UNIV. OF
TORONTO
LIBRARY

BINDING LIST JUN 1 1923.

DEPARTMENT OF METALLURGICAL ENGINEERING
Library Number: 8
Return this book to
Cupboard:
Shelf: N.
All books are to be signed for in the loan book when borrowed, and when returned.
Books must be returned within One Week, unless special permission is given for a longer loan.

BINDING LIST JUN 1 1923.

DEPARTMENT OF METALLURGICAL ENGINEERING
Library Number: 8
Return this book to
Cupboard:
Shelf: N.
All books are to be signed for in the loan book when borrowed, and when returned.
Books must be returned within One Week, unless special permission is given for a longer loan.

THE IRON AGE

LIBRARY
MAR 13 1923
UNIVERSITY OF TORONTO

VOL. CX

JULY—DECEMBER, 1922

182699.
23.7.23.

NEW YORK
IRON AGE PUBLISHING CO.
239 West 39th Street

T
I
I7
v.110

INDEX

Illustrated articles indicated by *

A

Accidents:
Causes and Prevention in Steel Industry, Sept. 14 p 699
Investigations, Value of, Aug 3 p 285
Massachusetts to Safeguard Power Press Tools, Oct 12 p 928
Safety Record in Worcester County Plants, Nov 2 p 1156

Acklin Stamping Co.:
Method of Stamping Draw-Bolt Tube*, Aug 17 p 401

Acme Machine Tool Co.:
Lathe, Universal Flat Turret*, Dec. 28 p 1681

Advertising Matter:
Prepaying Duties on, July 20 p 182

Air Compressors:
Ingersoll-Rand Small*, Oct 26 p 1075

Air Reduction Sales Co.:
Expansion, Aug 3 p 317

Air Tool:
Chicago Pneumatic Improved*, July 6 p 30

Alabama Co.:
Proposed Merger with Iron and Coal Interests, July 20 p 157

Alabama Power Co.:
Expenditure for Dams, Sept 7 p 630

Alford, L. P.:
Progress in Management, Nov 2 p 1158

Algoma Steel Corporation:
Activities, Aug 24 p 478

Allen, Edgar & Co., Ltd.:
Duplexing with Electric Furnaces, Dec 7 p 1502, (Editorial) p 1513

Alliance Machine Co.:
Contract for Coal Handling Plant, Dec 7 p 1493

Alloy & Forgeable Bronze Co.:
Casting Aluminum Bronze for French Coinage*, Sept 14 p 649

Alloys:
Aluminum-Copper, Light, Dec 28 p 1687
Aluminum Sand Castings, Inclusions, Aug 24 p 474
Apparatus for Determining Linear Shrinkage and Bottom Pouring, Oct 19 p 999
Chrome-Nickel, German Tests, Aug 17 p 406
Chromium Steel Cast Centrifugally*, Sept 14 p 655, (Editorial) p 666
Copper-Rich Aluminum, Oct 12 p 928
Molybdenum as an Element, Oct 5 p 864
Steel, Etching Reagents for Carbides in Dec 28 p 1683
Steel, Growth of Industry*, Sept 28 p 791 (Editorial), Oct 5 p 877
Uranium Steel Studies, Aug 24 p 474

Althoff, William:
World Trade in Machinery, July 6 p 28

Aluminum:
Alloy Sand Castings, Inclusions, Aug 24 p 474
Coating with, to Avoid Corrosion, Aug 3 p 276
Foil, Made in Germany, Aug 10 p 389
In Steel, Dec 14 p 1574
Overheating, Oct 19 p 990
Soldering, German Process, Aug 3 p 285

Aluminum Mfrs, Inc.:
Plants Leased, July 6 p 23

American Association for Labor Legislation:
Program of Meeting, Dec 14 p 1570

American Bolt Corporation:
Consolidation of Standard Bolt, Bayonne Nut & Bolt, Michigan Bolt & Nut and Boss Nut Companies, Dec 21 p 1630

American Bosch Magneto Co.:
Combining Operations for Economy*, Nov 30 p 1409
Gray & Davis Division Increased Production*, Nov 23 p 1335

American Brake Shoe & Foundry Co.:
Acquires Ramapo Iron Works, Sept 14 p 710

American Broach & Machine Co.:
Vertical Broaching Press*, Nov 9 p 1206

American Car & Foundry Co.:
Annual Report, July 20 p 198

American Chemic l Society:
Conference on Metric System, Sept 14 p 697

American Drop Forging Institute:
Convention Announcement, Aug 3 p 266
Convention Proceedings, Oct 12 p 937
Objects and Workings of Organization, Sept 21 p 719

American Electrochemical Society:
Convention Announcement, Aug 3 p 274
Convention Proceedings, Sept 28 p 799
Convention Program, Aug 24 p 480; Sept 7 p 587
New Headquarters, July 13 p 101
Officers, New York Section, Nov 23 p 1356
Spring Meeting Announcement and Program, Nov 16 p 1316

Symposium on Electric Industrial Heating, Sept 28 p 799

American Engineering Council:
Hearings on Two-Shift and Three-Shift Days, Sept 14 p 668
Three Shift Day at Steel Works, Bradley Stoughton's Report, Sept 14 pp 657, 689

American Engineering Standards Committee:
Chemical Analysis of Babbitt Metal, Dec 28 p 1728
Conference on Numbering of Steel, Nov 30 p 1464; Dec 14 p 1569
Personnel Changes, July 6 p 27

American Foundry & Mfg. Co.:
Tilting Bar Flexible Coupling*, Oct 5 p 872

American Gear Manufacturers' Association:
Convention Proceedings, Oct 19 p 993
Moves Headquarters to Cleveland, Sept 14 p 693
Spring Convention Announcement, Dec 21 p 1627

American Institute of Mining and Metallurgical Engineers:
Convention Announcement and Program, Aug 3 p 274

American Institute of Steel Construction:
Convention Proceedings, Nov 30 p 1445

American Iron and Steel Institute:
Convention Papers, Oct 5 p 896
Convention Proceedings*, Nov 2 p 1125
Data Sheet on Three-Shift Day, Aug 24 p 484
Leadership in Iron and Steel Production Literature (Editorial), Nov 9 p 1223
Pig Iron Production First Half 1922, Aug 17 p 428
Steel Ingot Production, June, July 13 p 72; July, Aug 10 p 384; August, Sept 14 p 652; September, Oct 12 p 949; October, Nov 16 p 1319; November, Dec 14 p 1573

American Iron, Steel and Heavy Hardware Association:
Semi-Annual Meeting, Nov 30 p 1470

American Kreuger & Toll Corporation:
Nitrol, Case Hardening Compound, Sept 28 p 806

American Locomotive Co.:
Semi-Annual Report, Aug 24 p 523

American Malleable Castings Association:
"Certified Malleable in Transportation and Industry," July 20 p 137
Enlarging Activities, Nov 16 p 1315
Meeting, Oct 19 p 996
Spring Meeting Announcement, Dec 7 p 1509

American Manganese Mfg. Co.:
In Receiver's Hands, Nov 30 p 1444; Dec 14 p 1562

American Mining Congress:
Convention Proceedings, Oct 19 p 996

American Multigraph Co.:
Employee Representation*, Oct 12 p 917

American Nickeloid Co.:
Nickelized Zinc in Ribbon Form, Oct 26 p 1071

American Railway Association:
Car Situation, Sept 14 p 696; Oct 19 p 1020; Dec 7 p 1504; Dec 14 p 1568; Dec 21 pp 1627, 1638; Dec 28 p 1682

American Rolling Mill Co.:
Additions to Ashland Works, Aug 10 p 338

American Sheet & Tin Plate Co.:
Proposed Lorain Works, Dec 28 p 1728

American Short Line Railroad Association:
Consolidated Purchasing Agency Economies, Dec 14 p 1577
Purchasing Agency to Move to Chicago, Nov 23 p 1361

American Smelting & Refining Co.:
By-Product Coke Plant for Mexico, July 6 p 29

American Society for Steel Treating:
Convention Proceedings, Oct 12 p 931
Convention Program, Aug 24 p 479
Exhibition*, Sept 28 p 795; Oct 12 p 938
Founds Henry Marion Howe Medal, Sept 7 p 596
New Honorary Member, Sept 7 p 628
Officers*, Aug 24 p 510; Oct 5 p 883
Symposium on Hardness Testing, Research and Metallurgical Education, Oct 12 p 935
Tablet to Commemorate First Production of Bessemer Steel, Sept 7 p 596

American Society for Testing Materials:
Committee Meetings, Sept 7 p 596

(*Am. Socy. Testing Matls., continued*)
Convention Proceedings*, July 6 p 13
Investigations of Committee on Steel, Nov 30 p 1470
Railroad Steel Castings Specifications*, Aug 3 pp 284, 321
Specifications for Semi-Steel Castings*, July 20 p 149
American Society of Mechanical Engineers:
Coming Meetings, Nov 9 p 1220
Convention Proceedings, Dec 7 p 1517
Convention Program, Oct 26 p 1090; Nov 30 p 1436
Local Sections to Discuss Management, Aug 31 p 536
New Haven Branch Exhibit of Machine Tools, Sept 28 p 811
American Statistical Society:
Business Cycle, Dec 21 p 1627
American Steel & Wire Co.:
Changes in Operating Officials, Oct 12 p 971
American Steel Co.:
Extras on Cotter Pins, Oct 19 p 1037
American Steel Foundries:
Prices of Steel Castings, Sept 28 p 814
Semi-Annual Report, Aug 24 p 523
American Trade Association Executives:
Convention Announcement, Aug 17 p 434
American Welding Society:
Convention Proceedings, Oct 12 p 929
Meeting of Metropolitan Section, Nov 16 p 1290
American Wire Fabrics Co.:
Acquired by Wickwire-Spencer Steel Corporation, Aug 31 p 554
Ames, B. C., Co.:
Universal Attachment for Dial Gage*, Aug 17 p 420
Anderson, H. N.:
Forming Gear Teeth by Hot Rolling*, Oct 5 p 861
Anderson, R. J.:
Light Aluminum Copper Castings, Dec 28 p 1687
Andrews, J. I.:
Testimony re Pittsburgh Basing, Nov 9 p 1230
Annealing:
Gray Cast Iron, Dec 7 p 1499
Ansaldo Steel Works:
Reorganized, Nov 23 p 1347
Arcade Mfg. Co.:
Molding Machine, Jolt Stripper*, July 20 p 138
Armament:
How Bethlehem Became Maker of, Nov 23 p 1339
Armstrong-Blum Mfg. Co.:
Motor-Driven Hacksaw*, Nov 16 p 1234
Armstrong Steel Co.:
To Build New Plant, Oct 5 p 903
Arrowood, Milton W.:
Furnace Maintenance with Pulverized Coal*, Dec 21 p 1633
Arrow Transportation Co.:
Reasons for Establishing Lower Freight Rates, Sept 14 p 696
Ashtabula Steel Co.:
Continuous Annealing Furnaces for Sheets*, Nov 23 pp 1342, 1362
Associated Industries of Massachusetts:
Activities and Policies, Sept 28 p 1689
Convention Proceedings, Oct 26 p 1066
Associated Metal Lath Manufacturers:
Consider Standardization, Nov 16 p 1282
Associated Motor Industries:
Automotive Merger, July 6 p 6
Association of Iron and Steel Electrical Engineers:
Convention Papers, July 20 p 138
Convention Proceedings, Sept 14 p 668; Sept 21 p 721
Philadelphia Section to Hold Exhibit, Oct 19 p 1045
Associations:
Liable for Acts in Massachusetts (Editorial) Nov 30 p 1439
Atlas Car & Mfg. Co.:
Electric Platform Truck*, July 27 p 204
Atlas Crucible Steel Co.:
Merged with Electric Alloy Steel Co., Aug 10 p 344; Sept 7 p 628
Atlas Steel Corporation:
Improvements, Nov 16 p 1289
Organized, Oct 5 p 903
Aupperle, J. A.:
Galvanized Coating*, Nov 16 p 1283
Australia:
Machinery Market, July 13 p 80
Steel Trade, Aug 10 p 389
Austria:
Industrial Conditions, Dec 14 p 1560
Automobile Chamber of Commerce:
(See National Automobile Chamber of Commerce)
Automobiles:
Copper Uses in Industry, Sept 7 p 630
Has Production Reached Peak? Nov 30 p 1411
Production, June, July 27 p 253; July, Aug 24 p 483; August, Sept 7 p 612; Eight Months 1922, Oct 12 p 960; September, Oct 26 p 1072, Nov 2 p 1182
Production Problems Discussed, Nov 2 p 1147
Standardized Steel Specifications of German Industry, Nov 9 p 1199
Steel Demand Less Seasonal (Editorial), Oct 26 p 1080
Steel Requirements, Nov 2 p 1136
Automotive Engineers:
(See Society of Automotive Engineers)
Automotive Industry:
Steel Requirements, Nov 2 p 1136
Automotive Merger:
Associated Motor Industries, July 6 p 6
Axles:
Inspection in Plant of Standard Parts Co.*, Oct 19 p 987

B

Babbitt Metal:
Chemical Analysis for, Dec 28 p 1728
Badger Tool Co.:
Automatic Grinders*, Dec 21 p 1639
Baird Machine Co.:
Chucking Machine, Six-Spindle*, Oct 19 p 998
Baker R & L Co.:
Electric Truck and Portable Elevator*, Dec 7 p 1489
Ball Bearings:
Anti-Friction in Steel Mill*, Aug 3 p 267; Aug 10 p 354; Aug 17 p 423
Standard Machinery, Large*, Sept 21 p 720
U. S. Double Row Radial*, Dec 21 p 1630
Ballard, W. E.:
Manufacture of Brass Tubes, Dec 7 p 1515
Ballay and Galibourg:
Methods for Locally Preventing Case Hardening, July 20 p 136
Bario Metals Corporation:
Ryan Furnaces for Melting*, Dec 7 p 1507
Barr, William H.:
Trade Unions, What Value, if any, to the Public? Nov 23 p 1374
Barrows, W. A., Third:
Foreign Pig Iron Analysis, Dec 21 p 1631
Bars:
Steel, Imports Under New Tariff, Nov 16 p 1290
Barton, Larry L.:
Alloy Castings from Electric Furnaces*, Sept 21 p 784
Basing Point, Pittsburgh:
Attorney-Generals of Two States Oppose, July 20 p 131
Explained by E. J. Buffington, Dec 14 p 1559
Hearings, July 6 p 21; July 13 p 86; Nov 9 p 1228; Nov 16 p 1287; Nov 23 pp 1366, 1375
Steel Mergers and, July 13 p 85
Testimony of Elbert H. Gary, Nov 9 p 1228
Western Consumers Send Statement to Trade Commission, Aug 3 p 292
Basset Process:
Progress, Aug 17 p 419; Sept 7 p 596; Oct 12 p 974
Baush Machine Tool Co.:
Multiple Drilling Machine*, Nov 2 p 1146
Bayonne Steel Casting Co.:
To Be Taken Over by Eastern Steel Castings, Dec 7 p 1501
Beach, B. S.:
Electric Strip Mill Drive, Oct 5 p 858
Beard, L. O., Tool Co.:
Inside Micrometer for Gaging Cylinders*, Nov 16 p 1282
Bearings:
Anti-Friction, in Steel Mill*, Aug 3 p 267; Aug 10 p 354; Aug 17 p 423
Hoffman, to be Made by Norma Co. of America, Oct 26 p 1107
U. S. Ball Double Row Radial*, Dec 21 p 1630
Beaudry & Co., Inc.:
Hammer Die for Drawing Tapers*, Dec 21 p 1630
Becker, Joseph:
Koppers New Combination By-Product Coke Oven*, Nov 16 p 1275
Belgium:
Iron and Steel Market and Prices, Oct 19 p 1022; Nov 16 p 1285; Dec 14 p 1590
Machine Tool Market, July 13 p 80
Rolling Stock Award Recommended, July 13 p 81
Belting:
Leather, Sales, Aug 3 p 278; Oct 12 p 926; Nov 2 p 1158
Bender, George:
Lathe for Turning Commutators, Sept 28 p 804
Bensinger, C., Co.:
Iron and Steel Code, Nov 2 p 1161
Best Co.:
Taken Over by Kelly & Jones Co., Dec 21 p 1663
Bethlehem-Lackawanna Consolidation:
Personnel Changes, Sept 21 p 751; Sept 28 p 840*; Oct 5 p 874*
Bethlehem Shipbuilding Corporation, Ltd.:
Purchases Simpson's Patent Dry Dock Co., Nov 9 p 1210
Shopmen Disagree in Fore River Works, Nov 23 p 1349
Bethlehem Steel Corporation:
Acquires Midvale Steel & Ordnance Co., Nov 30 p 1443
Contracts with Swedish Firm to Carry Ore, Oct 5 p 896
How It Became Armament Maker, Nov 23 p 1339
Improvements at Lackawanna Plant, Oct 26 p 1110; Nov 23 p 1362
Plans of Merger with Lackawanna Steel Co., Aug 24 p 473; Oct 12 p 968
Quarterly Statement, Nov 2 p 1185
Bethlehem Steel Export Corporation:
Officers, Nov 30 p 1442
Organized, Sept 28 p 813
Biggert, F. C., Jr.:
Imperfect Management, July 27 p 205
Machinery Outlook, Aug 17 p 415

Blacker Engineering Co.:
Blacksmith Hammer*, Nov 9 p 1206
Blackwood Electric Steel Corporation:
Organized, Nov 30 p 1433
Blindness:
Decrease in, Oct 19 p 1040
Blount, J. G., Co.:
Combination Grinding and Buffing Machine*, Oct 26 p 1070
Blow-Torch Process:
Consolidation of McKune, Danforth and Egler Systems, Aug 10 p 382; Dec 14 p 1582
Bock Bearing Co.:
Manufacture of Special Equipment*, Apr 20 p 1057
Boilers:
Code, Progress in Adoption of A. S. M. E., Oct 19 p 1014
Jacobs Safety Hand Hole Plate for*, Aug 17 p 415
Book Reviews:
American Fuels, Dec 28 p 1723
Applied Motion Study, Dec 7 p 1506
Bureau of Mines, Dec 28 p 1723
Clay Products Cyclopedia, Dec 28 p 1723
Federal Administration and the Alien, Sept 14 p 698
Foundrymen's Handbook, July 6 p 35
Galvanizing and Tinning, Dec 28 p 1723
Gantt Chart, Dec 7 p 1505
Handbook on Controllers for Electric Motors, July 6 p 35
Health and Efficiency, Oct 26 p 1111
Hütte-Taschenbuch für Eisenhüttenleute, Dec 7 p 1505
Industrial Unionism in America, Sept 14 p 698
Labor Injunction — Exposition of Government by Judicial Conscience and Its Menace, Nov 23 p 1368
Official Report of Ninth National Foreign Trade Convention, Aug 3 p 333
Peril of the Republic, Sept 14 p 698
Science and Common Sense in Working with Men, Dec 7 p 1505
Wave Transmission, Oct 12 p 976
Welding Encyclopedia, Dec 7 p 1505
Books Received:
Aug 3 p 333; Aug 31 p 583; Oct 12 p 976; Nov 23 p 1368; Dec 7 p 1506; Dec 28 p 1716
Bope, Col. H. P.:
Testimony re Pittsburgh Basing, Nov 16 p 1287
Borgeson Tool & Machine Co.:
Multi-Production Lubricator Attachment*, Nov 30 p 1424
Boring Head:
Bruce Precision Eccentric*, Dec 14 p 1570
Boring Machines:
Bullard Coupling*, Nov 23 p 1365
Manufacturers' Cylinder*, Dec 7 p 1503
Bounties:
Steel, Aid Japanese Merchant Marine, Sept 28 p 813
Box, Alfred, & Co., Inc.:
Electric Hoist*, Nov 2 p 1141
Brake:
Cincinnati Heavy Forming*, Sept 14 p 656
Brake and Clutch:
Whiting, for Tumbling Mills*, Sept 14 p 650
Brass:
Consumption in Building Industry, Oct 12 p 930
Rolling Mill, Saving Worn*, Aug 3 p 268
Sterling Casting and Machining Plant*, Nov 2 p 1144
Brass Manufacturers:
(See National Association of Brass Manufacturers)
Brazil:
Imports of American Iron and Steel, Sept 7 p 595
Brick:
From Slag, Tests of, July 6 p 25
Bridges:
American Low Bidder for Uruguay, Sept 14 p 685
Chicago, Wrought Iron from, Sept 28 p 803
Design and Standardization, Oct 19 p 1004
Towers for Philadelphia, Oct 5 p 868
Brier Hill Steel Co.:
Egler Open-Hearth Process, Results*, July 20 p 147 (Editorial), Sept 7 p 611
Extensions, Oct 5 p 873; Oct 12 p 971; Oct 19 p 1045
Merger with Youngstown Sheet & Tube, Sept 28 p 827; Abandoned, Oct 5 p 873; Finally Consummated, Dec 21 p 1658; Dec 28 p 1701
Record Production, Nov 9 p 1249
To Build Strip Mill, Dec 21 p 1645
To Rebuild Thomas Plant, Sept 21 p 751
Briquettes:
Brown Coal, for Producer Gas, Nov 2 p 1176
Flue Dust, by Corrosion, Nov 9 p 1205; Dec 14 p 1571*
British Empire Steel Corporation:
Activities, Nov 16 p 1317
Additions, July 6 p 57; July 20 p 142
Rail Order from Canadian Railroad, Nov 16 p 1317
Reorganization, Oct 26 p 1120
Broaching Machine:
Oilgear High Speed*, Aug 31 p 542
Broden & Dailey Construction Co.:
Wire Galvanizing Equipment*, Dec 14 p 1563
Broken Hill Proprietary Co.:
Business Situation, Aug 10 p 389
Bronze:
Aluminum, Casting for French Coinage*, Sept 14 p 649
Brooks, Russell M.:
United States Principal Importer of Cleveland Iron, Aug 10 p 390
Brown & Sharpe Mfg. Co.:
Ground-Form Gear Cutters*, Oct 5 p 872
Brown, George C.:
Steam for Cooling Sheet Rolls*, Aug 3 p 279
Brown Hoisting Machinery Co.:
Unusual Crane for Rotterdam*, Dec 7 p 1491
Buckets:
Hayward Orange Peel, for Foundries*, July 13 p 81
Buckeye Listing Co.:
Directory of Ohio Metal-Working Industries, Aug 24 p 510
Buell, W. C., Jr.:
Oil Burning Using Cold Air, Aug 3 p 269
Buffing Machines:
Blount Combination Grinding and*, Oct 26 p 1070
Buffington, E. J.:
Explains Pittsburgh Base, Dec 14 p 1559
Building:
British Costs (Editorial), Oct 26 p 1082
Contracts, June and First Half 1922, July 20 p 188; July, Aug 17 p 420; August, Sept 14 p 650; September, Nov 9 p 1237
Steel in Dwelling Houses* (Editorial), Aug 3 p 291; Aug 24 p 469*
Bullard Machine Tool Co.:
Coupling Boring Machine*, Nov 23 p 1365
Bundy Tubing Co.:
Organized, Nov 16 p 1319
Bureau of Foreign and Domestic Commerce:
Annual Report of Industrial Machinery Division, Dec 21 p 1629; Iron and Steel Division p 1638
Mineral Section Added*, July 6 p 19
Walter L. Miller Chief of Foreign Division, Oct 26 p 1070
Bureau of Mines:
Aluminum Alloy Sand Castings, Inclusions, Aug 24 p 474
Coal Dust Ignition by Electric Arcs, July 27 p 215
Desulphurizing of Coke, July 27 p 205
Drill Steel Report, Aug 17 p 420; Oct 19 p 1046
Emergency Fuel, Aug 31 p 538
Graphite Crucible Investigation, Dec 28 p 1728
Metal Corrosion Studies, Aug 10 p 352
Reducing Hematite to Magnetite with Methane, Oct 5 p 868
Sound Detector Experiments, July 27 p 251
Uranium and Other Alloy Steel Studies, Aug 24 p 474
Bureau of Standards:
Compression Tests of Forging Steel, July 20 p 152
Molding Sand Investigations, Nov 23 p 1346
Nitrogen in Steel, Dec 28 p 1680
Sample Metals with Certified Gas Content, Dec 28 p 1685
Specifications for Safes, Nov 23 p 1362
Studying Steel for Gages, July 27 p 217
Tin-Base Bearing Metal, New Sample, Aug 24 p 477
Burns, Timothy M.:
General Manager Lackawanna Plants, Sept 21 p 751; Sept 28 p 840*
Bushings:
Union Self-Lubricating*, July 20 p 142
Business:
After Two Wars (Editorial), July 6 p 33
Basic Conditions*, Oct 5 p 855; July 13 p 69*
Commercial Conditions, Sept 21 p 736
Cycles, Characteristics and Limitations, Dec 21 p 1627
Cycles, Study Recommended, July 13 p 90
Enterprise, Country as a (Editorial), Nov 9 p 1224
Flattening the Curve (Editorial), Dec. 28 p 1698
Forecasts, Oct 26 p 1083
Greater Adaptability of (Editorial), Sept 14 p 665
Memories (Editorials), July 6 p 34
Business Paper Editors:
(See National Conference of Business Paper Editors)
Butler, Joseph G., Jr.:
At Home, Aug 17 p 453
Buying:
Economies of Consolidated Purchasing Agency, Dec 14 p 1577
Peculiarities of Buyers, Nov 30 p 1420
Speed of the Dollar, Dec 7 p 1489
Utilizing the Seller, Aug 3 p 322

C

Calcium Silicide:
Deoxidizer of Liquid Steel, Sept 28 p 806
Calculator:
Pittsburgh 'Lectromelt for Alloy Additions*, Nov 16 p 1284
Caliper:
Horstmann Swivel Head Indicating*, Aug 3 p 288
Starrett Micrometer, Aug 17 p 415

Cambria Steel Co.:
Objects to Rates on Rails and Cross Ties, Oct 12 p 972
Cammen, L.:
Casting Steel Ingots Centrifugally*, Dec 7 p 1494
Chromium Alloy Steel Cast Centrifugally*, Sept 14 p 655
Campbell, A. C., Inc.:
Nibbling Machine*, Oct 26 p 1076
Campbell, H. H.:
An Appreciation, Sept 28 p 841
Canada:
Algoma Steel Corporation Activities, Aug 24 p 478
Appeals for Help in Developing Ore Resources, July 13 p 79
British Empire Steel Corporation Additions, July 6 p 57; July 20 p 142; Reorganization, Oct 26 p 1120
Coast Range Steel Co. Plans, Aug 10 p 389; Aug 24 p 478
Grand Trunk Rail Order, Oct 26 p 1070
Iron and Steel Industry, 1922 (Editorial), Sept 28 p 819
Iron and Steel Production, June, July 27 p 228; July, Aug 31 p 539; September, Nov 16 p 1317
Trade with United States, Fiscal Year 1922, Oct 5 p 867
Canterbury, Gilbert:
For Greater Use of Steel in Dwellings*, Aug 24 p 469
Steel Lumber Developed for Building*, Sept 14 p 645
Canton Pneumatic Tool Co.:
Regulators for Foundry Air Squeezers*, Aug 10 p 351
Carden, Capt. Godfrey L.:
Borsig Locomotive Works, Dec 21 p 1623
Polish Machinery Industry*, Dec 7 p 1483
Carling Tool & Machine Co.:
Sine Plate for Compound Angle Work*, Sept 14 p 693
Carnegie Institute of Technology:
Clay Pipe as Substitute for Cast Iron, July 6 p 6
Metallurgical Courses, July 20 p 131
Carnegie Steel Co.:
Clairton By-Products Coke Addition, Aug 31 p 547
Steel Shipment via Inland Waterway, Dec 21 p 1645
Carpenter Steel Co.:
Merger with Penn Seaboard Steel Broken Off, Aug 17 p 412; Dec 14 p 1587
Cars:
Defense for Privately Owned, Nov 23 p 1367
European Type Sold to Poland, Oct 12 p 922
Freight, Strike Effect, Aug 10 p 360
Low Prices, Aug 3 p 283
Interstate Commerce Commission Modifies Order, Sept 21 p 741
Ore, Railroad Charge for Placement Held Reasonable, Sept 21 p 753
Situation, Sept 14 p 696; Sept 28 p 841; Oct 19 p 1020; Dec 7 p 1504; Dec 14 p 1568; Dec 21 pp 1627, 1638; Dec 28 p 1682
Carter, G. O.:
Gas Welding Applications, Nov 16 p 1299
Caruthers, Merle W.:
Layout for Electric Tool Steel Plant*, Nov 23 p 1363
Carwheels:
Chilled Cast Iron, Nov 30 p 1419
Case Hardening:
Methods for Locally Preventing, July 20 p 136
Nitrol, Compound for, Sept 28 p 806
Problems in Localized, Aug 3 p 265
Cast Iron:
Annealing, Dec 7 p 1499
Growth of Gray, Aug 10 p 390
Synthetic on the Pacific Coast, Oct 26 p 1076
Tensile Tests at Various Temperatures*, Sept 28 p 793
Thermit Welds, Lower Temperature in Preheating, Oct 5 p 869
Welding, Oct 12 p 929
Castings:
Alloy, from Electric Furnaces*, Sept 28 p 784
Aluminum Alloy Sand, Inclusions, Aug 24 p 474
Aluminum Bronze, for French Coinage*, Sept 14 p 649
Aluminum-Copper, Light, Dec 28 p 1687
Centrifugal, Chromium Alloy Steel*, Sept 14 p 655, (Editorial) p 666
Crystallization of Galvanized Malleable, Oct 26 p 1070
Electric Steel, Increase in (Editorial), July 13 p 93
For Mill Journals*, July 27 p 222
Iron, by Centrifugal Process*, Aug 31 p 529; (Editorial), Sept 14 p 666
Malleable, Booklet of American Malleable Castings Association, July 20 p 137
Railroad Steel, Specifications*, Aug 3 pp 284, 321
Semi-Steel or High-Test (Editorial), Aug 10 p 363
Semi-Steel, Specifications*, July 20 p 149
Steel, Prices, Sept 28 p 814
Cement:
Freight Rates, Dec 14 p 1579
New Plants in Alabama, Sept 7 p 630
Portland, Production, Eight Months 1922, Sept 21 p 764; September, Oct 19 p 1041; October, Nov 23 p 1349; November, Dec 21 p 1630
Production and Shipments Compared with Steel (Editorial), July 20 p 163
Use of Steel in Industry, Aug 10 p 347
Centering and Facing Machine:
Goodman Double End*, Dec 7 p 1486
Centering Machine:
Pratt & Whitney Automatic*, Nov 2 p 1143
Pratt & Whitney Duplex Hand*, Nov 16 p 1280
Centers:
Snellex, for Lathes and Grinders*, July 6 p 26
Central Iron & Steel Co.:
Making Steel Without Pig Iron, Sept 7 p 585
Central Steel Co.:
Metal Lumber from Hot Rolled Strip Steel*, Sept 14 p 645
Centrifugal Process:
Chromium Alloy Steel*, Sept 14 p 655, (Editorial) p 666
Growth (Editorial), Dec 21 pp 1642 1643
Iron Castings by*, Aug 31 p 529; (Editorial) Sept 14 p 666
Steel Ingots*, Dec 7 p 1494
Chamber of Commerce of the United States:
Favors Ship Subsidy, Dec 14 p 1560
Foreign Commerce Handbook, Oct 12 p 942
Southern Tour, Nov 23 p 1355
To Help Statistical Bureaus, Aug 17 p 434
Uniform Cost Accounting, July 6 p 22
Chandler, Henry:
Steel Requirements of Automotive Industry, Nov 2 p 1136
Chandler, W. P., Jr.:
Heating Furnaces for Blooms, Slabs and Billets*, Nov 9 p 1211
Charcoal Iron Products Co.:
To Make Knobbled Charcoal Iron Sheets, Sept 7 p 595
Charts:
Refractories Manufacturers' Association*, Sept 7 p 601
Chase Companies, Inc.:
Why Wages Were Raised, Nov 23 p 1341
Chemical Exposition:
Announcement, Aug 10 p 353
Chemicals:
Industrial, Oct 19 p 1002
Chicago Building Trades:
Landis Decision Upheld, July 27 p 253
Chicago Pneumatic Tool Co.:
Boyer Rivet Cutter*, Dec 21 p 1640
Improved Air Tool*, July 6 p 30
Little Giant Air Drill with New Features*, July 6 p 26
Child, Allen P.:
Ziz-Zag Oil Groove Planing Attachment*, July 20 p 158
China:
Iron and Steel Industry, Aug 17 p 414; Nov 2 p 1160; Nov 16 p 1295
Tayeh Blast Furnace*, Aug 17 p 416
Trade Act, Regulations for Carrying Out, Nov 2 p 1155
Chromium:
Electroplating (Editorial), Nov 9 p 1222
Key Place of (Editorial), Aug 17 p 431
Chucking Machine:
Baird Six-Spindle*, Oct 19 p 998
Chucks:
Landau Plain and Back Geared Tapping*, July 6 p 23
McCrosky Quick Change Drill*, Nov 2 p 1142
Rockford Spring, for Holding Small Rods*, Nov 16 p 1284
Church, Col. Samuel H.:
Authority in a Democracy, Nov 30 p 1416
Cincinnati Lathe & Tool Co.:
Geared Head Engine Lathe*, Aug 31 p 540
Cincinnati Planer Co.:
Planer, New Open Side*, Dec 28 p 1683
Cincinnati Shaper Co.:
Heavy Forming Brake*, Sept 14 p 656
Clark University:
Courses in Industrial Geography, Nov 23 p 1377
Clarkson, S. N.:
Standardization of Pulley Sizes, July 6 p 35
Cleaning Device:
For Old Machinery*, Dec 7 p 1514
Clements, Fred:
British Siemens Furnace Practice*, July 13 p 75
Cleveland Automatic Machine Co.:
Staybolt Threading Machine*, Aug 31 p 527
Cleveland Crane & Engineering Co.:
Device for Handling Coils of Rods*, Nov. 16 p 1282
Tramrail Cranes in Use at Wire Mill*, Nov 9 p 1218
Clock Dial:
For Business Control, Dec 7 p 1503
Clutch:
Universal Giant, for Heavy Work*, Sept 7 p 593
Clutch and Brake:
Whiting, for Tumbling Mills*, Sept 14 p 650
Coal:
British Miners' Reaction to Supplying America, Aug 24 p 483
British, Suggestions to American Buyers, Sept 14 p 667
British, to New York Port, Sept 28 p 813
Consolidation of Companies, Sept 14 p 696
Distribution Committee, Aug 10 p 358

Distribution of National Income and (Editorial), Oct 19 p 1016
Distribution Plans, Aug 3 p 297; Aug 10 p 358
Distribution Problems, Aug 17 p 425
Dust, Ignition by Electric Arcs, July 27 p 215
Fact Finding Commission Beginning Its Labors, Oct 19 p 1045; Policy Dec 14 p 1611
Free Competition the Remedy in Industry, Aug 17 p 412
Ingersoll-Rand Machine for Grading Pile*, Aug 31 p 528
Legislation Enacted on Industry, Sept 14 p 659
Powdered, Facts About, Dec 28 p 1722
Powdered, Furnace Maintenance with*, Dec 21 p 1633
Powdered, Handled with Compressed Air, Oct 5 p 868
Prepare for April 1 (Editorial), Sept 7 p 610
Prices in Alabama, Sept 7 p 630
Prices, Voluntary Agreement Proposed, Aug 10 p 358
Priority List, July 27 p 223; Aug 10 p 357, 360
Priority Order, Contractors Protest, Aug 10 p 357; Aug 31 p 546
Public Concern in (Editorial), Aug 17 p 431
Regional Requirements, Aug 17 p 427
State Fuel Distributors, Aug 3 p 299
Steel Industry and, Nov 9 p 1217
Stocks and Prices (Editorial), Aug 10 p 363
Strike a Decision for War (Editorial), July 20 p 160
Strike, Cleveland Agreement, Aug 24 p 481; Aug 31 p 547
Strike, Government Policy, Aug 31 p 553
Strike, President Orders Mines Opened, July 20 p 167
Strike, President's Plan to Open Mines (Editorial), July 13 p 92
Strike, Shall Autocracy Succeed? (Editorial), Aug 3 p 290
Strike Situation, July 6 pp 19, 58; July 13 pp 95, 117; July 20 p 164; July 27 p 224; Aug 3 p 298; Aug 10 p 357; Aug 17 p 426; Aug 24 p 481; Aug 31 p 545; Sept 7 p 604
Transportation and (Editorial), Dec 21 p 1643
William H. Woodin New York State Fuel Administrator*, Sept 14 p 686

Coast Range Steel Co.:
Plans, Aug 10 p 389; Aug 24 p 478

Code:
Bensinger New Iron and Steel, Nov 2 p 1161
Boiler, Progress in Adoption of A. S. M. E., Oct 19 p 1014

Coffin, Charles A., Foundation:
Organized, Dec 7 p 1490
To Award Prizes, Dec 7 p 1518

Coke:
Beehive and By-Product Production, 1921, Dec 14 p 1579
Combustibility and Hardness of*, Sept 14 p 695
Combustibility in Blast Furnace, Oct 19 p 990
Desulphurizing, July 27 p 205
Oven, Koppers New Combination By-Product*, Nov 16 p 1275
Production Notes, Aug 10 p 359, August, Sept 14 p 660; September, Oct 19 p 1020; October, Nov 16 p 1274; November, Nov 23 p 1362; Dec 7 p 1510; Dec 14 p 1579

Colorado Fuel & Iron Co.:
Awarded Reparation on Switching Charges, Oct 12 p 964
Coal Miners Work Throughout Strike Period, Oct 5 p 903
Operations, Aug 3 p 287
Quarterly Statement, July 27 p 249; Dec 7 p 1502

Columbia Steel Co.:
Acquires Utah Coal & Coke Co., July 6 p 11
To Sell Plant, Nov 2 p 1142

Columbia Steel Corporation:
Consolidation of Columbia Steel and Utah Coal & Coke Companies, Dec 21 p 1645

Columbus-McKinnon Chain Co.:
Controlling Interest Acquired by Charles M. Wambaugh and Associates, Oct 19 p 1000

Colven, James M.:
Threading Dial for Lathes*, July 6 p 30

Compensation:
Workmen's, from Physician's Viewpoint, Aug 17 p 433

Compressed Air:
In Industry, Motion Pictures of, Oct 26 p 1071

Condenser:
Ingersoll-Rand, with Separate Cooler*, July 6 p 22

Cone, Edwin F.:
American Alloy Steel Industry Growth*, Sept 28 p 791
Electric Steel Production of the World, Sept 14 p 653
Steel Making Without Pig Iron, Sept 7 p 585

Conference on Unemployment:
Recommendations as to Periods of Depression, Aug 31 p 526

Connecticut Electric Steel Co., Inc.:
To Make Test Runs on Synthetic Pig Iron, Nov 9 p 1226

Connecticut Dynamo & Motor Co.:
Polishing and Buffing Lathe*, Dec 7 p 1510

Consolidated Machine Tool Corporation of America:
Colburn Gang Drills*, Nov 30 p 1433
Elects Officers and Takes Over Five Plants, July 27 p 202

Consolidated Steel & Iron Co.:
Merger of Hoosier Rolling Mill and Missouri Iron & Steel Companies, Dec 21 p 1637

Consolidated Steel Corporation:
To be Reorganized, Sept 21 p 751

Consolidated Tool Works, Inc.:
Hack Saw Frame with New Handle*, Oct 12 p 928

Consolidations:
Alabama Iron and Coal Properties Proposed, July 20 p 157
Bethlehem and Midvale Companies, Nov 30 p 1443
Coal Companies, Sept 14 p 696
Government Decisions on Steel Companies (Editorial), July 27 p 226
Inland Steel and Steel & Tube Co. of America Planned, Dec 14 p 1580
McKune, Danforth and Egler Blow Torch Systems, Aug 10 p 382; Dec 14 p 1582
Mackintosh-Hemphill Garrison Foundry, Pittsburgh Iron & Steel, Woodward Machine Companies*, Aug 3 p 272
Midvale-Republic-Inland Abandoned, Oct 5 p 873
Midvale-Republic-Inland, Federal Trade Commission Dismisses Complaint, Oct 12 p 974
Midvale-Republic-Inland, Federal Trade Commission Objects to, Sept 7 p 597
Nut and Bolt Companies, Dec 21 p 1630
Pacific Coast Steel and Coke Merger, July 6 p 11
Pittsburgh Plus and Steel Companies, July 13 p 85
Steel Companies Answer Questionnaires, July 6 p 6
Steel Companies, Report of Department of Justice, July 27 p 207, 246a
Wire Goods Makers, Aug 24 p 484
Youngstown Sheet & Tube and Brier Hill Proposed, Sept 28 p 827; Abandoned, Oct 5 p 873; Finally Consummated, Dec 21 p 1658; Dec 28 p 1701

Constitution:
United States, Reprinted, Dec 28 p 1722

Consumers Ice & Cold Storage Co.:
Resourceful Engine Repair Job*, July 13 p 78

Containers:
Food, Simplification of, Dec 14 p 1578
Metal, for Exporting Bolts and Nuts, Aug 31 p 534

Conventions:
American Chemical Society, Sept 14 p 697
American Drop Forging Institute, Oct 12 p 937
American Electrochemical Society, Sept 28 p 799
American Gear Manufacturers' Association, Oct 19 p 993
American Institute of Steel Construction, Nov 30 p 1445
American Iron and Steel Institute*, Nov 2 p 1125
American Mining Congress, Oct 19 p 996
American Society for Steel Treating, Oct 12 p 931
American Society for Testing Materials*, July 6 p 13
American Society of Mechanical Engineers, Dec 7 p 1517
American Welding Society, Oct 12 p 929
Associated Industries of Massachusetts, Oct 26 p 1066
Association of Iron and Steel Electrical Engineers, Sept 14 p 668; Sept 21 p 721
Institute of Metals (British), Oct 5 p 865
Iron and Steel Institute (British), Sept 21 pp 732, 760
Lake Superior Mining Institute, Aug 31 p 536
National Association of Farm Equipment Manufacturers, Oct 26 p 1067
National Founders' Association, Nov 23 p 1374; Nov 30 p 1413*
National Machine Tool Builders' Association*, Oct 12 p 923
National Metal Trades Association, Branch Secretaries, Aug 24 p 480
National Personnel Association, Nov 16 p 1315
National Safety Congress, Sept 7 p 613
National Supply and Machinery Dealers' Association, Machine Tool Section, Nov 30 p 1447
New York State Industrial Conference, Nov 23 p 1356; Nov 30 p 1471
Society of Automotive Engineers, Nov 2 p 1147
Society of Industrial Engineers, Oct 26 p 1086
Taylor Society, Nov 30 p 1431

Cook, Asa S., Co.:
Machine for Shaving Bolts and Screws*, Oct 19 p 1000

Cook, F. J.:
American Foundry Practice Compared with British, Nov 16 p 1280

Co-operation:
Steel User and Steel Maker, Aug 10 pp 347, 388

Cope, H. W.:
Electrical Development in Steel Industry, Dec 28 p 1729

Copper:
Aluminum Alloys, Oct 12 p 928
Consumption in Building Industry, Oct 12 p 930
Exports (Editorial), Aug 31 p 551
Increase in Use, Dec 14 p 1580
Japanese Demand, Sept 21 p 753; Nov 2 p 1160
Shipments, Three Months, Sept 21 p 755
Shortage and Fuel Situation, Aug 24 p 482
Uses in Automotive Industry, Sept 7 p 630

Copper and Brass Research Association:
Annual Meeting, Dec 14 p 1580
Copper and Brass in Building Industry, Oct 12 p 930

Core Box:
De Ved, for Making Sash Weight Cores*, Aug 10 p 344

Corporations:
State, Powers of Congress Over, Oct 6 p 869

Corrosion:
Flue Dust Briquetting by*, Dec 14 p 1571
Metal, Bureau of Mines to Study, Aug 10 p 352
Protection by Aluminum, Aug 3 p 276
Steel Pipe, Research, Dec 14 p 1578

Cost Accountants:
(See National Association of Cost Accountants)

Costs:
Accounting, Uniform Methods Adopted, July 6 p 22
British Building (Editorial), Oct 26 p 1082
British Labor Lower (Editorial), Dec 14 p 1586
High, and Steel Exports (Editorial), Oct 19 p 1016
High, Factor in Scrap Trade, Nov 30 p 1430
Electric Steel Melting, Aug 31 p 525
Living, June, Aug 3 p 287; July, Aug 24 p 509; August, Sept 28 p 803; September, Nov 2 p 1141; October, Nov 23 p 1374; November, Dec 28 p 1718
Pig Iron, Lowered by Freight Cuts, July 13 p 82
Strikes in Pennsylvania Aug 31 p 542

Cotter Pins:
Extras, Oct 19 p 1037

Couplings:
American Tilting Bar Flexible*, Oct 5 p 872
Robinson Automatic Air Hose*, Nov 23 p 1350
Steel-Flex, for Light Duty*, Sept 14 p 693

Cranes:
Brown Hoisting, for Rotterdam*, Dec 7 p 1491
Industrial 200-Ton for Virginian Railway*, Nov 23 p 1346
Link-Belt Crawler*, July 20 p 152
Shovel Combination, Orton & Steinbrenner*, Oct 5 p 869
Tramrail in Use at Wire Mill*, Nov 9 p 1218

Creditors' Committee Salvage:
(Editorial), Nov 16 p 1294

Crescent Dishwashing Machine Co.:
Machine for Washing Metal Parts*, Dec 28 p 1685

Cromwell Steel Co.:
Plant Sold to W. L. Gerrity, Nov 30 p 1441

Crucible Steel Co. of America:
Annual Report, Nov 16 p 1274
Ordnance Plant to Be Converted into Repair Shop, Sept 28 p 821

Cruiser Brooklyn:
Cutting into Scrap, July 6 p 9

Crushing Machine:
Coal, Pennsylvania Single Roll*, Nov 2 p 1140

Cupolas:
Liner Rings as Substitute for Brick, Nov 16 p 1279
Schuermann Construction Developments*, Oct 19 p 991; Editorial, Oct 26 p 1082
Shepard Hoist for Charging*, July 20 p 134
Steel Scrap in Iron Mixtures*, Aug 10 p 337 (Editorial), p 363

Curtis & Curtis Co.:
Pipe Threading Machines*, Aug 24 p 468

Cutler-Hammer Mfg. Co.:
Switches for Electric Tool Handles*, Aug 3 p 266

Cutler Steel Co.:
To Make Duraloy, Dec 14 p 1567

Cutters:
Brown & Sharpe Ground-Form Gear*, Oct 5 p 872
Chicago Pneumatic Rivet*, Dec 21 p 1640
Morris Interchangeable Tool Holders and*, Sept 7 p 595

Cutting Machine:
Electric Arc for Rivets*, Aug 31 p 528

Cutting-Off Machine:
Modern Machine Tool Co.'s Improved*, Nov 23 p 1348

Czecho-Slovakia:
Iron and Steel Industry, Aug 3 p 293; Dec 7 p 1516

D

D'Arcambal, A. H.:
High Speed Steel, Physical Tests*, July 6 p 1

Davenport Machine Tool Co.:
Spiral Bevel Gear Testing Machine*, Nov 2 p 1140

Davey, A. T.:
American Factory Methods Superior to British, Oct 19 p 999

Department of Commerce:
Automobile Production, June, July 27 p 253; September, Oct 26 p 1072; Nov 2 p 1182; October, Nov 30 p 1420
Business Conditions, July 13 p 79; Aug 31 p 548; Sept 14 p 650; Sept 28 p 790; Oct 12 p 949; Nov 16 p 1289; Nov 30 p 1418; Dec 14 p 1578
Cast Iron Pipe Manufacture in 1921, Oct 26 p 1071
Clock Dial for Business Control, Dec 7 p 1503
Distribution of Iron and Steel Exports, Aug 24 p 467
Exports of Gas Engines, October, Dec 28 p 1687
Exports of Railroad Material and Structural Steel, Dec 28 p 1682
Fabricated Steel Sales, June, July 20 p 181; July, Aug 24 p 470; August, Sept 21 p 756; September, Oct 19 p 1392; October, Nov 23 p 1392; November, Dec 21 p 1659
Iron Ore Imports Eight Months 1922, Oct 12 p 922
Motion Pictures of Steel Making, Aug 3 p 274
New Commodity Divisions, July 6 p 28
Prepaying Duties on Advertising Matter, July 20 p 182

DeLavaud Process:
Centrifugal Process in Motion Pictures, Dec 14 p 1570

Dennison, M. R.:
Handling Material in Studebaker Plant*, Nov 16 p 1269

Deoxidizer:
Calcium Silicide, of Liquid Steel, Sept 28 p 806

Deschamps, Jules:
Gas-Making Process, Nov 16 p 1285

Detroit:
Labor Situation*, Aug 10 p 349

Detroit Electric Furnace Co.:
Installations, Dec 7 p 1507

Detroit Seamless Steel Tubes Co.:
Tube Prices, Aug 24 p 472

Detroit Stoker Co.:
Buys Plant at Monroe, Mich., Oct 19 p 1000

De Ved Brothers, Inc.:
Core Box for Making Sash Weight Cores*, Aug 10 p 344

Dial:
Colvin Threading, for Lathes*, July 6 p 30

Dial Feeds:
S & S Machine for Punch Presses*, Dec 28 p 1686

Diamond Machine Co.:
Pulley Grinding Machine*, Sept 7 p 590

Die Casting Machine:
W-J Automatic*, Aug 10 p 368

Die Sinking Machine:
Keller Automatic*, Oct 12 p 927

Die-Head:
Landis, with Micrometer Attachment*, Aug 3 p 275

Dierfeld, Benno R.:
Steels for Automobile Construction, Nov 9 p 1199

Dinkey, Alva C.:
Testimony re Pittsburgh Basing, Nov 23 p 1375

Directory:
Ohio Metal-Working Industries, Aug 24 p 510

Disston, Henry, & Sons, Inc.:
Celebrate Founding of Saw Business, Oct 19 p 1019

Dividends:
Stock and the Works (Editorial), Dec 28 p 1698

Dodge, F. W., Co.:
Construction, June and First Half 1922, July 20 p 188; July, Aug 17 p 420; August, Sept 14 p 650; September Nov 9 p 1237

Dollar:
Speed of the, Dec 7 p 1489

Dolomite:
For Refractories, Oct 19 p 998

Donner Steel Co.:
Manufacture of Alloy Steels, Oct 26 p 1070

Donner, William H.:
Testimony re Pittsburgh Basing, Nov 16 p 1287

Dornhecker, Dr.:
Electricity and Italian Steel Industry, Aug 10 p 389

Doyle, Joseph A.:
Industrial Heating, Nov 9 p 1220

Dreifus, Charles:
Economic Basis of Scrap Business, Aug 31 p 533

Dreses Machine Tool Co.:
Drill with Power Clamping Device*, Aug 17 p 419

Drilling Machines:
Baush Multiple*, Nov 2 p 1146
Chicago-Pneumatic Air, with New Features*, July 6 p 26
Colburn Gang*, Nov 30 p 1433
Dreses with Power Clamping Device*, Aug 17 p 419
Electric, Standardization, Oct 19 p 1019
Hammond, Wall or Post Bracket*, Aug 10 p 353
Hoefer Die Plate*, Nov 30 p 1418
Independent Pneumatic with Mechanical Reversing Device*, July 27 p 204
Jones Automatic for Light Operations*, Dec 7 p 1502
Kingsbury Automatic Head for Small Work*, Oct 19 p 1014
Krag Laying Out and*, Sept 21 p 720
Rockford Attachment for Milling and*, July 6 p 29

Rockford for High Production, Sept 7 p 593
Turbine Air*, Aug 24 p 474
Van Dorn Radial Arm*, Aug 3 p 288
Way, Convertible into Bench Drill*, Nov 2 p 1142
Drives:
Electric, for Rolling Mills*, Aug 10 p 339; Aug 17 p 408; Dec 7 p 1497
Electric, Trumbull Strip Mill, Oct 5 p 858
Drop Forging Institute:
(See American Drop Forging Institute)
Du Brul, Ernest F.:
Economic Aspect of Production, Oct 26 p 1088
Machine Tool Industry Problems, Nov 30 p 1425
Duggan, M. E.:
Casting for Mill Journals*, July 27 p 222
Saving Rolling Mill Brasses*, Aug 3 p 268
Dunkley, W. J.:
Mixed Coal and Coke for Water Gas, Aug 3 p 288
Dunn, Samuel O.:
Railroad Situation, Oct 19 p 1001
Duraloy:
Cutler Steel Co. to Make, Dec 14 p 1567
Durant Motors Co.:
Plans, July 27 p 237
Durville, M.:
Casting Aluminum for French Coinage*, Sept 14 p 649
Dust:
Flue, Briquetting by Corrosion, Nov 9 p 1205, Dec 14 p 1571*

E

East End Manufacturers' Association:
Adops Open Shop Policy, Oct 12 p 944
Eastern Malleable Iron Co.:
Crystallization of Galvanized Malleable Iron Castings, Oct 26 p 1070
Eastern Steel Castings:
To Take Over Bayonne Steel Casting Co., Dec 7 p 1501
Eastern Steel Co.:
May Purchase Warwick Blast Furnaces, July 6 p 57
Economics:
Discussed at Industrial Engineers' Meeting, Oct 26 p 1086
In Production, Oct 26 p 1088
Machine Shop, Oct 19 p 1004
Markets and (Editorial), Sept 28 p 820
Psychology and (Editorial), Sept 14 p 665
Edert, H.:
Tests with Special Steels, Aug 17 p 406
Editorials:
Alloy Steels, Advance in, Oct 5 p 877
American Iron and Steel Institute Leadership, Nov 9 p 1223
Associations Made Liable, Nov 30 p 1439
Autocracy, Shall It Succeed?, Aug 3 p 290
Automobile Steel Less Seasonal, Oct 26 p 1080
British Capacity and Output, Aug 24 p 490
British Labor Cost Lower, Dec 14 p 1586
British Steel in Shipbuilding, Aug 31 p 552; Nov 9 p 1223
British Steel, Revival in, Dec 7 p 1513
Business After Two Wars, July 6 p 33
Business Curve, Flattening the, Dec 28 p 1698
Business, Greater Adaptability of, Sept 14 p 665
Business Memories, July 6 p 34
Buying Power the Test, Aug 3 p 291
Canada's Steel Industry, Sept 28 p 819
Castings, High-Test Iron, Aug 10 p 363
Castings, Increase in Electric Steel, July 13 p 93
Cement and Steel Production and Shipments, July 20 p 162
Centrifugal Process, Growth, Sept 14 p 666; Dec 21 pp 1642, 1643
Chromium Electroplating, Nov 9 p 1222
Chromium, Key Place of, Aug 17 p 431
Coal and Transportation, Dec 21 p 1643
Coal, Public Concern in, Aug 17 p 430
Coal Strike, Cleveland Surrender, Aug 24 p 489
Coal and the Distribution of National Income, Oct 19 p 1016
Coal Industry, Prepare for April 1, Sept 7 p 610
Coal Mines, to be Opened, July 13 p 92
Coal Situation, a Decision for War, July 20 p 160
Coal Stocks and Coal Prices, Aug 10 p 363
Coal Strike, Verging on Revolution, Aug 31 p 551
Combating Organized Minorities, Oct 12 p 964
Commercial Conditions, Sept 21 p 736
Copper Exports, Aug 31 p 551
Country as a Business Enterprise, Nov 9 p 1224
Creative Effort, Incentive to, Dec 28 p 1696
Creative Intelligence Hampered, Aug 31 p 552
Creditor's Committee Salvage, Nov 16 p 1294
Cupolas, Schuermann, Oct 26 p 1082
Cycles and Current Phenomena, Sept 21 p 737
Duplexing with Electric Furnaces, Dec 7 p 1513
Economics and Markets, Sept 28 p 820
Economics and Psychology, Sept 14 p 665
Economy in Railroad Operation, Oct 5 p 878
Electric Industrial Heating, Sept 28 p 819
Employers the Buffer, July 27 p 228
Engineering Museum Wanted, Dec 28 p 1697
Exports, High Costs and Steel, Oct 19 p 1016
Ferromanganese Equation, Dec 21 p 1644
Freight Rates, Unjust, Iron Ore, July 20 p 161
French Honors to American, July 27 p 217
Fuel in Steel Making, Saving, Sept 7 p 611
German Iron and Steel Exports, July 20 p 161; Dec 7 p 1514
German Steel Industry, Sept 21 p 736
Government Advice for Railroads, Aug 24 p 490
Government by Public Opinion, Dec 7 p 1513
Heat Treatment, Progress, Oct 12 p 947
Immigration Act, Aug 10 p 362
Industrial Depression, No Danger from, Nov 16 p 1292
Industry, Public Control of, Oct 19 p 1018
Ingot Output, Steel, 1922, Sept 28 p 818
International Debts and Trade, Oct 5 p 876
International Trade, [illegible] July 6 p 33
Iron Ore Per Ton of Pig Iron, Less, Aug 17 p 432
Labor, Common, Making Jobs Fewer, Nov 23 p 1371
Labor, Common, Shortage, Oct 12 p 947
Labor, Facing the Issue, Nov 2 p 1151
Labor, Getting a Full Day's Work, Oct 26 p 1081
Labor, Hourly Output a Constant, Nov 23 p 1371
Labor Supply and Prosperity, July 13 p 93
Labor Turnover, Change, Dec 14 p 1584
Luxemburg Steel Production, Nov 9 p 1223
Machine Tool Building, Stabilizing, Oct 12 p 946
Manganese and the Tariff, Oct 26 p 1081
Manganese Ore Survey, Nov [illegible] 1150
Manganese Steels, Pearlitic and Sorbitic, Dec 14 p 1585
National Foundrymen's Association, Nov 30 p 1438
Open-Hearth Combustion System, Dec 14 p 1585
Oxygen in Steel Metallurgy, Nov 9 p 1223
Paying Toll to Railroad Workers, Aug 17 p 430
Philosophy of Work, July 20 p 162
Pig Iron, Equalization in, Dec 14 p 1584
Pig Iron for Steel, Less, Nov 30 p 1440
Pig Iron Imports, Sept 7 p 612; Nov 16 p 1292; Dec 28 p 1697
Pig Iron Output, 1922, Estimated, Dec 28 p 1697
Pirating American Machinery, Dec 21 p 1643
Power Sources of Utilities, July 13 p 94
Prices and Progress, Oct 26 p 1080
Prices, Course of Steel, Nov 23 p 1370
Prices, Government's Hand in, Oct 26 p 1082
Prices, High, and Prosperity, Sept 28 p 818
Prices, Scrap, Relation of, July 27 p 227
Prices, Sheet and Tin Plate, Nov 30 p 1438
Prices, Steel, and Wages, Sept 14 p 664
Purchases and Sales, Matching, Dec 28 p 1696
Railroad Injunction, Sept 7 p 610
Railroad Situation, Turns in, Nov 30 p 1440
Refractory Survey, Nov 30 p 1439
Repetitive Operations, Aug 24 p 489
Restraint of Trade, Glaring Exception to, Dec 7 p 1512
Revising the Country's Future Needs, Nov 16 p 1293
Salesmanship, New Factor in, Nov 16 p 1293
Sand, Foundry, Research, July 27 p 227
Speeches, Two Institute, Nov 2 p 1151
Stainless Steel in Bridge Work, Oct 12 p 947
Stand by the President, July 20 p 160
Steel and Iron from Britain, Oct 12 p 948
Steel Capacity and Orders, Aug 31 p 551
Steel Demand, Wide Distribution, Dec 21 p 1642
Steel in Dwelling Houses, Aug 3 p 291
Steel Ingot Output, July 13 p 92
Steel Merger Decisions, July 27 p 226

(*Editorials, continued*)
Steel, One Gage of Future Demand, Nov 2 p 1150
Steel Output for 1922, Estimates, Dec 7 p 1512
Steel Production, Fluctuations in, Nov 23 p 1372
Steel Supply, World, Now and in 1913, Oct 19 p 1015
Stock Dividends and the Works, Dec 28 p 1698
Strike and "Rights," Aug 24 p 488
Tariff Provisions, Elastic, Oct 5 p 877
Tariff, Unsatisfactory, July 6 p 32
Tax Burdens, Uneven, Aug 31 p 552
Testing, Impact and Fatigue, July 6 p 34
Viewpoints of Old and Young, Aug 10 p 364
Wages, Advance in Steel Works, Aug 31 p 550
Wages, Living, Nov 9 p 1222
Welding, Magnetic Testing, July 20 p 161
Welfare Work, Is It Overdone? Sept 21 p 787

Edmonds, William L.:
Canada's Trade with United States, Oct 5 p 867

Edwards, C. L. T.:
Progress in Open-Hearth Process, Aug 3 p 292

Egler Open-Hearth Process:
Merged with Danforth and McKune Systems, Aug 10 p 382; Dec 14 p 1582
Results at Brier Hill plants*, July 20 p 147; (Editorial) Sept 7 p 611

Egypt:
Sends Students to Learn American Manufacturing Methods, Nov 9 p 1254

Elecdrive Mfg. Co.:
Tool for Turning Down Nuts*, July 20 p 146

Electric Arc Cutting & Welding Co.:
Arc Rivet Cutting Apparatus*, Aug 31 p 528

Electric Alloy Steel Co.:
Merged with Atlas Crucible Steel Co.*, Aug 10 p 344; Sept 7 p 628

Electric Controller & Mfg. Co.:
Squirrel Cage Induction Motors, Sept 7 p 590

Electric Industrial Heating:
Progress, Sept 28 p 799, (Editorial) p 819

Electric Power Club:
Handbook, Oct 12 p 942
Standardization of Electric Drills, Oct 19 p 1019

Electric Steel Founders' Research Group:
Meeting, Oct 26 p 1078; Nov 23 p 1390

Electrical Development:
In Steel Industry, Dec 28 p 1729

Electrical Engineers:
(See Association of Iron and Steel Electrical Engineers)

Electrochemical Society:
(See American Electrochemical Society)

Electrodes:
Graphite, for Resistor Elements, July 6 p 28

Emery, James A.:
Powers of Congress Over State Corporations, Oct 5 p 869

Employee Representation:
[illegible]
[illegible]
541

Emporium Iron Co.:
[illegible]
588

Enameled Ware:
Cause of Cracks, Nov 16 p 1284

Engines:
[illegible]
168

Internal Combustion for Power*, Oct 26 p 1073
Resourceful Repair Job*, July 13 p 78
Shipping Board Sales, Aug 3 p 319
Steam, Air-Steam Mixtures in, Nov 16 p 1290

Entwisle, E. F.:
Power Plants in Steel Industry, Nov 9 p 1214

Esterline-Angus Co.:
Voltmeter, Combination A. C. and D. C.*, July 20 p 138

Etching:
Reagents for Carbides in Alloy Steels, Dec 28 p 1683

Europe:
Fairs and Exhibitions Planned, July 20 p 184
Metal Trades Wages, Aug 24 p 486

Exhibitions:
American Society for Steel Treating*, Sept 28 p 795; Oct 12 p 938
European and South American, July 20 p 184
General Electric Industrial Heating, Oct 5 p 896
Machine Tools, New Haven Branch A. S. M. E., Sept 28 p 811
Motion Study Data, Oct 5 p 864
National Exposition of Power and Mechanical Engineering, Nov 23 p 1350; Dec 14 p 1604

Export Notes:
July 6 p 38; July 13 p 111; July 20 p 163; July 27 p 231; Aug 3 p 293; Aug 10 p 384; Aug 17 p 414; Aug 24 p 493; Sept 7 p 608; Sept 14 p 669; Sept 21 p 752; Oct 5 p 879; Oct 12 p 941; Oct 26 p 1091; Nov 2 p 1161; Nov 9 p 1255; Nov 16 p 1290; Nov 23 p 1376; Nov 30 p 1448; Dec 14 p 1588; Dec 21 p 1660; Dec 28 p 1701

Exports:
Alabama Shipments, Oct 5 p 899
American Iron and Steel, Aug 24 p 467; Nov 9 p 1226
Friendliness a Factor in Extending Trade, Nov 9 p 1224
Iron and Steel to Brazil, Sept 7 p 595
Machinery, July, Sept 7 p 603; August, Oct 12 p 951; September, Nov 2 p 1155; October, Dec 7 p 1508
Machinery, Openings in Latin America and Other Lands, Dec 14 p 1568
Railroad Material and Structural Steel, October, Dec 28 p 1682
Steel, High Costs and (Editorial), Oct 19 p 1016
Steel Shipments to South Africa, Oct 19 p 1046

Exports and Imports of Iron and Steel:
May, July 6 p 24; June, Aug 10 p 366, (Editorial) p 363; July, Sept 7 p 602; Sept 14 p 652; August, Oct 12 p 950; September, Nov 2 p 1154; Nov 9 p 1226; October, Dec 7 p 1508

Extras:
Cotter Pin, Oct 19 p 1037

Eye-Sight Conservation Council of America:
Engineers Elected to Council, Sept 7 p 596

F

Fabricated Steel Business:
Awards and Pending Projects, July 6 p 54; July 13 p 97; July 20 p 182; July 27 p 247; Aug 3 p 296; Aug 10 p 369; Aug 17 p 435; Aug 24 p 508; Aug 31 p 555; Sept 7 p 608; Sept 14 p 684; Sept 21 p 756; Sept 28 p 838; Oct 5 p 898; Oct 12 p 965; Oct 19 p 1040; Oct 26 p 1106; Nov 2 p 1176; Nov 16 p 1210; Nov 23 p 1392; Nov 30 p 1462; Dec 7 p 1538; Dec 14 p 1608; Dec 21 p 1659; Dec 28 p 1722
New Era in Industry, Nov 30 p 1445
Sales, June, July 20 p 181; July, Aug 24 p 470; August, Sept 21 p 756; September, Oct 14 p 1040; October, Nov 23 p 1392; November, Dec 21 p 1659

Facing and Centering Machines:
Goodman Double End*, Dec 7 p 1486

Fact Finding Coal Commission:
Policy, Dec 14 p 1611

Farm Equipment Manufacturers:
(See National Association of Farm Equipment Manufacturers)

Farm Implements:
No Profiteering in, Aug 31 p 527
Outlook for, Nov 30 p 1423
Standardization, July 13 p 84

Farquhar, A. B.:
Tribute to Steel Makers*, Dec 14 p 1581

Fate-Root-Heath Co.:
Gasoline Locomotive, 7-Ton, Dec 21 p 1629

Fatigue:
Metals, Development in*, Sept 28 p 779
Non-Ferrous Metal*, Aug 10 p 356

Fay, J. A., & Egan:
Buys Plant, Oct 26 p 1107

Federal Trade Commission:
Bethlehem-Midvale Merger Under Advisement, Nov 30 p 1444
Dismisses Midvale, Republic, Inland Merger Complaint, Oct 12 p 974
Exceeds Authority, Nov 9 p 1257
Investigation of Steel Merger, July 6 p 6
Larger Appropriation for, Nov 23 p 1377
Personnel, July 6 p 9
Report on Republic-Midvale-Inland Merger, Sept 7 p 597
To Reopen Hearings on Pittsburgh Basing, Aug 24 p 468

Federated American Chambers of Commerce of the Near East:
Dinner, Dec 14 p 1587

Federated Engineering Societies:
New Members, Aug 10 p 353

Ferrochromium:
Decarburization by Hydrogen, Nov 23 p 1344

Ferromanganese:
Drawback Provision in New Tariff, Oct 19 p 1006
Equation (Editorial), Dec 21 p 1644
Present Status, Oct 26 p 1077

Fiat Electric Furnace Works:
Furnaces*, July 20 p 151; Sept 14 p 667

Files:
Simplification in Variety, Oct 19 p 1018

Findley, A. I.:
Iron and Steel, Oct 19 p 1001
Testimony re Pittsburgh Basing, Nov 9 p 1229
What Will Next Ten Years Bring in Steel? July 20 p 132

Flue Dust:
Briquets by Corrosion Process, Nov 9 p 1205; Dec 14 p 1571

Fluorspar:
Investigations, Oct 19 p 997
Scarcity, July 13 p 90
Uses, Nov 9 p 1215

Flynn, J. J.:
Safety Guard for Power Presses*, Aug 24 p 472

Forbes & Myers:
Reel for Use with Portable Grinder*, Dec 7 p 1502
Tool Grinder for Single Phase Current, Nov 9 p 1206

Ford Motor Co.:
Plants to Close, Due to Fuel Situation, Aug 31 pp 545, 553
Resumes Operations, Sept 28 p 816
Safety Week*, July 20 p 129

To Erect Steel Plant and Rolling Mills, Nov 30 p 1441

Ford Motor Co., Ltd. of Canada:
Annual Report, Oct 12 p 965
Expansion Plans, Nov 9 p 1257

Ford Puddling:
Process to be Used in New Youngstown Steel Plant, July 6 p 9

Fordney-McCumber Tariff:
Investigations, Methods of Procedure, Nov 2 p 1159
Metal Duties, Sept 21 p 726
Rates, Compared with Other, Sept 28 p 807

Foreign Trade Council:
(See National Foreign Trade Council)

Foremen Training:
Results from, Dec 14 p 1565

Fosdick Machine Tool Co.:
High Speed Ball Bearing Sensitive Radial Drilling Machine*, Oct 3 p 870

Founders' Association:
(See National Founders' Association)

Foundries:
British View of American Practice, Nov 16 p 1280; Dec 28 p 1684
Cantòn Regulators for Air Squeezers*, Aug 10 p 351
Electric, Economy Features, Aug 3 p 277
Electric Furnace, Choosing, July 27 p 201
Hayward Orange Peel Bucket for*, July 13 p 83
In United States and Canada, Oct 12 p 972
Lowe Riddling Machine*, Dec 28 p 1694
Molding Sand Research (Editorial), July 27 p 227
Ohio Operations, Aug 24 p 468; Sept 21 p 753; Nov 23 p 1356; Dec 28 p 1729
Role of Metallurgist in, Oct 26 p 1078
Sands, New Method of Testing, Dec 28 p 1725
Shepard Hoist for Cupola Charging*, July 20 p 134
Steel Scrap in Cupola Iron Mixtures*, Aug 10 p 337, (Editorial) p 363
Troubles and Their Remedy*, Nov 9 p 1197

Foundrymen's Associations:
American, Convention and Exhibition Announcement, Nov 2 p 1181
Indiana Organizing, Dec 7 p 1510
New England, Aug 17 p 434; Sept 21 p 760; Oct 19 p 997; Dec 21 p 1660
Ohio State, Annual Meeting, Dec 14 p 1558; Report of Operations, Aug 24 p 468; Sept 21 p 753; Oct 26 p 1064
Quad City, Oct 26 p 1078; Nov 30 p 1471; Dec 28 p 1729
Wisconsin Meeting, Nov 23 p 1356

Fox, Gordon:
Electric Motor Drive in Steel Industry*, Aug 10 p 339; Aug 17 p 408

France:
Casting Aluminum Bronze for Coinage*, Sept 14 p 649
Confers Honors on American Engineers, July 27 p 217
Imports of Machinery and Tools, Oct 26 p 1068
Iron and Steel Exports and Imports Four Months 1922, Aug 3 p 276
Iron and Steel Market and Prices, July 6 p 39; July 13 p 111; July 27 p 231; Aug 3 p 319; Aug 10 p 387; Aug 24 p 493; Aug 31 p 544; Sept 7 p 628; Sept 14 p 662; Oct 5 p 881; Oct 12 p 971; Oct 19 p 1022; Oct 26 p 1090; Nov 9 p 1248; Nov 23 p 1351; Dec 14 p 1588; Dec 28 p 1739
Iron and Steel Production, May, July 27 p 217
Pig Iron Supply, Oct 12 p 971
Tariff Changes Recommended, July 6 p 10

Francis, Charles W.:
Acid Electric Furnace Practice, Aug 10 p 345
Basic Electric Furnace Operation, Aug 17 p 421
Costs of Electric Steel Melting, Aug 31 p 525
Economy Features of Electric Foundry, Aug 3 p 277
Electric Furnace for Foundry, July 27 p 201
Labor Problems in Electric Melting, Sept 21 p 725

Freight Rates:
Briefs Filed Opposing Rates from Group Points on Iron and Steel Products, Oct 19 p 1003
Cement, Declared Unjust, Dec 14 p 1579
Iron and Steel, Change in Southern, July 13 p 96
Iron and Steel Products, Complaint Filed, July 20 p 131
Iron and Steel Products, Increase Not Justified from Utah to California, Oct 26 p 1064
Iron and Steel Products New Orleans to Houston, Dec 7 p 1539
Iron and Steel Products, New Tariffs, July 6 p 20; Dec 28 p 1702
Iron and Steel Products, Reduced Local Rate in South, Nov 16 p 1318
Iron and Steel Products to Southeast Justified, Nov 2 p 1182
Iron and Steel, Southern Suspended, July 20 p 145
Iron Ore, Decision Against Buffalo Interests, Dec 7 p 1519
Iron Ore, Eastern, Reduced, Aug 3 p 281
Iron Ore, Unjust (Editorial), July 20 p 161
Lake Superior Ore, Exceptions Filed, Nov 23 p 1355
Lake Superior Ore to Upper Docks, Present, Proposed and Original, Oct 26 p 1065
Limestone, Oct 26 p 1085; Nov 2 p 1152; Dec 21 p 1637
Mill Cinder, Oct 19 p 1003
Ocean, Foreign Trade, 1921, Dec 28 p 1690
Ore, Ex-Lake and Eastern Again Suspended, July 20 p 184
Ore from Minnesota, Rates Justified, Oct 26 p 1065
Ore, Imported, Sept 28 p 821
Ore, Mississippi Valley Iron Co., Complaint Dismissed, Dec 28 p 1726
Pig Iron, Arrow Company Gives Reasons for Establishing Lower, Sept 14 p 696
Pig Iron from Birmingham, July 13 p 82; July 27 p 244
Pig Iron from the South, Aug 17 p 407; Aug 24 p 486; Sept 7 p 608; Sept 21 p 738
Pig Iron, from the South to Middle West, Dec 28 p 1690
Pig Iron, No Cut to St. Louis Ohio River Crossings and Other Points, Dec 21 p 1637
Pig Iron, Reduced Rates Asked for Imported, Sept 21 p 747
Pig Iron, Reparation to Roane Iron Co., Nov 2 p 1143
Pipe Unreasonable, Nov 9 p 1252; Dec 28 p 1731
Railroad Disagreement Does Not Justify Increase, July 20 p 167
Rails and Cross Ties, Cambria Steel Co. Files Objections, Oct 12 p 972
Rails, New Rate Ordered [illegible] p 1[illegible]
Rails, Protest [illegible] Canadian Shipments, Nov [illegible] 1139
Rails, Request to Increase Rates, Oct 5 p 863
Reparation Awarded Pittsburgh Steel Co., Nov 9 p 1210
Scrap, Cohen Case Dismissed, Nov 9 p 1246
Steel Plate Case Dismissed, Nov 9 p 1252
Steel Tank, July 27 p 217
Transcontinental, Shippers Denied Relief, Nov 16 p 1318
Waterways, July 13 p 82
Wire Fencing, July 27 p 217
Wire Rods, Definition Involves Decision on, Nov 2 p 1184

French, H. J.:
Stainless Steel at High Temperatures*, Aug 17 p 404

Fuel:
Carbonized Lignite, Nov 23 p 1346
Emergency, Aug 31 p 538
Liquid, in Metallurgical Furnaces*, Nov 2 p 1137
Michigan's Control Law, Oct 19 p 1004
Oil for Coal at Valley Plants, July 20 p 181
Oil, Using Cold Air, Aug 3 p 269
Saving, in Steel Making (Editorial), Sept 7 p 611
Utilization, in Economic Adjustment, Sept 28 p 820

Funk, I. C.:
Electric Furnaces in Italy, Aug 24 p 491

Furnaces, Annealing:
Continuous, at Ashtabula Plant, Nov 23 pp 1342, 1362

Furnaces, Blast:
American and British Methods, Sept 21 pp 732, 760
American Rolling Mill Blows in Second Columbus, Oct 26 p 1071
Bases of Modern Practice, Nov 9 pp 1207, 1253; Nov 23 p 1353
Claire, New*, Nov 30 p 1422
Combustibility of Coke in, Oct 19 p 990
Crane No. 1 of Replogle Steel Co. Sold, Dec 7 p 1517
Dayton, Rebuilding, Nov 2 p 1158
Elevated Intake for Air*, Dec 28 p 1700
Emporium Rebuilt*, Sept 7 p 588
Ford Operating on Reduced Scale, Sept 21 p 740
Low Moor Blows in Furnace "A," Nov 16 p 1319
Macungie and Topton Sold, Nov 30 p 1464; Dec 7 p 1500; Dec 21 p 1640
Monthly Production, June*, July 6 p 36; July, Aug 3 p 300; August, Sept 7 p 606; September, Oct 5 p 882; October, Nov 9 p 1232; November, Dec 7 p 1520
New Zealand Furnace Starts, July 13 p 81
Notes, Sept 14 p 688; Sept 28 p 802; Nov 9 p 1246; Nov 30 pp 1441, 1442
St. Louis Coke & Chemical Record, Sept 28 p 802
Tayeh Iron & Steel Co.*, Aug 17 p 416
Oxygen, Use in, Nov 2 p 1179
Youngstown Sheet & Tube Record, Nov 23 p 1372

Furnaces, Electric:
Acid Practice, Aug 10 p 345
Alloy Castings from*, Sept 28 p 784
Arc Regulation, Nov 23 p 1349
Basic Operation, Aug 17 p 421
Castings, Increase in (Editorial), July 13 p 93
Costs of Melting, Aug 31 p 525
Duplexing at Sheffield, England, Dec 7 p 1502, (Editorial) p 1513

(*Furnaces, Electric, continued*)
Flat Characteristics, July 20 p 151; Sept 14 p 667
Foreign Contracts, July 13 p 81
General Electric Non-Ferrous Induction*, Aug 3 p 271
Graphite Electrodes for Resistor Elements, July 6 p 28
Heroult Improvements*, Aug 10 p 342
In Foundries, July 27 p 201; Aug 3 p 277
In Italian Industry, Aug 10 p 389; Aug 24 p 491; (Editorial) Aug 17 p 431
Labor Problems, Sept 21 pp 725, 763
Layout for Tool Steel Plant*, Nov 23 p 1363
Levoz, New Type, Sept 21 p 763
Refining Iron and Steel, Nov 2 pp 1127, 1130
Refractories, Study of, Oct 19 p 990
Ryan for High Temperature Melting*, Dec 7 p 1507
World's Output, 1913-1921, Sept 14 p 653

Furnaces, Heating:
Continuous, for Steel*, Aug 24 p 465
For Blooms, Slabs and Billets*, Nov 9 p 1211
Regeneratively Fired*, Aug 31 p 537

Furnaces, Oil:
Electric Modification of Schwartz Non-Ferrous*, Oct 19 p 1003

Furnaces, Open-Hearth:
British Practice*, July 13 p 75
Coke Oven Gas in, Dec 14 p 1561
Design of Proposed 100-Ton*, Nov 2 p 1131
Egler Results at Brier Hill Plant*, July 20 p 147; (Editorial) Sept 7 p 611
Liquid Fuel in*, Nov 2 p 1137
Loftus, New*, Dec 28 p 1677
McKune, Danforth and Egler Systems Merged, Aug 10 p 382; Dec 14 p 1582 (Editorial) p 1585
Open-Hearth Combustion System, Dec 14 p 1582, (Editorial) p 1585
Progress*, July 20 p 147; Aug 3 p 292
Talbot and Other Processes, Oct 19 p 1009

Furnaces, Reheating:
Liquid Fuel in*, Nov 2 p 1137
Soaking Pit*, Oct 19 p 1013

G

Gage:
Ames Universal Attachment for Dial*, Aug 17 p 420
Bureau of Standards Studying Steel for, July 27 p 217
Johnson Thread Snap*, Sept 14 p 651
Pratt & Whitney Pipe, Pin and Steel Wheel*, Nov 30 p 1434

Gage Steel Committee:
Investigation, Dec 28 p 1686

Galibourg and Ballay:
Methods for Locally Preventing Case Hardening, July 20 p 136

Galvanizing:
Life of Sheets Dependent on Zinc Coating, Dec 14 p 1586
Method of Coating Criticised, Nov 16 p 1283
Wire, Broden and Dailey Equipment*, Dec 14 p 1563

Garrett, S. H.:
Hydraulic Press for Baling Scrap*, July 27 p 206

Gary, Elbert H.:
8-Hr. Day and Pittsburgh Basing, Dec 28 p 1719
Business Conditions, Sept 7 p 617; Dec 14 p 1577
Testimony re Pittsburgh Basing, Nov 9 p 1228; Nov 23 p 1366

Gas:
Analyses, Judging Combustion from, Nov 16 p 1281
Coke Oven, in Open-Hearth Furnaces, Dec 14 p 1561
Deschamps Process of Making, Nov 16 p 1285
Fuel, in Iron and Steel Plants*, July 20 p 153
In Steel, Aug 31 p 534
Producer, Brown Coal Briquettes for, Nov 2 p 1176
Water, Mixed Coal and Coke for, Aug 3 p 288

Gas Producer and Engineering Corporation:
Tar Extractor*, Aug 3 p 283

Gas Producers:
Morgan, in British Plants*, Dec 14 p 1575

Gates, W. H.:
Machine Shop Economies, Oct 19 p 1004

Gear Manufacturers' Association:
(See American Gear Manufacturers' Association)

Gears:
Forming Teeth by Hot Rolling*, Oct 5 p 861
Pratt & Whitney Instrument for Testing Teeth*, July 27 p 204

General Electric Co.:
Buys Plant of Remington Arms Co., July 6 p 57
Creates Charles A. Coffin Foundation, Dec 7 p 1490
Industrial Electric Heating Exhibit, Oct 5 p 896
Non-Ferrous Induction Furnace*, Aug 3 p 271
To Build Pacific Coast Factory, Aug 17 p 450
To Exhibit Electrical Heating Equipment, July 27 p 206

General Refractories Co.:
Absorbs Pennsylvania Fire Brick, Hays Run Fire Brick and Standard Refractories Companies, Aug 17 p 405

General Tool & Equipment Co.:
Sapihl Electric Grinding Machines*, Oct 5 p 864

General Welding & Equipment Co.:
Automatic Welding Machine*, July 27 p 206

Geography:
Industrial, Clark University Courses, Nov 23 p 1377

Geological Survey:
Dr. George O. Smith Resigns as Director, Nov 2 p 1160
Power Sources of Utilities (Editorial), July 13 p 94

Germany:
8-Hr. Day, July 27 p 216
Aluminum Foil, Aug 10 p 389
Annealing Gray Cast Iron, Dec 7 p 1499
Borsig Locomotive Works, Dec 21 p 1623
Coal Production, Five Months, 1922, Sept 7 p 590
Exchange, Effect on Industry, Aug 3 p 294
Export Duties, Call for Higher, Aug 31 p 543
Financing Russian Business, July 20 p 150; Nov 16 p 1317
Hardening Steel, New Method, July 20 p 134
Heat Temperature Curves of Metals*, July 27 p 218
Industrial Standards, Aug 31 p 543
Iron and Steel Exports, April (Editorial), July 20 p 161; April and May, Aug 24 p 491; June, Sept 14 p 700; (Editorial), Dec 7 p 1514
Iron and Steel Industry (Editorial), Sept 21 p 736
Iron and Steel Market and Prices, July 6 p 12; July 13 p 111; July 20 p 184; July 27 p 229; Aug 3 p 294; Aug 10 p 389; Aug 17 p 413; Aug 24 p 492; Sept 7 p 628; Sept 14 p 661; Oct 5 p 880; Oct 12 p 973; Oct 19 p 1021; Nov 9 pp 1225, 1256; Nov 30 p 1467; Dec 7 p 1539; Dec 14 p 1589; Dec 21 p 1626
Iron and Steel Output, 1919, July 13 p 81; 1920-1921, Sept 14 p 700
Iron Ore Output, 1918, 1919, Aug 17 p 412
Liner Rings for Cupola Lining, Nov 16 p 1279
Machine Tool Manufacturers' Meeting, July 27 p 224
Russian Manganese Ore, Sept 7 p 630
Russian Scrap Iron and Steel, Utilization of, Sept 7 p 630
Schuermann Cupola Construction Development*, Oct 19 p 991
Soldering Aluminum, Aug 3 p 285
Standardized Steel Specifications of Automotive Industry, Nov 9 p 1199
Stinnes Tube Works, Nov 2 p 1146
Tests with Chrome-Nickel Steels, Aug 17 p 406
Wage Advances, Dec 7 p 1491

Gibbons Engineering Co.:
Safety Device for Presses*, Aug 17 p 420

Giddings & Lewis Machine Tool Co.:
Internal Grinder*, Nov 9 p 1219

Gilbreth, Frank B., Inc.:
Motion Study Data, Oct 5 p 864

Gillett, H. W.:
Study of Molybdenum and Other Alloy Steels, Aug 10 p 368

Gits Brothers Mfg. Co.:
Wire Wick Lubricating System*, Dec 28 p 1700

Glessner, Arthur W.:
Forty-three Years as Buyer of Iron and Steel*, Nov 9 p 1227

Globe Seamless Steel Tubes Co.:
To Pass Into New Ownership, July 20 p 157

Goggles:
Saving Eyes by, July 6 p 30

Goodman Mfg. Co.:
Facing and Centering Machine*, Dec 7 p 1486

Gould & Eberhardt:
Shaper Equipped with Jib Crane, Nov 23 p 1344
Shaper for Planing Bearing Seats*, Aug 10 p 353

Gradenwitz, Dr. Alfred:
Elevated Intake for Blast Furnace Air*, Dec 28 p 1700

Graton & Knight Mfg. Co.:
Leather Belting Business, Oct 12 p 928

Great Britain:
Bounty-fed vs. British Steel, Sept 21 p 764
Brass Tube Manufacture at Birmingham, Dec 7 p 1514
Building Costs, Oct 26 p 1082
Cleveland Pig Iron, United States Principal Importer, Aug 10 p 390
Coal to America, Miners' Reaction to Supplying, Aug 24 p 483
Coal to New York Port, Sept 28 p 813
Duplexing with Electric Furnaces at Sheffield, Dec 7 p 1502, (Editorial) p 1513
Engineering Lockout Ended, July 13 p 81
Engineering Societies Cooperating, Aug 31 p 536
Imports of Manganese Ore, Nine Months 1922, Oct 26 p 1077
Institute of Metals Convention Proceedings, Oct 5 p 865
Institute of Metals Lectures, Sept 14 p 697

Iron and Steel Exports and Imports, May, July 13 p 80; June, July 20 p 181; July, Aug 10 p 390, Aug 31 p 544, Sept 7 p 603; August, Sept 21 p 752, Oct 5 p 866; September, Nov 9 p 1210; October, Dec 7 p 1509
Iron and Steel Institute Convention Proceedings, Sept 21 pp 732, 760
Iron and Steel Institute Fall Meeting Announcement and Papers, Aug 10 p 385
Iron and Steel Output, June, July 13 p 116; July, Aug 17 p 414; August, Sept 21 p 752; September, Oct 19 p 1045; October, Nov 16 p 1317; November, Dec 21 p 1632
Kennedy Oscilloscope*, Dec 28 p 1685
Labor Cost, Lower (Editorial), Dec 14 p 1586
Morgan Gas Producers in Steel Plants*, Dec 14 p 1575
Open-Hearth Furnace Practice*, July 13 p 75
Revival in Steel Industry (Editorial), Dec 7 p 1513
Scottish Plant Making Castings by Centrifugal Process*, Aug 31 p 529; (Editorial) Sept 14 p 666
Steel and Iron to United States (Editorial) Oct 12 p 948
Steel Capacity and Output, Aug 24 p 490
Steel for Shipbuilding (Editorial), Aug 31 p 552; Nov 9 p 1223
Stewarts & Lloyds New Plate Mill, Nov 2 p 1148
Unemployment, Dec 14 p 1562
View of American Foundry Practice, Nov 16 p 1280; Dec 28 p 1684
Welfare Work, Nov 30 p 1470
Wire Nail Importations, Aug 17 p 414

Green Engineering Co.:
Absorbed by International Combustion Engineering Co., Oct 5 p 903

Greenfield Tap & Die Corporation:
Pipe Wrench*, Aug 3 p 283

Griffin, P. H.:
Chilled Cast Iron Car Wheels, Nov 30 p 1419

Grinding Machines:
Badger Automatic*, Dec 21 p 1639
Blount Combination Buffing and*, Oct 26 p 1070
Diamond Pulley*, Sept 7 p 590
Forbes & Myers for Single-Phase Current, Nov 9 p 1206
General Tool & Equipment Co.'s Electric*, Oct 5 p 864
Giddings & Lewis Internal*, Nov 9 p 1219
Hy-Way Vertical-Spindle Cylinder*, Nov 23 p 1345
Landis, for Mill Rolls*, Aug 31 p 539
Pratt & Whitney Safety Dresser*, Sept 28 p 806
Precision Extension Spindle Attachment*, Sept 28 p 805
Springfield Double Ring Wheel*, Oct 26 p 1069
Stow Flexible Radial*, Aug 3 p 276
Van Norman Self Contained Valve*, Oct 12 p 928

Grocholl, Karl:
Liner Rings for Cupola Lining, Nov 16 p 1279

Grogan, J. D.:
Overheating Aluminum, Oct 19 p 990

Groume-Grjimailo, W. E.:
Continuous Heating Furnaces for Steel*, Aug 24 p 465
Regeneratively Fired Heating Furnaces*, Aug 31 p 537
Reheating or Soaking Furnaces*, Oct 19 p 1013

Ground Coal Engineering Co.:
Acquired by Sanford Riley Stoker Co., Dec 28 p 1700
Furnace Maintenance with Powdered Coal*, Dec 21 p 1633

Guatemala:
Imports of Iron and Steel Manufactures, Oct 19 p 1023

Guillet, Leon:
Protection by Aluminum Coating, Aug 3 p 276

Guns:
Parker Special Machines for Making*, Dec 21 p 1625

H

Hacksaw:
Armstrong-Blum Motor-Driven*, Nov 16 p 1284

Hadfield, Sir Robert:
Scholarship for Sweden, July 6 p 27

Hadley, Charles O.:
Testimony re Pittsburgh Basing, Nov 9 p 1230

Haiss Mfg. Co.:
Truck Loader Mounted on Truck Chassis*, Dec 7 p 1501

Halfacre and Singmaster:
Galvanizing, Modern Method of Coating Criticised*, Nov 16 p 1283

Hammers:
Blacker Blacksmith's*, Nov 9 p 1206
For Stamping Single Letter*, July 13 p 94

Hammond Mfg. Co.:
Wall or Post Bracket Drill*, Aug 10 p 353

Hanna Engineering Works:
General Utility Pneumatic Press*, Aug 31 p 540
Molding Machine, Split Pattern*, Dec 7 p 1504
Riveting Machine, Last-Head-in-Boiler*, Dec 14 p 1567

Hanna, M. A., Furnace Co.:
Briquets of Flue Dust, by Corrosion, Nov 9 p 1205; Dec 14 p 1571

Hanna, M. A., Co.:
Reorganization of M. A. Hanna & Co., Dec 21 p 1628

Hardening:
Case, Methods for Locally Preventing, July 20 p 136

Hardware Association:
(See American Iron, Steel and Heavy Hardware Association)

Harnishfeger, Henry:
Far East a Market for American Labor-Saving Machinery, Aug 10 p 388

Harper and MacPherran:
Annealing Gray Iron Castings*, Oct 19 p 1007
Tensile Tests of Cast Iron at Various Temperatures*, Sept 28 p 793

Harris Engineering Co.:
Semi-Automatic Sharpening Machine*, Sept 28 p 804

Harvard University:
Business Forecasts, Oct 26 p 1083

Hatfield, W. H.:
Stainless Steel in Mining, Aug 3 p 266

Haven, William A.:
Combustibility and Hardness of Coke*, Sept 14 p 695

Hawley Down Draft Furnace Co.:
Electric Modification of Schwartz Non-Ferrous Oil Furnace*, Oct 19 p 1003

Haynes, Williams:
Industrial Chemicals, Oct 19 p 1002

Hayward Co.:
Orange Peel Bucket for Foundries*, July 13 p 83

Heat Treatment:
Influence of Mass*, Sept 28 p 788
Progress (Editorial), Oct 12 p 947
Session at Steel Treaters' Convention, Oct 12 p 933
Temperature Curves of Metals*, July 27 p 218

Heater:
Westinghouse Electric Space*, July 20 p 142

Heating:
Industrial, Nov 9 p 1220; Electric Industrial, Sept 28 p 799, (Editorial) p 819

Hellmund, E.:
Development in Schuermann Cupola Construction, Oct 19 p 991

Helm, R. C.:
Liquid Fuel in Metallurgical Furnaces*, Nov 2 p 1137

Hematite:
Reduced to Magnetite with Methane, Oct 5 p 868

Hendey Machine Co.:
Gear Drive Crank Shaper*, Aug 3 p 275
Engine Lathe for Light Manufacturing*, Aug 24 p 477
Lathe Attachment for Long Lead Threads*, July 13 p 83

Heroult Electric Furnace:
Improvements*, Aug 10 p 342

Herr, E. M.:
Human Problems in Industry, Dec 14 p 1609

Heyne, H. P.:
Value of Accident Investigations, Aug 3 p 285

Hibbard, Henry D.:
H. H. Campbell—An Appreciation, Sept 28 p 841
Mechanical Puddling Process*, July 20 p 143
Temperatures for Physical Changes, Dec 7 p 1492

High Speed Steel:
Physical Tests*, July 6 p 1

High-Test Iron:
Castings, Specifications for*, July 20 p 149
In Cupola Mixtures*, Aug 10 p 337, (Editorial) p 363

Hoblitzelle, William E.:
Acquires Control of Smith & Davis Mfg. Co., July 13 p 82

Hoefer Mfg. Co.:
Die Plate Drilling Machine*, Nov 30 p 1418

Hoists:
Box Small Electric*, Nov 2 p 1141
Motorbloc Chain*, Nov 2 p 1153

Holder:
Bag, Malleable Iron Fittings Co.*, Nov 30 p 1424

Holmes Engineering Co.:
Threading and Tapping Machine*, Dec 28 p 1687

Holz, Herman A.:
Tensile Testing Machine for Bars, Strips and Wire*, Nov 23 p 1345

Hood, O. P.:
Brown Coal Briquettes for Producer Gas, Nov 2 p 1176

Hooker Mfg. Corporation:
Universal Saw Bench with Tilting Arbor*, Oct 26 p 1084

Hooks:
Smith Safety, for Mills and Cargoes*, Aug 10 p 351

Hoosier Rolling Mill Co.:
Merged with Missouri Iron & Steel Co., Dec 21 p 1637

Horseshoes:
Manufacture, 1921, Nov 9 p 1206

Horstmann, F. W., Co.:
Swivel Head Indicating Caliper*, Aug 3 p 288

Hoskins Mfg. Co.:
Automatic Temperature Regulator*, Sept 14 p 694

Hot Rollings:
Forming Gear Teeth by*, Oct 5 p 861

Hull Bill:
Opposition to, Dec 7 p 1492

Hungary:
Iron and Steel Industry, Nov 9 p 1251

Hurst, F. E.:
Iron Castings by Centrifugal Process*, Aug 31 p 529

Hutton, Dr. R. S.:
Science of Human Effort, Nov 30 p 1470

Hydraulic Press Mfg. Co.:
Large Flanging Press*, Aug 10 p 346

Hy-Way Service Co.:
Vertical-Spindle Cylinder Grinder*, Nov 23 p 1345

I

Illinois Manufacturers' Association:
Asks Repeal of Miner Law, Aug 10 p 360

Illinois Steel Co.:
Shipments by Water to, Dec 28 p 1700

Immigration:
Labor Supply and, Aug 3 p 278; Sept 14 p 692
Law Hampers Manufacturing, Sept 21 p 717
Needed Restrictions (Editorial), Aug 10 p 362
Problem, Effect on Industry, Oct 26 p 1072
Senator Reed's Bill, Dec 28 p 1718

Imports:
From Canada, Oct 5 p 867
Iron Ore, Eight Months 1922, Oct 12 p 922
Manganese Ore, Nine Months 1922, Oct 26 p 1077
Pig Iron, Nov 16 p 1292; Dec 28 p 1697 (Editorials)
Steel Bars Under New Tariff, Nov 16 p 1290

Imports and Exports of Iron and Steel:
May, July 6 p 24; June, Aug 10 p 366, (Editorial) p 363; July, Sept 7 p 602; August, Oct 12 p 950; September, Nov 2 p 1155; Nov 9 p 1226; October, Dec 7 p 1508

Independent Pneumatic Tool Co.:
Drill with Mechanical Reversing Device*, July 27 p 204

India:
Trade with the United States, Oct 12 p 922

Indiana Foundrymen:
(See Foundrymen's Association)

Industrial Conditions:
National Industrial Conference Board Survey, July 20 p 188

Industrial Conference:
Convention Announcement, July 13 p 103
New York State, Program of Buffalo Meeting, Nov 16 p 1316

Industrial Conference Board:
(See National Industrial Conference Board)

Industrial Engineers:
(See Society of Industrial Engineers)

Industrial Relations:
Further Legislation to Control Suggested, Sept 14 p 666
Progress, and Mistakes in Employee Representation, Aug 31 p 541
Y. M. C. A. Rocky Mountain Conference, Aug 10 p 343

Industrial Works:
200-Ton Crane for Virginian Railway*, Nov 23 p 1346

Indianapolis Chamber of Commerce:
Champions Open-Shop, Aug 3 p 299

Ingersoll-Rand Co.:
Air Compressors, Small*, Oct 26 p 1075
Machine for Grading Coal Pile*, Aug 31 p 528
Surface Condenser with Separate Cooler*, July 6 p 22

Ingots:
Steel, Casting Centrifugally*, Dec 7 p 1494
Steel, Increase in 1922 (Editorial), Sept 28 p 818
Steel, Monthly Production, June, July 13 p 72, (Editorial) p 92; July, Aug 10 p 384; August, Sept 14 p 652; September, Oct 12 p 949; October, Nov 16 p 1319; November, Dec 14 p 1573
Steel Production, United States, for Five Years*, July 13 p 71

Inland Steel Co.:
Extension Plans, Sept 14 p 652
Federal Trade Commission Objects to Merger with Republic and Midvale Companies, Sept 7 p 597
Fire Damages Plant, Sept 14 p 696
Merger with Republic and Midvale Companies Abandoned, Oct 5 p 873
Merger with Steel & Tube Co. of America Planned, Dec 14 p 1580

International Chamber of Commerce:
American Delegation to Rome Meeting, Nov 16 p 1311
Convention Announcement, Aug 24 p 480

International Combustion Engineering Corporation:
Acquires Capital Stock of Green Engineering Co., Oct 5 p 903

International Nickel Co.:
Heroult Electric Furnace Improvements*, Aug 10 p 342
Mill to Roll Monel Metal, Oct 19 p 1011

International Steel Tube Co.:
Reorganization, Dec 21 p 1627

Interstate Commerce Commission:
Broadening Control of Railroad Shipments, Sept 7 p 600
Decisions, Sept 14 p 696
Ore Rate Decision Against Buffalo Interests, Dec 7 p 1519
Pig Iron Freight Rates, No Cut to St. Louis, Ohio River Crossings and Other Points, Dec 21 p 1637
Pipe in Oil Lines Nearly 60,000 Miles, Nov 23 p 1344
Reconsignment Decision, July 20, p 157
Reduced Freight Rates on Eastern Iron Ore, Aug 3 p 281
Sustains Protest on Rail Freight Rates, Nov 2 p 1139

Institute of Metals:
Convention Proceedings, Oct 5 p 865
Lectures, Sept 14 p 697

Invar:
Steel, Mechanical Working of, July 27 p 222

Iron:
Cast, Growth, Aug 10 p 390
Cast, Tensile Tests at Various Temperatures*, Sept 28 p 793
Mainstay of Present Day Life, Oct 5 p 859
Malleable, Pamphlet, July 13 p 96
Ore, Imports, July, Sept 14 p 652
Ore, World's Resources*, July 27 p 211
Wrought, from an Old Chicago Bridge, Sept 28 p 803

Iron & Ore Corporation of America:
Agent for Caucasian Manganese Ore, Aug 17 p 422

Iron and Steel Institute (British):
Fall Meeting Announcement and Papers, Aug 10 p 385
Fall Meeting Proceedings, Sept 21 p 760

Iron, Cast:
(See Cast Iron)

Italy:
Ansaldo Steel Works Reorganized, Nov 23 p 1347
Electric Furnace Industry, Aug 10 p 389; Aug 24 p 491; (Editorial), Aug 17 p 431
Fiat Electric Furnace*, July 20 p 151; Sept 14 p 667

J

Jacobs, William C.:
Safety Hand-Hole Plate for Boilers*, Aug 17 p 514

Janitsky, E. J.:
Heat Treatment, Influence of Mass*, Sept 28 p 788

Japan:
Bonuses to Dismissed Employees, July 27 p 222
Copper Market, Sept 21 p 753; Nov 2 p 1160; Dec 21 p 1662
Imports, Nine Months, 1922, Nov 30 p 1448
Iron and Steel Industry, Aug 17 p 433; Oct 19 p 1023; Nov 16 p 1295; Nov 23 p 1351; Nov 30 p 1442
Refrigerator Cars, Oct 12 p 922
Steel Bounties Aid Merchant Marine, Sept 28 p 813

Jasper and Moore:
Development in Fatigue of Metals*, Sept 28 p 779

Jig Saw:
Oliver Self-Contained*, Aug 3 p 270

John Fritz Medal:
Awarded to Marconi, July 6 p 27

Johnson and Jones:
Apparatus for Determining Linear Shrinkage and for Bottom Pouring of Cast Metals and Alloys, Oct 19 p 999

Johnson Gage Works:
Thread Snap Gage*, Sept 14 p 651

Jones & Laughlin Steel Co.:
Earnings, 1913-1922, Dec 14 p 1591
Operations, Sept 21 p 751
To Be Reorganized as Jones & Laughlin Steel Corporation, Dec 7 p 1518
Week End Employment of Students in Steel Plant, Oct 19 p 997

Jones & Laughlin Steel Corporation:
Pays Incorporation Bonus, Dec 28 p 1727

Jones and Johnson:
Apparatus for Determining Linear Shrinkage and for Bottom Pouring of Cast Metals, Oct 19 p 999

Jones, G. H.:
Fluorspar and Its Uses, Nov 9 p 1215

Jonès, Joseph W.:
Automatic Drill for Light Operations*, Dec 7 p 1502

K

Keen, W. H.:
Aluminum in Steel, Dec 14 p 1574

Keller Mechanical Engraving Co.:
Automatic Die Sinking Machine*, Oct 12 p 927

Kelly & Jones Co.:
Takes Over Best Co., Dec 21 p 1663

Kennedy, Herbert & Co., Ltd.:
Oscilloscope*, Dec 28 p 1685

Kentucky Steel & Wire Co.:
New Plant, July 6 p 57

Keys:
Smith & Serrell Self-Fitting and Cutting*, Sept 14 p 650

Kimball, Dexter S.:
Engineer in Industrial Leadership, Dec 7 p 1490

Kikuta, Tario:
Growth of Gray Cast Iron, Aug 10 p 390

Kingsbury Mfg. Co.:
Automatic Drill Head for Small Work*, Oct 19 p 1014

Kinnard and Spooner:
Electrical and Magnetic Weld Testing*, July 20 p 139

Kinney and McDermott:
Open-Hearth Furnace, Design of Proposed 100-Ton, Nov 2 p 1131
Knight, Richard:
Conditions Abroad, Nov 9 p 1219
Koenig & Paton:
Metal Wool Manufacture*, Sept 7 p 591
Koon, Sidney G.:
Basic Business Conditions Favorable*, Oct 5 p 855
Naval Gun Factory at Washington*, July 13 p 87
Koppers Co.:
Combination By-Product Coke Oven*, Nov 16 p 1275
Krag, Franz K.:
Laying Out and Drilling Machine*, Sept 21 p 720
Kreuzpointer, Paul:
Developing the Will to Work, Aug 17 p 432
Kritiskope:
Nilson, for Determining Critical Point in Steel*, Sept 28 p 806
Kuhn, Olin R.:
World's Iron Ore Resources*, July 27 p 211

L

Labor:
8-Hr. Day in Germany, July 27 p 216
Bonuses to Dismissed Japanese Employees, July 27 p 222
British Cost Lower (Editorial), Dec 14 p 1586
British Miners' Reaction to Supplying Coal to America, Aug 24 p 483
Chicago Building Trades, Landis Decision Upheld, July 27 p 253
Coal and Railroad Strikes, Shall Autocracy Succeed (Editorial), Aug 3 p 290
Coal Strike, Cleveland Surrender (Editorial), Aug 24 p 489
Coal Strike, Decision for War (Editorial), July 20 p 160
Coal Strike, Government Establishes Priority List, July 27 p 223
Coal Strike, President Orders Mines Opened, July 20 p 167
Coal Strike Situation, July 6 pp 19, 58; July 13 pp 95, 117; July 20 p 164; July 27 p 224; Aug 3 p 298; Aug 10 p 357; Aug 17 p 426; Aug 24 p 481; Aug 31 p 545; Sept 7 p 604
Common, Making Jobs Fewer (Editorial), Nov 23 p 1371
Common, Shortage, Sept 21 p 717 (Editorial), Oct 12 p 947
Compensation Laws from Physician's Viewpoint, Aug 17 p 433
Day's Work, Getting a Full (Editorial), Oct 26 p 1081
Detroit Situation*, Aug 10 p 349
Electric Melting Problems, Sept 21 pp 725, 763
Employee Representation at American Multigraph Plant*, Oct 12 p 917
Employers the Buffer, July 27 p 228
Employment and Wages in Metal Working Industries, July 13 p 114; July 27 p 244; Aug 10 p 346; Aug 31 p 539; Sept 14 p 651; Sept 28 p 821; Oct 5 p 870; Oct 26 p 1072; Nov 9 p 1257; Nov 23 p 1393; Dec 14 p 1568; Dec 28 p 1727
Facing the Issue (Editorial), Nov 2 p 1151
German Wage Advances, Dec 7 p 1491
Hourly Output a Constant (Editorial), Nov 23 p 1371
Human Relations in Industry, Aug 31 p 541
Industrial Relations, Further Legislation Suggested, Sept 14 p 666
Illinois Manufacturers Ask Repeal of Miner Law, Aug 10 p 360
Independent Steel Companies Meet Steel Corporation Wage Advance, Aug 24 p 508
Indianapolis Chamber of Commerce Champions Open-Shop, Aug 3 p 299
Legislation in 1921, Dec 28 p 1723
Loss Due to Strikes, July 13 p 112
Metal Trades Wages Abroad, Aug 24 p 486
Output Less, Prices Rise, Aug 31 p 548
Philosophy of Work (Editorial), July 20 p 162; Aug 17 p 432
Puddlers' Wages, July 6 p 10; Aug 31 p 571; Nov 2 p 1142
Railroad Injunction (Editorial), Sept 7 p 610
Repetitive Operations (Editorial), Aug 24 p 489
Safety Week at Ford Plant*, July 20 p 129
Sheet Mill Wages, July 20 p 158; Sept 14 p 685; Nov 16 p 1289
Steel Corporation Wage Advance, Aug 24 p 508
Steel Wages and Prices (Editorial), Sept 14 p 664
Strike and "Rights," Aug 24 p 488
Strikes, High Cost of, Aug 31 p 542
Supply and Immigration, Aug 3 p 278
Supply, Prosperity and (Editorial), July 13 p 93
Three-Shift Day, Report of Bradley Stoughton, Sept 14 pp 657, 689
Turnover, Change (Editorial), Dec 14 p 1584
Two Shift Day, What Are the Evils of, Oct 19 p 1005
Union Sued Under Recent Decision, July 20 p 157
Unions Liable in Massachusetts (Editorial), Nov 30 p 1439
Wage Advance At Cambria Works, Aug 3 p 321
Wage Trend, Aug 10 p 343; Nov 30 p 1436
Wages, Advance in Steel Works (Editorial), Aug 31 p 550
Wages in Kentucky-Tennessee District, 1920, Aug 3 p 299
Wages, Independent Steel Companies Meet Steel Corporation Advance, Aug 24 p 508; Aug 31 p 555
Wages, Living (Editorial), Nov 9 p 1222
Wages of Telegraphers Reduced, Dec 14 p 1580
Wages, Railroad Shopmen's, Aug 10 p 350
Wages, Why Raised in Chase Plants, Nov 23 p 1341
Welfare Work, Is It Overdone? (Editorial), Sept 21 p 737
Labor Legislation Association:
(See American Association for Labor Legislation)
Laboratory:
New Naval, Oct 26 p 1075
Lacher, Gilbert L.:
Control of Raw Material to Suit Output in Woodstock Plant*, Sept 21 p 713
From Ore to Nails in Minnesota Plant*, Oct 26 p 1057
Lackawanna Steel Co.:
Plans of Merger with Bethlehem Steel Corporation, Aug 24 p 473
Quarterly Statement, July 20 p 197
Lake Superior Mining Institute:
Convention Papers, Aug 31 p 536
Lake Superior Iron Ore Association:
Ore Statistics, Dec 14 p 1573
Lake Superior Ore:
Freight Rates to Upper Docks, Present, Proposed and Original, Oct 26 p 1065
Shipments, June, July 13 p 82; July, Aug 10 p 351; August, Sept 14 p 652; September, Oct 12 p 942; October, Nov 9 p 1231; Year 1922, Dec 7 p 1516
Lamme and Sykes:
Steel Mill Electrification, Dec 7 p 1497
Landau Machine & Drill Press Co.:
Tapping Chucks, Plain and Back Geared*, July 6 p 23
Landis Machine Co.:
Die-Head with Micrometer Attachment*, Aug 3 p 275
Grinding Machine for Mill Rolls*, Aug 31 p 533
Lane, Henry M.:
Some Foundry Troubles and Their Remedy*, Nov 9 p 1197
Lath:
Metal, Standards, Dec 14 p 1611
Metal, Varieties Eliminated, Dec 21 p 1645
Lath Manufacturers:
(See Associated Metal Lath Manufacturers)
Lathes:
Acme Universal Flat Turret*, Dec 28 p 1681
Bender, for Turning Commutators, Sept 28 p 804
Cincinnati Geared Head Engine*, Aug 31 p 540
Hendey Attachment for Long Lead Threads*, July 13 p 83
Hendey Engine for Light Manufacturing*, Aug 24 p 477
LeBlond Heavy Duty Engine*, Dec 28 p 1699
Niles-Bement-Pond 60-in. Swing*, Dec 7 p 1496
Oliver Smaller Line of Engine*, Nov 23 p 1347
Reading, for Chilled Rolls*, Aug 17 p 406
Rockford Stub for Piston Turning, Nov 9 p 1218
Wood Self-Contained Turret*, Dec 28 p 1686
Leather Belting Exchange:
Sales, Aug 3 p 278; Oct 12 p 926
LeBlond R. K., Machine Tool Works:
Engine Lathe, Heavy Duty*, Dec 28 p 1699
LeChatelier, Prof. Henry:
Honorary Member American Society for Steel Treating, Sept 7 p 621
'Lectromelt Calculator:
Pittsburgh Device for Alloy Additions*, Nov 16 p 1284
Level:
Starrett Aluminum Line*, Nov 23 p 1348
Levoz Process:
For Making Steel Direct, Oct 12 p 974
Levox, T.:
French Electric Furnace, New, Sept 21 p 763
Liberty Machine Tool Co.:
Combination Planer and Slotter, July 13 p 73
Light:
Polarized, In Determining Stress, July 6 p 18
Lignite:
Carbonized for Fuel, Nov 23 p 1346
Lima Locomotive Works:
Locomotive for Fast Freight Service, Oct 12 p 927
Lincoln, Paul M.:
Director of School of Electrical Engineering, Cornell University, Nov 23 p 1394
Link-Belt Co.:
Crawler Crane*, July 20 p 152
General Catalog, Nov 2 p 1157
Lloyd's Register of Shipping:
Ships Under Construction, Aug 10 p 356; Oct 12 p 942

Locomotives:
At Low Prices, Aug 3 p 283
Fate-Root-Heath 7-Ton Gasoline*, Dec 21 p 1629
Interchangeability in German for Russia, Sept 7 p 612
Lima, for Fast Freight Service, Oct 12 p 927
Spanish Order, Competition for, Oct 12 p 951

Loftus Open-Hearth Furnace:
In Operation at Sharon Plant*, Dec 28 p 1677

Long Island Air Reserve Depot:
Government Sale of Machine Tools, Nov 16 p 1286

Love, L. S.:
Machine Shop Economies, Oct 19 p 1004
Parker Brothers Special Machines*, Dec 21 p 1625
Reincarnation of a Firearms Business*, Nov 9 p 1204
Sigourney Tool Co. Planing Work*, Dec 14 p 1555
Standard Machines Increase Production*, Nov 23 p 1335

Lowe Mfg. Co.:
Riddling Machine for Foundries*, Dec 28 p 1694

Lowry, E. J.:
Steel Scrap in Cupola Iron Mixtures*, Aug 10 p 337

Lubricator:
Borgeson Multi-Production Attachment*, Nov 30 p 1424
Gits Brothers Wire Wick System*, Dec 28 p 1700

Lukens Steel Co.:
To Build New Warehouse, Oct 26 p 1106

Lumber, Steel:
Developed for Building*, Sept 14 p 645; Oct 19 p 1019

Luxemburg:
Steel Market and Prices, Dec 14 p 1590
Steel Production (Editorial), Nov 9 p 1223

M

McClintic-Marshall Co.:
Bonded, Nov 9 p 1210

McCrosky Tool Corporation:
Quick Change Drill Chuck*, Nov 2 p 1142

McDermott and Kinney:
Open-Hearth Furnace, Design of Proposed 100-ton*, Nov 2 p 1131

McDonnell, E. J.:
Basic Open-Hearth Steel Furnaces, Dec 7 p 1582

McKee, Willis:
Open-Hearth Progress, Aug 10 p 147

McKune Open-Hearth Process:
Merged with Danforth and Egler Systems, Aug 10 p 382; Dec 14 p 1582

MacCutcheon, A. M.:
Anti-Friction Bearings in Steel Mill*, Aug 3 p 267; Aug 10 p 354; Aug 17 p 423

Machine Tool Builders' Association:
(See National Machine Tool Builders' Association)

Machine Tools:
Belgian Market, July 13 p 80
Government Sale, Nov 16 p 1286
New Haven Branch A. S. M. E. Exhibit, Sept 28 p 811
Problems of the Industry, Nov 30 p 1425
Stabilizing (Editorial), Oct 12 p 946
Standard, for Automotive Industry, Nov 30 p 1435

Machinery:
American Labor Saving, Far East a Market for, Aug 10 p 388
Australian Market, July 13 p 80
Esthonians Interested in American [illegible]
Export Openings in Latin America and Other Lands, Dec 14 p 1568
Exports, June, Aug 10 p 377; July, Sept 7 p 603; August, Oct 12 p 951; September, Nov 2 p 1155; October, Dec 7 p 1508
Industrial, Annual Report of Bureau of Foreign and Domestic Commerce, Dec 21 p 1629
Outlook for, Aug 17 p 415
Pirating American (Editorial), Dec 21 p 1643
World Trade in, July 6 p 28

MacKay Machine Co.:
Roll Leveler to Iron Buckles Out of Sheets, Aug 3 p 278

Mackintosh-Hemphill Co.:
Rolling Mill Equipment Merger, Aug 3 p 272

MacMurray, James E.:
Testimony re Pittsburgh Basing, Nov 23 p 1375

MacPherran and Harper:
Annealing of Gray Iron Castings*, Oct 19 p 1007
Tensile Tests of Cast Iron at Various Temperatures*, Sept 28 p 793

Magnesite:
Deposits in Southern Nevada, July 20 p 145

Malleable Castings Association:
(See American Malleable Castings Association)

Malleable Iron Fittings Co.:
Bag Holder*, Nov 30 p 1424

Management:
Accident Investigations, Value of, Aug 3 p 285
Adjustment to Meet New Conditions, Nov 30 p 1431
British Welfare Work, Nov 30 p 1470
Choosing the Electric Furnace for Foundry, July 27 p 201
Combining Operations in American Bosch Magneto Plant*, Nov 30 p 1409
Coordination of Purchases and Production*, Sept 21 p 713
Economy Features of Electric Foundry, Aug 3 p 277
Employee Representation at American Multigraph Plant*, Oct 12 p 917
Foremen Training, Results from, Dec 14 p 1565
Getting Ready to Buy, July 20 p 166
Imperfect, July 27 p 205
Industrial Relations Conference, Y. M. C. A., Aug 10 p 343
Inspection in Axle Plant of Standard Parts Co.*, Oct 19 p 987
Machine Shop Economies, Oct 19 p 1004
Material Handling in Studebaker Plant*, Nov 16 p 1269
Progress in, Nov 2 p 1158
Relieving Industry of Burden, Dec 7 p 1518
Roebling Insurance Plan and Pension System, Aug 31 p 538
Steel User and Steel Maker Cooperation, Aug 10 pp 347, 388
Utilizing the Seller, Aug 3 p 322
Welfare Work, Is It Overdone? (Editorial), Sept 21 p 737
Youngstown Sheet & Tube Cooperative Dealing, Sept 14 p 694

Manganese:
Caucasian Ore, Iron & Ore Corporation of America Agent, Aug 17 p 422
Effect on Carbon Steels*, Nov 23 p 1357
Effect on Magnetic Properties of Steel, July 20 p 185
Ore, Country's Resources to be Investigated, Nov 2 p 1161
Ore from Cuba Entitled to Free Entry, Dec 28 p 1731
Ore Imports, Nine Months 1922, Oct 26 p 1077
Ore Survey (Editorial), Nov 2 p 1150
Russian Ore for Germany, Sept 7 p 630
Steel, Pearlitic and Sorbitic (Editorial), Dec 14 p 1585
Tariff and (Editorial), Oct 26 p 1081

Manufacturers' Consulting Engineers:
Cylinder Boring Machine*, Dec 7 p 1503

Marine Situation, Oct 19 p 1002

Markham, C. H.:
Defends Privately Owned Railroad Cars, Nov 23 p 1367

Marking Machine:
Noble & Westbrook Bench*, Sept 28 p 805

Marks, J. H.:
Piece Work in Packard Motor Car Plant, Nov 23 p 1373

Marlin Firearms Corporation:
Reincarnation of a Firearms Business*, Nov 9 p 1204

Marten, R. C.:
Suggestions to American Buyers of British Coal, Sept 14 p 667

Maryland Steel Rolling Co.:
Absorbs Trenton Steel & Wire Co., July 13 p 79

Massachusetts Institute of Technology:
Dr. S. W. Stratton, president*, Oct 19 p 1038

Mathews, John A.:
Electric Furnace in Refining Iron and Steel, Nov 2 pp 1127, 1130

Measuring Machines:
Pratt & Whitney Bench*, Aug 31 p 535

Mechanical Appliance Co.:
Watson A. C. Motor for Machine Drives*, July 13 p 74

Mechanical Engineers:
(See American Society of Mechanical Engineers)

Medals:
Henry M. Howe, Founded by American Society for Steel Treating, Sept 7 p 596
John Fritz Awarded to Marconi, July 6 p 27

Merchant Marine:
Chamber of Commerce of the United States Favors Ship Subsidy, Dec 14 p 1560
Importance of, Dec 28 p 1691
President Harding Urges Passage of Ship Subsidy Bill, Nov 23 p 1377
Schwab, Charles M., in Favor of Ship Subsidy, Nov 23 p 1362

Mesabi Iron Co.:
Expansion, Aug 10 p 368

Metal & Thermit Corporation:
Lower Temperature in Preheating Cast Iron Thermit Welds, Oct 5 p 869
Thermit Insert Rail Weld*, Aug 31 p 532

Metal Lath:
Standards, Dec 14 p 1611
Varieties Eliminated, Dec 21 p 1645

Metal Wool:
Methods of Manufacturing*, Sept 7 p 591

Metallurgy:
In Foundry, Oct 26 p 1078
Oxygen in, Nov 9 p 1203 (Editorial), p 1223

Metals:
Cast, Apparatus for Determining Linear Shrinkage and Bottom Pouring, Oct 19 p 999
Fatigue of, July 6 p 17; Sept 28 p 779*
Non-Ferrous, Fatigue in*, Aug 10 p 356
Schoop Process of Spraying*, Aug 3 p 286
Stress Determination and Polarized Light, July 6 p 18

Metal Trades Association:
(See National Metal Trades Association)

Metric System:
American Chemical Society Conference on, Sept 14 p 697
Metropolitan Steel Co.:
Organized, Nov 16 p 1319
Mexico:
Monterrey Iron & Steel Co. Using Mexican Coke Exclusively, Sept 7 p 595
Michigan Steel Corporation:
Buys Site for Plant, Nov. 30 p 1449
To Build Sheet Mill, Nov 9 p 1220; Dec 21 p 1628
Micrometers:
Beard Inside, for Gaging Cylinders*, Nov 16 p 1282
Reed Inside Gage*, July 13 p 84
Midland Seamless Tube & Steel Co.:
Organized, Nov 30 p 1441
Midvale Steel & Ordnance Co.:
Acquired by Bethlehem Steel Corporation, Nov 30 p 1443
Federal Trade Commission Objects to Merger with Republic and Inland Companies, Sept 7 p 597
Merger with Inland and Republic Companies Abandoned, Oct 5 p 873
Quarterly Report, Aug 24 p 523; Nov 9 p 1210
Miller, L. H.:
Structural Steel Industry, New Era in, Nov 30 p 1445
Miller, Walter L.:
Chief of Foreign Division Bureau of Foreign and Domestic Commerce, Oct 26 p 1070
Millerette:
Garrett Converter*, Oct 19 p 1004
Millholland, R. A.:
Case Hardening, Problems in Localized, Aug 3 p 265
Milling Machines:
Rockford New*, July 27 p 203
Waltham, Thread*, Dec 28 p 1684
Mills, Charles M.:
Book Reviews on Labor Problems, Sept 14 p 698
Minerals:
Section Added to Bureau of Foreign and Domestic Commerce*, July 6 p 19
Mining:
Industries, Oct 19 p 1002
Mining and Metallurgical Engineers:
(See American Institute of Mining and Metallurgical Engineers)
Mining Congress:
(See American Mining Congress)
Minnesota Occupation Tax:
Arguments Before Supreme Court, Dec 7 p 1519
Minnesota Steel Co.:
Adds Rod Mill and Wire Plant to Duluth Works*, Oct 26 p 1057
First Shipment of Nails, Sept 14 p 695
Wire Rod Mill Rolls Its First Steel, Sept 21 p 719
Mirra Piston Pin Co.:
Organized, Dec 28 p 1739
Missouri Iron & Steel Co.:
Merged with Hoosier Rolling Mill Co., Dec 21 p 1637
Mitchell Engineering Co.:
Polishing Machinery*, Aug. 3 p 270
Mitchell Motors Co.:
To Be Reorganized, Dec 28 p 1709
Mitchell, R. K.:
Standard, vs. Special Machine Tools for Automotive Production, Nov 30 p 1435
Modern Machine Tool Co.:
Cutting Off Machine*, Nov 23 p 1348
Modjeski, Ralph:
Standardization and Bridge Design, Oct 19 p 1004
Moenich, Oscar:
British Wire Nail Importation, Aug 17 p 414
Moffett, L. W.:
Changes in Metal Schedule of Tariff, Aug 24 p 475
Coal Strike Situation, July 13 p 95
Eastern Iron Ore Freight Rate Reduction, Aug 3 p 281
Fordney-McCumber Tariff Compared with Others, Sept 28 p 807
Freight Rates on Minnesota Ore Justified, Oct 26 p 1065
Merchant Marine, Importance of, Dec 28 p 1691
Metal Duties in Fordney-McCumber Tariff, Sept 21 p 726
Metal Wool and Methods of Manufacturing*, Sept 7 p 591
Pittsburgh Basing Point Hearings, Nov 9 p 1228; Nov 16 p 1228; Nov 23 p 1366
Steel Mergers, Report of Department of Justice, July 27 p 207
Trade Commission Objects to Republic-Midvale Steel Merger, Sept 7 p 597
Tariff, Free Zone System Included in Bill, Aug 24 p 471
Tariff Investigations, Methods of Procedure, Nov 2 p 1159
Molding Machines:
Arcade Jolt Stripper*, July 20 p 138
Hanna Split Pattern*, Dec 7 1504
Molybdenum:
As an Alloying Element, Oct 5 p 864
Ore Smelting Plant in Washington, Oct 19 p 998
Monterrey Iron & Steel Co.:
Use of Mexican Coke Exclusively, Sept 7 p 595
Moore and Jasper:
Developments in Fatigue of Metals*, Sept 28 p 779
Moore, Harry:
Device for Cleaning Old Machinery*, Dec 7 p 1514
Hammer for Stamping Single Letters*, July 13 p 94
Morgan Construction Co.:
Operations, Oct 26 p 1076
Morris & Bailey Steel Co.:
Absorbed by Oliver Iron & Steel Co., Dec 21 p 1659
Morris Tool Co.:
Tool Holder and Interchangeable Cutters*, Sept 7 p 595
Mortiser:
Oliver Power Feed Hollow Chisel*, Sept 28 p 804
Motion Pictures:
De Lavaud Centrifugal Process, Dec 14 p 1570
Management and Study Data Exhibited, Oct 5 p 864
Steel Making, to Be Presented by Department of Commerce, Aug 3 p 274
Story of Compressed Air, Oct 26 p 1071
"Story of Steel" Shown in Washington, Nov 16 p 1295
Motorbloc Corporation:
Chain Hoist, Motor-Driven*, Nov 2 p 1153
Motors:
Electric Controller Squirrel Cage Induction*, Sept 7 p 590
Mechanical Appliance A. C. for Machine Drives*, July 13 p 74
Muntz Metal Co., Ltd.:
Manufacture of Brass Tubes, Dec 7 p 1515
Museum:
Engineering, Movement for Establishment at Smithsonian Institute, Aug 3 p 280
Engineering Wanted (Editorial), Dec 28 p 1697

N

Nagle Steel Co.:
Organized, Oct 5 p 903
Sells Two Plants, Sept 14 p 685
To Resume Operations, Sept 21 p 719
Nails:
First Shipment of Minnesota Steel Co., Sept 14 p 695
Wire, British Importations, Aug 17 p 414
National Association of Brass Manufacturers:
Red Lead in Pipe Joints, Opposition to, Oct 12 p 927
National Association of Cost Accountants:
Convention Program, Aug 3 p 266
Cost Accounting in Manufacture of Iron and Steel Sheets, Dec 14 p 1573
National Association of Farm Equipment Manufacturers:
Convention Program, Oct 5 p 860
Proceedings of Convention, Oct 26 p 1067
National Association of Sheet and Tin Plate Manufacturers:
June Sheet Statistics, Aug 3 p 321; July, Aug 31 p 554; August, September, Nov 2 p 1182; October, Nov 23 p 1346; November, Dec 28 p 1679
National Automobile Chamber of Commerce:
Passenger Car and Truck Production, June, Aug 24 p 483; August, Sept 7 p 612
National Conference of Business Paper Editors:
Convention Proceedings, Oct 19 p 1001
National Enameling & Stamping Co.:
Breaks Ground for New Mill, Oct 19 p 998
Extensions, July 13 p 86
National Exposition of Power and Mechanical Engineering:
Exhibitors, Nov 23 p 1350
Power Equipment Exhibition, Dec 14 p 1604
National Foreign Trade Council:
Convention Announcement, Dec 14 p 1558
Selected Bibliography of Foreign Trade, Nov 16 p 1317
Trade Adviser Service Organized, Nov 30 p 1424
National Founders' Association:
Convention Proceedings, Nov 23 p 1374; Nov 30 p 1413*
Convention Program, Nov 9 p 1257
National Industrial Conference Board:
Cost of Living, Oct 26 p 1072
Immigration Policy's Effect on Industry, Oct 26 p 1072
Industrial Conditions, Aug 3 p 307
Loss Due to Strikes, July 13 p 112
Metal Trades Wages Abroad, Aug 24 p 486
Railroad Shopmen's Pay, Aug 10 p 359
Survey of Industries, July 20 p 188
Taxation and National Income, Dec 14 p 1564
Trend of Wages, Aug 10 p 343; Nov 30 p 1436
Workmen's Compensation Laws from Physician's Viewpoint, Aug 17 p 433
National Machine Tool Builders' Association:
Branch Secretaries' Semi-Annual Meeting, Aug 24 p 480
Convention Proceedings*, Oct 12 p 923
National Personnel Association:
Convention Proceedings, Nov 16 p 1315
Convention Program, Nov 2 p 1181
Organize to Study Industrial and Labor Questions, Aug 17 p 434
National Pressed Steel Co.:
Handbook of Steel Lumber Sections, Sept 14 p 700
National Research Council:
Booklet of Engineering Division, Oct 26 p 1078
National Safety Council:
Convention Program, Aug 3 p 323
Proceedings of Convention, Sept 7 p 613

National Supply and Machinery Dealers Association:
Convention of Machine Tool Section, Nov 30 p 1147
Program of Machine Tool Section Meeting, Nov 2 p 1252
National Tube Co.:
50th Anniversary, Sept 21 p 760
Research on Corrosion of Steel Pipe, Dec 14 p 1578
To Begin Work on Gary Plant, Oct 12 p 972
Navy Department:
Cutting Cruiser Into Scrap*, July 6 p 9
Gun Factory at Washington*, July 13 p 87
Laboratory, Oct 26 p 1075
Nelson, John:
Associated Industries of Massachusetts, Activities, Dec 28 pp 1689, 1724
Friendliness a Factor in Export Trade, Nov 9 p 1224
Safety Records in Worcester County Plants, Nov 2 p 1156
New England Foundrymen's Association:
(See Foundrymen's Associations)
New England Iron and Hardware Association:
Outing, Oct 5 p 860
New York State Industrial Conference:
Convention Proceedings, Nov 23 p 1356; Nov 30 p 1471
New York University:
Lectures on Geology of Commerce and Industry, July 20 p 142
New Zealand:
Onakaka Iron & Steel Co. Starts Blast Furnace, July 13 p 81
Onakaka Pig Iron Output, Aug 17 p 419
Newark Museum:
Motion Study Data Exhibited, Oct 5 p 864
Newton Steel Co.:
Expansion Plans, Dec 21 p 1624
Nibbling Machine:
Campbell, for Cutting Irregular Shapes*, Oct 26 p 1076
Niles-Bement-Pond Co.:
Plate Planer*, Sept 28 p 803
Swing Lathe, 60-In.*, Dec 7 p 1496
Nilson Kritiskope:
Device for Determining Critical Point in Steel*, Sept 28 p 806
Nitrogen:
In Steel, Dec 28 p 1680
Nitrol:
Case-Hardening Compound, Sept 28 p 806
Noble & Westbrook Mfg. Co.:
Bench Marking Machine*, Sept 28 p 805
Norma Co. of America:
To Make Hoffman Bearings, Oct 26 p 1107
North American Steel Corporation:
Location of Offices Not Decided, July 27 p 202
Nussbaum, B. M.:
Foremen Training Results, Dec 14 p 1565
Nuts:
Electrive Tool for Turning Down*, July 20 p 146

O

Oberhoffer and Piwowarsky:
Gases in Steel, Aug 31 p 534
Obituary:
Adam, Frank, Sept 21 p 759
Adt, Edwin B., July 13 p 117
Alsop, Edward B., Nov 16 p 1313
Anthony, [illegible] Oct [illegible] p 1043
Arrel, David T., Dec 21 p 1664
Bacon, Don H., Dec 28 p 1721
Baird, Chester R., Nov 2 p 1178
Bangs, Burton C., July 20 p 187
Bass, John H., Dec 28 p 1721
Beadling, Thomas, Sr., Sept 21 p 759
Beaton, A. J., Nov 2 p 1179
Blackburn, Oliver A., Aug 31 p 573
Bliss, Lewis R., Aug 31 p 573
Bogert, John J., Nov 30 p 1467
Borland, Robert, July 13 p 117
Brayton, Charles A., Oct 26 p 1109
Brayton, Edward L., Aug 3 p 319
Bronson, J. Hobart, July 20 p 187
Brown, Walter H., Aug 10 p 387
Buffum, Frank W., Nov 23 p 1395
Burrell, L. A., Oct 26 p 1109
Byers, William M., Dec 7 p 1540
Cairns, William, Dec 28 p 1721
Campbell, H. H.*, Sept 21 p 759
Carpenter, Francis W., Dec 7 p 1540
Carpenter, Samuel H., Aug 3 p 319
Carter, Hedley P., Nov 30 p 1467
Chamberlain, Valentine B., Jr., Aug 17 p 453
Colvin, Theodore H*, Aug 31 p 573
Conant, Edmund S., Aug 31 p 573
Cooke, Frederick W., Sept 14 p 687
Cooper, Charles G., Aug 17 p 453
Crompton, Charles, July 13 p 117
Davis, Perry H., Oct 5 p 901
Dawes, Alfred, July 20 p 187
Dean, William B., Dec 14 p 1611
De Haven, Hugh., Dec 21 p 1664
Donahue, Lawrence, Oct 5 p 901
Dornberger, Herbert S., Sept 7 p 631
Dowling, John, Nov 23 p 1395
Eckel, Peter, July 13 p 117
Elliott, D. D., Aug 3 p 319
Everest, W. B., Dec 14 p 1611
Faris, David D., July 13 p 117
Flagler, John H.*, Sept 14 p 687
Flaig, William G., Aug 17 p 453
Flynn, James F., Nov 9 p 1251
Foht, Emil A., Oct 19 p 1043
Follet, Louis*, Aug 24 p 511
Follinger, Herbert C., Oct 5 p 901
Foote, John B., Nov 2 p 1179
Frank, Harry J., Sr., Oct 19 p 1043
French, Edmund L., Sept 7 p 631
Frost, Meshech, Aug 24 p 511
Gardner, Frederick W., Nov 23 p 1395
Garland, Charles, Nov 30 p 1467
Gay, Clarence H., July 27 p 253
Gingrich, Charles S., Oct 19 p 1043
Glover, Charles E., Nov 2 p 1178
Goodwin, John M., July 13 p 117
Goss, Samuel G., July 13 p 117
Grantham, Herbert T., Nov 9 p 1251
Hamilton, George W., July 27 p 253
Hewitt, Herbert H., Dec 28 p 1721
Hewitt, William, Aug 10 p 387
Hirsch, Henry, Nov 23 p 1395
Hoblitzelle, George K., Nov 9 p 1251
Hoffer, Allen, Nov 9 p 1251
Holland, W. H., July 13 p 117
Howe, Frank P., Aug 31 p 573
Humbird, James S., Sept 7 p 631
Hutchins, C. Henry, Nov 23 p 1395
Hutchinson, Edward L., Dec 14 p 1611
Jackson, S. D. L., Oct 5 p 901
Johnson, Albert L., July 27 p 253
Johnston, Thomas, Nov 16 p 1313
Jones, Paul, July 13 p 117
Kelly, Warren, Nov 2 p 1179
King, James A., Oct 26 p 1109
Kingsley, Henry L., Nov 30 p 1467
Kinnear, James W., Sept 14 p 687
Koop, George, Oct 19 p 1043
Kroner, John C., Oct 26 p 1109
Leonard, John A., Sept 14 p 687
Lincoln, Louis P., Oct 26 p 1109
Luitink, William G., Oct 5 p 901
Lynch, Harry F., Dec. 28 p 1721
McCarthy, James J., Dec 7 p 1540
McGilvray, Charles F., July 13 p 117
McHugh, John T., Sept 7 p 631
McMillen, Porter, Nov 16 p 1313
McNab, F. B., Dec 7 p 1540
Mark, Cyrus, Nov 30 p 1467
Marsh, Fred A., Dec 14 p 1611
Mathews, James A., Dec 21 p 1664
Mayer, Levy, Aug 31 p 573
Meston, Thomas M., Nov 30 p 1467
Mishler, E. J., Dec 21 p 1664
Mitchell, Frank L., July 13 p 117
Moore, Spencer F., Oct 19 p 1043
Murphy, William T., July 20 p 187
Neff, John C., Aug 24 p 511
Niedringhaus, Frederick G., Nov 30 p 1467
Norton, W. D., Nov 16 p 1313
Ohl, Edwin N.*, Sept 14 p 687
Parker, Frank H., Oct 5 p 901
Patterson, Thomas S., Nov 16 p 1313
Pearson, William C., Aug 17 p 453
Pero, J. P., Oct 5 p 901
Pew, John Osborn*, Aug 24 p 511
Phillips, Charles, July 13 p 117
Phillips, Edgar B., Dec 21 p 1721
Potter, John M., Sept 14 p 687
Price, William A., Dec 21 p 1664
Pullen, Richard T., Nov 2 p 1179
Rapp, John W., Aug 24 p 511
Raymond, Edward B., Sept 14 p 687
Rea, Charles S., Aug 10 p 387
Reed, Richard D., Aug 24 p 511
Rhodes, William B., Oct 26 p 1109
Sellers, Coleman, Jr.*, Aug 31 p 573
Sidnell, Harry R., July 20 p 187
Small, Thomas L., Dec 21 p 1664
Smith, Frank B.*, Aug 24 p 511
Smith, George F., Nov 23 p 1395
Snyder, J. E., Nov 16 p 1313
Spaulding, Walter M., Nov 23 p 1395
Steger, Louis C., Aug 31 p 573
Stephans, John, Aug 31 p 573
Stiles, Raymond H., Nov 23 p 1395
Taglibue, Charles J., Nov 9 p 1251
Teal, Crowther, Aug 3 p 319
Thwing, Charles E., July 20 p 187
Tobin, John H., Sept 14 p 687
Toomey, Frank, Sr.*, Aug 10 p 387
Tower, C. L., July 27 p 253
Tyler, Edgar B.*, Oct 5 p 901
Walker, William R., Dec 28 p 1721
Walsh, Phillip C., Jr., Nov 2 p 1179
Walton, Druid A., Nov 9 p 1251
Wheeler, A. N., Sept 14 p 687
Witherbee, Walter C., Oct 5 p 901
Wood, Harry I., Aug 3 p 319
Wood, William B., Nov 2 p 1179
Ohio State Foundrymen's Association:
(See Foundrymen's Associations)
Oil:
Fuel, Substituted for Coal at Valley Plants, July 20 p 181
Fuel, Using Cold Air, Aug 3 p 269
Oilgear Co.:
Broaching Unit, High-Speed*, Aug 31 p 542
Horizontal Press for General Work*, July 20 p 158
Oliver Iron & Steel Co.:
Takes Over Morris & Bailey Steel Co., Dec 21 p 1659
Oliver Machinery Co.:
Engine Lathes, Smaller Line*, Nov 23 p 1347
Mortiser, Power Feed Hollow Chisel*, Sept 28 p 804
Saw Bench, Motor Driven*, Dec 28 p 1684
Self-Contained Jig Saw*, Aug 3 p 270
Oliver, William H.:
Manager of Sales New York Office Republic Iron & Steel Co.*, Oct 19 p 1042
Onakaka Iron & Steel Co.:
Blast Furnace Started, July 13 p 81
Pig Iron Output, Aug 17 p 419
Open-Hearth Combustion System:
Merger of Blow Torch Furnaces, Dec 14 p 1582, (Editorial) p 1585
Open-Shop:
Adopted by East End Manufacturers' Association, Oct 12 p 944
Indianapolis Chamber of Commerce Champions, Aug 3 p 299
Ore:
Imported, Freight Rates Reduced, Sept 28 p 821
Iron, Analyzing Birmingham District*, Aug 10 p 338
Iron, Demand from Sweden, Sept 21 p 752

Iron, Eastern, Freight Rate Reduction, Aug 3 p 281
Iron, Ex-Lake and Eastern Freight Rates Again Suspended, July 20 p 184
Iron from Utah, Oct 26 p 1085
Iron, German Output 1918, 1919, Aug 17 p 412
Iron Imports Eight Months 1922, Oct 12 p 922
Iron, Less Per Ton of Pig Iron (Editorial), Aug 17 p 432
Iron, Unjust Freight Rates (Editorial), July 20 p 161
Iron, World's Resources*, July 27 p 211
Lake Superior Shipments, June, July 13 p 82; July, Aug 10 p 351; August, Sept 14 p 652; September, Oct 12 p 942; October, Nov 9 p 1231; Year 1922, Dec 8 p 1516
Magnesite Deposits in Southern Nevada, July 20 p 145
Manganese, Country's Resources to Be Investigated, Nov 2 p 1161
Manganese from Cuba Entitled to Free Entry, Dec 28 p 1731
Manganese Imports, Nine Months 1922, Oct 26 p 1077
Manganese, Survey (Editorial), Nov 2 p 1150
Minnesota Freight Rates Justified, Oct 26 p 1065
Molybdenum Smelting Plant in Washington, Oct 19 p 998
Titaniferous Iron, Use of, Dec 28 p 1688

Orton & Steinbrenner Co.:
Combination Crane and Shovel*, Oct 5 p 869

Oscilloscope:
Kennedy, for Studying Mechanism*, Dec 28 p 1685

Otis Steel Co.:
Orders for Equipment, Sept 21 p 759
Quarterly Statement, Nov 16 p 1289
To Build New Plant, July 27 p 247; Aug 3 p 278

Oxy-Acetylene:
Cutting Cruiser Into Scrap*, July 6 p 9

Oxygen:
In Blast Furnace and Metallurgical Operations, Nov 2 p 1179
In Metallurgy, Nov 9 p 1203, (Editorial), Nov 9 p 1223

P

Pacific Coast:
Merger of Columbia Steel and Utah Coal & Coke Companies, June 6 p 11; Dec 21 p 1645
Merger of Three Steel Companies, Sept 14 p 684

Pacific Steel Corporation:
Merger of Pacific Coast Steel and Southern California Iron & Steel Companies and Milner Corporation, Sept 14 p 684

Packard Motor Car Co.:
Piece Work Plan, Nov 23 p 1373

Pardee Steel Corporation:
Equipment and Product, Dec 28 p 1694

Parker Brothers:
Special Machines*, Dec 21 p 1625

Panama Canal:
Traffic, Oct 19 p 1004

Pangborn Corporation:
Sand Blast Barrel*, Nov 9 p 1209

Patents:
Foreign Chemical, Appeals for Retaining, July 27 p 217

Paton and Koenig:
Metal Wool Manufacture*, Sept 7 p 591

Paullsen, H. C.:
Aluminum Foil, Aug 10 p 389

Peabody, F. S.:
Free Competition, the Remedy in Coal Industry, Aug 17 p 412

Peat:
Story of, Dec 7 p 1506

Penn Seabord Steel Corporation:
Merger with Carpenter Steel Co Abandoned, Aug 17 p 412

Pennsylvania Crusher Co.:
Single Roll Coal Crusher Improved*, Nov 2 p 1140

Pennsylvania Flexible Metallic Tubing Co.:
Passing Rivets with Rivet Gun*, Aug 17 p 422

Pennsylvania Railroad:
Machine Tool Inquiry, Oct 19 p 1046

Pennsylvania State College:
Industrial Course, July 6 p 27

Pension:
Roebling Plan, Aug 31 p 538

Perley, Alden D.:
What Are Real Evils of the Long Shift? Oct 19 p 1005

Person, Dr. H. S.:
Shaping Your Management to Meet Industrial Conditions, Nov 30 p 1431

Personnel Association:
(See National Personnel Association)

Petty, D. M.:
Internal Combustion Engines for Power*, Oct 26 p 1073

Philadelphia District Salvage Board:
Shell Steel Sale, Nov 23 p 1375

Phillips, W. Vernon:
High Cost Factor in Scrap Trade, Nov 30 p 1430

Pig Iron:
Cleveland, United States Principal Importer, Aug 10 p 390
Cost of Making Lowered by Freight Cuts, July 13 p 82
Equalization in (Editorial), Dec 14 p 1584
Foreign, Analysis, Dec 21 p 1631
Foundry Specifications, July 6 p 16
Freight Rates, Arrow Company's Reasons for Establishing Lower, Sept 14 p 696
Freight Rates from Birmingham, July 13 p 82; July 27 p 244
Freight Rates from the South, Hearing, Oct 5 p 869
Freight Rates from the South, Proposed Reductions, Aug 17 p 407
Freight Rates from the South, Protests Filed, Aug 24 p 486
Freight Rates from the South Upheld, Sept 21 p 738
Freight Rates, No Cut to St. Louis, Ohio River Crossings and Other Points, Dec 21 p 1637
Freight Rates, Reparation to Roane Iron Co., Nov 2 p 1143
French Supply, Oct 12 p 971
Imported, Reduced Freight Rates Asked, Sept 21 p 747
Imports, Sept 7 p 612; Nov 16 p 1292; Dec 28 p 1697 (Editorials)
Less for Steel Making (Editorial), Nov 30 p 1440
Less Iron Ore Per Ton of (Editorial), Aug 17 p 432
Monthly Production, June*, July 6 p 36; July, Aug 3 p 300; August, Sept 7 p 606; September, Oct 5 p 882; October, Nov 9 p 1232; November, Dec 7 p 1521
Production, 1922, United States, Estimated (Editorial), Dec 28 p 1697
Production, United States, First Half 1922, Aug 17 p 428
Shortage, What Is Today's?* July 20 p 135
Synthetic, Connecticut Electric Steel Co. to Make Test Runs, Nov 9 p 1226
To Appeal for Higher Tariff on, Dec 7 p 1525

Pig Iron Association:
(See Southern Ohio Pig Iron and Coke Association)

Pipe:
Cast Iron, DeLavaud Centrifugal Process in Motion Pictures, Dec 14 p 1570
Cast Iron Manufacture in 1921, Oct 26 p 1071
Clay, Substitute for Cast Iron, July 6 p 6
Freight Rate Charges Unreasonable, Nov 9 p 1252
In Oil Lines, Nearly 60,000 Miles, Nov 23 p 1344
Joints, Red Lead in, Oct 12 p 927
Prices, Independents, Oct 26 p 1084
Steel, Research on Corrosion, Dec 14 p 1578

Pittsburgh Basing Point:
(See Basing Point, Pittsburgh)

Pittsburgh Electric Furnace Corporation:
Device for Calculating Alloy Additions*, Nov 16 p 1284

Pittsburgh Steel Co.:
Annual Report, Oct 26 p 1120
Freight Rate Reparation, Nov 9 p 1210

Piwowarsky and Oberhoffer:
Gases in Steel, Aug 31 p 534

Piwowarsky, Dr. E.:
Annealing Grey Cast Iron, Dec 7 p 1499

Planing:
Metal Parts, at Sigourney Tool Plant*, Dec 14 p 1555

Planing Machines:
Cincinnati New Open-Side*, Dec 28 p 1683
Liberty Combination Slotter and*, July 13 p 73
Niles-Bement-Pond Plate*, Sept 28 p 803
Zig-Zag Oil Groove Attachment*, July 20 p 158

Plates:
Freight Rates, Gulf Refining Case Dismissed, Nov 9 p 1252
Van Keuren Lapped Steel Surface*, Oct 26 p 1084

Poland:
Iron and Steel Industry, Dec 7 p 1539
Machinery Industry*, Dec 7 p 1483

Polarized Light:
In Determining Stress, July 6 p 18

Poliakoff, R.:
Interchangeability in German Locomotives for Russia, Sept 7 p 612

Polishing Machinery:
Mitchell Engineering*, Aug 3 p 270

Porter, H. F. J.:
How Bethlehem Became Armament Maker, Nov 23 p 1339

Potts, Horace T. & Co.:
Warehouse, July 6 p 29

Power:
Electric, Efficiency of Supply*, Dec 7 p 1487
Equipment Exhibition, Dec 14 p 1604
Sources of Utilities (Editorial), July 13 p 94

Pratt & Whitney Co.:
Automatic Centering Machine*, Nov 2 p 1143
Bench Measuring Machine*, Aug 31 p 535
Duplex Hand Centering Machine*, Nov 16 p 1280
Instrument for Testing Gear Teeth*, July 27 p 204
Level for Setting Up Precision Machinery*, Dec 28 p 1680
Pipe, Pin and Steel Wheel Gages*, Nov 30 p 1434
Safety Wheel Dresser for Vertical Surface Grinder*, Sept 28 p 806

Precision & Thread Grinder Mfg. Co.:
Bruce Precision Eccentric Boring Head*, Dec 14 p 1670
Extension Grinding Attachment*, Sept 28 p 805

Precision Level:
Pratt & Whitney, for Setting Up*, Dec 28 p 1680

Precision Machine Co.:
Revolution or Stroke Counter*, Aug 3 p 295

Presses:
American Vertical Broaching*, Nov 9 p 1206
Garrett Hydraulic for Baling Scrap*, July 27 p 206
Gibbons Safety Device for*, Aug 17 p 420
Hanna General Utility Pneumatic*, Aug 31 p 540
Hydraulic Large Flanging*, Aug 10 p 346
Massachusetts to Safeguard Power, Oct 12 p 928
Oilgear Horizontal, for General Work, July 20 p 158
Punch, S & S Dial Feeds for*, Dec 28 p 1686
Southwark Universal Hydraulic*, Dec 28 p 1680
Standard Safety Guard for*, Oct 26 p 1064
Toledo Double Crank Toggle Drawing*, Dec 28 p 1690

Prices:
Belgian Iron and Steel, Oct 19 p 1022; Nov 16 p 1285; Dec 14 p 1590
Cars and Locomotives, Aug 3 p 283
Coal, in Alabama, Sept 7 p 630
Coal, Stocks and (Editorial), Aug 10 p 333
Coal, Voluntary Agreement Proposed, Aug 10 p 358
Course of Steel (Editorial), Nov 23 p 1370
French Iron and Steel, July 6 p 39; July 13 p 111; July 27 p 231; Aug 10 p 387; Aug 24 p 493; Aug 31 p 544; Sept 7 p 628; Sept 14 p 662; Oct 5 p 881; Oct 19 p 1022; Oct 26 p 1090; Nov 9 p 1248; Nov 23 p 1351; Dec 14 p 1588; Dec 28 p 1739
German Iron and Steel, July 6 p 12; July 13 p 111; July 20 p 184; July 27 p 229; Aug 3 p 295; Aug 10 p 389; Aug 17 p 413; Aug 24 p 492; Sept 7 p 628; Sept 14 p 661; Sept 21 p 753; Oct 5 p 880; Oct 19 p 1021; Oct 26 p 1109; Nov 9 pp 1225, 1256; Nov 23 p 1377; Nov 30 p 1467; Dec 7 p 1539; Dec 14 p 1589; Dec 21 p 1626; Dec 28 p 1722
Government's Hand in (Editorial), Oct 26 p 1083
High, and Prosperity (Editorial), Sept 28 p 818
Japanese Iron and Steel, Aug 17 p 433; Oct 19 p 1023; Nov 16 p 1295; Nov 23 p 1351
Luxemburg Iron and Steel, Dec 14 p 1590
Pipe, Oct 26 p 1084
Progress and (Editorial), Oct 26 p 1080
Rails Advanced, Sept 21 p 766
Scrap, Relation of (Editorial), July 27 p 227
Seamless Steel Tubes, Aug 24 p 472
Sheet and Tin Plate (Editorial), Nov 30 p 1438
Steel, and Mergers, Aug 3 p 292
Steel, and Wages (Editorial), Sept 14 p 664
Steel Castings, Sept 28 p 814
Tin Plate, Independents Follow Steel Corporation, Dec 7 p 1501

Prizes:
Economic Essay, Dec 14 p 1582

Producer Gas:
Brown Coal Briquettes for, Nov 2 p 1176

Production Machine Tool Co.:
Lathe Attachment for Milling*, Oct 19 p 1004

Production Statistics:
Automobiles, June, July 27 p 253; August, Sept 7 p 612; Eight Months 1922, Oct 12 p 960; September, Oct 26 p 1072; Nov 2 p 1182; October, Nov 30 p 1420
Brier Hill Steel Co., Record, Nov 9 p 1249
British Pig Iron and Steel, June, July 13 p 116; July, Aug 17 p 415; August, Sept 21 p 752; September, Oct 19 p 1045; October, Nov 16 p 1317; November, Dec 21 p 1632
Canadian Iron and Steel, June, July 27 p 228; July, Aug 31 p 539; September, Nov 16 p 1317; (Editorial) Sept 28 p 819
Cast Iron Pipe, 1921, Oct 26 p 1071
Cement, Portland, Eight Months 1922, Sept 21 p 764; September, Oct 19 p 1041; October, Nov 23 p 1349; November, Dec 21 p 1630
Coal and Coke, Aug 10 p 359; August, Sept 10 p 660; September, Oct 19 p 1020; October, Nov 16 p 1274; November, Nov 23 p 1362; Dec 7 p 1510; Dec 14 p 1579; Dec 28 p 1728
Coke, Beehive and By-Product, 1921, Dec 14 p 1579
Ferromanganese, Nine Months 1922, Oct 26 p 1077
French Iron and Steel, May, July 2 p 217
German Coal Production, Five Months 1922, Sept 7 p 590
German Iron and Steel, 1919, July 13 p 81; 1920-1921, Sept 14 p 700
German Iron Ore, 1918, 1919, Aug 17 p 412
Ingots, Steel, by Months, June, July 13 p 72 (Editorial), p 92; July, Aug 10 p 384; August, Sept 14 p 652; September, Oct 12 p 949; October, Nov 16 p 1319; November, Dec 14 p 1573
Ingots, Steel, United States, for Five Years*, July 13 p 71
Pig Iron by Months, June*, July 6 p 32; July, Aug 3 p 300; August, Sept 7 p 606; September, Oct 5 p 882; October, Nov 9 p 1232; November, Dec 7 p 1521
Pig Iron, United States, 1922, Estimated (Editorial), Dec 28 p 1697
Pig Iron, United States, First Half 1922, Aug 17 p 428
Refractories, July*, Sept 7 p 601; August, Sept 28 p 810
Russian Iron and Steel Industry 1921, Aug 21 p 412; Six Months 1922, Sept 21 p 752
Sheets, June, Aug 3 p 321; July, Aug 31 p 554; August-September, Nov 2 p 1182; October, Nov 23 p 1346
Spiegeleisen, Nine Months, 1922, Oct 26 p 1077
Steel in South Africa, 1921, Nov 9 p 1217
Steel Ingot, Estimates for 1922 (Editorials), Sept 22 p 818; Dec 7 p 1512
Swedish Pig Iron and Ore 1921, Aug 17 p 415; Seven Months 1922, Nov 9 p 1248
Tin Plate, 1921, Nov 9 p 1254
World Steel Supply Now and in 1913 (Editorial), Oct 19 p 1017
World's Electric Steel 1913-1921, Sept 14 p 653

Psychology:
Economics and (Editorial), Sept 14 p 665

Puddling:
Ford Mechanical Process at Youngstown Plant*, July 6 p 9
Hibbard Mechanical Process*, July 20 p 145

Pulleys:
Standardization of, July 6 p 35

Pumps:
American in South Africa, Dec 28 p 1729

Puppe, Dr. J.:
Comparison of Talbot and Other Open-Hearth Processes, Oct 19 p 1009

Purchases:
And Sales, Matching (Editorial), Dec 28 p 1696
Getting Ready to Buy, July 20 p 166

Q

Quad City Foundrymen:
(See Foundrymen's Associations)

Quigg, Murray T.:
Book Review, Nov 23 p 1368

R

Racine Tool & Machine Co.:
Wood and Metal Band Saws*, Nov 23 p 1349

Railroad Equipment:
Business, July 6 p 45; July 13 p 97; July 20 p 181; July 27 p 247; Aug 3 p 296; Aug 10 p 369; Aug 17 p 435; Aug 24 p 506; Aug 31 p 554; Sept 7 p 608; Sept 14 p 684; Sept 21 p 756; Sept 28 p 838; Oct 5 p 898; Oct 12 p 965; Oct 19 p 1040; Oct 26 p 1106; Nov 2 p 1176; Nov 9 p 1252; Nov 16 p 1310; Nov 23 p 1392; Nov 30 p 1462; Dec 7 p 1538; Dec 14 p 1608; Dec 21 p 1658; Dec 28 p 1722

Railroads:
Charge for Placement of Ore Cars Held Reasonable, Sept 21 p 753
Consolidating, Opposition to Ore Carrying, Nov 23 p 1372
Economy in Operation (Editorial), Oct 5 p 878
File Briefs Opposing Freight Rates from Group Points on Iron and Steel Products, Oct 19 p 1003
Freight Rates, Disagreement Does Not Justify Increase, July 20 p 167
Future Buying of Rolling Stock*, Nov 2 p 1123
Government Advice for (Editorial), Aug 24 p 490
Shopmen's Strike, Attorney's Injunction (Editorial), Sept 7 p 610
Shopmen's Strike, Executives Reject President's Proposal, Aug 3 p 299
Shopmen's Strike, Shall Autocracy Succeed? (Editorial), Aug 3 p 290
Turns in the Situation (Editorial), Nov 30 p 1440

Rails:
American vs. British Contract, Sept 14 p 662
Freight Rates, Protest Sustained on Canadian Shipments, Nov 2 p 1139
New Freight Rates Ordered, Aug 24 p 472
Orders, Sept 28 p 838; Oct 5 p 898; Oct 12 p 974 Oct 26 p 1070
Price Advance, Sept 21 p 766

Ralph, John J.:
Getting Ready to Buy, July 20 p 166
Peculiarities of Buyers, Nov 30 p 1420
Speed of the Dollar, Dec 7 p 1489
Utilizing the Seller, Aug 3 p 322

Ramapo Iron Works:
Acquired by American Brake Shoe & Foundry Co., Sept 14 p 710

Rawdon and Sillers, Jr.:
Effect of Manganese on Carbon Steels, Nov 23 p 1357

Rayner, Harry:
Role of Metallurgist, Oct 26 p 1078

Reading Iron Co.:
Lathe for Chilled Rolls , Aug 17 p 406
Takes Over Thomas Iron Co., Dec 28 p 1701
Readjustment:
Fuel Utilization in Economics, Sept 28 p 820
Reed-Prentice Co.:
Capital Readjustment, Nov 30 p 1433
Changes in Personnel, Dec 21 p 1640
Concentrating Work, Nov 30 p 1449
Plans for Selling Subsidiary Companies, Oct 12 p 941; Nov 2 p 1124
Reed Small Tool Works:
Micrometer and Height Gages*, July 13 p 84
Reel:
Forbes & Myer, for Portable Grinder*, Dec 7 p 1502
Reese, A. K.:
Bases of Modern Blast Furnace Practice, Nov 9 pp 1207, 1253; Nov 23 p 1353
Refractories:
Dolomite for, Oct 19 p 998
Market, July 6 p 54; July 20 p 187; Aug 10 p 351; Aug 31 p 554; Sept 14 p 675; Oct 5 p 889; Oct 19 p 1038; Nov 2 p 1184; Nov 16 p 1320; Nov 30 p 1465; Dec 14 p 1579
Study of Electric Furnace, Oct 19 p 990
Refractories Manufacturers' Association:
Statistics, July *, Sept 7 p 601; August, Sept 28 p 810; September, Oct 26 p 1071; October, Nov 30 p 1434; November, Dec 28 p 1682
Survey of Industry, Nov 30 p 1471 (Editorial), p 1439
Regulators:
Canton, for Foundry Air Squeezers*, Aug 10 p 351
Hoskins Automatic Temperature*, Sept 14 p 694
Reliance Coke & Furnace Co.:
New Claire Furnace*, Nov 30 p 1422
Remington Arms Co.:
Plant Sold to General Electric Co., July 6 p 57
Replogle, J. Leonard:
Director Wickwire-Spencer Steel Corporation, Dec 7 p 1519
Replogle Steel Co.:
Sells Crane No. 1 Furnace, Dec 7 p 1517
Sells Macungie and Topton Furnaces, Nov 30 p 1464; Dec 7 p 1500; Dec 21 p 1640
Republic Iron & Steel Co.:
Bessemer Plant Resumes, July 6 p 26
Federal Trade Commission Objects to Merger with Midvale and Inland Companies, Sept 7 p 597
Merger with Inland and Midvale Companies Abandoned, Oct 5 p 873
Quarterly Statement, July 27 p 249; Oct 26 p 1120
Research:
Corrosion of Steel Pipe, Dec 14 p 1578
Engineering Division of National Research Council, Oct 26 p 1078
Laboratories, What They Mean to Industry, Oct 5 p 878
Restraint of Trade:
Glaring Exception to (Editorial), Dec 7 p 1512
Rice, Calvin W.:
Dinner Tendered to, Nov 30 p 1464
To Represent American Engineers at Brazilian Congress, Aug 24 p 484
Riddling Machine:
Lowe, for Foundries*, Dec 28 p 1694
Riley, Sanford, Stoker Co.:
Acquires Ground Coal Engineering Co., Dec 28 p 1700
Riveting Machine:
Hanna Engineering Last-Head-in-Boiler*, Dec 14 p 1567
Rivets:
Pennsylvania Gun for Passing*, Aug 17 p 422
Robinson Machine Co.:
Automatic Air Hose Coupling*, Nov 23 p 1350
Robinson, Wilbur J.:
Life of Galvanized Sheets, Dec 14 p 1586
Rockford Drilling Machine Co.:
Drill for High Production*, Sept 7 p 593
Rockford Milling Machine Co.:
Develops New Machine*, July 27 p 203
Milling and Drilling Attachment*, July 6 p 29
Spring Chuck for Holding Small Rods*, Nov 16 p 1284
Rockford Tool Co.:
Stub Lathe for Piston Turning*, Nov 9 p 1218
Rockwell, W. S., Co.:
Booklet on Elements of Industrial Heating, Nov 9 p 1231
Rod Coils:
Cleveland Device for Handling*, Nov 16 p 1282
Roebling, John A., Son's Co.:
Insurance Plan and Pension System, Aug 31 p 538
Rogers, Brown & Co.:
Prizes for Suggestions as to New Uses of Cast Iron, Dec 28 p 1726
Roll Leveler:
MacKay, to Iron Buckles Out of Sheets, Aug 3 p 278
Rolling Mills:
Anti-Friction Bearings in*, Aug 3 p 267; Aug 10 p 354
Brasses, Saving Worn*, Aug 3 p 268
Brier Hill to Build Strip, Dec 21 p 1645
Electric Motor Drive*, Aug 10 p 339; Aug 17 p 408
Electrification of, Dec 7 p 1497
International Nickel Co., for Monel Metal, Oct 19 p 1011
Michigan Steel Corporation to Build Sheet Mill, Nov 9 p 1220; Dec 21 p 1628
Otis Steel Co. to Build New, July 27 p 247; Aug 3 p 278
Sheet, Continuous Annealing Furnaces for*, Nov 23 pp 1342, 1362
Steam for Cooling Sheet Rolls*, Aug 3 p 279
Stewarts & Lloyds Plate, Nov 2 p 1148
Trumbull Electric Strip Mill Drive, Oct 5 p 858
Wallingford Cold Rolling Strip Steel*, Oct 12 p 920
Worcester Pressed Steel, with Wedge Adjustment*, Oct 5 p 857
Romann & Bush Pig Iron & Coke Co.:
Reconsignment Decision, July 20 p 157
Rosenhaim, Walter:
Overheating Aluminum, Oct 19 p 990
Russia:
German Capital for Industries, July 20 p 150; Nov 16 p 1317
Iron and Steel Production 1921, Aug 17 p 412; Six Months 1922, Sept 21 p 752
Manganese Ore for Germany, Sept 7 p 630
Southern Metal Industry, Dec 7 p 1503
Soviet Steel Industry, Oct 26 p 1091
Ryan, F. J., & Co.:
Graphite Electrodes for Resistors, July 6 p 28
High Temperature Melting Furnaces*, Dec 7 p 1507
Ryerson, Joseph T., & Son:
Eighteenth Annual Outing, Dec 28 p 1183

S

S & S Machine Works:
Dial Feeds for Punch Presses*, Dec 28 p 1686
Safes:
Specifications for, Nov 23 p 1362
Safety:
Rules for Power Press Tools*, Dec 28 p 1680
Safeguarding Power Press Tools, Oct 12 p 928
Shop, Drama in Wickwire-Spencer Plant, Nov 2 p 1160
Week at Ford Plant*, July 20 p 129
Safety Devices:
Flynn, for Presses*, Aug 24 p 472
Gibbons, for Presses*, Aug 17 p 420
Goggles, Saving Eyes with, July 6 p 30
Jacobs Hand-Hole Plate for Boilers*, Aug 17 p 415
Pratt & Whitney Wheel Dresser*, Sept 28 p 806
Standard Guard for Presses*, Oct 26 p 1064
St. Louis Coke & Chemical Co.:
Blast Furnace Record, Sept 28 p 802
Salesmanship:
New Factor in (Editorial), Nov 16 p 1293
Sand:
Molding, Investigations, Nov 23 p 1346
Molding, New Method of Testing, Dec 28 p 1725
Molding, Research (Editorial), July 27 p 227
Sand Blast:
Pangborn Improved Barrel*, Nov 9 p 1209
Saw Bench:
Hooker Universal with Tilting Arbor*, Oct 26 p 1084
Oliver Motor-Driven*, Dec 28 p 1684
Sawhill, R. V.:
Marine Situation, Oct 19 p 1002
Saws:
Consolidated Frame for Hack*, Oct 12 p 928
Racine Wood and Metal Band*, Nov 23 p 1349
Wire, for Marble Cutting, Aug 3 p 320
Schaller, Alwin:
Income Taxes and Industry, Sept 21 p 738
Scheffler, Frederick A.:
Burning Mine Culm and Waste, Nov 9 p 1225
Pulverized Coal, Dec. 28 p 1722
Scholarship:
Hadfield, for Sweden, July 6 p 27
Schoop, M. U.:
Metal Spraying Process*, Aug 3 p 286
Schuermann Cupola:
Development in Construction*, Oct 19 p 991; (Editorial), Oct 26 p 1082
Schwab, Charles M.:
Addresses Associated Industries of Massachusetts, Oct 26 p 1066
Discusses Bethlehem Company's Position, Aug 3 p 323
Testimony re Pittsburgh Basing, Nov 23 p 1366
Scrap:
Cutting Cruiser Into*, July 6 p 9
Economic Basis of the Business, Aug 31 p 533
Freight Rates, Cohen Case Dismissed, Nov 9 p 1246
German-Russian Company Utilizing Russian, Sept 7 p 630
Government Sale at Toledo, Oct 26 p 1106

(*Scrap, continued*)
High-Cost Factor in Trade, Nov 30 p 1450
In Open-Hearth Process, Oct 5 p 869
Prices, Relation of (Editorial), July 27 p 227
More Valuable Than Salvage, Aug 3 p 316
Shortage Predicted, Sept 21 p 762
Standardization, Dec 14 p 1597
Steel, in Cupola Iron Mixtures*, Aug 10 p 337 (Editorial), p 363
Wooden Vessels to Be Dismantled, Oct 19 p 997

Screws:
Wood, Standardization, July 27 p 222

Semi-Steel:
Cupola Iron Mixtures, Aug 10 p 337 (Editorial), p 363
Specifications for Castings*, July 20 p 149

Shadgen, Joseph F.:
Deschamps Gas-Making Method, Nov 15 p 1285
Heat Temperature Curves of Metals*, July 27 p 218

Shapers:
Gould & Eberhardt Equipped with Jib Crane*, Nov 23 p 1344
Gould & Eberhardt for Planing Bearing Seats*, Aug 10 p 353
Hendey Gear-Drive Crank*, Aug 3 p 275

Sharon Steel Hoop Co.:
Loftus Open-Hearth Furnace*, Dec 28 p 1677

Sharpening Machine:
Harris Semi-Automatic*, Sept 28 p 804

Shaving Machine:
Cook, for Bolts and Screws*, Oct 19 p 1000

Sheet and Tin Plate Manufacturers:
(See National Association of Sheet and Tin Plate Manufacturers)

Sheets:
Galvanized, Life of, Dec 14 p 1586
Prices (Editorial), Nov 30 p 1438
Statistics, June, Aug 3 p 321; July, Aug 31 p 554; August, September, Nov 2 p 1182; October, Nov 23 p 1346; November, Dec 28 p 1679
Steam for Cooling Rolls*, Aug 3 p 279

Shepard Electric Crane & Hoist Co.:
Hoist for Cupola Charging*, July 29 p 134

Shimer, W. R.:
Let Steel User and Steel Maker Cooperate, Aug 10 pp 347, 388

Ship Subsidy:
Favored by Chamber of Commerce of the United States, Dec 14 p 1561

Shipbuilding:
British Steel for (Editorials), Aug 31 p 552; Nov 9 p 1223
In American Yards Sept 1, Oct 12 p 974
Merchant Ships Under Construction, Aug 10 p 356; Oct 12 p 942
Standardizing Parts, Dec 28 p 1700

Shipping Board:
Auction Sales of Surplus Material at Hog Island and Sparrows Point, Oct 12 p 974; Oct 19 p 997; Oct 26 p 1085; Nov 2 p 1153
Sales, July 13 p 84; July 20 p 150; Aug 3 p 319
To Ship Cars to Poland, Nov 23 p 1390

Shovel and Crane:
Orton & Steinbrenner Combination*, Oct 19 p 980

Sigourney Tool Co.:
Planing Metal Parts*, Dec 14 p 1555

Sillers, Jr., and Rawdon:
Effect of Manganese on Carbon Steel*, Nov 23 p 1341

Simmons, M. F.:
Utilizing Industrial Wastes, Dec 28 p 1690

Simonds, Alvin T.:
Economic Essay Prizes, Dec 14 p 1582

Simplification in Manufactures:
Advisory Committee on, July 6 p 27
Food Containers, Dec 14 p 1578

Simpson's Patent Dry Dock Co.:
Purchased by Bethlehem Shipbuilding Corporation, Nov 9 p 1210

Sine Plate:
Carling, for Compound Angle Work*, Sept 14 p 693

Singmaster and Halfacre:
What Is the Matter with Modern Galvanizing?*, Nov 16 p 1283

Skerrett, Robert G.:
Protective Coatings of Sprayed Metal*, Aug 3 p 286

Slag:
Tests of Brick Made from, July 6 p 25

Slotter:
Liberty Combination Planer and*, July 13 p 73

Small, A. R.:
Steel Lumber for Buildings, Oct 19 p 1019

Smart, George:
Improving Relations Between Employee and Employer*, Oct 12 p 918

Smith & Davis Mfg. Co.:
William E. Hoblitzelle Acquires Control of, July 13 p 82

Smith & Serrell:
Self-Fitting and Cutting Keys*, Sept 14 p 650

Smith, Acheson:
Scarcity of Common Labor, Sept 21 p 717

Smith, Charles L.:
Resourceful Engine Repair Job*, July 13 p 78

Smith, Eugene W.:
Testing Foundry Sands, New Method, Dec 28 p 1725

Smith, Dr. George O.:
Resigns from Geological Survey, Nov 2 p 1160

Smith Forge Co.:
Safety Hook for Mills and Cargoes*, Aug 10 p 351

Smithsonian Institute:
Movement to Establish Engineering Museum at, Aug 3 p 280

Snellex Mfg. Co.:
Centers for Lathes and Grinders*, July 6 p 26

Snyder, W. P., Jr.:
Foreign Conditions, Sept 14 p 700

Society of Automotive Engineers:
Convention Program, Oct 19 p 1014
Proceedings of Convention, Nov 2 p 1147

Society of Industrial Engineers:
Convention Announcement and Program, Aug 10 p 353
Convention Proceedings, Oct 26 p 1086

Sound Detector:
Experiments, July 27 p 251

South Africa:
American Pumps in, Dec 28 p 1729
American Steel Shipments to, Oct 19 p 1046
Steel Production, Nov 9 p 1217

South America:
Fairs and Exhibitions Planned, July 20 p 184
Scrap, Reported Purchase from, Aug 3 p 301

Southern Ohio Pig Iron and Coke Association:
Coal Problems, Sept 7 p 587

Southwark Foundry & Machine Co.:
Press, Universal Hydraulic*, Dec 28 p 1680

Spain:
Locomotive Order, Oct 12 p 951
Lower Duties for American Products, Aug 24 p 468

Specifications:
For Safes, Nov 23 p 1362
Foundry Pig Iron, July 6 p 16
Railroad Steel Castings*, Aug 3 pp 284, 321
Semi-Steel Castings*, July 20 p 149

Sperry, Edwin A.:
Blast Furnace on the Yangtse*, Aug 17 p 416

Spooner and Kinnard:
Electrical and Magnetic Weld Testing*, July 20 p 139

Springfield Mfg. Co.:
Double Ring Wheel Grinder*, Oct 26 p 1069

Spurr, J. E.:
Metal Mining Industries, Oct 19 p 1002

Stader, J. A.:
In Charge of Mineral Section of Bureau of Foreign and Domestic Commerce*, July 6 p 19

Stainless Steel:
At High Temperatures*, Aug 17 p 404
Chromium Electroplating (Editorial), Nov 9 p 1222
In Bridge Work (Editorial), Oct 12 p 947
In Mining Industry, Aug 3 p 266

Stamping:
Draw-Bolt Tube, Acklin Method*, Aug 17 p 401
Hammer for Single Letters*, July 13 p 94

Standard Machinery Co.:
Large Ball Bearing*, Sept 21 p 720

Standard Parts Co.:
Financial Status, Dec 14 p 1573
Inspection the Keynote in Axle Plant*, Oct 19 p 987

Standard Safety Mfg. Co.:
Press Safety Guard of Positive Type*, Oct 26 p 1064

Standard Turbine Corporation:
Turbine for Steel Mill Service*, Aug 24 p 477

Standardization:
Bridge Design and, Oct 19 p 1004
Electric Drills, Oct 19 p 1019
Export Packing Methods, Dec 28 p 1681
Farm Implements, July 13 p 84
German Automotive Steels, Nov 9 p 1199
German Progress in, Aug 31 p 543
Metal Lath and Tin Cans, Nov 16 p 1282; Dec 14 p 1611
Numbering of Steel, Nov 30 p 1464
Oil Well Casing Threads, Nov 30 p 1471
Pulley Sizes, July 6 p 35
Scrap, Dec 14 p 1597
Ship Parts, Dec 28 p 1700
Terminology in Industry, Dec 7 p 1536
Wood Screw Sizes, July 27 p 222

Starrett, L. S., Co.:
Aluminum Line Level*, Nov 23 p 1348
Micrometer Caliper, Aug 17 p 415

Statistical Association:
(See American Statistical Society)

Steam:
For Cooling Sheet Rolls*, Aug 3 p 279

Steel:
Alloy, Growth of American Industry*, Sept 21 p 791; (Editorial) Oct 5 p 877
Alloys, Etching Reagents for Carbides in, Dec 28 p 1683
Aluminum in, Dec 14 p 1574
Automobile Demand Less Seasonal (Editorial), Oct 26 p 1080
Automotive Industry Requirements, Nov 2 p 1136
Basset Direct Process, Sept 7 p 596; Oct 12 p 974
Bounty-fed vs. British, Sept 21 p 764
Cable, for Street Service, July 20 p 152

Carbon, Effect of Manganese on*, Nov 23 p 1357
Case Hardening, Methods for Locally Preventing, July 20 p 136
Case Hardening, Problems, Aug 3 p 265
Chrome-Nickel, German Tests, Aug 17 p 406
Chromium Alloy Cast Centrifugally*, Sept 14 p 655, (Editorial) p 666
Continuous Heating Furnaces for*, Aug 24 p 465
Demand, Buying Power the Test (Editorial), Aug 3 p 291
Demand, Wide Distribution (Editorial), Dec 21 p 1642
Drill, Survey of Bureau of Mines, Aug 17 p 420; Oct 19 p 1046
Electric, World's Production 1913-1921, Sept 14 p 653
Fabricated, New Era in Industry, Nov 30 p 1445
Forging, Compression Tests, July 20 p 152
Gage, Investigation, Sept 21 p 762; Dec 28 p 1686
Gases in, Aug 31 p 534
German Automotive Industry, Standardized Specifications, Nov 9 p 1199
Hardening, New German Method, July 20 p 134
High Speed, Physical Tests*, July 6 p 1
In Cement Industry, Aug 10 p 347
In Dwellling Houses (Editorial), Aug 3 p 291; Aug 24 p 469*
In the Army, Nov 30 p 1412
Ingots, Monthly Production, June, July 13 p 72; (Editorial) p 92; July, Aug 10 p 384; August, Sept 14 p 652; September, Oct 12 p 949; October, Nov 16 p 1319; November, Dec 14 p 1573
Ingots, Production United States, Five Years*, July 13 p 71
Invar, Mechanical Working of, July 27 p 222
Levoz Direct Process, Oct 12 p 974
Lumber, Developed for Building*, Sept 14 p 645; Oct 19 p 1019
Making, Less Pig Iron for (Editorial), Nov 30 p 1440
Making, Without Pig Iron, Sept 7 p 585, (Editorial) p 611
Manganese Effect on Magnetic Properties of, July 20 p 185
Manganese, Pearlitic and Sorbitic (Editorial), Dec 14 p 1585
Nitrogen in, Dec 28 p 1680
Numbering, Conference on, Nov 30 p 1464; Dec 14 p 1569
Output for 1922, Estimated (Editorial), Dec 7 p 1512
Prices and Wages (Editorial), Sept 14 p 664
Production and Shipments Compared with Cement (Editorial), July 20 p 163
Production, Fluctuations in (Editorial), Nov 23 p 1372
Rivet, Sulphur in, Discussion*, July 6 p 13
Shell, Government Sale, Nov 23 p 1375
Stainless, at High Temperatures*, Aug 17 p 404
Stainless, in Bridge Work (Editorial), Oct 12 p 947
Stainless, in Mining Industry, Aug 3 p 266
Temperatures for Physical Changes, Dec 7 p 1492
Tests with Special, Aug 17 p 406
Trade Status of Some Products, July 6 p 7
Uranium Alloy Studies, Aug 24 p 474
World Supply Now and in 1913 (Editorial), Oct 19 p 1017

Steel & Tube Co. of America:
Merger with Inland Steel Co. Planned, Dec 14 p 1580

Steel Construction Institute:
(See American Institute of Steel Construction)

Steel Flex Coupling Corporation:
All-Steel Flexible Coupling for Light Duty*, Sept 14 p 693

Steel Industry:
Capacity and Orders (Editorial), Aug 31 p 551
Causes and Prevention of Accidents, Sept 14 p 699
Coal and, Nov 9 p 1217
Electric Motor Drive in*, Aug 10 p 339; Aug 17 p 408
Electrical Development in, Dec 28 p 1729
Power Plants in, Nov 9 p 1214

Steel Lumber:
Developed for Building*, Sept 14 p 645; Oct 19 p 1019
National Handbook on Sections, Sept 14 p 700

Steel Treaters' Society:
(See American Society for Steel Treating)

Steinmetz, Charles P.:
Electric Power Supply Efficiency*, Dec 7 p 1487

Sterling Brass Co.:
New Plant*, Nov 2 p 1144

Stevens, Harold L.:
Dinner Given to, Sept 7 p 596

Sticht, Herman H., & Co.:
Device for Determining Critical Point in Steel*, Sept 28 p 806

Stillman, A. L.:
Flue Dust Briquetting by Corrosion Process*, Dec 14 p 1571

Stinnes Tube Works:
Construction Under Way, Nov 2 p 1146

Stockdale, D.:
Copper-Rich Aluminum Alloys, Oct 12 p 928

Storage:
Coal, Coke and Ore, Diagram for Calculation*, Aug 10 p 352

Stow Mfg. Co.:
Flexible Radial Grinder*, Aug 3 p 276

Stoughton, Bradley:
Three-Shift Day at Steel Works, Sept 14 pp 657, 689

Stratton, Dr. S. W.:
President Massachusetts Institute of Technology*, Oct 19

Strickland, D. M.:
Zinc Coating on Sheets, Sept 21 p 777

Stroke Counter:
Precision Universal*, Aug. 3 p 295

Stromboli, Dr. Alfred:
Fiat Electric Furnace*, July 20 p 151; Sept 14 p 667

Stubbs, Oliver:
View of American Foundries, Dec 28 p 1684

Studebaker Corporation:
Economy in Handling Material*, Nov 16 p 1269

Stumpf, Prof. Johann:
Entertained in Cincinnati, Aug 31 p 538

Sulphur:
In Rivet Steel, Discussion*, July 6 p 13

Supply and Machinery Dealers' Association:
(See National Supply and Machinery Dealers' Association)

Supply Associations:
Convention Announcement, Dec 7 p 1490

Sweden:
Exports and Imports of Iron and Steel, Six Months 1922, Sept 21 p 753
Increased Demand for Ore, Sept 21 p 752
Iron and Steel Industry, Sept 28 p 813; Seven Months 1922, Nov 9 p 1248
Pig Iron and Ore Output 1921, Aug 17 p 415

Sweet's Steel Co.:
Taken Over by Syndicate, Nov 23 p 1376

Switches:
Cutler-Hammer, for Tool Handles*, Aug 3 p 266
Westinghouse Snap for Automatic Service*, Oct 26 p 1070

Sykes and Lamme:
Steel Mill Electrification, Dec 7 p 1497

Sylvany, R.:
Levox French Electric Furnace, Sept 21 p 763

Symington Co.:
Plant Sold to A. Harris and Associates, Dec 14 p 1578

Symposium:
Electric Industrial Heating, Sept 28 p 799
Hardness Testing, Research and Metallurgical Education, Oct 12 p 935

T

Tanks:
Steel, Freight Rates, July 27 p 217

Tapping Machines:
Holmes Threading and*, Dec 28 p 1687

Tar Extractor:
Gas Producer & Engineering Corporation's Improved*, Aug 3 p 283

Tariff:
Appeal to Be Made for High Pig Iron, Dec 7 p 1525
British and Spanish Agreement, Nov 16 p 1320
Data for Electrical Industry, Oct 19 p 1003
Elastic Provisions (Editorial), Oct 5 p 877
Ferromanganese Drawback, Oct 19 p 1006
Fordney-McCumber Compared with Other Rates, Sept 28 p 807
Fordney-McCumber Metal Duties, Sept 21 p 726
Fordney-McCumber, Methods of Procedure for Investigations, Nov 2 p 1159
Free Zone System Included in Bill, Aug 24 p 471
Manganese and (Editorial), Oct 26 p 1081
Manganese and Tungsten, Proposed Duties, Aug 17 p 405
Senate Metal Schedule, July 6 p 11; Aug 24 p 475; Sept 14 p 669
Steel Bar Importations, Nov 16 p 1290
Unsatisfactory (Editorial), July 6 p 32

Tariff Commission:
Results of Investigations, Nov 23 p 1348
Trade Status of Some Steel Products, July 6 p 7

Taxes:
Income and Industry, Sept 21 p 738
Minnesota Occupation, Dec 7 p 1519
National Income and, Dec 14 p 1564
Uneven Burdens (Editorial), Aug 31 p 552

Tayeh Iron & Steel Co.:
Blast Furnace on the Yangtse*, Aug 17 p 416

Taylor Society:
Convention Program, Nov 16 p 1280
Proceedings of Convention, Nov 30 p 1431

Tegan, George F.:
Claire Furnace*, Nov 30 p 1422

Telescope:
Warner & Swasey for Argentina, Oct 19 p 1019

Temperatures:
Physical Changes in Steel, Dec 7 p 1492

Templin, R. L.:
Non-Ferrous Metal Fatigue*, Aug 10 p 356

Testing Machines:
Amsler Tensile for Bars, Strips and Wire*, Nov 23 p 1345
Davenport Spiral Bevel Gear*, Nov 2 p 1140
Tests:
Brick from Blast Furnace Slag, July 6 p 25
Burning Mine Wastes, Aug 24 p 467
Chrome-Nickel Steel, German, Aug 17 p 406
Coal Dust Ignition by Electric Arcs, July 27 p 215
Compression, of Forging Steel, July 20 p 152
Electrical and Magnetic Weld*, July 20 p 139
Foundry Sands, New Method, Dec 28 p 1725
Impact, Symposium, July 6 p 16 (Editorial), p 34
Magnetic, in Welding (Editorial), July 20 p 161
Thomas Iron Co.:
Taken Over by Reading Iron Co., July 6 p 57; Dec 28 p 1701
Thomas, Kirby:
Fuel Utilization in Economic Adjustment, Sept 820
Threading Machines:
Cleveland Stayboltr, Aug 31 p 527
Curtis Pipe*, Aug 24 p 468
Holmes Tapping and*, Dec 28 p 1687
Threads:
Standards for Oil Well Casings, Nov 30 p 1471
Three-Shift Day: (*See also two-shift*)
American Iron and Steel Institute Data Sheet, Aug 24 p 484
Report of Bradley Stoughton, Sept 14 pp 657, 689
Thurston, N. T.:
Stamping a Draw-Bolt Tube*, Aug 17 p 401
Thyssen, August:
8-Hr. Day in Germany, July 27 p 216
Tielke, H. F.:
Addresses Associated Technical Societies, Dec 28 p 1729
Tin Plate:
Prices (Editorial), Nov 30 p 1438; Dec 7 p 1501
Production, 1921, Nov 9 p 1254
Titan Iron & Steel Co.:
Hibbard Mechanical Puddling process*, July 20 p 143
Todd, F. R.:
Farm Implement Outlook, Nov 30 p 1423
Toledo Machine & Tool Co.:
Double Crank Toggle Drawing Press*, Dec 28 p 1690
Tool Holders and Cutters:
Morris Interchangeable*, Sept 7 p 595
Towmotor Co.:
Small Tractor*, Nov 9 p 1209
Tractors:
Towmotor Small Industrial*, Nov 9 p 1209
Trade Association Executives:
(See American Trade Association Executives)
Trade Associations:
Closer Cooperation with Government Favored, Oct 12 p 926
Legal Activities of, Dec 28 p 1683
Trenton Steel & Wire Co.:
Absorbed by Maryland Steel Rolling Co., July 13 p 79
Trucks:
Atlas Electric Platform*, July 27 p 205
Electric and Portable Elevator Combined*, Dec 7 p 1489
Haiss Loader Mounted on Truck Chassis*, Dec 7 p 1501
Trumbull Steel Co.:
Electric Strip Mill Drive, Oct 5 p 858
Proposed Additions, Aug 31 p 526
Truscon Steel Co.:
Record Sales, Oct 12 p 944
Tubes:
Bundy Company's Process of Manufacture, Nov 16 p 1319
Brass, Manufacture of, Dec 7 p 1515
Seamless Steel, Prices, Aug 24 p 472
Turbine Air Tool Co.:
Air Drill*, Aug 24 p 474
Turbines:
Standard, for Steel Mill Service*, Aug 24 p 477
Two-Shift Day: (*See also three-shift*)
What Are the Evils of the Long Shift? Oct 19 p 1005

U

Unger, J. S.:
Iron, Mainstay of Present Day Life, Oct 5 p 859
Union Electric Light & Power Co.:
To Handle Pulverized Fuel with Compressed Air, Oct 5 p 868
Union Machine Co.:
Self-Lubricating Bushings*, July 20 p 142
U. S. Ball Bearing Mfg. Co.:
Radial Bearings, Double Row*, Dec 21 p 1630
U. S. Electric Welder Co.:
Machine for Welding Light and Medium Stock*, Dec 7 p 1510
United States Molybdenum Metals, Ltd.:
Ore Smelting Plant, Oct 19 p 998
United States Steel Corporation:
Adds Rod Mill and Wire Plant to Duluth Works*, Oct 26 p 1057
Motion Pictures of Steel Making, Aug 3 p 274
Officials on Inspection Tour, July 6 p 57
Ore Freight Rates on Railroads Justified, Oct 26 p 1065
Quarterly Statement, July 27 p 251; Nov 2 p 1153
Stock Holders, Oct 5 p 915
Unfilled Orders, July 13 p 79; Aug 17 p 418; Sept 14 p 652; Oct 12 p 942; Nov 16 p 1319; Dec 14 p 1578
Wage Advance, Aug 24 p 508
Utah:
Iron Ore from, Oct 26 p 1085
Utah Coal & Coke Co.:
Acquired by Columbia Steel Co., July 6 p 11; Dec 21 p 1645

V

Van Dorn Electric Tool Co.:
Millwrights' Radial Arm Drill*, Aug 3 p 288
Van Keuren Co.:
Lapped Steel Surface Plates*, Oct 26 p 1084
Van Norman Machine Tool Co.:
Valve Grinder, Self-Contained*, Oct 12 p 928
Vessels:
New Type of Great Lake Freighters, Nov 16 p 1318
Voltmeter:
Esterline-Angus Combination A. C. and D. C.*, July 20 p 138

W

W-J. Die Casting Machine Co.:
Die-Casting Machine*, Aug 10 p 368
Wages:
German Advances, Dec 7 p 1491
In Kentucky-Tennessee District, 1920, Aug 3 p 299
Independent Steel Companies Meet Steel Corporation Advance, Aug 24 p 508; Aug 31 p 555
Living (Editorial), Nov 9 p 1222
Metal Trades Abroad, Aug 24 p 486
Puddlers', July 6 p 10; Aug 31 p 571; Nov 2 p 1142
Railroad Shopmen's, Aug 10 p 359
Sheet Mill, July 20 p 158; Sept 14 p 685; Nov 16 p 1289
Steel, and Prices (Editorial), Sept 14 p 664
Steel Corporation Advance, Aug 24 p 508
Trend, Aug 10 p 343; Nov 30 p 1436
Why Chase Companies Raised, Nov 23 p 1341
Walker, K. C.:
What "Laboratories for Research in Fact" Mean to Industry, Oct 5 p 879
Wallace, L. W.:
Principles Which Govern Industrial Activity, July 13 p 90
Wallingford Steel Co.:
Cold Rolled Strip Steel Plant*, Oct 12 p 920
Waltham Machine Works:
Thread Miller for Relieving*, Dec 28 p 1684
War Department:
Ordnance Officials Confer with Business Men, Oct 19 p 1012
Steel in the Army, Nov 30 p 1412
War Plants:
Proposed Aid for, Aug 31 p 534
Warner & Swasey:
Telescope for Argentina, Oct 19 p 1019
Warwick Iron & Steel Co.:
May Sell Blast Furnaces to Eastern Steel Co., July 6 p 57
Washing Machine:
Crescent, for Metal Parts*, Dec 28 p 1688
Wastes:
Burning Mine, Aug 24 p 467; Nov 9 p 1225
Utilizing Industrial, Dec 28 p 1690
Waterhouse, Dr. George B.:
Accepts Chair of Metallurgy at M. I. T.*, Aug 31 p 555
Waterways:
Shipments to Illinois Steel Co. by, Dec 28 p 1700
Shipments en Route, Dec 28 p 1731
Watson, F. C.:
Rolling Mill for Monel Metal, Oct 19 p 1011
Watts, H. S.:
Fuel Gases in Iron and Steel Plants*, July 20 p 153
Way, A. F., Co.:
Electric Drill Convertible Into Bench Drill*, Nov 2 p 1142
Webber-Wood Spar Mining Co.:
To Open Fluorspar Mine, Aug 24 p 478
Weirton Steel Co.:
To Build By-Product Plant, Aug 17 p 419
To Build New Sheet Mill, Aug 31 p 571
Welding Equipment:
Westinghouse Engine Driven*, July 13 p 74
Weitzel, R. H.:
Human Relations in Industry, Aug 31 p 541
Welding:
Cast Iron, Lower Temperature in Preheating, Oct 5 p 869
Cast Iron Problems, Oct 12 p 929
Magnetic Testing (Editorial), July 20 p 161
Metal & Thermit Insert Rail*, Aug 31 p 532
Welding Machines:
General Automatic*, July 27 p 206
U. S. Electric SAF*, Dec 7 p 1510
Welding Society:
(See American Welding Society)
Welfare:
British Industrial Relations, Nov 30 p 1470
Is It Overdone? (Editorial), Sept 21 p 737

Western Association of Rolled Steel Consumers:
Asks Consideration of Pittsburgh Plus, July 13 p 85
Western Electric Co.:
Improvements, Dec 21 p 1630
Western Marine & Salvage Co.:
To Scrap Wooden Vessels, Oct 19 p 997
Westinghouse Electric & Mfg. Co.:
Personnel Changes, July 6 p 57; Oct 5 p 903
Electric Space Heater*, July 20 p 142
Sales and Service Building in Minneapolis Industrial District, Nov 30 p 1410
Snap Switch for Automatic Application*, Oct 26 p 1070
Welding Equipment, Engine Driven*, July 13 p 74
Wheel-Truing:
Wilmarth & Morman Angular Device for*, Nov 23 p 1344
Wheeling Steel Corporation:
Offers Stock to Employees, Dec 28 p 1686
Whiting Corporation:
Clutch and Brake for Tumbling Mills*, Sept 14 p 650
Wickwire-Spencer Steel Corporation:
Acquires American Wire Fabrics Co., Aug 31 p 554
J. Leonard Replogle Elected Director, Dec 7 p 1519
Quarterly Report, Aug 24 p 523
Shop Safety Enforced by Drama, Nov 2 p 1160
Wikander, Oscar R.:
German Industrial Standards, Aug 31 p 543
Williams, A. D.:
Coal, Coke and Ore Storage*, Aug. 10 p 352
Continuous Heating Furnaces for Steel*, Aug 24 p 465
Pit Reheating and Soaking Furnaces*, Oct 19 p 1013
Regeneratively Fired Heating Furnaces*, Aug 31 p 537
Wilmarth & Morman Co.:
Angular Wheel-Truing Device*, Nov 23 p 1344
Winter, Wilhelm:
Hardening Steel, New Method, July 20 p 134
Wire Goods Co.:
Consolidates with Cassady-Fairbanks, Andrews, and Other Companies, Aug 24 p 484
Wisconsin Steel Works:
Orders for Open-Hearth Plant, Aug 17 p 441
Witting, A. G.:
Judging Combustion from Gas Analyses, Nov 16 p 1281
Woodin, William H.:
New York State Fuel Administrator*, Sept 14 p 686
Wood Turret Machine Co.:
Turret Lathe, Self-Contained*, Dec 28 p 1686
Wood's, T. B., Sons Co.:
Clutch for Heavy Work*, Sept 7 p 593
Woodstock Typewriter Co.:
Control of Raw Material to Suit Output*, Sept 21 p 713
Worcester County Safety Council:
Accident Record, Nov 2 p 1156
Worcester Pressed Steel Co.:
Cold Rolling Mill with Wedge Adjustment*, Oct 5 p 857
Wrenches:
Greenfield Pipe*, Aug 3 p 283
Wright, C. E.:
Has Automobile Production Reached Peak? Nov 30 p 1411

Y

Youngstown Chamber of Commerce:
Booklet on Industrial Developments, Nov 9 p 1255
Youngstown Foundry & Machine Co.:
Contemplates Selling Its Properties, Nov 30 p 1441
Youngstown Sheet & Tube Co.:
Blast Furnace Record, Nov 23 p 1372
Cooperative Dealing, Sept 14 p 694
Proposed Merger with Brier Hill Steel Co., Sept 28 p 827; Abandoned, Oct 5 p 873; Finally Consummated, Dec 21 p 1658; Dec 28 p 1701
Youngstown Steel Co.:
To Build Puddling Plant, Ford Process*, July 6 p 9

Z

Zig-Zag Oil Groove:
Attachment for Planing Machines*, July 20 p 158
Zinc:
Coating on Sheets, Sept 21 p 777
Nickelized in Ribbon Form, Oct 26 p 1071

THE IRON AGE

New York, July 6, 1922

ESTABLISHED 1855

VOL. 110 No. 1

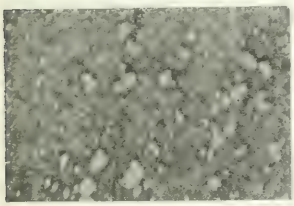
Physical Tests on High-Speed Steels

Transverse and Tenstile Tests of Two Grades Compared—Effect of These Properties on the Service of the Tool

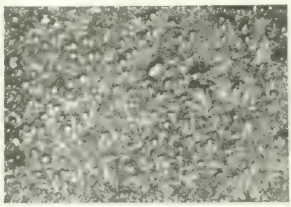
BY A. H. D'ARCAMBAL*

A RECENT search of the literature on high-speed steel showed that very little information had ever been published on the strength of high-speed steel given different heat treatments. Believing that such information was of sufficient value to merit work along these lines, the writer conducted a series of tensile and transverse tests on the two classes of high-speed steel finding the widest use in this country, namely, the 18 per cent tungsten, 1 per cent vanadium-

*Chief metallurgist Pratt & Whitney Co., Hartford, Conn.



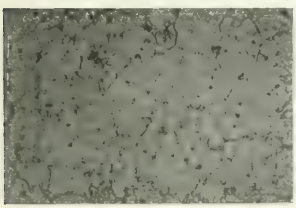
Annealed Condition; Longitudinal Section



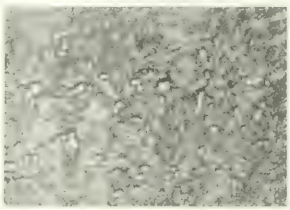
2100 Deg. Fahr.; Oil Quenched; Not Drawn; Cross Section



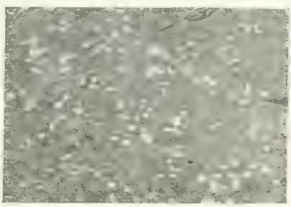
2100 Deg. Fahr.; Oil Quenched; Drawn to 1100 Deg. Fahr.; Cross Section



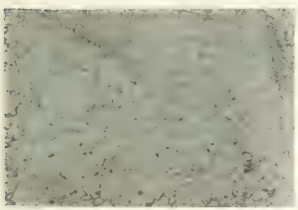
2500 Deg. Fahr.; Oil Quenched; Not Drawn; Cross Section



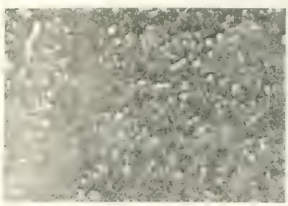
2350 Deg. Fahr.; Oil Quenched; Drawn to 450 Deg. Fahr.; Cross Section



2350 Deg. Fahr.; Oil Quenched; Drawn to 1100 Deg. Fahr.; Cross Section



2350 Deg. Fahr.; Quenched in Lead at 1100 Deg. Fahr.; Then Air Cooled; Not Drawn; Cross Section



2350 Deg. Fahr.; Quenched in Lead at 1100 Deg. Fahr.; Air Cooled; Then Drawn to 1100 Deg. Fahr.; Cross Section



2350 Deg. Fahr.; Quenched in Oil Until Specimen Was Cooled to About 1100 Deg. Fahr.; Then Air Cooled; Not Drawn; Cross Section

Fig. 1.—Photomicrographs on Grade A Tungsten Series Reduced About One-Fifth from an Original [illegible] Samples etched for 3 minutes in 5 per cent nital

Composition of the Steel: Carbon, 0.63; Chromium, 3.55; Vanadium, 0.97, and Tungsten, 17.04 Per Cent

type and the 14 per cent tungsten, 2 per cent vanadium grade.

Transverse Tests

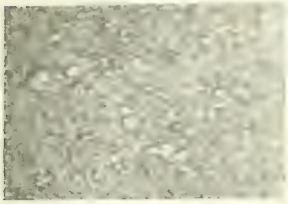
Hot rolled and annealed bars ¾ in. round were used for the transverse specimens, the analysis of the material running as follows:

	Grade A	Grade B
[illegible]	[illegible]	[illegible]

These bars were cut into seven inch lengths, centered, and turned to 11/16 in. in diameter. They were given the different heat treatments shown in Table I, then carefully ground to 21/32 in. The transverse figures obtained on these different specimens are shown in Table I and the photomicrographs in Figs. 1 and 2. The fractures were also examined, and it was noted that on the specimens of grade B steel quenched from 2350 deg. Fahr. they showed a slight coarsening of the grain; the fractures on the grade B samples quenched from 2100 deg. Fahr. and all of the grade A specimens possessing a velvety appearance. All of these transverse samples were also tested for hardness, using flat temper testing Nicholson XF files. The only specimens too soft to the file were the samples of grade A and grade B steels quenched from 2100 deg. Fahr. and given the 1100 deg. Fahr. draw. One is led to draw the following conclusions from these tests:

1.—The heat treatment which produced the greatest fiber stress, together with the requisite hardness, was that of quenching from 2350 deg. Fahr. in the lead bath at 1100 deg. Fahr., cooling to room temperature and drawing to 1100 deg. Fahr. Quenching from the high temperature in an oil bath, and drawing to 1100 deg. Fahr., gave almost as high results as the specimens quenched in the lead bath and given the high draw. On tests conducted several months ago, transverse specimens made from high-speed steel similar in analysis to grade A steel, were quenched from 2300 deg. Fahr. in oil and drawn to 1100 deg. Fahr. These specimens gave a fiber stress of 550,000 lb. per sq. in., two and one-half times the strength of the samples from the same bar quenched from the same temperature, but drawn to 450 deg. Fahr. only. I believe that if the A steel specimens, quenched from 2350 deg. Fahr., had been drawn to 1150 to 1175 deg. Fahr., the fiber stress figures obtained would have compared quite favorably with the samples given the 2300 to 1100 treatment. This higher drawing treatment would also have produced the requisite hardness because of the higher quenching temperature (2350 deg. Fahr.).

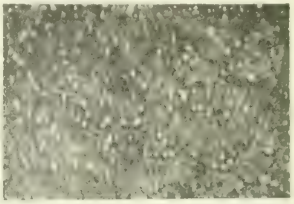
2.—Specimens of grade A steel, quenched from 2350 deg. Fahr. in oil and not drawn and samples quenched from the same temperature in the lead bath at 1100 deg. Fahr., air cooled and not drawn, showed a fiber stress of only a little more than one-half that of specimens given the same quenching treatment but drawn to 1100 deg. Fahr. Some of the undrawn specimens developed small cracks after grinding, due to the strains in the material. Every specimen made from grade B steel, and quenched from 2350 deg. Fahr. in oil or lead and not drawn, developed so many grinding cracks that they could not be tested. The undrawn specimens of both grades of steel were ground with the utmost care, for from tests conducted in the past, we discovered that the specimens given the high quenching temperature (2300 deg. Fahr.) and not drawn all cracked in grinding. It was impossible, however, to grind all of the undrawn specimens from grade A steel without cracking a few, and we were not able to obtain an undrawn specimen of grade B steel



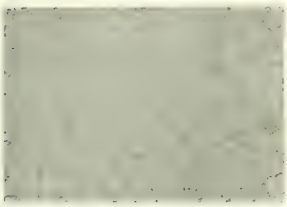
Annealed Condition, Longitudinal Section



2100 Deg. Fahr. Oil Quenched, Not Drawn; Cross Section



2100 Deg. Fahr.; Oil Quenched; Drawn to 1100 Deg. Fahr.; Cross Section



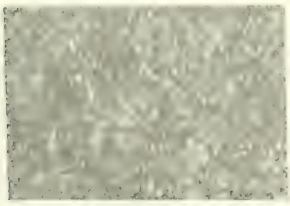
2350 Deg. Fahr.; Oil Quenched; Not Drawn; Cross Section

Fig. 2.—Photomicrographs on Grade B Transverse Series, Reduced About One-Fifth from an Original of 500 Diameters. Samples etched for 3 minutes in 5 per cent nital

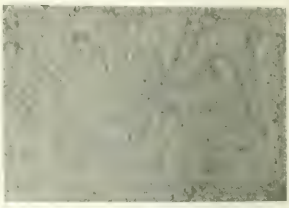
Composition of the steel: Carbon, 0.65; chromium, 3.33; vanadium, 1.78, and tungsten, 13.85 per cent.



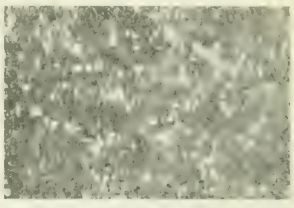
2350 Deg. Fahr.; Oil Quenched; Drawn to 450 Deg. Fahr.; Cross Section



2350 Deg. Fahr.; Oil Quenched; Drawn to 1100 Deg. Fahr.; Cross Section



2350 Deg. Fahr. Quenched into Lead at 1100 Deg. Fahr.; Then Air Cooled; [illegible] Cross Section

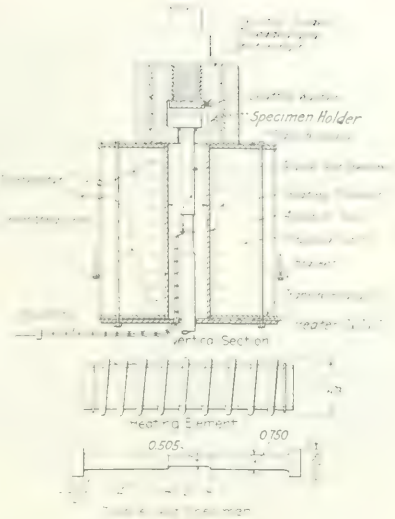


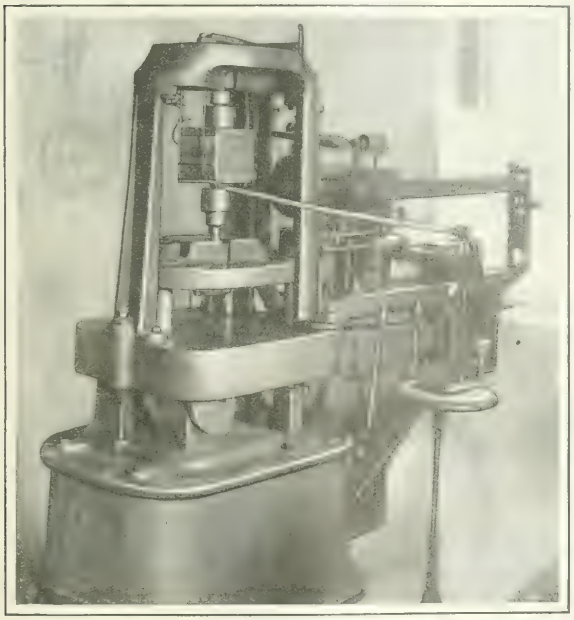
2350 Deg. Fahr., Quenched into Lead at 1100 Deg. Fahr.; Air Cooled; Then Drawn to 1100 Deg. Fahr. Cross Section

that was not full of grinding cracks. This high-drawing treatment, therefore, not only produces about double the transverse strength over that of undrawn specimens, but also gives a greater factor of safety in grinding.

3.—Grade B specimens quenched from 2350 deg. Fahr. and drawn to 450 deg. Fahr. and 1100 deg. Fahr., did not possess as high a transverse strength as grade A specimens given the same hardening treatments. It would appear that grade B steel does not stand as high a quenching temperature as grade A steel, for the fracture on the grade B specimens, quenched from the high temperature, showed a slight coarsening of the grain. I believe that grade B specimens quenched from 2300 deg. Fahr. and drawn to 1100 deg. Fahr. would show at least as great a strength as grade A specimens given the 2350 to 1100 treatment.

4.—The micrographs, Figs. 1 and 2, showed that the material as received in the annealed condition was satisfactory. Specimens of both grades of steel quenched from 2100 deg. Fahr. and not drawn possessed a fine grained martensitic structure with free carbides and tungstides. Drawing to 1100 deg. Fahr. produced a small amount of troostite with its corresponding softness. Specimens of both types of steel quenched from 2350 deg. Fahr. in oil or lead and not drawn possessed the polyhedral structure of austenite with only a few undissolved carbides and tungstides. Drawing to 450 deg. Fahr., in case of the A grade, left only a trace of the polyhedral structure, while the B specimens still showed the well developed grain. It would thus seem that the B type of steel requires a higher drawing temperature to produce the same changes in microstructure than is required by the A grade. It is also interesting to note the extremely low fiber stress on the B grade drawn to 450 deg. Fahr. in comparison with the A grade given the same heat treatment. Photomicrographs of both grades of steel, drawn to 1100 deg. Fahr., showed a complete disappearance of the polyhedral structure of austenite, and the development of a full martensitic structure. This structure is the most desirable one, for material possessing this microstructure has the greatest strength, proper hardness, and greatest degree of red hardness.



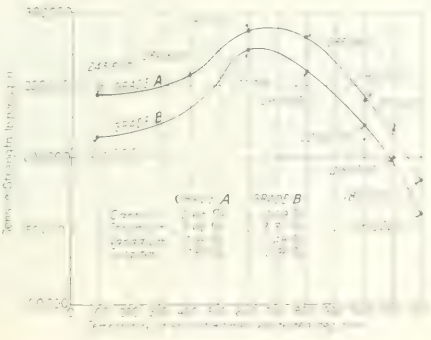


Test Specimen. Heating element contains chromel A wire, connected in parallel, wound around an alundum tube, then with alundum cement

tion on a Standard Testing Machine

Fig. 5 (Below.)—Tensile Test Curves. All specimens were quenched in oil from Fahr. before being tested. Additional tensile tests were:

Heat Treatment, Deg. Fahr.	Temp. of Wkd. Tested, Deg. Fahr.	Tensile Strength Lb. per Sq. In.
High-Speed Steel		
not drawn	Room temp.	175,000
not drawn	1100	225,000
Carbon Tool Steel		
1460, brine quenched, 400 deg. drawn..	Room temp.	183,500

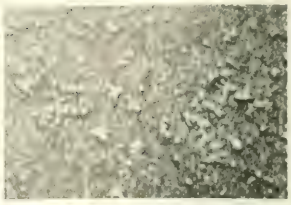


Tensile Tests

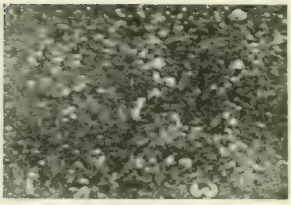
Hot rolled and annealed bars of high-speed steel



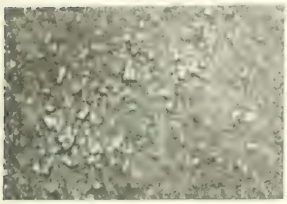
Annealed Condition; Longitudinal Section



2350 Deg. Fahr.; Oil Quenched; Drawn to 1100 Deg. Fahr.; Tested at Room Temperature; Cross Section

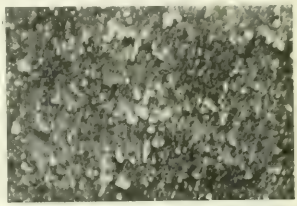


2350 Deg. Fahr.; Oil Quenched; Drawn to 1100 Deg. Fahr.; Tested at 600 Deg. Fahr.; Cross Section



2350 Deg. Fahr.; Quenched; Drawn to 1100 Deg. Fahr. Tested at 1100 Deg. Fahr.; Cross Section

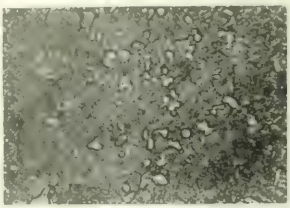
Fig. 6. — Photomicrographs on Tensile Test Series, Grade A Steel, Reduced About One-Fifth from an Original of 500 Diameters. All specimens etched for 2 minutes in 5 per cent nital



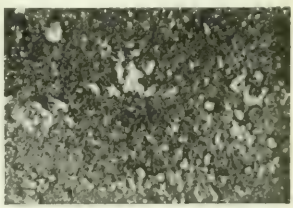
2350 Deg. Fahr.; Oil Quenched; Drawn to 1100 Deg. Fahr.; Tested at 1200 Deg. Fahr.; Cross Section



2350 Deg. Fahr. Oil Quenched, Drawn to 1100 Deg. Fahr. Tested at Room Temperature; Cross Section



2350 Deg. Fahr.; Oil Quenched; Not Drawn; Tested at 800 Deg. Fahr.; Cross Section



2350 Deg. Fahr.; Oil Quenched; Not Drawn; Tested at 1100 Deg. Fahr.; Cross Section

1 3/16 in., were obtained for the tensile test specimens. These bars analyzed as follows:

	Grade A Per Cent	Grade B Per Cent
Carbon	0.6	0.69
Chromium	3.62	3.31
Vanadium	0.95	1.68
Tungsten	17.80	13.96

The test specimens were made with shoulders instead of threaded ends, for past experience had shown that it was impossible to obtain accurate tensile test results on hardened high speed steel with the standard United States threaded end test pieces, due to the specimens usually failing in the threads.

A large number of these specimens were to be tested at elevated temperatures, so the test specimens were made 11 in. in length in order to allow a sufficient length on each end of the test specimen to extend through the electric heater so as to fit into the especially designed holders. The electric heater, shown in Fig. 3, is quite similar in design to that used by R. S. MacPherran.*

Fig. 4 shows the heater in position on the Tinius Olsen universal testing machine. All specimens were held at temperature for 30 min. before being tested. The results obtained with the various heat treatments, and at the different temperatures tested are shown in Fig. 5. The fractures of the grade A specimens pulled at room temperature all had the usual velvety appearance, but the fractures of the specimens made from grade B steel all showed a coarse, fairly crystalline structure.

I believe that this coarseness was due not only to the high quenching temperature but also to the fact that the material as received in the annealed condition had large lumps of carbide present, which, of course, would not go into solution upon hardening (See Fig. 7). The fractures on the specimens tested at temperatures higher than room temperature presented an interesting range of colors, as is shown in the following chart:

Fracture Colors

Deg. Fahr. at Which Specimen Was Tested	Grade A Steel Color	Grade B Steel Color
Room temp.	Steel gray	Steel gray
400	Steel gray	Steel gray
600	Very dark gray	Very dark gray
800	Chocolate brown	Medium brown
1000	Dark blue	Dark blue
1100	Greenish blue	Greenish blue
1200	Dull purple	Brownish purple

These specimens, after being pulled, were also tested with the flat temper testing files, all of these pieces being hard to the file with the exception of the grade A and B specimens tested at 1200 deg. Fahr., these being filed with difficulty, and the grade A specimens quenched from 2350 deg. Fahr., not drawn, and tested at 800 deg. Fahr. test. The specimens which were drawn to 1100 deg. Fahr., before being tested were file hard after each temperature tested from room temperature to 1100 deg. Fahr.

This illustrates another advantage of the high drawing treatment, for tools in service which have not been drawn quite often attain a temperature of 600 to 1000 deg. Fahr. These tools will, therefore, be very soft, after being cooled to room temperature in comparison with their original hardness, whereas tools drawn to 1100 to 1150 deg. Fahr. before being placed into service will maintain their hardness when cooled to room temperature from any temperature up to the original drawing heat.

Photomicrographs were taken from some of these tensile test specimens and are shown in Figs. 6 and 7. As stated in a previous part of this article, the micro-

structure of the grade B steel was in a very unfavorable condition as received, due to the presence of large carbide lumps. The structure on the grade A material as received is satisfactory. Specimens drawn to 1100 deg. Fahr. after quenching, and then tested at elevated temperatures, showed the same microstructures as samples given the same treatment but tested at room temperature. This is to be expected for a temperature higher than the original drawing temperature must be exceeded before the martensitic matrix is changed into troostite.

Photomicrographs of the samples of carbon tool steel tested at room temperature and 1100 deg. Fahr. are also shown in Fig. 7. The sample tested at room temperature shows a martensitic matrix with free cementite present, while the samples tested at 1100 deg. Fahr. show a sorbitic matrix with a large amount of free cementite present.

Referring again to Fig. 5, we note that both grades of steel attained their maximum tensile strength at 600 deg. Fahr. The slope of the curve would indicate that the maximum physical properties would have been reached at around 700 deg. Fahr. Unfortunately, we did not have sufficient specimens to run tests at temperatures between 600 and 800 deg. Fahr. Hardened high-speed steel therefore gives the same characteristic curves when tested at elevated temperatures as do plain carbon and alloy steels. The grade B specimens gave lower reading than the type A samples, as would be expected from an examination of the fractures. I believe that drawing specimens of both grades of steel to 1150 to 1175 deg. Fahr., would have produced higher tensile strengths, without sacrificing the hardness to any extent.

Grade A test specimens quenched from 2350 deg. Fahr. and not drawn showed a tensile strength of only 175,000 lb. per sq. in., about 70 per cent of the value obtained on specimens quenched from 2350 deg. Fahr. and drawn to 1100 deg. Fahr. Specimens drawn to 450 deg. Fahr. after being quenched from the high temperature, showed a tensile strength of 185,000 lb. per sq. in. Very little increase in strength is obtained by drawing to only 450 deg. Fahr. Carbon tool steel, given its usual heat treatment, gave a tensile strength of 183,500 lb. per sq. in., tested at room temperature, and 65,000 lb. per sq. in., tested at 1100 deg. Fahr. Carbon tool steel shows a higher tensile strength at room temperature than high-speed steel quenched from 2350 deg. Fahr. and not drawn.

All of the high-speed test specimens were measured for elongation and reduction of area and none was obtained, even on samples pulled at the high temperatures. Hardened high-speed steel therefore possesses zero ductility, even when tested at a red heat.

The following precautions were taken in conducting these tests:

Table I [illegible]

	Grade A Per Cent	Grade B Per Cent
Carbon	[illegible]	[illegible]
Chromium	[illegible]	[illegible]
Vanadium	0.97	1.78
Tungsten	[illegible]	[illegible]

Specimens 0.656 in. in diameter x 7 in. long

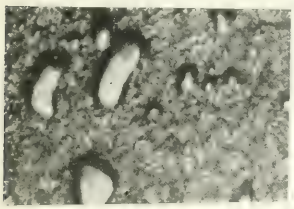
Heat Treatment	Approximate Fiber Stress Grade A Lb. per Sq. In.	Grade B Lb. per Sq. In.
2100 deg. Fahr. Oil quenched; not drawn	302,000	330,000
2100 deg. Fahr. Oil quenched; drawn to 1100 deg. Fahr.	460,000	520,000
2350 deg. Fahr. Oil quenched; not drawn	250,000†	*
2350 deg. Fahr. Oil quenched; drawn to 450 deg. Fahr.	308,000	222,000
2350 deg. Fahr. Oil quenched; drawn to 1100 deg. Fahr.	401,000	378,000
2350 deg. Fahr. Quenched in lead at 1100 deg. Fahr.; then air cooled; not drawn	243,000	*
2350 deg. Fahr. Quenched in lead at 1100 deg. Fahr; air cooled; then drawn to 1100 deg. Fahr.	432,000	396,000
2350 deg. Fahr. Quenched in oil until specimen was cooled to about 1100 deg. Fahr.; then air cooled; not drawn.	243,000‡	

*Full of grinding cracks, so not tested.
†Few small grinding cracks present.
‡Few small grinding cracks present in one of the specimens.

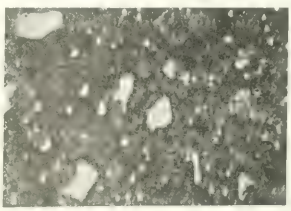
The specimens were all time hardened, so as to insure the heat treatment being a constant.

All pyrometers were carefully calibrated before being used. The accuracy of the testing machine was determined.

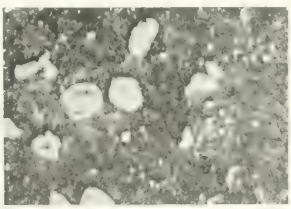
The writer does not wish to convey the impression that the physical strength of high-speed steel is an indication of its cutting qualities, but does believe that tools possessing the proper analysis, hardness and red hardness, together with the highest possible physical strength, will give the most satisfactory service.



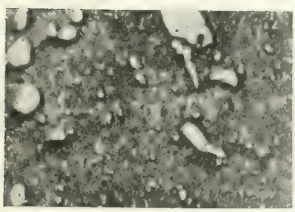
Annealed Condition; Longitudinal Section



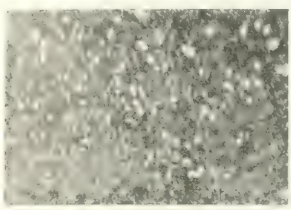
2350 Deg. Fahr.; Oil Quenched; Drawn to 1100 Deg. Fahr.; Tested at Room Temperature; Cross Section



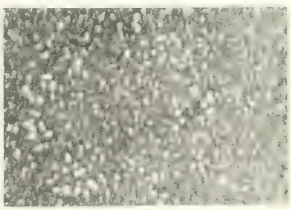
2350 Deg. Fahr.; Oil Quenched: Drawn to 1100 Deg. Fahr.; Tested at 600 Deg. Fahr.; Cross Section



2350 Deg. Fahr.; Oil Quenched: Drawn to 1100 Deg. Fahr.; Tested at 1200 Deg. Fahr.; Cross Section



Carbon Tool Steel: 1440 Deg. Fahr.; Brine Quenched: Drawn to 400 Deg. Fahr.; Tested at Room Temperature; Cross Section



Carbon Tool Steel: 1440 Deg. Fahr.; Brine Quenched; Drawn to 400 Deg. Fahr.; Tested at 1100 Deg. Fahr.; Cross Section

Fig. 7.—Photomicrographs in Tensile Test Series, Grade B Steel, Reduced About One-Fifth from an Original of 500 Diameters. All specimens etched 3 minutes in 5 per cent nital

LARGE AUTOMOTIVE MERGER

Associated Motor Industries With $30,000,000 Capital, Takes Over 14 Plants

A consolidation of manufacturers of automobiles, trucks and automobile parts, taking in 14 plants in seven states, with capitalization of $80,000,000, has been effected at Dayton, Ohio. The name of the consolidated company is the Associated Motor Industries. Main offices will be in Dayton. All of the plants are owned outright by the new corporation, the merger having been the result of actual purchase rather than transfer of property to a holding company.

Included in the new company are the following companies and plants: National Motor Car & Vehicle corporation, Lockport, N. Y.; Covert Gear Co., Lockport, N. Y., transmission and clutch manufacturer; Recording & Computing Machines Co., Dayton, Ohio, ignition, magneto, starter, battery and generator manufacturer; Jackson Motors Corporation, Jackson, Mich.; Kentucky Wagon Mfg. Co., Louisville, Ky.; Saginaw Sheet Metal Works, Saginaw, Mich.; Traffic Motor Truck Corporation, St. Louis, Mo.; Murray-Tregurtha Corporation, Boston, gasoline engines; H. F. Holbrook Co., New York, automobile bodies.

Officers of the corporation are: Will I. Ohmer, Dayton, Ohio, chairman of the board of directors; Louis Ruthenburg, Dayton, Ohio, president; A. A. Gloetzner, Lockport, N. Y.; Robert V. Board, Louisville, Ky.; T. C. Brandle, St. Louis, Mo., and George M. Dickson, Indianapolis, Ind., vice-presidents.

Directors include the above and the following: James R. Duffin, Louisville, Ky.; H. G. Stoddard, Worcester, Mass.; H. V. Hale, Saginaw, Mich.; H. J. Linkert, Dayton, Ohio; C. L. Halladay, Jackson, Mich.; W. W. Sterling, Jackson; C. L. V. Exselsen, Chicago; Guy Wilson, St. Louis; Buell Hollister, New York; H. F. Holbrook, New York; M. D. Flattery, Boston.

Mr. Ohmer, chairman of the board, made the following announcement regarding the new corporation:

This merger is unique in that it has purchased outright all its plants, instead of being a holding company. The usual thing in such mergers has been a holding corporation and separate operating corporations, the holding corporation owning a majority of the stock, with a full set of officers and each operating corporation having a full set of officers and staff. Associated Motor Industries eliminates all that duplication. The executive officers of the consolidation are the only executive officers of the merger. All the plants will be operated as a unit from the central offices. It is not an imitation of any organization that has gone before it.

As to prosperity, it is here now. We have only to accept it and go ahead with business. So much pessimism has been spread over the country that many people have lost belief in themselves. Associated Motor Industries believes that the time to start up is now. Business is ready right now for people who can make the right kind of goods at the right price.

It is the purpose of Associated Motor Industries to standardize and produce in such quantities as will get the cost of cars of quality within the reach of the people.

There is no question but that a reduction in cost so that prices will come within reach of the consumers' pocketbook must be brought about before there can be a return to "old-time prosperity." The manufacturer must be satisfied with smaller profits. And to be able to reduce the cost and work on smaller profits it is necessary to increase production by the most efficient methods.

As to my employment policies, they are well known and I shall have more to say about them later. I believe in paying people all they can earn, and making it possible for them to enjoy their work.

Women should receive the same pay as men for the same work.

I want employees to feel that they are partners in the business and share in the success of the business.

The interests of the employees of Associated Motor Industries shall have my personal care, and everything possible will be done to make them satisfied and happy.

Production in all of the plants will be started at full speed at once, Mr. Ohmer said.

PROMPT REPLIES

Independent Steel Companies Answer Questionnaire of Commission

WASHINGTON, July 4.—Replies in good-sized numbers are being received by the Federal Trade Commission from independent steel companies to the questionnaire it has sent out to all steel makers of the country in connection with its investigation regarding proposed mergers. The companies proposing to consolidate, including the Bethlehem Steel Co. and the Lackawanna Steel Co., and the Midvale Steel & Ordnance Co., the Republic Iron & Steel Co., and the Inland Steel Co., were the first to make response to the questionnaire. The freedom with which companies not involved in the proposed mergers have replied to the questionnaires apparently is a source of gratification to the commission. The replies, it was stated at the commission, are made complete wherever it is possible to do so.

Reports that the commission in asking for responses from companies not associated with the merger plans is actually attempting, without direction from Congress, to inquire into the entire industry of the country are strongly denied. It is insisted by the commission that, as stated in THE IRON AGE last week, the only purpose of sending out the questionnaire to all of the producers is to ascertain the effect of the contemplated consolidations on competition.

The questionnaire, aside from that portion of it inquiring as to the tonnage the producers sell in the United States and foreign countries, is largely formal and deals with matters that for the most part are already of public record through annual statements, trade papers, commercial publications, etc. The other information sought also is a matter of current knowledge, such as whether products of some companies are sold in the open market or to the parent company and, if both, the percentage of each.

The commission has not as yet taken any action regarding the issuance of a complaint against the Midvale, Republic and Inland companies and has not indicated whether it will or will not issue one. It also has done nothing as to the suggestion of the Bethlehem and Lackawanna companies to the effect that the hearing be set for an early date. It has been stated by the commission that no actual date for the hearing has been set. The fact remains, however, that it was announced in the notice appended to the Bethlehem-Lackawanna complaint that "on the 24th day of July, 1922, at 10:30 o'clock in the forenoon, is hereby fixed as the time, and the offices of the Federal Trade Commission * * * when and where a hearing will be had on the charges set forth in this complaint." It was stated at the offices of the commission that this was intended to mean only that the two companies had until July 24 to make answer to the complaint.

Clay Pipe as Substitute for Cast Iron

As a result of laboratory tests made in the College of Industries of Carnegie Institute of Technology, Pittsburgh, the claim is made by the institute that it has finally been established that bituminous clay pipe for drainage and sewerage use is in every way the equal of the more expensive cast iron pipe which has been employed heretofore. Details can be obtained by addressing R. S. Clark, office of the secretary, Carnegie Institute of Technology, Pittsburgh.

Charles Close, Bureau of Sanitation and Safety, United States Steel Corporation; Major William M. Hoag, National Tube Co., Charles Woolridge, Carnegie Land Co., and R. J. Young, Safety Department Illinois Steel Co., recently visited Gary, Ind., for the purpose of working out a plan for the construction of several hundred additional houses to take care of the employees of the tube plant to be erected there.

Trade Status of Some Minor Steel Products

Facts and Figures Collected by the Tariff Commission Relating to Production and Markets, Also the Export and Import Trade

INFORMATION concerning methods of manufacturing various iron and steel products, and their uses in manufacture and trade, together with data as to imports and exports, also the countries which compete with the United States in the manufacture of these products, is given in a volume of more than 1600 pages. The material in this book was prepared by the United States Tariff Commission for the use of the Senate Committee on Finance in making up the schedules in the pending tariff bill. All the articles in the various schedules are covered, the title of the book being "Summary of Tariff Information, 1921, Relative to the Bill HR 7456." From the sections devoted to the metal schedule the following paragraphs are taken relating to various manufactured forms of iron and steel:

Hoops and Bands Cut to Lengths—Cotton Ties, Etc.

This paragraph applies particularly to the standard cotton tie, a strip of steel 15/16 in. wide by 35/1000 in. thick (20 gage) and 11½ ft. long, chiefly used in tying bales of cotton. Once used, they are rerolled and used again. Production is part of the output of rolling mills making also hoops, wire nails, smooth wire, barbed wire, woven wire fence, bars, spikes, and similar products. Four plants are located in Pennsylvania, one in Georgia, and one in Alabama. The annual production is estimated at 2,000,000 to 3,000,000 bundles of 45 lb. each, approximately two-thirds of the world's output. England and Germany are the principal foreign producers. Imports of hoop or band iron, etc., in 1915 were 1,416,538 lb., valued at $22,552. In 1920 they were 131,370 lb., valued at $5,952, and in the first nine months of 1921 they were 1,055,366 lb., valued at $32,883. Exports are irregular; they depend almost entirely upon the cotton crop and English competition. It is roughly estimated that in recent years they have ranged somewhat over 1,500,000 lb. annually.

Galvanized Wire for Fencing and Wire for Baling Hay

Wire provided for in this paragraph is that used for fencing purposes and for baling hay and other commodities. The fencing wire is limited to galvanized, while the baling wire may or may not be galvanized. Barbed wire is provided for in paragraph 1680, and hence is not included in this paragraph. The country's output of woven wire fencing and poultry netting, plain and coated, in 1919, amounted to 312,150 tons, valued at $30,527,000. In 1914 the corresponding figures were 411,460 tons and $19,795,800. Exports of woven wire fencing since 1917 by calendar years have been as follows: 1918, $1,036,730; 1919, $933,143; 1920, $903,272; 1921 (9 months), $451,823. The principal destinations of this exported material were Cuba, Canada, Mexico, Argentina and New Zealand.

Woven Wire Cloth

Woven wire cloth consists of gauze fabrics, screens, etc., composed of wire with fine meshes and is used largely for straining and for protection against insects and the like. "Fourdrinier wires," or wire cloth used in paper making, are one of the most important items. In the figures of the Federal Census, the country's output of woven wire cloth is included with that of other woven wire products. Excluding woven wire fencing and poultry nettings, the output of woven wire products in the United States in 1919 amounted to 26,610 net tons, valued at $4,274,200. In 1914 the country's output was 22,720 tons, valued at $2,822,700.

Anti-Friction Balls and Bearings

Anti-friction bearings consist of metal balls or rollers fitted between two metal cases in such a way that a shaft may be inserted into the inner case, and the outer case into the bearing frame, the contact between the two cases being through balls or rollers. This arrangement substitutes a rolling contact for the sliding contact of the ordinary bearing and thus reduces friction. The automobile industry is the largest consumer of ball and roller bearings; the bicycle affords examples of the use of ball bearings. Some anti-friction bearings are used in screw jacks, many machine tools, elevators, etc. The domestic industry has gone extensively into both types of bearing—roller and ball. The European industry has given attention chiefly to the ball bearings.

Wheels for Railroad Purposes

The car wheels in general domestic use are either of chilled cast iron, cast steel, or rolled steel. A car wheel made with a cast or forged center piece, about which a steel tire is shrunk, is used to some extent. Locomotive drive wheels are of this type. It has been estimated that 3,000,000 chilled cast iron wheels, valued at $40,000,000, were produced in 1917. According to the 1920 census there were produced in 1919 117,700 gross tons of car and locomotive wheels, rolled or forged, valued at $17,044,700. Pennsylvania has a larger number of manufacturers than any other State; Michigan, New York and Ohio follow. European concerns have not developed the chilled cast iron or rolled steel wheels, which are the predominant types here. The bulk of foreign production has been the steel-tired wheel. Such wheels are likewise made here, and (according to report) before the war could be produced as cheaply as in Europe.

Chains

Structurally, chains made of iron or steel may be divided into (1) those with each link a single piece of metal, and (2) those with each link made of several pieces of metal. The first are used generally for fastening objects together or supporting or lifting weights. Such chains, if small, are chiefly made by machinery, but larger sizes are usually hand-made. Chains for cranes, ships' cables, dredges, etc., have each link welded by hand, often both formed and welded from the rolled bar iron. Those of the second class are known as sprocket or driving chains and are used for transmitting power. In certain of these each link is made of several pieces of metal connected by rivets, bolts, or steel screws, and so formed as to engage with the teeth of a sprocket wheel. The bicycle chain is a familiar example. Stud-like chains are those with a bar or rod across the width of the link. The United States is a large producer of chains made of iron or steel, but statistics are not available. A representative of an important producer estimated the investment in the chain industry in 1918 at $5,000,000 and the country's normal output at $10,000,000.

Bolts, Nuts and Washers

Iron and steel nuts, bolts, washers, spiral nut locks, etc., and their uses are for the most part well known. The word "blank" used in connection with nuts and bolts signifies a piece of metal that has been prepared for manufacture into these various forms. The term "washer" denotes a ring of metal or perforated plate used to distribute pressure to prevent motion or play. Spiral nut locks are special devices for locking a nut, as on a bolt, so that it may not be loosened by jarring. In 1914 the output of bolts, nuts, rivets and washers was valued at $23,403,000, in addition to that of builders' hardware which was valued at $24,280,000.

Horseshoe Nails

The tariff classification embraces horseshoe nails, the product of a distinct industry (the horseshoe nail

manufacturers generally make no other nail product), hobnails and shoe nails to a great extent made in tack mills. Production of horseshoe nails in 1914 was valued at $2,345,762. In 1918 there were six factories located in New York, Connecticut, Pennsylvania, and Illinois. The raw material used is nail rods or wire of soft steel or iron. One company has imported nail rods from Sweden, an important producer of horseshoe nails.

Wire Staples

The census heretofore did not specify wire staples separately. In 1914 the production of wire tacks, brads and staples, made in establishments drawing wire, was valued at $1,324,948. A portion of the product of wire staples is manufactured in the tack mills. In the 1920 Census wire staples figures were separated from those of wire tacks and brads and the 1919 output was shown as 68,221,300 lb., valued at $2,745,000.

Cut Tacks, Brads and Sprigs

Tacks and brads are of two kinds, cut and wire. Cut tacks and brads fall under this designation; those of wire (if of iron or steel) are included under "all other wrought iron and steel nails." "Sprig" is an obsolete word in the trade, formerly applied to sharp-pointed shoe-heel nails. Production of cut tacks and small nails in 1918 was estimated at from 50,000,000 to 60,000,000 lb., valued at approximately $6,600,000. The establishments making cut tacks also manufacture small nails cut from sheets, and to some extent wire tacks. Massachusetts leads in production of cut tacks.

Horse, Mule and Ox Shoes

The factory horse or mule shoe usually requires further working by the horseshoer to fit it to the hoof. Formerly he made the entire shoe from a bar; some shoes are still so produced. Production of horse and mule shoes by rolling mills, etc., was valued at about $9,000,000 in 1914. Hand production from bar iron (not recorded) was very small. In 1917 horse and mule shoes were produced by nine establishments, located in Pennsylvania, Ohio, New York, Illinois, and other States, as their principal or only product. Two large companies (one iron and one steel) are included in this number. Horse and mule shoes are formed by a series of rolling, bending and pressing operations, and, to a lesser extent and at a higher cost, by drop forging. The latter method is used chiefly in France, Belgium and Great Britian. Germany and Canada manufacture by a process similar to ours.

Steel Wool and Shavings

Steel wool consists of long steel fibers resembling curled hair. The fibers are of triangular cross section, and are graded according to fineness from coarse shavings to wool. Steel wool is used as an abrasive, and is a substitute for sandpaper and emery cloth or pumice stone, being regarded as superior to them for certain purposes. It is used in shipbuilding, in other building, in factories, and in the household. No accurate figures of production are available. In 1917 the yearly consumption was estimated at between 1,000,000 and 1,500,000 lb., which (imports being cut off) virtually represented domestic production. Germany and Switzerland are also producers.

Grit, Shot and Sand of Iron and Steel

Grit, shot and iron sand are chilled iron shot made by heating scrap or pig iron to a fluid state and spraying it with steam as it runs into a large vat of water. The grit is used in grinding rough surfaces of granite, marble and other stones. Production figures are not available. Before the war domestic consumption was estimated at 3200 tons. England is an important producer of these abrasives.

Wood Screws

Screws known in the trade as "wood screws," because intended for use in wood, are of mild steel or iron; or of brass, copper, and zinc when protection from rust is desirable. In 1914 wood screws, including those made of brass and bronze, were valued at $6,217,000, the output of twelve establishments. In 1919 the value was $16,462,000, the output of the same number of establishments.

Umbrella Ribs and Tubes

The United States is a large producer of umbrella and parasol ribs and tubes. The value of the annual production is estimated at from $1,250,000 to $2,000,000. Although figures regarding the extent of the output of parts are not available, the production of umbrellas, parasols and canes in 1914 was valued at $13,813,353, and in 1919 at $22,199,000.

Saddlery and Harness Hardware

The phrase "saddlery and harness hardware" is applied to buckles, rings, etc., made of metal and used on bridles, saddles and harness. In 1914 there were 58 establishments in the United States manufacturing saddlery hardware, with an output valued at $4,040,000. In 1919 the number of establishments had declined to 37, but the value of the product had increased to $14,137,000.

Snap Fasteners and Clasps

These articles are fastening devices chiefly for clothing, and are used as a substitute for buttons, hooks and eyes, buckles and pins. In 1914 snap fasteners and clasps, or parts of, amounted to 91,957 great gross, valued at $714,492. Production was estimated by a well-informed manufacturer in July, 1919, to be at the rate of about 1,500,000 great gross annually, valued at approximately $6,000,000.

Metal Buttons

The industry includes practically every kind of metal button, from the most ordinary button of sheet iron, made automatically, to the expensive gold button, made by hand. There are sew-on trouser buttons; tack buttons, put on by machine; bachelor buttons, put on by hand; uniform buttons, and buttons for women's and children's clothing. Connecticut, New Jersey, New York, Massachusetts, and Rhode Island are the leading States in the manufacture of metal buttons. Production in 1914 of steel trouser buttons amounted to 535,207 gross, valued at $307,802; other metal trouser buttons, to 252,248 gross; metal buttons, not including trouser or collar or cuff buttons, to 872,563 gross, at $455,485.

Pins

Production of common or toilet pins in 1914 amounted to 641,121 lb. plus 1,825,673 packs of 3360 pins of steel wire, and 1,186,397 lb. plus 1,638,035 packs of 3600 pins of brass wire, with a combined value of $1,248,757. Some firms report output in pounds and others in packs. Production of hairpins was 9,242,012 gross, valued at $528,362, and of safety pins, 4,744,303 gross, valued at $936,663. Production of common or toilet pins in 1919 amounted to 2,799,000 lb. plus 1,342,000 packs of 3360 pins of steel wire, valued at $1,521,000; and 741,000 lb. plus 1,089,000 packs of 3600 pins of brass wire, valued at $1,269,000. Production of hairpins was 24,310 gross, valued at $1,481,000; and of safety pins, 8,428,000 gross, valued at $2,977,000. The total value of common pins, hairpins and safety pins produced in 1914 was $2,713,782, and in 1919 was $7,248,000. Connecticut leads in the manufacture of articles covered by this paragraph. The leading foreign producers are France, Germany and England.

Pens

The domestic manufacture of steel pens began in 1860, when the knowledge of the quality of metal best adapted for their manufacture was acquired. Most of the steel used has been imported from England and Sweden. Five establishments, with a capital of $870,601 and 573 wage earners, manufactured steel pens in 1914. Materials used were worth $117,113, wages amounted to $243,043, and the value of the product was $513,498. Steel pens valued at $160,068 were also produced by establishments classified under other industries. The value of the product of five establishments in 1919 was $1,706,000. A pre-war estimate credited domestic production with 2,500,000 gross.

CUTTING CRUISER INTO SCRAP

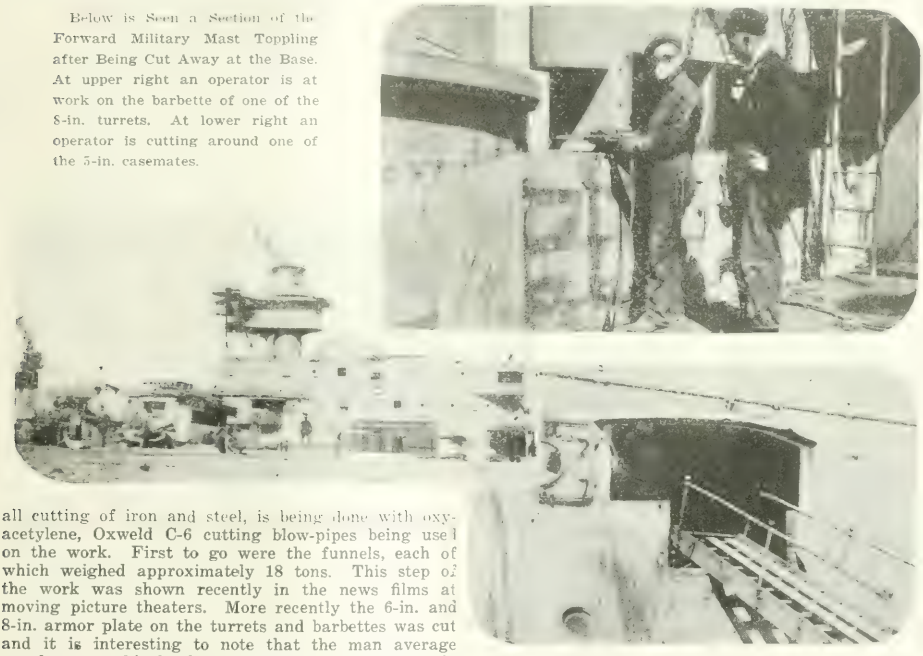
Ten Feet Per Hour Speed of Advance on Armor Plate with Oxy-acetylene Blowpipe

With the cutting up into junk of the United States armored cruiser Brooklyn, famous as the fighting flagship of Admiral Schley at Santiago, there passes into the limbo of things departed a symbol of the new America. The Brooklyn, constructed at a cost of more than $4,370,000, was sold for $40,000 to a California dealer in scrap metals. It is estimated that the ship will yield 6500 tons of steel, and many tons of copper and brass, besides the miles of copper wire that were used in the electric signalling system. The four main engines, 18,000 hp. in all, will also afford valuable salvage in the form of parts that can be removed without injury and sold for other construction.

The major part of the demolition work, including all cutting of iron and steel, is being done with oxy-acetylene, Oxweld C-6 cutting blow-pipes being used on the work. First to go were the funnels, each of which weighed approximately 18 tons. This step of the work was shown recently in the news films at moving picture theaters. More recently the 6-in. and 8-in. armor plate on the turrets and barbettes was cut and it is interesting to note that the man average per hour on this kind of cutting was approximately 10 lineal feet. This cutting speed was attained with an oxygen pressure of 85 lbs.

In a general way the cutting that is being done on the Brooklyn is typical of the work that is being done not only in the newly created ship-breaking yards in this country, but in those of England and Japan, in the undertaking set on foot at Washington early this year. One picture of the work in progress on the Brooklyn shows a part of the foremast, atilt and about to fall after having been cut at the base of the section. This picture shows also a large supply of oxygen cylinders in the foreground.

Below is Seen a Section of the Forward Military Mast Toppling after Being Cut Away at the Base. At upper right an operator is at work on the barbette of one of the 8-in. turrets. At lower right an operator is cutting around one of the 5-in. casemates.



Federal Trade Commission Personnel

WASHINGTON, July 4.—Judge W. Vernon Van Fleet, of South Bend, Ind., was sworn in last Friday for a term of seven years as a member of the Federal Trade Commission and has assumed his duties. Judge Van Fleet until recently has been special assistant to the Attorney General, giving his attention particularly to re-organization work. He became associated with the Department of Justice in March, 1921. His appointment as a member of the Federal Trade Commission completes the personnel of that organization and is important to the iron and steel industry because of the activities of the commission as they relate to the industry. These include the Pittsburgh base and cost reporting cases as well as the investigation regarding proposed mergers of independent steel companies.

MECHANICAL PUDDLING

Ground Broken for First Unit of a Large Plant of Youngstown Steel Co.

Ground was broken last week by the Youngstown Steel Co., Youngstown, Ohio, for a mechanical puddling plant on a 415-acre site two miles north of Warren in Trumbull county. The initial unit in an extensive construction program, will consist of four machines, with a capacity of 250 tons of puddled iron per 24-hr., and rolling mill complement.

The rolling mill will consist of two stands of 3-high rolls, arranged tandem, and will be furnished by the United Engineering & Foundry Co., Pittsburgh. Rolling mill machinery to be installed at this time will handle up to 1000 tons of iron per day.

A rotary furnace will be installed for mixing the iron. From the time it enters the cupola furnace for melting until it emerges from the rolling mill, all operations will be mechanical. The plant will be fully electrified and will produce its own power. After the puddling operation, the iron will be removed in the form of a ball weighing from 2000 to 2500 lb., and will be pressed into ingot form by a hydraulic press. In this form it will be sent to the heating furnaces and rolled direct into billets, sheet bar or muck bar.

The present installation is merely the beginning of an extensive plant, plans for which have been drawn, to include a total of 16 mechanical puddle furnaces, two 500-ton blast furnaces and auxiliary by product coke ovens. Pig iron will be purchased on the market until blast furnaces are built later. It is planned to operate the initial installation for at least a year before undertaking extensions on any large scale.

The plant will produce a ton of puddled iron every 20 minutes. This compares with an average produc-

tion of 2500 to 2700 lb. by a puddler and helper, working five heats per day. Production costs by the mechanical process are therefore considerably less costly than by the hand-puddled methods now in effect in the majority of plants, and it is claimed the product is of a superior grade. It will be similar to the old-time hand puddled iron. Its corrosive resistance properties are said to be greater than those of steel. The structure of puddled iron is fibrous, instead of crystalline, as is the case with steel.

Present plans do not contemplate any finishing units and the company proposes to market its product in the semi-finished forms mentioned, making the product available for a diversity of uses in pipe, sheets, bar iron for railroad uses and the like. It is expected the first installation will be completed and ready for operation by the first of next year. Construction will be conducted under direction of the company's own organization.

Plans to proceed follow years of intensive experimentation by E. L. Ford, who is a director of the Youngstown Sheet & Tube Co. and a member of the executive committee of the Brier Hill Steel Co. The puddling machines are designed after plans patented by him.

One of the machines was built a number of years ago at the Brier Hill company's plant and has produced some tonnage in trial runs, which has proved satisfactory upon conversion into finished product. This equipment will be transferred to the Warren site and will form part of the new plant.

An office building will be erected at the plant to house the operating departments. At present, the company's principal office is located at 513 Stambaugh building, Youngstown. The company's name is to be changed to more properly conform to its product, while details of capitalization and reincorporation are still to be worked out. Contracts for buildings and electrical equipment for the plant will be awarded in a short time.

Associated with Mr. Ford in the enterprise are T. M. Phillips, general manager of the company, and H. Z. Bixler, chief engineer. Mr. Phillips has been identified with the iron and steel industry in the Mahoning Valley for many years, and previously had charge of blast furnaces and the washed metal plant of the Brier Hill company.

Mr. Bixler was formerly chief engineer of the Brier Hill company, but has been with the Youngstown Steel Co. for the past two years. J. P. Suter, formerly accountant with the Republic Rubber Corporation, Youngstown, is secretary-treasurer.

The company's site at Warren has rail connections with the Erie, Baltimore & Ohio and Pennsylvania railroads. At the start, only a small number of men will be employed.

FRENCH TARIFF CHANGES URGED

Commission Suggests Increased Duties on Hematite Iron, Spiegeleisen, Tool Steel, Hoops and Sheets

(*By Correspondence*)

PARIS, FRANCE, June 15.—The recently published findings of the Departmental Commission for the Revision of customs duties relative to pig iron, has been generally criticized by the French engineering and other steel-using trades, which want to obtain raw and semi-finished materials as cheaply as possible, regardless of origin.

While the pig iron capacity of France since the war is 10 to 12 million tons annually, last year only about three million tons was produced, and this year the increase will probably be only about one million tons. Therefore production in 1921 was only one-fourth and in 1922 probably will be one-third of the total capacity. Producing at full capacity under normal conditions France probably could not consume more than one-half her output.

Therefore, France, which before the war had never been an iron exporting country, is being led by the force of altered circumstances to become one.

But French producers are now meeting with strong competition in foreign markets from Germany—favored by the fall of the mark and by intensive production—as well as from Great Britain, Belgium and Luxemburg, the two last named countries being now economically united, and the French producers are forced to offer foreign purchasers prices often below cost. The inland market is relied upon to make up these losses. But there again producers are confronted by keen Belgian and British competition. Both Belgium and Great Britain, which are receiving the minimum rates of the French tariff, have lately succeeded in exporting to France quite important quantities of hematite pig iron, sheets and plates, and rolled merchant products.

French blast furnaces are now paying for coke (mostly German) 93 fr. ($7.75) per ton at the Franco-German frontier. (There is a refund of 20 fr. per ton ($1.68) on coke used in making export pig iron), while British blast furnaces, for instance, pay about 28s. per ton ($6.16). On the other hand, wages and other charges are higher in France than in Great Britain and in Belgium.

French iron-makers, because of this situation, have asked for an increased tariff protection. The French consuming industries have protested, claiming that if they obtain their raw materials at a low price they can increase their exports of finished products, machinery and electrical goods. The Departmental Commission took a middle course and suggested the following revisions, which have not yet been approved by the government:

Product	New Duty (Fr. per Metric Ton)	Old Duty (Fr. per Metric Ton)
Hematite iron and spiegeleisen	37.50	30.00
Pig iron, other kinds	27.00	30.00
Steel ingots	90.00	76.50
Tool steel, per 100 kg	52.50	39.00
Other special steels, per 100 kg	125.00	95.00
Hoops and strip steel, hot rolled, per 100 kg.	13.00	15.60
Hoops and strip steel, cold rolled, per 100 kg.	{ 24.00 / 39.00	11.20 / 18.20
Iron and steel sheets, cut, per 100 kg	{ 11.25 / 18.00	10.50 / 16.80

Wages of Puddlers Advanced

YOUNGSTOWN, July 3.—Boiling rate for July-August will be $8.53 per ton, based on a 1.60c. card. This was determined June 28 at the bimonthly examination of sales sheets conducted at the office of James H. Nutt, secretary of the Western Bar Iron Association, Youngstown. Examination of reports of shipments of base sizes of bar iron shipped from April 20 to June 20 by mid-Western mills disclosed an average price of $1.604. This compares with an average of $1.50 per 100 lb. at the settlement two months previously, and represents an advance of two points on the card rate. Puddlers were paid $7.63 per ton in May and June.

The wage rate for boiling will be $8.53 per ton for the reason that the boiling base rate was advanced 50c. per ton, in the new agreement with employees, effective from July 1. Under the agreement which expired June 30, the puddling rate on a 1.60c. card was $8.03. In the new contract, the base puddling rate is increased from $5.50 to $6 on a 1c. card, with a 50c. advance applying at all card points above 1c.

Shipments for the period covered by the settlement showed an appreciable gain as compared with the 60 days ending April 20.

Finishers receive an increase of 4 per cent as a result of the settlement, and will be 28½ per cent above the rates in the scale for July and August.

Employees were represented by officials of the Amalgamated Association of Iron, Steel and Tin Workers, located at Pittsburgh.

Manufactured gas sold in 1920, nearly 500 billion cu. ft., was greater than ever before. The value is estimated by the United States Geological Survey at over $300,000,000.

METAL SCHEDULE COMPLETED

Further Announcements May Be Made, However, Before Tariff Bill is Passed

WASHINGTON, July 4.—The metal schedule of the tariff finally has been completed by the Senate sitting as a Committee of the Whole, but when the bill is presented to the Senate as a body and the parliamentary status permits it, it is expected there will be many amendments offered other than those made by the Senate Committee on Finance itself. While it is not likely that the attacks that will be made on the schedule by Democrats as well as some so-called progressive Republicans will yield any changes of importance, the schedule undoubtedly will be subjected to further sharp criticism, such as was made on it during the past few weeks.

The iron, steel and foundry interests are greatly displeased at the action of the Senate with regard to the duties it has placed on raw materials. At the same time, those who have been urging protection for these materials are gratified at the duties named.

Estimated Increase in Costs

Estimates have been made here that iron and steel costs because of the proposed tariff duties fixed by the Senate on raw materials will be increased by $21,757,962 annually. This compares with $23,805,225, which Chairman John A. Topping of the Republic Iron & Steel Co. estimated they would cost annually in the production of steel. Mr. Topping made his statement as a representative of the independent iron and steel industry before the Senate Committee on Finance in the course of hearings on the metal schedule. His estimate was based upon House duties on ferrosilicon, fluorspar, manganese ore, magnesite, pig tin, and zinc. He appeared in opposition to duties on these products and asked that ferromanganese, if made dutiable, be given no higher rate than pig iron.

Action of the Senate committee in reporting the bill had partly followed suggestions made, particularly in the case of manganese ore, which was made free, ferromanganese, which was given a duty of $2.50 per ton and pig tin which also was made free. But as amended upon the initiative of the committee itself, the Senate as a Committee of the Whole, restored the House duty of 1c. per lb. (of contained manganese) on manganese ore and fixed a duty of 1⅞c. per lb. (of contained manganese) on ferromanganese containing more than 1 per cent of carbon as compared with the House duty of 2 1/5c. per lb. Rates on ferrosilicon were revised downward in the Senate and pig tin was left on the free list, but the duty on fluorspar was increased by the Committee on Finance from the House duty of $5 per ton to $5.60 per ton and the duty of $10 per ton on crude magnesite carried in the House bill was restored by the Senate after somewhat lower rates had been reported by the Committee on Finance.

Mr. Topping's Figures Revised

Iron and steel producers who are opposed to the duties fixed on raw materials, using the duties adopted by the Senate, have revised the figures presented by Mr. Topping which were based on House duties and have made estimates as to increased costs as follows:

	Annual Requirements Tons	Proposed Tax	Total per Annum
Ferrosilicon, 57 per cent	[illegible]	[illegible]	[illegible]
Fluorspar	300,000	5.60	1,680,000
Manganese ore, 48 per cent	750,000	10.75	8,062,500
Magnesite	150,000	10.00	1,500,000
Zinc (first two years)	†426,986,416	*0.0175	7,472,262
Total			[illegible]

*Per pound. †Pounds.

The duty determined upon for ferromanganese recalls the statement of Mr. Topping before the Committee on Finance that independent steel interests might form a co-operative company of two or three concerns and put one or two blast furnaces on ferromanganese for joint use:

"And that is what we would have to do if this (House) rate goes through without change, because we could not afford to be at the disadvantage that this bill contemplates placing on us as compared with the cost of manganese per ton of steel made by the Steel Corporation. Should we import our ore and pay the duty you proposed in this bill, and manufacture our own ferro, it will be more economical than to buy our ferromanganese in the open market."

Changes Adopted

The final and important changes made in the metal schedule included the following:

Chain (paragraph 329) not less than ¾ in. in diameter, duty reduced from 1c. to ⅞c. per lb.; less than ¾ and not less than ⅜ in., duty reduced from 1¼ to 1½c. per lb., etc.; sprocket and machine chains, duty reduced from 50 per cent to 35 per cent ad valorem; for shovels, spades, etc. (paragraph 373), duty of 35 per cent reported by the committee agreed to.

New paragraph (392B) submitted by Chairman McCumber fixes duty of 60 per cent on twist drills, reamers, milling cutters, taps, dies, and metal cutting tools of all descriptions, not provided for, containing more than 0.6 per cent of tungsten or molybdenum, this action following complaint of tool steel makers that they had been given a duty of only 40 per cent while their raw products had been made dutiable at 60 per cent.

PACIFIC COAST COMPANY

California and Utah Capitalists Plan a $15,000,000 Enterprise

SAN FRANCISCO, June 30.—Announcement is made to-day by Wigginton E. Creed, president of Columbia Steel Co., of the projected organization of a $15,000,000 independent steel and coke company on the Pacific Coast, following the acquisition of extensive coal and iron properties in Utah from the Utah Coal & Coke Co. by the Columbia Steel Co. The new company, which will be organized for the manufacture of steel products and coke as soon as practicable, is being backed by several prominent capitalists of Utah and California. Among the San Franciscans interested are: W. E. Creed, H. D. Grant, A. E. Boynton, Joseph Sloss, W. P. Hammon, John S. Drum, Herbert Fleischhacker of the Pacific Coast Steel Co., Mortimer Fleischhacker and Alfred Esberg. The Utah group includes: W. W. Armstrong, president National Copper Bank of Salt Lake City; L. R. Rains, president Carbon Fuel Co.; Adrian C. Ellis, Jr., A. M. Clark and D. H. Botchford.

The properties being acquired comprise 3120 acres of coal lands and the townsite of 1160 acres near Sunnyvale, Carbon County, Utah, and a number of patented claims covering the iron deposits in Iron County.

For the past eight months those interested have been investigating the possibilities of developing the resources acquired. Although it has been decided to construct a plant for the manufacture of fabricated material, complete plans have not as yet been reached. W. E. Creed makes the following statement: "The Columbia Steel Co. has acquired the coal and iron properties of the Utah Coal & Coke Co., situated in Carbon and Iron counties, Utah. The purchase will be effected through the organization of a new corporation to take over the rolling mills and steel foundries of the Columbia Steel Co. and the assets of the Utah Coal & Coke Co. An intensive investigation, extending over a period

of more than eight months, has demonstrated that the Utah coal and iron properties can be used to form the basis of an independent steel industry for the Coast and Mountain territory. Definite plans have not been matured, except to the point of effecting the purchase and consolidation, but the program for future developments is now being worked out. The West needs the basic industries of iron and steel fully developed, and an unusual opportunity exists for progress in this direction by co-operation by California and Utah."

The building of a blast furnace to supply pig iron to the Columbia and Pacific Coast steel companies is part of the plan of the new company and has been long contemplated.

GERMAN PRICE TREND UPWARD

Export Demand for Machinery and Electric Material—French and Belgian Competition on Pig Iron and Steel

(*Special Correspondence*)

BERLIN, GERMANY, June 14.—The domestic iron and steel market continues active. This is also true of the export market for finished metal goods, machinery and electro-technical articles, but in heavy and semi-finished products there is increased French and Belgian competition, and in pig-iron, for which the domestic demand is great, there is more dependence upon imports from France. The failure of the reparations loan has not affected business in the way predicted. The expectation was that if the loan failed the mark would collapse, and an increased domestic and export boom would result. The mark has, however, so far fallen only a little; and business conditions have on the whole remained unchanged.

Domestic prices are still rising, although at a reduced rate. The *Frankfurter Zeitung's* wholesale commodities index, which is based on 100 for January, 1920, showed for the beginning of June 606, against 584 on May 1. Assertions that Germany cannot compete appear daily in the trade press, but are in general untrue. The *Frankfurter Zeitung* index for twenty-one standard finished products shows a forty-six-fold increase. As the dollar is appreciated about seventy fold, German prices for finished articles are materially lower than in 1914, if expressed in dollars or in gold. The official "Wirtschaft und Statistik" correctly shows that in March, American prices were 154 per cent above German.

Production is increasingly threatened by fuel shortage. The Ruhr coal output in May was 25,000 tons a day less than in March. The Ruhr miners have rejected a Government proposal to do extra work on four days a week, at increased pay. Lack of coal is the main cause of the pig iron shortage. The importing body, the Pig Iron Syndicate (Roheisenverband) is now offering its customers large quantities of Luxemburg foundry iron No. III, at a price of 195 French francs ($16.34) per metric ton, duty paid, delivered on the Lorraine or Luxemburg frontier. At present exchange, this makes less than 5500 m. per ton ($14.85), or below the latest German price of 6133 m. ($16.57) but these imports were contracted for when the mark stood materially higher than now.

Rising Prices for Metal Products

As cabled June 3 (June 8 issue of THE IRON AGE), the "Eisenwirtschaftsbund" again raised pig iron prices, effective June 1. Simultaneously, ferromanganese 80 per cent was raised from 14,415 m. ($38.92) to 15,415 m. ($41.62); 50 per cent from 13,735 m. ($37.08) to 14,400 m. ($38.88) and ferro-silicon 10 per cent from 7750 m. ($20.92) to 8100 m. ($21.87). The reason given was the increase in cost of coal, transport and wages. The Steel Syndicate (Stahlbund) decided on June 8, to make no change in semi-finished products, bars, shapes, wires, plates and rails. [An advance of 12 per cent was made on June 22, as given in THE IRON AGE of June 29, p. 1845.—EDITOR.] The prices of finished metal goods are still rising, though slowly. The Central Association of Electro-Technical Industries lately raised machines and transformers 10 per cent and small articles 20 per cent. The Trade-Screw Association yesterday raised its prices, which had been unchanged since April, by varying amounts, the highest being 6500 per cent above peace rates.

A movement led by Hugo Stinnes, aims to encourage importation of French semi-finished products on a large scale, in order to take care of Germany's finishing industries. The Lorraine mining industry shows nervousness at the decline in German ore buying, fearing that the increased German importation of pig iron is only temporary. The *Journée Industrielle* declares that good relations must be established between French smelters and German pig iron consumers, as the only way to prevent the Thyssen, Kloeckner and other groups re-establishing in Westphalia the great Hagendingen, Kneutingen and other smelting works which passed to France under the peace treaty.

Some Lines Not Prosperous

The market for plates is less satisfactory, sales of heavy plates being damaged by the inactivity in shipbuilding, caused mainly by lack of money. The paper-mark compensation for the shipping companies' war losses agreed on with the Goverment in March, 1921, has largely lost its value through price increases. In thin plates England and Belgium are both underselling Germany, by as much as 2000 m. ($5.40) per ton. The Upper Silesian smelting and rolling mill companies have orders for several months. The small iron and steel finishing branches report reserve by buyers, and complain of shortage of materials. Reports from manufacturers of tools, screws, saws and hammers, and locks and fittings complain of stagnation. A great demand for plates, wire and tubes is noted in Upper Silesia, but the local fuel supply is insufficient. Many Silesian coal miners, fearing worse living conditions under Polish rule, have left the mines.

Labor More Efficient

Favorable data are appearing as to the recovery in labor efficiency. The Prussian factory inspectors report that in some rolling mills, per capita production has risen to 95 per cent of that of 1913; and that one blast furnace which produced 5895 tons of iron a month in 1920 produced (for the same number of employees) 7765 tons in 1921. The Ukrainian Government has been negotiating with German smelting interests to work the manganese mines of the Ukraine; but negotiations were suspended because of the German condition that only high grade ore should be mined. An English counter offer is under consideration. The Austrian Government has leased the Wollersdorfer mechanical works to the General Electricity Co. On these works Austria has been losing at the rate of fifteen billion crowns a year. The term of the concession is fifty years. A company capitalized at one billion Austrian crowns will be formed, Austria receiving one-third of the shares for land, buildings, plant and raw materials in stock, but not ready machines.

GERMAN IRON AGAIN ADVANCES

Higher Coal Prices Force Pig Iron Upward 15 Per Cent On Top of June 1 Advance

BERLIN, GERMANY, June 30.—Another advance in pig iron has been determined on by the Eisenwirthschaftsbund, effective July 1. It amounts roughly to 15 per cent. Prices had been raised 5 to 6 per cent on June 1. Meanwhile the value of the mark is sharply receding and for the moment the dollar equivalent of various grades of iron is as follows: Hematite pig iron, $19.50, foundry No. 1, $18, spiegeleisen, $20.50. Higher coal prices are expected and these will increase automatically the price of iron.

The New Castle, Pa., plant of the Carnegie Steel Co. is now on a 100 per cent basis, with resumption of Rosena or No. 1 blast furnace in the New Castle group. The stack was lighted June 27 with appropriate ceremonies.

American Society for Testing Materials

Annual Convention Discusses Steel Castings and Pig and Cast Iron—Sulphur in Steel—Symposiums on Impact Testing and Fatigue of Metals

FOR many years prior to 1920, the American Society for Testing Materials had held its annual meetings at Atlantic City, N. J., but in 1920 and 1921, Asbury Park, N. J., was the meeting place. The society this year featured its twenty-fifth annual meeting by returning to Atlantic City and previous records for attendance were broken. At the last meeting at Atlantic City in 1919, the record attendance of 692 men and 174 women was made; this year the attendance was estimated at not less than 725 men and 175 women. The meetings were held from June 26 to 30, inclusive, in the spacious auditorium and rooms of the new Haddon Hall Hotel and the technical sessions were distinctly large and enthusiastic. While there were no features of unusual significance, the papers and the reports of the various committees were of the usual high order. Several new tentative specifications, including carbon steel castings for railroads and high-test gray iron castings, were adopted. There was an important symposium on impact testing which made history in this particular subject. An important section of one session was devoted to the fatigue of metals.

Two sessions were devoted entirely to iron and steel matters. The one on steel, which covered also steel castings, was restored to its old place on the program, being held on Wednesday morning. In the program devoted to wrought, cast and malleable iron, specifications for pig iron and cast iron were uppermost topics.

Session on Steel

Three principal topics were discussed at the session devoted to steel, at which Vice-President Guilliaem Aersten presided. The subject to which most of the attention was devoted was the tensile properties of steel castings. Other topics were the effect of sulphur on rivet steel and various methods of testing the welds in butt-welded steel plates.

Because of the fact that part of the report of committee A-1 on steel was the presentation of new specifications for carbon steel castings for railroads, the committee's report was presented in conjunction with a paper entitled "Tensile Properties of Steel Castings" by Lawford H. Fry, Standard Steel Works Co., Burnham, Pa.

New Specifications

New specifications for steel castings for railroads were the result of the work of the joint committee of the American Railroad Association and the American Society for Testing Materials, the final draft having been agreed upon March 24, 1922. The report of the society's representatives on the joint committee was signed by J. C. Davis, fourth vice-president American Steel Foundries, Chicago. It was emphasized that the sub-committee spent a great deal of time on the questions of elastic limit and yield point. It was finally agreed upon by the majority that the yield point by drop of beam or by dividers gave the most uniform results for steel castings and it was decided the yield point should be determined in either of these ways. The specifications also provide that the manganese requirement be placed at a maximum of 0.85 per cent, this concession being made to satisfy the majority of consumers. These specifications will be published later in THE IRON AGE.

Before the adoption of these specifications as tentative, Mr. Fry's paper was presented in abstract by the author. It deals with the tensile properties of steel castings made of grades commonly used for railroad service and is a comprehensive study of the subject. It covered an investigation which involved the examination of about 600 tests from seven manufacturers. In one series of tests, the tensile properties as usually determined are compared to show the relation between strength and ductility, and the relation between yield point and the elastic limit, determined by the method for forgings adopted by committee A-1 on Steel. In a second series, the so-called true elastic limit is compared with the yield point by a series of tests involving much greater precision than usually applied in commercial testing. Complete data of all the tests are given together with charts. The tests were made by a group of manufacturers of steel castings as a contribution to the work of the joint committee on the new specifications for steel castings. The author of the paper was the chairman of the committee and the other members were H. M. Lewis, Pratt & Letchworth Co.; C. N. Ring, Ohio Steel Castings Co.; J. D. R. Stehman, Birdsboro Steel Foundry & Machine Co.; and J. L. Uhler, Union Steel Casting Co. The author stated that the results of the tests show that, with even a moderate degree of precision in the method of measurement, annealed cast steel is found to behave as a plastic rather than an elastic material and that the term "elastic limit" has little meaning.

In the discussion which followed George F. Comstock, Titanium Alloy Mfg. Co., Niagara Falls, N. Y., called attention to the fact that no extensometer had been used in the tests and criticized the use of the Berry strain gage, implying at the same time that the results were not, therefore, scientific. Mr. Fry replied that the use of a more accurate extensometer would not have changed the general results. Prof. H. F. Moore, University of Illinois, Urbana, Ill., reviewed some of the points brought out by the author and stated that, as a result of much of the work done at his laboratories, there was no evidence yet of the existence of any absolute point for the elastic limit.

The new specifications were formally adopted as tentative together with the committees' report as a whole.

Changes in Steel Specifications

The report of the committee A-1 contained also recommendations involving minor changes in standard and tentative standard specifications. These embraced eight proposed revisions in standards and two proposed revisions in tentative standards. During the year, one new sub-committee was appointed as sub-committee XIX on sheet steels. The report announced that 11 specifications have been approved during the year for submission to the secretary-treasurer for transmission to the American Engineering Standards Committee.

Sulphur in Rivet Steel

Some disappointment was evident that there was but little discussion of the preliminary report of the joint committee on the investigation of phosphorus and sulphur in steel, covering in particular the effect of sulphur on rivet steel, presented by the chairman, Dr. George K. Burgess. Supplementing his presentation of the abstract of the report (given in THE IRON AGE of June 22) Dr. Burgess said that the committee's work on rivet steel was practically completed with the exception of a few minor points; that for the investigation on sheets, the steel had been manufactured and tests were being prepared; that the work on grade-B steel had progressed rapidly and tests were nearly completed and that for the investigation on forgings, the steel had been promised. So far as conclusions were concerned covering the report on rivet steel, the committee had felt that, until all the data had been completed and studied, the publication of any conclusions or comments was unwise.

Henry S. Rawdon, Bureau of Standards, Washing-

ton, read an interesting discussion commenting on one of the features of the report involving the effect of heat treatment and notched bar impact test on a low carbon steel containing 0.056 per cent sulphur. He showed that in both the Charpy and Izod tests the fractures varied decidedly as to whether the breaks were through the crystals or not, depending on the heat treatment.

Dr. John S. Unger, director Central Research Bureau, Carnegie Steel Co., Pittsburgh, read a written discussion, the substance of which follows:

For more than 40 years the question of the effect of sulphur in steel has attracted the attention of metallurgists. Much study has been given to this subject, extending so far as to include the several chemical forms or combinations in which it exists, particularly in cast iron.

Within a period of 20 years, the tonnage of steel made by the two principal processes, the Bessemer and the basic open-hearth, has undergone a great change. In 1900 about 65 per cent of the total was Bessemer; in 1920 it was 25 per cent.

With the change in processes came a change in the sulphur content in steel, the average sulphur in Bessemer steel being at least 0.065 against 0.040 per cent in the basic open-hearth. Structures of all kinds built from 20 to 40 years ago of Bessemer steel, are still in service today. Additional evidence is found by making a study of soft, medium and hard steel parts which have worn out in service, giving a good life, and which in many cases have contained more than 0.065 per cent, sulphur. On the other hand, equally convincing evidence is found for the same kinds of steels failing after a short time in similar service, in which the sulphur has been under 0.040 per cent. Evidence of this kind is enough to make one hesitate in forming an opinion whether a reasonable amount of sulphur, say under 0.100 per cent, is detrimental or otherwise. These facts conflict with the generally accepted opinion that steel is of poor quality and should not be used for any important work, unless it be low in sulphur. I sincerely hope the committee will give this angle of their work serious consideration in their future studies.

In discussing the committee's preliminary report, I have copied graphs from their report, combining a number of their graphs on a single sheet and inserting a line for sulphur in order that it may be more easily and quickly comprehended. In this chart, I have shown the composition curves for carbon and manganese at the bottom, adding a line for the sulphur content. Since the ordinates and abscissas are in percentages of sulphur, the line for sulphur becomes a gradually rising straight line.

The effect of the carbon and manganese in the several heats is clearly shown by the approximate parallelism of the composition curves with those representing the tensile, shearing, torsion, impact and hardness curves. All the curves for the physical properties are not shown as there is not sufficient space.

The striking thing seems to be that changes in the carbon and manganese content are immediately reflected by similar changes in the physical properties of the several heats with little, if any, change due to the increasing sulphur. It is almost impossible to make a number of heats of steel containing exactly the same percentage of carbon and manganese. Since this is true, it is practically impossible to determine the effect of sulphur if other variables in composition exist in the steel.

In studying this same problem during 1915, I believed it best to use the same heat of steel, but to vary the sulphur content in the individual ingots of the heat. My results were given in full in a paper before the Society of Automotive Engineers, January, 1916, and later in a paper before the American Boiler Manufacturers in June, 1916. [THE IRON AGE, Jan. 13, 1916.]

Many persons are inclined to believe that sulphur added to steel does not have the same effect as residual sulphur remaining in the steel, but it is surprising how closely my results, obtained by added sulphur, check the results of the committee's work with residual sulphur, when allowances are made for the effects of the variations in the carbon and manganese in the several heats.

The committee's work was confined to rivet steel, but this same quality steel is used in making wire products, tubular products and sheets. The specifications for such products specify the composition and sometimes calls for tensile tests and bending tests. The fitness of the steel is determined by the working of steel during fabrication and by such shop tests as flattening, bending, hydrostatic or beading tests. On pp. 9, 10, 11 and 23 of the report, some shop tests are given, showing very little differences among the steels. These are some of the commercial tests employed by the user to show whether the steel is of good quality, yet the committee, beyond stating what was done, have not made any comment on the quality. Instead physical or mechanical tests of many kinds were made, very few of which are ever regularly used in the arts.

I have examined the complaints or claims for rivet steels covering a period from 1911 to 1922, or 11 years. They show the following percentages:

	Per Cent
For Quality:	
Mixed steel and tensile strength	15
For Surface:	
Mechanical defects, seams, pipe, split heads	28
For Rolling:	
Out of round	6
Variation of size	
For high sulphur	51
Total	100

This table shows that more than one-half of the complaints were due to high sulphur, in most cases causing the rejection of the steel without any effort being made on the part of the user by shop or service tests to see if the steel was really bad or unfit for use.

The committee has refrained from drawing conclusions from its work. The graphs are not easily understood by the layman. Considerable time has elapsed since the work was begun. Probably a much longer time will be needed for the study of the medium and harder varieties of steel. In the meantime, much commercially good steel is being thrown away. The producer and consumer are awaiting the verdict.

I ask the committee to hasten its work, drawing conclusions as it proceeds and completing the work at an early date. This will be of great benefit to our society, settling, partially at least, a controversy of many years' standing.

Dr. Unger exhibited a series of lantern slides taken from a paper contributed by him before the Society of Automotive Engineers in January, 1916, which involved an investigation of sulphur in various forms of rolled products, and the effect of the sulphur on these products when worked. The original paper was published in THE IRON AGE, Jan. 13, 1916.

Heat Treatment of Iron and Steel

The report of committee A-4 on the heat treatment of iron and steel, in the absence of the chairman, H. M. Boylston, was presented by John Howe Hall, Taylor-Wharton Iron & Steel Co., High Bridge, N. J. The report states that one sub-committee was making an investigation to determine the desirability of annealing wrought iron chain at intervals, and that another sub-committee, on the heat treatment of steel castings, has recommended a substitute for the present recommended practice for the annealing of carbon steel castings. The latter was accepted by the Society as tentative and the report as a whole was adopted.

Magnetic Testing of Welds

A highly interesting paper entitled "Electrical and Magnetic Weld Testing as Applied to Butt-Welded Steel Plates" by T. Spooner and I. F. Kinnard, research engineers Westinghouse Electric & Mfg. Co., East Pittsburgh, was presented in abstract by Mr. Spooner. The work described by this paper involves a series of laboratory tests applied to arc-butt welded steel plates to ascertain whether it is possible to develop electrical and magnetic tests capable of revealing the quality of such welds. The paper describes the various apparatus and the methods of applying the electrical and magnetic tests and then these are compared with tension tests from the plates which had been tested electrically and magnetically. It states that the electrical, magnetic and tension tests showed a very fair general agreement among themselves, as well as with the known quality of the welds as reported by the welder. As a result of the tests, the authors feel that the electrical and magnetic methods of testing show considerable promise, at least as applied to butt-welded plates, and that without doubt a really poor weld can be demonstrated. They also feel that the methods described can be applied commercially by suitable alterations in the details of the apparatus so as to provide a more rugged portable device. They hold that such an outcome will greatly increase the possible applications of electrical and gas welding, since it should be feasible to eliminate poor welded sections before any harm could come to a completed structure.

In discussing this report, Dr. Burgess commented on the excellence of the data brought forth and

asked whether the authors believed that the magnetic tests could be adapted to the testing of electrically welded rail joints in position, to which Mr. Spooner replied that, while no work had been done on this subject, they were justified in saying that it could be applied to such rails.

Session on Iron

The session on wrought, cast and malleable iron was held Tuesday afternoon, June 27, with Vice-president Burgess in the chair.

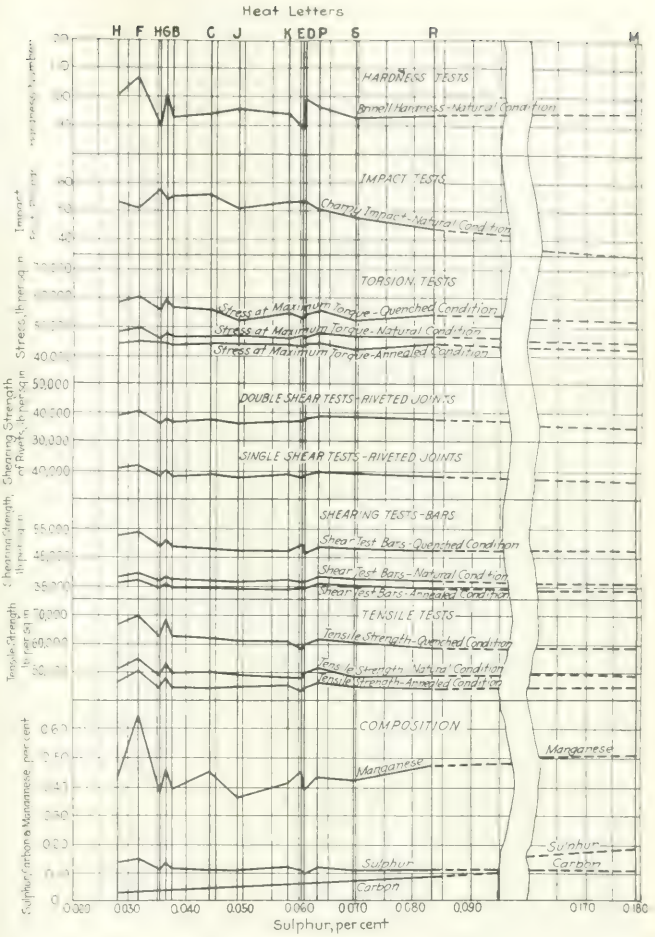
Some problems connected with foundry pig iron were easily the leading topics of this meeting. The subject was introduced by paper entitled "The Physics of Cast Iron and Its Bearing On All Cast Iron Products and Specifications for Cast Iron" by William R. Webster, consulting engineer, Philadelphia, followed by a report of committee A-3 on cast iron, the two subjects being thrown open to general discussion after their presentation.

Physics of Cast Iron

Mr. Webster's paper was presented in abstract by Dr. Moldenke. After referring to some of the earlier discussions of the physics of cast iron before the American Institute of Mining Engineers at one of its meetings in March, 1895, in which the author presented a brief note on a proposed scheme of the study of the physics of cast iron (which led ultimately to the preparation of the testing society's standard specifications for foundry pig iron) Mr. Webster draws attention to the importance of reducing to the lowest possible minimum the great variety of chemical compositions of pig iron now used in the manufacture of steel, gray iron and malleable iron castings.

At present, the chemical requirements of pig iron ordered by foundries making even the same grade and weight of castings vary so greatly that blast furnacemen are caused unnecessary trouble when required to make several grades of pig iron for the same weight and grade of castings. The author emphasized that the standard specifications for foundry pig iron of the society, known as A 43-09, have been in general use for about seventeen years with excellent results, and yet there are no definite statements in the specifications of the chemical composition of the foundry pig iron that would guide and assist the foundryman in making light, medium or heavy castings or malleable iron. According to Mr. Webster, all that they have given the foundrymen is a convenient code for writing out a prescription in code words to the blast furnaceman giving the chemical composition of the irons most desirable for the requirements.

The suggestion is made by the author that the present practice of foundrymen and blast furnacemen be tabulated in such a way that a representative standard set of requirements can be agreed upon which will protect fairly the interests of both producers and consumers and that such requirements would form a valuable addition to the society's present specifications. The author quotes from an article in THE IRON AGE, Dec. 1, 1921, by Y. A. Dyer, entitled "Purchasing Foundry Iron by Specification," in which was cited the classifications by analysis of various foundry irons as created by the committee on steel and steel products of the American Iron and Steel Institute during the war.



Various Charts of the Investigation on Sulphur in Rivet Steel Compared with a Chart of the Carbon and Manganese Composition. This was prepared and used by Mr. Unger in his discussion

In a printed appendix to the paper, Dr. Moldenke, chairman of the committee on cast iron, discusses several proposals in Mr. Webster's paper. He offers some changes in the suggested lines for discussion and investigation as contained in the original proposals and states that the discussion of every point included in such a scheme of study would assume the magnitude of a book. He offered as a summary of a life's work in the production of good castings, which are necessarily interwoven with the chemical and physical characteristics of cast iron, the following:

1. Use the best material suited to the production of the castings wanted.
2. Employ correct melting, molding and finishing processes.
3. Gate the molds correctly, so that the good material properly manipulated, may be given the best chance possible to produce good work.

According to Dr. Moldenke, the natural solution of the present conditions, referred to by Mr. Webster, "is to collect the requirements under which pig iron has

been sold for each grade of casting, including steel and malleable, the work to be done by a committee having an equal representation of blast furnacemen, whom we term the producers, and the consumers who manufacture the finished product. If this course is followed, it would enable any blast furnace in the country to produce a much larger output on a given grade of pig iron than ever before, as the number of grades would be reduced and the hair-splitting requirements removed. In dull times, this would enable the furnaces to stock up considerable quantities of each grade of iron with much more certainty than under the present conditions."

Foundry Pig Iron Specifications

The report of committee A-3 on cast iron was then presented by its chairman, Dr. Moldenke. The section of the report referring to specifications for foundry pig iron, A 43-09, adopted in 1904 and revised in 1909, has been brought up-to-date, says the report, by making a few changes found desirable as experience was acquired. Th principal change referred to consists in removing from the original specifications the code already referred to and incorporating it as an appendix to the new proposed tentative specification. Other points in the committee's reports are referred to later on.

The discussion of Mr. Webster's paper and the proposed changes in the specifications for cast iron involved some sharp differences of opinion, particularly from representatives of makers of steel castings. R. A. Bull, J. L. Uhler and J. H. Hall, in particular, said that they were not aware, until a day or so previous to the meeting, that these specifications were intended to include foundry irons used in steel foundry practice, but understood that they applied only to the gray iron foundry. It was their opinion that in their present form the specifications could not be used to purchase iron for certain steel foundry work, particularly acid open-hearth, and for that reason, they did not approve of the adoption of the specifications, if they were intended to include anything else than gray iron foundry pig iron.

G. C. Davies, Philadelphia, chairman of the committee on pig iron, in response to these objections claimed that the specifications were not only intended to apply to all grades of iron used in all kinds of foundry operations but also felt that they were easily adaptable to the ordering of iron for steel foundry as well as gray iron foundry use. Messrs. Hall and Uhler, replied that for converter use a pig iron having a low manganese content was necessary,and a phosphorus and sulphur content not exceeding 0.04 per cent, while for acid open-hearth work a Bessemer pig iron not exeeeeding 0.10 per cent phosphorus and a low phosphorus iron not exceeding 0.04 per cent phosphorus and sulphur, as well as a manganese content running from 1 to 1.50 per cent was required. They insisted that it would be impossible to buy such irons under the present foundry iron specifications or, if it were possible, a bonus would be exacted by the producers for certain constituents, such as manganese.

Walter Wood, of R. D. Wood & Co., Philadelphia, impressively stated that he considered that the time for distinguishing various irons by grades had passed and that what was necessary was a set of specifications as elastic as possible. In his opinion the revised specifications as proposed by the committee were the best that could be formulated.

Dr. Moldenke, in reply to some of the foregoing statements, stated that he agreed with some of the objectors and even differed from the chairman of the pig iron committee as to an allowable variation of 0.25 per cent in the silicon content of malleable pig iron, but he felt that the solution of the present difficulty lay in adopting the present report with the understanding that during the coming year the steel foundry and malleable iron interests could formulate their objections or offer specifications more in harmony with their own ideas and present them to the committee for proper consideration and possible further revision next year. With this understanding, the report on foundry specifications, after a division of the vote, was adopted.

Chilled Wheel and High-Test Iron

Two other important matters contained in the report of committee A-3 on cast iron included revisions in the proposed tentative specifications for chilled cast iron wheels, A 46-22 T, and the presentation of new specifications covering what the committee has classified as high-test gray iron castings, which include those irons showing higher strengths than the usual run of iron and more popularly known as semi-steel.

Changes in the tentative specifications for chilled iron wheels were confined chiefly to three points, two of these having to do with chemical composition. In the new tentative specifications, it is stated that the phosphorus content shall not exceed 0.30 per cent and the maximum on sulphur was advanced from 0.17 to 0.18, while under the paragraph dealing with the chilled test, a note is added that the chilled and physical test specified cover only 33-in. wheels of the weights listed, other diameters and weights to be in proportion. It was stated in explanation that the fixing of maximum sulphur at 0.18 per cent was in the way of a compromise as a result of tests made by the Cast Iron Wheel Manufacturers Association. These demonstrated that sulphur is not harmful up to 0.18 per cent or thereabouts, and if limited to 0.17 per cent it would throw out too many good wheels. As to phosphorus, recent physical and thermal tests on a large variety of wheels have shown in some cases that certain wheels crack which are low in phosphorus. J. R. Onderdonk, Baltimore, Md., said that for the size of some wheels now in use, the 250-lb. tup used in the drop tests was altogether too light, some wheels at present in use running as high as 900 lb. and higher.

Wrought Iron

The report of committee A-2 on wrought iron was presented by its chairman, H. C. Smith. It offers minor recommendations for revisions in existing tentative standards for welded wrought iron pipe; for wrought iron forgings for locomotives and cars, and for lap welded and seamless steel and lap welded iron boiler tubes.

In connection with the committee's report, two papers were presented, one by W. M. Myers, general manager Highland Iron & Steel Co., entitled "Merchant Bar Iron Made by the Busheled Scrap Process" and the other by H. S. Rawdon and S. Epstein of the Bureau of Standards, entitled "Some Observations on the Nick-Brand Test for Wrought Iron."

Mr. Myers described the manufacture of merchant bar iron made from re-worked iron scrap or a reworked mixture of iron and steel scrap in hand busheling furnaces and in mechanical busheling furnaces. Test results were included, together with the physical properties and chemical analysis of the materials. The Rawdon and Epstein paper called attention to the fact that the nick and bend test, as included in specifications for wrought iron, specifies that the materials shall show no crystalline areas or not more than a specified amount, the test being made either by pressure or by blows. The aim of the paper is to show that the usual nick and bend clause is indefinite, since either fibrous or crystalline fractures may be produced according to the procedure followed, including the apparatus used and the way in which the blow is received and the nick is made. Robert Job, Montreal, Canada, pointed to this paper as a good illustration of much of the work done by the Bureau of Standards and contended that decidedly more explicit specifications were needed for wrought iron, particularly as to the crystalline areas resulting from the nick and bend tests.

Symposium on Impact Testing

The entire Wednesday evening session, June 28, was devoted to a symposium on impact testing of materials. It is probably the first symposium of the kind ever attempted; it made a deep impression and was a complete success. In general, it was a review of the development of the impact testing of materials and a discussion of the significance and value of the impact test. There were ten contributions to this symposium. After

a brief preface, the subject was introduced by a résumé of impact testing of materials, including a bibliography and then various papers discussed three phases of the subject: Machines and test specimens used; standardizations of machines and specimens for notched bar impact tests of metals; and the measurement of impact, closing with a paper on the significance of the test.

The contributions to the symposium were published in a pamphlet, ready for distribution at the meeting and containing 107 pages. The symposium was announced as the outcome of an informal discussion in the society's committee E-1 on methods of testing, extending over a period of nearly two years. It was agreed by the committee that steps should be taken by the society to study impact testing of materials more definitely and intensely than heretofore attempted in any concerted way in this country, covering not only details of methods and their standardization, but also inquiring into the significance of such tests. As a result, committee E-1 appointed a sub-committee of 12 members of which T. D. Lynch, Westinghouse Electric & Mfg. Co., was chairman which, in co-operation with the committee on papers, planned the symposium. The publication of the various papers referred to is believed by the committee to comprise the most recent and extensive statement of the status of impact testing of materials and to serve as the start for further study.

Machines for Impact Testing

The résumé and bibliography was prepared by H. L. Whittemore, mechanical engineer Bureau of Standards, Washington. The contributions on machines and test specimens used in impact testing were by D. J. MacAdam, Jr., metallurgist United States Naval Engineering Experiment Station, Annapolis, Md., on "Impact Tests of Metals"; by Thomas R. C. Wilson, engineer in forest products, Forest Products Laboratory, United States Department of Agriculture, Madison, Wis., on "Impact Tests of Wood," and by Earl B. Smith, senior testing engineer, United States Bureau of Public Roads, Washington, entitled "Impact Tests of Road Materials."

Mr. MacAdam, besides describing impact testing machines of various types, as well as a static-resilience testing machine, discussed the relations of repeated impact to single blow impact and the various impact specimens in common use on metals. He also entered into a theoretical discussion of stress distribution in a notched tension specimen and its effect on resilience, as well as other important phases of the subject.

Under the second general division of the symposium, namely, standardization of machines and specimens for notched bar impact tests of metals, one of the most interesting contributions to this symposium was that of C. L. Warwick, secretary-treasurer of the society, Philadelphia, entitled "A Résumé of American Practice in Notched Bar Impact Tests of Metals." The paper is the result of the circulation of a questionnaire among a selected list of testing engineers, laboratories, etc. Mr. Warwick believes the results of the questionnaire point to the desirability of the society's undertaking a suitable study of impact testing in order that methods for such testing shall be prepared, which will compare with the society's methods for tension, compression and other tests of materials.

The brief review of the work on impact testing done by the British Engineering Standards Association was then presented in abstract by Mr. Lynch. It covered the chief features of British practice in the impact testing of notched metal specimens, abstracted from a more complete report of the main committee a year ago by a special committee under the chairmanship of the author. Mr. Lynch summed up with the statement that it is evident that there is a real need for a standardization of the main features of impact testing by the American society, including size and type of specimen, depth of notch and its character, the striking speed and energy and other important details.

Measurement and Significance of Impact

Under the general subject of measurement of impact, three papers were presented, one by C. E. Margerum, metallurgist, United States Naval Ordnance Plant, Charleston, W. Va., who discussed measurement of pressures caused by impact, another by Armin Elmendorf, consulting engineer, Haskelite Mfg. Corporation, Chicago, on "Measuring Forces of Impact," and another by Prof. H. F. Moore on the "Measurement of the Force of Impact by Means of the Elastic Stretch of a Steel Bar."

The symposium was brought to a close by a paper entitled "Significance of the Impact Test" by F. C. Langenberg and N. Richardson, metallurgist and research engineer, respectively, Watertown Arsenal, Watertown, Mass. A brief summary follows:

The authors point out that many attempts have been made to correlate the impact test with other tests and state that it does not appear at the present time that a definite relation between the static tension test and the dynamic impact test exists. Reference is made to attempts of investigators to develop a certain relation between the amount of work done on a given material when broken statically and dynamically. The conclusions are diversified, but the authors believe that the proper conclusion in the light of our present knowledge is that this relationship will vary with the nature of the material.

Regardless of the type of impact machine employed or form of specimen used, the essential result obtained is the amount of energy absorbed by the specimen. In comparing static and dynamic tests, therefore, the same essential data should be recorded in both cases, and the authors point out that in the ordinary static tension tests as it is carried out to-day such data are not recorded and it is therefore impossible to draw any definite relationship between the values usually recorded in the tension test and the data obtained from the impact test. From the large number of tests made at the laboratories at Watertown Arsenal, the authors conclude that the elastic limit and tensile strength of a wide variety of steels, both in the annealed and heat-treated conditions, do not bear any relationship whatever to the work expended in the rupture of Charpy impact test specimens. The percentgae of elongation in tension is low when the Charpy value is low, but it does not follow that when the percentage of elongation is high the Charpy value will be correspondingly high. Typical test data on certain alloy steels and ordnance steels are recorded, illustrating these conclusions and furnishing an opportunity for comparison of static and dynamic tests.

The paper concludes with a brief discussion of the properties revealed by the impact test and the possibilities of interpreting results of the test in engineering practice.

Fatigue of Metals

The major portion of the morning session of Thursday, June 29, was devoted to the subject of the "Fatigue of Metals" with past-president G. H. Clamer presiding. The subject was introduced by a paper entitled "Fatigue or Progressive Failure of Metals Under Repeated Stress" by Profs. H. F. Moore, J. B. Kommers, and T. M. Jasper, University of Illinois, Urbana, Ill. Professor Moore delivered an abstract of the paper, which consists largely of a discussion of the testing practice used in making repeated stress tests, with special reference to the testing machines, the specimens and the methods used in the joint investigation of the fatigue of metals, now in progress under the auspices of the National Research Council, the Engineering Foundation, the General Electric Co., and the Engineering Experiment Station of the University of Illinois.

The authors point out several important conclusions which have been arrived at. One of these is that, for a ferrous metal, there exists a fairly well defined limiting unit stress below which the metal can withstand hundreds of millions of reversals of stress, and that, so far as can be seen, such a metal can withstand an indefinitely larger number of such reversals. For this particular characteristic or limiting stress the term "endurance limit" has been given, and the statement is made that experimental evidence in favor of its existence has been uncovered.

Another feature of this paper is a discussion of the significance of this endurance limit and the presentation of charts showing its correlation with other physical properties. The paper also discusses recent test results of repeated-stress tests. The paper concludes with the following significant statement:

An interesting series of tests is now in progress. Specimens which have withstood 100,000,000 reversals of a stress close to the endurance limit have been subjected to further reversals at slightly higher stresses—in one case 16 per cent

run of 100,000,000 reversals of this increased stress. Static tension tests on other specimens which have withstood 100,000,000 reversals of stress close to the endurance limit have given distinctly higher values for tensile strength than those given by tension tests of the material before repeated stressing. These tests are by no means complete, but the possibility that steel may be actually benefited by repeated stressing below the endurance limit is of interest.

Among the numerous lines of possible investigation of the phenomena of repeated stress, two seem to the writers to be worthy of special attention: (1) the extension of investigations of the fatigue strength of non-ferrous metals, with an attempt to see whether they show any phenomena markedly different from those shown by ferrous metals; and (2) an investigation of the strength of steel under repeated stress and at high temperature. There is almost a complete dearth of test data on this second item, and the problem is certainly one of great importance to makers and users of steam turbines and internal combustion engines.

Stress Concentrations and Polarized Light

At the conclusion of the presentation of this paper, A. L. Kimball of the research laboratory of the General Electric Co., Schenectady, N. Y., delivered a brief illustrated address on "Stress Concentrations as Determined by the Use of Transparent Specimens and Polarized Light." Colored slides illustrating the phenomena were shown and were very impressive.

There was also on exhibition three testing machines used by the joint investigation of the fatigue of metals referred to by Professor Moore and brought from Urbana, especially for the purpose. There was a reversed bending machine of the Farmer type; a machine for testing under a combination of reversed-bending and steady tension, and a reversed bending machine adapted either for tests to destruction or for the "rise-of-temperature" test. The latter machine was shown in operation.

A fairly liberal discussion followed the presentation of Professor Moore's paper, several being written. L. E. Tuckerman, Bureau of Standards, Washington, presented an interesting comparison of the work done at Urbana and at Annapolis, laying particular stress upon the specimens of ingot iron used at both places, as being easily comparable, pointing out that the fatigue results obtained at Annapolis are lower than those obtained at Urbana; he raised the question whether the explanation might not be a difference in the surface condition of the specimen used, particularly as affected by rough or smooth tool cuts.

An interesting comparison of certain fatigue tests made on the non-ferrous alloys, duraluminum and a magnesium alloy, as conducted by the Aluminum Co. of America, was presented by R. L. Templin, New Kensington, Pa. The question of the making of fatigue tests of cast iron was suggested as necessary by George K. Elliott, Lunkenheimer Co., Cincinnati, because of the fact that his experience had shown that drop tests, made on two cast irons of practically the same chemical and physical properties, had shown as high as 200 per cent difference in resistance to breaking. C. B. Bronson, New York Central Lines, New York, called attention to some investigations being made by that railroad on the fatigue of steel rails and some other products used in railroad work, with special reference to determining their endurance limit and their improvement, such information being essential for rail steel used in any form of high-speed service on railroad. The discussion was brought to a conclusion by Prof. T. M. Jasper of the University of Illinois, who answered certain questions.

Non-Ferrous Metals and Corrosion

The first session of the convention, Tuesday morning, June 27, was devoted to papers and committee reports on non-ferrous metals and corrosion. It embraced reports of Committee B-1 on copper wire, J. A. Capp, chairman; of Committee B-2 on non-ferrous metals and alloys, Prof. William Campbell, chairman. These reports presented new tentative specifications for brass pipe, copper tubing and admiralty condenser tubes and tentative methods of chemical analysis of brass ingots and sand castings and of bronze bearing metals. They also included tentative revisions in specifications for pig lead and for aluminum for remelting and rolling.

An important paper, "Physical Properties of Some Copper-Silicon-Aluminum Alloys When Sand Cast," by E. H. Dix, Jr., and A. J. Lyon, engineering division, air service, Dayton, Ohio, was presented in abstract. The paper gives the results of an investigation covering alloys of 3, 6 and 9 per cent silicon with 0, 2, 4 and 6 per cent, and with 2 per cent copper and 1 per cent manganese. The metallography of the alloys "as cast" is illustrated in detail and all the results are given in the form of graphs which show that the most desirable compositions lie between 3 to 5 per cent for both copper and silicon. Within these limits alloys can be prepared, the authors say, by simple foundry methods, to show physical properties as good or better than No. 12 alloy and having casting qualities superior to any other aluminum alloy of which the writers have knowledge. "They possess the property of being cast without chills and around steel barrels or hard cores without cracking."

Corrosion

The report of Committee A-5 on corrosion of iron and steel, J. H. Gibboney, acting chariman, consisted of reports of sub-committee II on preservative metallic coatings for metals, of sub-committee III on the inspection of the Fort Sheridan, Pittsburgh and Annapolis tests and sub-committee V on total immersion tests. The report mentions the death during the year of its chairman, Mr. Vorhees, who passed away last September and pays a suitable tribute to his leadership of the committee for seven years.

W. D. Bancroft, professor of chemistry Cornell University, Ithaca, N. Y., in a paper "Preliminary Notes on Corrosion," which is a brief résumé of the corrosion problem, states that he believes measurement of electromotive force is practically valueless from a fundamental viewpoint.

"A Method of Determining the Spelter Coating of Iron and Steel Sheets by Measuring the Rise in Temperature of the Acid Employed," by D. M. Strickland, research engineer, American Rolling Mill Co., describes an accurate method for determining the weight of such coating which is a departure from any method heretofore suggested. A measured volume of hydrochloric acid is poured into a glass tumbler. The temperature of the acid is taken with a thermometer, reading to 0.1 deg. C. The test piece or pieces are dropped into the acid, the galvanized coating is dissolved from the specimens, and the temperature rise recorded. Each one-tenth degree temperature rise equals a definite weight of zinc in grams. Radiation has no influence as the action is completed in possibly 30 sec. All sizes and shapes of galvanized specimens may be used. The equipment is portable and can be used for field tests, the glass container and thermometer taking the place of the laboratory balance heretofore used in making galvanized coating determinations. A table showing results obtained and detailed description of apparatus, application and manipulation are included.

At the conclusion of this session an announcement was made of the election of officers for the next year. This was published in THE IRON AGE, June 29.

Miscellaneous Matters

Steps were put on foot to combine the two committees on coal and coke, Committee D-5 and D-6, the chairmen of which are A. C. Fieldner and Dr. Richard Moldenke, respectively. One session was devoted Thursday afternoon, June 29, to coal, coke, timber, etc., at which revisions in the regular and tentative specifications were discussed. The committee on coal reported that an exhaustive study has shown that it is impracticable to adopt standard specifications for steam coal because of the great variety of coals. The coke committees presented a tentative method for the shatter test for coke, the result of a year's study.

The evening session of Tuesday, June 27, was devoted to the annual address of the president, C. D. Young, and the annual report of the executive committee, reported in brief in THE IRON AGE, June 29. This was followed by an informal dance and smoker.

CONFUSED CONDITIONS

Much Uncertainty Concerning Coal Strike—Little Gain in Loadings

PITTSBURGH, July 3.—Between the efforts of the Government to bring about a conference of the coal mine operators and the officials of the miners' unions, the walkout of the railroad car shop employees and the observance of the Fourth of July holiday, the fuel situation is very much confused. This is not surprising in view of the fact that there are reports that meetings of miners' locals are being held to consider, among other things, an immediate return to work, pending a settlement of the wage scales. This would indicate some progress toward a settlement, but is counterbalanced by suggestions that the Pittsburgh Coal Co. and some of the other operators with mines in the unionized districts in and around Pittsburgh, tiring of the passive policy hitherto pursued, on July 5 would start up several operations on an open shop basis.

Since a week ago there has been no appreciable gain in the loadings of coal in western Pennsylvania; indeed, as indicating the unrest which still exists in this district, several mines which had resumed have gone down again. The walkout of the railroad shop employees is associated with the coal strike in that it appears to have strengthened the will of the miners to stay out, and, of course, the Fourth of July observance has been the occasion of a good many staying away from work until after that holiday.

The supply situation is tighter than it has been recently and probably will remain so at least over the present week. Local non-union coal now is quoted at $4 minimum, and the few small lots of lump gas coal coming out of local mines command $5 per net ton at mines. Southern coal is priced at $3.50 to $3.75, beehive oven coke is extremely scarce this week and quotable anywhere from $8 to $10 per net ton at oven.

Keen Interest in Washington Conference

UNIONTOWN, PA., July 1.—Considerable interest in the Connellsville bituminous region now is centering on the outcome of the negotiations between union representatives and coal operators called to Washington by President Harding. Just how a successful outcome of such negotiations would affect the local region is being studied. The Connellsville region has never been unionized. The operators have never had any dealings with the unions. Since the sympathetic strike developed in the region union locals were organized at many plants, but these have had no relations with the operators. It is almost a certainty that the union will not be recognized in the Connellsville region. Should the strike be settled and the union men return to work, what will happen to the men who have joined the union in this region? What support will the union give them or will they be allowed "to hold the bag"? These questions are being asked with no answers given.

Union organizers have been busy this week. From one to four meetings a day have been held all week, at which the organizers are understood to have devoted much of their attention to discussing the probable results of the Washington conference and predicting a successful outcome of the strike—but not stating in what way it will be successful.

The sheriff, following disorders of a minor character, issued a ban on meetings within a mile of operating mines. One meeting in the county this week was entirely broken up when the strikers showed some signs of surliness when told to move on. Several other meetings were held after they had been moved outside the limits prescribed.

Beating up of a working miner in Brownsville, not the first such occurrence, resulted in the sheriff and State police taking over police powers in the three river towns.

The union got a foothold at Leisenring No. 2 of the H. C. Frick Coke Co. this week, causing a drop in production at that plant, although failing to bring about an entire suspension of operations.

Hundreds of men have come into the Connellsville region during the past fortnight, bringing production up noticeably. Scores of miners have moved from one plant to another where they have gone to work. To date it is estimated that there have been some 500 eviction notices, possibly 600, served on strikers in the region. In most of these instances their houses are now occupied by men who have come into the region. Many of the evicted families are now living in tents, and in some sections small tent colonies have appeared.

The H. C. Frick Coke Co. production showed an increase of some 1000 tons a day over the preceding week Production this week, it is estimated, will show an increase of 600 to 700 tons a day over last week.

Mineral Section Added to Iron and Steel Division

Inquiries regarding minerals are coming to the Iron and Steel Division of the Bureau of Foreign and Domestic Commerce in such increased volume that its scope has been enlarged by having a mineral section added to it and placed in charge of James A. Stader, of Joplin, Mo., an experienced man in mineralogy. Being a part of the Iron and Steel Division, the section will be under the supervision of Luther Becker, chief of the division. Mr. Stader took up his duties on July 1.



J. A. STADER

The Mineral Section will handle all minerals, metallic and non-metallic, excepting fuels, iron ore and such ores and ferro-alloys as are intimately associated with iron and steel. The section will pay particular attention to refractories and the major metals with which it will deal will include copper and alloys of bronze and brass and their products; lead, zinc and tin and their manufactures. The refractories materials will involve such products as fire clay, magnesite, chrome, and silica brick and clay products except earthenware and pottery. Other products include abrasive, cement, sand, tiling for construction purposes and gold and silver, excepting their financial aspects.

Mr. Stader was selected to take charge of the section because it was considered advisable to find a man not only possessed of a thorough knowledge of the work, but also because of his actual foreign experience in mining and investigation and his acquaintance with economic conditions abroad as they apply to minerals and their production. Mr. Stader is a graduate chemical engineer of the class of 1906 of the University of Missouri. In that year, he did mining work in Mexico. Later he became chief engineer of the Eagle Pitcher Lead Co., Joplin, and subsequently was made a member of the Central European Industrial and Mining Commission, under the Supreme Council created by the armistice agreement. As a member of the commission, Mr. Stader was stationed first in Moravia and upper Silesia. He traveled extensively in connection with his work through various mineral producing European countries.

Production of the Ford Motor Co. for May is reported by *Automotive Industries* at 144,469, which included 134,222 Ford cars and trucks, 602 Lincoln cars and 9105 tractors. Of the Ford cars and trucks, 6579 were Canadian and 7170 for export. Tractors for ex-

An involuntary suit in bankruptcy has been filed against the Cedar Rapids Foundry & Machine Co., Cedar Rapids, Iowa.

Reduced Railroad Rates Effective July 1.

The railroads have not yet issued tariff supplements containing new freight rates in effect July 1, except in a few scattering instances. The following rates are substantially correct. In some instances, the announced rates will be different to the extent of a cent or two, according to the construction placed upon the rule as to figuring new rates. For example, the rate on pig iron from the valleys to Pittsburgh figures $1.764. When finally issued, this may be $1.76 or $1.77.

Finished Material

(Per 100 Lb.,

Pittsburgh to

	0.315
	0.34
	0.365
	0.215
Cleveland, Youngstown, combination	
	0.19
	0.295
	0.31
	0.34
	0.43
Kansas City (pipe)	0.705

Pittsburgh to

Denver (pipe)	1.215
plates	1.20
Jacksonville, all rail	0.50
Jacksonville, rail and	
New Orleans	0.515

Pig Iron

(Per Gross Ton)

Buffalo to

	4.92
	2.27
	1.89
	1.385

Youngstown to

	1.77
	1.77
	1.77
Warren, Ohio	0.76
	4.79
Indianapolis	3.66
	5.80
	3.66
	6.43
	5.43
	5.63

Virginia to

	5.17
Brooklyn and Jersey City	5.28
	5.64

Birmingham, Ala., to

Cincinnati	4.05
Columbus, Ohio	
	6.00
	6.91
Boston, all rail	9.61
	6.67
Philadelphia, all rail	7.81
Pacific Coast	22.40
	8.17
	5.17
	4.02

Ironton and Jackson to

	3.02
	3.28

From Chicago to

Rockford, Ill.	1.385
Freeport, Ill.	1.385
Rock Island, Ill.	1.745
Moline, Ill.	1.745
Davenport, Iowa	1.745
	1.745
Peoria, Ill.	1.745
Aurora, Ill.	0.88
Elgin, Ill.	0.88
Joliet, Ill.	0.63
Milwaukee, Wis.	
Racine, Wis.	
Kenosha, Wis.	
Waukesha, Wis.	
Janesville, Wis.	1.385
Beloit, Wis.	1.385
Madison, Wis.	1.64
Sheboygan, Wis.	1.945
Minneapolis, Minn.	3.04
St. Paul, Minn.	3.04
Michigan City, Ind.	1.385
South Bend, Ind.	1.89
Kokomo, Ind.	2.645
Benton Harbor, Mich.	2.64
Muskegon, Mich.	3.025
Grand Rapids, Mich.	3.025
Kalamazoo, Mich.	2.945
Jackson, Mich.	3.025
Lansing, Mich.	3.15
St. Louis, Mo.	2.16
Des Moines, Iowa	4.15
Omaha, Neb.	5.17
Batavia, Ill.	0.88
Chicago Heights, Ill.	0.63
Geneva, Ill.	$0.88
Carpentersville, Ill.	1.01
Danville, Ill.	1.64
Belvedere, Ill.	1.385
Sterling, Ill.	1.385
Galesburg, Ill.	1.745
Quincy, Ill.	1.745
La Porte, Ind.	1.745
Terre Haute, Ind.	2.945
Indianapolis, Ind.	2.89
Mishawauka, Ind.	1.89
Battle Creek, Mich.	3.025
Appleton, Wis.	1.97
Fond du Lac, Wis.	1.89
Green Bay, Wis.	1.89
La Crosse, Wis.	2.89
Winona, Minn.	2.89
Duluth, Minn.	3.25
Dubuque, Iowa	1.89
Cedar Rapids, Iowa	3.025
Charles City, Iowa	3.025
Waterloo, Iowa	3.025
Ottumwa, Iowa	3.025
Marshalltown, Iowa	4.25

To Chicago from

Birmingham, Ala.	6.25
Ironton, Ohio	4.25
Jackson, Ohio	4.25
Mahoning Valley	4.25
Shenango Valley	4.25
Granite City, Ill.	2.25

Wells and Marquette, Mich.	3.04
Cadillac and Antrim, Mich.	3.15
Boyne City and East Jordan, Mich.	3.275

To New York from

East. Pennsylvania	2.27
Buffalo	4.92
Virginia	5.54

To common New England points

From Eastern Pennsylvania	3.65
From Buffalo	4.92
From Alabama	9.60

From Cleveland to

Akron	1.64
Barberton	1.64
Bucyrus	2.02
Canton	1.77
Columbus	2.27
Dover	1.77
Dayton	2.52
Erie	1.77
Elyria	1.77
Lima	2.39
Mansfield	2.27
Newark	2.27
Painesville	1.77
Ravenna	1.64
Salem	1.77
Springfield	2.39
Valley points	1.77

From Toledo to

Bucyrus	1.77
Columbus	2.27
Mansfield	2.27
Springfield	2.40
Dayton	2.40
Indianapolis, Ind.	2.90
Ft. Wayne, Ind.	2.27
Marion, Ind.	2.65
South Bend, Ind.	2.90
Detroit	1.39
Jackson, Mich.	1.77
Lansing, Mich.	2.02
Saginaw, Mich.	2.52
Bay City, Mich.	2.52
Pontiac, Mich.	1.64

From Eastern Furnaces to Philadelphia:

Virginia (all furnaces)	$5.17
	0.76
Pottstown	1.14
Birdsboro	1.14
Coatesville	1.14
Reading	1.14
Bethlehem	1.26
Sparrows Point, Md.	1.64
Catasauqua	1.39
Parryville	1.39
Hokendaqua	1.39
Hellertown	1.39
Alburtis	1.39
Robesonia	1.39
Emporium	3.54
Wharton, N. J.	1.64

New Steel Rails

(Per Gross Ton)

Pittsburgh to		*Pittsburgh to*	
New York	$5.17	Boston	$5.67
Philadelphia	4.92	Chicago	5.42
Baltimore	4.79	St. Louis	6.18

Billets, Wire Rods, Etc.

(Per Gross Ton)

Pittsburgh to		*Pittsburgh to*	
New York	$5.67	Boston	$6.18
Philadelphia	5.17	Chicago	5.42
Baltimore	4.92	St. Louis	6.81

Coal Freight Rates

To Eastern Points, per Gross Ton	Originating District — Connellsville / Westmoreland: Pittsburgh	Fairmont	Greensburg	Latrobe
Baltimore	$3.22	$3.09	$2.95	$2.86
Chester, Pa. (PRR)	2.22	3.09	2.95	2.86
Chester, Pa. (P&R)	3.35	3.21	3.08	2.99
Harrisburg, (PRR & P&R)	2.72	2.58	2.45	2.36
Johnstown, Pa. (B&O)	1.39	1.39		
*Johnstown, Pa. (PRR)	1.64	1.64		
Lebanon, Pa. (PRR & P&R)	3.10	2.96	2.83	2.74
New York (37th St.)	3.47	3.34	3.20	3.11
Brooklyn	3.60	3.47	3.33	3.24
Philadelphia	3.22	3.09	2.95	2.86
Sparrows Point	3.22	3.09	2.95	2.86
Steelton, Pa.	2.72	2.58	2.45	2.36
South Bethlehem, Pa.	3.35	3.21	3.08	2.99
Syracuse, N. Y.	3.35	3.21	3.08	2.99

*The rate from points on the Monongahela Railway in the Fairmont group south of the Pennsylvania state line to Johnstown is $1.96 per net ton. Rates to Johnstown from Greensburg and Latrobe groups apply specifically from point of origin to destination.

The Connellsville rate applies to shipments from points

on the Southwest Branch of the Pennsylvania ... from south of Ruffsdale, from points on the ... Virginia & Charleston and points on the Monongahela River railroad.

The Fairmont rate on shipments via the Baltimore & Ohio applies to shipments from points East of Suterville, Pa., from points on the Smithfield & Masontown Branch and from the Fairmont Region of West ...

To Western Points per Net Ton	Originating District — Pittsburgh	Upper Connellsville	Lower Connellsville
Canton, Ohio ..	$1.60	$1.65	$1.80
Chicago ..	2.09	3.09	...
Cleveland	1.85	...	...
Columbus, Ohio	1.89	...	...
Detroit, Mich.	2.58	...	2.58
Indiana Harbor, Mich.	3.09	...	3.09
Toledo, Ohio	2.39	...	2.39
Youngstown, Ohio ..	1.35	1.42	1.64
Lake Ports	1.67	1.73	...
To Canadian Passing Points:			
Port Maitland, Ont.	2.26	2.39	2.39
Buffalo	2.25	2.39	2.39

These rates apply in a general way to shipments from the territory described. There are, however, numerous extensions to the specific rates quoted and in each case before applying the rate as a basis for freight charges, the shipper or consignee should determine the exact location of the mine from which the business will move; then refer to the tariff naming the rate in question.

The Pittsburgh district includes points East as far as Latrobe and South on the Southwest Branch to and including Ruffsdale; South to, but not including, Brownsville on the Pittsburgh, Virginia & Charleston railroad; eastward to Dawson on the Baltimore & Ohio railroad and eastward to Dickerson Run and Southwest to and including Brownsville on the New York Central lines.

The Connellsville district includes points on the Southwest Branch of the Pennsylvania railroad South of Ruffsdale; on the Pittsburgh, Virginia & Charleston, except Braznell and all Monongahela River railroad points; New York Central points East of Dickerson Run, including Connellsville Transfer and points on the Baltimore & Ohio, Dawson to Point Marion, Pa.

Coke

(Per Net Ton)

Connellsville, Pa., to		Connellsville, Pa., to	
Baltimore	$3.21	Pittsburgh	$1.51
Buffalo	3.28	Port Henry, N. Y....	4.54
Canton, Ohio	2.52	Port Maitland, Ont...	3.28
Chicago	4.16	Portsmouth, O.	4.16
Cleveland	2.77	Reading, Pa.	3.28
Columbus, Ohio ..	2.77	Richmond, Va.	
Detroit	4.65	(B. & O.)	4.79
East St. Louis...	4.54	Richmond, Va.	
Erie, Pa.	2.77	(P. R. R.)	4.79
Harrisburg	2.90	South Bethlehem, Pa.	3.53
Joliet, Ill.	4.16	Swedeland, Pa.	3.54
Louisville	4.16	Toledo	3.28
Milwaukee	4.79	Wheeling	2.27
New York	3.91	Valley ...	2.27
Philadelphia	3.53		

Iron Ore

(Per Gross Ton)
(From lower lake ports)

Direct Ore

Rail of vessel to car	
Handling charge	$0.08
Line haul to	
Mahoning and Shenango valleys	0.82
Dover, Ohio, district	0.88
Midland, Pa., district	0.99
Pittsburgh district	1.15
Jackson, Ohio, district (Toledo)	0.90
Jackson, Ohio, district (Cleveland).....	1.12
Ironton and Hamilton, Ohio, districts	1.25
Johnstown, Pa., district.....	1.30
Lehigh valley district	1.94
Sparrows Point, Md.	1.99

Dock Ore

In addition to line haul	
Rail of vessel to dock pile	0.20
Dock pile to car	0.13
Storage charge per ton per month	0.01

Mines to Upper Ports

The new freight rates on Lake Superior ore from the mines to the upper lake ports which became effective June 19 representing practically a 16 per cent reduction are as follows, the rates named including unloading charges:

Marquette from ...	...
Marquette from Western Marquette range.....	.78
Escanaba from ...	...
Ashland from ...	...
Duluth and Superior from Mesabi Range.....	.91
Two Harbors from Vermillion range.....	.91
Duluth and Superior from Cuyuna range.....	.91

SOUTHERN COMPLAINTS

Hearing of Pittsburgh Boring Case Held at Chattanooga

CHATTANOOGA, TENN., July 3.—Several Birmingham steel fabricators appeared before Federal Trade Commission Examiner J. W. Bennett in Chattanooga last week presenting argument against the Pittsburgh plus plan of basing steel prices. Interesting testimony was that of R. I Ingalls, of the Ingalls Iron Works, structural steel operator. Mr. Ingalls said the territory of his company included the states of North and South Carolina, Georgia, Florida, Louisiana, Mississippi, Alabama, Tennessee and Virginia, and included exports to Cuba, South America, Philippines and other points. He said as a general rule a differential of $5 a ton is being added by the Tennessee company to the Pittsburgh price, but this is not always the case. In highly competitive jobs, where the Tennessee company desires the business, lower prices are made. He said his business would be much curtailed if full Pittsburgh base plus freight were charged. If there were no differential, Mr. Ingalls said his trade territory would be widened. Concessions have enabled him to go into Virginia and North Carolina. He purchases 80 to 90 per cent of the 20,000 to 25,000 tons of steel consumed in his plant per annum in Birmingham. The Fairfield plant of the Tennessee company, which was built in 1919, has materially assisted in the expansion of his business.

Frank J. Ridout, of the Perfection Spring & Mattress Co., Birmingham, said he paid Pittsburgh price plus the freight from mill to Birmingham for steel for bed springs purchased of a maker other than the Tennessee company. He claimed that on account of this disadvantage bed spring makers in Wisconsin, St. Louis and other distant points competed with him in local territory. He said if the full Pittsburgh price plus freight from Pittsburgh were charged, it would put him out of business.

Harold M. Thompson, of Johnson & Thompson, Birmingham, structural steel operators, specializing in manufacture of tanks, said the operation of his plant was much restricted by the differential. He said the American Bridge Co. could get in wherever it wished irrespective of destination. He declared his company could not compete with Northern operators to the same degree that they compete with him in Birmingham district and adjacent territory.

Francis M. Herring, of the Scofield Sons Co., Macon, Ga., maker of boilers and tanks, said a real Birmingham production cost selling price would extend the competitive area of all Southern manufacturers by allowing them to sell in what naturally, by geographical and fundamental transportation factors, would seem to be their logical right. This would result in less keen competition in what is now the restricted area of Southern factories, as all would share in the benefits of increased volume of business through larger area of sales. This, in turn, would result in lower overhead expenses, which would be reflected in lower selling prices to the ultimate benefit of the consumer.

J. F. Baker, of Sanford-Day Iron Works, Knoxville, said he is limited to Kentucky, Tennessee and Virginia in sales of complete mine cars. On car trucks alone, bodies to be supplied by some other manufacturer, he can compete even in the Pittsburgh district, because he gets his pig iron in Birmingham at Birmingham production price. He sells the trucks pretty well over the country by reason of getting the iron so advantageously.

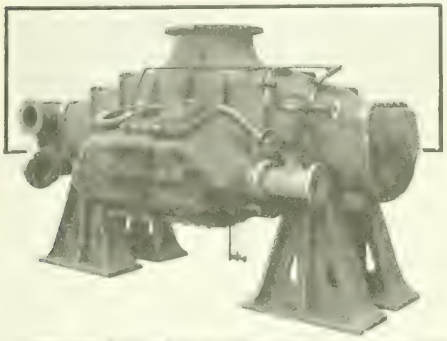
Testimony as to disadvantages of the Pittsburgh plus selling price base were also given by officials of the Vulcan Rivet Works, Birmingham, and others.

Surface Condenser with Separate Cooler

In the accompanying illustration is a shop view of one of the smaller of the new type of surface condenser units developed by the Ingersoll-Rand Co., New York, and built to serve a 600-kw. turbine.

An interesting feature is the separate cooler mounted on the shell, as shown. This is intended to devaporize thoroughly the air and vapors before they are finally drawn off by the vacuum equipment. Air is withdrawn by a steam jet vacuum pump in combination with a small secondary reciprocating pump. The primary steam jet is mounted on the cooler dome and the secondary jet on the tee, shown. The secondary vacuum pump takes its suction from the open end of the tee. The condensate and circulating water pumps are Cameron centrifugal motor-driven units.

The new type condenser is characterized by the special shell and cooler design combined with an



Special Shell and Cooler and Tubes Arranged in Stages Reduce Surfaces

arrangement of tubes in "stages" which is said to result in the practical elimination of waste tubes and a condenser of greatly reduced surface. The surface may be still further reduced by the use of high water velocities, which it is urged, are of benefit in alleviating corrosion and fouling.

Elimination of waste tubes is secured by arranging the tubes in "stages," by correct shell shape, and by the use of a separate devaporizer-cooler. The tubes, spaced on wide centers in the top of the shell, are brought closer together in each lower bank or stage. The shell itself is gradually narrowed from its width at the top to that of a nozzle running the length of the shell under the last row of tubes, giving it the characteristic heart-shaped section. Sufficiently high steam velocities to sweep condensate and air films from the tubes are maintained throughout the condenser by this construction, which compensates for the decreased volume of the steam as it is condensed in its passage down over the tubes. The residual air and steam from the last row of tubes is drawn up into the cooler which is mounted on the side of the shell proper and fitted with cast iron cooling grids whose surfaces are particularly adapted to devaporize and cool the air before it passes to the vacuum pump. The withdrawal of the non-condensibles at the bottom of the shell and the use of a multi-stage tube arrangement and correct shell shape is said to assure active flow of steam over every tube and preclude pocketing and stagnation.

The elimination of waste tubes in this way is claimed to result in a large saving in maintenance and renewal costs.

The number of holders of United States Steel common stock at closing of books for June dividend was 99,512, the lowest figure since December, 1920, and comparing with 106,811 in March, a decrease of 7299 in three months. Preferred stockholders at closing of books for May dividend numbered 81,446, compared with 81,865 in February and 81,621 in November, 1921.

Adoption of Uniform Cost Accounting

WASHINGTON, July 4.—Malleable castings, pressed steel, steel barrels and power piping and stoves are included among approximately 120 commodity lines which have adopted uniform cost accounting methods, according to a survey just completed by the Fabricated Production Department of the Chamber of Commerce of the United States. A statement issued by the department says that 40 lines have gone the whole distance in adoption of uniform cost systems and in securing general use of them in their industries. About the same number have adopted complete uniform methods and are now facing the important problem of installing such systems, while the remainder have only worked out plans for simplification of accounts.

While making the survey the department received scores of letters from trade associations and individual manufacturers pointing out the benefits of uniform cost accounting. Some of the advantages enumerated are:

It strengthens position of industry in dealing with Governmental or regulatory bodies.

It inspires confidence that selling prices are determined upon a fair and equitable basis.

It solves disputed points of accounting within the industry authoritatively.

It makes possible a more intelligent competition.

It reveals lines within the industry which have been marketed on an unprofitable basis.

It shows the danger line below which goods cannot be sold at a profit, thus serving as an insurer of profits.

It acts as a common guide to the value, efficiency and waste of workers, machines, methods, operations and plants.

It becomes a reliable guide and basis for estimating prospective business, thus acting as a forerunner for comprehensive production statistics.

It furnishes current reports for comparing major cost items with standards, which are predetermined and thereby measuring and increasing operating efficiency.

It establishes a standard code of accounting practice, so that if your cost clerk or bookkeeper leaves you, his successor will step into a system whose operation has been fully and completely formulated.

In announcing the result of the investigation the department let it be known that it stands ready to suggest the various means by which interest in cost methods can be so aroused that manufacturers will demand uniform cost accounting, rather than have it thrust upon them.

To illustrate what is meant by a uniform cost system the department analyzes some of the systems actually in operation. It calls attention to the flexibility and their adaptability to accounting in the particular industry. The following analysis is made of uniform cost accounting as it applies to malleable castings:

Classification of accounts and departmentalization of industry.
Standard definition of cost accounts.
A method of distributing fixed plant charges.
Standard practice covering the treatment of cost of metal, melting expense and the distribution of indirect costs
How to arrive at the cost of metal poured.
Standard forms and statements:
- Distribution of fixed plant charges.
- Analysis and distribution of pattern shop costs.
- Statement of iron costs.
- Monthly cost statement.
- Statement of metal, melting and overhead rates.
- Casting summary cost record.
- Casting cost record.

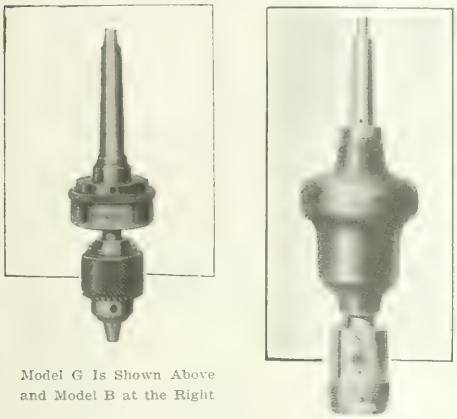
The following are among the associations which, the statement of the department says, have applied themselves earnestly to the establishing of a more uniform cost system: American Foundrymen's Association, American Malleable Castings Association, National Association of Brass Manufacturers, National Association of Stove Manufacturers, National Machine Tool Builders' Association, National Implement and Vehicle Association, Pressed Metal Association, Steel Barrel Manufacturers' Association.

Examinations for valuation engineer in general mining, coal mining, oil and gas and the forest industry are announced by the Civil Service Commission, Washington. The salary is $3,600 to $4,800 per year. Applicants should apply for form 1312. Papers will be rated as received, up to Sept. 1.

Plain and Back Geared Tapping Chucks

The accompanying illustrations show a group of tapping chucks recently placed on the market by the Landau Machine & Drill Press Co., 45 West Eighteenth Street, New York.

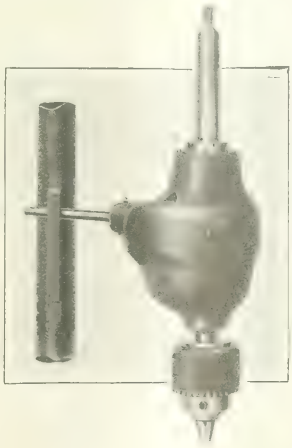
The chuck at the left, known as model G, is a friction tap holder which can be used with type B and E, also shown. It is made in three sizes and two styles, one style having a taper shank for use on a drill press or in the tailstock of a lathe, the other style having a straight shank with reversing sleeve for use in the turret head. The reversing sleeve can be furnished in any diameter from 1 in., minimum. Model B is a single-spindle tapping chuck which is driven from the main spindle of a drill press. It is



Model G Is Shown Above and Model B at the Right

equipped with ball bearings and reverses at higher speed than when tapping. The capacity of the model B chuck is up to ¼ in.

The model E, shown below, is a single-spindle back-geared tapping chuck, in which the ratio of reversing to tapping speed is 5 to 1. It is made for a No.'s 1 or 2 Morse taper and the capacity is for taps up to 7/16 in. The main drive is fitted with ball bear-



Back Geared Tapping Chuck, Model E. The ratio of reversing speed to tapping speed is 5 to 1

ings and a standard chuck is used. The body or housing is comparatively small for a tapper of this capacity, the compactness being attributed to the back gear design. There are no protruding screws. The speed and special clutch design are said to result in greatly preventing tap breakage. The clutch will release on undue strain.

A model F, not shown, is similar to the model E, except that it has a tapping ratio of 3 to 1, the reverse speed being three times the tapping speed, and a capacity of from ⅜ to 1⅛ in.

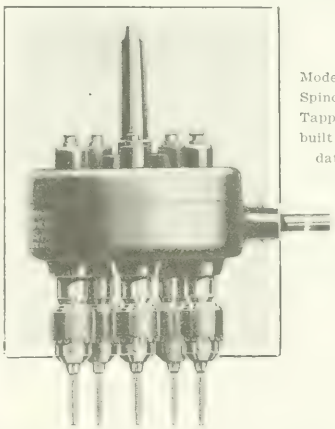
Back-Gear Tapping and Drilling Head.

A multiple spindle back gear tapping head, shown in the separate illustration, designated as the model H, is built to accommodate up to five spindles. The spindles are equally spaced about the circumference of a circle and the distance from the center of the driving spindle to the center of the tap is 2½ in. The main drive spindle is mounted on ball bearings. The tapping ratio is 4 to 1, the reversal being the faster. A standard drill chuck is used and essential parts are hardened and are interchangeable. The capacity is up to ¼ in. Clutches disengage when too great a strain is placed on the taps, which can be fed to the bottom of the hole, stopping automatically when meeting with an obstruction.

A multiple drilling head, known as the model K, is made for use in conjunction with the model H tapper. It is essentially of the same design, but is without the reversing mechanism. The main drive is fitted with ball bearings and the drilling spindles have standard taper shanks, also fitted with ball bearings.

Plants of Aluminum Mfrs. Leased

At a meeting of the stockholders of the Aluminum Mfrs., Inc., held in Cleveland, June 29, the proposed lease of the plants of the Aluminum Mfrs., Inc., to the Aluminum Co. of America, Pittsburgh, for a period of



Model H Multiple Spindle Back Gear Tapping Head. It is built to accommodate up to five spindles

25 years, was approved by the unanimous vote of the stockholders present. The Aluminum Mfrs., Inc., has plants in Cleveland, Detroit, Buffalo and Fairfield, Conn., for the manufacture of aluminum castings and forgings. For a number of years the Aluminum Co. of America has owned approximately a 50 per cent interest in the plants of the Aluminum Mfrs., Inc. The company has a stock issue of $5,000,000 in preferred stock and 325,860 shares of no par common stock. Under the terms of the lease the Aluminum Co. of America will pay rental sufficient to pay dividends on the preferred stock of the Aluminum Mfrs. and to retire a portion of this stock as provided under the charter and also sufficient to pay approximately $2 per share on common stock after 1926. No change is expected in the management of the plants of the Aluminum Mfrs., Inc., as a result of the lease. The officers of this company are: W. P. King, president and treasurer, George J. Stanley, vice-president in charge of production, and John H. Watson, secretary.

The Brier Hill Steel Co., Youngstown, is erecting a six-story office building on West Federal Street, opposite its open-hearth furnace department. The building will house the company's executive, accounting and operating officers and staffs.

Iron and Steel Exports Gain Heavily

Highest Exports Since March, 1921—Rails, Black Sheets, Structural Shapes, Pipe and Wire Share in Increase—Imports Higher

WASHINGTON, July 3.—Exports of iron and steel in May, amounting to 230,062 gross tons, valued at $29,456,349, brought the total to the pre-war monthly average and at the same time showed a sharp recovery over the April total, which aggregated 198,830 tons, valued at $17,563,662. For the 11 months ending with May of the current year the total was 1,498,993 tons, valued at $281,735,991, as compared with 4,117,239 tons valued at $739,214,697 for the corresponding period one year ago. The May movement of this year was the largest since March of last year, which exceeded it only slightly, amounting to 230,635 tons.

Imports of iron and steel and of manganese ore as well as exports of machinery also showed gains in May. Imports of iron and steel aggregated 23,093 tons valued at $2,966,332, as compared with 18,417 tons valued at $2,888,790 in April. For the 11-month period ending with May, the total of imports amounted to 147,391 tons valued at $95,955,369, as compared with 246,336 tons valued at $41,696,151 for the corresponding period of last year. Imports of manganese ore in May aggregated 46,517 tons, valued at $307,571, as compared with 25,559 tons valued at $133,715 in April; for the 11-month period the total was 212,879 tons, valued at $1,226,133.

Exports of machinery in May were valued at $19,415,994, as compared with $19,191,148 in April. For the 11-month period the total value was $222,427,107. The largest machinery items exported in May were textile equipment and agricultural machinery, which amounted to $1,520,512 and $1,603,574, respectively. The exports of lathes were valued at only $66,604.

Exports of Iron and Steel—Gross Tons

	May		Eleven Months Ending May	
	1921	1922	1921	1922
Pig [illegible]	[illegible]	3,297	123,992	26,334
Ferromanganese	[illegible]	11	3,335	966
Ferro[illegible]	[illegible]	42	525	405
Scrap	4,116	12,804	178,891	52,136
Ingots, blooms, billets, sheet bar, skelp	749	13,091	81,443	49,949
Iron and steel bars	5,905	26,544	199,138	83,106
Alloy steel bars*	[illegible]	174	[illegible]	4,414
Wire rods	2,612	4,367	61,075	37,558
Plates, iron and steel	18,518	16,879	753,222	110,007
Sheets, galvanized	3,042	9,487	90,211	71,544
Sheets, black steel	7,686	34,619	145,533	275,505
Sheets, black iron	1,264	581	24,451	5,918
Hoops, bands, strip steel	915	2,539	37,128	22,001
Tin plate, terne plate, etc.	1,593	6,291	175,551	70,391
Structural shapes, plain material	17,926	18,132	508,424	107,224
Structural material, fabricated	119	1,242	30,138	20,901
Skelp	24,492	23,812	529,252	196,490
Rail fastenings, switches, frogs, etc.	289	3,011	13,529	18,587
Boiler tubes, welded pipe and fittings	41,312	15,589	418,631	143,139
Cast iron pipe and fittings	4,124	2,709	72,411	24,691
Plain wire	2,961	12,836	163,328	72,567
Barbed wire and woven wire fencing	1,027	7,791	85,180	33,538
Wire cloth and screening*	[illegible]	143	[illegible]	452
Wire rope and cable*	[illegible]	343	[illegible]	[illegible]
Wire nails	709	5,797	71,761	46,611
All other nails and tacks	191	810	12,872	6,213
Horseshoes	12	109	1,472	653
Bolts, nuts, rivets and washers, except track	1,286	1,313	36,988	15,702
Car wheels and axles†	[illegible]	686	[illegible]	[illegible]
Iron and steel [illegible]	[illegible]	972	[illegible]	4,564
Steel [illegible]	[illegible]	204	[illegible]	[illegible]
Pipe [illegible]	[illegible]	187	[illegible]	[illegible]
Miscellaneous	[illegible]	17	[illegible]	75
Total	142,551	230,062	4,117,239	1,498,993

*Not reported separately, prior to January, 1922.
†Previous to January, 1922, reported by value only.

Imports of Iron and Steel—Gross Tons

	May		Eleven Months Ending May	
	1921	1922	1921	1922
Pig [illegible]	[illegible]	[illegible]	42,932	17,624
Ferro[illegible]	[illegible]	[illegible]	6,841	9,493
Scrap	[illegible]	[illegible]	60,471	34,622
Steel [illegible]	[illegible]	[illegible]	84,285	40,969
Iron and steel [illegible]	[illegible]	[illegible]	4,177	[illegible]
Steel [illegible]	[illegible]	[illegible]	3,582	2,651
Pipe [illegible]	[illegible]	[illegible]	1,322	1,371
All [illegible]	[illegible]	[illegible]	[illegible]	10,663
Steel [illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Sheets and plates	359	34	34,998	22,519
Tin and [illegible]	[illegible]	[illegible]	1,548	305
Wire [illegible]	[illegible]	[illegible]	477	[illegible]
Total	23,573	23,093	246,336	147,391
Manganese ore and oxide	54,663	46,517	667,601	212,879

MACHINERY EXPORTS
By Value

	May, 1921	May, 1922	Eleven Months Ending May, 1921	Eleven Months Ending May, 1922
Locomotives	$2,647,441	$278,167	$42,313,209	$17,350,752
Other Steam Engines	27,126	9,323	478,419	51,064
Boilers	236,678	55,252	8,684,615	1,351,775
Accessories and Parts	[illegible]	717,028	[illegible]	*182,036
Automobile Engines	248,687	616,128	2,536,811	3,124,168
Other Internal Combustion Engines	903,136	302,707	9,839,550	2,756,703
Accessories and Parts for	[illegible]	509,802	[illegible]	*1,116,771
All Other Parts of Engines	766,249	[illegible]	19,650,065	†3,251,595
Complete Tractors, except Agricultural	35,344	2,435	19,673,608	257,280
Electric Locomotives	274,511	[illegible]	572,982	†1,339,190
Other Electric Machinery and Apparatus	2,132,800	875,694	33,906,464	14,774,031
Excavating Machinery	748,335	[illegible]	2,632,008	†710,339
Concrete Mixers	25,116	39,596	982,924	365,991
Road Making Machinery	109,995	[illegible]	1,100,736	†414,539
Elevators and Elevator Machinery	155,842	[illegible]	1,935,519	†552,821
Mining and Quarrying Machinery	688,326	380,930	9,141,903	3,923,915
Oil Well Machinery	1,039,667	[illegible]	10,773,031	†3,146,283
Pumps	743,498	425,405	15,976,426	5,079,950
Lathes	269,835	66,604	5,244,550	961,285
Boring and Drilling Machines	[illegible]	60,424	[illegible]	*266,448
Planers, Shapers and Slotters	[illegible]	17,590	[illegible]	*95,741
Bending and Power Presses	[illegible]	15,806	[illegible]	*207,794
Gear Cutters	[illegible]	9,174	[illegible]	*22,446
Milling Machines	[illegible]	25,255	[illegible]	*107,053
Sawing Machines	[illegible]	2,930	[illegible]	*20,590
Thread Cutting and Screw Machines	[illegible]	17,608	[illegible]	*71,649
Punching and Shearing Machines	[illegible]	12,610	[illegible]	*75,884
Power Hammers	[illegible]	13,188	[illegible]	*52,827
Rolling Machines	[illegible]	10,270	[illegible]	*23,919
Wire-drawing Machines	[illegible]	2,248	[illegible]	*4,134
Polishing and Burnishing Machines	[illegible]	83	[illegible]	*8,794
Sharpening and Grinding Machines	82,183	83,101	2,515,999	763,411
Other Metal Working Machinery and Parts of	927,653	308,383	25,191,658	6,138,679
Textile Machinery	1,887,148	1,520,512	22,468,133	16,083,407
Sewing Machines	661,809	504,674	10,796,308	5,036,771
Shoe Machinery	88,994	79,748	2,691,430	915,494
Flour-Mill and Gristmill Machinery	247,709	67,703	2,180,176	956,138
Sugar-Mill Machinery	425,866	181,276	27,511,937	3,887,777
Paper- and Pulp-Mill Machinery	157,993	[illegible]	3,453,677	†1,376,674
Sawmill Machinery	90,130	33,569	1,337,513	546,569
Other Woodworking Machinery	193,488	88,966	3,725,058	982,708
Refrigerating and Ice-Making Machinery	71,850	177,877	3,288,132	1,700,700
Air Compressors	205,139	285,430	5,382,697	1,749,559
Typewriters	757,192	1,136,860	18,143,716	9,383,558
Power Laundry Machinery	79,366	68,030	1,082,832	509,912
Type-setting Machines	263,911	432,966	4,369,877	3,046,561
Printing Presses	926,193	266,703	10,026,628	4,467,217
Agricultural Machinery and Implements	1,255,126	1,603,574	48,081,651	17,259,251
All Other Machinery and Parts	11,127,150	8,063,242	183,510,313	85,668,864
Total	$31,287,655	$19,415,994	$561,200,355	$222,427,107

*January 1, 1922, to May 31, 1922.
†July 1 to December 31, 1921.

As is shown by the accompanying table of exports by countries, Japan continued in May its first position as the leading foreign market for American iron and steel. Of the 34,619 tons of black steel sheets exported in May, the largest single item of export, that country took 28,211 tons, or 81 per cent, while of the 26,544 tons of iron and steel bars Japan took 13,245 tons or practically 50 per cent. It also led in six other items, as is shown in the table.

Exports of Some of the Leading Steel Products to Principal Countries of Consumption

	May, 1922	11 Months Ending May, 1922
Plates		
China	6,083	8,003
Canada	[illegible]	53,683
Black Steel Sheets		
Japan	28,211	230,690
Canada	3,77[illegible]	26,17[illegible]
Rails		
Japan	11,9[illegible]	[illegible]
Canada	3,[illegible]	27,18[illegible]
Wire		
Japan	3,[illegible]	40,747
Argentina	2,741	7,199
Australia	1,8[illegible]	5,867
Canada	1,128	12,602
Wire Rods		
Japan	2,416	
Canada	1,522	
China	3[illegible]	
Hoops and Bands		
Canada	1,0[illegible]	
Tin Plate		
Japan	2,301	
Canada	1,836	
Argentina	4[illegible]	
Chile	359	
Cuba	3[illegible]	
Brazil	299	
Structural—Not Fabricated		
Japan	8,997	
Canada	6,455	
Iron and Steel Bars		
Japan	13,245	
Canada	5,017	
Skelp		
Canada	9,024	
Scotland	2,224	
Scrap		
Japan	5,8[illegible]	
China	4,225	
Italy	1,505	
Hongkong	979	
Pig Iron		
Canada	2,110	
England	1,205	
Ingots, Blooms, Etc.		
Canada	1,816	

Products which showed sharp gains in exports in May over April include black steel sheets, steel rails, plain structural shapes, boiler tubes and welded pipe and plain wire.

Exports, January, 1920, to May, 1922, Inclusive

	Gross Tons		
	All Iron and Steel	Pig Iron	Semi-finished Material
Calendar year 1919...	4,239,837	309,682	258,907
January, 1920	333,601	18,468	19,937
February	308,185	15,739	22,693
March	417,216	22,740	30,444
April	395,120	14,685	19,032
May	420,359	13,032	16,[illegible]
June	402,707	17,075	29,811
Fiscal year 1920 ...	4,212,732	248,126	288,766
July	458,866	29,647	17,243
August	431,484	22,645	20,920
September	409,200	22,724	18,113
October	452,015	17,296	11,853
November	434,297	13,929	7,042
December	498,765	10,055	3,415
Calendar year 1920...	4,961,851	217,958	216,873
January, 1921	547,394	3,710	315
February	393,328	1,307	92
March	230,635	[illegible]	1,023
April	162,592	1,234	678
May	142,551	2,541	749
June	119,081	1,689	1,[illegible]06
Fiscal year 1921 ...	4,168,619	129,541	$2,549
July	86,523	2,744	3[illegible]2
August	75,827	2,424	2,447
September	95,169	3,078	1,318
October	106,582	[illegible]	153
Novembe[illegible]	122,290	[illegible]	1,869
December	134,415	[illegible]	250
Calendar year 1921...	2,213,042	28,305	10,363
January, 1922	160,920	1,043	4,683
February	133,975	1,430	6,627
March	208,843	2,724	10,002
April	198,830	2,750	9,376
May	230,062	3,897	13,091
Eleven months	1,498,993	26,344	51,423

Next to scrap, ferromanganese constituted the biggest single item of imports in May, amounting to 5213 tons, which appears to be due to the impending duty that has been placed on this product in the new tariff bill. Scrap imports totaled 7292 tons, while pig iron imports, ranking third, amounted to 4476 tons.

Tests of Bricks Made from Slag

For utilization of blast furnace slag in making slag bricks, the following scheme is proposed by E. P. Gangewere, Lehigh University, who has patented the idea:

1. Discharge slag directly from furnace into cars filled to depth of several feet with water.
2. Place disintegrated slag into centrifugal drier.
3. Run product through pulverizer, crushing slag to such a degree that 75 per cent will pass through a 100-mesh sieve.
4. Mix one part of cement to twelve parts of powdered slag, adding small amount of water.
5. Mold the resulting mixture in presses to bricks of standard size.

The bricks thus produced from slag of Bethlehem Steel Co. furnaces at Bethlehem, Pa., have been tested at the Fritz Engineering Laboratory at Lehigh University by Mr. Gangewere, who reports the following results:

Transverse tests, with supports ⅝ in. from each end; width, 2 5/16 in.; depth, 4 in.; span, 7 in.; average breaking load, 7000 lb.

Compression test with bricks set on edge after being broken in half. The following area was subjected to compression: length, 4 3/16 in.; breadth, 2 5/16 in.; average breaking load, 80,000 lb., or ultimate strength of 8500 lb. per sq. in.

Absorption test. In a period of eleven days the bricks absorbed 7.15 per cent of their weight in moisture.

In subjecting the bricks to a double-shearing test they failed at a unit load of 1650 lb. per sq. in.

The results are taken to show that bricks produced from blast furnace slag have a strength far above the average produced from shale or clay. The texture of the bricks is uniform, and an even, smooth surface results from this method of manufacture.

The cost of producing this product is claimed to be far less than that involved in making bricks from clay or shale, and the whole process can be operated in conjunction with any blast furnaces.

The specifications of the American Society for Testing Materials for vitrified building brick call for 5000 lb., the average minimum compressive strength, tested on edge and an absorption limit of 5 per cent or less after five hours' boiling, or 5 to 12 per cent in the case of hard brick.

The United States Government investigated the cost of making common clay brick on the Hudson River in 1920, and found it to be $13.19 per thousand, plus $3.93 per thousand for barge transportation to New York, making the delivered cost $17.12 per thousand. Such brick is now selling at $18 to $24 retail, while a good grade of vitrified brick will bring around $40.

In an endeavor to direct the attention of foreign-born employees to the citizenship classes conducted by public schools, the Bureau of Naturalization of the United States Department of Labor is offering employers for display in the shop any number of posters calling attention to the free government textbooks and advantages of enrollment. It is also asking data on the number of employees various companies have assisted in obtaining naturalization, the success of public school classes, classes in the plant, etc. Suggestions are called for in the belief that a compilation of such information will be helpful to all industry.

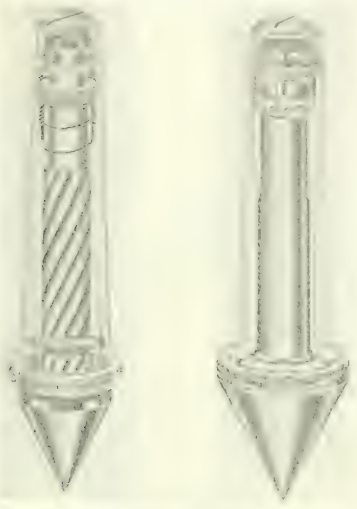
For using anthracite culm as a boiler fuel, the Susquehanna Collieries Co. at Lykens, Pa., has increased its equipment of pulverizers by the purchase of two 42-in. Fuller-Lehigh mills. The steam plant includes six 600-hp. Edgemoor boilers.

Centers for Lathes and Grinders

An anti-expansion center and an anti-friction center, as shown in the accompanying illustrations, have been placed on the market by the Snellex Mfg. Co., Rochester.

The anti-expansion center is for lathe headstocks and releases automatically the pressure caused by expansion of the work. It is said to save adjusting of expansion at the tailstock, ragged or burnt center-points, heavy side-wear on the headstock bearing, buckling of small diameter work, or slippage of drive belts.

The center releases the force of expansion by withdrawing in the sleeve as far as the work expands, the movement being limited by a stop pin. A spring device, which is of a solid piece of tool steel and has no hole,



is located at the end of the center and is adjustable to equalize the cutting pressure. An oil-grooved stem is provided and is accurately fitted in the sleeve. Lubrication is through an oil hole in the adjusting screw. All parts are hardened and are fitted to assure lasting accuracy in production to within one ten-thousandth of an inch.

The anti-friction center is for lathes and grinders and turns with the work, on ball bearings. It is intended to eliminate friction on the center point, and to save lubrication of center holes, worn centers and spoiled work therefrom, re-grinding centers, and chattering of work. The ball bearings will carry the load without chatter. The ball races are formed in one piece with the center parts and their angular position gives the balls a spinning, as well as a rolling motion, which keeps the balls round and uniform in size. The cone is keyseated with the stem and is adjustable to compensate for wear of the ball bearings, the adjusting nut being split on one side. The center holds enough oil to lubricate the bearings for a month and is sealed by an oil cap and a dust guard to prevent entering of chips or dirt. All parts are hardened and precisely finished to permit of accuracy of production to within one ten-thousandth of an inch.

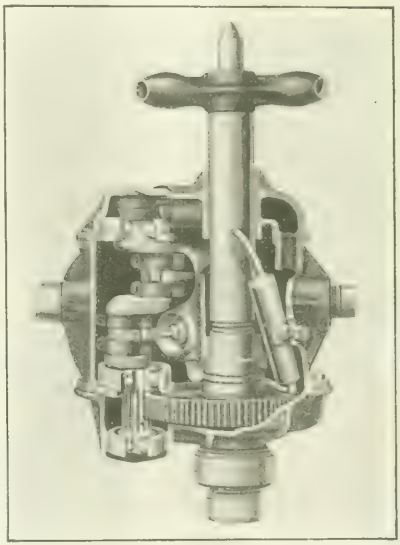
Bessemer Plant Resumes

Current operating schedules of the Republic Iron & Steel Co. provided for the resumption July 5 of its Bessemer department at Youngstown, following a protracted suspension. Except for a 90-day operating period in 1921, this department of the Republic company's plant has been idle since late in 1920. Its operation follows closely the lighting of a third blast furnace in the company's Haselton group. The Bessemer plant was scheduled for operation in April, but the coal miners' strike prevented its resumption at that time. Meanwhile the company has been purchasing its Bessemer steel requirements in the open market.

Air Drill with New Features

The Little Giant air drill of the Chicago Pneumatic Tool Co., New York, will be equipped with a new feature known as the Oil Vent which is designed to prevent oil leakage and to obviate the necessity of frequent oiling of the machine. Another feature that will be incorporated is the Invincible one-piece interchangeable toggle, which, among other advantages, provides a large opening at the top and bottom of the toggle bearing, permitting lubricant to come in direct contact with the crank pins.

The arrangement of the Oil Vent may be seen in the illustration. It is applicable to most sizes and types of the Little Giant drills, it being provided as regular equipment on new drills, but being also attachable to machines now in use. It contains a sliding plunger intended automatically to prevent oil leakage regardless of the operating position of the drill. The new



Pneumatic Drill with Oil Vent Feature to Prevent Oil Leakage and Obviate Frequent Oiling

device is claimed to effect considerable saving of time, labor and lubricant.

In the one-piece interchangeable toggle the toggle bearing and connecting rod are integral and are held in place in pairs by means of hinged split collars. The toggle mechanism may be assembled or disassembled without dismantling the drill. A 30 per cent reduction in weight is claimed for the new arrangement.

Production of the Truscon Steel Co., Youngstown, Ohio, is running close to normal, and business is well sustained, according to a statement by President Julius Kahn. "We never had a larger volume of business in the history of the company than at the present time," he states. "We are getting foreign orders as well as a variety of domestic business. Our steel supplies are satisfactory. Unless interrupted by coal shortage or a rail strike, business is likely to be maintained at this rate for some time." The company is an important fabricating interest manufacturing a variety of steel products entering into fireproof building, road and bridge construction.

Industrial Course at Pennsylvania State College

The seventh annual summer session in industrial organization and administration will be held at the Pennsylvania State College from Aug. 28 to Sept. 9 under the immediate direction of Prof. Edward J. Kunze, assisted by Prof. J. O. Keller and P. P. Henshall of the department of industrial engineering.

The course is an intensive one, designed to meet the needs of manufacturers, superintendents, personnel directors, accountants, production managers and all others who pilot the affairs of industry.

Its purpose is to assist men in the development of their jobs, to broaden their horizon of the possibilities of the science of management and to illustrate to them by practical examples the most effective methods of modern organizations. It is not a theoretical resume of a batch of reading material but rather a careful consideration of the theory in its application.

The work is divided into discussions on industrial organization, manufacturing methods, employment, industrial relations, factory planning, material and production control, scheduling and dispatching, purchasing, cost accounting, and kindred subjects. The greater portion of the time is devoted to practical installation methods, using the equipment of the five shops and the other facilities of the department that have been especially designed to handle this type of work.

Besides the discussions and laboratory applications, provision has been made for group conferences, a feature which last year brought forth so much favorable comment. The benefit to be derived from intimate contact with others whose problems are mutual and the valuable acquaintanceships formed make this group conference feature a very valuable one.

The different lines of manufacture followed by those who have attended former sessions have been varied. It has been the custom for many companies to send one or more of their executive staff to attend the course and report back not only along the specific line of the attending executive but also along such other lines as may indicate or provide solutions to needs of the company.

Bulletins describing the course may be obtained by addressing Prof. Edward J. Kunze, State College, Pa.

John Fritz Medal Awarded Marconi

The John Fritz Medal, one of the highest distinctions bestowed by the engineering profession in this country, has been awarded for 1922 to Senator Guglielmo Marconi, the inventor of wireless telegraphy.

The medal will be formally presented to Senator Marconi at a gathering of engineers to be held in the Engineering Societies Building, New York, Thursday evening, July 6.

Prof. C. A. Adams, Harvard University and chairman of the John Fritz Medal board of award, has appointed the following committee to arrange for the presentation ceremonies: Benjamin B. Thayer, New York, chairman; George S. Webster, Philadelphia; Walter M. McFarland, New York; William McClellan, Philadelphia.

Simplification in Manufactures

In connection with the investigation by various technical societies into methods calculated to bring about simplification in sizes and varieties of commodities, all in accordance with the request of Secretary of Commerce Hoover, the American Engineering Standards Committee has appointed W. A. Durgin, chief of the division of simplified practice of the Department of Commerce, a member of the standards committee, and A. A. Stevenson, former chairman of the standards committee, has been appointed a member of an advisory committee to the division of simplified practice.

The membership of the American Society of Mechanical Engineers has been asked, through the eleven professional divisions of the society, to supply the suggestions desired as to what things may be done in the interest of simplification. Those in charge would, as a matter of fact, like to have anyone who is in a position to do so to give thought to the manufactured articles he is in touch with and consider the possibilities of standardization. Thus he may help in the efforts to reduce waste in industry.

Hadfield Scholarship for Sweden

Sir Robert A. Hadfield has presented to the Metallografiska Institutet, Stockholm, Sweden, a scholarship of £150 per year for two years. This is to be made available to a young scientist for carrying on special research work at the institute, and has been given as "an expression of the debt of gratitude which the world owes to Swedish science." He called particular attention to the contributions of the early Swedish workers in the practical metallurgy of iron.

At the inauguration of the institute, Dr. Carl Benedicks, the director, referred to the lead in modern metallurgy which England had taken, mentioning particularly Henry Clifton Sorby and Sir Robert A. Hadfield, both of Sheffield. He paid touching tribute to the recent great loss which the metallurgical world had sustained in the death of Prof. Henry M. Howe, of New York.

It was the pioneer work of the early Swedish scientists, more than a century ago, which gave the world the first alloy steels. And Bergman, the founder of analytical chemistry, showed the influence of carbon on iron and first defined and differentiated pig iron, wrought iron and steel.

National Safety Council Meeting Aug. 28.

The National Safety Council, 168 North Michigan Avenue, Chicago, will hold its eleventh annual meeting in Detroit Aug. 28 to Sept. 1, inclusive. A special program has been arranged for the metals section, of which J. R. Mulligan, safety inspector of the Bethlehem Steel Co., is chairman. J. A. Northwood, safety engineer, Cambria Steel Co., is vice-chairman, and Walter Hart, safety inspector, Jones & Laughlin Steel Co., is secretary. The program will include reports of officers and committees and several addresses, among which these have been announced: "Outstanding Features of the Safety Movement in Iron and Steel, 1910-1919," by Dr. L. W. Chaney, United States Bureau of Labor Statistics, Washington; "Safety in Electric Furnace Operation," by E. T. Moore, electrical engineer, Halcomb Steel Co., Syracuse, N. Y.; "The Safe Handling of Gas at the Blast Furnace" and "Safety in Crane Repairing," for which no speakers have yet been announced.

There will be a joint meeting of the automotive, drop forge and metals sections on Friday, Sept. 1, at 9 a. m.

All meetings will be held in the new Cass Technical High School, which has just been completed. This building has an auditorium with a seating capacity for 3000 persons. Other rooms are available in the same building for sectional and committee meetings.

Personnel Changes in Standards Committee

The American Engineering Standards Committee, 29 West Thirty-ninth Street, New York, announces the following additions and changes in personnel:

F. J. Schlink, formerly of the development branch of the engineering department of the Western Electric Co., New York, has been appointed assistant secretary of the committee.

The Electrical Manufacturers Council has appointed A. L. Doremus, Crocker-Wheeler Co., New York, as alternate for A. H. Moore, on the main committee of the American Engineering Standards Committee.

The gas group has appointed W. J. Serrill, United Gas Improvement Co., Philadelphia, Pa., as alternate for A. H. Hall on the main committee.

The U. S. Navy Department has designated Commander Harvey Delano, bureau of ordnance, Washington, to represent the Navy Department on the main committee.

The U. S. War Department has appointed Maj. Glen F. Jenks, ordnance department, U. S. A., Washington, as alternate to Brig.-Gen. W. S. Pierce, ordnance department, on the main committee.

WORLD TRADE IN MACHINERY

America's Premier Position Not Menaced by Germany, with Which We Have Exchanged Places Since 1913

The present position of Germany as a competitor in the world's machinery markets has been considerably overrated by many writers, says William Althoff, of the industrial machinery division of the Department of Commerce, in a special survey of the international situation in the forthcoming issue of *Commerce Reports*. Mr. Althoff's conclusions are that America's premier position, which it has captured from Germany since 1913, is not menaced by Germany, whose exports of industrial machinery are now in value well below those of Great Britain, our present closest competitor for first place.

During the years 1910-1913, inclusive, as shown by charts and tables prepared by Mr. Althoff, Germany, the United Kingdom, France, and the United States exported annually a total average of approximately $530,000,000 worth of machinery. Throughout this period Germany held first place, but its proportion fell from 45.1 per cent of the total of these countries in 1910 to 43.6 per cent in 1913. The proportion of the United Kingdom also declined continually during these years, and in 1913 its share was only 28.8 per cent as against 33.1 per cent in 1910. The United States, on the contrary, secured a larger proportion each successive year, rising steadily from 17.1 per cent of the total in 1910 to 20.9 per cent in 1913. In value this represented an increase of almost $57,000,000.

In 1918 and 1919 the United States, as was to be expected, furnished the bulk of the machinery exports, the actual amounts being $282,000,000 and $378,000,000 respectively.

During 1920 Germany was again in the field, the total of the four countries ascending well on toward a billion dollars. Of this the United States supplied nearly one-half (48.9 per cent), the United Kingdom 24.6 per cent, and Germany 20.8 per cent.

The United Kingdom alone of the four countries shows an increase in the value of its exports for 1921, due largely to heavy shipments of textile machinery on orders that had long been unfilled. Machinery exports from the United States fell off considerably during 1921, this being due in a large measure to the reduction in unit prices and to the extraordinary exchange situation that prevailed in the world markets.

It should be particularly noted, however, that our machinery exports last year exceeded in value those for 1918, and were more than twice as great as in 1913.

In other words, during 1921 we exported machinery to the extent of $290,000,000 or 36.2 per cent of the total of the four countries combined, as against $130,000,006 or 20.8 per cent of the 1913 total.

The outstanding feature of the figures presented herewith is that in 1920 and 1921, Germany, in spite of the advantages of favorable exchange rates, low wages Government subsidies, etc., exported only about one-half the proportion it shipped during the pre-war period.

Fundamental conditions at present existing in Germany are such as to seriously impair its position as a competitor in the world machinery markets. To a large extent its low costs have been the result of direct and indirect Government subsidies which the German Government must necessarily abandon. Government control as applied to grain prices has already been abolished, bringing about a general movement for higher wages. Freight rates and raw material prices are rising rapidly, and labor difficulties are becoming increasingly numerous. There is a shortage of both coal and coke. The forced internal loan contemplated by the German Government will undoubtedly be demanded in the near future. The amount is about one billion gold marks, equivalent at present to approximately 70 billion paper marks. This loan will be a heavy burden on industry. The supplementary taxation that must necessarily follow will raise production costs still higher. Furthermore Germany is becoming sold out and the continuation of production will involve increased purchasing of raw materials from outside sources at prices which will be almost beyond the German buyer, although in line with the world markets.

These and other factors make it practically impossible to quote firm prices for long-term commitments. The tendency now is to quote prices subject to increases to cover any enhanced production costs that may occur before the goods are delivered. The cancellation of numerous orders placed in Germany by foreign customers is reported.

All of the above conditions have a further peculiar significance when it is remembered that during recent years German supplies had already found it difficult to deliver machinery in accordance with prices and delivery dates contracted.

Graphite Electrodes for Resistor Elements in Electric Furnaces

To provide electric heat treating furnaces capable of high temperature work, such as necessary in treating manganese steel and other alloys and also in forging and billet heating, the use of solid graphite electrodes as resistors has been developed by F. J. Ryan & Co., Philadelphia. It appears that such construction was begun on the first practical furnace about seven months ago and furnaces of the type are now under construction to meet a demand for temperatures of 2800 to 2900 deg. Fahr.

The designs contemplate the placing of the resistors in any part of the furnace to secure uniform heat treatment, and the company claims that temperature ranges of 1000 to 3600 deg. are feasible. The general arrangement is such that a single resistor can be changed without interfering with the operation of the furnace or necessitating the opening of the center chamber.

F. J. Ryan, president of the company, says that in melting practice it is not expected that furnaces for use on iron alloys will be built with more than 750 lb. holding capacity, but he does not limit the capacity for non-ferrous melting. In heat treating, he says it is possible to build any size or dimension to meet conditions. The principle described is used in melting work and three of a new nose tilt design, automatically controlled, have been built for the alloy plant of the Bario Metal Corporation under a guarantee of temperatures for melting alloys from 3200 to 4000 deg. On present furnaces, it is stated that tungsten and chromium alloys have been melted from the cold condition in 25 to 30 minutes.

New Commodity Divisions

WASHINGTON, July 4.—Beginning with the new fiscal year, the Department of Commerce added three commodity divisions to those already created. They include the chemical division, headed by C. R. Delong of Ohio; the banking and investment division, headed by G. M. Jones of New York and the specialties division, headed by Edward Morse of Boston. This makes seventeen commodity divisions now installed within the department. It also has added a mineral section, beginning July 1, to the iron and steel division.

The Personnel Research Federation has established a monthly journal, published by Williams & Wilkins Co., Baltimore. The first number, dated May, contains an article by President James R. Angell of Yale University, on the reasons for personnel research, by Alfred D. Flinn, secretary of the Engineering Foundation and of the Personnel Research Federation, on the development of the federation, and by C. S. Yoakum, of the Carnegie Institute of Technology, on experiments in vocational guidance.

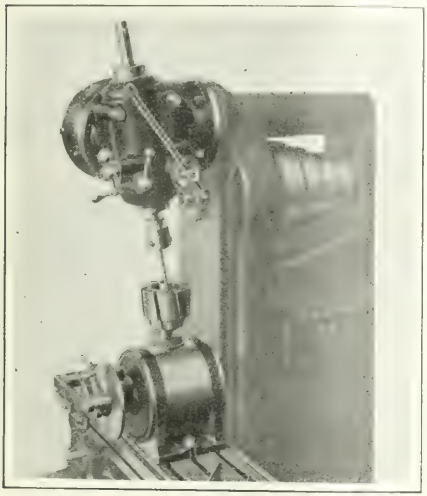
The Central Ohio Manufacturers Association, composed of manufacturers located in 12 Ohio counties, at its recent annual meeting elected T. R. Barnes, Barnes Mfg. Co., Mansfield, president. Other new officers are: first vice president, R. O. Parrott, Bucyrus; second vice president, F. B. McMillan, Mt. Gilead; third vice president, E. B. Phillips, Kenton; fourth vice president, F. E. Myers, Ashland; secretary-treasurer, W. P. Leonard, Mansfield.

Milling and Drilling Attachment

A universal milling and drilling attachment for the Rockford millers has been placed on the market by the Rockford Milling Machine Co., Rockford, Ill. It is a combination of two tools for use where there is considerable work to be done, which requires angular milling of surfaces or drilling at different angles.

The attachment is clamped by four bolts to the face of the machine column as shown in the accompanying illustration. There are two graduated bases at right angles to each other, both of which can be swiveled through 360 deg. This construction makes the spindle completely universal.

The drive is obtained by means of a geared connection from the back of the main spindle through a driving sleeve substituted in place of the overhanging arm. The same driving sleeve and intermediate gear as used with the company's standard vertical milling and slotting attachments is used. From the sleeve the drive is



Universal Milling and Drilling Attachment in Use Reaming a Taper Hole in a Cutter Head

through bevel gears driving a set of hardened steel bevel gears solidly mounted on a shaft and which drive a set of hardened steel bevel gears that drive the attachment spindle. This arrangement leaves the main spindle of the machine free, to be used as desired. On many jobs it is possible to do milling with a cutter inserted in the main spindle of the machine and angular milling or drilling at the same time.

A rack and worm feed is provided, which is a convenient feature for boring operations to close limits. This feed is obtained by loosening a thumb screw and moving the drill handle sleeve in, which throws it into clutch with the worm and rack. The rack and worm feed ratio is 48 to 1, that is, when using the worm feed, the feed is 48 times as fine as the hand feed.

There are 16 spindle speeds obtainable, ranging from 21 to 414 r.p.m., and drills 3/16 to 1¼ in. can be used advantageously. The spindle sleeve is graduated in inches and has an adjustment of 5 in., which increases the vertical range. On the inside of the spindle sleeve a take-up nut or the lower spindle bearing is conveniently located. Adjustment of the upper spindle bearing is independent of the lower and is made by means of an accessible nut.

The main spindle is of crucible steel and runs in phosphor bronze bearings, fitted with felts for retaining oil. The spindle hole is bored to No. 9 B & S taper. The net weight of the attachment is approximately 330 lb.

The Sumter Radio Mfg. Co. has leased suitable space and will manufacture radio parts aimed for quality rather than quantity.

New Potts Warehouse in Philadelphia

Horace T. Potts & Co., with a record of 107 years in the iron and steel business established in 1815 by the great-grandfather of the present active partners, are breaking ground on plot of about 10 acres on East Erie Avenue, Philadelphia, with a frontage on the Pennsylvania Railroad of 1042 ft. for new warehouses, office building, garage, machine shop, power house and watchman's residence. The total expenditure will be in excess of $500,000.

The office building will contain some 5400 sq. ft. for general office work and storage of records, and in addition will afford space for employees' rest rooms, locker rooms, lavatories, shower baths, restaurant and kitchen.

One warehouse 120 x 192 ft. will be equipped for dry and warm storage of cold finished steels, bands, hoops, sheets, wire, fencing, tool and alloy steels and light materials injured by dampness and rust. Dry air under forced pressure will be supplied to this building. Another building 75 x 369 ft. will be equipped to handle heavy and long sections up to 45-ft. lengths. Electric cranes, three of 7½ tons capacity and one of 3 tons capacity, as well as electrically driven saws, shears and punches, automatic scales, interplant railroad and trucking and up-to-date racks and storage facilities will be installed. The railroad siding will accommodate 10 cars at one time with unloading facilities either into truck or into warehouse.

The development of the autotruck and the call for prompt deliveries of material to distant points have made necessary the maintenance of a fleet of trucks and these and the automobile equipment of the sales department will be kept in repair in the company's own machine shop.

The Potts company has been a large importer of Swedish iron in the form of pig iron, wire rods in coils for making chain and rivets, bars, blooms for rolling into boiler tubes, melting bars for the manufacture of crucible steels and Swedish tool steels and anvils. The organization has also at times done an export business in iron and steel, largely with Australia, South America and the Orient.

At home it has developed a trade in tool and alloy steels and of other grades of steel and iron for various uses sold under its own special names and trade mark.

Employees can invest their savings in the business, receiving a guaranteed return of 7 per cent annually and with provision for withdrawal in full or part at any time. Group life insurance, beginning at $1,000 after six months' employment and running up by degrees to $3,000 after fifteen years, is carried at the expense of the firm. The purchase and owning of homes has been encouraged and aided.

By-Product Coke Plant for Mexico

The American Smelting & Refining Co. plans to build a by-product coke plant at Coahuila, in the district of Sabinas, Mexico, according to an announcement by William Loeb, Jr., vice-president of the company. Mr. Loeb was in Mexico in April conferring with President Obregon and other officials regarding the project. Construction work will not be begun until official authorization has been received from the Mexican Government and an agreement reached regarding taxation. The plant will cost about $7,000,000 and will include a model village with workmen's homes.

To discuss management methods and results in different localities, the management division of the American Society of Mechanical Engineers, in co-operation with the Society of Industrial Engineers and the Taylor Society, will provide for a series of meetings throughout the country in the week of Oct. 16 to 21. This special activity will be known as management week.

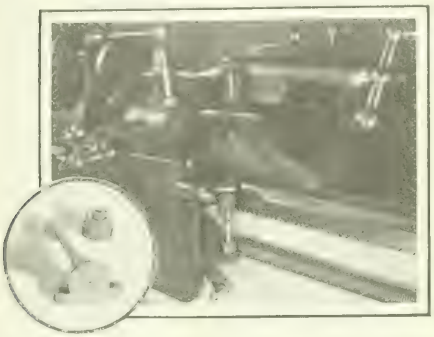
While the negotiations, whereby the General Refractories Co. will absorb several smaller companies, making fire clay and silica brick have not yet been concluded, they are progressing and an official announcement is expected in about a week or so.

Threading Dial for Lathes

The dial device shown in the illustrations is being placed on the market by James M. Colven, 20 Wolffe Street, Yonkers, N. Y., and is intended to facilitate thread cutting on engine lathes. It is known as the E-Z and is said to be easily installed on the carriage of any make of lathe by simply drilling and tapping two small holes.

The device is made up of a cast-iron bracket, a brass sleeve, a brass dial, a steel shaft and a brass worm gear suitable to the lead screw with which it is to operate. It serves for internal or external, odd or even right or left hand threads, and threads of any diameter or length. Threads can be cut close up to the shoulder without difficulty. In operating the device the operator has only to close the nut on the lead screw at the proper time, which the dial indicates, and open it when the tool has traveled the distance required, the lathe running continuously.

When cutting an even number of threads per inch the half nut can be engaged at any line on the dial, and



Attachment to Facilitate Thread Cutting on Engine Lathes. It permits continuous operation

when cutting odd threads the nut is engaged at any of the numbered lines on the dial. For half threads the nut is engaged at every half revolution of the dial.

With this device the lathe may be run continuously until the thread is finished, it eliminating the necessity of stopping and reversing the machine at the completion of each cut through the thread. Among the advantages claimed are that a backing or reversing belt is unnecessary and starting the lathe and not stopping it until the thread is finished, saves time and reduces the cost of cutting threads.

Saving Eyes by Goggles

ST. LOUIS, July 3.—How in 20 or 25 cases a year it is found that the vision of one or both eyes has been saved by the use of goggles, thereby saving a Pittsburgh steel company employing about 8000 men about $50,000 or $60,000 in compensation a year was related in a paper read last week by Dr. V. E. Van Kirk of Pittsburgh before the section on Ophthalmology of the American Medical Association. The subject was "Industrial Ophthalmology."

The paper represented a survey of 25,000 cases in a mill consisting of furnaces, open-hearth and Bessemer, rolling mills and the various co-ordinating departments. The medical and "safety first" departments were organized in the mill about 12 years ago. The paper says:

"The various types of goggles to be used in a mill should be inspected by the ophthalmologist with care, as many of them are not fit to be worn. The frames can be had in different weights for various kinds of work. The thickness of the glass varies also, but must always be a plain glass. The goggles must be in various sizes, so that all the men can be comfortably fitted.

"Goggles are worn by men in chipping or grinding, for example, where there is increased danger of eye injury. Plate glass shields are used on punches and like machines to protect the worker from chips of steel. Masks are worn by men pouring babbitt metal. Special goggles of various kinds are worn by men using the oxy-acetylene torch or electric arc in welding, furnace workers and others exposed to intense light.

"The employees are now on an honor system; a man who sees a fellow employee breaking one of the rules of safety first is justified in reporting him to the foreman. The penalty for failure to wear goggles when so ordered is rarely necessary now; the men realize the value of this protection."

Dr. George H. Cross, Chester, Pa., who led the discussion of the paper, said that of 13,008 accidents among employees of a large corporation, 5843 were injuries to eyes, as were 2000 of 3893 in another corporation. A factor in the large percentage of eye cases recorded was that the employees have been successfully educated to come to the ophthalmologist for even dust in the eyes, 536 reporting last year for the removal of a foreign body from the eye when there was none in it. The latter was regarded as an encouraging sign.

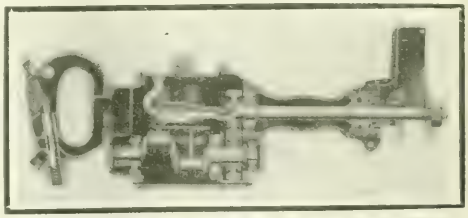
The principal objective for education, it was thought, should be the men in charge of industry. More men will wear goggles and adopt other safety measures if there are plant rules and factory owners must be shown that accident prevention will save money, it was said, for measures for avoiding and caring for injuries will be adopted in proportion as the leaders of industry are taught that they are measures of economy.

Improves Portable Air Tool

The Chicago Pneumatic Tool Co., New York, has devised what is called an oil separator for its Little Giant air grinders, which, it is claimed, permits continuous operation of the machine for 48 hr. or longer without replenishing the supply of lubricant.

The oil separator consists of a hollow perforated cylindrical steel shell attached at one end to the grinder spindle as shown in the sectional view herewith. At the other end it encircles and revolves around the vent tube. As the oil-laden air enters the holes in the separator, the centrifugal action separates the oil from the air, permitting the air to escape, oil-free, through the vent tube and preventing oil leakage.

The new feature is applicable to the larger sizes of Little Giant grinders and can be attached to such



Continuous Operation Without Replenishing Lubricant Is the Feature

grinders now in use. Considerable saving in lubricating expense is claimed because oiling is necessary but once a week instead of daily.

A new wire brush for removing rust and old paint is also an added feature of the company's air grinders. It consists of three units: a ⅛ in. dished back plate, a ⅛ in. front plate having a series of slots through which the wires project, and a wire brush made up of 30 renewable units of heat-treated crucible steel.

Suspension of coal mining in Pennsylvania has cost that state $200,000,000 to date, according to the State Commissioner of Labor. Loss of wages of 326,286 miners is placed at $94,420,755, of which $41,979,600 is in the anthracite fields and $52,441,155 in the bituminous fields. Loss to the operators is estimated to be $52,780,000 in the anthracite fields and a similar amount in the bituminous fields.

CONTENTS

July 6, 1922

Physical Tests on High-Speed Steels 1

Transverse and Tensile Tests of Two Grades Compared—Effect of These Properties on the Service of the Tool

Trade Status of Some Minor Steel Products 7

Facts and Figures Collected by Tariff Commission Relating to Production and Markets, Also Export and Import Trade

American Society for Testing Materials 13

Annual Convention Discusses Steel Castings and Cast Iron, Sulphur in Steel, Impact Testing and Fatigue of Metals

Iron and Steel Exports Gain Heavily 24

Highest Exports Since March, 1921—Rails, Black Sheets, Structural Shapes, Pipe and Wire Share in Increase—Imports Higher

Pig Iron Production in June 36

Gain of 4292 Tons Per Day Over May, More Largely Among Merchant Furnaces Than Steel Company Stacks

Large Automotive Merger 6
Trade Commission Merger Questionnaire 6
Clay Pipe as Substitute for Cast Iron 6
Cutting Cruiser Into Scrap 9
Federal Trade Commission Personnel 9
Mechanical Puddling 9
French Tariff Changes Urged 10
Puddling Wages Advanced 10
Metal Schedule Completed 11
New Pacific Coast Company 11
German Price Trend Upward 12
Coal Situation 19, 37, 58
Mineral Section of Commerce Department 19
Reduced Railroad Rates 20
Pittsburgh Basing Case at Chattanooga 21
Surface Condenser with Separate Cooler 22
Adoption of Uniform Cost Accounting 22
Plain and Back Geared Tapping Chucks 23
Aluminum Plants Leased 23
Tests of Slag Brick 25
Centers for Lathes and Grinders 26
Air Drill with New Features 26
Summer Industrial Management Course 27
Fritz Medal Awarded Marconi 27
Simplification in Manufactures 27
Hadfield Scholarship for Sweden 27
National Safety Council Meeting 27
Changes in Standards Committee 27
World Trade in Machinery 28
Graphite Electrodes for Resistors 28
Milling and Drilling Attachment 29
New Potts Warehouse in Philadelphia 29
By-Products Coke Plant for Mexico 29
Threading Dial for Lathes 30
Saving Eyes by Goggles 30
Improves Portable Air Tube 30
Editorials 32
Unsatisfactory Tariff — International Testing Relations—Business After Two Wars—Impact and Fatigue Testing—Business Memories
Correspondence 35
Standardization of Pulley Sizes
Book Review 35
British Iron and Steel Market 38
American Export Market 38
French Production Active 39
Railroad Equipment Business 45
Fabricated Steel Business 54
Refractories Market 54
Plant Operations 54
Activities of Various Companies 57, 67

Iron and Steel Markets 40
Comparison of Prices 41
Prices Finished Iron and Steel, f.o.b. Pittsburgh 55
Personal Notes 56
Non-Ferrous Metal Market 58
Machinery Markets and News of the Works 59
New York Jobbers' Prices 68

ESTABLISHED 1855

THE IRON AGE

EDITORS:

A. I. FINDLEY WILLIAM W. MACON GEORGE SMART

CHARLES S. BAUR, *Advertising Manager*

Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

F. J. Frank, *President* PRINTED IN U. S. A. George H. Griffiths, *Secretary*

Owned by the United Publishers Corporation, 243 West 39th Street, New York, H. M. Swetland, Pres. Charles G. Phillips, *Vice-Pres.* A. C. Pearson, *Treas.* F. J. Frank, *Secy.*

Detroit: 317 West Fort St. Cincinnati: Mercantile Library Bldg. Buffalo: 881 Ellicott Square. Washington: 816 Fifteenth St., N. W. San Francisco: 320 Market St. London, Eng.: 11 Haymarket, S.W.1.

BRANCH OFFICES—Chicago: Otis Building. Pittsburgh: Park Building. Boston: 410 Unity Building. Philadelphia: 1420-1422 Widener Building. Cleveland: Guardian Building.

Subscription Price: United States and Possessions, Mexico, Cuba, Shanghai, $6.00; Canada, $8.50; Foreign, $12.00 per year. Single copy 25 cents.

Entered as second class matter, June 18, 1879, at the Post Office at New York, New York, under the Act of March 3, 1879.

An Unsatisfactory Tariff

The tariff bill as it stands to-day, much amended by the Senate in committee of the whole, may fairly be spoken of as more unsatisfactory than any of its predecessors. It was to be expected that the majority party would frame the schedules on a protective basis and therefore that these would more closely approach the rates of the Payne-Aldrich act than of the existing Underwood tariff. But no consistent policy has been followed in making the new schedules. Moreover, in many instances the existing duties have been so greatly increased that advocates of a moderate tariff, of whom there are many more in the ranks of life-long protectionists than at any time since revenue bills began to be made, have either made open protest or washed their hands of what they fear will be one of the most unpopular of all tariff acts.

It is granted that the public mind in its present state is highly receptive to any and all statements to the effect that special interests are having their way in the making of duties. More easily than ever any increase in existing duties can be put before the people as so much more added to the consumer's burdens for the benefit of domestic producers. War taxes are felt in every quarter; profiteering by retailers in many lines is still notoriously common. The purchasing power of many classes in the community has been cut down by the wage reductions of the past year. These conditions give uncommon weight to criticisms of the pending bill, particularly to criticisms to the effect that in many cases domestic producers have had their way completely in the framing of schedules in which they are interested.

As has been pointed out in these columns from time to time, the efforts of steel manufacturers have been more in the direction of urging that their raw materials be left free of duty or nearly so, than in securing high duties on their finished products. Their ability to export was an important consideration in this connection. Excessive transportation charges and the high labor costs of to-day, even after the reductions of 1921, have made the export position of our steel companies much more difficult than it was in 1913 when the Underwood bill was passed. There was hope that the Senate would reduce the House bill duties on manganese ore, ferromanganese, fluorspar, magnesite and some of the ores entering into the manufacture of special steels. But through the action of the agricultural bloc and various combinations of Senators representing sectional interests, the raw materials duties in the metal schedule have been retained substantially as the House passed them. The manganese ore duty is left at 1 cent per pound of contained manganese, or $11.20 per ton for a 50 per cent ore. The duty on 80 per cent ferromanganese was put at $33.60, instead of $39.42. The fluorspar duty was raised from $5 per ton in the House bill to $5.60. The House duties on crude and dead burned magnesite were finally put at one-half cent and three-fourths cent per pound, just as in the House bill. The House duties on ferrotungsten and ferromolybdenum and their ores were reduced somewhat, but in other duties affecting tool steel prices the changes are immaterial.

Both House and Senate bills continue the Underwood bill's concession to the farmer in free barbed wire, but protection consistency is asserted in respect to cotton ties, the Senate retaining the House bill duty of one-fourth cent per pound, whereas cotton ties are now on the free list.

Changes may yet be made in the metal schedule, as the bill comes up for final consideration in the Senate and later in conference committee, but no important departure need be expected from the policy already approved of imposing on the raw materials of steel manufacture duties that each year will add many millions of dollars to the cost of producing American steel.

That tariff-making under present world conditions and the unparalleled problems, industrial and fiscal, existing at home is a business of high hazard, is being demonstrated almost daily in the popular reactions to the provisions of the pending bill. To add to the uncertainties of domestic industries the form which the pending bill will finally take seems likely to make it short-lived. Radical changes by the next Congress are the well-nigh certain result of its enactment on substantially the present lines.

Large cities are evidently tiring of the expense of wooden stands for reviewing parades. From now on we have reason to expect that municipal officials

and their friends will see and be seen from stands of steel. Portable or sectional structures of fabricated steel can be knocked down and stored against the next celebration. In the long run they undoubtedly will be much cheaper than those of wood, and such a point of economy can be used against any greater first cost, not to mention the relatively little wear and tear of repeated assembly. A New York official has reported that the cost per seat for a stand accommodating 1000 persons is $5.78, and that the cost of cartage and erecting would be 93 cents per seat. Here is a business suggestion that should appeal to the recently organized association of fabricators, who are desirous of extending the applications of structural steel. Here also is an index to the cost of city entertaining. There are no statistics as to the annual number of occasions justifying such seating conveniences, but it is clear that each recipient of the municipal favor represents an outlay of nearly a dollar of the taxpayers' money merely for having his seat put in place. Used a few times a year and lasting, say, ten years, interest and amortization would easily bring the base cost of a seat, without considering the cost of the ticket, to $1.50; but we must have the stands, none the less.

International Testing Relations

While no action was taken by the American Society for Testing Materials, at its annual meeting last week, looking to a revival of the International Association for Testing Materials, there were indications of an undercurrent of sentiment favorable to such a movement. At the international session on cast iron, held by the American Foundrymen's Association in Rochester early in June, there was a strong sentiment for closer international relations on foundry questions, possibly in the shape of an association. Largely because of the Rochester session, the Testing Society's committee on cast iron formally voted a recommendation to the executive committee that international relations be made a subject of negotiation, with special reference to standardized tests for cast iron which might form a more satisfactory basis for comparisons. The Testing Society's retiring president, C. D. Young, in his annual address advocated "strong support for any movement which will again create an international association of testing engineers." Almost simultaneously comes word of the feeling in favor of an international foundrymen's association which was expressed at the recent convention and exhibition of the Institution of British Foundrymen.

There need be no underestimate of the difficulties in the way of reviving the International Association for Testing Materials on the old lines. Some countries represented in the old association are not likely to be participants in a reorganization movement at the start. Russia is one, and there are no indications of any effort to resume relations between German and Austrian engineering societies and those of the Allied countries. What is likely to come first is a movement in which American and British engineers would co-operate. Foundrymen in the two countries might well attempt to reach agreement on the size and shape of test bars that will best represent various classes of castings, and it will probably be found that mechanical testing will furnish sufficient scope for international effort in the foundry trade for a long time to come.

So far as the larger field of the Testing Society is concerned, the effort to revive international relations should be undertaken with a full appreciation of the narrow range of activities open to an international association. The last congress, held in New York ten years ago, showed that even on the matter of the nomenclature of steel the chance of agreement between the metallurgists of the United States and Great Britain was quite remote.

Business After Two Wars

In the Annual Review Number of THE IRON AGE of Jan. 4, 1917, there was given a collection of statistics showing what occurred industrially and commercially after our Civil War, 1861-65, and the Franco-Prussian war of 1870, the object being to furnish the reader with definite facts from which to draw conclusions concerning the years after the World War. Now that nearly four years have elapsed since the termination of hostilities an opportunity is afforded to make some comparisons.

The end of the Civil War was seen upon the investment of Richmond in 1864, although the termination of hostilities did not come until Lee's surrender to Grant at Appomattox Court House, April 9, 1865. It seems fair to take it that Germany surrendered at an earlier stage than did the Southern Confederacy, and if so, 1864 and 1918 are parallel years, so that in essence the summer of 1922 is as far after the World War as the summer of 1868 was after the Civil War. Parallelism or divergence is brought out by comparing years that are 54 years apart.

Following the Civil War there was, in general, a period of great industrial activity and expansion, lasting with short interruptions until the panic in September, 1873. Meanwhile there had occurred "Black Friday," Sept. 24, 1869, caused by the failure of the gold corner attempted by Smith, Gould, Martin & Co. Were there parallelism, then, our Black Friday would come next year and our panic in 1927, five years hence. The computation is made, of course, merely to furnish the necessary perspective.

After the Civil War pig iron and bar iron first suffered a sharp but quite moderate liquidation in price and then held rather steady for years. In 1867, corresponding to last year, there was a moderate decline in pig iron and a slight decline in bar iron, while in 1868 pig iron recovered part way, bar iron having little occasion to recover. Prices continued to recede slightly, in a general way, until the obviously foolish price boom of 1872, which would correspond to 1926, when in a few months prices reached their greatest height since the war, and then started on a long and great decline.

After the Civil War there was no 1919-20 boom in prices. Things were taken more moderately. There can be no doubt that one great difference between conditions then and now is that then men were willing to work hard, and did work hard, while in this recent period men have been unwill-

ing to work hard, but have expected great rewards.

There was what is commonly called an "unfavorable" trade balance during the Civil War and afterward, until 1876. In the active times there was an "unfavorable balance," while in the "hard times" that followed the panic of 1873, the "unfavorable" balance gradually turned into a "favorable" balance. We were selling securities to foreign investors in the period after the Civil War. An "unfavorable" trade balance now would correspond to our permitting our foreign debtors to pay us.

In the panic of 1873 one naturally expects to find information as to what, if anything, was wrong with the eight or nine years of trade activity that followed the Civil War. The panic showed that too much business had been done on paper for the currency system then existing to take care of. We do not have the same danger now on account of our new system. There was much evidence that there had been undue investment in construction work which could not continuously earn its keep, in railroads in particular, and in plants erected to provide railroad materials. The trouble was not that the unit costs had been too great; there was merely a case of endeavoring to develop the country too rapidly. The condition of late has been quite different. Construction costs have been higher than they should be, and if we have an excess of facilities in any quarter, it is the creation of the war period, not of the post-war period.

Impact and Fatigue Testing

Stimulus was given to further work in at least two testing fields by last week's convention of the American Society for Testing Materials. The symposium on impact testing of materials was an impressive review of accomplishment, and the new contributions to the recently published data on the fatigue of metals were of much significance.

While impact testing as applied to steel is older and in more extensive use than fatigue testing, there is a crying need of standardization of machines, methods and test pieces and of more knowledge of the entire subject. The contributions, besides affording valuable data on past progress and the present status of the art, clearly indicated inconsistencies and the need of further study. Impact tests uniformly carried out are necessary in determining properties of metals not possible of detection by other tests. Doubtless the Testing Society, as a result of this year's meeting, will bring order out of the conflicting data.

The remarkable work on the fatigue of steel by Professor Moore and his colleagues at the University of Illinois, in collaboration with the National Research Council and other organizations, was given added distinction by the results published last week. It had been shown previously that among other things cracks and re-entrant angles in the surfaces of steel, due perhaps to machining, are important factors in fatigue failure. It is now fairly well demonstrated that steel possesses a well-defined "endurance limit" below which it can withstand hundreds of millions of reversals of stress and that it possibly can withstand an indefinitely larger number of such reversals. The arresting statement is made that static tension tests of specimens which have withstood 100,000,000 reversals of stress, close to the endurance limit, have given higher values for tensile strength than before the repeated stressing; and the question is raised whether a metal actually can be benefited by repeated stressing below the endurance limit. The serious drawback to this valuable work, however, is the time required to make such tests. The need of a rapid fatigue test was emphasized and is apparent.

Impact and fatigue testing ultimately can be made valuable commercially, but a vast amount of work is yet to be done. Not only is standardization necessary, but a correlation of the results, particularly the impact with static and other properties, is a *sine qua non* of future progress. Metallurgists and testing engineers are co-operating and the desired result is only a question of time.

Business Memories

Judged by what some business men say, their memories are rather short, particularly when they speak of the prices of the commodities they buy and sell. A buyer insists that a certain price is unreasonably high, while a few months later he not only is quite willing to pay it, but is disposed to pay a premium to secure an early delivery. A seller explains that a certain price is his cost, and points out that one cannot possibly expect him to sell at cost, but in a short time he sells eagerly at a still lower figure.

When, in a period of depression, an observer predicts that better times are coming, his prediction is taken lightly, and he may even be called "an irrepressible optimist" or some other opprobrious epithet. When times are "good," one who predicts less good times coming is considered a "calamity howler." In the abstract, the existence of the business cycle is admitted, but there is objection to taking it in the concrete and assigning the present a particular place in the cycle. When, in the progress of the business cycle, prices are going up, we generally find sellers and buyers co-operating to put them up farther. When they are declining there is similar co-operation.

This apparent shortness of memory is a part of human nature. When times are good men do not wish to remember that they are ever bad. When times are bad courage is at a low ebb and men are afraid to act upon the principle that bad times must be followed by good times.

The business cycle has been studied with particular care in recent years, and fond hopes have been entertained that such study will tend to reduce the amplitude of the swings in the cycle. More than study, however, is necessary. There must be a change in the mind, in its acquiring more willingness to be guided by study and in shaking off some of the tendency to be guided by the present; in other words, by what other men are doing.

An example of this shortness, or apparent shortness, of men's memories is present to-day. There is in most lines of trade a degree of activ-

ity greater than that which a year ago would have been entirely satisfactory to the members of those trades. Whether they then were setting their desires too low or are now wanting too much is no point in the argument. The difference in mental attitude is obvious. Thorough consideration should be given, therefore, to those who are now urging that sellers do not press their present price advantage too far, thus drawing the line indicating the cycle so far above the mean as to cause it sooner to descend below the mean.

CORRESPONDENCE

Standardization of Pulley Sizes

To the Editor: In connection with Mr. Hoover's plan of simplification in industry which means the elimination of commercially nonessential types, sizes and styles, I understand that some of the pulley manufacturers have indicated that pulleys might be simplified with advantage. We have had some correspondence with the fabricated production department of the Chamber of Commerce of the United States on this subject and they seem surprised to know that back in 1919 the Electric Power Club adopted specific pulley sizes as the recommended practice for use with each different size and speed of motor. This information is given in the Electric Power Club Handbook.

There was some little misunderstanding due to the fact that our handbook specified belt width instead of pulley width but at the annual meeting of the club at the beginning of this month it was decided to add another column giving the pulley width in addition to the belt width so that there should be no misunderstanding in future.

I am calling this matter to your attention because if the pulley sizes as adopted by the Electric Power Club were universally recognized, it would tend to standardize the different pulleys on the many machines which are sold for belt drive. As it is now, most of these machine manufacturers seem to pick a pulley size out of the air, so to speak, and when the purchaser comes to buy the motor to drive the machine, he has to order a special pulley in order to get the speed he wants out of the driven machine. This is one of the principal reasons why pulley manufacturers think there is no such a thing as standard pulley sizes for motors. This is a subject which I know would interest the readers of your paper and I hope you will help the good work along by giving some publicity to the pulley standardization which has been effected by the Electric Power Club and by pointing out to your readers the advantage of specifying these standard size pulleys when they buy electric motors.

Referring to our handbook, you will find the standard shaft extension sizes and pulley dimensions on pages 107, 108, and 114 for fractional horsepower motors and pages 126, 127, 137, 138, 150, and 151 for large power motors.

You will note that no pulley bore, shaft extension diameter, or key dimensions are given for the 100-hp. motor at 1150 to 1200 r.p.m. or the 75-hp. motor at 850 to 900 r.p.m. These dimensions were agreed upon at the annual meeting June 6, 1922, and are as follows:

Pulley bore and shaft extension diameter, 3⅜ in.

Key dimensions, ¾ in. wide and ½ in. thick.

It was also decided at the same meeting that the dimensions in the new column which is to be added under the heading of "pulley widths" would be obtained as follows:

½ in. shall be added to the present belt widths of 2 to 5 in., inclusive.

¾ in. shall be added to the present belt widths of 6 in. to 7 in., inclusive.

1 in. shall be added to the present belt widths of 10 in. to 14 in., inclusive.

I hope you agree with me on the importance of this subject of pulley standardization and if you publish anything regarding the standardization which has been accomplished by the Electric Power Club, will you please state that the Electric Power Club is an association consisting of the manufacturers which make over 95 per cent of the electric power apparatus and control equipment manufactured in this country. I ask you to make some such statement as this regarding the Electric Power Club because its name is such that most people think it is connected with the National Electric Light Association or with the central stations in the country.

Although the fourteenth edition of the Electric Power Club Handbook is dated March, 1922, it was not actually issued until this month. It is about one-third larger than the preceding edition and all the new material in this edition is dated later than August, 1920. The handbook itself is a standard of measurement, which every buyer of electric power and control apparatus should use. You will note that some of the sections, notably, the industrial control section and the power switchboard and switching equipment section have not only established manufacturing standards but have also compiled specifications for use of the purchaser in buying such equipment.

S. N. CLARKSON,
Executive Secretary
Electric Power Club.

St. Louis, June 29.

BOOK REVIEWS

Foundrymen's Handbook. — Penton Publishing Co., Cleveland. Pages 309. 6 x 9 in. Price $5.

For some years the *Foundry* has been issuing data sheets of interest to foundrymen and engineers connected with foundry establishments. These sheets have now been collected, divided into proper groups and elaborately indexed. The data themselves have been compiled by competent men and can be regarded correct, so far as "tables" for an advancing industry may be constructed.

The first section embraces general foundry data of a very miscellaneous character, which will doubtless be sub-divided and increased in a subsequent edition. More might well have been given concerning cupola operation. The second section, on computing weights, is quite complete and will be found very useful by the engineering staff connected with active, pushing concerns. The patternmaker is particularly interested in section three, which gives him about thirty pages of data. This should be extended in later editions.

The non-ferrous metals and alloys are ably handled in section four. A profusion of information is gathered here, which will be much appreciated by the brass founder. Some of the foundry specifications in current use follow in section five; and a few tables of miscellaneous character comprise the last section. The index is noteworthy in its completeness and cross reference.

The volume, which is substantially gotten up, is a good fore-runner of the handbook the foundry industry is looking for. It will be well received by the foundry and prove its usefulness time and again. Eventually there should be a well considered grouping of the information presented, with good editorial connecting up, so that instead of merely looking up a table, the foundryman may be briefly informed on the general subject involved, and how the table was constructed. It will then be possible to crowd much more information into a handier volume of thin paper, on the model of Marks' "Mechanical Engineers' Handbook."

Handbook on Controllers for Electric Motors, a 32-page handbook, 4 x 6¾ in., has been issued by the Electric Power Club, 1017 Olive Street, St. Louis, for the information of those using controllers. Words which do not appear in regular dictionaries are herewith explained in simple language, together with instructions for the care and handling of the apparatus.

JUNE PIG IRON OUTPUT

A Gain of 4292 Tons Per Day Over May

Seventeen Furnaces Blown In, Two Out

Despite the coal strike and for the third month in succession, data of the country's pig iron output collected largely by telegraph, show a large gain in June over May. The gain per day in June was 4,292 tons over the rate per day in April. While this is not as large as the gain of 5,339 tons per day in May over April it is larger than the gain of 3,395 tons per day in April over March. A significant feature of the June output is the fact that the merchant iron production showed a larger gain than the steel-making iron output which is the first time that this has occurred in many months.

The production of coke and anthracite pig iron for the 30 days in May amounted to 2,361,028 gross tons or 78,701 tons per day as compared with 2,306,-679 tons or 74,409 tons per day in May, a 31-day month. The June increase over May was 54,349 tons. Last year the June output was 1,064,833 tons. Although the June output this year is still less than that of January, 1921, the daily rate is larger, but does not yet equal any record made in 1920.

The total number of furnaces in blast on July 1 was 192 as compared with 175 on June 1, with 162 on May 1 and with only 69 on Aug. 1, 1921, the low point in last year's depression. The capacity of the 192 furnaces in blast on July 1 is estimated at 81,845 tons per day as compared with 77,520 tons per day for the 175 furnaces in blast on June 1. There were 19 furnaces blown in in June and only 2 blown out or banked, a net gain of 17 furnaces. In May the net gain was 13 furnaces with 21 blown in and 8 blown out. These gains compare with 7 in April, 17 in March and 12 in February.

The manganese-iron alloy output of 23,090 tons in June was the largest since April, 1921. Of this total 18,273 tons was ferromanganese and 4,817 tons was spiegeleisen.

Daily Rate of Production

The daily rate of production of coke and anthracite pig iron by months, from June, 1921, is as follows:

Daily Rate of Pig Iron Production by Months—Gross Tons

	Steel Works	Merchant	Total
June, 1921	29,144	6,050	35,194
July	23,086	4,803	27,889
August	26,037	4,743	30,780
September	34,789	5,661	32,850
October	33,365	6,850	40,215
November	37,960	9,223	47,183
December	41,173	12,023	53,196
January	42,120	10,933	53,063
February	46,841	11,387	58,214
March	53,547	12,128	65,675
April	56,970	12,140	69,070
May	60,619	13,790	74,409
June	62,534	16,167	78,701

The figures for daily average production, beginning with January, 1916, are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since Jan. 1, 1916—Gross Tons

	1916	1917	1918	1919	1920	1921	1922
Jan.	102,746	101,643	77,799	106,525	97,264	77,945	53,063
Feb.	106,456	94,473	82,835	105,006	102,720	69,187	58,214
Mar.	107,667	104,882	103,648	99,685	108,900	51,468	65,675
Apr.	107,592	111,165	109,607	82,607	91,327	39,768	69,070
May	108,422	110,238	111,175	68,002	96,312	39,394	74,409
June	107,053	109,002	110,793	70,495	101,451	35,494	78,701
July	104,017	107,820	110,354	78,340	98,931	27,889	.....
Aug.	103,346	104,772	109,341	88,496	101,529	30,780	.....
Sept.	106,745	104,465	113,942	82,932	104,310	32,850	.....
Oct.	113,189	106,550	112,482	60,115	106,212	40,215	.....
Nov.	110,394	106,859	111,802	79,745	97,830	47,183	.....
Dec.	102,537	92,997	110,762	84,944	87,222	53,196	.....

Among the furnaces blown in during June were the following: Buffalo A furnace and Harriet Y furnace in the Buffalo district; the Robesonia furnace in the Lebanon Valley; No. 2 Isabella furnace of the Carnegie Steel Co., and one Monessen furnace of the Pittsburgh Steel Co. in the Pittsburgh district; No. 1 Newcastle furnace and No. 1 Farrell furnace of the Carnegie Steel Co. in the Shenango Valley; the Norton furnace in Kentucky; the Tod furnace of the Brier Hill Steel Co., No. 3 furnace of the Republic Iron and Steel Co. and the Mary furnace in the Mahoning Valley; No. 4 furnace of the National Tube Co. and one River furnace in northern Ohio; the Milton furnace in southern Ohio; No. 2 South Chicago (old) furnace of the Illinois Steel Co. in Illinois; the Zenith furnace in Minnesota; the Philadelphia furnace of the Sloss-Sheffield Steel & Iron Co. in Alabama and the LaFollette furnace in Tennessee.

Among the furnaces blown out during June were the following: One Shenango furnace in the Shenango Valley and one Johnstown furnace of the Cambria Steel Co. in western Pennsylvania.

Output by Districts

The accompanying table gives the production of all coke and anthracite furnaces for June and the three months preceding:

Pig Iron Production by Districts, Gross Tons

	June (30 days)	May (31 days)	April (30 days)	March (31 days)
New York	148,115	150,141	131,093	124,584
New Jersey	10,725	5,636	4,815	4,199
Lehigh Valley	66,967	66,572	45,714	32,142
Schuylkill Valley	60,925	66,669	58,927	56,893
Lower Susquehanna and Lebanon Valleys	26,501	21,313	17,387	19,948
Pittsburgh district	485,401	479,106	473,584	479,433
Shenango Valley	87,156	79,145	63,940	59,901
Western Penna.	91,494	103,072	106,430	98,502
Maryland, Virginia and Kentucky	54,687	47,862	26,463	24,172
Wheeling district	74,710	66,148	54,450	80,819
Mahoning Valley	240,470	227,053	197,113	207,892
Central and Northern Ohio	236,374	218,547	197,595	226,765
Southern Ohio	30,272	29,311	27,165	35,333
Illinois and Indiana	454,937	459,631	427,427	362,129
Mich., Minn., Mo., Wis. and Colo.	93,723	89,147	67,360	64,665
Alabama	189,101	196,104	171,823	157,441
Tennessee	9,470	1,222	828	1,102
Total	2,361,028	2,306,679	2,072,114	2,035,920

Capacities in Blast July 1

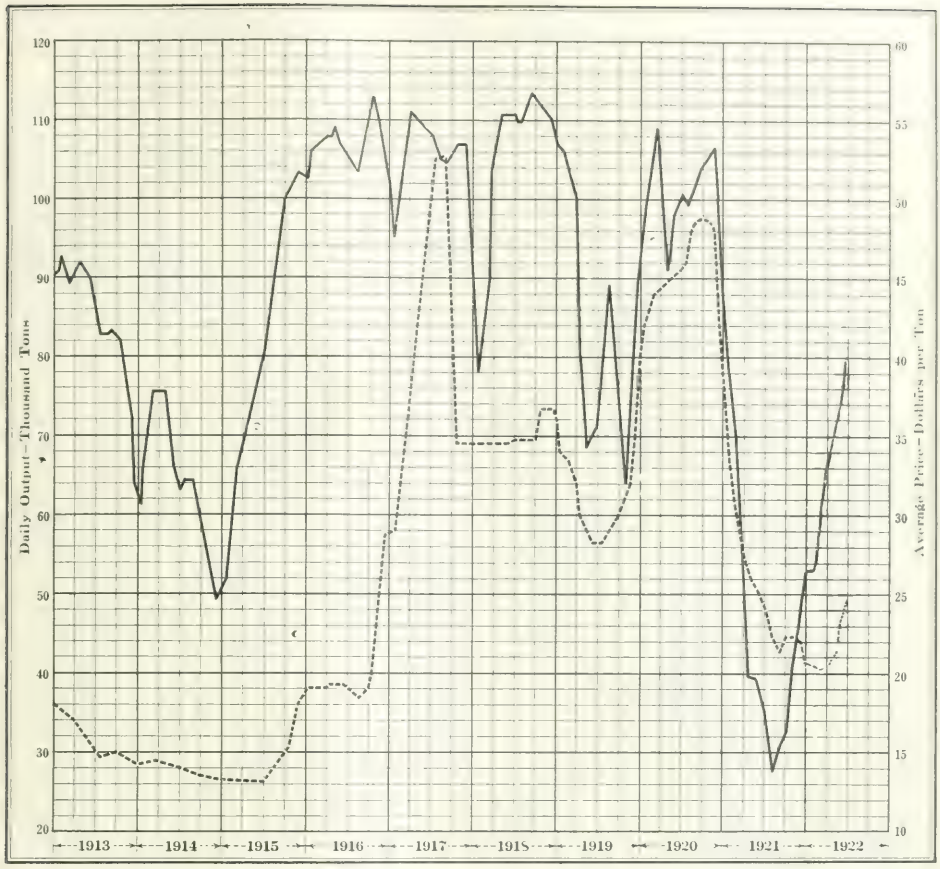
The following table shows the number of furnaces in blast July 1 in the different districts and their capacity, also the number and daily capacity in gross tons of furnaces in blast June 1:

Coke and Anthracite Furnaces in Blast

Location of Furnaces	Total Stacks	July 1 — In Blast	July 1 — Capacity per Day	June 1 — In Blast	June 1 — Capacity per Day
New York:					
Buffalo	22	13	5,400	11	4,840
Other New York	4	0	.....	0	.....
New Jersey	4	1	355	1	400
Pennsylvania:					
Lehigh Valley	18	5	2,070	5	2,000
Spiegel	2	1	150	1	170
Schuylkill Valley	15	6	2,030	6	2,150
Lower Susquehanna	10	2	775	2	615
Lebanon Valley	6	1	195	0	.....
Ferro	2	1	70	1	70
Pittsburgh District	55	35	16,300	33	15,215
Ferro and Spiegel	4	3	405	3	390
Shenango Valley	19	8	3,300	7	2,825
Western Pennsylvania	26	7	2,870	8	3,325
Maryland	5	3	1,050	3	1,125
Ferro	1	1	170	1	70
Wheeling District	15	5	2,490	5	2,660
Ohio:					
Mahoning Valley	28	18	8,800	15	7,485
Central and Northern	26	17	8,395	15	7,520
Southern	16	2	1,050	2	945
Illinois and Indiana	42	28	15,350	27	15,200
Mich., Wis. and Minn.	11	6	2,300	4	1,660
Colorado and Missouri	6	3	1,170	3	1,215
The South:					
Virginia	16	0	.....	0	.....
Kentucky	2	0	600	1	300
Alabama	41	20	6,340	19	7,040
Tenn., Ga. and Texas	16	3	350	2	300
Total	317	192	81,845	175	77,520

Diagram of Pig Iron Production and Prices

The fluctuations in pig iron production from 1913 to the present time are shown in the accompanying chart. The figures represented by the heavy lines are those of daily average production by months of coke and anthracite iron. The dotted curve on the chart represents monthly average prices of Southern No. 2 foundry pig iron at Cincinnati, local No. 2 foundry iron at furnaces in Chicago, and No. 2X at Philadelphia. They are based on the weekly quotations of THE IRON AGE.



The Full Line Represents the Daily Production of Pig Iron and the Dotted Line Is the Average of the Price Per Ton of No. 2 Southern Pig Iron at Cincinnati, Local No. 2 Iron at Chicago and No. 2X Iron at Philadelphia

Production of Coke and Anthracite Pig Iron in the United States by Months, Beginning Jan. 1, 1918—Gross Tons

	1918	1919	1920	1921	1922
Jan. ...	2,411,768	3,302,260	3,015,181	2,416,292	1,644,951
Feb. ...	2,319,299	2,940,168	2,978,879	1,937,257	1,629,991
Mar. ...	3,213,091	3,090,243	3,375,907	1,595,522	2,035,920
Apr. ...	3,288,211	2,478,218	2,729,797	1,193,041	2,072,114
May ...	3,446,412	2,108,056	2,985,682	1,221,221	2,306,679
June ...	3,323,791	2,114,863	3,043,540	1,064,833	2,361,028
½ year.	18,002,572	16,033,808	18,138,986	9,428,166	12,050,683
July ...	3,420,988	2,428,541	3,067,043	864,555	.....
Aug. ...	3,389,585	2,743,388	3,147,402	954,193	.....
Sept. ...	3,418,270	2,487,965	3,129,223	985,529	.....
Oct. ...	3,486,941	1,863,558	3,292,597	1,246,676	.....
Nov. ...	3,354,074	2,392,350	2,934,908	1,415,481	.....
Dec. ...	3,433,617	2,633,268	2,703,855	1,649,086	.....
Ttl. yr.	*38,506,047	30,582,878	36,414,114	16,543,686	.....

*These totals do not include charcoal pig iron. The 1921 production of this iron was 94,730 tons.

Production of Steel Companies—Gross Tons

Returns from all furnaces of the United States Steel Corporation and the various independent steel companies, as well as from merchant furnaces producing ferromanganese and spiegeleisen, show the following totals of steel making iron, month by month, together with ferromanganese and spiegeleisen. These last, while stated separately, are also included in the columns of "total production."

Production of Steel Companies—Gross Tons

	Total Production			Spiegeleisen and Ferromanganese		
	1920	1921	1922	1920	1921	1922
Jan.	2,232,455	1,932,159	1,306,045	23,957	22,228	6,874
Feb.	2,181,679	1,625,695	1,311,170	28,038	29,013	8,540
Mar.	2,480,668	1,323,443	1,629,982	35,275	41,294	13,695
Apr.	1,968,542	1,015,621	1,707,902	27,628	24,310	19,209
May	2,128,720	1,024,678	1,879,180	33,407	9,232	20,334
June	2,209,770	883,312	1,876,033	34,751	4,536	23,090
July	2,230,567	715,664	.....	36,789	5,524	.....
Aug.	2,254,943	807,144	.....	36,985	3,878	.....
Sept.	2,247,250	815,692	.....	39,546	3,289	.....
Oct.	2,393,644	1,034,312	.....	41,536	3,902	.....
Nov.	2,150,075	1,128,786	.....	26,944	3,525	.....
Dec.	2,047,167	1,276,381	.....	28,023	3,953	.....

Coal Conference in Deadlock

WASHINGTON, July 3.—Adjournment of the bituminous coal conference until next Monday has left for speculation only the result of efforts made, through the offices of the Government, to settle the strike. To all outward signs the operators and miners are deadlocked, the former refusing to accept the suggestion of the miners that a settlement be based upon National agreements, while the miners appear to be strongly opposed to the operators' suggestion that it be based upon district agreements. This has led to reports that one side might find a convenient way out of yielding to the other by accepting a plan proposed by the Government, even if it is not in accordance with the principle that side favors. That a plan for unconditional arbitration at the hands of a Government body has been or will be accepted by both sides has also been reported, but nothing of an official character supported such a report.

Still another report has it that the operators have determined that, before they will yield to the demands of the miners, they will open well-located properties now in union fields and resume operations at an early date as non-union mines prepared to combat any trouble that may develop.

British Iron and Steel Market

Pig Iron Again Shipped to United States—Steel, Prices Sagging—Tin Plate Active—Continental Prices Unchanged

(By Cable)

LONDON, ENGLAND, July 3.

Pig iron presents no fresh feature, but the freight question is now arranged. Shipment of 2000 tons of Cleveland pig iron from Middlesbrough to Baltimore and 2500 tons to New Orleans is being made. The boats are now loading. There is still some American inquiry for foundry iron, but nothing has been done.

Hematite has an easy tendency. There is some inquiry from Germany. There has been good recent buying of ferromanganese for America and there still is some demand.

Steel shows a little more home inquiry and trade is getting better by degrees, but the export market is dull. The works are inclined to cut prices for desirable specifications.

Tin plate has a good market, with general buying, especially by Portugal, Italy and France. The pooling scheme, including all of the South Wales mills, has been approved and comes into force immediately. The market is firmer, in consequence. A big oil-size inquiry for the Far East probably will be placed here shortly. The mills are running now at about 90 per cent of capacity.

Japanese specifications for black sheets are in request, but galvanized sheets are dull and have an easy tendency.

The Newport Monmouthshire Corporation is in the market for 22,000 tons of cast iron pipe.

Clyde shipbuilding output of the past six months has amounted to 61 vessels, aggregating 167,000 tons, against 118 vessels and 236,000 tons for the first half of last year.

Japanese Government railroads have bought 34 electric locomotives from the English Electric Co., Ltd., London.

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $4.42 per £1, as follows:

Durham coke, delivered	£1	7s.		$5.97	
Cleveland No. 1 foundry	4	15		21.00	
Cleveland No. 3 foundry	4	10		19.89	
Cleveland No. 4 foundry	4	7½		19.34	
Cleveland No. 4 forge	4	5		18.79	
Cleveland basic	4	10		19.89	
East Coast mixed	4	14	& £4 13s.*	20.77 &	20.55*
Ferromanganese	15	0		66.20	
Ferromanganese*	14	10	to 14 15	64.09 to	65.20
Rails, 60 lb. and up	7	17½	to 9 10	34.81 to	41.99
Billets	7	0	to 8 0	30.94 to	35.36
Sheet and tin plate bars, Welsh	7	7½		32.60	
Tin plates, base box	0	19½	to 0 20	4.31 to	4.42
				C. per Lb.	
Ship plates	9	0	to 10 0	1.78 to	1.97
Boiler plates	13	0	to 14 0	2.57 to	2.76
Tees	9	5	to 10 10	1.83 to	2.07
Channels	8	10	to 9 15	1.68 to	1.93
Beams	8	5	to 10 0	1.63 to	1.97
Round bars, ¾ to 3 in.	9	5	to 10 0	1.83 to	1.97
Galvanized sheets, 24 g.	15	12½	to 15 15	3.08 to	3.11
Black sheets	12	0		2.37	
Steel hoops	12	0	& 12 5*	2.37 &	2.42*
Cold rolled steel strip, 20 g.	23	2½		4.56	
Cotton ties, Indian specifications	15	0		2.96	

*Export price.

Continental Prices, All F.O.B. Channel Ports, Delivery as Specified

No. 3 foundry pig iron:					
Belgium, July	£4	12½s.	to £4 15s.	$20.45 to	$21.00
Luxemburg, July	4	12½	to 4 15	20.45 to	21.00
France, July	4	12½	to 4 15	20.45 to	21.00
Basic pig iron:					
Luxemburg, July	4	6	to 4 7	19.01 to	19.23
Billets:					
Luxemburg, July	6	5		27.63	
Lorraine, July	6	5		27.63	
Wire rods (Oeg basic):					
Germany, August	0	14½		3.20	
Wire rods, 5 mm. (0.2 in.):					
Belgium, July	7	5		32.05	
Angles:				C. per Lb.	
Belgium, July	7	10	to 7 12½	1.48 to	1.50
Tees					
Belgium, July	8	5		1.63	
Channels:					
Belgium, July	7	10	to 7 12½	1.48 to	1.50
Merchant bars:					
Belgium, July	7	12½	to 8 0	1.54 to	1.58
Luxemb'g, July, Aug.	8	0		1.58	
Germany, July, Aug.	8	0	to 8 7½	1.58 to	1.65
France, July	8	5	to 8 10	1.63 to	1.68
Joists (beams):					
France, July, Aug.	7	7½	to 8 0	1.46 to	1.58
Belgium, July, Aug.	7	7½	to 7 10	1.46 to	1.48
Luxemburg, July	7	15	to 8 0	1.53 to	1.58
Belgium, July	8	2½		1.60	
⅜-in. plates:					
Germany, July, Aug.	9	5		1.83	
Belgium, July	8	0	to 8 2½	1.58 to	1.60
Luxemburg	8	10		1.68	
¼-in. plates:					
Germany	9	0		1.78	
No. 8 gage wire:					
Belgium, July, Aug.	14	10		2.86	

JAPAN STILL BUYING RAILS

Municipalities and Private Railroads Inquire—China Buys Copper—Germany Seeks Scrap

NEW YORK, July 3.—Japan continues to show an increasing interest in purchasing black sheets of light gage. Most exporters to Japan are now handling inquiries totaling 50 or 75 tons up to 1000 or 1500 tons. As a comparison of British and American quotations on black sheets delivered to Japanese ports, an exporter in New York recently obtained a quotation on three inquiries of 70 tons, 50 tons and 30 tons of light gage sheets of $84.70 per ton, c.i.f. Yokohama from an American seller and £16 18s, c. and f. Yokohama (at exchange then prevailing $75.95) from a British seller. Adding 1 per cent to cover insurance on the British shipment their price was about $76.70 per ton, c.i.f. Japan. This difference in price might be discounted somewhat by the fact that the British sheets probably were not one pass cold rolled.

Activity in purchases of rails of all weights, both from Governmental and private sources in Japan, is heavy. One Japanese export house, which has shipped three miles of 30-lb. rails to the Division of Forestry of the Formosan Government is quoting on an additional three miles. A Japanese municipality is asking for prices on about 1500 tons of 82-lb. and 127-lb. grooved rails, Lorain type, and there is an inquiry for 2000 tons of 45-lb. and 60-lb. rails from a privately owned railroad. As a comparison of German and American prices on light rails at present, on a recent inquiry for 12-lb. sections, $45.25 per ton, c.i.f. Yokohama, August-September delivery, was quoted by a German mill against $48.95 per ton, four weeks delivery by an American seller.

The most important railroad construction project planned by the Imperial Government Railways during the coming year, according to the *Trans-Pacific* is the building of the submarine tunnel under Shimonoseki Strait to Kyushu. Another important project is the electrification of the Tokio-Yokohama-Odawara lines and several other suburban lines around Tokio. A freight line is to be built within the year from Sumidagawa freight station to Echujima and the Minister of Railways has granted a charter to the Jomo Electric Tramway Co., to construct a tramway from Mayebashi to Takasaki.

The Chinese market is quiet but still eager to purchase wire shorts. One New York exporter after great difficulty obtained sufficient wire shorts in small lots to fill orders from China totaling 300 tons. There is some interest also in second hand material. There is some copper buying, an inquiry from Shanghai calling for 1000 tons of casting copper, said to be for minting. A small inquiry for grooved rails is being bid upon. The South Manchuria Railway Co. is asking for prices on about 25 tons of soft steel bars.

German copper purchases are still heavy; one buying agent in New York purchased a total of almost 1000 tons last month and may run up to 1500 tons next month. The great majority of these purchases

are in small lots of 75-lb. wire rods with pointed ends. While much of it is being used in Germany some is being re-exported to other European countries.

That Germany would purchase heavily of steel scrap in the United States if sufficiently low prices could be obtained is probable, but thus far no sales are reported to have been made. There is a rumor, however, that a shipment of 19,000 tons of heavy melting steel has been made, which was purchased at $10 per ton, f.a.s. New York. Scrap dealers in this district express considerable doubt that even a low grade of heavy melting steel could have been obtained at this price and point out that the buying office of one German interest has recently offered up to $12 per ton, f.a.s. New York, unsuccessfully. The general scrap shortage throughout Europe is shown in a recent Italian inquiry offering $14 per ton, c.i.f. Italian port.

Belgian pig iron production in April registered a decline from the previous month's figures, being only 113,820 metric tons. The steel ingot production was 90,870 metric tons. The Australian metal industries continue in a difficult situation, says a report of an American trade commissioner. Employers state that the 44-hr. week for 48-hr. pay has crippled the industry, and employees refuse to consent to any reduction in wages or increase in hours of work. The Australian pig iron production which increased from 209,253 tons in 1918 to 352,365 tons in 1921, has practically ceased, because of offerings of pig iron and steel products from overseas at prices with which Australian producers cannot compete.

Brazil Centennial Exposition

The two buildings, which will house the exhibits from the United States at the Brazil Centennial Exposition, Sept. 7, 1922, to March 31, 1923, will cost the United States Government about $1,000,000 and will house exhibits and missions from 29 States and a number of the larger cities, according to Davies, Turner & Co., 29 Pearl Street, New York.

FRENCH PRODUCTION ACTIVE

Buying Dropping Off, But International Competition Not So Severe

PARIS, FRANCE, June 20.

The situation of the French iron and steel market has been improving since the early part of May. This improvement was due partly to a seasonal revival of the structural trades and also to some demands from Germany in semi-finished products and rolled merchant products, but it never assumed large proportions and it seems already to have come to a standstill, after having, however, brought to the producers orders for some months to come. Its influence on prices was very slight, and foundry pig-iron sells even lower now than it did six weeks ago. Of course, so large is the present iron production capacity of France that nothing but the so much hoped for general world revival of trade will put things right again. Meanwhile, the large Lorraine concerns are losing money, as was shown by the report recently submitted to the general meeting of the Knutange iron works.

For the time being, the rise of German prices has lessened the pressure of German iron products on export markets and has permitted Lorraine iron works, such as Knutange, Rombas, Hagondange, etc., to obtain some orders at very low prices, on which they will indeed probably sustain a loss but which will enable them to increase their production. Austrian construction works, for instance, which could not satisfactorily procure pig iron from western Germany, purchased it in the Saar and Lorraine districts.

Iron Ore.—The French production of iron ore in April was 1,379,721 tons, against 1,553,900 tons in March and a pre-war monthly average output of 3,582,000 tons. Stocks, which amounted to 3,911,000 tons at the end of March, have since notably decreased. During the first quarter of 1922, French exports of iron ore totalled 2,104,000 tons (of this 616,000 tons to Germany and 316,000 tons to Belgium).

Pig Iron.—The production of basic pig iron for steelworks is increasing, owing to large orders for semi-finished steel. As regards foundry pig iron, the demand is not important and small stocks exist at blast furnaces. The tendency is rather to restrict the production than to increase it. The current price for chill-cast foundry pig-iron, No. 3 P. L., is 215 to 220 frs., but the price of 210 frs. ($17.85 per metric ton) has been done.

Belgian foundry pig-iron is now worth 230 to 235 frs. (Belgian currency), or 216 to 220 frs. (French currency). Lorraine foundry pig-iron for export is now approximately 235 frs. (French currency) f. o. b. Antwerp. Cleveland pig-iron, No. 3 G. M. B. is now worth 109s c.i.f. Antwerp, or 340 frs. (French currency) at the Franco-Belgian frontier, which, of course, hardly gives it a chance to compete with French pig-iron on inland markets.

Inquiry for hematite pig-iron is very quiet. British competition, notwithstanding the rise of the pound sterling, is still to be reckoned with. An actual offer of British hematite at 315 frs. c.i.f., Havre, is reported. Orders were booked by French producers at 305 to 315 frs. in the East; 295 to 305 frs. in the Northern and Western coast areas (where British hematite most easily penetrates), and 325 to 330 frs. in the Central and Parisian areas.

Semi-finished Steel.—Prices are firm, and producers are well supplied with orders. Last published prices per metric ton for mild steel products are:

	Domestic	Export	Export equivalent
Blooms	320 to 325 fr.	315 to 320 fr.	$26.35 to $27.20
Billets	340 to 350	320 to 330	27.20 to 28.05
Flat bars	350 to 370	350 to 355	29.75 to 30.20

Beams.—The market is moderately active. The base price is 475 frs. (1.80c. per lb.), equivalent to an average of 420 to 430 frs. at producing works.

Rails.—French railroad companies are now preparing extensive orders for rails which they will allocate shortly. The base price is 540 to 550 frs. ($45.90 to $46.75) per ton delivered.

Sheets and Plates.—The home market for sheets is now much better, and the rise of both the British pound and the Belgian franc has tended to check foreign competition. Small orders for plates have been given by French private shipbuilding yards, but the trade is still eagerly awaiting the orders relative to the carrying out of the new French naval program, which were delayed by extensive tests on plates intended for the new large submarines. Base prices of the Comptoir des Toles et Larges Plats are:

Thick sheets	640 frs. (2.40c. per lb.)
Medium sheets	720 frs. (2.78c. per lb.)
Thin Sheets	900 frs. (3.48c. per lb.)

These are for mild steel products, delivered at an averaged distance French consuming center.

Rolled Merchant Products.—The demand has calmed down. However, in May and early June producers booked orders that will carry them into the fall. The current price is 420 to 430 frs. (1.62c. to 1.66c. per lb.), at producers works.

Steel Wire.—The market is moderately active. The current price is 460 to 480 frs. (1.77c. to 1.86c. per lb.), at producers works.

Coke.—The adjusted price of coke to be supplied to French blast-furnaces has been increased from 90 frs. ($7.65 a ton) for June, to 93 frs. ($7.90) for July, at the Franco-German frontier. This is due to a rise of the German home price. French production of coke from collieries' ovens is now at the rate of only 800,000 tons per annum, while it was over 2,500,000 tons before the war.

Pourparlers are now going on between the Italian and French iron and steel trades with a view of entering into an greement for safeguarding the existence of Italian ironworks and avoiding a tariff strife between the nations. French representatives seem quite ready to fall in with the views of their Italian colleagues, provided they be granted the possibility of exporting to Italy some raw products and semi-finished material of such specifications, however, as Italy does not produce herself.

Iron and Steel Markets

NEW UNCERTAINTIES

Fuel Situation Confused—Large Pig Iron Gain in June

Pressure on the Mills Keeps Up—New Chicago Business in Large Volume

The events of the week have brought new uncertainties into the situation, after a month in which output of pig iron and steel were at the highest rate since December, 1920. Hopes of a settlement of the coal strike have not been raised by the first contacts at Washington, and the strike of railroad shop employees temporarily strengthens the will of the miners to remain out. Western Pennsylvania coal loadings showed no increase last week, and meanwhile holiday absences of workers have reduced production.

In the Pittsburgh district a good many rolling mills suspended operations from Saturday to Wednesday, thus adding to the arrearages on their order books.

The June pig iron figures bear out all that was said in that month of the gains being made at blast furnaces. For the 30 days output was 2,361,028 tons, or 78,701 tons per day, against 2,306,679 tons in the 31 days of May, or 74,409 tons per day. The Steel Corporation added five furnaces to its active list in June, the independent steel companies seven and the merchant pig iron producers five. The capacity of the 192 furnaces active on July 1 was 81,845 tons per day, against 77,520 tons per day for 175 furnaces on June 1.

Pig iron production is now at the rate of nearly 30,000,000 tons per year, which is between the rate of December, 1920, and that of January, 1921.

Producers are not attempting to predict the effect of the railroad strike upon transportation. Some slight congestion is reported and the interruption of raw and finished material movement is recognized as a possible factor.

Both coal and coke prices are higher in view of this week's holiday. Little furnace coke can be had at less than $8.50, and $9 has been paid. In the Pittsburgh district the minimum for coal is $4, and Southern coal has advanced 50 cents to $3.75 at mine.

The effect of coal shortage on the operations of consumers of iron and steel is having more consideration. Producers are better provided for than are those who buy from them. Thus far, however, there has been no lessening of the pressure upon steel mills for early deliveries.

Chicago mills in particular have felt this urging. For a large company there last week was one of the heaviest of the year in new business booked.

Greater variations appear in prices of plates, shapes and bars, especially for July and August delivery, in view of advances made by certain independent companies and the course of the Steel Corporation in holding back.

Further sheet bar sales are reported at $35 in the Central West, while the Steel Corporation's third quarter price is $33. On wire rods $40 is the general market, but the leading producer's price is $38.

With 5000 more freight cars bought in the week, the total of nearly 100,000 since January 1 shows a good margin over the six months average of the ten years before the war. It represents a rate of buying nearly three times that of the last five years.

Rail mills have been kept busy, particularly in the West. The Algoma mill at Sault Ste. Marie has a 48,000-ton order from the Canadian Pacific.

Structural steel lettings totaling 24,000 tons for the larger projects and new inquiries for 11,000 tons show no noticeable let up in fabricated steel activity.

Iron puddlers will receive $8.53 per ton in July and August as the result of the bi-monthly wage settlement of last week, an advance of 90 cents. The average price of bar iron in the April 20-June 20 period was 1.604c.

With costs of pig iron rapidly advancing, due principally to high coke, prices are tending upward and at Chicago have advanced 50c. on foundry, malleable and basic grades, while Southern iron has also been marked up at least 50c. The importing of moderate tonnages of foreign iron and contracts for additional amounts are acting as a check on the market. In steel making irons, inquiries in the Pittsburgh district include 7000 tons of basic and 1500 tons of Bessemer. In Philadelphia, a Steel Corporation subsidiary has purchased 10,000 tons of basic. With the reduced freight rates, Southern iron promises to be a more important factor in the Northern market.

The iron ore movement down the Lakes is heavy, June shipments amounting to 6,629,000 tons, or 3,000,000 tons more than in June, 1921. Some large orders for ore are still held back in view of fuel uncertainties.

Pittsburgh

Prices of Independents Inclined to Advance - Steel Corporation Holds Back

PITTSBURGH, July 3.—It is a common thing to hear the present steel situation referred to as a modified repetition of the 1920 condition. Independent company prices in most lines continue to grow stronger, while the Steel Corporation is inclined to hold back. The failure of the Washington coal conference to develop any material change in the attitude of either the operators' or miners' representatives toward settlement terms, coupled with the threat of the transportation difficulties contained in the walkout of the railroad shopmen, has the trade more or less at sea as to what is immediately ahead. Sentiment is not as hopeful as a week ago of an early ending of the coal strike, and there are fears that without the inspection of motive power done in railroad shops, difficulties soon will develop in the movement of materials.

These conditions promote conservatism on the part of the steel mills about further adding to their obligations, except at prices sufficiently high to at least cover costs. This week will result in a further falling behind on the part of the mills in regard to their booking, because outside of the blast furnaces there has been almost complete suspension of operations which began at noon last Saturday and runs over to Wednesday

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	July 3, 1922	June 27, 1922	June 6, 1922	July 5, 1921
No. 2X, Philadelphia‡	$27.65	$27.85	$28.25	$27.50
No. 2, Valley furnace†	24.00	24.00	24.00	21.00
No. 2, Southern, Cin'ti†	**22.55**	22.50	23.00	25.50
No. 2, Birmingham, Ala.†	**18.50**	18.00	18.50	21.00
No. 2 foundry, Chicago*	**24.00**	23.50	23.00	20.00
Basic, del'd, east'rn Pa.	**25.75**	25.00	25.00	23.50
Basic, Valley furnace	25.00	25.00	25.00	20.00
Valley Bessemer, del. P'gh	26.77	26.96	26.96	23.46
Malleable, Chicago*	**24.00**	23.50	23.00	20.00
Malleable, Valley	24.50	24.50	24.50	21.50
Gray forge, Pittsburgh	25.27	25.46	25.46	21.96
L. S. charcoal, Chicago	31.65	32.00	29.00	37.50
Ferromanganese, seaboard	67.50	67.50	67.50	70.00

Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$40.00	$40.00	$40.00	$47.00
Bess. billets, Pittsburgh	35.00	35.00	35.00	33.00
O.-h. billets, Pittsburgh	35.00	35.00	35.00	33.00
O.-h. sheet bars, P'gh	35.00	35.00	35.00	35.00
Forging billets, base, P'gh	40.00	40.00	40.00	38.00
O.-h. billets, Philadelphia	40.17	40.74	40.74	38.74
Wire rods, Pittsburgh	40.00	40.00	38.00	45.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	1.70	1.70	1.70	2.00
Light rails at mill	**1.70**	1.60	1.50	2.20

Finished Iron and Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	1.925	1.96	1.96	2.25
Iron bars, Chicago	**1.80**	1.75	1.70	2.10
Steel bars, Pittsburgh	1.70	1.70	1.70	1.90
Steel bars, Chicago	1.75	1.75	1.75	2.28
Steel bars, New York	2.04	2.08	1.98	2.28
Tank plates, Pittsburgh	1.70	1.70	1.60	1.90
Tank plates, Chicago	1.75	1.75	1.75	2.28
Tank plates, New York	2.04	2.08	1.98	2.28
Beams, Pittsburgh	1.70	1.70	1.60	2.00
Beams, Chicago	1.75	1.75	1.75	2.28
Beams, New York	2.04	2.08	1.98	2.28
Steel hoops, Pittsburgh	**2.50**	2.40	2.40	2.50

Sheets, Nails and Wire, *Per Lb. to Large Buyers*	July 3, 1922 Cents	June 27, 1922 Cents	June 6, 1922 Cents	July 5, 1921 Cents
Sheets, black, No. 28, P'gh	3.15	3.15	3.15	4.15
Sheets, galv., No. 28, P'gh	4.15	4.15	4.15	5.15
Sheets, blue an'l'd, 9 & 10	2.40	2.40	2.40	2.65
Wire nails, Pittsburgh	2.40	2.40	2.40	3.00
Plain wire, Pittsburgh	2.25	2.25	2.25	2.75
Barbed wire, galv., P'gh	3.05	3.05	3.05	3.65
Tin plate, 100-lb. box, P'gh	$4.75	$4.75	$4.75	$5.75

Old Material, Per Gross Ton:				
Carwheels, Chicago	**$18.50**	$18.25	$18.25	$13.25
Carwheels, Philadelphia	17.50	17.50	17.00	18.00
Heavy steel scrap, P'gh	**17.50**	17.00	17.00	12.00
Heavy steel scrap, Phila.	15.00	15.00	15.00	11.00
Heavy steel scrap, Ch'go	**15.00**	14.75	14.50	10.00
No. 1 cast, Pittsburgh	19.00	19.00	18.50	16.00
No. 1 cast, Philadelphia	17.50	19.00	19.00	16.00
No. 1 cast, Ch'go (net ton)	**17.00**	16.50	16.00	12.50
No. 1 RR. wrot, Phila.	17.00	17.00	17.00	13.50
No. 1 RR. wrot, Ch'go (net)	**13.50**	13.25	12.50	9.50

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	**$8.50**	$7.50	$6.50	$2.00
Foundry coke, prompt	**9.00**	8.00	7.00	4.25

Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York	13.75	13.75	14.00	12.75
Electrolytic copper, refinery	13.50	13.50	13.75	12.62½
Zinc, St. Louis	**5.35**	5.27½	5.32½	4.35
Zinc, New York	**5.70**	5.62½	5.67½	4.85
Lead, St. Louis	5.55	5.55	5.50	4.25
Lead, New York	5.75	5.80	5.80	4.40
Tin (Straits), New York		31.00	32.50	29.87½
Antimony (Asiatic), N. Y.	5.00	5.00	5.25	4.75

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, July 3, 1922, Finished Steel, 2.169c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel

June 27, 1922,	2.169c.
June 6, 1922,	2.141c.
July 5, 1921,	2.557c.
10-year pre-war average,	1.689c.

Composite Price, July 3, 1922, Pig Iron, $24.19 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

June 27, 1922,	$24.05
June 6, 1922,	23.79
July 5, 1921,	21.08
10-year pre-war average,	15.72

morning. Demand for bars and shapes still is very insistent and no considerable salesmanship skill is necessary these days to sell pipe. In other lines, however, there has been something of a pause, if not in the buying, at least in the urgency of buyers. That buyers have been holding back specifications until after July 1, to secure the advantage of the lower freight rates, is not verified by the reports of railroads which note no very marked variation from the recent rate of traffic.

The pig iron market has been featured by the appearance of two or three fair sized inquiries for the steel making grades, but with no actual gain in business. Prices are sustained chiefly by high costs, notably of coke, which is costing Valley furnaces at least $10, and in some instances more, delivered. Expectation of an early revival of buying is reflected in a stronger undertone to the scrap market.

Pig Iron.—The N. & G. Taylor Co., Cumberland, Md., is in the market for 5000 tons of basic for delivery over the present quarter, 2000 tons this month, 2000 tons in August and 1000 tons in September; the Edgewater Steel Co. has put out an inquiry for 2000 tons of basic for immediate shipment, and a middle interest has been asking quotations on 1500 tons of standard Bessemer. None of this business yet has been closed. Valley producers generally are quoting $25, furnace, for both basic and Bessemer, and suggestions that the former grade can be bought at $23 are believed to refer to a block of off-grade basic lying at the plant of one of the Youngstown district steel companies. Some of the merchant furnaces have entered reservations for their regular customers on foundry iron for the third quarter, on a basis of $24, Valley furnace, No. 2. The recent inquiry for 500 tons of gray forge iron by a wrought iron pipe manufacturer has been largely placed at $23.50, Valley furnace. The market on malleable iron is not quotable above $24.50, a local consumer who was quoted $25, Valley furnace, against a recent inquiry claiming that he had bought at $25, delivered. W. P. Snyder & Co. report the average price of both basic and Bessemer iron from Valley furnaces in June to have been $25 as compared with the May averages of $24.91 for basic and $24.40 for Bessemer.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.77 per gross ton:

Basic	$25.00
Bessemer	25.00
Gray forge	$23.50 to 24.00
No. 2 foundry	24.00
No. 3 foundry	23.50 to 24.00
Malleable	24.50

Ferroalloys.—Prices of English ferromanganese are inclined to stiffen as a result of the recent heavy purchases prompted by the fear of a high duty in the new tariff. We note one sale of 100 tons for early delivery at $70 c.i.f. Philadelphia and it is reported some of the English producers have advanced the price for August shipments or September deliveries to $72.50, because they are practically sold up against probable production over the next six weeks. The old price of $67.50, however, still is named by most English makers. Very little spiegeleisen is available for early delivery and prices are very firm and likely to advance if the proposed duty on ferromanganese is allowed to stand. This duty of $33.60 would mean a price for ferromanganese of more than $100, and present spiegeleisen prices would be out of line. Interest in other ferroalloys is almost nil.

We quote 78 to 82 per cent ferromanganese, $67.50 c.i.f. Atlantic seaboard for domestic and $67.50 to $70 for August. Average 20 per cent spiegeleisen, $55 furnace; 16 to 19 per cent, $35 furnace; 50 per cent ferrosilicon, domestic, $55 to $60 furnace, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, $41.50; 11 per cent, $44.80; 12 per cent, $48.10; 13 per cent, $52.10; 14 per cent, $55.10; silvery iron, 6 per cent, $30; 7 per cent, $31; 8 per cent, $32.50; 9 per cent, $34.50; 10 per cent, $36.50; 11 per cent, $39; 12 per cent, $40.50. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Structural Material.—There is an unusually wide variation in quotations. Contracts are known to be outstanding at 1.50c. while the Steel Corporation price is supposed to be 1.60c. and independents are at 1.70c., 1.75c. and 1.80c. Only tonnages that are attractive from a mill standpoint, however, can be placed as low as 1.60c., and 1.70c. is the going minimum upon such tonnages as are coming out. Fabricating shops in this district are fairly busy, although the bulk of the orders is for small tonnages. Plain material prices are given on page 55.

Plates.—High costs and the fact that a number of mills cannot be operated profitably at present prices, together with the sold-up condition of mills in operation, account for the strength of the market rather than the demand. New business actually is moderate in this district. Really attractive tonnages can be placed as low as 1.60c., but the inquiries coming out generally are unattractive, and on these 1.70c., Pittsburgh, is minimum. Prices are given on page 55.

Sheets.—The supply situation is tight, because mill booking are sufficient in the case of the American Sheet & Tin Plate Co. to sustain the recent rate of operations of about 90 per cent of capacity right through the present quarter, without additional orders, while orders of the independents represent practically two months' operations at the recent rate of more than 80 per cent. With labor shortages developing and hot weather ahead, the indications are that much business will be unfilled at the end of the quarter. This week's production will be low at all mills because the mills that did not suspend Saturday for the holiday had only a small number of men at work today. All makers of automobile sheets are far behind because few automobile makers were prepared for the business they have taken. The American Sheet & Tin Plate Co. still is quoting automobile body stock at $4.50 base, but cannot ship promptly on new business, while independents are quoting and obtaining $4.75 to $4.85. Premiums of $3 to $5 a ton over regular quotations still are being asked by some independents for early shipments, but only small tonnages are moving at the higher figures. Prices are given on page 55.

Tin Plate.—The market is quiet, although some makers are beginning to get specifications on August and September shipments. On such order for 100,000 boxes recently was placed. The Northwest is reported to have a heavy crop of berries and other small fruit this year and one big can company will ship at least 50,000,000 more cans into that district than were called for on the original orders. The weather is reported favorable for tomatoes, but there has been so much rain that there is doubt about the size of the green corn pack. Uncertainty about the canning crops is what is holding up tin plate business at present. There is no weakening in prices because the present base of $4.75 per base box is claimed to be low enough on today's material and labor costs. This price was quoted when sheet bars and fuel were much cheaper than at present.

Hot-rolled Flats.—Prices have strengthened further since last reports, with 2.50c base Pittsburgh, now the minimum of the independent makers on new business and as high as 2.75c being obtained on the light gages of narrow material, where early shipment is demanded. There has been no formal announcement with regard to prices on these products by the Steel Corporation, but it is reported to be heavily committed and is not a factor as far as early shipments are concerned. Its last formal quotation was 2.25c base. Announcement of the price on cotton ties is waited with much interest. On the basis of 2.50c for hoops, plus the extra of 35c. per 100-lb. for 15/16-in. 19 gage, the price would be about $1.28 per bundle of 45-lb. It is believed that the operating price would be about $1.30.

Wire Rods.—Independents have put the base on common soft rods to $40 Pittsburgh and Youngstown, and this advance has been adopted informally by the American Steel & Wire Co. The former extras of $5 per ton for screw stock rods and of $7 to $10 per ton for high carbon steel are preserved. The new prices are on contracts and more probably would be asked on other business.

We quote No. 5 common basic or Bessemer rods to domestic consumers $40, chain rods $40; screw stock rods, $45; rivet and bolt rods and other rods of that character, $40; high carbon rods, $47 to $50, depending on carbon, per gross ton, f.o.b. Pittsburgh or Youngstown.

Wire Products.—The American Steel & Wire Co. last week reduced the price of woven wire fence $5 per ton and inaugurated fall datings against new purchases. This action was accompanied by a withdrawal of all price guarantees previously in effect. Independent makers have fallen in line, the new discount being 73 per cent off list for car loads to jobbers and 70½ per cent off list on carloads to dealers. Prices of wire products have pretty generally settled to the bases long observed by the American Steel & Wire Co. Independents still are quoting advances over these levels of $2 a ton on all lines except plain wire, but demand is not stout enough to sustain the premiums. Prices are given on page 55.

Semi-Finished Steel.—Reports as to demand vary, but that the edge is off is the prevailing idea, and while prices are firm, this is due more to the influence of costs than because of a pressing demand. In a general way, $35 still is a fair appraisal of prices for billets, sheet bars and slabs. A Youngstown maker has taken considerable business in sheet bars in the East at $37.50, Youngstown, and sales are also reported up to $38, Pittsburgh. On the other hand, a middle interest who recently was appealed to by a maker to find an outlet of 2000 tons for prompt shipment had much difficulty in making the sale at $35. Steel production is still high despite the coal strike and some companies have small supplies over contract requirements. A lake front producer recently had slabs and billets in moderate tonnages for early delivery. Forging billets and blooms are stronger with sales reported as high as $45 mill or about $44, Pittsburgh, and even $48, mill, was paid for a small lot, probably because of a freight advantage to destination enjoyed by the maker. An Allegheny Valley sheet maker is understood to have closed for his third quarter sheet bar requirements with a western Pennsylvania mill at $35, and the Steel Corporation price to regular customers for the present quarter is reported to be $33.

We quote 4 x 4-in. soft Bessemer and open-hearth billets at $35, 2 x 2-in. billets, $35. Bessemer and open-hearth sheet bars, $35; slabs, $35; forging billets, ordinary carbons, $40, all f.o.b. Youngstown or Pittsburgh mills.

Cold-rolled Strips.—The price is unchanged at 4c., base, Pittsburgh, despite the advance of $2 per ton in hot-rolled strips. Premiums for delivery are rare, as the peak of automotive industry activities has been reached and this as well as other consuming industries are covered by contracts against normal third quarter requirements.

Iron and Steel Bars.—While demands for some other lines have diminished, mills still are besieged by buyers for steel bars and deliveries are becoming

more deferred, some makers now being unable to definitely assure shipments until late in September. Little headway will be made toward cutting down obligations this week, as few of the mills in this district will start up before Wednesday and some will be down all this week. If 1.60c. can be done at all, it is against deliveries too far away to interest buyers, most of whom want early shipments. We regard the quotable market as 1.70c. to 1.80c. base, Pittsburgh. Reinforcing bars from new steel command the same price with those rolled from old rails held at 1.60c., iron bars are firm, this being due chiefly to higher costs, through demand is gaining.

We quote steel bars rolled from billets at 1.70c. to 1.80c.; reinforcing bars, rolled from billets, 1.70c. to 1.80c. base; reinforcing bars, rolled from old rails, 1.60c.; refined iron bars, 2.20c. in carloads, f.o.b. mill, Pittsburgh.

Steel Rails.—Light rails rolled from billets now are not available under 1.70c. base, the company recently quoting 1.60c. having gone to 1.70c. since a week ago. The Carnegie Steel Co. and the Cambria Steel Co. are quoting 1.75c. Business is not heavy, but there is a fairly good demand for early tonnages for shipment to coal mines in operation. These rails rolled from old standard sections are held at 1.60c.

We quote 25 to 45-lb. sections, rolled from new steel, 1.70c. to 1.75c. base; rolled from old rails, 1.50c. to 1.60c. base; standard rails, $40 per gross ton mill for Bessemer and open-hearth sections.

Iron and Steel Pipe.—There is no decrease in the insistency of the demand and independent makers of steel pipe are sold ahead on full weight pipe on the average about 10 weeks. The leading interest is quite as heavily committed on those sizes, finding the principal use in house and building construction. Oil and gas line pipe and oil well pipe are in almost as good demand as full weight goods. Wrought iron pipe is in steady demand. Prices are very firm, not only because of the heavy demand and sold up condition of makers, but because costs are high on account of the fuel situation and labor shortages. Discounts are given on page 55.

Cold-Finished Steel Bars and Shafting.—The recently established base of 2.10c., Pittsburgh, for carload lots, is well maintained, but it would be some exaggeration to call the market strong, since buyers usually can find accommodation, even for early delivery, at that price. The demand is good, but supplies appear ample. Ground shafting is unchanged at 2.50c., base, mill, for carload lots.

Nuts and Bolts.—Makers here have a comfortable business, but do not find the demand especially urgent from buyers in this immediate territory. Strength in bars, rods and bolt wire largely explains the firmness of nut and bolt prices here. Discounts are given on page 55.

Rivets.—Leading makers still report the demand to be good and that recent advances in prices in no way are restricting purchases. Prices are unchanged on heavy rivets and on small rivets, 70 and 5 per cent off list is becoming a more general price. Prices and discounts are given on page 55.

Spikes and Track Bolts.—Some makers of track bolts here now are holding to a minimum of $3.25, base, per 100 lb. for track bolts in carload lots, but the recent minimum of $3 still is being named by others, especially in competitive territory. Standard railroad spikes do not find much sale at higher than $2.25, base, per 100 lb. Prices are given on page 55.

Boiler Tubes.—The advances recently announced in seamless steel tubes by the Pittsburgh Steel Products Co. have been followed by other makers, but are not yet very well established, since it is believed consumers were allowed to cover probable requirements fairly well ahead at the previous prices. Steel skelp is short and firm and this is reflected in a stronger trend to lap welded steel tubes. The demand for charcoal iron tubes is helped by the stronger market in steel tubes. Discounts are given on page 55.

Steel Skelp.—Supplies still are extremely limited and 1.70c. now appears to be the minimum on both grooved and sheared material, at least of the independent makers. Some are asking 1.80c. The Steel Corporation is believed to be meeting the requirements of its regular customers at around 1.65c. for sheared and 1.70c. for grooved.

Coke and Coal.—Production has made no further gains since last week; on the contrary, it seems to have slipped back slightly during the past few days and prices have again stiffened. Available supplies of beehive oven coke have dwindled almost to the vanishing point and in anticipation of further decrease this week on account of the holiday, producers have had little trouble in obtaining fully a dollar a ton above the prices of a week ago. Very little furnace grade coke is available today at less than $8.50 and on most sales $9 has been the price. On spot tonnages of foundry grade, anywhere from $9 to $10 has been done in the past few days. On nearby coal the market is at a minimum of $4 per net ton at mines, for either steam or by-product grade, and as high as $5 at mines has been paid for a few small tonnages of nearby lump gas coal. Southern coal, which a week ago ranged from $3.25 to $3.50, now commands from $3.75 to $4 at mines.

Old Material.—Although interest in the market on the part of melters still appears to be passive, there is a plainly stronger undertone to prices of the steel works and blast furnace grades, due to expectations of another buying movement in the near future. A decline in the demand from Youngstown and Canton mills has resulted in no appreciable increase in offerings in this market from the West, nor has a similar development East brought freer offerings from that direction. Some dealers have paid as high as $18 to cover on short sales of heavy melting steel and while the current demand from the mills is light and a few cars have been sold as low as $17, round tonnages do not appear available below $17.50. As high as $20 is said to have been offered for railroad knuckles and couplers. Definite bids of $16.50 for cast iron borings, $18 for heavy breakable cast and of $14 for machine shop turnings have been made without bringing out much material. Cast scrap is less eagerly sought for open-hearth use than recently, but prices are sustained by light supplies. July railroad lists are substantial. It is said that those who bought the June scrap of one line paid a premium to the road to defer demanding shipping instructions until after July 1. A movement is on foot to get the railroads to cut their wrought scrap to 3-ft. lengths, the basis being that this preparation would make the material more readily marketable and mean higher returns to the roads.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows per gross ton:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	$17.50
No. 1 cast, cupola size	$19.00 to 20.00
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	17.00 to 17.50
Compressed sheet steel	15.50 to 16.00
Bundled sheets, sides and ends	14.50 to 15.00
Railroad knuckles and couplers	19.00 to 19.50
Railroad coil and leaf springs	19.00 to 19.50
Low phosphorus standard bloom and billet ends	20.00 to 21.00
Low phosphorus plates and other grades	19.00 to 20.00
Railroad malleable	16.50 to 17.00
Iron car axles	26.00 to 27.00
Locomotive axles, steel	24.00 to 25.00
Steel car axles	17.50 to 18.00
Cast iron wheels	19.00 to 19.50
Rolled steel wheels	19.00 to 19.50
Machine shop turnings	14.00 to 14.50
Sheet bar crop ends	18.50 to 19.00
Heavy steel axle turnings	15.50 to 16.00
Short shoveling turnings	15.50 to 16.00
Heavy breakable cast	18.50 to 19.00
Stove plate	15.00 to 15.50
Cast iron borings	16.00 to 16.50
No. 1 railroad wrought	15.00 to 15.50

The initial statement of the Durant Motors of Canada, Toronto, Ont., covering operations for the two months ending April 30 last, indicates that the company has closed a satisfactory amount of business within the limited period of operation. The plant opened March 1, and in the period of two months total revenue from the sale of cars and parts, with receipts from other operations, amounted to $652,944.

Chicago

Pig Iron Advanced Half Dollar—Strike Expected to End Soon

CHICAGO, July 3.—Although the railroad shopmen have struck and they may be joined by the maintenance of way employees, the signalmen and clerks, they are expected to encounter the vigorous opposition of the Government, inasmuch as they have defied the Railroad Labor Board, a Government bureau. Railroads entering Chicago are moving energetically to replace their striking employees. A number of lines have advertised for shopmen and labor agencies are busy recruiting labor at the Railroad Labor Board wage scales. A typical advertisement by the New York Central points out that the strikers left the service in defiance of the United States Board and it promises sanitary housing with ample police protection at all times. It also quotes the Labor Board as stating that men taking the place of the strikers will not be considered as strike breakers but will be regarded as doing a public good.

In view of the attitude of the Government, it is felt that the railroad strike will be short lived. Efforts at Washington to settle the coal strike have also tended to reassure those whose business outlook has been rendered uncertain by the fuel shortage. Much as government interference in industry is opposed, it is generally felt that emergencies have arisen which demand prompt and decisive action.

There are no new developments in the finished steel market. Demand is still insistent and one large local producer reports last week one of the heaviest in the year in new business booked. Rapidly rising costs due in large part to the coal strike have resulted in another 50c. advance in pig iron. Steel works and blast furnace operations are unchanged.

Pig Iron.—Unabated demand and rising production costs have resulted in another advance of local iron to $24, base furnace, for future delivery and $25, for prompt shipment. While it is true that some melters have been frightened by the coal and transportation strikes, others are sending in repeat orders or are asking furnaces to anticipate shipments against contracts. Conservatism no doubt actuates the policy of most buyers, but the very fact that their orders represent actual needs makes the volume of present demand particularly impressive. Buying of spot iron is especially active. Foundry operations in this territory have reached a high level, the principal limitation on melt being a shortage of labor which is most pronounced among the malleable shops. Recent bookings of furnaces range from carloads up to several thousand tons. A local melter has closed for 1,500 tons of foundry for third quarter delivery and another Chicago user wants 2,000 tons for last half. An Indiana melter is in the market for from 1,000 to 1,200 tons of malleable for August and September shipment and a plow maker wants 300 to 500 tons of foundry for delivery at a Wisconsin plant during third quarter. Although most Southern producers are quoting and booking business at $20 base, Birmingham, foundry can still be bought from one maker at $18 Birmingham, and from at least one other furnace at $19. Thus with the new freight rate of $6 from Birmingham Southern foundry can be laid down in Chicago at $24, or at a parity with the local furnace price. There is a strong probability that the freight from Birmingham will be further reduced, as the Southern Railway has announced a new rate of $4.22 from Birmingham to St. Louis, or nearly $1 less than the rate which would have obtained under the 10 per cent reduction. The Buick Motor Co. has closed for 1,500 tons of silvery for last half requirements at the full Jackson County schedule. A Milwaukee melter is inquiring for 100 tons of low phosphorus for prompt shipment. The Thomas Furnace, Milwaukee, has set no definite date for a resumption of operation, apparently delaying action pending strike developments.

Copper free low phosphorus is quoted at from $34 to $35, Valley. The Wisconsin Steel Works is no longer offering its Sunday make for merchant consumption as it requires its entire output for steel production. Only one of its three furnaces is active at present with a second scheduled to go in about Aug. 15.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$31.65
Northern coke, No. 1, sil. 2.25 to 2.75	$24.50 to 25.50
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	24.00 to 25.00
Northern high phos	24.00 to 25.00
Southern No. 2	24.00 to 26.00
Malleable, not over 2.25 sil	24.00 to 25.00
Basic	24.00 to 25.00
Low phos., Valley furnace, sil. 1 to 2 per cent copper free	34.00 to 35.00
Silvery, sil. 8 per cent	37.29

Ferroalloys.—Ferromanganese for prompt shipment is bringing as high as $72.50 and $75 base seaboard. For September delivery a relatively small amount can still be bought at $67.50 seaboard, but the more general quotation is $70, the duty to be assumed by the buyer in each instance. Spiegeleisen is quiet after considerable buying. Owing to the inactivity of the market it is difficult to ascertain the ruling price on 50 per cent ferrosilicon. On prompt material quotations range from $57.50 to $62.50 delivered and on last half contracts $55 is named.

We quote 78 to 82 per cent ferromanganese, $77.56, delivered; 50 per cent ferrosilicon, $55 to $62.50, delivered; spiegeleisen, 18 to 22 per cent, $46.50 to $47, delivered.

Bars.—Demand for soft steel bars is heavy with prompt material difficult to obtain. Bar iron has again advanced $1 a ton to 1.80c., Chicago, with buying heavy and mills working to the limit of their present possible capacity. Hard steel bars are firm with mills well booked ahead.

Mill prices are: Mild steel bars, 1.75c. to 1.85c., Chicago; common bar iron, 1.80c., Chicago; rail carbon, 1.70c., mill or Chicago.

Jobbers quote 2.48c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 3.40c. for rounds and 3.90c. for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 2.38c. base. Hoops, 3.48c. Bands, 3.23c.

Bolts and Nuts.—Specifications were exceptionally heavy last week, reflecting the desire of buyers to get the benefit of the old discounts. After the heavy buying up to July 1, business is expected to be less active for a time. The ruling discounts are the same as those on page 55, except that they are on a Chicago base.

Jobbers quote structural rivets, 3.10c.; boiler rivets, 3.20c.; machine bolts up to ⅞ x 4 in., 50, 10 and 10 per cent off; larger sizes, 50 and 10 off; carriage bolts up to ⅞ x 6 in., 50 and 5 off; larger sizes, 45 off; hot pressed nuts, squares and hexagons, tapped, $3.25 off; blank nuts, $3.50 off; coach or lag screws, gimlet points, square heads, 60 per cent off; quantity extras are unchanged.

Wire Products.—The leading interest has advanced wire rods to $40 a ton, but has reduced woven wire fencing by increasing the discount 2½ points to 70½ per cent off to consumers and 73 per cent off to jobbers. Demand for nails and plain wire is strong. For mill prices see finished iron and steel, f.o.b. Pittsburgh, page 55.

We quote warehouse prices, f.o.b. Chicago: No. 9 and heavier black annealed wire, $3.10 per 100 lb.; No. 9 and heavier bright basic wire, $3.25 per 100 lb.; common wire nails, $3.25 per 100 lb.; cement coated nails, $2.75 per keg.

Sheets.—The local independent is out of the market and consumers are experiencing difficulty in placing their business with any mill, particularly when third quarter delivery is desired.

Mill quotations are 3.15c. to 3.30c. for No. 28 black, 2.40c. to 2.50c. for No. 10 blue annealed and 4.15c. to 4.30c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote blue annealed, 3.63c.; black, 4.45c.; galvanized, 5.45c.

Structural Material.—Construction activity is in full swing as evidenced by the fact that Chicago building permits in June broke all previous records. Fabricating shops have considerable work ahead, and mills are choked with orders for plain material.

The mill quotation on plain material is 1.75c. to 1.85c., Chicago. Jobbers quote 2.58c. for plain material out of warehouse.

Plates.—Demand is still strong, one of the leading local producers reporting that last week was one of the heaviest in the year in new business booked. Much of this tonnage is coming from railroad carbuilders and is being taken for indefinite delivery with the probability that shipments will be actually made late in the year. The Marland Refining Co., Oklahoma City, Okla., has let 20 small tanks, requiring 600 tons of steel, to the Chicago Bridge & Iron Works.

The mill quotation is 1.75c. to 1.85c., Chicago. Jobbers quote 2.58c. for plates out of stock.

Cast-Iron Pipe.—New municipal work consists largely of small tonnages for smaller cities, the larger municipalities with a few exceptions having covered their needs. Orders from private sources are still large. The market is strong at $37 to $38, Birmingham, for 6-in. and larger. Premiums of $2 to $3 a ton are being obtained for early shipment, as pipe shops are well booked ahead. Freight rates from Birmingham have been reduced 90c. a ton, so that the minimum Chicago delivered price quoted below is lower than that published a week ago. Chicago will soon enter the market for 500 tons, and Lake Forest, Ill., has taken bids on 100 tons. The United States Cast Iron Pipe & Foundry Co. is low bidder on 100 tons for Hammond, Ind.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $49.20 to $50.20; 6-in. and above, $45.20 to $46.20; class A and gas pipe, $3 extra.

Rails and Track Supplies.—Buying of spikes, bolts, tie plates and angle bars is brisk, orders for standard spikes ranging up to 16,000 kegs and for track bolts up to 12,000 kegs.

Standard Bessemer and open-hearth rails, $40; light rails rolled from new steel, 1.75c., f.o.b. makers' mills.
Standard railroad spikes, 2.16c. to 2.25c., Pittsburgh; track bolts with square nuts, 3.16c. to 3.25c., Pittsburgh; tie plates, steel and iron, 1.85c., f.o.b. mill; angle bars, 2.40c., f.o.b. mill.

Steel Castings.—Considerable business has been closed to get the benefit of the discounts effective until July 1. On outstanding quotations on car castings, however, buyers have been given the privilege to close at the old discounts until July 15. The general tone of the market is firm, although there are isolated instances of price cutting.

Reinforcing Bars.—Recent awards include: Kalamazoo, Mich., Vegetable Parchment Co. plant, 750 tons, to Rochester Bridge Co.; University of Minnesota Library Building, 400 tons, to Concrete Steel Co.; Manitowoc, Wis., High School, 175 tons, to Truscon Steel Co.; Mercy Hospital, Oshkosh, Wis., and State Highway Bridge, Ixonia, Wis., 100 tons each, to Corrugated Bar Co.; Speedway and Grandstand, Kansas City, Mo., 500 tons, to Kansas City Structural Steel Co. The Santa Fe Railroad is in the market for 300 tons.

Coke.—The price of $11.25 delivered Chicago switching district named on local by-product foundry coke, July 1, will apply on business taken this month only. Because of the uncertainties of the fuel situation, the ovens are not disposed to commit themselves any farther ahead. A Southern by-product plant is offering foundry coke at $10.50 delivered Chicago.

Old Material.—Demand is growing more active and prices have rather generally advanced 25c. to $1 a ton. It is evident that more consumers than had been expected held up buying until the new freight rates became effective. The recent advances in pig iron and the possibility of delayed shipments from blast furnaces if the coal strike continues are also given as reasons for the resumption in buying. In some quarters, the freight rate reduction was expected to result in an easier market because it would release shipments from outlying points. It appears, however, that the increased supply resulting from lower rates as well as from greater scrap production by manufacturing plants is balanced by increased consumption. A local steel works has closed for a round tonnage of heavy melting at a maximum price of $15.50 per ton delivered, and has also made liberal purchases of special grades, including 10,000 tons of low phosphorus heavy melting steel. All of the low phosphorus grades are in greater demand and have advanced proportionately. This material has been low in comparison with the price of low phosphorus pig iron, which is about $40 delivered, Chicago. Iron mill grades are moving in greater volume as bar iron mills increase their production. There is also a widespread demand for cupola and malleable scrap. Railroad offerings include blind lists issued by the Michigan Central and the Big Four.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton

Iron rails	$18.00 to $18.50
Cast iron car wheels	18.50 to 19.00
Relaying rails	22.50 to 27.50
Rolled or forged steel car wheels	17.50 to 18.00
Steel rails, rerolling	16.00 to 16.50
Steel rails, less than 3 ft	17.00 to 17.50
Heavy melting steel	15.00 to 15.50
Frogs, switches and guards cut apart	15.00 to 15.50
Shoveling steel	14.50 to 15.00
Drop forge flashings	11.50 to 12.00
Hydraulic compressed sheet	12.50 to 13.00
Axle turnings	12.50 to 13.00

Per Net Ton

Iron angles and splice bars	16.50 to 17.00
Steel angle bars	14.50 to 15.00
Iron arch bars and transoms	17.00 to 17.50
Iron car axles	22.50 to 23.00
Steel car axles	15.50 to 16.00
No. 1 busheling	11.50 to 12.00
No. 2 busheling	6.75 to 7.25
Cut forge	13.00 to 13.50
Pipes and flues	10.00 to 10.50
No. 1 railroad wrought	13.50 to 14.00
No. 2 railroad wrought	13.50 to 14.00
Steel knuckles and couplers	15.50 to 16.00
Coil springs	16.00 to 16.50
No. 1 machinery cast	17.00 to 17.50
No. 1 railroad cast	16.00 to 16.50
Low phos. punchings	15.00 to 15.50
Locomotive tires, smooth	13.00 to 13.50
Machine shop turnings	8.50 to 9.00
Cast borings	11.00 to 11.50
Stove plate	14.50 to 15.00
Grate bars	13.50 to 14.00
Brake shoes	13.50 to 14.00
Railroad malleable	15.50 to 16.00
Agricultural malleable	15.50 to 16.00

Railroad Equipment Business

Car purchases which came to light for the past week total 5000, a substantial addition was made to the car business under inquiry and activity marked the negotiations in locomotives.

The Western Pacific has ordered 2000 refrigerator cars from the American Car & Foundry Co. The Norfolk & Western will place orders this week for 2000 70-ton steel hopper cars and 1000 box cars.

The Nashville, Chattanooga & St. Louis Railroad has increased the number of cars for which it is inquiring from 750 to 1000, its revised inquiry calling for 750 cars, 150 stock and 100 flat cars. It is also in the market for 17 passenger service cars.

The Chicago Great Western has distributed repairs on 527 box cars as follows: 154 to Sheffield Car & Equipment Co., 173 to Siems-Stembel Co., 200 to Pullman Co.

The Chicago, Milwaukee & St. Paul is inquiring for 700 underframes.

The Pere Marquette is in the market for 1000 box car repairs.

The Chicago & Eastern Illinois is inquiring for 15 baggage cars and the Santa Fe for 8 buffet cars.

The Boston & Maine Railroad has made preliminary plans for the purchase of 22 type 0-8-0 switching locomotives, two type 0-8-8-0 Mallet switching locomotives, 65 steel passenger coaches, 20 steel smoking cars, 8 steel baggage-smoking cars, 5 steel baggage and mail cars and 25 milk cars.

The New York, Chicago & St. Louis has ordered 14 locomotives from the Lima Locomotive Works.

The Southern has bought 15 Mikado type engines from the American Locomotive Co., and is also in the market for 15 Pacific type locomotives.

The Chicago & Eastern Illinois has placed 10 Mikado type engines with the American company and is about to order 6 Pacific type.

The Milwaukee Rolling Mill Co., Milwaukee, manufacturing blue annealed and black sheets, is reported to have under consideration tentative plans for the enlargement of the plant, completed about 18 months ago. This has been in operation 24 hr. a day for nearly a year past. Details of the proposed extensions are not available as yet. Boyd B. Jack is general manager.

New York

Coke Situation More Serious—Some Foreign Pig Iron Coming In

NEW YORK, July 3.

Pig Iron.—The scarcity of high silicon irons is becoming more pronounced, owing to the increased cost of coke and the difficulty of obtaining coke supplies, and one company which is selling on a basis of $25.50 eastern Pennsylvania furnace for No. 2 plain and $26.50 for No. 2 X, would sell No. IX at $27.50, but is not seeking orders in the high silicon irons. During the past week more has been heard in regard to foreign iron. A sale of 100 tons of Scotch was made to an up-State furnace at about $25.50, New York. At Baltimore, 500 tons of Middlesbrough was delivered and about 2000 tons more is on the way, the price being about $24.50, Baltimore. No important sales have been made during the past week and the market has been very quiet. This is attributed to a large extent to the holidays. Alabama iron can be bought at $18.50, Birmingham.

We quote delivered in the New York district as follows, having added to furnace prices $2.27 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$28.77 to $29.77
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	27.77 to 28.77
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	26.77 to 27.77
Buffalo, sil. 1.75 to 2.25	28.91 to 29.41
No. 2 Virginia, sil. 1.75 to 2.25	29.44

Ferroalloys.—Demand for ferromanganese has declined. There is some inquiry for August shipment of British alloy, but not much desire on the part of consumers to place orders because of the possible tariff. It is evident that July shipments of the British alloy have been sold up and there is no evidence that consumers are not covered for immediate needs. Quotations are unchanged except for such lots of prompt or July shipments as are available, for which $70, seaboard, is easily obtained. The spiegeleisen market is quiet at unchanged prices and there are no developments in the 50 per cent ferrosilicon or the ferrochromium markets, except that specifications on contracts are heavy. Quotations are as follows:

Ferromanganese, domestic, seaboard, per ton	$67.50
Ferromanganese, British, seaboard, per ton	$67.50
Spiegeleisen, 20 per cent	$36.00
Ferrosilicon, 50 per cent, delivered, per ton,	$55.00 to $60.00
Ferrotungsten, per lb. of contained metal	40c. to 50c.
Ferrochromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr., delivered	12c. to 14c.
Ferrovanadium, per lb. of contained vanadium,	$3.00 to $3.50
Ferrocarbontitanium, 15 to 18 per cent, 1 ton to carloads, per ton	$200.00

Ores.

Manganese ore, foreign, per unit, seaboard	25c. to 26c.
Tungsten ore, per unit, 60 per cent concentrates, nominal	$3.00 up
Chrome ore, basis 48 per cent Cr_2O_3, crude, per unit, Atlantic seaboard	40c. to 45c.
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	40c. to 45c.

Finished Iron and Steel.—Bids submitted to the New York Central Railroad last week on 3000 tons of plates, shapes and bars for its third quarter requirements probably indicate the minimum at which the various bidders are now willing to accept business even from such a preferential customer as a large railroad system. The Carnegie Steel Co. bid 1.705c., base Youngstown, on all three items; the Illinois Steel Co. bid 1.755c., Chicago; the Inland Steel Co., 2c., mill, on plates and shapes. The Lackawanna Steel Co. bid 1.86c., West Seneca, N. Y., equivalent to 1.80c. at its mill; the Bethlehem Steel Co.'s bid was 2.02c., base, delivered at Newberry Junction, Pa., for all three items. Bids were also submitted on wire nails and staples, billets, axles and tires. The Cambria Steel Co.'s bid of 2.50c. per lb. base, Pittsburgh, on wire nails was the highest. The Jones & Laughlin Steel Co. bid 2.40c., Youngstown, while the American Steel & Wire Co. bid 2.40c., Farrell, Pa., or Cleveland. The Pittsburgh Steel Co.'s price was 2.502c., Youngstown. On billets, forging quality, the Cambria Steel Co. quoted $40, Pittsburgh; Donner Steel Co., $41, Buffalo; Lackawanna Steel Co., $40, West Seneca, N. Y., and Wheeling Steel Products Co., $39, Portsmouth, Ohio, all of which were base prices to which usual extras were added. On tires there were two bids of 5c. per lb., one for delivery at Newberry Junction, Pa., and the other f.o.b. Youngstown, while 5.20c. per lb., Pittsburgh, and 5.65c. per lb., Youngstown, were also bid. Fresh developments in the local steel market during the past week have been few, the three-day holiday, which was quite generally observed, having tended to hold back business. At least the holiday was credited as partly the cause for the quiet condition of the market, though there has been little business of any important character for the past two weeks. The uncertainty due to the coal and coke situation, on top of which now comes the strike of railroad shopmen, has apparently placed consumers in a quandary as to what buying policy to pursue. Indications are that most of them have decided to buy very cautiously for the present. Prices are strong, several companies now quoting 1.80c., Pittsburgh, on plates, shapes and bars, though purchases are being made at $2 a ton under these prices. Only in cases where buyers are willing to pay a premium for prompt delivery or where the tonnages are small has 1.80c. been obtained. One Eastern plate mill has advanced from 1.60c. to 1.70c. and an Eastern mill rolling shapes has made the same advance. An outstanding inquiry is for 7500 tons of semi-finished steel from a Buffalo maker of bolts, nuts and rivets.

We quote for mill shipments, New York, as follows: Soft steel bars and structural shapes, 2.04c.; bar iron, 1.94c., and steel plates, 1.94c. to 2.04c. On export shipments the freight rate from Pittsburgh to New York is 28.5c. per 100 lb., while the domestic rate is 34c.

High Speed Steel.—The market shows a distinct improvement, but buying is still from hand to mouth. Lumping sales of high speed and high carbon steels together June has been as satisfactory a month as any this year with most producers. The market is unchanged at about 75c. per lb. for 18 per cent tungsten high speed steel with special brands of some companies bringing up to 95c. per lb.

Cast-Iron Pipe.—Foundries in this district are unable to make better than two to three months deliveries. The demand is heavy from private sources for all sizes of pipe, but the scarcity is particularly severe in the smaller sizes, ranging from 6-in. to 12-in. Increased cost of coke and pig iron has caused makers in this district to advance prices $2.50 per ton. The Department of Water Supply, Gas & Electricity, New York, will open bids July 8, on 6100 tons of 6-in., 8-in., 12-in. and 20-in. pipe. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $53.30; 4-in. and 5-in., $58.00; 3-in., $68.30, with $4 additional for Class A and gas pipe.

Warehouse Business.—With the exception of black and galvanized sheets, prices are exceedingly stiff and there is a feeling that an upward revision may be made within the next ten days or two weeks. Despite strong efforts on the part of many warehouses to hold prices on black and galvanized sheets to the established schedule of 4.35c. and 5.35c. per lb., respectively, shading is prevalent and sellers in New York are reported to have quoted as low as 4c. and 5c. per lb. delivered to consumers through Connecticut or about 3.90c. and 4.90c. per lb. base, New York on black and galvanized. June is generally conceded to have been the best month this year by iron and steel warehouses, dealers in wrought iron and steel pipe and others. The brass and copper warehouses also report an improvement for June, despite a decided decline in business during the past two weeks. We quote prices on page 68.

Coke.—Preceding the holidays, beginning last Saturday, the coke market was very active, as consumers, fearing a reduction in output on account of the holidays, were pressing for deliveries and were trying to make purchases. It was, however, very difficult to obtain high grade coke and both furnace and foundry grades were quoted at $8.50 to $9.50, while the price of by-product was advanced 50c. to $10.50 and was being sold only to regular customers. Conditions were not improved early this week.

Old Material.—Prices are firmer and considering the holidays the market has been fairly active. Wierton, Monessen, Jones & Laughlin, Alan Wood and Bethlehem are buying. Cast scrap is strong. Stove plate is now quotable up to $10.50 to $11.00 per ton. The acute shortage of scrap of all kinds in Europe may lead to purchase in this market eventually. One buying office

of a German interest is reported to have offered up to as high as $12.00 per ton, f.a.s. New York, but unsuccessfully, while inquiries have been received from Italy offering $14.00 per ton, c.i.f. Italian port.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$9.00 to $10.00
Steel rails, short lengths, or equivalent	11.00 to 11.50
Rerolling rails	11.00 to 11.50
Relaying rails, nominal	27.00 to 28.00
Steel car axles	16.00 to 17.00
Iron car axles	25.00 to 26.00
No. 1 railroad wrought	12.50 to 13.00
Wrought iron track	11.00 to 11.50
Forge fire	8.00 to 8.50
No. 1 yard wrought, long	10.50 to 11.00
Cast borings (clean)	9.00 to 10.00
Machine-shop turnings	9.00 to 10.00
Mixed borings and turnings	9.00 to 10.00
Iron and steel pipe (1 in. diam., not under 2 ft. long)	8.00 to 8.50
Stove plate	10.00 to 11.00
Locomotive grate bars	11.50 to 12.00
Malleable cast (railroad)	10.00 to 10.50
Cast-iron car wheels	13.00 to 13.50

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$18.00 to $19.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	16.50 to 17.00
No. 1 heavy cast, not cupola size	13.00 to 13.50
No. 2 cast (radiators, cast boilers, etc.)	12.00 to 12.50

Boston

BOSTON, July 3.

Pig Iron.—Sales of domestic iron the past week were confined to car lots of Buffalo at $25, furnace base, eastern Pennsylvania at $25 and $26 base, western Pennsylvania at $26 base, Virginia at $25 base, and Alabama at $18.50 base. The aggregate tonnage is unimportant. Buffalo iron at $23 is a thing of the past, while a northwestern Pennsylvania furnace with a freight of $6.58, advanced its price from $23 to $24 base and withdrew from the market. Eastern Pennsylvania furnaces quite generally are making $1 differentials in silicons. The domestic iron situation, barring Alabama, therefore is stronger, although not active. Brokers show considerable and the foundry trade little interest in foreign irons. A Taunton, Mass., stove maker bought 500 tons of Scotch iron equivalent to our No. IX at a price well below those quoted on domestic grades, but no other sales were reported for the past week. One steamer brought in 1000 tons of Scotch iron "to order" the past week as reported in THE IRON AGE and 500 tons consigned to Philadelphia. Scotch, silicon 2 to 2.75, is offered at about $26 to $26.50 landed Boston; English, silicon 2 to 2.50, at about $26; and French, silicon 2.50 to 3.50 at about $22.50 to $23. The only inquiry in the market of any size is one for 500 tons No. IX, third quarter delivery, from a Connecticut foundry.

We quote delivered at common New England points as follows, having added to furnace prices $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia and $9.60 from Alabama:

East. Penn., sil. 2.25 to 2.75	$29.15 to $30.65
East. Penn., sil. 1.75 to 2.25	28.65 to 29.65
Buffalo, sil. 2.25 to 2.75	30.41
Buffalo, sil. 1.75 to 2.25	29.91
Virginia, sil. 2.25 to 2.75	31.42
Virginia, sil. 1.75 to 2.25	30.92
Alabama, sil. 2.25 to 2.75	28.60 to 30.10
Alabama, sil. 1.75 to 2.25	28.10 to 29.60

Warehouse Business.—Early in the week the movement of iron and steel out of Boston stocks was fairly brisk, but business tapered off in the last few days, presumably because a very large percentage of the New England metal working plants were closed from Saturday to July 5. Notwithstanding the reduction in freight rates, there is common talk of still higher prices on bars, shapes, plates and sheets within the near future. Buying of bolts and nuts is on a fairly satisfactory scale, while wire products, aside from nails, have little call. Horseshoes are selling better than they were a month back.

Jobbers quote: Soft steel bars, $2.60½ per 100 lb. base; flats, $3.25½; concrete bars, $2.75 to $2.88; structural steel, $2.60½ to $2.70½; tire steel, $4 to $4.35; open-hearth spring steel, $4.50 to $6; crucible spring steel, $11.50; steel bands, $3.50; hoop steel, $4; cold rolled steel, $3.30 to $3.80; refined iron, $2.60½; best refined iron, $4.25; Wayne iron, $5.50; Norway iron, $6 to $6.50; plates, $2.70½ to $2.87½; No. 10 blue annealed sheets, $3.40½ to $3.63 per 100 lb. base; No. 28 black sheets, $4.90; No. 28 galvanized sheets, $5.90.

Coke.—Both the New England Coal & Coke Co., Boston, and the Providence Gas Co., Providence, R. I., have announced a further advance in prices on by-product foundry coke. This time spot fuel is advanced from $13 to $14.50, and contract from $12 to $13.50, delivered. The Boston concern also advanced its price on foundry coke to be delivered outside New England from $10 to $12, ovens. Both producers are now out of the market on contract coke, but previous to this announcement the New England Coal & Coke Co. booked a considerable tonnage for last half delivery at prices ruling date of shipment. Its decision to withdraw from the contract market is based on the uncertainty of the transportation and coal situation, and not because the capacity of ovens has been reached. Against the further advance in fuel is a reduction in the freight rate allowed on delivered prices. Heretofore delivered prices involved freight not exceeding $3.40 a ton. Today the allowance is $3.10, a reduction of a little less than 10 per cent.

Old Material.—A fairly good business in mixed borings and turnings for shipment to eastern Pennsylvania mills was put through by brokers the past week. In a few instances $8.75 f.o.b. shipping point was paid for shoveling material, but where bushings are involved, dealers will not pay more than $8 or $8.10. A few car lots of bundled skeleton were purchased by eastern Pennsylvania mills, while cotton ties were taken for New England delivery at $7.10 shipping point. Stove plate is quoted at 50c. a ton higher, but comparatively little is moving. Heavy melting steel is sentimentally firmer, but consumers have continued to hold off pending a reduction in freights. Most of the new business put through recently was made on contracts which provided for the buyer securing the benefit of reduced freights. Rates on scrap to Lebanon, Pa., are now $4.41, contrasted with $4.90 heretofore; to Johnstown, Pa., $5.25½, as against $5.84; to West Virginia points $5.52½, compared with $6.14 heretofore, and to other points proportionately lower. Delivered prices on machinery cast, insofar as applied to New England points, apparently have not been influenced by the reduction in freight rates.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$19.00 to $20.00
No. 2 machinery cast	17.00 to 18.00
Stove plate	14.00 to 14.50
Railroad malleable	15.00 to 15.50
Street car wheels	18.00 to 19.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$10.50 to $11.00
No. 1 railroad wrought	11.50 to 12.00
No. 1 yard wrought	10.00 to 10.50
Wrought pipe (1 in. in diam., over 2 ft. long)	8.00 to 8.50
Machine shop turnings	8.00 to 8.50
Cast iron borings, rolling mill	8.50 to 9.00
Cast iron borings, chemical	10.50 to 11.00
Blast furnace borings and turnings	8.00 to 8.50
Forged scrap and bundled skeleton	8.00 to 8.50
Street car axles and shafting	14.50 to 15.00
Rerolling rails	11.00 to 11.50

Birmingham

BIRMINGHAM, ALA., July 3.

Pig Iron.—Following booking of about 40,000 tons for the leading pipe interests by two or three makers and acknowledged bookings of 50,000 tons in June by the Sloss-Sheffield Steel & Iron Co., July entered under an apparently strong head toward $20 iron all around. The lion's share of the June business, it is admitted, was done on the $18.50 base, but the makers holding for $20 also made bookings of considerable tonnage over a scattered territory. Philadelphia took two lots of 100 and 500 tons at $20. A disconcerting factor was the quotation of $18, Birmingham base, by a Tennessee furnace just resuming and desirous of tonnage. An interesting sale was 3000 tons in Boston territory at base of $18.50 and $19. The mass of June business was done in St. Louis and Chicago territory, rail and water, iron from northern Alabama being conspicuous. The Tennessee company resumed at No. 1 furnace in Bessemer on foundry last week, but will change to ferromanganese on arrival of Brazilian ore now on the way up the Warrior River and will probably operate on ferromanganese until the 30,000 tons of ore are converted. The Republic Iron & Steel Co. is getting its third stack at Thomas in Birmingham prepared to operate. It is

thought it may go in about July 15. The stack of Central Coal & Iron Co. at Holt will be ready to resume toward the end of the month. On July 1 there were 21 active stacks in Alabama, 13 on foundry and 8 on basic.

We quote per gross ton f.o.b. Birmingham district furnace:

Foundry, silicon 1.75 to 2.25	$18.50 to $20.00
Basic	18.50 to 19.50
Charcoal, warm blast	30.00 to 32.00

Finishing Mills.—Steel works will resume July 5 the Tennessee company continuing double turn at practically all mills with 100 per cent ingot production. The Gulf States Steel Co., American Steel & Wire Co., Conners Steel Co. and structural steel works are on or near full turn. Shipments out of Mobile last week included 200 tons of steel hoops and 250 tons of fence wire for Buenos Aires, 100 tons of fence wire for Montevideo and 50 tons of fence wire for Neuvitas, Cuba. Northern mills are not accepting new business in sheets and pipe.

Cast Iron Pipe.—Belated brokers have offered $60 and $65 for prompt shipment of sanitary pipe and some bookings have been made at these prices. Larger makers say their base is still $55. Shops are on full turn. Ten per cent wage advances have been made. Pressure pipe bookings include 400 tons of universal pipe for Detroit by the Central Foundry Co. and numbers of orders from southwestern points by Birmingham shops. Delivery is the burning question. Base is firm at $37.

Coal and Coke.—Coal production week ending June 24 was 360,000 tons, largest in five years. All mines are on full turn. Extra business incident to strike is from 65,000 to 80,000 tons a week. Base is $2.25 to $2.50 Pratt seam for spot deliveries. Iron Mountain and Rock Island have entered the market. Coke is firm at $5.50 to $6. Sloss-Sheffield Steel & Iron Co. is reducing the coke pile at its by-product plant at the rate of 1000 tons a day.

Old Material.—The scrap market is stronger than in several months and stocks on yards have been depleted. Cast scrap is now bringing $15 to $16.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Steel rails	$13.00 to $15.00
No. 1 steel	12.00 to 14.00
No. 1 cast	15.00 to 16.00
Car wheels	14.00 to 15.00
Tramcar wheels	13.00 to 14.00
Stove plate	13.00 to 14.00
Cast iron borings	6.00 to 7.00
Machine shop turnings	4.00 to 5.00

Buffalo

BUFFALO, July 3.

Pig Iron.—While No. 2 plain iron can still be purchased for $24 in some quarters, there is a stiffening apparent and $25 has been the consideration in several transactions. Only one seller has booked any considerable tonnage and 5000 tons of new business represents the total volume by this interest for the week. M. A. Hanna & Co., who operate the Buffalo Union Furnace Co., have put another furnace in blast. Inquiry has been good with all the selling factors and with several the situation is that they cannot consider third quarter business because of the amount of tonnage booked and are not ready to commit themselves on fourth quarter requests. There is no change in the fuel situation but July operation is assured on the same basis as has existed since the inception of the strike.

We quote f.o.b. per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$25.00
No. 2X foundry, 2.25 to 2.75 sil.	24.50
No. 2 plain, 1.75 to 2.25 sil.	24.00
Basic	24.00
[illegible]	[illegible]
[illegible]	[illegible]

Warehouse Business.—Sheets are in better demand than other products and this is assumed to be due to the stringency with the mills. Prices on bolts have been advanced by mills, but the raise has not been passed along by warehouses as yet. No rush of orders appeared on account of the railroad labor unrest—a direct contrast to the situation at the time of the last threatened trouble.

Finished Iron and Steel.—None of the local selling agencies is in any better position in the matter of accepting business. One steel interest, manufacturing a line of specialties and which has its full complement of open hearths in operation, is able to use more steel than it produces and is in the market for billets. Some of the sellers report a heavier demand on bars, but the leaders in the selling field in this product are entirely unable to take the business. One agency is able to take only certain sizes in plates—⅜ in. and heavier and shapes only where rolling schedules permit. Tin plate is quiet and buyers are between seasons. An independent interest is taking orders on black sheets freely, but unable to consider offers of tonnage in galvanized or blue annealed. An inquiry for 8000 tons of plates, 1400 tons of shapes and 600 tons of bars is expected in the market if the efforts of a car company are successful in obtaining a contract for the repair of D., L. & W. cars. The Buffalo Structural Steel Co. is low bidder on 350 tons of shapes on the new Hurst Building, Buffalo, but the contract has not been let.

We quote warehouse prices, f.o.b. Buffalo, as follows: Structural shapes, 2.65c.; plates, 2.65c.; soft steel bars, 2.55c.; hoops, 3.30c.; bands, 3.15c.; blue annealed sheets, No. 10, 3.55c.; galvanized steel sheets, No. 28, 5.40c.; black sheets, No. 28, 4.40c.; cold-rolled strip steel, 6.05c.; cold-rolled round shafting, 3.35c.

Old Material.—Mills are showing more interest and there is a tendency on the part of dealers to hold heavy melting steel for better prices. Demand from outside the district for cast iron borings and car wheels has stiffened prices on those products.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$16.75 to $17.00
Low phos., 0.04 and under	18.00 to 19.00
No. 1 railroad wrought	16.00 to 16.50
Car wheels	17.00 to 18.00
Machine shop turnings	10.50 to 11.00
Cast iron borings	12.50 to 13.00
Heavy axle turnings	14.00 to 14.50
Grate bars	14.00 to 14.50
No. 1 busheling	15.00 to 15.50
Stove plate	15.00 to 15.50
Bundled sheet stampings	11.50 to 12.00
No. 1 machinery cast	18.00 to 18.50
Hydraulic compressed	15.00 to 15.50
Railroad malleable	17.00 to 17.50

St. Louis

ST. LOUIS, July 3.

Pig Iron.—The market for pig iron continues strong with prices unchanged for either Northern or Southern makes. Buying, however, has not been so heavy, the only sales of consequence being made by a Sheffield producer, whose quotation of $18.50 Birmingham, while other makers of Southern iron are quoting up to $20, Birmingham, is the attraction, indicating that price is considerable of a factor. The Sheffield maker's sales amounted to 2500 tons, which was in lots of from 35 to 200 tons, mostly to stove manufacturers. The St. Louis Federal Reserve Bank report shows that the melt of pig iron and scrap in the district increased approximately 8¾ per cent in May over the April level. The St. Louis bank review also states that seven leading stove manufacturers report sales in May 10 per cent to 115 per cent larger than for May, 1921, and 10 to 60 per cent more than in April, 1922. Five farm implement manufacturers and distributors reported to the bank that their May sales were from 6 to 82½ per cent larger than in April.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago and $5.17 from Birmingham and 81 cents average switching charge from Granite City:

Northern foundry, sil. 1.75 to 2.25 (third quar.)	$26.56
Northern malleable, sil. 1.75 to 2.25 (third quar.)	26.56
Basic (third quar.)	26.56
Southern foundry, all rail, sil. 1.75 to [illegible]	$23.67 to 24.67
Southern foundry, water and rail, sil. 1.75 to 2.25, f.o.b. St. Louis	22.74

Finished Iron and Steel.—Structural steel fabricators report specifications received in May the heaviest in any month, the reports of the St. Louis Federal Reserve Bank say. June business continues also to be

good, although St. Louis contracts are for the most part small ones. Fabricators, however, continue to buy on a more or less hand to mouth basis, and have not yet begun to consider their fall requirements. Mills are well sold up, and the coal strike adds to the difficulties of placing business. James Stewart & Co. are the lowest bidders on the contract for the Government hospital to be built at Jefferson Barracks, involving about 400 tons of reinforcing bars, and a small amount of structural steel.

For stock out of warehouse we quote: Soft steel bars, 2.57½c. per lb.; iron bars, 2.57½c.; structural shapes, 2.67½c.; tank plates, 2.67½c.; No. 10 blue annealed sheets, 3.72½c.; No. 28 black sheets, cold rolled, one pass, 4.45c.; cold drawn rounds, shafting and screw stock, 3.50c.; structural rivets, $3.19½ per 100 lb.; boiler rivets, $3.29½; tank rivets, 7/16 in. and smaller, 60 per cent off list; machine bolts, large, 50 and 10 per cent; small, 50-10 and 10 per cent; carriage bolts, large, 55-5 per cent; small, 60 and 10 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon blank, $3.50; and tapped, $3.25 off list.

Coke.—The substitution of coke for coal increases as the coal strike continues. Buying has been heavy, and it is expected that there will be considerable additional business placed with the decline in freight rates. The market for Connellsville coke is at $8.00 to $8.25.

Old Material.—The market for old material continues firm. Buyers are expected to enter the market as soon as the railroad situation improves. Special steel grades are strong, and large short interests exist in these grades. Melting rails and foundry grades are in good demand. Rolling mill and ordinary steel grades are quiet.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton

Old iron rails	$16.75 to $17.25
Steel rails, rerolling	14.25 to 14.75
Steel rails, less than 3 ft.	15.00 to 15.50
Relaying rails, standard section	25.00 to 28.00
Cast iron car wheels	15.25 to 15.75
No. 1 heavy railroad melting steel	14.00 to 14.50
No. 1 heavy shoveling steel	13.00 to 13.50
Ordinary shoveling steel	12.50 to 13.00
Frogs, switches and guards, cut apart	14.00 to 14.50

Per Net Ton

Heavy axle and tire turnings	9.50 to 10.00
Steel angle bars	13.00 to 13.50
Iron car axles	23.00 to 23.50
Steel car axles	17.00 to 17.50
Wrought iron bars and transoms	18.50 to 19.00
No. 1 railroad wrought	12.75 to 13.00
No. 2 railroad wrought	11.75 to 12.25
Railroad springs	15.25 to 15.75
Steel couplers and knucklers	15.25 to 15.75
Cast iron borings	9.00 to 9.50
No. 1 busheling	11.00 to 11.50
No. 1 railroad cast	11.50 to 16.00
Stove plate and light cast	12.75 to 13.25
Railroad malleable	12.50 to 13.00
Pipe and flues	7.75 to 8.25
Machine shop turnings	8.50 to 9.00

Philadelphia

Quiet Week Due Largely to Strike Uncertainties—Costs Advancing

PHILADELPHIA, July 3.

Facing costs which will be higher in July than they were in June, steel and pig iron producers are making every effort to obtain a sufficient price to minimize losses or eke out a small profit. Despite the large volume of business during the past two or three months, some of the independent steel companies have not shown a profit on the first half's operation, nor even on the past two months. One independent company in figuring its July costs found that out of about 60 items of all kinds bought for its blast furnaces, only three or four had not advanced in price within the past month. Mounting fuel costs are the largest single element in iron and steel manufacture, coke costing about $11 a ton at eastern furnaces, or about $13.75 per ton of foundry iron. Based on to-day's prices, foundry pig iron is costing as high as $26 a ton to produce at some eastern Pennsylvania furnaces and even under the most favorable operating and raw material conditions, it is asserted that this manufacturing cost will not be shaded very much during July unless a settlement of the coal strike should bring lower fuel costs. Blast furnaces are still shipping $19 and $20 iron, which brings their average down and adds to their losses.

In both the steel and pig iron trade, the past week has been marked by extreme quiet, a situation due in part to the holidays, but more largely to the increased uncertainty with regard to the coal and railroad strikes. Sellers are quite as anxious to be cautious in selling as buyers are in buying. Resumption of active buying is not looked for until the strike clouds have cleared away, permitting the trade generally to plan for the future with more assurance.

Pig Iron.—Another quiet week in the eastern pig iron trade has brought no material change in the situation, which, as it stands, leaves both producers and consumers without reliable guidance in planning for the future. A great deal of third quarter buying, it is known, must still be done, but consumers apparently prefer to worry along with the iron they already have in sight, picking up spot carloads when necessary, rather than try to anticipate what may happen when the coal and railroad strikes shall have been settled. Pig iron costs are mounting, as referred to in a paragraph above, which induces conservatism in selling as well as in buying. Domestic producers of iron are not anxious to see prices go higher, as they fear further importation of foreign iron, which already is largely dominating the spot market. Nearly all of the local merchants in seeking supplies to meet urgent requirements of their customers have bought some foreign iron because furnaces here are unwilling to accept their orders. The cheapest iron being offered is from France at $23 a ton, f.o.b. cars, Philadelphia, for a grade closely approximating eastern Pennsylvania No. 2X except that the phosphorus runs as high as 1.75 per cent. Not all buyers are satisfied to use the foreign iron, however, and they are offering as high as $28 and $30, furnace, for domestic No. 2X. The scarcity of foundry iron may shortly be accentuated by buying of basic by eastern steel companies. One company has bought about 1500 tons at $26.75, delivered, and is seeking a few thousand tons more, while an eastern plate manufacturer is seeking a tonnage for shipment this month. The American Bridge Co. has bought 10,000 to 12,000 tons of basic for August-September shipment, but the price reported to have been paid is about $2 a ton less than eastern furnaces are apparently willing to do, which leads the local trade to assume that the order was placed with another Steel Corporation subsidiary. Local furnaces are quoting basic at $25, furnace, but on the 1500-ton sale referred to the furnace price was slightly above $25. A sale of 3000 tons of gray forge at about $25.50, delivered, has been made. The only important inquiry for foundry iron is from the National Radiator Co., which wants 1000 tons for its Trenton, N. J., and Johnstown, Pa., plants. The prices printed below are slightly lower than last week's quotations, due to the reduction in freight rates.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 76 cents to $1.64 per gross ton:

East Pa. No. 2 plain, 1.75 to 2.25 sil.	$26.64 to $27.26
East. Pa. No. 2X, 2.25 to 2.75	27.64 to 28.26
East. Pa. No. 1X	28.64 to 29.76
Virginia No. 2 plain, 1.75 to 2.25 sil.	29.17 to 30.17
Virginia No. 2X, 2.25 to 2.75 sil.	30.17 to 31.17
Basic delivery eastern Pa.	25.75 to 26.75
Gray forge	25.50 to 26.00
Malleable	27.50 to 28.00
Standard low phos. (f.o.b. furnace)	30.00
Copper bearing low phos. (f.o.b. furnace)	30.00

Ferroalloys.—The situation in ferromanganese has not changed within the past week. The quotation of both British and domestic producers is $67.50, Atlantic seaboard. Spiegeleisen is quoted at $36, furnace.

Semi-Finished Steel.—There is considerable divergence in prices for forging billets. One mill is quoting $38 to $40, Pittsburgh, while another has been paid $40 to $45, Pittsburgh. Sales of 500 tons at $40, 500 tons at $42.50 and a carload at $45, all base Pittsburgh, are reported by one maker. Rerolling billets are uniformly quoted at $35, Pittsburgh. The new rate on semi-finished steel from Pittsburgh to Philadelphia is $5.17 per gross ton.

Plates.—One Eastern company which has been selling plates at 1.60c., Pittsburgh, has advanced its price to 1.70c., while two or three others are now quoting 1.80c. One effect of the stronger situation in plates is to advance the base prices at which the lighter gages are quoted. Until recently sizes under 3/16 in. were sold on the ordinary tank steel base, but now there are special base prices, with usual extras, for lighter gages up to 2c. per lb., base, for No. 8 gage. A contract for 1000 tons of light plates for third quarter at 1.95c., Pittsburgh, is reported by one Eastern maker, while on 300 tons for prompt shipment the price was 2.05c., mill. The Pennsylvania Railroad will inquire probably this week for 5000 to 10,000 tons of car repair plates. Bids close July 5 on 3000 tons of plates, shapes and bars for the Norfolk & Western Railroad. We quote ¼ in. and heavier at 1.70c. to 1.80c., Pittsburgh, to which is added the new freight rate of 32½c. per 100 lb. to Philadelphia and 31½c. to Baltimore.

Structural Material.—An advance in its price from 1.60c. to 1.70c., Pittsburgh, on structural shapes by an Eastern mill places this market firmly upon the 1.70c. level, while some mills are asking 1.80c., Pittsburgh. One mill is restricting its orders only to those specifications which can be gotten out economically. We quote plain material at 1.70c. to 1.80c., Pittsburgh. The new freight rate on finished material to Philadelphia is 32½c. per 100 lb. and 31½c. to Baltimore.

Bars.—The price situation on steel bars continues stronger than that of plates and shapes and 1.80c., Pittsburgh, is more nearly the price which consumers must now pay for early shipment, though 1.70c. still obtains on considerable business where mills cannot do better than six or eight weeks. Bar iron prices are unchanged by Eastern makers at 1.60c., Pittsburgh, for carloads and 1.70c. for less than carloads.

Sheets.—Most of the mills have now covered their regular customers for all of third quarter at 2.40c. for blue annealed, 3.15c. for black and 4.15c. for galvanized, base Pittsburgh, and prices asked for prompt shipment are uniformly higher, varying from $2 to $5 a ton.

Bolts, Nuts and Rivets.—During the week or two prior to the end of second quarter users of bolts, nuts and rivets have specified very heavily on their contracts, in some instances buyers specified more than their contracts called for. Third quarter prices are considerably above those ruling on second quarter contracts.

Warehouse Business.—The demand for steel out of stock continues fairly active, buyers usually complaining that they are not getting shipments as expected from the mills. Prices are unchanged, but there will probably be slight readjustments to meet the reduction in freight rates. We quote for Philadelphia delivery as follows:

Soft steel bars and small shapes, 2.56c.; iron bars (except bands), 2.56c.; round edge iron, 2.75c; round edge steel, iron finish, 1½ x ½ in., 2.75c.; round edge steel planished, 3.50c.; tank steel plates, ¼-in. and heavier, 2.66c.; tank steel plates, 3/16-in., 2.85c.; blue annealed steel sheets, No. 10 gage, 2.40c. [illegible] No. 28 gage, 2.65c., [illegible] galvanized sheets, No. 28 gage, 5.25c.; square twisted and deformed steel bars, 2.65c.; structural shapes, 2.66c.; diamond pattern plates, ¼-in., 4.35c.; 3/16-in., 4.50c.; spring steel, 3.50c.; round cold-rolled steel, 3.20c.; squares and hexagons, cold-rolled steel, 3.70c.; steel hoops, No. 13 gage and [illegible] 3.21c.; iron bands, 3.90c.; rails, 2.36c.; tool steel, 8c.; Norway iron, 5.50c.; toe calk steel, 4.50c.; tire steel, 2.65c.; planished tire steel, 3.40c.

Old Material.—Although the Pittsburgh market is strong on some grades, weakness has appeared in Eastern scrap prices within the past few days. There are more sellers than buyers and this situation, as usual, has resulted in concessions on certain grades, the most marked of which is on No. 1 cast, of which 500 tons has been sold at $17.50, delivered to a nearby cast iron pipe foundry, a reduction of $1.50 a ton from our last week's quotation. We note a sale of 200 tons of heavy breakable cast at $18, delivered. Borings and turnings and pipe are off about 50c. a ton. Cast iron borings are reported to have been sold at $16, Pittsburgh, and No. 1 cast at $20 to $21. Users of scrap have apparently expected that they would derive the benefit from freight rate reductions, but dealers say that this advantage will go to the shipper and not to the consumer. We quote for delivery at consuming points in this district as follows:

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$15.00 to $15.50
Scrap rails	15.00 to 15.50
Steel rails, rerolling	17.00 to 17.50
No. 1 low phos., heavy 0.04 and under	22.00 to 24.00
Cast iron car wheels	17.50 to 18.50
No. 1 railroad wrought	17.00 to 17.50
No. 1 yard wrought	15.00 to 15.50
No. 1 forge fire	13.00 to 13.50
Bundled sheets (for steel works)	13.50 to 14.00
No. 1 busheling	15.00 to 15.50
No. 2 busheling	12.00 to 13.00
Turnings (short shoveling grade for blast furnace use)	13.00 to 13.50
Mixed borings and turnings (for blast furnace use)	13.00 to 13.50
Machine-shop turnings (for steel works use)	13.00 to 13.50
Machine-shop turnings (for rolling mill use)	13.50 to 14.00
Heavy axle turnings (or equivalent)	13.50 to 14.00
Cast borings (for steel works and rolling mills)	14.00 to 14.50
Cast borings (for chemical plants)	16.50 to 17.50
No. 1 cast	17.50 to 18.50
Railroad grate bars	14.50 to 15.00
Stove plate (for steel plant use)	15.00 to 15.50
Railroad malleable	15.00 to 15.50
Wrought iron and soft steel pipes and tubes (new specifications)	13.50 to 14.00
Shafting	20.00 to 20.50

Cleveland

Ore Shipments by Lake Heavy—Pig Iron Fairly Active

Iron Ore.—Activity in the ore market has subsided somewhat, although a few sales were made during the week in lots of 25,000 tons and under and some new inquiry came out. Several of the round lot inquiries that have been noted are still pending. In some cases, the fuel situation is causing delay in placing orders. If lack of coke prevents operations, furnaces will not want the ore. Lake shipments are now heavy. The June movement was 6,629,711 gross tons as compared with 3,600,189 tons during June of last year. Shipments up to July 1 were 8,351,177 tons as compared with 6,371,227 tons during the corresponding period a year ago.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $5.95; Old range non-Bessemer, 51½ per cent iron, $5.20; Mesabi Bessemer, 55 per cent iron, $5.70; Mesabi non-Bessemer, 51½ per cent iron, $5.05.

Pig Iron.—While sales have fallen off somewhat, the market continues fairly active in small lot orders. Prices on foundry iron shows a stiffening tendency, as some of the lake furnaces are trying to get 50c. more or $23.50. The market is generally represented by a spread of $23 to $23.50, although one Cleveland seller has taken some outside business at $24. For Cleveland delivery 400 tons was sold at $24.50, although $24 has been the usual quotation. The most active seller booked about 10,000 tons during the week. Sales include 1500 tons of malleable iron to a Michigan melter and the following foundry iron orders: Five hundred tons to an Ohio jobbing foundry; 400 tons to an Indiana implement manufacturer; 400 tons to an Indiana automobile foundry; 500 tons to a Michigan automobile foundry, and 600 tons to a northern Ohio machine tool manufacturer. The N. & G. Taylor Co. is inquiring for 5000 tons of basic iron. A New York implement manufacturer is inquiring for 1200 tons of malleable and 800 tons of foundry iron and a Muncie, Ind., foundry for 1200 to 1500 tons of malleable iron. Small lot sales of Southern iron are being made at $18.50, there being no report of the appearance of $18 iron in this market. Prices on low phosphorus iron are slightly easier, especially for shipment to points outside of the sellers' immediate territory. The sale of 500 tons of copper bearing iron to a southern Ohio consumer is reported at $28, or $2 a ton below the regular quotation. It is reported that English low phosphorus iron is being offered in New York at $31. Under new freight rates the Birmingham rate on Southern pig iron is reduced from $6.67 to $6 for shipment to Cleveland and other northern Ohio points, including Akron, Canton, Massillon and Mansfield. The rate on Ohio

silvery iron from the Jackson district has been reduced from $3.36 to $3.02 and the local switching charge in Cleveland from 56c. to 50c. Freight rate changes and price changes due to revised freight rates are shown below.

Quotations below are f.o.b. local furnace for Northern foundry iron, not including a 50c. switching charge. Other quotations except basic and low phosphorus are delivered Cleveland, being based on a $3.02 rate from Jackson and a $6 rate from Birmingham:

Basic, Valley furnace	$25.00
Northern No. 2 fdy., sil. 1.75 to 2.25	$23.00 to 24.00
Southern fdy., sil. 1.75 to 2.25	24.50
Ohio silvery, sil. 8 per cent	33.52
Standard low phos., Valley furnace	33.00 to 34.00

Ferroalloys.—English ferromanganese for July shipment is being offered at $70, an advance of $2.50, the price evidently being marked up because buyers are assured delivery before a tariff advance.

Finished Material.—The market continues fairly active and prices still show an upward tendency. On structural material and plates, 1.70c. apparently is now the minimum quotation. On steel bars the 1.60c. price has not entirely disappeared. A Buffalo district mill has advanced its price $2 a ton on steel bars and structural material to 1.80c. for the former and 1.90c. for the latter. Quotations on heavy plates range up to 2c. and on the light plates up to 2.10c. Automobile and parts manufacturers continue to buy steel, although delivery on some of the orders now being placed cannot be made before about Nov. 15. Reeves Brothers, Alliance, Ohio, have taken oil tanks for the Magnolia Refining Co. requiring 1200 tons of plates which will be furnished by the Midvale Steel & Ordnance Co. The Lima Locomotive Corporation has taken 14 locomotives for the Nickel Plate Railroad. The Community Traction Co., Toledo, has placed 500 tons of steel rails with the Lackawanna Steel Co. Independent mills have made the 2½c. price reduction on fence. In the structural field a large amount of work continues to come out.

Sheets.—Consumers are crowding the mills for deliveries and some orders are being booked for September shipment at 2.60c. for blue annealed, 3.40c. for black and 4.40c. for galvanized.

Warehouse Business.—The demand continues heavy. So far the reduction in freight rates has not resulted in any reductions in warehouse prices.

Jobbers quote steel bars, 2.41c.; plates and structural shapes, 2.51c.; No. 9 galvanized wire, 3c.; No. 9 annealed wire, 2.50c.; No. 28 black sheets, 3.90c. to 4c.; No. 28 galvanized sheets, 4.90c. to 5c.; No. 10 blue annealed sheets, 3.25c. to 3.46c.; hoops and bands, 3.06c.; cold-rolled rounds, 3.20c.; flats, squares and hexagons, 3.70c.

Reinforcing Bars.—Prices are firm at 1.70c. Buffalo has taken bids for a filtration plant requiring 3500 tons. The Franklin Steel Works has taken 400 tons for a warehouse for the Hardware & Supply Co., Akron. The American Construction Co. is low bidder for the general contract for a highway bridge at Schenectady, N. Y., requiring 1000 tons. The Central States Engineering & Construction Co., Cleveland, is low bidder for the West Seventy-third Street Bridge, Cleveland, requiring 270 tons.

Bolts, Nuts and Rivets.—Bolt and nut specifications have been very heavy, consumers taking the full amount due on low-priced contracts that expired July 1. Considerable new business is pending. Many rivet contracts are being closed for the third quarter at regular prices, although there are occasional reports of concessions.

Semi-finished Steel.—A local mill during the week sold several lots of sheet bars, billets and slabs aggregating 5000 tons at $35, Cleveland. A northern Ohio drop forge shop is inquiring for 2000 tons of forging billets. Small lot sales are reported at $42, Pittsburgh.

Coke.—With the withdrawal of one producer there is almost no Connellsville foundry coke being offered in this market. Wise County coke is available at $7 to $7.50. The demand has increased owing to the fact that stocks of many foundries have become low.

Old Material.—The market shows very little life and is weak. There is no demand for either Cleveland or Valley mills for scrap, but there is expectation of an improvement after the holidays. Heavy melting steel is quoted at $17 to $17.50 for Youngstown delivery, or 50c. below recent price. A pipe foundry, at Newcomerstown, Ohio, is reported to have purchased a round lot of machinery and railroad cast scrap, and a dealer is inquiring for scrap to fill this contract at $19, delivered. The New York Central and the Big Four railroads received bids to-day on unspecified tonnages. With the rate revision, the freight rate on scrap from Cleveland to Youngstown, Warren and other Valley points and to Canton has been reduced from $2.10 to $1.89 per ton.

We quote per gross ton, f.o.b. Cleveland, as follows:

Heavy melting steel	$15.25 to $15.50
Steel rails, under 3 ft	15.75 to 16.00
Steel rails, rerolling	16.00 to 16.50
Iron rails	14.00 to 15.00
Iron car axles	18.00 to 19.00
Low phosphorus melting	16.00 to 16.25
Cast borings	12.50 to 12.75
Machine shop turnings	11.50 to 12.00
Mixed borings and short turnings	12.50 to 12.75
Compressed steel	12.85 to 13.25
Railroad wrought	14.00 to 14.50
Railroad malleable	15.50 to 16.00
Light bundled sheet stampings	10.00 to 10.25
Steel axle turnings	13.00 to 13.50
No. 1 cast	17.00 to 17.50
No. 1 busheling	11.25 to 11.75
Drop forge flashings over 10 in.	11.00 to 11.50
Drop forge flashings under 10 in.	11.25 to 11.75
Railroad grate bars	14.00 to 14.50
Stove plate	14.00 to 14.50
Pipes and flues	11.00 to 11.50

Cincinnati

Good Buying of Pig Iron in Prospect—Present Demand Fair

CINCINNATI, July 3.

Pig Iron.—Fair activity was recorded in the market during the week, and while the inquiry is light, the indications are that some good buying will be seen during the next few weeks. A Southern furnace interest booked approximately 5000 tons during the week at prices ranging from $18 to $18.50, and an attractive tonnage can still be booked at the lower figure. Included in this amount was a sale of 1000 tons to a Kentucky melter, and approximately 500 tons for shipment to Canada. The Louisville & Nashville Railroad bought approximately 1000 tons of various grades, paying $18 to $18.50 for foundry irons, and $31, Southern furnace, for charcoal. Northern irons were more active, and we note a sale of 500 tons to a central Ohio melter at $24, Ironton base, an advance of 50c. A number of smaller sales of foundry and malleable grades were booked at the same figure. A Michigan melter took 1500 tons of silvery for third quarter shipment at the schedule, and a nearby melter 500 tons of Valley foundry at $24, furnace. Inquiries for 1000 and 600 tons respectively of malleable for shipment to Indiana and Illinois melters during the third quarter are the only ones of size before the trade. There is also an inquiry for 1000 tons of Bessemer from outside the district. Furnaces report shipping instructions received on Monday for large tonnages of iron, melters being anxious to take advantage of the new freight rates, and also to get in a supply of iron in case railroad traffic is curtailed by strikes.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$22.05
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	22.55
Ohio silvery, 8 per cent	34.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	26.27
Basic Northern	27.27
Malleable	26.27

Coke.—The demand for foundry and domestic coke is showing a steady gain, and contracts for last half are being negotiated at open prices. The price situation is firm, but unchanged from last week.

Finished Material.—While the number of orders for finished material has shown the customary falling off at this season of the year, specifications on contracts are coming in at a highly satisfactory rate. There were no large orders placed during the week and the inquiries consisted principally of lots under 100 tons. It is expected, however, that a number of inquiries for third quarter delivery will be put out during the present week and that some now before the trade will be

closed. The demand for sheets continues heavy, most of the inquiries, however, being for earliest possible delivery. On all finished products, deliveries are running from 8 to 10 weeks, although plates are available for six weeks' delivery from some mills. Prices are showing considerable strength and several independent mills have moved up to 1.80c. on bars, shapes and plates. Very little is now heard of the 1.60c. price and 1.70c. appears to be the minimum for any reasonable delivery. On sheets the spread ranges from 2.40c. to 2.60c. on blue annealed; 3.15c. to 3.40c. on black; 4.15c. to 4.40c. on galvanized; and 4.50c. to 5c. on automobile body sheets. On wire products it is rumored that nails will shortly be advanced to $2.50 per keg. Some orders have been booked by independent mills at $2.45, base. Readjustment of discounts on woven wire fencing were made by some manufacturers during the past week, but the price situation was hardly affected thereby. In the structural field a number of projects involving considerable tonnages of reinforcing bars are expected to come out within the next week or so. Two new inquiries were issued for steel buildings, but only one of consequence was made. A number of fair-sized awards will likely be made this week.

Warehouse Business.—Jobbers report a very good week and with mills getting further behind on deliveries, are looking forward to continued good business. Prices are very firm, and while it was expected advances would be made of approximately $2 a ton, these have not developed as yet.

Jobbers quote iron and steel bars, 2.75c. base; hoops, 3.60c.; bands, 3.35c. base; shapes and plates, 2.85c. base; reinforcing bars, 2.82½c. base; cold-rolled rounds, 3.35c. base; flats, squares and hexagons, 3.85c. base; No. 10 blue annealed sheets, 3.60c.; No. 28 black sheets, 4.50c.; No. 28 galvanized sheets, 5.50c.; No. 9 annealed wire, $2.70 per 100 lb.; common wire nails, $2.85 per keg, base.

Old Material.—The local scrap market continues inactive, but there is a good demand for blast furnace scrap for shipment out of the district. Steel mill grades and cast scrap are quiet. Dealers are marking time, and are not actively buying or selling. Prices, while inclined to be somewhat soft, are unchanged in the absence of trading of consequence.

We quote per gross ton, f.o.b. Cleveland, as follows:

Heavy melting steel	$15.25 to $15.50
Steel rails, under 3 ft	15.75 to 16.00
Steel rails, rerolling	16.00 to 16.50
Iron rails	14.00 to 15.00
Iron car axles	18.00 to 19.00
Low phosphorus melting	16.00 to 16.25
Cast borings	12.50 to 12.75
Machine shop turnings	11.50 to 12.00
Mixed borings and short turnings	12.50 to 12.75
Compressed steel	12.85 to 13.25
Railroad wrought	14.00 to 14.50
Railroad malleable	15.50 to 16.00
Light bundled sheet stampings	10.00 to 10.25
Steel axle turnings	13.00 to 13.50
No. 1 cast	17.00 to 17.50
No. 1 busheling	11.25 to 11.75
Drop forge flashings over 10 in.	11.00 to 11.50
Drop forge flashings under 10 in.	11.25 to 11.75
Railroad grate bars	14.00 to 14.50
Stove plate	11.00 to 11.50
Pipes and flues	11.00 to 11.50

San Francisco

SAN FRANCISCO, June 28.

Pig Iron.—New business in pig iron has been lighter during the past two weeks, probably due to the liberal buying of the preceding few weeks. Consumers, for the most part, are well supplied for current needs, and with the more apparent settling of prices, there is not the same amount of purchasing for future requirements. An Oakland interest has just taken 500 tons of English material; while the price is not divulged, it is understood to be around $30, delivered. Conditions in the foundry trade appear to be improving, as indicated by the gradual increase in pig iron consumption, and manufacturers likewise are feeling the steady expansion of activities.

Cast Iron Pipe.—A satisfactory condition prevails on the Coast, but no very large volume of business seems to be offering at present. There are a few good-sized prospects, almost exclusively from municipal sources, one of the best of which is an inquiry from Monterey Park for 1800 tons of 4-12-in. material. Los Angeles is in the market for 675 tons of 24-in. and a considerable volume of smaller tonnages. Glendale has just closed for 700 tons. Private contracts are said to be rather light at present, and the market inclined to be slow. Prices are maintaining the increase recorded a short time ago, being firm at approximately $54, delivered. Soil pipe continues scarce, and manufacturers are showing no disposition to accept orders other than those subject to the mill's delivery, the outer limit of which is generally set at about eight weeks. This inability of mills to meet the demand is accompanied by the lack of an adequate number of freighters in the intercoastal service, which makes it difficult to handle the tonnage offered. It is expected, however, that this latter condition will be relieved in about two months. The active demand for plumbers' brass goods likewise is tending to strengthen that market.

Finished Iron and Steel.—The expansion of building and construction operations, observed several weeks ago, continues, and the general opinion appears to be that the market is giving evidence of stability, favorable to a steady buying demand. No great change in prices of the heavy materials is apparent, but the levels recently reached are being held. Demand is diversified, the greater volume comprising the smaller tonnages for stock and shop needs. Oil well operations in the South are prevailingly active. One of the best prospects is that for 2080 tons of plates and mixed structural material for storage tanks. There is also an inquiry for from 400 to 500 tons of plates for a pipe line. The contract for 500 tons of rails and fittings for the new dock at San Pedro has been awarded to a local interest. Among the larger jobs in sight around San Francisco are the $2,500,000 11-story commercial hotel and theater building to be constructed at Eighth and Market streets, San Francisco; and the $2,000,000 Athens Athletic Club building, which will be located in Oakland.

Coke.—Approximately the same condition as prevails in pig iron rules in the coke situation. A good, steady business, generally in small lots and carloads, continues. Almost the only single sale of any proportions was that for 500 tons of English coke for a local consumer. There is no apparent change in market values, domestic material being fairly steady at between $8 and $8.50, f.o.b. ovens, for good quality, while foreign brings from $18.50 to $19.50 delivered.

Old Material.—Some improvement in the consumption of scrap, particularly cast scrap, is reported by the larger users. Although many are pretty well stocked for immediate needs, a perceptible increase in the weekly volume of buying is observed, which is taken by the trade to indicate a gradual recovery in this market. Prices appear firm at $10 a gross ton for heavy melting, since buyers experience difficulty in purchasing for less, and cast iron scrap ranges from about $21 to $22, delivered at consumers' works. Recently some holders have been selling for Japanese account considerable amounts of scrap from the cruiser Brooklyn, which has been dismantled, perhaps 2000 tons in all. The Pacific Coast Steel Co. is now operating two open-hearth furnaces out of six. For many months it was operating only one.

Trade Changes

The Wilson Welder & Metals Co., Inc., 132 King Street, New York, recently appointed the King-Knight Co., Underwood Building, San Francisco, exclusive representative in central and northern California for Wilson Plastic-arc welding machines and Wilson "COLOR-TIPT" metals.

The American Sheet and Tin Plate Co. is now located in its new office in the Empire Building, 71 Broadway, New York. E. E. Winckler is manager of sales.

The Turbine Air Tool Co., Cleveland, has moved its executive offices from 710 Huron Road to 301 Chamber of Commerce Building.

The Hampden Corundum Wheel Co., Springfield, Mass., has changed its name to Hampden Grinding Wheel Co.

HIGH COAL PRICES

Steel Companies Buying with More Caution in Mahoning Valley

YOUNGSTOWN, July 3.—One Valley independent which predicted a $37.50 price on sheet bars for August and September deliveries has extended the current quotation of $35 to apply on August shipments. Non-integrated sheet makers covered on bar requirements by contract expect the $35 price to apply throughout the third quarter.

Some doubt as to the sufficiency of coal supplies beyond Aug. 1 is now expressed by interests which have heretofore shown no apprehension over the fuel situation. Prices have exhibited a firmer tendency the past week, both for Southern coal suitable for coking and for Pittsburgh district coal.

West Virginia and Kentucky coal, of good grade, is purchasable at $3.50 and likely somewhat less, industrial buyers believe, though some mines in those districts have recently quoted up to $3.75. One of the large Valley buyers, which entered the market extensively shortly following the outbreak of the strike of union miners, has paid an average of $2.35 per ton for an amount ranging up to 2500 carloads. The bulk of this coal came from the Kentucky field.

In the Pittsburgh district, operators are asking prices ranging up to $4.50 and $5, and the quality in some cases is not so good as the southern coal.

Owing to susceptibility of the price situation to demand, steel plants are buying with more caution and are sounding the market more carefully.

The Trumbull Steel Co., Youngstown Sheet & Tube Co. and Republic Iron & Steel Co. are operating their own mines in Pennsylvania in a small way, the largest tonnage being produced by the Trumbull company. No steps have yet been taken by the Brier Hill Steel Co. for resumption of its mines in Pennsylvania.

Diversion of coal to the lakes for Northwest consignment will have the usual effect of contracting supplies which would otherwise be available for Middle West industrial consumption, l rge interests point out. Pressure in this respect is likely to be more pronounced this year in view of disturbed working conditions in both the union and non-union fields. For this reason, industrial buyers beileve it will be more difficult to obtain adequate supplies a month hence.

Labor Causes Anxiety

The labor situation is likewise causing some anxiety, and Valley independents are joining in the movement to seek modification of the existing immigration laws which greatly restrict the number of immigrants to be admitted into this country in 1922 and 1923. In late years common labor in many of the steel plants has been recruited to a large degree from immigrants coming from Hungary, Czecho-Slovakia, Jugoslavia and Poland. Restriction on immigration from these countries has cut into the common labor supply of the larger steel employers, a situation looming more serious as operations approach normal.

Mid-summer weather is likewise cutting into hot mill production. A Youngstown independent which had 15 mills scheduled last week, was compelled to reduce the number to 12 before the end of the week, because workmen failed to report and it was unable to assemble full mill crews.

Sheet Prices

Sheet prices are reaching more stable levels in a general way and the higher range which recently applied, namely 2.60c. for blue annealed, 3.40c. for black and 4.40c. for galvanized is disappearing. One of the principal Valley interests, in fact, is accepting tonnage at the levels of the leading interest, 2.40c., 3.15c. and 4.15c. respectively for the three grades. Some slack in urgency of demand has likewise been partially responsible for this situation. Galvanized grades are in strongest demand at this time, particularly for roofing purposes, and several interests are unable to give shipments under six weeks.

The principal Valley producer of full finished stock is virtually out of the market, capacity being occupied in excess of two to three months ahead on orders from its regular customers, chiefly automobile and body makers. The 4.75c. price is applying on all current No. 22 gage auto body stock, and is characterized as very firm.

Active Demand For Pipe

Pipe requirements continue in unabated volume, both for large and small sizes, jobbers being active factors in the market. Resumption of the Bessemer department July 5 of the Republic Iron & Steel Co. relieves the pressure for Bessemer steel, and will be followed by an increase in the number of active pipe mills operated by the company, from five to six. Demand has warranted production from the entire group of pipe furnaces, but has been held in check by shortage of Bessemer steel, required especially for buttweld sizes of tubes.

Active demand for steel bars, exceeding supply, is manifest. In this district the minimum price is now 1.75c., as compared with a recent minimum of 1.70c.

Valley pig iron capacity is now occupied at 75 per cent., only the 18 largest and most efficient blast furnaces of the 27, pouring. This enlargement in production is relieving some of the pressure which existed for a time in the iron market, and deviations from the $25 level for basic iron are occasionally noted. This price, however, still represents the market, say producers, who declare costs of production warrant maintenance of this quotation. It compares with a low of $17.75 several months ago.

Seven Furnaces Blown In

Since April 1, seven blast furnaces have been blown in this territory requiring fully 5000 tons of coal daily for their maintenance. In addition, rolling mill schedules have been expanded, creating enlarged demands for coal. Makers appear covered until Aug. 1 as a general rule. If coal costs are still further increased after that date, because of accumulated demands, they will be reflected in higher steel prices, say the independents.

Valley interests are endeavoring to encourage trade by naming fair prices, believing that quotations which are too high will discourage buying and react disadvantageously. Higher prices now prevailing, they point out, as compared with two months ago, are largely due to advanced coal, iron and scrap costs.

Scrap metals have sagged somewhat the past ten days. Dealers have been offering heavy melting at $18, which compares with a recent high of $19. One interest, in fact, has been getting some tonnage under contract at $17, though the seller has been making strenuous efforts to annul the agreement. Compressed sheet scrap has been sold at $16.40.

Some surplus wire rod tonnage has been offered by the Youngstown Sheet & Tube Co., but prices are being quoted only on a definite bid for tonnage, and are likely higher than $40.

Algoma Rail Mill Gets 48,000-Ton Order—Resumes Operation

The Algoma Steel Corporation's rail mill at Saulte Ste. Marie, Ont., resumed operations on full time Monday, July 3, the company having just closed a contract with the Canadian Pacific Railroad for 48,000 tons of heavy rails. President Franz says that Canadian business is improving steadily and he believes the plant will be kept running from now on.

Steel of not over 0.15 per cent carbon and minimum tensile strength of 47,000 lb. per sq. in. and that of not over 0.20 per cent carbon and minimum tensile strength of 52,000 lb. per sq. in. are satisfactory for forge welding of pipe lines, penstocks, tank-car work and similar construction, according to Frank N. Speller, metallurgical engineer, National Tube Co., Pittsburgh, in a paper read before the American Society of Mechanical Engineers.

FABRICATED STEEL BUSINESS

Bridge and Building Awards and Tonnages Pending at Leading Centers

Awards for fabricated steel work for the past week include the following:

Michigan Central Railroad bridge at Niagara Falls, N. Y., [illegible] Bridge Co., low bidder [illegible] contract not yet awarded.

Building for Beattie Mfg. Co., Little Falls, N. J., 250 tons, to J. E. Brooks Co.

Two bridges for the Baltimore & Ohio Railroad, 400 tons, to Fort Pitt Bridge Works.

Lincoln Life Insurance Building, Fort Wayne, Ind., 1,000 tons, to Lackawanna Bridge Works Corporation.

Bridge over Gunpowder River, Baltimore, Md., to McLean Construction Co.; Second-hand material to be furnished.

Bartlett-Hayward Co., Baltimore, Md., 900 tons of I-bars, to American Bridge Co.

Tomlinson bridge at New Haven, Conn., 1,400 tons, to Phoenix Bridge Works.

Bigelow-Hartford Carpet Co., Thompsonville, Conn., 300 tons, to American Bridge Co.

Telephone Exchange Building, Brooklyn, 3,000 tons; general erection contract to Eidlitz & Ross; steel to be fabricated by Bethlehem Steel Bridge Corporation.

Missouri, Kansas & Texas Railway of Texas, locomotive repair shop, Waco, Tex., 1,400 tons, to Mt. Vernon Bridge Co.

Missouri Pacific Railroad, bridge over Kaw River, Kansas City, 501 tons, to King Bridge Co.

Missouri Pacific Railroad, two 35-ft. girder spans and one 90-ft. through plate girder span for bridge No. 113, Joplin division, 127 tons, to American Bridge Co.

Federal Ice & Cold Storage Co., St. Louis, 169 tons, to Mississippi Valley Structural Steel Co.

Kalamazoo Vegetable Parchment Co., Kalamazoo, Mich., 750 tons, to American Bridge Co.

Marland Refining Co., Oklahoma City, Okla., 20 small tanks, 600 tons, to Chicago Bridge & Iron Works.

Pantlind Hotel, Grand Rapids, Mich., addition, 300 tons, to Lackawanna Bridge Works Corporation.

Hayes Office Building, Erie, Pa., 600 tons, to Lackawanna Bridge Works Corporation.

Masonic Temple, Binghamton, N. Y., 300 tons, to Lackawanna Bridge Works Corporation.

First National Bank, Ashland, Ky., 1,500 tons, to Fort Pitt Bridge Co.

Nash Motor Co., new body and sheet metal shop, 200 tons, additional, (original letting, 400 tons), to Worden-Allen Co., Milwaukee.

Warehouse for Eggleston Brothers, Long Island City, N. Y., 300 tons, to Jones & Laughlin Steel Co.

High tension transmission towers for Ohio Public Service Corporation, 3500 tons, to American Bridge Co.

Structural Projects Pending

Inquiries for fabricated steel work which may be added to lists of pending projects include the following:

Masonic Temple, Paterson, N. J., 400 tons.

Sterling Hall of Medicine, New Haven, Conn., 600 tons.

Emerson Building, 1431 Broadway, New York, 400 tons.

Repairs to Williamsburg bridge, New York, 700 tons.

National Biscuit Co., three buildings, at Cincinnati, Philadelphia and Buffalo, 300 tons.

Long Island Railroad, crane runway, 400 tons.

Citizens Hotel, Charlotte, N. C., 700 tons; bids close July 7.

Federal Reserve Bank, St. Louis, 370 tons.

Car dumper for Ford Motor Co., Detroit, 725 tons.

[illegible] Co., Stock [illegible], Chevrolet Motors S. A., Mexico City, Mexico, 425 tons.

Johnson Building, Knoxville, Tenn., 200 tons, bids in.

Caldwell Building, Nashville, Tenn., 300 tons, bids in.

Office building 1200 Washington Boulevard, Detroit, 1240 tons.

Car shops, Erie Railroad, Hornell, N. Y., 900 tons, Bates & Rogers, Chicago, general contractors.

Methodist Episcopal church house, Champaign, Ill., 250 tons.

Painter Building, Cleveland, 170 tons, bids taken.

Standard Envelope Co., Cleveland, 200 tons, bids taken

Cleveland Machine Co., Cleveland factory, 250 tons.

Highway bridge, Schenectady, N. Y., 500 tons, American Construction Co., Cleveland, low bidder.

West Technical High School, Cleveland, 450 tons, bids taken.

Mirimar Hotel, Cleveland, 1500 tons, previously reported as 700 tons.

Refractories Prices Have Been Advanced

PITTSBURGH, July 3.—Increases in prices of fire clay brick and other refractories recently were announced by manufacturers in the various producing districts. The advance includes all grades except Birmingham silica brick, which remain at the recent basis of $40 per 1000. Fire clay brick have been advanced $2 per 1000 in all districts, thus establishing a mimimum of $31 per 1000 for high heat duty, Pennsylvania, Kentucky, Illinois and Missouri brick, and of $32 for this grade at Ohio works. The new prices for silica brick represent an advance of $3 per 1000, while there has been a like advance in magnesite brick, $2 a ton in Austrian grain magnesite and $2 a ton in chrome brick.

Advances in magnesite brick and grain magnesite are explained largely by the action of the Senate in connection with the tariff on foreign magnesite, this development having had the effect of stimulating the demand. Demand for fire clay and silica brick has been increasing steadily, following the failure of the coal strike to affect steel plant operations seriously, and in trying to increase production to care for the orders, not a few refractories manufacturers have esperienced labor shortages which have forced increases in wages. Fuel costs also have climbed, whether the manufacturers, as many do, own their own mines, or are dependent upon the open market for supplies. The new prices do not apply on such orders as were on the books of makers prior to the advance which carried a fixed price, and as usual consumers were given the opportunity to place orders before the increase became effective.

We quote per 1000 f.o.b. works:

Fire Clay	High Duty	Moderate Duty
Pennsylvania	$34.00 to $36.00	$32.00 to $34.00
Ohio	32.00 to 34.00	30.00 to 32.00
Kentucky	34.00 to 37.00	32.00 to 34.00
Illinois	34.00 to 36.00	32.00 to 34.00
Missouri	34.00 to 36.00	30.00 to 34.00
Silica Brick		
Pennsylvania		33.00 to 35.00
Chicago		38.00 to 41.00
Birmingham		40.00
Standard size per net ton (f.o.b. Baltimore and Chester, Pa.)		56.00
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)		30.00
Chrome Brick		
Standard size, per net ton		42.00

Plant Operations

The Ryan Foundry Co., Lansing, Mich., has taken an order for castings for 100,000 motors for the Grant Motor Co., same city, and is arranging for immediate increased production.

The American Steel & Wire Co., Anderson, Ind., is advancing production in different departments of its local mill. The wire nail department has booked some heavy orders for foreign shipment.

The Packard Motor Car Co., Detroit, has adopted a production schedule of 2,000 single-six automobiles a month, doubling the monthly output heretofore operative since last April, when this model car was announced. During the past few weeks, the company has made the heaviest shipments in its history.

The Texas & Pacific Railroad Co. is increasing operations at its repair shops at Marshall, Tex., and about 200 men will be added to the working force at once, making a total of 600 workers now on the payroll.

The New Era Spring & Specialty Co., Grand Rapids, Mich., has adopted a night shift operation in addition to the regular day operating schedule. Orders now being received are in excess of production.

The Cadillac Malleable Iron Co., Cadillac, Mich., is arranging for the early operation of its new local foundry now nearing completion. It is expected to give employment to about 100 men at the plant.

The Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa., is increasing production at its plant, with operating schedule close to plant capacity. The wages of all employees have been advanced, effective July 10.

The Moon Motor Car Co., St. Louis, has adopted a production schedule call for 1,000 complete cars during each month of July and August.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Plates

Sheared, tank quality, base, per lb.....1.70c. to 1.80c.

Structural Material

Beams, channels, etc.....1.70c. to 1.80c.

Iron and Steel Bars

Soft steel bars, base, per lb.....1.70c. to 1.80c.
Refined iron bars, base per lb.....2.20c.

Hot-Rolled Flats

Hoops, base, per lb.....2.50c. to 2.75c.
Bands, base, per lb.....2.50c. to 2.75c.
Strips, base, per lb.....2.50c. to 2.75c.

Cold-Finished Steels

Bars and shafting, base, per lb.....2.10c.
Strips, base, per lb.....4.00c.

Wire Products

Nails, base, per keg	$2.40 to $2.50
Bright plain wire, base, per 100 lb.	2.25
Annealed fence wire, base, per 100 lb.	2.25
Galvanized wire, base, per 100 lb.	2.75
Galvanized barbed, base, per 100 lb.	3.05 to 3.15
Galvanized staples, base, per keg	3.05 to 3.15
Painted barbed wire, base, per 100 lb.	2.55 to 2.65
Polished staples, base per keg	2.55 to 2.65
Cement coated nails, base, per count keg	1.90 to 2.00
Woven fence, carloads	73 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads,
60, 10 and 10 per cent off list
Machine bolts, small, cut threads....60 and 10 per cent off list
Machine bolts, larger and longer.....60 and 10 per cent off list
Carriage bolts, ⅜ x 6 in.:
Smaller and shorter, rolled threads.60 and 10 per cent off list
Cut threads .....60 per cent off list
Longer and larger sizes .....60 per cent off list
Lag bolts .....60, 10 and 10 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads....50 and 10 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.:
Smaller and shorter .....50 and 10 per cent off list
Larger and longer sizes .....50 and 10 per cent off list
Hot pressed square or hex. blank nuts.....$4.50 off list
Hot pressed nuts, tapped .....$4.50 off list
C.p.c. and t. sq. or hex. nuts, blank.....$4.50 off list
C.p.c. and t. sq. or hex. nuts, tapped.....$4.50 off list
Semi-finished hex. nuts:
9/16 in. and smaller, U. S. S.....80 and10 per cent off list
⅝ in. and larger, U. S. S...75 and 10 and 10 per cent off list
Small sizes, S. A. E.....80, 10 and 10 per cent off list
S. A. E. ⅝ in. and larger...75 and 10 and 10 per cent off list
Stove bolts in packages.....80 and 5 per cent off list
Stove bolts in bulk.....80, 5 and 2½ per cent off list
Tire bolts .....65 per cent off list
Track bolts in carloads.....3.00c. to 3.25c. base
Track bolts, less than 200 kegs.....3.50c. to 3.75c. base

Cap and Set Screws

Milled square and hex. head cap screws,
75 and 10 per cent off list
Milled set screws.....75 per cent off list
Upset cap screws.....80 per cent off list
Upset set screws.....80 and 5 per cent off list

Rivets

Large structural and ship rivets, base per 100 lb.....$2.40
Large boiler rivets, base per 100 lb..... 2.50
Small rivets .....70 and 5 per cent off list

Track Equipment

Spikes, 9/16 in. and larger, base, per 100 lb.	$2.25 to $2.35
Spikes, ½ in. and smaller, base, per 100 lb.	2.50
Spikes, boat and barge, base, per 100 lb.	2.50
Track bolts, base, per 100 lb.	3.25
Tie plates, per 100 lb.	$1.75 to 2.00
Angle bars, base, per 100 lb.	2.40

Welded Pipe

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛	54½	28	⅛ to ¼	31½	22½
¼ to ⅜	60	33½	⅜	36½	18½
½	65	50½	½	42½	27½
¾	69	56½	¾	42½	29½
1 to 3	71	58½	1 to 1½	44½	29½

Lap Weld

2	64	51½	2	39½	25½
2½ to 6	68	55½	2½ to 6	42½	29½
7 to 8	65	51½	7 to 12	40½	27½
9 to 12	64	50½			

Butt Weld, extra strong, plain ends

⅛	50½	33	¼ to ⅜	41½	27½
¼ to ⅜	56	38½	½	35½	23½
½	62	50½	¾	42½	28½
¾	67	55½	1 to 1½	44½	30½
1 to 1½	69	57½			
2 to 3	70	58½			

Lap Weld, extra strong, plain ends

2	62	50½	2	40½	27½
2½ to 4	66	54½	2½ to 4	43½	31½
4½ to 6	65	53½	4½ to 6	42½	30½
7 to 8	61	47½	7 to 8	35½	23½
9 to 12	55	41½	9 to 12	30½	18½

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 and 2½ per cent.

Boiler Tubes

Lap Welded Steel		Charcoal Iron	
1¾ in.	26½	1½ in.	5
2 to 2¼ in.	41	1¾ to 1⅞ in.	17
2½ to 3 in.	52	2 to 2¼ in.	32
3¼ to 13 in.	57	2½ to 3 in.	52
		3¼ to 4½ in.	62

To large buyers of steel tubes a supplementary discount of 5 per cent is allowed.

Standard Commercial Seamless Boiler Tubes

Discounts on cold-drawn or hot-rolled tubes in carload lots, f.o.b. Pittsburgh, follow:

1 in.	50	2¼ and 2¾ in.	43
1¼ and 1½ in.	52	3 in.	47
1¾ in.	56	3½ to 4 in.	52
2 and 2¼ in.	39	4¼ in. to 5 in.	44

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Tin Plate

Standard cokes, per base box.....$4.75

Terne Plate

(Per package, 200-lb.)

8-lb. coating	$9.30	25-lb. coating I. C.	$14.25
8-lb. coating I. C.	9.60	30-lb. coating I. C.	15.25
15-lb. coating I. C.	11.80	35-lb. coating I. C.	16.25
20-lb. coating I. C.	13.00	40-lb. coating I. C.	17.25

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....2.40c. to 2.60c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.15c. to 3.40c.

Galvanized

No. 28 (base), per lb.....4.15c. to 4.40c.

Tin-Mill Black Plate

No. 28 (base), per lb.....3.15c. to 3.40c.

Manufacturers have pamphlets, which can be had upon application, giving price differentials for gage and extras for length, width, shearing, etc.

Freight Rates

All rail freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic	$0.325	Buffalo	$0.265	St. Louis	0.43
Philadelphia, export	0.265	Cleveland	0.215	Kansas City	$0.735
Baltimore, domestic	0.315	Cleveland, Youngstown		Kansas City (pipe)	0.705
Baltimore, export	0.255	Comb.	0.19	St. Paul	0.595
New York, domestic	0.34	Detroit	0.295	Omaha	0.735
New York, export	0.285	Cincinnati	0.295	Omaha (pipe)	0.705
Boston, domestic	0.365	Indianapolis	0.31	Denver	1.275
Boston, export	0.285	Chicago	0.34	Denver (pipe)	1.215

Pacific Coast	$1.50		
Pac. Coast, ship plates	1.20		
Birmingham	0.69		
Memphis	0.385		
Jacksonville, all rail	0.50		
Jacksonville, rail and water	0.415		
New Orleans	0.515		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c.; ship plates, 75c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, $1; wire fencing, netting and stretcher, 75c.; pipe, not over 8 in. in diameter, 75c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

PERSONAL

William J. Gruss, who has been the head of the pig iron sales department of Pickands, Mather & Co., Cleveland, since 1913, has tendered his resignation, effective July 10, to become manager of sales of the Gartland-Haswell-Rentschler interests, operating 12 or more gray iron foundries in the Central West. He will have his headquarters in Dayton, Ohio, and will assume his new duties Aug. 1. Mr. Gruss is widely known among the pig iron manufacturers of the country and also has an extensive acquaintance with the foundry trade, and is qualified for his new position by his many years' experience in the pig iron business. He was born in Salem, Ohio, in 1878, and has been with Pickands, Mather & Co. over 28 years, the Cleveland office of that firm being his first place of employment. There he worked up through successive stages until he was placed in an important executive position. He is a member of the American Iron and Steel Institute and of the Union Club, Cleveland Athletic Club, and Cleveland Chamber of Commerce. Mr. Gruss will be succeeded by George W. Striebing, who has been connected with the pig iron sales and ore sales departments of the Pickands, Mather & Co. for 11 years.



WILLIAM J. GRUSS

Lewis T. Rights, contracting manager at New York for the Shoemaker-Satterthwait Bridge Co., sailed July 1 for a two months' trip in England, France, Belgium and Switzerland.

Henry Held, secretary and treasurer Rundle Mfg. Co., Milwaukee, manufacturer of bathtubs and enameled sanitary ware, has been elected president and treasurer. He succeeds the late Robert T. Hazelwood. L. R. Kinnear has been elected vice-president; A. C. Held, secretary, and H. F. Galdammer, assistant treasurer.

J. C. Gore, for 12 years with Domhoff & Joyce Co., pig iron and coke brokers, has been appointed resident manager at Chicago, vice J. P. Crowley, resigned. For the past nine years Mr. Gore has been in the Indianapolis office of the company. He will be assisted at Chicago by L. H. Hoerdt, formerly of the St. Louis office.

Frederick M. Spencer, superintendent Landers, Frary & Clark, Meriden, Conn., cutlery plant, has resigned to associate himself with the International Silver Co.

C. F. Ford, who for the past several years has been with the Chicago Pulley & Shafting Co., has recently joined the engineering sales forces of W. A. Jones Foundry & Machine Co., manufacturer of speed reducers and power transmitting machinery, Chicago. In the near future, Mr. Ford will be located in Minneapolis, Minn., as manager of the Jones branch there. Several years ago, when the Jones company was in its old plant at North Avenue and Noble Street, Chicago, Mr. Ford was transmission engineer and acted in that capacity over an extended period.

S. Glen Vinson, secretary and general manager Ideal Electric & Mfg. Co., Mansfield, Ohio, left April 15 for the Orient, where he will make a survey of business conditions. Mr. Vinson will include on this trip all the larger cities in Japan, China, Philippine Islands, and India. He expects to return to the States about Oct. 1.

Floyd H. Smith, formerly with the Pierce-Arrow Motor Car Co., Buffalo, as director of purchases, has become associated with the Simms Magneto Co., East Orange, N. J., as assistant general manager.

H. E. Cyphers, formerly sales manager of the Brown-Hunkele Corporation, Newark, N. J., is now associated with the McCool-Ellis Co., that city, handling the sales of used machinery, boilers, motors and compressors.

Arthur A. Hammerschlag, president Carnegie Institute of Technology, Pittsburgh, since 1903, has resigned and will become consulting engineer and advisor to corporations, with offices in Pittsburgh and New York.

Charles H. McKnight, who has held the positions of president and chairman of the Carbon Steel Co., Pittsburgh, resigned from the former office at a recent meeting of the board of directors. His successor is C. F. Blue, Jr., who has been vice-president, and Frank C. Neale, president Kittanning Iron & Steel Mfg. Co., controlled by the Carbon Steel Co., and a director of the latter, has been made vice-president, in succession to Mr. Blue.

J. F. Keller, vice-president Keller Mechanical Engraving Co., Brooklyn, has been awarded the Edward Longstreth medal of merit by the Franklin Institute. The award was made in consideration of very substantial improvements and inventions made by Mr. Keller in the art of mechanical die cutting, as represented by his automatic die cutting machine of the reproducing type. In the citation accompanying the presentation, it was stated that "the institute believes that credit should be given Mr. Keller for having met a need for increasing die production and reproduction over that which was possible by the old hand method and skilled operators. His efforts have resulted in easier, quicker and better production by less skillful operators, and a reduction of the costs."



J. F. KELLER

Anson W. Burchard, vice-chairman of the board of directors General Electric Co., has been elected president and chairman of the board International General Electric Co., succeeding Gerard Swope, its former president who was recently chosen president of the G-E company and Charles Neave, former chairman of the I. G. E. company, who has resigned.

P. J. Connor, formerly traveling representative for the International Machine Tool Co., Indianapolis, manufacturer of the Libby turret lathe and who recently resigned from the Essley Machinery Co., Chicago, is now engaged with the Haynes Stellite Co., Chicago, in an engineering capacity with headquarters at New York.

Charles H. Bluske has been appointed Los Angeles district sales manager of the Economy Fuse & Mfg. Co., Chicago, with office at 1304 Maltman Avenue. Mr. Bluske was formerly connected with the Pacific States Electric Co., Los Angeles, and succeeds George L. Davis.

H. F. Hoevel has been appointed manager of the sand blast department of the J. W. Paxson Co., in Philadelphia. He has developed a new line of improved Hoevel-Paxson sand blast machines.

J. Allen Dillon, manager of sales, New York office, Pittsburgh Screw & Bolt Co., accompanied by his wife and son sailed on the Paris from New York July 5, for a six weeks' trip to Europe.

R. D. Shields has been appointed assistant general manager of the Ohio Machine Tool Co., Kenton, Ohio. Mr. Shields has been chief engineer of this company for several years past and will continue in that capacity.

Westinghouse Changes

The following changes in personnel have been announced by the Westinghouse Electric & Mfg. Co.:

L. C. Bullington, who has been assistant to the manager of the power department for several years, has been made assistant manager and will have charge of the general work of the power department. Charles F. Lloyd, formerly manager of the sub-station section, has been made manager of the electric division and R. E. Carotheis, formerly manager of the turbine section, has been appointed manager of the steam division. The vacancies have been filled by the elevation of Bruce H. Lytle and D. O. Tylee, the former becoming manager of the sub-station section and the latter manager of the turbine section.

R. B. Mildon has been appointed general manager of the stoker department, with headquarters at South Philadelphia.

G. A. Sacchi, formerly manager of the stoker section, power department, has been appointed manager of stoker sales and will have his headquarters at South Philadelphia.

Edgar Woodrow has been appointed manager of the contract division, stoker repartment.

F. G. Hickling is now manager of the railway division, Pittsburgh district office.

C. C. Curry, formerly branch manager in Minneapolis, has been assigned to special work in connection with the St. Paul Electric Co.

Norman Stewart is branch manager in Minneapolis.

S. R. Shave has been appointed manager of the price section, power and railway departments, East Pittsburgh.

A. Heckman is now works electrical engineer at the East Pittsburgh works of the company.

F. R. Kohnstamm has been appointed acting manager, appliance section, merchandising department and will be located in Mansfield, Ohio.

J. W. Robinson will succeed C. E. Alles as manager, central station division, Chicago office.

H. A. Lynette has been appointed syndicate representative, central station division, Chicago office.

Kentucky Steel & Wire Co.'s Plant

The Kentucky Steel & Wire Co., Louisville, Ky., recently incorporated with a capitalization of $500,000, has purchased property at Thirty-second and Market streets, and has plans prepared for mill buildings to cost with equipment approximately $200,000. Wire nails, barbed wire, staples, galvanized wire nails and bent wire specialties will be manufactured. The company expects to begin manufacturing operations about Sept. 1. A. H. Dillon, formerly connected with the Youngstown Sheet & Tube Co., is president of the company, and associated with him are John R. Humphrey, Lexington, Ky., and Joseph O'Donnell, Louisville.

British Empire Steel Corporation Plans

A newspaper telegram from Montreal says that it is the intention of the British Empire Steel Corporation to spend the sum of $19,000,000 in additions and repairs to the steel plant. It is stated that engineers employed by the corporation are now engaged preparing plans for new open-hearth furnaces and a blooming mill, to cost about $10,000,000. One blast furnace is to be rebuilt and a second one extensively repaired. Other additions and improvements are to be made in the plant, it is said, the whole to cost in the vicinity of the amount above mentioned.

Stockholders of the Sharon Steel Hoop Co., Sharon, Pa., have approved recommendation of directors for an increase in the capitalization from $15,000,000 to $20,000,000. The new authorization will consist of $5,000,000 8 per cent cumulative preferred, convertible into common. It is the intention to issue at once $1,500,000 of the new authorization, this amount having been largely underwritten by shareholders pro rata at par. The new funds will give the company a net working capital of about $3,000,000 and thereby strengthen its position. It has been showing profits on operations for several months, states an official.

Eastern Steel Co. May Purchase Warwick Blast Furnaces

The Eastern Steel Co., Pottsville, Pa., which in January, 1912, leased the blast furnaces of the Warwick Iron & Steel Co., Real Estate Trust Building, Philadelphia, at Pottstown, Pa., for 99 years, is considering exercising an option to purchase the property, but no definite action has been taken.

Under the terms of the lease, the Eastern Steel Co. has the right to purchase the property of the Warwick Iron & Steel Co. at any time within fifteen years from the date of the execution of the lease for $2,000,000, less such payments in dividends as have been made upon the stock, which total $500,000. If the purchase deal goes through, the Eastern Steel Co. plans a new bond issue which probably will be about $4,000,000.

Officers of the Warwick Iron & Steel Co. are: W. S. Pilling, president; G. E. Schlegelmilch, vice-president; H. F. Hallman, secretary and treasurer.

The Eastern Steel Co. also has mills at Pottsville, Pa., for rolling structural shapes. The product of the Warwick Blast furnaces is used both for supplying the company's steel plant and for merchant trade. The annual capacity of these furnaces is 300,000 tons.

Inspection Tour of Steel Corporation Officials

An inspection tour, which is believed to be preliminary to greater use of the upper Ohio River by the United States Steel Corporation subsidiaries, was conducted by officials of the Carnegie Steel Co., June 29. A party of more than 100, including several New York officials of the Corporation, left Pittsburgh on a special train in the morning for Steubenville, Ohio, returning by river barge. Lately the Carnegie Steel Co. has been using the Ohio river between Steubenville and Pittsburgh for the shipment of coke to the Mingo, Ohio, furnaces and in bringing back coal and scrap. It is believed that the Corporation, if it does not go so far as to make distant shipments by the inland waterways as the Jones & Laughlin Steel Co. has been doing since last fall, will put in service additional barges for interplant shipments and for serving customers in and near Pittsburgh who are so situated as to be able to receive such shipments. A plan of this sort was worked out during the railroad transportation snarls two years ago, but was sidetracked when the railroad situation improved.

Thomas Iron Co. Sale Confirmed

The Thomas Iron Co., Hokendauqua, Pa., by W. A. Barrows, Jr., president, announces that the required amount of the Thomas Iron Co. stock has been deposited with Drexel & Co., bankers, Philadelphia, and the Easton Trust Co., Easton, Pa., the agreement to purchase the iron company stock by Drexel & Co. thereby becoming effective.

Stockholders of the Thomas Iron Co. who have not yet deposited their stock can, under the terms of the agreement, do so now and receive prompt payment at $50 per share.

Notwithstanding published reports that Drexel & Co. are acting for the Reading Iron Co., Mr. Barrows states that the agreement of purchase is solely with Drexel & Co. and that the use of other names in this connection has not been officially authorized.

Remington Arms Plant Taken Over

The General Electric Co. has purchased the Remington Arms Co's. plant at Bridgeport, Conn., for a price said to exceed $3,300,000. The transaction was completed last week. The General Electric Co. two years ago leased the Remington plant, with an option to purchase from the Bridgeport Liquidation Co.

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Straits Tin, New York	Lead		Zinc	
June	Lake	Electrolytic*		New York	St. Louis	New York	St. Louis
28	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
29	13.75	13.50	30.70	5.80	5.55	5.65	5.30
30	13.75	13.50	30.87½	5.80	5.55	5.67½	5.32½
July 1	13.75	13.50	....	5.75	5.55	5.70	5.35

*Refinery quotation.

New York

NEW YORK, July 3.

Because of the Independence Day holiday all the markets have virtually been closed since Saturday, July 1, and almost no trading is reported. In the past week the copper and zinc markets have turned stronger, while lead has become slightly easier. The tin market has been stagnant with prices substantially unchanged.

Copper.—Sentiment is generally unanimous that there will be no further recession in the electrolytic copper market for some time and that the undercurrent is essentially strong with the price tendency upward. There is more inquiry for third quarter and last half delivery and metal for July shipment is becoming scarcer. According to some accounts it is difficult to buy electrolytic copper for July or August shipment at 13.75c., delivered, and it is likely that within two or three days the minimum will be 13.87½c. for this position, with the probability that this level will be the minimum for third quarter. Owing to the strong position of the market, consumers are starting to inquire more liberally. The export market is steady and strong. Sales for June are estimated to have been about 80,000,000 lb., which is considerably lower than April or May, but large under the circumstances. Lake copper is quoted at 13.75c. to 14c., delivered.

Copper Averages.—The average price of Lake copper for the month of June, based on daily quotations in THE IRON AGE, was 13.87c. The average price of electrolytic copper was 13.62c., refinery, or 13.87c., delivered.

Tin.—Buying has virtually come to a standstill and the market is stagnant. The bulk of the large consignment of 2500 tons of tin which arrived June 17 on the steamer Knight Templar has been shipped to consumers and any moderate unsold portions are in strong hands. There is also no pressure to sell lots due to arrive and the position of the market is, as the result, satisfactory. With the holiday in the tin market extending from June 30 to Wednesday, July 5, developments have been very few and this situation is accentuated by the fact that the New York Metal Exchange is also closed during this period. Private cables to-day indicate an advance of approximately £2 to £3 per ton over the London quotations prevailing Friday, June 30, which were £152 12s. 6d. for spot standard, £153 12s. 6d for future standard and £155 12s. 6d for spot Straits. On June 29 a little business in Straits tin was done at a range of 30.62½c. to 30.75c., New York. Total arrivals for June are reported as 5580 tons. The deliveries into consumption have been 5130 tons with 2371 tons in stock and landing on June 30. The latter data are larger than the trade expected.

Lead.—The market is quiet with less demand than there was recently and there is a slightly easing in quotations, particularly at St. Louis. At that point the market is quoted at 5.55c., but it is probable that a desirable order could be put through at 5.50c. There are signs also that the outside market and that of the leading interest are virtually the same at New York. Consumption continues very heavy.

Zinc.—Prices have advanced perceptibly in the past week until prime Western for early delivery is now quoted at a minimum of 5.35c., St. Louis, or 5.70c., New York. Consumers have placed fair sized orders recently and dealers are also buying, but producers generally are inclined to revise quotations as far as possible.

Aluminum.—Wholesale lots of virgin metal, 98 to 99 per cent pure, are quoted by the leading interest at 19.10c., f.o.b. plant, with the same grade of imported metal available from dealers from 17.75c. to 18c., duty paid, New York.

Antimony.—The market is quiet and wholesale lots for early delivery are quoted at 5c., New York, duty paid.

Old Metals.—Business has been rather quiet but values continue firm. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	13.50
Copper, heavy and wire	12.75
Copper, light and bottoms	11.00
Heavy machine composition	10.25
Brass, heavy	[illegible]
Brass, light	6.50
No. 1 red brass or composition turnings	8.75
No. 1 yellow rod brass turnings	7.50
Lead, heavy	4.875
Lead, tea	3.75
Zinc	[illegible]

Chicago

July 3.—The metals are quiet with copper weaker and zinc higher. The advance in zinc seems to be explained by the disinclination of producers to sell at recent low levels. It is pointed out that zinc ore is nearly as high as when zinc sold for 8c. Copper is very weak and in some cases is being sold at considerable concessions under the nominally quoted market. Old metal prices are unchanged. We quote in carload lots: Lake copper, 13.75c.; tin, 32.50c.; lead, 5.60c.; spelter, 5.40c.; antimony, 7c., in less than carload lots. On old metals we quote. Copper wire, crucible shapes and copper clips, 10.75c.; copper bottoms, 8.75c.; red brass, 8.25c.; yellow brass, 6.75c.; lead pipe, 4.25c.; zinc, 2.75c.; pewter, No. 1, 20c.; tin foil, 22.50c.; block tin, 25c.; all buying prices for less than carload lots.

Traffic Congestion in Non-Union Fields

WASHINGTON, July 4.—Present indications point to a total production of less than 5,300,000 tons of coal during the thirteenth week of the strike, according to the Geological Survey, the output of anthracite being negligible. The decline from the twelfth week, when bituminous production totaled 5,337,000 tons, is attributed to traffic congestion in the non-union fields of southeastern Kentucky and parts of southern West Virginia, which prevailed chiefly on Monday and Tuesday. The present rate of output weekly is from 5,000,000 to 6,000,000 tons below normal.

The thirteenth week opened with production at a high rate. Loading on Monday, June 26, were 16,735 cars, the largest on any Monday since the strike began. Owing to the traffic congestion, production was curtailed and loading fell off 11,000 cars on the two days following, but went up to 16,441 cars on Thursday. The decrease in loading is reported to be due not to scarcity of cars but to inability to move them faster than a certain limit set by the existing yard and track facilities and it is noted that the railroads concerned are making new records in volume of traffic handled.

The number of unbilled cars at the mines continues to steadily decrease and was down to 2190 cars of soft coal on June 29 for a group of 22 of the largest carriers holding about 75 per cent of the total number of unbilled loads. This was the lowest point reached up to that date. On all lines on June 24, the number of unbilled cars of soft coal was 3678.

June cement shipments of the Bessemer Limestone & Cement Co., Youngstown, Ohio, from its Bessemer, Pa., property approximated 150,000 bbl., a new monthly record. The company reports firm demand for cement for building construction and road building. Its fluxstone shipments are likewise expanding as blast furnace operations are enlarged. It supplies fluxstone to stacks in the Mahoning Valley and in the Pittsburgh district.

AUTOMOBILE COMPANIES BUY

Ford Motor Co. and the Studebaker Corporation Are Large Purchasers

Manufacturers of Turret Lathes Advance Prices 10 Per Cent—Radial Drills Also Higher

Large automobile production has brought manufacturers into the market for more shop equipment. The Ford Motor Co., Detroit, has placed orders for about $150,000 worth of tools, including a large lathe, die sinking machines, vertical boring mills, etc. It is reported that the Fisher Body Corporation and the Wilson Body Co., Detroit, will be in the market within a month for considerable equipment, mostly woodworking tools. The Studebaker Corporation, South Bend, Ind., has bought some of the tools for which it recently inquired. One purchase of grinding machines totaled about $40,000. The Continental Motors Co., Muskegon, Mich., is buying tools for production of motors for the Star automobile, which will be put on the market by the Durant Motors Co.

The Associated Motor Industries, a new $80,000,000 corporation organized at Dayton, Ohio, which takes in fourteen plants making automobiles, trucks and automobile parts, plans immediate expansion and speeding up of production in all of its units, which gives promise of machine-tool buying from this source.

No buying has been done in Chicago by the railroads whose inquiries for tools have recently been published. It is stated that one or two of the roads will soon purchase a part of their requirements, but no important buying is expected until the strike of railroad shopmen has been settled. The New York Central has purchased several machines.

Municipal buying continues. Joliet, Ill., has bought $25,000 worth of tools, and the Wilmington, Del., fire department has equipped a motor repair shop at a cost of $10,000. The Cleveland Board of Education has received bids on about 30 machines.

Price advances, forecasted by THE IRON AGE a few weeks ago, have been put into effect by a number of manufacturers. The Warner & Swasey Co., Cleveland, announces a 10 per cent advance, effective July 1. Radial drill manufacturers have announced new prices which are from 5 to 7½ per cent higher. Price advances are under consideration by other manufacturers, who say that increasing costs make it imperative that they obtain more money for their products.

New York

NEW YORK, July 3.

The New York Central Railroad has placed orders for an axle lathe, slotter and horizontal boring and drilling machine, but the other machines for which this road recently inquired have not been purchased. The Long Island Railroad has made no purchases against its recent inquiry for about a half dozen machines. The Erie Railroad is reported to have completed its purchase of about 25 tools. It took part new and part used tools.

The McCabe & Sheeran Machinery Corporation, New York, has sold two used Liberty frog and switch planers to the Ramapo Iron Works for its plant at Hillburn, N. Y.

Business in machine tools the past week has been rather quiet, due probably to the holidays this week as well as to the uncertainty regarding the coal situation and the railroad strike. Companies which have sales offices in various centers report that business is considerably better in the Middle West, particularly in the Chicago district, than in the East.

There was great activity in crane purchases the past week in both electric overhead and locomotive cranes. On the whole, the market is greatly improved. One manufacturer of electric hoists reports June as the best month for sales this year and manufacturers of chain blocks also report a heavy month's business in June, numerous dealers having placed orders for chain hoists for stock. Locomotive crane sales are good, although there is still a strong desire on the part of buyers to purchase used cranes when possible. In electric overhead traveling cranes no large orders are pending, but builders are bidding on a number of single cranes and there is reported to be one inquiry in this district for five 5-ton and 10-ton electric cranes.

Among recent sales are: Niles-Bement-Pond Co., two 20-ton electric cranes, 56-ft. 9-in. and 80-ft. spans, three 10-ton, 56-ft. 9-in., 57-ft. and 61-ft. 11-in. spans, two 7-ton, 53-ft. and 61-ft. 11-in. spans and one 5-ton, 27-ft. 3-in. span to the M. W. Kellogg Co., Jersey City, N. J., and a 5-ton, 68-ft. span electric crane to the McIntosh & Seymour Corporation, Auburn, N. Y.; Cleveland Crane & Engineering Co., a 40-ton, 56-ft. span gantry crane to the Phoenix Utility Co., 71 Broadway, New York; Shaw Electric Crane Co., two 3-ton electric cranes and the Chesapeake Iron Works a 10-ton, 28-ft. 4-in. span overhead crane to the Otis Elevator Co., Yonkers, N. Y.; Morgan Engineering Co., a 250-ton overhead traveling crane to the Erie Railroad for Hornell, N. Y., (two 15-ton cranes still pending); Shepard Electric Crane & Hoist Co., nine 1-ton and six ½-ton, "Liftabout" hoists to the Baltimore Car & Foundry Co., for Curtis Bay, Md.; Browning Co., a 20-ton locomotive crane to Isaac Miller's Sons, Lebanon, Pa., a 2-ton locomotive crane to Hurwitz Brothers, Syracuse, N. Y., and two 20-ton locomotive cranes to a Baltimore contractor; Philip T. King, 30 Church Street, New York, a 30-ton, 50-ft. boom used Ohio locomotive crane with 1½-yd. new Hayward bucket to the Girardeau Cement Co., St. Louis, and a 30-ton, 50-ft. boom used Ohio locomotive crane with new Hayward orange-peel bucket to the Atlas Sand Co., Hartford, Conn.; and the Ohio Locomotive Crane Co., a 20-ton, 50-ft. boom locomotive crane to the McDonald Construction Co., Flushing, N. Y.

William Thorpe, 705 Whitlock Avenue, New York, has leased property at the location noted, heretofore occupied by Ejur Brothers, for the establishment of a new plant to manufacture electrically-operated talking machines and parts.

The Buick Motor Co., 1733 Broadway, New York, has awarded contract to the Thompson-Starrett Co., 49 Wall Street, for a six-story service and repair building on Eleventh Avenue, between fifty-fifth and Fifty-sixth Streets, estimated to cost in excess of $200,000. A portion of the building will be used by the Oakland Motor Car Co.

The Orange County Hydro-Electric Corporation, Middletown, N. Y., is disposing of a bond issue of $600,000, a portion of the proceeds to be used for the erection of a hydroelectric generating plant at Mongaup Falls.

The Rathbun & Bird Co., 17 Walker Street, New York, operating a general machine shop, is making inquiries for a vertical milling machine.

The Tunnel Garage, Inc., 3 Charlton Street, New York, has awarded contract to the Ettinger Contracting Co., 44 Court Street, Brooklyn, for a two-story automobile service and repair works, 100 x 200 ft., at 520-28 Broome Street and 55 Thompson Street, to cost about $50,000. G. S. Strivers is president.

The Electric Auto-Lite Co., Poughkeepsie, N. Y., manufacturer of automobile starting and lighting equipment, has been reorganized by Clement O. Miniger and associates,

who recently acquired the local plant, as well as the other factories of the company at Toledo and Fostoria, Ohio. The new company will soon resume operations and has arranged for a bond issue of $3,000,000, a portion of the proceeds to be used for extensions and betterments. Mr. Miniger is president.

The Long Island Railroad Co., Pennsylvania Terminal, New York, is arranging a fund of more than $2,000,000, for extensions and improvements, to include the construction of new power plants, electrical and mechanical equipment purchased, etc. It is proposed to electrify the entire system in the near future. Ralph Peters is president.

The Empire Metal Specialty Co., 327 Sixteenth Street, Brooklyn, is planning for the installation of new equipment to manufacture light metal die products.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until July 25, for a quantity of hacksaw blades for the Navy yards, South Brooklyn, and Philadelphia, as specified in schedule 9646. Also, for 226 ball pein hammers for use at the South Brooklyn yard, and under the same specification, schedule 9649, 840 machine and scaling hammers and copper hammers for Mare Island.

The New York Edison Co., 130 East Fifteenth Street, New York, will commence the immediate erection of a new power house at 19 East Thirty-second Street, to cost about $100,000, including equipment. It is reported to be arranging for the construction of a large generating plant, with cost estimated in excess of $1,200,000.

The Cling Cutlery Corporation, 28 West Forty-fourth Street, New York, has acquired a factory at Welland, Ont., for a new branch plant. It will be operated in the name of its subsidiary organization, the British Empire Cutlery Co.

Motors and other electric power equipment, conveying machinery, etc., will be installed in the new one-story and basement plant, 120 x 200 ft., to be erected at Elmsford, N. Y., by the Horace L. Day Co., 4 White Street, estimated to cost about $250,000.

The Argonaut Service Corporation, New York, has taken title to property on Eleventh Avenue, between Fifty-fifth and Fifty-Sixth streets, and will commence the erection of a six-story automobile service and repair works, estimated to cost about $400,000. Albert Kahn, Marquette Building, Detroit, is architect. Frank J. Davis is president.

The G. A. Schacht Motor Truck Co., Cincinnati, has leased the building at Thirteenth Street and Ely Avenue, Long Island City, recently completed, for an Eastern service and repair works.

Fire, June 24, destroyed one of the buildings at the plant of the Metal & Thermit Corporation, Cornelson Avenue, Jersey City, N. J., with loss estimated in excess of $50,000.

The Arctic Ice Co., Anglesea, N. J., is planning for enlargements in its plant, to include the installation of two 50-ton ice-manufacturing machines, with auxiliary equipment. W. E. Epler is general manager.

A power house will be established in connection with the new five-story addition to be erected by the board of directors, St Mary's Hospital, Passaic, N. J., estimated to cost about $300,000. Crow, Lewis & Wick, 200 Fifth Avenue, New York, are architects and engineers.

A power house, refrigerating and cold storage plant will be installed in the new building to be erected at 142-50 North Canal Street, Newark, by M. Augenblick & Brother, 16 Commerce Street. It will be two-stories and basement, 80 x 105 ft., and estimated to cost close to $75,000. A one-story machine shop will also be built in connection with a garage for company trucks and cars.

A vocational department will be intalled in the proposed high school to be erected at Maplewood, N. J., by the South Orange, N. J., Board of Education, estimated to cost about $500,000.

The Premier Rubber Co., Newark, N. J., recently organized, has leased buildings at 218-24 New Street, for the establishment of a new plant to manufacture rubber products. Possession will be taken at once and machinery installed. It is proposed to commence operations during August. The company is headed by John W. Stoddard, James A. Whitman and W. Howard Demarest, 790 Broad Street.

The Capital Phonolier Corporation, 54-60 Lafayette Street, New York, is making inquiries for two 18-in. swing engine lathes; two 4-spindle drill presses, size up to ½-in. drill; one emery wheel grinder to take an 8-in. wheel; and one 18-in. band grinder, all motor-driven.

The Board of Trade, Hightstown, N. J., is negotiating with a tool manufacturing company, now located at Newark, N. J., whose name is temporarily withheld, for the erection of a local branch plant. A committee composed of Forman A. Updike, Joseph H. Johnes and William H. Franklin is in charge.

The Wheeling Corrugating Co., 16 Desbrosses Street, New York, a subsidiary of the Whitaker-Glessner Co., has awarded contract to the Foundation Co., 120 Liberty Street, for a six-story factory branch, 120 x 140 ft., on Nelson Avenue, Long Island City.

The International Carbon Corporation, New York, recently organized by officials of the Columbian Carbon Co. and the Atlas Powder Co., 200 Fifth Avenue, New York, has preliminary plans under consideration for the construction of a European plant in France to manufacture special carbon products made from lignite, and similar to its works at Marshall, Tex., recently completed. To carry out the project and for other expansion the company is disposing of a stock issue of $1,210,000.

The Van Dorn Iron Works Co., 318 Broadway, New York, with plants at Cleveland and Long Island City, is disposing of a bond issue of $1,000,000, a portion of the proceeds to be used for expansion.

Chicago

CHICAGO, July 3.

No orders have yet been placed against the pending railroad lists, but early action is looked for. It is intimated that one or two roads will purchase only part of the equipment included in their inquiries. The Joliet, Ill., Board of Education has ordered $25,000 worth of machine tools and the Studebaker Corporation, South Bend, Ind., is closing for considerable equipment, one order for grinding machines alone totaling $40,000. The Continental Motors Co., Muskegon, Mich., is buying tools from time to time as required in the development of the Star motor, which it is manufacturing for the Durant Motors Co. Business booked by local dealers during the month of June consisted largely of scattering orders for one or two machines and in the aggregate totaled about same as sales in May. The closing of railroad business which is imminent will mean liberal bookings in July.

The American Tool Works and the Fosdick Machine Tool Co. have both advanced radial drills five per cent. Other radial drill makers are expected to meet these advances and it is expected that other lines of standard machines will be marked up in the near future.

Building permits issued in Chicago in June exceeded all records in number of structures, total frontage and cost. The total cost aggregated $27,500,000 as against $7,484,200 for the same month last year. The permits numbered 1400 and 18,510 ft. of frontage in June, 1921. The record for the first six months of 1922 is also the best in history. Permits numbered 6406, covering 200,058 ft. of frontage and involving $112,000,000, as against 2863 permits, 86,930 ft. and $48,336,950 in the first half of 1921. The best previous record since 1912 was that of the first six months of 1916 with 5551 permits, 176,692 ft. of frontage and $63,078,900. In total cost the first half of this year fell only $12,000,000 behind the total for the twelve months of 1921.

The Indiana Power Co., Vincennes, Ind., is negotiating for the purchase of the power plant and property of the Princeton Light & Power Co., Princeton, Ind. Upon acquisition it will be enlarged and improved. The company is also arranging for the purchase of the power plant at Oakland City, Ind., and will make extensions for service in this district.

The Texas Co. 17 Battery Place, New York, has acquired about 500 acres at Glenrock, Wyo., and will use a portion of the site for a new oil refinery. It will have a capacity of more than 5000 bbl. of crude oil daily, and will include complete by-product operating units for gasoline, naphtha, etc. The plant is estimated to cost in excess of $750,000, including machinery, and it is planned to have the first unit ready for operation in the fall.

The Watson Stabilator Co., Trenton, N. J., has been formed to sell Watson Stabilators in the central New Jersey district. These stabilators are manufactured in Philadelphia by the John Warren Watson Co. and are shipped to the Watson Stabilator Co., Trenton, complete and ready for installing.

E. Edelmann & Co., manufacturers of automobile accessories, have let contract for a two-story plant, 150 x 250 ft., at the southwest corner of Logan Boulevard and Holly Avenue, Chicago, to cost $250,000.

The Kastory Mfg. Co., manufacturer of automobile bodies, La Grange, Ill., has let contract for a one-story plant, 100 x 125 ft., to cost $28,000.

The U. S. Sample Co., printer, 901 South Wells Street, Chicago, has let a contract for a six-story printing plant, 125 x 125 ft., at the southeast corner West Jackson Boulevard and Laflin Street, to cost $350,000.

The Evans L. Reed Mfg. Co., manufacturer of store fixtures and household utensils, Sterling, Ill., will move its plant to Danville, Ill.

The Enterprise Foundry Co., Ft. Wayne, Ind., a recently organized corporation, will open a plant at High and Clark streets soon. A one-story building, 30 x 120 ft., and another two-story structure of the same ground area, have been procured and equipment has been installed. The company will specialize in small gray iron castings.

The Quaker Mill building, near Manchester, Iowa, is being razed by the Iowa Electric Co., preparatory to the erection of an hydroelectric power plant.

The Davis-Watkins Dairymen's Mfg. Co., North Chicago, Ill., manufacturer of dairy supplies, has let contract for a 120 x 160-ft. addition, to cost $80,000.

The Howard Wire Products Co., Terre Haute, Ind., has moved into a new plant on North Waugh Street between Markland Avenue and Harrison Street.

The Ramm & Yahl Brass Foundry Co., Ft. Wayne, Ind., recently organized, will soon start operations in the former plant of the Zimmerman Carpet Cleaning Co., 1911 St. Joe Boulevard. Castings of brass, aluminum, bronze and copper will be manufactured

The Anchor Concrete Mfg. Co., Adrian, Mich., has commenced the construction of an addition which will double its floor space.

Fire, June 21, destroyed a large portion of the plant of the George B. Miller & Son Mfg. Co., Waterloo, Iowa, manufacturer of gasoline engines, tractors, etc., with loss estimated in excess of $500,000, including machinery.

The Chicago & Eastern Illnois Railroad Co., 332 South Michigan Avenue, Chicago, is planning to rebuild its engine house and shop at West Frankfort, Ill., recently destroyed by fire, with loss estimated at $50,000.

The Benjamin Electric Mfg. Co., 806 West Washington Boulevard, Chicago, manufacturer of electrical specialties, is disposing of a bond issue of $1,500,000, a portion of the proceeds to be used for extensions and improvements. R. B. Benjamin is president.

The Minnesota Utilities Co., Eveleth, Minn., has plans in progress for the construction of a hydroelectric generating plant on Falls Lake, near Ely, Minn., with initial capacity of about 12,000 hp., estimated to cost about $1,750,000. R. M. Hesketh is secretary.

The Service Rubber Co., 401 Central Trust Building, Rock Island, Ill., is taking bids for a new three-story plant, 60 x 200 ft., estimated to cost about $100,000. Carrin & Horn, 311 Safety Building, are architects. J. T. Crowley heads the company.

The United Light & Railways Co., Davenport, Iowa, is arranging for a preferred stock issue of $20,000,000, a portion of the proceeds to be used for extensions and improvements.

A vocational department will be installed in the new two-story and basement high school to be erected at Charlton, Iowa, ground for which will be broken at once. William Gordon, Hubbell Building, Des Moines, Iowa, is architect.

The Danville, Champaign & Decatur Railway & Light Co., Danville, Ill., is disposing of a bond issue of $1,000,000, a portion of the proceeds to be used for extensions and improvements.

The American Steel & Wire Co., Denver, Col., has plans under way for the erection of a new building in the vicinity of its works, estimated to cost about $500,000.

The State Board of Control, St. Paul, Minn., will install an electric crane, air compressors and other mechanical equipment in the new mines experiment station at the State university.

The Climax Ice Cream Co., Producers' Dairy and Corbett Dairy Co., Denver, Col., recently affiliated, will install a cold storage plant in connection with a new creamery and dairy plant, estimated to cost about $300,000, including equipment.

The Biflex Products Co., North Chicago Ill., manufacturer of automobile bumpers, has taken title to property adjoining its plant, consisting of a foundry building and land for further expansion. The addition will be used at once for the manufacture of double-barbumpers and it is expected to increase the output more than 100 per cent. The plant area now approximates 5 acres.

The Commonwealth Edison Co., 72 West Adams Street, Chicago, will soon take bids for a new one-story power house, 78 x 100 ft., at 707-15 South La Salle Street.

The J. L. Clark Mfg. Co., Rockford, Ill., manufacturer of metal cans and containers, will commence the erection of a one-story addition, 60 x 190 ft.

Toth & Co., 1301 Larabee Street, Chicago, are arranging for the installation of machine tools, dies and other equipment at their machine shop.

Philadelphia

The James H. Billington Co., 113 Chestnut Street, Philadelphia, manufacturer of textile mill equipment and supplies, has filed plans for a new machine shop at 1528-48 North Fifth Street, to cost about $40,000.

Frederick W. Hosbach, 2415 South Street, Philadelphia, will build a new two-story wood-working plant, 64 x 76 ft., at Twelfth and Brown streets, to include machine shop and other mechanical departments. Henry P. Schneider, 2713 York Road, is architect.

Fire, June 25, destroyed the tankage department at the plant of the Pennsylvania Synthetic Gas & Chemical Co., Sixty-third Street, with loss reported at close to $25,000.

Thomas Savill's Sons, 1310 Wallace Street, Philadelphia, manufacturers of pipe, plumbing equipment, etc., have awarded contract to Seeds & Steinmetz, 1101 Divinity Place, for a two-story foundry, 42 x 60 ft., at 635-7 North Watts Street. H. B. Waldon, 10 South Eighteenth Street is architect.

The N. & G. Taylor Co., 300 Chestnut Street, Philadelphia, has awarded contract to the Belmont Iron Works, Twenty-second Street and Washington Avenue, for a one-story foundry, 50 x 90 ft., and one-story general manufacturing building, about 75 x 140 ft., at Cumberland, Md.

The American Motor Body Co., Eighteenth and Lehigh Streets, Philadelphia, operated by the Hale & Kilburn Co., is arranging for increased production, following the receipt of a contract from the Durant Motors, Inc., New York, for 50,000 car bodies.

T. B. Martindale, Broad Street and Allegheny Avenue, Philadelphia, has awarded contract to the Bowden Construction Co., 1935 Chestnut Street, for a two-story automobile service and repair building, 100 x 265 ft., estimated to cost approximately $100,000.

The Philadelphia Paper Mfg. Co., River Road, Philadelphia, is said to be arranging for the early purchase of cranes and conveying machinery for installation at its new building at Nixon and Fountain streets, now in course of erection. It has also filed plans for improvement in its present building at this location.

W. D. Warren, Mt. Holly, N. J., has awarded a contract to McCloskey & Co., 1620 Thompson Street, Philadelphia, for a one-story automobile service building, with machine repair department, 40 x 100 ft., estimated to cost approximately $55,000. Folsom & Stanton, Fuller Building, Philadelphia, are architects.

A one-story machine repair shop, 48 x 60 ft., will be constructed by the Lebanon Silk Co., Lebanon, Pa.

The Rowe-Stuart Motors Corporation, Lancaster, Pa., has plans nearing completion for a new plant, 270 x 325 ft., on Fountain Avenue, for the manufacture of motor truck equipment.

August N. C. Madsen, Harrisburg, Pa., operating a concrete block manufacturing plant at Nineteenth and Pemberton streets, has tentative plans under consideration for enlargements to increase the output from 1500 to 3600 blocks per day. Automatic machinery will be used for production.

A vocational department will be installed in the two-story and basement high school, 140 x 180 ft., to be erected at Leechburg, Pa., estimated to cost about $250,000. W. G. Eckles, Lawrence County Bank Building, New Castle, Pa., is architect.

The Womelsdorf Electric Co., Womelsdorf, Pa., recently organized by officials of the Berkshire Electric Co., 50 North Duke Street, Lancaster, Pa., is considering extensions and improvements in the municipal power plant, just acquired. In the future it will be operated as a private enterprise.

The Blue Mountain Electric Co., Millersburg, Pa., is planning the construction of a new hydroelectric power plant on local site, recently acquired.

J. K. Wetzel & Sons, Shamokin, Pa., will commence the immediate erection of a two-story automobile service and repair works, 80 x 100 ft. William H. Lee, 32 South Seventeenth Street, is architect.

James J. H. McNally and A. W. Grant, Harrison Building, Philadelphia, have commissioned N. W. Akimoff, same address, mechanical engineer, to prepare plans for new works at Fourth, Sixth and Water streets, Camden, N. J., to manufacture American Diesel engines, to be one and two stories, 100 x 500 ft., estimated to cost close to $500,000, with machinery. The city will vacate a number of streets at the site, and a bond of $25,000 has been posted to insure the construction. A company is being organized to build and operate the plant.

The Cumberland Valley Light & Power Co., Harrisburg, Pa., has arranged for a bond issue of $40,000 for extensions and improvements.

A vocational department will be installed in the two-story and basement high school, 130 x 150 ft., to be erected at Dunlo, Pa., estimated to cost about $100,000. W. C. Ackles, Lawrence County Bank Building, New Castle, Pa., is architect.

The Jones Machine Works, Fifty-third Street and Lansdowne Avenue, Philadelphia, is said to be arranging a list of equipment for installation at its proposed new machine shop at Primos, Pa., estimated to cost about $50,000.

Motors, conveying apparatus and other mechanical and electrical equipment will be installed in the addition to be constructed by the Blumenthal Brothers Co., Margaret and James streets, Philadelphia, estimated to cost about $175,000. The Ballinger Co., Twelfth and Chestnut streets, is architect.

Motors, controlling devices and other electrical and mechanical equipment, will be installed in the new two-story printing plant to be constructed on Main Street, Washington, Pa., by the Observer Publishing Co., estimated to cost about $150,000.

A vocational department will be installed in the new two-story high school to be constructed at Throop, Pa., estimated to cost about $170,000. John J. Howley, Traders' Bank Building, Scranton, Pa., is architect.

The Bethlehem Foundry & Machine Co., Front Street, Bethlehem, Pa., has acquired the plant and business of the Wedge Mechanical Furnace Co., Greenwich Point, Philadelphia. It includes patents for the furnaces manufactured for mining service, and the new purchaser will remove this branch of the business to its works at Bethlehem.

Detroit

DETROIT, July 3.

The Motor Wheel Corporation, 701 East Saginaw street, Lansing, Mich., has awarded contract to the H. G. Christman Co., Lansing, for two additions, each one-story, 120 x 400 ft., and 120 x 240 ft., respectively. The larger structure will be used for the manufacture of wire wheels, etc., and the other building for gear production. M. E. Harper is president and general manager.

The Ryan Foundry Co., Lansing, Mich., will develop maximum capacity at its plant at once. A contract has been secured from the Grant Motor Co., Cleveland, for castings for 100,000 automobile engines.

The Common Council, North Muskegon, Mich., will install an electrically operated pumping plant in connection with its proposed new waterworks, estimated to cost about $300,000.

The Michigan Gas & Electric Co., Ishpeming, Mich., has plans nearing completion for a new electric generating plant at Three Rivers, Mich., estimated to cost in excess of $100,000. An addition will also be erected to the present plant at Constantine, Mich., to cost about $40,000.

The Gibson Refrigerator Co., Greenville, Mich., manufacturer of refrigerators and refrigerating equipment, has awarded contract to J. Herrmann & Son, Perkins Building, Grand Rapids, for a four-story addition.

The Whitcomb Hotel Co., St. Joseph, Mich., has plans under way for a new power house. Cahill & Douglas, 217 West Water Street, Milwaukee, Wis., are engineers.

The Detroit Steam Motor Corporation, 38 Hendrie Street, Detroit, manufacturer of steam-driven automobiles, has tentative plans under way for the establishment of a branch plant at Windsor, Ont., to be operated under the name of the Windsor Steam Motors, Ltd.

The Bay City Freezer Co., Bay City, Mich., has completed plans for a new one and three-story ice-manufacturing plant.

The Morse Chain Co., Ithaca, N. Y., manufacturer of silent chain transmissions, has preliminary plans for a new branch factory at Detroit, and has secured a site on the Detroit Terminal Railway line, near Warren Avenue. It will be of reinforced concrete and will approximate 60,000 sq. ft. of area.

The Hayes Wheel Co., Jackson, Mich., is disposing of a stock issue of $825,000, a portion of the proceeds to be used for extensions. It operates branch plants at Albion, Mich., and Anderson, Ind., with total production of about 16,000 automobile wheels daily.

The Wilson Foundry & Machine Co., Pontiac, Mich., a subsidiary of the Willys-Overland Co., Toledo, Ohio, is arranging for immediate increase in the manufacture of Willys-Knight motors. A portion of the No. 3 plant of the company will be used for this purpose, and it is proposed to double, approximately, the present output.

The Cadillac Malleable Iron Co., Cadillac, Mich., was incorporated recently with capital stock of $350,000 to manufacture malleable iron castings and related products. The malleable castings produced at this plant will be made exclusively of charcoal iron. Officers of the company are: J. C. Ford, president; C. T. Mitchell, vice-president; R. J. Teetor, secretary and general manager; George G. Brown, treasurer. Construction of the plant was begun in 1921, but work was delayed and the plant is now being completed. Equipment is being installed and manufacturing operations will begin late in the summer. The Foundry Equipment Co., Cleveland, will install the core ovens; Holcroft & Co., Detroit, will put in the air furnace; steel work was fabricated and erected by the Indiana Bridge Co., Muncie, Ind., steel sash being furnished by the Detroit Steel Products Co., Detroit.

The Furnace Fan Co., capital $50,000 preferred and 150,000 shares no par value common stock, has been formed to manufacture appliances used in connection with hot air systems. An option has been secured on a vacant plant at Dowagiac, Mich. The incorporators are: N. B. Wales, Kalamazoo; Dr. F. N. Bonine, Niles, and Marinus Vander-Maas, Plainwell.

The C. G. Spring Co., Kalamazoo, has purchased the machinery and plating plant of the Shakespeare Products Co. and will operate it in the future.

Milwaukee

MILWAUKEE, Wis., July 3.

It is stated by sales directors of large machine-tool manufacturing concerns in this market that more real progress was made in sales and production in June than in any month in nearly two years, while at the close, the prospects were much more favorable as well. The outlook embraces genuine hope of a renewal of demand from railroad sources, despite their labor difficulties. The buying of tools by automotive shops is well sustained. Manufacturers of milling machines report increasing patronage and active inquiry, which in the last four to six weeks enabled them to advance production schedules to some extent, although the rate of operations still is unsatisfactory from the standpoint of profitable operation. In the local tool trade there is no expectancy of a sudden demand, but hope is well grounded that the improvement noticeable in the last 60 days will continue. This view is supported by the steadily growing scope of foundry operations and the new construction movement, especially in metal-working industries.

The Bahde Mfg. Co., 2621 Vine Street, Milwaukee, a new corporation organized to do a general jobbing machine shop business, has engaged Leiser & Holst, 105 Wells Street, to design a one-story brick and steel shop, 30 x 150 ft., to be erected at Thirtieth and Chambers streets. A miscellaneous list of equipment for toolroom and production purposes will be purchased at once. Carl A. H. Bahde is president and general manager.

The Middle West Mfg. Co., Beaver Dam, Wis., has been incorporated with an initial capitalization of $30,000 to manufacture farm tools, barn equipment, steel dairy fixtures, etc. It plans to take over an existing plant, but details have not been given out. The incorporators are C. A. Friday, W. R. Zimmerman and M. B. Bulger.

The West Bend Aluminum Co., West Bend, Wis., manufacturer of aluminum stampings, drawn-ware, novelties, etc., is undertaking an important steam power plant enlargement project, involving the purchase of additional boilers, generators, two new steel stacks and other equipment. The work is in charge of the Federal Engineering Co., 444 Milwaukee Street, Milwaukee.

The Willow River Power Co., Hudson, Wis., is a new $500,000 corporation chartered in Wisconsin to build, maintain and develop water powers and steam generating plants and distributing and transmission systems. It is hoped to start work this year on an extensive water power development project on the St. Croix River and Willow River branch. Tentative specifications are under consideration. The principals in the enterprise are F. P. Buckhardt, A. P. Schultz and B. A. Buckhardt, of Hudson.

The Pawling & Harnischfeger Co., Milwaukee, has taken an order for one 10-ton electric traveling crane for the new plant which is being erected by the Claybourn Process Corporation, formerly of Menasha, Wis., at Humboldt Avenue and Franklin Street, in Milwaukee, at a cost of $500,000 Herman J. Esser, Camp Building, Milwaukee, is supervising architect.

The Board of Education, Stevens Point, Wis., has let the general contract to the Immel Construction Co., Fond du Lac, Wis., for a new high school with manual training departments, estimated to cost $250,000. Vocational equipment will not be purchased until early in the fall. Robert A. Messmer & Bro., Majestic Building, Milwaukee, are the architects.

The Wisconsin Valley Electric Co., Wausau, Wis., has purchased the entire holdings of the Tomahawk, Wis., Light, Telephone & Improvement Co., taking possession July 1. The new owner plans to develop a 67-ft. head at Grandfather Dam, the highest waterfall on the Wisconsin River, between Tomahawk and Merrill, at an estimated cost of $200,000. Specifications are now in preparation.

The Milwaukee Vending Machine & Mfg. Co., Milwaukee, has been incorporated with a capital stock of $25,000 to manufacture special devices and appliances. A plant has been acquired at 1261 Kinnickinnic Avenue and is now being equipped. The principals are William O'Brien, 966 Mound Street; Robert W. McCormick, and Robert F. Downey, 391 Pryor Avenue, local.

Henry Behrens and Ervin H. Stibbe, Peshtigo, Wis., conducting a machine shop and garage, are organizing a new corporation to engage in quantity production of a line of special automotive service shop tools designed and patented by Mr. Behrens, principally an engine stand and bearing tool.

The Lusk Light & Power Co. of Lusk, Wis., has been incorporated with a capital stock of $25,000 to build and operate hydroelectric generating plants and generally furnish electric current for light and power purposes. The incorporators are P. M., A. K. and O. L. Pederson, all of Lusk.

The E. J. Pfiffner Lumber Co., Stevens Point, Wis., has plans for a two-story brick and concrete planing mill, 60 x 110 ft., which will require a full complement of new machinery with individual electric motor drive. The architect is Frank Spalenka, Stevens Point.

The Bukolt Mfg. Co., Stevens Point, Wis., manufacturer of automotive specialties and steel-shod tire protecting devices, is making inquiry for additional miscellaneous equipment to handle a 10-year contract for tire protectors from the Atlantic Coast Auto Exchange, Inc., Baltimore, Md., representing $100,000 a year. John J. Bukolt is president and general manager.

The Menasha Machinery Mfg. Co., Menasha, Wis., has filed a notice of dissolution. The interests of the concern have been embodied in the Claybourn Process Corporation, which is now erecting a $500,000 plant in Milwaukee equipped for manufacturing multi-color printing presses. L. W. Claybourn, president of the dissolved concern, is president and general manager of the new corporation.

The Northwest Engineering Works Co., Green Bay, Wis., is increasing its output of crawler type traveling cranes and hoists from two a week to four and is planning to place its plant on a 24-hr. schedule to meet demands from all sections of the United States.

The Wisconsin Power, Light & Heat Co., Madison, Wis., which is engaged in a plant enlargement program involving an additional investment of about $750,000, has recently increased its authorized capitalization from $2,000,000 to $3,000,000, the new issues consisting of $1,000,000 common and $2,000,000 preferred stock.

The Gulf States

BIRMINGHAM, July 3.

The Wright Steam Motor Co., J. B. Wright, president and general manager, Baton Rouge, La., has plans under way for new works to manufacture steam-operated engines for automotive service, comprising a main building 100 x 150 ft., with smaller structures. A list of equipment is being arranged.

The oil refinery of the Beaver Electra Refining Co., Electra, Tex., has been acquired by D. E. DeCourse, Devol, Okla., and associates. A company will be formed to operate the plant at an early date. A number of extensions and improvements will be made.

James E. Taylor, Cleburne, Tex., is organizing a company to construct and operate a local electric power plant. It is said that the plant will cost about $50,000.

The Common Council Homestead, Fla., has advanced the date for bids for equipment for its municipal electric power until July 28. The apparatus will include two complete turbo-generator sets, each 300 kw., three phase, 60 cycle, 2300 volts; two boilers, each 150 to 200-hp.; one 10-panel switchboard, and one 10-ton traveling crane. B. M. Duncan is engineer; R. E. Edwards is town clerk.

The Ford Motor Co., Highland Park, Mich., will take bids at once for a new one and two-story assembling plant on property recently acquired at New Orleans, 430 x 460 ft., on North Peters Street. Albert Kahn, 1000 Marquette Building, Detroit, is architect.

J. D. Ford, Bristow, Okla., is organizing a company to construct and operate a new oil refinery in the vicinity of Cross Plains, Tex.

The Edwards Wheel & Body Co., 204 Washington Street, Dallas, Tex., has filed plans for a new one-story plant.

The Nueces County Water Improvement District Commissioners, No. 3, Robstown, Tex., will erect an electrically operated pumping plant in connection with an irrigation project in the north central section of the county. It will have a capacity of about 18,000 gal. per min.

Plans are being perfected for the reorganization of the Louisiana Motor Car Co., Cedar Grove, La., and it is expected to begin operations at an early date. Improvements will be made and new equipment installed. The reorganization is being carried out under the direction of the Commercial National Bank, which recently acquired the physical properties of the company.

The Pine City Property Owners, Progressive Association, Pine City, Fla., has preliminary plans in progress for a municipal electric light and power plant. J. A. Monney is secretary.

The Jahncke Dry Docks, Inc., New Orleans, La., has arranged for a bond issue of $1,500,000, a portion of the proceeds to be used for extensions, improvements, etc. Ernest L. Jahncke is president.

The West Florida Power Co., Tallahassee, Fla., recently organized with a capital of $1,000,000, is perfecting plans for a new hydroelectric generating plant on the Ocklocknee River, including transmission system, estimated to cost in excess of $400,000. B. H. Hardaway, Sr. and Jr., head the company.

Fire, June 23, destroyed a portion of the plant of the Lee Lumber Co., Alexandria, La., including saw mill, with loss estimated at about $100,000, including machinery. It is proposed to rebuild at an early date.

The Texas Boiler Works, 3214 Hickory Street, Dallas, Tex., has arranged for the establishment of a department for the repair and overhauling of railroad tank cars.

The Western Compress & Storage Co., Abilene, Tex., is planning the erection of a series of branch cotton compress and storage plants at McKinney, Hamlin, Sweetwater and Slaton, Tex., estimated to cost about $80,000, including equipment.

The Bennett Motor Co., Breckenridge, Tex., has leased a two-story building, 100 x 150 ft., to be erected on local site, for the establishment of a new service and repair works. It will cost close to $50,000.

Fire, June 23, destroyed a portion of the plant of the Stamford Cotton Oil Co., Stamford, Tex., with loss estimated at about $40,000, including equipment.

The Central South

ST. LOUIS, July 3.

The Huntzinger Advertising & Mfg. Co., 909 Baltimore Avenue, Kansas City, Mo., manufacturer of metal novelties, has awarded contract to the Pratt-Thompson Construction Co., 505 Republic Building, for a new six-story and basement plant, 30 x 140 ft., at 108 West Tenth Street, estimated to cost $110,000, including equipment. The Reyburn Engineering Co., 609 Weidheim Building, is engineer.

E. J. Robinson, Cheney, Kan., is arranging a list of equipment for installation in a machine shop for automobile repairs and other work.

The Farris Hardwood Lumber Co., Nashville, Tenn., is planning to rebuild the portion of its saw mill, recently destroyed by fire, with loss estimated at close to $45,000.

The Mississippi River Commission, First and Second districts, Custom House, Memphis, Tenn., will receive bids until July 15, for one marine type refrigerating and ice-making plant.

The Duncan Machinery Co., 721 North Central Avenue, Knoxville, Tenn., machinery dealer, is making inquiries for locomotive type boilers and other power equipment.

Electric equipment, hoisting machinery, power equipment, conveying apparatus will be installed in the new elevator to be constructed by the Victory Mill & Elevator Co., Wichita, Kan. T. F. Dawkins is secretary.

A vocational department will be installed in the new high school to be erected at Mount Pleasant, Tenn., estimated to cost about $75,000, revised plans for which have been prepared by George Waller, architect, Independent Life Building, Nashville, Tenn.

The Oklahoma General Power Co., Muskogee, Okla., has plans under way for the erection of a new electric power plant with initial capacity of about 10,000 hp.

The Goodwin-Field Motor Car Co., 250 East Main Street, Lexington, Ky., has plans nearing completion for a new one-story service and repair works, 100 x 200 ft.

The Gary Eagle Marble Mills, Knoxville, Tenn., operated by the Gray Eagle Quarries, will commence the construction of a new one-story plant, 125 x 160 ft., to be equipped for cutting, finishing, polishing and kindred operations. It is estimated to cost close to $40,000, including equipment. Charles L. Lawton is architect in charge.

The Wichita Key & Novelty Co., 132 North Topeka Avenue, Wichita, Kan., is planning for the installation of a number of machine tools and other equipment.

The Associated Gas & Electric Co., operating the Kentucky Public Service Co., Bowling Green, Ky., and other electric power organizations, has arranged for a preferred

stock issue of $270,000, a portion of the proceeds to be used for extensions and improvements.

The Motor-Q Battery Co., 1619 East Douglas Avenue, Wichita, Kan., is planning for the installation of machine tools and other equipment. J. W. Martin heads the company.

The Board of Administration, State Penitentiary, Lansing, Kan., will build a new power house at the institution. James A. Kimball, State House, Topeka, Kan., is business manager in charge.

The Dixie Power Co., Memphis, Tenn., has plans under way for a hydroelectric generating plant on the White River, estimated to cost in excess of $750,000, including machinery and transmission system.

The Hermitage Portland Cement Co., 174 Third Avenue, North, Nashville, Tenn., has work under way on its mill at Old Hickory, and is receiving bids for the machinery installation. A power house will be established in connection with the new plant, which is estimated to cost approximately $1,000,000. R. T. Miller is secretary.

The Saline River Hardwood Co., Pine Bluff, Ark., has plans under way for extensions and improvements in its plant to cost about $100,000. New machinery will be installed.

An electric power house will be installed in the new plant to be established by the Silk Tie Knitting Co., Knoxville, Tenn., recently organized. V. H. Spruill is president.

The Success Specialty Co., P. O. Box 102, Bells, Tenn., is making inquiries for a quantity of wood-working machinery, electric motors and other power apparatus.

The Ozark Creamery Co., Neosho, Mo., is planning for the installation of new refrigerating machinery at its ice-manufacturing and cold storage plant.

Indiana

INDIANAPOLIS, July 3.

The Chapman Price Steel Co., Shelby Street, Indianapolis, is preparing plans for an addition to its plant, forming a complete operating unit, estimated to cost about $500,000, including machinery. Lief Lee, Frick Building, Youngstown, Ohio, is engineer. Niles Chapman is president.

Joseph Entwhistle, Terre Haute, Ind., has leased the plant of the Terre Haute Vitrified Brick Co., St. Mary's, recently purchased by Charles Minshall. It will be remodeled for the manufacture of face brick instead of paving brick, as heretofore.

The Rockford Mfg. Co., 2001 English Avenue, Indianapolis, manufacturer of transmission pulleys, etc., has awarded contract to the Builders' Construction Co., 840 North Meridian Street, for a new one-story machine shop, estimated to cost about $40,000.

George Raub, Logansport, Ind., has acquired property on Broadway as a site for a new two-story automobile service building, including machine repair shop.

A vocational department will be installed in the new two-story and basement East Side high school to be erected at Evansville, Ind., estimated to cost about $300,000, including equipment. J. C. Llewellyn, 38 South Dearborn Street, Chicago, is architect.

The Studebaker Corporation, South Bend, Ind., has laid foundations for five new buildings, comprising a four-story structure, 100 x 600 ft.; a one-story shop, 50 x 96 ft.; a two-story shop, 72 x 156 ft.; one-story car loading and car storage building, and a one-story power house addition, 50 x 50 ft. The extensions will cost in excess of $500,000. Albert Kahn, 1000 Marquette Building, Detroit, is architect.

W. J. Holliday & Co., Indianapolis, manufacturers of iron and steel products, has acquired for future expansion, through its subsidiary organization, the J. S. Holliday Realty Co., property at 110-16 South Meridian Street, 48 x 195 ft., improved with a machine shop and adjoining building.

The Calumet Tank & Mfg. Co., Hammond, Ind., will commence the erection of a new one-story foundry, 60 x 130 ft. on Industrial Road, estimated to cost about $75,000.

Buffalo

BUFFALO, July 3.

The Ulrich Plan File Co., 516 West Fourth Street, Jamestown, N. Y., is planning for the erection of a new factory, estimated to cost close to 25,000.

The Romer Axe & Tool Co., 805 Main Street, Dunkirk, N. Y., will install electric motors and other electrical equipment at its plant.

The plant and property of the Parenti Motors Corporation, Buffalo, bankrupt, is being purchased by the Hanover Mfg. Co., from the Marine Trust Co., trustee, for about $225,000. The new owner will take immediate possession and will install machinery for the manufacture of a small automobile, two-cylinder, air-cooled motor, designed to take the place of motorcycles.

A vocational department will be installed in the new two-story high school, 50 x 130 ft., to be erected at Clarence, N. Y. Herbert C. Swain, 52 West Chippewa Street, Buffalo, is architect.

The Mancusco & Son Co., 322 Elliott Street, Batavia, N. Y., has plans for a two-story automobile service and repair building, 81 x 100 ft., on East Main Street, estimated to cost close to $50,000.

The Eberhardt Steel Products Co., 43 Chelsea Street, Buffalo, is planning for the installation of forge shop equipment in an extension.

The Niagara Gorge Power Co., Niagara Falls, N. Y., has tentative plans under consideration for a new hydroelectric generating plant on the lower Niagara River.

A vocational department will be installed in the new three-story high school, 180 x 275 ft., to be erected at Pine Avenue and Portage Road, Niagara Falls, N. Y., estimated to cost $450,000. It will replace a building recently destroyed by fire. The Associated Architects of Niagara Falls, Inc., Niagara and Third Streets, is architect.

The Allen Mfg. & Welding Corporation, 163 Adams Street, Buffalo, is arranging a list of equipment for installation at its new plant on Washington Street.

Pittsburgh

PITTSBURGH, July 3.

Business in machinery and equipment in June in this district has fallen short of the expectations created by the good showing of the previous month. Inquiries have not fallen away materially, but for some reason, presumably to get the benefit of freight rate reductions, effective July 1, or because of the uncertainty caused by the coal strike and the threat of labor troubles on the railroads, growing out of the wage reduction which went into effect Saturday, buyers have been extremely cautious in the matter of placing orders. No general lists of machine tools lately have appeared and while the day to day busines reaches a fairly satisfactory aggregate, it is not as pleasing to the trade as would be individual orders calling for several tools.

The crane market still shows a fair degree of activity. The Pittsburgh Plate Glass Co., Ford City, Pa., has placed an order for two 5-ton, 100-ft. span Shaw cranes, while the Morgan Engineering Works, Alliance, Ohio, has taken an additional 75-ton ladle crane and a 25-ton standard crane for the Steubenville works of the Wheeling Steel Corporation. The Alliance Machine Co., Alliance, Ohio, has been awarded four cranes by the Weldless Tube Co., Wooster, Ohio. Formal inquiry for 35 to 40 cranes for the new plant of the National Tube Co., Gary, Ind., is likely to go out soon. Engineering plans are completed and excavation and grading work is expected to start in the near future. The company itself probably will make most of pipe-bending, straightening and other machinery for this plant.

The Youngstown Steel Co., Youngstown, Ohio, H. Z. Hixler, Youngstown, chief engineer, recently broke ground for a new plant and has placed the order for a muck bar mill with the United Engineering & Foundry Co. This company will engage in wrought iron made in mechanical puddlers. The General Electric Co. has taken the order for a 1000-kw. turbo-alternator unit, three-phase, 60-cycle, 2300 volts, with exciter and switchboard complete, for the Preston County Coke Co., Morgantown, W. Va. The condenser to go with the alternator has been placed with the Wheeler Condenser & Engineering Co., Carteret, N. J.

The Star Ornamental Iron & Works Co., 3625 Frazier Street, Pittsburgh, is planning for the installation of additional equipment.

The Clarion River Power Co., Johnstown, Pa., affiliated with the Penn Public Service Co., with headquarters at the same place, is perfecting plans for the first of three new hydro-electric generating plants at Piney Creek, Clarion River. It will have an initial capacity of 22,000 hp., and is estimated to cost about $3,000,000. The company has two other sites on the same river, and will develop these later. A bond issue of $2,700,000 is being sold to be used in connection with immediate construction. F. T. Hepburn is president of both companies.

A vocational department will be installed in the two-story and basement high school addition to be erected at McKeesport, Pa., estimated to cost about $300,000. T. B. and Lawrence Wolfe, Century Building, Pittsburgh, are architects. Inquiries are being made for machine tools and other equipment.

Ovens and power equipment, electrical apparatus, conveying machinery, etc., will be installed in the new three-story baking plant to be erected at New Kensington, Pa., 80 x 100 ft., by the Premier Baking Co., an interest of the Fayette Baking Co., Connellsville, Pa., estimated to cost about $100,000, including equipment. B. H. Prack, Keystone Building, Pittsburgh, is architect

The Blystone Mfg. Co., Cambridge Springs, Pa., manu-

facturer of concrete products, etc., is planning for a one-story works, 90 x 400 ft., and a two-story structure, 40 x 95 ft., to replace buildings recently destroyed by fire.

The Stonecrete Corporation, 6023 Penn Avenue, Pittsburgh, Pa., will install a quantity of used machinery, including lathes, drill press, shaper, boring mill, punch and shear, etc. Inquiries are being made.

Cunningham, Miller & Enslow, Huntington, W. Va., will install conveying and other equipment at their coal properties, at Kistler, W. Va., to cost about $25,000.

In connection with extensions and the installation of new equipment at the municipal waterworks, Fairmont, W. Va., bids for which will be received until July 10, quotations are also being asked for an electrically-operated hoist for handling screens. Fuller & McClintock, 170 Broadway, New York, are consulting engineers.

The Spencer Coal Co., Whitby, W. Va., is planning for the installation of new electrical equipment and other machinery. It has arranged for a change of name to the Bowyer Smokeless Coal Co W. H. Ruby heads the company.

The Hardy Coal Co., Huntington, W. Va., has plans under way for the installation of electrical machinery and other equipment on property recently acquired in McDowell County. Paul Hardy is president.

The Manown Mfg. Co., Oliver Building, Pittsburgh, manufacturer of firebrick, is about to begin the erection of a new plant.

A vocational department will be installed in the new high school to be erected at Sewickley, Pa., estimated to cost about $250,000. Press C. Dowler, Magee Building, Pittsburgh, is architect.

The Lakeside Refining Co., Franklin, Pa., is planning for extensions and improvements in its oil refinery, comprising the former plant of the Foco Oil Co., recently acquired, estimated to cost about $55,000.

The H. M. Crawford Coal Co., Grafton, W. Va., is considering rebuilding the tipple at its properties, destroyed by fire June 27.

B. L. Bailey, Bluefield, W. Va., has awarded a contract to the W. T. Owen Co., Earle Avenue, for a new four-story automobile service and repair works, 83 x 120 ft., estimated to cost about $50,000.

The Hall & Thomas Co., 45 Hilton Street, Bradford, Pa., manufacturer of cement and concrete products, is planning for the installation of new equipment. B. F. Hall heads the company.

The Island Creek Coal Co., Holden, W. Va., will soon arrange for the equipment installation in its new machine shop, plans for which are under way. The structure will replace a works recently destroyed by fire with loss of about $75,000.

New England

BOSTON, July 3.

May was one of the most unprofitable months experienced by the New England machine tool trade in several years, and June was not appreciably better, according to a majority of dealers. In the closing days of June, however, there were tangible indications of a turn for the better. Prospects, which in the aggregate amount to a considerable investment by customers, believed by the machine tool trade to have passed beyond the active stage, are again showing life. The renewed activity generally is ascribed to a growing belief among users that the price situation is stronger and that the machine tool market has passed its extreme low point of depression. Substantiating this is the announcement during the past week of advances on some sizes of turret machines amounting to 10 per cent, and on small radial drills about 7½ per cent. These follow closely on advances in standard lathes. In addition, the inclination to cut prices on planers is less noticeable.

Business the past week was interrupted by holidays. Virtually all Boston machine tool houses closed from Saturday to Wednesday. Previous to Saturday, however, sales of new machines again exceeded those of used machinery, but the largest single transaction was six specially designed profilers, purchased by a Massachusetts textile machinery manufacturer. Sales of new tools otherwise were of one or two machines in individual cases and include a No. 3 Universal milling machine to a Connecticut concern; hoist equipment having 4000 lb. capacity to a Massachusetts textile machinery maker; a 1 x 15-in. turret lathe to a Worcester screw manufacturer; numerous bench drills to radio manufacturers and machine shops engaged on special work, and hand screw machines to local and out of town machine shops. Inquiries for used equipment are coming from New York, Pennsylvania and New Jersey, as well as from various New England points. In connection with radio appliances, it is interesting to note that manufacturers are quoting twelve and thirteen months' deliveries.

The demand for small tools continues active. June bookings by the leading machine tool houses were fully up to those of May, which was an exceptionally good month. The call for machine parts is less active, however. Some sizes of motors are difficult to obtain.

The J. T. Robertson Co., soap, Manchester, Conn., is to construct a $100,000 plant, two stories, 60 x 150 feet.

The Kenney Electric Co., New London, Conn., capitalized for $300,000, has been incorporated to manufacture electric safety razors. It will begin business with $150,000. The incorporators are C. H. Kenney, William Weiner, Richard Hendel, Joseph Swartz and George Packer.

Considerable damage was done to the floating machine shop owned by Howard & Horne, Portland, Me., when it capsized last week. Heavy machinery and tools probably will be a total loss.

The Stafford Co., Readville, Mass., textile machinery, has sold $550,000 8 per cent cumulative preferred stock. Funds derived from this sale will be used to pay off floating indebtedness, provide additional working capital and the purchase of equipment and material.

The MacKenzie Co., P. O. Box 432, Westerly, R. I., manufacturer of textile machinery, is considering the installation of spinning frame equipment and other machinery.

The Bantam Ball Bearing Co., Bantam, Conn., has taken bids for an addition to its plant at Litchfield, Conn., to cost about $150,000, including equipment. The Fletcher-Thompson Co., Fairfield Avenue, Bridgeport, Conn., is architect.

The Carroll Wire Co., Huntington Avenue and East Aurora Street, Waterbury, Conn., recently incorporated, has elected the following officers: P. H. Carroll, president; V. J. Carroll, vice-president and treasurer; F. W. Carroll, secretary and assistant treasurer. It will operate a plant at the above address.

The Maine & New Brunswick Power Co., Presque Isle, Me., will make enlargements and improvements in its power plant. New equipment will be installed. A. R. Gould is general manager.

S. J. Cardner, 32 Taylor Street, Springfield, Mass., will commence the immediate erection of a new one-story automobile service building, 55 x 220 ft., with machine repair shop, at 162 North Main Street. C. C. West, 25 Harrison Avenue, is architect.

The American Electric Service & Maintenance Co., Springfield, Mass., will use its new building, recently completed, for a complete line of repair work for electric power equipment, including motor rebuilding, transformer rewinding, etc.

The Worcester Cold Storage & Warehouse Co., 284 Franklin Street, Worcester, Mass., will build an addition to its cold storage plant, to cost close to $40,000

A vocational department will be installed in the three-story high school to be constructed on Commercial Street, Adams, Mass., estimated to cost $350,000. The Frank Irving Cooper Corporation, 33 Cornhill Street, Boston, is architect.

Fire, June 25, destroyed a portion of the plant of the American Powder Co., South Acton, Mass., with loss approximating $100,000.

A one-story power house will be erected by the Sturdy Memorial Hospital, Attleboro, Mass. Kendall, Taylor & Co., 142 Berkeley Street, Boston, are architects: R. D. Kimball Co., 6 Beacon Street, Boston, are consulting engineers.

The Oldsmobile Co., Hartford, Conn., has purchased a site on Main street, Manchester, Conn., and will build a garage and service station.

Cleveland

CLEVELAND, July 3.

The Ford Motor Co., Detroit, placed orders during the week, for about $150,000 worth of equipment including a heavy duty engine lathe with 186-in. swing and an 86-ft. bed, five die sinking machines and two large vertical boring mills. It is reported that the Fisher Body Corporation and the Wilson Body Co., Detroit, will be in the market in about 30 days for considerable machinery, mostly wood-working, to equip extensions now under way.

Local dealers did a fair volume of business during the week, but practically all in single tools, orders coming from well scattered sources. The aggregate business placed by manufacturers and dealers during June showed an improvement over May. The Ohio Brass Co., Mansfield, Ohio, is purchasing four or five machines for its experimental engineering department. The Chapman Valve Mfg. Co., Indian Orchard, Mass., has placed an order with a Cleveland machinery manufacturer for two 24-in. turret lathes. Manufacturers of punching and shearing machinery report some improvement in orders. The demand for forging machinery

is still dull. The Cleveland Board of Education received bids to-day for about 30 metal and wood-working tools covered by a list issued about a month ago.

The Warner & Swasey Co., Cleveland, made a price advance averaging about 10 per cent effective July 1 on its smaller types of turret lathes. No other advances by local manufacturers are reported but with increasing costs some Cleveland machine tool builders state that they will have to mark up prices. There has been some stiffening of wages in Cleveland in the metal working field. Many workmen have gone to Detroit to work in the automobile plants and there is a scarcity of some kinds of skilled labor. Some local automobile plants have commenced to curtail production slightly and are not employing as many men as they were, but other industries are increasing their working forces.

The Broden & Dailey Construction Co., Cleveland, has been organized as a partnership by G. A. Broden and K. T. Dailey and will manufacture wire mill and cold rolling equipment. Mr. Broden was connected with the American Steel & Wire Co., for 15 years as construction engineer and later as assistant superintendent. Mr. Dailey was connected with the engineering department of the Cleveland Machine & Mfg. Co., for 13 years. The company is located in the Union Building, 1836 Euclid Avenue.

The Goldsmith Welding & Engine Co., Canton, Ohio, has recently been organized and will establish a plant at Harrisburgh Road and Sixteenth Street, N. E. It will manufacture welded steel storage tanks, racks and frames and conduct a jobbing department and repair works. V. J. Goldsmith is president and general manager.

The Rose Machine & Spring Co., Canton, Ohio, according to an announcement made by N. J. Rose, president and general manager, has purchased the entire equipment of the Advance Dairy & Machine Co., and will move the equipment of both plants to the building of the Belden Motor Car Co., half of which has been leased. The Rose company manufactures special machinery, dies, tools, fixtures, etc., and does general machine shop work.

The Hoskins Mfg. Co., Detroit, has taken an order from the American Radiator Co. for a 50-kw. furnace for annealing brass which will be installed at the Buffalo works of the Radiator company.

It is reported from Akron that the Telestyle Umbrella Co., Findlay, Ohio, will locate in a plant at Main Street and Buchtel Avenue, Akron. E. A. Ziesloft is president.

The Lewis Electric Co., Minerva, Ohio, has purchased the plant of the Effinger-Menegay Machine & Die Co., Canton, Ohio, and has moved the equipment of the latter company to Minerva.

The Mason Tire & Rubber Co., Kent, Ohio, has purchased the plant of the Owen Tire & Rubber Co., Bedford, Ohio, which went into bankruptcy come time ago. It will be placed in operation shortly.

Cincinnati

CINCINNATI, July 3.

Advances in prices of radial drilling machines ranging from 5 to 7½ per cent were announced, effective July 1, by practically all manufacturers of this type of tool. Increasing costs of production, including iron and steel castings, and the fact that higher wages are being paid to secure competent mechanics, is the reason given. Reports are current that manufacturers of lathes are contemplating similar increases, and one manufacturer has already notified his dealers that a 5 per cent advance would be effective on July 1.

The month of June was not quite up to that of May in the number of orders booked, but ran much ahead of any other month this year. There were no spectacular purchases, most of the orders running to one and two machines. There is, however, a good demand for special machinery for rapid production purposes, one manufacturer reporting the receipt of five machines from an automobile builder. A drilling machine maker booked an order for a multiple spindle machine costing in the vicinity of $13,000. Railroad business is expected to put the machine tool industry on a higher production basis in the near future. The Santa Fe has purchased practically all of its list, the Missouri, Kansas & Texas bought a number of tools, including six radial drills, and the New York Central has also bought several tools. Local dealers report a fair demand for small tools, and used machinery is fairly active.

A noticeable pick-up in the demand for agricultural implements is reported by manufacturers in this district. An Indiana malleable shop which supplies a number of makers with malleable castings is running to capacity and is making tentative plans to increase its output should the demand be sustained. Manufacturers of wood-working and road building machinery are running practically full time.

The Logan, Ohio, car repair shops of the Hocking Valley Railroad will reopen on July 5 after having been closed since last November. About 200 men will be employed.

An automobile [illegible] a completely equipped repair shop, will be erected at 308 Walnut Street, Cincinnati, contract having been awarded to the Ferro-Concrete Construction Co. The building will cost approximately $225,000.

The Portsmouth Stove & Range Co., Portsmouth, Ohio, has let contract to the Ferro-Concrete Construction Co., Cincinnati, for an addition to its plant, to cost with equipment $100,000. It has placed an order with the George J. Hagen Co. for the ovens and other equipment.

The auction sale of the plant of the Barney & Smith Car Co., Dayton, Ohio, scheduled for June 28, has been postponed until Wednesday, July 12. It is reported that the bondholders protective committee will bid in the property.

The Marietta Paint & Color Co., Marietta, Ohio, will erect a building, 30 x 82 ft., on Dennison Avenue, Columbus, Ohio, and plans to install a number of storage tanks to take care of its business in that city.

Baltimore

BALTIMORE, July 3.

The New Brick & Tile Co., Moreland Building, Easton, Md., has been organized under State laws with a capital of $50,000 to manufacture hollow tile, etc. A site has been acquired and plans for the initial works are being completed. It will cost close to $45,000, including machinery. The company is headed by Robert L. Kemp, J. Elwood Smith and J. Fletcher Clark.

Motors, controllers, electrical and other equipment will be installed in the new printing plant to be erected by the Register & Bee Publishing Co., Danville, Va., estimated to cost about $80,000. R. A. Jones is president.

The Board of Harbor Commissioners, Wilmington, Del., is perfecting details of the equipment installation at the new marine terminal now in course of construction and which is expected to be ready for service early in 1923. The equipment will include gantry cranes, tractor trailers, locomotives, electric dock winches, etc., with fixed steel Burtoning spans. The storage yard will be provided with a locomotive crane. It will cost $3,410,000.

The Shippers' Compress Co., Atlanta, Ga., has leased a building on Stewart Avenue, and plans the immediate installation of machinery for a cotton compressing plant.

A one-story electric power plant will be constructed by the Ruby Cotton Mills, Inc., Gastonia, N. C., recently organized, in connection with its proposed mill. James A. Page, Clover, S. C., is president.

The Caldwell Power Co., Morganton, N. C., has acquired the plant and property of the Citizens' Light & Power Co., Lenoir, N. C., and has plans under way for extensions and improvements. A. M. Kistler heads the company.

Electric loading and unloading machinery, industrial trucks, conveying equipment, etc., will be installed at the proposed six-story municipal warehouse and pier to be constructed at Locust Point, by the Port Development Commission, Baltimore, Md., estimated to cost about $3,000,000. It will be leased to the W. P. Tanner-Gross Co., 25 Beaver Street, New York. Engineers of the latter company are working with the commission in the preparation of plans.

The Georgia Sand & Gravel Co., Augusta, Ga., recently organized, plans for the installation of screening, washing and other machinery at its plant to develop an output of 500 tons of material per day. E. W. Hancock is general manager.

The South Boston Mfg. Co., South Boston, Va., is planning for the installation of new machinery in its foundry and machine shop. J. L. Watkins is secretary.

The Textile Mill Supply Co., Charlotte, N. C., has filed plans for a new three-story and basement building, totaling about 30,000 sq. ft. of floor space. A machine shop will be installed.

A vocational department will be installed in the new high school to be constructed at Dover, Del., estimated to cost about $200,000.

E. T. Brown, Newmarket, Va., is completing the organization of a new company to construct and operate a hydro-electric power plant on the Pitts Run River.

A vocational department will be installed in the two-story high school to be erected at Westernport, Md., estimated to cost close to $100,000. Charles M. Anderson, 324 North Charles Street, Baltimore, Md., is architect.

A vocational department will be installed at the proposed high school to be constructed at Duke, N. C., by the Duke School District trustees, estimated to cost about $75,000.

An electric power plant will be installed by the White Co., Mebane, N. C., at its furniture factory, to replace present steam operation. Motors and electric-operating equipment will be installed in the different departments. W. E. White is president.

The Youghiogheny Water & Electric Co. and the Youghio-

gheny Power Co., Oakland, Md., affiliated companies, have made application for permission to construct and operate a hydroelectric generating plant on the Youghiogheny River, near Oakland.

The County Board of Education, Salisbury, Md., will install a vocational department in connection with its high school to be erected in the vicinity of Wicomico, estimated to cost approximately $300,000.

The Aerial Transport Corp., Richmond, Va., recently organized with a capital of $2,000,000, is planning for the establishment of a machine repair and construction plant in connection with its proposed aircraft transportation system. Edmund M. Preston is president.

The Columbus Electric & Power Co., Columbus, Ga., has arranged for a bond issue of $1,500,000, a portion of the proceeds to be used for extensions and improvements. C. F. W. Wetterer is president.

The Chief of the Supply Section, United States Veterans' Bureau, Washington, is taking bids until July 10, for one cylinder reboring tool, as specified in circular V-151-M.

Canada

TORONTO, July 3.

The demand for machine tools in this market has shown slow but gradual improvement the past week or two. Large buying, however, is still absent, but a steady call prevails for equipment in single units. Inquiries are also increasing in volume. At present wood-working equipment is furnishing the greater part of the current business, but a slight improvement is reported in equipment for foundries and automobile plants. Among a number of plants in Ontario general industrial activities are said to be increasing and buying for replacement purposes is more pronounced. The demand for small tools remains steady, but shows no improvement over last week.

The Consolidated Mining & Smelting Co. has announced that construction will start immediately on a 500-ton concentrator plant at Kimberley, B. C. It will represent an expenditure of upward of $1,250,000. It is expected to be completed and in operation early in 1923. A. Broderick, Trail, B. C., is architect.

The contract for additions and alterations to a building for the Empire Brass Foundry, 128 Wellington Street, Montreal, has been awarded to W. H. Madigan, 939 Atwater Avenue.

The general contract for an addition to the machine shop for the Canadian Aloxite Co., Montrose, Ont., has been awarded the Robertson Construction Co., Erie Avenue, Niagara Falls, Ont.

The Yarmouth Light & Power Co., Yarmouth, N. S., proposes to erect a hydroelectric power plant. G. St. C. Perrin is engineer.

The Pacific Coast

SAN FRANCISCO, June 29.

The Columbia Steel Co., 503 Market Street, San Francisco, has preliminary plans under way for an addition to its plant at Pittsburg, Cal. W. E. Creed is president.

The Pioneer Rubber Mills, Inc., 68 Sacramento Street, San Francisco, manufacturer of tires and other rubber products, has plans nearing completion for a new plant at Pittsburg, Cal., to cost about $100,000, including machinery. B. G. McDougall, 381 Bush Street, is architect.

The Oil Tool Service Mfg. Co., Anaheim, Cal., has plans in progress for a one-story machine shop and foundry at Santa Ana and Atchison streets. B. D. McAlvay and M. N. Putnam head the company.

A vocational department will be installed in the new high school to be erected at Santa Rosa, Cal., for which bonds totaling $375,000 have been approved. The Board of Education will select an architect to prepare plans.

The Board of Education, El Monte, Cal., has plans under way for a one-story vocational and manual training building at the union high school, 50 x 200 ft., and will call for bids about July 15. E. C. Thorne, 620 Western Mutual Building, Los Angeles, is architect.

The Little Rock Power & Water Co., 615 Chapman Building, Los Angeles, has made application for permission to construct and operate a hydroelectric power plant in Los Angeles County, with capacity of 2450 hp., estimated to cost about $350,000.

The Caladero Products Co., Atascadero, Cal., will commence the immediate erection of a new cold storage and refrigerating plant to cost about $200,000, including machinery.

The Marine Equipment Co., Aberdeen, Wash., has acquired property between Aberdeen and Hoquiam, and has plans under way for a new plant, estimated to cost about $275,000, including machinery.

The Pacific Power & Light Co., Portland, Ore., has selected a site near Hood River, Ore., for its new hydroelectric power plant and will soon commence active work on the initial unit, to have a capacity of about 7,500 hp.

The Commercial Iron Works, Portland, Ore., has filed plans for a one-story works at 360-74 Union Avenue, estimated to cost about $18,000, exclusive of equipment.

The Santa Fe Railroad Co., Kerckhoff Building, Los Angeles, is completing plans for a new reinforced-concrete power house at its shops at San Bernardino, Cal., to cost about $100,000.

The Boston-Idaho Gold Mining Co., Grimes Pass, near Boise, Ida., has preliminary plans under way for rebuilding its electric power house, recently destroyed by fire with loss estimated at close to $100,000.

The Idaho Sash & Door Co., Nampa, Ida., is contemplating the erection of a new plant to cost about $60,000.

Plans of New Companies

The Brunswick Refrigerating Co., New Brunswick, N. J., and the Kroeschell Brothers Ice Machine Co., Chicago, and the Kroeschell Brothers Co., Chicago, have combined as the Brunswick-Kroeschell Co., with main offices at New Brunswick, N. J. For the present, at least, both the New Brunswick and Chicago plants will remain in operation.

The Gable-Christal Co., Sumter, S. C., has recently been organized to manufacture all-metal boll weevil traps. The company has its own factory.

The United Radio Corporation of America, 1210 Michigan Avenue, Chicago, has engaged in the manufacture and wholesaling of radio equipment. All contracts have been awarded.

Clark's Iron Foundry has been incorporated to take over the plant and business of J. Alfred Clark, deceased, Philadelphia. The new organization will not be in the market for new equipment.

The Wilson "Reverso" Window Co., 168 Upper Michigan Avenue, Chicago, is equipping a factory at Elkhart, Ind., including a machine shop, for the manufacture of all types of No. 12 gage steel window frames and sash. The company will make a specialty of the Wilson "Reverso" window both in steel and bronze or extruded metal. President is Harrison D. Wilson; vice-president, Grover H. Ashbrook; treasurer, J. L. Kennedy.

The William Schmitt Co., 80 Twenty-second Street, Irvington, N. J., has taken over the business formerly conducted under the name of Herman Schmitt, and will continue the manufacture of carpenters' and woodworkers' tools in which the latter was engaged.

The Cranston Wire Binding Machine Co., Spokane, Wash., which was recently organized, has contracted with a Spokane manufacturing company to make its machines, and will not for the present undertake the construction and equipment of a plant of its own.

The Davis-Jones Insulated Wire Co., whose temporary offices are at 216 Main Street, Pawtucket, R. I., will manufacture national electrical code standard wires and cables, also flexible lamps and portable cords, including such items as heater cords, silk covered cords, armored cords for automobile lighting purposes and radio head set cords. The company has purchased land and buildings in Phillipsdale, R. I., and has purchased considerable machinery for its plant, which will be in operation about Aug. 15.

The Radio Appliance Mfg. Co., 6282 Beaubien Street, Detroit, manufacturer of radio equipment, was recently incorporated.

The Standard Welding Co., 665 South Water Street, Providence, R. I., Harry T. Prince, president, has outgrown its present manufacturing quarters and expects to build a new plant or addition within the near future. No definite plans have been made, however, for such expansion.

The American Nut Co., 343 Lenox Avenue, Detroit, has been incorporated with capital stock of $25,000 to manufacture bolts, nuts and screw machine products. Equipment has been purchased.

The Keystone Friction Hinge Co., Williamsport, Pa., has been incorporated by V. C. Luppert, who has conducted the business under his sole ownership for the past 15 years. The incorporation is for the purpose of taking in as partners some of the older employees of the business. The company manufactures furniture hardware.

The K. I. Willis Corporation, Moline, Ill., is the new corporate name for the manufacturing business which has been conducted in that city by the Willis & Sons Co. The company makes elevator cups, mill supplies and sheet iron specialties.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

	Per Lb.
Bars:	
Refined iron bars, base price	2.58c.
Swedish bars, base price	7.00c.
Soft steel bars, base price	2.58c.
Hoops, base price	3.63c.
Bands, base price	3.23c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	2.68c.
Channels, angles and tees under 3 in. x ¼ in., base	2.58c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	2.60c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	2.80c.
Toe-calk, ½ x ⅜ in. and larger	3.40c.
Cold-rolled strip, soft and quarter hard	6.25c. to 7.25c.
Open-hearth spring steel	3.50c. to 6c.
Shafting and Screw Stock:	
Rounds	3.35c.
Squares, flats and hex	3.85c.
Standard cast steel, base price	12.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	2.68c.

Sheets

Blue Annealed

	Per Lb.
No. 10	3.63c.
No. 12	3.68c.
No. 14	3.73c.
No. 16	3.83c.

Box Annealed—Black

	Soft Steel C. R., One Pass. Per Lb.	Blued Stove Pipe Sheet, Per Lb.
Nos. 18 to 20	4.00c. to 4.30c.	.....
Nos. 22 and 24	4.05c. to 4.35c.	4.60c.
No. 26	4.10c. to 4.40c.	4.65c.
No. 28	4.20c. to 4.50c.	4.75c.
No. 30	4.45c. to 4.75c.	.....

No. 28 and lighter, 36 in. wide, 10c. higher.

Galvanized

	Per Lb.
No. 14	4.30c. to 4.60c.
No. 16	4.45c. to 4.75c.
Nos. 18 and 20	4.60c. to 4.90c.
Nos. 22 and 24	4.75c. to 5.05c.
No. 26	4.90c. to 5.20c.
No. 27	5.05c. to 5.35c.
No. 28	5.20c. to 5.50c.
No. 30	5.70c. to 6.00c.

No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
⅛ in. Butt..	—56	—40	¾ in. Butt..	—30	—13
¼ in. Butt..	—61	—47	1½ in. Butt..	—32	—15
1-3 in. Butt..	—63	—49	2 in. Lap....	—27	—10
3½-6 in. Lap.	—60	—46	2½-6 in. Lap.	—30	—15
7-8 in. Lap..	—56	—34	7-12 in. Lap..	—23	— 7
9-12 in. Lap.	—55	—33			

Steel Wire

Base Price,* No. 9 Gage, Per Lb.

Bright basic	3.50c. to 3.75c.
Annealed soft	3.50c. to 3.75c.
Galvanized annealed	4.25c. to 4.50c.
Coppered basic	4.00c. to 4.25c.
Tinned soft Bessemer	5.50c. to 5.75c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	16¾c. to 17¼c.
High brass wire	17¼c. to 17¾c.
Brass rod	14¾c. to 15¾c.
Brass tube, brazed	23¾c. to 24½c.
Brass tube, seamless	20 c. to 20½c.
Copper tube, seamless	22¼c. to 23¼c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 20¾c. to 21¾c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14-20	
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20		Primes Wasters
		80 lb..	$6.05 $5.80
		90 lb..	6.15 5.90
		100 lb..	6.25 6.00
IC..$10.00	$8.50	IC..	6.40 6.15
IX.. 11.50	10.00	IX..	7.40 7.15
IXX.. 13.00	11.25	IXX..	8.40 8.15
IXXX.. 14.25	12.50	IXXX..	9.40 9.15
IXXXX.. 16.00	14.00	IXXXX..	10.40 10.15

Terne Plates

8-lb. coating, 14 x 20

100 lb.	$7.00
IC	7.25
IX	7.50
Fire door stock	9.00

Tin

Straits, pig	33½c.
Bar	40c. to 44c.

Copper

Lake ingot	15¼c.
Electrolytic	15 c.
Casting	14¾c.

Spelter and Sheet Zinc

Western spelter	6¾c. to 7c.
Sheet zinc, No. 9 base, casks	8½c. open 9c.

Lead and Solder*

American pig lead	6¾c. to 7c.
Bar lead	8c. to 8½c.
Solder, ½ and ½ guaranteed	25c.
No. 1 solder	23½c.
Refined solder	20¼c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	75c.
Commercial grade, per lb.	35c.
Grade D, per lb.	25c.

Antimony

Asiatic	6½c. to 7c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb. ... 25c. to 27c.

Old Metals

The market continues firm but has been quiet this week. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy crucible	11.75
Copper, heavy wire	11.25
Copper, light and bottoms	9.00
Brass, heavy	6.00
Brass, light	5.00
Heavy machine composition	8.50
No. 1 yellow brass turnings	6.25
No. 1 red brass or composition turnings	7.75
Lead, heavy	4.50
Lead, tea	3.25
Zinc	2.75

THE IRON AGE

New York, July 13, 1922

ESTABLISHED 1855 VOL. 110 No. 2

Trend of Basic Business Conditions

Present Situation Similar, in Volume of Activity, to 1920— March Saw a Distinct Emergence from the Influence of the Slump

WHILE it has been generally recognized that the steel industry was harder hit by the slump of 1921 than business in general, there has been little opportunity to make a direct comparison between the way in which the two were incapacitated. Figures now being given out each month, however, by the Department of Commerce, under Mr. Hoover's direction, and covered under the heading "Survey of Current Business," permit a study over a considerable period of time of the production of most of the basic commodities. Making use of these figures, and particularly of the relation which they bear to production of the same items at earlier dates, we may obtain a gage of business conditions in general, rather than in terms of one industry.

Ten basic groups of items were taken for the study. These are food, building, textiles, fuel, vehicles, leather, lumber, steel, non-ferrous metals and paper. Seven of the ten items are further sub-divided. Thus, food is a composite of beef, flour and sugar; textiles is a composite of cotton, wool and silk; fuel is a composite of bituminous and anthracite coal and petroleum; vehicles include both automobiles and trucks; leather is a composite of belting and sole leather; lumber includes yellow pine, Douglas fir and Northern hardwood; the non-ferrous metals include copper, lead and zinc.

This makes a total of twenty-two items under study, of which three are separate items, while the other nineteen are in groups, each group working into a single item in the major list. The figures were carried back to the beginning of 1920, from which date, with a few exceptions, all of the items could be shown. The chart on this page gives an indication of the general course of production during the period of two years and a half covered by the survey. It will be noted that the high point was reached in March of 1920, when the figure stood at 126, this being a comparison with previous figures, most of them carried



In the Solid Curve Is the Story of Productive Activity in the United States, as Measured by Ten Basic Industries. The dotted line tells the same story, but with the component items weighted in accordance with their relative quantities

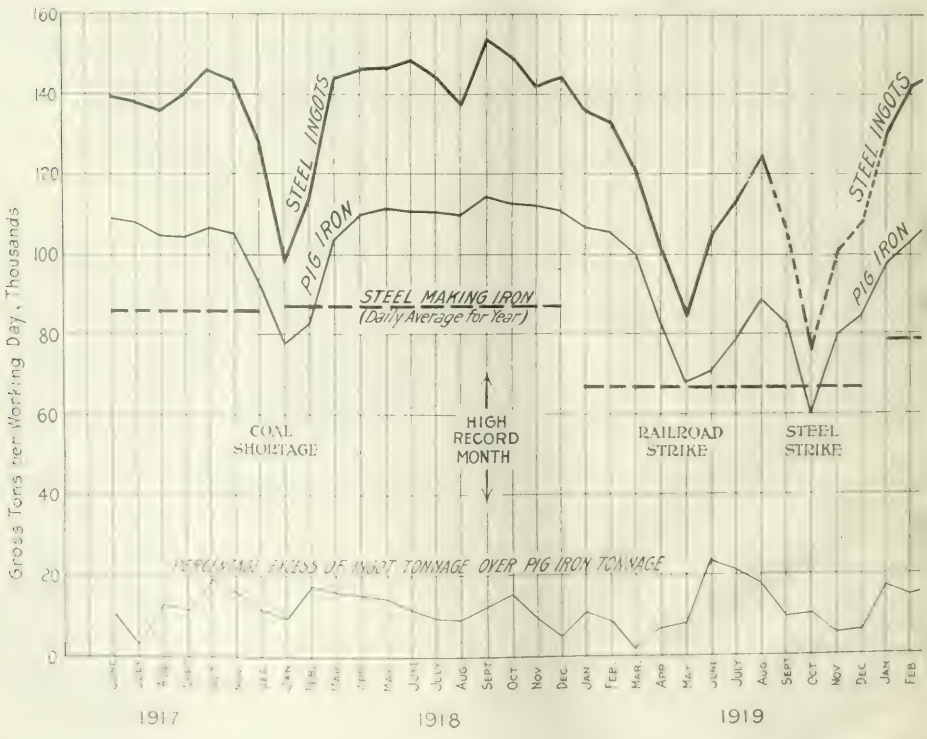
back to the year 1913. From March, 1920, the production of commodities fell, with few interruptions, until February of 1921, at which time the figure stood at 72. That was the low point of production, according to composite business curve shown in the chart and, although there have been both ups and downs since then, it will be noted that for the greater part of 1921 production ranged between 80 and 90. It first got above the 100 per cent mark again in March of the current year; the coal strike, coming in April, brought it back almost to the 100 per cent line, but it has since recovered handsomely. The present figure stands at 113½.

All of the figures on which the solid curve is based are averaged up, without any attempt to give any one figure a greater weight than any other; that is, the figures for the ten major items are added together and the sum divided by ten. The dotted curve, on the other hand, tells the same story, but with the figures weighted in accordance with the financial importance of the various industries covered by the survey. It is surprising how closely the two curves cling together throughout the entire range of thirty months.

During the falling period from March, 1920, to February, 1921, and for some little period thereafter, the weighted curve is consistently below the non-weighted curve. This shows that the items of production which were hardest hit by the slump and shortage of business were those of largest importance and largest size. As the same items appear to have been the quickest to recover from the condition prevailing throughout the summer of 1921, it is apparent that the large items are the ones which are leading in the resumption of business activity.

Careful study of the curves, together with the individual figures from which they are made up, shows some of the outstanding elements which have caused sharp fluctuations. Thus, the peak in March, 1920, was due to a sudden spurt both in building construction and in the production of automobiles, as well as several other items. Similarly, other peaks and hollows throughout the remainder of the curves may be traced down to separate individual prominent causes which produced these divergences from the general line. No allowance was made for increasing population.

It must be remembered, in consulting such a curve as is shown here, that the activity is expressed as a percentage of the activity during a previous period of time. It bears no relation whatever to capacity. It takes no account of increased productive capacity provided during the intervening years. Most of the data from which this curve was prepared are based on the 1913 output of the various commodities presented. Some of them, where the earlier figures are not available, are based on 1917 or even as late as 1919. In each case the basing figure is the average monthly output for the year in question. The use of 1913 in this connection is particularly fortunate, insofar as it has been used, because 1913 was a year of considerable activity, but was not a boom year. It was the first year in which pig iron production in the United States passed the 30,000,000 ton mark. Many other items besides iron and steel made new records in 1913 and business generally was good.



Production of Steel Ingots in the United States, Month by Month, for the Five Years During Which are expressed in gross tons per working day. The pig iron curve is shown, for comparison. The

United States Production of Steel Ingots

Figures Given Include Estimates for the Months of the 1919 Steel Strike—Daily Output Calculated for Each Month of Past Five Years

SINCE early summer of 1917 figures have been compiled by the American Iron and Steel Institute showing the production of steel ingots, month by month, of a number of producing companies. This number, 29 at first, is now 30. The companies so reporting have been producing, from year to year, about 85 per cent of the total ingot output of the country.

It has been customary among those studying these figures to assume that the production of the non-reporting companies has been, each month, about in the same proportion to the total as the ascertained figure for the full year. This assumption, which cannot be far in error, has given rise to a series of monthly figures which are presumably very close to the actual ingot output of the United States.

On this basis it has been possible to make up, for seven months of 1917, all of 1918, the first eight months of 1919 and all of 1920 and 1921, figures which must be very near the actual total monthly ingot production. The first five months of 1917 were not reported upon. The last four months of 1919 were the months covered by the steel strike, during which the figures were not reported. The first six months of 1922 have been estimated on the basis of the ascertained ratio of 1921, between the reporting companies and the total.

It has been found possible to fill in the gap in the latter part of 1919 by estimates in which the daily production of the mills during those four months is assumed proportional to the known average daily production of pig iron, month by month, during those same four months. The first eight months of the year were calculated on the usual basis, that the output of the 30 companies bore the same relation to the total as for the full year, thus giving a total apparent production for those eight months, by the entire United States, of 23,633,618 gross tons, out of the reported total for the year of 33,694,795 tons. This left a difference of 10,061,177 tons to be distributed among the last four months of the year. This has been done, and the distributed figures work out as follows:

	Ingot Production	Working Days	Tons Per Day
September	2,718,082	26	104,541
October	2,046,030	27	75,779
November	2,513,083	25	100,523
December	2,784,002	26	107,077
Total	10,061,177	104	96,742*

*Average

In order that a measure may be had of the production of steel ingots, month by month, for the period beginning with June, 1917, the table appended is printed,



Data Have Been Collected. Figures Covering the period of the steel strike have been estimated; all bottom curve shows the percentage by which ingot tonnage, each month, exceeds pig iron tonnage.

giving the reported tonnage, the apparent monthly tonnage of the whole United States, the number of working days each month, and the daily tonnage of steel ingot output. These figures for daily tonnage

Steel Ingot Output of United States

1921 (a)	[illegible]	[illegible]	[illegible]	[illegible]
June	3,083,929	3,617,361	26	139,129
July	[illegible]	[illegible]	[illegible]	[illegible]
August	[illegible]	[illegible]	[illegible]	[illegible]
September	[illegible]	[illegible]	[illegible]	[illegible]
October	3,351,935	3,931,725	27	145,619
November	3,166,257	3,713,930	26	142,859
December	2,733,722	3,206,579	25	128,263
Year	37,187,325	43,619,200*	311	140,255
1918 (b)				
January	2,203,845	2,641,195	27	97,822
February	2,273,741	2,724,962	24	113,540
March	3,110,381	3,727,632	26	143,370
April	3,163,410	3,791,184	26	145,815
May	3,287,233	3,939,580	27	145,910
June	3,083,446	3,695,351	25	147,814
July	3,113,635	3,731,531	26	143,520
August	[illegible]	[illegible]	[illegible]	136,875
September	[illegible]	[illegible]	[illegible]	[illegible]
October	[illegible]	[illegible]	[illegible]	148,794
November	3,060,760	3,668,164	26	141,083
December	2,992,306	3,586,129	25	143,445
Year	35,922,291	43,051,022*	311	138,425
1919 (c)				
January	3,107,778	3,651,055	27	135,224
February	2,704,683	3,177,493	24	132,396
March	3,127,661	3,727,632	26	120,295
April	2,239,731	2,631,239	26	101,202
May	1,929,024	2,266,241	27	83,935
June	2,219,219	2,607,165	25	104,287
July	2,508,176	2,946,635	26	113,332
August	2,746,081	3,226,129	26	124,082
September	[illegible]	2,718,062	26	104,541
October	[illegible]	2,046,030	27	75,779
November	[illegible]	2,513,083	25	100,523
December	[illegible]	2,784,002	26	107,077
Year	[illegible]	33,694,795*	311	108,343
1920 (d)				
January	2,968,102	3,524,025	27	130,519
February	2,865,124	3,401,759	24	141,740
March	3,299,049	3,916,958	27	145,073
April	2,668,306	3,133,169	26	120,480
May	2,883,164	3,423,178	26	131,661
June	2,980,690	3,538,970	26	136,114
July	2,802,818	3,327,783	26	127,992
August	3,000,432	3,562,410	26	137,016
September	2,999,551	3,561,364	26	136,976
October	3,015 982	3,580,873	26	137,726
November	2,638,670	3,132,890	26	120,496
December	2,340,365	2,778,713	26	106,874
Year	34,432,252	40,881,392*	312	131,030
1921 (e)				
January	[illegible]	[illegible]	26	96,810
February	[illegible]	[illegible]	24	83,279
March	[illegible]	[illegible]	25	66,173
April	[illegible]	[illegible]	26	55,312
May	1,265,850	1,446,181	26	55,622
June	1,003,406	1,146,349	26	44,090
July	[illegible]	[illegible]	[illegible]	[illegible]
August	1,138,071	1,360,199	27	48,156
September	1,174,740	1,342,092	26	51,619
October	1,616,810	1,847,138	26	71,044
November	1,660,001	1,896,482	26	72,942
December	1,427,093	1,630,394	26	62,707
Year	16,826,946 f	19,224,084*	311	61,814
1922		(g)		(g)
January	1,593,482	1,820,487	26	70,019
February	1,745,022	1,993,616	24	83,067
March	2,370,751	2,708,484	27	100,314
April	2,444,513	2,792,755	25	111,710
May	2,711,141	3,097,366	27	114,717
June	2,631,477	3,009,800	26	115,761
Half-year	13,199,386	15,422,508	155	99,500

*Official total, reported by American Iron and Steel Institute.

†Highest figure ever reached.

[illegible]

[illegible]

[illegible]

[illegible]

g—30 companies produced 87.53 per cent of the total.

[illegible]

[illegible]

ratio for 1921. This gives a figure which is probably somewhat below the actual tonnage.

are plotted on the chart, upon which, for comparative purposes, the daily tonnage of pig iron production, month by month, is also plotted. Horizontal broken lines, each covering a period of one year, show the average production for the year of steel-making iron, as reported at the close of the year by the American Iron and Steel Institute. It is unfortunately impossible to apportion this iron among the months, as reports are made annually and not monthly. It is also not feasible to show the steel-making iron from steel works furnaces as a companion curve because, as it happens, this would not include all of the steel-making iron of the country, as it would omit the important but variable contributions of some of the merchant furnaces.

It should be noted that the only holidays taken into consideration, in figuring out the number of working days in the month, are Christmas and Independence Day. Some of the steel companies close the steel-making departments on Labor Day also, but the practice is not general. In a few cases other holidays are recognized when the demand for steel is light. It is evident from this that strictly exact daily tonnage figures could not be obtained without weighting the companies according to output, and using as divisor a figure, with fraction, representing the proportion of tonnage capacity operating on a holiday not generally observed.

One interesting coincidence lies in the fact that the last nine months of 1920 and January, 1921, ten months in all, show 26 working days in each month. It happened that each 30-day month of that period had four Sundays; each 31-day month had either five Sundays or four Sundays and a holiday. At the end of 1921 there are five successive 26-day months, but no other group larger than three in succession was observed within the five years covered by the survey.

At the bottom of the diagram appears a third curve showing the percentage of excess of the ingot tonnage over the pig iron tonnage. This is based on monthly figures and not on the daily figures shown in the curves above. It is interesting to note that, prior to the summer of 1921, there was only one period when the ingot tonnage was as much as 20 per cent greater than the pig iron tonnage, that being during June and July of 1919. The great excess of ingot tonnage coming in the fall of 1921 was compensated for in December by an excess of 1 per cent of pig iron tonnage over ingots. At the same time, it must be recognized that the large excess during the past few months, with the exception of December and January, represents a large and increasing use of scrap in the making of steel.

JUNE STEEL OUTPUT

Ingot Production Rate Over 36,000,000 Tons Per Annum—Daily Output Over 1,000 Tons More Than in May

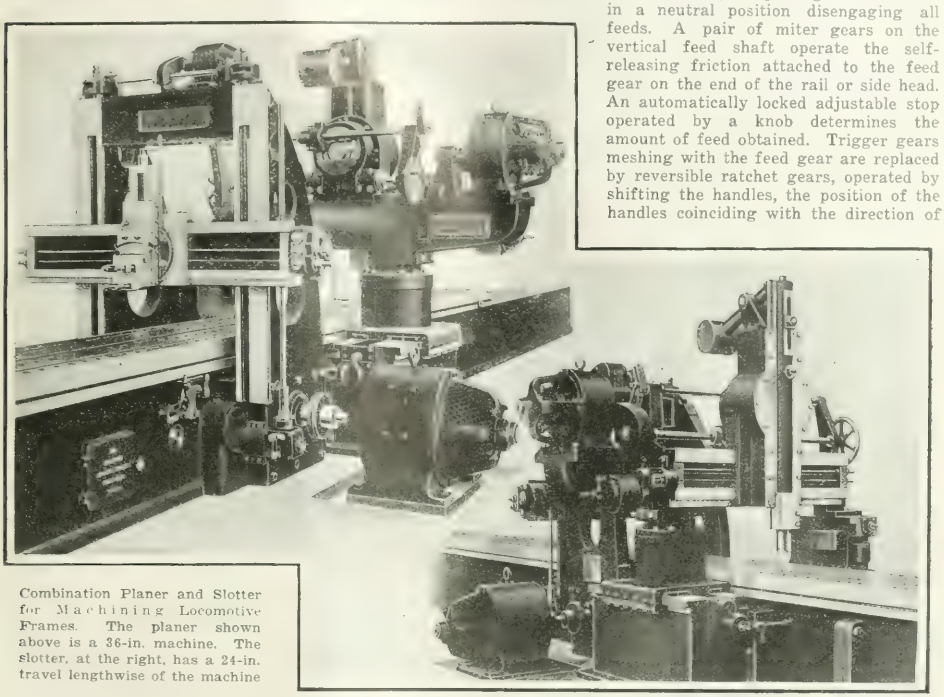
The accompanying table gives the steel ingot statistics as collected by the American Iron and Steel Institute. These show that the 30 companies which in 1921 made 87.50 per cent of the total had an output in June of 2,634,477 tons. This is less than the total for May of 2,711,141 tons, but in May there were 27 working days. On the assumption that companies reporting are supplying the same percentage of the total as they did last year, (though the percentage may be less) the output for the 26 working days of June is about 3,010,000 tons or approximately 115,800 tons per day.

Months	Open-Hearth	Bessemer	All Other	Total
January, 1921	1,591,281	608,276	3,629	2,203,186
February	[illegible]	[illegible]	[illegible]	[illegible]
March	[illegible]	[illegible]	[illegible]	[illegible]
April	1,000,055	[illegible]	[illegible]	[illegible]
May	1,047,810	216,497	1,543	1,265,850
June	[illegible]	[illegible]	[illegible]	[illegible]
Total 6 months	6,918,884	2,073,973	13,998	9,006,855
July	689,489	113,312	575	803,376
August	915,334	221,116	1,621	1,138,071
September	908,381	265,152	1,207	1,174,740
October	1,268,945	345,837	1,028	1,616,810
November	1,294,371	363,912	1,718	1,660,001
December	1,129,171	[illegible]	1,509	1,427,093
Total whole yr	13,125,578	[illegible]	21,686	16,826,946
January, 1922	1,260,809	331,851	822	1,593,482
February	1,378,835	365,571	616	1,745,022
March	1,918,570	451,188	795	2,370,751
April	1,997,165	445,239	1,109	2,444,513
May	2,214,774	494,893	1,474	2,711,141
June	2,143,508	485,351	2,918	2,631,477
Total 6 months	10,931,161	2,560,491	7,734	13,499,386

PLANER AND SLOTTER

Combination Unit for Locomotive Frames Reduces Machining Time—Floor Space Saved—Features Outlined

A combination planer and slotter for machining locomotive frames and which is claimed to reduce the actual machining time more than 50 per cent has been brought out by the Liberty Machine Tool Co., Hamilton, Ohio. In addition to saving floor space, time is saved in handling the work from one machine to another, and setting-up time is reduced to a minimum.



Combination Planer and Slotter for Machining Locomotive Frames. The planer shown above is a 36-in. machine. The slotter, at the right, has a 24-in. travel lengthwise of the machine

The planer is of the company's standard 36 in. pattern, and incorporates the patented features and safety appliances of the standard machine. Although shown with one head on the cross rail the machine is arranged with four heads if required.

The bed is of box type with closed top between the V's, which have ample spread to eliminate unnecessary overhang of the table. They are fitted with automatic oil rollers to assure adequate lubrication. The table T-slots are planed from the solid and reamed holes are provided throughout the length for clamping. The housings extend to the floor and are attached to the bed with taper plugs and bolts. The cross rail is well braced at the back and made to accommodate two heads, allowing either head to have full traverse across the table. The elevating screws are adjustable from the top and are supported on ball bearings. The heads have long and wide bearing surfaces on the cross rail and are made right and left for close range. They are graduated for swiveling up to 90 deg. and have automatic feeds in all directions, operative from either end of the cross rail. The down feed screws under strain are in tension. The slides are hung on ball bearings and binder screws are provided on both saddles and slides. Micrometer adjustments are incorporated on all vertical and horizontal feed screws.

The elevating device is centrally located on the top brace and is self-contained. The long handle at the side of the housing operates a saw-tooth clutch for raising or lowering the cross rail, the handle being held in position while operating. Any obstruction instantly disengages the clutch. All gears are idle when not in use. Side heads can be attached and are counterbalanced, and moved below the top of table when not in use. The feed micrometer collars and control handles are conveniently located on the heads and move up and down with them. They are graduated for swiveling up to 90 deg.

In the patented feed arrangement the power is transmitted from a spur gear on the end of the bull pinion shaft, through a pair of reversing miter gears to a vertical splined feed shaft. A handle conveniently located determines whether the feed is to take place on the cutting or return stroke, the placing of the handle in a neutral position disengaging all feeds. A pair of miter gears on the vertical feed shaft operate the self-releasing friction attached to the feed gear on the end of the rail or side head. An automatically locked adjustable stop operated by a knob determines the amount of feed obtained. Trigger gears meshing with the feed gear are replaced by reversible ratchet gears, operated by shifting the handles, the position of the handles coinciding with the direction of the feed. Among the advantages claimed for the feed are that the operator can control or change the feed on the rail heads without stopping the machine or disturbing the feeds on either right or left side heads, or vice versa. All parts are well protected, yet easily accessible, and operating handles and knobs are conveniently located. The amount of feed is indicated by a dial which permits the operator to set the feed to the proper amount.

The driving pulleys are of aluminum with cast-iron centers and the loose pulleys have wick-oiled bronze bushings and solid web. Shifting levers located on both front and rear sides of the machine permit the operator to control the motion of the table without walking around the planer.

The slotter, shown in the separate illustration, is self-contained and furnished with a base which is bolted and dowelled to the bed. It is provided with a variable speed motor giving the necessary range of speed, and two additional small motors, which furnish the power for quick movement of the rail and head. The slotter has a 24-in. travel lengthwise of the machine and is provided with independent automatic feed and rapid traverse in both directions. The cross rail can be swiveled in either direction to any angle within the limits of locomotive frame work, and can also be swiveled entirely out of the way. The head has an independent automatic feed and rapid traverse in both directions.

The ram is driven by an improved worm and worm

wheel through a crank disk and connecting rod, and the stroke is adjustable both for position and length. Notched washers fasten the connecting rod when set. A special tool bar is provided for circular feeding and for cutting fillets. The table is held stationary when using the slotter and is rapidly set with pendant switch for the next position after finishing the cut. Adequate oiling facilities and adjustments for wear are provided throughout and ball bearings and adjustments for wear provided where necessary.

The maximum stroke of the slotter is 14 in., the clearance in the yoke being 37 in. wide and 18 in. high. The maximum length of work accommodated is 30 ft. and the travel of the rail 24 in.

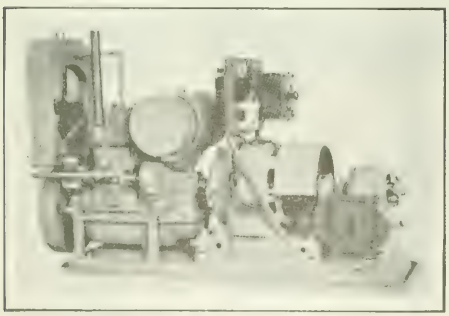
The width between the housings of the planer is 37 in., the maximum height under the cross rail being also 37 in. The length of the planer table is 38 ft. and the width 30 ft., the bed being 69 ft. long and 27 in. deep. The distance between the Vees is 20 in. The face of the housings is 8 in. and that of the cross rail 14 in. The horsepower required for the planer is 15 hp. and for the slotter 10 hp. The driving belts are 3 in. wide.

The weight of the machine is 69,000 lb. The floor space overall is 78 ft. long by 10 ft. 2 in. wide and the height 10 ft. 11 in. overall.

Engine-Driven Welding Equipment

An engine-driven welding equipment for use where electric power for motor drive is not available and for job welders who must work in widely scattered districts has been developed by the Westinghouse Electric & Mfg. Co. One advantage of this apparatus, which is made in stationary and portable models, is that it is not necessary to waste time applying for a permit or making proper connections before work can be started.

The equipment consists of a Westinghouse single-operator welding generator geared to a Doman four-cycle, two-cylinder, low speed, marine-type gasoline engine. The generator is direct current, has a rated capacity of 175 amp. and a maximum capacity of 225 amp. at 1750 r.p.m. The generator is designed to operate at arc voltage, and to inherently stabilize the arc and supply a substantially constant current of different values over the working range of 90 to 225



amp. The operating characteristics of the generator are said to be such that it is unusually easy for the operator to strike and maintain the arc, and also to obtain the deep penetration and thorough fusion necessary for satisfactory welding. The shaft of the generator extends through the pedestal bearing and is connected by means of a flexible coupling to the exciter.

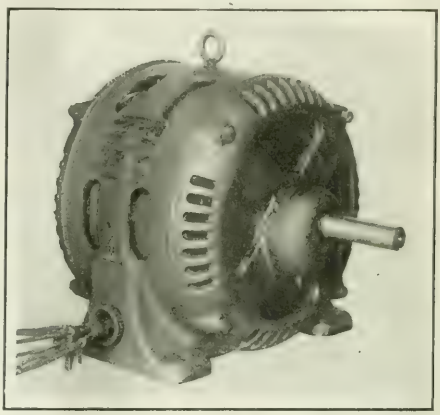
The engine is of rugged construction. The cylinder block and removable head are of semi-steel and the valves, main bearings, and connecting rod bearings are of liberal dimensions for the service. Other features of the engine are forced feed system of lubrication, Wheeler-Schebler carburetor, Taco throttle governor, impulse starter and large honey-comb type radiator.

The control panel is mounted directly over the generator on a rigid, light weight angle iron frame work, and the entire equipment is mounted on a substantial cast-iron bed plate.

New A. C. Motor for Machine Drives

A new line of Watson alternating-current multi-speed motors, providing speeds of 600, 720, 900 and 1200 r.p.m., has been placed on the market by the Mechanical Appliance Co., Milwaukee. The line is intended to make available effective individual alternating-current drive for machine tools, blowers, conveyors, compressors and other machines which previously were driven only by direct-current motors.

Standard four-speed windings for alternating-current motors have been 600, 900, 1200 and 1800 r.p.m. on 60 cycle circuits, the two higher speeds being twice the lower. The introduction of the 720 r.p.m. speed constitutes an important advance in the design



Multi-Speed Alternating Current Motor. The speeds are 600, 720, 900 and 1200 r.p.m.

of alternating current motors, it is pointed out, the wide speed gaps which have an objection to the use of alternating current motors for machine drive being eliminated, as also speed duplication and complicated gear changes to obtain intermediate speeds. The 720 r.p.m. speed step is possible, it is claimed, by the company's standardized practice of using an independent winding on the stator for each speed. Increments of 20, 25 and 33 1/3 per cent are obtained.

The new motors are of the squirrel-cage type and are rated on the 40 deg. basis, carrying the full-rated load indefinitely without exceeding 40 deg. rise. It is claimed that an overload of 25 per cent will be carried two hours with a temperature rise not exceeding 55 deg. C. The motors will be furnished for constant horsepower, constant torque or combinations of both in two, three or four speeds, selected from 600, 720, 900, 1200 and 1800 r.p.m. for 60 cycle circuits. The same ratings will be furnished for other frequencies, likewise two phase.

Suitable control apparatus has been developed and is offered for both automatic and remote control, equipped with the protective apparatus.

The Dort Motor Car Co., Flint, Mich., is increasing operations at its plant, with June output showing an advance estimated at 20 per cent over May production. This last noted month showed a gain of 156 per cent over the month of May, 1921, and of 374 per cent for the same month in the year preceding. Orders on hand insure capacity operations throughout the summer.

June wage distribution of $4,687,976 by Youngstown, Ohio, industries was the largest in the past 16 months, topping the May disbursement by $445,000.

British Open-Hearth Furnace Practice

Higher Temperatures and More Rapid Working Aimed at in the Proposed Design of a 100-Ton Furnace—Reduction of Heat Losses a Great Desideratum

CHANGES in open-hearth furnace design which will give larger outputs through more rapid and more complete combustion have been under consideration simultaneously both in the United States and Great Britain. Open-hearth practice has been the subject of important papers at the last two meetings of the American Iron and Steel Institute, and at the May meeting of the Iron and Steel Institute (British) in London the principal paper was that of Fred Clements of the Park Gate Iron Works, Rotherham, Yorkshire, on "British Siemens Furnace Practice." The author, in introducing his paper, which is really a volume on open-hearth furnace construction and operation, referred to the fact that many new open-hearth furnace installations have been made in Great Britain in the past few years. While these new furnaces showed a growing appreciation of the need of better mechanical detail in furnace construction they followed well established precedents as far as proportions are concerned, and, in the author's opinion, did not show any material advance in thermal efficiency over what has been obtained in older plants.

With a view to formulating some of the principles which govern the design of regenerative furnaces, Mr. Clements made a series of tests at Park Gate, and a section of his paper is devoted to data obtained by thorough analysis of the work done in the 60-ton furnaces of the Park Gate Iron & Steel Co. These voluminous data accompany the paper in the form of charts dealing with temperatures, fuel and air consumption, furnace charge, chemical and heat balance of furnace charge, heat balance of furnace, details of regenerators and ports, production results, recovery of heat from chimney gases, etc. Details were given also in the charts of construction and performance of other important open-hearth plants in Great Britain.

Higher Temperatures and Refractories

Another section of the paper takes up in detail the design of a furnace of 100 tons capacity embodying the principles outlined by the author in his comments on the performance of the 60-ton furnaces at Park Gate. The author emphasizes the necessity of higher temperatures and the new design he proposes is with a view to providing against the more drastic effects of high temperatures upon refractory materials. By recognizing the following principles in design he held that the refractories would be subjected to conditions not more severe than those obtaining at present:

1 The gas and air must be regenerated to a sufficiently high temperature, intimately mixed, and then projected into the furnace at an angle which will insure their passing along the surface of the metal, and at such a velocity as will maintain them in the line of direction desired and in close contact with the contents of the bath. There will be little tendency for the flame to rise to the upper regions of the furnace.

2 The distance between the port blocks must be great enough to insure that combustion is fully complete before the gases closely approach the outgoing ports.

3 The distance of the roof and side walls from the zone of highest temperature must be increased so as to provide against the possibility of the burning gases impinging on the refractory. The space between the stream of gases in combustion and the roof is considered to be occupied by an almost immobile mass of inert gas. The function of this gas is to reduce the heat effect on the refractories.

[It may be noted that the more rapid operation of open-hearth furnaces in the United States that has been obtained in the past year has been greatly assisted by the production of refractories that will stand much higher temperatures than have been customary heretofore.—EDITOR.]

In considering the heat contributed by the exothermic reactions in the working of the charge, Mr. Clements proposes accelerating these reactions by raising the temperature ruling in the bath. The effect of this would be cumulative, in that the quicker the elements are removed the greater the amount of heat generated per unit of time. Three important results would follow, according to the author: The slag would be maintained in a more fluid and workable condition; the time of working would be reduced, and greater advantage would be taken of the heat of chemical reaction.

Referring generally to the factors involved in providing an efficient system of regeneration, Mr. Clements mentions the following:

1 The shape and dimensions of the chamber should be such that the gases during regeneration or recuperation are evenly distributed over the whole of the checkerwork, thus bringing all parts of it into service.

2 The weight of suitable brickwork provided to form the checkering should be sufficient to insure a store of heat ample for regeneration without a wide range of temperature.

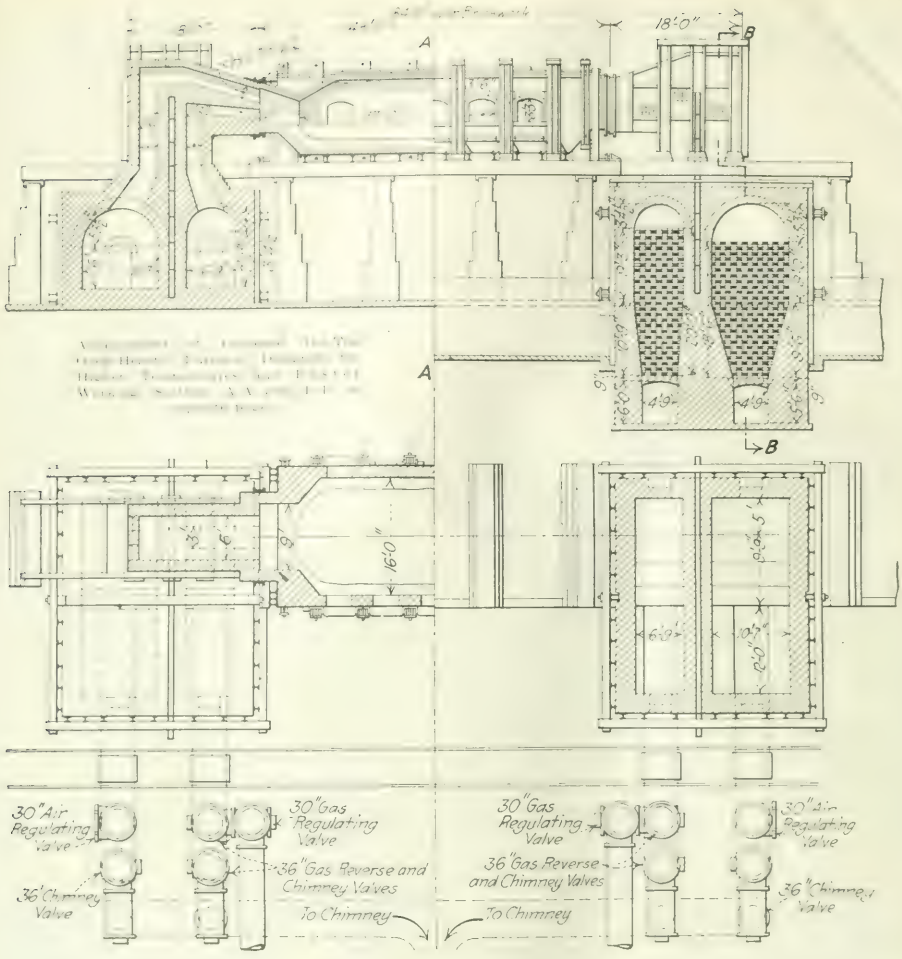
3 The effective heating surface presented by the checkerwork must be ample to allow for a rapid heat exchange, and the arrangement of the checkers must be such that all the particles of the gases are brought into intimate contact with the hot surfaces. As the velocity of the gases is a factor in heat exchange it is important that this should be sufficiently high to give maximum results. A higher velocity also helps to keep the checkerwork free from dust deposit.

Details of Proposed 100-Ton Furnace

The accompanying illustrations reproduced from Mr. Clements' paper show the design of his proposed furnace of 100 tons capacity. In his paper he comments on the various features of construction as follows:

Bath and Ports.—The area of the bath has been determined in accordance with the best general practice, and naturally the relation of length to width has been decided so that the bath is not too wide for easy fettling nor the distance between the arch springers too great for stability, even after making the extra allowance on the distance between the side walls in order to reduce the intensity of the radiant heat effect. The need for this increase in width, along with the greater height of roof, has been demonstrated previously. The distance between what may be called the effective port mouths is 37 ft., and this is deemed from other experience sufficient to insure that combustion is complete before the products of cumbustion enter the outgoing port mouth. Five charging doors are provided, so that the charge can be distributed over the whole of the furnace bath.

With regard to the ports, the usual positions of gas and air uptakes have been reversed, with the considerable advantage that only one uptake need be provided for each. The overall width of the port block therefore is much reduced, and with the design of casing shown, along with the use of cast iron chills at the point of juncture between port block and furnace, it is possible quickly to remove the port end complete and replace it by a spare. Another advantage arising out of this arrangement is that it allows freedom for that relative movement between the port block and furnace, due to expansion, which always takes place. One sheet accompanying the paper shows the velocity of the air leaving the port as 120 ft. per sec. and the gas as 140 ft. per sec. These velocities are higher than is customary, but in order to provide for the increased temperature in the hearth it is necessary for the gas and air to mix rapidly and intimately on the surface of the metal so as to develop the highest temperature of combustion in direct contact with the materials in the bath.



In order to assist in attaining this result the gas and air ports discharge into a common port before entering the furnace. This port with its sloping crown directs the gas and air down on to the metal in the bath, and in conjunction with the port at the other end of the furnace, assists in keeping the flow of gases on the bath surface and prevents any tendency of the stream to rise to the roof. At the same time any danger of burning the arch of the common port is removed by arranging the dimensions so that the gas stream issuing from the gas port is always insulated from the brickwork by the stream of air which is around it.

Regenerators.—It cannot be too strongly emphasized that for the most effective results care must be taken to determine the best proportions of the checkerwork, as in a correctly operated furnace the quantity of heat carried into the regenerators by the products of combustion between the temperatures permissible is only a little in excess of the amount required for adequate regeneration. In the design of the checkerwork attention is called to the following axioms:

(a) Correct weight of effective brickwork.

(b) Maximum heating surface possible per unit volume.

(c) Proper distribution of the gases over the checkers.

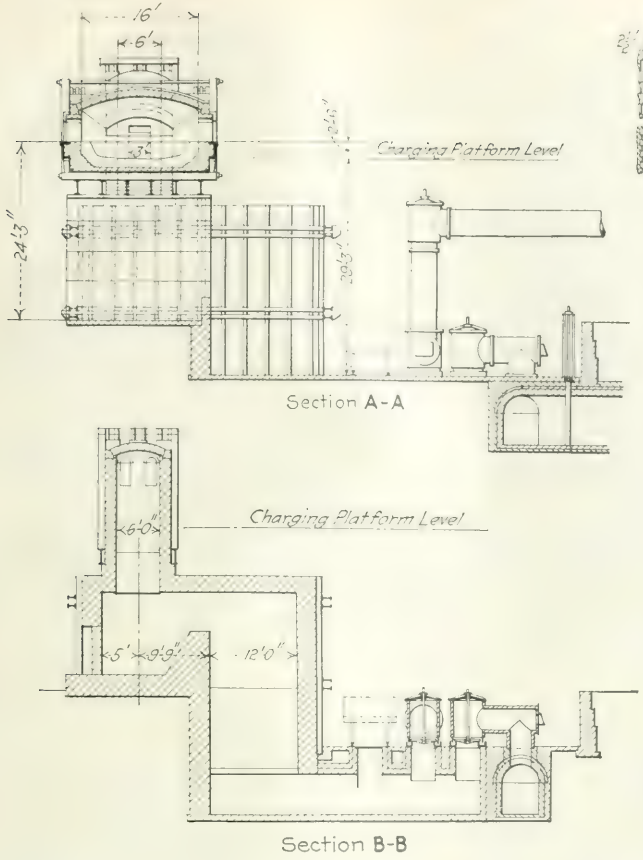
(d) Best velocity through the checkers to give most effective heat interchange.

If these axioms be properly followed then the temperature of regeneration will be attained without difficulty. The height of the checkerwork is also naturally determined by the provisions necessary to satisfy the four factors mentioned.

The following comments on axioms (a) and (d) are important:

On Axiom (a).—The weight of effective brick work must be correct for the conditions existing, because with too little mass the temperature range is too great. Again, too much checkerwork is equally undesirable, as in this case the available heat is distributed over a weight of brick work which may absorb the whole, while the mass is so great as to prevent the requisite temperature being attained, the latter being vital to success.

On Axiom (d).—The problem of the ideal velocity through the checkers is one of extreme difficulty. Investigation on this important subject would have a considerable bearing on regenerative furnace practice. As far as is shown by the data available [showing practice at various British steel plants] it would appear that a velocity of about 20 ft. per sec. ought to be allowed. It is essential that the lower sections of the checkerwork should do the major portion of the regeneration, and this being so it is necessary that the heat interchange in these regions should be as effective as possible. The free area arranged therefore should be such as to give a velocity of approximately 20 ft. per sec. through the lower half of the regenerators, after allowing for the increase in volume of the gas due to increase in temperature. However, in order to give a chamber which is economical in construction, the veloc-





ity allowed in the upper half of the checkerwork can be increased, since the density of the gas per unit volume is reduced and consequently higher velocities can be allowed. The reason for the reduction in the cross sectional area toward the bottom of the regenerator chamber will therefore be self-evident.

Binding of Furnace and Regenerators.—The furnace hearth is very effectively bound without the need of the bottom longitudinal tie bolts by using the supporting girders for binding purposes. The gas and air regenerator chambers at each end of the furnace are, in the main, separate units, and this effectively prevents any leakage of gas to the air chamber, which is sometimes a source of trouble. The binding of the chambers is of simple but very substantial character.

Gas Reverse Valves.—In order to reduce the loss of gas on reversal it is advisable that the reverse valves should be as close to the regenerator chamber as possible. On the same basis the type of gas valve used should be such as to shut off the supply to the furnace while reversal is taking place. Any design of gas reverse valve which allows the producer gas to pass directly to the chimney even for the space of a few seconds during the act of reversal is not permissible in an installation where the highest economy is looked for.

Air Reverse Valves.—The air valves provided are of the water-sealed type. Considerable leakage of cold air direct into the chimney gases takes place with the ordinary type of butterfly valve, or dry mushroom valve, unless special precautions are taken to prevent it. Such a leakage is undesirable in any case, but is especially detrimental if the use of waste heat boilers is adopted.

Method of Reversing.—The need of uniform periods between reversals is of paramount importance and while it is customary to leave this operation to the furnacemen, with no doubt usually good results, yet a very strong case can be made out for automatic reversal every half hour. The design of the necessary gear presents no great difficulty, and indeed a similar device is already in service on some types of coke oven plant.

Chimney.—In order to give the suction necessary for the quick removal of the burnt gases from the furnace bath as well as to maintain the speed of the products of combustion through the checkerwork during recuperation the chimney must be ample in height. Under the conditions of temperature anticipated a stack 200 ft. high is calculated to give a suction of 1.75 in. w.g. at the base.

Fuel Consumption.—The fuel consumption used in the calculations, viz., 3 cwt. per ton of steel, allows for using coal at the same rate per hour per ton of metal as is now obtained in the best Park Gate practice, and only takes into account the quicker working which is anticipated from a furnace of the design shown. No allowance has been made therefore for the economy which would result from the prevention of radiant heat losses as suggested, and if this is adequately carried out a fuel consumption of not more than 2 cwt. of good coal at the producers per ton of ingots made could be confidently expected.

Discussion

The proposal to have a separate session of the institute for the discussion of Mr. Clements' paper has been under consideration. From our London correspondent we have the following report of the comment offered at the May meeting:

E. H. SANITER, referring to the graphs of the consumption of gas and air, said no such graphs had ever been published before. Extraordinary changes were shown in the relative consumptions. During charging the gas and air consumptions were high, while during melting the air was high and the gas low. This was not in accordance with preconceived ideas, which might be wrong. It should be remembered, however, that the records related to an individual experiment. In the thermal balance sheet the author assumed that the carbon was burned into CO, but it would be more accurate to take CO_2 as the product of combustion. He thought the particularly deep regenerators advocated would reduce the draft on the furnace or shorten its life. A water-cooled block, on the American system, would be an improvement.

E. B. CHRISTMAS, who made a tour of steel plants in the United States this year, criticized the general lack of water cooling in British furnaces. Quite 95 per cent of American furnaces had water cooling in some form or other. At Gary, Ind., he had seen 45 open-hearth furnaces with Knox water-cooled blocks and door frames. The blocks averaged over 2000 heats at the Edgar Thomson Works, while the total cost of water cooling was 2½c. per ton of steel, the average life of a small door being 40 months and of a large

door 26 months. Waste-heat boilers were common practice and averaged 350 hp. from four furnaces of 75 tons nominal capacity. The present tendency in the United States was to eliminate valves with turns, while the Orth roof was also growing in favor.

DR. A. MCCANCE said the author had calculated his heat balance on a wrong basis, and it contained a cumulative error. The best way was to calculate all the heat put into the furnace and all the heat taken out. He thought the author had made a wrong assumption in working out the radiation losses. Calculating the efficiency on his own methods, Dr. McCance obtained a figure of 32.3 per cent, which he thought was nearer reality than the author's figure of 16.9 per cent.

F. W. HARBORD appreciated the attitude of the author is first ascertaining the theoretical conditions and then seeing how far they could be approached in practice. Investigation would probably show that some of the losses could be considerably modified. As regards radiation losses the only hope in the bath itself was better refractories. The losses in the flue gases were also serious, and he suggested the possibility of cheapening the production of oxygen, which could be used to decrease the present large proportion of inert nitrogen passing through the furnace system and carrying away large quantities of heat.

BENJAMIN TALBOT was somewhat skeptical of the author's idea that the fuel consumption could be brought down to 3 cwt. per ton or lower, although such a reduction would be welcomed by steel makers. He thought the author's 100-ton furnace design was very good, but was afraid that the extra deep regenerators would reduce the speed of the furnace.

J. A. SMEETON said the Siemens furnace was a back number, and advocated a multi-flame continuous-recuperative furnace of the Chautraine type in which he was interested. This, he claimed, should be able to melt steel with 3 or even 2 cwt. of coal per ton. The whole Siemens system ought to be scrapped and something modern substituted. He mentioned economies of 40 per cent on any existing furnace and 85 per cent on many. Members were not unduly disconcerted and apparently preferred to await the results of a practical demonstration, which the speaker hoped to arrange in about six months.

H. M. RIDGE said that he had obtained economies by comparatively simple alterations of Siemens plant, without any change in metallurgical practice, and he thought by applying his method to the Park Gate plant the fuel consumption could be reduced by fully 26 per cent. He noted that in the author's records the CO_2 dropped during melting, which appeared undesirable and a source of heat loss. He also criticized the checker design.

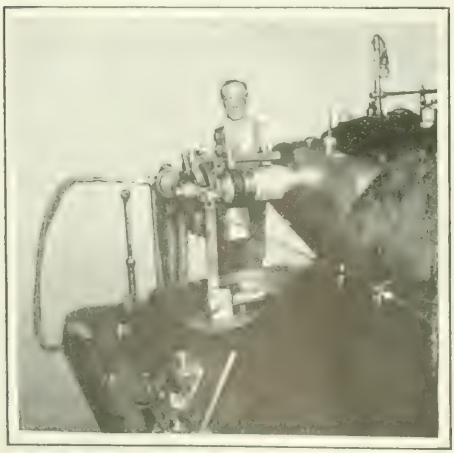
DR. W. H. HATFIELD considered the author's figures for efficiency more accurate than those of Dr. McCance. He thought it quite likely that a fuel consumption of 3 cwt. would be obtained in the author's new furnace, which would be a remarkable achievement.

DR. W. ROSENHAIN pointed out that damage to the refractories was purely a question of the temperature they attained, which depended on the balance between the heat radiated away and the heat supplied. He argued that if the heat supplied were reduced proportionately to the proposed reduction in radiation losses, the refractories would be all right.

Resourceful Engine Repair Job

BY CHARLES L. SMITH

The connecting rod on the ammonia compressor side of a large steam unit in the plant of the Consumers Ice & Cold Storage Co., El Paso, Tex., was recently broken off close to the crank pin end. The crank pin was considerably marred before the engine could be stopped and the damage necessitated either removal and replacement of the wrist pin, or turning off the flange and re-turning the bearing part of the pin.



Repairing the Ammonia Compressor of a Large Steam Unit. The Threading Head Is Mounted on the Crank Pin by Means of a Split Collar

Dismantling the rear end of the unit and sending it to a shop in St. Louis for repairs was decided upon, but before this was done, W. B. Langston, machinist, contracted to repair the machine as it stood. The improvised equipment devised for the job is shown in the accompanying illustration.

The crank pin was originally 7 in. in diameter by 8½ in. from crank to outside of flange on the pin; the bearing being about 7⅝ in. long. To turn off the flange and re-turn the pin the unique apparatus shown, which was made from the head of a 6-in. pipe machine, was used. This mechanism was centered and fastened by bolting into the oil hole in the center of the crank pin, through a cylindrical filler piece, supports being provided to anchor the overhanging outer end.

Attached to the sleeve part of the head there was an extension angle piece with a slot running lengthwise of the crank pin, an improvised tool holder being set in this slot at any point on the length of the crank pin desired. The sleeve of the threading head revolved on the inner piece and was set to true rotation by means of the adjustable jaws, while the bevel gears which rotated the sleeve part of the head were driven through an improvised joint by a Little Giant air motor. To offset the weight of the device arranged to carry the tool a heavy counterbalance was swung opposite.

The flange of the crank pin was turned off and the crank pin itself turned up, on the latter it being necessary to remove ⅛ in. of metal. The finish could hardly be excelled on the best equipped lathe, and while the process was much slower the job was completed in less than a week. This represented an estimated saving in time alone of more than six weeks over the first plan.

The feed of this turning device was regulated by hand by adjusting a Star valve wheel that advanced the sleeve as desired and was arranged for tripping on a trigger fastened on, and brought up from the bed plate of the engine. A collar-shaped ring was made to fit on the end of the crank pin, thus forming a flange. The shoulder was turned on the end of the crank pin, over which this ring was placed with a driving fit, and then countersunk bolted to hold it firmly in place.

The Volta Mfg. Co., Welland, Ont., announces the securing of an order from the Hopetown Steel Works, Bathgate, Scotland, for a standard 3-ton capacity Heroult type electric steel furnace, with transformer and switchboard equipment complete.

APPEAL FOR STATE AID

Canadian Government Asked to Help in Developing Ore Resources

TORONTO, July 10.—Representatives of the miners, engineers, steel manufacturers and transportation officials interested in the development of the iron ore industry of Ontario, in conference at the Parliament Buildings, Toronto, Ont., unanimously adopted a resolution calling on the Dominion and Provincial Governments to launch a scheme of State aid to iron mine operators over a period of 15 years. Although payment of a bounty of 75c. per ton on ore and the giving of assistance in the erection of the necessary plants were suggested as alternatives, the conference finally asked for aid without specifying any sum or method. The members of the conference also put themselves on record as being of the belief that the iron ore resources of Ontario are sufficient to support an important iron and steel industry, and requested the Ontario Government to appoint a committee consisting of at least one metallurgist, one geologist and one transportation expert, to prepare a report on the various phases of the development of the industry. Hon. Harry Mills, Minister of Mines, who presided, intimated that the Government would accede to the request. Considerable significance was attached to the gathering in view of the fact that it marked the first general conference between iron ore operators and steel manufacturers in Canada, some 40 of whom were present. Prominent among the steel men was J. D. Jones, general manager Algoma Steel Corporation, Sault Ste. Marie, Ont., who declared that if the low-grade Canadian ores could be offered at a price equivalent to that of the higher grade American ores now in use, his company would be willing to use Canadian ore exclusively. Mr. Jones also stated that he believed that given production on a sufficiently large scale, pig iron from Canadian ores could be manufactured to sell at $1.75 per ton less than the pig from American ores.

At the present time no domestic ore is being utilized in Canada, owing to the fact that all ore bodies hitherto discovered have been of such low grade as to require beneficiation before being marketed to operators of blast furnaces.

Business Activity Increasing

Advance reports from the Department of Commerce show a rapid improvement in business conditions during the month of May. Practically every industry for which figures have been received shows greater activity. Attention is called to the fact that prices, while they have not become stabilized, are nearly stationary at about 50 per cent above the pre-war level. This is somewhat higher than the low point reached some months ago, when they were about 40 per cent above pre-war level.

Among the advances in productive activity, copper took another big jump, with a total of 88,714,000 lb., the largest month since 1920, and four times the production of six months ago. Exports of copper amount to about 70 per cent of production, as compared with more than 90 per cent in April and with more than 130 per cent in May of 1921. Exports and imports of iron and steel showed moderate increases in May, the exports being the largest for fourteen months. Production of petroleum reached 46,473,000 barrels, or slightly less than the high record of March. Consumption exceeded production by more than 3,000,000 barrels. The lumber industry as a whole is operating at practically 100 per cent.

Both automobiles and trucks showed heavy increases in May, the former being 17 per cent and the latter about 11 per cent above April. Building volume stands at 179 as against 150 for April and 90 for May of last year. The activity is thus practically double what it was a year ago. There is a considerable increase in the number and tonnage of vessels clearing from the United States in the foreign trade, as well as those entering United States ports. The bulk of the increase is in American ships, while foreign ships show a smaller percentage of increase.

Immigration for May numbered 36,880, against 29,166 for April and 82,648 for May of last year. Emigration was 23,147 for May against 24,962 for April and 30,029 for May of last year.

Steel Corporation's Unfilled Orders

The unfilled business on the books of the United States Steel Corporation as of June 30 amounted to 5,635,531 tons, or 381,303 tons more than reported on the books May 31, and the largest amount reported since April, 1921. In May the unfilled business increased 157,311 tons, in April 602,769 tons, and in March 353,079 tons, while in February and January decreases were recorded. A year ago the unfilled tonnage amounted to 5,117,868 tons, or 517,663 tons less than on June 30 last. The monthly unfilled tonnage since January, 1919, compares as follows:

	1922	1921	1920	1919
Jan. 31	4,241,678	7,573,164	9,285,441	6,684,268
Feb. 28	4,141,069	6,933,867	9,502,081	6,010,787
Mar. 31	4,494,148	6,284,765	9,892,075	5,430,572
Apr. 30	5,096,917	5,845,224	10,359,747	4,800,685
May 31	5,254,228	5,482,487	10,940,465	4,282,310
June 30	5,635,531	5,117,868	10,978,817	4,892,855
July 31	.....	4,830,324	11,118,468	5,578,661
Aug. 31	.....	4,531,926	10,805,038	6,109,103
Sept. 30	.....	4,560,670	10,374,804	6,284,638
Oct. 31	.....	4,286,829	9,836,852	6,472,668
Nov. 30	.....	4,268,412	9,411,484	7,000,...
Dec. 31	.....	4,268,414	8,148,122	8,265,366

The largest total of unfilled orders was on April 30, 1917, when it was 12,183,083 tons. The lowest was on Dec. 31, 1910, at 2,605,747 tons.

Trenton Steel & Wire Co. Absorbed

The Maryland Steel Rolling Co., Baltimore, has acquired the plant and property of the Trenton Steel & Wire Co., 599 Ingham Avenue, Trenton, N. J., and will consolidate the business with its organization. The local works will be continued in operation and raw material supply, including hot-rolled strip steel, secured in the future from the Baltimore plant, which will be increased in capacity by the installation of additional machinery to provide for an output of 20,000 tons per annum. The Trenton plant, also, will be enlarged at a later date. John Robinson, formerly president of the Keystone Rolling Mill Co., Pittsburgh, will act as manager of the Trenton works, and Stanton Haines, former manager, will be mill superintendent.

Railroads Contract for Repairs

Due to the railroad strike of machinists, New England railroads are farming out their repair work. For instance, the New York, New Haven & Hartford Railroad has closed a contract with the Keith Car & Mfg. Co., Sagamore, Mass., for the repair of 6000 freight cars, while the Boston & Maine Railroad has placed additional car repair orders with the Laconia Car Co., Laconia, N. H. Such orders so far have failed to bring out additional buying of finished material, the railroads applying material on hand to such work.

To help users of its boilers over any problems that may have developed, the Heine Boiler Co., St. Louis, has recently taken steps to systematize the method by which Heine boilers in use are followed up. The plan includes the arranging of itineraries of field men in such a way that they can conveniently visit and report on Heine installations. The purpose is to establish a connection with the boiler user and ascertain what results are being obtained. Whenever possible the representative gives advice, but if unusual questions are involved, they are referred to the engineering department. The field men are supplied with suitable blanks for making out reports.

BRITISH FOREIGN TRADE

May Steel Exports Second Largest of the Year —Imports Still Light

The May official returns of British foreign trade in steel and iron show that the total exports were 300,981 gross tons. This is an increase of 26,559 tons over April. The May exports are next to the largest for the year, March being 311,654 tons, and compare with a monthly average of 267,047 tons for the first quarter. In May, 1921, the exports were only 101,202 tons. In these totals scrap is included. For the first five months of this year the total exports were 1,376,546 tons compared with 812,829 tons for the same period in 1921.

The May imports were 72,427 tons, or practically the same as March and April. The monthly average for the first quarter is 82,536 tons. In May, 1921, the imports were 89,348 tons. These figures also include scrap. The following table shows comparative data:

	Exports	Imports
[illegible]	[illegible]	72,071
[illegible]	[illegible]	72,427
[illegible]	[illegible]	82,536
[illegible]	[illegible]	89,348
Average per month, 1920	274,851	128,685
Average per month, 1919	188,519	80,801
Average per month, 1913	420,757	195,264

The following table covers the principal exports:

Principal British Exports, Gross Tons

	Average per Month		May	
	1913	1921	1921	1922
[illegible]	[illegible]	[illegible]	7,873	41,888
[illegible]	[illegible]	[illegible]	10,722	13,003
[illegible]	[illegible]	[illegible]	5,607	4,907
Galvanized sheets	63,506	17,635	10,679	46,258
[illegible]	[illegible]	[illegible]	[illegible]	10,172
[illegible]	[illegible]	[illegible]	12,350	29,155
[illegible]	[illegible]	[illegible]	920	5,545
[illegible]	[illegible]	[illegible]	[illegible]	14,357
Total exports, first 5 months, 1922				1,376,546
Total exports, first 5 months, 1921				812,829

As in April, exports of steel rails, galvanized sheets, pig iron and tin plate have shown the most marked recovery. To this must now be added steel sheets and bars.

Pig iron imports in May were 4858 tons compared with a monthly average in 1921 of 55,564 tons.

Iron ore imports in May were 410,821 tons, which compared with a monthly average in 1921 of 157,298 tons.

Manganese ore imports in May were 31,518 tons. Last year they were 14,405 tons per month and in 1913 they were over 50,000 tons per month.

Australia an Expanding Market for Machinery

Australia presents an expanding market for machinery, as shown by the latest Australian statistics, says William Althoff, assistant chief, Industrial Machinery Division, Department of Commerce. Imports of industrial machinery, excluding agricultural machinery, amounted to £9,059,871 for the fiscal year ending June 30, 1921, as against £4,302,419 for 1913. It is also gratifying to observe, he says, a large increase in the value and the percentage of machinery imports emanating from the United States as compared with pre-war figures. In 1913 American manufacturers furnished machinery valued at £1,245,516, or 28.9 per cent of the total, as against £3,884,396, or 42.9 per cent in the fiscal year ending June 30, 1921.

The United Kingdom and the United States have between them practically monopolized the Australian machinery market. The only other countries supplying appreciable quantities are Sweden, Canada, Switzerland, France and Belgium.

German goods have been excluded by the provisions of Australian war-time legislation, but beginning next August may again enter the field. Machinery imports from Germany attainted a maximum of £387,100 in 1913. This represented only 9 per cent of the total for the year.

The growth in imports from the United States as compared with pre-war years is particularly striking in view of the advantages enjoyed in the Australian market by the United Kingdom, among which may be mentioned: (a) substantially heavy preferential tariffs (b) favorable exchange rates; (c) close political, commercial and financial affiliations. A great many of the importing machinery dealers have intimate connections with Great Britain, and some are actually branches of British houses. A considerable number of Australian industrial establishments are financed by British capital. As regards the matter of commercial facilities, three of the most important banks in Australia are British and the rest have branches in Great Britain, whereas no American bank has been established there as yet.

Australia is developing steadily and American machinery manufacturers should not overlook the opportunities presented for the future.

Estimated Value of Australian Production, 1910–1919-20

Year	Agricultural	Pastoral	Dairy, Poultry and Bee Farming	Forestry and Fisheries	Mining	Manufactures	Total
	£1,000	£1,000	£1,000	£1,000	£1,000	£1,000	£1,000
1910	39,752	56,993	17,387	4,789	23,222	45,598	187,741
1911	38,774	50,725	19,107	5,728	23,494	50,767	188,595
1912	45,754	51,615	20,280	6,432	25,645	57,022	206,748
1913	46,162	57,866	20,341	6,338	25,810	61,586	218,103
1914	36,052	60,265	21,562	6,319	22,275	62,922	209,395
1915	73,769	65,607	21,156	5,777	22,428	62,883	251,620
1916	60,207	89,939	26,949	5,505	23,606	64,205	270,411
1917	57,967	93,435	31,326	5,523	25,581	69,797	283,629
1918	58,080	98,297	33,738	7,137	26,156	75,261	298,669
1919-20	72,234	109,062	38,830	10,170	19,725	98,162	348,183

Condition of the Belgian Machine Tool Market

In spite of improved industrial conditions and the removal of much of the immediate threat of German competition, the market for American machine tools in Belgium is rendered heavy by the presence of considerable stocks of American machinery probably aggregating 15,000,000 francs in value, which will no doubt require another year for liquidation even at the sacrifice prices at which they are being sold off, says Acting Commercial Attache S. H. Cross at Brussels. Appreciation of American equipment, even at higher prices, is indicated, however, by the fact that at the recent Commercial Fair one of the best known Belgian manufacturers sold no lathes whatever, while several purchasers were found by representatives of American manufacturers. Some sales of universal millers as well as of broaching and balancing machines, ordered from the United States rather than taken from local stocks, indicate also that American prices are reaching a point where they are interesting to the native user, though Belgian dealers in machine tools, after taking considerable losses, cannot be expected to stock machinery again for some time.

Two factors must be distinguished in regard to German competition with American tools. At the present time, in view of constantly increasing labor costs in Germany and the discriminatory tariff against German products, the German manufacturer cannot currently produce a machine tool and deliver it in Belgium at a price very much below our own quotations. On the other hand, German machinery dealers who accumulated considerable machinery stocks before production costs in Germany had greatly risen can still undersell American tools as long as these stocks hold out. A case of this sort is noted in which a well-known American radial drill is quoted in Belgium at 13,500 francs, while a German machine directly copied from the American apparatus and practically identical with it could be purchased in Germany a few months ago for 4,000 francs. The chances are that at present the German machine at the factory would cost double this amount. The position of the German manufacturer is exemplified by another instance in which an American representative quoted a Belgian prospect 82,000 francs for a well-known make of American wheel lathe including motor, and was told by his customer that he could get the same machine from the firm of W. Hegenscheid, of Ratibor, for 40,000 francs. The customer for one

reason or another delayed placing the order in Germany, and when he finally did so, learned that the German price had been advanced to 80,000 francs without motor.

Except on light tools, such as small millers, some of which are direct copies of American machines, it can hardly be said that Belgian manufacturers present very serious competition with American tools on any basis except price.

The outlook for machine tool sales in Belgium is thus on the whole more hopeful during the present spring. Better results can probably be obtained in this market by quoting local representatives special prices and by supporting them to the extent of supplying moderate stocks on consignment, as the losses of the average firm have been too great to permit any purchases for stock.

German Iron and Steel Output in 1919

Official data of the German pig iron and steel production in 1919 have been made public in *Stahl und Eisen* of June 15. This is the first publication of details as to grades as well as the final figures for the total outputs. The pig iron output in 1919 was as follows in metric tons:

Foundry iron	[illegible]
Bessemer iron	[illegible]
Thomas iron	[illegible]
Open-hearth iron, ferromanganese and spiegeleisen	1,521,390
Puddle iron	[illegible]
Other grades	1,338
Total	[illegible]

Of this total 3264 tons is classed as charcoal iron.

The steel output for 1919 is classified as follows:

Ingots		6,731,699
Basic Bessemer	[illegible]	
Acid Bessemer	[illegible]	
Basic open-hearth	4,143,700	
Acid open-hearth	61,712	
Electric	55,382	
Crucible	38,294	
	6,731,699	
Castings		145,699
Total		[illegible]

The total production of rolled steel is given as 6,362,543 tons, of which 1,132,257 tons was semi-finished steel.

The coke output for 1919 is reported as 22,709,532 tons and that of briquettes as 19,300,555 tons.

At the close of 1919 there were 232 blast furnaces in existence, of which 152 were operating. The number of open-hearth furnaces was 451 making ingots and 143 making steel castings. Total electric furnaces were 38 on ingots and 13 on steel castings.

New Zealand Blast Furnace Starts

WASHINGTON, July 11.—Organized in 1920, the Onakaka Iron & Steel Co., Onakaka, New Zealand, made the first tapping of its blast furnace on April 27, this year, and, according to a report received by the Department of Commerce from Consul General David F. Wilbur, Wellington, several tons of high quality iron were secured. The company was organized, it is stated, for the purpose of developing the limonite deposits which are found on the ridges bordering Golden Bay located near Nelson on the South Island. It recently purchased the plant of the New Zealand Iron Ore Smelting & Mfg. Co., which had been endeavoring to develop a commercial method of separating the metal from the iron-sand deposits along the west coast of North Island. The latter company was defeated by the presence of titanic acid, and the former was able to secure the plant. It is expected to produce eight to ten tons every eight hours and to confine the output for the present to 100 or 150 tons for the purpose of thoroughly testing the various units connected with the plant. The company expects to supply two-thirds of the demand of the New Zealand market which imports as high as 10,000 tons of pig iron annually.

The Struthers Furnace Co. has its merchant stack at Struthers, Mahoning County, Ohio, ready to go into blast, but it has not yet been able to get the coke. It planned to blow in the stack June 15.

LOCKOUT ENDED

English Engineers Obtain Some Concessions, But Concede Important Principle

A cable from Commercial Attache Tower to the Department of Commerce, Washington, states that great satisfaction is felt in Great Britain over the settlement of the engineering lockout. Unemployment is on the decrease. The gradual and consistent improvement in the United Kingdom foreign trade position has injected a feeling of confidence, and the general tone of business is much better. Increased activity is apparent in the iron and steel, textiles, and engineering trades toward the close of June as compared with May.

The engineering lockout which lasted more than three months has been settled satisfactorily and the men are returning to work under the conditions enacted. The dispute involved the principle of management by employees or their representatives, a point which the British owners considered beyond discussion. This was the fundamental point at issue. In the settlement the men have obtained certain concessions, but the principle that the management be vested in the employer has been maintained. The ballot of the members of the Amalgamated Engineering Union on the modified terms put forward by the employers were 75,478 for acceptance and 39,423 against acceptance—the majority for acceptance being 36,055.

Award of Rolling Stock to Belgian Maker Recommended

WASHINGTON, July 11.—Award of 130 cars, 100 gondolas and 30 box cars, has been recommended to be made to a Belgian maker, Hanis St. Pierre, by the transportation division of the Buenos Aires Port Railways, the bid of this maker being $1,875 Argentine gold for each gondola and $2,542 Argentine gold for each box car. Bids on 10 locomotives were rejected. A revision of the bids, reports Commercial Attache Edward F. Feely, showed that there were seven German manufacturers who quoted prices almost identical, and it was for this reason that all the bids were rejected. New bids have been called for.

Foreign Contracts for Electric Furnaces

The United Aluminum Works, Lautewerke, Germany, has contracted with the Electric Furnace Co., Salem, Ohio, for a 200 kw. tapping type electric furnace capable of holding 4000 lb. of aluminum. Mitsui & Co., New York, has purchased, for shipment to Japan, an automatic set for heat-treating forgings. The hardening furnace will be rated at 80 kw. and will contain five rows along which the forgings will advance. The only manual operation will be the periodic placing of material before the pusher of this furnace.

Two new Baily furnaces are also going into operation at the Port Huron plant of the American Bushings Corporation. The first is a 105-kw. brass melting furnace of 1500 lb. capacity; the second is a 60-kw. annealing furnace for bronze bushings. This furnace has a magazine feed and contains 11 rows for advancing the bushings down to 11 discharge tubes, treating the product at the rate of one bushing every three seconds.

Effects of Strike at Youngstown

YOUNGSTOWN, July 10.—As yet the strike of railway shopmen has not interfered with transportation of raw materials to the mills, or shipments of finished products. Repair of industrial railroad equipment is largely made by the plants themselves, and rolling stock of the mills is therefore not likely to be put out of commission.

Some slight interference with coal movement has been noted, due to inability at certain railroad centers to handle locomotive repairs. In this district, the strike has had little or no effect in impeding rail operations and motive equipment has been sent to the shops in this territory from other districts for repairs.

LOWER WATER RATES

Sharp Competition Between Lines Carrying from Atlantic to Pacific Ports

Following the break-up of the conference of shipping lines carrying from Atlantic Coast to Pacific Coast ports, what is quite evidently a rate war has broken out among the intercoastal lines, and as long as it lasts Pacific Coast consumers of iron and steel will derive considerable benefit from the lowered rates. The first result of the cancellation of agreement on rates between the several steamship companies was a drop from 60c. per 100 lb., the recent minimum on plates, sheets, tin plate, bars and other easily stored steel products, from New York, Philadelphia, Baltimore and Boston to Pacific Coast ports of call, to 40c. per 100 lb., a saving of $2 per ton. At least one company quotes a rate as low as 30c. per 100 lb. on shipments from Boston, New York and Philadelphia, and this rate per 100 lb. has been named on contracts running over the remainder of the year. A rate of 35c. per 100 lb. has been quoted on contracts to run until July 1, 1923. Lines offering a year's contract on this basis also are giving guarantees against a decline in the shape of a promise to meet any legitimately quoted rate of less than 35c.

While some companies claim to be maintaining a rate of 60c. per 100 lb. on easily stored iron and steel items, the same companies have reduced pig iron to 50c. per 100 lb., from the old rate of 55c., and are carrying a charge of 60c. per 100 lb. on wire rope, which formerly carried a rate of $1. The company quoting 30c. per 100 lb. on easily stored items of iron and steel is charging only $5.63 per net ton, or 26.8c. per 100 lb. on pig iron from New York, Boston or Philadelphia to the Pacific Coast.

Including the rail charge from Pittsburgh to the Atlantic seaboard of 34c. to New York, 32½c. to Philadelphia and 31½c. to Baltimore, plus 5c. per 100 lb. for handling, there is a combined rail and water charge from Pittsburgh to the Pacific Coast of 66½c. to 69c., which compares with the all-rail rate, which became effective July 1, of $1.50 on all steel products except ship plates, the new rate on which is $1.20.

Lower Pig Iron Rates from Birmingham

BIRMINGHAM, ALA., July 11.—The Louisville & Nashville and Southern Railroads have notified Birmingham iron makers of rates on pig iron over their lines from Birmingham to St. Louis and Ohio River crossings considerably lower than the reduced rates of the Interstate Commerce Commission going in effect July 1. The rates announced by these two railroads to points named are as follows:

To St. Louis, $4.22, or 95c. less than the recently announced rate.

To Cincinnati, $3.53, a reduction of 52c.

To Louisville, $3.24, a reduction of 48c.

The notice says these rates will be in effect as soon as possible. The reduction in these rates is from 21 to over 26 per cent under the rates prior to July 1.

Reduced Cost of Iron Making

A steel works interest at Youngstown figures that its assembly charges on raw materials sufficient to produce one ton of pig iron have been reduced by recent freight cuts from $9.59 to $8.55.

For the Mahoning Valley, lower freight rates will mean a yearly saving of about $5,000,000, it is roughly estimated. The 1920 freight bill of one of the largest interests was close to $10,000,000. Had the advance which became effective in August of that year applied throughout the 12-month period, it is estimated the gross charge would have been close to $12,000,000. On normal business, therefore, an average of 10 per cent reduction would mean a saving to this interest of about $1,200,000. The 1920 freight bill of another Valley independent approximated $4,000,000, and this company estimates the freight rate cut will mean a saving of at least $500,000 per year.

Lake Ore Shipments in June

The movement of Lake Superior iron ore by water in June and for the season up to July 1 was considerably larger than that of the corresponding period in 1921. June shipments from upper lake docks amounted to 6,629,711 gross tons against 3,600,989 tons in June, 1921, an increase of 3,028,722 tons or 84.11 per cent. The total to July was 8,351,177 tons or 1,979,950 tons in excess of the movement to July 1, 1921.

The shipments by ports for June, 1921 and 1922, and for the season were as follows:

	June, 1921	June, 1922	To July 1, 1921	To July 1, 1922
Escanaba	[illegible]	[illegible]	[illegible]	[illegible]
Marquette	38,959	324,419	52,944	394,544
Ashland	309,398	902,759	526,937	1,199,448
Superior	873,674	1,632,911	1,716,230	2,354,595
Duluth	1,681,411	2,017,801	2,908,299	2,253,863
Two Harbors	558,791	1,165,165	956,013	1,344,133
Total	[illegible]	6,629,711	[illegible]	8,351,177
Increase	[illegible]	[illegible]	[illegible]	[illegible]

Duluth shipments this year have been considerably less than in 1921 or only 26.99 per cent of the total to July 1. Ashland and Escanaba have contributed to the largest increase.

Acquires Control of Smith & Davis Mfg. Co.

ST. LOUIS, July 10.—William E. Hoblitzelle, former general manager of the Commonwealth Steel Co., St. Louis, who has been vice-president of the Duquesne Steel Co., Pittsburgh, for the last four years, has bought the control of the Smith & Davis Mfg. Co.—1231 of the 2000 shares, appraised at $439,467—St. Louis, from the wife and children of the late Clarence J. Curby, who accidentally shot and killed himself in his home here last February. Mr. Hoblitzelle was in charge of the Granite City plant of the Commonwealth Steel Co. for 12 years preceding 1918.

The Smith & Davis company, which manufactures metal beds, was established in 1876. The present company, employing 700, occupies a building at the northeast corner of Twentieth and Locust streets. There will be an expansion soon which will make necessary new or additional facilities, according to Mr. Hoblitzelle. Officers who will remain with the company are: James C. Harvey, vice-president; J. H. Kentnor, secretary; W. H. Whitehill, treasurer, and Henry Knickmeyer, superintendent.

Sheet Prices Irregular

YOUNGSTOWN, July 11.—Sheet prices are characterized as somewhat erratic by a number of district independents. An interest whose books are well filled with galvanized grades has been accepting black tonnages at the 3.15c. level of the leading interest, to round out rolling schedules. One of the principal Valley independents states it has been booking blue annealed sheets at 2.60c. base gage. All interests have sizable backlogs, sufficient to maintain production at a rate approximating normal for five to six weeks. Rolling mills idle last week for repairs have resumed and capacity is occupied at a rate in excess of 90 per cent.

Though some sheet bar tonnages have been booked in this territory at $37.50, the maker who entered the business states that prices are tightening at $35, which is expected to be the governing price for the quarter.

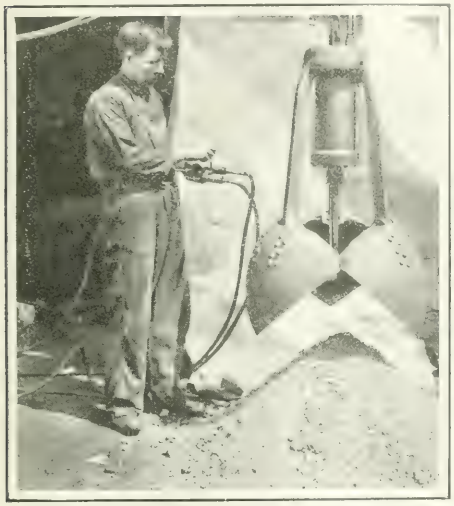
The Riter-Conley Co., Pittsburgh, has made its first shipment of fabricated steel on an order taken several weeks ago for 30 80,000-barrel oil storage tanks for erection at Pearl Harbor, Hawaii. About 2500 tons of steel is in the shipment.

The Central Iron & Steel Co., Harrisburg, Pa., is now operating at 70 per cent capacity, and is expected soon to resume full operations. A number of additional workmen have been employed recently.

Orange Peel Bucket for Foundry Use

An air-operated orange peel bucket, constructed, as shown in the illustration, is being offered by the Hayward Co., 50 Church Street, New York. It was designed primarily for use in car-wheel foundries in cleaning out the car-wheel pits, but is intended also for use on any foundry crane or hoist adjacent to air lines, and in any materials. Hot sand can be removed from car-wheel pits several hours before it can be handled by the usual method. Its usefulness may be further extended to cleaning up refuse, mixing sands, digging pits and other jobs around the foundry. In many cases the bucket can be operated by the crane man.

In cleaning car wheel pits it has been necessary to wait until the pits were sufficiently cooled to permit a man to enter them. One man, located at the bottom of the pit, shovelled the material into a pail, which was hoisted by a man above. This entailed considerable



Air-Operated Orange Peel Bucket for Removing Hot Sand from Car-Wheel Pits and for Other Foundry Uses

loss of time, and the work was usually done on Sundays or holidays, the pits being out of commission during the period of cooling, and also during the process of removing the material. The new air bucket is intended to eliminate waiting for the pits to cool and to save time in cleaning the pits, the time of which operation having been reduced 75 per cent over the old method, it is claimed.

The same hoist as used in the regular foundry work may be employed to lower and hoist the bucket and material, the bucket being operated from any adjacent air line. A four-way valve is used with a Cleveland Pneumatic Tool Co.'s air connection to the top of the bucket, permitting the armored air hose to be readily detached from the bucket head to facilitate moving from place to place.

The bucket shown is of 2 cu. ft. capacity and weighs approximately 300 lb. The closed diameter is 25 in. and the height closed 41 in. The open diameter is 30 in., the height when open being 45 in. Other sizes from ¾ to 9 cu. ft. capacity are made to suit various conditions and for handling all classes of material encountered in foundry work.

The Hunting, Davis Co., Century Building, Pittsburgh, has the plans for a new packing and distributing plant for the Chesborough Mfg. Co., a Standard Oil Co. interest, to be erected near McKees Rocks, Pa., on the Pittsburgh & Lake Erie Railroad. The buildings comprise a packing house of reinforced concrete construction, a boiler house and a tank storage house.

Lathe Attachment for Long Lead Threads

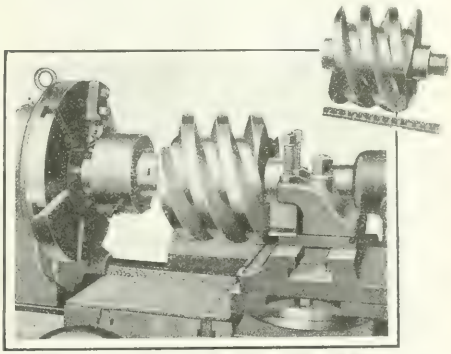
The Hendey Machine Co., Torrington, Conn., has placed on the market the attachment illustrated, called a sub-headstock, the primary purpose of which, applied to Hendey lathes, is the chasing of screw threads having unusually long leads.

The mechanism consists of a reduction gearing driven from the nose of the spindle, with driving face plate, and a dead center. The gearing gives a reduction of 6 to 1, the work revolving one turn to six turns of the spindle. The feed gearing and lead screw are driven from the spindle in the usual way.

If the gear box handles are set for the coarsest lead shown on the index, 1 in., it is obvious that for six turns of the spindle the carriage will have advanced 6 in. and the work revolved one turn. This, it is said, will not to any great extent increase the pressure on the screw cutting gearing over that obtained with the lathe regularly equipped in chasing 1-in. lead.

The sub-headstock is readily attached or removed. The frame is mounted on the ways of the bed and is backed against the front housing of headstock to take end thrust. It is fitted to the bed in the same manner as tailstock base and is clamped by two bolts. The face plate has six tee-slots to permit of work being bolted to plate and it also has a special driver. The standard open-side tool rest is provided with the attachment if not already supplied with the lathe, and although recommended for the work involved, the special compound rest with two-strap tool rest or the compound four-way tool block can also be used.

It is to be noted that all work centered is carried on two dead centers, the same as in a cylindrical grinder, the work being revolved by a suitable dog engaging with the face plate driver. With the regular feed gear-



Sub-Headstock Lathe Attachment for Chasing Screw Threads Having Long Leads

ing on the standard lathe, the longest lead obtained is 6 in. for 18, 20 and 24-in. lathes, and 4 in. for 12, 14 and 16-in. lathes. By using special change gears a lead as long as 10 or 12 in. can readily be obtained.

Other applications of the sub-headstock include forming shapes, cutters, etc, with very wide tools where exceptionally low speeds are required, and the turning of such work as would call for the use of the dead centers where extreme accuracy is wanted.

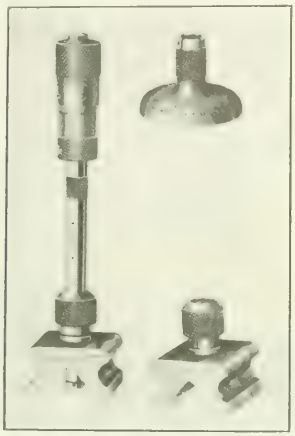
Orders booked by the Allis-Chalmers Mfg. Co., Milwaukee, in June, exceeded the total bookings in May by $2,370,000, according to a report made by Otto H. Falk, president, to the board of directors at the monthly meeting held at the general offices in West Allis, Milwaukee, July 7. George M. Moffett, New York, president Corn Products Refining Co., was elected a director to fill the vacancy caused by the death of William T. Abbott, Evanston, Ill. A quarterly dividend of 1 per cent on common stock of record July 15, payable Aug. 15, was declared.

The American Gear Manufacturers Association will hold its semi-annual meeting in Chicago, Oct. 9 to 11.

Inside Micrometer and Height Gages

A new size of inside micrometer gage with a measuring range from 2 to 32 in., which is lower in range than its previous design, has been brought out by the Reed Small Tool Works, Worcester. Two height gage attachments as shown in the illustrations, for use with the micrometer, are also being offered.

The new tool is graduated to read to thousandths of an inch and has the usual half-inch run of spindle. It incorporates the sturdy design of the previous style and retains the regulation diameter of barrel, spindle and thimble, as well as the large surfaces to permit of figures of generous size. The rods are fitted with hardened tool-steel anvils, adjustable for wear, and are interchangeable on the threaded stud at the end of the micrometer head, and can be used in combination. A detachable handle is provided and arranged so that the tool can be used for right- or left-handed work. The standard set is provided with a case and is made up of the micrometer head, an adjusting wrench, five rods



The Height Gage in Combination with the Micrometer Is at the Left

and a ¼-in. spacer, the capacity provided being from 2 to 7 in. With five additional 5-in. spacers the maximum range of 32 in. is secured. The micrometer is transformed into a height gage by the attachments shown.

The height gage and alinement attachment known as the No. 6 is shown in combination with the inside micrometer, a reliable height gage being simply obtained, it is claimed, to serve where a more expensive tool would otherwise be required. By attaching a rod of proper length to the micrometer, any range from 3 to 32 in. is available. The rod is inserted downward through the case-hardened base until the anvil finds the surface from which the measurement is to be taken. A quick clamping knurled nut is provided and holds the measuring rod in the perpendicular position.

This tool is intended to be useful in obtaining the height of projections from plane surfaces, the location of bushings in jigs, etc., being particularly convenient on planer work which frequently requires taking measurements from the bottom of a groove to points above, and for setting planer tools or the milling machine table. The V-shaped groove at the bottom of the base is provided to adapt the tool for use in cylindrical work, measuring distances between shafts or for alinement purposes. By inserting a 0.250 in. drill rod in the base and attaching any standard indicator, a surface gage for use in straightening shafts or for checking the variance in the distance between surfaces can be obtained. A surface gage scriber can be conveniently clamped to the rod, forming still another tool.

Another attachment known as the No. 7, shown also in the illustration, and having a round base, is intended mainly for height-gage purposes. It has a large base and the hole for the measuring rod is said to be greater in size and depth than usual. The upper end of the support, vertically split at right angles, is adjusted to permit a sliding friction as the rod is inserted, and will tend to prevent side play in the event of wear. It is also intended to hold the base and micrometer measuring rod intact when the tool is lifted from one surface to another, the knurled exterior also facilitating handling.

Shipping Board Selling Surplus Material on Pacific Coast

All surplus marine stock of the United States Shipping Board stored at points along the Pacific Coast is to be disposed of immediately at open competitive bidding. In addition to the contents of St. John's Warehouse at Portland, Ore., the Shipping Board has directed the sale, at public auction, of its property at Tacoma, Wash., and at Alameda, Cal. The sale at Portland took place on Tuesday, July 11, the sale at Tacoma takes place on Tuesday, July 25, and the sale at Alameda on Tuesday, Aug. 8.

Included in the sale of material at Tacoma are a large number of standard water tube boilers, locomotive cranes, scales, warehouse trucks, timber dollies, tractors, plumbing fixtures, tanks, pumps, blower sets consisting of fan and high-speed reciprocating steam engines, feed water-heaters and gages, galley equipment, office furniture and supplies, paint, oil, varnish, dry colors, wire rope, lumber, building material, electrical equipment, hand saws, bolt heading machines, large quantities of tools, etc.

The materials to be sold at Alameda consist of cranes, derricks, switching locomotive, standard water tube boilers, a considerable quantity of plumbing fixtures, valves and pipe fittings, machine tools, metal and wood-working machinery, augurs, drills, hammers, shovels, reciprocating high-speed engine driven blower sets, pumps, tanks, furniture, textiles, galley equipment, wire manila rope, hardware, wood preservatives, railroad ties, electrical material, mechanical telegraphs, telephone poles, searchlights, cargo lights, nautical instruments, clam shell buckets, etc.

Further Standardization of Farm Implements

Farm implement manufacturers have held preliminary conferences with Secretary Hoover of the Department of Commerce to discuss the further standardization of agricultural machinery. Following the formulation of a new list of implements and the elimination of those not considered necessary by the General Standardization Committee of the National Association of Farm Equipment Manufacturers, further conferences will be held in the fall between representatives of the farm equipment makers and Secretary Hoover, when the new schedule will be announced. The new standardization program will go so far as to reduce the number of sizes of bolts, screws and other standard parts, so far as can be done without preventing individuality of manufacture and interfering with practical plant operation. The enthusiasm for standardization is the natural outcome of the recent dull period when manufacturers found that their inventories of both raw materials and finished products were considerably smaller than they would have been if the standardization program, which dates back to the war years, had not been adopted.

The Maynard Electric Steel Casting Co., Milwaukee, Wis., is building an addition to its foundry 100 ft. by 120 ft., which will increase the molding and core making floor about 50 per cent. Business has been brisk with the company.

The National Enameling & Stamping Co. will increase its sheet steel capacity by 25 per cent through an addition of six new mills at Granite City, Ill., at a cost of $1,500,000.

"Pittsburgh Plus" and the Proposed Mergers

Western Rolled Steel Consumers Ask Attorney General to Consider Basing Point Case in Connection with Investigation of Proposed Independent Consolidations

CHICAGO, July 10.—Following the statement circulated by the Associated Press that Attorney General Daugherty invited the opinions of members of the iron and steel trade on the mergers of independent steel mills, it was learned in steel circles here that the Western Association of Rolled Steel Consumers had addressed a letter to the Department of Justice discussing the consolidation in relation to "Pittsburgh Plus." The communication which was obtained by application to the Association, reads as follows:

HON. H. M. DAUGHERTY,
Attorney General, United States,
Washington.

Dear Sir:

Referring to the proposed steel mergers and your request for statements from responsible persons in connection therewith, we desire to call to your attention the practice in the steel industry known as "Pittsburgh Plus."

The Federal Trade Commission is now conducting an investigation as to this practice, under a complaint issued upon our application. This investigation has been handled in a very thoroughgoing, competent and exhaustive manner, and we are confident that the commission will arrive at a just conclusion upon the evidence when its hearing has concluded.

It is quite probable, however, that if the proposed mergers of the several steel companies are effected, there may be an intimate connection between them and this practice. The proposed mergers may or may not be for the best interests of the industry and for the best interests of the public. As to that we express no opinion, nor have we one to offer. However, since your department has undertaken to investigate and supervise the mergers in question, we believe it of the utmost importance, in the interests of western industry, that such investigation include the practice of "Pittsburgh Plus."

Mergers of steel companies which might otherwise be for the benefit of the industry and the public might have an effect upon the extension and perpetuation of this unjust practice which would be very injurious, and which would seriously handicap the Trade Commission in its present investigation, or possibly render its orders ineffectual.

For the reasons above indicated we desire to call this practice to your attention and to request that it be included in your investigation in order that the interests of this association, which represents 800 of the major Western manufacturers, and the interests of the public generally may be fully protected, not only with respect to the mergers themselves, but also with respect to the practice of "Pittsburgh Plus" which must of necessity be intimately connected therewith.

For your information we are inclosing some data and some expressions of opinion with respect to the practice. We believe you can fully inform yourself with regard to the same through the Federal Trade Commission.

Trusting that this matter may have your attention, we are

Very truly yours.

WESTERN ASSOCIATION OF ROLLED STEEL CONSUMERS.
W. E. McCollum, Secretary.

Possible Results of Merging

While the Association does not go on record for or against the mergers, it does intimate that their consummation might result in the perpetuation of the Pittsburgh basing point for finished steel prices and calls upon the Attorney General to give due consideration to this possibility in passing upon the question before him. The views of the association are amplified in a public statement sent out to the press. This asserts, in part:

"Some manufacturers using rolled steel believe the effect of the mergers will be good, because by merging mills east and west of Pittsburgh in one large company they will eliminate wasteful cross-hauls and thus effect economies which may be reflected in lower cost of steel to the consumer. Others assert that there is danger in the new combination, as there is likelihood that the two new companies may again merge, taking in others, into a giant corporation which would control approximately 30 per cent of the steel output of the country and this, added to the 45 per cent now controlled by the United States Steel Corporation, would give two powerful corporations control of 75 per cent of the entire steel output, and consequently an unshakable grip upon the nation's steel industry, which would enable them to set any price for steel they saw fit.

"Manufacturers and fabricators of rolled steel do not generally object to but rather favor a stabilized market. They do, however, object to the iniquitous 'Pittsburgh Plus' practice or to any other practice which penalizes efficient mills in favor of inefficient mills or that will cause differentiation in price between manufacturers in different sections of the country, discriminating against the entire country in favor of the relatively small section close to Pittsburgh."

Production Costs

In further comments on the investigation undertaken by the Attorney General, the statement calls attention to testimony brought out in the prior inquiry by the Lockwood Committee, and particularly to certain considerations as to production costs which that committee failed to develop. It says:

"John A. Topping, chairman Republic Iron & Steel Co., testifying before the Lockwood Committee, indicated the advantage of the United States Steel Corporation over independents at from $3 to $5 a ton. Judge Gary thought $3 per ton would be the maximum. Both these gentlemen denied that the United States Steel Corporation had an advantage over the independents because of its great holdings of ore and coal properties and attributed the advantage to the Corporation's ownership of railroads, advantage of massing production at strategic points for distribution and geographical advantages both in the distribution and assembling of raw material with their resultant economy and efficiency.

"*The Chicago Tribune* compares the actual earnings of the railroads owned by the Corporation in 1920 with the Corporation's output, averaging the advantage at $4 a ton, and asks where the additional $40,000,000 comes from. The *Tribune* forcefully brings out—what the Lockwood Committee did not—that the earnings of the Corporation-owned roads could not account for the entire advantage, since their aggregate earnings, according to *Poor's Manual*, were approximately $13,000,000 in 1920, the last year for which figures are available.

"Well posted men in the steel trade assert that the major portion of this enormous difference results from the Corporation's ownership of steel mills at the lower end of Lake Michigan and also at Birmingham, Ala., admitted points of low-cost production. It is also asserted that the amount collected for the 'Pittsburgh Plus' unearned freight charge helps to swell these profits."

Questionnaires Will Throw Light on "Pittsburgh Plus"

In discussing the separate investigation of the mergers which has been undertaken by the Federal Trade Commission, W. E. McCollum, secretary Western Association of Rolled Steel Consumers, asserted that the questionnaires sent to all large steel producers will be of the utmost value in clearing up points at issue in the "Pittsburgh Plus" controversy. The questionnaires ask the production figures for each class of rolled steel, also the tonnage of each product shipped

to each State during 1921, and, if possible, 1919 and 1920 also.

"With this information," Mr. McCollum added, "the commission expects to ascertain the greatest area of production and consumption and chart the movement of all rolled steel. This is very interesting from our point of view. It will undoubtedly elicit information we have long sought, which, we believe, will show the West and South have potential, if not actual, producing capacity sufficient to supply all steel demands in those sections, and thus knock the last prop from under the supporters of 'Pittsburgh Plus.'"

Steel Corporation Will Present Its Case

WASHINGTON, July 11.—The Federal Trade Commission will complete the presentation of its side in the Pittsburgh-base proceedings either the latter part of this week or the fore part of next, it was stated at the offices of the commission. The final hearings on the side of the commission now are being held at Chattanooga, Tenn.

The next step will be for the United States Steel Corporation to present its side through the witnesses it will call. It will be at liberty to have the hearings held wherever it desires, and this will probably mean that they will be held at least in some of the points where hearings for the commission's side were conducted. After the hearings are entirely completed, arguments will be made before the commission in Washington, to be followed either by a dismissal or cease and desist order by the commission. In the event the latter course is followed, it is assumed that the case will be appealed by the Steel Corporation and carried through the Supreme Court of the United States.

The probable attitude of the commission has taken on increased interest because of the change in its personnel since the complaint was issued at the request of the Western Association of Rolled Steel Consumers. Of present members of the commission who passed on the complaint, two, Chairman Gaskill and Commissioner Murdock, voted against its issuance, while Commissioner Thompson voted for its issuance, being joined in his vote by former Commissioners Colver and Pollard. There have been two new members of the commission since the complaint was issued, Commissioners Nugent and Van Fleet.

In the event the attitude of Chairman Gaskill and Commissioner Murdock remained unchanged and they voted for dismissal of the complaint, and are joined in such a vote by either one of the two new members, the majority would be in favor of dismissal. On the other hand, if both new members should vote for a cease and desist order and the attitude of the old members are unchanged, the majority would be in favor of this order.

Judge Van Fleet has become associated with the commission so recently that he has not had an opportunity to study the case.

Hearing Concluded at Chattanooga

CHATTANOOGA, TENN., July 10.—The Federal Trade Commission's hearing of Southern steel consumers in their complaint against the Pittsburgh base plan of selling steel was concluded Friday and the session was adjourned to Washington to meet at a later date. The record now embraces 11,000 pages without tabulated matter and 4000 exhibits showing contracts for purchase of steel from various manufacturers.

Among the last to testify was William P. Copping of the Copping Steel Plate & Iron Works, New Orleans. He said that he had formed a connection with a Pittsburgh district concern in order to have his steel fabricated for tanks and shipped to the jobs ready to erect. He said he was kept practically at home by reason of the Tennessee company charging the Pittsburgh plus, Northern competitors invading New Orleans itself. He found he could have the steel fabricated in Pittsburgh and shipped to New Orleans cheaper than he could buy from Birmingham and do the fabricating himself.

F. E. Degolian, Degolian company, Atlanta, maker of steel structures, said the Pittsburgh basing plan keeps his business limited to a part of the South and prevents expansion that would keep his shop busy.

Joseph K. Barcroft, Austin Bridge Co., Atlanta, said the differential barred it from the Carolinas and territory north of Atlanta and that he had gotten into Florida only since fabricating in transit had been granted. Removal of the Pittsburgh plan would extend territory and increase business.

Kilby Car & Foundry Co. and National Forge Co., Anniston, Ala., declared Pittsburgh concerns enjoyed a distinct advantage by reason of the Pitttsburgh base, which would be offset by elimination of the $5 differential.

The testimony of representatives of the Steel Products Co. and the Savannah Blow Pipe Co., Savannah, was to the effect that their business was confined to a radius of about 200 miles from Savannah on account of the "Pittsburgh plus," while Northern competitors did business in territory naturally theirs and from which they are cut off by the "Pittsburg plus."

D. H. Wood, president Converse Bridge & Steel Co., Chattanooga, testified that the American Bridge Co. could secure business in the area where the Chattanooga concern is handicapped by the Pittsburgh base. The Steel Corporation, he said, also has an advantage by ownership of the American Bridge Co., to which it could make prompt delivery of material and sell its product at a rolling mill profit through the American Bridge Co., even if it were necessary for the latter to do work at cost in order to get the business. Most of his business, witness said, is done in Tennessee and Alabama, his area being restricted to 100 to 150 miles on the east and north. Beginning at that point, he said, Pittsburgh competitors could get into the Carolinas and coast of Georgia, Florida, Louisiana and adjacent territory. With the differential removed he declared his company could get as far as Oklahoma, St. Louis, Louisville and both the Carolinas.

National Enameling & Stamping Co. Extensions

ST. LOUIS, July 11.—George W. Niedringhaus, president National Enameling & Stamping Co., has announced that new equipment costing about $1,000,000 will be installed in its Granite City plant. The new facilities, Mr. Niedringhaus said, will mean the employment of from 600 to 700 men in addition to the 4200 now at work.

The equipment to be installed includes six sheet mills for the rolling of black steel, a large 72-in. jobbing mill and a galvanized sheet department. The company now has 30 sheet mills—six at the plant in North St. Louis and 24 at Granite City.

The new mills, which will add 5000 or 6000 tons of steel a month to the present capacity of 17,000 tons, will make the company the largest independent sheet producer in the West, according to Mr. Niedringhaus. The company also produces 15,000 tons of steel plates a month.

How to Figure a Mixture is the title of a pamphlet issued by the Matthew Addy Co., First National Bank Building, Cincinnati, with offices also in Philadelphia, Pittsburgh, St. Louis and Chicago. The booklet provides for foundrymen a standard method for figuring mixtures, in the efficient and economical manufacture of gray iron castings.

Naval Gun Factory at Washington

Exceptionally Massive Machine Tools for the Production of the Heaviest Naval Ordnance—Subsidiary Work of Great Importance

BY SIDNEY G. KOON

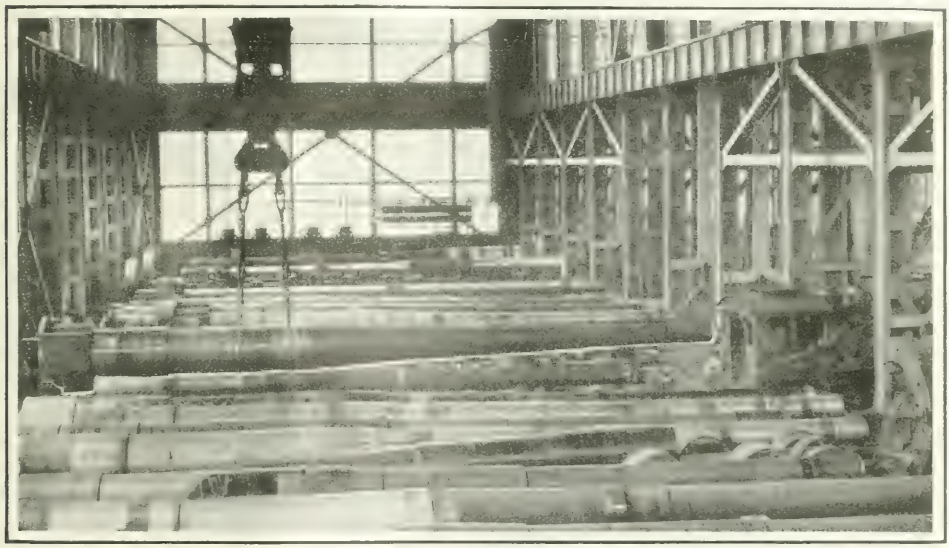
TO prepare for a war with France, which was more or less actively prosecuted for more than a year, but which was never declared, Congress in January of 1799 appropriated a sum of money for the building of six ships of war. A part of the sum was devoted to the purchase of land for six navy yards, all of which are to-day active and one of them located in what is now the city of Washington. Some years later, an appropriation was made to establish in the Washington Navy Yard a factory for the making of guns for the navy. That gun factory, enlarged from time to time, has taken a conspicuous share in the manufacture and development of heavy guns for naval use. The latest and most important of its enlargements, started at the time the United States entered the Great War, was completed about a year ago. This latest addition is an immense machine shop capable of manufacturing guns up to 20-in. in diameter of bore and 50 calibers in length—a size much larger than has ever been built anywhere. Such a gun—exclusive of the mount upon which it would be fought—would weigh approximately 250 tons.

Taken as a whole, the naval gun factory is primarily organized for the manufacture of guns, mounts, sights, breech mechanisms, torpedo tubes, torpedoes, gun-firing, lighting and fire-control instruments, including telescopes and other optical instruments used by the navy in the armament of war vessels.

What the Plant Has Done and Can Do

A principal achievement of the yard during the late war was the construction of the ordnance end of the 14-in. railroad guns sent to France, and built in conjunction with the Baldwin Locomotive Works, Philadelphia, which furnished the carriages. These guns were the largest and most powerful of any guns used by either side on the Western front during the war. They had not the range of the guns which bombarded Paris, but were much more powerful and threw a much heavier shell—1400 lb. instead of 204 lb.

Still larger guns have been turned out since the war, in the shape of the 16-in. guns for the new battleships and battle cruisers of the "three-year" naval act of 1916. The heaviest of these guns will never be put on the ships for which they were designed, because all twelve of the ships which were to have received them were canceled by the limitations of armament conference, and will not be completed as designed.



Loading a 16-In. Gun, 50 Calibers Long, and Weighing About 125 Tons, Upon a Truck for Shipment to the Proving Grounds, Where Each Gun Has to Pass Definite Tests. This view was taken in the new gun shop, designed for the manufacture of the heaviest pieces of naval ordnance. The crane handling the gun has 300 tons capacity

Without the naval gun factory, the navy would have been unable so quickly to arm the merchant vessels during the war, and the campaign against the submarine would have been longer and much more expensive. The demand for guns, mounts, accessories and spare parts for ordnance material exceeded all expectations, and it was only by the experience and the ability of the gun factory that this material was manufactured. In addition, the guidance by the gun factory of the manufacturing plants of the country newly undertaking naval ordnance matters proved the salvation of those plants in the early and accurate production of their work.

An interesting item going through the factory at present consists of twenty gun houses for the ten light cruisers now under construction for the Government. Each of these gun houses is mounted upon a turntable and carries two 6-in. guns mounted close together, side by side. It is not a turret except in appearance, for there is no armor to keep out enemy projectiles, but it is designed to keep out the water and thus protect the gunners from spray and other disturbance. The turn-

table or base upon which these gun houses revolve is made of a single steel casting poured in the steel department, while the revolving house itself has been fabricated of steel plates in the boiler shop of the plant, in which, as it happens, no boilers have ever been built.

Melting Equipment

In addition to the building of mounts for heavy guns and to the machining of the guns themselves from forgings furnished by outside steel makers, the gun factory has its own melting equipment for steel and alloy materials, with capacity up to about 25 tons in a single unit. This melting capacity is used for the production of guns smaller in size than the monsters in the big ship turret, and also is used for auxiliary purposes, such as castings for the mounts for these guns, for turntables and other auxiliary purposes in connection with the use of the guns on shipboard. The melting equipment consists of one 20-ton open-hearth furnace, operating on an acid bottom, two 6-ton electric furnaces and four 2-ton Tropenas converters.

One interesting feature of the work lies in the fact that frequently steel from the Tropenas converters and from the electric furnaces is mixed together in a single ladle and the casting made from that mixture. For certain classes of work this has given a very satisfactory metal and one which has excellent ductile and other qualities.

A good part of the charge put into both the open-hearth furnace and the electric furnaces consists of turnings and borings from guns. These contain from 3 to 3½ per cent of nickel, which is retained in the castings made from these furnaces. There is also a small amount of copper put into these castings, in the interest of ductility. No effort, however, is made to retain chromium, although this may exist in the original scrap passed into the furnaces.

Steel and brass foundries occupy two buildings, with a total floor space of 122,000 sq. ft., of which 24,000 sq. ft. is occupied by furnaces and ovens. The steel foundry is capable of turning out 88 tons of steel in 24 hr. The largest steel casting yet poured weighed 58,000 lb. The brass foundry, which has a capacity of 1,000,000 lb. per month of non-ferrous castings, produces many castings for other Government departments, in addition to the needs of the gun factory.

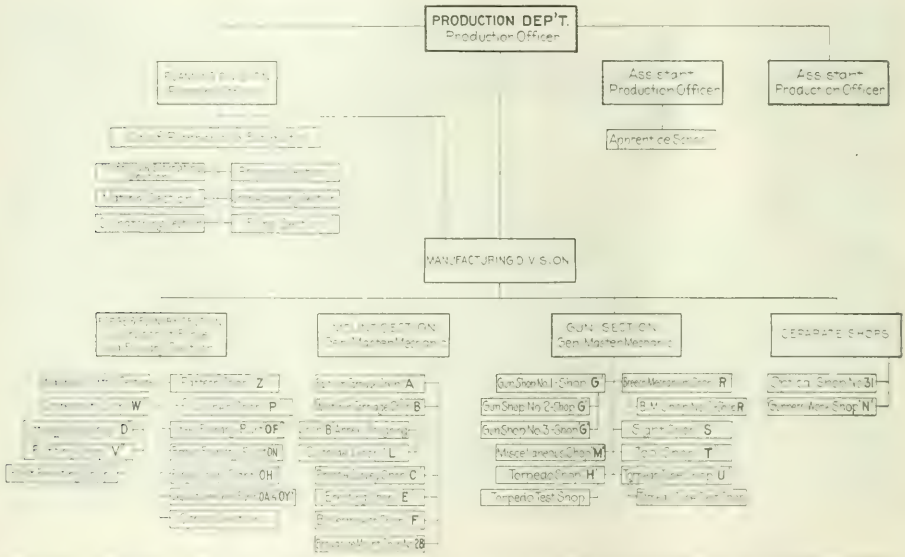
A great many small castings are made in chills, it being found that these will prove sounder than sand-cast materials. Experiments have recently been made here in this direction in the casting of pistons for aircraft engines. By this means a good deal of the unsoundness in castings made in sand has been overcome and a very dense metal secured. Incidentally, this reduces largely the amount of molding work necessary and therefore decreases the cost.

Forging equipment at the factory includes one 2000-ton hydraulic press and one 1000-ton press, as well as a battery of steam hammers and drop forges. This equipment, in conjunction with the melting equipment, makes the yard independent of outside sources of supply for small and medium size forgings, while a continuous supply of steel ingots and castings is possible in the steel department.

Occupying 48,000 sq. ft. of floor space, the forge shop is capable of manufacturing gun and mount forgings up to 6-in. guns, and breech mechanism forgings for all sizes of guns. It can handle ingots up to 15 tons, including the forging, annealing and application of special heat treatment processes.

Two Big Gun Shops

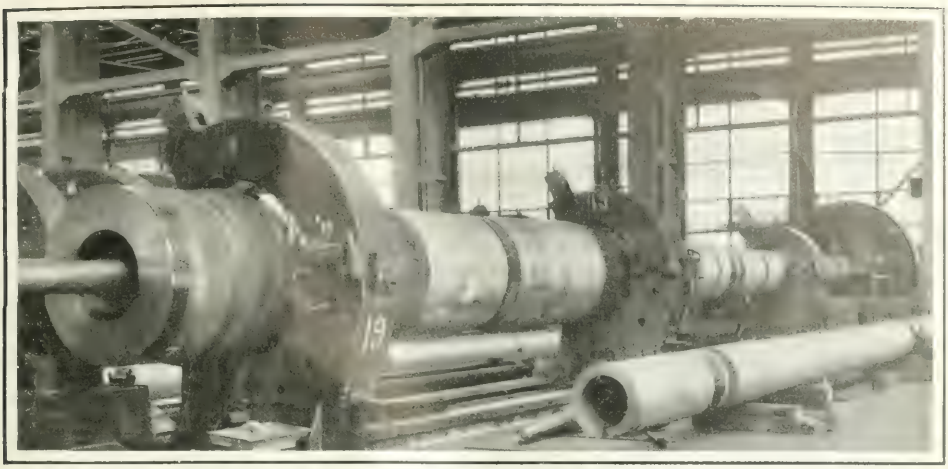
Until six years ago No. 1 gun shop, capable of handling 14-in. guns 50 calibers long, weighing about 91 tons, sufficed for the needs of the navy. But the more powerful ordnance called for on the ships of the "three-year" naval program required more massive equipment. This led to the designing and building of No. 2 gun shop. The two shops occupy, between them, 231,000 sq. ft. of floor space and are valued, with their equipment, at $8,500,000.



Production Department Diagram Showing Relationships of the Various Shops and Activities to the Directing Heads

In No. 1 gun shop the largest lathe has 102-in. swing and is 180 ft. long. The longest single boring operation requires 56 8-hr. days, during which the machines are kept running continuously, 24 hr. per day, for over 18 days.

Gun Shop No. 2, which has recently been completed for the manufacture of the largest size guns, has the most modern and up-to-date high powered machinery and equipment of any plant of its kind in the United States. Its largest lathes swing 120-in. and are about 208 ft. long. These machines were designed to take a gun with a maximum length of about 85 ft., and to bore that gun or to place rifling in a bore already made. This makes necessary, in the lathe, more than double the length of the gun, besides the necessary length at the two ends to take care of the head and tail stocks and the tool holders. The lead screws on these machines are supported all along the length, so that aline-



One of the 16-In. Guns in a Large Lathe; the Boring Tool Is Seen in the Left End of the Gun. The longest of these guns is 208 ft. over all and can swing a piece 10 ft. in diameter

ment may be maintained. The large cranes are each capable of handling 300 tons.

Three assembling pits have been provided for heat treatment and for heating preliminary to shrinkage of gun forgings or hoops over liners. These pits are 100 ft. deep and have an inside diameter of about 7 ft. Each one is large enough to take the largest gun which it is proposed to make at the yard and will easily take the largest gun which has ever been made. All three pits have electric heating elements provided by the General Electric Co.

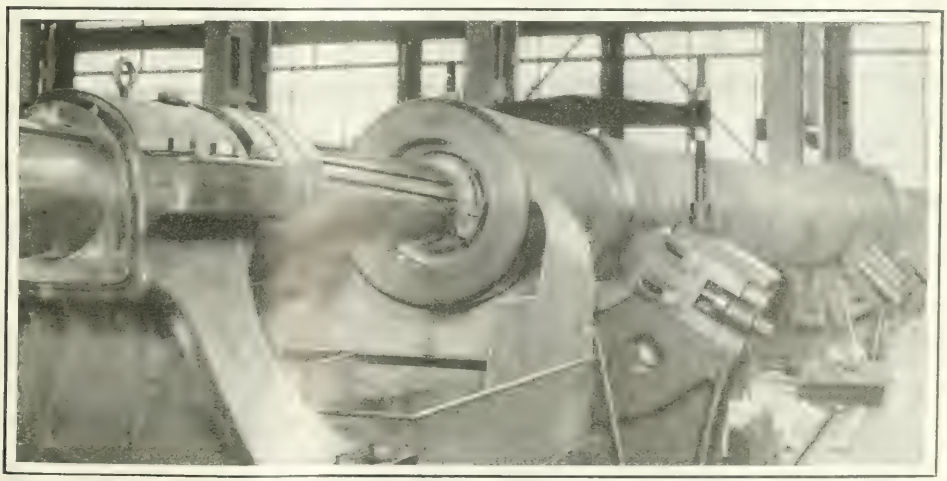
Ordinarily, work in these pits is done at between 800 and 1000 deg. Fahr., which provides enough expansion so that a liner may be inserted in the tube, whereupon the gun is allowed to cool and grasp the liner firmly. In the same manner, liners which have partially worn out in active service are withdrawn from guns, the outside of the gun being heated by the heating elements, while the inside of the liner is cooled by sprays.

Breech mechanisms and firing locks for all calibers of guns are made in the breech mechanism shop, which covers 24,000 sq. ft. of floor space. The weights of these mechanisms vary from 11½ lb. for a 1-pounder rapid fire gun to 5500 lb. for a 16-in. gun.

Machinery for machining gun mounts is housed principally in two buildings covering 136,250 sq. ft. of floor space. The broadside mount shop, in one building, handles work for the medium and smaller caliber guns—7 in. bore and under. The mount shop for the large turret guns, including the erecting bay, is equipped with a number of unusually large machines. There are here planers 10 ft. x 10 ft. x 20 ft.; 80 in. horizontal boring mills, taking a length of 25 ft. between centers and 12 ft. vertical boring mills, handling castings up to 27 tons, 17 ft. long, 7 ft. high and 6 ft. wide.

There was completed, during the war, a 5-story machine shop having a floor space of 343,000 sq. ft. In this are manufactured torpedoes, torpedo tubes, gun sights and a large quantity of the miscellaneous detail work necessary in the assembling of complete guns. This shop also manufactures tools, jigs, fixtures, drop forging dies, gages, taps, screw dies, reamers, packed bits, drawing punches and measuring instruments. To insure interchangeability of ordnance material made in outside plants with the standard material in service, most of the gages used by the outside plants in ordnance work are made here.

Non-ferrous metals are handled in large quantities



Rifling Head at Work on a 16-In. Gun. This is an operation requiring the utmost accuracy, as the lands must be parallel throughout the 69-ft. length of the gun. The rifling extends over all this length except for the enlarged powder chamber at the breech and the seat for the breech block

and special attention has been given both to aluminum and to Tobin bronze. Special study applied to the working of some of these materials has given results which were previously found impracticable. An instance of this lies in the warhead of one of the 21-in. torpedoes, made of Tobin bronze, about 1/16 in. thick. This is made in four pieces welded together. Three of the pieces form each one-third of the circumference of a cylindrical form, while the fourth forms the head or nose. These are all rolled down into the proper thickness from an ingot of considerable size cast from one of the furnaces. The nose piece is then passed through a press which forces it into the shape of a hemisphere, approximately, while the other pieces, after being rolled to the proper thickness, are bent on a circle press to the radius required. After being welded together, the entire warhead is then machined on the outside and all traces of the weld disappear. They may, however, be found on the inside. This method of manufacture has reduced the cost of these warheads considerably below what it was under the old system.

Manganese bronze has been produced in about the same way, being made on a commercial scale from scrap gathered up around the yard and elsewhere. By using this process the purchase of manganese bronze from outside smelting concerns at 35c. per lb. has been discontinued and it is now obtainable in the yard at a cost of about 16c. per lb. In many cases yellow brass castings have been used as a substitute for bronze, reducing the cost and rendering possible the utilization of scrap brass from cartridge cases, etc., which has been refined by processes developed in the yard, with the result that virgin metal is thus conserved. Development of these processes is credited to Paul A. McKinney, general master mechanic and metallurgist.

Special work carried on in the yard, in addition to that required for direct gunnery purposes, consists in optical work in the manufacture of lenses for periscope use and the manufacture of the periscopes themselves for submarine purposes. Range finders and lenses are also built here in large quantities as well as binoculars, telescopes and spotting glasses. In connection with both the optical work and gunnery work, men are detailed from the fleet to take up here a sort of apprenticeship course in the manufacture of the devices which they are later to operate on shipboard. In general, these men are detailed for one year.

The number of employees in the naval gun factory has increased from about 4100 in December, 1916, to a maximum of 9660 at the time of the armistice. Ten months later the number had fallen to about 7600 and is to-day in the neighborhood of 5500.

Control of work passing through the different shops is handled under the direction of the production engineer of the yard. The planning division maintains a live file of some 3000 cards on a visible system. Each column of cards is headed by the name of the shop through which the work represented by the card is being handled. Only the lower line on each card shows through the celluloid pocket in which the card is maintained in the file, this line recording the essential data for identification purposes. Back of the card in each pocket will be found such additional memoranda or orders as may be necessary to complete the history of each particular piece or operation.

Similar cards issued with the work are kept in the office of each shop in which the work is being done. As soon as one of these cards, marked "completed," is forwarded from the shop to the production office, it is carefully checked up with the card in the file just mentioned, and then retained in a permanent file in the production office. Meantime, the card which has been reposing in the production office file is also marked "completed" and forwarded to the accounting division for action. By this means complete control is had, at all times, of the work in process through the shop and it is possible from time to time to learn just what status the work is in.

The Navy Yard has a dual function with one head, the commandant. As commandant he has military functions distinct and separate from his industrial duties as superintendent of the naval gun factory.

About 98 per cent of the work done at the Washington Navy Yard is ordnance work performed in the shops which comprise the naval gun factory. The model tank, for testing ships' models, radio material for vessels and shore stations and a wind tunnel for testing purposes are under other bureaus of the Navy Department, the gun factory being directly under the Bureau of Ordnance.

Business Cycles Study Urged

L. W. Wallace, executive secretary of the American Engineering Council of the Federated Engineering Societies, addressed the Engineers' Club of the Youngstown district June 29 on "Principles Which Govern Industrial Stability." He said there are two forms of intermittent operation in American industry, that which occurs every seven to ten years and is commonly referred to as cyclical depression and that which is intermittent in a seasonal sense.

"The wonder is that these forms of depression have never been given the constructive thought their seriousness demands," he stated. "Their ill effects are immeasurable. While it is known in a general way that millions of workers are forced out of employment for months at a time, at no time has any authoritative information been accumulated as to the primary causes of such depressions. And there is no source to which one may turn for helpful suggestions to forestall such depressions.

"Funds to finance a comprehensive study of such depressions have been secured by the permanent committee of the President's conference on unemployment and such a study is now being made. Many beneficial results are expected. Dr. Wesley Mitchell and associates are conducting this investigation, assisted by a number of organizations. One phase is being studied by the American engineering societies, assisted by 120 groups of engineers. This is the first comprehensive study of business cycles ever undertaken and it is hoped from it will come such concerted action as will greatly reduce the ill effects of the next depression. Seasonal operations are believed by some to cause even heavier industrial and wage losses than the cyclical depressions."

The address is one of a series which Mr. Wallace is making in important industrial centers. From his headquarters in Washington, he is directing a nation-wide movement to have all the engineering groups in the country express themselves on matters of national importance involving engineering through the organization of the Federated American Engineering Societies, of which Dean Mortimer E. Cooley, of the University of Michigan, is president.

Fluorspar Scarcity Forecast

R. B. Ladoo, mineral technologist U. S. Bureau of Mines, recently spent a month in the southern Illinois and western Kentucky fluorspar field in order to complete the investigation of the fluorspar industry. The outstanding feature of the fluorspar situation is that known reserves are very low and, unless new deposits are found, fluorspar will be very scarce and expensive within a few years. The development of possible substitutes is being considered. The object of the fluorspar investigation is the eventual preparation of a bulletin on all phases of the fluorspar situation.

Existence of the zinc industry in Belgium is seriously threatened by prevailing economic conditions, according to the annual report of the largest zinc producing company in that country. A summary of the report has been received by the Department of Commerce from Consul George M. Hanson, Liege.

The Wheeling Steel Corporation has begun excavation at Tiltonville, Ohio, for 50 houses for employees of its Yorkville tin plate plant.

CONTENTS

July 13, 1922

Trend of Basic Business Conditions 69

Present Situation Similar, in Volume of Activity, to 1920—March Saw a Distinct Emergence from the Influence of the Slump

United States Production of Steel Ingots 71

Figures Given Include Estimates for the Months of the 1919 Steel Strike—Daily Output Calculated for Each Month of Past Five Years

British Open-Hearth Furnace Practice 75

Higher Temperature and More Rapid Working Aimed at in Design of 100-Ton Furnace—Reduction of Heat Losses Greatly Desired

"Pittsburgh Plus" and the Proposed Mergers 85

Western Rolled Steel Consumers Ask Attorney General to Consider Basing Point Case in Connection with Investigation of Proposed Independent Consolidations

Naval Gun Factory at Washington 87

Exceptionally Massive Machine Tools for the Production of the Heaviest Naval Ordnance—Subsidiary Work of Great Importance

Hopeful As to Coal Strike Situation 95

White House Confident Satisfactory Adjustment Will Soon Be Reached—Assurance That Country Will Be Supplied with Coal

June Steel Output 72
Combination Planer and Slotter 73
Engine-Driven Welding Equipment 74
New A. C. Motor for Machine Drives 74
Resourceful Engine Repair Job 78
Canadian Government Asked to Help Develop Ore Resources 79
Business Activity Increasing 79
Steel Corporation's Unfilled Orders 79
Trenton Steel & Wire Co. Absorbed 79
Railroad Contract for Repairs 79
Foreign Trade Notes 80, 81, 111, 112, 115
German Iron and Steel Output in 1919 81
Foreign Contracts for Electric Furnaces 81
Labor Notes 81, 110, 112, 114, 117
Lower Water Rates to Pacific Ports 82
Lower Pig Iron Rate from Birmingham 82
Reduced Cost of Iron Making in Youngstown 82
Lake Ore Shipments in June 82
Smith & Davis Mfg. Co. Sold 82
Sheet Prices Irregular 82
Orange Peel Bucket for Foundry Use 83
Lathe Attachment for Long Lead Threads 83
Inside Micrometer and Height Gages 83
Shipping Board Selling Surplus Stocks 84
Standardization of Farm Implements 84
National Enameling & Stamping Co. Extensions 86
Business Cycles Study Urged 90
Fluorspar Scarcity Forecast 90
Editorials 92
To Open the Coal Mines—Prosperity and Labor Supply—Increase in Electric Steel Castings — Power Sources of Utilities
Correspondence 94
Hammer for Stamping Single Letters
Important Freight Change 96
Pamphlet on Malleable Iron 96
Fabricated Steel Business 97
Railroad Equipment Business 97
Industrial Conference in Colorado 103
Export Trade Notes 111
Panama Canal Sells Steel 112
British Iron and Steel Market 115
Higher Coal Prices 117

Iron and Steel Markets 98
Comparison of Prices 99
Prices Finished Iron and Steel, f.o.b. Pittsburgh 113
Non-Ferrous Metal Market 114
Personal Notes 116
Obituary Notes 117
Machinery Markets and News of the Works 118
New York Jobbers' Prices 128

ESTABLISHED 1855

THE IRON AGE

EDITORS:

A. I. FINDLEY WILLIAM W. MACON GEORGE SMART

CHARLES S. BAUR, *Advertising Manager*

Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

F. J. Frank, *President* PRINTED IN U. S. A. George H. Griffiths, *Secretary*

Owned by the United Publishers Corporation : 239 West 39th Street, New York. H. M. Swetland, Pres. Charles G. Phillips, *Vice-Pres.* A. C. Pearson, *Treas.* F. J. Frank, *Secy.*

BRANCH OFFICES: Chicago: Otis Building. Pittsburgh: Park Building. Boston: 410 Unity Building. Philadelphia: 1420-1422 Widener Building. Cleveland: Guardian Building. Detroit: 317 West Fort St. Cincinnati: Mercantile Library Bldg. Buffalo: 881 Ellicott Square. Washington: 816 Fifteenth St., N. W. San Francisco: 320 Market St. London, Eng.: 11 Haymarket, S.W.1.

Subscription Price: United States and Possessions, Mexico, Cuba, Shanghai, $6.00; Canada, $8.50; Foreign, $12.00 per year. Single copy 25 cents.

Entered as second class matter, June 18, 1879, at the Post Office at New York, New York, under the Act of March 3, 1879.

To Open the Coal Mines

President Harding's proposal that the union coal miners return to work at the wages existing March 31 and that a coal commission determine a new wage scale by Aug. 10 shows a way out, and both operators and miners should accept the plan. When Secretary Hoover attempted, some months ago, to prevent a coal strike by a similar plan of arbitration the miners refused it. They did not hesitate to say that the threat of a coal strike, with the privation it would bring to all the people, was too powerful a weapon for them to give up.

Fourteen weeks of the strike have gone by, and 400,000 miners have lost millions in wages they would have received in that time. The operators have lost other millions in profits, and there has been a loss in production which may have serious consequences in some sections of the country because of fuel shortage next winter.

Since it is accepted that the soft coal industry is suffering from too many mines and too many miners, it might be considered that the stoppage of work since April is helping to correct, temporarily, an uneconomic condition, chiefly at the expense of the capital and labor of the industry itself. That evidently was the reasoning of the Administration, in waiting more than three months before taking a hand in the struggle. There is no question now, however, that the hurt the strike will inflict upon the public is the paramount consideration. Even though it is probable that, if the strike ended at once, not many more than half the striking miners would get anything like full employment, the point has now been reached where the mining of coal at union properties ought to be resumed.

It remains to be seen whether the miners' union will agree to arbitration without imposing conditions that would amount to an advance award to the strikers on one or more of the issues involved. It is not a good sign that the union representatives who felt fully authorized to reject an arbitration proposal made by the operators who were called to Washington should now cause delay on the ground that they have no power to accept the President's plan. It has been intimated in some Washington dispatches that the miners are in no haste to accept the President's proffer because they believe they have the strike won. They point to the fact that the Northwest is already beginning to feel the coal pinch, and they expect some Eastern seaboard industries to be crying for coal by another fortnight.

If the miners do not accept the President's plan, it is to be hoped he will promptly appoint a commission made up on the lines he has already suggested —three miners, three operators and five persons representing the public. The findings of such a commission would have public opinion behind them, and men who now fear to enter the mines would feel that they had backing enough to take up their jobs. The action of the President has given the situation a more hopeful look from whatever angle viewed.

While a finding as to wages is called for by Aug. 10, it is obvious that the commission will take a much longer time for its "recommendations for stabilization, avoidance of intermittency of employment and other evils." What ought to come out of the present strike and the inquiry that is to end it is some legislation that will take away from organized labor in the coal industry the power it has to take society by the throat in enforcing its demands. No like power is held by labor in any other industry save that of transportation, and there a Government curb has been partly effective at least. Public opinion will not always continue to be any better satisfied with labor union control of its fuel supply than with union control of the movement of food.

The steel output of the country is now at a rate between 36 and 37 million tons of ingots, or between 70 and 72½ per cent of capacity. Such has been the state of demand in 1922 as compared with that of 1921 that it seems likely a larger share of current business has gone to the relatively small steel making companies than was the case in 1921. Thus, while the thirty companies regularly reporting to the American Iron and Steel Institute made 87.53 per cent of the total steel last year, their share so far this year may not be over 85 per cent. The production statistics for the thirty companies for June indicate a total for the whole country of about 3,010,000 tons if the 87.5 per cent factor is used, but 3,100,000 if 85 per cent is used. The daily output works out at about 116,000 and 119,000 tons, respectively, or annual rates of 36 and 37 millions,

respectively. The actual rate, assuming it is between these figures, is 83 or 84 per cent of the record output of 1917.

Prosperity and Labor Supply

The current reviews of business conditions are heralding a return of "prosperity" and are noting that there is some scarcity of labor, with a possibility that a definite "shortage" of labor will develop. The statement of facts cannot be questioned. There is undoubtedly a measure of prosperity existing, while labor is well employed, and there are distinct prospects that in some lines what is called a shortage of labor may be found within the next few months.

Some criticism is justified, however, of the disposition shown in some of these reviews to couple "prosperity" and "labor shortage" as things that naturally and necessarily go together. On this general subject no truer statement was ever made than that by Nathaniel R. Whitney, Ph.D., in THE IRON AGE of Jan. 5, 1922: "The final test of prosperity is capacity for self-perpetuation."

Prosperity involves progress, advancement, improvement. When a people fully employed is able to do no more than provide for its daily necessities it is not advancing, it is not really prospering. When, by working hard enough and efficiently enough it can, for instance, provide for its daily necessities with two-thirds of its work and with the other third make improvements, or put by savings for future improvements, it is advancing and prospering.

If this operation proceeds smoothly and the spending is done uniformly, every one is employed. Some are working to provide the common everyday necessities, others are working to provide the improvements, made out of the savings. It may be inconvenient for the individual to spend his savings as he goes, the savings representing the excess of his income over what is required to provide him with daily necessities. Individuals may accumulate and spend the accumulations in lump sums. Some individuals may borrow and spend a lump sum, as for a dwelling house, intending to pay the indebtedness with the savings of future years.

When a so-called "shortage of labor" exists, the condition suggested is that of an abnormally heavy spending of accumulations or savings at that particular time. If such spending is abnormally great at one time it must be abnormally little at another time, in order to balance the average.

It may be said that all this is elementary and well understood. That may be, but sometimes we do not keep in mind the obvious. "The final test of prosperity is capacity for self-perpetuation." The real prosperity lies in the saving, not in the spending. Abnormally great spending of savings in a time of labor shortage may mean the reverse of prosperity. Two men each save $1,000 a year for ten years, and each spends $10,000 erecting a dwelling house. It is a detail whether the investment is made in the third year or the seventh year of the saving, the remainder being borrowed. One man builds when costs are high, i.e., there is a "labor shortage," the other when costs are low. The first man gets less, in the intrinsic value of the house, than the second man. He has prospered less, although both have saved the same amount and spent the same amount.

Increase in Electric Steel Castings

Two facts stand out in the statistics of electric steel production in the United States in 1921. One is the rapid increase in the output of electric alloy steel castings and the other is the large proportion of steel castings of all kinds made electrically. Both records are noteworthy, despite the fact that the year was one of acute depression.

According to the statistics of the American Iron and Steel Institute only 63,246 tons of electric alloy steel ingots and castings were made in 1921, but of this total 10,084 tons or 15.9 per cent was castings. In 1920 electric alloy steel castings were 11,710 tons out of a total electric steel alloy output of 245,572 tons, or only 4.8 per cent. Part of the gain is due to the use of heat-treated alloy castings as substitutes for forgings.

For the first time steel castings were more than half the total electric steel output, the actual percentage being 50.3. In 1920 only 30.9 per cent of the total was steel castings. Of almost equal importance is the fact that in 1921 steel castings made in electric furnaces were a larger proportion of all steel castings made than ever before. Out of a total of 559,713 tons of steel castings, 85,095 tons or 15.2 per cent was made in electric furnaces. Eleven years ago, at 1878 tons, electric steel castings represented only 1.2 per cent.

The output of electric steel ingots last year was 84,404 tons, or 4.39 per cent of all steel ingots. This compares with 8.48 per cent in 1920 and 9.36 per cent in 1918, the record year in electric steel. Ten years ago ingots made electrically amounted to only 1.2 per cent of the total.

While the electric steel output last year (at 169,499 tons) was much smaller than in 1919 and 1920, it exceeded that of the war year 1916 (168,918 tons) and was far more than that of any year previous. In 1916 the total electric steel output was but 3.7 per cent of the total steel production; in 1921 it was 8.6 per cent and in 1920, 11.9 per cent.

While the outstanding fact in the 1921 record of electric steel was the high percentage of electric alloy steel castings, the industry as a whole made excellent progress—a progress unexpected under the conditions. The record last year shows that the electric furnace has taken a firm hold on the steel foundry. It is probable that 1922 will write an even more interesting record for all departments of this comparatively new industry.

Conditions in the British iron and steel industry are rapidly improving, if the values of iron and steel shares are a criterion. Data published from the office of the National Federation of Iron and Steel Manufacturers, London, show that the market value of the shares of 24 iron and steel companies fell to an average of 73.8 on Feb. 14,

1922. On April 28 the same shares had risen to 85.5 and on May 15 stood at 82.5. Taking 6 iron and coal companies, 9 iron, steel and engineering companies and the 24 iron and steel companies, the average for the shares of the 39 organizations rose uninterruptedly from 79.0 on Feb. 14 to 95.5 on May 15. On March 31, 1920, the same shares averaged 163.9, from which figure there was an almost uninterrupted decline to the average of 79 in February of last year.

Power Sources of Utilities

The Geological Survey reports monthly the production of electric power by public utility plants. Quantities in the first five months of this year were as follows, in thousands of kilowatt hours:

	Water Power	Fuel	Total
January	1,[illegible]	[illegible]	3,805,718
February	1,220,922	2,246,924	3,467,846
March	1,467,832	2,354,134	3,821,966
April	1,[illegible]	[illegible]	3,601,708
May	1,626,711	2,173,223	3,799,934

The variations in the monthly totals are due chiefly to difference in the length of months, but May showed an increase of 2.1 per cent over April in daily output. At the most, only a slight decrease in production of power by plants using coal could be traced to the coal strike. There is a significant gain in the production by water power representing, in all probability, a regular growth of this industry, aided by improvement in business conditions. The May production was the highest thus far attained.

Returns are received from about 3500 power plants, each producing 10,000 kilowatt-hours or more a month, engaged in public service, including central stations, electric railroads and certain other plants that contribute to the public supply. The capacity of reporting plants is about 90 per cent of the total of all listed, and the figures given above include estimates for the 10 per cent not reporting.

The proportion of the total produced by water power rose from 34 per cent in January to 43 per cent in May. Thus the use of water power in connection with public utilities has reached decidedly important proportions. Of the total produced by water power in May, California led with 21 per cent, New York coming second with 16 per cent and Washington third with 6 per cent. The remainder was widely distributed, only four States and the District of Columbia failing to contribute. The fuel consumed in May was as follows:

Coal, net tons.....	2,484,500
Fuel oil, barrels.....	828,981
Natural gas, M cu. ft.....	2,206,473

At intervals the Geological Survey estimates the coal consumption per kilowatt-hour by counting out oil, gas and wood, and has found the consumption to have averaged as follows: 1919, 3.17 pounds; 1920, 3.00 pounds; 1921, 2.73 pounds, showing a marked increase in efficiency.

The total consumption of coal in calendar years was as follows: 1919, 35,100,000 net tons; 1920, 37,244,000 tons; 1921, 31,573,000 tons. The May consumption was at the rate of 29,200,000 tons a year. The normal for the nearby future may be taken at fully 30,000,000 tons, while normal coal production for the country may be taken at fully 600,000,000 tons. Public utilities are responsible, therefore, for 5 per cent of the coal consumption. Using a factor of 2.73 pounds of coal per kilowatt-hour, the electricity produced by water power in May represented 2,220,000 tons of coal, or at the rate of 26,000,000 tons a year. Thus the use of water power in this one connection is saving the country the labor of getting 4 per cent as much coal as it still has to secure.

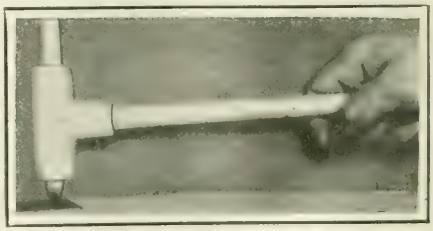
The rapid expansion in the iron and steel production of France is the feature of recent developments in world output. For the first four months of this year the average monthly output of both pig iron and steel in France has exceeded not only the 1921 production but also that of 1920, a year of large output in all countries. Pig iron and steel in the first four months of 1922 averaged 345,500 and 325,500 tons per month respectively, against 275,700 tons and 281,700 tons per month of pig iron in 1921 and 1920 respectively, with corresponding steel outputs of 250,900 and 250,200 tons. It is noteworthy also that the steel exports have not increased with this production, but rather have sharply declined. No other producing country can show an output larger thus far this year than in 1920. The domestic needs of France are evidently large, both for the devasted sections and for the large and industrially important districts added by the fortunes of war.

CORRESPONDENCE

Hammer for Stamping Single Letters

To the Editor: Whenever there is a sufficient number of pieces to be stamped with a single letter or figure, the holder shown in the accompanying illustration will greatly facilitate the work.

The particular instance which originally furnished the necessity for this device was an occasion when several thousand brass strips required an identifying letter stamped near the end. Progress was slow, and the work tedious when a hammer and loose stamp were used in the ordinary manner. The whole thing was speeded up and made decidedly easier for the inspector by the adoption of the hammer stamp shown.



The materials required are a length of ½-in. pipe for the handle, a strong pattern tee for the head, and a short piece of pipe, fitting the top end of tee. The stamp is held by inserting it on the tee until it touches the end of the short pipe, and screwing in the handle until it tightens the stamp against the opposite thread walls. The use of a strong pattern tee of the size named gives just the right weight and balance.

HARRY MOORE.

Rosemount, Montreal, Can.

Hopeful as to Coal Strike Situation

White House Confident Satisfactory Adjustment Will Soon Be Reached—Assurance That Country Will Be Supplied With Coal

BY L. W. MOFFETT

WASHINGTON, July 11.—Confidence was expressed this afternoon at the White House that the coal strike situation would be worked out satisfactorily soon. It was further stated that in any event the country will be supplied with coal. The statements were made with such apparent assurance that they have led to the belief that the operators and miners will accept the proposal made by the President yesterday to bring about a settlement of the strike through an arbitration commission to consist of five appointees of the President and three representatives each for the operators and miners. But it was indicated that if the Government's proposal is not accepted, it will resort to other means to bring about resumption of coal production at an early date. The proposal for setting up a coal commission to arbitrate the strike is predicated upon the immediate return of the strikers to the mines at the old scale of wages. Meanwhile the commission would make investigation of the coal industry as to cost and develop plans for the elimination of waste of the high cost mines.

Attitude of Operators

The bituminous operators have informed the President that they will consider his plan and while they have authority to accept it or reject it at the present conference, President John L. Lewis of the United Mine Workers told the Chief Executive that officials of the union here did not have power to pass upon the proposal, but would have to refer it to the Policy Committee of the union. At the suggestion of the President, both the operators and the miners are to give their final answer on Saturday of the present week. The same proposal relates to the anthracite operators and miners, and it was stated that their reply is to be made on Wednesday of the present week.

While there has been considerable criticism of the attitude of the miners, who say they are unable to act until approval has been given by the Policy Committee, making it necessary to further delay negotiations, it is evident that the Administration is satisfied that its proposal will be accepted and that coal production will be resumed at an early date. Apparently it is thought that it will not be necessary to resort to other means, but at the same time it was indicated that if this latter course is necessary in order to insure supply of coal, other methods will be adopted. The railroad strike has complicated the situation and in some quarters the opinion has been expressed that the miners purposely are delaying settlement in order to see if railroad strikers gain strength and that, if they do, it will give added power to the striking miners and put them in a position to make further demands before the strike is settled.

Agreement Violated

While it is announced this morning that Secretary of Commerce Hoover has called a conference for the latter part of the present week of non-union bituminous coal operators, which will relate to prices at the mines, it was stated that some of the smaller mines, particularly those in western Kentucky and in one district of Pennsylvania are violating the agreement made with Mr. Hoover which fixed prices at $3.50 per ton as a maximum. It is stated that some of the smaller producers have increased prices considerably over this figure and have been advancing them at the rate of 50c. per ton per week. At the same time, it was stated that the larger operators are living up to the agreement in every respect and that some are selling at less than the agreed price, asking from $2.90 to $3 per ton and refusing as high as $5 per ton when offered.

Serious Conditions for Iron and Steel Industries

PITTSBURGH, July 11.—The coal strike situation now is more serious from the standpoint of the iron and steel industry than it has been at any time since the outbreak of the trouble, despite the action taken by the President looking toward an early settlement. The President's suggestion, that the men go back to work at the 1920 scale pending an investigation and a report by a committee to be appointed for the purpose of devising an equitable adjustment, is regarded in both iron and steel and coal trade circles here as favorable to the miners, and there is considerable doubt of its acceptance by the operators. It is considered impossible for the committee, no matter how promptly it gets to work, to make an investigation and report by Aug. 10, the date mentioned by the President, and since the President's plan provides that in the event the commission is unable to report its scale by Aug. 10, it shall have power to direct continued work under the old scale until the superseding scale is ready, fear is expressed by operators that the high scale of wages might be continued for an indefinite period.

The opinion also is expressed that the President has given more consideration to the probable winter requirements than he has to the cost of coal to consumers or to whether the operators shall have a profit. There is also the question of the effect of the higher wage scale in the union than in the non-union field. To restore the 1920 scale in the non-union districts would mean an increase in wages, since scales in these districts have been considerably reduced in the past two years. Not only that, but to establish the union scale in the non-union fields would be tantamount to recognizing the union in the non-union districts, and this is something that is bound to meet with considerable opposition. It is hardly probable that in the Connellsville district, for example, the men who have gone out and now are members of the union would be willing to resume work at $4.50 to $5 per day with the union scale of $7.50 per day re-established. The union organizers in this district can be depended upon to work this argument overtime in their efforts to effect a unification. Common opinion is that resumption in the union fields would be accompanied by a

suspension in the non-union fields because of the wide difference in the wage scale.

Conditions Are Worse

The general situation has grown worse instead of better since last week as far as production is concerned. There have been further losses among the active non-union mines in the past week and coal is extremely hard to obtain here, even at materially higher prices than hitherto have prevailed since the strike began. Local coal now is not available at less than $4.25 per net ton oven for steam or by-product grade, while in the Southern field the common price to-day is $4 a ton at mines, as against the maximum of $3.50 agreed upon at the Hoover conference of May 31 last. Moreover, it is getting harder to get coal out of the Southern field than formerly because of car congestions and the fact that the railroad operating men are giving some aid to the striking shop men.

Railroad Troubles

It is reported that the Louisville & Nashville Railroad is conserving its motive power for passengers, perishable food and mail traffic and is declining coal business. The Chesapeake & Ohio Railroad is having trouble about coal shipments because the train crews in many instances are refusing to haul loaded cars of coal on the ground that the cars are in bad shape and in need of inspection and repairs. Coke supplies are getting more limited daily, and with the difficulty attending the movement of coal to steel company by-product plants, there is an imminent danger that some of the blast furnaces now active may soon be obliged to suspend. It is reported that a western Pennsylvania steel manufacturer has been obliged to put down a furnace through lack of sufficient coke, and it is currently reported that one of the reasons why there was such a complete suspension of steel works activities over the Fourth of July was for the purpose of building up stocks of pig iron. It is pretty well established that steel works activities have been on a heavier scale than blast furnace operations and this hardly would be the case if coke supplies were ample. Such small lots of coke as are to be had to-day command around $10 per ton at oven, and there is no distinction between furnace and foundry grade.

IMPORTANT FREIGHT CHANGE

Proposed Rate Opposed by Chicago and St. Louis and Favored by Pittsburgh Steel Men

WASHINGTON, July 11.—With Chicago and St. Louis iron and steel interests and a group of rail lines opposing it and iron and steel producers in the Pittsburgh and surrounding districts favoring it, a freight tariff supplement has been filed by Agent Leland with the Interstate Commerce Commission, to be effective July 15, establishing a proportional rate of 20c. per 100 lb. on practically all iron and steel products from the three lower Mississippi crossings, New Orleans, Baton Rouge, and Anchorage, La., to the Galveston, Houston, Beaumont and Orange groups in Texas. The tariff apparently was filed because of the desire of Southern rail carriers to meet water competition, especially Gulf Coast lines. It has been protested by the all-rail lines from St. Louis together with steel producers in Chicago, St. Louis and other points in a position to use the barge service on the Mississippi River. It is claimed by protesting steel makers that the rate would be unduly low and the protesting rail lines also say the rate would have a tendency to break down their rates to Texas common point territory and probably destroy the adjustment to St. Louis.

Mr. Townsend's Position

The attitude of Pittsburgh and other producers who have asked that the commission allow the tariff to become effective on the date proposed is expressed in a telegram to the commission to-day from J. F. Townsend, traffic manager of the National Tube Co., Pittsburgh. Mr. Townsend defended the rate on the ground that it did not compare unfavorably with rates on iron and steel products, particularly wrought pipe, which were available to those asking for the suspension of the supplement. Mr. Townsend says that the National Tube Co. is interested in the proportional rate of 20c. so that it could take advantage of the rate by shipping down the Ohio and Mississippi rivers for delivery to the rail lines at the three lower Mississippi River crossings. He compares the proposed rate with rates on other iron and steel articles from lower Mississippi River crossings to the Houston group. He asserts that competitors at both Birmingham and Chicago enjoy a lower basis of rates to the Houston group.

Reason for Proposing Rate

The 20c. proportional rate was proposed, it is stated, with the idea that the rail lines from the three crossings would be able to obtain business brought to those points by barges from Ohio and Mississippi River points in competition with iron and steel moving from Atlantic ports, particularly from Philadelphia to Galveston. The supplement also has been taken to be an admission on the part of at least some rail lines that competition by water has reappeared as an important factor, with which they will have to deal. It also was taken to be recognition of the fact that coastwise competition again is being felt. It was not, however, openly acknowledged that water competition was forcing the proposed rate. Apparently such an attitude was avoided, so as not to subject the rate to the law which provides that when a rate is lowered to meet water competition, it may not be advanced except upon a showing of a change in conditions other than the disappearance of such competition by water. The proposed rate has been the source of considerable discussion in shipping and railroad circles because of its probable effect, if it is allowed to become operative, upon the all-rail rate structure in the Southwest.

One Possible Result

One view was that it would force the all-rail lines from St. Louis to reduce their rates because the combination on the three lower river crossings would be lower than that based on St. Louis. In the case of joint rates, it was contended that lines both east and west of the Mississippi River would have to cut their rates or obtain fourth section permission to continue joint rates in excess of the aggregate of the intermediates. Others, however, maintained that if the supplement were properly limited to show the rate would be applicable only to tonnage brought to the crossings by water, there would be no violation of the fourth section. Some shipping circles expressed the view that the rate in itself would increase competition between producers in the Pittsburgh and surrounding territory with Chicago and St. Louis and eastern steel makers, for business in the Southwest.

Pamphlet on Malleable Iron

The daily service that is being rendered by one of the important branches of the iron and steel business is outlined in a pamphlet entitled "Certified Malleable in Transportation and Industry," issued by the American Malleable Castings Association, Cleveland. It tells the story of certified malleable castings, outlining the means employed by the association in bringing the product of its members to a uniformly high standard and maintaining it at that point. It will be sent to interested persons upon written request to the American Malleable Castings Association, 1900 Euclid Building, Cleveland.

FABRICATED STEEL BUSINESS

Bridge and Building Awards and Tonnages Pending at Leading Centers

Awards for fabricated steel work for the past week include the following:

Tribune Building, West Fortieth Street, New York, 500 tons, to Levering & Garrigues Co., 1000 tons of reinforcing bars also required.

Bridges for the Baltimore & Ohio Railroad, 100 tons, to Fort Pitt Bridge Works.

Foundry building for Frick Foundry Co., Waynesboro, Pa., 700 tons, to a local fabricator.

Power plant for the United Gas Improvement Co., Philadelphia, 300 tons, to Belmont Iron Works.

Hotel at Nassau, Bahamas, 1000 tons, to Hedden Iron Construction Co.

Kalamazoo Vegetable Parchment Co., Kalamazoo, Mich., 750 tons to Rochester Bridge Co., instead of American Bridge Co., as reported last week.

Speedway and Grandstand, Kansas City, Mo., 500 tons to Kansas City Structural Steel Co.

W. B. Maxwell, Casper, Wyo., two 80,000-obl. tanks, 589 tons to Chicago Bridge & Iron Works.

Trimountain Mining Co., Rock House for No. 2 Shaft, Trimountain, Mich., 290 tons to Wisconsin Bridge & Iron Co.

Rollman Department Store, Cincinnati, 697 tons to American Bridge Co., award of general contract noted in the issue of June 29.

Illinois Central, deck plate girder span and structural steel, Matterson, Ill., 511 tons to American Bridge Co.

Methodist-Episcopal Parish House, Champaign, Ill., 250 tons to Mississippi Valley Structural Steel Co.

Moss Bluff Bridge, Lake Charles, La., 350 tons to Milwaukee Bridge Co.

International Harvester Co., addition to concentrating plant, Hawkins Mine, Nashwauk, Minn., 375 tons to McClintic-Marshall Co.

First National Bank Building, Ironton, Ohio, 300 tons to Mt. Vernon Bridge Co., previously reported to Fort Pitt Bridge Co.

Dams No. 36 and 38, Ohio River, 620 tons, Independent Bridge Co., low bidder.

State Highway Commission of Wisconsin, miscellaneous bridge work, 400 tons, to Worden-Allen Co.

Manitowoc, Wis., new high school, 125 tons, to Lakeside Bridge & Steel Co., Milwaukee.

Indiana Hydro-Electric Co., Norway, Ind., head gates, 200 tons, to Lakeside Bridge & Steel Co.

The Gillsy Hotel, Cleveland, additional, 200 tons to the Forest City Steel & Iron Co.

Painter's Building, Cleveland, 170 tons, to the Forest City Steel & Iron Co.

Ann Arbor Railroad, bridges, 300 tons, to the American Bridge Co.

South High School, Columbus, 200 tons, to the Fort Pitt Bridge Works.

Western Reserve University, medical department group, Cleveland, 500 tons.

Addition to the Summit County Court House, Akron, Ohio, 500 tons.

National Union Fire Insurance Co., Schenley district, Pittsburgh, 300 tons, to McClintic-Marshall Co.

Structural Projects Pending

Inquiries for fabricated steel work which may be added to lists of pending projects include the following:

Brooklyn Edison Co., Brooklyn, power plant, 9000 to 10,000 tons.

Public Service Corporation, Newark, N. J., power plant, 2000 tons.

International House, Riverside Drive, near Grant's Tomb, New York, 1800 tons.

Chamber of Commerce of the United States, Washington, D. C., 1000 tons.

Hospital for the Friedman Home, New York, 500 tons.

City piers, Portland, Me., 1000 tons.

Highway bridge over Susquehanna River, Lycoming County, Pa., 1200 tons.

High school, Elmira, N. Y., 1000 tons.

Department store at Poughkeepsie, N. Y., 400 tons.

Loft building on West Forty-fifth Street, New York, 750 tons, to Hay Foundry & Iron Works.

J. B. Book Building, Detroit, 1300 tons.

Western Electric Co., new shop building, Hawthorne, Ill., 1000 tons.

Nebraska State Capitol, Lincoln, 1000 tons, revised bids to be in July 12.

Addition to plant of Warner Elevator Co., Cincinnati, 215 tons, bids in.

St. Francis Seminary, Cincinnati, 200 tons, bids being taken.

Roosevelt School, Dayton, Ohio, 230 tons, bids being taken.

Pittsburgh & Lake Erie Railroad Co., South Smithfield Street, Pittsburgh, C. M. Yoke, purchasing agent, 1625 tons of fabricated steel work, bids received to July 17.

Wisconsin General Hospital, Madison, Wis., 250 tons, bids in.

Railroad Equipment Business

One result of the shopmen's strike has been to cause railroads to put out inquiries for car repairs which they had expected to take care of in their own shops. The Rock Island is inquiring for figures on the reconstruction of 500 National dump cars and heavy repairs on box, refrigerator and furniture cars, totaling possibly 2000 in all. The St. Paul wants heavy repairs on 1000 or more box cars. The Northwestern is inquiring for heavy repairs on various classes of freight equipment, while the Burlington wants heavy repairs on box and coal cars. The Baltimore & Ohio is figuring with car builders on repairs to 6000 cars.

Considerable locomotive business has appeared, as noted below, including orders reported by the American Locomotive Co. for 29 locomotives, of which 25 were mentioned in this column last week. Itemized, the orders and inquiries include the following:

The Illinois Central Railroad is inquiring for 500 to 1000 new composite gondolas.

Another new inquiry is from the Pittsburgh & West Virginia for 1000 all-steel, 55-ton hopper cars.

The Northern Pacific has ordered 250 gondola cars from the Standard Steel Car Co.

The Norfolk & Western has placed 2000 hopper cars and still has 1000 box cars to buy. The distribution of the hopper cars follows: 500 each to American Car & Foundry Co. and Standard Steel Car Co., and 1000 to Pressed Steel Car Co.

The Osgood-Bradley Car Co., Worcester, Mass., has been awarded a contract by the Argentine State Railway for 27 steel passenger coaches, 6 steel parlor cars, 10 steel dining cars and 10 steel baggage cars.

The United Verde Copper Co., Clarksdale, Ariz., placed 24 ore cars with the Western Steel Car & Foundry Co.

The Illinois Central is in the market for 25 Mikado type, 25 Santa Fe type engines and 15 switch engines.

The Nashville, Chattanooga & St. Louis has ordered 5 Mikado type and 3 mountain type locomotives from the Baldwin Locomotive Works.

The Delaware, Lackawanna & Western is inquiring for 25 Mikado type and 5 Pacific type engines.

The Norfolk Southern has ordered 5 consolidation type locomotives from the Baldwin Locomotive Works.

The Chicago & Eastern Illinois has placed 6 Pacific type engines with the Lima Locomotive Co.

The orders for locomotives received by the American Locomotive Co. are as follows: Chicago & Eastern Illinois, 10 Mikado type, weighing 315,000 lb.; Southern Railway, 15 Mikado type, weighing 288,000 lb.; Central America of Cuba, 1 mogul type, weighing 111,000 lb.; National Enameling Co., Granite City, Ill., 1 switching locomotive, weighing 141,000 lb.; Pittsburgh Plate Glass Co., Zanesville, Ohio, 1 switching locomotive, weighing 65,000 lb.; Delaware & Hudson Co., 1 consolidation type, weighing 312,000 lb.

Effects of Hot Weather

YOUNGSTOWN, OHIO, July 11.—Hot weather throughout the Middle West is cutting into sheet mill operations to a greater extent this week than at any time during the year. Lower priced workers are drifting to outside forms of employment. Mills were scheduled at 98 per cent at the first of the week, but actual operating is at a lessened rate.

Of 17 pipe furnaces in the Valley, 16 are fired. District steel capacity is scheduled at 85 per cent.

Iron and Steel Markets

FACING CURTAILMENT

Coal Situation More Serious for the Steel Industry

Railroad Strike Cuts Down Supply—Some Reductions in Pig Iron

The coal situation has grown more serious in the past week from the standpoint of the steel industry. This is due in part to lessened production of coal last week, but largely to car shortages and congestion produced by the strike of railroad shopmen.

Conditions are so acute with the Norfolk & Western, Louisville & Nashville and Chesapeake & Ohio railroads, which have been moving coal from Kentucky and West Virginia mines to coke ovens and steel works in western Pennsylvania and Ohio, that a number of pig iron producers are facing blast furnace shutdowns. Coal shipments on the Chesapeake & Ohio have been reduced by 50 per cent in the past few days.

The Steel Corporation is now operating at slightly less than 75 per cent of steel-making capacity, as against more than 77 per cent in the two or three weeks preceding. Some independent steel companies are doing nearly as well, but several will be forced to curtail production if the situation is not soon relieved.

While a hopeful view is taken of the outlook for early resumption of coal mining under the President's plan, the railroad congestion, it is feared, may go farther, with the season of grain movement just ahead. The iron ore movement in Minnesota has not been affected, 25 per cent of the Steel Corporation's shopmen remaining at work. On the Bessemer & Lake Erie railroad, which takes ore from Lake Erie to the Pittsburgh district, none of the shopmen went out.

The June output of steel ingots did not show the expected increase, the estimated daily rate for the country being 115,761 tons, as against 114,717 tons in May and the July rate promises to be less than either. The Steel Corporation's increase of 381,000 tons in unfilled orders last month bore out what was reported week by week of the continued pressure upon the mills.

Regardless of developments in the coal strike, the steel companies see little prospect of a material increase in their output in view of the scarcity of iron and steel works labor. Any increase in wages at non-union coal mines that might result from the return of union miners to work at their old wages would have its effect also on the steel works labor situation.

While new business going to the steel mills is less, the difficulties of consumers in getting shipments have increased. As is usual in times of congestion, small sizes of bars, shapes and other products are hard to get, the mills preferring rollings that run into larger tonnages.

The cotton tie season has opened with transactions at $1.10 per bundle, Pittsburgh, though business is reported at $1.07. Last year's price was $1.35. European mills have little chance at this market on the present basis, which is the lowest since 1915. Recent foreign quotations have been based on $1.38, Liverpool or Antwerp. At 22c. for cotton the Southern planter gets nine times as much for cotton ties as he pays, since the ties are weighed with the bale.

A notable feature of the past week has been the number and size of orders from the railroads for car and locomotive repair work in view of the idleness of their own shops. Three large lines have asked for bids on repairing 9000 cars. New locomotive business is of good volume also. In the past two weeks orders have come out for 62 engines and active inquiries call for 119.

The Union Pacific has placed 12,000 tons of rails at Chicago and the Southern Pacific has given a new order to the Tennessee company's mill at Ensley, Ala.

Awards of fabricated steel work fell off sharply in the week, but fresh projects, including 26,000 tons in 20 different jobs, show no cessation of interest in building.

At Chicago the outlook for agricultural implement works shows further improvement, and steel mills are getting more business from this source.

Owing to uncertainties as to the coke supply, both buyers and sellers of pig iron are very cautious and few important transactions have been recorded. Alabama iron is again quoted at $18, a decline of 50c., but the Southern situation as to stocks is strong, as only 44,000 tons was on hand July 1, compared with 232,000 tons a year ago and 60,000 on June 1 last. The melt of Southern iron is the largest ever known. Sharp reductions in pig iron rates from Birmingham to Cincinnati, Louisville and St. Louis below those recently announced, will make the Southern product a more important factor in those cities in competition with Northern iron. Basic iron has declined $1 at Pittsburgh to a basis of $24, Valley.

Continental prices and markets are unsettled, owing to the demoralized exchanges. Our cable reports rejections of German steel products on the Continent and in Great Britain because of the use of inferior raw materials and unsuitable scrap.

Pittsburgh

Coal Strike Causes Much Anxiety—Basic Pig Iron Declines

PITTSBURGH, July 11.—The danger of curtailment in the production of iron and steel as a result of the coal strike situation is more serious now than it has been at any time since the outbreak of the trouble 14 weeks ago.

With the possibility that the 1920 scale is to prevail, at least until a committee can investigate the entire situation and report back, the attempt of some of the union mine operators to resume on an open shop basis has been practically a failure, and in the non-union districts the argument has been effectively used that men are foolish to stay at work at present scales

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	July 11, 1922	July 3, 1922	June 13, 1922	July 12, 1921
No. 2X, Philadelphia†	$27.64	$27.64	$26.82	$25.50
No. 2, Valley furnace†	24.00	24.00	24.00	20.50
No. 2, Southern, Cin'ti†	*21.53*	22.55	23.00	24.50
No. 2, Birmingham, Ala.†	*18.00*	18.50	18.50	20.00
No. 2 foundry, Chicago*	24.00	24.00	23.00	19.00
Basic, del'd, eastern Pa.	25.75	25.75	25.00	23.50
Basic, Valley furnace	*24.00*	25.00	25.00	19.50
Valley Bessemer, del. P'gh	26.77	26.77	26.96	22.96
Malleable, Chicago*	24.00	24.00	23.00	19.00
Malleable, Valley	24.50	24.50	24.50	21.00
Gray forge, Pittsburgh	25.27	25.27	25.46	21.46
L. S. charcoal, Chicago	31.65	31.65	29.00	36.00
Ferromanganese, seaboard	67.50	67.50	67.50	70.00

Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill.	$40.00	$40.00	$40.00	$47.00
Bess. billets, Pittsburgh	35.00	35.00	35.00	33.00
O.-h. billets, Pittsburgh	35.00	35.00	35.00	33.00
O.-h. sheet bars, P'gh	35.00	35.00	35.00	35.00
Forging billets, base, P'gh	40.00	40.00	40.00	38.00
O.-h. billets, Phila.	40.17	40.17	40.74	38.74
Wire rods, Pittsburgh	40.00	40.00	38.00	43.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	1.70	1.70	1.70	2.00
Light rails at mill	**1.75**	1.70	1.50	2.10

Finished Iron and Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	1.925	1.925	1.96	2.15
Iron bars, Chicago	1.80	1.80	1.75	2.00
Steel bars, Pittsburgh	1.70	1.70	1.70	1.90
Steel bars, Chicago	1.75	1.75	1.75	2.28
Steel bars, New York	2.04	2.04	1.98	2.28
Tank plates, Pittsburgh	1.70	1.70	1.60	1.90
Tank plates, Chicago	1.75	1.75	1.75	2.28
Tank plates, New York	2.04	2.04	1.98	2.28
Beams, Pittsburgh	1.70	1.70	1.60	2.00
Beams, Chicago	1.75	1.75	1.75	2.38
Beams, New York	2.04	2.04	1.98	2.38
Steel hoops, Pittsburgh	2.50	2.50	2.40	2.50

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Sheets, Nails and Wire, *Per Lb. to Large Buyers:*	July 11, 1922 Cents	July 3, 1922 Cents	June 13, 1922 Cents	July 12, 1921 Cents
Sheets, black, No. 28, P'gh	3.15	3.15	3.15	3.50
Sheets, galv., No. 28, P'gh	4.15	4.15	4.15	4.50
Sheets, blue an'l'd, 9 & 10	2.40	2.40	2.40	2.65
Wire nails, Pittsburgh	2.40	2.40	2.40	3.15
Plain wire, Pittsburgh	2.25	2.25	2.25	2.50
Barbed wire, galv., P'gh	3.05	3.05	3.05	3.40
Tin plate, 100-lb. box, P'gh	$4.75	$4.75	$4.75	$5.75

Old Material, Per Gross Ton:				
Carwheels, Chicago	**$19.50**	$18.50	$18.25	$13.25
Carwheels, Philadelphia	17.50	17.50	17.00	16.00
Heavy steel scrap, P'gh	17.50	17.50	17.00	12.00
Heavy steel scrap, Phila.	15.00	15.00	15.00	11.00
Heavy steel scrap, Ch'go	**15.50**	15.00	14.50	10.00
No. 1 cast, Pittsburgh	19.00	19.00	18.50	16.00
No. 1 cast, Philadelphia	17.50	17.50	19.00	16.00
No. 1 cast, Ch'go (net ton)	17.00	17.00	16.00	12.50
No. 1 RR. wrot, Phila.	17.00	17.00	17.00	13.50
No. 1 RR. wrot, Ch'go (net)	13.50	13.50	12.50	9.25

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	**$9.50**	$8.50	$6.50	$2.75
Foundry coke, prompt	**10.00**	9.00	7.00	4.00

Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York	**14.00**	13.75	14.00	12.75
Electrolytic copper, refinery	**13.75**	13.50	13.75	12.62½
Zinc, St. Louis	**5.52½**	5.35	5.42½	4.50
Zinc, New York	**5.87½**	5.70	5.77½	4.80
Lead, St. Louis	*5.50*	5.55	5.60	4.35
Lead, New York	5.75	5.75	5.90	4.40
Tin (Straits), New York	31.12½		31.00	28.50
Antimony (Asiatic), N. Y.	5.00	5.00	5.25	4.75

Composite Price, July 11, 1922, Finished Steel, 2.169c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

July 3, 1922,	2.169c.
June 13, 1922,	2.141c.
July 12, 1921,	2.493c.
10-year pre-war average,	1.689c.

These products constitute 88 per cent of the United States output of finished steel

Composite Price, July 11, 1922, Pig Iron, $23.61 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

July 3, 1922,	$24.19
June 13, 1922,	23.88
July 12, 1921,	20.50
10-year pre-war average,	15.72

when by throwing their lot with the unions they can get much better wages. Not only has the fuel supply situation in this district grown very much tighter in the past week, but on account of the strike of the car shopmen and railroad congestions growing out of the unusually heavy operations of Southern mines, coal supplies from the South lately have been very hard to obtain.

One western Pennsylvania steel works blast furnace has gone down in the past week because of the scarcity of coke, and as both beehive and by-product ovens are finding it increasingly difficult to keep up production because of the lighter supply of coal, it would not be surprising if other furnaces soon were obliged to suspend.

The steel market generally is quieter than it has been, and while this is partly ascribed to the unwillingness of producers to add further to their obligations, it is a fact that buyers believe themselves to be protected against their probable requirements over the next few months and are not taking hold as eagerly as they did recently. There is no let-up in the demand for steel bars or for tubular goods, but in practically all other finished products buying is on a more conservative scale. Light rails now are quoted by all makers at 1.75c., base, which represents a slight advance on the part of one maker, but prices on all other lines are the same as they were a week ago.

Instead of showing strength, as might naturally be expected from the scarcity and high cost of coke, the pig iron market actually has taken a turn in the other direction as to basic grade, sales of which lately have been done at $24, Valley Furnace, as against $25 previously quoted. Extremely high prices rule for the very small lots of coal and coke coming upon the market.

Scrap prices are uninfluenced by the lack of consumptive demand, because dealers with short contracts are paying liberal premiums on railroad material in covering them.

Pig Iron.—The price of basic iron has dropped $1 per ton since a week ago, and while there is some question whether additional tonnages can be bought at the same price, the business of the past week has established $24, Valley furnace, as the market price. One lot of 2000 tons sold at this figure and there was also one involving 2500 tons. A recent inquiry for a round tonnage of Bessemer iron, it transpires, was for a Wheeling district steel maker, and the business was

placed with a southern Ohio furnace, the iron to be moved to destination by river. A recent inquiry of the N. & G. Taylor Co., Cumberland, Md., for 6000 tons of basic, is understood to have been placed with a furnace well outside this district, having a more favorable freight rate to destination. Not much activity has been noted in foundry iron, but such business as has been done has been generally at $24, Valley furnace, for No. 2 grade. It is understood, however, that a Valley furnace interest which is getting ready to start up as soon as coke supplies are available, accumulated a back log at $23 for this grade. Some interest is noted in malleable iron and a small sale placed without competition was done at $25, Valley furnace.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.77 per gross ton:

Bessemer	25.00
[illegible]	[illegible]
No. 2 foundry	24.00
[illegible]	[illegible]
Malleable	24.50

Ferroalloys.—Consumers of ferromanganese appear to have covered their probable requirements for the next few months and the market now is very quiet. Domestic producers have had little tonnage for sale for some time and recent activity has obligated English makers against production for the next six or eight weeks. The market consequently is firm with no spot tonnages of either English or American material available at less than $70, Atlantic seaboard. For September and later delivery the English product can be bought at $67.50. Some German 76 to 80 per cent material is offered at $66, Atlantic seaboard. Business in other ferroalloys has been limited and prices are unchanged.

We quote 78 to 82 per cent ferromanganese, $67.50 c.i.f. Atlantic seaboard for domestic; British, spot, $70; British, future, $67.50; German, 76 to 80 per cent, $66. Average 20 per cent spiegeleisen, $36 furnace; 16 to 19 per cent, $35 furnace; 50 per cent ferrosilicon, domestic, $55 to $60 furnace, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, $41.50; 11 per cent, $44.80; 12 per cent, $48.10; 13 per cent, $52.10; 14 per cent, $55.10; [illegible] per cent, $61, 8 per cent, $32.50; 9 per cent, $34.50; 10 per cent, $36.50; 11 per cent, $39; 12 per cent, $40.50. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Iron and Steel Bars.—The demand for merchant steel bars still is active and those who insist upon early delivery are finding it increasingly difficult to secure supplies at less than 1.70c. and some makers are exacting 1.80c. for service of this sort. There are occasional suggestions of 1.60c., but these refer to deferred shipments or unfilled contracts of long standing. There is no change in iron bar prices, but as labor costs are rising and demand is increasing, there are suggestions of an early advance.

We quote steel bars rolled from billets at 1.70c. to 1.80c.; reinforcing bars, rolled from billets, 1.70c. to 1.80c. base; reinforcing bars, rolled from old rails, 1.60c.; refined iron bars, 2.20c. in carloads, f.o.b. mill, Pittsburgh.

Semi-Finished Steel.—The market appears to be stiffening again, due to last week's curtailment of production incident to the holiday, and also to the fact that the increased shortage of coke is affecting pig iron production. While non-integrated sheet and tin plate manufacturers balk at paying more than $35, Pittsburgh or Youngstown, for sheet bars, since there has been only a slight advance as compared with the first of the year in sheets, and none at all in tin plate. There are few makers who have any steel to spare and these companies are not interested in business at that price. The Corporation price to regular customers is $33, an advance of $2 over the second quarter price, and by inference the Corporation price on billets and slabs is $32. Independents regard the market on these forms as $35. Forging billets are $40 minimum.

[illegible] all f.o.b. Youngstown or Pittsburgh mills.

Structural Material.—New demands are smaller and less frequent than they were recently since the bulk of contracts lately taken by local fabricators has been of small lots. The mills, however, are pretty heavily committed and few are anxious for additional business. Prices take a wide range when those named on protections are included, these being around 1.50c., but the common prices on current business are from 1.70c. to 1.80c. Prices are given on page 113.

Steel Rails.—There is a pretty steady demand for light rails for prompt shipment and on such business 1.75c. base now is the general quotation. It is possible that this price would be shaded on tonnages for future shipment, but where delivery is specified all makers now are asking 1.75c. base. Thus far the strike of the railroad shopmen has been without effect on other branches of railroad service, and makers of standard rails report normal specifications against existing contracts.

We quote 25 to 45-lb. sections, rolled from new steel, 1.75c. base; rolled from old rails, 1.60c. to 1.65c. base; standard rails, $40 per gross ton mill for Bessemer and open-hearth sections.

Wire Rods.—The market is very firm at $40 for the base size of common soft rods and it is doubtful whether much new business could be placed that low to-day. The leading interest is practically out of the market, while a large independent is refusing business at $40 on the claim that its costs are much above that figure and that it should get $43 base to break even. No business, however, yet has been recorded at above $40.

We quote No. 5 common basic or Bessemer rods to domestic consumers $40, chain rods $40; screw stock rods, $45; rivet and bolt rods and other rods of that character, $40; high carbon rods, $47 to $50, depending on carbon, per gross ton, f.o.b. Pittsburgh or Youngstown.

Wire Products.—Independent makers are enjoying a better business than recently due to the fact that the leading interest is so heavily committed and having so much trouble in catching up with its obligations on account of the fuel situation as to be unable to take more than a small part of the business now offered. Bookings of independents also have been helped by the fact that they have been meeting the Corporation prices. The fact that all producers now have a backlog of orders makes the situation somewhat stronger than it was recently when the distribution of business was less even. Prices are given on page 113.

Cold-Finished Steel Bars and Shafting.—Continued strength of hot-rolled bars as well as the difficulty there is in securing prompt tonnages of a number of sizes, is reflected in a firmer tendency in prices of cold-finished steel bars. Middle Western producers no longer are able to buy hot-rolled bars very cheaply and are trying to establish a base on cold-rolled stock at the equivalent of 2.25c., Pittsburgh. Local makers are inclined to go along with this movement, claiming that the present price, 2.10c., does not allow a reasonable profit. Demand still is good, but supplies appear to be ample except in some of the very small sizes of rounds. Ground shafting is unchanged at 2.50c. base, f.o.b. mill, for carload lots.

Cotton Ties.—The opening price on cotton ties as announced by the Carnegie Steel Co. and subsequently adopted by other makers, is $1.10 per bundle of 45-lb. f.o.b. Pittsburgh, with a monthly carrying charge of 1c. per bundle per month. This price compares with $1.35 per bundle, subsequently cut to $1.30 last year; $2, in 1920 and $1.70 in 1919. Some surprise is expressed that the price should have opened so low this year because $1.10 means that the extra for size over the hoop base has been waived, as has also the cost of the buckle and the lacquering, which usually are considered in establishing the price of ties. At $1.10 per bundle, ties are selling for less than 2½c. per lb. The explanation probably is to be found in the desire of makers to fight off foreign competition. It is interesting to note that there already has been some cutting of the official quotation, one sale of a good-sized lot being noted at $1.07, Pittsburgh. Representatives of German interests still claim that $1.38 per bundle, f.o.b. Hamburg, Antwerp or Liverpool, is about the best foreign price obtainable.

Rivets.—Makers complain that it is increasingly difficult to secure bars and rods promptly except at premium prices and intimate the possibility of a further advance in rivets in the next few weeks. It is claimed current rivet prices were based on rods at $38 and bars at 1.60c., but rods now cannot be bought under $40 and bars command 1.80c. for early shipment. Demand for rivets is good, but so far no particular trouble has been

had in meeting it. Prices and discounts are given on page 113.

Plates.—Inquiry for this product has quieted down considerably, due to the fact that tank builders and most other users are figuring on much less business than they did earlier in the year. Prices hold firm in line with the general market rather than because of a good demand. Prices are given on page 113.

Sheets.—Automobile makers continue to press for delivery of supplies, but activity in other kinds of stock is not as great it was recently, though consumers are specifying fairly well on contracts. The mills are pretty heavily committed and cannot take much additional third quarter tonnage, since full operation is out of the question during the summer months. Practically all mills are taking some business for delivery at their convenience at the Steel Corporation prices, but where early shipment is insisted upon, premiums of $3 to $5 per ton are asked. Prices are given on page 113.

Tin Plate.—Container manufacturers generally have entered orders for their third quarter requirements, but are not much interested at this time in supplies for the last three months of the year. Specifications for August and September shipments are coming along in normal fashion and the independent mills are fairly fully occupied. The Steel Corporation tin plate making subsidiary this week is scheduled for about 75 per cent operation. There is no change in price.

Hot-Rolled Flats.—The market holds firm at 2.50c. base, Pittsburgh, as a minimum of those makers who can take on business for specified delivery. Demand is good, especially from the automotive industry, and on the narrow light gages which most makers are disinclined to take, as high as 2.75c. still is being done.

Cold-Rolled Strips.—New business is not especially heavy, but specifications against contracts are coming in without much prodding on the part of producers. The price remains unchanged at 4c. base, Pittsburgh.

Iron and Steel Pipe.—There has been no appreciable let down in the demand for standard pipe and the obligations of makers continue to climb. Present bookings in steel pipe are sufficient to keep the butt mills fully engaged for about 90 days on the average, and business in lap-welded pipe now before makers is estimated to be equivalent to six to eight weeks capacity operations. There is a better business in oil country goods and in line pipe than there was recently, but less difficulty is experienced in getting reasonably early deliveries on these lines than on standard pipe. The market is extremely firm, but outside of conduit, which has been advanced $4 per ton, there has been no change in prices. The Union Natural Gas Co. has an inquiry out for six miles, or about 500 tons, of 12-in. plain end line pipe to be laid in northern Ohio. Discounts are given on page 113.

Track Equipment.—There is a steady demand for large spikes, but sales are more numerous than large, as the railroads quite generally have covered against their summer requirements. The market is a little slow on small spikes, but all sizes are firm at a minimum of $2.25 base per 100-lb. for large and $2.50 for small and boat and barge spikes. One large maker here is holding to $2 a ton above these prices. Track bolts find a steady sale, with some makers at a minimum of $3.25 base per 100-lb. for carload lots of a size, but with others still quoting $3 on attractive orders. Tie plates have been advanced $5 per ton, now being quoted at $2 to $2.25 per 100-lb. Prices are given on page 113.

Steel Skelp.—Offerings on the open market still are extremely meager notwithstanding a resumption in the Bessemer department by a Youngstown pipe manufacturer who had previously been a buyer of skelp. A well sustained demand for tubular goods makes for a brisk demand for skelp, and prices are very firm at 1.70c. to 1.80c. for either grooved or sheared material.

Bolts and Nuts.—Makers here are doing a comfortable business, but are not being forced and could take on more orders. Third quarter business is not as heavy as that for the previous three months. Prices are firm, but this is due in no small measure to the strength of the general steel market. Discounts are given on page 113.

Coke and Coal.—Prices continue to strengthen despite the activity of the Administration in trying to bring about a settlement of the strike. Efforts to get some of the union mines in this district going have not been at all successful and because of the recent holiday and increased activity on the part of the union organizers, production in the non-union fields has decreased rather heavily. Coal loadings as reported by the railroads in the past week have averaged slightly less than 2000 cars daily, as against close to 2500 cars daily in the two previous weeks. The result has been that the limited amount of nearby coal coming upon the market lately has been bringing $4.25 at mines, the highest point reached since the trouble began. The prevailing market in the South to-day is $4 minimum. Curtailment in the production of beehive oven coke has forced a further advance of about a dollar per ton in price, coke for blast furnace now selling at $9.50 to $10, and for foundry use at $10.

Old Material.—Prices do not change much for the reason that while the consumptive demand is exceedingly light at present, the open market supplies are very limited. Youngstown district melters seem to be out of the market as well as those in this district, but in spite of that fact very high prices were paid on the railroad lists recently issued. A bid of $18.10 per gross ton for the steel in the Pennsylvania Railroad, Central Region, list failed to bring an allotment to a dealer here who made the bid and steel offered in the Pennsylvania Railroad, Eastern Region, list is understood to have sold at around $18.50 per gross ton. These prices are hardly representative of the consumers' market today because the companies here which might take on tonnages of heavy melting steel have set $17.50 as their maximum. High prices for railroad scrap were paid by dealers having contracts to cover. Cast scrap for steel works use is dull and buyers have cut their bids.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows per gross ton:

Heavy melting steel Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	$17.50
No. 1 cast, cupola size	$19.00 to 20.00
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	17.00 to 17.50
Compressed sheet steel	15.50 to 16.00
Bundled sheets, sides and ends	14.50 to 15.00
Railroad knuckles and couplers	18.50 to 19.00
Railroad coil and leaf springs	18.50 to 19.00
Low phosphorus standard bloom and billet ends	20.00 to 21.00
Low phosphorus plates and other grades	19.00 to 20.00
Railroad malleable	16.50 to 17.00
Iron car axles	26.00 to 27.00
Locomotive axles, steel	24.00 to 25.00
Steel car axles	17.50 to 18.00
Cast iron wheels	18.50 to 19.00
Rolled steel wheels	18.50 to 19.00
Machine shop turnings	14.00 to 14.50
Sheet bar crop ends	18.50 to 19.00
Heavy steel axle turnings	15.50 to 16.00
Short shoveling turnings	15.00 to 15.50
Heavy breakable cast	18.00 to 18.50
Stove plate	15.00 to 15.50
Cast iron borings	16.00 to 16.50
No. 1 railroad wrought	15.00 to 15.50

American Electrochemical Society's New Headquarters

The American Electrochemical Society announces the removal of its national headquarters to Columbia University, New York, after having been located for nearly 20 years at Lehigh University, Bethlehem, Pa. This change is due to the fact that the society's new secretary, Dr. Colin G. Fink, who succeeded the late Dr. Joseph W. Richards, has recently been appointed lecturer in electrochemistry at Columbia, and he will have charge of that division of the university's department of chemical engineering.

By recent action of the society, the adoption of an amendment to the constitution raises the annual dues from $5 to $8. By action of the directors, the organization of a division of organic electrochemistry has been authorized with A. W. Burwell as temporary chairman.

Chicago

Optimistic Feeling as to Coal Strike—Rushing Pig Iron Shipments

CHICAGO, July 11.—There is a growing feeling in this district that the settlement of the coal strike is near at hand. The operators and miners seem to be in a more receptive mood to the efforts of the Government at Washington to bring them together, and while no safe prediction can be made at this time, the outlook is regarded as more favorable than it has been since the inception of the strike. It is regarded as significant that the railroads are corralling a maximum of open top cars on their own lines with the evident purpose of holding themselves in readiness for the coal movement which will be released when the mines resume operation.

The outbreaks of violence which attended the first week of the railroad shopmen's strike are expected to precipitate armed interference by the State and Federal Governments. Such action will be welcomed because it is felt that the exercise of a firm policy by governmental authorities will soon break the morale of the strikers.

Local mill operations remain unchanged notwithstanding the threat of fuel shortage, the uncertainties introduced by the rail strike, and a scarcity of labor. The Illinois Steel Co. is producing at 85 per cent of ingot capacity while the Inland Steel Co. is on a 65 per cent basis. The latter will soon have a third blast furnace ready to go in, but it is probable that actual blowing in will be deferred until the source of fuel supply becomes less uncertain.

Mills are booked from three months to six months ahead and are finding it difficult to make the deliveries desired by consumers. Some users, in fact, are unable to operate their manufacturing plants to capacity because of a shortage of steel. As a consequence, an increasing tonnage of steel is being placed with Eastern mills for early shipment.

Both railroad and car builders continue to make heavy purchases of steel. A Western line has placed an order for 12,000 tons of rails, its second purchase this year, and track fastenings, wheels and axles are being bought liberally. A single order for 4000 axles stands out among recent bookings of local mills. One result of the shopmen's strike has been the appearance of numerous inquiries by Western lines for heavy car repairs which would otherwise have been taken care of by their own forces.

Ferroalloys.—Consumers of ferromanganese seem to have satisfied their requirements to a large extent, with the result that the market is quiet. Two carload inquiries for spot shipment appear to constitute all the new business in the market. For September shipment, more material is available at $67.50, seaboard, than appeared to be the case a week ago. A recent sale for prompt shipment brought out a price of $72, seaboard. Two recent carload sales of spiegeliesen were closed at $46, delivered.

We quote 80 per cent ferromanganese, future, $75.06; prompt, $79.56, delivered; 50 per cent ferrosilicon, $55 to $62.50, delivered; spiegeleisen, 18 to 22 per cent, $46, delivered.

Pig Iron.—There are few inquiries for forward shipment, although demand for spot iron is fairly active and melters are asking furnaces to rush forward tonnage against contracts. It would appear that melters are adopting a cautious policy, preferring to operate on a close basis rather than to cover their pig iron requirements very far ahead. This seems to be further evidence that shipments up to date have been going directly into consumption, for the most part, and points to the release of even heavier buying when current strike uncertainties are removed and melters no longer need to hesitate to protect their future requirements. The price situation remains unchanged so far as local iron is concerned, but the Southern product seems slightly weaker. Southern iron can still be bought at $18, Birmingham, and a number of furnaces which were quoting $20 have taken business at $19.50 and even as low as $19. Melters serving the automobile business are very busy. One local broker reports recent sales involving 1100 tons of Northern foundry to western Michigan consumers in that category. A local railroad equipment maker has closed for 2000 tons of high manganese foundry with a Milwaukee furnace. One of the most encouraging features of the market is the improved position of the farm implement makers. After a long period of dull business, these manufacturers are resuming production and are now buying iron for last half and fourth quarter.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$31.65
Northern coke, No. 1, sil. 2.25 to 2.75	$24.50 to 25.50
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	24.00 to 25.00
Northern high phos.	24.00 to 25.00
Southern No. 2	24.00 to 25.00
Malleable, not over 2.25 sil.	24.00 to 25.00
Basic	24.00 to 25.00
Low phos. Valley furnace, sil. 1 to 2 per cent copper free	34.00 to 35.00
Silvery, sil. 8 per cent	37.29

Bars.—The automobile industry, which has been a heavy consumer of bars during the past quarter, is expected to slow down during the late summer and early fall in accordance with past precedents. In fact, automobile sales are already reported as declining, although present commitments will keep the plants busy for a month or two. An easing off in the consumption of soft steel bars would not be unwelcome to the mills, as they have been utterly unable to keep pace with the demand. On the other hand, the mills expect to encounter a steadily increasing demand from the farm implement manufacturers. In fact, the rapidity with which the agricultural machinery makers have disposed of their remaining stocks of finished products has been surprising, but nevertheless convincing of the final recovery of the farming industry after a long period of depression. Implement makers are now buying steel for fourth quarter needs and in some cases their purchases will be liberal. Bar iron demand is active and prices are stronger, ranging from 1.80c. to 1.85c., Chicago. Hard steel bar prices are unchanged, although one mill is booked through third quarter and has withdrawn from the market. The hard bar mill of the Republic Iron & Steel Co. at Moline will start up Aug. 1.

Mill prices are: Mild steel bars, 1.75c. to 1.85c., Chicago; common bar iron, 1.80c. to 1.85c., Chicago; rail carbon, 1.70c., mill or Chicago.

Jobbers quote 2.48c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 3.40c. for rounds and 3.90c. for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 2.38c. base. Hoops, 3.48c. Bands, 3.23c.

Bolts and Nuts.—Demand has fallen off because most buyers placed heavy orders and specifications at the old discounts effective until July 1. The new discounts are firm, however. The ruling discounts in this territory are those on page 113, except that they are figured on a Chicago base.

Jobbers quote structural rivets, 3.10c.; boiler rivets, 3.20c.; machine bolts up to ¾ x 4 in., 50, 10 and 10 per cent off; larger sizes, 50 and 10 off; carriage bolts up to ⅝ x 6 in., 50 and 5 off; larger sizes, 45 off; hot pressed nuts, squares and hexagon, tapped, $3.25 off; blank nuts, $3.50 off; coach or lag screws, gimlet points, square heads, 60 per cent off; quantity extras are unchanged.

Wire Products.—New orders tapered off during the first week in July. This may have been due to the holiday, although ordinarily the summer months form a dull season in the wire trade. While new buying is lighter, requests for shipments against contracts are as insistent as ever, indicating that jobbers and manufacturing users have been unable to accumulate stocks. Mills have been unable to increase their operations and are still behind on deliveries. For mill prices see Finished Iron and Steel, f.o.b. Pittsburgh, page 113.

We quote warehouse prices, f.o.b. Chicago: No. 9 and heavier black annealed wire, $3.10 per 100 lb.; No. 9 and heavier bright basic wire, $3.25 per 100 lb.; common wire nails, $3.25 per 100 lb.; cement coated nails, $2.75 per keg.

Sheets.—Local mills are well sold up for third quarter, the Inland Steel Co. now being out of the market. Eastern mills continue to take business in this territory, largely at the Corporation prices. Demand for galvanized is more insistent than for black and blue annealed.

Mill quotations are 3.15c. to 3.30c. for No. 28 black, 2.40c. to 2.50c. for No. 10 blue annealed and 4.15c. to 4.30c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote blue annealed, 3.63c.; black, 4.45c.; galvanized, 5.45c.

Structural Material.—In the opinion of some observers, building activity has reached its peak and construction work will slacken during the remainder of year. As yet, however, there are no tangible evidences of such a reaction, as structural awards and inquiries are still numerous. Reduced construction would not affect local producers for some time, as one mill now has orders for plain material on the books which will engage its capacity until late in the year, while another local interest will not commit itself beyond third quarter, with the probability, however, that its bookings will lap over into fourth quarter. It is possible, of course, that a settlement of the coal strike might permit of better operations than are now possible and thereby enable the mills to catch up on their commitments.

The mill quotation on plain material is 1.75c. to 1.85c., Chicago. Jobbers quote 2.58c. for plain material out of warehouse.

Cast-Iron Pipe.—The market is stronger, prices ranging from $37.50 to $38.50, Birmingham, for 6-in. and larger. Middleville, Mich., took bids July 7 on 175 tons. The United States Cast Iron Pipe & Foundry Co. will furnish 100 tons for Hammond, Ind..

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $49.70 to $50.70; 6-in. and above, $45.70 to $46.70; class A and gas pipe, $3 extra.

Plates.—One local mill continues to take business for indefinite delivery, while another mill is practically out of the market, inasmuch as it does not wish to commit itself beyond third quarter. As a result, demand considerably exceeds local supply and orders for early delivery are going to Eastern mills. The outlook for plate demand is good, as railroad car purchases are expected to continue. It is estimated that the carriers need 15,000 new cars a month to replace worn out equipment and to take care of the natural growth in traffic. Buying during the first six months of this year was at only a slightly higher rate. The Inland Steel Co. has advanced light plates, No. 8 gage and under, to 2c. base, Chicago, and on heavier gages is quoting 1.80c.

The mill quotation is 1.75c. to 1.85c., Chicago. Jobbers quote 2.58c. for plates out of stock.

Rails and Track Supplies.—A Western road has placed 12,000 tons of rails with a local producer. Mills are receiving a constant stream of orders for bolts, spikes and angle bars. Tie plates have not been so active.

Standard Bessemer and open-hearth rails, $40; light rails rolled from new steel, 1.75c., f.o.b. makers' mills.

Standard railroad spikes, 2.16c. to 2.25c., Pittsburgh; track bolts with square nuts, 3.16c. to 3.25c., Pittsburgh; tie plates, steel and iron, 1.85c., f.o.b. mill; angle bars, 2.40c., f.o.b. mill.

Reinforcing Bars.—The concrete bars for the Kalamazoo, Mich., Vegetable Parchment Co., amounting to 600 tons, will be furnished by Joseph T. Ryerson & Son instead of by the Rochester Bridge Co., as erroneously reported last week. The latter company has the contract for the fabricated steel. Other recent lettings include:

Addition to Davis-Watkins dairy machinery plant, North Chicago, Ill., 100 tons, to Corrugated Bar Co.

Highway work, Hardin County, 100 tons, to Concrete Steel Co.

Reservoir, Cedar Rapids, Iowa, 300 tons, to Paul J. Kalman Co.

Greenwood School, St. Paul, Minn., 225 tons, C. A. P. Turner Co.

Fulton Bag and Cotton Mills factory, Minneapolis, 400 tons, to Paul J. Kalman Co.

Bible Training School, St. Paul, 150 tons, to Minneapolis Steel & Machinery Co.

Ford Motor Co. plant, Iron Mountain, Mich., 150 tons, to Worden-Allen Co.

B. & R. Electric Co. plant, Kansas City, Mo., 130 tons, to Kansas City Bolt & Nut Co.

State Capitol, Santa Fe, N. M., 130 tons, to Truscon Steel Co.

Pending business includes:

Wisconsin General Hospital, Madison, Wis., 250 tons, bids in.

Horm Packing Co. plant, South St. Paul, Minn., 100 tons.

Agricultural College building, University of Illinois, Urbana, 200 tons.

Garrett Biblical Institute building, Evanston, Ill., 200 tons.

Fluorspar.—A local steel company is inquiring for 1000 tons of gravel fluorspar for shipment over the remainder of the year.

Coke.—The Southern by-product plant offering foundry coke here has advanced its price to $10.75, delivered Chicago.

Steel Castings.—The new discounts appear to be holding. Steel foundries are operating at a satisfactory rate, in some cases at as high as 80 per cent of capacity, and have considerable work ahead. It is feared, however, that a continuation of the shopmen's strike for any length of time might cause a halt in railroad car purchases.

Old Material.—The market continues to gather strength and a number of grades have again advanced. While large sales to the leading steel mills have not been made for some time, there is a well diversified demand from other sources. Several thousand tons of heavy melting have been sold to some of the smaller interests at $15.50, $15.75 and $16 per gross ton delivered. Consumptive buying of rolling mill grades is fairly active and both gray iron and malleable foundries are buying scrap more freely because of the recent advances in pig iron. Cast borings are stronger as the result of purchases by blast furnaces and a number of the specialties, such as steel knuckles and couplers, coil springs, drop forge flashings, compressed sheet and axle turnings, have advanced. Dealers are reluctant to sell and at the same time are adding to their yard stock in the belief that the market will go still higher. The inflow of country scrap, which was expected to increase materially following the reduction in freight rates, is as yet disappointingly small. Railroad offerings include the Soo Line, 1500 tons; the Chicago & Eastern Illinois, 500 tons, and the Pullman Co., 800 tons.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

	Per Gross Ton	
Iron rails	$18.00 to	$18.50
Cast iron car wheels	19.50 to	20.00
Relaying rails	22.50 to	27.50
Rolled or forged steel car wheels	18.50 to	19.00
Steel rails, rerolling	16.00 to	16.50
Steel rails, less than 3 ft	17.50 to	18.00
Heavy melting steel	15.00 to	15.50
Frogs, switches and guards cut apart	15.00 to	15.50
Shoveling steel	14.50 to	15.00
Drop forge flashings	10.50 to	11.00
Hydraulic compressed sheet	13.00 to	13.50
Axle turnings	13.00 to	13.50
	Per Net Ton	
Iron angles and splice bars	17.00 to	17.50
Steel angle bars	14.75 to	15.25
Iron arch bars and transoms	17.50 to	18.00
Iron car axles	22.50 to	23.00
Steel car axles	15.50 to	16.00
No. 1 busheling	12.00 to	12.50
No. 2 busheling	6.75 to	7.25
Cut forge	13.50 to	14.00
Pipes and flues	10.50 to	11.00
No. 1 railroad wrought	13.50 to	14.00
No. 2 railroad wrought	13.50 to	14.00
Steel knuckles and couplers	16.00 to	16.50
Coil springs	16.50 to	17.00
No. 1 machinery cast	17.00 to	17.50
No. 1 railroad cast	16.00 to	16.50
Low phos. punchings	15.00 to	15.50
Locomotive tires, smooth	13.00 to	13.50
Machine shop turnings	8.50 to	9.00
Cast borings	11.50 to	12.00
Stove plate	14.50 to	15.00
Grate bars	13.50 to	14.00
Brake shoes	14.00 to	14.50
Railroad malleable	15.50 to	16.00
Agricultural malleable	15.50 to	16.00

Industrial Conference in Colorado

The second annual industrial conference on "Human Relations in Industry," on the Y. M. C. A. Conference Grounds, Estes Park, Col, will be held July 28-30, and the training school for superintendents, foremen, supervisors, employment managers, welfare directors and others, will be held July 24-28, at the same place. Among the addresses to be delivered are the following:

Fellowship in Industry, Clarence H. Howard, president Commonwealth Steel Co., St. Louis.

The Public and Industrial Relations, Hon. B. B. Brooks, Casper, Wyo.

Progress in Recent Years on Human Relations in Industry, E. H. Weitzel, general manager Colorado Fuel & Iron Co., Pueblo.

The Progress of Christian Ideals in Industry, David G. Latshaw, D.D., New York.

New York

Plate Inquiry Heavy—Buying Awaits Coal Strike Settlement

NEW YORK, July 11.

Pig Iron.—The only transaction of any importance reported is the purchase of 2500 tons of high silicon iron for July-August delivery by an electric company. No details as to prices are available, but it is thought that the iron will come from Buffalo where the minimum price is $24, furnace, for No. 2 plain. In the Buffalo district, a steel company which has been furnishing merchant furnaces coke has notified them that it will need its coke for its own furnaces and it is feared that the merchant stacks may have some difficulty in obtaining fuel. Very little iron can now be had at Buffalo at $24 and several interests are asking from $1 to $3 higher. In eastern Pennsylvania, the lowest prices are $25.50 for No. 2 plain, $26.50 for No. 2X and $27.50 for No. 1X. Sales of foreign iron include moderate tonnages of Belgian, French and Scotch. The Belgian iron is very high in silicon, ranging from 5 to 6 per cent, and is sold at $22, seaboard. The French, analysis from 2½ to 3 per cent silicon, is high in phosphorus and low in manganese and has sold at $22.50, seaboard. Owing to the limited demand for any kind of iron and also on account of some reluctance to buy foreign grades, owing to their unusual chemical analysis, sales of the foreign product are limited.

We quote delivered in the New York district as follows, having added to furnace prices $2.27 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$29.77 to $30.77
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	28.77 to 29.77
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	27.77 to 28.77
Buffalo, sil. 1.75 to 2.25	28.91 to 29.41
No. 2 Virginia, sil. 1.75 to 2.25	29.44 to 30.44

Ferroalloys.—Demand for ferromanganese, while not brisk, is moderately active and consists almost entirely of small lots averaging about 100 tons. Sales, which are almost entirely made up of British alloy, are for August shipment, although some September shipment has been sold. All British representatives have sold their alloy available for July shipment and have disposed of a large proportion of that available for August shipment, a clause covering a possible duty being included in each contract. Very little is heard of sales of domestic alloy. The spiegeleisen market is quiet, the 17 to 19 per cent alloy being quoted at $35, furnace, and the 20 per cent alloy at $36, furnace, with moderate sales reported. Sales of 50 per cent ferrosilicon are confined to small lots and are fairly numerous at $55 to $62 per ton, delivered. Quotations in general are as follows:

Ferromanganese, domestic, seaboard, per ton	$67.50
Ferromanganese, British, seaboard, per ton	$67.50
Spiegeleisen, 17 to 19 per cent	$35.00
Spiegeleisen, 20 per cent	$36.00
Perrosilicon, 50 per cent, delivered, per ton	$55.00 to $62.00
Ferrotungsten, per lb. of contained metal, 40c. to 50c.	
Ferrotitanium, 15 to 20 per cent, carloads, 70 per cent Cr., per lb. Cr., delivered	12c. to 14c.
Ferrovanadium, per lb. of contained vanadium	$3.00 to $3.50
Ferrocarbontitanium, 15 to 18 per cent, 1 ton to carloads, per ton	$200.00

Ores

Manganese ore, foreign, per unit, seaboard	25c. to 26c.
Tungsten ore, per unit, duty paid, concentrates, nominal	$3.00 up
Chrome ore, 48 per cent metal, c.i.f. seaboard, per unit, Atlantic seaboard	40c. to 45c.
Molybdenite ore, 85 per cent basis, f.o.b. mine, per lb. of MoS2, New York	

Cast-Iron Pipe.—The market is exceedingly strong and deliveries are, if anything, becoming more extended. Both private and municipal buying continues good. Despite the stiffness of prices, buyers, anxious for early delivery, have offered bonuses in some cases. Recent bids requested by the Board of Contract and Supply, Yonkers, N. Y., on 2200 tons of cast-iron pipe resulted in a low bid being submitted by R. D. Wood & Co. The contract has not yet been awarded. Low bids on the July 8 opening by the Department of Water Supply, Gas and Electricity, New York, for about 6500 tons of 8-in., 10-in., 12-in. and 20-in. pipe, were submitted on: Section 1, by John Fox & Co., New York, representing the Donaldson Iron Co., Emaus, Pa.; section 2, the Warren Foundry & Machine Co.; and sections 3 and 4 by the United States Cast Iron Pipe & Foundry Co. Prices ranged from $55 to $57 per ton. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $53.50; 4-in. and 5-in. $58; 3-in., $68.30, with $4 additional for Class A and gas pipe.

Warehouse Business.—The market is quiet, but business thus far this month is apparently about on a par with June activity. Sheet prices continue rather weak, but the tendency on both black and galvanized is believed to be upward rather than downward. Dealers handling tire steel, although still quoting about 2.60c. per lb. base expect that an increase on this item will become necessary shortly, as the prices now rather generally quoted by mills have narrowed down the spread for the warehouse to about $9 per ton. This condition is also true of other prices generally. Brass and copper warehouses report business fairly active and prices firm. We quote prices on page 128.

Finished Iron and Steel.—The New York Central Railroad has distributed orders for several thousand tons of steel, including plates, shapes, bars, axles, tires, wire nails, etc., to several mills, this material representing the road's third quarter requirements on which bids were opened two weeks ago. Standard Oil Co. of New Jersey is in the market for 5000 tons of tank plates. In structural steel a number of large jobs are pending totaling 30,000 tons or more, including the 10,000 tons needed for the New York County Court House, which the George A. Fuller Co., general contractor, will award within a week. Except for these large projects, the local steel market continues rather quiet, but steel company representatives report a backed-up demand, which probably will come into the market as formal inquiries when the coal situation has been settled. Some steel companies are discouraging the placing of business, maintaining that it is not to the advantage either of the seller or the buyer to anticipate very far ahead in view of the coal uncertainty. Prices remain firm, and the minimum on shapes and bars is certainly not below 1.70c., Pittsburgh, where early delivery can be promised. On plates the price situation is not quite so strong, and while 1.70c. is nominally the market it is apparent that on an attractive tonnage a buyer could find quotations of 1.65c., Pittsburgh. Specifications on contracts are coming in freely, contracts having been made chiefly on sheets, tin plate, bolts, nuts and rivets and bar iron.

We quote for mill shipments New York as follows: Soft steel bars and structural shapes, 2.04c.; bar iron, 1.94c.; and steel plates, 1.99c. to 2.04c. On export shipments the freight rate from Pittsburgh to New York is 28.5c. per 100 lb., while the domestic rate is 34c.

High Speed Steel.—The market shows improvement, probably reflecting the activity now prevailing in the automotive industries. High carbon tool steel shows even greater improvement than high speed steel. We quote 18 per cent tungsten high speed steel at 75c. per lb., base, with special brands of some companies ranging up to 95c. per lb.

Coke.—The lowest prices named on foundry coke are $10.50 to $10.75, ovens, but foundries are not disposed to pay such high prices and most of them are fairly well covered for their requirements; hence some of the coke offered has gone begging. By-product is selling at $10.50, seaboard, to regular customers, but the supply is limited. The lowest quotation named on furnace coke is $9, ovens.

Old Material.—Although prices continue to stand up as firmly as last week, the market generally is quiet. Bethlehem, Alan Wood and Monessen are buying and the Donner Steel Co., Buffalo, recently bought in this market 3500 tons of heavy melting steel. Steel is more active than cast iron at present, although local foundries in Brooklyn have been buying considerable cast scrap at good prices lately. Prices on wrought iron are not strong. Specification pipe prices are firm,

but it is doubtful if better than $8 to $8.50 per ton can be done. It is reported that a dealer in New York, who recently contracted with South American interests for about 100,000 tons of scrap on the West coast of South America, included in which was a fairly large tonnage of old iron rails of British origin, has a contract with the Bethlehem Steel Co. for about 25,000 tons of this material at a price said to be $14.50 per ton delivered.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$9.50 to $10.00
Steel rails, short lengths, or equivalent	11.00 to 11.50
Rerolling rails	11.00 to 11.50
Relaying rails, nominal	27.00 to 28.00
Steel car axles	16.00 to 17.00
Iron car axles	22.00 to 23.00
No. 1 railroad wrought	12.50 to 13.00
Wrought iron track	11.00 to 11.50
Forge fire	8.00 to 8.50
No. 1 yard wrought, long	10.50 to 11.00
Cast borings (clean)	9.00 to 10.00
Machine-shop turnings	9.00 to 10.00
Mixed borings and turnings	9.00 to 10.00
Iron and steel pipe (1 in. diam., not under 2 ft. long)	8.00 to 8.50
Stove plate	10.50 to 11.00
Locomotive grate bars	11.50 to 12.00
Malleable cast (railroad)	10.00 to 10.50
Cast-iron car wheels	13.00 to 13.50

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$18.00 to $19.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	16.50 to 17.00
No. 1 heavy cast, not cupola size	13.00 to 13.50
No. 2 cast (radiators, cast boilers, etc.)	12.00 to 12.50

Birmingham

BIRMINGHAM, ALA., July 10.

Pig Iron.—In spite of the known strategical strength of Birmingham pig iron and firm attitude of most makers on a $20 base for third and fourth quarter delivery, the $1.50 spread in iron prices still existed at the close of the second week in July. There was no absolutely open quotation under $19, but business that should ordinarily have been taken on that base was lost to concerns making that price even on 500 tons. The majority of makers hold obstinately to the $20 base, even though very little was done last week, the sales being few and for small tonnages, while it is understood that a maker thought to be selling at $18.50 did a fairly good business. Yard stocks, which made a new low level June 1, made a still lower one July 1. Stocks on furnace yards June 1 and July 1 were as follows: foundry, 30,000 and 28,000 tons; machine cast, 12,000 and 3000 tons; warrants, 2400 and 2600; basic, 15,000 and 10,000; totals, 60,000 and 44,000 tons. Total stocks this time last year were 232,000 tons and on Jan. 1, 1922, were 152,000 tons. The largest individual foundry iron holdings July 1 were 12,000 tons, the next 7000. None others had an appreciable amount. Makers insist that the lull has little bearing on prices to be gotten for the bulk of fourth quarter delivery. Large sales made to St. Louis stove makers at $18.50 and recently reported are understood to have been closed two weeks ago. The leading interest is so pressed for iron for steel making purposes that it can scarcely figure conspicuously in any merchant iron market. Many inquiries for prompt iron are turned down because furnaces cannot supply the grades. Southern iron melt is at highest point ever known, although many jobbing foundries and large machinery makers have not come in for much iron.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon 1.75 to 2.25	$18.50 to $20.00
Basic	18.50 to 19.00
Charcoal, warm blast	30.00 to 32.00

Finishing Mills.—All Bessemer rolling mill departments, Fairfield tie-plate and structural mills and Ensley blooming and rail mills of the Tennessee company remain on double turn this week with ingot production at 100 per cent. Steel and wire mills are fairly full up in all departments. The Gulf States Steel Co. has resumed at its 20-in. bar mills, for the first time since 1920 and is operating four instead of three open hearths.

Cast Iron Pipe.—Jobbers late in entering the market continue to pay $65 for standard and $60 for extra heavy sanitary pipe on a contract base of $55. Shops have all they can handle and deliveries are not promised under several weeks. The United States Cast Iron Pipe & Foundry Co. booked ten miles of 12-in. pressure pipe for Morgantown, N. C., and is filled at four plants excepting that at North Birmingham where the installation of De Lavaud pipe casting machines nears completion with promise of tests being made around July 15. The Pacific Coast is taking 7000 to 10,000 tons of pressure and sanitary pipe per month via vessel out of Mobile. The movement is continuous. It is to all Pacific ports and thence as far inland as Arizona.

Coal and Coke.—C., B. & Q., Iron Mountain, Rock Island, "Frisco," Illinois Central and other Western railroads continue to take 60,000 to 80,000 tons of Alabama coal per week and mines are on full turn. The base is $2.25 and up, Pratt seam, for spot. Coke is firm at $5.50 to $6. Queen Bee coke made by the Barrett Co. sells several dollars higher than the highest grades of other coke. It has found a market in Europe and regular shipments are going there.

Old Material.—Dealers are making heavy deliveries of scrap on contracts booked last month, some of which were heavy, one being for 7000 tons of No. 1 steel for an Alamaba consumer. One very large consumer of No. 1 steel said he was paying $12. A small consumer, using select material, said he was paying $14. This coincides with prices given the same day by yards.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Steel rails	$13.00 to $15.00
No. 1 steel	12.00 to 14.00
No. 1 cast	15.00 to 16.00
Car wheels	14.00 to 15.00
Tramcar wheels	13.00 to 14.00
Stove plate	13.00 to 14.00
Cast iron borings	6.00 to 7.00
Machine shop turnings	4.00 to 5.00

Boston

BOSTON, June 11.

Pig Iron.—An inquiry for 2200 tons, silicon 2.75 to 3.25, and 550 tons higher silicon, July and August shipment, from the General Electric Co., served to break the monotony of an uninteresting week in pig iron. The reported sale of 2000 tons of No. 2X and 400 tons, silicon 3.25 to 3.75, Warwick iron, cannot be confirmed here. The supply of available domestic iron apparently has shrunk further and furnaces, especially eastern Pennsylvania, are inclined to increase differentials on silicons. Spreads of $1 between No. 2 plain and No. 2X are now common, while some furnaces make a difference of $2 between No. 2X and No. 1X. All but 175 tons of the Scotch iron received here two weeks ago remains on dock. The 175 tons previously was sold to a Greater Boston stove maker. Unimportant sales of Scotch and French iron, silicons ranging from 2.25 to 3.50, were made the past week, the largest reported being 250 tons to a heater manufacturer to go to a Canadian subsidiary plant. One broker is dickering with a foundry on 1000 tons foreign iron, but details are withheld.

We quote delivered at common New England points as follows, having added to furnace prices $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia and $9.60 from Alabama:

East. Penn., sil. 2.25 to 2.75	$29.15 to	$30.65
East. Penn., sil. 1.75 to 2.25	28.65 to	29.65
Buffalo, sil. 2.25 to 2.75		30.41
Buffalo, sil. 1.75 to 2.25		29.91
Alabama, sil. 2.25 to 2.75	28.60 to	30.10
Alabama, sil. 1.75 to 2.25	28.10 to	29.60

Cast-Iron Pipe.—The only business of any size put through in this territory since last reports is 900 tons 16-in. pipe placed by Turners Falls, Mass., with the Warren Foundry & Machine Co. That and other pipe makers are booking occasional carlot business on a basis of $55.70 f.o.b. common Boston freight points, for 6-in. pipe and larger, and $59.70 for 4-in. stock. The aggregate weekly tonnage involved is unimportant, however. Class A and gas pipe take $4 differentials. Because pipe producers are sold ahead to October, most New England municipalities are holding off until fall before replenishing stocks.

Finished Material.—Connecticut, Massachusetts and New Hampshire manufacturing plants were fairly

heavy buyers of bars the past week at 1.70c. to 1.80c. base, Pittsburgh. A Boston concern, shortly to engage in the production of tractors, is covering its bar and sheet requirements, and a fair tonnage of sheets, band and hoop and tool steel, in small lots, has been booked in this territory since July 1. Jobbers, however, are not inclined to buy beyond third quarter requirements. No important structural steel tonnages were placed the past week, but several good-sized jobs are pending. One Massachusetts street railway is buying about $15,000 special trackage, but New England carriers collectively are not factors in the finished material market. A moderate demand for steel forgings is noted.

Warehouse Business.—Local prices on cold-rolled steel have been advanced 20c. per 100 lb. to $3.50 on rounds and $4 on squares, hexagons and flats, while steel bands and hoop steel are 25c. higher, the former at $3.75 and the latter at $4.25. Some warehouses have marked up toe calk steel $1 to $6, but others are maintaining $5 base. Blue annealed sheets are slightly higher, but no change is noted in black or galvanized. The demand for both iron and steel is slowly expanding and considerably in excess of that of a month ago. Bolts and nuts are moderately active. Local stocks are fairly large. Blacksmith supplies are moving quite freely. Small rivets find a good market, but large sizes are inactive.

Jobbers quote: Soft steel bars, $2.60[illegible] per 100 lb. base; flats, $3.25½; concrete bars, $2.75 to $2.88; structural steel, $2.60½ to $2.70½; tire steel, $4 to $4.35; open-hearth spring steel, $4.50 to $6; crucible spring steel, $11.50; steel bands, $3.75; hoop steel, $4.25; cold rolled steel, $3.50 to $4; refined iron, $2.60½; best refined iron, $4.25; Wayne iron, $5.50; Norway iron, $6 to $6.50; plates, $2.70½ to $2.87½; No. 10 blue annealed sheets, $3.75 per 100 lb. base; No. 28 black sheets, $[illegible]; No. 28 galvanized sheets, $5.90.

Coke.—Both the New England Coal & Coke Co. and the Providence Gas Co. are holding firmly to $13.50, delivered, for contract by-product foundry coke where the local freight does not exceed $3.10, and to $14.50 for spot. Both producers are still out of the market for contract fuel and report an increase in shipping instructions on contracts placed heretofore. The New England Coal & Coke Co. continues to make free shipments to points outside New England, the price for such coke now being $12 f.o.b. ovens.

Old Material.—A strengthening of heavy melting steel and borings and turnings prices is the outstanding feature of the market. Steel, for shipment to the Pittsburgh district, is easily 50c. a ton higher. Brokers heretofore offering $8.10 for mixed borings and turnings with bushings are now quoting $8.70, and $9.40 to $9.45 for short shoveling borings and turnings, contrasted with $9 heretofore. Machine shop turnings have advanced 50c. a ton in sympathy. A central Massachusetts maker of textile machinery is offered better than $11.84 for 200 tons of fine cast-iron borings, but 50c. to 75c. a ton less is the best brokers will do on smaller tonnages. The advance in prices just about offsets the recent reduction in freight rates, which works out to the advantage of the manufacturer with material to sell. Little actual business was put through the past week, however, largely because of the lack of desired material. New England foundries show almost no interest in the local machinery cast market.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$19.00 to $20.00
No. 1 [illegible] cast	18.00 to 18.50
No. 1 [illegible]	14.00 to 14.50
Railroad malleable	15.00 to 15.50
Street car wheels	18.00 to 19.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$11.00 to $11.50
No. 1 railroad wrought	9.50 to 10.00
No. 1 yard wrought	10.00 to 10.50
Wrought pipe (1 in. in diam., over 2 ft. long)	8.00 to 8.50
Machine shop turnings	8.50 to 9.00
Cast iron borings, rolling mill	9.50 to 10.00
Cast iron borings, chemical	10.50 to 12.00
Blast furnace borings and turnings	8.50 to 9.40
Forged scrap and bundled skeleton	8.00 to 8.50
Street car axles and shafting	11.00 to 11.50
Rerolling rails	11.00 to 11.50

Cincinnati

Extremely Quiet Pig Iron Market—Southern Selling at $18

CINCINNATI, July 11.

Pig Iron.—The past week was one of the quietest of the year, sales aggregating in the vicinity of 2500 tons. The largest sale reported was of 400 tons of Southern iron, which was booked on an $18, Birmingham, base. Two other sales of 300 tons each were reported and one of 200 tons of malleable to a central Ohio melter on a $24, Ironton, base. There is very little inquiry, the largest being for 1500 tons for third quarter shipment to a northern Indiana melter. A Louisville implement manufacturer is inquiring for 700 tons of Southern foundry for last quarter shipment. Prices are unchanged from most districts. Northern irons are generally quoted at $24, although it is reported that a Lake producer booked 1000 tons of malleable on a $23 furnace base. Southern iron is still available at $18, from furnaces, and also resale material in brokers' hands, but a stiffening tendency is noted and with an increased demand an upward swing is expected to develop. Shipments on contracts are going forward in good shape and hold-up tonnages now moving forword are given as the reason for the dullness of the last two weeks. The Louisville & Nashville and Southern railroads having notified Birmingham iron makers that their rate on pig iron from Birmingham to Cincinnati will be $3.53, this rate is used in our pig iron quotations this week.

Based on freight rates of $3.50 from Birmingham and $2.27 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$21.53
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	22.03
Ohio silvery, 8 per cent	34.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	26.27
Basic Northern	27.27
Malleable	26.27

Finished Material—The past week was a rather quiet one in this territory, although local sales agencies report receipts of specifications on contracts in fairly heavy volume. New business is rather light and is mostly composed of fill-in orders. There is still, however, a good demand for sheets, automobile body sheets continuing as the leader. Prices show no change, and while premiums are being paid for early delivery, buyers are becoming more convinced that they will have to wait for their shipments at the mills' convenience. There are a number of inquiries for bars before the trade, and while 1.70c. is still being quoted, this price applies for what is practically fourth quarter delivery. For early delivery, 1.80c appears to be the ruling price, and we note several sales of 150 tons at this figure. The Big Four took bids on its third quarter steel requirements last week. Included in the inquiry was a third quarter requirement of small bolts amounting to approximately 700,000. Another inquiry calls for 500 tons of plates for third quarter delivery. In the structural field, the new inquiries consisted mostly of less than 100-ton lots and only one award of consequence was reported. There are a number of projects involving small tonnages of reinforcing bars before the trade, which will likely be awarded within the next two weeks. The demand for wire nails and wire fence has fallen off considerably, although manufactured wire is in fair demand. Some mills are turning down business, owing to interference with their operations as a result of a lack of coal.

Warehouse Business—Local jobbers report their sales continuing in good volume, and the size of the orders is gradually increasing as mill deliveries fall further behind. Prices are very firm but unchanged.

Jobbers quote: Iron and steel bars, 2.75c. base; hoops, 3.60c.; bands, 3.35c. base; shapes and plates, 2.85c. base; reinforcing bars, 2.82½c base; cold-rolled rounds, 3.35c. base; flats, squares and hexagons, 3.85c. base; No. 10 blue annealed sheets, 3.60c.; No. 28 black sheets, 4.50c.; No. 28 galvanized sheets, 5.50c.; No. 9 annealed wire, $2.70 per 100 lb.; common wire nails, $2.85 per keg, base.

Coke.—The coke market was rather quiet, though furnace coke is still in demand with little available. We note a sale of 3000 tons of furnace coke for shipment during July and August at an unnamed price.

Foundry coke is rather quiet, though shipments on contracts are good. No price changes are reported, and last week's quotations continue in effect. Some Southern railroad lines have placed embargoes on other than perishable freight, including coke, and in some instances coal, as a result of the shopmen's strike.

Old Material.—There is practically no activity in the steel grades, although blast furnace scrap is in good demand for outside points. The local market is inactive. Prices are inclined to be weak, but quotations remain unchanged.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

Per Gross Ton	
Bundled sheets	$8.00 to $8.50
Iron rails	13.50 to 14.00
Relaying rails, 50 lb. and up	26.50 to 27.00
Rerolling steel rails	13.50 to 14.00
Heavy melting steel	12.00 to 12.50
Steel rails for melting	13.00 to 13.50
Car wheels	14.00 to 14.50
Per Net Ton	
No. 1 railroad wrought	11.50 to 12.00
Cast borings	9.00 to 9.50
Steel turnings	8.00 to 8.50
Railroad cast	14.00 to 14.50
No. 1 machinery	16.00 to 16.50
Burnt scrap	9.50 to 10.00
Iron axles	18.00 to 18.50
Locomotive tires (smooth inside)	11.00 to 11.50
Pipes and flues	6.50 to 7.00

Buffalo

BUFFALO, July 10.

Pig Iron.—The $24.00 base price is still in existence and while small lots have been sold above that figure, there is no difficulty in obtaining large tonnages at $24. Inquiry is not extraordinarily heavy with any of the furnaces. The largest one engaging attention now is the General Electric inquiry for 3000 tons for delivery in Pittsfield and Lynn, but Buffalo furnaces believe Southern iron will be used in filling this requirement. Sales of No. 2 X at $25 have been frequent. In a total inquiry of 7000 tons to one furnace the largest individual inquiries were for 1500 tons, 1200 tons and 1000 tons. A furnace has sold one car load of No. 2 plain iron at $26, with malleable quoted on the same basis as No. 2 plain. Furnaces not interested in third quarter business are holding off commitments on fourth quarter iron, expecting that $26 will develop shortly and that demand will increase within 30 or 60 days for extended delivery iron. There has been no spurt because of the reduction in freight rates.

We quote f.o.b. per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$25.00
No. 2X foundry, 2.25 to 2.75 sil.	24.50
No. 2 plain, 1.75 to 2.25 sil.	24.00
Basic	24.00
Malleable	24.50
Lake Superior charcoal	31.78

Finished Iron and Steel.—Quotations of 1.80c. on bars, 1.90c. on shapes and 2c. on plates are regarded as ruling prices in the Buffalo market. One interest is quoting 1.75c. to 1.80c. on bars and shapes and the Lackawanna Steel Co. is quoting 1.80c. on bars. But none of the local interests is able to consider bar business in any freer way than heretofore. One agency is taking business in black sheets and getting plenty of it at 3.15c., competitors having advanced to 3.30c. The American Steel & Wire Co. is unable to take any new business and only considers specifications on contracts. The filtration plant inquiry by the City of Buffalo requiring 3500 tons of bars is in the hands of several mills. The ruling price on reinforcing bars is 1.80c. Some attractive plate inquiries are out in certain sizes and there is a brisk demand for cold-rolled material and wire and nails.

Warehouse Business.—Automobile business is said to be supplying 50 per cent of the demand in warehouses. Inquiry is uniform in all lines and there is nothing spectacular in the nature of present business. Demand is better outside of Buffalo. The railroad shop strike has not affected local warehouse business, but is expected to shortly.

We quote warehouse prices, f.o.b. Buffalo, as follows: Structural shapes, 2.65c.; plates, 2.65c.; soft steel bars, 2.55c.; hoops, 3.30c.; bands, 3.15c.; blue annealed sheets, No. 10, 3.55c.; galvanized steel sheets, No. 28, 5.40c.; black sheets, No. 28, 4.40c.; cold-rolled strip steel, 6.05c.; cold-rolled round shafting, 3.35c.

Old Material.—Mills are understood to be paying $16.75 for heavy melting steel, but are not inclined to pay more than that figure and [illegible] dealers in the same material are made at $16.50. Cast iron borings are in good demand outside the district and tend to make the price in Buffalo firm. There is no local demand for car wheels, though in Pittsburgh it is reported that $22 has been paid. No big sales in any material are reported.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$16.75 to $17.00
Low phos., 0.04 and under	18.00 to 19.00
No. 1 railroad wrought	16.00 to 16.50
Car wheels	17.00 to 18.00
Machine shop turnings	10.50 to 11.00
Cast iron borings	12.50 to 13.00
Heavy axle turnings	14.00 to 14.50
Grate bars	14.00 to 14.50
No. 1 busheling	15.00 to 15.50
Stove plate	15.00 to 15.50
Bundled sheet stampings	11.50 to 12.00
No. 1 machinery cast	18.00 to 18.50
Hydraulic compressed	15.00 to 15.50
Railroad malleable	17.00 to 17.50

St. Louis

ST. LOUIS, July 11.

Pig Iron.—The market for Northern iron advanced during the week to $24.50, Chicago, for third quarter delivery and $25 for prompt shipment. While the market is strong, buyers have not been showing an active interest, except consumers of foundry iron who are seeking iron of silicon of 2.25 and over, of which grades the local maker has none. The tendency of the market seems upward. Consumers who bought enough to take care of what they thought would be their requirements through the third quarter have taken on more business than they had expected, with the result that they again will be in the market for material. The lower freight rates have had the effect of stimulating shipping specifications against contracts. The Granite City maker sold 2000 tons of foundry iron—1500 tons for immediate shipment, and 500 tons for August—to an East Side consumer and 150 tons to a Louisville interest. Other sales were from a carload up to 200 tons. Southern iron is still being quoted at from $18.50 to $20, Birmingham. The lower price is being quoted by a Sheffield maker, but even at the low price very few sales were made during the week. An Indiana melter's request for a price on 1000 to 1500 tons of malleable is the principal inquiry pending. The ferroalloys are quiet.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago and $4.22 from Birmingham and 81 cents average switching charge from Granite City:

Northern foundry, sil. 1.75 to 2.25 (third quar.)	$26.66
Northern malleable, sil. 1.75 to 2.25 (third quar.)	26.56
Basic (third quar.)	26.56
Southern foundry, all rail, sil. 1.75 to 2.25	$22.72 to 24.22
Southern foundry, water and rail, sil. 1.75 to 2.25, f.o.b. St. Louis	22.17

Finished Iron and Steel.—Inquiries from the railroads amounted to very little during the week, a condition that may be due to the railroad strike. One of the Southwestern lines issued instructions that all orders placed for engine and car material be held up indefinitely. The contract for the Government hospital at Jefferson Barracks went to James Stewart & Co., the low bidders named in THE IRON AGE of July 6, the contract involving about 400 tons of reinforcing bars. The plans for the Fort Madison, Iowa, high school have been revived. The contract for the Cornwell National Bank building at Nashville, Tenn., has been let to a local contractor.

For stock out of warehouse we quote: Soft steel bars, 2.57½c. per lb.; iron bars, 2.57½c.; structural shapes, 2.67½c.; tank plates, 2.67½c.; No. 10 blue annealed sheets, 3.72½c.; No. 28 black sheets, cold rolled, one pass, 4.45c.; cold drawn rounds, shafting and screw stock, 3.50c.; structural rivets, $3.19½ per 100 lb.; boiler rivets, $3.29½; tank rivets, 7/16 in. and smaller, 60 per cent off list; machine bolts, large, 50 and 10 per cent; small, 50-10 and 10 per cent; carriage bolts, large, 55-5 per cent; small, 60 and 10 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon blank, $3.50; and tapped, $3.25 off list.

Coke.—There is a big demand for coke both for industrial and domestic purposes. Shipments by the

Granite City by-products producer are far in excess of current make, and it is reclaiming a substantial tonnage daily. Sales to the coal trade brought about by the absence of anthracite and bituminous coal due to the strike have been heavy. Connellsville coke is quoted at $9.50, ovens.

Old Material.—The tone of the market for old material continues to improve. The Laclede Steel Co. bought a small lot of re-rolling rails, which will take care of its requirements for the next 90 days. The short interests in melting steel are eager to cover.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton

Old iron rails	$16.75 to $17.25
Steel rails, rerolling	14.75 to 15.25
Steel rails, less than 3 ft.	15.00 to 15.50
Relaying rails, standard section	25.00 to 28.00
Cast iron car wheels	18.25 to 18.75
No. 1 heavy railroad melting steel	14.00 to 14.50
No. 1 heavy shoveling steel	13.00 to 13.50
Ordinary shoveling steel	12.50 to 13.00
Frogs, switches and guards, cut apart	14.50 to 15.00

Per Net Ton

Heavy axle and tire turnings	9.50 to 10.00
Steel angle bars	13.00 to 13.50
Iron car axles	23.00 to 23.50
Steel car axles	17.00 to 17.50
Wrought iron bars and transoms	18.50 to 19.00
No. 1 railroad wrought	12.75 to 13.00
No. 2 railroad wrought	11.75 to 12.25
Railroad springs	15.25 to 15.75
Steel couplers and knuckles	15.25 to 15.75
Cast iron borings	9.00 to 9.50
No. 1 busheling	11.00 to 11.50
No. 1 railroad cast	15.50 to 16.00
Stove plate and light cast	12.75 to 13.25
Railroad malleable	12.50 to 13.00
Pipes and flues	7.75 to 8.25
Machine shop turnings	8.50 to 9.00

Cleveland

Fuel Situation Acute and Number of Blast Furnaces May Be Banked

CLEVELAND, July 11.—The fuel situation has become very acute owing to the inability of the railroads to keep coal moving from the non-union mines of Kentucky and West Virginia because of the shopmen's strike, which prevents locomotive repair work. Several Valley and lake front furnace plants are depending upon fuel from those States for by-product coke plants and have been able to accumulate but little reserve stocks of fuel. Coal shipments have slackened down and the railroads have become badly congested. Among the railroads affected are the Norfolk & Western, Louisville & Nashville and Chesapeake & Ohio. Advices received by telephone late to-day from an investigator sent to the mining districts by a Cleveland steel plant were to the effect that the Chesapeake & Ohio coal shipments have been reduced 50 per cent during the last two or three days. Railroads have advised some of the mines that they will not be able to supply cars for more than a day or two, which will necessitate the shutting down of mines. Unless the situation is relieved shortly a number of blast furnaces will probably have to shut down. M. A. Hanna & Co. are considering blowing out their Cherry Valley furnace, taking advantage of the shut-down to reline the stack.

Iron Ore.—The ore market is dull. Several new inquiries in lots of 25,000 to 50,000 tons have come out and others for lots up to 100,000 tons previously reported are still pending, but no sales are reported during the week. Open market sales so far have been rather light, but a large tonnage has been contracted for by consumers having mining affiliations or long term contracts. Considerable manganiferous ore has been sold and some stocks of this ore have got so low that consumers are calling for early shipments. On July 1 there was 6,753,991 gross tons of ore on Lake Erie docks as compared with 8,417,725 tons on the same date a year ago. June receipts at Lake Erie ports were 4,287,273 tons as compared with 2,774,580 tons during June of last year. Shipments from Lake Erie ports during June were 2,885,027 tons as compared with 2,028,548 tons during June of 1921. Receipts at other than Lake Erie ports during the month were 1,463,979 tons as compared with 848,689 tons during June of last year.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $5.95; Old range non-Bessemer, 51½ per cent iron, $5.20; Mesabi Bessemer, 55 per cent iron, $5.70; Mesabi non-Bessemer, 51½ per cent iron, $5.05.

Pig Iron.—The market has quieted down considerably and there is more of a disposition among some sellers not to take much additional business until the fuel situation becomes brighter. This has been aggravated by the danger that shipments of coal from West Virginia and Kentucky to Ohio by-product coke plants may be suspended as the result of the railroad shopmen's strike. The coal movement from these States has slowed down considerably in the past day or two because of the inability of railroads to keep their locomotives in repair. There has been a further advance of 50c. per ton in prices on foundry iron by two producers. A Cleveland furnace has advanced its price to $23.50 for outside shipment and a western Pennsylvania foundry has marked its price up from $23.50 to $24. However, $23 is still being quoted by one or more lake furnaces. One producer reports sales aggregating 3000 to 4000 tons during the week, the largest of which was a 1500-ton lot which went to an Indiana melter. A new inquiry has come from a Ft. Wayne, Ind., consumer for 1500 tons of foundry iron and the General Electric Co. is inquiring for 1700 tons of high silicon and high phosphorus iron for its Erie works for July and August shipment. The only new basic inquiry reported came from the Edgewater Steel Co., which asked for 2000 tons for July shipment and it is reported that this order has been placed. A Valley furnace has sold two lots of Bessemer in the Pittsburgh district, one for 500 tons and the other for 100 tons at $25. Competition in low phosphorus iron has resulted in the market settling down to $33 or $1 per ton lower than the maximum that has been quoted recently by a Valley producer. We note the sale of about 1000 tons including a 500-ton lot of low phosphorus iron at $33. Pig iron shipments are holding up well and some producers report that their shipments so far during July have exceeded those of the same period in June. This is evidently partly due to the fact that some consumers held back shipments last month to take advantage of the reduced freight rates. The demand for pig iron from the Michigan automobile industry shows no signs of a let up.

Quotations below are f.o.b. local furnace for Northern foundry iron, not including a 50c. switching charge. Other quotations except basic and low phosphorus are delivered Cleveland, being based on a $3.02 rate from Jackson and a $6 rate from Birmingham:

Basic, Valley furnace	$25.00
Northern No. 2 fdy., sil. 1.75 to 2.25	$23.00 to 24.00
Southern fdy., sil. 1.75 to 2.25	24.50
Ohio silvery, sil. 8 per cent	33.52
Standard low phos., Valley furnace	33.00

Alloy Steel.—Several of the largest automobile companies are specifying for as much alloy steel for their third quarter requirements as they used during the second quarter and mills specializing on this steel is operating at close to 100 per cent capacity. Prices are reported fairly firm at 5c. for chrome vanadium, 4.75c. for chrome vanadium spring steel, 4.75c. for chrome nickel steel and 5.25c. for 3½ per cent nickeled steel.

Semi-Finished Material.—Inquiries are pending for several lots of sheet bars and slabs aggregating 7000 tons. Quotations on sheet bars, billets and slabs are unchanged at $35, Cleveland or Youngstown. We note small lot sales of forging billets at $40, but some mills are asking $42.

Finished Iron and Steel.—New demand for steel is not as active as it has been, indicating a possible summer lull, but consumers are crowding mills for shipments on existing orders. Some manufacturers of automobile forgings and other parts report a slackening in the demand, but so far there is little evidence of a general slowing down in the automotive industry. The market is very firm on steel bars, plates and structural material, with 1.70c. usually the minimum quotation, and some independent mills are asking 1.80c. Hoops and bands are firmer with quotations ranging from 2.50c. to 2.75c., and mills report that they have no trouble in getting the higher price. Inquiry for structural material continues heavy. Two new inquiries

have come from oil companies for 20 stills requiring 600 tons of plates. The Big Four Railroad received bids in Cincinnati late in the week for 1400 tons of tank plates and 300 tons of boiler plates, fire box quality. The minimum quotation on the latter was 1.80c. by Pittsburgh and Chicago district mills. One mill quoted 2c. Locomotive orders are bringing out some plate business.

Reinforcing Bars.—The demand is heavy and deliveries are slower. One mill has advanced its price to 1.80c. for the smaller sizes, but is still quoting 1.70c. for larger sizes. A new inquiry is for 700 tons for the Roosevelt School, Dayton, Ohio.

Sheets.—The demand for automobile body sheets continues heavy with 4.75c. as the ruling quotation by independent mills. Blue annealed sheets in the lighter gages are in heavy demand and a local mill has established a differential on these, quoting No. 12 gage and heavier at 2.55c. and No. 13 gage and lighter at 2.65c. Black sheets are still to be had by independent mills at 3.15c., but some mills are quoting 3.40c. There is a spread of from 4.15c. to 4.40c. on galvanized sheets. A Cleveland mill is quoting light plates at 2.52c. for No. 10 gage.

Warehouse Business.—The demand continues heavy and stocks have become badly depleted. Prices are unchanged.

Jobbers quote steel bars, 2.41c.; plates and structural shapes, 2.51c.; No. 9 galvanized wire, 3c.; No. 9 annealed wire, 2.50c.; No. 28 black sheets, 3.90c. to 4c.; No. 28 galvanized sheets, 4.90c. to 5c.; No. 10 blue annealed sheets, 3.25c. to 3.46c.; hoops and bands, 3.06c.; cold-rolled rounds, 3.20c.; flats, squares and hexagons, 3.70c.

Bolts, Nuts and Rivets.—Bolt and nut specifications continue fairly heavy. The demand is much better for small bolts which are used by automobile and other manufacturers, than for large bolts which are consumed by the railroads. New sales are not numerous, as most consumers are covered with contracts. A few rivet consumers are still placing contracts for the third quarter at the recent advance in prices. Small rivets are quoted at 70 and 10 per cent off list by the leading local manufacturer.

Coke.—There is an increased demand for foundry coke from consumers who laid in a stock before the coal strike but whose supply is now running out. Some sales of Wise County coke are reported at $7 at oven. The price on Connellsville foundry coke has been advanced to $10 and a very limited supply is available.

Old Material.—The market continues dull, but prices are fairly firm. There is very little buying by mills and some are holding up on shipments. Dealers apparently have sufficient scrap to take care of their orders and orders for whatever scrap they have purchased, so that trading between dealers is light. Some dealers are buying miscellaneous scrap for yard stocks. Dealers can get better prices for scrap for Cleveland delivery than for shipments to Valley points. However, the local demand is limited. A Cleveland mill has purchased odd lots of heavy melting steel scrap at $16 to $16.50 delivered. This grade is quoted at $17.50 for Valley delivery with $1.89 freight rate. Borings and turnings are quoted around $14.50 for Valley shipment and $13 to $13.50 delivered Cleveland. For local delivery, dealers are quoting machine shop turnings at $12.75 to $13.

We quote per gross ton, f.o.b. Cleveland, as follows:

Heavy melting steel	$15.25 to $15.50
Steel rails, under 3 ft.	15.75 to 16.00
Steel rails, rerolling	16.00 to 16.50
Iron rails	14.00 to 15.00
Iron car axles	18.00 to 19.00
Low phosphorus melting	16.00 to 16.25
Cast borings	12.50 to 12.75
Machine shop turnings	11.50 to 12.00
Mixed borings and short turnings	12.50 to 12.75
Compressed steel	12.85 to 13.25
Railroad wrought	14.00 to 14.50
Railroad malleable	15.50 to 16.00
Light bundled sheet stampings	10.00 to 10.25
Steel axle turnings	13.00 to 13.50
No. 1 cast	17.00 to 17.50
No. 1 busheling	11.25 to 11.75
Drop forge flashings over 10 in.	11.00 to 11.50
Drop forge flashings under 10 in.	11.25 to 11.75
Railroad grate bars	14.00 to 14.50
Stove plate	14.00 to 14.50
Pipes and flues	11.00 to 11.50

Philadelphia

Strikes an Important Factor—Plates Are Much Stronger

PHILADELPHIA, July 11.

Neither buyers nor sellers appear to be anxious to make important commitments pending the outcome of the negotiations at Washington to end the coal strike. And the unlooked-for seriousness of the railroad strike has injected a new factor into the situation which makes for caution. President Harding's firm stand in the coal situation has won general commendation, though the immediate victory seems to be with the miners rather than with the operators. The proposal that there shall be early resumption of mining pending the solution of the larger difficulties involved is not entirely reassuring, for the fear is that production of coal in increasing quantity may not come soon enough to prevent entirely the further crippling of steel plants and blast furnaces. Some of the steel companies are more seriously concerned over their coal supply than at any time since the strike began. In a few cases, at least, supplies at steel works are sufficient to last out only the month, and unless more coal soon becomes available, partial or complete shutdowns are inevitable in August. Even those companies which have coal bought are not sure of getting all of it because some may be diverted to other purposes, such as public utilities and the railroads.

Rising costs at steel works are also being contended with, steel ingots at some plants costing nearly $2 a ton more than last month. This factor, together with the uncertainty regarding the outcome of the strikes, is adding to the strength of finished steel and pig iron prices notwithstanding the diminished volume of buying. If the coal strike is soon ended, a large demand for coal and coke is expected and the need for cars for coal movement and transportation of the grain crops soon to be harvested is expected to produce a car shortage, especially as the number of bad order cars and locomotives will undoubtedly increase during the shop mechanics' absence from work. Eastern roads are taking steps to anticipate this situation by placing orders for repairs with locomotive and car builders, numerous inquiries for figures on such work now being before the equipment companies.

There is considerable speculation as to what effect, if any, the ending of the coal strike will have upon prices. Some close observers who a month ago expected lower prices on steel and pig iron to follow the end of the strike are not now so sure that such will be the result except, perhaps, to a limited degree.

Ferroalloys.—There is practically no demand for ferromanganese, consumers having recently covered their requirements until August or later. The price of both British and American remains at $67.50, seaboard. Spiegeleisen is quoted at $36, furnace.

Pig Iron.—There is very little demand for iron and no aggressive effort is being made by Eastern furnaces to sell. The market is largely a waiting one, with producers concerned chiefly with their coke supply, while consumers presumably are holding off in the belief that a settlement of the coal strike may have some effect on pig iron prices. The present price situation is very strong, so much so that a furnace with a freight rate of about $3.50 has made sales of No. 2X for shipments to points near Philadelphia at $26.50, furnace, or about $30, delivered. A furnace with a freight rate of $1.64 to Philadelphia is quoting $25.50, furnace, on No. 2 plain and $26.50 for No. 2X, but a furnace with a $1.14 rate quotes $26.50, furnace, for No. 2X, which makes its delivered price at Philadelphia $27.64, which is about as low as this grade of iron can be bought for to-day. Another furnace is asking as high as $28, furnace, for No. 2X. Grades of iron other than foundry are not in demand, and prices are nominal. Some Southern iron is being shipped to a Delaware River cast iron pipe works, and two pipe foundries in Virginia have purchased together more

than 5000 tons of Alabama iron at $18 and $18.50, furnace.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Pittsburgh district furnaces, and include freight rates varying from 76 cents to $1.64 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$27.14 to $27.76
East. Pa. No. 2X, 2.25 to 2.75	27.64 to 28.76
East. Pa. No. 1X	[illegible]
Virginia No. 2 plain, 1.75 to 2.25 sil.	29.17 to 30.17
Virginia No. 2X, 2.25 to 2.75 sil.	30.17 to 31.17
Basic delivery eastern Pa.	25.75 to 26.75
Gray forge	[illegible]
Malleable	27.50 to 28.00
Standard low phos. (f.o.b. furnace)	30.00
Copper bearing low phos. (f.o.b. furnace)	[illegible]

Semi-Finished Steel.—With demand very light, billets are quoted at the prices which have prevailed for several weeks, $35, Pittsburgh, for rerolling quality, and $40, Pittsburgh, for forging quality.

Plates.—The plate market is very much stronger, due both to rising costs and to a volume of business which is maintaining operations at substantially the same rate as has prevailed for some weeks. For early shipment it is now difficult, if not impossible, to buy below 1.70c., Pittsburgh, while some mills are getting 1.75c. and 1.80c. Pittsburgh. The Pennsylvania Railroad has bought about 5000 tons within the past few days for car repairs and may buy at least that much more. On a part of this tonnage 1.70c., Pittsburgh, was paid, but some of it is reported to have been purchased at 1.60c. or 1.65c. Repairs to cars and locomotives will soon require fairly large tonnages of plates. A local locomotive works is quoting on about 70 new locomotives and on about 65 locomotives for two roads to be repaired. Bids are being asked on the repair of several thousand cars by the Baltimore & Ohio. We quote sheared plates, ¼ in. and heavier, at 1.70c. to 1.80c., Pittsburgh.

Structural Material.—The demand for structural shapes has diminished this month, due largely to the fact that fabricators and jobbers specified fully on their contracts which expired July 1 and in most instances will have enough steel to last through this month. Most of these contracts were made two or three months ago at prices ranging from 1.35c. to 1.50c., Pittsburgh. The present market on plain material is firm at 1.70c., Pittsburgh, with some mills getting 1.75c. and 1.80c.

Bars.—One large producer of steel bars which recently could quote deliveries of two or three weeks is now sold up for three months, and the situation with other bar mills is much the same. Bars are stronger than plates or shapes, and it is becoming more difficult to buy for less than 1.75c. or 1.80c., Pittsburgh, though 1.70c. is the nominal quotation of a few mills. Bar iron is still quoted by Eastern makers at 1.60c., Pittsburgh, but they are asking 1.80c. for less carloads, which is an advance of $2 a ton.

Sheets.—Consumers are specifying freely on their third quarter contracts, but new business in sheets is small. Most of the contract business was taken at 2.40c. for blue annealed, 3.15c. for black and 4.15c. for galvanized, base, Pittsburgh, which makes it difficult for the mills to get prices about $4 or $5 a ton higher, now being quoted on current orders.

Warehouse Business.—Local warehouses have made adjustments in prices to meet the change in freight rates. We now quote for delivery from local warehouses to local consumers as follows:

Soft steel bars and small shapes, 2.55c.; iron bars (except bands), 2.55c.; round edge iron, 2.75c.; round edge steel, iron finish, 1½ x ½ in., 2.75c.; round edge steel planished, 3.50c.; tank steel plates, ¼-in. and heavier, 2.65c.; tank steel plates, 3/16-in., 2.85c.; blue annealed steel sheets, No. 10 gage, 3.40c.; black sheets, No. 28 gage, 4.25c.; galvanized sheets, No. 28 gage, 5.25c.; square twisted and deformed steel bars, 2.65c.; structural shapes, 2.65c.; diamond pattern plates, ¼-in., 4.35c.; 3/16-in., 4.50c.; spring steel, 3.50c.; round cold-rolled steel, 3.20c.; squares and hexagons, cold-rolled steel, 3.70c.; steel hoops, No. 13 gage and lighter, 3.45c.; steel bands, No. 12 gage to 3/16-in., inclusive, 3.20c.; iron bands, 3.90c.; rails, 2.36c.; tool steel, 8c.; Norway iron, 5.50c.; toe calk steel, 4.50c.; tire steel, 2.65c.; planished tire steel, 3.40c.

Coke.—Foundry coke has been sold at as high as $11, Connellsville, which indicates its extreme scarcity.

Old Material.—There is so little demand for scrap that prices are largely nominal. For example, heavy melting steel has been bought within the past week for shipment to Johnstown, Pa., for $15 and $15.50, delivered, which is also the market for eastern Pennsylvania mills, though the latter have a lower freight rate from points of shipment. Blast furnace turnings have been bought for Johnstown at $14.50. There is a wide spread in prices being paid for No. 1 cast. As reported last week, a cast iron pipe foundry bought 500 tons at $17.50, delivered, and more is undoubtedly available at the same price, but for a more selected grade of cast scrap as high as $19.50 is being paid. The difference in price largely has to do with variations in the specifications of buyers. Those which demand selected quality must pay the top price. A rolling mill has bought 250 tons of No. 1 busheling at $12.50, delivered, and a tonnage of pipe at $13. Dealers expect a better demand as soon as the coal strike is settled. We quote for delivery at buyers' works in this district as follows:

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$15.00 to $15.50
Scrap rails	15.00 to 15.50
Steel rails, rerolling	17.00 to 17.50
No. 1 low phos., heavy 0.04 and under	22.00 to 24.00
Cast iron car wheels	17.50 to 18.50
No. 1 railroad wrought	17.00 to 17.50
No. 1 yard wrought	15.00 to 15.50
No. 1 forge fire	13.00 to 13.50
Bundled sheets (for steel works)	13.00 to 13.50
No. 1 busheling	12.50 to 13.00
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	13.00 to 13.50
Mixed borings and turnings (for blast furnace use)	13.00 to 13.50
Machine-shop turnings (for steel works use)	13.00 to 13.50
Machine-shop turnings (for rolling mill use)	13.50 to 14.00
Heavy axle turnings (or equivalent)	14.00 to 14.50
Cast borings (for steel works and rolling mills)	14.00 to 14.50
Cast borings (for chemical plants)	16.50 to 17.50
No. 1 cast	17.50 to 18.50
Railroad grate bars	14.50 to 15.00
Stove plate (for steel plant use)	15.00 to 15.50
Railroad malleable	15.00 to 15.50
Wrought iron and soft steel pipes and tubes (new specifications)	13.00 to 13.25
Shafting	20.00 to 20.50

Unemployment Decreasing in Pennsylvania

HARRISBURG, PA., July 10.—Further improvement in iron and steel conditions in Pennsylvania is indicated in the semi-monthly bulletin on unemployment in the State, issued by the commissioner of the State Department of Labor and Industry, Clifford B. Connelley. Twenty-three per cent fewer iron and steel workers were unemployed on July 1 than on June 15, the figures being 25,500 and 33,250 respectively. Those unemployed on July 1, 25,500, were but slightly more than 50 per cent of those unemployed on May 15, when 49,075 were reported out of work.

Unemployment conditions in Pennsylvania generally have been showing much improvement lately. A department statement says that "general unemployment has become a thing of the past, although there are still 124,665 persons in this State unable to obtain work. Most of these are clerks, machinery operatives, professional people, tradesmen, and railroad workers. The railroads are said to be marking time, pending settlement of the shopmen's strike."

As far as conditions in the iron and steel trade are concerned, each of the State's 10 employment districts reported improvement in the half-month ending June 30, the report indicates.

The unemployed in the metal and machinery trades, by districts, on May 15, June 15 and July 1, follow:

	May 15	June 15	July 1
Altoona	[illegible]	500	500
Erie	3,800	1,900	1,800
Johnstown	2,000	500	400
Mckeesport	1,200	900	700
New Kensington	600	1,000	750
Philadelphia	30,000	20,000	15,000
Harrisburg	1,800	1,400	1,200
Pittsburgh	4,500	3,000	2,000
Scranton	4,000	3,700	3,000
Williamsport	200	150	100
Total	49,075	33,250	25,500

EXPORT TRADE IMPROVES

Japan Buying Rails—Strong Competition from England on Structural Material in Canada —German Competition Weaker

NEW YORK, July 11.—Purchases of rails—light, medium and heavy—are probably the largest item in Japanese transactions at present, although buying of black sheets continues to show improvement. Purchases of sheets, however, are not as large as the number of inquiries in the market would tend to show, for purchases are largely confined to small lots, usually less than a hundred tons, while the inquiries often call for various gages and total up to 400 or 500 tons. One exporter in New York reports receiving an order last week for between 80 and 90 tons of copper bearing sheets of a well known brand. Takata & Co. has booked a small order for switches and similar equipment and 10 miles of 70-lb., 92-lb. and 102-lb. grooved rails from the city of Osaka, Japan. Mitsui & Co. received an order for about a mile of 92-lb. and 102-lb. grooved rails from the Kyoto Electric Railway Co., Kyoto, and the municipality of Tokio is about to close on five miles of 92-lb. grooved rails.

If recent bids received on a small tonnage of 20-lb. T rails asked for by the Imperial Government Railways may be considered as a criterion of future quotations, British mills may again be in a competitive position in the Far East. The order for these rails was placed with Suzuki & Co., which awarded it on a bid, submitted by its London office, of $6 per ton lower than the American quotation, c.i.f. Japan. In business other than rail purchases, the Mitsubishi Shoji Kaisha has booked orders recently for 300 tons of bars and 200 tons of black sheets.

Canada is just now the most active of the export markets for steel, but prices there are lower than in the domestic market owing to keen competition, not only among American mills but with steel offered from England. Skeleton broad flange beams, which are produced under basic patents similar to those held by the Bethlehem Steel Co. on its special sections, are offered from England for delivery in four to six weeks at $2 to $3 per ton lower than Bethlehem sections are quoted in Canada. This differential in favor of English shapes exists mostly on lengths under 30 ft.; on longer lengths the steamship companies charge an extra for transportation.

Plates, shapes and bars are selling in Canada from American mills at prices which figure back to 1.55c. and 1.60c., Pittsburgh, the latter price ruling only on the smaller transactions. Thus the Canadian market is fully $3 per ton under the domestic market. One large buyer there is still getting shipments on a contract made with a Chicago mill, which is equivalent to 1.20c., Pittsburgh, although the Chicago mill gets a higher price because of low transportation costs, the material being shipped via the Great Lakes.

With German prices moving rapidly upward through increased costs of fuel, wages and transportation, fewer complaints are heard of German competition in foreign markets. Although the cotton tie market has opened at $1.10 per bundle, Pittsburgh, a price quite evidently established to forestall the competition in ties received from Germany last year, there is thus far no evidence of any great influx of German ties at this price or lower. In fact, German representatives in this country still contend that at this price or even a considerably higher one, competition is impossible at the present scale of prices prevailing in Germany.

A noteworthy importation of scrap has been made by a dealer in New York, who recently closed with interests in South America for more than 100,000 tons of all kinds of old material including a considerable tonnage of old iron rails and similar equipment, of Engish origin. The material is said to be on the West coast of South America and about 25,000 tons to have been contracted for by the Bethlehem Steel Co. at $14.50 per ton, but delivery has not yet been made.

FRENCH MARKET DULL

Increase in British Pound Aids Pig Iron Exports—Ore Stocks Decline—Automobile Trade Buys Castings

(Special Correspondence)

PARIS, FRANCE, June 28.—Demand, in the French iron and steel market, was not as heavy in June as in May, domestic business being very light. However, orders recently taken will keep the trade busy for two or three months. The rise of British and Belgian currencies and the upward trend of prices in Germany are placing French producers in a position to obtain substantial orders in foreign markets.

Ore.—During the first four months of this year, France exported 2,883,000 tons of iron ore, against 1,997,000 tons during the same period of 1921. Of these, 819,000 tons went to Germany and 492,000 tons to Belgium, instead of 434,000 tons to Germany and 626,000 tons to Belgium during the first four months of 1921. Stocks of French iron ore at the mines decreased from 3,911,000 tons at the end of March to 3,667,000 tons at the end of April.

Present prices of French iron ore, per metric ton at mines, are as follows:

	Fr.	
Minette, Briey	[illegible]	$1.11 to $1.17
Minette, Thionville	[illegible]	0.79
Minette, Longwy	[illegible]	0.83
Hematite, Pyrénées	[illegible]	2.37
Carbonate, Normandy	[illegible]	2.78

Pig Iron.—The production of pig iron for steel works is not likely to increase at present, as it is fully sufficient to meet the current demand and producers fear a possible coke shortage. Demand for foundry iron is restricted and prices have been reduced by competition among French producers. There is no question of increasing the present output. The maximum consumption of foundry iron, which may be estimated at about 25,000 metric tons per month, can be fully met by the blast-furnaces now in commission.

Current price of chill-cast foundry iron No. 3 P.L. is 215 to 220 fr. ($17.00 to $17.50) at furnace, with as low as 210 fr. ($16.67) possible. Belgian foundry iron is now worth, at furnace, 204 to 209 fr. (French currency) ($16.20 to $16.59), and 5 fr. less f.o.b. Antwerp for export, which is also the export price accepted by Lorraine and Luxemburg producers. British foundry iron No. 3, from Middlesbrough, is quoted at 308 fr. ($24.45) c.i.f. Calais or Rouen, which places it out of competition for the present.

French hematite iron, partly because of the rise of the British pound sterling, which is restricting British exports, now has a better market than it had in May. Transactions in French hematite have been concluded at the following prices: 305 to 315 fr. in the East; 295 to 305 fr. in the Northern and Western coast areas; 325 to 330 fr. in the Center of France and in the Paris area. British East Coast hematite is now worth 316.50 fr. c.i.f. Calais or Rouen, or 321.80 fr. at the Franco-Belgian frontier. British hematite is generally considered of higher grade than French.

Negotiations for the renewal of the Comptoir des Fontes Hématites, which terminates in two months, are now going on.

Semi-Finished Steel.—Semi-finished products are in a satisfactory position, more because of orders already booked than in consequence of new business. Prices of semi-finished products are as follows, per metric ton, f.o.b. works:

	Fr.	
Ingots	290 to 300	$23.03 to $23.82
Blooms	310	24.61
Billets	330	26.20
Flat bars	350	27.79

The above are inland prices for mild (Bessemer) steel. An increase of 20 fr. per ton is charged for open-hearth steel. About the same prices, f.ob. Antwerp, are quoted for export by Lorraine and Saar works. A few sales of French semi-finished products have been made in Great Britain recently as a consequence of the rise of the British pound sterling.

The Comptoir Sidérurgique, which controls inland

sales of beams and rails, sold in May over 40,000 tons of these two products, more than in April, but less than in March.

Sheets.—The market has declined. However, the Comptoir des Tôles, by granting special terms whenever necessary and protection against future price reductions, has skilfully met British and Belgian competition, and its position is now much stronger than it was.

Rolled Merchant Products.—In rolled merchant products, small shapes and round iron for concrete work and nut making are mostly in demand. The current price at works in Lorraine or in the East, is 420 to 430 fr. ($33.35 to $34.14) per metric ton.

Castings.—The castings market is dull, with the exception of malleable iron castings, in demand by the automobile industry.

Scrap.—In the scrap market good machinery scrap is quoted at 200 to 220 fr. and cast-iron scrap at 120 fr. per ton f.o.b. cars, at sellers' works.

The Comptoir des Tubes Soudés par Rapprochement (bureau for the sale and purchase of butt-welded tubes of iron and steel), which existed before the war, has been re-established, and will probably be extended to include lap-welded and seamless tubes (extensively produced in the Saar district).

It is announced that the modifications in the coefficients of import dues on metallurgical products, recently proposed by the Commission of Revision of Customs Dues (reported in THE IRON AGE, July 6), will be shortly ratified by the Government.

The question of the creation of a consortium of banks for financing French exports of metallurgical products is now receiving attention.

The French imports and exports of these products during the first four months of 1922 were as follows:

	Imports Metric Tons	Exports Metric Tons
Pig iron	53,000	147,000
Blooms, billets and bars	134,000	233,000
Sheets	50,000	15,500
Flat billets	6,200	558
Tin plates	15,300	2,100
Steel wire	7,100	7,400
Rails	8,500	47,400

UP-TREND IN GERMAN PRICES

Decline of Mark May Permit Further Increases—Rail Rates Up and Higher Coal Expected—Labor Shortage

(Special Correspondence)

BERLIN, GERMANY, June 21.—With the recent depreciation of the mark, the iron and steel trade has been able again to meet foreign competition, and the steel association has decided to increase the price of semi-finished material which had been constant since May. When the members of the association met June 8, they deemed it inadvisable to raise prices, because of lower foreign quotations, but the recent fall in the mark permitted an increase. The price of coal will doubtless go up, as the miners have secured higher wages. Railroad rates are to be increased 25 per cent more on July 1, and it is expected that iron and steel prices will follow if the exchange continues to depreciate.

Until the end of April incoming orders grew less but works were still busy on old contracts. When the conferences in Genoa and Paris showed that they would not lead to an early improvement in the German political and economic situation orders began to come in again more freely.

In all branches of the steel industry, the scarcity of skilled labor is retarding production. The cost of living increased about 10 per cent during May and has since gone still higher, so there is no possibility that the increase in prices will cease. When some German prices reached the world's market level, especially in iron and steel, it was generally predicted that the import of foreign material would soon lead to a reversal of the economic situation, with a lowering of German prices and extensive unemployment. The industry is, at present, still busy and works have orders ahead for several months. A number of companies are building extensions and enlarging their plants. The hardware industry in the Velbert district and the Remscheid and Cronenberger tool and implement factories report that orders, especially for export, show a distinct decrease, but that the works will still be employed for some time.

The base prices as increased on June 20, were given on page 1845, THE IRON AGE of June 29.

The surcharge for open hearth material remains the same, 900 m per metric ton.

Enormous Loss Due to Strikes

The National Industrial Conference Board, in its review of industrial conditions, says:

"Close to 1,250,000 persons are now idle because of strikes in various industries. This represents the number directly affected by voluntary cessations of work and entails a loss of approximately 10,000,000 man hours of work during each day that this situation continues. To visualize the magnitude of this waste, it may be noted that it would require the labor of 100 men working for over 30 years of 300 weekdays each in order to offset the time lost for each week of such idleness. Moreover, this loss applies only to those who have voluntarily quit their employment. With each day that this strike condition exists, more and more persons engaged in secondary or allied industries which are dependent on the major industries are thrown into involuntary unemployment, thereby imposing an additional burden on the community."

Reports of Wage Advance

YOUNGSTOWN, July 10.—Reports of a prospective wage advance persist, but lack authoritative statement. While it is argued that a shortage of labor will force an increase, independents say it is as yet of insufficient proportions to have any effect in this direction. In fact, a number of large employers say they are able to command all the common labor they require, but admit it is more difficult to secure an adequate number of skilled and semi-skilled workers.

Valley independents have never paid common labor less than 30c. per hr., though rates as low as 23c. and 25c. have been paid in competitive districts. Coal miners have secured employment in steel works in the Pittsburgh and Youngstown districts to some extent, and termination of the strike is expected to see an exodus of such men from the mills, returning to the coal fields.

Panama Canal Sells Steel

WASHINGTON, July 11.—The Panama Canal has sold approximately 5500 tons of plates, shapes and bars to the Rosenberg Iron & Metal Co., San Francisco, at $14.55 per net ton f.a.s., Balboa. This material, which is new, constituted a surplus that the Canal had on hand and which was bought on a basis of consumption during the war for the purpose of repairing vessels. The Panama Canal now is asking for informal bids on approximately 1000 tons of billets, tool steel, and a small lot of bars, which is to be disposed of as surplus stock.

The Carnegie Steel Co., Illinois Steel Co. and Tennessee Coal, Iron & Railroad Co. announce the removal of their New York district sales office from the Hudson Terminal Building, 30 Church Street, to the Empire Building, 71 Broadway. Charles C. Cluff is district manager of sales.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Plates

Sheared, tank quality, base, per lb..... 1.70c. to 1.80c.

Structural Material

Beams, channels, etc.....1.70c. to 1.80c.

Iron and Steel Bars

Soft steel bars, base, per lb.....1.70c. to 1.80c.
Refined iron bars, base per lb.....2.20c.

Hot-Rolled Flats

Hoops, base, per lb.....2.50c. to 2.75c.
Bands, base, per lb.....2.50c. to 2.75c.
Strips, base, per lb.....2.50c. to 2.75c.
Cotton ties, per bundle of 4 lb..... $1.10

Cold-Finished Steels

Bars and shafting, base, per lb.....2.10c.
Strips, base, per lb.....4.00c.

Wire Products

Nails, base, per keg .....$2.40 to $2.50
Bright plain wire, base, per 100 lb..... 2.25
Annealed fence wire, base, per 100 lb..... 2.25
Galvanized wire, base, per 100 lb..... 2.75
Galvanized barbed, base, per 100 lb..... 3.05 to 3.15
Galvanized staples, base, per keg..... 3.05 to 3.15
Painted barbed wire, base, per 100 lb..... 2.55 to 2.65
Polished staples, base, per keg..... 2.55 to 2.65
Cement coated nails, base, per count keg..... 1.90 to 2.00
Woven fence, carloads.....73 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads.
60, 10 and 10 per cent off list
Machine bolts, small, cut threads....60 and 10 per cent off list
Machine bolts, larger and longer.....60 and 10 per cent off list
Carriage bolts, ⅜ x 6 in.
Smaller and shorter, rolled threads. 60 and 10 per cent off list
Cut threads .....60 per cent off list
Longer and larger sizes .....60 per cent off list
Lag bolts .....60, 10 and 10 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads....50 and 10 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.:
Smaller and shorter .....50 and 10 per cent off list
Larger and longer sizes.....50 and 10 per cent off list
Hot pressed square or hex. blank nuts.....$4.50 off list
Hot pressed nuts, tapped .....$4.50 off list
C.p.c. and t. sq. or hex. nuts, blank.....$4.50 off list
C.p.c. and t. sq. or hex. nuts, tapped.....$4.50 off list
Semi-finished hex. nuts:
9/16 in. and smaller, U. S. S.....80 and10 per cent off list
⅝ in. and larger, U. S. S...75 and 10 and 10 per cent off list
Small sizes, S. A. E. .....80, 10 and 10 per cent off list
S. A. E. ⅝ in. and larger...75 and 10 and 10 per cent off list
Stove bolts in packages.....80 and 5 per cent off list
Stove bolts in bulk.....80, 5 and 2½ per cent off list
Tire bolts .....65 per cent off list
Track bolts in carloads.....3.00c. to 3.25c. base
Track bolts, less than 200 kegs.....3.50c. to 3.75c. base

Cap and Set Screws

Milled square and hex. head cap screws,
75 and 10 per cent off list
Milled set screws.....75 per cent off list
Upset cap screws.....80 per cent off list
Upset set screws.....80 and 5 per cent off list

Rivets

Large structural and ship rivets, base per 100 lb.....$2.40
Large boiler rivets, base per 100 lb..... 2.50
Small rivets .....70 and 5 to 70 and 10 per cent off list

Track Equipment

Spikes, 9/16 in. and larger, base, per 100 lb....$2.25 to $2.35
Spikes, ½ in. and smaller, base, per 100 lb..... 2.50 to 2.60
Spikes, boat and barge, base, per 100 lb..... 2.50 to 2.60
Track bolts, base, per 100 lb..... 3.25
Tie plates, per 100 lb..... 2.00 to 2.25
Angle bars, base, per 100 lb..... 2.40

Welded Pipe

Butt Weld

Steel Inches	Steel Black	Steel Galv.	Iron Inches	Iron Black	Iron Galv.
⅛	51½	28	¼ to ⅜	1	+22½
¼ to ⅜	60	33½	½	36½	14½
½	65	50½	¾	42½	23½
¾	69	56½	1 to 1½	44½	29½
1 to 3	71	58½			

Lap Weld

2	64	51½	2	39½	25½
2½ to 6	68	55½	2½ to 6	42½	29½
7 to 8	65	51½	7 to 12	40½	27½
9 to 12	64	50½			

Butt Weld, extra strong, plain ends

⅛	50½	33	¼ to ⅜	1	+37½
¼ to ⅜	56	38½	½	36½	33½
½	62	50½	¾	42½	28½
¾	67	55½	1 to 1½	44½	30½
1 to 1½	69	57½			
2 to 3	70	58½			

Lap Weld, extra strong, plain ends

2	62	50½	2	40½	27½
2½ to 4	66	54½	2½ to 4	43½	31½
4½ to 6	65	53½	4½ to 6	42½	30½
7 to 8	61	47½	7 to 8	38½	23½
9 to 12	55	41½	9 to 12	30½	18½

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 and 2½ per cent.

Boiler Tubes

Lap Welded Steel		Charcoal Iron	
1¾ in.	26½	1½ in.	5
2 to 2¾ in.	41	1¾ to 1¾ in.	15
2½ to 3 in.	52	2 to 2¼ in.	25
3¼ to 13 in.	57	2½ to 3 in.	30
		3¼ to 4½ in.	32

To large buyers of steel tubes a supplementary discount of 5 per cent is allowed.

Standard Commercial Seamless Boiler Tubes

Discounts on cold-drawn or hot-rolled tubes in carload lots, f.o.b. Pittsburgh, follow:

1 in.	60	2½ and 2¾ in.	43
1¼ and 1½ in.	52	3 in.	47
1¾ in.	56	3¼ to 4 in.	52
2 and 2¼ in.	39	4¼ in. to 5 in.	44

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Tin Plate

Standard cokes, per base box.....$4.75

Terne Plate

(Per package, 200-lb.)

8-lb. coating	$9.30	25-lb. coating I. C.	$14.25
8-lb. coating I. C.	9.60	30-lb. coating I. C.	15.25
15-lb. coating I. C.	11.50	35-lb. coating I. C.	16.25
20-lb. coating I. C.	13.00	40-lb. coating I. C.	17.25

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....2.40c. to 2.60c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.15c. to 3.40c.

Galvanized

No. 28 (base), per lb.....4.15c. to 4.40c.

Tin-Mill Black Plate

No. 28 (base), per lb.....3.15c. to 3.40c.

Manufacturers have pamphlets, which can be had upon application, giving price differentials for gage and extras for length, width, shearing, etc.

Freight Rates

All rail freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic.	$0.325	Buff. [illegible]	$0.265	St. Louis	0.43
Philadelphia, export	0.265	Cleveland	0.215	Kansas City	$0.735
Baltimore, domestic	0.315	Cleveland, Youngstown		Kansas City (pipe)	0.705
Baltimore, export	0.255	Comb.	0.19	St. Paul	0.595
New York, domestic	0.34	Detroit	0.295	Omaha	0.735
New York, export	0.285	Cincinnati	0.295	Omaha (pipe)	0.705
Boston, domestic	0.385	Indianapolis	0.31	Denver	1.275
Boston, export	0.285	Chicago	0.34	Denver (pipe)	1.215

Pacific Coast	$1.50
Pac. Coast, ship plates	1.20
Birmingham	0.69
Memphis	0.385
Jacksonville, all rail	0.50
Jacksonville, rail and water	0.415
New Orleans	0.515

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 30c. to 40c.; ship plates, 30c. to 40c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 30c. to 40c.; sheets and tin plates, 50c.; rods, wire rope, cable and strands, 75c.; wire fencing, netting and stretcher, 50c.; pipe, not over 8 in. in diameter, 50c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots [illegible] 40,000 lb.

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
July	Lake	Electrolytic*	New York	New York	St. Louis	New York	St. Louis
5.....	13.87½	13.62½	31.37½	5.75	5.50	5.77½	5.42½
6.....	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
7.....	13.87½	13.62½	31.37½	5.75	5.50	5.85	5.50
8.....	13.87½	13.62½	.....	5.75	5.50	5.85	5.50
10.....	13.87½	13.62½	31.37½	5.75	5.50	5.85	5.50
11.....	14.00	13.75	31.12½	5.75	5.50	5.87½	5.52½

*Refinery quotation.

New York

NEW YORK, July 11.

Practically all of the markets are quiet, but the price tendency is firm. Prices for copper have advanced but sales are not heavy. The tin and lead markets are exceedingly quiet, but prices are firm. A decided advance has taken place in the zinc market, but sales have been moderate.

Copper.—Since the holiday period last week the market for electrolytic copper has turned stronger, although buying is not active. Moderate sales are reported for all positions through October and prices have advanced about ¼c. since a week ago. Up to within a day or so ago the metal could be bought at a minimum of 13.87½c., delivered, or 13.62½c., refinery, but the minimum is now regarded as general at 14c., delivered, or 13.75c., refinery, which we quote as the market. The strength of the market is partly due to the decline in stocks and the generally favorable statistical position, particularly if the coal strike is soon settled. Sales for export are steady at 14c. to 14.12½c. f.a.s. Lake copper has advanced sympathetically to at least a minimum of 14c., delivered.

Tin.—The stagnant condition which has prevailed for some time in the Straits tin market continues and there has been no revival in buying since the holidays. Sales on July 5 and 6 amounted to about 200 tons, but since then there has been practically no business. There has been a little re-selling by a few consumers, but it is without significance. Yesterday the only sale heard of was five tons of spot Chinese tin. Quotations have been steady for nearly a week with the spot Straits tin quoted to-day at 31.12½c., New York, but almost no business transacted and the quotation largely nominal. Prices in London are substantially unchanged from those prevailing Friday, June 30, and are £153 10s. for spot standard, £154 5s. for future standard and £155 per ton for spot Straits, with the market quiet. Arrivals thus far this month have been 1740 tons, with 5720 tons reported afloat.

Lead.—The market continues quiet with almost no demand outside of heavy specifications on contracts, with consumption large. The two markets, that of the independents and that of the leading interest, are now practically on a parity at 5.75c., New York, or 5.50c., St. Louis, although the asking price of the leading producer is 5.55c., St. Louis. Order books for August have not yet been opened.

Zinc.—The rapid advance in the price of prime Western since the holidays last week has been the feature of the non-ferrous metals. Quotations are now 15 to 20 points higher than a week ago for July and August delivery at 5.52½c., St. Louis, or 5.87½c., New York. The strength of the market is due to several causes, one of the principal ones being the prospect of a termination of the coal strike, which would mean a heavier demand from consumers in the face of rapidly diminishing stocks. The fact that producers are not free sellers also contributes to the strength of the market. Stocks which a year ago amounted to over 90,000 tons had been reduced by the end of May to about 40,000 tons, and the situation at the end of June is reported to have been even more favorable.

Aluminum.—Virgin metal, 98 to 99 per cent pure, in wholesale lots, is quoted by the leading producer at 19.10c. f.o.b. plant, with the same grade of imported metal quoted by dealers at 17.75c. to 18c., duty paid, New York.

Antimony.—Conditions are unchanged, with the market quiet and wholesale lots for early delivery quoted at 5c., New York, duty paid.

Old Metals.—The market continues firm, with a slight improvement in business. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	13.50
Copper, heavy and wire	12.75
Copper, light and bottoms	11.00
Heavy machine composition	10.25
Brass, heavy	8.00
Brass, light	6.50
No. 1 red brass or composition turnings	8.75
No. 1 yellow rod brass turnings	7.50
Lead, heavy	4.875
Lead, tea	3.75
Zinc	3.00

Chicago

JULY 11.—Copper and zinc have advanced and all of the metals are firmer. The market is quiet but there is no pressure to sell and no disposition to make concessions to move material. Old metal prices are unchanged except for advances in red brass and block tin. We quote in carload lots: Lake copper, 14c.; tin, 32.50c.; lead, 5.60c.; spelter, 5.55c.; antimony, 7c., in less than carload lots. On old metals we quote: Copper wire, crucible shapes and copper clips, 10.75c.; copper bottoms, 8.75c.; red brass, 8.50c.; yellow brass, 6.75c.; lead pipe, 4.25c.; zinc, 2.75c.; pewter, No. 1, 20c.; tin foil, 22.50c.; block tin, 26c.; all buying prices for less than carload lots.

St. Louis

July 11.—We quote lead, 5.50c. to 5.60c., carlots; slab zinc, 5.30c. to 5.35c. On old metals we quote: Light brass, 3.50c.; heavy red brass and light copper, 7c.; heavy yellow brass, 4c.; heavy copper and copper wire, 7.50c.; zinc, 2c.; pewter, 15c.; tin foil, 16c.; tea lead 2c.; aluminum 9c.

More Steel Workers Employed

WASHINGTON, July 11.—Employment in the iron and steel industry showed an increase of 4.04 per cent in June over May, according to the monthly industrial survey of the Employment Service, Department of Labor. The total increase in employment in all industries coming within the survey was 179,328, a gain over May of 3.2 per cent. All of the industries, except stone, coal and glass, showed increases. Railroad repair shops showed a gain of 2.5 per cent, while metal products other than iron and steel also showed an increase of 2.5 per cent.

The report estimates that not more than 20,000 employees were furloughed in June, most of this being seasonal. The increase in June is considered remarkable for the reason that it was made despite the unsettled conditions caused by the coal, cotton textile and railroad controversies. Building activities, it is stated, are developing to such an extent that a shortage of skilled building craftsmen is becoming apparent in many sections of the country. The extremely hot weather has hastened wheat cutting in Kansas and Nebraska which, coupled with transportation difficulties, has caused a temporary shortage in the harvest fields of the Middle West.

"The country is steadily but surely forging its way toward a period of industrial prosperity in which it is possible that the labor supply will not equal the demand," says Director General Francis I. Jones, of the Employment Service. "As contrasted with opinion six months ago, a note of optimism pervades practically every industry in every section of the country."

The first installation of the Hawley electric oscillating brass melting furnace is announced as having been made by the Magnus Co., Depew, N. Y.

British Iron and Steel Market

Cleveland Foundry Iron Shipped to United States —Continental Markets Unsettled, Due to Demoralized Money Exchange

(By Cable)

LONDON, ENGLAND, July 11.

Pig iron quietness continues but hopes are still maintained of extended home buying this month. Export inquiry is fair and one lot of 1000 tons of special Cleveland foundry iron has been shipped from Middlesbrough to the United States, while further business is possible.

Hematite stocks are growing and furnaces are cutting prices for export; 92s. ($20.42) has been paid for East Coast mixed numbers.

There is no change in the general aspect in finished iron and steel, though there is perhaps a little more buying going on.

Continental prices are unsettled, owing to the fall in franc exchange. Belgian merchant bars have been sold at £8 5s. (1.54c. per lb.) c.i.f. India; wire rods at £10 7½s. ($46.06) cost and freight to Japan; joists (beams) at £7 5s. (1.44c. per lb.) f.o.b.; wire nails at 20½s. ($4.55) cost and freight to Japan.

Tin plate demand is less active, especially for export, owing to the demoralized foreign exchanges.

Galvanized sheets are very dull.

America is still inquiring for ferromanganese.

Rejections are reported, on the Continent and here, of German material, on the ground of quality. It is suggested that the German works are using inferior raw materials and unsuitable scrap.

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $4.44 per £1, as follows:

Durham coke, delivered	£1	6½s.	to £1	7s	$5.88 to	$5.99
Cleveland No. 1 foundry	4	15			21.09	
Cleveland No. 3 foundry	4	10			19.98	
Cleveland No. 4 foundry	4	7½			19.42	
Cleveland No. 4 forge	4	5			18.87	
Cleveland basic	4	10			19.98	
East Coast mixed	4	14	& 4	12*	20.87 &	20.42*
Ferromanganese	15	0			66.60	
Ferromanganese*	14	10	to 14	15	65.38 to	65.49
Rails, 60 lb. and up	7	17½	to 9	10	34.96 to	42.18
Billets	7	0	to 8	0	31.08 to	35.52
Sheet and tin plate bars, Welsh	7	7½			32.74	
Tin plates, base box	0	19½	to 0	20	4.33 to	4.44
					C. per Lb.	
Ship plates	9	0	to 10	0	1.78 to	1.98
Boiler plates	13	0	to 14	0	2.58 to	2.77
Tees	9	5	to 10	10	1.85 to	2.08
Channels	8	10	to 9	15	1.68 to	1.93
Beams	8	5	to 10	0	1.84 to	1.98
Round bars, ¾ to 3 in.	9	5	to 10	10	1.83 to	2.08
Galvanized sheets, 24 g.	15	12½	to 15	17½	3.10 to	3.15
Black sheets	12	0			2.38	
Steel hoops	12	0	& 12	10*	2.38 &	2.43*
Cold rolled steel strip, 20 g.	23	2½			4.58	
Cotton ties, Indian specifications	15	0			2.97	

*Export price.

Continental Prices, All F.O.B. Channel Ports, Delivery as Specified

No. 3 foundry pig iron:						
Belgium, July	£4	12½s.	to £4	15s.	$20.53 to	$21.09
Luxemburg, July	4	12½	to 4	15	20.53 to	21.09
France, July	4	12½	to 4	15	20.53 to	21.09
Basic pig iron:						
Luxemburg, July	4	6	to 4	7	19.09 to	19.31
Billets:						
Luxemburg, July	6	5			27.75	
Lorraine, July	6	5			27.75	
Wire nails (keg basis)						
Germany, August	0	14½			3.22	
Belgium, July	0	20½			4.55	
Wire rods, 5 mm. (0.2 in.):						
Belgium, July	7	5	to 10	7½	32.19 to	46.06
Angles:					C. per Lb.	
Belgium, July	7	10	to 7	12½	1.49 to	1.51
Tees:						
Belgium, July	8	5			1.64	
Merchant bars:						
Belgium, July	7	13½	to 8	5	1.52 to	1.64
Luxemb'g, July, Aug.	8	0			1.59	
Germany, July, Aug.	8	0	to 8	7½	1.59 to	1.66
France, July	8	5	to 8	10	1.64 to	1.68
Channels:						
Belgium, July	7	10	to 7	12½	1.49 to	1.51
Joists (beams):						
France, July, Aug.	7	7½	to 8	0	1.46 to	1.57
Belgium, July, Aug.	7	5	to 7	15	1.44 to	1.49
Luxemburg, July	7	15	to 8	0	1.54 to	1.59
Belgium, July	8	2½			1.61	
⅜-in. plates:						
Germany, July, Aug.	8	5			1.70	
Belgium, July	8	0	to 8	15	1.59 to	1.61
Luxemburg	8	10			1.68	
⅛-in. plates:						
Germany	9	0			1.80	
No. 8 gage wire:						
Belgium, July, Aug.	14	10			2.85	

Pig Iron and Steel Markets Quiet—Germany Buying British Coal

LONDON, ENGLAND, June 28.—Trade conditions are not particularly cheerful. There are general complaints of the paucity of business, and this is reflected in the lackadaisical aspect of most of the metal markets. The marked improvement which is apparently being experienced in industrial conditions in the United States is regarded with the greatest interest and hopes are naturally entertained that they may be the forerunner of better things here, since in the past the revival has often been perceptible in America before it has become noticeable in other quarters. At the same time eyes are turned with considerable misgiving toward the continent of Europe and it is felt that until things are in a more stable condition there, no improvement in trade conditions can become really permanent. It is sometimes forgotten that the purchasing power of a large portion of the world was enormously reduced by reason of the years of conflict, but it has apparently become recognized that the best has not been done to alleviate the inevitable results of the war on economic and industrial conditions. Possibly the resolution put to the labor congress in Edinburgh to-day is a straw which shows how the wind blows. This blames the present condition of Europe on the mischievous policy of the supreme council.

In the iron trade there are no new features. In pig iron rather more business is coming out but the settlement of the recent labor dispute has not probably resulted in so much improvement as was hoped. Germany has been buying, however, and after the sale of 4000 tons of foundry iron to the United States, it is understood negotiations are proceeding for further quantities. The output of Cleveland iron is being well taken care of, and prices are steady. Some more Cleveland furnaces have been re-lighted. As regards hematite there is a little improvement in inquiry but fairly large stocks still exist and as a consequence prices are on the easy side. Continental competition in pig iron has been apparent again, such offers having been brought out apparently owing to the movement in exchange. So far, however, consumers here do not seem to have given much encouragement to sellers.

The steel market is generally quiet, and it would appear that some makers did not altogether like the 10s. reduction in prices which has been decided upon recently, and some are consequently evading selling at all at these figures. Business for export is quiet, but a few rail orders have been booked both here and on the continent.

It is interesting to note that Germany has been buying British coal.

The Paul J. Kalman Co., Chicago, fabricating interest, has made an initial shipment of reinforcing steel from its new plant on Poland Avenue, Youngstown, Ohio, built to supply its Eastern trade. When in full operation in about six weeks, it will have a capacity for producing 100 tons of reinforcing material daily.

The National Tube Co., Pittsburgh, is arranging for an expenditure of approximately $2,000,000 during the next twelve months for the construction of homes for officials and employees at its new tube mills at Gary, Ind. Plans are nearing completion for erection of an initial unit of more than 200 dwellings.

PERSONAL

George D. McIlvaine, Pittsburgh, who enjoys a wide acquaintance in the steel industry because of his connection with the Association of Tin Plate Manufacturers, of which he is secretary and the National Pipe and Supplies Association, which he serves as secretary-treasurer, lately has been a much honored man. Recently he was elected president of the Lafayette College Alumni Association and a trustee of Lafayette College, from which he was graduated with the class of 1889. At the biennial convention of the Grand Arch Council, Phi Kappa Psi fraternity, in Springfield, Ohio, June 24, last, Mr. McIlvaine was elected president of that organization, which has 17,000 members. He also is president of the American Trade Association Executives and secretary of the Enameled Sanitary Ware Manufacturers' Association.



GEORGE D. McILVAINE

W. K. Kenly and George L. Mayer of W. K. Kenly & Co., Chicago, dissolved partnership July 1, on account of the ill health of the former. W. K. Kenly & Co. was formed last fall for the sale of ferroalloys, finished and raw iron and steel products, iron and steel scrap, new and relaying rails and the distribution in the Chicago district of the products of the Vanadium Corporation of America. Mr. Kenly has gone to Sunmount, Sante Fe, N. M., for an indefinite period, and Mr. Mayer has become associated with Templeton Kenly & Co., Ltd., Chicago, manufacturer of Simplex jacks.

Charles B. Kendall has been appointed purchasing agent of the Hart Mfg. Co., Hartford, Conn., with which he has been associated for the past 17 years.

T. L. Schrantz, formerly manager, supply division, Buffalo office, Westinghouse Electric & Mfg. Co., has been appointed branch manager of the Syracuse office and George W. Roosa has been made acting manager of the supply division, Buffalo office. H. F. Boe has been appointed manager, industrial division, Buffalo office. J. W. Robinson, Chicago office of the company, has been made manager, central station division, to succeed C. E. Allen, who has become St. Louis district manager. H. A. Lynette has been appointed syndicate representative, central station division and Norman Stewart has been made Minneapolis branch manager.

C. C. Clark, who has been affiliated with the Pressed Steel Car Co. for 20 years, has been named as successor to Kenneth C. Gardner, who recently resigned as general sales manager, central district, to become vice-president in charge of sales, Greenville Steel Car Co., Greenville, Pa.

At a meeting of the board of directors of the Consolidated Steel & Iron Corporation, St. Louis, J. R. Finkelstein, president Hoosier Rolling Mill Co., Terre Haute, Ind., was elected president of the Consolidated corporation. The other officers follow: F. J. Stuart, chairman of the board; Hugh Ferguson, first vice president; E. J. Schroeder, vice president and treasurer; M. C. Walsh, secretary.

Edward Sullivan, formerly with the Capewell Horse Nail Co., Hartford, Conn., is now associated with Butts & Ordway Co., Boston, and will be in charge of the company's greater Boston horseshoe supplies business.

Harry G. Stoddard, vice-president and general manager Wyman-Gordon Co., Worcester, Mass., has been made a director of the Associated Motor Industries, a new consolidation of producers of automobile trucks and parts.

Col. Arthur S. Dwight, president, and Charles F. Rand, past president, of the American Institute of Mining and Metallurgical Engineers, have received from the French Government the Croix de Chevalier de la Legion d'Honneur.

Stewart M. Marshall of the consulting engineering firm of Perin & Marshall, New York, returned to the United States on July 5 after an absence of eight or nine months, most of the time in India. F. L. Estep of the firm is scheduled to leave for India by way of England on July 18.

J. L. Cooper has been appointed manager of the Chicago office of the Main Belting Co., Philadelphia, to succeed J. W. Cullen, resigned, to become affiliated with R. E. Ward & Co., Chicago, an advertising agency. Mr. Cooper has been connected with the Main Belting Co. for twenty-five years in Chicago and Philadelphia, and as sales manager of the Buffalo office.

J. G. Benedict, treasurer and general manager Landis Machine Co., Waynesboro, Pa., sailed for Europe on the New Amsterdam July 8. Mr. Benedict plans to visit nearly every country in Europe, returning to America some time in the early autumn.

A. A. Thorsell, for some time connected with the engineering department the Rockford Machine Tool Co., Rockford, Ill., has been promoted to sales manager of that company, with headquarters at Rockford.

F. G. Peterson, for five years managing superintendent of foundries, Bucyrus Co., South Milwaukee, Wis., has resigned to accept the position of general superintendent Hercules Steel Casting Co., Milwaukee, succeeding Frank E. McIntyre, who has returned to the National Brake & Electric Co., Milwaukee. The Hercules company resumed operations July 5 with a normal force after being idle nearly a year.

Frank H. Reynolds, vice-president, general manager and director of the Crawford & McCrimmon Co., Brazil, Ind., has disposed of his holdings in that company and has tendered his resignation. It is understood Mr. Reynolds will take up similar duties with an Eastern company.

L. H. Bloom of the Hart-Parr Co., machinist and founder, Charles City, Iowa, has been promoted to general sales manager to succeed Walter F. Frederickson, resigned to go with another company.

Walter S. Frederickson, until recently general sales manager Hart-Parr Co., Charles City, Iowa, has been appointed sales manager of Auburn Motor Co., Auburn, Ind.

Charles C. Boyden, for a number of years employed by B. Nicoll & Co., New York, and later by the Alan Wood Iron & Steel Co., Philadelphia, has returned to the service of the former company as a pig iron salesman.

Silas H. Horn, formerly with the Brass & Bronze Co., Toledo, Ohio, is chief engineer for the Johnson Bronze Co., at New Castle, Pa.

Joseph M. Harding has been appointed sales manager for the New England Tube & Stamping Co., Inc., at West Haven, Conn.

N. R. Seidle has been made works manager for the General Boilers Co., Waukegan, Ill.

British Pig Iron and Steel Output for June

LONDON, ENGLAND, July 11 (*By Cable*).—The production of pig iron in Great Britain in June was 269,200 gross tons and that of steel ingots and castings 400,200 tons. These compare with 407,900 tons of pig iron and 462,300 tons of steel ingots and castings in May. (The June pig iron production is the lowest for any month this year and steel figures are next to the lowest month this year. The average monthly production of pig iron for the first half of this year is 341,500 tons and of steel ingots and castings 427,100 tons.)

OBITUARY

JOHN M. GOODWIN, general manager New Process Twist Drill Co., Taunton, Mass., died on Tuesday, July 4.

PETER ECKEL, president Eckel-Nye Steel Co., Syracuse, N. Y., died July 7, aged 67 years. Mr. Eckel was born in Syracuse and after attending the public schools became connected with the steel business. In time he was made open-hearth superintendent of the Sweet Mfg. Co., of which the late William A. Sweet was head, and later continued with the reorganized Sweet Steel Co. About 1897, Mr. Eckel and his brothers and Francis H. Nye formed the Eckel-Nye Steel Co., which became one of the successful industries of Syracuse.

SAMUEL GEORGE GOSS, one of the founders of the Goss Printing Press Co., manufacturer of printing presses, Chicago, and president of the organization for many years, died at his home in Glencoe, Ill., June 29.

CHARLES PHILLIPS, superintendent of the Bridgeport Metal Goods Mfg. Co., Bridgeport, Conn., died at his home in that city on July 4 after a brief illness. Mr. Phillips, who was 59 years of age, was at one time connected with the local plant of the Bridgeport Brass Co., resigning to accept the position he held at his death.

CHARLES CROMPTON, son of the founder of the Crompton Loom Works, Worcester, Mass., which eventually became the Crompton & Knowles Loom Works, of which he was vice-president, died June 5, at his home after a long illness, in his fifty-sixth year.

ROBERT BORLAND, senior member of the firm of Borland Brothers, Providence, R. I., machinists, died July 6, at his home.

W. H. HOLLAND, president and general manager, Sibley Machine Co., South Bend, Ind., died on June 14.

FRANK L. MITCHELL, one of the founders of the Mitchell & Lewis Wagon Co., Racine, Wis., which later became the Mitchell-Lewis Motor Car Co., predecessor of the present Mitchell Motors Co., Inc., died at Santa Barbara, Cal., July 3, aged 70 years. He was born in Kenosha, Wis., Dec. 4, 1852. Mr. Mitchell retired from active business in 1912.

PAUL JONES, 84, for many years identified with the iron and steel industry of the Mahoning Valley, died July 8 at Youngstown, Ohio. He served at one time as general manager and subsequently as secretary-treasurer of the William Tod Co., whose plant has since been absorbed by the United Engineering & Foundry Co., Pittsburgh. He was later a vice-president and director of the old Youngstown Steel Co., which has since been absorbed by the Sharon Steel Hoop Co., Sharon, Pa.

W. H. HOLLAND, president and general manager Sibley Machine Co., South Bend, Ind., died June 14.

EDWIN B. ADT, 53 years old, secretary John B. Adt Machinery Co., Baltimore, died June 27. His brother, Albert W. Adt, is president of the machinery company.

CHARLES F. MCGILVRAY, Springfield, Ohio, former president and general manager of the Robbins & Myers Co., died at his home in that city on June 27. He was born in Peterboro, N. H., Jan. 22, 1849, and had resided in Springfield since 1884.

DAVID D. FARIS, manager marine department, Westinghouse Electric & Mfg. Co., Pittsburgh, died suddenly in his office shortly after returning from lunch, July 10. He was born in Wheeling, W. Va., and prior to associating himself with the Westinghouse company in 1904, had been with the Carnegie Steel Co. at Bellaire, Ohio; the National Tube Co. in Pittsburgh; the National Cash Register Co. in Dayton, Ohio, and the Pressed Steel Car Co. in McKee's Rocks, Pa.

COKE REGION VIOLENCE

Increasing Disturbances Due to Strike More Importation

UNIONTOWN, PA., July 8.—Production of coal for the week ending last Saturday, according to estimates made public the middle of this week, showed an increase of 2,160 tons over the preceding week. This week will probably show a substantial gain over last week, although figures will not be available until the middle of next week.

Union strength in the county has shown no gain, despite intensive efforts on the part of organizers during the week. The first big picnic of the United Mine Workers was held at Shady Grove Park, near Uniontown, to-day and there was a large attendance. Addresses were made by several of the organizers.

Sporadic "sniping" in the way of dynamite explosions with resultant damage to property is growing throughout the county. The Fairchance territory is the most seriously affected thus far, and authorities are exerting every effort to round up the ring leaders. The work is that of organized gangs, according to the officers, who are using automobiles in their raids upon property of working miners. So far there have been no casualties, but property has been damaged and workers have been threatened.

The first of the dynamitings within the city of Uniontown developed during the week when the porch at the home of J. W. Dawson, a prominent lawyer.

The H. C. Frick Coke Co., over the signature of R. S. Skemp, superintendent of Kyle works, is offering $500 for information leading to the arrest and conviction of the dynamiters.

Importation of workers into the region is being continued and places of striking miners are rapidly being filled. Evictions also are continuing, although many strikers are voluntarily moving from company properties. Probably 1000 families have been evicted.

Activities of the union organizers have been directed to maintaining their men in line. Much stress has been laid upon the Washington conferences with the declaration that the strike would soon be settled but would not be settled by the union without the sympathetic strikers in this region being taken care of. The outcome is being watched with interest. Operators in the region here will not recognize the union.

Higher Coal Prices

YOUNGSTOWN, July 10.—Coal prices have appreciably stiffened in the past two weeks. West Virginia and Kentucky coal is firm at $3.50, while some mines are asking $3.75. Prices of coal in the Pittsburgh district show considerable variation, ranging from $4.25 and $4.30 to $4.75. On account of the lower freight charge from the Pittsburgh territory to the Valleys, increased tonnages are moving into the Valleys from that district.

As demand for coal for Northwest consignment strengthens, and diverts supplies that would be otherwise available for industrial uses, it is expected steel companies will enlarge operations at their Pennsylvania mining properties. The Republic Iron & Steel Co., Trumbull Steel Co. and Youngstown Sheet & Tube Co. are obtaining supplies from their mines, but the properties of the Brier Hill Steel Co. are still idle.

Failed to Respond

An attempt on the part of Commissioner C. B. Connelley, Pennsylvania Department of Labor and Industry, to bring about a meeting of Pennsylvania operators of union coal mines and officials of the miners' union at the William Penn Hotel, Pittsburgh, July 6, for the purpose of discussing terms of settling the strike, was not successful. While there was a full attendance of the operators of the bituminous mines, the officials of the miners' union failed to appear.

Machinery Markets and News of the Works

RAILROADS ARE BUYING

Substantial Orders Placed by the Atchison, Topeka & Santa Fe

Illinois Central Expected to Place Orders This Week—New York Central Inquiries Increase

When the coal strike and the railroad shop mechanics' strike are ended, it is expected that the railroads will buy machine tools in generous lots. The Atchison, Topeka & Santa Fe has ignored the shopmen's strike and within the past week has placed orders totaling $75,000 or more. If all of the tools for which this road has inquired in the past few months are purchased, the aggregate will be considerably larger.

The Illinois Central Railroad, which also has inquired for a large list of tools, is expected to begin the placing of orders this week, while in the case of the Chicago, Burlington & Quincy the opinion of the Chicago machine-tool trade is that action will be deferred until a settlement of the railroad strike is in sight.

The New York Central has sent out additional inquiries and the tools for which this road is now definitely in the market total 40 or 50.

The Newport News Shipbuilding & Dry Dock Co., Newport News, Va., will probably place orders within a week for about $100,000 worth of new equipment for extensions to its car department. Included in its requirements are a hydraulic press, hydraulic riveters, two coping machines, a bulldozer and other machines and several overhead electric cranes.

A good many of the orders now being received come from companies engaged in manufacturing automobiles or parts. The Studebaker Corporation is expected to buy additional equipment for its South Bend, Ind., shops, while the Continental Motors Co., Muskegon, Mich., is likewise counted upon as a buyer of more tools.

The General Electric Co. has inquired for seven lathes and six shapers for its Schenectady, N. Y., plant, and a special boring mill for Pittsfield, Mass.

The Jones & Laughlin Steel Co., Pittsburgh, has bought new equipment for a repair shop recently destroyed by fire.

Purchases of tools by the New Castle, Pa., Board of Education total more than 20 items, of which lathes formed the largest part.

Notwithstanding recent price advances, some reductions have been announced. Three makers of upright drills have named new prices about 10 per cent lower.

New York

NEW YORK, July 11

With many orders of machine tools June was the best month in a year and a half, sales during that period exceeding those of May, which up to that time had been the best month since the industrial depression began. Prospects for continued improvement appear to be excellent, but the immediate situation is somewhat clouded by the uncertainties engendered by the coal and railroad strikes. The expectation of the trade is that by next fall the machine-tool industry will be well on the road toward a normal volume of business.

Buying is still very much confined to single tools, or at the most two or three machines. Inquiries the past week have not been numerous, but there is a fairly substantial amount of business pending on which quotations have gone out in the past month.

The New York Central Railroad is sending out inquiries every few days for tools and its known requirements now total 40 to 50 machines. Except for a few machines ordered late in June [illegible]

Bids were closed last week by the Essex County Vocational Schools, Newark, on a list of about 20 machines, and it is expected that orders will be placed this week.

The General Electric Co. has inquired for seven 16-in. lathes and six shapers for its Schenectady, N. Y., plant and for a special boring mill for Pittsfield, Mass.

The Department of Street [illegible] New York, has inquired for three 12-in. lathes for its repair shops.

The Liberty Machine Tool Co., Hamilton, Ohio, has appointed the McCabe & Sheeran Machinery Corporation, 50 Church Street, its selling agent for the New York territory. The item in the issue of July 6, referring to a sale of two used Liberty frog and switch planers by this company to the Ramapo Iron Works, Hillburn, N. Y., was incorrect in that the planers were not second-hand but new.

Axel Lindstrom, manufacturer from Cape Town, South Africa, is at the Hotel Astor, New York, and is purchasing machinery for his factory. Mr. Lindstrom, in a newspaper interview, said that "[illegible] I find no machinery that compares with that of American manufacture. I believe American machinery is so good because your people are always on the lookout for new things and are ready to experiment and adopt innovations."

The Wilson Welder & Metals Co., New York, has received a repeat order from the Cambria Steel Co., Johnstown, Pa., for six plastic arc welding machines.

Following last week's activity in purchases of electric overhead and locomotive cranes, the market has quieted down. However, the present dullness is apparently only temporary in this district, as prospects of good business are reported from other territories. Among the current inquiries in this market is one from the J. G. White Engineering Corporation, 43 Exchange Place, New York, calling for a 60-ton, 4-motor crane with 10-ton auxiliary, for a power house at Pine Grove, Pa. The Boston Elevated Railroad, 108 Massachusetts Avenue, Boston, asked for quotations on a traveling larry, capable of carrying two 10-ton hoppers of crushed coal, bids on which closed July 10.

Among recent purchases are: Long Island Railroad, New York, a 150-ton, 5-motor, locomotive handling crane, and the Southern Pacific Co., a 20-ton, 32-ft. span 3-motor gantry crane from the Whiting Corporation Erie Railroad, for Hornell, N. Y., shops two 15-ton electric cranes from the Champion Engineering Co.; Mount Vernon Car Mfg. Co., Mount Vernon, Ill., a 20-ton, 50-ft. boom locomotive crane equipped with bucket and magnet generator from the Industrial Works; Georgia Marble Co., Tate, Ga., two 1-ton "Liftabout" electric hoists, two 2-ton and one 3-ton electric hoists, two 2-ton and two 1-ton single I-beam cranes from the Shepard Electric Crane & Hoist Co., which has also sold three 10,000 lb. and one 2000 lb. car hauling winches to the Baltimore Car & Foundry Co., Curtis Bay, Md.; Clarence Cottman Co., Canton Terminal, Baltimore, Md., an 11-ton, man trolley ore bridge from Heyl & Patterson, Inc.; American Dyewood Co., Chester, Pa., a 12-ton locomotive crane with bucket from the Orton & Steinbrenner Co.

The Westchester Lighting Co., First Avenue, Mount Vernon, N. Y., will soon take bids for the erection of a two-story shop on East Seventh Street for electric meter repair work, with department for automobile service and repair for company cars. A portion of the building will be used as

a store department. It is estimated to cost about $250,000. William C. Morris, 130 West Fifteenth Street, New York, is architect.

The Anaconda Copper Co., 25 Broadway, New York, has acquired 9 acres at Betts Corner, Akron, Ohio, as a site for a new zinc and lead plant to be owned and operated by its subsidiary organization, the International Lead Co. The plant is estimated to cost close to $1,000,000, including machinery.

Thomsen & Co., 90 Wall Street, New York, commission merchants, are making inquiries for four radial drilling machines, universal type.

S. M. De Pasquale, 2975 Marion Avenue, New York, will soon call for bids for a one-story automobile service and repair works on Webster Avenue, 122 x 170 ft., estimated to cost about $120,000. S. J. Kessler, 529 Cortland Avenue, is architect.

Fire, July 6, destroyed the coal pocket and equipment of the Wyoming Valley Coal Co., 1181 Grand Street, Brooklyn, with loss estimated at about $45,000. Headquarters are at 163 Sixth Street, Brooklyn.

A. H. Grebe & Co., Inc., 10 Van Wyck Avenue, Jamaica, L. I., manufacturer of wireless instruments and equipment, has awarded contract to the Barney Ahlers Construction Co., 110 West Fortieth Street, New York, for a three-story addition, 80 x 100 ft., estimated to cost about $100,000, including equipment.

The B. F. Goodrich Co., 1780 Broadway, New York, with plant at Akron, Ohio, is disposing of a bond issue of $20,000,000, a portion of the proceeds to be used for extensions and improvements. B. G. Work is president.

The Clayton Co., 136 West Fifty-second Street, New York, manufacturer of automobile bodies, has leased the eight-story and basement building at 427-31 West Forty-second Street, 69 x 100 ft., for a new plant.

The Department of Plant and Structures, Municipal Building, New York, G. A. Wahlen, commissioner, has withdrawn bids recently asked for the construction of a machine and repair works for the Department of Street Cleaning, at Sixteenth Street and Avenue C, and will call for new bids at an early date. It will cost in excess of $75,000.

The New York & Queens Electric Light & Power Co., Electric Building, Long Island City, will commence the erection of a new one-story power house, 100 x 120 ft., at Maspeth, L. I., to cost about $50,000.

The Cities Service Co., 60 Wall Street, New York, operating electric light and power companies, is arranging a fund of more than $1,000,000 for extensions and improvements in the power plants and system of the Ohio Public Service Co. The plant of the Toledo Edison Co., a subsidiary, Toledo, Ohio, will be extended for an increased capacity of 30,000 kw.

The Long Island Railroad Co., Pennsylvania Terminal, New York, will commence the immediate construction of a new crane runway at its shops.

The General Electric Co., Schenectady, N. Y., has completed plans for the erection of a new building, to be known as Building No. 99. This will make a total of 311 plant structures on a site of 438 acres.

A new two-story power house, 48 x 68 ft., will be constructed at the New York Homeopathic Medical College and Flower Hospital, Avenue A, Sixty-third to Sixty-fourth streets. Francis T. Joanes, 16 East Fortieth Street, is architect.

Motors, controlling devices, and other equipment will be installed in the proposed nine-story printing and publishing plant, to be constructed at 147 West Fiftieth Street, by Street & Smith, 79 Fifth Avenue, New York. H. O. Chapman, 334 Fifth Avenue, New York, is architect and engineer.

H. Waterman & Brother, 195 Lewis Street, New York, manufacturer of gas stoves, radiators, etc., have incorporated as Henry Waterman & Brother, Inc., under State Laws, with capital of $250,000, for general expansion.

The Daniels Motor Car Co., Reading, Pa., will establish a complete service and repair works in Brooklyn, to be operated as a factory branch for the Long Island district. Philip Jackson has been appointed manager.

Durant Motors, Inc., 1819 Broadway, New York, is concluding negotiations for the purchase of the plant and business of the Locomobile Co., Bridgeport, Conn., for about $2,000,000. The latter company is now in receivership.

The Mandel-Ehrich Corporation, New York, has acquired the building on East Eighty-eighth Street, near Park Avenue, extending through to East Eighty-ninth Street, for the establishment of an automobile service building, with repair works. Plans are being drawn for three additional stories to the one-story structure.

A vocational department will be installed in the new three-story high school, 270x277 ft., for which foundations will be laid at once at Cedarhurst, L. I., estimated to cost about $200,000. William Adams, 15 West Thirty-eighth Street, New York, is architect.

The Mexican Petroleum Co., Ltd., 120 Broadway, New York, will make extensions and improvements in its oil terminal and distributing plant at Mata Redonda, Mexico, to cost about $300,000, including equipment.

The Utica Motor Car Co., Genesee Street, Utica, N. Y., will take bids about July 15 for an addition to its service and repair building, estimated to cost about $100,000. Linn Kinne, 113 Mayo Building, is architect.

The Board of Water Commissioners, East Orange, N. J., will take bids until July 20, for the following equipment in connection with extensions to the municipal water system: One watertube steam boiler, 132-hp. capacity; two engine-driven electric generators, each of 120 kva. capacity; one steam turbine driven centrifugal pump, 2,000,000-gal. capacity, complete with condensing equipment; three or more motor-driven centrifugal or reciprocating deep well pumps, each about 1,000,000-gal. capacity; two condensers and vacuum pumps for unaflow steam engines; electric switchboards, transformers annd auxiliary equipment; and electric transmission equipment. Nicholas S. Hill, Jr., and S. F. Ferguson, 112 East Nineteenth Street, New York, are consulting engineers. Roswell M. Roper is secretary.

The Newark Scale Works, 10 Hobson Street, Newark, N. J., has acquired property at 14 Hobson Street, 25 x 100 ft., for the erection of an addition.

Motors, conveying machinery, and other equipment apparatus will be installed in the four-story addition to be erected by the Union Steam Laundry Co., 888 Broad Street, Newark, N. J., in the rear of its present plant, estimated to cost about $100,000, including machinery. William E. Lehman, 738 Broad Street, is architect.

Cressi Brothers, 735 Landis Avenue, Vineland, N. J., will build a new two-story automobile service building, with repair shop, 50 x 170 ft.

Chicago

CHICAGO, July 10.

Railroad buying has commenced, with the prospect of a succession of heavy purchasing during the month. The Santa Fe has closed for part of its list and is still placing orders. Its purchases so far involve an expenditure of about $75,000 and cover some of the heavier tools, including a car wheel lathe, axle lathe, driving wheel lathe, two boring mills, an 18-in. and a 24-in. engine lathe, shaper, a number of drill presses and miscellaneous equipment. The Illinois Central is expected to distribute orders this week, but action on the first of the two Burlington lists has been delayed because the attention of mechanical department officers has been diverted by the shopmen's strike. The Northern Pacific has ordered a No. 2-A Warner & Swasey turret lathe.

Dealers report continued improvement in business with orders coming from diversified sources. The Studebaker Corporation, South Bend, Ind., is expected to buy additional equipment and further orders are looked for from the Continental Motors Co., Muskegon, Mich. Local machine houses are particularly encouraged by the volume of inquiry, although it is still true that in many cases prices on used machines are asked for. Notwithstanding recent advances in a number of standard machines, a few reductions are reported this week. The Royersford Foundry & Machine Co., Inc., Royersford, Pa., has reduced upright drills, emery grinders and foot presses 10 per cent. The Champion Blower & Forge Co., Lancaster, Pa., announces a reduction of 10 per cent on 20-in. upright drills and a similar cut has been made on upright drills by the Silver Mfg. Co., Salem, Ohio.

Although there is considerable pending crane business, there have been few recent orders. The Santa Fe has placed a 240-ton screw jack locomotive hoist with the Whiting Corporation for the Gulf, Colorado & Santa Fe lines. James O. Heyworth, engineer and contractor, Chicago, has ordered a Whiting 40-ton overhead electric traveling crane for a new power plant at Jim's Falls, Wis.

The Battery Parts Corporation, 1408 Cortland Street, Chicago, has been incorporated with $25,000 capital stock to take over the business of the Battery Parts Mfg. Co. It manufactures storage battery separators and is not in the market for additional equipment. The officers are R. H. Starbuck, president, and A. J. Pierson, secretary and treasurer.

The Radio Industries, Inc., 82 West Washington Street, Chicago, recently incorporated, has leased space for the manufacture of metal specialties. It has not yet placed orders for equipment.

J. M. Kryl, president Kryl Bridge & Crane Co., Chicago.

and W. H. Eichelman, until recently chief engineer Hamler Boiler & Tank Co., Chicago, have formed a partnership under the name of Kryl & Eichelman, with headquarters at 2906-2918 West Twenty-sixth Street, Chicago, and will engage in the fabrication of water tanks, oil tanks, stacks, process kettles for chemical equipment, and ornamental and structural iron and steel.

The Western Newspaper Union, 200 North Third Street, Minneapolis, Minn., has taken bids for a two-story printing plant and office building, 46 x 134 ft., at 316 East Avenue, South, to cost $100,000.

The Chicago & Northwestern Railroad has let contract for the construction of a 12-stall engine house at Ashland, Wis.

The Chicago, Burlington & Quincy Railroad has taken bids on a six-stall engine house at Rock Island, Ill.

The Minneapolis, St. Paul & Sault Ste. Marie Railroad will rebuild its 16-stall round house at Gladstone, Mich., recently destroyed by fire.

The Witwer Battery Co., 630 St. Louis Street, Danville, Ill., recently incorporated with $500,000 capital stock, will manufacture automobile and radio semi-dry storage batteries. It has a new two-story plant, 47 x 70 ft., and will build a one-story addition, 52 x 127 ft. It has not yet decided on the equipment it will purchase. The officers are: President, H. T. Witwer; vice-president and treasurer, G. H. Keeley; secretary, F. M. Witwer.

The Duke Nut Lock Co., 69 South Water Street, Chicago, incorporated with $10,000 capital stock, is buying dies and letting out the manufacturing on contract of the Duke nut lock. The officers are: President, George H. Duke; vice-president, George E. Gibson; secretary-treasurer, George H. Duke, Jr.

Cribben & Sexton, manufacturers of stoves, 680 North Sacramento Boulevard, Chicago, have let contract for a one-story factory, 24 x 45 ft., at 716-24 Sacramento Boulevard, to cost $4,000.

The Ryan Car Co., repairer of railroad freight equipment, Hegewisch, Ind., is erecting a one-story extension to its power house, 30 x 60 ft., to cost $6,000.

The Plano Works of the International Harvester Co., West Pullman, Ill., is being repaired and enlarged. The Plano machine shop is being rehabiliated and the foundry building will be used hereafter as the heat-treating department.

O. V. Palmquist & Co., manufacturer of sash, doors and blinds, 4884 North Clark Street, Chicago, has let contract for a one-story factory, 60 x 163 ft. at 5915-23 Ravenswood Avenue, to cost $10,000.

The machine shops of the Denver & Salt Lake Railroad, Denver, Colo., were partially destroyed by fire July 4. The damage is estimated at $60,000, including equipment.

The Atlas Iron Works Corporation, 351-9 West Fifty-ninth Street, Chicago, has been incorporated with $25,000 capital stock to fabricate structural, ornamental and miscellaneous iron work. A plant, 100 x 100 ft., on a site, 100 x 265 ft., has been purchased. The officers are: President, T. F. Husmann; secretary, H. Kitzelman, and treasurer, C. Chapman. The company is in the market for a structural punch and shear and a riveter.

The Chicago Hardware Co., North Chicago, Ill., is taking bids for a one-story addition, 70 x100 ft., to be equipped as an enameling works, estimated to cost close to $45,000. Shankland & Pingrey, 209 South La Salle Street, Chicago, are architects.

The National Enameling & Stamping Co., 411 Fifth Avenue, New York, has plans nearing completion for an addition to its plant at Granite City, Ill., estimated to cost close to $1,000,000, including equipment. George W. Niedringhaus is president.

The Zenith Furnace Co., Duluth, Minn., has arranged for a bond issue of $1,000,000, a portion of the proceeds to be used for extensions and improvements. W. B. Castle is president.

The Buick Motor Co., 2031 Calumet Avenue, Chicago, has filed plans for a two-story service and repair building at 2021-29 Calumet Avenue, estimated to cost about $125,000.

A vocational department will be installed in the two-story and basement senior high school, 77 x 170 ft., to be erected at Alliance, Neb., estimated to cost about $175,000. Fiske & Meginnis, 533 Bankers' Life Building, Lincoln, Neb., are architects.

The Northwest Paper Co., Cloquet, Minn., is considering the installation of a traveling crane.

The Cabirange Mfg. Co., Granite City, Ill., manufacturer of stoves, ranges, etc., is having revised plans prepared for a new one-story plant at Twenty-fourth Street and Avenue A. Charles Pauley & Son, Nineteenth Street, are architects.

A vocational department will be installed in the new one and two-story high school to be erected at Arlington Heights, Ill., estimated to cost about $100,000, for which bids will soon be asked. J. N. Coleman, 6257 St. Lawrence Avenue, Chicago, is architect.

The Common Council, Whitehall, Ill., will soon call for bids for extensions and improvements in the municipal electric power plant, estimated to cost about $75,000. The Caldwell Engineering Co., Ayers Bank Building, Jacksonville, Ill., is engineer.

The Racine Horseshoe Tire Co., Racine, Wis., is disposing of a bond issue of $300,000, a portion of the proceeds to be used for extensions and improvements. J. C. Lawrence is president.

A vocational department will be installed in the two-story and basement junior high school at Grand Rapids, Minn., to be 70 x 180 ft., and estimated to cost about $250,000. Bids for erection are being asked. Holstead & Sullivan, Palladio Building, Duluth, Minn., are architects.

The Atlas Power Co., duPont Building, Wilmington, Del., has plans under way for an addition to its plant near Pinckneyville, Ill., estimated to cost about $100,000, including equipment. It will replace a portion of the works recently destroyed by fire. I. K. O'Brien is engineer in charge.

Philadelphia

PHILADELPHIA, July 10.

Proctor & Schwartz, Inc., Seventh Street and Tabor Road, Philadelphia, manufacturer of drying machinery, has filed plans for the erection of a one-story machine shop, estimated to cost $100,000, including equipment.

The Heintz Mfg. Co., Philadelphia, has taken out a State charter with capital of $300,000, to manufacture heavy metal stampings and other products. Work will begin on two one-story buildings, 73 x 205 ft., and 26 x 36 ft., respectively, at Front and Olney Streets. Leo I. Heintz, 2120 West Tioga Street, is president, and R. P. Farrington, Bala (Montgomery County), treasurer.

The Charles P. Hoffman Co., 215 Cuthbert Street, Philadelphia, operating an electro plating works, has leased two floors in the building at 311 Cherry Street for extensions.

Max Levy & Co., Wayne Avenue and Berkley Street, Philadelphia, manufacturer of equipment and supplies for photoengraving, has plans under way for a new four-story addition, 60 x 100 ft. Louis Levi, Real Estate Trust Building, is architect.

The Horn & Brannen Mfg. Co., 427 North Broad Street, Philadelphia, manufacturer of gas and electric fixtures, has acquired property, 84 x 208 ft., at 1814-16 Spring Garden Street, for about $100,000. The present building will be remodeled and improved and an addition erected in the rear.

Fire, June 30, destroyed a portion of the plant of the Textile Machinery Co., Fourteenth and Esrey streets, Chester, Pa., occupying part of the building, with loss reported in excess of $50,000.

Horace T. Potts & Co., 316 North Third Street, Philadelphia, iron and steel manufacturers and merchants, are laying foundations for a new machine shop and power house. Two warehouses will be built, 75 x 370 ft., and 120 x 192 ft., respectively, to be equipped with electric traveling cranes, from 7½ to 3-tons capacity. The entire plant will represent an investment of about $500,000.

The Pennsylvania Railroad Co., Broad Street Station, Philadelphia, has plans under consideration for new car and locomotive shops, and extensions in present shops in different parts of the State. An appropriation of $3,000,000 has been arranged, it is said, for the expansion.

The Philadelphia Electric Co., Tenth and Chestnut streets, Philadelphia, is clearing the site at 5607 Race Street, preparatory to the erection of a new power house, plans for which have been drown.

The Concrete Steel Co., 42 Broadway, New York, manufacturer of steel and wire products, will commence the erection of a one-story addition to its plant at Seventeenth and Federal streets, Camden, N. J.

The Trenton Electric Supply Co., 207 East State Street, Trenton, has purchased property at 233 East State Street, 21 x 150 ft., for future expansion. Charles F. McCoy is president.

Bids will soon be asked for a one-story power house at the Mark M. Packer Hospital, Third and Market streets, Sunbury, Pa. W. H. Rockefeller, 214 Market Square, is architect.

The Williamsport Wire Rope Co., Williamsport, Pa., is disposing of a bond issue of $600,000, a portion of the proceeds to be used for expansion. Joseph W. Cochran is president.

Fire, July 1, destroyed the plant of the Storb Crushed Stone Co., Pine Forge, near Pottstown, Pa., including crush-

ing and other machinery, with loss estimated at about $75,000.

The Board of Education, Dowington, Pa., is arranging a list of equipment for installation in the vocational department at the new high school.

The Pennsylvania Water & Power Co., Holtwood, Pa., has arranged a bond issue of $850,000, a portion of the proceeds to be used for extensions and improvements in power plant and system.

The Pottstown Machine Co., Pottstown, Pa., manufacturer of machinery and parts, has plans under way for enlargements, to cost about $50,000. John R. Saylor heads the company.

A vocational department will be installed in the new three-story and basement high school to be erected at Shippensburg, Pa., estimated to cost about $200,000, for which J. A. Dempwolf, Casset Building, York, Pa., architect, will prepare plans.

The Wilkes-Barre Co., Wilkes-Barre, Pa., operating a local light and power plant, has arranged for a bond issue of $402,900, a portion of the proceeds to be used for extensions and improvements.

The Roberts & Mander Stove Co., Eleventh and Washington streets, Philadelphia, has awarded contract to the Austin Co., Bulletin Building, for a new one-story plant, 130 x 155 ft., at Hatboro, Pa.

The Cresson Township Power Co., Cresson, Pa., is being organized by Philadelphia interests, to construct and operate a power house and system in this section. Application for a State Charter will be made on July 17. James Collins Jones, Bullitt Building, Philadelphia, represents the company.

New England

BOSTON, July 10.

No business of importance transpired in the New England machine tool market the past week. Sales were confined to a very few single tools, mostly used, to diversified manufacturing interests. This condition is ascribed to the fact that the machine tool trade took a long holiday over July 4, as well as that a number of industrial plants considering the purchase of metal-working equipment, especially in the Connecticut district, have been closed for inventory and other purposes. The three New England railroads inquiring for equipment have temporarily postponed purchases, due to the strike. Local machine-tool dealers are still confident that a turn for the better has come and that several pending sales will be closed this week.

Plans have been filed with the Springfield, Mass., building authorities for a one-story and basement machine shop to be erected at Fisk Street and Roland Avenue by the Connery Machine & Tool Co.

The city of Providence, R. I., will erect a one-story, 67 x 124 ft. addition to its trade school on Dodge Street.

The Malden Cotton Tie Co., 59 Clinton Street, Malden, Mass., has begun, in a small way, the manufacture of remade cotton ties. Plant extensions are in order, but details have not been completed.

Joseph Richards, Elm Street, Southbridge, Mass., has purchased property, 100 x 200 ft., on which he and others will erect a plant to manufacture knives. Mr. Richards for several years was associated with the Richards Knife Co.

The Murray-Tregurtha Corporation, Boston, which is included in a merger of various properties under the name of the Associated Motor Industries, a $80,000,000 consolidation, maintains a plant on the Neponset River, Atlantic, Quincy, Mass. During the war the company did considerable motor construction work for the Government and since has confined its activities largely to motor building.

The Sexton Can Co., 31 Cross Street, Everett, Mass., plans at an early date to build an addition sufficiently large to give employment to 100 extra men, which will bring the number up to 350. Contract for the addition has not been let as yet.

The Boston Sand & Gravel Co., 88 Broad Street, Boston, has filed plans for a one-story machine shop at 300 Condor Street.

The National Metal Seal Co., Morrills Corner, Portland, Me., has preliminary plans for rebuilding the portion of its plant destroyed by fire, June 16, with loss estimated at $400,000. The burned structures included the machine shop, press and other departments.

A vocational department will be installed in the two-story high school to be erected at Berlin, Conn., estimated to cost about $150,000. R. B. Showalter, superintendent of schools, is in charge.

The Kant-Luz-It Clip Co., Fitchburg, Mass., has leased the third floor of a local building for the manufacture of metal pen and pencil clips, and other metal specialties.

The Spaulding Mfg. Co., Chicopee, Mass., will soon commence the construction of a new power house at its factory. Jackson & Moreland, 387 Washington Street, Boston, are engineers.

The United Electric Railways Co., Providence, R. I., will build a new car barn and shop, 60 x 75 ft., to cost about $60,000.

A machine shop and other manual training departments, with complete mechanical laboratories will be installed in the new Thomas Snell Weaver high school, Hartford, Conn., to be 200 x 500 ft., and estimated to cost about $1,250,000.

A three-story vocational training and trade school, 70 x 120 ft., will be constructed on South Main Street, New Britain, Conn., estimated to cost about $150,000. Max Unkelback, 162 Main Street, is architect. Stanley J. Holmes is superintendent of schools.

The Pejepscot Paper Co., Brunswick, Me., has tentative plans for the erection of an addition at Pejepscot, Me., estimated to cost close to $1,000,000, including machinery, power equipment, etc.

The Beacon Oil Co., Beacham Street, Everett, Mass., has filed plans for the erection of a one-story addition to its machine and mechanical shops. It will also commence the immediate erection of a new one-story pumping plant.

The Monarch Mfg. Co., Bellows Falls, Vt., has preliminary plans under way for a new paper mill, 80x100 ft., estimated to cost about $50,000.

The Clark Brothers Bolt Co., Milldale, Conn., has awarded contract to the H. Wales Lines Co., Meriden, Conn., for a one-story addition, 50 x 104 ft.

Pittsburgh

PITTSBURGH, July 10.

While it would be an exaggeration to say that the local machine-tool business is active, it is true that there is a fairly good turnover, especially by manufacturers' representatives who maintain warehouses or showrooms. One house with such facilities the past week sold off the floor a 60-in. production milling machine, a 24-in. shaper and a good-sized lathe. From the first of the year this firm has been enjoying a much better business than those merely maintaining offices here. In a market such as had existed for more than a year, it is apparently an advantage to show buyers what they will get. The Jones & Laughlin Steel Co. in the past fortnight closed for considerable machinery for the re-equipment of the machine shop destroyed by fire several weeks ago. The purchases were almost entirely duplications of the destroyed tools and there was no open competition. The Pittsburgh Board of Education has not yet made awards against the list on which bids closed June 20, but action is expected soon. The McKeesport, Pa., school board will open bids July 13 on several tools for its manual training school. The New Castle, Pa., school board has closed on practically all of the tools on a list put out a few weeks ago. All bids on a shaper were thrown out and new bids asked, to close July 13. The order includes 11 lathes and almost all makes shared in the business. There were three 11-in. South Bend lathes, one 18-in. Oliver, one 13-in. Star, one 14-in. Sidney, one 14-in. Lodge & Shipley, one 14-in. Monarch, one 14-in. Willard, one 14-in. American and one 14-in. Reed Prentice. The Somers, Fitler & Todd Co., Pittsburgh, were awarded a compressor, milling and drilling machine, floor grinder, soldering furnace and much of the miscellaneous supplies.

A 5 per cent advance in radial drills has been announced by leading makers and the general drift of prices is away from the levels which recently prevailed, due to the increase in costs brought about chiefly by the coal strike. The crane market reflects a fair amount of interest by buyers, though the complaint of sellers is that there is considerably more prospective than actual business. The Northern Engineering Works, Detroit, lately took two 3-ton cranes and two 3-ton, 2-motor hoists for the American Laundry Machine Co., Cincinnati; also two 7½-ton heavy duty mill type 2-motor hoists for the Toronto, Ohio, works of the Follansbee Brothers Co. The Champion Engineering Co., Kenton, Ohio, was the successful bidder for three semi-mill type, 15-ton cranes for the West Leechburg Steel Co. There is an inquiry for a 50-ton crane and a 15-ton crane, but the identity of the prospective buyer is withheld. Nothing yet has occured in connection with the cranes for the new National Tube Co.'s plant at Gary, Ind., and there is an impression that only the makers of such cranes as the company now is using and have proved satisfactory will be asked to bid. There is no sign of life as far as machinery and cranes are concerned, in connection with the plant which the Jones & Laughlin Steel Co. some time will build at Hammond, Ind.

The Atlantic Refining Co., Chamber of Commerce Building, Pittsburgh, has purchased about 7½ acres, adjoining

its oil refinery in the Lawrenceville section, for about $350,000. The property heretofore has been held by the Pittsburgh Malleable Iron Co. and will be used by the new owner for an addition to its plant. Plans are under way for rebuilding the portion of the refinery at Franklin, Pa., recently destroyed by fire with loss approximately $100,000. Headquarters are at 3144 Passyunk Avenue, Philadelphia.

The Federal Electric & Mfg. Co., 501 Chartiers Street, Pittsburgh, manufacturer of electric switches and kindred products, has purchased a four-story factory at McKees Rocks, Pa., for $60,000, and will occupy the building.

The Keystone Power Corporation, Ridgway, Pa., will commence the erection of a one-story addition to its power plant, 100 x 100 ft., estimated to cost about $200,000, including machinery.

The Borough Council, New Kensington, Pa., will receive bids until July 18, for a 30-ton garbage incinerator plant, complete with electrical equipment and other machinery. W. N. Jenkins is secretary.

In connection with an improvement program to cost about $1,000,000, the receivers for the Pittsburgh Railways Co., Pittsburgh, will purchase a quantity of mechanical equipment, including two double truck steel dump cars, estimated to cost $35,500; vacuum oilers; car barn and yard equipment; rails, electric lines, etc.

G. C. Cross, Sharon, Pa., is arranging for the purchase of equipment for installation in a new automobile service and repair works on South Dock Street. Construction is under way.

The Pennsylvania-Ohio Electric Co., New Castle, Pa., has arranged for the sale of $200,000 in bonds, a part of the proceeds to be used for extensions and improvements.

The City Taxi Co., Warren, Pa., is arranging a list of machinery and tools for installation in the repair department at its proposed automobile service works. R. Norris is general manager in charge.

The American Water Works & Electric Co., 50 Broad Street, New York, operating the West Penn Co., West Penn Building, Pittsburgh, and its recently acquired subsidiary, the Monongahela Power & Railway Co., West Virginia, is concluding arrangements for the purchase of the Potomac Public Service Co., operating at Hagerstown and Frederick, Md., and will consolidate this system with its other properties. Plans are under way for additions in power plants and systems of the different companies.

The H. C. Frick Co., Carnegie Building, Pittsburgh, will construct a new coal-loading plant and harbor on the Monongahela River, Luzerne Township. An underground electric railroad will also be built for transporting coal from the inland district to the new coal-loading plant.

The Chesapeake & Ohio Railroad Co., Roanoke, Va., has awarded contract to the Joseph E. Nelson & Sons Co., 3240 South Michigan Avenue, Chicago, for additions to its shops at Peach Creek, W. Va., consisting of an extension to the engine house; one-story machine shop, 60 x 75 ft.; one-story forge and blacksmith shop, 40 x 115 ft.; boiler washing plant, 60 x 90 ft. store house and oil works, 75 x 100 ft.; power plant and other structures. The expansion will cost about $350,000, including machinery. The company will also commence the erection of new coaling stations at Peach Creek, Raleigh and Thurmond, W. Va., and Clifton Forge and Charlottesville, Va., to be provided with coal crushers, screens, etc., and estimated to cost in excess of $225,000, complete. F. I. Cabell, Roanoke, is chief engineer.

The Western Pennsylvania Power Co., West Penn Building, Pittsburgh, will soon commence the erection of a one-story addition to its power plant at Ronceverte, W. Va., estimated to cost about $500,000, including machinery. The J. G. White Engineering Corporation, 43 Exchange Place, New York, is engineer.

The Board of Works, Morgantown, W. Va., will install power plant equipment, electric pumping machinery and other apparatus in connection with extensions and improvements in the sewerage system. The work is estimated to cost $750,000, and bonds for this amount are being arranged.

Buffalo

BUFFALO, July 10.

The Superintendent of Public Works, Albany, N. Y., is taking bids until July 25 for the construction of a crane runway, installation of electrical equipment and other mechanical work at the barge canal terminal, Syracuse, N. Y. Charles L. Cadle is superintendent.

The Peckham Vocational School, 321 Peckham Street, Buffalo, is soon to let contracts for the [illegible] machine shop and other equipment.

W. A. McDougal and R. E. Powers, receivers for the Ericsson Mfg. Co., 1100 Military Road, Buffalo, manufacturer of Magnetos and kindred equipment, will offer the plant and buildings for sale on July 25, comprising about 12 acres of land and buildings with total floor area of 75,000 sq. ft., fully equipped.

The Geneva Brick Products Corporation, Geneva, N. Y., is planning for the installation of new machinery. R. A. Catchpool is head.

A vocational department will be installed in the new Westside junior high school to be erected at Erie, Pa., for which bids will be asked late in August. It is estimated to cost about $500,000.

The Board of Commissioners, Buffalo, will take bids at once for a municipal incinerating plant, estimated to cost about $500,000, including equipment. Commissioner Kreinheder is in charge.

The Board of Education, 1401 Telephone Building, Buffalo, will receive bids until July 18 for steel lockers for installation at a number of schools. D. J. Sweeney is deputy superintendent in charge.

The Deer River Power Co., Copenhagen, N. Y., is arranging for the installation of equipment in a new machine shop.

The Rogers Heating Co., Ransomville, N. Y., is making inquiries for steam and hot water boilers of different sizes.

The City Council, Buffalo, has authorized the purchase of property on North Elmwood Avenue, the site to be used for the construction of a new vocational school, estimated to cost close to $500,000. Plans will be prepared at an early date.

The Genesee Light & Power Co., Batavia, N. Y., will make extensions and improvements in its power houses and system at Attica and Pembroke, to cost about $55,000.

Cleveland

CLEVELAND, July 10.

Local manufacturers of turret lathes, automatic machinery and drilling machines report a fair volume of business, mostly for single tools. Some small lot orders are coming from automobile and automotive accessory plants. The demand from the automobile builders appears to be largely for special machinery. No new inquiry of any size came out during the week.

Some dealers are getting a good volume of single tool orders but others report the demand a little less active than a few weeks ago. The call is more for new than for used machinery. No action has been taken as yet on the 30 tools required by the Cleveland Board of Education, for which bids were received last week. The American Steel & Wire Co., is inquiring for an angle iron bending machine.

Employment had increased 4.5 per cent on June 30 over May 29 in 100 of the largest local metal-working plants, including automobile works, according to monthly statistics gathered by the Cleveland Chamber of Commerce.

The demand for hydroelectric equipment shows a marked improvement. During the week the Power Construction Co. awarded a confract to the Allis-Chalmers Co., Milwaukee, for two 20,500 hp. turbines to operate under a 345 ft. head at 360 r.p.m., to be installed near Readsboro, Vt. The Allis-Chalmers Co., has also taken an order from the Minneapolis Utilities Co., for two 4000 hp. single vertical turbines with steel plate spiral casings. The Wellman-Seaver-Morgan Co., Cleveland, has taken an order from the Penobscot Power Co., for three 1000 hp. open flue single vertical turbines to operate under a 16 ft. head at 100 r.p.m., to be installed near Bangor, Me. The State of New York Development of Canal Power received bids July 10 for two 4000 hp. turbines, being the first units to be installed in canal water power development work along the Mohawk River above Cohoes, N. Y. These turbines will operate under a 26½ ft. head at 90 r.p.m. and will be placed in concrete spiral casings. Dothan, Ala., will receive bids July 15 for two 1500 hp. turbines.

The Geo. J. Hagan Co., has taken an order from the Link-Belt Co., Indianapolis, Ind., for an electric heat treating furnace and another from the Portsmouth Stove Co., Portsmouth, Ohio, for a furnace for baking stove parts. Both furnaces will be provided with General Electric heating equipment.

The Youngstown Board of Education has divided woodworking machinery for the new Rayen High school among the following: Strong, Carlisle & Hammond Co., Cleveland, $1,432; Oliver Machinery Co., Grand Rapids, Mich., $2,774.20; J. A. Fay & Egan Co., Cincinnati, $1,202.74; Cleveland Tool & Supply Co., Cleveland, $570.

John Z. Shunk, Bucyrus, Ohio, has purchased the Bucyrus plant of the Allen Motor Co., which was offered at auction a few days ago. The sale price was $25,000 for the building and real estate, not including the machinery.

The Reeves Mfg. Co., Dover, Ohio, is having plans pre-

pared for a one story factory and warehouse addition.

The Iten Fiber Co., Cleveland, has acquired the plant formerly occupied by the Cleveland Scissor Co., on East Sixty-seventh Street, and will engage in the manufacture of fiber products. It has purchased about $15,000 worth of metal-working machinery.

The Hodes-Zink Co., Fremont, Ohio, makers of automobile accessories, has leased a building at Tenth and Parade streets, Erie, Pa., for a branch factory. It manufactures automobile tops and other accessories. A. E. Blenner will be manager of the Erie plant.

The Safe Storm Shield Co., Fremont, Ohio, plans to erect a three story brick factory, 66 x 132 ft., to manufacture automobile tops and accessories.

The Industrial Steel Castings Co., Toledo, Ohio, has purchased a site adjoining its plant and contemplates the erection of two additional factory units, duplicating its present plant.

The Bowman-Vaughn Co., Lisbon, Ohio, manufacturer of wheel toys, will build a new plant 100 x [illegible] ft., controlled by the George H. Bowman Co., Cleveland, which at present operates three toy manufacturing plants in Ohio which will be merged in the new Lisbon plant.

The Arrow Motor Co., Sandusky, Ohio, recently incorporated to take over the Maibohm automobile plant in that city, has been organized by the election of A. C. Burch, president; Oliver P. Brace, vice-president; Joseph G. Pyle, secretary, and E. E. Ernst, treasurer. The board of directors includes the officers and R. E. Hayslett, treasurer Hydraulic Steel Co., Cleveland; E. G. Kirby and Stanley G. Hiatt, Toledo, and M. T. Brotherton, Detroit.

Cincinnati

CINCINNATI, July 1.

Practically all manufacturers report a slight improvement in the number of orders placed over the week previous. Some buying has been done by automotive industries and several small orders were booked by local manufacturers from a number of railroads. Two important railroad lists closed last week, but it is not expected that large buying will be done in the near future, as the railroad shopmen's strike is expected to have a dampening effect for the time being on purchases. Eventually, however, manufacturers look for the strike to prove somewhat of a boon to their industry. While buying of standard machines is showing only slight improvement, the increase in orders for special machines is fairly heavy. There is also a fair demand for punch presses and small portable electric tools. The price situation is tending upward, but no announcements of increases have been made since those of the radial drill manufacturers last week.

The Wadsworth Electric Co., Covington, Ky., has awarded contract for a one-story factory, 200 x 209 ft., to be erected in East Pike Street. It manufactures electrical supplies and when the new building is completed will increase its force to 300 men.

The Marietta Paint & Color Co., Marietta, Ohio, is having plans prepared for a factory to replace the one now in use at High Point, N. C. It will be four stories, 60 x 60 ft., and will consist of four units.

The Kentucky Wagon Works Co., Louisville, Ky., which is included in the merger of motor truck builders under the name of the Associated Motor Industries, is contemplating extensions to manufacture 4 and 6-cylinder automobiles.

The Wright Mfg. Co., Cincinnati, has been incorporated with a capitalization of $5,000 to manufacture metal specialties. T. B. Wright, formerly president Wright Traffic Signal Co., heads the new concern. Plans as to location and equipment have not as yet been completed.

Indiana

INDIANAPOLIS, July 10.

The Dodge Mfg. Corporation, Mishawaka, Ind., manufacturer of transmission machinery, etc., is disposing of a bond issue of $2,250,000, a portion of the proceeds to be used for extensions and improvements. W. W. Dodge is vice-president.

Fire, June 29, destroyed the power house and other mechanical departments at the plant of the Green Valley Coal Mining Co., Jacksonville, Ind., with loss estimated at $50,000.

Robert H. Hassler, Inc., 1535 Naomi Street, Indianapolis, manufacturer of shock absorbers and other automobile equipment, has awarded contract to the Builders' Construction Co., 540 North Meridian Street, for a new two-story and basement service building, 37 x 120 ft., estimated to cost about $75,000.

Fire, June 28, destroyed a portion of the plant of the National Tile Co., Anderson, Ind., with loss estimated at about $50,000, including equipment. It is planned to rebuild.

The Chicago & Eastern Illinois Railroad Co., 332 South Michigan Avenue, Chicago, has plans in progress for new car and locomotive shops and freight classification yards at Evansville, Ind., estimated to cost about $1,500,000.

Electrically-operated pumping machinery will be installed at the municipal waterworks plant at Auburn, Ind., in connection with extensions and improvements, estimated to cost about $65,000. The Common Council will call for bids at once, to close about July 20.

The Merchants Heat & Light Co., Indianapolis, has made application for permission to issue bonds for $7,205,000, the proceeds, to net $6,700,000, to be used in part for extensions and improvements.

Freight-handling equipment, conveying machinery, etc., will be installed in the new freight house to be erected at Gary, Ind., by the Baltimore & Ohio Railroad Co., estimated to cost about $125,000. H. H. Griffin is division engineer in charge.

The Zenite Metal Co., Indianapolis, manufacturer of automobile parts, will add a one-story building, 100 x 200 ft., to its plant at 201 North West Street. Herbert R. Duckwall is president of the company, which was organized in 1908 with $1,000,000 capital stock. Over 500 men are employed, but there is demand for an increased output.

Milwaukee

MILWAUKEE, July 10.

In the absence of railroad business, which appears to be awaiting the settlement of the shopmen's strike, the machine-tool industry is depending largely upon the automotive industries for the bulk of orders. These are coming in increasing numbers and buyers are going beyond the single tool orders which have characterized business so far. The milling machine trade is broadening steadily, with production schedules slowly increasing. The agricultural implement, gas engine and tractor industries are responsible for a part of the new business booked in the past few weeks, and prospects for heavier buying are regarded as bright. Foundry activity is making excellent gains and labor conditions are greatly improved in the foundry and machine shop industries. The Milwaukee office of the Federal Employment Bureau reports 8957 calls for help in June, and 6830 places filled, the best record in two years.

The Hercules Steel Casting Co., 871-881 Robinson Street, Milwaukee, which has not operated its electric steel foundry for more than a year, resumed operations July 5 with a force of 300. The plant has been entirely overhauled under the direction of F. G. Peterson, general superintendent, who recently assumed this position after five years' service as managing superintendent of foundries for the Bucyrus Co., South Milwaukee.

The Waukesha Foundry Co., manufacturer of brass castings, Waukesha, Wis., contemplates the extension of additions which will increase the capacity approximately 100 per cent during the coming four months. The present shop was erected two years ago and has been operating steadily but is overcrowded with orders.

The Specialized Automotive Service Co., Manitowoc, Wis., has been formed by Leo Bloomer, N. J. Jordan and John Bloomer, all of Madison, and will equip a building on Washington Street, near South Eighth Street, as a general machine shop, specializing in gas engine, tractor and automobile work.

The Harley-Davidson Motor Co., Milwaukee, has engaged the Federal Engineering Co., 444 Milwaukee Street, local, to design and supervise the construction of an additional story on its plant, at Thirty-eighth and Chestnut streets, to be 72 x 138 ft., of brick and steel. William Davidson is factory manager.

The Patton-Pitcairn paint and varnish manufacturing division of the Pittsburgh Plate Glass Co., with plant and offices at 213 Lake Street, Milwaukee, will build a five-story addition, 86 x 140 ft., at South Water and Lake streets, to be equipped for manufacturing, research laboratories, offices and storage. The project is in charge of Kirchhoff & Rose, architects, Majestic Building, Milwaukee, Ludington Patton is vice-president and general manager.

The North Light & Mfg. Co., Chippewa Falls, Wis., is planning to enlarge its works and buy additional equipment to handle a ten-year order valued at $2,000,000 calling for 1000 pumping units annually. It manufactures three sizes of pumps designed for country homes, dairy plants and isolated places. It also is putting into production a combination unit, consisting of a gas engine and pump.

The Board of Education, Kaukauna, Wis., has let the general contract to Hayes & Langdon, Janesville, Wis., for a new central continuation school and manual arts institute, estimated to cost $250,000. Shop equipment will be purchased later, specifications being still incomplete.

The Aluminum Goods Mfg. Co., Manitowoc, Wis., has placed the general contract with Walter W. Oeflein, Inc., 86 Michigan Street, Milwaukee, for a one-story brick and steel addition, 150 x 360 ft., to plant No. 2 in Manitowoc. It will cost about $150,000.

The Blum Bros. Box Co., Marshfield, Wis., which is erecting a $50,000 factory addition, is in the market for a 100-hp. heating boiler and miscellaneous machinery, including a 30-in. double planer, boxboard matcher, three jointers, one heading turner, etc., with individual motor drive.

The Trane Co., 127-129 South Sixth Street, LaCrosse, Wis., has awarded contracts for a brick and steel addition to cost about $50,000. If manufactures heating devices, vapor specialties and does general heating engineering and contracting business. Reuben N. Trane is vice-president and general manager.

The Barton Mfg. Co., Barton, Washington County, Wis., has been incorporated with a capital stock of $60,000 to manufacture automotive parts and specialties. It will take over an existing plant erected and equipped three years ago for the manufacture of motor truck axles, but expects to install additional equipment to accommodate a greater variety of production. The principals are William J. Goebel, S. J. Driessel and Emil C. Backhaus, all of Barton.

Baltimore

BALTIMORE, July 10.

The Republic Boiler & Radiator Co., Woodbury, Baltimore, has filed plans for two one-story additions, 20 x 150 ft., and 49 x 60 ft., respectively, estimated to cost about $50,000.

The Maryland Motors, Inc., 601 St. Paul Street, Baltimore, will take bids in about a week for a three-story service and repair works, 90 x 110 ft., at 414 North Calvert Street, estimated to cost about $75,000. Mottu & White, 324 North Charles Street, are architects.

The Baltimore & Ohio Railroad Co., Baltimore, will rebuild at once its grain elevators B and C, and pier No. 5, destroyed by fire, July 2, caused by lightning, with loss estimated at $3,500,000, including structures, equipment and contents. The new elevators will be of reinforced concrete, provided with mechanical conveyor systems. The plant will be electrically operated and is estimated to cost approximately the amount of the fire loss.

The Frostburg Sewer Pipe Co., Frostburg, Md., recently organized has acquired about 33 acres in the vicinity of the works of the Big Savage Fire Brick Co., as a site for its new plant to manufacture vitrified sewer pipe. Plans for the initial buildings are being drawn. The company address is temporarily care of the Frostburg Commercial Club.

H. S. Block, Baltimore, operating an automobile service and repair works at Eager and Cathedral streets, has purchased adjoining property for the erection of a three-story addition, 42 x 125 ft., estimated to cost close to $100,000, and designed to double the present capacity. J. E. Moxley, Jr., Equitable Building, is architect.

A vocational department will be installed in the new high school to be erected at Newark, Del., for which an appropriation of $400,000, has been secured.

The Western Maryland Railroad Co., Baltimore, has plans under way for extensions in its grain elevator plant at Port Covington, with mechanical and operating machinery to provide for an increased capacity of 2,000,000 bushels. It has foundation work under way for a new locomotive and car repair shop in the same section, estimated to cost about $50,000.

The Virginian Railway Co., Norfolk, Va., has plans in progress for a new coal pier at its Sewalls Point terminals, designed to double the present capacity. It will be mechanically operated and is estimated to cost $3,000,000. It is expected to require about 24 months to complete the plant.

The Town Council, Belhaven, N. C., will receive bids until July 19 for extensions and improvements to the municipal electric power plant, including semi-Diesel crude oil engine-generator, exciter, switchboard and other auxiliary machinery. William C. Olsen, Kinston, N. C., is consulting engineer. J. F. Stephenson is mayor.

The Bureau of Supplies and Accounts, Navy Department, Washington, will take bids at once for 106 hand drills, 64 soldering irons, side-cutting pliers, 1950 pipe wrenches, 114 dozen files, 608 gasoline torches, and 9 chain blocks, for use at Eastern and Western navy yards, as set forth in schedule 3645.

The District Commissioners, District of Columbia, Washington, will commence the immediate erection of a one-story power house, 50 x 122 ft., at the Gallinger Hospital.

The Case-Fowler Lumber Co., Macon, Ga., has preliminary plans under way for rebuilding the portion of its mill, recently destroyed by fire with loss of about $70,000, including equipment.

The Mallory Machinery Co., 524 Light Street, Baltimore, machinery dealer, is making inquiries for a motor of from 35 to 40 hp., complete with hand-control and electric brake, designed for intermittent service.

The Western Reserve Mills, Millen and Quitman, Ga., a subsidiary of the Mason Tire & Rubber Co., Kent, Ohio, is planning for the establishment of a new mill in the Southern district.

The United States Veterans' Bureau, Arlington Building, Washington, will receive bids until July 17, for two tankless air compressors, as specified in circular 1703.

Electrically operated pumping machinery, power equipment, etc., will be installed at the new filtration plant to be constructed at the municipal waterworks, Baltimore, estimated to cost close to $1,000,000. Plans are being prepared by William A. Megraw, City Hall, water engineer.

The Concocheague Brick Co., Williamsport, Md., will make extensions and improvements in its plant, including the installation of additional equipment, estimated to cost $35,000.

Freight-handling machinery, conveying equipment, etc., will be installed in the one and two-story freight station, 52 x 525 ft., to be erected at the foot of Brooks Avenue, Norfolk, Va., by the Chesapeake & Ohio Railroad Co., Richmond, Va.

The Mount Vernon Garage, 113 North Saint Asaph Street, Alexandria, Va., is planning for the installation of machines and small tools in its automobile service works.

The Central South

ST. LOUIS, July 10.

The Union Electric Light & Power Co., St. Louis, has ordered two 30,000-kw. turbo generators and condensing machines. One generator was purchased from the Westinghouse Electric & Mfg. Co., and the other from the General Electric Co. The Worthington Pump Co. has received the order for the condensers. Installation will be in the Cahokia plant now being built on the east side of the Mississippi River.

The Hall & Brown Woodworking Machinery Co., 1913-33 Broadway, St. Louis, will commence the erection of an addition to its plant, with improvements also in the present building, estimated to cost $50,000. Preston J. Bradshaw, International Life Building, is architect. Charles S. Brown is president.

The Erd Mfg. Co., 117 Sherman Avenue, Lexington, Ky., is planning for a one-story machine shop. A list of equipment is being arranged, including lathes, drills, punches, presses, bench tools, etc. Robert L. Erd heads the company.

The Central Paper Box Co., 2935 Belleview Avenue, Kansas City, Mo., will soon commence the erection of a new two-story and basement factory, 126 x 150 ft., on Belleview Avenue, estimated to cost about $35,000. Hans Von Unwerth, 507 Finance Building, is engineer.

The Memphis Wire & Iron Works, Memphis, Tenn., has preliminary plans in progress for the erection of a new factory on Third Street. McLean & Broadwell, Memphis, are architects. W. A. Haglin is president.

The Air Service, United States Army, Washington, has selected a site of 150 acres at Kansas City, Mo., for a new air terminal. Three army hangars will be constructed, with shop for repairs and parts manufacture. The Air Terminal Association, Kansas City, is interested in the project, and will occupy a corner of the tract for hangars and repair shop for private service.

The Pure Oil Co., Muskogee, Okla., is considering preliminary plans for an addition to its refinery, formerly the plant of the Oklahoma Producing & Refining Corporation, recently acquired, to increase the capacity to 5400 bbl. per day.

The Louisville Gas & Electric Co., Louisville, is perfecting plans for an addition to its Waterside power plant, to include the installation of a 27,000-hp. turbo-generator and auxiliary operating equipment.

A vocational department will be installed in the two-story and basement industrial school, 56 x 110 ft., to be erected by the State industrial department at Chillicothe, Mo., estimated to cost about $125,000. Samuel M. Hitt, 321 Sheidley Building, Kansas City, Mo., is architect; W. W. Huff, 313 Interstate Building, Kansas City, is engineer.

The Oklahoma General Power Co., Muskogee, Okla., has plans under way for a new electric generating plant with initial capacity of about 10,000 hp.

The White Co., 2001 Grand Avenue, Kansas City, Mo., has awarded contract to the George M. Bliss Construction Co., the Lathrop Building, for a two-story and basement

automobile service and repair building 100 x 250 ft., at Twenty-ninth and Walnut streets, estimated to cost about $100,000.

The Iddins Machinery Co., Knoxville, Tenn., manufacturer of agricultural machinery, has plans under way for a new one-story plant on property recently acquired, estimated to cost close to $50,000. J. S. Sample is president.

The Atchison, Topeka & Santa Fe Railroad Co., 80 East Jackson Boulevard, Chicago, has plans nearing completion for a new one-story car repair shop, 100 x 160 ft., at Winfield, Kan., estimated to cost $60,000, including equipment.

The Star Box & Printing Co., Chattanooga, Tenn., has acquired a building at 61 West Colorado Avenue, Memphis, Tenn., for a branch plant to manufacture corrugated boxes, cartons and kindred products.

A vocational department will be installed in the two-story and basement junior high school, 63 x 175 ft., to be erected at Calhoun Street and Boonville Avenue, Springfield, Mo., estimated to cost about $180,000. Earl Hawkins & Co., 400 McDaniel Building, are architects.

Frank R. McCullough, Tulsa, Okla., has awarded contract to J. R. Burnside, 301 Drexel Building, for a two-story and basement automobile service building and repair department, 150 x 300 ft., estimated to cost about $150,000. Stone & Deegan, Kennedy Building, are architects.

A power house, ice-manufacturing and refrigerating plant will be installed at the new three-story dairy and ice-cream manufacturing plant to be erected at Walnut Street and Union Avenue, Memphis, Tenn., by the Clover Farm Dairy Co., Memphis. The ice-manufacturing department will have a daily capacity of 150 tons. William H. Timm, Perry Building, Philadelphia, is consulting engineer; L. N. Larned is general manager.

The Superior Folding Box Co., 211 Chestnut Street, St. Louis, has plans in progress for a new factory at Geraldine Avenue and Penrose Street, estimated to cost about $100,000, of which amount approximately $30,000 will be used for machinery.

The Oklahoma Portland Cement Co., Ada, Okla., will erect a new power plant at its local mills. Improvements will be made in the "dry process" plant, including machinery repairs and replacements.

Detroit

DETROIT, July 10.

The Wilson Body Co., 1440 Clay Avenue, Detroit, has awarded contract to the F. R. Patterson Construction Co., Ford Building, for the erection of a three, four, five and six-story addition, estimated to cost about $200,000. C. R. Wilson is president.

The Ford Motor Co., Highland Park, Mich., has awarded contract to the Austin Co., 208 South La Salle Street, Chicago, for a one-story addition, 80 x 260 ft., estimated to cost approximately $50,000. The company is reported to be planning the erection of works in the vicinity of Minneapolis for automobile and tractor production. It will include a hydro-electric generating plant and is estimated to cost in excess of $1,500,000. A site is being selected.

The Central Paper Co., Muskegon, Mich., has tentative plans for a three-story addition to its paper mill, estimated to cost about $200,000, including machinery. Construction is expected to commence in the fall, or may be deferred until early in the coming year. E. J. Geddes is secretary.

The Chapin Co., South Bend, Ind., is considering the construction of a new electric generating plant at Berrien Springs, Mich., to be used in connection with the interurban traction system between Dowagiac and Benton Harbor, Mich., recently acquired.

The Charles B. Bohn Foundry Co., 3651 Hart Street, Detroit, is having plans prepared for a new one-story building, 46 x 60 ft., estimated to cost about $45,000. C. W. Brandt, 1114 Kresge Building, is architect.

The Kalamazoo Vegetable Parchment Co., Kalamazoo, Mich., has awarded contract to H. L. Vanderhorst, Grand Rapids National Bank Building, Grand Rapids, Mich., for a two-story paper mill addition, estimated to cost about $400,000, including machinery. It will be equipped as two complete operating units. J. Kindlebarger is president.

C. I. Scott & Co., Charlotte, Mich., manufacturers of cold air registers and other metal products, are planning to rebuild the portion of their plant destroyed by fire June 20.

A vocational department will be installed in the new high school to be erected at Eaton Rapids, Mich., estimated to cost about $125,000, for which bids will be asked at once. Fisher Brothers, Fisher Building, Pontiac, Mich., are architects.

The Guy Disc Valve Motor Corporation, Chelsea, Mich., recently organized with a capital of $1,500,000 to manufacture automotive products, has leased a portion of the local plant of the Lewis Spring & Axle Co.

The Pacific Coast

SAN FRANCISCO, July 5.

The Fresno Tire & Rubber Co., Mattei Building, Fresno, Call., has awarded contract to W. L. Miller, Los Angeles, for a new plant at Selma, Cal., estimated to cost about $125,000, including machinery.

The Doble Steam Motors Co., Call Building, San Francisco, has acquired property at Atascadero, Cal., for the erection of a new plant to manufacture steam-driven automobiles. Plans are being drawn for a building to approximate 100,000 sq. ft. of floor area. J. E. King is representative in charge.

The Los Angeles Gas & Electric Corporation, Los Angeles, has arranged for a bond issue of $5,000,000, a portion of the proceeds to be used for extensions and improvements.

The Foster Lumber Co., Ritner, Ore., has tentative plans for rebuilding the portion of its plant destroyed by fire, June 25, with loss estimated at about $100,000, including machinery.

The Western Die Casting Co., Berkeley, Cal., has taken bids on a general contract for a new one-story plant, 125 x 162 ft., on Napa Street, Vallejo, Cal., estimated to cost about $45,000, including equipment. C. E. Perry, Jr., P. O. Box 636, Vallejo, is architect in charge.

The Pacific Gas & Electric Co., 445 Sutter Street, San Francisco, and the Sierra & San Francisco Power Co., 58 Sutter Street, have been granted permission for the joint construction of a new hydroelectric generating plant at Spring Gap, on the Middle Fork of the Stanislaus River, Tuolumne County. It will have an initial capacity of about 7500 and is estimated to cost close to $1,000,000.

The Pridham-Low Co., Los Angeles, manufacturer of paper boxes, cartons, etc., has leased a new factory to be erected on O Street, Fresno, Cal., for the establishment of a branch plant. The machinery installation is estimated to cost close to $75,000, and will provide for the employment of about 100 workers.

The Grays Harbor Railway & Light Co., Hoquiam, Wash., will commence the immediate erection of a new plant on local site, estimated to cost about $250,000, including equipment.

The Long Beach Paper Box Co., Long Beach, Cal., has plans under way for a new factory on Cherry Avenue, estimated to cost about $100,000, including machinery.

The Atchison, Topeka & Santa Fe Railway Co., Kerckhoff, Los Angeles, will commence the immediate erection of a machine shop at San Bernardino, Cal., estimated to cost about $107,000, including equipment.

The Mineral Lake Lumber Co., Tacoma, Wash., is considering preliminary plans for rebuilding its plant, recently destroyed by fire with loss in excess of $200,000, including machinery. The new mill is expected to cost a like amount.

The Pacific Fruit Express Co., 65 Market Street, San Francisco, has plans under way for a new ice and cold storage plant at Tucson, Ariz. It will be electrically operated.

The City Council, Tacoma, Wash., has plans in progress for a new municipal steam-operated electric power plant, to cost about $350,000 with machinery.

The Columbia Wood Products Co., Raymond, Wash., has tentative plans for a veneer mill on the site formerly occupied by the plant of the State Lumber & Box Co.

The Gulf States

BIRMINGHAM, July 10.

The Missouri, Kansas & Texas Railroad Co., St. Louis, has completed plans for a one-story locomotive shop, 148 x 475 ft., with adjoining repair shops, at Waco, Tex., to cost in excess of $500,000, including machinery. The plant will have a capacity for rebuilding 10 locomotives per month, and will be constructed on the unit plan to permit of further expansion. Bowie, Loyden & Co., Inc., Chicago, has been awarded the general contract for the freight terminal at Denison, Tex., to cost approximately $450,000.

The Refugio Glass Co., National Bank of Commerce Building, San Antonio, Tex., is perfecting plans for new works on property recently acquired at Refugio to manufacture glass bottles for high pressure service and other glass containers. It will include a power house and is estimated to cost in excess of $75,000. W. L. Napier is general manager.

The Humble Oil & Refining Co., Houston, Tex., is disposing of a bond issue of $25,000,000, a portion of the proceeds to be used for extensions and [illegible]

contracted by the Standard Oil Co. of New Jersey, 26 Broadway, New York. W. S. Farish is vice-president.

The Texas Power & Light Co., Dallas, Tex., has tentative plans for a power plant on the Colorado River in the vicinity of Bastrop, Tex. The company is concluding negotiations for the purchase of the municipal electric plant at Austin, Tex., and proposes to enlarge this station. W. B. Head is chairman of the board.

The Atlantic Ice & Cold Storage Corporation, Montgomery, Ala., has plans under way for an addition to its ice-manufacturing and cold storage plant to more than double the present capacity. It is estimated to cost in excess of $300,000, including machinery.

Fire, June 29, destroyed a portion of the car and locomotive shops of the Atlantic Coast Line Railway Co., at Montgomery, Ala., with loss estimated at close to $200,000. The general offices are at Wilmington, N. C.

The Dillingham Ice Cream Co., Breckenridge, Tex., will commence the construction of a new ice-manufacturing and cold storage plant, with initial daily capacity of about 65 tons.

The power plant of the Currie Power Co., Currie, Tex., has been acquired by local interests, headed by H. P. Tate and T. H. Williams, who will organize a company to operate the property. Plans are under way for an addition to more than double the present capacity. Mr. Tate will be president of the new organization.

The Preston Motors Corporation, Birmingham, manufacturer of automobiles, has arranged for a bond issue of $300,000, and stock issue of $800,000, a portion of the proceeds to be used for extensions and improvements.

Fire, June 25, destroyed the power house, saw mill and other portions of the plant of the Ward Lumber Syndicate, Benton, Ala., with loss estimated at close to $100,000. A quantity of machinery, practically new, was completely destroyed. It is said that the plant will be rebuilt at an early date. Arthur Ward is general manager.

The Williams-Miller Gin Co., Elk City, Okla., has plans under way for a new cotton oil manufacturing plant at Stamford, Tex., to cost about $150,000, including machinery. Samuel Williams is head.

The Common Council, Livingston, Tex., will commence the immediate erection of a new municipal electric power plant to cost about $30,000.

The Deems Tractor Hitch Co., 301 Bedell Building, San Antonio, Tex., recently organized with a capital of $30,000 to manufacture motor tractor equipment, has arranged with the Lone Star Motor Truck & Tractor Association to manufacture a line of its different specialties, and the association plant will be given over in part to this work. Later the Deems company proposes to operate its own plant. C. O. Deems is president.

Fire, June 27, destroyed a section of the power plant of the Dallas Power & Light Co., Dallas, Tex., with loss estimated at about $60,000. It will be rebuilt at once.

A vocational department will be installed in the new high school to be erected at Georgetown, Tex., estimated to cost in excess of $100,000. Plans will be drawn at an early date.

The Southwest General Electric Co., 801 North Lamar Street, Dallas, Tex., manufacturer of electrical specialties, will build a three-story addition, estimated to cost $95,000.

Canada

TORONTO, July 10.

Large purchases of machine tools from any one source are still absent from the market, but steady buying of one or two tools continues from a fairly wide range of customers. Equipment required for technical schools has fur- [illegible] three weeks and a fair amount of business has been derived from this source. Automobile plants have also been purchasers and it is probable that more active buying from this source will shortly materialize. It is stated that the Durant Motors, Ltd., Toronto, is about to start work on an addition to the Leaside plant and considerable equipment will be required in the near future, as it is proposed to have the works completed and in operation by next spring. Other lines of industry are also making progress and while buying has been put off from time to time it is the opinion of dealers and manufacturers that purchases of equipment cannot be much further delayed. Small tools are in brisk demand and sales are continually mounting. Prices are holding firm on all lines.

Contracts have been placed for six 14-in. lathes for the Hamilton, Ont., technical school, three going to the D. McKenzie Machinery Co., Guelph, Ont., and three to the Per- [illegible]

The Preston Woodworking Machinery Co., Preston, Ont., has been awarded the contract for wood-working equipment to be installed in the new technical school at Sarnia, Ont. The list includes five lathes, one grinder, band saw, buzz planer, variety saw, surfacer and mortiser. In addition, the Canadian Fairbanks Morse Co., Toronto, has the contract for one milling machine, one shaper and one tool and cutter grinder. Charles A. Strelinger Co., Windsor, Ont., received the contract for lathes and heat treating furnaces.

The lumber mill of the Northern Construction Co., Kamloops, B. C., was destroyed by fire July 2 with a loss of about $100,000.

The Wigwam Paper & Pulp Co., Waldo, B. C., contemplates the erection of a paper mill at Elko, B. C., to cost $4,000,000.

The Canadian By-Products Co., Home Bank Building, Hamilton, is preparing to erect a plant for the manufacture of fire brick.

Col. Thomas Gibson, president Fort William Paper Co., Fort William, Ont., states that his company contemplates the extension of its ground wood and paper mill.

The Cape Breton Cold Storage Co., North Sydney, N. S., has let the general contract to M. J. Paulson, Gloucester, Mass., for the erection of a cold storage plant to cost $200,000.

The Dominion Steel Corporation, 120 St. James Street, Montreal, contemplates installing several new furnaces at its plant at Sydney, N. S., and making general repairs at an estimated cost of $15,000,000. Equipment and material required includes electric machinery, wire, cranes, steel, firebrick, etc. D. S. Hines, Sydney, N. S., is purchasing agent.

Bids are being received by John O. Coulter, clerk, Thessalon, Ont., for the supply and erection of a 200 hp. water turbine with governor, etc., direct connected to a 175 k.v.a. generator, complete with switchboard exciter, etc. James, Proctor & Redfern, Ltd., 36 Toronto Street, Toronto, are consulting engineers.

J. Waller & Sons, Gaukel Street, Kitchener, Ont., have had plans prepared and are receiving bids for a factory to cost $25,000. Architect, J. Knechtel, Courtland Street West.

The Steel Trough & Machine Co., Tweed, Ont., is building additions to its factory to take care of increased business and will install considerable new equipment.

Supplies, Ltd., Kentville, N. S., is in the market for equipment and machinery for an aerated water plant.

M. J. Armstrong & Co., Ottawa, Ont., are installing a new grinder, three lathes and a milling machine and have taken an option on property on Queen Street, 33 x 90 ft., for the erection of a machine shop to cost $10,000.

It is the intention of the Peninsular Sugar Co., to start construction on its new plant at Petrolia, Ont., in the near future. The refinery will have a daily capacity of 200,000 tons and the machinery will be electrically driven and of special design. When completed the plant will represent an expenditure of $800,000. It is expected to be ready for operation by September. H. J. French and Harry Gilroy are interested.

Trade Changes

The Pittsburgh sales office of the Economy Fuse & Mfg. Co., Chicago, has been moved from 2223 Farmers Bank Building to 1006 Peoples Bank Building at Fourth Avenue and Wood Street.

The Central Foundry Co. and the Central Radiator Co., both at 90 West Street, New York, and the Molby Boiler Co., Inc., 101 Park Avenue, have been consolidated. Headquarters will be at 41 East Forty-second Street. The different plants of the merged company, including the Central Radiator works at Lansdale, Pa., will be continued in operation.

The business of the Pittsburgh High Voltage Insulator Co. hereafter will be carried on under the name of the Westinghouse High Voltage Insulator Co., C. M. Semler, general manager, announces. The company is a subsidiary of the Westinghouse Electric & Mfg. Co.

The Electric Furnace Construction Co., 908 Chestnut Street, Philadelphia, manufacturer of electric furnaces, "Electro" steam boilers, etc., reports an increase in capital and the election of the following new officers: P. H. Falter, vice president and treasurer; Arthur G. Dickson, of Dickson, Beitler & McCouch, Philadelphia, vice president and counsel, and the following new directors: John Gilbert, of Madeira, Hill & Co.; Wm. A. Webb, president Empire Coal Mining Co., and T. H. Weisenburg. Frank Hodson retains the presidency of the company. Mr. Falter, the new vice president and treasurer, is a graduate of the engineering department of the University of Michigan, and until recently has been vice president and general manager of the

Canadian Electro Products Co. He has been general manager of the Baltimore Electric Alloys Co., in the manufacture of ferrosilicon and other electric furnace alloys, and was for 13 years with the Aluminum Co. of America in various capacities, including design, construction and operation of a number of its plants. Mr. Falter was also general manager of the Shawinigan Electro Metals Co., Montreal, manufacturer of metallic magnesium, and he has also had considerable experience on hydro-electric power plant work at Sault Ste. Marie and Shawinigan Falls, Canada.

Jay L. Hench, who recently resigned as district sales manager Lackawanna Steel Co. at Chicago, has formed a new company under the style of Jay L. Hench & Co., to engage in the purchase and sale of various iron and steel products, including steel sheet piling, light and heavy tee rails, sheets, plates, shapes and bars, with an additional line of open-hearth and electric steel castings. He has opened headquarters at 208 South LaSalle Street, Chicago. Mr. Hench was identified with the Lackawanna Steel Co. at Chicago for 11 years, during the last three of which he was district sales manager. Prior to his service with the Lackawanna Steel Co. he was for five years associated with Joseph T. Ryerson & Son, a greater part of the time as sales representative in Michigan and Indiana. Mr. Hench was educated at Cornell University, where he specialized in iron and steel metallurgy. In 1915 he entered the employ of Illinois Steel Co. and for a year was engaged in practical work in the open-hearth and Bessemer departments at South Works.



J. L. HENCH

The Louis Allis Co. is now the name of the Mechanical Appliance Co., Milwaukee, which was established in 1901 and is the manufacturer of the Watson direct and alternating current motor. Louis Allis, president of the company, says that there is no change in policy or personnel of the organization.

The Younglove Construction Co., United Bank Building, Sioux City, Iowa., has been appointed representative of the Conveyors Corporation of America, 326 West Madison St., Chicago, for the sale of American trolley carriers in northwestern Iowa, and in South Dakota.

The General Fireproofing Co., Youngstown, has appointed R. S. Gildart, Cleveland, advertising manager. Mr. Gildart was formerly director of publicity for The American Malleable Castings Association, Cleveland, prior to which he was advertising manager for the P. B. Yates Machine Co., Beloit, Wis. and the Kelvinator Corporation, Detroit. C. W. Noble, who has been advertising manager for several years, has been advanced by the company and will conduct market investigations and special research work.

Irving A. Berndt, Dwight T. Farnham and Walter G. Scott, have withdrawn from the C. E. Knoeppel & Co., consulting industrial engineers, New York, of which they were vice-presidents. The arrangement amounts to a friendly dissolution of the firm, leaving all free to serve industry in a personal way, at the same time collaborating with one another. The name of C. E. Knoeppel & Co. is retained and remains under the direction of C. E. Knoeppel.

W. L. Dixon and J. F. Griswold, Los Angeles, Cal., for 16 years Pacific Coast distributors of the Bain Wagon Co., Kenosha, Wis., have acquired the controlling interest in the corporation from George A. Yule, and on July 1 assumed the general management of the works and business. Mr. Yule is retained in the capacity of president for the present. The Bain Wagon Co. is one of the oldest and largest manufacturers of horse-drawn vehicles in the United States, having been established in 1840.

The Wright-Alexander Co., Boston, machine tools, formerly located at 201 Devonshire Street, is now located at 126 Massachusetts Avenue, that city. The company has just been appointed agent for the Syracuse Sander Mfg. Co., Syracuse, N. Y.

The Cushman Chuck Co., Hartford, Conn., has established quarters at 130 High Street, Boston, for district distribution purposes.

The Iron & Steel Products Co., Pittsburgh, has removed from 230 Fifth Avenue to 421 Wood Street, occupying Suite 510, Citizens' Savings Bank Building, corner Wood and Diamond streets.

The South Boston Mfg. Co., South Boston, Va., incorporated with a capital of $100,000 to manufacture metal products, expects to build its own plant. It will manufacture farm wagons.

Industrial Finances

The plant and manufacturing facilities of the Wagner Electric Mfg. Co., St. Louis, are being operated at about 65 per cent of capacity, W. A. Layman, president, reports in a letter to the underwriters of the reorganization plan. Mr. Layman adds: "The net earnings of the company after deducting interest on the proposed bond issue and dividends on the preferred stock, but before charging physical depreciation, were for March, $44,000; for April, $52,000, and for May, $85,000. The business and earnings of the company are steadily increasing and there is every prospect that the entire manufacturing facilities of the company will be productively active within six months."

The Noiseless Typewriter Co., Middletown, Conn., has filed a preliminary certificate of dissolution with the secretary of that State. The company proposes to reincorporate under the laws of Delaware in order that it may increase its capitalization. All claims against the Connecticut corporation should be sent to Earl H. Russell, in care of the company at Middletown.

The Pfau Mfg. Co., Norwood, Ohio, manufacturer of plumbers' supplies, has been placed in the hands of receivers. The company has a large number of unfilled orders and bright prospects of obtaining a profitable future business. Difficulty in making collections of outstanding accounts is given as the reason for the receivership.

Receivers for the Texas Steel Co., Rusk, Tex., have secured permission from the District Court at Beaumont, Tex., to sell the plant and property of the company. It is proposed to hold the sale on Sept. 15. The holdings consist of an iron and steel works at Rusk, and a large acreage of iron ore lands in eastern Texas. The company was organized by the late L. P. Featherstone.

Final action has not yet been taken by the stockholders of the Sharon Steel Hoop Co. on a proposed issue of $5,000,000 8 per cent. cumulative preferred stock, but probably will be at any early date, according to Severn P. Ker, president of the company. If the new issue is approved, the authorized capital stock of the company then will be $20,000,000, consisting of $15,000,000 common and $5,000,000 preferred stock. Stockholders are to be offered $1,500,000 of the new issue.

The sale of the Electric Auto-Lite Corporation plants in Toledo and Fostoria, Ohio, to C. O. Miniger has been confirmed by the Federal Court. The purchase price was $4,700,000.

Directors of the Trumbull Steel Co., Warren, Ohio, have declared a dividend of 20c. per share on common stock and the regular quarterly dividend of $1.75 on preferred, both payable July 1 to stock of record June 20. The company has paid 15c. per share on its common stock for the past four quarters. Its second quarter dividends will be distributed from current earnings on operations running in excess of all dividend requirements. The company announces that it will treat shareholders as liberally as conditions warrant, with respect to future dividend distributions. It has $10,000,000 of preferred stock, all outstanding and $25,000,000 of $25 par-value common, with $12,500,000 issued.

J. N. Lapointe, principal stockholder of the Arnold Electric Tool Co., New London, Conn., has been appointed temporary receiver of that concern, following his application.

The Molle Typewriter Co., Oshkosh, Wis., manufacturer of writing machines, has filed a voluntary petition in bankruptcy, scheduling its assets at $262,028 and liabilities at $131,710. The principal items of assets are machinery and equipment.

New York and middle west bankers are offering for public subscription $5,000,000 Donner Steel Co., Inc., Buffalo, first refunding mortgage 20-year 7 per cent sinking fund bonds. The bonds are dated Jan. 1, last, and mature in 1942.

The Massachusetts court has appointed George A. Bacon and Samuel M. Green as co-receivers of the Harley Co., Springfield, Mass., drop forgings and castings, following a petition of creditors.

The Taft-Peirce Mfg. Co., Woonsocket, R. I., machinists, engineers, etc., has increased its capitalization from $300,000 to $1,200,000, according to an amendment to its charter filed at the state house, Providence, R. I.

The Hamilton Hardware Corporation and two other creditors have filed an involuntary petition in bankruptcy against the Eastern Brass & Ingot Co., Waterbury, Conn. George E. Dalbey recently was appointed receiver. The company is capitalized at $300,000, and is said to be solvent. The plant has been operating since last summer.

No action was taken by the stockholders of the Sharon Steel Hoop Co. at their special meeting on the proposed increase in the stock to $20,000,000, from $15,000,000. The matter was brought up again June 21.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

	Per Lb
Bars:	
Refined iron bars, base price	2.58c.
Swedish bars, base price	7.00c.
Soft steel bars, base price	2.58c.
Hoops, base price	3.63c.
Bands, base price	3.23c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	2.68c.
Channels, angles and tees under 3 in. x ¼ in., base	2.58c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	2.60c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	2.80c.
Toe-calk, ½ x ⅜ in. and larger	3.40c.
Cold-rolled strip, soft and quarter hard	6.25c. to 7.25c.
Open-hearth spring steel	3.50c. to 6c.
Shafting and Screw Stock:	
Rounds	3.35c.
Squares, flats and hex	3.85c.
Standard cast steel, base price	12.00c.
Extra cast steel	17.05c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	2.68c.

Sheets

Blue Annealed

	Per Lb.
No. 10	3.63c.
No. 12	3.68c.
No. 14	3.73c.
No. 16	3.83c.

Box Annealed—Black

	Soft Steel C. R., One Pass, Per Lb	Blued Stove Pipe Sheet, Per Lb.
Nos. 18 to 20	4.00c. to 4.30c.	.....
Nos. 22 and 24	4.05c. to 4.35c.	4.60c.
No. 26	4.10c. to 4.40c.	4.65c.
No. 28	4.20c. to 4.50c.	4.75c.
No. 30	4.45c. to 4.75c.	.....

No. 28 and lighter, 36 in. wide, 10c. higher.

Galvanized

	Per Lb.
No. 14	4.30c. to 4.60c.
No. 16	4.45c. to 4.75c.
Nos. 18 and 20	4.60c. to 4.90c.
Nos. 22 and 24	4.75c. to 5.05c.
No. 26	4.90c. to 5.20c.
No. 27	5.05c. to 5.35c.
No. 28	5.20c. to 5.50c.
No. 30	5.70c. to 6.00c.

No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
⅛ in. Butt..	—56	—40	¾ in. Butt..	—30	—13
¾ in. Butt..	—61	—47	1½ in. Butt..	—32	—15
1-3 in. Butt..	—63	—49	2 in. Lap....	—27	—10
3½-6 in. Lap.	—60	—46	2½-6 in. Lap.	—30	—15
7-8 in. Lap..	—56	—34	7-12 in. Lap..	—23	— 7
9-12 in. Lap.	—55	—33			

Steel Wire

BASE PRICE PER KEG OF 100 LB.* Per Lb.

Bright basic	3.50c. to 3.75c.
Annealed soft	3.50c. to 3.75c.
Galvanized annealed	4.25c. to 4.50c.
Coppered basic	4.00c. to 4.25c.
Tinned soft Bessemer	5.50c. to 5.75c.

*Regular extras for lighter gage

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	16¾c. to 17½c.
High brass wire	17¼c. to 18 c.
Brass rod	14¾c. to 15¾c.
Brass tube, brazed	23¾c. to 24½c.
Brass tube, seamless	20 c. to 20½c.
Copper tube, seamless	22¼c. to 23½c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 20¾c. to 21¾c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14-20		
	Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20		Primes Wasters
			80 lb..	$6.05 $5.80
			90 lb..	6.15 5.90
			100 lb..	6.25 6.00
IC..	$10.00	$8.50	IC..	6.40 6.15
IX..	11.50	10.00	IX..	7.40 7.15
IXX..	13.00	11.25	IXX..	8.40 8.15
IXXX..	14.25	12.50	IXXX..	9.40 9.15
IXXXX..	16.00	14.00	IXXXX..	10.40 10.15

Terne Plates

8-lb. coating, 14 x 20

100 lb.	$7.00
IC	7.25
IX	7.50
Fire door stock	9.00

Tin

Straits, pig	33½c.
Bar	40c. to 44c.

Copper

Lake ingot	15¼c.
Electrolytic	15 c.
Casting	14¾c.

Spelter and Sheet Zinc

Western spelter	6¾c. to 7c.
Sheet zinc, No. 9 base, casks	8½c. open 9c.

Lead and Solder*

American pig lead	6¾c. to 7c.
Bar lead	8c. to 8½c.
Solder, ½ and ½ guaranteed	25c.
No. 1 solder	23½c.
Refined solder	20¼c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	75c.
Commercial grade, per lb.	35c.
Grade D, per lb.	25c.

Antimony

Asiatic	6½c. to 7c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.	25c. to 27c.

Old Metals

The market has been firmer this week, although business generally has been quiet. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy crucible	11.75
Copper, heavy wire	11.25
Copper, light and bottoms	9.00
Brass, heavy	6.00
Brass, light	5.00
Heavy machine composition	8.50
No. 1 yellow brass turnings	6.25
No. 1 red brass or composition turnings	7.75
Lead, heavy	4.50
Lead, tea	3.25
Zinc	2.75

THE IRON AGE

New York, July 20, 1922

ESTABLISHED 1855

VOL. 110 No. 3

Successful Safety Week at Ford Plant



The Making of 30,972 Cars by 46,627 Workers Without a Major Accident and With a 50 Per Cent Reduction in Minor Accidents

A WEEK of intensive safety work among the 46,627 workers at the Highland Park plant, Detroit, of the Ford Motor Co. produced astonishing results, according to figures obtained from the department of safety and factory hygiene of the company. During this period 30,972 cars were manufactured, in conjunction with the various branches; 1253 carloads, or 31 trains of 40 cars each, were loaded with finished parts and shipped over the entire country, and a proportionate number of railroad cars filled with raw materials entered the plant. This was all accomplished without a major accident, and minor accidents were reduced 50 per cent.

There were no fatal accidents; no amputations of fingers, toes, etc., and no eyes lost. Four accidents involved the loss of one day each; three, two days each; two, four days each; one, five days; two, six days each; four, seven days each; one, ten days, and one, 14 days. A total of 18 cases and 87 days lost time. Only two cases entered the compensation period which starts after the seventh day. These were foot accidents, caused by dropping material.

Employees worked a total of approximately 276,000 days. The days lost through accidents amounted to 87. According to the scale of time losses advocated by the U. S. Bureau of Labor Statistics, this would give a frequency rate of 8.15 lost time accidents per one million *hours* worked; and a severity rate of 0.32 lost *hours* per one thousand *hours* worked.

Every employee was instructed in the safe operation of his particular job at group meetings conducted by superintendents and foremen during the lunch periods on all shifts. The reproduced photographs show a few of these meetings in progress:

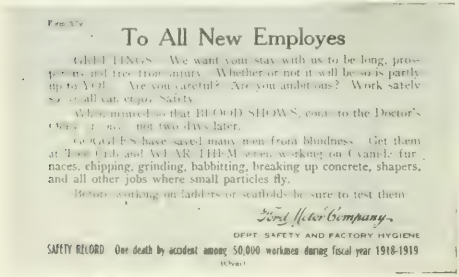
The picture at the bottom of page 130 was taken on the roof of a six-story building. The men are almost continually engaged in hazardous work on scaffolds, etc. Those in the upper left hand corner have just recently completed the painting of the large smoke stacks shown in the rear of the picture. This factory paint department went 46 consecutive months without a lost time accident.

Another picture shows a meeting in progress in the drop forge department, where axles, connecting



Lunch Hour Talk at the Drop Forge Department for Which Improvised Seats Were Obtained

rods, etc., are formed under steam hammers. The large upsetting machines shown press hot metal into gear blanks and other automobile parts. The



To All New Employes

GOOD THINGS — We want your stay with us to be long, prosperous and free from injury. Whether or not it will be so is partly up to YOU. Are you careful? Are you ambitious? Work safely so we all can enjoy Safety.

Why is it noticed so that BLOOD SHOWS, come to the Doctor's Office [illegible] not two days later.

GOGGLES have saved many men from blindness. Get them at Tool Crib and WEAR THEM when working on Cupola furnaces, chipping, grinding, babbitting, breaking up concrete, shapers, and all other jobs where small particles fly.

Before working on ladders or scaffolds be sure to test them.

Ford Motor Company.

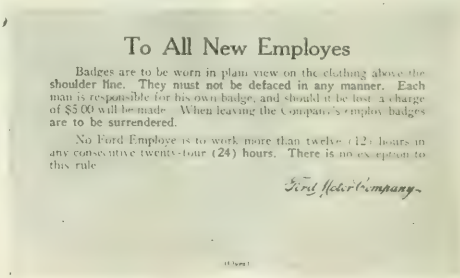
DEPT. SAFETY AND FACTORY HYGIENE

SAFETY RECORD One death by accident among 50,000 workmen during fiscal year 1918-1919

Card to Introduce Safety Idea to New Employee

men were gathered into one end of the building and made as comfortable as possible on improvised seats. The talks were illustrated with objects that had and could cause accidents. As a result, this extremely hazardous department had no lost time accidents during safety week.

At the head of the article is shown one shift of the body pressed steel department. This department employs 2767 men,who make more than 350 different parts for the Ford car. Four hundred punch presses and 950 other machines are used in this work. The punch press is considered one of the most dangerous machines in industry. During the week 78 carloads of steel were made into fenders,



To All New Employes

Badges are to be worn in plain view on the clothing above the shoulder line. They must not be defaced in any manner. Each man is responsible for his own badge, and should it be lost a charge of $5.00 will be made. When leaving the Company's employ badges are to be surrendered.

No Ford Employe is to work more than twelve (12) hours in any consecutive twenty-four (24) hours. There is no exception to this rule.

Ford Motor Company.

General Rules Are Given on Opposite Side of Card

running boards, shields, etc. The meeting shown in the picture was held in celebration of no lost time accidents during safety week.



The Factory Team [illegible] Won 46 Consecutive Months Without a Lost-Time Accident

All new employees who entered the plant were given a card, here reproduced, to instill the safety idea while their minds were eager to learn of the company's policies. The card has suggestion value for broad use in industrial plants generally.

Superintendents and foremen will hold meetings, similar to those held during safety week, on the first work day of each month hereafter, to keep alive the spirit of co-operation which prevailed during the drive.

OPPOSE PITTSBURGH BASING

Attorneys-General of Two States Write to Attorney-General Daugherty

MADISON, Wis., July 15.—Attorney-General William I. Morgan of Wisconsin, has sent to Attorney-General Harry M. Daugherty a letter in which he says:

It has come to my attention that you have publicly requested expressions of opinion upon the proposed merger of steel producing corporations which is before your department for consideration. One matter that is of vital importance to the people of Wisconsin in relation to the steel industry is the practice of making steel prices upon a Pittsburgh base price plus the freight from Pittsburgh to the point of delivery. As you know, the Federal Trade Commission has made a formal complaint against the United States Steel Corporation and its subsidiaries with reference to this practice and is conducting an exhaustive inquiry into the matter. It has occurred to me that in connection with the proposed merger the method of fixing prices may have come before you for consideration, and in that event I wish to urge most strongly that nothing be done that will have a tendency to legalize or perpetuate the Pittsburgh plus system or to embarrass the Federal Trade Commission in its treatment of the question now before it. On the contrary, it is my earnest hope that in dealing with the proposed steel merger it will be possible for you to take positive action against the Pittsburgh plus practice and aid the nation to rid itself of that evil.

Pittsburgh plus has been for a number of years a matter of deep concern to the people of Wisconsin as a whole. The manner in which the interests of the State and its people are prejudiced by the practice is well expressed, though of course only briefly in joint resolution No. 31, adopted by the Wisconsin Legislature of 1921, of which I inclose a copy herewith. This resolution, in addition to setting forth the situation as it affects the people of this State, constitutes an official recognition by the legislative branches of our State Government of the public interest involved. I trust that the time is not far distant when the Pittsburgh plus evil will be permanently eliminated, and if you can do anything to aid in bringing about that result, either in connection with the proposed steel merger or otherwise, you will in my opinion be rendering a very great public service.

Protest from Illinois

CHICAGO, July 17.—The recent invitation of Attorney-General Daugherty for expressions of opinion from those connected with the iron and steel trade on the mergers of independent steel companies now having the attention of the Department of Justice, has brought a response from Edward J. Brundage, Attorney-General, State of Illinois. In his letter dated July 8, Mr. Brundage, as did W. E. McCollum, secretary, Western Association of Rolled Steel Consumers, in a letter to the Attorney-General published in THE IRON AGE, July 13, page 85, emphasizes the harm that will be done business interests in this section if, as a result of the combinations, the "Pittsburgh plus" practice is made more solid. Mr. Brundage's letter reads in part:

This practice is injurious to the industries of this section of the country and it is contended complicates housing and building problems because of the increased cost of steel which results from the addition of the arbitrary amount to what would otherwise be the price of steel at mills in this section of the country. It is contended that this practice amounts to an unlawful fixing of prices and this contention forms the basis of the proceedings now pending before the Federal Trade Commission.

If the effect of the mergers under consideration by you is to put the combining concerns in a position where this practice is on a more solid basis, it would be harmful to the business interests of this section.

I suggest, therefore, that in the investigation of these mergers, consideration be given to the question which I have above stated and that no action be taken which can be construed as an approval of the "Pittsburgh Plus" practice or which will aid those who are maintaining it in making it more effective.

Advanced Courses in Metallurgy at Carnegie Tech

Carnegie Institute of Technology, Pittsburgh, has been selected by the United States Naval Academy at Annapolis to give advanced courses in metallurgy to its graduate officers. The institution is the only school in the country chosen for this work. Beginning next September, the Naval Academy will send two ordnance officers, graduates of the academy, for a year's study in advanced metallurgy. The officers will be here for the full college year. Their studies will be graduate work in advanced metallurgy with some studies in electricity and physical chemistry. Other groups of graduate officers are assigned each year to various colleges or universities to study along specialized lines. F. F. McIntosh, associate professor in metallurgy at Carnegie Tech, will supervise the studies of the Naval officers. Lieuts. Gilbert C. Hoover and John H. Keefe have been assigned to take the work the next college year.

Iron and Steel Companies Object to Freight Rates

WASHINGTON, July 18.—Eastern Pennsylvania iron and steel companies yesterday filed a complaint with the Interstate Commerce Commission, protesting against alleged discrimination against them and in favor of the Bethlehem Steel Co. in rates on steel products to New York. It is claimed that the rate from Bethlehem, Pa., to New York is 16c. per 100 lb., while the rate from plants of the complainants is 19.5c., a differential of 3.5c. or 70c. a ton. It is stated that if the rate from group B plants—that is, plants whose average distance from New York is 105 miles—were established on the same percentage of the fifth class as the rates from group A plants—that is, plants which are on an average distance of 175 miles from New York, the group B rate would be 16c., the rate from Bethlehem, or 57 per cent of the actual fifth class rate. It is further stated that if 16c. is the proper basis as related to the actual fifth class rate from Bethlehem, the rate from the other plants in group B should be 14c. and the rate in group A should be approximately 18c. per 100 lb. It is stated that the distance from Bethlehem and Nicetown, Pa., both in group B, to New York, is the same, yet there is a differential of 70c. in favor of the former. The complaining companies are the Alan Wood Iron & Steel Co., the American Bridge Co., the Lukens Steel Co., the Midvale Steel & Ordnance Co., and the Phoenix Iron Co.

Coal and Coke Shipments

Figures recently made public by the Pittsburgh office, United States Engineers, on the movement of coal and coke over the Allegheny, Monongahela and Ohio rivers, in May and June line up closely with the increases recorded in the rail shipments during that month. Western Pennsylvania Railroad coal loadings which fell below 1000 cars daily about the middle of April increased steadily in May and June, and in the last week in June reached a daily average of 2450 cars. River shipments in net tons, make the following comparison:

	June	May	Increase
Coal			
Allegheny	28,895	17,370	11,525
Monongahela	196,930	128,622	68,308
Ohio	106,011	138,350	*32,339
Total	331,836	283,742	48,094
Coke			
Monongahela	33,675	28,112	5,563
Ohio	16,600	16,765	*165
Total	50,275	44,877	5,398

*Decrease.

What Will Next Ten Years Bring in Steel?*

Drift Toward Consolidation—Profits Through New Economies in Production, Not by Any Price Maintenance Policy—Leadership Ability for Future Not Lacking

BY A. I. FINDLEY, EDITOR THE IRON AGE

THE men of the steel trade—leaders, lieutenants, rank and file and all—were surprised at the way their business picked up four months ago. Some of them are not sure to-day that they know why the country's steel plants have been turning out products for weeks at a greater rate than was reached in either of the peak pre-war years, 1913 and 1914. Hopeful as prophecies were thought to be at the opening of 1922, no man of light and leading in the business went further than to say that operations might get up to 60 or 65 per cent at some time before the year ended.

This is not the first time steel men have been taken unawares. The ups and downs of the past forty years have shown so many sudden reversals of form that one of the most dependable formulas in iron and steel is that it is the unexpected that happens. Yet every time of prosperity regularly produces a crop of prophets who are confident that pig iron and steel will never again sell as low as in the years before that particular boom. Likewise, when they are groveling in the depths of depression no other industry can show so many men who see no chance for prices ever to rise to the mad heights reached in the last previous ascent when clamorous buyers took pig iron from the blast furnaces before it fairly had a chance to cool.

There must be some connection between these uncertainties of steel, and the kind of men who have led in the development of the industry in the United States. No doubt something inherent in the industry has developed in those who work in it the willingness to risk; it is also the fact that the courage to push out that has been shown by so many American steel captains has put its stamp on the whole industry. Karl Wittgenstein, Austrian steel master of twenty years ago, sometimes called the "Carnegie of Austria, was a close student of iron and steel progress in the United States. He found here a high development of the speculative faculty—speculative in the better sense of willingness to risk uncertainties in carrying on great enterprises. He praised the American "capacity for taking into consideration besides the visible factors also the uncertain ones lying in the future, and of coming to corresponding decisions even at the risk of having events turn out quite differently."

This tradition of the uncertainties of steel making in the United States and of the American way of meeting them may need revising as time goes on. Prophecy is daring business to-day, just following a year in which production fell to the lowest point on record in relation to existing capacity. But that was a sequel of the greatest of world upheavals. Those who are trying to look ahead in steel see tendencies apart from the readjustments from war conditions, and are thinking of the outcome of these tendencies in the steel trade of five years or ten years from to-day.

The drift toward consolidation is probably the most obvious fact in the industry to-day. While for one reason or another some companies that have been included in recent merger projects have decided not to go ahead with those particular plans, the movement toward large capital aggregates is likely to go farther. The answer to the advantages the Steel Corporation has, so far as these are due to its diversity of product and to its vast raw material holdings, may be two or three large companies with plants at the various strategic points of production and distribution. Whatever the technical or official outcome of the action of Western consumers to do away with Pittsburgh basing in the sale of steel, independent producers are bound to take such steps as will insure to the corporation's chief competitors whatever benefits it now derives from the single-base régime.

Element of Governmental Scrutiny of Mergers

It is interesting, in connection with present efforts toward consolidation, to see that altogether apart from any initiative of manufacturers the Government at Washington is now preparing to pass judgment *in advance* on steps the steel industry may take without fear of prosecution under the Sherman act or the Clayton act. This is the very thing Judge Gary proposed, when the Gary dinners were being called in question and when Congressman Stanley was putting steel men on the grill to extract the evidence on which the dissolution suit was brought in 1911. But the Department of Justice in the Taft and Wilson administrations—in the Roosevelt days also, with the single exception of the permission given for the purchase of the Tennessee company by the Steel Corporation—steadily declined to say in advance whether a contemplated plan of a corporation might be carried out without inviting Government prosecution. Now, at the instance of the Senator from Wisconsin, the Attorney-General and the Federal Trade Commission have said to those about to merge, "Do nothing until you see us."

Like the policeman at the crossing, these Government agencies have set the "Stop" signal, not fully realizing, perhaps, all that will be involved later in turning the target to "Go."

These recent Washington moves, that have had their place in the news of the day along with other incidents classed as political, may have more of a bearing on the future of the steel industry than has yet been suggested. Next to the railroads, coal mining has been a chief object of Government attention. There are obvious reasons for Federal oversight of transportation, and more than one situation in the coal mining industry in the past twenty years has warranted Federal action; but even in the war period, with steel the most vital of all war implements, the full co-operation and competent management of the heads of the industry were judged at Washington to be far preferable to Government control of plants or output.

Just now the future of steel manufacture in its relation to the public seems likely to turn on the view taken by official Washington of what is aimed at in the consolidations under way and others that may come forward. In view of what has happened to them in the past year, and of what is ahead when the real test comes after the coal strike, the independent producers of steel urge that the new consolidation movement represents an effort to give the Steel Corporation real competition and hence is in the public interest.

Those who have been declaiming at Washington against any further concentration in steel on the ground that monopoly is aimed at through final co-operation with the United States Steel Corporation forget the narrow ground on which the decision favorable to the latter was given in 1920. The participation of Justices Brandeis and McReynolds in any future suit based on proved co-operation between the Steel Corporation and its competitors would be quite certain to give a different outcome. The Steel Corporation seems to have had this well in mind in deciding its market policy since the famous suit.

The course of the steel market in the past two years gives no ground for expecting that the Steel Corporation will make the race easier for its competitors in the years just ahead.

Profits will be made in the coming five years by new economies in production and not by any policy of price maintenance entered into by the leading producers.

*Reprinted by permission from [illegible]

And economy in production means that the steel companies will continue to be prodigal spenders for labor-saving, fuel-saving, and time-saving equipment and for new facilities to get increased tonnage. The steel company bond issues of the past few years are an index of the unending call for capital to provide new capacity and to make the old more efficient. That more than $100,000,000 has been appropriated first and last by the Steel Corporation for Gary alone, suggests the scale on which other steel makers must lay out money to maintain their position. It is one of the reasons also for the effort to get greater strength by further consolidation.

The question may be raised whether the future will bring any change in the policy long followed in iron and steel, of building new plants when the pressure of demand is greatest, with the frequent result of having the newly finished capacity ready just as the market turns downward as depression comes on. Thus the new capacity at Gary lay quite undigested for three or four years. But each return of prosperous times has called for all the plants in existence and more; and so the process of over-building and of catching up has been repeated time after time.

More consolidations in steel might bring, in the next decade, some modification of this traditional practice. Blast furnaces and steel plants mean huge money outlays. One modern blast furnace with accessory ore yard and auxiliary equipment represents $2,000,000, or four times the outlay of twenty-five years ago. Rolling mills for the production of finished steel can be built cheaply in comparison with the cost of the blast furnaces and steel works requisite to feed them. Thus the idleness of a rolling mill in time of depression is far less serious from the investment standpoint than that of blast furnaces and steel plants.

Carrying Large Stocks May Be the Rule

Strong companies may yet find that there are economies in carrying large stocks of raw and semi-finished products—pig iron, ingots, slabs and billets—with ample finishing capacity for the peaks in demand. The stored pig iron and raw or semi-finished steel would simply represent to an integrated company the putting of a certain amount of labor upon given quantities of ore and coal it has in the ground. It can be seen that the interest on capital required for carrying such stocks might be far less than that involved in idle plant, with the added advantage of having pig iron and steel on hand to answer the call of the market when the revival came.

These matters of organization, competition, and the control of the instruments of production, in the steel trade of the future are interesting, but not less so is the question of the lines of steel consumption that are likely to see the greatest development in the next ten years. Without doubt the largest increases in uses of steel will be in the uncounted and almost countless lines that are individually of so little importance that they are not commonly catalogued. Railroad building, and automobile outlets are impressive. A skyscraper and a Queensboro bridge are spectacular; but the demand for which the bulk of the new capacity of the country has been built in recent years is rather that which ramifies into hundreds of uses and into thousands of sales to individual buyers.

In 1887, thirty-five years ago, the 2,000,000 tons of rails rolled in American mills were nearly three-quarters of the entire output of finished steel. In 1920, rails were just 8 per cent of the total of more than 32,000,000 tons. The large place long held by rails in the steel trade is responsible for the erroneous but common belief to-day that railroad demand is the steel manufacturer's chief dependence. It is often said in the discussions of well-informed business men, that in one way and another the railroads take 40 to 50 per cent of all the steel turned out. It is doubtful if at any time in the past twenty years the railroad consumption of steel has been more than 25 per cent of the whole. In late years, the percentage has been under 20; in 1921 it probably was little more than 10 per cent.

The average man is astonished to be told that wire products, many of them the most tenuous forms in which steel exists, now represent a larger annual tonnage than steel rails.

The leading wire company now lists no less than 5000 distinct products and manufacturing uses of wire.

Food containers call for a million tons of steel a year in the form of tin plate, and this use of steel is growing every day as the army of delicatessen buyers grows. In pre-prohibition days the crimped bottle cap was responsible for 50,000 tons a year on the books of the mills rolling steel for tin plate.

Steel Demand of the Future

A Central Western steel maker, who expects a 60,000,000-ton output for the United States by 1930, silences doubters by pointing out that there is not a civilized man, woman, or child on earth to-day who does not carry around from a quarter-pound to a half-pound of steel in pockets or clothing. There are the pen knife, the key ring, the belt buckle, the suspender and garter buckles, the pencil tip, the shoe shank, the shoe heel full of nails, and the steel buttons, eyelets, and snaps. There is practically nothing that the man of to-day eats or wears or uses in his work that is not made of iron or steel or produced by iron and steel machinery. From the toy shop to the automobile plant turning out a million cars in a year, the whole range of modern manufacture shows an increasing penetration of steel into every industrial activity and into the every-day life of the people.

Steel production has depended only in part on growth of population for its gains. Abram S. Hewitt, in his famous forecast of 1890, when British iron masters visited the United States in a body, advertised to the world the steady per capita increase in steel consumption year by year that even then had become an American habit. In 1890, in order to meet the demands, our steel works turned out 140 pounds per inhabitant. By 1900 the per capita had gone up to 347 pounds; by 1910 to 585 pounds; and by 1920 to 858 pounds. Steel is constantly replacing wood, and the great expansion in concrete work, which it was once thought would be at the expense of steel, has meant a larger call on the steel mills. No less than 600,000 tons of steel for reinforcing of concrete was produced in 1920.

Perhaps the most important changes to be looked for in the steel industry in the next ten years will be those affecting personnel.

Average Age of Steel Heads 59 Years

In the case of the Steel Corporation, some of these changes may come before the decade is half run. Breaks in the corporation's organization have been few—apart from the loss, one at a time, of five men whose names were prominent in the list of Andrew Carnegie's "young partners"—and the continuity in its management has been one of its great factors of strength. But every year now adds to the probability of new faces appearing in its higher official family. The average age of nine of its heads—chairman, president, and the seven presidents of manufacturing subsidiaries—is 61 years. The youngest of these subsidiary presidents is 53, and the oldest is 64.

Very similar is the showing in respect to the heads of important independent steel companies. Nine of them, with an aggregate of 532 years, average 59 years, and 59 is also the average age of the seven presidents of Steel Corporation subsidiaries.

Thus it may fairly be said that the steel industry gives conspicuous exemption from the edict of Osler. No other shows a stronger official personnel, and no other represents higher standards of executive capacity or greater mastery of the complicated problems of modern industry.

The past twenty years have been the most important in American industrial history, and it is fortunate that in such a period the steel trade has had the guidance of such practical hands. At the works, direction of operations has fallen to aggressive, well-trained men—school-and-works-trained, and where promotions have been made to higher executive places, they have been almost entirely of operating men. The oncoming second line is a strong one, and the industry need have no fear for the years just ahead, as retirement time comes for one and another of the seasoned leaders of to-day.

HOIST FOR CUPOLA CHARGING

Monorail Machine for General and Special Work —One Operator Controls All Movements

The Shepard Electric Crane & Hoist Co., Montour Falls, N. Y., recently designed a cupola charging attachment for its form 24 C. H. monorail hoist, arranged as shown in the accompanying illustration.

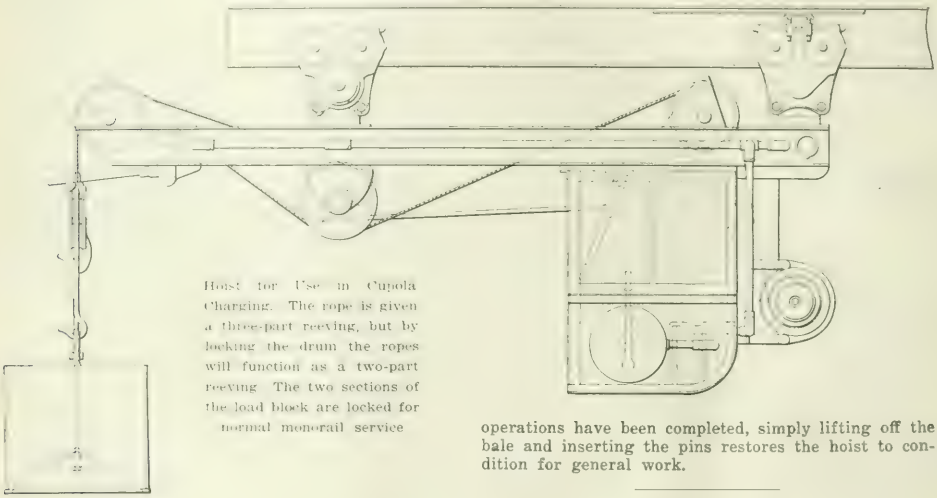
This machine is primarily a general service monorail hoist for all types of work for which hoists of that type are adapted, although extending its use to cupola charging has made several modifications of the standard form 24 unit necessary. In the machine illustrated the hoisting rope and load block are pendant from an extension of the hoist frame, which places them forward of the front trolley a sufficient distance to permit a suspended bucket to enter the cupola. In the standard machine, on the other hand, the hoisting rope and load block hang from the hoist frame a short distance back of the front trolley.

The hoisting rope is given a three-part reeving. The dead end of the rope is attached to an independently movable section of the load block, and one loop of the hoisting rope, which would normally pass around an upper sheave, is deflected over sheaves to an auxiliary winding drum located under the main frame. This drum is provided with a hand brake by means of which the drum and attached ropes may move in a manner normal for the ropes and upper sheave for a three-part reeving. By locking the drum the ropes will function as a two-part reeving; the dead end for the time being is at the periphery of the auxiliary drum and the third part of the rope, which was normally the dead end, with attached parts remaining stationary. The two sections of the load block are provided with pins for locking them together for normal monorail service, and to separate them so that they may function independently when operating as a cupola charging machine.

For cupola charging a bale carrying two extra hooks is hung across the top of the load block, and the pins are withdrawn. The hoist is then ready for cupola charging. The weight of the bale is sufficient to overcome the running friction of the hoisting rope, and the load block with its three hooks moves up or down as a unit just as if its several parts were connected together.

With the loaded charging buckets placed in line directly under the monorail runway, the operation of the charging hoist proceeds as follows: The hoist load block is lowered so that the three load hooks come opposite the three loops, forming the suspension members of the bucket. The hoist is then traveled forward until the hooks enter the loops as far as they will go, the hoisting motion being started and the bucket lifted to a height that permits it to enter the cupola door, the hoist being then traveled forward until the bucket enters the cupola and is central with the cupola walls. The lowering motion is started, the bucket descending into the cupola to within about 4 ft. of the top of the materials previously charged. The hand brake controlling the rotation of the auxiliary drum is set, the drum stands still, as also the upper section of the load block, the bale and the body of charging bucket. The movable bottom of the bucket continues to descend until the bucket is wide open when the lowering motion is stopped.

The contents of the bucket having been discharged, the hand brake is released and the bucket closes by its own gravity. The bucket is then hoisted to a level with the cupola door, the hoist traveled back, and the bucket deposited for refilling. It is detached by movements the reverse of those used in attaching it. Attaching and detaching buckets to the hoist, as well as other features of charging the cupola, are easily conducted by the hoist operator alone. When charging operations have been completed, simply lifting off the bale and inserting the pins restores the hoist to condition for general work.



Hoist for Use in Cupola Charging. The rope is given a three-part reeving, but by locking the drum the ropes will function as a two-part reeving. The two sections of the load block are locked for normal monorail service

New German Method of Hardening Steel

A new process for hardening steel has been patented recently in the United States by Wilhelm Winter, Remscheid, Germany. It is the result of experimental work by the inventor in his steel hardening plants at Remscheid, known as the Westdeutsche Stahl Harte Gesellschaft. Since the process was perfected over a year ago it has been in use in a number of German plants producing machine tools, gears, axles, springs, etc. An unusual degree of hardness is said to result from the application of the process and a considerable saving in cost.

There are two treatments, a heating bath and a cooling off process. The material to be hardened is first placed in the heating bath, where it remains until it obtains a temperature equal to that of the bath. When this stage is reached it is taken out and passed through a cooling-off process, which is accomplished without the use of any materials such as oil, water or compressed air. The patentee states that the feasibility of the chemical reactions appearing in the treatment has been demonstrated to the German patent office by laboratory analysis and experiment, and that the tests and demonstrations took place in the Technical High School at Charlottenburg.

Henry Engels, 55 Buffalo Avenue, Brooklyn, acquired the American patents late in June. He plans to have in operation soon a plant and testing laboratory for demonstrating the process. Hans Becker, Remscheid, Germany, recently arrived in the United States and will be associated with Mr. Engels in this work.

What Is Today's Shortage in Pig Iron?

The Trend of the Years Before the War and the Low Rate of Consumption Since Indicate a Deficiency of Over 25,000,000 Tons

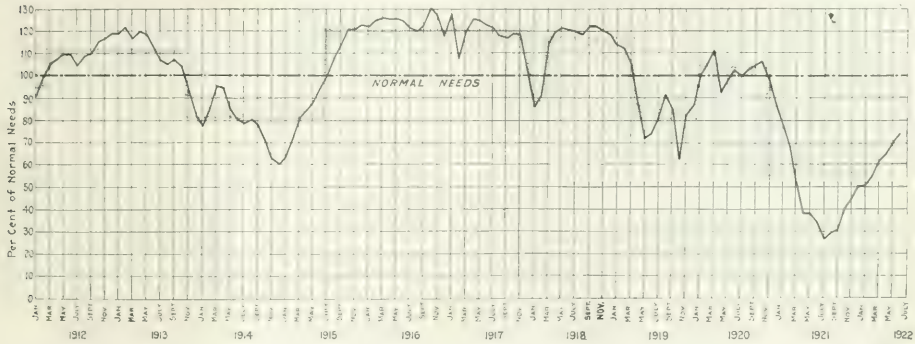
IF we take the mean of the ups and downs of production over a number of years, we approximate the trend of consumption or demand. Such a trend line extended for a period beyond the years of observation gives an indication of the approximate needs of the extended period. For pig iron such a curve and the corresponding figures of the theoretical requirements were given in THE IRON AGE of March 3, 1921.

Considering these needs as normal, then for a given month the actual production either more than satisfies the current normal or is short of doing so, or it may equal the calculated amount. Periods of excess must then be followed by periods of deficiency. Assuming no great change has occurred meanwhile in general conditions, the consumption of the material is following the law indicated by the past. This may mean that new uses are constantly being found for iron and its derivatives, that per capita consumption is therefore on the increase, and that the total is further swelled by increase in population. When against a line corresponding to the normal are plotted the percentages above or below the normal, then the eye gets a picture of the over-supply or under-supply.

A trend line over too long a number of years may cover such epochal changes in the material, such as a revolution in process, and therefore a revolution in possibilities of use or of price, that even short extensions into the future may exaggerate unduly the indications of the past. Thus, in the period of the war, so great was the dislocation of peace-time industrial activities that production statistics for that time might easily give an incorrect indication when combined with those of periods affected little or not at all by war.

In the accompanying curve for pig iron deviations from normal the years of the war were not considered. Eliminating from the calculation the unusual stimulus for output kept the line of apparent or theoretical needs lower than it otherwise would have been. In other words, the excess above the normal in the war period would not be so great as is indicated and deficiencies later would be greater. Moreover, no attempt has been made in determining the normal to assume or estimate any hoped-for increase in exportation. Should such increase occur it might indeed balance some other opposite factor not now apprehended. Naturally the records of a new group of years will bring about modifications of the equation which mathematically may be given to the trend line, and the normal line is thus subject to a change as sufficient additional information becomes available.

The shaded areas above and below the normal line are equivalent to the areas inclosed by the production curve. While they give an idea of a great deficiency in the amount of pig iron made, the theoretical deficiency is even greater, as to-day's normal needs are considerably greater than even those of war time. In the article referred to, it was shown that the production for the fourteen years ended with 1913 was hardly 1 per cent greater than the total needs for that period. Production was 309,453,000 tons and the theoretical requirements totaled 306,450,000 tons. Thus it may be said that 1914 opened with no deficiency. Then came subnormal production for all of 1914 and half of 1915 until war demand turned the scale, and we had 45 months of supernormal production, save for the months of January and February, 1918, when there was a temporary check, because of shortage of fuel and collapse of transportation, due in turn to weather of extreme severity. The 45 months of war activity gave an excess over theoretical needs of two and one-half times the deficiency of the 18 months immediately preceding, or a net excess of 13 million tons.



Excesses and Deficiencies in Pig Iron Production from Month to Month, the Comparison Being with Theoretical Requirements Determined by a Balancing of the Ups and Downs Over the Fifteen Years Before the War. The deficiency since early in 1919 appears to be 31 million tons to date. Allowing one-half of the 13 million tons excess production in the war period for peace time needs would leave a shortage of 25 million tons

But even assuming the country started at the end of the first quarter of 1919 with this excess of 13 million tons available for later consumption, there is still a great apparent deficiency. There were 9 months of under-production (the remainder of 1919), some over-production for the first three months of 1920, a slight falling backward for 2 months, then 5 months more on the positive side and finally the 20 months up to date, most of the time far below theoretical needs. In these 39 months, there were only 8 with output greater than needs.

The areas show that the deficiency due to sub-

normal production was fully 28 times the excess production. The figures indicate over 31 million tons deficiency, so that if the 13 millions excess of the war period were available, as it was not (much going into ships, shells and engines of destruction not now in existence), there would still be a shortage of 18 million tons; or if one-half of excess war production could be charged against peace-time pursuits, the shortage would be 31,000,000 minus 6,500,000, or 24,500,000 tons.

A decided change in the rate of consumption would need to be shown to nullify the claim of the shortage. It is to be noted that in spite of the improvement since July, 1921, when the production was only 27½ per cent of needs, the output of June, this year, was only 75 per cent of the normal and not as much as two-thirds of the total capacity of the country.

Methods for Locally Preventing Case Hardening

Protective Layers Applied with a Brush and Coating with Copper Compared by French Authorities

METHODS for locally preventing case hardening is the title of an interesting article in *Revue de Metallurgie* for April, 1922. The authors are Jean Galibourg and Marcel Ballay.

A method often employed is to cover the desired parts to be protected with a thin coating of copper, deposited electrolytically. This method presents numerous advantages, but it requires rather costly material and the method takes a long time because it needs two principal operations: First, the varnishing of the parts to be case-hardened and, second, the electrolytic coating of the remainder of the piece.

Many efforts have been made to obtain a simple method for the efficient protection against case hardening by coating the parts to be protected in one operation by a layer impermeable to the gases producing the cementation. The authors publish their results obtained on various methods.

I. Direct Application of Protecting Layer Applied with the Brush.

We have started with the principle clearly established by Guillet and Bernard that copper is the best of the usual materials to use as an anticementation coating.

Organic Varnish and Powdered Copper.—A paint formed of copper powder and a varnish, the base of which was resin and turpentine, has been used previously as a protection. This paint protects very imperfectly. A microstructure is shown in the original paper giving the penetration of carbon in material covered with this paint. The coating is also very fragile and is easily detached during handling. The inefficiency of this protection seems to come from the presence of carbon in the paint itself.

Silicate of Soda and Powdered Copper.—Very good results are obtained by replacing the organic varnish with commercial silicate of soda. A microstructure shows the results obtained on very soft steel, using a mixture of one part silicate of soda and one part powdered copper by weight. The case hardening is absolutely nil. This paint, copper-silicate, dries rapidly and resists rubbing and blows very well. As against this material may be advanced its high price, due to the high cost of powdered copper and its adherence to the piece after cementation and quenching. There is, as a matter of fact, a great deal of difficulty in detaching the coat which limits its use to the protection of parts that have to be afterwards machined.

Silicate of Soda, Powdered Copper and Inert Material.—The addition to the copper of a convenient inert material allows the cost of the coating to be reduced and the adherence after quenching. In the following table are given the results of some of the tests on bars case-hardened to 1 mm. depth:

Composition	*Results*	*Observations*
Powdered [illegible]	Good protection	The coat is very adherent after quenching.
Copper ⅔, powdered [illegible]	Good protection	The coating detaches after quenching.
Copper ⅔, powdered [illegible]	Feeble penetration	The coating detaches after quenching.
Copper ⅔, powdered [illegible]	Strong penetration	The coating detaches after quenching.
Copper ⅔, kaolin [illegible]	Bad protection	
Copper ⅔, [illegible]	Good protection	The coating is adherent after quenching.
Copper ⅔, [illegible]	Feeble penetration	The coating is adherent after quenching.
Copper ⅔, powdered [illegible]	Good protection	Difficult to use. The paint thickens rapidly. Coating very adherent after quenching.

It is seen that among the materials tried, as shown in the preceding table, two only are worthy of further use, namely, powdered emery and oxide of iron. The oxide of iron should be eliminated because the coating is only removed with great difficulty after the operation.

Other Mixtures With or Without Copper.—The results with other mixtures with or without copper are:

Composition	*Results*
Aluminum and silicate	Protection very imperfect.
Copper ⅔, aluminum ⅓ and silicate	Protection imperfect.
Copper ⅓, aluminum ⅓, powdered emery ⅓ and silicate	Protection imperfect.
Powdered emery and silicate	Bad protection.
Kaolin and silicate	The coating cracks or drops away from the steel.
Oxide of iron and silicate	The coating cracks or drops away from the steel.

From this last series of experiments the conclusion is drawn that, unfortunately, powdered aluminum cannot replace powdered copper. This is regrettable because of the lower price of aluminum. The results of the three last mixtures show that the presence of powdered copper in the coating is indispensable.

Conditions of Use of Copper-Emery-Silicate Paint.—Following the experiments outlined above the mixture decided upon was as follows:

Powdered copper	2 parts by weight
Powdered emery	1 part
Commercial solution of silicate of soda in sufficient quantity to give a thick paint.	

The coating obtained with this mixture is very adherent before heating and is easily removed from the steel after case hardening. The best method of preparing the paint is to mix the powdered copper and emery before use and just before applying to the steel adding the necessary amount of silicate of soda to give the desired consistency. The silicate is added little by little so as to make first a thick paste and then is brought to the necessary fluidity to flow freely from the brush. If while being used the mixture thickens a little more silicate is added.

Removal of Grease from the Steel.—Experience has shown that the paint will only protect properly if the parts are perfectly free from grease. Removing grease with a bath of hot potash solution is altogether insufficient, the mineral oils being only partially or not at all emulsified. The simplest and the most efficient method of removing grease seems to be to heat the samples in a furnace to about 500 deg. C. (932 deg. Fahr.), avoiding in all cases a red heat. From numerous tests made under these conditions carried out on several thousand pieces good results have always been obtained.

The question of finding the hard parts in the protected areas is made very simple after quenching. The

pieces, sand blasted with care, are immersed for one or two minutes in a copper reagent, similar to the Stead reagent. The parts not case hardened are strongly covered with copper, while the case-hardened parts are not affected. Further, this may be proved by means of a file or by a Brinell hardness test.

Application and Drying of the Coating.—A coating is required of about ½ or ¾ mm. thick, in order to protect against case hardening 1 mm. deep. When the paint is correctly applied drying takes about 15 min., and at the end of this time the pieces may be handled without danger. In every case the pieces may be placed in the boxes 1 hr. after being covered with the paint. Where there is need for speed or if a rapid drying is necessary on account of the shape of the piece (for instance, protection of salient angles) the paint may be applied to pieces previously heated to 70 to 90 deg. C. (158 to 194 deg. Fahr.); drying is then quite rapid and the pieces may be placed in the boxes 15 min. after.

Comparison of Price Compared with Electrolytical Copper Treatment.—If the simple cost of materials is considered the advantage is with the electrolytical method, but if it is remembered that painting with the silicate allows four times the number of pieces to be treated and does not require the expensive installation of baths, etc., the advantage is very clearly in favor of painting. It is very evident that the choice of one or the other method depends entirely on the kind of materials to be protected against case hardening. In the case of large pieces of which only a small part is to be case hardened the advantage is greatly with electrolysis.

II. Coating by Immersion in Copper Solution.

As is well known, iron displaces copper from a copper solution and produces a deposit of copper, the appearance and compactness of which differ according to the solution used. If an ordinary solution of copper chloride or copper sulphate in water is used the iron or steel is covered very rapidly with a powdery and a fragile deposit, which does not give any real protection against case hardening. If chloride of iron is added to ordinary copper chloride solutions in increasing quantity the deposit is produced much more slowly and is more adherent, according as the amount of chloride of iron is greater. In every case the most compact deposits detach in little scales if the action is prolonged long enough to give a thick coating. Ammoniacal chloride of copper solution (the Heyn reagent) gives a similar deposit that scales off when it reaches considerable thickness. The coating obtained with alcoholic solution, such as the Stead reagent, is continuous resistant and similar to an electrolytic coating. These methods were carefully tried out by covering the coating obtained with glue and solution of gum-arabic.

The results obtained were not better than from electrolytic coatings and like them required a preliminary covering with varnish on the parts to be afterwards case hardened. The only case where their use would seem to be indicated would be if one wished to protect the end of a piece by immersing the part to be protected in a dish or vat at a constant level. In this case the solution with chloride of iron and water or alcoholic solution would seem to be the best. G. B. W.

Civil service examinations are to be held by the United States Civil Service Commission, Washington, for an assistant examiner of the patent office, for an instructor in machine guns and armament at Raritan Arsenal, Metuchen, N. J., and for instructor in the ordnance department at Watertown Arsenal, Mass. Applicants should apply for form 1312, stating the title of the examination desired.

Construction of foundations for the new mechanical puddling plant at Warren, Ohio, to be erected by the Youngstown Steel Co., Youngstown, will commence during the next two weeks, and will be carried forward by the company's own organization. Excavation is virtually completed.

MALLEABLE CASTINGS

Great Improvement Made in Past Ten Years Described

The story of the great improvement in the quality of the malleable iron castings during the past few years is told in an interesting 32-page illustrated booklet entitled "Certified Malleable in Transportation and Industry," just issued by the American Malleable Castings Association, Cleveland. This recounts the results of the efforts of the association through its research department to improve malleable castings. It is asserted that less than 10 years ago there was little definiteness to the physical properties of the malleable iron and that there were virtually as many varieties as there were foundries making it. Co-operative efforts were started in 1913 by the 25 members of the association, which has since increased its membership to 50. Through these efforts, it is stated that the manufacture of malleable iron has been changed from a hit or miss proposition to a scientific basis.

When the research work was started, with a view of improving the physical properties of malleable iron, members were required to submit test bars daily. At that time the specifications of the American Society for Testing Materials for malleable iron called for a tensile strength of 38,000 lb. and 5 per cent elongation in 2 in., but this specification exceeded the product of many foundries. Through individual plant inspection the adoption of more successful practices and the regular submission of test bars, it was not long before a majority of the malleable foundries were making castings exceeding the A. S. T. M. specifications and subsequently at the solicitation of this association these specifications were raised to 45,000 lb. tensile strength and 7½ per cent elongation in 2 in., this specification being later adopted by the Society of Automotive Engineers. The association was inspired by its success to further improve its products and as a result a new specification of 50,000 lb. per sq. in. tensile strength and 10 per cent elongation has been adopted recently. It is pointed out that other desirable properties have shown even greater improvement. Experiments have been conducted to develop soundness, machining qualities and finish. The use of chills has given way to a proper proportioning of gates and risers, so that voids due to unequal cooling of the metal may be eliminated rather than driven to other parts. Scaled castings have been eliminated by the proper selection and treatment of packing materials and the proper protection of casting during annealing.

Rôle of the Microscope

The practice of issuing certificates of merit to foundries whose products meet the rigid requirements of the association, from which developed the term "Certified Malleable Castings," is described, as well as some of the manufacturing processes. The microscope is given credit for accomplishing much in bringing malleable castings to their present high standard of quality. It is stated that one of the most popular fallacies regarding malleable castings was the belief that the valuable properties of the casting is confined to its surface and that it has a tough outer skin with a hard brittle interior. It is pointed out that a study of the better malleable casting with the use of the microscope revealed that malleability was not due exclusively to the decarbonizing effect of the packing material, but rather to the breaking up of the hard carbides and the formation of ferrite or carbonless iron, the most ductile form of the metal, and that this was not confined to the outer layers, but extended to the center, thus substantiating the theory on which present day American practice is founded.

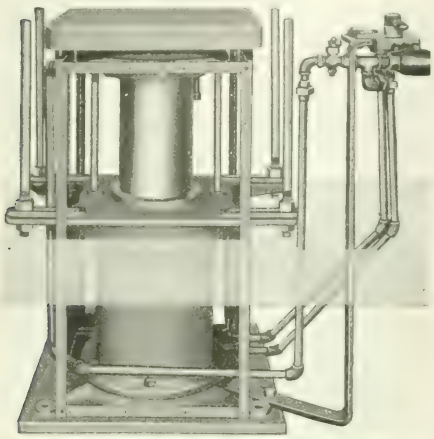
Comparisons are made of the physical and mechanical properties of malleable as compared with grey iron and steel castings, drop forgings and compressed steel and attention is called to the easy machining qualities of malleable iron. Numerous uses of malleable castings are listed and it is stated that from 200 to 250 lb. of malleable castings are now used in many of the best types of automobiles for various vital parts.

New Jolt Stripper Molding Machine

A new style jolt stripper of the type shown in the accompanying illustration has been added to the line of the Arcade Mfg. Co., Freeport, Ill.

The new machine has a 6-in. jolt cylinder and a 12-in. air strip. In this design the stripper frame, which carries the pins for engaging the stripping plate, or the flask when a stripping plate is not used, is mounted on a ring piston. The latter is guided around the jolt cylinder column and inside the cylinder shell at the bottom of the machine. For a 12-in. lift the ring piston is provided with an 18-in. bearing on the guide column, which is intended to assure perfectly vertical motion that will lift a flask with the sand from a pattern having the minimum of drag.

The 12-in. strip machine is placed with about half its height below the floor level, those with the 8-in.



Jolt Stripper Molding Machine. The stripper frame is mounted on a ring piston

strip being placed on top of the floor. The lifting pins, which engage the stripping plate or flask, are adjustable for flasks of different sizes. This equipment is made also with hand strip and with two lift cylinders for long flasks.

Papers for Steel Plant Electrical Engineers Convention

A tentative list of the papers to be presented at the sixteenth annual convention of the Association of Iron and Steel Electrical Engineers at Cleveland, Sept. 11 to 15 inclusive, is as follows:

"Improvement in Efficiency of Electric Power Supply" by Dr. Charles P. Steinmetz, chief consulting engineer General Electric Co., Schenectady, N. Y.

"A Review of Steel Mill Electrification" by B. G. Lamme, chief consulting engineer Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., and Wilfred Sykes, assistant to operating vice-president Steel & Tube Co. of America, Chicago.

"Industrial Control Improvements" by A. G. Witting, assistant chief engineer Illinois Steel Co., Gary, Ind.

"Electrification of the International Nickel Company's Works for Monel Metal" by F. C. Watson, electrical superintendent International Nickel Co., Huntington, W. Va.

"The Gas Engine as a Prime Mover for Power Generation" by D. M. Petty, electrical superintendent Lehigh plant, Bethlehem Steel Co., South Bethlehem, Pa.

"Steam Turbines" by L. W. Heller, assistant superintendent power stations Duquesne Light Co., Pittsburgh.

"Some Considerations in the Electrification of the Steel Plant Railroad Yard" by R. B. Gerhardt, electrical superintendent Bethlehem Steel Co., Sparrows Point, Md.

"Power in the Iron and Steel Industry" by D. B. Rushmore, consulting engineer General Electric Co., Schenectady N. Y.

"Boiler Practices of 1922," a topical discussion by J. B. Crane, combustion engineer George T. Ladd Co.; E. R. Fish, vice-president Heine Boiler Co.; R. M. Rush, Springfield Boiler Co.; [illegible]

Electric Furnace Construction Co.; Professor Edgar Kidwell, general manager Kidwell Boiler & Engineering Co.

"Control Standardization" by F. W. Cramer, engineer of tests Cambria Steel Co., Johnstown, Pa.

"Motor Standardization" by D. M. Petty.

"Investigation of Insulators for Steel Mill Service" by A. R. Leavitt, engineer of tests Carnegie Steel Co., Duquesne, Pa.

"Electric Furnaces" by E. T. Moore, electrical engineer Halcomb Steel Co., Syracuse, N. Y.

"Lighting in Steel Plants" by R. H. Bauer, electrical engineer Carnegie Steel Co., Clairton, Pa.

"The Question of Safety in Steel Mills" by F. A. Wiley, electrical superintendent Wisconsin Steel Co., Chicago.

"Education" by L. F. Galbraith, electrical superintendent West Penn Steel Co., Brackenridge, Pa.

"Electrical Developments in 1922" by R. B. Gerhardt.

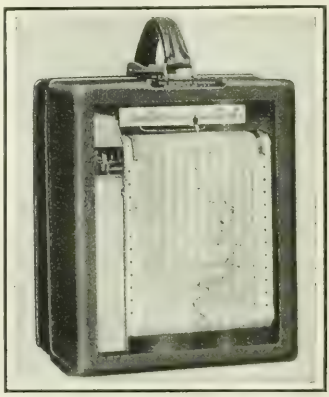
"Crane Standardization" by R. S. Shoemaker, superintendent of maintenance American Rolling Mills Co., Middletown, Ohio, W. S. Hall and E. Friedlaender.

Combination A. C. and D. C. Voltmeter

A graphic voltmeter known as the Utility and said to be equally accurate on all commercial frequencies of alternating current and direct current as well, has been brought out by the Esterline-Angus Co., Indianapolis.

The meter, shown in the accompanying illustration, is made of the portable type, the case being of aluminum, finished in hand-rubbed, baked enamel. The clock provided is an 8-day marine type, inclosed in a separate case, and five hourly chart speeds, ¾, 1½, 3, 6 and 12 in. per hour are obtainable. The clock can also be fitted to give additional hourly chart speeds, and the same speed for inches per minute as well. The chart is 6 in. wide and 90 ft. long.

The measuring element incorporates unique features, a molded bakelite frame being used to give high insulation and accurate assembly. The moving system, instead of being mounted on a staff carried by pivots



Voltmeter for Both Alternating and Direct Current Service

and jewels, is supported on a taut steel suspension wire. This arrangement is intended to eliminate friction and make the instrument really portable, because the suspension is not affected by shocks, jars and vibration. The ink well and the damper are molded integrally with the frame, and constructed to eliminate spilling of the ink with ordinary handling.

The instruments are available in the following ranges: 0-150; 0-300; 0-600 and 0-750, and can be furnished with combinations of two, three or all four of the ranges given.

The Kilby Mfg. Co., which recently resumed the operation of its foundry in Cleveland on an open shop basis, has brought suit asking for a restraining order against members of the union to prevent them from picketing its plant.

Electrical and Magnetic Weld Testing*

Their Application to Butt-Welded Steel Plates—Comparison With Physical Tests—Commercial Possibilities of Magnetic Testing

BY T. SPOONER AND I. F. KINNARD

IN spite of the very rapid progress made in recent years in the application of arc and gas welding, this progress would have been more rapid if at the same time there had been developed a reliable and simple method of determining the quality of welded joints. Provided plenty of reliable and competent operators are available, it is well known that many important structures such as large tanks, steel ships, boilers and perhaps the steel frameworks of bridges and buildings could be safely joined together by welding alone. However, since the results are always in doubt where the human element enters in and since visual inspection alone will not reveal the presence of slag inclusions, incomplete fusion of metal, etc., the applications of welding methods have been greatly retarded for important structures where reliability is essential.

There are various possible methods of inspection available such as X-ray analysis, acoustical methods,

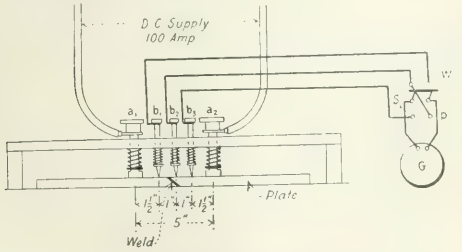


Fig. 1.—Diagram of Apparatus for Electrical Tests of Butt-Welded Joints of Steel

electrical tests, magnetic tests, etc. This paper will describe some preliminary laboratory tests to determine the possibility of applying electrical and magnetic methods for testing the quality of butt welds joining steel plates. These preliminary tests were merely to determine whether or not such methods showed promise of ultimate success and not to develop commercial testing apparatus.

Samples

Four pairs of steel plates having the following dimensions were butt-welded by an experienced operator:

Plate	Thickness, In.	Length of Weld, In.
A	1/2	16
B	1/4	24
C	1/2	24
D	1/2	24

The joints were made according to a predetermined schedule and were designated by the welder as good, fair and poor, over various sections as will be noted later.

Methods of Test

The method of application was similar for the electrical and magnetic methods of test and consisted in measuring the electrical or magnetic potential drop across the weld with a definite e.m.f. or magnetic potential applied on opposite sides of the weld. This drop was compared with the drop over an equal length of unwelded plate. The e.m.f. or magnetic potential was applied at points fairly close to the weld in order to localize the effect. If the e.m.f., for instance, had been applied at the edges of the plate parallel to the weld, the current would have distributed itself inversely as the resistivity and the potential drop across the various portions of the weld would have been nearly the same regardless of the quality.

Electrical Tests.—The apparatus constructed to make use of the electric current for weld testing is shown in Fig. 1. The current, in this case 100 amperes direct current, was passed into the plate through two heavy brass posts a_1 and a_2. A galvanometer was connected through the switch S_2 to either b_1-b_2 which was across the weld, or to b_2-b_3 which was across an equal distance on the plate. Consequently, readings could be readily obtained for any point in the weld which indicated the difference, if any, between the weld and plate at that point. In general the weld had a higher resistance than the plate and consequently the potential drop was greater for the former. The difference between the above readings expressed as a percentage of the plate readings represents the percentage decrease in the quality of the weld based on the plate. The quality of the weld is expressed as 100 minus the percentage decrease as just defined.

The scale was first removed from the plate over the portion to be tested. The plate was then marked off into 1-in. strips and readings were taken at the center of each strip. In all cases these readings were repeated several times and it was found that reasonable checks could be obtained.

Magnetic Tests.—A magnetic tester was designed incorporating the same general principles utilized in the electrical method. Fig. 2 shows the general arrangement. A method of measuring magnetic potential drop was originally described by Chattock in England and was later used by Rogowski in Germany. A modification of the general principle, due to Fahy and incorporated in his Simplex permeameter, was used

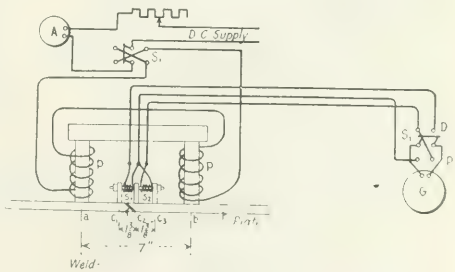


Fig. 2.—Diagram of Apparatus for Magnetic Tests of Butt-Welded Joints of Steel

in our tests. Fig. 2 shows the general arrangement of the apparatus and connections. In this case the soft iron posts c_1, c_2 and c_3 were used as potential contacts and the drop in magnetic potential across the weld and plate respectively was obtained ballistically by means of the air coils s_1 and s_2 which were connected to a ballistic galvanometer. The set-up was arranged so that when switch S_1 was in position D the coils were connected differentially, and when in position P the coil across the plate only was connected to the galvanometer. Only sufficient exciting current was used to induce a flux in the plate at about the value of maximum permeability, as it was found for instance that 0.5 ampere worked better than 2 amperes.

After experimenting it was found that for the most consistent results it was necessary to raise the poten-

*From a paper delivered at the annual convention of the American Society for Testing Materials at Atlantic City, N. J., June 26 to 29. The authors are research engineers, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

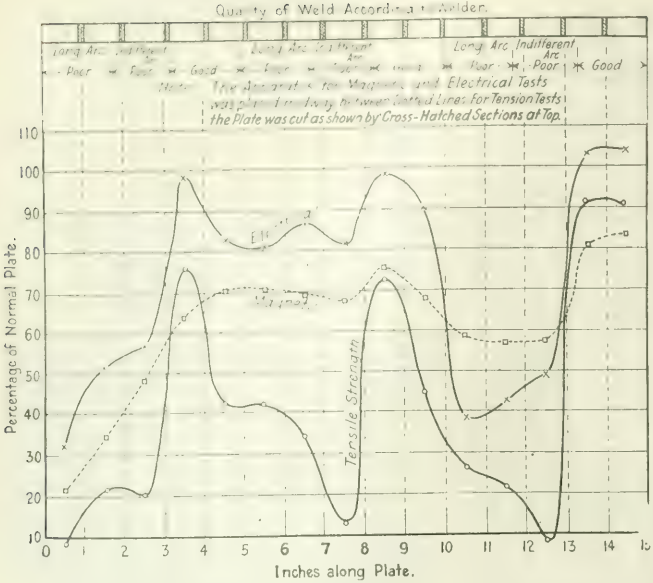


Fig. 3.—Plotted Results of Electrical, Magnetic and Tension Tests, Plate A

tial contacts from the plate a slight distance with some non-magnetic material. This was done to equalize the effects of scale and non-uniform contacts. Due to the fact that, in some cases, the plates were badly bent and twisted, better results were also obtained by rounding the main contacts at *a* and *b*. It is necessary for proper functioning that the potential posts c_1, c_2 and c_3 be symmetrically spaced in respect to each other and to the magnet cores *a* and *b*.

In the magnetic test, readings were taken along the plate at 1-in. intervals as in the electrical tests. The quality of the weld is expressed as in the electrical tests.

Tension Tests.—After completing the electrical and magnetic tests, the plates were cut into 1-in. strips at right angles to the weld and the tensile strength of the strips determined. The cross-section was taken equal to that of the normal plate outside the weld. In most cases rupture occurred within the weld, but in a few instances the strip broke outside, showing that the weld was stronger than the plate. In all cases an average value was obtained for the strength of material in the plate so that the strength of the weld could be expressed as a percentage of that of the plate.

Test Results

The electrical and magnetic test results for the various plates, together with the quality as reported by the welder, are shown in Figs. 3 to 6. The electrical and magnetic testing apparatus was located midway between each pair of vertical dotted lines as indicated by the test points. For the tensile tests the plates were supposed to have been cut along the dotted lines. The machining was not accurately done, however, as indicated by the cross-hatched portions at the top of the figures which show the actual cutting positions. The results shown for the electrical and magnetic tests represent data obtained after a good many trials and check runs which were in some cases made on both sides of the plate. A weld equal in quality to the plate is represented as 100 per cent. For points below the 100 per cent line, the weld is poorer than the plate and above, better.

Discussion of Results

Before considering the results on each plate in detail the following points may be noted. In comparing the electrical and magnetic tests with tensile strength we must make allowance for the fact that the latter tests were made on isolated strips and represent absolute values, while in the former tests adjacent strips have an influence on the value read. Although this does not prevent the electrical or magnetic testing from showing up isolated bad spots, it may modify them or slightly displace their apparent position since the measurements could not be completely localized. If a good and bad spot are adjacent, the electrical and magnetic tests will give a more or less mean value, whereas the tension test, which is the absolute test value for one inch, is not of course influenced by the adjacent material, since this material has been removed. Moreover, the tension tests tend to be too low as compared with the quality of the completed weld for two reasons:

1. In many cases the two plates welded were no longer in the same plane due to shrinkage caused by unequal cooling and therefore tension tests produced bending strains as well as normal strains; and

2. If a small slag inclusion or other weak spot was present near the edge of a strip it would tend to spread on pulling, thus reducing the strength of the strips below that to be expected of the completed weld.

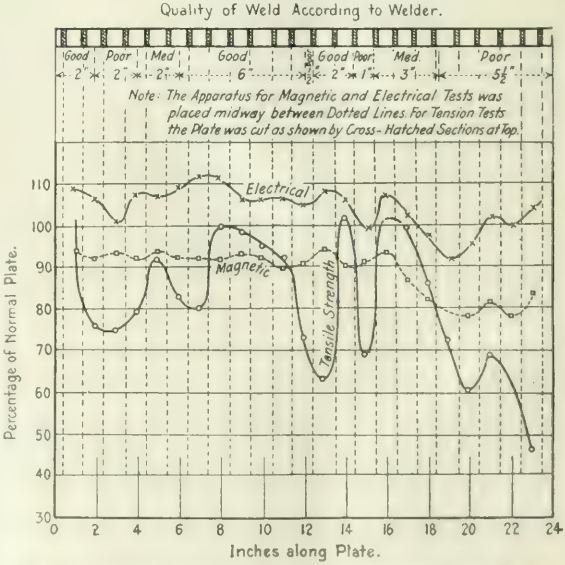


Fig. 4.—According to the Magnetic Test on This Plate (Plate B) It Would Be Pronounced a Good Weld with the Exception of the End, 18 to 24 In. There are evidently some isolated bad spots at some other points, but these are not sufficiently bad to have much effect on the magnetic data. The electrical test in general shows much the same results as the magnetic. In general we would say that this was the best plate of the four, but that the detail of variations was not brought out very well by either of the two tests

It is probable, then, that the tension tests represent a worse condition than actually existed. Moreover, it is quite possible that the electrical and magnetic results more nearly represent the true quality of the weld as a whole, although they probably indicate a weld quality somewhat superior to the actual quality.

Plate A.—This plate was tested a large number of times by both methods. As shown by the curves (Fig. 3) the electrical test follows the tensile strength more closely than the magnetic test does. The latter, though, indicates that the weld is very bad in almost every part. The bad region between the 5 and 8-in. points is somewhat slighted by both tests, although it is not shown as "good" by either one. The good spot between the 3 and 4-in. points is shown by the electrical test but not by the magnetic. It is probable that an isolated good spot will not be picked out by the magnetic test, but the results seem to show that isolated bad spots are readily located, which is presumably more important. It will be well to call attention to the fact that in testing this plate the magnetic tester had not been developed to the working efficiency that was reached later. Therefore, there is a possibility that the poor 5 to 8-in. section would have been better detected had it been tested under the later conditions of test. This plate had the poorest welding of the four, which is shown by all the tests.

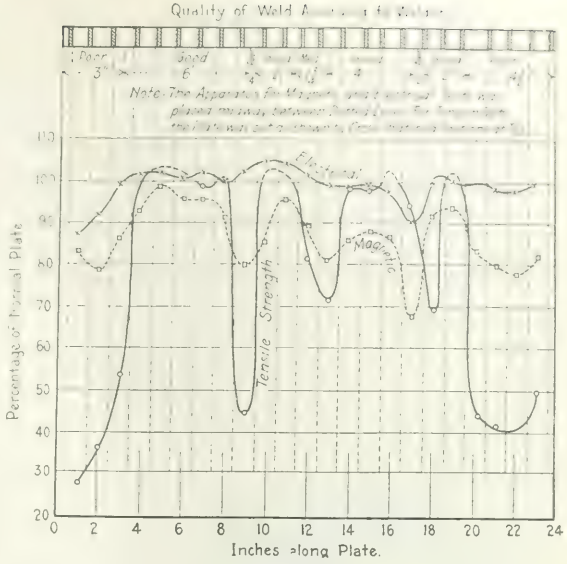


Fig. 5.—The Magnetic Test on Plate C Seems to Follow the Tensile Strength Remarkably Well, Although the Magnitude of the Percentages Are Somewhat Different, as Would Be Expected. The strip at 17 in. shows a bad spot magnetically, while in the tension test this bad spot seemed to be located at 18 in. However, according to the data on the original welding there was a bad spot located at 17 in. and it is probable that it extended into the 18-in. region. On account of the adjacent good weld at 19 in. the effect of the bad spot was more prominent at 17 than at 18 in. The electrical test on this plate was not so successful and shows a uniformly good plate with the exception of the strip at 17 in. and the section from 1 to 3 in.

Conclusions

1. It would seem that the foregoing tests will pick out faults in welds irrespective of what type they may be. For instance, it was brought out by an examination of the test strips that a small cross-section at the weld shows up magnetically. On the other hand if there is a surplus of metal at the weld and part of it poor, this condition is detected.

2. From the experimental work here reported it seems that the magnetic methods give the more consistent results.

3. For butt-welding it is quite feasible to definitely state from the magnetic test whether a weld is good, fair or poor when the results are properly interpreted.

4. While the electrical or magnetic tests do not detect small isolated bad spots with certainty, a fairly poor weld extending over considerable distance will be indicated without the slightest possibility of doubt.

5. It is apparent that the tension tests indicate much poorer quality of welds than the magnetic or electrical. However, from considerations mentioned above we believe that the tension tests indicate a poorer quality than actually exists, while the electrical and magnetic tests show more nearly the average quality.

6. All of the welds with the exception of plate A, Fig. 3, would be considered good average welds. For this plate, the tension, magnetic and electrical tests all agree that this is a poor weld.

7. It should be possible to readily devise a simple and portable apparatus for applying these methods, especially the magnetic, for commercial weld testing. The magnetic method should be more readily applicable since actual metallic contact between the testing apparatus and plate is not essential.

8. These results open up a line of approach to weld testing in general. It remains to be seen whether the foregoing methods can be successfully applied to lap-welded joints and other untried forms. The application to butt welding alone should be quite important to any industry that utilizes this type of weld extensively.

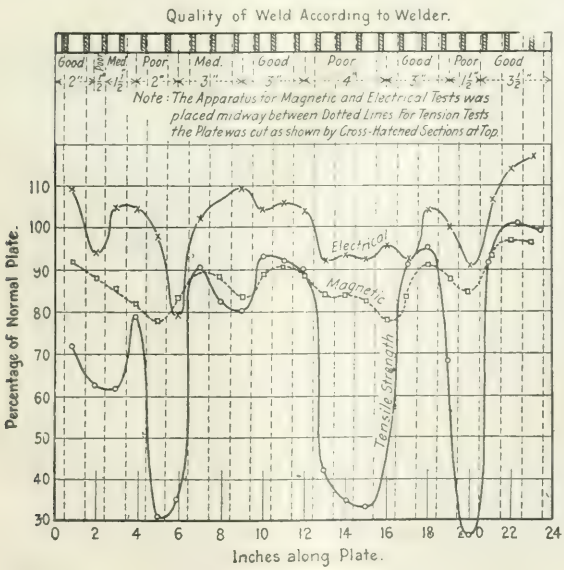


Fig. 6.—Again in This Plate (Plate D) the Magnetic Test Follows the Shape of the Tensile Strength Curve Quite Closely. The electrical test also shows quite good results, although the latter is displaced above the 100 per cent line too much. The bad spots in the plate are quite definitely picked out by both tests

---

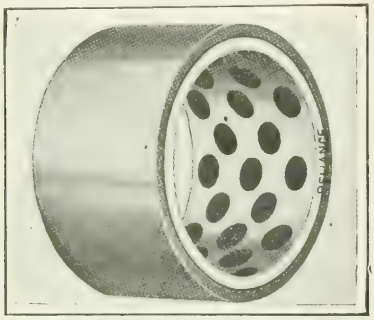
A. L. Flint, general purchasing officer, the Panama Canal, Washington, will receive bids until July 25, for a quantity of metals and miscellaneous equipment.

Self-Lubricating Bushings

Self-lubricating bushings and bearings for use where oiled bearings are objectionable, inaccessible, or likely to be forgotten, and recommended for use because of the comparatively lower cost and their durability, are being offered by the Union Machine Co., Fitchburg, Mass.

The bushing is shown in the accompanying illustration. It is designated as the Reliance and is made up of two parts, an inner casing of bronze and an outer casing of steel tubing machined to standard sizes for a driving or pressing fit. The method of manufacture is said to be a departure from the usual practice and involve fewer manufacturing operations, the bushings being machined, filled and burnished without being split. If required the outer casing may be of bronze or of steel, tinned to prevent rusting.

Holes that contain the lubricant are ¼ in. for all sizes of bushing, which is intended to assure a large lubricating surface irrespective of the dimensions of wearing parts. The shaft or pin holes in the bushings for sheave and block work are larger than listed sizes to allow for running tolerance. The bushings are made with the requisite allowance for a driving fit into the



The Inner Casing Is of Bronze and the Outer of Steel Tubing. The bushings are machined, filled and burnished without being split

holes bored to the exact size usually given as the outside diameter of the bushings. They are available in any length and with any special inside or outside diameters required, also flange bushings of all standard sizes.

The inner casing wall is 3/32 in. Instead of straight, tapered holes are bored, these being slightly larger on the outside than the inside, which is intended to furnish a grip for the lubricant mixture and eliminate possibility of its dropping from place. The nature of the inner casing and the patented process used is said to permit of great compression in placing the lubricant plugs, the plugs being made directly inside the hole and under great pressure. In the event of the lubricant wearing below the point of usefulness a new inner casing can be inserted. The thickness of the outer casing can be made to meet requirements, and bushings can be furnished without outer casings.

A test shaft 1 in. in diameter with bearings 5 in. long, is said to have been run continuously for 150 hours at a speed of 4700 r.p.m., the bushings being after the test in practically the same condition as when started.

British Empire Steel Corporation Additions

In connection with the additions to be made to the plant of the British Empire Steel Corporation, Sydney, N. S., to cost $19,000,000, it is stated that the company's engineers are now preparing plans for new open hearths and a blooming mill which will cost about $10,000,000. One blast furnace is to be rebuilt and another extensively repaired, while a number of other additions and improvements will also be made to the plant. It is reported that the money to pay for these improvements is to come from a large loan to be made to the British Empire Steel Corporation by two large American financial houses, the negotiations for the loan being nearly completed.

According to information furnished by the head office of the British Empire Steel Corporation, at Montreal Que., one open-hearth furnace at the Sydney, N. S., plant was blown in on July 10. This company's business has been improving for the past three months, and everything points to continued improvement. It is also stated that the company's pay roll amounts to $10,000 per day, this being the first time since November, 1920, that the payroll has reached this amount.

Lectures on Geology of Commerce and Industry

A series of evening lectures on the geology of commerce and industry has been announced by New York University. They will be given at the Washington Square division of the school of commerce by Ernest R. Lilley, consulting geologist and mineral economist, and lecturer on economic geology. The fall term will cover commercial geology of the fuels, chemicals, and building materials. The spring term will treat of the problems of the metal industries. The subjects include the mining and preparation of iron and steel; world problems in iron ore conservation and utilization; the major alloy bases, manganese, chromium; economics of the minor alloy ores, tungsten, molybdenum, vanadium; process materials of the metal industries, including refractories and abrasives; non-ferrous metals. The lectures will be given at the Washington Square Building, New York University, on Wednesdays from 8 to 9.45 p. m. beginning Sept. 27, 1922. For information the secretary of school of commerce should be addressed at Washington Square, New York.

Electric Space Heater for Various Uses

An electric device called a space heater and having a wide field of application, has been placed on the market by the Westinghouse Electric & Mfg. Co., East Pittsburgh. It is adaptable to heating metal, water tanks, baking and drying ovens, drying of foundry molds, warming crane cabs, and in other uses where the temperature required does not exceed 800 deg. Fahr. The device is available in many sizes and in several wattages and voltages.

Ease of application, adaptability to any heating pur-



Electric Space Heater for Use Where the Temperature Required Does Not Exceed 800 Deg. Fahr. Electrical connections are insulated from the supports

pose, rugged construction, convenient lengths and durbility of the heating element are said to make the heater particularly useful for industrial applications.

The heater shown in the illustration is made up of a sheet-steel outer casing which forms the sheath and also has the supporting holes. The back is flat and the terminals project from one side only, the terminal supports being permanently attached to the casing. Electrical connections are insulated from the supports, which adapts the heater for attachment directly to plates, tanks and other metals without the danger of short circuiting or grounding the terminals.

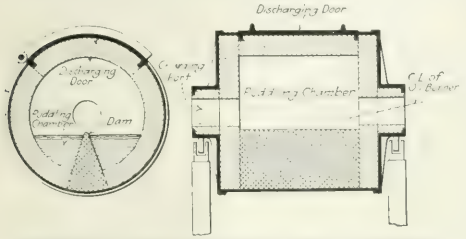
For general air heating purposes, such as warming of isolated rooms, booths, etc., the heaters may be fastened on angle iron frames and protected by screening. For heating metal tanks, pipes, etc., the device is fastened against the surface and insulated.

New Process for Mechanical Puddling

Commercial Installation at the Titan Works Consisting of Cupola and Ten Furnaces—Repeated Pourings Over a Dam the Unique Principle of the New Method

HAVING demonstrated, through an experimental outfit, that mechanically puddled wrought iron is a commercial possibility, the Titan Iron & Steel Co., Inc., Newark, N. J., is about to install a complete unit consisting of a large cupola, ten mechanical puddling furnaces and a mechanical squeezer for handling the large balls. One of the furnaces is already in position and the squeezer is also in commission. In connection with the new equipment will be a roll train for breaking down the puddled bar into billets and a finishing train for the production, from the billets, of merchant bars and skelp and various types of rods. The whole will be installed in the company's plant in Newark.

Two or three hundred heats of iron have already been made in the experimental furnace, with results reported as exceptionally good. The four photomicro-



Mechanical Puddling Furnace with Dam for Producing Intimate Mixture and Homogeneous Iron. The molten pig iron is introduced through the hollow trunnion at left and the fuel oil through that at right. Products of combustion pass out through the charging port at left. When the ball is ready, the door at top is opened and the ball drops out

graphs shown are taken from some of the iron produced by this process. These photomicrographs were made by Prof. Albert Sauveur, of Harvard University, all being magnified 100 diameters and then reduced one-half in reproduction.

The unique principle of the process, which is the invention of Henry D. Hibbard, is in making a charge of molten iron and oxide of iron pour repeatedly over a dam. An intimate mixture of the two ensues, with a rapid change of the iron to the wrought state. The presence of this dam causes the material to spill over the top in a thin stream as the furnace is oscillated back and forth in operation. This makes for thorough mechanical mixing and goes far to explain the homogeneity reported in the product.

The melting stage is carried on in a cupola, as considerably less expensive than melting in the puddling furnace. Molten iron goes into the furnace through one hollow trunnion (the oil fuel is introduced through the other trunnion) and the purifying, boiling and balling stages take place within the furnace. In all three of these the operation, mechanically, follows the hand method, both in the chemical and physical aspects. The carbon is removed, just as in the hand method, during the boiling process, while in the balling process the plastic grains unite and form the sponge. A mixture of gray forge pig iron and scale is used. The chemical reactions, which eliminate practically all the nonferrous ingredients of the crude iron and change it into wrought iron, are these:

The silicon is wholly oxidized and enters the slag as silicic acid (SiO_2).

The manganese is wholly oxidized and enters the slag as oxide (MnO).

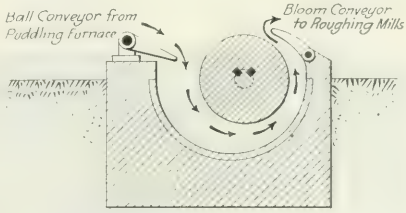
The phosphorus is oxidized to the extent of 80 to 90 per cent, and enters the slag as phosphoric acid (P_2O_5).

The sulphur to the extent of 70 to 90 per cent leaves the iron and enters the slag probably as sulphide of manganese or sulphide of iron.

The carbon is almost wholly oxidized and leaves the metal as carbonic oxide gas (CO) with less than 0.10 per cent of carbon remaining in the rolled bar.

Essentially, the furnace consists of a cylinder of steel plate about 6 ft. in diameter and 5 ft. 6 in. long, with projecting trunnions 18 in. in diameter. The cylinder is lined with magnesite brick to an inside diameter of about 4 ft. The dam, which consists also of magnesite brick, extends up nearly to the center line. On the surface of the brick a skim of iron is sintered to perhaps ½ in. As this protects the brick both from mechanical damage and from the action of the hot metal, the refractory situation is reported as not causing trouble. The operation is carried on at a temperature of about 2650 deg. Fahr., the flame being 2850 deg. As soon as the iron "comes to nature" and begins to form into a ball, the oscillating motion of the furnace is stopped and it is rotated clear over. Eventually the door, which normally is at the top of the furnace, is opened, and out of this door the balls drop upon a conveyor.

From the conveyor the ball is carried to the squeezer (which was designed in the plant and built by contract) where it goes down through a passage of continually decreasing dimension and whence it is expelled in rough cylindrical form at the far side, freed from surplus slag, and prepared for the breaking down rolls. The squeezer is made of steel castings, the rotating corrugated drum having a diameter of approximately 4 ft. So long as the corrugations hold their shape, it is felt that no need will exist for special projecting points to carry the ball through the machine.



Rotary Squeezer for Converting the Puddled Ball into a Bloom for the Roughing Rolls. The arrows show course of ball. The axis of the corrugated drum is horizontal

Arrangements have been made, however, so that these points may be fitted as needed.

Each puddling furnace has a capacity of 1200 lb. or more per heat. The largest heat which has been taken out weighed 1340 lb. It is claimed that this particular ball is the heaviest which has ever passed through a squeezer. The one squeezer will do for the ten furnaces, because the ball is in the squeezer only about 45 sec. The squeezer is operated by an electric motor of 250 hp., but this is reported to be about double the actual requirements. The motor is geared into an intermediate shaft carrying a flywheel; from this shaft spur gearing further reduces the speed for the squeezer roll. Thus there is a double reduction from the speed of the motor to that of the squeezer.

Some of the physical and chemical results obtained from this iron are shown in the table. The iron is used largely for pipe and sockets, for engine bolts, stay bolts and high grade merchant bar. It is reported that

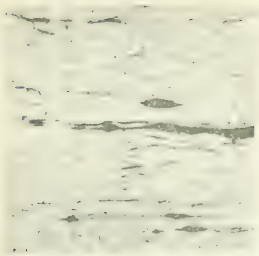


Fig. 1

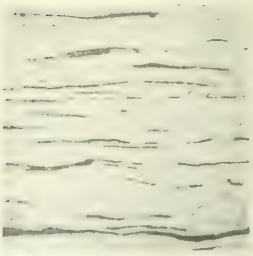


Fig. 2

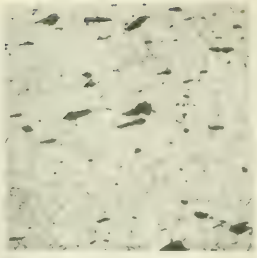


Fig. 3



Fig. 4

Photomicrographs of Microstructure. Puddled Wrought Iron. Figs. 1 and 2 are longitudinal sections. Figs. 3 and 4 are cross sections. All magnified 100 diameters, and reduced one-half

the chemical analysis presents great uniformity from one heat to another.

	Pipe and Socket Iron	Stay Bolts and Merchant Bar
Carbon, per cent.....	0.022	0.030
Manganese, per cent.....	0.031	0.022
Silicon, per cent.....	0.220	0.200
Phosphorus, per cent....	0.128	0.042
Sulphur, per cent.....	0.025	0.013
Tensile strength, from...	45,000 lb.	48,000 lb.
to.....	50,000 lb.	52,000 lb.
Yield point, from.....	25,000 lb.	26,000 lb.
to.....	30,000 lb.	32,000 lb.
Elongation, per cent (in 8 in.)	15 to 20	25 to 30

The building in which the operations are now carried on includes three bays about 50 x 400 ft., equipped with electric cranes, and one area about 200 ft. square without cranes. One bay contains four open-hearth furnaces, three being stationary 30-ton units, while the other is a tilting furnace of about 25 tons capacity. These furnaces, not now in use, are reserved for possible future operation. The new cupola, of continuous type, will have a 72-in. diameter shell, but will be lined at first to 60 in. diameter. It will be located alongside the open-hearth charging platform and will be charged from that platform, as are the two small cupolas now in use.

It is expected that the new cupola and ten furnaces will be in position by the middle of September, giving a capacity of about 5000 tons per month. The plant is to be extended next year to a capacity of about 7500 tons per month, which is regarded as the maximum for the present buildings and land area. It is planned to install later a still larger plant somewhere west of the Allegheny mountains, taking advantage of proximity to blast furnace iron in that district.

The Hibbard process, which was originally contrived for refining or washing crude iron, is patented throughout the world. Several additional patents have been applied for and are pending and negotiations are in progress for the establishment of the process in nearly all iron-making countries. The Hibbard Process Corporation, 71 Broadway, New York, has been organized, of which Henry D. Hibbard is president, Charles F. Rand, vice-president and C. Ames Brooks, secretary and treasurer.

Robert E. Jennings, 2nd., formerly vice-president



Mechanical Puddling Furnace in Operation, with Flame Issuing from Charging Port at Right. Farther to right is the charging spout for cupola iron. In foreground is the rotary squeezer which compresses the puddled ball into a rough cylinder for passage through the breaking down rolls

and general manager of the Hewitt Steel Corporation, is president of the Titan Iron & Steel Co., Inc. W. W. Williams, vice-president, was formerly general manager of the A. M. Byers Co. and vice-president and general manager of the Reading Iron Co. Louis M. Atha is treasurer. E. F. Blessing, works manager, was formerly chief metallurgist of the Reading Iron Co.

SHIPBUILDING SHOWS DECLINE

Production of Ships Throughout the World Now Below Pre-War Level

World shipbuilding to-day is actually below the pre-war level, says a statement by Lloyd's Register of Shipping. The decrease in production has been steady since the fall of 1919, and the volume of new orders continues to be far below the completion of orders in hand.

While the returns for the quarter ended July 1 show that the aggregate of contracts in hand is nearly 800,000 gross tons more than the total at July 1, 1914, so many suspensions of work have been directed by those who placed the orders that the actual volume of construction actively under way is slightly below the pre-war figure. On April 1 the American aggregate was lower than before the war, but on July 1 it was slightly above the pre-war figure. This country, however, was practically the only one in the world to show a gain during the past quarter.

The gross aggregate of tonnage on July 1, as compared with the previous quarter, was as follows (in gross tons):

	July 1	April 1
United States	150,623	136,266
United Kingdom	1,919,504	2,235,998
Other countries	1,165,303	1,307,358
World total	3,235,430	3,679,622

British Work Drops Off

Stoppages ordered on this work fell more heavily on British shipyards than on those of all the other maritime nations combined, says Lloyd's Register, the result being that, while the actual British total is nearly 300,000 tons below the pre-war figure, the aggregate of the other shipbuilding countries is about 250,000 tons higher than in 1914. The following shows the result of the last quarter's suspensions, in gross tons:

	Britain	Others
Work contracted	1,919,504	1,315,926
Less suspensions	481,000	290,000
Actual work	1,438,504	1,025,926

The actual construction under way at present, as compared with that just before the war, shows how British shipyards have been affected:

	July 1, 1914	July 1, 1922
United Kingdom	1,722,000	1,438,504
United States	148,000	150,623
Other countries	626,000	875,303
World total	2,496,000	2,464,430

The world construction now actually under way shows a decline of nearly 5,600,000 gross tons from the peak, which was attained in September, 1919, when 8,048,000 tons were being built. This country's present total of 150,000 tons, compared with the high level of 4,186,000 tons reached in the first quarter of 1919, shows a decrease of more than 95 per cent. It is interesting to note that the relative proportions of the world's shipbuilding have changed considerably since the pre-war period. Great Britain, which then had 69 per cent of the total, now has only 58 per cent; the United States has still its 6 per cent as in 1914, and the other countries have increased their share from 25 per cent to 36 per cent.

Returns from all countries of the construction being done under the supervision of Lloyd's Register and intended to be classed with that society, show a total of 2,010,912 gross tons, of which 1,470,977 tons represent orders placed in Great Britain.

The total of work now under way in German shipyards is estimated by Lloyd's Register to be 500,000 gross tons, or over 200,000 tons more than for any other country in the world except Great Britain. Danzig is reported to be building 45,000 tons of merchant ships.

Of the smaller shipbuilding countries, Italy, France and Holland still retain their lead, in the order named. All, however, show declines from their figures for the quarter ended April 1. Of the smaller ship-producing nations, it is to be noted that Japan shows the least decline, her decrease being only 1800 tons from the April figure.

Proposed Iron and Steel Freight Rates Suspended

WASHINGTON, July 18.—The Interstate Commerce Commission last Saturday entered an order suspending from July 15 until Nov. 12, unless otherwise ordered, the operation of the tariff supplement establishing a proportional rate of 20c. per 100 lb. on iron and steel articles in carloads from New Orleans, Baton Rouge, and Anchorage, La., to the Galveston, Houston, Beaumont and Orange groups in Texas. In the meantime a hearing on the proposed reduction in the rate will be held. This case has created considerable interest in the iron and steel trade, as well as among the affected railroads, as pointed out in THE IRON AGE of last week, page 96. Chicago and St. Louis steel makers oppose the proposed proportional rate of 20c., while steel producers in the Pittsburgh and surrounding districts had asked the commission to allow the rate to become effective on July 15, as proposed by Agent Leland, who filed the tariff, on behalf of southwestern rail lines.

The following table illustrates the proposed changes:

Rates are in cents per 100 lb.

From New Orleans to	On Bars, Angles and Fence Material		On Pipe and Fittings	
	Present	Proposed	Present	Proposed
Galveston, Tex.	57.5	*20	33	*20
Houston, Tex.		†38		†33

*Applies only on traffic originating beyond other than import traffic. †Applies on local traffic.

Large Magnesite Deposit in Southern Nevada

A massive deposit of magnesite of unusual character that has recently been brought to the attention of the U. S. Geological Survey promises to yield a large and readily available supply. The deposit lies in Clark county, Nev., a few miles above St. Thomas. The material has been known for some time as kaolin, and successful experiments for utilizing it as a porcelain clay are reported to have been made, though they have not yet resulted in the exploitation of the deposit.

The so-called kaolin is stated by the geological survey to be in fact a magnesite. The material is porcelain-white, fine grained, and massive, is remarkably free from foreign material, and has the structureless appearance and conchoidal fracture that are generally characteristic of magnesite. It is not so hard as the more typical magnesite, and it crumbles more rapidly on exposure to the weather. Unlike most other deposits of magnesite in California and elsewhere in this country, this is not a vein deposit, such as occurs with serpentine, but resembles closely the deposits discovered in 1911 at Bissell siding, near Mojave, Cal. The deposit at Bissell, however, does not appear to be so large or regular as the deposit on Muddy River.

Sales of leather belting in the week ending July 1, as reported by the Leather Belting Exchange, representing about 60 per cent of the total product, were 105,168 lb., valued at $167,532. For the preceding week they were 89,312 lb., valued at $146,204, and for the corresponding week in 1921 they were 72,408 lb., valued at $120,560.

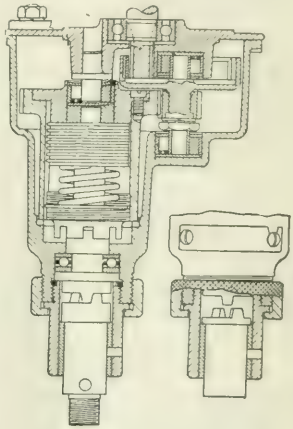
TOOL FOR TURNING DOWN NUTS

Electric Machines Intended to Shorten Operations —Special Features Outlined

An electric tool designed for turning down nuts, cap screws, wood screws, studs and similar fastenings and arranged to operate in either direction, has been placed on the market by the Elecdrive Mfg. Co., Inc., Syracuse. It is intended to shorten the operations of starting by hand, driving and setting nuts or screws and can be used on left-hand threads or for turning-off nuts, screws and the other fastenings.

At present the machine is made in three sizes, two portable and one stationary type. The portable tool as shown in the illustration resembles in general outline the ordinary electric drill. The stationary type is shown in the separate illustration, and represents a departure from the usual design of nut or screw driving machine.





Electric Tool for Turning Down Nuts and Screws. The stationary type is shown in operation at the left, and the portable machine below. The arrangement of the mechanism is shown in the view above

The driving mechanism of the tool is the patented feature and incorporates a multiple-disk slip clutch, adjustable for any tension within the capacity of the motor and operating through a spline shaft to a positive clutch. The arrangement is such that the positive clutch automatically "kicks out" when the disk clutch fully releases. While the positive clutch is kicked out or disengaged, the driving spindle is relieved from torque and is free. This feature permits the removing of the wrench, chuck or screwdriver from the driven member and their engagement with a new member while the motor is running at full speed. The slip clutch requires that all nuts or screws be driven to the same tension and also prevents any shock reaching the motor. Because the clutch cannot be tightened to a degree that will stall the motor, the motor cannot be overloaded or burned out. Setting up of the nuts or screws slowly is a feature of the clutch arrangement and it is emphasized by the makers that without the clutch arrangement provided, threads would be stripped, the bolt strained or the tool damaged.

The portable tool operates from an electric light socket on either direct or alternating current at 110 volts, where the frequency does not exceed 60. The stationary type is usually connected to a power line, but where a large margin of safety has been used on the lighting circuit, the tool may be connected to a socket. The stationary type is also a universal motor and can be used on any circuit up to 60 cycle. The motors employed are of special design for the work done and are said to be of exceptionally high speed for universal motors, operating through a set of reduction gears with a ratio of 10 to 1.

Both the portable and stationary types are equipped with wrenches of special design, recessed and tapered to permit nuts to be picked from the bench while the tool is running at full speed. The nut or screw is held in the wrench so that its axis is true with the driving spindle of the machine and can be started on the thread without danger of cross threading.

The driving spindle of the machine rotates at 1000 r.p.m. while the nut or screw is being driven down, excepting the fraction of a turn necessary for the actual setting. The spindle then decreases in speed gradually until during the actual setting-up operation it is rotating at only approximately 350 r.p.m. The driving spindle of the smallest tool develops when driving nuts or cap screws from 10 to 12 foot-pound torque, the larger portable tool developing from 12 to 14 foot-pound torque and the stationary tool setting nuts or cap screws that require 65 foot-pound torque.

The reversing control mechanism is unique and has been designed for this type of motor only. The motor can be thrown from direct motion into reverse only after the current has been broken. The stationary type can be equipped with a hopper to handle double chamfered nuts, cap screws, wood screws, and other types. When the hopper is used the speed of the machine is greatly increased and in experimental work, 32, ⅜-in. nuts are said to have been started, driven and set in one minute.

Progress in the Open-Hearth Process*

Some Results from the Blow Torch Furnace—Its Principles and Advantages — Steel Encased Regenerators

BY WILLIS McKEE

UNTIL the last couple of years probably no process in the steel-making industry progressed less since its introduction than the making of steel in the open-hearth furnace. From the building of the first successful furnace in this country, a little more than 50 years ago, there had been no basic change in open-hearth construction. It is true that during this time the units had become larger and more substantially built; the facilities for handling the materials to and from the furnaces had become much more satisfactory; improved valves had been invented; water-cooled ports, doors, door frames and buckstays had been employed and slag-line coolers had been installed; but the time of the making of the heat had remained approximately the same, the fuel economies had been improved but little and the operation of the furnace was no more under the control of the operator than a half century ago. The problem of satisfactory refractories is still unsolved, although this phase is now receiving most intensive study and consideration. The operation of the units is intermittent, shutdowns being necessitated every few weeks for repairs to the brick work.

Heat Balanced

About 10 years ago a careful test was run at the Homestead works of the Carnegie Steel Co. to determine the heat balance of the open-hearth furnaces. The furnace used in the test made an average heat of 54.6 tons; natural gas was used as fuel. This test was run for seven or eight months. The results proved that the losses due to the temperature of the escaping gases, radiation, conduction and other causes amounted to 95.77 per cent of the heat units supplied by the combustion of the incoming fuel. This brings us to the startling conclusion that if we could eliminate all such losses that there would be only about 20 to 30 lb. of coal required per ton of steel produced. It is not to be expected that any such efficiency can be obtained, but it is time that careful thought be given to the saving of our fuel supplies and to the lowering of the cost of steelmaking by their more economical use.

In the last 10 years, the use of water-cooled devices has had a tendency to stabilize the operation of the furnaces, but excessive use of water of course decreases the thermal efficiency of the furnace, so that the use of such equipment must not be carried to excess. The use of waste heat boilers has materially decreased the heat losses but at a considerable cost of installation. The fact that the stack losses are great enough to justify the installation of waste heat boilers helps us to realize the inefficiency of the process.

Efficiency and Poor Combustion

The greatest cause of the low efficiency is imperfect or delayed combustion. It has been customary to introduce the gas into the hearth in a semicircular port at about ½ to 1-in. pressure and to introduce the air around it at a pressure which is created by the column of heated air from the bottom of the checkers to the top of the uptake. Although it was early appreciated that it was necessary, in order to obtain the temperature required in the open-hearth furnace, to preheat both the gas and air to as high a temperature as possible, no attempt appears to have been made to see that the gas and air were intimately mixed with the result that although some particles of air and gas mixed promptly at the end of the port and combustion started quickly, other particles of air never came in contact with the gas until reaching the other end of the hearth and frequently not until they had reached the slag pockets or regenerator chambers in the outgoing end of the furnace.

This delayed combustion not only decreases the thermal efficiency of the furnace and lengthens the time required for a heat, but it causes needless destruction of the uptakes, slag pockets and regenerators. In order to insure combustion it has been customary to supply additional air, which, of course, decreases the thermal efficiency. In the test previously mentioned, it was found that 150 per cent excess air was actually being used. If such excess is maintained while conducting a test, it is to be assumed that under normal conditions, even worse practice prevails.

Only about three years ago it was first proposed to mix the fuel and air before they entered the hearth of the furnace so as to obtain complete combustion promptly. This is an application of the Bunsen burner or blow torch principle which was invented some 65 years ago with the exception that the Bunsen burner insures against burning in the mixing chamber by having the velocity of the gases such that the flames cannot travel back into the mixing chamber. In an open-hearth furnace the temperature of the gases coming from the regenerators is so high that the flame is initiated as soon as the gases come in contact with each other. It is, therefore, necessary in order to use this principle to cause the gases to travel at such a velocity that there will not be enough combustion in the port to raise the temperature to such a point as to cause rapid destruction of the port.

[The author discusses by means of drawings the principles of the Egler furnace. This furnace was described in THE IRON AGE, June 2, 1921.]

Requirements of Blow-Torch Furnace

After a careful study of the requirements of a successful blow torch or Bunsen burner installation, it has been found that the following conditions must be met:

When using producer gas it is necessary to so introduce the air and gas that excessive gas house pressure will not be required. In other words, if over 1½-in. air pressure is used (and a higher pressure has been found desirable) it is necessary to aspirate the gas so that the proper amount of gas can be introduced without necessitating a gas house pressure in excess of 2 in.

It is necessary to insure a perfect mixture of the gas and air before they issue from the port.

It is necessary to properly direct the flame so that it will impinge sharply upon the bath so as to not only obtain full benefit of the blow torch flame but to prevent it coming in contact with the brick work.

Adequate outlet ports must be provided to carry off the products of combustion.

These conditions are fully met in the construction shown. The combined port is long enough not only to thoroughly mix the gas and air but to properly direct the flame upon the bath. The velocity of the gases is such as to avoid excessive combustion in the port. The ports are exterior of the furnace, that is, the brick work forming the port is not subject to the high temperature of the furnace on both sides. This greatly lengthens the life of the ports. The valve arrangement is simple and not liable to get out of order due to expansion and contraction of the brickwork.

In the operation of a furnace this description at the plant of the Brier Hill Steel Co., Youngstown, using natural gas, 9111 tons of high grade basic open-hearth steel were made in 31 days, with a charge consisting of 65 per cent heavy melting scrap, 6 per cent cold pig

*From a paper presented at the annual convention of the American Foundrymen's Association at Rochester N. Y. June 5 to 9. The author is connected with Arthur G. McKee & Co., Cleveland, engineers.

iron and 29 per cent hot metal. The best tonnage ever made in this plant on a furnace using ordinary method of construction was 6344 tons, and this record was made when using a mix of 45 per cent scrap and 55 per cent hot metal. The average monthly output per furnace of this plant operating on approximately 45 per cent scrap is 5000 tons per month.

On account of the short, sharp, blow torch flame the gases attain their highest temperature and combustion is completed before they reach the middle of the hearth. From this point their temperature drops

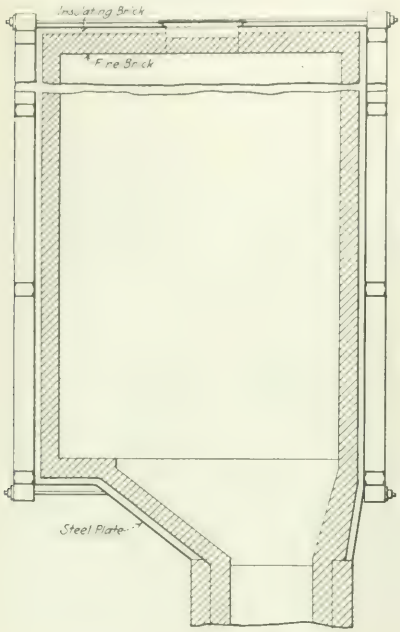


Fig. 1.—Steel Encased Insulated Regenerator Chamber

rapidly due to the radiation and transmission of heat to the bath, so that, notwithstanding the fact that the flame in this furnace is much hotter than in other furnaces, the temperature of the escaping gases in the downtakes and in the regenerator chambers is very considerably decreased. In other words, the combustion is completed so early that the maximum amount of heat is retained in the bath, greatly increasing the thermal efficiency of the unit and decreasing the repairs to the downtakes and regenerator chambers.

In practice at the Brier Hill Steel Co.'s plant, the stack temperatures have been found to average 300 deg. Fahr. lower than in their other furnaces. There is not enough data collected as yet to show just what fuel economies can be obtained, but it appears that the saving will be in the neighborhood of 20 to 25 per cent.

One of the greatest advantages of the system is due to the fact that the fuel and air are both thoroughly under the control of the operator so that the temperature of the bath can be regulated to a nicety. On account of the thermal efficiency of the furnace there is less contamination of the bath from the impurities in the fuel.

Although attention is called to the fact that greater economies and greater production can be procured due to these improvements in design, too much stress cannot be laid on the fact that the using of this process enables the operator to make a uniformly better grade of steel. Due to the fact that the charge is melted down so rapidly, a higher percentage of scrap can be used without the addition of carbon, thus making possible the use of a much cheaper mix.

There are may refinements of the blow torch furnace which will be worked out, but the results so far obtained are so remarkable and the correctness of the principle involved has been so universally acknowledged as to insure its rapid introduction.

Other Improvements

This process of combustion has opened up quite a number of possibilities for the further improving of open-hearth construction which deserves very serious consideration. In Fig. 1 is shown an open-hearth furnace in which the regenerators are encased with insulating bricks and steel platework. Inasmuch as the use of the steel platework enables the use of much thinner walls, it is evident that this construction is little more expensive than that which is now used, while the saving due to decreased heat losses is appreciable. Furthermore, the regenerator chambers can be maintained in much better shape and the temperature of the basement is materially decreased, making it much more livable.

A more radical departure is the eliminating of the gas regenerator chambers when using producer gas as shown in Fig. 2. It is proposed to locate the gas producers comparatively near to the open-hearth and conduct the gas in suitable steel mains, properly insulated, to the ends of the furnace and introduce the gas into the air uptakes without any regeneration. This practice becomes possible only by the use of the blow torch principle, where the air and gas thoroughly mix before they issue from the port so that the resultant temperature of the mixture is the only temperature that needs to be considered. Inasmuch as approximately 800 deg. Fahr. stack temperature is now obtained in a blow torch furnace, it is evident that the temperature of the gases escaping through the air checkers is much lower than those escaping through the gas regenerators, as the incoming gas cannot possbly lower the temperature of the gas checkers below 1050 to 1100. Therefore, it is evident that by making all the gases escape through the air regenerators the temperature of the incoming air will be considerably higher than when

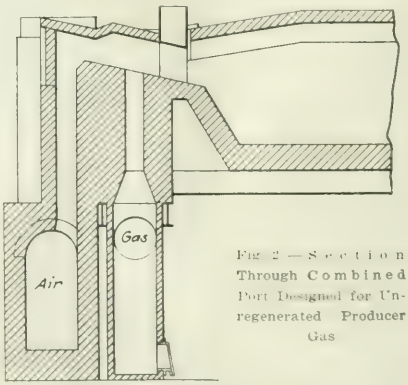


Fig. 2.—Section Through Combined Port Designed for Unregenerated Producer Gas

the gases are divided and the resultant temperature of the mixture of gas and air will be substantially the same as at present.

This construction appeals strongly to those to whom it has been suggested because it eliminates the gas loss that now occurs whenever the furnace is reversed when not only all the gas from the end of the port back through the generators to the gas valve is lost but with most designs or valves the gas in the mains back to the producers is exhausted by being connected to the stack during reversals. It eliminates the hydrocarbon loss which now occurs in the regenerators and the difficulties due to the clogging of the gas checkers. This construction greatly decreases the volume of the slag pockets and the heat losses due to radiation from the excessive space between the checkers and the ports. Structurally this construction is exceedingly desirable as it greatly decreases the cost of the furnace and shortens the distance required from center to center of furnace by 5 to 10 ft. It also eliminates the center

wall in the slag pockets and the need of overhung brickwork in the uptake.

Conclusions and Advantages

There is no question but that the transition through which the open-hearth is now passing will so increase the capacity of existing units that there will be practically no construction of new open-hearth plants required to meet the demand for steel for a number of years, but one of the biggest problems incident to the introduction of the rapidly operated furnace will be to get the raw material to the furnace and to handle the material on the casting side. New plants must be carefully laid out so as to eliminate as far as possible delays due to shop conditions and doubtless existing ones will need to be considerably altered and improved to take care of the additional materials to be handled.

While previous inventions in the open-hearth have had for their object increasing the comfort of the operators and the decreasing of the shut-downs and repairs to the furnace, the effects of this invention are so far reaching that it is difficult to appreciate the magnitude of the development. The principal advantages as have been outlined are:

Better steel
Increased fuel economy.
Greatly increased output
Longer life of the furnace
Possibility of using a higher percentage of scrap
Decreased plant cost for a given capacity

By using unregenerated producer gas as proposed, it should be possible to obtain the following additional advantages:

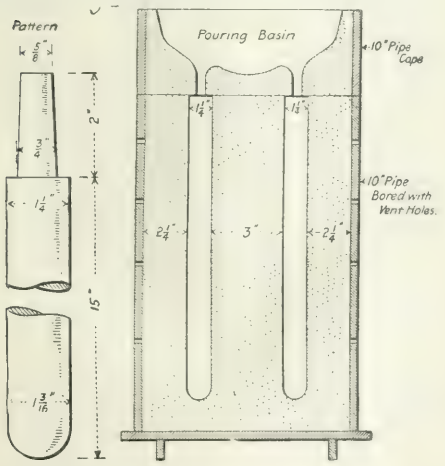
Additional fuel economies
Greatly decreased cost of construction
Simpler construction

No great invention is ever made that does not require considerable study and the careful co-operation of all interested before the full benefits of such invention can be obtained, so it will be necessary to have the hearty co-operation of engineers and operators before the maximum results are derived with the blow torch furnace. However the correctness of the principle is so universally acknowledged and the results already obtained are so remarkable as to necessitate its rapid introduction.

HIGH TEST IRON CASTINGS

New Specifications for Castings Containing Steel—The Arbitration Test Bar

New tentative specifications for high-test gray iron castings, familiarly known as semi-steel, were adopted by the American Society for Testing Materials, at its annual convention at Atlantic City, N. J., June 26th to 29th. They represent the latest ideas as to the properties of this much-discussed metal, and also include details of the arbitration test bar. They are as follows:



1. These specifications cover all classes of gray-iron castings which are required to have a high strength, including those generally known as semi-steel castings.

2. The tension test will be made only when specified by the purchaser and at his expense.

MANUFACTURE

3. The castings may be made by the cupola, or any other approved process.

PHYSICAL PROPERTIES AND TESTS

4. (*a*) The transverse test specimens (arbitration test bars) specified in Section 6 (*a*), when placed horizontally upon supports 12 in. apart and tested under a centrally applied load, shall withstand a minimum load of 3800 lb. and deflect under this load at least 0.12 in. at the center.

(*b*) The rate of application of the load shall be such that a central deflection of 0.10 in. is produced in from 20 to 40 sec.

5. When tension tests are specified, the tension test specimen shall show a minimum tensile strength of 28,000 lb. per sq. in.

6. (*a*) *Arbitration Test Bar.*—The form and dimensions of the mold for the arbitration test bar shall be in accordance with Fig. 1. The bottom of the bar shall be $\frac{1}{8}$ in. smaller in diameter than the top, to allow for draft and for the strain of pouring. The pattern shall not be rapped before withdrawing. The flask shall be rammed up with green molding sand, a little damper than usual, well mixed and put through a No. 8 sieve, with a mixture of 1 to 12 bituminous facing. The mold shall be rammed evenly and fairly hard, thoroughly dried, and not cast until it is cold. The test bar shall not be removed from the mold until cold enough to be handled. It shall not be rumbled or otherwise treated, being simply brushed off before testing.

(*b*) *Tension Test Specimen.*—When tension tests are specified, the tension test specimen shall be turned from any

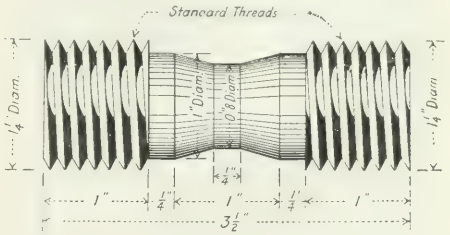


Fig. 1 (Left).—Mold for Arbitration Test Bar
Fig. 2 (Above).—Tension Test Specimen for High Test Cast Iron

of the broken pieces of the transverse test specimens, and shall conform to the dimensions shown in Fig. 2.

7. (*a*) Two sets of two arbitration test bars each shall be cast from each melt, one set from the first and the other set from the last iron going into the castings. Where the melt exceeds 20 tons, an additional set of two bars shall be cast for each additional 20 tons or fraction thereof. In case of a change of mixture during the melt, one set of two bars shall also be cast for every mixture other than the regular one. Each set of two bars shall be cast in a single mold.

When a large casting is made for which test bars are required, the test bar shall be cast from the same ladle of iron used to pour the casting. If two ladles are used for pouring the casting, the iron for the test bars shall be poured from a ladle of iron caught between the pouring of these two ladles. In either case the test bars shall be poured at as near as possible the same temperature at which the casting is poured.

(*b*) All arbitration test bars cast shall be tested as specified in Section 4 (*a*).

8. One arbitration test bar of each set cast shall conform to the requirements specified in Section 4 (*a*); otherwise the castings represented by such bars shall be rejected.

WORKMANSHIP AND FINISH

9. The castings shall be true to pattern and free from

gas holes, cracks, flaws and excessive shrinkage. In other respects they shall conform to whatever points may be specially agreed upon between the manufacturer and the purchaser.

INSPECTION

10. The inspector representing the purchaser shall have free entry, at all times while work on the contract of the purchaser is being performed, to all parts of the manufacturer's works which concern the manufacture of the castings ordered. The manufacturer shall afford the inspector without charge all reasonable facilities to satisfy him that the castings are being furnished in accordance with these specifications. All tests and inspection shall be made at the place of manufacture prior to shipment, unless otherwise specified, and shall be so conducted as not to interfere unnecessarily with the operation of the works.

GERMAN CAPITAL IN RUSSIA

Reported Combination with Soviet to Exploit Metallurgical Resources on Capitalistic Basis

By Special Correspondence

BERLIN, GERMANY, June 28.—Stories have been current for some time that Krupp, Stinnes, and the Allgemeine Electricitats Gesellschaft (A. E. G.) have completed an agreement with the Russian Soviet Government whereby is secured a large control in the restoration of Russia's metal and machinery industries. These three groups for nearly a year have had representatives in Petrograd and Moscow. The German trade press has hardly touched the matter, but Russian and some neutral newspapers have dealt with it at length. The Russian *Rabotchi Golos* of June 11, states vaguely that "an agreement has been signed with the three greatest German iron concerns." The Christiania *Handelstidende* of May 31, professes to give exact details. The Stinnes agent in Russia, says this authority, is a departmental chief of the Siemens-Schuckert Co., which is in the Stinnes Electro-metal combination; Krupp has numerous agencies; and the late Dr. Rathenau sent negotiators on behalf of the A. E. G. At the end of May, says the article, these three companies signed an agreement with the Soviets. A limited liability company is to be established, in which the three German companies will each hold a one-fourth interest, the Russian state taking a fourth interest. The plan is to "utilize Russia's latent natural resources for restoration aims on a sound German capitalistic basis."

Though this story is neither confirmed nor denied, it accords both with the new soviet law, and with similar deals of less importance. The Moscow official *Ekonomitcheskaya Zhizn* lately published the text of a law authorizing the foundation of "mixed" corporations with foreign participation; and to date there have been founded nine such corporations: Metallotorg, Napthaexport, Linotorg, Dwinoles, Seweroles, Koshsyrie, Derumetal, Russangloles and Russgolandles. The mixed corporation Metallotorog sells and buys scrap metal of all kinds in Russia and abroad. The Derumetal has a monopoly for export of Russian scrap iron to Germany. Its partners are the Soviet Government, and Robert Lewi, chief of the Lichtenberg Metal Co., Berlin; and the capital is 2,000,000 m. The other mixed companies deal in naphtha, flax, animal raw materials and wood. The most important concession to foreign capital is an agreement said to have been reached with the Moscow Supreme Industrial Council leasing all nationalized mechanical workshops at Odessa to the Czecho-Slovak Skoda concern. Prague newspapers state that this deal has been completed but Russian confirmation is lacking.

Before any of these combinations becomes effective, the Soviet Government must first define the relations of forigners with the lately-formed companies. So far these combinations are entirely Russian. The movement toward large combinations began in the late summer of 1921; progressed, at least on paper, rapidly, and today embraces the greater part of the heavy iron and steel, the locomotive, and the general mechanical trades. The *Krasnaya Gazeta* of June 7, lists 23 of these combinations. All are composed exclusively of formerly nationalized concerns, which have been removed from the direct control of the supreme council of industry, and fused into semi-independent corporations. These companies are permitted to sell all, or a fixed part, of their output in the free market at whatever price can be obtained; and are allowed to import raw materials and fuel without permission of the foreign trade commissariat, which in general still claims a monopoly in foreign trade.

Of the metal combinations the most important is Jugostahl (Southern Steel). This embraces the Petrovsk, Makeevsk and Hughesovsk iron and coal companies in South-East Russia. Jugostahl must deliver 75 per cent of its output to the State at State prices; but can sell the remaining 25 per cent at will. At present 35,000 men are employed. A second metal combine is the zinc-lead trust, comprising the Ruidlerovsk smelting works, and the Ekibastuask and Zuirianovsk mines in the Urals, with right to take in other concerns. In the locomotive combination are the Sormova, Kolomensk, Briansk, Muitishensk and Radtsk rolling stock and mechanical workshops, and five other metal works. A second company, formed in November, includes the Nobel, Phoenix, Tillmans, Koppel and two Lessner companies. A third embraces the Ural platinum industry. The total number of employees in metal and mechanical corporations so far is stated as 92,000; but the normal pre-war staff in the same concerns was nearly 300,000.

According to Comissary Okunieff, all these combinations are so far losing money. The losses of the important Jugostahl for September-May inclusive amounted to three-fifths of the value of the output. The official *Ekonomitcheskaya Zhizn* suggests as a remedy that the State should pay full market price for goods delivered under agreement by these companies; otherwise "it cannot pretend that the so-called financial independence is a privilege." The main obstacle to financial success, however, is inadequate production. All reports of the new companies' operations in their first months of existence agree that the relative independence from the bureaucratic supreme council, the employment of private experts, and the freedom to concentrate skilled labor, raw materials and fuel in the more efficient workshops (the inefficient being closed entirely) led to a considerable increase in output; but output is still small. In the summer of 1921, before being combined, the Jugostahl companies were producing about 2,500,000 puds (1 pud = 2.2 lb.) of coal a month; this amount increased to 4,800,000 puds in October, the first month they were combined, to 6.000,000 puds in November, and to 9,000,000 puds in January. The pig-iron production rose from 60,000 puds in September to 270,000 puds in November, and 350,000 puds in February. The output of open-hearth steel, castings, and sheets also increased. The production program of this company for 1922 is 10,000,000 puds per month of heavy and semi-finished iron and steel.

Last reports show that in all Soviet-Russia the coal output has again begun to decline, whereas the iron and steel output is still increasing. Coal output, in April, was 25,202,000 puds. The iron-ore output in March was 1,216.000 puds against 850,000 puds in February. The output of foundry iron in January and February was 1,805,000 puds, open-hearth steel 3,500,000 puds, and rolling mill products 2,226,000 puds, as against 7,083,000 puds, 10,025.000 puds and 12,303.000 puds respectively for the whole of 1921. The figures for this year show a considerable increase.

Shipping Board Sales

WASHINGTON, July 18.—The auction sale of the Emergency Fleet Corporation of its surplus marine stock at St. John's warehouse, Portland, Ore., has been completed and as a result practically all of the material has been disposed of at that point. The total receipts were approximately $51.000.

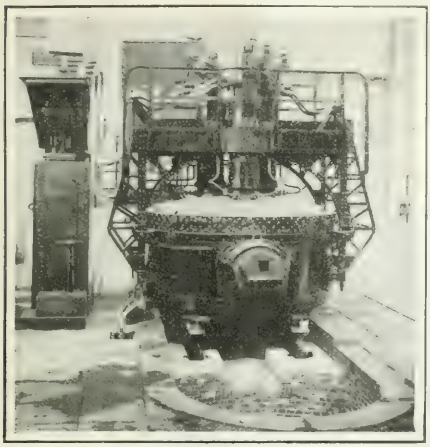
The next sale of the Shipping Board's property on the Pacific Coast will take place at Tacoma, Wash., July 25.

NEW FIAT ELECTRIC FURNACE

Characteristics and Claims of the New Italian Melting Unit

BY DR. ALFRED STROMBOLI*

WHEN Stassano in 1898 brought to the metallurgical world his new electric furnace for the manufacture of steel, the Italian steel mills quickly realized the great advantages of this new process, but only during the World War period did they adopt it on a large scale. The scarcity of coal and the poor quality of



The Fiat Electric Steel Melting Furnace

pig iron, both of which had to come from foreign countries, was no doubt the deciding factor. Some of the largest steel mills were confronted with the serious problem of how to fill their orders. Notable among them was the Fabrica Italiana d'Automobile di Torino (Fiat), which had to produce 1000 tons of steel ingots per month. Such a production could never be obtained by the ordinary processes, due to the great difficulty in getting cool and raw material on time and of good quality.

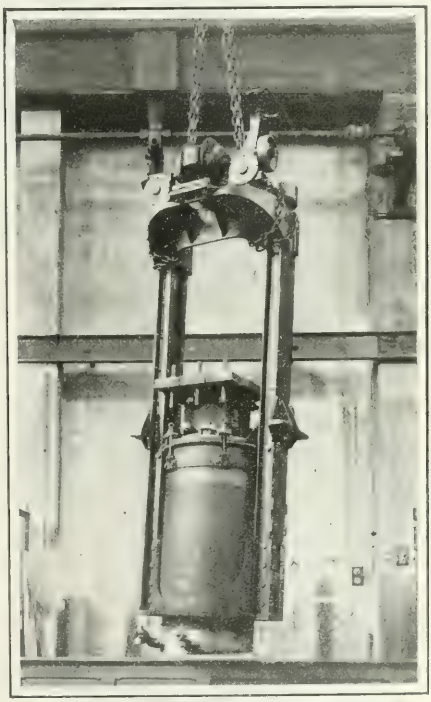
The necessity of finding a type of electric furnace of large capacity and able to make steel out of iron and steel scrap was an urgent problem. After much study and a series of tests the decision to build a new type of Fiat electric furnace was reached. The Fiat works immediately started the construction of a furnace which has achieved success during its continuous operation for five years. Of this type of furnace there are six of 5 and 6 tons capacity and one of 1½-ton capacity in service at the Fiat works and four of 20 tons capacity, two of 6 tons and two of 3 tons capacity at the Ferriere Piemontese, Turin, also part of the Fiat works.

This type of electric furnace was so successful that the Fiat company decided to organize the Fiat Electric Furnace Works for the exclusive construction of electric furnaces. A brief description of the main characteristics of these furnaces follows:

The Fiat furnaces are of the three-phase system having the neutral grounded through the furnace's frame. One illustration shows an external view of a 5-ton furnace. A rigid steel cylinder having a concave base and reinforced by means of riveted steel angles forms the frame. Circular cast steel rockers are provided at the base for the two movements of the furnace. At the top the removable cover is of silica brick and encircled by a wrought iron ring. This cover tightly closes the furnace by means of four lateral hinged bolts. On opposite sides of the frame two openings are provided for the charge, purification and discharging of the metal. This furnace is moved by means of two hydraulic engines having oscillatory cylinders, with their pistons attached to the two rockers on the furnace.

One of the most important features of the Fiat furnaces is the Fiat economizer or electrode supporter. The Fiat electrode supporter will not allow air to get into the furnace through the opening made in the roof for the passage of the carbon electrodes. This is accomplished by means of a specially designed supporter. The air which penetrates into the furnace not only has the disadvantage of considerably shortening the life of the electrodes, but, worse yet, enormously decreases the efficiency of the furnaces.

The Fiat economizer was briefly described in THE IRON AGE, Feb. 23, 1922, page 538. This economizer is so designed that it can be quickly cleaned, inspected or removed from the furnace as shown in one illustration. Before the use of this device the electrodes used to burn to a conical shape and even 30 or 40 cm. on the part outside of the furnace. There was also great damage done by the escaping gas. When the electrodes burn out in a cylindrical shape it is obvious that they can carry more electrical current and will last longer. An electrode which had an initial length of the point of 1.5 m. (4.9 ft.) and weighed 120 kg. (265 lb.), after serving 21 full charges on a 5-ton Fiat furnace, each charge having been cold, was reduced in length to 25 cm. (9.8 in.) with the weight to 20 kg. (44 lb.). This represents a consumption of only 2.85 kg. (6.3 lb.) of electrode per ton of steel.



The Fiat Economizer as It Appears When Lifted Out of the Furnace

The potential used in the Fiat furnaces is 130 to 75 volts stepped down from a 21,000-volt supply line. The first voltage, 130, is used for the first stage, that is, to melt the metal, and the lower one to maintain the metal in a molten condition during the refining process.

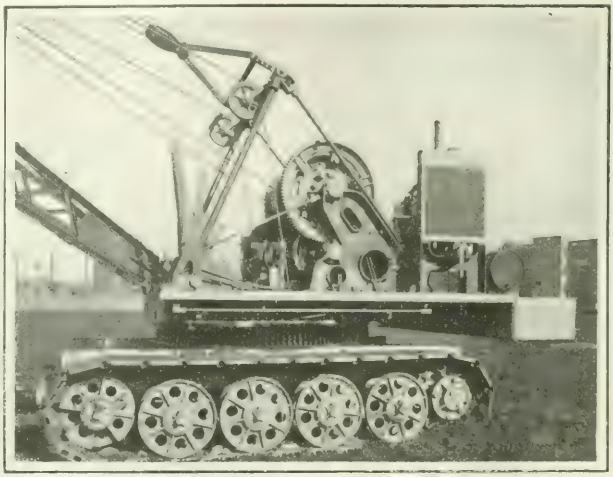
Costello continuous pair furnaces are to be installed in the plants of the Wheeling Steel Corporation, the Newton Steel Co. at Newton Falls, Ohio, and the Superior Sheet Steel Co., Canton, Ohio, by Tate-Jones & Co., Inc., Pittsburgh.

*Turin, Italy.

NEW CRAWLER CRANE

Lower Frame a One-Piece Casting—Improved Control Features—Mechanism Described

The crawler crane shown in the illustration and which embodies a number of new features has been placed on the market by the Link-Belt Co., Chicago. Without bucket the machine weighs 22 tons, making a ground pressure of 10 lb. per sq. in. and it is rated to lift 10 tons at 12 ft. radius and three tons at 30 ft. radius. The hoisting speed is 125 ft. per min. with a maximum rope pull of 10,000 lb. on a single line. The machine is suitable for both clam-shell and drag-line bucket work, having two independent band-clutch operated hoisting drums. The crane will rotate four times a minute, travel ¾ mile per hour and climb a 20 per cent grade.



Crawler Crane Rated to Lift 10 Tons at 12 Ft. Radius and 3 Tons at 30 Ft. Radius. The boom is 35 ft long and of angle and lattice bar construction, parabolic in shape

The shoes are 18 in wide, of 12 in. pitch, and made of one-piece high-carbon chrome steel castings with machined holes for 1¾-in. diameter high-carbon pins. There are eight bronze-bushed crawler rollers, 25 in. in diameter. The overall width of the crawler tread is 9 ft. 7 in., and the distance from center to center of the sprockets, lengthwise, is 10 ft., giving a bearing area of 30 sq. ft. The lower frame is a one-piece annealed open-hearth steel casting designed to carry the severe diagonal stresses of a machine of this type.

A hollow cast-steel dead axle housing has been provided on which the load carrying sprockets are mounted and inside of which the floating drive axles are located, cut bevel gearing running in oil being used. The control clutch steering the caterpillar, is also placed inside the housing and is in constant connection with a foot lever on the operator's platform, and can be used in any position of the rotating base. The foot lever also instantly locks the caterpillar, so that the crane can be operated on an incline without resorting to blocking. The bevel gearing underneath the frame, connecting the vertical travel shaft with the longitudinal rear axle countershaft, is also inclosed in a cast-steel casing, the gears running in a bath of oil.

The rotation gear, roller path and center casting form a single steel casting 7 ft. in diameter, the large size of which is intended to keep the center of gravity of the rotating frame within the roller race, thereby materially reducing the stresses in the center pin and rotating mechanism. The upper rotating frame, a single-piece annealed open-hearth steel casting, 14 ft. long, 5 ft. wide, and 11 in. deep, rotates on four 12-in. diameter, 4-in. face finished and bronze-bushed conical steel rollers, and is held to the lower frame by a finished forged steel center pin.

The machine is driven by a Climax Engineering Co. four-cylinder, heavy-duty tractor engine with a gasoline tank of 30-gal. capacity, or enough for about 15 hr. continuous operation. A 40 hp. electric motor can be provided instead of the gasoline motor, if required. All gears with the exception of the rotation gear and pinion, have machined teeth. There are only three bevel gears on the rotating frame and only 16 gears of all descriptions in the entire crane.

The reversing friction clutches for swinging, traveling and boom hoisting are of the expanding type and may be applied with a minimum of effort. The boom hoisting mechanism is automatically self-locking. The brake drums are mounted on extended hubs of their respective rope drums and connected with them by means of ratchet and pawl mechanism. The operator can set his brakes either before or while hoisting his load, so that the moment he pulls his hoist clutch out of engagement his load is automatically held in position. This permits a less skilled operator to run the crane, as it requires a certain amount of dexterity to manipulate clutch and brakes simultaneously.

The construction of the crane is such that all of the machinery may be inclosed. Inside the housing there is an unobstructed platform, 30 in. wide the full length on each side of the rotating base so that the machinery is easily accessible. The machinery may be dismantled without disturbing the house. All necessary attachments for hook block, grab bucket, dragline bucket, pile driver and magnet up to 45 in. in diameter, are included in the equipment.

New Use for Steel

What may be referred to as a new use for steel has been observed in the way San Francisco holds back its crowds in providing for parades. Most of the marching celebrations occur on Market Street, from the Ferry Building to the City Hall. The police department has adopted a plan of stretching a strong steel cable along the street near the curb.

The cable is supported by heavy wooden posts at regular intervals. The posts are let into holes in the roadway pavement, about a foot out from the curb. To protect the edge of the hole and to hold the post firmly, a flanged iron collar is set into the top of the hole. An iron cover, similar to the cover of a small waterworks valve box, is kept on each hole when the posts are not in place. At street intersections, the cable is laid in the adjacent gutter until a few minutes before the approach of the parade, when it is drawn across the intersecting roadway by the policeman in charge of each intersection. Police department wagons follow up the parade and the posts are loaded into these and the rope is wound up on drums, the entire equipment being stored in the basement of the Hall of Justice.

Compression Tests of Forging Steel

A series of compression tests at temperatures between 20 and 700 deg. C on carbon forging steels has been completed at the Bureau of Standards, Washington. In this series the proportional limit decreased slightly with rise in temperature of 300 deg. C and thereafter more rapidly to a very low value at 700 deg. C. The yield point which was determined by means of the drop of the beam of the testing machine first increased and then decreased.

Fuel Gases in Iron and Steel Plants

Characteristics of Blast Furnace, Coke Oven and Producer Gas, and of Their Use in Continuous Heating Furnaces

BY H. S. WATTS*

BLAST furnace gas, producer gas and coke oven gas are the only fuel gases which can claim general usage in steel plants. Natural gas has come into disuse because of the limited supply available, and blue water gas has not passed the experimental stage in the industry.

Blast furnace gas has been available, with the production of pig iron, since the advent of the closed-top blast furnace. Similarly, coke oven gas has been collected and used in large quantities where by-product coke ovens are installed. Producer gas, once the most generally used fuel in steel plants, is now employed on certain operations when there is not enough coke oven gas.

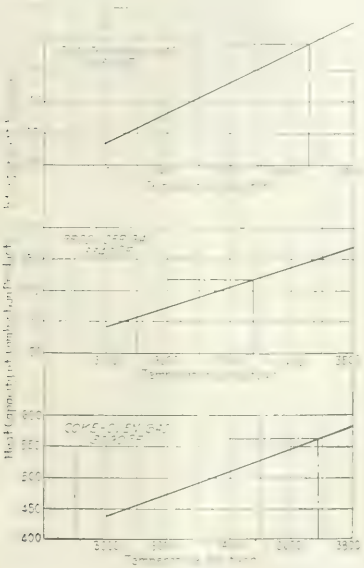


Fig. 1. Theoretical Combustion Temperatures of Blast-Furnace Gas, Producer Gas and Coke-Oven Gas

A fuel gas is principally characterized by its chemical analysis. The proportions in which the various constituents are found bears strongly upon its action in the furnace, its adaptability to certain operations, and, in general, its value as a fuel. Volumetric analyses of typical gases are shown below. Since all of these gases are derived primarily from coal, it is not unusual that they have practically the same constituent compounds. Carbon monoxide, hydrogen and the hydrocarbons are the heat-producing components.

ANALYSES OF TYPICAL GASES

	Percentage Composition		
	Blast Furnace Gas	Coke Oven Gas	Producer Gas
Carbon Dioxide	12.8	1.8	6.2
Carbon Monoxide	26.0	[illegible]	22.3
Ethylene	...	3.[illegible]	0.3
Methane	0.2	34.6	3.5
Hydrogen	3.0	[illegible]	12.3
Nitrogen	58.0	[illegible]	55.4

These analyses show producer gas and blast furnace gas to be strikingly similar in the large proportion of non-heatbearing components, in contrast to coke oven gas, which is composed almost entirely of compounds having fuel value. Further, it may be seen that furnace gas has a higher percentage of carbon dioxide than producer gas, while the latter contains more free hydrogen and hydrocarbons than furnace gas. Again, coke oven gas has a very small percentage of carbon monoxide, while the other two gases depend largely upon this compound for their fuel values. These variations in composition are due to methods of manufacture.

Production of Blast Furnace Gas

Air under pressure, entering the lower part of the furnace through a set of tuyeres, and coming into contact with incandescent carbon, results in forming carbon dioxide. In the presence of additional carbon, this is converted into carbon monoxide. Passing upward through the charge of ore, coke and limestone, a part of the monoxide is again changed to the dioxide in the reduction of ores. In the gas at the top, both oxides are present. Additional carbon dioxide is produced in the upper part of the furnace, due to the roasting of limestone.

The water vapor, contained in the air blown, is acted upon by hot carbon, with the formation of carbon monoxide and free hydrogen. The former is subjected to the same changes as the monoxide formed by the introduction of air. The hydrogen passes upward through the column, and a portion of it may combine with the carbon to form methane. The small quantity of volatile matter in the coke is driven off in the upper strata, and is represented in the analysis by additional quantities of free hydrogen and methane.

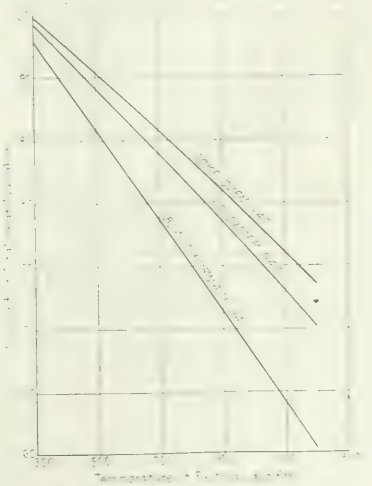


Fig. 2. Percentage of Heat Available with Perfect Combustion of Fuel Gases

Incombustible constituents include the carbon dioxide formed in the manner indicated, and the inert nitrogen derived from the air blown and, in small quantities, from the fuel. These components aggregate at least 70 per cent of the total volume. Another in-

*Steam Engineer, Otis Steel Co., Cleveland. Abstract of paper presented before the Association of Iron and Steel Electrical Engineers.

combustible and very objectionable component of blast furnace gas, which does not appear in the chemical analysis, is water vapor. This is due to the vaporization of the moisture in the materials charged, and the water thrown on the charge in the skip bucket to lower the temperature at the top of the furnace. The evaporation occurs at or near the top of the column. The quantity of water vapor present may be roughly estimated, normally, at 30 grains per cu. ft. of gas, with a corresponding dew-point of 115 deg. Fahr.

Flue dust present in this gas is in quantities which vary widely with the furnace operation; but the

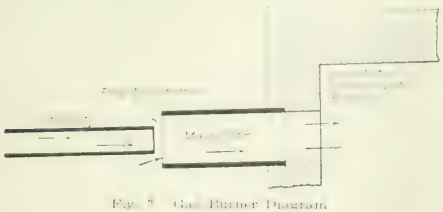


Fig. 3. Gas Burner Diagram

greater part is extracted before the gas reaches the point of consumption. The normal temperature of the gas leaving the furnace is about 400 deg. Fahr. In gas cleaners, where water is used to carry out the dust, the sensible heat of the gas is lost, depreciating its heating value somewhat less than 10 per cent. Due to the reduction of the gas temperature in passing through the wet washer, the vapor content is reduced.

The quantity of gas produced in the furnace varies slightly with the operation. For many reasons, it is difficult to measure the volume, but this may be closely estimated by reference to the analysis of the gas, and the analyses and weights of the materials charged and produced. In the particular case from which the typical analysis was taken, the volume generated was 68.7 cu. ft. at 32 deg. Fahr., per pound of coke charged. Since the calorific power of the gas is about 100 B.t.u. per cu. ft., the heat of the gas represents more than one-half of the heat in the coke charged. This fact may lend more interest to the problems confronted in the proper utilization of blast furnace gas.

Production of Coke Oven Gas

Coke oven gas is a by-product obtained in the modern process of coke manufacture. As the coal spaces are sealed so that no air may enter, and practically no combustion take place, the volatile constituents are slowly driven from the coal, leaving coke. The gas is collected in a common, overhead main, through which it is conducted to the by-product plant. The process primarily intended for the extraction of by-products, fortunately, is effective in thoroughly cleaning the gas.

Hydrogen and methane form, in the typical analysis, 88 per cent of the total volume. Unsaturated hydrocarbons, or "illuminants" are present in small quantities. The balance of the volume is composed of nitrogen and the two oxides of carbon. These formations are due both to the oxygen and nitrogen in the coal, and to the slight infiltration of air. Ordinarily, the foreign matter is so completely removed as to pass notice, except for occasional clogging of valves and fittings. The gas is usually saturated with water vapor at the point of consumption, but since the temperature is that of the surrounding air, the quantity of vapor contained is small.

Due to the large percentage of heat producing constituents, and the correspondingly low non-combustible proportion, the heating value of this gas is high. The standard cubic foot, at 32 deg. Fahr., has a net heating value of approximately 550 B.t.u. The gas weight is about 0.4, referred to air. The volume of gas generated depends upon the quantity of volatile matter in the coal and, to some extent, upon the operation. Normally 9000 to 11,000 cu. ft. are produced per ton of dry coal used. It then appears that the total volume of gas contains about one-fifth of the total heat of the coal charged. In the great majority of coke plants, about 40 per cent of the gas is used for heating the ovens; the other 60 per cent being available for mill use.

Producer Gas

In many respects, the formation of producer gas is similar to that of blast furnace gas. Air is forced into the producer at or near the base, usually by means of steam-jet blowers. When in operation, there are three general zones, of which the upper consists of the green fuel charged at the top. Immediately beneath this is the hot zone of incandescent coke which, in the cycle of operation, after being relieved of its volatile components in the upper zone, has been passed to the lower position. Beneath this, a bed of ashes forms the lower zone.

The fundamental chemical reactions in the producer are simple. Air and steam, entering at the base, soon encounter incandescent carbon in the hot zone. Oxygen from the air unites with carbon, forming carbon dioxide, and heat is liberated. Part of this heat is reabsorbed when the dioxide, in the presence of additional carbon at a high temperature, is converted into monoxide. The steam or water vapor reacts with the hot carbon, forming carbon monoxide and free hydrogen. This reaction also absorbs a portion of the heat liberated in the hot zone. The hydrogen passes up through the fuel bed and a part

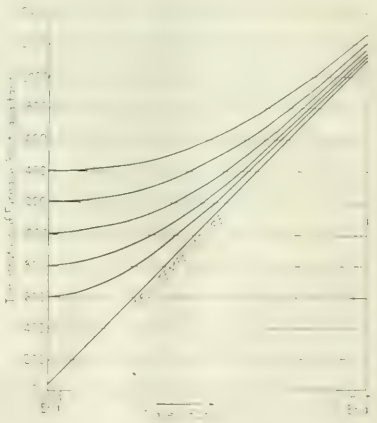


Fig. 4. Roof Temperatures Required to Give Equal Heat Transfer at All Points in Continuous Billet Heating Furnace

of it may combine with carbon to form methane. The other portion enters the final gas in the free state.

Volatile matter contained in the coal charged is driven off almost immediately after the introduction of the fuel at the top. This appears in the analysis as free hydrogen and hydrocarbons, saturated and unsaturated, the latter in proportions dependent largely upon the temperature of distillation. Low temperatures favor the formation of tarry vapors, which condense under reduced temperatures in the flue and deposit soot, while high temperatures favor the formation of fixed gases, such as methane. In any case, however, the proportion of condensible vapors is small.

Incombustibles, nitrogen and carbon dioxide, comprise about 60 per cent of the total volume. The nitrogen present, neglecting the small quantity driven from the coal is derived from the air blown. The carbon dioxide may vary considerably with the operation, and gives an excellent indication of the efficiency of the process. A high percentage may indicate a thin fire or a relatively cold producer. The latter may be caused by slow running or by an excessive use of steam. High hydrogen content also points to the use of too much steam.

Both heat-liberating and heat-absorbing reactions

occur in the producer. The quantity of heat liberated exceeds the heat absorbed; the difference raises the temperature of the gases generated. The temperature is maintained within desired limits by proper control of the steam supply, in relation to the air blown. The normal temperature is about 1,100 deg. Fahr. The total heat of the gas is more than 150 B.t.u. per standard cu. ft., and approximately 70 cu. ft. are produced per pound of coal used. The weight of the gas is about 0.9, referred to air.

Combustion of the Three Gases

As indicated above, these gases are mixtures of carbon monoxide, free hydrogen, hydrocarbons and incombustibles. The first three named components have stored-up energy in the form of latent heat, liberated when they are acted upon chemically by oxygen. When they are brought into intimate contact with air at high temperature and in proper proportion, combustion takes place.

The chemical reactions are not complex. Carbon monoxide combines with oxygen from the air to form carbon dioxide; hydrogen combines with oxygen to form water vapor; the hydrocarbons combine with oxygen to form both carbon dioxide and water vapor. Each of these reactions is accompanied by the liberation of heat. When sufficient air is supplied, complete oxidation and maximum heat liberation take place. No other compounds are formed, in considerable quantities, in the process of combustion. The products of perfect combustion contain these two gases and, in addition, the nitrogen content of the air used for combustion, and the carbon dioxide and nitrogen from the original fuel. The greater portion of the liberated heat immediately raises the temperature of the products of combustion. Part of the heat may be re-absorbed or dissipated to the furnace walls. The temperature to which the remaining heat is able to raise the products of combustion is called the combustion temperature.

For various reasons, it is almost impossible to derive the real temperature of combustion from the gas analysis. The so-called theoretical temperature of combustion is sometimes used in comparing gases and, for relative values, gives satisfactory results. This is the temperature which would be obtained if all the heat liberated were used to heat the products of combustion. We have roughly calculated this value for the various gases, as shown in Fig. 1. The curves show the sensible heat capacity of products of perfect combustion at given temperatures. The ordinate, representing the sum of the latent and sensible heats of the fuel gas, and the sensible heat of the air, all above 0 deg. Fahr., has a corresponding abscissa which gives the theoretical temperature of combustion.

High combustion temperature is favored by high proportion of combustibles in the fuel gas, because of the greater heat available for a given quantity of combustion products. We may naturally expect a high combustion temperature with coke oven gas, practically free from incombustibles, compared with furnace gas, which has less than 30 per cent of its volume in heat-bearing constituents. Proper regulation of the air supply also promotes high temperature of combustion. For every gas, there is a theoretical quantity of air required for complete oxidation, which may be calculated from the chemical analysis. In actual operation, complete combustion under these conditions is never obtained.

Gases are sometimes valued commercially according to net calorific power. If it were possible to reduce the temperature of the stack gases to that of the atmosphere, this valuation would be more consistent. Unfortunately, this operation is not practicable, and combustion is always accompanied by a stack loss. The calorific power of a gas is a direct measure of the heat liberated in the furnace under the best conditions, but the composition of the gas largely controls the quantity of heat passing out with the waste gases, other conditions remaining the same. Each gas has an inherent stack loss. The difference between the net calorific power and the stack loss gives the heat available, and this figure should be used in any attempts at commercial valuation.

Specific conditions affect the relative value of gases on various operations. Fig. 2, giving the percentage of net calorific power available for the three gases, with various stack temperatures, shows that the effect of incombustibles on stack loss is accentuated by increased stack temperatures. In view of the foregoing, it is natural to expect the wide divergence of points representing high stack temperature conditions, and the close approach to a common value, at points representing low stack temperatures.

Contact Between Gas and Air

There are at least three general methods employed to bring the gas and air into direct contact. The two fluids may enter the furnace or combustion chamber

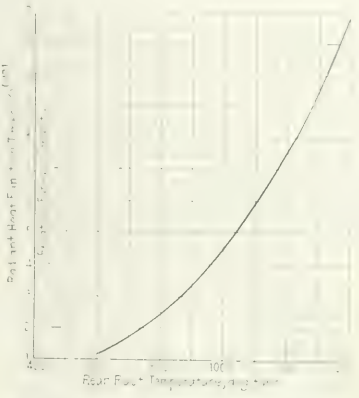


Fig. 5. Furnace Capacity Corresponding with Various Rear Roof Temperatures

through separate ports at relatively low velocities. In this case, at the beginning of the travel across the furnace, the air and gas pass in separate lanes, mixing taking place only at the plane of contact between the lanes. The combustion along this surface causes a disruption of the stream line flow, and the speed of combustion may be accelerated continuously until the gases reach the outlet port. By means of bridgewalls and irregularly-shaped roofs, the stream line travel may be further broken, further increasing the speed of combustion.

The air, which is heavier than most gases, may be introduced above the gas; after entrance, its general downward travel causes it to engage the gas and cause further mixing. This general method of operation produces the "lazy flame." It has had long and successful usage and is easy to manipulate. It has the advantage of producing the "mild" or "soft" flame, and of producing a flame of great length, resulting in direct radiation from the flame to the steel over all sections of the furnace. In some cases, particularly in slab furnaces, the flame also finds its way under the steel, resulting in direct radiation to the under side.

The greatest objection to this method of operation is that it causes delayed combustion which results in high stack temperature and loss. The rather indifferent mixing frequently permits incomplete combustion, even with an excess of air supplied to the furnace.

Another method of introducing air and gas provides for the impinging of the two streams upon each other at high velocities. This disturbance causes a random motion of the elementary volumes of which the air and gas are composed, and increases the probability of direct contact. To carry out this principle more fully, the air and gas are sometimes divided into a number of impinging streams, causing complete mixing in a shorter travel.

This last method employs the eddy-flow principle to cause the mixing action. For every gas or mix-

ture of gases, flowing through a given conduit, there is a critical velocity which marks the change from streamline flow to eddy or turbulent flow. At lesser velocities the mass of fluid proceeds in straight lines, while at greater velocities a whirling motion is set up. It is natural to expect that, if the fluid mixture traveling above the critical velocity were composed of quantities of air and fuel gas, a thorough mixing action would be obtained. The completeness to which any mixing is carried depends upon the line of contact between the components. The whirling flow gives a long line of contact in a short travel.

In general, the effort required to produce proper mixing depends upon the richness of the gas. Poor gases have a high percentage of incombustibles, and the presence of these inert constituents decreases the probability of direct contact between the important constituents.

Perhaps the best method of mixing the air and gas is to combine the second and third plans, obtaining a mixing action due both to the impinging of streams at high velocities and to the action of the turbulent stream. The air may be supplied to the port or burner under external pressure, or it may be forced in by the impact of the gas, by the stack draft or by both. The specific conditions determine which means is most suitable. When conditions permit, it is advisable to use the aspirating burner, which draws in air for combustion, due to the impact of the gas mass. Its use is limited but, within its own field, excellent operation is obtained with a minimum of attendance.

Use of the Aspirating Burner

Aspirating burners, properly designed and applied, will give the desired condition of constant air-gas ratio. Certain factors should influence the design, and definite methods be employed in obtaining the given air-gas ratio. It is not contended that adherence to these principles will yield a burner which will function perfectly, but, with this method as a starting point it should be possible, with the aid of experimentation, to proceed to the construction of a real, constant-ratio aspirating burner.

Fig. 3 shows the aspirating burner in its simplest form. A jet of gas issues from the gas pipe into the mixing pipe, which is open at both ends. Due to the impact of the gas stream, air is drawn into the mixer in contact with the gas. The mixture passes through the mixing pipe at a velocity exceeding the critical speed, and a turbulent motion is set up, thoroughly mixing the gas and air components. Passing to the furnace, this homogenous mixture is ready for rapid combustion.

Assuming no loss in energy due to friction, eddy currents, etc., the ratio of air to gas is a function of the ratio of gas pipe and mixer pipe areas, and is independent of gas velocity. Further, with a given burner, the mixture ratio is substantially constant for all gas velocities within reasonable limits.

Obviously, such a burner would automatically adjust the air supply to the varying gas supply as long as the gas composition and temperature remain the same. This feature admirably fits the conditions under which blast furnace gas is supplied. Usually, as no attempt is made to keep it constant, the pressure of blast furnace gas is subject to considerable and frequent variation, due to the variation in the rate of gasification through the cycle of furnace operation.

Successful application of the aspirating burner is limited by the momentum available in the gas stream, for a given weight of mixture. Gases with a high percentage of incombustibles are heavier and require less air than the richer gases. The use of a burner of this type is limited to poor gases, and particularly to blast furnace gas. This appears to differentiate against its use on coke oven gas for, with the large mixing tube which would be required, it would be impossible to transfer the energy of the small gas stream uniformly to all parts of the mixture stream.

Heating Steel in Continuous Furnaces

The continuous billet-heating furnace presents some interesting problems relating to heat transfer. The furnace bottom is almost completely covered by long billets placed transversely. In the charging operation, as each cold bar is pushed in at the rear of the furnace the entire charge is advanced, the forward bar having been previously withdrawn for the mill. The continuous furnace may be described as one in which the steel, as it progresses slowly from the cold end of the furnace to the hot end, is subjected to a gradual and uniform rise in temperature.

In many furnaces of this type, due to careless operation, the temperature of the steel rises but slightly in passing over the first half of the course, and the greater portion of the heating is accomplished in the third quarter of travel. The last quarter is used as a soaking area, in which the heat on the upper portions of the steel is allowed to pass to the inner and lower portions. In other cases we find the rise in temperature more uniform over the entire length of steel travel. It is interesting to study the conditions necessary to produce this gradual and uniform temperature rise, particularly since, as will be freely admitted, this is the best method of operation.

Since the temperature rise of the steel must be substantially uniform, the rate of heat transfer to the steel must be equal over all sections of the furnace. If we neglect the transfer of heat to the steel by convection it may be assumed that all of it is transferred by radiation from the flame or roof. Since the rate of heat transfer to the steel must be the same in all sections of the furnace, the difference of the fourth powers of the absolute temperatures of the flame or roof and the steel must be constant, in all sections. Now the roof temperature is necessarily less than the flame temperature, and in combining the two radiant values, the effective temperature must be used. For convenience, this temperature will hereafter be referred to as the roof temperature.

Referring to a specific case, let the steel enter the furnace at 60 deg. Fahr., and be subjected to a uniform temperature rise until it is discharged at a temperature of 2100 deg. Fahr. Since the rear end temperatures are lowest and most easily reckoned with, we use them for a basis in calculation. Assuming a rear end roof temperature, and recalling the temperature range of the steel, we may readily solve for the radiant heat transfer characteristic, the difference of the fourth powers of the absolute temperatures of the roof and steel. This is comparable to a force which drives the heat from the roof to the steel.

Having this function properly evaluated it is possible, by reference to the desired steel temperatures at the various points in the steel travel, to determine the corresponding roof temperatures required at these points. This yields a series of roof temperatures which, under the assumptions, will give the condition of uniform steel temperature rise as required. This procedure was followed in plotting the curves shown in Fig. 4, one curve being drawn for each assumed rear roof temperature. Along each curve the driving force is constant. Each curve represents a constant rate of heat transfer, and therefore a definite furnace capacity.

Further, in Fig. 5, a curve has been plotted to show the relation between the rear roof temperature and the capacity of the furnace operating under these conditions. It appears in this case rather unusual to find that the furnace capacity with a rear roof temperature of 1400 deg. Fahr. is ten times as great as the capacity obtained with a rear roof temperature of 600 deg. Fahr. It may appear perhaps more unusual to find that a similar capacity ratio is obtained with front roof temperatures of 2263 deg. Fahr. and 2120 deg. Fahr., respectively.

Attention is called on Fig. 4, to the wide divergence of points representing conditions at the rear end of the furnace, compared with the proximity of the points representing the front end conditions. This indicates that the furnace capacity may be considerably increased by a slight rise in temperature of the roof at the hot end. Again it may be seen that, to effect considerable heat transfer at the rear end of the furnace, a wide divergence of roof and steel temperatures is necessary. This may add weight to the

statement that the combustion temperature is extremely important. It may also give a clearer explanation of the low furnace efficiency caused by the high rear gas temperature necessary to provide the high rear roof temperature required.

Roof Length and Capacity

The proper length of roof is often in question. Clearly, the addition of furnace length cannot well be used to reduce appreciably the stack gas temperature. From Fig. 5 it may be seen that the heat transfer is seriously compromised by reduction in temperature at the rear end. This indicates that an enormous increase in furnace length would be required to reduce appreciably the stack gas temperature. The fact that a vast expanse of low temperature roof at the rear end is not particularly effective is undoubtedly well known to furnace manufacturers.

If it were possible to obtain reasonably low stack gas temperatures by making a moderate increase in the furnace length, this method would have been resorted to long ago. Instead of this, we find the general use of recuperators. These are built to absorb heat from the waste gases and transfer it to the air supplied for combustion. Perhaps no part of the furnace presents so many operating difficulties as the recuperators; and in some cases these have been discarded because the saving in heat did not justify the expense incurred in their proper maintenance. Of course, when it is necessary to preheat the air in order to maintain the required combustion temperature, this reasoning does not apply; but the use of recuperators on billet heating furnaces admits the failure of the longer furnaces in reducing the stack gas temperature.

Other conditions remaining the same, the length of the furnace determines its capacity. It might be thought that the furnace capacity is limited only by the extent to which the radiant heat function or driving force can be increased. The latter is limited in two ways. At the hot end, the roof temperature must not exceed the fusion temperature of the best refractories. The other limit is measured by the rate at which the steel will allow heat to be conducted through its mass.

If the transfer of heat to the steel exceeds the conductance of heat through the steel, there will be a non-uniformity of temperature in the steel cross-section. If this condition is allowed to prevail for a sufficient length of time, the inevitable result will be the fusion of the steel section. Such operation not only ruins the structure of the bar, but seriously impedes the continuous operation of the furnace.

We may therefore say that the capacity of a given furnace is limited by the capacity of the steel to conduct the heat from its upper surface to its inner and lower portions. After this point is reached, the capacity may be increased only by the addition of furnace length. It seems wise to make the length sufficient to give the desired capacity when the rate of heat transfer from the roof to the steel is near the maximum rate of heat conductance through the steel.

Globe Seamless Tubes Co. to Pass to New Ownership

Negotiations are under way and are expected to be completed soon for the sale of the Globe Seamless Steel Tubes Co., Chicago, manufacturer of steel boiler tubes and mechanical tubing, works of which is at Milwaukee. William Renshaw, Chicago, president, and Lawrence Fitch, Milwaukee, vice-president and secretary, principal owners of the company, will retire. The new interests will be headed by Robert P. Lamont, president, the American Steel Foundries, Chicago; Paul J. Kalman, St. Paul, Minn., president, Paul J. Kalman Co. and also of Bliss & Laughlin, Inc., and the Hudson Motor Co. of Illinois; and by Frank J. O'Brien, present vice-president and general manager of the company, who will continue in active charge of the business.

Proposed Alabama Iron and Coal Merger

A merger of Alabama iron and coal properties is reported to be under negotiation. The Alabama Co., owning the two Clifton blast furnaces at Ironaton, Ala., and the two Etowah furnaces at Gadsden, Ala., is the only company whose name has been mentioned, but four or five companies, in all, are being considered. Negotiations are being conducted by Lloyd H. Atkinson, whose office is with Crocker Brothers, 21 East Fortieth Street, New York. Mr. Atkinson was for some years with the Bethlehem Steel Co., and later was a member of the firm of Atkinson & Utech, railroad supplies.

The Alabama Co. owns about 1750 acres of land at Gate City, Ala., containing deposits of red iron ore, limestone and dolomite. Hard ore mines have been opened on this property at Hammond, Ala. About 2500 acres of mineral lands and 15,000 acres of timber and other lands were acquired with the Clifton furnaces, and 730 acres of ore and other lands with the Etowah furnaces. The company has about 3700 acres of land near Gadsden containing deposits of red iron ore and a large acreage of land containing brown iron ore. Mines have been developed on these properties with a daily capacity of 600 tons. At Hematite, Ga., the company owns 1700 acres of brown iron ore lands with ore washers. Coal mines and coke ovens are operated at Lewisburg, Searles and Brookwood, Ala. There are 915 beehive coke ovens at one place and 350 at another. The total annual capacity of the coke ovens is 300,000 tons. About 300 acres of limestone lands are also owned by the Alabama Co.

The statement has been made that if the pending merger plans are carried out there will be a saving of 40 to 50 cents a ton in the cost of making pig iron, economies being effected chiefly through reduction in the length of ore hauls. Stockholders of the Alabama Co. have already been asked to give their assent to the proposal.

Union Sued Under Recent Decision

Suit to recover $5,000 damages as a result of injuries received at the hands of striking union molders in Cleveland, was brought last week against the Cleveland local of the International Molders' Union of America, under the ruling of the United States Supreme Court in the Coronada case. The president, business manager and secretary of the union were named as co-defendants in the suit which was started by a molder who claimed to be the victim of an attack by union strikers.

Decision as to Reconsignment

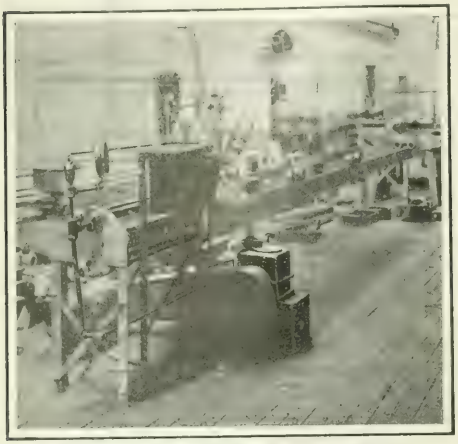
WASHINGTON, July 18.—Passing upon the complaint of the Romann & Bush Pig Iron & Coke Co., St. Louis, Examiner Warren A. Wagner, in a tentative report to the Interstate Commerce Commission, finds not to be unreasonable or otherwise unlawful the reconsignment rule of carriers permitting only one change in destination. It was charged that failure of the Western Maryland and other carriers to permit more than one reconsignment, and apply the through rate from points of origin east of the Mississippi River on shipments of coal and coke by way of the reconsigning points to final destinations in the far west and southwest violated the fourth section of the interstate commerce act.

The Commercial Galvanizing & Mfg. Co., Warren, Ohio, has begun the erection of a new plant in the industrial allotment in the northeastern section of Warren, adjoining holdings of the Warren Tool & Forge Co. It will manufacture large and one-time containers as one of its chief products, used by petroleum companies, tar producers and other manufacturers in transportation of their materials. A galvanizing department will be maintained in conjunction.

Horizontal Press for General Work

Wide range of ram speeds and unusual readiness of the ram to respond to movements of the control handle are said to permit the new self-contained horizontal press of the Oilgear Co., Milwaukee, shown in the illustration, to be used effectively on many different kinds of work.

The particular press shown is used in the saw mill department of the Allis-Chalmers Mfg. Co. on general work, such as pressing wheels on the axles for saw mill carriages, pressing heads into pipe rollers and a variety of odd jobs. The capacity is 25 tons at pressing speeds varying from ¼ to 6 in. per min. The maximum speed of ram travel out to the work is 37 in. per min.



Self-Contained Horizontal Press for General Work. Wide range of ram speeds is a feature

and the return speed is 56 in. Ram speeds are changed instantly by means of the control handle located on the top of the standard variable-stroke QC pump, as shown. The stroke is said to begin without shock, and the push to be steady and without pulsations.

The pump is driven by a 2 hp. constant-speed, electric motor; no accumulator or auxiliary pump being required. Overload relief valves are provided to permit the ram to be driven at full speed against a stop without danger of injury. The cylinder is 9 in. in diameter and at full capacity a pressure of 800 lb. per sq. in. is exerted on the ram piston head. The large diameter of the ram, 5¼ in., and the long guide, is said to eliminate any tendency of the ram to deflect, even on its maximum stroke of 30 in. The axis of the ram is 32 in. above the floor and the space between the stop supports, 24 in. The V-shaped stops provided can be located along the supports at regular intervals and are held in place by heavy steel pins.

Among the advantages claimed for this type of press, are that power is not wasted in maintaining pressure for an accumulator or for pumping fluid through by-pass valves; the power efficiency is high over a wide range of ram speeds; no adjustments are necessary to keep the machine in normal operating condition and it is not damaged by overload.

Wages of Sheet Mill Workers Advanced

YOUNGSTOWN, July 18.—Tonnage rates of sheet mill workers employed by Middle West makers subscribing to the sliding scale agreement of the Amalgamated Association of Iron, Steel & Tin Workers will be advanced 3 per cent of the base rate, for the July-August period, as a result of the bimonthly examination of sales sheets conducted July 12 at Youngstown.

The average price of Nos. 26, 27 and 28 gage black sheets shipped during the 60 days ending June 30 was disclosed to be $2.90 per 100 lb., an increase from $2.80, the average two months before.

Under the new rate, sheet mill employees will be paid 22½ per cent above base, as compared with 19½ per cent in May and June.

The average price indicates that the higher quotations recently prevailing applied only to a small percentage of the total shipments. The current independent sheet market, however, is from $5 to $8 per ton higher than the average disclosed by the examination, as quotations range from $3.15 to $3.30 on base gage sheets.

Indications therefore point to another advance for affected workers at the next settlement.

The examination also disclosed an average price of $4.65 for tin plate, per base box of 100 lb. coke primes, unchanged from the settlement two months ago. Tonnage rates of tin mill workers are therefore unaffected and continue at 23 per cent above the base, the same as for May and June.

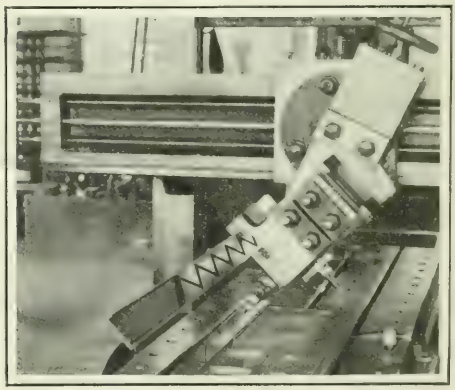
Current tin plate quotations are nominal at $4.75 per base box, or $2 per ton higher than the settlement average.

Ziz-Zag Oil-Groove Planing Attachment

ALLEN P. CHILD

A device used as an attachment on planers, for cutting zig-zag oil grooves in slides, and of interest because of the manner in which it cuts the grooves, is shown in the accompanying illustration. The groove is V-shaped, with a total angle of 120 deg. and because this form gives the oil an opportunity to wedge itself between the wearing surfaces, it is claimed that it is superior to a half-round section groove.

The cutting device is mounted on the clapper of the planer and is locked so that it cannot be lifted. The grooving tool is carried by a small clapper-box mounted on a cross slide, and its position on this slide is adjustable. One end of a bar cam, fitted in the body of the device, is attached to an upright strapped to the planer table so that it moves with the work. Freedom of



Planer Attachment for Cutting Zig-Zag Oil Grooves

movement of the planer head carrying the device is possible to a great extent through connection being made by both horizontal and vertical slides. As the planer table travels, the follower in the cam groove reciprocates and the motion is transmitted to the grooving tool.

Civil service examinations are announced for mining engineers at $3,600 and upward, and associate and assistant mining engineers at $2,160 to $3,600; for junior mining engineers at $1,620 to $2,160, and for assistant sanitary engineers at $2,320 to $3,225 per year. The two latter classes will be examined Aug. 9; the other applications will be received by the Civil Service Commission, Washington, until further notice. Applicants should ask the commission for form 2118 (mining engineer or associate or assistant) or 1312 (junior mining engineer or assistant sanitary engineer), stating the title of the examination desired.

CONTENTS

July 20, 1922

Successful Safety Week at Ford Plant 129
The Making of 30,972 Cars by 46,627 Workers Without a Major Accident and with a 50 Per Cent Reduction in Minor Accidents

What Will Next Ten Years Bring in Steel? 132
Drift Toward Consolidation—Profits Through New Economies in Production—Leadership Ability for the Future

What Is Today's Shortage in Pig Iron? 135
The Trend of the Years Before the War and the Low Rate of Consumption Since Indicate a Deficiency of Over 25,000,000 Tons

Methods for Locally Preventing Case Hardening 136
Protective Layers Applied with a Brush and Coating With Copper Compared by French Authorities

Electrical and Magnetic Weld Testing 139
Application to Butt-Welded Plates—Comparison With Physical Tests—Commercial Possibilities of Magnetic Testing

New Process for Mechanical Puddling 143
Commercial Installation at the Titan Works Consisting of Cupola and Ten Furnaces—Repeated Pourings Over a Dam the Unique Principle

Progress in the Open-Hearth Process 147
Some Results from the Blow Torch Furnace—Its Principles and Advantages—Steel Encased Regenerators

Fuel Gases in Iron and Steel Plants 153
Characteristics of Blast Furnace, Coke Oven and Producer Gas, and of Their Use in Continuous Heating Furnaces

Strike Causes Banking of Blast Furnaces 164
Four Stacks Now Idle in the Valleys and Others Have Difficulty in Operating—Situation More Serious.

Complaints Against Pittsburgh Basing...131
Courses in Metallurgy in Carnegie Tech..131
Complaint Filed Against Freight Rates...131
Coal and Coke Shipments.....131
Hoist for Cupola Charging.....134
New German Method of Hardening Steel..134
Improvement of Malleable Castings.....137
New Jolt Stripper Molding Machine.....138
Papers for Steel Plant Electrical Engineers.138
Combination A. C. and D. C. Voltmeter...138
Self-Lubricating Bushings.....142
British Empire Steel Corporation.....142
Geology of Commerce and Industry.....142
Electric Space Heater.....142
Shipbuilding Shows Decline.....145
Proposed Freights Suspended.....145
Magnesite Deposit in Southern Nevada....145
Tool for Turning Down Nuts.....146
High Test Iron Castings.....149
German Capital in Russia.....150
New Fiat Electric Furnace.....151
Compression Tests of Forging Steel.....152
New Crawler Crane.....152
New Use for Steel.....152
Proposed Alabama Iron and Coal Merger..157
Union Sued Under Recent Decision.....157
Decision as to Reconsignment.....157
Horizontal Press for General Work.....158
Labor Notes.....158, 164
Zig-Zag Oil-Groove Planing Attachment...158
Editorials 160
A Decision for War—Stand by the President—Unjust Iron Ore Rates—Magnetic Testing in Welding—A Better Philosophy of Work—Cement and Steel
Export Market.....163
Iron Age and Its Readers.....163
Getting Ready to Buy.....166
Plans to Secure Coal Production.....167
British Market.....181
British Imports and Exports.....181
June Structural Sales.....181
Railroad Equipment Business.....181
Fabricated Steel Business.....182
German Iron and Steel Market.....184
European and South American Fairs....184
Ore Freight Rates.....184
Effect of Manganese on Magnetic Properties 185
Soon to Report on Mergers.....185
Refractories Market.....187
Record Construction First Half 1922.....188
Plant Operations.....188
Industrial Finances.....197, 198
Trade Changes.....198
Plans of New Companies.....198
New Trade Publications.....199

Iron and Steel Markets 168
Comparison of Prices 169
Prices Finished Iron and Steel, f.o.b. Pittsburgh.....183
Non-Ferrous Metal Market.....185
Personal Notes 186
Obituary Notes 187
Machinery Markets and News of the Works.....189
New York Jobbers' Prices.....200

ESTABLISHED 1855

THE IRON AGE

EDITORS:

A. I. FINDLEY — WILLIAM W. MACON — GEORGE SMART

CHARLES S. BAUR, *Advertising Manager*

Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

F. J. Frank, *President* PRINTED IN U. S. A. George H. Griffiths, *Secretary*

Owned by the United Publishers Corporation, 243 West 39th Street, New York. H. M. Swetland, *Pres.* Charles G. Phillips, *Vice-Pres.* A. C. Pearson, *Treas.* F. J. Frank, *Secy.*

BRANCH OFFICES: Chicago, Otis Building. Pittsburgh: Park Building. Boston: 410 Unity Building. Philadelphia: 1420 1422 Widener Building. Cleveland, Guardian Building. Detroit: 317 West Fort St. Cincinnati: Mercantile Library Bldg. Buffalo: 881 Ellicott Square. Washington: 816 Fifteenth St., N. W. San Francisco: 320 Market St. London, Eng.: 11 Haymarket, S.W.1.

Subscription Price: United States and Possessions, Mexico, Cuba, Shanghai, $6.00; Canada, $8.50; Foreign, $12.00 per year. Single copy 25 cents.

Entered as second class matter, June 18, 1879, at the Post Office at New York, New York, under the Act of March 3, 1879.

A Decision for War

Reading the declaration of some of the coal operators and the official reply of the miners' union to the proposal of President Harding stamps anew on the mind of the reader the intense militancy that so long has marked the handling of labor issues in the coal industry. Some of the published complaints against the Administration that have had the evident sanction of operators find fault because the Government did not put itself behind the operators' proposal to the miners for a new grouping of districts. That is not far from the miners' insistence in their reply to the President that the only thing for the operators to do to avert a catastrophe is to meet the miners' representatives in interstate conference.

If there is to be arbitration of the coal strike, the issues must be handed over to the arbitrators for decision, and in questions so bitterly contested as are those which have caused the present deadlock, the outcome of necessity will be such as will suit neither side. In spite of all that has been said of the necessity of such thoroughgoing work by the proposed commission as shall "establish the proper basis for the future conduct of the industry," it is idle to look for any magic formula to right conditions under which coal mining has been going from bad to worse year after year. The way back will be long and hard, both for operators and miners, even though the war that has already cost many lives were to end tomorrow. Meanwhile, such a commission as the operators failed to support as offered and as the miners' committee rejected outright should be appointed and proceed with its work.

In the phase of the struggle on which the country is now entering the immediate interest of the public is in getting coal from the mines. A majority of the operators have expressed a willingness to have work resumed even though for a time at wages that represent the highest point of post-war inflation. The strikers, while with lip service "alive to the necessity of immediate resumption of coal mining operations," stand opposed to any efforts in that direction except on their own terms. Thus they are arrayed against the public interest and against the Government's plan for the opening of the mines and must now reckon with opposing forces more powerful than any they have had to meet in all the privation of more than 15 weeks of idleness. The public earnestly wants peace in the coal industry and peace with justice; but it appreciates that the conflict will be more serious before the way can be opened for peace.

Stand by the President

The patriotism of home is as imperatively necessary as the patriotism which sends soldiers to fight a foreign foe. It is easier to be patriotic when fired by hate of the Hun and love of country than it is to fight one's own countrymen. But Sheriff Duval and his little band who marched up the West Virginia hill were serving the cause of liberty and democracy just as truly as were the American boys who fought in Flanders or the Argonne; for if a man is not free to work in this country without getting permission from a labor union, there is no liberty and democracy is a farce.

Eugene V. Debs, the same Debs who was justly sent to prison for doing his utmost to prevent this country from winning the great war, has now added ingratitude to his other offenses by trying to make it more difficult for President Harding, who pardoned him, to enforce the laws of the United States. Debs sneers at the Government again as he did before a jury found him guilty and, whether legally or not, he is morally as guilty to-day as he was in the time of the other war, for to-day a few men are making war against the sacred rights of all men and Debs is helping them.

When Debs and his kind defy the Government, no patriot ought to hesitate as to where he stands. During that other war in 1917 and 1918, President Wilson and the Labor Board, headed by William H. Taft, made many concessions to labor. It seemed necessary to them to do so because determination to win the war dominated all other considerations. We do not know whether history will say they were right, and it would be useless to argue that question now. Conditions have changed. No one can now claim that in order to establish the right of men to work it is necessary

to submit to the demands of a labor dictator. Temporizing can not go on forever. The time to take a definite, positive stand for principle has come. The wise labor leaders have no sympathy with anarchy and socialism, and a tremendous majority of those who work for wages are patriotic. The President of to-day is in a much stronger position than was the President of 1917-18; but President Harding needs and should receive the heartiest, most effective support possible. Some critics are saying that he did not act soon enough—that he should have acted before the railroad strike and before the coal strike. Possibly that is true; but no good purpose will be served by discusssing that criticism. The present duty is to stand by the President in any drastic step he may take.

President Harding has had little more than a year in his great office. He is naturally conservative and slow to act until he knows he is right. In that respect he resembles our greatest President. He is courageous and God-fearing, and will do what the good of the country requires and his conscience commands. To doubt that the people will support him would be to question the stability of our Government.

Unjust Iron Ore Rates

Early in April of this year THE IRON AGE called attention to the deplorable conditions under which producers of iron ore in Eastern States were laboring, owing to the suspension by the Interstate Commerce Commission of the proposed reduction of 28 per cent in freight rates and handling charges on Eastern ores which had been filed to become effective April 1. At the same time the proposed reduction of 20 per cent on ex-lake rates was suspended, the suspension in both cases extending until July 30. The low rates on foreign ore from seaboard to inland furnaces continued, and operators of Eastern iron mines declared that it would be impossible for them to compete with foreign ores. One Eastern steel company had then contracted for a cargo of foreign ore, and the same company has since contracted for 150,000 tons and negotiations for other tonnages are pending.

Month after month dragged along without the Eastern ore operators obtaining any relief except the general rate reduction of 10 per cent on all iron and steel products, but it was hoped that before July 30 a substantial reduction would be made in the Eastern rates. On Monday of this week, however, the Interstate Commerce Commission suspended until Aug. 29 the tariffs which represented a reduction of 20 per cent on ex-lake ore rates and 28 per cent on Eastern ore rates. It was stated that the suspension was ordered because the commission had not completed its hearing in these cases.

A few concrete examples will show the handicap of the Eastern producers. The pre-war rate on ore from Ringwood, N. J., to Pottstown was $1.12. This was increased 100 per cent to $2.24, which continued until the recent reduction to $2.02. Foreign ore, coming to this country pays less than half of this freight, the usual rate from seaboard to Eastern furnaces ranging from 90 cents to $1.

The rate from Buffalo to Hellertown, Pa., over 300 miles, is $1.94, but the rate from Ringwood to Hellertown is $2.02. This is one instance of the way the producers of ore in the Eastern States are suffering, not only from foreign competition, but from discrimination in favor of Lake Superior ores which, in many cases, have lower rates on long hauls than the Eastern mines have on short hauls.

Under these conditions it is no wonder that some Eastern mines are idle and have been for months, and that at others production is greatly reduced. The latest action of the commission will insure further losses and further suspension of activities. It is difficult to understand the position that body has taken.

Magnetic Testing in Welding

The rapid advances made in welding operations have emphasized the necessity for a reliable method of checking the quality of such welds. The joining of ships' hulls, of tanks and of other large steel fabrications by welding instead of riveting is gaining in favor. Investigations have been made recently which have an important bearing on the future of large welding undertakings. At the annual convention of the American Society for Testing Materials last month a paper was presented, abstracted elsewhere in this issue, which makes public some highly interesting results. According to the authors, who compare magnetic and electrical testing of steel welds, the former, as applied to butt-welded steel plates, affords strikingly uniform and reliable results in detecting the quality.

In recent years magnetic testing of steel has acquired large commercial importance, particularly for rails. Only last March its successful application to the testing of chain was made public. Its special advantage lies in the fact that actual metallic contact with the metal to be tested is not necessary, nor even the removal of scale or dirt.

The recent experiments here referred to emphasize the commercial importance of such a method of testing, for if poor welds can be quickly detected then the use of welding may safely be extended. The possibilities are large. There is also the consideration that magnetic testing is really the only means by which the completeness of the heat treatment of a product can be determined without destruction of the object examined. As the applications of heat treatment increase, magnetic testing is certain to gain in importance.

German iron and steel exports have been holding up more nearly to the rate of the second half of 1921 than might be inferred from some reports. The latest data from *Stahl und Eisen* show 200,676 metric tons for April. This makes the average for the first four months of the year 201,800 tons per month, against about 220,000 as the average for the second half of 1921. In the first four months of this year exports from the United

States were only 175,600 tons per month. Great Britain and Germany, therefore, outrank this country. A feature of the German foreign trade is the large importation of scrap. In April the total was 35,120 tons, the largest for any month so far as recent data go, bringing the total to 98,600 tons to May 1, nearly equal to the entire receipt for all of 1921. The necessity of lowering costs by the use of cheap raw materials accounts for this rapidly increasing movement.

A Better Philosophy of Work

The large labor turnover in most industries, the disposition to go on strike, and the disinclination of many wage earners to do a full day's work, all have a common origin—a philosophy of work that work in itself is objectionable and naturally is to be avoided as far as possible. Recognition of this fact, in the abstract, is probably general enough, but hope that the philosophy of work can be altered and improved is not as great as it should be.

We began our misconception of work as early as we could by misinterpreting a line in what is only the third chapter of the Old Testament: "In the sweat of thy face shalt thou eat bread," and the united testimony of medical men that sweating is healthful has not altered our philosophy of work. Through the centuries the philosophy thrived and "the dismal science," the old political economy, put a broad stamp of approval on it.

It is unnecessary to argue that when workmen demand higher wages and when they shift employment a strong motive is the desire to avoid work, as this fact is commonly admitted. The abstract principle that work ought to be made more pleasant is, moreover, generally recognized. The difficulty lies in the practice, not in failure to observe the principle. The practice tends to the treatment of symptoms rather than to attack upon the disease or cause.

The study must go to the very seat of the emotions that cause work to be considered irksome. The seat is deep in the mind of the workmen, below his consciousness, indeed. As he does not himself understand the mental processes by which work appears irksome to him, it is quite idle to appeal to his judgment. From this viewpoint it is not straining a point to call "collective bargaining" by the simple word foolish. There are various arguments in favor of collective bargaining; and this reference does not combat those arguments. Anything of that sort, done with the avowed purpose of making the surroundings or circumstances of employment more attractive, serves by that very token to emphasize the conception in the mind of the worker that the work itself is disagreeable.

The rather common notion that it is only work of certain descriptions that can be really agreeable to the worker will not bear the test of study. To illustrate, if an instant answer be demanded to the question whether there is joy in the production of an oil painting, the average man will confidently answer in the affirmative, yet questioned further the great majority of men would admit that they would not care to be painters. One has merely jumped to the conclusion by observing that many men have painted without making a decent living from the work. If some men have put their whole souls into painting and other men would find such work most irksome, is it reasonable to assume that other lines of work cannot become tolerable, even pleasurable, through the creation of a different mental attitude?

If we are not on the threshold of important discoveries and applications, by way of creating a new viewpoint and philosophy of work, instead of attacking symptoms in endeavoring only to improve the surroundings of work, we are most unfortunate. The demand for a "living wage" in terms of commodities that are not available in the aggregate cannot easily be downed. It can be met only by increasing production so that the commodities the "living wage" would purchase at present prices can be had. Otherwise increasing wages merely increases the competition of buyers for the commodities available.

Cement and Steel

Cement and steel as measures of business activity are much alike in some respects and entirely different in other respects, hence a glance at movements in both materials discloses facts as to business conditions which a study of but one of the materials would not show, just as in algebra a single equation with two unknown quantities cannot be solved, while with two equations complete solution is possible.

Cement is practically altogether a construction material, while steel is only in part a building material. The commodities are wholly different in this, that steel can be and is stocked by distributers and consumers while cement is not. Stocks of cement are necessary, to take care of the wide seasonal variations in consumption, but this stocking is done by the producers, who endeavor to maintain a moderately uniform rate of production, while the rise and fall in stocks takes care quite largely of variations in shipments. The Geological Survey presents monthly statistics of production, stocks and factory shipments, which show that shipments in the summer months may be two, three, or even four times as great as shipments in the winter months.

The use of cement—which nowadays means practically Portland cement—is relatively new. Up through the year 1902 production doubled almost every year or two, that of 1902 being 17,230,644 barrels. Then successive doublings occurred in 1905 and 1910, the increase thereafter being substantial, but reasonably moderate. The best pre-war production was 92,097,131 barrels, in 1913.

Comparing 1913 and 1920 conditions one finds a departure between cement and steel, cement production increasing 8½ per cent while steel production increased 35 per cent. Comparing 1920 and 1921 we find a greater departure, in the other direction. Cement went off only 5 per cent while steel went off 53 per cent.

These remarkable departures can hardly be ascribed to accident or to changes in conditions affecting the two materials differently. Un-

doubtedly, of course, the activity in road building in 1921 helped cement much more than steel, but that would not account for everything. The statistics furnish strong ground for the suspicion, which is justified also by various other considerations, that there was a large carry-over of steel from 1920 to 1921, whereby the steel consumption of 1921 was much greater than the production.

The figures tend to support the suspicion. The combined output of 1920 and 1921 in steel was precisely double the output of 1913, while in cement the two-year production was 6 per cent more than double the 1913 output. It is much easier to believe there was a large carry-over in steel and manufactures of steel from 1920 to 1921 than to believe that in 1920 everybody was busy using steel and cement, but in 1921 they confined their attention to cement.

In the present year the shipments of cement have been 13,218,000 barrels in the first quarter and 34,811,000 barrels in the second quarter. Allowing seasonal variation in shipments this year to follow last year, the indicated shipments for the whole of 1922 would be 107,000,000 barrels, or 7 per cent over the record of 1920 and 16 per cent over the amount in 1913. Whatever may be the cause, the relation between production in 1913 and production or shipments this year is approximately the same for cement and steel. The similarity suggests that steel used for construction work and steel used for other purposes are in no greatly different relations from those of the past.

CONSIDERING FOREIGN IRON

Quotations Under American Market But No Analysis Guarantee Is Obstacle—Japan Again Buys Rails

NEW YORK, July 18.—Activity in purchases of rails, both T and grooved type, by Japan continues strong, and black sheet inquiries and purchases are on the increase. One black sheet inquiry now current among Japanese houses is for about 600 tons of light gage. The recent inquiry by the city of Tokio for five miles of 92-lb. grooved rails is reported to have gone to the New York branch of a large Japanese import and export house. The tender of the South Manchuria Railway Co. calling for about 6800 tons of 100-lb. rails was placed with Suzuki & Co., 220 Broadway, New York. An American exporter dealing with Japan recently booked an order for 1000 tons of 12-lb. rails, of which 800 tons have already been placed with a mill.

The Imperial Steel Works, Yawata, Japan, has completed construction of its tin plate mill, says a report of the American commercial attache in Tokio. While the estimated capacity of the mill is 20,000 tons annually, the first year's production is not expected to exceed 6000 tons.

The Bancroft-Jones Corporation, Buffalo, N. Y., reports receipt of a contract from the Truxillo Railroad Co., New York, for a number of steel buildings, involving about 700 tons of structural steel, for use in Honduras.

The rising cost of pig iron in the American market is the cause of considerable interest now being shown by consumers in foreign iron. There are prospects of Belgian, French and Scotch iron being brought in. One importer in New York reports that he is offering a pig iron of Belgian origin, analyzing silicon 5 to 6 per cent, and phosphorus 1.80 to 2 per cent, at $22.25, c.i.f. New York, or other Atlantic port. The greatest obstacle to purchases of foreign irons seems to be the inability or unwillingness of foreign sellers to give a guaranteed analysis.

In a recent report on conditions of trading with Brazil forwarded to the National Foreign Trade Council, New York, the American Chamber of Commerce at Sao Paulo, Brazil, says: "It seems to be generally agreed that the worst of the crisis which has existed for the last two years has passed, but it is also felt that a great deal of care and effort must be exercised before conditions can resume their normal state. However, the situation is far from hopeless, and instances can be cited where customers are ready and anxious to buy American goods, admitting that the price in dollars was all that could be desired, but positively refusing to consider placing an order until exchange has improved. In these cases the importers are not buying European goods, but insisting that they will wait for American."

In referring to the exchange situation, the report says: "It might be borne in mind that under existing conditions not only is the cost of goods doubled in the local currency, but the importer has also to contend with an increase in duties of approximately 100 per cent, due to the advance in the gold rate. For those with any intention or inclination to invest money in Brazil in the form of local manufacturing, it would seem that the present would be a good time to make a thorough study of the field, especially in view of the high value of the dollar when converted into milreis, the high protective tariff, and the lower investment required in shipping raw materials to Brazil for fabrication as compared with shipping finished products."

Leo H. Marks, who was president of the defunct Marks Steel Supply Co., Cleveland, and who pleaded guilty to concealing assets totaling $3,500 during a hearing in bankruptcy proceedings, was sentenced last week by Federal Court to eighteen months' imprisonment in the Atlanta penitentiary.

The Iron Age and Its Readers

An interesting story may be told of the colorful advertisement which appeared on the front cover of the issue of July 13. It is a reproduction of a large painting now to be seen as one enters the offices of the American Rolling Mill Co., at Middletown, Ohio. A desire to have something monumental at the Armco Works to be symbolic of the company's niche in industry resulted in the decision to have a painting of permanence. In securing a representatively virile example of a worker for the picture, some twelve different employees were photographed in the attitude of the heroic figure, and a composite was made of the dozen subjects. When the picture was unveiled under impressive ceremonies, the audience of employees, in response to a request, named correctly eight of the men whose portraits had been used, thus making it possible to say that the worker as well as the works are preserved in the finished picture.

The advertisement itself is noteworthy as the first one on an IRON AGE cover requiring the so-called four-color process. Actually there were five colors, counting the black ink, for the red regularly forming the field of THE IRON AGE heading was not suited to securing a reproduction of the colors of the artist's painting, and another red was needed. Readers may perhaps take the excellence of subject matter and the general rendition of the advertisement as a compliment paid by the advertiser to their discerning appreciation.

Strike Causes Banking of Blast Furnaces

Four Stacks Now Idle in the Valleys and Others Have Difficulty in Operating—Situation in Many Centers More Serious

YOUNGSTOWN, July 18.—The question of fuel supply has become the dominant consideration in the iron and steel industry, overshadowing all other current influences. Attention of executives, operating officials and consumers is focused upon this issue and day-to-day developments. Important independents are laying plans for curtailed production, preferring to gradually let down than to consume reserves and then wholly suspend. Allocation of steel supplies to consumers on a pro rata basis looms as an early development.

Four blast furnaces have already been banked in the Mahoning Valley because of the disorganized transportation situation checking coal shipments. Tod furnace of the Brier Hill Steel Co. was banked July 17; the 600-ton stack at Warren, operated by the Trumbull-Cliffs Furnace Co., and supplying hot metal to the Trumbull Steel Co., went down July 16, while two stacks in the Haselton group of the Republic Iron & Steel Co. were banked July 15.

The situation is likewise forcing other curtailments, which promise to become more serious, unless fuel supplies improve.

Slowing Down Expected

The Youngstown Sheet & Tube Co. started the week with schedules at 80 to 85 per cent. Officials anticipate a slowing down before the week end, however, and characterize the fuel situation as desperate.

Paradoxically, the very seriousness of the situation presents the hope that an early adjustment will be effected. Shopmen's strike proved the last straw in the difficulties under which Southern roads, tapping mining regions in West Virginia and Kentucky, were laboring. Before the shopmen walked out, these carriers, connecting with trunk line roads serving the Valleys and other large consuming districts, were operating in excess of capacity to meet the enlarged demands for coal. This created additional strains on motive equipment and rolling stock and the crippled roads were unable to meet the crisis precipitated by the shopmen's walkout.

The first important independent in this territory to announce suspensions as a result of these developments was the Republic Iron & Steel Co., which on July 15 banked two of the three active blast furnaces in its Haselton group at Youngstown and its Bessemer department. Its Bessemer converters had been blowing only since July 5, when they resumed following a protracted shutdown.

Coal Shipments Short

Other Valley plants announced curtailments. These interruptions come at a time when the industry was hitting its stride and production of steel was approaching a rate close to normal. They are caused immediately through inability to obtain adequate coal shipments through the rail congestion. Stoppage of fuel supplies occurred almost overnight, and its immediate reflection in lowered schedules indicates dependence of the industry upon transportation.

Reserves at Valley Plants

Reserves at Valley plants will be conserved as long as possible to prolong at least partial operations. Reduced ingot output, forced by the situation, will curtail sheet bar supplies and thus cut into rolling schedules of both integrated and non-integrated sheet interests.

The Trumbull Steel Co., Warren, has a stock of cold iron sufficient to carry it along for about 60 days, irrespective of the operation of the blast furnace of the Trumbull-Cliffs Furnace Co., which has been supplying hot metal since Jan. 16 to the open hearth furnaces of the Trumbull company. The company expects to be able to secure enough coal and other fuel to continue operation of its steel plant and finishing departments.

Coal prices have stiffened at Southern mines as indicated by the statement of a large industrial buyer that he was offered coking coal at $5.50, at the mine, this price representing a horizontal advance of $2 per ton over previous quotations.

Proceeding With Caution

Naturally, in view of disorganized conditions, due to the coal and railroad strikes, sales departments are proceeding with caution in accepting future commitments. All business is of course contingent upon early adjustment of transportation difficulties.

Non-integrated sheet producers in the Valley protected on coal, will be compelled to slow down because of reduced volume of sheet bar shipments and will likely be forced into early suspension, unless the situation with makers of semi-finished stock improves.

Interference with outbound shipments of steel has been of minor proportions, especially on the New York Central, Erie and Pennsylvania lines. Ore movement from docks to Valley furnaces has slowed down, but not at all to the extent that coal shipments have been affected.

Comment of industrial executives is that, even if an early settlement is effected ending the shopmen's strike, it will be some time before the steel plants again reach their recent high operating rate, should broad suspensions occur. It is pointed out that it will take some time to restore the Southern railroads especially to a normal operating basis. A shortage of open top cars is predicted and return of coal rationing and lake coal priority under Government control is held probable by some interests.

Railroads Respond to Appeals in Making Rates

WASHINGTON, July 18.—Concern shown by iron and steel and other industries over the drain being made on their supplies of coal has caused railroads serving them to respond to appeals for fixing of commodity rates where it is necessary to make circuitous hauls because of strike conditions. In order to do this, railroads have been and are getting permission from the Interstate Commerce Commission to establish rates on coal on one day's notice. A number of lines serving important coal regions have found their usual gateways either closed or congested, resulting in the shutting off of the natural and most direct routes for coal shipments to steel and other industries, particularly those in Pennsylvania.

This has made it necessary to ship coal by indirect routes which would call for classification rating, usually sixth class rates, unless authority to establish com-

modity rates were granted. The railroads desiring to serve industries on their lines have been quick to act upon the suggestion of shippers, where the carriers themselves have not taken the initiative to establish the lower rates because of the exorbitant costs that would accrue to shippers on the payment of class rates on coal shipments. As it is, many steel companies are drawing coal from distant sources of production, which are resulting in high delivered charges and further narrowing of margins of profit. The overhead costs of steel companies, it has been pointed out, have greatly increased because of restricted production, brought about by the necessity to conserve supplies of coal. Shipments being received are not adequate to meet requirements and this is making it necessary to draw on stocks, the quantity of which is not known here.

Reduced Coal Output

The congestion of traffic conditions is referred to by the Geological Survey as a new cause for limiting the production of coal. It is not believed that the production of bituminous coal during the fifteenth week (July 10-15) can exceed 4,300,000 tons. Final reports on the week of Independence Day, the fourteenth week of the strike, show that 3,936,000 net tons of soft coal and 23,000 tons of anthracite were produced. Loadings on Monday, July 10, amounting to only 14,952 cars, were lower than those on Monday in other recent weeks and on Thursday they fell to 11,584, the lowest on any Thursday since mid-April. Districts affected particularly by traffic congestion, were Logan and eastern Kentucky, but in western Kentucky and southwestern Virginia, also, loadings soon began to decrease and by Wednesday even the Pocahontas Tug River and Kenova-Thacker were producing far below normal. In the non-union fields of Pennsylvania and in Alabama and the far West no decrease had been reported up to Wednesday.

Production of By-Product Coke

To replace the deficit in beehive coke caused by the strike in the Connellsville region and other beehive coke districts, the by-product ovens are now producing at a rate above even the average for 1920. The total output of by-product coke in June was in round numbers 2,580,000 net tons, against a monthly average of 2,565,000 tons in 1920, the record year. The average output per working day was 86,000 net tons, an increase of 5 per cent over the May average. The month's production represented 70 per cent of the aggregate capacity of the ovens. Of the 71 plants in existence, 58 were active and 13 idle.

These statistics are based on reports from 70 plants and include an estimate for the one plant not heard from.

Because of the low production of beehive coke—458,000 tons against a monthly average of 1,748,000 tons in 1920—the total output of all coke was only 3,038,000 tons. This was 70.5 per cent of the monthly average of all coke in 1920.

To make the coke produced, it is estimated, required 4,429,000 tons of coal, of which 3,707,000 tons was used in by-product ovens and 722,000 tons in beehive ovens. The present monthly rate of consumption of coking coal is thus about 1,300,000 tons above the 1921 average, but is still 2,660,000 tons below the average in the year of maximum demand, 1918.

Drop in Coal Production

Uniontown, Pa., July 15.—The railroad strike will result in a drop in production during the week just closing at coal and coke plants in the Connellsville bituminous region, although figures are not available. The strike of shopmen has affected railroads in the region, particularly the Baltimore & Ohio, which has suffered considerably in movement of both passenger and freight trains. The Pennsylvania was not seriously crippled when West Brownsville and Youngwood crews went out, but late this week Rainey yard shopmen quit. The delays on the Baltimore & Ohio have crippled shipments of coal and coke somewhat.

No improvement has been noted in the coal strike situation as pertains to the disorder phase. Three men were killed early this week at New Geneva, being shot by LeRoy Lincoln, a guard. The shooting followed trouble at the Atlantic Coal & Coke Co. The victims were striking miners, and large crowds attended their funerals, State police being on hand following a tip that a demonstration was planned. There was no disorder, however. The guard is being held in the county jail pending investigation.

The first big picnic of the striking miners of the region was held at Shady Grove park last Saturday afternoon. There were a number of addresses. The men were told that, if the union men in other fields returned to work following any agreement reached at Washington, they would contribute half their pay to the men in the Connellsville region. Previously the strikers in the local region have been told that the union men would accept no agreement which did not provide for the men in the Connellsville region.

There is growing dissatisfaction in the region although just what form such feeling will take remains problematical. There are increasing tent colonies in the region as strikers and sympathizers who refuse to return to their work are being evicted from company houses.

The number of evictions is being increased daily. Companies in the region are preparing to continue operations. A number of ovens have been put in blast in the Fairchance region. In this territory, the H. C. Frick Coke Co. is continuing its advertisement of $500 reward for information leading to arrest and conviction of those responsible for dynamite outrages.

As the strike progresses with the striking miners refusing to go back to work and their places being taken by outside men, the situation is becoming increasingly serious. It is true that there is a heavy shifting about of men in the region, workers going to other plants and returning to work while refusing to go back to work at plants where they have resided for years.

Vigorous Protest Against Illinois Atrocities

Illinois coal operators representing all sections of the state, at a large meeting held at the Great Northern Hotel, Chicago, today, expressed unanimously their "continuing horror and bitterness of feeling over the monstrous atrocities committed near Herrin, Ill., on June 20 and 21, when some 72 employees of the Southern Illinois Coal Co., after their surrender under a flag of truce, were removed from the mining property and a substantial number of them brutally murdered by a lawless mob on the public highways, the remainder being tracked like wild animals through woods and fields in an effort to destroy them all.

That local and State officials, with a full knowledge of the extreme threat of this situation, and in ample time to have prevented such ruthless butchery, took no action to prevent it, is and will remain a stain not only upon the local community but upon the State as a whole until through adequate energy and effort not only the perpetrators but the instigators of this awful crime are apprehended and punished to the fullest extent of the law.

If for any reason, either of politics or because of the domination by any class or group, there shall be failure on the part of the proper authorities to handle this situation promptly and vigorously, it must be apparent to everyone that group lawlessness will be encouraged and become a menace always before the people in every section of the State.

We commend the utterances of President Harding in his address on July Fourth, that "liberty is gone in America when any man is denied by anybody the right to work and live by that work. It does not matter who denies. A free American has the right to labor without any other's leave."

The production of Portland cement for the first half of 1922 is estimated by the United States Geological Survey on the basis of returns from producers at 31,664,000 bbl. against 27,228,000 in 1921. Shipments for the six months of 1922 are 34,811,000 bbl. and for 1921, 27,984,000 bbl.

GETTING READY TO BUY

Knowledge of Requirements an Important Element—Flexibility Essential

BY JOHN J. RALPH

WHAT is the kind of proposition the sales department respects, goes right after, checks through carefully to see if the bid can be bettered, either in price or in value? The kind it likes to land and is chagrined when lost? In the first place, it is clear cut; in the second, it is complete.

When looking at the specification the seller knows the buyer knows what he wants. He knows what the market affords, for there is margin enough to care for standard variation of material. He knows the quantities he should buy, considering both the plant needs and price conditions. Delivery terms, quality and inspection conditions insure a fair deal. There is a lack of the "cast iron" quality that invites the best efforts to give the best products at the best price.

It is obvious that getting up such a bid is not the duty merely of a purchasing agent or department. It goes back through the entire organization. The files and records of the purchasing department first yield descriptions of the available products and trade information concerning them and names of possible suppliers.

These are considered by the design and manufacturing departments and the relative adaptability is worked out. The sales department also has a hand in it, with a view to the salability of the finished product. The cost department goes over its records, to show the variation in manufacturing cost due to variation in quality.

There are then worked out specifications of the ideal material or machine. There is also worked out an estimate showing at what price it would pay to make the purchase and the effect which lowering the price would have on the quantity that could be bought to advantage at one time.

There will be considered the effect on manufacturing cost of variations of chemical and physical nature from the ideal. Competing materials will be considered and relative prices which would make an equivalent buy roughly computed.

With this information as a basis, the purchasing agent is then ready to go into the market for supplies or machinery. He is able to draw his specifications to permit submission of bids, both of the ideal material as determined by the factory and substitute materials, and obtain intelligent bids from those approached. He has clearly stated the allowable variation in quality, in finish, in size.

Bidders Help Solve the Problem

By stating the use, he obtains the assistance of bidders who may have materials or methods available for satisfaction of the need, which the plant information files did not supply, and it may lead to finding a material or machine more satisfactory than the stated shop ideal. The clear statement of the possible quantities the plant may buy may enable one or more competitors, by working out better methods of production, to give a better price without changing the quality.

Bids having been received, it is sometimes possible to decide immediately just what is the best purchase to make.

If the bids give alternatives, they require careful attention by design, manufacturing, cost and sales departments. The investigation will be similar to the preliminary one, but this time will proceed on definite actual figures rather than on estimates. The maximum price that could be paid for the product to make it a money-making purchase having been decided, the relative profits to be made through the use of alternatives can readily be worked out. The bids and the trend of prices will determine the quantity it will pay to buy.

Conferences and Investigations

Every department in the plant is interested in the main purchases. The opinion of each department has a modifying effect on that of every other department. The purchasing agent requires all of this information. When the problem is put up to him in final shape, it should be in just exactly as clear and complete a form as his request for bids or the bids themselves.

It is usual to go over matters in conference taking up the various aspects, but it is not usual to reduce the discussion to writing or to get written reports covering the salient questions as they appear to the various departments. Such reports are essential to the best work by the purchasing agent, for from them he can prepare intelligently his request for bids.

It is possible to carry this, as all other careful work, to a ridiculous limit, but where the fundamental product, manufacturing and design conditions of the plant depend on the purchase, it is impossible to exercise too much care. Reducing the informal discussion to a formal report also has the advantage of impressing on the various departments the fundamental importance of buying, and their part in it.

If this is reduced to a routine there is a tendency, after the initial installation, for it to become machine-like. If so, it is far better to return to the system of individual "hunches," for reliance placed on a precise looking report, which is in reality inaccurate, makes it easy for big mistakes in judgment to occur.

Degree of Investigation Warranted

Be the purchase small or large, it has its proportionate effect on the profit sheet, and the elements of the large purchase are the same as the elements of the small one. Training in consideration of the elementary economics of the small purchase, usually prepared and handled by the less important members of the organization, is precisely the development of methods of investigation which they will use later in considering more important purchases.

Small purchases fall in classes and their aggregate runs up to a considerable sum in each class. Each class of purchases needs consideration and decisions should be made as to the relative economy to be reached, and the conditions, for each type of purchase.

The effect on the profit sheet of some of these small purchases is often entirely out of proportion to their money value. Just the substitution of one make and type of tool for another may increase the efficiency of some workman more than enough to pay for the tool in one day.

Here we have, then, the measure of the amount of attention to be paid to any purchase—the resultant economy attainable through more careful consideration. Where the amounts run large, as in the case of raw materials; where the time influence of the purchase is considerable, as in the case of tools and equipment, much attention should be given.

Limiting Conditions Often Harmful

It is usual for the purchasing department to be bound by a rule that no purchase shall be made of over a certain sum without the approval of the board of directors.

Right here is the source of much foregone profits. Ask your own salesmen about this, and the times when a shop has been balked of purchasing because of the prejudices of some member of the board, or because of an arbitrary ruling that no more money was to be spent in some direction for a set length of time.

Try to sell a labor-saving tool to some railroad shop or to an institution with a number of plants and a governing central board. Yes, and many a time clever selling to the same source, against the entire sentiment and advice of the shop, has fastened on the manufacturing department costs, with no possibility of profit, that have later proved very embarrassing.

The army philosophy is that the bestowal of rank is the automatic bestowal of ability to fill the position. We can see the absurdity of this in the army, but in industrial ranks is it certain that there is not much of the same feeling?

The urgent necessity for improving buying and for reaching the highest state of that art is beginning to be understood. The basic realization is that, while principles never change, circumstances do, and that under

different circumstances the application of the same principles must always produce different results.

Each problem must be carefully studied and a solution reached in keeping with the facts. The intrusion of personality or personalities almost always means an imperfect solution. The man who requires purchases made to suit his prejudices is too small to be able to grasp the essentials of real purchasing and if his influence is sufficient it sooner or later spells grave loss to the plant.

People Expected to Support the President

White House Calls Upon Executives of 28 States to Do Their Duty—Governor Sproul of Pennsylvania Is First to Respond

WASHINGTON, July 18.—Public approval is expected to be given readily to the drastic step of President Harding to bring about immediate resumption of coal production. The communication addressed to 28 Governors of coal producing States this evening at 6 o'clock in substance provides that they shall make every effort, with the assurance of support from the Federal Government if needed, to see that coal mining operations are started at once. While the communication does not specifically say so, it is plain in making it known that troops or any other means that may be required shall be used to protect mining properties and transportation. The final sentence in the statement of the President is a challenge to strikers or any others who attempt to interfere with coal mining and transportation. "To the task of lawful protection and the maintenance of order the Federal Government pledges every assistance at its command," concludes the communication.

Attitude of Labor Unions

In a word, if the States find it necessary to call upon the Federal Government for troops or other means for protection, they will be afforded. Organized labor already has begun a campaign of what appears to be open defiance of the Government. This had been expected and is being disregarded. But the attitude of the Government similarly is directed against coal operators who also refused to accept plans of arbitration.

Operators Also Blamed

It is distinctly known that Government officials consider that the tactics of delay, evasion and final refusal to submit to the Government's proposals of negotiation and arbitration, except upon their own terms, by operators, were as reprehensible as those of the miners' union. The outcome of the strife between the Federal and State Governments on the one hand and the organized miners on the other is being watched with eagerness, but the utmost confidence is expressed that, whether the strikers capitulate or not, they have lost their opportunity to resume work on an equitable basis, which by some is considered to be more than equitable for them.

All Other Means Exhausted

The Administration did not take its present steps until after it had exhausted every means of peaceful settlement of the strike, but finding they were futile, it has resorted to the only alternative it thinks remained. It has turned to the State governments to remind them that it is for them to assume responsibility in the situation which, it is believed, has been decidedly lacking in many instances. Pledge of the aid of the State of Pennsylvania made by Governor Sproul was the first publicly announced policy of any State and it is expected that the other States will fall in line. Those that do not, it is stated, will have to submit to Federal action.

In his statement, the President points out repeated efforts of the Federal Government to settle the coal strike and says that their failure left him "no other course but to invite the mine operators to return to their mines and resume activities." A number of operators have said that with sufficient protection they will have no difficulty in getting miners and resuming production. It is also intended to see that transportation is protected, made more difficult because of the rail strike, but it is believed the protection necessary will be easily provided. The President told the Governors that he hopes they will find it consistent to second the invitation to have all miners and operators resume their work, and points out the joint responsibility of the State and Federal Governments.

Responsibility Placed

"We are responsible," says the statement, "for the production and the transportation of a fuel supply ample for the necessities of the American people and the public utilities which serve them, particularly the railways engaged in interstate commerce. We must have ample coal to maintain industrial activity, we must have the coal necessary to the health, security and activity of all the people."

In concluding, the statement says:

"It becomes necessary, therefore, in the name of common welfare, to invite production, in the fulfillment of that obligation which attaches to any American industry engaged in providing any public necessity, and to afford security to all men alike who are ready and willing to work and serve the common need. No cause is so important as that of common welfare and there must be the suppression of every unlawful hindrance to the service of that cause. To the task of lawful protection and the maintenance of order the Federal Government pledges to you every assistance at its command."

Disagreement Does Not Justify Increase of Freight Rates

WASHINGTON, July 18.—Notice has been served upon the railroads by the Interstate Commerce Commission that disagreement over divisions is not considered justification for increases in or cancellation of joint through rates. Calling attention to the fact that it frequently occurs that carriers, unable to agree among themselves upon the division of such rates, propose to cancel or increase the rates, the commission points out to the railroads that under Section 15 of the Interstate Commerce act it has no option other than to condemn such changes unless substantial justification other than dissatisfaction with the divisions is submitted. Almost invariably, it is declared, when there is a lack of justification, the commission suspends such cancellation or increase and after hearing, requires that the schedules under suspension be canceled, continuing the joint rates in effect.

Iron and Steel Markets

MORE PLANTS SHUT DOWN

Fuel Scarcity and Railroad Troubles More Pronounced

Pennsylvania Coal Mines May Start—Fuel Oil Being Used at Steel Works

The effect of the coal and railroad strikes in cutting down pig iron and steel production is more pronounced. At Youngstown, Ohio, three large blast furnaces have banked and the Bessemer steel department of the Republic Iron & Steel Co. has closed down. A steel company blast furnace at Warren, Ohio, has stopped, also one at Steubenville, Ohio. At Cleveland the McKinney Steel Co. has banked a blast furnace and at two Cleveland steel plants five open-hearth furnaces are down. Cherry Valley furnace at Leetonia, Ohio, will probably go out this week. In eastern Pennsylvania two Bethlehem blast furnaces have been compelled to bank.

In the Pittsburgh district, all furnaces and steel works active last week have kept going, but steel works and rolling mills have been hampered by delays in coal delivery and some mills have fallen further behind on orders. Railroad congestion and labor shortage in several shops around Pittsburgh have hindered shipments in and out. In other Pennsylvania districts congestion of freight cars at junction points is causing trouble. West Virginia and Kentucky coal roads have been further crippled.

The iron ore movement on the Mesabi range in Minnesota has been reduced 25 per cent and some underground mines have stopped loading ore. While the operating percentage of the steel industry as a whole has not been seriously cut down by the week's events, the strain upon producers is much increased. One large Pennsylvania steel company, in view of the greater difficulty of getting coal, has withdrawn from the market as a seller of finished steel.

Consumers are more concerned about the delivery of steel they have bought, and in many cases their representatives are going to Pittsburgh mills to hasten shipments. New business is falling off, because of increasing uncertainty as to costs and fuel supplies, and on some products higher prices are being asked, particularly bars and plates. Some independent sheet mills have withdrawn all prices and a higher sheet market is predicted.

With coal growing scarcer, some steel plants are substituting fuel oil, though at rising prices. Large oil shipments are going to Youngstown, Ohio, this week, and a central Pennsylvania plate mill has started to use oil in its open-hearth furnaces.

Western Pennsylvania coal mines owned by steel companies or from which steel companies commonly buy coal may see the first efforts to operate in response to the President's proclamation. But railroad conditions must improve before increased coal production can be felt to any great degree, and the outlook at best is for hampered transportation for weeks to come.

Farming out of car and locomotive repairs features the railroad equipment market, but orders for 2300 new cars and 75 new engines were placed. Repair orders of the week cover 7600 cars and 220 locomotives, not counting heavy material purchases by the Pennsylvania Railroad, for use in its own shops, or the numerous small repair jobs negotiated with difficulty.

At Chicago the seasonal falling off in orders from the automobile industry has not yet developed. It now appears likely that there will be little or no gap between the demand for bars from that source and the starting of buying by agricultural implement makers. The latter are expected to be active within 30 days.

The inability of Western steel bar mills to take early delivery business has caused a demand for iron bars, and the latter are up $2 per ton.

Workers in Central Western sheet mills governed by the sliding-scale agreement will receive for July and August a 3 per cent advance over the base rate, shipments in May and June having averaged $2 per ton higher than in the previous 60 days. A further advance is already indicated for the next settlement.

In addition to the furnaces which have retired from the pig iron market, having banked because of coke shortage, a number have virtually retired by asking prices far above recent quotations.

Three weeks of July in fabricated steel lettings appears to show 30 per cent falling off from the tonnage awarded for the corresponding period of June. For the entire month of June bridge and building contracts took 66 per cent of shop capacity, according to figures compiled by the Bureau of the Census, while in May 81 per cent of capacity was engaged.

Pittsburgh

Fuel Shortage Causes Sharp Reduction in Plant Operations

PITTSBURGH, July 18.—Coal and coke shortage, due to the strikes of miners and railroad shopmen, is now seriously affecting operations of blast furnaces, steel works and general manufacturing plants in the Pittsburgh, Youngstown and Wheeling districts. In Youngstown, the Republic Iron & Steel Co. has been compelled to bank two of its three blast furnaces at Haselton and has closed its Bessemer steel plant at Youngstown. The company is still operating 12 out of its 14 open-hearth furnaces and its skelp and pipe mills are going, but at a reduced rate, and possibly may have to close in part at least within a week unless the supply of coal increases. In the Wheeling district, the Wheeling Steel Corporation banked one La Belle furnace at Steubenville on July 13, and both of its stacks there are idle. The comany is operating its top mill and Portsmouth furnaces but has two stacks down in Wheeling and the Martins Ferry stack is out. So far this company has not been compelled to close down any of its steel mills or finishing departments. In the Pittsburgh district, the Carnegie Steel Co. blew out one Isabella furnace on July 8 for relining, but this was necessary, and was not done on account of the coal strike. The company is now operating 38 out of 59 stacks. The Jones & Laughlin Steel Co. is fortunate in having a fair supply of coal, and has not been compelled to close down any of its blast furnaces, steel works or finishing mills either in Pittsburgh or Aliquippa.

While so far in this coal and railroad critical situa-

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	July 18, 1922	July 11, 1922	June 20, 1922	July 19, 1921
No. 2X, Philadelphia†	$27.64	$27.64	$27.32	$21.85
No. 2, Valley furnace†	24.00	24.00	24.00	19.50
No. 2, Southern, Cin'ti†	21.53	21.53	23.00	24.50
No. 2, Birmingham, Ala.†	18.00	18.00	18.50	20.00
No. 2 foundry, Chicago*	24.00	24.00	23.50	18.50
Basic, del'd, eastern Pa.	25.75	25.75	25.00	21.25
Basic, Valley furnace	24.00	24.00	25.00	19.00
Bessemer, Valley, del. P'gh	26.77	26.77	26.96	22.46
Malleable, Chicago*	24.00	24.00	23.50	18.50
Malleable, Valley	24.50	24.50	24.50	20.50
Gray forge, Pittsburgh	25.27	25.27	25.46	21.46
L. S. charcoal, Chicago	31.65	31.65	29.00	36.00
Ferromanganese, seaboard	67.50	67.50	67.50	70.00

Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$40.00	$40.00	$40.00	$47.00
Bess. billets, Pittsburgh	35.00	35.00	35.00	33.00
O.-h. billets, Pittsburgh	35.00	35.00	35.00	33.00
O.-h. sheet bars, P'gh	35.00	35.00	35.00	35.00
Forging billets, base, P'gh	40.00	40.00	40.00	38.00
O.-h. billets, Phila.	40.17	40.17	40.74	38.74
Wire rods, Pittsburgh	40.00	40.00	38.00	42.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, Pgh, lb.	1.70	1.70	1.70	2.00
Light rails at mill	1.75	1.75	1.50	2.00

Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	1.925	1.925	1.96	2.10
Iron bars, Chicago	**1.90**	1.80	1.75	1.90
Steel bars, Pittsburgh	1.70	1.70	1.70	1.80
Steel bars, Chicago	1.75	1.75	1.75	2.18
Steel bars, New York	2.04	2.04	1.98	2.18
Tank plates, Pittsburgh	1.70	1.70	1.60	1.80
Tank plates, Chicago	1.75	1.75	1.75	2.18
Tank plates, New York	2.04	2.04	1.98	2.18
Beams, Pittsburgh	1.70	1.70	1.60	1.85
Beams, Chicago	1.75	1.75	1.75	2.23
Beams, New York	2.04	2.04	1.98	2.23
Steel hoops, Pittsburgh	2.50	2.50	2.40	2.50

Sheets, Nails and Wire,	July 18, 1922	July 11, 1922	June 20, 1922	July 19, 1921
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh	3.15	3.15	3.15	3.25
Sheets, galv., No. 28, P'gh	4.15	4.15	4.15	4
Sheets, blue an'l'd, 9 & 10	2.40	2.40	2.40	2.50
Wire nails, Pittsburgh	2.40	2.40	2.40	2.75
Plain wire, Pittsburgh	2.25	2.25	2.25	2.50
Barbed wire, galv., P'gh	3.05	3.05	3	3.40
Tin plate, 100-lb. box, P'gh	$4.75	$4.75	$4.75	$5.75

Old Material, Per Gross Ton:				
Carwheels, Chicago	$19.50	$19.50	$18.25	$12.50
Carwheels, Philadelphia	17.50	17.50	17.00	16.00
Heavy steel scrap, P'gh	17.25	17.50	17.00	12.00
Heavy steel scrap, Phila.	15.00	15.00	15.00	11.00
Heavy steel scrap, Ch'go	15.50	15.50	14.50	10.00
No. 1 cast, Pittsburgh	19.00	19.00	18.50	16.00
No. 1 cast, Philadelphia	17.50	17.50	19.00	17.00
No. 1 cast, Ch'go (net ton)	17.00	17.00	15.75	12.50
No. 1 RR. wrot, Phila.	17.00	17.00	17.00	13.50
No. 1 RR. wrot, Ch'go (net)	13.50	13.50	12.50	9.00

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	**$11.00**	$9.50	$6.50	$4.75
Foundry coke, prompt	**11.00**	10.00	7.00	4.00

Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	14.00	14.00	13.75	12.75
Electrolytic copper, N. Y.	13.75	13.75	13.50	12.62½
Zinc, St. Louis	**5.75**	5.52½	5.37½	4.25
Zinc, New York	**6.10**	5.87½	5.72½	4.75
Lead, St. Louis	5.50	5.50	5.60	4.35
Lead, New York	5.75	5.75	5.85	4.40
Tin (Straits), New York	**31.50**	31.12½	31.37½	27.00
Antimony (Asiatic), N. Y.	5.00	5.00	5.10	4.65

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, July 18, 1922, Finished Steel, 2.169c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel

July 11, 1922,	2.169c.
June 20, 1922,	2.141c.
July 19, 1921,	2.407c.
10-year pre-war average,	1.688c.

Composite Price, July 18, 1922, Pig Iron, $23.61 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

July 11, 1922,	$23.61
June 20, 1922,	24.05
July 19, 1921,	19.81
10-year pre-war average,	15.72

tion there has been no suspension of blast furnaces and steel works in the Pittsburgh district, they are very much hampered in operations by the scarcity and delay in delivery of coal to the plants by the railroads, which have been intensified by the railroad strike. This has brought about a restriction in output, and the steel works and finishing mills are steadily getting further behind in deliveries. Consumers are getting very anxious about deliveries of materials they have bought, and are hounding the mills for shipments. Some representative consumers have men in this district at the different plants from which they have bought material, who are using every effort they can to expedite shipments.

The Baltimore & Ohio Railroad seems to have been hit harder by the strike than any other of the trunk lines entering this district. This road has already cancelled excursion trains and several of its through trains, especially those running into West Virginia and other southern territories. The Pittsburgh & Lake Erie has been seriously affected by the walkout of shopmen at its McKees Rocks shops which at noon on Monday virtually suspended operations. The McKees Rocks shopmen are members of the American Federation of Railroad Workers, an independent labor organization that did not join the strike when it was called on July 1. They now claim that the Pittsburgh & Lake Erie Railroad was sending Baltimore & Ohio trains over its tracks, and they refused to permit this to continue, and went out on strike. The Pennsylvania Railroad claims that many of its men are returning to work. This railroad has brought in some strike breakers, some of whom quit when they realized the situation. The Erie Railroad has applied to the deputy United States marshal to protect the men in the shopmen's strike, this protection being asked in Erie, Crawford and Venango counties. The Erie Railroad has been crippled by the shopmen's strike at its shops at Meadville, Pa., which are doing little work.

Steel companies are scanning orders closely, turning down promptly any business coming from other than regular customers, and in many cases paring down considerably orders that their regular customers are trying to place. Prices show a decided upward tendency and sales of steel bars at 1.80c. are being made regularly, while it is claimed that plates have been sold as high as 1.90c. at mill. The situation now in finished steel products is that it is not so much a question of prices, but whether the mill can make the delivery wanted.

Pig Iron.—The local market is quiet, and with some furnaces already out, and a strong possibility that others may have to go out, on account of not being able to get shipments of fuel, the market is expected to take an upward turn in prices, but has not yet done so. A local open-hearth steel concern sent out an inquiry two or three days ago for 5000 tons of basic, and is reported to have already closed for the iron with a Valley furnace at $24 at furnace. There is no demand for Bessemer or malleable, and sales of foundry have dwindled down to carloads and lots up to 200 tons. One interest reports a sale of 250 tons of No. 2 foundry at $24 at Valley furnace. One maker of basic is selling at $24 Valley furnace. Another maker of basic is holding for $25, Cleveland, freight added for delivery to any point, but has not sold any iron as yet at this price. Unless the coal and railroad strikes are quickly settled, a number of steel works and merchant blast furnaces will have to go out or bank, as supplies of coke and other fuels are steadily getting scarcer, the railroads being unable to move them. Two stacks in the Shenango Valley and two or three in the Mahoning Valley are on the ragged edge for coke and may possibly have to bank this week.

We quote Valley furnace the freight rate for delivery to the Cleveland or Pittsburgh district being $1.77 per gross ton:

Basic	$24.00
Bessemer	25.00
Gray forge	$23.50 to 24.00
No. 2 foundry	24.00
No. 3 foundry	23.50 to 24.00
Malleable	24.50

Ferroalloys.—The local market is not active, as consumers of ferromanganese have apparently covered their needs for some months and are out of the market. A few sellers are quoting prompt ferromanganese at $70, Atlantic seaboard, for either British or domestic, and several small sales have been made at that price.

We quote 78 to 82 per cent ferromanganese, $67.50 c.i.f. Atlantic seaboard for domestic, British, spot, $70, British, future, $67.50; German, 76 to 80 per cent, $66. Average 20 per cent spiegeleisen, $36 furnace; 16 to 19 per cent, $35 furnace; 50 per cent ferrosilicon, domestic, $55 to $60 furnace, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, $41.50; 11 per cent, $44.80; 12 per cent, $48.10; 13 per cent, $52.10; 14 per cent, $55.10; silvery iron, 6 per cent, $30; 7 per cent, $31; 8 per cent $32.50; 9 per cent, $34.50; 10 per cent, $36.50; 11 per cent, $39; 12 per cent, $40.50. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Iron and Steel Bars.—There is no let-up in the demand for steel bars, which is very heavy, and mills are considerably back in shipments. The Carnegie Steel Co. is reported filled up for two or three months and is accepting orders only for indefinite delivery at 1.60c. at mill, for favored customers. Independent mills are quoting steel bars from 1.70c. to 1.80c., but are scanning orders closely, not desiring to take on any orders they can avoid, and at the same time serve regular customers. The demand for iron bars is fairly active, with prospects of higher prices very soon, owing to higher labor costs.

We quote steel bars rolled from billets at 1.70c. to 1.80c.; reinforcing bars, rolled from billets, 1.70c. to 1.80c. base; reinforcing bars, rolled from old rails, 1.60c.; refined iron bars, 2.20c. in carloads, f.o.b. mill, Pittsburgh.

Structural Shapes.—No large structural jobs have been placed here lately, and inquiry is light. The two local mills that roll shapes are filled up over the next two or three months, and are declining to quote, except to favored customers, and then only for indefinite delivery. Prices quoted on current order range from 1.60c. to 1.80c., depending entirely on the customer, the size of the order and the delivery.

Steel Rails.—Two local companies that roll light rails state that demand in the past week has been more active, and report closing contracts for 5000 tons or more of 25 to 45 lb. sections at 1.75c., base at mill. With the serious condition existing, owing to the railroad strike, it is likely some railroads will ask the mills to defer shipments until the situation has cleared up. Two trunk lines entering this city have already suspended shipment on all track materials.

We quote 25 to 45-lb. sections, current rolls, new steel 1.75c. base; rolled from old rails, 1.60c. to 1.65c. base; standard rails, $40 per gross ton mill for Bessemer and open-hearth sections.

Wire Rods.—The demand for wire rods is reported as fairly active, but the available supply is limited. Due to the constantly decreasing supply of coal on account of the strike, makers of rods will not sell for delivery very far ahead. The American Steel & Wire Co. continues to quote soft common rods at $40 Pittsburgh, and another local maker having in view the probable higher cost of coal, is now quoting $43, Pittsburgh, but is not anxious to sell very many rods even at that price. Another leading maker here is declining to book orders for rods, desiring to conserve its supply for use in its wire and wire nail mills. An inquiry came in the market recently for 1200 to 1500 tons of soft rods, but it has not yet been closed. So far as known, almost no new orders have been taken as yet at above $40, at makers mills.

We quote No. 5 common basic or Bessemer rods to domestic consumers $40, chain rods $40; screw stock rods, $45; rivet and bolt rods and other rods of that character, $40; high carbon rods, $47 to $50, depending on carbon, per gross ton, f.o.b. Pittsburgh or Youngstown.

Wire Products.—Considering that this is usually the dull season of the year, the present heavy demand for wire and wire nails is remarkable, and is caused largely by the fact that jobbers and consumers are afraid of future supplies, due to the coal strike, also realizing that prices of wire nails are low, and they are anxious to stock up as largely as possible. The American Steel & Wire Co. is reported to be slow in delivery of wire nails, and has heavy obligations on its books. This condition allows a good deal of business to go to the independents that can make fairly prompt shipments, and they are taking orders freely. All the independent makers are now quoting wire nails at $2.40 base, having found it impracticable to get a higher price than was being quoted by the leading interest. Specifications against contracts are good, but the mills are slow to take on obligations, owing to their constantly dwindling supplies of coal. One large maker of wire nails reports it has a full supply of coal until Sept. 1, but unless the strike is settled before that date, it will have to close down its mills, in part at least. The demand for wire and wire fence is reported active, and for the latter has been enlarged by the recent reduction in prices of $5 per ton, which all makers met promptly. We now quote wire nails at $2.40 base and plain wire at $2.25 per 100-lb. at mill. Detailed prices on wire products and woven fence are given on page 183.

Cold-Finished Steel Bars and Shafting.—While some effort has been made to advance the market on cold-rolled bars to 2.25c, it has not developed very far, the leading maker here continuing to quote cold-finished steel bars at 2.10c, but it is stated one or two other makers are quoting 2.25c, so far without securing very much new business. The tendency of makers is not to sell very far ahead on account of the uncertainty as to the supply of coal, and the certainty of higher manufacturing costs if the coal strike should continue for some considerable time. Makers here are able, so far, to ship out promptly, except in the case of small rounds, in which there is some delay in delivery. Ground shafting is firm at 2.50c base, f.o.b. mill in small lots, 2.60c in less than carload lots. Demand is fairly active.

Cotton Ties.—Reports from several local makers of cotton ties are that the bulk of the business for the 1922 season is already on the books and that future sales will be confined to small lots and repeat orders from large users who may not have covered their full needs. No figures are available as to the tonnage in cotton ties for this year, and this will not be known until the full size of the cotton crop is determined. While some comment has been made that $1.10 per bundle of 45 lb. is a low price, there has been a shading of this price to $1.07 to very large users. We quote cotton ties at $1.10 per bundle of 45 lb. for July shipment, with a carrying charge of 1c per bundle for each month thereafter.

Rivets.—The demand for rivets from car builders is active, but from boiler shops it is only fair. Makers say that owing to higher prices for coal and for rods

and steel bars, they ought to be getting higher prices for rivets, but so far no move has been made with this in view. Makers are pretty well covered on rods at $38 or less, and on steel bars at 1.60c, but when they have to again enter the market for these materials, they will probably have to pay higher prices. The market is very firm and any change is likely to be to a higher market. Prices and discounts are given on page 183.

Plates.—Inquiries for plates in the past week have taken a spurt, and the leading interest has closed for 5000 tons for car repair work for the Pennsylvania Railroad, and expects to close in a few days for a much larger tonnage for 35 locomotives to be built by the Baldwin Locomotive Works for the Baltimore & Ohio Railroad. Inquiries for the plates and other materials for these locomotives were received here yesterday. The Carnegie Steel Co. is still quoting 1.60c. on plates for such deliveries as it can make, but has made some sales at 1.65c. to 1.70c., at mill. Independent mills are quoting plates all the way from 1.70c. to 1.90c., the price depending on the customer and the delivery wanted. A mill in the Wheeling district reports having sold sheared tank plates on the basis of 1.90c., Pittsburgh, for fairly prompt delivery. Prices are give on page 183.

Tin Plate.—This month and August are the peak months for the canning of fruit and vegetables, and makers of food containers are urging the mills for shipments of tin plate, one leading can maker having had a man here for some days. Operations among the tin plate mills have slowed down, the American Sheet & Tin Plate Co. operating this week to only about 70 per cent, the independent mills also showing a falling off, not only in operations but in output. Heavy stocks of tin plate are piled up in warehouses of the mills, which they are unable to move to customers, owing to the shortage of labor and the congested condition of the railroads. There is no change in prices, which are given on page 183.

Track Equipment.—The railroad strike is regarded as in a more serious condition today than at any time since it started, but in spite of this, two large inquiries from railroads for spikes have come into this market in the past week. The Southern Pacific has an inquiry out for 2500 kegs and the Erie for 5000 kegs. General demand for large spikes has been fairly active, but is likely to fall off as most railroads have covered their needs for this year, and also on account of the railroad strike. The demand for small spikes is active. Prices are firm and we continue to quote large spikes at $2.25 per 100 lb. and $2.50 for small and large and bolt spikes. A leading maker here continues to quote $2.35 for large spikes, but is quoting the above named prices on small spikes. There is a good demand for track bolts, the minimum price on which is $3 base, per 100 lb. on good orders. It is said the recent advance of $5 per ton on tie plates is holding firm, and we now quote these at $2 to $2.25 per 100 lb. maker's mill. Detailed prices are given on page 183.

Billets and Sheet Bars.—A week ago it was comparatively easy to obtain billets or sheet bars for fairly prompt shipment, but to-day the reverse is the case, and several mills that have been offering both billets and bars in the market now say they have none to sell, owing to the uncertainties of the situation as regards supplies of coal and coke. A local company reports a sale of 500 tons of sheet bars at $35, Pittsburgh, and 200 tons of small billets at the same price.

Iron and Steel Pipe.—The coal strike is embarrassing pipe mills more now than at any time since it started, and is restricting output to a considerable extent. This is naturally increasing costs somewhat, but as yet there are no indications of an advance in prices on either iron or steel pipe at an early date, this being regarded as an inopportune time to advance prices on account of the present serious labor troubles. The demand for butt and lap welded sizes of iron and steel pipe and also for line pipe is heavy, and the mills are inclined to go slow in taking on obligations on account of the uncertainty of future coal supplies. Several local makers report that on both butt and lap-welded sizes they are filled for three to four months, and are slipping back in deliveries owing to their output being curtailed. There is a better demand for oil country goods which are moving out freely. The order for six miles of 12-in. plain end line pipe for the Union Natural Gas Co. was placed with a local mill. Demand for butt welded sizes of pipe is probably the heaviest ever known, much of the tonnage going into building operations which are active all over the country. A further curtailment in production of pipe is looked for, unless there is soon a settlement of the coal strike. So far the railroad strike has not interfered seriously with shipments, except that some mills report shortages in cars on several days last week. Discounts are given on page 183.

Hot-rolled Strips.—Two local makers say their demand has been active in the past week or two, both consumers and jobbers desiring to stock up as largely as possible in view of restricted supplies in case the coal strike is prolonged. At the same time, it is a fact that the demand from consumers for strips to go into early use is active, and the tendency of the market is upward. A good part of the present demand comes from the automobile builders, who are putting the material into cars about as fast as they receive it. It is said that on the narrow light gages of hot-rolled strip steel, a modest advance over the base price is being paid in some cases. We quote hot-rolled strips at 2.50c base, Pittsburgh.

Steel Skelp.—Demand is reported active with available supply very light. One large user that was formerly a buyer in the open market is running its own skelp mill and making practically all it needs for its pipe mills. Prices are firm with a tendency to advance on account of the higher costs of coal and other manufacturing charges. We quote grooved and sheared skelp at 1.70c. to 1.80c. at mill, depending on the order.

Cold-rolled Strips.—Local makers report specifications against contracts in the past week have been more active, showing a desire on the part of users and jobbers to increase their stocks, in view of the uncertainty of ample future supplies. The market is firm at 4c, base, Pittsburgh, for cold-rolled strips, and several local makers say if manufacturing costs continue to increase, they will have to advance their prices.

Nuts and Bolts.—Jobbers and consumers alike bought heavily for the present quarter, and are specifying freely against contracts, but the demand since the first of this month has been quiet. Owing to the uncertainty of future costs, none of the local makers of nuts and bolts will sell for fourth quarter. Most of the demand at present is coming from automobile builders and from car shops. Discounts as adopted late in June are given on page 183.

Coal and Coke.—The situation in the coal strike from the standpoint of production, and also for an early settlement of the strike, are worse to-day than at any time since April 1, when the coal strike started. The facts as to the strike are given elsewhere in this issue. We now quote both blast furnace and foundry coke at $11 per net ton at oven. Connellsville steam coal is $5 at oven and West Virginia coal from $4.50 to $5 per net ton at oven.

Sheets.—Leading mills are sold up on sheets to October, and production has been very much curtailed, due to the coal and railroad strikes. Owing to the serious situation, some independent mills have withdrawn all prices, and others may do so soon unless the situation quickly clears up. This week the American Sheet & Tin Plate Co. is operating to 83 per cent of sheet mill capacity, but reports that production is very much curtailed, owing to scarcity of men, and inability to get coal promptly. Several of the large automobile builders have had men here for more than a week trying to accelerate shipments. Unless the coal and railroad strikes are soon settled, higher prices for sheets

(*Continued on page* 182)

Chicago

Little Trouble Due to Shopmen's Strike, But Future Curtailment Feared

CHICAGO, July 18.—While not yet a curtailing factor in iron and steel plant operations in this district, the strike of the railroad shopmen does loom up as a possible restrictive influence later. The railroads tributary to this city, with one or two exceptions, lately have been scurrying around in an effort to find private shops which will do car repair work, ordinarily performed in their own shops. One system even has gone so far as to offer to send its loyal workers to a plant in the city in an effort to get this plant to take on the contract. Generally, the jobs involved are too small to interest the car builders and it begins to look as though a great number of cars would not be available for the heavy demands of the crop moving period and should the demands for cars for coal shipments be large at the same time, it is declared with some positiveness, a shortage of equipment could hardly be escaped.

So far complaints of delays to shipments as a result of the shopmen's strike are not numerous. And the plants in this territory, as yet, are not suffering from the fact that fuel is not abundant, except that more capacity would be engaged than now is the case if the uncertainty as to fuel supplies were removed. The Steel Corporation plants here are running slightly in excess of 84 per cent of capacity, or substantially at the same gait as last week, and there has been no particular change in either direction as far as the independents are concerned. Railroad supplies, track equipment in particular, still are in brisk demand and there has not yet been any perceptible slackening in the automotive demand for steel bars. As a general proposition, however, this market is quieter than it has been. As typified by mill order books and the specification coming to the manufacturers against orders, business still is good, but it is pretty generally admitted that new inquiries are fewer and this occasions considerable surprise, since the ordinary signs point so generally to a tighter, rather than an easier, supply situation later in the year. Mills here are not particularly eager for business. This usually gives a market a quiet appearance and in addition, buyers probably are waiting on definite results from the labor troubles before mapping out their policies.

Price changes have been few, but generally the market is firm, about the only exception being sheets and in this product the situation is easier chiefly as to supplies and this means that buyers do not have to pay more than the Steel Corporation prices. Bar iron has moved up in this market to a minimum of 1.90c.

Intimations of a possible increase in wages of steel plant labor are heard here, but the common belief is that if such a step is taken, it will not be until after the coal and railroad strikes are out of the way.

Pig Iron.—Demand has been light and sales small except for a couple of lots of Southern foundry, one of about 2000 tons and the other of 4000 tons, sold to local melters on a basis of $18, Birmingham, for No. 2 grade. Incidentally, this business marked the passing of that price, as the company which lately has been naming it to-day advanced to $18.50. In general, melters have shown little interest beyond their immediate requirements. Outside of the stiffening in the minimum price on Southern foundry iron, prices are unchanged, but the market is best described as firm, since available supplies are moderate and costs are high, and must remain so as long as the coal strike is unsettled. The trade is much interested in the further reductions in pig iron freight rate from the Birmingham district, which Southern roads have asked the Interstate Commerce Commission to sanction. The proposed new rates would be $3.53 to Cincinnati and Evansville as against the rate which became effective July 1 of $4.05 to those points, while the proposed rate to Louisville is $3.24 against $3.72 at present and to St. Louis $4.22 against the present rate of $5.17. The failure of Northern roads to concur in the suggestion of Southern roads, however-means that the combination rate from Birmingham to Evansville to Chicago, would be $6.13 as against the present through rate of $6. If Southern iron can get into St. Louis as cheaply as is indicated by the proposed tariff, it might for a time be disturbing to Chicago district furnaces now serving that market. Either Southern prices would have to move up or Chicago prices decline to restore the normal relation.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$31.65
Northern coke, No. 1, sil. 2.25 to 2.75	$24.50 to 25.50
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	24.00 to 25.00
Northern high phos.	24.00 to 25.00
Southern No. 2	24.50 to 26.00
Malleable, not over 2.25 sil.	24.00 to 25.00
Basic	24.00 to 25.00
Low phos. Valley furnace, sil. 1 to 2 per cent copper free	34.00 to 35.00
Silvery, sil. 8 per cent	37.29

Ferroalloys.—Activity is lacking in all materials, but recent prices hold and in ferromanganese for early delivery the market is slightly firmer. Spot tonnages of this material, all of British origin, now are held at $72.50, New Orleans, or $80.06 delivered this district. For future shipment $67.50, seaboard, still is possible.

We quote 78 to 82 per cent ferromanganese, future, $75.06; prompt, $80.06, delivered; 50 per cent ferrosilicon, $55 to $62.50, delivered; spiegeleisen, 18 to 22 per cent, $46, delivered.

Bars.—The expected falling away in the demand for steel bars from the automotive industry has not yet developed; indeed, surprise is expressed over the way demand from this source holds up. It now looks as though there would be no considerable lapse between the passing of the automotive demand and the starting up of buying by agricultural implement manufacturers, who are expected to be active within the next 30 days. The mills in this territory all are heavily committed and are discouraging new business, unless buyers are willing to accept delivery at their convenience. Demand is essentially for early deliveries and inability of makers to take such business has occasioned increased demands upon makers of iron bars to replace steel. The market is stronger on iron bars, which now are quoted at 1.90c., Chicago, minimum, and even 2c. on small and less desirable business. These prices compare with the recent range of 1.80c. to 1.85c. Labor and fuel costs, as well as the heavier demand, account for this advance. Hard bars are firm at unchanged prices.

Mill prices are: Mild steel bars, 1.75c. to 1.85c., Chicago; common bar iron, 1.90c. to 2c., Chicago; rail carbon, 1.70c., mill or Chicago.

Jobbers quote 2.48c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 3.40c. for rounds and 3.90c. for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 2.38c. base. Hoops, 3.48c. Bands, 3.23c.

Bolts and Nuts.—New business is exceedingly light, due to the fact that buyers generally got under cover at the prices in effect prior to July 1. On such business as is coming out, however, the new discounts are closely observed. The discounts given on page 183 are those applicable to this territory, except that they are figured on a Chicago instead of a Pittsburgh base.

Jobbers quote structural rivets, 3.10c.; boiler rivets, 3.20c.; machine bolts up to ⅞ x 4 in., 50, 10 and 10 per cent off; larger sizes, 50 and 10 off; carriage bolts up to ⅞ x 6 in., 50 and 5 off; larger sizes, 45 off; hot pressed nuts, squares and hexagons, tapped, $3.25 off; blank nuts, $3.50 off; coach or lag screws, gimlet points, square heads, 60 per cent off; quantity extras are unchanged.

Wire Products.—New demands show a seasonable paucity, particularly from the agricultural regions, where the farmers are busy afield and making few purchases. The leading interest is well sold ahead and is not making much progress in reducing its obligations, owing to the fuel situation and the fact that labor is rather short, and, as usual at this time of the year, not

particularly efficient. Independent companies generally are meeting the Steel Corporation prices, though usually asking $2 a ton more on all products except plain wire. Mill prices are given on page 183.

We quote warehouse prices for Chicago: No. 9 and heavier black annealed wire, $3.10 per 100 lb.; No. 9 and heavier bright basic wire, $3.25 per 100 lb.; common wire nails, $3.25 per 100 lb.; cement coated nails, $2.75 per keg.

Sheets.—Inquiry is considerably less than it was recently, but makers note no material dimunition in the demand as typified by specifications on orders. The Inland Steel Co. is pretty well sold up against third quarter production, but while not actively seeking further obligations, it does occasionally manage to slip in a little additional tonnage for regular customers. Several Eastern mills, which did not fill up on third quarter business in the belief that prices would advance, now are taking business at the Steel Corporation bases of 3.15c. for black, 4.15c. for galvanized and 2.40c. for blue annealed, all f.o.b. Pittsburgh. Indeed, as far as this territory is concerned, there does not seem to be much basis for higher quotation, based on sales.

Mill quotations are 3.15c. to 3.30c. for No. 28 black, 2.40c. to 2.50c. for No. 10 blue annealed and 4.15c. to 4.30c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote blue annealed, 3.63c.; black, 4.45c.; galvanized, 5.45c.

Structural Material.—There is a very steady demand for small tonnages, both against structural projects and for stock and since none of the local mills can promise deliveries in quicker than 90 days, more or less business is going to Eastern mills, some of which are in shape to make fairly early shipment. Prices here hold unchanged at from 1.75c., as quoted by the Steel Corporation subsidiary for indefinite delivery, up to 1.85c., as quoted by some of the independents. These prices are well below the delivered prices of Eastern mills, but willingness to pay merely emphasizes the inability of local mills to take on prompt tonnages. No big structural lettings have come out here lately and the common opinion is that there will not be many during the next 30 or 60 days, ordinarily a quiet period, although all companies are figuring upon a large number of projects.

The mill quotation on plain material is 1.75c. to 1.85c., Chicago. Jobbers quote 2.58c. for plain material out of warehouse.

Cast Iron Pipe.—Considerable business still is pending, but actual orders are not especially numerous. Makers are to be well filled up as a result of the liberal bookings of the past two months and are less eager for business at current quotations. Mitchell, S. D., has asked for prices on 300 tons of 4- to 10-in., and Belle Plain, Iowa, on 200 tons of 6-, 8 and 10-in.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $49.70 to $50.70; 6-in. and above, $45.70 to $46.70; class A and gas pipe, $3 extra.

Reinforcing Bars.—The Inland Steel Co., Chicago, has taken 1100 tons for the Grant Park Stadium, Chicago. The Corrugated Bar Co. will furnish 500 tons for a Government hospital at St. Louis. New inquiries are fewer than they have been.

Coke.—Prices of by-product foundry grade range at $10.75 to $11.25, delivered Chicago. These prices are the same as those of a week ago.

Plates.—Not only are local makers as heavily committed as they wish to be, but the indications are that this condition is going to continue, because the railroads still have pretty ambitious programs for the remainder of the year, both as regards new cars and repairs to old ones. Pending inquiries are reported to exceed 15,000 new cars and the number of old cars to be put into the shops in the next few weeks is even greater than that total. Since the railroads are anxious to avoid shortages, or at least minimize them, during the period of heavy coal and crop movements, it is likely that much of this business will be let promptly. There is not much demand for plates for tanks or structural work at present. The maker quoting 1.75c. is not able to make early deliveries and the higher quotations also refer to deferred shipments. The Inland Steel Co. is holding to 2c. base, Chicago, for light plates.

The mill quotation is 1.75c. to 1.85c., Chicago. Jobbers quote 2.58c. for plates out of stock.

Rails and Track Supplies.—Evidently, the coal mine operators are expecting an early termination of the strike, as local interests lately have been getting a good many inquiries for light rails and track supplies from this source. The railroads are ordering steadily of spikes, angle bars and bolts, but are not taking on many tie plates. Prices are stronger on spikes and bolts, with 2.25c. to 2.35c. base, Pittsburgh, now quoted by leading makers and track bolts held at 3.25c. to 3.35c. base, Pittsburgh.

Standard Bessemer and open-hearth rails, $40; light rails rolled from new steel, 1.75c., f.o.b. makers' mills.

Standard railroad spikes, 2.25c. to 2.35c., Pittsburgh; track bolts with square nuts, 3.25c. to 3.35c., Pittsburgh; tie plates, steel and iron, 1.85c., f.o.b. mill; angle bars, 2.40c., f.o.b. mill.

Old Material.—Prices continue to move upward in this market, notably so on those grades finding other than steel works use, and particularly on the light material for blast furnace use. Offerings of scrap by the railroads are not at all heavy, nor is much country scrap reaching the market; meanwhile, dealers hesitate to let go of yard holdings at current prices. Prices might advance if there should be an early termination of the coal strike, thus removing the restrictions on steel works operations which the lack of big reserve coal stocks entails. But it may be argued that the end of the coal strike will mean an ample supply of coke and an increased iron production and the displacement of scrap by pig iron. Rerolling rails are up at least 25c. a ton, as a result of a better demand inspired by the improved outlook for light rails and reinforcing bars. There seems to be little heavy melting steel available at less than $16 per gross ton. We advance prices on practically all materials sold on a per gross basis on an average, about 50c. per ton. Cut forge and No. 2 wrought grade are going frequently as steel and command more money. The Northern Pacific list, on which bids close to-day, contains 1500 tons.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$18.50 to $19.00
Cast iron car wheels	19.50 to 20.00
Relaying rails	22.50 to 27.50
Rolled or forged steel car wheels	18.50 to 19.00
Steel rails, rerolling	16.25 to 16.75
Steel rails, less than 3 ft	17.50 to 18.00
Heavy melting steel	15.50 to 16.00
Frogs, switches and guards cut apart	15.50 to 16.00
Shoveling steel	15.00 to 15.50
Drop forge flashings	11.50 to 12.00
Hydraulic compressed sheet	13.50 to 14.00
Axle turnings	13.50 to 14.00
Per Net Ton	
Iron angles and splice bars	17.50 to 18.00
Steel angle bars	14.75 to 15.25
Iron arch bars and transoms	18.00 to 18.50
Iron car axles	22.50 to 23.00
Steel car axles	15.50 to 16.00
No. 1 busheling	12.00 to 12.50
No. 2 busheling	6.75 to 7.25
Cut forge	13.75 to 14.25
Pipes and flues	10.50 to 11.00
No. 1 railroad wrought	13.50 to 14.00
No. 2 railroad wrought	13.75 to 14.25
Steel knuckles and couplers	16.25 to 16.75
Coil springs	16.50 to 17.00
No. 1 machinery cast	17.00 to 17.50
No. 1 railroad cast	16.00 to 16.50
Low phos. punchings	15.00 to 15.50
Locomotive tires, smooth	13.00 to 13.50
Machine shop turnings	8.50 to 9.00
Cast borings	11.50 to 12.00
Stove plate	14.50 to 15.00
Grate bars	13.50 to 14.00
Brake shoes	14.00 to 14.50
Railroad malleable	15.50 to 16.00
Agricultural malleable	15.50 to 16.00

Obstacles have been encountered in completing the merger of the Electric Alloy Steel Co., Youngstown, Ohio, and the Atlas Crucible Steel Co., Dunkirk, N. Y., which was recommended by directors of both companies. Additional meetings of interested parties have been recently held, but no definite conclusion has been reached. Opinion is voiced, however, that the merger will eventually be consummated.

Philadelphia

Buying Declines Sharply—Furnace and Mill Operations Curtailed

PHILADELPHIA, July 18.—The combination of the coal and railroad strikes is beginning to have a serious effect upon the iron and steel industry. Not only has buying slumped considerably, but operations also are being affected with the prospect that the situation will become worse before the efforts of the Administration at Washington to restore mining and railroad transportation shall have become effective. The troubles which have arisen within the past few days are due mostly to railroad congestion and the inability of the roads to keep cars moving from the mines to points of coal consumption. Among the roads which tap Eastern territory, the Baltimore & Ohio, the Chesapeake & Ohio and the Norfolk & Western are the most seriously affected, and, where possible, shipments are being routed over the Pennsylvania and Philadelphia & Reading, which are comparatively free from trouble. The agreement which the Pennsylvania has just concluded with its men will undoubtedly clear that road of difficulties, while the Reading has had no strike on its lines. Congestion of freight cars at junction points is beginning to cause trouble.

The first steel mill seriously affected by shortage of coal was the Central Iron & Steel Co. at Harrisburg, which has withdrawn from the market. This plant will utilize fuel oil but will confine its work solely to orders on hand for the present. The Bethlehem Steel Co. has been obliged to withdraw two blast furnaces from operation at Bethlehem, while the Replogle Steel Co., which has been drawing partially upon Bethlehem for coke, is so short of fuel that it has temporarily stopped selling pig iron from its one active furnace at Wharton, N. J.

In some lines business has come almost to a standstill. This is not true so much in finished steel as in pig iron, ferroalloys and scrap. Meanwhile prices remain firm, and the tendency in finished steel is toward greater strength.

Pig Iron.—The effect of the coal and railroad strikes on blast furnace operation is being more seriously felt than at any time since the strikes began. The Bethlehem Steel Co. has been obliged to discontinue two furnaces at Bethlehem, while the Replogle Steel Co., which is partially dependent on Bethlehem for coke, is so short of fuel that it has withdrawn from the market. Other Eastern furnaces, if they are selling at all, are doing so with great caution. Only a few thousand tons of foundry iron has been sold within the past week, mostly by one furnace, and in other grades there is little or no activity. There is little demand from users of foundry iron, who complain that the present high prices do not permit them to compete successfully for castings, on which market prices are relatively lower than for pig iron. The consequence is that the foundries are going along with the iron they have on hand or under contract and are trusting that increased production of coal and coke will bring pig iron prices down when the coal strike is settled. Prices asked for foundry iron vary from $25 to $27, furnace, for No. 2 plain and from $26 to $28, furnace, for No. 2 X

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 76 cents to $1.64 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$27.14 to $27.76
East. Pa. No. 2X, 2.25 to 2.75	27.64 to 28.76
East. Pa. No. 1X	29.14 to 29.76
Virginia No. 2 plain, 1.75 to 2.25 sil.	29.17 to 30.17
Virginia No. 2X, 2.25 to 2.75 sil.	30.17 to 31.17
Basic delivery eastern Pa.	25.75 to 26.75
Gray forge	25.50 to 26.00
Malleable	27.50 to 28.00
Standard low phos. (f.o.b. furnace)	36.00
Copper bearing low phos. (f.o.b. furnace)	36.00

Ferroalloys.—There is a demand for carload lots of ferromanganese for prompt shipments, but sellers have little, if any, available for delivery before August or September. Spot ferromanganese is quoted at $70, while for forward delivery the price named for both British and domestic alloy is $67.50, seaboard. Spiegeleisen is quoted at $35 for 16 to 19 per cent, and at $36 for 19 to 21 per cent.

Semi-Finished Steel.—Open hearth rerolling billets are quoted at $35 and forging billets at $40, Pittsburgh, with little demand.

Plates.—The Central Iron & Steel Co. is the first Eastern plate manufacturer whose plant has been affected by coal shortage. This plant will use fuel oil. It has withdrawn from the market. Another Eastern steel company is close to the end of its coal reserves and is virtually out of the market on all of its products. Prices are firm and the market this week is nearer 1.80c., Pittsburgh, than 1.70c. There is a fairly good demand for plates and premium prices are being paid in some instances, particularly for prompt delivery to the Pittsburgh district, sales having been made at 2c. and 2.05c., Coatesville mills. A sale is noted of 300 tons of 3/16 in. plates at 2c., base, Pittsburgh. The Baldwin Locomotive Works is in the market for considerable steel, it having taken orders for 75 new locomotives, 50 from the Baltimore & Ohio and 25 from the Reading, and more than 200 for repairs, including 100 from the Erie, 50 from the New York Central, 30 from the New York, New Haven & Hartford and 40 from the Baltimore & Ohio. Three or four inquiries that are pending total about 100 locomotives. The Newport News Shipbuilding & Dry Dock Co. will require about 4500 tons of steel, mostly plates, for two steamers it has contracted to build for the Ocean Steamship Co. The War Department is to build four dredges, requiring 1000 tons of plates each, and a Delaware River shipbuilding company has asked for prices on the steel. The Pennsylvania Railroad has bought more car repair material, its purchases within the past two weeks totalling 8000 to 10,000 tons. Eastern plate mills have decided to restore the cutting extras which were dropped a few months ago. We quote sheared plates, ¼ in. and heavier, at 1.70c. to 1.80c., Pittsburgh.

Structural Material.—A publishing building for the United Lutheran Church at Thirteenth and Spruce Streets and a similar structure for the Reformed Church at Fifteenth and Race streets, each requiring about 1000 tons of steel, are up for bids. The Bethlehem Steel Co. has been awarded 300 tons of H sections for an office building for the Westinghouse Electric & Mfg. Co., Philadelphia. Plain material is in fair demand and the market is firm at 1.70c., Pittsburgh, while some makers are quoting 1.75c. and 1.80c.

Warehouse Business.—The present situation has caused more consumers to look to the warehouses for material and sales out of stock have picked up materially within the past week. Prices are unchanged and for local delivery are quoted as follows:

Soft steel bars and small shapes, 2.55c.; iron bars (except bands), 2.55c.; round edge iron, 2.75c.; round edge steel, iron finish, 1½ x ½ in., 2.75c.; round edge steel planished, 3.50c.; tank steel plates, ¼-in. and heavier, 2.65c.; tank steel plates, 3/16-in., 2.85c.; blue annealed steel sheets, No. 10 gage, 3.40c.; black sheets, No. 28 gage, 4.25c.; galvanized sheets, No. 28 gage, 5.25c.; square twisted and deformed steel bars, 2.65c.; structural shapes, 2.65c.; diamond pattern plates, ¼-in., 4.35c.; 3/16-in., 4.50c.; spring steel, 3.50c.; round cold-rolled steel, 3.20c.; squares and hexagons, cold-rolled steel, 3.70c.; steel hoops, No. 13 gage and lighter, 3.45c.; steel bands, No. 12 gage to 3/16-in., inclusive, 3.20c.; iron bands, 3.90c.; rails, 2.36c.; tool steel, 8c.; Norway iron, 5.50c.; toe calk steel, 4.50c.; tire steel, 2.65c.; planished tire steel, 3.10c.

Bars.—The largest inquiry for steel bars is for 3500 tons of reinforcing quality for a water filtration plant at Buffalo. The Thompson-Starrett Co., New York, has the general contract. In common with the slump in demand for all steel products, steel bars are not so active, but there is a fair demand and it is difficult to buy for early delivery below 1.80c., Pittsburgh. Bar iron is quoted at 1.60c., Pittsburgh, for carloads and at 1.80c. for less carloads.

Sheets.—Most of the users of sheets appear to be well covered on contract and there is very little demand

for spot material. Prices quoted for prompt delivery are $4 or $5 a ton above the third quarter contract prices.

Coke.—Furnace coke is almost unobtainable at any price, while carload lots of foundry coke have been sold at prices ranging from $10.50 to $11.50, Connellsville. By-product coke is quoted at $12.50, Swedeland, Pa.

Old Material.—The scrap market is so quiet that the prices quoted this week are largely nominal. There are few transactions, but the general trend is toward weakness. We quote for delivery to consumers' works in this district as follows:

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$15.00 to $15.50
Scrap rails	15.00 to 15.50
Steel rails, rerolling	17.00 to 17.50
No. 1 low phos., heavy 0.04 and under	22.00 to 24.00
Cast iron car wheels	17.50 to 18.00
No. 1 railroad wrought	16.00 to 17.00
No. 1 yard wrought	15.00 to 15.50
No. 1 forge fire	13.00 to 13.50
Bundled sheets (for steel works)	13.00 to 13.50
No. 1 busheling	12.50 to 13.00
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	13.00 to 13.50
Mixed borings and turnings (for blast furnace use)	13.00 to 13.50
Machine-shop turnings (for steel works use)	13.00 to 13.50
Machine-shop turnings (for rolling mill use)	13.50 to 14.00
Heavy axle turnings (or equivalent)	14.00 to 14.50
Cast borings (for steel works and rolling mills)	14.00 to 14.50
Cast borings (for chemical plants)	16.50 to 17.50
No. 1 cast	17.50 to 19.50
Railroad grate bars	14.50 to 15.00
Stove plate (for steel plant use)	15.00 to 15.50
Railroad malleable	15.00 to 15.50
Wrought iron and soft steel pipes and tubes (new specifications)	13.00 to 13.25
Shafting	20.00 to 20.50

Boston

BOSTON, July 18.

Pig Iron.—Sales in this territory the past week approximate 3,000 tons, including 450 tons of foreign iron. The General Electric Co.'s purchase of 750 tons of Buffalo iron on a $24.50 furnace base constitutes the largest individual transaction. Of this amount 500 tons is silicon 3.25, minimum, for the Lynn, Mass., plant, and 250 tons of silicon 3.26 to 3.75 for Pittsfield, Mass., July and August delivery. Additional small tonnages of other Buffalo iron were taken by melters at $25 base furnace. Other sales include 500 to 600 tons eastern Pennsylvania No. 2X and No. 1X, in small lots, at $26.50 and $27 furnace for the former, and $27.50 and $28 for No. 1X, third quarter delivery; 150 tons special analysis Virginia for mixture purposes at private terms, and a car of lake charcoal at $28.50 base furnace. A western Pennsylvania furnace, competing with Buffalo interests in this territory, has advanced its price $1 to $26 for No. 2X and $27 for No. 1X furnace. Foreign iron sold was 400 tons French silicon 2.50 to 3.00, July shipment, to a Massachusetts stove maker, on a delivered basis $3 to $4 under domestic quotations, and 50 tons Scotch of No. 2X, August shipment, to a Massachusetts jobbing foundry, on a delivered base about $1 under domestic. Several tentative inquiries are out on domestic iron for fourth quarter delivery, but the only new inquiry for nearby delivery is 100 tons of low phosphorus for the Boston Navy Yard.

We quote delivered at common New England points as follows, having added to furnace prices $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia and $9.60 from Alabama:

East., Penn., sil 2.25 to 2.75	$30.15 to $30.65
East. Penn., sil. 1.75 to 2.25	29.65 to 30.15
Buffalo, sil. 2.25 to 2.75	29.91 to 30.41
Buffalo, sil. 1.75 to 2.25	29.41 to 29.91
Alabama, sil. 2.25 to 2.75	28.60 to 30.10
Alabama, sil. 1.75 to 2.25	28.10 to 29.60

Ferroalloys.—Although not active, the demand for ferromanganese in this territory shows more life. Wire making interests are the largest buyers, others taking small tonnages, on a basis of $67.50 c.i.f. Boston.

Finished Material.—The Phoenix Bridge Co. is awarded 1300 tons of structural steel for a Tomlinson, Conn., bridge, and the Bethlehem Steel Co. 172 tons of beams for the East Boston street railway loop. Bids will be opened to-day on approximately 900 tons of structural steel for the State pier, Portland, Me. Bids on several round tonnages of structural steel have been rejected within the past 10 days, and will be asked to be refigured. One Pennsylvania mill, which recently re-entered the structural steel market, has secured a comfortable backlog and has raised its price to 1.70c. Pittsburgh base, which is more in line with the other mills. A Buffalo mill is making more prompt deliveries on all products, having secured additional labor, but Pennsylvania mill deliveries have not improved. All mills report little new business booked so far this month, and prices unchanged.

Warehouse Business.—The movement of iron and steel out of New England warehouses shows no expansion, barely holding its own. Contrasted with a year ago, however, business, according to some interests, is 60 to 75 per cent better. Warehouse stocks are in good condition and presumably enough to carry the trade along two months, with an occasional fill-in lot from mills. Prices are firm and unchanged.

Jobbers quote: Soft steel bars, $2.60½ per 100 lb. base; flats, $3.25½; concrete bars, $2.75 to $2.88; structural steel, $2.60½ to $2.70½; tire steel, $4 to $4.35; open-hearth spring steel, $4.50 to $6; crucible spring steel, $11.50; steel bands, $3.75; hoop steel, $4.25; cold rolled steel, $3.50 to $4; refined iron, $2.60½; best refined iron, $4.25; Wayne iron, $5.50; Norway iron, $6 to $6.50; plates, $2.70½ to $2.87½; No. 10 blue annealed sheets, $3.75 per 100 lb. base; No. 28 black sheets, $4.90; No. 28 galvanized sheets, $5.90.

Coke.—New England by-product coke producers have advanced crushed coke 50c. a ton to $12 ovens for spot, $11 for contract, and $12.50 for tonnages to be delivered outside New England. On foundry coke the market is strong and unchanged at $14.50 delivered where the local freight does not extend $3.10 on spot. The contract price is nominal at $13.50 delivered, both producers still remaining out of the market. Developments in the railroad strike situation have caused foundries to take their full monthly contract allotments, which makes for greater activity at ovens. Spot Connellsville coke sold the past week to New Hampshire foundry interests at $10.25 ovens or $15.59 delivered, $1.09 above the delivered price of by-product coke made in this territory.

Old Material.—Important old material interests are fairly busy making shipments to Pennsylvania on contracts placed heretofore, but report almost no new business the past week. On new contracts, interest centers almost exclusively in borings and turnings. Several hundred tons of cast iron borings, suitable for chemical purposes, have been purchased at around $11 on cars shipping point, and a few mixed turnings at $9.50. It is intimated purchases will be made this week of heavy melting steel for Pennsylvania mill consumption. Additional deliveries of stove plate at $15.50 Norwood, Mass., are noted, but this material appears in short supply at that price. Boston brokers say they cannot interest New England foundries in machinery cast. These melters are still able to supply requirements from local yards, or from out-of-town yards, who make delivery by truck, which works out to better advantage to the melter than railroad transportation.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$19.00 to $20.00
No. 2 machinery cast	17.00 to 18.00
Stove plate	14.00 to 14.50
Railroad malleable	15.00 to 15.50
Street car wheels	18.00 to 19.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$11.00 to $11.50
No. 1 railroad wrought	11.50 to 12.00
No. 1 yard wrought	10.00 to 10.50
Wrought pipe (1 in. in diam., over 2 ft. long)	8.00 to 8.50
Machine shop turnings	8.50 to 9.00
Cast iron borings, rolling mill	9.50 to 10.00
Cast iron borings, chemical	10.50 to 12.00
Blast furnace borings and turnings	8.50 to 9.40
Forged scrap and bundled skeleton	8.00 to 8.50
Street car axles and shafting	14.50 to 15.00
Rerolling rails	11.00 to 11.50

Recent fire at the plant of the Atlantic Refining Co., Franklin, Pa., resulted in the loss of only one tank out of several hundred in the plant. The company is not in need of new material or equipment.

San Francisco

Active Competition in Water Freights Has Marked Effect on Market

SAN FRANCISCO, July 12.

Pig Iron.—A moderately good business has prevailed on the Coast, but individual buyers are not disposed to take more material than satisfies their daily needs, so that sales have been almost exclusively in small lots. It is estimated by the principal handlers of foreign iron that around 1000 tons of English material has been sold for San Francisco and Los Angeles delivery during the past fortnight. The market appears easier at present with offerings of No. 1 quality at close to $29, ex-ship, Pacific Coast ports. A feature of the recent trading was the sale of 250 tons of Chinese iron, made under an old contract, at $31, ex ship. Due to high quotations from the Orient, there have been no sales of Chinese material in this market for a number of months. Domestic pig iron continues inactive, as no attractive rates have been offered of late. Moreover, the highly competitive rates being quoted by intercoastal steamship operators are tending to restrict business.

Cast Iron Pipe.—The greatest activity at present seems to be in soil pipe, which reflects a consistent demand. Many of the large makers are reported sold up for at least 60 days, with the result that a good deal of new business is being rejected. Prices, however, are unchanged. The trade is watching with interest the existing rate war being waged between intercoastal lines, and while the new reductions in freights do not affect shipments from the South, there is some speculation as to whether the attractive figures in the North will encourage business between Atlantic Coast water pipe foundries and the Pacific Coast, an unusual situation. There is no apparent change in the market of heavy pipe, the delivered price approximating $50 for 6-in. and $54 for 4-in. Both municipal and private business is quiet.

Finished Iron and Steel.—The active competition in water freights is having a marked effect on business in finished materials, and few makers report any new contracts of considerable size. Consumers, in other words, are showing a tendency to purchase cautiously and for their immediate requirements only. Some confusion is apparent, due to mills quoting on different bases, some being delivered, some tidewater and others f.o.b. Pittsburgh. The result is that it is difficult to ascertain a real market on heavy materials. A few mills are quoting as much as $7 a ton higher than the Steel Corporation prices, but are offering quick delivery. This situation, however, is considered as temporary only, and it may be said that the steel business on the Coast is active and fundamentally sound. More than one large maker reports June as the best month in a year and a half. There are a few large prospects in the market at present, one for 5200 tons and another involving 1200 tons of heavy products. A carlot business is being done in sheets and plates. There is nothing new in the bar situation. Bolts and nuts are quiet so far this quarter after the heavy buying last. The Penn Bridge Co. was low bidder on the Snake River bridge at Central Ferry, Wash., which involved about 1000 tons. Oakland has taken 450 tons of girder rails.

Coke.—The Interstate Commerce Commission ruling of July 1 providing for a 10 per cent cut on all freight, both local and transcontinental, on all commodities not reduced since August, 1918, has not affected business in coke, as it probably has on pig iron, because buyers on the Coast seem willing to pay a premium for quick delivery, in any case. A few spot sales of domestic coke are reported, but generally in small quantities. Prices on Birmingham material rule from $7 to $8, f.o.b. ovens, and those on West Virginia beehive are quoted from $8.50 to $9.50. Around 1500 tons of coke from Great Britain, some of which is now in transit, is reported sold for foundry accounts. Dealers and importers are figuring on 1000 tons for a Northern consumer.

Old Material.—There appears to be a firmer tendency in scrap, due apparently to the stiffening in the finished market and to delayed Eastern shipments. A few good-sized sales have been consummated of late, conspicuous among which is that of 5000 tons, offered by the Market Street Railway, at about $11 a gross ton, delivered at buyer's works. The Southern Pacific Co. is offering 1000 tons of wrought iron scrap, 200 net tons of scrap steel axles and 350 of miscellaneous cast iron scrap. The Pacific Gas & Electric is disposing of a quantity of old material to a local dealer. A scarcity of cast iron scrap in this market is reported, and prices appear firm at $22 a net ton, delivered at consumers' works.

Cincinnati

CINCINNATI, July 18.

Pig Iron.—Dullness continues in the Cincinnati iron market, and only a few sales are reported. Southern iron is still avalaible on a basis of $18, Birmingham. The largest sale reported was of 700 tons to a Kentucky implement manufacturer for fourth quarter shipment. It is understood that this order was placed on an $18.50, Birmingham, basis. A sale of 400 tons of Buffalo iron, on a $24, furnace, basis was made in the Wheeling district, and another West Virginia melter took 300 tons of southern Ohio iron on a $24, Ironton, basis. A central Ohio implement manufacturer bought 200 tons of iron, the first in over eighteen months, which is taken as an indication of returning activity in this industry. Inquiry is confined to carload lots for immediate shipment. The railroad strike is becoming serious in this district. Railroads have placed embargoes on coke shipments from West Virginia points, and inability to move coal is seriously threatening the operation of coke oven plants. The coke supply is so short that a number of furnaces now operating in this district may be forced to bank before the week ends. Shipping instructions are coming forward for third quarter allotments and furnaces are being asked to anticipate shipments wherever possible, but movement of iron is very slow.

Based on freight rates of $3.53 from Birmingham and $2.27 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$21.53
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	22.03
Ohio silvery, 8 per cent	34.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	26.27
Basic Northern	27.27
Malleable	26.27

Warehouse Business.—Local warehouses report a very active demand for their products, as shipments from mills are getting further behind and those now on the way are being held up on account of the railroad strike. The demand for shapes and plates continues to improve steadily and reinforcing bars are also moving in heavier volume. Jobbers of wire products report business as rather light. Prices show little change with the exception that bolts and nuts and screws have been advanced approximately ten per cent.

Jobbers quote: Iron and steel bars, 2.75c. base; hoops, 3.60c.; bands, 3.35c. base; shapes and plates, 2.85c. base; reinforcing bars, 2.82½c. base; cold-rolled rounds, 3.35c. base; flats, squares and hexagons, 3.85c. base; No. 10 blue annealed sheets, 3.60c.; No. 28 black sheets, 4.50c.; No. 28 galvanized sheets, 5.50c.; No. 9 annealed wire, $2.70 per 100 lb.; common wire nails, $2.85 per keg, base.

Finished Material.—The market, generally speaking, is rather quiet, although the demand for sheets continues in good volume. Specifications are coming in, however, on existing contracts and while shipments are beginning to slow up as a result of the railroad strike, the situation locally has not yet become acute. Practically all of the new business booked is for small tonnages, although occasionally an order running into three figures is accepted. The Big Four Railroad last week took bids on its third quarter requirements of plates, shapes, bars, billets car axles and bar iron. On 1400 tons of car plates the Carnegie Steel Co. was low bidder at 1.60c. Pittsburgh. The Steel Corporation was also low bidder on 75 tons of bars and 500 tons of shapes, the same price being quoted. On 160 tons of billets the Wheeling Steel Corporation was low bidder

at $39 per ton, f.o.b. Pittsburgh, and on 1100 tons of bar iron a western Indiana rolling mill was low bidder at approximately 1.75c. mill. On 700,000 bolts, a Youngstown manufacturer was low bidder; and on 500 tons of car axles, the Cambria Steel Co. was low bidder at 2.395c. On sheets the prices named by the American Sheet & Tin Plate Co. are being more generally adhered to by independent mills, although in some instances higher prices are asked for automobile body sheets. The nail and wire market shows only fair activity, although prices are strong. In the structural field, a number of small projects came up during the week and several awards were reported. On reinforcing bars, the demand continues strong, a number of awards having been made for buildings running as high as 150 and 200 tons.

Coke.—There is a fair demand for foundry coke for prompt shipment, and prices have shot up rapidly during the week. Wise County foundry coke has sold as high as $10.50, ovens, and New River at $10. By-product fuel is generally quoted at $10, ovens, and in some instances even higher prices have been paid. Furnace coke is in extremely short supply, and we note an inquiry from a Cleveland district stack for 36,000 tons. Movement of coke is slow on account of the railroad strike.

Old Material.—There is practically no activity in the local scrap market. Foundries are pretty well supplied, and steel plants in the district are well covered by contracts. Prices are firm, but quotably unchanged.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

	Per Gross Ton	
Bundled sheets	$8.00 to	$8.50
Iron rails	13.50 to	14.00
Relaying rails, 50 lb. and up	26.50 to	27.00
Rerolling steel rails	13.50 to	14.00
Heavy melting steel	13.00 to	13.50
Steel rails for melting	13.00 to	13.50
Car wheels	14.50 to	15.00
Per Net Ton		
No. 1 railroad wrought	11.50 to	12.00
Cast borings	9.00 to	9.50
Steel turnings	8.00 to	8.50
Railroad cast	14.00 to	14.50
No. 1 machinery	16.00 to	16.50
Burnt scrap	9.50 to	10.00
Iron axles	18.00 to	18.50
Locomotive tires (smooth inside)	11.00 to	11.50
Pipes and flues	6.50 to	7.00

Buffalo

BUFFALO, July 17.

Pig Iron.—One furnace which quoted $24 a week ago has now advanced to $24.50 base, and has even sold No. 2 plain at $25 base. A curtailment in pig iron production in this district may be a development of the next few weeks, on account of the fuel situation. Good grades of coke are quoted at $14 delivered when it can be obtained. Sales for the week are less than 10,000 tons. The fuel situation with all factors is extremely serious, and all stocks are near exhaustion. Malleable is quoted at $24. One furnace having inquiries for 1000 tons, 600 tons and several for 500 tons is reluctant to quote, not knowing whether it will be able to deliver.

We quote f.o.b. per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$25.00
No. 2X foundry, 2.25 to 2.75 sil.	24.50
No. 2 plain, 1.75 to 2.25 sil.	24.00
Basic	24.00
Malleable	24.00
Lake Superior charcoal	31.78

Finished Iron and Steel.—Bar inquiry has fallen off in several offices. The Steel Corporation and a leading independent are still quoting 1.70c. minimum on bars, and a minimum of 1.80c. is being quoted by a local independent on such business as can be taken for immediate rolling. Nothing is booked for extended delivery by this interest. The same mill is running all departments at full capacity, with the exception of the plate mill, and in that department there is no likelihood that it will be started while prices are as they are and the fuel situation so precarious. A Rochester car shop is in the market for 200 tons of shapes. The Buffalo Steel Car Co. is understood to have bought part of its 8000-ton plate requirement to be used on car repairs at less than 1.75c., and that considerable difficulty was encountered in placing this business. Sheets are quiet. Local sellers quote 3.15c. to 3.30c. on black and 4.13c. to 4.30c. on galvanized. The Steel Corporation is understood to be quoting 4.15c. and other independents 4.30c. on galvanized. Interest in shipments is keen, and pressure for delivery strong, indicating that consumers are using material as fast as it can be delivered. No structural jobs of consequence have appeared. A number of awards ranging from 10 to 25 tons have been booked by a leading fabricator.

We quote warehouse prices, f.o.b. Buffalo, as follows: Structural shapes, 2.65c.; plates, 2.65c.; soft steel bars, 2.55c.; hoops, 3.30c.; bands, 3.15c.; blue annealed sheets, No. 10, 3.55c.; galvanized steel sheets, No. 28, 5.40c.; black sheets, No. 28, 4.40c.; cold-rolled strip steel, 6.05c.; cold-rolled round shafting, 3.35c.

Old Material.—The majority of mills are interested in steel purchases, and the market is strong at $17. There is little available, however, and all dealers' stocks are low. Cast iron borings are scarce, and consumers are offering $14.50 to $15, but there is no rush to fill the orders.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$16.75 to $17.00
Low phos., 0.04 and under	18.00 to 19.00
No. 1 railroad wrought	16.00 to 16.50
Car wheels	17.00 to 18.00
Machine shop turnings	10.50 to 11.00
Cast iron borings	14.00 to 14.50
Heavy axle turnings	14.00 to 14.50
Grate bars	14.00 to 14.50
No. 1 busheling	15.00 to 15.50
Stove plate	15.00 to 15.50
Bundled sheet stampings	11.50 to 12.00
No. 1 machinery cast	18.00 to 18.50
Hydraulic compressed	15.00 to 15.50
Railroad malleable	17.00 to 17.50

St. Louis

ST. LOUIS, July 18.

Pig Iron.—The market for pig iron remains firm at unchanged prices, although no sales of consequence were made during the week. Scattering sales of Northern iron up to 100 tons were the rule. The Sheffield maker continues to quote $18.50, Birmingham, while others are offering their product at $19 to $20. Sales of the lowest price iron were about 1200 tons during the week, which nearly all of the Southern make sold. There is a very heavy inquiry for foundry iron of the high-silicon grades, which consumers are not finding particularly easy to purchase. These high-silicon grades are not available from the East Side maker. An Iowa user is in the market for 10,000 tons of standard basic for prompt shipment. An inquiry also has been received from a Birmingham melter for 1000 tons of foundry iron with liberal manganese. It is feared that the melt of iron in the district may be seriously affected because of the shortage of coal. The market for the ferroalloys is quiet, users in the district being well covered with their requirements for some time.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago and $4.22 from Birmingham and 81 cents average switching charge from Granite City:

Northern foundry, sil. 1.75 to 2.25 (third quar.)	$26.66
Northern malleable, sil. 1.75 to 2.25 (third quar.)	26.56
Basic (third quar.)	26.56
Southern foundry, all rail, sil. 1.75 to 2.25	$22.72 to 24.22
Southern foundry, water and rail, sil. 1.75 to 2.25, f.o.b. St. Louis	22.17

Finished Iron and Steel.—Despite the strike, inquiries were issued during the week by railroads centering in the St. Louis district for material for repair work, although small material was mostly wanted. The Missouri-Kansas-Texas has an inquiry out for its requirements of locomotive jacket steel for the last half of the year. It is understood that this road used about three carloads during the first half of the year. The same railroad wants 2500 kegs of standard track spikes. Bids will close on July 25 for Akdar Temple, Tulsa, Okla., involving 219 tons of steel. C. W. & George L.

Robb, Chicago, are the architects. Little interest is being taken in inquiries received by representatives here of steel interests, because their plants not only are well sold up but production is being curtailed because of the coal strike.

For mill out of warehouse we quote: Soft steel bars, 2.57½c. per lb.; iron bars, 2.57½c.; structural shapes, 2.67½c.; tank plates, 2.67½c.; No. 10 blue annealed sheets, 3.72½c.; No. 28 black sheets, cold rolled, one pass, 4.45c.; cold drawn rounds, shafting and screw stock, 3.50c.; structural rivets, $3.19½ per 100 lb.; boiler rivets, $3.29½; tank rivets, 7/16 in. and smaller, 60 per cent off list; machine bolts, large, 50 and 10 per cent; small, 50-10 and 10 per cent; carriage bolts, large, 55-5 per cent; small, 60 and 10 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon blank, $3.50; and tapped, $3.25 off list.

Coke.—Coke continues in big demand both from the industries and from the coal trade. The St. Louis producer of by-product coke is sold up through July and is not taking on any new business. Granite City by-product coke is still to be had. Connellsville coke is very difficult to get, the market price being $10.50 at the ovens. The shortage of coal is creating a greater demand for coke as well as tending to curtail its production.

Old Material.—The market for old material continues very strong. Very little railroad scrap is moving because of the strike. Several large buyers are in the market for heavy melting steel and special steel grades. Large tonnages of rolling mill grades are being moved out of the St. Louis district. The general feeling is that after the coal strike is settled, buying will be on a much larger scale.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

	Per Gross Ton	
Old iron rails	$16.75	to $17.25
Steel rails, rerolling	15.25	to 15.75
Steel rails, less than 3 ft	16.25	to 16.75
Relaying rails, standard section	25.00	to 28.00
Cast iron car wheels	18.25	to 18.75
No. 1 heavy railroad melting steel	14.75	to 15.25
No. 1 heavy shoveling steel	13.50	to 14.00
Ordinary shoveling steel	13.50	to 14.00
Frogs, switches and guards, cut apart	15.00	to 15.50
	Per Net Ton	
Heavy axle and tire turnings	9.50	to 10.00
Steel angle bars	13.75	to 14.25
Iron car axles	23.00	to 23.50
Steel car axles	17.00	to 17.50
Wrought iron bars and transoms	18.50	to 19.00
No. 1 railroad wrought	12.75	to 13.00
No. 2 railroad wrought	12.25	to 12.75
Railroad springs	16.00	to 16.50
Steel couplers and knuckles	16.00	to 16.50
Cast iron borings	9.00	to 9.50
No. 1 busheling	11.25	to 11.75
No. 1 railroad cast	15.50	to 16.00
Stove plate and light cast	12.75	to 13.25
Railroad malleable	13.50	to 14.00
Pipes and flues	8.25	to 8.75
Machine shop turnings	8.50	to 9.00

Birmingham

BIRMINGHAM, ALA., July 18.

Pig Iron.—It is positively asserted by those in a position to know that all offerings of iron at $18 had ceased at the end of last week and that makers heretofore quoting $18.50 freely were more inclined to ask $19. The week was dullest in many, with makers holding for $20. Inquiry was sparse. The few sales made at $20 were for small lots and nearby delivery. The feature of the close of the week was the statement of the Sloss-Sheffield Steel & Iron Co. that this concern had booked 26,000 tons of iron up to July 15 on a probable month's make of 35,000 tons. This company booked more than 50,000 tons in June. Even under a five-stack operation, that is regarded as heavy tonnage, preceded as it was by large bookings and facing little or no iron on company yards either on part of this or any other iron maker. The Tennessee company went to nine-furnace operation this week, blowing in a third Bessemer stack on foundry and changing one from foundry to ferromanganese. The Tennessee company's iron operations, like steel, are the heaviest of several years. Delay in publishing the extra low rates to Cincinnati, St. Louis and Louisville announced by the Louisville & Nashville and Southern railroads as well as the two strikes and delays in transit that are apprehended combined in producing a very dull weekend. Production, however, has not set-back and, as a whole, is greatest in steel on record and up to normal in iron.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon 1.75 to 2.25	$18.50 to $20.00
Basic	18.50 to 19.00
Charcoal, warm blast	30.00 to 32.00

Cast Iron Pipe.—The pressure pipe base is $37, but $38 was gotten by some concerns on recent orders. Plants are principally concerned with deliveries. A cargo of 3,000 tons, pressure and sanitary, left Mobile for the Pacific Coast, delivery from San Francisco to Seattle. The sanitary pipe base is $55, but belated consumers continue offering $60 and $65 for prompt delivery and not all are accommodated.

Finishing Mills.—The Tennessee company continued double turn in finishing mills this week as well as maximum production of ingots. The American Steel & Wire Co. is executing a large wire order for Japan and the Gulf States Steel Co.'s export business includes an order from Palestine. Hoops and bands are moving to Argentine. All steel mills are on near full or full turn.

Coal and Coke.—Railroads are wary of sending cars into the coal fields except for their own use, hence there is some distress. Commercial coal business in the West offers but cannot be served. Spot price is rather stiff at $2.50. Maximum production seems to have been reached. Peru has taken another 4,000 tons of gas coal and Cuba took 3,000 tons. The rail strike has not handicapped coal production or coke movements locally. Coke sells at $5.50 to $6.

Old Material.—The scrap market is rather quiet with deliveries on contracts still going on in a large way. There has been no change in prices. Lower freight rates have not apparently widened territory.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Steel rails	$13.00 to $15.00
No. 1 steel	12.00 to 14.00
No. 1 cast	15.00 to 16.00
Car wheels	14.00 to 15.00
Tramcar wheels	13.00 to 14.00
Stove plate	13.00 to 14.00
Cast iron borings	6.00 to 7.00
Machine shop turnings	4.00 to 5.00

New York

Seriousness of Coal Strike Shown in Withdrawal of Iron and Steel Producers from Market

NEW YORK, July 18.—The seriousness of the coal situation is shown in the actual withdrawal from the market temporarily of several important producers of pig iron and steel in the East, while a number of other plants are having difficulty in obtaining coal and coke, and may be compelled at any time to cease operations. Some important sellers of pig iron have virtually withdrawn from the market by naming high prices. News from the coal mines is extremely discouraging. A New York seller who visited West Virginia and Pennsylvania a few days ago says conditions at the mines are even worse than has been reported.

Pig Iron.—The General Electric Co. continues to be the principal buyer of pig iron. In addition to purchases recently made amounting to about 2500 tons for its Lynn and Pittsfield, Mass., and Elizabethport, N. J., plants, it is now in the market for an additional tonnage for New York State plants. It is understood that most of the iron purchased for this company will come from Buffalo, having been bought on a basis of $24 for No. 2 plain. Buying by other companies is limited. One company, which has been selling No. 2 plain at $25.50 and No. 2 X at $26.50, is now out of the market. Small tonnages of foreign iron are being received, but dealers are showing a disposition to be cautious in buying large tonnages. Although such purchases might relieve the scarcity in this country due to the coal strike, many uncertainties are connected with foreign transactions.

We quote delivered in the New York district as follows, having added to furnace prices $2.27 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$29.77 to $30.77
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	28.77 to 29.77
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	27.77 to 28.77
Buffalo, sil. 1.75 to 2.25	28.91 to 29.41
No. 2 Virginia, sil. 1.75 to 2.25	29.44 to 30.44

Ferroalloys.—The market is inactive. A little ferromanganese is available for prompt shipment and sales are being made at $70, seaboard. For forward delivery, August or September, the quotation is $67.50, seaboard, for both British and domestic. Spiegeleisen is still quoted at $35 for 16 to 19 per cent, and at $36 for 19 to 21 per cent. Prices on other alloys are found in the table below:

Ferromanganese, [illegible] $67.50
Ferromanganese, British, seaboard, per ton...$67.50
Spiegeleisen, 16 to 19 per cent [illegible]
Spiegeleisen, 20 per cent.....$36.00
Ferrosilicon, 50 per cent, delivered, per ton, $55.00 to $62.00
Ferrotungsten, per lb. of contained metal..40c. to 50c.
Ferrochromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr., delivered...12c. to 14c.
Ferrovanadium, per lb. of contained vanadium, $3.00 to $3.50
Ferrocarbontitanium, 15 to 18 per cent Ti, ton to carloads, per ton.....$200.00

Ores

Manganese ore, foreign, per unit, seaboard..25c. to 26c.
Tungsten ore, per unit, in 60 per cent concentrates, nominal .....$3.00 up
Chrome ore, basis 48 per cent Cr_2O_3, crude, per unit, Atlantic seaboard.....40c. to 45c.
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York.....40c. to 45c.

Finished Iron and Steel.—The national rail and coal strikes are regarded as responsible for a decided slump in inquiry. It remains, however, that demand is still sufficient in volume to cause mills to scrutinize carefully in the light of their own mill conditions before making any quotations. New railroad equipment buying has halted and little is expected in the next sixty days, seeing that fresh orders would not always mean deliveries of cars in time to be of service for the transportation pressure likely when free movements are again established. For the time being railroad buying is expected to lie largely in repair items. Bar mills are busy and no let up is discernible in the automobile trade. The structural trade is fairly active.

We quote for mill shipments New York, as follows: Soft steel bars, 2.04c. to 2.14c; structural shapes, 2.04c.; bar iron, 1.94c.; and steel plates, 1.99c. to 2.04c. On export shipments the freight rate from Pittsburgh to New York is 28.5c. per 100 lb., while the domestic rate is 34c.

Cast-Iron Pipe.—Business continues intensely active with most Northern pipe foundries probably from three to four months and more behind on deliveries. While the situation resulting from the coal strike has not yet affected most of them seriously, it is reported that the foundries in the South have been having some difficulty in obtaining iron and are also getting behind on deliveries. No new municipal tenders are reported, but private buying continues strong. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $53.50; 4-in. and 5-in., $58; 3-in., $68.30, with $4 additional for class A and gas pipe.

Warehouse Business.—Another upward revision of prices is expected in this district. Probably the change, if it is made, will amount to a 10c. per 100 lb. advance over present prices, in conformance with the correspondingly higher base of mill prices. The present warehouse quotations are established on a basis of 1.60c. per lb. base, Pittsburgh, for bars. In contrast with the strong condition of practically all other iron and steel items in this market, both black and galvanized sheets are weak, prices ranging downward from the official schedule of 4.35c. and 5.35c. per lb. on black and galvanized respectively, which most warehouses are attempting to maintain, to as low at 4c. and 5c. per lb. Dealers in wrought iron and steel pipe report no change. Brass and copper products have been advanced ½c. per lb. and although the usual late spring and early summer trade has been supplied, business continues active, particularly in both brass and copper materials entering into buildings. We quote prices on page 200.

High Speed Steel.—The market is unchanged. Some producers state that a slight improvement is evident. Prices continue at about 75c. per lb. for 18 per cent tungsten high speed steel, with special brands of some companies selling up to as high as 95c. per lb.

Coke.—Coke prices are advancing rapidly and the lowest price for Connellsville grades which has been named is $11.75, while $12 and $13 has been asked. By-product coke has been advanced 50c. to $11 seaboard for regular customers. Furnace and foundry coke are being sold without much discrimination.

Old Material.—No change in the market is evident and although sales are largely confined to small tonnages, prices are stiff. Based upon quotations of No. 1 heavy melting steel to Monessen of $16.50, to Bethlehem of $14.50 and to Alan Wood of $14, the market here is quotable at $10 to $10.50 per ton. With the possibility of selling scrap into a Buffalo market at $17 per ton, dealers in this district are showing considerable interest in possible sales in that direction. Specification pipe is slighty stronger and now quoted at $8.50 to $9 per ton, while stove plate is off slightly, $10 to $10.50 being a fair estimate of the market.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$10.00 to $10.50
Steel rails, short lengths, or equivalent	11.00 to 11.50
Rerolling rails	11.00 to 11.50
Relaying rails, nominal	27.00 to 28.00
Steel car axles	16.00 to 17.00
Iron car axles	22.00 to 23.00
No. 1 railroad wrought	12.50 to 13.00
Wrought iron track	11.00 to 11.50
Forge fire	[illegible]
No. 1 yard wrought, long	10.50 to 11.00
Cast borings (clean)	9.00 to 10.00
Machine-shop turnings	9.00 to 10.00
Mixed borings and turnings	9.00 to 10.00
Iron and steel pipe (1 in. diam., not under 2 ft. long)	[illegible]
Stove plate	10.00 to 10.50
Locomotive grate bars	11.50 to 12.00
Malleable cast (railroad)	10.00 to 10.50
Cast-iron car wheels	13.00 to 13.50

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$18.00 to $19.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	16.50 to 17.00
No. 1 heavy cast, not cupola size	13.00 to 13.50
No. 2 cast (radiators, cast boilers, etc.)	12.00 to 12.50

Cleveland

Plants Suspend on Account of Strike—Railroads Cannot Handle Coal

CLEVELAND, July 18.—The fuel situation due to the breaking down of the railroad transportation system has become much worse and there has already been some curtailment of the blast furnace and steel plant operations in the Cleveland and Valley districts. In this city the McKinney Steel Co. has banked one blast furnace and shut down three open-hearth furnaces and the Bourne-Fuller Co. has shut down two of five furnaces at its Upson steel plant, which will be compelled to shut down entirely unless the situation improves shortly. The Trumbull-Cliffs furnace in Warren was banked to-day and the Cherry Valley furnace at Leetonia will probably go out during the week. Several other furnaces in Cleveland and other Ohio points have only enough coal for their by-products plants to last them from one to three weeks. The coal strike is a factor to a very limited extent in the present critical situation. The miners in the non-union fields of Kentucky and West Virginia on which the steel plants and blast furnaces are depending almost wholly for fuel are anxious to work, but the railroads are unable to handle coal owing to their inability to keep their motive power in repair because of the shopmen's strike. Very little coal is reaching Ohio mills and coke plants. Virtually no coal is now being shipped over the Norfolk & Western Railroad, little over the Louisville & Nashville and a sharp curtailment over the Chesapeake & Ohio. The Baltimore & Ohio Railroad has placed an embargo on coal from Cincinnati and Columbus to northern Ohio points. The Big Four is still open. The curtailment of transportation facilities has affected the Lake Superior iron ore mining district. The car supply on the Mesabi range has been cut 25 per cent and some producers in order to keep up operations in their open pit mines have discontinued loading cars at stock piles at underground mines.

Iron Ore.—Ore shipments from the mines to the upper lake docks are slowing down because of the bad condition of the motive power of the railroads, due to the shopmen's strike, and a sharp curtailment in the movement is expected before the end of the week. Boats are now being delayed somewhat for cargoes. At present the situation is worse at Superior, Wis., than at other shipping ports. So far there has been little slowing down in ore shipments from Lake Erie to interior furnaces, only two ports, Fairport and Toledo, being much affected. Shippers are experiencing delays in moving ore over the Baltimore & Ohio Railroad from those ports. Although some furnaces have been banked and others may be compelled to shut down for lack of fuel, consumers are taking all the ore they can handle, desiring to get as much in their furnace yards as possible before the situation becomes worse. In case their ore requirements are curtailed by reason of banking the furnaces, they can shut off on shipments earlier in the fall. With virtually no coal moving up the lakes, vessels are going up light for ore, and the lack of sufficient ore cargoes will probably result in the tieing up of a number of boats. Coal for fueling lake vessels is so scarce at lake ports that some boats are getting their fuel from the ports at the head of the lakes. A strike of the firemen on the lake boats is a possibility. Firemen are at present taking a vote on calling a strike Aug. 1. No ore sales are reported and no activity is expected in the market until the present situation clears up somewhat.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $5.95; Old range non-Bessemer, 51½ per cent iron, $5.70; Mesabi Bessemer, 55 per cent iron, $5.70; Mesabi non-Bessemer, 51½ per cent iron, $5.05.

Pig Iron.—With the present critical fuel situation and uncertainty as to furnace operations, some pig iron producers have advanced prices 50c. to $1 a ton and others have withdrawn from the market. On foundry iron, the $23 price has apparently disappeared, as a Toledo furnace has marked its minimum price up to $23.50. A Cleveland furnace which has been quoting the latter price, but which does not wish any additional orders at present, took a 200-ton lot at $25. Another Cleveland producer continues to quote this grade at $24 and a western Pennsylvania furnace has advanced its price to $25. For local delivery, foundry iron is quoted at $24 in Cleveland, Toledo and Detroit. The market generally is not active, although one interest sold 10,000 tons during the week in lots of 1000 tons and under in foundry and malleable grades. Another booked a foundry iron order for a round lot. The General Electric Co., which was reported to be in the market for 700 tons, sent out additional inquiries for various grades of foundry iron for its Erie plant, aggregating 2000 tons. Of this about 300 tons of high silicon iron has been placed with a Cleveland furnace at $24 base, and it is probable that the remainder will be bought from an Erie furnace. Low phosphorus iron is fairly active. A Valley interest reports sales aggregating 4000 tons, including one round lot. An inquiry is pending from a West Virginia consumer for 500 tons of low phosphorus iron. There seems to be doubt whether additional basic iron can be had for $24, the price at which sales were reported last week at Pittsburgh. A local producer and also a local middleman are still asking $25 for basic iron.

Quotations below are f.o.b. local furnace for Northern foundry [illegible] charge. Other quotations except [illegible] are delivered Cleveland [illegible] from Jackson and a $6 rate from [illegible]

[illegible]	$24.00
Northern No. 2 [illegible]	24.00
Southern [illegible]	24.50
Ohio silvery, [illegible] per cent	33.52
Standard low phos., Valley furnace	33.00

Semi-finished Steel.—We note the sale of two lots of re-rolling billets, aggregating 5000 tons by a local mill at $35, Cleveland. Sheet bars and slabs are quoted at the same price, but no sales are reported.

Finished Material.—Some of the independent mills have withdrawn from the market because the fuel shortage may cause them to curtail operations or shut down. New demand is not so active as it has been, but mills are turning away considerable tonnage. Some of the independent mills are now about as far behind on deliveries as the leading producers. Mills are being crowded as hard as ever for deliveries, which seem to be growing somewhat worse. While consumers are trying to accumulate material for stock, some are actually in need of steel for current operations, this being particularly true of steel bars, strip steel, hoops and bands. Forging bars are apparently harder to get than other material. Inquiries are heavier for steel bars than for other lines. Specifications from automobile companies continue heavy and reports indicate that the leading Detroit car builders will keep up their present rate of production during August. There is no change in the price situation. On steel bars, plates and structural material, 1.70c. is generally the minimum quotation for delivery at the mills' convenience. However, there seems to be more of a willingness on the part of some buyers to pay considerably higher prices to be assured early deliveries. Plates are selling up to 2c. for prompt shipment and that is the general market price for the lighter gages. We note the sale of 2000 tons of carbon and alloy steel forging bars to a local consumer and another inquiry for 600 tons is pending. In structural lines, a large amount of building work is still coming out. Preliminary plans are being prepared for the Huron-Lorain bridge, Cleveland, which will require approximately 16,000 tons of steel if steel construction is decided upon, or 4000 tons of reinforcing bars if the bridge is built of concrete.

Jobbers quote steel bars, 2.41c.; plates and structural shapes, 2.51c.; No. 9 galvanized wire, 3c.; No. 9 annealed wire, 2.50c.; No. 28 black sheets, 3.90c. to 4c.; No. 28 galvanized sheets, 4.90c. to 5c.; No. 10 blue annealed sheets, 3.25c. to 3.46c.; hoops and bands, 3.06c.; cold-rolled rounds, 3.20c.; flats, squares and hexagons, 3.70c.

Reinforcing Bars.—The demand is heavy and small sections are scarce. The market is firm at 1.70c. to 1.80c. The general contract for the Buffalo filtration plant requiring 3500 tons has been taken by the Thompson-Starret Co. and the West Seventy-third Street bridge, Cleveland, requiring 230 tons by the Central States Engineering & Construction Co. The Ohio Highway Commission has placed 285 tons with the Concrete Steel Co. for road work. Bids have been taken for 1200 tons for the Western Reserve University group of buildings and bids will be taken July 29 for a Federal-State bridge at Conneaut, requiring 540 tons.

Sheets.—There is still considerable demand from the automobile trade for body sheets, but with this exception the buying is rather limited. Specifications are heavy, but mills are able to make shipments as fast as needed. Some independent mills are still quoting the American Sheet & Tin Plate prices. A leading Valley district producer has reduced its price $2 per ton to 3.30c. for black, 4.30c. for galvanized and 2.50c. for blue annealed sheets.

Coke.—Prices on Connellsville foundry coke have further advanced, carlot sales being made at $10.75 and the supply is very limited. Little, if any, Wise County foundry coke is available for immediate shipment.

Old Material.—The scrap market is weak, particularly on steel making grades, evidently being affected by the situation growing out of the railroad shopmen's strike. Some Valley district consumers have held up shipments and no new buying by the mills is reported. Small lot sales of heavy melting steel have been made locally at $14.75, or 50c. lower than the recent minimum price. Turnings and borings and compressed steel are still fairly firm. Small lot sales of the latter are reported at $16 for Youngstown delivery.

We quote per gross ton, f.o.b. Cleveland, as follows:

Heavy melting steel	$14.75 to 15.25
Steel rails, under 3 ft	15.50 to 15.75
Steel rails, rerolling	15.75 to 16.25
Iron rails	14.00 to 15.00
Iron car axles	18.00 to 19.00
Low phosphorus melting	16.00 to 16.25
Cast borings	12.00 to 12.50
Machine shop turnings	11.50 to 12.00
Mixed borings and short turnings	12.50 to 12.75
Compressed steel	12.85 to 13.25
Railroad wrought	14.00 to 14.50
Railroad malleab'e	15.50 to 16.00
Light bundled sheet stampings	10.00 to 10.25
Steel axle turnings	13.00 to 13.50
No. 1 cast	17.00 to 17.50
No. 1 busheling	10.75 to 11.00
Drop forge flashings over 10 in	10.75 to 11.25
Drop forge flashings under 10 in	10.75 to 11.25
Railroad grate bars	13.75 to 14.25
Stove plate	13.75 to 14.25
Pipes and flues	10.00 to 11.00

British Iron and Steel Market

Cleveland Pig Iron Weakening—Germany Promising Better Wire Deliveries—Tin Plates Lower But Sheets Advanced

(By Cable)

LONDON, ENGLAND, July 18.

Control of Cleveland pig iron prices has been removed and the tendency is downward. Assisted by further impending reductions in railroad rates, 89s. ($19.85) f.o.b. is acceptable for No. 3 G.M.B. Holidays here and disorganized foreign exchanges are checking business.

Hematite is weak and down to 91s. ($20.29) f.o.b. has been done for East Coast mixed numbers. There is some talk of reduced output.

Foreign ore is lifeless and Bilbao Rubio is nominally 25s. ($5.58) ex-ship Tees.

Steel generally is quiet. Germany bought 5000 tons of East Coast shipplates. Belgian merchant bars are quoted up to £7 10s. (1.49c. per lb.) f.o.b.

South America is buying Continental galvanized barbed wire. No. 12 gage has sold at £7 12s. 6d., cost and freight, (3.51c. per lb.) Buenos Aires.

Continental billets have sold for £5 15s. ($25.65) f.o.b.

Continental foundry pig iron is easier at 80s. ($17.84) f.o.b. L L L

German merchant bars are quoted at £7 15s. (1.54c. per lb.) f.o.b., for October delivery. German works are now in a position to supply wire meshing in all sizes.

Tin plates are easier and business quieter. They have sold at 17s. 6d. base, f.o.b. Common wasters are 17s. base.

Galvanized sheet makers have advanced prices but demand has not been stimulated and it is anticipated that prices will again recede in the near future. Rangoon specification sheets sold at £21 f.o.b. There is more enquiry from Japan for black sheets.

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $4.46 per £1, as follows:

Durham coke, delivered	£1 6½s to £1 7s	$5.91 to	$6.02
Cleveland No. 1 foundry	4 15	21.18	
Cleveland No. 3 foundry	4 10	20.07	
Cleveland No. 4 foundry	4 7½	19.52	
Cleveland No. 4 forge	4 5	18.96	
Cleveland basic	4 10	20.07	
East Coast mixed	4 13 & 4 11*	20.96 &	20.29*
Ferromanganese	15 0	66.90	
Ferromanganese*	14 10 to 14 15	64.67 to	65.78
Rails, 60 lb. and up	7 17½ to 9 10	35.12 to	42.37
Billets	7 0 to 8 0	31.22 to	35.68
Sheet and tin plate bars, Welsh	7 7½	32.89	
Tin plates, base box	0 19½ to 0 19¾	4.35 to	4.40
		C. per Lb.	
Ship plates	9 0 to 10 0	1.79 to	1.99
Boiler plates	13 0 to 14 0	2.59 to	2.79
Tees	9 5 to 10 10	1.84 to	2.09
Channels	8 10 to 9 15	1.69 to	1.94
Beams	8 5 to 10 0	1.64 to	1.99
Round bars, ¾ to 3 in.	9 5 to 10 10	1.84 to	2.09
Galvanized sheets, 24 g.	15 15 to 16 10	3.14 to	3.29
Black sheets	12 0	2.39	
Steel hoops	12 0 & 12 5*	2.39 &	2.41*
Cold rolled steel strip, 20 g.	23 2½	4.60	
Cotton ties, Indian specifications	15 0	2.99	

*Export price.

British Iron and Steel Exports and Imports

WASHINGTON, July 18.—Iron and steel exports of the United Kingdom during June totaled 236,298 gross tons, a decrease of 36,139 tons under May, according to a cablegram received to-day by the Department of Commerce from Commercial Attache Walter S. Tower, London.

Imports in June aggregated 52,775 tons, a decrease of 8164 tons under May.

Production of pig iron of all grades in June totaled 369,200 tons, instead of the figure given on page 116 of the issue of July 13.

At the close of June there were 115 blast furnaces and 212 open-hearth furnaces in operation. This compares with 110 blast furnaces and 220 open-hearth furnaces in operation at the end of May.

Fuel Oil Substituted for Coal at Valley Steel Plants

YOUNGSTOWN, July 18.—Steel plants are substituting fuel oil for coal wherever possible. Valley independents Tuesday received 43 cars of fuel oil in one trainload.

Owing to scarcity of offerings, there has virtually ceased to be a coal market. Independents are preparing under promise of Federal protection to operate Pennsylvania workings on a larger scale.

The Youngstown Sheet & Tube Co. and Carnegie Steel Co. are maintaining district plants on an 85 per cent basis.

June Structural Sales at 66 Per Cent

WASHINGTON, June 18.—Sales of fabricated structural steel during June amounted to 66 per cent of shop capacity as against 81 per cent in May, according to reports made to the Department of Commerce by firms representing 75 per cent of the fabricated capacity of the United States. On the basis of the percentage of sales to capacity, the total sales throughout the United States would amount to 119,000 tons in June as against 146,200 tons in May and 155,340 tons in April.

Reports from 96 identical firms, with an aggregate capacity of 135,050 tons, showed the following actual sales for past three months: April, 118,911 tons; May, 109,263 tons; June, 89,974 tons. The percentage of the actual tonnage booked by firms reporting compared to their capacity for three months was as follows: April 88 per cent, May 80.9 per cent, June 66.6 per cent.

The six months business of 1922 totals upward of 710,000 tons, or nearly two-thirds fabricating capacity. The first half year contracting was greater in 1916 and 1920, but the rate as applied to a whole year was exceeded in the last decade in only 1915 and 1916. June, 1922, showed the largest total of any June for which there are records except June, 1915, in which there was a volume of 138,000 tons. The June average for the preceding decade is 95,650 tons.

Railroad Equipment Business

A feature of the week was the placing of large orders for repairs to locomotives and freight cars.

The Baltimore & Ohio divided orders for repairs to 6000 cars and 40 locomotives. The cars were divided as follows: Koppel Car Repair Co., American Car & Foundry Co., Standard Steel Car Co. and the Pullman Co., each 1000; Youngstown Steel Car Co., Hamilton Car Co., General American Car Co. and Illinois Car & Equipment Co., each 500.

The B. & O. locomotive repairs were awarded to Baldwin Locomotive Works, which has also contracted to repair 100 engines for the Erie, 50 for the New York Central and 30 for the New York, New Haven & Hartford.

The Baldwin Works has also taken orders for 50 new locomotives for the Baltimore & Ohio and 25 for the Philadelphia & Reading.

The Norfolk & Western Railroad has ordered 1000 box cars from the Ralston Steel Car Co.

The Buffalo Creek & Gauley Railroad (owned by the Elk River Coal & Lumber Co.) has bought 300 all-steel hopper cars from the American Car & Foundry Co.

The Nashville, Chattanooga & St. Louis has ordered 750 box cars, 150 stock cars and 100 flat cars from the American Car & Foundry Co.; also 15 passenger cars from the same company.

The Illinois Central has let 600 cars for repairs to the Ryan Car Co.

The New York Central has let contracts for an indefinite number of cars for repairs, upward of 1000.

The Chicago, Indianapolis & Louisville is inquiring for 300 composite gondola cars.

FABRICATED STEEL BUSINESS

Bridge and Building Awards and Tonnages Pending at Leading Centers

Awards for fabricated steel work for the past week include the following:

Office building for Westinghouse Electric & Mfg. Co., Thirtieth and Walnut streets, Philadelphia, 300 tons, to Bethlehem Steel Bridge Corporation.

Citizens' Hotel, Charlotte, N. C., 1000 tons, to Southern Engineering Co., Charlotte, N. C.

Public Service Corporation power station at Newark, N. J., 2000 tons, to New York Shipbuilding Corporation.

Building for Chamber of Commerce of the United States, Washington, D. C., 2000 tons, to American Bridge Co.

Shops for Long Island Railroad at Long Island City, N. Y., 400 tons, to Shoemaker-Satterthwait Bridge Co.

Bridge over the Susquehanna River in Lycoming County, Pennsylvania, 1100 tons, to Bethlehem Steel Bridge Corporation.

School No. 188, New York, 700 tons, to Bethlehem Fabricators, Inc.

State highway bridge, No. 3688, War Road, Minn., Guaranty Construction Co., general contractor, 130 tons, to American Bridge Co.

Warehouse for Appleton Coated Paper Co., Appleton, Wis., 100 tons, to Northern Boiler & Structural Iron Works.

Building for Aluminum Goods Mfg. Co., Manitowoc, Wis., 300 tons, let by Walter W. Oeflein, Inc., to Wisconsin Bridge & Iron Co.

Truxillo Railroad Co. of New York for a number of buildings for Honduras, 700 tons, to Bancroft-Jones Corporation, Buffalo, N. Y.

Transmission towers for Blackstone Valley Gas & Electric Co., 650 tons, to Bancroft-Jones Corporation.

Danville, Ill., high school, 300 tons, to Central States Bridge Co.

Tomlinson, Conn., bridge, 1300 tons, to Phoenix Bridge Co.

City of Boston, transit department, 172 tons, to Bethlehem Steel Bridge Corporation.

Euclid-Seventy Ninth Street Building, Cleveland, 470 tons, to the VanDorn Iron Works Co.

Structural Projects Pending

Inquiries for fabricated steel work which may be added to lists of pending projects include the following:

Telephone building on East Thirty-sixth Street, New York, 2000 tons.

New York Edison Co., sub-station, New York, 400 tons.

Material for repair of Queensboro bridge plaza, New York, 500 tons.

Interborough Rapid Transit Co., New York, sub-station, 500 tons.

Museum of Natural History, New York, addition, 700 tons.

Convent of the Sacred Heart, Philadelphia, 500 tons.

United Lutheran publishing building, Thirteenth and Spruce streets, Philadelphia, 1000 tons; bids close July 21.

Reformed Church building at Fifteenth and Race streets, Philadelphia, 1000 tons.

Wire mill, rod mill and train shed for Western Electric Co., 1300 tons, bids close July 21.

Freight depot, Union Pacific Railroad, Denver, Colo.

Bridge work for Cincinnati Northern Railroad, 250 tons. Mount Vernon Bridge Co. low bidder.

Viaduct for a West Virginia coal company, 100 tons; American Bridge Co. low bidder.

Dam No. 44, Ohio River, 650 tons; bids close July 17.

River work near Vicksburg, Miss., 600 tons; bids close July 26.

Roosevelt Hospital building, Dayton, Ohio, 200 tons; bids in.

State Pier, Portland, Me., 900 tons.

Michigan-Lafayette Building, Detroit, 2000 tons, bids taken.

Lima Locomotive Works, Lima, Ohio, plant addition, 2000 tons, bids taken.

Detroit baseball grandstand, 550 tons, bids taken.

St. Clair-Doan Co., Cleveland, theater and other buildings, 250 tons.

County administration buildings, Wanta, N. Y., 500 tons.

Pittsburgh Iron and Steel Market

(*Continued from page* 171)

are likely. The American Sheet & Tin Plate Co. continues to quote on the basis of 3.15c. for black and 4.15c. for galvanized, but has practically no tonnage to spare this side of October. Some independent mills are quoting from $5 to $7 per ton advance over the above price, but to certain favored customers are quoting the same prices as the leading interest. Prices on sheets are given on page 183.

Old Material.—Hardly enough scrap of any kind is being sold in the local market to determine prices. Dealers say that consumers are specifying on contracts and taking in the scrap promptly, but are not in the market to buy more, preferring to await the outcome of the coal and railroad strikes. There is a scarcity in the supply of cast iron borings, and also in several grades of steel-making scrap. Heavy melting scrap sold at Youngstown last week at $18.25 to $18.50, but the local market is considerably lower. Cast scrap for open-hearth use is very dull and prices are purely nominal. Not much change in the local scrap market is likely, or is looked for until something definite occurs in the coal or the railroad strikes. In the absence of sales, we make no change in our scrap prices as quoted last week, except a slight reduction on heavy melting scrap.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows per gross ton:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	$17.25
No. 1 cast, cupola size	$19.00 to 20.00
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	17.00 to 17.50
Compressed sheet steel	15.50 to 16.00
Bundled sheets, sides and ends	14.50 to 15.00
Railroad knuckles and couplers	18.50 to 19.00
Railroad coil and leaf springs	18.50 to 19.00
Low phosphorus standard bloom and billet ends	20.00 to 21.00
Low phosphorus plates and other grades	19.00 to 20.00
Railroad malleable	16.50 to 17.00
Iron car axles	26.00 to 27.00
Locomotive axles, steel	24.00 to 25.00
Steel car axles	17.50 to 18.00
Cast iron wheels	18.50 to 19.00
Rolled steel wheels	18.50 to 19.00
Machine shop turnings	14.00 to 14.50
Sheet bar crop ends	18.50 to 19.00
Heavy steel axle turpings	15.50 to 16.00
Short shoveling turnings	15.00 to 15.50
Heavy breakable cast	18.00 to 18.50
Stove plate	15.00 to 15.50
Cast iron borings	16.00 to 16.50
No. 1 railroad wrought	15.00 to 15.50

Prepaying Duties on Advertising Matter

For the information of those concerned there is reprinted from the Commerce Reports of the Department of Commerce a dispatch from the American consul at Adelaide, reading in part as follows:

"Manufacturers who go to the trouble to issue expensive catalogs and price lists often suffer a very serious disadvantage when such packages arrive addressed to Australian business men, who find that they are required to pay duty and short postage. In many cases, if he had previously been inclined to purchase in the United States the line represented by the catalog, its receipt in this manner offends him to such an extent that he refuses to give further consideration to any line that that particular manufacturer has to offer. It is therefore advisable to warn American business houses to make certain that the duty is fully prepaid and that packages bear the full amount of postage required. It should also be borne in mind that short postage which has to be paid at the other end is levied at double the regular rate."

An ore transfer car of approximately as much as 150 tons capacity is to be built for the Cambria Steel Co. by the Atlas Car & Mfg. Co.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Plates

Sheared, tank quality, base, per lb.....1.70c. to 1.80c.

Structural Material

Beams, channels, etc.....1.70c. to 1.80c.

Iron and Steel Bars

Soft steel bars, base, per lb.....1.70c. to 1.80c.
Refined iron bars, base per lb.....2.20c.

Hot-Rolled Flats

Hoops, base, per lb.....2.50c. to 2.75c.
Bands, base, per lb.....2.50c. to 2.75c.
Strips, base, per lb.....2.50c. to 2.75c.
Cotton ties, per bundle of 45 lb.....$1.10

Cold-Finished Steels

Bars and shafting, base, per lb.....2.10c.
Strips, base, per lb.....4.00c.

Wire Products

Nails, base, per keg	$2.10
Bright plain wire, base, per 100 lb.	2.25
Annealed fence wire, base, per 100 lb.	2.25
Galvanized wire, base, per 100 lb.	2.75
Galvanized barbed, base, per 100 lb.	3.05 to 3.15
Galvanized staples, base, per keg	3.05 to 3.15
Painted barbed wire, base, per 100 lb.	2.55 to 2.65
Polished staples, base per keg	2.55 to 2.65
Cement coated nails, base, per count keg	1.90 to 2.00
Woven fence, carloads	73 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads, 60, 10 and 10 per cent off list
Machine bolts, small, cut threads....60 and 10 per cent off list
Machine bolts, larger and longer....60 and 10 per cent off list
Carriage bolts, ⅜ x 6 in.:
Smaller and shorter, rolled threads.60 and 10 per cent off list
Cut threads.....60 per cent off list
Longer and larger sizes.....60 per cent off list
Lag bolts.....60, 10 and 10 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads....50 and 10 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.:
Smaller and shorter.....50 and 10 per cent off list
Larger and longer sizes.....50 and 10 per cent off list
Hot pressed square or hex. blank nuts.....$4.50 off list
Hot pressed nuts, tapped.....$4.50 off list
C.p.c. and t. sq. or hex. nuts, blank.....$4.50 off list
C.p.c. and t. sq. or hex. nuts, tapped.....$4.50 off list
Semi-finished hex. nuts:
9/16 in. and smaller, U. S. S.....80 and10 per cent off list
⅝ in. and larger, U. S. S...75 and 10 and 10 per cent off list
Small sizes, S. A. E.....80, 10 and 10 per cent off list
S. A. E. ⅝ in. and larger...75 and 10 and 10 per cent off list
Stove bolts in packages.....80 and 5 per cent off list
Stove bolts in bulk.....80, 5 and 2½ per cent off list
Tire bolts.....65 per cent off list
Track bolts in carloads.....3.00c. to 3.25c. base
Track bolts, less than 200 kegs.....3.50c. to 3.75c. base

Cap and Set Screws

Milled square and hex. head cap screws, 75 and 10 per cent off list
Milled set screws.....75 per cent off list
Upset cap screws.....80 per cent off list
Upset set screws.....80 and 5 per cent off list

Rivets

Large structural and ship rivets, base per 100 lb.....$2.40
Large boiler rivets, base per 100 lb.....2.50
Small rivets.....70 and 5 to 70 and 10 per cent off list

Track Equipment

Spikes, 9/16 in. and larger, base, per 100 lb....$2.25 to $2.35
Spikes, ½ in. and smaller, base, per 100 lb.....2.50 to 2.60
Spikes, boat and barge, base, per 100 lb.....2.50 to 2.60
Track bolts, base, per 100 lb.....3.25
Tie plates, per 100 lb.....2.00 to 2.25
Angle bars, base, per 100 lb.....2.40

Welded Pipe

Butt Weld

Steel Inches	Steel Black	Steel Galv.	Iron Inches	Iron Black	Iron Galv.
⅛	54½	28	¼ to ⅜	26½	13½
¼ to ⅜	60	33½	½	35½	18½
½	65	40½	¾	43½	27½
¾	69	46½	1 to 1½	44½	30½
1 to 3	71	48½			

Lap Weld

2	61	51½	2	39½	25½
2½ to 6	63	53½	2½ to 6	42½	29½
7 to 8	65	51½	7 to 12	40½	27½
9 to 12	64	50½			

Butt Weld, extra strong, plain ends

⅛	50½	33	¼ to ⅜	4½	+37½
¼ to ⅜	56	38½	½	35½	23½
½	62	50½	¾	42½	28½
¾	67	55½	1 to 1½	44½	30½
1 to 1½	69	57½			
2 to 3	70	58½			

Lap Weld, extra strong, plain ends

2	62	50½	2	40½	27½
2½ to 4	66	54½	2½ to 4	43½	31½
4½ to 6	65	53½	4½ to 6	42½	30½
7 to 8	61	47½	7 to 8	35½	23½
9 to 12	55	41½	9 to 12	30½	18½

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 and 2½ per cent.

Boiler Tubes

Lap Welded Steel		*Charcoal Iron*	
1¾ in.	26½	1½ in.	15
2 to 2¼ in.	41	1¾ to 1¾ in.	15
2½ to 3 in.	52	2 to 2¼ in.	25
3¼ to 13 in.	57	2½ to 3 in.	30
		3¼ to 4½ in.	32

To large buyers of steel tubes a supplementary discount of 5 per cent is allowed.

Standard Commercial Seamless Boiler Tubes

Discounts on cold-drawn or hot-rolled tubes in carload lots, f.o.b. Pittsburgh, follow:

1 in.	60	2½ and 2¾ in.	43
1¼ and 1½ in.	52	3 in.	47
1¾ in.	36	3¼ to 4 in.	52
2 and 2¼ in.	39	4¼ in. to 5 in.	44

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Tin Plate

Standard cokes, per base box.....$4.75

Terne Plate

(Per package, 200-lb.)

8-lb. coating	$9.30	25-lb. coating I. C.	$14.25
8-lb. coating I. C.	9.60	30-lb. coating I. C.	15.25
15-lb. coating I. C.	11.80	35-lb. coating I. C.	16.25
20-lb. coating I. C.	13.00	40-lb. coating I. C.	17.25

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....2.40c. to 2.60c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.15c. to 3.40c.

Galvanized

No. 28 (base), per lb.....4.15c. to 4.40c.

Tin-Mill Black Plate

No. 28 (base), per lb.....3.15c. to 3.40c.

Manufacturers have pamphlets, which can be had upon application, giving price differentials for gage and extras for length, width, shearing, etc.

Freight Rates

All rail freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic.	$0.325	Buffalo	$0.265	St. Louis	0.43
Philadelphia, export	0.265	Cleveland	0.215	Kansas City	$0.735
Baltimore, domestic	0.315	Cleveland, Youngstown		Kansas City (pipe)	0.705
Baltimore, export	0.255	Comb.	0.19	St. Paul	0.595
New York, domestic	0.34	Detroit	0.295	Omaha	0.735
New York, export	0.285	Cincinnati	0.295	Omaha (pipe)	0.705
Boston, domestic	0.365	Indianapolis	0.31	Denver	1.275
Boston, export	0.285	Chicago	0.34	Denver (pipe)	1.215
				Pacific Coast	$1.50
				Pac. Coast, ship plates	1.20
				Birmingham	0.69
				Memphis	0.385
				Jacksonville, all rail	0.50
				Jacksonville, rail and water	0.415
				New Orleans	0.515

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 30c. to 40c.; ship plates, 30c. to 40c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 30c. to 40c.; sheets and tin plates, 50c.; rods, wire rope, cable and strands, 75c.; wire fencing, netting and stretcher, 50c.; pipe, not over 8 in. in diameter, 50c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

GERMAN PRICES AGAIN RISE

Steel Prices Increased 1000 m. to Offset 400 m. Increase in Coal—Austria Undersells Germany

(Special Correspondence)

BERLIN, GERMANY, July 4.—When prices for semi-finished material were increased on June 20, they were based on the price of coal fixed by the Federal Coal Board on April 20, and were to remain in force until the end of July. It was stated, however, that for every 100 m. increase in the price of bituminous coal rolled material would be automatically increased 275 m. The negotiations in Berlin on miners' wages have led to an increase of about 31 per cent, which works out to 65 m. per shift increase. Bituminous coal rises from 909.50 m. ($2) per ton to 1208 m. ($2.68) and Rhenish lignite is 180 to 735 m. ($0.40 to $1.62) per ton higher. The miners' union originally asked for an increase of 35 m. to counterbalance depreciation in the purchasing power of the mark, but it was realized that unless a substantial inducement was offered, large numbers would leave the mines to take up work in industries paying higher wages. Reparations coal is drawing heavily on German coal production, and the present output could not be maintained if the ranks of the colliers were further depleted. The increase in coal prices raises rolled material by about 1000 m. ($2.20) per metric ton. Guiding prices for basic material are now as follows per metric ton:

	Marks	
Ingots	8,320	$18.74
Blooms	9,320	20.50
Billets	9,660	21.25
Sheet bars	9,910	21.80
Structural shapes	11,290	24.84
Bar iron shapes	11,470	25.23
Universal iron	12,470	27.43
Hoop iron	13,030	28.67
Wire rods	12,340	27.15
Sheets		
No. 6 and heavier	12,860	28.29
Nos. 6 to 11	14,610	32.14
Nos. 11 to 20	15,710	34.56
No. 20 and lighter	16,490	36.28

The surcharge for open hearth material is unaltered at 900 m. ($1.98) per ton. The increase still leaves a margin between German and foreign prices, which is, however, further reduced by the export duty of 4 per cent and the tax on turnover of 2 per cent.

Through the recent depreciation of German currency British coal is again considerably higher than the home product but because of the coal shortage large quantities are still being imported. The Pig Iron Association lately offered 8000 tons of iron which was produced with British coal. The price was 800 m. higher than the iron produced with German coal. The association now announces the sale of another 16,000 tons with a surcharge of 500 m. per ton. Pig iron has been increased about 1000 m. per metric ton. The following table shows the prices, now in effect, in marks per metric ton:

	Marks	
Hematite	7,670	$16.87
Foundry Iron		
No. 1	7,261	15.97
No. 3	6,491	14.28
Luxemburg	6,151	14.15
Steel making, low in copper	7,250	15.95
Siegerland, steel making	7,250	15.95
Malleable, per cent	7,582	16.70
Ferromanganese, 80 per cent	16,570	36.45
Spiegeleisen, 8 to 12 per cent	8,252	18.15
Ferrosilicon, 10 per cent	9,050	19.91

These prices are in force until further notice. The Pig Iron Association is allowing a rebate of 100 m. ($0.22) per ton. The increase is made because of the 25 per cent rise in freight rates, wage increases and higher costs of inland and foreign ore. Scrap iron has gone up lately and is 6,400 m. ($14.08) for cast iron, and 5,400 ($11.88) for wrought iron. Because of the excessive prices it is intended to re-introduce rationing and Government control of scrap. In view of the rise in pig iron foundries are raising prices 15 per cent. Works have plenty of orders.

The Otto Wolff company, which with some of the largest iron and steel interests recently founded the Iron Export Otto Wolff, has acquired a controlling interest in the Archimedes A. G. in Berlin, which manufactures iron and steel products. Archimedes is now increasing its capital from 6,000,000 to 30,000,000 m. Of the increase 16,000,000 will be used to combine with the Wolff company, the Düsseldorfer Eisenhütte A. G., Ratingen, capital 8,000,000 m. the Hildener Schrauben und Metallwerke A. G., capital 4,000,000 m. and R. W. Schulte in Plettenberg and Düsseldorf. These three companies manufacture screws and rivets and their products are to be sold by Wolff, which is beginning to be one of the largest interests in the German iron and steel industry.

The Mannesmann company has established a new tube company in Komotau, Czecho-Slovakia, with a capital of 30,000,000 kronen.

The Society of German Rivet Works in Düsseldorf has raised the price for heavy rivets (boilers, ships, bridge work) from 19,200 to 24,000 m. per ton.

Austrian foundries, which have been obtaining their pig iron largely from Upper Silesia, are now placing large orders in the Saar district and in France, as the Silesian and the West German works cannot supply sufficient quantities. The Austrian mills are very busy as their prices are considerably below the level of the world market and are even undercutting German quotations. Dealers in Austria with stocks of Czecho-Slovakian rolled material are unable to dispose of them because of the lower domestic prices. The situation in the Czecho-Slovakian iron and steel industry has forced 17 of the 22 blast furnaces in the country out of operation.

European and South American Fairs

Throughout the world a good many fairs and exhibitions seem to have been planned. Among them may be mentioned the following:

Hamburg, Germany, July 19 to 24, fair of electrical and other machinery.

Rio de Janeiro, Brazil, Sept. 7, 1922, to March 31, 1923, International Centenary Exhibition.

Santiago, Chile, middle of September to November, Chilean exhibition of national industries.

Breslau, Germany, Sept. 3 to 6, autumn sample fair.

Trieste, Italy, Sept. 3 to 18, general sample fair.

Naples, Italy, Sept. 16 to 30, sample fair.

Laibach, Jugoslavia, Sept. 2 to 11, sample fair.

Vienna, Austria, Sept. 10 to 16, autumn fair.

Lemberg, Poland, Sept. 5 to 15, eastern fair.

Prag, Czechoslovakia, Sept. 3 to 10, international autumn fair.

Frankfort-on-Main, Germany, Oct. 8 to 14, autumn fair.

Lyon, France, Oct. 1 to 15, international autumn sample fair.

Paris, France, Oct. 1 to 16, exhibition of agricultural machinery.

Paris, France, Oct. 4 to 15, international motor-car exhibition.

London, England, Oct. 13 to 23, international exhibition of motor trucks.

London, England, November, international motor exhibition.

Brussels, Belgium, Dec. 3 to 17, international motor car exhibition.

Proposed Reductions on Ore Rates Again Suspended

WASHINGTON, July 18.—The Interstate Commerce Commission yesterday further suspended until Aug. 29, tariffs which proposed a reduction of 20 per cent in ex-lake ore rates and 28 per cent in Eastern ore rates. The further suspension was ordered because the commission has not completed its hearing in these cases. The proposed reductions, which were the object of prolonged hearings during the spring, were strongly supported by the railroads and iron and steel interests, except those in the Buffalo district. Since this case came before the commission, it has made a reduction of 10 per cent in rates on ore as well as other products in its general rate decision, which became effective July 1.

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
July	Lake	Electrolytic*	New York	New York	St Louis	New York	St. Louis
12.....	14.00	13.75	31.00	5.75	5.50	5.95	5.60
13.....	14.00	13.75	30.95	5.75	5.50	6.00	5.65
14.....	14.00	13.75	31.00	5.75	5.50	6.10	5.75
15.....	14.00	13.75		5.75	5.50	6.10	5.75
17.....	14.00	13.75	31.12½	5.75	5.50	6.10	5.75
18.....	14.00	13.75	31.50	5.75	5.50	6.10	5.75

*Refinery quotation.

New York

NEW YORK, July 18.

Copper.—A fairly well sustained demand, together with the fact that there is no surplus of copper, contributed to the continued strength of prices. Usually July is marked by weakness in prices, but the situation this year is different. Sales have been made during the past week for delivery up to the end of the year at 14c., delivered, for electrolytic, and while this price has been shaded on a few sales the price has not gone below 13.95c. Sales for export have also been made at 13.95c. and 14c., f.a.s. There is no large volume of business and buyers are disposed to be somewhat cautious, but are ready to buy for prompt shipment the copper that is available. However, there is little copper to be had from second hands.

Tin.—Up to Thursday the tin market was dull last week. There were sellers but no buyers. On Thursday there was a slight change for the better, a little business, possibly 100 to 150 tons, being done at 30.87½c. to 31c. Sales were made from steamers at dock and to arrive. On Friday about 100 tons was sold at 30.87½c. to 31c., while on Monday about 200 tons was sold, mostly for July-August delivery, but including August-September from the East, at 31.25c. to 31.50c. The market to-day was firm at 31.50c. London cables to-day report spot standard quoted there at £155 2s. 6d.; future standard, £155 12s. 6d.; spot straits, £156 12s. 6d.; Singapore price £156 15s.

Lead.—The market is quiet and dull and prices are stationary, 5.50c., St. Louis, and 5.75c., New York. It is reported that some transactions at St. Louis have been put through at 5.45c.

Zinc.—Publication of zinc statistics by the American Zinc Institute during the week greatly strengthened the market; at any rate the strength occurred simultaneously with the announcement of these figures, hence it is fair to assume that the better statistical position of this metal was responsible for the upturn in prices. The report stated the stocks on hand as of July 1 totaled 29,576 tons, a decline of about 11,000 tons from the June 1 figures. Shipments in June were 39,380 tons, so that the amount on hand July 1 was less than one month's supply. Prices for prompt shipment stiffened about the middle of last week, and the quotations for several days have been 5.75c., St. Louis, or 6.10c., New York.

Old Metals.—Prices are a little higher and business more active. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	13.50
Copper, heavy and wire	12.75
Copper, light and bottoms	11.00
Heavy machine composition	10.50
Brass, heavy	8.00
Brass, light	6.50
No. 1 red brass or composition turnings	8.75
No. 1 yellow rod brass turnings	7.50
Lead, heavy	4.875
Lead, tea	3.75
Zinc	3.25

Aluminum.—The Aluminum Co. of America continued to quote virgin metal, 98-99 per cent pure, in lots of 15 tons or more, f.o.b. shipping point, carload rate of freight allowed, at 19.10c. The same grade of imported metal is quoted at 17.75c. to 18c., duty paid, New York.

Antimony.—The market is quiet and unchanged, prompt carloads being quoted at 5c. per lb. or a shade under, duty paid, New York.

Chicago

July 18.—Copper and spelter have advanced, but tin and lead are easier. Some fairly sizable inquiries are pending in spelter, but actual business is light and the market is dull. On other metals prices are unchanged except for a slight advance in copper bottoms. We quote, in carload lots, Lake copper, 14.12½c.; tin, 32c.; lead, 5.50c.; spelter, 5.75c.; antimony, 7c., in less than carload lots. On old metals we quote: Copper wire, crucible shapes and copper clips, 10.75c.; copper bottoms, 9c.; red brass, 8.50c.; yellow brass, 6.75c.; lead pipe, 14.25c.; zinc, 2.75c.; pewter, No. 1, 20c.; tin foil, 22.50c.; block tin, 26c.; all buying prices for less than carload lots.

St. Louis

July 18.—We quote lead in carload lots at 5.40c. to 5.50c.; slab zinc, 5.73c. to 5.80c. On old metals we quote light brass, 3.50c.; heavy red brass and light copper, 7c.; heavy yellow brass, 4c.; heavy copper and copper wire, 7.50c.; zinc, 2c.; lead, 3c.; pewter, 15c.; tin foil, 16c.; tea lead, 2c.; and aluminum, 9c.

Effect of Manganese on the Magnetic Properties of Steel

It has been recognized for some time that manganese has an effect on the magnetic properties of steel which is of a somewhat similar nature to that of carbon. A series of iron-carbon-manganese alloys of exceptional purity have become available for a study at the Bureau of Standards of their magnetic properties. Several sets of specimens, each set having the same carbon content, but varying manganese, will be subjected to standard heat treatment and their magnetic properties determined. New apparatus for the testing of small specimens recently developed at the bureau is being used in this investigation.

Attorney General Will Soon Report on Mergers

WASHINGTON, July 18.—Attorney General Daugherty said this afternoon that he expected to send the report of the Department of Justice regarding the investigation of proposed mergers of independent steel companies to the Senate some time this week. He stated that the draft of the report practically has been completed and but little remains to be done before it is ready to be submitted to the Senate. The Department of Justice investigation was under the Sherman anti-trust act while the investigation of the Federal Trade Commission is under the Clayton act. Both investigations were ordered by a resolution of Senator La Follette. Meanwhile the Federal Trade Commission is continuing its investigation without any indication as to when it will be completed. Its complaint against the Bethlehem Steel Co. and the Lackawanna Steel Co. was followed by the issuance of a questionnaire to all the steel companies of the country bearing on production, domestic and foreign shipments, capitalization, etc. This questionnaire has been responded to by many companies, including the United States Steel Corporation.

As yet nothing has been done to indicate what action will be taken with regard to the proposed merger of the Midvale Steel & Ordnance Co., the Republic Iron & Steel Co. and the Inland Steel Co. To-morrow counsel for these three companies will hold a conference with the Federal Trade Commission at which, it is said, explanation of data submitted by these companies will be made.

June sales of the Metropolitan Paving Brick Co., Canton, Ohio, reached 3000 carloads, establishing a new monthly record. Officials report sustained demand for road building and construction. The company operates properties at Bessemer, Pa., and in the vicinity of Canton.

PERSONAL

Frederick R. Sites has been appointed private secretary of Judge Elbert H. Gary, chairman United States Steel Corporation, succeeding George K. Leet, who, after serving as private secretary for 11 years was elected secretary of the Steel Corporation last April. Mr. Sites graduated from the Massachusetts Institute of Technology in 1899. He served for about a year in a minor capacity at the Central blast furnaces of the American Steel & Wire Co., Cleveland, and later for about a year in the metallurgical department of the Carnegie Steel Co., Homestead, Pa. Nine years ago he became connected with the United States Steel Products Co. and has just returned from Shanghai, China, where he has been manager in China for that company. During a part of the years 1918-19, Mr. Sites was treasurer of the Federal Shipbuilding Co., but returned to China when the export business became active after the war. Judge Gary became well acquainted with Mr. Sites while making a tour of the Far East six years ago. Mr. Leet, who has been serving as private secretary to Judge Gary as well as secretary of the Steel Corporation since his election to the latter position, will now devote his entire time to the position of secretary of the Steel Corporation.

Roy H. Davis, general manager Firth-Sterling Steel Co., McKeesport, Pa., whose paper on "Brands vs. Analysis in Buying Tool Steel," read at the convention of the National Association of Purchasing Agents, Rochester, N. Y., May 17, has aroused much interest among buyers of tool steel, was born in 1885 and after 6 months' work at the University of Oregon, entered the United States Naval Academy in 1905, graduating four years later. His time in the service, 1909-13, was spent at sea and in ordnance and metallurgical work at the various steel companies which were undertaking that work. In the latter part of 1913, he became connected with the United States Coal & Coke Co., Gary, W. Va., serving as mechanical engineer and superintendent of power and electrical engineer. In 1915 he became associated with L. J. Firth in the office of the Washington Steel & Ordnance Co., New York, as assistant to W. A. Burton. Since 1917 he has been at the McKeesport plant of the Firth-Sterling Steel Co. with the exception of several months spent in Sheffield, England.



ROY H. DAVIS

Eugene G. Grace, president Bethlehem Steel Corporation, sailed on the Olympic, July 15, for a European trip of several weeks.

Walter W. Leck, formerly general superintendent American Tube & Stamping Co., Bridgeport, Conn., and later superintendent of rolling mills, Steelton plant, Bethlehem Steel Co., has resigned to become general superintendent, Scullin Steel Co., St. Louis.

William F. Figee, formerly with Laughlin & Barney Machinery Co., Pittsburgh, is now connected with the sales department of Chas. A. Schieren Co., in its office in the Maloney building, Pittsburgh.

James A. McCrory, formerly secretary and general manager of sales American Steel Co., Park Building, Pittsburgh, has resigned, effective July 15. After a vacation, Mr. McCrory plans to engage in business on his own account.

Julius Kahn, president Truscon Steel Co., Youngstown, Ohio, sailed last Saturday on the Vroonland for an extended tour of Europe.

Arthur Hungerford Pullen, chairman Burton-Griffiths Co., Ltd., London, Eng., importer of machinery, spent several days in Milwaukee on a business mission with local manufacturers. The Milwaukee Association of Commerce arranged a special luncheon at the Athletic Club in his honor at which Mr. Pullen briefly discussed exporting and importing problems under present-day conditions.

W. S. Stothoff has resigned as works manager of the Hadfield-Penfield Steel Co., Bucyrus, Ohio, and will engage in other business in the East. He has been succeeded by R. O. Perrott, secretary of the company and resident manager of the Bucyrus plants who has become manager of all the plants, the others being located in Mansfield and Willoughby, Ohio. Arthur Whitcraft has become manager of the company's steel foundry in Bucyrus.

Albert E. Newton has been chosen general manager of the Collins Co., manufacturer of tools, Collinsville, Conn. Mr. Newton was for many years with the Reed-Prentice Co., Worcester, Mass.

J. S. Black has been made works manager of the Corbin Screw division of the American Hardware Corporation, New Britain, Conn., succeeding Roswell Sorrow, who recently resigned. Mr. Black was formerly associated with the New Britain Machine Co., New Britain, Conn.

Frank H. Willard has been elected vice-president and general manager Graton & Knight Mfg. Co., Worcester, Mass., belting. At the time of the reorganization of the company a few months ago, Mr. Willard resigned as vice-president and director, but remained with the company.

Henry C. Graton, founder of Graton & Knight Mfg. Co., Worcester, Mass., belting, last week celebrated his ninety-second birthday. He and Joseph A. Knight formed a partnership in 1861.

R. M. Connell, Kansas City, Mo., has been appointed trade commissioner for Sao Paulo and southern Brazil, and will leave Washington on July 20 to take up his new work. For the past year Mr. Connell was in Mexico City as assistant trade commissioner, and for several months he was in charge of the office of the commercial attaché at that post.

E. B. Phillips, of Jacksonville, Fla., has been appointed instructor in electrical engineering at Carnegie Institute of Technology, Pittsburgh. He will join the staff of the college of engineering on Sept. 1. Mr. Phillips has had teaching and practical experience. He is a graduate of Georgia Institute of Technology, class of 1917, and for two years following was an electrical engineer with the Western Electric Co., New York. During the past two years, Mr. Phillips has been instructor in electrical engineering at the United States Naval Academy, Annapolis, and at Georgia Tech.

An important change in the Department of Electrical Engineering at the Carnegie Institute of Technology next year will be the retirement of Prof. A. J. Wurtz from the staff of the department. Beginning next fall, he will devote all of his time to research work in electrical engineering for the division of co-operative research, continuing research work he has been doing on a part-time basis in the college of engineering. The acquisition of Professor Wurtz to the Research division is of particular interest to electrical engineering companies, because of his contributions to the development of electrical engineering. He is the discoverer of the five non-arcing metals, and has made many notable inventions during his career.

Frank L. Estep, junior partner of the firm of C. P. Perin and S. M. Marshall, consulting engineers, New York, whose sailing for India on July 18 was mentioned in this column in last week's issue, plans to remain a few weeks in England in connection with engineering work for the Tinplate Co. of India. In India he will supervise the completion of construction and the starting up of the plant. He will also represent his firm while in India in connection with work being done for the Tata Iron & Steel Co., the Mysore Distillation &

Iron Works, the Indian Steel Wire Products Co., the Agricultural Implements Co., Ltd., and other enterprises.

Howard F. Deverell, vice-president and director the Otis Steel Co., Cleveland, retired on June 30, terminating a career of 28 years of active service in that organization. Mr. Deverell's first connection with the Otis Steel Co. was in the capacity of clerk in the Chicago office in April, 1894. Two years later, he took charge of the Chicago office as district sales representative. With the closing of the office in that district, he was transferred to the main office in 1898. A few years later he was made secretary of the firm, then known as Otis Steel Co., Ltd. When the Otis Steel Co. of Ohio was formed in 1912 to supplant the Otis Steel Co., Ltd., Mr. Deverell was elected secretary and director. He assumed his duties as vice-president in 1919, in which capacity he exercised general supervision over sales and attended other executive matters. Mr. Deverell plans to devote his future time to private affairs.

W. C. Perkins was transferred on July 15 to the Pittsburgh office as district sales manager of the American Chain Co., Inc., Bridgeport, Conn. At the same time the headquarters of the Southern district office were moved to Pittsburgh, combining with the Pittsburgh organization.

Elbert H. Gary, chairman United States Steel Corporation, expects to start about Aug. 1 on a vacation to be spent in the Rocky Mountains.

OBITUARY

WILLIAM T. MURPHY, president, Standard Machinery Co., Auburn, R. I., died at Greenfield, Mass., July 9, following a three days illness. Mr. Murphy was born in Providence 40 years ago, and graduated from Brown University in 1903. A few months later he became associated with the late Michael J. Houlihan in the construction of machinery, and eventually the machine company of which he was the head was established. He had served as a member of the State Board of Labor, as president of the Metal Trades Council, and for years was an active member of the Providence Chamber of Commerce.

HARRY R. SIDNELL, superintendent of the F. A. Colman Co., Cleveland, manufacturer of foundry equipment, died July 11, age 61 years.

BURTON CLIFTON BANGS, vice-president and purchasing agent Leavitt Machine Co., Orange, Mass., died July 13, at his home in that town after a ten-weeks' illness, age 70.

CHARLES E. THWING, former president Worcester Lathe Co., Worcester, Mass., died last week at his home in that city after a five-weeks' illness, in his sixty-first year. Mr. Thwing retired from business about five years ago.

ALFRED DAWES, Winchester, Mass., inventor of machinery for manufacturing rivets, died at his home July 12. Mr. Dawes was born in Richmond, Me., in 1836.

J. HOBART BRONSON, president, Oakville Co., manufacturer of wire and metal goods, of Oakville, Conn., died at his summer home in the Berkshire Mountains, at Litchfield, Conn., Thursday morning, July 6, after an illness of but two days. Mr. Bronson, who was 80 years old, was a prominent industrial figure in Connecticut.

The projected symposium on electro-osmosis intended for the Montreal meeting of the American Electro-Chemical Society has been abandoned owing to the inability of a number of members who were relied on to prepare papers at this time. It has, therefore, been decided to abandon the symposium so far as the fall meeting is concerned.

Refractories Prices Irregular

PITTSBURGH, July 17.—The recent advance of $2 per 1000 in prices of fire clay brick does not yet appear to be fully established. A few makers of high duty brick still are accepting business at $32, and since these makers are among the largest producers, the effort of others to obtain $34 is meeting with little success. A good many users were permitted to cover their immediate requirements at the old prices and this also is a hindrance to the establishment of the higher prices. The advances in silica brick and in magnesite and chrome brick are well held. Obligations of the makers of fire clay and silica brick are rather heavy and not a few of them are falling behind their orders because of inability to obtain a sufficient supply of labor. Some manufacturers have been obliged to raise wages to maintain their organizations, and if coal miners have present wage scales preserved still further advances in clay mine and brick plant wage scales may be necessary to narrow the gap, now unusually wide, between the two classes of labor.

We quote per 1000 f.o.b. works:

Fire Clay	High Duty	Moderate Duty
Pennsylvania	$32.00 to $36.00	$28.00 to $34.00
Ohio	32.00 to 34.00	28.00 to 32.00
Kentucky	32.00 to 37.00	28.00 to 34.00
Illinois	34.00 to 36.00	32.00 to 34.00
Missouri	34.00 to 36.00	30.00 to 34.00
Silica Brick		
Pennsylvania		33.00 to 35.00
Chicago		41.00
Birmingham		40.00
Standard size per net ton (f.o.b. Baltimore and Chester, Pa.)		56.00
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)		30.00
Chrome Brick		
Standard size, per net ton		42.00

Black Sheets Easier in Valleys

YOUNGSTOWN, July 17.—In the sheet market, black sheets have been purchasable either out of stock or from new rollings at the 3.15c. basis, with deliveries possible in three to four weeks. Higher prices applied only on the smaller percentage of shipments, as indicated by the $2.90 average on Nos. 26, 27 and 28 gage black sheets on May-June shipments.

Galvanized has been more difficult to obtain on prompt shipment, however, due more to inadequacy of pickling capacity than shortage of black sheets. Full finished sheets have been in urgent demand and because a greater profit is realized on them as compared with galvanized grades, they have been accorded preferment in pickling departments.

Certain independents have been quoting up to 4.85c. on full finished stock, base gage, which compares with the nominal 4.75c. market and the 4.50c. quotation of the leading interest.

The pipe situation is characterized as very firm, especially with regard to buttweld sizes, with some makers committed 90 days ahead. This, coupled with sheet demand, reflects activity in new construction.

Makers of merchant bars have been falling behind on their obligations, and current interruptions to production will produce still more of a stringency in this market. Prices are trending to a 1.80c. minimum.

Valley Scrap Market

YOUNGSTOWN, July 17.—Higher scrap prices will immediately follow any enlarged demand in wake of curtailed iron output. The market in the Valley has been ranging from $18.50 to $19 for heavy melting.

Russell E. Gardner, president, Gardner Motor Car Co., St. Louis, announces that sales and production for the first six months of 1922 were 50 per cent greater than they were for the entire year of 1921, that orders on hand for July exceed those of any month since the company began business and that orders already received for August are in excess for those for July. The plant here now has an average of output of 85 cars a day, and when the supply of bodies, in which there has been a shortage, becomes more easily available the production will be increased to 100 cars daily.

PROSPEROUS INDUSTRIES

National Industrial Conference Board Survey of Conditions

In surveying industrial conditions, the National Industrial Conference Board says:

"The week has been tense with labor difficulties. Though some of the striking railroad shop men have returned to avoid loss of seniority and other privileges, and a strike of maintenance of way men has so far been held off, a small number of stationary firemen, engineers and oilers have joined the strike and the roads are having difficulty in maintaining service. Efforts of the Railway Labor Board at conciliation have not been successful, though the question of restoration of seniority rights is reported to be the chief obstacle to agreement. The Administration is hopeful of a settlement, but the Government, according to a presidential proclamation, has ready all necessary measures to check any tendency to violence or interruption of mail traffic.

"Bituminous miners and operators having failed to agree in conference, the President has proposed resumption of work under present wage scales until Aug. 10, or until an arbitration board shall have completed a thorough investigation of the industry. Anthracite operators and miners have accepted this proposal, but the bituminous miners offered such strong objection to certain features as to constitute practical rejection of it.

"The clothing trades of New York, Philadelphia and Baltimore are faced with new strike disturbances, but textile workers in New England are reported to be returning. All but four mills in Rhode Island have resumed, though a deadlock persists in the New Hampshire mills, where the employers have refused State arbitration offers.

"Despite the handicap of labor disturbances, industry shows a steady improvement, employment continues to pick up, the demand for labor grows and the number of wage increases still continues to overbalance the number of wage reductions reported. The United States Employment Service reports employment increases in 52 of 65 leading cities, all industries but the stone, clay and glass products showing an increase. The general feeling is that if current railroad and coal problems can be satisfactorily settled, the rate of progress shown in the past month will be satisfactorily maintained and the country will be able to step clear of the depression by the fall. The greatest factors of uncertainty are felt to lie in the labor situation and in the tariff legislation contemplated in Congress.

"Abroad, the signs of more stable industrial readjustment are seen in the continued movement to lengthen working hours. The precarious financial position of Germany remains the outstanding factor in the international situation, the Hague conference having so far failed of noteworthy accomplishment."

Record Construction First Half 1922

Building contracts awarded during June in the 27 northeastern States, according to the F. W. Dodge Co., amounted to $343,440,000. Except for the record figures of April and May of this year, this is larger than any previous monthly total. It is only 5 per cent under the record May figure, and shows a 52 per cent increase over June of last year.

The continued high rate of activity has brought the total amount of construction started in the first six months of this year up to $1,690,984,000, which is by far the highest figure for the first half of any year.

In the six months' record are the following items: $682,663,000 for residential construction; $288,932,000 for public works and utilities; $280,329,000 for business buildings; $164,641,000 for educational buildings, and $123,181,000 for industrial plants, an increase of 42 per cent over the corresponding period of last year.

It seems not unlikely that the remaining summer months may show a slight falling off from the extreme high rate of activity that has prevailed during the second quarter of the year. However, there are localities in the Middle West where the revival has not yet gained the headway that it has in the East. These places may be expected to show increases that will in a measure offset declines elsewhere.

Plant Operations

The Nicholson File Co., Anderson, Ind., is increasing production at its local plant, with working schedule advanced from 45 to 50 hrs. a week.

The Atwater-Kent Co., Philadelphia, manufacturer of ignition equipment, etc., is working at full capacity in all departments of the plant, with an overtime schedule operative in the wireless equipment branches of the works.

The Auto Body Co., Lansing, Mich., is developing maximum capacity output for the manufacture of bodies for the Durant Motor Co.

The Lebanon Iron Co., Duncannon, Pa., has resumed operations at its plant, effective July 10, following a suspension for more than a year. The works will give employment to about 150 men.

The Remy Electric Co., Anderson, Ind., is operating at full capacity with the employment of about 1900 persons. The regular week's shut-down over the Fourth of July, as in former years, was eliminated this year owing to the rush of orders, and just the single day observed.

The John Wood Mfg. Co., Conshohocken, Pa., is running at full capacity at its plant devoted to the manufacture of metal cans for ice cream and kindred service, developing an output of about 4,000 containers daily. The plant was built during the war to manufacture steel containers for the Government, and following converted to commercial production.

The Hess-Bright Mfg. Co., Philadelphia, manufacturer of ball bearings, is working at full capacity, with regular operating force. A shortage of skilled labor for desired additions to the force is reported.

In the Field of Labor

Greater Boston union molders have officially called off their strike and are seeking re-employment. Few of the strikers have been taken back, however, inasmuch as their places previously had been filled.

It developed at a recent meeting in union quarters that drop forgers, who went on strike against the Moore Drop Forging Co., Springfield, Mass., because of the individual contract, more than a year ago, have secured employment at other establishments in that city, as well as in Detroit, Cleveland, Pittsburgh and Plainfield, N. J.

An investigation made by the Massachusetts Associated Industries shows that industries in that State in June operated on an average of 77½ per cent of normal. Production, compared with normal, varied from 50 per cent in the metal working group to 81 to 100 per cent in other industries.

The Supreme Court of Wisconsin has affirmed without opinion a decision of the circuit court which upholds the constitutionality of the provision of the Wisconsin workmen's compensation law, giving the Industrial Commission of Wisconsin authority to impose treble the standard scheduled indemnities on a corporation or other employer, when a minor child working without a child labor permit is injured.

The contract for furnishing and erecting the piping for the north extension of the Windsor, W. Va., power station has been awarded by the West Penn Power Co. to the Pittsburgh Piping & Equipment Co., Pittsburgh, Pa., which was the piping contractor on the original installation as well as on the south extension. Each of the three installations covers two 30,000 kw. units, making a total of 180,000 kw. when the north extension is finished. An interesting feature of the new installation is the steam pressure of 350 lb. per sq. in. with 250 deg. superheat. The Sargol gasketless flanged joint will be used on the steam piping.

JULY BUSINESS IS FAIR

Sales This Month Compare Favorably with June Despite Strikes

Automobile Companies Buying, But Railroad Purchases Are Being Deferred, Except Santa Fe

The automobile industry continues to buy considerable machine-shop equipment and is the mainstay of the machine-tool market in the Central States, though there is a fairly good volume of buying in other lines as compared with June, which was the best month the industry has had in a year and a half. Undoubtedly the coal and railroad strikes are holding back a good deal of business, railroad buying in particular having been deferred until a settlement of the labor troubles has been reached. The Santa Fe has gone ahead with its purchases. Thus far this road has closed for more than half of the items for which it inquired. Its total expenditure for tools and cranes will be $200,000 to $250,000.

There has been other scattered railroad buying. The New York Central, the Central Railroad of Vermont and the Rutland Railroad are among those which have made small purchases.

The automobile buying of the week has been chiefly in the Cleveland market. The Toledo Chevrolet Motor Co., Toledo, Ohio, has bought 12 multiple spindle drilling machines; the General Motors Co. has bought six special Rockford boring machines for its Chevrolet plant at Flint, Mich., both orders going to a Cleveland machinery dealer. The Studebaker Corporation, South Bend, Ind., is figuring on additional equipment, including a number of grinding machines. The Continental Motors Co., Muskegon, Mich., is placing orders from week to week.

A turret lathe manufacturer has booked an order for 14 machines for shipment to Montreal, Canada.

The Cleveland Board of Education has rejected bids on about 30 tools and will receive new bids up to Aug. 14. The Newark schools have bought about 20 tools, totaling about $25,000, for vocational training work. Berlin, N. H., schools have bought about $17,000 worth of tools and trade schools at New Britain, Conn., have bought several machines.

New York

NEW YORK, July 18

The volume of machine-tool business that has been done so far this month, in comparison with that of June, is fairly encouraging considering the increasing uncertainties arising out of the coal and railroad strikes. Buying is mostly in small units, but more manufacturers are indicating their need of new shop equipment. A fairly large number of inquiries remain to be acted upon as soon as manufacturers can go ahead with more assurance than is possible to-day. The Newark schools placed orders last week for about $25,000 worth of machine tools and about $10,000 worth of accessories and supplies for its vocational training schools. The business was split up among several manufacturers and dealers. There is a cessation of railroad buying, due undoubtedly to the shop mechanics' strike. The New York Central has bought two turret lathes and the Central Railroad of Vermont has ordered a 1500-lb. steam hammer.

Although the crane market is generally quiet, the condition is attributed to the usual summer dullness, combined with the uncertainties of the strike situation, there is some business being closed and a few new inquiries. One of these now current is for a 10-ton, 44-ft. span electric crane from the American Car & Foundry Co., New York. The Newport News Shipbuilding & Drydock Co., Newport News, Va., which is buying a list of machine tools and cranes for its car shop is receiving bids on a small list of electric hoists. An inquiry for a 110-ton power house crane and another calling for one 40-ton electric crane are reported to be current. Among recent sales are the following:

Pawling & Harnischfeger Co., a 5-ton, 62-ft. span electric crane to the Kieckhefer Container Co., Milwaukee, Wis.

Industrial Works, a 150-ton wrecking crane to the Grand Trunk Railway System, Montreal, and a 160-ton wrecking crane to the Canadian Pacific Railway Co., Montreal, Can. Also a 15-ton, 45-ft. boom locomotive crane with bucket to the Dominion Construction Co., for Niles, Ohio, a 20-ton locomotive crane to Louis Caplan, Lebanon, Pa., and a 15-ton, 50-ft. boom locomotive crane to the Duluth-Superior Dredging Co., Duluth, Minn.

Shepard Electric Crane & Hoist Co., a 5-ton, 32-in. span electric crane to the Meeker Union Foundry, Norwalk, Conn.

Bedford Foundry & Machine Co., a 50-ton, 70-ft. 9-in. span overhead traveling crane with 15-ton auxiliary to the Central Penn Power Co., Saxton, Pa.

Ohio Locomotive Crane Co., a 20-ton, 50-ft. boom locomotive crane with Hayward bucket to the Central Penn Power Co., Saxton, Pa.

Niles-Bement-Pond Co., a 10-ton, 80-ft. span, electric crane to the M. W. Kellogg Co., Jersey City, N. J., and a 4-ton, 48-ft. span, hand power crane to W. R. Grace & Co. for export to Peru.

The General Motors Corporation, 224 West Fifty-seventh Street, New York, will remove the machine shop and parts department of its Buick Motor Co. division from the building at Fifty-second Street and the Hudson River to the new six-story building on Eleventh Avenue and Fifty-fifth Street, ground for which recently was broken. The capacity will be increased at the new location and additional machinery installed. The service and parts departments of the Oakland Motor Car Co. division will be established also in the new building, which will have a total floor area of 140,000 sq. ft. Both plants will be entirely separate and complete in themselves. It is expected to have the structure ready for occupancy early in the fall.

The Coffield Radio Equipment Corporation, Ellenville, N. Y., is planning for the installation of machinery for the manufacture of wireless instruments and apparatus.

A power house will be installed at the new four-story and basement plant to be erected on Mill Street, Poughkeepsie, N. Y., by the American Chocolate Products Co., 158 Broadway, New York, estimated to cost about $350,000. Andrews, Towers & Lavalle, 21 East Fortieth Street, New York, are architects and engineers.

John L. Miller, 1947 Broadway, New York, is having

plans completed for a one-story automobile service and repair building, 125 x 150 ft., at West 210th Street, Tenth Avenue and Broadway, estimated to cost close to $75,000. Frank Hausle, 81 East 125th Street, is architect.

The Baragua Sugar Co., 25 Broad Street, New York, a subsidiary of Punta Alegre Sugar Co., Camaguey Province, Cuba, is disposing of a bond issue of $4,500,000, a portion of the proceeds to be used for extensions and betterments and additions to working capital. Edwin F. Atkins is president.

The New York Edison Co., 130 East Fifteenth Street, New York, has plans under way for a new three-story power house, 45 x 125 ft., at 12 Stone Street, estimated to cost about $90,000. William Whitehall, 709 Sixth Avenue, New York, is architect and engineer.

Charles Serota, 1575 President Street, Brooklyn, has plans nearing completion for a one-story automobile service and repair works, 100 x 100 ft., on Chauncey Street. Charles Goodman, 375 Fulton Street, is architect.

The Ford Motor Co., Highland Park, Mich., has awarded contract to the Fred T. Ley Co., Springfield, Mass., for two buildings, each one-story, 110 x 120 ft., at its new plant at Green Island, N. Y., used for the manufacture of ball and roller bearings, automobile and tractor parts, etc. A store house and concrete dock will also be constructed at this time, and other factory structures later. Albert Kahn, 1000 Marquette Building, Detroit, is architect.

The Jane Street Garage, Inc., New York, recently organized, has leased the two-story building now being erected at 11-19 Jane Street, for the establishment of an automobile service and repair works. The company is headed by H. J. Schaus and W. G. Stira, and is represented by I. L. Broadwin, 55 Liberty Street.

The New York Steam Co., 280 Madison Avenue, New York, operating power plants for general commercial service, has acquired two-five-story buildings, 43 x 122 ft., at 222-26 Pearl Street, adjoining its present property, for proposed extensions.

The New Jersey Concrete Products Corporation, Dover, N. J., has acquired the plant of the Pre-Cast Concrete Co., near Dover, for expansion in the line of pre-cast structural concrete and kindred products.

A vocational department will be installed in the new two-story and basement high school at Bridgeton, N. J., 61 x 195 ft., for which ground will be broken at once. It is estimated to cost about $225,000. Ritter & Shay, North American Building, Philadelphia, are architects.

The Thomson Machine Co., 298 Main Street, Belleville, N. J., manufacturer of bakers' machinery, has awarded contract to the John W. Ferguson Co., Paterson, N. J., for a two-story addition, totaling about 75,000 sp. ft. of floor area, estimated to cost about $150,000, including equipment.

The Edison Lamp Works of the General Electric Co., Harrison, N. J., has acquired about 175 acres at Parsippany, N. J., for future expansion. Plans are being prepared, it is said, for a number of buildings and as soon as these are completed an official announcement will be made.

D. W. May, Inc., Newark, N. J., operating an automotive electrical repair and service works, has removed to its new building at 319-25 Central Avenue, where 10,000 sq. ft. of floor area will be provided for extensions in the different departments, including machine repair, lighting and starting equipment, etc.

A vocational department will be installed in the three-story and basement high school to be erected on Northfield Avenue, West Orange, N. J., estimated to cost about $400,000. Guilbert & Betelle, 546 Broad Street, Newark, N. J., are architects.

The Board of Education, City Hall, Newark, will take bids until July 27 for vocational equipment, including hand and other tools for machine shop, electrical shop, wood-working department and automobile repair shop; electrical instruments; electrical equipment; wood-working benches and wood-working machinery; sterilizer and stand, and other equipment. The new Seymour Vocational School has been completed, and equipment will be installed so as to have the structure ready for occupancy in the fall. R. D. Argue is secretary.

The Chemical Treatment Co., Newark, manufacturer of specialties for the treatment of iron and steel, has leased the three-story and basement building at 264-68 Jeliffe Avenue, totaling about 13,000 sq. ft. of floor area, and adjoining land, 105 x 250 ft. The latter property will be used for the erection of an addition later. Joseph D. Sears is one of the heads of the company.

A power house, 33 x 45 ft., will be erected in connection with the new three-story hospital to be built by the Vineland Hospital Association, Vineland, N. J., estimated to cost about $150,000. Stern & Woodnut, Stephen Girard Building, Philadelphia, are engineers.

Chicago

CHICAGO, July 17

THE Santa Fe has made further purchases against its inquiry and thus far has closed for more than half of the items listed, with the probability that the remainder will be bought in the coming week. The road's total expenditures for the tools and a 150-ton crane also on inquiry, will range from $200,000 to $250,000. The shopmen's strike is interfering with the placing of other pending lists, as the mechanical departments and, in some cases, railroad clerical forces, generally are being enlisted to do the shop work which is absolutely essential to keep trains running. Action on the Union Pacific and Burlington inquiries has been definitely postponed while it is beginning to appear unlikely that the Illinois Central will place orders for some time.

Local dealers continue to report a slow improvement in trade from miscellaneous sources, although new inquiries are not so plentiful as in June. It is notable, however, that considerable equipment which has been pending for several weeks is now being purchased with the result that total sales for July are expected to be larger than in June. One representative machine tool house has thus far booked 75 per cent of its aggregate sales in the entire month of June. The Studebaker Corporation, South Bend, Ind., and the Continental Motors Co., Muskegon, Mich., continue to place a few orders from week to week, rather than to make large purchasers at one time.

Radial drill manufacturers have generally advanced their prices five per cent. Additional companies which have announced advances include the Carlton Machine Tool Co., the Cincinnati Bickford Tool Co. and the Dreses Machine Tool Co., all of Cincinnati, and the Western Machine Tool Works, Holland, Mich. Other price changes include a reduction of five per cent on emery grinders by the Ramsom Mfg. Co., Oshkosh, Wis., and an advance of about 10 per cent by the Dalton Mfg. Corporation, Sound Beach, Conn., on its 6-in. type "TL" motor-driven engine lathe only.

The Whiting Corporation has sold a No. 6 cupola and a tumbling barrel to the Bucyrus Co., South Milwaukee, Wis., and a 3-ton overhead electric traveling crane to the Kellogg's Toasted Corn Flake Co., Battle Cheek, Mich.

The Roach-Appleton Mfg. Co., 2446-56 North Crawford Avenue, Chicago, recently incorporated with $100,000 capital stock, will manufacture electrical specialties and protecting materials and also special stampings and assemblies. It has taken a five-year lease on the plant at the address given, which contains 13,000 sq. ft. of floor space with a switch track connection on the Chicago, Milwaukee & St. Paul Railroad. Purchases of punch and drill presses and tool room equipment have been made. The officers are Ernest G. Appleton, president and treasurer; Walter O. Roach, vice-president and general manager, and John N. Willson, secretary. All of these men were formerly employed by the Chicago Fuse Mfg. Co., Mr. Appleton as superintendent, for the past 25 years; Mr. Roach as assistant general sales manager and Eastern sales manager during a period of 10 years, and Mr. Willson, as purchasing agent for four years.

The American Medical Association, 535 North Dearborn Street, Chicago, has let the general contract for a six-story mercantile building at 535 to 538 North Dearborn Street, to cost $350,000, to R. C. Wieboldt Co., 1534 Van Buren Street, Chicago.

The Chicago By-Products Coke Co., 122 South Michigan Avenue, has awarded contract to the Koppers Co., same address, for a one-story first aid building at 3524 South Crawford Avenue, to cost $9,000 and for a garage near Crawford Avenue and Thirty-fifth Street to cost $5,000.

C. W. Lampe, 155 North Clark Street, Chicago, is completing plans for a one and two-story addition to the furniture factory of Fenske Brothers, 1666 McHenry Street, to cost $20,000.

The Broline, Nolan Co., 5 North LaSalle Street, Chicago, has the general contract for a two-story factory, 100 x 125 ft., at 3317 and 3319 Elston Avenue, for Pelton & Pelton, to cost $6,000.

Fugard & Knapp, 212 East Superior Street, Chicago, have

taken bids for a three-story printing plant, 80 x 100 ft., on the corner of North Franklin and Locust streets, for the Neely Printing Co., 112 Orleans Street, to cost $100,000.

The Public Service Co. of Northern Illinois, 72 West Adams Street, Chicago, will take bids before the close of the month for the first unit of its new steam-operated electric power plant on Greenwood Avenue, Waukegan, Ill., to be 100 x 300 ft., and estimated to cost close to $1,000,000, including machinery. H. Van Holst, company address, is engineer.

The Denver & Salt Lake Railroad, Denver, Colo., has preliminary plans for rebuilding its shops at Utah Junction, destroyed by fire, July 4, with loss of about $700,000.

The Washington Foundry Co., Washington and Eagle streets, St. Paul, Minn., has awarded contract to the F. J. Romer Construction Co., 190 Ramsey Street, for a one and two-story addition, 75 x 165 ft., and 22 x 100 ft.

The Northern States Power Co., Minneapolis, Minn., is disposing of a bond issue of $2,000,000, a portion of the proceeds to be used for extensions and improvements.

The Sager Metal Weather Strip Co., 190 North State Street, Chicago, has leased a floor at 162 West Austin Avenue for extensions.

Plans are being completed for a municipal electrically operated pumping plant at Waukegan, Ill., in connection with filtration plant and intake, estimated to cost about $950,000, including machinery. M. J. Dothit is city engineer in charge; Hoad, Decker & Drury, 303 South State Street, Ann Arbor, Mich., are consulting engineers.

The Watab Paper Co., Sartell, Minn., has arranged for a bond issue of $1,250,000, a portion of the proceeds to be used for extensions and improvements. David E. Town is president.

The Duluth Motor Co., Duluth, Minn., has preliminary plans for a new two-story service and repair building, 100 x 150 ft., on First Avenue, estimated to cost about $75,000. Ellingsen & Erickson, Lonsdale Building, are architects.

The Mutual Oil Co., Denver, Colo., operating oil refineries, is arranging for an increase in capital from $15,000,000 to $30,000,000, a portion of the proceeds to be used for plant extensions and improvements, and the purchase of additional properties.

A vocational department will be installed in the new high school to be erected at Litchville, N. D., estimated to cost about $600,000, for which bids on a general contract are being asked up to July 24. W. D. Gillespie, Fargo, N. D., is architect.

Motors, power equipment, ovens, conveying machinery and other mechanical equipment will be installed in the new two-story plant, 100 x 193 ft., to be erected by the Maier-Roedel Baking Co., Inc., 5029 North Western Avenue, Chicago, estimated to cost about $165,000, including machinery.

The Iowa Traction Co., Cedar Rapids, Iowa, has preliminary plans under way for a new hydroelectric generating plant on the Des Moines River, near Boone. J. D. Wardle, company address, is engineer.

Buffalo

BUFFALO, July 17.

The Pioneer Paper Co., Inc., Ballston Spa, N. Y., is desirous of securing a small amount of fabricated steel, together with one or more wooden tanks.

The Ilex Mfg. Co., 726 Portland Avenue, Rochester, N. Y., manufacturer of camera shutters and other precision equipment, has plans under way for the erection of a three-story addition, 85 x 220 ft., estimated to cost about $200,000, including machinery.

The Gallagher Motor Corporation, Rochester, care of Carl Ade, 344 East Avenue, architect, has awarded contract to the Henry Stallmans' Sons Co., Arlington Building, for a two-story automobile service and repair works, 70 x 160 ft., on Monroe Avenue.

The Board of Education, 1401 Telephone Building, Buffalo, will take bids until July 26 for equipment for the several vocational schools, and until July 24 for drafting and drawing room supplies required from July, 1922, to April, 1923. D. J. Sweeney is deputy superintendent of business and accounts, in charge.

The Retsof Mining Co., Retsof, N. Y., will build a one-story machine shop in connection with its new salt mining and refining plant. With machinery, it will cost in excess of $100,000.

A vocational department will be installed in the new high school, two-stories, 80 x 180 ft., to be erected at Solvay, N. Y., estimated to cost about $400,000, for which bids will be asked this month. M. L. King, Snow Building, Syracuse, N. Y., is architect.

Townsend, Krug & Green, Perry, N. Y., manufacturers of cutlery, have established a branch plant at Hamilton, Ont.

The Hodes-Zinc Co., Fremont, Ohio, manufacturer of automobile equipment and accessories, is considering plans for a branch factory at Erie, Pa.

The board of managers, State School for Mental Defectives, Rome, N. Y., will take bids until Aug. 7 for engines and electric generators for installation at the power plant of the institution. L. F. Pilcher, Capitol Building, Albany, N. Y., is State architect. Charles Bernstein is superintendent.

The Defiance Paper Co., Walnut Avenue, Niagara Falls, N. Y., has awarded contract to Braas Brothers, 1110 Whitney Avenue, for a one-story paper mill addition, 50 x 200 ft., estimated to cost close to $200,000, including machinery and alterations in the present mill.

E. P. Leitz, 463 Connecticut Street, Buffalo, is arranging a list of machine tools, bench tools, etc., for installation at his automobile service and repair shop on Genesee Street.

The Niagara Falls Power Co., Niagara Falls, N. Y., has ordered a 70,000-hp. generator for its hydroelectric power plant extension to the Allis-Chalmers Mfg. Co., Milwaukee, Wis., at a cost of about $850,000. Two other units of approximately the same size have been ordered from the General Electric Co., Schenectady, N. Y., for use at the same station.

Conveying and hoisting equipment, finishing and polishing machinery, etc., will be installed in the new plant of the Lautz Marble Co., 861 Main Street, Buffalo, estimated to cost about $85,000.

Bids are being asked by the National Biscuit Co., Buffalo, for a one-story automobile service and repair building, 120 x 125 ft., on Urban Street, for company cars and trucks. Headquarters are at Tenth Avenue and Fifteenth Street, New York. A. G. Zimmerman, company address, is architect.

The Rochester Gas & Electric Co., Rochester, will install new equipment at its power plant, including electrical and steam apparatus to utilize surplus hydraulic power. F. J. Howes is chief engineer.

Philadelphia

PHILADELPHIA, July 17.

The Hellwig Silk Dyeing Co., Ninth and Buttonwood streets, Philadelphia, has awarded contract to F. W. Van Loon, Perry Building, for a one-story machine shop, 40 x 240 ft., to cost about $45,000. A portion of the building will be used for a service works for company automobiles.

George D. Ellis & Sons, Inc., 309 North Third Street, Philadelphia, manufacturer of tin cans, etc., is planning for the installation of additional equipment.

The Philadelphia Electric Co., Tenth and Chestnut streets, Philadelphia, has arranged for an increase in capital from $60,000,000 to $67,085,000, a portion of the proceeds to be used for extensions and improvements. A new power house will be erected on Race Street to cost about $70,000, and work will soon commence on an addition to the Franklin power station, Sixth Street. A new power house will be built at American and Susquehanna avenues.

The Universal Service Motors Co., 1407 Locust Street, Philadelphia, has awarded contract to P. M. Sax, Penfield Building, for an addition to its works at Seventeenth and Manning streets, comprising a six-story and basement building, 70 x 117 ft. William M. Godfrey is president.

The Wills Sainte Claire Co. of Pennsylvania, 2033 Market Street, Philadelphia, manufacturer of automobiles, has leased a portion of the new building to be erected at 207-209 North Broad Street for a new service and repair branch.

Proctor & Schwartz, Inc., Seventh Street and Tabor Road, Philadelphia, manufacturer of drying machinery, is arranging for a merger with the Smith & Furbush Machine Co., Hancock and Somerset streets, manufacturer of textile machinery, in which it has held a controlling interest for a number of years. The consolidated company will be capitalized at $2,500,000, and will be operated under the first noted name. Plans are under way for extensions in the works at Seventh Street and Tabor Road. Upon completion, the Smith & Furbush plant will be removed to this location and the present plant discontinued. Walter M. Schwartz will be president of the combined company, and Frank E. Schermerhorn, secretary and treasurer.

The Fidelity Machine & Mfg. Co., 4015 Paul Street, Philadelphia, will break ground at once for a new one-story and basement plant, 86 x 200 ft., at Frankford Avenue and Wheatsheaf Lane, estimated to cost about $60,000. John M. Higginbotham is president.

The R. B. Dutt Co., 1736 North Mascher Street, Philadelphia, will commence the immediate erection of a one-story power house at its dye works.

The Delaware County Electric Co., Lansdown, Pa., has arranged for an increase in capital from $12,800,000 to

$15,000,000, a portion of the proceeds to be used for extensions and improvements.

The De Zeng-Standard Co., Camden, N. J., has taken out a State charter to manufacture surgical, medical and optical instruments and parts. A plant is now in operation on East State Street and work will commence at an early date on a branch plant at Geneva, N. Y., to cost about $50,000. The company is headed by Henry L. De Zeng, Charles H. Kerr and Samuel W. Cafferty.

The Trent Tile Co., Flagg Avenue, Trenton, N. J., will commence the immediate erection of a one-story power house.

Thomas J. Lee and associates, Philipsburg, Pa., are arranging for the reorganization of the Nickel Fabricating Co., whose plant recently was acquired under bankruptcy proceedings. It is proposed to change the name of the company, remodel the works and commence production at an early date.

Work will soon commence on a new power house, 100 x 130 ft., at the plant of the Scranton Lace Co., Scranton, Pa., estimated to cost about $150,000, including a 150-ft. stack. Lockwood, Greene & Co., 101 Park Avenue, New York, are architects. Paul B. Belin is general manager.

The Lexington Motor Co. of Pennsylvania, 851 North Broad Street, Philadelphia, manufacturer of automobiles, has acquired the building at 4624-28 Chestnut Street, totaling about 20,000 sq. ft. of floor space. It will be remodeled as a service and repair works, to include a complete machine shop.

The McGann Mfg. Co., York, Pa., is planning for the installation of a 10-ton electric traveling crane.

The Excelsior Electric Light, Power & Gas Co., 834 Land Title Building, Philadelphia, is perfecting plans for a merger with other electric power companies operating in the West Rockhill Township district, including the West Rockhill Township Electric Light & Power Co., and the East Rockhill Township Co. The new corporation will be known as the Excelsior Electric Light & Power Co., and has plans under way for extensions and improvements. Daniel W. Simkins is secretary.

Bernard S. Pincus, Twenty-first and Market streets, Philadelphia, operating a provision business, will commence the immediate erection of a new two-story ice and cold storage plant at 454-58 North American Street, estimated to cost about $85,000.

The State Board of Control, Administration Building, Scranton, Pa., will soon commence the installation of new equipment at the power house at Adams Avenue and Gibson Street, estimated to cost close to $60,000. J. H. Williams, 425 Washington Avenue, is president of the board.

The Pennsylvania Edison Co., Easton, Pa., has arranged for a bond issue of $57,000, the proceeds to be used in part for extensions and improvements.

A two-story and basement service building, 45 x 75 ft., with machine department, will be constructed by the Western Union Telegraph Co., 195 Broadway, New York, at Harrisburg, Pa., estimated to cost about $40,000. Stone & Webster, Inc., 147 Milk Street, Boston, is engineer.

The Susquehanna Castings Co., Wrightsville, Pa., is arranging a list of equipment for installation at its proposed foundry at New Oxford, Pa.

Fire July 14, destroyed the plant of the Nitroloid Corporation of America, Stroudsburg, Pa., manufacturer of composition products, with loss estimated at $250,000, including machinery.

In connection with remodeling and improving the Driscoll Building, South Cameron Street, Harrisburg, Pa., by the State Motors Co., representative for the Chevrolet automobile, a complete machine and repair shop will be operated on the second floor, while the third floor will be given over to a parts department and auxiliary service works. N. K. van Der Zee is local manager.

Fire, July 11, destroyed the brass foundry at the plant of Orr & Sembower, Inc., Millmont, Pa., manufacturer of boilers, tanks, stacks, etc. An official estimate of loss has not been made.

The Keystone Carbonic Gas Co., Inc., Security Trust Building, Harrisburg, Pa., is taking bids on separate contracts for its new plant at Highspire, for the manufacture of carbonic gas, commercial oxygen, etc. The main building will be 60 x 140 ft. The plant is estimated to cost in excess of $300,000, including machinery. C. J. Smith, company address, is architect and engineer. S. S. Bailey is president.

Fire, July 10, destroyed a portion of the planing mill of Reitz & Snyder, Palmerton, Pa., with loss estimated at about $75,000, approximately $25,000 representing machinery.

Cleveland

CLEVELAND, July 17.

THE automobile industry continues to buy considerable equipment. The Toledo Chevrolet Motor Co., Toledo, Ohio, has purchased 12 multiple drilling machines from the National Automatic Tool Co., Richmond, Ind., and the General Motors Corporation purchased six special Rockford boring machines for its Chevrolet plant in Flint, Mich., both orders being placed with a Cleveland machinery house. A turret lathe manufacturer has booked an order from Montreal for 14 machines. The Studebaker Corporation, South Bend, Ind., is figuring on a number of grinding machines and will probably purchase additional equipment. There is considerable demand, particularly from the automobile field, for special single purpose machines for production work. Many manufacturers in this field are looking for equipment which will enable them to reduce production costs.

The coal and railroad strikes are apparently having the effect of reducing machinery business. Some buyers who have had inquiries out show a hesitancy about placing orders because they feel that the strike situation may have some effect on general business conditions. There is also some evidence of the usual summer lull and the volume of sales is showing some falling off as compared with June. The Cleveland Board of Education has rejected bids for about 30 machine tools and will receive new bids Aug. 14.

The F. P. Screw Co., East Seventy-ninth Street, Cleveland, manufacturer of cap and set screws, is enlarging its plant by an addition providing 5000 sq. ft. of floor space for manufacturing purposes. It recently purchased the equipment of the Cleveland Valve & Mfg. Co.

The Commercial Galvanizingg & Mfg. Co., Warren, Ohio, has been incorporated with a capital stock of $50,000 and will erect a plant near the Warren Tool & Forging Co., to manufacture containers for transporting oil, petroleum and tar, together with a galvanizing department. T. E. Bromley, J. J. Hehet, B. F. Fletcher, R. C. Kunlow and Frank Baker are the incorporators.

The International Lead Refining Co., a subsidiary of the Anaconda Copper Mining Co., has acquired a site at Bettes Corners, Akron, Ohio, on which it will shortly commence the erection of a plant to manufacture zinc oxide. Four structural buildings will be erected.

The Hermann Tire-Building Machine Co., Columbus, Ohio, has purchased the A. R. McDonald machine shop, St. Marys, Ohio, for the manufacture of tire building machinery. Walter H. Hermann is president.

F. E. Myers & Brother, Ashland, Ohio, have had plans prepared for a foundry addition.

The Ford Motor Co., Detroit, is considering the rearrangement of handling raw material in its River Rouge foundry and recently sent out an inquiry for a car dumper with a view of using this for unloading the pig iron, coke and other raw material.

Detroit

DETROIT, July 17.

The Barton Auto Top Co., 4445 Woodward Avenue, Detroit, has awarded a contract to W. M. Pratt, Penobscot Building, for a new three-story plant, 62 x 160 ft., on West Canfield Avenue, estimated to cost about $50,000, including equipment. Albert Barton is president.

The Detroit Stoker Co., 7342 Woodward Avenue, Detroit, has acquired the plant of the Van Blerck Motor Co., Monroe, Mich., for the establishment of new works. It plans to install equipment and commence operations at an early date. Employment will be given to about 200.

The Ford Motor Co., Highland Park, Mich., has completed plans for the construction of a new one-story laboratory and mechanical research plant, 200 x 800 ft., estimated to cost about $500,000, including equipment. It will replace 13 temporary buildings of this character erected during the war. The company is reported to have preliminary plans under consideration for the erection of a new assembling plant, on site to be selected in Mexico.

The Aetna Portland Cement Co., 412 Union Trust Building, Detroit, is laying foundations for the initial buildings at its new plant on property recently acquired at Essexville, Mich., estimated to cost close to $1,000,000. It will include a

number of cement mills, machine shop, power plant and other structures.

The Auto Specialties Mfg. Co., St. Joseph, Mich., manufacturer of automobile jacks, shock absorbers and kindred equipment, is disposing of a bond issue of $350,000, a portion of the proceeds to be used for extensions and improvements. J. W. Tiscornia is vice-president.

A detached power plant will be erected in connection with the new two-story high school to be constructed on the East Side, Saginaw, Mich., estimated to cost about $250,000. J. F. Beckbissinger, 114 South Jefferson Street, is architect.

The Hupp Motor Car Corporation, Milwaukee and Mt. Elliott avenues, Detroit, is clearing the site adjoining its plant preparatory to the erection of its proposed new unit, estimated to cost about $2,000,000, including machinery. Charles D. Hastings is president and general manager.

The Fisher Body Corporation, General Motors Building, Detroit, is perfecting plans for the erection of additional units to the new plant now in course of erection at Junction Avenue and the Michigan Central Railroad, to be occupied by its subsidiary organization, the Shepard Art Metal Co., with present plant at Grand Boulevard and Hastings Street. The first unit will have a total area of about 100,000 sq. ft., all of which will be given over to the manufacture of hardware specialties, locks, etc., for automobile body construction. Later units will increase the floor space to about 250,000 sq. ft. The Fisher company has acquired the plant and business of O. J. Beaudett & Co., Pontiac, Mich., manufacturers of automobile bodies, and will continue the works as one of its divisions. The Pontiac plant approximates 300,000 sq. ft. of floor space, and will give employment to about 1500.

New England

BOSTON, July 17

THE machine tool situation in this section is more encouraging. The market is far from active, but enough equipment has been moved the past week to lead the trade to believe that July bookings will be larger than anticipated early in the month. Some machine tool builders as a result of the strike are securing shop work direct from the railroads and from car repair interests engaged in special work for the carriers, making it necessary to take on additional men in some instances. The Rutland Railroad apparently is better off for mechanical help than other New England transportation companies, its shop force being about 80 per cent. of normal. The Boston & Maine is concentrating its efforts on securing help in one Massachusetts shop where it has 1000 mechanics, contrasted with 3000 before the strike.

In going business new tools have again led used machinery. Sales the past week include a 1500-lb. steam hammer, 2-in. turret machine, 20-in. lathe, Warner & Swasey chucking machinery and a structural steel shear taken by the Central Vermont Railroad; a 400-ton wheel press and two small grinders sold to the Rutland Railroad; a new hack saw, used 22-in. planer, two used 14-in. lathes, a new 12-in. shaper, new sensitive drill with single spindle and a new arbor press for New Britain, Conn., trade school purposes; 23 miscellaneous machine shop tools, blacksmith equipment and $1,300 worth of supplies, the whole amounting to a little less than $17,000, taken by the Berlin, N. H., Board of Education. The machine tools were divided among five local dealers, the largest amount going to any one being approximately $3,000. Other sales include a new 14-in. lathe and four screw shaving machines to a Massachusetts concern about to engage in special piston ring grooving work; a new large multiple drilling machine to a Providence firm and several new and used single machines. A better demand for wood-working equipment is reported. New inquiries include one for complete machine shop equipment from India.

The price situation on new tools appears stronger.

Coal handling machinery is wanted by the Boston Elevated Railway, 108 Massachusetts Avenue, Boston, for its South Boston plant.

Bids closed last week on a three-story, 43 x 102 ft. addition to the State trade school, New Bedford, Mass.

The New York, New Haven & Hartford Railroad this week will reopen its Norwood, Mass., steel car shops, closed since Dec. 24, 1921.

The American Can Co. has taken a long-term lease from the Boston Wharf Co. of the six-story and basement building at 22-24 Midway Street, South Boston.

The New Bedford Textile School, New Bedford, Mass., is planning the erection of a four-story brick and steel addition. Leary & Walker, Times Building, New Bedford, are the engineers. Contract will be awarded shortly.

The Bridgeport Furnace Works, Bridgeport, Conn., is removing to a new plant at 1661 Main Street, from 187 Congress Street, and will install equipment to manufacture iron elbows and other furnace fittings.

The Quincy Electric Light & Power Co., Quincy, Mass., has received permission to issue capital stock for $140,000, and bonds for $250,000, a portion of the proceeds to be used for extensions and improvements in plant and system.

The Connecticut Light & Power Co., West Main Street, Waterbury, Conn., has plans under way for a new electric generating plant on the east side of the Housatonic River, near Devon, estimated to cost in excess of $400,000.

The Military Emergency Board, State Armory, Hartford, Conn., has awarded contract to Payne & Keefe, Manwaring Building, New London, Conn., for a new one-story mechanical building, 85 x 150 ft., at Branford, Conn., to cost about $40,000.

The Safety Car Heating & Lighting Co., Dixwell Avenue, Hamden, Conn., is completing plans for a new one-story building, 100 x 194 ft., for battery plate production, and a one-story addition to the present building, 106 x 115 ft. Stovel & Brinkerhoff, 136 Liberty Street, New York, are engineers and contractors.

A vocational department will be installed in the new junior high school to be erected at Somerville, Mass., estimated to cost about $800,000, for which Ritchie, Parsons & Taylor, 15 Ashburton Place, Boston, are architects.

The Cumberland County Power & Light Co., Congress and Elm streets, Portland, Me., has foundations in progress for a new electric generating plant at South Portland, estimated to cost $1,000,000, including machinery.

The Saco-Lowell Shops, 77 Franklin Street, Boston, manufacturers of textile machinery and parts, have palns under consideration for an addition to the plant at Lowell, Mass.

The New Bedford Gas & Edison Light Co., New Bedford, Mass., has arranged for a capital stock issue of $1,602,720, a portion of the proceeds to be used for plant extensions and improvements.

Cincinnati

CINCINNATI, July 17.

WHILE it was expected that July would be a quiet month in the machine tool industry, the number of orders booked the past week was a source of much satisfaction to local manufacturers. While no large purchases were made, single orders were well up to the average of the past few weeks. In addition to domestic business, an export order for six tools was booked and shipped from stock by a local manufacturer. An Indianapolis manufacturer bought five tools from a local firm and an Indiana automobile manufacturer also placed an order for six special machines for manufacturing parts. A Cincinnati manufacturer received a contract from a Pittsburgh district steel company for six lathes and was in receipt of an order from a printing press manufacturer in the East for a number of tools.

The Ford Motor Co. is in the market for a number of special machines and the Louisville & Nashville railroad also has an inquiry out for several tools.

Local manufacturers report a scarcity of good men and are forced to pay much higher wages than recently to secure enough mechanics to take care of orders.

Littleford Brothers, sheet metal workers, Cincinnati, have awarded the contract for a three-story office building and a two-story factory adjoining their present property on East Third Street. The building will be 45 ft. x 240 ft. of reinforced concrete. The Austin Co. of Cleveland, are the architects.

The Warner Elevator Co., Spring Grove Avenue, Cincinnati, has awarded the contract for an addition to contain approximately 38,000 sq. ft. of floor space. It will be used principally as an assembling floor.

The plant of the Louisville Cement Co., near Jeffersonville,

Ind., was damaged by fire to the extent of $250,000 on July 13. About $75,000 worth of machinery was destroyed. It is understood that the works will be rebuilt as soon as plans can be prepared.

The receiver's sale at the plant of the Allen Motor Car Co., Columbus and Bucyrus, Ohio, the past week brought approximately $210,000. The real estate owned by the company at Columbus was not disposed of.

The Lowe Brothers Co., paint manufacturer, Dayton, Ohio, is having plans prepared for a 7-story addition at Wayne Avenue and the Baltimore & Ohio Railroad, of reinforced concrete, 60 x 270 ft. Frank Hill Smith, Inc., Dayton, Ohio, is the engineer.

Milwaukee

MILWAUKEE, July 17.

THE machine-tool business so far in July has not differed materially from that in May or June, but it is encouraging to note that volume is slowly but steadily assuming broader proportions. Demand remains spotty and spasmodic and purchases still are confined to the most urgent needs. On the other hand, replacement requirements have enlarged and embrace needs for additional capacity. This is especially true of the automotive industries, which in general continue along the active lines developed in the last three to five months. Agricultural machinery manufacturers begin to feel a substantial revival which is believed to portend a resumption of equipment needs. Mining machine demand, while not normally active, is gradually increasing, making production schedules of local plants not only heavier but much more regular.

Prospects for the selection of Milwaukee as the location of a proposed American aircraft works by A. H. G. Fokker of Amsterdam and Rotterdam, Holland, appear bright as the result of a conference of 50 leading business men called by the Milwaukee Association of Commerce to consider a definite proposition on July 12. It is understood that commercial organizations in New York, Chicago, Dayton and Columbus, Ohio, are entertaining similar propositions. The prospective investment is $3,000,000, of which amount the inventor and manufacturer proposes to furnish approximately 80 per cent. Francis A. Vaughn, president F. A. Vaughn, Inc., consulting engineer, 290 Third Street, is representing the Milwaukee interests.

The Scolding Locks Hair Pin Co., Appleton, Wis., manufacturer of hair pins and other wire specialties and novelties, has broken ground for a new factory, 40 x 200 ft., one story and part basement, at Appleton Junction. The present shop equipment will be augmented by miscellaneous purchases upon which inquiries are about to be put out. The total investment is estimated at $75,000.

Frank Holton & Co., Elkhorn, Wis., manufacturers of band and orchestra instruments and metal music specialties, has let contract to Morrissey Brothers, local, for a two-story brick, concrete and mill-floored addition, 40 x 80 ft., which will cost about $45,000, including additional equipment. This will include drawing, stamping, pressing, polishing, plating and other machinery. Harry J. Charlton is secretary and general manager.

J. H. Saris, Ford dealer, Beloit, Wis., has placed the complete contract with the W. G. Fitzgerald Co., 726 Central Avenue, local, for a new garage, sales and service establishment, 100 x 130 ft., two stories and basement, at 412 Broad Street. The machine shop department will occupy a space, 75 x 100 ft., and the building and equipment will cost about $100,000. The architects are J. E. Hetherington & Son, 105 North Clark Street, Chicago.

The Republic Box Co., Chicago, has plans for a new box and crating factory to be erected at Marinette, Wis., in place of the plant almost totally destroyed by fire last fall. It will be of brick and steel, one story, 100 x 250 ft., with several wings and a separate power plant and boiler house. Commencement of the work has been delayed, but the recent substantial betterment in general business conditions is expected to bring a decision to start shortly. John Stunkel is secretary.

Gregor Lenz, Little Chute, Wis., dealer and repairer of automobiles, tractors, etc., will erect a one-story building, 60 x 120 ft., designed by A. A. Nelson, architect, Neenah, Wis. It will cost about $20,000 complete.

The L. Niemcheck Mfg. Co., Milwaukee, has been incorporated with a capital stock of $25,000 to manufacture tools, dies, jigs, fixtures, metal stampings, etc. It takes over the business of a similar character developed in recent years under the style of Niemcheck & Wenzel, at 313 Poplar Street, Milwaukee. Ludwig Niemcheck, E. Wiznerowicz and S. L. Grzechowiak are the principals in the new organization.

Milwaukee and Appleton interests, as yet unidentified, are negotiating for the lease or purchase of the plant of the Rex Foundry Co. at Schleisingerville, Wis., to remodel and equip it for the manufacture of steel castings by the electric furnace process. It is proposed to employ about 50 at the start. The commencement of operations is dependent upon how soon arrangements can be made for the supply of current from the Milwaukee Electric Railway & Light Co. At present only a tributary line supplies customers at Schleisingerville, which is inadequate for electric furnace requirements.

The Bahde Mfg. Co., 2616 Vliet Street, Milwaukee, has let the general contract to Paul Bringe & Co., 940 Third Street, for a one-story brick and concrete machine shop, 30 x 104 ft., at Thirtieth and Chambers streets. It will require new equipment throughout. As previously reported, it was recently incorporated to manufacture mechanical appliances on a royalty basis under contracts with inventors and designers. The initial investment will be about $20,000.

The Herman Motor Car Co., Appleton, Wis., expects to start work shortly after Aug. 1 on a two-story brick and concrete garage and repair shop, 80 ft. square, one floor of which will be equipped for machine work. It will cost about $25,000.

The Claybourn Process Corporation, Milwaukee, organized recently by L. W. Claybourn, Menasha, Wis., to manufacture automatic multicolor printing presses, has been granted permits for the erection of its manufacturing group at Humboldt Avenue, Franklin and Becker streets, plans for which have been prepared by Herman J. Esser, architect, 402 Camp Building, Milwaukee. The main building will be 122 x 124 ft., one story, of brick and steel; the power house, 30 x 80 ft., one story; the assembling, warehouse, storage, administration and general purpose building, 103 x 122 ft., two stories and basement. The cost of the structures is estimated at $175,000. Machinery and equipment will cost in the neighborhood of $125,000 to $150,000 additional.

The Heating & Power Appliance Co., Milwaukee, organized some time ago by F. L. Hutchinson, has established a factory and machine shop at 200-210 Pleasant Street to manufacture a new type of valve for vacuum, vapor and atmospheric systems of heating. It also manufactures other heating and power appliances, steam and electric driven pumps, fire brick, etc., and does general heating and power engineering and contracting. Mr. Hutchinson is president; M. V. Eicholtz, vice-president, and W. M. Tuckwell, secretary and treasurer.

The Meyer Furnace & Supply Co., Milwaukee, has been incorporated with a capital stock of $50,000 to manufacture furnaces, stoves, sheet metal specialties, etc. A factory has been opened at 170-174 Reed Street. The incorporators are F. W. Giese, Don Howland and H. L. Jackson.

The Northern Sash & Door Co., Hawkins, Wis., has recently increased its authorized capitalization to $100,000 to provide for enlargement of the plant and the purchase of miscellaneous equipment.

Pittsburgh

PITTSBURGH, July 17.

The National Metal Products Co., West Erie Street, Pittsburgh, is planning for a new three-story factory at West Erie and Diamond streets, to manufacture metal weatherstrips and other products, estimated to cost in excess of $75,000.

The Pittsburgh Gage & Supply Co., Thirtieth and Liberty streets, Pittsburgh, manufacturer of electrically-operated washing machines, ironing machines, etc., is disposing of a bond issue of $600,000, a portion of the proceeds to be used for extensions and additional working capital.

The Industrial Bureau of the Chamber of Commerce, Pittsburgh, is perfecting arrangements for the establishment of three new plants in the city, each of which will manufacture steel products. The company names are temporarily withheld. R. J. Seaman is head of the department in charge of the projects.

The Champion Tool Co., Meadville, Pa., is taking bids for a new one and two-story machine and forge shop, 100 x 200 ft., and 60 x 60 ft., respectively, estimated to cost in excess of $60,000, including equipment.

The Coraopolis Electric Co., Coraopolis, Pa., is being organized under State laws, to equip and operate a local electric plant and system.

The Fayro Machine & Engineering Co., Johnstown, Pa., has acquired the plant and property of the Reinhold Betterman Co., manufacturer of boilers, tanks, etc., and will operate the works. The purchasing company is erecting a plant at Sheridan, Pa., and as soon as this is completed the Betterman plant will be discontinued and the machinery removed to the new building. F. F. Faunce is president and J. C. Ayres, vice-president and treasurer.

The Hopkins Motor Co., Fifteenth Street, Wheeling, W. Va., is taking bids for a new three-story service and repair works, 40 x 60 ft., at Eoff and Fifteenth streets, estimated to cost about $50,000. E. B. Franzheim, 1425 Chapline Street, is architect.

A vocational department will be installed in the new two-story high school to be erected at Vendergrift, Pa., estimated to cost about $155,000. W. G. Eckles, New Castle, Pa., is architect.

The Warren Auto Trading Co., Wheeling, W. Va., has plans in progress for a new three-story automobile service and repair works, 60 x 125 ft., estimated to cost about $50,000.

The Harbison-Walker Refractories Co., Farmers' Bank Building, Pittsburgh, has awarded contract to Pihl & Miller, Wabash Building, for a new four-story building, 40 x 130 ft., estimated to cost about $55,000.

The Standard Plate Glass Co., Butler, Pa., is laying foundations for a new one-story building, 100 x 250 ft., estimated to cost about $100,000.

The Standard Sanitary Mfg. Co., Bessemer Building, Pittsburgh, has awarded a general contract to the Austin Co., Euclid Avenue, Cleveland, for a one-story foundry and machine shop at New Brighton, Pa., estimated to cost about $50,000.

The Fesenmeier Packing Co., Huntington, W. Va., has acquired property on Fourteenth Street and will remodel the structure for an ice-manufacturing and cold storage plant to have an initial output of 250 tons of ice per day and cold storage capacity for about 35,000 bbl. It is estimated to cost in excess of $125,000, with equipment.

The Consolidated Light, Heat & Power Co., Miller-Ritter Building, Huntington, W. Va., plans the erection of a new two-story power house, estimated to cost close to $100,000.

Baltimore

BALTIMORE, July 17.

The Consolidated Gas, Electric Light & Power Co., Lexington Building, Baltimore, will soon take bids for a new two-story power house at 6-8 McClellan Street, estimated to cost about $35,000.

The Republic Boiler & Radiator Co., Woodbury, Baltimore, recently organized, will remodel a portion of the former ordnance plant of the Government, lately acquired, for the establishment of works to manufacture boilers, radiators and other heating equipment. New buildings will be constructed, providing a total floor area of 82,500 sq. ft., estimated to cost $50,000. E. L. Stock is president.

The District of Columbia Paper Co., Water and Thirty-fourth streets, Washington, will build a new one-story hydroelectric power plant for mill service, estimated to cost close to $60,000. G. L. Nicholsen is president.

The Bureau of Supplies and Accounts, Navy Department, Washington, will take bids until Aug. 1 for the following equipment: Schedule, 56, two crank shapers; schedule 57, one upright drill, one grinding cutter and reamer, one arbor press, one twist drill grinder and one serpentine shear; schedule 58, three precision bench lathes, three engine lathes, and one toolmakers' lathe, all for the naval base at Bellevue, D. C.; also until Aug. 1 for the following equipment for Eastern and Western navy yards: Schedule 9645, 106 hand drills, 64 soldering irons, side-cutting pliers, 608 gasoline torches, 1950 pipe wrenches, 114 dozen files, and 9 chain blocks.

The Southern Power Co., Charlotte, N. C., has tentative plans for a new hydroelectric power plant on the Catawba River. It is proposed to construct a dam between Van Wyck and Great Falls, locating the plant in the vicinity of the first noted place.

The Union Machine Shop, Richmond, Va., will install a new lathe, grinder and other equipment. R. E. Savage heads the company.

The Bureau of Yards and Docks, Navy Department, Washington, will receive bids until July 26 for coal and ash-handling machinery for the naval base at Hampton Roads, Va., as set forth under specification 4667.

The City Council, Valdosta, Ga., has tentative plans under way for a new electrically-operated pumping plant, to replace the station recently destroyed by fire with loss estimated at $35,000.

The General Electric Co., Citizens' and Southern Bank Building, Atlanta, Ga., has plans under way for a new local distributing building, four stories reinforced-concrete, estimated to cost about $175,000, including equipment. It is proposed to erect a one-story adjoining building as a machine and repair shop, and general service works. Headquarters of the company are at Schenectady, N. Y.

R. A. Easterling, Denmark, S. C., and associates, are organizing a company to build and operate a hydroelectric power plant on the Edisto River. A site has been selected about four miles from the city. The new generating plant will be operated in conjunction with an existing steam-operated station at Denmark.

A vocational department will be installed in the new southwest junior high school to be erected at Gwynn's Fall Park, Baltimore, estimated to cost in excess of $500,000. Smith & May, Calvert Building, are architects.

The Lavale Light & Power Co., Lavale, Md., recently organized, has acquired the local power plant of the Lavale Milling Co., now in receivership, and plans for immediate enlargement, to include the installation of new generating and other machinery. It is headed by M. S. Berkley and Ezra Deal, both of Lavale.

The office of the Chief of Engineers, United States Army, Washington, will take bids until Aug. 1, for 10 Diesel engine generating sets, each 90 kw., 125 volts and switchboards; also for four motor-driven air compressors.

The Sandhill Power Co., Carthage, N. C., is planning for the construction of a new steam-driven electric power plant in the vicinity of the property of the Carolina Coal Co., to be used as an auxiliary to the present hydroelectric power station. It is estimated to cost in excess of $100,000. John R. McQueen is president.

The Board of Public Works, Baltimore, will build a one-story service and repair plant, 32 x 100 ft., at Cedar Avenue and Twenty-fourth Street, for automobiles and motorcycles used by the Police Department. A machine repair department will be provided. It will cost about $25,000.

The Hackley Morrison Co., 16½ North Ninth Street, Richmond, Va., machinery dealer, is making inquiries for a number of electric generators, with exciters, base, switchboard, etc.

Electric motors, controlling devices, conveying machinery and other mechanical equipment will be installed in the new four-story printing plant, 90 x 140 ft., to be erected by the News-Leader Publishing Co., 9 North Eighth Street, Richmond, Va., estimated to cost about $300,000. Baskerville & Lambert, Travelers' Building, architects, are taking bids.

The Gulf States

BIRMINGHAM, July 17.

The United States Machine Shop, Box 424, Electra, Tex., recently organized, has acquired a local building and plans the installation of equipment for a forge and machine shop for the production of oil-well equipment and supplies. C. A. Lininger is secretary, treasurer and general manager.

The Texas Power & Light Co., Waco, Tex., is disposing of a bond issue of $2,000,000, a portion of the proceeds to be used for extensions and improvements in power plants and system. A. S. Grenier is vice-president.

The Consumers Light & Power Co., New Orleans, will commence the immediate erection of a new power plant.

The Standard Oil Co. of Louisiana, New Orleans, is perfecting plans for the installation of new pipe lines, pumping plants and auxiliary equipment, to provide for an additional handling capacity of 75,000 gallons of oil per day, estimated to cost close to $5,000,000.

The Tucker Motor Co., Tuscaloosa, Ala., has leased a new building to be erected on Sixth Street, for the establishment of a service works, with machine repair shop. It is estimated to cost close to $50,000.

The Florida Veneer & Crate Co., Brooksville, Fla., recently organized, has acquired a local building and will install machinery to manufacture crates, boxes, etc., estimated to cost about $22,000. J. K. Coogler is treasurer in charge.

The Honey Creek Minerals Co., Llano, Tex., operating molybdenite ore properties, has plans under way for the erection of a new refinery and laboratory, estimated to cost about $150,000, including machinery. It will also install a quantity of machinery at its local mines, to cost about $100,000.

The Bristow Refining Co., Cross Plains, Tex., has foundation work under way for its new oil refinery to have an initial capacity of about 500 bbl. per day. It will cost close to $100,000, including pipe line from the Pioneer oil fields.

The Consumers' Ice Co., Sulphur Springs, Fla., has plans in progress for a new branch ice-manufacturing plant at Nebraska Avenue and Broad Street, estimated to cost close to $45,000, including equipment. Clyde Perry is general manager.

Stringer Brothers, Gadsden, Ala., manufacturers of pipe, plumbing specialties, etc., have filed plans for a one-story building, 60 x 100 ft., and adjoining extension, 40 x 40 ft.

A vocational department will be installed in the three-story high school to be built at Beaumont, Tex., by the South Park Independent School District, estimated to cost

about $175,000. The R. H. Hunt Co., Dallas, Tex., is engineer and architect.

Price Brothers, Rotan, Tex., will build a new five-stand cotton ginning plant at Big Spring, Tex. A site has been acquired at East Second and Benton streets. C. E. Lytle is manager.

Ryan & Knight, Inc., Miami, Fla., will commence the immediate erection of a new three-story automobile service building, 90 x 110 ft., with machine shop and repair department, estimated to cost about $90,000.

The Atlantic Coast Line Railway Co., Wilmington, N. C., has tentative plans for rebuilding the portion of its car and locomotive shops at Montgomery, Ala., including machine shops, car repair building, mill room and engine house, recently destroyed by fire with loss estimated at about $200,000.

A vocational department will be installed in the new high school to be erected at Port Arthur, Tex., estimated to cost about $200,000.

The Lee Lumber Co., Tioga, La., has plans nearing completion for rebuilding its sawmill, recently destroyed by fire with loss of about $100,000. The new plant will have a daily capacity of about 70,000 sq. ft.

The City Council, Kaufman, Tex., has tentative plans under consideration for the construction of a municipal electric power plant, with local distributing system. Estimates of cost of equipment will be secured at once.

The Clayton Refining Co., Dallas, Tex., has work under way on remodeling and improving the refinery of the Hercules Refining Co., West Dallas, recently acquired. The work, including equipment, will cost close to $50,000.

The Alabama Concrete Pipe & Mfg. Co., Birmingham, recently organized, has taken over the local plant of the Southern Bridge Co., for the production of concrete pipe specialties. J. C. Griffin is president, and W. C. Austin, secretary and treasurer.

The Central South

ST. LOUIS, July 17.

The White Co., Firestone Building, Kansas City, Mo., manufacturer of motor trucks with plant at Cleveland, has awarded contract to the George M. Bliss Construction Co., 508 Lathrop Building, for a two-story and basement service and repair building, 100 x 250 ft., at Twenty-eighth and Walnut streets, estimated to cost about $100,000. M. A. O'Mara is local manager.

The Service Machine Shop, Henryetta, Okla., has tentative plans for rebuilding the portion of its plant destroyed by fire July 6, with loss reported at $20,000.

The Tulsa Stove & Foundry Co., San Springs, Okla., has awarded contract to the Tulsa Structural Steel Co., Tulsa, Okla., for a one-story addition, 80 x 290 ft., for the manufacture of oil field pumps, engines, parts, etc. It is estimated to cost about $180,000, including equipment, which will include a number of traveling cranes and electrically-driven tools. A. C. Spitznagel is head.

Fire, July 5 destroyed the planing mill of J. C. Winn, Muskogee, Okla., with loss estimated at about $45,000, including equipment. It is planned to rebuild.

The Constantin Refining Co., Tulsa, Okla., is disposing of a bond issue of $720,000, a portion of the proceeds to be used for extensions and improvements.

The Wilhoit Refining Co., Joplin, Mo., is planning for extensions and improvements in its refinery, including the installation of new equipment, estimated to cost about $75,000.

The Empire District Electric Co., Joplin, Mo., operated by the Cities Service Co., 60 Wall Street, New York, is planning for an addition to its generating plant, to include the installation of a 10,000 kw. generator and auxiliary machinery.

A vocational department will be installed in the new high school to be erected at Wichita, Kan., three stories and basement, estimated to cost about $1,000,000, for which bids are being asked until July 31. Lorentz Schmidt & Co., 121 North Market Street, are architects.

The Oklahoma Public Service Co., Mayo Building, Tulsa, Okla., is perfecting plans for an addition to its electric generating plant, estimated to cost about $1,000,000, including machinery. Sargent & Lundy, 72 West Adams Street, Chicago, are engineers.

The Goodwin-Fields Motor Car Co., 250 East Main Street, Lexington, Ky., will commence the immediate erection of a one-story and basement service and repair building, 100 x 200 ft., on Main Street, estimated to cost about $60,000. The Frankel, Curtis Co., Ben All Theater Building, is architect.

The Arkansas-Missouri Power Co., Blytheville, Ark., has been granted permission to issue bonds for $652,000, a portion of the proceeds to be used for extensions and improvements in power plants and system. The company is concluding negotiations for the purchase of the property of the Missouri-Southeastern Utilities Co., and the Caruthersville-Kennett Light & Power Co., and will make extensions in these plants.

The Osage Battery Co., Tulsa, Okla., has preliminary plans for the erection of a local factory, estimated to cost in excess of $75,000.

The Joplin Supply Co., Joplin, Mo., has awarded contract to the C. A. Dieter Construction Co., Joplin, for a five-story and basement automobile service and repair works, 75 x 120 ft., estimated to cost about $200,000, including equipment. Smith & Van Pelt, Frisco Building, are architects.

The Atchison, Topeka & Santa Fe Railroad, 80 East Jackson Boulevard, Chicago, will soon break ground for its new boiler and tank shops at Albuquerque, N. M., estimated to cost about $500,000, including equipment.

A vocational department will be installed in the two-story and basement high school, 70 x 122 ft., to be erected at Kingfisher, Okla., estimated to cost close to $100,000. Monnot & Reid, 409 Empire Building, Oklahoma City, Okla., are architects.

Eisele & Co., Nashville, Tenn., manufacturer of surgical instruments and similar equipment, have leased a local building for the establishment of a new plant. A list of equipment for installation is being arranged, to include automatic screw machines, hand-operated screw machines, punches, presses, etc., as well as a quantity of special machinery. An electro-plaiting department will be established. Logan Eisele is president.

The Apco Refining Co., Colcord Building, Oklahoma City, Okla., recently organized with a capital of $100,000, has plans under way for a new oil refinery with initial output of about 750 bbl. per day. It will cost in excess of $50,000.

The Pacific Coast

SAN FRANCISCO, July 11.

Henry Olson, Seventeenth and Santee streets, Los Angeles, will soon commence the erection of a new one-story machine shop, 100 x 150 ft. A. G. Bailey, 3429 Lanfranco Street, is architect.

The Berkeley School District, Berkeley, Cal., will build a one-story machine and mechanical shop at the Burbank School, estimated to cost about $20,000.

The Illinois Electric Co., Los Angeles, manufacturer of electrical specialties, is completing plans for a new four-story building, 50 x 137 ft., at Boyd and San Pedro streets, estimated to cost about $65,000. Noerenberg & Johnson, 401 Los Angeles Railway Building, are architects.

The Shell Oil Co., 343 Sansome Street, San Francisco, has plans nearing completion for a new oil distributing plant at Yuba City, Cal., estimated to cost about $35,000.

The San Joaquin Light & Power Corporation, Fresno, Cal., will build an addition, 48 x 110 ft., to its power house at California and Orange avenues, estimated to cost about $100,000.

The Oil Tool Service Mfg. Co., Anaheim, Cal., has filed plans for the erection of a new one-story building to be equipped as a machine shop and foundry. It will cost about $25,000. B. D. McAlvay is president.

The Central Mendocino County Power Co., Willits, Cal., has made application for permission to issue stock for $200,000, the proceeds to be used for a new power plant and local distributing system.

Nathaniel Baldwin, Salt Lake City, Utah, operating a plant to manufacture wireless receivers and other radio specialties, has organized a company to be known as Nathaniel Baldwin, Inc., capitalized at $1,000,000, to provide for general expansion in operations. It will enlarge its facilities for receiver and amplifier production. David Neff will be vice-president and treasurer, and Lawrence Clayton, secretary.

The Board of Education, Los Angeles, will soon commence the erection of a new one-story shop building at the Jefferson High School, estimated to cost $50,000.

The Western Iron-Ite Sash Weight Co., Los Angeles, recently organized to manufacture sash weights, has established a plant at 2448 East Eleventh Street. In addition to regular iron sash weights, it will produce a concrete sash weight, under rights granted by the Concrete Sash Weight Co. George W. Roberts and Alexander R. White head the company.

The Hubbard Machine Co., 615 Howard Street, San Francisco, manufacturer of pumping machinery, has leased a new building, one-story, 50 x 165 ft., now in course of erection, for a new works.

The Washington Iron Works, Seattle Boulevard and Nor-

man Street, Seattle, Wash., has plans nearing completion for the erection of the following buildings: Foundry, one-story, 130 x 450 ft., for the production of steel and grey iron castings; machine and erecting shop, one-story, 120 x 570 ft.; boiler and plate shop, one-story, 80 x 570 ft.; pattern shop, five stories, totaling about 50,000 sq. ft. of floor area; iron-working shop, one-story, 50 x 110 ft.; carpenter and wood-working shop, one-story, 50 x 100 ft.; store house, 60 x 200 ft.; power plant, 50 x 110 ft.; and three-story office. The structures will be of steel and concrete and are estimated to cost about $500,000, including machinery. Richard E. Ellis is company engineer; Gerald Fink is president.

The Oregon Pulp & Paper Co., Salem, Ore., has plans nearing completion for additional machinery to increase the capacity about one-third. The expansion is estimated to cost about $200,000.

The Foster Lumber Co., Dallas, Ore., is considering plans for rebuilding the portion of its mill recently destroyed by fire with loss estimated at about $100,000, including machinery.

Fire, July 5, destroyed a large portion of the mill of the Murphy Timber Co., Portland, Ore., with loss estimated at about $250,000. It was operated throughout with electric drive. It is proposed to rebuild at an early date. Edward Murphy is president.

Canada

TORONTO, July 17.

ORDERS for one or two machines still continue to predominate in this market. Automotive plants are buying in a limited way for replacement purposes, but some good orders are expected from this source later, as a number of manufacturing plants are under construction for which equipment will be required. The Durant Motors, Ltd., Toronto, is about to start work on an addition for the manufacture of the Star car, the new building to be completed and in operation by next spring. Woodworking equipment is in fair demand and some good orders having recently been closed for the line. Inquiries from various parts of the Dominion are coming in for equipment for diversified lines of manufacture and dealers are of the opinion that if only a small portion of this prospective business results in actual sales the year will show a decided improvement over that of 1921. Dealers are experiencing a steady call for most lines of small tools and buyers are ordering in larger quantities. Prices are holding firm.

Wallace R. Campbell, vice-president and treasurer Ford Motor Co. of Canada, Ltd., has announced that his company will soon begin the erection of a large motor car plant immediately adjacent to the works at Ford City, Ont. It will cover approximately 125 acres and will cost in the neighborhood of $6,000,000. For several weeks it has been known that big developments were to be looked for at Ford City, but official announcement was postponed until the real estate was actually secured. This has been purchased at a cost of approximately $1,000,000 and definite plans for the works are being prepared. It is expected that the production of the Canadian Ford will be doubled immediately the new plant is in operation and the plans are to turn out 500 cars a day. This, however, will not represent the entire capacity, as the plans will allow a production of 1000 cars per day as soon as the market warrants the output. The new property extends for 2000 ft. along the river front. The buildings will all be one story, with daylight roofs. The present plant will gradually cease to operate as a motor car factory, following the completion of the new buildings, and will eventually be devoted to the manufacture of car bodies, a line of manufacture not now carried on by the Ford company here.

The Windsor Steam Motors, a branch of the Trask Detroit Steamer Co., is arranging for the erection of a manufacturing plant at Windsor, Ont. Until the Windsor plant is ready for operation it is the intention of the company to take care of the Canadian trade from the Detroit plant.

The Charles A. Strelinger Co., Windsor, Ont., has secured one-half of the contract for machine tools let by the Sarnia Board of Education for the new technical school and collegiate institute. The order consists of five lathes, two gas furnaces, one electric furnace, torch-weld equipment, grinder and anvil.

The Toronto Board of Control has awarded contract for a 4,000,000-gal. centrifugal pump for the Island pumping station to the John Inglis Co., Strachan Avenue, Toronto, whose price was some $300 lower than that of the lowest United States bidder.

The Peninsula Cord Tire Co., 45 John Street South, Hamilton, Ont., is arranging for the erection of a local manufacturing plant.

The general contract for a paper mill for the Westminster Paper Mills, Ltd., New Westminster, B. C., has been awarded to the Dominion Construction Co., 509 Richards Street, Vancouver, B. C.

The Ideal Iron Works, 123 Powell Street, Vancouver, B. C., will build a machine shop and has awarded the general contract to the James Layfield Contracting Co., 2763 Cambridge Street, Vancouver.

The towns of Enderby, B. C., will build an electric light plant to cost $23,000, for which bids will soon be called.

The Durant Motors of Canada, Ltd., Royal Bank Building, Toronto, will receive bids, no closing date set, for an addition to its plant at Leaside, Ont., to cost $500,000. Plans are with E. A. Walberg, 909 Royal Bank Building, Toronto

Indiana

INDIANAPOLIS, July 17.

Bids are being asked by the Board of School Trustees, Fort Wayne, Ind., until July 24, for the erection of a new vocational training school, plans and specifications for which have been prepared by the Austin Co., 208 South LaSalle Street, Chicago. Bids for machinery and equipment will be asked in the near future. Henry J. Bowerfind is secretary of the board.

The Olin-Wilmeth Co., Inc., 515 North Meridian Street, Indianapolis, formerly known as the Olin Sales Co., will commence the erection of a new three-story automobile service and repair building, 59 x 195 ft., at 720-22 North Meridian Street, estimated to cost about $150,000. Roy F. Wilmeth is secretary and treasurer.

A power plant will be erected in connection with the new State reformatory to be built at Pendleton, Ind., at a cost of about $3,000,000. Plans are being completed by Herbert Foltz, Indianapolis, architect for the Special Reformatory Committee, State House, Indianapolis.

The Hercules Corporation, Evansville, Ind., has discontinued the manufacture of automobiles and parts, and subsidiaries of the company devoted to this line have been dissolved, including the Hercules Tractor Co., Hercules Body Mfg. Co., Hercules Wheel Co., Hercules Buggy Co. and the Hercules Engine Co.

William S. Baerich, Evansville, Ind., and associates, have acquired the uncompleted plant of the Stronghold Tire & Rubber Co. from the receiver. The new owner is said to be planning the organization of a new company to complete the erection, install machinery and operate the plant.

The Merchants Light, Heat & Power Co., Indianapolis, has leased a one-story building, 60 x 160 ft., at 305 North Senate Avenue, for a service and repair works for company trucks and cars.

The City Council, Michigan City, Ind., has tentative plans under way for rebuilding the pumping plant at the waterworks, destroyed by fire July 6, with loss estimated at close to $500,000, including machinery.

The Acme Works, Inc., 420 South Harding Street, Indianapolis, manufacturer of castings, etc., is planning for the installation of new equipment, including metal and wood pattern-making apparatus. Peter Lambertous is president.

A vocational department will be installed in the new two-story and basement high school at Martinsville, Ind. D. A. Bohlen & Son, 1001 Majestic Building, Indianapolis, are architects.

Fire at the plant of the Louisville Cement Co., Speeds, Ind., July 13, caused a loss estimated at $300,000, principally to the building manufacturing brickment and containing considerable machinery. A boiler-house supplying power was included in the loss. The entire plant of the company is valued at $2,000,000.

Lackawanna Steel Deficit Reduced

In the quarterly report of the Lackawanna Steel Co., which covers the three months ending with June, giving a comparative statement of the income account over the same period last year, a deficit of $172,880 is shown against $983,127, the second quarter deficit for 1921. Total net earnings of all properties after deducting taxes and other expenses were $457,303, against a net loss a year ago of $384,762.

For the first six months there was a deficit of $652,852, as against $974,392 for the first half of 1921. Net earnings over this period, before deducting charges, totaled $659,713, whereas last year they reached only $282,933. Interest charges for this period were $528,742, compared with $518,929 for 1921. Depreciation and accruing renewals amounted to $783,823, compared with $738,396.

American Car & Foundry Report

The American Car & Foundry Co. in its report for the fiscal year ended April 30, 1922, shows surplus of $4,183,320 after charges, federal taxes and preferred dividends equal to $14.94 a share earned on the $30,000,000 common stock. This compares with surplus of $6,450,856, or $21.50 a share in the previous year.

W. H. Woodin, president, says:

"The company began its year with thoroughly liquidated inventory of slightly over $14,000,000—less than was needed for the business then on books. During the year orders for new equipment have come fitfully rather than in a steady flow. The market, in the main, has been a 'buyers' market,' and the railroads have been able to get their requirements at prices which have made possible a profit to the manufacturer only by the combination of a high degree of efficiency in production with the utmost economy in operation and material-purchases. The company closed its year with an inventory of less than $10,000,000 and with a volume of new business on its books substantially in excess of that with which the year began.

"The railroads are slowly recovering from war-time conditions and effects of governmental control and operation. Rates they may charge for their service and wages they shall pay for labor are questions still in process of solution. Until these two great questions are settled, obviously the roads can with safety do no more than attempt to meet their immediate and absolute necessities in the rehabilitation of their properties. That they are lacking the facilities of transportation necessary for their requirements and for the proper handilng of the country's traffic when industry and commerce shall return to normal conditions, cannot be doubted.

"The situation with respect to foreign business is not different in any marked degree from that of a year ago. While the company during the year has sold some equipment to other than domestic buyers, the management has not felt that conditions with respect to foreign credits have been such as to warrant the company in contracting for the sale of its products abroad unless payment were definitely and amply assured.

"Condition of the company is in all ways healthy and satisfactory. It has not been necessary during the year to draw to any appreciable extent upon any of the reserves.

"The company is fortunate in having a wide diversity of product which enables it to do a large and generally profitable business in the sale of miscellaneous articles and supplies."

Industrial Finances

The recent increase in the capital stock of the Doehler Die-Casting Co., Brooklyn, was for the purpose of possible future requirements rather than for any additions in the immediate future.

Pittsburgh Steel Co. has declared the usual quarterly dividend of $1.75 on the preferred stock, payable Sept. 1.

Elmer E. Mitchell, Wilmington, Del., has been appointed ancillary receiver of the Premier Motor Corporation, Indianapolis, the concern being a Delaware corporation. The petitioner is the American Foundry Co., Indianapolis, one of the creditors. The Fletcher Savings and Trust Co., Indianapolis, is receiver for the Premier Corporation, the foundry company being also petitioner there. The suits are friendly and in behalf of a reorganization of the corporation.

The Superior Court at Indianapolis has approved the sale of the Midwest Engine Co., of Indiana, that city, to the reorganization committee for a price said to be in excess of $2,000,000. The bid on which the sale was made was by Benjamin F. Castle, New York, secretary pro tem. for the reorganization committee, of which the members are: Lewis E. Pierson and L. C. Ansmann, Cincinnati; Charles F. Mills, Boston, and Elmer W. Stout and Homer McKee, Indianapolis. The reorganized company will be known as the Midwest Engine Corporation.

Listing of stock of the Brier Hill Steel Co., Youngstown, Ohio, and the Trumbull Steel Co., Warren, Ohio, on the New York stock exchange is being given consideration by important interests in both companies.

Boston and Chicago banking interests have purchased and resold an issue of $5,000,000 Crane Co., Chicago, 7 per cent cumulative preferred stock. Funds derived from the sale of this stock will be used largely as additional working capital.

Boston heavy hardware jobbing interests have been notified that the Champion Horseshoe Co., Pawtucket, R. I., has been acquired by the Phoenix Horse Shoe Co., Poughkeepsie, but is being operated under its old name. Further details are lacking.

Trade Changes

Joseph W. Jones, manufacturer of electric drills, gages, etc., has arranged with C. K. Turner & Son, 116 Broad Street, to act as his representative in the foreign market.

The Mesta Machine Co., Pittsburgh, announces the removal of its Chicago office from the McCormick Building to the Peoples' Gas Building. C. J. Mesta, second vice-president, who has been in charge of the Chicago office for over a year, has returned to the home office in Pittsburgh to take charge of the sales department. A. B. Neumann, mechanical engineer, has been appointed manager of the Chicago office. Mr. Neumann has been in the Chicago district for a number of years in the capacity of chief engineer and consulting engineer for several of the largest steel plants in that district.

A. C. Haberkorn, former Detroit branch manager, Manning Maxwell & Moore, Inc. and Biggs-Watterson Co. and E. E. Wood, former sales manager Jones & Lamson Machine Co., have formed a partnership under the name of Haberkorn & Wood, and have opened an office and warehouse at 620 E. Hancock Ave., intending to handle a line of machine tools, cutting oils and compounds, also permanent mould aluminum alloy castings.

E. V. Swangren, former vice-president and superintendent F. J. Littell Machine Co., Chicago, and W. N. Stevenson, former secretary and chief engineer of the same company, announce the formation of a partnership. The firm will be known as the S & S Machine Works, 4522 Lexington Street, Chicago.

Edward C. Dilworth, until recently manager of sales Pittsburgh-Des Moines Steel Co., Pittsburgh, who also had a broad experience in the structural steel business while affiliated with the American Bridge Co., has opened offices at 302 Wabash building, Pittsburgh, as a consulting engineer on all kinds of structural projects.

An arangement has been consummated between The Bastian Blessing Co., Chicago, manufacturer of Rego welding and cutting apparatus and the St. Paul Welding & Mfg. Co., manufacturer of the Torit welding and cutting equipment by which the Bastian Blessing Co.. has taken over the entire stock of the St. Paul Welding & Mfg. Co.'s line of soldering equipment, trucks, preheaters and acetylene generators. The latter company on the other hand, will be the service distributor of Rego welding and cutting equipment throughout the Northwest. It will carry a complete stock of welding and cutting equipment and supplies and operate a repair service station at St. Paul, Minn.

The Barnes Foundry Co. announces the removal of its main office and sales room to 515 West 56th Street, New York. The foundry and machine shop are located at Freeland, Pa.

The Westinghouse Electric & Mfg. Co. has opened a new office in Richmond, Va., in room 503, Virginia Railway & Power Co. building, with W. O. Peale in charge.

H. S. Huncke, western sales manager Lumen Bearing Co., Buffalo, N. Y., at Chicago, has resigned and formed the firm H. S. Huncke & Co., with headquarters at 15 North Jefferson Street, Chicago, to deal in wrenches, pliers, portable drills, screw plates, taps, dies, portable bench hack saw machines and welded steel shop equipment.

Plans of New Companies

The McLaughlin Radio & Electrical Corporation, Equitable Building, Baltimore, recently incorporated, will have its work done by contract for the present. The company is, however, looking toward the erection and equipment of a thoroughly modern plant.

The Wireless Mfg. Co., Canton, Ohio, recently incorporated, will conduct principally a distributors' business, handling other manufacturers' products in a wholesale way, but it will market certain items of its own manufacture, at present principally transmitting inductances and a complete line of variable condensers to be put out under the trade name of Wireco.

The Furnace Fan Corporation, Dowagiac, Mich., will manufacture a small mechanical fan system called a furnace fan. The company contemplates taking over a plant now in Dowagiac, which has a complete foundry and machine shop equipment and will manufacture the entire unit in its plant.

The Aluminum Die-Casting Corporation has moved from 87 Thirty-fifth Street, Brooklyn, to Garwood, N. J.

NEW TRADE PUBLICATIONS

Amperehour Meters.—Sangamo Electric Co., Springfield, Ill. Bulletin No. 58 describes the Sangamo "locomotive type" amperehour meter, which when installed permanently in the storage battery circuit on a truck, tractor or mine locomotive, registers every amperehour which the battery discharges in driving the vehicle. Since the total battery capacity is indicated by a red "empty" hand on the meter, the black hand indicates the remaining capacity left in the battery. When the battery is subsequently put on charge, the amperehour meter registers as the charge proceeds, operating in the reverse direction from that of the discharge. The booklet describes the principles of operation, and is illustrated with photographic reproductions and drawings.

Oil Control Pump.—The Oilgear Co., 60 Twenty-seventh Street, Milwaukee. Bulletin No. 6 describes the Oilgear control pump, designed to pump oil under pressure with instantly variable delivery from zero to maximum in either direction. A single operating handle controls the machine, giving desired rates of delivery, and stopping or reversing the flow. It can be connected to any machine or device requiring oil under pressure.

Motor Generator Sets.—Ideal Electric & Mfg. Co., Mansfield, Ohio. Bulletin No. 106 illustrates and describes the company's line of motor generator sets, giving names of some of the prominent users of this equipment.

Electro-Plating Apparatus.—Ideal Electric & Mfg. Co., Mansfield, Ohio. Bulletin No. 107 describes the company's line of electro-plating apparatus, which ranges from 50 to 7500 amperes.

Pyrometers.—Wilson-Maeulen Co., Inc., New York. Catalog No. 14, 20 pages. Illustrated description of the various instruments and recorders.

Ferroalloys and Metals.—A 26-page pamphlet giving the composition and uses of about 28 products of the "Electromet Brand" of ferroalloys and special alloys and metals put on the market by the Electro Metallurgical Co., 30 East Forty-second Street, New York.

Carbon Dioxide Recorders.—Uehling Instrument Co., Paterson, N. J. Bulletin 112, 12 pages, 6 by 9 in. Describes and illustrates single, two, three and four unit CO_2 meters and also a multiple unit which is for the office of the chief engineer, providing the means for measuring CO_2 from two to six boilers, independently and simultaneously. Type M gages operating on the hydrostatic principle are described and also type Z auxiliary boiler front indicator. The "Pyro-porus" filter for keeping the gas sampling lines clean is given space.

Boiler Installations for Textile Mills.—A 32-page heavily illustrated booklet issued by the Heine Boiler Co., St. Louis, devoted largely to illustrations of installations. Technical matters are handled, particularly the relation between boiler efficiency and flue gas temperature for different percentages of CO_2. A table is given of the properties and calorific values of fuels drawn from many localities all over the United States.

The Weather Vein.—A 32-page pamphlet issued by the Carrier Engineering Corporation, Newark, N. J. This is devoted to the question of humidity in the air in manufacturing and other buildings and means by which that humidity may be controlled.

Forty Years of Progress.—An eight-page leaflet announcing the change of name of the Heine Safety Boiler Co. to the Heine Boiler Co., St. Louis. The boiler was first called a safety boiler because, being of the watertube type, there was only a small volume of high temperature water in it, thus minimizing the danger of explosions.

Micarta Gears.—Westinghouse Electric & Mfg. Co., East Pittsburgh. Circular 1579-B, containing general and technical data on Micarta, a non-metallic material for gear and pinion application, developed by the Westinghouse company. It is a laminated product of specially treated woven fabric of homogeneous structure and physical properties are claimed for it that make possible its substitution for untreated steel, cast iron, bronze and other materials used in gear manufacture. It is self-sustaining and may be machined with ordinary standard tools and equipment. It was developed primarily to provide a silent gear drive.

Vises.—Athol Machine & Foundry Co., Athol, Mass. A 40-page booklet, recently published by this company illustrates and gives specifications of their various types of vises, as well as grindstone frames and bench grinders.

Steel Wheels and Derricks.—Marion Machine, Foundry & Supply Co., Marion, Ind. Bulletins 530 and 535, devoted to steel turnbuckle derricks and steel band wheels. Parts of the derricks are shown and line drawings give measurements and proportions. The steel band wheels and steel tug rims are described briefly in bulletin 535.

Foundry and Pattern Shop Supplies.—The Kindt-Collins Co., Cleveland. Catalog F, listing and illustrating pattern shop supplies and equipment, chaplets and snap flasks. Included are also crucible furnace blowers, blow torches and pattern shop woodworking machinery.

Valves.—Buckeye Iron & Brass Works, Dayton, Ohio. Catalogue of 159 pages, bound in cloth. This is the utilitarian type of book, of convenience to the purchasing agent and to the engineering or designing department, profusely illustrated with the types of valves and incidental specialties made by the company in both brass and iron and accompanied where necessary with sectional drawings. A noteworthy feature is an index for finding the particulars of valves by figure number. The brass section covers over 100 pages and illustrates valves under fifteen general classifications. Most of the remainder of the book is given over to the iron body valves, of which there are fourteen different general types, including blow-off valves and butterfly, throttle, safety and whistle valves. A few pages show the Government valves the company is prepared to make and fourteen or fifteen pages are devoted to data and information, such as the proportionate weight of castings to wood patterns, the shrinkage of patterns for different metal castings and tap drill sizes for threads.

Hoevel Sandblast Machines.—Hoevel Mfg. Corporation, Jersey City, N. J., 1922 catalog, 24 pages, describing and illustrating sand blasting machines and equipment, covering Hoevel revolving barrel, rotary table, cabinet, room and portable types.

Preparing Flue for Analysis.—Four-page illustrated leaflet by the Uehling Instrument Co., Paterson, N. J., patentee and manufacturer of the Pyro-porus gas filter, describes apparatus for excluding dust and dirt from gas sampling line.

Heat Treatment Furnaces.—Bulletin 242, W. S. Rockwell Co., 50 Church Street, New York, 16 pages, 8½ x 11 in., illustrates and describes the practical application of many types of heat treating furnaces. The bulletin includes also a discussion on the influence of method of heating and handling on quality and cost of heat treated products. There are 30 illustrations, mostly halftones.

Pioneer Acid-Resisting Alloys.—Pioneer Alloy Products Co., Inc., Cleveland—a 6-page leaflet giving the physical properties of Pioneer acid-resisting alloy ar[illegible]ach, showing its use in an acid-resisting, quick-opening g[illegible] it is valve. [illegible]elec-

Low Pressure Air Gas Inspirator.—One of a series of bulletins published by the Surface Combustion Co., industrial furnaces, New York. Others are oven-furnaces, pot-hardening furnaces, soft metal furnaces, galvanizing baths, shipyard furnaces, rivet heaters, small forges and laboratory furnaces for high temperatures. [illegible]t

Industrial Lighting Briefs.—Cooper Hewitt Electric Co., Hoboken, N. J.—A series of bulletins containing digests and reviews of articles on the theory and practice of industrial lighting. Additional numbers to be published from time to time will deal with important phases of the subject in such a way that engineers interested in industrial lighting will be able to use them to advantage.

Coal Pulverizer.—Bannot Co., Canton, Ohio. A 12-page illustrated bulletin, 8 in. x 11 in., showing the uses, design and construction of the Bannot pulverizer, air separator and exhauster for powdered coal burning installations.

Heating Specialties.—Fulton Co., Knoxville, Tenn. Catalog No. 100, 144 pages, 3¾ in. x 6¾ in., illustrates and describes sylphon heating devices and thermostatic equipment manufactured by the company, there being in addition 26 pages of tabular matter relating to properties of steam, relative humidity, specific heats, pressure equivalents, temperature conversion, pipe dimensions, etc.

Positive Pressure Blowers.—Connersville Blower Co., Connersville, Ind. Bulletin No. 21, 4 pages, 8½ in. x 11 in. Illustrates and describes the Victor line of small blowers (capacities 40 to 275 cu. ft. of free air per min. at pressures of 1 to 5 lb.).

Malleable Nickel.—American Nickel Corporation, Clearfield, Pa. A 12-page bulletin, 8½ in. x 11 in., giving a resumé of the properties and uses of pure nickel, shown by graphs and tabular comparisons.

For Hoist Efficiency.—The Wright Mfg. Co., Lisbon, Ohio. A 16-page illustrated booklet, two colors, giving capacities, details and prices of Wright hoists.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

	Per Lb.
Bars:	
Refined iron bars, base price	2.58c.
Swedish bars, base price	7.00c.
Soft steel bars, base price	2.58c.
Hoops, base price	3.63c.
Bands, base price	3.23c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	2.68c.
Channels, angles and tees under 3 in. x ¼ in., base	2.58c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	2.60c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	2.80c.
Toe-calk, ½ x ⅝ in. and larger	3.40c.
Cold-rolled strip, soft and quarter hard	6.25c. to 7.25c.
Open-hearth spring steel	3.50c. to 6c.
Shafting and Screw Stock:	
Rounds	3.35c.
Squares, flats and hex	3.85c.
Standard cast steel, base price	12.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	2.68c.

Sheets

Blue Annealed

	Per Lb.
No. 10	3.63c.
No. 12	3.68c.
No. 14	3.73c.
No. 16	3.83c.

Box Annealed—Black

	Soft Steel C. R., One Pass, Per Lb.	Blued Stove Pipe Sheet, Per Lb.
Nos. 18 to 20	4.00c. to 4.30c.	.....
Nos. 22 and 24	4.05c. to 4.35c.	4.60c.
No. 26	4.10c. to 4.40c.	4.65c.
No. 28	4.20c. to 4.50c.	4.75c.
No. 30	4.45c. to 4.75c.	.....

No. 28 and lighter, 36 in. wide, 10c. higher.

Galvanized

	Per Lb.
No. 14	4.30c. to 4.60c.
No. 16	4.45c. to 4.75c.
Nos. 18 and 20	4.60c. to 4.90c.
Nos. 22 and 24	4.75c. to 5.05c.
No. 26	4.90c. to 5.20c.
No. 27	5.05c. to 5.35c.
No. 28	5.20c. to 5.50c.
No. 30	5.70c. to 6.00c.

No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
⅛ in. Butt..	—56	—40	¾ in. Butt..	—30	—13
¾ in. Butt..	—61	—45	1½ in. Butt..	—32	—15
1-3 in. Butt..	—63	—48	2 in. Lap....	—27	—10
3½-6 in. Lap.	—60	—46	2½-6 in. Lap.	—30	—15
7-8 in. Lap..	—56	—34	7-12 in. Lap..	—23	— 7
9-12 in. Lap.	—55	—33			

Steel Wire

BASE PRICE* ON NO. 9 GAGE AND COARSER	Per Lb.
Bright basic	3.50c. to 3.75c.
Annealed soft	3.50c. to 3.75c.
Galvanized annealed	4.25c. to 4.50c.
Coppered basic	4.00c. to 4.25c.
Tinned soft Bessemer	5.50c. to 5.75c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	17¼c. to 18 c.
High brass wire	18¼c. to 18½c.
Brass rod	15¼c. to 16¼c.
Brass tube, brazed	24¼c. to 25 c.
Brass tube, seamless	20½c. to 21 c.
Copper tube, seamless	22¾c. to 24 c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 21¼c. to 22¼c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14-20		
	Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	Primes	Wasters
			80 lb..	$6.05 $5.80
			90 lb..	6.15 5.90
			100 lb..	6.25 6.00
IC..	$10.00	$8.50	IC..	6.40 6.15
IX..	11.50	10.00	IX..	7.40 7.15
IXX..	13.00	11.25	IXX..	8.40 8.15
IXXX..	14.25	12.50	IXXX..	9.40 9.15
IXXXX..	16.00	14.00	IXXXX..	10.40 10.15

Terne Plates

8-lb. coating, 14 x 20

100 lb.	$7.00
IC	7.25
IX	7.50
Fire door stock	9.00

Tin

Straits, pig	33½c.
Bar	40c. to 44c.

Copper

Lake ingot	15¼c.
Electrolytic	15 c.
Casting	14¾c.

Spelter and Sheet Zinc

Western spelter	7c. to 7½c.
Sheet zinc, No. 9 base, casks	8½c. open 9c.

Lead and Solder*

American pig lead	6¾c. to 7c.
Bar lead	8c. to 8½c.
Solder, ½ and ⅛ guaranteed	25c.
No. 1 solder	23½c.
Refined solder	20¼c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	75c.
Commercial grade, per lb	35c.
Grade D, per lb	25c.

Antimony

Asiatic	6½c. to 7c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb. 25c. to 27c.

Old Metals

Dealers report business improved this week with values firm. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy crucible	11.75
Copper, heavy wire	11.25
Copper, light and bottoms	9.00
Brass, heavy	6.25
Brass, light	5.25
Heavy machine composition	8.50
No. 1 yellow brass turnings	6.50
No. 1 red brass or composition turnings	7.75
Lead, heavy	4.50
Lead, tea	3.25
Zinc	3.00

THE IRON AGE

New York, July 27, 1922

ESTABLISHED 1855

VOL. 110 NO. 4

The Electric Furnace for the Foundry

Considerations in Choosing the Proper Unit for Making Steel Castings—Too Large Sizes Often Selected —Place of Acid and Basic Operations

BY CHARLES WELLMAN FRANCIS

THE advent of the electric furnace as a real commercial factor in the iron and steel industry for the past six to seven years has revolutionized the foundry business far beyond expectations. It no longer remains to be proved that castings made by the electric furnace process are of a finer quality and at the same time cheaper than those made by any other method of melting. Metallurgists and electric furnace engineers throughout the country agree that there would be more of these units in operation were it not for the ever present prejudice against their initial cost, and prospective users of electric furnaces must suppress their reluctance in order to give this process a fair trial.

Probably the most outstanding question which confronts the prospective purchaser of an electric furnace is that of the proper size or tonnage capacity to be chosen. To many this may not seem a very difficult problem to settle, but we have but to look around us to see a number of failures due to the inability to cope with this phase of the situation successfully. The writer can cite several instances where installations have proved "white elephants" because of a lack of sufficient floor space to handle the output of the unit installed.

The 3-ton furnace has universally become the most popular size furnace for foundry use in making the average run of jobbing steel castings. Foundrymen have in some instances feared they would not have sufficient melting capacity and have installed one unit of 6 tons capacity, and have not realized their mistake until depressions in business appeared. Then they begin to realize that tapping a 3 or 4-ton heat from a 6-ton furnace once or twice a day is not good operating economy.

Another reason is that even though business be plentiful, most foundry superintendents try to clear the floor of work by the end of the day turn. Not having enough molds to take a full heat, they are obliged to undercharge the furnace, which requires longer proportionate time per heat, excess of power and electrode consumption, all tending generally to increase greatly the melting costs. Still further, should melting troubles be encountered, as is often the case, caused by broken electrodes, burning out of roofs, etc., a number of laborers must be kept after the end of the day turn to handle the heat. Often time and half time must be paid these men, which fact also adds considerably to the cost and is often sufficient to counterbalance all profits, to say nothing of causing labor dissatisfaction.

A large proportion of these difficulties can be eliminated by installing two units of 3 tons each, instead of one 6-ton unit, as it is an easy matter to time two electric furnace heats to be tapped at the same time, should the demand arise for a larger amount of metal than can be tapped from one furnace.

Another angle of this question to be considered in purchasing electric furnace equipment is the fact that the most reliable furnace builders have designed their furnaces so that they can be charged 25 to 50 per cent above capacity and can be operated continuously without overtaxing the installation in the least. The large electrical equipment companies have met their part of this situation by building furnace transformers to withstand a 40 deg. rise in temperature and carry 50 per cent or more overload for a period of 2 hr. continuous operation without endangering a transformer blowout.

When the molding foreman can so adjust his work as to keep a little ahead of the melting foreman, thus enabling the furnaces to operate under conditions which the writer has just outlined, then and there only can the foundry production closely approach 100 per cent and give minimum operating costs. The writer is well acquainted with one company in the Middle West which over a period of one month produced 13 to 14 6-ton heats of mild steel for castings from a rated 3-ton capacity furnace. Needless to say this company's operating

THE author of the accompanying article, on the basis of some years experience in electric furnace work, both as superintendent and metallurgist, proposes to discuss in a number of articles the practical phases of the use of the electric furnace in the foundry. With the present contribution as an introduction the articles are to cover:

Construction Features for Operating Economy.

Acid Furnace Practice.

Basic Furnace Practice.

Comparison of Costs of Acid and Basic Operations.

Electric Furnace Labor Problems.

costs were at a minimum for this period.

Electric power facilities must be looked into thoroughly when an electric furnace installation is contemplated. The author cannot emphasize this side of the problem too strongly. It has been only a few years since that central station engineers and foundrymen were at swords points continually, due largely, the writer feels, to the ignorance of each to the other's problems. This situation is gradually being relieved, each doing all in his power to meet the other half way. The power engineer's greatest problem seemed to be the unbalancing effect that electric furnace "surges" tend to produce on the power line, causing considerable complaint from other power consumers on the same line. These "surges" which occur on all furnaces are made easier by the proper reactance in the circuit, a problem which should be thoroughly investigated at the start.

The question of the use of acid or basic operation is a vital one, and the choice of one or the other is dependent on a large number of factors. If the furnace is to be used for the manufacture of alloy steel castings, then it is almost imperative to use basic refractories, for on a basic bottom only can rigid alloy specifications be met and controlled without considerable loss of alloys.

The output of the majority of electric steel foundries is castings made from mild steel for the ordinary run of machine and jobbing work. This specification usually averages 0.25 per cent carbon; 0.75 manganese, 0.30 silicon. It is the author's opinion that for this class of work the acid lined furnace is the most practical from a production standpoint as well as the standpoint of operating economy, due largely to the fact that little or no refining is necessary in this case. It is best to use a good grade of scrap, such as heavy axle turnings, boiler plate punchings, light plate scrap, light forging stock or light forge flashings. In other words, use any good basic shoveling scrap, for there is no economy in charging the furnace with cheap scrap high in phosphorus and sulphur, and utilizing an excess of electric power and electrodes and a number of basic slags to reduce the phosphorus and sulphur and reach the desired specifications.

The acid furnace is particularly adapted to light "snap" work in the foundry where clean and hot metal is essential. These heats can be poured into a big ladle and "shanked" off, as is done with cupola metal in the iron foundry. With the proper care in handling, the loss in floor scrap and "spills" is practically negligable in this case.

Some of the points in the foregoing paragraphs may appear to be somewhat off the subject, and while they are of a more practical operating nature, they best exemplify some of the reasons for the choice of acid or basic practice in the foundry. Other minor features of some importance might be added to what has been said above, which will have some bearing on the choice of an electric furnace, but it will be found that they are all more or less interwoven each with the other, and with what have been already mentioned.

TOOL MERGER COMPLETED

Consolidated Machine Tool Corporation Elects Officers and Takes Over Five Plants

The organization of the Consolidated Machine Tool Corporation, 17 East Forty-second Street, New York, has been completed with the formal transfer of plants to the new company and the election of officers.

W. H. Marshall, formerly president of the American Locomotive Co., becomes chairman of the board; C. K. Lassiter, formerly vice-president in charge of manufacturing of the American Locomotive Co., is president, and there are five vice-presidents, each of whom will have charge of a specific branch of the company's activities as follows: James J. Dale of the Dale Machinery Co., machine-tool dealer, which has been absorbed by the Consolidated Machine Tool Corporation, will be located at the company's executive offices in New York; A. H. Ingle of the Betts Machine Co., Rochester, N. Y., will have the management of the Betts plant; Harry W. Champion, formerly president of the Newton Machine Tool Works, Philadelphia, will continue in charge of that plant; H. W. Breckenridge, formerly president of the Colburn Machine Tool Co., Cleveland, will remain at the Colburn plant, and H. J. Bailey, who has been president of the Hilles & Jones Co., Wilmington, Del., will be manager there. F. D. Paine, who will be in charge of the plant of the Modern Tool Co., Erie, Pa., is a member of the board of directors, but not a vice-president.

All of the above-named officers are members of the board of directors, which includes also B. J. Baker of B. J. Baker & Co., bankers, Boston; Lawrence Chamberlain of Lawrence Chamberlain & Co., bankers, New York, and T. Allen Hilles, Wilmington, Del. R. R. Lassiter is secretary of the company.

The capital stock consists of $10,000,000 of 7 per cent preferred and 200,000 shares of common of no par value. There is also a bond issue of $3,600,000. The appraised value of the plants entering the new company is given as $7,455,000 and the average annual net earnings of the five companies for the period Jan. 1, 1916, to April 30, 1922, is given as $1,023,014.

For the present, at least, none of the agency arrangements of the five machine-tool manufacturing companies which have entered the new organization will be disturbed. The Dale Machinery Co., which has handled both in New York and Chicago lines of tools made by companies which are not a part of the new company, has turned over these agencies to the Consolidated Machine Tool Corporation, which will continue the work as a dealer conducted by the Dale organization. An office will be maintained in Philadelphia, in addition to those now in New York and Chicago, while plans for offices in other large cities are in abeyance.

Additional floor space is being taken by the corporation on the third floor of the National City Building, 17 East Forty-second Street, New York, which will provide about 5000 sq. ft. of floor including the offices which have been occupied for the past year by the Dale Machinery Co.

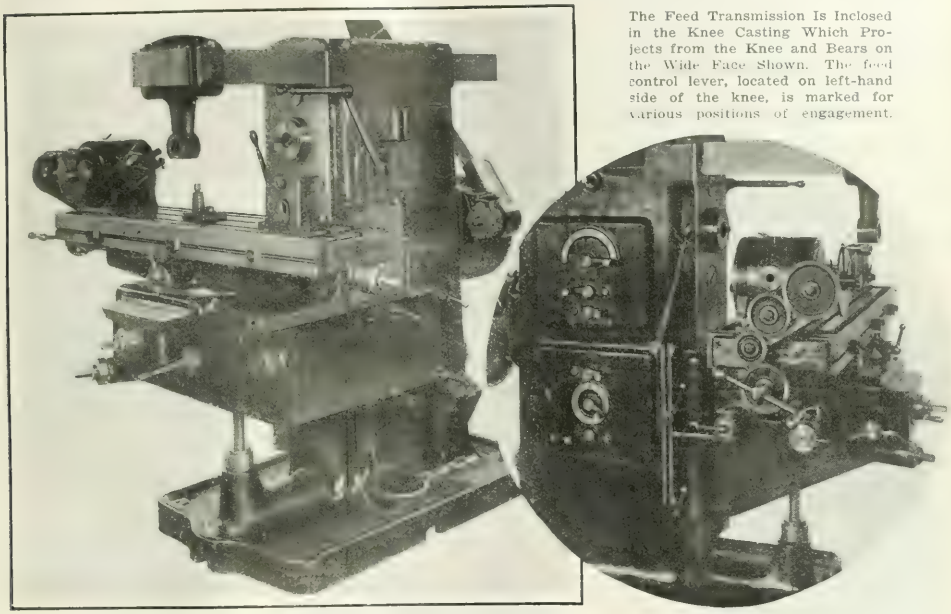
Speculation as to Location of North American Steel Offices

Now that the Department of Justice has officially approved the proposed merger of the Inland Steel Co., the Republic Iron & Steel Co., and the Midvale Steel & Ordnance Co., as well as the proposed Bethlehem-Lackawanna combination, there is considerable speculation as to where the general offices of the former are to be located. Although it has no plants in Pittsburgh, there is a possibility of that city being selected on account of its central location in relation to the several plants, located at Coatesville and Johnstown, Pa., Youngstown, Ohio, and in the Chicago district, these several points being within easy riding distance of Pittsburgh. The general offices of the constituent companies now are in Chicago, Youngstown, Ohio, and Philadelphia, but executive offices of both the Midvale and Republic companies are in New York. Youngstown is almost as central as Pittsburgh, but is hardly likely to be selected and Chicago in spite of the fact that it contains the Inland Steel Co., and some of the plants of the Republic Iron & Steel Co., it is believed has small chance of being chosen. It is probable that New York will get the offices, with Pittsburgh a second choice.

IMPROVES MILLING MACHINE

Rockford Company Develops New Feed Transmission—Attachments Added—Other Features

A LITTLE over a year ago the Rockford Milling Machine Co., Rockford, Ill., put on the market a No. 3 high-power, single-pulley drive milling machine, embodying several new features, notable among which was a method of transmitting the feed drive to the knee, saddle and table, which eliminated the use of a telescopic feed shaft and universal joints. This machine was described in THE IRON AGE of April 21, 1921, page 1039. In that design the feed-reverse and quick-return gears were located in a box which projected from the right-hand side of the column; a drive shaft extended from the bottom of the box to a second gear box located at the base of the machine; from the latter box a splined shaft connected through a pair of bevel gears with the drive shafts in the knee.



The Feed Transmission Is Inclosed in the Knee Casting Which Projects from the Knee and Bears on the Wide Face Shown. The feed control lever, located on left-hand side of the knee, is marked for various positions of engagement.

The company has now gone a step further and has eliminated the employment of drive shafts in conveying power to the knee. The transmission is all inclosed in the knee casting which projects on the right hand side of the column, bearing on a wide face, which also had been provided in the previous machine. A long gear in vertical position is located in the part of transmission housing which fits over the face on the side of the column, and throughout the range of the movement of the knee is always in mesh with the feed-reverse and quick-return gears, which in the new design are located inside of the column directly behind the plane of the face. The long gear connects through a pair of bevel gears with a second long gear in horizontal position on the side of the knee, which meshes with the gears operating the knee, saddle and table. Thus it is to be noted that the feed drive throughout is through gears always in mesh and that there are no connecting shafts.

A friction adjustment has been provided on the horizontal long gear and serves to release the feed drive in case of accident or carelessness. This is accomplished through a friction clutch with double points of contact through fiber washers set at each end of the gear. Graduations have been provided on a collar at one end, so that the friction can be set to break for a predetermined pressure.

Another change is in the feed-control lever, which determines whether the transverse or vertical feed is being engaged. This is located, as in the older design, on the left-hand side of the knee, but has been provided with a dial marked with the two positions of engagement, i. e., "transverse" and "vertical," as well as a third position, "neutral," in which neither feed is engaged.

The spindle of the new machine has phosphor-bronze taper bearings and is provided with a new style positive lock nut at the ends.

New Attachments Provided

Several new attachments have been provided for the machine, among which is the universal milling and drilling attachment described in THE IRON AGE of July 6, page 29.

A new dividing head in which two index plates take care of the indexing formerly done by three is another added attachment. One turn of the index crank is equivalent to a turn of 9 deg. on the spindle. Two arms have been provided on the index plate for quick setting; and for easier handling, these arms are extended beyond the periphery of the plate. The index crank is equipped with a plunger which can be withdrawn and kept out of engagement with the holes in the plate by a slight twist of the knob. The index plates are graduated to read in minutes on spindle. The worm has unusually sturdy support and bearings, and is adjustable for wear. A positive stop has been provided for throwing the worm out of mesh.

The machine is also equipped with a power-driven rotary table attachment. Feed is obtained through a telescopic shaft which is attached to the horizontal long gear in the knee, and is transmitted through bevel gears and shafts which clear the saddle and horizontal table, to a large worm wheel with ball thrust bearings under the rotary table. The worm drive of the table has the same gear ratio as that of the dividing head, so that an index plate can be transferred to the table and indexing can be done as readily as on the dividing head. The dial of the table is graduated down to two minutes. Thus the table can be accurately swung to any desired angle in the horizontal plane.

Another attachment has been provided for slotting. This fits over the end of the rectangular overarm

which gives it rigid support and is driven from the spindle by a crank.

Outstanding among the attachments is a standard vertical head which is bolted to the top of the column after the overarm has been removed, and which has unusual rigidity. It is emphasized that a horizontal machine equipped with this attachment differs in no respect from the standard vertical machine except that the horizontal spindle is omitted. A further advantage is that it can be set over on the column one set of bolts to obtain a greater throat distance, in the normal position the overhang from the column being 15 in.; and when set over, 20⅜ in. The older type of vertical attachment which is driven from the spindle of the horizontal machine and the head of which is fastened over the end of the over arm, is also available.

The new Rockford machine is constructed in two sizes, No. 3 heavy and No. 4 standard, the former having a 15 by 55 in. table, with a 34 in. feed, and the latter a 15 by 68 in. table, with a 42 in. feed. The unusually long overarm, 68 in. from end to end, has been retained and the specifications are for the most part the same as given for the previous type of machine.

Instrument for Testing Gear Teeth

The Pratt & Whitney Co., Hartford, has placed on the market a set of instruments for testing gear teeth, known as Odontometers. These instruments, one of which is illustrated herewith, are of simple design and self-contained. They are used for testing the accuracy or uniformity of the gear tooth profiles and spacings of the teeth in production work.

The instrument illustrated on the gear has a range of from 3 to 10 diametral pitch, may be used to check gears of any pressure angle, and can be applied to a gear while it is in place in the machine. In effect it is composed of a section of a straight-sided rack with two parallel effective faces, one fixed and the other movable. A third face, set at an angle to the two working faces, is used to hold the fixed working face in contact with the flank of the gear tooth. The fixed registering surface is at A, the movable indicating surface at B. The third surface, C, holds surface A in contact with the involute surface of the gear tooth. The surfaces B and C are adjustable so that gears of various pitches can be tested with the same instrument.

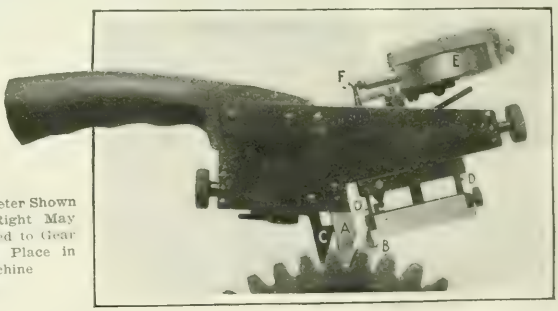


Odontometer Provided with a Stand and Testing a Pinion-Shaped Cutter Is Shown at the Left. The cutter is placed on a surface plate and rolled by the instrument

The indicating surface, B, is mounted on two thin flat springs, D, which act as pivots free from backlash. The dial indicator, E, is actuated by the lever, F, which has a ratio of 5 to 1, each division on the dial representing a movement of 0.0002 in. of the indicating surface, B.

In general the instrument is used as a comparator to test the uniformity of interchangeable and mating gears. If actual measurements are required, the distance between the two parallel working faces of the instrument can be measured. Stands are provided to hold the two smaller sizes of Odontometers when gears or pinion-shaped cutters are being tested. In this case the gear is placed on a surface plate and rolled by the instrument, as shown in the separate illustration. The actual cutting edge of cutters is tested, so that the errors, of whatever nature, are detected.

The gages are made to check gears in the following range of sizes: ¾ to 4 pitch, 3 to 10 pitch and 10 to 24 pitch.



Odontometer Shown at the Right May Be Applied to Gear While in Place in Machine

Drill with Mechanical Reversing Device

A reversible electric drill, which reverses mechanically and is intended to eliminate electrical troubles occurring in drills of this type, has been developed by the Independent Pneumatic Tool Co., Chicago.

The reverse is operated through a mechanical device located in the gear case. The motor runs always in the same direction and the shock resulting from reversing the current under load and speed is eliminated. The reversing gear is provided with a locking device which, it is explained, can be shifted instantly to permit a locked constant forward motion for general drilling, reaming, stud driving, nut tightening and tube rolling, and a locked constant reverse motion for backing off nuts and other fastenings. The third shift gives the neutral position which permits the spindle to slip into forward motion when the machine is pressed against the work and to slip into reverse motion as the machine is withdrawn. This is an automatic action that follows the operator's movements, making the tool especially adaptable for use in wood boring, tapping, flue rolling and similar work.

The patent applied for covers the device on both electric and pneumatic tools.

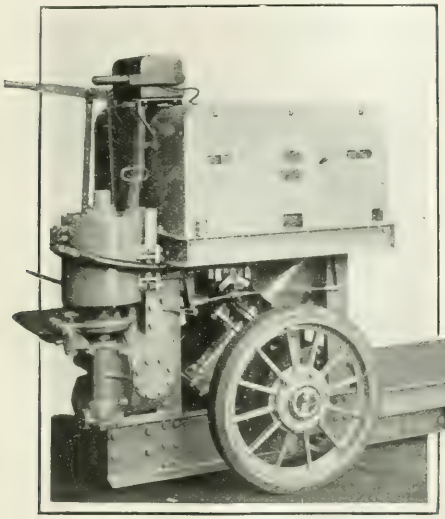
The production of natural gas in the United States in 1920 amounted to 860,540,000 cu. ft., according to the United States Geological Survey. Of the total, 28.4 per cent was produced in West Virginia, 19.3 per cent in Oklahoma and 14.9 per cent in Pennsylvania. The total consumption was 798,210,000 cu. ft., and of this total 20.2 per cent was used in Pennsylvania, 17.1 per cent in Ohio, 15.9 in Oklahoma and 12.6 per cent in West Virginia. The average price paid in Pennsylvania was 32.1c. per 1000 cu. ft., and in Ohio 36.8c. The average price covering the entire consumption was 24.8c.

Platform Truck for Foundry Use

An electric platform storage-battery truck of 5-ton capacity, shown in the illustration, and intended for use in foundries in handling large core racks in and out of core ovens, has been added to the line of the Atlas Car & Mfg. Co., Cleveland.

The load platform is 7 ft. 2½ in. long, 30 in. wide, and in its lowest position is 11½ in. above the floor. Its lift is 4 in. The over all length is 11 ft. 8 in. and the width, 4 ft. The inside turning radius is 5 ft. 9 in. and the outside turning radius is 12 ft. and with a core rack 5 ft. 1 in. wide and 7 ft. long, the car can be operated through interescting aisles 8 ft. wide. The truck without a load has a speed of 700 ft per min., or 8 mi. per hr., the loaded speed depending on the condition of the floor.

The driving wheels have solid metal base rubber tires 27¾ in. in diameter and 4¼ in. wide. The trailing or load carrying wheels are of steel, crown faced, 10¾ in. in diameter by ¾ in. face annd 11¼ in. tread and revolve on a double row of ball bearings. A ball thrust bearing is also provided for ease in steering.



Storage Battery Truck for Handling Core Racks. A 5-ton load is elevated 4 in. in 10 sec.

Steering is applied to all four wheels. The driving wheels have the Atlas type cover over the universal joints and the driving knuckle pivots are provided with inclosed ball-thrust bearings. The driving shafts and universal joints are removable from the outside and held in place by bolted clutch plates.

The driving reduction is through an inclosed worm and wheel, the motor being flexibly coupled to the worm. A contacting type of shoe brake interlocks with the foot-pedal lever and controller safety switch in such a manner that the brake is applied when pressure is completely relieved from the foot brake. The controller handle may be left in speed position but with the use of the interlocking arrangement the brake cannot be released until this handle has been brought to neutral, thus insuring that the truck will always be started on first speed. There are three speeds in either direction. Either Edison or Lead batteries may be used, the latter being the standard.

The elevating mechanism consists of a motor flexibly coupled to a double-worm reduction. A longitudinal shaft keyed to the worm wheel of the last reduction carries two miter gears which mesh with miter gears on the ends of four crank shafts located in a cross-wise position, two being on either side. The outer ends of the crank shafts form crank pins and are provided with hardened steel flanged rollers which bear against hard steel wearing plates on the under side of the platform. In operation these crank shafts are revolved simultaneously a half revolution, which causes the elevating of the load platform. In lowering the load this motion is reversed.

The control of the platform is simple, a handle being pushed upward to raise the platform and pushed down to lower it. It is stated that a 5-ton load is elevated 4 in. in 10 sec. The limit switch is operated automatically by the load platform and is thrown out of circuit in the up and down positions and at the same time a brake is applied to hold the load in place.

Desulphurizing of Coke

A study of the desulphurization of coke was begun July 1 at the experiment station of the United States Bureau of Mines at Pittsburgh. This is a practical follow-up of the theoretical study of the oxidation of iron sulphate in the coke and the subsequent removal of the free sulphur formed by this oxidation. Literature on this subject is being reviewed. Many patents were taken out in the years 1850 to 1870 and few since. Roasting and steaming were favorite methods. In this connection, methods for converting sulphur in coke into the FeS form are being sought. A process based on such method would hold back sulphur that might ordinarily be evolved, then this sulphur could later be removed by oxidation together with much additional sulphur. It seems that Fe_2O_3 mixed with coal being coked decreases the sulphur in solid solution. The work is being undertaken by Dr. A. R. Powell, physical organic chemist, and John H. Thompson, research fellow of the Carnegie Institute of Technology.

Imperfect Management

"The most difficult part to get right in a producing organization is management," states President F. C. Biggert, Jr., of the United Engineering & Foundry Co., Pittsburgh, in a statement to employees of the company's plants at Pittsburgh, Youngstown, Canton and Vandergrift, Pa. "It is never 100 per cent right and seldom 70 per cent. On an average, it is probably not 50 per cent right, and yet the advantages of large scale manufacture are so great—I mean that the increased production of goods by large manufacturing is so great—that with only this poor average management it is possible to give real service.

"This part of our manufacturing is poor because we cannot get better men for the job. If management, in which I include all those in authority, can be improved, the cost of all products can be greatly decreased. Where an individual company has exceptionally good management, the result is increased profits to that company, so that in a sense the community is not immediately benefited, but one company cannot long maintain this condition. It soon spreads to competing companies and the general price is lowered.

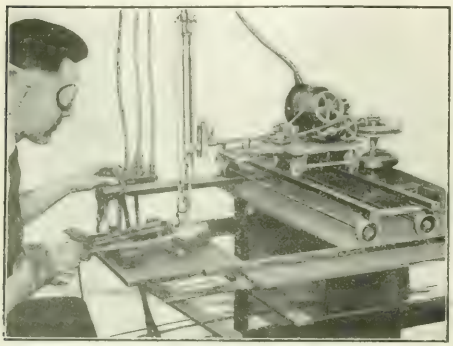
"We have better management to-day than formerly, the average is gradually improving and those companies which advance most rapidly will make the most profits and will, in the end, benefit every person."

Further expansion has been decided on at the Cumberland, Md., plant of the N. & G. Taylor Co., Philadelphia. A larger power house is to be built with improved type of boilers, automatic stokers, coal handling machinery and the like. Additional capacity has been added to the tin house to meet the demand for roofing plate, the company being conspicuously a maker of tin and terne plate. All the open-hearth furnaces of the plant are reported in operation and the bar mill has been running day and night turns.

Automatic Welding Machine

An automatic welding machine known as the "Gewe," the general construction of which may be noted from the accompanying illustration, has been brought out by the General Welding & Equipment Co., Boston.

The machine provides for heating up the line of welding on the work to the proper fusion point and heating up the material to be added, preparing it for fusion with the work and feeding in the added material continuously at a predetermined rate. It is also arranged to puddle together the molten particles of the work and the added material mechanically through the blowing action of the flame and the stirring action of the welding rod. Protecting the spot in fusion and the added material from the influence of surrounding air is by means of the cluster of flame inclosing the center of the weld and the welding rod. The work is said to be welded along the center of the seam and also to a certain distance over both sides, the added material being spread over the same area.



Welding Machine in Use Joining a Drop-Forged Piece to a Split Tubing. The line of weld is an irregular curve which the machine, mounted on a double carriage system, follows by means of a pattern and a special drive

The welding operation is performed not only with a straight progressing movement but also with an independent circular or elliptical movement of the torch, the combination of both movements being said to result in a spirally progressing, overspreading and overlapping weld. Separate adjustments are provided for the different procedures, which are operated mechanically and done at the proper moment with precision and without fatigue.

The illustration shows the machine in operation joining a drop forged steel piece of varying thickness to a split tubing of uniform thickness. The line of weld is an irregular curve, which the machine mounted on a double carriage, follows by means of a pattern and a special drive. The self-feeding torch, known as the No. 4, is oscillated in circles or in ellipses through an independent ex-center movement actuated by the sprocket shown. This movement is adjustable within wide limits. The finer feed regulations are obtained by an electric rheostat moved by the foot and permits slowing the machine down until heat conditions are right for steady movement. The welding wire passes through the center of the multiple-flame tip and feeds by gravity. It presses into the weld and when moved in spirals also forges itself in laterally. Thus, it is claimed, a combined fusion and forged weld is obtained.

A machine for heavy welding and having two torches is also available. On this machine one torch precedes the self-feeding torch and preheats the seam to very near the fusion point. Both torches are independently adjustable as to heat, height and inclination.

For extra long welds, such as long tanks, several sets of tandem torches can be used, each set welding one linear foot, a tank 8 ft. long being welded with seven sets, each starting a foot apart and the machine proper only progressing one foot. This, it is pointed out, would eliminate expansion, distortion and strain caused by one-sided overheating, and would finish the work in one-eighth the time.

To Exhibit Electrical Heating Equipment

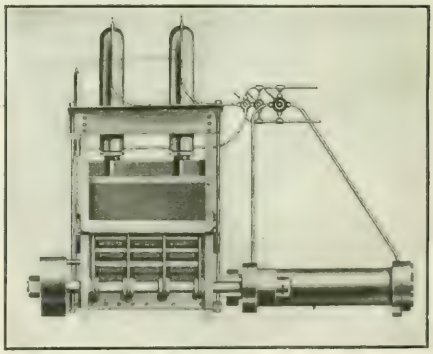
A portable semi-automatic arc welding outfit will be shown by General Electric Co. at the Chemical Exposition, Grand Central Palace, New York, during the week of Sept. 11. This outfit is mounted on a truck and will be in actual operation. The rest of the company's exhibit will consist of various devices for the industrial utilization of electric heat. Among them will be a semi-cylindrical heat treating furnace, a tool-room muffle furnace and a soldering iron muffle furnace. In addition there will be an electric rivet heater, an electrically heated oil tempering bath, a self-regulating metal melting pot for melting solder, babbitt, or similar non-ferrous metals, and a display of individual heating units. The exhibit will be in charge of I. W. Shugg, of Schenectady.

Hydraulic Press for Baling Scrap

A bundling press employing the hydraulic principle has been developed by S. H. Garrett, 234 North Thirteenth Street, Philadelphia.

The machine, shown in the accompanying illustration, is known as the Tempus No. 4. All parts where stress occurs are either of structural or cast steel and wearing surfaces are lined with heavy boiler plate which can be readily replaced when worn. The cylinders are composition lined and provided with quick return movements. The pump may be driven either by a direct connected motor or by belt.

An outstanding feature is the large and conveniently low feeding opening, into which the scrap to be bundled may be shoved, forked or shoveled. This is obtained by dropping one side of the hopper to an angle of 55 deg., making a receptacle similar to a hay rack. When the charge is in, this side is closed by a hydraulic cylinder through a rack and toggle movement, forming the first operation in the squeezing process. At the same time the upper ram is moving down, making the second movement, after the completion of which the main pressure is applied. This forces the mass into a rectangular chamber, which is provided with a friction device that resists to within a fraction of the ultimate pressure.



Scrap Baling Press. A feature is the low feed opening

The process is then repeated. When the second billet is formed, the first is pushed out, either to drop on the floor or to be carried by means of a chute to a storage pile or placed directly into a car. This chute can be made any length and made to run in any direction and by reducing the friction the entire force of the press may be made available for conveying the finished billets.

The Youngstown Boiler & Tank Co., Youngstown, Ohio, is enlarging its capacity and installing additional equipment.

Proposed Steel Mergers Are Not Illegal

Attorney General Daugherty Renders Exhaustive Opinion Concerning Union of Independent Steel Companies

BY L. W. MOFFETT

WASHINGTON, July 25.—In giving the anticipated clean bill to the independent iron and steel companies which are proposing to merge, Attorney General Harry M. Daugherty, in his report to the Senate last Friday, presented a really profound and interesting study not only of the negotiations of the corporations involved, but also of the steel industry itself. With this basis established, the Department of Justice, discussing the question from a legal point of view and the probable effect of the mergers, held that they would not be in violation either of the Sherman act, the Clayton act, or the Webb act. Going further, the Attorney General said that the motive which prompts the Bethlehem Steel Co. to acquire the Lackawanna Steel Co. is solely the desire to acquire greater efficiency and economy in production, etc. Dealing with the proposed merger of the Midvale Steel & Ordnance Co., the Republic Iron & Steel Co., and the Inland Steel Co., the opinion said that nothing in this merger violates the Sherman act and "that there is not the slightest ground to believe that restraint of trade or monopolistic control will result." It was held that there is but one underlying purpose in the combination; that is, to enable the new company to compete with the United States Steel Corporation, which, because of the widespread distribution of its various plants and their easy accessibility to the sources of raw materials, is "enabled to produce and sell its products much cheaper than other products." Emphasizing this point, the Attorney General said: "Instead, therefore, of being in restraint of trade, the new combination will be in furtherance of trade."

View of Bethlehem Purchase of Lackawanna:

Ingot production would be 9.7 per cent of the country's total.

"I am unable to find in the exhaustive investigation I have made any reasonable warrant for asserting that the public will suffer if this combination goes through. . . . The merger now under consideration will be neither an actual monopoly nor even an attempt to monopolize."

View of Midvale-Republic-Inland Merger:

"By owning plants that are widely scattered, where production can take place in accordance with the needs of the community lying closest to the plants; by manufacturing products at plants advantageously located to ore supplies; by reducing overhead expenses; and by eliminating unnecessary sales agencies, substantial economies can be effected. The combination being formed for this sole purpose, I am unable to see wherein it is tainted with illegality."

The report of the Department of Justice, made in response to a Senate resolution offered by Senator La Follette, was of the character expected. The Attorney General, in a statement issued on June 21, made it clear that the Department of Justice had exhausted its research regarding the mergers. Indicating that he found nothing illegal regarding them, the Attorney General announced publicly that he would be glad to "hear from any dependable person who has any legitimate argument to offer against the mergers." No such arguments, except those from several State attorneys general relating to possible bearing of the basing point controversy on the mergers, having been submitted, the report clearing the steel companies of any illegal action was submitted to the Senate. The Department of Justice obviously disregarded statements asking that it consider the Pittsburgh base case in connection with the proposed mergers. This latter issue is still a matter that is before the Federal Trade Commission and is extraneous to the merger investigations of both the Department of Justice and the Federal Trade Commission and moreover has not been passed upon one way or the other, except for the issuing of a complaint.

The report of the Department of Justice was confined to the effect of the proposed mergers as they relate to the Sherman act, the Clayton act, and the Webb act. The investigation of the Federal Trade Commission regarding the mergers is under Section 5 of the Federal Trade act relating to unfair methods of competition and the Attorney General would not give any advice as to whether or not the mergers constitute a violation of this latter act.

The Federal Trade Commission, which has already issued a complaint against the Bethlehem and Lackawanna companies, held a conference last Wednesday with representatives of the Midvale Steel & Ordnance Co., the Republic Iron & Steel Co. and the Inland Steel Co., at the suggestion of the steel interests. They explained data that they have submitted regarding the proposed merger and submitted extensive schedules in connection with the questionnaire the commission has sent to steel companies throughout the country, designed to develop the effect of the proposed mergers on the steel trade. It is evident from a statement issued by Attorney Thomas L. Chadbourne, representing the steel companies, that the commission is concerned as to whether this proposed merger has any connection with the merger of the Bethlehem and Lackawanna companies, and also as to whether the proposed merger had been discussed with the United States Steel Corporation. Mr. Chadbourne said distinctly that there was no relation between the proposed Midvale-Republic-Inland merger and that of the Bethlehem and Lackawanna companies and also that the approval or disapproval of the merger by the Steel Corporation "had never been asked or wanted."

Those present at the conference included Chairman John A. Topping, of the Republic Iron & Steel Co.; President A. C. Dinkey, of the Midvale Steel & Ordnance Co.; Chairman L. E. Block, of the Inland Steel Co., and Attorneys Chadbourne and William Wallace, Jr., New York; Levy Mayer, Chicago, and John J. Walsh, of Washington. Joseph P. Tumulty, former Secretary to Woodrow Wilson, also is associated as counsel for the steel companies.

When asked whether, as has been stated, this pro-

ject had the approval of the United States Steel Corporation, Mr. Chadbourne said, "Our proposed organization has never been discussed with any of the officials or directors of the United States Steel Corporation directly or indirectly; its approval or disapproval of our plans has never been asked or wanted."

Asked whether there was any intention to combine with the Bethlehem, Lackawanna, Youngstown, Brier Hill or Steel & Tube of America, Mr. Chadbourne replied, "I wish to declare solemnly that there are no negotiations pending with any of these concerns and no thought of any negotiations." In further discussing the proposed unification, Mr. Chadbourne said, "At the end of the war inflation—October, 1920—the steel producing capacity of the country was overbuilt from 30 to 40 per cent beyond what could reasonably be expected to be the consuming capacity for several years to come. During the succeeding year and a half, the steel companies produced between 30 and 40 per cent of their capacity and the independent companies lost many millions of dollars. The United States Steel Corporation did not suffer any loss during this period. On the contrary, it made a profit. This was due to its advantages in cheaper transportation on raw materials which go into the making of steel; a greater diversification of products so that it was always producing and selling the products most in demand; advantageous location of plants so that it could supply the needed product nearest its point of consumption, thus securing more sales because of saving in the freight rate to the consumer, and cheaper selling and administration costs because of larger operation under one management.

"The independent companies enjoy none of these advantages, and to secure them they must do one of two things. Either build plants supplemental to their own in different localities throughout the country, or combine their properties, or some of them, under one management so as to overcome the handicap to some extent.

"The first alternative would involve great expenditures of captial, which it would be difficult or impossible to raise because additional building would add to the already serious situation of over-production, and any return from such additional expenditures would be very doubtful, as they would have to await the increase in the country's consuming capacity.

"The unification of the Midvale-Republic-Inland companies will produce a unit having plants in Coatesville and Johnstown, Pa., Youngstown and Niles, Ohio; Chicago (Indiana Harbor), Illinois and Birmingham, Ala. In short, it will have plants in the principal consuming districts. Its product will be very much more diversified than the product of any one of the companies, and it will be in a position to stock steel products in the principal markets of the country so as to supply the demand at different points promptly and efficiently.

"The combination of these three companies will not disturb competition in the steel industry. The output of the three companies is only 7½ per cent of the country's production.

"Some products of all three companies, or of some two of them, meet at common points or are sold within the same State. This is true, for instance, of structural shapes, plates, bars and sheets. The plants of the three companies are situated in Pennsylvania, Ohio and Indiana. That is to say, in the Eastern, Middle and Western districts. If circumstances are such that products of Midvale, Republic and Inland can meet at a common point, it must follow that products of all other plants located in any of the three districts can also be shipped to this same common point.

"If we take the actual shipments of the three companies which might have been considered competitive, say in the year 1920, and compare them with the potential competition from all other companies for that same year, we find that unification of the three companies might have eliminated competition in—

Structural shapes to the extent of 65 100ths of 1 per cent (0.65).
Plates to the extent of 1 7/100ths per cent (1.07).
Bars to the extent of 8/10ths of 1 per cent (0.80).
Sheets to the extent of 31/100ths of 1 per cent (0.31).

"In other words, the unification of these three companies would leave the following percentage of the total production of the United States in the field of competition:

Structural shapes	99.35
Plates	98.93
Bars	99.20
Sheets	99.69

"The men who are responsible for this unification realize that they can only hope by the resulting economies to cut off part of the cost differential or from $3 to $5 now enjoyed by the Steel Corporation, so we have planned a most conservative corporate structure in order that our interest charges shall be lower than the Steel Corporation's.

"The basis of the capitalization of the North American Steel Co. involves its assumption of the present outstanding bonds of the three companies. No new bonds will be issued. About 3,222,000 shares of new stock will be issued against 3,563,000 shares of the constituent companies. Additional working capital to the extent of $20,000,000 cash will be provided by sale of common stock. Thus, upon the unification of the properties, the total shares of preferred and common outstanding will be about 3,812,000 compared with the present number of shares of the constituent companies, 3,563,000, and the additional number of shares will be accounted for by $20,000,000 cash working capital added to the assets of the unified company.

"This makes our interest charges on bonds and preferred stocks about $1.41 per ingot ton against the Steel Corporation's $2.30."

The Opinion of the Attorney General

To the President of the Senate:

This communication is in response to a resolution passed by the Senate on May 8, 1922, a copy of which was duly transmitted to me. Without stopping to quote it in full, the resolution starts out with recitals that the public press has announced a proposed merger of seven steel companies, to be followed later by the inclusion therein of the Bethlehem Steel Corporation; that if such a merger takes place the corporation thereby formed will control the steel production of the country outside of that part in the hands of the United Steel Corporation, thereby placing monopolistic control of the country's entire steel production in the hands of two gigantic corporations. These recitals are then followed by requests to the Attorney General and the Federal Trade Commission to inform the Senate what steps they have taken to ascertain the purpose and effects of such a merger; the results of any investigation they may have made; what action they have instituted to protect the public interests; and that the Attorney General inform the Senate whether he thinks it advisable to proceed under the Sherman Act and the Clayton Act to prevent the impending combination.

At the outset I think it proper to call attention to the fact that my predecessors have consistently adhered to the doctrine that the duties of the Attorney General are prescribed by statute; that he is a member of the executive branch and as such is under the guidance and supervision of the President; that for the legislative branch to direct his conduct is a measurable interference with the executive branch; and that he is under no duty to obey the mandates of one branch of the Government when not sanctioned by positive law. The opinions embodying these declarations are copied in the margin. A compliance with this resolution in all of its details demands a departure on my part from what has heretofore been regarded as settled law. I do not intend, however, to allow these rulings to stand in the way of making a full and comprehensive report; but it must not be inferred that by so doing I mani-

fest any intention to challenge the correctness of these rulings or to assail in the slightest degree the reasoning on which they are founded.

Two separate and independent mergers, unrelated to each other in any way, are in process of formation. One is between the Bethlehem Steel Corporation, owning plants in Pennsylvania and Maryland; and the Lackawanna Steel Company, whose plant is at Buffalo. The other is between the Midvale Steel & Ordnance Co., owning plants in Pennsylvania and in Delaware; the Republic Iron & Steel Co., owning plants in Ohio, furnaces in Pennsylvania and in Alabama, and certain plants at East Chicago and Muncie, Indiana, and at Moline, Illinois; and the Inland Steel Co., owning plants close to Chicago.

It will be conducive to a clearer understanding of the situation if I take these mergers up separately. In order to furnish the information which I called for it was necessary for these companies to set at work for many days a large clerical force to go through hundreds of thousands of invoices covering each individual sale for the years 1919, 1920 and 1921, and to tabulate the results. The figures for all these years are before me, but to set them all forth would require an inordinately long report. I shall therefore confine myself to the figures for 1920, which I think can be considered a fairly normal year. As every one knows, there was a heavy slump in the steel business in 1921, and the figures for that year can hardly be regarded as typical.

Bethlehem and Lackawanna Merger

To get an accurate idea of the scope of the activities of the Bethlehem and the Lackawanna, it will be well to present at the outset a list of the articles made by one company which are not made by the other. As to such articles there obviously can be no competition between the two. This process of elimination will eventually lead us to the products which are common to both.

The activities of the Bethlehem may properly be divided into main divisions, one representing the production of steel products, the other the building of ships. Of the selling value of its products in 1920, 61.39 per cent. was derived from the former; 38.61 per cent from the latter. Inasmuch as the Lackawanna does not engage in ship building activities, it is apparent that no competition between the two in this line of business can possibly exist.

Coming now to the division representing the production of steel products, the Bethlehem produces for sale a large number of articles which the Lackawanna does not. These include low phosphorous pig iron; spiegeleisen; ferromanganese; Mayari iron; girder rails for street car service; guard rails; high tee rails; rail braces; frogs; switches, crossings, special track work, switch stands, turntables, Bethlehem structural shapes, ship structural shapes, eye bars, cement mill balls, hollow forgings, press and hammer forgings, fluid compressed ingots, hardened steel rolls, drop forgings, shafting, die blocks, iron, alloy, steel and other highly finished bars, cold drawn bars, spring steel, file steel, rough turned bars, window sash sections, curb bar, barrel hoop sections, blue annealed sheets, black and galvanized sheets, tin and black plate, steel castings, manganese steel castings, cast iron and steel rolls, iron castings, tunnel segments, iron moulds, brass castings, puddle iron, staybolt iron, chain iron, electric tool steel, crucible tool steel, toe calk steel, armor plate, guns, gun forgings, gun mounts, carriage caissons and limbers, range finders, gun sights, air flask forgings, shell forgings, completed ammunition, cartridge cases, fuses, turret mechanisms, armor plate vaults, safe deposit boxes, large gas engines, large oil engines, heavy machinery, large pumps, machine tools, hydraulic presses, steel automobile wheels, cutting and punching tools, special bolts and nuts of all kinds, rivets, washers, tie rods, liner wedges, car and bridge knuckle and cotter pins, clevices, pole line material, turnbuckles, marine engines, Curtiss turbines, Diesel engines, Scotch and Yarrow boilers, condensers, marine auxiliaries, Weir pumps, Dahl fuel oil burners, valves and fittings, paraffine wax machinery, mining machinery, steel and wood, sleeping, private, passenger, baggage and mail cars.

On the other hand, the Lackawanna produces for sale a number of articles which the Bethlehem does not. These include base plates; piling, plate piling, merchant steel bars, including rounds, squares and flats, agricultural shapes, auto sections.

The products produced by both companies for sale may with substantial accuracy be designated as follows: coke by-products, pig iron, blooms, billets, slabs and sheet bars, standard tee and light rails, rail joints, splice bars and tie plates, structural shapes, plates, universal and sheared, concrete bars, steel bridges, viaducts, buildings and pier caissons, railroad spikes, track bolts and nuts.

Taking the figures for 1920 as a basis, it appears that of the income received by the Bethlehem from its steel products division, 67.60 per cent was derived from products which the Lackawanna does not produce. In the case of the Lackawanna, 31.98 per cent was derived from products which the Bethlehem does not produce. Or to state the matter in a different way, the Bethlehem's income received from products common to both companies (including both the domestic and foreign trade) was 32.40 per cent; the Lackawanna's, 68.02 per cent.

In this connection it should be borne in mind that both companies engage in export as well as domestic trade. Inasmuch as the anti-trust laws differentiate between the two, it will be well to produce the figures showing the percentages of each. Of the total income, both domestic and export, received by the Bethlehem from its steel products division in 1920 on all articles, common to both companies, substantially 83 per cent was received from the domestic trade, and 17 per cent from the export. In the case of the Lackawanna, substantially 84 per cent was received from the domestic and 16 per cent from the export.

The following table shows the products in the domestic trade common to both companies in 1920, and the percentage of income represented by each such product to the total income on both common and noncommon products, the Bethlehem's income from its shipbuilding activities being wholly disregarded in arriving at the percentages:

Articles	Bethlehem Per Cent	Lackawanna Per Cent
Coke and by-products	3.48	2.12
Pig iron, basic	2.12	2.24
Blooms, billets and slabs	2.06	1.08
Sheet bars	2.15	7.31
Rails—Standard	5.02	30.01
Rails—Light tee	0.06	1.53
Structural shapes, standard	8.82	10.21
Plates, 7⅜ in. and under	2.23	7.82
Concrete bars, twisted	0.07	0.01
Rail accessories:		
Standard splice bars and continuous and 100 per cent joints	1.96	2.49
Bonzano joints	0.19	0.06
Tie plates, standard	0.19	0.12
Railroad spikes	0.57	0.35
Track bolts	0.56	0.32
Total common products	29.48	66.27
Total all others	70.52	33.73
Total of both	100.00	100.00

Coming now to the products common to both companies, I shall take up each separately and present figures from which a fair idea of the extent of competition between the two can be obtained.

Coke and By-products: The products derived in the making of coke and tar, ammonia sulphate, naptha, benzol, toluol, motor fuel and gas. As might be inferred, the sale of coke and gas is not a normal incident of the steel business. The Lackawanna sold neither in 1920. All that was produced was needed for its own business. The tar is sold outright at the plants to purchasers in that locality. Of the various products, ammonia sulphate, motor fuel and benzol are, in the order named, the most important from the standpoint of revenue. The companies themselves do not engage in the sale of these products. They are delivered to an independent company, which disposes of them on a commission basis wherever a market can be found. Inasmuch as all concerns engaged in the manufacture of gas produce similar products, to say nothing of like products placed on the market by the United States

Steel Corporation through an independent selling agency, it will be seen how really unimportant are these items with respect to the matter in hand.

Pig Iron—Basic: The pig iron produced by both of these companies is primarily intended for their own use. The production of pig iron is, of course, the initial step in the manufacture of steel products. As both companies need pig iron in their operations, it is obvious that the sale of this article is but a mere incident. It not infrequently happens, however, that if a surplus is on hand at any particular time the companies are willing to dispose of the same; but this is usually done as a matter of accommodation to a steel manufacturer who happens to be in need of the particular product. In the year in question the entire production of all kinds of pig iron was 36,925,987 tons. Of this amount the Bethlehem produced 4.69 per cent; the Lackawanna, 2.87 per cent. The Bethlehem sold in the domestic trade 107,145 tons; the Lackawanna, 33,997 tons. At the present time the latter company is selling none. The only States in the New England district (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island and Vermont) where both companies happened to ship in 1920 were Connecticut and Massachusetts; the Bethlehem shipping that year to Connecticut 6865 tons and to Massachusetts 374; the Lackawanna, 8315 tons to Massachusetts and 2337 to Connecticut. In the Eastern district (New York, Delaware, District of Columbia, Maryland, New Jersey, Ohio, Pennsylvania and West Virginia), the Bethlehem sold in that year 99,540 tons; the Lackawanna, 22,327. Of the amount thus shipped by the Bethlehem, about 57 per cent went to Pennsylvania; and of the amount thus shipped by the Lackawanna, about 65 per cent went to New York. The tonnage shipped by the Bethlehem to New York was slightly under 1200; while the Lackawanna's tonnage was slightly over 14,400. The Bethlehem shipped a large tonnage to Delaware; the Lackawanna shipped none. The Bethlehem shipped close to 10,000 tons to New Jersey; the Lackawanna shipped slightly over 4000 tons. The Lackawanna shipped a comparatively small tonnage to Ohio; the Bethlehem none at all. The Bethlehem shipped none at all to the Western district (Colorado, Idaho, Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Montana, Nebraska, Nevada, North Dakota, South Dakota, Utah, Wisconsin and Wyoming); the Lackawanna, only 440 tons. The Bethlehem shipped none at all to the Southern district (Alabama, Arizona, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, New Mexico, North Carolina, Oklahoma, South Carolina, Tennessee, Texas and Virginia); the Lackawanna but 69 tons. The Bethlehem shipped to the Pacific Coast district (Alaska, California, Oregon and Washington) only 366 tons; the Lackawanna, 159.

While statistics are available showing the entire production of pig iron in the whole of the United States, there are none showing the total sales in each particular State. But when we stop to consider that of the total pig iron produced in the United States in 1920, the Bethlehem and the Lackawanna together produced but 7.56 per cent; it becomes at once apparent that any question of competition with respect to pig iron is a matter of small concern.

Blooms, Billets and Slabs: These are semi-finished rolled-steel products, being forms through which the steel ingot passes before its conversion into other steel products. Blooms, billets, and slabs are similar products, differing from each other merely in point of size. As might be implied, they are consumed for the most part by the company which produces them, although a small tonnage finds its way into the hands of some particular manufacturer of steel products. The total production of steel ingots in the United States in 1920 was 40,881,392 tons. Assuming a loss in the conversion of these ingots into blooms, billets and slabs of 15 per cent, which is ordinarily the case, the production of the latter was therefore close to 35,000,000 tons. The total tonnage sold by the Bethlehem in the United States in 1920 was 51,631; by the Lackawanna, 9408. In other words, their combined tonnage sold in the United States in that year was 61,039, the Bethlehem contributing 84.59 per cent and the Lackawanna 15.41 per cent.

Sheet Bars: Statistics are not available showing the entire production in the United States. Like the items last discussed, sheet bars are a semi-finished rolled-steel product and constitute the material out of which sheets are made. Obviously, therefore, the purchaser of this product is usually some particular manufacturer of steel products. In 1920 the Bethlehem sold in the domestic grade 49,870 tons; the Lackawanna, 70,473 tons. In other words, out of a combined tonnage that year of 120,343 the Bethlehem contributed 41.44 per cent; the Lackawanna, 58.56 per cent. There were only six States to which sheet bars were shipped by either company in that year—New York, Delaware, Maryland, Ohio, Pennsylvania, and West Virginia. Of the 70,473 tons sold by the Lackawanna that year 66,248 tons, or 94 per cent of its entire tonnage, were sold in New York, while the Bethlehem shipped none at all to that State. Of the 49,870 tons sold by the Bethlehem that year, 26,803 tons were sold in Maryland and 17,168 in Pennsylvania, representing 88.17 per cent of its entire tonnage. On the other hand, the Lackawanna sold none at all in Maryland and only 1850 tons in Pennsylvania. Of the entire business transacted by these companies, blooms, billets and slabs constitute a very small part.

Sheet Plates—78½ Inches: No mention will be made of plates exceeding the size just mentioned, inasmuch as one of these companies does not produce them. In 1920 the sales made by these companies were distributed as follows: in the New England district, the Bethlehem 1564 tons, the Lackawanna 2720; in the Eastern district, the Bethlehem 37,626 tons; the Lackawanna 43,375; in the Western district, the Bethlehem 2408 tons, the Lackawanna 9612; in the Southern district, the Bethlehem 2500; the Lackawanna 368; in the Pacific Coast district, the Bethlehem 1946; the Lackawanna 5694. In short, out of a combined tonnage of 107,813, the Bethlehem contributed 42.71 per cent, the Lackawanna 57.29 per cent. It will be observed that 81.72 per cent of the total tonnage sold by the Bethlehem in 1920 found its way into the Eastern district as against 70.20 per cent on the part of the Lackawanna. Of the portion produced by both companies which found its way into the area described as Greater New York, the Bethlehem shipped 72 per cent, the Lackawanna 28 per cent. Of the tonnage produced by both which found its way into the rest of New York State, the Bethlehem shipped 8.62 per cent; the Lackawanna 91.38 per cent.

Concrete Bars — Twisted: In the entire United States the Bethlehem sold but 1192 tons; the Lackawanna, only 129 tons.

Structural Shapes: In point of tonnage and revenue this constitutes a very important item. There are two kinds known to the trade, the standard and the Bethlehem. The latter derives its name from the fact that it is made alone by the Bethlehem company under letter's patent. The manufacture of standard shapes is open to anyone. The total tonnage of structural shapes produced in the United States in 1920, both standard and Bethlehem, aggregated 3,306,748 tons. The Bethlehem shipped for the domestic trade 204,837 tons of standard; the Lackawanna, 88,877. In addition the Bethlehem shipped for the domestic trade 185,347 tons of the Bethlehem shapes. In other words, the percentage of the portion shipped by both companies in the domestic trade was 14.49 per cent of the total production in the United States. Of the total tonnage of both shapes shipped by the Bethlehem close to one-third was marketed in Pennsylvania alone, while slightly less than one-tenth was marketed in New York. The Lackawanna, on the other hand, shipped about one-ninth of its product to Pennsylvania and about one-quarter to New York. The Bethlehem shipped about one-thirteenth of its product to Ohio; the Lackawanna, about one-tenth. The Bethlehem shipped about one-sixth of its product to New Jersey; the Lackawanna scarcely any. In passing it may be

(*Continued on page 246a*)

World's Iron Ore Resources, 32 Billion Tons

That Is "Actual Reserves"—Potential Reserves Are Put at Several Times That Amount—A Summary by Countries and Districts

BY OLIN R. KUHN*

It is impossible to estimate closely the world's reserve of iron ore, because of the lack of available information on the unexplored fields and the varying iron content of the ores; but practically all authorities agree that there is a known reserve of from 30 to 35 billion tons of commercial ore.

According to Clarke, the American geologist, the crust of the earth contains 4.4 per cent of metallic iron, a small fraction of which has been concentrated by geological agencies to form commercial iron ore, and for every ton of these ores containing 60 per cent of metallic iron there are many tons that contain 50 per cent, many more tons that contain 40 per cent, and so on. Thus, as the iron makers or blast furnace operators are able to use the lower grades of ore at a cost that is not prohibitive, vast reserves of ore will be available for commercial use.

Iron ores are divided into many classes, as Bessemer, non-Bessemer, low phosphorus, manganiferous, etc., and each class of ore is used for the specific kind of iron or steel that is to be made. What is prejudicial in one ore may be beneficial in another. A self-fluxing ore containing 35 per cent of metallic iron may be more valuable than a refractory ore containing 45 or 50 per cent iron. An ore high in silica content is generally objectionable, because of the additional limestone that is required to neutralize the acid content, thereby decreasing the output of the furnace and increasing the cost of the iron.

The physical condition of an ore is of the utmost importance. A very fine ore chokes the furnace and prevents the free passage of the gases and leads to excessive dust losses unless it is sintered or nodulized. A hard, dense ore, such as some magnetites, is refractory and is more costly to smelt than the less refractory ores.

Extensive explorations have been made in the Americas and in Europe, so that considerable is known of the reserves of iron ore in these continents, but so little has been done in Asia and Africa that no dependence can be put on the estimates of reserves of these continents.

With a known reserve for the world of from 30 to 35 billion tons, assuming that the consumption of ore steadily increases, there is enough proved reserve to supply the requirements of the world for over 75 years. With a potential reserve of over 100 billion tons, there would probably be enough ore for between 150 to 200 years. It seems to be agreed by authorities that the reserve of iron ore in the world will be sufficient to supply the requirements for 200 years or more. Of course, this does not take into consideration the now uncommercial low grade ores or the vast unexplored regions.



Over 80 per cent of the known reserves of iron ore are located in five countries—Brazil, United States, France, Newfoundland and Cuba—although the United States is by far the largest producing country, mining from 35 to 40 per cent of the total world production. In 1917, the record year, 76,493,473 tons of iron ore was produced in the United States, 15,084,008 tons in the United Kingdom, and 22,464,780 tons in Germany. But since the war Germany has ceased to be a very large producer and France, by the acquisition of the Lorraine fields, has taken its place.

United States

The United States, which outside of Brazil contains the largest reserve of high grade iron ore in the world, the estimate being about 6½ billion tons, is divided into four districts:

Lake Superior District, including Minnesota, Michi-

*Midvale Steel & Ordnance Co., Philadelphia.

gan and Wisconsin.

Southern District, including Alabama, Georgia, the Carolinas, the Virginias, Tennessee, Kentucky, Maryland, Arkansas, Missouri and Texas.

Eastern District, including New York, New Jersey, New England, Pennsylvania and Ohio.

Western District, including the States of the Plains, the Rocky Mountains and the Pacific coast region.

The Lake Superior district, the largest iron ore producing district in the world, sends out about 85 per cent of the ore mined in the United States. The normal supply from these fields is about 60 million tons annually and the ore is for the most part high grade hematite, averaging over 58 per cent metallic iron, dry content. There are various estimates of the reserves in this district, ranging from 1600 million tons to 3500 million tons, but good authorities agree that there is a reserve of about 3 billion tons of ore averaging over 45 per cent natural metallic iron content. The low grade ore, unavailable at present, is estimated at about 70 billion tons.

The Birmingham field in Alabama is the largest in the Southern district and the ore is for the most part hematite, averaging from 35 to 45 per cent iron and usually high in silica content. The estimate for the Southern district is about 2½ billion tons.

The ores of the Eastern district are generally magnetite, although some red hematite ores of the Clinton age are also found. The magnetites are as a rule low grade, averaging about 25 to 40 per cent iron, but they are usually concentrated, and this raises their iron content to 55 to 60 per cent. There has not been sufficient exploration in the Eastern district to give any close estimate, but it is safe to say there are 500 million tons of commercial ore in these States.

Very little is known about the ores of the Western district, which produces less than 2 per cent of the total output of iron ore in the United States. The ores are hematite, brown and magnetite and are as a rule high grade, running from 55 to 65 per cent iron content. The reserve is estimated at about 500 million tons.

Newfoundland

Newfoundland contains one of the largest iron ore reserves in the world, and it lies within a radius of five miles of Belle Island, in the Wabana basin, a greater part of it lying under Conception Bay. The ore is hematite and averages 48 to 57 per cent iron and 6 to 12 per cent silica. The Stockholm report credits Newfoundland with 3635 million tons of ore.

Canada

There are no large proved reserves of iron ore in Canada, although some is found in New Brunswick, Nova Scotia, Quebec, Ontario, Alberta and British Columbia. Recently there has been a report of a large body of ore found south of Hudson's Bay, but little is known of it and no exploration has been done. The ores are both hematite and magnetite and average from 50 to 65 per cent iron content. Hatch estimates the reserve of Canada at 150 million tons.

Mexico

On account of its lack of fuel Mexico has never been explored for iron ore to any great extent and the two coasts are the only places where deposits would be available for international trade. The ores found have been both hematite and

Iron Ores of the World—Reserves,

Country and District	Reserve in Million Tons — Actual	Potential	Iron Content	Kind of Ore
EUROPE:				
United Kingdom				
Northumberland Durham	35.0	200.0	25-30	Carg.
Cumberland-Lancaster	35.0	100.0	50.00	Hem.
Cleveland	190.0	400.0	30.00	Oolitic
York and Derby		200.0	25-30	Carb.
Lincoln	250.0	450.0	33.00	Carb.
Leicester	62.0		30.00	Carb.
Strafford, Scalop, etc.	200.0	800.0	25-30	Carb.
Rutland and Oxford	123.0	300.0	25-30	Carb.
Northampton	100.0	300.0	25-30	Carb.
Wilts and Kent		3.5	27.00	Cret.
Gloucester	2.5		36.00	Brown
Inverness, Scotland	10.0		23.00	Oolitic
Glasgow and Edinburgh	7.7	400.0	25-30	Carb.
South Wales		1,500.0	25-30	Carb.
Total United Kingdom	1,015.2	4,655.5		
Norway				
Sydvaranger	108.8	310.0	68.00	Mag. Concen.
Sarreisen		43.0	35.00	Mag.
Salangen	21.4	34.0	35.00	Mag.
Loedoes Islands		50.0	35.00	Tit.
Sjaafeld and Melkedal		17.1	35.00	Mag.
Sulitjelma	9.0	17.7	62.00	Mag.
Dunderland	90.0	300.0	35.00	Mag. & Hem.
Eiteraadal		13.0	35.00	Mag. & Hem.
Bertstaden	8.5	23.0	48.00	Mag. & Hem.
Total Norway	237.7	808.1		
Sweden				
Kirunavaara-Luossavara	365.0	840.0	54.00	Mag.
Ekstromberg	20.0	40.0	62.00	Mag.
Suappavaara-Leveanieni	50.0	61.7	60.00	Mag.
Gellivaare	129.0	175.7	51.00	Mag.
Ruouteyare		12.0	40.00	Tit.
Central Sweden	185.0	120.0	40.00	Hem.
Taberg		50.0	50.00	Mag.-Tit.
Total Sweden	749.0	1,239.4		
Finland				
Jussaro		30.0	38.00	Mag.
Pitkaranta	13.5	7.0	30.00	Mag.-High Sul.
Total Finland	13.5	37.0		
Germany:				
West Rhine	4.0	0.5	30.00	Brown
East Rhine-Kalkberg	3.5	4.0	40.00	Brown
Siegerland	116.0	50.0	38-40	Carb.
Lahn-Dill	166.0	100.0	48.00	Brown & Hem.
Westerwald-Taunus	15.7	15.3	35.00	Brown
Spessart	3.5	3.5	33.00	Carb.
Weser-Salzgitter	248.0	1,000.0	30.00	Brown & Col.
Harz Mountains	20.5	55.0	45.00	Brown & Hem.
Kellerwald	4.0	8.0	48.00	Brown & Hem
Lower Hesse	1.5	2.0	40.00	Brown
Bentheim		200.0	30.00	Brown
Teutoburger Wald	20.5	100.0	35.00	Brown & Carb.
Oolitic Ores	20.0	100.0	32.00	Oolitic
North and Central Germany	8.0	8.0	30.00	Brown Ore
Thuringia	52.0	105.0	45.00	Silic. Carb.
Bavaria and Wurttemberg	42.0	1,100.0	35.00	Brown.
Silesia	0.6		50.00	Mag.
Total Germany	725.8	2,851.3		
Luxemburg				
Lorraine Field	200.0	70.0	25-40	Brown
Belgium				
Namur and Liege	7.1	7.1	35.00	Hem.
Antwerp and Limburg		66.0	35-40	Brown
Total Belgium	7.1	73.1		
France				
Lorraine	4,800.0	1,500.0	25-40	Brown
Haute Marne	13.5	10.0	40.00	Brown
Dielette	50.0	50.0	55.00	Mag. & Hem.
Calvados Manche	175.0	2,000.0	47.00	Oolitic
Brittany and Anjou	250.0	500.0	50.00	Mostly Brown.
Pyrenees-Orientales	30.0	30.0	54.00	Spathic
Total France	5,318.5	4,090.0		
Spain				
Lugo	70.0	40.0	48.00	Brown & Spa
Leon	25.0	100.0	49-52	Brown
Oviedo	60.0	50.0	57-64	Brown & Hem.
Santander	20.0		55.00	Brown
Vizcaya	35.0	30.0	49-52	Brown & Hem.
Guipuzcoa and Navarra	8.0	4.0	52.00	Hem.-Calc.
Lerida		20.0	32.00	Low Grade
Salamanca	24.0		60.00	Hem.
Toledo and Guadalajara	120.0	60.0	50.00	Brown
Badajoz	7.0	7.0	55-66	Hem. & Mag.
Huelva	174.0		51-58	Brown & Mag.
Seville	18.0	18.0	50.00	Brown & Mag.
Malaga	10.0		55.00	Brown & Hem.
Granada	17.0	10.0	50-59	
Almeria	45.0	24.0	50-59	
Murcia	25.5	10.0	50.00	Mangan.
Total Spain	658.5	373.0		
Portugal				
Moncorvo	10.0	25.0	40.00	
Serra dos Monges	5.6		55-63	Brown
Serra Marao	1.0	2.0	50.00	
Serra de Cassia	1.0		50-60	Mangan.
Total Portugal	17.0	27.0		

magnetite, averaging 55 to 65 per cent iron, and most of the deposits are located in the states of Guerrero, Micheacan, Oaxaco and Pueblo. The International Geological Congress placed the reserve of Mexico at 55 million tons, but more recent explorations have shown that the reserve is far greater than this.

Average Iron Content and Kind of Ore

Country and District	Reserves—Million Tons: Actual	Potential	Iron Content	Kind of Ore
Sweden:				
Gellivara Mountains	1.0	1.0	42.00	Tit.
Lesser Deposits	2.5	2.5	30.00	Oxd. & Sil.
Total Sweden	3.5	3.5		
Italy:				
Elba	2.5		60.00	Hem. & Mag.
Sardinia			45.00	Oxd. & Mag.
Valle d'Aosta			55.00	Mag.
Central Italy	2.0		40.00	Brown
Total Italy	10.5			
Austria:				
Carinthia-Hartenberg	7.0		50.00	Brown & Sid.
Styria-Erzberg	210.0	150.0	50.00	Brown & Sid.
Total Austria	217.0	150.0		
Czecho-Slovakia:				
Rakonitz	50.0	18.0	35.00	Ool. Hem.
Bohemia	35.0	100.0	38.00	Brown
Total Czecho-Slovakia	85.0	118.0		
Poland:				
Joanes Ore	32.5	210.0	30–35	Brown & Sid.
Bog ore	2.0	[illegible]	30–35	Brown & Sid.
Total Poland	34.5	212.0		
Roumania:				
Hunvad	3.7	13.3	44.00	Brown & Carb.
Banat	[illegible]	10.0	40.00	Brown & Sid.
Total Roumania	6.2	23.3		
Jugo-Slavia:				
Vares	21.0	30.0	45.00	Hem. & Sid.
Greece:				
Kojias	40.0	50.0	45.00	Brown-Chrom.
Russia:				
Moskva Basin	300.0	400.0	40.00	Brown
Voronezh and Tambof	50.0	75.0	40.00	Brown
Orel and Kursk		37.0	40.00	Brown
Krivoi Rog	50.0	100.0	50–70	Hem.
Kerch	100.0	200.0	40–45	Oolitic
Caucasus	10.0	30.0	62.00	Mainly Mag.
Ural Mountains	2.0	1.0	40–60	Hem. & Mag.
Perm & Viatka	20.0	20.0	22.00	Siderite
Gora Blagodat	10.0	10.0	27.55	Hem. & Mag.
Versh. Isetsk	6.5		50–60	Brown & Hem.
Alapaevsk	30.0	50.0	44.00	Brown
Bakalsk	26.0	10.0	50.00	Brown
Magnitnaia Gora	25.0	25.0	45.00	Hem. & Mag.
Total Russia	629.5	958.0		
Total Europe	10,009.5	15,785.2		
ASIA:				
India:				
Bengal and Central Prov.	400.0		64–69	Hem. & Mag.
China:				
Ta-Yeh and Pen-Hsi-Hu	400.0		60–62	Hem. & Mag.
Japan:				
Kamaishi	20.0		55–60	Mag.
Total Asia	820.0	457.0		
AFRICA:				
North Africa:				
Tunis and Algeria	150.0		50–60	Hem.
South and West Africa:				
French West Africa	100.0		62.00	Hem.
Australasia:				
New Zealand—N. S. Wales	136.0		[illegible]	Brown & Hem.
Total Africa	386.0			
NORTH AMERICA:				
Newfoundland:				
Bell Island	3,635.0		48.57	Hem.
Canada:				
Total Canada	150.0		50–66	Hem. & Mag.
United States:				
Lake Superior	3,000.0		54–62	Hem.
Southern District	2,500.0		32–45	Hem.
Eastern Districts	500.0		25–65	Mag.
Western District	500.0		45–60	Hem. & Mag.
Total United States	6,500.0	70,000.0		
Mexico:				
West Coast	55.0		42–67	Hem. & Mag.
Cuba:				
Oriente—Mayari	600.0		40–50	Brown Hem.
Levisa	75.0		40–50	Brown Hem.
Mea	1,985.0		40–50	Brown Hem.
Camagüey	450.0		40–50	Brown Hem.
Pinar del Rio	40.0		55–65	Mag. & Hem.
Total Cuba	3,150.0	12,000.0		
Total North America	13,340.0	82,000.0		
SOUTH AMERICA:				
Venezuela:				
Orinoco	560.0		65–68	Mag.
Chile:				
Valparaiso			55–68	Mag.
Brazil:				
Minas Geraes	7,500.0		60–70	Hem.
Total South America	8,060.0			
Total World Reserve	32,555.5	98,242.0		

Cuba

About 90 per cent of the Cuban ores are brown and hematite and are found on the northeast coast of the Oriente Province. The famous Mayari field lies in this district. The ores average from 40 to 50 per cent iron, 6 to 14 per cent alumina, 1 per cent nickel, and 1.5 per cent chromium; but on account of the high moisture and sulphur content it is necessary to roast them before they are desirable for commercial use. The reserves of Cuba are estimated at 3 billion tons. Cuba has no iron industry and exports its entire production of ore. About 80 per cent of the ores in Cuba reserve are owned by four steel companies in the United States.

Venezuela

The ore depostis of Venezuela are located in the delta of the Orinoco River and the ore is generally magnetite. Eckel estimates that Venezuela and Chile have 500 million tons of high grade ore.

Chile

The iron ores of Chile are scattered along the west coast north of Valparaiso and consist chiefly of high grade hematite. The Bethlehem Steel Co. is operating a property at Tofo which is said to contain 200,000,000 tons of ore.

Brazil

Brazil has probably the largest undeveloped iron ore reserve in the world, being estimated by Merriam and Leith at 7½ billion tons averaging from 60 to 70 per cent iron. The principal deposits are located in the State of Minas Geraes, but so far little ore has been produced.

United Kingdom

The bulk of the ore in the United Kingdom is found in England and is of the carbonate variety, averaging from 25 to 35 per cent iron. Roesler estimates the known reserve at about 1015 million tons. England does not produce enough ore for its consumption and must draw upon Spain, Norway and Sweden.

Norway

The greater part of the iron ores of Norway are low grade magnetites, averaging about 35 per cent iron, and must be concentrated before they are desirable for furnace use. The Sydvaranger and Dunderland deposits are the largest, and the other deposits average from 50 to 60 per cent iron. The known reserve is estimated at about 237 million tons. Norway has no iron industry and exports practically all of its ore production.

Sweden

Sweden is renowned for the great purity of its iron ores. The largest deposits are in the north of Sweden and the ores, generally magnetite, contain about 62 per cent iron and are low in sulphur. The known reserve is estimated at about 750 million tons. Sweden exports over 80 per cent of its ore production.

Germany

Since the war, by the loss of the Lorraine fields, the reserves of Germany

have been greatly reduced. The ores are, as a rule, low grade brown or hematite and in some cases must be roasted to reduce the moisture. Germany without the Lorraine field only produces 5 to 10 million tons annually, while in 1913 she consumed 48 million tons, so that in the future she will have to import a great part of her ore. About 90 per cent of the reserves, which are estimated at about 725 million tons, are located in the Rhine and Wesser fields.

Luxemburg

The Luxemburg deposits lie in the Lorraine basin and are estimated to contain about 200 million tons. These ores are controlled and consumed by Germany.

Belgium

The Belgian iron ore deposits are small and are generally low grade brown ore averaging from 35 to 40 per cent iron and high in phosphorus. They are located in the Antwerp-Limburg district and the known reserve is estimated at only 7 million tons. The ore production of Belgium is very low and practically all of the ore it consumes is imported from France.

France

France ranks next to the United States and Brazil in reserves of available iron ore, the largest deposits being those of the Lorraine basin. France at present will produce about 40 million tons annually. The Lorraine ores are of the low grade brown type, averaging from 25 to 40 per cent iron, and are generally high in phosphorus. The other deposits in Normandy and Brittany are hematite and average about 50 per cent iron. Roesler estimates the reserve of France, including Lorraine, at 5318 million tons, the Lorraine field alone containing 4813 million tons.

Spain

Deposits of iron ore are scattered all through Spain, and the ores are generally brown, hematite, and spathic, averaging from 50 to 65 per cent metallic iron and low in phosphorus. The Huelva deposits in southern Spain are the largest. Spain produces 8 to 10 million tons of iron ore annually, most of which is exported, and the reserve is estimated at 678 million tons.

Portugal

The deposits of Portugal are small and the ores average from 40 to 60 per cent iron. Portugal has no iron industry. The reserves are estimated at about 17 million tons.

Italy

There are no large deposits of iron ore in Italy, the largest being the Val D'Aesta in the north, which has a known reserve of about 6 million tons. The ores are high grade magnetite low in phosphorus. Roesler credits Italy with a total of 10 million tons, and Italy and Switzerland with a reserve of 14 million tons. Italy produces about 1,000,000 tons of ore per year, which is consumed in Italian furnaces.

Austria

The only deposits of iron ore in new Austria are the Erzberg deposits of Styria and the Huttenberg deposits of Carinthia. The ore is as a rule low grade and must be roasted before it is suitable for use. The reserves of Austria are placed at about 217 million tons.

Czecho-Slovakia

The largest ore deposits in Czecho-Slovakia are in Bohemia and Ruthenia. The ore is generally low grade hematite and brown, averaging about 35 per cent iron, and must be roasted to reduce the moisture. Czecho-Slovakia has a reserve of about 85 million tons and produces from 2 to 3 million tons annually.

Poland

The main deposits of Poland are Jurassic and bog ores averaging from 30 to 35 per cent iron, and the known reserve is estimated at only about 35 million tons.

Rumania

There are no extensive iron ore bodies in Rumania

Iron Ore Produced in Some Principal Countries, 1913 and 1916-1920, in Metric Tons. Table from "Mineral Resources," 1920, Part I

Country	1913	1916	1917	1918	1919	1920	Source of Data [a]
North America							
Canada [b]	270,984	249,638	195,317	191,967	178,869	115,961	1913-1920, 1.
Cuba	1,607,750	724,119	562,341	653,829	363,522	896,952	1913-1920, 2.
Newfoundland [c]	1,456,859	918,121	801,172	769,809	453,565	585,074	1913-1920, 1.
United States	62,972,124	76,370,355	76,493,473	70,772,810	61,943,913	68,689,517	1913-1920, 2.
South America:							
Chile	14,100	56,166	5,000	2,743			1913-1917, 3; 1918-1920, 2.
Venezuela	8,141						1913, 1.
Europe							
Austria-Hungary	5,318,531		3,744,656	[d]	[d]	(d)	1913, 5; 1917, 30.
Belgium	150,450	30,430	17,000	500	1,820	(d)	1913-1919, 6.
France	21,917,870	1,680,684	2,034,721	1,671,851	e9,112,786	e13,871,187	1913-1918, 7; 1919-1920, 9.
Germany	e28,000,000	e21,355,064	e22,464,780	e18,392,569	[f]	(d)	1913-1917, 10; 1918, 10 and 11.
Greece	313,578	84,985	63,364	67,871	46,929	44,751	1913-1917, 12; 1918, 30; 1919-1920, 8.
Italy	603,116	942,244	993,825	693,872	613,025	423,300	1913-1919, 13; 1920, 8.
Luxemburg	7,333,382	6,957,854	4,502,692	3,131,400	3,111,692	(d)	1913-1917, 10; 1918, 11; 1919, 30.
Norway	544,686	417,899	302,739	95,887	[f]	(d)	1913-1918, 14.
Portugal	49,182	2,261	7,381	[d]	8,712	12,845	1913, 5; 1916-1918, 30; 1919-1920, 8.
Russia	9,513,945	[d]	[d]	[d]	[d]	(d)	1913, 15.
Spain	9,861,668	5,856,861	5,551,071	4,692,651	4,640,061	4,767,693	1913-1919, 16; 1920, 8.
Sweden	7,475,571	6,986,298	6,217,172	6,623,661	4,981,110	(d)	1913-1919, 17.
United Kingdom	16,254,085	13,711,247	15,084,008	14,847,571	12,450,875	12,911,430	1913-1920, 18.
Asia							
China	f423,003	278,555	304,356	e382,719	e610,420	e682,938	1913, 19; 1916-1917, 5; 1918-1920, 30.
Chosen	142,012	245,355	140,613	202,882	423,267	(d)	1913-1916, 4; 1917, 30; 1918-1919, 20
India	376,797	418,418	419,991	500,607	572,798	(d)	1913-1919, 21.
Japan	171,656	158,815	[g]	232,436	204,846	(d)	1913-1916, 4; 1918-1919, 22.
Africa:							
Algeria	1,348,899	1,042,865	985,293	902,465	735,579	1,071,278	1913-1918, 7; 1919-1920, 23.
Rhodesia	[h]	4,887	4,799	5,765	2,268	.....	1916-1920, 24.
Tunis	597,500	500,935	605,958	421,543	(d)	(d)	1913-1918, 7.
Union of South Africa				4,426	3,268	2,326	1913-1920, 25.
Oceania							
Australia							
New South Wales [g]	75,981	95,626	97,840	120,548	149,134	161,294	1913-1919, 26; 1920, 8.
Queensland	41,031	44,870	25,467	43,469	25,072	20,025	1913-1919, 20; 1920, 8.
Southern Australia	61,632	191,352	333,657	261,154	272,840	419,667	1913-1920, 28.
Philippine Islands					[i]	(d)	1919, 29.

[a] 1, Canada Dept. Mines, Mines Branch; U. S. Geol. Survey; 3, Anuario estadístico de la República de Chile; 4, Bur. Foreign and Domestic Commerce; 5, National Federation of Iron and Steel Manufacturers (London); 6, Statistique des Industries Extractives et Métallurgiques; 7, Statistique de l'Industrie Minérale; 8, Official Preliminary; 9, *Min. Jour.*, April 29, 1921; 10, Vierteljahrshefte zur Statistik; 11, Comité Central [illegible]; 12, Tchernyi Statistitcheskoi du Mouvement Minier; 13, Rivista del Servizio Minerario; 14, Norges Offisielle Statistik; 15, Russian Gornago Dept. Mining [illegible]; 16, Estadistica Minera de España; 17, [illegible]; 18, Mines and Quarries (London); 19, *Iron Trade Review;* 20, Official data furnished by American consul-general, Keijo (Seoul), Chosen, and American Embassy, Tokio, Japan; 21, Records Geol. Survey of India; 22, Mining Industry of Japan; 23, Consular Report; 24, Rept. Secretary for Mines; 25, Ann. Rept. Dept. Mines and Industries; 26, Ann. Repts. Dept. Mines; 27, Ann. Repts. Under Secretary for Mines; 28, Review of Mining Operations, Dept. Mines; 29, Mineral resources of the Philippine Islands; 30, Imperial Mineral Resource Bureau, London. [b] Shipments. [c] Exports. [d] No data available. [e] Includes Lorraine. [f] From Tayeh deposit. [g] Includes iron ore from State mines received at Eskbank Iron Works, Lithgow, also ironstone for flux and iron oxide.

and the reserve is estimated at only about 6 million tons of carbonate ore, averaging about 44 per cent iron. Rumania has no iron industry and produces practically no ore.

Jugo-Slavia

The only ore found in Jugo-Slavia is in Bosnia, and it is of the hematite variety. The reserve is estimated at 21 million tons. The production is very small and the ore is used in the furnaces of Trieste.

Greece

The principal deposits of iron ore in Greece are the chromiferous hematite ores near Lake Kopais. They average about 45 per cent iron and 2 per cent chromium and the reserve is placed at about 40 million tons. Practically all of the ore is exported. There are several small deposits of manganiferous ores in the islands of Syra, Cerigo, Zea, Thermia and Serpho.

Russia

The largest bodies of iron ore in Russia are found in the central and southern parts of the country and the most extensive of these are the deposits at Lipetsk, but the ore averages only about 40 per cent iron. Some high grade hematite ores averaging from 50 to 70 per cent iron are found in the southwest around Krivoi Rog. Russia produces about 10 million tons annually and the reserve is estimated at about 630 million tons.

India

The main deposits of India are hematite similar to those of the Lake Superior district in the United States and are located at Mayurbhanj and Singhum in Bihar and Orissa, Clanda and Drug in the central provinces, and Kadur in Mysore. The ores are high grade, averaging about 60 per cent metallic iron, but on account of the small portion of India that has been explored no very correct estimate of reserves can be given. The known ores are estimated at about 400 million tons, running above 60 per cent in iron.

China and Korea

As with the rest of Asia, very little is known about the iron ores of China. The largest known deposits are at Hanyang in Hu-Pei Province, which are estimated to contain over 100 million tons of hematite ore, and the magnetite deposits of Pen-Hsi-Hu, which are said to contain another 100 million tons of commercial ore. The ore is high grade, ranging from 50 to 65 per cent iron. Foster Bain, chief of the United States Bureau of Mines, gives the reserve of China and Korea at 400 million tons of known ore, although all authorities seem to agree that the undiscovered ores will prove many times that amount.

Japan and Chosen

The iron ores of Japan are widely distributed and the total available tonnage is fairly large, but no single large deposit is known. There are five producing deposits, the Kamaishi, Nakakasaka, and Hitekabe, which contain magnetite, and the Sennin and Chugeku deposits, which are hematite. The Kamaishi deposit is probably the largest and the ore will average from 55 to 60 per cent iron. Ineuye estimates the known reserve of Japan at 20 million tons.

North Africa

The only data on iron ore deposits in northern Africa show deposits in Tunis, Algeria and Morocco. The ore found is generally hematite and averages from 50 to 60 per cent iron. Eckel gives the reserve of these three countries as 150 million tons.

East and Southeast Africa

Brown hematite ores have been found in Egypt and the Soudan, but the deposits are scattered and little is known of them. Some magnetite ores are reported from Uganda, British Somaliland, and East Africa Protectorate, and there are large bodies of ore in the Congo and German East Africa, but no estimates of reserves are given for any of the deposits.

South and West Africa

Various types of ore are found in South and West Africa somewhat similar to those found in Cuba. They are generally of high silica and alumina content and fairly high in iron. One deposit in French West Africa has been found recently to contain a reserve of about 100 million tons, and others are found in Rhodesia and Transvaal, but like the rest of Africa, little is known of the amount of reserve tonnage.

Australia

Although no definite estimates are given of the reserve of ore in Australia, high grade hematite is found in New Zealand, New South Wales and Tasmania in considerable quantities, with scattered deposits in Victoria, Queensland, West and South Australia. Sjogren estimates the total for Australia at 136 million tons.

Summary

The above countries show a total reserve of known ore of 32,555,500,000 tons, equivalent to about 15,000 million tons of metallic iron, and the potential or possible ore will probably reach 100 billion tons. F. H. Hatch in 1920 estimated the actual reserve at 31,800 million tons and Sjogren in 1910 estimated it at 32,408 million tons, with a potential reserve of over 125 billion tons. E. C. Eckel in 1914 estimated the known ore at 34,792 million tons, with a potential reserve of over 90 billion tons.

Great Tonnage Moved at Steel Plants

YOUNGSTOWN, July 25.—Dependence of operations of important iron and steel properties on transportation is again being emphasized in curtailments following in wake of shopmen's strike. Within the plants of large industrial companies an astonishing volume of material is being constantly moved by rail.

"Transportation is of vital importance in a large industry," states V. W. Delaney, superintendent of transportation of the Youngstown Sheet & Tube Co. "Every commodity entering into manufacture must be handled by rail and all finished material likewise.

"Our plant has handled a maximum of 32,000 cars in one month to and from railroads, averaging better than a thousand a day. Every car averages five separate moves from its arrival to departure from our tracks, making a grand total of approximately 5000 car movements per day and necessitating almost clock-like work to avoid delays to some department or group of workmen.

"The greatest co-operation must exist between the more than 150 foremen ordering work, and the car department. Locomotives cost about $7 per hr. to operate, and a wrong order from a department causing unnecessary work is a costly thing for the company.

"The freight tonnage required to be handled in the normal operation of our plants amounts to more than 5,000,000 tons of inbound freight, 1¼ million tons of outbound and 1,000,000 tons of intra-mill between departments, making a grand total of more than 7,000,000 tons of freight to be handled on our tracks per year. This includes 30,000 cars of ore dumped through our car dumper."

Ignition of Coal Dust by Electric Arcs

The extensive use of pulverized coal for fuel in industrial plants gives interest to tests recently made by the United States Bureau of Mines, which proved that coal dust suspended in air can be exploded by electric arcs under conditions that might prevail in a pulverized coal plant or in a coal mine. If there is electrical machinery in places where coal dust is apt to collect in quantities capable of producing a dust cloud, such electrical machinery should be housed in compartments designed especially for use in dusty atmospheres. Under Schedule 2B, the Bureau of Mines is prepared to conduct investigations looking toward the safety of electrical equipment for this class of service. Details of tests of the ignition of coal dust by electric arcs are given in serial 2365 just issued by the Bureau of Mines.

THE 8-HOUR DAY IN GERMANY

August Thyssen Considers It a Misfortune Under Present Conditions

IN a recent issue of *Stahl und Eisen* an article appeared, commemorating the 80th birthday of August Thyssen, the well-known German iron master. His career is traced from the building of a small plant in 1871 having five puddling furnaces and two rolling mills, the production in the first year amounting to about 3000 tons. Of particular interest to his American friends is the reproduction in the article of a letter he wrote a short time before to the *Mülheimer Zeitung* on the occasion of its 50th anniversary. What Mr. Thyssen says of hours of labor in German industries in their relation to the country's ability to rise from its prostrate position is of special significance. The letter is as follows:

"Consideration of the past, when one thinks of the outstanding anxieties and successes of his work, always gives a certain satisfaction. If, however, one directs his glance forward and tries to look into the future, he is faced with complete uncertainty, and as conditions are at present the outlook is only dark. We have a terrible war behind us, we have experienced hard war years with many privations from which scarcely anyone has been exempt. We have lost the war; we have heavy war burdens to bear, and only dark prospects meet our eyes. We hope for a savior who will deliver us from our distress, but no one knows whence the savior will come. From without certainly no savior can or will come to us; if deliverance comes it can only come from within ourselves.

Work the Only Way Out

"And this deliverance can only lie in work. As work keeps the individual man healthy and sound, so it alone can keep a nation healthy; and on the other hand a nation like ours, which is sick through the war and war conditions, can only be made well again by work. It is a splendid thought that to each man who works there comes a share in the joy of living. I believe that I dare safely say that in general before the war it was the case that each man who was industrious and worked, even if he had a large family to support and because of that had much anxiety, had yet a share in life's enjoyment, even if sometimes perhaps in different amount from others who lived under more favorable conditions.

"It is no part of my intention to discuss the eight-hour day, whether it is really the ideal of the working class, and whether in that is its happiness and the solution of the great living and economic questions. I should be genuinely glad if the times were such that this ideal could be realized. But I am thoroughly sure that the mechanical eight-hour day, as it has been brought in by the revolution, especially in the present times, is a great misfortune for Germany. With a rigid eight-hour day, that for many men on hard work is thoroughly justified but for light work is just as strongly unjustified, we shall not come out from the difficulties in which we find ourselves to-day, and from which we absolutely must come out, come what may, by working ourselves out.

"We can only bring our political administration again to convalescence (especially after the great weakening that it has experienced through the loss of the industrial regions in Lorraine and Upper Silesia which are so important for Germany) by raising our industrial efficiency above the normal, and increasing it to the utmost. We must create values, because without the creation of new values it is impossible to bring the financial conditions of the country again into order.

Community Thought Must Be Cultivated

"We must create values in order to be in position to bring in raw materials, which we lack, from foreign countries, and with them operate our plants to give possibilities for work and wages; and on the other hand to again create values for export and thereby pay for increased imports that we use for the nation's nourishing. In order to reach this it is necessary that the German people themselves reflect and finally bring into use the community thought, about which there has been so much talk but so little action. In recent years, unfortunately (no other designation can be used), a tremendous amount of harm has been done with shibboleths or phrases, but the world cannot be governed with phrases, and I have not found that with them bread is created for the needy.

"The world is full of discontent, there is constantly talk of contrasts, which are thereby aggravated. Every logical man knows that there have always been differences, also class differences, which never can be equalized, and there will therefore always be economic differences. There is constant talk of equality and equal rights which will finally only amount to a desolate uniformity. No one will believe that the able and industrious can endure or will allow being placed on the same level as the idlers, but each must admit that if all were made equal through whatever agency or law the more able and diligent would again raise themselves above the unfit.

"On the one side one reads of the solidarity of the hand and head worker, on the other always of the opposition between proletariat and capital. I suppose I shall be counted in the class of capitalists, but however that may be I am conscious of having worked during my life just as hard as the most able and industrious of the workmen that have worked in the plants of my firm or in other plants.

Capital Interest and Common Interest

"What capitalist and plant owner can have personally of real profit is really little, not even an old age free from anxiety. I believe I dare say without exaggeration that from my life work the general community has had more profit than I myself. What I have created and worked out remains finally to the whole community, because I can carry nothing with me to the other life.

"When I look over everything I can only say that I mostly regret that always prominence is given to that which separates us whether in regard to religious, political or social considerations. On the other hand we have still many things common to the German people, which unite us, and to accentuate these things is far better in my opinion than always to talk of those things which separate us.

"Whether we live under a monarchical or democratic constitution is finally the same if the nation in itself is able and there are able leaders to lead it and give it regulation whereby our national and economic life will be made sound and our fatherland come to honor both at home and abroad. But the chief thing is that we ourselves as German people perceive and form a national community, which without misconstruing and worrying over petty jealousies and the constant bringing up of oppositions, will cultivate the conviction that all, whether high or low, poor or rich, hand-workers or head-workers, together form one nation in the good of which each one has the greatest interest, and to work together should receive from each the highest allegiance.

"The times are hard; the outlook is dark. If one would maintain alive the small gleam of optimism that

we still have within us, then we must make sound the national community spirit, hold together unreservedly, work together and save our earnings as much as possible instead of squandering our money in excessive and frivolous methods of living as seems to be so much the case with the young people.

"As I have said before, the best means of becoming healthy and at the same time the most simple, is and remains work. Only through constant, industrious and hard work, combined with the greatest economy will it be possible for us, even though slowly, to work out of the distress in which we find ourselves today. It is just as certain that without this increased joy and efficiency in work our people and the fatherland that we all love, whatever color we may be known by, must go down in misery."

French Iron and Steel Production for May

PARIS, FRANCE, July 11.—The following figures just given out officially at Paris show the production of iron and steel in France during the month of May, 1922, with totals for the current year so far:

Iron, Metric Tons

	For May, 1922	Preceding Months, 1922	Total for Current Year to May 31
From coke furnaces	435,426	1,385,267	1,820,693
From electric furnaces	6,780	17,792	24,572
Total*	442,206	1,403,059	1,845,265*
Detail of Production			
Forging iron	21,170	76,240	97,410
Foundry iron	102,919	317,025	419,944
Bessemer	1,682	1,727	3,409
Thomas	300,384	949,883	1,250,267
All other iron	16,051	58,184	74,235
Steel, Metric Tons			
Ingots	356,957	1,296,054	1,653,011
Castings	6,846	26,550	33,396
Total*	363,803	1,322,604	1,686,407*
Method of Making			
Converter:			
Acid	2,479	6,871	9,350
Basic	238,708	800,971	1,039,679
Open-hearth furnaces	120,271	503,084	623,355
Crucible furnaces	509	1,896	2,405
Electric furnaces	1,836	9,782	11,618

*Of the above there was produced in disannexed Lorraine during the month of May, 1922, 190,301 tons of iron and 142,856 tons of steel.

Engineers Receive French Honors

Charles F. Rand, chairman of the Engineering Foundation, and Col. A. S. Dwight, president of the American Institute of Mining and Metallurgical Engineers, were decorated on July 20 with the Croix de Chevalier de la Legion d' Honneur by the French Government for distinguished service during the war. The decorations were conferred by Consul General Gaston Liebert, at a luncheon given in his honor at the Engineers Club, New York.

Mr. Rand is internationally known for his years of service in mining as the head of large iron ore properties in this country and Cuba. He is an honorary member of the British Iron and Steel Institute, past president of the American Institute of Mining and Metallurgical Engineers, and as the head of the Engineering Foundation is active in promoting industrial research in the United States. Colonel Dwight is a member of the American Engineering Council of the Federated American Engineering Societies.

M. Liebert said that reconstruction was going on rapidly in northern France, two-thirds of whose industries are now working. The French Government, he said, is planning water power improvement on a vast scale and as a result it would soon be unnecessary for France to import a single ton of coal. He urged that French students be sent to this country to study engineering. It was announced by Calvin W. Rice, secretary of the American Society of Mechanical Engineers, that M. E. de Margerie, director of the Geological Service of France, had been appointed as exchange professor to the United States in applied science and engineering. He will lecture during 1922-23 in seven American universities, starting at Columbia.

Appeals for Retaining Foreign Chemical Patents

Engineers have appealed to President Harding to protect patents sold to America. Dean Mortimer E. Cooley, of the University of Michigan, president of the Federated American Engineering Societies, has announced that a resolution adopted at a meeting in New York on July 14 of the Federation's committee on procedure says that the patents formerly owned by Germany and her allies, and, through the Alien Property Custodian, ordered returned from the Chemical Foundation, "have become the nucleus of our American synthetic organic chemical industry, which must be encouraged for the sake of scientific research, public welfare and national defence."

The hope was expressed that no action will be taken without hearing representatives of chemists, chemical engineers, chemical manufacturers, the medical profession and others most directly concerned. It was implored that nothing be done which can, in any way tend toward the ultimate return to former owners of patents or other property lawfully sequestered and sold to Americans.

Rate on Steel Tanks

WASHINGTON, July 25.—In a tentative report handed down last Friday in connection with a complaint of the Parkersburg Rig & Reel Co., Parkersburg, W. Va., Examiner Warren H. Wagner recommends that the Interstate Commerce Commission find that the rate on steel tanks, knocked down, in carloads from Casper, Wyo., to Bixby and other California points, taking the same rate, be found unreasonable to the extent that it exceeds $1.50 per 100 lb., minimum 4000 lb. The complainant was charged the fifth class rate of $2.84. The report states that the consolidated classification does not distinguish between plates and sheets not otherwise indexed by name. Tanks made of material No. 3 to No. 16 gage, inclusive, were rated the same as tanks made of No. 2 gage and thicker in carloads.

Rates on Wire Fencing

WASHINGTON, July 25.—The Interstate Commerce Commission, pending any action it may take regarding applications for relief from the long-and-short haul provision, has authorized rates on wire fencing east of the Mississippi River and south of the Ohio and Potomac Rivers, the same as the rates in effect on special or manufactured iron, in the same territory. It is provided that the rates shall not exceed those to intermediate points. The minimum weight on wire fencings, fittings, posts, gates, etc., is 30,000 lb.

Studying Steel Suitable for Gages

Experimental work has been started by the Bureau of Standards in the study of the rate of or resistance to wear of steels when run in contact and without lubrication of any sort. The Amsler wear testing machine is being used for this investigation. The steels included in the preliminary studies form a series that has been submitted by the gage steel committee and which is being studied in detail to determine the suitability of the steels for gages. In gage work, the question of wear is of extreme importance.

More than 288,000 cars, trucks and buses were produced in the United States during June, according to Alfred Reeves, general manager the National Automobile Chamber of Commerce. This is a new high record in motor car production and is 12 per cent in advance of the May figures, 256,000. On this basis, Mr. Reeves predicts a total 1922 production of 2,000,000 motor vehicles. The total for the first six months passes the million mark by 137,000.

The Board of Public Service, St. Louis, has let the Worthington Pump & Machinery Corporation, Buffalo, the contract for the last of seven pumps for the Bissel Point high service station. The cost of the last unit is $199,000.

Heat-Temperature Curves of Metals

Basis for Average and Instantaneous Specific Heat Values Provided by German Laboratory Tests—New Specific Heats for Molten Metal

BY JOSEPH F. SHADGEN*

CALORIFIC energy influences all materials in different ways. Besides increasing their volumes, the most important effects of heat on bodies are the variation of their temperatures and often the transformation of their physical form.

Heating a solid material raises its temperature proportionately to the amount of energy involved. This increase varies with the nature of each material, and the thermal capacity of any material is the quantity of heat required to vary the temperature of unit mass of that material one degree from t to $t + 1$. The specific heat of the material is the ratio of its thermal capacity to that of pure water.

Certain solids change their physical forms when heated to certain temperatures, becoming liquid; these temperatures, also characteristic of each material, are called melting points, and the amount of heat necessary to cause the change of internal molecular equilibrium, without increase of temperature, is called heat of fusion. By adding further to the heat concentration, the temperature of the liquid rises to a second critical point, where gasification takes place; the liquid takes the form of a gas or a vapor. The temperatures characterizing these changes are called boiling points and the thermic energy absorbed, specific to the material, is called heat of vaporization.

These simple physical notions are known to practically all engineers, as they form the foundation of all industrial heat problems. Books dealing with the subject are filled with tables giving the results of numerous research investigations. Most of these tables concerning the commonly used metals date back to the early beginning of physical science, and are perpetuated, even in new issues of old publications, by the simple application of the law of least effort, because the majority of the recent test data is not only fractional, but also incoordinately spread in the multitude of technical magazines and reports of learned societies.

The notion of specific heat led to various complications; it was noticed by investigators that its value was not constant, for most materials, at all temperatures. This dependence necessitated further definitions, and that is the reason of the conception of mean specific heat and real specific heat. This can be best explained by a graphic analysis. In Fig. 1, ox represents the temperature and oy the amount of heat. By

Table I. Heat Content-Temperature Relations for Iron, Nickel and Cobalt

Temperature Deg. Cent.	Temperature Deg. Fahr.	Iron: Heat Content B.t.u. per Lb.	Iron: Heat Content Cal. per Kg.	Iron: Specific Heat Mean O° to T°	Iron: Specific Heat At T°	Nickel: Heat Content B.t.u. per Lb.	Nickel: Heat Content Cal. per Kg.	Nickel: Specific Heat Mean O° to T°	Nickel: Specific Heat At T°	Cobalt: Heat Content B.t.u. per Lb.	Cobalt: Heat Content Cal. per Kg.	Cobalt: Specific Heat Mean O° to T°	Cobalt: Specific Heat At T°
0	32				0.1055				0.1095				0.0912
100	212	20.00	11.11	0.1111	0.1168	20.66	11.47	0.1147	0.1200	18.14	9.52	0.0952	0.0993
200	392	42.85	23.36	0.1168	0.1282	43.20	24.00	0.1200	0.1305	37.72	19.85	0.0993	0.1073
300	572	68.14	39.7	0.1324	0.1396	67.83	37.57	0.1252	0.1409	54.79	30.99	0.1033	0.1154
350	662					72.74	40.41	0.1262	0.1430				
330	626					77.56	43 09	0.1306	0.1294				
400	752	91.39	51.77	0.1282	0.1509	93.87	52.15	0.1304	0.1294	77.28	42.93	0.1073	0.1235
500	932	120.49	66.94	0.1339	0.1623	117.16	65.09	0.1302	0.1294	100.24	55.69	0.1114	0.1316
600	1,112	150.73	83.74	0.1396	0.1737	140.47	78.04	0.1301	0.1295	124.65	69.25	0.1154	0.1396
700	1,292	183.01	101.67	0.1452	0.1850	163.76	90.98	0.1300	0.1295	151.52	83.62	0.1197	0.1477
740	1,364	191.34	106.30	0.1467	0.1879								
745	1,373	201.99	112.21	0.1506	0.3760								
765	1,409	212.79	118.41	0.1548	0.1592								
785	1,445	222.01	123.34	0.1571	0.1592								
800	1,472	226.31	125.73	0.1572	0.1592	187.07	103.93	0.1299	0.1295	177.82	98.79	0.1235	0.1558
850	1,562	240.64	133.69	0.1573	0.1592								
900	1,652	254.93	141.65	0.1574	0.1592	210.58	116.88	0.1299	0.1295	206.15	114.53	0.1273	0.1839
919	1,686	260.42	144.68	0.1574	0.1592								
919	1,686	272.43	151.35	0.1647	0.1448								
950	1,742	280.51	155.84	0.1640	0.1448					231.63	128.67	0.1354	0.1579
1,000	1,832	293.54	163.08	0.1630	0.1448	233.81	129.83	0.1298	0.1295	241.06	133.92	0.1339	0.1590
1,100	2,012	319.61	177.56	0.1614	0.1448	257.01	142.78	0.1298	0.1296	290.00	161.10	0.1465	0.1424
1,200	2,192	345.79	192.05	0.1600	0.1448	280.33	155.74	0.1298	0.1296	315.90	175.50	0.1463	0.1454
1,300	2,372	371.75	206.53	0.1589	0.1449	303.66	168.70	0.1298	0.1296	329.14	182.90	0.1463	0.1483
1,350	2,462	384.79	213.77	0.1584	0.1449								
1,400	2,552					326.99	181.66	0.1298	0.1296	342.53	190.18	0.1446	0.1512
1,404.5	2,560	398.01	221.67	0.1578	0.1449								
1,404.5	2,560	398.01	223.61	0.1592	0.2142								
1,451	2,644					338.89	188.27	0.1298	0.1296				
1,451	2,644					439.83	244	0.1684	0.1338				
1,478	2,692.4									390.70	217.05	0.1469	
1,478	2,692.4									495.42	275.28	0.1863	0.1472
1,500	2,732	449.11	249.51	0.1627	0.2142	451.54	250.91	0.1673	0.1338	501.34	278.52	0.1857	0.1472
1,520	2,768					476.38	253.59	0.1668	0.1338				
1,528	2,782.4	450.11	250.06	0.1637	0.1501								
1,528	2,782.4	538.94	299.41	0.1959	0.1501								
1,600	2,912	558.40	310.22	0.1939	0.1501					537.84	298.80	0.1867	0.1472



Fig. 1. Diagram to Illustrate Mean and Real Specific Heats

*Consulting engineer, New York.

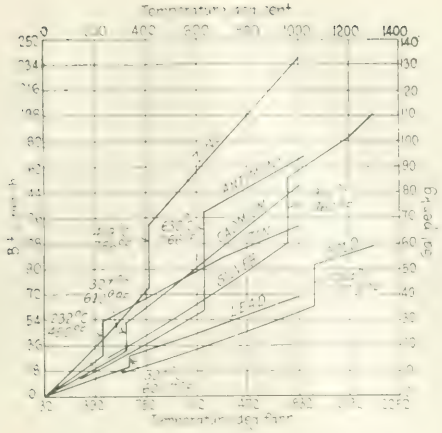


Fig. 2—Heat Content-Temperature Curves

successive determinations, with the help of a calorimeter, the curve *ACBD* has been plotted. The amount of heat contained in the unit weight of a certain material between t and T, is represented by the area $tACBDT,t$. The real specific heat at the temperature t is represented by the area (1); the real specific heat at the temperature T is (2); at any point X it is (4). The heat between t and T is represented by $tACBTt$.

To avoid planimetric complication or the integration of difficult formulas, it was found practical to

Table II. Comparison of Results Obtained by Different Investigators

Investigator	Material	Carbon Content, Per Cent	Heat Content per Kg. Cal.	Heat Content per Lb. B.t.u.	Temperature Deg. Cent.
Gruner	White pig iron, Normal, 2.20 to 4				
Wüst and					
Laval	[illegible] iron	[illegible]		277	1,220†
Springorum	Pig iron	[illegible]		336	1,203
[illegible]	[illegible]	[illegible]		354	1,500
Schmidt	White pig iron	[illegible]			
Gillhausen	[illegible]	[illegible]		278	1,220†
Gillhausen	Thomas* pig iron	[illegible]		268	1,210†
Wüst and					
Meuthen	[illegible]	[illegible]	[illegible]	396	1,528
and Duerrer	Electrolytic pure iron	[illegible]	[illegible]	404	1,580

*Bessemer pig iron. †About.

assimilate the real area $tACBTt$ to a rectangle $taEbTt$ of the same surface, and the ordinate Ee was called mean specific heat between the temperatures t and T. It follows that, for all those substances whose specific heat is dependent upon the temperature, the two varieties of specific heats have to be considered, and consequently two tables will be required for complete information.

To avoid this complication, and to avoid in all calculations the multiplication $S\,(T-t)$, the writer has used in all his technical reports heat-content tables giving immediately the result of the above multiplication, without duplicate effort and source of error. The recognition of the multiple advantages of this practice was the reason for working up several data sheets along these lines for iron and aluminum; these were unfortunately very fractional, as no complete methodical investigations had been carried on along these lines.

Lately the writer's attention was drawn to the publication, by the German Engineers' Society, of the heat-content temperature curves of the industrially important metals, by Wuest, Meuthen and Duerrer, in which the three authors have done this work with typical German thoroughness and the help of large scale laboratory equipment. The completeness of this research work and its scope are far beyond the effort of any individual, no matter how willing. The practical importance of the data is the reason for this article. The writer makes no claim to originality, so far as the source of his information goes, but a rearrangement of the tables and their co-ordination, and condensation of the comment, was thought opportune. The linking up of the results with more general metaleographic knowledge was also thought necessary.

Remarkable is the range of temperatures of the tests, from 0 deg. to 1000 deg. C. (1832 deg. Fahr.) for the low-melting metals and 0 deg. to 1500 or 1600 deg. C. (2732 or 2912 deg. Fahr.) for the others. New in every way are the specific heats of the metals in the

Table III. Heat Content-Temperature Relations for Manganese

—Temperature— Degrees Cent.	Degrees Fahr.	—Heat Content— B.t.u. per Lb.	Cal. per Kg.	—Specific Heat— Mean 0° to T°	At T°
0	32	.....	.....	.....	0.1204
100	212	22.12	12.29	0.1229	0.1254
200	392	47.16	25.09	0.1255	0.1305
300	572	69.07	38.37	0.1279	0.1356
400	752	93.98	52.21	0.1305	0.1407
500	932	119.75	66.53	0.1331	0.1458
600	1,112	146.46	81.37	0.1356	0.1509
700	1,292	174.08	96.71	0.1382	0.1559
800	1,472	202.61	112.56	0.1407	0.1610
900	1,652	232.11	128.95	0.1433	0.1661
1,000	1,832	262.40	145.78	0.1458	0.1712
1,050	1,922	277.92	154.40	0.1471	0.1737
1,070	1,958	284.11	157.89	0.1476	0.1747
1,130	2,066	346.68	192.60	0.1704	0.1770
1,200	2,192	369.00	204.99	0.1708	0.1770
1,210	2,210	372.17	206.76	0.1709	0.1770
1,230	2,246	445.26	247.37	0.2011	0.1980
1,250	2,282	452.39	251.33	0.2011	0.1980

Table IV. Heat Content-Temperature Relations for Antimony

—Temperature— Degrees Cent.	Degrees Fahr.	—Heat Content— B.t.u. per Lb.	Cal. per Kg.	—Specific Heat— Mean 0° to T°	At T°
0	32	.....	.....	.....	0.0521
100	212	9.39	5.21	0.0521	0.0527
200	392	18.86	10.48	0.0524	0.0533
300	572	28.46	15.81	0.0527	0.0539
400	752	38.16	21.20	0.0530	0.0545
500	932	47.97	26.65	0.0533	0.0551
600	1,112	57.87	32.15	0.0536	0.0557
630	1,166	60.88	33.82	0.0537	0.0559
630	1,166	130.82	72.68	0.1154	0.0546
700	1,292	137.73	76.52	0.1093	0.0550
800	1,472	147.69	82.05	0.1026	0.0556
900	1,652	157.77	87.65	0.0974	0.0562
1,000	1,832	167.94	93.30	0.0933	0.0568

molten state. The investigators used for all tests the purest forms of metals commercially available. The most outstanding feature, however, is the influence of allotropic modifications on the heat content-temperature curve, an effect that, while not unknown to the metallographers, was absolutely ignored by others interested in the heat applications of the various metals.

For their tests the investigators used an apparatus

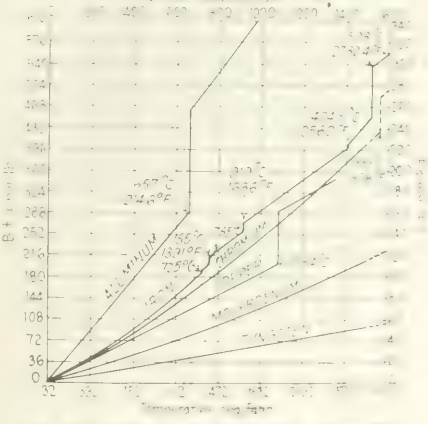


Fig. 3—The Heat Curve Is Shown to Have No Distinct Parts

Table V. Heat Content-Temperature Relations for Chromium, Molybdenum, Platinum and Tungsten

Temperature		Chromium				Molybdenum				Platinum				Tungsten			
		Heat Content		Specific Heat		Heat Content		Specific Heat		Heat Content		Specific Heat		Heat Content		Specific Heat	
Deg. Cent.	Deg. Fahr.	B.t.u. per lb.	Cal. per kg.	Mean 0° to T°	At T°	B.t.u. per lb.	Cal. per kg.	Mean 0° to T°	At T°	B.t.u. per lb.	Cal. per kg.	Mean 0° to T°	At T°	B.t.u. per lb.	Cal. per kg.	Mean 0° to T°	At T°
..	32	.....	.....	.....	0.1023	.....	.....	.....	0.0616	.....	.....	.....	0.0342	.....	.....	.....	0.0333
100	212	19.93	10.57	0.1057	0.1090	11.29	6.27	0.0627	0.0638	5.69	3.16	0.0316	0.0319	6.01	3.34	0.0334	0.0335
200	392	39.24	21.80	0.1090	0.1157	22.97	12.76	0.0638	0.0660	11.48	6.38	0.0319	0.0326	12.04	6.69	0.0335	0.0337
300	572	60.68	33.71	0.1124	0.1224	35.06	19.48	0.0649	0.0682	17.42	9.68	0.0323	0.0333	18.13	10.07	0.0336	0.0339
400	752	83.32	46.29	0.1157	0.1291	47.54	26.41	0.0660	0.0704	23.49	13.05	0.0326	0.0340	24.25	13.47	0.0337	0.0341
500	932	107.15	59.53	0.1191	0.1358	60.41	33.56	0.0671	0.0726	29.68	16.49	0.0329	0.0348	30.40	16.89	0.0338	0.0343
600	1,112	132.21	73.45	0.1224	0.1425	73.67	40.93	0.0682	0.0748	36.00	20.00	0.0333	0.0355	36.61	20.34	0.0339	0.0345
700	1,292	158.45	88.03	0.1258	0.1492	87.32	48.51	0.0693	0.0770	42.44	23.58	0.0337	0.0362	42.84	23.80	0.0340	0.0348
800	1,472	185.90	103.28	0.1291	0.1559	101.41	56.34	0.0704	0.0792	49.01	27.23	0.0340	0.0369	49.07	27.26	0.0341	0.0349
900	1,652	214.58	119.21	0.1324	0.1626	115.85	64.36	0.0715	0.0814	55.73	30.96	0.0344	0.0376	55.42	30.79	0.0342	0.0352
1,000	1,832	244.44	135.80	0.1358	0.1693	130.70	72.61	0.0726	0.0836	62.55	34.75	0.0348	0.0383	61.78	34.32	0.0343	0.0354
1,100	2,012	275.51	153.06	0.1392	0.1760	145.99	81.08	0.0737	0.0858	69.50	38.61	0.0351	0.0390	68.17	37.87	0.0344	0.0356
1,200	2,192	307.78	170.99	0.1425	0.1827	161.58	89.77	0.0748	0.0880	76.59	42.55	0.0355	0.0397	74.59	41.44	0.0345	0.0358
1,300	2,372	341.26	189.59	0.1458	0.1894	177.64	98.69	0.0759	0.0902	83.81	46.56	0.0358	0.0404	81.05	45.03	0.0346	0.0360
1,400	2,552	375.95	208.86	0.1492	0.1960	184.06	107.81	0.0770	0.0924	91.13	50.63	0.0362	0.0411	86.59	48.65	0.0347	0.0362
1,500	2,732	411.84	228.80	0.1525	0.2027	210.89	117.16	0.0781	0.0946	98.60	54.78	0.0365	0.0418	94.10	52.28	0.0348	0.0365
*1,553	2,828	427.32	237.40	0.1530													
*1,553	2,828	466.00	270.00	0.1738													
*1,600	2,912	497.52	276.40	0.1727													

*These three lines figured, approximately, by author.

similar to the vacuum calorimeter of Oberhoffer, that is, a combination of an ice calorimeter with an electric vacuum furnace. For very high temperature, modifications were made to obtain a quick rise in temperature so as to avoid all side effects. For further details it will be necessary to refer to the above mentioned source, which has also a most complete and up-to-date compilation of the literature on the subject.

All tables give the results in the calorie-Centigrade system, and the corresponding results in the B.t.u.-Fahrenheit system. They indicate for the given temperatures the heat content, the mean specific heat from 0 deg. to T, and the real specific heat at T. The calorie columns were taken from the various pages of the above-mentioned source; the others were figured by the writer. For the change of units, 1 kg.-calorie per kilogram of material was assumed equivalent to 1.8 B.t.u. per lb.; or 1 B.t.u. per lb., the same as 0.555 kg. cal. per kg.; in other words, in the ratio of the temperature scales (1 large calorie or kilogram calorie equals 3.968 B.t.u., or 1 B.t.u. equals 0.252 kg. cal.). The curves are plotted with the temperatures as abscissæ and the amounts of heat as ordinates. Both unit systems are given.

Information concerning iron is most important, and Figs. 3 and 5 as well as Tables I and II deal with this most useful metal. For the tests an electrolytic iron was secured with practically no impurity, even the gases having been purged out by a special process. It was found that the heat content temperature curve was made up of nine distinct parts. From 0 deg. C. to 725 deg. C. (1337 deg. Fahr.) there was an uninterrupted slightly parabolic line, corresponding to the crystallization of the metal. After that temperature a somewhat steeper branch ran from 725 deg. C. to 785 deg. C. (1445 deg. Fahr.) during which a change in the molecular structure took place; this corresponds to the gradual formation of the β variety of iron, stable at those higher temperatures. After 785 deg. C. practically a straight line occurred, until at 919 deg. C. (1686 deg. Fahr.) a pretty nearly definite decalescence point was characterized by a heat jump of 6.64 cal. per kg. (11.95 B. t. u. per lb.). This indicates the recrystallization of the mass into the γ variety.

From 919 deg. C., the fifth part of the curve is practically straight, with no disturbance until 1404.5 deg. C. (2560 deg. Fahr.), at which temperature a third critical point is noticed very clearly by a sudden heat absorption of 1.94 cal. per kg. (3.5 B. t. u. per lb). At this temperature another allotropic change takes place, a new resetting of molecular forces, which is called the δ variety of iron. From 1404.5 deg. C. the diagram continues as a straight line up to 1528 deg. C. (2782.4 deg. Fahr.), where the melting phenomena take place, accompanied by the large absorption of 49.35 cal. per kg. (88.83 B. t. u. per lb.) without increase in temperature. This quantity represents the heat of fusion, which is in fact only a sudden increase in the specific heat. After all molecules have found

Table VI. Heat Content-Temperature Relations for Cadmium, Lead, Tin and Zinc

Temperature		Cadmium				Lead				Tin				Zinc			
		Heat Content		Specific Heat		Heat Content		Specific Heat		Heat Content		Specific Heat		Heat Content		Specific Heat	
Deg. Cent.	Deg. Fahr.	B.t.u. per lb.	Cal. per kg.	Mean 0° to T°	At T°	B.t.u. per lb.	Cal. per kg.	Mean 0° to T°	At T°	B.t.u. per lb.	Cal. per kg.	Mean 0° to T°	At T°	B.t.u. per lb.	Cal. per kg.	Mean 0° to T°	At T°
0	32	.....	.....	.....	0.0555	.....	.....	.....	0.0359	.....	.....	.....	0.0683	.....	.....	.....	0.0878
100	212	10.10	5.61	0.0561	0.0588	6.26	3.48	0.0348	0.0376	12.24	6.83	0.0683	0.0683	16.58	9.21	0.0921	0.0965
200	392	20.43	11.35	0.0568	0.0580	13.10	6.72	0.0336	0.0313	24.59	13.66	0.0683	0.0683	34.72	19.29	0.0965	0.1052
232	450									28.51	15.84	0.0683	0.0683				
232	450									53.33	29.63	0.1277	0.0620				
300	572	31.00	17.22	0.0574	0.0593	17.52	9.74	0.0325	0.0290	60.73	33.74	0.1125	0.0592	54.43	30.24	0.1008	0.1139
321	610	33.23	18.46	0.0575	0.0595												
321	610	52.686	29.27	0.0912	0.0736												
327	620.6					18.91	10.51	0.0322	0.0284								
327	[illegible]					[illegible]	[illegible]	[illegible]	[illegible]								
400	[illegible]	63.23	35.13	0.0878	0.0746	[illegible]	[illegible]	[illegible]	[illegible]	72.06	39.48	0.0987	0.0556	[illegible]	[illegible]	[illegible]	[illegible]
419	[illegible]													[illegible]	[illegible]	[illegible]	[illegible]
419	786													121.36	67.42	0.1609	0.1199
500	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	138.65	77.03	0.1541	0.1173
600	1,112	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	159.50	88.61	0.1477	0.1141
700	[illegible]	104.544	58.08	0.0830	0.0784	50.65	28.14	0.0402	0.0246	98.08	54.49	0.0793	0.0446	178.49	99.16	0.1427	0.1109
800	1,472	118.76	65.98	0.0825	0.0799	56.81	31.56	0.0394	0.0239	105.77	58.76	0.0735	0.0409	199.42	110.79	0.1385	0.1076
900	1,652	133.25	74.03	0.0823	0.0810	63.10	35.05	0.0389	0.0233	112.79	62.66	0.0696	0.0373	218.52	121.40	0.1349	0.1044
1,000	1,832	147.94	82.19	0.0822	0.0823	69.43	38.57	0.0386	0.0226	119.36	66.20	0.0662	0.0336	237.04	131.69	0.1317	0.1012

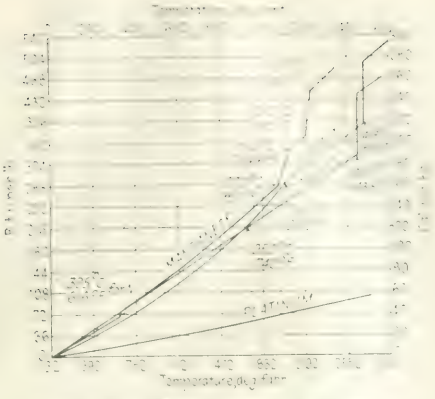


Fig. 4—Heat Content-Temperature Curves

their new balance, the curve indicates a steady increasing line showing the conditions of the superheated molten metal.

These results indicate that the specific heats not only vary with temperatures, but are also subject to irregularities pertaining to allotropic changes within the mass of the metal. While the few theories on the mechanism of these recrystallizations and their balance are still very conflicting, the practical thermic effect is undeniable, and has to be accepted at full face value. It must be stated that the first caloric disturbance, around 725 deg. C. (1337 deg. Fahr.), is accompanied by the loss of the magnetic qualities of the metal.

Similar curves are not available for the industrial forms of iron, such as soft steel containing 0.1, 0.2, 0.5, etc. per cent of carbon. It is undeniable that such investigations would be of enormous benefit to industry, but the metallographic researches have given us the well known Roberts-Austen diagram of Fig. 5, which, used in conjunction with the heat content-temperature curve, will prove of great value. Instead of the various allotropic changes of iron, the well known forms of iron carbon combinations and solutions have to find their internal balance and relative solubility, one in the other. The phenomena change very little in their nature, but the critical temperatures vary according to the lines given in the diagram.

National research laboratories have here a great opportunity to earn, besides scientific reputation, the thankfulness of the whole technical world by carrying out similar investigations. Table II is a comparative compilation of all experimental results of the literature on the subject, which shows that, in spite of the differences, the above data are very acceptable for industrial purposes. The recognition of the heat variations at the so-called critical points has up to now been the monopoly of the metallographer of the specialist—and this knowledge has hardly diffused beyond this narrow circle.

It is useless to emphasize the practical importance and great value of a better understanding of the interrelation of the thermic and crystallographic phenomena, and a generalization of this remarkable knowledge is imperative. The newly developed industry of alloys, with its enormous possibilities, and the interesting and efficient application of electric heating, will require a thorough knowledge of these data. Recently developed heat-treating methods, like the hump method of Leeds & Northrup, are only the logical application of the result of this science in a practical, foolproof form. In fact, it may be stated, without exaggeration or error, that all irregularities in the pyrometer-time curves, without reason from outside, are due to variation of the specific heat in correlation with internal changes within the mass of the metal.

Manganese, nickel and cobalt are dealt with on Fig. 4 and in Tables I and III. These three metals are closely related to iron, and present also irregularities in their heat content-temperature curves indicating

Table VII. Heat-Content-Temperature Relations for Aluminum, Copper, Gold and Silver

Temperature		Aluminum				Copper				Gold				Silver			
		Heat Content		Specific Heat		Heat Content		Specific Heat		Heat Content		Specific Heat		Heat Content		Specific Heat	
Deg. Cent.	Deg. Fahr.	B.t.u. per lb.	Cal. per kg.	Mean 0° to $T°$	At $T°$	B.t.u. per lb.	Cal. per kg.	Mean 0° to $T°$	At $T°$	B.t.u. per lb.	Cal. per kg.	Mean 0° to $T°$	At $T°$	B.t.u. per lb.	Cal. per kg.	Mean 0° to $T°$	At $T°$
0	32	.....	.....	.....	0.2220	.....	.....	.....	0.1008	.....	.....	.....	0.0317	.....	.....	.....	0.0573
100	212	40.66	22.59	0.2259	0.2297	18.20	10.11	0.1011	0.1014	5.72	3.18	0.0318	0.0320	10.40	5.78	0.0578	0.0583
200	392	82.69	45.94	0.2297	0.2374	36.51	20.28	0.1014	0.1020	11.50	6.39	0.0320	0.0323	20.90	11.64	0.0582	0.0594
300	572	126.12	70.07	0.2336	0.2451	54.92	30.51	0.1017	0.1026	16.85	9.36	0.0321	0.0325	31.81	17.67	0.0589	0.0605
400	752	170.95	94.97	0.2374	0.2529	73.44	40.80	0.1020	0.1032	23.20	12.89	0.0322	0.0328	42.80	23.78	0.0595	0.0616
500	932	217.15	120.64	0.2413	0.2606	92.09	51.16	0.1023	0.1038	29.12	16.18	0.0324	0.0330	54.00	30.00	0.0600	0.0627
600	1,112	264.76	147.09	0.2452	0.2683	10.74	61.57	0.1026	0.1045	35.08	19.49	0.0325	0.0333	65.38	36.32	0.0605	0.0638
657	1,214.6	292.50	162.50	0.2473	0.2727	.	.	.	.	.....	.....	.....	.....	.....	.....	.....	.....
657	1,214.6	461.63	256.46	0.3904	0.2502	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
700	1,292	481.09	267.27	0.3818	0.2523	129.69	72.05	0.1029	0.1051	41.09	22.83	0.0326	0.0335	76.97	42.76	0.0611	0.0649
800	1,472	526.93	292.74	0.3659	0.2571	148.64	82.58	0.1032	0.1057	47.36	26.20	0.0328	0.0338	88.76	49.31	0.0616	0.0660
900	1,652	573.66	318.70	0.3541	0.2619	167.72	93.18	0.1035	0.1063	53.26	29.59	0.0329	0.0341	100.73	55.96	0.0622	0.0670
961	1,762	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	108.14	60.08	0.0625	0.0678
961	1,762	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	154.98	86.10	0.0896	0.0615
1,000	1,832	621.26	345.14	0.3451	0.2667	186.91	103.84	0.1038	0.1069	60.02	33.01	0.0330	0.0343	159.37	88.54	0.0885	0.0637
1,050	1,922	.....	.....	.....	.....	.....	.....	.....	.....	62.51	34.73	0.0331	0.0344	.....	.....	.....	.....
1,064	1,947.2	.....	.....	.....	.....	.....	.....	.....	.....	63.38	35.21	0.0331	0.0345	.....	.....	.....	.....
1,064	1,947.2	..								91.94	51.08	0.0480	0.0323	. . .	.....	.....	.....
1,084	1,983	.	.	.	.	203.11	112.84	0.1041	0.1074	.	.	.....	.....	.....	.....	.....	.....
1,084	1,983					294.94	163.81	0.1511	0.1007	..	..	.....	.....	.....	.....	.....	.....
1,100	2,012					295.99	164.44	0.1495	0.1028	94.95	52.25	0.0475	0.0329	171.24	95.19	0.0865	0.0641
1,200	2,192					315.68	175.38	0.1462	0.1159	100.13	55.63	0.0464	0.0346	182.34	102.41	0.0853	0.0750
1,300	2,372					337.72	187.62	0.1443	0.1291	107.50	59.17	0.0455	0.0364	198.34	110.19	0.0848	0.0807

allotropic transformations and recrystallizations; some of them are sudden and clearly defined, others are gradual and progressive. Nickel has a perturbation

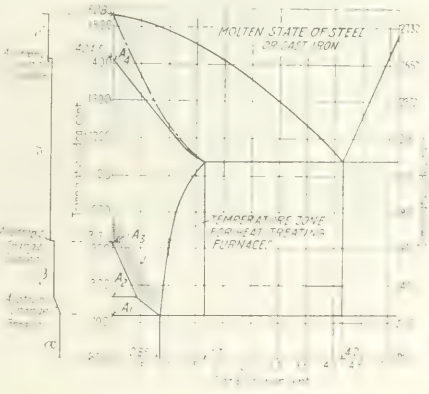


Fig. 5—The Roberts-Austen Diagram

at 325 deg. C. (about 615 deg. Fahr.) accompanied by the loss of magnetic properties. Manganese has, besides, a gradual modification at about 1100 deg. C. (2000 deg. Fahr.)—the peculiarity of melting within a range of temperatures, rather than at a definite melting point.

Chromium, molybdenum and tungsten are shown on Fig. 3 and platinum on Fig. 4; and the results are compiled in Table V. These metals do not show any disturbances in their diagrams. Chromium has been investigated up to only 1500 deg. C. (2732 deg. Fahr.); the dotted continuation is approximated, and the three last lines of its table are not absolutely correct.

Table VIII. Condensed Sequence of Melting Points and Fusion Points of Metals

Metal	Temperature of Fusion Deg. Cent.	Temperature of Fusion Deg. Fahr.	Heat of Fusion Cal. per Kg.	Heat of Fusion B.t.u. per Lb.	Temp'ture of Vaporization Deg. Cent.	Temp'ture of Vaporization Deg. Fahr.
Tin	232	449	14.06	25.30	2,270	4,118
Bismuth	271	520	10.47	18.85	1,420	2,588
Cadmium	321	610	13.81	19.47	778	1,432
Lead	327	621	5.41	9.85	1,550	2,822
Zinc	419	786	23.61	41.42	920	1,688
Antimony	630	1,166	38.86	69.95	1,440	2,624
Aluminum	657	1,214.6	93.96	169.12	1,800	3,272
Silver	961	1,762	26.00	46.80	1,955	3,551
Gold	1,064	1,927	15.87	28.56	2,200	3,992
Copper	1,084	1,983	50.97	91.75	2,310	4,190
Manganese	1,220	2,228	36.63	65.93	....	....
Nickel	1,451	2,644	56.08	101.92	....	....
Cobalt	1,478	2,692	58.23	105.71	....	....
Iron	1,528	2,782	49.35	88.83	....	....
Chromium	1,553	2,828	32.00	58.60	....	....
Platinum	1,750	3,182	27.18	48.92	....	....

The results of the investigation of the low-temperature melting metals are given on Figs. 2 and 3, and Tables IV, VI and VII contain the compiled data. No changes take place and all the diagrams are made up of three links only, due to the melting phenomena. Worth mentioning is the large heat capacity of aluminum, the light density metal.

Table VIII condenses in order the melting points of the metals investigated and the corresponding heats of fusion. Added are several boiling points at atmospheric pressure. These were determined by special tests, as the circumstances of the previous research, in inclosed quartz tubes under vacuum, did not allow these phenomena to interfere with the results. That is why, for certain metals, the curves do not show a disturbance, in spite of temperatures higher than the boiling points.

Bonuses Given to Dismissed Employees

How one of the leading shipbuilding companies in Japan successfully reduced the number of its workers by about one-fifth without labor difficulties is explained in a recent report of Vice-Consul Irvin C. Carrell at Nagasaki. The number of employees at the beginning of this year was in excess of the number needed for the building program. In February the company announced that in addition to the usual bonus given Japanese workmen upon resignation or dismissal, employees tendering their resignations within 10 days would be given a special bonus in addition, of cash amounting to 60 to 120 days extra pay and traveling expenses for themselves and families back to the workman's native city. The scale was worked out as follows: For 1 year's service 10 days pay, and 10 days additional for each year of service up to 5 years. For 10 years of service 150 days pay were given and this scale ranged up to 1520 days pay for 40 years of service.

The Youngstown Steel Co., Youngstown, Ohio, has awarded contracts for one 1200 hp. motor and one 1500 hp. motor to the Westinghouse Electric & Mfg. Co., Pittsburgh. The equipment is to be used in the mechanical puddling plant being erected by the company at Warren, Ohio.

Improved Casting for Mill Journals

BY M. E. DUGGAN

It is not uncommon to have to renew mill roll journal boxes within twenty-four hours after installation. I have seen two boxes taken out and replaced in a 10-hr. run.

The large amount of machine labor involved in preparing one of these water-cooled boxes for use can be materially reduced by using a core, as shown in the illustration, in place of the usual machining operation.

The drawing shows a standard mill roll water-cooled journal box with inlet and outlet at the top. The left-hand or inlet side shows the usual machining operation; the right-hand side shows the core arrangement suggested by the writer. Ordinarily a ¾-in. hole is drilled into the water chamber—a distance of 5 to 8 in.—as shown at *F*, and plugged at the top. A hole is then drilled and tapped square with the top face and a little to the side of the hole *F*, connecting it with the inlet.



Drilled, Tapped and Plugged Outlet on Left; Simpler Cored Outlet at Right

On the right-hand side, *A B* is the core print, *C* is the cored outlet port and *D* is a cored hole through the casting providing a support for the core, which is shown separately. Dimensions are as shown with the square section filed round at *G* so that the port can be drilled and tapped to receive the outlet fitting—a much simpler operation than its alternative.

Mechanical Working of Invar

Invar steel is very difficult to work mechanically but is an important alloy for certain classes of work where very low coefficient of expansion is desired. In order to see whether it could not be worked successfully, four small ingots of invar were prepared by the metallurgical division of the Bureau of Standards. The first attempt at forging was unsuccessful, the ingot cracking and breaking under the forging press. The second attempt was quite satisfactory as a result of very careful handling during forging operations.

It was found necessary to give very light reductions and not allow the forging temperature to drop below 1000 deg. C during the first reduction. This ingot was forged to a ⅜-in. rod, and a portion of this was cut off and machined to a ¼-in. rod. This has been cold drawn with two intermediate annealings down to approximately 1/16-in. wire. It is being carried further with the idea of determining how fine a wire of invar may be made.

Number Wood Screw Sizes Reduced

On June 20, a second conference of wood screw manufacturers was held at the Bureau of Standards. Twelve of the largest wood screw manufacturers were represented. A new list of standard sizes was adopted which reduces the sizes of both steel and brass screws from 555 to 291, a reduction of 47 per cent. The previous standards for tolerance in lengths of round head screws were revised.

Specifications for wood screws have been written as an outcome of the above conference and are now under consideration by the hardware committee of the Federal Specifications Board. It is expected that these specifications will be published shortly as a Government standard.

Government Takes Decisive Action

Plans to Prevent Distress Due to Railroad and Coal Strikes Are Adopted After Washington Conference

WASHINGTON, July 25.—The iron and steel and allied industries of the United States are expected to suffer severely from the rigid plans adopted by the Government to meet the acute situation growing out of the railroad and coal strikes. Effective at 12 o'clock tonight, orders issued this afternoon by the Interstate Commerce Commission establish a priority list for the dispatch of traffic to be observed by all railroads East of the Mississippi in respect to essential consumers. Iron and steel and allied industries not being so classified, they will take the lowest grade with reference to shipments of their products and receipt of coal.

Fitting in with this plan of the commission is one adopted as the result of a conference yesterday between Secretary of Commerce Hoover, representatives of railroads and coal operators providing for the distribution of current coal production and for prevention of unfair prices. This latter plan, to be reported back to coal operators, is expected to be put in operation within 36 hours.

Plans Outlined

The plans outlined are so sweeping in their character that cars may be assigned as directed by the commission, and coal obtained for consumers on the preference and priority list. Moreover, private cars may be commandeered and likewise coal from private mines may be taken for the purpose of supplying the consumers given priority and preference, if necessity demands it. The priority and preference list is as follows: Food for human consumption, feed for livestock, livestock, perishable products, coal, coke and fuel oil. It is intended that fuel be given preferential movement to the consumers on the priority list in the following preferred order: Railroads, bunkering for ships, public utilities directly serving the general public, electric power and light, gas, water and sewer works, ice plants, hospitals, Federal, State, county and municipal governments and their hospitals, schools, and other public institutions.

Priority List Created

In the creation of the priority list for the distribution of coal, the Interstate Commerce Commission said that in the supply of cars to mines upon the lines of any coal-loading carrier the railroad should observe the preference and priorities established in five classes as follows: For such special purposes as may from time to time be designated by the commission, the list previously mentioned, beginning with fuel for railroads, coal for trans-shipment by water from Lake Erie ports to Lake Superior ports to care for the needs of the Northwest, this covering coal from mines in Pennsylvania, Ohio, West Virginia, Kentucky, Tennessee and Alabama, commercial sizes of coal for domestic use. Lastly comes the classification "All other purposes," which includes, while not specified, among others, iron and steel and allied industries. The latter will be required to wait for coal until after the so-called essential consumers have been supplied.

Car Service Orders

The car service orders of the commission were issued upon its declaration of a national emergency, and the railroads of the country east of the Mississippi were accordingly placed upon a footing that in many respects is as serious as in a time of war.

Traffic is to be moved by the most available routes designed to expedite shipments and prevent congestion regardless of the routing that may be ordered by shippers or the ownership of the cars. The declaration of an emergency was made in one order, while another established the preferences and priorities. The wording is somewhat different from that of the car service order of May 20, 1920, and is phrased so as to avoid, if possible, controversies which followed the issuance of the order of 1920. The priority order provides that in the event carriers east of the Mississippi River are not able to transport all the tonnage offered to them within a reasonable time, they are to put aside the traffic of industries other than those engaged in the production of food and foodstuffs, livestock, perishable products, coal, coke and fuel oil. Coke ovens operating under this condition can be compelled by means of the distribution of cars to make shipments where directed. Iron and steel and other shipments can be withheld if cars are required for so-called essential purposes.

Directions to Railroads

The commission directed all railroads to place an embargo on the receipt of coal or other freight transported in open top cars suitable for coal loading and against the placement of such open top cars when any consignee fails to unload the coal or other freight within 24 hours after cars are placed. This is not to interfere with the movement of coal to tidewater or to the Great Lakes for trans-shipments by water. No coal included in any of the special classes is subject to reconsignment or diversion, except for some purpose in the same or superior class in the priority prescribed. Railroads are divided into coal loading and non-coal loading classes and orders are specified for their operation east of the Mississippi River, although the order affects all railroads of the country where the occasion may require it. A machine for the administration of the car orders will be set up by the commission.

The Hoover Plan

The organization being set up through the Hoover plan is distinct. It provides for a committee in Washington, to be appointed by the President, of representatives of the Department of Commerce, the Interstate Commerce Commission, the Department of Justice, and the Department of Interior, to be designated by the presidential committee. It will have general supervision of the measures adopted. Next will be an administrative committee, comprising representatives of the presidential committee, together with representatives of coal operators, and railroads, and where necessary of the larger consuming groups. The presidential committee will establish a representative in each coal producing district and appoint a committee of operators in each district to be nominated by the district operators' association or independent operators. In case of failure of the operators to take such action, the presidential committee may appoint such operators as it sees fit on such committee. The presidential committee will co-operate with the Interstate Commerce Commission in carrying out preferential orders to be issued by the commission. Governmental representatives in the districts in co-operation with the district committee will advise the commission as to the local car movement, and operators will proceed with their usual business until they are affected by preference

orders. It is expected that the district committees under the authority of the presidential committee will recommend allotment of cars on the basis of those who conform to the fair prices to be agreed upon with the presidential committee, the purpose being to give preference in car supply to mines living up to the price agreed upon with Secretary Hoover. Railroads will be asked to appoint a representative to deal with purchases of railroad fuel.

Should coal be moved at once to the preferred classes, it is estimated that it would take practically all of the present output, which is said to be at the rate of 4,000,000 tons this week, leaving other industries to depend entirely upon their stocks. Moreover the contracts the latter have had for coal can be abrogated, if necessary.

Further Reduction in Coal Output

WASHINGTON, July 25.—Further sharp restriction of coal production is reported by the Geological Survey, which says that the week of July 17-22 may set a new low record since the strike began. Reports indicate that output cannot exceed 3,600,000 tons, against a minimum of 3,575,000 tons in the third week of the strike and a maximum of 5,363,000 tons in the twelfth week. The chief factor in the continued curtailment is the railroad shopmen's strike. Practically no anthracite coal is being mined. At the present rate of production, it is from 5,000,000 to 6,000,000 tons weekly below normal. There was a gradual daily decline of car loadings during the sixteenth week of the strike, going down from 12,657 cars on Monday to 10,800 on Thursday, the latest day of the Geological Survey record. The cause of the decrease was traffic congestion on railroads serving the non-union fields. In the southern West Virginia and Eastern Kentucky from which the bulk of the country's supply during the strike has come, almost every field reported acute transportation disability. In Virginia, western Kentucky and Tennessee the interruption of car supply was less serious and in Alabama and the Far West increased. No important change in the number of men at work during the sixteenth week took place. Production in non-union Pennsylvania during the first half of the week showed a slight decrease from the week preceding.

The total number of unbilled cars at the mines on July 15 was only 2,405 of which 621 were at anthracite mines. For a group of 22 of the largest carriers, holding about 75 per cent of the total number of unbilled loads, there were only 1079 cars.

Developments in Connellsville Region

UNIONTOWN, PA., July 22.—Railroad and coal strikes are cutting into the fuel production and business conditions generally in the Connellsville bituminous region. Coal production is being affected more seriously now by the railroad strike than by the sympathetic strike of the coal miners who have affiliated with the United Mine Workers. Additional miners daily are being brought into the Connellsville region and operators are attempting to increase their production. The H. C. Frick Coke Co. has advanced its output to around 35 per cent of normal, but operating independent plants have not reached this proportion. W. J. Rainey, Inc., posted notices this week that its plants would resume in accordance with the President's invitations to operators. The Rainey notices read:

The [illegible] to start [illegible]. The Government expects you to return to work immediately or your places will be filled by others.

So far there has been no response to these notices. None was expected, however, until around the first of the week and the situation at the Rainey plants is largely one of watchful waiting. Four of the six Rainey plants have been idle since April 1. It is understood that some of the other companies in the region are considering posting similar notices.

An attempt was made this week to blow up the tipple at Lemont mine of the H. C. Frick Coke Co. A heavy charge of dynamite was exploded about 200 ft. from the tipple, but aside from tearing a hole in the ground, did no damage. When a suspicious person was seen near the Dearth tipple of the Frick company, guards ordered him to stop. He ran and they fired at him. A fusillade of some 75 to 100 shots fired from the hillside overlooking the plant followed, presumably by strikers in tent colonies on the hill. The home of a guard at Hopwood was destroyed by fire during absence of the family, incendiarism being charged. Two coal trains, one on the Smithfield branch of the Baltimore & Ohio and the other on the M. R. R. Railroad were wrecked last night. It is declared that switches had been tampered with. One brakeman was injured.

The coroner's jury investigating the recent tipple killing of three strikers at the New Geneva plant of the Atlantic Coal Co. disagreed as to Leroy S. Lincoln, chief deputy. Two other deputies were exonerated. Lincoln was later held under $15,000 bail for the grand jury on three charges of voluntary manslaughter. Two members of the coroner's jury were members of the United Mine Workers. The vote is said to have been five to one for exonerating Lincoln. It is the first time in the history of the county that a coroner's jury has failed to agree.

GERMAN MACHINE-TOOL MEETING

Manufacturers Discuss the Effects of Adverse Price Situation—Unable to Compete in Many Markets

The serious effect of the present price level on export trade was discussed at the annual meeting in Berlin of the Association of German Machine Tool Manufacturers, says a report from Commercial Attache Herring at Berlin. The association, it is stated, includes 700 plants employing 125,000 workers. Although in the closing months of 1921 the industry experienced a boom, it was asserted at the meeting that world market prices have recently been reached and even exceeded in certain lines, resulting in a decline of 80 per cent in export orders since Jan. 1 of this year.

The difficulties which an improvement of the mark would occasion, since labor costs could not be immediately reduced without serious controversy, were dwelt upon and the present difficulties of obtaining a regular and adequate supply of materials, particularly coal, was emphasized. Complaint was made of the lack of skilled labor. The shifting price system (gleitende Preise) was recognized as necessary under present conditions, and invoicing of export sales in foreign currencies was recommended. The foreign-trade control by the Aussenhandelsstelle of the machine-tool industry was commended, having resulted, it was said, in preventing exchange dumping abroad.

Exports of machine tools to Italy, Switzerland, France, Belgium and Spain, it was pointed out, have virtually ceased, since price competition in these countries on a c.i.f. duty paid basis is no longer possible.

Two pamphlets have recently been issued by the Electric Furnace Construction Co., Philadelphia. One describes the electro steam generator and the other the latest developments and improvements in the Greaves-Etchells electric melting and refining furnaces. Particular mention is made of the recent improvements which make it possible for all of the electric current to be put either entirely through the top electrodes or, by change of position of the switch, through the whole of the furnace hearth. Other specialties are discussed.

The Hydraulic Society has issued a second edition of its pamphlet entitled, "Trade Standards in the Pump Industry." Additional tables and explanatory data have been added to this compilation of standards of manufacture and engineering practice in the pump industry. There is also a revised list of members of the society. Copies of the pamphlet may be secured from the secretary, C. H. Rohrbach, 50 Church Street, New York.

CONTENTS

July 27, 1922

The Electric Furnace for the Foundry 201

Considerations in Choosing the Proper Unit for Making Steel Castings—Too Large Sizes Often Selected

Proposed Steel Mergers Are Not Illegal 207

Attorney General Daugherty Renders Exhaustive Opinion Concerning Union of Independent Steel Companies

World's Iron Ore Resources 32 Billion Tons 211

That Is "Actual Reserves"—Potential Reserves Are Put at Several Times That Amount—Summary by Countries and Districts

Heat-Temperature Curves of Metals 218

Basis for Average and Instantaneous Specific Heat Values Provided by German Laboratory Tests—New Specific Heats

Government Plan to Meet Strike Situation 223

Priorities Established by Interstate Commerce Commission to Control Movement of Coal—Iron and Steel Industry Down on List

Tool Merger Completed 202
Improves Milling Machine 203
Instrument for Testing Gear Teeth 204
Drill with Mechanical Reversing 204
Platform Truck for Foundry Use 205
Desulphurizing of Coke 205
Labor Notes 205, 253
Automatic Welding Machine 206
To Exhibit Electrical Heating Equipment 206
Hydraulic Press for Baling Scrap 206
Youngstown Notes 215, 230, 246, 251
Ignition of Coal Dust by Electric Arcs 215
The 8-Hour Day in Germany 216
French Iron and Steel Production 217
Engineers Receive French Honors 217
Foreign Chemical Patents 217
Freight Rates 217, 244
Studying Steel Suitable for Gages 217
Bonuses Given to Dismissed Employees 222
Improved Casting for Mill Journals 222
Mechanical Working of Invar 222
Number of Wood Screw Sizes Reduced 222
German Machine Tool Meeting 224
Editorials 226
The Steel Merger Decisions—Better Sands for the Foundry—The Relation of Scrap Prices—Employers the Buffer
Iron and Steel Production in Canada 228
The Iron Age and Its Readers 229
German Steel Prices 229
New York Export Market 231
French Market 231
Wages of Metal Workers 244
Fabricated Steel Business 247
Railroad Equipment Business 247
New Otis Steel Plant 247
British Market 248
Industrial Finance 249
Plans of New Companies 250
Steel Corporation Earnings 251
Sound Detector 251
June Automobile Production 253
Landis Award Upheld by Union Presidents 253
New Trade Publications 263

Iron and Steel Markets 232
Comparison of Prices 233
Prices Finished Iron and Steel, f.o.b. Pittsburgh 245
Non-Ferrous Metal Market 246
Personal Notes 252
Obituary Notes 253
Machinery Markets and News of the Works 254
New York Jobbers' Prices 264

ESTABLISHED 1855

THE IRON AGE

EDITORS:

A. I. FINDLEY WILLIAM W. MACON GEORGE SMART

CHARLES S. BAUR, *Advertising Manager*

Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

F. J. Frank, *President* PRINTED IN U. S. A. George H. Griffiths, *Secretary*

Owned by the United Publishers Corporation, 243 West 39th Street, New York, H. M. Swetland, Pres. Charles G. Phillips, *Vice-Pres.* A. C. Pearson, *Treas.* F. J. Frank, *Secy.*

BRANCH OFFICES—Chicago: Otis Building. Pittsburgh: Park Building. Boston: 410 Unity Building. Philadelphia: 1420-1422 Widener Building. Cleveland: Guardian Building. Detroit: 317 West Fort St. Cincinnati: Mercantile Library Bldg. Buffalo: 881 Ellicott Square. Washington: 816 Fifteenth St., N. W. San Francisco: 320 Market St. London, Eng.: 11 Haymarket, S.W.1.

Subscription Price: United States and Possessions, Mexico, Cuba, Shanghai, $6.00; Canada, $8.50; Foreign, $12.00 per year. Single copy 25 cents.

Entered as second class matter, June 18, 1879, at the Post Office at New York, New York, under the Act of March 3, 1879.

The Steel Merger Decisions

For many years big business has been groping in the dark because it has not known its rights. Beginning with the days of President Roosevelt, there was strong sentiment, which had much justification, against large combinations of companies, and this feeling reached its climax under the Taft administration with the filing of the dissolution suit against the United States Steel Corporation and continued under President Wilson until war came. As one prominent ore man expressed it: "Men of the same line of products can hardly meet on the street for a friendly conversation without placing themselves under suspicion of getting together in wicked alliance to fix prices." When war came, all was changed. As another industrial leader said: "Nowadays we are invited by the Government to violate the law." In other words, manufacturers were urgently requested to unite in regulation of both production and distribution of their products. And they did.

After the signing of the armistice, business was again surrounded by clouds of uncertainty. No one knew what the policies of the Wilson administration would be and there was little if any clearing of the skies after Warren G. Harding entered the White House. Many times, under the various administrations, it had been urged that business be provided some chart to guide it and that organizers of proposed mergers be told whether or not they were proceeding illegally. Generally the answer given was, in substance, that if the Government believed that the Sherman act or the Clayton act was being violated it would be heard from. Perhaps there would have been no departure from this policy of acting only after the fact, had not Senator La Follette forced the hand of the Department of Justice with his ranting resolution alleging an intended monopoly in the steel industry.

In responding to the Senate resolution, which to one type of public men would have been a not unwelcome invitation to corporation baiting, the Attorney-General has acted with courage seldom seen in public officials. He declares that the two proposed mergers of independent companies—one of Bethlehem and Lackawanna and the other of Midvale, Republic and Inland companies—are not in contravention of the Sherman, the Clayton or the Webb law. There is no evasion, no mincing of words. As to the former, the Attorney General emphatically says:

> I am persuaded that the motive which prompts the Bethlehem to acquire the Lackawanna plant is the sole desire to secure greater efficiency and economy in the production, handling, and distribution of steel products, and that the thought of acquiring a monopoly or of enhancing prices was never present. The whole transaction from beginning to end impresses me as being thoroughly clean, honest and straightforward.

As to the Midvale-Republic-Inland merger, the Attorney-General says in concluding his review of the proposal:

> Instead of being in restraint of trade, the new combination will be in furtherance of trade. Its formation has, I believe, been prompted in a great measure by the heavy losses which all of these companies sustained following the marked depression in the steel industry which began over a year ago. These losses, aggregating many millions of dollars, have naturally induced these companies to devise methods of cheapening the production, sale and distribution of their products. By owning plants that are widely scattered, where production can take place in accordance with the needs of the community lying closest to the plants; by manufacturing products at plants advantageously located to ore supplies; by reducing overhead expenses; and by eliminating unnecessary sales agencies, substantial economies can be effected. The combination being formed for this sole purpose, I am unable to see wherein it is tainted with illegality.

It is significant that the Attorney-General stresses what has appealed to steel manufacturers in the trying readjustments following the collapse of 1920 as the way out of their serious situation. There must be a cheapening of production and distribution. In a day of high transportation cost there must be ownership of plants in various districts, so that long hauls may be eliminated. Overhead must be cut down and output increased to produce the largest possible divisor into a lessened aggregate of fixed charges.

Seeing that the opinion just given was in response to a call of the Senate, it does not follow that the Department of Justice has established a policy of advising corporations definitely what they may or may not do without fear of prosecution. But a door has been opened that is not likely again to be completely shut. The Midvale-Worth-Cambria merger of war time went without

protest from Washington; likewise the acquisition of the Pennsylvania and Maryland companies by Bethlehem. Later came the Wheeling, La Belle and Whitaker-Glessner merger and the acquisition of the Ashland Iron & Mining Co. by the American Rolling Mill Co. But none of these or of the several minor consolidations of recent months met the challenge of a La Follette resolution.

The steel trade is not likely to conclude that the Attorney-General's findings as just announced give warrant for the indiscriminate forming of combinations, and it will not need to be reminded that the policy of to-day cannot determine with certainty that of to-morrow. Even the Supreme Court has made rulings that were tantamount to a reversal of itself. But there will be the satisfaction in connection with the opinion the Department of Justice has just given, that the "rule of reason" laid down in the Standard Oil case in 1911 is being practically applied and that furtherance of trade rather than restraint of trade may result from consolidation under the conditions now existing in the steel industry.

Better Sands for the Foundry

Not the least of the more recent developments in the foundry industry are those in molding sand research. For the first time in the history of the American Foundrymen's Association a special session was devoted to this subject at the annual convention in June. Too little attention has been paid to scientific study in this field; yet a vast deal depends on the composition and physical properties of molding sand, particularly in steel foundry practice. Temperatures are high there, and the chances of chemical reactions in the sand or between the sand and metal are many. It has been too long the custom to judge a sand by its appearance, by its action when handled, or by other untrustworthy tests. Scant investigation has been made of the chemistry required to meet temperature and other conditions.

The research now under way has had good results. More is being done in combining sands of various compositions to attain proper mixtures for diverse foundry conditions. It has been brought out that sands have been discovered which will not fuse at 3200 deg. Fahr. Mixtures which rightly may be called synthetic sands are also a possible development, and their use should mean better castings. As in the refractory industry, so with sand, the value of a knowledge of chemistry is being more thoroughly recognized.

Despite the slow recovery in the output of steel in Great Britain, exports are large and expanding. The May shipments of steel and iron from the country, 300,981 gross tons, were second only to those of March, and bring the monthly average for 1922 to 275,300 tons, or almost on a par with the 1920 rate. Over 50 per cent of the exports to June, this year, are made up of pig iron, rails, tin plate and galvanized sheets, with the latter predominating. An examination of the steel output, however, presents a singular contrast. For the first half of this year the monthly average was only 427,100 tons, with the June output next to the lowest for the year. In 1920 British steel furnaces made 755,600 tons per month. The rate this year is, therefore, only 56.5 per cent of the 1920 rate, while the exports to June 1 have been almost the same as in that year. The conclusion is natural that domestic demand is abnormally low.

The Relation of Scrap Prices

The theory held in many quarters that the coal strike would be particularly influential in advancing the market value of iron and steel scrap has not been borne out by events. It was natural enough to entertain such a theory. For many months it appeared that scrap was selling at less than what might be called its "intrinsic" value, i.e., that the offerings were so large that buyers did not have to pay as much for it as they could afford to pay, considering its value to them in relation to pig iron. When coke becomes scarce, scrap is particularly useful. Certain forms, which are quite cheap relative to heavy melting steel, can be charged into the blast furnace with the effect of reducing the consumption of coke per ton of pig iron produced. Certain forms of scrap can be used advantageously in the open-hearth furnace to reduce the amount of pig iron needed to make a ton of steel, the saving in coke being in proportion to the amount of pig iron saved. The iron mill makes rolled material from scrap, taking the place of steel in the manufacture of which coke plays a part. Similarly the iron foundry can use scrap and get along with less pig iron from the blast furnace.

Scrap, however, has not had any remarkable price advance since last March, while recent reports indicate an easier position in the market. At no time have buyers of scrap found any difficulty in getting all they wanted, merely by paying slight advances in price. Some of the advances that have occurred in the scrap market, moreover, were produced more by the ingenuity of the sellers than by consumers bidding against each other.

The average quoted price of the ten descriptions of scrap given in the comparison table of THE IRON AGE was $14.95 for March 28 last, and $16.875 for July 18, showing an advance of $1.925 per ton or about 13 per cent. In the same interval the composite of pig iron advanced $5.23, or about 28 per cent, while the composite of finished steel advanced $3 a net ton or 7½ per cent.

Thus scrap advanced barely more than one-third as much as pig iron in dollars per ton and less than one-half as much in percentage. It advanced more than did finished steel, but every one expects an average of finished steel products to be a slow-moving affair.

This showing agrees with the broader view that may be taken of the history and position of scrap. We seem to have passed into a new era. There was a time when scrap was regarded as one of the sensitive items in the general iron and steel market. Often an advance or decline in scrap prices foreshadowed what was likely to occur in pig iron or steel prices generally. When

scrap became scarce it was very scarce and when it became plentiful it was very plentiful.

Nowadays there is a much larger quantity of scrap moving, and the quantity is probably considerably larger than 15 or 20 years ago relative to the total tonnage of pig iron or steel produced. With larger tonnages, better facilities are provided for storing scrap and moving it as occasion requires. A scrap yard is an institution rather than a place where some junk chances to be piled. No small factor in this development is the magnet, which has facilitated greatly the handling of scrap.

A general principle is involved, that when the production of pig iron was increasing in geometric ratio, with a doubling every ten years, the old material coming out was naturally a smaller percentage of the new material being made than is the case when production is increasing at a more moderate rate. At the moment there is also the factor that a lot of material was left over from the war.

Employers the Buffer

When organized workmen demand of their employers higher wages and easier working conditions, under the guise of requiring a "living wage," the employers are only the buffer between their employees and the general public. The "living wage," which B. M. Jewell, president of the railroad shopmen's organization, sets at $2,637 a year, is not in essence the number of dollars mentioned, but the things the number of dollars would buy at present prices. The men would not be content to be paid in depreciated dollars and have prices of everything go up correspondingly.

It is well established by various statistical investigations, the substantial accuracy of which cannot be questioned, that the sum total of production in the country is far from sufficient to furnish each worker a share equal to that demanded by those who have expressed the "living wage" in concrete form. When workmen demand a disproportionate share the demand can be granted only by the general public suffering to the extent of the extra amount involved. The employer feels the full shock, but it is so distributed that the individual member of the community suffers but a little part of each particular shock. In the aggregate, however, the pressure upon the public is the sum total of all the shocks.

Employers have been so unwilling to emphasize the fact that they must perforce pass the extra payments along, that the public has been encouraged to remain in the unthinking stage. The public needs to be educated to the fact that it, not the employer, pays in the long run. There is need of one publicity campaign after another to carry enlightenment to all workers.

As a matter of fact, the machinery for passing the expense of unreasonable wages or working conditions on to the public is in the most important cases in full view. More than one-third of all organized labor is taken care of under the Transportation Act, which requires the Interstate Commerce Commission to fix passenger and freight charges upon the public covering the expenses of the railroads, whatever they may be. This is a plain legislative enactment. In the coal industry, where organized labor is largely represented, few if any are disposed to question that the long strikes or mining suspensions occasioned by the United Mine Workers are paid for by the public. In the building trades, where there is the third great group of organized workmen, the contractors make no secret of the fact that when they bid on a job they take cognizance of the wages they will probably have to pay and the number of days the workmen will be on the job. No contractor pretends that he pays any increase in wages out of his own pocket.

Surprise often is expressed that organized labor has the temerity to make the demands it does. It should not be particularly surprising. The surprise rather should be that employers make so little effort to advertise the fact that in these matters they are merely the buffers between their employees and the general public, and an equal surprise that the general public is not more roused by being forced to pay excessively for transportation service, for coal, for houses and for other things because organized labor demands more than its proper share of the total production of the country.

Evidence of the increased activity of manufacturing is given in the customs returns for May. The value of crude materials imported for use in manufacturing was 34 per cent greater in that month than for May, 1921, without taking into account the higher prices ruling a year ago, and the imports of "manufactures for further use in manufacturing" were valued at 64 per cent more than those of May a year ago.

Iron and Steel Production in Canada

The production of pig iron in June in Canada showed an increase of 23 per cent over the output of the previous month according to the statement issued by the Dominion Bureau of Statistics, Ottawa. A tonnage of 28,367 was reported for the month as compared with an output of 23,363 gross tons in May. The basic pig iron produced for the further use of the companies reporting increased by 8449 tons over the previous month's record. The malleable iron produced for sale also presented a substantial increase. On the other hand the production of ferroalloys in blast furnaces decreased from 2680 tons in May to 2051 tons in June, involving a reduction of 23 per cent.

The pig iron and ferroalloys produced during the first six months of the year presents a decline of 118,129 gross tons or 31.9 per cent from the output for the corresponding period of 1921. At the end of June last year six furnaces were in blast as compared with four furnaces in operation on June 30. One furnace was blown in in June by the Dominion Steel Corporation at Sydney, N. S., and two were blowing at the plant of the Algoma Steel Corporation, Sault Ste. Marie, Ont., and one at Hamilton, operated by the Steel Co. of Canada.

It may be of interest to quote the price of basic pig iron in this connection as given by one of the Canadian producers. The price was $24 per ton in April; $26 in May and $27 in June. The Labor Department index of iron and steel wholesale prices, including eleven commodities reached the lowest point in April since 1916. The index for the month was 182.5 as compared with an advance to 184.2 in May.

With the exception of the output during February,

the steel production in June was the greatest for any single month this year. The output of castings was practically maintained while the production of ingots increased from 15,646 tons in May to 31,270 tons in June involving an increase of 99.8 per cent. As usual a large proportion of the output consisted of open hearth basic steel intended for further use. On the other hand 1318 tons of castings comprising three different grades of castings were produced for sale.

A comparison of the cumulative steel production during the first six months of the present year with the record for the corresponding period of 1921, throws recent performance into an unfavorable light. The half year of 1921 was credited with an output of 295,140 tons, or 66.7 per cent more than the production of the first six months of the present year.

German Steel Prices and Costs Are Steadily Rising

Shortage of Supplies at Home Causes Export Market to Be Neglected—The "Catastrophe Boom" Goes On—Coal Situation Tightening

(*Special Correspondence*)

BERLIN, GERMANY, July 12.—The currency crisis which followed Dr. Rathenau's assassination has accentuated the existing tendencies in the German iron, steel and machinery trades. Prices are flying upwards, production cost is rising accordingly, the home market is buying so greedily that a general shortage of supply prevails and the export market is neglected and nearly all producers have orders for months ahead. Judging by experience, these familiar features of the so-called "catastrophe boom" will continue unless the reichsmark has not only a real recovery, but a recovery that is maintained for at least some months. Of this there is at present no sign.

Prices of the Steel Syndicate's products have undergone another all-round increase. The rise in coal prices came unexpectedly on July 1. Standard Ruhr coal (Foerdergruskohlen, price in 1914 13.75 marks) was then increased from 890.30 marks to 1184 marks per metric ton, and all coal, coke and briquettes correspondingly. Foundry coke was raised from 1355 to 1851 marks. This was the result of a mining wage increase of 65 marks per man per shift. The average coal price increase was 31 per cent. The resulting increase in Steel Syndicate prices was given in THE IRON AGE, July 20, page 184.

A marked divergence as to price policy has shown itself among the groups represented in the Steel Syndicate. The pure producer firms stand solidly for higher prices. But many of the most influential producers are also increasingly consumers, owing to the co-operation of their mills with machine construction and shipbuilding concerns. This applies to Stinnes, Krupps with their machine and locomotive shops, the Gutehoffnungshütte, which operates with the important Augsburg-Nurnberg Machinery Co., and the Stumm concern, which as early as 1919, the chief lower Rhine plant of August Thyssen, used its whole steel production for its own finishing manufactures. This tendency was one of the factors causing the dissolution of the old Stahlwerks Verband, of which the present Stahlbund is an offshoot. The diversity of interest has tended to keep down Steel Syndicate prices. While the legal maximum pig iron prices have been raised four times since May 1, the Stahlbund products have been raised only twice. However, the new fall in mark exchange (the dollar having closed last week at 536) has again thrown the German prices far below those of the world market, and for a time German complaints of English, French and Belgian underselling of Stahlbund products have ceased.

Scrap iron is very firm, having risen between May 18 and July 3 from 4400 to 5800 marks, and being about 12-fold the 460 marks which was the low point reached in May, 1921. In the belief that this rapid rise is due partly to speculation, the Reichsrath has sanctioned an ordinance restoring official rationing and control of scrap, which may henceforth be requisitioned at fair prices and distributed to consuming concerns.

Fuel Scarcity Accentuated

The coal and coke shortage continues to be acute. The official limitation of self-consumption by combined coal mining and smelting concerns imposed in June is still in force. The Government has decided to prolong the term for tax-free import of foreign coal from Sept. 1, 1921, to March 31, 1923. English coal is now being used in parts of Germany which it never reached before the war.

The Wirth Cabinet has resumed negotiations with the Allies, declaring that financially Germany cannot continue coal importations, and complaining that the Reparations Commission takes one-third of the whole supply of coking-coal, while it takes practically no brown coal.

The coal loss caused by the cession of Upper Silesia is put officially at 20 per cent. The Ruhr coal miners still refuse to agree to work extra shifts for much higher wages, and output is checked by a syndicalist agitation and by the flight of mining labor into the now reviving building trade. In May the Ruhr production per working day was only 310,844 tons against

The Iron Age and Its Readers

Frequently a letter has come to the editorial offices of THE IRON AGE relative to an article which the inquiring reader overlooked in the week of its publication. Having had his attention called to the article and its direct bearing on his business, the writer appealed to the editors to help him in locating it. This may be the experience of some IRON AGE readers in respect to the article on page 1754 of the issue of June 22, dealing with market prices in German metal-working industries, also the wages and hours of workers in those lines. The article brought out clearly the competitive possibilities of German products as determined by the exchange situation and the efficiency of German workers. A reader of THE IRON AGE writes: "It impresses me as the most illuminating review of this highly important subject that it has been my privilege to read."

Surprisingly interesting data are often found in documents which the average manufacturer and user of iron and steel rarely sees. THE IRON AGE of July 6, for example, gave two pages of little-known facts concerning iron and steel products which enter into the everyday life of the people, among them pins, pens, wood screws, snap fasteners and clasps, metal buttons, wire staples and steel wool and shavings. Coming to heavier things, this article, which was based on research of the United States Tariff Commission, gives interesting facts about woven wire cloth, chains, bolts and nuts, and wire for fencing and for baling hay. Many letters come in THE IRON AGE mail asking questions to which the article in the July 6 issue gives the answer.

326,637 tons in April and 333,862 tons in March.

Germany has practically ceased to export coal, with exception of compulsory reparations deliveries, and practically compulsory deliveries to Austria, Poland, Hungary, Danzig and Memel. The entirely free export to Holland, Switzerland and Czecho-Slovakia totaled in 1921 only 2½ million tons. With the mark exchange again depreciated, the price of English coal is far above German. The Essen "Bergwerks-Zeitung" predicts that further smelting furnaces will be blown out.

Pig iron is still being imported. Just before the last mark drop, the Pig Iron Syndicate sold imported Luxemburg foundry pig (No. 3) at 6800 marks.

The demand for rolling mill products is enormous. The State Railroad central office complains that it cannot get a sufficient supply of rails. For field, light and mine rails there is also an extraordinarily active demand. The export market in heavy rails is, however, sharply fought for. Germany's competitors of late have been offering very cheaply, and German firms declare that they cannot stand the 5 per cent export duty and the 2 per cent sales duty. This was before the new mark fall which has restored Germany's advantage.

Machine and electro-technical shops report having an abundance of old orders. Late last month they reported that few new orders were coming in, but since the mark collapse there have been symptoms of a new ordering boom.

German Exports to Holland Cut Down

Foreign trade reports show that the continuous home boom and the short supply (the two things are really one) have badly hit exports. Competitors have cut into Germany's chief market, Holland. In March Holland imported 4,123,000 kg. of pig iron, of which 1,867,000 kg. came from Germany, 1,140,000 kg. from Belgium, and 586,000 kg. from England. In April, of 2,057,000 kg. imports only 543,000 kg. came from Germany, while 1,030,000 kg. came form Belgium. Of Holland's imports of 696,000 kg. of semi-finished products in March Germany supplied 440,000 kg., whereas in April she supplied only 153,000 kg. out of 349,000 kg. In cast and forged machine parts, etc., deliveries from Germany fell from 544,000 kg. to 366,000 kg., while the German delivery of iron plates of all kinds fell from 8,011,000 kg. to 4,913,000 kg., both English and Belgian sales having increased. Germany's exports of iron and iron wares of all sorts other than machines, but including machine parts, in January-April inclusive, were 811,680 metric tons, valued at 11,249,040,000 marks. The figures for these months of 1921 are still lacking. The export of machines was 146,889 tons, valued at 5,022,284,000 marks.

A new patent fee schedule came into force on July 1. The patent registration fee is 300 marks; the annual fee, for the first and second years is 300 marks, for the third, 400 marks; fourth, 500 marks, and so on progressively up to 20,000 marks for the fifteenth and last year. The Reichstag rejected the Government's proposal to lengthen the patent term to 18 years.

Under presidency of Herr Adolf Ebering of Westhofen, a number of firms in the small iron manufacturing branches have formed the Eisenzentrale G.m.b.H., which is to do all the iron and steel buying for its members. The Deutsche Bank, reports *Deutsche Export*, is behind a new Hungarian company, capitalized at 120,000,000 Hungarian crowns, formed for exploitation of the newly-discovered manganese ores in the Hungarian Comitat of Vessprim. Stinnes' Rhine-Elbe Union is about to lay down a new great iron works in the neighborhood of Dortmund.

ERRATIC MARKET

Much Anxiety in the Valley Districts—Sheet Maker Withdraws

YOUNGSTOWN, July 25.—Sales officials characterize the market as "erratic," as current unsettlements are creating considerable anxiety on the part of manufacturing consumers over steel supplies.

An independent whose blast furnace has been forced into suspension is protected on its pig iron requirements for 60 days, much of this iron having been purchased at $18, before prices advanced. This interest has withdrawn from the sheet market for the time being.

In general, makers are showing little interest in new offerings, being satisfied to meet obligations of regular customers, if possible. In full finished sheets, merchant bars and pipe, district interests are falling behind in their obligations.

Little or no surplus iron is available from Valley interests, whose own supplies are becoming inadequate. The shopmen's strike has prevented resumption by a number of merchant furnace operators, which had prepared to blow in their stacks during July.

In the sheet market, a number of independents are endeavoring to meet requirements of their customers at the prices quoted by the leading interest. One maker, however, reports that it is getting some tonnages of black at 3.30c. and galvanized at 4.30c., or $3 per ton above quotations of other producers. This same company likewise claims to be entering blue annealed tonnages at 2.60c., or $4 per ton higher than the 2.40c. price of the leading maker.

All Valley sheet mills have a comfortable backlog on their books, and the problem of delivery is now paramount to that of sales.

There has been accelerated demand for plates from tank builders and car repair interests. The principal Valley maker is well filled on 84-in. mill plate sizes. Plate quotations vary, say consumers, from 1.70c. to 2.25c., though little tonnage is available for early delivery at the lower figures.

The market on merchant bars ranges from 1.75c. to 1.80c., with principal district independent declining new offerings.

All orders are being subjected to close scrutiny, in finished lines.

Important district shippers fear that a car shortage will follow in wake of settlement of the coal and railroad strikes, especially affecting open top equipment. Difficulties in car supply are anticipated through balance of the summer.

Melters are using larger tonnages of scrap since restrictions in iron output, with heavy melting grades moving to consumers at $18.50.

Among the papers announced to be submitted to the technical sessions which will be held at the time of the eighth national exhibition of chemical industries at Grand Central Palace, New York, in the week of Sept. 11, are mentioned the following: "Steel Belts and Their Application to the Solution of Conveying Problems," by Harry Carlson, of Sandvik Steel, Inc., New York. "Moderation in Standardization," by W. D. Collins, United States Geological Survey, and "Standardized Testing Apparatus," by N. F. Harriman, United States Bureau of Standards.

New editions of its books on wheels, car blanks and circular forgings have been issued by the Carnegie Steel Co., Pittsburgh. One of these is devoted to wrought steel wheels for steam and electric railroad service. Besides the specifications of the American Society for Testing Materials, the book contains profiles with detailed dimensions of the wheels it manufactures. A saparate booklet includes the profiles and tables of dimensions for various types of industrial car wheels, including crane wheels, and besides gear blanks, shows the form and range of sizes of piston blanks and pipe flange blanks regularly made.

JAPANESE BUYING LIGHT

Price Ideas Below Prevailing Market Shanghai Market 15 Per Cent Below American Prices Imports

NEW YORK, July 25.—A small but active trade continues with South American countries in merchant products, orders being usually of 50 to 75 tons. The Chinese market is dull as far as American exporters are concerned, as a result of the uncertainties of the political situation there. Because of inability of merchants to obtain advances from banks, warehouses in Manchuria are stated to be carrying less than 25 per cent of usual stocks. A recent cable received by a large export house dealing exclusively with China, reports that prices in the Shanghai market are about 15 per cent below the quotations now being received by importers from the United States. The needs in China are large and with any considerable improvement in the situation, exporters to this market expect a satisfactory run of buying.

Japan continues to buy rails, black sheets of light gage and some structural material. A recent order from the Keizo Electric Railway, Keizo, Corea, involving a small tonnage of 60-lb. and 92-lb. grooved rails, was divided between Suzuki & Co., and Mitsui & Co. A tonnage of steel scrap, for use in a large steelworks, has been contracted for with Asano Bussan & Co., 165 Broadway. The total contract is for about 10,000 tons and is being shipped c.i.f. Moji, in lots of 1000 and 2000 tons. Some small purchasing of structural material is noted and there is an inquiry in the market from a private interest involving about 200 tons of structural steel. A tender on tin plate for canning purposes, the annual requirement of the Japanese army, is in the market from the Imperial Government. When first issued it called for slightly more than 7000 base boxes, but was later reduced to about 4300 base boxes.

Japanese buyers are exhibiting a distinct tendency to bear the market. Whether this is because of a belief that lower prices are unobtainable from the United States than are being quoted, or because of lower offers from British sellers, is a question. Inquirers for tin plate have made counter offers to exporters of about 50c. per base box lower than the c.i.f. quotation made and on structural material the offers have been as much as $5 per ton under the possible c.i.f. price at the present market. On light rails Japanese buyers seem to think they should be able to purchase from the United States at as low as $50 per ton, c.i.f. Japanese port.

Japanese exporters in Japan will be partly financed by the Imperial Government, if a proposal to be presented to the Diet, proves successful. The plan is designed to aid Japanese exporters to compete in foreign markets by the extension of long-term credits, the Government furnishing one-half the necessary financial assistance. It is proposed to seek yen 100,000,000 from the Diet, if the plan is acceptable to the Government.

As the American domestic market ascends, importers become more and more convinced that they should be able to import foreign material. At the same time, the shortage of pig iron is influencing more consumers to interest themselves in foreign iron. While these efforts at importation are largely confined to pig iron, one export and import house in New York is offering shovel steel, about 0.40 to 0.60 per cent carbon, of English origin, at $2 to $3 per ton, f.o.b. New York, under the prevailing price.

According to the American consul at San Salvador, a contract involving about 4000 meters of 3½-in. iron pipe, 500 meters of 2-in. and 100 meters of 1-in. pipe, has been closed between the Water Supply Committee, Department of La Paz, San Salvador and J. Gerardo Flores, San Salvador. The pipe is to be installed for water supply to San Juan Talpa. A contract involving cast-iron pipe will be opened Aug. 16 by the Argentine Sanitary Works and calls for 8201 tons of pipe as well as a tonnage of valves and accessories. The material is for installation at Resistencia, Posadas, La Banda, Rawson and Jachal, Argentina. Bids are being received by the Secretaria del Directorio de las Obras Sanitarias de la Nacion, Charcas 1840, Buenos Aires, Argentina.

China's total production of pig iron annually, according to the estimates of K. Y. Kwong, engineering and mining authority, is about 450,000 tons from Chinese owned and operated furnaces and 250,000 tons from Japanese owned furnaces, says Commercial Attache Julean Arnold at Pekin. The iron ore output is estimated at 2,000,000 tons.

FRENCH MARKET QUIET

About 50 Per Cent of Furnaces in Blast—Rise of Pound Sterling Aids Exports—Shortage of Skilled Labor.

(*By Special Correspondence*)

PARIS, FRANCE, July 13.—The domestic demand for iron and steel is very quiet, but there is more activity for export. The number of blast furnaces now in operation in the east of France is about 74: Lorraine (June 27), 37, out of a total of 66; Meurthe-et-Moselle (production in May, 178,000 tons), 37, out of a total of 85.

Reports recently published by large Lorraine works, such as Knutange, Rombas, etc., have shown material losses. These concerns hope, of course, to increase output, which will reduce costs; but, besides world economic conditions which restrict this expansion, there are other factors, such as a shortage of skilled labor. For instance, the Société de Redange-Dilling has blown out the only blast furnace it had in operation at its Redange works. The Société Lorraine Minière et Métallurgique, Thionville, has not yet re-started one blast furnace lately blown out because of lack of labor. It is a lack of labor also which prevents the Société Métallurgique de Knutange from blowing in the sixth blast furnace, out of its total of 10.

Iron Ore.—There is no change in the iron ore market. Transportation rates on French iron ore have been reduced as follows: Exported iron ore receives a 15 per cent reduction on old rates, reduced themselves by 10 per cent for full trainloads made up of cars owned by the railroad companies and by 15 per cent when the cars are privately owned. Iron ore forwarded from a mine situated outside the eastern and northern areas to ironworks situated also outside those areas receives a 25 per cent reduction on old rates or 30 per cent if minimum consignment is 180 tons. These reductions will remain in force until Oct. 31.

Pig Iron.—Chill-cast foundry pig iron, No. 3 P. L., has declined to 205 to 210 fr. With the Belgian franc at 0.95 fr. French, Belgian pig iron is at about the same level. Very low prices f.o.b. Antwerp are being quoted for export by Lorraine works. The considerable rise of the British pound has greatly benefited French producers, who can now sell hematite pig iron easily, within the zone of penetration of British hematite, at 295 to 305 fr. Prices for the other areas are: Eastern area, 305 to 315 fr.; Center and Parisian areas, 325 to 330 fr.

Semi-Finished Steel.—Inland demand for semi-finished products is restricted, but a rather large export business is being done, in competition with Belgian and Luxemburg producers.

Finished Steel.—There is nothing new to report in plates and sheets, except that the rise of the British pound is greatly helping French producers. The base prices of the Comptoir des Tôles, delivered at average destinations, remain as follows: Flat bars, 590 fr. per metric ton; heavy sheets, 640 fr. per metric ton; medium sheets, 720 fr. per metric ton; light sheets, 900 fr. per metric ton. The prices of rolled merchant products, affected by the lack of orders, are lower, and purchasers easily obtain quotations as low as 400 fr. on large orders of heavy shapes. But on small orders of various specifications the price remains 420 to 430 fr. Steel wire is 450 to 470 fr.

Iron and Steel Markets

GREAT UNCERTAINTY

Emergency Order Brings a Crisis

Industry May Be Dependent for a Time on Fuel Stocks—A Week of Increasing Suspensions

The sweeping order of the Interstate Commerce Commission, effective Tuesday midnight, establishing priorities in all railroad traffic and in fuel distribution has thrown the steel trade into a condition of utmost uncertainty.

Under the war priorities of four years ago, steel as one of the chief war necessities was high on the priority list, but the order just issued requires that the iron and steel and allied industries wait for coal until the more essential consuming lines have been supplied.

An immediate effect, assuming that coal begins to move at once to the preferred classes, would probably be to take up most of the soft coal output, estimated at 4,000,000 tons this week, leaving steel and other industries to depend to a large extent upon their stocks. These represent in most cases not more than a 30 days' supply.

While recently the insufficiency of transportation and the lack of coal have affected steel production more than consumption, it is now to be expected that actual requirements of steel consumers will decrease along with the cutting off of shipments from mills. An unknown factor, in the absence of actual experience under the rationing scheme, is the extent to which the coal output of steel company mines will be taken for distribution among preferred consumers.

It is not to be overlooked that shipments of food and other preferred commodities as named on the Commerce Commission's list are fully provided for in the present movement of freight and that therefore the effect of the priorities in fuel distribution are the chief of the new factors introduced into the situation.

Before the announcement of the new order, which comes as this review is written, the slowing down in blast furnace and steel works operations was more noticeable than in the third week of July. Eastern Pennsylvania, Johnstown and the Mahoning and Shenango valleys had the most marked curtailment. The Pittsburgh district was nearly up to its operation of the preceding week.

In the week ending July 22, four additional blast furnaces were banked in the East, including one Bethlehem and one Sparrows Point, one at Sharpsville, Pa., and one at Leetonia, Ohio.

At best the outlook is for such a railroad congestion as will affect the entire industry for weeks to come.

Coke prices have advanced rapidly and Connellsville foundry coke has been sold at from $14.50 to $15, an advance of $4.50 to $5 within a week. Quotations on furnace coke are almost, if not fully, as high. Coal which sold at $1.90 on April 1 and at $3.50 under the agreement with Secretary Hoover, is now selling at from $8 to $9 and the Hoover schedule has been abandoned, although coal companies are making deliveries at low prices on contracts. Considerable imports of British coal have been arranged for and there are some negotiations for British coke.

Due to the increasing scarcity of coke, there is a decided upward tendency in pig iron prices, with much irregularity. Advances range from 50c. on Alabama iron to as much as $3 in some Northern centers on foundry and malleable grades. Sales have been limited and there is only fair inquiry. The largest sales of the week was 5000 tons of basic to a Cleveland steel company. Foreign pig iron has already advanced under increased demand and higher freight rates which have been brought about by contracting for the shipment of coal from England to the United States.

It is now definitely announced that reduced freight rates on pig iron from Birmingham to St. Louis, Cincinnati and Louisville will become effective Sept. 1, but there will be no reduction to Cleveland, Chicago, or other Northern points because Northern railroads would not agree to reductions proposed by Southern lines.

Scotch foundry iron has been sold for prompt shipment to Atlantic ports of the United States, and our London cable reports pending inquiries.

Railroad equipment business is still noteworthy. Not only have several more large car repair inquiries been put before the trade, involving upward of 8500 cars, but 5000 steel cars have been bought, taking probably 50,000 tons of steel, and the locomotive orders of the week aggregate more than 100.

Iron ore stocks at blast furnaces and on Lake line docks on July 1 were 25,367,000 tons, as against 30,066,000 tons one year previous. Furnace consumption of ore was 3,388,000 tons in June, compared with 3,294,000 tons in May, an indication that until the railroad strike operations were being well maintained.

Pittsburgh

Curtailment of Operations More General — Outlook Uncertain

PITTSBURGH, July 25.—The slowing down in blast furnace and steel mill operations is beginning to reach impressive proportions. Thus far the most serious curtailment has been in eastern Pennsylvania at Johnstown, and in the Mahoning and Shenango Valleys. The immediate Pittsburgh district is still running fairly well, but it also will suffer severely within a few weeks unless there is a great improvement in fuel supplies. Nearly all the by-product plants are receiving much less coal than formerly. Some have had to curtail operations already, while others are running on stocks, which will not last long, a 30-day stock being probably the greatest at any by-product plant. The chief cause of present trouble is the inability of railroads to move Kentucky and West Virginia coal, this having been lately the principal dependence of Ohio, western Pennsylvania and Buffalo by-product coke plants and the chief cause of railroad incapacity is the shopmen's strike, although some congestion had developed by the middle of June.

Thus far the insufficiency of transportation and the lack of coal has affected steel production more than steel consumption, but it is the common view in Pittsburgh

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton	July 25, 1922	July 18, 1922	June 27, 1922	July 26, 1921
No. 2X, Philadelphia†	**$28.77**	$27.61	$27.82	$21.36
No. 2 Valley furnace†	**25.00**	24.00	24.00	19.00
No. 2, Southern, Cin'tif.	**22.55**	22.05	23.00	24.50
No. 2, Birmingham, Ala.	**18.50**	18.00	18.00	20.00
No. 2 foundry, Chicago*†	**25.00**	24.00	23.50	18.50
Basic, del'd, eastern Pa.	25.75	25.75	25.00	21.25
Basic, Valley furnace	24.00	24.00	25.00	19.00
Valley Bess., del. Pitts.	26.77	26.77	26.96	22.46
Malleable, Chicago†	**25.00**	24.00	23.50	18.50
Malleable, Valley	**27.00**	24.50	24.50	20.50
Gray forge, Pittsburgh	**26.27**	25.27	25.46	21.46
L. S. charcoal, Chicago	31.65	31.65	32.00	36.00
Ferromanganese, seaboard	67.50	67.50	67.50	70.00

Rails, Billets, Etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$40.00	$40.00	$40.00	$47.00
Bess. billets, Pittsburgh	35.00	35.00	35.00	30.00
O.-h. billets, Pittsburgh	35.00	35.00	35.00	30.00
O.-h. sheet bars, P'gh.	35.00	35.00	35.00	32.00
Forging billets, base, P'gh	40.00	40.00	40.00	35.00
O.-h. billets, Phila.	40.17	40.17	40.74	35.74
Wire rods, Pittsburgh	40.00	40.00	40.00	42.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	1.70	1.70	1.70	1.90
Light rails at mill	1.75	1.75	1.60	1.85

Finished Iron and Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	1.925	1.925	1.96	2.10
Iron bars, Chicago	**2.00**	1.90	1.75	1.85
Steel bars, Pittsburgh	1.70	1.70	1.70	1.75
Steel bars, Chicago	1.75	1.75	1.75	2.13
Steel bars, New York	2.04	2.04	2.08	2.13
Tank plates, Pittsburgh	1.70	1.70	1.70	1.80
Tank plates, Chicago	1.75	1.75	1.75	2.18
Tank plates, New York	2.04	2.04	2.08	2.18
Beams, Pittsburgh	1.70	1.70	1.70	1.85
Beams, Chicago	1.75	1.75	1.75	2.23
Beams, New York	2.04	2.04	2.08	2.23
Steel hoops, Pittsburgh	2.50	2.50	2.40	2.50

Sheets, Nails and Wire, *Per Lb. to Large Buyers*	[illegible]	[illegible]	[illegible]	July 26, 1921
	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh	3.15	3.15	3.15	3.00
Sheets, galv., No. 28, P'gh	4.15	4.15	4.15	4.00
Sheets, blue an'l'd, 9 & 10	2.40	2.40	2.40	2.40
Wire nails, Pittsburgh	2.40	2.40	2.40	2.75
Plain wire, Pittsburgh	2.25	2.25	2.25	2.50
Barbed wire, galv., P'gh.	3.05	3.05	3.05	3.40
Tin plate, 100-lb. box, P'gh	$4.75	$4.75	$4.75	[illegible]

Old Material, Per Gross Ton:				
Carwheels, Chicago	$19.50	$19.50	$18.25	$12.50
Carwheels, Philadelphia	17.50	17.50	17.50	16.00
Heavy steel scrap, P'gh.	17.25	17.25	17.00	12.00
Heavy steel scrap, Phila.	15.00	15.00	15.00	11.00
Heavy steel scrap, Ch'go.	15.50	15.50	14.75	10.00
No. 1 cast, Pittsburgh	19.00	19.00	19.00	16.00
No. 1 cast, Philadelphia	17.50	17.50	19.00	17.00
No. 1 cast, Ch'go (net ton)	17.00	17.00	16.50	11.50
No. 1 RR. wrot., Phila.	**17.50**	17.00	17.00	13.50
No. 1 RR. wrot., Ch'go (net)	13.50	13.50	13.25	[illegible]

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	**$14.00**	$11.00	$7.50	$2.75
Foundry coke, prompt	**14.00**	11.00	8.00	4.00

Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake Copper, New York	14.00	14.00	13.75	12.50
Electrolytic copper, refin'y	13.75	13.75	13.50	12.25
Zinc, St. Louis	**5.95**	5.75	5.27½	4.25
Zinc, New York	**6.30**	6.10	5.62½	4.75
Lead, St. Louis	*5.40*	5.50	5.55	4.35
Lead, New York	5.75	5.75	5.80	4.40
Tin (Straits), New York	**32.12½**	31.50	31.00	26.00
Antimony (Asiatic), N. Y.	**5.25**	5.00	5.00	4.65

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, July 25, 1922, Finished Steel, 2.169c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel

July 18, 1922,	2.169c.
June 27, 1922,	2.169c.
July 26, 1921,	2.364c.
10-year pre-war average,	1.689c.

Composite Price, July 25, 1922, Pig Iron, $24.05 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

July 18, 1922,	$23.61
June 27, 1922,	24.05
July 26, 1921,	19.48
10-year pre-war average,	15.72

steel circles that the actual requirements of steel consumers will decrease almost as much as the supplies of steel. Thus far, however, buyers of steel have not exhibited any expectation that their consuming ability will be much decreased and they are clamoring for deliveries for steel while mills are endeavoring to regulate their deliveries to the respective requirements of customers.

There is somewhat more urgent inquiry in connection with the purchase of products for prompt mill deliveries, but the tonnages called for are relatively small. Premiums for early delivery are tending to increase. They apply almost entirely to assured early deliveries, rather than to moderately early deliveries. Buying from warehouse, in place of ordering for direct mill shipment, has increased, orders not infrequently being for whole carloads, particularly in butt weld pipe. Pittsburgh warehouses are endeavoring to avoid taking orders that should go direct to mill, and preserve their warehouse facilities to meet regular small lot requirements. Pittsburgh warehouse prices were advanced $3 a ton last week, to 2.35c. for bars and 2.45c. for plates and shapes.

In iron and steel circles, regret is universally expressed that the industrial outlook, recently so promising, should be clouded by the railroad and coal strikes. The augury for autumn business is much less favorable than 30 or 60 days ago.

The mill price of 1.60c. on bars, shapes and plates, occasionally quoted in the past few weeks on particularly desirable orders for indefinite delivery, seems now to have disappeared entirely, leaving the market squarely on a 1.70c. minimum.

Pig Iron.—Only one or two merchant furnaces in western Pennsylvania and the Valleys are in operation, nearly all of the few that were in operation 30 days ago having had to bank or blow out on account of inability to obtain coke. The furnaces have some stocks. Consumers are very apathetic and it might be difficult to sell any considerable tonnage of pig iron regardless of the price, while on the other hand forced purchases would probably develop very high prices. A sale of 200 tons of standard Bessemer iron of immediate shipment was made last Friday at $25, Valley, the price formerly quoted. On the same day, a sale of 100 tons of malleable was made at $27, Valley, which illustrates the vagaries of the market. A sale of basic iron is believed to have been made within a week on the basis of

about $24, Valley, following recent sales at that price or a shade lower. On the other hand, it is not definitely known where any more could be had at any price. Foundry iron sold a few days ago at $25, Valley, or $1 advance over last week's quotations. A higher price might be obtained now, but there is no inquiry of importance and there are no regular asking prices.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.77 per gross ton:

Basic	[illegible]
Bessemer	[illegible]
Gray forge	$24.50 to 25.00
No. 2 foundry	25.00
No. 3 foundry	[illegible]
Malleable	27.00

Ferroalloys.—There is nothing new in the ferroalloy market, as mills exhibit no interest in purchases on account of prospects of greatly decreased operations.

We quote 76 to 80 per cent [illegible] $67.50 c.i.f. Atlantic seaboard for domestic; British, spot, $70; British, future, $67.50; German, 76 to 80 per cent, $66. Average 20 per cent spiegeleisen, $36 furnace; 16 to 19 per cent, $35 furnace; 50 per cent ferrosilicon, domestic, $55 to $60 furnace, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, $41.50; 11 per cent, $44.80; 12 per cent, $48.10; 13 per cent, $52.10; 14 per cent, $55.10; silvery iron, 6 per cent, $30; 7 per cent, $31; 8 per cent, $32.50; 9 per cent, $34.50; 10 per cent, $36.50; 11 per cent, $39; 12 per cent, $40.50. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Iron and Steel Bars.—Pressure for deliveries of steel bars continues heavy, but it does not appear that consumers are actually short of bars to any appreciable extent. The Carnegie Steel Co., which had lately been accepting some orders at 1.60c. for indefinite delivery, will not now sell at less than 1.70c. in any case and is very reserved about making further commitments.

We quote steel bars rolled from billets at 1.70c. to 1.80c.; reinforcing bars, rolled from billets, 1.70c. to 1.80c. base; reinforcing bars, rolled from old rails, 1.60c.; refined iron bars, 2.20c. in carloads, f.o.b. mill, Pittsburgh.

Structural Shapes.—The turnover in structural shapes is very light, and on account of previous commitments, mills are very reserved about selling.

Steel Rails.—The market is quiet in both standard and light rails. Coal mines are interested only in resuming production and do not feel in position to plan any improvements at this time.

We quote 25 to 45-lb. sections, rolled from new steel, 1.75c. base; rolled from old rails, 1.60c. to 1.65c. base; standard rails, $40 per gross ton mill for Bessemer and open-hearth sections.

Wire Products.—Demand for nails is unusually heavy for this time of year, but is being met by mills without much difficulty. Regular prices are unchanged. Detailed prices are given on page 245.

Cold-Finished Steel Bars and Shafting.—Producers expect to have difficulty in making deliveries against sales and contracts already made, as deliveries of hot-rolled bars have slowed down somewhat and are likely to slow down still more. While some sales have been lately at 2.10c., the common asking price has been 2.25c. and this would probably be insisted upon now, as producers do not care to take on any more tonnage with manufacturing conditions so uncertain. Ground shafting is firm at 2.50c. base, f.o.b. mill, and 2.60c. in less than carloads.

Rivets.—Following an advance of $3 per ton on rivets made on June 7 by leading makers there has been a further advance made of $5 per ton on all grades of rivets, effective from Monday, July 24. Local makers now quote 2.65c. base on button head structural rivets and 2.75c. base on cone head boiler rivets, 7/16-in. and smaller now being 70 to 70 and 5 per cent off.

Plates.—The plate mills that have been actively in the market of late are comfortably sold up, while a number of plate mills have been practically out of the situation, considering their costs too high to justify competing for business. While premiums are obtainable for early deliveries, this applies only to small lots, not enough to enable an idle mill to accumulate a back-log. The minimum on plates is now 1.70c., and this is only for indefinite delivery. Prices are given on page 245.

Tin Plate.—Some additional business has come to mills in the past week on account of crop prospects becoming still more favorable. Southern California will have the largest fruit and vegetable pack in history. On account of steel shortage, tin plate mills are unable to average more than about a 75 per cent operation and this is approximately the present rate. Prices are given on page 245.

Track Equipment.—Railroads are showing little interest in track equipment, as they are busy with labor matters. Demand for small spikes continues active. We continue to quote $2.25 on standard railroad spikes and $2.50 on small spikes and boat and barge spikes.

Billets and Sheet Bars.—The market is altogether inactive. Some sheet bars are offered for shipment from Newport, Ky., but there are few mills near enough to make the offer at all interesting. Producers generally are unwilling to sell while sheet and tin plate mills are uncertain, as to how much they will be able to consume. The market is more or less nominal, but is quotable at the old price of $35 for standard billets, small billets and sheet bars.

We quote 4 x 4-in. soft Bessemer and open-hearth billets at $35; 2 x 2-in. billets, $35; Bessemer and open-hearth sheet bars, $35; slabs, $35; forging billets, ordinary carbons, $40, all f.o.b. Youngstown or Pittsburgh mills.

Iron and Steel Pipe.—There is some intimation of a coming advance in the prices of both iron and steel pipe, but so far absolutely nothing reliable has been given out by the mills. Costs of making pipe in the past month or more are much higher than they were, and it is said that on certain sizes the mills could not break even at the present ruling. The demand for ½-in. butt and 1-in. lap welded black pipe is heaviest ever known in the history of the trade, these sizes being used largely in new building work. The leading interest is said to be filled up to October and independent mills for 60 days or longer. Discounts are given on page 245.

Hot-Rolled Strips.—The demand is more active now than for some time and prices are strong. None of the mills is getting out normal production owing to the coal and rail strikes, and the supply of cars is getting to be short in some districts. The automobile builders have been heavy buyers for some time and are still taking a good part of present production. On light gages of hot-rolled strips two or three mills are asking about $2 per ton advance over base prices and are able to get it in some cases. We quote hot-rolled strips at 2.50c. base, Pittsburgh.

Cold-Rolled Strips.—The market is fairly active and mills report they are sold up for six weeks or two months. Prices may advance on account of the higher manufacturing costs due to the coal and rail strikes. We quote cold-rolled strips at 4c. base at mill, Pittsburgh.

Sheets.—Sheet mill operations have been decreasing somewhat of late, chiefly on account of shortage of steel and fuel, although labor supply is a factor at a few points. In general, it is doubtful whether production in point of actual tonnage is at much above 75 per cent of capacity. The American Sheet & Tin Plate Co. has had to curtail its sheet mill operation slightly on account of the steel requirements of its tin plate mills and now has its sheet and tin mills equally scheduled to a 75 per cent operation. All producers are very reserved about making sales, being already well filled with business against their prospective rate of operation. New demand is far from insistent in point of tonnage. There are few sellers on the basis of 3.15c. common black and then only for rather indefinite delivery, while anything like prompt delivery would command a substantial premium. Prices on sheets are given on page 245.

Steel Skelp.—Several local makers report inquiry very active and say they can sell a good deal more skelp in the open market than they are able to turn out. The output has been going down in the last two weeks by reason of the coal strike and the slow movement of coal by the railroads. We continue to quote grooved and sheared skelp from 1.70c. to 1.80c. at mill, depending on the order.

Wire Rods.—While sellers of rods have not formally changed their quotations, they are indisposed to take on new commitments, unless from old and regular customers.

We quote No. 5 common basis at Pittsburgh mills for merchant rods to domestic consumers, $40; chain rods, No. 5 screw stock rods, $45; rivet and bolt rods and other rods of that character, $40; high carbon rods, $47 to $50, depending on carbon, per gross ton, Pittsburgh or Youngstown.

Coal and Coke.—Very little coke is being sold and standard furnace coke has brought $14 to $15 for a few small lots, while Connellsville steam coal ranges in price from $8 up to $9 per ton. It will be recalled that Secretary Hoover fixed a maximum of $3.50 per ton at mines for Connellsville coal, but the agreement is apparently forgotten by all operators, although they are delivering coal sold some time ago at low prices.

Old Material.—There is confusion in the local scrap market due to the orders issued by two or three mills to dealers to hold up shipments of heavy melting steel which was coming to them on contract. The mills have taken this action because of the coal and rail situation, as they will not need more scrap unless they have coal and coke with which to operate. In a certain sense this has created a weakness in the market. One steel company has bid $17.50, delivered, for a small tonnage of No. 1 steel scrap, but it has rejected much material lately and dealers are slow to sell to it They can pick up steel at about $17. Another company is reported to have paid a railroad $19 for knuckles and couplers and to have paid a dealer $21 for the same grade. The market as a whole is quiet and no marked resumption of activity is expected until the coal and railroad troubles are out of the way. The prices quoted represent dealers' views as to what they would sell for under present conditions.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows per gross ton:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	$17.25
No. 1 cast, cupola size	$19.00 to 20.00
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	17.00 to 17.50
Compressed sheet steel	15.50 to 16.00
Bundled sheets, sides and ends	14.50 to 15.00
Railroad knuckles and couplers	18.50 to 19.00
Railroad coil and leaf springs	18.50 to 19.00
Low phosphorus standard bloom and billet ends	20.50 to 21.00
Low phosphorus plates and other grades	19.00 to 20.00
Railroad malleable	16.00 to 16.50
Iron car axles	25.00 to 26.00
Locomotive axles, steel	24.00 to 25.00
Steel car axles	17.50 to 18.00
Cast iron wheels	18.50 to 19.00
Rolled steel wheels	18.50 to 19.00
Machine shop turnings	14.00 to 14.50
Sheet bar crop ends	19.50 to 20.00
Heavy steel axle turnings	15.50 to 16.00
Short shoveling turnings	15.00 to 15.50
Heavy breakable cast	18.00 to 18.50
Stove plate	15.00 to 15.50
Cast iron borings	16.00 to 16.50
No. 1 railroad wrought	15.00 to 15.50

Drastic Curtailment May Be Necessary

YOUNGSTOWN, OHIO, July 25.—The opinion is growing in industrial circles that drastic curtailments will occur in the steel industry after Aug. 1 unless transportation and coal mining difficulties are quickly adjusted. Plants are encountering much difficulty in maintaining schedules.

Shortage of pig metal forced suspension following the night turn Tuesday of No. 2 puddling mill of the A. M. Byers Co., Pittsburgh, at its Girard plant. This mill contains 44 puddling furnaces, of which 30 have been operating. The 30 active puddling furnaces in No. 1 mill will continue active until the end of the week, when they will also suspend. The company's blast furnace at Girard has been idle for several months because of inability to cover on fuel requirements.

The Brier Hill Steel Co. plans to bank Jeannette blast furnace this week because of coal shortage.

MANY BUSY PLANTS

Springfield, Ohio, Companies Busy in Spite of Strikes

SPRINGFIELD, OHIO, July 20.—A steady improvement in the business conditions of Springfield and vicinity is reported by the local manufacturers. President T. W. Ludlow, of the Springfield Malleable Iron Co., says that there is a good local demand for castings as well as from the general trade. The company has large orders from car works; also for small castings. At present the plant is being operated with about 80 per cent of its normal force. The company is well supplied with pig iron and coal, Mr. Ludlow says, so that he is not worried as a result of the strike.

The Ohio Steel Foundry Co. is operating with a good force of men, filling orders for the locomotive works at Lima and the Standard Car Co., Butler, Pa. There is a steady demand for castings for motor trucks and automobiles. The company is employing about 65 per cent of its normal force.

A slight improvement is noticed in the machine tool business, Edward Montanus, of the Springfield Machine Tool Co., said. This is especially true regarding the past few weeks. Mr. Montanus said, however, that as a result of the strike the railroad companies are holding up orders for machine tools.

Business is gradually getting better in the gas engine line, according to President H. C. Blake, of the Foos Gas Engine Co. The Superior Gas Engine Co. is operating with almost its normal force. It is getting out engines for the oil fields. The company has started the construction of an attractive office building, which will be of reinforced concrete and brick. During the last few years the company has completed the erection of a model plant, which it is estimated cost more than $500,000. P. J. Shouvlin is president of the company and director of the Mad River National Bank.

"We are running some overtime," said President A. F. Sparks, of the James Leffel & Co., manufacturers of water wheels. "Things are coming along well, and we are getting a number of good orders." Recently the company booked orders for turbines for cities in Indiana and other points in the Central West.

C. J. Burton, vice-president and treasurer the G. F. Burton Co., dealer in pig iron, who has just returned from a trip through Ohio and Indiana, says that there is a general improvement in conditions and that there is an increasing demand for pig iron.

Local agricultural implement manufacturing companies which have been running light for the past year are beginning to see encouraging signs for the future. The American Seeding Machine Co. is expecting good orders from South America and Australia. These should be received by the middle of August. President Frank C. Johnson says that prospects are good for a fair fall seeding machine trade, according to reports from the travelers and dealers.

Considering the lateness of the season, the motor truck and automobile manufacturing companies here are doing good business. While the Kelly-Springfield Motor Truck Co. is forging ahead on its schedule of trucks, owing to increasing orders, the Springfield works of the International Harvester Co. is not so active. It has been turning out an average of 50 high speed trucks since early spring. Lately this number has been reduced to 25 trucks per day.

The Westcott Motor Car Co. reports that business is holding up well and that indications are that July will be practically as good as June, which was the record month since 1920. This company is having difficulty in getting parts, which is delaying the assembling of the machines.

The big plant of the Robbins & Myers Co., motors and fans, closed Saturday, July 15, until July 31, for the annual inventory and vacation period. Indications are that there will be a steady improvement in orders for motors, the officers say. Normally this company employs 3200 persons. F. H. Hunting, of Fort Wayne, Ind., formerly with the General Electric Co., took charge as president of the Robbins & Myers Co.

Chicago

Strikes an Increasingly Important Factor in Prices and Production

CHICAGO, July 25.—The shadow of the restrictive influence of the coal and railroad strikes is rapidly falling on the iron and steel industry in this district, and, while as yet there has been no material decline in plant operations, the end of fuel reserves is only a few weeks off and unless there is an early change for the better, most of the producers now running at a relatively high rate will be forced to suspend. With coal stocks getting very low and with such new supplies as are available costing up around $12 to $13 a ton delivered, attention is diverted sharply to costs, and in the past few days there has been either a withdrawal by steel makers from the market or an advance in prices calculated to cover the indicated producing charges.

While the Steel Corporation subsidiary here still is taking business in the major products on a base of 1.75c., Chicago, independents generally have advanced prices $3 per ton to a base of 2c., Chicago. The Inland Steel Co. still is in a position to take on some gages of plates and small structural shapes, but on other products is out of the market and on plates and shapes it is picking its orders. Operations by this company still are placed at between 65 and 70 per cent. The Illinois Steel Co. is operating between 84 and 85 per cent, while the Interstate Iron & Steel Co. reports full operations.

An advance of $1 a ton in all grades of Northern iron is due less to the demand than to the fact that with costs steadily mounting, producers feel it is dangerous to gamble on an early settlement of labor troubles. There is not much hope that fuel will be plentiful and reasonable in the near future and only the advent of such a condition would make possible profitable production of iron at recent prices.

There seems to be no let up in the demand for steel from the automotive industry and there continues to be a good deal of urgency to the demand for railroad track supplies. Railroad business in general is pretty heavy, with the week's business including a sizable total of both locomotives and cars and much repair work about ready to be placed.

The most favorable word that can be said about the railroad strike in this territory is that it is not spreading beyond the shopmen. A strike of the Chicago surface elevated street railroad men threatens. This would be bad for industrial Chicago in view of the fact that a very large percentage of those engaged in business use the street railroads and also because the storage of coal is resulting in the cancellation of a good many suburban trains by the steam roads. If all the troubles which now threaten actually occur, it would cause no stretch of imagination to picture almost complete suspension of business activity.

Pig Iron.—Real activity is lacking in all grades and while a few sales of lots amounting to 500 tons have been put through, the more common purchase is of one or two carloads. We note sales of two 500-ton lots of Southern foundry at $18.50, Birmingham, for the base grade and there have been several smaller lots at the same figure. Other furnace interests continue to quote Southern foundry at from $19 to $20 at furnace for No. 2 grade, but without getting much business. A sale of 600 tons of No. 1 Northern iron is reported to an agricultural implement maker at the recent Chicago base. On the whole, there is more demand for shipments against contracts than there is for fresh supplies and that is surprising in view of the fact that if the blast furnaces are forced to suspend because of the fuel shortage, melters no doubt would be affected in the same way. The most recent sale of basic iron here was involving a round tonnage for delivery at the convenience of the maker at $24 and the new prices on this and other grades have been in effect for too brief a period to have yet found basis in sales. A sale of 400 to 500 tons of high silicon iron to one of the automobile manufacturers is reported to have been made for shipment from Jackson, Ohio, but full details are not available.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$31.65
Northern coke, No. 1, sil. 2.25 to 2.75	$25.50 to 26.50
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	25.00 to 26.00
Northern high phos	25.00 to 26.00
Southern No. 2	24.50 to 26.00
Malleable, not over 2.25 sil	25.00 to 26.00
Basic	25.00 to 26.00
Low phos. Valley furnace, sil. 1 to 2 per cent copper free	34.00 to 35.00
Silvery, sil. 8 per cent	37.29

Bars.—The supply situation in mild steel bars is growing more acute and while the Steel Corporation subsidiary has made no change from 1.75c. base, Chicago, the independents are decidedly stronger. The Inland Steel Co. has virtually withdrawn from the market and has no regular quotation, while other independents in a position to take on tonnages for relatively early delivery are talking 2c. minimum. There has been no let up in the demand; indeed, as a result of the fact that Eastern mills are falling behind instead of gaining upon their obligations, local mills are getting an increased number of inquiries. The Steel Corporation price, as for some time past, refers entirely to such business as buyers are willing to place for delivery at the convenience of the mill. Makers of hard steel bars are heavily committed for the present quarter and indisposed to commit themselves further until they have a definite line on what last quarter is going to produce with regard to the fuel, labor and transportation conditions. On iron bars, 2c. Chicago or mill now is minimum and one important maker having no stated quotation has to-day withdrawn all prices and is accepting specification only on the basis of price in effect at time of shipment. This development is solely ascribable to the shortage of coal and the probability of changing costs. Warehouse prices on bars and bar mill products have been advanced $2.40 to $3 per ton.

Mill prices are: Mild steel bars, 1.75c. to 2c., Chicago; common bar iron, 1.90c. to 2c., Chicago; rail carbon, 1.70c., mill or Chicago.

Jobbers quote 2.60c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 3.55c. for rounds and 4.05c. for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 2.50c. base; hoops, 3.60c.; bands, 3.35c.

Bolts and Nuts.—Jobbers and consumers are specifying fairly freely on contracts at the prices in effect prior to July 1. While new business is not large, there is a fair volume in the aggregate and at the new prices. The Michigan Bolt & Nut Co., Detroit, as of July 20, met the advance in machine carriage bolts and lag bolts made July 1 by other makers. Jobbing prices of rivets have been advanced $3 per ton and a further advance is indicated by the mill advance of $5 a ton made by Eastern makers, effective July 24. The full list of discounts will be found on page 245, except that, as to this territory, they are f.o.b. Chicago instead of Pittsburgh.

Jobbers quote structural rivets, 3.25c.; boiler rivets, 3.35c.; machine bolts up to ⅞ x 4 in., 50, 10 and 10 per cent off; larger sizes, 50 and 10 off; carriage bolts up to ⅞ x 6 in., 50 and 5 off; larger sizes, 45 off; hot pressed nuts, squares and hexagons, tapped, $3.25 off; blank nuts, $3.50 off; coach or lag screws, gimlet points, square heads, 60 per cent off; quantity extras are unchanged.

Wire Products.—The past week has shown a little more activity, although distributors still are more disposed to seek deliveries against old orders than to enter new orders. The leading interest still is several weeks behind in its deliveries and this condition throws much of the early shipment business to the independents, who, however, are generally quoting the Steel Corporation basis. Wire rods are scarce in this district and $40 per gross ton is the absolute minimum.

We quote warehouse prices, f.o.b. Chicago: No. 9 and heavier black annealed wire, $3.10 per 100 lb.; No. 9 and heavier bright basic wire, $3.25 per 100 lb.; common wire nails, $3.25 per 100 lb., cement coated nails, $2.75 per keg.

Sheets.—The leading independent maker in this district within the past few days has practically withdrawn from the market. It is comfortably filled with business for the present quarter, and fearing higher costs, has instructed salesmen and branch offices to submit all inquiries. The general situation is a little

mixed. The automobile manufacturers figuring upon a big demand from the agricultural districts when money begins to flow back from the crops, still are running heavily and specifying freely for sheets. Demand for galvanized sheets also is good, but several of the independent mills are eager for business in black sheets. The market is not quotable above 3.15c., base, Pittsburgh, for black sheets, but on other finishes where prompt shipment is required, premiums are being obtained. A good many inquiries are coming to this market from consumers who are not getting full shipments from mills in the East. The automotive industry is being watched closely for signs of slowing up and there is conservatism about taking orders from irregular consumers in the fear that the business is merely a duplication of that already placed and would be cancelled on the first sign of an easier delivery situation.

Mill quotations are 3.15c. to 3.30c. for No. 28 black, 2.40c. to 2.50c. for No. 10 blue annealed and 4.15c. to 4.30c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote blue annealed, 3.75c.; black, 4.45c.; galvanized, 5.45c.

Plates.—It is increasingly difficult to place orders for plates for prompt deliveries and with many inquiries coming here on account of the inability of Eastern mills to accept new business, the price situation is growing stronger. The Steel Corporation subsidiary has made no change in base price, but it is doubtful whether independent makers would to-day take on business at less than 2c. The Inland Steel Co. is pretty heavily committed and while it can take some business in heavy material, it is asking its sales offices to submit all inquiries and has no stated price. About 30,000 tons of steel mostly plates will be required for the 3000 composite gondolas recently placed by the Illinois Central Railroad. There has been a marked revival in the demand for oil storage tanks and builders in this territory are figuring on a large number. Details of this business are not yet available. The warehouse price of plates has been advanced to 2.70c.

The mill quotation is 1.75c. to 2c., Chicago. Jobbers quote 2.70c. for plates out of stock.

Cast Iron Pipe.—No big projects are up at the moment, but an active demand for small tonnages is reported. There is no change in prices, either here or at Birmingham. Bids close July 27 on a job at Hinsdale, Ill.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $49.70 to $50.70; 6-in. and above, $45.70 to $46.70; class A and gas pipe, $3 extra.

Structural Material.—The Inland Steel Co. is accepting new business, except that which can be rolled on its small structural mill, with much caution and has no stated price. The Steel Corporation subsidiary still holds to 1.75c., Chicago, but is making no definite delivery promises on new business. The Chicago market appears quotable at 1.75c. to 2c., with the latter figure minimum where specific delivery is required. Structural lettings are more numerous than they have been and include a few of fair size. Jobbers have advanced the price of plain material out of warehouse to 2.70c.

The mill quotation on plain material is 1.75c. to 2c., Chicago. Jobbers quote 2.70c. for plain material out of warehouse.

Rails and Track Supplies.—There is no appreciable decline in the demand for track bolts, spikes, tie plates and angle bars and makers find it difficult to keep abreast of their orders. Not much new business is coming out in rails, but on standard sections, makers cannot make definite deliveries before October. Fairly prompt shipments can be made against new orders for light rails.

Standard Bessemer and open-hearth rails, $40; light rails rolled from new steel, 1.75c., f.o.b. makers' mills.

Standard railroad spikes, 2.25c. to 2.35c., Pittsburgh; track bolts with square nuts, 3.25c. to 3.35c., Pittsburgh; tie plates, steel and iron, 1.85c. to 2c., f.o.b. mill; angle bars, 2.40c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.30c. base and track bolts 4.30c. base.

Reinforcing Bars.—The Truscon Steel Co. has been awarded 100 tons for the packing plant for Katz & Horn, St. Paul. Other business done in the past week has involved only small tonnages. Pending business includes the Pine Grove Apartments, Chicago, 275 tons, and an office building for the Atchison, Topeka & Santa Fe Railroad, Newton, Kan., 125 tons.

Coke.—Available tonnages of foundry coke are very limited because of the shortage of coal and the hindrances to deliveries incident to the congestions and the railroad labor troubles. The local product is nominally quoted at $11.25, Chicago, and that from the South at $10.75. Not much of the latter is enroute and sales for the moment are nil.

Old Material.—Prices do not change much in this market. We note a slightly weaker tendency in the steel works grades, which are in light demand on account of the uncertainty as to the fuel supply. Compressed sheets are down about 50c. per gross ton. Cast iron borings also are weaker, but the market is stronger on malleable, which is in brisk demand from the malleable foundries and busheling also commands slightly more money this week than it did last week.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

	Per Gross Ton
Iron rails	$18.50 to $19.00
Cast iron car wheels	19.50 to 20.00
Relaying rails	22.50 to 27.50
Rolled or forged steel car wheels	18.50 to 19.00
Steel rails, rerolling	16.25 to 16.75
Steel rails, less than 3 ft	17.50 to 18.00
Heavy melting steel	15.50 to 16.00
Frogs, switches and guards cut apart	15.50 to 16.00
Shoveling steel	15.00 to 15.50
Drop forge flashings	11.50 to 12.00
Hydraulic compressed sheet	13.00 to 13.50
Axle turnings	13.50 to 14.00
	Per Net Ton
Iron angles and splice bars	17.50 to 18.00
Steel angle bars	14.75 to 15.25
Iron arch bars and transoms	18.00 to 18.50
Iron car axles	22.50 to 23.00
Steel car axles	15.50 to 16.00
No. 1 busheling	12.25 to 12.75
No. 2 busheling	7.00 to 7.50
Cut forge	13.75 to 14.25
Pipes and flues	10.50 to 11.00
No. 1 railroad wrought	14.00 to 14.50
No. 2 railroad wrought	13.75 to 14.25
Steel knuckles and couplers	16.25 to 16.75
Coil springs	16.50 to 17.00
No. 1 machinery cast	17.00 to 17.50
No. 1 railroad cast	16.00 to 16.50
Low phos. punchings	15.00 to 15.50
Locomotive tires, smooth	13.00 to 13.50
Machine shop turnings	8.50 to 9.00
Cast borings	11.25 to 11.75
Stove plate	14.50 to 15.00
Grate bars	13.50 to 14.00
Brake shoes	14.00 to 14.50
Railroad malleable	16.00 to 16.50
Agricultural malleable	16.00 to 16.50

Plans of the Durant Motors Co.

It is announced that the Durant Motors Co. has organized a new company to be known as the Flint Motor Co., Flint, Mich., to manufacture a medium-priced automobile to be known as the Flint. The Durant Motors Co. takes possession this week of the former plant of the Willys Corporation at Elizabeth, N. J., which it recently purchased at public auction, and the plant at Long Island City, which has been used by the Durant company for assembly of the Durant automobile, will soon be utilized as an assembly plant for the Flint Motor Co. It has also been announced within the past few days that W. C. Durant, head of the Durant Motors Co., has been elected president of the Locomobile Co., Bridgeport, Conn., and plans for the expansion of the business of the latter company, which has been in the hands of a receiver, are under way.

A cast iron door, 15 x 16 in. in size, has been developed by the Conveyors Corporation of America, 326 West Madison Street, Chicago. It is designed especially for boiler settings thus to secure tightness against the leakage of air or gases. The bearing surfaces are machined and floating hinges pivoted to the door at the center are used.

New York

Coal and Coke Strikes Responsible for Feverish Condition of Market

NEW YORK, July 25.—The market is demoralized on account of the coal and railroad strikes causing scarcity of pig iron, coal and coke. A very limited tonnage of pig iron can now be obtained and the shortage of coke is causing great embarrassment. British coal and coke may check the rapid advance in prices of fuel. Considerable coal from England is now on the ocean.

Pig Iron.—The market is feverish and prices are rapidly advancing. In eastern Pennsylvania the lowest schedule announced within the past two days was $27 for No. 2 plain, $28 for No. 2X and $29 to $30 for No. 1X. One of the two companies having any iron to sell has advanced its base from $28 and is now quoting from $28 to $29. Reports from Buffalo indicate that the market is at least $26 on No. 2 plain and $26.50 on malleable, with $28 asked. No Virginia iron is obtainable and quotations on this grade are nominal. The A. P. Smith Mfg. Co., East Orange, is in the market for 450 tons of foundry iron for delivery in the first quarter of next year. There seems to be no probability of quotations being submitted soon for that delivery. A boiler company is in the market for 1000 tons No. 2X for delivery in August and September at its New York plant. A Springfield, Mass., melter is in the market for 1200 to 2200 tons for the remainder of the year. Prices on foreign iron are advancing, usual quotations being $27 seaboard on Scotch, $23.50 on French, and $25 on Middlesbrough.

We quote delivered in the New York district as follows, having added to furnace prices $2.27 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$31.77 to $32.77
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	30.77 to 31.77
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	29.77 to 30.77
Buffalo, sil. 1.75 to 2.25	30.91 to 31.91
No. 2 Virginia, sil. 1.75 to 2.25	29.44 to 30.44

Ferroalloys.—There is a demand for ferromanganese for prompt shipment, with very little available. Buyers have offered as high as $72.50 and $75, seaboard, for spot carloads and a few such sales have been made, resale material being supplied. One British agent with a small consignment due in August has sold several hundred tons at $67.50, seaboard, while others have gotten $70 on small lots. No domestic alloy is to be had before September and the coke shortage may affect this delivery. The Sheridan furnace of the Lavino Furnace Co. may be obliged to bank at any time because of lack of coke. Spiegeleisen is unchanged at $35 for the 16 to 19 per cent and $36, furnace, for the 19 to 21 per cent. Prices are lower on 50 per cent ferrosilicon. Makers who were quoting $55, delivered, are now willing to sell at $52, or possibly less.

Ferromanganese, domestic, seaboard, per ton	$67.50 to $70.00
Ferromanganese, British, seaboard, per ton	$67.50 to $70.00
[illegible] per cent	$35.00
Spiegeleisen, 20 per cent	$36.00
Ferrosilicon, 50 per cent, delivered, per ton	$52.00 to $55.00
Ferrotungsten, per lb. of contained metal	40c. to 50c.
Ferrochromium, [illegible] per cent, carrying 60 to 70 per cent Cr. per lb. Cr., delivered	12c. to 14c.
Ferrovanadium, per lb. of contained vanadium	$3.00 to $3.50
Ferrocarbontitanium, 15 to 18 per cent, 1 ton to carloads, per ton	$200.00

Ores

Manganese ore, foreign, per unit, seaboard	25c. to 26c.
[illegible] per ton	$2.00 up
Chrome ore, basis 48 per cent Cr_2O_3, crude, per unit, Atlantic seaboard	40c. to 45c.
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	40c. to 45c.

Finished Iron and Steel.—Fuel shortage, occasioned in no small degree by transportation delays, is the all-important topic. An added number of mills will not consider any fresh business. Those mills which can still promise delivery in a few weeks are quoting premium prices, and even under these conditions do not favor relatively small tonnage orders involving a variety of sizes. More is heard of a repetition of conditions of 1920 in that there has been to some degree considerable duplication of orders. The minimum on heavy tonnage products appears still to be 1.70c., Pittsburgh, except to such large consumers as car builders. Round lots of merchant and reinforcing concrete bars have sold at 1.90c., Pittsburgh, under definite delivery promises.

We quote for mill shipments, New York, as follows: Soft steel bars, 2.04c. to 2.14c.; structural shapes, 2.04c.; bar iron, 1.94c.; and steel plates, 1.99c. to 2.04c. On export shipments the freight rate from Pittsburgh to New York is 28.5c. per 100 lb., while the domestic rate is 34c.

High Speed Steel.—Slightly increased activity is reported, but sales are still small. Producers continue to quote 18 per cent tungsten high speed steel at 75c. per lb., with special brands of some companies ranging up to 95c. per lb.

Warehouse Business.—Prices in this district on bars, structural material, hoops, bands and plates and blue annealed sheets have been increased 15c. per 100 lb. Black and galvanized sheets are still on the same schedule of 4.35c. and 5.35c. per lb. respectively, with this schedule very weak. The new price is evidently based upon 1.70c. per lb., base, Pittsburgh, with an effort to keep as close as possible to the $13 per ton spread that has prevailed for some time. Bars are now 2.73c.; structural material, 2.78c.; plates, 2.78c.; hoops, 3.78c.; bands, 3.38c., and blue annealed sheets, 3.78c. for No. 10 gage. The market continues fairly active, warehouses handling structural material reporting unusually good business in this line. Dealers in wrought iron and steel pipe report prevailing prices strong and very close to the official schedule. We quote prices on page 264.

Cast-Iron Pipe.—Activity in purchasing by both private and municipal interests continues strong, but the pig iron shortage is beginning to be felt. Foundries are still booked up for three to four months. No new municipal tenders or lettings are reported this week. We quote, per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $53.50; 4-in. and 5-in., $58; 3-in., $63.80, with $4 additional for Class A and gas pipe.

Coke.—While a sale of 25 cars of coke has been made at $12, ovens, the market has since advanced rapidly, and it is doubtful whether less than $14.50 could now be done on Connellsville coke. By-product coke is quoted at $12 to regular customers. The advance in foundry coke is due not only to increase in demand, but also to heavy freight rates due to the chartering of vessels for the importation of British coal.

Old Material.—Despite the general quietness in the market, prices on heavy melting steel are particularly stiff. Buying by Buffalo mills has warranted payment on No. 1 heavy melting steel up to as high as $11. This was on steel being shipped by barge to Buffalo, which takes a freight of only $2.25 per ton, compared with the railroad freight rate of $5.17. Higher prices in the Pittsburgh market have also tended to stiffen heavy melting steel. Specification pipe is quotable at $9 to $9.50 per ton. Prices being paid on heavy melting steel are now about $10.25 to $10.75, and on short length steel rails $11.25 to $11.75. Rerolling rails range from $11.50 to $12.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$10.25 to $10.75
Steel rails, short lengths, or equivalent	11.25 to 11.75
Rerolling rails	11.50 to 12.00
Relaying rails, nominal	27.00 to 28.00
Steel car axles	16.00 to 17.00
Iron car axles	22.00 to 23.00
No. 1 railroad wrought	12.50 to 13.00
Wrought iron track	11.00 to 11.50
Forge fire	Nom. to 8.50
No. 1 yard wrought, long	10.50 to 11.00
Cast borings (clean)	9.25 to 10.25
Machine-shop turnings	9.25 to 10.25
Mixed borings and turnings	9.25 to 10.25
Iron and steel pipe (1 in. diam., not under 2 ft. long)	9.00 to 9.50
Stove plate	10.00 to 10.50
Locomotive grate bars	11.50 to 12.00
Malleable cast (railroad)	10.50 to 11.00
Cast-iron car wheels	13.00 to 13.50

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$18.00 to $19.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	16.50 to 17.00
No. 1 heavy cast, not cupola size	13.00 to 13.50
No. 1 cast (radiators, cast boilers, etc.)	12.00 to 12.50

Philadelphia

Coal and Coke Shortage Is Crux of Present Situation—Prices Higher

PHILADELPHIA, July 25.—Although the Administration at Washington is not relaxing its efforts to bring about a settlement of labor troubles at coal mines and on the railroads, the pig iron and steel trade sees little hope of speedy improvement in the coal and coke supply, which is now being seriously restricted by the inability of railroads to furnish transportation. The first effect has been upon blast furnaces, and in addition to the several in the East which were reported last week as having banked, others have been similarly stopped. The Bethlehem Steel Co. has banked a furnace at Steelton and one at Sparrows Point, also having two banked at Bethlehem, as mentioned last week. The Midvale Steel & Ordnance Co. has banked one at its Johnstown plant and another will probably become idle this week, while the coke situation also threatens the one active Midvale stack at Coatesville. The Eastern Steel Co. has banked its furnace at Pottstown. Other furnaces are short of coke and may be forced to suspend. The Sheridan furnace of the Lavino Furnace Co., making ferromanganese, is in this position. Pig iron prices have been forced upward, the high prices being paid for such coke as is available leaving furnaces with no alternative but to ask more for their product.

In steel the situation is not yet so acute, but of course it will become so as soon as the effect of reduced pig iron output has spread to other departments. At present the situation is being helped out at some plants by stocks of cold steel on hand. Some steel companies are wholly or partly out of the market. The sources of supply for finished steel for prompt delivery are becoming fewer.

Pig Iron.—With the Warwick furnace banked on account of coke shortage, the Wharton furnace of the Replogle Steel Co. out of the market, the Bethlehem Steel Co. having no iron available for prompt delivery except some stock iron of off analysis, and other furnaces not anxious to sell in view of the possibility that they, too, may soon be affected by coke shortage, the present Eastern pig iron situation is not hopeful either from the buyer's or seller's point of view. The minimum at which foundry iron is now obtainable is $27 for No. 2 plain, $28 for No. 2X and $30 for No. 1X, f.o.b. furnace, with the sellers restricting their sales largely to regular customers. Fortunately for consumers, they appear to have their present needs covered and there is very little inquiry, but there is considerable pressure for deliveries on contracts.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 76 cents to $1.64 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$27.76
East. Pa. No. 2X, 2.25 to 2.75	28.76
East. Pa. No. 1X	30.76
Virginia No. 2 plain, 1.75 to 2.25 sil.	$29.17 to 30.17
Virginia No. 2X, 2.25 to 2.75 sil.	30.17 to 31.17
Basic delivery eastern Pa.	25.75 to 26.75
Gray forge	25.50 to 26.00
Malleable	27.50 to 28.00
Standard low phos. (f.o.b. furnace)	30.00
Copper bearing low phos. (f.o.b. furnace)	30.00

Ferroalloys.—A few carloads of resale ferromanganese for prompt shipment have been sold at $72.50 and $75, seaboard, the buyers in one or two instances making the offers. Very little ferromanganese from abroad is available for August delivery, most of the British agents offering nothing earlier than September. For forward delivery $67.50, seaboard, is still quoted by domestic and British producers, but the buyer must pay whatever tariff may be legislated.

Semi-Finished Steel.—Open-hearth rerolling billets are quoted at $35, Pittsburgh, and forging billets at $40, Pittsburgh. There are few sales.

Plates.—With few mills offering plates for prompt shipment, the situation has become much tighter and price no longer is an important factor when consumers' needs are pressing. For prompt delivery 1.80c., Pittsburgh, is easily obtainable, and it is doubtful whether the average buyer can do much better, though the Pennsylvania Railroad, on 5000 tons of car repair material bought a few days ago, is said to have been quoted less than 2c., Eastern mills. The plate mills are harassed by diminishing coal reserves and receipts are so low that the effect of the shortage will soon be reflected in decreased operations.

Structural Material.—Although plain material is obtainable at 1.70c., Pittsburgh, the sources of supply at this price are narrowing. Probably not more than one or two Eastern mills will now accept orders for early shipment at 1.70c. In some instances, higher prices are being paid. An office building for Albert M. Greenfield, to be built at Chestnut and Fifteenth streets, requiring 2500 tons, is in the market.

Bars.—There is a scarcity of steel bars for prompt delivery at regular market prices. One Buffalo mill is quoting 2c., Pittsburgh. Another leading producer, which has been quoting 1.80c., Pittsburgh, is now out of the market. Some Eastern makers of bar iron have advanced their prices to 1.80c., Pittsburgh, for carload lots. One large producer is still quoting 1.60c., but may advance to 1.70c. this week.

Warehouse Business.—Local jobbers have advanced prices on nearly all items. Demands upon the warehouses for steel have increased since the railroad situation has made shipments more difficult. We now quote for local delivery out of stock as follows:

Soft steel bars and small shapes, 2.70c.; iron bars (except bands), 2.70c.; round edge iron, 2.90c.; round edge steel, iron finish, 1½ x ½ in., 2.90c.; round edge steel planished, 3.65c.; tank steel plates, ¼-in. and heavier, 2.80c.; tank steel plates, 3/16-in., 3c.; blue annealed steel sheets, No. 10 gage, 3.40c.; black sheets, No. 28 gage, 4.25c.; galvanized sheets, No. 28 gage, 5.25c.; square twisted and deformed steel bars, 2.80c.; structural shapes, 2.80c.; diamond pattern plates, ¼-in., 4.50c.; 3/16-in., 4.50c.; spring steel, 3.50c.; round cold-rolled steel, 3.35c.; squares and hexagons, cold-rolled steel, 3.70c.; steel hoops, No. 13 gage and lighter, 3.75c.; steel bands, No. 12 gage to 3/16-in., inclusive, 3.35c.; iron bands, 3.90c.; rails, 2.70c.; tool steel, 8c.; Norway iron, 5.50c.

Old Material.—There is very little activity in eastern Pennsylvania and such demands as exist for steel scrap come from the Pittsburgh district. Johnstown, Pa., has paid $16 for No. 1 steel and $16.50 for railroad steel. A Pittsburgh mill is offering $17.50. There has been a little demand for No. 1 railroad wrought and cast iron borings for chemical plants, with prices advancing. We quote for delivery at consumers' works in this district as follows:

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$15.00 to $15.50
Scrap rails	15.00 to 15.50
Steel rails, rerolling	17.00 to 17.50
No. 1 low phos., heavy 0.04 and under	22.00 to 24.00
Cast iron car wheels	17.50 to 18.50
No. 1 railroad wrought	17.50 to 18.50
No. 1 yard wrought	15.00 to 15.50
No. 1 forge fire	13.00 to 13.50
Bundled sheets (for steel works)	13.00 to 13.50
No. 1 busheling	12.50 to 13.00
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	13.00 to 13.50
Mixed borings and turnings (for blast furnace use)	13.00 to 13.50
Machine-shop turnings (for steel works use)	13.00 to 13.50
Machine-shop turnings (for rolling mill use)	13.50 to 14.00
Heavy axle turnings (or equivalent)	14.00 to 14.50
Cast borings (for steel works and rolling mills)	14.00 to 14.50
Cast borings (for chemical plants)	17.00 to 17.50
No. 1 cast	17.50 to 19.50
Railroad grate bars	14.50 to 15.00
Stove plate (for steel plant use)	15.00 to 15.50
Railroad malleable	15.00 to 15.50
Wrought iron and soft steel pipes and tubes (new specifications)	13.00 to 13.25
Shafting	20.00 to 20.50

Competitive examinations for engineering positions in the Interstate Commerce Commission and for an aeronautic engineer in the Navy Yard, Washington, are announced by the United States Civil Service Commission. Applicants should ask for blank 1312, stating that it is desired to take the examination for senior engineer, grade 2, in the one case and assistant aeronautic engineer in the other.

Cleveland

Pig Iron Advanced $2 to $3—Strikes More Seriously Felt

CLEVELAND, July 25.—The effects of the coal shortage due largely to the railroad shopmen's strike are being more seriously felt every day by blast furnaces and steel works in this district. While coal shipments from the Kentucky and West Virginia fields improved slightly during the week, stocks of some consumers are about exhausted and there has been some further curtailment in plant operations. M. A. Hanna & Co. have blown out their Cherry Valley furnace. Another Ohio furnace is scheduled to be banked in a few days, and the continued operation of one or two others is very uncertain. The McKinney Steel Co. has shut down three more open-hearth furnaces, and is now operating but seven out of 14.

Iron Ore.—Ore shipments by Northern railroads from the mines to the docks, which were cut down as a result of the shopmen's strike, have improved. The slowing down was due to lack of motive power, but some of the roads have been able to secure men for locomotive repair work. However, the situation is still bad on the Great Northern Railroad. The ore market is at a standstill. One inquiry for approximately 100,000 tons is pending, but very little activity is expected before the strike situation clears up. Boats are getting good despatch owing to the fact that having no coal cargoes they are going up the lake light and it is expected that the July movement will be close to 10,000,000 tons. The situation has not as yet compelled the tying up of any boats, although this may become necessary.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $5.95; Old range non-Bessemer, 51½ per cent iron, $5.20; Mesabi Bessemer, 55 per cent iron, $5.70; Mesabi non-Bessemer, 51½ per cent iron, $5.05.

Ore Statistics.—Ore on hand at furnaces and Lake Erie docks, July 1, amounted to 25,367,087 tons, as compared with 30,066,465 tons on the same date a year ago. Furnace stocks July 1 amounted to 18,693,088 tons. During June there was consumed 3,388,027 tons of lake ore as compared with 3,293,964 tons during May.

Pig Iron.—Pig iron has advanced $2 to $3 per ton on foundry and malleable grades owing to the growing scarcity due to the shutting down of some furnaces and the withdrawal of other producers from the market. Three lake furnaces entirely stopped selling iron during the week because of the uncertainty as to future operations due to the fuel shortage and there is apparently only one producer in the northern Ohio and Valley districts that has any iron to offer at present. A Cleveland steel maker has purchased 5000 tons of basic iron from a local producer at $25 Valley, but it is doubtful whether any more could be had at that price. A West Virginia consumer has an inquiry out for 3000 tons of basic. Considerable inquiry for foundry iron came out during the week on which several producers declined to quote. Others booked several thousand tons. A local furnace sold several lots of foundry iron up to 1000 tons at $25 and then advanced its minimum price to $26 and its next quotation may be $27. Sales include a small lot of foundry iron at $26.50. A local furnace sold 400 tons for shipment to the Pittsburgh district at $26. Another lake furnace sold considerable foundry iron at $25 to $26. Sales of malleable iron have been made at $27. The minimum price on foundry iron in Buffalo and Detroit is now $26. A small lot of southern Ohio iron is available at $25. Southern iron is unchanged at $18.50. Shipments of Alabama iron have become very slow on account of the railroad situation and much of this iron is being routed in a roundabout way for Ohio delivery instead of through Cincinnati.

Quotations below are f.o.b. local furnace for Northern foundry iron, not including a 50c. switching charge. Other quotations except basic and 2.5 phosphorus are delivered Cleveland, being based on a $3.02 rate from Jackson and a $6 rate from Birmingham:

Basic, Valley furnace	$25.00
Northern No. 2 fdy., sil. 1.75 to 2.25	$26.00 to 26.50
Southern fdy., sil. 1.75 to 2.25	24.50
Ohio silvery, sil. 8 per cent	33.52
Standard low phos., Valley furnace	33.00

Semi-Finished Steel.—The leading Cleveland producers sold several lots of sheet bars, billets and slabs during the week at $35. There is considerable inquiry for forging billets in car lots. An Eastern mill is quoting these at $40 at mill, or about $43, Pittsburgh.

Finished Iron and Steel.—There is considerable inquiry for steel, but several mills are not taking on additional business because of their well-filled order books and the uncertainty about future operation. Consequently consumers are having difficulty in placing orders. Special forging steel and nut steel are scarcer than other items. New demand is largely for steel for early shipment and buyers seem willing to pay premium prices to secure quick deliveries. A local bolt and nut manufacturer paid 1.80c. for 200 tons of steel bars, that being the lowest price available for early shipment. Cleveland and some Valley district mills are quoting tank pates at 2c. to 2.10c. Some sales are reported at the lower price and orders have been booked at the higher price for quick shipment. On light plates 2.10c. is fairly common. There is an increase in demand for plates from boiler manufacturers. Considerable new work continues to develop in the building field.

Reinforcing Bars.—The demand for reinforcing bars continues heavy and some of the mills are getting behind on deliveries. Quotations on hard steel bars range from 1.75c. to 1.80c. The Concrete Steel Co. has taken 220 tons for the Louisville Gas & Electric Co., Louisville, Ky., 190 tons for a service building for the Vahey Oil Co., Youngstown, Ohio, and 130 tons for highway work near Dayton, Ohio. The Franklin Steel Co. has taken 230 tons for the West Seventy-third Street bridge, Cleveland. The general contract for the Roosevelt School, Dayton, Ohio, has been placed with the Wallbridge-Aldinger Co., Dayton.

Sheets.—Specifications continue heavy, but only a moderate amount of new business is coming out. The price situation seems somewhat easier in that several mills are quoting the American Sheet & Tin Plate Co. prices without delivery promises. However, there is considerable irregularity in the market and some mills are getting $3 per ton above the Steel Corporation's prices. One jobber reports car lot sales of galvanized sheets for mill shipment at 4.25c.

Cast-Iron Pipe.—Cleveland will receive bids July 28 for 1625 tons of 24 to 60-in. cast-iron pipe and for 155 tons of fittings for the water works department.

Warehouse Business.—Warehouse prices on steel bars, plates and structural material, hoops and bands, and blue annealed sheets have been advanced $3 per ton. Warehouse sales show an increase over June.

Jobbers quote steel bars, 2.56c.; plates and structural shapes, 2.66c.; No. 9 galvanized wire, 3c.; No. 9 annealed wire, 2.50c; No. 28 black sheets, 4c.; No. 28 galvanized sheets, 5c.; No. 10 blue annealed sheets, 3.50c. to 3.61c.; hoops and bands, 3.21c.; cold-rolled rounds, 3.30c.; flats, squares and hexagons, 3.50c.

Bolts, Nuts and Rivets.—Specifications on bolt and nut contracts are heavy and include good orders from the railroads in spite of the shopmen's strike. The market is firmer and there is less disposition than recently among some makers to shade regular quotations. The leading local rivet manufacturer Monday advanced prices $5 per ton on structural and boiler rivets and has discontinued making contracts. The price advance and refusal to make further commitments is due to the inability to place additional orders for steel for early requirements, except at premium prices, and to uncertainty about future steel prices. It is understood that other manufacturers will make similar advances. Structural rivets are now quoted at 2.65c. and boiler rivets at 2.75c. Small rivets have advanced, 70 per cent off list now being the general quotation and 70 and 5 per cent off list the extreme discount.

Coke.—The coke situation has become more acute. Considerable new inquiry is coming out for foundry coke, but practically none is available. Very little of

the Virginia coke recently sold to Ohio consumers is coming through to its destination because of the railroad situation. The last sale of Connellsville foundry coke was at $13. We note the sale of ten cars of Indianapolis by-product foundry coke at $10 to a Cleveland consumer. One Virginia interest is still booking orders from its regular foundry customers at $7.

Old Material.—Owing to the uncertainty as to future mill operations because of the fuel situation and the resulting absence of demand, there has been a further softening in scrap prices of about 25c. a ton on both steel making and blast furnace grades. Mills generally are taking material on contracts, but are declining to buy for future requirements. Dealers are making little attempt to do any business. Small lot purchases of heavy melting steel by dealers to cover old orders are reported at $14.75.

We quote per gross ton, f.o.b. Cleveland, as follows:

Heavy melting steel	$14.75 to $15.00
Steel rails, under 3 ft	15.25 to 15.50
Steel rails, rerolling	15.75 to 16.25
Iron rails	14.00 to 15.00
Iron car axles	18.00 to 19.00
Low phosphorus melting	16.00 to 16.25
Cast borings	12.25 to 12.50
Machine shop turnings	11.50 to 12.00
Mixed borings and short turnings	12.00 to 12.50
Compressed steel	12.85 to 13.25
Railroad wrought	14.00 to 14.50
Railroad malleable	15.50 to 16.00
Light bundled sheet stampings	10.00 to 10.25
Steel axle turnings	13.00 to 13.50
No. 1 cast	17.00 to 17.50
No. 1 busheling	10.50 to 10.75
Drop forge flashings over 10 in.	10.50 to 10.75
Drop forge flashings under 10 in.	10.50 to 10.75
Railroad grate bars	13.75 to 14.25
Stove plate	13.75 to 14.25
Pipes and flues	10.00 to 11.00

Birmingham

BIRMINGHAM, ALA., July 25.

Pig Iron.—Although little business was done outside of the bookings by one large foundry interest in the St. Louis, Cincinnati and Chicago markets, and the placing of a large tonnage by a pipe maker, the Birmingham iron base at the close of the third week of the month seemed nearer $19 to $20 than $18.50 to $20, the large maker, retiring from a former $18 minimum, also retiring from a later $18.50 minimum. Sales of recent occurrence have included 1000 tons to a pipe maker, lots of 2000 and 4000 booked in Chicago territory, lots of 300 and 400 tons to Kansas City and St. Louis and 760 tons to a Louisville melter. It is also understood that the United States Cast Iron Pipe & Foundry Co. has bought 20,000 tons, paying base of $18.50. Reports of extremely large tonnages booked by pipe concerns are a rehash of news published in June. Withdrawal of the large maker quoting $18.50 from that base is accepted as indicating the end of that price. One maker holding for $20 for fourth quarter is selling third quarter at $19 and that is about the base for that business for such as can be had. Rather more pipe iron for fourth quarter delivery appears to have been taken than was estimated. However, there is no hurry in that quarter. Neither steel mill nor furnace operations had been affected from production standpoint by the railroad strike up to the close of the week and this week's operations were likewise assured of non-interruption. The leading interest has not lost a turn of a wheel in any department. Where one company is short on full coal supply there is ample coke on hand. Deliveries are handicapped.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon 1.75 to 2.25	$18.50 to $20.00
Basic	18.50 to 19.00
Charcoal, warm blast	30.00 to 32.00

Finishing Mills.—The strike has not interfered with steel mill operations. The Tennessee company is continuing its double turn in finishing mills. The Gulf States Steel Co. and American Steel & Wire Co. are at full turn. The Conners Steel Co. is busy on cotton ties and has trouble in deliveries. The Southern Pacific's order for 35,000 tons of rails to be rolled at Ensley is for 1923 delivery.

Cast Iron Pipe.—The United States Cast Iron Pipe & Foundry Co. booked 10,000 ft. of 24-in. pipe for Wilmington, N. C., following 12 miles of 16-in. for Hendersonville and 6½ miles for Morgantown, N. C., and numerous other Southern bookings. Belated customers are placing orders even when delivery is not promised under 90 to 120 days. The base is $37 and $38 can be had in many instances for the asking. Sanitary pipe continues to sell at $65 for standard and $60 for extra heavy. Coast movements are continuously heavy.

Coal and Coke.—The rail strike has upset the coal field nearly 50 per cent, especially on the Southern Railway, while other roads, especially the Louisville & Nashville, are doing much better. In one instance motor trucks are moving coal from mines to Illinois Central cars. Spot coal base has moved up to $3.

Old Material.—Steel scrap has become active with numerous buyers. In some instances it has sold as low as $11, but general quotations are unchanged.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Steel rails	$13.00 to $15.00
No. 1 steel	12.00 to 14.00
No. 1 cast	15.00 to 16.00
Car wheels	14.00 to 15.00
Tramcar wheels	13.00 to 14.00
Stove plate	13.00 to 14.00
Cast iron borings	6.00 to 7.00
Machine shop turnings	4.00 to 5.00

St. Louis

ST. LOUIS, July 25.

Pig Iron.—The market for pig iron continues strong. Prices are unchanged at $24.50, Chicago, for deferred shipment and $25 for prompt shipment for Northern iron, and $18.50 to $20, Birmingham, for the Southern product. The increasing difficulties besetting makers of pig iron through the shortage of coal and its steadily mounting prices are expected to cause further advances in the price of iron. The principal inquiries are for high-silicon iron, of which there is a scarcity, the local maker beng entirely out of these grades. Buying for the week was confined largely to lots of a carload up to 300 tons, although not of any great volume. The Sheffield maker quoting the lowest price for Southern iron did only a small business during the week. The melt in the district still is heavy, and melters are asking for quick shipments of orders already placed. A Des Moines, Iowa, melter is in the market for from 1000 to 1500 tons of foundry iron, and an Indiana concern wants 1000 to 1500 tons of malleable. A concern in the district wants several hundred tons of ferromanganese; otherwise the ferroalloy markets are quiet. As the Southern Railroad and the Louisville & Nashville have not yet filed with the Interstate Commerce Commission their proposed rate of $4.22 from Birmingham to St. Louis, we are using the $5.17 rate announced July 1.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago and $5.17 from Birmingham and 81 cents average switching charge from Granite City:

Northern foundry, sil. 1.75 to 2.25 (third quar.)	$26.66
Northern malleable, sil. 1.75 to 2.25 (third quar.)	26.56
Basic (third quar.)	26.56
Southern foundry, all rail, sil. 1.75 to 2.25	24.48
Southern foundry, water and rail, sil. 1.75 to 2.25, f.o.b. St. Louis	22.17

Finished Iron and Steel.—Local fabricators have had some difficulty in placing orders for from 50 to 100 tons, as the shortage of coal and heavy orders have put some of the largest concerns out of the market altogether, while others are declining most business submitted to them. The steel for the Missouri, Kansas & Texas Railway shops at Denison, Texas, amounting to 350 tons, has been let to the Mississippi Valley Structural Steel Co. Local concerns are interested in the building of the American Can Co., New Orleans, Favrot & Livaudais, architects, involving a considerable tonnage of reinforcing bars and a small amount of structural steel. The Missouri, Kansas & Texas Railway purchased 2500 kegs of standard track spikes, dividing the order among several concerns. Other railroad inquiries

were for small quantities, items that should come from warehouses.

For stock out of warehouse we quote: Soft steel bars, 2.57½c. per lb.; iron bars, 2.57½c.; structural shapes, 2.67½c.; tank plates, 2.67½c.; No. 10 blue annealed sheets, 3.72½c.; No. 28 black sheets, cold rolled, one pass, 4.45c.; cold drawn rounds, shafting and screw stock, 3.50c.; structural rivets, $3.19½ per 100 lb.; boiler rivets, $3.29½; tank rivets, 7/16 in. and smaller, 60 per cent off list; machine bolts, large, 50 and 10 per cent; small, 50-10 and 10 per cent; carriage bolts, large, 55-5 per cent; small, 60 and 10 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon blank, $3.50; and tapped, $3.25 off list.

Coke.—An avalanche of orders for coke has swept down on everyone in the trade here. Orders have come in exceedingly heavy volume not only from the industries, but from the coal trade as well. The St. Louis by-product producers are out of the market. The Granite City producers have taken on a very big tonnage. Their plant is at full capacity, but orders exceed that and they have been drawing on their storage stocks. In addition to the business that has resulted as a result of the coal strike and other concerns being out of the market, coke on gas contracts is being supplied. The price of coke is steadily mounting on account of the abnormal cost of coal, its scarcity and rising prices. At mines where there is coal to be had, its movement is hampered by the railroad strike. Connellsville coke is most difficult to get. Some Alabama coke is being shipped in here.

Old Material.—The old material market continues to show strength, and most items are higher. Very little material is moving on account of the railroad strike, and it is difficult to get cars in which to make shipments. There are no railroad offerings, as the roads are without the labor to handle old material. The demand for rolling mill grades is good, a little going out of the district.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

	Per Gross Ton	
Old iron rails	$16.75 to	$17.25
Steel rails, rerolling	15.75 to	16.25
Steel rails, less than 3 ft.	16.25 to	16.75
Relaying rails, standard section	25.00 to	28.00
Cast iron car wheels	18.25 to	18.75
No. 1 heavy railroad melting steel	14.75 to	15.25
No. 1 heavy shoveling steel	13.75 to	14.25
Ordinary shoveling steel	13.75 to	14.25
Frogs, switches and guards, cut apart	15.25 to	15.75
Per Net Ton		
Heavy axle and tire turnings	9.50 to	10.00
Steel angle bars	13.75 to	14.25
Iron car axles	23.50 to	24.00
Steel car axles	17.00 to	17.50
Wrought iron bars and transoms	19.00 to	19.50
No. 1 railroad wrought	13.50 to	14.00
No. 2 railroad wrought	13.00 to	13.50
Railroad springs	16.00 to	16.50
Steel couplers and knuckles	16.25 to	16.75
Cast iron borings	9.00 to	9.50
No. 1 busheling	11.75 to	12.25
No. 1 railroad cast	15.50 to	16.00
Stove plate and light cast	12.75 to	13.25
Railroad malleable	14.00 to	14.50
Pipes and flues	8.75 to	9.25
Machine shop turnings	9.25 to	9.75

Buffalo

BUFFALO, July 25.

Pig Iron.—The situation in the pig iron industry here is most serious and practically all the furnaces see the end of operations on the basis of their present coke commitments. Although no furnaces have been banked, two interests have curtailed their blast in an effort to extend operations for a longer period. The rail situation has precipitated what is close to a crisis, in the sense that where furnaces were able to get some supplies of coke, deliveries have been delayed and the likelihood that stacks will be banked looms closer. Rogers, Brown & Co. are out of the market. While they have had little iron available for some weeks, the statement is now made that absolutely none is for sale. For No. 2 foundry $26 appears to be the price on the few sales that have been made, and $27 has been done on malleable where a small tonnage was concerned. No big sales have been made, and inquiry has been rather quiet with all sellers.

We quote f.o.b. per gross ton Buffalo as follows:

No. 1 [illegible]	[illegible]
No. 2X foundry, 2.25 to 2.75 sil.	26.50
No. 2 plain, 1.75 to 2.25 sil.	[illegible]
Basic	[illegible]
Malleable	[illegible]
Lake Superior charcoal	31.78

Finished Iron and Steel.—All the producers of this section are in a serious condition, and none is able to forecast just how long operations will continue. The local branch of an independent has received orders to withdraw from the market on all products, although it was able to take only limited tonnages of bars and shapes. Inquiry is brisk for all materials. Reduced operations have had the effect of further delaying deliveries. The independent referred to was quoting 1.70c. on bars before it formally withdrew. A local bar maker is understood to have booked 1000 tons at 1.80c. with delivery in six to eight weeks. One interest is able to take pipe business in a limited way, but only from its established trade and these tonnages are booked for 60 to 90 days deliveries. Intimations from the trade have been that an advance in pipe prices could be expected. One company is understood to be quoting 2c. on bars. An advance is expected in sheet prices by one local factor, but no announcement is to be made, at least for the present. Sheet inquiry is good, but the tonnages are not especially big. No maker of finished material has more than from two to three weeks supply of fuel ahead.

Warehouse Business.—Effective July 20, prices have advanced. Business is especially brisk in bars and structural materials, and is good in all lines. With the curtailment of mill operations a greater volume of business is reaching all warehouses.

We quote warehouse prices, Buffalo, as follows: Structural shapes, 2.85c.; plates, 2.85c.; soft steel bars, 2.75c.; hoops, 3.55c.; bands, 3.40c.; blue annealed sheets, No. 10 gage, 3.80c.; galvanized steel sheets, No. 28 gage, 5.60c.; black sheets, No. 28, 4.60c.; cold rolled round shafting, 3.55c.

Old Material.—The railroad shop strike is beginning to have a serious effect on the scrap market, and while prices are firm, mills are not especially anxious to buy the last few days. The strike is interfering with the movement of cars and deliveries are going to be delayed with scrap recently purchased from railroads. There have been no big sales and dealers expect none until the fuel situation is relieved in some manner.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$16.75 to $17.00
Low phos., 0.04 and under	18.00 to 19.00
No. 1 railroad wrought	16.00 to 16.50
Car wheels	17.00 to 18.00
Machine shop turnings	10.50 to 11.00
Cast iron borings	14.00 to 14.50
Heavy axle turnings	14.00 to 14.50
Grate bars	14.00 to 14.50
No. 1 busheling	15.00 to 15.50
Stove plate	15.00 to 15.50
Bundled sheet stampings	11.50 to 12.00
No. 1 machinery cast	18.00 to 18.50
Hydraulic compressed	15.00 to 15.50
Railroad malleable	17.00 to 17.50

Boston

BOSTON, July 25.

Pig Iron.—The largest individual sale reported in this territory the past week is 500 tons No. 1 foundry lake charcoal iron at $28.50 furnace base, to an eastern Massachusetts melter. Business otherwise ranged from car lots to 150 tons, mostly Buffalo at $25.50 furnace for silicon 2.25 to 2.75 and $26.50 to $26.75 for silicon 2.75 to 3.25. Eastern and western Pennsylvania, Virginia, Alabama and foreign iron sales were made on base prices previously reported. Aggregate sales of all kinds of iron fell considerably short of 3000 tons. A Springfield, Mass., melter is inquiring on 500 to 1000 tons of silicon 2.25 to 2.75, 500 to 1000 tons of silicon 2.75 to 3.25, and 250 tons of silicon 4.50 to 5.50, last quarter shipment. In the last two or three days, numerous small inquiries from foundries not receiving contract iron ordered heretofore have come into the market. A Buffalo furnace has again withdrawn from the market, thereby complicating the third quarter shipment market, inasmuch as brokers have few other domestic irons to offer. It is expected prices will advance within the next ten days on the strength of emergency inquiries. More or less foreign iron, mostly Scotch and English, is offered at August and later deliveries. Prices range from around $26, upward, c.i.f. Boston and other Atlantic seaboard points, depending on the urgency of the foundry's needs. New England

foundries, so far, however, have not manifested much interest in foreign irons.

We quote delivered at common New England points as follows, having added to furnace prices $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia and $9.60 from Alabama:

East. Penn., sil. 2.25 to 2.75	$30.15 to $30.65
East. Penn., sil. 1.75 to 2.25	29.65 to 30.15
Buffalo, sil. 2.25 to 2.75	29.91 to 30.41
Buffalo, sil. 1.75 to 2.25	29.41 to 29.91
Alabama, sil. 2.25 to 2.75	28.60 to 30.10
Alabama, sil. 1.75 to 2.25	28.10 to 29.60

Warehouse Business.—The following advances have been made, per 100 lb., in local warehouse prices: toe calk steel, $1; steel bands 6 in. wide x ⅛ in. thick, 72c., and 3/16 in. thick, 57c.; plain round and square concrete bars, 25c.; 3/16 in. thick plates, 16½c.; soft steel bars, flats, deformed bars, structural steel, tire steel, hoop steel, half rounds, ovals and bevels, and refined iron, 15c. Sheets, open-hearth and crucible spring steel, cold rolled steel, best refined iron, Wayne and Norway iron remain as heretofore. The movement of iron and steel out of warehouses has no more than held its own. Stocks are in better shape, however, because of recent arrivals from mills. Steel bands appear to be in shorter supply than other products. Bolts and nuts are moving in average quantities for this time of the year. Large rivets are in slightly better demand.

Jobbers quote: Soft steel bars, $2.75½ per 100 lb. base; flats, $3.40½; concrete bars, $2.90 to $3.03; structural steel, $2.75½ to $2.90½; tire steel, $4.15 to $4.50; open-hearth spring steel, $4.50 to $6; crucible spring steel, $11.50; steel bands, $3.90; hoop steel, $4.40; cold rolled steel, $3.50 to $4; refined iron, $2.75½; best refined iron, $4.25; Wayne iron, $5.50; Norway iron, $6 to $6.50; plates, $2.85½ to $3.04; No. 10 blue annealed sheets, $3.75 per 100 lb. base; No. 28 black sheets, $4.90; No. 28 galvanized sheets, $5.90.

Old Material.—Pennsylvania mills have withdrawn from the New England old material market as a result of the coal and railroad labor situations. The trade here takes this action to mean that mills either have all the old material needed or expect reduced operations. The local market for heavy melting steel, pipe, bundled skeleton, etc., therefore, was flat the past week. Prices on mixed borings and turnings are 50c. to $1 a ton lower, according to the material, due to a lack of buying orders and increased offerings. Quotations otherwise remain unchanged. A small demand remains for cast iron borings suitable for chemical purposes at $11.50 to $12 f.o.b. cars shipping point, but material is lacking because of the inactivity of textile machinery making plants. New England foundries continue to supply themselves with machinery cast from local or nearby yards. Boston dealers find this kind of competition difficult to overcome. Sales of car lots therefore are few and far between.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$19.00 to $20.00
No. 2 machinery cast	17.00 to 18.00
Stove plate	14.00 to 14.50
Railroad malleable	15.00 to 15.50
Street car wheels	18.00 to 19.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$11.00 to $11.50
No. 1 railroad wrought	11.50 to 12.00
No. 1 yard wrought	10.00 to 10.50
Wrought pipe (1 in. in diam., over 2 ft. long)	8.00 to 8.50
Machine shop turnings	8.50 to 9.00
Cast iron borings, rolling mill	9.50 to 10.00
Cast iron borings, chemical	10.50 to 12.00
Blast furnace borings and turnings	8.50 to 9.00
Forged scrap and bundled skeleton	8.00 to 8.50
Street car axles and shafting	14.50 to 15.00
Rerolling rails	11.00 to 11.50

Coke.—New England producers of by-product foundry coke are quoting spot fuel at $14.50 to $15, delivered, where the local freight does not exceed $3.10, and have advanced contract coke from $13.50 to $15.50, delivered. The contract price now is equal to $12.40 per ton at oven, or $5.65 a ton above the low price quoted this year and $4.89 a ton above the oven price a year ago. The producers also have advanced crushed coke $1 a ton, making the spot price $13 f.o.b. ovens and the contract $12, while $13.50 is charged on tonnages delivered outside of New England. Producers are experiencing considerable difficulty in maintaining adequate high volatile coal for mixture purposes in producing coke. Foundries, fearful of deferred deliveries, due to railroad labor troubles, are making heavy demands on coke producers. A Connecticut brass manufacturer during the past week closed on 1000 tons of crushed coke on a basis of $14.25, Boston.

Cincinnati

CINCINNATI, July 25.

Pig Iron.—The market this week shows little life, and while the price situation is a little stronger, actual transactions are few and far between. The melters appear to have taken the attitude that it would be practically useless to buy iron while the coal and rail strikes are on, as they feel that with the interruption of railroad traffic they would stand little chance of getting iron should they come into the market. With present conditions continuing there is bound to be a scarcity of iron. Several furnaces now operating in the Ironton-Ashland district are on the ragged edge for coke and unless coal is moved to the ovens will shut down. Sales during the week included a number of 100-ton lots, with three totaling 500 each reported. A central Ohio melter bought 500 tons of malleable at a reported price of $25.50, southern Ohio furnace, and another district melter 500 tons of foundry at $18.50, Southern furnace. A southern Ohio melter took 500 tons of Southern foundry for fourth quarter shipment on an $18.50 Birmingham, base, on Northern irons. With the exception of a lake furnace, which is reported to have booked an order for 300 tons at $23, prices are up from 50c. to $1 a ton. Ironton producers are now quoting a minimum of $24.50 Ironton, and Chicago district stacks are quoting $25. In the South $18.50 appears to be the minimum, as the low priced seller was booking orders at this figure last week. There is some resale Southern available at $18, but the tonnage is reported to be rather light. The only inquiry of consequence is from northern Ohio for 300 tons of foundry for immediate shipments.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$22.55
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	23.05
Ohio silvery, 8 per cent	34.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	26.77
Basic Northern	27.27
Malleable	26.77

Plant Operations.—The rail and coal strikes, while causing some inconvenience to mills in this district, have not as yet seriously interfered with operations. Blast furnaces operating in southern Ohio are still being supplied with coke by their connections, and while the outlook is not at all bright, it is hoped that something may develop shortly that will enable them to keep running. Most of the steel plants in this district receive their coal supplies through river shipments, and are therefore in a good position to keep operating regardless of a railroad tie-up. Delay in railroad transportation is the only thing that will necessitate shutdowns.

Finished Material.—A number of independent steel companies have withdrawn from the market, owing to their inability to make deliveries, and will bend every effort to take care of orders now on their books. The demand for finished materials is rather quiet, due to the general upset caused by the rail and coal strikes. Consumers are urging the mills to make shipments, and are bending every effort to get materials in before the congestion becomes more serious. Prices have an advancing tendency, but it appears to be the policy of the mills to prevent, if possible, a runaway market. On bars, shapes and plates, the ruling quotations are 1.70c. to 1.80c., the higher figure being named for early delivery, while the lower price generally refers to orders booked for shipment at mills' convenience. We note an order for 400 tons of bars booked by an independent company during the week at 1.80c., Pittsburgh, with no definite delivery asked. Inquiries for plates from car equipment companies are coming to the front. A Middle West car builder, which recently booked an order for 1000 cars, and which has also taken on a large order for car repair work, is understood to have placed a sizable tonnage of plates with the leading interest. An Eastern mill is quoting plates in this district at 2.10c., Pittsburgh, but the ruling price is generally

1.70c. On sheets demand for automobile body stock continues heavy, seconds commanding the same price as primes. The market generally can be quoted at a range from 4.50c. to 4.85c. Black, galvanized and blue annealed sheets are in fair demand, prices ranging from 3.15c. to 3.40c. for black, 4.15c. to 4.30c. for galvanized, and 2.40c. to 2.50c. for blue annealed. Wire products are showing more activity, due undoubtedly to the desire on the part of jobbers to round out their stocks before the railroad situation becomes acute. Inquiries for pipe are fairly numerous, with mills quoting three months' delivery. In the structural field no new inquiries of size have come out, and the number of awards fell off considerably. A number of projects on which bids have been taken have been deferred for the time being.

Warehouse Business.—Local jobbers of iron and steel products report a heavy demand for immediate shipment, a local warehouse booking an order for 125 tons of small angles for shipment out of stock. Prices, following similar announcements from the Pittsburgh district, have been advanced $3 per ton on most products. Sheets are moving in better volume, and bolts and nuts are also picking up.

Jobbers quote [illegible] bars, 3.75c. base; hoops, 3.65c. base; [illegible] plates, 2.85c. base; reinforcing bars, 2.82½c. base; cold-rolled rounds, 3.35c. base; flats, squares and hexagons, 3.85c. base; No. 10 blue annealed sheets, 3.60c.; No. 28 black sheets, 4.50c.; No. 28 galvanized sheets, 5.50c.; No. 9 annealed wire, $2.70 per 100 lb.; common wire nails, $2.85 per keg, base.

Tool Steel.—The demand for tool steel shows a slight falling off, due entirely to the unsettled condition caused by the coal and rail strikes. Operations at some local manufacturing plants are being interfered with to a slight extent, and the outlook for the immediate future is not encouraging. Prices are unchanged, 18 per cent tungsten high speed steel being quoted at 75c. per lb. base.

Coke.—There is a heavy demand for coke for prompt shipment and prices are rising rapidly. Connellsville foundry coke is quoted at $14, New River at $8.50 to $11, Wise County at $9.50 to $10, ovens, and by-product fuel at $9, Connellsville basis. Transportation is being seriously interferred with, but coke producers report that railroads are still accepting cars for shipment subject to delay. To date there has been little interference with foundry operations, but this week will likely see a number of plants shut down on account of coke shortage.

Old Material.—There is little more activity in the scrap market, all transactions being for delivery within the next 30 days. Steel and cast are in better demand. Some mills have asked dealers to withhold shipments until the transportation question is settled one way or another. Prices, while having a softer tendency, remain unchanged.

We quote dealers' buying prices, f.o.b cars Cincinnati:

	Per Gross Ton	
Bundled sheets	$8.00 to	$8.50
[illegible]	13.50 to	14.00
Relaying rails, 50 lb. and up	26.50 to	27.00
Rerolling steel rails	13.50 to	14.00
Heavy melting steel	13.00 to	13.50
Steel rails for melting	13.00 to	13.50
Car wheels	14.50 to	15.00
	Per Net Ton	
No. 1 railroad wrought	11.50 to	12.00
Cast borings	9.00 to	9.50
Steel turnings	8.00 to	8.50
Railroad cast	14.00 to	14.50
No. 1 machinery	16.00 to	16.50
Burnt scrap	9.50 to	10.00
Iron axles	18.00 to	18.50
Locomotive tires (smooth inside)	11.00 to	11.50
Pipes and flues	[illegible] to	7.00

Freight Rates on Pig Iron from Birmingham

As the Louisville and Nashville and Southern railroads notified Birmingham iron makers July 10 that the rate on pig iron from Birmingham to Cincinnati would be $3.53 and the rate from Birmingham to St. Louis $4.22, THE IRON AGE, in its issues of July 13 and July 20, published those as the prevailing rates, instead of the rates of $4.05 to Cincinnati and $5.17 to St. Louis, which became effective July 1, succeeding the rates of $4.50 to Cincinnati and $5.70 to St. Louis. On Monday of this week the railroads made the following announcement:

> Effective Sept. 1, rates on pig iron from Birmingham and intermediate points to St. Louis and other places taking the St. Louis rate will be reduced 26.48 per cent from the rates in effect June 29. Rates from Birmingham to Cincinnati, Louisville, Evansville and other crossing points will be reduced 21.55 per cent from the rates in effect June 29. Rates to Cleveland, Chicago and other points in Central Freight Association territory will remain unchanged, as northern roads would not come into agreement.

Hence THE IRON AGE this week quotes the rates which became effective July 1, namely, $4.05 from Birmingham to Cincinnati and $5.17 from Birmingham to St. Louis.

More Metal Workers at Higher Wages

Iron and steel plants, according to figures of the Bureau of Labor Statistics, show for June a gain over May of 7256 employees in 106 establishments. This gain of 5.3 per cent was accompanied by a gain of 6.7 per cent in amount of payroll and a corresponding gain in the average pay envelope from $46.77 to $47.41, or 1.3 per cent.

In the automobile industry the gain in 44 establishments was 22 per cent in number of employees and 7.7 per cent in payroll total. In car building and repairing there was a gain of 6.9 per cent in number of employees in 61 establishments, and a gain of 10.6 per cent in amount of payroll.

Wages in car building and repairing, due to the continuance of war time wages in railroad repair shops, are considerably higher than in the steel industry. The excess in June over steel mill wages was 26.5 per cent and that in May was over 24 per cent. Wages in automobile plants, which are exceptionally busy, were 52.7 per cent over those prevailing in steel plants, and not so much as in May when the excess was 59 per cent. Details are shown in the table.

Period	Number of Establishments	Number of Men	Half-Month Payroll	Average Pay Envelope
Iron and Steel				
May, 1922	106	137,170	$6,415,178	$46.77
June, 1922	106	144,426	6,847,174	47.41
June, 1921	110	110,572	4,907,968	44.38
*Automobiles**				
May, 1922	44	100,800*	7,257,400	72.00
June, 1922	44	108,012	7,818,566	72.39
June, 1921	44	94,729	6,635,553	70.05
Car Building and Repairing				
May, 1922	61	54,258	3,147,377	58.01
June, 1922	61	58,025	3,481,629	60.00
June, 1921	61	44,462	3,057,619	68.77

*Payroll figures are reported as "weekly"; they have been made "half-monthly" by multiplying by 2 1/6.

In referring, on page 1717, June 15, to the una-flow steam engine, it should have been stated that the steam flows from the ends of the cylinder toward a common central exhaust, instead of from the center toward the ends. This uni-directional flow of the steam causes a gradual fall of temperature in the cylinder walls from inlet to exhaust, while the long compression, in combination with jacketing of the heads, raises the temperature of the clearance surfaces to a point above that of the entering steam, thus eliminating cylinder condensation.

A manual on corporation law, accounting and finance, entitled, "Corporation Procedure," is about to be issued by the Ronald Press Co., 20 Vesey Street, New York, under the authorship of Thomas Conyngton, R. J. Bennett, Hugh R. Conyngton and Paul W. Pinkerton. The book is intended to serve as a guide to corporation officials and accountants as well as to lawyers, bankers and investors.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Plates

Sheared, tank quality, base, per lb. ..... 1.70c. to 1.80c.

Structural Material

Beams, channels, etc. ..... 1.70c. to 1.80c.

Iron and Steel Bars

Soft steel bars, base, per lb. ..... 1.70c. to 1.80c.
Reinforcing iron bars, base per lb. ..... 2.20c.

Hot-Rolled Flats

Hoops, base, per lb. ..... 2.50c. to 2.75c.
Bands, base, per lb. ..... 2.50c. to 2.75c.
Shoe base, per lb. ..... 2.50c.
Cotton ties, per bundle of 10 lb. ..... 2.75c.

Cold-Finished Steels

Bars and shafting, base, per lb. ..... 2.10c.
Strips, base, per lb. ..... 4.00c.

Wire Products

Nails, base, per keg	$2.40
Bright plain wire, base, per 100 lb.	2.25
Annealed fence wire, base, per 100 lb.	2.25
Galvanized wire, base, per 100 lb.	2.75
Galvanized barbed, base, per 100 lb.	3.05 to 3.15
Galvanized staples, base, per keg	3.05 to 3.15
Painted barbed wire, base, per 100 lb.	2.55 to 2.65
Polished staples, base, per keg	2.55 to 2.65
Cement coated nails, base, per count keg	1.90 to 2.00
Woven fence, 4 rods high	70 and 10 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads, 60 and 10 per cent off list
Machine bolts, small, cut threads....60 and 10 per cent off list
Machine bolts, larger and longer.....60 and 10 per cent off list
Carriage bolts, ⅜ x 6 in.:
Smaller and shorter, rolled threads. 60 and 10 per cent off list
Cut threads ..... 60 per cent off list
Longer and larger sizes ..... 60 per cent off list
Lag bolts ..... 60, 10 and 10 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads....50 and 10 per cent off list
Other style heads ..... 20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.:
Smaller and shorter ..... 50 and 10 per cent off list
Larger and longer sizes .....50 and 10 per cent off list
Hot pressed square or hex. blank nuts .....$4.50 off list
Hot pressed nuts, tapped .....$4.50 off list
C.p.c. and t. sq. or hex. nuts, blank .....$4.50 off list
C.p.c. and t. sq. or hex. nuts, tapped .....$4.50 off list
Semi-finished hex. nuts:
9/16 in. and smaller, U. S. S.....80 and 10 per cent off list
⅝ in. and larger, U. S. S...75 and 10 and 10 per cent off list
Small sizes, S. A. E. .....80, 10 and 10 per cent off list
S. A. E. ⅝ in. and larger..75 and 10 and 10 per cent off list
Stove bolts in packages .....80 and 5 per cent off list
Stove bolts in bulk .....80, 5 and 2½ per cent off list
Tire bolts ..... 65 per cent off list
Track bolts in carloads .....3.00c. to 3.25c. base
Track bolts, less than 200 kegs .....3.50c. to 3.75c. base

Cap and Set Screws

Milled square and hex. head cap screws, 75 and 10 per cent off list
Milled set screws..... 75 per cent off list
Upset cap screws ..... 80 per cent off list
Upset set screws ..... 80 and 5 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb.....$2.65
Large boiler rivets, base, per 100 lb..... 2.75
Small rivets .....70 to 70 and 5 per cent off list

Track Equipment

Spikes, 9/16 in. and larger, base, per 100 lb.....$2.25 to $2.35
Spikes, ½ in. and smaller, base, per 100 lb. .... 2.50 to 2.60
Spikes, boat and barge, base, per 100 lb..... 2.50 to 2.60
Track bolts, base, per 100 lb..... 3.25
Tie plates, per 100 lb. ..... 2.00 to 2.25
Angle bars, base, per 100 lb. 2.40

Welded Pipe

Butt Weld

Steel Inches	Black	Galv.	*Iron* Inches	Black	Galv.
⅛	54½	28	¼	10	+22½
¼ to ⅜.....	60	33½	½	4	18½
½	65	40½	¾	11	21½
¾	69	56½	1 to 1½	14	29½
1 to 3.....	71	58½			

Lap Weld

2	64	51½	2	39½	27½
2½ to 6.....	68	55½	2½ to 6.	41	29½
7 to 8.....	65	51½	7 to 12.....	40½	27½
9 to 12.....	64	50½			

Butt Weld, extra strong, plain ends

⅛	50½	33	¼ to ⅜.....	41	23½
¼ to ⅜.....	56	38½	½	35½	23½
½	62	50½	¾	42½	31½
¾	67	55½	1 to 1½.....	44½	30½
1 to 1½.....	69	57½			
2 to 3.....	70	58½			

Lap Weld, extra strong, plain ends

2	62	50½	2	40½	27½
2½ to 4.....	66	54½	2½ to 4.....	43½	31½
4½ to 6.....	65	53½	4½ to 6.....	42½	30½
7 to 8.....	61	47½	7 to 8.....	35½	23½
9 to 12.....	55	41½	9 to 12	30½	18½

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 and 2½ per cent.

Boiler Tubes

Lap Welded Steel		*Charcoal Iron*	
1¼ in.	26½	1½ in.	5
2 to 2¼ in.....	41	1¾ to 1⅞ in.....	15
2½ to 3 in.....	52	2 to 2¼ in.....	25
3¼ to 13 in.....	57	2½ to 3 in.....	30
		3¼ to 4½ in.....	32

To large buyers of steel tubes a supplementary discount of 5 per cent is allowed.

Standard Commercial Seamless Boiler Tubes

Discounts on cold-drawn or hot-rolled tubes in carload lots, f.o.b. Pittsburgh, follow:

1 in.	60	2½ and 2¾ in.....	43
1¼ and 1½ in.....	52	3 in.	47
1¾ in.	36	3½ to 4 in.....	52
2 and 2¼ in.....	39	4½ in. to 5 in.....	44

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Tin Plate

Standard cokes, per base box.....$4.75

Terne Plate

(Per package, 200-lb.)

8-lb. coating	$9.30	25-lb. coating I. C.....$14.25	
8-lb. coating I. C.....	9.60	30-lb. coating I. C.....	15.25
15-lb. coating I. C.....	11.80	35-lb. coating I. C.....	16.25
20-lb. coating I. C.....	13.00	40-lb. coating I. C.....	17.25

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....2.40c. to 2.60c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.15c. to 4.40c.

Galvanized

No. 28 (base), per lb.....4.15c. to 4.40c.

Tin-Mill Black Plate

No. 28 (base), per lb.....3.15c. to 3.40c.

Manufacturers have pamphlets, which can be had upon application, giving price differentials for gage and extras for length, width, shearing, etc.

Freight Rates

All rail freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic.	$0.325	Buffalo	$0.265	St. Louis	$0.43
Philadelphia, export...	0.265	Cleveland	0.215	Kansas City	0.735
Baltimore, domestic...	0.315	Cleveland, Youngstown		Kansas City (pipe)...	0.705
Baltimore, export.....	0.255	Comb.	0.19	St. Paul	0.595
New York, domestic...	0.34	Detroit	0.295	Omaha	0.735
New York, export.....	0.285	Cincinnati	0.295	Omaha (pipe)	0.705
Boston, domestic.....	0.365	Indianapolis	0.31	Denver	1.275
Boston, export	0.285	Chicago	0.34	Denver (pipe)	1.215

Pacific Coast	$1.50
Pac. Coast, ship plates	1.20
Birmingham	0.69
Memphis	0.385
Jacksonville, all rail..	0.50
Jacksonville, rail and water	0.415
New Orleans	0.515

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha, and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 30c. to 40c.; ship plates, 30c. to 40c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 30c. to 40c.; sheets and tin plates, 50c.; rods, wire rope, cable and strands, 75c.; wire fencing, netting and stretcher, 50c.; pipe, not over 8 in. in diameter, 50c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
July	Lake	Electrolytic*	New York	New York	St. Louis	New York	St. Louis
19.....	14.00	13.75	31.62½	5.75	5.42½	6.15	5.80
20.....	14.00	13.75	31.75	5.75	5.42½	6.20	5.85
21.....	14.00	13.75	31.87½	5.75	5.40	6.25	5.90
22.....	14.00	13.75	....	5.75	5.40	6.25	5.90
24.....	14.00	13.75	32.00	5.75	5.40	6.30	5.95
25.....	14.00	13.75	32.12½	5.75	5.40	6.30	5.95

*Refinery quotation.

New York

NEW YORK, July 25.

Copper is quiet, but prices are fairly well sustained. There is very little activity in tin, but prices have shown a slightly upward trend. Lead is quiet, the St. Louis price being slightly easier. A steady demand for zinc, with small stocks available, continues to force prices upward.

Copper.—The copper market is quiet, but prices are fairly steady. Leading producers are unwilling to sell for any position or for delivery to any point at less than 14c., delivered, for electrolytic, but copper held by second hands has been sold at a fraction under this price, but apparently nothing less than 13.87½c., delivered, has been done. The coal and railroad strikes are having at least a sentimental effect upon buying, although so far no actual distress due to coal shortage is reported from plants of the principal copper consumers. The leading copper producers believe that the market is now in fairly strong position, surplus stocks having practically been exhausted, and that larger buying and higher prices will follow the settlement of the coal and railroad labor troubles.

Tin.—There has been just enough business in tin during the past week to establish price levels. Buyers appear to be well supplied for the present and the trade expects present quiet conditions to prevail until the end of the coal and railroad strikes. Most of the large consumers are covered for the next 60 days. Nevertheless the market is firm and prices, as established by sales, have shown a slightly upward tendency during the week, sales to-day having been made at ⅝c. above the price of Tuesday, July 18. Sales during the week have amounted to a few hundred tons only, being mostly for September-October shipment to arrive here in November and December. It was reported but not confirmed that sales at 32c. per lb. for future shipment had been made. To-day's London cables report spot standard quoted there at £158 5s.; future standard at £158 7s. 6d.; spot Straits, £159 5s., while the Singapore price is £160 10s.

Lead.—There is some pressure to sell and fairly substantial lots have been disposed of, mostly by one company, at slightly easier prices at St. Louis, although the New York price has remained unchanged at 5.75c. per lb. The St. Louis sales were made, it is stated, at as low as 5.37½c. per lb. Business is spotty.

Zinc.—Declining stocks and a fairly well-sustained demand are the factors influencing an upward trend in zinc prices. The minimum now appears to be 5.95c., St. Louis, while a few sales are said to have been made at 6c., St. Louis. Production is not increasing and probably will not until the coal and railroad strikes are out of the way, and it is expected that this month will bring about a still further reduction in available stocks.

Antimony.—High prices are being asked for antimony, holders now quoting 5.25c. per lb. for carload lots, duty paid, New York. The market continues to be influenced by prospective tariff legislation.

Aluminum.—The price of the Aluminum Co. of America is unchanged at 19.10c. per lb., f.o.b. cars at producer's plant, freight allowed, for the 98-99 per cent virgin metal. Imported aluminum in the outside market is being offered at 17.75c. to 18c. for the same grade.

Old Metals.—The market during the past week was inclined to be sluggish, but values generally showed little change. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	13.50
Copper, heavy and wire	12.75
Copper, light and bottoms	11.00
Heavy machine composition	10.50
Brass, heavy	8.00
Brass, light	6.50
No. 1 red brass or composition turnings	8.75
No. 1 yellow rod brass turnings	7.50
Lead, heavy	4.87½
Lead, tea	3.75
Zinc	2.50

Chicago

JULY 25.—Lead has declined slightly, but good advances have been recorded in tin and spelter prices. The advance in tin seems to be largely in sympathy with the London market, through which considerable business recently is reported to have passed. There is a large inquiry for spelter and although the year began with reserve stocks of considerable proportions the report now is that supplies are meager. Copper is unchanged and old metals prices also are holding at the levels of a week ago. We quote, in carload lots, lake copper 14.12½c.; tin, 30.33½c.; lead, 5.45c.; spelter, 6c,; antimony, 7c.; in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 10.75c.; copper bottoms, 9c.; red brass, 8.50c.; yellow brass, 6.75c.; lead pipe, 4.25c.; zinc, 2.75c.; pewter, No. 1, 20c.; tin foil, 22.50c.; block tin, 26c., all buying prices for less than carload lots.

St. Louis

July 25.—The lead market for the week was a little easier, 5.35c. to 5.40c., carlots, against 5.45c. last week, while slab zinc was firmer at 5.80c. to 5.90c. On old metals we quote light brass 3.50c.; heavy red brass and light copper, 7c.; heavy yellow brass, 4c.; heavy copper and copper wire, 7.50c.; zinc, 2c.; lead, 3c.; pewter, 15c.; tin foil, 16c.; tea lead, 2c., and aluminum 9c.

Plant Operations in the Youngstown District

YOUNGSTOWN, Ohio, July 25.—Industrial coal consumers say that coal prices are prohibitive, and there is no use to buy, as shipments cannot get through.

District plants of the Carnegie Steel Co. at Youngstown and McDonald are maintaining operations. Five of six furnaces are in blast at the Ohio Works, 14 open hearth furnaces are melting, the Bessemer converter is blowing, while bar mill capacity is engaged at about 80 per cent.

The Youngstown Sheet & Tube Co. reports that it is operating four blast furnaces in its East Youngstown group, 11 open-hearth furnaces, Bessemer department, two blooming mills, four skelp mills, one bar mill, 10 tube and 13 to 14 sheet mills, with rod, wire and conduit capacity active.

At its Youngstown plant, the Republic Iron & Steel Co. has one furnace in blast, 11 open hearths charged, two skelp, one bar, one plate, five tube mills and 16 sheet mills. The output of its plate mill is devoted to skelp.

The Brier Hill Steel Co. has two blast furnaces active, 11 open hearths, blooming and bar mills, 84-in. plate mill and 28 sheet mills scheduled.

Schedules of the Trumbull Steel Co. call for the operation of all seven units in its open-hearth department, bar rolling equipment, three strip mills and 44 sheet and tin plate mills at its Trumbull and Liberty plants.

The Sharon Steel Hoop Co. has one blast furnace pouring, six open hearths charged, and it is operating six sheet mills and four strip mills.

Shortage of sheet bars has not yet curtailed production by non-integrated sheet producers, such as the Newton Steel Co., Falcon Steel Co. and the Mahoning Valley Steel Co., which are operating close to a normal basis.

Proposed Steel Mergers Are Not Illegal

(*Continued from page* 210)

observed that the Bethlehem specializes in the production of structural shapes.

Rails — Standard: The Lackawanna's great specialty is the production of steel rails. Of the entire tonnage produced in the United States in 1920 (2,604,116), it contributed 15.18 per cent; the Bethlehem, 6.78 per cent. If these companies combine they will, if the ratio just mentioned continues, control substantially 22 per cent of the country's entire production. About seven-eighths of this production is sold in the United States, the remaining one-eighth being sold in the foreign trade. Of the entire amount sold by these two companies in the New England district, the Bethlehem contributed 16.37 per cent; the Lackawanna 83.63 per cent. In the Eastern district, the Bethlehem contributed 38.69 per cent; the Lackawanna 61.31 per cent. In the Western district, the Bethlehem contributed 4.73 per cent; the Lackawanna, 95.27 per cent. In the Southern district the Bethlehem contributed 67.08 per cent; the Lackawanna, 32.92 per cent. Neither company shipped any into the Pacific Coast district.

My investigation of this matter, conducted by representatives in the field, convinces me that in the New England district these two companies enjoy a very substantial amount of the trade in rails. As already indicated, no figures are available showing what other manufacturers ship there. But representatives of practically every railroad in this district were interviewed, all of whom corroborate the statement just made. This in a great measure, if not entirely, is attributable to the fact that the Lackawanna's plant at Buffalo and the Bethlehem's plant in eastern Pennsylvania lie closest to that field.

With respect to rails a marked uniformity, of long duration, exists in quoting prices. All manufacturers of steel rails throughout the country, no matter where the plants may be located, quote substantially the same prices; and the prices thus quoted are uniformly f.o.b. at the mills. Naturally, therefore, it is the railroad's advantage to place its orders with those mills reached by its own rails; or if no mills are located on its line then with those mills off its line that afford the shortest haul. In the former case it incurs no transportation charge; in the latter, such charges are reduced to a minimum. None of the railroad representatives in the New England district (where alone the Bethlehem and Lackawanna enjoy almost an exclusive field in the rail line), voiced any apprehension that a merger of these companies would result in an enhancement of prices or a monopolistic control.

Rails — Light Tees: These constitute a comparatively unimportant item. In 1920 the Bethlehem produced in the domestic trade 2191 tons; the Lackawanna, 14,416 tons. Only 14 tons were sold by both companies in the New England district. Of the 2191 tons shipped by the Bethlehem 1550 were sold in Pennsylvania and 484 in West Virginia, leaving only 157 tons for distribution elsewhere. The Lackawanna, on the other hand, disposed in Pennsylvania, New York and Ohio of nearly all it produced.

Rail accessories:

(a) Standard splice bars: In the New England district the Bethlehem sold 2701 tons; the Lackawanna, 711 tons. In the Eastern district the Bethlehem sold 8389 tons; the Lackawanna 10,975 tons. Of the latter tonnage the Lackawanna marketed over two-thirds in the State of New York. In the Western district the Bethlehem marketed 1554 tons; the Lackawanna, 3066 tons. In the Southern district the Bethlehem marketed 2405 tons; the Lackawanna, 95 tons. In the Pacific Coast district the Bethlehem marketed 29 tons; the Lackawanna, less than a ton.

(b) Bonzano joints: This is a patented product. The Bethlehem produced 3825 tons; the Lackawanna, 510 tons; both companies selling to a single purchaser.

(c) Continuous and 100 per cent joints: This also is a patented product sold by both companies to a single purchaser, the Bethlehem selling 21,643 tons; the Lackawanna, 4320.

(d) Tie plates—standard: The Bethlehem sold direct to customers 3633 tons; the Lackawanna, 1370 tons, all of which went to a single concern.

These rail accessories constituted but 2.34 per cent of the Bethlehem's domestic business in its steel works division; and but 2.67 per cent of the Lackawanna's domestic business.

Railroad spikes and track bolts: In the New England district the Bethlehem sold 833 tons; the Lackawanna, 544 tons. In the Eastern district the Bethlehem sold 5602 tons; the Lackawanna, 4626 tons. In the Western district the ratio between the two was about the same, although the volume of sales was considerably less. In the Southern district the Bethlehem sold 4570 tons; the Lackawanna, only 591. The sales in the Pacific Coast district were so small as to deserve no mention.

Bridges, Viaducts, Caissons and Buildings.

No figures are available showing the entire amount of business done throughout the country in this line of activity; and it was not until the beginning of this year that the Lackawanna entered upon the construction of viaducts and bridges. It has had nothing to do with caisson construction for upward of three years, although just now it is engaged in carrying out a contract for the tunneling of the Hudson River. With respect to viaducts and bridges the Lackawanna is not equipped to carry on work of the larger kind, its main work being confined to railroad bridges and the like. On the other hand, the Bethlehem's equipment is such as to enable it to construct viaducts and bridges of whatever size. It makes no active effort, however, to acquire the smaller business, such as the Lackawanna engages in, for on the whole it finds it advantageous to keep away as much as possible from work of the smaller kind.

The principal concerns engaged in the fabrication of structural material on a large scale are the following, although there is a large number of smaller fabricators not included in this list whose combined capacity is very substantial:

American Bridge Co., a subsidiary of U. S. Steel Corporation; Belmont Iron Works; Berlin Construction Co.; Bethlehem Fabricators, Inc.; Boston Bridge Works; Buffalo Structural Steel Co.; Eastern Bridge & Structural Co.; Erie Steel Construction Co.; Fort Pitt Bridge Co.; Hay Foundry & Iron Works; Hedden Iron Construction Co.; Jones & Laughlin Steel Co.; George A. Jast Co.; Kansas City Structural Co.; Kellogg Structural Steel Co.; King Bridge Co.; Lehigh Structural Steel Co.; Levgar Structural Co.; McClintic-Marshall Co.; Minneapolis Steel & Machinery Co.; Mt. Vernon Bridge Co.; National Bridge Works; New England Structural Co.; Paterson Bridge Co.; Penn Bridge Co.; Phoenix Iron Co.; Pittsburgh Des Moines Co.; Shoemaker Satterthwaite Co.; Virginia Bridge & Iron Co.; Witherow Steel Co.

The percentage of the principal products produced by other manufacturers and the competition that will exist if this merger goes through.

Pig iron: The total production in the United States in 1920 was 36,925,987 tons, of which the Bethlehem and the Lackawanna together contributed 7.56 per cent. The amount produced by others was 34,137,290 tons, or 92.44 per cent.

Structural Shapes: The entire production in the United States for 1920 was 3,306,748 tons. Of this tonnage, Bethlehem and Lackawanna together contributed 21.43 per cent. Or, to state the matter in a different way, 2,757,929 tons, or 78.57 per cent of the whole, were produced by other concerns. The Iron and Steel Works Directory of the United States and Canada for 1920 gives, on page 470, a list of 52 different concerns engaged in the manufacture of structural shapes in the United States.

Plates: 4,755,133 tons were produced in the United States in 1920; the Bethlehem and the Lackawanna together contributed 4.73 per cent. This means that 4,529,986 tons, representing 95.27 per cent of the total, were produced by other concerns. See pp. 472-3 of the Directory just mentioned for a list of 58 concerns in the United States manufacturing plates in 1920.

Rails: The total production in the United States in

1920 amounted to 2,604,116 tons, of which Bethlehem and Lackawanna together contributed 21.96 per cent. Or, to state the matter in a different way, 2,032,231 tons, representing 78.04 per cent of the total, were produced by others. See p. 469 of the Directory for a list of the various concerns in the United States engaged in the manufacture of rails.

Steel Ingots: Inasmuch as all steel products are made from this article, it will be well to give figures showing the ingot capacity of the entire country and the percentage represented by Bethlehem and Lackawanna, with figures designed to contrast their capacity with that of the United States Steel Corporation and other producers. The country's total rated annual ingot capacity is 50,440,000 tons. Of this amount Bethlehem and Lackawanna's combined capacity is 9.7 per cent; that of the United States Steel Corporation is 45 per cent; that of all others is 45.3 per cent. In other words, the rated ingot capacity of the United States Steel Corporation is about five times that of the Bethlehem and Lackawanna combined.

Will a merger of these companies violate the act of July 2, 1890, commonly known as the anti-trust act?

In my opinion it will not. I am unable to find any ground for asserting that the acquisition of the Lackawanna by the Bethlehem will offend the Act of July 2, 1890, commonly known as the Sherman or anti-trust act. The numerous decisions of the supreme Court, ranging over a period of 30 years, leave little room for doubt as to the true scope and meaning of this important statute. Every combination formed for the avowed purpose of restraining interstate trade or of acquiring a monopoly therein falls, of course, within its condemnation. As pointed out in an early decision of the Supreme Court,[1] it is not every contract or combination in restraint of trade that is prohibited by this act; for if that were the case, scarcely any contract would fall beyond its reach. It obviously applies, however, to every contract or combination in unreasonable restraint of trade; and manifestly the evils that may be inflicted upon the public, such as the enhancement of prices, are of paramount concern.

I am unable, however, to find in the exhaustive investigation I have made any reasonable warrant for asserting that the public will suffer if this consolidation is consummated. I am persuaded that the motive which prompts the Bethlehem to acquire the Lackawanna plant is the sole desire to secure greater efficiency and economy in the production, handling, and distribution of steel products, and that the thought of acquiring a monopoly or of enhancing prices was never present. The whole transaction from beginning to end impresses me as being thoroughly clean, honest and straightforward. I need not stop to point out that in *United States* v. *U. S. Steel Corporation*, 251 U. S. 417, the Supreme Court refused to declare illegal a combination of much greater magnitude. In that case the court apparently adopted the findings of two of the four judges of the lower court that the combination there assailed was formed for the avowed purpose of acquiring a monopoly; but because monopoly was found to be impossible of attainment and all attempts with other manufacturers to control prices had been abandoned in good faith before suit was brought, the court refused to order the combination dissolved. The merger now under consideration will be neither an actual monopoly nor even an attempt to monopolize; and of course the decision just referred to is controlling.

Will a merger of these companies violate the Act of October 15, 1914, commonly known as the Clayton Act?

Here also I am constrained to the conclusion that it will not. But different considerations in part apply. That act (Sec. 7) makes it illegal for one corporation engaged in interstate commerce to acquire the *stock or other share capital* of another corporation engaged also in such commerce where the effect of such acquisition may be substantially to lessen competition between them or to restrain commerce in any section or community, or tend to create a monopoly of any line of commerce. It is obvious that the acquisition of the stock of one company by another is not prohibited where all that takes place is a mere lessening of competition. The act denounces the acquisition only where the effect may be *substantially* to lessen competition between the companies. I have set forth with considerable detail the extent of the competition existing between the two companies mentioned. In my opinion the facts are not such as to bring the proposed merger within the prohibition of the Clayton act.

This conclusion renders it unnecessary for me to consider another question, the solution of which is attended with no little difficulty, and that is whether the proposed merger would fall within this act if its effect were to substantially lessen competition. As we have just seen, that act does not in express terms prohibit the acquisition of physical assets. What it prohibits is the acquisition of "the stock or other share capital." What the Bethlehem company in this instance proposes to do is to acquire, not the capital stock of the Lackawanna, but an outright conveyance of its physical assets. The Federal Trade Commission, by a ruling made in 1916, announced that in its opinion the act did not prohibit the acquisition of the physical assets of one corporation by another. As that body, no less than myself, is charged with the duty of enforcing certain provisions of this act, its administrative construction of the section in question is entitled, under a long and well recognized line of authorities, to great weight. In this instance, however, the plan of purchase contemplates that the Lackawanna shall convey its property to the Bethlehem in return for shares of stock of the latter company, to be followed by an early winding up and dissolution of the Lackawanna and the distribution of these shares among the Lackawanna stockholders. I need not, however, stop to consider whether, under other circumstances, this would be a violation of the act, for the conclusion I have just announced makes it unnecessary to do so.

Will a merger of these companies violate the Act of April 10, 1918, commonly known as the Webb Act?

These companies are members of an association formed pursuant to the authority granted by this act to handle export trade. It is obvious from what I have already said that this act will in no wise be violated if this merger goes through.

Will a merger of these companies violate the act of Sept. 26, 1914, commonly known as the Federal Trade Commission act?

The Senate's resolution is broad enough to call for an expression of my views upon this point; but for obvious reasons I must decline to express any. The Federal Trade Commission is alone vested with the power of enforcing that act, and as appears from the *Congressional Record*, 67th Congress, 2d session, p. 8872 *et seq.*, that body has preferred a formal complaint against these companies, charging that the proposed merger is an unfair method of competition within the meaning of sec. 5. The Senate will no doubt be quick to perceive the impropriety of my expressing any opinion upon this matter.

Midvale-Republic-Inland Merger

I shall begin by taking up the products common to all three of these companies and present sales figures showing the geographical distribution of the products and the percentage which the production of these companies bears to the entire production in the United States. As in the case of the other merger, I shall deal alone with the year 1920.

Coke and By-Products: The remarks under this heading in dealing with the other merger are likewise applicable here, and accordingly this item does not require separate treatment.

Pig Iron: What has been said under this heading with respect to the other merger likewise applies here.

[1] *Hopkins* v. *United States*, 171 U. S. 578, 600. "The act * * * must have a broad application to the many [illegible] would seriously hamper the conduct of commerce in many lines of business men that could not be said to have indirectly or remotely some bearing upon interstate commerce, and possibly to restrain it."

and repetition is accordingly unnecessary. The three companies combined produced only a small per cent of the entire production in the United States, and are really not in competition with respect to this item, the Republic alone engaging in its sale and then only with respect to that made in Alabama.

Blooms, Billets and Slabs: In the New England district (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island and Vermont) none of the three companies in 1920 sold any blooms. Midvale sold 33 tons of billets and 3 tons of slabs. The Republic sold 1055 tons of billets, and no slabs. Inland sold neither blooms, slabs nor billets. In the Eastern district (New York, Delaware, District of Columbia, Maryland, New Jersey, Ohio, Pennsylvania and West Virginia) the Republic sold no blooms. The Midvale sold 10,582 tons, over one-half of which went to New York. The Inland sold 36,451 tons, all but 90 tons going to Ohio and Pennsylvania. As a rule the Inland's shipments into this territory are exceedingly small, the heavier tonnage for 1920 being accounted for by the fact that an unusual shortage occurred in this district in that year, and the abnormal conditions which existed at the time were such as to induce Inland to ship a portion of its product to that territory.

With respect to billets the Midvale sold 953 tons; the Republic 6977 tons; the Inland 12,747, all but 154 tons going to Ohio. With respect to slabs Midvale sold 3015 tons; Republic 1845 tons; Inland 15,021 tons, all of which went to a single concern in northern Ohio.

In the Western district (Colorado, Idaho, Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Montana, Nebraska, Nevada, North Dakota, South Dakota, Utah, Wisconsin and Wyoming) the Midvale sold only 4 tons of blooms, 56 tons of slabs and 2733 tons of billets; the Republic none at all; the Inland 217 tons of blooms and 33,819 tons of billets, of which over 30,000 were sold in Illinois. In the Southern and Pacific Coast districts the sales made by each are so insignificant as to deserve no mention. When we stop to consider that approximately 35,000,000 tons were produced in the United States, we realize how inconsequential this item really is. As stated elsewhere, blooms, billets and slabs are usually used by the steel manufacturer that produces them, the surplus only finding its way to the market and then usually to accommodate some particular manufacturer who happens to be running short.

Sheet Bars: None of the companies sold this product in the New England district. In the Eastern district, Midvale sold 15,792 tons, over one-half of which was sold in Pennsylvania; Republic, 173,533 tons, of which all but 18,759 tons were sold in Ohio; Inland sold 35,300 tons, 22,302 tons going to Ohio and the balance to Pennsylvania. In the Western district, Midvale sold none at all; Republic, 165 tons; Inland, 2928 tons; all but 39 tons being sold in Indiana, where the Republic sold none at all. None of the companies sold in the Southern or Pacific Coast States. It is to be borne in mind that sheet bars are a semi-finished product, the purchaser being the steel manufacturer and not the ultimate consumer. As shown at page 469 of the Iron and Steel Works Directory of the United States and Canada for 1920, there are 37 concerns scattered throughout the United States engaged in the production of this product.

Plates: The entire production in the United States for 1920 was 4,755,133 tons. Midvale contributed 8.22 per cent; Republic 0.75 per cent; Inland 2.31 per cent. In the entire New England and Eastern districts Inland sold only 576 tons; Republic 27,956 tons, 16,215 tons of which were sold in Pennsylvania, 6763 tons in Ohio, and 3153 tons in Maryland. The rest of its sales were scattered through Delaware, New Jersey, New York, Rhode Island and West Virginia. On the other hand, Midvale, whose sales aggregated 269,057 tons, reached every one of the States in these two districts, Pennsylvania, Ohio, New York, Maryland, New Jersey, Massachusetts and Delaware being the heaviest purchasers in the order stated. In the Western States Midvale sold 26,054 tons; Inland 94,850 tons; while Republic sold but 67 tons. In Illinois and Indiana Inland's sales aggregated over 68,000 tons; Midvale's sales in these two States amounting to about 10,000 tons. In the Southern States, Midvale's sales amounted to 18,260; Republic's, 1137; Inland's, 844 tons. In the Pacific Coast States, Midvale's sales amounted to 6004 tons; Inland's to 3544 and Republic's to 26 tons.

After eliminating the plates made by these three companies in 1920, the remaining production in the United States amounted to 4,218,803 tons, or 88.72 per cent of the total. By referring to the Iron and Steel Works Directory of the United States and Canada for 1920 it will be seen (pp. 472-3) that 62 companies are listed as manufacturers of plates, 58 of which are in the United States.

Sheets: Midvale is not a manufacturer of this article and therefore can be disregarded. In the entire New England and Eastern districts Republic sold 32,204 tons; Inland only 1279 tons, all but 214 tons of which went to Ohio, the remaining 214 finding its way either to New York or Pennsylvania. When we come to the Western district, we find the Republic sold 9077 tons, whereas the Inland sold 84,600 tons. Of the 9077 tons sold by the Republic in this territory, over one-half found its way to Illinois, in which State the Inland sold 44,980 tons. In the Southern district the Republic sold 3709 tons; the Inland 5030 tons. In the Pacific Coast district the Republic sold 1704 tons; the Inland 5751 tons.

The total production of sheets in the United States in 1920 was 4,582,547 tons, Inland contributing 2.3 per cent and Republic 1.09 per cent. Or, to state the matter in a different way, 4,427,158 tons, representing 96.61 per cent of the total production, were produced by other companies. On p. 474 of the directory mentioned under the preceding heading will be found a list of 66 companies, all engaged in the manufacture of plates. The American Sheet & Tin Plate Co. alone has 13 mills, located at various points in Ohio, Indiana and Pennsylvania. (See pp. 21-24 of directory just mentioned.) There were 644 sheet mills in the United States on Jan. 1, 1922, the Republic and the Inland together owning 36 of this number.

Structural Shapes: The Republic does not manufacture this important item and therefore may be disregarded. In the entire New England and Eastern districts the Midvale sold 79,032 tons; the Inland 4174 tons. The Midvale reached every State in this territory; the Inland only Connecticut, New York, Ohio and Pennsylvania, nearly all of its product going to the two latter States. In the Western district, the Midvale sold 13,985 tons; the Inland 106,747 tons. In the Southern district, the Midvale sold 5145 tons; the Inland 1560 tons. In the Pacific Coast district, the Midvale sold 3109 tons; the Inland 7746 tons.

The entire production in 1920 in the United States was 3,306,748 tons, of which Midvale contributed 3.61 per cent and the Inland 3.72 per cent. It will be seen from the figures just given that the great bulk of Midvale's tonnage is marketed in the New England and Eastern territory, where Inland finds a market for about one-nineteenth of the tonnage marketed by Midvale. On the other hand, the great bulk of Inland's tonnage is marketed in the Western district, where Midvale markets about one-eighth of the tonnage marketed by the Inland.

After deducting the tonnage manufactured by these two companies in 1920 from the total tonnage throughout the United States, we have left 3,064,323 tons, or 92.67 per cent of the total. By turning to the Iron and Steel Works Directory for 1920, p. 470, we find a list of 52 concerns engaged in the manufacture of structural shapes at different places in the United States.

Rails: Until recently Midvale was the only one of these three companies to manufacture rails. In March, 1922, Inland, however, began their manufacture and sale. It is apparent from the discussion of this item in dealing with the other merger that no competition between the two companies will exist with respect to rails, the plants of each company being close to 800 miles apart.

Merchant Bars: In point of tonnage this is the most important item in the steel industry. To obtain an accurate idea of the sales made by these three com-

panies it will be well to divide merchant bars into three classes: (1) steel bars; (2) old rail bars; (3) iron bars. Iron bars may be disregarded, the Republic being the only one that makes them. Midvale may be disregarded so far as old rail bars are concerned, for it does not make them. And so far as the New England and Eastern districts are concerned Inland may be entirely disregarded with respect to steel and old rail bars, for it sold none of the latter and only 877 tons of the former.

Coming now to steel bars, in the New England and Eastern districts Midvale sold 132,087 tons; Republic 191,712 tons. In the Western district, sales of steel bars were: Midvale, 30,597 tons; Republic, 44,842 tons; Inland, 73,922 tons. In the Southern district, Midvale, 7945 tons; Republic, 4922 tons; Inland, 1009 tons. In the Pacific Coast district, Midvale, 1526 tons; Republic, 152 tons; Inland, 630 tons.

With respect to old rail bars (which Midvale does not produce) the Republic sold 1219 tons in the New England and Eastern districts; the Inland none at all. In the Western district, the sales were: Republic, 34,366 tons; Inland, 35,868 tons; in the Southern district, Republic, 1464 tons; Inland, 671 tons; in the Pacific Coast district, none at all.

In this connection the fact must not be overlooked that "merchant bars" is a generic term of wide application, embracing different kinds of bars which are used for an endless number of purposes. The bars produced by the Midvale are practically all made on slow-running hand mills. On the other hand, about 75 per cent of the bars turned out by the Republic are made on continuous or semi-continuous mills. The larger part of those produced by the Midvale are of a high grade and of special grades and special sections; while those produced by the Republic and Inland are of a commoner sort—styled common merchant bars to distinguish them from the higher grade article. Because of the wide variety of uses to which these bars are put, the demands of the trade must be satisfied by the production of these various types and grades. Unlike those produced by the Midvale, Inland, for example, makes no special sections. Its product, all of which is made from continuous mills, consists for the most part of rounds, squares and flats, and of what is termed concrete bars.

Still using 1920 figures as a basis, of the entire steel tonnage market by Midvale 14.45 per cent was represented by merchant bars; in the case of the Republic 34.37 per cent; and in the case of the Inland 16.83 per cent.

The total production of merchant bars (iron, steel and old rail bars) in the United States in 1920 amounted to 7,268,313 tons. Midvale's contribution was 2.72 per cent; Republic's 4.77 per cent; Inland's 1.75 per cent; or 9.24 per cent for all three. There are 148 different concerns engaged in the production of these bars, 109 of which make steel bars. A complete list of these various manufacturers and the location of their plants will be found at pp. 478-82 of the 1920 directory above mentioned.

Other Products Made by These Companies: It must not, of course, be inferred that the products above enumerated are the only ones made by these companies. On the contrary, numerous other articles are manufactured, many of them on a large scale. For example, Republic is a large manufacturer of oil and gas pipe, which neither Midvale nor Inland produces. Again, Midvale is a large manufacturer of boiler tubes, rods, drawn wire, wire nails, steel cars, axles and wheels, none of which is produced by the other two. But the above enumeration ambraces substantially all of the products of any importance produced in common by these companies.

Will a merger of these companies violate the act of July 2, 1890, commonly known as the anti-trust act?

I see nothing in the proposed merger that offends this act. In my opinion there is not the slightest ground for supposing that it will result in any restraint of trade or monopolistic control. The plants of these companies are widely scattered; and my investigation leads to but one conclusion, and that is that the underlying purpose of this combination is not to acquire a monopoly or to restrain trade, but to enable the new company more effectually to compete with the United States Steel Corporation, which because of the wide distribution of its various plants and their easy accessibility to the source of raw materials, is enabled to produce and sell its products much cheaper than other manufacturers. Instead, therefore, of being in restraint of trade, the new combination will be in furtherance of trade. Its formation has, I believe, been in a great measure prompted by the heavy losses which all of these companies sustained following the marked depression in the steel industry which began over a year ago. These losses, aggregating many millions of dollars, have naturally induced these companies to devise methods of cheapening the production, sale and distribution of their products. By owning plants that are widely scattered, where production can take place in accordance with the needs of the community lying closest to the plants; by manufacturing products at plants advantageously located to ore supplies; by reducing overhead expenses; and by eliminating unnecessary sales agencies, substantial economies can be effected. The combination being formed for this sole purpose, I am unable to see wherein it is tainted with illegality.

Will a merger of these companies violate the Act of Oct. 15, 1914, commonly known as the Clayton act?

What these companies plan to do is to merge the Inland with the Midvale and to acquire outright the physical assets of the Republic. To accomplish this shares of the stock of the new company will be issued to the stockholders of the old companies in exchange for their present holdings, accompanied in the case of the Inland by a payment of something like $24,000,000 to retire its preferred stock.

In the light of the facts which I have set forth, I fail to descover any ground for asserting that the Clayton Act will be violated.

Will a merger of these companies violate the act of April 10, 1918, commonly known as the Webb act?

As in the case of the other merger, these companies, too, belong to an association formed to handle export trade alone and functioning under the permission which this act gives. In my opinion it is impossible to conceive how a merger of these companies will in any way offend this act.

Will a merger of these companies violate the act of Sept. 26, 1914, commonly known as the Federal Trade Commission act?

Under a like heading in dealing with the other merger I have pointed out the impropriety of my expressing any opinion upon this question. For exactly the same reasons I must pursue a similar course here.

Very respectfully,

H. M. DAUGHERTY,
Attorney General.

HON. CALVIN COOLIDGE,
President of the Senate.

July 21, 1922.

The first regional meeting of the American Society of Mechanical Engineers will be held at Springfield, Mass., Sept. 25, 26 and 27, under the auspices of the Engineering Society of Western Massachusetts. It is planned to make the program broad in scope and interest and thus to provide a meeting calculated to attract membership from a large section of New England and New York State, particularly the eastern section of the latter.

The Walworth Mfg. Co., valves, fittings, etc., has advanced wages six to ten per cent to apply to 1200 workers at the company's South Boston plant, thereby restoring a cut made May 30, which, according to Howard Coonley, president, was not justified by conditions that have obtained since. He states the cost of living has not declined as much as anticipated.

FABRICATED STEEL BUSINESS

Bridge and Building Awards and Tonnages Pending at Leading Centers

Awards for fabricated steel work for the past week include the following:

Power plant for Brooklyn Edison Co., Brooklyn, N. Y., 8000 tons, to McClintic-Marshall Co.

New York Telephone Co., exchange, New York, 1800 tons, Levering & Garrigues Co.

Public schools Nos. 19 and 69, New York, totaling 650 tons, to Bethlehem Fabricators, Inc.

State Hospital, Trenton, N. J., 200 tons, to American Bridge Co.

Shops for Erie Railroad, Hornell, N. Y., 937 tons, to American Bridge Co.

Tribune Building, Oakland, Cal., 650 tons, to Dyer Brothers.

Central Ferry Bridge, Snake River, Whitman and Garfield counties, Washington, 956 tons, to Penn Bridge Co.

Kansas City Southern Railway Bridge over Arkansas River, Redlands, Okla., 1900 tons, to McClintic-Marshall Co.

Northwestern States Portland Cement Co., building, 194 tons, to Indiana Bridge Co.

Building for Nash Motors Co., Kenosha, Mich., 1000 tons, to H. K. Ferguson Co., steel to be furnished by McClintic-Marshall Co.

Dam No. 44, Ohio River, 620 tons: Lock A, to the American Car & Foundry Co.; Lock B, to the Charles Hegewald Co.; Lock C, to the Penn Bridge Co.; Lock D, to the American Bridge Co.

Commercial building for Zingen & Braun, Sixth and Sycamore streets, Milwaukee, 125 tons, to Milwaukee Structural Steel Co.

Missouri, Kansas & Texas Railroad, shops at Dennison, Tex., 350 tons, to Mississippi Valley Structural Steel Co.

Gas holder at Framingham, Mass., 500 tons, to Stacey Mfg. Co., Cincinnati.

West Technical High School, Cleveland, 500 tons to the American Bridge Co.

Structural Projects Pending

Inquiries for fabricated steel work which may be added to lists of pending projects include the following:

First Church of Christ Scientist, New York, 500 tons.

Young Men's Hebrew Association, Newark, N. J., 1000 tons.

Sinclair Consolidated Oil Corporation, 25 oil tanks for Wyoming field, 7000 tons.

Loft building on Thirty-third Street, New York, 300 tons.

Locust Street Office Building, Philadelphia, 400 tons.

Chamber of Commerce Building, Newark, N. J., 400 tons.

New Nebraska Capitol, 2100 tons, bids being taken.

Apartment building, Chicago, Howard Shaw, architect, Chicago, 700 tons.

Riverside pumping station, Milwaukee, 438 tons, bids close July 27, R. E. Stoelting, commissioner of public works.

Bascule bridge for Florida State Highways at Pensacola, 100 tons, bids being taken.

Jewish Temple, Cleveland, 500 tons, bids to be taken Aug. 14.

Bradford-Carrollton bridge, Cattaraugus County, New York, 500 tons, bids taken.

Court House addition, Akron, Ohio, 500 tons, all bids rejected and to be re-advertised.

Office building at Chestnut and Fifteenth Streets, Philadelphia, for Albert M. Greenfield, 2500 tons.

Railroad Equipment Business

Locomotive orders have been heavy lately, reported awards reaching an aggregate of more than 100. The Illinois Central Railroad has bought 65, the Delaware, Lackawanna & Western 30, and the Southern Railway 6. Evidently anticipating future demands for Mikados, the American Locomotive Co. is asking bids on supplies for 25 to 50 engines of that type. There is a good number of new cars in the business of the past week, the outstanding one being of 3000 composite gondolas distributed among five builders by the Illinois Central Railroad. It is estimated that about 40,000 tons of steel will be required for this and an order from the Reading for 1000 gondolas. Car repair business is heavy; much has been placed but more still is to be let.

Of the 1000 70-ton steel gondolas for the Philadelphia & Reading, 500 will be built by the Pressed Steel Car Co. and 500 by the Standard Steel Car Co.

The 3000 composite gondolas for the Illinois Central have been divided as follows: Pullman Co., 1000; American Car & Foundry Co., 500; Bettendorf Co., 500; Mount Vernon Car Mfg. Co., 500; Western Steel Car & Foundry Co., 500.

The Pittsburgh & West Virginia has ordered 1000 55-ton steel hopper cars from the Cambria Steel Co.

The Baltimore & Ohio has placed 500 box cars for repairs with the Streator Car Co., Streator, Ill., and is asking bids for the repair of 750 additional.

The Chicago, Milwaukee & St. Paul Railroad soon will distribute repair work on 250 gondolas, 500 box cars requiring new steel underframes and heavy repairs and 1250 wooden gondolas.

The Rock Island System will put out for repairs 500 National dump cars, 500 refrigerator cars, 500 automobile and furniture cars and 1500 box cars.

The Chicago, Burlington & Quincy Railroad, which recently placed 500 new box cars with the Streator Car Co., will put out for repairs 500 all-steel gondolas and from 500 to 1000 box cars.

The Chicago & North Western Railroad will put out 1000 or more box cars for repairs.

The Erie Railroad is asking bids on heavy running repairs to an indefinite number of box cars.

The Metropolitan Elevated Railroad has awarded 100 new cars to the Cincinnati Car Co.

The Illinois Central Railroad also has placed 65 new locomotives, 25 Mikados with the American Locomotive Co., 25 central type with the Lima Locomotive Co., and 15 switch locomotives with the Baldwin Locomotive Works.

The American Locomotive is in the market for supplies for 25 to 50 Mikados for stock.

The Delaware, Lackawanna & Western Railroad has placed 5 fast freight Pacific and 25 Mikados with the American Locomotive Co.

The Southern Railway has ordered 6 eight-wheel switch engines from the Baldwin Locomotive Works.

NEW OTIS STEEL PLANT

Cleveland Company Will Roll Sheet Bars and Slabs for Its Mills

The Otis Steel Co., Cleveland, is understood to have about completed financial plans for the erection of a steel plant to supply the sheet bar and slab requirements of its plate and sheet mills. An inquiry for buildings for the plant is now in the hands of fabricators. There will be seven open-hearth furnaces and the necessary rolling equipment.

The New York Stock Exchange recently received notice of a proposed increase in the common stock of the Otis Steel Co. from 500,000 to 1,000,000 shares.

The notice, while stating that a special meeting of stockholders will be held on Sept. 15 at Cleveland for the purpose of authorizing the increase in the common stock, gave no details as to the purpose of doubling the amount of outstanding common shares.

The company has a small amount of unissued common stock in the treasury. Under the laws of the State of Ohio a corporation cannot increase the authorized amount of stock so long as it has some stock unissued. In this case the unissued stock is small and the company desired to increase the authorized amount of its common stock considerably. In order to do this a special meeting of stockholders was called to reduce its authorized common stock to the amount now outstanding. That having been done, the company will be in position to have the stockholders vote on the proposition to increase the authorized amount of its common stock from 500,000 shares to 1,000,000 shares.

The California Equipment & Supply Co., 205 North Los Angeles Street, Los Angeles, Cal., is in the market for a steel building 50 to 60 ft. wide and about 240 ft. long, second-hand, and a used 20-ton overhead traveling crane. The company is also inquiring for a tonnage of 8-lb., 12-lb. and 16-lb. rails, new or used, and some ½-in. to 6-in. black and galvanized pipe, second-hand.

British Iron and Steel Market

More American Pig Iron Purchases—British Loan to Skoda Works—India Buying on Continent

(By Cable)

LONDON, ENGLAND, July 25.

In pig iron there are further American and Canadian inquiries for Cleveland and Scotch foundry grades. Some Scotch foundry has been sold for Atlantic ports and for prompt shipment. Home buying is practically stagnant and prices are tending downward. Present supplies are sufficient to meet demand.

Foreign ore is idle.

Steel prices generally are unaltered with small business passing. Some Scottish works have reopened, others remaining idle for all of July.

A British group is reported negotiating a loan of £1,500,000 to the Skoda Works.

Continental sales are moderate. India is the chief buyer. Belgian merchant bars have sold at £8 2s., c.i.f. Bombay. German 14 to 20-lb. rails are quoted at £7 10s., f.o.b..

Tinplates show a weaker tendency on lack of a substantial demand. On prompt business 19s. 7½d. is quoted per base box, f.o.b. Export in tinplate is quiet. The home trade is buying moderately. Odd sizes go at 19s. 3d., f.o.t. August delivery. There is a fair demand for wasters, buyers paying for 28 x 20-in. plates 33s. 6d., f.o.t.

Galvanized sheets are firmer, but demand has not been stimulated. South America bought small lots. Japanese specifications black sheets sold at £15 f.o.b.

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $4.46 per £1, as follows:

Durham coke, delivered	1	6	9			$5 95	
Cleveland No. 1 foundry	1	15				21.18	
Cleveland No. 3 foundry	1	8		&	4 8*	19 62	
Cleveland No. 4 foundry	1	7½				19.52	
Cleveland No. 1 forge	1	7				18 96	
Cleveland basic	1	10		&	4 6*	17 81	
East Coast mixed	1	11		&	4 11*	20 29	
Ferromanganese	15	0				66.90	
Ferromanganese*	14	10		to	14 15	64.67 to	$65.78
[illegible]	1	17½		to	9 10	35 12 to	42 37
[illegible]		0		to	8 0	31.22 to	35 68
Sheet and tin plate bars, Welsh		13				32.89	
Tin plate bars	6	15	6	to	6 19 7½	1.25 to	1.38
						C. per Lb.	
Slab [illegible]	9	0		to	10 0	1 79 to	1.99
Billet [illegible]	13	0		to	14 0	2 59 to	2 79
Tees	9	5		to	10 10	1.84 to	2.09
Channels	8	10		to	9 15	1.69 to	1.94
[illegible]	8	[illegible]		to	10 0	1 61 to	1.99
Rounds [illegible]	8	[illegible]		to	10 10	1 81 to	2.09
Gas [illegible]	15	0		to	16 16	3 18 to	3.28
Black sheets	12	0				2.39	
[illegible]	[illegible]	[illegible]		&	12 *	2 29 &	2 44*
Cold rolled steel strip, [illegible]	[illegible]	21½				4 60	
Cotton ties, Indian specification	14	0				2.99	

*Export price.

Continental Prices, All F.O.B. Channel Ports, Delivery as Specified

No. 3 foundry [illegible]							
[illegible]	[illegible]	[illegible]		to	4 5	$18 10 to	$18 95
[illegible]	[illegible]	[illegible]		to	4	17 81 to	18 95
France, August	4	2½		to	4 5	18.40 to	18.95
Basic pig iron: [illegible]							
[illegible]							
Billets:							
France	5	15				25.65	
[illegible]	[illegible]	[illegible]				[illegible]	
[illegible]	[illegible]	[illegible]				[illegible]	
Wire nails (keg basis):							
Germany, August	0	14½				3.22	
Belgium, July	0	20½				4.55	
Wire rods, 5 mm. (0.2 in.):							
[illegible]	[illegible]	[illegible]		to	10 7½	[illegible]	[illegible]
Angles:							
[illegible]	[illegible]	[illegible]				[illegible]	
Tees:							
[illegible]	[illegible]	[illegible]				[illegible]	

Merchant bars:

Belgium, October	7	7½		to	7 15	1.47 to	1.54
Luxemb'g, October	7	12½		to	7 15	1.52 to	1.54
Germany, October	7	15		to	7 17½	1.54 to	1.56
France, October	7	17½		to	8 0	1.57 to	1.60
Channels:							
Belgium, July	7	10		to	7 12½	1.49 to	1.51
Joists (beams):							
France, Sept.	7	15				1.54	
Belgium, Oct.	7	5				1.44	
Luxemburg, Sept.	7	2½		to	7 5	1.42 to	1.44
⅜-in. plates:							
Germany, Aug., Sept.	7	15		to	8 5	1.54 to	1.64
Belgium, Aug., Sept.	7	15		to	7 17½	1.54 to	1.56
Luxemburg and France, not offered.							
½-in. plates:							
Germany	9	0				1 78	
No. 8 gage wire:							
Belgium, July, Aug.	14	10/7½				2 87	

Favorable and Unfavorable Influences Affecting British Business

(By Mail)

LONDON, ENGLAND, July 13.—Although business generally here is far from active, markets on the whole show a wonderfully confident tone in the face of the many disquieting political and economic problems, such as the threatened breakdown of the Hague conference and the catastrophic fall of the German mark. Certain features assist in stimulating hopefulness. One of these is the cheap rate for money and another the more reasonable attitude of labor, and a third the prospect of a reduction in railroad freight rates commencing at the beginning of next month.

Business with the iron and steel industry generally is restricted, but this is apparently attributable to the succession of holiday periods in various parts of the country. So far as pig iron is concerned, the quantities going into home consumption are not very important, but a fairly brisk export trade has been done and about a week ago a cargo of 1000 tons of special foundry iron was dispatched to the United States, while negotiations for further quantities of ordinary standard quality are proceeding.

So far as manufactured materials are concerned some orders for structural steel have been placed by Indian railroads, as well as for rails, and some of the rail makers are fairly busy. On the whole, however, the trade in manufactured iron and steel is not expanding very rapidly. The prices of Continental material are, of course, unsettled on account of the abnormal condition of the foreign exchanges, and at the moment there does not seem to be much business passing in this class of material.

It is reported that the Imperial Government Railways in Japan have ordered 34 complete electric locomotives from the English Electrical Co., Ltd. This company has five large works, three of which are in the Birmingham neighborhood. Meanwhile the Leeds Forge Co. has dispatched the first of 40 all-steel railroad coaches for the trans-European passenger service.

A matter of some interest is the issue of £2,000,000 7 per cent first mortgage debenture stock on behalf of the Tata Iron & Steel Co. The company has long term contracts for the supply of pig iron to Japan and steel rails to many of the Indian railroads.

A galvanizing unit is being added to the equipment of the Dominion Sheet Metal Corporation, Ltd., Hamilton, Canada. This is estimated to give a total capacity for galvanizing sheets of 22,500 tons per annum. The company reports full operations since March 1 and the outlook as good in view of a highly favorable Canadian crop situation.

The Hymen-Michaels Co., Chicago, recently bought from the Union Pacific Railroad 25,000 tons of 75-lb. to 85-lb. relaying rails, and in the past five or six weeks, including the Union Pacific purchase, has secured a total of 60,000 tons of these rails in various parts of the country.

STEEL STOCKS STRONG

Unfavorable Developments in Coal and Railroad Status Not Depressing

The stock market was remarkably strong last week, in view of the failure of Allan A. Ryan, and the unfavorable developments in the coal and railroad stocks. Steel stocks, for the most part, made gains. That for the week for the United States Steel Common was 1.75 points and ⅛ on preferred, while the Republic Iron & Steel Co. and the Midvale Steel Co. made fractional gains. The market early this week was not so strong as last week.

Steel mill shares made a relatively better showing than industrial securities during the past week. Earnings statements recently issued by independent steel companies are encouraging inasmuch as they show net profits, whereas six months and a year ago deficits were in order. Not in all cases, however, have earnings suggested an early resumption of dividends by these corporations.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

Allis-Chalmers	53⅜ - 56	Lima Loco. pf...	-110
Allis-Chal. pf ...	98¼ - 98½	Midvale Steel ...	37½ - 38
Am. B. S. & F...	61 - 63½	Nat. Acme ...	17 - 18
Am. Can ...	58 - 58	Nat. En. & Stm..	58¼ - 58¼
Am. Car & Fdry.	166 -169¾	N. Y. Air Brake	88⅛ - 92
Am. Car. & F. pf. ...	-121	Nova Scotia Steel ...	- 31½
Am. Loco.	114½ -118½	Otis Steel	11¼ - 12⅝
Am. Loco. pf... ..	-117½	Pitts. Steel pf...	- 96⅜
Am. Rad. pf.	-116	Pressed Steel ...	79 - 82¼
Am. Stl. Fdries..	36¾ - 38½	Ry. Steel Spring.	104 -109
Am. Stl. F. pf...	99½ - 99⅝	Ry. Steel Spg. pf	-112½
Bald. Loco.	118 -121½	Replogle Steel ..	31½ - 35
Beth. Steel ...	74⅜ - 76	Republic	71 - 76½
Beth. Steel Cl. B	76 - 79⅞	Republic pf	92½ - 93½
Beth Stl. 8% pf. ..	-114	Sloss	47½ - 49¼
Br. E. Stl. 1st pf ..	- 73⅛	Steel of Canada.	73½ - 75
Br. E. Stl. 2d pf	30¾ - 31	Superior Steel...	32½ - 33½
Chic. Pneu. Tool.	67½ - 71½	Trans.-Williams.	- 39
Colo. Fuel	30 - 32	Un. Alloy Steel..	39 - 40⅝
Cruc. Steel	76½ - 85⅜	U. S. Pipe	32⅝ - 35⅜
Cruc. Steel pf...	96½ - 98	U. S. Pipe pf...	- 77
Gen. Electric ...171	-178¼	U. S. Steel	99½-102½
Gt. No. Ore Cert.	39⅝ - 40⅞	U. S. Steel pf....120⅜-120⅞	
Gulf States Steel	81½ - 86⅝	Vanadium Steel.	46½ - 50¾
Inland Steel ...	50¾ - 52	Va. I. C. & C...	50 - 51
Int. Har.	104¼-104¼	Whouse Air Br..	92 - 93
Lack. Steel	77½ - 79	Whouse E. & M.	59⅞ - 62⅜
Lima Loco. ...	100¼-111		

Industrial Finance

Stockholders of the Lima Locomotive Works, at a recent meeting at Richmond, Va., approved the refinancing plan submitted by the directors of that company. The plan provides that 48,590 shares of common stock, par $100, shall be converted into common stock of no par value in the ratio of two shares of new stock for each one share of original stock held. Common shareholders have the right to subscribe, at $50 a share, for one and one-third shares additional stock of no par value for each existing outstanding share. Preferred shareholders may also obtain the right to subscribe to the new stock by converting their holdings into new common shares.

A public offering is made of $3,600,000 Consolidated Machine Tool Corporation of America first mortgage 20-year 7 per cent sinking fund bonds, dated June 1, and due in 1942. This issue constitutes the corporation's only bonded obligation. Its capitalization otherwise consists of $10,000,000 7 per cent preferred stock of which $6,137,000 is outstanding, and 200,000 shares of common stock of no par value, of which 128,000 shares are outstanding. The total assets of the corporation, after deducting all liabilities other than the funded debt, are placed by the management at $10,269,589, stress being put on the fact that no valuation has been placed on good-will, contracts or business connections of the company. The current assets are more than six times the current liabilities.

The Gulf States Steel Co., for the quarter ended June 30, 1922, reports net operating income of $313,740 against $34,396 in the same period last year. After allowing for all charges, including taxes, depreciation and interest, there was a balance of $225,664 against a deficit of $53,353 in 1921.

The Union Trust Co., Pittsburgh, is asking tenders as trustees on $90,000 Aluminum Goods Mfg. Co. 10-year 7½ per cent gold notes. Tenders must be received on or before noon July 31.

Vanadium Corporation of America reports for the six months ended June 30, net income of $18,566 after depreciation and depletion, against a deficit of $64,204 in the first half of 1921.

The Frick-Reid Supply Co., Pittsburgh, has given notice that it will redeem on Sept. 15 next, its $1,500,000 outstanding preferred stock at 107, and at the same time will pay a dividend of $2 per share, which will accrue from June 15, to the date of redemption. Stockholders are requested to surrender for cancellation their holdings of these shares to either the company direct, or to the Bank of Pittsburgh, N. A.

The financial statement of the Hayes Wheel Co. for the six months ended June 30, shows a net of $544,321, compared with $269,682 for the same period of 1921.

Republic Iron & Steel Profit

The Republic Iron & Steel Co., for the second quarter of 1922, reported a profit after charges of $86,382, equal to 34 cents a share on the preferred stock, compared with a deficit the preceding quarter of $712,082 and a loss of $883,679 for the corresponding quarter of 1921.

The operating profit for the June quarter was $563,053, against an operating loss of $508,447 for the similar three months of last year. Depreciation and renewal charges were $249,575, exhaustion of minerals $22,322 and bond interest $204,774.

For the first half of 1922 the company had an operating profit of $285,989, against a loss of $38,205 for the corresponding period of 1921. The deficit after charges was $625,700, contrasted with a loss of $779,062 in the similar period of the previous year.

Unfilled orders on hand June 30 totaled 196,886 tons, against 130,551 tons on March 31 and 97,265 tons on June 30, 1921.

Colorado Fuel & Iron Quarter

The earnings statement of the Colorado Fuel & Iron Co. for the quarter ending June 30, last, was encouraging in one respect; namely, the cutting down of the deficit. The company in that period showed a loss of $18,430, contrasted with a loss of $431,269 in the preceding quarter, and $273,752 in the corresponding three months last year, after providing for interest on outstanding obligations, taxes, the sinking fund and depreciation.

General Motors Earnings

Net earnings of the General Motors Corporation for the six months ending June 30 were $35,116,481. This amounts to $1.30 per share. Its net sales for this period totalled $218,490,887. After all charges, the amount available for the common stock was $26,839,391. The first quarter of 1922 showed sales amounting to $80,590,887, and net earnings $9,146,481.

Receivers for Thurlow Steel Works

The Delaware County Court at Media, Pa., has appointed receivers for the Thurlow Steel Works, Chester, Pa. It was stated in court that the company owed more than $1,000,000. It was organized in 1916 with a capital of $25,000 to manufacture machine tools to machine shells and was forced to shut down when the war ended.

Trade Changes

The Groton Iron Works, New London, Conn., has been leased by the New York, New Haven & Hartford Railroad, according to an announcement by an official of the railroad company. The strike making it impossible to get certain grades of work done was declared to be the reason for the change. The Groton concern, which employed 5000 men during the war, was recently put into a receiver's hands. Present plans are to employ about 800 men to repair locomotives which cannot be handled by the Baldwin Locomotive Works and other plants.

The National Tool Co., Cleveland, has taken over the Save-All chuck business of the Save-All Tool Co., Waltham, Mass. J. C. Dufresne has been employed as manager of the Save-All end.

Commencing Aug. 1 the Drake Hardware Co., Friendship, N. Y., will change its name to the Drake Mfg. Co., Inc.

The Conveyors' Corporation of America, 326 West Madison Street, Chicago, has appointed the Mid-West Engineering Sales Co., Masonic Temple, Cedar Rapids, Iowa, representative in eastern Iowa for the sale of American trolley carriers, which are coal handling equipment of the monorail type. J. W. Holden is manager of the Mid-West Engineering Sales Co.

J. S. Morrison Co., Oliver Building, Pittsburgh, for some years distributor in that district for rolled, forged and cast

manganese steel products, has recently added "wearite" steel to its line of wear resisting steels.

The Nilson-Miller Co., Hoboken, N. J., announces that it has changed its name to Nilson Miller Corporation.

Burt Harris, 30 Church Street, New York, dealer in iron and steel, has taken over the exclusive sales of the Mineral Oil Paint Co., Port Allegheny, Pa.

The Peck Spring Co., Plainville, Conn., maker of springs for typewriters, adding machines and the like and springs of both steel and phosphor bronze, has added screw machines to its equipment.

Plans of New Companies

[No news in regard to new incorporations is published in THE IRON AGE until it has been investigated by correspondence or by personal call.]

R. A. Lister & Co., Inc., is opening an office at 101 Park Avenue, New York. It has recently been incorporated with a capital of 1000 shares, no par value, to import and eventually to manufacture the Lister-Buston automatic electric lighting plant and other machinery. It will also be the agency of R. A. Lister & Co., Ltd., Durisley, England, which has an organization extending throughout all important parts of the world. This new branch is entirely owned and directed by the R. A. Lister Co., Ltd. of England, but it proposes to take in certain American interests which already have some knowledge of these electric plants. The directors have expressed a desire to share the advantage of American banking, and they are now open for banking connections. L. Burbidge is acting as president of the American company, which is represented by J. K. Byard, 120 Broadway, New York. The directors are: George A. Lister, president of the Canadian company, R. A. Lister & Co., Ltd., 58 Stewart Street, Toronto; L. Burbidge and H. M. Towart.

The Driscoll Mfg. Co., Brooklyn, has incorporated with a capital of $50,000, for the purpose of manufacturing wireless instruments and equipment. The directors are J. F. Driscoll, L. M. Baer and E. Levy. Address Goodman & Werner, 51 Chambers Street, New York.

The Manhattan Crown Seal Co., New York, has filed articles of incorporation with a capital of $50,000. It will manufacture metal bottle seals and kindred articles. The incorporators are C. C. Abbott, L. M. Rosenthal, Samuel Rosenthal and C. L. Hoadley. Address C. J. Austrian, 27 Cedar Street, New York.

The Monarch Appliance & Radio Corporation, New York, has been incorporated with a capital of $10,000. The Monarch vacuum cleaner is the main product, but wireless outfits and accessories will also be made. Incorporators: L. Goldberg and A. J. Kollin. Address Jacob W. Block, attorney, 186 Fifth Avenue, New York.

The Marco Metal Works, Inc., Brooklyn, recently incorporated with a capital of $20,000, will manufacture metal goods, wireless equipment and accessories. Incorporators: M. Wetztein, Max Planshaft and Robert Tow. The company's plant is equipped.

The H. & S. Automotive Corporation, New York, has been incorporated with a capital of $10,000 to manufacture automobile equipment and parts. Incorporators: H. Hegeman, C. P. Brown and O. Herrmann. Address Otto Greenberger, 368 Broome Street, New York.

The Modern Automatic Match Machinery Co., New York, has been incorporated with a capital of $10,000 to manufacture matches, match machinery and parts. Incorporators: C. B. Kinberg, S. M. Wittner and S. M. Friede. Address S. M. Wittner, 565 Fifth Avenue, New York.

Lebarron Carrossiers, Inc., New York, will manufacture automobile parts, motors and particularly bodies. Its capitalization is $10,000. Incorporators: R. S. Roberts, T. L. Hibbard and R. H. Dietrich. The company is already manufacturing. Address W. H. Ives, 38 Park Row, New York.

The Racony Corporation, New York, recently incorporated with a capital of $20,000, will manufacture wireless equipment and parts. Incorporators: F. Lewin, A. L. Hecht, Nathan Reznikoff and Julius Schoenberg, Samuel Rubin, 120 Broadway, New York.

Gillis & Geoghegan, Inc., New York, has been incorporated with a capital of $25,000 to manufacture heating and ventilating equipment. Incorporators: W. M. G. Watson, H. A. St. George and B. W. Dennis. Address Phillips & Avery, 41 Park Row, New York.

The Conly Stoker Co., New York, has been incorporated with a capital of $100,000. The main item of manufacture is an automatic traveling-grate stoker on which it is ready to receive orders. Incorporators: J. A. Conly, O. S. Magnus and J. H. Ellers, Jr. Address N. J. Toomey, 280 Broadway, New York.

The Mortimer Radio Corporation, New York, has been incorporated with a capital of $50,000 to manufacture wireless equipment and instruments. Incorporators: M. L. Newman, A. Birnbaum and L. Levy. Address Price Brothers, 261 Broadway, New York.

The Electrolock Mfg. Co., Vicksburg, Miss., has applied for a charter of incorporation which it expects to receive in a few days. Capital stock will be $100,000. This company is negotiating with several manufacturers with the idea of contracting for the manufacture and possibly the sale of the Electrolock device for locking automobiles. Representatives have been sent North with models and specifications. In case a suitable agreement for manufacturing cannot be closed the company plans to do its own manufacturing.

The B. & C. Magneto Co., New York, has been incorporated with a capital stock of $15,000 to manufacture magnetoes and kindred automotive equipment. Incorporators: J. A. Cordary, M. Cordary, and E. R. Horowitz. Address D. M. Freedman, 233 Broadway, New York.

The Squire Mfg. Corporation, 280 Madison Avenue, New York, is manufacturing under contract and distributing patented cooking articles and oil burners.

The Columbia Fence & Wire Co., Dallas, Tex., has its plant over half completed. It is in the market for machinery, such as punch machines, dies, shears and any equipment necessary to a wire fence plant.

The Binghamton Engineering Co. recently organized at Binghamton, N. Y. with A. L. Gilmore as president and Geo. H. Young as treasurer, has opened offices at 777 O'Neil Building for conducting steel and iron business. This company is specializing in the design, fabrication and erection of structural steel, and has recently closed contracts for the erection of the new Masonic Temple, Binghamton Gas Works, and some towers for the Binghamton Light, Heat & Power Co. Contracts have also been closed for structural steel for St. Paul's School, the Chevrolet Garage, a church in Port Dickinson, N. Y., the hospital in Corning, N. Y., and the Red Men's Building at Endicott, N. Y.

The John W. Flower Engineering Co., 2372 West Grand Boulevard, Detroit, has been organized to manufacture a line of water works supplies, together with a patented system of filtration and operating tables. John W. Flower, who is head of the new company, has long been identified with the manufacture of water works supplies. The company has not decided whether to make its new products in a plant of its own. Another company may be organized to conduct the manufacturing work.

The Wright Battery Co., Lynn, Ind., has been organized to manufacture batteries. The company has purchased all of the equipment it will need for the present, but is considering contracting for the manufacture of battery boxes, plates, separators, sealing compounds and other materials which enter into battery manufacture.

The Abbey-Scherer Co., Detroit, has organized a new company to be known as the Advance Wire Works, Ltd., which will engage in the manufacture of some of the products which have been made by the Abbey-Scherer Co. Later on the Advance Wire Works may erect its own building and put in its own equipment. John R. Scherer is president of both companies and other officers are practically the same.

The Reo Motor Car Co., Lansing Mich., has leased a small plant opposite the Swedish Crucible Steel Co. plant at Windsor, Ont. The leased plant is to be used by the Reo Motor Car Co. of Canada, Ltd.

The Dearborn Tractor Appliance Co., Dearborn, Mich., recently incorporated with a capital of $25,000, will manufacture some of the articles it expects to handle while others will be manufactured under contract. A little later the company may be in the market for equipment.

The Midland Electric Mfg. Co., 220 South State Street, Chicago, does not intend to build at the present time. It is manufacturing and selling an electric hair waver by contract with another firm, although it may manufacture it in the near future.

An automotive production meeting is to be held by the Society of Automotive Engineers in Detroit, Oct. 26 and 27. Papers will be read in the mornings of the days and the afternoons will be devoted to factory inspection trips, with the evening of Thursday given over to a "production" dinner.

STEEL CORPORATION EARNINGS

Second Quarter Shows Marked Improvement for Each Month

The report of the United States Steel Corporation for the second quarter of 1922 shows a comfortable increase in net earnings for the first quarter, the figures being $19,339,985 for the first quarter and $27,286,945 for the second quarter. In the first quarter the earnings increased from $4,654,134 in January to $8,505,166 in March, and in the second quarter the increase was from $7,750,054 in April to $10,712,004 in June. The deficit after the payment of dividends was $6,749,468 at the end of the first quarter and for the second quarter it was $1,462,345.

The usual quarterly dividends of 1¾ on preferred and 1¼ on common were declared Tuesday. The earnings for the first two quarters of 1922 and for the preceding years were as follows:

Quarters	1922	1921	1920	1919
First	$19,339,985	$32,286,722	$42,089,019	$33,513,384
Second ...	27,286,945	21,892,016	43,155,705	34,331,301
Third	.....	18,918,058	48,051,540	40,177,232
Fourth ...	.....	19,612,033	43,877,862	35,791,302
Net earnings each year		$92,708,827	$177,174,126	$143,813,219

Earnings for Second Quarter, 1922

	Earnings Before Charging Interest on the Subsidiary Companies' Bonds Outstanding	Less: Interest on the Subsidiary Companies' Bonds Outstanding	Balance of Earnings
April, 1922.....	$8,399,560	$649,506	$7,750,054
May, 1922.....	9,512,938	688,051	8,824,887
June, 1922.....	11,417,757	705,753	10,712,004
	$29,330,255	$2,043,310	
Net earnings			$27,286,945
Less charges and allowances for depreciation and sinking funds.....			11,067,432
Net income			$16,219,513
Deduct interest for the quarter on U. S. Steel Corporation bonds..	$4,823,158		
Premium on bonds redeemed....	200,000		5,023,158
Balance			$11,196,355
Dividends on stocks of the United States Steel Corporation, viz.:			
Preferred, 1¾ per cent.....	$6,304,919		
Common, 1¼ per cent.....	6,353,781		12,658,700
Deficit			$1,462,345

Sound Detector Promising Broad Field of Usefulness

WASHINGTON, July 25.—As the result of experiments made by the Bureau of Mines, the geophone, a novel instrument developed in the war for the detection of earth and rock sounds, promises to become an active factor in the saving of the lives of entombed miners. In tests near Pittsburgh blows with a sledge on a coal face were heard at a distance of 650 ft., with various rooms and entries intervening. On a suspended pipe line, light hammering with the knuckles was detected at a distance of 1500 feet. Ordinary talking and singing could be detected through 150 ft. of solid coal. By the use of two geophones, one instrument to each ear, it is possible to determine the direction from which a sound is coming through the earth. Tests conducted at a busy corner in the downtown district of Pittsburgh located a leak in a water main which the water company had for two weeks vainly sought to detect.

The instrument was invented by the French during the war to detect sapping and underground mining operations. It was developed by the United States engineers, and the instruments now used by the Bureau of Mines were made according to plans drawn by them, except for the introduction of different diaphragms.

MORE PLANTS SUSPEND

Six Blast Furnaces in the Valleys Coke Production Reduced

YOUNGSTOWN, July 25.—Additional curtailments in iron and steel plant operations in the Mahoning Valley are occurring due to restricted coal supplies. Five blast furnaces have already suspended in the Youngstown district, and Shenango furnace, Sharpsville, Pa., was banked July 22. Fuel shortage forced suspension July 19 of the Cherry Valley furnace at Leetonia, operated by the United Iron & Steel Co. The Youngstown Sheet & Tube Co. has reduced the number of its active by-product coke ovens, thereby decreasing coke production. Coking time of the producing ovens is being lengthened.

Steel makers are concentrating all efforts to obtain fuel and keep their properties operating. Fuel oil, gas and tar are being employed as acceptable substitutes for coal. Small quantities of coal are being shipped into the Valleys from the Pittsburgh and Connellsville regions, but the prices asked are excessive, say industrial buyers. For instance, one large consuming interest reports it was offered gas coal at Pittsburgh at $8. Some mining interests in Kentucky and West Virginia are asking from $7 to $8.

There has been little or no improvement in transportation on railroad tapping the Southern mining districts and connecting with trunk line carriers reaching the Valley district. These roads are still paralyzed by congestion.

Under the promise of Federal protection, Valley independents are considering plans to operate their Pennsylvania coal workings on a larger scale, or to resume where such mines are idle. Operators, however, believe such a move must be concerted if it is to be successful, and contend that all interests must act in conjunction.

They believe many men will go back, if assured of proper protection. Steel companies have sent representatives to the mining districts where coal shipments have been held up, in an effort to expedite such movement, but without appreciable result.

Other difficulties are likewise developing which threaten to cut into operations. The strike has interfered with operations of the Valley Mould & Iron Corporation, Sharpsville, Pa., supplying ingot moulds to Valley steel plants. Any prolonged interruption to the supply of molds will have a hampering effect on steel department operations.

Difficulty has also been encountered in getting through shipments of a fluxing stone employed extensively by Valley independents in the open-hearth process. This stone is quarried near Millersburg, W. Va., and shipments have been largely reduced, though plants have fairly abundant stocks.

In the face of active demand for lapweld and buttweld sizes of pipe, Valley makers are endeavoring to maintain production, and 15 of 17 pipe furnaces are fired this week. The Youngstown Sheet & Tube Co. is operating ten and Republic Iron & Steel Co. five.

There has been as yet less interference with semi-finished production than with pig iron, aside from suspension of the Bessemer department of the Republic company. The Ashtabula Steel Co., completing an eight-mill sheet property at Ashtabula, Ohio, has closed on part of its sheet bar requirements with a Valley independent. The company plans to begin rolling down bars in August.

The billet and blooming mill at the Sydney, N. S., plant of the Dominion Steel Corporation, are now working double shift, according to a statement issued by the British Empire Steel Corporation headquarters. This new activity will increase the working force to 2300 men. For the first time in the 22 years of its history, the Dominion Steel Corporation has successfully entered the foreign market for finished steel products. Orders are on hand for nails, barbed and galvanized wire for Buenos Aires, South Africa, New Zealand, Costa Rico, Colombia, India and British West Indies.

PERSONAL

Bertram D. Quarrie has been appointed general manager of the Otis Steel Co., Cleveland, and will have charge of the operations of the company's plants under Parker F. Wilson, who has had the title of assistant to the president and general manager. Mr. Wilson's duties will be broadened, and hereafter he will devote considerable attention to the sales department in addition to his other work. Mr. Quarrie, for the past 12 years, has been general superintendent of the blast furnaces and steel works of the American Steel & Wire Co. in Cleveland and has resigned this position to assume his new duties about Aug. 10. He graduated from Case School of Applied Science in 1903. For a time he was connected with the Grasselli Chemical Co. as a chemist, later went with the Cleveland Furnace Co., as chief chemist, and shortly afterward was appointed blast furnace superintendent of the latter company. He left that company to become assistant blast furnace superintendent of the Cleveland furnaces of the American Steel & Wire Co. For a short time, he was blast furnace superintendent of the Inland Steel Co., Indiana Harbor, Ind., but returned to the Central Furnaces as superintendent. Mr. Quarrie was appointed to his present position in 1910, when Henry A. Barren was promoted to the general superintendency of all the blast furnaces of the American Steel & Wire Co., in the Cleveland, Pittsburgh and Donora districts.



B. D. QUARRIE

O. P. Hood, chief mechanical engineer of the Bureau of Mines, sailed on July 12 for London. He will spend three months in Europe studying new developments in lignite utilization and the low-temperature carbonization of coal, for the purpose of applying the information to studies in lignite and fuel utilization now being conducted under his direction in the United States by the Bureau of Mines. Mr. Hood will visit England, Germany, Switzerland, Belgium, Holland, Jugoslavia, Czecho-Slovakia, Austria, Italy and France.

F. H. Chapin, vice-president and general manager Upson works of the Bourne-Fuller Co., Cleveland, returned a few days ago from an extended trip to Europe.

L. E. Armstrong, formerly of the engineering department of the Heine Boiler Co., St. Louis, has connected with the Bass Foundry & Machine Co., Fort Wayne, Ind.

H. G. Hoss has been appointed general manager of the Ott Grinder Co., Indianapolis. He was with the Vonnegut Machinery Co. for 11 years, and prior to that was connected with the International Machine Tool Co., both of Indianapolis.

J. A. Beaubien, formerly vice-president and general manager of the Weber Subterranean Pump Co., 50 East Forty-second Street, New York, has been made manager of the New York office of the Pennsylvania Pump & Compressor Co., Easton, Pa.

E. R. Abbott, former New York representative for the Taft-Pierce Mfg. Co., has joined the Dupont Engineering Co., Wilmington, Del., as sales representative for the Wilmington shops, recently opened to contract work.

G. C. Kimmel has been appointed consulting engineer of the Heald Machine Co., Worcester, Mass.

E. C. Rack, former assistant manager of the Precision Instrument Co., Newark, N. J., is now associated with the Johns-Manville Co., Inc. He will engage in research and engineering work in the general offices of the company at New York.

G. M. Thompson, Worcester, Mass., has resigned as vice-president and general manager Wickwire Spencer Steel Corporation, but remains as a member of the board. Mr. Thompson was president of the Clinton, Wright Wire Co. when it was absorbed by the Wickwire-Spencer Steel Corporation, and has been identified with the wire industry for more than 27 years. His health has been impaired for some time and his resignation is with a view of lightening his responsibilities.

Commander A. J. Chantry, Jr., U. S. N., has reported to the Charlestown Navy Yard, Boston, as production manager. He succeeds Commander W. B. Fogarty, who has been assigned to duty at Groton, Conn., as superintendent Electric Boat Co. Commander Chantry formerly was attached to the Philadelphia Navy Yard.

H. F. Barrus, for some years associated with the Union Twist Drill Co., Athol, Mass., has accepted a position as general manager Barrus & Cullen of London, England, and will leave Athol about Sept. 1.

M. B. Layton, a vice-president of the Manufacturers' Light & Heat Co., Pittsburgh, supplier of natural gas, has resigned and will devote most of his time looking after his private gas and oil interests.

W. B. Schiller, president National Tube Co., Frick Building, Pittsburgh, is back at his desk again after being confined in the hospital for some time recovering from an operation on his ankle.

Dr. T. T. Read, chief of the information service of the United States Bureau of Mines, has been appointed by the president of the American Institute of Mining and Metallurgical Engineers the official representative of the institute to attend the International Congress of Engineering, to be held in Rio de Janeiro, Brazil, in September. Dr. Read expects to leave for Rio de Janeiro about Aug. 15.

William S. Silpath, who for 25 years represented the Buffalo Wire Works Co. in the Philadelphia district, has become general manager of the Hub Wire Cloth & Water Works Co., Boston.

F. S. Cox, formerly assistant to the consulting engineer of the Pittsburgh Plate Glass Co., is now chief engineer of the Calorizing Co. of Pittsburgh, and will have direct charge of the Wilkinsburg, Pa., plant, in addition to other duties.

Edward Peterson has become associated with the Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa., as chief engineer. He was formerly assistant chief engineer of the Treadwell Engineering Co., Easton, Pa., and prior to that was assistant to A. F. Backlin, chief engineer of the American Steel & Wire Co., Pittsburgh.

Robert W. Appleton, production engineer of the Pierce Arrow Motor Car Co., Buffalo, has been appointed manager of purchases of that company. He will also continue his duties as production engineer. He has been identified with the Pierce Arrow factory for more than 20 years.

Earl S. Murton, who has been hot mill foreman at the plant of the Inland Steel Co., Indiana Harbor, Ind., recently was promoted to the position of assistant superintendent of the sheet department. Prior to going to the Inland Steel Co., Mr. Murton was with the Canton Sheet Steel Co., Canton, Ohio.

James C. Potter, president, the Potter & Johnston Machine Co., Pawtucket, R. I., recently returned from a trip to Europe.

W. P. Snyder, Jr., president Shenango Furnace Co., Pittsburgh, has sailed for Europe.

James H. Walsh, for 20 years superintendent the rolling department, South Chicago works, Illinois Steel Co., recently resigned that position to become as-

sistant general superintendent the Inland Steel Co., Indiana Harbor, Ind.

F. W. Carter, assistant manager the heavy traffic division, railway department, Westinghouse Electric & Mfg. Co., has resigned to become president of the Louisville Frog & Switch Co., Louisville. Mr. Carter graduated in electrical engineering from the Virginia Military Institute in 1912, and in that year entered the employ of the Westinghouse company in the graduate students' course. Between 1912 and 1916, he filled several important assignments, and then took up heavy traction work in the New York office. The Louisville Frog & Switch Co. manufactures manganese frogs, crossings, switches, signals and other railway specialties.

OBITUARY

CLARENCE H. GAY, for many years identified with the iron and steel business of New England, died June 30, at his home in Boston. He was a native of that city, born in 1833.

GEORGE W. HAMILTON, for 16 years assistant general superintendent Bay View mills, Illinois Steel Co., at Milwaukee, died suddenly of heart failure on July 20, while on a train en route to his summer home on Green Lake, Wis. He was born in Johnstown, Pa., Nov. 1, 1848, and went to Milwaukee in 1906 to take an executive post in the Bay View mills. He was prominent in Masonic and business circles.

ALBERT L. JOHNSON, president the Corrugated Bar Co., Buffalo, died Friday, July 21, at his home in Hamburg, N. Y., a suburb of Buffalo.

C. L. TOWER, New England representative the Babcock & Wilcox Co., steam boilers, died July 19 at his summer home in Allerton, Mass., in his 35th year. He was a member of the American Society of Mechanical Engineers, the Engineers' Club of Boston, and other organizations.

June Automobile Production

Figures received by the Department of Commerce show a further increase in the June production of passenger automobiles and trucks. The total production of passenger cars in June, so far reported, amounted to 261,963, compared to 231,724 in May. This is an increase of over 11 per cent for the month. The total truck production in June was 25,912 machines, compared with the revised figures of 23,803 in May.

With a few exceptions the following table represents the production of identical firms for each month including approximately 90 passenger car and 80 truck manufacturers.

Automobile and Truck Production

1922	Passenger Cars	Trucks
January	81,583	9,344
February	109,170	13,121
March	152,959	19,651
April	197,221	22,227
May	231,724*	23,803*
June	261,963	25,912

*Revised.

Examinations for the position of appraisal engineer, carrying a salary of $3,000 to $4,000 per annum, said engineer to be attached to the technical staff of the income tax unit of the Bureau of Internal Revenue, has been announced by the United States Civil Service Commission. Applicants should apply to the commission at Washington for form 2118, stating the title of the examination desired. An examination is also shortly to take place for architectural and structural steel draftsman for the lighthouse service. Applicants should apply for form 1312, stating the title of the examination desired.

UPHOLD JUDGE LANDIS

Labor Union Investigators in Chicago Submit Their Report

CHICAGO, July 24.—A special committee, composed of the presidents of the international building trades unions, which has been holding hearings here on the Landis award of last fall in the building trades controversy, with an idea of bringing about a clarification of the situation, on Saturday submitted a report which completely upholds the award and suggests a reorganization of the Chicago Building Trades Council on a basis of entire recognition of the Landis decision.

The investigation was conducted in accordance with a resolution adopted at the annual convention of the American Federation of Labor at Cincinnati early last month. As is well known, the Landis award did not find favor with a number of crafts and it is no secret that some of the contractors have been violating its precepts. Conditions have been chaotic with distinct wage scales and working conditions for union and non-union workmen. The committee finds that the trouble is due "to the failure of the Chicago Building Trades Council to meet and fulfill its moral obligation as regards its arbitration agreements and the award of its chosen arbiter, Judge Landis."

Evidently, this move toward peace on the part of the unions is not going to find ready acceptance, because James A. Patten, chairman of the citizens' committee for the enforcement of the Landis award, has come out with a statement which indicates that the committee will continue to fight for the establishment of the "open shop." Mr. Patten says: "There can be no compromise with those crafts that refused to work under the award. The open shop plan will still be in effect as to the 13 groups involved. The committee has made its decision and will not yield. The committee has brought 16,000 men to Chicago to work under the award; they will continue in their jobs."

Equipment for a Great Cleveland Building

Considerable mechanical and other equipment and steel for interior construction will be required for the new building of the Union Trust Co., Cleveland, which will be the second largest building in the world. With 1,000,000 sq. ft. of floor space, it will be exceeded in size only by the Equitable Building in New York with 1,200,000 sq. ft. of floor space. There will be 25 passenger elevators, 10 bank elevators serving six floors and three freight elevators, which will be furnished by the Otis Elevator Co. It will be a fire proof building throughout with metal doors and trim and metal window frames and sash. The building will require 1100 or more tons of galvanized steel pipe which will be supplied by the Youngstown Sheet & Tube Co. The electric conduits will take 450 tons, the plumbing 450 tons and the heating system 200 to 250 tons. A large blower fan system will be installed to provide forced air ventilation for banking rooms and lavatories. W. B. VanSickle, Cleveland, has the contract for both the ventilating and heating. Electric current for power and light will be supplied by a commercial company, but it has not yet been decided whether to put in a heating plant or to buy steam from a commercial producer. The contract for the vault doors, vault linings, and deposit boxes has been placed with the Diebold Safe & Lock Co., Canton, Ohio. These will require about 850 tons of steel, largely in alloy steel plates. The building will have 2200 doors and the hardware will cost $75,000 or more. Contracts for this will be placed shortly.

An increase in the number of employees of Milwaukee industries in June embraced additions of from 200 to 500 men each by three or four of the large metal-working concerns, according to the July issue of Business and Financial Comment, published by the commercial research department of the First Wisconsin National Bank, Milwaukee.

Machinery Markets and News of the Works

STRIKES AFFECT BUYING

Machine-Tool Business Continues in Fair Volume, However

Some Purchases Are Being Held Up Pending Settlement of Present Labor Troubles

Although July business in machine tools continues at a rate which compares favorably with that of June, it is evident that many prospective purchases are being held back pending a settlement of the labor troubles at the coal mines and on the railroads. Railroad buying, which had gotten a fair start before the shop mechanics' strike, has been checked, the railroads announcing that orders will not be placed until their present operating troubles are out of the way. Repair work on locomotives and cars has made it necessary for locomotive and car companies to add to their shop equipment in a small way, outstanding purchases being a driving wheel lathe and car wheel lathe by the American Locomotive Co. and a multiple punch by the American Car & Foundry Co. The Boston & Albany Railroad has bought a driving wheel lathe and one other machine. The Chicago, Milwaukee & St. Paul has added several items to its recent inquiries. Further purchases by the Atchison, Topeka & Sante Fe are apparently being delayed until the rail strike is settled. There is an intimation that the Illinois Central may place a few orders this week.

Municipal purchases for vocational training schools continue a fairly important factor. The Youngstown Board of Education has ordered about 25 metal-working and woodworking tools from two or three dealers, and the city of Boston is in the market for a number of tools and accessories. The Belleville Research Laboratories, Navy Department, Washington, has inquired for lathes, shapers and drill grinders, bids closing Aug. 1.

Export business is dull and the sale of a few machines to a South American country is exceptional among current export transactions.

New York

NEW YORK, July 25.

THERE are few developments of interest in the local machine-tool market. Buying of tools by the railroads has almost wholly stopped, due to the shop mechanics' strike, but business from other sources keeps up at a rate that is fully equal to that of June and in some instances is better than the June records. The American Locomotive Co., New York, has purchased a 90-in. driving wheel lathe and a 42-in. car wheel lathe, and the American Car & Foundry Co., New York, has bought a multiple punch, these companies adding this equipment in all probability to take care of the present rush of repair work on locomotives and cars. The Belleville Research Laboratory of the Navy Department, Washington, has inquired for lathes, shapers and drill grinders, bids closing Aug. 1. Export business is not active, and a sale of several machines for shipment to South America stands out as exceptional among current export transactions in machine tools.

From the standpoint of new inquiries the crane market is quiet, but several orders are pending and a number of overhead cranes were purchased the past week. The 60-ton electric crane recently asked for by the J. G. White Engineering Co. is expected to be closed during the next few days. Action will also probably be taken shortly on the 110-ton crane for a power house, which has been in the market for some time. Sales of hand power cranes are light. Business in locomotive cranes, however, is fairly active in both new and used. Among recent purchases are:

Monitor Bi-Loop Radiator Co., Lancaster, Pa., one 15-ton, 58-ft. span, one 5-ton, 47-ft. span and two 5-ton, 27-ft. span, electric cranes from the Northern Engineering Works.

Frick Co., Waynesboro, Pa., a 25-ton, 68-ft. span electric crane from the Shepard Electric Crane & Hoist Co. and a 10-ton, 74-ft. span and two 5-ton, 35-ft. span electric cranes from Maris Brothers.

[illegible] 20-ton, 50-ft. boom locomotive crane for use at Lebanon, Pa., from the Browning Co.

H. B. Streicher Co., Toledo, Ohio, a 20-ton, 50-ft. boom used Ohio Locomotive crane for Oil City, Pa., from Philip T. King, 30 Church Street, New York.

Bertoline Quarries Co., New Haven, Conn., a used Type B., Erie steam shovel from Philip T. King, 30 Church Street, New York.

Schaefs Foundry, New Orleans, a 1-ton electric traveling crane from the Northern Engineering Works.

Magnolia Petroleum Co., Dallas, Tex., one 25-ton and two 10-ton, 50-ft. spans, overhead traveling cranes from the Northern Engineering Works.

Follansbee Brothers Co., Pittsburgh, a 7½-ton heavy duty monorail hoist for Toronto, Canada, from the Northern Engineering Works.

The Air Reduction Sales Co., 342 Madison Avenue, New York, manufacturer of welding and cutting apparatus, has plans under way for new works at Birmingham, Ala. Other units will be constructed later, with total cost estimated at $250,000, including equipment.

A. L. Kushner, 15 Central Avenue, Albany, N. Y., is taking bids for a new two-story automobile service and repair building at 43-7 Columbia Street, 70 x 250 ft., to include machine shop, estimated to cost about $90,000. Howard Rogers, 443 Broadway, Albany, is architect.

The W. S. Freezer & Machine Corporation, 270 Union Avenue, Brooklyn, will install a new gas engine and subsidiary power equipment at its plant.

The Nevada Consolidated Copper Co., 25 Broad Street, New York, has plans under way for rebuilding its concentrating plant, recently destroyed by fire, with loss estimated at about $2,000,000, including machinery, electrical and power equipment. The new unit will be of like size and cost, approximately, the amount of the loss.

U. G. Stockwell, 175 Jay Street, Albany, N. Y., is planning the erection of a new automobile service and repair building, estimated to cost about $250,000.

The Murphy Garage, Inc., New York, has leased for 21 years the building now being erected on West 133rd Street, near Broadway, for the establishment of an automobile service and machine repair works. William A. Murphy is president.

Motors, controlling equipment, conveying apparatus and

other equipment will be installed in the nine-story printing plant, 60 x 103 ft., to be erected at 147-51 West Fifteenth Street, New York, by Street & Smith, 79 Seventh Avenue, publishers, estimated to cost about $1,000,000, exclusive of equipment.

The Turner-Armour Co., 567 Flushing Avenue, Brooklyn, has plans under way for a three-story addition, 62 x 300 ft., to its cabinet works on Harrison Place, estimated to cost about $65,000. John E. Nitchie, World Building, New York, is architect.

The Pyramid Iron Products Corporation, 2 Rector Street, New York, will purchase a Corliss engine and subsidiary power equipment for its plant.

The Watson Elevator Co., 407 East Thirty-sixth Street, New York, has completed the purchase of the plant and business of the Reedy Elevator Co., at 1226 Willow Avenue, Hoboken, N. J. It will be used exclusively for Watson type elevators, parts, etc. A repair and service department will be operated from this location, and a similar plant now at 407 West Thirty-sixth Street, New York, continued in operation.

The Board of Public Works, Albany, N. Y., will commence the erection of the new dam on the State Barge Canal at Crescent, about 12 miles north of Albany, and will soon begin work on a hydroelectric generating plant, estimated to cost $1,000,000. Charles L. Cadle is superintendent of Public Works, in charge.

A power house will be installed in connection with the new one-story plant to be erected on Saw Mill Road, Elmsford, N. Y., by the Horace L. Day Co., 4 White Street, New York, for the manufacture of chocolate products, estimated to cost about $250,000.

The Johns-Manville Co., Madison Avenue and Forty-first Street, New York, manufacturer of asbestos and fireproofing products, has acquired the Bennett Martin mining properties at Thetford Mines, Que., and proposes to break ground at an early date for a new plant at Asbestos, Que., estimated to cost approximately $1,000,000, including machinery. The initial works will give employment to about 300 and it is expected to have the mill ready for operation by the end of the year.

Durant Motors, Inc., 1819 Broadway, New York, has concluded negotiations for the purchase of the Locomobile Co., Bridgeport, Conn., including plant and business, for about $2,000,000, and W. C. Durant has been elected president of the company. Operations will be continued at the Bridgeport works and no immediate change, it is said, will be made.

The Tunnel Garage, Inc., 55 Thompson Street, New York, has awarded a contract to T. J. Murphy, Inc., 2 West Forty-fifth Street, for a new two-story automobile service and repair works at Broome and Thompson streets, estimated to cost about $55,000.

The American Water Works & Electric Co., 50 Broad Street, New York, operating the West Penn Co., Pittsburgh, and other light and power companies, is disposing of a preferred stock issue of $1,200,000, the proceeds to be used in connection with the acquisition of the Potomac Public Service Co., operating in western Maryland, Virginia and Pennsylvania, and for extensions and improvements in plants and system. Hobart Porter is president.

The Samcee Corporation, New York, has acquired through G. Montague Mabie, 33 West Forty-second Street, property on Columbus Avenue, between 204th and 205th streets, 100 x 200 ft., and will have plans prepared for a one-story automobile service and repair building.

Motors, conveying equipment, power and other equipment will be installed in the new one-story printing plant to be erected at Ossining, N. Y., 150 x 150 ft., by Rand, McNally & Co., 42 East Twenty-second Street, New York, with headquarters at 538 South Clark Street, Chicago. H. Lansing Quick, 18 South Broadway, Yonkers, N. Y., is architect.

A vocational department will be installed in the new three-story high school, 150 x 150 ft., to be erected at Saratoga Springs, N. Y., estimated to cost about $400,000, for which bids will be asked early in August. Coffin & Coffin, 522 Fifth Avenue, New York, N. Y., are architects. Charles L. Mosher is secretary of the school board.

The Standard Oil Co. of New Jersey, 31 Clinton Street, Newark, will build a new distributing plant, with electric station in the Silver Lake section, Bloomfield, N. J., to cost about $40,000.

The Morris & Somerset Electric Co., Morristown, N. J., has arranged for a bond issue of $200,000, the proceeds to be used for extensions and improvements.

Compounding and mixing machinery, power and other equipment will be installed at the plant of the Atlantic Tar & Chemical Works, Inc., Bayway, Elizabeth, N. J., in connection with plant enlargements. To carry out the project, the company has arranged a capital stock and bond issue for $500,000, the majority of the proceeds to be used for the expansion. George C. Lewis is president.

A bond issue of $401,000 has been approved for the erection of a new high school at West Orange N. J., to include a vocational department, exclusive of site. The latter has been secured in the Rollinson tract for $45,000. Plans will be prepared by Guilbert & Betelle, 546 Broad Street, Newark, architects. Albert Wrensch is secretary of the school board.

Walter C. Jacobs, 9 Campbell Street, Newark, operating a foundry, has commenced foundations for a new three-story plant at 63-73 Warren Street, for which contract recently was let to the American Concrete Steel Co., Essex Building. The new foundry is estimated to cost in excess of $50,000.

Herpers Brothers, 18 Crawford Street, Newark, manufacturing jewelers, are taking bids for a new four-story plant, 52 x 100 ft., at 474-76 Washington Street, estimated to cost close to $50,000. Edward A. Wurth, 207 Market Street, is architect.

Van Vleet, Inc., has been organized, with office at Hedden Place, North Fifteenth Street, Newark, N. J., to engage in auctioning, appraising and financing manufacturing plants. The officers are B. Dorf, president; S. H. Berger, vice-president; Herbert Segal, treasurer.

Chicago

CHICAGO, July 24.

REPORTS about the machine tool business in this district vary, but the more common expression is that considering the time of year and the fact that railroad buying is almost completely suspended, pending a settlement of the labor troubles, business is as good as could be expected. The Chicago, Milwaukee & St. Paul Railroad has just put out a new list, which besides a 20-ton crane, calls for two 36-in. lathes, a 28-in. shaper, 34-in. drill press, 44-in. boring mill and an 1100-lb. steam hammer. A couple of these tools were included in a list sent out some time ago. It is of interest that in its latest inquiry this road omits the suggestion that it will consider good used tools, as it did in the last previous list. The Atchison, Topeka & Santa Fe Railroad has not made any additional purchases against its list put out several weeks ago, about half of which had been placed up to a week ago. This road recently closed for a 15-ton crane for Argentine, Kan., with the Milwaukee Electric Crane & Mfg. Co., Milwaukee. Other railroad lists are dormant, although the report is heard in some quarters that the Illinois Central this week may order some of the tools it recently inquired for.

There have been no price changes the past week, and while there are occasional suggestions of an advance, there are quite as many assertions that no immediate change is likely. It is pointed out that an advance at this time could be based only on the present labor, fuel and transportation conditions, which few regard as any more than temporary.

The Radio Parts Mfg. Co., 1038 Van Buren Street, Chicago, recently incorporated for $10,000, will manufacture variometers, variocouplers and radio parts, and has leased quarters containing 3800 sq. ft., at the above address. It will buy drill and punch presses and winding machines. The officers are Joseph Zabotzsky, president and treasurer; John M. Smith, vice-president, and J. G. Zahradka, secretary.

The Vaughn Machinery Co., 531 McKnight Building, Minneapolis, recently incorporated with a capital of $175,000, is the outgrowth of the Vaughn Mfg. Co. It now has its grain cleaning machinery built, but may eventually have its own plant and will want metal and wood-working machines. The officers are T. C. Vaughn, president; James J. McCanney, vice-president, and P. H. Vaughn, secretary-treasurer.

The American Water Heater Corporation, 2838 West Twenty-first Street, Chicago, has been incorporated with a capital of 2000 shares of no par value. It will manufacture hardware and automobile specialties. Machinery sufficient for present needs has been installed. The officers are Henry Kocourek, president; Louis Aeby, vice-president, and E. F. Gillis, secretary-treasurer.

The Thermalene Gas Corporation, 413 City Bank Building, Kankakee, Ill., has been incorporated with a capital of $60,000 and will manufacture gas generators and supplies. The gas is a new hydrocarbon gas for welding, cutting,

lighting, heating and cooking. Buildings will be leased in Kankakee and all necessary equipment is on hand. The officers are S. D. Knight, president; L. Wolf, vice-president; J. S. Knight, secretary.

The Tyree Auto Radiator Co., 814 West Thirty-third Street, Chicago, incorporated with a capital of $100,000, is manufacturing radiator cores for replacement purposes for automobiles, trucks, tractors and aeroplanes and a complete radiator for Ford cars. The company proposes to build a plant later this year and will want punch presses, sheet metal machinery and specially built machinery, tools and dies. Officers of the company are R. A. Tyree, president; James S. Bradley, vice-president; Fred L. Garst, treasurer and B. M. Rowan, secretary.

The Illinois Publishing & Printing Co., Chicago, publisher of the *Chicago Herald-Examiner* and the *Chicago American*, is reported to have plans for a large printing plant where such parts of the publications as can be printed in advance may be put out. Paul Gerhardt, 64 West Randolph Street, is the architect.

W. F. Hall Printing Co., 466 West Superior Street, Chicago, has bought 14 acres between Diversey Boulevard and Kilpatrick Street, upon which it expects to erect a new printing plant at some future date.

Bids are being received by Henschieu & McLaren, 1637 Prairie Avenue, Chicago, on a 4-story packing plant, 76 x 150 ft. at the Union Stock Yards, for the Western Packing & Provision Co., 3854 South Morgan Street, to cost $170,000.

The Chicago Flanging & Pressing Co., has purchased the property of the Ketler-Elliot Co., 3121 South California Street, Chicago, comprising 43,566 sq. ft. of land, containing a one-story steel fabricating plant and office building. Plans of the purchasing company with regard to improvements and extensions are indefinite at present.

Bowie, Lydon & Co., 340 West Harrison Street, Chicago, has the general contract for a two-story brick and concrete factory for the McAdam Mfg. Co., to cost approximately $100,000.

J. P. & J. W. O'Connor, 189 West Madison Street, Chicago, have the general contract for a two-story and basement addition, 50 x 150 ft., with elevator and heating plant, for Pratt & Lambert, Inc., manufacturer of paints and varnishes, on West Twenty-sixth Street, near Princeton Avenue, Chicago, to cost $60,000.

Contracts have been placed for a two-story, mill construction, factory 40 x 130 ft. at 60 West Superior Street, Chicago, for the F. H. Smith Mfg. Co., machinists, 3047 Carroll Avenue, to cost $40,000.

The Rockford Malleable Iron Works, Rockford, Ill., has awarded contract to the Austin Co., 208 South La Salle Street, Chicago, for a new one-story foundry, 150 x 200 ft., with extension, 90 x 120 ft., estimated to cost in excess of $100,000, including equipment.

The United States Reclamation Service, Washington and Denver, Col., will receive bids until Aug. 18, for furnishing radial gates, radial gate hoists, geared hoists, operating machinery and other iron and metal work for the Riverton, Wyo., project of the department. A. P. Davis is director.

The State Board of Control, Lincoln, Neb., E. B. Fairfield, secretary, has awarded a contract to E. S. Clark & Co., York, Neb., for a new two-story industrial school at Geneva, Neb., 26 x 107 ft., estimated to cost about $50,000.

The Northwestern Paper Co., Cloquet, Minn., has awarded contract to the Siems, Helmers & Schaffner, 514 Guardian Life Building, St. Paul, Minn., for a new two-story paper and pulp mill, 200 x 500 ft., estimated to cost about $500,000, including machinery. George F. Hardy, 209 Broadway, New York, is engineer.

A power house will be constructed at the new high school to be erected at Maquoketa, Iowa, to include a vocational department, estimated to cost about $150,000. Arthur Ebeling, 810 Kahl Building, Davenport, Iowa, is architect.

A vocational department will be installed in the new three-story and basement junior high school, 160 x 200 ft., to be erected at Cedar Rapids, Iowa, estimated to cost about $400,000, for which bids will be asked early in August. Herbert Rugh, 811-13 Security Building, is architect.

The Northwest Refining Co., Billings, Mont., has plans under way for the construction of a new oil refinery at Laurel, Mont., with initial capacity of about 2000 bbl. per day. R. M. Hodgins is general manager.

The Davis-Watkins Dairymen's Mfg. Co., 130 North Wells Street, Chicago, manufacturer of dairy machinery and parts, has awarded contract to the Raulf Co., Milwaukee, for a new one-story plant, 100 x 140 ft., to cost about $75,000.

Work has been placed under way for a new one-story power house at the plant of the Star & Crescent Milling Co., 108 South La Salle Street, Chicago, at South Chicago, Ill., estimated to cost about $35,000.

Philadelphia

PHILADELPHIA, July 24.

The A. H. Fox Gun Co., Eighteenth and Windrim streets, Philadelphia, has acquired property at Eighteenth Street and Wagner Avenue, 303 x 504 ft., as a site for a new plant. Plans will be prepared at an early date.

The Badenhausen Boiler Co. and the Badenhausen Co., 1425 Chestnut Street, Philadelphia, manufacturer of power boilers with plants at Bridgeport and Cornwells, Pa., and Bound Brook, N. J., operating under a receivership, is being reorganized and will take out a State charter under the name of the Badenhausen Corporation, to manufacture boilers, tanks, superheaters, power and heating equipment. Application for the charter will be made on Aug. 7.

The Philadelphia Enameling Works, 1311 Vine Street, Philadelphia, has acquired property at 254 North Thirteenth Street, extending to 259-63 North Clarion Street, for extensions.

The N. & G. Taylor Co., 300 Chestnut Street, Philadelphia, has plans in preparation for a new power house at its tin plate works at Cumberland, Md., to include boilers, automatic stokers, coal-handling and ash-handling machinery, etc.

Louis J. Kolb, Tenth and Reed streets, Philadelphia, will build an automobile service and repair works, 56 x 90 ft., at 905-11 Watts Street. H. B. Welden, 10 South Eighteenth Street, is architect.

The Atlantic Elevator Co., Inc., Pennsylvania Building, and the Albro Clem Elevator Co., Erie and D streets, Philadelphia, manufacturers of elevators, have been consolidated under the name of the first noted company. The new organization will be capitalized at $1,020,000. B. F. Mechling, Jr., is president.

J. W. Vandegrift, Mervine and Cambria streets, Philadelphia, has awarded contract to Henry E. Baton, 1713 Sansom Street, for a two-story and basement mechanical maintenance and repair works, 111 x 226 ft., to include machine and other departments, estimated to cost about $200,000.

W. A. Breese, Philadelphia, has acquired the building, 100 x 150 ft., at Sixty-fifth and Media streets, with adjoining property, 68 x 100 ft., for an automobile service and repair works.

The Universal Service Motors Co., 1407 Locust Street, Philadelphia, has leased property at 1825-33 Market Street, 110 x 180 ft., for new branch works. Alterations and improvements will be made in the present building. The company will also commence the erection of a six-story addition to its plant at Seventeenth and Manning streets, 70 x 117 ft.

The Bureau of Water, City Hall, Philadelphia, has awarded contract to the Robbins Contracting Co., 1137 North Front Street, for the installation of coal and ash-handling equipment at the Queen Lane Pumping Station, to cost $68,350.

The Washington Plating Co., 28 South Seventh St., Philadelphia, manufacturer of plated wire, has leased a floor in the building at 141 North Third Street for extensions.

The Westinghouse Electric & Mfg. Co., Widener Building, Philadelphia, has awarded contract to the Consolidated Engineering Co., Calvert Building, Baltimore, for a ten-story factory and distributing branch, 95 x 191 ft., at Thirtieth and Walnut streets.

A vocational department will be installed in the new two-story junior high school to be erected on West State Street, Trenton, N. J., estimated to cost about $900,000. J. Osborne Hunt, 219 East Hanover Street, is architect. R. C. Belville, 9 South Stockton Street, is secretary of the school board.

The Pennsylvania Railroad Co., Broad Street Station, Philadelphia, has acquired seven acres on the Dillersville Road, Lancaster, Pa., from the Burnham Boiler Co. It will be used for new classification yards, freight houses, shops, etc., estimated to cost close to $250,000.

The Daniels Motor Car Co., Reading, Pa., is arranging to double the present plant capacity. George E. Daniels is president.

A cold storage and refrigerating plant will be erected in connection with the proposed meat-packing plant to be established at Bethlehem, Pa., by the Confederated Home Abattoirs Corporation, Portland, Me., estimated to cost close to $1,000,000, with machinery. The company is in negotiation with the Bethlehem Chamber of Commerce for a suitable site, and has opened local offices in the Odd Fellow's Building.

The W. L. Connell Coal Co., Scranton, Pa., has tentative plans for rebuilding its coal washery, known as the Enterprise Washery, at Kulpmont, Pa., destroyed by fire, July 15, with loss estimated at $30,000, including equipment.

The Topton Foundry Co., Topton, Pa., manufacturer of

iron and steel castings, etc., has work under way on a new one-story machine shop. Nathan Kline heads the company.

The Williamsport Building Products Co., Williamsport, Pa., care of Elmer Dittmar, 1603 Erie Avenue, architect, has completed plans for the erection of a new one-story factory, 57 x 164 ft.

The Harrisburg Light & Power Co., Harrisburg, Pa., has arranged for a bond issue of $4,000,000, the proceeds to be used for extensions and improvements.

The Harrison Safety Boiler Works-Cochrane Corporation, Seventeenth and Clearfield streets, Philadelphia, is completing the erection of a foundry, 100 x 352 ft., at Earnest Station, Norristown, Pa., to replace the plant destroyed by fire several months ago.

The W. S. Lehrman Pattern Works, Allentown, Pa., has removed its plant from 600 Turner Street to 15 North Church Street, where increased facilities will be arranged, including a department for experimental work in pattern design.

The Jordan Electric Co., Allentown, Pa., is being organized to conduct and operate an electric power plant and system in Heidelberg Township. Silas R. Rothermel, Allentown, represents the company.

The Standard Tank Car Co., Sharon, Pa., has plans in progress for an addition, 50 x 100 ft., estimated to cost about $70,000. It will be used for assembling.

Pittsburgh

PITTSBURGH, July 24.

A FAIR amount of new machine tool business is being closed, but the bulk of orders on which estimating has been going on for the past three or four months is held up by the coal and rail strikes. One interest states it has more prospective business on its books than at any time in three years, and expects to close most of it as soon as the strikes are settled. Inquiries all coming from coal operators whose mines are closed, and some of these will result in sales in the near future. There is also considerable inquiry from steel mills for heavy equipment, and from machine shops for lighter machine tools.

Prices are firm and most of the radial drill manufacturers advanced quotations the past week about 5 per cent. Makers of other machine tools state that with increased costs of fuel, higher labor and manufacturing costs, they will have to get more money for their tools. It is a fact, however, that when a good inquiry comes in, competition is very keen and usually low prices are named.

The only machine tool list which came out the past week was from the Pittsburgh Railways Co. and included two lathes, two drill grinders, two woodworking tools and a small bench drill.

The local office of the Shepard Electric Crane & Hoist Co. has sold to the Wheeling Bronze Casting Co. a 2-ton electric crane, and other equipment to the Greenville Steel Car Co., Greenville, Pa.

The Consolidated Light, Heat & Power Co., Huntington, W. Va., has plans for the erection of a $15,000 brick and steel building for which some new equipment will be needed.

The National Sanitary Co., Salem, Ohio, is planning to rebuild its works, recently destroyed by fire.

The General Refractories Co., Oliver Building, Pittsburgh, has acquired the plant and property of the Hayes Run Fire Brick Co., Orviston, Pa., Possession will be taken about Aug. 1. The company recently acquired the plant of the Pennsylvania Fire Brick Co., Beech Creek, Pa.

A vocational department will be installed in the new junior high school to be erected at Oil City, Pa., for which plans are being prepared by E. E. Bailey, Chambers Building, architect.

The Jones & Laughlin Steel Co., Ross Street, Pittsburgh, has filed plans for an addition to its Southside Works, East Carson Street, to cost about $50,000.

The Raymilton Refining Co., Raymilton, Pa., has plans under way for a new refinery at Mercer, Pa., to provide more than four times the present plant capacity. It is proposed to remove the latter refinery to the new location later.

The Citizens' Light & Power Co., Oil City, Pa., has arranged for a capital stock issue of $95,000, a portion of the proceeds to be used for extensions and improvements.

The Stroh Steel-Hardening Process Co., Westinghouse Building, Pittsburgh, with plant at Thirty-second Street and Allegheny Valley Railroad, has acquired the property of the Pittsburgh Knife & Forge Co., at Chateau Street and Ridge Avenue, consisting of brick buildngs on a site 68 x 100 ft., and will use it for extensions.

The Westinghouse Electric & Mfg. Co., East Pittsburgh, is arranging for the installation of shears and other equipment at its new tin works, now in course of construction at Trafford City, Pa.

The Greer & Laing Hardware Co., Wheeling, W. Va., is planning the erection of a new works at 1327 Main Street, to be five-stories, 90 x 137 ft., and estimated to cost about $150,000.

M. S. Hodges, Franklin, W. Va., has tentative plans for the organization of a company to construct and operate a hydroelectric generating plant and system on the Potomac River.

The Guyan Machine Shops, Logan, W. Va., have inquiries out for a new power boiler, 80 to 100 hp., also machine shop equipment, including band wheel, scroll saw with tilting table, etc.

The Warren Steel Car Co., Warren, Pa., manufacturer of tank cars, etc., has arranged for rebuilding a portion of its plant by day labor, replacing the structures destroyed by fire recently with loss of about $70,000. M. Mathis is general manager.

A vocational department will be installed in the addition to be erected at the Peabody high school, Highland Avenue, Black and Beatty streets, estimated to cost about $500,000. Edward B. Lee, Chamber of Commerce Building, is architect.

The Virginia Electric Co., Charleston, W. Va., formerly the Virginia Electric & Machine Works, has tentative plans for extensions and improvements in its power house and system. The company has recently increased its capital to $300,000.

The Wheeling Oxygen Co., 1130 Market Street, Wheeling, W. Va., has plans in progress for the erection of a new plant on Sixteenth Street, Warwood, W. Va. The Industrial Engineering Co., Park Building, Pittsburgh, is engineer. I. S. Scott is president.

A vocational department will be installed in the high school addition to be erected at Paw Paw, W. Va. C. R. White is secretary of the school board.

Baltimore

BALTIMORE, July 24.

The City Council, Easton, Md., has authorized plans for extensions and improvements in the municipal electric power plant, including the installation of turbo-generators and auxiliary equipment.

The Crown Cork & Seal Co., 1511 Guilford Avenue, Baltimore, has arranged for a bond issue of $4,000,000, a portion of the proceeds to be used for extensions and improvements. J. M. Hood, Jr., is president.

J. E. Moxley, Jr., Equitable Building, Baltimore, architect, has completed plans for a three-story automobile service and repair building, 42 x 125 ft., estimated to cost about $100,000. It will be owned and operated by M. S. Block, Baltimore.

The Northern Maryland Electric Co., Port Deposit, Md., is concluding arrangements for the purchase of the plant and property of the Port Deposit Electric Co. and will make extensions and improvements. To carry out the project, a bond issue of $85,000 is being arranged.

The Tin Decorating Co. of Baltimore, Boston Street and Linwood Avenue, Baltimore, manufacturer of metal specialties, has filed plans for the erection of a one-story addition, 23 x 137 ft.

The United Railways & Electric Co., Baltimore, is disposing of a note issue of $2,500,000, a portion of the proceeds to be used for power house extensions, betterments, etc. C. D. Emmons is president.

The City Council, Macon, Ga., will receive proposals at an early date for a municipal electric power plant.

A. L. Flint, general purchasing officer, the Panama Canal, Washington, will take bids until Aug. 8 for bronze seal strips, wire nails, bibb cocks, globe valves, yellow metal and other materials, for use in the canal zone.

The L. Rosenfeld Mfg. Co., 105 South Hanover Street, Baltimore, manufacturer of bakers' utensils and similar equipment, has filed plans for a new one-story factory, 46 x 147 ft. to cost about $17,000.

The Alexandria County Lighting Co. and the Arlington Electric Co., Alexandria, Va., has been merged as the Alexandria Light & Power Co., with capital of $650,000. It is planning for extensions and improvements in power plant and system.

A vocational department will be installed in the pro-

posed high school to be erected at Claymont, Del., estimated to cost $285,000. Locals of [illegible] and plans will soon be prepared.

George W. Koiner, Petersburg, Va., has organized a company to construct and operate a five-story and basement cold storage and refrigerating plant on Bollingbrook Street, totaling about 70,000 sq. ft. of floor area and estimated to cost [illegible]

The Lincolnton Creamery & Ice Co., Lincolnton, N. C., is arranging to rebuild its ice-manufacturing plant, recently destroyed by fire with loss estimated at about $100,000.

A vocational department will be installed in the new three-story junior high school to be erected at Roanoke, Va., estimated to cost about $150,000. H. Courcy Richards, 608 Chestnut Street, Philadelphia, is architect.

Fire, July 15, destroyed the plant and machinery of the Union Box & Lumber Co., West Point, Va., with loss estimated at about $75,000. It is said that it will be rebuilt.

The Charleston-Anderson Motor Co., 106 East Bay Street, Charleston, S. C., recently organized, will establish a service and repair works. A local building has been acquired which will be remodeled. F. R. Baker is president.

The Pennsylvania Railroad Co., Baltimore, and the Norfolk & Western Railroad Co., Roanoke, Va., have commenced construction of their new joint engine terminal, with shop and repair facilities, at Hagerstown, Md. The structure will provide for about 40 locomotives.

G. C. White & Son, 406-8 North Fifth Street, Richmond, Va., are planning for the installation of a number of new machine tools.

Eugene F. Bates, Greenville, S. C., has awarded contract to the Fiske-Carter Construction Co., Greenville, for a two-story automobile service and repair building on College Street.

The Rocky River Power Co., Cumnock, N. C., is arranging a list of equipment for installation in its new hydro-electric generating plant.

Morris Brothers, Greenville, N. C., have tentative plans for a new plant to manufacture bobbins and other textile mill equipment. D. L. Morris is president.

The Alsop Motor Co., 918 West Broad Street, Richmond, Va., is planning for the installation of a lathe, drill press and other machine tools.

The Suffolk Coal & Ice Co., Suffolk, Va., recently organized with a capital of $50,000, has taken over the local ice-manufacturing plant of the Crystal Ice & Fuel Co., and plans for extensions and improvements. A. E. Harvell is president.

A vocational department will be installed in the new high school to be erected at Warrenton, Va. Smith & May, Calvert Building, Baltimore, are architects.

The Munn & Griffon Co., Rocky Mount, N. C., is planning for the installation of new refrigerating and cold storage equipment.

The Virginia Machinery & Well Co., 1319 East Main Street, Richmond, Va., is making inquiries for a steel cable-[illegible]

Cleveland

[illegible] July 1

THE demand for machine tools fell off during the week and sales generally were limited to single tools. The possible effects of the coal and railroad strikes have caused some industrial concerns to delay placing orders and have also retarded railroad buying. Automobile and automobile parts manufacturers are still purchasing some equipment, but orders from this source were mostly for single machines. Sales by some local dealers during July will show a gain over June, owing to the fact that some fair sized orders which had been pending several weeks were placed this month. About 25 metal and wood-working machines for the Youngstown Board of Education, which have been hanging fire for some time, have been distributed among two or three dealers. Crane inquiries have improved somewhat, but orders are slow in closing. The Lima Locomotive Works, Lima, Ohio, will require several cranes for its proposed plant extensions.

Foundry operations in Ohio showed a slight gain July 1 over June 1, according to the monthly report of the Ohio State Foundrymen's Association. At present the foundries reporting are op-[illegible]

While the small shops are fairly busy many of the large shops are still operating at limited capacity, which accounts for the low average operations.

The Toledo Automatic Brush Machine Co., Toledo, Ohio, has been incorporated to manufacture machines for making brushes. It has a capitalization of $200,000 in preferred stock and 60,000 shares of no par common stock. It is stated that the men identified with the Kent Owens Machine Co. and the Owens Bottle Machine Co. are interested in the new organization. George P. Greenhalgh is president, and John R. Cowell, vice-president and general manager.

At a recent meeting of the stockholders of the Lima Locomotive Works, Inc., Lima, Ohio, refinancing plans for extensions were approved, the estimated cost of which is $1,500 000. Bids have been taken for an addition and the company is expected to buy considerable machinery. It is understood that it has prepared a list, but it has not yet been sent to the trade.

The Cleveland Folding Machine Co., 5200 Euclid Avenue, Cleveland, plans the erection of a two-story factory and warehouse, 96 x 180 ft., to cost approximately $100,000.

The Canton Malleable Iron Co., Canton, Ohio, is planning to enlarge its works by the erection of a building to be used for an annealing department.

The National Sanitary Co., Salem, Ohio, is preparing plans for rebuilding its factory, recently damaged by fire.

The Akron Bronze & Aluminum Co., Akron, Ohio, will add to its products the manufacture of fireless cookers.

The Standard Equipment Co., Lorain Avenue and West 106th Street, Cleveland, plans the erection of a forge shop, 60 x 200 ft.

New England

Boston, July 24.

THE city of Boston is asking quotations on one wet tool grinder, one 16-in. shaper and four 13-in. x 5-ft. screw cutting engine lathes, in addition to motor, anvil, tool-stand and vise equipment and a small list of wood-working machinery, for the Frank V. Thompson school. This is the largest individual inquiry put out the past week. The General Electric Co., West Lynn, Mas., is considering the purchase of one or two high priced single tools, more or less specialties. The Mead, Morrison Co., list, East Boston, for the production of tractors, is unfilled, and the Worthington Pump & Machinery Corporation has yet to purchase a 56-in. cold saw for its Cambridge plant, and the Boston & Albany Railroad a 90-in. wheel lathe and box facing and boring machine. Between 70 and 85 per cent of the other inquiries in the market are from small concerns, many of them new, about to engage in the manufacture of some special product. A small amount of metal-working equipment is involved in each instance. The leading New England industries are putting out few feelers on machine tools.

The largest individual sale the past week was two new 16-in. x 8-ft. lathes and 12 used machine-shop tools, including lathes, milling machines, planers, shapers and drill presses, to a Portland, Me., interest. Other sales included a new 6-ft. radial drill and an automatic tapping machine, costing approximately $1,300, to two textile companies; a new 16-in. x 8-ft. lathe and a used milling machine to a Portsmouth, N. H., firm; a used 6-in. gear cutter to a Connecticut maker of bag machinery; two 16-in. x 6-ft. new South Bend lathes to the New Bedford vocational school; a 14-in. x 6-ft. used standard lathe to a Vermont garage, and possibly a dozen small and lower priced lathes to Massachusetts and Maine garages. So far this month about 30 tools at the Bath shipyard of the Texas Co. have been sold to interests outside of New England, some of the machines being very large.

Prices on machine tools are steadier and general belief in the trade is that values will be marked up between now and fall.

Local houses reporting no sales of machine tools the past week have been compensated to some extent by an exceptionally good business in chucks, taps, dies, chasers, drills and other small tools. A New England car builder, recently taking on considerable repair work as a result of the strike,

the United Shoe Machinery Corporation, Boston, and paper cup manufacturers have been leaders in purchases of small tools, sales of which have far exceeded business booked in any previous week this year. The plumbing and fittings industries are large purchasers of threading tools.

The property of the Marine Engineering & Dry Dock Co. of Rhode Island, Allen's Avenue, Providence, will be sold in one lot at auction on Aug. 3.

The Salem Laundry Co., Lafayette Street, Salem, Mass., has awarded contract for a two-story and basement garage, 80 x 140 ft., to cost approximately $120,000.

Bids are in for a three-story, 40 x 50 ft. service station contemplated by Louis A. Blair, 27 Church Street, Cambridge, Mass.

Plans are being prepared for a water power development, including a 30 x 80-ft. power house, for the Salmon Falls Mfg. Co., Salmon Falls, N. H. Charles T. Main, 200 Devonshire Street, Boston, is the engineer.

Papers are being drawn for the organization of the Hartford Products Corporation, Hartford, Conn., capitalized for $100,000, to manufacture joints and automobile parts, and possibly brushes. Jarvis McAlpine Johnson, John F. Forward, C. M. Bigelow and Maj. Robert Woodbury are the principals.

The Hart & Hegeman Mfg. Co., Capitol Avenue, Hartford, Conn., manufacturer of electric light supplies, etc., will soon let contract for a four-story reinforced concrete addition, 52 x 181 ft. Greenwood & Noerr, 847 Main Street, Hartford, are the engineers.

The Sprague Meter Co., 203 Water Street, Bridgeport, Conn., is in the market for a used 34-in. squaring shear, for use on tin and sheet metal.

The Milford Electrolytic Iron Co., Milford, Conn., recently organized, is remodeling the factory of Page & Nettleton, recently leased and expects to start production in about two months. Laboratory equipment and new machinery will be required.

The Safety Car Heating & Lighting Co., Dixwell Avenue, Hamden, Conn., will shortly start work on a one-story brick addition, 106 x 115 ft., to its main factory. Another one-story building will also be erected, about 100 x 200 ft. Stovel & Brinckerhoff, New York, are the engineers.

Frederick L. Mills, 617 State Street, Bridgeport, Conn., will soon start the erection of a garage and service station, on the corner of State and Hansen Streets. It will be one-story, 54 x 100 ft.

In connection with general plant expansion and the operation of its new plant at Syracuse, N. Y., the Lamson Co., 100 Boylston Street, Boston, Mass., has filed articles of incorporation, under State laws, with a capital of $3,000,000, to manufacture pneumatic tube systems, pneumatic machinery and parts.

Frankel & Warshaw, 262 Atlantic Street, Stamford, Conn., are taking bids for the construction of a two-story automobile service and repair works, on State Street, with machine repair department, 85 x 90 ft., estimated to cost close to $50,000. S. Z. Levine, Gurley Building, is architect.

The Dawn Mfg. Co., Fairfield Avenue, Bridgeport, Conn., manufacturer of washing machines, is planning for the installation of new equipment. R. A. Leckie heads the company.

The Hygrade Lamp Co., Salem, Mass., is arranging for the immediate installation of equipment in its new four-story addition, 50 x 110 ft., now nearing completion. The extension will total 100,000 sq. ft. of floor space and will have a capacity of about 30,000 lamps daily.

The New Down Town Garage, Inc., Providence, R. I., is taking bids for an automobile service and repair works on Richmond Street, to include a machine shop. It will have a capacity of about 250 cars. William R. Walker & Son, Providence, are architects.

The Connery Machine & Tool Co., 4 Fisk Avenue, Springfield, Mass., has filed plans for a one-story addition, estimated to cost about $17,000.

The Eastern States Refrigerating Co., Springfield, Mass., with branch plants at Albany, N. Y., and Jersey City, N. J., has arranged for a bond issue of $1,500,000, a portion of the proceeds to be used for extensions and improvements.

The Central Railway of Vermont, St. Albans, Vt., is considering the installation of additional machine tools at its shops.

A vocational department will be installed in the new high school addition to be erected at Fairfield, Conn., estimated to cost about $160,000. O. C. S. Ziroli, Court Exchange Building, Bridgeport, Conn., is architect.

The Connecticut Light & Power Co., Hartford, Conn., is planning for the construction of a power dam and hydro-electric plant on the Housatonic River, in the vicinity of West Cornwall.

Detroit

DETROIT, July 24.

The Auto Specialties Mfg. Co., St. Joseph, Mich., manufacturer of automobile jacks, shock absorbers, etc., will take bids immediately for an addition estimated to cost about $100,000, including equipment. Davidson & Weiss, 53 West Jackson Boulevard, Chicago, are architects. J. W. Tiscornia is vice-president.

The Best Stove & Stamping Co., 145 East Atwater Street, Detroit, is planning for the installation of new pressing equipment.

C. H. Wills & Co., Marysville, Mich., manufacturers of automobiles, have established a branch plant at Sarnia, Ont.

The Par-Kar Coach Co., Detroit, manufacturer of automobiles, has acquired the plant of the Bollstrum Truck Co., St. Louis, Mich., for new works.

The Lincoln Motor Co., Warren and Livernois streets, Detroit, operated by the Ford Motor Co., Highland Park, Mich., is taking bids for a one-story addition, 250 x 800 ft. Improvements will be made also to present buildings. Albert Kahn, 1000 Marquette Building, is architect and engineer.

Officials of the Lorraine Motors Co., Beverly, Mich., are perfecting plans for the organization of a new company to take over and operate the plant for the manufacture of automobile parts and equipment. Plans for the manufacture of automobiles have been abandoned. J. L. Dornbos, Grand Haven, Mich., is secretary and treasurer in charge.

The Washtenaw Motor Co., Ann Arbor, Mich., is taking bids for a new automobile service and repair works, to cost about $75,000; 60 x 200 ft. Cuthbert & Cuthbert, 327 East Huron Street, are architects and engineers.

The Garber Machine Co., Bay City, Mich., is planning for the installation of new equipment in its machine shop and foundry.

The Packard Motor Car Co., Boulevard and Belt Line, Detroit, is having plans prepared for a one-story building, estimated to cost about $40,000. Albert Kahn, 1000 Marquette Building, is architect.

Buffalo

BUFFALO, July 24.

The Board of Education, 1401 Telephone Building, Buffalo, will take bids until Aug. 2, for vocational equipment for the public schools, including variety saw, grinder, lathes, motors, anvil, shearing machine, oven furnace and holdall. The Associated Buffalo Architects, Inc., Delaware Court Building, 232 Delaware Avenue, are architects. James Storer is secretary.

Officials of the United States Light & Heat Corporation, Niagara Falls, N. Y., manufacturer of electric storage batteries, railroad car lighting equipment, etc., have organized the United States Light & Heat Corporation of California, as a subsidiary, to erect a branch plant at Oakland, Cal. Plans are being drawn and it is proposed to commence construction early in the fall.

The Endicott Forging & Mfg. Co., North Street, Endicott, N. Y., is planning for the installation of new tools and machinery.

The Beaver Products Co., Beaver Road, Buffalo, a subsidiary of the Beaverboard Co., has acquired the plants of the American Cement Plaster Co., Port Clinton, Ohio, and other points, the acquisition comprising 12 complete mills. The new owner will continue operations and plans a number of extensions and improvements.

The plant and property of the New Process Gear Corporation, 500 Plum Street, Syracuse, N. Y., a subsidiary of the Willys Corporation, will be offered at public sale on Aug. 22. The parent organization is now in receivership, and the disposition of this plant will complete the liquidation of the physical properties.

The Oneonta Battery Co., Oneonta, N. Y., has commenced foundations for a new two-story plant, 100 x 100 ft. A complete repair department will be installed.

The Great Lakes Dredge & Dock Co., Morgan Building, Buffalo, is planning for the installation of machine tools and other equipment in a repair shop on Katherine Street.

The Rectograph Co., Inc., 307 St. Paul Street, Rochester, N. Y., manufacturer of photographic equipment, is planning the erection of a new one-story plant, estimated to cost close to $20,000.

The Associated Motor Industries, Inc., Dayton, Ohio, recently organized, has closed the plant of the Covert Gear Co., Grant Street, Lockport, N. Y., one of the divisions of the

organization, pending the change in the local management and proposed improvements.

A vocational department will be installed in the new two-story high school, 146 x 150 ft., to be erected at Perry, N. Y., for which bids are being received until Aug. 2. Gordon & Kaelber, 125 Sibley Building, Rochester, N. Y., are architects. T. H. Donnelly is secretary of the local school board.

The Fonda, Johnstown & Gloversville Railroad Co., Gloversville, N. Y., operating an interurban line, is planning for the issuance of bonds for $550,000, a portion of the proceeds to be used in connection with extensions and improvements of electric plant and system.

The Erie Mop & Wringer Co., West Commercial Street, East Rochester, N. Y., plans the installation of additional machinery.

The Lautz Marble Corporation, 861 Main Street, Buffalo, has plans in progress for a new works, estimated to cost about $85,000. Equipment for cutting, grinding, polishing, etc., and conveying machinery will be installed.

Cincinnati

CINCINNATI, July 24.

EFFECTS of the coal and rail strikes are being felt in the machine-tool industry. Last week showed a falling off in the number of orders placed with local manufacturers, and the explanation advanced is that with a transportation tie-up in prospect placing of orders would be of little benefit to the purchaser. Some buying was done, however, and while the automotive industry continued as the leader, other lines took a greater number of tools than previously.

A Wisconsin truck manufacturer inquired for four machines for immediate delivery, and a local manufacturer who quoted three-weeks' delivery was informed that the machines had to be shipped on the day the order was received.

A local manufacturer booked some orders for export, including two machines for France and three for Australia. Canada is also increasing its purchases from this country, and a local builder is in receipt of a number of inquiries from Canadian houses for tools for shipment to other countries.

An inquiry from the Mexican Government was received during the week, but until the Obregon ministry is officially recognized it is not likely that much business will be done in that country.

Local dealers report a fair demand for small tools, and used equipment is also moving in better volume.

The Board of Education, Louisville, Ky., is asking bids on an addition to the vocational school, to cost about $50,000. It will be 26 x 176 ft., two stories, and will be equipped as an automobile mechanics' and electrical shop. Woodworking and printing departments will also be installed. Bids will close Aug. 4.

Milwaukee

MILWAUKEE, July 24.

ALTHOUGH the continuance of the strike has delayed to a marked extent the purchase of machine tools by railroads, it has speeded up buying by the automotive and other metal-working interests. Purchases, however, are for one or two machines for immediate delivery and no large lots are appearing. The railroad difficulties have not had as yet any material effect on deliveries, but the production situation is apprehensive of the effect of the miners' strike. Fuel supplies here are very low, replenishment has suffered further setbacks, and the outlook is alarming unless output of coal is resumed without further delay and deliveries from lower Great Lakes' ports are speeded up.

The Nash Motors Co., Kenosha, Wis., has let the general contract to Theodore Stark & Co., 130 Muskegon Avenue, Milwaukee, for a two-story brick and steel addition, 200 x 950 ft., to the four-cylinder car division works in Milwaukee. It will be equipped for general sheet-metal working processes and open body manufacture, including also a new administration building. The project represents an increase of about one-third capacity of the addition originally planned, due to the improved prospects in the passenger car manufacturing industry. The H. K. Ferguson Co., Cleveland, is architect and engineer. B. W. Twyman is general manager of the Milwaukee Nash works.

The Acme Gas Mixer Co., Superior, Wis., manufacturing carburetion and other gas engine specialties, is negotiating with the Association of Commerce of Stoughton, Wis., with a view of relocating its plant and offices. An option has been taken on an existing building. C. A. Peterson is president.

The G. R. & S. Motor Co., Appleton, Wis., has broken ground for a two-story garage and service buildng, 48 x 90 ft., at Morrison and Washington streets. The general contractor is Earl F. Miller, Inc., local. With equipment now being purchased the investment will be about $20,000.

The Waukesha Stanchion Co., Waukesha, Wis., is a new $20,000 corporation organized by Lews K. Wilson, Harry L. Horning and S. A. Perkins, and will establish a factory for the production of steel stanchions and other metal barn and dairy fixtures.

The Milwaukee Electric Railway & Light Co., Milwaukee, through its parent corporation, the North Amercan Co., has acquired the common stock of the Milwaukee Northern Railroad, a local and interurban electric line running northward from Milwaukee 60 miles. The new owner will immediately build about 25 miles of connecting lines, purchase several new passenger and express cars, and make other improvements, according to a statement by John I. Beggs, president and general manager.

The White Rock Mineral Springs Co., Waukesha, Wis., has engaged Henry C. Hengels, architect, 445 Milwaukee street, Milwaukee, to design a power plant addition estimated to cost about $25,000, including new boilers and other equipment.

The Kewaunee Mfg. Co., Kewaunee, Wis., manufacturer of laboratory furniture and fixtures, contemplates the erection of two additions, 40 x 112 and 24 x 108 ft., to the main factory, and a lumber tempering building with a capacity of 350,000 ft. It is overcrowded with orders from high schools, colleges, hospitals and commercial and industrial institutions for equipment which will require the maximum existing capacity until May 1, 1923. C. G. Campbell is general manager.

The Sanitary Novelties Co., Eau Claire, Wis., has been chartered with a capital stock of $25,000 to manufacture milk containers and other packages for foodstuffs. A factory will be equipped at once. The principals are J. E. Llewellyn, L. C. Zarbeck and F. J. Berg, all of Eau Claire.

The Mattefs Brothers Co., Antigo, Wis., has started work on a two-story brick and mill factory, 80 x 200 ft., and is inquiring for equipment for manufacturing hardwood novelties, toys, interior trim, etc. Later a dry kiln and warehouse will be erected, and it is planned to add a sawmill unit early in 1923.

The Heath Cedar Co., Marinette, Wis., has broken ground for a two-story addtion, 50 x 100 ft., to its factory at Sherman and State streets, and will install 12 additional woodworking tools for fabricating interior finish, silo material and other specialties. Individual electric motor drive is employed throughout the plant. Earl Heath is president and general manager.

The Consumers Lumber & Coal Co., Portage, Wis., has awarded contract to the Godfrey Mfg. Co., Elkhart, Ind., for the entire equipment of a new coal storage and handling plant.

The Middle Wisconsin Power Co., Madison, Wis., has been incorporated with a capital stock of $25,000 by C. W. Kernston, William J. P. Aberg and J. B. Sanborn, to build and operate electric light and power, gas and other public utilities. Other definite information is not available, but it is stated that construction of a hydroelectric generating plant is to be undertaken before the end of the year.

The Wisconsin Public Service Co., Green Bay, Wis., principal subsidiary of the Wisconsin Securities Co., 425 East Water street, Milwaukee, has acquired the entire properties of the Oshkosh, Wis., and the Menominee-Marinette Light & Traction Co. Improvements in both properties will be made. Plans for the Menominee-Marinette division include additional hydroelectric and steam generating equipment in the Menominee main station and construction of a transmission line from the High Falls line to the Grand Rapids hydroelectric station on the Monominee River near Menominee, Mich. Specifications for the Oshkosh gas plant improvement have not been completed. Clement C. Smith, Milwaukee, is president.

The movement undertaken by a committee of Milwaukee business men, headed by Clarence R. Falk, president the Falk Corporation, to secure the proposed American aircraft establishment of A. H. G. Fokker, Amsterdam, Holland, is maturing. A $100,000 fund has nearly been raised to finance a survey of aircraft transportation possibilities throughout

the country, as well as suitable sites in Milwaukee, with land and water facilities for terminal and manufacturing establishments. Mr. Fokker has returned to Holland but expects to come back to Milwaukee in about 60 days for further discussion with the committee. Francis A. Vaughn, consulting engineer, has been appointed director of the survey.

Indiana

INDIANAPOLIS, July 21.

The Highway Iron Products Co., Ligonier, Ind., manufacturer of structural steel products, culverts, etc., is arranging for the removal of its plant to South Bend, Ind., where a site has been selected for a new plant with considerably increased capacity. The company has recently increased its capital from $350,000 to $700,000 for expansion.

The Board of Sanitary Commissioners, City Hall, Indianapolis, is taking bids until July 31, for a new one-story power plant at the sewerage disposal works, to have a capacity of about 300 hp., and estimated to cost about $250,000, including machinery. Charles H. Hurd, 1405 Merchants' Bank Building, is engineer.

A number of electric light and power companies in Indiana are planning for the construction of new generating plants and systems, as well as extensions to present plants, including the Indiana Service Corporation, Fort Wayne, estimated cost $300,000; Indiana Power Co., Vincennes, $75,000; Wabash Valley Electric Co., $50,000; the Indiana & Michigan Electric Co., South Bend, $750,000; Indiana Utilities Co., Angola, $35,000; the Spencer Light, Power, Heat & Water Co., Spencer, $12,000; the Martinsville Gas & Electric Co., Martinsville, and the Washington Water, Light & Power Co., Washington, Ind.

The Zenite Metal Co., 201 North West Street, Indianapolis, has awarded a contract to the Service Construction Co., Indianapolis, for a one-story addition, 100 x 200 ft., on North West Street, estimated to cost about $100,000, including equipment.

The Louisville Cement Co., Louisville, Ky., is planning to rebuild the portion of plant at Speeds, Ind., destroyed by fire July 13, with loss estimated at about $350,000, including equipment.

The Central Indiana Power Co., Indianapolis, formerly the Merchants' Public Utilities Co., has arranged for a bond issue of $7,500,000, a portion of the proceeds to be used for plant extensions and improvements. Joseph H. Brewer is president.

A vocational department will be installed in the new two-story and basement high school to be erected at Salem, Ind., estimated to cost about $100,000, for which plans are being contemplated by Paul Moosmiller, Ninth and Market streets, New Albany, Ind., architect.

The Hydroelectric Light & Power Co., Connersville, Ind., will make extensions and improvements in its local plant and system to cost about $200,000.

The Central South

ST. LOUIS, July 24.

The Sedalia Light & Traction Co., Sedalia, Mo., has acquired property at Broadway and Ingram Avenue for a new steam-operated electric power house. Plans are being prepared for a building 100 x 100 ft., with installation to include electric generator, switchboard, boilers, automatic stokers, coal and ash-handling machinery, etc. It is estimated to cost approximately $350,000.

A vocational department will be installed in the new three-story and basement high school to be erected at Liberty, Mo., 140 x 190 ft., estimated to cost about $125,000. C. A. Smith, 602 Finance Building, Kansas City, Mo., is architect.

The Unity School of Christianity, Ninth Avenue, Kansas City, Mo., will commence the erection of a new three-story power house and machine shop, 50 x 60 ft., estimated to cost about $50,000. Elmer Boillot, 1202 Scarritt Building, is architect.

The Standard Underground Cable Co., Westinghouse Building, Pittsburgh, will proceed at once with the erection of its new plant at St. Louis, which has been held in abeyance owing to a strike in the building trades. The plant will cost in excess of $500,000 and is expected to be ready for the installation of machinery early in the fall.

The Carthage Superior Spring Bed Co., Carthage, Mo., has abandoned plans for the time being for the construction of its proposed new plant, estimated to cost about $40,000.

The City Council, St. Joseph, Mo., is arranging a bond issue of $300,000, the proceeds to be used for extensions and improvements in the municipal electric plant, including new machinery.

The Kansas City Power & Light Co., Kansas City, Mo., has arranged for a preferred stock issue to total $5,676,100, a portion of the proceeds to be used for extensions and improvements in power plants and system.

The Federal Cold Storage Co., 3003 North Broadway, St. Louis, recently organized with a capital of $550,000, will commence the erection of a new ice-manufacturing and cold storage plant. It will have an ice-making capacity of 300 tons a day, with refrigerating equipment of 1000 tons daily, and cold storage department to approximate 15,000 tons of space. P. D. C. Ball is president, and J. P. Kelly, manager.

The Haines & Noll Co., Wichita, Kan., an interest of the Haines Tile & Mantel Co., 152 North Market Street, is planning for the installation of equipment in a building to manufacture belting, shafting, hangers and other transmission apparatus.

The Wonder State Crystal Co., Little Rock, Ark., recently organized, has plans under way for the establishment of a plant to manufacture radio equipment. John Thornburg is president, and T. A. Wright, secretary.

The Rex Auto Specialty Co., 630 North Main Street, Wichita, Kan., is planning for the installation of machine tools, etc., to manufacture automobile equipment.

The Central Power & Light Co., Pocahontas, Ark., has arranged for an increase in capital from $2,500,000 to $5,000,000, a portion of the proceeds to be used for power plant extensions and improvements.

The Empire District Electric Co., Joplin, Mo., will install a new 10,000-kw. turbo-generator at its power plant at Riverton, Mo., to replace present equipment, including new auxiliary machinery, estimated to cost close to $300,000. It will make other extensions and improvements in its plants and system, with the total expenditure in excess of $1,000,000.

A vocational department will be installed in the new junior high school to be erected at Sapulpa, Okla., estimated to cost about $175,000. Jewell Hicks, West Main Street, Oklahoma City, Okla., is architect.

The Tennessee Eastern Electric Co., Johnson City, Tenn., is arranging for a preferred stock issue of $600,000, a portion of the proceeds to be used for extensions and improvements in power plants and system.

The Henry Vogt Machine Co., Tenth Street and Ormsby Avenue, Louisville, has plans in preparation for a new three-story and basement building, 50 x 80 ft., estimated to cost about $40,000. It manufacturers ice-making and refrigerating machinery.

The Louisiana & Arkansas Railway Co., Texarkana, Ark., is taking bids for a one-story locomotive repair shop, 130 x 286 ft.; forge shop, 60 x 80 ft.; power house 17 x 35 ft.; and a number of other structures at Stamps, Ark. The installation will include 24-in. slotter, 60-in. wheel lathe, 48-in. boring machine, flat turret lathe, 48-in. car wheel borer, 24-in. shaper, double car wheel press, 4-ft. radial drill, 2500-lb. steam hammer, forge upsetting machine, bolt heading upsetting machine, 18-in. lathe, and other miscellaneous tools. Three electric traveling cranes, each about 90 tons capacity, and 65-ft. span, will be installed, as well as two 100-kw. electric generators and auxiliary equipment. Harrington, Howard & Ash, Kansas City, Mo., are consulting engineers. C. G. Lunday is vice-president and general manager.

The Kansas Gas & Electric Co., Wichita, Kan., will make extensions and improvements in its power plants and system to cost about $2,000,000.

The Gulf States

BIRMINGHAM, July 24.

The Columbia Fence & Wire Co., Dallas, Tex., is planning for the erection of an addition, 200 x 212 ft., on adjoining plot recently leased.

The Rule-Jayton Cotton Oil Co., Stamford, Tex., has acquired about 21 acres as a site for a new cotton oil mill, estimated to cost $150,000.

Fire, July 10, destroyed the power house and saw mill of the Deal-Powers Lumber Co., Vance, Ala., with loss estimated at $50,000, including equipment. It is planned to rebuild.

The Mayhew Produce Co., Brady, Tex., has preliminary plans under way for a new cold storage and refrigerating plant.

The Missouri, Kansas & Texas Railroad Co., St. Louis, has awarded a contract to the Mount Vernon Bridge Co., Kansas City, Mo., for its new locomotive shops at Bellmead, Tex., at a cost of $642,000, exclusive of equipment. The main shop will be 222 x 475 ft., with capacity of 16 engines; a number of smaller structures will be built and

with equipment will represent an investment in excess of $1,000,000.

The Hill City Mfg. Co., Tallahassee, Fla., recently organized, has secured a local building and will operate a plant to manufacture automobile tire rims and other metal specialties. George V. Stein heads the company.

The Texas Utility Co., Lubbock, Tex., will proceed with the immediate erection of additional units at its new electric generating plant, following the completion of the first section, which was placed in service July 13. A number of power lines will be constructed. The entire project is estimated to cost in excess of $250,000.

The American Ice Co., Dallas, Tex., will commence the erection of an ice-manufacturing plant on local site. All equipment will be electrically driven and a power house will also be established.

The Todd Shipyards Corporation, Mobile, Ala., has work under way on extensions and improvements at its shipyard, and expects to have the plant ready for service early in the fall. The yard will be devoted to repair operations. Headquarters of the company are at 25 Broadway, New York.

The City Council, Melville, La., is planning for extensions and improvements in its municipal electric power plant to cost about $40,000.

The Guidry Brick Co., Lafayette, La., is planning for enlargements to double, approximately, the present capacity. A. Guidry heads the company.

The Alabama Saw Mill Co., Magazine, Ala., is planning to rebuild the portion of its plant recently destroyed by fire with loss estimated at about $50,000, including machinery.

A vocational department will be installed in the new high school, 98 x 106 ft., to be erected at Newberry, Fla. Plans have been prepared. T. M. Bryan, Gainesville, Fla., is architect.

The Dillingham Ice Cream Co., Breckenridge, Tex., will build a new ice and cold storage plant, with capacity of about 65 tons per day.

The City Commission, Lakeland, Fla., has plans under way for the installation of additional equipment at the municipal electric power plant.

Fire, July 15, destroyed a portion of the distributing plant of the Magnolia Petroleum Co., Beaumont, Tex., with loss estimated in excess of $1,000,000, including stock, buildings and equipment.

The Forsechler Wagon Mfg. Co., New Orleans, has plans under way for a new two-story factory, 60 x 150 ft., estimated to cost $25,000, including equipment. Paul Andry, 840 Gravier Street, is architect.

The City Council, Vero, Fla., has plans in preparation for the enlargement of the municipal electric light and power plant, estimated to cost $40,000, including equipment.

The Consumers Ice Co. Tampa, Fla., will call for bids early in the fall for a new ice-manufacturing plant. Equipment will be electrically driven. Clyde Perry is manager.

The Electric Motor Co., 114 South Franklin Street, Tampa, Fla., has plans under way for an addition. A list of equipment is being arranged.

Canada

TORONTO, July 24

A SLIGHT improvement in the machinery market was noted last week and sales were heavier than for the two or three preceding weeks. Prospective buying for the early future looks promising, according to the inquiries being received, and it is the general opinion that a good demand for practically all lines of equipment will appear in the early fall, providing the coal strike in the United States has no serious effect on manufacturing operations this side of the border. Notwithstanding that United States railroads have been entering the market for equipment and rolling stock, nothing of this nature has developed in Canada, and it is pointed out that the various railroads in the Dominion are well supplied with equipment and that rolling stock is in good order.

The automotive industry is still buying some equipment, and dealers look for more activity from this source as soon as some of the plants under construction are nearer completion. Foundry and general iron working tools have been backward for some time, but improvement in these lines has recently been reported and prospects for the future are good. Municipal governments are entering the market for equipment for waterworks, sewage, electric and incinerator plants and companies handling these lines are busy. Woodworking tools are in active demand. Equipment for pulp and paper mills is also being purchased freely and in the past two weeks several announcements have been made of arrangements to build additions and new pulp and paper mills.

Small tools have taken another turn for the better and manufacturers and dealers report good business.

C. N. Tingle, secretary-treasurer, Hanna, Alta., will receive bids until Aug. 7 for the supply and installation of one 100-kw. generator and exciter, direct connected to a compound steam engine to be erected in the power house, one 50-kw. similar unit, two 150-hp. return tubular or water tube boilers and accessories, including mechanical stoker, switchboard and street lighting equipment, transformers and copper wire.

The Town Council, Alvinston, Ont., plans the erection of a pump house and installation of electrically operated pumps. John Irving is clerk.

The Fort William Paper Mill Co., Mission street, Fort William, Ont., will erect a mill there at a cost of $300,000.

John Gray, Collingwood, Ont., has organized the Georgian Bay Spring & Metal Co., and will specialize in the manufacture of springs for motor car and other industries.

The Lion-Mead Rubber Co. has secured an option on six acres at Wrightville, Que., where it proposes to erect a plant for the manufacture of tires, tubes and Mead valves. When in full operation it will employ between 300 and 500 men.

The planing and woodworking mill owned by McCullough Brothers, Debert Station, near Truro, N. S., was totally destroyed by fire with loss to building and equipment estimated at $35,000.

The Pacific Coast

SAN FRANCISCO, July 18.

The Southern California Ice & Cold Storage Co., San Bernardino, Cal., has plans for a new four-story ice-manufacturing and cold storage plant on Third Street, estimated to cost about $135,000, including machinery. Harold E. Jones, Katz Building, San Bernardino, is architect.

The Mariposa Mining Co., Bagby, Cal., is planning to rebuild its power house near Bagby, destroyed by fire, July 14. An official estimate of loss has not been announced.

D. D. Duncan & Co., 239 South San Pedro Street, Los Angeles, manufacturers of sash, doors, etc., are preparing plans for a new one-story factory, 107x136 ft., on Fifty-eighth Street. O. M. Warner, 220 Stimson Building, is architect.

The Consumers Ice & Cold Storage Co., 801 D Street, Sacramento, Cal., has plans under way for extensions and improvements to cost about $25,000.

The Three Lakes Lumber Co., Three Lakes, near Everett, Wash., is reported to be arranging to rebuild its saw mill and lumber plant, destroyed by fire July 11, with loss estimated in excess of $500,000, including machinery, power equipment, etc.

The Murphy Timber Co., Banks, Ore., is planning to rebuild its electrically-operated mill, recently destroyed by fire with loss estimated at about $300,000, including equipment.

The Standard Oil Co. of California, 200 Bush Street, San Francisco, is planning for the construction of a new distributing plant at Santa Paula, Cal.

The Northern Pacific Railroad Co., St. Paul, Minn., is planning the erection of a new electric power house at Glendive, Mont., to cost about $125,000.

The Economic Mfg. Co., Sacramento, Cal., manufacturer of piston rings, etc., has leased property at 115-17 Broadway, Oakland, Cal., for a new plant and will remove to the new location. F. M. Moore is president.

The Southern California Edison Co., Los Angeles, has made application to the city officials, Long Beach, Cal., for permission to build a new power house on West Third Street. Plans are being prepared.

The Cameron-Hogue Lumber Co., Portland, Ore., has plans under way for rebuilding the portion of its mill recently destroyed by fire, with loss estimated at about $40,000.

Fire, July 15, destroyed the building occupied by the Acme Pattern Works, Puget Sound Mfg. Co., and the Puget Sound Metal Works, Tacoma, Wash., causing a loss estimated at about $50,000.

NEW TRADE PUBLICATIONS

Ovens.—Paul Maehler Co., 2210 West Lake Street, Chicago. Booklet, 33 pages, 10¾ x 7½ in. Describes and illustrates the company's ovens, all of which are built sectional with the exception of small portable and muffle types. Several pages are devoted to the construction of the standard unit which includes assembling or setting up. Gas heated ovens, including indirect types, are described and specifications and dimensions given. Electrical heat and its adaptation to the ovens is outlined and includes electric heater and control equipment. A section is devoted to conveyor and special type ovens and other sections to core ovens, oven accessory and other equipment. The booklet is profusely illustrated, many views of actual installations of various types of equipment being included.

Ball Bearings.—Nice Ball Bearing Co., Nicetown, Philadelphia. Loose-leaf booklet, 4 x 7½ in., 40 pages, gives sizes, specifications and list prices of various types of the company's ball-bearings, which include the annular type, turned cone, not-ground, single and double, combination types and thrust types. Ball bearing, flat type and diamond ball retainers, ball bearing sheaves and wheels are also included. Discounts in effect as of April 15 are given.

Welding Rods & Electrodes.—Page Steel & Wire Co., Monessen, Pa. Catalog 500, devoted to Page-Armco welding rods and electrodes, giving the history and manufacture of Armco iron and various industries that use welding rods and electrodes. The illustrations include various products welded by the company's materials. Several pages are devoted to useful information, metric conversion tables, weights and measures, decimal equivalents, comparisons of wire gages, etc.

Oil Engines.—Charter Gas Engine Co., Sterling, Ill. Catalog No. 22, 56 pages, 7¾ x 10¾ in., describes and profusely illustrates the company's type "R" oil engine. The type is large and the photographic reproductions unusually adequate. Several pages are devoted to describing the details of construction with several views and cross-section views of various parts of the mechanism. Illustrations include various designs in which the engine is built and several pages are given to testimonial letters, each letter having reproductions of photographs of machines using the engines described in the catalog.

Flexible Couplings.—Thomas Flexible Coupling Co., Warren, Pa. Booklet, 14 pages, 8½ x 11 in. The company's flexible couplings for main mill drives, for heavy-duty reversing mill drives and for other service are illustrated and described, the illustrations including actual installation. What is said to be the world's largest flexible coupling, having a capacity of 10,000 hp. at 100 r.p.m. and weighing 14 tons, is shown connecting a motor to 132 in. plate mill at the Brier Hill Steel Co. Sectional views, a partial list of users, and specifications sheets, are included.

Lock Washers.—Reliance Mfg. Co., Massillon, Ohio. Catalog No. 6, 32 pages, listing various types of lock washers, both in plain and positive patterns and giving tables of washer widths, thicknesses and sizes for bolts and machine screws. For convenience, the washers are furnished in various assortments in packages of different sizes and also in a display case containing an assortment.

Boring Mills.—Colburn Machine Tool Co., Cleveland. Bulletin B-103, 12 pages, devoted to a description of the company's new heavy-duty boring and turning mills. Each unit of the mechanism is clearly described and illustrated and a phantom view of the machine shows the oil circulating system. The manipulation of the single-lever control for both feed and rapid traverse is illustrated.

Internal Grinder.—The Garvin Machine Co., New York. A four-page booklet describing and illustrating the Bright Internal grinder, a vertical spindle machine for the accurate grinding of straight round holes on a production basis.

Magnetic Chucks.—O. S. Walker Co., Inc., Worcester. Circular W-2, 16 pages, describes the company's rectangular, swiveling and vertical face type, magnetic chucks, showing various views of the chuck assembled and disassembled and in use on grinding machines. Sections are devoted to the company's improved demagnetizing switch and also to direct-current generator and demagnetizer. Specifications and dimensions of the various units included.

Gears.—Boston Gear Works, Norfolk Downs, Quincy, Mass. Catalog No. 40, 1922, 128 pages, 3½ x 6 in. Lists the various types and sizes of gears carried in stock which includes spur gears in brass, iron and steel, worm, mitre, bevel, and also spiral gears. Sprockets and steel chains are included as well as annular ball bearings and other material. Steel and iron internal gears for use with the company's new style pinion of less than 12 teeth, are also included.

Spur Gear Cutting Machines.—Newark Gear Cutting Machine Co., Newark, N. J. Catalog No. 3, 40 pages, 6 x 9 in. General information as to the operation and construction, the drive mechanism, cutter speeds and feeds, patented centralized control, indexing mechanism and other features of the machine are given at length in first part of the catalog. Other pages illustrate and give specifications of various sizes of machines, the company's No. 1 gear cutter grinding machine and the gear cutters in stock being also described and illustrated. A page is devoted to the company's gear hobbing machine for helical and herringbone gears. Many useful tables are given. The machines are classified as gear cutting machines, but are intended also for cutting sprockets, ratchet wheels, circular saw teeth and other work requiring automatic milling of this nature.

Sheet Mill Equipment.—Erie Foundry Co., Erie, Pa. Bulletin No. 90, illustrating and describing its improved line of sheet mill equipment, including galvanizing machines, leveling machines, cooling wheels, pickling equipment, acid and storage tanks and squaring shears.

Resistance Thermometry.—Brown Instrument Co., Philadelphia. Catalog which explains the theory of resistance thermometry and the various types of instruments which operate on the basis of electrical resistance, favoring accuracy and rapidity, especially for small ranges of temperature.

Steel Sash.—David Lupton's Sons Co., Philadelphia. Catalog 11 containing 191 pages and profusely illustrated with half-tones and line drawings, completely describes and shows in use, sash for all types of buildings, corrugated wire glass, shelving, bookstacks, partitions and general factory equipment. Details of construction of buildings equipped with steel sash with dimensions and illustrations of factories, power houses and other buildings so equipped are given, as well as detailed description of the sash itself, illustrated with sectional views and cross section drawings of the most suitable types of factory construction for the elimination of smoke and dust and clear ventilation.

Centrifugal Pump.—Bulletin No. 23 of the Goulds Mfg. Co., Seneca Falls, N. Y., describes the newest addition to its line of pumps, a steam turbine-driven centrifugal pump.

Broach Handbook.—The American Broach & Machine Co., Ann Arbor, Mich., has published a handbook for the purpose of placing information on broaching, broached fittings and standard broachings, their use and care, before engineers, superintendents, draftsmen, purchasing agents and others interested in broaching operations.

Power Press Attachments.—The V. & O. Press Co., Glendale, Long Island, N. Y., Bulletin No. 6-B, which covers automatic attachments for V. & O. presses.

Track Specialties.—The Track Specialties Co., 29 Broadway, New York. Booklet illustrating and describing its line of "Trasco" devices, which include practically everything for steam and electric railroad tracks.

Wiring Devices.—The Weber Electric Co., Henry D. Sears, general sales agent, 80 Boylston Street, Boston. Illustrated booklet of 104 pages covering a large line of electric wiring devices.

Trane Data.—The Trane Co., vapor heating equipment, pumps, etc., La Crosse, Wis. This seventh edition of bulletin 11 has 24 pages, 6 in. x 9 in., printed in three colors and is filled with information, tables and blueprints relating to this application of low pressure steam heating systems. It illustrates also a number of heating specialties manufactured by the Trane Co.

Lighting Data.—Edison Lamp Works of the General Electric Co., Harrison, N. J. Additional bulletins of a series being published to cover eventually all phases of the lighting problem "Effect of Color on Walls and Ceilings on Resultant Illumination," "Fundamentals of Projection" and "The Lighting of Small Stores" are the titles. Out-of-date bulletins in the series are being replaced constantly by revised issues, and the researches of one kind and another have been thoroughly worked up, are accompanied by diagrams and illustrations and are full of information of interest to users of artificial light.

Boiler Feed Water Regulator.—Northern Equipment Co., Erie, Pa. A 20-page illustrated booklet, 8 in. x 11 in., covering boiler feed control in general and describing the Copes system of control. The subject has been treated in a way to cover the subject of boiler feed water regulation completely and yet very briefly. Free use has been made of graphical methods of presentation: charts showing the effect of feed water regulation on water input, steam output, feed water temperature, etc., also other charts, photographs, etc., are used.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossbile to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

	Per Lb.
Bars:	
Refined iron bars, base price	2.73c.
Swedish bars, base price	7.00c.
Soft steel bars, base price	2.73c.
Hoops, base price	3.78c.
Bands, base price	3.38c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	2.83c.
Channels, angles and tees under 3 in. x ¼ in., base	2.73c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	2.73c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	2.83c.
Toe-calk, ½ x ⅜ in. and larger	3.50c.
Cold-rolled strip, soft and quarter hard	6.25c. to 7.25c.
Open-hearth spring steel	3.50c. to 6c.
Shafting and Screw Stock:	
Rounds	3.35c.
Squares, flats and hex	3.85c.
Standard cast steel, base price	12.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	2.83c.

Sheets

Blue Annealed

	Per Lb.
No. 10	3.78c.
No. 12	3.83c.
No. 14	3.88c.
No. 16	3.98c.

Box Annealed—Black

	Soft Steel C. R., One Pass, Per Lb.	Blued Stove Pipe Sheet, Per Lb.
Nos. 18 to 20	4.00c. to 4.30c.	.....
Nos. 22 and 24	4.05c. to 4.35c.	4.60c.
No. 26	4.10c. to 4.40c.	4.65c.
No. 28	4.20c. to 4.50c.	4.75c.
No. 30	4.45c. to 4.75c.	.....

No. 28 and lighter, 36 in. wide, 10c. higher

Galvanized

	Per Lb.
No. 14	4.30c. to 4.60c.
No. 16	4.45c. to 4.75c.
Nos. 18 and 20	4.60c. to 4.90c.
Nos. 22 and 24	4.75c. to 5.05c.
No. 26	4.90c. to 5.20c.
No. 27	5.05c. to 5.35c.
No. 28	5.20c. to 5.50c.
No. 30	5.70c. to 6.00c.

No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
⅛ in. Butt	56	—40	¾ in. Butt	—30	—13
¾ in. Butt	—61	—47	1½ in. Butt	—32	—15
1-3 in. Butt	63	—49	2 in. Lap	—27	—10
3½-6 in. Lap	—60	—46	2½-6 in. Lap	—30	—15
7-8 in. Lap	—56	—34	7-12 in. Lap	—23	— 7
9-12 in. Lap	—55	—33			

Steel Wire

Base Price* on No. 9 Gage and Coarser	Per Lb.
Bright basic	3.50c. to 3.75c.
Annealed soft	3.50c. to 3.75c.
Galvanized annealed	4.25c. to 4.50c.
Coppered basic	4.00c. to 4.25c.
Tinned soft Bessemer	5.50c. to 5.75c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	17¼c. to 18 c.
High brass wire	18¼c. to 18½c.
Brass rod	15¼c. to 16¼c.
Brass tube, brazed	24¼c. to 25 c.
Brass tube, seamless	20½c. to 21 c.
Copper tube, seamless	22¾c. to 24 c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 21¼c. to 22¼c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14-20	
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	Primes	Wasters
		80 lb.	$6.05 $5.80
		90 lb.	6.15 5.90
		100 lb.	6.25 6.00
IC. $10.00	$8.50	IC.	6.40 6.15
IX. 11.50	10.00	IX.	7.40 7.15
IXX. 13.00	11.25	IXX.	8.40 8.15
IXXX. 14.25	12.50	IXXX.	9.40 9.15
IXXXX. 16.00	14.00	IXXXX.	10.40 10.15

Terne Plates

8-lb. coating, 14 x 20

100 lb.	$7.00
IC	7.25
IX	7.50
Fire door stock	9.00

Tin

Straits, pig	33½c.
Bar	40c. to 44c.

Copper

Lake ingot	15¼c.
Electrolytic	15 c.
Casting	14¾c.

Spelter and Sheet Zinc

Western spelter	7¼c. to 7¾c.
Sheet zinc, No. 9 base, casks	8½c. open 9c.

Lead and Solder*

American pig lead	6¾c. to 7c.
Bar lead	8c. to 8½c.
Solder, ½ and ½ guaranteed	25c.
No. 1 solder	23½c.
Refined solder	20¼c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	75c.
Commercial grade, per lb	35c.
Grade D, per lb	25c.

Antimony

Asiatic	6½c. to 7c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb. 25c. to 27c.

Old Metals

Business was not active this week but values are generally unchanged. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy crucible	11.75
Copper, heavy wire	11.25
Copper, light and bottoms	9.00
Brass, heavy	6.25
Brass, light	5.25
Heavy machine composition	8.50
No. 1 yellow brass turnings	6.25
No. 1 red brass or composition turnings	7.75
Lead, heavy	4.50
Lead, tea	3.25
Zinc	3.25

THE IRON AGE

New York, August 3, 1922

ESTABLISHED 1855 VOL. 110, No. 5

Problems in Localized Case Hardening

Low Carbon Machine Steel Used—After Carburization and Annealing, Material to Be Removed Machinable and Not Distorted in Subsequent Hardening

BY R. A. MILLHOLLAND

IN the problem of localized case hardening the manufacturer often confronts losses incurred through experimental expense and defective results.

Localized case hardening, as the writer uses the term, is the production of case hardened parts that have certain areas which from necessity or for reasons of subsequent machining operations must be kept in a machinable state. A characteristic example taken from the writer's experience is to be found in the manufacture of master collet hoods for screw machines. This part is a member of a screw machine which fits on the end of a screw machine spindle. Into it is forced the collet nose employed to grip the stock. It is readily seen that this hood must be accurate or the collet will not chuck the stock concentrically. For many obvious reasons this part must be hardened and ground to obtain the best results.

The method that would be usually employed would be to finish the hood with allowance for the usual grinding and chasing the thread before hardening. This method, however, is poor practice and leads to many difficulties. The principal ones are: Distortion of the thread lead and the added expense of lapping threads that shrink in hardening.

One of the Problems Stated

Since it was predetermined that the hoods were to be hardened, it was decided that the hoods be made of low carbon steel and afterward case hardened to a depth of about 3/32 in. The case-hardening method was decided upon because it was cheaper to machine the hood from a soft steel and also because localized case hardening could be employed.

In making the first hoods the usual mistake was made; that is, the hoods were machined, allowing stock for grinding, and the threads were chased before hardening. Right there the trouble started, for after the hoods were hardened and ground to size, it was found that some of the threads had shrunk and considerable expense was experienced in lapping in order to fit the gage. Other threads expanded and the parts were a total loss. In still another case the lead of the thread changed so badly that lapping was impractical and these pieces were also a loss. It became very evident that the cost of manufacture was excessive, and, coupled with the excess expense, it was found that no two hoods would chuck a test bar alike even when the same collet was employed. This lack of uniformity was alarming, and after considerable experimental expense the trouble was found in the distortion of the threads.

Once having established the cause, the remedy was the next step. Strange as it may seem, this was not as easy as it now appears. Several methods were available; one was to quench the nose of the hood and leave the thread soft, but this was discarded, as it gave unsatisfactory results. Another method was to use clay packing or copper plate on the thread diameter and not chase the thread until after hardening; but in spite of all that could be done hard spots showed up that made the threading operation too expensive, and even with the utmost care the hard spots affected the lead to such an extent that fault showed up when the test bar was chucked and indicated. Finally the solution to the difficulty came by the process of elimination, and the following method was employed with splendid results and with a minimum manufacturing expense:

Method Employed

The hoods were machined in the regular way except that on the threaded diameter there was left ¼ in. of stock and on the back face ⅛ in. of stock and the threading operation was omitted until after the carburizing operation. The hoods were then sent to the heat-treat department and the proper penetration of carbon was given with no attention being paid to localizing the carbon. After the hoods were properly carburized they were allowed to cool in the pots and therefore were in the annealed state and quite machinable. In this soft state the hoods went back to the machine shop, and the carburized area on the thread diameter and the back face of the hood were turned off. This turning operation removed all the high carbon steel on the thread area, and when the hoods were subsequently heated and quenched the thread area remained soft and quite machinable, while the remainder of the hood was as hard as could be desired.

The grinding of the hoods was purely a mechanical operation, the accuracy of which was controlled to a nice point. After the grinding operations, the hoods were chucked, indicated for concentricity, and the threads were chased in the soft machine steel without difficulty. This was possible because it is a well-known fact that low carbon machine steel does not harden perceptibly at the temperature which hardens the outer case of a high carbon content. Needless to say the result was a very uniform product with unsurpassed accuracy and interchangeability.

How a Second Problem Was Met

Another case that came to the writer's attention afterward was handled on the same plan and gave perfect results with no experimental expense. A large fixture required a number of long parallel strips that had to be hardened and ground. These strips were lo-

cated with dowel pins and held in place with filister head screws, the threads being in the strips.

In the light of past experience it was readily seen that if the strips were drilled and tapped before hardening that distortion of the strips in hardening would throw the alinement of the hole in the strips out of relation to those in the body of the fixture. With this in mind the tool room was ordered to make the strips from low carbon machine steel of about 0.10 to 0.20 per cent carbon and to send them to the heat-treating department before drilling and tapping in place. Instructions to the heat-treating department were that the strips were to be carburized to the proper depth and allowed to cool in the pots. This left them in the soft state, and upon being returned to the tool room, the carburized area on the bottom side of each strip was machined off and plainly marked to that effect. The strips were again sent to the heat-treating department and hardened. This method left the side of the strips that was faced to the fixture dead soft and readily drilled and tapped. The strips were then ground, assembled in place, drilled, tapped and reamed for dowel pins without the slightest difficulty. The result was very satisfactory because the holes in the strips matched perfectly with those in the body of the fixture and precluded the possibility of poor alinement due to changing of the relation of the holes in hardening.

The application of this method of localized case hardening is very wide, but the method involved applies to them all. Saving is effected in many ways; namely, using low-priced steel as compared to the cost of high carbon non-shrinking steel, lower machining costs and elimination of losses from breakage or distortion in hardening.

Stainless Steel in Mining

A paper on "Stainless Steels" was presented at the summer meeting of the Institution of Mining Engineers at Sheffield, England, by Dr. W. H. Hatfield, head of the Brown-Firth Research Laboratories. The London *Ironmonger* gives this summary:

The author asserted that the mining industry has not taken the best advantage of the development in steel metallurgy during the last 40 years. The industry is based on mild steel, and from a commonsense point of view probably it is right. But in the development of armaments, aircraft, automobiles and many other present day applications of steel, there has arisen a series of steels having much greater strength coupled with a considerable and sufficient ductility, which might be applied in different directions in the mining industry.

There are many items which could economically be manufactured of stainless steel, for instance, boiler fittings, pump rods, pump cylinder liners, valve parts for steam, water or air, impeller blades, rotary pumps, fan blades, pins for lifting apparatus, hooks, shackles and pins for coal conveyers, weighing machine parts and gauze for safety lamps. Wire ropes made from stainless steel are costly, but they have a definite application under certain conditions. Experiments have been carried out with rustless ropes, and he thought that shortly such ropes will be used in collieries. Springs are being manufactured successfully from rustless material.

International Conference of Cost Accountants

The preliminary program of the third international cost conference to be held under the auspices of the National Association of Cost Accountants in Atlantic City, Sept. 23 to 28, inclusive, lists the following among the subjects for discussion: "Actual Costs as Compared with Replacement Costs," "Sales and Administration Costs," "Standards as a Means of Reducing Costs," "The Place of Costs in Business Management," "Cost Problems of Specific Industries—Steel and Textile Industries."

The National Association of Cost Accountants has 20 chapters in different cities in the United States and Canada, and one recently established in Hawaii.

Drop Forging Meeting in October

The American Drop Forging Institute will hold a convention in Detroit on Oct. 3, 4 and 5, concurrently with the convention of the American Society for Steel Treating. It is planned to hold two joint sessions of the two bodies.

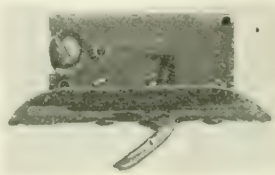
A few months ago the institute and the former American Drop Forge Association joined forces, all members of the latter body becoming automatically members of the institute until July 1. At that time they were given an opportunity of becoming either associate or executive members of the institute according to their eligibility.

Executive members are those whose principal drop forging business is the manufacture and sale of drop forgings to other than affiliated companies, while associate members comprise those who manufacture drop forgings chiefly for their own use. Associate members join with the executive members in regional group meetings held periodically to consider matters of common interest to all producers of drop forgings for whatever purpose, as well as in the annual convention. Executive members in addition meet five times a year to consider questions primarily of interest to the commercial forger only.

It has been decided that all producers of drop forgings will be asked to participate in the October convention on exactly the same basis as active members of the institute. With the added attraction of the concurrent proceedings of the American Society for Steel Treating and the international steel exhibition the largest attendance of any drop forging convention is expected.

New Switches for Electric Tool Handles

Two new types of compact electric tool and appliance switches have been brought out by the Cutler-Hammer Mfg. Co., Milwaukee. One, designated as the No. 7037 switch, is of the momentary-contact type for installation in the handle of such tools as drills. It is placed so that when the tool is gripped the forefinger rests on the trigger pressure which turns on the current. A return spring causes the trigger to return to the "off" position so that when the grip is released the switch automatically cuts off the current. Long phosphor-bronze contacts of generous proportions and a wiping motion are features intended to add to the serviceability of this equipment.



When the Grip Is Released the Switch Automatically Cuts Off the Current

A No. 7039 switch having a different form of operating lever with no return spring has also been developed for use in vacuum cleaners and similar appliances where the switch is to remain in the "on" or "off" position until moved to the other.

Boston pig iron interests have organized as the Iron Monger League, Puritan Charter, with E. Arthur Tutein, president; J. O. Henshaw, vice-president, and W. J. Lavelle, sales manager New England Coal & Coke Co., secretary and treasurer. The chapter held its initial outing on Wednesday, July 19, at the Winchester Country Club, Winchester, Mass., as guests of Mr. Tutein.

Anti-Friction Bearings in the Steel Mill

Development of Ball and Roller Bearings—Considerations Affecting Their Use—Advantages and Disadvantages

BY A. M. MAC CUTCHEON*

ELIMINATION of friction has always been a most fascinating study in all branches of engineering. The use of rollers under a block of stone was known to the ancient Egyptians. Wheels used on chariots marked the first development in changing rolling friction, between the ground and the weight, to rubbing friction in an axle. Crude ball bearings were first considered about 1862 to 1870, the Patent Office files showing several patent applications at about this time. But the first practical applications came in the early nineties, with the use of the cup and cone bearings on bicycles.

Indeed, the history of the anti-friction bearing is closely identified with the development of the bicycle and the automobile. This industry furnished the stimulus for intensive effort toward the production of a bearing more general in its application.

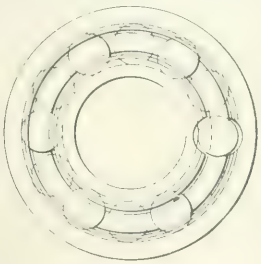


Fig. 1. Slot Assembly of Balls

The first type of annular or ring ball bearings was developed about 1901, based upon investigations made by Professor Strybeck. The annular bearing consists of two independent concentric rings, of practically rectangular section, and with grooved raceways in the outer surface of the inner ring and the inner surface of the outer ring. In this groove a row of balls is placed, and the whole is a self-contained, non-adjusting bearing. It was recognized that, theoretically, the annular bearing should contain as many balls as the space permitted. The number of balls which may be introduced into any bearing is intimately connected with the method of assembly, which will be discussed in greater detail under the various types of bearings. One method, with a slot in the side of the bearing, permits the maximum number of balls, but breaks the continuity of the race, and usually necessitates a shallower groove.

In another method, the Conrad patent, the introduction of the balls takes place by means of an eccentric displacement of the rings in relation to each other. The number of balls which may be introduced is limited, but the raceway is continuous and deep grooves may be used.

One type of bearing, which has been very largely used, was developed with a roll not solid but made up of a spiral. Considerable difficulty was experienced with the misalinement, and the consequent stresses not anticipated in the design. In 1906 a native of Sweden invented a two-row annular bearing with a self-alining feature, which it was claimed eliminated the sensitiveness to misalinement. Another claim for the double-row bearing is the increased number of balls which may be introduced in such a bearing.

In 1905 the first commercial application of annular ball bearings was made in America, although these bearings had been previously used abroad. The application was on a marble polishing machine for the Empire City Iron Works, in Long Island, and proved satisfactory. At about the same time, ball bearings were first applied to electric motors, and the two electrical manufacturing companies who were the pioneers in the use of ball bearings for motors are still using them.

In 1905 ball bearings were being favorably considered by the automobile industry, and during that year they were applied to the transmission of a 50-hp. Thomas flyer. In 1906, an Apperson car, built for the Vanderbilt Cup race, had its transmission so equipped. In 1910 one machine tool company exhibited at Atlantic City and elsewhere a vertical spindle drill press mounted on ball bearings, which drove a 1½-in. drill through 31 in. of cast iron per minute, and a 3½-in. drill through 11½ in. of metal per minute. This, of course, meant a very heavy end thrust on the bearings. Also, in 1910, ball bearings were used to take the thrust on belted vertical milling machines.

It is interesting to know that ball bearings have been used, also, on power punch presses, where there is undoubtedly a very heavy shock condition. The claim is made that, on such a press, the use of anti-friction bearings decreased the idle stroke power 54 per cent and the working stroke power 20 per cent, and that the power saving for the complete cycle was 40 per cent. Nineteen hundred and ten marked another interesting application of anti-friction bearings to a cold saw, which ran at 4100 r.p.m. Plain bearings had required renewal about once in three weeks, with consequent shutting down of the machine. Twenty hp. was required to drive the saw when equipped with oil type bearings, and water cooling was employed. After the change in the bearings, a 7½-hp. motor was substituted for the 20-hp., and there is no evidence of further bearing trouble.



Fig. 2. Conrad Eccentric Assembly of Balls

In the catalog published by one anti-friction manufacturer is listed a bearing ½-in. outside diameter and weighing a few ounces, while the largest is over 19 in. outside diameter and weighs approximately 300 lb. Special large radial bearings have been made by this company, having an outside diameter of 32¼ in. and a bore of 15¾ in. This bearing, fitted with 34 balls 4¼ in. in diameter, has a total weight of 1000 lb. and will carry a weight of 80 tons at 100 r.p.m.

Many types of anti-friction bearings are being manufactured, to some of which reference has already been made. A classification, with examples of each type, is given, but the information is not complete.

1.—BALL BEARINGS

(a) Annular type with deep grooves, balls assembled by eccentric displacement of the races.

Hess Bright Ball Bearing Co.
Fafnir Ball Bearing Co.

*Chief designing engineer, Reliance Electric & Engineering Co., Cleveland. Abstract of a paper read before the Association of Iron and Steel Electrical Engineers.

(b) Annular type with balls assembled through filling slots, permitting of a large number of balls.

Standard Roller Bearing Co.

(c) Annular type with balls assembled by expansion of the outer race under heat, permitting of a large number of balls.

Gurney Ball Bearing Co.

(d) Annular type with a double row of balls, permitting of a larger number of balls.

New Departure Ball Bearing Co.

(e) Annular type with a double row of balls and self-alining features.

S K F Ball Bearing Co.

2.—ROLLER BEARINGS

(a) Self-contained, with the inner and outer races forming a cage for the rolls; rolls assembled through filling groove.

Rollway Roller Bearing Co.

(b) Semi-flexible spiral roll assembled between end cages, and with the outer and inner races slipped over and within the rolls, permitting easy disassembly, but not capable of taking end thrust.

Hyatt Roller Bearing Co.

(c) Tapered rolls assembled between end cages, and with tapered races, permitting easy disassembly, taking end thrust, and making possible adjustment for wear.

Timken Roller Bearing Co.

Practically all types of ball and roller bearings are assembled with end cages, which maintain the proper relation in position of the ball and rolls. The proper design of these end cages is as necessary as the proper design of the rest of the bearing.

Manufacture

This is a highly specialized industry requiring special machinery, special materials and special operation. All bearings must be subjected to rigid inspection and test. The three most important properties which a finished anti-friction bearing should possess are (1) high fatigue limit and strength; (2) high resistance to shock; (3) highest possible resistance to wear.

Each bar of steel used in the manufacture of balls or rolls and races is tested. The steel must possess in the highest degree the qualities of hardness, toughness, durability after hardening and resistance to shock. The best balls are made of chrome alloy steel and carefully heat treated. They are hardened clear through, which makes the steel tough and less liable to crack under excessive load. They must be as spherical as it is possible to make them. The best grade balls are ground to size within 0.0001 in., an accuracy necessary to secure uniformity in size, and consequent even distribution of the load. The manufacture of a ball involves eleven main operations, as follows:

1.—[illegible] of steel stock.
2.—Forging or pressing in dies into rough spheres.
3.—Annealing to eliminate internal strain.
4.—[illegible]
5.—Second heat treatment; the balls are hardened, and then drawn, to toughen the steel.
6.—[illegible] to a fairly smooth surface, and more accurate spherically, but still considerably oversize.
7.—Precision grinding with fine grade wheels and heavy oil [illegible] to size desired.
8.—Final grinding in Hoffman machine, in which the balls are ground to within a small fraction of the finished [illegible].
9.—Polishing balls in a tumbling barrel.
10.—Burnishing the balls, by which the surface is polished to a mirror finish.
11.—Final inspection and test for hardness, sphericity and size.

The balls are gaged with special machines calibrated with special care, and by the use of an instrument with which it is possible to determine the size to an accuracy within 0.00005 in. The same care is exercised in the manufacture of the races. One bearing manufacturer considers it necessary to manufacture his own steel, because of the exacting specifications. The steel tubes of which the races are manufactured are formed by forcing a pointed steel tool through the entire length of a steel bar, which results in a tube free of welds, laps or seams, and which has a uniform strength and texture on its entire circumference. The tubes are finally cold drawn to size, within a very close limit.

Selection of Anti-Friction Bearings

If anti-friction bearings are applied to motors, close co-operation is essential between the motor manufacturer and the ball bearing manufacturer. Several years ago the electrical engineer of an eastern railroad advised selecting a bearing two sizes larger than indicated by a consideration of the load which the bearing was expected and guaranteed to carry. He attributed the entire absence of trouble on car lighting outfits to the following of this plan.

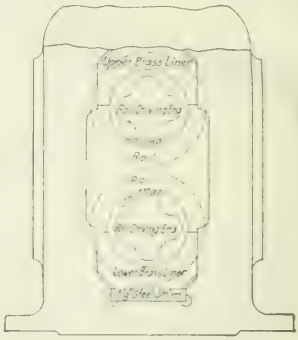
In justice to the manufacturer of the anti-friction bearing it should be stated that, since that time, exhaustive study has been made of the requirements of anti-friction bearings applied to motors, so that they are in a far better position to-day than at that time to specify the safe working load for the bearing. From many sources information has been received that, if the bearing is selected large enough and properly applied, no failure will result. This undoubtedly is an extreme view, but is interesting as evidence of the confidence which some users of anti-friction bearings have in this type.

(To be continued)

Saving Rolling Mill Brasses

BY M. E. DUGGAN

Worn journal brasses often cause rolling mill spindles to drop at the roll end below the level of the power end. When this occurs, considerable friction results in the spindles and couplings. While poor lubrication aggravates this condition, there is, nevertheless,



A ¾-In. Steel Shim in Place at Bottom of Housing

something radically wrong with a noisy drive, and as a rule mill operators take prompt measures to correct it.

A usual remedy has been to replace the journal brasses, which resulted in the scrapping of worn and even slightly worn brasses long before they had become unserviceable.

A steel riser block placed under each liner, as shown in the sketch, will help to keep the rolls up to pretty near the normal level line, thus eliminating much of the friction. These blocks or plates can be made in sets varying in thickness from ⅜ in. up, thus getting all possible wear from the brasses. The roll can be raised and lowered with the traveling crane by means of a sling under the bottom roll.

The Southington Hardware Co., manufacturer of hardware, screws, etc., Southington, Conn., at its annual meeting last week, elected the following officers for the coming year: James H. Pratt, president; William E. Smith, secretary; and F. M. Gridley, treasurer. The directors chosen were: Ex-Governor Marcus H. Holcomb, Charles Hopkins Clark, Cyrus C. Chamberlain, Bradley H. Barnes, William E. Smith and W. P. E. Vierning.

The Norwalk Iron Works, South Norwalk, Conn., and the Automatic Carbonic Machine Co., Peoria, Ill., have combined, the new organization to have a capitalization of $1,500,000. C. L. Thompson of South Norwalk, will become president. Each company shall continue manufacture of machinery as previous to the merger. This includes oxygen and hydrogen compressors, air compressors and refrigerating machinery, both for ammonia and carbonic acid gas.

Factors in Oil Burning Using Cold Air*

Study of Different Conditions of Air Supply with Comparisons of Cost—Regenerative Furnaces and Steam Boilers Not Considered

AIR for use in oil burning practice is divided into three general classes: *A*, volume air at pressures below 12 oz.; *B*, positive air at pressures of 12 oz. to 2 lb.; *C*, compressed air at pressures above 2 lb.

Velocity when discharging against atmospheric pressures and temperatures is shown to be approximately 70 ft. per sec. at 1 in. water pressure, and on the basis that four times the pressure will double volume, the velocity at 1 lb. pressure is approximately 350 ft. per sec. and at 80 lb., 3200 ft. per sec.

Velocity has two general functions in oil burning: To atomize the fuel, and to induce the greatest amount of atmospheric air consistent with good burner, setting and furnace design.

Velocity for Atomizing by Air

Good atomizing by air action with satisfactory combustion conditions may only be secured with fuel having viscosities below 300 sec. on a Saybolt viscosimeter, and consequently burner and setting design must be premised on air pressure that will produce satisfactory combustion speeds.

Laboratory results indicate that the speed of backfire with a hydrogen-air mixture and at atmospheric temperature and constant pressure is approximately 14 ft. per sec. Under the same condition the backfire speed of the liquid hydrocarbons is probably not over 5 ft. per sec., but heating the air-oil column entering the combustion chamber by radiant heat accelerates backfire speed and with a hot furnace backfire speeds may exceed 100 ft. per sec., although the most desirable speed appears to be 60 to 70 ft. per sec.

The velocity from mechanically delivered air is greatly in excess of desirable combustion velocities, and the intitial velocities must be broken down as rapidly as possible, this being accomplished by atomizer, setting, combustion chamber and furnace design.

Quantities of Air Required for Burning Fuel Oil

For perfect combustion 1250 to 1700 cu. ft. of air per gal. of fuel are required. The lower figure applies to the lighter oils; the higher to the heavier oils.

Excess air is the source of one of the greatest fuel wastes, but 5 to 10 per cent excess air should mark the maximum limit in oil burning practice. Proper design of atomizer, setting and furnace and the installation of the most suitable equipment in part will greatly assist in reducing the excess air waste.

The author showed graphically in his paper what may be anticipated in percentage of induced or aspirated air with good atomizer and furnace design. The induction property of air under the *A* classification is shown to be small, averaging about 33 per cent, while under the *B* classification it is more than 50 per cent, and with high pressure air under the *C* classification it should be over 80 per cent, approaching 90 per cent of the total air required.

Comparison of Blowers for Delivering Air

The author discussed at some length the general characteristics of blower types ordinarily employed in oil burning and criticised the use of the fan type blower chiefly on account of the inability of blowers of this type to maintain a constant pressure at constant speed against varying air delivery openings, and further, because of the lack of atomizing properties of air at low pressure, a premium must be paid for a selected fuel that will produce satisfactory operating conditions.

The displacement type blower operates at constant speed and maintains constant pressure. This type blower is criticized chiefly because a change in the delivery areas at the burners is not reflected in the energy required for operation. A relief valve is ordinarily employed on blowers of this type and at constant speed they require constant energy due to the fact that the machine operates at substantially constant volume by the action of relief valve.

The turbine type machine in operation maintains constant speed and constant pressure against variable volume, and the energy varies almost directly with the volume and consequently only that energy required to move the air plus the machine constant is actually used.

A piston compressor operating at the initial pressure of 15 lb. is an excellent type of machine and the cost of an equal volume of air is less than 25 per cent of the cost of air compressed initially to 80 lb. Either the 15-lb. or the 80-lb. compressor, due to the effect of the unloader, absorbs energy only in an amount proportional to the amount of air actually needed plus the machine constant and the air is furnished at substantially constant pressure.

Comparative Cost of Air

A table of the author's gave in condensed form the results of the study completed in detail as to 13 different sets of conditions.

On an assumed requirement of 1500 cu. ft. air to burn a gal. of oil, this shows that under the *A* classification 1125 to 825 cu. ft. of air are required per gal. of fuel, while under the *B* classification 825 to 480 cu. ft. of air, and under the *C* classification 210 to 180 cu. ft. must be supplied from the mechanical air mover per gal of fuel burned and further that with electric current at 2c. per kwhr., the power cost of supplying air for 1000 gal. of fuel burned varies: $2.70 to $1.75, with air under the *A* classification; $1.75 to $2.50 under the *B* classification, and $1.50 to $6.66 with air under the *C* classification.

No account is taken of the cost of piping various systems, as each layout offers problems which cannot be generalized.

Conclusion

Consideration of the study shows that the proper method of burning oil is with air under *B* classification or with 15 lb. air under the *C* classification. The conclusion drawn in the paper may be applied with slight modifications to the combustion of pulverized fuel. The study covers specifically only the burning of liquid fuel in such industrial furnaces as use cold air, and no attempt has been made to touch the conditions existing in regenerative or recuperative furnaces or steam boilers. In its complete form the study has thirteen charts, bearing on various factors and essential to a complete consideration of the paper.

The labor situation in the eighth federal reserve district is reflected in the compilation by the Federal Reserve Bank of St. Louis from reports received from 200 leading employers in 20 of the largest cities in the district. The number of employees of the reporting interests increased 12,498 or 10.3 per cent (men increased 10.9 per cent while women increased 7.5 per cent) between June 30, 1921, and June 30, 1922. On June 30, 1921, the number was 23.2 per cent under normal and on May 31, 1922, the total was 17.7 per cent under normal as compared with 15.3 per cent on June 30, 1922. Wages figures on a semi-monthly basis, increased 0.3 per cent. The average per worker appeared to be $81.90 per half month on June 30, 1921, and $74.45 on June 30, 1922.

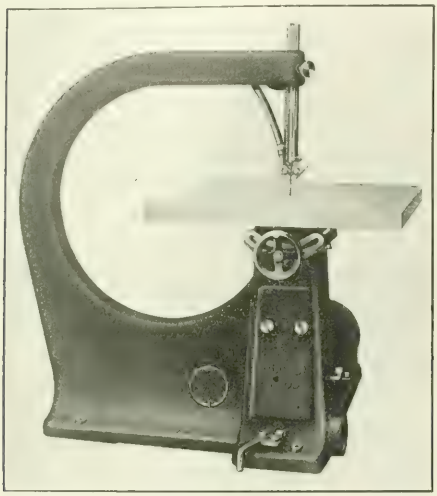
*Abstract of paper read by W. C. Buell, Jr., president Buell-Scheib-Mueller, Inc., consulting and combustion engineers, Pittsburgh, before the Engineers Society of Western Pennsylvania, June 6. Copyrighted, 1922, by W. C. Buell, Jr., and the Engineers Society of Western Pennsylvania.

Self-Contained Jig Saw

A new self-contained jig saw which represents a departure from the usual design in that there are no overhead belts, no moving parts unguarded and no tension in the saw blade, has been brought out by the Oliver Machinery Co., Grand Rapids. It is primarily adaptable to pattern and other woodworking shops for interior and exterior scroll work on wood, although it may be used on other material.

The new machine, designated as the No. 173, is shown in the illustration. Operated from the front the capacity is up to 36½ in. between the saw and the column. With the saw turned at 90 deg. and operated from the side, work of almost any length or practical width may be handled. The highest work accommodated under the guide is 10 in. The stroke of the saw blade is 3 in., and saws up to 18 in. may be used.

Moving parts of the machine are adequately guarded and the saw blade not being under tension, a broken



New Jig Saw Machine in Which There Are No Overhead Belts, No Moving Parts Unguarded and No Tension in the Saw Blade

blade would be unlikely to cause an accident. Saw blades are conveniently removed and replaced. The clamping device below the table is automatic and the sliding block in the upper guide-way is intended to provide a rapid and convenient means of inserting the saw. Absence of overbalance load is a feature of the new design and is said to assure a quiet running, vibrationless operation and better work.

The machine may be either belt or motor driven, being a self-contained unit in both cases. Bearings and movable parts are made to compensate for wear. The pitman and cross head are of aluminum and complete control of the machine is by means of a conveniently located foot lever.

The table is 39 x 34 in. and is of cast iron. It is mounted on rockers to tilt 30 deg. to right or left and it may be locked in any position by means of a clamp screw and hand wheel provided. When direct-motor drive is employed a flexible coupling connects the shaft and motor.

Two saw guides are provided, one above and one below the table, and these may be turned to permit sawing from either the front or side. A slide dumping device is provided in the table in front and around the saw, with the knob on the under side. This may be drawn back to permit small cuttings to drop through the table and out of the way.

An air blast, by which a continuous flow of air is directed to the front of the saw, is included in the new design.

New Line of Polishing Machinery

A new line of ball-bearing polishing and buffing machinery, two units of which, a single and a double spindle lathe, are now available, is being brought out by the Mitchell Engineering Co., Springfield, Ohio.

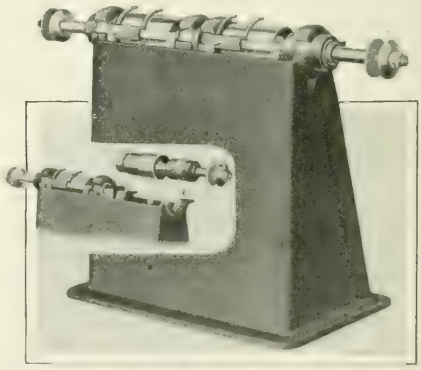
The double spindle lathe, known as the No. 5, is shown in the accompanying illustration. It has two independent spindles which permit the stopping of one without interfering with the other. Another feature is the ball bearing mounting of the spindle, each spindle having three ball bearings and each loose pulley two. Either or both spindles, together with the bearings, may be removed by releasing the bearing-housing clamps and removing the spindle assembly, a ball and socket feature being included to assure perfect alinement.

The machine may be driven from overhead or underneath. The ends of both spindles are drilled and tapped for taper points. The spindles are 2 in. in diameter the full length, except where the wheels are mounted, and the length of each spindle is 32 in., the length of both being 66 in. overall. The distance between wheels is 57 in.

The distance from the tight flange to the side of the machine is 10½ in., but can be longer or shorter as required. The machine will take wheels 2½ in. thick. The height from the floor to center of spindle is 38 in. and size of base at the floor is 26 by 42 in. The weight is 950 lb. net.

A No. 5 machine arranged for motor drive is also available and in this design any wheel speed is obtainable regardless of the motor speed. In this arrangement any standard motor may be mounted in the base of the machine, and the spindles driven by belts. The spindles are started and stopped independently of each other by means of a ball-bearing equipped belt tightening device operated by a hand lever.

The No. 6 machine is a single spindle unit, the spindle being mounted in four ball bearings and the



Double Spindle Ball-Bearing Polishing and Buffing Lathe. The insert shows the manner of mounting spindles with bearings assembled

loose pulley in two. In this case also the spindle, together with the bearings, may be removed by releasing the bearing housing clamps, the ball and socket feature being also included. In this machine the spindle is 48 in. long overall and the distance between wheels 39 in. The size of base at the floor is 20 by 26 in., and the net weight 600 lb.

Samuel T. Freeman & Co., 1519 Chestnut Street, Philadelphia, auctioneers, will sell at public auction on Aug. 7 at their salesrooms at this address 1742 tons of chill cast forging ingots and 33,405 lb. of finished and rough turned forgings.

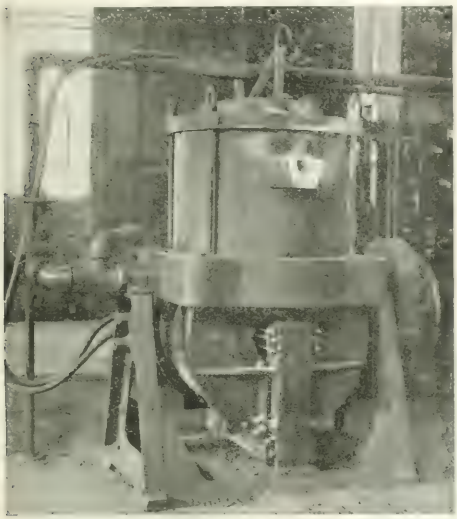
The United States Nickel Co., New Brunswick, N. J., manufacturer of shot and ingot nickel, has resumed operation at its plant in New Brunswick.

NEW ELECTRIC FURNACE

Induction Type Developed by General Electric Co. for Melting Non-Ferrous Metals

The General Electric Co. has recently developed and operated for several months an induction type furnace which is particularly adapted to melting non-ferrous metals. It possesses several important features not previously found, it is claimed, in induction furnaces, and calculated to extend greatly the field of application.

The melting chamber, in which the charge is received, melted, and held for pouring, resembles an ordinary crucible, with inclosed top. It has a charging door on one side and a pouring spout on the other. There is also a door in the cover which may be used for



75-Kw. Repulsion Induction Furnace for Non-Ferrous Metals

charging or as a vent when melting oily scrap or other material producing smoke or fumes.

Distinct from this chamber, but communicating with it through ports or ducts, is another chamber in the form of a hollow cylinder encircling a primary winding and one leg of a laminated iron core. Molten metal in this cylindrical chamber constitutes the secondary of a transformer, and the heat in the furnace is generated by the secondary current which flows around the cylinder, through the resistance of the molten metal, when alternating voltage is applied to the primary winding.

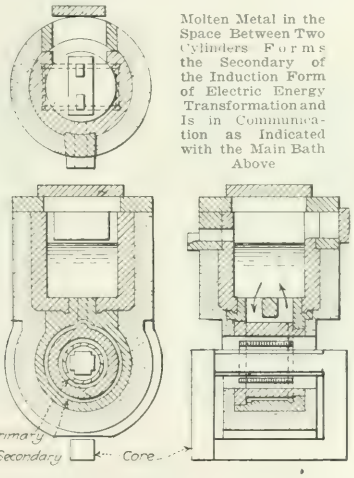
The secondary chamber, with its associated primary and core, is located beneath the melting chamber, partly for compactness of design, and partly because this position is favorable for maintaining a full secondary with a small residual charge in the melting chamber after pouring. This serves to insure uniform power input and uniform rate of heating.

A positive unidirectional circulation between the melting chamber and the heating chamber (secondary) constitutes a feature in this furnace. It is found to result in uniform composition of metal and uniform temperature throughout the bath. This feature has particular value in the melting of finely divided metal, such as borings or light scrap, since the molten material is continually washing against it.

This circulation is effected by the magnetic force of repulsion, which exists between primary and secondary in the transformer. The axial displacement of the primary relative to the secondary causes the fluid pressure due to this force to be greater at one end of the secondary cylinder than at the other. The molten charge flows from the end under higher pressure to the melting chamber, with a return flow from the chamber to the other end of the cylinder, as indicated by the arrows in the drawing. The strength of the circulation may be changed, if desired, by shifting the axial position of the winding.

The refractory lining for this furnace is constructed of three preformed and prefired parts, which are assembled with cemented joints in the furnace. This, in itself, is considered a radical improvement in furnace design, making for a durable lining, and when necessary to replace it, for doing so in short time and little expense. This construction has the advantage of permitting the inspection, before assembly, of all parts of the lining, with special attention to the surfaces which come in contact with molten metal. The lining is surrounded, in the furnace, by layers of heat insulating material which, together with the compact design of the furnace, reduce the radiation losses to a minimum.

When starting the furnace it is necessary to prime it with sufficient molten metal to fill the secondary and give a depth of 2 or 3 in. in the melting chamber. The furnace is therefore at its best when operating continuously, on the same kind of metal, as a residual charge must be retained from the previous heat for starting a new one. When melting intermittently, as for day work only, or for a few heats per day, the residual charge must be kept in a molten condition between heats by applying a low voltage sufficient to supply the radiation losses only. If it is desired to change the metal or alloy which is melted, this may be done by emptying the furnace completely and pouring



Molten Metal in the Space Between Two Cylinders Forms the Secondary of the Induction Form of Electric Energy Transformation and Is in Communication as Indicated with the Main Bath Above

in a priming charge of the new metal which has been melted in some other furnace, or, if it is desired merely to change the percentages of the constituents in the alloy, this may be done by adding an increased percentage of one or more of the constituents to correct the proportions of the residual charge.

The furnace, although of recent development, has been used on red and yellow brass and on copper with, it is stated, pronounced success. Future development is expected to extend the field of application to other metals both ferrous and nonferrous.

For yellow brass the furnace illustrated has a total holding capacity of 1200 lb., with a pouring capacity of 750 lb. The full pouring capacity of 750 lb. can be melted and poured each hour with an input of 75 kw., thus giving a power consumption of not more than 200 kwhr. a ton for brass. For intermittent operation this energy consumption is, of course, increased by the power necessary to supply the radiation loss during standby periods, which is about 10 kw. The power factor on a 60-cycle circuit is about 75 per cent, varying somewhat with the composition of the metal to be melted. The metal loss is almost negligible, being put at less than 1 per cent for yellow brass having a composition of 60 per cent copper and 40 per cent zinc, and

still less for such metals as have higher copper content.

This furnace will be built in two forms, which are practically the same except for the tilting mechanism and method of tilting. The furnace proper, which is the same in both forms, is mounted on a strong steel frame or yoke, which is provided with trunnions supported in bearings on pedestals. In the form here illustrated, the trunnions are so located at opposite ends of the yoke that the furnace tilts around a line approximately through its center of gravity, the pouring spout moving forward and down. In this form of the furnace, the tilting is accomplished by means of a hand wheel suitably geared to the trunnions. In the other form, the trunnions are located on a line passing through the pouring spout, so that in tilting there is no motion of the spout. This type of furnace is used when it is desired to pour directly from the furnace into molds. In this form of the furnace the tilting is accomplished by means of a motor, which is controlled by a standard drum switch.

Rolling Mill Equipment Merger Is Completed

Mackintosh-Hemphill Co., A. Garrison Foundry Co., Pittsburgh Iron & Steel Foundries Co. and Woodard Machine Co. Now a Single Corporation with Capital of $6,500,000

PITTSBURGH, July 31.—Official announcement has been made of the merging of the Mackintosh-Hemphill Co., the A. Garrison Foundry Co. and the Pittsburgh Iron & Steel Foundries Co., first news of which was published in THE IRON AGE, March 16, 1922, page 743. Included in the combination, which takes the name of the Mackintosh-Hemphill Co., is the Woodard Machine Co., Wooster, Ohio, an interest of the Mackintosh-Hemphill Co. Negotiations were completed more than a month ago, and the official announcement was delayed pending a meeting of stockholders of the Mackintosh-Hemphill Co., approval of which was necessary to the consummation of the deal. The merger has been accomplished through the purchase of the stock of the A. Garrison Foundry Co. and the merging of the Pittsburgh Iron & Steel Foundries Co. and the Woodard Machine Co. in the Mackintosh-Hemphill Co. The capital of the last named company has been increased from $1,000,000 to $6,500,000, consisting of $2,850,000 7 per cent cumulative preferred stock, all of which has been issued, and $3,650,000 common stock, of which $3,000,000, or 30,000 shares of par value of $100, has been issued. This increase will provide for the exchange of shares in the Pittsburgh Iron & Steel Foundries Co. and Woodard Machine Co. into Mackintosh-Hemphill stock. An issue of $4,000,000 27-year 6 per cent sinking fund gold bonds has been authorized by the Mackintosh-Hemphill Co., and of this $3,000,000 has been put out to provide funds to complete payment for the properties of the consolidating companies, for the payment of existing mortgages and bank loans, and to furnish additional working capital for the new company.

A committee on which George S. Macrum, George W. Baum and Joseph E. Fawell represented the Mackintosh-Hemphill Co. and the Woodard Machine Co., and J. Ramsey Speer and H. V. Blaxter, the Pittsburgh Iron & Steel Foundries Co. and the A. Garrison Foundry Co. conducted the negotiations. The officers of the new company are: Pennock Hart, chairman; George S. Macrum, president and treasurer; G. W. Baum, Joseph E. Fawell and L. A. Woodard, vice-presidents; D. H. Baum, secretary, and A. W. Bendig, assistant secretary and assistant treasurer.

This merger has an historical significance, in that it reunites foundry interests which trace their origin to the first foundry established in Pittsburgh. The principal stockholders in each of the companies are descendants of the original owners and their associates. J. H. Ricketson, Jr., and O. G. Ricketson, retiring officers of the A. Garrison Foundry Co., are grandsons of Abram Garrison, to whom the success and reputation of the Garrison company is largely due. Pennock Hart, chairman of the board of directors, Mackintosh-Hemphill Co., is the son of N. F. Hart, one of the founders of Mackintosh-Hemphill Co.; George Macrum, president, is a son-in-law of William Wade, whose name appears prominently in the early history of the Fort Pitt Foundry; G. W. Baum, vice-president, is a son-in-law of James Hemphill; and J. Ramsey Speer and J. McK. Speer are great-grandsons of Joseph McClurg, who founded the Pittsburgh Foundry, and of William McKnight, who with Mr. McClurg operated the plant for a number of years during its early history; Charles McKnight is a grandson of William McKnight. The McClurgs and McKnights also were active in the early history of the Fort Pitt Foundry.



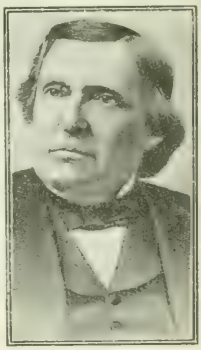
JAMES HEMPHILL

Mr. Hemphill's designs in heavy rolling mill machinery have been responsible for many record outputs in more recent practice.



JOSEPH McCLURG

Mr. McClurg was one of the builders of the first Pittsburgh foundry 119 years ago, and Mr. Garrison's name has been connected with the same business since 1826.



ABRAM GARRISON

It is doubtful if larger contributions have been made to the success of the iron and steel industry than those made by the members of this group. The earliest rolling mill and blast furnace engines, the rolls for the various requirements of the mills, the most effective pipe balls in the earlier days, all testify to the skill and knowledge of those who headed these companies.

First Foundry in Pittsburgh

The first foundry in Pittsburgh, and probably the first one west of the Allegheny Mountains, was built in 1803, on what is now the site of the Park Building, at Fifth Avenue and Smithfield Street, by Joseph Mc-

Clurg, Joseph Smith and John Gormley. It was called the Pittsburgh Foundry. Shortly after its establishment, or before 1807, Joseph McClurg bought out his two partners, and with his son, Alexander McClurg, conducted the business until 1814. The early years of the Pittsburgh Foundry are particularly interesting, since it was here that many of the cannonballs used by Commodore Perry at Lake Erie, and by General Jackson at New Orleans in the War of 1812, were made. After the end of this war, the foundry was devoted to the production of water pipe, stoves and miscellaneous agricultural castings. The record of the ownership of the Pittsburgh Foundry shows remarkably few changes, and almost a continuous line of descent through the families of the original owners and their associates.

From 1814 to 1822 it was owned and operated by McClurg & McKnight. From 1822 to 1830 by Alexander McClurg & Co. At this time it was merged with the Jackson and Eagle foundries, owned by Kingsland & Lightner. From 1831 to 1840, the firm was known as Kingsland, Lightner & Cuddy. In 1836 Abram Garrison obtained an interest in the business, and in 1840 Mr. Garrison, who was a nephew of Mr. Kingsland, and H. L. Bollman, a nephew of Mr. Lightner, succeeded their uncles, and associating with them H. F. Bollman, conducted the business under the name of Bollmans & Garrison until 1851, when H. F. Bollman withdrew. From 1851 to 1863, the firm was Bollman & Garrison, and from 1863 to 1865 Bollman, Garrison & Co. In 1864 Mr. Bollman retired, and in 1865 the partnership of A. Garrison & Co. was formed. The company was incorporated under its present name in 1887. In 1852 the original location at Fifth Avenue and Smithfield Street was given up, and the foundry was moved to its present location on the south side of the Monongahela river between Ninth and Tenth streets.

Because of the failure of Mr. Garrison's health in 1862, the active management of the business was turned over to his son-in-law, J. H. Ricketson, who held the presidency until his death in 1900. He was succeeded by his son, J. H. Ricketson, Jr., who has had active charge of the company up to the present time.

First Chilled Rolls

The first chilled rolls made west of the Allegheny Mountains were cast in 1825 at the Eagle Foundry of Kingsland, Lightner & Co. After the merger of this company with the Pittsburgh Foundry in 1830, the importance of the development of rolls and rolling mill machinery was appreciated. Almost the entire capacity of the foundry up to the present time has been devoted to the production of rolls and rolling mill equipment, not only for use in the rapidly expanding steel industry, but also for rolling brass, copper, zinc and other non-ferrous metals. In 1842, the first chilled rolls for rolling sheet brass made in this country were furnished by Bollmans & Garrison to the mills of the Naugatuck Valley in Connecticut. Rolls for this service had previously been imported from England. Mr. Garrison's success in making these rolls resulted in the adoption of American made rolls by most of the brass and copper sheet makers.

The prestige obtained by the manufacture of the first chilled rolls in the Pittsburgh district has been consistently maintained. The names of Pittsburgh Foundry and later A. Garrison Foundry Co. are nationally associated with the development and production of chilled iron rolls. The company also has become prominent in the designing and constructing of mills, roll tables and auxiliary equipment for the smaller structural and sheet mills. However, its efforts have not been confined exclusively to the development of the small mills. It has designed and installed a 152-in. plate mill which requires chilled iron rolls 42-in. in diameter, weighing 72,000 lb.

Established in 1837

In 1837 Calvin Adams established in Pittsburgh a small iron foundry for making pump plungers and small castings. It enjoyed continued success, though on a small scale, and later the firm became known as the S. Jarvis Adams Co. Under the management of S. Jarvis Adams, the son of the founder, the company built up a reputation as makers of cast iron pipe balls and bell dies used in the manufacture of welded pipe. In 1899 the business was purchased by J. Ramsey Speer, J. McK. Speer, Charles McKnight, H. C. Fownes and W. C. Fownes, Jr. In 1907 the requirements for increased plant capacity were met by the purchase of a site at Midland, Beaver County, Pa., and the erection of a foundry and machine shop of the most modern type. The name was changed from the S. Jarvis Adams Co. to the Pittsburgh Iron & Steel Foundries Co. in 1912 and the interests of H. C. Fownes and W. C. Fownes, Jr., were acquired by J. Ramsey Speer, J. McK. Speer and Charles McKnight.

Adamite, which was conceived by J. Ramsey Speer two or three years previously, was perfected and patented by him in 1913. It was soon demonstrated that Adamite possessed properties of great value when the metal was used for rolling mill rolls and pinions. The plant was equipped with open hearth furnaces and large annealing pits for the efficient production of rolls and other castings.

Since 1913 the attention of the company has been devoted almost exclusively to the production and development of Adamite, and since its first use for steel mill rolls a number of other alloy rolls have followed, all of which have had an influence upon the efficiency and economy of steel mill practice. Adamite has functioned with particular success in castings subject to abrasion, as well as in other special services requiring a close grained homogeneous structure.

The American Adamite Co., which holds the patents to Adamite, is not included in the merger, but will probably license the new company, as it does the United Engineering & Foundry Co.

Mackintosh-Hemphill Co. History

The Fort Pitt Foundry, now owned and operated by Mackintosh-Hemphill Co., was originally established on or near its present location at Twelfth and Etna Streets, Pittsburgh, by Alex McClurg some time before 1825. Mr. McClurg was succeeded in the ownership of the foundry by the firms of McClurg, Pratt & Wade; McClurg, Wade & Co.; John Freeman; Freeman, Knap & Totten; Knap & Totten; Knap & Co.; Knap, Rudd & Co.; Chas. Knap's Nephews; Knap-Fort Pitt Foundry Co., and in 1878 the property and business was purchased by Mackintosh-Hemphill Co.

The earlier years of the Fort Pitt Foundry were devoted to the manufacture of the miscellaneous iron castings in use at that time. Later the owners undertook the manufacture of engines, locomotives, boats and shot and cannon for the Government. The first locomotive west of the Allegheny Mountains was built here, and before 1850 a number of iron vessels for use in the revenue service on the Great Lakes were completed and launched in the Allegheny River.

In 1841 Knap & Totten, as the firm was then called, received a contract for cannon from the War Department and from that time until the close of the Civil War much was done in the production of munitions. Some of the largest cannon used were cast here, and the two most celebrated makes of the period, the Dahlgreen of the Navy and the Rodman of the Army were practically developed and perfected at the Fort Pitt Foundry. In 1859 James Hemphill, Dr. W. S. Mackintosh and N. F. Hart entered into a partnership and purchased a small machine shop at the corner of Twelfth and Pike Streets. To this enterprise Mr. Hart contributed the financial support, Mr. Hemphill the engineering and practical shop experience and Dr. Mackintosh some valuable patents, including one upon a new type of oscillating steam engine. The partnership was later incorporated under the name of Mackintosh-Hemphill Co., Ltd. In 1878, to meet the requirements of the growing business, the Fort Pitt Foundry, which adjoined the original Mackintosh-Hemphill shop, was purchased and entirely rebuilt. The old wooden lathes used by the Fort Pitt Foundry for turning and boring cannon were replaced by modern equipment for building engines and rolling mills.

In the light of present knowledge, it is obvious that Mr. Hemphill's theory that weight and solidity of construction were fundamental considerations in the de-

sign of heavy duty engines and rolling mill equipment placed him far in advance of his age. The first successful two-high blooming mill was designed and installed by him at the Pittsburgh Bessemer Steel Works, now the Homestead Works of Carnegie Steel Co. The tonnage records of today, which but a few years ago would have seemed utterly impossible, have been achieved largely by the projection and development of the designs worked out by Mr. Hemphill. Upon his death in 1900 his son, N. A. Hemphill, was elected to the presidency of the company. In 1902 he disposed of his interests and retired from active business, Joseph Fawell succeeding him as president. Mr. Fawell died in 1914 and was succeeded by Pennock Hart, who continued in active management of the company until December, 1919, when he resigned to become chairman of the board of directors. George S. Macrum was elected to the vacancy and in addition has held the office of treasurer.

The Woodard Machine Co., Wooster, Ohio, was incorporated in 1916, at which time it acquired the plant and property of the Canton Hughes Pump Co., Wooster, Ohio, and also the Foundries Co. at Orrville, Ohio. Later the equipment at Orrville was moved to Wooster. The company, under the direction of L. A. Woodard, its president, has extended and improved the plant at Wooster to include an iron foundry and an extensive machine shop with special patented equipment for cutting gears and racks with double helical teeth; also equipment for hobbing high speed helical gears up to 12 ft. in diameter. In addition to gear work the company has devoted considerable attention to the development and construction of seamless tube mills, welded pipe mills and mills for hot-rolled strip steel.

PICTURES OF STEEL MAKING

Films May Be Obtained from Department of Commerce—To Be Shown at Rio de Janeiro Fair

WASHINGTON, Aug. 1.—World-wide distribution is to be given to the processes of manufacture and welfare work in the American iron and steel industry through a six-reel motion picture film, to be known as "The Story of Steel." It is to be produced under the auspices of the United States Bureau of Mines of the Department of the Interior and the United States Department of Commerce in co-operation with the United States Steel Corporation. The picture is to be presented extensively in the United States and abroad and will acquaint the peoples of the world with the industry in all of its operations.

The story is to begin with the mining of ore and will end with the making of finished products, passing through the transportation period, blast furnace operations and the making of steel by the Bessemer, open hearth and electric processes. In a graphic way the picture will show the production of rails, plates, shapes, axles, rods, wire products, pipe, tin plate and the numerous other products so as to give the audience an intimate study of the processes of manufacture and coupled with it will be a presentation of the activities of welfare and social character conducted by the United States Steel Corporation.

The picture is to be used extensively at the coming world's fair in Rio de Janeiro this year and efforts also will be made by the Government to show it before the leading engineering and other organizations throughout the world. The film will be loaned without cost to all dependable parties. Application for its use should be made to the Department of Commerce, Washington.

Mining Institute at San Francisco

The 126th meeting of the American Institute of Mining and Metallurgical Engineers will be held at San Francisco Sept. 25-29. The institute is organizing a transcontinental trip for this meeting, the party leaving the Grand Central Station, New York, at 6 p. m. on Saturday, Sept. 9. The trip will be via Chicago, Denver, Salt Lake City, Butte, Spokane, Seattle, Portland, Sacramento and Reno, and San Francisco will be reached on Sunday morning, Sept. 24. Technical sessions will be held at the Engineers' Club in San Francisco on the following day. Most of the week will be devoted to an excursion to Hetch Hetchy, San Francisco Water Project. Those not taking this trip will visit interesting points in the vicinity of San Francisco. The return trip will be by the southern route, with stops at Los Angeles, Kingman, Grand Canyon, Globe, Bowie and El Paso. Chicago will be reached on Oct. 10 and the party will arrive at New York Oct. 11. Among the papers scheduled for the meeting are the following:

"Conditions of Stable Equilibrium in Iron-Carbon Alloys," by H. A. Schwartz, H. R. Payne, A. F. Gorton and M. M. Austin.

"Effect of Nickel Chromium on Cast Iron," by Richard Moldenke.

"Heating and Cooling Curves of Large Ingots," by F. E. Bash.

"Mining Iron Ore in the Adirondacks," by John E. Hodge.

Employment in Pennsylvania

HARRISBURG, PA., Aug. 1.—Despite the disturbing influence of strikes and coal shortages, the iron and steel trade of Pennsylvania continued to show improvement during the first half of July. The semi-monthly report of Clifford B. Connelley, Commissioner of the Department of Labor and Industry, indicates but 20,050 iron and steel workers were reported employed on July 15, this being slightly more than 60 per cent of those without work on June 15 and more than 78 per cent of those on July 1. The figures for June 15 were 33,250 and for July 1, 25,500.

Unemployment conditions throughout the State, exclusive of in the mine trade and railroad shops, continue to show improvement. Exclusive of those without work in these two trades as a result of strikes, the department reports only 101,705 persons without employment. This shows a reduction of more than 20,000 in the first two weeks of July, 124,665 having been reported without employment on July 1.

The strike of railroad shopmen has resulted in an increase in unemployed metal and machinery workers in some cases in Pennsylvania, while coal shortages, resulting from the strike of miners, have necessitated the closing of some plants. Despite these, seven of the ten employment districts of the State report fewer unemployed on July 15 than on July 1; one reports no change, while two districts report more without employment.

American Electrochemists at Montreal

Arrangements have been made for a trip of inspection through the industrial developments at Shawmigan Falls, the great electro-chemical center of Canada, at the time of the fall meeting of the American Electrochemical Society at Montreal, Sept. 21, 22 and 23. The program for the technical meeting will embrace from 16 to 20 papers. The projected symposium on electro-osmosis has been abandoned.

Engineers to Meet in San Francisco

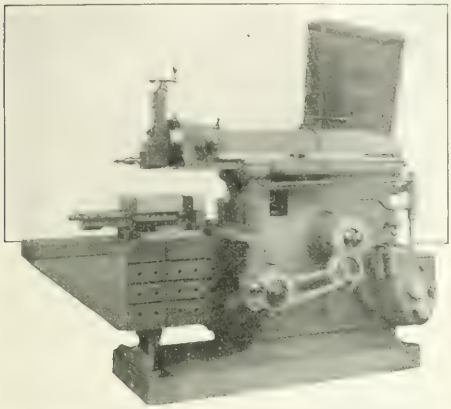
The fall meeting of the American Institute of Mining and Metallurgical Engineers will be held in San Francisco in the week of Sept. 25. F. W. Bradley, San Francisco, has been appointed chairman of the committee on arrangements.

For the Gary, Ind., plant of the National Tube Co., for grading and the foundation work, a contract has been given to the Mellon-Stuart-Nelson Co., contractor, Pittsburgh. The work is expected to take six to eight months.

New Gear-Drive Crank Shaper

A gear-drive, 24-in. crank shaper known as the 1922 design, and arranged for either motor or single pulley drive, has been placed on the market by the Hendey Machine Co., Torrington, Conn.

The new tool, shown in the accompanying illustration, is of the same general design as the company's cone-pulley type of machines. Among the advantages of the speed-change gear mechanism are that its application permits of greater and more constant power, and also that this design lends itself readily to application of motor drive. The motor is mounted on a bracket at the rear, and silent chain transmission used. Push



The Extension Table Shown Adds 18 In. The speed change gearing is in the oil-tight box at right

button control may be provided. The machine may also be driven directly from the line shaft, no countershaft being necessary.

The speed-change gearing is in an oil-tight box on the right side of the machine as shown, and it is to be noted that the projections of this box are within the floor space required for the machine. There are but eight gears in the assembly, all of which are of alloy steel, hardened and heat-treated. Four speed changes are provided, which with the regular back gears of the machine gives eight speeds.

Gear shifts are conveniently made with a ball-handle lever guided by slots in an H-plate and their manipulation is further simplified by the quick stop and start clutch provided, which is controlled by a long horizontal lever passing to the front of the machine, as shown. The operator manipulates this lever with his left hand while making gear shifts with his right. The driving clutch is of the double angle cone type and engages with the driving pulley, also acting as a quick brake when shifted in the opposite direction. It has a very short motion and gives a quick start and stop to the ram, a feature which saves time and is of great value in setting tools and taking measurements. Index plates conveniently placed show the number of strokes per minute and the approximate cutting speeds produced according to the position of the levers.

The ram can be set in any position while in motion or idle, the length of the stroke being shown on the index provided. The ram has a bearing in the frame of 12¼ by 41¼ in. and the ways for the ram in the frame have an angle of 50 deg. The gib for the ram is combined with the cap in one casting making it very rigid, and permitting complete take-up by a single adjustment in a horizontal direction. The actual stroke of the ram is 24¾ in. The head slide has a binder which may be used as a drag and the swivel head is equipped with a single binder screw.

The cross-feed mechanism is operated at the end of the cross-rail, in all its adjustments, a dial with indicator serving to control the amount of feed while the machine is in motion. The feed may be manipulated while in motion by the ball lever on top of the casting and the lever points in the direction of the table travel. The power down feed is optional and when applied is set by the graduated dial for any feed from 0.005 to 0.060 in. in steps of 0.005 in.

Aside from the usual T-slots, the table has rows of jig-drilled and reamed plug holes at right angles to the faces of the table for blocking and fastening the work. The minimum distance from the ram to the table is 4 in. The vertical travel of the table is 14¾ in., the horizontal travel being 30 in. The top of the table is 17 by 24 in. and the side 17½ by 18 in. A table extension can be provided, giving a total length of 42 in., and a tool post extension can be provided with it. The table may be removed and worked bolted to the saddle, which is provided with finished T-slots. Vise jaws are 14½ by 3 in., and the vise opens 16 in.

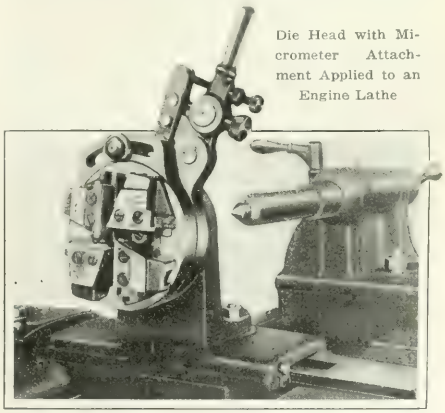
The floor space occupied by the machine is 52 by 107 in., and the weight, net, 5680 lb.

Die-Head with Micrometer Attachment

A stationary type die-head with micrometer attachment, the general arrangement of which is shown in the accompanying illustration, has been added to the line of the Landis Machine Co., Waynesboro, Pa. It is intended to be particularly useful in connection with cutting threads which require one or more roughing cuts and a finishing cut, the micrometer attachment permitting the setting of the die-head so that the same amount of metal is left on all pieces for the finishing cut.

The head is graduated for both right and left hand and for all sizes of bolts and pipe within its range, the graduations being stamped on the outer surface of the closing ring above the circular slot, as shown. The die-head is adjusted to size by loosening the clamping nut and bringing the index mark opposite the required graduation on the scale, further adjustment being made, if required, through the micrometer attachment.

The micrometer attachment is adjusted by backing off the upper, or stop screw, after first loosening the



Die Head with Micrometer Attachment Applied to an Engine Lathe

stop screw lock nut; the micrometer screw, below these, then being adjusted for increasing or decreasing the diametrical adjustment. Turning the micrometer screw in a counter-clockwise direction, causes the upper part of the link shown to swing to the left about the lower center, which pulls the closing ring to the right and increases the diametrical adjustment. Turning the micrometer screw in the opposite direction causes a counter movement of the link and decreases the diametrical adjustment. After the micrometer adjustment is made, the stop screw is set against the link and locked in place with the lock nut.

For the roughing cut the die-head is adjusted by turning the micrometer screw in a counter-clockwise direction until the desired diametrical adjustment is obtained, the stop screw being left in the locked position. Two or more roughing cuts can be made by decreasing the diametrical adjustment of the die-head

in one or more increments through the micrometer screw. When the roughing cut has been made, the micrometer screw is turned back in a clockwise direction until the link comes against the stop screw, the die-head then being set for the final diameter and is ready for the finishing cut.

The die-head described may be applied to turret lathes, engine lathes, and hand operated screw machines, being also applicable to all lathe types of threading machines where the work is revolved and the threading head remains stationary. In applying the head to a turret lathe it is equipped with a shank to conform to the dimensions of the socket of the turret, and used in connection with the cross slide of an engine lathe a special knee bracket is necessary, a special dead center being also required. The work can be gripped in a chuck and threaded without the use of the centers when the shape of the part makes it necessary.

PROTECTION BY ALUMINUM

Coated Grate Bars Shown to Have Four to Six Times Life of Bars Untreated

In the issue of the *Revue de Metallurgie* for May, 1922, there is a short article by Leon Guillet giving the results of experiments obtained with metal protected by an aluminum coating.

This coating was somewhat similar to that well-known in this country under the title of calorized, but instead of being obtained by packing the articles in powdered aluminum and other agents and raising to a high temperature, the articles were coated by means of the Schoop process. This process consists in melting the metal used, whether aluminum or zinc or whatever it may be and projecting the melted metal in a fine spray against the article to be covered. The coating so obtained when aluminum is used has been given the name of "aluminage." The results obtained with metal so protected do not appear to be comparable with those of calorized metal, except in particular cases and especially when the temperature reached by the pieces is low.

Two applications have been noted during the last few months which are of sufficient interest to merit attention. They consist of fire grate bars and also of cast iron stoves. In both cases the life of the samples was considerably increased.

Fire Grate Tests

First in regard to fire grate bars; the tests have been chiefly made in Denmark and Germany, although tests are being carried out in France especially with locomotives of the Chemins de Fer de l'Etat. In 1919 a preliminary series of tests were made in Germany with grate bars, on which a coating of pulverized aluminum had been made. In this case freight engines of the Prussian State railroad were used. The results showed that the resistance of the grate bars so treated were six times greater than that of untreated bars. In 1920 another series of tests were made with four express locomotives, one-half of the grate bars in each fire (20 bars) were covered with aluminum and the others were untreated. Every four weeks the bars were weighed and photographed. At the end of the first four weeks the untreated bars lost on the average 250 gr.; after 8 weeks 1600 gr.; after 12 weeks 2050 gr. per bar. After a period of six weeks some untreated bars had to be replaced, and after sixteen weeks not any of the original twenty untreated bars remained. At the end of four months none of the treated bars were attacked and the loss in weight was insignificant.

Tests With Cooking Stoves

In Denmark the State railroad carried out a large number of similar tests in the autumn of 1920. On the other hand the Danish company Soyakagefabrik carried out a very interesting series of experiments on cooking stoves. After 2000 hr. the firepot was completely corroded and needed replacement. In the same case a similar plate covered with aluminum remained practically intact after 2000 hr. of service. Also some tests were made on tuyeres; those covered with aluminum retained very smooth faces and were hardly, if at all, attacked by the fire.

To sum up the tests made under the conditions given above, the treated samples gave at least four times the service and, as a general rule, six times the service of untreated pieces.

At the same time it would appear from experiments that are not yet finished that if the sample is carried to a high temperature the protection cannot compare with that obtained with calorization. The layer is detached easily and the protection fails. It should be added that, in regard to the fire grate bars, the information obtained is unanimous in regard to not only an important increase in the life of the bars but also that the clinker is much more easy to remove and does not stick so hard as with uncovered grate bars. This is extremely important and is not to be neglected.

The information given above comes from well authorized sources and it appears certain that the practical tests being made in France will confirm it.

G. B. W.

Flexible Radial Grinder

The flexible radial grinder shown in the accompanying illustration, is a recent development of the Stow Mfg. Co., Inc., Binghamton, N. Y. It is designed for



Flexible Radial Grinder for Operation of Abrasive Wheels and Wire Scratch Brushes on Large Castings

grinding with maximum power over a large area, for the operation of abrasive wheels and wire scratch brushes on large castings, automobile bodies and similar applications. It may also be provided for drilling or with a screwdriver for assembling.

The grinder hangs from the ceiling and no countershaft is necessary, as it can be belted directly to the line shaft or the motor. The weight of the flexible shaft is counterbalanced, as shown, so that the operator is free at all times and may have the tool within easy reach and control. Five sizes are available.

French Iron and Steel Exports Increase

Exports of pig iron and steel from France during the first four months of 1922 were 818,167 metric tons, valued at 391,120,000 francs, as compared with 674,939 metric tons, valued at 350,576,000 francs, during the same period of 1921.

Imports of pig iron and steel into France in the first four months of 1922 totaled 269,784 metric tons, valued at 214,328,000 francs, as compared with 189,926 metric tons, valued at 224,868,000 francs, for the same period of 1921.

The Peck, Stow & Wilcox Co., Southington, Conn., manufacturer of hardware and mechanics tools, at its annual meeting last week elected the following officers: L. E. Sichthorn, president; T. J. Ray, vice-president; George S. Case, secretary; and E. N. Walkeley, treasurer.

Economy Features of Electric Foundry*

Locating Furnace and Supply Bins—Handling Materials—What Is Involved in Caring for Electrodes—Laboratory Facilities Necessary

BY CHARLES WELLMAN FRANCIS

PROBABLY the most essential requisite of the installation of an electric furnace in the foundry is its location or relative position in the shop. Most foundry buildings of modern type construction are built with a main bay ranging in width from 40 to 65 ft. with a side bay or leanto on each side, of 20 to 30 ft. In the main bay are located overhead traveling cranes.

One of the best locations for the furnace is to place it just inside the main bay of the building, so that when the crane trolley is at its maximum position at the side, the crane hook will lift vertically the electrode farthest from the center of the building. This will govern its position relative to the width of the shop and leave it placed so that the maximum floor space is available between it and the opposite side of the main bay.

As to its position lengthwise, it is advisable to place it close to one end of the shop, for with the furnace in this position we have a continuous chain, so to speak, of raw material to finished product from the furnace end of the building to the other, respectively. This location is practical for the larger size furnaces. The only great disadvantage of this location is that valuable floor space under the overhead cranes is lost. However, this can hardly be rectified because electric furnaces of 3 tons capacity or more require at least 20 ft. of headroom to facilitate the raising of the electrodes, and this headroom can only be had, as a rule, under the cranes in the main bay.

Provided there is sufficient headroom, it is economy to place smaller size furnaces in one of the side bays of the shop, with the pouring spout pointing across the shop, and extending into the main bay to such a position that the crane trolley will give a vertical lift to the furnace ladle as it is raised from the pit. This location makes all of the floor space in the main bay available for molding and shaking out castings. An electric hoist can be erected alongside of the furnace in the side bay for raising the electrodes clear of the roof-eyes, as is often required when a roof has to be replaced, and subsequently for handling the roof.

Locating the Scrap Bins

The next question of vital importance is the handling of the materials, principally the scrap. Unless this problem be properly worked out, an enormous amount of money can be thrown away needlessly. It is advisable to have scrap bins built of brick and concrete construction close to the railroad siding, the top level of the side walls of the bins being the same height as the top of the standard gage gondola cars in which scrap is usually shipped. An electro-magnet can be erected at a convenient point to unload the steel scrap from the railroad cars to the bins.

An industrial railroad of narrow gage can be readily built along the face of bins, turning at right angles and passing into the shop through the side bay and thence to a point accessible to the furnace charging door. Just inside the door entering the side bay, a suspension platform scale can be readily located for weighing the scrap while it is being carried in small scrap cars of a dumping type. With this layout, the electro-magnet can be used for the double purpose of unloading the scrap into the bins and loading the small cars from the bins. By this means two men, one for operating the magnet crane and another for handling the industrial cars, can take care of all the scrap up to the point where it is piled near the furnace charging door, whereas by another arrangement it would require a regular yard gang of two or three times this number of men for unloading the scrap by hand to the bins.

Hand Charging of Furnace

In the author's opinion the most economical means of charging the furnace is by hand shoveling, provided the furnace is a 3-ton furnace or smaller, and the scrap is of a shoveling type. About three years ago the writer personally conducted a test to determine the time required for charging a 3-ton furnace by hand. This test covered a series of 30 heats, which were the first heats taken from this furnace. A green crew of three laborers was used and the charges consisted of about 40 per cent foundry scrap, the remaining 60 per cent being made up of heavy axle turnings and boiler plate punchings. The shortest time required to charge this furnace with 6000 lb. of scrap was 8 min., and the longest time was 14 min., the average time per heat being 12 min. As long as scrap can be handled at this rate there is no need for considering a charging machine which is cumbersome and in the way in a small shop, where space is exceedingly valuable. The crew of laborers which is used for charging the furnace can be used in the cleaning room or on the shakeout floor at intervals between heats, thus relieving the labor costs on the furnace department.

Aside from the scrap, the handling of the refractories and electrodes is the next problem of greatest importance. Silica roof bricks of special shape are easily broken and for this reason they should be stacked, together with the remaining types of brick, in a dry room or shed, which is not accessible for any other purpose, thoroughly protected from the weather, and in close proximity to the furnace.

Inspecting and Storing Electrodes

Electrodes should be stored under the same conditions as bricks, and they should be laid in tiers of parallel rows with several smooth boards laid parallel under the bottom row, to protect them from the dampness of the floor. The most important part of an electrode is the end, because it forms the joint between two sections of electrode. If the edges on the ends are chipped or broken, the efficiency of the electrode is greatly diminished, simply because the efficiency of an electrode depends on its current-carrying capacity per square inch of sectional area.

When a shipment of electrodes arrives at the plant, it should be subjected to a rigid inspection as each electrode is being unloaded from the car. Four main points should be considered during this inspection. First, that each electrode is free from linear cracks, which sometimes extend almost the entire length of the electrode. Second, that the threaded sections or the female ends of each electrode are concentric with the periphery or circumference of the electrode. Third, that the ends of the electrode are as nearly a perfect

*An article by Mr. Francis covering the choice of the electric furnace appeared in the issue of July 27, page 201.

circle as possible instead of being oval or elliptical. Fourth, that the end edges and threads are not chipped or broken in any way.

When the electrode ends are not concentric an overlapping at the joint is in evidence, giving a smaller sectional area of contact and subsequently less current-carrying capacity, which causes the electrode to overheat at the joint and pencil off. Chipped or broken ends and threads will cause the same troubles as mentioned above, while oval electrodes will often jam in the roof cooling glands and be the means of the automatic regulators functioning improperly. It is advisable to number or letter the corresponding ends of the electrode screws and electrodes, so that when they are put on the furnace in a certain order, the joints made are the best possible. A good electrode joint is probably the essential feature of real operating economy, as a large portion of furnace delays are caused by broken electrodes, portions of electrodes in the bath, etc., all of which are generally caused by a carelessly made joint.

Quick Test Laboratory Advocated

Probably no one can appreciate the value and saving derived from a quick-test laboratory more than the electric furnace melter. The initial expenditure on such an installation is little or nothing compared to the results obtained from it. Any number of foundries send drillings from a cup test to some outside laboratory for a determination of their final analysis. For preliminary carbon tests they rely solely on the melter's judgment of a fracture test piece. Often troubles arise during a heat when it is next to impossible to obtain a good fracture test, and it is in such emergencies that the chemical laboratory exemplifies its real value, for a laboratory test can be taken from any test sample that comes from the furnace. Another real value is that all incoming scrap can be quickly analyzed before the railroad cars are unloaded and the shipment rejected or accepted as the case may be. Our readers can judge for themselves whether the expenditure of a few hundred dollars is justifiable under such conditions as have been mentioned.

The author has endeavored in this writing to set forth a few points of value to be considered when a new electric furnace installation is contemplated. Foundry superintendents find that it is not the easiest matter to obtain improvements after a new installation is completed and in operation. If features which have been mentioned in this article are therefore included in the construction and installation costs, they will be greatly counterbalanced by the saving in melting costs, to say nothing of eliminating the confusion and other difficulties which accompany the installation of these features while the furnace is in operation.

OTIS STEEL CO. PLANS

Strip Department Will Be Included in Additions to Plant Capacity

The Otis Steel Co., Cleveland, in addition to the erection of a steel plant at its Riverside works to round out the present equipment, as announced in THE IRON AGE last week, will add a hot and cold-rolled strip department with an annual capacity of 80,000 tons. Extension plans provide for four 100-ton open-hearth furnaces, a 40-in. blooming mill and a 24-in. sheet bar mill to manufacture billets, sheet bars and slabs for its plate, sheet and strip mill departments. With the proposed extensions the company will have a complete steel making plant. It has been manufacturing pig iron since its purchase of the two blast furnaces of the Cleveland Furnace Co., in 1919, but at present has to buy its semi-finished steel from other producers. It is announced that on completion of the new units the company will have an annual capacity of approximately 534,000 tons of finished steel products.

To provide funds for the extensions and $1,000,000 additional working capital, The Otis Company is offering through investment houses, a $5,000,000 issue of first mortgage, 25 year, 7½ per cent sinking fund gold bonds and proposes to issue 330,000 additional shares of no par common stock which will be offered to present stockholders at $11 per share. A special meeting of the stockholders will be held Aug. 25 to take action on reducing the present authorized amount of capital stock to the amount outstanding, this being required by law before an additional stock issue can be voted. Another stockholders' meeting has been called for Sept. 18 to approve the proposed increase in common stock.

Labor Supply and Immigration

Only 68 1-3 per cent of the number of aliens permitted under the 3 per cent limitation law were admitted to the United States in the fiscal year ended June 30, according to figures of the Bureau of Immigration. The number admitted was 243,953, out of a possible 356,995. This compares with 805,228 admitted during the preceding year.

In the five-year period, 1910 to 1914, admissions aggregated 5,174,701, an annual average of 1,034,940, and the excess of arrivals over departures added 3,731,809 persons net to our population, at an average yearly rate of 746,362. In these five years more than 1,500,000 common and in excess of 500,000 skilled workers arrived in this country. From 1915 through 1919 the total net immigration was only 554,456, and the largest number of arrivals in one year was 326,700, in 1915.

According to the 1910 census, three-fifths of our bituminous coal, 65 per cent of our copper, more than half of our iron ore, three-quarters of our construction work, three-fifths of our slaughtering and meat packing, 85 per cent of our sugar refining, between 60 and 70 per cent of our woolen and cotton goods, nearly three-quarters of our clothing, more than half of our iron and steel, and 67 per cent of our leather were produced with the labor of foreign-born wage earners. Moreover, our railroad and highway building, as well as other construction requiring unskilled labor, has been done for the most part by this type of worker.

Ashtabula Steel Mill Soon to Operate

The plant of the Ashtabula Steel Co., Ashtabula, Ohio, a sheet interest, is being completed and initial production will be turned out early in August. The product will consist of sheet steel, black and galvanized, flat and corrugated. The plant has eight pair and sheet furnaces, now ready for firing, and equipment for pulverizing coal. Pickling and galvanizing machines have been installed. Sheet bars will be purchased on the market.

Machine Irons Out Buckles in Sheets

The MacKay Machine Co., Youngstown, Ohio, engaged in general machine and job work and in building special machinery, has evolved a roll leveler of its own design to roll the buckles and strains out of sheets. Installations have been made for the C. R. Wilson Body Co., the Packard Motor Car Co., the Ford Motor Co. and others. The machine has 17 rolls in bronze bearings, and operates at 80 ft. per minute in the buckling departments of several mills.

Sales of Leather Belting

Domestic sales of oak leather belting, as reported by the Leather Belting Exchange, and representing about 60 per cent of the total product, amounted to 103,890 lb. and $164,250 for the week ended July 15, compared with 81,987 lb. and $134,542 for the preceding week and 52,708 lb. and $89,447 for the corresponding week in 1921. Included in the current figures are 64,311 lb. of first quality, at $103,363, and 17,308 lb. of waterproof, at $32,717.

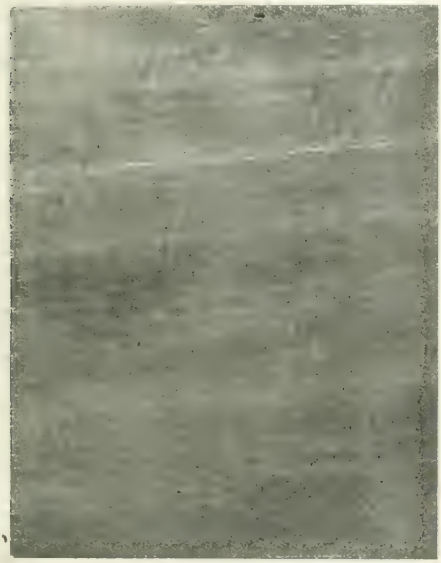
Use of Steam for Cooling Sheet Rolls

How Best to Apply—Better Cooling Method Needed to Reduce Roughening of Roll Surface—Deep Chilled Rolls Favored

BY GEORGE C. BROWN

SOME years ago the limit on sheet mills for double iron was 135 pairs for 8 hr. work. This limit was placed there by the Amalgamated Association of Iron and Steel Workers. The standard size roll at that time was 24 in. in diameter. This size was thought to be large enough to take care of the amount of heat that that number of pairs would add to the rolls, but at a convention held in 1903 or 1904 this limit was removed and the crews were allowed to turn out any number of pairs they could in the 8 hr.

It was then found that 24-in. rolls were not large enough to take care of the increased tonnage, so the



The Illustration Shows a Sheet That Was Rolled on a Mill Where the Steam Was Applied Through Pipes Paralleling the Back of the Roll. The stripes show where the steam has pitted or roughened the roll. The effect is just as bad when the steam is applied through a hood under the foreplate, but with this method the entire surface is roughened instead of striped

diameter of the roll was raised to 26 in. After a time the men became so efficient in their work and by taking advantage of some minor details, such as one pass on the run over, etc., where two passes were given under the old method, they were enabled to turn out still greater tonnage and 26-in. rolls were found to be too small, making it necessary again to increase the diameter to 28 in. and 30 in., which latter size is in common use to-day.

Where this limit of the diameter of the sheet roll is I am unable to say, but it would seem that we have about reached it; but even with this larger size roll we have to resort to artificial means of cooling. For this purpose we use steam, which is a crude means, as there is no question that it roughens the surface of the rolls. Especially is this true where the chill is light, say, of ½ or ¾ in. in depth and soft or medium in hardness. This roughness from steam is not so apparent where the chill is of a good depth and reasonably hard. The effect on the roll is just the same, but the harder chill of course offers a greater resistance and will run a longer time or make a greater number of heats before becoming rough.

Again is this soft light chill bad in that it picks up iron from the pairs while roughing and makes a rough pitted sheet when finished. In heavy orders such as Nos. 26 and 25 gage double, it is almost impossible to make a first-class sheet on a medium chilled roll, where one has to use a good head of steam, as is generally the case. It keeps a roller riding a polishing block almost continually, at least every two or three heats, if he wants to have good results. This cuts down his tonnage, as it takes from 5 to 10 min. to polish a roll.

It is generally supposed that there are less breaks on soft than on hard chilled rolls, but the way we work to-day continuously for 8 hr., I do not think there is much more risk on the hard chill than on the soft, and I know with the harder chill better results are obtained, both in the iron opening and in smooth sheets.

Steam is applied to the rolls in two ways: one through a funnel shaped hood under the fore plate; the other by means of a ½-in. perforated pipe paralleling the bottom roll under the guides, and one parallel to the top roll just above the guides. These perforations are about 1 in. apart and the pipe is ½ in. from the rolls.

There are no set rules that can be laid down for using steam, that is, I mean, no roller can follow a set of rules that will enable him to do good work and be reasonably safe from roll breakage at all times, for the roller who sacrifices his work by putting on a full head of steam continuously in order to keep from breaking rolls will not last long as a sheet roller. He will not be a profitable workman to the firm for which he works. Experience with the use of steam for a number of years has taught the writer that the following methods will be found good in the majority of cases:

> When you begin to rough your heat down, turn on a head of steam sufficient to give you the desired circle in the end of your pair. Every roller will know just what that circle should be. Let that amount of steam remain on during the roughing of the heat. When you come to the run over, turn about one-half the steam off. After the heat is run over and just before you rough your three finishers or whatever number you need, turn your steam up to where it was during the roughing of the heat. After the finishers are roughed down turn your steam down again for the finish to the same amount that you had on the run over. If you follow this out during the turn you will find that your rolls have changed shape very little. Expansion and contraction in the minimum are the main factor in preventing roll breaking.

It is thought by some that a sheet roll absorbs as much if not more heat on the run over and finishing

than it does on roughing because the iron is in contact with the rolls much longer. But this, I believe, is an error. If a sheet roll would absorb as much heat on the run over and finishing as in the roughing, why does one rough down three finishers after the run over before finishing to expand the rolls to the same place they were during the roughing? Then, again, if one will follow the record of rolls that were broken on the finish, he will find that 7 out of 10 were broken on the first pack out and in the first pass, showing that the rolls have contracted or lost heat between the time of roughing and finishing.

If one would slack the screws an inch or two and put hot packs through the rolls all day he would not add 200 deg. of temperature to the rolls, for this reason it is evident the rolls take on heat through pressure rather than by contact. The reduction is much greater on the roughing than on the finishing. For example, take a ¾-in bar, give it five equal passes on the chill rolls, making about 20 per cent of a draft; then, again, take a ½-in bar, give it five equal passes about 20 per cent draft also. The ¾-in. bar will be reduced ⅛ in. on each pass, while the ½-in. bar will be reduced only 1/16 in. Yet the draft is the same on both bars. The ¾-in. bar will add much more heat to the roll than the ½-in. bar, though the ½-in. bar may have been hotter on the roughing than the ¾-in. bar.

If from a pack that has broken a roll a piece is cut out just where the break has occurred, it will be found that it is almost impossible to detect with the naked eye the difference in thickness between what has gone through the roll and that which has not, yet the micrometers will show a draft from 30 to 35 per cent. From these facts it can readily be seen that it is reduction rather than contact that adds heat to the rolls.

The method given for applying steam is only for double iron. For single iron and for some of the heavier gages the fixing of the steam supply can be made at the starting of the turn to give the desired shape in the end of the pair and let it remain on during the 8 hr. Of course, no roller who expects to do good work will use as much steam on the lighter gages, such as on No. 24 single and No. 30 double sheets, as he would on heavier.

I said in the beginning of this article that steam was a crude method of cooling sheet rolls. The best that can be said for it perhaps is, that it is the less of two evils and that there will be a better method invented some day. I think myself that the better way would be through an application of warm air to be used as we use steam to-day. This would not pit the sheet rolls due to lack of moisture and I think it would reduce the heat just as effectively in the roll without the evil effects.

AN ENGINEERING MUSEUM

Movement to Establish One at the Smithsonian Institution at Washington

After the DeLamater-Ericsson commemoration on March 9, the sixtieth anniversary of the battle between the Monitor and Merrimac, the American Society of Mechanical Engineers appointed a committee to cooperate with the committee in charge in making a collection of historical material connected with Cornelius H. DeLamater and Capt. John Ericsson (during their 50 years' association [1840-1890] as the leading factors in the DeLamater Iron Works, at the foot of West Thirteenth Street, New York) H. F. J. Porter, chairman of the joint committee points out that these works were the largest institution of their kind in their day and there during the period mentioned developments took place in naval, merchant-marine, ordnance and industrial engineering "which helped materially to raise this nation from comparative unimportance to its recognition as the leading nation of the world, and yet of the details of this accomplishment there is no record. In fact, there is nowhere a tangible record of any of the steps whereby this country has attained its present commanding position in the world."

In seeking for a permanent depository for the DeLamater-Ericsson historical collection the committee conferred with the Smithsonian Institution at Washington and its secretary sent with his reply his latest report on the National Museum which is under his custody. The concluding paragraph of this report reads as follows:

> Museums devoted to history, art and the natural sciences are established in all of the larger nations of the world and many of them have established, in addition, educational museums of engineering and industries. Thus England has her South Kensington Museum; France her Conservatoire des Arts et Matiors (at Paris) and Germany her Deutsches Museum (at Munich), but nowhere in this nation of ours, the most advanced in the application of the engineering and mechanical arts, is there a similar institution. The commanding place in the world which the United States has reached in the short space of seventy-five years is due largely to the full development and utilization of mechanical power in the exploitation of her natural resources. It is this that has made it possible for the people of the United States to enjoy a standard of living far and above that under which the peoples of the rest of the world exist, and still no public sign of appreciation, either national or otherwise, is to be found anywhere. What more suitable monument could there be, therefore, than a Museum of Engineering and where could there be found a more logical place for it than as a part of the great National Museum?

The Smithsonian Institution then not only solicited the placing of the DeLamater-Ericsson historical collection in its National Museum but proposed the cooperation of the committee in establishing the nucleus there of a great national engineering museum comparable to the foreign museums to record the accomplishments, in the upbuilding of this nation, of its engineers, who are only now beginning to secure a recognition of obligations too long deferred.

Notwithstanding all that the engineers have done for this country, it was not until 1920, Mr. Porter adds, that one of them, James B. Eads, was deemed worthy of being associated with the notables in other vocations in the Hall of Fame. "The first monument to an engineer is only now being erected and will be dedicated to Capt. John Ericsson in 1924 adjoining the Lincoln Memorial in Washington. The first engineer to be given a chair in a President's cabinet is Mr. Hoover, in the present administration."

The committee has responded that it realizes the responsibilities to be incurred in assuming the performance of such a task as has been proposed, but feeling that now is the time to do it, for every day passing is one during which the records needed are being lost and men who were leaders in events are dying off, and feeling that with the backing of the American Society of Mechanical Engineers, it is strong enough to do it, it has started the movement.

At the annual meeting of the American Society of Mechanical Engineers, there will be exhibited a part of the historical collection in the Engineering Societies' Building. Such of it as would be appropriate as representing the work of Capt. Ericsson will be sent as requested to the tercentenary of the city of Gothenburg, Sweden, to be held there next summer. On its return it will go with the rest of the collection to the National Museum at Washington.

It is desired to make this a national movement in which every engineer in the country will participate. Engineering societies and alumni associations of engineering schools are requested to communicate for further information with the joint committee on the National Engineering Museum, Engineering Societies' Building, 29 West Thirty-ninth Street, New York.

A meeting will be held within the near future for the election of officers of a recently formed western Massachusetts branch of the American Society of Mechanical Engineers.

Rates on Eastern Iron Ore Reduced

Schedule Which Prevailed Prior to August, 1920, Restored —Ex-Lake Ore Rates Unchanged by Interstate Commerce Commission

BY L. W. MOFFETT

WASHINGTON, Aug. 1.—Eastern iron and steel and iron ore interests, by a decision of the Interstate Commerce Commission handed down last Thursday, won their fight for a 28 per cent reduction on ore rates from Eastern mines, while iron and steel interests using Lake Superior ore lost in their efforts to get a 20 per cent reduction in rates. The decision, in addition to ordering suspended tariffs carrying the 28 per cent reduction in Eastern ore rates to go into effect on Aug. 28, also ordered that tariffs proposing a similar reduction in rates on imported ore become operative on that date. Suspended tariffs proposing the 20 per cent reduction on ex-lake ore rate were ordered canceled on or before Aug. 29.

The effect of the reduction is to restore the Eastern domestic and import ore rates to the level prevailing prior to the 40 per cent increase that went into effect on Aug. 26, 1920, and to place the rates on these two classes of ore on the same relationship that obtained before that increase was made. The 28 per cent reduction is to replace, and is not in addition to the 10 per cent decrease that became effective on July 1, 1922, by the general rate reduction decision of the commission. The ore decision has no effect on reduced import ore rates that are already in effect, such as the rate of $1 per ton from Constable Hook, N. J., to Bethlehem, Pa. It does, however, eliminate the 40 per cent increase of Aug. 26, 1920, where this had not been done. An instance of this is the $1.26 rate from Perth Amboy, N. J., to Bethlehem, which will become $1 on Aug. 28.

Effect of I. C. C. Ore Rate Decision

EASTERN or station-to-station iron ore rates reduced 28 per cent and restored to level existing prior to Aug. 26, 1920, eliminating 40 per cent increase. New rates go into effect Aug. 28.

Ex-lake ore rates remain unchanged from those going into effect July 1, 1922, when 10 per cent reduction was made in accordance with general reduction rate decision.

Pending tariffs reducing rates on imported ore to level existing prior to Aug. 26, 1920, also go into effect Aug. 28. This will bring these particular rates on imported ore from Eastern tidewater to a parity of rates on imported ore already in effect, and import and Eastern ore rates will be on the same basis as they were before the 40 per cent increase was made operative.

The Eastern and imported ore tonnages affected by the decision giving it the lowered rates, based on 1920 consumption, were about 2,096,321 and about 1,228,496 tons, respectively, while the ex-lake ore tonnage, on the same basis, which was denied the proposed reduction, was 35,700,000 tons, according to the estimate of the commission.

Lake Interests Disappointed

The decision, while a source of gratification to Eastern consumers and mining interests, and a distinct disappointment to the large consuming interests of ex-lake ore in Ohio, western Pennsylvania, West Virginia and Virginia, was fully concurred in by six members of the commission, while the remaining three, Commissioners Meyer, Aitchison, and Potter, concurred in the decision as to reducing the Eastern and imported ore rates, but sharply dissented as to the refusal to reduce the ex-lake rates. They maintained that these rates should also have been reduced 20 per cent as proposed in the tariffs which have been ordered canceled. They do not agree with the majority report that the new adjustment is necessary to a proper relationship between Eastern and ex-lake ore rates and rates on coal from and to certain points, or that the proposed ex-lake reductions would be an undue burden on the revenues of the carriers or on other traffic. The carriers, it will be recalled, also participated in the efforts to reduce the rates on all the ore traffic involved.

The commission did not find any relationship between upper lake ore rates to Lake Superior docks to the other rates under discussion. The upper lake rates, however, are the source of a pending case in which ore interests are seeking reductions, which the railroads serving the mines are opposing. The decision also did not involve the proposal of Buffalo district iron and steel interests, which opposed ore rate reductions while coal rates to their plants were unchanged, to establish minimum rate on ex-lake ore rates. The Buffalo interests, however, were not opposed to reductions in Eastern ore rates themselves, but were contending for lower coal rates, which were granted in part recently.

The decision covered three complaints. One was the general case of iron and steel and railroad interests, except the Buffalo iron and steel makers, seeking the 28 per cent reduction in Eastern rates, and the 20 per cent reduction in rates from Lake Erie ports. The other two were what are known as the Wharton Steel Co. and Ringwood Co. cases. The Wharton Steel Co., operating the Replogle mines, near Wharton, N. J., and the Ringwood Co. in separate cases, later consolidated with the general case, had also been seeking the reductions, which were granted, on rates to furnaces in eastern Pennsylvania and New Jersey, which, it was charged, were unreasonable, unjustly discriminatory, and unduly prejudicial in comparison with the rates accorded to competing mines in Pennsylvania, New Jersey, Minnesota and Michigan, and at Sterlington, Fort Montgomery and Mineville, N. Y.

History of the Proceedings

It will be recalled that in October, 1921, reductions of about 28 per cent were made in both the Eastern trunk-line and ex-lake ore rates, limited to expire Dec. 31, 1921. Prior to the latter date, the carriers applied to the commission for authority to extend on short notice the period for an additional three months. At that time, the commission was considering the question of general reductions in rates, and the authorization sought was denied. Early in March, 1922, the Eastern carriers filed the schedules, which were suspended, proposing a 28 per cent reduction in Eastern trunk-line ore rates. These were shortly followed by the suspended rates applying on ex-lake ore, now ordered canceled, which were modified so as to represent a reduction of only 20 per cent. Meanwhile there had gone into effect some of the reduced import ore rates, and carrying no date of limitation, they were not suspended.

The following table shows present rates and those

which go in effect on Aug. 28 on ore in cents per gross tons from Wharton, N. J.:

To	Present	Effective Aug. 28
Catasauqua	154	111
Coatesville	196	141
Lebanon	[illegible]	[illegible]
Steelton	224	161.5

The following presents similar facts as to rates from Ringwood:

To		Effective Aug. 28
Bethlehem	[illegible]	[illegible]
Emaus	201.5	161.5
Hellertown	201.5	161.5
Reading	201.5	161.5

The foregoing compares with the rate of $1.15 per gross ton on ore from Lake Erie ports to Pittsburgh, which it was sought to reduce to $1.02.

In taking up a discussion of the ex-lake ore rate case, the commission points out that on June 25, 1918, the ore rates from the mines to the upper lake ports were increased 36.5 cents, but no change was made at that time on the ex-lake ore rates. Under the general increases of 1920, the ex-lake, local, and import rates on ore were increased 40 per cent, but no further increase was made in the rates to the upper lake ports from the mines. The commission says there appears never to have been any fixed relationship between the upper and lower lake rates, and it is stated that the rates on coal and coke have become relatively higher than the rates on iron ore.

"While we are not prepared to find that there should be any definite or fixed relationship between rates on coal or coke on the one hand and the rates on iron ore on the other," the decision says, "it is evident that some consideration must be given to the maintenance of a relatively fair level of rates on the two commodities.

Former Plan of Rate Making

"To preclude misapprehension, it should be stated that we do not here sanction by implication any reversion to the type of rate making known as the equalization of freight-assembly costs of raw material," the opinion says. The commission emphasizes in its finding that on each raw material the freight charge must be properly apportioned to the service performed. It says: "The proposal of the carriers to single out only one of the raw materials for the manufacture of pig iron and to leave unchanged the general level of rates on all other raw materials used for the same purpose does not contemplate the same unlawful charges involved in the assembly-cost method; but in other respects it is equally indefensible. To affirm, however, that the level of rates upon one important raw material may be violently reduced below the comparative level of the rates upon all other raw materials finds not the slightest sanction in our rejection of the assembly-cost idea.

In justifying its denial of reducing the ex-lake rates, the commission says that, roughly, the ex-lake rates since July 1, 1922, represent an index number of 155, considering the rates fixed by the iron ore decision of 1916 as representing 100. Rates on traffic in general, it is pointed out, were increased to a level representing an index of over 200, taking the rates of 1916 as 100, and since July 1, 1922, they still represent an index of over 180.

"If the reduced ex-lake ore rates become effective, they will represent an index of approximately 138," it is contended. "In the absence of some showing that the ex-lake rates on ore are relatively high compared with other rates on ore and with rates on traffic in general, further reduction therein at this time would appear to be out of harmony with our findings in Reduced Rates, 1922." Since 1916 and up to July 1, 1922, the decision says, there has been an aggregate increase of about 55 per cent in the ex-lake rates and of over 85 per cent in such of the Eastern and import rates as have not been subject to more than 10 per cent reduction since the increase of 1920."

Speaking generally, the decision says, rates on Eastern trunk line and import ore, where such rates have not been reduced more than 10 per cent since the increase of 1920, are now much in excess of ex-lake ore rates for like distances, in many cases nearly double, and probably on the average more than 80 per cent higher.

The commission justifies the Eastern and import reduced rates and finds the proposed ex-lake rate reduction unreasonable and unlawful "for the reason that in relation to rates in general, and in relation to rates closely affiliated, such as on coal, they would tend to cast an undue burden upon other traffic; that they would be unduly prejudicial to ore traffic from mines in Eastern trunk-line territory, so far as the same carriers participate in the interstate carriage of both ex-lake and local mine ore traffic; that they are unlawful inasmuch as their establishment would jeopardize the rates on a large volume of other heavy-loading low-grade traffic which we have initiated under authority of section 15a of the interstate commerce act." Apprehension also was expressed lest it would adversely affect the annual return of 5.75 per cent fixed in the 10 per cent reduction case. The commission said it was persuaded the proposed reductions in ex-lake rates would not result in increased net revenues to the carriers, but in substantial reduction, "probably more than $3,000,000 per annum."

Dissenting Views

In dissenting in part, and with Commissioner Aitchison concurring in his views, Commissioner Meyer gave figures as to earnings and made comparison with upper lake and other ore rates to justify the reduction proposed in ex-lake rates. He said the conclusion of the majority as to the probable reduced earnings not being based on car-loading statistics, does not specifically show the movement under the ex-lake rates.

"It cannot, therefore, on this record be concluded that an increase in tonnage following the reduction in rates would not result in increased rather than reduced revenues for the carriers," he says. "The opinion of practically all parties on record was to the effect that a reduction in rates would result in increased movement and increased revenues." At another point, he states that: "The incidences of rate reductions are necessarily more or less uncertain, but on no commodity does a reduction in rate give greater promise of a resulting reduction in the price of intermediate and final products than in the reduction of rates on iron ore; and to this extent the report of the majority is standing in the way of a reduction in the cost of living."

Commissioner Potter in his partial dissent gives figures to offset the contention of the majority that the proposed reduced ex-lake rates would be an undue burden on traffic and as to the finding that the proposed rates would imperil the returns to which the carriers are entitled, says the carriers do not think they would. The apprehension regarding further jeopardizing of the 5.75 per cent return is replied to with the statement that it does not justify the interference of the majority view, and that condemnation of reductions in rates should have a better foundation in certainty as to what the results would be. A reduction of the ex-lake rate 20 per cent, it is stated, would be approximately 25 cents per ton and aggregate approximately $9,000,000 per year, based on the 1920 movement. Such reduction, Commissioner Potter points out, would reduce the cost of pig iron approximately 50 cents per ton and correspondingly reduce the cost of iron and steel products.

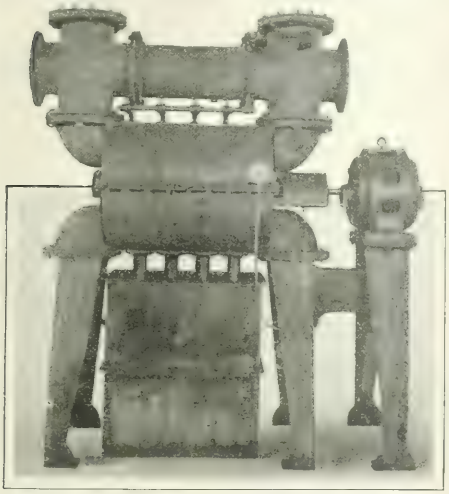
"The total 1920 movement of ore from mines in Eastern trunk-line territory was approximately 2,096,000 tons," he adds. "The protection afforded these ores by denying the proposed ex-lake reduction is 25 cents per ton, or an aggregate of $524,000 on the total movement. The protection of the Eastern mines to the extent of $524,000 is by the majority report made to cost the consumers of products of iron ore $9,000,000. To put it another way, in order to protect the Eastern ores to the extent of 25 cents per ton, the consumers of ore products are to be compelled to pay in excess of what they should more than $4 per ton on the ore produced by the local mines. I can see no justice in such action. We are not called upon to subsidize the East-

ern mines out of the funds of consumers generally of the products of iron ore. If the local mines are entitled to protection to the extent of 25 cents per ton, some means should be found which would not cost the consumers $4 per ton. It is to be noted, too, that the higher cost of pig iron continued by refusing the proposed reduction will naturally affect the cost to the consumer of products of import ore, so that the aggregate amount which the consuming public would pay on the basis of the majority report to protect the Eastern mines to the extent of $524,000 will be much in excess of $9,000,000. The interstate commerce act requires no such relation of ward and guardian between the local mines and this commission, as the majority report recognizes, at the expense of the producers of other iron ores and the consumers of their products."

Tar Extractor with Improved Features

A centrifugal tar extractor for cleaning producer gas, which has, among other features, a water spray directed upon the walls instead of upon the fan blades, is being manufactured and marketed by the Gas Producer & Engineering Corporation, 115 Broad Street, New York, under the name of the Galusha tar extractor and gas pump. It is a multi-stage design.

The size shown in the accompanying illustration is driven by a 16-hp. motor at 1720 r.p.m. Under test it removed, it is stated, over 99.5 per cent of the tar with the gas flow at a rate of 50,000 cu. ft. per hour. The gas enters the extractor after passing through a cooler, which is a small cylindrical tank fitted with



Tar Extractor and Gas Pump. The water spray is directed upon the walls instead of upon the fan blades

water sprays, to chill the gas to approximately 100 to 140 deg. Fahr. The clean gas is delivered from the extractor under pressure, which may be distributed in an ordinary steel pipe in the same manner as natural gas and city gas and used in the same way.

The machine has a housing divided by transverse partitions into four or more sections, each provided with a rotor and a spraying nozzle. The nozzles direct the flow of water upon the walls of the casing instead of upon the fan blades, thus reducing the power consumption. A suitable drain carries off the wash water and tar at the bottom. Centrifugal force keeps the water distributed over the stationary interior walls. The clearance between the rotor and the housing brings the gas and the film of water over the casing in close contact. The drains lead into a tar collecting tank at bottom.

The gas enters opposite the center of the first fan and is forced outward toward the periphery against the water covered casing. It then passes around the first rotor through a central opening into next stage and the process is repeated for each stage.

Some of the distinctive features claimed for the Galusha extractor are: Small amount of power required; elimination of gas blowers, because the extractor also puts the gas under pressure; separation of the tar from the water in a very small space at the extractor, and small space required for the unit as a whole and the simplicity of the whole apparatus.

Improved Pipe Wrench

A new pipe wrench known as the Little Giant and having the end-opening feature, as shown in the illustration, has been placed on the market by the Greenfield Tap & Die Corporation, Greenfield, Mass.

Simplicity, lightness and unusual strength are features claimed and the tool is designed to facilitate handling of pipe in corners and other confined places, the wrench being set on the pipe in the same manner as

Pipe Wrench with End Opening Feature



a pair of pliers, instead of having to fit the jaws on from the side.

The wrench is made up of only three parts, a drop-forged handle and jaw in one piece, heat treated; a drop-forged movable jaw, also heat treated, and a hardened steel nut. In this design springs, rivets, frame and pins have been eliminated. In a test of strength the 14 in. size is said to have withstood more than 4700 in. lb. without slipping or bending, the Army and Navy departments requiring but 2800 in. lb. for a wrench of this size. It is said to weigh less than a Stillson wrench of corresponding capacity.

A feature is the double set of teeth on the main jaw. The movable jaw can be engaged with either set of teeth which, it is pointed out, increases the life of that part. On the larger sizes four sets of teeth are provided, the movable jaw being reversible to engage the additional sets of teeth, which are below the adjusting nut.

The wrench will be made in 8, 10, 14, 18 and 24 in. sizes, the three smaller sizes being now available.

Cars and Locomotives at Low Prices

Low-priced steel has been no small factor in bringing large steel car orders to the books of the car works in the past six months. The *Railway Age* says of the exceptional prices named on cars and locomotives:

"The car and locomotive market has been greatly assisted by lower prices. Steel underframe box cars have been secured in recent months at prices approximating $1,500 or $1,600, steel hopper and gondola cars at from $1,600 to $1,800, the price varying, of course, with the size and design. Refrigerator cars cost at present about $2,700. Typical locomotive prices are $40,000 for a Pacific and from $37,000 to $42,000 for a Mikado. Six-wheel switchers have been bought at about $30,000 to $33,000. Passenger coaches have been secured at about $20,000. These prices represent marked decreases from the high prices which ruled in 1920 and are apparently proving a real attraction in so far as concerns bringing out orders. Considering the situation as a whole, other than the fact that we should normally expect a decline in business in the summer months, there is nothing at present in sight to lead one to believe that the equipment business will do else than continue in good volume."

RAILROAD STEEL CASTINGS

Testing Society's Tentative Specifications Just Adopted for Carbon Steel

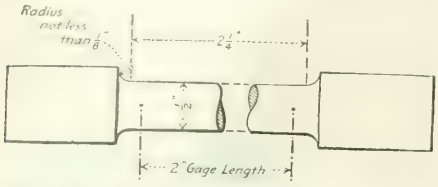
Among the new tentative specifications adopted by the American Society for Testing Materials, at its annual convention at Atlantic City, N. J., June 26th to 29th, those for railroad steel castings were prominent. They are the result of an extensive investigation and are reproduced as follows:

1. (*a*) These specifications cover all carbon-steel castings for [illegible] miscellaneous use, classified as Grade A and Grade B.

(*b*) The [illegible] are generally used as

(*c*) [illegible] special castings as may be approved by the purchaser. *Grade A*, annealed, covers such castings not covered by Grade A, unannealed.

Grade B covers all castings for high stresses such as truck side frames, bolsters, couplers and coupler parts, locomotive frames and locomotive driving and trailer wheel centers.



Note.—The Gage Length, Parallel Portions and Fillets shall be as shown, but the Ends may be of any Form which will Fit the Holders of the Testing Machine.

2. Grade A castings shall be furnished annealed unless otherwise specified by the purchaser.

Grade B castings shall be furnished annealed.

Manufacture

3. The steel may be made by one or more of the following processes: open-hearth, electric furnace, crucible or side blow converter.

4. (*a*) The castings shall be allowed to become cool. They shall then be uniformly heated to the proper temperature to refine the grain, and allowed to cool uniformly.

(*b*) For the purpose of determining the quality of annealing of all castings weighing 150 lb. or over, and of such lighter castings as shall be required by the purchaser or his representative, there shall be provided for removal by the inspector after annealing and also after reannealing, if necessary, at least one and not more than two annealing lugs. The location of the annealing lugs shall be such that when removed by the inspector they shall be indicative of the character of annealing. The standard annealing lug shall be 1 in. in height and 1 in. in width and ⅝ in. in thickness where it joins the casting.

(*c*) If, in the opinion of the inspector, a casting is not properly annealed, he may at his option require the casting to be re-annealed.

Chemical Properties and Tests

5. The steel shall conform to the following requirements as to chemical composition:

	Grade A	Grade B
Manganese, per cent, not over.....	0.85	0.85
Phosphorus, per cent, not over.....	0.05	0.05
Sulphur, per cent, not over.....	0.05	0.05

6. An analysis of each melt of steel shall be made by the manufacturer to determine the percentages of carbon, manganese, phosphorus, sulphur and silicon. This analysis shall be made from drillings taken at least ¼ in. beneath the surface of a test ingot obtained during the pouring of the melt. The chemical composition thus determined shall be reported to the purchaser or his representative, when requested, and shall conform to the requirements specified in Section 5.

7. An analysis may be made by the purchaser from the broken tension test specimen or from a casting representing each melt. The chemical composition thus determined shall conform to the requirements specified in Section 5. Drillings for analysis shall be taken not less than ¼ in. beneath the surface, and shall be taken in such a manner as not to impair the usefulness of a casting.

Physical Properties and Tests

8. (*a*) The steel shall conform to the following minimum requirements as to tensile properties:

	Grade A Unannealed	Grade A Annealed	Grade B Annealed
Yield point, lb. per sq. in.....	29,250	29,250	36,000
Elongation in 2 in., per cent..	1,450,000	1,600,000	1,600,000
	Tens. str.	Tens. str.	Tens. str.
Elongation, per cent, not under	22	24	22
Reduction of area, per cent...	2,250,000	2,600,000	2,500,000
	Tens. str.	Tens. str.	Tens. str.
Reduction of area, per cent, not under	30	35	30

(*b*) The tensile strength shall be reported as information.

(*c*) The yield point shall be determined by the drop of the beam or by the dividers, the method being optional with the inspector, and at a cross-head speed not to exceed ½ in. per minute. The tensile strength shall be determined at a speed not to exceed 1½ in. per minute.

9. (*a*) A sufficient number of test coupons, from which the required test specimen may be prepared, shall be cast attached in the neighborhood of each end of each locomotive frame, attached to each locomotive cylinder, to each wheel center, and to miscellaneous castings weighing over 150 lb. These test coupons shall remain attached to the castings throughout the annealing and until the castings are presented for inspection. If the design of the casting is such that the test coupons cannot be attached, they shall be cast in runners outside of the casting, but attached to it, to represent each melt. The location of the test coupons, as well as the method of casting such coupons, shall be subject to mutual agreement between the inspector and the manufacturer. In the case of any orders for castings weighing under 150 lb., the physical properties as required in Section 8 may be determined from an extra or spare test bar cast with and attached to some other casting from the same melt.

(*b*) When sufficient coupons have not been cast, a test specimen may be cut from a finished casting at a location mutually agreed upon by the inspector and the manufacturer.

(*c*) Tension test specimens shall conform to dimensions shown in Fig. 1. The ends shall be not less than ⅞ in. in diameter and of a length and form to fit the holders of the testing machine in such a way that the load shall be axial.

10. (*a*) One tension test shall be made from the neighborhood of each end of each locomotive frame and both tests shall meet the requirements of the specifications. One tension test may be made from each wheel center and each locomotive cylinder casting, but of such castings at least one of each kind in each melt shall be tested. For miscellaneous castings from melts which do not include frames, wheel centers or cylinders, one tension test shall be made from each melt, except as provided in Section 11 (*a*).

(*b*) If the test specimen shows defective machining or develops flaws, it may be discarded and another specimen substituted.

(*c*) If the percentage of elongation of any tension test specimen is less than that specified in Section 8 and any part of the fracture is more than ¾ in. from the center of the gage length, as indicated by scribe scratches marked on the specimen before testing, a retest shall be allowed.

(*d*) No part of these specifications shall operate to cause any one tension test to apply to more than 40 tons of casting as offered for inspection.

11. (*a*) After 15 consecutive melts, which may contain any or all classes of castings (except frames, wheel centers and cylinders) covered by these specifications on one or more orders have been tested and accepted in accordance with the above requirements, the manufacturer may group the succeeding melts in lots of five melts each, but each lot not to exceed 40 tons, the entire group to be accepted if the test specimen selected from the lot fulfills the chemical and physical requirements herein specified. If this test fails, a rehearing will be granted on the melt that the failed bar represents, and the other four melts of the group shall be tested individually.

(*b*) If there is a period of more than six months between shipments of the class of castings covered by these specifications, then each melt shall be tested individually until 15 consecutive melts have been accepted, after which the melts may again be grouped as in Paragraph (*a*).

(*c*) If one or more melts are rejected, each succeeding melt shall be tested individually until 15 consecutive melts have been accepted, after which melts may again be grouped as in Paragraph (*a*).

12. If the results of the physical test lot do not conform to the requirements specified, the manufacturer may re-anneal such lot not more than twice and retest shall be as specified in Section 8.

(*Continued on page* 321)

Value of Accident Investigations

Need of Studying Each Case in a Methodical Way, Thus to Prevent Recurrence—Meeting the Variable Human Factor

BY H. P. HEYNE*

LIKE any other work, accident prevention activities should be conducted in a systematic manner if they are to be successful, both from the humanitarian and economic viewpoint. Too much stress cannot be laid in the section of safety engineering which deals with accident investigations, as corrective measures or methods are the outcome of the results of the investigations if conducted in a thorough and impartial manner.

Need of Ascertaining Causes

Each accident involving loss time should be thoroughly looked into, together with injuries where no time was lost but which might have been serious. The idea of an investigation is that one accident will prevent another by removing the cause, which eliminates the effect.

Each injury, whether trivial or one causing loss of time, is reported to our emergency hospital, by having the foremen render their reports. A foreman may state on his report that the "man had first finger of right hand lacerated by having finger caught between slabs." It may be true that the injury occurred in this manner, but we aim to get after the "why and how" of the injury, and also what should be done to prevent a recurrence. Without a thorough investigation, in a case similar to the aforementioned, one would not know whether the slabs were improperly piled; handled in an unsafe manner by crane operator; fellow workman pushing slabs over with the one on which the man was working; slab may have toppled over, and a host of other questions may present themselves, and still one would not know the real cause, such as the predisposing, contributing and immediate causes for the injury.

Procedure in Studying Accidents

In cases of lost time injuries, we visit the scene of the accident together with the department superintendent and foremen and members of the safety committee in the department, and make a thorough survey of all surrounding and existing conditions, such as the machinery or equipment, method of performing the work, and material employed in the work, in order to get the scene firmly impressed.

Witnesses are interviewed and must make true statements, and not conceal any facts, so that one may get to the root of the trouble. Each witness to the accident is personally interviewed.

After the statements have been secured, a meeting of the investigating committee is called, which is composed of the department superintendent and foremen of the division where the injury occurred, also members of the safety committee. The information as furnished by each witness is gone over in a thorough manner and discussed, also a discussion by the committee of our previous visit to the scene of the accident, whereupon the committee renders an "investigation report" which is signed by the members of the committee. The report brings out the results of the investigation as to what or who was at fault for the accident, also as to what must be followed in the future to prevent a recurrence.

A copy of the witnesses' statements and the committee's report is forwarded to the general manager, general superintendent and department superintendent and a copy is retained in the permanent files of the safety department.

It will be observed that by having a full and complete record of accidents the papers serve their purpose. All department heads may become familiar with the cases which might bring up matters in other departments to be corrected, or result in closer observance over the men, with instructions that they pay particular attention to certain matters or conditions.

The papers may be brought into use when conducting departmental meetings among the working men, for they will eagerly absorb the information which causes them to think, talk and act safely, because the instances are driven home.

The time consumed in drawing up statements in a business-like form;—attacking the accident from different angles,—is well spent, in that each case is recorded in a detailed manner so that future reference may be made to each case. Also there is the psychological effect the investigations have upon the men, which in due time results in a reduction of injuries and finally the economic saving to the employer.

Disciplining of Employees

When an employee is injured through ignorance or lack of forethought on his part or that of a fellow working man, it is well to consider whether the best interests of the company demand his dismissal or lay off, for the employee has to be replaced by a less experienced man, which does not help matters any, and increases the accident exposure and the cost of labor turnover, which is reflected in decreased efficiency of the new worker.

It may prove more effective to demote the employee at fault and to insure that he and others may know why such action was taken, which fact would tend to make the men think before they act.

Our records show that 57.4 per cent of the injuries occurred to employees who were in our service for periods less than six months. Dismissal of an employee may be necessary in cases where a shop rule or instruction was violated or for wilful negligence or intent, which caused the accident, but an impartial hearing should be given the employee before final dismissal.

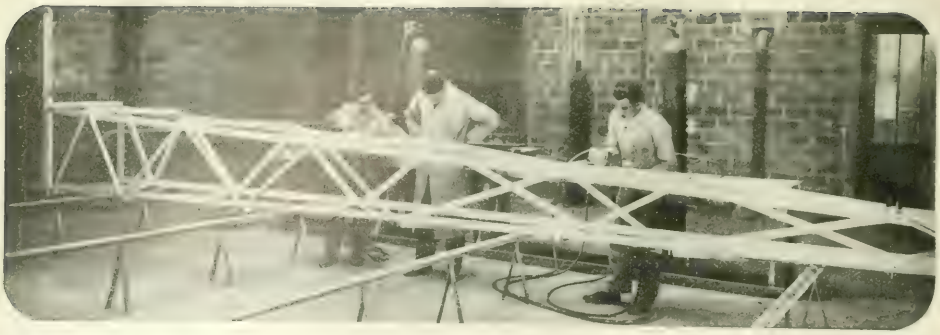
Safety engineering involves the human element, and might be termed the study of human nature, for no two persons are alike, and problems are presented each day which differ from the preceding cases of similar nature. It is a branch of work in an establishment which must be conducted along scientific lines in order to get results.

*Safety inspector, United Alloy Steel Corporation, Canton, Ohio.

German Process for Soldering Aluminum

WASHINGTON, Aug. 1.—Attempts are being made by the German inventor of what is said to be a new process of soldering aluminum to sell the American rights for $5,000 and the rights for all countries for $30,000. Carl Barthels, Heidelberg, has been commissioned, according to a report received by the Department of Commerce from Consul Moorhead, Stuttgart, Germany, by the inventor to sell the rights to the patent. It is stated that the solder has been tried by German manufacturers and that it has proved satisfactory. It is claimed that the process simplifies the soldering of aluminum both pure and in connection with other metals, such as tin, zinc, copper, etc. The so-called advantages are declared to be simple application with the soldering iron, without any liquid soldering agent, firm union of the edges soldered and permanency, no matter how much the soldered seam may be exposed to pressure, bending and pulling.

At Charleroi, Pa., the Electric Alloy Steel Co. is operating its property on a basis close to usual production.



Protective Coatings of Sprayed Metal*

Late Developments With the Schoop Process Abroad—Examples of Applications and Operating Features—Spraying Pistol Operated Electrically

BY ROBERT G. SKERRETT

SPRAYING molten metals to form a protective coating was looked upon a decade back as little better than a laboratory achievement of trifling practical value. To-day, thanks to the persistence of M. U. Schoop of Zürich, Switzerland, apparatus and methods have been devised that make metal spraying for this purpose of wide commercial usefulness. The latest reports of every-day performances reveal how effectually the inventor has surmounted the techinal obstacles which beset his path; and his longest strides forward have been achieved in the last five years. To-day, in Europe, Schoop metal-spraying equipments are employed extensively in depositing coats or films of zinc, lead, aluminum, copper, tin, etc.

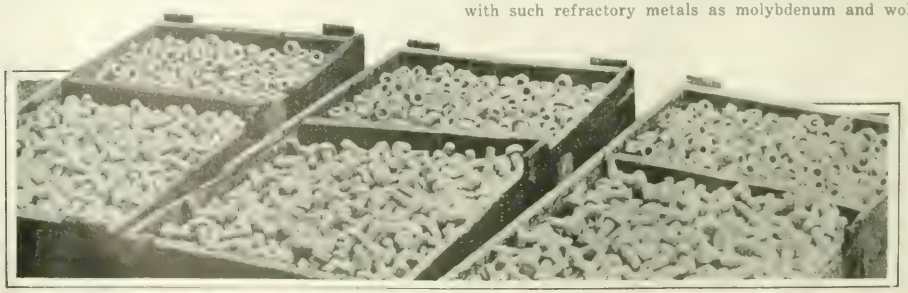
Broadly stated, his different processes depend upon the generation of sufficient heat to melt wires or powdered metal and then to project the molten particles forcibly by a blast of compressed air. The velocity of the atomized metals suffices to cause them to adhere, by reason of their impact, to the receiving surface and also to insure their uniform distribution. Whether the metal is used in the form of a wire or a powder depends upon the nature of the metal, its price and the service for which it is intended. For instance, abroad, powdered zinc is obtainable in abundant quantities as an industrial by-product, and is therefore much cheaper than zinc wire. A so-called pistol is the medium by which the metal is made molten or plastic and projected against the body or surface which is to be coated.

The powder-spraying pistol has much to commend it, and by reason of its simplicity of construction it has won approval among industrial users, inasmuch as little training is required to qualify a workman to manipulate it satisfactorily. The powdered material is fused by a gas flame. The pistol is equipped with a magazine or small container charged with the metallic dust or powder, and this material is forced out of the reservoir by compressed air and carried by the air stream through the melting flame. The air pressure is regulated so that its impulse will be strong enough to drive the incandescent particles against their target. This manual type of apparatus has no movable parts, such as are essential to feeding the wire in the pistols designed to handle metal in that form, and is largely employed for zinc or tin coating.

Quantity galvanizing and tinning of small articles is done by means of the powder-spraying pistol associated with another mechanical feature. The products to be treated are loaded into a revolving drum, equipped with a series of spiral ribs, which continually turn the contents and bring every surface of each piece into the path of the atomized metal. The pistol is mounted upon an oscillating shaft, and the motion of the latter serves to distribute the spray and to insure the complete coating of the manifold tumbling bodies. Of course the wire-spraying pistol can be adapted to this machine.

The electro-pistol is a late evolution of the Schoop metal-spraying processes. Instead of a gas burner, an electric arc is relied upon to do the melting, and the intense heat of the arc makes it practicable to deal with such refractory metals as molybdenum and wol-

*This article, based on European information, does not refer to developments of the Schoop process in the United States under the control of the Metals Coating Co. of America, 495 North Third Street, Philadelphia, which has issued a profusely illustrated pamphlet for this purpose.



Bolts and Nuts Which Have Been Galvanized in Quantity by the Schoop Metal Spraying Process

fram, in addition to the metals already mentioned. The adoption of the arc, however, imposed important modifications in the apparatus. As is well known, electrothermic heating, especially when using the lighting arc as a source of heat, permits the generation of the highest-known temperatures within any desired limited area. But the usual electro-thermic melting cycle cannot be applied to the fusing of metals for spraying, because of the difficulties of maintaining a uniform flow of the metal and the impossibility of preventing the clogging of the channel through which the necessarily fine stream would have to be fed to the blast of compressed air.

This problem has been met as follows: Instead of a miniature furnace, Schoop has substituted a self-melting arc which is induced between two terminals formed of the wire to be sprayed. These wires are kept at an arcing distance from each other, and as they are fused, and then atomized by the blast of compressed air, compensation is effected through the agency of an air-driven mechanism. In earlier forms of the pistol a pneumatic turbine making 27,000 r.p.m. was relied upon to feed the wires, but a simple Pelton wheel has now been adopted which runs at a velocity of from 4000 to 5000 r.p.m. By means of suitable gearing, the speed is reduced so that the advance of the opposing electrodes is just fast enough to offset their consumption. The heat generated at the arc is prevented from spreading into the mass of the pistol by the cooling action of the discharged compressed air.

The electro-pistol is operated by current of from 20 to 30 volts, at from 40 to 70 amperes; and spraying the metal calls for an expenditure of about 18 cu. ft. of compressed air per minute at a pressure of 50 lb. per sq. in. In earlier models of the Schoop pistols, air at a pressure of 100 lb. was employed. By reducing the pressure to 50 lb. there is a distinct technical gain, inasmuch as there is less chilling of the atomized particles; and this promotes adherence and a more intimate union with the texture of the supporting mass. Each wire is advanced at the rate of from 5 to 13 ft. per min., depending upon the nature and the size of the wire.

The quantity of metal that can be deposited in the course of an hour depends, of course, upon the kind of metal handled. The results may be broadly stated as follows:

Zinc, sprayed at the rate of 6½ lb. per hr., will cover a superficial area of 65 sq. ft. to a thickness of 0.0002 in.
Tin, sprayed at the rate of 13 lb. per hr., will cover a superficial area of 43 sq. ft. to a thickness of 0.0008 in.
Lead, sprayed at the rate of 22 lb. per hr. will cover a superficial area of from 20 to 30 sq. ft. to a thickness of 0.002 in.
Aluminum, sprayed at the rate of 1 lb. per hr., will cover a superficial area of from 30 to 40 sq. ft. to a thickness of 0.0012 in.

In the case of multiple galvanizing, by the machine already described, it is entirely practicable to coat a charge of 650 lb. of bolts and nuts, for instance, within an interval of 20 min.

The principal use of the metal-spraying process is for galvanizing, and its employment in this field will be the most conspicuous of its applications for some time to come. About three years ago the Swiss federal railroads introduced this system of galvanizing, and have thus coated the transmission towers, etc., of the electrified St. Gothard line. Both the German and the Swiss railroads have so protected the frames of their cars—especially coal cars exposed to the corrosive action of sulphur washed out of the fuel by rain or melting snow.

Latterly, the French have galvanized the transmission towers of the Midi road; and these towers were zinked in this way without any interruption to traffic. A number of bridges have been galvanized in this manner by recourse to portable outfits; and the parts of these structures directly in the path of the smokestack exhaust of steam locomotives have been further shielded from erosion by a supplemental film of lead deposited by the same apparatus. In the climate of Switzerland the sprayed-on metal will last anywhere from 18 to 20 years. In Italy, two coats of paint are being saved by metallizing wood with zinc and afterwards covering the deposit with a coat of paint.

During the world war, the Germans made a practice of spraying aluminum upon the grate bars of their locomotives, and they found that the protecting film measurably reduced wear and tear. The aluminum seems to screen the bars from the action of the furnace gases, and incidentally prevents scaling of the iron and the adherence of slag.

It is not possible within the limits of the present article to more than hint at the many ways in which Schoop metal-spraying pistols are being utilized. In Switzerland alone no fewer than 250 establishments are licensed and equipped to operate these tools, and with them the shops are coating a wide range of products. For example, iron containers for chemical plants are coated with aluminum, lead, or copper; iron calenders for textile works are sprayed with brass; centrifugals used in the manufacture of guncotton are protected with aluminum; porcelain insulators are surfaced with copper; Pelton wheels are thus overlaid with lead to arrest the erosive action of sand and pebbles; and paper and fabrics are extensively metallized for all sorts of purposes. Telephone cables, etc., instead of being wrapped first with paper and then with zinc foil, are now insulated with a single wrapping of zinc-coated paper. No mention has been made of the purely decorative or art fields in which the Schoop metal-spraying pistols can be employed.

Colorado Steel Works Operations

President J. F. Welborn of the Colorado Fuel & Iron Co. makes this statement concerning the company's business in the July 15 issue of its *Industrial Bulletin:*

"Operations at the steel works and coal mines during the last three months have been at a fairly satisfactory rate for that time of the year, yet the volume of business done at the low prices made necessary by keen competition has not been sufficient to pay all direct charges and take care of depreciation. Operations for the quarter ending March 31 returned a loss of $431,268.53. Statements of earnings for the first two quarters of the year are published elsewhere. An analysis of these statements shows that after paying wages of employees the receipts from business done during the first six months of this year were barely sufficient to meet the other necessary charges for conducting the business, such as freight on raw materials, cost of supplies, interest on borrowed money and taxes, leaving less than half the amount necessary to take care of depreciation for the period. Obviously, in this half year the stockholders received nothing from their investment in the business.

"Business in the coal department promises well for the next few months, although the demand is not abnormal and there has been no enlargement of the territory in which our coals are marketed as a result of the strike elsewhere.

"Orders for wire, nails, merchant bars and other products of the small mills are at a rate slightly less than our capacity. The prospects are that this business will not decrease in volume during the next few months, and it may increase.

"We have made no sale of heavy rails in recent months, and our rail orders will be completed in the near future when in all probability the rail mill will have to close down for a period. This will, of course, necessitate some curtailment in production of coke, pig iron and ingots, and reduce coal shipments to the steel plant."

Changes in Cost of Living

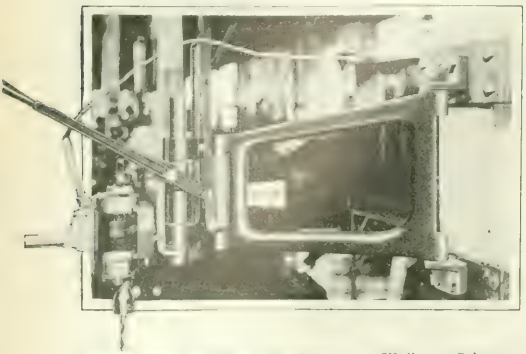
Changes in the cost of living for June, as determined by the U. S. Department of Labor through the Bureau of Labor Statistics, show that the cost of living was 66.6 per cent higher than in December, 1913, 23 per cent lower than in June, 1920, and two-tenths of one per cent lower than in March, 1922.

Furniture continues to be the highest item in the cost of living, standing 102.9 per cent higher than in 1913. Food, the largest item in the family budget, is 41 per cent above 1913; rents are 60.9 per cent "up" and clothing 72.3 per cent.

Millwrights' Radial Arm Drill

A radial arm drill of the type illustrated, intended especially for use in connection with the work of millwrights and maintenance men, has been placed on the market by the Van Dorn Electric Tool Co., Cleveland. It is attached to the wall or column and the arm and drill cover a radius of 31½ in. from center to wall pivots. The auxiliary forearm permits a secondary radius of 10½ in., to be swung for locating the drill.

The electric drill proper is incased in an aluminum housing and arranged for quick disassembly for greasing and cleaning. It is well balanced, convenient to handle in almost any position, and the light weight of the machine as a whole permits easy moving to various locations in the shop. The motor is of the universal type for either alternating or direct current and is ventilated by an aluminum fan on the rotor shaft. The drill chuck provided permits the use of drills up to ⅝ in. diameter for work of iron or steel; larger wood bits may be used.



Radial Arm Drill for Attachment to Wall or Column. The radius covered, from center of drill to wall pivots, is 31½ in. Drills up to ⅝ in. in steel may be used

In the radial arm the weight is distributed to give the strength and rigidity necessary to withstand heavy duty and the design permits of an easy swinging motion of the arm for quick location of the drill. The arm is supported by the pivoted brackets, as shown. At the opposite end of the main arm casting there is a second pivoted joint on which the short forearm swings and the outer bearings of the forearm form a support and guide for the drill bracket. The forearm is intended to give flexibility to permit quick and accurate location of the drill.

The drill bracket or sliding member is raised and lowered by means of a long lever and toggle-link mechanism. A secondary drill-lifting arrangement is also provided in the form of a strong tension spring attached to the lower part of the drill bracket and hung from an extension rod above the forearm. The drill is attached to the radial arm by unscrewing one handle and bolting the drill to the adaptor plate on the radial arm. Less than a minute is said to be required to attach or detach the drill.

Large Orders for Springfield Plants

SPRINGFIELD, OHIO, July 31.—The Armstrong Brothers' Mfg. Co. is turning out from 1000 to 1200 castings for incubator heaters each week. It has an order for 50,000 heaters from the Buckeye Incubator Co., which has many domestic and foreign orders. Archibald Bell of Harbley, France, European representative of the latter company, who has been here for two weeks, left a large order with the incubator company.

A survey made by the Chamber of Commerce shows that out of 18,000 employees used in the local plants normally, 74 per cent are working 5½ days per week and the rest three days a week. Manufacturers say the coal supply here will last from 60 to 90 days and that rail shipments outbound are good. Inbound shipments of supplies are not coming so well. The delay is partly due, it is stated, to a rush of orders at the supply plants.

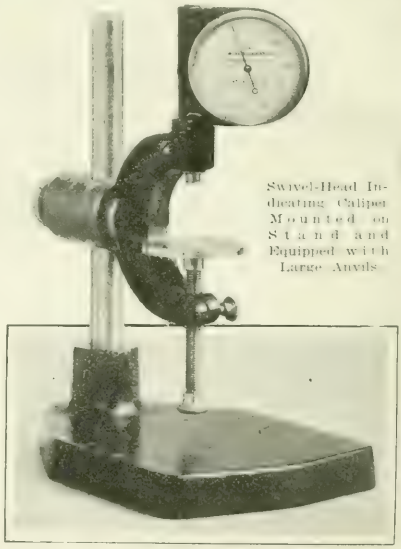
As a result of an order for 25 locomotives placed by the New York Central Railroad with the Lima Locomotive Works, the plants of Ohio Steel Foundry Co., this city and Lima, are working good sized forces of men, according to announcement of Works Manager T. H. Harvey.

Swivel Head Indicating Caliper

An indicating caliper the head of which swings a full circle about the plunger, permitting of easy reading of the dial from any position, has been brought out by the F. W. Horstmann Co., Irvington, N. J.

The head will stay fixed in any position and without the use of clamps. The instrument is set to a sample in the same manner as in the company's regular type, the sample or gage being set with the hand on the zero mark and the back stop arranged so that the work is centrally located on the contact points. The dial is graduated in thousandths of an inch. Six sizes, from 1 to 6 in. capacity, are available and each size has a range of 1 in.

A stand can be provided in which the tool can be clamped in either a straight or tilted position, and held perfectly rigid and although heavy enough for the usual work the stand is provided with two holes in the base for fastening to a bench or table. The instrument can be equipped with larger anvils for use with the caliper and stand combination.



Swivel-Head Indicating Caliper Mounted on Stand and Equipped with Large Anvils

Mixed Coal and Coke for Water Gas

Results obtained by W. J. Dunkley, gas engineer of the Bureau of Mines, in the course of experiments made at Ottwa, Ill., in the use of mixed coal and coke fuel for water gas manufacture, show that capacities up to 97 per cent of the rated capacity with good coke fuel can be obtained, using 70 per cent Illinois coal and 30 per cent coke from Kentucky coal, with 6 ft. gas sets operating up to 10 hr. per day. The generator fuel consumption was about 33.5 lb. of mixed fuel per 1000 cu. ft. of gas made.

Experiments on the treatment of lignite, raw and carbonized, by the Trent process, are being made in North Dakota by W. W. Odell, fuel engineer of the United States Bureau of Mines. Construction of a vertical lignite carbonizing oven has been completed.

CONTENTS

August 3, 1922

Problems in Localized Case Hardening 265
Low Carbon Machine Steel Used—After Carburization and Annealing, Material to Be Removed Machinable and Not Distorted in Subsequent Hardening

Anti-Friction Bearings in the Steel Mill 267
Development of Ball and Roller Bearings—Considerations Affecting Their Use—Advantages and Disadvantages

Factors in Oil Burning Using Cold Air 269
Study of Different Conditions of Air Supply with Comparisons of Cost—Regenerative Furnaces and Steam Boilers Not Considered

Economy Features of Electric Foundry 277
Locating Furnace and Supply Bins—Handling Materials—What Is Involved in Caring for Electrodes—Laboratory Facilities Necessary

Use of Steam for Cooling Sheet Rolls 279
How Best to Apply—Better Cooling Method Needed to Reduce Roughening of Roll Surface—Deep Chilled Rolls Favored

Value of Accident Investigations 285
Need of Studying Each Case in a Methodical Way, Thus to Prevent Recurrence—Meeting the Variable Human Factor

Protective Coatings of Sprayed Metal 286
Late Developments With the Schoop Process Abroad—Examples of Applications and Operating Features—Spraying Pistol Operated Electrically

Working Out Coal Distribution Plans 297
Large Place of State Organizations—How a Consumer in Need Proceeds—Personnel of Committee in Charge

July Pig Iron Output 300
Shows a Loss of 1281 Tons per Day Compared With June—26 Furnaces Banked or Blown Out; 5 Blown In

Stainless Steel In Mining 266
Association Meetings 266, 274, 323
New Switches for Electric Tool Handles 266
Saving Rolling Mill Brasses 268
Self-Contained Jig Saw 270
New Line of Polishing Machinery 270
New Induction Type Electric Furnace 271
Rolling Mill Equipment Merger 272
Pictures of Steel Making 274
Labor Notes 274, 278, 321
New Gear-Drive Crank Shaper 275
Die-Head With Micrometer Attachment 275
Protection by Aluminum 276
Flexible Radial Grinder 276
French Iron and Steel Exports Increase 276
Otis Steel Co. Plans 278
Immigration and Labor Supply 278
Machine Irons Out Buckles in Sheets 278
Leather Belting Sales Index 278
An Engineering Museum Favored 280
Rates on Eastern Ore 281
Tar Extractor With Improved Features 283
Improved Pipe Wrench 283
Cars and Locomotives at Low Prices 283
Railroad Steel Castings 284
German Process for Soldering Aluminum 285
Colorado Steel Works Operation 287
Changes in Cost of Living 287

Millwrights' Radial Arm Drill 288
Swivel Head Indicating Caliper 288
Mixed Coal and Coke for Water Gas 288
Editorials 290
Shall Autocracy Succeed?—Steel in Dwelling Houses—Buying Power the Test
Correspondence 292
Progress in Open Hearth Process
Steel Prices and Mergers 292
Foreign Iron and Steel Trade Notes 293
German Market 294
Revolution Counter 295
Fabricated Steel Business 296
Railroad Equipment Business 296
Strike Situation in Pittsburgh 298
Expansion of Air Reduction Sales Co. 317
French Market 319
June Sheet Statistics 321
Last Week's Coal Production 321
Utilizing the Seller 322
Chairman Schwab Discusses Bethlehem Company's Position 323
Book Reviews 333
New Trade Publications 334
Plans of New Companies 334
Industrial Finances 335
Trade Changes 335

Iron and Steel Markets 302
Comparison of Prices 303
Prices Finished Iron and Steel, f.o.b. Pittsburgh 315
Non-Ferrous Metal Market 317
Personal Notes 318
Obituary Notes 319
Machinery Markets and News of the Works 324
New York Jobbers' Prices 336

ESTABLISHED 1855

THE IRON AGE

EDITORS:

A. I. FINDLEY — WILLIAM W. MACON — GEORGE SMART

CHARLES S. BAUR, *Advertising Manager*

Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

E. J. Frank, *President* — PRINTED IN U. S. A. — George H. Griffiths, *Secretary*

Owned by the [illegible] 243 West 39th Street, New York. [illegible] Phillips, *Vice Pres.* A. C. Pearson, *Treas.* E. J. Frank, *Secy.*

BRANCH OFFICES: Chicago, Otis Building. Pittsburgh: Park Building. Boston: 710 Unity Building. Philadelphia: 1420-1422 Widener Building. Cleveland: Guardian Building. Detroit: 317 West Fort St. Cincinnati: Mercantile Library Bldg. Buffalo: 881 Ellicott Square. Washington: 818 Fifteenth St., N. W. San Francisco: 320 Market St. London, Eng.: 11 Haymarket, S.W.1.

Subscription Price: United States and Possessions, Mexico, Cuba, Shanghai, $6.00; Canada, $8.50; Foreign, $12.00 per year. Single copy 25 cents.

Entered as second class matter, June 18, 1879, at the Post Office at New York, New York, under the Act of March 3, 1879.

Shall Autocracy Succeed?

The air has been full of strike settlement talk in the past week. In the coal strike the miners' leader has said confidently that a national conference between operators and union miners was near at hand, but there has been little to corroborate this view or to indicate early resumption of work by the strikers. In the railroad strike, from many directions have come the prediction of an early return of the shopmen to their work under a settlement made at the President's instance and involving concessions by both sides.

For more than a week Government and unofficial comment has pointed to the seniority question as the only real bar to the calling off of the railroad strike. In fact, a plan was said to have been proposed by the President under which the railroad employees who stayed at work would have preferential treatment, while next would come the returning strikers, and last the men who had taken the strikers' places. The urging of various editorial writers in the daily press that with a compromise in sight on all but seniority in service, that issue must not be allowed to prevent a settlement has plainly implied that the railroad executives should recede from their stand on this question. With entire justice the president of the New York Central has replied, "It is the solemn duty of the roads to be loyal to the men who were loyal to them." And another railroad president has said: "It is not an academic question. We have given our word of honor to the new men, guaranteeing their seniority over old men coming back." Still others have pointed out that they were triply bound to protect their new employees —first, morally; second, by written contract, and third, by the decision of the Railroad Labor Board to rank new men immediately after old men who remained loyal.

At this writing conferences are still on, and it is not known to what extent the men who came to the help of the railroads and of the whole people are to be sacrificed to the demands of those who set at nought the decisions of the Government, expressed through the Railroad Labor Board. As the President wrote to J. Cleve Dean, and in so writing sent an unequivocal message to the Lewises, the Jewells and all the incendiary leaders of organized labor who have expressed contempt for the Administration in this most grave crisis, "there can be no Government unless its mandates are accepted by the citizenship of the Republic." Yet in the proposed settlement the country is called on to see a practical reversal of the finding of this same Railroad Labor Board on the status of the men who tried to stop the wheels of transportation and bring industry to a standstill. It is true that the compromise proposal, in sending certain demands of the strikers back to the labor board for rehearing, compels the union to recognize the authority of that body, but that recognition should be demanded as of right and not bought by a sacrifice of principle.

The most serious thing about the double strike situation is not that transportation may be crippled—though, in fact, leading railroads are in a fair way to defeat the strikers completely; nor even that the country may be in the grip of a fuel famine in the coming winter. What is of the gravest concern is that a law-defying labor autocracy is in a fair way to succeed in its coercion of the "loyal and law-abiding citizenship," that overwhelming majority of the American people to whom the President has made his appeal in this critical time.

Without adopting the language John L. Lewis applied to the non-union workers at Herrin, Ill., when he advised that they be "treated like ordinary strikebreakers," the Administration's seniority proposal practically puts the men who have saved the railroad situation in the past month in that very category.

Apparently the country took too much satisfaction from the repeated defeats of union autocracy in 1919. First a courageous Governor made it plain at Boston that there was no room in a democracy for labor union imperialism; and later in the same year, when the coal miners tried to impose their will on the whole people, they got the same answer. Last of all came the railroad brotherhoods, with their threat to strike against the Government; but after sounding out the popular temper they wisely decided not to make war on the American people.

Three years have passed, with industry depressed for more than half the period, and many

adjustments have come both in wages and in commodities in response to a widespread demand for relief from the heavy burdens of war-time prices. Yet here are two classes of workers that have defied the Government and with lawless disregard of the rights of others have set out to force the Government to accept their will. Why should the American people, who in 1919 were able so decisively to check union autocracy, be forced now to compromise on an issue involving the ability of the Government to compel respect for its findings? What can come from such a compromise but encouragement to law-breakers and more power to superior force as the labor court of last resort?

Steel in Dwelling Houses

In recent months there has been remarkably great activity in the erection of dwelling houses, and it is to be regretted that conditions were not ripe for this unusual opportunity to be embraced for the introduction of steel in the framing of these buildings. From all angles this substitution, long predicted and certain to occur some time, would be advantageous. The steel industry would be glad to have this additional outlet for its steel. The owner of the building would be much better satisfied, since he would have a more durable building. The occupant would feel safer and be more comfortable. The general public would be advantaged in fire losses being reduced in the long run and insurance rates coming down in consequence.

Without entering into details, it may be remarked that steel sections to replace wood joists and studding and wood or brick outside walls have reached a point, so far as the section is concerned, where there is much to commend them. It is recognized that perfection has not been attained in distribution of metal to give the greatest stiffness for a given weight; but considering the whole problem of the substitution of steel for wood much more progress has been made in this part of the problem than in its other parts.

From the practical viewpoint, the greatest barrier to the general use of steel in this connection in place of wood is the training and habits of those who are engaged to build houses. The carpenter has his plans and dimensions; but in practice he does most of his cutting of wood, not to fit the plan but to fit such parts of the building as he has already managed to construct. This he cannot do with steel. The carpenter has practically no initiative even when working with wood. Although houses have been framed for generations, practice has not been standardized, and if carpenters have not arrived at a common, and best, method of performing simple operations in wood it is plain that the substitution of an entirely different material is a serious matter.

Apart from the personality of the individual workman, there is the great difficulty of the building trades being what is called "organized," which means, among other things, "jurisdictional disputes," which arise now from the most trivial causes. A given form of roofing, for instance, requires a different craft according to the angle. One craft lays it on the roof, another lays it when it goes on the vertical side wall.

It is hard enough for the individual owner to get his house built when he strives to follow the beaten path. He is unlikely to attempt something altogether new. The hope of steel must lie in the investment builder, the capitalist who builds large numbers of houses as a business. An entirely new machine for building houses will have to be created. There is no chance simply to make a substitution of the one material for the other. One can substitute wall board for plaster, or metal lath for wood lath, or steel conduit for loom, without a great deal of difficulty, but substituting steel framing for wood framing is fundamental. It is not a mere matter of the steel industry offering the product. In essence a whole consuming industry will have to be built up.

Buying Power the Test

Efforts to prognosticate the course of industry may usually be aided by comparing the expectations of the past with what has developed, so as to observe the tendency to error. It is helpful, therefore, to compare the condition of the export steel market now existing with the predictions that were being made during the war. It was the common prediction that after the war the demand for steel would be world-wide and of unprecedented proportions. The world would have grown very short of steel, would have accumulated new "needs" and would be "hungry" for steel. In some quarters, however, fears were expressed that the American manufacturers might be at a disadvantage in export trade on account of high costs.

The record of three and a half years of post-war steel demand is now available. In 1919 and 1920 iron and steel exports of the United States were greater than in the two years before the war, by approximately one-half, while exports in 1921 were 23 per cent less than in 1912-13, and this year they have been running at about the 1921 average.

British exports of all iron and steel products have been as follows: First half 1921, 879,130 tons; second half, 856,436 tons; first half 1922, 1,625,635 tons. Deducting, for the first half of this year, exports of scrap, pig iron, castings, etc., there is left about 1,200,000 tons of regular steel mill products. Our own production of finished rolled steel in the first half of this year was about 12,000,000 tons, representing about 60 per cent of the productive capacity.

If, therefore, the American steel industry had had all the export steel business in the first half of this year that fell to the British producers, the result would have been a 66 per cent operation instead of a 60 per cent operation. Our beating the British would have helped very little to engage our increased capacity.

The error made during the war—an error frequently made—was that of taking it for granted that imagined "needs" will be satisfied. Buying power is the real factor. If buying power is lacking needs that are very pressing will not be satisfied. If there is buying power and no pressing needs, needs that are not pressing will be satisfied. If

there are no needs at all the money in all probability will be spent anyhow.

It is the same with the consumers of the United States as with consumers in other countries. For trade to be active, buyers must be able to buy. They will always discover needs or wishes if they have the buying power. As a rule it is not a favorable symptom for a class of people to appear to be in great need of material or equipment. Such a condition is symptomatic of an inability to buy. In the case of our railroads, for instance, should they in a natural way make large purchases during the next two years their having done so would in itself furnish no suggestion that they were then going to stop buying. Judicious expenditures would reduce operating costs and improve earnings, whereby the railroads would have better credit and there would be greater opportunity to make further improvements, conducing to more economy. It is the prosperous and progressive industry, not the industry that is out at the elbows, that makes a promising customer.

CORRESPONDENCE

Progress in Open-Hearth Process

To the Editor: I read with considerable interest the article by Willis McKee, on "Progress in the Open-Hearth Process," which appeared in the July 20 issue of THE IRON AGE. Having held supervisory positions in three major departments of the steel industry I can realize the possibilities which the proposed layout has to offer. The relations of all the important developments to each other are well co-ordinated and the construction, as suggested, will not be an experiment. It will be a combination of features which have long since been worked out in a practical way.

While the question of refractories is not solved to complete satisfaction, it is because the refractories which will solve this problem have not had the opportunity of trial. When the atmosphere of the open-hearth can be maintained strictly oxidizing or at least neutral, the refractories will be supplied. With the present furnace port arrangement this is impossible, but will be corrected earlier than expected.

The development of silica brick for furnace roofs has no doubt reached its limit. The roof of the future will probably be constructed of brick made from blends of aluminous clays. At the present time brick from these mixes are produced which will resist higher temperatures than silica. They will not spawl, they have greater strength at both atmospheric and high temperatures, but are somewhat affected by carbon deposition.

Aluminous clay brick are now being used with success in the electric furnace, but are not entirely suited to the open-hearth on account of the limitations set by present open-hearth construction which carries with it poor combustion and carbon deposition.

During the winter the writer made an investigation of the possibilities of open-hearth checker insulation. The saving effected would vary from practically nothing to a point which would materially affect the furnace operation, depending upon the plant considered. It would be economical to enclose the checker chamber in a steel jacket, as suggested by Mr. McKee, if only for the saving of heat effected by insulation, letting alone the great possibilities to be obtained by delivery of the gas and air under pressure. The old idea is that insulation would cause the checkers to burn out; this is wrong. Burn your gas in your furnace and the checkers will take care of themselves. Burn the gas in the furnace and the checkers will have reserve power to do work, and waste-heat boilers will become unnecessary.

It is not because the bulk-head of an open-hearth furnace gets so hot that it burns out rapidly; it is the principal effect of carbon deposition at high temperatures. The proposed new arrangement will largely solve this problem.

C. L. T. EDWARDS,
Laclede-Christy Clay Products Co.

Chicago, July 26.

STEEL PRICES AND MERGERS

Western Consumers Send Statement to the Trade Commission

CHICAGO, July 29.—W. E. McCollum, secretary of the Western Association of Rolled Steel Consumers, sent to the Federal Trade Commission at Washington to-day a statement calling attention to "the intimate connection between the Pittsburgh Plus and the steel mergers which are now under investigation by your commission." The statement refers to the condition created in the steel market in February, 1921, when one of the Eastern independent companies announced that it would make such prices as would attract tonnage to its mills regardless of the prices quoted by other mills. "Such prices were made and trade publications show that they were commonly $5 per ton less than prices quoted by the United States Steel Corporation." The statement then says:

The Western independent mills were compelled to meet these prices, with the result that before the close of the year prices in the Chicago district on plates, shapes and bars [illegible] on a practical level with those prevailing in Pittsburgh, and for the first time in nearly twenty years—over any considerable period—the Pittsburgh base on plates, shapes and bars had vanished so far as Chicago competition was concerned, although on other products it remained. This, however, was not the result of free competition, but of necessity, born of a time when certain mills pursued the policy above indicated with respect to price.

Mr. McCollum went on to say that "with the only independent mill in the West which rolls a complete line controlled by its Eastern connections, as will be the case if the merger is consummated, the perpetuation of the Pittsburgh Plus, or some similar arrangement, seems to us inevitable. This mill has within a generation grown from nothing to a large and rich organization—it is probably the most successful enterprise of its kind—and it can safely be assumed that its economical operation does not depend upon its merging with some of its Eastern competitors." In conclusion the statement says, after suggesting that the Federal Trade Commission make inquiry into costs of production at various points:

[illegible] these several cases be requested to bear the issues in both cases [illegible] and to seek to develop in each case anything that may be important in the other, and to exchange information with a view to getting all of such facts into the record in the Pittsburgh Plus case. In short, we believe that such information relating to the price of steel, the methods of fixing the price, the fairness or unfairness of price, the discriminatory character of price, the practice of Pittsburgh Plus itself and its economic background will normally be developed in the progress of the merger cases, which might not, or perhaps even could not, be developed in the normal progress of the Pittsburgh Plus case within its present scope, and that advantage should be taken of the opportunity presented by the pendency of the merger cases to get such facts into the record in the Pittsburgh Plus case.

We believe the situation presents an extraordinary opportunity to the commission for strengthening its case under the complaint in the action against the United States Steel Corporation, and we sincerely trust that the greatest advantage will be taken of such opportunity.

EXPORT BUSINESS QUIET

Light Rail Buying by Japan—Chinese Copper Imports Heavy—German Material in Manchuria

NEW YORK, Aug. 1.—The Japanese market shows slightly less activity and the Chinese market is still dull. There is still some small buying of light rails by Japan. One exporter recently sold a tonnage of 32 miles of 12-lb. rails to a private interest and is handling an inquiry for 16 miles of 35-lb. rails from the Division of Forestry, Formosa. There is also some inquiry for locomotive boiler tubes. Black sheet purchases have fallen off slightly.

In China, although there is no importation of material, the market is fairly active through sales of merchants, who in order to realize cash on their stocks are undercutting the market, resulting in lower prices. Transactions with buyers in the Philippines, although not large, continue highly satisfactory. One exporter dealing with the Far East, has booked orders during the past two or three weeks from buyers in the Philippines for 5500 kegs of nails, about 145 tons of 35-lb. rails and 1500 reels of barbed wire, 85 lb. to the reel. Despite the uncertainties that have prevailed in the political situation in China for many months, imports of copper ingots by Hankow from the United States and Japan have been unusual. From Jan. 1 to May 19, this year, imports totaled 12,847,000 lb. from the United States and 4,706,000 lb. from Japan and other foreign ingots shipped through Shanghai 1,177,000 lb. These figures compare with 14,441,333 lb. of copper ingots imported from the United States and other countries into Hankow in 1921 and 10,950,133 lb. imported from Japan in 1921. These figures are submitted by Consul General P. Stewart Heintzleman, Hankow, China.

It is reported from Manchuria that imports of German material are increasing through the port of Dairen. In 1921 imports from Germany amounted to 1,573,311 gold yen, compared with 48,505 gold yen in 1920 and at the current rate of importation this year's figures will show a decided increase over the figures for 1921. The chief imports in 1921 were iron and steel manufactures, electrical appliances, machinery, medical instruments, locks, etc.

CZECHO-SLOVAK STEEL INDUSTRY

Iron and Steel Capacity of the Country—Present Rate of Operation—Exports and Imports

In a recent report to the Bureau of Foreign and Domestic Commerce, Trade Commissioner Vladimir A. Geringer, at Prague, Czecho-Slovakia, describes specifically the situation and capacity in iron and steel production of Czecho-Slovakia. The report says in part: "Of the 47 blast furnaces in the former Austro-Hungarian Empire 27 are in Czecho-Slovakia—10 in Bohemia, 8 in Moravia, 3 in Silesia and 6 in Slovakia. The total annual capacity of these 27 blast furnaces is approximately 1,500,000 metric tons. Since the beginning of March, 1922, five blast furnaces, representing about 27 per cent of the total capacity, have been in operation, producing about 1100 tons of pig iron daily. Need for the waste gas is the reason given for keeping two of these furnaces active. The Prague Iron & Steel Co., which owns eight furnaces, operated none of them from July, 1921, to March, 1922, and then put in operation one furnace when it succeeded in securing cheaper coke from Germany. It is estimated that in January 25,000 metric tons of pig iron, in February 23,000 tons, and in March 34,000 tons were produced.

Rolling Mill Products

There are in Czecho-Slovakia 42 stationary open-hearth and 3 Talbot open-hearth furnaces, and 5 Bessemer converters, the total annual capacity of which is estimated to be 2,000,000 tons of steel. About 20 to 25 per cent of the steel furnaces are believed to be in operation now, as compared with some 40 per cent in December, 1921. In 1921, 917,662 metric tons of steel of various kinds were produced—75.742 tons of Bessemer steel (8.25 per cent of the total output for the year), 820,995 tons of open-hearth steel (89.47 per cent), 3772 tons of puddled steel (0.41 per cent), and 17,153 tons of electric steel (1.87 per cent of the total). Compared with the 1920 production of 972,976 tons, the 1921 output declined by 6 per cent.

The 16 steel rolling mills of Czecho-Slovakia have a total normal capacity estimated at 2,000,000 to 2,500,000 tons a year, but this production can be substantially increased if business conditions should demand it. Approximately 15 to 20 per cent of total capacity is now being operated. Seven of the largest rolling mills also own coal and iron mines.

Among the chief products manufactured are steel and iron bars, shapes, wire rods, iron hoops, iron or steel strips (hot or cold rolled), girders, beams, angles, T-columns and posts and other structural shapes of iron or steel, rails, splice bars and other track material, sheets and plates of iron and steel, galvanized sheets, tin plate and wrought iron pipe. The output for 1921 was considerably smaller than that for the previous year.

In the last quarter of 1921 the production of the Iron and Steel Combine amounted to 97,800 tons and in the first quarter of 1922 to 56,400 tons. It is believed that the contraction represented by these figures holds true of the operation of other concerns. The reason is said to be the appreciation of the Czecho-Slovak crown and the depreciation of the German mark, whereby the competitive ability of the Czecho-Slovak steel mills has been reduced. While in January, 1922, the steel rolling mills operated at about the same capacity as in December, 1921, completing orders previously received, their operation in February and March declined about 30 per cent. Judging from the orders that are being received it is expected this slowing down of operation will continue.

Majority of Products Exported

"Local iron and steel plants export from two-thirds to three-fourths of their products. This is because over 55 per cent of the pig iron output of the former Austro-Hungarian Empire is in the territory of the Czecho-Slovak Republic, whose consumption of iron and steel is estimated at 600,000 metric tons annually, while the production capacity is four times as great."

In the portion of the report dealing with exports and imports of iron and steel, it is pointed out that the heaviest imports of pig iron, spiegeleisen and ferroalloys, which totaled 11,116 tons in January of this year, were from Germany, which furnished 6,650 tons. Exports of pig iron, spiegeleisen and ferroalloys in January were 2824 tons. The report continues: "Importation of pig iron from Lorraine and England has been growing recently because it is considerably cheaper than buying domestic iron, notwithstanding transportation costs and customs duties. The circumstance that pig iron is also exported from Czecho-Slovakia can be explained by the fact that the Vitkovice Mining & Iron & Steel Co., which manufactures pig iron principally for sale, has its natural markets in Poland and Austria, and would rather maintain those markets even at a loss than to sell at home, which would probably cause a damaging decline in domestic prices.

Not an American Market

"France, Sweden, Denmark, Portugal and Great Britain sent chiefly pig iron, while shipments from the United States were highly manufactured products. There is no possibility of importing iron and steel from the United States under present conditions, especially in view of the low value of the German mark. Furthermore, American exporters would have to adjust their prices to German, English and Lorraine prices. The English iron, considering its quality, is regarded as a very good purchase." Exports of iron and steel from

Czecho-Slovakia, amounting to 16,575 tons in January, were chiefly distributed among Austria, Germany, Hungary, Poland, Jugoslavia, Rumania, Great Britain and the United States (24 tons). Much of the iron and steel shipped to Germany was re-exported to other countries.

Notwithstanding the estimated annual capacity of the country for iron ore, considerable quantities must be imported. In 1921 imports of pyrite, iron ore, manganese ore and others totaled 564,672 tons, while exports were only 99,691 tons. The growth in imports indicates that domestic ores are continually giving way to imported ores, for the reason that domestic ore contains less iron and requires therefore a greater quantity of coke, which is costly. A ton of pig iron produced from Slovak ore costs, according to the latest estimate, almost twice as much as does a ton of iron manufactured from Swedish ore.

Effects on German Industry of Decline in Exchange

Exchange Conditions Similar to Austrian and Russian Seem to Be Inevitable—British Coal Imported—Need for Capital—Pig Iron Again Advances

(By Correspondence)

BERLIN, GERMANY, July 17.—The Berlin printers have been on strike for a fortnight, but a settlement has at last been arrived at with the aid of the Government. The absence of reliable news has been felt keenly and the heavy fluctuations in exchange were no doubt accentuated by uncontrolled information and rumors. Paper money has not been printed during the strike, so that the wish of economists has been realized for a short time.

Dissatisfaction is evident in the mining industry. Members of the miners' union are threatening to strike unless the general agreement in the mining industry is altered. The difference over the question of working hours has been adjusted, but the wage increase has almost been surpassed again by the recent depreciation of the mark and the consequent rise in prices. The men ask for weekly payment of wages, instead of monthly, for alteration in the piecework system and in the position of their representatives (Betriebsräte) on the board of management. According to the latest reports, through the efforts of the Minister of Labor, a stoppage of work may be avoided.

Negotiations in Berlin on miners' wages have led to an increase of 70 marks per shift on the wages of June 1. The miners' union had originally asked for an increase of 35 marks on the June wages to counterbalance depreciation in the purchasing power of the mark, but it was realized that a substantial inducement was needed to keep the colliers from going into other industries paying higher wages. The socialist miners' union has advised its members to strike Aug. 1, to enforce a new agreement. This action of the union will add considerably to the uncertain position of trade and industry.

British Coal a Factor in Situation

British coal is appearing in the German market to such an extent that even the lignite producers are anxious about their trade, especially in the coastal districts. To increase the import of British coal to alleviate the scarcity in Germany, the Government allows the imported coal (except from Czecho-Slovakia and Polish Upper Silesia) to be sold without any rationing restrictions, and it is taxed only to the same extent as the home product.

Reparations coal is drawing heavily on the German production, and the Government has asked the Reparations Committee for permission to have British coal shipped to France instead of sending German coal. This is changing the reparation in goods into reparation in currency, to improve the coal situation, and will probably help in inflating the mark.

According to reliable reports coal imports were 1,200,000 tons in June, which is about 60 per cent more than in pre-war years. There has been a decline in orders for imported coal in the Rhenish-Westphalian district, but industry along the coast and shipping firms are ordering large quantities.

With the rise in coal, the prices for pig iron have gone up again. Pig iron prices, which had been fixed only on June 29, after lengthy negotiations with the representatives of labor, through a 476 m. increase in coke, have again been increased as follows per metric ton:

	Marks Amount of Increase	Marks Present Price
Hematite	595	8,265
Foundry iron No. 1	654	7,915
Foundry iron No. 3	[illegible]	[illegible]
Foundry iron, Luxemburg	[illegible]	[illegible]
Steel making, low in copper	[illegible]	[illegible]
Siegerland, steel making	595	7,845
Spiegeleisen, 8 to 10 per cent	690	8,929
Malleable pig iron	619	8,269
Ferromanganese 80 per cent	1,285	17,855
Ferrosilicon	1,070	10,120

German Industry in Need of Capital

German bankruptcies have continually decreased during the first half of 1922, and reached 88 in June, the lowest number in the past two years; 676 bankruptcies have been declared in the six months, against 1610 during the same period of 1921.

There is an unabated need for capital by industrial concerns, the capital of which amounted to 11,873,200,000 marks during the second quarter of 1922, compared with 4,196,000,000 marks during the same period of 1921. In June, 1922, increases in capital took place in 296 cases to the amount of 3,279,000,000 marks, equal to 73.5 per cent against 216 cases, with 1,540,000,000 or 88.5 per cent in June, 1921. New enterprises from April to June, 1922, were principally started in the following industries:

Machinery (59), commerce (59), metalworking (49), wood (42), chemicals (39), textile (38), food (32), coal and peat (11).

Prices are rising generally, the average wholesale index number of the Federal Statistical Office showing an increase from 6458 in May to 7030 in June. The index number for food increased from 5847 to 6405 and for metals from 6489 to 7029; for coal and iron from 7061 to 7469; and for industrial products together from 7602 to 8197. The exchange value of the mark decreased far more during this time, and it is interesting to recall that the dollar stood at 186 marks on Jan. 2 against 502 on July 7. The recent inflation of German currency is not yet noticeable in prices but they show a strong upward tendency.

During the Genoa conference German exchange was fairly stable and the rising prices threatened to restrict export. The crisis in German trade and industry, which had been predicted for months, seemed imminent. Manufacturers opened the question of reduction in wages and increase in working hours. There were even extensive strikes and lockouts in the South, causing enormous losses, and wage agreements were arrived at only after lengthy negotiations. The whole situation has now radically changed. The failure to stabilize the currency caused the mark to resume its downward movement, which lately has assumed such dimensions that conditions of exchange similar to those of Austria and Russia seem inevitable.

There is evidently no prospect now of a change in the German industrial position. With a few exceptions, German industries have orders for several months, and as buyers realize that prices will not come down, new orders are placed more frequently. There is, however, not so much speculative buying as on previous occasions when the mark dropped, as firms are selling only on a sliding price scale now and require a long time for delivery. Everybody with a stock of material is keeping it, for fear of losses through the depreciation of the currency. Some firms are sold up until 1923 and are declining further orders. Associations in cast iron, steel and hardware announce heavy increases in their prices. The number of unemployed is constantly diminishing. Berlin, for instance, had only 8442 on the lists at the end of May against 58,471 at the beginning of the year.

Imports are largely a question of delivery. With the declining German exchange home supplies are always cheaper than foreign material, but works are generally unable to meet the demand. To supply their customers manufacturers are paying a higher price for imports rather than be delayed in production through shortage of material.

According to a preliminary statement of the Government Statistical Office the imports in May amounted to 3,810,000 metric tons, valued at 32,400,000,000 marks, and exports to 2,090,000 tons, valued at 27,200,000,000 marks. The imports increased by 920,000 tons compared with April. Exports were, however, 82,700 tons less.

Depreciation of the mark has again relieved industry of anxiety as to the future, especially in export, but it is realized that this is only a temporary condition, and that provision must be made for the time when the mark becomes more stable. Some firms are even accepting export contracts with the stipulation that the customer be allowed to withdraw if German prices rise above the world's level. It is the constant complaint of German customers that goods needed in the domestic market are sold for export because of the higher prices obtainable. There is an undiminished home demand, but it is only when export is slackening that German manufacturers receive sufficient supplies. Should exports cease, the German market is capable of absorbing most of the industrial products for some time, and it is this fact that exporters reckon with at present.

It is also held in some quarters that demand from the Russian market may prevent serious shocks to German industries if endeavors to develop trade to that country meet with success. The Treaty of Rapollo seems to have stimulated considerably the opening up of trade relations between the two countries. New companies have been formed in Upper Silesia and in the Rhenish districts for trade with Russia and negotiations are being conducted in several industries to form syndicates for the same purpose.

Manufacturers Import Despite High Prices

The catastrophal fall in the mark recently has led to a temporary decline in German orders for iron and steel in the Saar district. Rumors of a moratorium have again stimulated buying, but business is done on only a small scale. The present value of the mark offers no inducement to the German importer but the latest increases in domestic prices of iron and steel reduce again the margin between the German and the imported product. Hence manufacturers are willing to pay a higher price rather than be delayed in production for want of material. The higher prices of imported material are moreover counterbalanced by the prices being fixed while German firms are selling "freibleibend" (prices subject to change), and by the certainty of prompt delivery. The question of delivery within the specified time has not been treated with proper consideration by German manufacturers, and export orders are being canceled because of delayed delivery. Irregular supplies of fuel and raw materials are generally the cause. The question is, however, frequently discussed, as the German export trade is losing its reputation through the carelessness of some manufacturers in supplying their foreign customers.

In the south of Germany, Saar, Luxemburg and Lorraine iron and steel products still predominate, as it is impossible to procure sufficient home material. The demand in semi-finished material, especially in bar iron, is brisk, as the machinery industry is again in the market. As imports must be paid for in francs, the trade depends on the rate of exchange and business is largely a matter of speculation in foreign bills. The following quotations in marks per metric ton for "Right" and "Left" Rhenish material show the considerable difference between domestic and imported products.

	Left Rhenish (Saar, Luxemburg, Lorraine)	Right Rhenish (German)
Bar iron	21,700 to 23,900	15,400 to 16,500
Structural shapes	20,600 to 22,800	15,370 to 17,580
Hoop iron	23,980 to 26,180	17,160 to 19,360
Universal iron	22,900 to 25,200	16,800 to 19,100
Sheet, heavy	6,600 to 11,300 marks higher	17,380 to 19,580
Sheet, medium		17,270 to 21,560
Sheet, light		20,570 to 22,770

A meeting of the representatives of manufacturing and wholesale firms has been held in Düsseldorf to discuss arrangements for the importation of ferrosilicon. It was agreed that the home product should receive some protection but, because of the absence of representatives of consumers, the meeting was postponed until September. In the meantime import permission will be given if proof can be furnished that the home production is insufficient to meet the demand. In all other cases permits shall be issued only if the imported material is 5 per cent cheaper than the German product.

Some American companies, well known over here in the machine tool line, were again in the market lately and in strong competition with German makes. The German machine tool industry made great progress during the war, but some American specialties are still in favor, and will find a good market if the price is not prohibitive. The exchange rate is at present a deterrent.

New manganese ore deposits have been found in Ungaria in the Vesprimer Komitat. A new company, in which the German Bank is largely interested, has been founded with a capital of 120,000,000 kronen to exploit the deposits.

Revolution or Stroke Counter

A Universal model counter, which, among other uses, is adaptable to punch presses, stamping presses and coal conveyors, is being marketed by the Precision Machine Co., Milwaukee. The device is shown in the accompanying illustration and can be used either as a revolution or a stroke counter.

In this design all wheels are locked when not counting, and all are interchangeable. No lead gear or lock washers are used, also no ratchets, ratchet pawls or springs. Gears are of steel and important parts are hardened. Transparent fireproof material is used in place of glass to cover the numbers and readings are legible at a distance of twelve feet. The counter is unusually light in weight and has an unlimited amount of overstroke which provision eliminates the necessity of particular care in setting the connection rod.



Revolution or Stroke Counter for Use on Punch and Other Presses

It is claimed that the device will operate as satisfactorily at 1000 r.p.m. as at any slower speed, a test of a counter at that speed for six weeks and running more than 300,000 trips a day being said to show no appreciable wear. Electrical contacts permitting the location of the counter in the office or elsewhere at a distance, a method particularly applicable to coal conveyors, can be provided.

FABRICATED STEEL BUSINESS

Bridge and Building Awards and Tonnages Pending at Leading Centers

Awards for fabricated steel work for the past week include the following:

[illegible] New York, to New York Shipbuilding Corporation, Camden, N. J.

Office building, Stapleton, Staten Island, New York, 400 tons to [illegible]

Sterling Hall of Medicine, Yale University, New Haven, 700 tons, to Levering & Garrigues Co.

International House, Riverside Drive, New York, 1200 tons, to Taylor-Fichter Steel Construction Co., fabrication, it is thought, to be done by American Bridge Co.

Loft building, Brooklyn, 500 tons, to the Hay Foundry & Iron Works.

Hospital building, Elmira, N. Y., 300 tons, to the American Bridge Co.

Apartment house, New York, 1800 tons, to the American Bridge Co.

Tanks for the Sinclair Consolidated Oil Corporation, 7000 tons, to Riter-Conley Co.

Western Electric Co., Hawthorne, Ill., wire drawing plant, 1400 tons, to McClintic-Marshall Co.

Broadway Department Store, Los Angeles, Cal., 1100 tons, to Baker Iron Works.

J. B. Book junior office building, Detroit, 1100 tons, to Russell Wheel & Foundry Co.

Agricultural Building, University of Illinois, Urbana, 462 tons, to an unnamed fabricator.

Exchange National Bank Building, Pittsburgh, 275 tons, to Fort Pitt Bridge Works.

Hyde Park Y. M. C. A. Building, Chicago, 240 tons to Vierling Steel Works.

Chicago & Northwestern deck plate girder spans over Milwaukee River, near Lindwerm, Wis., 215 tons, to American Bridge Co.

Illinois Northern Utilities Co., power station, Dixon, Ill., 150 tons to Indiana Bridge Co.

State terminal pier, Portland, Me., 1000 tons, to McClintic-Marshall Co.

Structural Awards

Ideal Concrete Machinery Co., Cincinnati, 103 tons, to Dayton Structural Steel Co.

Addition to plant of Warner Elevator Co., Cincinnati, 220 tons, to Fort Pitt Bridge Co.

Warehouse for National Biscuit Co., Cincinnati, 100 tons, to General Iron Works Co.

Addition to plant of Littleford Brothers, Cincinnati, approximately 100 tons, to Fort Pitt Bridge Co.

Power house for Ottawa Silica Co., Ottawa, Ill., 100 tons, to Lakeside Bridge & Steel Co., Milwaukee.

Plant for Lafayette Motors Co., Indianapolis, at Milwaukee, 750 tons, to H. K. Ferguson Co.

Transmission towers, Appalachian Power Co., Coalwood, W. Va., 600 tons, to American Bridge Co.

Dam No. 44, Ohio River, 300 tons, to American Bridge Co.

Highway Bridge, Kent, Conn., 340 tons, to American Bridge Co.

Bridge No. 2 over Allegheny River, 300 tons, to American Bridge Co.

Michigan Lafayette Building, Detroit, 1700 tons, to McClintic-Marshall Co.

Structural Projects Pending

Inquiries for fabricated steel work which may be added to lists of pending projects include the following:

Federal Sugar Refining Co. building, Yonkers, N. Y., 200 tons.

Bridges for the New York Central Railroad, 400 tons.

Highway bridge for Paterson, N. J., 600 tons.

Oil tanks for the J. G. White Engineering Corporation, New York, 400 tons.

Highway bridge for Baltimore, 400 tons.

State Capitol Building, Lincoln, Neb., 2100 tons, Westover Steel & Iron Co., Paxton & Vierling Iron Works and Omaha Steel Works, low bidders, respectively, on three alternates.

American Can Co., new building, New Orleans, 185 tons.

Addition to Carter Building, Houston, Tex., 670 tons.

Pullman Co., Pullman, Ill., foundry building, 1000 tons, Frank D. Chase, Inc., engineer.

Open hearth furnaces, Otis Steel Co., 6000 to 6500 tons.

Forge building for the Frick Co., York, Pa., 450 tons.

Railroad Equipment Business

Orders for locomotives and new cars, particularly freight, continue to appear and large orders for the repair of old cars are still a feature. The number of locomotives and idle cars at the present time is not regarded as sufficient by some railroad executives and the possible settlement of the railroad and coal strikes is expected to increase the demand for both.

The largest single order for new locomotives placed last week was for the account of the New York Central Railroad. This was for 150 modern freight locomotives of the Mikado type, of which the American Locomotive Co. is expected to supply half and the Baldwin Locomotive Works half.

In addition to the orders placed many roads are in the market for new engines. The Union Pacific is inquiring for 55 Mountain type and 15 Santa Fe type locomotives, and the Chicago, Indianapolis & Louisville is in the market for five Mikado engines and two of the Pacific type. Bids for the repairing of 75 locomotives are in the market now.

The [illegible] applied to the Interstate Commerce Commission for permission to issue first lien equipment notes to the value of $375,000 for the purpose of rebuilding 397 bad order cars, requiring the installation of steel underframes and center rails.

The Union Pacific Railroad is inquiring for 10 mallet type, 55 mountain type and 15 Santa Fé type locomotives.

The Nickel Plate Railroad has placed orders for 15 freight engines with the Lima Locomotive Co.

The Monon is inquiring for 2 Pacific and 5 Mikado type engines.

The [illegible] engines in addition to the freight engines it recently ordered.

The Chicago, Rock Island & Pacific has placed orders for repairs on 500 wooden box, 500 furniture and 500 steel frame box cars with the Western Steel Car & Foundry Co.

The Missouri Pacific has let repairs on 1250 gondola cars to the American Car & Foundry Co., on 1000 to the Sheffield Car & Equipment Co. and on 250 to the Mount Vernon Car Mfg. Co.

The Burlington has let repairs on 500 general service cars to American Car & Foundry Co. and on a like number to the Keith Railway Equipment Co.

The Chesapeake & Ohio has let repairs on 1500 hopper cars to the American Car & Foundry Co. and is inquiring for 50 steel frame refrigerator cars.

The Seaboard Air Line has placed repairs on 400 cars with the Magor Car Co. and still has repairs on 1000 cars to place.

The Tennessee, Alabama & Georgia is inquiring for 20 box and 20 composite gondola cars.

The Northern Pacific has placed 70 passenger service refrigerator cars with American Car & Foundry Co.

The Pittsburgh & West Virginia Railroad has placed 9 coaches, 1 passenger and baggage, 2 passenger, mail and baggage, and 2 baggage cars with American Car & Foundry Co.

The Philadelphia & Reading has ordered 5 baggage and 5 baggage and mail cars from American Car & Foundry Co.

The Wilcox Co., Chicago, is inquiring for 50 hopper cars.

The San Antonio, Uvalde & Gulf Railroad is in the market for 25 ventilated box cars and 25 composite gondola cars.

The Winston-Salem Southbound Railroad is inquiring for 6 coaches and 3 baggage and mail cars.

The Baltimore & Ohio has placed 500 gondola repairs each with the Pullman Co. and Illinois Car & Mfg. Co.

The Lehigh & New England is inquiring for 150 ton gondola cars and the New York Central is reported to be in the market for 50 King-Lawson air-dump cars.

Working Out Coal Distribution Plans

Large Place of State Organizations—How an Industrial Consumer in Need Proceeds—Personnel of Committee in Charge

WASHINGTON, Aug. 1.—The President's committee in charge of fuel distribution is completing its organization and it was stated by officials that it probably would be in complete operation on Wednesday. The organization has headquarters in the American Railway Association building on Eighteenth Street, across from the Interstate Commerce Commission Building.

Regardless of how soon the labor situation is entirely ended, however, it was said yesterday by Secretary of Commerce Hoover that coal and car distribution will be necessary for an indefinite period, estimated at 30 to 60 days. The iron and steel industry, as is evidenced from reports coming to Washington, is watching developments closely, but is showing no signs of being unduly alarmed. The greater producing companies, it is declared, have considerable coal on hand and can go along with restricted output for some time before, as a whole, there is an acute pinch felt.

First priority orders, aside from those for fuel for railroads, will be for shipments to the Northwest and New England. The President's committee is already engaged in checking up coal supplies on hand, needs for preferred industries, and consumers, States, etc.

Some Requests for Modification of Orders

Before the fuel distribution administration had organized, representatives of some industries, claiming to be on the preferred list, began to make inquiries as to how to get coal. The tendency to resort to individual priority orders, however, has not been strong so far. While the fuel distribution (President's) committee and the central purchasing committees of the railroads were setting up their organizations, requests for modifications of the car service orders were coming to the Interstate Commerce Commission. Representations were made on behalf of users of open top equipment, moving such material as sand, gravel, brick, rough lumber and stone, for a change in the orders that would permit for their use flat or mixed bottom open tops cars with sides higher than 36 in. inside measurement. Changes in the immediate future, however, do not seem probable.

Embargoes against all freight but coal, live stock and fuel oil declared by the Chesapeake & Ohio and the Norfolk & Western were declared in order to hasten the movement of these commodities, which are on the preferred list, these lines being two of the chief arteries which serve operating mines at present.

Procedure in Securing Coal

Reduced to the simplest form, the working plan for distribution of coal and cars is as follows: The consumer, unable to get coal through his regular channels, applies to the State committee. The State committee distributes the quota that has been alloted, if any has been alloted. In the event the State has no coal, appeal is made to the presidential committee in Washington. This latter committee then will deal with the central committee of coal operators. The central committee in turn makes requisition on the district committees.

It is always to be kept in mind that the iron and steel, or any other industries, will get coal in their usual way, provided the coal is available and has not been allocated to consumers on the preferred and priority list included in the car service orders of the Interstate Commerce Commission, which has general supervision over the distribution of cars. Obviously, the iron and steel industry, being in the "other purposes," or lowest classification, will have to wait until the demands of those on the preferred list are filled. Where there is not a sufficient supply either of coal or of suitable open top equipment, 36 in. in height, the industry necessarily will have to suffer. Preference for the class equipment mentioned is to be supplied for consumers on the priority list, but it does not include flat bottom gondola cars with sides less than 36 in. in height, or cars equipped with racks, or cars which on July 1 had been definitely retired from service for the transportation of coal and stenciled or tagged for other service.

Likely Preferences in Steel Trade

The list of consumers and commodities included in the orders of the Interstate Commerce Commission manifestly is subject to revision or amplification, and because of this, it is conceivable that certain units of the iron and steel industry, as for instance tin plate, oil country goods, steel for building new and repairing old cars, etc., may be given preferred listing, though there has been nothing to indicate that this plan is in contemplation at present.

Secretary of Commerce Hoover, chairman, Secretary of the Interior Fall, Attorney General Daugherty, and Commissioner Aitchison of the Interstate Commerce Commission, constitute the Presidential Committee, which has general supervision of the measures for the distribution of coal and the restriction of unfair prices. Acting in this capacity, Mr. Hoover has selected C. E. Tuttle, of the Tuttle Coal Corporation, New York, as advisor on the Lake situation. Mr. Tuttle, whose experience has familiarized him with this situation, will advise as to the coal tonnage going to the Lakes and as to its distribution in the Northwest. It was stated by high Government officials that it is not believed there will be any interruption of the movement of iron ore traffic from the upper mines to Lake Superior ports because of the sufficiency and the type of equipment used in that service.

Control of distribution of available coal supplies on a priority basis to essential industries and utilities is, of course, under the direction of Henry B. Spencer, the administrative member of the President's Committee, formerly vice-president of the Southern Railway and general purchasing agent under the one-time Railroad Administration. Mr. Spencer assumed his duties in Washington last Saturday. The selection of Mr. Spencer as fuel distributor was followed by a statement at the White House expressing confidence that production of coal, regardless of rail and mine strikes, eventually would be adequate to meet requirements. While the statement by some was thought to be somewhat over-optimistic, it did provide a cheering tone for the iron and steel and other industries, whose output had been restricted owing to fuel shortage, because it was associated with plans to bring the rail strike to a quick end and with the hope that the coal strike also will not be of much longer duration.

In view of other futile attempts to end the strike, the public is apparently in a waiting mood to see what actually materializes before becoming over-confident as to results. The plan of the Federal Government to put upon each State the entire responsibility for the distribution of coal within its own borders, together with other parts of its program, was accepted as recognition of the necessity to omit no details for a rigid control, such as might be necessary if the coal and rail strikes are not settled in the near future.

Secretary Hoover has been given assurances from practically all those coal producing States to which he has appealed that they will, as was suggested, take all responsibility for the distribution of coal within the borders of their respective commonwealths and do all

they can to end profiteering. It is the purpose of the Presidential Committee to see that the States get coal from operators at a fair price and that each State gets its quota.

Coal Exports Practically Prohibited

As a means of further conserving the available coal supply, Mr. Hoover notified the coal bunkering trade to bunker ships only to the nearest port of call. No exports of coal are to be permitted although urgent requirements in the West Indies will be given consideration. Foreign ships also have been notified to bunker at their own ports for complete trips and Canada has been advised not to rely on the United States for its entire supply of coal, but to import as much fuel as possible.

Under the plan set up by the Presidential coal distribution committee, distribution for railroad use will be directed from Washington, but with the possible exception of a few interstate public utilities, the responsibility for all other distribution will rest upon organizations created under State control.

SITUATION IN PITTSBURGH

Views Toward Strike Ending Proposals Stocks, Prices and Production Rates

PITTSBURGH, Aug. 1.—Suggestions from Washington and elsewhere that this week would bring a conclusion of the twin strikes—coal and railroad—are received here with considerable skepticism. While everyone hopes for the best, most are prepared for the worst. A meeting of 148 railroad officials is considered to be less likely to "get anywhere" than a smaller group, because there will be so many to be heard and also because there is certain to be a sharp division of opinion on the main question at issue, that of restoring old seniority ratings to the strikers. No doubt, many railroad officials will be willing to concede this demand of the men for the sake of peace, but there is a feeling among traffic men here that such a move will find much opposition, if for no other reason that any such discipline as the railroads have been able to establish since the railroads reverted from Governmental to private management would be destroyed. To allow the men, who in spite of warnings that they would lose their ratings if they went out and who were given plenty of opportunity to hold them after having gone out, to go back now at the same places in the seniority lists, it is argued, would be tantamount to a declaration by the officials that the men could strike any time and not suffer in their positions as to promotion and pension privileges. The suggestion that an appeal will be made to the President for a month's period of grace in which to meet strike conditions strengthens the idea that getting the officials into line is not going to be an easy matter. That the railroads are suffering from the strike is too evident to be denied, but it also is a fact that the places of the strikers have been filled to a larger extent than is comfortable to the men who have gone out.

With regard to the coal strike, there is a very strong sentiment among operators here to "fight it out" and little disposition among owners of union mines to abandon their original position of being willing to make an agreement with the men of this district. The "four State" agreement finds no supporters here and the number of operators now taking a stand on the side of the open shop idea is greater than when the strike began. Assured of ample protection, by the State and Federal authorities, there is a strong movement on foot to open the mines without recourse to agreements of any sort. In this connection, the aggressive stand of the Pittsburgh Coal Co., which is the largest single producing unit in the district and which during the first three months of the suspension was inclined to pursue a passive policy, is commented upon. This company has succeeded in starting up some of its idle mines in Washington County and is now least disposed of all producing units to enter a conference with the union leaders.

In the non-union Connellsville district, where so many mines are owned by the steel companies, no consideration at all has been given the idea of a conference. The steel companies' mines are not commercial ventures; their output goes directly to the plants of the owners and since steel plant operation is on an all-the-year-round basis, miners there have more constant work than those employed in strictly commercial mines. It may be that operators in some other districts may get together with the union officials and frame an agreement, but it may be set down that the present attitude of most Pittsburgh district operators is in opposition to other than a district agreement and also to a continuance of the check-off system, which made the operators collectors of union dues and assessments.

Low Coal Stocks

There has been very little change in the strike situation in the week in this district. The gain in production has been very slight. There does not seem to have been any easing in the railroad congestion and deliveries of Southern coal still are much restricted. The reserve stocks of the steel companies are getting dangerously low and some see a complete or nearly complete suspension before there can be any relief. If the railroad and coal strikes were to end immediately, there is doubt that the prospect would be much helped, since the operation of the priority system would mean the movement of coal to those consumers having preference over the iron and steel industry.

It is the interpretation of Secretary Hoover's plan that the steel companies owning mines would not be able to control their own coal, save those who have their own rail lines for hauling it or who can ship by water. The latter is one avenue that is open to the Pittsburgh steel mills not open to other districts. River traffic is outside the scope of the Interstate Commerce Commission and if the river mines can be operated, Pittsburgh would be able to get coal and the mills could be kept going.

Easier Coal Prices, but Higher Coke

Coal prices have eased off a little since a week ago, due to buyers withdrawing from the market in the belief that denial of cars to those seeking exorbitant prices will have a salutary effect. Some operators are falling in line with the price ideas of Secretary Hoover, but there are quite as many who went through with the Government's "fair prices" plan two years ago, who saw others reap a golden harvest and who now are inclined to ask "all the traffic will bear" in the idea that no harm can come to them. Coke still is very hard to obtain and as costly, if not more costly, than a week ago. Recent sales generally have been around $15 per net ton at oven for bee hive oven foundry coke, but there have been instances where more, even up to $17.50 has been paid. Coke is coke these days and the price is the same whether it is for furnace of foundry use.

Operations in the Pittsburgh district plants are holding up fairly well, but a decline is immediately ahead, owing to the light reserves and the difficulty in getting new supplies of coal.

Waiting Developments at Uniontown

UNIONTOWN, PA., July 29.—Independent coal and coke operators of the Connellsville bituminous region, while feeling that tentative prices of coal at $3.50 under Federal regulation, are rather low with present production costs, are going along with the Government plan of distribution and priority. Out of the present strike emergency, it is believed, will grow a permanent

association of operators in Fayette and Greene counties. The skeleton of this association already has been formed with some 50 operators as members.

Widespread comment developed in the region this week with the publication of a statement from Washington that the Department of Justice had promised complete investigation into the alleged activities of foreign societies and lodges in the region in intimidating workers, preparing letters and directing a campaign to keep miners away from the jobs.

George Whyel, president of the new operators' association, stated that the average production in the region would be around 20 per cent at the present time. H. C. Frick Coke Co. production is around 35 per cent this week. Little actual change has been noted. The possibility of a settlement of the bituminous strike has had the effect of keeping many men away from work who otherwise would have returned.

Railroad Executives Reject the President's Proposal for Seniority Rights

Railroad executives in session at the Grand Central Terminal, New York, on Tuesday, Aug. 1, rejected the proposal of President Harding that striking shopmen be reinstated without forfeiting seniority rights, but accepted conditionally the other two suggestions of the President for the settlement of the strike. The meeting was attended by the executives of 148 of the principal railroads of the country. President Harding's proposals were as follows:

"1. Railroad managers and workers are to agree to recognize the validity of all decisions of the Railroad Labor Board and to faithfully carry out such decisions as contemplated by laws.

"2. The carriers will withdraw all lawsuits growing out of the strike, and Railroad Labor Board decisions which have been involved in the strike may be taken in exercise of recognized rights by either party to the labor board for rehearing.

"3. All employees now on strike to be returned to work and to their former positions, with seniority and other rights unimpaired. The representatives of carriers and representatives of organizations especially agree that there will be no discrimination by either party against employees who did or did not strike."

The action of the executives was telegraphed to the White House late Tuesday afternoon, as soon as it had been drawn up by a sub-committee headed by Judge Robert S. Lovett of the Union Pacific and approved unanimously by the general conference.

CHICAGO, Aug. 1.—Executives of the six federated railroad shop crafts went into conference today to consider President Harding's proposal for a settlement of their strike. It was stated that the discussion probably would be finished by noon of Wednesday. One proposition to come before the meeting is that the striking shop crafts settle their strike with such roads as are willing to agree to the President's proposals, regardless of whether all the roads agree to them.

Indianapolis Chamber of Commerce Champions Open Shop

In response to a resolution setting forth that the effect of the demands of the striking coal miners and railroad workers means that the non-union shopmen who have taken the places of the strikers would be deprived of their positions to make room for the striking craftsmen; also that loyal employees remaining in the service of the companies and who would have greater seniority rights than returning strikers, would be displaced to make room for the strikers, tending to force all non-union shopmen to become members of the union, bringing about the closed shop on the railroads, the board of directors of the Indianapolis Chamber of Commerce adopted a resolution July 21 in favor of the open shop.

The resolution urges that "this un-American attempt at compulsory unionism be relinquished and that all men shall have the lawful sanction of the government to the exercise and enjoyment of their legal right to pursue a lawful vocation without interference or molestation."

Protest against any settlement of either the coal or railroad strikes which carries with it the discharge of any loyal non-union worker, is voiced.

Protest is also expressed against reference to loyal railway employees as "strike breakers," inasmuch as the Railroad Labor Board has publicly announced that new employees and old employees who refused to strike "are not strike breakers seeking to oppose the arbitrary will of an employer on employees. They have the moral as well as the legal right to engage in such service of the American public and to avoid the interruption of indispensable railway transportation and are entitled to the protection of every department and branch of the government, state and nation.

1920 Wages in Kentucky-Tennessee District

The joint arbitration board of the Kentucky-Tennessee district, in session at Cincinnati, July 28, decided to restore the wage scale of 1920 to union coal miners in the section around Pineville, Ky., to a few mines in the section around Nashville, Tenn., and to mines along the line of the Tennessee Central Railroad. The award grants an increase of wages amounting to 24c. a ton to pick and machine miners; 20 per cent increase on yardage and dead work, and $2.50 a day to datal and monthly men. The award is not a recognition of the union, but is simply a resumption of the 1920 wage scale with the miners as individuals.

State Fuel Distributers

WASHINGTON, Aug. 1.—Federal Coal Distributer H. B. Spencer this afternoon was advised of the appointment of the following State fuel agencies:

Alabama, Hon. Roy R. Cox, fuel administrator, Montgomery.

Connecticut, Public Utilities Commission, Hartford.

Florida, Florida Railroad Commission, Tallahassee.

Illinois, Robert M. Medil, distributer, Department of Mines Shipping Field.

Indiana, Indiana Public Service Commission.

Iowa, Charles Webster, fuel administrator, Des Moines.

Kansas, Committee of Industrial Relations, Topeka.

Kentucky, J. Sherman Cooper, chairman Railway Commission, Frankfort.

Massachusetts, Fuel Adminstrator, Boston.

Michigan, State Administrator Board, Lansing.

Nebraska, State Railway Comission, Lincoln.

New York, committee composed of representatives of the port authority, the Public Service Commission, the Transit Commission and the Attorney General.

North Carolina, State Corporation Commission, Raleigh.

North Dakota, Railroad Commission, Bismarck.

Pennsylvania, Public Service Commission.

Rhode Island, George H. Webb, Fuel Administrator, Providence.

South Carolina, Hon. B. E. Gerr, chairman Governor's Coal Committee, Greenville.

Tennessee, State Commission, composed of W. N. Beasley, representative of Public Utilities Commission, Wilbur A. Nelson, State Geologist, T. F. Peck, Agricultural Department and C. P. Pile, Bureau of Mines and Mining.

Vermont, J. M. Jones, State House, Montpelier.

Virginia, Maj. Alexander Forward, Coal Administrator, Richmond.

West Virginia, J. Walter Barnes, Fuel Commissioner, Charlestown.

Wisconsin, Edward Norman, Commissioner of Markets, Chairman; L. S. Gettle, Chairman of Railroad Commission, John G. Mack, State Chief Engineer, J. B. Borden, Secretary Board of Public Affairs.

JULY PIG IRON OUTPUT

Loss in July 1281 Tons Per Day as Compared with June

Twenty-six Furnaces Blown Out or Banked. Five Blown In

The immediate effect of the railroad strike in conjunction with the coal strike on the country's pig-iron output has been a large reduction in the number of blast furnaces in active operation. There were 26 furnaces blown out or banked in July and 5 blown in, resulting in a net loss of 21, or the largest since late in the depression a year ago. The July output, however, was larger than that for June and closely approaches the output for January, 1921, which was the largest in the last 17 months. The actual loss in daily output in July from that in June was 1281 tons per day.

The production of coke and anthracite pig iron for the 31 days in July, from data collected almost entirely by telegraph, amounted to 2,400,045 gross tons, or 77,421 tons per day, as compared with 2,361,028 tons, or 78,701 tons per day in June, a 30-day month. The increase in the July total output over June was 39,017 tons, contrasting with a loss in daily rate of 1281 tons. Last year the July output was only 864,555 tons.

The total number of furnaces in blast on Aug. 1 was 171, as compared with 192 on July 1, with 175 on June 1, with 162 on May 1 and with only 69 on Aug. 1, 1921, the low point in last year's depression. The capacity of the 171 furnaces in blast on Aug. 1 is roughly estimated at 71,500 tons per day, but the usual table of capacity in detail must be postponed to a later issue. On July 1 the 192 furnaces in blast had an estimated capacity of 81,845 tons per day. In July there were 26 furnaces blown out or banked and 5 blown in, a net loss of 21 furnaces. In June there was a net gain of 17 furnaces, so that the effect of the combined strikes has been to cancel the gain registered in June.

The manganese-alloy output made a new record on this movement in July, with a total production of 26,059 tons, or the largest since March, 1921. Of this total, 18,881 tons was ferromanganese and 7178 tons was spiegeleisen.

Daily Rate of Production

The daily rate of production of coke and anthracite pig iron by months, from July, 1921, is as follows:

Daily Rate of Pig Iron Production by Months. Gross Tons

	Steel Works	Merchant	Total
July, 1921	23,056	4,803	27,859
August	26,074	4,713	30,787
September	27,189	5,661	32,850
October	32,566	6,850	39,415
November	24,960	6,225	31,185
December	44,173	13,923	58,096
January, 1922	42,150	10,973	53,063
February	46,842	11,387	58,144
March	[illegible]	12,428	66,675
April	56,650	12,440	69,070
May	[illegible]	13,290	74,409
June	[illegible]	16,197	78,701
July	62,321	15,100	77,421

The figures for daily average production, beginning with January, 1916, are as follows:

Daily Average Production of Pig Iron in the United States by Months. Gross Tons

	1916	1917	1918	1919	1920	1921	1922
Jan.	102,746	101,643	77,799	106,525	97,264	77,945	53,063
Feb.	106,456	94,473	82,835	105,006	102,720	69,187	58,214
Mar.	107,667	104,882	103,648	99,685	108,900	51,468	65,675
Apr.	107,592	111,165	109,607	82,607	91,327	39,768	69,070
May	108,422	110,238	111,175	68,002	96,312	39,394	74,409
June	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
July	104,017	107,820	110,354	78,340	98,931	27,889	77,421
Aug.	103,346	104,772	109,341	88,496	101,529	30,780	.
Sept.	106,745	104,465	113,942	82,932	104,310	32,850	.
Oct.	113,189	106,550	112,482	60,115	106,212	40,215	.
Nov.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	.
Dec.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	.

Diagram of Pig Iron Production and Prices

The fluctuations in pig iron production from 1913 to the present time are shown in the accompanying chart. The figures represented by the heavy lines are those of daily average production by months of coke and anthracite iron. The dotted curve on the chart represents monthly average prices of Southern No. 2 foundry pig iron at Cincinnati, local No. 2 foundry iron at furnaces in Chicago, and No. 2X at Philadelphia. They are based on the weekly quotations of THE IRON AGE.

Production of Coke and Anthracite Pig Iron in the United States, by Months, Beginning Jan. 1, 1918. Gross Tons

	1918	1919	1920	1921	1922
Jan.	2,411,768	3,302,260	3,015,181	2,416,292	1,644,951
Feb.	2,319,299	2,940,168	2,978,879	1,937,257	1,629,991
Mar.	3,213,091	3,090,243	3,375,907	1,595,522	2,035,920
Apr.	3,288,211	2,478,218	2,739,797	1,193,041	2,072,114
May	3,446,412	2,108,056	2,985,682	1,221,221	2,306,679
June	3,323,791	2,114,863	3,043,540	1,064,833	2,361,028
½ year.	18,002,572	16,033,808	18,138,986	9,428,166	12,050,683
July	3,420,988	2,428,541	3,067,043	864,555	2,400,045
Aug.	3,389,585	2,743,388	3,147,402	954,193	.....
Sept.	3,418,270	2,487,965	3,129,323	985,529	.....
Oct.	3,486,941	1,863,558	3,292,597	1,246,676	.....
Nov.	3,354,074	2,392,350	2,934,908	1,415,481	.....
Dec.	3,433,617	2,633,268	2,703,855	1,649,086	.....
Ttl. yr.	*38,506,047	30,582,878	36,414,114	16,543,686	.....

*These totals do not include charcoal pig iron. The 1921 production of this iron was 94,730 tons.

Production of Steel Companies—Gross Tons

Returns from all furnaces of the United States Steel Corporation and the various independent steel companies, as well as from merchant furnaces producing ferromanganese and spiegeleisen, show the following totals of steel making iron, month by month, together with ferromanganese and spiegeleisen. These last, while stated separately, are also included in the columns of "total production."

Production of Steel Companies—Gross Tons

	Total Production			Spiegeleisen and Ferromanganese		
	1920	1921	1922	1920	1921	1922
Jan.	2,232,455	1,932,159	1,306,045	23,957	22,228	6,874
Feb.	2,181,679	1,625,695	1,311,170	28,038	29,013	8,540
Mar.	2,480,668	1,323,443	1,629,982	35,275	41,294	13,695
Apr.	1,968,542	1,015,621	1,707,902	27,628	24,310	19,209
May	2,128,720	1,024,678	1,879,180	33,407	9,232	20,334
June	2,209,770	833,312	1,876,033	34,751	4,536	23,090
July	2,230,567	715,664	1,931,957	36,789	5,524	26,059
Aug.	2,254,913	807,141	.....	36,985	3,878	.....
Sept.	2,247,250	815,692	.....	39,546	3,289	.....
Oct.	2,393,644	1,054,312	.....	34,786	3,902	.....
Nov.	2,150,075	1,138,789	.....	26,944	3,525	.....
Dec.	2,047,167	1,276,581	.....	28,023	3,953	.....

Output by Districts

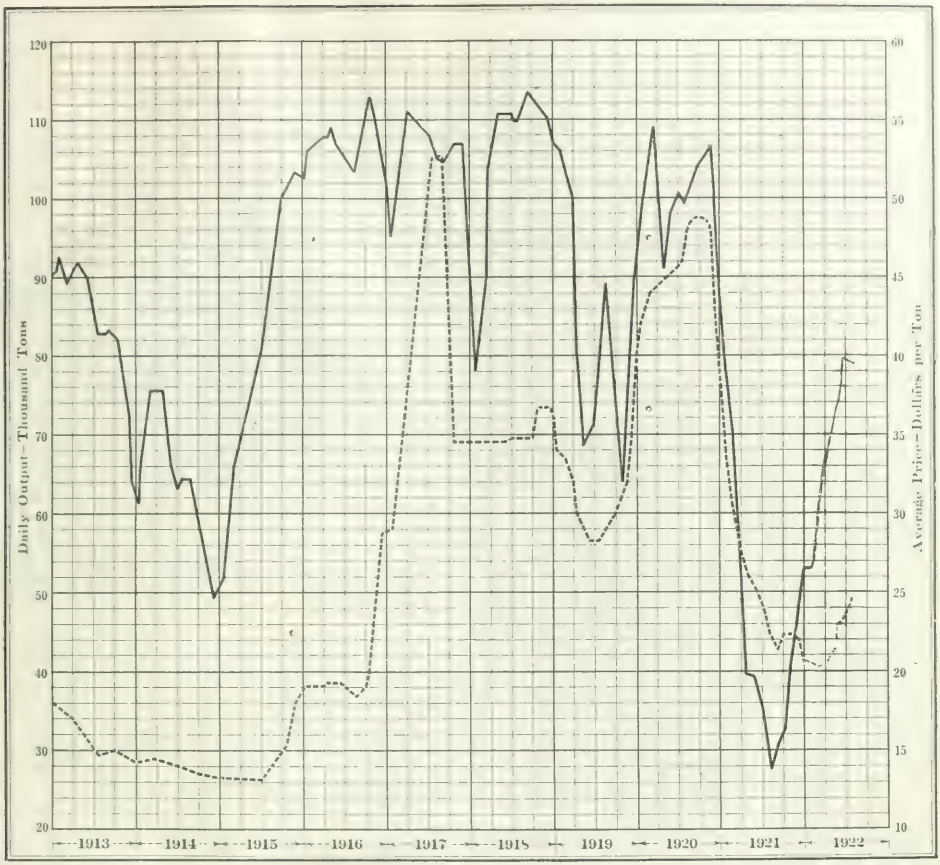
The accompanying table gives the production of all coke and anthracite furnaces for July and the three months preceding:

Pig Iron Production by Districts, Gross Tons

	July (31 days)	June (30 days)	May (31 days)	April (30 days)
New York	145,831	148,115	150,141	131,093
New Jersey	10,745	10,725	5,636	4,815
Lehigh Valley	58,070	66,967	66,572	45,714
Schuylkill Valley	54,660	60,925	66,669	58,927
Lower Susquehanna and Lebanon Valleys	26,689	26,501	21,313	17,387
Pittsburgh district	493,963	485,401	479,106	473,584
Shenango Valley	99,335	87,156	79,145	63,940
Western Penna.	82,294	91,494	103,072	106,430
Maryland, Virginia and Kentucky	55,984	54,687	47,862	26,463
Wheeling district	65,735	74,710	66,148	54,450
Mahoning Valley	233,093	240,470	227,053	197,113
Central and Northern Ohio	261,941	236,374	218,547	197,595
Southern Ohio	29,517	30,272	29,311	27,165
Illinois and Indiana	472,179	454,937	459,631	427,427
Mich., Minn., Mo., Wis. and Colo.	101,616	93,723	89,147	67,360
Alabama	195,910	189,101	196,104	171,823
Tennessee	12,483	9,470	1,222	828
Total	[illegible]	[illegible]	[illegible]	[illegible]

Among the furnaces blown in during July were the following: No. 1 Swede furnace in the Schuylkill Valley; No. 1 Ashland furnace in Kentucky; Nos. 1 and 4 Bessemer furnaces of the Tennessee Coal, Iron & Railroad Co. in Alabama and the Rockdale furnace in Tennessee.

Among the furnaces blown out or banked during July were the following: One furnace of the Lacka-



The Full Line Represents the Daily Production of Pig Iron and the Dotted Line Is the Average of the Price Per Ton of No. 2 Southern Pig Iron at Cincinnati, Local No. 2 Iron at Chicago and No. 2X Iron at Philadelphia

wanna Steel Co. and one furnace of the Donner Steel Co. in the Buffalo district; two furnaces of the Bethlehem Steel Co. in the Lehigh Valley; one Warwick and one Worth furnace in the Schuylkill Valley; one furnace of the Bethlehem Steel Co. at Steelton in the lower Susquehanna Valley; one Isabella and one Lucy furnace of the Carnegie Steel Co. in the Pittsburgh district; one Shenango furnace in the Shenango Valley; one furnace of the Bethlehem Steel Co. in Maryland; one La Belle furnace in the Wheeling district; one Ohio furnace of the Carnegie Steel Co., the Todd and Jeanette furnaces of the Brier Hill Steel Co., Nos. 2 and 4 Haselton furnaces of the Republic Iron & Steel Co., one furnace of the Youngstown Sheet & Tube Co. and the Trumbull-Cliffs furnace in the Mahoning Valley; one River furnace in northern Ohio; the Belfont and Milton furnaces in southern Ohio; Nos. 3 and 6 South Chicago (new) furnaces of the Illinois Steel Co. and Nos. 1 and 2 Gary furnaces in the Chicago district.

Blast Furnace Notes

The Temple furnace, Temple, Pa., idle since November, 1920, has been under repair recently and is ready to be put in operation in the near future. J. J. Becker is superintendent.

Norton furnace at Ashland is expected to go out any minute. The American Rolling Mill furnace at Ashland is still operating, and will likely be able to continue for at least a week. It looks now as though the Whitaker-Glessner at Portsmouth and the Columbus furnace of the American Rolling Mill Co. will be the only ones in blast at the end of another week.

Negotiations Proceeding Over Scrap Supplies in South America

The recently reported purchase of a large tonnage of iron and steel scrap located at various points on the west coast of South America, with which purchase Hyman Ehrlich, 233 Broadway, New York, is identified, is said to amount to as much as 260,000 tons. The Hyman Michaels Co., Chicago, is understood to be interested in the negotiations to an amount of 65,000 tons. So far it is stated that about 61,000 tons has been contracted for, 25,000 tons of heavy melting steel for the Bethlehem Steel Co. at Sparrows Point, Md., and 2500 tons of old iron rails to the same company for delivery to Lebanon. An additional tonnage of the rails is under option with Bethlehem, according to Mr. Ehrlich. The material includes also about 35,000 tons of cast iron car wheels, 21,000 tons of axles, and about 90,000 tons of unspecified material.

The Nautical Instrument Mfg. Co., Inc., 82 Beaver Street, New York, is in the market for molds and dies for making combination celluloid and metal instruments.

The Vitrified Wheel Co., Westfield, Mass., has returned to a 9-hr. day, as compared with an 8-hr. day heretofore.

The open hearth furnace development of the Otis Steel Co. at Cleveland provided one of the notable items in the fabricated steel market of the week.

Iron and Steel Markets

FURTHER CURTAILMENT

Fuel Situation Steadily Growing More Serious

Net Loss of 21 Blast Furnaces with Other Shutdowns Coming—Railroad Buying Still the Feature

The week has brought a further tightening of the grip of the coal and railroad strikes upon iron and steel works. It is realized that the situation will grow worse before it is better and that it has in it more serious possibilities than producers have yet entertained.

Pig iron production figures for July show how well the industry was maintaining itself, in spite of the railroad strike, until the priorities order became effective. After six months of steadily increasing output, July brought a net loss of 21 furnaces. However, the large majority of these blew out in the last week of the month.

In the 31 days of July production was 2,400,045 tons, or 77,421 tons per day, against 2,361,028 tons for the 30 days of June, or 78,701 tons per day. Merchant furnaces were hit hardest, their loss being nearly 1100 tons per day, while steel works furnaces held nearly up to the June rate.

The 171 furnaces in blast Aug. 1 had a capacity of about 68,000 tons per day, as against 81,845 tons per day for 192 furnaces on July 1. Since July ended other furnaces have been compelled to bank and with still others the uncertainties of getting coke are likely soon to be the certainty of not getting it.

This week the Steel Corporation has ordered the banking of two Carrie furnaces in the Pittsburgh district and of one Gary and one Joliet furnace in the Chicago district. In the Pittsburgh and adjoining districts nine furnaces have been thrown idle in the past week.

Steel works operations, owing to the large use of scrap, have not suffered in proportion to the falling off in pig iron. The Steel Corporation entered this week with steel output at nearly 70 per cent, but this is not likely to be maintained—and the average for independent steel companies has been nearer 60. Further reductions are impending in the Youngstown district.

In view of the enforcement of priority orders on coal shipments, a number of steel companies having stocks on hand are conserving their supply by slowing down steel works operation. A slight increase in Connellsville coke production is reported and some improvement in shipments of Kentucky and West Virginia coal.

Throughout the trade the view prevails that even with an early settlement of the two strikes, steel producers will not be greatly helped. Railroads and public utilities will be served first. Thus far few coal producers have regarded an order from the Pennsylvania Railroad calling for 20 per cent of their production.

The control of coal shipments has not gone yet to the point of holding prices in bounds. Some steel companies have paid as high as $10 for producer gas coal. Connellsville foundry coke has sold up to $17 and in most districts blast furnace coke is unobtainable at any price.

Already a good many consumers are taking less steel because fuel scarcity has cut down their operations, but others who have fuel are offering premiums for steel. Thus on a small scale the situation of the first half of 1920 is repeated and there is evidence of duplicate ordering to insure getting material. Prices in some cases have gone to 2c., Pittsburgh, and higher for bars and plates.

Railroad buying is still the strong feature of the situation. Several thousand additional cars are added to the list of repair orders. In locomotives the New York Central contract for 150 is conspicuous.

The persistence of structural business is another factor, and there is surprise at the continued buying in other lines, including automobile manufacture in spite of the accumulating difficulties in all industries.

The Pennsylvania Railroad has bought about 5000 tons more of steel, principally plates, for car repair work, making 17,000 tons it has taken for this purpose in two or three weeks.

In export trade several rail inquiries are up, including 8000 tons for Bolivia, 10,000 tons for Siam and 3000 tons for the Cuba Cane Co. London reports a 7000-ton rail order taken by the United States in competition with British makers.

Pig iron markets show further advances in prices, with only moderate inquiry, producers having little iron to offer in view of the curtailment of coke supply. At Chicago foundry and malleable irons are $1 higher and Lake Superior charcoal iron has advanced $1.50 per ton. In the Central West the advance on foundry iron is in some cases $2 per ton in the week. Foreign irons are still coming in at Atlantic ports to help out the Eastern market. Probably 30,000 to 35,000 tons has been sold here or sent over since the movement began in May.

In spite of the difficulty in getting coal, lake vessel owners expect to move all the Lake Superior ore the furnaces can take this month.

Pittsburgh

Sharp Curtailment of Operations with Mounting Prices on Little Buying

PITTSBURGH, Aug. 1.—The iron and steel industry still is paying a heavy toll to the coal and railroad strikes. In the past week no less than six blast furnaces have been forced into idleness by the shortage of fuel in this and adjacent districts. Late last week the Brier Hill Steel Co. put down one stack, while yesterday the Carnegie Steel Co. blew out one Lucy furnace and the Jones & Laughlin Steel Co. had to stop the operation of one Eliza furnace as well as one battery of its by-product plant at its south side works. The Youngstown Sheet & Tube Co. last Saturday put off a furnace and at Johnstown, Pa., the Cambria Steel Co. now has only three active furnaces as compared with five recently.

In the Mahoning and Shenango Valleys only six furnaces now are making iron, and it is probable that

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Aug. 1, 1922	July 25, 1922	July 3, 1922	Aug. 2, 1921
No. 2X, Philadelphia	**$29.76**	$28.77	$27.64	$21.35
No. 2, Valley furnace†	**28.00**	25.00	24.00	19.50
No. 2, Southern, Cin'ti†	22.55	22.55	22.55	23.50
No. 2, Birmingham, Ala.†	18.50	18.50	18.50	19.00
No. 2, foundry, Chicago*	**26.00**	25.00	24.00	18.00
Basic, del'd, eastern Pa.	**27.25**	25.75	25.75	21.25
Basic, Valley furnace	**25.00**	24.00	25.00	18.00
Valley Bess., del. Pitts.	26.76	26.76	26.76	21.96
Malleable, Chicago*	**26.00**	25.00	24.00	18.50
Malleable, Valley	27.00	27.00	24.50	20.00
Gray forge, Pittsburgh	**27.76**	26.26	25.26	21.46
L. S. charcoal, Chicago	**33.15**	31.65	31.65	35.00
Ferromanganese, seaboard	67.50	67.50	67.50	70.00

Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$40.00	$40.00	$40.00	$47.00
Bess. billets, Pittsburgh	35.00	35.00	35.00	30.00
O.-h. billets, Pittsburgh	35.00	35.00	35.00	30.00
O.-h. sheet bars, P'gh	35.00	35.00	35.00	32.00
Forging billets, base, P'gh.	40.00	40.00	40.00	35.00
O.-h. billets, Phila.	40.17	40.17	40.17	35.74
Wire rods, Pittsburgh	40.00	40.00	40.00	42.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	1.70	1.70	1.70	1.85
Light rails at mill	1.75	1.75	1.70	1.85

Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	**2.025**	1.925	1.925	2.10
Iron bars, Chicago	2.00	2.00	1.90	2.10
Steel bars, Pittsburgh	1.70	1.70	1.70	1.75
Steel bars, Chicago	1.75	1.75	1.75	2.13
Steel bars, New York	2.04	2.04	2.04	2.17
Tank plates, Pittsburgh	1.70	1.70	1.70	1.80
Tank plates, Chicago	1.75	1.75	1.75	2.18
Tank plates, New York	2.04	2.04	2.04	2.18
Beams, Pittsburgh	1.70	1.70	1.70	1.85
Beams, Chicago	1.75	1.75	1.75	2.23
Beams, New York	2.04	2.04	2.04	2.23
Steel hoops, Pittsburgh	2.50	2.50	2.50	2.40

Sheets, Nails and Wire,	Aug. 1, 1922	July 25, 1922	July 3, 1922	Aug. 2, 1921
Per Lb. to Large Buyers	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh	3.15	3.15	3.15	3.00
Sheets, galv, No. 28, P'gh	4.15	4.15	4.15	4.00
Sheets, blue an'l'd, 9 & 10	2.40	2.40	2.40	2.40
Wire nails, Pittsburgh	2.40	2.40	2.40	2.75
Plain wire, Pittsburgh	2.25	2.25	2.25	2.50
Barbed wire, galv., P'gh	3.05	3.05	3.05	3.40
Tin plate, 100-lb. box, P'gh	$4.75	$4.75	$4.75	$5.25

Old Material, Per Gross Ton:				
Carwheels, Chicago	$19.50	$19.50	$18.50	$12.50
Carwheels, Philadelphia	17.50	17.50	17.50	16.00
Heavy steel scrap, P'gh	**17.00**	17.25	17.50	12.00
Heavy steel scrap, Phila.	15.00	15.00	14.00	11.00
Heavy steel scrap, Chicago	15.50	15.50	14.00	10.00
No. 1 cast, Pittsburgh	19.00	19.00	18.00	16.00
No. 1 cast, Philadelphia	**18.00**	17.50	17.50	17.00
No. 1 cast, Ch'go (net ton)	17.00	17.00	17.00	11.50
No. 1 RR. wrot, Phila.	17.50	17.50	17.00	14.00
No. 1 RR. wrot, Ch'go (net)	**14.25**	14.00	13.00	9.25

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$14.00	$14.00	$8.50	$2.75
Foundry coke, prompt	**14.50**	14.00	9.00	3.75

Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	**14.12½**	14.00	13.75	12.00
Electrolytic copper, N. Y.	13.75	13.75	13.50	11.75
Zinc, St. Louis	**6.25**	5.95	5.35	4.20
Zinc, New York	**6.60**	6.30	5.70	4.70
Lead, St. Louis	**5.47½**	5.40	5.55	4.20
Lead, New York	**5.80**	5.75	5.75	4.40
Tin (Straits), New York	**32.75**	32.12½		26.50
Antimony (Asiatic), N. Y.	5.25	5.25	5.00	4.60

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Aug. 1, 1922, Finished Steel, 2.169c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 85 per cent of the United States output of finished steel

July 25, 1922,	2.169c.
July 3, 1922,	2.169c.
Aug. 2, 1921,	2.364c.
10-year pre-war average,	1.689c.

Composite Price, Aug. 1, 1922, Pig Iron, $24.38 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

July 25, 1922,	$24.05
July 3, 1922,	24.19
Aug. 2, 1921,	18.81
10-year pre-war average,	15.72

this number will be further reduced before the end of the week. Of the 140 furnaces located in the triangle formed by Johnstown, Wheeling and Warren (Ohio) only 62 now are active, a loss of 15 from the recent peak of the furnaces now active. It is believed that the Hanna stack at Dover, Ohio; that of the Sharon Steel Hoop Co., Lowellville, Ohio, and one of the three of the Youngstown Sheet & Tube Co. soon will suspend.

Steel plant operations also are on a lighter scale. The American Sheet & Tin Plate Co. is operating at about 60 per cent, taking in both sheet and tin plate mills, and while the Carnegie Steel Co. last week averaged about 75 per cent operations, the expectation is that this week's rate will be much lower. Shortage of coal also is affecting other Steel Corporation subsidiaries here. The Jones & Laughlin Steel Co. and the Pittsburgh Steel Co. are at about a 60 per cent operation and the Pittsburgh Crucible Steel Co. somewhat below 50 per cent.

Pittsburgh is not much encouraged that an early settlement of the railroad and coal strikes will help the steel industry materially, because of the preference which railroads and public utilities and domestic requirements will have over the steel industry for some time to come. Right in Pittsburgh those steel plants which draw coal supplies by river would be helped by a settlement of the coal strike, since river transportation is unaffected by the priority system.

There is much confusion on account of the application of coal priorities, particularly on intrastate shipments, because control is left with the State public service commissions, and coal producers believe that these commissions lack authority to direct railroad operations. Few of the coal producers are inclined to honor an order recently made by the Pennsylvania Railroad demanding 20 per cent of the production. They feel that the railroad has no authority to make such a demand, and while the Pennsylvania Railroad can confiscate the coal the producers are refraining from consigning it to that road.

With the slowing down in steel plant activities, there also has come a falling away in the demand for steel. Consumers evidently expect to be in no better shape than the producers with regard to fuel supplies. Further advances have taken place in pig iron prices.

notably in special analysis iron, due to the fact that while the demand is far from active, there are more buyers than sellers and more demand than supply. No. 2 foundry iron now does not seem to be available at less than $28, Valley furnace, as against $25 a week ago, and an advance of $1 per ton has been established in basic iron on one or two good-sized sales.

Coal is slightly easier under a smaller demand, but fancy prices continue to be paid for the limited tonnages of coke that are coming on the market. Old material is slow and prices show a softer tendency.

Pig Iron.—Founders and other users of special analysis iron appear to be suffering less from the fuel shortage than are the steel companies, and as there continues to be a good demand from those sources, and production and available supplies are very limited, prices still are mounting. All of the merchant Valley furnace interests are out of the market and the only iron of foundry grade now offered is from a Cleveland furnace, which is quoting $28, Valley furnace, for No. 2 grade. This interest has made sales during the week at $26 and $27 and claims to have obtained $28 within the last two days. The most recent sale of gray forge iron was at $26, Valley furnace basis, but it is doubtful if any of this grade now could be had for less than $27. Similarly malleable iron is quoted at $27, Valley furnace, that being the basis of the most recent business, but fresh inquiries might be hard to cover at less than $28. Two sales of basic, one of 2000 and another of 3000 tons, have been made at $25, Valley furnace, thus setting the market at that figure. There is doubt, however, that more of that grade can be had that low. The Monongahela Iron & Steel Co., Paden City, W. Va., which is seeking a round tonnage of Bessemer iron for August, September and October delivery, has been quoted $26, Valley furnace, but claims ability to buy at $25. In the absence of sales this grade is quoted at the former price, $25. W. P. Snyder & Co. makes the average price of basic iron from Valley furnaces in July $24.56 and of Bessemer $25. June averages were $25 for both grades.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.76 per gross ton:

Basic	$25.00
Bessemer	25.00
Gray forge	$26.00 to 27.00
No. 2 foundry	28.00
No. 3 foundry	26.00 to 27.00
Malleable	27.00 to 28.00

Ferroalloys.—Business still is virtually at a standstill because of the uncertainty of continued steel plant operation, due to the fuel situation. Prices are unchanged. Practically no domestic ferromanganese is being offered at present and quotations are nominal. The British product, which is arriving in this country freely on orders placed 60 days ago, still is quotable at $67.50, c.i.f. Atlantic seaboard, for September delivery, but on spot tonnages the common quotation is $72.50. We note one inquiry for 100 tons of 20 per cent spiegeleisen for immediate delivery from a Pittsburgh district steel maker. This material still is quoted at $36 furnace for 20 per cent and $35 furnace for 16 to 19 per cent by the leading commercial producer, but this interest is committed on probable production over the remainder of the year.

We quote 78 to 82 per cent ferromanganese, $67.50 c.i.f. Atlantic seaboard for [illegible] British, future, $67.50; German, 76 to 80 per cent, $66. Average 20 per cent spiegeleisen, $36 furnace; 16 to 19 per cent, $35 furnace; 50 per cent ferrosilicon, domestic, $55 to $60 furnace, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, $41.50; 11 per cent, $44.80; 12 per cent, $48.10; 13 per cent, $52.10; 14 per cent, $55.10; silvery iron, 6 per cent, $30; 7 per cent, $31; 8 per cent, $32.50; 9 per cent, $34.50; 10 per cent, $36.50; 11 per cent, $39; 12 per cent, $40.50. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Iron and Steel Bars.—On account of the restrictions to steel production caused by the fuel situation, there is no easing in the bar supply situation and prices are very firm within the quoted range. The Jones & Laughlin Steel Co. still is taking some tonnage at 1.70c. base, Pittsburgh, and that is the price also of the Steel Corporation, but for indefinite delivery. Most of the other independent makers are out of the market. Iron bars are up $1 per ton to 2.25c., base, for refined bars in carload lots.

We quote steel bars rolled from billets at 1.70c. to 1.80c.; reinforcing bars, rolled from billets, 1.70c. to 1.80c. base; rail steel reinforcing bars, 1.60c. to 1.70c.; refined iron bars, 2.25c. in car loads, f.o.b. mill, Pittsburgh.

Wire Products.—Although the demand often before has been greater, all makers are falling behind in their deliveries, because of the restrictions to steel production caused by the fuel situation. The Steel Corporation is more heavily committed than are the independents and naturally it is making the poorest showing with regard to deliveries. Prices higher than those named by the leading interest do not find much basis in sales. The full range of prices is given on page 315.

Cold-Finished Steel Bars and Shafting.—The effort to establish a minimum of 2.25c. base, Pittsburgh, so far has not been successful, despite the increasing difficulties which makers are having in getting hot-rolled bars promptly, because demands are not sufficiently heavy or urgent. Consumers generally are disposed to wait on deliveries on contracts on which prices are much below even the present minimum of 2.10c. Ground shafting is firm and unchanged at 2.50c. base, mill, for carloads and 2.75c. for less than carloads.

Rivets.—The recent advance of $5 per ton has not in any way lessened the demand, which is still reported to be heavy, due to the fact that so much structural work is in progress, while railroad equipment manufacturers are extremely busy. The automotive industry as yet has shown no appreciable slowing up and this fact largely accounts for the continued heavy demand for small rivets. The new quotations are well observed on new business. They are to be found on page 315.

Billets, Sheet Bars and Slabs.—Since the finishing mills are suffering quite as much as the steel works from the coal shortage and the introduction of the priority system means that there can be no immediate improvement in the fuel supply situation, business in semi-finished steel has become exceedingly quiet in the past week. Buyers are not anxious for supplies and producers are not anxious for business. Prices are nominal, but $35 is regarded as a fair appraisal of today's value of sheet bars, slabs and large billets. Steel works operations are holding up better in Pittsburgh than in some of the nearby districts.

We quote 4 x 4-in. soft Bessemer and open-hearth billets at $35; 2 x 2-in. billets, $35; Bessemer and open-hearth sheet bars, $35; slabs, $35; forging billets, ordinary carbons, $40, all f.o.b. Youngstown or Pittsburgh mills.

Iron and Steel Pipe.—Demand for the smaller sizes of standard pipe finding their heaviest use in building construction still is on a tremendous scale and obligations of most producers are so heavy that they are obliged to restrict new bookings. Some have adopted the plan of taking on new business to the extent only of what can be supplied from stock or fitted in with existing mill schedules. Butt weld capacity is estimated to be engaged 90 days ahead. There is a good business in lap welded sizes, but most producers are able to promise deliveries in four to five weeks. There continues to be much talk of a possible advance in steel pipe on the ground that the rise in this product has been only about half that in other finished steel lines, but as yet no definite steps looking toward higher prices have been taken. Discounts are given on page 315.

Hot-Rolled Flats.—New demands, if anything, are lighter than they have been but makers are heavily committed and consumers are specifying freely. The market is firm at 2.50c., base, Pittsburgh, for hoops, bands and hot-rolled strips, with now and then some sales carrying prompt delivery assurances as high as 2.75c. Some mills failed to complete rollings of cotton ties in advance of the opening of the season and having orders to get out are turning down inquiries for narrow, light-gage stock. The August price for cotton ties is $1.11 per bundle of 45 lb., this being the established price of $1.10, plus the carrying charge of 1c. per bundle per month.

Plates.—It is still easier for buyers to interest the mills in plates than in any of the other heavier products. Not much railroad business has lately come into this market, but considerable new tank business for Wyoming and Oklahoma has been placed with local builders. One order for Wyoming calls for 25 80,000-bbl. tanks, involving about 7500 tons of steel, while a recent order for 12 tanks of similar capacity for the Oklahoma field will take about 3500 tons of steel. Prices are firm within the recent range. Quotations are given on page 315.

Tin Plate.—Canning crops not only are abundant this year but matured earlier than usual and miscalculation as to requirements of tin plate has caused the container manufacturers to seek additional tonnages. This demand, coming at a time when maintenance of mill operations has been impossible owing to the fuel shortage, the situation in regard to supplies is tight. Prices are unchanged but may be said to be firm.

Cold-Rolled Strips.—Makers are not very anxious for additional business as their present obligations are sufficient to carry them through the present quarter, and there is a possibility that there may be a carryover into the fourth quarter, in view of the restrictive influence of the coal strike situation upon steel production. The market still is quotable at 4c., base, Pittsburgh, but premiums of as much as $5 per ton over this price have been paid for small tonnages for early delivery.

Sheets.—Demand has not decreased quite as much as that for some other finished lines and actually is still brisk from the automotive industry and with the mills obliged to curtail operations on account of the fuel shortage. The supply situation is really acute. Premiums for prompt shipments are much more common than they were recently. Prices are given on page 315.

Steel Skelp.—The market is quiet as far as actual sales are concerned, but this is due to the meagerness of available supplies rather than a lack of demand. Grooved skelp is wanted on account of a high demand for the smaller sizes of pipe and is quotable as high as 2c.; on sheared skelp the range is from 1.70c. to 1.80c.

Wire Rods.—On a few small tonnages, urgently wanted, as high as $45 is reported to have been done and one large independent producer, who for some time has been quoting $43 on sizable lots, continues to hold to that price. Most of the tonnage moving carries a price of $40 for the base size of soft rods, but that figure now is not interesting to independent makers on fresh inquiries.

We quote No. 5 common basic or Bessemer rods to domestic consumers $40 to $43; chain rods, $40 to $43; screw stock rods, $45 to $48; rivet and bolt rods and other rods of that character, $40 to $43; high carbon rods, $47 to $53, depending on carbon, per gross ton, f.o.b. Pittsburgh or Youngstown.

Steel Rails.—There is a fair amount of current business in light rails, and since those that are wanted must be shipped out immediately, some of the mills are getting as high as 2c. out of stock. The regular mill base, however, is unchanged at 1.75c., base, for those sections rolled from new steel.

We quote 25 to 45-lb. sections, rolled from new steel, 1.75c. base; rolled from old rails, 1.60c. to 1.65c. base; standard rails, $40 per gross ton mill for Bessemer and open-hearth sections.

Structural Material.—Fabricating interests here report increased difficulty in securing deliveries of plain material, and some of them are unable to quote against current projects because of their inability to make deliveries within the specified time. Stronger prices are indicated in recent bids on new structural jobs, but the complaint still is heard that fabricated steel has not advanced in keeping with plain material. Prices are given on page 315.

Spikes.—Railroads tributary to this city appear to be well covered against their immediate requirements of spikes and other track equipment and new inquiries are few and small. There is no change in prices. Quotations are given on page 315.

Nuts and Bolts.—Buyers entered heavy orders for third quarter delivery prior to an advance which became effective July 1, and while specifications are coming in freely strictly new business is of very moderate proportions. Discounts are given on page 315.

Coke and Coal.—Coal prices have declined about $1 per ton since a week ago, the range now being $7 to $7.50 as against $8 to $8.50 recently. Available supplies are no larger, but the feeling that when the Government plans really become operative, prices will be more reasonable, has led to the withdrawal of a good many buyers from the market. The few lots of Beehive oven coke reaching the market are selling at $14 to $14.50 for furnace grade and at $14.50 to $15.00 for foundry coke.

Old Material.—If there is a definite tendency to prices, it is toward lower levels, due to the fact that a large majority of consumers in this district are out of the market on account of the uncertainty about fuel supplies. Some mills are holding up shipments against contracts, and it is the reconsigning of these tonnages that tends to weaken prices. General offerings of old material are moderate and the market is not likely to be flooded by railroad scrap right away, since on account of the shortage of coal the railroads are unlikely to give early attention to the collection and loading of road scrap, while production is likely to be affected so long as the strike of the shopmen continues. On the basis of recent transactions, including a purchase of about 12,000 tons by a large independent steel company, the market on heavy melting steel is quotable from $17 to $17.50. The market is slightly stronger on old rails for rolling, but rules a shade easier on most kinds of cast scrap and on the blast furnace grades. Bids were opened this morning on about 17,000 tons of scrap offered by the Pennsylvania Railroad, Eastern region.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows per gross ton:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	$17.50 to $17.50
No. 1 cast, cupola size	19.00 to 19.50
Rails for rerolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	17.50 to 18.00
Compressed sheet steel	16.00 to 16.50
Bundled sheets, sides and ends	15.00 to 15.50
Railroad knuckles and couplers	18.00 to 18.50
Railroad coil and leaf springs	18.00 to 18.50
Low phosphorus standard bloom and billet ends	20.00 to 20.50
Low phosphorus plates and other grades	19.00 to 19.50
Railroad malleable	16.00 to 16.50
Iron car axles	26.00 to 26.50
Locomotive axles, steel	25.00 to 25.50
Steel car axles	17.50 to 18.00
Cast iron wheels	18.00 to 18.50
Rolled steel wheels	18.00 to 18.50
Machine shop turnings	13.75 to 14.25
Sheet bar crop ends	19.50 to 20.00
Heavy steel axle turnings	15.00 to 15.50
Short shoveling turnings	15.00 to 15.50
Heavy breakable cast	18.00 to 18.50
Stove plate	14.50 to 15.00
Cast iron borings	15.50 to 16.00
No. 1 railroad wrought	15.00 to 15.50

Wholesale Trade in New York in June

The dollar value of June sales of 122 wholesale dealers in the New York Federal Reserve Bank district was about the same as in June of last year. This is the third month this year that sales have been practically equal to those of the corresponding month of 1921. The value of sales during the first half of the present year was 2 per cent below sales for January to June, 1921.

In June for the first time since the fall of 1920, sales of machine tools were larger than in the corresponding month of the preceding year, reflecting increased activity in industrial plants. The larger volume of building is apparent in the sales of hardware dealers, which increased 12 per cent over those of June, 1921.

Grocery dealers report an increase of 7 per cent in June sales, the largest gain recorded this year, and probably due, in a measure, to somewhat higher prices.

Chicago

Pig Iron Production Checked More Than Steel—Demand Surprisingly Strong

CHICAGO, Aug. 1.—The coal and railroad strikes have progressed to the point where they are causing both producers and users of iron and steel to curtail operations. Four steel works blast furnaces and one merchant stack have been banked with the certainty that others will become inactive unless fuel becomes more plentiful. Steel output has not declined in proportion to pig iron production, owing to the greater use of scrap in the open hearth furnaces. Notwithstanding the loss of two blast furnaces at Gary and two at South Works, reducing its total active stacks to 16 out of 29, the Illinois Steel Co. is producing steel at the rate of 78 per cent of capacity as against 84 per cent last week. The Inland Steel Co. continues to operate at 65 to 70 per cent of capacity.

In view of the uncertain fuel situation, it was rather surprising that steel demand shows so little change. For a leading local producer, specifications passed to the mills for execution are substantially as heavy as in previous weeks, inquiry is slightly heavier, while new business booked is a little lighter. The explanation seems to lie in the fact that certain important classes of consumers continue to buy steel, despite serious current industrial difficulties. The railroads are still placing large orders for cars and car repairs as well as for track material and are apparently anxious to carry out their program despite the fact that they now realize that these programs cannot be completed this year.

Automobile manufacturers are endeavoring to buy for 60 to 90 days ahead and even further, whereas until recently they adhered to a hand-to-mouth policy of purchasing. Building activity is still flourishing, as evidenced by numerous structural awards and inquiries. There appears to be a feeling among users that the present is a good time to buy, even though deliveries may be distant. This sentiment may be due to the belief that it will take steel producers months to rebuild their fuel stocks, and in the meantime the tendency of prices may continue to be upward.

As against this it is argued in some quarters that in the scurry to get material there has been considerable duplication of both inquiries and orders. Owing to their crippled operations, however, mills are carefully scrutinizing business offered them and in some cases are limiting their new sales to old customers.

Ferroalloys.—Ferromanganese por prompt shipment has advanced to a minimum of $75, f.o.b., New Orleans, but still can be bought for late September and October shipment at $67.50. Fifty per cent ferrosilicon is available at $57, delivered, for both spot and future shipment.

We quote 78 to 82 per cent ferromanganese, future, $75 to $80, delivered, 50 per cent ferrosilicon, $57 delivered, spiegeleisen, 18 to 22 per cent, $46 delivered.

Pig Iron.—With an acute scarcity of fuel staring them in the face, local producers have advanced their prices to $28, base, furnace, on spot and a minimum of $26 on contract iron. One dollar extra is charged for each ½ per cent increase in silicon content above the base grade. The Southern furnace, which has been selling at $18.50, base, Birmingham, has withdrawn from the market, so that the present minimum quotation of Southern foundry is $20. Even the latter price is practically nominal, as it is exceedingly difficult to get delivery on the Southern product, because of car shortage. Consignments of Southern iron which have been in transit four and five weeks have not yet reached destination. The policy of buyers at present seems to be one of caution, dictated by uncertainty as to fuel supplies. The principal demand is for spot iron to take care of immediate needs, as an absolute suspension of operation may become necessary if the coal strike is not settled. One of the largest recent sales was 1500 tons of malleable iron to a Wisconsin melter, 500 tons for prompt shipment and the remainder for later delivery. Most orders cover small lots, ranging from a carload up to a few hundred tons. Charcoal iron has advanced to $30, base, furnace.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards or where so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, according to sil. 1.50, delivered at Chicago	$33.15
Northern coke, No. 1, sil. 2.25 to 2.75	$27.00 to 29.00
Northern coke, foundry, sil. 1.75 to 2.25	26.00 to 28.00
Northern high phos	26.00 to 28.00
Southern No. 2	26.00
Malleable, not over 2.25 sil.	26.00 to 28.00
Basic	26.00 to 28.00
Low phos, Valley furnace, sil. 1 to 2 per cent copper free	34.00 to 37.00
Silvery sil. 8 per cent	37.29

Bars.—Prices on soft steel bars for indefinite delivery are unchanged, but for specific shipment, material is difficult to obtain and quotations are steadily advancing. The minimum price for early shipment in this market appears to be 2.15c., Chicago, while Eastern mills are booking business at 1.85c. to 2c., Pittsburgh. In the opinion of some observers the scurry for bars by users has made the volume of inquiry appear larger than it actually is. Bar iron is firm at a minimum of 2c., Chicago, and one important mill is taking new business only on the basis of prices ruling at the time of shipment. High fuel costs are a source of great concern to these mills and it is intimated that the situation may force one or more producers to suspend operations. The Moline, Ill., rail and steel bar plant of the Republic Iron & Steel Co., started up to-day with a comfortable back log. This mill is quoting 1.65c. to 1.70c., f.o.b Moline, while Chicago Heights rail steel makers are practically out of the market, with nominal quotations of 1.70c. to 1.80c., Chicago. Bar iron, two cents.

Mill prices are: Mild steel bars, 1.75c. to 2.15c., Chicago; common bar iron, 2c., Chicago; rail steel, 1.70c. to 1.80c., mill or Chicago.

Jobbers quote 2.60c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 3.10c. for rounds and 3.60c. for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 2.50c. base; loops, 3.00c.; bands, 3.25c.

Bolts and Nuts.—Some makers continue to accept specifications at the discounts of May 11, but the dominant tendency of the market is toward firmness at the July 1 prices. Demand from farm implement makers is steadily improving and buying by automobile manufacturers is heavy. The latter have abandoned their policy of buying for immediate needs and are now trying to cover for 60 to 90 days ahead. The discounts on page 315 apply in this territory except that they are f.o.b., Chicago, instead of f.o.b., Pittsburgh.

Jobbers quote structural rivets, 3.25c.; boiler rivets, 3.35c.; machine bolts up to ⅞ x 4 in., 50, 10 and 10 per cent off; larger sizes are said to be 10 off; carriage bolts up to ⅞ x 6 in., 40 and 5 off; larger sizes, 15 off; hot pressed nuts, squares and hexagons, tapped, $3.25 off; blank nuts, $3.50 off; coach or lag screws, gimlet points, square heads, 60 per cent off; quantity extras are unchanged.

Wire Products.—Production has been materially curtailed both by shortage of steel and labor. Demand still exceeds the ability of the mills to deliver in all classes of products. It is probable, however, that if mill output were normal, little trouble would be experienced in meeting the needs of consumers. For mill prices see finished iron and steel, f.o.b. Pittsburgh, page 315.

We quote warehouse prices, f.o.b. Chicago: No. 9 and heavier black annealed wire and No. 9 and heavier bright basis $3.50 per 100 lb., common wire nails $3.15 base, 10d base, cement coated nails $3.50 per keg.

Sheets.—There is a healthy demand for blue annealed, while inquiries for galvanized are particularly heavy. Black sheets alone lag. The situation is the reverse of that which obtained early in the year, when sales of black were heavy and the demand for galvanized was slack. The change is explained by the fact that the farmers who are large consumers of galvanized sheet steel products have commenced to buy on a broad scale. Purchases of sheets for corrugated roofing are especially liberal. Sheets for early delivery are difficult to obtain.

Mill quotations are 3.15c. to 3.30c. for No. 28 black, 2.40c. for No. 10 blue annealed, 3.50c. to 3.65c. for No. 28 galvanized, all being Pittsburgh prices, subject to a [illegible] per cent.

Jobbers quote blue annealed, 3.75c.; black, 4.45c.; galvan-

Plates.—The price situation shows little change, but material for early delivery is difficult to obtain. The Illinois Steel Co. continues to quote 1.75c., Chicago, for indefinite delivery, while the Inland Steel Co. is still able to take a limited tonnage of certain sizes of heavy sheared plate for six to nine weeks delivery. Owing to sharp reductions in the operations of Eastern mills, consumers no longer find it easy to secure material for early shipment from points outside the Chicago district. Demand is still flourishing with additional cars and car repairs being placed by the railroads and further inquiry for oil storage tanks. The contract for 25 oil tanks for the Sinclair properties in the Wyoming field is about to be awarded.

[illegible]

Structural Material.—Structural lettings for the week have been heavy and new inquiry is large. Plain material for early delivery, however, is difficult to obtain. The Illinois Steel Co. continues to quote 1.75c., Chicago, for indefinite shipment, while the Inland Steel Co. is out of the market except for an occasional size on which it can make from six to nine weeks' delivery. The minimum price for specific delivery is 2c., Chicago, but Eastern mills are experiencing no difficulty in booking orders at 1.90c. to 2c., Pittsburgh.

The mill quotation on plain material is 1.75c. to 2c., Chicago. Jobbers quote 2.70c. for plain material out of warehouse.

Warehouse Prices.—Local jobbers have reduced prices on wire and nails 15c. to 30c. per 100 lb. The new quotations are published under "Wire Products."

Rails and Track Supplies.—Demand for track supplies is active, although as a rule individual orders are smaller than some time ago. An exception is a current inquiry for 7000 tons of tie plates. After a long period of slack demand, a number of small inquiries for light rails have been received from coal operators, evidently indicating a desire to repair their lines in anticipation of an early reopening of their mines. Prices are unchanged.

Standard Bessemer and open-hearth rails, $45; light rails rolled from new steel, 1.75c., f.o.b. makers' mills.

Standard railroad spikes, 2.25c. to 2.35c., Pittsburgh; track bolts with square nuts, 3.25c. to 3.35c., Pittsburgh; tie plates, steel and iron, 1.85c. to 2c., f.o.b. mill; angle bars, 2.40c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.30c. base and track bolts 4.30c. base.

Reinforcing Bars.—Recent lettings include: Research Laboratory, Pittsburgh Plate Glass Co., Milwaukee, 125 tons, to Concrete Steel Co.; Thirty-Ninth Street Sewer, Chicago Sanitary District, 600 tons, to Concrete Steel Co.; High School, Houghton, Mich., 150 tons, to Corrugated Bar Co.; highway work, Kentucky, 150 tons, to Corrugated Bar Co.; High School, Ft. Madison, Ia., 150 tons, to Corrugated Bar Co.; Nelson Building, Davenport, Ia., 150 tons, to Corrugated Bar Co.; Benz Hotel, St. Paul, 150 tons, to Corrugated Bar Co. Pending business includes: Masonic Temple, St. Louis, 800 tons; High School, Wichita, Kan., 400 tons.

Steel Castings.—Steel foundries are generally very busy and current discounts on castings are very firm with the prospect of another advance within thirty days. The coal shortage is not affecting steel foundries as adversely as other foundries, because their furnaces largely burn oil or are operated by electricity.

Cast-Iron Pipe.—Prices have again advanced to a range of $38 to $39, base Birmingham, for 6 in. and larger. St. Paul, Minn., has let 535 tons to National Cast Iron Pipe Co. Other lettings are small or private.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $50.20 to $51.20; 6-in. and above, $46.20 to $47.20; class A and gas pipe, $3 extra.

Coal and Coke.—The local producer of by-product foundry coke will take no new business except on the basis of the price ruling at time of delivery. The Southern producer of by-product foundry coke, which recently took some business in this district, has withdrawn from the market. Plants using coal are experiencing great difficulty in getting deliveries, owing to car shortage and at the same time find prices so high as to make operation practically prohibitive. Western Kentucky bituminous coal is now bringing from $13.50 to $15, delivered Chicago. Malleable foundries are particularly hard hit by the situation and bar iron rolling mills are also in a tight position with the possibility of a complete shut down.

Old Material.—A moderate revival in buying, made up largely of small individual purchases together with a limited available supply of scrap, has given the market a stronger tone and has resulted in advances in a number of grades. While the fuel situation has caused consumers of scrap to buy from hand to mouth, it is also true that scrap offerings have declined sharply. The shopmen's strike has materially reduced the offerings of the railroads, the largest producers of scrap, while industrial concerns are neglecting to prepare their scrap for shipment owing to a shortage of labor. Consumption of open hearth grades by the Steel Corporation subsidiary has increased as the result of the banking of 4 blast furnaces. Railroad offerings include the Chicago & Northwestern, 2400 tons; the Wabash, 500 tons of miscellaneous scrap from dismantled cars, and the New York Central, the Michigan Central and the Grand Trunk, blind lists.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

	Per Gross Ton	
Iron rails	$19.00 to	$19.50
Cast iron car wheels	19.50 to	20.00
Relaying rails	22.50 to	27.50
Rolled or forged steel car wheels	18.50 to	19.00
Rails for rerolling	16.50 to	17.00
Steel rails, less than 3 ft	17.50 to	18.00
Heavy melting steel	15.50 to	16.00
Frogs, switches and guards cut apart	15.50 to	16.00
Shoveling steel	15.00 to	15.50
Drop forge flashings	11.50 to	12.00
Hydraulic compressed sheet	13.00 to	13.50
Axle turnings	13.50 to	14.00
Per Net Ton		
Iron angles and splice bars	18.00 to	18.50
Steel angle bars	14.75 to	15.25
Iron arch bars and transoms	18.50 to	19.00
Iron car axles	23.00 to	23.50
Steel car axles	15.75 to	18.25
No. 1 busheling	12.50 to	13.00
No. 2 busheling	7.25 to	7.50
Cut forge	13.75 to	14.25
Pipes and flues	11.00 to	11.50
No. 1 railroad wrought	14.25 to	14.75
No. 2 railroad wrought	13.75 to	14.25
Steel knuckles and couplers	16.25 to	16.75
Coil springs	16.50 to	17.00
No. 1 machinery cast	17.00 to	17.50
No. 1 railroad cast	16.00 to	16.50
Low phos. punchings	15.00 to	15.50
Locomotive tires, smooth	13.00 to	13.50
Machine shop turnings	9.00 to	9.50
Cast borings	11.25 to	11.75
Stove plate	14.75 to	15.25
Grate bars	14.25 to	14.75
Brake shoes	14.00 to	14.50
Railroad malleable	16.00 to	16.50
Agricultural malleable	16.00 to	16.50

National Industrial Conference Board on Situation

The National Industrial Conference Board, in its weekly radio review of industrial conditions, says:

"Railroad executives report that the roads are in good condition, that traffic has been little disturbed and that new men are rendering satisfactory service. Railroad shopmen on strike are reported as in more tractable mood and as willing to return to work on terms specified by President Harding provided satisfactory arrangements are made over the question of seniority.

"In his conferences with the strikers the President is understood to have insisted that the Labor Board's decisions be recognized and obeyed by both sides, that the strikers return to work and request a rehearing of their grievances, and has agreed also to request railroad executives to restore the strikers' former seniority privileges but that shopmen who remained at work shall be advanced in rating over the strikers. The question of seniority is a major consideration with railroad employees since it bears relation not only to pension privileges but determines the order in which men shall be discharged, men lowest in rank of seniority being the first to be laid off when discharges are ordered.

"While current strikes have tended to impede business recovery, business generally is good. Retail trade in many districts is reported satisfactory.

New York

Little Domestic Pig Iron Available—Foundries Inquiring, But Are Buying Sparingly

NEW YORK, Aug. 1.—There is no excitement in the market in view of the further tightening of the situation in pig iron and in fuel. A few buyers have inquired for pig iron for August and September deliveries and perhaps 1500 tons in all has been closed for early delivery in the past week. The foundries are showing more interest in foreign iron, for which prices have advanced from $1 to $2 per ton over the recent low point. Large purchases of coal have been made in England, but deliveries are uncertain and ocean freights are high. A New England by-product coke plant is out of the market in view of the cutting off of domestic coal supply.

Pig Iron.—Pending inquiries for iron amount to 1500 to 2000 tons. A near-by New York State foundry bought 400 tons of No. 1X iron for delivery within the week. One Connecticut interest has inquired for 900 tons of foundry iron in the last quarter and first quarter. Another New England inquiry is for 500 tons of malleable and a Connecticut foundry has asked for 500 tons of No. 2X. In the New York district there is an inquiry for 150 tons of high silicon iron for early delivery. Eastern Pennsylvania furnaces are quoting $28 to $29.50 for 2X iron, but little is available. Some Buffalo furnaces have put their price for prompt No. 2X at $28 at furnace, but there is still some Buffalo iron offered at $25 for delivery over the remainder of the year. A New York buyer came into the market for 1000 tons of foundry iron and has closed for 500 tons of Scotch iron. The latter could be had this week at $27, f.o.b. New York, but as high as $30 has been paid for Scotch iron delivered in Brooklyn. Most foundries are well provided with coke, but the few that needed to buy have found prices soaring, $16 to $17 at ovens being asked for foundry coke. Most furnaces have no iron to offer and in general foundries are unwilling to take the risk of present prices for deliveries running late into the year. No buying has resulted, as far as can be learned, from the three inquiries reported last week, one from a boiler company, another from a New Jersey foundry and a third from Springfield, Mass. On a New York State inquiry which came up last week $29.50, delivered, was quoted on Southern No. 1 iron. Foundries are getting little or no advance in prices of castings, to compensate for the high prices they are paying for pig iron, and evidently fear that any advance would curtail business.

We quote on [illegible] New York district as follows, having added to furnace prices $2.27 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$31.77 to	$32.77
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	30.77 to	31.77
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	29.77 to	30.77
Buffalo, sil. 1.75 to 2.25	30.91 to	31.91
No. 2 Virginia, sil. 1.75 to 2.25	29.44 to	30.44

Finished Iron and Steel.—Regular mill customers are having difficulty in getting their normal monthly amounts of steel—in some cases, indeed, being told that they cannot expect current deliveries. In that the uncertainty is greater than it was a week ago, the steel situation is worse and urgent buying naturally begets premium prices. Going business is reported at 1.80c. to 2c., Pittsburgh basis, on plates, shapes and bars. There are still those who entertain inquiries, but it appears the list of mills which are out of the market has been enlarged, although one mill which would not quote a week ago on material like plates will consider fresh business at a 2c. basis. Plates are, if anything, stronger than bars or shapes, and it is difficult to buy any of these forms of steel at less than 1.80c., Pittsburgh, for any reasonable delivery. A surprisingly large amount of fabricated steel work keeps coming before the trade, but nothing of moment is noted in railroad equipment buying in the East other than large locomotive purchases reported elsewhere. Bar iron has strengthened and we recognize a range of prices as noted below.

We quote for mill shipments, New York, as follows: Soft steel bars, 2.04c. to 2.24c.; structural shapes, 2.04c. to 2.19c.; bar iron, 1.94c. to 2.04c.; and steel plates, 2.04c. to 2.34c. On export shipments the freight rate from Pittsburgh to New York is 28.5c. per 100 lb., while the domestic rate is 34c.

Ferroalloys.—Demand for ferromanganese is confined to small and large lots for August shipment, which can be obtained and which have been sold at $67.50 to $70, seaboard. The spiegeleisen market is quiet and quotations are unchanged. There is a moderate demand for 50 per cent ferrosilicon at unchanged quotations. The uncertainty as to the future of the industrial situation has had its effect on these markets. Quotations are as follows:

Ferromanganese, domestic, seaboard, per ton	$67.50 to $70.00
Ferromanganese, British, seaboard, per ton	$67.50 to $70.00
Spiegeleisen, 17 to 19 per cent	$35.00
Spiegeleisen, 20 per cent	$36.00
Ferrosilicon, 50 per cent, delivered, per ton	$52.00 to $55.00
Ferrotungsten, per lb. of contained metal	40c. to 50c.
Ferrochromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr., delivered	12c. to 14c.
Ferrovanadium, per lb of contained vanadium	$3.00 to $3.50
Ferrocarbontitanium, 15 to 18 per cent, 1 ton to carloads, per ton	$200.00
Ores	
Manganese ore, foreign, per unit, seaboard	26c. to 30c.
Tungsten ore, per unit, in 60 per cent concentrates, nominal	$2.00 up
Chrome ore, basis 48 per cent Cr_2O_3, crude, per unit, Atlantic seaboard	40c. to 45c.
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	[illegible] to [illegible]

High-Speed Steel.—Both the price and business conditions in this market continue unchanged. Producers continue to quote 18 per cent tungsten high-speed steel at 75c. per lb., base, with special brands of some companies selling up as high as 95c. per lb.

Cast-Iron Pipe.—Prices are firm and demand is still heavy for the smaller sizes. The city of Buffalo is asking for bids on 12,000 ft. of 6-in. pipe. Deliveries in this district are from six to eight weeks. We quote, per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $53.50; 4-in. and 5-in., $58; 3-in., $63.80, with $4 additional for Class A and gas pipe.

Old Material.—The market is strong and prices firm with an upward tendency. Heavy melting steel is quotable at $10.50 to $11 per ton, the high price being well established in this district based upon shipments being made by one dealer to Buffalo by barge, the low freight rate thus obtained warranting higher prices. Steel is also being shipped to Monessen, Alan Wood, Jones & Laughlin, Bethlehem and the American Sheet & Tin Plate Co. Stove plate is slightly stronger than for several weeks past, one dealer in this district having closed on a tonnage which figures back to a basis of $11 per ton.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$10.50 to $11.00
Steel rails, short lengths, or equivalent	11.25 to 11.75
[illegible]	[illegible]
[illegible]	[illegible]
Steel car axles	[illegible]
Iron car axles	[illegible]
No. 1 railroad wrought	[illegible]
Wrought iron track	11.00 to 11.50
[illegible]	[illegible]
No. 1 cast wrought	[illegible]
Cast borings, clean	[illegible]
Machine shop turnings	9.25 to 10.25
Mixed borings and turnings	[illegible]
Iron and steel pipe (1 in. diam., not under 2 ft. long)	9.00 to 9.50
Stove plate	[illegible]
[illegible]	[illegible]
Malleable cast (railroad)	[illegible]
Cast-iron car wheels	13.00 to 13.50

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$18.00 to $19.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	16.50 to 17.00
No. 1 heavy cast, not cupola size	13.00 to 13.50
No. 1 cast [illegible]	[illegible]
[illegible]	[illegible]

Warehouse Business.—The situation is unchanged in this district. Prices are firm and business fairly active. Open-hearth spring steel is now quoted at 4c. to 6c. per lb. Sheets are still weak, but reported sales of black and galvanized sheets on a basis of 4c. and 5c. per lb.,

base, are far less numerous than formerly. The minimum price now obtainable is probably close to 4.20c. and 5.20c. per lb., base, on black and galvanized respectively, with sales of small lots ranging as high as 4.50c. and 5.50c. per lb., base. Brass and copper warehouses have again advanced prices on both brass and copper products, and report better business than at any time since purchasing by manufacturers of radio equipment ceased several weeks ago. We quote prices on page 336.

Philadelphia

Prices Climbing Especially in Pig Iron—Uncertainties of Priority System Dominate

PHILADELPHIA, Aug. 1.—The situation due to the railroad and coal strikes is going from bad to worse, and the iron and steel trade of the eastern Pennsylvania district does not know to-day what new conditions it may have to face to-morrow. Coal priorities have not as yet seriously complicated the muddle, but this is due to the fact that the Government plan has not been fully worked out. The fear is that when the preferred priorities have been taken care of the supply of coal and coke for steel plants and blast furnaces, already inadequate, will be further restricted and that more widespread banking of blast furnaces and slowing down of steel plant operations are inevitable. Even a settlement of the railroad strike, it is believed here, would not materially improve the situation, as there would immediately be a demand for coal from so many sources that industrial plants, fourth on the list, would not fare well for the next 30 or 60 days at least.

In the New River coal and coke field, car distrubutors have already been posted by the Federal board and cars are being allocated to the mines and coke ovens and shipments are being made as the Government directs. As yet this supervision has not extended to all districts, but it soon will become more comprehensive. As an example of the way the priorities are working, it is pointed out that 5000 tons of blast furnace coke, in storage at a Virginia blast furnace, would quickly be purchased by some eastern Pennsylvania furnace, but the railroads will not move it for such destination, and if sold it will probably go to a public utility plant.

The uncertainties the iron and steel trade is facing has resulted in less and less business being done. While there is no overwhelming demand for iron or steel, more orders are being offered than mills and furnaces are willing to accept. Prices continue their upward climb, particularly on pig iron, which is at least $1 to $2 a ton higher than a week ago.

Pig Iron.—Blast furnace operators do not seem to know just how the coal priority plan of the Government is going to affect them, but they fear the worst, especially as industrial plants generally are fourth on the list and presumably will not get coke until the preferred classifications are taken care of. The Coatesville furnace of the Midvale Steel & Ordnance Co., which has been furnishing some iron for merchant trade, was blown out on Sunday due to coke shortage. Other active furnaces are in a precarious position as to coke supply, but have little definite information as to whether their supply will be cut off entirely. Under these uncertain conditions iron prices have soared and $30 has been reached on foundry iron. On limited tonnages to regular customers two furnaces are quoting $28 to $30, furnace, on No. 2 plain and $29 to $31 in No. 2X. Sales of imported iron constitute the chief activity. Several lots of 1000 tons or more have been sold to cast iron pipe makers and small lots, usually not over 100 or 150 tons, have been sold to gray iron foundries. In all, possibly 10,000 tons of foreign iron have been disposed of in this market in the past few weeks. Prices range from $23.50 to $24 on French iron; from $26 to $27 on Middlesborough (English) and from $27.50 to $28.50 on Scotch iron, these prices all being f.o.b. cars at Philadelphia docks. Some foundrymen are hesitant about using foreign iron in their mixtures, but are doing so because of their inability to obtain their regular domestic brands. A surprising feature of the present situation is that there seems to be no alarming scarcity of iron; in other words, the majority of consumers are wholly or partially covered for the next 30 days or more and unless there should be serious interruption of shipments they believe they will get along some way until the strikes are settled. A few inquiries for fourth quarter have appeared, but melters are in most instances disposed to await the outcome of the present difficulties before making further commitments. One lot of 5000 tons of basic pig iron has been sold at $25, furnace, and a recent sale of standard basic was at $26, furnace. Furnaces would now quote $27, furnace.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 76 cents to $1.64 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$28.76 to $30.14
East. Pa. No. 2X, 2.25 to 2.75	29.76 to 31.14
East. Pa. No. 1X	30.76 to 32.76
Virginia No. 2 plain, 1.75 to 2.25 sil.	29.17 to 30.17
Virginia No. 2X, 2.25 to 2.75 sil.	30.17 to 31.17
Basic delivery eastern Pa.	26.75 to 27.25
Gray forge	27.00 to 28.00
Malleable	28.00 to 30.00
Standard low phos. (f.o.b. furnace)	30.00
Copper bearing low phos. (f.o.b. furnace)	30.00

Ferroalloys.—Spot carloads of ferromanganese have been sold at $72.50, seaboard. The domestic and English prices remain at $67.50, seaboard, but this is for delivery in September or later, with the buyer assuming full risk as to the duty which the new tariff bill may impose. Spiegeleisen is offered at $36, furnace, for 19 to 21 per cent.

Semi-Finished Steel.—The Pennsylvania Railroad has bought a tonnage of special quality forging billets, for which it paid as high as $46, base, Pittsburgh. Nominal quotations are $35, Pittsburgh, for rerolling quality and $40 for forging quality, but few makers are willing to sell at these prices to-day.

Plates.—The plate market is now firmly established at 1.80c., Pittsburgh, it being impossible to buy for less for early shipment, while on some business as high as 2c., Pittsburgh, has been paid. One Eastern plate company is limiting the amount which it will sell to any one customer. The coal situation is precarious and companies which are operating their plate mills have no idea as to how long they will be able to continue. The Lukens Steel Co., which had two of its open-hearth furnaces fitted up with oil-burning equipment some time ago, is now equipping other furnaces to burn oil. As it had no oil storage facilities, the company has leased 10,000 gal. tank cars for this purpose. The Pennsylvania Railroad has bought about 5000 tons more of car repair material, making about 17,000 tons in the past two or three weeks, and it is stated that more will be bought shortly. As there are few mills able to make early deliveries of plates, the demands upon these mills are considerable and business is being turned away. We quote the market at 1.80c. to 2c., Pittsburgh.

Structural Material.—It is becoming more difficult to place orders for plain material and mills which are accepting business are doing so with qualifying clauses which protect them in case it is impossible, through coal shortage or railroad embargoes, to make shipment as promised. The mills are having no trouble in getting 1.75c. to 1.80c., Pittsburgh.

Bars.—The minimum for soft steel bars is 1.80c., Pittsburgh, and it is not easy to place orders even at this price with any degree of assurance as to deliveries. One leading maker is still out of the market and will take no further business, according to present intentions, until the coal and coke situation is clearer. Some makers of bar iron are now quoting 1.80c., Pittsburgh, for carload lots, while the minimum appears to be 1.70c. for carloads and 1.90c., Pittsburgh, for less than carloads.

Sheets.—Makers of sheets are exacting premium prices for prompt delivery material, these prices being several dollars a ton above the third quarter contract prices. As high as 2.75c., Pittsburgh, has been obtained for blue annealed sheets by one maker.

Warehouse Business.—Jobbers are doing a very satisfactory business under present conditions, as consumers are turning to them for supplies because of the fact that many of the mills are taking little or no business. We quote as follows for local delivery out of stock:

Soft steel bars and small shapes, 2.70c.; iron bars (except bands), 2.70c.; round edge iron, 2.90c.; round edge steel, iron finish, 1½ x ½ in., 2.90c.; round edge steel planished, 3.65c.; tank steel plates, ¼-in. and heavier, 2.80c.; tank steel plates, ⅜-in., 3c.; blue annealed steel sheets, No. 10 gage, 3.40c.; black sheets, No. 28 gage, 4.25c.; galvanized sheets, No. 28 gage, 5.25c.; square twisted and deformed steel bars, 2.80c.; structural shapes, 2.80c.; diamond pattern plates, ¼-in., 4.50c.; ⅜-in., 4.50c.; spring steel, 3.50c.; round cold-rolled steel, 3.35c.; squares and hexagons, cold-rolled steel, 3.70c.; steel hoops, No. 13 gage and lighter, 3.75c.; steel bands, No. 12 gage to ⅜-in., inclusive, 3.35c.; iron bands, 3.90c.; rails, 2.70c.; tool steel, 8c.; Norway iron, 5.50c.

Coke.—Prices paid for foundry coke range from $14 to $17, Connellsville. By-product coke from the plant of the Rainey-Wood Coke Co. is quoted at $16, Swedeland, Pa. Furnace coke is to be had in limited quantities at $14 to $15, Connellsville.

Old Material.—Steel scrap remains firm at $15, delivered, although there is very little demand. Prices generally are almost stationary and are holding well in view of the small volume of business that is being done. The only change is in cast scrap, which is slightly higher because of better demand. Foundries are evidently using more cast scrap on account of the shortage of pig iron. We quote for delivery at consumers' works in this district as follows:

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$15.00 to $15.50
[illegible]	[illegible]
Steel rails, rerolling	17.00 to 17.50
No. 1 low phos., heavy 0.04 and under	22.00 to 24.00
Cast iron car wheels	17.50 to 18.50
No. 1 railroad wrought	17.50 to 18.50
No. 1 yard wrought	15.00 to 15.50
No. 1 forge fire	13.00 to 13.50
Bundled sheets (for steel works)	13.00 to 13.50
No. 1 busheling	12.50 to 13.00
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	13.00 to 13.50
Mixed borings and turnings (for blast furnace use)	13.00 to 13.50
Machine-shop turnings (for steel works use)	13.00 to 13.50
Machine-shop turnings (for rolling mill use)	13.50 to 14.00
Heavy axle turnings (or equivalent)	14.00 to 14.50
Cast borings (for steel works and rolling mills)	14.00 to 14.50
Cast borings (for chemical plants)	17.00 to 17.50
No. 1 cast	18.00 to 20.00
Railroad grate bars	14.50 to 15.00
Stove plate (for steel plant use)	15.00 to 15.50
Railroad malleable	15.00 to 15.50
Wrought iron and soft steel pipes and tubes (new specifications)	13.00 to 13.25
Shafting	20.00 to 20.50

Cincinnati

CINCINNATI, Aug. 1.

Pig Iron.—The market is tightening up, particularly in Northern irons, which are at least 50c. higher than last week. At southern Ohio furnace, $25 is now the absolute minimum, with some furnaces having iron on yards quoting as high as $27. In the South, the situation is also stronger, the low priced seller having withdrawn from the market during the week, leaving furnace prices at $19 to $20, with little iron available. However, Southern resale iron is still available at $18.50, but it is likely that this price will be withdrawn before the end of the week. There is little activity in the market, sales being confined mostly to carload lots. A local melter bought 800 tons last week, 300 Northern and 500 Southern. It is understood that the Northern iron was placed in three lots on a $24.50, Ironton basis, and the Southern from $18.50 to $19, Birmingham. Another melter took several hundred tons of Southern iron; special conditions attaching to the order, particularly with regard to prompt shipment, were responsible for a price of $20, Birmingham. Several sales of up to 300 tons were made at $18.50 to $19. Little Northern iron was dealt in, the largest sale reported being for 100 tons as reported above. There are few inquiries. An Indiana melter is inquiring for 750 tons, a central Ohio melter for 200 tons for the last quarter, and a Michigan melter for 300 tons for the third quarter. An offer to buy 1000 tons of Southern iron was turned down by a furnace, as the price, $18.50, was not attractive. A number of Southern furnaces have withdrawn from the market, leaving only about two active sellers, and silvery furnaces in Jackson county have also announced their withdrawal. Belfont furnace at Ironton and Milton at Wellston have been banked as a result of the shortage of coke. Norton furnace at Ashland is the only merchant furnace producing in the Ironton-Ashland district, but it is understood the Whitaker-Glessner stack at Portsmouth will go on foundry iron within the next week. The American Rolling Mill Co. has one stack at Ashland and one at Columbus in blast, and it is expected that the latter will continue indefinitely, as a coke supply for the next two months is practically assured.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$22.55 to $24.05
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	[illegible]
Ohio Silvery, 9 per cent	[illegible]
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	[illegible]
Basic Northern	27.27
Malleable	[illegible]

Plant Operations.—No serious inconvenience has as yet been experienced by steel mills in this district as a result of the coal and rail strikes. While a number of merchant blast furnaces have been banked, steel-making furnaces are able to keep running. The American Rolling Mill Co., at Middletown, Ohio, has put the blooming mill on 24-hr. turn, three eight-hour shifts being installed. The Newport Rolling Mills Co. and the Andrews Steel Co. at Newport, Ky., while suffering a little inconvenience on account of delayed shipments, have been able to maintain their customary schedules. The same is true of the Whitaker-Glessner Co. at Portsmouth. This week is expected to be the crucial one for steel plants, but it is hoped it will be unnecessary to curtail operations.

Finished Materials.—The trade has apparently gained the idea that it is useless to attempt to get on the books of steel companies for some time to come. Practically all of the independent companies are now definitely out of the market on new business, but are still accepting specifications on contracts. The Steel Corporation is accepting business for indefinite delivery. Sheet mills are practically sold up for the third quarter, and are not anxious to accept any other orders for this delivery. Prices on all steel products, while having an advancing tendency, show little change over last week. Some plate mills are quoting 2.10c., but this is taken to mean that they are out of the market. On bars, shapes and plates, the range is 1.70c. to 1.80c., with little business being booked. Sheets are quoted quite generally at 2.40c. to 2.60c. for blue annealed, 3.15c. to 3.30c. for black and 4.15c. to 4.40c. for galvanized. The American Sheet & Tin Plate Co. is reported to be out of the market for the time being, as it is expected that some of its sheet and tin mills will have to suspend, owing to the fuel situation. Tin plate specifications are coming in fairly well. There is a better demand for nails, and shipments are coming through in fairly good time. On other wire products the market is quiet. A number of small structural awards were reported, but new inquiries were light. Bids on 400 tons of bars for a new academy for the Sisters of Mercy, Cincinnati, closed July 31.

Warehouse Business.—Jobbers report a pressing demand for steel products for immediate delivery, and some fair-sized orders for shipment out of stock were booked, including one order for 100 tons of reinforcing bars. Cold-rolled prices have been advanced $3 per ton to 3.50c. for rounds, and 4c. for flats, squares and hexagons. The demand for nails is increasing, and local jobbers have been forced to replenish their stocks from mills. Jobbers of bolts, nuts and rivets will likely make

a 5 per cent advance in their prices shortly, in line with higher prices recently announced by manufacturers.

Jobbers quote iron and steel bars 2.75c, base; [illegible] 2.85c, base; shapes [illegible] 2.90c, base; [illegible] bars 2.85c, base; [illegible] plates 2.90c, base; [illegible] spring steel, 4c, base; [illegible] No. 10 blue annealed sheets, 3.90c, base; No. 28 black sheets, 4[illegible]; No. 28 galvanized sheets, [illegible]; No. 9 annealed wire, $2.70 per 100 lb., common wire nails, $2.85 per keg, base.

Coke.—There is a fair demand, but dealers report meeting with some resistance on the part of buyers to paying the high prices now ruling. However, melters covered by contracts are asking ovens to anticipate shipments. With the exception of Connellsville coke, which has sold as high as $16 to $17, prices show little change. By-product coke is available at $9, Connellsville basis, to regular customers, and August quotas are being filled at this figure. Wise County foundry coke is quoted at $10 to $10.50, and New River foundry at $8.50 to $12. Coke is moving in better volume, and shipments are going forward with more rapidity than has been the case for the last two weeks.

Old Material.—Local dealers report the scrap market as stagnant. Very little scrap is moving, as railroads have practically embargoed the use of open top equipment for other than coal movement. Mills are not concerned at present, and foundries, while showing more interest, are buying only from hand to mouth. Prices, which are unchanged, are regarded as nominal.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

Per Gross Ton	
Pipe and flue sheets	$[illegible] to $[illegible]
Iron rails	[illegible] to [illegible]
Relaying rails, 50 lb. and up	26.50 to 27.00
Rails for rerolling	[illegible] to [illegible]
Heavy melting steel	13.00 to 13.50
Steel rails for melting	[illegible] to [illegible]
Car wheels	[illegible] to [illegible]
Per Net Ton	
No. 1 railroad wrought	11.50 to 12.00
Cast borings	9.00 to 9.50
Steel turnings	[illegible] to [illegible]
Railroad cast	[illegible] to [illegible]
No. 1 machinery	16.00 to 16.50
Burnt scrap	[illegible] to [illegible]
Iron axles	[illegible] to [illegible]
Locomotive tires (smooth inside)	11.00 to 11.50
Pipes and flues	6.50 to 7.00

St. Louis

ST. LOUIS, Aug. 1.

Pig Iron.—Further advances are expected. Pig iron is scarce, as the makers are well sold up on all grades. The greatest demand is for iron of a high silicon, inquiries being mostly for grades of 2.25 per cent and higher, but makers have very little of these grades; the East Side maker has none. Buying was only of small lots, and there is no call for large tonnages. Melters are fairly well supplied with iron, except high-silicon grades. They realize the situation and regard it useless to look far to the future. A report of the Federal Reserve Bank of St. Louis says that the melt of pig iron, according to the figures of the reporting interests, increased in the eighth reserve district approximately 5¾ per cent in June over May. Stove manufacturers, seven interests reporting to the bank, showed June sales from 23 to 51 per cent larger than a year ago, and about steady with the preceding month. The demand for ferroalloys has taken a sudden spurt, inquiries totaling 600 tons for various items coming from district users.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago and $5.17 from Birmingham and 81 cents average switching charge from Granite City:

Northern foundry, sil. 1.75 to 2.25 (third quar.)	$26.66
Northern malleable, sil. 1.75 to 2.25 (third quar.)	26.56
Basic (third quar.)	26.56
Southern foundry, all rail, sil. 1.75 to 2.25	24.48
Southern foundry, water and rail, sil. 1.75 to 2.25, f.o.b. St. Louis	22.17

Finished Iron and Steel.—Local fabricators report that there has been a marked falling off in inquiries. Business interests are said to be loath to enter any new building enterprises until the strike situation clears up. The contract is expected to be let this week for the American Can Co. building at New Orleans, involving 200 tons of structural steel and 500 tons of reinforcing bars, and word has been received here that the Virginia Bridge & Iron Co. received the contract for the 700 tons of structural steel to be used in the Ford Motor Co. assembly plant at New Orleans. Railroad inquiries were confined in the week to 3000 kegs of standard track spikes for the Missouri Pacific and 300 kegs for the St. Louis Southwestern. The railroad purchasing agents care only to talk to persons who sell coal. The only inquiries were for a few cars of sheets. Some of the largest steel mills are out of the market, due to heavy order files and curtailed production. Word has been received here that Inland Steel Co. has increased the price of plates from 1.80c., Chicago, to 2c. Warehouse prices are higher.

For stock out of warehouse we quote: Soft steel bars, 2.70c. per lb.; iron bars, 2.70c.; structural shapes, 2.80c.; tank plates, 2.80c.; No. 10 blue annealed sheets, 3.85c.; No. 28 black sheets, cold rolled, one pass, 4.45c.; cold drawn rounds, shafting and screw stock, 3.50c.; structural rivets, $3.35 per 100 lb.; boiler rivets, $3.45; tank rivets, ⅞ in. and smaller, 60 per cent off list; machine bolts, large, 50 and 10 per cent; small, 50-10 and 10 per cent; carriage bolts, large, 55-5 per cent; small, 60 and 10 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon blank, $3.50; and tapped, $3.25 off list.

Coke.—The trade here is being overwhelmed with orders for coke, business reaching war-time proportions. The orders are coming in from the industries, and from the coal trade, the coal strike creating new users for coke as well as making it more difficult for producers of coke to get supplies of the raw material. The St. Louis by-product producers are out of the market, and are making only enough coke to take care of their water-gas contracts. The Granite City by-product producer is now quoting $11, f.o.b. furnace, for metallurgical coke, an increase of $2 a ton in the last two weeks. The demand for coke still exceeds production and stocks in storage have been heavily drawn on. Connellsville coke is quoted at $14 to $14.50 at the ovens, and prices are steadily mounting.

Old Material.—The market for old material is higher on several items, and the market continues strong. Not much material is coming in, shipments being held up on account of the railroad strike, and the railroads themselves are not offering any lists, as labor is too scarce and is needed for more urgent duties than assembling scrap. Buying of scrap by consumers has not been so heavy.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Old iron rails	$16.75 to $17.25
Rails for rerolling	15.75 to 16.25
Steel rails, less than 3 ft.	16.25 to 16.75
Relaying rails, standard section	25.00 to 28.00
Cast iron car wheels	18.50 to 19.00
No. 1 heavy railroad melting steel	14.75 to 15.25
No. 1 heavy shoveling steel	14.00 to 14.50
Ordinary shoveling steel	13.75 to 14.25
Frogs, switches and guards, cut apart	15.25 to 15.75
Per Net Ton	
Heavy axle and tire turnings	9.50 to 10.00
Steel angle bars	13.75 to 14.25
Iron car axles	23.50 to 24.00
Steel car axles	17.00 to 17.50
Wrought iron bars and transoms	19.00 to 19.50
No. 1 railroad wrought	13.50 to 14.00
No. 2 railroad wrought	13.00 to 13.50
Railroad springs	16.00 to 16.50
Steel couplers and knuckles	17.00 to 17.50
Cast iron borings	9.00 to 9.50
No. 1 busheling	11.75 to 12.25
No. 1 railroad cast	15.50 to 16.00
Stove plate and light cast	12.75 to 13.25
Railroad malleable	14.00 to 14.50
Pipes and flues	8.75 to 9.25
Machine shop turnings	9.25 to 9.75

Birmingham

BIRMINGHAM, Aug. 1.

Pig Iron.—One large furnace operator holding firmly for some time to a $20 base reports the sale of 1500 tons to Philadelphia for fourth quarter delivery at that price. Two were lots of 500 tons. Other sales reported, but believed to date back a week to ten days, were lots of 500 tons in Chicago and Cincinnati districts at $18.50. Sales of lots of that size made during the past week brought $19 and were made by maker lately selling on the $18.50 base. No Birmingham maker is longer quoting under $19. The Alabama Co. went out of market early in the week after doing a fairly good fourth quarter entrance business at $20. The Central Coal &

Iron Co. expects to resume at Holt furnace, which is under repairs, around Aug. 7. The Tennessee company resumed at a third Bessemer furnace on July 22 and has nine in operation, six on basic, two on foundry and one on ferro. This is up to maximum of the war period and the subsequent inflation period. None of the blast furnaces has suffered from a production standpoint and fuel priorities will not hamper them. The Woodward Iron Co. and the Tennessee company are fully self-sustaining, the Sloss-Sheffield Steel & Iron Co. and the Central Coal & Iron Co. supply municipalities with gas and other companies will scarcely be called on to divert their own coal to commercial purposes. No foundries, or machine shops, and no pipe works have been affected as to production and do not apprehend it. All mills manage to get production started to destination with few exceptions, but none can tell when cars will arrive.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silion 1.75 to 2.25	$19.00 to $20.00
[illegible]	18.50 to 19.00
Charcoal, warm blast	30.00 to 32.00

Finishing Mills.—All steel mills have weathered strikes so far as production is concerned. The Tennessee company continues double turn at finishing mills and 100 per cent in ingot mill this week. The Gulf States Steel Co. has gone back to three open hearth furnaces because the supply of steel has caught up with finishing capacity. The rod mill of this company is turning out 272 tons a day, a new July record, it is reported. The Conners Steel Co. has been piling crossties, but this week began to move them to Texas points. Bar demand is very strong.

Cast Iron Pipe.—All pressure pipe shops are on full turn. New business was small this week owing to the general state of uncertainty. Base is firm at $37 minimum. The sanitary pipe base of $65 has disappeared and $60 is the new high. The former base was really a bonus for quick delivery. All shops are busy, but report poor deliveries.

Coal and Coke.—The base price under new Hoover agreement is $2.60, Pratt seam, which will do away with recent spot prices of as high as $4. Two Western carriers have given orders for all the coal that can be furnished them. Mine production went to 370,000 tons week of July 22, making a new high record for the past five years. The Semet-Solvay Co. fired its 60 idle ovens this week and went to 100 per cent of operations, an increase since July 1 of 100 per cent. All 240 ovens are now active. The Republic Iron & Steel Co. and the Alabama Co. are among the concerns using the supply, furnishing their own coal. Coke remains at $5.50 to $6.

Old Material.—Largest interests have lately paid $12 for No. 1 steel. That market seems stronger than it has been in a long time. Quoted prices are firm.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Steel rails	$13.00 to $15.00
No. 2 steel	12.00 to 14.00
[illegible]	15.00 to 16.00
[illegible]	14.00 to 15.00
Tramcar wheels	13.00 to 14.00
Stove plate	13.00 to 14.00
Cast iron borings	6.00 to 7.00
Machine shop turnings	4.00 to 5.00

Boston

BOSTON, Aug. 1.

Pig Iron.—Sales of more than 3000 tons of foreign iron, mostly Scotch, but including English, French and Belgian, are reported by brokers. They range from 100 to 700 tons each, largely the equivalent of domestic No. 2X, and for August arrival. Price details are lacking. It is reported by most brokers, however, iron has advanced, in some cases to the equivalent of $28, furnace, for No. 2X eastern Pennsylvania and $26.75 for Buffalo. In other cases foreign iron is even higher, figuring on a delivered New England consuming point basis. One eastern Pennsylvania furnace sold a limited tonnage in this territory the past week at $28, furnace base. No eastern Pennsylvania, Buffalo, Virginia or Alabama furnace is now making quotations, except on rare occasions for car lots. Resale Virginia and Alabama is to be had as well as Alabama at $30 base on cars at Providence, R. I. Inquiries for iron are more numerous than for some time and include 300 tons high silicon malleable wanted by a Massachusetts foundry; a like quantity by a Naugatuck Valley, Conn., melter; 500 tons No. 2X by a Providence, R. I., concern; and numerous car lots, mostly for prompt shipment. Lake charcoal iron has advanced $1 to $30 furnace base, and a limited tonnage sold in this territory on that basis.

We quote delivered prices, on the basis of the latest reported sales, now infrequent, and as follows, having added to furnace prices $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia and $9.60 from Alabama:

East. Penn., sil. 2.25 to 2.75	$30.15 to $30.65
East. Penn., sil. 1.75 to 2.25	29.65 to 30.15
Buffalo, sil. 2.25 to 2.75	29.91 to 30.41
Buffalo, sil. 1.75 to 2.25	29.41 to 29.91
Alabama, sil. 2.25 to 2.75	28.60 to 30.10
Alabama, sil. 1.75 to 2.25	28.10 to 29.60

Warehouse Business.—Aside from an advance of 15c. per 100 lb. in blue annealed sheets to a basis of $3.90 for No. 10, prices on warehouse products remain unchanged. An improvement in the volume of iron and steel moving out of local warehouses is reported. Business is on a larger scale than at any previous time this year, according to a majority of the distributers. Sentiment is stronger regarding bolt and nut prices, with consumption heavier than last week. Wrought steel washers are approximately 10 per cent higher because of an increasing demand and a shortage of material.

Jobbers quote: Soft steel bars, $2.75½ per 100 lb. base; flats, $3.40½; concrete bars, $2.90 to $3.03; structural steel, $2.75½ to $2.90½; tire steel, $4.15 to $4.50; open-hearth spring steel, $4.50 to $6; crucible spring steel, $11.50; steel bands, $3.90; hoop steel, $4.40; cold rolled steel, $3.50 to $4; refined iron, $2.75½; best refined iron, $4.25; Wayne iron, $5.50; Norway iron, $6 to $6.50; plates, $2.85½ to $3.04; No. 10 blue annealed sheets, $3.90 per 100 lb. base; No. 28 black sheets, $4.90; No. 28 galvanized sheets, $5.90.

Finished Iron and Steel.—McClintic-Marshall Co. will fabricate approximately 1000 tons of structural steel for the State pier, Portland, Me. The city of Boston has awarded about 150 tons of beams to the Bethlehem Steel Co. Prospective fabricating tonnages in this territory are unimportant. Some bar business was placed the past week at full prices, but a majority of the producers did not accept business. Tonnages and prices on other steel products are subjected to mill confirmation before accepted. The volume of new business booked here therefore was small. With most mills, July was a lean month so far as New England is concerned. New England wire mills are well supplied with raw material needed for their processes, and the nature of their products is such the priority order of the Interstate Commerce Commission will work comparatively little hardship.

Soil Pipe.—The demand for soil pipe continues of large proportions, and producers are well booked up to Sept. 1 or later. All sizes are in urgent request, but the call for 2, 3, 4 and 5-in., single anl double hub, is especially brisk. Prices have not changed for some time, the market remaining at 33, 10 and 5 per cent discount. Stocks in distributers or jobbers' hands are unusually small for this time of the year.

Cast Iron Pipe.—Inquiry for cast iron pipe is expanding and includes round tonnages wanted by municipalities. Producers, however, apparently are not anxious to commit themselves further except in a small way and then only for extended deliveries, inasmuch as they sold up for practically the balance of the year. The only round tonnage accepted in this territory of late is 200 tons of 6-in. pipe by the Crane Co., Chicago, for West Springfield, Mass. Bids will be opened this week on approximately 200 tons of 6 and 8-in. pipe and fittings for the Massachusetts Department of Mental Diseases. Pipe prices have been moved up $2 a ton to a basis of $57.10, delivered, Boston common points for 6-in. and larger, and $62.10 for 4-in. pipe. The usual differential of $4 is made on class A and gas pipe. The freight rate on pipe from southern points to Boston common points is $5.10, contrasted with $5.70 heretofore.

Coke.—New England producers of by-product foundry coke have advanced contract fuel $1 a ton to $16.50 delivered, where the local freight does not exceed $3.10. Both the New England Coal & Coke Co. and the Providence Gas Co. will accept no further busi-

ness during August or until the coal supply situation is clearer. This action on their part eliminates the spot market. The New England Coal & Coke Co. is operating 240 of its 400 ovens. The normal number of ovens operated at its plant is 310. Production to-day therefore is 77.41 per cent of normal.

Old Material.—Chemical borings are in demand at better than $12 shipping point. Approximately 1000 tons were bought in New England the past week for shipment outside. Mixed borings and turnings also are in demand at $9 to $9.50 on cars shipping point, fully 1000 tons having been taken on that basis since last reports. A Portland, Me., rolling mill is in the market for shafting at about $19 delivered, and some scrap rail sat $11.25 shipping point were bought for a Pennsylvania mill. A Norwood, Mass., foundry is still inquiring for stove plate at $14 delivered, but material is scarce at that figure. Car lots sold the past week at $15.50 and $16.40 delivered Cape Cod points. A sale of 100 tons of machinery cast at $18 delivered Putnam, Conn., is reported, but New England foundries in general continue to supply requirements from local yards. The old material market otherwise has been quiet. Pennsylvania mills are not interested in heavy melting steel due to the uncertainty of the fuel situation.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$19.00 to $20.00
No. 2 machinery cast	17.00 to 18.00
Stove plate	15.50 to 16.50
Railroad malleable	15.00 to 15.50
Street car wheels	18.00 to 19.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$11.00 to $11.50
No. 1 railroad wrought	11.50 to 12.00
No. 1 yard wrought	10.00 to 10.50
Wrought pipe (1 in. in diam., over 2 ft. long)	8.00 to 8.50
Machine shop turnings	5.00 to 5.50
Cast iron borings, rolling mill	9.50 to 10.00
Cast iron borings, chemical	12.00 to 12.50
Blast furnace borings and turnings	8.00 to 8.50
Forged scrap and bundled skeleton	8.00 to 8.50
Street car axles and shafting	14.50 to 15.00
Rails for rerolling	11.00 to 11.50

Cleveland

Further Shut-downs Imminent—Advance of $1 in Pig Iron

CLEVELAND, Aug. 1.—Although there has been no change in the number of active blast furnaces during the past week and steel capacity in operation is about the same, the industrial situation in this district is much more serious than it was a week ago, owing to the increasing difficulty in obtaining delivery of coal and coke. Blast furnaces are working on a hand-to-mouth basis and may be blown out or banked any day. The supply of coal for all steel plants is inadequate and prices very high. Some steel companies are paying $10 per ton for coal. Lake traffic is suffering on account of coal shortage and a number of vessels have been tied up, unable to fill their bunkers. The fear is that unless the coal and shopmen's strikes are settled within a week or two, many plants will be forced into idleness.

Iron Ore.—The movement of iron ore from upper Lake docks in July was somewhat disappointing. It was estimated that the shipments would amount to over 9,000,000 tons, but the strike of shopmen interfered to some extent and the total was 8 942,337 tons, which compares with 4,047.687 in July of last year. The movement to Aug. 1 was 17,293,513 tons, compared with 10,418 914 tons to Aug. 1 last year. In spite of difficulty in getting coal, the vessel owners expect to be able to handle all the furnaces can receive this month. Although 98½ per cent of the members of the International Seamen's Union voted to strike on the Great Lakes the union officials have decided not to call a strike. Evidently they consider that this is an inopportune time to try conclusions with the vessel operators.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $5.95; Old range non-Bessemer, 51½ per cent iron, $5.20; Mesabi Bessemer, 55 per cent iron, $5.70; Mesabi non-Bessemer, 51½ per cent iron, $5.05.

Pig Iron.—Furnaces in the Cleveland district have very little iron to sell and transactions are few. One company, which has a considerable tonnage of basic iron, is disposed to hold it for its own use. Recent pending inquiries for steel making iron, including one for 3000 tons of basic and 3000 tons of Bessemer from a West Virginia consumer, have not been placed. Another steel company is understood to be in the market for 2000 to 3000 tons of basic iron. Foundry iron prices are largely nominal, and $27, Cleveland, is probably the minimum. Sales have been made at Buffalo on a basis of $28, furnace, for No. 2 plain and $30 for No. 1 and malleable. It is doubtful whether any purchases could be made at these prices to-day.

Quotations below are f.o.b. local furnace for Northern foundry iron, not including a 50c. switching charge. Other quotations except basic and low phosphorus are delivered Cleveland, being based on a $3.02 rate from Jackson and a $6 rate from Birmingham:

Basic, Valley furnace	$26.00
Northern No. 2 fdy., sil. 1.75 to 2.25	$27.00 to 28.00
Southern fdy., sil. 1.75 to 2.25	24.50
Ohio silvery, sil. 8 per cent	33.52
Standard low phos., Valley furnace	33.00

Finished Iron and Steel.—If any sales of shapes, plates or bars are being made by Steel Corporation subsidiaries at less than 1.70c., Pittsburgh, they are very exceptional and on highly desirable business, with much uncertainty as to the time of delivery. The plate market is very strong. This is illustrated by a sale by an independent Cleveland company of 140 tons to a railroad for delivery in Chicago on a basis of 2.10c., Pittsburgh, or 2.44c., Chicago. Independents able to give prompt delivery have no difficulty in obtaining 2c. to 2.15c. on tank quality. The demand for small sizes of bars and angles is exceptionally heavy. On reinforcing bars prices range from 1.70c. to 1.80c., with the latter quotation prevailing, except on very desirable business. On cold drawn steel, delivery can be made in two to three weeks, but the companies that can give anything like early delivery on hot rolled material are few.

Warehouse Business.—Warehouse business is fairly active. Quotations remain unchanged, although on hoops and bands some warehouses are obtaining 3.50c.

Jobbers quote steel bars, 2.56c.; plates and structural shapes, 2.66c.; No. 9 galvanized wire, 3c.; No. 9 annealed wire, 2.50c., No. 28 black sheets, 4c.; No. 28 galvanized sheets, 5c.; No. 10 blue annealed sheets, 3.50c. to 3.61c.; hoops and bands, 3.21c.; cold-rolled rounds, 3.30c.; flats, squares and hexagons, 3.80c.

Semi-Finished Steel.—The scarcity of semi-finished steel is illustrated by the fact that a leading producer of slabs quoted a customer $50 this week on an inquiry for several hundred tons. While the normal price of $35 on sheet bars, billets and slabs has not been changed, it seems probable that $40 will soon be the prevailing price.

Sheets.—Business is active and independents who are quoting 3.25c. to 3.30c. on black, 4.25c. to 4.50c. on galvanized, and 2.50c. to 2.55c. on blue annealed are several weeks behind on deliveries, although they have recently been very conservative in making promises. The demand for strip steel is extremely strong and mills are running at full capacity.

Cast Iron Pipe.—The United States Cast Iron Pipe & Foundry Co. was low bidder on 1625 tons of 24 to 60-in. cast iron pipe, and the Bowler Foundry Co. was low on 155 tons of fittings, the bids being $46.95 and $94.25, respectively. Contracts will be awarded to these companies.

Bolts, Nuts and Rivets.—Most manufacturers have more business than they can take care of comfortably and prices are strong. Bolt and nut manufacturers particularly report that business is more active than it has been at any time since the spring of 1920, and there is a likelihood of a scarcity of bolts. The $5 advance on structural and boiler rivets announced last week is being rigidly adhered to by nearly all manufacturers. There is much complaint in regard to the slow delivery of steel to bolt and nut plants. Makers of cap and set screws may announce an advance at an early date.

Coke.—The situation continues to be a source of great embarrassment to all consumers. The latest sale of Connellsville foundry coke was at $17. The outlook is that even higher prices will prevail and furnace coke is not obtainable at any price.

Old Material.—The strike situation continues to have a depressing effect on the scrap market and transactions are few. On a number of grades, prices have declined from 25c. to 50c.

We quote per gross ton, f.o.b. Cleveland, as follows:

Heavy melting steel	$14.75 to $15.00
Steel rails, under 3 ft	15.25 to 15.50
Rails for rolling	15.75 to 16.25
Iron rails	14.00 to 15.00
Iron car axles	18.00 to 19.00
Low phosphorus melting	16.00 to 16.25
Cast borings	12.00 to 12.25
Machine shop turnings	11.50 to 12.00
Mixed borings and short turnings	11.75 to 12.00
Compressed steel	12.85 to 13.25
Railroad wrought	14.00 to 14.50
Railroad malleable	15.50 to 16.00
Light bundled sheet stampings	10.00 to 10.25
Steel axle turnings	13.00 to 13.50
No. 1 cast	17.00 to 17.50
No. 1 busheling	10.25 to 10.50
Drop forge flashings over 10 in	10.25 to 10.50
Drop forge flashings under 10 in	10.00 to 10.50
Railroad grate bars	13.75 to 14.25
Stove plate	13.75 to 14.25
Pipes and flues	10.00 to 11.00

Buffalo

BUFFALO, Aug. 1.

Pig Iron.—Two Buffalo producers have each banked one furnace and there is strong likelihood that further curtailment will develop within a few days. Rogers, Brown & Co., and the Donner Steel Co., are the two interests which have banked furnaces. Only one Buffalo producer has iron to sell—except in isolated cases where a carload is available here or there under special insistent conditions. It is hard to determine the base price of foundry iron because while iron was available, there was no difficulty in obtaining $30 for No. 2 plain foundry. Two carloads were sold by one interest—their last sale at $30 and another tonnage slightly in excess of a carload could have been sold at $30 but a sight draft transaction was not agreeable to the purchaser. Inquiry is heavy. All big buyers are in the market and it is estimated that 50,000 tons could be disposed of at the Buffalo district without difficulty if the iron was available.

We quote f.o.b. per gross ton Buffalo as follows:

[illegible]	[illegible]
[illegible]	[illegible]
No. 2 plain, 1.75 to 2.25 sil	28.00
[illegible]	[illegible]
Malleable	28.00
[illegible]	[illegible]

Finished Iron and Steel.—The shut down of blast furnaces has further interfered with mill operation on finished material and if anything the mills are in a more precarious condition than represented last week. There is likely to be a complete shut down within a few days of several departments of leading interests here. The Lackawanna Steel Co. shut down the rail mill on July 29. The local branch of an independent is booking only black sheets at 3.15c. and withdrew on pipe within the week. With the exception of repair work, there is nothing new coming out in the structural field nor are any big operations expected in 1922. The Buffalo Steel Car Company, which has considerable car repair work contracted for, was seriously damaged by fire on July 24. The Sutherland Building Co. of St. Louis has the general contract for a new building for the Erie Malleables Co., of Erie, Pa., involving 450 tons. Morris & Allan, of Buffalo, are low bidders on the new buildings for the Erie County firm, Alden, N. Y.

Warehouse Business. — Transportation difficulties have not seriously affected delivery of warehouse material for the reason that many of the consignments are being trucked. Two warehouses are extending the radius of their trucking schedules. Inquiry is coming in from many points outside the district, indicative of the inability of warehouses in some points to furnish material. There is a healthy demand for all materials from all quarters.

We [illegible] warehouse prices, Buffalo, as follows: Steel bar shapes, 2.85c.; plates, 2.85c.; soft steel bars, 2.75c.; hoops, 3.55c.; bands, 3.40c.; blue annealed sheets, No. 10 gage, 3.80c.; galvanized steel sheets, No. 28 gage, 5.60c.; black sheets, No. 28, 4.60c.; cold rolled round shafting, 3.55c.

Old Material.—There is a lively local demand for No. 1 machinery cast scrap and one large consumer has bought about 4000 tons in the last ten days. Mills are not anxious to buy steel on account of the strike and the fuel situation and dealers are finding it hard to obtain cars to ship material contracted for lately. There has been no advance in prices except a stiffening in the price of cast scrap.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$16.75 to $17.00
Low phos., 0.04 and under	18.00 to 19.00
No. 1 railroad wrought	16.00 to 16.50
Car wheels	17.00 to 18.00
Machine shop turnings	10.50 to 11.00
Cast iron borings	14.00 to 14.50
Heavy axle turnings	14.00 to 14.50
Grate bars	14.00 to 14.50
No. 1 busheling	15.00 to 15.50
Stove plate	15.00 to 15.50
Bundled sheet stampings	11.50 to 12.00
No. 1 machinery cast	18.50 to 19.50
Hydraulic compressed	15.00 to 15.50
Railroad malleable	17.00 to 17.50

San Francisco

SAN FRANCISCO, July 26.

Pig Iron.—Conditions on the Coast reflect the general instability at present existing, including the rate war between intercoastal operators, but these inconveniences of transportation are somewhat relieved by consumers turning their attention to foreign material, almost to the exclusion of domestic. In any case, demand during the past two weeks has not been very urgent, and the tonnage placed scarcely amounts to more than 400 tons, principally English iron, which is for the account of various foundries. The price was close to $29, ex ship. A local dealer has just been advised that a large Pacific Coast interest is inquiring in England and on the Continent for 1000 tons of 3.75 to 4.25 per cent silicon iron, but that is virtually the only indication of activity at this time.

Finished Iron and Steel.—Although the market is subject to several disrupting influences, including the strikes and the intercoastal rate war, business in most lines continues satisfactory. This is the result of the fundamental soundness of conditions on the Coast, which have been showing steady improvement since the first of the year. Building in all sections of the State is reported distinctly above the normal, and various large enterprises, such as the oil industry, display steady expansion. Bars are holding pretty closely to the 2.55c. basis, but the heavy materials range from the Steel Corporation levels to about $7 per ton higher, according to the delivery. Galvanized sheets are being quoted from 3.15c. to 3.50c., Pittsburgh; black sheets from 4.15c. to 4.50c., and blue annealed from 2.40c. to 2.75c., while plates range from 2.30c. to around 2.40c., c. and f., Pacific Coast ports. Sheets have not been quite as active recently, but plates are moving freely, one mill having taken around 1000 tons in three or four lots in the past few days, and working on an inquiry for about 400 tons. A large interest has just been awarded 375 tons of black sheets. The Los Angeles market is reported active, with several good sized prospects in sight. An oil field contract, involving 4500 tons, has just been closed. The Government is expected to ask for bids next month on four sea-going dredges, which will require around 5500 tons of plates and shapes. The local agent of a Middle West mill has just been advised of an advance of $5 a ton on large rivets.

Cast Iron Pipe.—This is a rather quiet period, with the exception of soil pipe, which is in active demand, though comparatively little new business is being accepted. Prices appear to be holding firm at recent

(*Continued on page* 320)

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Plates

Sheared, tank quality, base, per lb. .....1.70c. to 1.80c.

Structural Material

Beams, channels, etc. .....1.70c. to 1.80c.

Iron and Steel Bars

Soft steel bars, base, per lb. .....1.70c. to 1.80c.
Refined iron bars, base, per lb. .....2.25c.

Hot-Rolled Flats

Hoops, base, per lb. .....2.50c. to 2.75c.
Bands, base, per lb. .....2.50c. to 2.75c.
Strips, base, per lb. .....2.50c. to 2.75c.
Cotton ties, per bundle of 45 lb. $1.11

Cold-Finished Steels

Bars and shafting, base, per lb. .....2.10c.
Strips, base, per lb. .....4.00c.

Wire Products

Nails, base, per keg	$2.40
Bright plain wire, base, per 100 lb.	2.25
Annealed fence wire, base, per 100 lb.	2.25
Galvanized wire, base, per 100 lb.	2.75
Galvanized barbed, base, per 100 lb.	3.05 to 3.15
Galvanized staples, base, per keg	3.05 to 3.15
Painted barbed wire, base, per 100 lb.	2.55 to 2.65
Polished staples, base, per keg	2.55 to 2.65
Cement coated nails, base, per count keg	1.90 to 2.00
Woven fence, carloads	75 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads,
60, 10 and 10 per cent off list
Machine bolts, small, cut threads....60 and 10 per cent off list
Machine bolts, larger and longer.....60 and 10 per cent off list
Carriage bolts, ⅜ x 6 in.:
Smaller and shorter, rolled threads.60 and 10 per cent off list
Cut threads .....60 per cent off list
Longer and larger sizes .....60 per cent off list
Lag bolts .....60, 10 and 10 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads....50 and 10 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.:
Smaller and shorter.....50 and 10 per cent off list
Larger and longer sizes .....50 and 10 per cent off list
Hot pressed square or hex. blank nuts .....$4.50 off list
Hot pressed nuts, tapped .....$4.50 off list
C.p.c. and t. sq. or hex. nuts, blank .....$4.50 off list
C.p.c. and t. sq. or hex. nuts, tapped .....$4.50 off list
Semi-finished hex. nuts:
9/16 in. and smaller, U. S. S.....80 and 10 per cent off list
⅝ in. and larger, U. S. S...75 and 10 per cent off list
Small sizes, S. A. E. .....80, 10 and 10 per cent off list
S. A. E. ⅝ in. and larger..75 and 10 and 10 per cent off list
Stove bolts in packages .....80 and 5 per cent off list
Stove bolts in bulk .....80, 5 and 2½ per cent off list
Tire bolts .....65 per cent off list
Track bolts in carloads .....3.00c. to 3.25c. base
Track bolts, less than 200 kegs .....3.50c. to 3.75c. base

Cap and Set Screws

Milled square and hex. head cap screws,
75 and 10 per cent off list
Milled set screws.....75 per cent off list
Upset cap screws .....80 per cent off list
Upset set screws .....80 and 5 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb.....$2.65
Large boiler rivets, base, per 100 lb. 2.75
Small rivets .....70 to 70 and 5 per cent off list

Track Equipment

Spikes, 9/16 in. and larger, base, per 100 lb.	$2.25 to $2.35
Spikes, ½ in. and smaller, base, per 100 lb.	2.50 to 2.60
Spikes, boat and barge, base, per 100 lb.	2.50 to 2.60
Track bolts, base, per 100 lb.	3.25
Tie plates, per 100 lb.	2.00 to 2.25
Angle bars, base, per 100 lb.	2.40

Welded Pipe

Butt Weld

Steel Inches	Black	Galv.	*Iron* Inches	Black	Galv.
⅛	54½	28	¼ to ⅜	+ 3½	+ 14½
¼ to ⅜	60	33½	½	36½	18½
½	65	50½	¾	42½	27½
¾	69	56½	1 to 1½	41½	29½
1 to 3	71	58½			

Lap Weld

2	64	51½	2	39½	25½
2½ to 6	68	55½	2½ to 6	42½	29½
7 to 8	65	51½	7 to 12	40½	27½
9 to 12	64	50½			

Butt Weld, extra strong, plain ends

⅛	50½	33	¼ to ⅜	+ 4½	+ 27½
¼ to ⅜	56	38½	½	35½	23½
½	62	50½	¾	42½	28½
¾	67	55½	1 to 1½	44½	30½
1 to 1½	69	57½			
2 to 3	70	58½			

Lap Weld, extra strong, plain ends

2	62	50½	2	40½	27½
2½ to 4	66	54½	2½ to 4	43½	31½
4½ to 6	65	53½	4½ to 6	42½	30½
7 to 8	61	47½	7 to 8	35½	23½
9 to 12	55	41½	9 to 12	30½	18½

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 and 2½ per cent.

Boiler Tubes

Lap Welded Steel		*Charcoal Iron*	
1¾ in.	26½	1½ in.	5
2 to 2¼ in.	41	1¾ to 1⅞ in.	15
2½ to 3 in.	52	2 to 2¼ in.	25
3¼ to 13 in.	57	2½ to 3 in.	30
		3¼ to 4½ in.	32

To large buyers of steel tubes a supplementary discount of 5 per cent is allowed.

Standard Commercial Seamless Boiler Tubes

Discounts on cold-drawn or hot-rolled tubes in carload lots, f.o.b. Pittsburgh, follow:

1 in.	60	2½ and 2¾ in.	43
1¼ and 1½ in.	52	3 in.	47
1⅝ in.	36	3¼ to 4 in.	52
2 and 2¼ in.	39	4¼ in. to 5 in.	44

Less carloads, 4 points less Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Tin Plate

Standard cokes, per base box.....$4.75

Terne Plate

(Per package, 200-lb.)

8-lb. coating	$9.30	25-lb. coating I. C.	$14.25
8-lb. coating I. C.	9.60	30-lb. coating I. C.	15.25
15-lb. coating I. C.	11.80	35-lb. coating I. C.	16.25
20-lb. coating I. C.	13.00	40-lb. coating I. C.	17.25

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb. .....2.40c. to 2.60c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb. .....3.15c. to 3.40c.

Galvanized

No. 28 (base), per lb. .....4.15c. to 4.40c.

Tin-Mill Black Plate

No. 28 (base), per lb. .....3.15c. to 3.40c.

Manufacturers have pamphlets, which can be had upon application, giving price differentials for gage and extras for length, width, shearing, etc.

Freight Rates

All rail freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic.	$0.325	Buffalo	$0.265	St. Louis	$0.43
Philadelphia, export...	0.265	Cleveland	0.215	Kansas City	0.735
Baltimore, domestic...	0.315	Cleveland, Youngstown		Kansas City (pipe)...	0.705
Baltimore, export.....	0.255	Comb.	0.19	St. Paul	0.595
New York, domestic...	0.34	Detroit	0.295	Omaha	0.735
New York, export.....	0.285	Cincinnati	0.295	Omaha (pipe)	0.705
Boston, domestic	0.365	Indianapolis	0.31	Denver	1.275
Boston, export	0.285	Chicago	0.34	Denver (pipe)	1.215

Pacific Coast	$1.50
Pac. Coast, ship plates	1.20
Birmingham	0.69
Memphis	0.385
Jacksonville, all rail	0.50
Jacksonville, rail and water	0.415
New Orleans	0.515

The minimum carload to most of the foregoing points is 36, 000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha, and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 30c. to 40c.; ship plates, 30c. to 40c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 30c. to 40c.; sheets and tin plates, 50c.; rods, wire rope, cable and strands, 75c.; wire fencing, netting and stretcher, 50c.; pipe, not over 8 in. in diameter, 50c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

British Iron and Steel Market

American Coal Purchases Continue—America Has Bought 7,000 Tons of Rails and Is Inquiring for Tin Plate

(By Cable)

LONDON, ENGLAND, August 1.

Good quantities of British coal have been bought by America and the demand continues.

Pig iron is quiet and weaker. There have been further inquiries for 5000 tons of Scotch foundry iron to be sold for prompt delivery. The home demand is quiet. Hematite is weak and the demand sluggish. Stocks are accumulating and makers are granting concessions freely.

Coke is firmer on increased sales.

Steel prices are unchanged but the tendency is downward. It is anticipated that the home-trade price control will be dissolved before long. Australia and New Zealand are buying moderately, but other markets are quiet.

July output of the Clyde shipyards was 32,775 gross tons.

Continental material is in fair demand. India has bought sheets and plates. South America has bought merchant bars. America has secured 7000 tons of rails. Japan, China and Australia are purchasing wire meshing.

Tin plate is weak, with little business. Prompt position has sold at 19½s. ($4.33) basis, f.o.b. Sellers of September and October deliveries are asking 19¼s. ($4.27) basis, f.o.b. There is a good German demand and some works are filled up to the end of August. America is inquiring, but so far no actual orders have been placed.

Galvanized sheets are steady and business quiet. Japan is inquiring for thin-gage black sheets; also for sheets for galvanizing. India has bought a little.

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $4.44 per £1, as follows:

Durham coke, delivered rail	0 6 3½		$5.94
Cleveland No. 1 foundry	4 15		21.09
Cleveland No. 3 foundry	4 5	& 4 5*	19.54
Cleveland No. 4 foundry	4 7½		19.43
Cleveland No. 4 forge	4 5		18.87
Cleveland basic	4 0	& 4 0*	17.76
East Coast mixed	4 11	& 4 11*	20.20
Ferromanganese	15 0		66.60
Ferromanganese*	14 10	to 14 15	64.38 to $66.49
Rails, 60 lb. and up	6 17 6	to 9 10	31.97 to 42.18
Billets	7 0	to 8 0	31.08 to 35.52
Sheet and tin plate bars, Welsh	7 11½		32.75
Tin plates, base box	0 1 4½	to 0 1 9⅜	1.35 to 1.46 (Cwt. Lb.)
Steel plates	9 0	to 10 0	1.78 to 1.98
Boiler plates	12 0	to 14 0	2.58 to 2.78
Tees	9 0	to 10 10	1.83 to 2.08
Channels	8 10	to 9 15	1.68 to 1.92
Beams	8 0	to 10 0	1.64 to 1.98
Round bars, ¾ to 3 in.	9 0	to 10 10	1.83 to 2.08
Galvanized sheets, 24 g.	16 0	to 16 10	3.15 to 3.36
Black sheets	12 0		2.35
Steel hoops	11 0	to 11 10*	2.38 & 2.43*
Cold rolled steel strip, 20 w.			1.98
Cotton ties, Indian specification	1		2.97

*Export price.

Continental Prices, All F. O. B. Channel Ports. Delivery as Specified

No. 3 foundry pig iron:

Belgium, August	3 4	to 3 11	15.18 to 15.84
Luxemburg, August	3 0	to 3 4	13.92 to 14.56
France, August	3	to 3	13.92 to 14.56

Billets:

France		
Luxemburg, July	6 5	27.75
Lorraine, July	6 5	27.75

Wire rods (Oeg basis):

Germany, August	0 14½	3.22
Belgium, July	0 20½	4.55

Wire rods, 5 mm. (0.2 in.):

Belgium, July	7 5	to 10 7½	32.19 to 46.96

Angles:

Belgium, September	7 7½		1.46

Tees:

Belgium, July	8 5		1.64

Merchant bars:

Belgium, October	7 12½	to 7 15	1.51 to 1.54
Luxemburg, October	7 11		1.41
Germany, October	7 15	to 7 17½	1.51 to 1.56
France, October	7 17½	to 8 0	1.56 to 1.59

Channels:

Belgium, July	7 10	to 7 12½	1.49 to 1.51

Joists (beams):

France, Sept.	7 15		1.51
Belgium, Sept., Oct.	7 2½	to 7 5	1.41 to 1.44
Luxemburg, Sept.	7 2½	to 7 5	1.41 to 1.44

⅛-in. plates:

Germany, Aug., Sept.	7 15	to 8 5	1.51 to 1.64
Belgium, Aug., Sept.	7 17½	to 8 0	1.56 to 1.59

Luxemburg and France, not offered.

¼-in. plates:

Germany	9 0	1.78

No. 8 gage wire:

Belgium, July, Aug.	11 10⅞	2.88

Scrap Made of More Worth Than Salvage

The question when to scrap and when not to scrap, occurs with surprising frequency in demolition work. At times there is a very nice balance between the advantage of salvaging a piece of machinery or structural work and merely junking it. Since the development of cast iron cutting with oxy-acetylene the practice in this branch of demolition has undergone a very radical change, because it is now economical to reduce iron castings to charging box sizes in many instances where such a procedure could not have been considered even a couple of years ago. This is particularly true in the cutting up of very heavy iron castings such as are found in the mechanical equipment of power plants.

An interesting case in point is illustrated in the instance of a Chicago malting company that recently contracted with a scrap metal company to dismantle a power plant containing a large cast iron flywheel. Here the question arose as to whether it would be better to remove the flywheel in halves with a view to reassembling it as second-hand machinery, or to cut it up into such sections that it might be easily removed and broken into charging box sizes for sale as scrap. Salvaging would have required the erection of a heavy scaffold, because the roof of the power house was not strong enough to allow the removal of the halves by means of block and tackle unless some supplementary support was provided. This would probably have been the procedure before cast iron cutting with oxy-acetylene was developed, because it would have been impracticable to break up the flywheel in place.

In the case noted the cost of the scaffolding and labor for removal and salvage would have approximated so nearly the resale value of the flywheel that its reduction to scrap resulted in saving a considerable sum, even at the low price then obtaining for cast iron scrap. Eight cuts were made on the rim by means of Oxweld apparatus and one on each of the eight spokes. With the exception of the first cut on the rim, all were made by the contractor's own operator after witnessing the Oxweld service operator's demonstration.

One of the largest items of saving on the flywheel job mentioned was time, the scrapping operation being accomplished in hours against several days which would have been required to remove the parts for salvaging.

Savings Bank Deposits

Reporting savings banks in the Second Federal Reserve District, New York, show an increase of 2.5 per cent in aggregate deposits in the month ended July 10, chiefly as a result of the crediting of interest on July 1.

Deposits of reporting banks in New York City in most cases made gains slightly larger than the amounts credited as interest.

Reporting banks in other cities, however, showed in general such narrow gains as to indicate that without interest payments aggregate deposits would have declined.

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Straits Tin			Zinc	
	Lake	Electro-lytic*	New York	New York	St. Louis	New York	St. Louis
July 26	14.00	13.75	32.12½	5.75	5.40	6.35	6.00
27	14.00	13.75	32.50	5.75	5.40	6.45	6.10
28	14.12½	13.75	32.75	5.75	5.40	6.50	6.15
29	14.12½	13.75	....	5.75	5.40	6.52½	6.17½
31	14.12½	13.75	32.62½	5.80	....	6.55	6.20
Aug. 1	14.12½	13.75	32.75	5.80	5.45	6.60	6.25

*Refinery quotation.

New York

NEW YORK, Aug. 1.

The price tendency is upward, and some of the markets are active. Buying of copper is fairly good with higher prices expected. The tin market is steady and only moderately active. The buying of lead has been heavy and prices slightly higher. Zinc continues its moderately rapid advance with demand good.

Copper.—Demand for electrolytic copper has been fairly good the past week, so much so that any shading of the 14c. delivered price has practically disappeared and some producers are quoting 14.12½c. There are indications that higher prices are confidently expected before the end of the week. Export business continues in sustained volume at increasing rather than diminishing prices. The fact that July has passed in the face of the coal and railroad strikes without any recession in prices is considered significant. There has also been continued depletion of stocks.

Copper Averages.—The average price of Lake copper for the month of July, based on daily quotations in THE IRON AGE, was 13.98c. The average price of electrolytic copper was 13.71c., refinery, or 13.96c. delivered.

Tin.—Moderate sales of Straits tin are reported during the past week, estimates placing the total at 500 to 700 tons, mostly future shipments, with dealers the most active participants. Considerable of the business was done below import cost, the London market being exceedingly strong. On one day 75 tons of August-September shipment from the East was sold at 32.50c., and on another day several lots of spot metal and of June-July shipment changed hands at 32.75c. The general trade is somewhat puzzled at the strength of the London market, which has advanced almost daily for the past 11 or 12 days. Quotations for to-day were £162 15s. for spot standard, £162 15s. for future standard and £163 10s. per ton for spot Straits, with heavy sales reported. Spot Straits tin to-day was quoted in the New York market at 32.75c. The monthly statistics for July are unusually interesting in that the deliveries into consumption were lower than expected, having been 4590 tons, as contrasted with estimated deliveries of at least 5500 tons. There was also an unexpected increase in stocks in store July 31, the total being 1791 tons, with the quantity landing on July 31 at 1825 tons. These figures indicate smaller consumption than expected. Imports for the first seven months of the year have been 34,895 tons, against 10,418 tons for the same seven months last year.

Lead.—A very large business has been done in this market, mostly for August delivery, and the tone is exceedingly strong. There has been no change in the quotations of the leading interest which remain at 5.55c., St. Louis, or 5.75c., New York, but the outside quotation is higher at New York, the producers asking 5.80c. Independent sellers, however, are lower than the leading interest at St. Louis, at 5.45c. to 5.50c.

Zinc.—The same factors which have prevailed for some little time continue to exert a strong influence in this market and prices continue to advance. Prime Western for early delivery is firm at 6.25c., St. Louis, or 6.60c., New York, at which levels sales were made yesterday and to-day. Brass special has sold at 6.37½c., St. Louis. The coal and railroad strikes continue to exert a deterrent influence on production, and stocks are rapidly diminishing. Information is also to the effect that stocks in England are at a low point, and the belief is strong that that country must sooner or later turn to American producers for some of their zinc requirements.

Antimony.—The market is quiet and unchanged at 5.25c. per lb. for wholesale lots for early delivery, duty paid, New York.

Aluminum.—The leading interest continues to quote 19.10c. per lb., f.o.b. producers' plant, for virgin metal, 98 to 99 per cent pure. Imported aluminum from dealers is offered at 17.75c. to 18c. for the same grade, New York, duty paid.

Old Metals.—Business was a little better this week as a result of a firmer market. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	13.50
Copper, heavy and wire	12.75
Copper, light and bottoms	11.00
Heavy machine composition	10.50
Brass, heavy	8.00
Brass, light	6.50
No. 1 red brass or composition turnings	8.75
No. 1 yellow rod brass turnings	7.50
Lead, heavy	5.00
Lead, tea	4.00
Zinc	3.75

Chicago

Aug. 1.—Copper, tin, lead and zinc have advanced. Outside of copper there is an absence of endeavor to sell which has tended to strengthen the market. Tin has also been influenced by a strong bull movement in the London market. Sellers of spelter are confident because they feel that, though prices have advanced, idle smelters will not be able to resume operation on account of the pinch of the coal strike. Lead alone is in active demand after a quiet period. Some of the old metal grades have advanced in sympathy with the new metals. We quote, in carload lots, lake copper, 14.25c.; tin, 33.50c. to 34c.; lead, 5.50c.; spelter, 6.30c.; antimony, 7c.; in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 10.75c.; copper bottoms, 9c.; red brass, 8.75c.; yellow brass, 6.75c.; lead pipe, 4.50c.; zinc, 3.25c.; pewter, No. 1, 20c.; tin foil, 22.50c.; block tin, 26c., all buying prices for less than carload lots.

Expansion of Air Reduction Sales Co.

The Air Reduction Sales Co., Inc., has purchased plant sites and has begun the erection of additional plants. These include an Airco acetylene plant at Birmingham, an oxygen plant at Milwaukee, and an acetylene plant and a calorene plant at Pittsburgh, the last two augmenting a recently completed oxygen plant in the same city. Construction of the plant at Birmingham already has been begun. Facilities for producing oxygen from the air will also be enlarged in Buffalo and Minneapolis.

The completion of the new construction will bring the total number of the company's oxygen plants throughout the country up to 20, the acetylene plants to 11, and the calorene plants to 2. These are in addition to the air reduction apparatus plant in Jersey City, N. J., the recently acquired Davis-Bournonville apparatus plant, also in Jersey City, and the Ivanhoe, Va., plant of the National Carbide Corporation.

The drawing room practice of the Taft Peirce Mfg. Co., Woonsocket, R. I., calls for bond paper for, say, tool drawings. The paper is purchased cut to size with the title blanks and border lines printed. Drawings are made in pencil, using ink only on the outline of the work and for the center lines, dimensions and notes. Blueprints are provided for the use of the shop and the original drawing kept in the files.

PERSONAL

A. F. Knoblock has resigned as vice-president and works manager of the Cleveland Tractor Co., Cleveland, and his brother, H. Knoblock, has resigned as superintendent of that company. They plan to establish plants in Detroit, Cleveland, and other cities for the manufacture of transmission and timing gears for automobiles.



JOHN A. CAMM

John A. Camm, for several years the sales manager of Kearney & Trecker Corporation, manufacturer of milling machines, Milwaukee, became on Aug. 1 president of the Western Iron Stores Co., Milwaukee, dealer in machinery supplies. Mr. Camm has been associated with Kearney & Trecker for a considerable number of years, entering into the employ of that company in 1908 as superintendent. His experience in the sale and manufacture of machine tools dates from 1900, and previous to his connection with the Kearney & Trecker Corporation, he was general foreman of the Boye & Emmes Co., and previously foreman with other Cincinnati machine tool builders, among them being American Tool Works Co., R. K. LeBlond Machine Tool Co., and the Cincinnati Planer Co. In making his new connection Mr. Camm does not disassociate himself from the machine tool business, as he will continue to act in an advisory capacity for Kearney & Trecker Corporation.

E. R. Wiggins, formerly with the Chilton Co., Philadelphia, as technical editor of the Chilton *Tractor Journal*, has joined the sales department of the Holt Mfg. Co., Peoria, Ill., to do special work as sales engineer. He was formerly with the J. I. Case Threshing Machine Co., Racine, Wis.; Aultman & Taylor Machinery Co., Mansfield, Ohio; and Deere & Co., Moline, Ill., in their various engineering and experimental departments on tractor development.

W. L. Walker, formerly chief engineer of the Indianapolis Switch & Frog Co., Springfield, Ohio, and for the past four years assistant plant manager of the Ajax Forge Co., Chicago, has been appointed superintendent of the switch and frog department of the Buda Co., Harvey, Ill.

Bertram H. Lawrence, district engineer American Steel & Wire Co., Worcester, Mass., has been made chief engineer to succeed W. E. Snyder, Pittsburgh, who recently died. Matthew R. Fish, chief draughtsman, South Works, Worcester, succeeds Mr. Lawrence as district engineer. Mr. Lawrence will have charge of power and mechanical equipment, with headquarters at Pittsburgh, and will take up his duties this month. He originally was with the Chicago office of the company, and went to Worcester about seven years ago. His education as a mechanical engineer was received at the University of North Carolina.

Col. E. H. Havens has been made vice-president and general manager of the Locomobile Co. of America, Bridgeport, Conn. He was one of the receivers of the old Locomobile company prior to its being acquired by the Durant interests.

Joseph H. Swift, master mechanic, South Works, American Steel & Wire Co., Worcester, Mass., has been made chief draughtsman, to succeed Matthew R. Fish, who is now district engineer. Joseph Ashworth, shop foreman at the North Works succeeds Mr. Swift as master mechanic at the South Works.

W. S. Silpath, who has been made general manager of the Hub Wire Cloth & Wire Works Co., Boston, has been identified with the wire business 25 years, six years with the Buffalo Wire Works Co., Inc., the item regarding him in THE IRON AGE of July 27 being inaccurate.

C. A. Hintz has resigned his position with the Crucible Steel Co. of America to become Milwaukee manager of the Ziv Steel & Wire Co., Chicago, with offices at 201 University Building, Milwaukee.

E. W. Schultz, Sheboygan, Wis., president State Board of Vocational Education, and R. L. Cooley, director Central Continuation School, Milwaukee, will leave Aug. 15 for Europe to make a study of industrial training schools in England, France, Germany, Switzerland and Denmark.

Joseph G. Lawler, formerly sales manager of Louis Schlesinger, Inc., is now associated with the Van Wagoner-Linn Construction Co., New York, contracting electrical engineers.

Joseph Dhavernas, president United States Nickel Co., New Brunswick, N. J., has returned from an extended visit to Europe, having made an investigation of the business conditions with respect to nickel and its future.

Monroe L. Patzig, 206 Eleventh Street, Des Moines, Iowa, has been appointed representative of the Conveyors Corporation of America, Chicago, for the sale of the American trolley carrier. His territory lies in central Iowa.

A. L. Roberts, formerly master mechanic of the Lehigh Valley Railroad, and recently chief engineer of the Atlas Crucible Steel Co., has been appointed sales engineer, railroad department of the United Alloy Steel Corporation, Canton, Ohio.

A. M. Lindsley, chief engineer, Alvord Reamer & Tool Co., Millersburg, Pa., has been placed in charge of the advertising department of that company. He will continue his duties as chief engineer. Mr. Lindsley was formerly connected with the Cincinnati Milling Machine Co., Cincinnati.

S. P. Ker, Jr., Sharon, Pa., has been appointed general manager of sales of the Ashtabula Steel Co., Ashtabula, Ohio. The company is completing an eight-mill sheet plant, and expects to begin rolling in August. Mr. Ker is a son of Severn P. Ker, president of the Sharon Steel Hoop Co.

S. G. Gilfillan, president of the Belfont Iron Works Co., Ironton, Ohio, resigned at a recent meeting of the board of directors, and was made chairman of the board. He has been vice-president of the company for several years and has been a notable figure in the Hanging Rock iron district. C. Peebles, for many years managing head of the Ashland Steel Co., Ashland, Ky., which was recently taken over by the American Rolling Mill Co., has been elected to succeed Mr. Gilfillan as president of the company.

W. C. Durant has become identified with the Locomobile Co. of America as its active head. A 350 per cent advance in the price of Locomobile shares marked the arrival of this announcement on Wall Street.

Elbert H. Gary has accepted the chairmanship of the public safety committee of the Safety Institute of America, which with the help of 87 leaders in civic, industrial, social, educational and administrative circles, is to conduct an intensive public safety campaign. Judge Gary is generally credited with believing that the safety methods employed by the United States Steel Corporation, which it is estimated has saved 30,000 employees from serious injury in 14 years, could be adopted in large cities.

Dr. Colin G. Fink, consulting electrometallurgist, has been put in charge of the division of electrochemistry, department of chemical engineering, Columbia University, New York. He will continue his services as secretary of the American Electrochemical Society, office facilities having been arranged at Columbia for this purpose. The society's offices at Lehigh University will be discontinued after Aug. 1.

FRENCH PRICES UNEVEN

Market Slightly Unsettled Export Activity Pig Iron Weak Less British Competition

(By Special Correspondence)

PARIS, FRANCE, July 20.—The French iron and steel market is in much the same situation as last week; quiet for inland sales, which is natural during the holiday season, but, notwithstanding the fall of the German mark, more active for export. Prices are well maintained in some items, show a sagging tendency in others and are on the whole rather unsettled.

The adjusted price of German coke delivered to French blast furnaces through the pooling agency of the Société des Cokes de Hauts-Fourneaux, has been raised from its present level of 93 fr. at Franco-German frontier to 97 fr. for August delivery. On the other hand, Germany is asking the Reparations Commission for a reduction of her present coal and coke deliveries to France. Lorraine iron works are, of course, normally depending upon German coke from the Ruhr for their supply, and if the German request were granted, they would have to procure French, Belgian or British coke at a much higher delivered price. Negotiations are now on between French and British companies for an exchange of British metallurgical coke for French iron ore, via French northern ports.

All this adds a regrettable element of uncertainty to the unfavorable conditions that the French iron and steel industry is laboring under: rising costs and falling prices. A substantial increase of production could alone improve this situation, but world economic conditions are, thus far, against it.

Of the 222 French blast furnaces, in May, 93 were in operation; 61 were under repair or in course of construction, and 68 were inactive.

Iron Ore.—Latest prices of French Eastern iron ore are as follows (per ton, at mine):

Metallic contents	Fr.
Thionville (32 per cent)	11 to 50
Briey	11 to 45
Longwy	10 to 11

Pig Iron.—Prices of foundry pig iron are still sagging, because of keen competition among producers. The current price for chill-cast pig iron No. 3 P. L. is 210 fr., but some orders were booked at 208 fr. and even 205 fr. If this price is contrasted with the price paid for coke by French Eastern iron works (97 fr. next month, which is equivalent to an average delivered price of 100 fr.), it will be readily seen that, at such a level, producers are undoubtedly losing money. One Lorraine producer is upholding the price of 215 to 220 fr., and another one (the Redange works, has decided to blow in its one blast furnace. Middlesbrough foundry iron No. 3 is now quoted 308 fr. f.o.t. Calais or Rouen.

Owing to the recent rise of British currency (which has now partly receded), the market for French hematite has lately been rather satisfactory, and a postponement of the application of the new import duty, 37.50 fr. per ton instead of 30 fr., was even contemplated. British East Coast hematite, mixed numbers, is worth now 91s. f.o.b., which is equivalent, with a 6s. freight rate and at the present rate of exchange, of 52.5 fr. to £1, to 254.6 fr. plus 30 fr. per ton of import duty and unloading expenses. The present prices of French hematite are as follows: In the zone of penetration of British hematite (Northwestern coast area), 295 to 305 fr.; in the Eastern area, 305 to 315 fr.; in the Center and Paris areas, 325 to 330 fr.

Semi-Finished Steel.—Although quieter, the market for semi-finished products is good, especially for export, and if fewer orders were lately booked from Germany, a few orders, on the other hand, were placed in Great Britain. Present inland prices average 290 fr. for ingots and 310 fr. for blooms, at Lorraine works.

Beams.—The Comptoir Sidérurgique bookings for beams during the month of June totaled close to 35,000 tons.

Rails.—The large orders for rails which were contemplated for some time by the French railroads have just been virtually awarded to the Comptoir Sidérurgique, the domestic selling association of French producers of rails and beams.

Sheets and Plates.—The situation of the sheet market is satisfactory. The British product is now out of competition and Belgian sheets are selling only in the frontier area. Orders booked by the French Comptoir des Tôles, which have been steadily increasing since April, show higher figures still for the first part of July.

Rolled Merchant Iron.—Less activity has caused a prolonged weakness of prices, which vary considerably according to specifications, time of delivery, etc. For instance, one Lorraine works has booked an order for 1000 tons at 425 fr., while another producer has accepted 407 fr. for a similar tonnage. For export, 410 to 415 fr. f.o.b. Antwerp was recently accepted. Delivery on medium and small shapes varies now from two to three months. Steel wire is now quoted at 450 to 470 fr. at Lorraine works. There is continued improvement in sales of castings.

Western Iron Stores Co. Expansion

In connection with the election of John A. Camm to the presidency of the Western Iron Stores Co., 145-147 West Forty-seventh Street, Milwaukee, as referred to elsewhere in this issue, it is stated that the company will gradually enlarge its machine tool department and will deal extensively in metal-working equipment, production tools, etc. It has dealt in machine tools in a limited way for several years in connection with its business as a jobber and dealer in foundry and machine shop equipment and supplies, transmission appliances, fixtures, etc.

Shipping Board Sale of Engines

WASHINGTON, Aug. 1.—The United States Shipping Board has sold 102 triple expansion marine engines at public auction for $155,850. They were bid in by dealers in scrap metal and others, as follows: Big Four Machinery & Salvage Co., Chicago; Guy Mason, Washington; Stock Yards Scrap Iron & Metal Co., Chicago; Federal Shipbuilding Co., New York; David Dick, Welland, Ont.; Henry A. Hitners Sons Co., Philadelphia; Kennecott Copper Co., New York; S. D. Ostrow, Erie, Pa.; John W. Sullivan, New York, and Daniel Kern, Portland, Ore.

OBITUARY

CROWTHER TEAL, part owner and manager of the Rochester Barrel Machinery Co., Rochester, N. Y., died at his home Friday, July 21, after a brief illness which resulted from heart attack. He had been connected with the manufacture of barrel machinery since he came to this country from England 38 years ago.

SAMUEL H. CARPENTER, president and one of the directors of the Atlas Drop Forge Co., Lansing, Mich., died suddenly at his home July 26. He had been at the head of the Atlas company since it began in 1906.

HARRY I. WOOD, president Harry I. Wood Electric Co., Louisville, Ky., for 22 years, died July 25.

EDWARD LACEY BRAYTON, president of the Pelton Water Wheel Co., San Francisco, died July 21, at Piedmont, Cal. Mr. Brayton had much to do with the development of California water power.

D. D. ELLIOTT, general superintendent Joseph E. Thropp Co., Earlston, Pa., died at his home Monday morning, July 24. Starting with the Shwenberger Steel Corporation, then successively with the American Steel & Wire Co. at Cleveland, the Donora furnaces of the Steel Corporation, the Cambria Steel Co., Johnstown, Pa., then with the Joseph E. Thropp Co., Mr. Elliott has been connected with the iron and steel industry of this country for many years.

IRON AND STEEL MARKETS

(*Continued from page* 314)

levels, that is, $50 for 6-in. and $54 for 4-in., delivered. Perhaps the best offering at present is that involving 1270 tons of 20-in. pipe for Seattle, the award on which is expected at the end of the current week. Deliveries are growing daily more difficult, and, under conditions, are very uncertain. Some mills are urging consumers to anticipate their spring needs at this time when demand is lighter.

Coke.—The best business of recent date involves the 1000 tons of coke on which several dealers and importers have been working. Keen competition brought out a low bid, around $15, c.i.f., but agents have just received advices from Europe indicating an advance of $3 per ton, which makes the market price about $17.50. The strikes have curtailed business in domestic coke to a marked extent, and buyers are showing more interest in foreign material. It is estimated that around 2000 tons have been sold for late August arrival at close to $17.50, ex ship, to the foundry trade in carload quantities, for the most part.

Old Material.—A fairly steady business continues in scrap, but it is not of great proportions at present. The Southern Pacific Company is still offering freely, and absorption is progressing slowly. Market prices rule steady at $10, or a little better, on heavy melting, per gross ton, delivered at consumers' plants, and firm at $22 on cast iron scrap, per net ton.

Youngstown

YOUNGSTOWN, OHIO, Aug. 1.—Differing opinions prevail with respect to effect of the coal priority orders of the Interstate Commerce Commission. One group inclines to the belief that little coal will be available for industrial consumption, at least for duration of the coal miners' strike. Another group believes that the Government will seek to avert serious unemployment by giving industries enough fuel for at least partial operations.

Independents are hopeful that the priority order may start shipments held up on Southern carriers moving and that coal loaded prior to the order will not be diverted. Lack of motive power, however, is declared to be the principal deterrent toward the relief of congestion on roads tapping the Southern mining regions, from which coal for Youngstown and Pittsburgh district industries has moved in heavy tonnages since the middle of April.

In a general way, producers are largely out of the market. Efforts are being concentrated to meet obligations of regular customers, and mills are falling behind in this respect. One interest reports that it occasionally has some tonnage that can be sold when an order fits in with rolling schedules, but not otherwise.

Just how long non-integrated sheet rollers will be able to maintain schedules is a question, in view of the fact that they must purchase their sheet bar requirements on the market, and that such makers appear to be especially hard hit by the disorganization to transportation. First evidences of curtailment in semi-finished production appear this week, aside from the suspension July 15 of the Bessemer department of the Republic Iron & Steel Co. On slabs, billets and sheet bars, $35 is the ruling third quarter quotation.

Larger interests have as yet shown little disposition to mark up quotations, though advances above the nominal market ranging from $3 to $5 per ton have applied on sheets, strips and merchant steel bars. Not all independents have abandoned the quotations of the leading interest on the three grades of sheets, but little new business is being considered.

Producers, however, point out they cannot be expected to maintain current quotations based upon coal costs ranging from $2.50 to $3.50 per ton, when their fuel costs have jumped to $8 and $9 for new supplies. As yet comparatively little of this high-priced coal has entered into actual production costs, because of unwillingness of industrial buyers to pay these figures and inability of the roads to make deliveries. One interest in the district was recently asked $9.50 per ton for upward of 100 carloads of Kentucky coal, which would have cost $11.90 delivered. Some companies are buying steam coal in a small way to keep their boilers operating when their own reserves are exhausted.

In the Youngstown district, the Carnegie Steel Co. has been in more favorable operating position, from the standpoint of fuel supplies, than the independents. Its Ohio Works blast furnaces have received considerable coke from Lorain, enabling it to continue five of six stacks in operation. The Charleroi, Pa., plant of the Electric Alloy Steel Co. is operating on a normal basis. The company is receiving a large number of small orders, states an official, which necessitates frequent changing of the rolls and thus adds to the costs. Combination of the company with the Atlas Crucible Steel Co., Dunkirk, N. Y., as proposed, will give the merged interests five finishing mills, as compared with two now operated at Charleroi, one of which is also used for blooming mill purposes.

Local Strike Developments

Belief prevails in traffic and industrial circles that the strike of railway shopmen will gradually wear itself out and that the men will drift back to work. In many cases shopmen have gone from one district and have accepted employment in another in the shops of another carrier; in others, shopmen who walked out willingly or unwillingly have left their own communities and accepted employment in shops in other districts operated by their employer.

In many cases skilled workmen have gone with equipment interests working on contracts for the carrier whose service the employee left. Railroads are concentrating their active forces on locomotive repairs, but the inadequacy of such work is evidenced by inability to handle heavy freight movements in normal volume. Less attention is being paid to car repairs.

In this district the railroads took immediate steps to prevent disorder, securing injunctions in federal court restraining striking employees from trespassing on the company's property or molesting or interfering with men who took their places. These writs of injunction were personally served on many of the striking shopmen, and as a result there has been comparatively little disturbance.

Two men have been arrested at New Castle charged with sabotage, but disorder has been of negligible proportions in this territory. As yet there has been little interference with outbound shipments of steel products. The Baltimore & Ohio railroad appears to be the most seriously affected of any of the trunk line carriers, in so far as its operations throughout this territory are concerned.

Wire Saws for Marble Cutting

The use of wire for cutting slate and marble was recently discussed in *The Quarry and Surveyors' and Contractors' Journal.* The wire travels at about 12 miles per hour. It is made in lengths of from 220 to 880 yd., sometimes more, and in three diameters, 4 mm., 5 mm. and 6 mm., the lighter-gage wire being employed for yard sawing and the heavier for quarry work.

In a large working the cutting wire is sometimes driven by a pulley fixed on a countershaft which may drive one or more lines of cutting wire each with its own friction clutch so that each can be worked independently of the other.

The wire saw is referred to as a useful and economical machine, being cheap to operate, requiring little horsepower, and only occasional attention to see that sand and water are kept fed into the cut. They have been developed primarily for marble working, but can be easily adapted to slate cutting.

Attempts to use them for sandstone cutting did not apparently turn out well, because of the excessive wear on the wire. The original article describes the details of their installation.

Railroad Steel Castings

(*Continued from page* 284)

13. In case of small orders for bolsters, truck sides, draft arms, yokes or castings weighing over 150 lb. where the size of the order and the available pattern and foundry equipment are such that not more than five castings can be cast in any one melt, the physical properties, as required in Section 8, will be determined from an extra or spare test coupon cast with and attached to some other casting of the same melt.

14. In the case of orders including only castings not exceeding 150 lb. in weight, a test to destruction of one casting from each 100 castings or smaller lot may be substituted for the tension tests, at the option of the inspector. This test shall show the material to be ductile, free from injurious defects and suitable for the purpose intended.

Workmanship and Finish

15. The castings shall substantially conform to the sizes and shapes shown on the purchaser's drawings, and shall be made in a workmanlike manner.

16. (*a*) The castings shall be free from injurious defects.

(*b*) Minor defects which do not impair the strength of the castings may, with the approval of the inspector, be welded by an approved process. The defects shall first be cleaned out to solid metal; and, after welding, the castings shall be annealed, if required by the inspector.

Marking

17. The manufacturer's name or indentification mark and the specified pattern number shall be cast on all castings. In addition, the month and year when made shall be cast on all bolsters, truck sides, frames, wheel centers, cylinders, and similiar castings. The location and size of numbers shall be agreed upon by the manufacturer and the inspector. In accordance with the standard practice of the individual foundry to identify individual castings, a serial number may be cast or the melt number may be stamped on bolsters, truck sides, frames, wheel centers, cylinders and similiar castings as agreed upon by the manufacturer and the inspector. The melt number shall be legibly stamped on all other castings weighing over 150 lb.

Inspection and Rejection

18. The inspector representing the purchaser shall have free entry, at all times while work on the contract of the purchaser is being performed, to all parts of the manufacturer's works which concern the manufacture of castings ordered. The manufacturer shall afford the inspector without charge, all reasonable facilities to satisfy him that the castings are being furnished in accordance with these specifications. All tests (except check analyses) and inspection shall be made at the place of manufacture prior to shipment, unless otherwise specified, and shall be so conducted as not to interfere unnecessarily with the operation of the works.

19. (*a*) Unless otherwise specified, any rejection based on tests made in accordance with Section 7 shall be reported within five working days from the receipt of samples.

(*b*) Castings which show injurious defects subsequent to their acceptance at the manufacturer's works will be rejected and the manufacturer shall be notified.

20. Samples tested in accordance with Section 7, which represent rejected castings, shall be preserved for two weeks from the date of the test report. In case of dissatisfaction with the results of the tests, the manufacturer may make claim for a rehearing within that time.

JUNE SHEET STATISTICS

Unfilled Orders Mount When Production Falls Behind New Sales

Sheet sales for the month of June, as disclosed by the monthly report of the National Association of Sheet and Tin Plate Manufacturers to the Department of Commerce, gained substantially over those for May, amounting to 268,032 net tons as compared with 176,200 tons for the previous month. Production for June was 210,460 tons, or 57,572 tons less than the sales, while shipments were 203,023 tons or 65,009 tons less than the sales. Unfilled tonnage as of July 1, was 437,853 tons, an increase of 73,778 tons over the June 1, total. Finished stock on hand awaiting shipment as of July 1, was 77,251 tons as compared with 72,676 tons a month before and unsold stocks amounted to 21,609 tons as against 22,177 tons on June 1.

The total number of hot mills in the United States is 641, having a monthly capacity of 365,000 tons and the percentage of the capacity to which the figures are related is 67 per cent. June sales were 110 per cent of such capacity; production 86.4 per cent; shipments 83.3 per cent; unfilled orders 179.7 per cent; stocks awaiting shipment 31.7 per cent and unsold stocks 8.8 per cent.

The unfilled tonnage figures indicated obligations of the mills, upon whose reports the figures are based, as equal to about 1.8 months' capacity production, but if the unshipped and unsold stocks amounting to 98,860 tons are deducted, the net obligations of these mills drop to 338,993 tons, equal to about 1.72 months' capacity production. Capacity production is out of the question under existing coal, transportation and labor conditions, and based on the June production rate the unfilled orders constitute well over two months' output.

Last Week's Coal Production

WASHINGTON, Aug. 1.—Whether it was only a coincidence or an immediate result, figures of the Geological Survey show that there was an increase of approximately 200,000 tons in the coal in the seventeenth week (July 24-29) of the strike which followed the invitation of the President to reopen the mines. The survey says that production that week ran at the rate of 3,900,000 tons as compared with 3,700,000 tons for the preceding week.

Production of anthracite coal remains practically zero. The increase in output of bituminous coal is attributed partly to more men at work in Pennsylvania, partly to improved car supply in Southern West Virginia, and partly to heavier shipments from Alabama. There was no indication of increased production in response to the invitation to reopen mines in any of the strongly organized districts. More coal is coming out of the former non-union fields of Pennsylvania, and a little more from the Fairmont and Kanawha districts of West Virginia, but the additional supply from these sources was not yet significant in comparison with the requirements of the country.

Loadings on Monday, July 24, totaled 13,083 cars, or 417 above the preceding Monday, but 3664 cars below the last Monday before the shopmen's strike. Loadings on Tuesday, July 25, were 11,861, on Wednesday, 11,383, and on Thursday, 11,760.

Plant Operations in the Youngstown District

Extensions now being made to the plant of the Youngstown Boiler & Tank Co., Youngstown, Ohio, will be completed in August, according to President James P. Keene. An addition is being built to the main plant building, substantially increasing productive capacity. The company now has orders sufficient for four months' operations, and output will be increased immediately upon completion of the additional capacity. The company manufactures storage tanks in standard sizes, and is engaged in miscellaneous steel plate construction. It consumes annually about 25,000 tons of plates. Two new buildings, of steel construction, are being added, one 100 x 160 ft. and the other 30 x 120 ft.

Wage Advance at Cambria Works

An advance in wages was made by the Midvale Steel & Ordnance Co. at its Cambria plants at Johnstown, Pa., effective Aug. 1. Common labor, which had been at 25 cents per hour, was advanced to 28½ cents per hour. At the Central Western plants of the Steel Corporation and of some other producers the basis for common labor has been for some time 30 cents per hour.

The Branford Brass Foundry Co., Inc., Branford, Conn., has completed its foundry and is ready to begin manufacturing in brass, aluminum and alloyed castings.

UTILIZING THE SELLER

Making the Manufacturer Prove His Goods—Inspection and Tests

BY JOHN J. RALPH

HAVING specialized in his line and made his living from it, the seller may be assumed to have a good knowledge of it. He knows the trade customs, the history of the product, what the general trend is along which advancement may be expected to come, and how and where it is usually used.

In the matter of grades he has definite information which the purchaser often has not. At times, cheaper grades may be used to better advantage than the expensive ones. At other times a few cents more spent for quality will cut the consumption materially.

An instance in which this is particularly true is in the paper line. Few have any real knowledge of the different kinds of paper and the grades, yet every concern in the country must buy paper and it should be exactly adapted to their needs. Here the seller must be relied upon.

The producer is usually in touch with alternative products. Jobbers are perfectly willing to quote on these and, if they can in any way be used, it will pay to get further information. These competitive lines mean much to the buyer and it pays to keep in touch with their development. For instance, in the electrical line, there is the development during the past ten years of synthetic rosin for insulating.

As the manufacturer has usually made careful studies of the possible developments and adaptation of his products, he stands ready to give this information. He comes into contact with many other users of his material and has been called in many times to tell why it did not give satisfactory results, or how the manufacturing treatment could be changed to attain the desired product. This has given him a training in the handling and overcoming of difficulties connected with it.

This information is of particular value in advance of the time of designing the product and settling the methods of manufacture. If work has reached that stage, it is necessary to struggle with the difficulties, but if they can be avoided in the design of product and equipment of shop, there will be a gratifying lack of trouble and a noticeable saving.

Information as to the probable trend of the market price and the probabilities of plentiful or restricted supply can best be obtained from the maker. The source may perhaps be tainted, for the interests of both parties are not exactly the same, but usually it is as unbiased as possible, for salesmen, if not sellers, have come to realize that only through strict honesty can they retain the respect of customers.

The delivery situation is often of much importance. After the experience of the past few years this has probably not been forgotten. Very often it is not realized that some goods, if not in stock, cannot be made up for some time. This is particularly the case where they are made on large machines, which must be specially set up for each particular size and kind of goods going through, and where the machine is used to turn out a whole line of goods, as is the case with rolled goods, and particularly in the steel mill.

Co-operation

This is usually desired by the seller. Often the buyer does not care for it, not wishing to put himself under obligations, and partly because he does not wish the details of his business generally known. In some cases there is a disposition to recommend courses which would practically compel the buyer to continue buying the same kind of goods. At times there is great rivalry to have certain goods declared standard, as in architects' or government specifications.

This is usually considered to be legitimate business, but if there is realization that each knows his business and that the buyer is not willing to have all of his engineering and design work done for him, the attitude changes and there is a sincere desire to assist in obtaining the very best possible result in meeting the real needs.

The first contact is with the salesman and the sales organization. Their special duty is to sell the goods—the knowledge and design services are purely incidental. For this reason the sales department is filled with salesmen and the real engineer is somewhat of a novelty. There is a feeling that a man who knows his subject thoroughly and is a real expert is ordinarily a poor salesman.

Particularly with the larger concerns is it unusual to find men who are experts in the particular line in which one is interested. These men have to sell too many kinds of things in too many kinds of places to know their subject well. This is also true of jobbers' representatives.

It is then necessary to get all the information that the salesman has. This can usually best be done by calling in the man or men in the plant who are particularly interested in the product. It will probably not be long before the salesman is reduced to referring to "our factory man." If the best results are to be obtained, here is where care is to be used.

If the project does not warrant bringing on the factory representative or expert in person, it must be so put that he can obtain a particularly clear idea of just what is wanted. This is not easy. There are difficulties in just the pure use of words. Each trade and profession has particular meanings for even common words, which may easily cause difficulty.

Not every man has the ability to use the English language so that but one meaning can be read from what he has written. There are still less who can present a complete picture of any proposition. Much can be done with care and the use of such assistance as sketches, specifications, etc.

Reaction on the Buyer's Organization

This information, gathered from perhaps a half dozen sources, and representing the very best of modern practice, is of supreme importance to the various departments of the buyer.

In the field of design it is necessary for the designer and the production department, and that they shall work together in co-operation to make the best use of it. Their aim is (first) to get out the most saleable product and (second) to make it as economically as is possible under the conditions.

This sounds elementary, but it is far from being a usual condition. In fact, it is novel to find a concern which makes provision for the general and systematic reception and use of information. In some of the smaller concerns it is possible to get right to the men who are responsible for the work, and they will gladly take it, in a verbal form, mainly, it is true, but it makes far more impression on them, for they are alert to find that which they may use.

Discounting Seller's Information

No matter where information comes from, it must be carefully tested and checked to find (first) its accuracy and (second) its bearing on the problem in hand.

The salesman is usually a very optimistic individual. Accustomed to have his statements discounted, he embroiders them so that the final effect will be substantially accurate. He suffers from the feeling that the final responsibility is the buyer's and that his job is to get rid of the goods. It is, therefore, necessary to examine his information closely for absolute misstatements, for exaggerations and for mistakes. It is not unusual for the purchasing agent to obtain inaccurate impressions through his lack of exact familiarity with the goods. By focusing on this information the intelligence of the part of the organization involved, it is usually possible to get the facts and discover their bearing under the conditions considered.

There are methods of checking up that have not been used to the extent that they might be. Each of them is standard procedure in certain lines. The first is the systematic study of machines and materials in

other factories. It is seldom that other manufacturers, even competitors, will fail to give permission to study either machines or materials in their plants. Such a request is usually taken as a compliment. This gives one a chance to obtain an unbiased opinion and to find out the opinions of others. It is not, however, sufficient.

Our reputation as manufacturers of automotive equipment has gone out to the ends of the world. We have had visitors from all over the world who have carefully and closely checked the work in our various factories. These are very suave gentlemen and never fail to leave a plant without mentioning how efficient it is. They also never tell what they have seen that does not seem to them to be the best of practice. They would not be so presumptuous, and they have no wish to hurt anybody's feelings.

The standing wonder of all of these gentlemen is how, with access to no plants barred, two plants in the same city can each have crude processes in certain departments, while some other plant practically next door has worked out extremely efficient and economical methods of machining. To them it seems common sense for each to exchange their advanced ideas and both profit from the exchange.

Experts

Large companies have on their staffs men who are experts in their special lines to whom such problems as may come up are referred. While these men work with the regular staff, they bring to the study special training and experience which is of great assistance. This is impossible to the small plant and they therefore work along without it, because they cannot afford to hire a whole line of experts.

There has developed during the past few years a body of men in independent practice who are experts in certain branches. But there is often a feeling that to call on them is an indictment of the staff. This is, of course, erroneous, for many things come up with every company which must be solved in a "rule of thumb" manner, or by the "cut and try" method, which, if turned over to a real expert, could be solved in the unusual manner that means profits.

Testing

A fairly certain way, and one which must always be used eventually, is to test. It gives invaluable information which sometimes can be obtained in no other way. Large plants in highly technical lines have fully equipped testing departments through which it is possible to run tests which give absolute information on the machine or material under consideration. In others it is necessary to go to outside commercial laboratories.

These latter have not been used as much as they should be. Company after company is still working on "rule of thumb," where they should know exactly "where they are at." Many a company is still taking the sellers' word for the material he ships when, for a few dollars a month, it could have tests made which would give all of the characteristics of the material received. This would enable the company to plan intelligently to use it to the best advantage.

There is an interesting tendency to place development problems in the various engineering college laboratories. In these places there is often the best of talent, with an abundance of observing assistance from students. Their equipment in testing machinery is usually far more complete and of greater capacity than in the usual plant laboratory.

If the precaution is taken of stating the problem with exactness, supplying sufficient money so that the necessary work can be done, and starting the experiments in sufficient time, this is a very satisfactory method.

The producer's plant offers facilities, both in the way of talent and equipment, which sometimes is the only practical solution. This is particularly true of special machinery or products which it may not be possible to duplicate in any other place in the country. Because of their familiarity with the material, and other investigations they may have carried out in some lines, this is often the only satisfactory way to make tests.

Chairman Schwab Discusses Bethlehem Company's Position

The Bethlehem Steel Corporation declared its regular quarterly dividends, payable Oct. 2, on both classes of common stock. Following a meeting of the board of directors, July 27, Charles M. Schwab, chairman of the board, described the outlook for improved business as encouraging. "The directors," he said, "concluded that the ability of the corporation to distribute accumulated earnings from its resources, due to conservative dividend policy during the period of large earnings, warranted the payment of the present dividend on the common stock."

Mr. Schwab said the building of additional open-hearth steel capacity to serve the plate, sheet and tin plate mills at the Sparrows Point plant is being planned. This is expected to add 300,000 tons annually to the company's capacity. He said further:

"Orders booked in the second quarter were much in excess of the first quarter and at gradually improving prices. Prices prevailing during the first quarter proved to be the lowest of the recent depression. Early in the second quarter a revived demand for steel developed, necessitating a rapid expansion of operations, which was accompanied by an increase in costs due largely to the high cost of fuel occasioned by the coal strike.

"The corporation's coal properties continued in operation during the quarter, but the difficulty of railroad movement under the present conditions has made it impossible to supply the corporation's full needs, necessitating some curtailment of operations.

"There has been an improvement in the inquiries for new ships, and the corporation has been able to secure some new business in that department. There has also been an increase in the amount of ship repair work. Our railroad passenger car business shows a much improved condition, capacity being taken for some time to come.

"The steel business for the next half of the year will be very much influenced by the duration of the coal and railroad strikes. There are large unfilled orders for steel, with substantial additional tonnage awaiting some assurance as to deliveries. Coupled with this there is a more general recognition of the necessity for a higher price basis for steel."

National Safety Council Meets at Detroit

At the eleventh annual meeting of the council, to be held at the new Cass Technical High School, Detroit, Aug. 28 to Sept. 1, inclusive, a safety exhibit will be open from 9 a. m. to 6.30 p. m. each day of the meeting, closing at 6 p. m., Sept. 1. Mention of the principal papers before the metals section was made in THE IRON AGE, July 6, page 27. The paper on "The Safe Handling of Gas at the Blast Furnace" will be read by G. M. Hohl, superintendent of blast furnaces, Bethlehem Steel Co., Bethlehem, Pa. The paper on "Safety in Crane Repairing" will be read by E. E. Remington, assistant superintendent of maintenance, Ford Motor Co., Detroit.

At the joint meeting of the automotive, drop forge and metals sections, at 9.30 a. m., Sept. 1, three papers will be read, followed by informal discussion, led by R. A. Shaw, on how co-operation between sections can help reduce accidents. The papers are "Safety in Handling Material," by C. E. Ralston, Equitable Life Assurance Society, New York; "How the Plant Surgeon Can Help in Accident Prevention," by Dr. L. A. Shoudy, Bethlehem Steel Co., Bethlehem, Pa.; "Safe Practices in Acetylene and Oxygen Welding," by H. S. Smith, Prest-o-lite Co., New York.

Employees of the Bay State Metal Wheel Co., East Templeton, Mass., have had a 15 per cent cut in wages.

MARKET QUIET

Few Lists Issued—Prospective Business in La Fayette Motors New Plant

Shopmen's Strike Holding Up Pending Railroad Business—First Half of Month the Best

The market during the week was quiet. Among the few lists issued was that of the Wright Aeronautical Corporation, Newark, which is getting prices on 20 or 30 tools; though the inquiry has been circulated among dealers in used machines, there is the probability that good used tools will have the preference. Four special lathes for piston-ring work wanted by Eldege Chansse, New Bedford, Mass., stands out among the week's news items. The New York Central continues to send out inquiries but is not expected to buy until the strike is ended. In the Pittsburgh district a few lists were issued, chiefly for manual-training school equipment.

In prospective business the outstanding item of the week is equipment that will undoubtedly be required by the La Fayette Motors Corporation, Indianapolis, for its new plant being erected at Milwaukee. Plans call for a works three times the size of the company's Indianapolis shops.

The effect of the coal and shopmen's strikes is still felt, but the settlement of these disputes, it is believed, will show a marked increase in machine tool sales. This expectation is based largely on the volume of business pending which has been deferred on account of the strike. It is also felt that if the railroad operators agree to the proposal of the Railroad Labor Board to do outside contracting on repair work, several Eastern railroads, at least, will then doubtless begin immediate rehabilitation of their own repair shops.

In Milwaukee the automotive industries are by far the best source of new business, and in Chicago, Cincinnati and other centers, some buying by automobile builders is noted. Buying by industrial companies showed a falling off. Bookings for export to countries not in the market for several months was a bright spot of the week in Cincinnati. Special machinery manufacturers in Cincinnati are working full time, and in New England many shops are busier than in months, due to taking on railroad shop work.

In all centers July started out promisingly, the business being done indicating that it would be the best of many months. In the latter half, however, sales fell off, and for the most part the month will not exceed, if equal, June. In Pittsburgh and Milwaukee and in some classes of machinery sold by New England companies, activity in July is reported as greater than June.

New York

NEW YORK, Aug. 1

THE machine-tool trade is looking forward to an early ending of the coal and railroad strikes in the confident belief that business will soon thereafter show a marked increase. This expectation is based on the volume of business pending, on which action has been deferred until labor troubles, with their possible disastrous consequences, are out of the way. July started out very promisingly, the business done in the first half indicating that it would be the best month since buying started on the upgrade. The latter half of the month, however, has been so beset with uncertainties that buyers have held off, and sales for the month will not exceed, if they equal, those of June.

Railroad buying should pick up soon after the strikes are settled, particularly if the carriers agree to the proposal of the Railroad Labor Board that they agree not to do outside contracting on repair work as one means of effecting a settlement. Several Eastern roads, which are alleged to have violated the Railroad Labor Board's decisions on outside contracting, will then doubtless begin the rehabilitation of their own repair shops. The New York Central continues to send out inquiries, but will do no buying until the strike is ended.

In the industrial field, the principal buying of the week was by the General Electric Co., Schenectady, N. Y., which placed orders for seven lathes and six shapers. The Wright Aeronautical Corporation, Newark, has a list of 20 or 30 tools on which it is getting prices, the inquiry first having been circulated among dealers in used machines, with the probability that good used tools will have the preference.

About 20 tools have been bought by the Navy Department, Washington, for the Naval Air Station at San Diego, Cal.

Activity in both locomotive and overhead cranes is well sustained. There have been a few closings this week and a number of current inquiries are quite active. Among the companies now in the market for cranes are the Phoenix Utility Co., 71 Broadway, New York, which is asking prices on a 60-ton, 1-motor crane, 24-ft. span; the United States Cast Iron Pipe & Foundry Co., Burlington, N. J., inquiring for a 10-ton, 2-motor, ladle crane. The U. G. I. Contracting Co., Philadelphia, will probably issue an inquiry shortly for an overhead traveling crane. Among recent purchases are:

J. G. White Engineering Corporation, 43 Exchange Place, New York, a 60-ton, overhead traveling crane from the Niles-Bement-Pond Co.

Egleston Brothers & Co., 166 South Street, New York, a 3-ton, 1 motor overhead traveling crane from Niles-Bement-Pond Co.

Michigan Copper & Brass Co., Detroit, Mich., a 5-ton, 3-motor overhead traveling crane from Niles-Bement-Pond Co.

Viele-Blackwell & Buck, 49 Wall Street, New York, a 35-ton overhead traveling crane for use in Canada from Niles-Bement-Pond Co.

Phoenix Iron Co., Phoenixville, Pa., twelve 5-ton, 35-ft. 6-in. span electric traveling cranes from the Roeper Crane & Hoist Works.

Kleckhefer Container Co., Camden, N. J., a 5-ton,

42-ft. span, hand power crane from the Roeper Crane & Hoist Works.

Technical High School, Omaha, Neb., a 3-ton, 46-ft. span, hand power crane from the Roeper Crane & Hoist Works.

American Woolen Co., Boston, Mass., a 10,000-lb. grab-bucket hoist for coal handling at Baltic Mills, Enfield, N. H. from the Shepart Electric Crane & Hoist Co.

Newport News Shipbuilding & Dry Dock Co., Newport News, Va., twenty-one 2-ton floor operated, electric hoists, one 5-ton riveter hoist and one 5-ton, single I-beam trolley from the Shepard Electric Crane & Hoist Co.

Hampton Co., Kenilworth, Ky., two 20-ton used Brownhoist locomotive cranes with 1-cu. yd. buckets from Philip T. King, 30 Church Street, New York.

Whitehead & Kales, Detroit, Mich., a 40-ton, 70-ft. boom, used industrial locomotive crane from Philip T. King, 30 Church Street, New York.

Italian Art Granite Co., Tilden Avenue, Brooklyn, N. Y., a 5-ton, 50-ft. radius, hand power, jib crane from W. J. Shoebridge, 96 Schermerhorn Street, Brooklyn, N. Y.

American Foundry Equipment Co., York, Pa., two 1-ton hand power jib cranes from H. D. Conkey & Co., 149 Broadway, New York.

The New York Edison Co., 130 East Fifteenth Street, New York, will commence the immediate erection of a new one-story power house at Thirty-second Street and Madison Avenue, estimated to cost about $200,000, with equipment. William Whitehill, Buckley Newhall Building, Sixth Avenue and Forty-first Street, is architect.

The Transit Commission, 49 Lafayette Street, New York, is arranging for the purchase of about 60 acres on the Shell Road, Brooklyn, as a site for new repair and construction shops for the New York Municipal Railway.

The Burnham Boiler Corporation, Irvington-on-Hudson, N. Y., is arranging a list of equipment for installation in a foundry and machine shop at Lancaster, Pa.

The Havana Electric Railway, Light & Power Co., 55 Liberty Street, New York, a New Jersey corporation operating at Havana, Cuba, is disposing of a bond issue of $3,600,000, a portion of the proceeds to be used for power plant extensions and improvements. Frank Steinhart is president.

The Thirty-Sixth Street Garage Corporation, 256 West Thirty-sixth Street, New York, has awarded contract to Nisnewitz & Goldstein, 277 Broadway, for a three-story automobile service and repair building at 103-7 West 108th Street, 75 x 100 ft., estimated to cost $80,000. Bloch & Hesse, 18 East Forty-first Street, are architects.

The Metropolitan Material Co., 1335 Flushing Avenue, Brooklyn, is planning for the installation of several new boilers, each about 100 hp., and auxiliary equipment at its power house.

Robert J. Moorehead, 311 East 200th Street, New York, will take bids at once for a new automobile service and repair building at Sheridan Avenue and 162nd Street, estimated to cost about $75,000. Charles Kreymborg, 2534 Marion Avenue, is architect.

The Superintendent of Lighthouses, Staten Island, N. Y., will receive bids until Aug. 16, for approximately 315 tons of various size stud link and open link mooring chain, ¾-in. to 2 in. in diameter.

The Department of Public Works, Albany, N. Y., will soon commence the construction of new repair shops at Waterford, Pittsford and Baldwinsville, N. Y., estimated to cost about $100,000, including equipment. C. L. Cadle is superintendent of public works.

The Mexican Petroleum Co., Ltd., 120 Broadway, New York, will commence the immediate construction of a new oil refinery at Tampico, Mex., estimated to cost close to $2,000,000, including machinery.

Charles P. Barnes, Central Avenue, Albany, N. Y., has awarded contract to the William G. Sheehan Construction Co., 28 DeWitt Street, for a three-story automobile service and repair building, with machine shop, 66 x 165 ft., estimated to cost approximately $80,000.

Halliwell & Co., New York, manufacturers of electrical equipment, have leased a floor in the building at Fourth Avenue and Twelfth Street, totaling about 13,000 sq. ft., for a local plant.

A vocational department will be installed in the new high school to be erected at Riverhead, N. Y., on which work will commence at once. It will cost about $250,000.

Albert Kahn, 1000 Marquette Building, Detroit, architect, will take bids at once for part of the mechanical equipment to be installed in the new plant of the Ford Motor Co. at Green Island, N. Y., for which certain building contracts recently were let.

In connection with its new hydroelectric power plant at Crescent Dam, N. Y., for which preliminary work is in progress, the State Department of Public Works, Albany, will operate a drydock and general ship repair shop at Watervliet, N. Y., for the barge canal boats. Tentative plans are also under consideration for a second hydroelectric generating plant at Visscher Ferry, with initial capacity of about 5600 kw.

The Adirondack Power & Light Corporation, Amsterdam, N. Y., is arranging for an increase in capital from $23,100,000 to $25,000,000, a portion of the proceeds to be used for plant additions and improvements.

The Dubilier Condenser & Radio Corporation, 217 Centre Street, New York, manufacturer of wireless equipment, condensers, etc., has arranged for the immediate removal of its plant to 48 West Fourth Street, where space recently was leased approximately double the present floor area. Additional equipment will be installed for increase in capacity. William Dubilier is president.

The Harlem Valley Electric Co., New York, has been organized with a capital of $100,000, to construct and operate an electric plant and system in portions of Dutchess and Putnam counties. The company is headed by J. G. Deane and W. Cook, Jr., care of Deane & Cook, 15 Park Row, New York.

Fire, July 21, destroyed a portion of the plant of the Charles Leffler Co., 49-61 Clymer Place, Brooklyn, manufacturer of presses, tools, dies, etc. An official estimate of loss has not been announced.

Fire, July 24, destroyed a portion of the ice-manufacturing plant and power house of the Littlefield Ice & Coal Co., Line Street and the Philadelphia & Reading Railroad, Hammonton, N. J., with loss estimated at close to $27,000. It is planned to rebuild.

The Borough Council, Sayreville, N. J., will receive bids until Aug. 16 for a 100,000-gal. steel tank on a 60-ft. steel tower, as per plans and specifications by Waldo S. Coulter, 114 Liberty Street, New York, consulting engineer. Frank P. Kolb is borough clerk.

A vocational department will be installed in the high school to be erected at Lyndhurst, N. J., now under consideration by the Board of Education. It is estimated to cost about $125,000.

The Essex Foundry Co., Murray Street, Newark, N. J., manufacturer of cast iron pipe, etc., will build a one-story addition, 84 x 110 ft.

The Ward-Bennet Automobile Repair Co., Newark, has leased property at 235 Halsey Street, for the establishment of an automobile service and repair shop. Charles E. Ward and F. H. Bennet head the company.

Fire, July 24, caused by lightning, destroyed a portion of the power house at the plant of the Balbach Smelting & Refining Co., 580 Market Street, with loss reported at close to $18,000. It will be rebuilt. Emil E. Dieffenbach is general superintendent.

A machine repair shop, 31 x 57 ft., to cost about $22,000, will be constructed by the Brunswick Laundry, Jersey City, N. J., at its plant at 222 Tonnelle Avenue. George A. Flagg, 665 Newark Avenue, Jersey City, is architect.

The American Metal Moulding Co., 141 New Jersey Railroad Avenue, Newark, has awarded contract to Enstice Brothers, 111 Academy Street, for a two-story addition to its plant on Coit Street, Irvington district, estimated to cost about $25,000. Gustave A. Johnson is president.

Philadelphia

PHILADELPHIA, July 31.

The Horn & Brannen Mfg. Co., 427 North Broad Street, Philadelphia, manufacturer of gas and electric fixtures, is arranging a list of equipment for its new plant at 1814-16 Spring Garden Street, recently acqpired, including drills, presses, automatic cut-off saws and other apparatus.

The Water Bureau, City Hall, Philadelphia, is planning to purchase two motor-driven pumps, capacity of about 4200 gal. per min. each. C. E. Davis is director.

The Willis-Sainte Claire Co., of Pennsylvania, 2033 Market Street, Philadelphia, has plans under way for a sixteeen-story and basement automobile service and repair building at 200 Broad Street, as a branch of the main plant of the company at Marysville, Mich. The William Steele & Sons Co., 1600 Arch Street, is architect and engineer. W. J. Foss is president.

Weston Dodson & Co., Inc., 1610 Spruce Street, Philadelphia, coal operator, has acquired the colliery of the Ship-

man Coal Co., near Shamokin, Pa., and contemplates extensions in the present plant, with hoisting, conveying and other operating machinery.

The Textile Machinery Co., Fourteenth Street, Chester, Pa., is reported to be arranging for the purchase of machine tools and other equipment, replacing that destroyed in a recent fire.

The Consumers Gas Co., Reading, Pa., a subsidiary of the United Gas Improvement Co., Broad and Arch streets, Philadelphia, has acquired local property as a site for a large soft coal gas manufacturing plant, with power house, machine shop and other operating departments, estimated to cost about $1,000,000, with equipment.

The Roberts & Mander Stove Co., Eleventh and Washington streets, Philadelphia, has awarded contract to the Austin Co., Bulletin Building, for a new two-story plant at Hatboro, Pa., 125 x 185 ft., estimated to cost about $50,000.

The Philadelphia Partition & Building Block Corporation, Medical Arts Building, Philadelphia, William Chapman, president, has completed plans for a new two-story factory, 100 x 200 ft., at Ritner and Twenty-eighth streets.

The National Biscuit Co., Tenth Avenue and Fifteenth Street, New York, has awarded contract to the Turner Construction Co., 1716 Sansom Street, Philadelphia, for a one-story automobile service and repair building, 130 x 184 ft., at Twelfth and Glenwood streets, Philadelphia, for company trucks and cars, estimated to cost about $55,000.

A power plant will be erected in connection with the twenty-story office building at Fifteenth and Chestnut streets, Philadelphia, estimated to cost about $4,000,000, for which plans have been completed by the Hoffman Henon Co., Finance Building, architects, for Albert H. Greenfield, owner.

The Freeman Electric Co., 803 East State Street, Trenton, N. J., will take bids at once for an addition to a one and three-story building at Mead and Prince streets, recently acquired, to be equipped as an assembling plant.

Nicholas W. Akimoff, Harrison Building, Philadelphia, mechanical engineer, has plans under way for a one and two-story factory, 100 x 500 ft., at Fifth and Water streets, Gloucester City, N. J., for the manufacture of Diesel engines and parts. A company headed by A. W. Grant and J. J. Y. McNally is being organized to operate the plant.

The West End Garage, West Hanover Street, Trenton, N. J., will build a two-story, brick and steel addition to its service and repair works. Harry C. Wood heads the company.

The Skillman Hardware Mfg. Co., West End Avenue, Trenton, N. J., will install two new presses and other equipment in its one-story addition, 32 x 60 ft., now in course of construction.

A vocational department will be installed in the new junior high school to be erected by the Board of Education, Camden, N. J., estimated to cost about $562,000. A site is benig selected in the vicinity of Park Boulevard and Euclid Avenue.

The Cadillac Automobile Co., 525 Market Street, Camden, N. J., is completing plans for a four-story service and repair building, 48 x 126 ft., estimated to cost about $100,000. Lackey & Hettel, 509 Federal Street, are architects.

The Lock Haven Electric Light & Power Co., Lock Haven, Pa., is planning for the erection of a new power house at Castanea, Pa. Bonds for $200,000 have been issued.

The Pennsylvania Wireless Mfg. Co., Inc., New Castle, Pa., is planning for the installation of machinery for the manufacture of radio equipment and parts, in a factory on Florence Avenue.

Harry K. Smith and John Minnich, Wrightsville, Pa., have construction under way on a factory to manufacture thermometers and other instruments. The equipment of the American Thermometer Co., Columbia, Pa., has been purchased and will be removed to the Wrightsville works. Other machinery will be installed and a company will be organized to operate the plant.

The Excelsior Coal Co., West Excelsior, near Sunbury, Pa., is considering rebuilding its coal washery destroyed by fire July 14.

The Board of Control, Scranton, Pa., will equip a new power plant for its institutions at Adams Avenue and Gibson Street, estimated to cost about $61,000. J. H. Williams, Administration Building, 425 Washington Avenue, is president.

The Merchants' Shipbuilding Corporation, Chester, Pa., is arranging to devote a portion of its plant to railroad car and locomotive repair work, and has negotiations under way for contracts of this character. R. H. M. Robinson is president.

The Glen Alden Coal Co., 306 Jefferson Avenue, Scranton, Pa., will build a one-story machine repair shop at its Woodward Colliery, near Wilkes-Barre, Pa.

Chicago

CHICAGO, July 31.

WHILE July started with every promise of running ahead of June in machinery sales, with most of the trade it will fall somewhat behind, both in sales and values. The first half of the month was easily the best that the local trade has had since the revival in business, but the strike of the railroad car shopmen became quite effective in cutting off railroad buying the last two weeks. The Atchison, Topeka & Sante Fe Railroad had awarded by July 15 about half of the tools on a list issued several weeks ago and has not since made any additional purchases. Lists of the Union Pacific, Illinois Central and the Chicago, Burlington & Quincy have been dormant the past few weeks and are expected to remain so as long as the strike of the shopmen continues. Demands from other sources also have dwindled the past week or two, although some buying by automobile builders still is observed, and one company making an extension to its plant has put out an inquiry for a few tools. It is believed that the Studebaker Corporation has about completed the tool purchases for its latest extension. Dealers, while noting some falling off in new inquiries, report that they have lately booked a number of orders.

The Whiting Corporation, Harvey, Ill., has taken a 50-ton, 63-ft. span electric traveling crane for the Fort Dodge Gas & Electric Co., Fort Dodge, Iowa, placed through the United Light & Railways Co., Davenport, Iowa.

The Hyde-Schneider-Haley Mfg. Co., Ninth Street and Harrison Avenue, Rockford, Ill., recently incorporated with a capital of $60,000, will manufacture equipment for oil storage stations, such as pumps for unloading cars, valves and other oil specialties. It has purchased a factory and all of the necessary machinery. The officers are George S. Haley, president; Lester B. Hyde, vice-president, and Eduard A. Schneider, secretary-treasurer.

The National Tile Co., Anderson, Ind., has placed contract for a one-story addition, 85 x 496 ft., and contemplates further extensions to its plant.

The Calumet Tank & Mfg. Co., Hammond, Ind., will soon start work on a one-story foundry, 60 x 130 ft., to cost $75,000.

The Durand Steel Locker Co., 76 West Monroe Street, Chicago, has awarded contract to the Arnold Co., 105 South LaSalle Street, for a one-story addition to its plant at Chicago Heights, totaling about 25,000 sq. ft., estimated to cost $90,000.

The Southern Colorado Power Co., Pueblo, Col., has arranged for a bond issue of $6,000,000, a portion of the proceeds to be used for plant extensions and improvements.

The Northern States Power Co., 208 South LaSalle Street, Chicago, has made application for permission to construct and operate a hydroelectric power plant on the St. Croix River in the vicinity of Kettle Falls.

The United States Reclamation Service, Denver, Col., will receive bids until Sept. 6, for electrical machinery, including motors, transformers, switching apparatus, etc., for the valley drainage pumping plant, Yuma project, Ariz.; also until Aug. 21, for cast iron conduit linings for the Hubbart Dam, Flathead project, Mont. A. P. Davis, Washington, is director.

A vocational department will be installed in the two-story and basement high school, 100 x 120 ft., to be erected at Elkhart, Ill., estimated to cost about $90,000. F. J. Klein, 331 Main Street, Peoria, Ill., is architect.

The Bastian Blessing Co., 125 West Austin Avenue, Chicago, manufacturer of welding apparatus, has acquired the manufacturing end of the business of the St. Paul Welding & Mfg. Co., St. Paul, Minn., and will add a line of soldering equipment, trucks, etc., to its regular manufacture. The St. Paul company will act as a service branch in its locality.

The Brooks Mining Co., Louisville, Col., is planning to rebuild the tipple at its local mines, destroyed by fire July 22.

The Service Rubber Co., 401 Central Trust Building, Rock Island, Ill., has awarded contract to the Brissman Construction Co., 407 Moline Trust Savings Bank Building, Moline, Ill., for its three-story plant on Second Street, 60 x 300 ft., estimated to cost about $100,000, including machinery. J. T. Crowley heads the company.

The Fort Dodge Gas & Electric Co., Fort Dodge, Iowa, will commence construction late in August for a new electric generating plant with initial capacity of about 5000 kw.,

[illegible] R. J. Denman [illegible] Mark Anderson [illegible] general manager.

The City Council, Shelbyville, Ill., is arranging a special election to vote bonds for $100,000 for the construction of a municipal electric power plant. Fuller & Beard, Chemical Building, St. Louis, are engineers.

The Davenport Ice Co., 114 Myrtle Street, Davenport, Iowa, has preliminary plans for a new ice-manufacturing plant. The George B. Bright Co., 103 Marquette Building, Detroit, is engineer. George Albrecht is president.

The W. H. Maze Co., Peru, Ill., manufacturer of nails, etc., has awarded contract to the Austin Co., 208 South LaSalle Street, Chicago, for a one-story addition, 75 x 140 ft., estimated to cost about $65,000.

Fire, July 21, destroyed a portion of the plant of the Mulholland Brothers Silverplate Co., Aurora, Ill., with loss approximating $200,000.

Buffalo

BUFFALO, July 31.

The Lockport Foundries Corporation, Lockport, N. Y., has plans under way for additions. It has acquired control of the Jefferson Union Co., Lexington, Mass., manufacturer of pipe unions, etc., and plans to increase the local works to accommodate this branch of manufacture. Robert E. Bryant is treasurer and general manager.

The Swan Garage, Inc., Ellicott Square, Buffalo, is completing plans for a new three-story automobile service and repair works, 90 x 115 ft. Kidd & Kidd, 232 Delaware Avenue, are architects. C. J. Irwin is president.

The Angert Auto Parts Co., 601 Bailey Avenue, Buffalo, is planning for the installation of machinery to manufacture automobile motors, parts, etc. S. Angert is president.

A vocation department will be installed in the new high school to be erected at Bath, N. Y., estimated to cost about $220,000. Palmer, Rogers & Smith, 101 Park Avenue, New York, are architects.

Fire, July 22, destroyed a portion of the works of the Broadalbin Light & Power Co., Broadalbin, N. Y. with loss estimated at $25,000.

The plant and property of the Ericsson Mfg. Co., 1100 Military Road, Buffalo, manufacturer of magnetos, ignition equipment, etc., has been acquired at receiver's sale by Edward L. Jellinek, Prudential Building, for $250,000. The purchaser represented certain stockholders of the company. It is said that reorganization plans will be perfected in the near future and the plant placed in service.

The Ramp Garage, Inc., Buffalo, recently organized with a capital of $1,500,000, has plans nearing completion for a new six-story automobile service and repair building at South Elmwood Avenue and West Mohawk Street, estimated to cost about $500,000. The company is headed by Robert Allen, Charles A. Klocke and Harry N. Kraft.

The Twin Filter Co., Buffalo, is planning for the installation of equipment to manufacture water filters. G. W. Barker, 78 Tioga Street, one of the heads of the company, is in charge.

The Elmira Water, Light & Railway Co., Elmira, N. Y., will make extensions and improvements in its plant and system to cost about $350,000. Bids will soon be asked on machinery, cooling equipment and other operating apparatus. F. H. Hill is general manager.

Power plant extensions will be made by the Jamestown Worsted Mills, Inc., Jamestown, N. Y., in connection with other mill improvements, to include new pumping machinery, condensers, ash-handling equipment, etc. The entire work will cost in excess of $100,000. Lockwood, Greene & Co., Hanna Building, Cleveland, are architects and engineers.

The Board of Education, Dunkirk, N. Y., will receive bids until Aug. 14 for machinery, tools and other equipment for the local vocational schools.

The State School for Metal Defectives, Rome, N. Y., is taking bids until Aug. 7 for engines, motor-generators and auxiliary equipment for the power and lighting plant. C. J. Severance is president.

A vocational department will be installed in the new three-story high school to be erected at Sinclairville, N. Y., 55 x 103 ft., estimated to cost about $75,000, exclusive of equipment. Beck & Tinkham, 317 Washington Street, Jamestown, N. Y., are architects.

The Jamestown Malleable Products Co., Tiffany Avenue, Jamestown, N. Y., is planning for the installation of equipment, including annealing ovens, etc. H. E. Kies is general manager.

The Morse Chain Co., Ithaca, N. Y., plans to erect new works in Detroit. It recently completed its power plant in Ithaca, changing from direct to alternating current, also adding 1000 hp. in Babcock & Wilcox boilers and 2300 kva. to the electric equipment.

New England

BOSTON, July 31.

THE July New England machine-tool market closed quietly. No new business of importance developed the last week, while sales were confined to a very few new and used tools, which in the aggregate represented a small investment. Large industries contemplating purchases of machinery have deferred action until the railroad and coal labor atmosphere is clearer. Sales included a new 15-in. Hendey shaper to the Rhode Island Braiding Machine Co., Providence; new bench drill equipment to George Knight & Co., Brockton, Mass.; a 14-in. x 6-ft. lathe, 16-in. shaper and a No. 2 universal milling machine, used tools, to a South Boston manufacturer, and other individual used tools of small value. Bids are in for Boston's school list, but no award has been made. The largest new inquiry is for four special lathes wanted by Eldege Chansse, North Front Street, New Bedford, for piston ring work.

Local representatives of makers of heavy machinery state that July was the best month this year, but reports by dealers handling used and new equipment and second-hand machine tool houses are quite contrary. Several machine tool builders in New England are busier than in months, due to taking on railroad shop work, it being necessary in some instances to hire extra machinists. Such activity, together with indications of the textile industry slowly overcoming labor troubles, is the basis for a better feeling among makers and sellers of metal-working equipment. While advances in prices are lacking, machinery values are firmer as few sellers are willing to give extra discounts to secure business.

The Boston Supply Department, City Hall Annex, has taken bids on a fairly large turbine driven feed pump for the city hospital.

Bids have closed on a one-story, 60 x 140 ft. sales and service station to be erected on Highland Avenue, Somerville, Mass., by H. A. Steeves, Carleton Road, Belmont, Mass.

Plans are being prepared for a three-story building to house the mechanical department of the Woonsocket *Daily Call*, Woonsocket, R. I.

Articles of association have been filed by the Mastercrafts' Corporation, Brattleboro, Vt. It owns patents on an electrical windshield cleaner, and has awarded a contract for 100,000 with an Elbridge, N. Y., concern. Present plans are to eventually manufacture the device at Brattleboro. W. E. Stellman, Stellman Machine Shop, that city, is interested in the company.

The Hollander Brothers Co., 360 George Street, Bridgeport, Conn., manufacturer of sheet metal goods, has purchased a factory on Barnum Avenue, formerly occupied by the Columbia Graphophone Mfg. Co. The building contains 30,000 sq. ft. of floor space, and the property extends along the east end freight yards of the New York & New Haven Railroad. Henry Hollander, president of the company, states that about $10,000 would be expended in remodeling the structure.

The McCathron Boiler Works, 72 Knowlton Street, Bridgeport, Conn., is in the market for an air compressor.

The New York, New Haven & Hartford Railroad Co. will lease the war-time plants of the Groton Iron Works, Groton, Conn., and employ about 700 men. An official of the company stated that "inability to get certain grades of work done at the New Haven repair shops caused the move."

The Specialty Bolt & Rivet Works, 132 Hillside Avenue, Shelton, Conn., is planning for the installation of new machine tools, including surface grinder, threading machine, etc.

Fire, July 24, destroyed a portion of the shops, engine house and other property of the Rutland Railroad Co., Rutland, Vt., at Alburg, Vt., with loss reported in excess of $175,000.

The Winsted Gas Co., Winsted, Conn., will build a new hydroelectric power plant at Robertsville Falls, to replace a present power house. Two new water-wheels, generators and auxiliary electrical machinery will be installed.

The Hayes-Meserole Mfg. Co., Milford, Conn., recently

organized with a capital of $100,000 to manufacture wire products, has leased a portion of the plant of the United States Rubber Co.

J. L. Anthony & Co., Providence, R. I., manufacturers of jewelers' findings, etc., have removed to their new plant at 115 Baker Street, where additional equipment will be provided for increased output.

The Central Maine Power Co., Augusta, Me., will issue preferred stock for $289,855, the proceeds to be used for extensions and improvements in power plants and system.

A vocational department will be installed in the new three-story high school to be erected at Sawyer Road and Colon Street, Beverly, Mass., estimated to cost about $750,000. Adden & Parker, 177 State Street, Boston, are architects.

The New England Collapsible Tube Co., New London, Conn., has leased a three-story building, 50 x 100 ft., at 3132-34 South Canal Street, Chicago, for a Western branch works.

The Fairfield Battery Co., East Norwalk, Conn., has tentative plans for rebuilding its plant on Kaiser Place, partially destroyed by fire July 21, with loss estimated at about $40,000, including equipment. The company is also known as the Hi-Po Battery Co.

Lynnfield Damon, Jr., Hull, Mass., care of Bradford Weston, Allerton, Mass., contractor, will commence the immediate erection of a new one-story automobile service and repair shop, 95 x 110 ft., on Atlantic Avenue, Nantasket, Mass.

The United Electric Railways Co., Providence, R. I., has had plans prepared for a one and two-story automobile service and repair plant, 88 x 250 ft., at Melrose and Russell streets, for company motor trucks and buses.

A vocational department will be installed in the three-story high school, 80 x 153 ft., with extension, 60 x 65 ft., to be erected at Belfast, Me., for which bids on a general contract are being received. Kilham, Hopkins & Greeley, 9 Park Street, Boston, are architects.

Cincinnati

CINCINNATI, July 31.

THE rail and coal strikes have somewhat affected the machine tool industry. It was expected that railroads with lists out would place large orders during July, but buying from this source has been confined to tools absolutely needed. How much some roads are in need of equipment was illustrated the past week when instructions were received by a number of local manufacturers to ship tools on order as soon as completed. Buying from industrial concerns showed a falling off, but a number of orders from the automotive industries were taken by local builders.

Perhaps the brightest spot in the trade is the receipt of several export orders. This business does not amount to a large volume, but is interesting from the fact that the orders are the first to be booked from several countries for many months. Sweden, Japan, Argentina, Brazil and the Philippine Islands were among the countries which bought tools the past week. Canada continues to take a fair number, both for domestic needs and for export, particularly to South American countries.

Special machinery manufacturers are working practically full time, and some have been forced to turn down orders for their regular lines on account of not being able to make deliveries wanted. Dealers report a fair demand for used tools, with better prices being secured.

The Erie Railroad is planning to consolidate the shop, roundhouse and terminal facilities of the Kent, Marion and Cincinnati divisions of the road at Marion, Ohio, and will spend approximately $750,000 for new buildings, according to an announcement by railroad officials at Marion this week.

The Ideal Concrete Machinery Co., Cincinnati, has awarded contract for a new factory on Spring Grove Avenue to the W. F. McConnell Construction Co., work to commence immediately. It manufactures tumbling barrels and concrete mixing machinery.

The Cynthiana Carriage Co., Cynthiana, Ky., will move its head office and main plant to Covington, Ky., in the near future. A definite location has not been secured, but it is likely that the company will erect a new plant. J. W. Leek, Cynthiana, is president and treasurer.

Pittsburgh

PITTSBURGH, July 31.

ALTHOUGH only a few machine tool lists are coming out in this district, and these chiefly for manual training schools, sales and inquiries are satisfactory. Several local dealers state that their sales for July will exceed those for June which in turn showed improvement over May. This record has been built up chiefly on sales of individual tools. Some dealers who have been going among possible buyers instead of waiting for the buyers to come to them, are figuring on more prospective business than in many months. There has been a considerable change of opinion with regard to stocks of new and used machinery in the past few months. Earlier in the year it was thought that manufacturers' stocks were so large and so many good used tools were available that the machine-tool trade could not well hope for normally good times until 1923. But this view does not, in the light of the betterment in business over the past few months, find much support now.

Pittsburgh seems less affected by the coal mine and railroad labor troubles than some other parts of the country, as two of the principal rail arteries of the city claim to be operating 100 per cent and thus far have not found it necessary to put into effect the coal priority system. They are delivering and not confiscating coal, which is helpful to plant operations here. At the same time, not many machine-tool orders are being placed by the railroads.

New crane inquiries have not been especially numerous the past week, but local offices have many prospective orders, among them seven 3-ton floor control cranes and two 10-ton cab control cranes for an Ohio machine tool manufacturer. It is expected that a Pittsburgh district sheet maker this week will close for a couple of cranes, one of 50 tons capacity and the other 15 tons. A steel maker in this district recently broke ground for an addition and is expected to buy some mill type cranes. The Graham Bolt & Nut Co., Pittsburgh, recently closed for a 10-ton crane with the Pawling & Harnischfeger Co.

The Du Roth Steel Truck & Car Wheel Co., 611 Keystone Building, Pittsburgh, has plans nearing completion for new works at Osgood, Pa., estimated to cost in excess of $800,000, including equipment. C. Edward Long, 1202 Peoples' Bank Building, is engineer.

The Clarion River Power Co., Foxburg, Pa., C. B. Hawley, 450 Munsey Trust Building, Washington, in charge, has made application for permission to construct and operate three hydroelectric power plants on the Clarion River. One will be located in the vicinity of Beaver; another near Mill Creek; and the third near Foxburg. The company is operated by the Penn Public Service Co., Johnstown, Pa., F. T. Hepburn, president.

The Duquesne Light Co., 435 Sixth Street, Pittsburgh, is organizing the Bellevue Light Co., as a subsidiary, to take over and operate the property of the Southern Heat, Light & Power Co., North Boroughs section. Extensions and improvements are planned.

The Board of Education, Farrell, Pa., is arranging a list of machine tools, bench tools and wood-working machinery for the vocational department of the new school.

The Warren Steel Car Co., Starbrick, Pa., will commence the immediate erection of a new one-story plant, 90 x 260 ft., to replace the portion of its works recently destroyed by fire. It will cost about $75,000. W. W. Muir is president.

Fire, July 20, destroyed the box factory, wood-working shop and other mechanical departments at the plant of the American Window Glass Co., Arnold, Pa., with loss estimated at about $180,000, including machinery. It is planned to rebuild.

The Atlantic Refining Co., Fifty-sixth and Butler streets, Pittsburgh, is planning for an addition to its local oil refinery. Headquarters of the company are at 3144 Passyunk Avenue, Philadelphia.

The Kennedy Township Light Co. and the Neville Township Light Co., are being organized under State laws by C. P. Morrison, E. P. Griffiths and J. R. McNary, 435 Sixth Ave-

nue, Pittsburgh, to install and operate electric light and power plants and systems in Kennedy and Neville townships.

The West Penn Power Co., West Penn Building, Pittsburgh, is planning to rebuild the portion of its power house at Vandergrift, Pa., destroyed by fire July 23 with loss estimated at about $25,000.

The Coal Valley Machine & Electric Co., Montgomery, W. Va., has awarded contract to C. H. Williamson & Co., Montgomery, for a new plant, 50 x 100 ft., to manufacture mine cars and other iron and steel products. The company has a 2-acre site and will erect other buildings later. E. R. Howery is secretary.

The J. G. Dickson Co., Pittsburgh, manufacturer of metal products, has removed its plant from 241 South Main Street to 317 South Main Street, where larger space will be provided for increase in output.

The Hornor Brothers Co., Clarksburg, W. Va., is planning the erection of a new ice-manufacturing plant at Shinnston, W. Va., estimated to cost close to $35,000.

A vocational department will be installed in the two-story and basement high school, 103 x 128 ft., to be erected at Wayne, W. Va., estimated to cost about $180,000, on which work will commence at once. Holmboe & Fogue, Empire Bank Building, Clarksburg, W. Va., are architects.

The F. A. Jones Stone Co., 616 Forest Avenue, Zanesville, Ohio, is planning the equipment of a stone quarry plant at Martinsburg, W. Va. It has a tract of about 40 acres.

Cleveland

CLEVELAND, July 31.

WHILE reports vary as to the volume of machinery business, several local dealers are getting a fair number of orders and some are working on many small lot inquiries and, in fact, have more live prospects than for several weeks. On the whole the market appears to be fully as active as at any time in the past few weeks and July sales evidently will be equal to those of June. Railroad inquiries and orders have entirely disappeared as a result of the shopmen's strike. The inquiries coming out are from well scattered sources, but largely from the automobile and parts manufacturers and some industries more or less closely allied to the automobile trade. Detroit automobile manufacturers continue to place small lots orders that in the aggregate amount to considerable business. The demand at present is largely for new machinery.

The Apex Electrical Mfg. Co., manufacturer of washing machines and other electrical household appliances has acquired the plant of the Cleveland Smelting & Refining Co., on Bessemer Avenue, and will install a foundry in a section of the plant and use other portions for the manufacture of motors.

The Brass & Aluminum Products Co., 5119 Euclid Avenue, Cleveland, has acquired a one story brick building, 66 x 180 ft., at 7708 Quincy Avenue and will move to this location shortly. It manufactures automobile hardware and oil and grease cups. Some new equipment will probably be installed.

The Kranz Mfg. Co., Brooklyn, N. Y., a subsidiary of the Westinghouse Electric & Mfg. Co., and manufacturer of safety switches, will move its plant to Mansfield, Ohio, and locate in the building of the Westinghouse Electric Products Co.

The Weldless Tube Co., Wooster, Ohio, has placed orders for equipment for its new plant, now under construction. It will consist of a main building, 110 x 500 ft. and an annealing and pickling department, 50 x 110 ft. A piercing mill, other mill equipment and draw benches will be furnished by the Woodard Machine Co., Wooster, and some other equpiment by the A. Garrison Foundry Co. The General Electric Co. will supply the electrical equipment and the Alliance Machine Co. four electric traveling cranes. It is expected to have the plant completed about Oct. 1. The company has recently increased its capital stock to $1,000,000.

The K-W Brick Co., Warren, Ohio, has been incorporated with a capital stock of $150,000 and will build a plant to manufacture slag brick from slag supplied by the Trumbull-Cliffs blast furnace. J. Whittaker is president, and Robert W. Swift, secretary and general manager.

The Ohio Pumping Machinery Co., Akron, Ohio, which will move its business from Fitchburg, Mass., to Akron, plans the erection of a foundry and machine shop.

The Pederson Machine Co., Mansfield, Ohio, has been organized to manufacture umbrellas and will establish a plant in a building formerly occupied by the Ideal Electric & Mfg. Co.

The F. A. Colman Co., Cleveland, has recently taken orders for four core ovens for the Owosso, Mich., plant of the American Malleable Co., four core ovens for the Flint Foundry Co., and several ovens for the Apex Electric Mfg. Co., Cleveland.

Catalogs Wanted

The Broden & Dailey Construction Co., engineer and builder, room 411 Union Building, 1836 Euclid Avenue, Cleveland, has recently opened an office and desires manufacturers' catalogs.

Baltimore

BALTIMORE, July 31.

Unger & Mahon, Inc., Pratt and Gay streets, Baltimore, engineer, operating a marine railroad and other shipyard properties, has plans under way for a new one-story ship repair plant in the Sparrows Point district, estimated to cost about $50,000. F. W. Unger is president.

The Office of the Purchasing Agent, Post Office Department, Washington, will receive bids until Aug. 9, for one 3 hp. heavy duty floor grinder and two single arbor emery wheels; also until Aug. 11 for two stationary air compressors, motor-driven, for installation at the post offices at Philadelphia and Cleveland.

The Clarksville Farmers' Implement & Supply Co., Clarksville, Va., has tentative plans for a new one-story factory to manufacture farm implements, etc. H. A. Noblin is secretary.

The Acme Mfg. Co., Acme, N. C., is making inquiries for a 250-hp. power generator set, direct-connected to engine, and including auxiliary equipment.

The Virginia-Carolina Chemical Co., Richmond, Va., manufacturer of fertilizer products, is disposing of a bond issue of $12,500,000, a portion of the proceeds to be used for a new plant and extensions and improvements in present works. C. G. Wilson is president.

The Geer Industrial School, Geer, near Charlottesville, Va., will build a new power house.

The Travelers Garage Corporation, Norfolk, Va., has awarded contract to Baker & Brinkley, Dickson Building, for a new one-story service and repair building, 120 x 160 ft., on Cove Street, estimated to cost about $45,000. W. P. Tunstall, Bank of Commerce Building, is architect.

The Bureau of Yards and Docks, Navy Department, Washington, will commence the immediate erection of a new machine shop at the Naval Base, Pearl Harbor, H. T., estimated to cost about $186,000.

A vocational department will be installed in the proposed new high school to be erected at Claymont, Del., for which bonds for $275,000 have just been voted.

The Maurice Chemical Co., 1427 Washington Boulevard, Baltimore, recently organized, will operate a plant to manufacture refractory and high temperature cements for furnace and other service. A list of equipment is being arranged. D. E. Collins is president.

Traveling cranes, freight handling and conveying machinery, etc., will be installed on the proposed new pier to be constructed by the Port Development Commission, Baltimore, at the McComas Street Terminal, and leased to the Western Maryland Railroad Co., Baltimore. It will be 260 ft. wide and 1800 ft. long, and is estimated to cost approximately $3,000,000.

The Franklin Motor Car Co., 1017 North Eutaw Street, Baltimore, has awarded contract to the Consolidated Engineering Co., Calvert Building, for a two-story repair building, 88 x 100 ft., estimated to cost about $35,000, exclusive of equipment.

The Felstone Co., 326 Haywood Building, 46 Haywood Street, Asheville, N. C., has plans under way for the erection of a new factory, 56 x 115 ft., to manufacture concrete products. A list of equipment is being arranged. C. Marshall Gravatt heads the company.

J. E. Doherty, 2405 Granby Street, Norfolk, Va., will equip a machine and repair shop in connection with an automobile service works.

The Fayetteville Ice & Mfg. Co., Fayetteville, N. C., is perfecting plans for rebuilding its ice-manufacturing plant, recently destroyed by fire. It will have a daily capacity of 90 tons, the installation to include electric pumping machinery, electric hoists, conveying machinery, etc., in addition to main equipment. J. F. Harrison is president.

The Lowtenburg-Goodman Co., 127 Granby Street, Nor-

folk, Va., has rejected all bids recently received for a new two-story automobile service and repair building, 130 x 405 ft., and will call for new bids at an early date. Calrow & Wreen, Monroe Building, are architects.

The Fulton & Barnes Co., 1643 West Broad Street, Richmond, Va., is planning to purchase machine tools for installation in its automobile service building.

The Atlantic Ice & Coal Corporation, Athens, Ga., will soon commence the erection of a new ice and cold storage plant on Oconee Street.

Eugene F. Bates, Greenville, S. C., has awarded contract to the Fiske-Carter Construction Co., Greenville, for a new automobile machine and repair shop, 65 x 95 ft. J. E. Sirrine & Co., Greenville, are architects.

A. B. Pounds, Concord, N. C., operating a local ice-manufacturing plant, is planning for enlargements, to include the installation of a 25-ton electrically operated ice machine and auxiliary equipment.

Milwaukee

MILWAUKEE, July 31.

SALES of machine tools in July represent a substantial gain over June, continuing the upward rise which had its beginning in March. Each succeeding month has shown consistent gains. At the same time, production has come forward, although it still is not yet possible to operate at normal capacity. Conflicting news relative to the railroad and coal strikes undoubtedly contributed something to the activity in the past two weeks. The automotive industries are by far the best source of new business. Railroad business is hard to close, due to the uncertainties of the labor situation, but some urgent needs are being filled from time to time.

The LaFayette Motors Corporation, Indianapolis, has completed arrangements to transfer its entire operation, headquarters and general offices to Milwaukee by Nov. 1, according to announcement made by Charles W. Nash, president of this concern and the Nash Motors Co., Kenosha, Wis. Contracts have been awarded for the erection of the first unit of a new LaFayette passenger car works on Clement, south of Oklahoma avenues, Milwaukee, adjoining the four-cylinder car division works of the Nash Motors. The first building will be of brick and steel, 250 x 950 ft., with steel sidewall and monitor sash, and will be erected by the H. K. Ferguson Co., Cleveland. The general contractors are Theodore Stark & Co., 130 Muskego Avenue, Milwaukee. A considerable list of machine tool and other shop equipment will be required, the capacity of the new factory being planned at three times the capacity of the original plant at Indianapolis, which will be abandoned and placed on the market and the equipment moved to Milwaukee. The new construction undertaken by the LaFayette company is entirely distinct and separate from a large new sheet metal and body shop being erected by the Nash Motors Co. as an addition to its Milwaukee four-cylinder car division, reported previously.

The Air Reduction Sales Co., Inc., 342 Madison Avenue, New York, will build a branch plant in Milwaukee for the manufacture of oxy-acetylene welding and cutting apparatus, with a proposed initial investment of $135,000, according to official advices received by the Milwaukee Association of Commerce. The company during the past week acquired five acres on Buffum Street, and expects to begin work about Aug. 15 on the erection of a shop, power house, generating and filling plant and auxiliary buildings. Edward L. Fiddyment, 272 South Water Street, Milwaukee, is local manager. It is understood that a branch plant will also be built at Birmingham, Ala.

Roy Herman, automobile dealer and repairer, Black Earth, Wis., will build a garage and service station, 70 x 90 ft., two stories and basement, estimated to cost about $20,000 complete.

The Pittsburgh Plate Glass Co., 213 Lake Street, Milwaukee, has let the general contract to the Dahlman Construction Co., 456 Broadway, for a five-story building, 86 x 154 ft., at Lake and South Water streets, to serve as a research laboratory, factory, warehouse and office building for the Patton-Pitcairn Division, manufacturing paints and varnishes, at Milwaukee. The investment will be in excess of $250,000. The architects are Kirchhoff & Rose, 221 Grand Avenue.

The Madison, Wis., Garage & Machine Co. has been organized by C. L. Lodine and has opened a garage and repair works at 18-24 North Charter Street. The machine shop will be under the management of Samuel Olson, formerly with the Gisholt Machine Co., Madison. A small list of equipment remains to be purchased.

The United States Engineer Office, Duluth, Minn., is asking sealed bids until Aug. 14 for constructing and delivering a steel derrick scow, complete with machinery and equipment.

The Edwards Motor Car Co., 2709-2715 Grand Avenue, Milwaukee, Dodge distributor and dealer, will build a new sales and service building costing $100,000 on Grand Avenue. It will be 100 x 120 ft., two stories and basement, of reinforced concrete. The general contract has been let to the Coddington Engineering Corporation, 290 Third Street, local, by Voelz & Siebert, architects, 373 Broadway.

The Marathon Motor Car Co., 210 McClellan Street, Wausau, Wis., has let the general contract to Frank Seefeldt & Co., local, for a four-story addition, 60 x 120 ft., estimated to cost $75,000. Two floors will be equipped as a machine and repair shop.

The Consolidated Water Power & Paper Co., Wisconsin Rapids, Wis., has announced plans for new construction and equipment work at its Canadian mill unit at Fort William, Ont., estimated to cost $1,000,000. The enlargement of the plant calls for increasing the capacity of the mill 100 per cent and the installation of a new 100-ton paper mill. The capacity of the hydroelectric generating plant, now producing 1500 hp., will immediately be increased to 10,000 hp. to accommodate the enlarged capacity. The present mill at Fort William was acquired recently for $200,000 from the Kaministiquita Paper & Pulp Co. The new owners are operating it as the Thunder Bay Paper Co. George W. Mead, Wisconsin Rapids, is president and general manager; F. N. Youngman is local manager.

The C. A. Shaler Co., Waupun, Wis., manufacturer of vulcanizing apparatus, tire specialties and automotive accessories, resumed production Aug. 1 in its new plant, erected at a cost of $166,000 to replace the factory which burned last February. Practically all of the new equipment has been contracted for, but further purchases are being made from time to time. C. A. Shaler is president.

The Board of Education, Madison, Wis., let the general contract to L. B. Gilbert, local, for a one-story brick and concrete addition, 78 x 80 ft., to the Madison high school, to serve as a manual arts institute. It will cost about $50,000. Equipment will be purchased in about 60 days. Frank Riley is architect.

The Ottawa, Ill., Silica Co. will build a new power plant and has let the structural steel work, involving about 100 tons, to the Lakeside Bridge & Steel Co., Milwaukee.

The Biggam Trailer Co., formerly located in the First Wisconsin National Bank Building, Milwaukee, has completed the equipment of its permanent plant at Racine, Wis., where is occupies 18,000 sq. ft. in the Racine Industrial Community Building, Racine Junction. It is now manufacturing a line of trailers ranging in capacity from 800 lb. to 5 tons.

The J. A. Grimm Coal Co., Hartford, Wis., has engaged Peacock & Frank, architects and engineers, 445 Milwaukee Street, to design a new coal storage and handling plant, estimated to cost about $20,000.

The Production Pattern & Equipment Co., Milwaukee, has moved its plant and offices from 92-94 Second Street to the new building at Broadway and Erie streets, where it occupies 15,000 sq. ft. It manufactures patterns, molding machines, flasks, core driers and other foundry appliances and equipment. P. E. Keller is secretary-treasurer and manager.

Detroit

DETROIT, July 31.

The Holley Carburetor Co., Vancouver Avenue and the Pere Marquette Railroad line, Detroit, is taking bids on a general contract for a one-story addition, 120 x 195 ft. Albert Kahn, 1000 Marquette Building, is architect.

Porath Brothers, Detroit, are planning to rebuild the portion of their brick manufacturing plant, recently destroyed by fire with loss estimated at about $50,000, including equipment.

The Martin-Perry Corporation, York, Pa., manufacturer of automobile bodies, has leased a portion of building No. 18 at the plant of the Dort Motor Car Co., Flint, Mich., totaling about 15,000 sq. ft., for the establishment of a local plant. Initial operations will be devoted to assembling work. It is said that additional units will be established in the near future.

Parke, Davis & Co., 2951 Atwater Street, Detroit, will make extensions and improvements in its power house, estimated to cost about $45,000.

Dodge Brothers, Inc., Detroit, has acquired about 7½

acres at Windsor, Ont., for a branch plant for Canadian business. Plans are under way for construction of the initial buildings.

The National Portland Cement Co., Mount Pleasant, Mich., will commence the immediate erection of its new plant at Coldwater Lake, estimated to cost about $500,000, with machinery. A. E. Gorham, 119 South Normal Street, is president.

The Wisconsin Public Service Co., 559 Marshall Street, Milwaukee, is completing plans for an addition to its electric power plant at Menominee, Mich., including line extensions, estimated to cost in excess of $100,000. Mead & Seastone, State Street, Madison, Wis., are engineers. J. P. Pulliam is secretary.

The Consumers' Power Co., Grand Rapids, Mich., has plans under way for extensions and improvements, including new steam turbines and auxiliary operating machinery, underground conduit lines, etc., estimated to cost close to $1,000,000.

The Pere Marquette Railroad Co., Fort Street, Detroit, has awarded contract to the Arnold Co., 105 South LaSalle Street, Chicago, Ill., for new shops and other buildings at its Wyoming Street yard, Grand Rapids, Mich., estimated to cost about $1,000,000, including equipment. Work will be placed under way at once.

The Michigan Gas & Electric Co., Three Rivers, Mich., is completing plans for a new one-story power house, estimated to cost about $45,000. P. Simmons is general manager.

The Four Wheel Hydraulic Brake Co., 708 Harper Avenue, Detroit is arranging a list of equipment for installation in an addition.

The Central South

ST. LOUIS, July 31.

The City Council, St. Joseph, Mo., is planning for extensions and improvements in the municipal electric light and power house, estimated to cost about $300,000, including machinery.

The Treasury Department, office of the supervising architect, Washington, is taking bids until Aug. 15 for an electric-driven turbine pump for installation at the post office, St. Louis.

The Union Electric Light & Power Co., St. Louis, is perfecting plans for reorganization, to include the issuance of $60,000,000 of new stock, a portion of the fund to be used for extensions and improvements. It is proposed to build an addition to the main generating plant and to erect a new power plant in the East Side section. Louis H. Egan is president.

The Doniphan Light, Ice & Power Co., Doniphan, Mo., S. C. Danner, P. O. Box No. 213, president, has plans in progress for a new cold storage and refrigerating plant.

The City Engineering Department, Louisville, has made application for permission to build a municipal hydroelectric generating plant at the United States Lock and Dam, Louisville Falls, Ohio River, Louisville.

The W. R. Martin Co., Louisville, operating a machine shop, is arranging for enlargements, to include the equipment of a new forge shop.

A vocational department will be installed in the new two-story and basement junior high school, 123 x 175 ft., to be erected at Owensboro, Ky., estimated to cost about $250,000.

The Oklahoma Gas & Electric Co., Oklahoma City, Okla., has disposed of a bond issue of $500,000, a portion of the proceeds to be used for extensions and improvements in plant and system.

A vocational department will be installed in the new three-story high school to be erected at Enid, Okla., 110 x 145 ft., to be known as the Kenwood Junior High School, estimated to cost about $125,000; and in the new Garfield Junior High School, two stories to cost about $90,000, at the same place. Bids for both buildings were rejected recently, and new bids have been asked. R. W. Shaw, Beck Building, is architect.

The Molybdenum Co. of America, 1008 Empire Building, Pittsburgh, is planning the erection of new hydroelectric generating plants on the Red River and Columbine Creek, Taos County, N. M. The company is also arranging for the establishment of new production plants in this section.

The Central Paper Box Co., 2935 Belleview Avenue, Kansas City, Mo., has awarded contract to the Sofus & Sorenson Construction Co., 2701 East Thirty-first Street, for a two-story and basement plant, 126 x 153 ft., on Belleview Avenue, estimated to cost in excess of $50,000, including equipment.

The Memphis Sash & Door Co., 673 South Dudley Street, Memphis, Tenn., has acquired property at Railroad Street and Roland Avenue, and plans the erection of a three-story factory, 200 x 300 ft.

W. A. McGuire, Horse Cave, Ky., is organizing a company to build and operate a cold storage and refrigerating plant.

Fire, July 18, destroyed a portion of the general plant, including steel tankage department, etc., of the Prairie Pipe Line Co., Jenks, Okla., with loss approximating $100,000. It is said that the plant will be rebuilt.

C. T. Dana, 1505 Del Norte Avenue, St. Louis, is organizing a company to build and operate a hydroelectric power plant on the Black River, estimated to cost close to $500,000. It will have an initial capacity of 2000 kw. Fuller & Beard, Chemical Building, St. Louis, are engineers.

The Missouri Lumber Co., Hot Springs, Ark., has plans under way to rebuild its plant, destroyed by fire with loss estimated at $75,000, including machinery. The new mill will cost approximately a like amount.

A vocational department will be installed in the new two-story and basement central high school, 140 x 170 ft., to be erected at Bowling Green, Ky., estimated to cost about $100,000. Clifford B. Shopbell & Co., Evansville, Ind., are architects.

The Green Light & Power Co., Pleasant Hill, Mo., is concluding arrangements for the purchase of an existing power plant and system at Warrensburg, Mo. Plans are under way for extensions and improvements.

The Caddo River Lumber Co., Glenwood, Ark., is planning for the early installation of machinery and electric equipment in its new saw mill, construction for which is under way. It is estimated to cost in excess of $50,000, and is expected to be ready for operation in September.

A vocational department will be installed in the two-story high school to be erected at Eufaula, Okla., estimated to cost about $75,000, for which bids on a general contract are being received until Aug. 24. Jewel Hicks, West Main Street, Oklahoma City, Okla., is architect.

The Gulf States

BIRMINGHAM, July 31.

The Magnolia Petroleum Co., Dallas, Tex., will build a new central repair plant at Electra, Tex., for machinery and parts manufacture. It will comprise a one-story machine shop, 40 x 112 ft.; one-story forge shop, 60 x 140 ft.; boiler shop, 40 x 80 ft.; pipe and machine shop, 40 x 60 ft.; automobile repair shops, warehouses and other buildings. It is estimated to cost about $250,000, with machinery. The company is also contemplating the erection of a new ice-manufacturing plant. A tract, 500 x 1000 ft., will be used for the works and other buildings added later.

The Board of Directors, University of Texas, Austin, Tex., has had plans prepared for a new power house at Galveston, Tex.

The Richardson Co., Monroe, La., manufacturer of roofing products, has awarded contract to the Austin Co., Cleveland, for the initial unit of a new plant, comprising a two-story factory, 30 x 300 ft. Other buildings will be erected later, making the entire plant cost close to $700,000.

The Consolidated Ice Co., Monroe, La., will commence the immediate erection of a new ice-manufacturing plant.

Fire, July 19, destroyed the engine house and shop buildings of the Texas & Pacific Railroad, El Paso, Tex., with loss reported in excess of $200,000, including equipment.

J. E. Adams and E. W. Gough, Sebring, Fla., have acquired a local building and will establish a machine and repair shop, primarily for automobile work. A list of equipment is being arranged.

Plans are being prepared for the erection of three fertilizer plants at Tampa, Fla., estimated to cost in excess of $300,000, including machinery. The factories will be built by companies recently organized, including the Melville Fertilizer Co., Tampa, capitalized at $1,000,000, Herbert M. Benker, president; the Dundee Fertilizer Co., Winter Haven, Fla., capitalized at $250,000, W. T. Overstreet, president; and the Cape Fear Fertilizer Co., Fayetteville, N. C., operating with a capital of $1,500,000.

The Shreveport Brick & Tile Co., Shreveport, La., has acquired property on Douglas Island, for a new plant, equipped for a production of about 900,000 bricks per month. The company has a tract of 100 acres. J. W. Peyton is president.

Smoak & Goin, Ocala, Fla., have plans under way for the establishment of a new plant on property recently acquired on Orange Street, for the manufacture of motor truck bodies.

The West Florida Power Co., Tallahassee, Fla., is perfecting plans for a new hydroelectric generating plant on the Ocklockonee River, estimated to cost close to $1,000,000, including equipment.

The Oak Lawn Ice & Cold Storage Co., Dallas, Tex.,

has plans under consideration for a new ice-manufacturing plant at Gertrude Street and Cole Avenue.

A vocational department will be installed in the high school to be erected by the East Baton Rouge Parish School Board, East Baton Rouge, La. Preliminary plans are under way. R. C. Gordon is president.

The City Council, Corinth, Miss., is arranging for a bond issue of $100,000, the proceeds to be used for the erection of a municipal electric light and power plant. Fuller & Beard, Chemical Building, St. Louis, are consulting engineers.

The Chalmette Petroleum Corporation, New Orleans, formed by a recent merger of the Chalmette Oil Refining Co., and the Louisiana Oil Exporting Co., capitalized at $1,000,000, has plans under way for enlargements in its oil refinery, to include the installation of new machinery.

The Ballinger Compress Co., Ballinger, Tex., will make extensions and improvements in its cotton compress plant, including the installation of additional equipment at the power house.

The Humble Oil Refining Co., and the Pierce Oil Co., Laredo, Tex., are planning to rebuild the portions of their plants destroyed by fire July 20, with combined loss estimated in excess of $100,000.

The Stedman Fruit Co., Beaumont, Tex., will commence the immediate erection of a new refrigerating and cold storage plant, estimated to cost in excess of $150,000 with equipment.

Traveling cranes, freight handling and conveying machinery, etc., will be installed at the Tampa, Fla., harbor, in connection with wharf and dock extensions and improvements to be made by the city, estimated to cost about $600,000. A. D. Hall is city manager in charge.

Indiana

INDIANAPOLIS, July 31.

The Paramount Wheel & Engineering Co., Hartford City, Ind., now being organized with a capital of $300,000, has concluded arrangements with the Chamber of Commerce for a site for the erection of its new plant to manufacture metal automobile wheels and other automotive products. The initial works is estimated to cost in excess of $100,000, including machinery, and will give employment to about 200.

The Board of County Commissioners, Lawrenceburg, Ind., has completed plans for an electric power house at the County infirmary. Bids on a general contract are being asked until Aug. 7.

The Concealed Door Check Co., Kokomo, Ind., recently organized, will operate a local plant for the manufacture of a special door check and other hardware specialties. J. C. Patten is president, and Floyd W. Eastman, secretary and general manager.

The Modern Brass Foundry, 1319 Bates Street, Indianapolis, is planning to rebuild its furnace room, partially destroyed by fire, July 25.

The Indiana & Michigan Electric Co., 220 West Colfax Avenue, South Bend, Ind., has applied for permission to construct and operate a hydroelectric power plant on the St. Joseph River, Berrien County, Mich. F. A. Bryan is in charge.

The Hercules Corporation, Evansville, Ind., manufacturer of wagons, gas engines, etc., is arranging to devote a portion of its plant to the manufacture of refrigerators and refrigerating apparatus.

The National Malleable Castings Co., Halmes Avenue and Michigan Street, Indianapolis, will rebuild the portion of its plant, destroyed by fire July 21.

A vocational department will be installed in the new senior and junior high school to be erected at Plymouth, Ind., two stories, 163 x 179 ft., estimated to cost about $300,000, for which bids on a general contract are being received until Aug. 7. Ernest W. Young, Dean Building, South Bend, Ind., is architect.

The Pacific Coast

SAN FRANCISCO, July 25.

The General Electric Co., Rialto Building, San Francisco, Cal., has awarded contract to the Foundation Co., Holbrook Building, for a new one and two-story plant at East Fourteenth Avenue and Fifty-fourth Street, Oakland, 132 x 235 ft., estimated to cost $200,000 with equipment.

The Los Angeles Railway Co., Pacific Electric Building, Los Angeles, has had plans prepared for a new car repair shop, aggregating about 94,500 sq. ft. and estimated to cost approximately $140,000. The engineering department of the company is in charge.

The Snow Mountain Water & Power Co., 216 Pine Street, San Francisco, has applied for permission to construct two hydroelectric power plants on the Middle Eel River, Mendocino County. Each plant will have a capacity of close to 12,000 hp., and the project is estimated to cost approximately $10,000,000.

The Royal Motor Accessory & Mfg. Co., Sawtelle, Cal., has completed plans for new works at Sawtelle and Pico Boulevards to manufacture automobile equipment. It has a tract of about 3 acres. The initial plant will cost approximately $100,000 with equipment. H. C. Cove is president.

The Star Motor Co. of California, Oakland, Cal., a subsidiary of the Durant Motor Co., with local plant on East Fourteenth Street, has awarded contract to the P. J. Walker Co., Monadnock Building, San Francisco, for two buildings to comprise the initial units of its new plant. The structures will be 100 x 200 ft., and 80 x 150 ft., respectively. The entire plant is estimated to cost in excess of $750,000.

The Pacific Coast Borax Co., Kohl Building, San Francisco, has acquired the property of the Chandler Shipbuilding Co. at San Pedro Harbor, Los Angeles, comprising about 10 acres, as a site for a new refinery to cost about $1,000,000, including machinery. The works will include a power house, machine shop and other mechanical buildings, and will require crushing, mixing, conveying machinery, etc. C. B. Zabriskie is president.

The Butte Meadows Co., Chico, Cal., has applied for permission to construct and operate a hydroelectric power plant on Butte Creek, estimated to cost approximately $40,000.

The Coy Valve Co., Chehalis, Wash., recently organized with a capital of $500,000, is selecting a site for the erection of a plant to manufacture valves and other specialties.

The Seattle Chain & Mfg. Co., Seattle, Wash., is arranging for a lease of property from the City Industrial Bureau, as a site for a new plant.

The E. K. Wood Lumber Co., Anacortes, Wash., has acquired about 420 acres as a site for the erection of a lumber mill. All departments will be electrically-operated. Traveling cranes and kindred equipment will be installed on loading docks, which will be constructed in connection with the plant.

W. W. Rosebraugh, Salem, Ore., has plans under way for rebuilding his machine shop, foundry and boiler works, at Seventeenth and Oak streets, recently destroyed by fire.

Vocational departments will be installed in the proposed two high schools to be constructed at Portland, Ore., estimated to cost close to $2,000,000.

Canada

TORONTO, July 31.

LOCAL dealers state that inquiries for many lines of equipment are being received which portend considerable activity around September or October. Canadian equipment manufacturers generally are quite actively engaged and in the past few weeks several have increased their working forces to cope with the orders on their books. In most cases, however, the demand for equipment is confined to one or two machines, with only a small amount of business coming out for larger sized orders.

The automotive industry is buying steadily and dealers state that it is a very poor week when they cannot sell a machine or tool to some of the leading automobile manufacturers in Ontario. A better demand is also springing up for equipment for replacement purposes, and manufacturers who have been putting off entering the market for some special machine now find that they can wait no longer. Small tools are moving briskly, with users entering the market both for spot and future deliveries.

The Ontario Steel Products Co., Ltd., Gananoque, Ont., proposes to spend about $60,000 on new machinery and equipment this year.

The Ford Motor Co. of Canada will commence building operations on the proposed $6,000,000 plant at Ford, Ont., within two weeks. The first building will be 400 x 1300 ft., and will be an extension to the present works. It is expected to be completed by January. It has also secured a site on Danforth Avenue, just outside the city limits of Toronto, and is preparing to establish a plant to cost about $1,000,000. The company is asking for sewage and water service from the city.

The Canadian National Railways are erecting a round-house and other buildings for complete divisional point

facilities near Fort William, Ont., to cost $250,000. H. A. Dixon, Winnipeg, Man., is chief engineer.

The Canadian Pacific Railway will build an engine house at Medicine Hat, Alta., to cost $30,000.

The Taylor Rubber Co., Ltd., 37 Richmond Street East, Toronto, will build a factory at Aurora, Ont., to manufacture automobile tubes.

The Sydenham Brick & Tile Co., Ltd., Wallaceburg, Ont., will build an addition to its plant to cost about $30,000. E. C. Morse is general manager.

S. L. Lambert, Welland, Ont., will rebuild his sawmill, recently destroyed by fire, and is interested in prices of equipment.

The Milton Pressed Brick Co., Milton, Ont., will spend $10,000 on construction of kiln and other improvements.

C. N. Tingle, Hanna, Alta., is receiving bids for the erection of a power plant.

The Alberta Hydro-Electric Co., Calgary, Alta., proposes to build a hydroelectric plant on the Bow River, to consist of four dams, the first of which will cost $500,000.

E. B. Reed, who recently severed his connection with Maguire, Patterson & Palmer, Ltd., match manufacturer, has leased a section of the building of the Pembroke Iron Works, Pembroke, Ont., and with three local associates will establish a plant for the manufacture of veneer, panels and plywood. The machinery has been purchased.

BOOK REVIEWS

Official Report of the Ninth National Foreign Trade Convention. Issued by the secretary, O. K. Davis, National Foreign Trade Convention headquarters, New York. Pages, 621, 6 x 9 in. Price, $2.50.

This report and its predecessors, which give the addresses made at the annual conventions under the auspices of the National Foreign Trade Council, together with a stenotype report of the proceedings, including discussions at the various group sessions, have come to be in a real sense text books of American foreign trade. One who has been to any extent a reader of them has not missed the evolution in literature of this sort. In earlier foreign trade convention days the discussions brought out a good many hackneyed observations. There was a good deal of sameness in the advice given as to what to do and what not to do in trying to trade with people of other countries. Makers of speeches of the old kind have disappeared from the floors of the convention and the group meetings, and in more recent years we have had the experiences of men fresh from foreign fields and of sales managers at home who have been willing to give others the results of their own successful methods and their latest contacts with resourceful salesmen in other lands.

Conditions due to the war have compelled some very hard thinking on the part of our exporting manufacturers. They have had to take new steps without the guidance of experience. The past two years in particular have been trying ones, and a sifting process has been going on which has separated the opportunists in export trade from those who years ago set about the development of foreign business with a purpose of standing by it through thick and thin.

The Philadelphia convention of May, 1922, with which the present volume deals, shows better than any other the result of the seasoning process. The speakers were well selected and knew whereof they spoke. There was probably a smaller admixture of academic theorizing than at any of the eight conventions that precedes it. Of particular interest are the sections dealing with market conditions abroad, the American merchant marine, our foreign loan policy, the exchange situation, export sale, promotion, and public education for greater foreign trade.

Industrial Furnaces, published by the Chapman-Stein Furnace Co., Mt. Vernon, Ohio, is a series of bulletins bound together, describing recuperative furnaces in general and those specifically for use in rolling mills and for annealing. The furnace of the Chapman-Stein company is built under patents held by Charles M. Stein of the Societe Anonyme des Appareils de Manutention et Fours Stein, Paris, France. It is explained that the advantage of a recuperative furnace is that it will preheat all the air required for combustion to a temperature about 250 to 350 deg. Fahr. less than the temperature of the spent furnace gases entering the recuperator. It is also pointed out that the recuperative furnace is not suited to conditions which demand a large overload capacity, under such requirements the regenerative furnace being called for, with its large number of checkers for storing heat. The recuperative furnace uses thin tile, comparatively light in weight, designed to transfer heat rather than to store it. Hence it is not suited to open-hearth furnaces, large glass melting tanks and large forge furnaces which heat ingots over 5 tons or more than 32 in. in diameter. The distinctive feature claimed for the Stein furnace is that the recuperator air ducts are vertical and have no turns or off-sets.

A standard code regulating the installation of warm air furnaces in residences has been compiled under the guidance of the American Society of Heating and Ventilating Engineers, the National Warm Air Heating and Ventilating Association, the National Association of Sheet Metal Contractors and the Western Warm Air Furnace and Supply Association. The code, which is in small pamphlet form, shows that considerable engineering thought has been given to warm air furnace installation with the object of taking it from the field of careless rule of thumb application. The present draft has not yet been approved by all of the four associations, but those interested could probably obtain a copy by applying to any one of the four associations named.

New Books Received

The International Molders Union of North America. By Frank T. Stockton, Ph.D., Professor of Economics, University of South Dakota. Pages, 234, 6¼ x 9½ in. Published by the Johns Hopkins Press (in series of Johns Hopkins University Studies in Historical and Political Science), Baltimore. Price, $1.50.

The Analysis of Non-Ferrous Alloys. By Fred Ibbotson and Leslie Aitchison. Pages 246, 5½ by 8½ in.; illustrations, 21. Published by Longmans, Green & Co., 55 Fifth Avenue, New York. Price, $4.

Machine Tool Operation. Part II. By Henry D. Burghardt. Pages 438, 4¾ x 7½ in.; illustrations, 298. Published by the McGraw-Hill Book Co., Inc., 370 Seventh Avenue, New York. Price, $2.75.

Production Engineering and Cost Keeping. By William R. Bassett and Johnson Heywood. Pages 311, 6 x 9 in.; illustrations, 115. Published by the McGraw-Hill Book Co., Inc., 370 Seventh Avenue, New York. Price, $3.50.

Hütte—Taschenbuch für Eisenhüttenleute. Compiled by Akademischer Verein Hütte, Berlin. Pages 982, 5 x 7½ in.; illustrations, 511. Published by Wilhelm Ernst & Sohn, Berlin, Germany. Price, 738 marks.

Report on Productive Industries, Railways, Taxes and Assessments, Waterways and Miscellaneous Statistics. Compiled for Commonwealth of Pennsylvania for 1920. Pages 1040, 5¾ x 9 in. Published by J. L. L. Kuhn, printer to the Commonwealth, Harrisburg, Pa.

The Gantt Chart. By Wallace Clark. Pages 155, 6 x 8½ in.; illustrations, 37. Published by the Ronald Press Co., 20 Vesey Street, New York, Price, $2.50.

Industrial Unionism in America. By Marion Dutton Savage. Pages 344, 5 x 7½ in. Published by the Ronald Press Co., 20 Vesey Street, New York. Price, $2.25.

The Peril of the Republic. By Daniel Chauncey Brewer. Pages 354, 5 x 7¾ in. Published by G. P. Putnam's Sons, 2 West Forty-fifth Street, New York. Price, $1.75.

NEW TRADE PUBLICATIONS

Centrifugal Pump Guide.—Allis-Chalmers Mfg. Co., Milwaukee. A 4-page monthly bulletin listing the Allis-Chalmers pumping units ready for immediate shipment.

Ash Handling.—Conveyors Corporation of America, 326 West Madison Street, Chicago. A 12-page 8½ in. x 4 in. booklet illustrating and describing the American steam jet ash conveyor, by means of which ashes are drawn by suction and then propelled through a discharge pipe line to the collecting point.

American-Made Drawing Instruments.—The C. F. Pease Co., 813-21 North Franklin Street, Chicago. A 16-page illustrated catalog showing detail of instruments and sets manufactured in Chicago, and adapted to professional drafting service.

Power Transmission Machinery.—Hill Clutch Co., Cleveland. Four-page leaflet describing an installation of Hill clutches at the Eddy Paper Mills, Three Rivers, Mich.

Adjustable Limit Snap Gage.—Meldrum-Gabrielson Corporation, Syracuse, N. Y. A 12-page booklet, 7½ x 4 in., cataloging, illustrating and describing the Syracuse gage for use in accurate machining of duplicate parts.

Fire Tools, Hooks, Etc.—Leetonia Tool Co., Leetonia, Ohio. Pages 72A and 72B for loose-leaf catalog No. 3.

Radiation Pyrometers.—Thwing Instrument Co., 3339 Lancaster Avenue, Philadelphia. A 16-page bulletin (No. 11) illustrating and describing the indicating and multiple-recording types of radiation pyrometers designed by Dr. C. B. Thwing, president of the company. The theory of operation is explained.

Chain Furnace Screens.—E. J. Codd Co., 700 South Caroline Street, Baltimore. An 8-page bulletin showing the use of the Wiegan patented chain screen door on furnaces, ovens, cupolas, electric furnaces, kilns, boiler fires, etc. The curtain of strands of steel chains give a view of the furnace interior and do not interfere with the passage of the charge or the manipulating tools.

Optical Pyrometer.—Scientific Materials Co., Pittsburgh. A 16-page 6 in. x 9 in. illustrated booklet giving technical data on the theory, design and operation of the F. & F. pyrometer.

Forging and Heating Furnaces.—Bulletin No. 241, W. S. Rockwell Co., 50 Church Street, New York, with 26 illustrations on 12 pages, describes many types of furnaces for forging work and heating steel and other materials. A discussion is included, on the need for better heating in forging and forming practice.

Level and Transit.—Warren Knight Co., 136 North Twelfth Street, Philadelphia. An illustrated circular devoted to the Sterling combination level and transit, an instrument which may be used either as a level or as a transit without the use of detachable parts.

Precision Measuring Tools.—Van Keuren Co., 362 Chambers Street, Boston. Catalog, illustrative and descriptive with prices, of combination precision gage blocks, gage block accessories, plug gages, measuring wires for screw threads and profile gages, surface plates and light waves measuring outfits.

Sprague Electric Dynamometer Chassis Test System.—An 8-page leaflet issued by the Sprague Electric Works, 524 West Thirty-fourth Street, New York. This describes, with the aid of eight photographs, a testing system for cars at speeds up to 60 miles per hour. During the test the car is stationary upon the test block, but the wheels are revolving at that speed. The system is recommended for the manufacturer to tune up a car into condition before shipment and for the service station to put customers' cars in good shape on the basis of actual performance under load.

Toledo Drop Hammers and Trimming and Forging Presses.—A 64-page catalog issued by the Toledo Machine & Tool Co., Toledo, Ohio. This is section 9-A of Catalog No. 11. It describes and illustrates a large number of hammers and presses and gives much in the way of particulars of dimensions, capacities, etc., in tables. The data given in the tables is unusually complete. The tools covered include board lift drop hammers, bench drop hammers, drop hammers, trimming presses, trimming and forging presses and forging presses.

Plans of New Companies

[No news in regard to new incorporations is published in THE IRON AGE until it has been investigated by correspondence or by personal call.]

The Schmidgall Tool Co., 617 Lincoln Avenue, Peoria, Ill., recently incorporated with capital stock of $10,000, will manufacture all kinds of cutting tools, wire and iron specialties such as bank cages, fences, gates, etc., but will specialize on granite and stone cutters' tools. The company has a small shop which will answer its present requirements, but is in the market for a 200-lb. drop hammer. Officers are Carl H. Schmidgall, president; Lester R. Renegar, vice-president; Roy A. Breymeier, secretary-treasurer.

The Perfection Radio Laboratory, Clinton, Iowa, of which H. L. Bailey is secretary and general manager, has been incorporated. Plans are under way for the construction of a factory building within the near future and later on the company will be in the market for screw machines, punches, etc. Various types of radio apparatus and parts will be manufactured.

The Motor Parts Machine Co., 815 East Pike Street, Seattle, Wash., which has been engaged in crankshaft and cylinder grinding for some time, has been incorporated. Manufacture of automobile parts, particularly pistons and piston pins, is under way and later on the company may be in the market for additional shop equipment.

The Sterling Wire Machinery Co., Sterling, Ill., recently incorporated with capital stock of $25,000, will sell wire-working machinery which it will have built on contract.

The Lloyd Engineering Co., 241 Cortlandt Street, New York, incorporated to do all kinds of blower and sheet metal work, has a fully equipped shop for making all kinds of sheet metal products, and does not propose to expand at present. Officers: E. M. Lloyd, J. E. Wells and U. Lloyd.

The Hartman Brake Corporation, New York, has been incorporated with a capital of $300,000, to manufacture brakes, brake bands, etc. Incorporators: T. F. Thornton, E. S. Wolbarst and J. P. H. Rieper. Plans for manufacturing are still pending. Feiner & Maass, 66 Pine Street, New York, represent the corporation.

The Wright Radio Corporation, New York, has been chartered under state laws to manufacture wireless equipment. Incorporators: C. W. Irwin, T. M. Smith and J. A. Delany. Plans for manufacturing are undecided. Address G. P. Breckenridge, 7 Dey Street, N. Y.

The Michigan Motor Specialties Corporation, foot of Mt. Elliott Avenue, Detroit, has been incorporated to take over the assets of a bankrupt company of the same name, which were sold at public auction recently. The new company will continue to manufacture the same line of automobile parts, screw machine work, stampings, including some patented oil-can holders, priming cups, etc., which were manufactured by its predecessor. The company does not contemplate purchasing additional shop equipment at this time. Officers of the new company are M. Mitshkun, president and treasurer; Charles W. Beck, vice-president; Charles W. Beck, Jr., secretary and general manager.

The Trippe Reflector Corporation, 600 Hartford Building, Chicago, has been organized and incorporated to produce an automobile reflector, which at first will be manufactured under contract. Graham Trippe is president.

The Standard Castings Co., South Bend, Ind., has been incorporated to manufacture aluminum castings. The company already has its own plant fully equipped. John M. Zigler is treasurer.

The Eureka Machine Works, Eureka, Kan., has recently opened a shop in the Kansas oil fields for the manufacture and repair of tools and materials used in this work such as drills, stems, pins, boxes, pipe threading, welding and other classes of smithing and machine work. Huffman & Boyersmith are the proprietors.

The Wood-Reinecke Electric Co., Louisville, Ky., incorporated several weeks ago with a capital of $30,000, will do a distributing and jobbing business and will not, for the present, engage in manufacturing. It is ordering a complete line of electric supplies.

The Perfection Radio Laboratories, Inc., Clinton, Iowa, recently incorporated with a capital of $1,000,000 to manufacture radio equipment, has received large orders and has found expansion necessary. Ground is being acquired and preparations made to erect a plant. Incorporators: F. M. Bailey, M. S. Ackles, H. L. Bailey and D. I. Bailey.

The C. & C. Appliance Corporation has been incorporated with a capital stock of $50,000, to manufacture and exploit four products patented by one of the incorporators, D. O. Cloud, and to be known as an electric automatic hammer, a pipe hanger and two accessories. A contract has been awarded for making the hanger, but bids are open for

manufacturing the other products. Address D. O. Cloud, 48 West Broadway, New York.

The Multi-Needle Engineering Corporation, Brooklyn, N. Y., has been incorporated with capital of $10,000, to manufacture steel needles and kindred specialties. Incorporators: A. J. Hugger, and H. N. [illegible]. It has taken over the Multi-Needle Machine Co., and is ready to manufacture. Address H. R. Berlinicke, 160 Broadway, New York.

The Schofield Mfg. Co., New York, has been incorporated with a capital of $50,000, to manufacture hardware products. Incorporators: J. Bramwell, A. P. Anderson, and F. W. Oberkirch. It is in the process of organization, but does not propose temporarily to build, since it is manufacturing under contract. Address Davis, Wagner, Heater & Holton, 34 Nassau Street, New York.

Miranda Brothers, Inc., 132 Nassau Street, New York, has been chartered under state laws to manufacture motors and engines. Incorporators: I. J. Miranda, Jr., L. Drecher and B. B. Smith. No manufacturing is being done at present, however, the company merely acting in the capacity of export department for the Driggs Ordnance & Mfg. Co., the Mercer Motor Car Co. and the Commerce Motor Car Co.

The Aviation Syndicate, Inc., New York, has been incorporated with a $150,000 capital with wide powers including the manufacture of airplanes and parts. H. Barber, 30 East Forty-second Street, New York, is the chief incorporator. Its immediate object is to act as a parent company for an air transport concern to be established soon. The operating companies under this parent will do some manufacturing through contract of products relating to aircraft. Among these are all-steel hangars, radio stations and some aircraft.

IRON AND INDUSTRIAL STOCKS

Backed and Filled Past Week with a Negligible Net Result

Prices of iron and industrial stocks and bonds have backed and filled the past week with a negligible net result. Day to day domestic and foreign economic developments proved conflicting. The ease of money is regarded as a factor in helping industry to weather the railroad and coal strikes. Buying power of the Western section of the country has been lessened by declining grain values, while that of the South has increased due to the appreciation in cotton values. Failures the country over are remarkably unimportant.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

Allis-Chalm.	51¾ - 54½	Inland Steel	52¾ - 53¾
Allis-Chalm. pf.	98 - 98½	Int. Har.	103 -103½
Am. B. S. & F.	63⅞ - 65	Lack. Steel	76⅞ - 78¾
Am. B. S. & F. pf.	-108	Lima Loco.	105¾ -109⅝
Am. Can	55½ - 59⅞	Midvale Steel	34½ - 37⅛
Am. Can pf.	109 -109½	Nat.-Acme	17 - 17½
Am. Car & F.	166 -172½	Nat. E. & Stm.	53¾ - 56⅛
Am. Car & F. pf.	-120¾	N. Y. Air Brake	78½ - 80½
Am. Loco.	113½-119¾	Nova Scotia Steel	- 31
Am. Loco. pf.	117 -117¼	Otis Steel	11 - 12
Am. Sti. Fdries.	36½ - 38	Pressed Steel	79 - 82½
Am. Radiator.	96 -101	Ry. Stl. Spring	105 -108¾
Am. Steel F. pf.	- 99⅝	Ry. Stl. Sprg. pf.	-114½
Bald. Loco.	115⅜-120¾	Replogle Steel	31¼ - 34
Beth. Steel	74 - 76	Republic	71¼ - 74⅝
Beth. Stl. Cl. B.	75¾ - 79	Republic pf	92⅛ - 92⅞
Beth. Stl. 8% pf.	113 -114½	Sloss	45 - 46
Brier Hill	- 18	Steel of Canada	72½ - 74¾
Br. Em. Steel	- 10½	Superior Steel	- 32
Br. E. Stl. 1st pf	- 73	Trans.-Williams.	37½ - 38
Br. E. Stl. 2d pf.	30 - 30½	Un. Alloy Steel.	39 - 39½
Chic. Pneu. Tool	69⅞ - 71⅞	U. S. Pipe	22¾ - 23¾
Colo. Fuel	30 - 31	U. S. Pipe pf.	68 - 72½
Cruc. Steel	81½ - 91⅝	U. S. Steel	99½-101¾
Cruc. Steel pf.	92½ - 93½	U. S. Steel pf.	120 -121¼
Dom. Steel	32 - 32¼	Vanadium Steel	45 - 50½
Gen. Electric	174 -182	Va. I. C. & C.	- 48
Gt. No. Ore. Cert.	39 - 40¼	Whouse E. & M.	59¾ - 62½
Gulf States Steel	79 - 85½		

Industrial Finances

Under the terms of the proposed Republic-Midvale-Inland steel merger, the Midvale stockholders are to receive for each share of the holdings 75 per cent of stock of the North American Steel, and 25 per cent of stock of a new company to be formed to take over and operate the Nicetown plant owned by the Midvale Steel & Ordnance Co.

The Remington Cutlery Works, Inc., Bridgeport, Conn., incorporated May 15, last, has increased its capital stock from $25,000 to $1,500,000.

At a special meeting of the stockholders of the Southern Coal & Iron Corporation called for Aug. 14 the proposed increase of its stock from $1,500,000 to $3,000,000 will be voted on.

The Lima Locomotive Works, Inc., shows in its 1921 report a gross income of $12,528,154; operating income, $2,112,005; net earnings after Federal taxes, etc., $1,136,591, and a surplus after dividends of $631,541. The Dec. 31 balance sheet shows cash on hand or in banks $873,644, and a surplus of $2,470,993.

The Penn Seaboard Steel Corporation reports for the first half of 1922 net sales of $834,470; working profits, $49,281; deficit after selling and administration expenses, $90,290, and a deficit after interest charges, etc. of $399,963.

The profits of the Ontario Steel Products Co., Ltd., Gananoque, Ont., for the year ended June 30, 1922, amounted to $141,083, a decrease of $81,362, from the level established in the previous year. The amount of $59,802 was written off for depreciation, a sum greater than a year ago by over $29,000. The net profits were $81,282, which with the $564,087 brought forward from the previous year, gave a total of $645,369 for distribution. Bond interest consumed $30,222. The regular dividend of 7 per cent was paid on the preferred stock, amounting to $52,500. Two per cent quarterly was paid on the common shares in August and November, 1921 and one per cent in February, 1922, these payments calling in the aggregate for $37,500. At the meeting of directors held last April, it was decided, on account of the uncertain business condition, to suspend further payments of dividends on the common shares. The directors have authorized the expenditure of approximately $60,000 during the coming year for the installation of modern and improved methods of manufacture.

The Chicago Pneumatic Tool Co. for the six months ended with June, reports earnings of $258,477. After deducting a reserve of $111,604 for depreciation and contingencies there was a net profit of $146,873.

Pursuant to resolutions of directors adopted July 21, 100,000 additional shares of the Penn Seaboard Steel Co. stock have been authorized to be issued for cash. The proceeds derived from the sale of this stock will be used to reduce current liabilities and to provide additional working capital.

The plant and all other assets of the New Process Gear Corporation, Syracuse, N. Y., with a value estimated at $3,000,000, will be sold there by Mayor George R. Lunn, of Schenectady, and Francis G. Gaffey, of New York, as special masters, at noon August 22. This sale will complete the liquidation of the Willys Corporation, of which the New Process Gear Corporation was a subsidiary, as far as physical properties are concerned.

Trade Changes

The Connecticut Electric Steel Co., Inc., Hartford, Conn., at a meeting held recently, voted to dissolve. Claims against the company should be sent to Day & Berry, 750 Main Street, Hartford, Conn., attorneys for the directors acting as trustees.

The New England Structural Co., Everett, Mass., has leased quarters in the Massachusetts Trust Co. building, Denvonshire Street, Boston. The company formerly maintained offices on State Street, but relinquished these some months ago.

The National Carbon Co., Inc., has established finishing plants at 237 East Forty-first Street, New York, and at 560 West Congress Street, Chicago, to supplement the emergency department maintained for some time at the Cleveland factory. Both of these plants will carry stocks of Columbia carbon, graphite and metal graphite brushes, and all sizes equipped with special methods of finishing will be available.

The Chandler & Farquhar Co., Boston, hardware and machinists' supplies, has leased for a term of years the large store and basement at 256-260 Devonshire Street. The new quarters are served with a rear entrance from Federal Court off 121 Federal Street and include the entire chamber on the second floor of the building at 250-260 Devonshire Street, which forms a part of the group of buildings on Winthrop Square known as the Carter-Rice Building. The new quarters will give the company approximately 40 per cent more floor space than at present, with a main floor nearly three times as large as the one now occupied. Extensive alterations are to be made to the three floors for the occupancy of the Chandler & Farquhar Co. about the first of next year, when it will move from its present quarters 32-38 Federal Street, where it has been located for more than 28 years. With the alterations, the company will be provided with ample loading and unloading platform space, which has not been possible in the present location. The company will operate its own elevator service.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossbile to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

	Per Lb.
Bars:	
Refined iron bars, base price	2.73c.
Swedish bars, base price	7.00c.
Soft steel bars, base price	2.73c.
Hoops, base price	3.78c.
Bands, base price	3.38c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	2.83c.
Channels, angles and tees under 3 in. x ¼ in., base	2.73c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	2.73c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	2.83c.
Toe-calk, ½ x ⅝ in. and larger	3.50c.
Cold-rolled strip, soft and quarter hard	6.25c. to 7.25c.
Open-hearth spring steel	4.00c. to 6.00c.
Shafting and Screw Stock:	
Rounds	3.35c.
Squares, flats and hex	3.85c.
Standard cast steel, base price	12.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	2.83c.

Sheets

Blue Annealed

	Per Lb.
No. 10	3.78c.
No. 12	3.83c.
No. 14	3.88c.
No. 16	3.98c.

Box Annealed—Black

	Soft Steel C. R., One Pass, Per Lb.	Blued Stove Pipe Sheet, Per Lb.
Nos. 18 to 20	4.00c. to 4.30c.	.....
Nos. 22 and 24	4.05c. to 4.35c.	4.60c.
No. 26	4.10c. to 4.40c.	4.65c.
No. 28	4.20c. to 4.50c.	4.75c.
No. 30	4.45c. to 4.75c.	.....

No. 28 and lighter, 36 in. wide, 10c. higher

Galvanized

	Per Lb.
No. 14	4.30c. to 4.60c.
No. 16	4.45c. to 4.75c.
Nos. 18 and 20	4.60c. to 4.90c.
Nos. 22 and 24	4.75c. to 5.05c.
No. 26	4.90c. to 5.20c.
No. 27	5.05c. to 5.35c.
No. 28	5.20c. to 5.50c.
No. 30	5.70c. to 6.00c.

No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
½ in. Butt.	—56	—40	¾ in. Butt.	—30	—13
¾ in. Butt.	—61	—47	1½ in. Butt.	—32	—15
1-3 in. Butt.	—63	—49	2 in. Lap	—27	—10
3½-6 in. Lap.	—60	—46	2½-6 in. Lap.	—30	—15
7-8 in. Lap.	—56	—34	7-12 in. Lap.	—23	— 7
9-12 in. Lap.	—55	—33			

Steel Wire

BASE PRICE* ON NO. 9 GAGE AND COARSER	Per Lb
Bright basic	3.50c. to 3.75c.
Annealed soft	3.50c. to 3.75c.
Galvanized annealed	4.25c. to 4.50c.
Coppered basic	4.00c. to 4.25c.
Tinned soft Bessemer	5.50c. to 5.75c.

*Regular extras for lighter gage

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	17¾c. to 18¼c.
High brass wire	18¼c. to 18½c.
Brass rod	16¼c. to 17¼c.
Brass tube, brazed	24½c. to 25½c.
Brass tube, seamless	21½c. to 22 c.
Copper tube, seamless	23 c. to 24 c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 21¾c. to 22¾c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin Grade "AAA" Charcoal 14x20	Bright Tin Grade "A" Charcoal 14x20	Coke—14-20 Primes	Coke—14-20 Wasters
		80 lb.	$6.05 $5.80
		90 lb.	6.15 5.90
		100 lb.	6.25 6.00
IC.	$10.00	$8.50	IC. 6.40 6.15
IX.	11.50	10.00	IX. 7.40 7.15
IXX.	13.00	11.25	IXX. 8.40 8.15
IXXX.	14.25	12.50	IXXX. 9.40 9.15
IXXXX.	16.00	14.00	IXXXX. 10.40 10.15

Terne Plates

8-lb. coating, 14 x 20

100 lb.	$7.00
IC	7.25
IX	7.50
Fire door stock	9.00

Tin

Straits, pig	35c.
Bar	42c. to 46c.

Copper

Lake ingot	15¼c.
Electrolytic	15 c.
Casting	14¾c.

Spelter and Sheet Zinc

Western spelter	8 c. to 8½c.
Sheet zinc, No. 9 base, casks	8¾c. open 9¼c.

Lead and Solder*

American pig lead	6¾c. to 7c.
Bar lead	8c. to 8½c.
Solder, ½ and ½ guaranteed	25c.
No. 1 solder	23½c.
Refined solder	20¼c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	75c.
Commercial grade, per lb	35c.
Grade D, per lb	25c.

Antimony

Asiatic	6½c. to 7c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb	25c. to 27c.

Old Metals

The market is stronger and business more active. Dealers' buying prices are as follows:

	Cents Per Lb
Copper, heavy crucible	11.75
Copper, heavy wire	11.25
Copper, light and bottoms	9.00
Brass, heavy	6.25
Brass, light	5.25
Heavy machine composition	8.50
No. 1 yellow brass turnings	6.50
No. 1 red brass or composition turnings	7.75
Lead, heavy	4.50
Lead, tea	3.50
Zinc	3.25

THE IRON AGE

New York, August 10, 1922

ESTABLISHED 1855 VOL. 110, No. 6

Steel Scrap in Cupola Iron Mixtures

Strength of the Product and the Percentages of Scrap— A Series of Experiments and the Results— Effect on Hardness

BY E. J. LOWRY*

A KNOWLEDGE of the properties bestowed on cupola cast iron by the addition of steel scrap to the mixtures is of fundamental importance when high strength castings are under consideration. In this article some of the more important characteristics of high-test irons are discussed when obtained under scientific methods of melting.

As a result of the term "semi-steel," the foundryman usually considers that any addition of steel scrap, varying from one per cent and upward, to the mixture will produce the strongest castings. It is not believed that the originator of this product had such a practice in mind when he placed it before the foundry world. Rather, it is felt that he had in mind a limited variation in the percentage of steel scrap to be used in obtaining the strongest iron for a given analysis. With this idea the term semi-steel was adopted and presented to the trade.

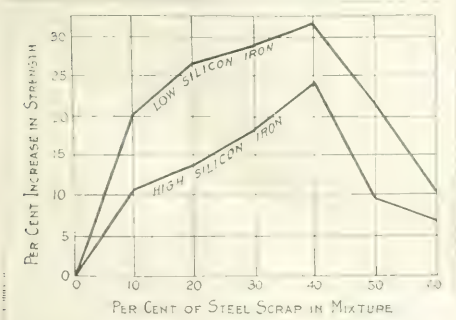


Fig. 1. Percentage Increase in Strength by Steel Additions to Two Classes of Iron Castings

From its inception there has been more or less debate as to the correctness of such a name. Some admirers have performed experiments to prove its worth; others have merely stated that high-test iron would be more correct. It is not within the province of this paper to present arguments either for or against. The trade names are accepted and used throughout the discussion without any bias.

The engineering professions, on learning that steel scrap added to the strength of cast iron, became hopeful of new applications for this material. Consequently, when cast iron was ordered the engineer demanded a semi-steel. This caused foundrymen to jump into the manufacture of this class of metal. The movement was without preparation and knowledge. As a result a heavy loss and many exceedingly poor castings were made. This caused the manufacturer as well as the consumer to look skeptically on the increase in strength of cast iron by the addition of steel scrap. Furthermore, some foundrymen learned to contend that such additions were injurious to their melt, while still others have gone to the exclusive manufacture of semi-steel castings.

Limitations on the Percentage of Scrap

From the foregoing, it is evident that there must be some merit in the way steel scrap is melted in the cupola. In other words, conditions in the various foundries and their methods of cupola operation have a direct bearing upon the resulting product. There are limitations which must be placed on the percentage of steel scrap in the mixture and on the arrangement and melting practice in the cupola. These limitations are principally because of the factors of mass, time and temperature.

It is generally conceded that carbon absorption by iron and steel is directly dependent upon time and temperature. Therefore, these become necessary elements in the melting of steel scrap in cupola charges. From the iron-carbon equilibrium diagram it is obvious that, as carbon increases in iron, the temperature of melting falls. From these phenom-

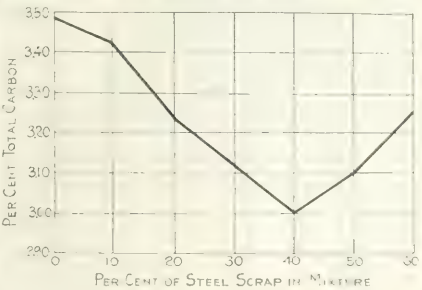


Fig. 2. Effect of Steel Scrap Additions on Total Carbon

*Metallurgist, Hickman, Williams & Co.

ena, if the time factor is correct, the steel will absorb carbon enough to bring its melting temperature well down to the range of that of the pig iron.

By actual experiment in melting 100 per cent steel scrap charges, it was found that the absorption of carbon readily took place up to 3.00 per cent. These experiments covered various grades of carbon steel, and in each case the final carbon content was within a 0.10 per cent range.

Factors to Be Considered

While discussing the elements which enter into the melting of steel scrap in the cupola, it is well to call attention to the factors which are considered important governors:

1. Diameter of [illegible] of melting.
2. Height of cupola charging platform above bed.
3. Ratio of [illegible] melting area.
4. Size of charges.
5. Blast pressure.
6. Volume of blast.
7. Bed charge of coke.
8. Coke [illegible] between iron charges.

These are given as a warning to foundrymen who are not aware of their melting conditions, so that they may forestall their being misled in the be-

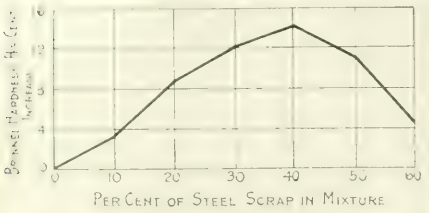


Fig. 2 Effect of Steel Scrap Additions on Hardness of Iron Castings

lief that they can take their original practice, add a little steel scrap and accomplish the results that follow.

The diagrams as reproduced show the average results of many tests run from actual production cupolas in one of the largest foundries in the Middle West. The time consumed by each percentage specified extended over a period of four days, so that the sprue was well worked in. The accumulated data as presented are averages of the samples from each of the four daily heats from which six tests were made. Each of the specimens were broken for strength, analyzed and microscopically examined. The bars were standard test bars and were all poured at 2300 deg. Fahr. The chemistry of the iron was held as near to conformity as possible. Fig. 1 shows the effects of varying percentages of steel scrap in cupola mixtures. The two lines indicate the effect on different analyses of irons. The upper one represents the results obtained from a low silicon, and the lower from a high silicon iron. The base grade, or a no-steel scrap mix, has been listed at zero and the percentage increase in strength as co-ordinates. As a matter of fact, the average strengths of the base grades considered were as follows:

Grades, Silicon, Per Cent	Strengths Lb. per Sq. In
0.75	22,000
1.20	29,000
1.50	[illegible]
1.65	[illegible]
2.10	[illegible]

By observing the strength chart, Fig. 1, it is seen that there is a limit to the strength obtainable by the additions of steel scrap. The highest, 40 per cent, which gives the maximum strength, is not to be recommended for standard practice, as continual daily remelting causes this mixture of iron to become sluggish after 5 to 10 days. The best working percentages to be suggested is between 20 and 30 per cent steel scrap. This gives a good, strong, close-grained iron, and one which gives satisfactory results.

As an explanation of the added strength given to cast iron by the addition of steel scrap, Figs. 2 and 3 are enlightening. Fig. 2 does not strictly adhere to the tests which were run showing that steel scrap absorbed between 2.90 and 3.00 per cent carbon in the melting. This difference may be attributed to the difference in total carbon of the pig iron and scrap used in the mix. The graphs, however, do confirm the statements that steel scrap dilutes the total carbon present in the iron.

Effect on Hardness

The question of steel scrap tending to harden the casting is amplified by Fig. 3. This increase in hardness is appreciably felt in the wear of the casting and is a noteworthy point for the consumers. This increase in hardness is a result of a slightly increased combined carbon content and the smaller formations of the graphitic carbon present.

The microscope shows a distinctive arrangement of carbon formation for each percentage of steel added. There is a marked tendency to break up the large lamellar formations, causing a more even distribution of the carbon throughout the section. The discussion of microscopic formations, however, is outside the scope of this paper, and the readers are therefore referred to the recent work of many of the leading investigators on the subject of cast iron.

In conclusion, the facts as presented show that semi-steel or high-test irons show a marked improvement over the regular cast irons. It is hoped that a more scientific control of the cupola will cause a wider adoption of this practice.

Iron Ore Problems in Birmingham District

Sampling of iron ores in the Birmingham district has been completed by the Southern experiment station of the United States Bureau of Mines, 453 samples having been taken. These samples are being analyzed at the Birmingham and Minneapolis experiment stations of the bureau. A study of mine supports, particularly with respect to the crushing strength of ores, is now under way. Several cubes have been cut from large blocks of iron ores taken from the mines. When this cube sampling is completed, crushing tests will be made with a view to obtaining data on the strength of iron pillars under compression. A detailed study of the ore beds and associated formations is in progress as a preliminary study to the support problem. Interesting results have been obtained in the investigation looking to improvement in the location of ores, particularly with the dip compass.

Contemplated Steel Plant Expansion at Ashland, Ky.

The American Rolling Mill Co., Middletown, Ohio, which some time ago acquired the properties of the Ashland Iron & Mining Co., at Ashland, Ky., is contemplating extensive additions to its Ashland works, principally in connection with its finishing capacity. Proposed extensions will cost in the neighborhood of $6,000,000. Reports that a $10,000,000 note issue will be offered by the company in the near future appeared on the financial pages of a number of papers last week, but officials of the company had no information to give out when interviewed.

Rolling mill equipment, recently installed at the Wallingford Cold Rolled Steel Co., Wallingford, Conn., plant, has been successfully tested, and is ready for production.

Electric Motor Drive in Steel Industry

Rolling Mill Requirements as to Power, Speed, Adjustability and Changing of Speed—Mill Layouts to Utilize Electric Power

BY GORDON FOX*

PRODUCTION of steel, including metallurgical transformation of the raw materials and mechanical configuration of the product, involves largely the application of heat and power. Although the direct cost of power is only about 5 per cent of the total cost of product, it is more nearly 15 per cent of the cost of mill operations. A ton of steel, in the form of billet, plate or sheet bar, involves a total power expenditure

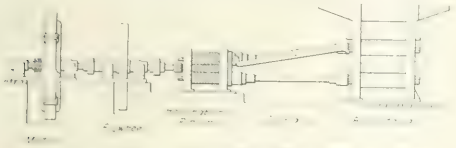
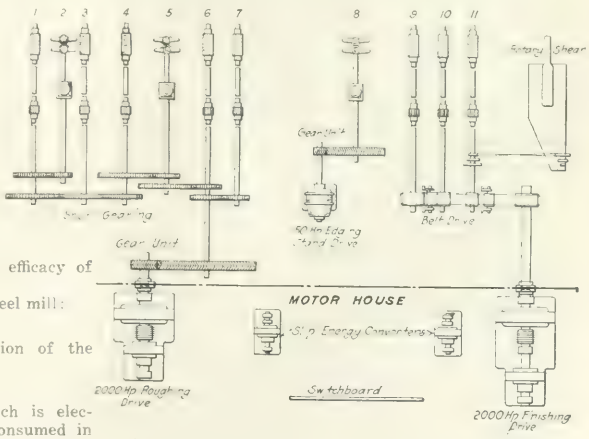


Fig. 1. Lauth Type of Three-High Plate Mill with Motor Drive and Flywheel

of some 200 kw. hr., about half of which is required for blowing at the blast furnace. Due to the large tonnages involved, the cost of power reaches a considerable total expense. In one electrically driven plant producing about 25,000 tons of steel per month, the corresponding electric power cost was about $40,000. Of greater importance than the direct cost of power is the indirect influence of reliability and efficacy of power application.

Fig. 2. Layout of 10-In. Continuous Skelp Mill with Roughing Stands Gear Driven from One Motor and Finishing Stands Belt Driven from Another. Two of the edging mills are driven by gear from the roughing stand drive; the third has a separate motor



Electric motive power is applied in the steel mill:

1. Directly, for rolling.
2. For transportation and manipulation of the steel and adjustment of machinery.
3. For driving accessory apparatus.

Relative usage varies. In a mill which is electrically equipped throughout, the power consumed in rolling is, in general, about 60 per cent of the total, the balance being used by auxiliary and accessory drives.

Power media employed in steel mills are steam, water, compressed air and electricity. Prior to the advent of the electric motor, steam and hydraulic drives were extensively employed for main rolls and auxiliaries, respectively. Most new mills are now equipped with electrically driven main rolls, and the less efficient steam drives are being replaced. Hydraulic power is still retained to some extent for auxiliaries. It has points of advantage, particularly for slow and short linear motions. Hydraulic mechanisms are inherently reciprocating as contrasted with high speed rotation obtained with motors. For linear motions, motors must be provided with screws, racks or cranks, and perhaps several gear reductions, introducing complication, cost, space and inertia factors.

Hydraulic drive is well adapted to shears. It is used where the market does not warrant the development of electric equipment, as for revolving ladle cranes. It is also used for counter-balancing, as at main rolls and lifting tables. The principal disadvantages of hydraulic drive are piping expense, inconvenient control, low efficiency, high maintenance costs, freezing and danger from leakage about molten metal. Compressed air is used to a limited extent for minor linear motions and for riveting and chipping.

One of the principal advantages of electric power in the steel mill lies in the fact that it permits centralized generation. The power plant, equipped with efficient condensing turbine generators, occupies a minimum of space and may be located to its best advantage, yet not conflicting with mill layout. Waste heat from blast furnaces may be utilized effectively and completely. The diversity factor between mill demands results in a relatively good load factor on the power house and boiler plant. Duplication of boiler capacity and operating forces is thus minimized. Power can be generated to best advantage on a quantity scale in a central plant.

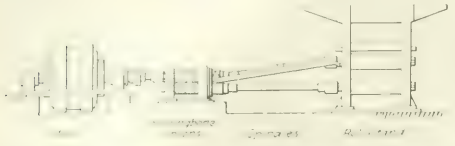
Electric power can be easily and economically transmitted in quantity. Protection of the distribution means is readily afforded. Duplicate feeders, loop systems or inter-connection may be employed. Faults are quickly isolated. There are no stand-by power losses at point of application; moving machinery may be readily supplied. The ease of metering electric power permits a ready check on rolling conditions. It permits rolling at maximum safe rates and assists to economies.

The possibilities of purchased electric power are attractive in many instances, either as a main or supplementary source or as a stand-by, particularly for plants in which waste heat is not available. The investment may thus be minimized. Probably the principal deterrent to the more general use of purchased power for steel mills is the experience of lack of reliability. The steel mill power plant compares in reliability and continuity with the central station and enjoys the advantage of contiguity. Transmission interruptions are still of too frequent occurrence with

*Electrical engineer Freyn, Brassert & Co., Chicago. This paper, before the Western Society of Engineers, won the Robert W. Hunt prize for the best discussion of some phase of the steel industry.

some utilities. Power interruptions at a steel mill are always serious and sometimes almost disastrous in their consequences. Interruptions from an outside source are particularly inconvenient because of their indefinite duration.

Probably the greatest advantages of electric drive are derived at the motors. Their compact form, light weight and wide range of characteristics permits their effective application to all classes of main and auxiliary apparatus. Their ease and flexibility of control as to speed, torque, direction of rotation and braking are of preëminent advantage. Their ready subdivision into units as desired assists in simplifying the drives. Their reliability is evidenced by the fact that, in most mills, the electrical delays are few and usually of short



Two High Blooming Mill with Motor Drive

duration. They involve relatively low inspection and maintenance charges. The overall economy from coal pile to the work is comparable or superior to that of other drive media. Motors involve no stand-by losses, and may be started and stopped on short notice. Their uniform torque and speed minimizes mill wear and breakage. Automatic control, with current limiting and protective features, safeguards both the drive and the mill and minimizes dependence upon the operator.

Electric drives for main rolls are available, having a wide range of characteristics. The general type of drive selected depends primarily upon the type of mill and its requirements. There are now installed in the United States and Canada more than 600 main roll motors. These represent a variety of mill arrangements which do not permit of distinct classification. There are, however, some predominating features which render possible a liberal classification of mills from the motor drive viewpoint. Such a classification will be here attempted and the principal features of the various mill types briefly discussed, chiefly as they relate to drive considerations.

Classification of Rolling Mills

Many mills comprise essentially one or more stands or trains of rolls which revolve continuously in one direction. Three-high stands are commonly used, in which the metal is passed forward between the two lower rolls and returned between the two upper rolls. Two or more such stands are often connected in train, that is, with all roll axes in a common vertical plane and with the drive shafts in series, so to speak. The most simple merchant mills are of this type. The last stand in this mill is commonly two-high, as the piece passes through it in one direction only; and better finish can be obtained than in a three-high mill, where the center roll serves double duty.

Some billet mills comprise two or more three-high stands, arranged either in train or in tandem. Rail and structural mills vary in layout, but commonly include three-high trains and tandem sets, which operate continuously in one direction and largely at fixed speeds.

Sheared plate is generally rolled on three-high mills of the Lauth type, the principle of which is shown in Fig. 1. The upper and lower rolls are driven, while the intermediate roll is rotated solely by friction from the roll which backs it up. Both the upper and the intermediate rolls may be raised and lowered. Tilting tables are provided in front and rear of the mills, and two such stands may be used in tandem.

So-called continuous mills comprise a number of two-high stands arranged in tandem, so that the metal passes in a straight line through the stands in sequence. All rolls revolve continuously in one direction. The rolls in each successive stand must revolve faster than those in the preceding stand by an amount just sufficient to account for the elongation, and thus prevent or minimize looping. As the delivery speed of a stand is approximately the same as the peripheral speed of the rolls, the intake speed varies in proportion to the draft. Thus, for a 30 per cent reduction in area, intake speed is to exit speed as 70 is to 100. This ratio varies some with different sections.

Some control is possible by adjusting the reduction in each stand. Guides are commonly inserted between stands to skew the metal, so as to work it from all sides, and also to clear the scale. Mills of this type are often divided into groups of stands, usually for roughing and finishing, each group being separately driven. The stands in each group are connected through gearing or belt to the drive. Fig. 2 illustrates a type of continuous mill.

Continuous mills are widely used both for roughing and for producing the simpler shapes. At Gary there is installed a continuous blooming mill having nine stands. This principle is widely used for billet, skelp, sheet bar, strip, merchant and rod mills. The chief advantages of the continuous mill are large production with little labor and rapid reduction with little cooling between passes. The rolls are of short length, and consequently may be of relatively small diameter. This type of mill requires relatively low power per unit of output, due both to the high temperature of working and to the small roll diameters.

The simple reversing mill comprises a single two-high stand of rolls. The lower roll is fixed in elevation, while the upper roll may be raised and lowered by a screw acting against a hydraulic balancing cylinder. These rolls are driven through spindles from a pair of pinions, which, in turn, are driven by the engine or motor through a flexible coupling. The metal is passed alternately forward and back between these rolls, which are reversed for each pass. Live tables are located in front and rear of the mill.

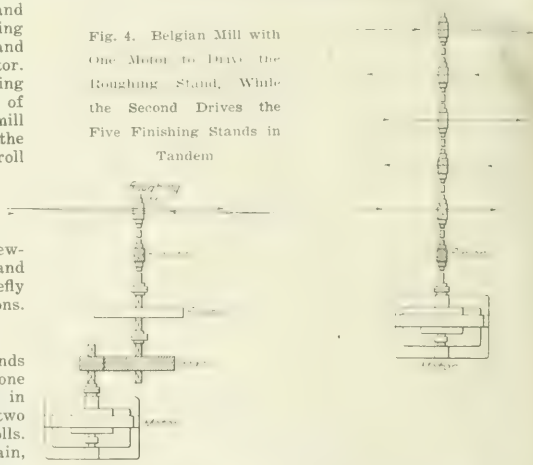


Fig. 4. Belgian Mill with One Motor to Drive the Roughing Stand, While the Second Drives the Five Finishing Stands in Tandem

Electrically driven blooming mills are almost exclusively of the reversing type. In these mills movable, aligning guards are located above the tables to guide the piece into the proper pass of the main rolls. A manipulating device serves to edge the piece when desired, so that it may be reduced in two dimensions. The general arrangement of such a mill is shown in Fig. 3. The principal application of the simple reversing mill is for roughing ingots. A reversing billet mill has been installed at the Mark Plant of the Steel & Tube Co. of America.

The universal mill is a reversing mill comprising a two-high stand of horizontal rolls, and, in addition, one or two sets of vertical rolls located at the sides of the mill ahead of and/or behind the horizontal rolls. The vertical rolls, which work on the edges of the piece,

and may be moved in and out, are driven through gearing from the main pinions. Universal mills are employed extensively for rolling slabs and universal plate. They are also used for some structural shapes.

The reversing mill enjoys a number of important advantages for breaking down ingots. It is flexible in that both slabs and blooms of various dimensions may be rolled, as ordered, without changing rolls. Due to the absence of lifting or tilting tables, the interval required between passes for manipulating and returning the piece may be made short. The steel may be entered between the rolls slowly, permitting of heavy draft without shock and avoiding slippage. The speed at each pass can be adapted to the length of the piece. The draft is under the control of the operator and can be varied for different steels or for a cold piece, and extra passes may be employed as desired. Due to the absence of lifting tables, the reversing mill as a whole is mechanically simpler than the three-high mill. Although the electric drive equipment is more complex, experience has shown that delays from electrical sources are less frequent and usually less serious than mechanical delays, so that additional electrical complexity is warranted by mechanical simplicity.

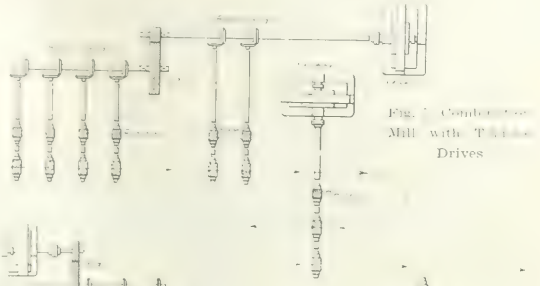


Fig. [illegible] Combination Mill with [illegible] Drives

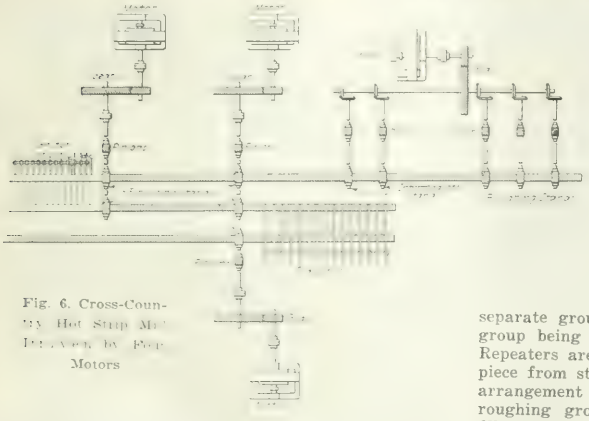


Fig. 6. Cross-Country Hot Strip Mill Driven by Electric Motors

At the Brier Hill Steel Co. is installed a reversing mill used for roughing plates, which are finished in a three-high mill of the Lauth type. It has been found that this reversing mill is preferable to a three-high roughing mill, particularly as to the short interval between passes. In rolling sheared plate it is necessary to turn the slab 90 deg. after it has been rolled to width in the first passes. It is easier to turn the slab on the fixed tables of the reversing mill than on the lifting tables of the three-high mill. Moreover, it is not necessary to square the piece accurately on the reversing mill, as it can be run against the main rolls and thus squared before the latter are accelerated and the piece entered. It has been suggested driving the three-high plate mill with a motor without flywheel, similar to a reversing motor, which could be stopped between passes when desired, but such a drive has never been installed.

Many mills combine the various types of stands or groups. One of the simpler combinations is the so-called Belgian mill. The single roughing stand of this mill is three-high; the finishing mill contains three-high and two-high stands in train. The piece, usually a billet, is roughed down by several passes in the roughing stand and then entered into the finishing mill and looped from one pass to the next through the various stands. Fig 4 shows the general arrangement of one type of Belgian mill. The advantage of this mill lies in the fact that the roughing stand is driven at a lower speed than the finishing train. A low speed is suitable for roughing work, as the rolls bite better on the heavy drafts and difficulty in entering the billet is avoided. Moreover, the finishing stands may be driven at a higher speed, as they are less compromised by the roughing stand requirements. As several passes are made in the roughing stand of a Belgian mill, this is a limiting factor in production.

One development of the Belgian mill is the combination mill which comprises a roughing mill having several two-high stands in tandem, on the continuous principle. This is followed by two or three separate groups of three-high stands in train, each group being separately driven at a different speed. Repeaters are used, at least in part, for guiding the piece from stand to stand. Fig. 5 shows the general arrangement of a combination mill. The continuous roughing group is able to maintain production to fill the finishing mills. The operation of the looping stands at different speeds reduces the length of loops between stands and thus avoids excessive cooling. It maintains the larger sections longer, both due to lower roughing speeds and by permitting more reduction in the later passes. It permits each group to operate at its most suitable speed and prevents restriction of the speed of the finishing rolls, which should be as high as possible.

The cross country mill, Fig. 6, is a combination made up of several stands or trains in tandem, but separated so that the material leaves one before entering another. The piece is carried between stands by live roll tables or transfers. To avoid excessive length of mill the piece may take a zigzag course, reversing its general direction of travel in passing through the various sets. This arrangement of mill usually permits rolling the steel in both directions, which improves its quality. The individual groups or sets may be driven separately or by gear, belt or rope, from a common source. The cross country mill is used to roll products not well adapted, due to size or shape, for continuous or loop mill rolling.

A sheet mill consists of two stands of two-high rolls, one pair being used for roughing, the other for finishing. The rolls revolve continuously in one direction at slow speed. The sheet bars are passed between the rolls by the roller and returned over the top roll by the catcher. The lower roll is at a fixed elevation and is driven. The upper roll revolves solely by friction from the lower roll or the steel and is fed up and down by screws. Several pairs of stands are commonly connected in train and driven by a single motor.

(To be concluded)

Improvements in Heroult Electric Furnace

Copper Pipes Carrying Cooling Water Used Instead of Copper Busses—Transformer Room Underneath the Charging Floor

THERE has been recently installed and placed in operation a 7-ton Heroult electric furnace at the plant of the International Nickel Co. at Huntington, W. Va. Although this furnace embodies the usual features of this type of furnace as manufactured by the American Bridge Co., the design is a new one and there are certain modifications or improvements which are shown in the accompanying illustrations.

The furnace is used for melting and refining Monel metal, which is cast into ingots for subsequent forging and rolling. It has a basic lining and desulphurization and deoxidation are carried on under a basic slag, as is customary with steel. Practically all heats tapped up to the present time have been as low as 0.005 per cent sulphur.

Copper Pipes as Conductors

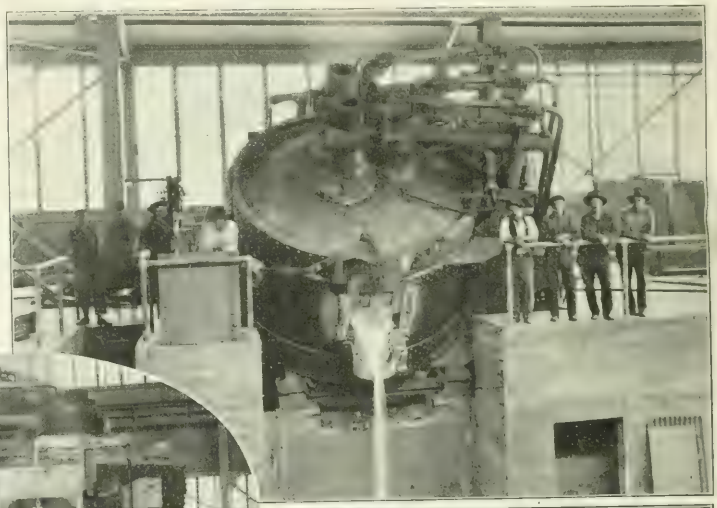
Instead of using built-up copper busses the electric current is conducted to the electrodes by means of copper pipes. The pipes also serve to carry water to the electrode holders and to the electrode coolers. For electrical reasons, a hollow circular section is the best one for conducting alternating current, and as the copper is water-cooled, only about one-third as much copper is required as when using busses. This is particularly true when the busses have to be carried over a hot furnace. All designers of electric furnaces have had to contend with the difficulties arising from reactance in furnaces of a large enough size so that the electric current required was considerable; for instance, where the amperes exceeded 7000. The trouble due to reactance is accentuated by having long conductors spread far apart and where the electric conductors pass near or between iron parts.

In most of the familiar types of electric furnaces there is a mast made of structural material, used to support the electrode cranes. It was found necessary to carry the conductors over the top of these masts in order to avoid proximity to iron parts with the consequent reactance. This also involved having overhead flexible cables. In the present design the mast is eliminated and the electrode cranes supported from below.

Transformer Room Under the Platform

The relatively small copper pipe conductors can be brought very close to each other, which makes it possible to have longer leads and at the same time have them extend beneath the floor. The necessary headroom for the passage of cranes is reduced and no flexible cables or other obstruction surround the furnace, the transformer room being beneath the floor. This arrangement makes it more convenient to have the electrode supporting mechanism attached to the furnace, either at the back opposite to the pouring spout or on the left or right hand side. In the present case this mechanism is placed on the left hand side.

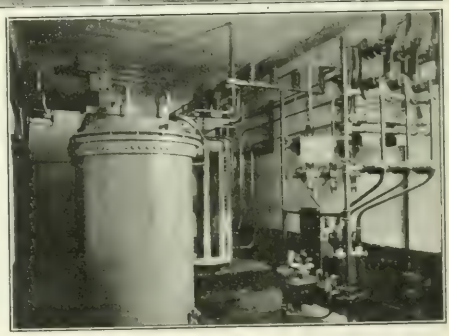
The transformers are 1800 k.v.a. water-cooled, General Electric transformers. The cooling water passes through the transformer and then through the copper pipe conductors, thence to the electrode holders, through a flexible connection and back to the electrode coolers.



The Larger Picture Shows the New Type of Heroult Electric Furnace with the Copper Pipes as Conductors Leading Up from the Transformer Room, Situated Under the Platform. The entrance to it is through the door, just below the four men. The illustration just under the door is the transformer room itself



The oval shows the furnace while in operation on Monel metal. The absence of the usual large amount of smoke and gases is considered a feature



The normal operating voltage is 100, although taps are provided to give higher voltages in case the voltage on the high tension line should be below normal. In order to avoid surges on the line and obtain steady operation, it was thought advisable not to have the power factor higher than 0.90 and additional external reactance was provided and is of the type furnished by the General Electric Company, as shown in one of the illustrations.

The cylindrical form of shell was adopted in preference to the dished or bowl shaped bottom, on account of its structural strength. These furnaces were formerly tipped about a hinge on line with the pouring spout and the furnace was provided with counterweights. In the rocker type of furnace the usual type of rocker rolling on a plain surface requires the cylindrical shell to stand too high above the foundation. In the present design, both the casting on which the furnace rolls and the rocker are curved. By thus dividing the curvature between the two castings the advantage of the rocker type is obtained without having the center of gravity above the rolling center. The furnace tilts backward as well as forward.

The arms carrying the electrodes have been brought in at an angle, for the purpose of placing the electrodes as close as possible to each other and to the center of the furnace. This is important in furnaces of high power, to avoid burning the furnace lining, especially where the basic process is used. The electrodes are actuated by winches and motors attached to the furnace. The General Electric Co. regulator is used. The tilting mechanism consists of two gear wheels on the same shaft, with connecting rods attached to the furnace. The tilting motor is of 15 horsepower.

Although the rated capacity of this furnace is 7 net tons, on account of the weight and compactness of Monel metal, heats of 9 tons are being tapped.

Rocky Mountain Industrial Relations Conference

The second annual conference on human relations in industry, under the management of the industrial department of the Young Men's Christian Association, was held at Association Camp, Estes Park, Col., July 28, 29 and 30. The sessions were attended by several hundred persons, mostly business men and manufacturers from Colorado, Utah, Wyoming, Nebraska, Kansas, Oklahoma, Texas and Montana, with a scattering of visitors from Eastern states. Program and general arrangements were in the hands of A. Bruce Minear, international industrial Y. M. C. A. secretary in the Rocky Mountain region.

The purpose of the conference was to discuss subjects connected with relations of employer, employee and consumer. Addresses, most of them given by men prominent in industrial management, covered various phases of these relations. Besides the prepared talks, there were general discussions in which different points of view were advanced and experiences exchanged.

The industrial relations conference grew out of a small week-end meeting of business men held in connection with the Y. M. C. A. schools at Estes Park in the summer of 1921. At this meeting it was suggested that a more widely attended conference be held in 1922, and that a foreman's course be conducted at one of the Y. M. C. A. schools. Both suggestions were carried out through co-operation between the Y. M. C. A. industrial department and interested business men of the Rocky Mountain district.

The program of the conference follows:

"Progress in Recent Years in Human Relations in Industry," E. H. Weitzel, Pueblo, Col., general manager Colorado Fuel & Iron Co.

"The Three-fold Responsibility of Management to the Parties in Industry," W. C. Coleman, Wichita, Kan., president Coleman Lamp Co.

"Japan's Industrial Future," J. Merle Davis, Tokio, Japan, industrial secretary Y. M. C. A.

"The Training of Men from the Industrial Standpoint," L. A. Gilbert, Denver, manager Swift & Co.

"Confidence and Goodwill," W. L. Petrikin, Denver, president Great Western Sugar Co.

"The Public and Industrial Relations," B. B. Brooks, Casper, Wyo., former governor of Wyoming.

"A Program of Health and Recreation in Industry," Dr. Henry F. Kallenberg, Chicago.

Sermon, the Rev. David G. Latshaw, New York.

"The Christian Spirit in Industry," T. W. Currie, professor, University of Texas.

The school for foremen and other business executives, conducted in connection with the industrial relations conference, covered a course of five days, July 24-28, inclusive, with intensive instruction in the following general subjects:

Industrial Leadership, by Fred O. Kelley, Lincoln, Neb., industrial secretary of the Y. M. C. A.

Industrial History and Economics, by E. S. Cowdrick, Denver, industrial engineer.

Industrial Organization, by T. E. Barker, Denver, general superintendent, Denver Rock Drill Mfg. Co.

The Sermon on the Mount as applied to industry, by T. W. Currie, University of Texas.

In addition to the four classes, there was a daily open forum, led by one of the students, in which subjects of direct interest to industrial executives were thrown open to general discussion. More than forty foremen, superintendents and others were enrolled.

It is planned to make the school for executives and the conference on human relations in industry an annual event, and preliminary arrangements for the 1923 meetings already are under way.

Trend of Wages Over the Depression

Figures of the National Industrial Conference Board for wages covering the period from July, 1914, to January, 1922, show average hourly and weekly earnings, average hours of employment and the ratio obtained by comparing money wages with cost of living. The figures are based on 26 major industries, 3800 industrial establishments and more than 1,000,000 wage earners.

As shown in our table, the average hourly earnings of all wage earners were 98 per cent higher at the end of December, 1921, than in July, 1914. The drop between December, 1920, and December, 1921, was 22.4 per cent. Common labor was 92 per cent higher in December, 1921, than in 1914, but 27.1 per cent lower than in September, 1920. Skilled labor was 98 per cent higher than in 1914, but 20.7 per cent lower than in September, 1920.

Because of shorter working weeks, the average weekly earnings of all wage earners was only 80 per cent higher than in July, 1914, but was 25 per cent lower than in July, 1920. Similarly, common labor was 74 per cent higher than in 1914 and 30.2 per cent lower than in August, 1920. Skilled labor was 80 per cent above the 1914 level and 23.8 per cent below July and August, 1920.

Real wages, meaning the purchasing power of the money wages received, were 11 per cent higher at the beginning of this year than in 1914. In other words, the standard of living had increased to that extent, this resulting from the fact that wages were 80.2 per cent higher and living cost 62.3 per cent higher than in 1914, the excess of wages accounting for the increased real wage or purchasing power. The highest point of real wages during the entire period under survey was reached in October, 1920, with 21 per cent greater real wages than in 1914.

	July, 1914	Peak, 1920	Dec., 1921
Hourly earnings:			
All wage earners..	24.3c.	a 62.1c.	48.2c.
Common labor.....	20.7	b 54.6	39.8
Skilled labor, male	28.0	b 70.0	55.5
Women	15.6	c 41.7	34.7
Weekly earnings:			
All wage earners..	$12.36	d $29.69	$22.27
Common labor.....	10.89	e 27.14	18.95
Skilled labor, male	14.19	d 33.64	25.66
Women	7.82	c 18.79	15.78
Hours per week:			
Average nominal..	55.1	c 50.7	49.8
Plant activity	53.8	c 49.8	47.2
Per wage earner..	51.0	c 48.5	46.2
Index number:			
Wages, weekly....	100	d 240.0	180.2
Cost of living.....	100	d 204.5	162.3
Real wages.....	100	f 121.0	111.0

a December b September c June d July. e August. f—October; July showed 117.

Core Box for Making Sash-Weight Cores

A patented combination core box for use in connection with end-drawn sash weight flasks, and which together form a special system of making sash weights, is being offered by the De Ved Brothers, Inc., Baltimore. This system is intended to permit the production of sash weights in large tonnage at very low cost, with a smooth eye and plainly marked.

The core produced by the box is in the form of a plug adapted to close the top of the sand mold in which the weight is cast, forming the eye which receives the sash cord, and incidentally forming the entire top of the weight.

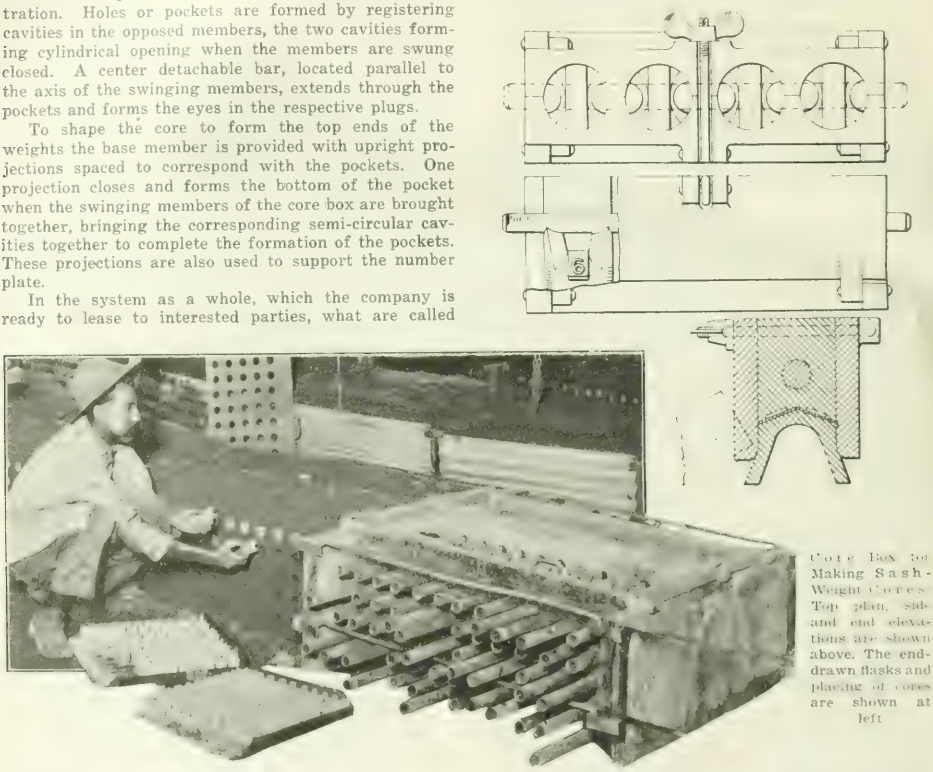
The core box is made up of two side members pivoted to open and close in a tongwise manner. These members are pivoted to a base as shown in the illustration. Holes or pockets are formed by registering cavities in the opposed members, the two cavities forming cylindrical opening when the members are swung closed. A center detachable bar, located parallel to the axis of the swinging members, extends through the pockets and forms the eyes in the respective plugs.

To shape the core to form the top ends of the weights the base member is provided with upright projections spaced to correspond with the pockets. One projection closes and forms the bottom of the pocket when the swinging members of the core box are brought together, bringing the corresponding semi-circular cavities together to complete the formation of the pockets. These projections are also used to support the number plate.

In the system as a whole, which the company is ready to lease to interested parties, what are called end-drawn flasks are used. These are 4 ft. long, 4 ft. wide and 18 in. high and contain 120 sash weights to the flask, or from 800 to 1000 lb. of iron. It is claimed that one laborer can put up 10 to 12 of these flasks per day, making 8000 to 12,000 lb. of sash weights and that experienced molders are not necessary to perform this molding, common labor being said to be adequate for the process.

With the combination core box described it is claimed that the cores for the flasks can be made by a boy at the rate of 500 per hr. It is figured that the cost of molding and of making the cores is one dollar per ton, the flasks now up, ready for the hot iron. A very cheap grade of melting scrap and also very low grade of scrap such as roofing tin, sheet metal clippings, etc., can be used in this system.

The company recommends the system to all foundries to be worked in with other general foundry work, it being emphasized that this system permits a foundry to produce sash weights for local requirements at a saving in freight and handling expense and permits of quick delivery to nearby consumers.



Core Box for Making Sash-Weight Cores. Top plan, side and end elevations are shown above. The end-drawn flasks and placing of cores are shown at left

Electric Alloy-Atlas Crucible Merger

President L. J. Campbell of the Electric Alloy Steel Co., Youngstown, Ohio, announces that the merger of this property with the Atlas Crucible Steel Co., Dunkirk, N. Y., is virtually completed. Consummation of the consolidation may be expected very shortly, he states. Mr. Campbell will be chairman of the board and chief executive officer, located at Dunkirk. To unify management, leading directors of the Electric Alloy company have been added to the board of the Atlas Crucible Steel Co., including James A. Campbell, Thomas J. Bray, W. A. Thomas and L. J. Campbell.

As far as possible the properties will be operated as a single unit until the merger details are actually completed, in order to get the advantages of operating economies which will thereby be effected. A temporary working arrangement, with Mr. Campbell in charge, is therefore in effect until legal consummation of the merger is completed.

Permits were issued in Chicago in July for 1144 buildings, fronting 33,075 ft. and involving a total cost of $16,214,300 as against 754 permits for structures fronting 21,403 ft. and costing $14,004,650 in July, 1921, an increase of 390 permits, 11,671 ft. of frontage and $2,209,650 in cost. The figures, however, show a decrease as compared with June, 1922, of 275 permits, 8744 ft. of frontage and $10,362,550. Figures for the first seven months of 1922, showing 7569 permits, 233,960 ft. of frontage and a cost of $127,716,610, are greatly in excess of the records for the same months in previous years as far back as and including 1913.

The United Coke & Coal Co., seller of foundry, furnace and domestic coke and coal, has moved its offices from 2013 to 814 Fisher Building, Chicago.

Notes on Acid Electric Furnace Practice*

Basic Scrap and How to Charge It—Making a New Bottom —When to Tap and How to Pour—Alloy Additions in the Furnace

BY CHARLES WELLMAN FRANCIS

ACID practice is the most universally used in the present day foundry for the manufacture of steel castings. This fact was probably due largely to the recent world war conditions which brought about a great scarcity of Austrian magnesite in this country, magnesite being the best of all basic refractories, and has caused the development of our own American product to such an extent that we have pretty closely approached the qualities of the Old World material which we at one time thought could not be equaled. Again, production was the first word in the American steel industry during this period, and acid practice is the fastest and most economical when ordinary physical and chemical specifications only are to be met. As a result, one great difficulty has arisen which may tend to swing us back more generally to basic operation, namely, that our scrap as a product of the acid-lined furnace has gradually become more impure in quality, due to no refining. Also during this reconstruction period, competition has become much keener, which will tend to the manufacture of finer grades of steel.

Basic Scrap for Acid Furnaces

As has been mentioned in one of the previous articles, the writer has found it advisable to use a good basic scrap for charging the acid furnace. This scrap should be of a light, quick melting, shoveling type, and yet have body enough to prevent the electrodes from quickly penetrating it and striking the furnace bottom. To help prevent the latter occurring, the foundry scrap portion of the charge, which usually makes up 40 to 50 per cent of the melt, is first placed on the bottom of the furnace with the purchased scrap on top, taking care to prevent the piling of the scrap against the side walls and banks as much as possible.

There is a double reason for piling the scrap in the center of the furnace as much as possible and consequently keeping it off the banks and side walls unnecessarily. First, when it is piled in a heap in the center of the furnace it will be the melting zone of the electrodes, which tends to enhance quick melting. Second, a great amount of unnecessary labor is done away with because this scrap clings to the side walls and banks and must be pulled into the bath when the furnace is hot. Of course, some of this work always has to be done, no matter how carefully the furnace is charged, but it is advisable to eliminate hot and heavy work wherever possible. It is important to emphasize here that the rate of melting is solely dependent on the manner in which the furnace is charged and how the current is applied.

When the charge is entirely melted a test is taken and broken for a fracture reading by the melter; one portion of the test piece is then drilled and sent to the laboratory for analysis. According to the result of the analysis, the necessary amount of ferroalloys is added as soon as the metal is hot enough to pour. No slag mixture is added during the acid electric furnace heat, as the impurities in the scrap, together with the washings from the banks and side walls, form sufficient slag. Often an acid heat will melt practically free of slag, but from the time the charge is entirely melted until the heat is ready to be tapped, the slag will accumulate rapidly. An acid heat should be tapped when the slag bubbles and becomes puffy, which is often termed a "dry" slag.

When the heat is tapped the furnace is ready for fettling or repairing. This work depends entirely on the condition of the furnace bottom and banks, and requires considerable experience to be done properly. Ground ganister is used and sometimes it is mixed with silica sand, depending on the conditions of the furnace. This material is usually wet thoroughly, because the wet mixture can be more accurately thrown from a shovel to the desired point in the furnace. Also because the wet mass will not spread as will dry fettling material when thrown from the shovel. Inexperience in doing this work is usually illustrated by the building up of the furnace bottom or the rapid disappearance of the banks, caused by using too much bottom mixture or not enough, respectively. Great care must be taken in repairing a "hole" which is sometimes left in the banks or bottom after a heat is tapped. In doing this the same methods are employed as are used in open-hearth furnace practice. If the hole is small the hot metal which stays pocketed therein can generally be balled on the end of a cold rabble or hook and pulled out. If the hole is larger the use of a little silica sand will help the operation considerably.

After making bottom, as the above operation is commonly termed by steel melters, it is advisable to close the furnace doors and let stand for a few minutes, as the intense heat of the furnace will cause the new repairs to set into place, and consequently it will not be so easily displaced by charging the foundry scrap.

Burning in a New Bottom

Burning in a new furnace bottom is one of the most important features in any type of furnace practice. Methods used in the electric furnace differ considerably from those used in open-hearth furnace work. Ground ganister, silica "grits," silica sand and fire clay are used in the proper proportion to form a somewhat plastic mixture, and the entire bottom is put in place in one operation with the use of a foundry air rammer, and smoothed off to the desired contour. The bottom should then be dried thoroughly with a wood fire from 24 to 48 hr., after which the furnace is dumped to remove the ashes and a bed of coke is distributed evenly over the bottom. The electrodes are lowered and the power turned on as low as possible. Four to six hours of burning, with the power on and off intermittently, is often sufficient to give the bottom the necessary baking, prior to charging the furnace. The furnace will gradually become hotter under these conditions, and it will be found advisable to leave the power on for shorter periods.

After the furnace has been well heated it will be found that these periods during which the power is shut off will give as good results as those during which the power is on, provided the furnace doors are kept closed and sealed, for the new furnace will be getting

*In the issue of July 27, p. 201, the author discussed the choice of an electric furnace and in the issue of Aug. 3, p. 277, the economy features of electric foundry design and equipment.

the desired soaking. It is surprising how quickly the empty furnace will be heated; consequently great care must be exercised not to carry this work on too quickly or a "dripping" of the roof and side walls will take place, greatly diminishing the life of the refractories.

Tapping and Pouring

The remaining phase of this problem which the author wishes to discuss briefly is the tapping and pouring of an acid heat. Considerable controversy arises at times whether to use bottom-pour or lip-pour ladles. For acid heats of three tons capacity or smaller, the lip-pour ladle will be far more economical in the long run because, aside from being much easier to handle, they will last for six to eight heats without being relined other than knocking off large particles of slag and repairing the lip. On the other hand, the bottom-pour ladle for small heats produces considerable distress in a small shop, due to the delays experienced in "setting stopper," to say nothing of the probability of losing a large part of the molten metal in the furnace pit. Just as much care must be exercised in setting the stopper in a small ladle as must be employed in an 80-ton open-hearth ladle.

All the metal should be tapped into a big ladle at once so that the furnace can be given the proper care immediately, instead of being "shanked" from the furnace, as is often done with the smaller size furnaces. Considerable electric power is also saved by getting the furnace charged again as quickly as possible, and analogous to this same principle is the fact that if work is slack in the foundry it is more economical to start the furnace later in the day and take the necessary heats one right after another until the floor is cleared, provided no overtime is necessary.

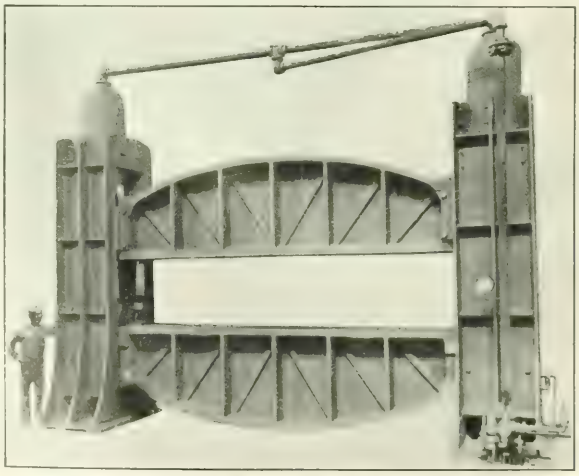
Alloy Additions

There is no general method which is universally followed by electric steel makers in making the alloy additions. Some foundries make their final additions in the ladle, some in the furnace, while other split them half and half, still others adding manganese in the furnace and silicon in the ladle and vice-versa.

There is an old saying among certain open-hearth melters that "the proper place to make the steel is in the furnace." The author is of the opinion that this statement is not far wrong. It has been his personal experience that the best method is as follows: When the heat is ready to be tapped, call for the ladle, and while the ladle is being brought up to position make the necessary additions of ferromanganese and ferrosilicon in the furnace, give the bath a good stirring and tap the heat at once. This method will give the best mixture and uniformity of analysis, and the melter can be reasonably sure that he will get all that he adds, while on the other hand alloy additions in the ladle often cause hard spots, poor mixture and low analysis, especially when the slag is a little "stiff."

Large Hydraulic Flanging Press

A hydraulic flanging press, the total weight of which is 42 tons, and capable of exerting a maximum pressure of 435 tons, is shown in the accompanying illustration. It was built recently by the Hydraulic Press Mfg. Co., Mount Gilead, Ohio, for the Merchants Dispatch Transportation Co., Rochester, N. Y., and is used for flanging the plates for Murphy car ends.



Flanging Press Used for Plates for Murphy Car Ends. It weighs 42 tons and exerts a pressure of 435 tons.

The machine will flange cold steel 5/16 in. thick and 10 ft. long. It has a stroke of 24 in., and the maximum distance between platens, daylight space, is 36 in. The two rams are 20 in. in size and located as shown. Two 5½ in. auxiliary cylinders are used for returning the platen. A three-way poppet-type H-P-M high-pressure hydraulic valve controls the movements of the press, the valve being manipulated by one hand lever. The cylinders, platens, housings and other parts of the machine are of cast steel and in connecting up the press H-P-M hydraulic valves and fittings were used.

This equipment is said to be the largest that has ever gone through the Hydraulic Press company's shop, although many presses of higher tonnage have been built. The height and massiveness of the machine may be judged from the size of the workman standing beside it.

Employment in July

WASHINGTON, Aug. 8.—Of the 65 leading cities of the country, 44 report employment increases, according to the industrial analysis of the Department of Labor for July.

"Throughout the country," says the report, "a strong undercurrent in the direction of an industrial recovery is evident, notwithstanding difficulties incident to lack of fuel and transportation. Evidence of this is found in decided increases in 10 of 14 basic industries. The iron and steel industry in some sections suffered keenly through inadequate fuel supply, yet employment registered a material increase. A more substantial increase was shown in the metals and metal products other than iron and steel."

The report further points out that the increase in building operations approaches a boom in many sections of the country. "A thorough canvass of the industrial situation," says the report, "reveals an optimistic opinion that the country, with the settlement of the two major controversies, will experience a rapid advance in industrial prosperity."

The Cedar Rapids Foundry & Machine Co., Cedar Rapids, Iowa, has filed an admission of insolvency in answer to an involuntary bankruptcy petition by several of its creditors.

Let Steel User and Steel Maker Co-operate*

Experiences with Steel in Cement Plant Machinery Show How Failures Might Have Been Avoided— Importance of Heat Treatment

BY W. R. SHIMER

IT was my original intention to present a paper containing definite recommendations for the more important iron and steel parts used in machinery for the manufacture of cement. Upon going into this phase of the subject in detail I find that, due to various local conditions, a steel which is satisfactory for a certain part at cement plant A may not be suitable for the same part at cement plant B. This is due to various reasons, such as difference in hardness of rock, type of machinery, condition of machinery, personnel of operators of machinery, etc. I will, therefore, confine myself to general remarks and attempt to show how to obtain steel which will best suit the purpose and how to draw up specifications which will assure a satisfactory product.

From an examination of certain failed parts there is every indication that some of the failures can be attributed to error in design. For example, the writer had the opportunity to investigate the breakage of shafts in an electrically operated shovel operated in the same quarry with two steam shovels. No shafts were known to break in either of the steam shovels, while the shaft breakages in the electric shovel were frequent.

When the electric shovel was attempting to dig out the side of a hill in one scoop—and since an electric motor will withstand a 100 per cent overload momentarily—the shafts were stressed to double the amount for which they were designed, and as this stress was a sudden one, the shafts naturally twisted off. I understand that when a steam shovel is overstressed it will stall; there are no sudden shocks, and consequently shaft failures are much less frequent in shovels of this type.

The shafts in the electric shovel could not be made larger without making radical changes throughout the entire mechanism, and it was necessary, therefore, to use a special nickel chrome steel, heat treated to give more than twice the elastic limit of the original shafts, and at the same time the elongation and the contraction of area had to be fairly high to insure sufficient ductility to withstand the usual shock and vibration. The physical properties of the failed shafts showed approximately the following:

Tensile strength	62,000
Elastic limit	32,000
Elongation, per cent	25.5
Contraction of area, per cent	61.07

The heat treated alloy steel shafts showed:

Tensile strength	112,000
Elastic limit	90,000
Elongation, per cent	22.5
Contraction of area, per cent	64.0

These physical proporties more than make up for the deficiency in the size of the shaft.

The Use of Cold Drawn Steel

For quick repairs, cold drawn shafting was used for shafts in this shovel, and some broke in one week's time. Cold drawn steel is made by pickling all the scale from the hot rolled bar, which is then pulled through a die 1/32 to 1/16 in. less in diameter than the original bar. This produces a bar of accurate size, with a smooth, bright finish. The bar is reduced cold and while cold extends in length in proportion to the amount of reduction in cross section. Low carbon steel is cold drawn without annealing, but the higher carbon and alloy steels are annealed first. The physical effect of this cold working is to raise the elastic limit in the smaller diameters up to approximately 90 per cent of the ultimate tensile strength, with a corresponding decrease in ductility. Prior to cold drawing, the elastic limit of the same steel approximates 50 per cent of the tensile strength, with considerable ductility.

I would not recommend that cold drawn steel be used for important structural parts which must withstand shock and vibration. It is an excellent steel for screw stock, bushings, sockets and parts of this nature which must be turned out cheaply by the thousands on automatics. It is satisfactory for line shafts and other parts of like nature which are not highly stressed. Some years ago an automobile company in an attempt to save money on lathe work, used for a time a cold drawn alloy steel for axles. They were drawn to finished size, and all the machining required was to cut to length and mill the ends square. This proved an expensive economy, as these axles failed in many of the cars after short service and replacements were made free of charge in order to satisfy the car owners. The replacing axles were made of a special heat-treated alloy steel, and they returned to the practice of turning the bars on a lathe rather than to obtain the accurate size by cold drawing.

Cold drawn steel has its field, and I do not wish to be misunderstood in my remarks concerning it. It is, however, false economy to use it for highly stressed parts, as there are so many steels which can be heat-treated to stand up under severe service and which will far outlive cold drawn steel.

Improper Heat Treatment

Many parts fail in cement machinery on account of not being heat-treated, or having been improperly heat treated for the service to be performed. Many times steel of correct composition for a certain use fails in a very short time because of improper heat treatment. When properly heat-treated this same steel will give satisfactory service. We received an order some years ago for ten bars of nickel steel 4 in. in diameter. This order was from a drop forge concern and from the composition of the steel ordered it was inferred that the steel was to be cut up and forged into gear blanks, which subsequently were to be heat-treated. This steel was shipped to the customer in its annealed condition, having been annealed for machinability. A short time later we received a complaint, stating they had made piston rods from three of these bars and put them in drop forge hammers. One lasted 2½ hours and broke; another lasted 5½ hours, and the third lasted about 15 hours. They stated that this so-called high grade nickel steel was inferior to brass or wrought iron. The remaining seven bars were returned and given a special heat treatment by quenching in oil, with subsequent annealing. They were returned to the customer and were found to be entirely satisfactory. In order to obtain the best service from alloy steels, they must be heat treated, as it is not good economy to use them otherwise. When heat treated they are far superior to ordinary steels.

Experiences with Steel Castings

Proper attention is not always given to steel castings, due in part, perhaps, to the users feeling that because the casting was made of steel instead of iron it had all the strength that was required, with the result that no check was made as to the analysis of the steel or to its annealing. This applies, of course, to commercial castings. There have come to my attention quite a few failures of machines where steel castings

*From a paper before the Atlantic City meeting of the Portland Cement Association, June 27, 1922. Mr. Shimer is sales metallurgist of the Bethlehem Steel Co., Bethlehem, Pa.

have been used, the machines in mind being large jaw crushers.

Up to a few years ago, the primary crusher was fitted with a jaw opening of about 24 by 36 in. but with the advent of steam shovels it became necessary to increase the size of crushers, and these machines are now built with openings up to 5½ by 7 ft.

In the designing of these larger size crushers, the manufacturers went to the use of steel and made a great many of the crushers in sectional design, i.e., the side frames and end frames being separate castings, machined and held together by turned bolts.

Another design of crusher consists of a "semi-steel" frame, reinforced with a cast steel band which is shrunk around the bottom of the frame and a cast steel band around the top. The design is such that the steel bands take all of the crushing strain.

The failures of these steel crushers have been due partly to incorrect analysis of the steel and partly to the fact that the castings had not been properly annealed, if annealed at all. In one of the large plants there was broken in operation a crusher in which the frame was 20 ft. long and the cross section of the steel about 6 in. by 5½ ft.

The breakage of these castings showed that the steel was very coarse grained and that it had not been properly annealed, with the result that original strains were still in the castings. Had these castings been properly annealed, there is no question that the machine would have stood up and that the breakage would not have occurred. The repairs to this particular machine will cost the operating company many thousands of dollars, as the machine will first have to be banded together to permit it to continue to operate, and later the side frames entirely replaced with new castings.

There has also been brought to my attention the failure of a crusher which was reinforced with a heavy steel band. This band was of oval shape and had a wall cross section of 5 by 24 in. It broke at three points almost simultaneously, and the nature of the breaks indicated brittleness. Investigation showed that the casting was too high in carbon and that it had not been properly annealed. The microscope showed a structure of steel in the same condition as when cast; if it had been annealed at all, it only went through the motions of this operation, as there was no indication of annealing from the examination of the casting itself.

Customary Specifications and Tests

The practice generally followed is to specify certain physical properties in accordance with the specifications of the American Society for Testing Materials. The tests are taken from coupons attached to the casting, and heat-treated with the casting. Test coupons are integral with the casting. They should not be broken from the casting until it has been heat treated. If, by accident, the coupons should be broken off prior to annealing, they should not be heat treated separately but should be charged in the same annealing furnace at the same time with the casting in order that it receive identical heat treatment with same. This is necessary in order to be assured that the physical results obtained from the coupon represent the physical properties of the casting itself.

Failures such as those just briefly cited might mislead prospective purchasers into believing the machinery itself was at fault. In cases of this kind, no reflection can be cast upon the make or design, because the failures are directly due to the fact that the makers of the castings did not furnish a good product. It is always unwise to place an order for a special part to the lowest or any bidder, without first having been satisfied as to his ability to furnish a satisfactory product.

I believe I am safe in stating that the average mechanical engineer knows steel only in a general way, as he has neither the time nor the opportunity to keep up to date with the rapid advances made in this art. Even we who are working on this subject all the time find it difficult to keep pace. An engineer will design a part and figure on a certain factor of safety, for example of 5 to 1, when he expects to encounter shocks, etc. With this factor of safety, he may require steel of, say, 110,000 lb. elastic limit, which predetermines an ultimate strength of approximately 140,000 lb., but loses sight of the fact that to meet this high elastic limit, the elongation and contraction will be relatively low, and he will have a steel lacking in ductility, so that the real factor of safety is actually much lower. For such a highly stressed part, he would have a more satisfactory product if he used a factor of safety of 4 to 1, and asked for a steel having, say, 90,000 lb. elastic limit, with proportionately lower tensile strength, since he would have a corresponding increase in ductility, thereby enabling the part to withstand shock and vibration.

Importance of Ductility

One big problem in some cement plants is to obtain satisfactory shafts for gyratory crushers. Low to high carbon steels and alloy steels heat treated for high tensile strength and elastic limit have been used, but certain plants still have more breakages than they should. I have been investigating this subject with a view to developing a satisfactory steel and a heat treatment for this purpose. In general, I find the tensile properties need not be high, but the important properties are elongation and contraction of area. The shafts which on the average stand up longest in service are those with greatest ductility.

I have interviewed a number of cement plant operators who use the gyratory crushers and find such shaft failures are peculiar to certain plants, while others rarely if ever have this trouble. The plants which have no failures attribute their success to the fact that they make a special effort to keep dipper teeth, sledge hammers, and other iron and steel parts from going through the crusher. The penalty to employees allowing such parts to go through is dismissal. I am inclined to believe that this is one of the major reasons for shaft breakages, as this would explain why the harder shafts are more susceptible to failure than the softer and more ductile ones.

When a large piece of steel passes through a crusher, something has to give, as the crusher itself cannot stall. If the liner plates do not break, the shaft must distort. A hard shaft will act as a spring, but the excessive strain which has been put on some points, usually on the outside surface, will produce a nick of perhaps microscopic size, which we might call an incipient break, and during continued service it grows larger, finally resulting in the fatigue break, which these shafts manifest on fracture. The softer steel shafts will bend and at times even take a permanent set, but there is no doubt but that the increased ductility accounts for their being longer lived. When a plant has an unusual number of breakages of this nature, and if it is certain no foreign material has gone through the crusher, an investigation should be made by a competent party, as such a condition can generally be corrected either by a change of steel or by special heat treatment.

I understand some gyratory crushers are being redesigned in order to permit shortening of these shafts, and that these shorter shafts are reducing the breakages to a considerable extent.

Buyers Need to Know Steels

I can easily imagine how the cement plant engineer, or the engineer building machinery, who might interview six to a dozen representatives from as many different steel concerns, could become confused when attempting to boil down the diversified information received. The same thing would happen if the writer were in the market for cement, and with his limited knowledge of this product would have difficulty deciding whose cement was best after interviewing representatives from as many cement companies. I would probably purchase from the lowest bidder, and no doubt obtain just what I paid for, namely, an inferior product. The enthusiastic steel salesman may elaborate on the wonderful physical properties of a special alloy steel, representing results obtained from a small test bar, and leave the cement engineer to believe that

(*Continued on page* 388)

Detroit Facing a Serious Fuel Situation

Many Iron, Steel and Other Plants Have Nearly Exhausted Their Supplies—The Detroit Employment Curve in 1920-22—Some Signs of Slackening

(Editorial Correspondence)

DETROIT, Aug. 5.—The labor situation is uppermost in the minds of manufacturers everywhere and Detroit is no exception to the rule, for there is grave apprehension here as to what will happen to the industries of this city within a very short time unless both the railroad and coal strikes are settled. Detroit is so located that in times of congestion on the railroads the coal shortage is likely to become very serious and to-day many plants have almost exhausted their supplies of coal. The Ford Motor Co. announces that its supply will last but 14 days, and it has made a strong appeal for priority in the shipment of coal to its plants, not only on its own account, but because other industries are dependent upon it.

If the great Ford plants are closed, many foundries and other plants will be thrown into idleness. Detroit's chief hope for relief rested upon the ability of Henry Ford to make an arrangement so that his railroad, the Detroit, Toledo & Ironton, would be able to carry coal from the Kentucky fields to Detroit. The Louisville & Nashville some time ago declined to enter into such an arrangement with the Ford line, and another appeal made this week was likewise declined to-day. There are 6000 cars loaded with coal at Corbin, Ky., and if a way can be found to deliver this coal to Detroit, relief will be afforded, but no plan for this is now under consideration.

A representative of the Semet-Solvay Co., on which the Detroit Iron & Steel Co., public utilities and many industries depend for coke, told me yesterday that unless there is a decided change for the better next week the company will be compelled to cease operations within 12 days. He said that no coal is being received now and that within two weeks it would not have more than enough on hand to keep the by-product ovens warm. Representatives of public utilities, including the electric light company, say that unless they obtain larger supplies of coal within a few days it will be necessary for them to curtail their service.

Employment in 1920-1922

The accompanying chart, compiled by the Employers' Association of Detroit from reports of the number of employees submitted each week by 79 firms whose employing strength includes approximately two-thirds of the working population of Detroit, shows that in 1920 nearly 200,000 men were employed until early in April, when, owing to the switchmen's strike, the number rapidly declined to about 70,000 and then advanced quickly to 190,000 about the middle of May, continuing without much decline until the first of August. Then came the slump which resulted in only about 25,000 men being employed at the close of the year. In 1921 the number of employees increased steadily from 25,000 in January until it touched nearly 120,000 in May, and continued with little change until about Dec. 15, when there was a sharp decline to about 50,000 men. In 1922, the change for the better started immediately after the first of the year and continued until Aug. 1, when nearly 185,000 men were busily engaged.

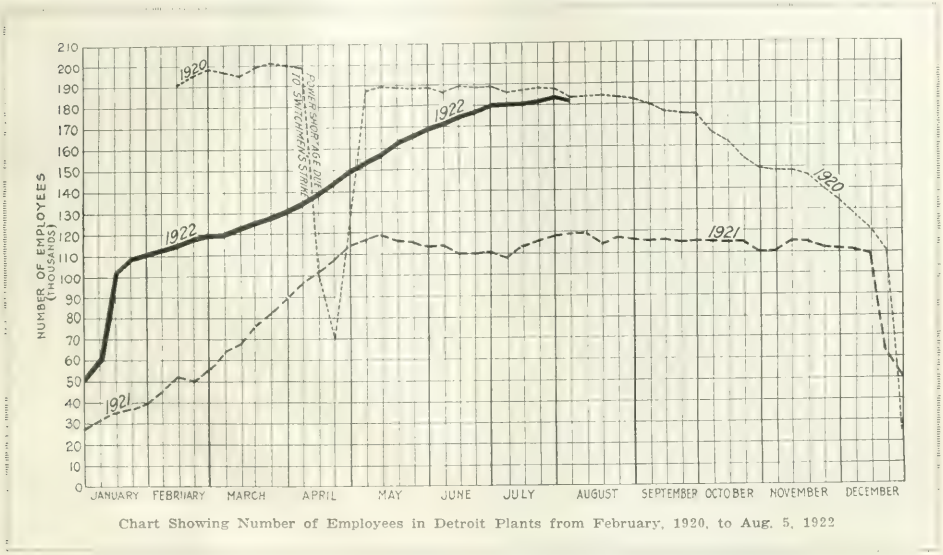


Chart Showing Number of Employees in Detroit Plants from February, 1920, to Aug. 5, 1922

This week, for the first time in months, the number of employed has declined and this fact has been viewed with some apprehension by a few observers, but it would be indeed surprising if some men were not thrown out of work at the present time and the best informed observers say that the showing of the past week is indeed remarkably favorable. What will happen in another week is problematical. There may be a decrease in employment like that of April, 1920, since there is a shortage of not only coal but of pig iron and other raw materials. Numerous foundries are on the verge of shutting down, at least temporarily, and Detroit furnace operators are at their wits' end trying to devise means of keeping the foundries supplied with

iron. Prices have advanced in harmony with the advances in other cities, but this fact does not deter foundrymen from placing orders when they are able to do so.

Satisfactory Industrial Relations

Except for the troubles which have arisen from the coal and railroad strikes, Detroit is enjoying very satisfactory relations of employers and employees. At one time last year there were 40,000 idle men in this city. Within a few months, virtually all of those men who wanted work were employed and in addition 60,000 other men have been added to the payrolls. All of this has been done without serious friction. There have been no strikes and labor has been well paid.

Detroit Iron & Steel Co. Operations

The one active blast furnace of the Detroit Iron & Steel Co. has been almost the sole reliance of many malleable and gray iron foundries for some time past. It has been running on malleable recently and goes on foundry to-day. A visit to the plant on Zug Island shows that the other stack, which was put out of commission by a serious explosion last winter, has been placed in repair and is in fine condition to resume, but owing to the coal and railroad strikes no definite date has been set.

Standing on the dock, one can see the modern equipment of the company, designed for handling a large amount of ore which must be transferred to barges for shipment up the River Rouge to the Ford blast furnaces. Fully 300,000 tons will be moved before Nov. 1. At another point on the river ore sold to the Ford company by Clement K. Quinn is being loaded on barges. His contract calls for the delivery of over 200,000 tons this season.

Across the river, one sees the two nearly completed furnaces of the Canadian Steel Corporation at Ojibway. The ore dock at Ojibway has been completed, but the blowing engines have not been installed and it probably will be a number of months before any iron is made by this subsidiary of the Steel Corporation.

Data for the Steel Institute Committee

An immense amount of information is being collected at a number of points in the Central West for the use of the committee appointed last May by the American Iron and Steel Institute to consider plans for reducing the hours of labor in the steel plants of the country. Many clerks are engaged in collecting the data, which will consist not only of statistics but also of opinions of superintendents and others who have had practical experience in steel plants.

There is a strong feeling, however, that the present is not opportune for the introduction of the eight-hour day, on account of the shortage of labor which prevails everywhere. An important operating official in another city, who is in sympathy with the movement for the introduction of shorter hours, told me the other day that it would be utterly useless to try to make the change until labor becomes more abundant. The wire mills particularly are suffering on account of the shortage.

Many wire drawers who are receiving big wages work two or three days a week and cannot be induced to work the rest of the week because they are entirely satisfied with the money which they are paid for two or three days and prefer to loaf the rest of the time.

The Seniority Problem

Sentiment among employers in the Central West is overwhelmingly favorable to the attitude of the railroads in standing firmly for the seniority rights of the men who have been employed since the strike was started and there is general regret at President Harding's view of the principle involved. Newspapers are filled with advertisements of the railroads, appealing for men to work in the shops and promising them permanent employment. If, after this kind of advertising, the railroads were to desert the new men, they would be subject to the severest condemnation. There is, however, a feeling that if the strike were declared off to-day, the seniority question would settle itself in a way that would be satisfactory to at least a large number of the strikers upon their return. It is known that many of the men who have gone into the shops do not expect to become permanent employees. Among the men of this class are large numbers of college students, who, seeing a way to earn large wages for a few weeks, are glad to do so, and they are making from $7 to $14 per day. But they will drop out as soon as college opens in September. Parenthetically it may be remarked that these boys are making good, for the product which they are turning out is much greater than that of the ordinary railroad employee. There are many other men who would leave their jobs voluntarily upon the return of the strikers and it is probable that by Oct. 1 only a small percentage of the so-called strikebreakers would continue at work. This, however, does not affect the principle involved, or relieve the railroads of their solemn duty to protect any of the new men who may wish to continue permanently in their present jobs.

G. S.

Iron and Steel in Pennsylvania

Evidence of the predominance of iron and steel among the industries of Pennsylvania is afforded by the annual report for the year 1920 of the Department of Internal Affairs. The outstanding features of this report bearing upon this particular topic are shown in our table. The number of establishments manufacturing metals and metal products was considerably greater than the number in any other industry, and was nearly 16 per cent of the total in the state. The establishments were of considerably greater average size than for the rest of the industries, the capital investment per plant being $517,700 in iron and steel, against only $167,800 in other industries. The value of products per plant was $1,218,000 in iron and steel against $277,700 in other industries. Not only was the value of products much greater per plant, but the value of products in the iron and steel industry for each $1,000 invested in the plant was higher, being $2,360 against $1,655 for other industries.

While the wages paid in the iron and steel industry were only 17.35 per cent of the total value of products against 24.67 per cent in other industries, the total wages earned per wage earner were greater in iron and steel, amounting to $1,724 against $1,354 for other industries.

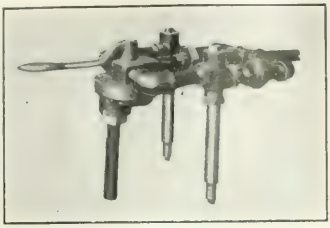
	Total Industries in Pennsylvania	Metals and Metal Products	Per Cent of Total	Industries Other Than Metals
Establishments, number	26,077	4,089	15.68	21,988
Operation, average days	278	290	....	268
Capital invested, thousands	$5,799,516	$2,110,375	36.39	$3,689,141
Value of products, thousands	11,086,748	4,980,105	44.92	6,106,643
Wages paid, thousands	2,370,758	864,056	36.45	1,506,702
Wages and salaries, thousands	2,757,443	1,017,659	36.90	1,739,784
Wage earners, number	1,614,099	501,169	31.05	1,112,930
Employees, total number	1,795,055	570,026	31.76	1,225,029
Derived Quantities				
Capital invested, per plant	$222,390	$513,700	..	$167,800
Value of products, per plant	425,100	1,218,000	...	277,700
Value of products, per $1,000 invested	1,912	2,360	....	1,655
Wages paid, per plant	90,900	211,300		68,525
Wages paid, per wage earner	1,469	1,724		1,354
Wages paid, per operating day	5.26	5.97		5.05
Wages paid, per cent of value of products	21.39	17.35		24.67

Industrial activity in Bridgeport, Conn., based on 31 factories and reported by the Manufacturers' Association, shows that in the week ended July 29 the number of employees was 60.8 per cent of normal. The number of man-hours was 59.8 per cent of normal, and the average factory hours per week were 99.8 per cent of normal. The average hours worked per employee during that week were 48.2, while the average factory hours were 48.9 during the week. Normal is based on estimates of the individual factories and represents a total of 25,218 employees.

Regulators for Foundry Air Squeezers

The accompanying illustration shows two pressure regulators and a service valve connected in the manner recommended for use on air squeezers for foundry work, the unit being offered by the Canton Pneumatic Tool Co., Canton, Ohio. Arranged as shown, the outfit gives two pressures, each lower than the initial pressure.

The service valve, shown at the left in the assembly, under the handle, is of the disk type. Air is admitted through a fine screen in the bottom of the valve and the bronze disk is pressed firmly against the upper section of the valve by the air pressure. All of the openings are tapped for ¾ in. pipe. The exhaust may be turned in any direction, the air passing through



Pressure Regulators and Service Valve for Use on Squeezers. Two pressures are available, each lower than the initial pressure

other ports in the valve instead of through the regulators. The weight of the service valve is 8½ lb.

The pressure regulator was designed especially for use on air squeezers. It is said to be more reliable and economical than a pop valve, and being entirely mechanical in its action, more uniform results are obtainable than with a pressure gage and the most careful operator. There is no diaphragm or auxiliary valve. Simplicity of construction, durability and convenient installation are features emphasized. Adjustment for pressures from 40 lb. to the initial pressure is made by a screw provided for the purpose. The regulator is calibrated so that no gage is required. The body and piston are of brass and the piston is the only moving part. Openings are for ¾ in. pipe.

It is emphasized that to exhaust air rapidly the company's service valve must be used in connection with the regulators. Using only one regulator with the valve gives initial pressure from one side of the valve and a lower pressure from the side to which the regulator is attached.

Fire Clay and Silica Brick Prices Advanced

PITTSBURGH, Aug. 7.—There has been a general advance in all districts of $3 per 1000 in the price of fire clay brick and $5 per 1000 for Pennsylvania and Chicago silica brick and $3 in Birmingham silica brick. This development finds its chief explanation in the rising costs of fuel and labor.

In the Chicago district the silica brick manufacturers are now obliged to pay as high as $10 per ton for coal, and as it is claimed that two tons of coal are required for producing 1000 brick, there is an indicated increase in cost of $10 per 1000. The situation in this respect in Pennsylvania and Birmingham is not quite so bad. Most manufacturers in these districts own their own coal mines and, as they usually have only a short haul from the mines to the brick plants, the delivered cost of fuel is not increased as much as in the Middle West.

Manufacturers have found it necessary to make substantial wage increases in order to hold their working organizations and it is claimed that even this move has not been entirely successful, because of the more remunerative scales prevailing in other lines of business.

The new minimum on fire clay brick now is $35 per 1000, f.o.b. works. The new prices apply to requirement contracts carrying prices at time of shipment, but do not affect such business as is on the books of manufacturers placed at stated prices. Prices on magnesite and chrome brick are unchanged. On account of the restrictive influence on blast furnace and steel plant operation of the coal and railroad strikes, business in refractories has dwindled to rather moderate proportions.

We quote per 1000 f.o.b. works

Fire Clay	High Duty	Moderate Duty
Pennsylvania	$35.00 to $38.00	$31.00 to $35.00
Ohio	35.00 to 38.00	31.00 to 35.00
Kentucky	35.00 to 38.00	30.00 to 34.00
Illinois	35.00 to 37.00	32.00 to 34.00
Missouri	35.00 to 37.00	30.00 to 34.00
Silica Brick		
Pennsylvania		38.00 to 40.00
Chicago		46.00
Birmingham		43.00
Standard size per net ton (f.o.b. Baltimore and Chester, Pa.)		56.00
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)		30.00
Chrome Brick		
Standard size, per net ton		42.00

Lake Ore Movement in July

Lake Superior iron ore shipments from the upper lake ports in July were 8,942,336 gross tons or 4,894,649 tons in excess of those for July, 1921, or an increase of 120.92 per cent. The total of this season's shipments to Aug. 1 was 17,293,513 tons, which compares with 10,418,914 tons to Aug. 1, 1921. The shipments by ports and for the season in 1921 and 1922 are as follows:

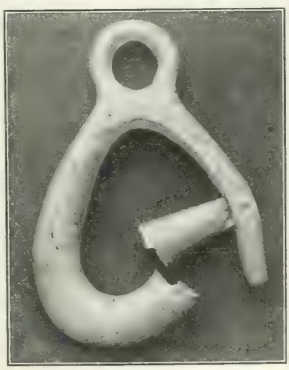
	July, 1921	July, 1922	To Aug. 1 1921	To Aug. 1 1922
Escanaba	238,258	799,536	449,062	1,604,130
Marquette	80,470	454,221	133,414	848,765
Ashland	434,088	1,379,608	961,025	2,579,056
Superior	875,005	2,010,368	2,591,235	4,364,963
Duluth	1,731,094	2,872,882	4,639,393	5,126,745
Two Harbors	688,772	1,425,721	1,644,785	2,769,854
Totals	4,047,687	8,942,336	10,418,914	17,293,513
Increase, 1922		4,894,669		6,874,599

The increase to Aug. 1, this year, in the season shipments was 6,874,599 tons or 65.98 per cent as compared with last year. Duluth contributed 29.64 per cent of the total against 44.53 per cent a year ago. Escanaba and Ashland made substantial gains this year.

Safety Hook for Mill and Cargo Use

A hoisting hook known as the Smith safety cargo hook, and which as the name implies, is intended to provide for safer operation than afforded by hooks of the usual design, is being offered by the Smith Forge Co., Camden, N. J.

The device is shown in the accompanying illustration. The outstanding features are the self attaching and locking catch; plumb balance, which eliminates the near approach for attaching the hook to the crucible,



Safety Hoisting Hook. The features include the self-attaching and locking catch and the plumb balance, which eliminates near approach in attaching the hook to the crucible

bucket or other object to be hoisted; and the guide butt, which facilitates attaching the hook and also prevents it from catching on projections during the hoisting operation.

A device of this kind aids materially in reducing the risks incident to handling molten metal. The hook is self attaching and it is not necessary to approach the ladle to make the hook fast. The hook is merely lowered over the handle or sling of the bucket or ladle, and it automatically locks. It is of steel, drop-forged, and available in four sizes, from one to six tons.

COAL, COKE AND ORE STORAGE

Diagram and Formulas for Calculation — Table Gives Certain Specific Examples

BY A. D. WILLIAMS*

IT is often necessary to estimate the storage capacity that may be secured on a certain area available. The general practice of obtaining estimates from the manufacturers of the cranes and bridges may require more time than is available, or may not be desirable in the case where only a preliminary estimate is desired, to compare different localities. The following data will be convenient for this purpose, and is accurate enough to permit the comparison of various sites.

Bituminous coal, per gross ton (2240 lb.) = 43 cu. ft.

Storage capacity for coke = 0.6 capacity for bituminous coal; ore = 2.25 capacity for bituminous coal.

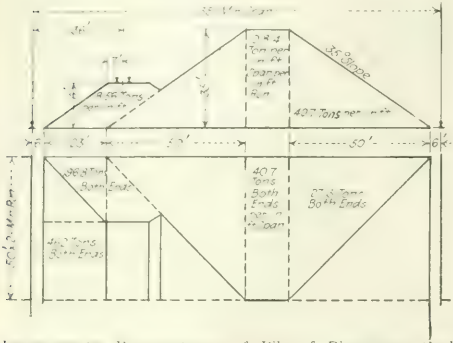
Anthracite coal = 1.10 capacity for bituminous coal.

Slope angle = 35 deg. Height of pile = 35 ft.

R = length of run or bridge travel in feet; minimum = 100 ft.

S = span between runway rails in feet.

There are two cases to be considered: 1—When the stocking and loading tracks are located under a cantilever at the end of the bridge. In this case the minimum span is 112 ft., giving 6 ft. clear between the bottom of the slope and the track. For this case the minimum run (100 ft.) gives a storage capacity of 2713 tons for the minimum span—for the pile will be a pyramid 100 ft. square and 35 ft. high, and $\frac{100 \times 100 \times 35}{3 \times 43} = 2713$. For a greater run and span, tons, total = $2713 + [40(S - 112)] + [40 + [0.8(S - 112)]] \times (R - 100)$. The table gives typical examples.



Diagrammatic Representation of Pile of Bituminous Coal with Stocking Track on a Trestle 16 Ft. Off the Ground. The tonnage figures shown permit quick calculation of contents of pile for any reasonable length and width

Capacities in Gross Tons of Typical Rectangular Piles (Without Track Raised on Trestle)

Ground Dimensions of Pile	Bituminous Coal	Anthracite Coal	Coke	Iron Ore
100 x 100 ft.	[illegible]	[illegible]	1,628	6,104
100 x [illegible] ft.	[illegible]	[illegible]	1,970	15,[illegible]1
100 x 500 ft.	18,992	20,891	11,395	42,732
100 x 1000 ft.	39,341	43,275	23,605	88,517
120 x 200 ft.	9,225	10,147	5,535	20,756
120 x 500 ft.	26,318	28,950	15,791	59,216
120 x 1000 ft.	54,806	60,287	32,884	123,314
150 x 200 ft.	[illegible]	[illegible]	7,753	28,908
150 x [illegible] ft.	[illegible]	[illegible]	[illegible]4	83,911
150 x 1000 ft.	78,004	85,805	46,802	175,509

2—When the stocking track is located on a trestle 16 ft. high above the base of the pile and under the bridge the minimum span is 135 ft., which for a minimum run (100 ft.) gives a storage capacity of 3372 tons. This is illustrated. For a greater run and span, tons, total = $3372 + [40(S - 135)] + [40 + [0.8(S - 135)]] \times (R - 100)$.

Both the above cases refer to bituminus coal. The other materials mentioned may be substituted by using the factors given.

The total length of track required will be:

$L = R + 10 +$ wheel base of gantry.

As a general proposition, a wide pile is more economical in operation, owing to the greater tonnage which may be handled without moving the bridge. Long span bridges, however, are costly and it is a case of balancing bridge cost and runway cost to obtain the maximum storage with the minimum of investment.

*P. O. Box [illegible], Newark, N. J.

To Report on Three-Shift Day

Findings in a nation-wide survey of the three-shift day in American industry will be placed before the executive board of the American Engineering Council of the Federated American Engineering Societies, at a meeting of the board to be held in Boston, Sept. 8 and 9.

Two reports, dealing with exhaustive investigations of the two-shift and the three-shift day problems in numerous industries, including metal working, mining and others, will be presented. One, prepared by Horace B. Drury, formerly of the faculty of Ohio State University, will describe the extent of two-shift operation in the continuous industries as well as the procedure followed and the results noted by those companies which have changed from the two-shift day of twelve hours each to the three-shift day of eight hours each. Mr. Drury's report will discuss the general practicability of abolishing twelve-hour turns.

A second report on an investigation of the modus operandi involved in changing the operations of a steel plant from two-shift to three-shift methods will be made by Bradley Stoughton, former secretary of the American Institute of Mining and Metallurgical Engineers. Both investigations are being directed by the American Engineering Council's committee on work periods in continuous-operation industries, of which H. E. Howe, Washington, president of the American Chemical Society, is chairman.

The findings of the committee, which are expected to be a notable contribution to the facts of present-day industry, will be presented to the Boston meeting of the engineering board, composed of engineers from all parts of the country, for definite action. A preliminary report by Mr. Drury estimates that "very roughly, the number of shift workers in the United States is probably well over 500,000, though likely not as large as 1,000,000." Industries of the South and the Far West are included in the survey as well as the industries of the East and Middle West.

The number of men on 12-hr. shifts in the period preceding the industrial depression was given as "perhaps not far from 300,000, of which about as many were outside the steel industry as within it." The committee, according to the investigators, "has been endeavoring to chart what is practically an unexplored field."

Mortimer E. Cooley, dean of the engineering schools of the University of Michigan, and successor of Herbert Hoover as president of the federation, will preside at the executive board meeting.

Metal Corrosion Studies

A study of film formations on metals under corrosion conditions will be made by the Bureau of Mines at Pittsburgh as a part of the general program of the study of corrosion of metals by acid mine waters. A study will be made of the formation of surface films on metals and alloys when exposed to corroding media, and an examination will be made of the effect of such films on corrosion inhibition. R. J. Anderson, metallurgist, and James R. Adams, research fellow of the Carnegie Institute of Technology, have been detailed for the work.

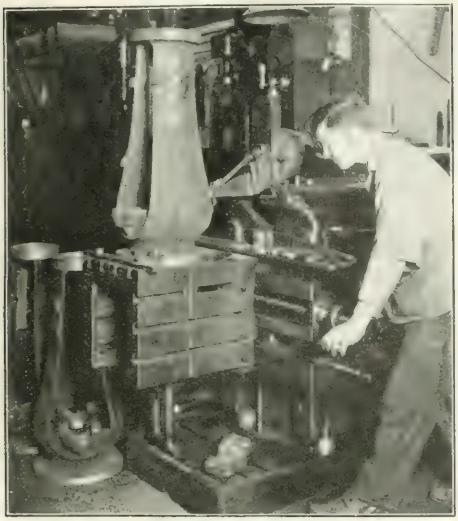
A research bulletin on the "Effect of Impurities on the Oxidation and Swelling of Zinc-Aluminum Alloys," has been issued by the New Jersey Zinc Co., 160 Front Street, New York. The authors are H. E. Brauer and W. M. Pierce of the company's research division.

Shaper Used in Planing Bearing Seats

A regular shop production job previously done on a planer, but at present handled on a 24-in. Gould & Eberhard shaper, the change being said to result in a saving of 30 per cent in the time for handling and setting up the casting, as well as a saving in machining costs, is shown in the accompanying illustration.

The operation consists in planing the bearing seats for the caps on 6- x 6-in. compressor frames built by the Brunswick Refrigerator Co., New Brunswick, N. J. The two sides of one bearing are planed, the casting being then turned through 180 deg. bringing the opposite bearing in place for machining.

A special extension tool holder with an over-reach of 6 in. beyond the regular tool position is used. This



Shaper Used in Machining the Bearing Seats for the Caps on Compressor Frames

permits the tool to plane the entire length, 4⅝ in., of the bearing without interference of the shaper head with the compressor frame, the sides of the frame being too close together to permit the shaper head or ram to pass through.

Engineers to Discuss Economics

The economics of industry has been selected as the major subject of the ninth national convention of the Society of Industrial Engineers to be held in New York at the Hotel McAlpin, Oct. 18 to 20. An address at the opening meeting will be on the relation of economics to industry and another on economics' part in the formation of a policy of business administration.

An evening meeting will be devoted entirely to addresses on "The Budget and the Financial Forecast," "The Business Cycle," and "The Importance of the Elimination of Waste to the Economic Structure," the latter address to be made by L. W. Wallace, executive secretary Federated American Engineering Societies. "Two Important Economic Factors" is the topic selected for an afternoon meeting, 15 min. papers by executives and workmen, followed by discussion being scheduled, the papers and discussions to be on specific subjects of "How We Can Reduce Production Costs," and "How Can We Keep the Worker Contented."

Sectional meetings for managing executives, production managers, sales managers, industrial relations directors, accountants and educators are included in the program as heretofore, and the International Committee for the Elimination of Unnecessary Fatigue will hold an open meeting.

The banquet will be held on Thursday evening, Oct. 19, with Prof. Joseph W. Roe, president of the society, as toastmaster. The addresses will include "The Relation of the Economist to Business," and "Finance and Industrial Economics." At an afternoon meeting the society will be addressed on the "Economic Aspect of Production," and on the subject of "The Industrial Age."

A special feature will be an exhibition of factory and office equipment and appliances designed to save labor and reduce fatigue, which will be held in a room adjoining that in which the principal meetings will be held.

On the evening before the convention, there will be a joint meeting of the society with the Taylor Society and the American Society of Mechanical Engineers.

Eighth Annual Chemical Exposition

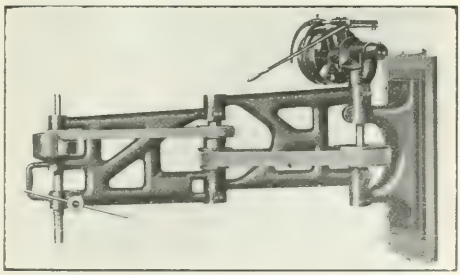
Preparations are going on for the eighth national exposition of chemical industries at the Grand Central Palace, New York, Sept. 11 to 16. A large list of exhibitors has been already announced and nearly all the space has been taken. Besides technical sessions, 15 feature films on chemical and other industrial subjects have been scheduled, some of them being shown for the first time. Among them are the "Story of Sulphur," "Story of Heavy Excavating Machinery," "Story of Air Reduction" and the "Story of Natural Gas."

New Wall or Post Bracket Drill

A new wall or post bracket drill covering a radius of 3½ ft. and designed for light drilling operations, being especially adapted to stove work, electrical and switchboard work, has been brought out by the Hammond Mfg. Co., Cleveland. The drilling capacity in steel is ⅜ in.

The general construction may be seen from the accompanying illustration. The drive is through the tight and loose pulley countershaft and bevel gears to an upright shaft. The countershaft yoke can be set to any position to conform to overhead drive, and is provided with convenient belt shifter. The arms swing on stationary sleeves, an arrangement intended to prevent undue pressure on the driving shafts. The spindle is equipped with a ball thrust bearing. The spindle quill is of steel with bushed bearings and is provided with a rack cut from solid. A spring counterbalance is provided.

The machine is equipped with belts as shown, and with belt guard for the spindle pulley. The traverse of



Bracket Drill for Light Drilling Operations. The capacity is ⅜ in. in steel

the spindle is 2½ in. The hole in the spindle is for a No. 2 Morse taper. The pulleys are 8 in. in dia. and run at 400 r.p.m., the spindle speeds being 500 and 1300 r.p.m. The shipping weight in 250 lb.

Federated Engineering Societies Adds Members

The Engineers' Club of Louisville, Ky., has applied for membership to the Federated Engineering Societies and the committee on procedure has approved the application.

Among the notable additions to the federation is the Engineers' Club of Columbus, Ohio, which has appointed Prof. James R. Withrow of Ohio State University as its representative on the American Engineering Council.

Anti-Friction Bearings in the Steel Mill

Mounting Details of Ball and Roller Bearings—Use and Care of Ball Bearings—Provision for Lubrication

BY A. M. MAC CUTCHEON

(*Continued from page* 268, *Aug.* 3)

IN successfully designing a mounting of an anti-friction bearing motor, the following points must be kept in mind:

a Ease of assembly. It should be possible to draw the bearing off the shaft without transmitting pressure from the outer race to the inner race through the ball. It should be possible to remove the armature without removing the bearing from the shaft.

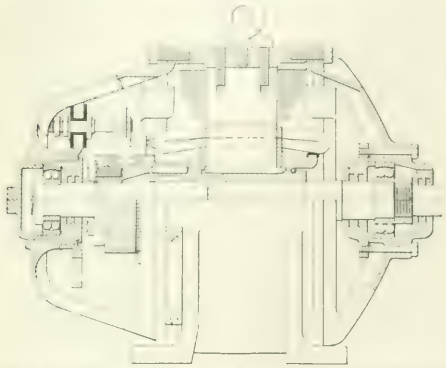


Fig. 3. Typical Ball Bearing Mounting on General Service Direct Current Motor

b. The bearing should be protected against the entrance of dirt or grit. If such foreign substances are present within the bearing, its life will be short.

c. The lubricant must be retained within the bearing housing.

d The bearing must be the proper fit on the shaft and within the housing.

e. The inner race of the bearing must be locked in place, against a suitable shoulder, by a suitable locking nut.

Fig. 3 represents a typical mounting on a general service direct current motor. At the commutator end the bearing is entirely inclosed in a cartridge which is removed from the motor with the armature. Such inclosure is believed the most satisfactory form of mounting, but is somewhat expensive. The armature may be entirely removed from the motor without disturbing the fit of the ball bearing on the shaft. A suitable mounting is always difficult at the commutator end of a direct current motor of the general service type, since the outer dimensions of the bearing housing are limited by the position of the rocker. Fig. 4 is a composite mounting, showing the application of a ball or roller bearing to the same motor.

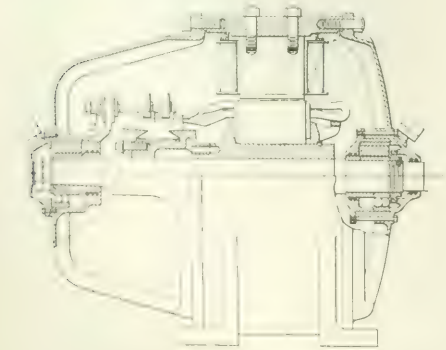


Fig. 4. Composite Mounting Using Both Balls and Rollers in the Bearing

Fig. 5 shows a typical mounting of a vertical general service motor, in which the armature weight is carried by a thrust ball bearing at the top.

Fig. 6 is an application of a ball bearing to a mill type motor. The bearing is completely inclosed in a cartridge, which is removed from the motor with the armature, effectively excluding foreign substances. This application was laid out in connection with changing over oil-type motors to anti-friction type. The ball bearing is mounted on a sleeve driven by a Woodruff key. The sleeve has the advantage of a long bearing on the shaft, and may be required in very heavy service.

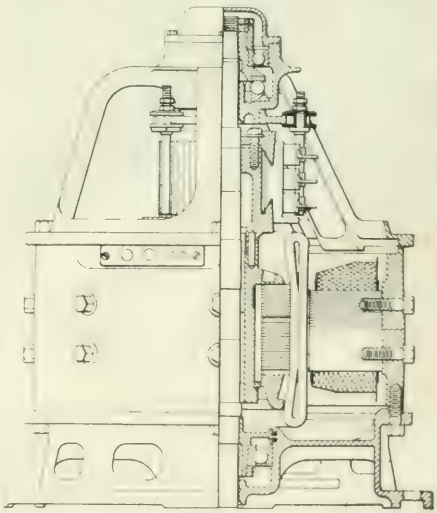


Fig. 5. Vertical Ball Bearing Mounting on General Service Motor

Fig. 7 represents the mounting of a ball bearing in a steel mill motor, with the bearing carried directly on the shaft, and without the cartridge inclosing the bearing. Unusually complete protection is provided against the escape of grease by what may be described as the "labyrinth" type of groove. As nearly all types of anti-friction bearings will take a considerable end thrust, from 30 or 40 per cent of the radial capacity of the bearing up to 100 per cent or over, it is not necessary to provide any other device to take the end thrust ordinarily found in motors.

Fig. 8 shows an application to a general service motor with the "labyrinth" type of grease groove; but as this mounting does not permit removal of the armature without the removal of the bearings from the shaft,

it is not to be recommended—certainly not in a steel plant.

Fig. 9 shows the application of a tapered roller bearing with the bearing completely inclosed in a cartridge. Disassembly is accomplished by removing the outer cap screws, and rotating the cartridge so that the extended bosses will clear the extended bosses on the bracket. Wear on such a bearing may be compensated for by removing shims between the outer and inner inclosing caps.

Fig. 10 represents the installation of a tapered roller

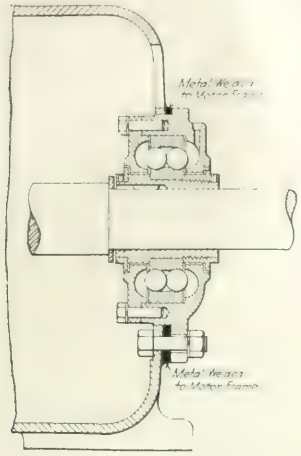


Fig. 6. Ball Bearing Mounting on Mill Type Motor, Inclosed in Cartridge

bearing in a split frame motor. The armature may then be removed by lifting the top half of the frame. The shims for adjustment after wear are again evident.

Consideration should be given to allowing a fair-sized space for lubricant, and to its introduction through a tapped hole closed with a pipe plug, a grease cup or other suitable means. All ball bearing manufacturers seem to be in accord that the inner race should be

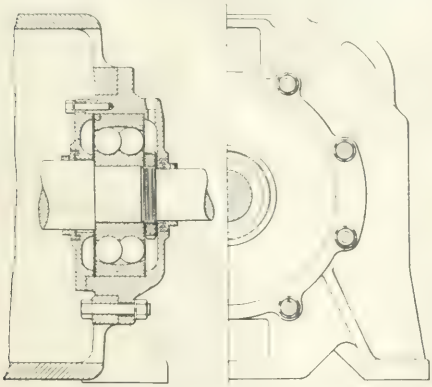


Fig. 7. Ball Bearing Mounting on Mill Type Motor, with Bearing Carried Directly on the Shaft

mounted on the shaft with a light drive fit, from 0.0006 to 0.002 force, depending upon the size of the shaft. The outer race should be a sucking fit in its housing, permitting a slight creepage of the outer race if such a tendency is present. The end play should be taken on one bearing, and the one carrying the heavier load is preferable. Either grease or oil may be used for lubrication; for speeds up to 2000 r.p.m. on 5 to 20-hp. motors, grease is recommended, because of the advantage in eliminating any possibility of oil getting into the motor. At very high peripheral speed oil is found preferable.

Great care must be exercised to protect the ball bearing before installation in the motor, and during

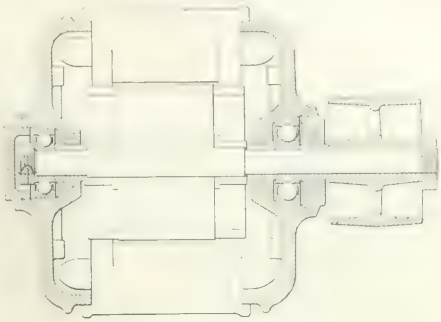


Fig. 8. Ball Bearing Mounting Fitted with Labyrinth Type Grease Grooves

the process of assembly, against the entrance of grit or foreign substance, as the presence of such substance will most certainly result in wear and the eventual failure of the bearing. If the armature is removed from the frame with the bearing not inclosed in a cartridge, the bearing should be carefully wrapped while the armature is out of the motor. To offset this, it is claimed that very little attention need be given the lubrication of the bearing while the motor is in operation. There are cases where anti-friction bearings have operated over a period of three to four years, without being greased. This is, of course, not recommended. Speed and heat conditions are the governing factors. Wherever possible, grease should be applied at intervals of about six months.

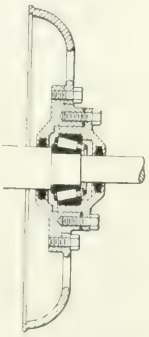


Fig. 9. Tapered Roller Bearing Completely Inclosed in a Cartridge

Probably the best practice would be for the operator to make monthly inspections at the time of the installation, in order to judge how long the lubricant will remain serviceable under the conditions existing in his particular plant, and then establish a period for applying grease. In no case should the housing be packed full of grease, as this will cause severe heating in operation. It is the prac-

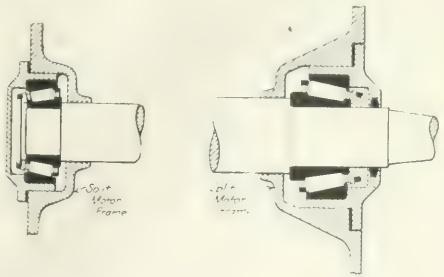


Fig. 10. Tapered Roller Bearing in a Split Frame Motor, Permitting Easy Removal of the Armature

tice of the ball bearing manufacturers to slush bearings with a coating, to avoid rust. Before installation, they should be cleaned with gasoline to remove this slush, as it is not a good lubricant, and under certain conditions will cause heating.

(To be concluded)

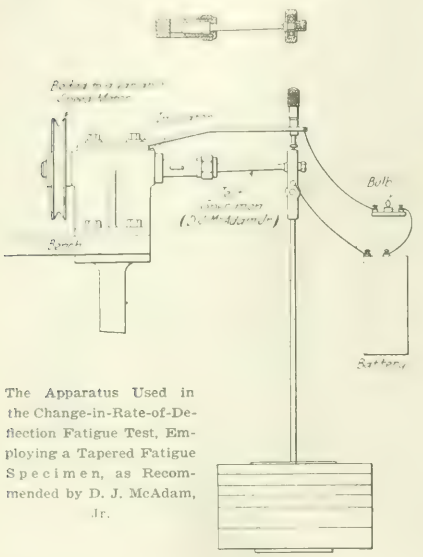
NON-FERROUS METAL FATIGUE*

Present Status of the Knowledge of the Fatigue Strength of Some Aluminum and Magnesium Alloys

BY R. L. TEMPLIN

AT the present writing, all of the fatigue investigations on the wrought ferrous metals have indicated that there is at least a practical endurance limit, at and below which the metal will withstand an indefinitely large number of repetitions of stress without failure. The same laws that obtain in the case of the wrought ferrous metals, however, apparently do not hold in the case of at least some of the non-ferrous metals.

It is quite true that the available fatigue data for the wrought non-ferrous metals are rather meager, but such as there are indicate an increase in the



The Apparatus Used in the Change-in-Rate-of-Deflection Fatigue Test, Employing a Tapered Fatigue Specimen, as Recommended by D. J. McAdam, Jr.

life of the metal with a decrease in the fiber stress to a point where an apparent endurance limit is reached. At this point the *SN* diagram becomes horizontal or nearly so, and stays so up to a second point, where the slope of the *SN* diagram again changes to a value approximating the slope of the first part of the curve. That is, there is a sort of an arrest in the curve, which in the case of duralumin may start at from 2×10^6 to 7×10^6 repetitions of stress and extend to 2×10^7 plus repetitions of stress.

More long time fatigue tests are necessary and are being made to establish the certainty of this kink in the *SN* diagram for wrought non-ferrous metals. It is perhaps significant that such a shape for the wrought ferrous metal curves has been rather anticipated by the joint committee on fatigue of metals, although it has not been found to date using specimens which have been tested to 7×10^6 repetitions of stress.

Some experimental work has been done in the technical direction bureau of the Aluminum Co. of America in an attempt to check or disprove the results obtained by Mr. Gough† using the change-in-rate-of-deflection method for determining the endurance limit. In these tests the tapered fatigue specimen, style E, as recommended by D. J. McAdam, Jr.‡ together with test apparatus as shown schematically in the illustration was used.

Tests were made on hard rolled 17S [aluminum alloy of the Aluminum Co. of America], heat treated 17S and aluminum-magnesium alloy rod using speeds of rotations of approximately 100, 400, 1000 and 1400 r.p.m. In every instance a straight line deflection curve was obtained up to a point considerably above the proportional limit as determined by the Ewing extensometer and plotting the stress strain values to the scale 1 in. = 5000 lb. per sq. in. (ordinates) and 1 in. = 0.002 in. per in. (abscissa). In some cases the straight line deformation persisted above the yield point of the metal.

For the routine fatigue tests, however, in the testing laboratory of the technical direction bureau of the Aluminum Co. of America, the rotating beam type fatigue testing machine is used. The machines, while considerably larger than those used by the joint committee at the University of Illinois, are quite similar and have been found to give satisfactory and consistent results. The type of specimen used in these machines for the long time fatigue tests is substantially that as used by the joint committee and when the test data derived becomes available, it should be comparable to the data obtained by the joint committee on wrought ferrous metals.

* Abstract of paper by H. J. Moore's paper on "Endurance of Metals Under Repeated Stress" at the annual convention of the American Society for Testing Materials in June at Atlantic City. The author is chief engineer of tests, research bureau, Aluminum Co. of America, New Kensington, Pa.

†"Improvements in Methods of Fatigue Testing," by H. J. Gough, B.Sc., in *Engineer*, Aug. 12, 1921, page 159.

‡"Endurance of Steel Under Repeated Stresses," by D. J. McAdam, Jr., [illegible] Dec. 14, 1921.

Merchant Ships Under Construction

According to returns of Lloyd's Register, the number of merchant ships under construction at the end of June was about 1016, of a total of 3,780,430 gross register tons. This includes an estimate of 150 ships and 545,000 tons for Germany. Particulars by nations will be found in the appended table. It will be noted that the British Isles are credited with just about half of the total tonnage, but it should be remarked that 25 per cent of the tonnage reported under construction in the British Isles has been suspended, no work being done on it at present. The same condition pertains to more than 40 per cent of the tonnage under construction in Italy, as well as a considerable tonnage elsewhere on the continent of Europe.

Much of the tonnage now being built in the United States is special and of a character which could not well be filled by the Shipping Board ships, at present tied up in such large numbers. As a matter of fact, almost half of the total American tonnage building consists of tank vessels intended to carry oil in bulk.

Among the steel vessels, those building in the British Isles will average 4969 tons each and those building in the United States will average 4641 tons each and those building elsewhere (outside of Germany) will average 3144 tons each. The average for the entire group is 4127 tons. The American position is well shown by the fact that Italy, France, Holland and Germany all have larger tonnages under construction than has the United States. This is, of course, due to the fact of so many Shipping Board vessels being idle.

Merchant Vessels Under Construction, June 30, 1922

	Total		Built of Steel	
	No.	Gross Tons	No.	Gross Tons
British Isles	390	1,919,504	386	1,917,957
United States	36	150,623	31	143,885
Italy	[illegible]	[illegible]	[illegible]	[illegible]
France	53	243,290	53	243,290
Holland	99	226,318	99	226,318
Japan	[illegible]	[illegible]	[illegible]	[illegible]
Scandinavia	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Germany (est.)	[illegible]	[illegible]	120	[illegible]
Total	1,016	3,780,430	[illegible]	[illegible]

The Wickwire Spencer Steel Co. is installing some of the heavy grill making equipment from the former Wright Wire Co., Worcester, Mass., mill, in its Clinton, Mass., plant. Production of fine wire screening at the Clinton plant will continue throughout the summer and fall on a full day and night shift schedule. In previous years production was somewhat reduced during these months.

Special Strike Legislation Forecasted

House of Representatives Called for a Definite Session Regardless of Tariff Bill Situation—Putting Teeth in Transportation Act Regarded Likely

WASHINGTON, Aug. 8.—The fact that President Harding has asked the House of Representatives to remain in continuous session when it convenes next Tuesday, Aug. 15, leads to the assumption here that the Executive will ask for some special legislation to deal with the coal and railroad strikes if satisfactory progress toward a settlement has not been made by that time.

Just what form such legislation may take has not been indicated by any Administration spokesman, but it is considered likely that it will take the form of an amendment to the Transportation Act putting "teeth" in it so that a penalty will be attached to violations of decisions of the Railroad Labor Board.

The President will probably address a special message to Congress discussing the strikes, should the situation at that time seem to require drastic action on the part of the Government.

While official Washington was fairly optimistic today regarding a possible settlement of the coal strike through the results of the Cleveland meeting of operators and miners Monday, it can not be said that the same holds true of the rail situation. President Harding's latest move as voluntary negotiator has apparently not found favor with representatives of the shop mechanics' organization, while the attitude of the railroad presidents as expressed by individuals among them is not wholly one of approval.

Because of the critical nature of the present situation, the President has asked the House of Representatives to reconvene on Aug. 15, regardless of whether the tariff bill is ready by that time. When the House adjourned it was with the understanding that it would reassemble on Aug. 15 and immediately adjourn if the tariff bill was not ready for submission.

President Harding and his cabinet are making no effort to belittle the growing seriousness of the coal and rail strikes. The attitude of both sides in the railroad strike on the seniority question leaves little room for optimism that this difference can be easily compromised. Representatives of the shop men are even opposed to leaving the question to the railroad labor board for decision.

Contractors Protest Against Priority Order

WASHINGTON, Aug. 8.—That the greater part of the construction projects now under way throughout the country will be forced to shut down for lack of construction materials unless the present coal priority order is modified is the statement made to-day by the Associated General Contractors of America in a petition of protest to the Interstate Commerce Commission. The association is looking not so much to the immediate situation as to that which will prevail when the coal and railroad strikes shall have been settled.

The petition calls attention to the fact that with the reopening of the mines, the demand for coal will be not less than 320,444 cars per week. Of the maximum 324,000 serviceable cars only 291,000 will be suitable for the loading and transportation of coal, leaving only 33,000 open-top cars weekly for all other purposes. Going on the assumption that the coal and railroad strikes will be settled shortly, and that the present priority order stands, the contractors estimate the probable demand and supply of open-top cars weekly during August, September and October will be as follows:

Weekly Needs of Open Top Cars

Commodity	Demands	Supply	Per Cent Supplied
Coal	320,000	291,000	91
Sandstone and gravel	70,000	14,645	21
Ore	40,000	8,516	21
Iron and Steel	25,000	5,322	21
Miscellaneous	20,000	4,258	21
Limestone	10,000	2,129	21
Coke	10,000	2,129	21

Coal Priority System Slowly Developing

Railroads and Public Utilities Take Present Production and Even with Fair Expansion of Output Some Stopping of Plants Appears Inevitable

WASHINGTON, Aug. 8.—Henry B. Spencer, Federal fuel distributer, said to THE IRON AGE that the present production of bituminous coal will take care only of classes 1 and 2 of the priority list, and that for class 4, which includes steel manufacturers, blast furnaces and industrial plants generally, there will be no coal available.

Until the working plans of the Federal fuel distribution committee are fully operative industrial users of coal may continue to get some of the supplies which they have bought, but these will gradually be cut off under the system of car allotment to mines for the prior classes and these prior wants will be taken care of before coal can be shipped to any other designation.

There are a few steel companies operating by-product coke ovens which furnish gas to municipalities, and these in all probability will get coal for coking purposes under the public utility preference, but it may be that their supply will be limited so that only as many ovens can be operated as are absolutely necessary for supplying municipal light and heat.

Coal Stocks Greatly Reduced

A survey of the coal stocks of the industrial plants of the country has been completed by the President's committee, revealing that the 400 plants from which returns were received had on Aug. 1 only 20 days coal supply. This, of course, is an average percentage, some plants having several weeks supply while others were within a few days or a week of the bottom of their coal stocks and were facing shutdowns.

With the organization plan of the fuel distribution committee completed, there was a rush to Washington by representatives of industries of all classes for priorities, but in most instances these claimants for consideration were referred to their State fuel agencies, which will take care of their wants, if possible, after the priorities which have been established under Government order are provided for.

It has been estimated that the daily consumption of bituminous coal in the United States at present is 1,600,000 tons, so that it may be seen that railroads, public utilities and industrial plants generally are eating into their stocks at an enormous rate, as the soft coal production is roughly only 4,000,000 tons a week or considerably less than half of the amount being consumed.

The railroads require at least 280,000 tons daily or half of the soft coal now being produced, while it is estimated that the public utilities of the country re-

quire 1,500,000 tons weekly, which will take most of the remaining half of present production.

Northwest Asks for 12,000,000 Tons

In addition to these pressing wants, which have been given first claim upon coal supplies by the Government's distribution plan, the Northwest, which relies on getting its winter supply of coal by way of the Great Lakes before the close of navigation, has asked for the shipment of 12,000,000 tons additional, and the fuel distribution committee is planning to begin shipments of this not later than Sept. 1. As there will then be only about 12 weeks remaining in the navigation season, this means a shipment of not less than 1,000,000 tons weekly.

Thus it will be seen that the steel industry will have very little, if any, coal to draw upon until there is an increase in production. Before the strike of railroad shopmen, the coal mines were producing about 5,500,000 tons a week and this has been brought down to less than 4,000,000 tons, though slight gains have been made in the past two weeks. In 1921, with industry operating at a much lower rate than this year, 407,000,000 tons of soft coal were mined. It is estimated that the minimum requirement of the country under present conditions is 7,000,000 tons a week and this does not allow anything for stocks which must be carried during the winter months to insure against delays in transportation due to ice and snow. Therefore, until soft coal production can be greatly increased the iron and steel industry and other manufacturing industries will have troubles which undoubtedly will become more serious while the railroad and coal strikes continue.

While it is intimated here that the steel industry because of its essential character in the maintenance of railroad transportation will have a certain degree of preference among industrial plants, this preference will amount to little or nothing until there is an increase in the coal supply. A question that has been considered this week by the fuel distribution committee is what shall be done with coal mined by steel companies in their own mines and transported in their own cars. It has been stated that no extreme measures will be resorted to unless necessary, but that the steel industry, in common with others which have been placed among the deferred priorities, will be asked to cut down voluntarily on its coal consumption.

Visits to Washington Not Advised

In this connection it may be stated that it will do little good for officials or other representatives of manufacturing plants to come to Washington in an effort to get coal. The fuel distribution committee has been obliged to turn away many who have visited Washington this week for such purpose. The time of the committee has largely been taken up with conferences and getting its program under way and members of the committee have not had the time to interview those who have come to see them. The result is that these special messengers have usually not gotten further than a clerk in the fuel distribution committee's offices, who has told them to take up such matters with the State fuel agencies, a list of which appeared in THE IRON AGE of Aug. 3, p. 299. The Government's committee will confine its work chiefly to getting coal for railroads, public utilities and States.

Another Voluntary Coal Price Agreement Proposed

WASHINGTON, Aug. 8.—Skyrocketing coal prices in Pennsylvania was the subject of a conference to-day between representatives of operating mines in that State and Secretary of Commerce Hoover and Federal Fuel Distributer Spencer. The purely voluntary price arrangement of June 1 of $3.25 to $3.50 a ton broke down two weeks ago partly due to the fact that some coal producing districts refused to co-operate in the voluntary agreement at that time and partly due to conditions brought about by the railroads offering $1.50 above the fair price for coal in the districts which did agree. Many coal operators in the districts where the voluntary agreement was made have held to the fair price, but other districts are asking as high as $7 to $8 a ton.

The operators proposed at to-day's conference that a new fair price should be fixed at a somewhat higher level than that of June 1 to allow for increased working expenses due to car shortages and partial operation of mines. Inasmuch as the bulk of Pennsylvania production is consumed in that State, it was deemed a matter in which the Pennsylvania authorities should participate. Hence a meeting has been arranged for Wednesday, Aug. 9, between Governor Sproul's State coal committee and the Administration officials for consideration of the matter.

Plan of Organization for Coal Distribution

WASHINGTON, Aug. 8.—Henry B. Spencer, the Federal fuel distributer, has announced the following plan of organization for the distribution of available coal supplies in the present emergency.

The President's fuel distribution committee, consisting of Secretary of Commerce Hoover, chairman; Attorney General Daugherty, Secretary of the Interior Fall, Commissioner Aitchison of the Interstate Commerce Commission and Federal Fuel Distributer Spencer, has appointed the following administrative committee for the purpose of directing the distribution of all available supplies among the railroads, Federal institutions and States:

H. B. Spencer, Federal Fuel Distributer, Chairman.

Staff

Samuel Porcher,
Railroad fuel.
Le Baron S. Willard,
Tidewater coal.
J. N. Snider,
New England and Eastern.
C. E. Tuttle,
Lake coal.
George E. MacGregor,
Southwestern region.
E. M. Durham, Jr.,
Southeastern region.
E. W. Thornley,
Manager of orders.
F. G. Tryon,
Geological Survey.
Lt. Com. E. A. Cobey,
United States Navy.

Coal Operators' Advisory Committee

C. E. Bockus, Chairman,
Virginia.
E. E. White,
Southern West Virginia.
E. C. Mahan,
Southern Appalachian.
E. L. Douglas,
Eastern Kentucky.
William J. Magee,
High volatile district of Southern West Virginia.
George R. Francis,
Pennsylvania.

M. J. Gormley, American Railway Association.
J. C. Roth, Interstate Commerce Commission.
D. R. MacLeod, secretary to the committee.

In addition district committees have been created in the principal coal-producing districts for the purpose of distributing orders from the Federal fuel distributer among the mines. These committees shall consist of a representative of the fuel distributer, Interstate Commerce Commission, coal operators and the railroads. District headquarters have been established in the following coal regions:

Norton, Va.—All of Virginia except the Pocahontas district.
Bluefield, W. Va.—Pocahontas, Winding Gulf, New River, Tug River and Virginian districts.
Huntington, W. Va.—Kanawha, Logan, Williamson and Big Sandy districts.
Knoxville, Tenn.—Fields in Southeastern Kentucky outside of Harlan and Hazard; all mines in Tennessee.
Louisville, Ky.—Harlan, Hazard and Western Kentucky fields on Louisville & Nashville and Illinois Central railroads.
Birmingham, Ala.—All mines in Alabama.

Gradual Working of Priority Plan Expected

Pending the completion of this organization, three intermediate stages will ensue: 1. Continuation of their normal business by the operators; 2. Priority buyers in accordance with the Interstate Commerce Commission service order No. 23 will gradually encroach upon operators' business; 3. Coal orders placed through the Federal fuel distributer for railroad purposes and State committees will gradually absorb the total output of the mines.

This latter clause is a direct quotation from a statement given out at the Federal fuel distributer's office and indicates as clearly as anything that has been stated as to what extent industrial plants may expect

to get coal until their is a marked increase in production.

Governors of all States have been asked to create fuel committees, the orders from whom will be sent to the Federal fuel distributer here. These State committees have been asked to report to Washington a list of those who should receive priority coal for current use, not for storage, in the order of the emergency of their need; also the nature of the consumer, whether public utility or industrial plant; the amount of coal on hand and the amount required by each to maintain operation.

The State committees are expected to distribute such coal as may be allotted to them in the following order: 1. Public utilities and public institutions; 2. Household coal; 3. Industrial manufacturing public necessities; 4. Industries in general.

Until such time as priority orders from the Federal fuel distributer shall reach them, coal operators are expected to operate individually as they have been.

Coke Supply Problem

The Federal fuel distribution committee will probably consider the question of coke supply this week. The probability is that some means will be found to take coking coal and divert it to other use. A problem in this connection is what to do with coal mined by coke companies and shipped over their own lines and in their own cars direct to the coke ovens. This whole question will doubtless be decided before the end of the week.

Consumption of tin plate for food packing will not be materially affected by the coal priorities, the Federal Fuel Distributor having assured canning companies that coal will be provided for them to prevent spoilage of the large quantities of farm crops.

More Workers and Increased Coke Production in Connellsville Region

UNIONTOWN, PA., Aug. 7.—Fuel production in the Connellsville bituminous region for the week ended July 29 showed the largest tonnage since the week of April 15, when the strike situation became serious in the Fayette county region. Merchant coke producers made a larger gain for the week than did furnace coke producers. The merchant operators have been the heaviest sufferers since the beginning of the strike and the gain last week is considered significant. Fuel production in the region increased 72,700 tons, an increase of 4030 tons over the preceding week.

Outside workers continue to be imported but here and there regular employees in the region are returning to their jobs at the old or at other plants. This does not apply to the element which has affiliated with union locals. These workers, now affiliated with the union, are, if anything, even more determined than ever to remain out. They have been told that the strike in the union fields will never be settled until the union in this field is granted recognition. Inasmuch as they stand little chance of being reinstated on employment lists at plants in the region, they apparently figure that their course is to hold out for union recognition.

With increased production, coal shipments naturally are increasing. The Pennsylvania Railroad, in the week of July 29, alone handled 4706 loads, an increase of more than 700 loads over the preceding week.

That the strikers are recognizing the situation as more serious from their viewpoint is indicated in the amount of dynamiting which has been carried out during the past week. No less than three railroad bridges on lines over which fuel shipments have been increasing were dynamited, although in no instance was traffic delayed more than 24 hr. Half a dozen or more homes have been dynamited.

No Allocation of Cars As Yet

Operation of Federal distribution through allocation of cars in the Fayette County field has not been instituted but the tentative organization is ready pending actual putting into force of these regulations by the government. Price control has not been put into effect, with the result that coal is being sold for as high as $8 a ton. Wagon mines in the county are exerting every effort to get out the maximum tonnage possible before the federal price fixing gets into operation.

Production in the Connellsville region, according to observers, will approximate 28 per cent of normal. The H. C. Frick Coke Co. is operating at around 33 to 35 per cent and this is being slowly increased. Efforts are being directed at increasing production as rapidly as possible. While a few of the idle workers in the region, as stated above, have returned to work, the majority of increased output is due to imported workers. When the actual break in the county situation will come is problematical.

Railroad Shopmen's Pay Higher Than in Private Plants

The National Industrial Conference Board, 10 East Thirty-Ninth Street, New York, has made a study of the wages of the striking railroad shopmen. Railroad skilled shop mechanics include machinists, boiler makers, blacksmiths, sheet metal workers, and electrical workers, whose duties in the railroad shops are practically identical with the duties of men employed in commercial foundries and machine shops. The report resulting from the investigation just completed covers the wages of 388,560 men employed in 1338 plants, or 73 per cent of all the wage earners in foundries and machine shops, as shown by the United States Census of Manufacturers in 1919. The statement estimates the average weekly earnings of skilled railroad mechanics to be $33.67, under the reduced rates recently established by the Railroad Labor Board. The weekly wages of foundry and machine shop employees, however, on Jan. 1, 1922, were $25.08, giving the railroad employees an advantage of 32 per cent in weekly earnings over the earnings of men performing identical work in the shops of private companies. Since a decline in wages of outside shop workers has taken place since the first of the year, the position of the railroad shopmen is even more favorable. The conclusion of the Conference Board's report, briefly stated, is this:

"Railroad shopmen are in a more advantageous position than they were in 1914, in three ways: First, that their hours of employment have been reduced, giving them more time for leisure and recreation; second, that their economic status, even under the new wage cuts, is 10 per cent higher than eight years ago; and third, that the average weekly wages of railroad shopmen are at least 32 per cent higher than those of men doing the same work but employed by other industries, where wages are regulated by the supply and demand for labor."

Coal Production Increased to 4,250,000 Tons

WASHINGTON, Aug. 8.—An increase of about 7½ per cent in the production of bituminous coal for the week of July 31 to Aug. 5, inclusive, is indicated by the weekly report of the United States Geological Survey. This was the eighteenth week of the coal strike.

Preliminary returns show a production for the week of 4,250,000 tons against 3,933,000 tons in the week before. The increase is due, the report states, to improved car supply in the Middle Appalachian fields rather than to reopening of mines hitherto closed by the strike.

In spite of the increase in bituminous output, the eighteenth week finds production still about 1,100,000 tons short of the level reached before the railroad shopmen's strike, for in the week ended June 24, 5,337,000 tons of coal were raised.

Production of anthracite in the week ended Aug. 5 will be barely 30,000 tons. The total of all coal, anthracite and bituminous, is therefore in round numbers 4,280,000 tons. In the corresponding week of 1921 7,320,000 tons of bituminous and 1,750,000 tons of anthracite were produced, making a total of 9,070,000 tons; and the rate the year before that was 11,283,000 tons. The

present rate of output is therefore from five to six million tons below normal.

Beehive Coke Production

There was but little change in the production of beehive coke during the last week of July. From reports of cars loaded by the principal carriers, it is estimated by the Geological Survey that the total output was 110,000 tons, an increase over the revised figure for the week preceding of 5000 tons.

Cumulative production for 1922 now stands at 3,625,000 net tons against 3,563,000 tons during the corresponding period in 1921, and 12,411,000 tons in 1920.

Revision of Coal Priority List

The Interstate Commerce Commission on Aug. 4 issued amendment No. 1 to its car service order No. 23. This amendment places in class 2 of the priority list all bituminous coal which has passed over screens of 4 in. or larger opening, coke and anthracite coal, to be shipped to retail dealers for household use. Class 4 is eliminated and a new class 4 is substituted therefor, reading as follows:

Class 4. Coal for the production and manufacture of foodstuffs and medicines and for the manufacture of containers therefor, for daily use but not for storage, exchange or sale.

This places tin plate mills, for example, within the class 4 priority, but it is doubtful whether there will be any coal for those in class 4 until production has been considerably increased.

Agents of the Interstate Commerce Commission to have charge of car service directions have been stationed at the following points: Thurmond, W. Va., S. J. Maywood; Bluefield, W. Va., B. S. Robertson; Huntington, W. Va., C. C. Semple; Norton, Va., W. L. Barry; Knoxville, Tenn., O. S. Reynolds; Louisville, Ky., H. M. Priest; Birmingham, Ala., J. B. Ford.

Ask Repeal of Illinois Miner Law

The Illinois Manufacturers Association and other commercial bodies are sending appeals to members of the Illinois State Legislature, asking them to call a special session in order to pass laws and repeal laws which at present bar any except experienced miners from working in Illinois coal mines. Workers now must have had two years experience to pass the examining board and it is charged that it is seen by the board that only union miners pass. It is urged that the law be annulled in view of a possible national emergency, which could not be advantageously met under the existing statutes.

Industry Retarded by Strikes

Advance information furnished by the Department of Commerce in connection with its Survey of Current Business supports previous conclusions regarding the retarding effect of labor difficulties on industry. So far, these disturbances do not seem to have affected the deeper undercurrent of returning prosperity. Production in many industries has been slowed down by these annoyances, but there is a general feeling that early settlements will be reached and that business will continue to gain in volume.

Freight Car Situation

WASHINGTON, Aug. 8.—The effect of the strike of railroad shop mechanics on the rolling stock of the railroads is noted in the latest report of the car service division of the American Railway Association. Although this report covers conditions only up to July 15, two weeks after the rail strike was called, there was an increase of 17,496 bad order cars during that period. Of the 2,258,267 freight cars on line 342,079, or 15.1 per cent, were in need of repairs on July 15, compared with 324,583, or 14.3 per cent on July 1.

Freight cars idle on American railroads on July 15 totaled 417,029, compared with 405,120 on July 1, or an increase of 11,909 cars. Allowing 7 per cent as representing the normal number unfit for service would leave 184,000 as the number unfit for service and idle because of business conditions.

Pittsburgh Not Looking for Early End of Strikes

PITTSBURGH, Aug. 8.—Iron and steel and fuel interests here still hesitate about believing that there will be an early termination of the railroad and coal miners' strikes. So far as the coal strike is concerned, all signs now point to a finish fight, and it may be set down positively that the representation of Pittsburgh coal operators at the national conference scheduled to be held in Cleveland to-morrow will be no greater than at the attempted meeting in that city yesterday. Reports reaching here from Cleveland are to the effect that so little tonnage was represented at the meeting called by President John L. Lewis of the coal miners' union yesterday that it was adjourned almost as soon as it was called.

Considerable embarrassment has been caused the Pittsburgh coal operators by a meeting held here Sunday between A. M. Ogle, president National Coal Association, and Mr. Lewis, accompanied by attorneys. The result was the drawing up of a memorandum of agreement, the outgrowth of which is the idea of tomorrow's conference in Cleveland. To this it is hoped to attract operators from all over the country. Mr. Ogle, according to local coal operators having membership in the National Coal Association, has no authority as head of that organization to negotiate wage scales or other matters in the present dispute. His action, as well as other matters in connection with the strike situation, are believed to have been threshed out at a meeting held here to-day of the Pittsburgh coal producers' association.

Meanwhile, the coal situation in this part of the country as far as production is concerned does not change much. There has been no material falling off in the output of the mines, but the impression is so strong in the minds of striking miners that victory is at hand that efforts to reopen idle mines have not met with much success. Priorities in the distribution of coal thus far have not been very generally applied, chiefly because the machinery for enforcing them has not yet been set up. The result is that coal prices are largely on a supply and demand basis and no attention has been given the maximum suggested from Washington.

Steam coal from nearby fields to-day is selling at $7.50 per net ton at mines, while by-product grade commands $7.50 and lump gas coal is selling around $8. The railroads seem to be making some progress in replacing striking shopmen, but operations still are more or less adversely affected by the poor condition of the equipment and of course by the inability of the railroads to secure full supplies of coal.

The issue in both the coal and railroad strikes is very clearly defined. Mine operators believe that they will be successful in the struggle if given sufficient time and the same thought is uppermost in the minds of the railroad executives. Whether the struggles will be allowed to go to a definite conclusion seems to hinge largely on the attitude of the Government. Business men generally hope that the Government will not interfere because they believe that at best only a partial settlement could be effected.

Strike at Chicago Rail Steel Mills

CHICAGO, Aug. 8.—Approximately 1000 mill hands have struck at the hard steel bar mills of the Inland Steel Co. and the Calumet Steel Co. at Chicago Heights, Ill. The strikers want a 20 per cent increase in wages. Both skilled and unskilled workers are out.

CONTENTS

August 10, 1922

Steel Scrap in Cupola Iron Mixtures 337
Strength of the Product and the Percentages of Scrap—A Series of Experiments and the Results—Effect on Hardness.

Electric Motor Drive in Steel Industry 339
Rolling Mill Requirements as to Power, Speed, Adjustability and Changing of Speed—Mill Layouts to Utilize Electric Power

Notes on Acid Electric Furnace Practice 345
Basic Scrap and How to Charge It—Making a New Bottom—When to Tap and How to Pour—Alloy Additions in the Furnace

Let Steel User and Steel Maker Co-operate 347
Experiences with Steel in Cement Plant Machinery Show How Failures Might Have Been Avoided—Importance of Heat Treatment

Anti-Friction Bearings in the Steel Mill 354
Mounting Details of Ball and Roller Bearings—Use and Care of Ball Bearings—Provision for Lubrication

Special Strike Legislation Forecasted 357
House of Representatives Called for a Definite Session—Coal Priority System Slowly Developing

Iron and Steel Exports Fall Again 366
Drop 8 Per Cent Below May, But June Shows Larger Than Any Other Month Since March, 1921—Fiscal Year Less Than Half the Previous Year

Iron Ore Problems in Birmingham District 338
Contemplated Steel Plant Expansion at Ashland, Ky. 338
Improved Heroult Furnace 342
Rocky Mountain Industrial Relations Conference 343
Trend of Wages Over the Depression.... 343
Labor Notes 343, 346
Core Box for Making Sash-Weight Cores. 344
Electric Alloy-Atlas Crucible Merger.... 344
Large Hydraulic Flanging Press..... 346
Employment in July..... 346
Detroit Facing Serious Fuel Situation.... 349
Iron and Steel in Pennsylvania..... 350
Regulators for Foundry Air Squeezers... 351
Fire Clay and Silica Brick Prices Advanced 351
Lake Ore Movement in July..... 351
Safety Hook for Mill and Cargo Use..... 351
Coal, Coke and Ore Storage..... 352
To Report on Three-Shift Day..... 352
Metal Corrosion Studies..... 352
Shaper Used in Planing Bearing Seats... 353
Engineers to Discuss Economies..... 353
Association Meetings 353, 385
New Wall or Post Bracket Drill..... 353
Non-Ferrous Metal Fatigue..... 356
Merchant Ships Under Construction..... 356
Editorials 362
Repeal the Immigration Law—Coal Stocks and Coal Strikes—High-Test Iron Castings—Viewpoints of Old and Young—Iron Age Index
Mahoning Valley Conditions..... 365
Will Hold Exhibition of Machine Tools.... 367
Die-Casting Machine 368
Trade Commission and Steel Mergers.... 368
Mesabi Iron Co. Expansion..... 368
Railroad Equipment Business..... 369
Fabricated Steel Business..... 369
Export Situation Dull 384
July Steel Output Less Than in June.... 384
Foreign Market News..... 387, 388, 389
Far East a Market for American Labor-Saving Machinery 388
German Prices Again Raised..... 389
Thin Aluminum Foil Made in Germany.. 389
Electricity and the Italian Steel Industry 389
The Australian Steel Trade..... 389
British Columbia Steel Plant Proposed... 389
British Foreign Trade..... 390
Growth of Gray Cast Iron..... 390
United States Principal Importer of Cleveland Iron 390
Iron and Industrial Stocks..... 390

Iron and Steel Markets 370
Comparison of Prices 371
Prices Finished Iron and Steel, f.o.b. Pittsburgh 383
Non-Ferrous Metal Market 385
Personal Notes 386
Obituary Notes 387
Machinery Markets and News of the Works 391
New York Jobbers' Prices 400

ESTABLISHED 1855

THE IRON AGE

EDITORS:

A. I. FINDLEY WILLIAM W. MACON GEORGE SMART
CHARLES S. BAUR, *Advertising Manager*

Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

F. J. Frank, *President* PRINTED IN U. S. A. George H. Griffiths, *Secretary*

Owned by the United Publishers Corporation, 243 West 39th Street, New York. H. M. Swetland, Pres. Charles G. Phillips, *Vice-Pres.* A. C. Pearson, *Treas.* F. J. Frank, *Secy.*

Detroit: 317 West Fort St. Cincinnati: Mercantile Library Bldg. Buffalo: 881 Ellicott Square. Washington: 816 Fifteenth St., N. W. San Francisco: 320 Market St. London, Eng.: 11 Haymarket, S.W.1.

BRANCH OFFICES—Chicago: Otis Building. Pittsburgh: Park Building. Boston: 410 Unity Building. Philadelphia: 1420-1422 Widener Building. Cleveland: Guardian Building.

Subscription Price: United States and Possessions, Mexico, Cuba, Shanghai, $6.00; Canada, $8.50; Foreign, $12.00 per year. Single copy 25 cents.

Entered as second class matter, June 18, 1879, at the Post Office at New York, New York, under the Act of March 3, 1879.

Repeal the Immigration Act

In the matter of immigration our "open door" policy allowed us for many years to draw upon the manual labor of Europe's best types. But the quality of our immigration gradually deteriorated, as more backward peoples sought an asylum here, and a change in our "open door" law was called for but was not obtained. When the cumulative effect of our mixed immigration policy could no longer be ignored, not a few insisted upon a "closed door" policy; but these had no knowledge of our industrial dependency, and a temporary compromise was attempted in the 3 per cent Dillingham Law, the damaging effects of which are now clearly apparent.

Unfortunately the framers of this law took no account of the inferior industrial and mental quality of our more recent immigration. The result was—to the gratification of organized labor—that we deprived ourselves of needed additions to both our skilled and common labor. Under the law, the large body of non-industrial aliens in our midst has been unnecessarily increased. And now a two-year extension of the Dillingham law has been made without sufficient inquiry as to its results, and largely under pressure from those interested in creating a monopoly of jobs.

Taking the countries which supply nearly all the common labor used in the industries outside the needle trades, we gained in immigration over emigration in the ten months ending April 30, 1922, the almost negligible figure of 9813 adult persons of the class usually able to enter industry. But this is not the whole measure of damage done to our industries, which were regularly requiring and absorbing a quarter of a million adults annually, qualified for common labor. We actually lost some tens of thousands of good workers during these ten months, 25,000 in fact, and in addition 46,394 Hebrews entered under the Dillingham law in that time, while only 713 of the Jewish emigrant class left the United States. These Hebrews included women and children "of no occupation," who composed the majority and who quickly migrated to the already congested ghettos of a few larger cities, while the adult males who entered with them were largely of the needle trades in which we already had an oversupply. This class of immigrants has refused, as a rule, to enter into other industries. The Dillingham law, therefore, places a continued penalty upon our former lack of discretion and upon our immigration policy based largely on sentimentality.

The maintenance of our common labor is basic and is an industrial necessity. There is, in fact, already a deficit in the common labor supply in various parts of the country which causes a real "restraint of trade" and of new enterprise. Many types of manual labor are needed in our agricultural and industrial territories and additions also to the body of our skilled craftsmen. The supply of this labor through immigration has been deliberately allowed to run down with the active aid of those interested in insuring that labor here shall have a high scarcity value.

Thus recruiting for the low manual jobs in the United States, which the average American worker for years has resolutely refused to perform is now left to politics and a freak law. The common labor which will fire the factory boiler, reap our harvests and "help" building tradesmen and skilled craftsmen in every line is absolutely necessary to normal operations. For many years it has been almost wholly supplied by immigration and is now at a minimum.

The immigration restrictions needed are these: An immediate repeal of the Dillingham 3 per cent law, the improvement of our general immigration code which at present makes it absolutely impossible to discriminate at any time in favor of the real labor needs of the country, and some emergency control of admission to the country which shall be legally operative whenever it is needed to mitigate the social effects of the trade depression or to prevent an immigrant "run" upon the United States during a crisis.

Commissioner W. W. Husband of the Federal Immigration Bureau declared last week at the Wellesley Industrial Conference that our policies of "open door," "closed door" and "percentage basis" were fundamentally wrong and insisted that when the United States is short of one kind of labor we should have laws which will permit us to handle the matter scientifically, laws which will allow us to pick and choose intelligently and

to obtain material that would surely develop into good American citizenship. The modification of the law should follow the example of Canada which has saved herself the dilemma in which we find ourselves by exercising a selection privilege at the place of origin. Canada ascertains the qualification for making good and certifies to it abroad, before issuing an embarkation permit, and does not leave it to chance and discovery after the entrant has been turned loose upon the country. Such a revision of our policy is not opposed to the traditional "spirit of America," but is calculated to make the lot of all those accepted and of their families more satisfactory than ever before.

Our population, foreign-born or with one or both parents of foreign birth, was 36,398,958 persons out of a total population of 105,710,620 at the census of 1920. That is, one-third of our people were of foreign origin. In view of this it is obvious that definite steps must be taken to insure the raising of the quality of our immigration, the continuation of which on the present basis of quality and quantity would lead to great impoverishment of the national intelligence and resources and corresponding damage to industry.

Coal Stocks and Coal Strikes

From one viewpoint it appears to be fortunate that the iron and steel industry has adopted the by-product coking process so extensively in recent years, for in this coal strike the stocks of coal at by-product ovens have helped greatly in maintaining the industry in operation. Were there no by-product industry, it might be argued, the iron and steel industry would have been affected much more seriously by the strike.

From a long range viewpoint there does not seem to be much in the argument. For decades we have had recurrent coal strikes and the whole thing seems to have developed long ago into a guessing contest. The coal consumers try to guess how long the strike will last, and lay in stocks accordingly, while the coal miners try to guess how long the stocks will last and make their preparation in corresponding manner. Each long strike added to the history of the industry induces both parties to make guesses of longer periods for the next strike.

At this time, when the coal strike has lasted for four months, it may well be asked whether the practice of stocking coal is doing any practical good. The consumer bears the expense of stocking. He pays in most cases an extra price for some coal during the strike. Afterwards he is likely to pay an extra price for coal by way of reimbursement to the coal miner for the time the miner has lost.

It has been urged repeatedly that coal consumers should stock coal in summer so as to take the peak off the load of the mines and the railroads in winter. Consumers have been indisposed to do this to any extent, presumably on account of the expense, and also because of a feeling that the risk of being without coal or of having to pay an extra price for a time is simply of the same order as other risks that business and industry must take.

If there is such objection to stocking coal against winter, which is sure to come year after year, it may well be concluded that the stocking of coal against coal strikes is a serious burden upon industry. While that is a serious burden the other burdens involved in a coal strike are greater still. The practice of having a strike at the time of every wage scale settlement, or a "suspension" as the operation used to be termed, is so fixed that it will certainly require very definite and positive action to eliminate it.

In proportion to the value of coal, the cost of stocking is very considerable. While for years it has been preached that consumers should stock coal it may well be considered whether, after all, it would not be cheaper and more efficient to devise means whereby coal can be produced and moved just as it is required. We have become so accustomed to waste and inefficiency in the production and distribution of coal that the whole question needs to be considered afresh without bias from habits of thought already formed.

High-Test Iron Castings

Whether iron castings containing steel scrap are called "semi-steel" or "high-test iron" they have become recognized as a distinct product. Official sanction for the use of the term high-test iron was given by the American Society for Testing Materials at its annual convention in June when tentative specifications were adopted for cupola castings under this designation.

Opinions are divided as to the percentage of steel scrap that will produce the best results. It has been assumed too readily that almost any quantity up to 40 or 50 per cent is productive of good castings. The specifications referred to say nothing about the charge to be used, but deal largely with methods of testing. On other pages of this issue is a critical discussion of the proper percentages of steel scrap in cupola iron and the effect on the strength, carbon absorption and hardness. It is based on operations in a large Middle Western foundry which throw new light on the metallurgy of this interesting product. While 40 per cent of scrap in cupola charges seems to insure the strongest iron, there are reasons why 20 to 30 per cent represents the best working charges. Again, as to hardness and carbon absorption, anything above 40 per cent scrap avails nothing and, as with the strength, a deterioration follows.

Definite scientific data on the metallurgy of high-test iron, which afford a more scientific control of the cupola, are welcome. It may be that the looseness of nomenclature that gave the current designation of semi-steel is in part responsible for the evident latitude in practice which this metal has taken in the past 20 years. With the principles controlling its production better defined and with tests prescribed as in the specification lately sanctioned it should take a place of even larger importance among high-grade products of the foundry.

Never in the history of American iron and steel exports has there been so large a movement in black steel sheets as in the past few months. We have referred before to the remarkable demand from Japan, which began to attract

attention a year ago. For the eleven months ended with May, Japan took about 83.75 per cent of the total exports of sheets, the actual figures being 516,774,613 lb. (230,703 gross tons) out of 617,143,078 lb., or over $17,500,000 worth. No other American steel product has approached this record in the same eleven months. In 1913 the foreign sales of sheets were insignificant and the present movement compares well with some of the war exports of steel for munitions. New building laws in Japan requiring the use of metal in place of the highly inflammable materials hitherto used, are the chief cause of this large demand.

Viewpoints of Old and Young

There have been various times when the views of old men and young men as to industrial and business matters differed fundamentally by reason of the difference in conditions in the periods in which the two groups received their training and formed their philosophies of affairs.

Approximately seven years have elapsed since commodity prices and wage rates began to mount as a result of war conditions. In those seven years many new workmen have come into the field and many young men have risen to positions of responsibility. The time is long enough for these graduates to constitute a considerable part of the whole body, and some of the things that older men consider curious in present-day conditions are explained by that fact.

In a valuable monograph published a year ago, "Price Changes and Business Prospects," Leonard P. Ayres, vice-president of the Cleveland Trust Co., emphasized the difference in philosophy between men who received their business training after the year 1896 and those who flourished in the preceding 30 years. From the Civil War to 1896 the general trend of prices was downward. Afterwards the general trend was upward. The early generation was trained to conservatism and learned the evil of issuing bonds. The later generation was trained in optimism and learned how profits could easily be made by issuing bonds. In 1896 there were "bloated bondholders." Later, the bondholder became a victim of the high cost of living.

In 1916 boys in their teens were given jobs at wages double what their fathers had been able to earn at double the age. Now they are men six years older and seriously believe high wages for performing relatively simple operations are perfectly natural and must be striven for. The beginners of 1917 are five years older. Altogether the respective classes count up. These young men do not know what hard work is, and as to striving, the chief idea in many cases is a strike. If older men endeavor to point out that the viewpoint is wrong, that these striplings cannot reasonably expect to thrive so easily, the counsel is treated with indifference or contempt. The elders are "old fogies" and have not kept up with the times.

At various times since the armistice it has been said in substance that the will to work, to work efficiently and industriously and for reasonable wages, would not be restored until industry had passed through a depression. In the past few months the remark has been that the depression of 1921 has not produced the expected results, and it has been asked whether the trouble is that it was not long enough or was not deep enough. When one divides the workers into the two classes—on the one hand those who knew the ups and downs of business before the great war and appreciate that there must be hard work in order to succeed at all, and on the other hand those whose whole experience has been accumulated in the past seven years, he will have strong suspicions that the older men need no additional experience, but that the younger men have had no real experience at all. To them 1921 may appear simply as a curious vacation period, an unexplained interruption that merely needs to be forgotten.

That American vessels are fast falling behind in the struggle for ocean supremacy is becoming increasingly apparent from reports, month by month, of the Department of Commerce. For the eleven months ended with May foreign vessels brought in 68 per cent of our imports, while American vessels accounted for only 32 per cent. This compares with 41 per cent in American vessels for the eleven months ended with May, 1921, and 59 per cent for foreign vessels. While the present share of American carriers in American commerce is a great improvement over pre-war years, the figures do not show the 50 per cent participation which might be considered normal. It is interesting to note that about 100 years ago American vessels carried as much as 90 per cent of the total, and in 1910, the low record year, less than 10 per cent.

Probably for the first time on record France is producing more pig iron than Great Britain. It would at least be necessary to search the records of normal production during many years to find a parallel, if one exists. In May France produced 435,300 gross tons of pig iron against Great Britain's 407,900 tons, and that was the third month this year in which the balance was in favor of France. In the first five months of this year the French production averaged 362,400 tons, while the British average was only 356,000 tons per month. In 1913 and in 1920 the British output was more than double that of France. A British authority states that export business with Germany and activity in the building trades are the main reasons for the improvement in the French industry. Before the war Great Britain led the world as an exporter of pig iron, but thus far this year the movement has been less than half what it was in 1913.

Iron Age Index

The index of THE IRON AGE for the past half year, January to June inclusive, has been compiled and printed and is now ready for distribution. It will be forwarded promptly to those who have entered their names on our list as desiring it. Others who may have use for copies will be furnished them by addressing our Circulation Department.

MAHONING VALLEY CONDITIONS

Curtailment of Operations Pig Iron, Semi-Finished and Finished Steel Markets

YOUNGSTOWN, OHIO, Aug. 8.—In the Youngstown district, the Youngstown Sheet & Tube Co. has suspended a second blast furnace in its East Youngstown group, its Bessemer department, one blooming mill and two open hearth furnaces. At its Farrell, Pa., plant, the Carnegie Steel Co. has banked Nos. 1 and 3 blast furnaces and has suspended its steel department, consisting of 12 open hearth furnaces, blooming and bar mills. The Republic Iron & Steel Co. has cut the number of its active open hearth furnaces to eight and but one skelp mill at its Brown-Bonnell plant is rolling.

Active blast furnaces in the Mahoning Valley have been reduced to 10, as follows: Carnegie Steel, five of six at its Ohio Works; Youngstown Sheet & Tube Co., two of four at East Youngstown, and Republic Iron & Steel Co., Sharon Steel Hoop Co., and Brier Hill Steel Co., one each. On July 1, when the railway shopmen's strike started, 18 furnaces were active in the Valley.

Independent steel making has been reduced to 36 of 51 open hearth furnaces. Sheet mill production is being sustained, however, as 106 sheet mills were scheduled at the beginning of the week. Non-integrated sheet rollers say their sheet bar supplies are sufficient for maintenance of rolling at a normal rate until September.

The Sheet & Tube company is operating but one of six batteries of by-product coke ovens, the output being sufficient for one blast furnace. It is planned to suspend a second stack as soon as coke stocks are exhausted and conserve coal for finishing mill uses. The company has sufficient semi-finished steel on hand to maintain rolling mill operations through August.

Production Cost of Steel Up $15 a Ton

Coal is not now available for the industry, states President James A. Campbell, adding that it would be impossible to pay prevailing prices without advancing prices of steel products. In the production costs of the higher finished steel products, advanced fuel costs add at least $15 per ton, he states. There has been of course no proportionate advance in steel prices. Higher prices in general for steel products are predicted by Mr. Campbell when the industry again reaches normal. Continued scarcity of coal, following adjustment of current labor disputes, is predicted for the industry, tending to keep prices up and adding to production costs of iron and steel.

Whereas the Sheet & Tube company consumes under normal operations an average of 135 cars daily, its receipts dropped to 11 cars one day last week and 35 another. Much of the coal coming into this territory is of indifferent quality.

Market for Finished Steel

Automobile interests continue to press for delivery of sheets, especially on full finished sheets and strip steel. There is little surplus fine finished sheet stock available in this district, as the chief maker is fully engaged on orders from regular trade channels. It is pushing the installation of six additional mills at its Newton Falls plant.

Bars, plates and shapes are moving toward a 2c. minimum. The chief independent merchant bar interest is out of the market and is falling behind in its obligations to customers, due to interruptions to production. In this territory, strip steel is quotable at 2.60c. to 2.75c. for hot-rolled, while cold finishes are being quoted at 4.25c., an advance of $5 per ton over recent levels.

In the pipe market, demand exceeds ability of makers to produce under present conditions, and is exceptionally marked for buttweld sizes. Difficulties in production due to coal shortage are assuming serious proportions, and it is unlikely the present rate of operations can be long maintained.

The leading independent producer of wire products again curtailed output this week and is out of the market, in so far as new commitments are concerned. Though nominally quoting nails at $2.50 per base keg, such business has been accepted for some time at $2.40. Prices of nails and of plain wire at $2.25 are declared prohibitively low by this interest.

Brier Hill Steel Co. continues to quote from 2c. to 2.40c. for plates, but is accepting only 84-in. mill sizes. A district fabricating interest is figuring on plate work for a power house installation in Massachusetts requiring 2200 tons of plates for fabrication into smokestacks, boilers and the like. An independent has been negotiating for resale of 90,000 lb. of small squares of forging steel quality, now in a warehouse in Massachusetts.

District interests do not expect priority regulations of the Interstate Commerce Commission to affect coal already loaded and consigned to them, prior to issuance of the order.

Virtually no pig iron is being offered for sale in the Mahoning Valley, due to cutting down of the number of active furnaces and prevention of operation by merchant stacks which had planned to start. One interest whose operations may permit small surpluses to be sold says it will adhere to a $27 minimum for standard basic iron. Another independent is using a considerable tonnage of off-grade basic, which has been lying in its yards for several years, to meet the current emergency.

All grades of semi-finished steel are held at $35, with little merchant tonnages available except to regular customers. In current rollings, production of sheet bars is considerably ahead of slabs or billets. Already there has been a curtailment in supplies going to non-integrated rolling interests, and sheet production will sooner or later be adversely affected as these supplies are diminished.

The Girard plant of the A. M. Byers Co., Pittsburgh, producers of wrought iron pipe, opened Monday with 30 puddling furnaces fired, of 88, and one skelp mill rolling, but planned to suspend entirely before the week-end. Two light bar mills, which were active last week at the Brown-Bonnell works of the Republic Iron & Steel Co., are idle this week.

Improved Car Movements

During the first five days of August the average daily loaded car movement in the Youngstown district was 15 per cent greater than during corresponding period in July, and 20 per cent ahead of the same period in August, 1921. Considerable improvement has been effected in freight movement of the Baltimore & Ohio Railroad, which was the worst hit of any of the carriers serving this territory.

July wage distribution through banks was $4,226,-181, a decline of $461,795 from the preceding month. July is the first month of the year to fail to show a gain over its predecessor. The decline is attributed to loss of employment resulting from the coal and rail strikes. The July disbursement, however, compares with a payroll of $3,323,982 in July, 1921, the low point in the post-war depression.

Higher labor costs are predicted by some interests. During the summer, until the shopmen's strike precipitated intermittency of employment, labor shortage was felt by most plants, especially at sheet mills. Workers have been attracted from the steel industry to other forms of employment.

The International Harvester Co., Chicago, has let a contract for a one-story open hearth works for the Wisconsin Steel Co., One Hundred and Sixth Street and Torrence Avenue, to cost $360,000. The building will be 143 x 504 ft. The company has also awarded a contract for a one-story storage building for steel, 103 x 400 ft., to cost $80,000.

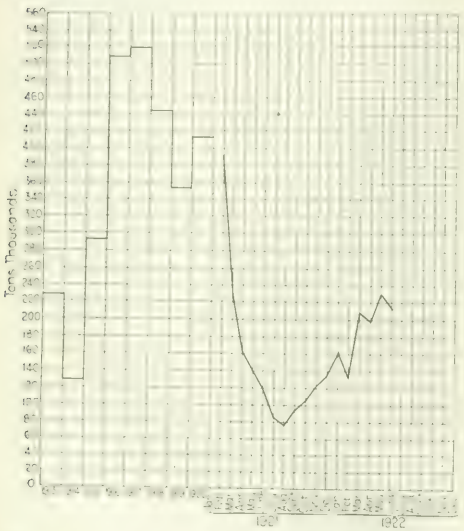
David Evans & Co., 3720 South Kedzie Avenue, Chicago, has opened a scrap iron and steel department in charge of Charles J. Reagan, formerly with Briggs & Turivas. David Evans & Co. has been in the pig iron, coke and ferroalloy business for 22 years and is well known in the iron and steel trade.

Iron and Steel Exports Fall Again

Drop 8 Per Cent Below May, But June Shows Larger Than Any Other Month Since March, 1921—Fiscal Year Less Than Half the Previous Year

WASHINGTON, Aug. 8.—Reflecting a substantial decline, iron and steel exports for June aggregated 212,295 gross tons, valued at $18,649,816 as compared with 230,062 tons valued at $29,456,348 in May. For the fiscal year 1922 ended with June, exports totaled 1,721,418 tons valued at $181,798,042 as compared with 4,168,619 tons valued at $608,541,550 for the fiscal year ended with June, 1921.

Exports of machinery, exclusive of vehicles, for June, were valued at $23,554,356, as compared with $19,415,994 for May. For the fiscal year ending with June they were valued at $245,946,681. For June of last year machinery exports were valued at $31,860,156 and for the fiscal year ending with June, 1921, at $593,042,511.



Monthly Exports of All Iron and Steel from United States. The horizontal lines at left show, in each case, the average month of the year indicated. The curve at right shows the movement during the past 18 months

In contrast to the downward trend of iron and steel exports in June, there was a sharp increase of imports, which totaled 39,155 tons, valued at $3,717,093, comparing with 23,093 tons valued at $2,966,332 for May. The chief increases in manufactured imports were made in ferromanganese, which amounted to 13,535 tons in June, and in scrap, which amounted to 10,000 tons. For the fiscal year ended with June, 1922, iron and steel imports totaled 186,186 tons, valued at $29,660,540. For the fiscal year ended with June, 1921, imports totaled 244,164 tons, valued at $44,236,077. Imports of manganese ore in June totaled 44,329 tons, valued at $310,529, as compared with 46,517 tons in May, valued at $307,571. For the fiscal year ending in June, 1922, manganese ore imports totaled 257,208 tons. For the corresponding period of last year they amounted to 682,770 tons.

Exports of Principal Steel Products for June, 1922,

	Gross Tons	Per Cent of Total
Black Steel Sheets:		
[illegible]	[illegible]	75.2
[illegible]	[illegible]	
[illegible]	[illegible]	
Tin Plate:		
[illegible]	[illegible]	41.6
Japan	1,949	
[illegible]	[illegible]	
Steel Rails:		
[illegible]	[illegible]	49.3
Canada	5,112	
Mexico	[illegible]	
[illegible]	[illegible]	
Japan	3,225	
Netherlands	[illegible]	
Canada	[illegible]	
[illegible]	[illegible]	
Barbed Wire:		
Argentina	2,923	
Brazil	1,524	

Exports, January, 1920, to May, 1922, inclusive

	Gross Tons		
	All Iron and Steel	Pig Iron	Semi-finished Material
Calendar year 1919....	4,239,827	[illegible]	[illegible]
January, 1920	333,601	18,468	[illegible]
February	308,185	15,739	22,693
March	417,216	22,740	[illegible]
April	[illegible]	14,608	19,032
May	[illegible]	13,032	16,370
June	402,707	17,075	29,811
Fiscal year 1920....	4,212,732	248,126	288,766
July	[illegible]	29,647	17,243
August	431,484	22,645	20,920
September	409,200	22,724	18,113
October	452,015	17,296	11,853
November	434,297	13,929	7,042
December	498,765	10,055	3,415
Calendar year 1920..	4,961,851	217,958	216,873
January, 1921.....	547,394	3,710	315
February	[illegible]	1,307	92
March	230,635	2,320	1,023
April	162,592	1,234	678
May	142,551	2,541	749
June	119,081	1,689	1,106
Fiscal year 1921...	4,168,619	129,541	82,549
July	86,523	2,744	363
August	75,827	2,424	2,447
September	95,169	3,078	1,318
October	106,582	2,830	153
November	122,290	1,299	1,869
December	134,415	2,550	250
Calendar year 1921..	2,213,042	28,305	10,363
January, 1922.....	[illegible]	1,043	4,683
February	133,975	1,430	6,627
March	[illegible]	2,724	10,002
April	[illegible]	2,750	9,376
May	230,062	3,897	13,091
June	212,295	1,996	13,178
Fiscal year 1922....	1,721,418	28,330	83,127

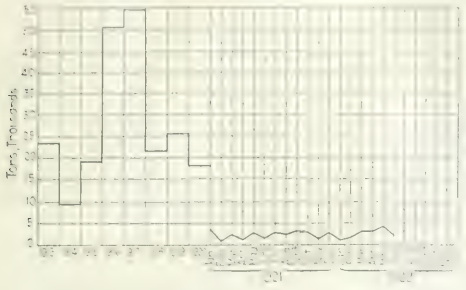
Imports of Iron and Steel—Gross Tons

	June		Year End'g June	
	1921	1922	1921	1922
Ferromanganese	265	13,535	43,197	30,799
Ferrosilicon	520	1,518	7,361	11,011
Pig iron.....	3,688	5,850	51,757	40,472
Scrap	1,372	10,000	82,657	50,969
Steel bars.....	116	914	4,293	5,399
Bar iron.....	33	268	3,815	2,919
Structural steel.....	72	154	1,394	1,525
Billets, without alloys....	245	47	996	11,010
All other billets.....	51	128	3,216	1,069
Steel rails	2,585	6,586	37,583	29,105
Sheets and plates.....	48	29	2,781	334
Tin and terne plates.....	26	64	503	356
Wire rods.....	24	62	4,612	1,218
Total	9,045	39,155	244,164	186,186
Manganese ore and oxide..	17,169	44,329	682,770	257,208

Of the total June imports practically all, as is shown by an accompanying table, came from the United Kingdom and Canada, the former shipping 18,882 tons and the latter 14,481 tons to the United States. Im-

ports from Belgium totaled 3750 tons and from Germany 934 tons.

Examination of the June exports shows that the decline was applied to practically all of the important steel products. It was particularly noticeable in the case of black steel sheets, exports of which for May



Monthly Exports of Pig Iron from United States. The horizontal lines at left show average month for each year. The curve at right shows the movement during 1921 and 1922

totaled 34,619 tons as compared with only 10,296 tons in June. In this connection it is interesting to observe that, while Japan continues to be the largest single buyer of American iron and steel, shipments to that country showed a decided drop in June as compared with May. Of the exports of 43,672 tons of steel rails, the greatest export item, Japan took 26,114 tons. Of the total of 23,822 tons of black steel sheets, the next to largest item of exports in June, Japan took 18,071 tons.

Exports of Iron and Steel—Gross Tons

	June 1921	June 1922	Twelve Months Ending June 1921	Twelve Months Ending June 1922
Pig iron	1,667	1,[illegible]	[illegible]	
Ferromanganese	[illegible]	[illegible]	3,335	1,021
Ferrosilicon	[illegible]	[illegible]	[illegible]	[illegible]
Scrap	3,587	8,739	182,478	60,875
Ingots, blooms, billets, sheet bar, steel	1,106	13,178	[illegible]	63,127
Iron and steel bars	8,335	19,084	[illegible]	102,190
Alloy steel bars*	[illegible]	220	[illegible]	4,673
Wire rods	492	3,565	61,[illegible]	41,123
Plates, iron and steel	7,781	9,844	761,022	119,851
Sheets, galvanized	2,942	10,628	93,155	82,172
Sheets, black steel	10,296	23,823	155,841	299,328
Sheets, black iron	248	721	22,722	[illegible]
Hoops, bands, strip steel	1,302	3,032	[illegible]	25,033
Tin plate, terne plate, etc.	2,727	8,160	178,299	78,551
Structural shapes, plain material	18,[illegible]	6,023	[illegible]	[illegible]
Structural material fabricated	1,941	2,389	32,089	[illegible]
Steel rails	20,308	43,672	549,558	[illegible]
Rail fastenings, switches, frogs, etc.	699	5,378	14,219	[illegible]
Boiler tubes, welded pipe and fittings	26,071	18,718	444,705	[illegible]
Cast iron pipe and fittings	4,076	1,686	[illegible]	[illegible]
Plain wire	2,569	11,285	167,[illegible]	[illegible]
Barbed wire and woven wire fencing	1,757	8,825	86,926	42,563
Wire cloth and screening*	[illegible]	150	[illegible]	‡622
Wire rope and cable*	[illegible]	335	[illegible]	‡2,312
Wire nails	851	4,677	67,017	51,286
All other nails and tacks	226	915	13,088	7,126
Horseshoes	32	50	1,505	703
Bolts, nuts, rivets and washers, except track	1,175	1,868	37,613	14,620
Car wheels and axles†	[illegible]	1,986	[illegible]	‡8,178
Iron castings†	[illegible]	729	[illegible]	‡5,233
Steel castings†	[illegible]	97	[illegible]	‡1,345
Forgings†	[illegible]	387	[illegible]	‡1,262
Machine screws†	[illegible]	10	[illegible]	‡85
Total	119,081	212,295	4,168,619	1,721,418

*Not reported separately, prior to January, 1922.
†Previous to January, 1922, reported by value only.
‡Six months, only.

Sources of June, 1922, Imports of Iron and Steel

Countries	Tons
United Kingdom	18,882
Canada	14,481
Belgium	3,750
Germany	934
Sweden	831
Italy	104
Virgin Islands of U. S.	75
France	22
Austria	23
Norway	2
Czechoslovakia	1
Total	39,155

MACHINERY EXPORTS
By Value

	June, 1921	June, 1922	Twelve Months Ending June, 1921	Twelve Months Ending June, 1922
Locomotives	$4,254,474	$783,170	$46,567,683	$18,133,922
Other Steam Engines	[illegible]	298,401	[illegible]	*1,361,900
Boilers	209,263	154,358	8,893,878	1,506,133
Accessories and Parts	[illegible]	53,982	[illegible]	*536,018
Automobile Engines	125,992	831,401	2,662,803	3,955,569
Other Internal Combustion Engines	595,775	510,228	10,435,325	3,266,931
Accessories and Parts for	[illegible]	225,567	[illegible]	*1,342,338
All Other Parts of Engines	711,807	[illegible]	20,363,872	†3,251,595
Complete Tractors, except Agricultural	119,124	9,074	19,702,742	266,954
Electric Locomotives	252,771	[illegible]	825,753	†1,339,190
Other Electric Machinery and Apparatus	2,266,675	751,356	36,273,139	15,527,171
Excavating Machinery	124,573	[illegible]	2,756,581	†710,339
Concrete Mixers	41,102	32,243	1,024,026	398,234
Road Making Machinery	81,447	[illegible]	1,182,183	†414,539
Elevators and Elevator Machinery	189,578	[illegible]	2,124,897	1552,821
Mining and Quarrying Machinery	1,704,881	568,796	21,620,815	5,358,265
Oil Well Machinery	[illegible]	580,837	[illegible]	*2,370,194
Pumps	827,624	[illegible]	16,804,650	[illegible]
Lathes	141,140	84,198	5,375,290	1,045,209
Boring and Drilling Machines	[illegible]	68,580	[illegible]	*335,028
Planers, Shapers and Slotters	[illegible]	52,280	[illegible]	*148,021
Bending and Power Presses	[illegible]	31,531	[illegible]	*239,325
Gear Cutters	[illegible]	15,937	[illegible]	*37,303
Milling Machines	[illegible]	51,622	[illegible]	*158,645
Sawing Machines	[illegible]	6,678	[illegible]	*27,268
Thread Cutting and Screw Machines	[illegible]	17,240	[illegible]	*86,835
Punching and Shearing Machines	[illegible]	20,685	[illegible]	*96,569
Power Hammers	[illegible]	3,162	[illegible]	*55,798
Rolling Machines	[illegible]	585	[illegible]	*24,504
Wire-drawing Machines	[illegible]	3,152	[illegible]	*7,226
Polishing and Burnishing Machines	[illegible]	804	[illegible]	*1,088
Sharpening and Grinding Machines	60,499	69,297	2,576,498	832,708
Other Metal Working Machinery and Parts of	1,296,574	813,229	26,488,232	6,952,320
Textile Machinery	1,045,095	1,385,904	23,513,228	17,469,311
Sewing Machines	483,820	[illegible]	11,280,128	5,727,922
Shoe Machinery	110,675	81,981	2,802,105	997,475
Flour-Mill and Gristmill Machinery	58,192	80,659	2,238,374	1,036,997
Sugar-Mill Machinery	1,596,972	494,532	29,108,909	4,392,269
Paper- and Pulp-Mill Machinery	108,908	[illegible]	3,562,585	†1,376,074
Sawmill Machinery	54,941	23,418	1,392,454	570,287
Other Woodworking Machinery	110,653	109,570	3,835,711	1,092,783
Refrigerating and Ice Making Machinery	102,631	166,123	3,390,763	1,866,823
Air Compressors	292,807	245,855	5,675,504	1,995,381
Typewriters	723,797	1,012,065	18,867,513	10,395,623
Power Laundry Machinery	56,477	41,899	1,139,309	551,717
Typesetting Machines	166,136	369,560	4,536,013	3,415,798
Printing Presses	375,004	227,293	10,383,632	4,694,510
Agricultural Machinery and Implements	2,262,641	1,821,284	51,341,262	19,055,581
All Other Machinery and Parts	10,316,108	11,455,170	191,203,844	101,056,577
Total	$31,860,156	$23,554,356	$593,042,511	$245,946,681

*—January 1, 1922, to June 30, 1922.
†—July 1 to December 31, 1921.

country showed a decided drop in June as compared with May. Of the exports of 43,672 tons of steel rails, the greatest export item, Japan took 26,114 tons. Of

Will Hold Exhibition of Machine Tools

A second annual exhibition of machine tools and appliances will be held under the joint auspices of the New Haven branch of the American Society of Mechanical Engineers and the department of mechanical engineering of Yale University, in Mason Laboratory, New Haven, Sept. 21 to 23.

The original purpose of the exhibition was to bring before the manufacturers of Connecticut and engineering students of the University the latest developments in machine tool practice. This year the purpose has been broadened with a view to contribute to the stimulation of industry and the restoration of prosperity. About 150 invitations to exhibit have been issued.

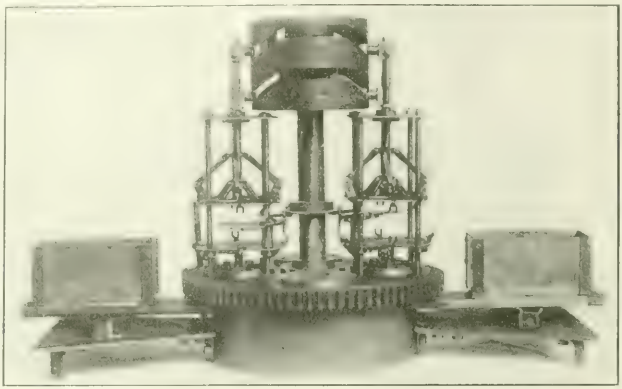
There will be no charge for exhibition space and no admission fee for spectators. Papers will be read each evening by authorities on the subjects treated, and it is expected that several exhibitors will show motion pictures of their machines, as well as having representatives present to demonstrate them. The exhibition chairman is H. R. Westcott, Westcott & Mapes, Inc., 207 Orange Street, New Haven.

DIE-CASTING MACHINE

Automatic Unit for High Production Simultaneous Casting of Different Work a Feature

An automatic die-casting machine designed to effect a high rate of production of die-castings has been placed on the market by the W-J Die-Casting Machine Co., 24 North Wabash Avenue, Chicago.

The new machine is of the continuous rotary type, four sets of cages, arranged to carry dies of any form, being mounted on a rotating table. Two melting pots on opposite sides of the table charge the molten metal to each die as it passes the pots. In the machine illustrated two of the die cages have been removed from their places on the table to permit a better view of the mechanism and, as shown here, the melting pots are not in their cases on the slides which extend from the base of the machine. Eight castings are produced in each revolution of the table, or two in each of the four dies. At the rate of 2 r.p.m., the production would be 960 castings an hour. A feature of the machine is that different types of castings may be produced simultaneously by using different dies.



Four Sets of Cages on the Rotatim Table Carry the Dies. The two melting pots are located opposite each other

As the dies approach the melting pot they are automatically closed, and the pot advanced to them. A nozzle on the pot enters a socket on the die, which is then filled with molten metal from the pot either by means of compressed air or by the action of a plunger. After the pots have been advanced to a die, they rotate with it long enough to permit sufficient metal to be forced into the die. The mechanism which actuates the melting pots provides both a rotary and in-and-out motion.

The pot then recedes, the die opens and the core pins withdraw. The casting is pushed from the upper die member by a knockout pin and falls upon a tray that is automatically brought in place to receive it. The table continues to rotate and a pair of revolving brushes loosens the dirt adhering to the dies, compressed air being then blown on the die members to remove foreign matter remaining on the die faces. On approaching the second melting pot the operations outlined are repeated.

The die is in two parts, the upper member being movable and the lower stationary. Closing the upper members on the lower, preparatory to the actual casting operation, is effected by means of the upper of the two cams shown on the post at the center of the machine. The rollers which run in the upper grooves are fastened to rods attached to the upper dies. As the dies approach a melting pot its roller runs down a decline in the groove, causing the upper die to be pushed down on the lower one. At the same time the roller in the lower groove proceeds down the decline provided for it, this roller pushing the core pins into the four sides of the upper die, this being accomplished through a sleeve and a link mechanism.

In the case of vertical core pins they are pushed straight down through the die. Adjustment is provided for varying the distance each core pin is advanced into the die. Core pins may also be introduced into the lower die member. On the table station a plate cam having four spiral grooves is mounted, each of the cams being carried on a stem projecting through the table and provided with a lever. This lever strikes a dog as the table rotates, which causes rotation of the cams. The pins which run in the cam grooves are guided at their lower ends by straight grooves. As each pair of pins slides into its groove, a link is rocked, pushing a core-pin into the lower die. There are four sets of rocking links to provide for introducing a core pin into the four sides of the die.

The dies are kept at the proper temperature by circulating water. Heating of the metal in the pots is by means of gas jets; gas flames being provided also for pre-heating the compressed air used in forcing molten metal into the dies.

In some cases a plunger and cylinder are used to force the molten metal to fill the dies completely. Under such circumstances it becomes necessary to prevent the metal from solidifying in the cylinder, this being done by heating the cylinder and plunger with a gas flame.

To meet the requirements of small shops the machine illustrated may be provided with one melting pot and two sets of dies.

Trade Commission and Steel Mergers

WASHINGTON, Aug. 8.—The Federal Trade Commission is still engaged in studying the facts and figures relating to the proposed consolidation of the Midvale Steel & Ordnance Co., Republic Iron & Steel Co. and Inland Steel Co., and no information is yet obtainable as to whether a complaint will be issued in this case. The data now being compiled in the office of the trade commission will doubtless be presented soon to the commissioners, who will then decide what further action, if any, is to be taken.

In the Bethlehem-Lackawanna case, in which a complaint was issued some time ago, no date has been set for hearings and this probably will go over until after the summer vacation period.

Mesabi Iron Co. Expansion

In connection with a recent offering in New York of 50,000 shares of common stock of the Mesabi Iron Co., it was stated that the company plans to increase materially the output of its iron ore concentrating and sintering plant on the eastern Mesabi range. The present capacity is 500 tons of sinter per day, but the coarse crushing plant, power plant and other installations are sufficient to handle a much increased tonnage. It has been estimated that on the production basis of 3500 tons of sinter per day the cost will be approximately $2.60 per ton. The Midvale Steel & Ordnance Co. has a 32 per cent interest in the company's common stock.

Molybdenum and Other Alloy Steels

In the study of molybdenum and other alloy steels, being made by Dr. H. W. Gillett at the Ithaca, N. Y., office of the Bureau of Mines, 600 endurance test pieces have been ground and polished to a special mirror finish ready for testing. These bars will keep two endurance machines busy night and day for probably more than a year.

FABRICATED STEEL BUSINESS

Bridge and Building Awards and Tonnages Pending at Leading Centers

Awards for fabricated steel work for the past week include the following:

Department store at Poughkeepsie, N. Y., [illegible] tons, to McClintic-Marshall Co.

Mount Holyoke College, South Hadley, Mass., 700 tons, to American Bridge Co.

Queensboro Plaza, New York, approach work, 400 tons, to American Bridge Co.

United Lead Co., Perth Amboy, N. J., 600 tons, to Levering & Garrigues Co.

Highway bridge, near Buffalo, N. Y., 575 tons to American Bridge Co.

Bridge work for New York Central Railroad, 200 tons, to Shoemaker-Satterthwaite Bridge Co., and 150 tons to Fort Pitt Bridge Works.

Bridge for Norfolk & Western, 150 tons, to Virginia Bridge & Iron Works.

Young Men's Hebrew Association, Newark, N. J., 800 tons, to American Bridge Co.

Standard Oil Co., 33 80,000-bbl. oil storage tanks for Casper, Wyo., 10,000 tons; 25 tanks to American Bridge Co. and 8 tanks to Chicago Bridge & Iron Works.

State Capitol Building, Lincoln, Neb., 2100 tons, to Omaha Steel Works.

Pullman Co., foundry building, Pullman, Ill., 1000 tons, erection to W. B. Kilgore Construction Co.; fabrication to Gage Structural Steel Co.

Power house for Indianapolis, 180 tons, to Helperington & Berner.

State bridge No. 3252 at Deer River, Minn., 119 tons, to American Bridge Co.

Bridge 1041, St. Louis County, Minn., at Hibbing, 294 tons, to American Bridge Co.

First National Bank building, Fort Wayne, Ind., 800 tons, to Whitehead & Kales.

Building for American Shipbuilding Co., 500 tons, to Republic Structural Iron Works, Cleveland.

Addition Jamestown Worsted Mills, Jamestown, N. Y., 150 tons, to Kellogg Structural Steel Co., Buffalo, N. Y.

Power house, J. N. Adam Memorial Hospital, Perrysburg, N. Y., 200 tons, to Kellogg Structural Steel Co., Buffalo.

High school, Elmira, N. Y., 100 tons, to Kellogg Structural Steel Co., Buffalo.

New Riverside pumping station, Milwaukee, 438 tons, to Worden-Allen Co.

Structural Projects Pending

Inquiries for fabricated steel work which may be added to lists of pending projects include the following:

Apartment house, Philadelphia, 1000 tons.

Highway bridge for New York-Saratoga, 400 tons.

Bridges for New York Central, 400 tons.

Addition to Chelsea Hotel, Atlantic City, N. J., 3000 tons, plans to be issued in about a week.

Bankers Reserve Life Insurance Building, Omaha, Neb., 700 tons.

Ford Motor Co. Building, River Rouge, 900 tons.

Louisiana & Arkansas Railroad, 650 tons of bridge work.

City of Seattle, bridges, 1800 tons.

Court house, Akron, Ohio, 250 tons.

Bridge for Spokane, Wash., 2000 tons, bids being taken.

Kimberly-Clark Paper Co., Niagara Falls, N. Y., 300 tons.

Spaulding & Son Paper Co., Tonawanda, N. Y., 200 tons.

Clapp Estate, Portland, Me., seven-story office building, 500 tons.

Lima Locomotive Works, Lima, Ohio, 1700 tons, general contract to James Stewart & Co.

Municipal viaduct at Atlanta, Ga., 1200 tons, bids close Aug. 23.

Office building at Charlestown, W. Va., tonnage unstated, Mills, Millspaugh & Carmichael Co., Columbus, Ohio, architects.

Buildings for new fair grounds at Huntington, W. Va., tonnage unstated, Joseph & Joseph, Louisville, Ky., architects.

Railroad Equipment Business

Locomotive purchases in July were the largest for any month this year, the total having been fully 350. The best previous month was April with about 275. The largest order was that of 150 by the New York Central, noted last week.

In freight cars, according to the *Railway Age*, July was a large month with a total of 15,675 cars, bringing the total to Aug. 1 to 103,847 cars. Passenger cars ordered in July were 120, making the total for the seven months 1352.

Inquiries for new locomotives and cars as well as repair activities continue, among which are the following:

The Baltimore & Ohio, reported as inquiring for 15 Pacific type locomotives, has ordered this equipment from the Baldwin Locomotive Works.

The Chesapeake & Ohio will receive bids until 12 o'clock noon Aug. 25 at Richmond, Va., for general repairs to 50 locomotives. This company is also asking for bids until Aug. 11 on the repair of 50 locomotives.

The Buffalo, Rochester & Pittsburgh Railroad is inquiring for 30 locomotives.

The Chicago & Northwestern has let repairs on 500 box cars to the American Car & Foundry Co.

The Fruit Growers Express is inquiring for 1000 refrigerator cars.

The Northern Pacific has ordered 1000 center constructions from the Western Steel Car & Foundry Co.

The Chesapeake & Ohio has awarded 50 refrigerator cars to the American Car & Foundry Co.

The Wilcox Co., Chicago, has awarded 50 hopper cars of 55-ton capacity to the Western Steel Car & Foundry Co.

The Indiana Gas & Coke Co. is inquiring for repairs on 50 hopper cars.

The Chicago, Burlington & Quincy is in the market for 500 to 1500 box car repairs.

The Boston & Maine is having 1000 box cars repaired at the shops of the Laconia Car Co.

The Chicago, Burlington & Quincy has ordered repairs to 500 gondolas from the Keith Railway Equipment Co.

The New York Central is having 500 coke cars converted to gondola cars at the shops of the Ryan Car Co., Hagewisch, Ill.; 500 coke cars converted into gondola cars at the shops of the Buffalo Steel Car Co., Buffalo, and 973 coke cars converted into 500 flat, 300 double deck stock and 173 single deck stock cars at the shops of the American Car & Foundry Co., Detroit, Mich.; for the Pittsburgh & Lake Erie 1200 coke cars are being converted into box cars at the shops of the Standard Steel Car Co., Newcastle, Pa.; 300 coke cars converted into box cars at the shops of the American Car & Foundry Co., Detroit.

The Rock Island has placed 1500 national dump car repairs with the Western Steel Car & Foundry Co.

The Chicago Elevated Railway has ordered 100 elevated cars from the Cincinnati Car Co.

The A. B. C. Transit Refrigerator Co., Chicago, has renewed its inquiry for 150, 40-ton express refrigerator cars.

The National Railways of Mexico have ordered 5 first-class and 10 second-class, narrow gage passenger coaches from the Pullman Co.

The Boston Elevated has ordered 40 tunnel cars from the Pullman Co.

The Baldwin Locomotive Works has received an order for 25 consolidation type locomotives from Poland. This type is a duplicate of 150 engines purchased from Baldwin about three years ago. President Vauclain stated this order will amount to about $1,000,000.

Evidence of the amazing growth of the electrical industry is afforded by the fact, shown in census reports on manufactures, that in 1919 there were 212,374 wage earners engaged in the manufacture of electrical machinery, apparatus and supplies, as compared with only 1271 in 1879. Salaries and wages increased during that period from $683,164 to $336,369,291.

The structural steel work on the new wire and rod mill of the Whitaker-Glessner plant of the Wheeling Steel Corporation at Portsmouth, Ohio, has been completed, and the brick walls are now going up. It is expected that installation of machinery will commence in about three weeks, and that operations will begin in the new mills about Jan. 1.

A booklet entitled, "250 Lacquer Questions Answered" has been issued by the Zeller Lacquer Mfg. Co., 342 Madison Avenue, New York, for distribution to those who request it. The attempt in compiling the questions and answers is to cover every problem confronting the lacquer user.

Iron and Steel Markets

MORE PLANTS SHUT DOWN

Fuel Situation More Critical in All Districts

Constriction of Steel Production Will Increase Even with Strike Settlement

The fuel stringency has become much more pronounced at iron and steel works. In the Chicago, Cleveland, Youngstown, Pittsburgh and Buffalo districts a dozen more blast furnaces have been forced to suspend. As many more are likely to be thrown idle by another week, and indications are that in two weeks several steel plants will be forced to stop.

The whole industry is in uncertainty over the working out of priorities, since the practical application of the plan has not been made known, but it is plainly indicated that for a good many weeks but a small percentage of newly mined coal will go into the production of iron and steel.

Whatever agreement may be reached at the Cleveland coal conference, Pittsburgh district mines on which the Central Western producers of steel draw so heavily will be but little affected, and Pittsburgh sentiment as to iron and steel output in the next two months is far from hopeful.

Chicago steel companies have led for many weeks in percentage of active capacity, but the operating situation there is now approaching a crisis. Shortage of open-top cars and congestion and embargoes on the railroads have been serious complications. Yet for a leading Chicago mill the week has been one of the largest of the year in new orders booked.

There is no excitement among consumers, and little of the scramble for material that is often seen in time of scarcity. Railroads, car builders and automobile works have been the most active buyers, much of the business being placed despite the fact that definite delivery cannot be promised.

Coming eastward from Chicago less pressure upon the mills appears, and in eastern Pennsylvania new inquiry is small, consumers being not disposed to pay present high prices when there is no assurance of coal with which to operate. More is heard of curtailed output by steel users because of shortage of various other raw materials and in some cases labor scarcity.

In the Pittsburgh district the Carnegie Steel Co. has been meeting the situation by concentrating in its Monongahela River plants and slowing down at outlying plants which it is more difficult to supply with fuel. The closing of the Farrell, Pa., steel works means a reduction in the allotment of sheet bars to nearby mills of the American Sheet & Tin Plate Co.

Some steel companies are increasing their scrap charge in making steel, while using up pig iron in stock and doing more melting with natural gas and fuel oil.

July output of steel ingots showed an expected decrease from June, but it was not large. The estimated daily rate for the country was 113,700 tons, as compared with 115,800 tons in June and 114,700 tons in May. The July rate represented about 35,350,000 tons per year; that of June about 36,000,000 tons. August will show a pronounced falling off.

With rising prices for coke and pig iron, finished steel, where bought for early delivery, is from $2 to $3 per ton higher. No formal advances have been made by the Steel Corporation, but on plates, shapes and bars a quotation below 1.80c., Pittsburgh, is rare. Independent makers have been freely quoting 2c. and from that to 2.15c.

The market is being largely made by the smaller consumers who have been able, in many cases, to struggle along with better success than some larger ones.

The common belief that an early ending of both coal and railroad strikes would not avert the more serious shutdowns the steel trade sees ahead has been laid formally before the Commerce Commission. The Associated General Contractors of America protest that unless the priorities plan is modified, much construction work will be stopped. It is pointed out that with 291,000 cars per week taken for coal movement only 33,000 open top cars weekly would be available for all other purposes.

That contract buying has not been halted by high prices appears from further new car and car repair orders. Locomotives bought in July numbered 353, the largest month in the year. At Cleveland 10,000 tons of plates and shapes were placed with the Carnegie Steel Co. for two new Detroit and Cleveland passenger boats and 4,600 tons for a new ore freighter. Standard Oil Co. tank plates amount to 15,000 tons.

Rail mills are having little to do, but the Southern Pacific has placed about 47,000 tons for 1923 with the Alabama mill.

More blast furnaces have had to withdraw from the pig iron market and again advances have been made of $1 and $2 per ton. Most foundries have iron on hand or on contract, and the present buying is to provide against a more acute scarcity expected in the fall. Blast furnaces are counting on high fuel costs, even though not at the present extreme, throughout the year.

Pittsburgh

Trend of Plant Activity Still Downward—Prices Mount on Small Purchases

PITTSBURGH, Aug. 8.—Iron and steel plant activities in this and adjacent territory slowly but steadily are tapering off as a result of the increasing shortage of fuel. There has been a further net loss of three furnaces. The Dover furnace of Hanna Furnace Co., Dover, Ohio, was banked yesterday, while Youngstown Sheet & Tube Co. and the Cambria Steel Co. each has retired one furnace. The Carnegie Steel Co., in closing down its Farrell, Pa., steel works last Saturday, also banked two of the three blast furnaces at the plant, but this curtailment has been offset by turning on the blast once more in two of the Carrie furnaces which were banked late last week. Several other furnaces are on the ragged edge and another week probably will tell the story of additions to the idle list.

Outside of the Youngstown district, which is suffering most from the fuel shortage, there has not been

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Aug. 8 1922	Aug. 1 1922	July 11 1922	Aug. 9 1921
No. 2X, Philadelphia‡	**$31.14**	$29.75	$27.64	$19.84
No. 2, Valley furnace†	**29.00**	28.00	24.00	19.50
No. 2, Southern, Cin'ti†	**24.05**	22.55	21.53	23.50
No. 2, Birmingham, Ala.†	**19.50**	18.50	18.00	19.00
No. 2 foundry, Chicago*	**27.00**	26.00	24.00	18.25
Basic del'd, eastern Pa.	27.25	27.25	25.75	20.26
Basic, Valley furnace	**26.00**	25.00	24.00	18.50
Valley Bess. del. Pitts.	**28.76**	26.76	26.77	21.96
Malleable, Chicago*	**27.00**	26.00	24.00	18.50
Malleable, Valley	**28.00**	27.00	24.50	20.00
Gray forge, Pittsburgh	**28.76**	27.76	25.27	21.46
L. S. charcoal, Chicago	33.15	33.15	31.65	33.50
Ferromanganese, seaboard	67.50	67.50	67.50	70.00

Rails, Billets, Etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$40.00	$40.00	$40.00	$47.00
Bess. billets, Pittsburgh	35.00	35.00	35.00	30.00
O.-h. billets, Pittsburgh	35.00	35.00	35.00	30.00
O.-h. sheet bars, P'gh	35.00	35.00	35.00	32.00
Forging billets, base, P'gh	40.00	40.00	40.00	35.00
O.-h. billets, Phila.	**42.67**	40.17	40.17	35.74
Wire rods, Pittsburgh	40.00	40.00	40.00	42.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh. lb.	**1.80**	1.70	1.70	1.75
Light rails at mill	1.75	1.75	1.75	1.85

Finished Iron and Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.025	2.025	1.925	2.05
Iron bars, Chicago	2.00	2.00	1.80	1.75
Steel bars, Pittsburgh	**1.80**	1.70	1.70	1.75
Steel bars, Chicago	**1.90**	1.75	1.75	2.13
Steel bars, New York	**2.14**	2.04	2.04	2.13
Tank plates, Pittsburgh	**1.80**	1.70	1.70	1.80
Tank plates, Chicago	**1.90**	1.75	1.75	2.18
Tank plates, New York	**2.14**	2.04	2.04	2.18
Beams, Pittsburgh	**1.80**	1.70	1.70	1.85
Beams, Chicago	**1.90**	1.75	1.75	2.23
Beams, New York	**2.14**	2.04	2.04	2.23
Steel hoops, Pittsburgh	2.50	2.50	2.50	2.25

Sheets, Nails and Wire, *Per Lb. to Large Buyers:*	Aug. 8 1922 Cents	Aug. 1 1922 Cents	July 11 1922 Cents	Aug. 9 1921 Cents
Sheets, black, No. 28, P'gh	3.15	3.15	3.15	3.00
Sheets, galv., No. 28, P'gh	4.15	4.15	4.15	4.00
Sheets, blue an'l'd, 9 & 10	2.40	2.40	2.40	2.40
Wire nails, Pittsburgh	2.40	2.40	2.40	2.75
Plain wire, Pittsburgh	2.25	2.25	2.25	2.50
Barbed wire, galv., P'gh	3.05	3.05	3.05	3.40
Tin plate, 100-lb. box, P'gh	$4.75	$4.75	$4.75	$5.25

Old Material, Per Gross Ton:				
Carwheels, Chicago	$19.50	$19.50	$19.50	$12.50
Carwheels, Philadelphia	17.50	17.50	17.50	16.00
Heavy steel scrap, P'gh	**17.50**	17.00	17.50	12.50
Heavy steel scrap, Phila.	15.00	15.00	15.00	11.50
Heavy steel scrap, Ch'go.	15.50	15.50	15.50	10.25
No. 1 cast, Pittsburgh	19.00	19.00	19.00	16.00
No. 1 cast, Philadelphia	18.00	18.00	17.50	17.00
No. 1 cast, Ch'go (net ton)	**18.00**	17.00	17.00	11.50
No. 1 RR. wrot, Phila.	17.50	17.50	17.00	14.00
No. 1 RR. wrot, Ch'go (net)	14.25	14.25	13.50	9.75

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$14.00	$14.00	$9.50	$2.75
Foundry coke, prompt	**15.00**	14.50	10.00	3.75

Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York	14.12½	14.12½	14.00	12.00
Electrolytic copper, refinery	13.75	13.75	13.75	11.75
Zinc, St. Louis	**6.30**	6.25	5.52½	4.20
Zinc, New York	**6.65**	6.60	5.87½	4.70
Lead, St. Louis	**5.50**	5.47½	5.50	4.20
Lead, New York	**5.85**	5.80	5.75	4.40
Tin (Straits), New York	32.62½	32.75	31.12½	27.75
Antimony (Asiatic), N. Y.	5.25	5.25	5.00	4.60

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.
The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Aug. 8, 1922, Finished Steel, 2.212c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel

Aug. 1, 1922,	2.169c.
July 11, 1922,	2.169c.
Aug. 9, 1921,	2.364c.
10-year pre-war average,	1.689c.

Composite Price, Aug. 8, 1922, Pig Iron, $25.94 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Aug. 1, 1922,	$24.88
July 11, 1922,	23.61
Aug. 9, 1921,	18.52
10-year pre-war average,	15.72

very much decline in steel works operations. This may be explained by the fact that most companies have some stocks of iron to draw upon and are increasing the scrap content of the charge and using fuel oil and natural gas as the melting agent. The Carnegie Steel Co. is meeting the situation by concentrating in its Monongahela river plants and slowing down at its outlying plants which are more difficult to provide with fuel than those in the former districts. An early possibility is the banking of two Mingo, Ohio, furnaces and the starting up of two Clairton stacks. Such a course is not open to other companies and as supplies of raw materials become exhausted, suspensions will follow.

Early termination of the rail and coal strikes, it is believed, would have little effect in staying the downward trend of plant activities, because of the low place occupied by the steel industry in the priority schedule. Although the supply situation is growing steadily tighter in steel and promises to be much worse before it is better, it is commented upon that there is so little excitement among consumers and that pressure for shipments is much less urgent than in other periods of shortage. Users of plates are urging shipments of material due them on orders, but in all other cases, with the possible exception of pipe, buyers appear to be satisfied to bear their part in a condition for which the steel manufacturers are in no wise responsible.

The market is being made these days by the smaller consumers who thus far have been able to struggle along with greater success than the larger consumers. This also is the case with pig iron, demand for which is for small tonnages for small users. Prices are reflecting such buying, further advances of $1 to $2 a ton having been established in pig iron, while on the major steel products 1.70c. is fast disappearing, except for very indefinite delivery, and the more common minimum now is 1.80c. Cold finished steel bars have advanced $3 a ton and higher prices also have been established on track supplies. Desirable scrap is hard to obtain except at stiff prices and fuel remains costly since the machinery for enforcing the priority system has not yet been set up.

Pig Iron.—Business of the past week has been of very small proportions, but the growing scarcity of available supplies as well as high costs find full reflection in prices. There no longer seems to be any foun-

dry iron at less than $29, Valley furnace, for No. 2, and small sales of this grade have been made from a western Pennsylvania furnace as high as $30. Prices of such lots of low silicon foundry iron as are left naturally are enhanced in value by the advance in the base grade. Although sales of the steel-making grades are very limited and usually of tonnages not regarded as quotation making lots, prices are up $1 to $2 in recognition of the fact that merchant producers have little iron and the steel companies are melting instead of offering for sale stocks they have on their yards. Quotations to a large degree now are an appraisal of to-day's possibilities, since their basis in sales is a small one.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.76 per gross ton:

[illegible]	[illegible]
[illegible]	[illegible]
Gray forge	27.00
No. 2 X foundry	29.00
No. 2 plain	27.00
No. 2 foundry	28.00
Malleable	28.00

Ferroalloys.—There is no special change in general conditions. Such business as is doing in ferromanganese is in small lots, usually of less than carloads, on which as high as $85 per ton, Atlantic seaboard, is said to have been obtained. On large lots, the quotable prices are unchanged, with British material still offered, subject to cabled confirmation, for September delivery, at $67.50. Eastern seaboard. On spot tonnages as high as $75 is quoted, but the most recent business was at $70 and on sales the market is not over $72.50. Spiegeleisen is almost impossible to obtain for early delivery. Domestic producers are sold up over the remainder of the year and while some British material is reported to be lying in New York, it is held above the prices that consumers feel they can afford to pay. Little interest is displayed in ferrosilicon or silvery iron.

We quote 78 to 82 per cent ferromanganese, $67.50 c.i.f. Atlantic seaboard for domestic; British, spot, $72.50; British, future, $67.50; German, 76 to 80 per cent, $66. Average 20 per cent spiegeleisen, $36 furnace; 16 to 19 per cent, $35 furnace; 50 per cent ferrosilicon, domestic, $55 to $60 furnace, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, $41.50; 11 per cent, $44.50; 12 per cent, $48.10; 13 per cent, $52.10; 14 per cent, $55.10; silvery iron, 6 per cent, $30; 7 per cent, $31; 8 per cent, $32.50; 9 per cent, $34.50; 10 per cent, $36.50; 11 per cent, $39; 12 per cent, $40.50. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Billets, Sheet Bars and Slabs.—Although steel works operations in this district are not suffering as much from the fuel shortage as are the blast furnaces, there has been some contraction and available supplies of billets, sheet bars and slabs are very limited. Open hearth operations are sustained fairly well by the use of fuel oil and natural gas and the raising of the scrap content in the charge, but this practice adds to costs, particularly, since a number of steel companies lately have been finding it hard to obtain satisfactory scrap except at high prices. It is reported that on small tonnages of forging billets, which were urgently needed, as high as $45, has been obtained and $40 is said to have been quoted against a recent sheet bar inquiry. We continue to regard $35 as a fair appraisal of the present market on sheet bars, slabs and large soft billets, but there is little question that this price would be exceeded if consumers had to have supplies in a hurry. Very few really urgent demands are current.

We quote 4 x 4-in. soft Bessemer and open-hearth billets at $35; [illegible] open-hearth sheet bars, $35; slabs, $35; forging billets, ordinary carbons, $40, all f.o.b. Youngstown or Pittsburgh mills.

Wire Rods.—The market is nearer $43, base, than it is $40, although the leading interest as yet has made no announcement of an abandonment of the latter price. Independent makers are reluctant about taking on additional business in view of the uncertainty as to continued operations, on account of the coal situation, but regard $43 as the market if they do take on any orders. There is one inquiry for 2000 tons before the market and no scramble among producers to get it.

We quote No. 5 common basic or Bessemer rods to domestic consumers, $40 to $43; chain rods, $40 to $43; screw stock rods, $45 to $48; rivet and bolt rods and other rods of that character, $40 to $43; high carbon rods, $47 to $53, depending on carbon, per gross ton, f.o.b. Pittsburgh or Youngstown

Iron and Steel Bars.—The market on steel bars is moving away from its recent minimum of 1.70c., base, Pittsburgh, and while some business might be taken by one or two makers from regular customers for indefinite delivery at that price, the more common minimum for relatively early shipments is 1.80c., and 2c. and even more is being asked by those in position to make prompt shipments. Leading mills have pretty heavy obligations and only one or two seem willing to take on fresh business. New demands in reinforcing bars are lighter than they have been, but early shipments are as hard to obtain as in ordinary steel bars. Rail steel bars are firmer in sympathy with those rolled from billets and also because of the higher market in rails for rerolling.

We quote steel bars rolled from billets at 1.70c. to 1.80c., reinforcing bars, rolled from billets, 1.70c. to 1.90c. base; rail steel reinforcing bars, 1.70c. to 1.75c.; refined iron bars, 2.25c. in car loads, f.o.b. mill, Pittsburgh.

Structural Material.—The price situation is getting stiffer as a result of the hindrances to production created by the coal and rail strikes. Mill obligations exceed probable production over the next few months and manufacturers who have not withdrawn from the market are picking their new orders. Where early delivery is essential buyers are having difficulty in interesting the mills at a price of less than 1.80c., Pittsburgh. Fabricating interests report a good inquiry, but the uncertainty as to deliveries is holding up awards. Plain material prices are given on page 383.

Plates.—Makers are heavily committed and a number of them, on account of the uncertain operating outlook, cannot consider new business even at premium prices. On small tonnages 2c., base, Pittsburgh, is not out of the question and on large lots only preferential customers are able to interest the mills in tonnages at less than 1.80c. That there should be a shortage of plates in view of the expansion of capacity during the war is surprising, but probably finds its explanation in the fact that a considerable percentage of capacity could not be operated profitably at the prices that prevailed early in the year, and such capacity cannot now go on with the production of steel on the downgrade. Prices are given on page 383.

Steel Skelp.—The shortage of supplies, especially of grooved, is as acute as ever and the tendency of prices is upward. Operation of butt weld pipe furnaces is restricted because of the scarcity of grooved skelp, which is explained largely by the curtailment of Bessemer plant operations. While 1.70c. still can be done on sheared skelp, this price is disappearing and the market is moving strongly toward a minimum of 1.80c. As much as 2c. is being paid for narrow grooved skelp.

Wire Products.—It is fortunate that demands upon producers are not heavy, for all of them have obligations against which they are not making much progress owing to the effect of the coal shortage on steel production. Increasing costs are indicated and there is not anxiety for additional business. One large independent company has practically withdrawn from the market, taking only such orders as it is reasonably certain of being able to fill, while another is taking business only on a day to day basis. All makers are behind in their deliveries on the smaller sizes of nails. Most of the business now on makers' books is at the Steel Corporation prices. Independent companies, however, have never formally abandoned the advances over those prices set up early in April. Quotations are on page 383.

Steel Rails.—Makers of light rails are showing increased indifference to new demands. One of the independent producers is refusing all business except that which can be supplied from stock, while the Carnegie Steel Co. has orders sufficient to engage rolling capacity for the next three or four weeks. The mill base still is 1.75c. for those rolled from new billets, but stock shipments are priced as high as 2c., base. Light rails rolled from old standard sections are held a little more firmly.

We quote 25 to [illegible] sections rolled from new steel, 1.75c. base; rolled from old rails, 1.65c. to 1.70c. base; standard rails, $40 per gross ton mill for Bessemer and open-[illegible] sections

Iron and Steel Pipe.—The supply situation in standard pipe has become so acute that makers now actually welcome cancellations. The shortage of coal threatens to bring a considerable curtailment of production soon and actually has affected manufacturers in the outlying districts. Bessemer departments of both of the Youngstown manufacturers now are idle and this affects production of the butt weld sizes, for which the demand is strongest. All makers, including the National Tube Co., which thus far has not suffered very much loss of output, now are taking on new business in standard pipe with considerable conservatism. Lap welded pipe is more readily available because of the relatively high operation of open hearth furnaces, and the fact that there is some open hearth steel for pipe. An inquiry for 100 miles of 10-in. 35-lb. to 40-lb. line pipe is reported, but the identity of the prospective buyer is not disclosed. Makers of wrought iron pipe are having difficulty in catching up with their obligations in standard pipe. Discounts are given on page 383.

Sheets.—The coal shortage has cut more heavily into operations of Steel Corporation mills than those of the independents. Closing down of the Farrell, Pa., steel works of the Carnegie Steel Co. means a reduction in the allotment of sheet bars to nearby mills of the American Sheet & Tin Plate Co. and a further reduction in steel supplies or an increase in the delivered price is probable from the plan of the Carnegie Steel Co. to concentrate steel works activities in its Monongahela river plants. About 60 per cent of the American Sheet & Tin Plate Co. mills are engaged this week. Some of its plants, fairly well fixed with regard to coal supplies, have no steel, while others having steel, lack coal. Moving the coal to plants having the steel is not attempted because of the danger that it would be seized for preferential consumers or confiscated by the railroads. Slowing down of independent steel works is likely to tell soon on independent sheet mill activities now averaging about 80 per cent. In spite of the prospect of a further backing up in deliveries on contracts, the market is not excited, as buyers seem to regard the situation as one which cannot be helped. With the exception of the agricultural implement manufacturers, no class of sheet consumers has a good claim for preferential treatment in car priorities, which now are getting consideration in view of orders that all cars suitable for the purpose be kept available for moving coal. With the possible exception of automobile sheets, delivery premiums are being paid on only a small part of the current shipments. We make no change in prices, the full range of which are given on page 383.

Tin Plate.—Active independent capacity still exceeds that of the leading interest, the independent mills in this and nearby districts being quite fully engaged as against slightly less than 60 per cent of the Steel Corporation units. This alignment reflects a divergence in steel supplies rather than in orders. A movement by perishable food container manufacturers to secure preferential treatment on car supplies for tin plate shipments does not find much support among manufacturers, who believe that the pack now will suffer little for want of cans. Shortage of steel probably will force a curtailment of production only a little earlier than usual. It is probable that most manufacturers will be able to complete most of their third quarter obligations, and few had any beyond Oct. 1. Prices are unchanged except that owing to the tight steel situation there is less shading of the regular quotation, except to those who usually have preferential treatment.

Boiler Tubes.—Not much activity is observed in charcoal iron tubes, but steel tubes are wanted, the demand being especially brisk for seamless tubes in connection with the heavy orders for new locomotives and for locomotive repairs. Suggestions of higher prices for lap weld tubes are frequent, because it is claimed that costs have risen to a point where present prices are without profit. Discounts are given on page 383.

Cold Finished Steel Bars and Shafting.—There has been a general advance of $2 per ton since a week ago, makers of cold drawn, rolled and turned material now quoting a base of 2.25c. base Pittsburgh, for carloads, and 2.50c. for less than carloads, while ground shafting now is priced at 2.65c. base, f. o. b. mill, for carloads and 2.90c. for less than carloads. This development finds its principal explanation in the scarcity and strength of hot-rolled bars.

Hot-rolled Flats.—There is no change in prices, all makers quoting 2.50c. base on orders from regular customers for the ordinary run of sizes and gages, but demanding a premium of $5 per ton for the light, narrow material or for early delivery of the easily rolled sizes. New demands for cotton ties are almost entirely absent as the business of the season has been closed and the ties rolled. It is, therefore, only a matter of specifications and deliveries during the remainder of the season. Prices on hot-rolled flats are given on page 383.

Cold-rolled Strips.—There is no change in prices. Where buyers insist on specified deliveries most makers are asking 4.25c. base, Pittsburgh, but regular customers of the various makers still are able to find accommodation if willing to accept delivery at makers' convenience at 4c. Most of the current shipments carry a price of less than 4c.

Nuts and Bolts.—Although buyers quite generally entered orders for their third quarter requirements prior to July 1, it is evident that on account of the steel scarcity they are not getting full shipments of contract specifications, since in the past week or two, new demands have been fairly numerous and rather insistent. Discounts printed on page 383 are closely observed on new orders.

Rivets.—Buyers are specifying freely on contracts and much new business is coming out despite the advance of $5 per ton in prices two weeks ago. Leading makers deplore a runaway market, but fear that still higher prices may result from the scarcity and high cost of bars and rods. Discounts are given on page 383.

Track Supplies.—Advances of $2 to $3 per ton lately have been announced by several makers of spikes. Local makers now are quoting large spikes at $2.35 base per 100-lb. and small spikes and bolt and barge spikes at $2.75 base per 100-lb. A leading Eastern maker who recently has been quoting $2.35 and $2.75, late last week advanced to $2.50, and $3, respectively, for large and small spikes. Track bolts also are firmer, being quoted at $3.25 to $3.50 base per 100-lb. for carloads and an attempt lately has been made by some to restore the old differential of 1c. per lb. on less than carload lots. Demand for both spikes and bolts is rather brisk for small lots, but the chief reason for the advance is the increasing strength of the market in steel bars. Prices are given on page 383.

Coke and Coal.—Available supplies of coke do not seem to increase much in spite of the gain in beehive oven production, and while the furnaces are buying very little, there seems to be an outlet in other directions at well sustained prices. It is reported that some furnace coke recently has been offered as low as $13.50 per net ton at oven, but to-day such fuel is not to be had at less than $14, and some sales have been made at $14.50, although for other than blast furnace use. On foundry grade the minimum is $15 per net ton at oven and from that up in accordance with the buyer's ability to pay. The Pittsburgh Crucible Steel Co. is offering some by-product foundry coke at $16 per net ton, f.o.b. Midland, Pa. Coal prices remain high because as yet there has not been very full application of the priority system. Sales of nearby coal range anywhere from $7 per net ton at mines for steam grade up to $8 for small lots of lump gas coal.

Old Material.—The market is showing a stronger tendency on the better grades of open hearth material, due to the fact that offerings are very limited while melters have found cheap offerings are very unsatisfactory. One independent steel company here is offering $17.50 for No. 1 heavy melting steel and is not

(*Continued on page* 382)

Chicago

Further Curtailment—Broad Active Buying —Higher Iron and Steel Prices

CHICAGO, Aug. 8.—Owing to the increasing scarcity of fuel, the operating situation in the Chicago district has reached a crisis and another two weeks may see a number of important iron and steel producers entirely idle. Coal stocks have fallen to a dangerously low point and even those furnaces and mills that have their own mines have no assurance that their output will not be allocated to preferred industries. Under the priorities ruling coal can be bought only by making full payment in advance to the State authorities and then to wait one's turn in the hope that the order will go through after the demands of those in the preferred list have been filled. Shortage of open top equipment, congestion and embargoes on the railroads have all operated to complicate the situation and to make the delivery of coal exceedingly uncertain even after it is en route.

The Illinois Steel Co. has been forced to suspend the operation of two additional blast furnaces, having banked one at South Chicago and having blown one out for relining at Joliet. This makes a total loss of six blast furnaces in two weeks, reducing the number of its active stacks to 14 out of 29. Through the greater use of scrap the company is maintaining a steel output of 78 per cent, which was its rate of operation a week ago. The Inland Steel Co. is still on a 65 per cent basis.

Notwithstanding the gloomy production outlook, demand for steel is holding up remarkably well. For a leading local mill, last week was one of the heaviest in the year in new orders booked and specifications were also above the average. New buying covers practically every finished steel commodity except rails and is heaviest in plates, shapes and bars. Conspicuous among purchasers are the railroad car builders, the railroads and the automobile plants. Agricultural implement makers are also increasingly active in the market and among users of minor importance steel sash manufacturers have been placing large orders. Much of this business is being closed despite the fact that definite delivery cannot be promised by the mills and in fact present shipments are being allocated among customers because of curtailed output. The slowing up of mill deliveries is affecting the operations of users adversely. The output of railroad carbuilders has been curtailed not only on account of a shortage of steel, but slow deliveries of lumber, specialties, coal shortage and in some instances labor scarcity.

Rising costs have again forced an advance in finished steel products and pig iron. Plates, shapes and bars have gone up to a minimum of 1.90c., Chicago, for shipment at mills convenience, while merchant pig iron is now quoted at $27 to $28, base furnace. Steel for prompt shipment is difficult to obtain and is commanding increasing premiums.

Pig Iron.—Rising fuel costs have again resulted in an advance of local merchant iron, the new minimum for contract iron being $27, base furnace, while spot iron is commanding $28. Future business is comparatively light, but spot iron is active. Both Northern and Southern iron are difficult to obtain for prompt shipment, however, the former because of prior commitments and the latter because of transportation difficulties, which are holding back shipments from the South. Of forward business recently placed a sale of 1000 tons of Northern foundry for September to November delivery stands out prominently. Among the few large inquiries outstanding are 1000 tons of Southern foundry, wanted by an Illinois melter, for fourth quarter, and 500 tons and 200 tons of 8 per cent silvery, respectively, wanted by Wisconsin and Illinois users for the same delivery. A recent sale of copper free low phosphorus iron in this district was closed at $34, Valley furnace. Small lots of charcoal have been sold at the new base of $30, furnace. An English inquiry for a small tonnage of charcoal iron has been received in this market.

Quotations on Northern foundry high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$33.15
Northern coke, No. 1, sil. 2.25 to 2.75	$28.00 to 29.00
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	27.00 to 28.00
Northern high phos	27.00 to 28.00
Southern No. 2	26.00
Malleable, not over 2.25 sil	27.00 to 28.00
Basic	27.00 to 28.00
Low phos. Valley furnace, sil. 1 to 2 per cent copper free	34.00 to 35.00
Silvery, sil. 8 per cent	37.29

Ferroalloys.—A local user has purchased a car of spiegeleisen at $46, delivered, but there is little additional material available at that price and an early advance is looked for. A carload inquiry for ferromanganese is current.

We quote 78 to 82 per cent ferromanganese, future, $75.06; prompt, $82.56, delivered; 50 per cent ferrosilicon, $57, delivered; spiegeleisen, 18 to 22 per cent, $46, delivered.

Bars.—Demand for soft steel bars is heavier than for any other finished steel product. Buyers, however, are finding it difficult to obtain material, particularly for specific delivery. The minimum local price for indefinite delivery has advanced to 1.90c., Chicago. The Inland Steel Co. has withdrawn all quotations. For reasonably early shipment the going market appears to range from 2.25c., delivered Chicago, upward. Fuel shortage and labor scarcity are a source of great concern to mills rolling bar iron, but it is still possible to place orders for this product at 2c., Chicago. Rail steel bars have advanced to a minimum of 1.80c., f.o.b., or Chicago. A strike of mill operators has forced the two Chicago Heights rail steel bar plants to suspend operations.

Mill prices are: Mild steel bars, 1.90c. to 2c., Chicago, for indefinite delivery; common bar iron, 2c., Chicago; rail steel, 1.80c., mill or Chicago.

Jobbers quote 2.60c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 3.55c. for rounds and 4.05c. for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 2.38c. base; hoops, 3.60c.; bands, 3.35c.

Bolts and Nuts.—Some business is still being placed at the discounts of May 11, but with raw material increasing in price and bolt production endangered by the fuel shortage, the tendency is toward greater firmness at the July 1 price. The automobile plants, which have been heavy buyers of bolts and nuts, are in danger of early shutdowns owing to lack of coal. The Ford Motor Co. has only two weeks' supply of fuel on hand. Discounts on page 383 apply in this territory, except that they are f.o.b., Chicago, instead of f.o.b., Pittsburgh.

Jobbers quote structural rivets, 3.25c.; boiler rivets, 3.35c.; machine bolts up to ¾ x 4 in., 50, 10 and 10 per cent off; larger sizes, 50 and 10 off; carriage bolts up to ⅝ x 6 in., 50 and 5 off; larger sizes, 45 off; hot pressed nuts, squares and hexagons, tapped, $3.25 off; blank nuts, $3.50 off; coach or lag screws, gimlet points, square heads, 60 per cent off; quantity extras are unchanged.

Wire Products.—New business last week showed a big increase over the four weeks previous. Apparently jobbers find that they must again replenish stocks and it is probable also the serious turn of the fuel situation in relation to mill operations accounts for the sudden desire of many buyers to have their orders entered on the books. Orders from the South are conspicuous, reflecting the improved conditions in that section following the marketing of this year's cotton crop at advantageous prices. Business is also good from Northern and Western agricultural sections, except where harvesting has temporarily stopped buying. The demand for nails is very heavy and barbed wire and staples are also much sought after. For mill prices see finished iron and steel, f.o.b., Pittsburgh, page 383.

We quote warehouse prices, f.o.b. Chicago: No. 9 and heavier black annealed wire and No. 9 and heavier bright basic wire, $2.95 per 100 lb.; common wire nails, $3.10 per 100 lb.; cement coated nails, $2.60 per keg.

Sheets.—The local source of supply has been largely cut off owing to the fact that the independent producer

has withdrawn from market and the Gary steel mills have been shut down because of shortage of fuel. Demand is still insistent.

Mill quotations are 3.15c. to 3.35c. for No. 28 black, 3.40c. to 3.50c. for No. 10 blue annealed and 4.15c. to 4.30c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote blue annealed, 3.75c.; black, 4.45c.; galvanized, 5.45c.

Plates.—The Standard Oil Co. has placed 33 oil storage tanks of 80,000-bbl. capacity for erection at Casper, Wyo. Of these 25 will be fabricated by the American Bridge Co. and 8 by the Chicago Bridge & Iron Works. The steel, aggregating 10,000 tons, will be rolled by the Illinois Steel Co. There are said to be other sizeable tank inquiries in the market but negotiations are being carried on quietly. Demand for plates is even heavier than in recent weeks, notwithstanding declining mill operations. The leading producer has advanced its price on material for delivery at mills convenience to a minimum of 1.90c., Chicago. The Inland Steel Co. is out of the market. Plates for reasonably early delivery are difficult to obtain even from Eastern mills on a Pittsburgh base.

The mill quotation for indefinite delivery is 1.90c. to 2c., Chicago. Jobbers quote 2.70c. for plates out of stock.

Structural Material.—The future course of construction is dependent on the outcome of the two national strikes. While there is much new work in progress, the increasing difficulty experienced in securing steel and other materials is resulting in the postponement of many projects. Fabricating awards, however, are still on encouraging proportions. Plain material has advanced to a minimum of 1.90c., Chicago, for shipment at mills convenience. The leading independent, however, has withdrawn from the market. Buyers are finding it difficult to obtain material for reasonably prompt delivery from any source, even when they are willing to pay as high as 1.90c. to 2c., f.o.b. Pittsburgh.

The mill quotation on plain material for indefinite delivery is 1.90c. to 2c., Chicago. Jobbers quote 2.70c. for plain material out of warehouse.

Reinforcing Bars.—The realization that steel mill operations are being sharply curtailed on account of the shortage of fuel has resulted in releasing many orders from buyers who have not yet covered their requirements. In many cases these users are asking for considerably more tonnage than they absolutely need, believing, no doubt, that with warehouses giving them only part of what they ask for, they will still receive all the tonnage that they imperatively require. Lettings and inquiries of reinforcing steel are still numerous, although it is realized that if the coal and railroad strikes continue, building operations will be affected adversely. The warehouse price on deformed reinforcing bars is still 2.38c., Chicago, but an early advance is looked for in view of the increasing scarcity of steel. Recent awards include:

Harbor View Apartment, Chicago, 350 tons, to Paul J. Kalman Co.

Bridge, Riverside, Ill., 100 tons, to Paul J. Kalman Co.

Holeproof Hosiery Co., Milwaukee, Wis., 100 tons, to Concrete Steel Co.

Little Sisters of the Poor Asylum, Kansas City, Mo., 200 tons, to Concrete Steel Co.

Edwards Motor Car Co., Milwaukee, 100 tons, to Truscon Steel Co.

Pending business includes:

Memorial building, Purdue University, LaFayette, Ind., 182 tons.

Grain elevator, Kansas City, Mo., 800 tons.

Sovereign Hotel, Chicago, 300 tons.

Louisville Gas & Electric Co., building, Louisville, Ky., 300 tons, to Concrete Steel Co.

H. & M. Body Corporatioin plant, Racine, Wis., 100 tons, to Corrugated Bar Co.

Atchison, Topeka & Santa Fe, office building, Newton, Kan., 150 tons, to Corrugated Bar Co.

Headquarters and service building, Edwards Motor Car Co., Milwaukee, 100 tons, to Truscon Steel Co.

Cast Iron Pipe.—With their books well filled and shop operations endangered by the fuel shortage, pipe makers are not actively competing for new business. At the same time a seasonal dullness has settled on the market, which ordinarily continues until October. Ogden, Utah, has taken bids on 1200 tons and Detroit is in the market for 200 tons of 6 to 8-in. Walbridge, Ohio, takes bids on 200 tons of 4 to 8-in. on Aug. 9.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $50.20 to $51.20; 6-in. and above, $46.20 to $47.20; class A and gas pipe, $3 extra.

Coke.—The local producers quote $12.25, delivered, Chicago switching district, and $13, delivered, Milwaukee, on foundry coke, but these prices are subject to change without notice and the buyer pays the price ruling at time of delivery. A Southern by-product producer is offering foundry coke at similar prices. Deliveries from the South are somewhat better than a week or two ago. Demand for spot coke is exceedingl active and melters are not so much concerned with prices as with deliveries. Connellsville foundry coke is $15 to $17 per net ton at ovens, to which a freight of $4.16 to Chicago must be added. Little Connellsville product is reaching this district, however. Wise County foundry coke with a similar freight rate is quoted at $10 to $11, ovens. A recent sale of 400 tons of spot foundry coke from a Northern by-product plant brought $19.50 delivered, Milwaukee.

Rails and Track Supplies.—The Southern Pacific has placed 50,000 tons of rails for 1923 delivery with the Tennessee mill. The same road has divided an order for 2500 kegs of spikes between the Gary and the Colorado mills. The Missouri, Kansas & Texas has also placed 2500 kegs of spikes, part of which will be shipped by the Gary mills. Demand for track supplies is generally good, with prices unchanged, except on tie plates which have advanced to a minimum of 2c., f.o.b. mill.

Standard Bessemer and open-hearth rails, $40; light rails rolled from new steel, 1.75c., f.o.b. makers' mills.

Standard railroad spikes, 2.25c. to 2.35c., Pittsburgh; track bolts with square nuts, 3.25c. to 3.35c., Pittsburgh; tie plates, steel and iron, 2c., f.o.b. mill; angle bars, 2.40c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.30c. base and track bolts 4.30c. base.

Old Material.—Malleable and cupola grades are in stronger demand, evidently because of the advance in pig iron, and low-phosphorus scrap is also sought after by users. Dealers are avoiding new sales of steel scrap because the supply which is coming on to the market is insufficient even to enable them to fill old orders. Sellers are in a quandary as to what policy to pursue under conditions. As current offerings by producers of scrap are very light, it is difficult to obtain material to apply on orders for prompt shipment. On the other hand, dealers hesitate to buy long, as a continuation of the coal strike will lead to the complete suspension of operations by many users, and hence cut off the demand. The market is stronger than last week, as evidenced by numerous advances, and the trend of prices is expected to keep upward as long as consumers are running their plants. The United States Ordnance Department took bids here to-day on 1400 tons of breakable cast. Railroad offerings include 1800 tons advertised by the Santa Fe and 1200 tons by the Pere Marquette.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton

Iron rails	$19.00 to $19.50
Cast iron car wheels	19.50 to 20.00
Relaying rails	22.50 to 27.50
Rolled or forged steel car wheels	23.00 to 23.50
Rails for rerolling	16.50 to 17.00
Steel rails, less than 3 ft.	18.00 to 18.50
Heavy melting steel	15.50 to 16.00
Frogs, switches and guards cut apart	15.50 to 16.00
Shoveling steel	15.25 to 15.75
Drop forge flashings	11.50 to 12.00
Hydraulic compressed sheet	13.00 to 13.50
Axle turnings	13.50 to 14.00

Per Net Ton

Iron angles and splice bars	18.50 to 19.00
Steel angle bars	15.00 to 15.50
Iron arch bars and transoms	19.00 to 19.50
Iron car axles	23.00 to 23.50
Steel car axles	15.75 to 16.25
No. 1 busheling	13.00 to 13.50
No. 2 busheling	7.50 to 8.00
Cut forge	14.00 to 14.50
Pipes and flues	11.00 to 11.50
No. 1 railroad wrought	14.25 to 14.75
No. 2 railroad wrought	14.00 to 14.50
Steel knuckles and couplers	16.50 to 17.00
Coil springs	17.00 to 17.50
No. 1 machinery cast	18.00 to 18.50
No. 1 railroad cast	16.50 to 17.00
Low phos. punchings	15.00 to 15.50
Locomotive tires, smooth	13.00 to 13.50
Machine shop turnings	9.50 to 10.00
Cast borings	11.25 to 11.75
Stove plate	14.75 to 15.25
Grate bars	14.50 to 15.00
Brake shoes	15.00 to 15.50
Railroad malleab'e	16.50 to 17.00
Agricultural malleable	16.50 to 17.00

New York

Scarcity of Pig Iron Accented Due to Fuel Uncertainty Furnaces Can Offer Little Product

NEW YORK, Aug. 8.—The latest developments in the coal and railroad strikes have made no definite change in iron and steel markets except to accent the scarcity of pig iron. Advices from Buffalo indicate that four blast furnaces have been banked since Aug. 1, leaving only seven out of 22 in operation in that district. More foreign pig iron has been sold, but reports of large contracts in which import firms not in the iron business are said to figure are not substantiated. Foundries in buying foreign iron appear to be dealing with firms having a background of experience in pig iron selling. In finished material firmer prices are reported on sales from local warehouses.

Pig Iron.—Fewer furnaces are offering iron in view of the uncertainty about getting sufficient fuel to make the iron already on their books. A number of foundries have been inquiring, but more with a view to safeguarding themselves for the later fall. Prices are higher both on eastern Pennsylvania and Buffalo irons. A Lehigh Valley seller has advanced its price to $30 at furnace for No. 2X iron. Another eastern Pennsylvania interest has quoted $29 on small lots for early delivery. In the Buffalo district $30 has been named for No. 2X. There is still some Buffalo iron available at lower prices, but all such iron has come from a single seller. Two important foundry interests have bought Scotch iron in the past week, 1000 tons in one case and 650 tons in the other. Some of this iron has sold at $26, New York, but more is being asked to-day. An air brake company has inquired for 500 to 1000 tons of high silicon iron and another interest which buys through New York has inquired for 200 to 300 tons of No. 2X iron. A Connecticut steel plant has been in the market for 3000 tons of basic for September-October delivery, and a western New York railroad supply plant is in the market for 1000 tons of basic. The General Electric Co., which bought for various plants in July, has asked for 500 tons of high silicon iron for its Lynn plant, deliveries from Sept. 1 to Nov. 15. The possibility of a settlement of the soft coal strike has found no response in the market as yet. Such a settlement might probably mean the end of one class of inquiry that has come up in the past two weeks, but it is yet to be seen to what extent foundrymen's expectations of lower prices will be realized. Furnaces look for high fuel for some months to come.

We quote delivered in the New York district as follows: Add $1.60 to furnace prices on 2.25 freight from eastern Pennsylvania, $2.61 from Buffalo and $5.14 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$32.77 to $33.77
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	31.77 to 32.27
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	30.77 to 31.77
Buffalo, sil. 1.75 to 2.25	31.91 to 32.91
No. [illegible]	31.14 to 32.14

Warehouse Business.—No changes of price on iron and steel items is noted, but sheets, both black and galvanized, are distinctly firmer and there is far less tendency to undercut the established schedule. This is also true of wrought iron and steel pipe discounts, probably better than 90 per cent of the sales in this line being consummated now at the established discounts. The margin between warehouse and mill prices on toe calk steel is considered too narrow and a slight advance may be made before long. In sympathy with the higher quotations of the mills on cold rolled shafting and screw stock, some warehouses are also contemplating an increase of 10c. to 15c. per 100-lb. Brass and copper prices are strong and in several instances have been marked up ½c. to 1c. per lb. A renewed interest is reported from manufacturers of radio equipment, who have been extremely quiet for the past few weeks. We quote prices on page 402.

High Speed Steel.—The market continues quiet. The few inquiries that recently appeared have evidently been abandoned for the present. Prices are still at about 75c. per lb. for 18 per cent tungsten high speed steel with special brands of some companies ranging up to 95c. per lb.

Ferroalloys.—Demand for ferromanganese continues quiet at unchanged prices. It is reported that offerings of spot alloy have been made at $85 to $90, delivered. Imports have been large as a result of the recent contracts and the desire to receive the alloy before any possible duty takes effect, those for June having been 13,525 gross tons. These receipts compare with an average of 10,000 tons per month in the months just preceding the war when British producers supplied about 50 per cent of the American consumption. The spiegeleisen market is quiet with some producers out of the market. Inquiries aggregate about 500 tons. Importations of British alloy are offered but at a price higher than domestic quotations. Quotations for manganese ore are unchanged but importations are heavy, those for June having been 44,329 tons. There is a quiet demand for 50 per cent ferrosilicon with quotations unchanged and the same is true of ferrochrome. Quotations are as follows:

Ferromanganese, domestic, seaboard, per ton	$67.50 to $70.00
Ferromanganese, British, seaboard, per ton	$67.50 to $70.00
Spiegeleisen, 17 to 19 per cent	$35.00
Spiegeleisen, 20 per cent	$36.00
Ferrosilicon, 50 per cent, delivered, per ton	$52.00 to $55.00
Ferrosilicon, 10 to 15 per cent, delivered, per gross ton	$38.00 to $40.00
Ferrotungsten, per lb. of contained metal	40c. to 50c.
Ferrochromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr., delivered	12c. to 14c.
Ferrovanadium, per lb. of contained vanadium	$3.00 to $3.50
Ferrocarbontitanium, 15 to 18 per cent, in carloads, per net ton	$200.00

Ores

Manganese ore, foreign, per unit, seaboard	26c. to 30c.
Tungsten ore, per unit, in 60 per cent concentrates, nominal	$7.25 up
Chrome ore, basis 48 per cent Cr2O3, crude, per ton, Atlantic seaboard	$15 to $18.50
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	45c. to 50c.

Finished Iron and Steel.—What change has occurred in the past week is increased buying from warehouses to satisfy urgent needs which mills cannot supply. There has also been an increase in bookings at the 2c. Pittsburgh basis, two carloads of plates for example going at this figure and round lots of bars for forging as well as for concrete reinforcing work. Probably 5000 tons of bars, largely for building work, are pending. New buying in the aggregate is of course not large, such has been the check brought upon industry by the strikes. Semi-finished steel is strong, 500 tons of forging quality billets going at $47, Pittsburgh base. Buying at a basis of 1.70c., Pittsburgh, is without any promise as to delivery, while the 2c. basis is for delivery in a few weeks with 1.90c., obtainable on an attractive offering with shipment in a reasonable time and 1.80c. as a minimum for any purchase for definite delivery. Eastern railroads show no interest as yet in rails for next year, though the need of getting a position on rail mill books is being emphasized to insure receiving the material in time for early track work next year.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, structural shapes and steel plates, 2.04c. for indefinite delivery and 2.14c. to 2.34c. for delivery in a number of weeks; bar iron, 2.04c.

Cast-Iron Pipe.—Prices are firm and deliveries continue extended to from two to three months on the smaller sizes and four to six weeks on the large sizes of pipe. No new municipal tenders are noted. The city of Poughkeepsie will open bids on Aug. 10 on the 2500 tons of 24-in. pipe reported last week. Rigid enforcement of priority orders would undoubtedly result in a serious situation among cast-iron pipe makers. Supplies of pig iron on contract are being received in larger quantities than was expected and this, supplemented by small lots of foreign iron under order by some foundries for early delivery distinctly relieves the pig iron situation for pipe foundries. We quote per net ton, f.o.b., New York, in carload lots, as follows: 6-in. and larger, $53.50; 4-in. and 5-in., $58; 3-in., $63.80, with $4 additional for Class A and gas pipe.

Old Material.—Although the market is generally rather quiet, buying of small orders is fairly brisk..

Cast iron is more active at present than steel, and the material showing the greatest activity is that which is most easily converted with the least fuel. Prices on heavy melting steel are strong at $10.50 to $11 per ton, $10.80 having been paid for shipment to Monessen. Stove plate is firm and $11.50 has been paid for Mahwah, N. J. A fair estimate of the market on this material is $11 to $11.50, although some dealers claim that even a higher quotation is warranted. Clean cast borings are stronger than either mixed borings and turnings or machine-shop turnings, being quotable at $9.75 to $10.75 per ton, while the latter are still fairly firm at $9.25 to $10.25. Buying for shipment by barge to Buffalo continues at good prices because of the low rate obtained on all water shipment.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$10.00 to $11.00
Steel rails, short lengths, or equivalent	11.50 to 12.00
Rerolling rails	11.50 to 12.00
Relaying rails, nominal	27.00 to 28.00
Steel car axles	17.00 to 18.00
Iron car axles	22.00 to 23.00
No. 1 railroad wrought	12.50 to 13.00
Wrought iron track	11.00 to 11.50
Forge fire	8.00 to 8.50
No. 1 yard wrought, long	11.00 to 11.50
Cast borings (clean)	9.75 to 10.75
Machine-shop turnings	9.25 to 10.25
Mixed borings and turnings	9.25 to 10.25
Iron and steel pipe (1 in. diam., not under 2 ft. long)	9.00 to 9.50
Stove plate	11.00 to 11.50
Locomotive grate bars	11.50 to 12.00
Malleable cast (railroad)	10.50 to 11.00
Cast-iron car wheels	13.00 to 13.50

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$18.00 to $19.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	16.50 to 17.00
No. 1 heavy cast, not cupola size	13.00 to 13.50
No. 2 cast (radiators, cast boilers, etc.)	12.00 to 12.50

Philadelphia

No Further Curtailment But Prices Higher on Practically No Buying

PHILADELPHIA, Aug. 8.—While the Eastern steel and pig iron trade is not more seriously affected in its operations than a week ago, there is a good deal of apprehensiveness over the coal situation. The industry understands clearly that as soon as the Government priorities are fully working there will be little, if any, coal left for coke ovens and steel plants, and unless the coal or railroad strike, or both, should end within the next fortnight more widespread contraction of operations is inevitable. Even an early ending of the coal strike would not entirely relieve steel plants and blast furnaces for some weeks, as it is apparent that the Government will handle coal distribution until railroads, public utilities and households are provided for.

The volume of inquiry for steel and pig iron is surprisingly small. The explanation for this apparently is that consumers are not disposed to anticipate their requirements for steel and iron at present high prices when they do not know whether they are going to have coal with which to operate.

For the most part, the trade, including both sellers and buyers, are accepting the situation philosophically, and there is less of the hysteria which has marked former periods of shortage. Meanwhile, prices are advancing, and the past week has brought 2c. steel and above $30 on foundry pig iron.

Pig Iron.—No further curtailment of blast furnace operations has occurred during the past week because of coke shortage, but two of the active furnaces in the East have coke only for about two or there weeks; another has sufficient coke on the ground to last until Sept. 1, while the trade generally is apprehensive that the Government coal priority plan will bring about an almost complete stoppage of pig iron making in this district. The few furnaces that are making foundry iron are not anxious to sell, and there are few inquiries, which indicates that consumers are not anxious to buy at present high prices, especially as they do not know whether they are going to have coal and coke with which to operate. One furnace company is selling No. 2 plain in limited quantities at $30, furnace, but has no No. 2X because the poor quality of its coke makes it difficult to make the higher silicon grades. Another furnace is selling No. 2 plain at $29, furnace, and No. 2X at $30, furnace, but is confining sales to small lots to help out regular customers. High silicon iron, about 3.50 per cent, has been sold at $35, furnace. Consumers apparently are relying almost entirely on shipments on their contracts and are filling in chiefly with small quantities of imported iron, which is selling at higher prices than a week ago. Brokers are asking $26 to $28, Philadelphia, for English iron; $27.50 to $30 for Scotch, while high silicon Scotch, 3.50 to 4 per cent, is offered at $32 to $33, Philadelphia. As high as $27, Philadelphia, has been paid for Continental iron high in phosphorus. A sale of 500 tons of gray forge was made at $27.50, Eastern furnace, while on a smaller lot divided between two consumers a furnace was paid $30, furnace, and the latter iron was not strictly true to standard gray forge specifications. The price of copper bearing low phosphorus iron has been advanced by the two principal Eastern makers to $33, furnace, while standard low phosphorus iron is nominal at $30, but none is obtainable in this district. The quotations on Virginia iron in the table below merely represent the prices at which last sales were made some time ago, as no Virginia iron is to be had, the furnaces in that State having long since cleaned up the stocks which were left over when they were last in operation.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 76 cents to $1.64 per gross ton.

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$30.14 to 30.76
East. Pa. No. 2X, 2.25 to 2.75	31.14
East. Pa. No. 1X	32.14
Virginia No. 2 plain, 1.75 to 2.25 sil.	29.17 to 29.75
Virginia No. 2X, 2.25 to 2.75 sil.	30.17 to 31.17
Basic delivery eastern Pa.	26.75 to 27.25
Gray forge	29.00 to 31.50
Malleable	29.00 to 30.00
Standard low phos. (f.o.b. furnace)	Nominal
Copper bearing low phos. (f.o.b. furnace)	33.00

Ferroalloys.—Although the nominal price of English ferromanganese remains at $67.50 and the domestic at $70, seaboard, early deliveries cannot be offered, and on sales for prompt shipment $75 has been obtained, and as high as $90 has been quoted. About 1000 tons of imported spiegeleisen on dock at Baltimore has been offered at $40, Baltimore, which is $4 a ton higher than was recently quoted by a leading Eastern maker whose furnace is now out of blast.

Semi-Finished Steel.—Steel makers are not anxious to sell semi-finished steel, and $37.50, Pittsburgh, for rerolling billets now appears to be the minimum quotation on any business that might be considered, while forging billers are quoted at $42.50 or higher, sales having been made at $44, Pittsburgh. Demand is unimportant.

Plates.—While one or two mills are still nominally quoting 1.80c., Pittsburgh, on plates, they are not in a position to accept much business, and are not therefore a real factor in the market. Only two mills are able to promise early deliveries, and are quoting 2c., Pittsburgh. One of these mills is operating on fuel oil and is fairly confident of being able to meet its obligations. The Lukens Steel Co. withdrew from the market after advancing its price from 1.80c. to 2c., Pittsburgh, having taken considerable business last week. The American Locomotive Co. is reported to have placed about 3000 tons with Eastern mills for the New York Central locomotives recently ordered, and the price paid is said to have been 1.80c., Pittsburgh.

Structural Material.—Mills are accepting orders with great caution, if at all, some being entirely out of the market. One Eastern mill has taken all orders recently subject to cancellation by either buyer or seller in the event that coal shortage makes it impossible to operate. The current market for plain material is certainly not under 1.80c., Pittsburgh, when prompt shipment is required, while 1.85c. has been paid in numerous instances.

Bars.—It would be difficult to-day to direct any buyer to a mill that will accept orders for steel bars for early shipment, except, of course, such bars as are rolled from rails or other old steel. The larger makers of soft steel bars are shipping on contracts and declining to take new orders until the coal situation has become

straightened out. In many instances mills are referring their regular customers to jobbers, some of whom have fair stocks on hand. Eastern bar iron makers are quoting 1.70c. to 1.80c. on carloads lots, with the tendency toward the higher figure, and 2c., Pittsburgh, is being charged for less than carloads.

Warehouse Business.—The demand for steel out of stock continues fairly good in view of the tightening mill situation. Prices on sheets have been slightly advanced. We quote for local delivery from Philadelphia warehouses as follows:

Soft steel bars and small shapes, 2.70c.; iron bars (except bands), 2.70c.; round edge iron, 2.90c.; round edge steel, iron finish, 1½ x ½ in., 2.90c.; round edge steel planished, 3.65c.; tank steel plates, ¼-in. and heavier, 2.80c.; tank steel plates, ⅜-in., 3c.; blue annealed steel sheets, No. 10 gage, 3.50c.; black sheets, No. 28 gage, 4.30c.; galvanized sheets, No. 28 gage, 5.40c.; square twisted and deformed steel bars, 2.80c.; structural shapes, 2.80c.; diamond pattern plates, ¼-in., 4.50c.; ⅜-in., 4.50c.; spring steel, 3.50c.; round cold-rolled steel, 3.35c.; squares and hexagons, cold-rolled steel, 3.70c.; steel hoops, No. 13 gage and lighter, 3.75c.; steel bands, No. 12 gage to ⅜-in., inclusive, 3.35c.; iron bands, 3.90c.; rails, 2.70c.; tool steel, 8c.; Norway iron, 5.50c.

Spikes.—An Eastern manufacturer has advanced the price of railroad spikes, 9-16 in. and larger, to 2.50c., base, Pittsburgh; ⅜, 7-16 and ½ in. sizes are now 3c., base, while boat spikes are quoted at 3c., Pittsburgh, in small lots and at 2.50c., Pittsburgh, in lots of 25 kegs or more.

Coke.—The scarcity of coke increases, and it is to be had only at extremely high prices, $14.50, Connellsville, or more. British coke has been offered here at about $14, Philadelphia. By-product coke is available in small lots at $16, Eastern ovens.

Old Material.—A Delaware mill has paid as high as $15.50 for No. 1 heavy melting steel, this being the only activity of importance in steel scrap. Prices hold up very well considering the small demand. Shafting is higher, a sale having been made at $22, delivered. We quote for delivery at consumers' works in this district as follows:

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$15.00 to $15.50
Scrap rails	15.00 to 15.50
Steel rails, rerolling	17.00 to 17.50
No. 1 low phos., heavy 0.04 and under	22.00 to 24.00
Cast iron car wheels	17.50 to 18.50
No. 1 railroad wrought	17.50 to 18.50
No. 1 yard wrought	15.00 to 15.50
No. 1 forge fire	13.00 to 13.50
Bundled sheets (for steel works)	13.00 to 13.50
No. 1 busheling	12.50 to 13.00
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	13.00 to 13.50
Mixed borings and turnings (for blast furnace use)	13.00 to 13.50
Machine-shop turnings (for steel works use)	13.00 to 13.50
Machine-shop turnings (for rolling mill use)	13.50 to 14.00
Heavy axle turnings (or equivalent)	14.00 to 14.50
Cast borings (for steel works and rolling mills)	14.00 to 14.50
Cast borings (for chemical plants)	17.00 to 17.50
No. 1 cast	18.00 to 20.00
Railroad grate bars	14.50 to 15.00
Stove plate (for steel plant use)	15.00 to 15.50
Railroad malleable	15.00 to 15.50
Wrought iron and soft steel pipes and tubes (new specifications)	13.00 to 13.25
Shafting	21.00 to 22.00

Cincinnati

CINCINNATI, Aug. 8.

Pig Iron.—Demand for small tonnages for fill-in purposes constituted the only activity in the market in the past week. With shipments held up on account of the railroad situation local melters are running short of iron, and are forced to borrow from one another to keep going. The result of this condition is seen in higher prices for prompt shipment material, the Southern market having advanced at least $1 in the week, and southern Ohio irons a similar amount. Sales range all the way from carload to 500-ton lots. A central Ohio melter bought 500 tons of Northern iron on a $26, Ironton, basis, and a West Virginia melter 600 tons at the same price. We note a sale of 300 tons of Southern resale iron to an Indiana melter on an $18.50, Birmingham, basis, but against this are numerous sales by furnaces ranging from $20 to $21. Practically all Southern furnaces are sold up for third quarter, and are out of the market for the time being. Shipments are being held back by the rail strike, and tonnages shipped around the middle of July have not yet reached their destination. No furnaces have been banked in this district during the week, but considerable difficulty is being experienced in securing enough coke to operate.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$24.05
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	24.55
Ohio silvery, 8 per cent	34.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	[illegible]
Basic Northern	27.27
Malleable	28.27

Fluorspar.—There is a fair number of small inquiries, but most steel plants have abandoned the market until the fuel situation improves. Prices are unchanged at $17.50 for guaranteed material.

Plant Operations.—The coal and rail strikes have not caused much inconvenience to steel mills operating in this district. The Middletown works of the American Rolling Mills Co. are operating at full capacity, and even with the coal shortage, the company does not anticipate a shutdown, as supplies of natural gas and fuel oil are available to keep the plant running in addition to a fair supply of coal now in stock. At Zanesville the company is operating all its mills, and at Ashland, Ky., a 50 per cent operation in its finishing capacity is being maintained, despite delays due to lack of transportation facilities. The Whitaker-Glessner Co. at Portsmouth is operating at its schedule of last week, and while some inconvenience has been experienced at the plants of the Andrews Steel Co. and Newport Rolling Mill Co. at Newport, Ky., it has not been necessary to curtail operations. All the blast furnaces active last week continue in blast, and it now looks as though the worst of the strike period has been left behind, as railroad movements of freight, including coal, are very much improved over a week ago.

Finished Material.—A slackening up in demand was noted in the past week. Whether this is due to the fact that consumers are pretty well supplied, or to the curtailment of manufacturing operations on account of transportation problems, is difficult to ascertain. New business is not in such volume as during the past several weeks, but specifications on contracts continue to come at a good rate. Consumers are sending in orders for their fourth quarter requirements, but books have not been opened by any mills for this delivery, prices are on the upward trend, and for early delivery as high as 2c. has been paid for bars, shapes and plates. The usual range, however, is still from 1.70c. to 1.90c., the former price carrying no definite delivery promises, and the latter from eight to ten weeks. A Youngstown plate mill, which started up last week, is understood to be booking tonnage at 2c. The demand for sheets has shown a considerable falling off, though prices are well maintained, and for early delivery, six to eight weeks, 3.30c., for black, and 4.30c. for galvanized is easily obtained. Slowing up of the automobile trade is noted in a lessened demand for automobile body sheets, although manufacturers of accessories, such as lamps, radiators and fenders are still good buyers. There has been little activity in the structural field, and no awards involving any considerable tonnages of reinforcing bars have been made in this district. It is reported that a Cleveland district mill, which makes a specialty of reinforcing bars, has raised its price to 2.75c., mill, with engineering service included.

Warehouse Business.—Local jobbers report a continuation of the excellent business enjoyed during the past six weeks, and stocks are being rapidly depleted. Prices are very firm, but unchanged.

Jobbers quote: Iron and steel bars, 2.75c. base; hoops, 3.60c.; bands, 3.35c. base; shapes and plates, 2.85c. base; reinforcing bars, 2.82½c. base; cold-rolled rounds, 3.50c. base; flats, squares and hexagons, 4c. base; No. 10 blue annealed sheets, 3.60c.; No. 28 black sheets, 4.50c.; No. 28 galvanized sheets, 5.50c.; No. 9 annealed wire, $2.70 per 100 lb.; common wire nails, $2.85 per keg, base.

Tool Steel.—A material slowing up is evidenced in the demand for high-speed steel, due primarily to conditions arising from the railroad strike. Prices are unchanged at 75c. per lb. base, for 18 per cent tungsten high speed steel.

Coke.—Nothing new has developed. Shipments are coming through slowly, and foundries are running on the ragged edge. Prices are steadily advancing, and Wise County foundry coke is to-day quoted at $12, an advance of $2 over last week. Prices from other districts remain about the same.

Old Material.—The scarcity of pig iron has created an interest in cast scrap, and a number of inquiries for machinery cast are before the trade. Some fair sized sales are reported, and as a result this grade has been advanced $1 a ton. The market is softer, as a whole, owing to the fact the mills are out of the market, and quite a number of "distressed" shipments are being offered to dealers.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

	Per Gross Ton	
Bundled sheets	$8.00 to	$8.50
Iron rails	13.50 to	14.00
Relaying rails, 50 lb. and up	26.50 to	27.00
Rails for rerolling	13.50 to	14.00
Heavy melting steel	13.00 to	13.50
Steel rails for melting	13.00 to	13.50
Car wheels	14.50 to	15.00
Per Net Ton		
No. 1 railroad wrought	11.50 to	12.00
Cast borings	9.00 to	9.50
Steel turnings	8.00 to	8.50
Railroad cast	14.00 to	14.50
No. 1 machinery	17.00 to	17.50
Burnt scrap	9.50 to	10.00
Iron axles	18.00 to	18.50
Locomotive tires (smooth inside)	11.00 to	11.50
Pipes and flues	6.50 to	7.00

St. Louis

ST. LOUIS, Aug. 8.

Pig Iron.—The market has advanced to $28, Chicago, for Northern iron, for spot delivery, and $26 for forward delivery, and is strong at that price. Southern iron has also advanced to $19.50 to $20, Birmingham, the Sheffield producer which had been quoting $18.50 having withdrawn from the market. The fact is there is no Southern iron to be had, the railroad strike having made it impossible to make shipments. Some Southern iron loaded on cars in June for St. Louis delivery is still in the South. This has added to an already serious situation, and iron is exceedingly scarce to get. Makers of Northern iron are well booked with orders, and their costs are steadily mounting on account of the advancing market for coke. The Granite City maker is still on a 100 per cent production basis, but is at present without any stocks of high silicon iron, for which there is a pressing demand. On account of the slow movement of freight, buyers are finding that they are obliged to make spot purchases to supply immediate needs. The situation does not permit of promising any relief, men in the trade say, and they look for higher prices to prevail. The principal transactions of the Granite City maker were the sales of 1000 tons of foundry iron to an East Side melter; 1000 tons of foundry iron to a southern Illinois foundry; 300 tons to a local melter; 100 tons to an Indiana concern and 100 tons to a Belleville melter. One Texas concern wants 500 to 1000 tons of foundry iron and another melter from that state is in the market for 300 tons, and there are numerous scattering inquiries for a carload up to 300 tons. Realizing conditions, users are scaling down their inquiries to cover immediate needs. There is an inquiry for 100 tons of spiegeleisen for prompt shipment. During the last two or three weeks there has been a good demand for ferromanganese, sales amounting to between 400 and 500 tons.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago and $5.17 from Birmingham and 81 cents average switching charge from Granite City:

Northern foundry, sil. 1.75 to 2.25 (forward delivery)	$28.16
Northern malleable, sil. 1.75 to 2.25 (forward delivery)	28.16
Basic (third quar.)	28.16
Southern foundry, all rail, sil. 1.75 to 2.25	$24.67 to 25.17

Finished Iron and Steel.—The coal strike continues to make it increasingly difficult to get material, and mills are disposed to turn down business because of this condition and an already large order file. Recently there has been a much better demand for plates for oil tanks. A Tulsa manufacturer bought 1000 tons of tank plates here during the week, and reported that the prospects were for a heavy demand for tanks. The Standard Oil Co. of Indiana is in the market for 25 70,000-gal. tanks, involving about 6000 tons. Railroad inquiries are limited to track material. For instance, the Wabash wants 240,000 tie plates, and 200 kegs of standard track bolts. There has been considerable buying of the latter lately. Other material wanted is such as to appeal only to a warehouse. Inquiries for structural steel in the district have amounted to about 400 tons in lots of 100 tons and less, the inquiries being confined to immediate needs. Galvanized sheets are in good demand, one local jobber buying 200 tons.

For stock out of warehouse we quote: Soft steel bars, 2.70c. per lb.; iron bars, 2.70c.; structural shapes, 2.80c.; tank plates, 2.80c.; No. 10 blue annealed sheets, 3.85c.; No. 28 black sheets, cold rolled, one pass, 4.45c.; cold drawn rounds, shafting and screw stock, 3.50c.; structural rivets, $3.35 per 100 lb.; boiler rivets, $3.45; tank rivets, ⅞ in. and smaller, 60 per cent off list; machine bolts, large, 50 and 10 per cent; small, 50-10 and 10 per cent; carriage bolts, large, 55-5 per cent; small, 60 and 10 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon blank $3.50; and tapped $3.25 off list.

Coke.—The demand for coke both from industrial and domestic users is tremendous, with the sources of supply becoming fewer. The St. Louis by-product maker has been out of the market for some time, confining its business to the filling of contracts for gas plants, while the Granite City by-product maker has reduced its coke production to the lowest possible degree consistent with supplying municipalities depending upon them for gas. Granite City coke is being sold at $12 at the ovens, if they are able to ship it, but orders are being taken subject to delays and price prevailing on date of shipment. Railroad conditions hamper the delivery of Alabama coke into St. Louis, and there is no Connellsville coke to be had.

Old Material.—The market for old material is firm, the only change being in steel couplers and knuckles, which are 50 cents a ton higher. Dealers are holding firm, expecting to get better prices. Very little material is coming into this district, as the railroads are too busily engaged in other matters to give the time to gather up scrap. Rolling mill grades are quiet.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

	Per Gross Ton	
Old iron rails	$16.75 to	$17.25
Rails for rerolling	15.75 to	16.25
Steel rails, less than 3 ft.	16.25 to	16.75
Relaying rails, standard section	25.00 to	28.00
Cast iron car wheels	18.50 to	19.00
No. 1 heavy railroad melting steel	14.75 to	15.25
No. 1 heavy shoveling steel	14.00 to	14.50
Ordinary shoveling steel	13.75 to	14.25
Frogs, switches and guards, cut apart	15.25 to	15.75
Per Net Ton		
Heavy axle and tire turnings	9.50 to	10.00
Steel angle bars	13.75 to	14.25
Iron car axles	23.50 to	24.00
Steel car axles	17.00 to	17.50
Wrought iron bars and transoms	19.00 to	19.50
No. 1 railroad wrought	13.50 to	14.00
No. 2 railroad wrought	13.00 to	13.50
Railroad springs	16.00 to	16.50
Steel couplers and knuckles	17.50 to	18.00
Cast iron borings	9.00 to	9.50
No. 1 busheling	11.75 to	12.25
No. 1 railroad cast	15.50 to	16.00
Stove plate and light cast	12.75 to	13.25
Railroad malleable	14.00 to	14.50
Pipes and flues	8.75 to	9.25
Machine shop turnings	9.25 to	9.75

Buffalo

BUFFALO, Aug. 8.

Pig Iron.—Only one Buffalo furnace has iron for sale and this only in limited quantities and all of low silicons. This interest has iron on hand but because of obligations it is not desirable to unload it all at this time, although the demand could easily exhaust the supply. The M. A. Hanna Co. has blown out one furnace and has one in blast. With the other interests the problem is one of trying to operate rather than trying to sell. On No. 2 plain $30 is easily obtainable, and on No. 2X, $31. A few scattered carloads were sold by a furnace which took the iron from the yard and obtained for it $30, $31 and $32 on these sales. The interest having iron for sale is making all its quotations subject to immediate acceptance. Inquiry generally has been rather light due in measure to the knowledge that Buffalo furnaces are unable to take business. The

majority of merchants feel that the present price base will not be changed for the remainder of the year; that even though the fuel situation were relieved, there would be little change in prices for at least ninety days.

We quote f.o.b. per gross ton, Buffalo, as follows:

No. 1 foundry, 2.25 to [illegible] sil.	[illegible]
No. 2X foundry, 2.25 to [illegible] sil.	[illegible]
No. 2 plain, 1.75 to 2.25 sil.	30.00
Basic	[illegible]
Malleable	[illegible]
Low phosphor charcoal	[illegible]

Finished Iron and Steel.—Mills are being brought nearer each day toward a complete shutdown and none feels any easier than last week. There is some difference in just how much longer the mills will keep going, because there is no uniformity in the amount of fuel on hand. The branch of a large independent continues to take black sheet and bolt business. Inquiry is good. Sellers are hearing from customers not ordinarily on their regular calling lists. Particularly is this true of buyers seeking bars. There is plenty of small structural business and Buffalo fabricators have taken some desirable tonnages in operations involving more than 100 tons, as shown in another column. Tin plate demand from canners is especially heavy. A local branch of an independent being able to take as much of this business as comes its way. The same interest is able to take orders for cold finished material and finds the demand good. The price is 2.25c., Pittsburgh, on carload lots with deliveries usually three to four weeks.

Warehouse Business.—The problem is more to get material than it is to sell it. Demand is very good for all material but notwithstanding merchants do not expect any price advance. Considerable inquiry is coming from outside the normal radius covered by local warehouses, indicative of the seriousness of the situation elsewhere.

We quote warehouse prices, Buffalo, as follows: Structural shapes, 2.85c.; plates, 2.85c.; soft steel bars, 2.75c.; hoops, 3.55c.; bands, 3.40c.; blue annealed sheets, No. 10 gage, 3.80c.; galvanized steel sheets, No. 28 gage, 5.60c.; black sheets, No. 28, 4.60c.; cold rolled round shafting, 3.55c.

Old Material.—Dealers appear to feel easier. Confidence has been partly restored by a large railroad equipment manufacturer's coming into the market for heavy melting steel and paying, it is understood, $17 for a good grade. About 5000 tons has been purchased so far. Other consumers are buying less tonnages of heavy melting steel. Consumers who regularly buy mixed turnings and borings have stopped shipment, because of blast furnace curtailment. No. 1 machinery cast scrap is strong and there is also a lively demand for low phosphorus scrap.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$16.75 to $17.00
Low phos., 0.04 and under	18.00 to 19.00
No. 1 railroad wrought	16.00 to 16.50
Car wheels	17.00 to 18.00
Machine shop turnings	10.50 to 11.00
Cast iron borings	14.00 to 14.50
Heavy axle turnings	14.00 to 14.50
Grate bars	14.00 to 14.50
No. 1 busheling	15.00 to 15.50
Stove plate	15.00 to 15.50
Bundled sheet stampings	11.50 to 12.00
No. 1 machinery cast	18.50 to 19.50
Hydraulic compressed	15.00 to 15.50
Railroad malleable	17.00 to 17.50

Birmingham

BIRMINGHAM, Aug. 8.

Pig Iron.—At the close of the first week in August there was only one openly quoted price for Birmingham iron. That was $20. The largest foundry iron maker and two small makers were out of the market and those in the market made sales at $20. Largest of these sales at $20 was for 1000 tons for August and September delivery, part of the tonnage to go to a Southern plant and part to a Northern one of the same interest. One lot of prompt iron of small tonnage was sold for New York delivery at $20.50. One maker booked numerous small lots at $20 base during the week. No maker seemed inclined to shade this base. The market attitude was stronger than at any time since the recovery from the depression began to set in. One lot of 300 tons for fourth quarter sold at $22, which was base of $20 and 50 cents for each of two silicon grades above the 1.75 to 2.25 per cent base. From unofficial reports it seemed clear at the end of the month that stocks on yards had not increased over the low level of July 1 with 44,000 tons. It is doubtful if there was change one way or the other. At the close of July and the first week in August production was maintained at the high pace existing on July 1. Two more blast furnaces were in operation this week than during the same week in July. Proximity of raw materials and company ownership of railroad lines and rolling stock have enabled full production. The Tennessee company, in fact, is credited with a record coal production in July, the holiday considered. The Central Coal & Iron Co. is scheduled to resume at the furnace at Holt this week. Supply of raw material is at hand. The furnace has been repaired. Deliveries are another matter. They are very difficult. Some pig iron is being piled this month on account of the car shortage, which is the only trouble in the Birmingham district.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon 1.75 to 2.25	$19.50 to $20.00
Basic	18.50 to 19.00
Charcoal, warm blast	30.00 to 32.00

Finishing Mills.—There has been no change in the finishing mill situation since July 1. The Tennessee company has steadily maintained this schedule: Double turn at plate, guide and bar mills at Bessemer, double turn at tie-plate and structural mills at Fairfield, double turn at rail and blooming mills at Ensley, 100 per cent capacity in the ingot mill and full turn at the car works. New high coal-producing records were made in July weeks. Nine blast furnaces were in operation this week, compared with seven July 1. The Gulf States Steel Co. and the American Steel and Wire Co. are on full turn in the finishing mills. Conners Steel Co. is on double turn at the Woodlawn mill and experiencing delays in shipment of cotton ties.

Cast Iron Pipe.—The National Cast Iron Pipe Co. has booked 500 tons for St. Paul and the United States Cast Iron Pipe & Foundry Co. booked the 1000 tons of 20-in. pipe let by Dallas. Some belated customers are reported to be paying $38 and $39 for pressure pipe, but the leading interest has not advanced beyond $37. The shops are on full turn and, incident to the car shortage, are piling some pipe. Sanitary shops are also on full turn except where slowing down on account of inability to ship and reluctance to accumulate exist. The base remains at $60 for standard pipe.

Coal and Coke.—Alabama mines, owing to the influx of cars from Western roads making extra purchases of coal, continue making the best production records in five years. Spot prices have gotten as high as $5, but $3 to $4 is the rule. Coke is very strong and the base is nearer $6 and $7 than the recent $5.50 to $6.

Old Material.—There has been a lull in the old material market owing to unwillingness of consumers to take on yards any more stock than meets current needs, while the car shortage works against shipments to distant points. Cast scrap is in fair demand on account of the steady local consumption in foundries, none of which have so far been forced to shut down on account of the rail strike. We quote per gross ton f.o.b. Birmingham district yards as follows:

We quote per gross ton f.o.b. Birmingham district yards as follows:

Steel rails	$13.00 to $15.00
No. 1 steel	12.00 to 14.00
No. 1 cast	15.00 to 16.00
Car wheels	14.00 to [illegible]
Tramcar wheels	13.00 to [illegible]
Stove plate	13.00 to 14.00
Cast iron borings	6.00 to [illegible]
Machine shop turnings	4.00 to [illegible]

More men are being added to the force at the works of the Ohio Steel Foundry Co. in Springfield and Lima, Ohio, as a result of the orders placed by the Lima Locomotive Works. The heavier castings will be made at the Lima works and the lighter ones at the Springfield works. Agricultural implement manufacturers are now booking fair-sized orders for the fall trade, according to announcements made by the heads of the local companies.

Boston

BOSTON, Aug. 8.

Pig Iron.—The increased demand for third and fourth quarter iron and larger sales of foreign iron are the features of the market. Inquiries aggregate 4000 to 5000 tons, being about equally divided between No. 2X and No. 1X, ranging from 500 tons down to carlots. Practically no Buffalo, Pennsylvania or Virginia iron is available, consequently activity centers in Alabama and foreign iron. A Providence, R. I., foundry has purchased 500 tons, silicon 2.25 to 2.75 per cent, Alabama iron at $30 base, dock that city, which with loading and other charges brings the delivered price to around $31. Smaller tonnages have sold at $30, Providence, dock base. In addition, fourth quarter Alabama iron sold at $19.50 to $20, furnace base. Sales of foreign iron in this territory the past week aggregate 5000 to 6000 tons, mostly Scotch, with silicons equal to our No. 2X and No. 1X. No. 3 Scotch iron sold at $27.50 to $29, c.i.f. dock Boston, making the average delivered price in Massachusetts $30 to $32. English pig irons are offered for third and fourth quarter shipment on the same basis, while French irons are slightly cheaper. The largest individual lot of foreign iron taken the past week was 1500 tons fourth quarter delivery, by a Connecticut melter. The sale of foreign iron in this market is handicapped by a lack of adequate storage facilities.

We quote delivered prices, on the basis of the latest reported sales, now infrequent, and as follows, having added to furnace prices $2.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia and $9.60 from Alabama:

East. Penn., sil. 2.25 to 2.75	$32.15 to $34.15
East. Penn., sil. 1.75 to 2.25	31.65 to 33.65
Buffalo, sil. 2.25 to 2.75	30.41 to 31.41
Buffalo, sil. 1.75 to 2.25	29.91 to 30.91
Alabama, sil. 2.25 to 2.75	29.60 to 30.10
Alabama, sil. 1.75 to 2.25	29.10 to 29.60

Coke.—The coal situation in this territory continues to tighten up. Both the New England Coal & Coke Co. and the Providence Gas Co. are on a $16.50 delivered basis for by-product foundry contract coke, but will accept no further business this month. One producer quotes $19.50 delivered for spot fuel, but no sales on that basis are reported. The other producer is reported to have accepted a limited tonnage of spot business at $16.50 ovens, the delivered price being considerably under $19.50. Both producers are seriously handicapped by inadequate coal supplies, and are unable to fulfill all requirements promptly. Demand for coke contracted for earlier is heavy, foundries being apprehensive of securing supplies this fall. A Providence, R. I., foundry wants 500 tons, shipments to begin in September. Crushed coke has advanced $2, to $14 on cars ovens.

Finished Material.—Approximately 500 tons of structural steel is being refigured for a seven-story office building for the Clapp Estate, Portland, Me. Other tonnages on the market are small. Moderately large tonnages of steel bars were placed last week at 2c., Pittsburgh base. Plate and structural prices also are firmer, but mills, especially northern, are not accepting much business except when no delivery specifications are in contracts.

Warehouse Business.—The recent advance in iron and steel prices served to stimulate rather than check the movement out of warehouses. Not only is more stock moving, but inquiries are freer and larger in individual cases. Sales of rivets have increased. Warehouse stocks remain unbalanced after months of readjustment, but in general are in fair condition. Brass wire, sheets, rods and tubing have advanced ½c. a pound and sheet zinc ¼c.

Jobbers quote: Soft steel bars, $2.75½ per 100 lb. base; flats, $3.40¼; concrete bars, $2.90 to $3.03; structural steel, $2.75½ to $2.90½; tire steel, $4.15 to $4.50; open-hearth spring steel, $4.50 to $6; crucible spring steel, $11.50; steel bands, $3.90; hoop steel, $4.40; cold rolled steel, $3.50 to $4; refined iron, $2.75½; best refined iron, $4.25; Wayne iron, $5.50; Norway iron, $6 to $6.50; plates, $2.85½ to $3.04; No. 10 blue annealed sheets, $3.90 per 100 lb. base; No. 28 black sheets, $4.90; No. 28 galvanized sheets, $5.90.

Old Material.—The old material market is quieter, the demand for borings and turnings, which has been the feature for several weeks having let up somewhat. Some business in strictly No. 1 borings and turnings was closed the past week at $9.25 shipping point, for a Pennsylvania mill account, and additional tonnages, including one of 200 tons, are pending. A Massachusetts nail manufacturer also has bought borings and turnings on a $10 delivered base, having a $1.40 average freight. Cast iron borings remain difficult to obtain. A sale of 100 tons at $12.35 shipping point is reported, and several offers of $12.25 are out, which are expected to close shortly. A few cars of horseshoes have been bought locally at $13.25. Heavy melting steel offers of $10.50 shipping point for eastern Pennsylvania delivery, and of $10.75 for Pittsburgh district delivery are out, but little material is available at those prices. Local dealers report heavy rejections of melting steel by Pennsylvania mills.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$19.00 to $20.00
No. 2 machinery cast	17.00 to 18.00
Stove plate	15.50 to 16.50
Railroad malleable	15.00 to 15.50
Street car wheels	18.00 to 19.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$11.00 to $11.50
No. 1 railroad wrought	11.50 to 12.00
No. 1 yard wrought	10.00 to 10.50
Wrought pipe (1 in. in diam., over 2 ft. long)	8.00 to 8.50
Machine shop turnings	9.00 to 9.50
Cast iron borings, rolling mill	9.50 to 10.00
Cast iron borings, chemical	12.00 to 12.50
Blast furnace borings and turnings	9.00 to 9.50
Forged scrap and bundled skeleton	8.00 to 8.50
Street car axles and shafting	14.50 to 15.00
Rails for rerolling	11.00 to 11.50

Cleveland

Production Rate Held with Difficulty—Costs and Prices Mounting

CLEVELAND, Aug. 8.—Further curtailment of blast furnace operations with several stacks having difficulty in keeping in operation, increasing costs in manufacturing iron and steel, and rapid advances in prices of iron and steel products for anything approaching early delivery characterized the market the past week. One independent steel company estimates that its coal is costing it at least $12 to $14 per ton for every ton of steel produced. Steel Corporation subsidiaries have not announced any advance in prices on shapes, plates and bars, but it is understood that not less than 1.80c. will be quoted.

On the eve of the reassembling of the meeting of coal operators and miners the prevailing belief is that most of the operators here will concede nearly everything demanded by the miners. The operators are divided concerning the policy to be pursued, and as one prominent man in the iron trade expressed it, it is a case of demoralization against organization, for the miners are standing firmly for their demands. Indications are that the railroads are making progress in improving service and will grant no concessions to the striking shopmen.

Iron Ore.—Cheering news comes from the head of the Lakes to the effect that railroads, particularly the Great Northern, which have been crippled by the shopmen's strike, are now operating much more satisfactorily, some of them at 85 per cent of the usual capacity, and ore is being loaded rapidly at upper Lake docks. At the lower Lake docks, however, although vessels are supposed to be in the first priority class with railroads, coal is being slowly received and some vessels have been tied up on account of inability to obtain fuel.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $5.95; Old range non-Bessemer, 51½ per cent iron, $5.20; Mesabi Bessemer, 55 per cent iron, $5.70; Mesabi non-Bessemer, 51½ per cent iron, $5.05.

Pig Iron.—The active stack of the Cleveland Furnace Co. was banked last Friday, and Perry Furnace, Erie, Pa., has been ordered out and will probably be on the idle list Friday or Saturday of this week. Several other blast furnaces are barely able to keep in operation and the fuel situation shows no improvement.

Foundries have been following a hand to mouth policy in buying pig iron and as a result many of them have very little iron on hand. The announcement of the banking of the Cleveland stack has resulted in numerous melters trying to place orders and sales of No. 2 Foundry in limited quantities, have been made at $30. It is very doubtful whether less than this could be done. Many foundrymen are fairly well stocked with coke and are willing to pay high prices for iron, if necessary. No basic is being offered for sale in this city and very little foundry iron is obtainable.

A Cleveland melter has placed an order for a moderate tonnage of malleable to be shipped from St. Louis at $32, delivered, Cleveland. The demand for standard low phosphorus is active and prices have been advanced $2 to $3, quotations varying somewhat according to the analysis.

Quotations below are f.o.b. local furnace for Northern foundry iron, not including a 50c. switching charge. Other quotations except basic and low phosphorus are delivered Cleveland, being based on a $3.02 rate from Jackson and a $6 rate from Birmingham:

Basic, Valley furnace	$26.00
Northern No. 2 fdy., sil. 1.75 to 2.25	30.00
Southern fdy., sil. 1.75 to 2.25	24.50
Malleable	26.00
Ohio silvery, sil. 8 per cent	33.52
Standard low phos., Valley furnace	$35.00 to 36.00

Sheets.—The market is strong. Buying by automobile companies is more active. The usual quotation on automobile stock is 4.75c., but some mills are quoting 4.85c.

Warehouse Business.—Warehouses are enjoying good business and prices are unchanged.

Jobbers quote steel bars, 2.56c.; plates and structural shapes, 2.66c.; No. 9 galvanized wire, 3c.; No. 9 annealed wire, 2.50c.; No. 28 black sheets, 4c.; No. 28 galvanized sheets, 5c.; No. 10 blue annealed sheets, 3.50c. to 3.61c.; hoops and bands, 3.21c.; cold-rolled rounds, 3.30c.; flats, squares and hexagons, 3.80c.

Semi-Finished Steel.—The nominal price of $35 is quoted on sheet bars, billets and slabs, but there is none for sale by any Cleveland producer, and, if any should be offered for sale, it would be at not less than $40.

Bolts, Nuts and Rivets.—Business is very active. Railroads continue to be among the important buyers. The strike of shop men does not seem to have affected the buying at all and so far has caused little trouble of any kind. While there is some delay in the receipt of steel, manufacturers are not suffering and they are able to make fairly satisfactory delivery on their products. Complaint is made that some of the coal being received is extremely poor.

Old Material.—Owing to strike conditions, buyers are placing no orders and there are no transactions between dealers. Prices are to a large extent nominal.

We quote per gross ton, f.o.b. Cleveland, as follows:

Heavy melting steel	$14.75 to $15.00
Steel rails, under 3 ft	15.25 to 15.50
Rails for rolling	15.75 to 16.25
Iron rails	14.00 to 15.00
Iron car axles	18.00 to 19.00
Low phosphorus melting	16.00 to 16.25
Cast borings	12.00 to 12.25
Machine shop turnings	11.50 to 12.00
Mixed borings and short turnings	11.75 to 12.00
Compressed steel	12.85 to 13.25
Railroad wrought	14.00 to 14.50
Railroad malleable	15.50 to 16.00
Light bundled sheet stampings	10.00 to 10.25
Steel axle turnings	13.00 to 13.50
No. 1 cast	17.00 to 17.50
No. 1 busheling	10.25 to 10.50
Drop forge flashings over 10 in.	10.25 to 10.50
Drop forge flashings under 10 in.	10.00 to 10.50
Railroad grate bars	13.75 to 14.25
Stove plate	13.75 to 14.25
Pipes and flues	10.00 to 11.00

Finished Iron and Steel.—Prices of bars and plates are moving upward rapidly. On bars for prompt delivery sales have been made as high as 2.75c. Fully 20,000 tons of forging bars offered mills has been turned down on account of inability to make deliveries. The Carnegie Steel Co. will furnish 10,000 tons of plates and shapes for the two new passenger boats, the largest on the Lakes, to be built by 1924, for the Detroit & Cleveland Navigation Co. by the American Shipbuilding Co., and also 4600 tons for a new freighter for Pickands, Mather & Co. Inquiries for tank plate from the Sharon field amounting to 6300 to 6500 tons have been received. Independent companies in this district are now quoting 2.25c. on plates and as high as 2.50c. has been paid on small lots for prompt delivery. Quotations on cold-rolled steel bars have been advanced to 2.25c. and a further advance to 2.50c. is predicted. The McClintic-Marshall Co. has booked 500 tons of reinforcing ribs for the Scotia-Schenectady Bridge, Schenectady, N. Y. The order for the steel for the addition to the Lima Locomotive Works, 2000 tons, has not been placed on account of uncertainty as to delivery. October delivery is desired.

Pittsburgh Iron and Steel Market

(*Concluded from page 373*)

getting many responses. Another steel company in this district, anxious to get some really good steel, bid $18.50 delivered for some railroad scrap and failed to secure any. Steel offered in the list of the Pennsylvania Railroad, central region, brought $18.25, Pittsburgh, and the knuckles and couples for both this division and the Eastern region went to dealers around $19 per gross ton, delivered Pittsburgh. The steel foundries are paying higher prices for billet and bloom crops and a large user of machine shop turnings lately has re-entered the market and is offering a slight advance over recent prices.

Principal users of compressed sheets in this district lately have been out of the market, and while some of the offerings by local mills and producers have sold as high as $16.50, delivered, Pittsburgh, $16 appears to be as high as any consumers now will go.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows per gross ton:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	$17.50
No. 1 cast, cupola size	$19.00 to 19.50
Rails for rerolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	17.50 to 18.00
Compressed sheet steel	16.00 to 16.50
Bundled sheets, sides and ends	15.00 to 15.50
Railroad knuckles and couplers	19.00 to 19.50
Railroad coil and leaf springs	19.00 to 19.50
Low phosphorus standard bloom and billet ends	21.00 to 22.00
Low phosphorus plates and other grades	19.00 to 20.00
Railroad malleable	16.50 to 17.00
Iron car axles	26.00 to 26.50
Locomotive axles, steel	25.00 to 25.50
Steel car axles	17.50 to 18.00
Cast iron wheels	18.00 to 18.50
Rolled steel wheels	19.00 to 19.50
Machine shop turnings	14.00 to 14.25
Sheet bar crop ends	19.00 to 19.50
Heavy steel axle turnings	15.00 to 15.50
Short shoveling turnings	15.00 to 15.50
Heavy breakable cast	18.00 to 18.50
Stove plate	14.50 to 15.00
Cast iron borings	15.50 to 16.00
No. 1 railroad wrought	15.00 to 15.50

Consolidation of McKune, Danforth and Egler Blow Torch Systems

PITTSBURGH, Aug. 8.—The announcement of the consolidation of all patents and patent applications relating to combustion in regenerative furnaces, known as the McKune, Danforth and Egler systems, is just announced. The Miami Metals Co., Blair Engineering Co. and Arthur G. McKee & Co. have assigned all patents and applications held by them in connection with the blow-torch process to the Union Trust Co., Cleveland, which as trustee for the open-hearth combustion system, is empowered to grant licenses under these patents. This consolidation will assure to the steel industry the best that has been developed under all of these basic patents combined in one design, and will also remove the possibility of any patent interference in the use of these equipments and methods of operation. The Blaw-Knox Co., Pittsburgh, has been appointed agent for the exclusive sale and manufacture of all of the equipment covered by these patents. It has organized a special engineering and service department, composed of experts in open-hearth design and operation, who will devote their time to the development and sale of these devices.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Plates

Sheared, tank quality, base, per lb. . . . . 1.70c. to 1.85c.

Structural Material

Beams, channels, etc. . . . . 1.70c. to 1.85c.

Iron and Steel Bars

Soft steel bars, base, per lb. . . . . 1.70c. to 1.85c.
Refined iron bars, base, per lb. . . . . 2.25c.

Hot-Rolled Flats

Hoops, base, per lb. . . . . 2.50c. to 2.75c.
Bands, base, per lb. . . . . 2.50c. to 2.75c.
Strips, base, per lb. . . . . 2.50c. to 2.75c.
Cotton ties, per bundle of 45 lb. $1.11

Cold-Finished Steels

Bars and shafting, base, per lb. . . . . 2.25c.
Strips, base, per lb. . . . . 4.00c.

Wire Products

Nails, base, per keg	$2.40
Bright plain wire, base, per 100 lb.	2.25
Annealed fence wire, base, per 100 lb.	2.25
Galvanized wire, base, per 100 lb.	2.75
Galvanized barbed, base, per 100 lb.	3.05 to 3.15
Galvanized staples, base, per keg	3.05 to 3.15
Painted barbed wire, base, per 100 lb.	2.55 to 2.65
Polished staples, base, per keg	2.55 to 2.65
Cement coated nails, base, per count keg	1.90 to 2.00
Woven fence, carloads	73 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads, 60, 10 and 10 per cent off list
Machine bolts, small, cut threads . . . . 60 and 10 per cent off list
Machine bolts, larger and longer . . . . . 60 and 10 per cent off list
Carriage bolts, ⅜ x 6 in.: Smaller and shorter, rolled threads . 60 and 10 per cent off list
Cut threads . . . . . 60 per cent off list
Longer and larger sizes . . . . . 60 per cent off list
Lag bolts . . . . . 60, 10 and 10 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads . . . . 50 and 10 per cent off list
Other style heads . . . . . 20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.: Smaller and shorter . . . . . 50 and 10 per cent off list
Larger and longer sizes . . . . . 50 and 10 per cent off list
Hot pressed square or hex. blank nuts . . . . . $4.50 off list
Hot pressed nuts, tapped . . . . . $4.50 off list
C.p.c. and t. sq. or hex. nuts, blank . . . . . $4.50 off list
C.p.c. and t. sq. or hex. nuts, tapped . . . . . $4.50 off list
Semi-finished hex. nuts: 9/16 in. and smaller, U. S. S. . . . . 80 and 10 per cent off list
⅝ in. and larger, U. S. S. . . 75 and 10 per cent off list
Small sizes, S. A. E. . . . . 80, 10 and 10 per cent off list
S. A. E. ⅝ in. and larger . . 75 and 10 per cent off list
Stove bolts in packages . . . . . 80 and 5 per cent off list
Stove bolts in bulk . . . . . 80, 5 and 2½ per cent off list
Tire bolts . . . . . 65 per cent off list
Track bolts, in. carriages . . . . . 3.25c. to 3.50c. base
Track bolts, less than 200 kegs . . . . . 4.25c. to 4.50c. base

Cap and Set Screws

Milled square and hex. head cap screws, 75 and 10 per cent off list
Milled set screws . . . . . 75 per cent off list
Upset cap screws . . . . . 80 per cent off list
Upset set screws . . . . . 80 and 5 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb. $2.65
Large boiler rivets, base, per 100 lb. 2.75
Small rivets . . . . . 70 to 70 and 5 per cent off list

Track Equipment

Spikes, ⅝ in. and larger, base, per 100 lb.	$2.35 to $2.50
Spikes, ½ in. and smaller, base, per 100 lb.	2.75 to 3.00
Spikes, boat and barge, base, per 100 lb.	2.75 to 3.00
Track bolts, base, per 100 lb.	3.25 to 3.50
Tie plates, per 100 lb.	2.00 to 2.25
Angle bars, base, per 100 lb.	2.40

Welded Pipe

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛	54½	28	¼ to ⅜	+ 3½	+22½
¼ to ⅜	60	33½	½	39½	18½
½	65	50½	¾	42½	27½
¾	69	56½	1 to 1½	44½	29½
1 to 3	71	58½			

Lap Weld

2	64	51½	2	39½	25½
2½ to 6	68	55½	2½ to 6	42½	28½
7 to 8	65	51½	7 to 12	40½	27½
9 to 12	64	50½			

Butt Weld, extra strong, plain ends

⅛	50½	33	¼ to ⅜	+ 4½	+37½
¼ to ⅜	56	38½	½	35½	23½
½	62	50½	¾	42½	28½
¾	67	56½	1 to 1½	44½	30½
1 to 1½	69	57½			
2 to 3	70	58½			

Lap Weld, extra strong, plain ends

2	62	50½	2	40½	27½
2½ to 4	66	54½	2½ to 4	43½	31½
4½ to 6	65	53½	4½ to 6	42½	30½
7 to 8	61	47½	7 to 8	35½	23½
9 to 12	55	41½	9 to 12	30½	18½

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 and 2½ per cent.

Boiler Tubes

Lap Welded Steel

1¾ in.	26½
2 to 2¼ in.	41
2½ to 3 in.	52
3¼ to 13 in.	57

Charcoal Iron

1½ in.	5
1¾ to 1⅞ in.	15
2 to 2¼ in.	25
2½ to 3 in.	30
3¼ to 4½ in.	32

To large buyers of steel tubes a supplementary discount of 5 per cent is allowed.

Standard Commercial Seamless Boiler Tubes

Discounts on cold-drawn or hot-rolled tubes in carload lots, f.o.b. Pittsburgh, follow:

1 in.	60	2½ and 2¾ in.	43
1¼ and 1½ in.	52	3 in.	47
1¾ in.	36	3¼ to 4 in.	52
2 and 2¼ in.	39	4¼ in. to 5 in.	44

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Tin Plate

Standard cokes, per base box. $4.75

Terne Plate

(Per package, 200-lb.)

8-lb. coating	$9.30	25-lb. coating I. C.	$14.25
8-lb. coating I. C.	9.60	30-lb. coating I. C.	15.25
15-lb. coating I. C.	11.80	35-lb. coating I. C.	16.25
20-lb. coating I. C.	13.00	40-lb. coating I. C.	17.25

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb. . . . . 2.40c. to 2.60c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb. . . . . 3.15c. to 3.40c.

Galvanized

No. 28 (base), per lb. . . . . 4.15c. to 4.40c.

Tin-Mill Black Plate

No. 28 (base), per lb. . . . . 3.15c. to 3.40c.

Manufacturers have pamphlets, which can be had upon application, giving price differentials for gage and extras for length, width, shearing, etc.

Freight Rates

All rail freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic	$0.325	Buffalo	$0.265	St. Louis	$0.43
Philadelphia, export	0.265	Cleveland	0.215	Kansas City	0.735
Baltimore, domestic	0.315	Cleveland, Youngstown		Kansas City (pipe)	0.705
Baltimore, export	0.255	Comb.	0.19	St. Paul	0.595
New York, domestic	0.34	Detroit	0.295	Omaha	0.735
New York, export	0.285	Cincinnati	0.295	Omaha (pipe)	0.705
Boston, domestic	0.365	Indianapolis	0.31	Denver	1.275
Boston, export	0.285	Chicago	0.34	Denver (pipe)	1.215

Pacific Coast	$1.50	Pac. Coast, ship plates	1.20
Birmingham	0.69	Memphis	0.385
Jacksonville, all rail	0.50	Jacksonville, rail and water	0.415
New Orleans	0.515		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha, and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 30c. to 40c.; ship plates, 30c. to 40c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 30c. to 40c.; sheets and tin plates, 50c.; rods, wire rope, cable and strands, 75c.; wire fencing, netting and stretcher, 50c.; pipe, not over 8 in. in diameter, 50c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

EXPORT SITUATION DULL

Japan Inactive—United States to Supply Rails for Bolivia—Importers of Foreign Iron Active

NEW YORK, Aug. 8.—Export trade shows but slight change for the better. Japan continues dull and inactive with the exception of a few small inquiries. One export house in New York has received an order from the Hanshin Electric Express Railway for five miles of 75-lb. rails. There is an inquiry in the market for 400 tons of reinforcing bars, and one Japanese house is handling a tender calling for 1300 tons of bridge material. Black sheet buying is at a low ebb, and it is believed by some exporters that what few sheets are now being purchased in Japan are being obtained in England. The Chinese market continues dull. The 5000 tons of grooved rails, which was included in the inquiry issued several months ago by the Pekin tramways, has been awarded to a French mill. What few orders are appearing from South America are small.

The rail tonnage which will be purchased by the Ulen Contracting Co., 120 Broadway, New York, which is executing a railroad construction contract in Bolivia with the government, amounts to 5000 tons of 60-lb. rails with accessories (splice bars, bolts, nuts and spikes). The line, which is to be built from Atoche to Villazon, is 204 kilometers in length and the rail tonnage will probably total 12,000 to 13,000 tons. As a result of new financing by the Bolivian Government, an effort is being made to complete the railroad considerably within the five-year limit originally intended and the Ulen Contracting Co. hopes to lay 75 kilometers before the end of this year. An additional contract for a shorter line between Potosi and Sucre, Bolivia, will probably be let within the next month. In obtaining quotations on the present tender for 5000 tons of rails, bids were received from Britain and Continental countries as well as the United States, but in all probability the contract will be awarded to an American mill, for while the European prices were in some instances lower, in one case $44 per ton, c.i.f. port, deliveries were generally from four to six months or longer; the American bid on the other hand, was for delivery of 2500 tons by Sept. 1 and the remaining 2500 tons by Sept. 15.

Importing of foreign pig iron continues, but imports are largely confined to Scotch iron, 2 to 2.50 per cent sil. and low in phosphorus. One importer of foreign iron and steel reports that he has cabled for prices, delivered, on 5000 tons of Scotch iron for one consumer and another exporter and importer has cabled inquiries to United Kingdom connections in the past ten days for 1000 tons of Scotch iron. The latter has received three orders on this iron for early delivery, each of 100 tons; from foundries in Poughkeepsie, N. Y., Framingham, Mass., and Boston. Foundries are in many cases evidently insuring themselves a supply of pig iron during the present strike situation, by ordering small tonnages of foreign iron, which in a majority of instances is evidently Scotch iron.

Automatic heat treatment of pipe being manufactured by the centrifugal casting method by the United States Cast Iron Pipe & Foundry Co., has been satisfactorily tested out, according to information received from F. J. Ryan, president F. J. Ryan & Co., Philadelphia, who furnished the equipment.

The bran cleaning department building at the Shenango plant of the American Sheet & Tin Plate Co., New Castle, Pa., was destroyed by fire on Aug. 6, with a loss of $5 000. Firemen checked the fire from spreading to other departments.

Pilling & Co. announce that on Aug. 15 their New York offices for the sale of pig iron, ore, coal and coke will be removed from 2 Rector Street to larger quarters in suite 2252-53 Equitable Building, 120 Broadway.

JULY STEEL OUTPUT

Ingot Production Rate About 35,360,000 Tons Per Year—Daily Output 2100 Tons Less Than in June

According to the steel ingot statistics, as collected by the American Iron and Steel Institute, the 30 companies, which in 1921 made 87.50 per cent of the total, had an output in July of 2,487,104 gross tons. This compares with 2,634,477 tons in June and is a decline of 147,373 tons.

On the assumption that companies reporting are supplying the same percentage of the total as they did last year (though the percentage may be less) the output for the 25 working days of July was about 2,842,400 tons, or approximately 113,700 tons per day. The June production on the same basis was about 3,010,000 tons, or 115,800 tons per day. The July output was at the rate of about 35,360,000 tons per year; in June it was about 36,000,000 tons per year.

The statistics of the American Iron & Steel Institute since January, 1921, follow:

Months	Open-Hearth	Bessemer	All Other	Total
January, 1921	1,591,281	608,276	3,629	2,203,186
February	1,295,563	446,818	2,796	1,745,177
March	1,175,591	392,983	2,404	1,570,978
April	1,000,053	211,755	2,150	1,213,958
May	1,047,810	216,497	1,543	1,265,850
June	808,286	193,644	1,476	1,003,406
Total 6 months	6,918,584	2,072,973	13,998	9,005,555
July	689,489	113,312	575	803,376
August	915,334	221,116	1,621	1,138,071
September	908,381	265,152	1,207	1,174,740
October	1,269,945	345,837	1,028	1,616,810
November	1,294,371	363,912	1,718	1,660,001
December	1,129,174	296,380	1,539	1,427,093
Total whole yr.	13,125,578	3,679,682	21,686	16,826,946
January, 1922	1,260,809	331,851	822	1,593,482
February	1,395,835	348,571	616	1,745,022
March	1,918,570	451,386	795	2,370,751
April	1,997,465	445,939	1,109	2,444,513
May	2,314,774	494,893	1,474	2,711,141
June	2,143,708	487,851	2,918	2,634,477
Total 6 months	10,931,161	2,560,491	7,734	13,499,386
July	2,020,572	464,047	2,485	2,487,104

The July daily estimated output of 113,700 tons compares with 70,019 tons per day in January and 114,717 tons per day in May. April ranks next lowest to July at 111,710 tons per day.

Reduction in Alabama Iron Stocks

BIRMINGHAM, Aug. 8.—Yard stocks went down 8000 tons. The stocks on furnace yards in Alabama on Aug. 1 and July 1 were as follows: Foundry, 25,000 and 28,000 tons; machine cast, 1000 and 3000 tons; warrants, 2000 and 2600 tons; basic, 8000 and 10,000 tons; totals, 36,000 and 44,000 tons. Stocks on yards at this time last year were 216,000 tons.

The Cities Service Co. has approved plans involving an expenditure of several millions of dollars on the properties of the Ohio Public Service Co. The plans approved call for the construction of a 60-mile steel tower electric power transmission line from Lorain to Mansfield, and a similar line, 55 miles long, for Warren, Alliance and Canton. The company is also contemplating the installation of a 20,000-kw. turbine at its power plant in Lorain, Ohio, and a 30,000-kw. turbine in the Toledo Edison plant at Toledo.

The Pennsylvania Railroad has announced that its shops at Mt. Vernon, Ohio, will not be opened again and that the work formerly done at Mt. Vernon will be transferred to Columbus. The reason given is that work can be done more economically at Columbus.

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
Aug.	Lake	Electrolytic*	New York	New York	St. Louis	New York	St. Louis
2	14.12½	13.75	32.12½	5.80	5.50	6.65	6.30
3	14.12½	13.75	32.12½	5.80	5.50	6.65	6.30
4	14.12½	13.75	32.50	5.85	5.50	6.65	6.30
5	14.12½	13.75	.....	5.85	5.50	6.65	6.30
7	14.12½	13.75	32.50	5.85	5.50	6.65	6.30
8	14.12½	13.75	32.62½	5.80	5.50	6.65	6.30

*Refinery quotation.

New York

NEW YORK, Aug. 8.

The markets are all strong but only moderately active. Domestic buying of copper is fair with prices strong. The tin market is exceedingly quiet but steady. Demand for lead is very heavy and prices are advancing. Sales of zinc continue in moderate volume at slightly higher levels.

Copper.—Domestic buying of electrolytic copper continues in moderate steady volume, but demand is not heavy nor speculative. The minimum price for August-September and 60-day delivery is 14c., delivered, or 13.75c., refinery, with some producers quoting nothing less than ⅛c, above these levels. There is still a very good demand from foreign consumers. Lake copper is quoted at 14.12½c., delivered.

Tin.—Light sales of Straits tin in a very quiet market have prevailed during the last week. On Thursday, Aug. 3, a moderate business was done in shipments from the East at around 32.12½c., the total approximating 150 tons. The uncertainty as to the labor situation is keeping large consumers out of the market. Yesterday and to-day have also been very quiet, partly because of the bank holiday in London yesterday. It is estimated that August shipments from the East will total about 7000 tons. Spot Straits to-day is quoted at 32.62½c, New York. Quotations in London to-day are as follows: £161 12s. 6d. for both spot and future standard and £162 7s. 6d. for spot Straits, or about £1 per ton below quotations a week ago, with the market still strong. Arrivals thus far this month here have been 1130 tons, with 5145 tons reported afloat.

Lead.—Large sales for August and 30-day shipment are reported and the market is firm at hardening prices. The quotations of the leading interest are unchanged at 5.55c., St. Louis, or 5.75c., New York, but in the outside market prices are higher at 5.85c., New York. In the West, however, the metal can be bought from independents at 5.50c., St. Louis. A good general inquiry is reported.

Zinc.—The advance in prime Western, which has continued almost daily for several weeks, apparently came to a temporary standstill last week at 6.30c., St. Louis, or 6.65c., New York, where it has remained for several days. Fundamental conditions are unchanged and demand is reported as good from both galvanizers and brass makers. The only alteration of interest is a slight easing in futures, which are now quoted about five points below August and September delivery, or 6.25c., St. Louis, and 6.60c., New York, due possibly to the expectation of an early settlement of the coal strike and a larger production of zinc ore.

Antimony.—Wholesale lots for early delivery are quoted unchanged in a quiet market at 5.25c. per lb., duty paid, New York.

Aluminum.—For virgin metal, 98 to 99 per cent pure, the leading interest continues to quote at 19.10c. per lb. f.o.b. plant, in wholesale lots for early delivery, and imported metal of the same analysis is offered by dealers at 17.75c. to 18c. per lb., New York, duty paid.

Old Metals.—The market is strong and was quite active the past week. Dealers' selling prices are as follows:

	Cents per Pound
Copper, heavy and crucible	[illegible]
Copper, heavy and wire	[illegible]
Copper, light and bottoms	11.25
Heavy machine composition	10.50
Brass, heavy	[illegible]
Brass, light	6.50
No. 1 red brass or composition turnings	8.75
No. 1 yellow rod brass turnings	7.50
Lead, heavy	[illegible]
Lead, tea	[illegible]
Zinc	3.75

Chicago

Aug. 8.—On the whole the market is quiet and marking time pending a settlement of the coal and rail strikes. There is some hand-to-mouth buying of lead, copper and zinc, but users are afraid to purchase futures. Some melters who are short of coal are said to have sold surplus stocks of metals. Lead and zinc have advanced slightly, while the other metals remain unchanged. Among the old metal grades only copper bottoms and zinc have advanced. We quote, in carload lots, lake copper, 14.25c.; tin, 33.50c. to 34c.; lead, 5.60c.; spelter, 6.40c.; antimony, 7c.; in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 10.75c.; copper bottoms, 9.25c.; red brass, 8.75c.; yellow brass, 6.75c.; lead pipe, 4.50c.; zinc, 3.50c.; pewter, No. 1, 20c.; tin foil, 22.50c.; block tin, 26c., all buying prices for less than carload lots.

St. Louis

AUG. 8.—The lead market is strong and 10 to 15 points higher for the week, while slab zinc is very strong, at an advance of 20 points for the week. We quote carlots: lead 5.50c. to 5.60c.; slab zinc, 6.30c. On old metals we quote: light brass, 3.50c.; heavy red brass and light copper, 4c.; heavy copper and copper wire, 7.50c.; zinc, 2c.; lead, 3c.; pewter, 15c.; tin foil, 16c.; tea lead, 2c.; aluminum, 9c.

Iron and Steel Institute Meeting at York

Announcement is made by the secretary, G. C. Lloyd, of the autumn meeting of the Iron and Steel Institute, which will be held at York, England, Sept. 5 and 6. On Thursday, Sept. 7 the members will visit the Devonshire Works of the Staveley Coal & Iron Co., Ltd., near Chesterfield, and on Friday the works of Parkgate Iron & Steel Co., Ltd. On Tuesday, following the afternoon session of the institute, the members are invited by William McConway, Pittsburgh, to attend a film demonstration at the Theatre Royal, York, of the new McConway process for the production of steel discs by the centrifugal hydraulic method direct from molten steel.

The following papers are announced:

"The Changes of Volume of Steels During Heat Treatment" (1. Air Hardening Nickel Chromium Steels), by L. Aitchison.

"Nitrogenization of Iron and Steel by Sodium Nitrate," by L. E. Benson.

"A Brinell Machine Attachment for Use with Small Specimens," by E. D. Campbell.

"A Preliminary Magnetic Study of Some Heat-treated Carbon Steels," by E. D. Campbell and Mr. Johnson.

"Some Experiments on the Flow of Steels, at a Low Red Heat, with a Note on the Scaling of Heated Steels," by J. H. S. Dickenson.

"An Investigation on the Factors Influencing the Grain and Bond in Molding Sands," by C. W. H. Holmes.

"Practical Notes on the Manufacture and Treatment of High-speed Steel," by H. K. Ogilvie.

"The Bases of Modern Blast Furnace Practice," by A. K. Reese.

"Reversing Cogging Mills: Their Drives and Auxiliary Equipment," by G. A. V. Russell.

"The Diminution of Lag at Ar 1 Through Deformation," by J. H. Whiteley.

PERSONAL

Arthur Whitcraft, manager manganese steel sales of the Hadfield-Penfield Steel Co., in addition to his previous duties, has been placed in charge of all foundry operations at the South Works at Bucyrus, Ohio.

Wm. H. Lolley, special representative for the Standard Parts Co., sailed for Europe Aug. 1. He will make negotiations with German and French interests for the manufacture and sales promotion of Bock taper roller bearings on the Continent, and will visit the British Bock Bearings, Ltd.

William Ochse, whose appointment as efficiency engineer of the Ohio Machine Tool Co., Kenton, Ohio, was announced in this column a few months ago, has been promoted to works manager.

F. D. Gordon has been appointed manager of the Gary Screw & Bolt Co. works, Gary, Ind., succeeding C. E. Carr, who had been manager for a number of years.

L. H. Williard, for the past two years representative of the Carnegie Steel Co. in Washington on armor plate matters, has been transferred to the general offices of the company in Pittsburgh.

A. C. Acker, formerly electrical engineer at the Shaw works, Manning, Maxwell & Moore, Inc., Muskegon, Mich., has been appointed sales engineer and will work out of the Pittsburgh office of that company.

E. W. Reitzel, treasurer MacWhyte Co., Kenosha, Wis., manufacturer of wire rope, cable, etc., has resigned to engage in other business at Chicago. H. G. Sawyer, Oak Park, Ill., has been elected treasurer in his stead.

Lewis J. Whitney, treasurer Osgood-Bradley Car Co., Worcester, Mass., since 1920, has resigned to accept a position with the Perkins Oil Well Cementing Co., Los Angeles. He became associated with the Worcester company in 1909.

Col. Lindley D. Hubbell, vice-president and in charge of operations of the Hendee Mfg. Co., Springfield, Mass., maker of motorcycles, has retired owing to ill health. He is succeeded by Frank J. Weschler.

Harry W. Hultgren, sales and traffic manager Skinner Chuck Co., New Britain, Conn., has resigned. He was associated with the company twelve years. He has made no plans for the immediate future.

Herbert H. Wheeler, secretary Union Mfg. Co., New Britain, Conn., maker of chucks, iron castings, etc., has returned from a three months' European business trip.

Col. Elmer H. Havens, formerly president and one of the Federal receivers of the Locomobile Co. of America, Bridgeport, Conn., has been chosen vice-president and general manager of the Locomobile Corporation of America, recently formed by W. C. Durant, who has purchased the business.

J. A. McCrory, formerly secretary and general manager of sales of the American Steel Co., Pittsburgh, and C. T. Baird, who was president of Charles T. Baird & Co., have formed a partnership under the firm name Baird & McCrory, Inc., with offices at 140 Nassau Street, New York.

A. H. Hudson, at one time associated with the late Edward Hagar when president of the Universal Portland Cement Co., and later in charge of purchasing for the American International Steel Corporation when Mr. Hagar was president of that organization, and who resigned in 1919 to go into business in Chicago, is now representing, with headquarters in New York, the Service Motor Truck Co., Wabash, Ind., manufacturer of a self-contained railroad passenger car employing a gasoline engine.

George M. Gillette has resigned as president of the Minneapolis Steel & Machinery Co., Minneapolis, after an official connection extending over 20 years. For 12 years prior to that time he was secretary of the Gillette-Herzog Mfg. Co. Mr. Gillette was a member of the commission appointed by the governor of Minnesota which spent four years in studying workmen's compensation in the United States and Europe, and he had much to do with framing the compensation act now in force in Minnesota. His successor as president of the Minneapolis Steel & Machinery Co. is yet to be chosen. Mr. Gillette remains a member of the executive committee and the board of directors.

I. H. Bragg, formerly manager of the Portland, Ore., warehouse of Waterhouse & Lester Co., is now associated with the Inland Iron Co., Fresno, Cal.

Irving S. Kemp, formerly sales manager of the Vaughan & Bushnell Mfg. Co., Chicago, has become vice-president of the Evansville Tool Works, Evansville, Ind.

J. Leonard Replogle returned to New York from a European trip, Aug. 5.

Richard Sanderson, vice-president Standard Steel Works Co., Philadelphia, underwent a serious operation this week at a hospital in Camden, N. J.

E. G. Grace, president Bethlehem Steel Co., has returned from Europe.

William P. Woodside, Studebaker Corporation, Detroit, Mich.; Wells K. Gregg, Milwaukee, and Earnshaw Cook, Towson, Md., have been proposed for membership in the Iron and Steel Institute, and their names are on the voting list for the autumn meeting, which will be held at York, England.

Don. H. Gordon, who has been in charge of the Cincinnati office of the Brier Hill Steel Co., as district manager of sales, has resigned his position to accept an executive position with the Niles Steel Products Co., Niles, Ohio. W. F. Rummell will have charge of the Cincinnati office, working out of the Cleveland office.

William A. Schuyler has resigned as president and general manager of the Scintilla Magneto Co., Inc., which is controlled by Brown, Boveri & Co., of Baden, Switzerland. He was formerly associated with the late Edouard Nieuport, the inventor of the Nieuport airplane, and he represented the Nieuport interests in the United States. Later he introduced the Simms magneto to the American market. Soon after the beginning of the world war he spent considerable time in Russia as the representative of American made motor vehicles and machinery, and later was European sales representative of the General Motors Export Corporation. When the United States was at war he was with the bureau of aircraft production. He plans to make an extended trip to Europe.

James T. Waite, for the past ten years New England sales engineer for the Whitman & Barnes Mfg. Co., assumed management of sales for the New Process Twist Drill Co., Taunton, Mass., on July 1.

George F. Davie, vice-president and treasurer Interstate Iron & Steel Co., Chicago, accompanied by Mrs. Davie, sailed on the Montcalm from Montreal, July 28, for Liverpool. They will visit the British Isles, Belgium, Germany, Switzerland, Italy and France and will return late in September.

Charles C. Hill, general superintendent Schoenberger Works, American Steel & Wire Co., Pittsburgh, for the past nine months, and whose connection with that plant goes back 30 years, has been appointed general superintendent of the Newburg Steel Works of the same company, Cleveland, succeeding B. D. Quarrie, who resigned recently to go with Otis Steel Co., Cleveland. Mr. Hill's first connection with the steel industry was as a clerk at the old Twenty-sixth Street works in Pittsburgh, and since he has successively been chief timekeeper, chief clerk, night and day superintendent of the Bessemer department, and assistant general superintendent, which position he held for about nine months before being made general superintendent. Mr. Hill's successor at Schoenberger works has not yet been named.

FRENCH EXPORTS DECLINE

Lower German and British Exchange Curtails French Sales—Domestic Market Dull Except for Sheets

(*Special Correspondence*)

PARIS, FRANCE, July 27.—With the exception of sheets the iron and steel market is dull. The fall of the German mark to 0.0235 fr. has strengthened the position of Germany in export markets to the detriment of French exports, which were also unfavorably influenced by the recession of the pound sterling to 53 fr. after having touched 58 fr.

Germany delivered to France, in June, 374,646 metric tons of coke on the reparations account. But France, whose own production of coke is only about 80,000 tons per month, imported in June 52,942 tons from Belgium and 5181 tons from Great Britain.

As French pig iron producers do not wish to increase the production of pig iron at present, these coke supplies, supplemented by some coking slack coal from Germany, were sufficient to meet the needs of the blast furnaces. But the situation might be quite different with a greater number of blast furnaces in operation.

Iron Ore.—The iron ore market is slowly improving and the following prices have been paid lately:

	Francs
Siliceous ore, Longwy	9.50 to 14.50
Minette, Briey	14.00 to 15.00
Minette, Thionville, 32 per cent.	11.50

Negotiations have been opened with British blast furnaces and coal mines for an exchange, via northern French ports, of iron ore from Briey for British coke and coal for French iron works and railroads and other public utilities.

Pig Iron.—Production no longer shows any increase. With the rise of the coke price to 97 fr. for August, French furnaces are exercising care to prevent an excess of production, which would increase the price decline. The current price of chill-cast foundry pig iron, No. 3 P. L., is 207 to 210 fr., with quotations as low as 205 fr. and up to 215 fr. per metric ton. A contract for 1000 tons of basic was made a few days ago at 195 fr., producing works.

British East Coast hematite, mixed numbers, is now worth 300 to 310 fr., delivered French northern ports. The present prices of the Comptoir des Fontes Hématites are as follows:

	Fr. per Metric Ton
Northern and western coast area	295 to 305
Eastern area	305 to 315
Center and Paris area	325 to 330

Semi-Finished Steel.—There is more activity in export than in domestic sales. However, works are not booked as full as they were some time ago and orders are being accepted for delivery within a month or six weeks. The present inland prices for mild steel are:

	Francs
Ingots	290 to 300
Blooms	310 to 320
Billets	330 to 340

For export: 5 fr. (French), less f.o.b. Antwerp than the above prices.

Beams.—The Comptoir Sidérurgique decided, at its meeting July 20, to maintain its base price on beams at 475 fr. This decision was taken against the advice of some members of the Comptoir, who, because of the increase in the price of coke for August, favored a higher price. The quotation of 475 fr. was introduced at a time when coke cost the blast furnaces 75 fr. at the Franco-German frontier, compared with the August price of 97 fr. A few small deals in beams for export were recently concluded at 360 fr. f.o.b. Antwerp (French currency).

Rails.—A contract for 4000 to 5000 tons of grooved rails, for the Pekin tramways, to be delivered at Antwerp before Sept. 15, has been taken by a mill of Meurthe-et-Moselle against keen competition from the United States.

Sheets.—The volume of orders taken by the Comptoir des Tôles is still increasing: 30,000 to 32,000 tons in May, 35,000 to 38,000 tons in June, and a still higher rate in July. These figures include orders received by members from their branches. Delivery is now 10 weeks for light sheets and 6 weeks for heavy sheets.

Plates.—On the option of 50,000 tons of plates taken a few months ago with the Comptoir des Tôles by French shipbuilding companies, about one-half has been taken up. To enable them to purchase the other half, the shipbuilders have asked the Comptoir des Tôles to make an effort to obtain from mills advantageous prices for 17,000 tons of special shapes which they need.

Germany has requested that her coal deliveries on the reparations account to France, Luxemburg, Belgium and Italy, amounting monthly to 1,916,000 metric tons of coal and coal equivalent (of which 1,150,000 tons goes to France) be reduced to 1,340,000 tons, as follows:
400,000 tons of coke (equivalent to 533,000 tons of coal);
150,000 tons of coking slacks;
507,000 tons of other coals;
150,000 tons of briquettes of lignite.

The Reparations Commission has decided that from Aug. 1 to Oct. 31 the monthly quantity of coal and coal equivalent to be supplied by Germany, on reparations account, to the four countries shall be 1,725,000 tons:
620,000 tons of coke (equivalent to 826,666 tons of coal);
100,000 tons of coking slacks;
798,334 tons of other coals and briquettes of lignite.

The 1,725,000 tons will eventually be increased by 20 per cent of any surplus production of the German coal fields (not lignite), Upper Silesia excepted, beyond 8,300,000 tons per month.

OBITUARY

FRANK TOOMEY, SR., founder of Frank Toomey, Inc., and a noted figure in the machine tool trade, died Wednesday morning, Aug. 2, at the home of his daughter, Mrs. S. Guy Megargee, Scranton, Pa., after a brief illness. He was born in Liverpool, England, 72 years ago, and came to this country when a young man and became affiliated with the Baxter Engine Co., Hartford, Conn. He had charge of its Centennial Exposition exhibit at Philadelphia in 1876. In the same year he established the business which now bears his name. He was among the first to rebuild used equipment. In 1909 the business was incorporated and he retired from the presidency in 1916 to be succeeded by his son. The corporation will be conducted by the present officers, Frank Toomey, Jr., being president.



FRANK TOOMEY

WALTER H. BROWN, sales manager Standard Supply & Equipment Co., Pittsburgh, was killed in an automobile accident on the evening of Aug. 1. For more than twenty years prior to becoming affiliated with the Standard company he was associated with the Pittsburgh Gage & Supply Company, Pittsburgh, of which he had been sales manager for a period of ten years. He was 40 years old.

CHARLES S. REA, vice-president and Pittsburgh district sales representative of the Ralston Steel Car Co., Columbus, Ohio, died at the Allegheny General Hospital, Pittsburgh, Aug. 1, following an apoplectic stroke. He was 63 years old and had been a prominent figure in commercial and civic affairs in Pittsburgh.

WILLIAM HEWITT, Trenton, N. J., formerly vice-president Trenton Iron Co., died Aug. 2 in Philadelphia, following an operation of the throat. He was 68 years old.

CHARLES G. COOPER, founder of the C. & G. Cooper Co., Mt. Vernon, Ohio, long conspicuous as a builder of Corliss type of steam engines, died at his home in that city on Aug. 4, at the age of 75.

Let Steel User and Steel Maker Co-operate

(*Concluded from page* 348)

these results can be obtained in a 15 or 20-in. diameter forging. Were the engineer to attempt to purchase a forging requiring such high properties, the reliable steel manufacturer would try to discourage such requirements, but the engineer might find some one hard up for work who would try to furnish it, and the chances for its giving satisfactory service would be very slight.

I believe I am safe in stating that cement machinery must stand as much or more abuse than machinery for most other industries, on account of the abrasive materials handled and the considerable amount of dirt and dust always found in the cement plant which becomes imbedded in bearings. Some parts must stand both wear and shock, and some must stand either shock alone or wear alone. In the case of parts which must stand both wear and shock, a happy combination can be obtained by means of case hardening the outside surface, which will resist wear, retaining a strong and tough core to resist shock. In the case of a part which is not subjected to shock, this can be made of a steel which can be hardened throughout. In the case of a part which must stand severe shocks and vibrations, certain steels can be specifically heat treated to stand up for this service.

It is my impression that certain parts, such as gudgeons, liner plates for tube mills and crushers, are expected to wear out in a certain length of time, and replacing material is ordered without investigating the possibility of obtaining a material which will give double the service or better. It seems that breakages and excessive wear are accepted as a matter of course by many cement plants. There are manganese steel castings made which stand up best under certain conditions at one plant, while some other special steel casting or forging will give better service at another plant. Each plant has its own individual problems which can be worked out by the proper co-operation with reliable steel manufacturers.

Take pinions, for example. Cast iron pinions are cheapest if the first cost is considered only. Occasionally a cast iron pinion makes an exceptional record, but how often is a cast iron pinion obtained which wears out or breaks in a short time, usually breaking before being worn out, and where the cost of labor and curtailment of production on account of repairs would make the ultimate cost considerably higher than if good special-steel, heat-treated pinions had been purchased in the first place.

Quality According to Price

When a cement company wishes a forging and is only willing to pay a certain limited price per pound it will receive a forging which is worth the price paid for it and no more, since in order to make a forging at such a figure the steel manufacturer will have to select his steel accordingly, and perhaps at this price he cannot afford to heat-treat it. If a forging is required, payment of a fair price to a reliable manufacturer will secure a special steel properly selected and will insure careful heat treatment for the service required. Though such a forging might cost three times as much per pound, it would probably last more than three times as long. But if it outlives the lower priced forging only 2½ times, it would be cheaper in the end, on account of continued operation during this extended period and saving on cost of taking down and reassembling.

In the case of the steel casting failures on the jaw crushers mentioned earlier in this paper, these castings would no doubt have been cheap at 50 cents a pound if they had not broken.

Co-operation Between Designer and Metallurgist

In our corporation, we find it valuable for our plant engineers and engineers who are designing or building machinery to keep in constant touch with our metallurgical departments. When they design a machine to perform a certain operation, they first consult the metallurgists to determine which steel will best stand up in service, and the physical properties which can be obtained from this steel, and they then design their machinery accordingly. In some plants the designing engineer will design his machinery independent of metallurgical advice and make some parts so light and at the same time requiring extremely high physical properties, that he works a hardship on the metallurgical and heat-treating departments. The latter then resort to the use of high priced alloy steels, which may be very sensitive to heat treatment, and which may crack and distort during the drastic heat treatments needed to obtain the extremely high physical properties. This results in high shop losses and often in the installation of defective parts, causing failure in service. Where there is close co-operation between the engineer and metallurgist, such a condition is not likely to occur, and although the machinery may be somewhat heavier, it will be more efficient.

The metallurgist finds it necessary many times to consult with the engineer before recommending steels for certain parts in order to become acquainted with the exact details of the duty which the particular parts are to perform. We find in our corporation that neither can get along without the other, and certainly this same condition must hold true with the cement industry or any other industry using iron or steel.

Far East a Market for American Labor-Saving Machinery

That there are numerous possibilities for business with the Far East and that there is a good market there for labor-saving machinery of all kinds, is the impression of Henry Harnischfeger, president Pawling & Harnischfeger Co., Milwaukee, Wis., builder of cranes and machine tools, who recently returned from an investigation of business conditions in Japan, China and India.

The Far Eastern countries, says Mr. Harnischfeger, are suffering from the effects of the world-wide business depression, since there is a large overstock of materials of all kinds, which must be used up before new supplies will be needed. Contrary to the general opinion, there is a growing market there for labor-saving machinery of all kinds. This is because of the fact that labor conditions are slowly reaching a point where costs of construction and manufacture are high.

He found considerable activity in large engineering projects, such as power plants, drainage, irrigation and building construction. There is a large amount of construction work to be done in the interior of India, says Mr. Harnischfeger, but up to this time it has been particularly hazardous because of loss of life among workmen through wild beasts and reptiles. It is believed that this work can be done very much more safely with the use of machinery.

Mr. Harnischfeger finds the Indian people well disposed toward American-made products. They feel that owing to the vastness of their own country and also of the United States we have had problems similar to theirs and for this reason the machinery designed for the construction of such developments as the Erie barge canal, the Panama canal, the Mississippi flood control and the several gigantic irrigation projects will meet their conditions. These experiences have not been shared by European manufacturers, he emphasized, as they have never had to contend with such large scale enterprises.

The Pittsburgh Steel Co. has received a Federal permit to construct a loading dock on the right bank of the Monongahela River, 3300 ft. above Dam No. 4. The loading dock is for the transfer of materials from railroad cars to barges. Principal material to be handled is slag, cinder and mill refuse, which is to be used in filling and reclaiming other lands of this and allied companies along the river. The American Manganese Mfg. Co., Dunbar, Pa., also received a Federal permit to construct a tipple for the purpose of loading coal in barges on the right bank of the Monongahela River, 6974 ft. west of Point Marion, or 1.3 miles above Lock and Dam No. 8.

GERMAN PRICES AGAIN RAISED

Continued Collapse of the Mark Makes Further Advances Likely—Imports Balance Exports

(By Cable)

BERLIN, GERMANY, Aug. 4.

The new exchange collapse produced convulsive activity in the steel market, the violent demand increasing the shortage of heavy semi-finished products. Prices are rapidly rising. Effective Aug. 1 the Eisenwirtschaftsbund raised all hematite pig iron from 8265 to 11317 m. (from $11.80 to $16.20) per metric ton. Other grades were increased correspondingly.

The Steel Syndicate has also raised all prices, ingots being increased from 8520 to 14,480 m. (from $12.20 to $20.50) and bars from 11,470 to 19,470 m. (from $16.40 to $27.80).

Both the Eisenwirtschaftsbund and the Steel Syndicate have called new meetings to discuss further price increases.

As a result of these new price levels and the home shortage, imports of pig iron and other staple iron and steel products are now about balancing the exports. Exports of pig iron, January to May inclusive, totaled 83,555 metric tons against imports of 99,154 metric tons. Exports of bars, girders and bands were 217,488 metric tons, compared with imports of 211,051 metric tons.

Thin Aluminum Foil Made in Germany

During the war aluminum became more or less one of the substitute materials in Germany, being used in a number of instances in place of copper, steel, tin, and so on. After prolonged research, Dr. H. C. Paullsen has succeeded in rolling aluminum into foil 1/200 mm. in thickness and has also evolved, as a result of further experiments, a method of annealing it so as to make it as pliable as tin foil, according to the London *Ironmonger*. In all respects aluminum foil is very similar to tin foil, and may be colored and printed in the same way.

The great advantage obtained by the use of aluminum foil is, of course, its lightness. It appears that in Germany it is largely used for covering chocolate candies and that, indeed, there are now very few chocolate manufacturers who do not use it. Cigarette factories are also making use of this foil. These and similar applications have so extended the manufacture in Germany that a syndicate has been formed, comparable with the steel syndicate, to watch the interests of producers and to promote research on the development of the product.

Electricity and the Italian Steel Industry

The Italian steel industry and its rapid growth, due to application of electrical power, is discussed by Dr. Dornhecker in Stahl und Eisen for June 1. The desire to be independent of coal, which has to be imported, and to use the available water powers, has brought about a marked expansion of electric furnace operation in the Italian steel works and foundries.

Specially noteworthy is the widespread use of furnaces of large capacity, a very careful estimate gives at least 25 furnaces of 10 to 15 tons capacity in operation, while the number of furnaces over 2 ton capacity amounts to at least 50. The furnaces are distributed as shown in the following data, although in regard to the smaller plants the information may not be entirely accurate:

J. Gio. Ansaldo Co., at Aosta:
4 Heroult furnaces, each 15 tons

Ansaldo Co., at Cornigliano:
3 furnaces of 2 tons, 2 furnaces [illegible] tons, Tagliaferri system.

Lombarde Steel & Iron Co., at Sesto S. Giovanni:
5 Heroult furnaces of 15 tons.
2 arc furnaces of 3 tons, Bassanese system. (This is a modification of the Stassano furnace.)

Fiat Co., at Turin:
6 furnaces of 5 tons, 2 furnaces of 20 tons. Fiat system.

Italiana Ernesto Breda Co.:
6 Heroult furnaces of 15 tons.
3 Stassano furnaces [illegible] tons.
2 Stassano furnaces, 2 tons.

Stablimenti di Dalmine (Mannesmann):
4 Heroult furnaces of 15 tons.
2 Heroult furnaces of 6 tons.

Franchi Gregorini, at [illegible]:
1 Heroult furnace of 15 tons (at Allione).
2 smaller Heroult furnaces of 2 tons (at S. Eustacchio, Brescia).

Giuseppe Redaelli and Brothers, Mailand:
2 arc furnaces of 8 to 10 tons.

Calcotto Steel Co., at Lecco:
1 arc furnace of 8 to 10 tons.

Italian Tubi Togni Co., at Brescia:
2 electrometal furnaces of 4 tons
1 electrometal furnace of 2 tons.

Fonderia Milanese di Acciaio, at Mailand:
2 electrometal furnaces of 4 tons, 6 furnaces of their own design between 2 and 4 tons.
2 Stassano furnaces of 1 ton. (They also have 4 open-hearth furnaces, 5 converters and 12 cupolas.)

Franco Tosi Co., at Legnano:
2 furnaces of 4 to 5 tons (on gray iron).
4 furnaces from 2 to 5 tons.

Terni:
1 Heroult furnace of 15 tons.
2 Bassanese furnaces of 1 ton.

Metallurgica Marcora Busto Arsizio:
3 furnaces of 3 to 5 tons.

Manfredi Bongivanni Cinnes:
2 electrometal furnaces of 2½ to 5 tons.
2 Bassanese furnaces, 1 ton.

The remainder of the paper consists of a description of the new Fiat furnace and foundry. This furnace was described in THE IRON AGE, July 20, 1922, p. 151. Every effort has been made to shorten the melting time and prevent loss of heat through the various openings, especially those in the roof for the electrodes. The consumption of Acheson graphite electrodes in these furnaces has been reduced to 2½ kg. per metric ton of product (5.6 lb. per gross ton). The furnaces are of 5 to 6 tons capacity, and seven casts are made per 24 hr. In the original paper is given a cross section and plan of the new foundry, the buildings of which are of reinforced concrete, and the detailed description shows the importance of this modern Italian plant.

G. B. W.

The Australian Steel Trade

The directors of the Broken Hill Proprietary Co. have issued a statement, according to the London *Ironmonger*, giving a gloomy picture of the industry, which, they say, is closing down solely from an inability to secure orders at prices below those for which products can be imported. Great Britain and America, it is added, are enabled to compete owing to reductions in the prices of coal and wages. The works would be able to restart if large coal were reduced by 4s. and small coal by 6s. per ton, and if a 48-hr. week were reconstituted before operations are recommenced. Moreover, the company is unable to start at the New South Wales basic wage of £3 18s. per week, but could restart at a minimum wage of £3 10s.

British Columbia Steel Plant Proposed

Legislation for the establishment of iron and steel works in British Columbia will be put through at the next session of the legislature, according to John Oliver, Victoria, B. C. The announcement was made following a cabinet meeting to representatives of the Coast Range Steel Co., a $15,000,000 corporation organized last year under H. J. Landahl. According to the announcement the British Columbia Government will unite with the British and Dominion Governments and guarantee as its share bonds not to exceed $4,000,000. Under plans which have been discussed between interests of the Coast Range Steel Co., the British Columbia Government and the Imperial Board of Trade, a plant to cost $12,000,000 and have a capacity of 120,000 tons of steel per annum will be constructed in the province.

BRITISH FOREIGN TRADE

June Steel Exports Second Smallest of the Year—Imports Very Low

The June official returns of British foreign trade in steel and iron show that the total exports were 249,089 gross tons. This is a decrease of 51,892 tons from May. The June exports are next to the smallest for the year, February being 228,370 tons, and compare with a monthly average of 267,047 tons for the first quarter. In June, 1921, the exports were only 66,301 tons. In these totals scrap is included. For the first six months of this year the total exports were 1,625,635 tons compared with 879,130 tons for the same period in 1921.

The June imports were 58,856 tons, or the lowest this year. The monthly average for the first quarter was 82,536 tons. In June, 1921, the imports were 88,083 tons. These figures also include scrap. The following table shows comparative data:

British Steel Exports and Imports, Gross Tons

	Exports	Imports
April, 1922	274,123	72,074
May, 1922	300,981	72,427
June, 1922	249,089	58,856
Aver. per month, first quarter, 1922	267,047	82,536
Aver. per month, second quarter, 1922	274,830	67,785
Aver. per month, 1921	144,885	152,734
Aver. per month, 1920	274,881	128,685
Aver. per month, 1919	188,519	50,801
Aver. per month, 1913	420,757	195,264

The following table covers the principal exports:

Principal British Exports, Gross Tons

	Average per Month		June	
	1913	1921	1921	1922
Pig iron	78,771	8,602	10,269	43,402
Steel rails	41,676	14,698	1,173	10,928
Steel plates	11,162	10,673	1,336	3,745
Galvanized sheets	63,506	17,635	4,471	35,432
Steel bars	20,921	8,927	2,115	15,961
Tin plates	41,208	18,873	8,801	37,134
Black plates	5,679	1,178	419	3,784
Steel sheets			684	15,180
Total exports, first 6 months, 1922				1,625,635
Total exports, first 6 months, 1921				879,130

As in April and May exports of steel rails, galvanized sheets, pig iron and tin plate have shown the most marked recovery. To this must be added steel sheets and bars.

Pig iron imports in June were 4,082 tons compared with a monthly average in 1921 of 55,564 tons.

Iron ore imports in June were 270,924 tons, which compares with a monthly average in 1921 of 157,298 tons.

Manganese ore imports in June were 18,798 tons. Last year they were 14,405 tons per month and in 1913 they were over 50,000 tons per month.

Growth of Gray Cast Iron

In the April number of the Science Reports of the Tohoku Imperial University, Japan, Tario Kikuta discusses "The Growth of Gray Cast Iron During Repeated Heatings and Coolings." In summarizing his investigations, the author states that it is improbable that the growth of gray cast iron during repeated heating and cooling through the A_1 range is caused by the pressure of occluded gases, in the manner as conceived by Prof. Okôchi and Mr. Satô.

As the result of measurements of the density found in specimens after different heat treatment and also of thermal dilatation during heating and cooling continuously, the author concludes that the growth of gray cast iron during the first heating through 700 deg. to 800 deg. is partly attributable to the decomposition of cementite. The continuous growth of gray cast iron in a vacuum during repeated heating and cooling through the A_1 range is the effect of the differential expansion at different microportions of the same specimen, numerous fissures or cavities being thus formed in the region of graphite flakes. In an oxidizing atmosphere, the growth is accelerated by oxides formed and filling the fissures or cavities during Ar_1 transformation.

Thus, it will be seen, the effect of oxidation on the growth of cast iron is indirect. The growth of white cast iron is almost completed in the first heating to 800 deg. About one-third of the whole expansion is due to the decomposition of eutectic and pearlitic cementites, and the other two-thirds to the minute fissures or cavities formed by the irreversible expansion in different microportions of the same specimen.

The elongation observable at higher temperature than the A_1 point is due to the pressure of occluded gases, as conceived by Prof. Okôchi and Mr. Satô. From the results of the present investigation, the author concludes that the oxidation theory put forward by Rugan and Carpenter seems to be untenable.

United States Principal Importer of Cleveland Iron

The United States was the principal importer of Cleveland pig iron from England in June, according to Russell M. Brooks, vice consul at Newcastle-on-Tyne, who reports the figures to the Department of Commerce.

The total iron exports from the Cleveland district in June were 71,969 tons, a drop from 79,389 tons in May and 86,902 tons in April. Loadings to the United States constituted more than one-fifth of June's total, amounting to 16,025 tons, or 7125 tons more than this country took in May, thus placing America at the head of importers of Cleveland iron.

An important agreement between Cumberland pig iron makers and blast furnace men has been concluded under which the wages of the employees will continue to be regulated by the 1919 sliding scale agreement until the middle of October, 1922. This means that there will be no further reduction below 35½ per cent (corresponding to £4 18s. 6d. per ton for iron) on standard rates in the wages of blast furnace men until the commencement of second full pay in October of this year.

If at that time the ascertained prices justify an advance in wages the men will be paid the increase. By this the question of fixing new rates of wages for the industry is postponed until October, when it is hoped that more stable conditions will prevail in the English iron trade. Any stoppage of work threatened is now averted until future arrangements can be made.

IRON AND INDUSTRIAL STOCKS

Securities Have Continued to Fluctuate in Narrow Limits

The movement of prices for iron and industrial stocks the past week indicated no abnormal apprehension on the part of industry. Securities have fluctuated within narrow limits. This fact possibly is explained in part, at least, by general business, which continues remarkably good despite strike handicaps. Increased car loadings and receding surplus idle equipment impress one with the country's commercial vitality and ability to earn a fair return on property investment.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

Allis-Chalm.	33 - 34½	Lima Loco.	105¾ - 110½
Allis Chalm. pf.	92 - 93½	Lima Loco. pf.	33¾ - 34¾
Am. B. S. & F.	64¾ - 65⅛	Midvale Steel	33¾ - 36¼
Am. Can	58 - 60⅛	Nat. Acme	16¾ - 17
Am. Can pf.	109 - 109	Nat. En. & Stm.	54¾ - 57⅝
Am. Car & Fdry.	168 - 172	N. Y. Air Brake	80 - 80
Am. Car & F. pf.	122 - 122	Nova Scotia Stl.	27 - 27
Am. Loco.	118 - 121½	Otis Steel	11 - 11¾
Am. Loco. pf.	117½ - 118	Otis Steel pf.	57 - 57
Am. Radiator	101½ - 101½	Penn Steel pf.	90 - 90
Am. Rad. pf.	119 - 119	Pressed Steel	37 - 37
Am. Stl. Fdries.	37⅜ - 38	Pressed Steel pf.	98 - 98
Am. Stl. F. pf.	99¾ - 99¾	Ry. Stl. Spring	106 - 109½
Bald. Loco.	119 - 122⅜	Republic Steel	20 - 21½
Beth. Steel	71 - 71	Republic 1st pf.	87½ - 87½
Beth. St. Class B	69½ - 70	Sloss	42 - 44½
Beth. Stl. 8% pf.	97½ - 98	Steel of Can.	70 - 70
Br. E. Stl. 1st pf.	43 - 44	Superior Steel	41 - 42
Br. E. Stl. 2d pf.	30⅛ - 30½	Trans.-Williams	29 - 30
Chic. Pneu. Tool	70 - 71	Un. Alloy Steel	50 - 50
Colo. Fuel	30⅛ - 30⅛	U. S. Cast	24 - 25
Cruc. Steel	91½ - 91⅝	U. S. Ind. Alc.	37 - 37
Cruc. Steel pf.	93 - 93½	U. S. Steel	100 - 100¾
Gen. Electric	179½ - 180	U. S. Steel pf.	118⅝ - 119
Gt. No. Ore Cert.	39¾ - 40¼	Vanadium Steel	48¾ - 51¼
Gulf States Steel	82 - 85	Va. I. C. & Coke	80 - 84
Inland Steel	50 - 51	Wheeling Steel	34 - 34
Int. Har.	100¼ - 101¾	Wheeling S. & M.	61 - 62
Int. Har. pf.	116 - 117		
Lack. Steel	76¼ - 78¾		

MARKET SPOTTY

Business Continues Fair in Some Centers, in Others Dull

Railroad Lists Still Dormant—Market in Cranes Fairly Active—Price Changes Noted

Activity during the week may be described as spotty. This has been the case both as between machine tool centers and also as to the distribution of orders among manufacturers in the various centers reporting fair business. Improvement over the previous two weeks is noted in Cincinnati and the New York market has been fairly active. In the Pittsburgh, Chicago and New England districts, on the other hand, the business done has been very limited.

A good demand for grinding wheels has been noted, the automotive industry taking, perhaps, the most. This has been more or less gradual since March, and is said to have become as good, if not above, pre-war figures.

Confidence is still felt generally that with the railroad and coal situations adjusted sales will expand. In Milwaukee, shops needing tools badly are sending in rush orders. It is expected that the Louisville & Nashville will shortly close on a number of tools.

In prospective business opportunities may be mentioned the Belle City Malleable Iron Co., Racine, Wis., which has undertaken a $750,000 plant extension. The reported purchase by the Ford Motor Co. of a site for a ten million dollar assembling plant at East Chicago, Ind., ought to mean the purchase of considerable equipment.

The International Harvester Co., after buying a few machines against its inquiry, has indefinitely postponed action on the remainder of the tools listed. The Continental Motors Co. continues to place scattered orders or tools.

In some centers used tools continue in demand, although prices on good second-hand machines are nearly as high as new machines of similar make.

Prices remain substantially unchanged. The Rhodes Mfg. Co., Hartford, has announced a reduction of 15 per cent on its line of small shapers and slotters, and the P. Pryibil Machine Co., Inc., New York, a reduction of 10 to 15 per cent on its spinning lathes.

The market in both overhead and locomotive cranes is showing a fair degree of activity. A new stock of used locomotive cranes may become available from the public auction of 36 cranes held by the Government at Boston. The Lima Corporation, Lima, Ohio, has placed six cranes. Further purchases are said to be contemplated.

New York

NEW YORK, Aug. 8.

ATTENTION in this district is still largely focused on the list of the Wright Aeronautical Corporation, Paterson, N. J., on which two used engine lathes have so far been purchased. The remainder of the list is expected to be closed during the current week, both new and used tools being purchased. The General Electric Co., in addition to the seven lathes and six shapers reported bought last week, has placed an order for four 16-in. tool room lathes and will probably close this week on two turret lathes. It has also purchased four special engine lathes for its Lynn shops. The Manila Railroad, Manila, P. I., has ordered a 60-in. tire mill and the American Car & Foundry Co. has purchased a multiple spindle drill.

An inquiry for prices on a small lathe and a shaper has been issued by the Brooklyn Rapid Transit Co., Brooklyn, N. Y. On the whole, the major part of the present business is evidently going to dealers in used tools. One dealer reports orders during the past week for three large 40-in. to 48-in. lathes. Although purchasers as a rule obtain quotations on new tools, they often place the business with sellers of used machinery. The market, however, is fairly active, and with the railroad and coal strikes settled prospects for considerable activity are believed to be good.

Despite the strikes, which are undoubtedly acting as a deterrent upon many companies which would otherwise issue inquiries for cranes, the market in this district on both overhead and locomotive cranes is fairly active. A few inquiries are still pending, among which is the 40-ton overhead traveling crane to be purchased by Sanderson & Porter, New York, for Frackville, Pa., probably closing sometime this week. Business in new locomotive cranes continues to show improvement as available used cranes become less numerous. A new stock of used locomotive cranes may become available in this district from the public auction of 36 cranes held by the Government at Boston, Aug. 9.

Among recent purchases are:

J. G. White Engineering Corporation, 43 Exchange Place, New York, a 20-ton, 50-ft. boom locomotive crane from the Ohio Locomotive Crane Co.

Canadian National Railways, Toronto, Ont., a 20-ton, 50-ft. boom locomotive crane with bucket from the Industrial Works.

Grand Trunk Railway, Montreal, Que., a 160-ton, wrecking crane from the Industrial Works. This is the second purchased within a month.

Union Pacific Railway Co., Omaha, Neb., a 15-ton, 45-ft. boom locomotive crane from the Industrial Works.

American Car & Foundry Co., 165 Broadway, New York, a 15-ton locomotive crane from the Orton & Steinbrenner Co.

Ballin Construction Co., Utica, N. Y., a 20-ton, 70-ft. boom used Brownhoist locomotive crane from Philip T. King, 30 Church Street, New York.

McClellan & Junkersfeld, 45 William Street, New York, a 110-ton, 55-ft., 6½-in. span, 4-motor, overhead traveling crane for the Union Electric Light & Power Co., St. Louis, Mo., from the Niles-Bement-Pond Co.

Long Island Railroad, Brooklyn, N. Y., a 25-ton 60-ft. span, 4-motor, gantry crane from the Whiting Corporation.

Long Island Railroad, Brooklyn, N. Y., a 10-ton, 58-ft. 9-in. span overhead traveling crane from the Niles-Bement-Pond Co.

Voska Foech Sidlio Marble & Slate Works, Astoria, L. I., a 600-ft. tramrail from the Cleveland Tramrail Co.

Friedman Marble & Slate Works, 654 Vernon Avenue, Long Island City, extension to tramrail system from the Cleveland Tramrail Co.

Town of Springwells, Wayne County, Mich., two 5-ton, 3-motor cranes, 30-ft. and 80-ft. spans, from the Northern Engineering Works.

W. S. Zitterell Co., Webster City, Iowa, a 10-ton overhead traveling crane from the Northern Engineering Works.

H. P. Deuscher Co., Hamilton, Ohio, a 2-ton electric hoist from the Northern Engineering Works.

Salmon Falls Mfg. Co., Salmon Falls, N. H., a 20-ton, 30-ft. 10-in. span, hand power crane from the Roeper Crane & Hoist Works.

Grasselli Chemical Co. for Grasselli, N. J., a 30-ton, 8-wheel, locomotive crane with bucket from the Orton & Steinbrenner Co.

Warner Sugar Refining Co., New York, a 10-ton overhead traveling crane for use in Cuba, from an unnamed builder.

American Radiator Co., Buffalo, N. Y., two 3-ton, 29-ft. span and 18-ft. span and one 1-ton, 47-ft. span electric cranes from an unnamed builder.

The Schumacher Mill Furnishing Works, P. O. Box 2, Port Melbourne, Victoria, Australia, desires equipment for perforating sheets and thin plates and asks for quotations, f.o.b. New York, with illustrations and descriptions of the range of machines needed for perforating work. On deciding what machine seems suitable, payment would be made in New York and shipments made through the company's shipping agent in New York.

The Universal Last Co., 191 Worth Street, New York, is taking bids for a new three-story plant, 80 x 130 ft., for the manufacture of iron lasts, etc., at Clifton Place and Classon Avenue, Brooklyn, estimated to cost about $100,000, including equipment. William Higginson, 15 Park Row, New York, is architect.

The Ulster & Delaware Railroad Co., 22 Ferry Street, Kingston, N. Y., has awarded contract to the Michand-Campbell Co., Inc., 77 Greenhill Street, for a one-story locomotive erecting shop, 75 x 154 ft. Charles Stowell, company address, is engineer.

The New York Steam Corporation, 280 Madison Avenue, New York, operating power utilities in the downtown district, has arranged for a bond issue of $1,000,000, a portion of the proceeds to be used for extensions and improvements. James D. Hurd is president.

The Long Island Lighting Co., 50 Church Street, New York, and the Nassau Light & Power Co., Mineola, N. Y., operating power plants and systems in the Long Island district, have been consolidated under the first noted name. The new company is planning for a bond issue of $3,000,000 and stock issue of the same amount, the proceeds to be used in part for plant extensions and improvements.

Joseph Breslauer, New York, operating an automobile service and repair works at 1986 Crotona Parkway, Fordham, has acquired the vacant property, 75 x 100 ft., on the Southern Boulevard, between 179th and 180th streets as a site for the erection of a new two-story plant.

The New York Central Railroad Co., New York, is making inquiries for a six-spindle bolt-threading and cutting machine, motor driven. C. S. White is purchasing agent.

The Brooklyn Edison Co., 360 Pearl Street, Brooklyn, has had plans prepared for a twelve-story operating building, for service departments, headquarters, etc., at Willoughby and Pearl streets, to cost about $1,000,000. The structure is part of the extension program arranged by the company, to include a new electric generating plant and automobile service building on property recently acquired at Third Street and Fourth Avenue. McKenzie, Voorhees & Gmelin, 1123 Broadway, New York, are architects for the first noted structure.

Thomas A. Edison, Inc., Lakeside Avenue, West Orange, N. J., manufacturer of electrical specialties, talking machines, etc., has leased the building on site 100 x 100 ft., at Freeman Avenue and Hamilton Street, Long Island City, for a new service works and distributing plant.

The New York Harbor Dry Dock Corporation, 32 Pearl Street, New York, will install a new 10,000-ton drydock with additional shop facilities at its yard at Rosebank, S. I. Other enlargements are under way, including the purchase of drydocks owned by the United States Shipping Board and heretofore leased. The company has arranged for an increase of $1,750,000 in plant investment. Charles E. Fraser is president.

The Hudson Motor Car Co., 1842 Broadway, New York, has leased the new automobile service and repair building, now being constructed on the Grand Concourse at a cost of $150,000, by the S. & L. Building Co., 1312 Clinton Avenue, and will occupy the structure immediately upon completion.

C. Brandes, Inc., 32 Union Square, New York, manufacturer of wireless equipment, headsets, etc., has arranged for the establishment of a new branch plant at Ottawa, Ont.

The Intercontinental Rubber Co., George H. Carnahan, 120 Broadway, New York, president, is perfecting plans for reorganization, to provide for extensions to the manufacturing plant in Mexico and improvement in properties in Sumatra. It is proposed to dispose immediately of bonds for $2,000,000, of which approximately $275,000, will be used for plant additions.

Hoisting equipment, conveyors, loading and unloading machinery, etc., will be installed at the new veneer lumber plant of the J. J. Bonneau Co., 315 East Thirty-fifth Street, New York, to be located on property, 131 x 284 ft., at Long Island City recently acquired.

S. M. DePasquale, 2975 Marion Avenue, New York, will take bids at once on a one-story automobile service and repair building on Webster Avenue, estimated to cost about $125,000. S. J. Kesler, 529 Cortlandt Avenue, is architect.

W. C. Durant, president, Durant Motors, Inc., 1819 Broadway, New York, is said to be organizing a new subsidiary, to be known as the Mason Truck Co., for the manufacture of motor trucks. The initial plants will be established at Bridgeport, Conn., and Flint, Mich. It will be operated as an independent unit.

The Anaconda Copper Mining Co., 25 Broadway, New York, has tentative plans under consideration for a brass fabricating plant, in connection with its mills at Great Falls, Mont., estimated to cost in excess of $500,000.

Mechanical unloading machinery, conveying equipment, motors, etc., will be installed at the two new incinerating plants to be constructed by the Borough of Queens, at Woodhaven and Winfield, L. I., respectively, estimated to cost about $275,000, each. Each plant will comprise two 50-ton units. Edward Richardson, Flushing, and Joseph P. Powers, Rockaway, L. I., are associated architects.

Campbell & Dannatt, Inc., New York, has leased the service works of the Urban Motor Car Co., 112-118 East Seventy-fifth Street, near Park Avenue, for a term of years. A service and repair plant will be operated.

The Standard Underground Cable Co., Perth Amboy, N. J., has awarded a contract to the Turner Construction Co., 242 Madison Avenue, New York, for a three-story and basement addition, 50 x 150 ft.

The Robian Corporation, New York, has leased the new building, 100 x 100 ft., at Tenth Avenue and Fifty-sixth Street, for the establishment of an automobile service and repair works.

The Westinghouse Lamp Co., Watessing district, Bloomfield, N. J., has plans under way for an addition.

Walter Butterfield, Wildwood, N. J., has awarded a contract to Rufus Hayes, Wildwood, for a one-story machine shop, at Holly Beach and Roberts Avenue, 50 x 80 ft.

The Standard Fuse Corporation, Paulsboro, N. J., has disposed of its local plant, constructed during the war, to a Trenton, N. J., manufacturing company, whose name is temporarily withheld. The plant will be remodeled and new machinery installed.

The Pennsylvania Railroad Co., Pennsylvania Terminal, New York, has acquired two tracts of property in the Kearny meadow section, Kearny, N. J., 107 acres, and 26 acres, adjoining, from the Newark Factory Sites, Inc., and the Trexler Lumber Co., respectively. The property will be used for new freight and classification yards, to include engine house, shops, etc.

A vocational department will be installed in the new high school to be erected at Mays Landing, N. J., two stories and basement, 110 x 190 ft., estimated to cost about $250,000. S. Huson Vaughn, Guarantee Trust Building, Atlantic City, N. J., is architect.

The Spicer Mfg. Co., South Plainfield, N. J., manufacturer of universal joints and other automotive products, will build a one-story addition to cost about $26,000.

A vocational department will be installed in the new high school to be erected at Clifton, N. J., for which bids on a general contract are being received, estimated to cost in excess of $800,000.

The J. L. Hamett Co., Cambridge, Mass., manufacturer of school equipment and supplies, will remove its branch factory at Brooklyn to a new four-story plant at 380 Jelliff Avenue, Newark, N. J., totaling about 44,000 sq. ft. of floor space.

The Natural Carbonic Gas Co., McClellan Street, Newark, has plans nearing completion for the erection of a one-story service and repair works, for company trucks and cars, estimated to cost about $100,000. Henry D. Scudder, Jr., Union Building, is architect.

The Standard Oil Co. of New Jersey, 31 Clinton Street, Newark, has leased the building at 61-63 River Street, for

a new distributing works, with service and repair department for company trucks.

Isaac G. Johnson & Co., Spuyten Duyvil section, Kingsbridge, New York, manufacturers of steel castings, have acquired property in the vicinity of the Spuyten Duyvil Creek and Harlem River Ship Canal, heretofore held by the New York Central Railroad, for future extensions.

The Long Island Railroad Co., Pennsylvania Terminal, New York, has awarded contract to the Turner Construction Co., 242 Madison Avenue, for two three-story and basement buildings at Morris Park, L. I., one to be used as a general shop and the other for warehouse service. L. V. Morris is chief engineer.

Philadelphia

PHILADELPHIA, Aug. 7.

The Standard Steel & Bearings, Inc., Fiftieth Street and Lancaster Avenue, Philadelphia, has plans under way for an addition to its branch plant at Plainville, Conn., to handle a considerable portion of the manufacture now being carried on at the Philadelphia works. Machinery will be transferred from the last noted plant to the Plainville extension.

Thomas B. Martindale, 3437 North Broad Street, Philadelphia, operating a Ford automobile agency, has construction in progress on a new two-story service and repair building, 100 x 265 ft., at Broad Street and Allegheny Avenue, estimated to cost in excess of $75,000.

The United Electric Construction Co., 1727 Sansom Street, Philadelphia, manufacturer of electric equipment, has leased the three-story building, 43 x 46 ft., at 2318-20 Sansom Street, for extensions.

Frank C. Snedaker & Co., Philadelphia, operating a mill work plant at Ninth and Tioga streets, have filed plans for a two-story addition, 20 x 113 ft.

The Sayre-Level Radio Co., Philadelphia, manufacturer of wireless equipment, has leased a portion of the six-story building at 41 North Tenth Street, for a local works.

The Roberts & Mander Stove Co., Eleventh and Washington streets, Philadelphia, will install a traveling crane in its new two-story plant at Hatboro, Pa.

The Paper Manufacturers' Co., Inc., 526 Cherry Street, Philadelphia, has acquired property at 408-18 North Fifth Street for plant extensions. It is now operating a factory at Thirteenth and Noble streets.

William Gerstley, Philadelphia, has acquired the four-story garage and warehouse building, 110 x 180 ft., at 1825-33 Market Street, for an automobile service and repair plant.

The Bureau of Water, City Hall, Philadelphia, is reported to be planning for the installation of two 3-ton traveling cranes at one of the city pumping plants. C. E. Davis is director.

James T. Finnesey, an official of Finnesey & Kobler, Inc., Twenty-sixth and Parrish streets, Philadelphia, manufacturer of automobile bodies, has awarded contract to Henry C. Dahl, 231 South Eighth Street, for a new building at Taney and Parrish streets, to cost about $20,000.

The Panelyte Board Co., Smith Building, 119-25 North Montgomery Street, Trenton, N. J., recently organized with a capital of $300,000, has plans under way for a new factory on the Whitehead Road to manufacture fibre products. The initial works will give employment to about 50 men. D. Mason Sutherland, Jr., formerly connected with the Agasote Co., Trenton, manufacturer of similar products, is president.

The Trent Tile Co., Klagg Avenue, Trenton, N. J., has awarded contract to the N. A. K. Bugbee Co., 306 East Hanover Street, for a one-story addition, 50 x 166 ft.

The Detroit Motors, Inc., care of Backes & Schroth, Broad Street Bank Building, Trenton, N. J., representatives, recently organized under Delaware laws to manufacture a six-cylinder automobile, has tentative plans for the erection of a local plant on site being selected. It is also proposed to establish a series of assembling works in a number of leading cities, with local service departments. Offices will be opened at Trenton at once. Milton Wells, formerly connected with Dodge Brothers, Detroit, is engineer and an official of the company.

The Armstrong Cork Co., Camden, N. J., manufacturer of insulating products, with headquarters on Twenty-fourth Street, Pittsburgh, will remodel and improve the plant of the Ancona Printing Co., Gloucester City, recently acquired, for a manufacturing works.

A one-story power house, 32 x 50 ft., will be constructed at the new furniture plant of the J. B. Van Sciver Co., Front and Federal streets, Camden, N. J. The Ballinger Co., 105 South Twelfth Street, Philadelphia, is architect.

N. B. T. Rooney, 503 Market Street, Camden, N. J., has had plans completed for a two-story automobile service and repair building, 52 x 100 ft., at Hadden and Sycamore avenues, estimated to cost about $55,000. A. B. Gill, Law Building, is architect.

The Ajax Rubber Co., Inc., Breunig Avenue, Trenton, N. J., manufacturer of automobile tires, is considering plans for new works at Sandusky, Ohio, estimated to cost in excess of $500,000, with machinery. Negotiations are under way with the Sandusky Chamber of Commerce for a site.

The Reading Hardware Co., Sixth and Willow streets, Reading, Pa., manufacturer of hardware and specialties, is having plans drawn for a new seven-story addition, 80 x 225 ft. George Gerhard & Sons, 619 Penn Street, are architects.

The Penn Central Light & Power Co., Altoona, Pa., has plans in progress for a new two-story power house at Saxton, Pa., with initial capacity of about 40,000 kw. Day & Zimmerman, Inc., 611 Chestnut Street, Philadelphia, operate the property and are engineers for the new plant.

The Elliott-Blair Steel Co., New Castle, Pa., will soon take bids for its new plant at Mercer, Pa., comprising five one-story buildings, estimated to cost about $200,000. George D. Blair, Sr., is president.

The Rochester Metal Weather Strip Co., Rochester, N. Y., will establish a branch manufacturing plant at East Stroudsburg, Pa.

Work will soon commence on a new power house, 50 x 76 ft., at the convent of the Sisters of Mercy, Dallas, Pa. James L. Morris, Coal Exchang Building, Dallas, is head of the building committee. F. F. Durang, 1220 Locust Street, Philadelphia, is architect.

The Motor Exchange, Inc., 327 North Third Street, Philadelphia, is said to be in the market for a new chain hoist, about 40 ft. lift.

The Philadelphia Suburban & Electric Co., Jenkintown, Pa., is arranging for an additional appropriation of $1,500,000, for extensions and improvements in its power plants and system at Jenkintown, Pottstown, Phoenixville and Coatesville, Pa. The company recently voted $1,938,760 for expansion, making a total appropriation of $3,438,760 to be used over 36 months.

The Middletown Ice Co., Middletown, Pa., will commence the erection of a new ice-manufacturing plant on Race Street.

A vocational department will be installed in the new two-story high school, 147 x 175 ft., to be erected at Plains, Pa., estimated to cost about $100,000. Austin L. Reilly, Bennett Building, Wilkes-Barre, Pa., is architect.

The Eastern Pennsylvania Power Co., Pottsville, Pa., will commence foundations at once for its new electric generating plant at Pine Grove, Pa., estimated to cost about $3,000,000, with machinery. It is expected to require close to 24 months to complete the station.

A bond issue of $75,000 has been voted by citizens of West Lampeter Township, Pa., for a new vocational high school to replace the school recently destroyed by fire. Henry Y. Shaub, Imperial Building, Lancaster, Pa., is architect.

The Hudson Mfg. Co., Inc., 144 Pearl Street, Trenton, N. J., is in the market for a 16 in. x 5-ft. Monarch lathe, a 20-in. shaper, 24-in. drill press, small tool grinder, two power presses and two kick presses. The officers of the company are W. W. Morell, president; D. A. Ungaro, vice-president, and J. Dale Herron, secretary-treasurer.

Buffalo

BUFFALO, Aug. 7.

The Buffalo General Electric Co., Electric Building, Buffalo, will commence the immediate erection of a new power house at Main and Hertel streets. P. F. Sellers is general superintendent.

O. E. Bray, 1009 Mutual Life Building, Buffalo, is planning to purchase machinery for the manufacture of special concrete blocks and kindred products at a number of plants in this section.

Fire, Aug. 1, destroyed a portion of the plant of the Rochester Composite Brick Co., Rochester, N. Y., with loss estimated at about $100,000.

The building committee of the Buffalo Club, 388 Delaware Avenue, Buffalo, will build a new power house to cost about $30,000, in connection with its proposed new club house. A list of equipment is being arranged. H. P. Werner is house commissioner.

The Niagara State Reservation Commission, Niagara Falls, N. Y., has tentative plans under way for the installation of elevating equipment to replace the present stairs at the Cave of the Winds. The elevator, with machinery, will

cost about $80,000. The State engineer, Albany, will supervise the installation. A. T. Clearwater, 280 Wall Street, Kingston, N. Y., is chairman of the commission.

August Schmidt, Doat Street, Buffalo, is having plans drawn for a new one-story automobile service and repair building, 60 x 100 ft., at Genesee Street and Rapin Place.

The Lindbeck Lumber & Mfg. Co., 16 River Street, Jamestown, N. Y., will install new conveying and other equipment in its plant addition.

The Jerge Motor Corporation, Buffalo, operating a local Ford automobile agency, will establish a new two-story service and repair works in the building at 1647-55 Genesee Street. Edward C. Jerge is president.

The Wood & Brooks Co., Military Road, Buffalo, manufacturer of mechanical player actions, etc., has recently acquired about 25 acres adjoining its plant for proposed expansion.

Shields Brothers, Bombay, N. Y., are arranging for the purchase of motors and other electrical equipment to be installed in their new three-story plant, 90 x 90 ft., for the manufacture of Indian goods, replacing a factory recently destroyed by fire. J. J. Shields is in charge.

The Upco Petroleum Co., Buffalo, has acquired about two acres on Military Road and will commence the immediate construction of a new refinery and distributing plant.

New England

BOSTON, Aug. 7.

THE machine-tool trade in this district the first seven days of August dropped to extremely small proportions. Aside from the Boston school business and the purchase of a thread milling machine by the Wentworth Institute, Boston, nothing worthy of mention has moved the past week. Buying of used equipment also shrunk materially, a milling machine, two screw machines and a large turret machine taken by a Quincy, Mass., company being the largest individual order booked. Manufacturer's representatives and dealers, however, are still working on prospects which in the aggregate total up fairly large.

The trade is confident that with the railroad and coal labor situations adjusted, sales will expand. A considerable amount of special work is being done by New England makers of machine tools for the railroads. Some falling off in such business is anticipated, however, inasmuch as the railroads are slowly increasing shop forces.

The Yale & Towne Mfg. Co. has advanced hoists 5 per cent.

Tentative plans have been made by the Standard Steel & Bearing, Inc., Plainville, Conn., for materially increasing manufacturing space.

Bids are in on a four-story, 80 x 100 ft. manufacturing plant to be erected by the Cambridge Rubber Co., 784 Main Street, Cambridge, Mass. The H. M. Hope Engineering Co., 228 Boylston Street, Boston is the engineer.

The Fresbrey-Leland Co., New York, granite, having acquired certain Brattleboro, Vt. property, this fall will erect steel and concrete sheds thereon at an estimated cost of $150,000. It will require cranes.

Plans are being drawn for the Industrial Buildings, Inc., Bridgeport, Conn., for a five-story, 60 x 300 ft. manufacturing plant.

Bids have been taken on private plans calling for a four-story, 122 x 157 ft. addition to building No. 63 of the General Electric Co., West Lynn, Mass.

The Marine Engineering & Dry Dock Co. and the Lord Construction Co., Providence, have been purchased by Frederick S. Peck of that city. By the purchase Mr. Peck protects a mortgage he held on the property. It is his present intention to sell the machinery and other equipment.

Plans are being drawn for a one and two-story, 88 x 250 ft. garage and service station to be erected at Melrose and Russell streets, Providence, R. I., by the United Electric Railway Co.

The G. Drouvé Co., manufacturer of skylights and factory specialties, Fairfield, Conn., has plans drawn up for extensive alterations at its new plant, recently built. The project calls for about twenty tons of steel.

The Schroeder Brothers Mfg. Co., Inc., Torrington, Conn., has recently been incorporated under State laws with a capital stock of $100,000 to manufacture machine parts, tools, mechanical hardware, novelties, etc., by Gustave A., Ernest E. F., Arthur E. R., and Richard F. W. Schroeder. The company has a plant on Brook Street, Torrington.

The Chamber of Commerce, Bridgeport, Conn., is having preliminary plans drawn by Fletcher-Thompson, Inc., engineer, 542 Fairfield Avenue, for a five-story, 60 x 150-ft. reinforced concrete industrial incubator building on Railroad Avenue and Garden Street, to cost about $250,000.

The Charles H. Harris Co., Inc., Norwalk, Conn., manufacturer of windshield glass, etc., has awarded contract for another plant unit, one-story, 100 x 120-ft.

The New England Brass Mfg. Co., Danbury, Conn., has been incorporated under State laws with a capital stock of $22,000, by Mary E. Krebbs, Mohammed Inamruddin and Joseph Peon. It operates a plant on Maple Street.

A vocational department will be installed in the new high school to be erected at Somerville, Mass., for which an appropriation of $550,000, has been approved.

F. P. Carpenter, Manchester, N. H., is organizing a company to build and operate a one-story automobile service and repair works on Mechanic Street, to cost about $65,000. Plans are being prepared by H. W. Rhodes, 574-A Congress Street, Portland, Me.

The Winchester Water Works Co., 14 Beacon Street, Boston, has made application for permission to construct and operate a hydroelectric power plant at the United States Lock and Dam, Kentucky River, near Winchester, Ky.

The Great Northern Paper Co., Greenville, Me., will use the new building at Greenville Junction, now being completed, as a machine shop, for the care and repair of company motor trucks, tractors, trailers, etc., including parts manufacture.

A power house will be constructed at the new State normal school to be erected at New Britain, Conn., estimated to cost about $750,000. The State Board of Education, Hartford, is in charge. Guilbert & Betelle, 546 Broad Street, Newark, N. J., are architects.

The Quincy Electric Light & Power Co., Quincy, Mass., is arranging for the sale of a bond issue of $250,000, a portion of the proceeds to be used for extensions and improvements.

A vocational shop will be installed in the new two-story addition to the Lincoln School, Ticonderoga Avenue, Providence, R. I. Jackson, Robertson & Adams, Providence, are architects.

The Nashwaak Pulp & Paper Co., Bangor, Me., operated by officials of the Oxford Paper Co., 200 Fifth Avenue, New York, and the Bryant Paper Co., Kalamazoo, Mich., has plans for extensions and improvements in its mills at St. John, N. B., including equipment for increasing the capacity from 60 to 80 tons a day. The work is estimated to cost about $500,000.

The National Knife Co., Providence, recently organized, has taken over property at 30 Cory Street, for a local plant. John B. Fazioti heads the company.

A vocational department will be installed in the new two-story and basement high school to be erected at Conway, N. H., estimated to cost about $100,000. C. R. Whitcher, Beacon Block, Manchester, N. H., is architect.

Gray & Davis, Inc., Cambridge, Mass., manufacturer of automobile starting and lighting equipment, is disposing of a bond issue of $1,250,000, a portion of the proceeds to be used for extensions and improvements.

Following the recent closing of its Worcester, Mass., plant, the Torrington Co., Torrington, Conn., is planning to manufacture its line of vacuum cleaning machines and parts, heretofore carried on at Worcester, in a six-story building at the Torrington plant.

Baltimore

BALTIMORE, Aug. 7

The Baltimore Concrete Products Co., Baltimore, has filed plans for the erection of a new one-story factory, 35 x 80 ft., at Kate Avenue and the line of the Western Maryland Railway.

The Maryland Motors, Inc., 601 St. Paul Street, Baltimore, is taking bids for a three-story service and repair building at 414-24 North Calvert Street, to cost about $75,000. Mottu & White, 324 North Charles Street, are architects.

The office of the general purchasing officer, Panama Canal, Washington, will take bids until Aug. 16, for equipment for the canal zone as follows, circular 1489: 3500 machine bolts; 2190 ft. brass tubing; 300 ft. galvanized wire netting; 8 boiler ranges; 240 galvanized water buckets; 350 ft. leather belting; 30,000 lb. corrugated roofing; 600 cable slips; 24 turnbuckles, and other miscellaneous equipment.

The Easton Utilities Commission, Easton, Md., will take bids until Aug. 17 for an addition to the municipal electric

light and power plant, including turbo-generator, exciter set, condenser, switchboard, cooling tower, etc.; also, for Diesel or semi-Diesel generating equipment. Carl J. Kiefer, 810 Fourth National Bank Building, Cincinnati, is consulting engineer.

The Southern Iron & Equipment Co., Grant Bulding, Atlanta, Ga., has inquiries out for a 30-ton, narrow gage, saddle tank locomotive. H. A. Merrill is in charge.

The Bureau of Yards and Docks, Navy Department, Washington, has awarded a contract to W. F. Martens, 112 Cutler Building, Rochester, N. Y., for a machine shop at the Naval Base, Pearl Harbor, H. T., to cost $185,366.

The Hearn Oil Co., Third and Commerce streets, Wilmington, Del., has acquired property on Mill Street, Salisbury, Md., for a new storage and distributing plant, estimated to cost about $35,000. Claude Hearn is manager.

S. T. Williams, 223 North Calvert Street, Baltimore, has inquiries out for a cableway hoisting engine, with winding and endless rope drum for electric drive, 35 to 40 hp.; also, for an electrically-operated air compressor, with or without motor.

The Locke Insulator Co., Baltimore, manufacturer of insulation products for high-tension electric service, will build a new one-story plant addition at Charles and Cromwell streets, estimated to cost close to $25,000. Plans have been drawn.

The Morris Brothers Co., Greenville, S. C., manufacturer of bobbins and other textile equipment, has awarded a contract to the Gallivan Building Co., for a new two-story plant, 40 x 128 ft. D. L. Morris is president.

The Sumter Ice & Fuel Co., Sumter, S. C., is arranging a list of equipment for installation at its proposed refrigerating and ice-manufacturing plant. E. H. Moses is general manager.

The Hackley Morrison Co., Richmond, Va., machinery dealer, is inquiring for a locomotive crane.

The City Council, Norfolk, Va., will receive bids until Aug. 17 for the erection of a new power house to be used in connection with the municipal terminal project. The Folwell-Ahlskog Co., 600 Seaboard Bank Building, is engineer. Charles E. Ashburner is city manager in charge.

The West Penn Power Co., Pittsburgh, has secured an option for the purchase of the municipal electric power plant at Oakland, Md. The new owner will make extensions and improvements.

T. Herbert Allen, Kenbridge, Va., is inquiring for coal unloading and conveying machinery.

A vocational department will be installed in the new high school to be erected at Kershaw, S. C., for which bids are being asked on a general contract. LaFaye & LaFaye, Columbia, S. C., are architects.

Pittsburgh

PITTSBURGH, Aug. 7.

WHILE the machine tool trade reports a good volume of prospective orders, actual business is very limited and the usual explanation is that buyers are delaying placing orders until there is a settlement of the coal and railroad strikes. The first week of the month indicates that August sales will make a poor showing compared with July and June. The electrical equipment market is not especially active, but the Allis-Chalmers Mfg. Co. recently took a 150-kw. Diesel oil engine generator unit for the Pittsburgh-Idaho Co., Inc. This is a duplicate order. The crane market shows a fair degree of activity.

Recent crane orders include a 50-ton 73-ft. span crane and a 15-ton 77-ft. span crane placed by the Apollo Steel Co., Apollo, Pa., with the Champion Engineering Co., Kenton, Ohio, while the Pittsburgh office of the Milwaukee Electric Crane & Mfg. Co. has taken an order from the Sandusky Cement Co., Cleveland, for a 10-ton 4-motor 80-ft. span bucket crane complete with 3-cu.yd. bucket, and the Northern Engineering Works, Detroit, through its Pittsburgh office has taken a 5-ton 75-ft. span, double hook crane for the Pittsburgh warehouse of the Crane Co., Chicago. The Northern Engineering Works also has taken four pillar jib cranes for the Pennsylvania Railroad, two for installation at the Pitcairn shops and two for Renova shops. The Shepard Electric Crane & Hoist Co. has taken a 25-ft. crane for Frick Co., Waynesboro, Pa. which also has placed two 5-ton cranes and one 10-ton crane with Maris Brothers, Philadelphia. The Jones & Laughlin Steel Co. has taken bids on two 10-ton cranes and two 15-ton cranes for its Southside works, and the award is expected shortly. The Weirton Steel Co., Weirton, W. Va., in addition to a ladle crane, probably will soon ask for bids on three other cranes, all of mill type construction. The United Engineering & Foundry Co. has taken bids on three cranes for installation at the St. Louis plant of the National Enameling & Stamping Co. This inquiry includes one 4-motor mill type 40-ton crane with 5-ton auxiliary, 75-ft. span, a 3-motor, 10-ton mill type crane, 75-ft. span, and a 4-motor, 10-ton double drum 35-ft. span crane. The Lima Corporation, Lima, Ohio, recently placed an order for two 150-ton double trolley, 75-ft. span cranes; two 25-ton double trolley, 75-ft. span cranes and two 20-ton double trolley, 60-ft. span cranes, in connection with the extension to its plant.

The Duquesne Light Co., 435 Sixth Avenue, Pittsburgh, will commence the immediate erection of three new power houses, to cost about $900,000, including equipment. One structure will be located at Maryland and Forest avenues, Bellevue, Pa.; another in the Northside District, Pittsburgh, at Sandusky and North Diamond streets and the third at Penn and Swissvale avenues, Wilkinsburg.

The McKays Carriage Works, Erie Street, Grove City, Pa., manufacturer of automobile bodies, will build a one-story addition, to cost about $16,000. A list of equipment is being arranged.

The Barnett Steel Barrel Co., Los Angeles, Cal., is in negotiation with the Chamber of Commerce, Pittsburgh, for a site for the erection of a new Eastern branch plant to manufacture all-steel barrels. Donald Barnett is head of the company.

A vocational department will be installed in the new three-story and basement high school, 64 x 165 ft., to be erected at Meadville, Pa., for which foundations will be placed under way at once. It will cost close to $400,000. W. G. Eckles, Lawrence Savings & Trust Building, New Castle, Pa., is architect.

The Standard Motor Car Co., 5748 Baum Boulevard, Pittsburgh, is arranging for the manufacture of a four-cylinder automobile at its recently completed plant at Butler, Pa. It consists of a main assembling works, 200 x 800 ft., with a number of smaller buildings, and will be equipped for an output about 150 eight and four-cylinder motors per day. The company will remove its headquarters to the Butler plant.

The National Auto Service Co., New Kensington, Pa., has completed plans for a new one-story service and repair building, 60 x 70 ft., with extension, 25 x 60 ft., at 1030 Fifth Avenue, estimated to cost close to $50,000.

The Pittsburgh Nipple & Mfg. Co., Pittsburgh, recently reorganized, has removed its plant from Carson Street to 411 South Main Street, West End, where additional machinery will be provided for large increased output. Ferdinand Manus is president, Charles Fette, vice-president, and George B. Shaw, treasurer.

Hinman Brothers, 1017 Seventh Avenue, Butler, Pa., will build a new two-story automobile service and repair works, 100 x 150 ft., at Green Avenue and Eighth Street, estimated to cost about $65,000.

The D. N. Carlin Co., 125 Denniston Avenue, Pittsburgh, manufacturer of toys, is taking bids for a two-story addition, 34 x 115 ft., estimated to cost about $25,000. W. H. Stulen, 101 Market Street, is architect.

The Amicon Fruit Co., 81-87 East Naghten Street, Columbus, Ohio, will soon commence the erection of a new three-story and basement cold storage and refrigerating plant at Williamson, W. Va.

The Moore Lumber Co., Charleston, W. Va., is planning for the installation of a new band mill, industrial locomotive, trucks and other equipment.

The Raleigh Motor Co., Beckley, W. Va., is completing plans for a new three-story service and repair building, 50 x 145 ft., on East Main Street, estimated to cost about $65,000. H. M. Miller, Roanoke, Va., is architect.

The Fesenmier Packing Co., Madison Avenue and Fourteenth Street, Huntington, W. Va., will remodel a local building for a new ice-manufacturing and cold storage plant, estimated to cost about $125,000. M. L. Fesenmier is president.

The Automobile Maintenance Association, Pittsburgh, has leased the building at Penn and Pacific avenues, for the establishment of a service and repair works.

Detroit

DETROIT, Aug. 7.

The Ford Motor Co., Highland Park, Mich., will take bids this month for its proposed one and two-story plant at Flat Rock, Mich., for the manufacture of plate glass for windshields and other service in connection with its automobile production. The works will cost in excess of $1,000,000 and will include a power house and other buildings. Albert Kahn, 1000 Marquette Building, Detroit, is architect.

The Egyptian Portland Cement Co., Fenton, Mich., has leased the former car shops of the Grand Trunk Railroad at Port Huron, Mich., and will remodel the buildings for new works. It is planned to begin operations early in 1923.

The Hupp Motor Car Corporation, 3501 East Milwaukee Street, Detroit, has construction under way on two four-

story additions, to increase the floor space by about 500,000 sq. ft., making a plant area of over 1,570,000 sq. ft. It is expected to have the structures ready for service by the end of the year.

The Brewer Mfg. Co., Inc., 1103 Front Avenue N.W., Grand Rapids, Mich., which has taken over the patent rights owned by Governor Laporte Brewer, Grand Rapids, will erect a plant this year and expects to be able to manufacture the Brewer spark plug by Jan. 1. Frank P. Allen & Son, Grand Rapids, are already working on the plans. It will be in the market for equipment and material such as screw machines, spinning machines, punch presses, electric motors, oil furnaces, hex rod cold rolled steel, rod brass, sheet brass, hex brass nuts, electrode wire, manganese wire, porcelains, porcelain cement, crude oil for furnaces, aluminum or manganese nickel, gaskets, asbestos copper lined, crude oil heating equipment and printing office equipment. Until the plant is ready for operation work will be done by contract. The officers of the company are: President, C. G. Brewer; vice-president, J. A. Brewer; secretary and sales manager, C. E. Farrington; treasurer and advertising manager, R. E. Brewer.

Chicago

CHICAGO, Aug. 7.

THE local machine tool market is dull, but the decline in demand is believed to be due to the coal and railroad strikes and a revival in activity is expected as soon as settlements are reached. The railroad lists will remain dormant so long as the shopmen's strike continues. Uncertainty as to coal supply seems to explain the increased caution of other buyers. The International Harvester Co., after buying a few machines against its inquiry, has indefinitely postponed action on the remainder of the list. The Continental Motors Co. continues to place scattered orders and the Studebaker Corporation, South Bend, Ind., has added to its recent liberal purchases, having placed 17 special lathes for turning pistons and 23 plain grinding machines. The reported purchase by the Ford Motor Co. of a site for a $10,000,000 assembling plant at East Chicago, Ind., will mean the purchase of considerable machine tool equipment, if true.

Prices remain substantially unchanged. The Rhodes Mfg. Co., Hartford, Conn., however, has announced reductions of 15 per cent on its line of small shapers and slotters. The P. Pryibil Machine Co., New York, has reduced metal spinning lathes 10 to 15 per cent.

The Atchison, Topeka & Sante Fe is expected to close soon for a 150-ton electric crane for its Albuquerque, N. M., shops. This inquiry has been before the trade for several months. The Milwaukee Sewerage Commission has bought a large overhead electric crane from the Milwaukee Electric Crane & Mfg. Co. The University of Chicago has placed an order with the Whiting Corporation for a 10-ton hand power [illegible] power hoist. The Thomas Furnace Co., Milwaukee, Wis., has ordered a 25-ton electric reservoir ladle from the Whiting Corporation.

The Donahue Steel Products Co., Chicago, has sold a 3½-in. Ajax upsetting and forging machine to the Richmond Car Works, Richmond, Va., and a 4-in. Acme upsetting and forging machine to the Steel Car Forge Co., Elwood City, Pa. These two sales represent an aggregate outlay of about $16,000.

The Ford Motor Co. has purchased 60 acres on the Indiana Harbor Canal, East Chicago, Ind., for an assembling plant to cost $10,000,000, according to a report rom Gary, Ind. The location of the plant will enable the company at Detroit to ship parts in bulk by water to East Chicago. The tract not only has considerable frontage on the canal, but is also located on the Chicago & Indiana Southern Railroad, the Wabash, the Indiana Harbor Belt and the Elgin, Joliet & Eastern.

The Standard Metal Screen & Weather Strip Co., recently incorporated with $50,000 capital stock, with general offices at 139 North Clark Street, Chicago, has acquired 8000 sq. ft. of floor space at 3753 South Halsted Street, which will be used as a factory and assembling plant. It will manufacture all metal screens and weather strips, radiator covers, roofing, shades and awnings and window ventilators. Pending the construction of its own complete manufacturing unit, the company has arranged for the manufacture of various products on contract with the Kawneer Co., Niles, Mich. It contemplates the purchase of rolling machines, shears and brakes, although the number installed will be limited to those now on hand until business requires additional equipment. The officers are: President and general manager, Gunnar F. Nordblad; secretary and treasurer, C. Walter Keeling, and general counsel, Ferdinand J. Karasek.

The Planet Piston Corporation, Belleville, Ill., recently incorporated with $50,000 capital stock, has leased a plant and purchased equipment and is now in active operation. About 50 lathes are employed and no additional equipment will be purchased for a time. It manufactures a non-expansible aluminum alloy piston for use in gasoline engines. The officers are: President, Steven D. Hartog; vice-president, Charles Procasky.

V. Malik, 2815 South Trumbull Avenue, Chicago, has let contract for a one-story automobile repair shop, 50 x 55 ft., at 4031-35 West Twenty-fourth Street, to cost $6000.

The Sullivan Machinery Co., Chicago, has awarded a general contract for a one and two-story plant at Michigan City, Ind., to cost $1,000,000. The construction of the foundation is now in progress, the contract having been let some time ago.

M. R. Thackaberry & Son, Sterling, Ill., are erecting a one-story machine shop, 20 x 36 ft., in the rear of the Hutton Bottling Works on West Fourth Street, to be used in connection with their garage.

The Biflex Products Co., manufacturer of automobile bumpers, North Chicago, Ill., has increased its capacity 150 per cent by the purchase of a foundry adjoining its plant, which formerly belonged to the Chicago Hardware Foundry Co.

The B. C. Chatfield Iron Works has commenced the construction of a foundry, 35 x 80 ft., at Gladstone, Mich. It will make bronze and gray iron castings. B. C. Chatfield, owner of the new Gladstone company, was associated for several years with the Chatfield Brass & Iron Works at Escanaba, owned and operated by his father, O. P. Chatfield.

Fire recently destroyed the round house of the Chicago, Milwaukee & St. Paul Railroad at Bedford, Ind., with a loss estimated at $25,000.

Fire of unknown origin recently gutted the third floor of the Island Avenue plant of the Aurora Silver Plate Mfg. Co., Aurora, Ill., doing damage estimated at $75,000.

The Barnwell Mfg. Co., manufacturer of bathroom fixtures, curtain rods, etc., is installing manufacturing equipment in space which it has leased on the lower floor of the Nulyne Laboratories Building, Wildwood Avenue, Jackson, Mich.

The Danley Sanitary Mfg. Co., St. John, Mich., manufacturer of sanitary feeding batteries for poultry, as well as cooling racks and other poultry equipment is building an addition, 45 x 60 ft., which will double its capacity.

The Paramount Wheel & Engineering Co. will locate a plant at Hartford City, Ind., for the manufacture of metal automobile wheels. The Chamber of Commerce of that city has purchased a site and will donate it with switching facilities to the company. Work is to be started at once on the factory, which will employ 200.

William M. Curtin and David G. Smith have opened a machine and general repair shop at 1842 East Miner Street, Desplaines, Ill.

The F. J. Lewis Mfg. Co., 2513 South Robey Street, Chicago, manufacturer of coal tar products, has purchased a 100-acre site for a factory between 108th Street, 112th Street, Avenue F and the State line. It is now building a $1,000,000 plant at Granite City, Ill., and owns works in Dover, Ohio; Moline, Ill.; Chattanooga, Tenn., as well as in Chicago.

The Star & Crescent Milling Co., South Chicago, Ill., has started the construction of a one-story power house to cost $35,000.

The J. L. Clark Mfg. Co., Rockford, Ill., manufacturer of metal cans and containers, will commence the erection of the superstructure for a one-story addition, 60 x 190 ft.

The Tomboy Mine & Milling Co., Telluride, Col., is planning to rebuild its machine shop and other departments, destroyed by fire, July 8, with loss estimated at about $50,000.

A vocational department will be installed in the new high school to be constructed at Scribner, Neb., for which bids on a general contract are being received until Aug. 16. It will be two stories and basement, 70 x 100 ft., and estimated to cost close to $90,000. Grabe & Helleberg, Columbus, Neb., are architects.

The Common Council, Storm Lake, Iowa, will build a new electrically-operated pumping plant at the municipal waterworks, estimated to cost about $100,000, including equipment. Roy U. Kinne is city clerk.

The Hi-Power Tool Corporation, Jackson, Mich., recently organized to manufacture reamers, hobs, milling cutters and kindred specialties, has acquired the local building formerly occupied by the Jackson Machine Co., and will soon commence the installation of equipment for its proposed new plant. It is expected to begin production early in the fall. M. C. Townley is president, and Watson R. Smith, treasurer and general manager.

The Wills-Sainte Claire Co., Marysville, Mich., manufacturer of automobiles, has preliminary plans under way for the construction of an addition to its local plant. C. H. Wills is president.

The Board of Education, Saginaw, Mich., will build a one-story power house in connection with a new two-story school building on Webber Street, estimated to cost about $250,000. J. F. Beckbissinger, 114 South Jefferson Avenue, is architect.

The Universal Portland Cement Co., 210 South LaSalle Street, Chicago, Ill., has completed plans for the construction of an addition to its mill No. 7, Duluth, Minn., estimated to cost about $200,000, including equipment.

The Dubuque Electric Co., Dubuque, Iowa, will soon commence the construction of a three-story addition to its local power plant, 62 x 67 ft., estimated to cost about $300,000, including machinery.

The Electrical Engineering Co., Chicago, manufacturer of electric transformers and kindred products, has removed its plant from 922 East Forty-first Street to 2014 Wabansia Avenue, where the floor area will be increased about 200 per cent.

The Chicago, Burlington & Quincy Railroad, 547 West Jackson Boulevard, Chicago, has awarded a contract to the Home Builders, Inc., Omaha, Neb., for the construction of a new engine house, with shop facilities, at Council Bluffs, Iowa., to include a one-story machine shop and power house.

The McDougall Terminal Warehouse Co., 510 Alworth Building, Duluth, Minn., has plans under way for a new ice manufacturing and refrigerating plant on Railroad Street.

Ohio

WHILE machine tool inquiry in Cincinnati has been somewhat affected by the railroad and coal strikes, orders booked the past week showed a decided improvement over the two previous weeks. Engine lathes appear to be in good demand, several manufacturers stating that their July business was the best since 1920. The situation is spotty, however, some makers reporting satisfactory orders, with others showing a falling off compared with the month of June. One of the largest contracts the past week was placed by an Eastern electrical manufacturer for a number of milling machines. Other orders include punch presses, small planers and automatic screw machines. A local manufacturer which recently commenced building plate shearing machinery, reports the sale of two of its machines to steel plants with a third under negotiation. Railroad buying is light and a number of lists on which bids have been submitted have been held up. It is expected that the Louisville & Nashville, however, will shortly close on several tools, including a large planer. Dealers report a fair amount of orders, with inquiries still under negotiation. Used tools continue in demand, although prices on good second-hand machines are now nearly as high as on new machines of similar make.

The Henry Vogt Machine Co., Louisville, Ky., is planning the erection of an addition, three stories, 50 x 80 ft., to cost $40,000.

The Dayton Engineering Laboratories Co., Dayton, Ohio, manufacturer of Delco products, will resume the erection of an addition begun in 1920, but abandoned after the foundation was completed. It will be six stories, 190 x 350 ft., with 335,000 sq.ft. of floor space. Products now manufactured by outside firms will be made in the new building, which will also house the service department, now located at Moraine City.

The Brightman Mfg. Co., Columbus, Ohio, manufacturer of shafting machinery, bolts and nuts, has been reorganized with L. H. Brightman, president, S. D. Shearer, vice-president, and Paul A. DeLong, secretary-treasurer.

The Portsmouth Stove & Range Co., Portsmouth, Ohio, which recently awarded contract for a three-story addition, has decided to add two additional stories to take care of business expansion, which during the past year has been large. A complete enameling department will be installed in the new building.

Fire at the plant of the Motors Sheet Steel Co., Beach City, Ohio, July 20, caused a loss of about $2,500, fully covered by insurance. The fire started in the refining room where the palm oil is cooked down and burned that building, also the boiler room building, and a part of the roof over the pickling department. The fire was checked before it reached the main building or any of the other departments. None of the main machinery was damaged to any extent, but when the pipes fell connecting the sulphuric acid tank with the pickling department the company lost its complete stock of sulphuric acid, but a new supply was secured, the insurance adjusted, and the plant again put into operation Aug. 25.

The Common Sense Piston Ring Mfg. Co., according to Thomas McGeachie, chairman of the executive committee of the Heather Rubber Co., Lorain, Ohio, will lease a building for a period of three years for the purpose of manufacturing the piston ring in Lorain. The company is in the market for machinery, either new or second hand, which could be used for the purpose.

Milwaukee

THE machine-tool trade is getting no better or worse, but is undergoing constant changes, due to the uncertainties of the coal and railroad labor situation. Shops in urgent need of tools are sending in rush orders, imparting a semblance of greater activity, but volume is not showing any increase, for other shops are holding off to await developments. This includes railroads, which still postpone ordering on extensive lists of requirements. Locally, the fuel situation is steadily growing more acute and some manufacturers in the metal trades are chary about accepting new business as freely as before, which has a reflex upon the tool trade.

The Belle City Malleable Iron Co., Racine, Wis., has begun work on a plant extension project which will require a year and involve a total investment of $750,000 in new buildings, equipment, etc. The present construction represents an investment of $400,000 and is to be completed by the end of the year. A contract has been let to Nelson & Co., local, for a 260-ft. extension to the annealing building and an order has been placed with the American Dressler Tunnel Kilns Co. for annealing ovens. Part of the building also will be used for a gas producer plant. A new administration building will be erected in place of the one now occupying the site of the annealing building extension. Other details of the project will be made public later.

The Wisconsin Clay Products Co. of Kenosha, Wis., incorporated recently with $100,000 capital, has placed the contract for the entire equipment of a new face and common brick plant with a daily capacity of 100,000 brick, with E. M. Freese & Co., Galion, Ohio. The plant will occupy a site of 15 acres at Burlington Road and Howland Avenue. Joseph Orth is president, and Charles Tyson, treasurer and works manager.

The Air Reduction Sales Co., Inc., 342 Madison Avenue, New York, which announced its intention of establishing a branch plant in Milwaukee, will not immediately undertake any considerable amount of new construction, having purchased the machine shop of the Petit Mfg. Co., 1505-1515 Buffum Street. This is 60 x 120 ft., part two stories and basement, and will be remodeled to some extent, as well as re-equipped throughout. It is to be ready for operations about Nov. 1.

The Milwaukee Woven Wire Works, 3014-3020 Clarke Street, Milwaukee, has awarded contracts for a new brick and mill factory, with concrete foundation, 131 x 138 ft., part three stories. The general contractor is C. F. Behnke, 827 Thirty-fourth Street, local. With looms, motors and other equipment, the investment will be about $125,000. O. G. Marquardt is president and treasurer.

The Rockwell Mfg. Co., 572 Park Street, Milwaukee, manufacturer of hardwood finish, interior woodwork, fixtures, etc., has placed contracts for a one-story brick and mill addition, 54 x 200 ft., which will require a considerable list of wood-working machinery with individual electric motor drive. Louis C. Nuesse is secretary.

The S. E. Tate Printing Co., 133 Second Street, Milwaukee, has plans for a new four-story printing and publishing plant, 60 x 125 ft., estimated to cost $200,000 complete, and to be erected at 496-502 Broadway. Practically a new equipment of presses, typesetting machines, metal furniture, fixtures and special machinery will be installed. E. L. Arnold is president and general manager.

The Wisconsin Upholstery Spring Co., Sheboygan, Wis., has been incorporated with a capital stock of $50,000 as the successor of a partnership business established about four months ago which manufactures cushion springs. It occupies a modern building at Calumet Drive and Winter Court. J. M. Spiller and A. M. Miller continue the principal owners and managers.

The Gilson Brothers Co., Fredonia, Wis., founder and machinist and manufacturer of corn husking machines, concrete mixers, etc., will build a new gray iron foundry, 40 x 120 ft., and rebuild the present casting shop into an addition to the machine shop. It is estimated that about $40,000 will be invested in buildings and equipment.

The Biggam Trailer Co., formerly of Milwaukee, on Monday, Aug. 7, commenced initial operations in its new factory, occupying 16,000 sq. ft. in the Racine Industrial Community Building at Racine Junction, Wis. It manufactures trailers in capacities from 800 lb. to 5 tons under contract with motor truck manufacturers rather than distributing its product among truck owners. The corporation is capitalized at $265,000 and its new officers are: President and general manager, H. F. Biggam; vice-president, George L. Buck, Racine; secretary and purchasing agent, L. E. Pitner, Racine.

The W. A. Knaak Motor Co., 1301 Georgia Avenue, Sheboygan, Wis., is erecting a $25,000 addition to its garage, service and machine shop building which will require some miscellaneous equipment.

The United Shoe Last Co. is erecting a new factory at Crystal Falls, Mich., which will represent a total investment of nearly $150,000. It consists of a main factory, 60 x 240 ft., a power plant, 30 x 50 ft., and warehouse, 58 x 400 ft.

The Chippewa Valley Auto Co., Chippewa Falls, Wis., has engaged E. J. Hancock, architect, Eau Claire, Wis., to design a new $75,000 sales and service building, 124 x 132 ft., two stories and basement. The machine and repair shop will occupy a space of 42 x 132 ft. and practically all equipment will be new. Fred A. Bigler is president and general manager.

The municipal waterworks department, Menominee, Mich., is building a two-story machine shop, 48 x 50 ft., and will buy a small list of machinery.

The Sparta, Wis., Board of Education awarded the general contract for the construction of a new high school with manual training department to Naset Brothers, local. It will cost about $200,000.

The Simplicity Engine & Mfg. Co., Port Washington, Wis., has increased its capital stock from $25,000 to $50,000 to provide additional facilities for enlarged production. Details are not yet available.

The Jenkins Machine Co., Sheboygan, Wis., which is enlarging its foundry and machine shops, has increased its capital stock by $100,000, so that the issues now consist of $200,000 preferred and $100,000 common stock.

The Central South

ST. LOUIS, Aug. 7.

The C. Hager & Sons Hinge Mfg. Co., 2427 DeKalb Street, St. Louis., manufacturer of hinges and other hardware products, is taking bids for a two-story addition, 60 x 120 ft., estimated to cost about $50,000. Helfensteller, Hirsch & Watson, Chemical Building, are architects.

The Apex Coal Co., Lynchburg, Va., is planning for the construction of a new tipple at its properties near Sergent, Ky. Other machinery, including electric equipment, will also be installed.

The Pauline Oil & Gas Co., Duncan, Okla., will build a new oil refinery on a site about six miles from Duncan, for handling about 700 bbl. of crude oil per day. It is estimated to cost about $65,000.

The Broderick & Bascom Rope Co., 4500 North Main Street, St. Louis, manufacturer of wire rope, cables, etc., will soon call for bids for two additions, one and two stories, 143 x 500 ft., and 85 x 500 ft., respectively, estimated to cost about $250,000, including equipment.

Fire, Aug. 2, destroyed a portion of the lard refining plant of Morris & Co., St. Joseph, Mo., with loss estimated at about $100,000, including machinery. It is planned to rebuild. Headquarters of the company are at Chicago.

E. B. Smith, Joplin, Mo., is organizing a company to construct and operate a plant at Purcell, Mo., for the manufacture of concrete blocks and kindred products.

The Woody Motor Co., Madill, Okla., has tentative plans for rebuilding its service and repair works, destroyed by fire, July 27, with loss estimated at $60,000, including equipment.

The Louisiana & Arkansas Railway Co., Texarkana, Ark., is taking bids until Aug. 14, for a one-story locomotive repair shop, 160 x 280 ft., at Stamps, Ark. It will cost about $150,000. Harrington, Howard & Ash, Orear-Leslie Building, Kansas City, Mo., are engineers.

The Bevis Salt Co., Lyons, Kan., has plans under way for extensions. New electric turbines and auxiliary equipment will be installed. The work is estimated to cost about $175,000.

Fire, July 26, destroyed the service building and repair shop of the Koup Motor Co., 1529-31 Oak Street, Kansas City, Mo., with loss reported at $50,000. It is planned to rebuild.

The Empire District Electric Co., Joplin, Mo., has made application for permission to construct a new hydroelectric power plant on the White and James rivers, near Branson, Mo., with ultimate capacity of 80,000 hp. The company is operated by the Cities Service Co., 60 Wall Street, New York.

The Caruthersville & Kennett Electric Light & Power Co., Kennett, Mo., has plans under way for extensions and improvements in its local electric power plant to cost about $40,000.

The Cushing Refining & Gasoline Co., Cushing, Okla., recently organized by officials of the Mulberry Oil Co., with capital of $500,000, has acquired the local refinery of Gustafson & Spencer, Inc. The new owner will make extensions and will operate in conjunction with the new gasoline producing plant to be constructed by the parent organization at Ingalls, Okla.

The Long-Bell Lumber Co., Long and Bannister streets, Kansas City, Mo., operating 13 mills in Arkansas, Louisiana, Texas and Mississippi, has arranged for a bond issue of $9,000,000, a portion of the proceeds to be used for extensions and improvements. R. A. Long is chairman of the board.

The Iddins Machinery Co., Knoxville, Tenn., will soon take bids for its proposed one-story plant for the manufacture of agricultural equipment, estimated to cost about $50,000.

The St. Louis Electric Welding Co., 2801 La Salle Street, St. Louis, recently organized, is planning for the installation of equipment in a local building, including electric welding apparatus, muffle and carbonizing furnaces, high speed welding equipment, etc. T. A. Oberchellman is secretary.

The Universal Car Co., Louisville, is planning the erection of a new one and two-story service and repair works, 100 x 225 ft., at Broadway and Twenty-fifth Street, estimated to cost about $60,000. W. C. Martin is president.

A vocational department will be installed in the two-story high school building to be erected at Roxbury, Kan., for which bids on a general contract are being asked Smith & English, Nelson Building, Hutchinson, Kan., are architects.

The Oklahoma Gas & Electric Co., Oklahoma City, Okla., is perfecting plans for a new hydroelectric generating plant on the Arkansas River, about four miles from Muskogee, Okla., estimated to cost close to $2,000,000, including machinery.

The Gulf States

BIRMINGHAM, Aug. 7.

The Kerr Tire Co., Fort Worth, Tex., has acquired a site for the erection of a new plant at Niles City, Tex., to have a daily capacity of about 2000 tires.

The American Well & Prospecting Co., Corsicana, Tex., manufacturer of oil well equipment, machine parts, etc., has plans in progress for a one-story addition, 50 x 100 ft.

Ryan & Knight, Inc., 214 West Flagler Street, Miami, Fla., has awarded a contract to John Bullen, Miami, for a three-story automobile service building, 100 x 100 ft., with machine shop for repairs and parts manufacture. S. A. Ryan is president.

The Rayville Ice Co., Rayville, La., recently organized by officials of the Consolidated Ice Co., Monroe, La., has acquired a site for a new ice-manufacturing and refrigerating plant, for which plans are being prepared. Paul Fudicker and W. W. Johnson head the company.

The Dallas Power & Light Co., Dallas, Tex., has made application for permission to build an addition to its electric power plant, estimated to cost $2,180,000. Plans have been prepared. C. E. Calder is president.

The Standard Carbon Co., Swartz, near Doss, La., will commence the erection of a new gasoline extraction plant, estimated to cost about $80,000, including machinery.

Loading and unloading machinery and other freight handling equipment will be installed in the new freight station to be constructed by the San Antonio & Aransas Pass Railway Co., San Antonio, at Waco, Tex., estimated to cost about $200,000.

The Pelsang Boat Works, Inc., Miami, Fla., recently organized with a capital of $500,000, will establish a marine construction and repair plant. Operations will commence at an early date.

The Citra Ice, Light & Development Co., Citra, Tex., is planning the erection of a new electric power plant. It will also build a new ice-manufacturing and cold storage plant, with daily capacity of about 10,000 tons.

A vocational department will be installed in the new high school to be erected at Wortham, Tex., for which plans are being prepared.

The Magnolia Oil Co., Sabine, Tex., is planning to rebuild the portion of its local distributing plant, destroyed by fire July 28 with loss estimated at $175,000.

The City Council, Vero, Fla., has plans for extensions and improvements in the municipal electric light and power plant to cost about $40,000.

Smoak & Goan, Eustis, Fla., will soon commence the erection of a one-story machine and automobile repair shop, 60 x 100 ft. A list of equipment is being arranged.

The Gould Mfg. Co., Batavia, N. Y., recently organized with a capital of $500,000 is planning the establishment of a factory to manufacture windshields and other automotive products. F. C. Gould heads the company.

Freight handling and conveying machinery will be installed in the new freight station to be constructed at Dallas, Tex., by the Atchison, Topeka & Santa Fe Railroad, 80 East Jackson Boulevard, Chicago. The first unit will be 60 x 300 ft., and will cost about $200,000; it will be supplemented by an addition to cost about $125,000.

The O. K. Ice Co., Clermont, Fla., will receive bids until Aug. 30 for an ice-manufacturing and cold storage plant, including equipment. F. B. Krieder is general manager.

A vocational department will be installed in the new three-story high school to be erected at West Palm Beach, Fla., estimated to cost about $125,000, for which bids will be received about Sept. 15. William Manly King, Palm Beach, is architect.

The Texas-Pacific Coal & Oil Co., Ranger, Tex., is planning the erection of a new gasoline absorption plant near Caddo, Tex., estimated to cost about $100,000, including machinery.

A vocational department will be installed in the new high school to be erected at Highland Park, Dallas, Tex., estimated to cost about $125,000.

California

SAN FRANCISCO, Aug. 1.

The Chevrolet Motor Co. of California, Sixty-ninth Avenue and Foothill Boulevard, Oakland, has had plans prepared for an addition to manufacture automobile bodies. W. C. Williams is manager.

The Pacific Asbestos Corporation, Oakdale, Cal., has preliminary plans under way for a new asbestos mining and manufacturing plant to include machine shop, power house and other buildings. W. A. Sutherland, president Fidelity Trust & Savings Bank, Fresno, Cal., is one of the heads of the company.

Plans have been completed for the construction of a one-story power house at the Fullerton High School, Fullerton, Cal., 40 x 112 ft. Carleton M. Winslow, 1134 Van Nuys Building, Los Angeles, is architect.

Ira G. Wagner, Sparks, Nev., is organizing a company to build and operate a new ice-manufacturing and refrigerating plant at Marysville, Cal. Negotiations are under way with the Marysville Chamber of Commerce, regarding a site.

The Public Service Commission, 210 South Broadway, Los Angeles, has had plans prepared for seven power houses, to be used in connection with local municipal service, estimated to cost about $6,000,000, including machinery. E. F. Scattergood is chief engineer.

Officials of the Shasta Lumber Co. and the Union Lumber Co., Marysville, Cal., have organized a new company to build a plant to manufacture brick and tile products. The initial works will have a capacity of about 10,000 brick per day. L. E. Hite and Calvin Smith, Marysville, are also interested in the company.

The Concrete Pipe Co., Board of Trade Building, Portland, Ore., will commence the immediate erection of a new two-story plant, 114 x 120 ft., on Page Street, estimated to cost about $25,000.

The Alaskan Engineering Commission, purchasing department, Seattle, Wash., will take bids until Aug. 16, for the following equipment, Circular 582: 100 end blocks with bolts; 50 guard rail clamps; 12 switch stands; 25 sets of split switches; 12 rigid bolted frogs; 100 rail clamps; 120 cast iron carwheels; 12 solid steel carwheels; 100 locomotive driver brake shoes; 750 boiler tubes, and other equipment.

Indiana

INDIANAPOLIS, Aug. 7.

The Inland Body Co., Indianapolis, manufacturer of automobile bodies, is planning the erection of new works at Columbus, Ind. The present business will be removed to the new location and additional equipment installed. The Columbus Chamber of Commerce is interested in the project.

The Indiana & Michigan Electric Co., South Bend, Ind., will commence foundation work at once for the erection of a new hydroelectric generating plant at Kings Landing, St. Joe River, estimated to cost about $1,500,000, including machinery.

Fire July 30 destroyed the plant of the Salem Stone Co., Bedford, Ind., including machinery, with loss estimated at $400,000. The engine house of the Chicago, Milwaukee & St. Paul Railroad, on adjoining site, was partially destroyed by the same fire, with loss of about $25,000. The Salem company is operated by the Indiana Quarries Co., which proposes to rebuild.

The Indiana General Service Co., Muncie, Ind., has arranged for a bond issue of $3,322,000, a portion of the proceeds to be used for extensions and improvements in power plants and system. R. E. Breed is president.

D. R. Ulmer, Terre Haute, Ind., has organized a company to establish a plant to manufacture sewer pipe, conduit and kindred products. The initial works will have a daily capacity of about 3000 tile lengths and blocks. Ernest Cox is manager.

The Kentucky Tire Pump Co., Madisonville, Ky., has arranged for the removal of its business to Evansville, Ind., where an enlarged works will be established.

A vocational department will be installed in the new high school to be erected at Terre Haute, Ind., for which a site has just been acquired at Twenty-fifth and Poplar streets, estimated to cost about $700,000. Johnson, Miller & Miller, 30 North Fifth Street, are architects.

The United States Quartermasters' Depot, Jeffersonville, Ind., will establish a new brass foundry in connection with its local plant. A portion of one of the existing buildings will be used.

The Olin Sales Co., 515 North Meridian Street, Indianapolis, Ind., has plans under way for a new three-story automobile service and repair works, 60 x 195 ft., at 720-22 North Meridian Street, estimated to cost $150,000.

The Ford Motor Co., Highland Park, Mich., is reported to be considering a site at Alexandria, Ind., for the construction of a branch plant. A local committee has been formed, headed by Dee R. Jones, city attorney, to arrange details. It is said that the plant will cost in excess of $200,000.

The Indiana Service Corporation, Fort Wayne, Ind., will make extensions and improvements in its local power plant to cost about $250,000, including buildings and equipment.

Canada

TORONTO, Aug. 7.

THE demand for machine tools continues about the same as in the past three or four weeks. Buyers have not commenced to enter the market with big lists and the greater part of the demand is for one or two tools. Notwithstanding that many new manufacturing plants are under construction, interests behind these undertakings are withholding orders as long as possible, but dealers look for the development of considerable activity early next month. The automotive industry is about the most consistent buyer, but purchases are chiefly for replacement. Wood-working equipment is in active demand and manufacturers report a steady inflow of orders. The demand for small tools continues good and order books are rapidly filling up, both for spot and future delivery. Prices in some districts are unsteady and price cutting is again being resorted to. No definite announcement has been made, however, regarding new lists.

The fuel situation is also having some effect on demand. The shortage of fuel is causing some concern to companies having small supplies on hand and unless some provision is made whereby coal can be secured it is likely that many will find it necessary to greatly curtail operations if not close down entirely. In some districts the supply of electric power is short and industrial plants in these localities have been forced to cut down operations.

The general contract for an addition to the plant at Leaside, Ont., for the Durant Motors of Canada, Ltd., Royal Bank Building, Toronto, to cost $750,000, has been awarded to Norman McLeod, Ltd., Kent Building, Toronto.

The sawmill at Thompson River, B. C., owned by the Northern Construction Co., Kamloops, B. C., was destroyed by fire with a loss of $100,000.

The Town Council of Montreal North, Que., will build an addition to the waterworks plant to cost $125,000. F. C. Laberge, 30 St. James Street, Montreal, is engineer.

Plans are being prepared for the erection of a paper mill at Hartville, N. S., for the Premier Paper & Pulp Co., 91 Hollis Street, Halifax, N. S. George F. Hardy, New York, is architect.

The Algoma Steel Corporation, 503 Queen Street East, Sault Ste. Marie, Ont., proposes to erect a heat treating plant at a cost of $50,000.

The Kingston Road Lumber Co., Ltd., 828 Kingston Road, Scarboro Junction, Ont., will build a planing mill and purchase equipment at an early date.

The Linde Canadian Refrigeration Co., St. Peters Street, Montreal, will build a factory at Lachine, Que., to cost $40,000 and has let the general contract to Arthur Leduc, 351 Christopher Colomb Street, Montreal.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossbile to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

	Per Lb.
Bars:	
Refined iron bars, base price	2.73c.
Swedish bars, base price	7.00c.
Soft steel bars, base price	2.73c.
Hoops, base price	3.78c.
Bands, base price	3.38c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	2.83c.
Channels, angles and tees under 3 in. x ¼ in., base	2.73c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	2.73c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	2.83c.
Toe-calk, ½ x ⅜ in. and larger	3.50c.
Cold-rolled strip, soft and quarter hard	6.25c. to 7.25c.
Open-hearth spring steel	4.00c. to 6.00c.
Shafting and Screw Stock:	
Rounds	3.50c.
Squares, flats and hex	4.00c.
Standard cast steel, base price	12.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	2.83c.

Sheets

Blue Annealed

	Per Lb.
No. 10	3.78c.
No. 12	3.83c.
No. 14	3.88c.
No. 16	3.98c.

Box Annealed—Black

	Soft Steel C. R., One Pass, Per Lb.	Blued Stove Pipe Sheet, Per Lb.
Nos. 18 to 20	4.00c. to 4.30c.	.....
Nos. 22 and 24	4.05c. to 4.35c.	4.60c.
No. 26	4.10c. to 4.40c.	4.65c.
No. 28	4.20c. to 4.50c.	4.75c.
No. 30	4.45c. to 4.75c.	.....

No. 28 and lighter, 36 in. wide, 10c. higher

Galvanized

	Per Lb.
No. 14	4.30c. to 4.60c.
No. 16	4.45c. to 4.75c.
Nos. 18 and 20	4.60c. to 4.90c.
Nos. 22 and 24	4.75c. to 5.05c.
No. 26	4.90c. to 5.20c.
No. 27	5.05c. to 5.35c.
No. 28	5.20c. to 5.50c.
No. 30	5.70c. to 6.00c.

No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel

	Black	Galv.
⅛ in. Butt.	—56	—40
¼ in. Butt.	—61	—47
1-3 in. Butt.	—63	—49
3½-6 in. Lap.	—60	—46
7-8 in. Lap.	—56	—34
9-12 in. Lap.	—55	—33

Wrought Iron

	Black	Galv.
¾ in. Butt.	—30	—13
1½ in. Butt.	—32	—15
2 in. Lap.	—27	—10
2½-6 in. Lap.	—30	—15
7-12 in. Lap.	—23	— 7

Steel Wire

BASE PRICE* ON NO. 9 GAGE AND COARSER	Per Lb.
Bright basic	3.50c. to 3.75c.
Annealed soft	3.50c. to 3.75c.
Galvanized annealed	4.25c. to 4.50c.
Coppered basic	4.00c. to 4.25c.
Tinned soft Bessemer	5.50c. to 5.75c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	18¾c. to 19¾c.
High brass wire	19¼c. to 20¼c.
Brass rod	16¼c. to 17¼c.
Brass tube, brazed	25⅝c. to 26⅝c.
Brass tube, seamless	22½c. to 23 c.
Copper tube, seamless	24¾c. to 25 c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 21¾c. to 22¾c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14-20		
	Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	Primes	Wasters
			80 lb.	$6.05 $5.80
			90 lb.	6.15 5.90
			100 lb.	6.25 6.00
IC	$10.00	$8.50	IC	6.40 6.15
IX	11.50	10.00	IX	7.40 7.15
IXX	13.00	11.25	IXX	8.40 8.15
IXXX	14.25	12.50	IXXX	9.40 9.15
IXXXX	16.00	14.00	IXXXX	10.40 10.15

Terne Plates

8-lb. coating, 14 x 20

100 lb.	$7.00
IC	7.25
IX	7.50
Fire door stock	9.00

Tin

Straits, pig	35c.
Bar	42c. to 46c.

Copper

Lake ingot	15¼c.
Electrolytic	15 c.
Casting	14¾c.

Spelter and Sheet Zinc

Western spelter	8 c. to 8½c.
Sheet zinc, No. 9 base, casks	8¾c. open 9¼c.

Lead and Solder*

American pig lead	6¾c. to 7c.
Bar lead	8c. to 8½c.
Solder, ½ and ½ guaranteed	25c.
No. 1 solder	23½c.
Refined solder	20¼c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	75c.
Commercial grade, per lb	35c.
Grade D, per lb	25c.

Antimony

Asiatic	6½c. to 7c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb. 25c. to 27c.

Old Metals

Business is fairly good and the market is strong. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy crucible	11.75
Copper, heavy wire	11.25
Copper, light and bottoms	9.00
Brass, heavy	6.25
Brass, light	5.25
Heavy machine composition	8.50
No. 1 yellow brass turnings	6.50
No. 1 red brass or composition turnings	7.75
Lead, heavy	4.50
Lead, tea	3.50
Zinc	3.25

THE IRON AGE

New York, August 17, 1922

ESTABLISHED 1855

Steps in Stamping a Draw-Bolt Tube

Single Stamped Part Replaces Complicated Assembly—Cost Lowered and Design Improved—Methods of Manufacture Outlined

BY N. T. THURSTON*



WITH a view to reducing costs and improving construction the draw-bolt tube used on a widely known fireproof safe was recently re-designed, a single stamped part being devised to replace the former comparatively complicated assembly. A saving of 18 cents per piece resulted, as well as an improvement in that part of the construction of the safe.

The single stamped part is shown above, the components of the previous draw-bolt tube employed being shown in Fig. 1. The draw-bolt tube is used as a sleeve into which the bolts on the door of the safe slide, when the door is closed and the bolts thrown.

There were two principal reasons for re-designing the old draw-bolt tube. The first was the fact that the bracket, having to be fastened to the front plate of the safe, served as a ready means for conducting outside heat to which the safe might be exposed in case of fire, direct to the draw-bolts themselves, causing them to freeze fast to the sleeves. The second reason was the matter of expense. In the single stamped tube the manufacturing expense was [illegible] per piece less than in the old style, and the labor expense in getting the assembly together and in place in the safe, ready to install, was eight cents less per piece. This gave a total saving of 18 cents per piece. As to weight, the old style draw-bolt tube was about six times heavier than the new stamped tube.

The old tube was constructed of two pieces of seamless steel tubing as shown in Fig. 1, the one

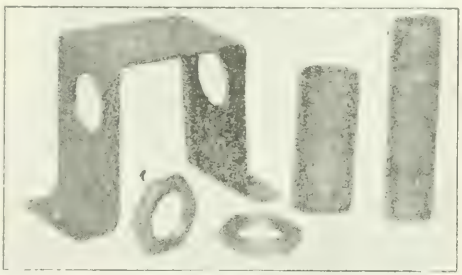


Fig. 1—Component Parts of Draw Bolt Tube Formerly Employed

*Acklin Stamping Co., Toledo, Ohio.



Fig. 2—Successive Steps in Making Stamping, Draw Bolt Tube. Beginning at the upper left, the operations are as follows: 1, Combination; 2, 3, 4, reduce; 5, finish shape; 6, trim, and 7, slot. The layout to determine the approximate number of drawing operations is shown at the lower right

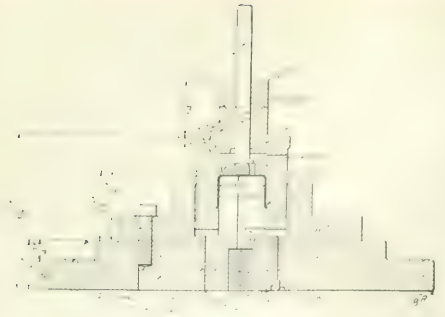


Fig. 3. Details of the Combination Die. As the punch descends the blank is cut, the punch continuing down and forming the metal around the plug

threaded on both ends and slipping inside the larger tube. Both tubes were set in position opposite the holes in the bracket and the nuts screwed up on both ends of the inner tube thus clamping the tubes to the bracket. To insure a smooth and uniform surface inside the center tube it was reamed. The assembly was then ready to be put in place on the safe and spot welded.

In manufacturing the stamped tube a good grade of drawing steel was used. This steel was furnished 3¾ in. in width and 0.050 in. in thickness and was pickled and oiled. Only two annealing operations were found necessary. The method for determining the approximate number of drawing operations necessary to bring the piece to size ready for trimming and shaping the flange at the bottom and cutting the slot in the side is shown in Fig. 2. The first operation was to cut the blank and form it around the punch to the shape shown, the blank being cut 3 3/16 in. in diameter and drawn to a length of 1 5/16 in. and to a diameter of 2 in. This work is done on the combination die shown in Fig. 3. The die is mounted on a cast-iron base and the punch turned up from a 4¼-in. bar of tool steel, the die being composed of a tool-steel cutting edge forged to a wrought-iron base with the tool-steel plug located in the center. A tool-steel draw-ring rides on the tops of four cold-rolled pins, ⅜ in. in diameter, which in turn rest on rubber buffers placed under the die.

As the punch descends the blank is cut from the strip steel, as it is fed across the die, the draw-ring holding the blank firmly against the punch which continues on down and forms the metal around the plug. On the up stroke of the ram the compressed rubbers force the draw ring to follow up the punch. At the top of the stroke the positive knock-out pin forces the cup out of the punch and it drops loose on the top of the die, to be knocked off by the operator. The vents in both the punch and the die allow the air confined on both sides of the cup to escape, preventing the stamping from buckling and tearing. A Bliss press No. 74½ was used to do this work.



Fig. 4. Die Used in Second Operation. The length of the cup is increased ½ in. and the diameter decreased by the same amount. Before this operation the cup is annealed and washed

To prepare it for further drawing the cup is thoroughly annealed to a cherry red, which releases all internal strains in the metal. It is previously wet in a solution of one part of muriatic acid and five parts of water, the purpose of this being to loosen the scale which invariably forms on the steel due to oxidation while red hot.

The next operation, done on a Bliss No. 84 press, increases the length of the cup ½ in., that is, from 1 5/16 in. to 1 13/16 in., the diameter being at the same time decreased ½ in., from 2 in. to 1½ in. The die for this work is shown in Fig. 4. This tool is mounted on a machine steel base 8 by 14 in. and the punch, plug, and draw-ring are of tool-steel hardened and ground. The operation of the die is similar to that of the previous one, the descending punch forcing the draw-ring down with it, thus compressing the rubbers under the die. On the up stroke of the ram the draw-ring follows the punch on its upward course and at the top of the stroke the knock-out pin forces the cup out of the punch. Immediately before this operation the stampings are washed in a soap and water mixture, which serves two purposes. First it removes all scale not removed by tumbling the annealed cups, and second, it serves to lubricate the cup, thus facilitating the drawing operation. The presence of scale is detrimental to the dies, causing them to wear unnecessarily. Vents are provided in the punch and plug as in the die used in the previous operation.

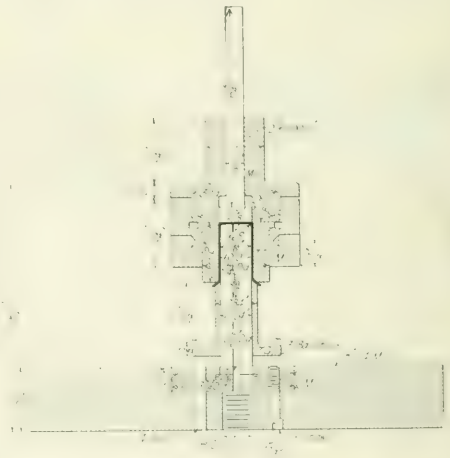


Fig. 5. The Third Operation Further Increases the Length of Cup by ⅜ In., Decreasing the Diameter Also. The die employed is shown above

The third operation still further increases the length of the cup by ⅜ in., decreasing the diameter by the same amount. The die, shown in Fig. 5, is mounted on a machine steel base, and the forming parts are tool steel, hardened and ground. The construction of the punch is a little different from that usually employed. In this design tool steel is used only where needed. The machine-steel punch holder is in two parts which when screwed together hold the tool steel punch in place. The principal reason for this type of construction is that in hardening the punch it is less likely to crack than if it were fastened to the machine punch holder by means of screws, screw holes being a flagrant cause of spoiling tool steel during hardening. This work was also done on a Bliss No. 84 press, and the operation of the die the same as those described.

At this point the stamping goes through a second annealing, the process being the same as the first.

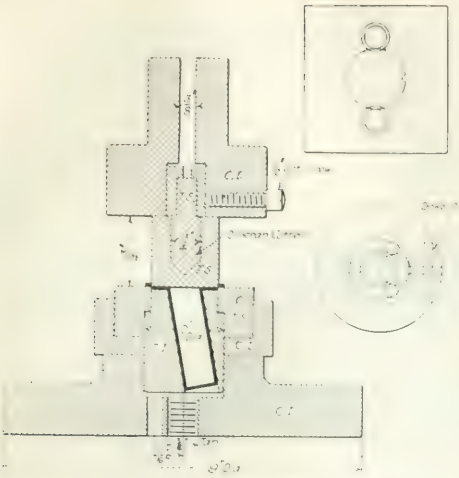


Fig. 6. Die Employed in Trimming Operation, Which Leaves the Base of the Tube with Proper Width of Flange. Plan of punch and die are shown in insert

A Bliss press No. 84 is used for this operation, which lengthens the tube ¼ in., decreasing the diameter by the same amount and forming the flange at the base perpendicular to the sides of the tube. The construction and operation of the die, is similar to the two preceding ones.

Bringing the tube to size, both as to its diameter and to the angle at the base in relation to the sides of the tube, is accomplished in the fifth operation. The die employed is mounted on a machine-steel base, the punch being constructed as previously described, in order to lessen the likelihood of its being spoiled during hardening and also to economize on the amount of tool steel used. The knock-out pin is screwed in the plug to keep it from shifting out of position.

The next step, the sixth operation, is a trimming one and leaves the base of the tube with the proper width flange. The die used is shown in Fig. 6. It is carried on a special cast-iron base, the punch being also of cast iron, into which is fitted a tool-steel cutting edge held in place by a ½ in. set screw. On the opposite sides of the cutting edge are located two tool-steel cutters, which cut through the trimmed-off scrap rings that accumulate around the punch. The cutting edge of the die is of tool steel, held in a cast-iron matrix. This work was done in a Toledo No. 5 press. The notch in the flange is used to gage the stamping in the slotting operation which follows.

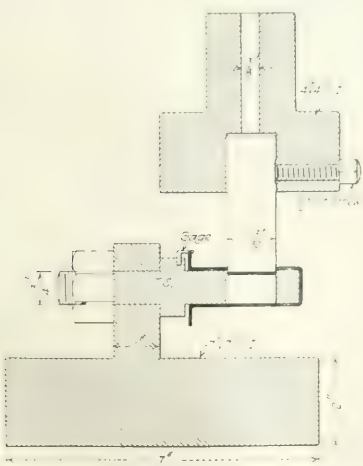


Fig. 7. The Final Operation Is Cutting the Slot in the Side of the Tube, the Die Employed Being Shown Above

The final operation is to cut the slot in the side of the tube which is done on a Toledo No. 5 press, using the tool shown in Fig. 7, the tool being carried on a cast-iron base which holds the tool-steel plug. The punch is of tool steel and is held in the cast-iron holder by means of a ½ in. set screw. The slugs fall out as the tube is pulled off the plug, after each operation of the press. The purpose of the slot, as seen from the illustration, is to permit connecting the draw-bolt mechanism to the draw-bolt itself, which provides the means for throwing the bolts out and in the sleeves. A hole is drilled and tapped into the side of the draw-bolt, a screw run into the hole and the throw mechanism fastened to the screw. The simplicity and effectiveness of this design is apparent.

The average production of all the operations throughout a run of 100,000 finished pieces was about 5000 a ten-hour day. The dies illustrated and described were designed and operated by the Acklin Stamping Co., Toledo, Ohio.

Improvement in Unemployment

HARRISBURG, Pa., Aug. 15.—Although a number of iron and steel plants of Pennsylvania are in imminent danger of being forced to close down because of a shortage of fuel, a slight improvement in employment conditions was reported during the last half of July, according to the semi-monthly report of the Pennsylvania Department of Labor and Industry just issued.

A total of only 18,450 iron and steel workers was reported without employment on Aug. 1, as compared to 20,050 without work on July 15 and 25,500 on July 1. The decrease approximates 8 per cent.

Four of the eleven employment districts of the State reported more men without employment in the metal and steel trades than during the preceding fortnight; two, Philadelphia and Harrisburg, reported fewer men without employment; four reported no change; and the eleventh office, Reading, has just been reopened and so no report is available for the preceding period.

Unemployment conditions throughout the State as a whole, exclusive of the mine trade and the railroad shops, showed a slight improvement during the same period. The 11 offices reported approximately 92,000 without work on Aug. 1 as compared to 101,000 reported unemployed by the 10 offices on July 15. There are still large numbers of railroad shopmen and miners on strike, and the unsettled conditions in these two trades has made itself felt adversely in the iron and steel trades.

The Gartland-Haswell Foundry Co., Sidney, Ohio, although ready for operation the latter part of 1920, did not open until recently owing to the long depression. Its first heat was taken a short time ago. The plant is running about 25 per cent of its capacity of 50 molders per day on automobiles, farm implements and washing machine gray iron castings. The officers of the company are: M. F. Gartland, president; Frank X. Gartland, vice-president; John C. Haswell, treasurer; W. J. Gruss, sales-manager; M. B. McKee, secretary and manager; G. R. Wood, factory superintendent. This foundry is affiliated with 14 other gray iron and malleable castings plants in the Central West, which are controlled by the Gartland-Haswell-Rentschler foundry interests.

The British Empire Steel Corporation, Sydney, N. S., office reports that 12 steamers are engaged in the export of iron ore from Wabana, Newfoundland, to Germany, via Rotterdam. About three quarters of a million tons will have been exported before the end of the year. These shipments are being made on an order the British Empire Steel Co. received a couple of months ago for 4,000,000 tons to be exported to steel companies in Europe.

Stainless Steel at High Temperatures

Heat Treatment Which Produces the Greatest Strength for Use in Valves of Internal Combustion Engines

BY H. J. FRENCH*

STAINLESS steel, containing about 0.3 per cent carbon and 13 per cent chromium, has been successfully used at high temperatures, notably in valves in internal combustion engines. Quite probably more extended application will be made along similar lines in the future on account of its peculiar combination of desirable properties after suitable heat treatment.

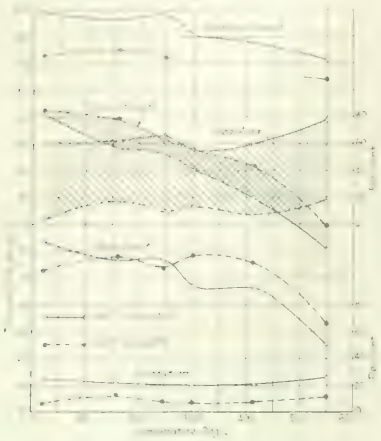


Fig. 1.—Tensile Properties at Elevated Temperatures of [illegible] Steel Oil Quenched from Either 955 or 1150 Deg. C. and Tempered at 675 Deg. C.

Composition: C., 0.31; Mn., 0.24; Si., 0.05; Cr., 12.75, and P. and S. each 0.020 per cent.

Breaking strength is taken as the load at fracture (in lb.) divided by the reduced cross section (in sq. in.).

It has already been shown that the high quenching temperature which produces maximum hardness is not that which produces the best tensile properties at ordinary temperatures, i.e., best combinations of strength and ductility.† Naturally the question arises as to which of these two hardening methods is most suitable for steel which is to be subjected to high temperature service and with this in mind two series of tensile tests were made throughout the range 20 to 550 deg. C.

The steel was first oil quenched from either 955 or 1150 deg. C. and subsequently tempered at 675 deg. C. The first of these methods of hardening produces excellent combinations of strength and ductility whether or not the steel is subsequently tempered, while maximum hardness is produced with moderately rapid cooling from the range around 1150 deg. C. A single and relatively high tempering temperature was chosen in order that

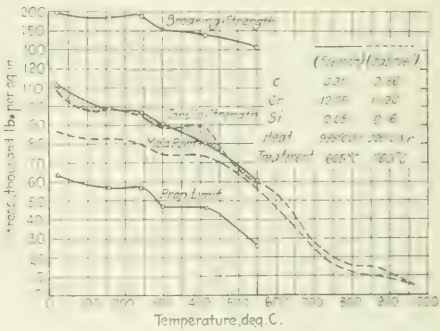


Fig. 3.—Strength and Elastic Properties of Stainless Steel at Various Temperatures as Reported by Both Gabriel and the Author. Breaking strength is taken as the load at fracture (in lb.) divided by the reduced cross section (in sq. in.)

*[illegible] Bureau of Standards, Washington. Published [illegible]

†French and Yamauchi: The Heat Treatment of a High-[illegible] Steel. *A. I. M. E.*, VII, No. 1, p. 103 (July, [illegible])

[illegible] Properties at Various Temperatures of Stainless and Carbon Steels

High Temperature Properties of Various Steels Compared to Normalized 0.32% C. Steel. (Values represent per cent increase (+) or decrease (—) from figures given in column 2)

	Properties of Normalized Carbon Steel (0.32% C.; Air Cooled from 850° C.)	Quenched and Tempered Carbon Steel (0.33% C.; 840° C. Water; 540° C. Air)	Cold-Rolled Boiler Plate (0.25% C.; Reduced 1/8 In. from 1/2 In. Thickness)	Heat-Treated Stainless Steel (0.31% C.; 12.75% Cr.; 955° C. [illegible] Air)
Tensile strength, lb. per sq. in.				
[illegible]	74,350	+ 34	+ 11	— 50
At 300° C.	[illegible]	+ [illegible]	+ [illegible]	— [illegible]
[illegible]	31,880	+ 41*	+ 17*	— [illegible]
Prop. limit, lb. per sq. in.				
At room	42,400	— 5	+ 30	— [illegible]
At 300° C.	[illegible]	+ 61	+ 18	— [illegible]
At 550° C.	9,875	+ [illegible]*	+92*	— [illegible]
Elongation in 2 in., per cent				
At room	[illegible]	— [illegible]	[illegible]	— [illegible]
[illegible]	[illegible]	— [illegible]	[illegible]	— [illegible]
At 550° C.	[illegible]	[illegible]	[illegible]	— [illegible]
Reduction of area, per cent				
At room	57.4	— 18	[illegible]	— [illegible]
At 300° C.	30.3	+ 114	[illegible]	— [illegible]
At 550° C.	87.8	[illegible]	[illegible]	— [illegible]

*Values obtained by extrapolation of curves from 470 deg. C.

the test results might be of widest interest as tempering below operating temperatures (which may be high) would of course result in quick softening of the metal when first placed in service.

It is at once evident from Fig. 1 that the higher quenching temperature (1150 deg. C.) produces metal generally about 10,000 lb. per sq. in. stronger at high temperatures than that similarly quenched from 955 deg. C. However, this small increase is obtained at the expense of a very large proportion of the ductility. Elongation has decreased about half and reduction of area has dropped from values between 60 and 80 per cent to less than 20 per cent throughout the entire range considered.

An even more striking illustration of the deleterious effects of the high temperature quench is shown in examination of fractures, two series of which are reproduced in Fig. 2. Coarsely crystalline breaks are obtained with little or no elongation such as is observed in the series first quenched from 955 deg. C. The latter likewise show much finer structures.

Unlike carbon steels which are strongest and at the same time most brittle around "blue-heat" (300 deg. C.) the strength of stainless steel decreases steadily with rise in temperature. Confirmation of this can readily be obtained from the work of other investigators as shown in Fig. 3. However, comparison with the properties of carbon steels in normalized, cold rolled and quenched and tempered conditions (Table I) shows some decided advantages for stainless steel.

It has very much higher strength and limit of proportionality in the range about 550 deg. C. where most carbon and structural alloy steels show a decided "weakening"; at the same time it retains good ductility. However, its advantages at lower temperatures, between 20 and 300 deg. C., over quenched and tempered carbon steel of similar carbon content are not so marked.

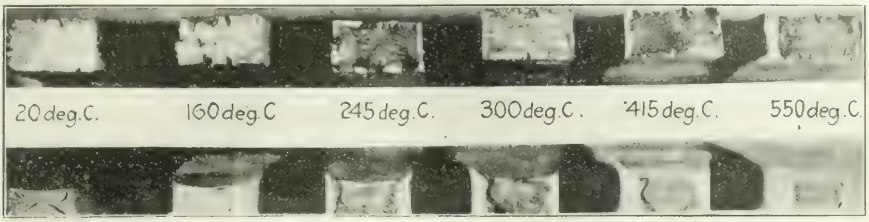


Fig. 2.—Fractures of Stainless Steel Broken in Tension at Various Temperatures
Top row: Oil quenched from 1150 deg. C. and tempered at 675 deg. C.
Bottom row: Oil quenched from 955 deg. C. and tempered at 675 deg. C.
Each pair of samples broken at temperatures indicated.

Proposed Duties on Manganese and Tungsten

WASHINGTON, Aug. 15.—Declaring that the United States Senate in its tariff making has adopted one system for one commodity and another system for another commodity, Senator Pomerene of Ohio in the Senate last week called attention to the proposed duties on manganese and tungsten.

The discussion was on the subject of potash, which Senator Pomerene declared should come in free for the agricultural interests in the country, stating that it has not been demonstrated that sufficient quantities of potash are produced in this country to make it commercially profitable. "The same situation," he said, "exists as to ferromanganese, tungsten and other alloy metals. I think it was perfectly clear from the debates on the floor of the Senate that such manganese and tungsten as we had, as well as other alloy ores, are low grade ores. There is a very great deal of uncertainty as to whether they can ever be produced from our deposits in commercially profitable quantities. The question that occurred to me is this:

"Why do you adopt the policy of a tariff to encourage the production of manganese and tungsten, and then, when it comes to potash, discard the protective theory entirely and adopt the bounty system of encouraging production? If the one scheme is advisable as to the ores that are used for alloys, why not in the other; or, if the bounty system is advisable when it comes to potash, why not as to the other?"

Senator McCumber answered that the proposed duty on potash is for the protection of the American industry. Senator Pomerene said further:

"It was conceded here in the course of the argument, I think, that the duty on the alloys would add $10,000,000 per year to the cost of steel to the consumers. I think those figures were generally admitted. I do not think it has been demonstrated that you have deposits in this country from which manganese or tungsten can be produced in commercially profitable quantities. Of course, I have no personal knowledge on this subject, and I am dependent on what the steel people say with regard to it. They are convinced that such deposits do not exist, or, at least, that they have not been discovered in such quantities as will justify an attempt to produce them in this country."

General Refractories Co. Absorbs Three Other Companies

Announcement has been made of the absorption by the General Refractories Co. of the Pennsylvania Fire Brick Co. with works at Beech Creek, Pa., the Hays Run Fire Brick Co., Orviston, Pa., and the Standard Refractories Co., Claysburg, Pa. These acquisitions will give the General Refractories Co. a daily capacity of approximately 900,000 refractory brick, making it the second largest producer in the country. Coincident with this development, the company has surrendered its West Virginia charter and has been incorporated under the laws of Pennsylvania. The West Virginia company was capitalized at $5,000,000 (50,000 shares of $100 par) of which $500,000 was held in the treasury for the absorption of its foreign subsidiary, the General Magnesite Co., Czecho-Slovakia. The Pennsylvania company has a capital of 180,000 shares of no par value and has issued $4,000,000 6 per cent bonds, to provide funds for refunding of current obligations, to furnish working capital and for the payment of the companies just taken over.

Fire hazards connected with industrial operations and how to eliminate and control fire dangers will be shown at a fire prevention exposition to be held Oct. 2 to 7, at the Twenty-second Regiment Armory, New York. It is proposed to show the latest developments in fire-safe construction and also to demonstrate the proper appliances to be used in fighting and preventing fire. A. E. MacKinnon, 405 Lexington Avenue, New York, is chairman of the exposition committee.

TESTS WITH SPECIAL STEELS

German Results on Various Chrome-Nickel Steels at High Temperatures

A LONG paper by Prof. H. Edert, giving the detailed results of experiments carried out at increasing temperatures on five alloy steels, appears in the issue of *Stahl und Eisen*, June 22. The steels were in the shape of 25 mm. rounds (0.984 in.) furnished by the Friedrich Krupp Co., Essen, and were tested in heat-treated condition as supplied by the works. The composition of the steels is shown in the table.

Table of Composition of Steels Used

No.	Carbon	Silicon	Manganese	Phosphorus	Sulphur	Chromium	Nickel	Vanadium
1	0.31	0.22	0.010	0.025	0.27	0.06	1.90	1.53	
2	0.21	0.28	0.018	0.050	0.21	0.06	4.03	1.69	
3	0.37	0.20	0.006	0.046	0.28	0.03	0.03	2.38	0.58
4	0.12	0.49	0.006	0.048	0.36	0.05	1.49	15.8	
5	0.28	0.48	0.008	0.04[illegible]	0.09	0.[illegible]8	5.76	20.6	

The first three steels had been quenched in oil and drawn, the fourth quenched at 900 deg. in oil and drawn at 650 deg. C. in oil and the fifth quenched at 1200 deg. in oil. Tensile tests were carried out at ordinary temperature, and at 200, 300, 500, 600 and 700 deg. and in some cases at 800 deg C. Brinell hardness tests at 20, 100 and 300 deg. C. Also shock tests and bending tests were made. Details of the methods of heating the samples and carrying out the tests are given in the original paper, and the results are shown in a very interesting series of diagrams.

The low percentage chrome-nickel steels, Nos. 1 and 2, were found to be easy to work. They have a fine structure and take a good polish, and are suitable as construction materials for parts of machinery with exacting requirements where the least possible weight is required. They show great resistance against alternating stresses and shocks and also against separate heavy blows. It is recommended that in such cases the special parts be properly designed and large fillets be provided as the cross section changes. The steels can be used for temperatures up to 500 deg. C.

The chrome-vanadium steel, No. 3, is more difficult to machine than those mentioned above, but still can be worked fairly well. It has a remarkably fine structure, very suitable for wearing surfaces, and is suitable as construction material for parts with difficult requirements, because of its resistance to alternating stresses and shocks. It can be used up to 500 deg. C., but great care must be used if these temperatures rise to 600 deg. C. because the special properties given by heat treatment are lost.

The high percentage chrome-nickel steel, No. 4, is noticeable because of its great resistance to oxidation and chemical action. The test pieces carried to 700 deg. C. showed no coating of oxide. The steel can be machined with care. In regard to its hardness and other special properties, it is very similar to the low percentage chrome-nickel steels. It can, therefore, be used as construction material where the requirements are for tenacity and toughness and a considerable amount of resistance to chemical action. The temperature limit is about 600 deg. C.

The high percentage chrome-nickel steel, No. 5, has a fine nickel like color and like the other steels takes a good polish, and notwithstanding its comparatively low Brinell hardness shows considerable resistance to abrasive wear. It can be machined but with more difficulty than steels Nos. 1 to 4. It is necessary to increase the speed of turning or sawing or else to use harder tools. This steel is very susceptible to changes of shape, because of its plasticity. At a clear red heat it can be forged something like tool steel and in the cold condition is comparatively easily shaped by drawing, pressing or stamping.

The most important property of this high chrome-nickel steel is its remarkable resistance to chemical action; for instance, a polished section etched in nitric acid solution in alcohol for 5 [illegible]. was not sufficiently attacked to show the microstructure. Hydrochloric acid (1 per cent) in alcohol was necessary for 1 to 2 hr. This steel withstands high temperatures better than the other steels and annealing for 8 hr. at 100 deg. C. shows very little surface attack. Polished sections and other test pieces can be left without care in the laboratory for a year without being attacked. It can be used for parts of machinery, if consideration is given to the low elastic limit and the parts made correspondingly larger. It is suitable for places where resistance to rust, ability to take a high polish, resistance to sea water or other corrosive agents, or to high temperatures are required. It cannot be magnetized, is plastic and shows very great resistance to the formation of cracks.

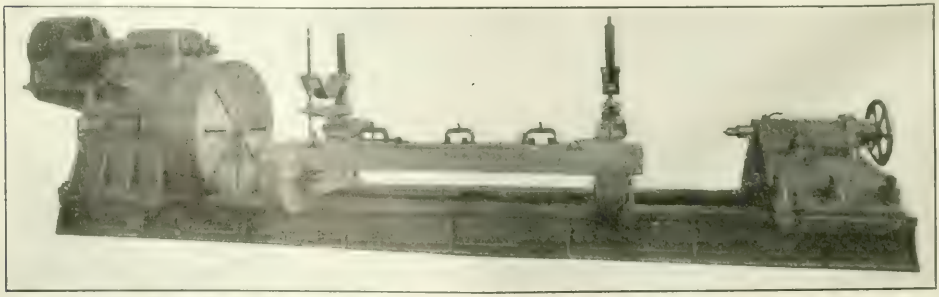
G. B. W.

Large Lathe for Chilled Rolls

A large roll lathe built recently by the Reading Iron Co., Scott Foundry dept., Reading, Pa., is shown in the accompanying illustration. It has a capacity for turning a chilled roll 42 in. in diameter by 120 in. length of body. It is driven by a 20 hp. variable-speed motor, the speeds of which range from 400 to 1600 r.p.m.

The main spindle bearing is 7¾ in. in diameter and all gears are machine cut. The face plate speed is four-tenths of a revolution to one and six-tenths revolutions per minute. Bearings are liberally proportioned and the entire construction embodies the strength needed for the heavy service for which the machine was designed. The total weight of the lathe shown is 35,000 lb.

Enough recoverable bituminous coal to meet the demands of the next 290 years, at present rate of consumption, lies in the Pennsylvania fields, according to a report of the State Bureau of Topographic and Geological Survey. The figure is given as 43,830,860,000 net tons, after deducting from the total known capacity of the fields the unrecoverable coal and waste. The amount already mined is put at 5,519,775,000 tons.



Lathe for Turning Chilled Rolls. The capacity is for rolls 42 in. in diameter by 120 in. length of body. A 20-hp. motor is used

METAL SCHEDULE

Little Change Probable in Final Consideration of the Tariff Bill

WASHINGTON, Aug. 15.—The metal schedule of the tariff bill probably will be changed little, if any, from its present form, when the measure is voted on by the Senate Saturday of the present week. Beginning this afternoon, the Senate started to vote without further debate on all committee amendments not disposed of, and at not later than 10 p.m. Thursday it will vote without further debate on all pending individual amendments. When the bill is brought to a final vote in the Senate on Saturday, in accordance with a unanimous consent agreement, it will have been before that body exactly four months. Discussion of the metal schedule occupied about six weeks of this time. It has been changed considerably, particularly with regard to certain raw products and the ferroalloy section, by the Senate as a whole, when compared with the form in which it was reported by the Committee on Finance. The most important changes have related to the transfer of manganese ore from the free to the dutiable list and sharp increases in the duties on ferromanganese, magnesite, and a small increase in the duty on fluorspar. The metal schedule as a whole now does not differ much from the schedule as it passed the House. Because of this, it is not likely that there will be much difference of opinion between House and Senate conferees on the metal schedule itself when it is sent to conference.

Work of the Conferees

The conference is to follow after the bill is sent back to the House, where the original measure was passed more than one year ago. It is the hope of Chairman McCumber of the Senate Finance Committee to have the conferees begin their work early next week. Senator McCumber has said that every effort will be made to have the measure reported out of conference within a few weeks and to have it enacted into law before the fall election campaign begins. In the event, however, that the measure is held up in conference, until a short time before election, the Republicans may prevent its passage at the present session, because of the fear of political reaction, should the measure not be given a chance to operate and to be understood before the political campaign is ended. Republicans deny emphatically that they intend otherwise to hold the measure in conference until after election.

The greatest point of contention in conference will be whether the House American valuation plan is to be discarded for the Senate plan, which provides for foreign valuation, subject to the provisions of the so-called flexible tariff amendment, which was adopted last Friday. This form of tariff is new in the annals of American tariff legislation. The question of constitutionality was raised by a number of Senators who were opposed to the plan because of what they declared is the danger of transferring the taxing power from the legislative branch to the chief executive.

Proposed Flexible Tariff

Briefly, the Senate granted authority to the President to increase or decrease the rates in the pending tariff bill until July 1, 1924. The original proposals for the establishment of a flexible tariff were considerably modified. The much mooted question of American valuation was disposed of easily in that now it will apply only to dyestuffs and coal-tar chemicals. Under the amendment adopted by the Senate, the United States Tariff Commission, in addition to the duties now imposed upon it by law, is directed to—

(1) Ascertain conversion costs and costs of production in the principal growing, producing, or manufacturing centers of the United States of articles of the United States, whenever in the opinion of the commission it is practicable; (2) ascertain conversion costs and costs of production in the principal growing, producing, or manufacturing centers of foreign countries of articles imported into the United States, whenever in the opinion of the commission such conversion costs or costs of production are necessary for comparison with conversion costs or costs of production in the United States and can be reasonably ascertained; (3) select and describe articles which are representative of the classes or kinds of articles imported into the United States and which are similar to or comparable with articles of the United States; select and describe articles of the United States similar to or comparable with such imported articles; and obtain and file samples of articles so selected, whenever the commission deems it advisable; (4) ascertain import costs of such representative articles so selected; (5) ascertain the grower's, producer's, or manufacturer's selling price in the principal growing, producing, or manufacturing centers of the United States of the articles of the United States so selected; and (6) ascertain all other facts which will show the difference in or which affect competition between articles of the United States and imported articles in the principal markets of the United States.

The import cost is defined as "the price at which the article is freely offered for sale in the ordinary course of trade in the usual wholesale quantities for exportation to the United States, plus, when not included in such price, all necessary expenses, exclusive of customs duties, of bringing such imported articles to the United States."

Penalizing Discrimination

The provision for penalizing discriminations against American trade is worthy of consideration and has been supported by iron and steel makers. The amendment provides that if a foreign country does not afford American commerce that equality of treatment which it is the American policy to grant, the President has the power to take more drastic measures and, if necessary, apply an embargo. It is necessary, however, for the President to find after investigation, that there is a discrimination. The additional duties are limited to the extent of the discrimination, but if the discrimination is maintained and continued, the importation of the merchandise may be prohibited entirely.

Considerable interest is being manifested in the appointment of the Senate conferees. While according to precedent the three ranking Republicans and the two ranking Democrats on the Finance Committee would be named, it seems likely that this custom will not be followed in the present instance. This is due to the fact that Senator La Follette of Wisconsin, a strong opponent of the tariff bill, is the third ranking Republican, and it is doubted that he will be appointed. In the event that he is not, it has been indicated that Senator Dillingham of Vermont will be named in the place of Senator La Follette.

Reductions in Pig Iron Rates from the South

WASHINGTON, Aug. 15.—Reductions in rates on pig iron from the Birmingham, Ala., district to Ohio and Mississippi river crossings are proposed in Speiden's tariff supplement filed with the Interstate Commerce Commission, to become effective Sept. 1. Carriers north of the Ohio river have not joined in any of the reductions, so that joint rates are not to be reduced and consequently the decreases in rates to consuming points north of the river arising from combinations will be due to the action of the Southern carriers only. The reductions to be made are proposed in addition to those that became effective July 1, when the general 10 per cent decrease went into operation. It had been previously intended by Southern carriers to effect joint rates with Northern lines, so as to make them applicable to consuming points north of Ohio river, such as Chicago.

The proposed reduced rates in gross tons are $3.53 to Cincinnati, Cairo, Ill., New Albany and Evansville, Ind.; $3.24 to Louisville and $4.24 to St. Louis. Previous to July 1, the rate now proposed to be $3.53 was $4.50. At present this rate is $4.05. The rate to Louisville was reduced from $4.13 to $3.71 and the rate to St. Louis was reduced from $5.74 to $5.16 when the 10 per cent cut went into effect. The through rate from Birmingham to Chicago was brought down from $6.67 to $6.01 at that time.

The Chase Metal Works, Waterbury, Conn., has added to its fleet of tractors four new towmotors, the product of the Towmotor Co., Cleveland.

Electric Motor Drive in Steel Industry

Mill Requirements for Adjustable Speed—Considerations of the Flow of Metal Under Rolling Pressure and Its Effect on Power Demands

BY GORDON FOX*

(*Concluded from page* 341, *Aug.* 10)

HAVING reviewed briefly the more general mill types, we may now consider the characteristics of the motors suited to their drive.

Mills revolving in one direction only may require either a constant speed or an adjustable speed. Continuous blooming and billet mills, sheet mills, three-high plate mills, rail, structural and merchant mills, are among

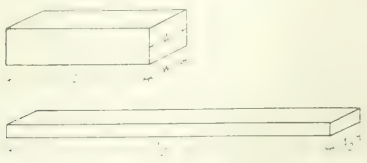


Fig. 7. Displacement Diagram for Rolling, in Which A_1 Is the Original Area, A_2 the Final Area, W the Width, L_1 the Original Length and L_2 the Final Length. The elongation E is $\frac{L_2}{L_1}$, while the [illegible] and the volume displaced, $L_2(A_1 - A_2)$

those frequently equipped with constant speed drives. Some of the newer mills are arranged for adjustable speed where the older mills managed with single speeds. Most constant speed mills are provided with wound rotor induction motors, both because of the suitability of this type and also because alternating current power is more readily available. Flywheels are used with many of these drives. The synchronous motor offers possibilities for application on some continuous mills which run at constant speed and fairly steady load, and which cannot well utilize flywheels. But it has insufficient starting torque where it is desired to reverse or back out a cobble. It can, however, develop sufficient torque to start against mill friction and inertia, and offers some advantage as to efficiency and power factor. Dynamic braking can be employed for a quick stop, if desired.

There are many reasons for the requirement of adjustable speed for some mills. Among these are the following:

Lighter materials may usually be handled and rolled at higher speeds without straining the mill or overloading the motor. It is usually desirable to roll the lighter sections as fast as possible, not only for production, but also to prevent excessive cooling.

The skill of workmen in handling the piece between passes may limit the mill speed. As this condition is subject to change and improvement, it is desirable to be able to adjust accordingly.

Some speed adjustment may be desirable to make up for variations in roll diameters. These diameters may vary as much as 20 per cent from original to final size.

It may sometimes be desired to roll some unusually heavy orders at low speeds to minimize the strain on the mill or to limit the power peaks, particularly with purchased power.

Some qualities of steel may dictate the use of lower speeds and lower temperature of rolling.

It may be of advantage to adjust the speed of rolling to obtain a constant finishing temperature, to maintain accurate gage and section.

It may be desired to adapt the mill speed according to the heating of the furnace, or the rate of shearing.

In a roughing mill slower speeds are desirable where heavier drafts are to be taken, as the metal then enters the rolls better.

Adjustable speed is of particular advantage at the finishing rolls—commonly a limiting factor of production. If adjustable speed is not provided, the speed for all products must be that suited for the slowest.

Where two or more stands or mills are in tandem, it will usually be necessary to adjust the speed of one to suit the others. This refers especially to the roughing and finishing groups of continuous or combination mills, where the metal is in several stands simultaneously. In mills of this general type it is also of advantage to be able to vary the relative speed of roughing and finishing rolls, according to the total

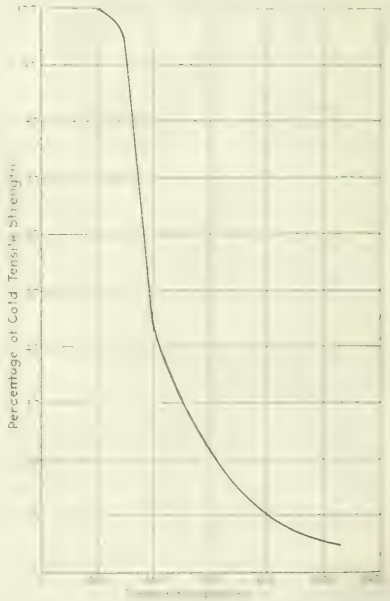


Fig. 8. Curve Showing the Variation in Tensile Strength of Steel at Different Temperatures, in Percentage of Its Cold Tensile Strength

elongation, and to apportion the reduction between the mills as desired.

An adjustable speed drive is used at the structural mill of the Inland Steel Co. at Indiana Harbor, Ind., to enable the piece to be entered at low speed and to enable the speed in the pass to be adapted to the length and section of the piece. A low entry speed is of particular benefit in rolling some structural shapes involving deep flanges.

[Here follow [illegible] of types of motors suited electrically to the several requirements outlined above.—EDITOR.]

neers won the Robert W. Hunt prize for the best discussion of some phase of the steel industry.

When the type of mill and drive are determined, the question of motor size demands consideration. Steel mill practices are largely empirical, being based on precedent and experience. However, as mills differ, it is desirable to have some measure by which data on known conditions may be extended in its application.

Little is known as to the flow of metal in the rolling process and no precise formula for power consumption can be derived. The governing factors are understood, however, and empirical methods have been developed for their application.

The load demand of a mill is composed of three components. The friction load is considered as the demand

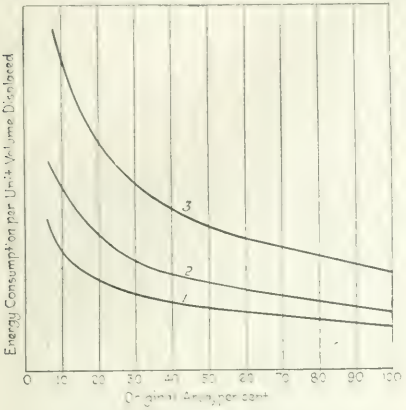


Fig. 9. Curves of Specific Power Consumption (Values of the Ordinates Were Withheld at the Source) in Which 1 Represents a Reversing Blooming Mill, 2 a Lauth Plate Mill Rolling Reheated Slabs and 3 a Billet Mill Rolling Reheated Blooms and Consisting of a Continuous Roughing Mill and a Belgian Finishing Mill

when the mill is running empty. This demand is in the nature of a constant torque with power in proportion to speed. The value of the friction load may be determined by test or approximated by comparison with similar mills. Reversing mills involve an element of inertia load due to the imparting and absorbing of the kinetic energy in accelerating and reversing the mill. This load may be calculated from weights and radii of gyration of rotating members based on a selected rate of acceleration. Flywheel effect is also an inertia load which relieves the motor as the speed drops and which adds to the motor load during acceleration periods.

The load demand incident to rolling is taken as including not only the power required for displacement of metal, but also the friction of the metal with the rolls and collars and the increased friction at the roll necks, spindles and pinions. It is evident that so inclusive a factor is not susceptible to theoretical calculation.

In rolling blooms, billets, slabs, flats, plates, strip and similar shapes, the metal is displaced almost entirely in the direction of rolling. It has been found that the power required to roll these shapes is consistent, provided similar rolling conditions maintain. In rolling special shapes in closed passes such items as side displacement, indirect pressure, collar friction and end thrust complicate the problem to such an extent that no formulæ are applicable and determinations of power must be based on precedent.

Both the volume of metal displaced and the elongation are used as the bases of formulæ for power determinations for simple rolling. It has been found empirically that the power consumed is proportional to the volume of metal displaced. Referring to Fig 7, *HP sec.* is proportionate to $L.\ (A_1-A_2)$. It has also been found that the power demand is closely proportional to the logarithm of the elongation. (*HP* is proportionate to log *E*.)

The volume displaced and the elongation in a given pass both depend upon the draft. This may be dictated by the number of passes available and the reduction desired. It is limited by the strength of the mill and by the allowable peak demand on the motor or on the power system. The possible draft is limited by the ability of the rolls to "bite." The larger the rolls the greater the draft that may be taken without exceeding the limiting angle of rolling, which corresponds to an arc of about 30 deg. on the roll periphery. The draft seldom exceeds 30 per cent, and is more commonly 15 to 20 per cent.

Some steels develop rough edges if heavy drafts are taken. The draft is often varied as rolling progresses. In rolling plate, for instance, the heavier drafts are taken on the first passes while the piece is hottest. The spring of the rolls then causes the piece to be thicker in the center. To eliminate this, the draft in the later passes must be conservative.

It is probable that, with relatively heavy drafts, the power consumption is increased by the fact that the average distance of displacement of the metal must be greater.

There are several factors which modify the power required per unit of volume displaced or per unit of elongation. Foremost among these is temperature. The power required is closely proportionate to the tensile strength of the metal. Fig. 8 shows how the tensile strength of steel varies with temperature. The usual rolling range is from 1800 to 2300 deg. Fahr. Cold rolling requires about twenty times the power of hot rolling, per unit of displacement. It is evident that the specific power consumption in the later passes may be relatively high. From the power viewpoint it is obviously desirable to roll at temperatures as high as possible.

From the viewpoint of quality of steel it is necessary to avoid too high an initial temperature; moreover, finishing at lower temperatures may give added strength. For instance, a thin plate rolled from a given slab will have greater unit tensile strength than a thick plate from the same slab, due to greater density and finer grain incident to the additional rolling and lower finishing temperature. A lower finishing temperature may also be of assistance in finishing to gage.

The quality of steel may influence its rolling power. The composition of steel does not greatly affect its strength at rolling temperatures, but high carbon and alloy steels should not be heated above 2000 deg. Fahr., for fear of burning and oxidation of alloys. They are therefore commonly rolled at lower temperatures, and thus require more power per unit displacement. The composition of the steel affects the action of the steel in rolling, rather more than the power requirement.

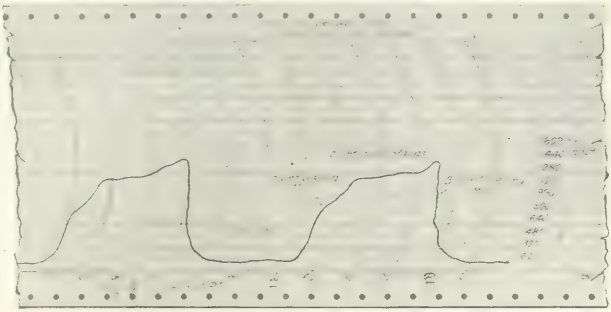


Fig. 10. Load Chart from the Continuous Roughing Mill Shown in Fig. 2 (Page 339, Aug. 10) Rolling 7¾ x 8 2-In. Blooms into 7⅝ x 0.315-In. Skelp

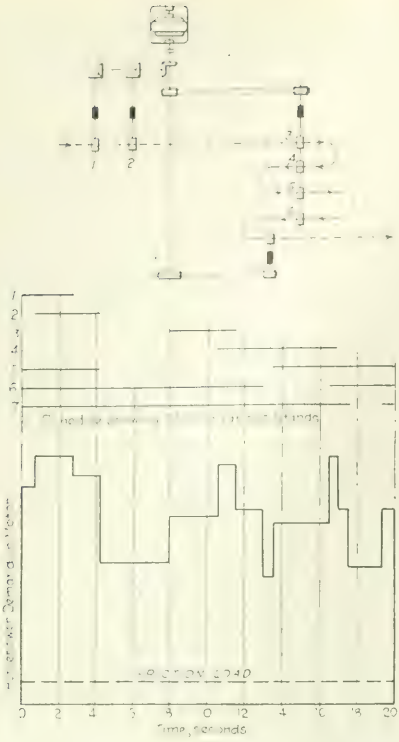


Fig. 11. Load Diagram of Combination Mill with Drive from a Single Motor. The diagram plan at top shows layout of the mill and power connections. In the middle is shown the timed schedule of steel in each of the seven stands

Some steels are hot short and the edges fray so that it is necessary to take lighter drafts and more passes.

Density of steel is a factor. The cast ingot is spongy and easily reduced. As rolling proceeds the metal becomes denser and somewhat more power is required to roll it. This action is particularly pronounced in cold rolling. The shape of the section is an important consideration, primarily with reference to the exposed area per unit of volume. Plates, for instance, expose more area than ingots and cool faster. The specific power demand therefore increases more rapidly as rolling proceeds. In the initial passes, at high temperatures, the specific power demand for different sections or pass shapes does not vary widely. In the later passes the variation is much more marked. It is characteristic of special sections, as a result of lateral displacement and forming the thin web and flanges, which cool rapidly and offer great resistance, that the power required for the later passes is relatively high.

The diameter of the rolls plays a part. A roll of large diameter requires greater pressure for a given draft because of the greater projected area of contact. The increased pressure on the roll necks increases the friction. Moreover, with a large roll there must be more slippage between roll and steel at the point of entry. Large rolls are necessary for reasons of strength and deflection, but they require more power per unit of metal displaced.

Because of the many factors involved, it is not possible to state any single value of kwhr. per unit of displaced metal to cover all conditions. Curves have been drawn from test data on various types of mills. These curves take into consideration, in a practical way, the modifying factors, particularly the rate of cooling, and serve as a guide for forecasting the requirements of proposed mills of similar character. Fig. 9 gives specific power consumption curves for a reversing blooming mill, for a three-high plate mill rolling reheated slabs and for a billet mill rolling reheated blooms.

These show, for instance, that when the piece has been reduced to about 40 per cent of its original area, the power consumed per unit displacement is roughly 150 per cent of that required for the first pass. This condition is primarily due to cooling and is therefore more marked in the case of plates and billets than with blooms, which hold their heat well. The curves are representative of zones in which fall test values from a large number of pieces. They are necessarily inexact.

The first step in the determination of motor size is the calculation of the load demand of the individual passes and the duration of each pass. The intervals between passes may be estimated, based on the character of the mill and the operation of the screw down, lifting tables or transfers, where used. Where stands or groups are operated in sequence, the slowest point determines the maximum rate of feed. The rolling schedule is based on these considerations.

With the above data available for perhaps several rolling orders, load cycle curves may be prepared by charting the loads of the individual passes and combining them where they overlap due to steel being in two or more passes simultaneously. In laying out such a chart, friction load is added, commonly considered as a constant demand. In considering load cycle charts, not only normal but possible abnormal conditions must be taken into account. The maximum possible output and probable average schedule must both be considered. The drive must have capacity to handle the maximum, at least occasionally.

If the load cycle is such that a flywheel is advisable the requirements may be determined from the chart. If a horizontal line be drawn representing maximum motor output, the flywheel must be able to supply the horsepower-seconds demand above this line. This general mode of procedure shows what effect can be obtained from flywheels of feasible dimensions. A study of the load cycle and the flywheel possibilities determines the motor requirements, both as to continuous and peak demands. Upon this information the motor selection is based.

In a continuous mill the steel enters the successive stands in rapid sequence and remains for some time in each stand. The resulting load is a sustained demand gradually applied and relieved, a most favorable condi-

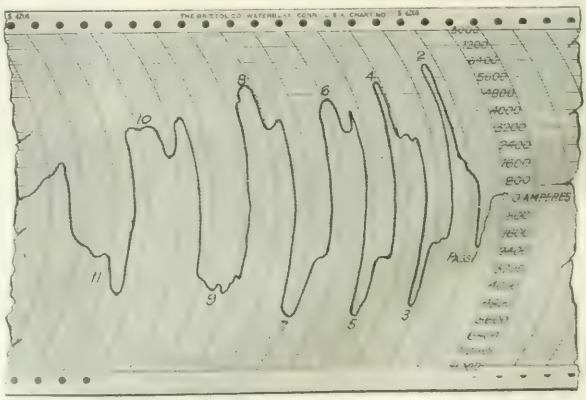


Fig. 12. Diagram of Current Supplied to Armature of a Plate Mill Reversing Motor Requiring Eleven Passes to Roll Open Hearth Slabs 8 x 24 In. into Plate 204 x ¼ In. The 500-hp. motor runs at speeds up to 120 r.p.m., with current up to 600 volts. The chart speed was 6 in. per min.

tion. Fig. 10 shows the load curve of the continuous roughing stand of the 10-in. skelp mill at the Mark plant, Steel & Tube Co. of America, when rolling 7¾ x 2 in. to 7⅝ x 0.315 in. As there are no severe peaks of short duration, there is no field for a flywheel, and flywheels are seldom used for continuous mill drives. The rolling schedule on a continuous mill is quite simple and definite, so that the required motor capacity can be determined with relatively good accuracy.

In mills involving several stands in train, or in Belgian or combination type mills, the rolling schedule is less simple and the individual pass demands will ordinarily overlap in such manner as to cause a load of fluctuating nature. Fig. 11 shows the layout of a mill having two tandem roughing stands followed by a guide mill or train in which the metal is looped between stands. The schedule shows the passes and their intervals, showing at a glance how the pass loads are superimposed.

It will be noted that the finishing pass is the limiting factor. The load chart, as shown, is based on a single group drive for all the stands. If the drive other installations are of value, but allowances must be made. Some mills can handle the steel more rapidly from the furnace to and through the mill. The steel is finished hotter and requires less power.

Operators differ as to drafts and passes and eventually tend to demand all the motor will stand. As operating skill improves, more output is expected. It is difficult to forecast accurately the future conditions under which a mill may be expected to work. In due time any limiting factors will be improved and motor capacity may eventually limit the output. It is therefore almost imperative that the motor selected be liberal for the duty contemplated at the time of installation. To a moderate degree reliability also justifies liberal motoring.

Flywheels are installed on Ilgner sets and on continuous running drives where the load is of a widely fluctuating nature. Where the passes are of short duration and the intervals relatively long, a flywheel serves to best advantage. Where the load is fairly well maintained, a flywheel can benefit but little. A proper flywheel permits the use of a motor of lower

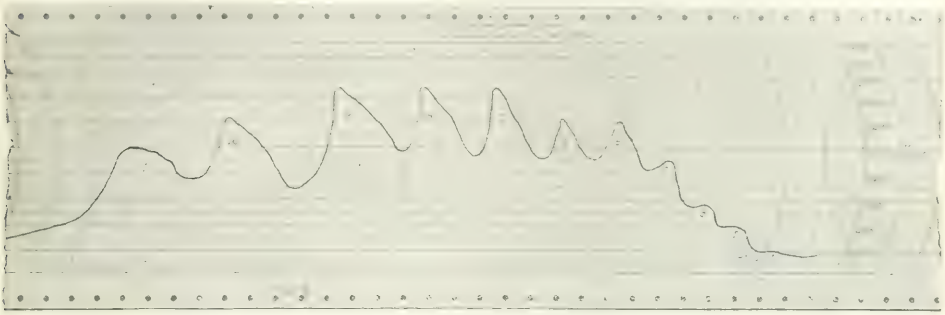


Fig. 13. Diagram of Kilowatt Input into the Ilgner Set of the Plate Mill of Fig. 12. The three-phase motor takes current at 2300 volts and delivers 1500 hp. at 360 r.p.m. The chart speed was 3 in. per min. This diagram was taken simultaneously with that in Fig. 12

were divided, the diversity factor would have less effect and the loads on the driving units would be more peaked. In a mill of this type, having separate drives for the roughing and finishing groups, it will likely be found that a flywheel may be used to advantage for the roughing drive but is not required for the finishing group.

The load on the motor driving a reversing mill involves the work done in displacing the metal, superimposed upon which is the friction load of the mill and the inertia load due to acceleration and reversal. About 30 to 40 per cent of the energy demand for a pass is for acceleration. About two-thirds of this is regained by regeneration in stopping before reversal. The nature of this load may best be seen from Fig. 12, a chart taken on the 30-in. universal plate mill at the Mark plant, Steel & Tube Co. of America, while rolling slabs 5 x 21 in. down to 0.250 x 20.5 in. The peaks due to reversal can be identified in most cases, as preceding the rolling load for each pass.

Fig. 13 shows the demand on the induction motor driving the Ilgner set. The effect of the flywheel in smoothing out the load demand is fairly evident, although more pronounced when rolling wider slabs. The load cycle of both the reversing motor and flywheel set may be computed in a manner similar to that indicated for other mill types, namely, by combining properly the component elements and by modifying for flywheel effect as selected.

In mills where passes are not superimposed, reversing mills and Lauth plate mills being examples, the power demand peaks during the first passes are high and short. The flywheel absorbs a considerable portion of this peak demand. During the later passes the peaks are lower but the demand more sustained, so that the motor then supplies about all the power required. The calculated power requirement and motor size should serve primarily as a basis of judgment. Local conditions have a bearing. Comparisons with peak capacity. Of often greater importance is the reduction of peak demands on the power system. The utilization of a flywheel requires slowing down under heavy loads. This, in turn, introduces slip losses, which are greatest at heavy loads. The slip permissible does not exceed 15 per cent, due both to low motor efficiency and difficulties in rolling with greater speed variation. The friction losses incident to heavy flywheels are an important item.

On the other hand, the increased efficiency due to better load factor at the power house may easily overbalance the added mill losses. The size of flywheel is usually a compromise. A flywheel large enough to absorb all peaks above the average load would usually be excessive in size and weight. The size of the drive in relation to the local power system has an important bearing. It is obvious that, if a flywheel is used on a drive having a range of speeds, it is less effective at the lower speeds. The selection of flywheel, motor and control should be based on their joint consideration, as they are closely related.

Motors equipped with flywheels are of the wound rotor type and employ either fixed or variable secondary resistors or a slip regulator. The use of a slip regulator affords most effective utilization of the flywheel by conserving the stored energy for use only during peaks.

Main drive motors may be direct connected to the mill or they may drive through rope, belt or gearing. Motors direct connected to the larger mills are necessarily of slow speed, many of them operating at about 80 to 100 r.p.m. Direct connected slow speed motors are of large dimensions; their efficiency and power factor are relatively low, particularly in the case of 60-cycle motors. Simplicity of drive and elimination of reduction gearing is their chief advantage.

Motors driving a group of tandem stands may drive through bevel gearing or through spur gearing or a combination of the two. Belt drives are also employed.

particularly for finishing stands, as a smoother finish is claimed, due to elimination of gear vibration. The herringbone reduction gear unit is slowly gaining in popularity. It enables the use of high-speed motors on low-speed mills. Herringbone gears are smooth in operation, eliminating largely all shock and back lash and thus relieving the teeth of much punishment. They permit wide speed ratios, if desired, and have an efficiency of about 98 per cent. The first cost of a complete geared drive is generally lower than that of a slow speed direct connected equipment, but the gear drive may require more floor space.

In the Lauth type plate mill, the central pinion in the housing may be made smaller than the upper and lower gears, obtaining a slight speed reduction. In the "Kennedy" housing the pinion is offset and larger gears are used, so that a reduction of four or five to one can be incorporated.

Many mills offer a choice between direct connection and drive through a gear unit. In some cases, notably in the sheet mill, the speed is so low that direct connection is not feasible and herringbone gearing is commonly used, so that a motor of about 240 r.p.m. may be used to drive the mill shaft at about 30 r.p.m. The use of a high-speed motor in connection with a gear unit is particularly desirable for adjustable speed drives of the constant horsepower type, where the auxiliary motor is mounted on the common shaft with the main motor.

Where a mill comprises a number of stands, groups or trains of rolls, the question of subdivision of drives is involved. Motor drive affords greater possibilities than engine drive for division of units. The principal advantages of such division are mechanical simplification and independent speed control. Isolation of the finishing rolls may also lead to better finish, through elimination of vibration.

Individual drive of the various stands of continuous mills has been suggested. Several advantages might accrue. Individual speed control would permit ready control of looping and allow adjustment for differing roll diameters, so that the exact relation required with grouped stands would not be necessary. This would reduce the variety of rolls required and permit leeway in turning individual sets. Any stand could be shut down and others adjusted to correspond. The piece could be finished in any stand and the final (later) stands stopped. Such an arrangement would eliminate considerable shafting and gearing and decrease the friction loss. These points are mentioned as suggestive of some possibilities of electric drive not yet fully developed.

The electrical efficiency of a reversing drive is necessarily a little low because of the conversions involved; it is of the general order of 66 per cent. Continuous running motors, either constant or adjustable speed, have efficiencies of the order of 85 per cent. The lesser friction losses in the reversing mill proper largely compensate for the lower electrical efficiency of the reversing drive.

Free Competition the Remedy in Coal Industry

Free competition involving "a gigantic struggle for existence" among the country's 10,000 coal mines in which "the fittest will survive" will solve the problem of too much coal and benefit the consumer, according to F. S. Peabody, Chicago, member of the American Institute of Mining and Metallurgical Engineers, and one of the leading bituminous coal men in the central competitive field. In a recent statement of his views Mr. Peabody asserted that over-development of the bituminous coal mines is adding $400,000,000 yearly to the nation's coal bill. Over-development, he figures, is costing about 80 cents on each ton of coal mined.

It is safe to say, according to Mr. Peabody, that the present developed capacity is fully one-third greater than any possible demand. The capital investment in active operations, he said, including developments and improvements and a reasonable coal acreage allocated to each mine, can be safely figured at two billions of dollars. The one-third over-development, therefore, amounts to nearly $700,000,000, on which the interest at six per cent is $40,000,000 per annum. There are approximately 700,000 men employed in the bituminous coal mines. The one-third excess amounts to 200,000 men, whose yearly wage figured at $1500 per man would come to $300,000,000.

"Under present conditions the mines must average at least 100 idle days per year. A coal mine cannot shut down on idle days without expense. Based on the actual experience of our company operating in 36 mines in 11 different districts, I figure that the cost of maintaining all of the mines in idleness for 100 days will amount to more than $50,000,000. "In dollars and cents, therefore, we have an item in the nation's yearly coal bill of about $400,000,000, which is directly caused by over-development. The normal consumption of bituminous coal in the United States, including the amount exported, is between 450,000,000 and 500,000,000 tons yearly. Over-development, therefore, is costing about 80 cents on each ton of coal mined."

"No solution has been presented that would effect the necessary cure," according to Mr. Peabody. "To those who have given the matter careful study," he said, "it would seem that the sensible thing to do is to do nothing. Under free competition, with general industrial conditions normal, the 10,000 units of the bituminous coal industry will be forced into a struggle for existence in which the fittest will survive and those least able to stand the strain of competition will be forced out.

It will take time, probably about ten years, but by allowing nature to take its course, we will have at the end of that period only the most efficient mines, able to produce coal at the lowest cost, and while the struggle for existence lasts competition can be depended upon to maintain a low level of prices. The situation is one that is bound to work directly to the benefit of the coal consumer.

Penn Seaboard—Carpenter Steel Merger Declared Off

It was announced on Aug. 5 that negotiations for consolidation of the Carpenter Steel Co. with the Penn Seaboard Steel Corporation have been definitely broken off.

It is stated that the Carpenter Steel Co. is now negotiating a merger with the Ludlum Steel Co., Watervliet, N. Y.

Iron Ore Output of Germany in 1918 and 1919

Data as to the German iron ore production in 1918 and 1919 have just been published in *Stahl und Eisen* for June 29. In metric tons they are as follows:

	1919	1918
Brown ore, under 12 per cent manganese	3,115,545	4,068,595
Brown ore, 12 to 30 per cent manganese	290,988	542,784
Manganese ore, over 30 per cent manganese	11,475	13,587
All other	2,735,826	3,289,951
Total	6,153,834	7,914,897

The average iron content of all the ores except the high (30 per cent) manganese ores, was 33.51 per cent Fe. in 1919 and 33.41 per cent Fe. in 1918.

Russian Steel Industries in 1921

Russia's pig iron, steel and rolled steel production in 1921 were as follows in metric tons, according to the *Mondliche Rundschau*, as published by *Stahl und Eisen*.

Region	Pig Iron	Open Hearth Steel	Rolled Steel
Ural	68,518	84,373	88,976
South Russia	29,025	52,432	90,631
Central Russia	18,640	27,404	21,916
Total	116,183	164,209	201,523

German Iron and Steel Prices Sharply Up

Increase in Hematite Is 40 Per Cent—Steel Products Are Advanced 10 Per Cent—Both Accompany Fall in Value of Mark

(*By Radiogram*)

BERLIN, GERMANY, Aug. 14.—The Eisenwirtschaftsbund has raised the price of pig iron, effective Aug. 21, by approximately 40 per cent above the prices prevailing the first of the month. The new price of hematite is 16,767 marks per metric ton ($20.02 per gross ton, at the exchange rate of 11¾c. per 100 marks.) This parallels falling exchange.

The Steel Syndicate has raised the price of bars to 21,070 m. (1.12c. per lb.); thick plates, exceeding 5 mm. (0.20 in.), 23,660 m. (1.26c. per lb.) and other products proportionately.

German Price Trend Continues Upward

Declining Exchange, Higher Freights, Increased Export Taxes, High Wages and Costly Coal Continue to Force Advances

(*Special Correspondence*)

BERLIN, GERMANY, July 26.—The steel market continues active, with complaints of a decline in certain classes of exports, the cause of which is more the intense domestic demand than foreign competition. The great price advance caused by the latest decline in the mark continues. In a few days the Steel Syndicate will meet to fix new prices. The Eisenwirtschaftsbund has announced considerable increases for pig. Pig-iron prices were last fixed on July 1 to hold for the month, with the usual "coal clause," providing for an automatic increase. This increase took place, and the supplements, of 600 to 700 per metric ton, automatically came into force. The prices fixed to-day hold good for August if coal prices remain unchanged. The current and July prices are as follows, in marks per metric ton:

	August	July
Hematite	10,760*	8,265
Foundry iron No. 1	9,868	7,915
Foundry iron No. 3	9,798	7,845
Siegerland steelmaking	10,092	7,845
Spiegeleisen	11,116	8,869

All these rates are more than 100 per cent over those of March. The price of 80 per cent ferromanganese has been raised from 17,855 to 18,580 m., 50 per cent from 16,698 to 17,380 m., and ferrosilicon from 10,120 to 12,620 m. The causes of the upward movement are, indirectly the exchange, directly the increased cost of imported ore, wages, and transport. Ore not only bears the increased net cost due to the mark's lower value abroad, but also the heavy increase in import duties. In accord with a reparations commission demand that taxes should be fixed to increase automatically as the mark falls, the Government has of late altered week by week the gold supplement on import duties paid in paper marks. This week the supplement is 10,400 per cent, or 105 times the scheduled rates. Under the latest railroad freight schedule, July 1, the cost of carrying foundry pig iron is 90 times the pre-war cost, for spiegeleisen and raw steel 134 times, for shipbuilding material 234 times, and for certain wire products 309 times. These increases are for specified distances.

Prices Held Down by Official Fixing

In spite of reserve by some buyers, who anticipate a mark-exchange recovery and a consequent price-fall, the market is strong; and there is an extreme shortage of heavy material, so that were prices not officially fixed they would rise very much higher. The shortage of pig iron is aggravated by the fact that furnace employees, like the coal miners, are leaving for the building and other industries. The foreign ore supply is sufficient and there is an increased demand for native ore, which cannot be satisfied because of desertion by the employees of the Siegerland mines. The demand for manganese ore is strong, and offers are few.

The newspaper theory that the low mark exchange may check export by making the mark unsaleable abroad is not accepted by Berlin financiers and business men, who point to similar scares at earlier mark crises, and declare that as long as Germany produces goods for export her mark, however low, will be bought by foreigners. Toward the end of June there was difficulty in exporting semi-finished material, because of competition from other countries, but at present exchange this difficulty is eliminated.

The domestic demand for bars is exceptionally strong and producers who weeks ago announced a "selling embargo" have prolonged this measure, and refuse to accept orders. Wire manufacturers also report plenty of work. The engineering branches lately reported sufficient orders, but this week there are signs of a reaction. The demand for agricultural machinery has slackened, and fewer foreign orders are coming in. The same is true of machine tools, sewing machines and typewriters. The report of the Association of Foundries for the second quarter of 1922 complains that loss of workmen to other industries and shortage of materials has severely checked expansion, and that export, Eastern Europe excepted, was unsatisfactory owing to the high import duties of certain western countries. The South German foundries are enjoying uninterrupted good business, but this is partly the result of suspended production during the recent metal-workers' strike.

American Cancellation of Cutlery Orders

Conditions in the small iron and high grade steel branches are good, but active business does not everywhere prevail. The Hagen district companies report that the last mark exchange fall did not cause any increase in orders. Solingen reports cancellation of orders and expects dullness, because of alleged over-importation of Solingen goods into the United States, with a view to evading the tariff increase. Solingen prices have been rapidly rising.

The latest domestic prices are about 450 per cent over those of midsummer, 1921. Wages are also tending upward. A skilled worker who on Jan. 1 drew 11.30 m. per hr., this month draws 25 m. Solingen is helped by the fact that part of its work is done in homes, so that strict enforcement of the eight-hour day is impracticable. The demand for locks, screws and certain other small iron products has been active since the last mark fall. Coal shortage in these branches is

*This price was later raised to 11,317 marks, as shown by cablegram published on page 389, Aug. 10.

more serious than ever. The Ruhr report for June shows a new heavy drop in output.

Further Amalgamations

The Phoenix Corporation of Horde, Westphalia, is about to establish new blast furnaces and coke ovens, as well as a works for conversion of slag into bricks. Merger plans are announced between the Lorraine group and the Westphalian Mining & Coal Exploitation Co., of Horde. The Siegen-Solingen Cast Steel Co., which before the war was in poor condition, has, following reorganization, increased its capital, and combined or established relations with several important companies, including the Weyersburg Kirschbaum bicycle company, which also makes firearms, and is the only German works permitted by the Allies to produce for the army. Further expansion for Siegen-Solingen is discussed and the corporation promises to rank with the Stinnes, Phoenix, Rhenish Steel and other large groups.

Wire Nails Imported by England

At a hearing in London on the proposition to place a tariff on wire nails, Oscar Moenich is reported by *Iron and Coal Trades Review*, in part, as follows:

The reason why, previous to the war, wire nails at times were very little dearer than ordinary wire, was due mainly to ordinary market fluctuations and to the fact that wire nails offered a favorable means of disposing of a substantial quantity of steel in simple form which might otherwise not be made good use of. Wire nails often are made from wire shorts, the market value of which is below that of ordinary wire.

Imports come from Belgium, Germany, Holland, Austria, France and from the United States, which, though enjoying an appreciated currency at present, is exporting nails to England at lower prices than those of Continental makers. The imports during 1912, 1913, 1920, and 1921 were as follows:

British Imports of Wire Nails, Gross Tons

	United States	Germany	Belgium	Holland	Total
1912.....	9,974	19,726	24,962	726	55,501
1913.....	6,732	19,959	22,827	470	50,246
1920.....	8,580	4,919	15,167	1,467	13,133
1921.....	3,456	5,500	21,217	1,744	35,600
1922*.....	578	2,874	6,753	716	.....

*First three months.

The fact that a number of (British) concerns which made wire nails during the war had had to discontinue this work was due largely to unecomonical working and to their having been established too far from the wire drawing mills. A German manufacturer stated that a man would produce 7½ tons of nails per month, or 90 tons per annum, so that the total number of hands required to turn out the 10,485 tons said to have been the British manufacturers' production during 1918 would only be 120.

CHINESE MARKET DULL

Merchants Await Political Developments British Prices Cut and Keep Buyers Out of Market Export Figures

(Special Correspondence)

SHANGHAI, CHINA, July 10.—It is difficult to find any improvement in steel in China. Nearly all steel importing interests in Shanghai report that business is practically at a standstill. A recent cut of 10 shillings per ton by British manufacturers has had the immediate effect here in China of keeping Chinese buyers out of the market. While there is no decided impression that prices will decline further, still the large Chinese buyers feel that in the absence of inquiries from the interior, it is safe to await political developments before going strongly into the market at Shanghai.

Hankow imports of copper ingots from America and Japan have been sufficiently large in the past few months to call for special comment. During the period Jan. 1 to May, 1922, the total imports of American copper ingots amounted to approximately 12,847,000 lb., of Japanese copper ingots, 4,706,000 lb., and of other foreign ingots through Shanghai, 1,177,000 lb. Hankow in recent years has replaced Shanghai as the center of the copper market for Central China. This copper is used almost entirely for minting purposes.

Chinese Iron Ore Exports Decline

Last year the export of iron ore from China recorded a distinct decline from 11,292,407 piculs (1 picul = 133.5 lb.) in 1920 to 8,517,162 piculs in 1921. Antimony ore decreased by some 3000 piculs and in 1921 stood at 19,459 piculs. Lead ore, zinc ore, antimony regulus, quicksilver and spelter all showed increases in 1921 but diminutions in quantities were returned for crude antimony, iron bars, iron plates and sheets, and tin in slabs, exports of tin receding from 189,940 piculs in 1920 to as low as 103,035 piculs in 1921. Tungsten ore exports totaled 39,054 piculs last year.

Visible supplies of iron and steel are ample for the needs of the country for another three months. In some lines heavy stocks are being carried, while in others stocks in warehouses cannot be said to be large.

EXPORT BUYING LIGHT

Japanese Buying Confined Largely to Government —United States Imports Foreign Iron

NEW YORK, Aug. 15.—Export trade continues quiet, most of the buying from Japan being from Government sources. The Chinese market shows little activity. Purchases of South American countries are usually in small lots of well under 100 tons. Some pipe has been bought lately by Rio de Janeiro, Brazil.

Among the governmental and municipal inquiries in the market from Japan is a tender from the city of Nogoya, calling for bids on 2500 tons of grooved rails of 127-lb. and some 93-lb. sections, and including frogs, switches and other track accessories; bids closed Aug. 10. The Imperial Government Railways are receiving bids on 400 tons of beams. One of the large Japanese houses in New York has booked an order for 32 miles of 12-lb. rails and one mile of 40-lb. rails for shipment to Formosa. The city of Osaka has purchased 250 tons of structural material through a Japanese exporter and there is an inquiry now current for 850 tons of reinforcing bars from a private source.

Black sheet business is still dull. Lately a considerable interest has been manifested in Japan in No. 1 heavy melting steel. Some heavy melting steel has been shipped from the Pacific coast, as recently reported in THE IRON AGE, and a number of Japanese export houses are now handling inquiries for tonnages of various size. Japanese exporters here are obtaining quotations on scrap f.a.s. Boston, New York or Philadelphia, as well as f.a.s. Pacific coast ports.

Pig Iron Imports

Importations of foreign pig iron continue fairly heavy. Some export and import houses are bringing in small tonnages of Scotch iron, usually of 100 tons to an order, which is being furnished to small foundries in the New England district. One company which handles large quantities of ore and pig iron is selling foreign iron of Belgian, Luxemburg and French origin to pig iron dealers and in the past week or ten days has received shipments of about 9,400 tons at prices c.i.f. Atlantic port, ranging from $22.50 to $25 per ton, according to analysis. Scotch iron is evidently the most popular and the average quotation recently made on No. 3 Scotch iron, c.i.f. New York, has been about $26.80 per gross ton. Iron quoted at this price generally analyzes about 2 to 3 per cent silicon; 0.01 to 0.05 per cent sulphur; 0.3 to 0.4 per cent phosphorus and 0.8 to 1.20 per cent manganese.

British Pig Iron and Steel Output for July

LONDON, ENGLAND, Aug. 14 (By Radio).—The production of pig iron in Great Britain in July was 399,100 gross tons and that of steel ingots and castings 471,100 tons. These compare with 369,200 tons of pig iron and 400,200 tons of steel ingots and castings in June.

The pig iron and steel output for Great Britain by

months so far this year has been as follows in gross tons:

1922	Pig Iron	Steel Ingots and Castings
January	288,000	327,500
February	300,100	418,800
March	389,800	549,100
April	394,300	404,200
May	407,900	462,300
June	369,200	400,200
July	399,100	471,100

The July outputs of both pig iron and steel are the second largest month of the year in each case. The 1921 pig iron production averaged 217,600 tons per month and the steel output 302,100 tons per month. In 1913 the two figures were 855,000 tons and 639,000 tons per month respectively.

Swedish Pig Iron and Ore Output in 1921

The pig iron production of Sweden in 1921, according to data published by *Stahl und Eisen*, taken from *Kommersiella Meddelanden*, was 313,080 metric tons. The outputs for recent years are given as follows in metric tons:

1913	730,207 tons
1918	761,822 tons
1919	495,701 tons
1920	470,550 tons
1921	313,080 tons

The 1921 production is stated to be the lowest in 50 years. Only about half the blast furnaces of the country were in operation during the year.

The country's production of iron ore, including schlick, was 6,464,347 tons in 1921, or 43.1 per cent in excess of the 1920 production. The data for recent years follow:

Year	Mines Operating	Output, Tons
1913	295	7,175,571
1914	313	6,588,630
1915	323	6,883,208
1916	345	6,986,298
1917	388	6,217,172
1918	363	6,623,661
1919	308	4,981,110
1920	279	4,519,112
1921	240	6,464,347

Of the 1921 production 483,707 tons was "schlick," or low grade ore.

Improved Outlook for Machinery

"Within the last few weeks we have closed more machinery business than in any two months during the last year and a half," states F. C. Biggert, Jr., president of the United Engineering & Foundry Co., Pittsburgh. "It can be further said that there are now good prospects for a large volume of machinery sales, and every indication that the third quarter will close with our plants operating at a very satisfactory rate.

"For several months the roll foundries have been gaining ground and recently have been able to produce at nearly the old capacity, that is, the capacity prior to the extensions at American department, Canton. The new capacity at American represents an addition of about one-third over the previous total, and as there has not been an opportunity to develop new business to meet this additional capacity, we feel that our present scale of operation is satisfactory.

"We have been quoting very close prices and to keep busy, must continue to do this. Prices will doubtless rise; this will be mainly due to increased costs of material and labor which are sure to follow increasing demand. Increased prices due to these causes are legitimate, but increases due to carelessness, inefficiency and excessive profits are not legitimate and are to be continually guarded against in a rising market."

The company recently made a shipment of five carloads of rail rolls from its Canton plant, bound for the Tata Iron & Steel Co., Calcutta, India. This shipment represented approximately 240 tons of a total of 900 tons ordered.

Cost of living in Great Britain is estimated for July, by the British Labor Ministry, at 84 per cent above July, 1914. This compares with 80 per cent in June. The high point was reached in November, 1920, with 176 per cent above 1914; by November, 1921, this excess had fallen to 103 per cent.

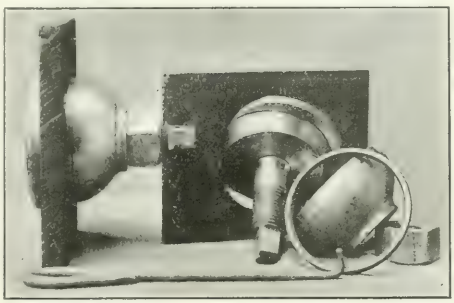
Safety Hand-Hole Plate for Boilers

The accompanying illustration shows a hand-hole plate designed for use on high or low pressure stationary or locomotive boilers and other places where a reliable hand-hole plate or plug is needed. An outstanding feature of this design is that a new gasket can be applied simply by releasing the pressure on the boiler. Each plate can be readily put in and taken out of the round hole that it closes, the hook shown being used to remove and replace plate where it is inconvenient to do this operation by hand.

A feature emphasized by the inventor is the oval flange that fits on the inside of the hole. This, it is claimed, is of suitable thickness so that it is impossible to blow it out with steam or water pressure, as the boiler would burst first. Another feature contributing to the safety of the device is the use of a metallic or copper gasket which will not go to pieces and blow out while under pressure.

There is no tendency to pull the plate through the hole by tightening the nut, as the gland on the cap simply pushes the gasket over the bevel of the plate. No strain is put on the boiler sheet. The joint is made by forcing a copper or metallic gasket over the bevel of the plate with the cap, tightening bell which has an extended gland on it of suitable depth. This cap fits over a central stud attached to a plate and by turning the nut the stud gasket is forced to find a seat against the wall of the hole, in this way making a very tight joint.

The nut can be tightened under pressure as the plate



Hand-Hole Plate for Boilers. A new gasket can be applied by releasing the boiler pressure

cannot be pulled through the hole. It is claimed that even if the stub should be broken off, danger of scalding is eliminated because the pressure on the boiler would hold the plate in place until the boiler could be emptied or the pressure blown off.

William C. Jacobs, 2011 South Seventieth Street, Philadelphia, is the inventor of the device.

New Micrometer Caliper

A new one-inch micrometer caliper, known as the No. 435 has been added to the line of the L. S. Starrett Co., Athol, Mass. It is intended as a low priced tool and is equipped with a ratchet stop if desired. The frame is drop-forged and black enameled. Decimal equivalents are marked on the thimble. The screw is 0.312 in. in diameter and the contact points 0.270 in., a construction intended to provide large wearing surface and assure long life.

In its exhibit of chains at the American Mining Congress Exposition, Cleveland, Oct. 9-14, the Morse Chain Co., Ithaca, N. Y., will have a 100-hp. chain drive in operation with rotoscope attached to show the rocker joint action as the chain enters and leaves the sprocket. A baloptican of the Bausch & Lomb Optical Co., which will show on a screen a series of chain-drive installations and views of the Morse plant will also be included.

Modern Blast Furnace Plant on the Yangtse

American Design Chiefly Followed—Assembling Costs at Hanyang Greatly Reduced—Steel Works and Rolling Mills to Be Built

BY EDWIN A. SPERRY*

WHILE the United States can point with pride to some of her model industrial plants it will be of undoubted interest to learn that there is under construction in China an iron and steel plant which has followed the lines of the most recent practice both in organization, and, as well, in technical equipment. While the plant is on no such scale as many in the United States, it reflects much credit on those who have backed the undertaking and goes far to indicate the growing tendency in China toward the progressive adoption of modern methods. It is the direct outgrowth of a careful study of economics and marks the beginning of advanced industrial undertakings in a country which has heretofore been given to unorganized effort. The location is near the well known Tayeh iron mines, descriptions of which have appeared in the technical journals. The company operating is designated as the Tayeh Iron & Steel Co. and is a subsidiary of the Han-Yeh-Ping Iron & Coal Co. which now operates the Hanyang Iron & Steel Co. at Hanyang, the Tayeh mines and the Pinghshiang collieries.

A brief history of the company and of the circumstances which led up to the establishment of this new plant will be of interest.

In 1890 Chang Tse-yung, then viceroy of Kwangtung Province, in which Canton is located, conceived the idea of establishing an iron and steel plant at Canton. Having been transferred to Wuchang as viceroy of Hupeh Province, he decided to erect the plant in that locality. As a suitable site was available at Hanyang, just across the Yangtse River from Wuchang, this location was decided upon and the machinery was brought from Canton where it had been landed, and the work of installation started.

In 1896 the plant was started up but ran for only a short time, being obliged to close down on account of the fact that suitable coke was not obtainable in China and had to be brought in from foreign countries at high cost.



Fig. 1. Portions of Hupeh, Hunan and Kiangsi Provinces, Showing Plant at Hanyang and the Later Plant at Tayeh, Farther Down the Yangtse River

Previous to this time, 1877, Sheng Sun-hwei, a prominent Chinese Government official, in his efforts to develop the mining industry of China, especially that of iron, instituted a search for workable bodies of iron ore. He soon found the Tayeh iron beds, secured the ground in which they were located and began development. These deposits had been worked some 300 years before and native smelting had been carried on, as is indicated by the name, which means "large smelter." Huge piles of slag indicate quite extensive operations at this time. The Hangyang works obtained ore and limestone from this district as there are large beds of a very pure limestone lying immediately adjacent to the ore beds.

After the shutdown in 1897 a reorganization was brought about on a more practical basis. Search was made for coal beds, which resulted in the discovery of these at Pinghshiang in Kwangsi Province. Investigation proved the coal to be suitable for coking for furnace use. Washing plants were installed and coke was made at the start in simple native coke ovens such as will be described later.

*Department of Mechanical Engineering, Pei-Yang University, Tientsin, China.

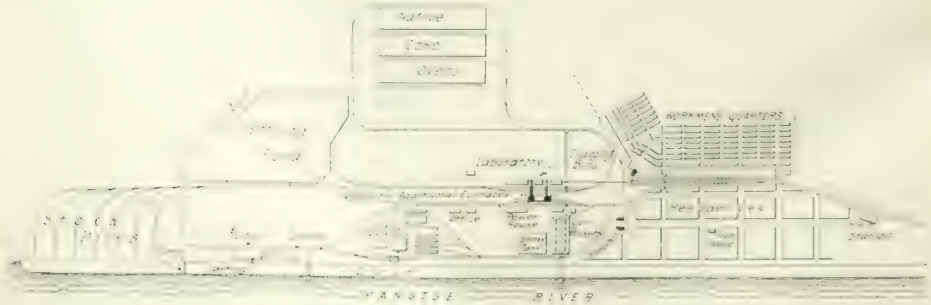


Fig. 2. Plan of Blast Furnaces, Coke Ovens and Auxiliary Plant





Fig. 4. Town from Furnace Head



Fig. 3. Original Conditions



Fig. 5. Main Street



Fig. 6. Company Clubhouse



Fig. 7. Coal Pockets





Fig. 8. Native Coke Ovens



Fig. 9. Ore Bins from Coal Incline



Fig. 10. Tapping Gallery and Fan House

The plant at this time consisted of two 60-ton blast furnaces, two acid Bessemer converters and a limited rolling equipment. The product proved to be unsatisfactory, so in 1905 a Chinese engineer was sent abroad with samples of the ore, coal and coke and specimens of the steel products. The problem was submitted to J. E. Stead, who determined that there was just too much phosphorus in the ore for the acid Bessemer and not enough for the basic Bessemer process, being on an average 0.05 per cent. He advised the use of the basic open-hearth process and it has given very satisfactory results.

The coal was washed and coked at Pinghshiang and shipped partly by rail and largely by water, as the railroad line had not then been built from Changsha to Wuchang as at present. The distance from the colliery to the blast furnace was about 300 miles and the coke required two handlings after loading at the ovens. This meant high transportation costs and large losses of coke caused by crushing. The ore and flux was brought up the river, a distance of about 90 miles, by barge at a heavy transportation charge. This also necessitated an extensive barge and tug equipment.

After operating under these disadvantageous conditions for a number of years, the company was forced to work out a method based on economic conditions and finally decided to start in on the erection of a thoroughly modern plant near the mines at Tayeh and so design it as to provide for progressively additional equipment, the completed plant to consist of eight blast furnaces with a capacity of over 3000 tons of pig per day, a steel plant and adequate rolling machinery.

In 1914 Dr. Z. T. K. Woo, general superintendent at the Hanyang works, was sent abroad to study the latest developments in the industry. Owing to the war, his work was practically confined to the United States, and after a year's tour of investigation he returned to China equipped with the latest plans and ideas.

In the meantime work was organized and started in surveying and grading the site, which consisted largely of flooded areas and hilly islands as shown in Fig. 3, for which the photograph was taken from the further bank of the settling pond looking toward the upper left-hand corner of the general plan, Fig. 2. The difficulties of the work are clearly evident and the results can be seen from Figs. 4, 5 and 6.

The essential changes which will be made in the methods of operation are: First, the coal will be washed at Pinghsiang and transported by boat to Tayeh, where it will be coked near the furnaces; second, the ore and flux will be transported by rail, with a short haul from the mines and quarries, and delivered directly to the charging bins. The economy of this plan seems obvious and need not be discussed here.

Provisions have been made for receiving the coal in a large storage pocket shown in Fig. 7. This is constructed of concrete and has a system of underground roadways so arranged as to make it possible to load cars from any one of the divisions. This roadway passes under the tracks for some distance and then, by a gentle incline, rises to the loading house where it is transferred to cars in which it is delivered to the coking plant. At present the simple native ovens will be used, the design of which is indicated in Fig. 8 which shows them in process of construction. Eventually, by-product ovens will be built on the site of the native ovens and the gas from these will be used for generating electric power to be used at the plant and the mines. The coke is brought to the furnaces in buckets ready for hoisting and charging.

The ore and flux will be brought to the furnaces

over a trestle and delivered to the bins shown in Fig. 9. These bins are also of concrete, with trackways beneath. Electric trolleys operate on these tracks, bringing the material to the charging inclines in buckets ready for hoisting to the furnace head.

The water circulation is derived from a settling pond from which it is pumped to an elevated tank 46 ft. in diameter and 36 ft. in depth, with an estimated capacity of 3,600,000 gal. or 1500 tons of water. From this tank it is supplied to the furnaces and is then delivered to a spray cooling pond from which it is returned to the tank. In times of low water the supply in the settling pond is maintained by pumping from the river through the pumping plant shown near the casting house in the general plan.

The gas from the furnaces is passed through a system of dust catchers and scrubbers and will be used for the heating of the blast. The surplus will be burned under the boilers for generating power, provision having been made for this in the construction of the boiler equipment. In heating the stoves, air is provided independently of the blast air. This is accomplished by the use of a fan located in the building situated between the two furnaces of each unit pair.

The pig is tapped at the tapping gallery, Fig. 10. It is delivered to a 60-ton ladle and taken to the casting house near the river bank, as shown in the plan.

The slag will be run into a granulating tank from which it will be conveyed by means of a heavy centrifugal pump to the ponds or depressions which will be filled in this manner. This pump is located in the same building with the fan which supplies air for the heating stoves and is directly back of the granulating tank.

The present furnaces have a crucible 15 ft. 5 in. in diameter, with a depth of 8 ft. 2 in. below the tuyere level or 9 ft. 10-in. below the lower end of the bosh. The bosh is 13 ft. 2 in. high and widens to a diameter of 22 ft. The shaft has a height of 51 ft. 2 in. above the top of the bosh, which with an additional height of 16 ft. 4 in. for the bells gives a total height of 90 ft. 6 in. from the bottom of the crucible to the charging platform. The capacity is rated at 450 tons of pig iron daily.

While the plant may be considered small by comparison, it must be remembered that it was only 30 years ago that any attempt was made toward adopting modern methods and that up to that time the most primitive and crude processes were used in the production of iron in China and that to this day many of these primitive plants are still in operation.

LITTLE TONNAGE ACCEPTED

Mahoning Valley Companies Conservative About Booking Orders

YOUNGSTOWN, Aug. 15.—Little new tonnage is being accepted by Valley interests, owing to the uncertainties attendant upon production and the desire to fill as much as possible needs of regular customers. Steel companies are making every effort possible to replenish coal supplies, but are meeting with indifferent success. Whereas the ruling price on Pennsylvania coal, run-of-mine, ranges from $8 to $10, one interest reports that it purchased, within the week, 30 carloads of coal, various grades, at $6.75, f.o.b. mine. A selling interest states it has offerings at $8.50, but cannot, of course, guarantee delivery.

It is the sharp advance in coal prices which is gradually forcing steel prices toward higher ground. Current fuel costs of $8 to $10 compare with $3.25 to $3.50, prevailing prior to July 1. One Valley independent filled its May-June coal requirements at $2.35, mine, buying Southern coal. High-priced coal is now entering largely into production, and it is very evident that it is having an appreciable effect on costs.

At the moment, buying of scrap has weakened, though steel makers are using larger tonnages than usual in their open-hearth departments, owing to curtailment of iron production.

In finished lines, there is firm demand for sheets, strips, tin plate, pipe, wire nails and bars, while plate demand has shown considerable improvement. The market on plates has moved to a minimum of 2c., ranging up to 2.10c., while one maker reports it has entered some tonnage, comprising the lighter gages, as high as 2.70c. Much of the current plate demand is for boilers and tanks. A Valley interest producing storage tanks reports active inquiry, with its capacity oversold several months ahead.

The spread on sheet prices continues from 3.15c. to 3.30c. for black, and 4.15c. to 4.30c. for galvanized, with still higher prices applying on tonnages where the mills put forth special efforts to expedite delivery. All Valley interests have well filled order books.

There has been quickened demand for full finished sheets from the automobile industry, with the chief independent making no effort to supply other than its regular trade. The Newton Steel Co. is pushing the installation of six additional mills at its Newton Falls property, and expects to have them ready for production around the first of the year. No action has yet been taken by the Falcon Steel Co. to proceed with the four mill addition to its eight-mill plant at Niles, which was under consideration earlier in the year.

Operations of non-integrated sheet rollers as yet show no abatement, and managers say sufficient bar supplies are in sight to maintain rollings at a normal rate through September. Such interests are getting in coal, but are paying the higher prices.

Little headway has been made by Valley independents owning coal properties in Pennsylvania, in increasing production. An interest operating its mines open shop has less than 100 men at work, and most of these are foremen or bosses. Production costs are increased by the necessity of maintaining guards.

As yet there has been comparatively little interruption to the outbound movement of steel products. Some Valley executives are more apprehensive, though, over shortage of cars, upon ending of the strikes, than ability to secure coal.

Valley furnace operators say indications point to an ample ore supply through the winter months and until the opening of navigation in 1923. Movement of ore over the Great Lakes routes has been substantial this year and it is expected furnace yards and lake docks will be well stocked by the close of navigation.

Steel Corporation's Unfilled Orders

The unfilled tonnage reports of the United States Steel Corporation for July showed 5,776,161 tons at the close of that month, or 140,630 tons more than reported on the books June 30, and the largest amount reported since April 30, 1921, when unfilled orders stood at 5,845,224 tons. The increase last month compares with one of 381,303 tons in June, 157,315 tons in May and 602,765 tons in April, and decreases of 353,079 tons, 100,609 tons and 26,736 tons in March, February and January, respectively. On July 31, last, the Corporation had 945,837 tons more of unfilled business on its books than it did a year ago. Following is the unfilled tonnage as reported by months since January, 1920:

	1922	1921	1920
Jan. 31	4,241,678	7,573,164	9,285,441
Feb 28	4,141,069	6,935,867	9,762,681
Mar 31	4,194,148	6,284,765	9,859,[illegible]
Apr. 30	5,096,917	5,845,224	10,[illegible]
May 31	[illegible]	5,482,187	10,942,[illegible]
June 30	5,635,531	5,117,868	10,978,817
July 31	5,776,161	4,830,324	11,118,468
Aug. 31	.....	4,531,926	10,805,038
Sept. 30	.....	4,560,670	10,374,804
Oct 31	.....	[illegible]	[illegible]
Nov. 30	.....	4,250,542	9,021,481
Dec. 31	.....	4,268,414	8,148,122

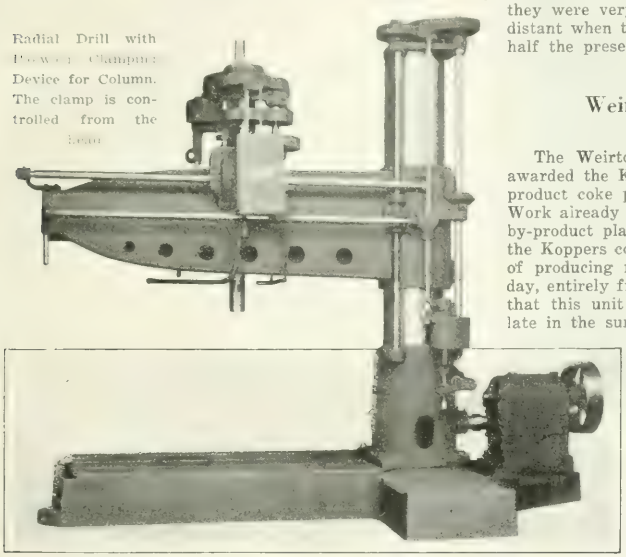
The largest total of unfilled orders was on April 30, 1917, when it was 12,183,083 tons. The lowest was on Dec. 31, 1910, at 2,605,747 tons.

The Steel Co. of Canada, Hamilton, Ont., is making extensive repairs to one of its blast furnaces, another of which has just been repaired and is ready to be blown in at any time.

Drill with Power Clamping Device

In drilling at the extreme end of the arm on a large radial drilling machine it is inconvenient for the operator to leave his place and tighten the swinging column with the arm at each shift of the drill. To obviate this, the Dreses Machine Tool Co., Cincinnati, has brought out a power column clamping device arranged as shown in the illustration. It was developed, it is said, because although pneumatic devices for this purpose have been successfully applied, not all shops have compressed air, and where it is available the piping to the machine is frequently expensive and inconvenient.

The device receives its power from the vertical driving shaft, which extends through the oval box. By means of friction clutches the screw below the box runs right or left handed, and a nut, to which is forked a lever, works on this screw. The hub of the lever is tapped and works on the column binding screw. The engagement of the friction clutches in connection with the screw is accomplished by a cam located on top of the box. The cam is operated by the splined vertical and horizontal shafts, a pair of bevel gears, and the lever and links attached and moving with the head, as shown. The friction clutches are self releasing and also slip at either end of the tightner-levers movement.



Radial Drill with Power Clamping Device for Column. The clamp is controlled from the front

The arrangement does not interfere with the hand-column clamping device in front of the column.

Manufacture of Pig Iron in New Zealand

According to the *Dominion* (New Zealand) the first tapping of the blast furnace at Onakaka took place on April 27. This furnace was erected by the Onakaka Iron & Steel Co., Ltd., which was formed for the purpose of developing a part of the extensive iron ore deposits of Golden Bay. The company, which has installed a modern plant for the production of pig iron, has its own supplies of coal, iron ore and limestone, and is able to get the ore and the limestone in an open quarry opened out not far from the furnace. The furnace is now, it is reported, running smoothly, no difficulties being encountered, and is tapped about every 8 hr.

As the furnace settles down to work, about 8 to 10 tons of pig iron per tap will be produced. The expert in charge is reported to be well satisfied, and to say that the iron produced is all that could be desired, and quite up to the desired quality.

Costs of raw materials, per ton of iron at the furnace, including royalty, labor and transportation are reported to be: Iron ore, 12s. ($2.70 at $4.50 per £1); limestone, 3s. (67½c.); coke, £2 ($9). Labor is not more than 15s. ($3.37½). It is estimated that coal from the company's mine, when opened up, will cost not more than 15s., including royalties, at the works.

The Basset Direct Steel Process

Whatever may be the future of the Basset direct process of steel making, it is clear that a large number of shareholders in the company are not satisfied with the complete absence of practical results, says the *Engineer*, London. M. Basset admits that there have been technical difficulties, which, he says, are all being overcome. There has been trouble with the linings of the rotary furnaces which were unable to stand the extremely high temperatures necessary for the success of this process. M. Basset also confessed at the general meeting that he is at present unable to produce steel to specification. This, he said, depends solely upon the furnace. Although large works have been equipped for the production of Basset steel the process has not yet entered the industrial phase but, said M. Basset, they were very near it, and the time was not far distant when they would be producing steel at one-half the present cost and exporting it to England.

Weirton Steel Co. to Build By-Product Plant

The Weirton Steel Co., Weirton, W. Va., has awarded the Koppers Co. a contract to build a by-product coke plant and motor fuel recovery plant. Work already has begun on the first battery of the by-product plant which will consist of 37 ovens of the Koppers company's new design, with a capacity of producing more than 600 net tons of coke per day, entirely from high volatile coal. It is expected that this unit will be completed and in operation late in the summer of 1923. Ultimately the plant will consist of three batteries of ovens.

The design of the ovens to be built at Weirton is the same as that of the five-oven battery which has been in operation at the plant of the Chicago By-Product Coke Co. for the past six months. Each oven will have a capacity of more than 14 net tons of coal per charge. This new type of oven is about 14 in. wide and embraces an entirely different system of heating than the old Koppers design. The ovens are so arranged that at any time they can be heated with either blast furnace or producer gas. thus releasing all the valuable coke oven gas for use in the steel works. The Chicago plant, with ovens like those to be constructed at Weirton, has been operating on an average coking time of 12 hr. and has been on as low coking time as 9 hr. 50 min.

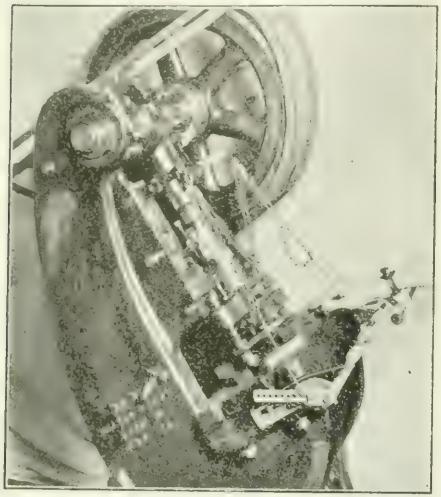
Valuation Engineers Wanted

WASHINGTON, Aug. 15.—The collection of the income tax becomes a complicated affair after it passes the point of figuring the return of the average wage earner. The technical staff of the Bureau of Internal Revenue is in need of valuation engineers in general mining, coal mining, oil and gas, and the forest industry. The positions pay from $3,600 to $4,800 a year. The United States Civil Service Commission will receive applications until Oct. 1. No written examination will be given; the ratings will be based upon education, training, experience and physical ability. The duties involve estimation of quantities, market values, value of equipment, cost of development, etc. Information and application blanks may be secured from the commission at Washington, D. C., or the civil service board at the post office or custom house in any city in the United States.

Device for Safe Operation of Presses

A safety device for use in connection with presses and drop hammers, and which is a departure from those controlled by a trip arrangement or operated by a side sweeping motion, has been placed on the market by the Gibbons Engineering Co., Worcester. It is said to be adaptable to any type of press, having any type of die.

The device is shown in the illustration attached to an inclinable press. It consists of two housings attached to the right and left sides of the platen of the press, which support a shaft that holds a right- and left-hand rocker bar or lever, the bar being keyed to the shaft. Two adjustable uprights hold the safety bar. Two independent and specially made chains, intended to assure the operator double protection, are attached to



Safety Device Installed on Inclinable Press. The safety bar can be regulated for various work

a perforated rocker lever arm as shown, and at a length equal to that of the press stroke, giving an angular motion of 6 in. The chain, after going through the pulleys, is placed in two open slots on a ram nut, and can be detached instantly. The ram nut can be attached at any convenient place over the slide-nut rest. This arrangement gives ram control.

A wrist strap with a metal part attachment on the under side is provided, as shown, the strap being made so that it will not twist on the wrist or slide on the operator's arm after adjustment. When adjusted it rests against the safety bar while the operator feeds work into the press. The safety bar having an angular motion controlled by the motion of the ram traverse, the operator's hand is removed from the danger zone on each downward stroke of the ram, by a natural backward movement, instead of a sweeping movement across the press. The wrist attachment also prevents the operator's hand from going into and over the die too far. Where a press is not provided with a standard non-repeating clutch, and the ram descends for any reason, the safety bar forcibly removes the operator's hand.

The backward-and-away-from the die motion of the safety bar can be regulated for any kind of work or for any physical characteristics of the operator. Regulation is by the safety bar itself and the side housings.

The Union Steel Corporation of South Africa is reported by the London *Ironmonger* to be busy, and although prices are being cut, it is prepared to cut still further in order to hold all the South African trade possible. It is now rolling 45-lb. rails, for which there is a fair demand, and before the end of the year it expects to be rolling girders and channels.

Unusually Heavy Building Construction

More industrial building construction was started in July than in any other month since November, 1920, according to figures compiled by F. W. Dodge Co. The amount is given as $31,882,000, or 9 per cent of the month's total of $350,081,000 for all building operations. The total is 2 per cent above that for June, 1922, and 65 per cent over that for July, 1921. It is greater than any previous monthly total except the record figures for April and May of this year, and marks the fourth successive month of unprecedented building activity.

Building contracts in the district comprising Illinois, Indiana, Michigan, Wisconsin, Iowa and Missouri, amounting to $124,655,000 in July, gave the largest monthly figure ever recorded. Construction in this district during the first seven months of 1922 has amounted to $595,668,000, or 29.2 per cent of the total of $2,041,065,000 for the 27 states covered (everything north and east of a line from Topeka, Kan., to Savannah, Ga.) The total is 60 per cent above the figures for the first seven months of 1921.

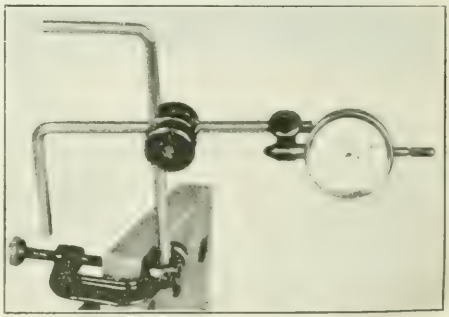
Drill Steel Survey

The comprehensive field survey conducted by the Bureau of Mines and the Bureau of Standards to determine the present status of heat treatment and breakage of rock drill steels has been completed. C. Y. Clayton and H. S. Burnholz, the investigators, recently visited some twelve mines. Data were collected from these mines on heat treatment, kinds of drills and steels in use, etc. A detailed report will be sent to the superintendents of the mines visited and it is probable that comprehensive reports giving the results of the investigation will be issued later as Government publications, to be available to the general public.

Universal Attachment for Dial Gage

An attachment, known as the Junior universal, for use with its Junior dial cylinder gage outfit, has been placed on the market by the B. C. Ames Co., Waltham, Mass.

The component members of attachment may be noted from the accompanying illustration, which shows also the set-up for proving the straightness of valve



Universal Attachment for Dial Gage Set Up for Checking Valve Stems

stems. It clamps in any position permitting gaging at any angle and may be attached to any object that will fit between the jaws of the clamp.

Indicating straightness of crankshafts, camshafts, thickness of piston rings and thickness of other material such as shims, bearing liners, etc., are among its uses. It can be used also in ascertaining the diameter of pistons and indicating the truths of fly wheels, gearbox shafts and angles. The universal attachment in connection with the dial cylinder gages provides a complete testing outfit, but where the cylinder gage feature is not required the attachment may also be used with the company's dial gage head.

Notes on Basic Electric Furnace Operation

Grade of Lime Necessary - Reducing the Phosphorus and Sulphur—Malleable or Gray Iron Castings— High and Low Tap Voltages

BY CHARLES WELLMAN FRANCIS

IN an article published in the preceding issue of THE IRON AGE* the author discussed briefly the charging of an acid furnace heat. This same method will apply to the basic furnace with the exception that in basic practice a certain amount of lime to form the oxidizing slag is either charged with the scrap or added after the charge is partly melted. The best grade of lime for this purpose is a metallurgical lime, high in calcium oxide and low in magnesia, as a high magnesia content will tend to make the melting sluggish and the slag formed will be heavy and hard to manage.

Removal of Phosphorus and Sulphur

An oxidizing atmosphere must exist in the basic electric furnace before the removal of phosphorus is possible, lime being the agent to promote this condition. The phosphorus in the steel having a greater chemical affinity for oxygen than the calcium of the lime, unites with the oxygen to form phosphoric pentoxide which is held suspended in the slag, this reaction taking place under fairly low temperature conditions. When the scrap is completely melted, this slag is drawn off as completely as possible. When a poor grade of scrap has been charged or a scrap high in phosphorus, and an extremely low specification for phosphorus is to be met, as is sometimes necessary with the finest grade of alloy steel castings, it is often necessary to throw another blanket of lime over the molten bath for the further removal of phosphorus. This slag is likewise removed and analysis shows that the phosphorus content is now extremely low and that we can proceed further with the heat.

The next procedure is to remove the sulphur in the steel. To accomplish this the exact opposite conditions must be attained, namely, a reducing atmosphere in the furnace which is obtained by a deoxidizing slag. The chief agent in obtaining this condition is carbon which is used in the form of ground petroleum coke, because this type of coke is the purest and has the lowest sulphur content. A mixture of lime and ground petroleum coke is then thrown on the bath to form this deoxidizing slag.

Steel chemists are still somewhat in doubt as to the exact chemical reaction which takes place at this point, but it is generally conceded that some of the carbon unites with the calcium of the lime to form calcium carbide while the remainder combines with the oxygen to form carbon monoxide and carbon dioxide. In 15 to 20 min. a test of this slag is taken from the furnace on the end of a hook and if its ingredients are right it will appear as a black, spongy mass which on being exposed to the air disintegrates and crumbles away to a grayish white powder which smells strongly of calcium carbide. This slag is known as the carbide slag or white slag, and its presence indicates that sulphur has been eliminated to a high degree. The existence of this slag indicates a state of chemical equilibrium, so to speak, and so long as the slag can be kept in this condition the analysis can be held constant for an indefinite time. An analysis taken at this time will be accurate and representative of the underlying metal and is the basis for figuring the final ferroalloy additions.

Non-Removal of All Oxidizing Slag

There is one essential point regarding the above process which cannot be emphasized too highly; that is the importance of the removal of all of the oxidizing slag before the deoxidizing slag is added to the bath. If some of the first slag be allowed to remain on the bath when the second slag is added, the phosphorus which is being held suspended in the first slag as phosphorus pentoxide will be liberated because of the fact that the carbon in the second slag has a greater chemical affinity for oxygen than does the phosphorus. Carbon dioxide will be formed and the phosphorus thus liberated will once more enter the steel, and probably raise the phosphorus content above the desired specification.

The following actual example will illustrate this fact in a very marked manner: The writer was called upon to meet a specification of 0.020 per cent phosphorus or under and the only available scrap for the purpose was automobile turnings, which during the period of the war were actually analyzing as high as 0.11 per cent phosphorus. Needless to say that it required anywhere from two to five oxidizing slags to bring the phosphorus to a point within reason. We found that it was necessary to get a phosphorus test analysis of 0.008 per cent to 0.01 per cent before we could proceed with the heat because, when the slag under which this test was taken was removed and the deoxidizing slag added, we found that the average pick-up of phosphorus was enough to bring the final phosphorus analysis just within the specification of 0.020 per cent in many instances. This increase was due to the liberated phosphorus from the oxidizing slag, brought down into the bath by the carbon in the deoxidizing slag, as certain portions of this slag adhere to the banks and are next to impossible to pull out of the furnace.

Gray Iron Castings and the Basic Furnace

The higher the carbon content the easier it is to obtain the white or desulphurizing slag. This is one of the reasons why the basic electric furnace is an ideal means for making pig iron, malleable or gray iron castings in view of the fact that high sulphur cannot exist in the presence of high carbon on a basic bottom. Thus iron practice in the basic electric furnace resolves itself into one operation, namely, that of removing the phosphorus. At this point, however, we encounter considerable difficulty in some instances because the removal of phosphorus cannot be facilitated to any high degree in the presence of a high carbon content. Hence in the manufacture of irons where it is out of the question to secure a low-carbon melt, a low phosphorus scrap for charging must be resorted to, and iron practice in general becomes a melting and recarburization process.

In making the ordinary grade of medium steel for castings on a basic bottom it is seldom necessary to use more than one slag, provided a good quality of scrap is used in which the phosphorus analysis shows a basic specification. In some cases, however, where the melt down shows a dirty slag, it is often advisable to remove this slag, as the white slag has a tendency

*In the issue of July 27, p. 201, the author discussed the choice of an electric furnace; in the issue of Aug. 3, p. 277, the economy features of electric foundry design and equipment, and in the issue of Aug. 10, p. 345, acid electric furnace practice.

to make a quicker appearance under these cleaner working conditions.

High and Low Tap Secondary Voltage

Some of the present day furnace builders have their equipment so designed as to supply the secondary voltage at two distinct values, or high and low tap as they are respectively termed. This feature has a decided advantage for basic operation in that it permits the use of a short arc on the low tap connection which is made use of after the heat has been melted and the deoxidizing slag has been added. With the lower voltage a better control of the metal temperature is assured, resulting primarily in longer life of the refractories due largely to the fact that the short arc, being partly smothered by the puffy basic slag, causes considerable less reflection on the roof and side walls. On the other hand, the long arc caused by the high tap connection is stronger and tends to scatter the slag away from the ends of the electrodes, thus baring the metal in spots and causing a stronger reflection to play on the roof and side walls which will tend to make them drip in a short time, to say nothing of burning the carbon out of the deoxidizing slag as can be readily seen by the dense black smoke which arises through the electrode eyes. With the proper adjustment on the switchboard rheostats, the heat can be held under the short arc for an indefinite period without detrimental effect on the refractories.

Basic electric furnace practice differs greatly throughout the country, and it is rare to find two shops who make use of identically the same practice. This is due in many instances to the difference of opinion of steel melters, local conditions as applied particularly to the scrap market, and the class of work handled by the various shops.

Passing Rivets with a Rivet Gun

The accompanying illustration shows a Penflex rivet gun of the Pennsylvania Flexible Metallic Tubing Co., Philadelphia, in use at the yard of the New York Shipbuilding Co. The components of the rivet passing outfit shown are a compressed air tank, a foot treadle mechanism to release the air, a compressed air inlet, shown at the right side of the tank; a head or body



The Heated Rivet Being Placed on the Valve, Which Re-closes Automatically After Passing the Foot Lever Releases the Compressed Air and Sends Rivet on its Journey

into which the rivet is inserted; metal tubing for transmitting the hot rivets, and a receiver into which the rivets are shot.

The gun and the forge are conveniently located in an out-of-the-way place and the tubing led to the job. As each rivet is heated and ready to be passed it is set by the heater on a valve provided in an opening contained in the head of the gun. The rivet opens this valve by its own weight and enters the machine. The valve recloses automatically and the rivet is sent on its journey simply by pressing the foot treadle. The latter operation releases the compressed air, which has been supplied to the tank, into the head of the machine, and speeds the hot rivet through the flexible tubing. The rivet is shot into a receiver at the other end, where the holder-on removes and inserts it in the hole.

The rivet gun has a distance capacity of 125 ft., delivering rivets up or down at the rate of 50 ft. every three seconds. It is claimed that the gun has even exceeded this performance, shooting rivets 180 ft. in nine and a fraction seconds without subjecting the rivets to change in temperature.

One of the outstanding advantages afforded by this equipment is that it eliminates the necessity of placing rivet forges in closed compartments, keeping the fires and their fumes out of closed places to the benefit not only of the riveting gang, but also of other workers there. Delivering heated rivets to points of operation difficult for direct passing facilitates work in inaccessible places, and passer boys are not needed. As to air consumption, data furnished would indicate that this equipment does not materially increase the total requirements of compressed air per rivet on new construction and a substantial reduction in rivet passing costs is claimed by the makers. Prevention of a high percentage of accidents in bridge building and structural work caused by faulty rivet passing is also a feature. The equipment is particularly adaptable to building steel masts in place.

Agents for Caucasian Manganese Ore

The Association of Manganese Ore Miners of the Caucasus, in which the Georgian Government holds a substantial interest, has appointed the Iron & Ore Corporation of America, 11 Broadway, New York, agent for the United States for all manganese ore coming from the Caucasus. Paul G. Leoni, president of the company, who recently returned from a two months' business trip to Europe, told in an interview with THE IRON AGE of having completed negotiations by which the Iron & Ore Corporation of America will handle all sales of Caucasian manganese ore and manganese dioxide in the United States.

Under the regulations of the Georgian Government, which controls the manganese fields in the Caucasus, all exports must pass through the Association of Manganese Ore Miners of the Caucasus, in which the government holds a substantial financial interest. Three cargoes of manganese ore, with an average analysis of 53 per cent manganese, were delivered at Baltimore in July.

Fuel oil is now being employed by the N. & G. Taylor Co., at its open-hearth furnace plant at Cumberland, Md., and by running emergency pipe lines to other departments of the works, it expects to reduce materially the need for coal. As it is, the company reports a stock of coal sufficient for full operation for six weeks and that changing over to using fuel oil will allow the plant to run several months with its present stock of coal.

Five 100-ton open-hearth furnaces are to be built by Alex Laughlin & Co., Pittsburgh, for the Wisconsin Steel Co., South Chicago. These furnaces are to be housed in an addition to the plant now in process of erection. The melting units are of heavy design, embodying modern features of regular furnaces.

Anti-Friction Bearings in the Steel Mill

Arguments For and Against Their Use—They Avoid Oil and Reduce Wear and Maintenance Cost—First Cost Is Heavier

BY A. M. MAC CUTCHEON

(*Concluded from page* 355, *Aug.* 10)

WHILE the history, manufacture and application or mounting of anti-friction bearings may be of interest to the engineer, the real question he wishes to consider is, what are the advantages of such a type of bearing, and what are the disadvantages. These are presented in summary form, compiled from information received from bearing manufacturers and from users of this type of bearing.

Advantages

1—Absence of oil. Steel mill electrical engineers have estimated that oil is responsible for 60 to 90 per cent of their motor troubles, causing injury to insulation, short circuiting of commutator bars, gumming of commutator, collecting dust and a general unsightly condition. The lubricant is more easily retained in a ball or roller bearing than in a sleeve bearing.

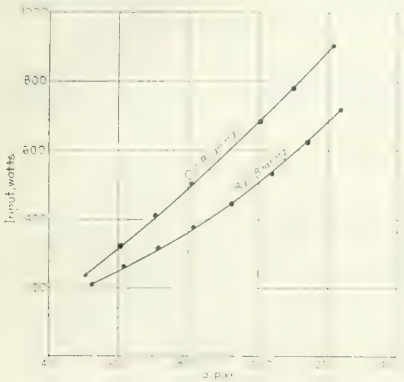


Fig. 11. Comparison of Losses Between a Ball Bearing and an Oil Bearing Motor. Each motor was 7½ hp., 230 volt, 800 to 2400 r.p.m.

2—Reduction in maintenance cost. Much less frequent attention need be given to the lubrication of a ball or roller bearing. The weight of evidence received from users of anti-friction bearing motors is to the effect that failure of bearings is much less frequent than on oil-ring bearing motors.

3—Reduced wear of the bearing, resulting in less frequent renewal, due to the lowering of the rotor, and the consequent decreased air gap at the bottom. This consideration is of particular importance on induction motors, with their necessarily small air gaps.

4—Increased efficiency. A record was presented of a test on a 3-hp., 1800-r.p.m. induction motor. Three motors were used, one equipped with ring oiler bearings, another with waste packed bearings and the third with ball bearings. The test showed the following efficiencies:

Ring oiling bearing	81½ per cent
Waste packed	80½ per cent
Ball bearing	84 per cent

Figs. 11, 12 and 13 represent the results of tests conducted under the direction of the writer. In the first case, Fig. 11, two motors normally rated at 7½ hp., 850 r.p.m., with 9¼-in. diameter armatures, were at different times belt driven by the same motor. One machine under test was equipped with oil-ring bearings and the other with ball bearings; in all other ways they were identical. The watt input represents not only the friction and windage losses of the machine under test, but also the losses of the driving motor. However, since the driving motor was the same in each case, the difference between the losses will represent the saving of the ball bearing over the oil-ring bearing.

The second case, Fig. 12, represents a somewhat similar test conducted on three motors, normally rated 30 hp. at 850 r.p.m. Motors were identical excepting the bearings; one was equipped with oil-ring bearings, a second with Hyatt roller bearings and the third with Hess-Bright ball bearings. In this test the losses of the driving motor were deducted from the watt input, and the only inaccuracy is that the losses shown include the belt loss. It is interesting to note that, at slow speeds, the reduction in loss with the use of ball bearings is not nearly so apparent as at high speeds. It is further interesting to note that the loss with roller bearings falls between the loss with oil bearings and with ball bearings, and more closely follows the line of the oil bearing loss at the high speed.

The third case, Fig. 13, represents the test on the same three motors, showing the number of seconds that the armature would rotate after shutting off the power, plotted against the speed. The results in this test closely checked in quantitative value the tests represented in Fig. 12. Sufficient tests have not been made to present conclusive evidence, and many more should be conducted, but so far as the investigation has proceeded, it appears certain that motors equipped with anti-friction bearings save power.

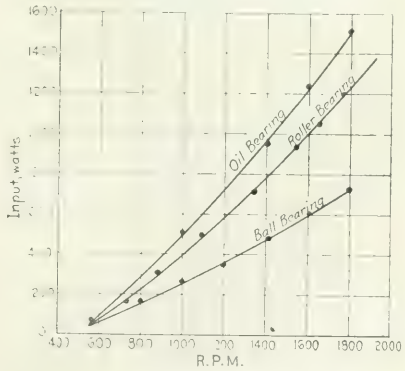


Fig. 12. Windage and Friction Losses of a Ball Bearing, a Roller Bearing and an Oil Bearing Motor. Each motor was 15 hp., 230 volt, 400 to 1600 r.p.m.

5—A considerably decreased torque may be used at starting. In the case of an oil-ring bearing, sufficient torque must be applied to break the contact of the shaft on the bearing metal before the oil film is established.

6—Anti-friction bearings make possible a considerable reduction in the overall length and in the weight of the end housing. Babbitted bearings are usually designed with the bearing length 2½ or 3 times the shaft diameter, whereas the length of the ball bearings is usually not over one-third of the shaft diameter. A ball bearing manufacturer states that a tabulation of standard motor sizes

and the steel mills, which have experimented with anti-friction bearings, indicate that these bearings have been successful; this experience should certainly be classed as a strong argument for the use of such bearings.

Disadvantages

1—Cost. The first cost of the motor will be greater, and two lines of motors will have to be manufactured, so long as the users of motors are not unanimous in opinion. A user changing to the anti-friction type of bearing, will have to carry two lines of spares until all of the oil-ring bearing motors have worn out or been replaced.

2—Difficulty in making replacements. It does not seem that it will ever be possible to replace a ball bearing so easily as an oil-ring bearing. To secure proper operation, it is necessary that the inner race be tight on the shaft, which prevents its easy removal. For steel mill operation, it

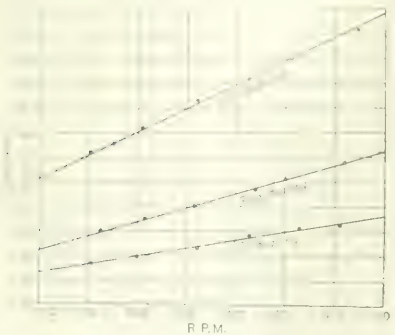


Fig. 13. Comparative Motor Drift of a Ball Bearing, a Roller Bearing and an Oil Bearing Motor, Showing the Period Taken by Each Motor to Become Stationary, After Power Was Shut Off, from Speeds of 1100 to 1650 r.p.m.

may be necessary to carry complete armatures with bearings assembled. This would certainly not be justified unless the reduction in the number of bearing troubles more than compensated for this extra expense.

bearings and assembling the armature in the frame. The oil-ring type of bearing does not require the careful assembly needed with an anti-friction bearing.

4—It is essential very carefully to protect anti-friction bearings in handling and installation. This is readily recognized as a disadvantage in steel plants.

5—The workman in the steel mill is unfamiliar with the mounting of anti-friction bearings, and the assembly of such motors. This must be charged up as a disadvantage, until the average worker becomes sufficiently familiar with this type of motor to be able to disassemble it without difficulty or detailed instruction.

6—In cases of armature grounding, current may pass through the balls or rollers and the races, causing pitting; in extreme cases actually fusing the race to the balls or rolls.

7—Under emergency conditions, where a spare bearing is not available, the oil-ring type of bearing may be babbitted or cast by any reasonably good workman. This is not possible with the anti-friction type.

8—The strongest argument against the use of the anti-friction bearing, or any other device, is the fact that it has not been thoroughly proved under actual operating conditions. Whether or not the anti-friction bearing will stand up as well as the oil-ring bearing under shock and unusual load conditions has not yet been conclusively demonstrated. Until the case for the anti-friction bearing has been firmly established, it must be recognized as being on trial.

Experience in Steel Mills

Some experience has already been gained by certain steel plants, and with their permission specific reference is made to their experience. The list is not complete.

The Youngstown Sheet & Tube Co. has equipped several crane motors with roller bearings. The company has also changed certain other motors over to ball bearings, and has bought some ball bearing motors. Experience so far has been satisfactory. The engineers feel that there are certain advantages in the use of anti-friction bearings, and so far have experienced no trouble, but do not feel that the bearings have been in operation sufficiently long to determine definitely that they are entirely satisfactory in heavy steel mill service.

The National Tube Co. has in operation at McKeesport a few small vertical motors with ball thrust bearings, which have given good satisfaction.

The Bethlehem Steel Co., Bethlehem, Pa., has replaced sleeve bearings with ball bearings on a motor driving a shear. Trouble with the sleeve bearing occurred, due to the fact that at each operation of the shear a shock was transferred back to the motor, and caused the oil to be forced out of the bearing, allowing it to run dry. Ball bearing motors have performed very well on the service. The company has also applied ball bearings to motors used in connection with grinding tools, where it was necessary to operate the motor in positions such that the oil would run out of the oil well. This application has been in operation for two years without any attention.

The electrical engineer feels that the success or failure of ball bearings in connection with motors depends largely on using balls of ample size to carry all pressure, and feels that a double row of balls should be used. The only argument that he advances against ball bearings is that, in case of failure, the bearing must be replaced with an entirely new bearing, or at least with a new set of balls. If the spare parts were not available, the motor would have to shut down, whereas if the sleeve bearing were used and no spare were available, it would be a comparatively simple matter to take out the old bearing, rebabbit and put it back into service. This, however, he considers to be offset by the fact that the sleeve bearing will wear out in a much shorter time than the ball bearing. With proper attention to the selection of the bearing, anti-friction bearings can be used probably more successfully than sleeve bearings.

The Carnegie Steel Co., Duquesne works, has equipped a number of motors with anti-friction bearings, and the experience gained in operating these motors over a period of two to six years indicates that troubles have been almost negligible. These have been caused, first, by the grounding of direct current armatures, making the ball races of bearings paths for the current, resulting in some cases in pitting the bearing, and in other instances in the complete welding of the bearing into a solid mass; secondly, the use of improper grease, which has destroyed the bearing surface. This company feels it desirable to inclose the anti-friction bearing completely in a cartridge.

The Illinois Steel Co. at Gary has installed a number of Hyatt roller bearings, which have given splendid results. The electrical engineer at this plant thinks that it would be a good thing to equip all constant speed motors with ball bearings—especially the induction type.

The value of crude materials imported for use in manufacturing was 35 per cent greater in June this year than in June, 1921, indicating again the activity of manufacturing, for the ratio for the month of May this year compared with May, 1921, was 34 per cent. The imports of "manufactures for further use in manufacturing" were valued at 75 per cent more in June than they were in June a year ago. This shows an increase over the high ratio for May, 1922, and May, 1921, of 164 to 100.

British unemployment during the first half of 1922 averaged 16.4 per cent, as measured by trade union returns compiled by the Ministry of Labor. The figure for June, 15.7 per cent, was the best month of the six. It compares with 23.1 per cent for the previous June—the coal miners on strike at that time being excluded. The total number of workers registered as unemployed at the end of June was 1,455,000.

Serious Coal Problems Being Faced

Distribution Will Involve Many Difficulties Even if Miners' Strike Is Settled—Congress May Not Be Asked for Legislation at Present

WASHINGTON, Aug. 15.—Distribution of coal strictly in accordance with the priority rules of the Interstate Commerce Commission having been ordered by the Federal Fuel Committee, the iron and steel industry faces a critical situation unless negotiations for settlement of the coal strike in all the coal States are brought quickly to a successful conclusion. Hope is entertained here that this will come about, but even under this condition sight is not lost of the seriousness of the railroad strike situation that still exists despite efforts of the Administration to have railroad executives and shopmen come to terms. The attitude of the railroad brotherhoods has increased apprehension and left the entire matter at a point where it may have to be fought out. The announcement that the President will address Congress in a day or two does not mean necessarily that he will ask legislation, though labor evidently is attempting to bring about action from Congress that would be favorable to it as to restoration of seniority rights and other points at issue in the face of the fact that the President has suggested, with most of the railroads agreeing, that the question of seniority right be left to the Railroad Labor Board, a Government body.

If the Coal Strike Is Settled

Yet with a quick settlement of the coal strike, and the railroad situation remaining unchanged, Government officials have expressed the view that by careful distribution practically adequate supplies of coal could be furnished for all needs. While the priority classification of the iron and steel industry probably would remain as at present, with perhaps a higher rating as to certain products, such as tin plate, oil country goods, steel for car repairing and building, etc., it is thought it could be supplied sufficiently to insure good operations and permit resumption of idle furnaces and steel plants. The shortage of fuel, however, has become so acute that supervision of distribution for several months seems to be a foregone conclusion, no matter how soon the strike may be settled, either in whole or in part. While there is a belief among some that it will require a considerable time to re-equip some coal mines before they could resume normal production, the general opinion is that virtually all of them have been kept in good condition and could begin full production practically at once. This latter view is shared by Fuel Distributer Spencer, among others.

Shipments to Great Lakes

The first application of the priority rules on a large scale was made yesterday when it was decided to ship 12,000,000 tons of bituminous coal by the great lakes to the Northwest. The tonnage for the Northwest is to be shipped before the close of the navigation season, 250,000 tons to move this week, 400,000 tons next week and the remainder at the rate of 1,000,000 tons each week. The latter depends largely, however, on the assumption that union fields in Pennsylvania will be reopened soon, but is complicated by the possibility of Pennsylvania State authorities making claim for some of the tonnage for that State. The shipment of such large tonnage to the Northwest will mean the taking of coal from districts which supply large quantities to the iron and steel plants. The estimate made is said to be conservative, however, and was arrived at by a delegation comprising members of the Northwestern Coal Dock Operators' Association and members of the Minnesota State Fuel Committee who presented the fuel requirements of five Northwestern States to Mr. Spencer last week. Distribution of lake cargo coal is in charge of C. E. Tuttle. Victor Palmer, of the Rice Coal Co., Cleveland, has been appointed as adviser to Mr. Tuttle.

Mr. Spencer said yesterday that it has been definitely decided to give coal to by-product coke ovens which serve public utilities with the provision that the coke may be taken over for distribution for domestic consumption. While there are comparatively few by-product plants serving public utilities, it is plain that even these, when connected with steel works, might be unable to keep their coke.

A great deal of the time of Mr. Spencer has been taken up in conference with users of coal whose necessities were declared to be such as to make it impossible for them to go through the routine of application to governors' committees and in conference with representatives of such committees. Orders for distribution of coal have been issued as the result of representations made by some of the conferees speaking for municipalities, etc. The Dominion of Canada has become a party to the arrangement for controlled distribution of coal following the conference of Canadian representatives who informed Mr. Spencer that Canada would co-operate to the extent of its ability and would undertake to distribute coal allotted to it. Mr. Spencer said that Canada is shipping some coal to the United States.

Needs of Public Utilities

Estimates have been made by the Geological Survey that public utilities east of the Mississippi River would require 765,000 tons of coal weekly and that railroads in that section would require 2,000,000 tons each week. At the rate of production of about 3,800,000 tons weekly east of the Mississippi River, there would be left a little more than 1,000,000 tons a week for distribution among food and feed producers, handlers of perishable goods, live stock, ice plants, and coke and fuel oil plants. The production is but 38 per cent of normal and it is recognized that the output must increase greatly if the plan of distribution is to be worked out satisfactorily and production of industrial plants, including iron and steel, is to be increased rather than further curtailed.

Users of Coal Object

Users of coal in various parts of the country have already shown strong inclination to deny the authority of the Presidential Distribution Committee to take contract coal from them and divert it to other consumers, but there has been no denial of the power of the Interstate Commerce Commission to prescribe priority and preference for the supplying and moving of cars loaded with coal where there might be a conflict with coal contracted for by so-called essential users. At the same time, doubt has been expressed by some as to the right of the commission to say that where there was no transportation disability, a mine operator should decline to furnish coal on a contract say to an automobile plant unless the operator had supplied coal to a food plant with which he had no contractural relations and would not have except through a committee appointed by a governor. A conflict also has risen between preferred users. Attorney General Daugherty has rendered a decision that coal orders under priority class 1 have preference over coal produced on contract made before the issuance of service order No. 23 between a mine operator and a public utility which is also a preferred user. These questions involve the duty of the mine operator as to the order in which he shall load coal in cars set by the railroads in accordance with the Interstate Commerce Commission's orders. The

Presidential Committee has stated in an announcement that "while it is desired to preserve the integrity of contracts as far as possible, the feeling is that general contracts must, in a measure, take secondary position to the meeting of particularly urgent coal necessities created under an exigency which has arisen since such contracts were entered into.

"Present plans of the Fuel Distribution Committee are that orders for class No. 1 coal shall be so distributed as not to disturb seriously the proper distribution of cars. All orders for coal considered to be within that classification will go to the district committees, which will apportion the orders among the mines in their districts."

Ford Railroad Hauls Coal to Detroit

DETROIT, Aug. 12.—Priority rules, which the Federal Fuel Administration at Washington has undertaken to enforce, make no provision for the continuance of operations of the automotive and allied industries, according to a statement issued today by William W. Potter, Michigan fuel administrator, upon his return from a conference at Washington with Federal Administrator H. B. Spencer. The statement occasioned considerable uneasiness here, as the bulk of Michigan's industrial employment is dependent upon the operations of the motor car and accessory factories. The question now being asked is how long will the motor industry be able to continue under available power resources?

The Detroit Edison Co. this week carried one of the heaviest power loads in the history of the company, indicating that most of the factories of the metropolitan area of Detroit are using Edison power to conserve their own fuel. The Edison company has 20 days' supply of fuel on hand not subject to priority rules and which will allow the company to give capacity service over that period.

Should motor car factories be forced to suspend operations, it is not likely that such action would be necessary much before Sept. 15 or Oct. 1 and this would not be a serious matter, except for the unemployment of workers, as the early fall months are among the months of the slack production season in the industry.

An arrangement has been consummated by the Detroit, Toledo & Ironton Railroad—Henry Ford's line—and the Chesapeake & Ohio whereby a large portion of the 600,000 tons of coal accumulated on the C. & O. tracks is being released for delivery to Michigan subject to priority rules of distribution. The coal will be handled by the D. T. & I. at the rate of 200 cars a day, as the Ford road minimum wage of $6 a day has kept all its workers on the job and it is not affected by the strike. The shipments will be distributed to public utilities, food and ice manufacturers of the State and a certain percentage designated for transfer at lake ports for reshipment by boat to other States.

With the Edison company taking care of its present power requirements, manufacturers in the Detroit area are immediately concerned with the problem of obtaining sufficient cars in which to move in raw materials and send out finished products. The car scarcity is becoming more acute each day owing to the constantly accumulating number of bad-order cars.

There is little indication, thus far, of a letting down of employment. John L. Lovett, manager of the Michigan Manufacturers' Association, says that there are approximately 7500 men out of work among the factories of the State and that 5000 of them are in Detroit as a result of curtailed operations. This he attributes to inability of manufacturers to obtain shipping facilities.

Chester M. Culver, manager of the Employers' Association of Detroit, reported, this week, 181,733 men employed by the 79 firms in the association. This is a decrease of 686 men compared with the previous week. He declares this slight loss is due to refinement of production methods rather than to the fuel or rail strike effects.

Secretary of Commerce Herbert Hoover informed Detroit newspaper representatives in Washington that Ford's railroad would not be permitted to haul any more coal to Michigan than the State is entitled to in spite of the fact that the D. T. & I. is unaffected by the strike. He declared that the D. T. & I. must work collaterally with the other railroads of the country under the supervision of the Government, for the good of all.

Approximately 250 cars of fuel are reaching Detroit daily from the Kentucky fields. The average requirements are about 500 cars a day, exclusive of railroad fuel.

Improvement in Conditions

WASHINGTON, Aug. 15.—Gradual improvement in traffic conditions on railroads serving non-union fields, together with slightly greater output in fields heretofore slowed down by the strike, resulted in an increase of 500,000 tons of soft coal during the nineteenth week of the strike (Aug. 7-12) when production, according to returns so far received by the Geological Survey, was estimated at 4,800,000 net tons. Even with this increase, production is still about 550,000 tons below the level reached before the shopmen's strike. There have been only very small gains in a few of the more strongly organized districts and the increase in shipments reported has come from those districts in which production was curtailed by traffic congestion during July. Mine reports confirm evidence of railroad shipments that the response to the invitation to reopen mines has been practically confined to the non-union districts of Pennsylvania and to the more weakly organized districts of West Virginia.

The growing scarcity of coal was reflected in a decrease in the output of by-product coke in the month of July. The total production for the month was 2,486,000 net tons, against 2,580,000 tons in June. The daily average production declined from 94,000 tons in June to 80,182 tons—a decrease of 7 per cent. The ovens were operated on the average at 67.7 per cent of capacity. Of the 71 plants, 58 were active and 13 idle.

In spite of the decrease as compared with June, the July rate of output was within 3 per cent of the average for 1920, the year of maximum output. The by-product plants of the country continue to be called upon to make good the deficit of beehive coke caused by the strike in the Connellsville region and elsewhere. The beehive ovens produced only 450,000 tons in June. The total output of all coke was thus 2,936,000 tons or 68 per cent of the 1920 average.

More Suspensions at Youngstown

YOUNGSTOWN, Aug. 15.—In the Youngstown district, the steel industry is marking time, pending termination of the coal miners' and railway shopmen's strike. In some quarters there is inclination to feel that the industry will show early recovery upon adjustment of the labor difficulties. In view of depleted coal supplies, affecting all grades, producers are resorting to fuel oil and natural gas wherever possible. The Republic Iron & Steel Co. has begun the use of crude oil as a fuel in its open-hearth furnaces, several units being fired exclusively with oil. The Youngstown Sheet & Tube Co. has resorted to this substitute with satisfactory results. Open-hearth furnaces of the Brier Hill Steel Co. are equipped for using natural gas, which is proving a very acceptable substitute.

Inability to maintain coke supply has obliged the Sharon Steel Hoop Co. to bank its blast furnace at Lowellville, Ohio. For some time the company has been endeavoring, without success, to cover on additional coke requirements, necessary to keep its furnace active. This suspension reduces the number of active independent stacks in the Mahoning and Shenango Valleys to four, and a total of 14, including Carnegie Steel Co.

furnaces, out of 47 in both valleys. No. 2 blast furnace at the Farrell, Pa., works of the Carnegie company has been ordered on the inactive list, which will again reduce the number of furnaces pouring by one.

Other suspensions include the Lower Union mills of the Carnegie company at Youngstown and the rod mill of the American Steel & Wire Co. at Farrell. All of the 88 puddle furnaces at the Girard plant of the A. M. Byers Co., Pittsburgh, are cold. The skelp mill at this property was scheduled to operate until Wednesday, when the plant goes down until transportation and coal supply improve.

Partially offsetting these curtailments are the resumption of the Bessemer department of the Sheet & Tube Company, the 132-in. plate mill of the Brier Hill Company and the operation of four bar mills at the Brown-Bonnell works of the Republic Iron & Steel Co., which were idle the past week.

It is, therefore, evident that operations are wholly dependent upon fuel supply. Steel making by the open hearth process continues virtually without change, except that one less unit is active at the Lowellville plant of the Sharon Steel Hoop Co. Of the 66 open hearths in the Mahoning Valley, 48 are charged, of which 34 are being operated by independents.

Sheet and tin plate schedules continue with little change, 106 of 113 sheet mills being scheduled at the beginning of the week, and 13 of 17 tube mills. This number is subject to fluctuation, of course, before the week is over.

Increased Production in Connellsville Region

UNIONTOWN, Pa., Aug. 12.—Notable increase in production has marked the situation in the Connellsville bituminous district. Shipments over the southwest branch of the Monongahela railroad set new records twice this week since the strike developed on April 1. Peak was reached yesterday when shipments over this branch were 441 cars of coal and 180 cars of coke.

Production in the Connellsville region for the week ending Aug. 5 was 75,370 tons, an increase of 2760 tons over the preceding week. Total production in the region since April 1 is 1,372,130 tons. Estimated production of coke during the week ending Aug. 5 was 75,370 tons. One hundred and twenty-nine ovens were added to the active list, 111 of these being at plants of the Frick Coke Co.

Efforts of the State Administration through cooperation with the Hoover commission to fix prices of coal are being resisted strenuously on the part of operators in the region. The Fayette County operators are opposed to the fixing of prices unless at a point sufficiently high to protect them against the risks which are being taken in the operation of their plants. Some of the operators point out that riot and strike emergency insurance rates are so high as to preclude policies on large plants and that the risk of such damage to the plants must be borne by the operators.

Publication here of stories under Cleveland date line that the union leaders were planning to desert the men in this region who have affiliated with the union has drawn sharp reply from union organizers. A statement signed by John O'Leary, William Hines, John D. Fagan and William Feeney declares that the union men in this region will never be deserted and that with a settlement in union fields the full power of the union will be directed back of the men in this region. Reports from Cleveland are at variance with this view.

There is very little spot coal or coke in the region, practically all of the production being shipped on consignment. Coal prices for available spot, however, are as high as $12 a ton; coke up to $15 a ton.

Two miners shot from ambush at plants in the region during the week died from their wounds.

While the production has been showing a steady increase, it is due almost entirely to the work of men imported into the region.

The county this week was brought to face an outbreak of typhoid fever in the tent colony of miners at Palmer. Eighteen cases have been admitted to county hospitals from this colony and two from a tent colony at Adah. State department of health officials have begun an investigation of all tent colonies in the region. The epidemic is attributed to polluted streams and springs. Arrangements for pure water supply were made at Palmer. So far the epidemic has been confined to that at Palmer and the two cases from Adah.

Regional Requirements of Coal

WASHINGTON, Aug. 10.—The problem of transporting coal supplies from Kentucky and the Virginias up the Great Lakes before the suspension of navigation is being given serious attention by the Federal Fuel Committee. A tentative figure of 250,000 tons per week has been agreed upon for immediate movement, but this figure may be changed at any time as the situation may be reflected in the daily figures on coal production and movement. Members of the Michigan State fuel committee have been in conference with Fuel Distributor Spencer regarding the acute fuel situation in that State.

An estimate of 765,000 tons of bituminous coal weekly as being required to meet the immediate needs of gas and electric public utilities and domestic consumers in the territory east of the Mississippi River is made by the United States Geological Survey. Of this amount, New England would require 9.2 per cent; the non-coal-producing states of the coast region exclusive of New England, 21.6 per cent; coal-producing states of the coast region, 22.9 per cent; and Ohio, Indiana, Illinois and Michigan 46.3 per cent. Railroads in the same territory will require 2,000,000 tons weekly, making a total emergency requirement of 2,765,000 tons. Coal is now being produced in this territory at the rate of 3,800,000 tons weekly.

The railway mechanical situation on coal-carrying lines in the Virginias, which has been hampering the shipment of coal, continues to improve with the importation of mechanics from eastern and western lines. The requirements of the Chesapeake & Ohio and the Norfolk & Western systems are said to have been practically met, and mechanics are now being diverted to the Virginian Railway. Shipments of coal from southeastern Kentucky are being retarded to some extent by conditions at Corbin, Ky., where more than 300 railway mechanical employees are said to have left their employment because of threats of violence. An unusual situation prevails in the western Kentucky field, where coal production is accelerated by the existence of a 100 per cent car supply.

Increase in Car Shipments

WASHINGTON, Aug. 15.—An increase in the number of cars that are being loaded daily with coal is shown by reports issued by the railroads. On Monday, Aug. 7, these reports showed that a total of 16,021 cars were loaded with coal. This total has been exceeded on only seven days since the miners' strike started on April 1, and then only by an average of a few hundred cars.

The number of cars loaded daily with coal on American railroads since Aug. 1 follows: Aug. 1, 11,783; Aug. 2, 12,218; Aug. 3, 12,177; Aug. 4, 12,505; Aug. 5, 12,317; Aug. 7, 16,021.

In August, 1921, the average number of cars loaded daily with coal was 23,688.

Reports showed that on the Chesapeake & Ohio, Norfolk & Western and Louisville & Nashville, the three largest coal-carrying railroads, in the West Virginia and Kentucky non-union fields, 7,554 cars were loaded Monday, Aug. 7. These three roads in June averaged 7,373 cars daily, which was the heaviest month's coal loading in their history.

All the lower floor positions have long since been sold out for the 1922 exposition of chemical industries which will be held at the Grand Central Palace, New York, Sept. 11 to 16, and spaces on the third and fourth floors are at a premium. With over 400 firms already signed up, there is little doubt but that the first four floors of the Grand Central Palace will be crowded with exhibitors during chemical exposition week.

United States Pig Iron Production for First Half of 1922

The American Iron and Steel Institute in its special statistical bulletin No. 4 gives the production of all kinds of pig iron in this country for the first six months of the present year. The total is 12,191,011 tons, which compares with 9,530,981 for the first half of 1921 and 18,435,602 for the first half of 1920. For the first time, there was no production of anthracite and mixed anthracite and coke pig iron. There was no production of charcoal pig iron in the group composed of Massachusetts, Connecticut, New York and Pennsylvania. Of the total 84,786 tons of charcoal, the group composed of Michigan, Wisconsin and Missouri produced 71,333 tons.

HALF-YEARLY OUTPUT OF PIG IRON BY STATES.

HALF-YEARLY PRODUCTION OF PIG IRON

State	[illegible]		Out	Total	[illegible]	Second half of 1921	First half of 1922
Maine	0	0	0	0			
Massachusetts	[illegible]	[illegible]	1	1	1,537	605	
Connecticut	[illegible]	[illegible]	2	2			
New York	1	13	14	[illegible]	506,114	462,547	833,488
New Jersey	1	1	3	4			
Pennsylvania	16	69	92	161	3,577,570	2,675,196	4,339,560
Maryland	[illegible]	4	[illegible]	[illegible]	75,130	72,059	140,885
Virginia	[illegible]	[illegible]	[illegible]	17	54,314	13,720	
Alabama	11	22	21	43	659,225	548,183	963,019
Georgia	0	0	3	3			
Texas	0	0	1	1			
West Virginia	[illegible]	[illegible]	[illegible]	5	117,215	147,544	240,822
Kentucky	1	2	5	7			
Missouri	0	0	1	1			
Tennessee	1	[illegible]	15	17	12,369	7,110	17,585
Ohio	[illegible]	43	39	80	2,081,847	1,717,766	2,898,846
Illinois	9	16	10	26	1,030,801	581,232	1,237,877
Indiana	9	12	4	16	1,019,010	874,601	1,252,733
Michigan	1	9	4	13			
Wisconsin	1	3	4	7	211,574	15,289	102,809
Minnesota	[illegible]	[illegible]	1	3			
Missouri	[illegible]	0	3	3			
Iowa	[illegible]	[illegible]	0	0			
Colorado	1	3	2	[illegible]	185,071	41,293	163,387
Oregon	0	0	1	1			
Washington	0	0	0	0			
Total	125	201	249	450	9,530,981	7,157,145	12,191,011

*Combined and reported

HALF-YEARLY PRODUCTION OF COKE PIG IRON.*

Maine	0	0	0	0			
New York	10	13	13	26	507,108	463,152	833,488
New Jersey	1	1	3	4			
Pennsylvania	46	69	81	150	3,564,405	2,674,267	4,339,560
Maryland	1	4	2	6	75,130	72,059	
Virginia	0	0	17	17			140,885
Georgia	0	0	2	2	53,519	13,720	
Texas	0	0	1	1			
Alabama	11	21	20	40	655,693	539,074	949,566
West Virginia	2	2	3	5	117,215	147,544	240,822
Kentucky	1	2	5	7			
Tennessee	1	2	12	14	12,369	7,110	17,585
Ohio	26	41	39	80	2,081,847	1,717,766	2,898,846
Illinois	9	16	10	26	1,030,801	581,232	1,237,877
Indiana	9	12	4	16			
Michigan	2	2	2	4	1,060,523	874,860	1,256,880
Wisconsin	1	2	4	6			
Minnesota	0	2	1	3			
Missouri	0	0	2	2			
Iowa	0	0	0	0	289,612	40,646	190,716
Colorado	3	3	2	5			
Washington	0	0	0	0			
Oregon	0	0	1	1			
Total	121	191	224	415	9,448,223	7,131,430	12,106,225

*Includes ferro-alloys made with electricity, electricity and coke, etc.

HALF-YEARLY PRODUCTION OF ANTHRACITE AND MIXED ANTHRACITE AND COKE PIG IRON.

Pennsylvania	0	0	7	7	12,823	920	
Total	0	0	7	7	12,823	920	

HALF-YEARLY PRODUCTION OF CHARCOAL PIG IRON.

Massachusetts	0	0	1	1			
Connecticut	[illegible]	[illegible]	[illegible]	2			
New York	0	0	1	1	883	9	
Pennsylvania	[illegible]	[illegible]	1	1			
Maryland	0	0	1	1			
Alabama	[illegible]	[illegible]	1	1			
Georgia	[illegible]	[illegible]	[illegible]	1	3,532	9,109	13,453
Tennessee	[illegible]	[illegible]	[illegible]	1			
Mississippi	[illegible]	[illegible]	[illegible]	1			
Michigan	2	7	[illegible]	9	47,346	15,030	
Wisconsin	0	1	0	1			71,333
Missouri	0	0	1	1	24,174	647	
Total	4	10	18	28	69,935	24,795	84,786

TOTAL PRODUCTION OF PIG IRON ACCORDING TO FUEL USED.

Coke*	121	191	224	415	9,448,223	7,131,430	12,106,225
Anthracite†	0	0	7	7	12,823	920	
Charcoal	4	10	18	28	69,935	24,795	84,786
Total	125	201	249	450	9,530,981	7,157,145	12,191,011

*Includes ferro-alloys made with electricity, electricity and coke, etc. †Includes mixed anthracite and coke pig iron.

HALF-YEARLY OUTPUT OF PIG IRON BY GRADES.

HALF-YEARLY PRODUCTION OF BASIC PIG IRON.

States	First half of 1921	Second half of 1921	First half of 1922
New York, New Jersey	199,568	189,342	428,536
Pennsylvania—Allegheny County	1,024,302	663,421	1,248,060
Other counties	[illegible]	[illegible]	1,100,324
West Virginia, Alabama, Kentucky	438,730	381,637	641,290
Ohio	685,788	540,609	1,257,315
Indiana, Illinois	1,149,432	824,744	1,534,969
Michigan, Minnesota, Missouri, Colo.	270,306	44,214	179,472
Total	4,504,431	3,248,640	6,389,876

HALF-YEARLY PRODUCTION OF BESSEMER AND LOW-PHOSPHORUS PIG IRON.

New York	61,225	22,201	50,541
Pennsylvania	1,381,591	1,084,752	1,760,892
Maryland	74,660	86,860	193,115
West Virginia, Tennessee, Alabama, Ohio	73,816	23,782	
Indiana, Illinois, Iowa, Colorado	1,081,868	794,007	1,149,416
Total	3,280,072	2,115,143	*3,512,604

*Includes 60,472 tons of low-phosphorus pig iron

HALF-YEARLY PRODUCTION OF FOUNDRY PIG IRON AND FERRO-SILICON.

Maine, Massachusetts	1,537	605	
New York, New Jersey	215,512	192,356	308,129
Pennsylvania	285,798	270,315	305,792
Maryland, Va., West Va., Ky., Tenn.	67,138	45,850	36,853
Alabama	241,091	279,007	479,563
Ohio	219,004	189,782	219,069
Indiana, Illinois	104,044	103,464	82,192
Michigan	148,110	100,691	130,783
Wisconsin, Missouri, Iowa, Colorado	122,265	11,047	86,868
Total	1,375,399	1,192,737	*1,629,229

*Includes 41,913 tons of ferro-silicon

HALF-YEARLY PRODUCTION OF MALLEABLE PIG IRON.

New York	22,533	49,279	65,848
Pennsylvania	14,099	6,644	17,945
Ohio	62,257	155,843	193,036
Indiana, Illinois, Mich., Wis., Minn	66,633	80,052	179,069
Total	165,522	291,818	427,998

HALF-YEARLY PRODUCTION OF FORGE PIG IRON.

New Jersey, Pennsylvania	13,280	23,832	65,845
Alabama	5,276	4,162	10,181
Ohio	30,381	35,817	26,858
Total	48,937	63,811	102,884

HALF-YEARLY PRODUCTION OF SPIEGELEISEN AND FERRO-MANGANESE.

Pennsylvania, Maryland, Ala., Tenn.	131,739	23,871	96,555
Illinois, Washington	4,530	38	
Total	136,269	23,909	*96,555

*Includes 69,482 tons of ferro-manganese and 27,073 tons of spiegeleisen

HALF-YEARLY PRODUCTION OF OTHER GRADES.

New York, New Jersey	4,482	4,771	4,269
Pennsylvania	2,895	1,666	1,443
Maryland, Va., West Va., Tenn., Ala.	7,101	7,339	14,858
Ohio	2,509	2,308	1,152
Indiana, Illinois, Michigan, Wisconsin, Missouri, Colorado	3,334	5,003	10,143
Total	20,351	21,087	31,865

PIG IRON MADE FOR SALE OR FOR USE OF MAKERS IN THE FIRST HALF OF 1922.

Grades	For sale	For maker's use	Total Gross tons
Basic	620,654	5,769,222	6,389,876
Bessemer and low-phosphorus	203,091	3,309,513	3,512,604
Foundry, including ferro-silicon	1,577,144	52,085	1,629,229
Malleable	318,723	109,275	427,998
Forge or mill	29,497	73,387	102,884
Ferro-manganese	30,829	38,653	69,482
Spiegeleisen	16,558	10,515	27,073
All other grades	16,246	15,619	31,865
Total	2,812,742	9,378,269	12,191,011

CONTENTS

August 17, 1922

Steps in Stamping a Draw-Bolt Tube 401
Single Stamped Part Replaces Complicated Assembly—Cost Lowered and Design Improved—Methods of Manufacture Outlined

Stainless Steel at High Temperatures 404
Heat Treatment Which Produces the Greatest Strength for Use in Valves of Internal Combustion Engines

Electric Motor Drive in the Steel Industry 408
Mill Requirements for Adjustable Speed—Considerations of the Flow of Metal Under Rolling Pressure and Its Effect on Power Demands

Modern Blast Furnace Plant on the Yangtse 416
American Design Chiefly Followed—Assembling Costs at Hanyang Greatly Reduced—Steel Works and Rolling Mills to Be Built

Notes on Basic Electric Furnace Operation 421
Grade of Lime Necessary—Reducing the Phosphorus and Sulphur—Malleable or Gray Iron Castings—High and Low Tap Voltages

Anti-Friction Bearings in the Steel Mill 423
Arguments For and Against Their Use—They Avoid Oil and Reduce Wear and Maintenance Cost—First Cost Is Heavier

Serious Coal Problems Being Faced 425
Distribution Will Involve Many Difficulties Even If Miners' Strike Is Settled—Congress May Not Be Asked for Legislation at Present

Improvement in Unemployment in Pennsylvania 403
Proposed Duties on Manganese and Tungsten 405
General Refractories Co. Absorbs Three Other Companies 405
Tests With Special Steels at High Temperatures 406
Large Lathe for Chilled Rolls 406
Metal Schedule in New Tariff Bill 407
Reductions in Pig Iron Rates from the South 407
Free Competition the Remedy in Coal Industry 412
Penn Seaboard—Carpenter Steel Merger Declared Off 412
Iron Ore Output of Germany in 1918 and 1919 412
Russian Steel Industries in 1921 412
German Iron and Steel Prices Sharply Up 413
Wire Nails Imported by England 414
Chinese Steel Market Dull 414
Export Buying Light 414
British Pig Iron and Steel Output for July 414
Swedish Pig Iron and Ore Output for 1921 415
Improved Outlook for Machinery 415
Safety Hand-Hole Plate for Boilers 415
Little Tonnage Accepted by Mahoning Valley Companies 418
Steel Corporation's Unfilled Orders 418
Drill With Power Clamping Device 419
Manufacture of Pig Iron in New Zealand. 419
The Basset Direct Steel Process 419
Weirton Steel Co. to Build By-Product Plant 419
Valuation Engineers Wanted 419
Device for Safe Operation of Presses 420
Unusually Heavy Building Construction .. 420
Drill Steel Survey Completed 420
Universal Attachment for Dial Gage 420
Passing Rivets with a Rivet Gun 422
United States Agents for Caucasian Manganese Ore 422
United States Pig Iron Production for First Half of 1922 428
Editorials 430
Paying Toll to Railroad Workers—Public Concern in Coal—The Key Place of Chromium—Less Iron Ore Per Ton of Pig Iron.
Correspondence 432
Developing the Will to Work.
Japanese Market Quiet 433
Workmen's Compensation Laws 433
Association Meetings 434
To Help Associations Conduct Statistical Bureaus 434
Strip Price Control 435
Fabricated Steel Business 435
Railroad Equipment Business 435
General Electric Co. to Build Pacific Coast Factory 450
British Iron and Steel Market 451

Iron and Steel Markets 436
Comparison of Prices 437
Prices Finished Iron and Steel, f.o.b. Pittsburgh 449
Non-Ferrous Metal Market 450
Personal Notes 452
Obituary Notes 453
Machinery Markets and News of the Works 454
New York Jobbers' Prices 464

ESTABLISHED 1855

THE IRON AGE

EDITORS:

A. I. FINDLEY WILLIAM W. MACON GEORGE SMART

CHARLES S. BAUR, *Advertising Manager*

Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

F. J. Frank, *President* PRINTED IN U. S. A. George H. Griffiths, *Secretary*

Owned by the United Publishers Corporation, 243 West 39th Street, New York. H. M. Swetland, *Treas.* Charles G. Phillips, *Vice-Pres.* A. C. Pearson, *Treas.* F. J. Frank, *Secy.*

BRANCH OFFICES: Chicago: Otis Building. Pittsburgh: Park Building. Boston: 410 Unity Building. Philadelphia: 1420-1422 Widener Building. Cleveland: Guardian Building. Detroit: 317 West Fort St. Cincinnati: Mercantile Library Bldg. Buffalo: 881 Ellicott Square. Washington: 816 Fifteenth St., N. W. San Francisco: 320 Market St. London, Eng.: 11 Haymarket, S.W.1.

Subscription Price: United States and Possessions, Mexico, Cuba, Shanghai, $6.00; Canada, $8.50; Foreign, $12.00 per year. Single copy 25 cents.

Entered as second class matter, June 18, 1879, at the Post Office at New York, New York, under the Act of March 3, 1879.

Paying Toll to Railroad Workers

We have pointed out before, but the fact cannot be too much emphasized, in getting at the real inwardness of the present struggle between the public and the railroad unions, that the railroad workers insist on having an excessive share of the total return to the country's labor. Deflation, in the unions' view, may be well enough for farmers, steel workers, textile employees, and scores of other battalions in the great industrial army, but all that railroad labor was able to wrest in war time from the Government management of the railroad lines it proposes to keep.

The ordinary man among the 104 millions or more Americans apart from railroad workers and their families has found out in a score of ways how the demand of the railroad unions for the continuance of war-time wages, when wages in nearly all other employments have come down well below war-time levels, is affecting his own buying power.

High transportation cost is high railroad labor cost, and high transportation cost is entering into the price of everything the average citizen eats or wears, of the fuel he buys and of the house in which he lives.

The *Bache Review*, pointing out that the farmer did not respond to the labor leaders' plea, soon after the war, to join in the movement for political control by organized labor, cites the analysis of the situation recently made by President David Friday of the Michigan Agricultural College. He estimates that in 1921 railroad employees, who make up less than 4½ per cent of our total working population, received as wages nearly 7 per cent of the nation's purchasing power—that is, of the nation's total agricultural, mining and manufacturing product. The farmers, who make up more than 26 per cent of the total working population, received less than 20 per cent of the total national income. In other words, there were six times as many workers in agriculture as in railroad transportation, and yet they received only three times as much of the year's production as did the railroad workers. That means, in short, that the average return from railroad employment is twice as great as the average return from the pursuit of agriculture.

It is not to be expected, under such a distribution of the rewards of labor in the two employments, that the farming community will aline itself with the aims of the organized workers on the railroads. On such a basis, the farmers, in common with other large sections of the community, are working for the railroad unions, just as the vast majority of the 40 millions or more of our population engaged in gainful occupations have long been working also for the members of the building trades unions and the United Mine Workers of America.

Public Concern in Coal

The chief basis upon which the Government undertook to assert authority over railroad rates and practices, more than a third of a century ago, was that the railroads had been given the right of eminent domain. The fact that they performed a "public service" lay far in the background, but it has since come to the front. The view of what constitutes a "public service" has gradually expanded, for several reasons. One is that with improvements in methods of communication services become more public and less localized. Another is that the public realizes more and more that when society furnishes protection to an industry it is entitled to consideration in return. Yet another is that labor unions have been working in the direction of nationalizing their arrangements, railroad labor being conspicuous in this connection.

With all the talk, however, of Government control of the coal industry it is apparent that the public at large has a remarkably small amount of interest in the subject. It is familiar with coal prices represented by high multiples of a dollar; but how many persons remember that often before the war, and occasionally even after the war started, coal sold at a single dollar a ton? When a contest between employer and employee in the coal industry is staged, the general public is scarcely even irritated and it is certainly not aroused. When after four months of a coal strike

a factory here and there closes for lack of coal there is a little mild surprise, perhaps a faint regret that the factory did not lay in a bigger stock of coal or that the strike had not been confined to a period of three or four months.

Those who have given any study at all to coal realize what an uneconomical alinement has been built up; but that is not the general public. The general public suffers and does not realize that it suffers. It may well be asked why it should be anybody's duty to inform the public of its suffering. Experience has shown that executive action cannot be depended on to help matters in coal. There was a little judicial action a couple of years ago, but even this has hung fire meanwhile. There remains legislative action, which should depend upon public demand, but does not always promptly follow public demand. As a matter of plain fact, really public demand has been decidedly lacking.

It has been assumed in Washington that in an emergency like the coal strike the Government has authority to seize the coal mines and operate them, but it has been assumed at the same time that in that case the Government would pay miners practically the wages they asked. It is also assumed that by legislative enactment the Government can regulate the coal industry, provided it does not attempt "confiscation," which is a term not yet defined in dollars or per cent, even as to transportation facilities.

Government regulation of coal would rest upon a very plain and substantial foundation. The great percentage of coal mines exist by grace of the rail transportation facilities, which the Government has obligated itself to take care of. The Government wishes the public to have reasonable transportation service, but does not wish it to have to pay for the creation of unnecessary facilities. If part of the coal industry operates and part is idle, the public can be served with coal only by some roads having to haul unreasonably much coal while others have but a small proportion of the traffic. Backing the railroads, the Government has a right to demand that coal mining be fairly distributed geographically and in point of time. The Government has the right, but it is not likely to exercise that right unless or until the public at large calls out to it to do so.

The growth of the electric furnace steel industry of Italy since the war has been remarkable. According to the information on other pages, which is corroborated by private advices, there are now about 180 electric steel furnaces of various types and capacities in Italy. Thus the Italian industry has a place close to the front rank and is exceeded only by that of the United States. In 1914 the two countries were credited with about 20 furnaces each, according to the first review of this industry published by THE IRON AGE. While the United States to-day has over twice as many furnaces as Italy, the latter country has probably outrun both Great Britain and Germany. In output, also, Italy ranks high, production in 1920 having been about 100,000 tons and in 1921 about 140,000 tons, the United States alone producing more. In size, also, the Italian furnaces are noteworthy, there being several of 20 to 25 tons' capacity and 23 furnaces of 15 tons' capacity. The north of Italy has been the seat of the largest recent expansion. Cheap water power and other conditions have made such rapid progress possible.

The Key Place of Chromium

The need of a metal with unusual tensile strength at high temperatures and pressures, and also with good resistance to corrosion, has long been recognized. Industrial operations making such demands are many—among others, the production of ammonia, the use of superheaters in various industries, of pipe for oil-cracking operations, of steam and gas turbines and of internal combustion engines.

That the problem is being solved appears from the development in recent months of several alloy steels having exceptional strength at high temperatures and pressures, as well as anti-corrosive or non-oxidizing properties. Two articles printed in this issue throw new light on the subject, one dealing with stainless steel and the other with some special German alloy steels. The solution of the problems mentioned has been largely due to the employment of alloy steels containing chromium or chromium combined with other metals, such as nickel.

To such an extent has chromium functioned in this connection, and in other important uses, that it is not uncommonly spoken of as the master metal in the alloy field. To its familiar uses as an essential constituent of steels with maximum strength at high temperatures has been added more recently its notable performance as the foundation of the stainless steels and irons.

No standard high-speed steels are made without chromium. During the war, when tungsten was lacking for the making of permanent magnets, chromium filled the breach. It is the basis of many important alloy steels which have figured largely in the advance of the automobile and other industries. In simple heat-resisting alloys for heat treatment and other uses it has been the key to success. Moreover, recent experiments have shown that as an ingredient in certain non-ferrous alloys it has added greatly to their strength and ductility.

Yet with all this advance, to which the electric furnace and a succession of discoveries in heat treatment have contributed so largely, there are not lacking predictions whose plain implication is that the field of heat-treated chromium alloys has scarcely been scratched.

Ferromanganese imports are gaining in volume and in June reached a figure in excess of the pre-war record. In 1913 the average was 10,600 tons per month, but in June of this year 13,500 tons was exceeded and the July figures will be larger, many contracts having been placed with British makers because of the American fuel situation and also in anticipation of a high duty. Receipts of manganese ore, including several cargoes of Russian ore, are also expanding, having

been over 45,000 tons per month for May and June, a figure in excess of the average for 1913 or 1921. Despite the increased duty on the ore, should the pending tariff bill pass, these imports must of necessity continue in large volume, since American mines do not contain the grade or the quantity adequate to supply the American steel industry.

Less Iron Ore Per Ton of Pig Iron

Consumption of iron ore per ton of pig iron made was lower in 1921 than in any previous year in the record, which extends back to 1909. It may have been the lowest in the history of iron making in the United States. The showing is important, in view of the common impression that increasing leanness of our iron ores furnishes a problem.

The highest ore consumption shown in the record was in 1911, a year of light production, and 1912, a year of heavy production. Taking the average of 1911, 1912 and 1913, as constituting the three-year period before the war, the following showing is made, the figures being per gross ton of pig iron produced:

Ore, briquettes, etc., gross tons	1.871
Scrap, scale, etc., gross ton	0.134
Total, gross tons	2.005
Limestone, pounds	1156.7
Coke, pounds	2434.9

The consumption of ferrous material is the average for all pig iron produced, as the statistics do not segregate. The limestone is for coke furnaces only (and a negligible output of anthracite furnaces), the charcoal furnaces being excluded. The coke consumption is of coke furnaces only, excluding anthracite and charcoal furnaces, and is the average of 1912 and 1913, as statistics of fuel consumption were not gathered for 1911.

Consumption of iron-bearing material in 1921, as given in the annual report of the American Iron and Steel Institute, just issued, makes a very favorable comparison with the average of about nine years previous. In 1921 the average consumption of ore, etc., was 1.784 gross tons and of scrap, etc., 0.141 ton, making a total of 1.925 tons, representing a decrease of 4 per cent.

With a decrease in the consumption of ferrous material there was of course less impurity to be slagged off, and the limestone consumption accordingly fell, the 1921 average being 995.5 lb., representing a decrease of 14 per cent from the average of the years 1911-1913.

Concurrently with these decreases, a lessened consumption of coke would be expected. The coke dropped to 2200.6 lb., representing a decrease of 9½ per cent.

These evident savings are of no small consequence. Making guesses as to what should be considered normal values in present times, of the materials delivered at the typical blast furnace, the saving in raw material is found to lie in the neighborhood of $1 per ton.

It would require a much more exhaustive analysis than is possible with the statistics available, to determine the precise ways in which the average of blast furnace practice has been improved. One thing can be observed from the statistics, that Alabama has helped to improve the general showing. That State, which is quite separate from the rest of the industry, decreased its limestone consumption from 746 lb. in 1913 to 557 lb. in 1921, per ton of pig iron made, this being well below the average of the country, and at the same time slightly increased its contribution to the total pig iron output. This, however, is a relatively insignificant item.

In general, one is led to conclude that improvements of various sorts in blast furnace practice have done much more than to offset such decrease as has occurred in the iron content of the ores that must be used. As the decades pass the industry will be driven to use leaner and leaner ores, there being immeasurable quantities low down in the scale, and it is encouraging to note that up to date the technique of the industry has more than kept pace.

CORRESPONDENCE

Developing the Will to Work

To the Editor: In THE IRON AGE of July 20 I noticed an editorial on "A Better Philosophy of Work," which was as timely as it was interesting and true. It is only too true, as you say in the closing paragraph of the editorial, that we are most unfortunate if we are unable to discover new viewpoints concerning the social value of work—if you had that in mind when speaking of the philosophy of work. We have been spending much time, money and energy on symptoms, by sentimental welfare work and paternal care of the mental, moral, physical, educational and literary needs of the worker; all of which, I have often noticed, smacks too much of the feudalism of the Middle Ages and has a tendency to create antagonism between labor and capital instead of harmony and mutual confidence.

As a matter of fact, the craft guilds of the Middle Ages had a better way of appealing to the character of the worker and developing in him that philosophy of work which you seem to have in mind than modern industry has. In saying this I speak from experience, because the medieval guild system was still in vogue when I was a young man, the last vestige of the system being officially abolished in Germany in 1865. The governments of the various German states retained that system so long for the very purpose of extending to the growing industries of Germany their social-ethical features, not the least of which was the cultivation of respect for work as a civic virtue. As a member of a medieval guild from 1854 to 1865, with all that this implied in those days, I feel justified in saying that the rapid and sound development of the German industries during the middle of the last century and later was largely due to the inherited influence of the guilds.

For 56 years now, or since 1866 when I came to this country, I have been in intimate contact with the development of American industry, particularly during the more than 30 years of my connection with the Pennsylvania Railroad Testing Laboratory, and during the trying and critical transitory period from iron to steel. And I am compelled to say that American industries, particularly corporations and industrial combinations, have succeeded admirably in repressing those characteristics of human nature which would favor the cultivation of a philosophy of work such as you refer to in the editorial mentioned. Does not the present attitude of labor indicate a serious dislocation of social relations between capital and labor, between employer and employee? True, there are strikes in European countries, but, with the exceptions of the communists'

demands, the mass action of labor there has not the sinister aspect it has with us.

It has often occurred to me that our technical journals have devoted themselves so exclusively to matters of the technique of machinery and processes and the mechanism of industrial organizations that they have lost sight of the interdependence and interrelations of the industrial fabric with the social structure. Industrial management needs a revival along social, not socialistic, lines as much as the worker. Technical progress has been so rapid and so destructive of the older social relations in society that the slower moving social evolution has been unable to keep up with the new requirements. Mass production and quantity requirements have overshadowed the ethical demand for social self-preservation. How long can we go on that way without even more serious disturbance of industrial, social and economic relations?

PAUL KREUZPOINTNER.

Altoona, Pa., Aug. 12.

JAPANESE MARKET QUIET

Competition from India in Pig Iron—Steel Market Weak—Copper Fairly Firm

TOKIO, JAPAN, July 10.—In the Japanese steel market quietness rules, but there are noticeable signs of improvement. Prices have ceased to fall away substantially. Unexpected business in the cocoon trade for several weeks is assisting credit in the provinces and inquiry for materials from provincial builders is on the increase. Efforts to stabilize the market on the part of importers and leading holders of stocks are having their effect. Prices, which have been weak, now stand unchanged. Round bars are quoted at 4.60 yen per 10 kwan (2.68c. per lb.), flats and squares at 4.90 yen (2.83c. per lb.) and plates at 7 yen (4.05c. per lb.). Tin plates are in an unfavorable position, packers who were expected to buy heavily showing no inclination to come into the market.

Company Has Orders Until 1924

That sufficient orders are on hand to keep the plant in full operation until 1924, with the full force of 20,000 workmen, and that an annual dividend of 15 per cent will be paid was definitely announced in a recent address by the president of the Kawasaki Dock Co. of Kobe at the semi-annual meeting of the shareholders. Orders have been received by the company for the building of five submarines, one light cruiser and two naval special service boats, all, it is stated, within the bounds of the Washington Conference limits. In addition, the company has received orders for 112 locomotives, 200 passenger cars and 252 freight cars. The chairman added: "Since our company holds several foreign electric patents we shall soon begin turning out electric machinery and apparatus for the electric industry of this country, which is still in an undeveloped condition."

Tenders for electrolytic copper are to be received at the Tokio Arsenal, and in anticipation the market has tended upward for the past few days, the quotation standing at 45.60 yen and 45.70 yen per 100 kin. (16½c. per lb.). The tone of the Osaka market is also fairly firm. Of late the price of electrolytic copper differs about one yen between the Tokio and Osaka markets. When tenders were last called, the Tokio Arsenal stipulated quality of 99.96 per cent pure, taking the Japanese electrolytic copper as a standard, but in the coming tender the Arsenal has altered the stipulation of quality to the American electrolytic copper as standard, and, therefore, it is supposed that some importers of American copper in Japan will participate.

Steady Importation of Indian Pig Iron

The pig iron market is dull. The price is prevented from decline only by the limited quantity of stocks. In the Tokio market some consumers are in financial difficulties. No. 1 Kamiasha is quoted nominally at 70 yen ($33.50) per ton, No. 1 Wanishi at 67 yen ($32.05) per ton, and No. 1 Rayang at 65 yen ($31.10). Indian iron is offered at still lower prices, and forms a menace to the market, arriving at the rate of 5000 to 7000 tons per month. Tata iron is quoted at 61 yen ($29.20) per ton, and Bengal at 60 yen ($28.72) per ton. The importation of pig iron into Japan from Europe and the United States is now practically impossible. American iron is out of stock in Tokio, while Cleveland (England) is quoted at 78 to 80 yen ($37.31 to $38.30) per ton.

German Trade with Japan Increasing

Indications of Germany's rapid recovery from the war may be seen in her trade relations with Japan. Imports by Japan from that country have been so heavy lately that Japanese manufacturers are complaining and seeking protection. German products, they state, are selling at prices lower than the Japanese market, especially in steel, machinery and dyes. German steel exports to Japan are showing up well, while America's exportation is on the decline, and Great Britain's record is slightly better than in the previous year.

Workmen's Compensation Laws from the Physician's Viewpoint

The relation of the physician and his industrial work to workmen's compensation laws is among the subjects considered in the report recently issued by the National Industrial Conference Board, 10 East Thirty-ninth Street, New York, for the Conference Board of Physicians in Industry, which acts as advisor on industrial medical problems to the former organization.

It is pointed out that although the effective administration of workmen's compensation laws depends in large measure upon the work of medical men, Washington is the only State to give a physician membership in its industrial commission by legal enactment. In that State the medical member is chairman of the board.

Compensation for hernia is discussed in the report by Dr. S. M. McCurdy, Youngstown Sheet & Tube Co., who expresses the opinion that hernia is seldom due to occupational causes, but is produced by the aggravation of a condition present in the majority of persons from birth. He states that hernia should be considered as an occupational disease rather than as an industrial accident and cured by surgical treatment. It is emphasized that a worker with hernia should not be denied employment but, after examination, should be placed at work for which he is suited, and his work supervised by the plant physician.

That each compensation commission has its own method of estimating eye injuries and no two of these methods are similar, resulting in conflicting standards among the states is pointed out by Dr. J. A. Jackson, New York Edison Co. This often has the effect of leaving employer and employee in doubt as to whether they have received proper recognition for their claims. A standard method of testing eyes is advocated.

Back injuries from the compensation standpoint, and the difficulty of determining not only the cause, but the exact type of the injury, is taken up by Dr. F. E. Schubmehl, General Electric Co.

That the introduction of the physician into the industrial organization has produced many beneficial results is the conclusion reached in the report, it being pointed out that the physician's work has revealed to the employer many sources of economic waste and to the worker the unnecessary price he is paying for inattention to his health.

A 20-ton open-hearth furnace is to be erected by the S. R. Smythe Co., Oliver Building, Pittsburgh, for the Universal Steel Co., Bridgeville, Pa., on foundations built by Universal company. The furnace is of the Smythe design with no unusual features.

NEW PERSONNEL ASSOCIATION

Engineers and Managers Organize to Study Industrial and Labor Questions

To study the human factor in American business and industrial life, to solve the problems which confront the management of industrial enterprises, and to bring about a better understanding of the labor question, leaders of organized engineering, representatives of large industries, insurance companies, railroads and publishers, and members of university faculties have organized the National Personnel Association.

The new organization takes over the activities of the National Association of Corporation Training and the Industrial Relations Association of America. Cooperative research will be conducted on a nationwide scale, and close relations will be established with colleges and universities in carrying out an extensive educational program.

An executive committee and a board of directors have been chosen. Members of the committee include Sam A. Lewisohn, Miami Copper Co., New York; John McLeod, Carnegie Steel Co., Pittsburgh; J. M. Larkin, Bethlehem Steel Co., Bethlehem; W. H. Winans, Union Carbide & Carbon Corporation, New York; J. W. Dietz, Western Electric Co., New York; Francis Farwell, Worthington Pump & Machinery Corporation, New York; S. R. Rectanus, American Rolling Mill Co., Middletown, Ohio, and Arthur H. Young, International Harvester Co., Chicago.

L. W. Wallace, executive secretary of the Federated American Engineering Societies, and L. P. Alford, New York, vice-president of the American Society of Mechanical Engineers, are among the directors elected. Among the several other directors are Alvin E. Dodd, United States Chamber of Commerce, Washington; C. V. Derrick, American Bosch Magneto Co., Springfield, Mass.; F. H. Dodge, Burroughs Adding Machine Co., Detroit; Dr. E. M. Hopkins, Dartmouth College, Hanover, N. H.; A. H. Lichty, Colorado Fuel & Iron Co., Denver; E. S. McClelland, Westinghouse Electric & Mfg. Co., East Pittsburgh; Louis L. Park, American Locomotive Co., Schenectady; F. W. Thomas, Atchison, Topeka & Santa Fe Railroad, Topeka.

W. W. Kincaid, Niagara Falls, head of the Spirella Co., has been named president of the new organization. Earl B. Morgan, Curtis Publishing Co., Philadelphia, is vice-president, and Montague A. Clark, the E. I. DuPont de Nemours & Co., Arlington, N. J., is treasurer. W. J. Ronald, 20 Vesey Street, New York, is the managing director and secretary. C. S. Coler, educational director, Westinghouse Electric & Mfg. Co., has been appointed chairman of the committee on industrial and public school relations.

To Help Associations Conduct Statistical Bureaus

WASHINGTON, Aug. 12.—A wider collection and use of essential business statistics is urged on business organizations by the fabricated production department of the Chamber of Commerce of the United States. It is preparing to set up a service for chambers of commerce and trade associations for the purpose of informing them how statistical bureaus may be established and operated.

New England Foundrymen Outing

The New England Foundrymen's Association held its annual August outing Wednesday, Aug. 9, at The Hummocks, Hamilton, R. I. It was the largest attended and most successful outing of its kind ever held. Approximately 170 enjoyed the clambake. Providence members of the association had charge of the affair. Edward F. Parks, Universal Winding Co., was chairman of the committee of arrangements; A. J. Miller, Whitehead Brothers Co. and C. H. Colvin, Colvin Foundry Co., were in charge of indoor and outdoor sports and entertainment; and W. Scott Thomas, J. W. Paxson Co., of transportation. These gentlemen and the following constituted the general committee: W. G. Rich, Providence Gas Co.; J. W. Richardson, H. & B. American Machine Co.; William S. White, J. S. White Co.; Henry S. Chafee, Builders' Iron Foundry; Harry C. Johnson, General Fire Extinguisher Co.; R. C. Fuller, Fuller Iron Works; W. M. Saunders, Saunders & Franklin; C. D. Starr, Barstow Stove Co.; George R. Burt, Franklin Machine Co.; John E. Aldrich, New England Butt Co.; L. M. Sherwin, Brown & Sharpe Mfg. Co.; and Charles E. Andrews, Whitehead Brothers Co. No association business was transacted at the outing.

Farm Implement Makers to Meet

The National Association of Farm Equipment Manufacturers, formerly known as the National Implement and Vehicle Association, will hold its annual convention at the Congress Hotel, Chicago, on Oct. 18, 19 and 20. Arrangements for the program have not been completed, but tentative acceptances have been received from at least one cabinet member, from the president of one of the best known railroads, from a prominent authority on agriculture and from a leader in agricultural finance. In addition to speakers from outside the association, the following are among the subjects which will be discussed by members: "Present and Future of the Implement Industry," "Transportation Situation from the Shippers' Viewpoint," "The National Institute of Progressive Farming," "Depreciation."

Trade Association Executives to Meet

The American Trade Association Executives will hold its third annual meeting at the Inn, Buck Falls, Pa., which is near the Delaware Water Gap, Oct. 25, 26 and 27. In view of the considerable talk there has been about trade associations, this meeting is expected to be of a particular interest to those in trade association work. The railroad station is at Cresco, on the Delaware, Lackawanna & Western Railroad.

The Commercial Steel Sales Co. has been organized in Philadelphia and has taken offices in the Stock Exchange Building, that city. It will represent in a sales capacity several companies making finished and semi-finished iron and steel. S. J. Carroll, formerly vice-president of the Pennsylvania Steel Export Co.; H. S. Gilhams, formerly of H. S. Gilhams Co., and J. S. Kenyon, formerly general manager of the Duplex Metallic Co., all of Philadelphia, are the officers and directors of the new organization.

COMING MEETINGS

August

Lake Superior Mining Institute. Aug. 28 to 30, inclusive. Annual meeting, Houghton, Mich. Secretary, A. J. Yungbluth, Ishpeming, Mich.

National Safety Council. Aug. 28 to Sept. 1. Annual meeting, Cass Technical High School, Detroit. Secretary, W. H. Cameron, 166 North Michigan Avenue, Chicago.

September

American Engineering Council. Sept. 8 and 9. Executive board meeting, Boston. Report on three-shift day in industry. Secretary, L. W. Wallace, 719 Fifteenth Street, N. W., Washington.

Association of Iron and Steel Electrical Engineers. Sept. 11 to 15, inclusive. Annual convention, New Auditorium, Cleveland. Secretary, J. F. Kelly, 513 Empire Building, Pittsburgh.

National Exhibition of Chemical Industries. Sept. 11 to 16. Grand Central Palace, New York.

American Electrochemical Society. Sept. 21, 22 and 23. Fall meeting, Windsor Hotel, Montreal, Canada. Secretary, Dr. Colin G. Fink, Columbia University, New York.

American Institute of Mining and Metallurgical Engineers. Sept. 25 to 29. Pacific Coast meeting, Engineers' Club, San Francisco. Secretary, F. F. Sharpless, 29 West Thirty-ninth Street, New York.

STRICT PRICE CONTROL

Secretary Hoover Favors Legislation—Position of the President Not Known

WASHINGTON, Aug. 15.—Congress will be asked within a short time to enact legislation providing for the strict control of prices and distribution of coal and probably within 48 hours will be addressed by President Harding regarding the railroad situation.

These were the two outstanding features of the coal and railroad strikes which developed in Washington to-day. It is evident that the administration realizes that a critical condition is faced by the country and that it must be met at once if much more serious crippling of transportation and industry and suffering of the public are to be avoided. The railroad situation is declared to be growing worse and efforts to solve it by negotiations are deadlocked. It is the purpose of the President to present the complete railroad situation to Congress and the country, but as yet it is not known by him what suggestions he may make.

Secretary Hoover's Position

While the President is represented as believing the coal problem is not far from a solution, it was stated this morning by Secretary Hoover that regardless of how soon extensive coal mining operations are resumed, it will be necessary to get prompt legislation enacted for strict control of prices and distribution of coal. This is especially necessary, he pointed out, as it relates to lake cargo and anthracite coal, but the plan which is proposed, it is taken for granted, will apply to all coal for industrial and other uses.

It was stated that continued control of prices and distribution of coal now under a more or less stringent voluntary system cannot prevail indefinitely and it has been taken as a foregone conclusion that coal distribution under Government supervision will be necessary for a period, no matter how soon the strike comes to an end. The point has been made that although the Interstate Commerce Commission can allot cars and establish priority; it has nothing to do with actual distribution and prices as such, but deals only with transportation. The statement was made that while some non-union operators are adhering to their agreement with Secretary Hoover as to prices, others have been and are breaking away from it and asking much higher levels. It is assumed that if Congress provides the legislation, the authority given by it will be exercised through the President's Fuel Administration Committee.

Inconsistent With Priorities Plan

The Interstate Commerce Commission to-day issued a statement pointing out that application of the so-called "railroad assigned car rule" is inconsistent with the plan of priorities carried in car service order No. 23 and ordered that it should not be invoked by the railroad carriers subject to the priority rule. The effect of this is to require carriers to get coal through the Federal Fuel Distibution Committee rather than to resort to the customary plan of assigning cars to mines and taking coal under the "assigned cars rule."

FABRICATED STEEL BUSINESS

Bridge and Building Awards and Tonnages Pending at Leading Centers

Awards for fabricated steel work for the past week include the following:

Building at Perth Amboy, N. J., 250 tons, to Schrimpf Iron Works.

St. Paul Street bridge, Baltimore, 400 tons, to Chesapeake Iron Works.

Hunters' Point telephone exchange for New York Telephone Co., 1000 tons, to Eidlitz & Ross.

Garage on East Seventy-sixth Street, New York, 900 tons, to George A. Just Co.

Public School No. 139, New York, 800 tons, to A. E. Norton, Inc.

New armory, New York, 1300 tons, Post & McCord, low bidder.

Masonic Temple, Paterson, N. J., 500 tons, to Paterson Bridge Co.

Yarn building, Newburgh, N. Y., 100 tons, to American Bridge Co.

Apartment building, 2450 Lake View Avenue, Chicago, 688 tons, to American Bridge Co.

Standard Oil Co., 46 additional oil tanks of 80,000-bbl. capacity, Casper, Wyo., 14,000 tons, 29 tanks to Chicago Bridge & Iron Works and 17 to American Bridge Co.

Five additional stories Carter Building, Houston, Tex., 306 tons, to Houston Structural Steel Co.

High school building, Rock Rapids, Iowa, 109 tons, to unnamed fabricator.

Nevada Consolidated Copper Co., building, Salt Lake City, Utah, 2000 tons, to Kansas City Structural Steel Co.

Additional steel for Kansas City Athletic Club building, Kansas City, Mo., 200 tons, to Kansas City Structural Steel Co.

Addition to plant of Lima Locomotive Works, Lima, Ohio, 1700 tons, to Massillon Bridge Co.

Witherbee, Sherman & Co., Port Henry, N. Y., 500 tons, to the Lackawanna Bridge Works Corporation.

Addition for power plant for L. E. Myers Co., Tony, Wis., 100 tons, to Worden-Allen Co.

Baseball park grand stand, Detroit, 500 tons, to The Russell Wheel & Foundry Co.

Structural Projects Pending

Inquiries for fabricated steel work which may be added to lists of pending projects include the following:

The New York Central Railroad, subway structure at Elyria, Ohio, tonnage not mentioned in inquiry; bids close Aug. 21.

Chesapeake & Ohio Railroad, bridge, 100 tons.

Building for General Electric Co., Schenectady, N. Y., 200 tons.

Building for Transit Commission at Lenox Avenue yards, New York, 125 tons.

Bascule bridge, Burnsham, Ill., 700 tons.

Louisiana & Arkansas Railroad, locomotive repair shop, 1311 tons.

Freight terminal for Illinois Central and Lake Erie & Western railroads at Indianapolis, tonnage unstated, plans completed but action deferred temporarily.

School building, Cincinnati, 400 tons.

Medical Center Building, Cleveland, 500 tons, bids taken.

St. Joseph's Home, Erie, Pa., 590 tons, bids taken.

Bolton Square apartment house, Cleveland, 700 tons.

Pennsylvania-Detroit freight house, Detroit, 1500 tons, bids taken.

Ingram Richardson Co., Bayonne, N. J., factory building, 300 tons, bids taken.

Steel plant, Otis Steel Co., Cleveland, 9000 tons.

Railroad Equipment Business

Although the formal inquiries have not been issued, it is known that three large railroads centering at Chicago will be in the market shortly for a total of 6500 new freight cars, and car builders are receiving many small contracts for car repairs pending a settlement of the rail strike.

The Burlington is expected to issue an inquiry this week for 2000 gondola cars.

The Illinois Central is inquiring for 75 caboose cars.

The Elgin, Joliet & Eastern has awarded 80 steel underframes to the General American Car Co.

The Indiana Coke & Gas Co., Terre Haute, Ind., has let repairs on 50 hopper cars to the American Car & Foundry Co.

The Chicago & North Western has issued an inquiry for 40 Mikado type and 10 Pacific type locomotives.

The Missouri, Kansas & Texas is inquiring for 40 Mikado type engines and 10 eight-wheel switchers.

The New York, Chicago & St. Louis has placed 15 additional locomotives with the Lima Locomotive Co.

The Seaboard Air Line has placed 600 freight car repairs with the Magor Car Co. in addition to the 400 reported placed with that company recently and it has awarded several hundred freight car repairs to the Richmond Car Works.

Orders received by the American Locomotive Co. include the following: Detroit Terminal Railroad Co., 2 switching engines; Public Service Co. of Northern Illinois, 1 switching engine; E. S. Tubarao A Ararangua (Brazil), 1 Mikado type engine; Wheeling Steel & Iron Co., 1 switching engine.

The Pacific Electric Co. is inquiring for 200 gondola cars.

Iron and Steel Markets

A SCARCITY MARKET

Prices Go Higher With Further Fall in Production

Operations on a 50 to 60 Per Cent Basis — Advances in Wire, Sheets and Pipe

The steel industry has suffered fresh losses in output in the past week, and there are indications that further crippling of blast furnaces and steel works will come before there is a turn for the better. More price advances and other aspects of a scarcity market have developed.

From a 65 to 70 per cent steel output last week the Steel Corporation is now down to about 60 per cent, and independent companies probably are not above 50 per cent on the average.

As in other weeks, blast furnaces are more seriously affected than steel works, and at least 13 furnaces have stopped in the second week of August—four in the Pittsburgh district, four at outside points in western Pennsylvania, three in eastern districts, one at Cleveland and one at Milwaukee.

Whatever the mining resumptions arranged at Cleveland may amount to, the steel industry is counting on little or no help from this source for weeks. Not only has the railroad strike caused the recent throttling of pig iron and steel production, but it is certain that when that strike ends the increased car and fuel supply will be turned into other than iron and steel channels.

Market changes of the week reflect the general belief of producers that for most if not all of the remainder of the year a rationing of steel supply will be the order. At Pittsburgh the mill schedules of the Carnegie Steel Co. have gone to a priority basis in which the order of preference is food containers, agricultural works, the oil industry and railroad car works.

Among important price developments is the opening of books of the American Sheet & Tin Plate Co. for fourth quarter business in sheets at 2.50c. base for blue annealed, 3.35c. for black and 4.35c. for galvanized—an advance of $2 per ton for the first named and $4 for black and galvanized.

An independent wire company has gone to $2.60 per keg for nails and to $2.35 for plain wire, or $4 and $2 respectively above Steel Corporation prices.

Several independent makers of standard pipe have advanced prices $6 per ton on black and $4 per ton on galvanized. The Steel Corporation and one independent are still on the old basis. Inquiry for line pipe includes 100 miles of 8, 10 and 12-in. and several thousand tons of 12-in. and 16-in.

Apart from the Steel Corporation nearly all producers of plates, shapes and bars have advanced those products, 2c. now being common for early delivery, with a range up to 2.25c. on urgent business.

Prices recently ruling on semi-finished steel now apply to such shipments as are being made on contracts. The small sales current are at $2 to $2.50 above the $35 level on billets and sheet bars and the $40 level on forging billets and wire rods.

In view of the tight mill situation, it is not surprising that warehouse prices have gone up in response to the piecing-out demand that is coming from all directions.

Buying of railroad cars still largely gives place to contracting for car repairs, but three Western roads are expected shortly to cover for 6500 new cars. Inquiries for 100 locomotives have appeared, and orders for 20 locomotives have been placed.

The sustained activity in fabricated steel work is shown in the figures for the last three weeks. Some 45,500 tons in 62 jobs, not including large oil tank business, were put under contract as compared with 46,700 tons for 61 jobs for the corresponding weeks a month ago.

The Standard Oil Co. has ordered 46 oil storage tanks in addition to the 33 reported last week, and about 31,000 tons of steel will be required for all the tank work just placed.

In the further advance of pig iron prices, due to inadequate supply of coke, foundry grades have taken the lead and in nearly all important centers have been marked up from $1 to $3 per ton. Basic and Bessemer have remained nearly stationary and a few transactions have been recorded at $1 below recent quotations. Important sales of the week include 7000 tons of foundry iron to the Pennsylvania Railroad, 4000 tons of copper-free low phosphorus to a wire company and 6000 tons of copper-bearing low phosphorus. Importers have contracted for large tonnages of foreign pig iron, in view of the increasing scarcity at home, but consumers in this country are disposed to be conservative about import orders.

The movement of iron ore shows improvement. The Great Northern, perhaps the most seriously affected by the rail strike, is now carrying about 90 per cent of the normal amount. Stocks of ore on Lake Erie docks increased 2,341,968 tons in July and on Aug. 1 stood at 7,396,842 tons.

Pittsburgh

Four More Blast Furnaces Added to Idle List —Prices Advancing

PITTSBURGH, Aug. 15.—The coal and railroad strikes still are exacting heavy tribute from the iron and steel industry, and as manufacturing activities dwindle and supplies become more limited, prices grow stronger. At the moment the coal strike situation is overshadowed by the railroad strike, which in several parts of the country is spreading to the train crews. The Pennsylvania and the Pittsburgh & Lake Erie railroads still are functioning in nearly normal shape, but west and south the railroads are suffering by the refusal of operating men to work on locomotives or cars on the pretext that they are in bad order. The present low rate of iron and steel plant activities is charged chiefly to the inability of Southern railroads to move coal, and the claim is made that enough coal could be had from

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton	Aug. 15 1922	Aug. 8, 1922	July 18, 1922	Aug. 16, 1921
No. 2X, Philadelphia†	**$33.44**	$31.44	$27.64	$20.34
No. 2, Valley furnace†	**30.00**	29.00	24.00	19.50
No. 2, Southern, Cin'ti†	24.05	24.05	21.53	23.50
No. 2, Birmingham, Ala.†	19.50	19.50	18.00	19.00
No. 2 foundry, Chicago*	**30.00**	27.00	24.00	20.00
Basic, del'd, eastern Pa.	27.25	27.25	25.75	19.00
Basic, Valley furnace	26.00	26.00	24.00	18.00
Valley Bess., del. Pitts.	28.76	28.76	26.77	21.96
Malleable, Chicago*	**30.00**	27.00	24.00	20.00
Malleable, Valley	28.00	28.00	24.50	20.00
Gray forge, Pittsburgh	**30.00**	28.76	25.27	21.46
L. S. charcoal, Chicago	33.15	33.15	31.65	33.50
Ferromanganese, seab'd	67.50	67.50	67.50	70.00

Rails, Billets, Etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$40.00	$40.00	$40.00	$47.00
Bess. billets, Pittsburgh	35.00	35.00	35.00	30.00
O.-h. billets, Pittsburgh	35.00	35.00	35.00	30.00
O.-h. sheet bars, P'gh	35.00	35.00	35.00	32.00
Forging billets, base, P'gh	40.00	40.00	40.00	35.00
O.-h. billets, Phila.	42.67	42.67	40.17	35.74
Wire rods, Pittsburgh	**42.00**	40.00	40.00	42.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	**2.00**	1.80	1.70	1.75
Light rails at mill	**1.90**	1.75	1.75	1.85

Finished Iron and Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	**2.325**	2.025	1.925	2.05
Iron bars, Chicago	**2.15**	2.00	1.90	1.75
Steel bars, Pittsburgh	**1.90**	1.80	1.70	1.75
Steel bars, Chicago	1.90	1.90	1.75	2.13
Steel bars, New York	**2.24**	2.14	2.04	2.13
Tank plates, Pittsburgh	**1.90**	1.80	1.70	1.80
Tank plates, Chicago	1.90	1.90	1.75	2.18
Tank plates, New York	**2.34**	2.14	2.04	2.18
Beams, Pittsburgh	**1.90**	1.80	1.70	1.85
Beams, Chicago	1.90	1.90	1.75	2.23
Beams, New York	**2.24**	2.14	2.04	2.23
Steel hoops, Pittsburgh	2.50	2.50	2.50	2.25

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Sheets, Nails and Wire, *Per Lb. to Large Buyers*	Aug. 15 1922 Cents	Aug. 8, 1922 Cents	July 18, 1922 Cents	Aug. 16, 1921 Cents
Sheets, black, No. 28, P'gh	3.15	3.15	3.15	3.00
Sheets, galv., No. 28, P'gh	4.15	4.15	4.15	4.00
Sheets, blue an'l'd, 9 & 10	2.40	2.40	2.40	2.25
Wire nails, Pittsburgh	2.40	2.40	2.40	2.75
Plain wire, Pittsburgh	2.25	2.25	2.25	2.50
Barbed wire, galv., P'gh	3.05	3.05	3.05	3.40
Tin plate, 100-lb. box, P'gh	$4.75	$4.75	$4.75	$5.25

Old Material, Per Gross Ton:				
Carwheels, Chicago	**$20.50**	$19.50	$19.50	$13.00
Carwheels, Philadelphia	17.50	17.50	17.50	16.00
Heavy steel scrap, P'gh	17.50	17.50	17.25	13.00
Heavy steel scrap, Phila.	15.00	15.00	15.00	11.50
Heavy steel scrap, Ch'go	**15.75**	15.50	15.50	10.75
No. 1 cast, Pittsburgh	19.00	19.00	19.00	16.00
No. 1 cast, Philadelphia	**19.00**	18.00	17.50	17.00
No. 1 cast, Ch'go (net ton)	**18.50**	18.00	17.00	13.00
No. 1 RR. wrot, Phila.	**18.00**	17.50	17.00	14.00
No. 1 RR. wrot, Ch'go (net)	**14.50**	14.25	13.50	11.00

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$14.00	$14.00	$11.00	$3.75
Foundry coke, prompt	15.00	15.00	11.00	3.75

Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York	14.12½	14.12½	14.00	12.00
Electrolytic copper, refinery	13.75	13.75	13.75	11.75
Zinc, St. Louis	*6.15*	6.30	5.75	4.20
Zinc, New York	*6.50*	6.65	6.10	4.70
Lead, St. Louis	**5.55**	5.50	5.50	4.25
Lead, New York	**5.90**	5.85	5.75	4.40
Tin (Straits), New York	32.12½	32.62½	31.50	26.12½
Antimony (Asiatic), N. Y.	5.25	5.25	5.00	4.50

Composite Price, Aug. 15, 1922, Finished Steel, 2.255c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel

Aug. 8, 1922.	2.212c.
July 18, 1922.	2.169c.
Aug. 16, 1921.	2.364c.
10-year pre-war average.	1.689c.

Composite Price, Aug. 15, 1922, Pig Iron, $26.77 Per Gross Ton

Based on average basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Aug. 8, 1922.	$25.94
July 18, 1922.	23.61
Aug. 16, 1921.	18.89
10-year pre-war average.	15.72

the South to maintain a fairly high rate of steel works operations if the railroads could transport it.

There has been a further net loss of four blast furnaces in this district in the past week. The Jones & Laughlin Steel Co. has banked one furnace each of its Eliza and Aliquippa group, now having only three of 12 furnaces making iron. The Crucible Steel Co. and the Sharon Steel Hoop Co. each has blown out a furnace since a week ago. The Carnegie Steel Co. has put down the one active stack at its Farrell, Pa., works, but has turned on the blast at one of its Clairton, Pa., furnaces and still is operating 35 furnaces out of a total of 59. Steel works operations also are suffering. It is doubtful whether ingot production of the independent companies in this and nearby districts now exceeds 50 per cent of capacity, while the Carnegie Steel Co., which last week produced somewhat in excess of 70 per cent of capacity, is not expected to do much in excess of 60 per cent this week. This company is conserving its coal primarily for coke, and is maintaining operations of steel melting units having access to natural gas or fuel oil. The past week has developed a number of important changes marketwise.

The Carnegie Steel Co. has adopted a plan of scheduling its mills on a priority basis, whereby preference is given first to material for food containers, second for the requirements of the agricultural industry, third for the oil industry, in helping oil production for fuel, fourth steel for railroad cars and fifth for the requirements for roadwork and other public utilities. Although other companies are not adopting such a plan, it is equally difficult for buyers to obtain supplies other than of such lots as the mills have in stock or are reasonably certain of being able to produce.

A large independent producer of wire goods yesterday announced an advance of $4 per ton in plain and cement coated nails and of $2 in plain wire. Other manufacturers have not acted, but most of them have been largely out of the market for the past few weeks. Most independent makers to-day advanced prices of standard pipe $4 per ton on galvanized and $6 per ton on black. The American Sheet & Tin Plate Co. has notified its customers that prices of sheets for the last quarter of the year will be 2.50c. base for blue annealed, 3.35c. for black and 4.35c. base for galvanized. Electrical sheets are left at the present base.

The market is definitely stronger for plates, shapes and bars and on spot tonnages 2c. Pittsburgh is pretty common, and even has been exceeded on some urgent business. Higher prices seem immediately ahead for

semi-finished steel in view of the curtailment of production, not to mention the increasing cost of pig iron. Scrap prices hold strong in the face of a very light demand and supplies of fuel are still too limited to permit of any easing in prices.

Pig Iron.—The market continues to gain in strength, especially on foundry grades, due to the ability of consumers of these grades to maintain higher relative operations than the users of steel making iron. A sanitary ware manufacturer recently closed for 1500 tons of No. 2 and No. 2 X iron for early delivery, on a base of $29.50 Valley furnace for the base grade. No more of this grade seems to be available at that price, and on small tonnages $30 has been paid, and the demand from the foundries is so insistent that it is believed iron could be sold here out of Buffalo, where the price is $31, and the delivered price here would be slightly more than $34.25. Some fairly sizable sales of steel making grades, made prior to last reports, have come to light. One of these sales involves 5000 tons of basic at $25, Valley furnace, to a Pittsburgh district consumer, and another 2000 tons of Bessemer at $26, Valley furnace, for shipment to Wheeling. These prices are about $1 per ton below what now could be done, as producers are holding at $26, Valley furnace, for basic and $27 for Bessemer, and some small sales have been done at these prices. Sales of off basic iron are noted at $23 and $24, but stocks of such iron no longer are large. The Follansbee Brothers Co. is inquiring for 5000 tons of basic for September shipment. We note one sale of 200 tons of No. 3, or gray forge iron, at $30, delivered Pittsburgh, but it is believed that $30 furnace now could be done on this grade.

We quote Valley furnace the freight rate for delivery to the Cleveland or Pittsburgh district being $1.76 per gross ton:

Basic	$26.00
Bessemer	27.00
Gray forge	28.25
No. 2 foundry	30.00
No. 3 foundry	28.25
Malleable	28.00

Ferroalloys.—The market in ferromanganese is a very limited one at present, due to the fact that with the decreasing steel works operations consumption is diminishing and consumers are too well covered to be actively interested in the market. Domestic producers at the moment are not actively seeking business because present indications are that the tariff will be in effect by Oct. 1, and they want to be free to act when this becomes a reality. Much of the current business is in less than carload lots at around $85 per ton, although one producer has announced a price of $100 at seaboard on such tonnages. It is claimed that carload lot sales have been made at more than $75 for prompt shipment. British material still is quotable as low as $67.50 c.i.f. Atlantic seaboard, for deferred delivery, but this price does not mean much in view of the fact that the tariff may be in effect by the time delivery can be made and the proposed duties added to this price would mean a cost to consumers of $100 per ton at seaboard. German material for delivery in six to eight weeks is priced at $67.50 to $70 seaboard. Demand for spiegeleisen, although relatively small, exceeds the available supply, and higher prices are looked for. In addition to an inquiry for 400 tons from a nearby consumer, an Ohio steel maker has inquired for 1000 tons for last quarter shipment.

We quote [illegible] ferromanganese, $75 c.i.f. Atlantic seaboard for domestic; British, spot, $72.50; British, future, $67.50. Germany [illegible] per cent, $67.50 to $70. Average [illegible] per cent [illegible] furnace, 16 to 19 per cent, $35 furnace; 50 per cent ferrosilicon, domestic, $55 to $60 furnace, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, $41.50; 11 per cent, $44.80; 12 per cent, $48.10; 13 per cent, $52.10; 14 per cent, $56.10; silvery iron, 6 per cent [illegible] per cent, $34.50; 9 per cent, $37.50; 10 per cent, $40.50; 11 per cent, $43.50; 12 per cent, $46.50; 13 per cent, $49.50. The [illegible] furnace at New Straitsville, Ohio, is 14 per cent, delivered New Straitsville, Ohio, $56.10, which is equivalent to $4.06 per gross ton.

Billets, Sheet Bars and Slabs.—Semi-finished steel is so scarce that few makers are in a position to entertain inquiries even for small tonnages that the price of $35 Pittsburgh or Youngstown, for sheet bars, slabs and large billets, now refers entirely to such shipments as are being made on contracts. Although demand is far from active, it considerably exceeds the available supply and those who must have tonnages in a hurry are finding it difficult to obtain accommodation, except at an advance of $2.50 to $3 per ton. Small sales of sheet bars are reported at $37.50 and it is doubtful whether slabs or large billets could be had today at less than that price. Labor shortages, as well as the scarcity of fuel, are affecting production. On forging billets $40 is merely the price on contract shipments and on new business for early delivery the market is quotable from **$43 to $45.**

We quote 4 x 4-in. soft Bessemer and open-hearth billets at $35 to $37.50; 2 x 2-in. billets, $35 to $37.50; Bessemer and open-hearth sheet bars, $35 to $37.50; slabs, $35 to $37.50; forging billets, ordinary carbons, $40 to $45, all f.o.b. Youngstown or Pittsburgh mills.

Wire Rods.—As a basis of sales, $40, base, for common soft rods appears to have disappeared. The leading interest is practically out of the market and those independents who might take on some tonnage hardly would do so at less than $43 while $45 is the price idea of one important maker. Actual business is kept down by the lack of supplies more than by a lack of demand.

We quote No. 5 common basic or Bessemer rods to domestic consumers, $43 to $45; chain rods, $43 to $45; screw stock rods, $48 to $50; rivet and bolt rods and other rods of that character, $43 to $45; high carbon rods, $50 to $55, depending on carbon, per gross ton, f.o.b. Pittsburgh or Youngstown.

Iron and Steel Bars.—Prices of steel bars are growing stronger in response to the curtailment of steel production and the inability of manufacturers to catch up with their obligations. Only attractive tonnages, and these for indefinite delivery, now can be placed as low as 1.80c., and several makers who are able to sell only such supplies as they have in stock are not interested at less than 2c. Reinforcing bars are held just as firmly as mild bars. There is no change in iron bars.

We quote steel bars rolled from billets at 1.80c. to 2c.; reinforcing bars, rolled from billets, 1.80c. to 2c. base; rail steel reinforcing bars, 1.70c. to 1.80c.; refined iron bars, 2.25c. in carloads, f.o.b. mill, Pittsburgh.

Structural Material.—The question of deliveries is becoming more perplexing because the mills are finding it difficult to maintain production in the face of decreasing supplies of steel. The full range of prices is from 1.80c. to 2c. Pittsburgh, but the lower figure refers to definite tonnages of good-sized proportions and the Steel Corporation seems to be alone at that figure. Generally the independents are on a minimum of 2c., and it is reported that as high as 3c. recently was quoted on a lot of 200 tons of small channels. Fabricators are interested in a new building for the Hardy Candy Co., Pittsburgh, for which 2100 tons of steel will be required and other live projects are the fastenings for the five 100-ton open-hearth furnaces for the Wisconsin Steel Co., South Chicago, and steel for the filtration plant for Wheeling, W. Va. Plain material prices are given on page 449.

Plates.—The chief source of demand now is in connection with oil storage tanks, for which there is a very brisk demand, particularly from the Southwest, due to the fact that producers are inclined to store rather than to sell oil at current prices. The Steel Corporation price now is 1.80c. base, Pittsburgh, but independents are holding at 2c. minimum and some are asking and obtaining as high as 2.25c. on small tonnages for quick delivery. Prices are given on page 449.

Sheets.—The American Sheet & Tin Plate Co. prices for fourth quarter will be 2.50c. base on blue annealed, 3.35c. base on black and 4.35c. base on galvanized. There has been no formal opening of books for this period by the company and these prices, representing advances of $2 per ton on blue annealed and of $4 per ton in black and galvanized sheets, merely have been announced to the company's customers. It is estimated that current costs are at least $6 per ton higher now than they were in the second quarter and since present indications are that fuel and labor costs will be higher over the remainder of the year, losses could not be avoided if present prices were made for that period, but all are expected to follow the Steel Corporation. It is probable that makers generally will be unable to take on much fourth quarter business because the carry over from the present quarter promises to be large. Present prices are given on page 449.

Iron and Steel Pipe.—Effective today the Youngstown Sheet & Tube Co. has reduced discounts on stand-

ard pipe three points on black and two points on galvanized, equivalent to an advance of $6 a ton on the former and of $4 on the latter. Most of the other independent makers have made this advance, but as yet the Republic Iron & Steel Co. and the National Tube Co. have not acted. Oil country and line pipe quotations have been withdrawn by all companies except these two, and prices now are made only upon application. This advance is not altogether unexpected because costs have been rising steadily for some time, and it is stated that for several weeks business has been done for no profit or at a slight loss. Most producers are heavily committed on the butt weld sizes and on account of the difficulty in maintaining steel production a number of companies have found it necessary to resort to an apportioning of production. Orders in lap welded goods are relatively light, but the inquiry lately has been gaining. About four miles of various sizes of pipe are wanted for the new filtration plant for the City of Wheeling, W. Va., while the Phillips Petroleum Co. is in the market for 100 miles of 8-in., 10-in., or 12-in. pipe and several thousand tons of 12-in. and 16-in. light weight pipe is wanted by a coal producer with operation in West Virginia and Kentucky. The Foundation Co., which has the contract for the Empire Building additions and extension, is inquiring for about 800 tons of 12-in. plain end pipe, with ⅜-in. wall for foundations. Makers of wrought iron pipe are pretty well sold ahead on the merchant sizes. Discounts are given on page 449.

Warehouse Business.—Effective immediately, the Carnegie Steel Co. and Jones & Laughlin Steel Co. have advanced warehouse prices of hot-rolled steel products $2 per ton. The new quotations are 2.45c. for bars, 2.55c. for plates and shapes and 3.10c. for bands and 3.95c. for hoops.

Tin Plate.—Pressure for shipments on contracts does not appear to be so urgent as it was recently and the shortage of steel is not so much of a factor as it is in most other products. Some of the independent companies making a full line of steel products have suspended operations of some mills and diverted the steel to other uses. The American Sheet & Tin Plate Co., on the other hand, has increased its active tin plate capacity, due to the fact that it has been able to get Bessemer steel. Few makers have very extensive obligations extending beyond Oct. 1 and all probably will be able to meet the bulk of them. There is no change in prices, the official quotation being $4.75 per base box, Pittsburgh, with the usual concessions from this figure to the large and preferential consumers.

Wire Products.—Effective immediately, the Pittsburgh Steel Co. has advanced the price of nails to 2.60c. base per keg, Pittsburgh, cement coated nails to 2.10c. base per count keg, and wire to 2.35c. base per 100-lb. These prices represent an advance of $4 per ton in nails, and $2 per ton in wire, which carries a corresponding increase in galvanized and barbed wire and in staples. The American Steel & Wire Co. has not changed its prices, but this company, as well as most of the independents, practically is out of the market and now, as for the past few weeks, is merely taking on such business as can be supplied from stock or have a supply of steel sufficient to insure full performance of obligations. Those companies making sales of nails out of stock have been charging $2.50 base per keg, Pittsburgh. The Pittsburgh Steel Co. appears to be faring better than most other companies in the matter of maintaining operations, but with labor so scarce and fuel costly, the company claims to have been losing money at recent prices. Quotations are given on page 449.

Steel Rails.—The Carnegie Steel Co. has raised its price on light rails from 1.75c. base to 1.90c. Independent makers of these rails, rolling them from new steel, are quoting 2c. base. Business is not very brisk and sales usually are in small lots, but the shortage of steel is beginning to tell on the available supplies.

We quote 25 to 45-lb. sections rolled from new steel, 1.90c. to 2c. base; rolled from old rails, 1.75c. to 1.80c. base; standard rails, $40 per gross ton mill for Bessemer and open-hearth sections.

Coke and Coal.—Available supplies still are extremely limited and the market is entirely a sellers' affair. Coal still commands from $7 to $8 per ton at mines, and the limited tonnages of beehive oven coke reaching the market are moving at from $14 to $15 per net ton at ovens for furnace grade and from $15 to $16 for that going to the foundries. The quality of current offerings of coke is very poor and it is claimed by some of the steel companies that from 2500 to 2900 lb. of present day coke are required for a ton of high iron. Good practice on basic iron is from 1800 to 2000 lb.

Cold-Finished Steel Bars and Shafting.—This line is firm in price, but the explanation is to be found in the strong market in hot-rolled bars rather than in the demand, which already is beginning to reflect the enforced curtailment of automobile production, due to the inability of that industry to get as large supplies of other kinds of steel as are required. All makers of rolled, drawn and turned bars are quoting 2.25c., base, Pittsburgh, for carloads and 2.50c. for less carloads. Ground shafting is unchanged at 2.65c., base, f.o.b. mill, for carloads and 2.90c. for less carloads.

Hot-Rolled Flats.—There is no easing in the price or supply situation. Mills are committed against probable production for the next 30 days and on account of the steel and fuel supply situation are not anxious for additional business at present prices. On the easily-rolled widths, the market is quotable at 2.50c., base, Pittsburgh, but on narrow stock, 2.75c., base, has become the common price and is sometimes demanded on wide material where prompt delivery is insisted upon.

Old Material.—No good reason exists for materially changing prices. The steel mills are doing very little buying and in the Youngstown district, on account of the contraction in operations forced by the fuel shortage, the mills are holding up shipments on contracts. Because the railroads are not pressing for shipping instructions on material sold, owing to the shortage of coal and the labor troubles, market offerings are quite as small as the demand. The result is a firm market. Railroad or industrial heavy melting steel, is not available at less than $17.50 and one company in this district requiring some good material recently paid $18.50 on 5000 tons. On the other hand, we note sales amounting to 1500 tons of material sold as heavy melting steel at $16.50. The full range on this grade, therefore, would be $16.50 to $18.50, but on a typical specification, the scrap sold at $16.50 would not find acceptance in local mills as heavy melting grade. Compressed sheets are slightly weaker; the highest price recently paid by any of the mills in this district was $16 and while few sellers would accept less, that is about all that can be obtained at the moment. Some users are bidding $15.50, but are not able to obtain tonnages.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows per gross ton:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh		$17.50
No. 1 cast, cupola size	$19.00 to	19.50
Rails for rerolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	17.50 to	18.00
Compressed sheet steel		16.00
Bundled sheets, sides and ends		15.00
Railroad knuckles and couplers	19.00 to	19.50
Railroad coil and leaf springs	19.00 to	19.50
Low phosphorus standard bloom and billet ends	21.00 to	22.00
Low phosphorus plates and other grades	19.00 to	20.00
Railroad malleable	16.50 to	17.00
Iron car axles	27.00 to	28.00
Locomotive axles, steel	25.00 to	26.00
Steel car axles	19.00 to	19.50
Cast iron wheels	19.00 to	19.50
Rolled steel wheels	19.00 to	19.50
Machine shop turnings	14.00 to	14.25
Sheet bar crop ends	19.00 to	19.50
Heavy steel axle turnings	15.00 to	15.50
Short shoveling turnings	15.00 to	15.50
Heavy breakable cast	18.00 to	18.50
Stove plate	14.50 to	15.00
Cast iron borings	15.50 to	16.00
No. 1 railroad wrought	15.00 to	15.50

Chicago

Further Curtailment Regarded Certain - - Pressing Pig Iron Demand

CHICAGO, Aug. 15.—An immediate resumption of coal mining will not end the difficulties of iron and steel works. So far as they are concerned the damage has been done. Owing to the priorities ruling, it will take so long for them to get additional coal that it is certain that additional blast furnaces will be banked and steel output will suffer further curtailment. Since last writing one additional blast furnace in this district has become inactive, the Bay View merchant stack of the Illinois Steel Co. at Milwaukee having been banked. This is the seventh furnace of this company to be thrown idle in three weeks, six having been banked and one blown out. There are now only 23 active stacks out of a total of 49 in the Chicago, Milwaukee and Duluth districts.

Steel output is also declining. The production of the Illinois Steel Co. has dropped from 78 per cent of ingot capacity to 67 per cent within the past week. The Inland Steel Co. is still on a 65 per cent basis, but it is felt that a reduction to a 30 per cent basis by the middle of September is inevitable. Some of the smaller mills are face to face with the necessity for shutting down altogether. A local bar iron mill has scarcely two weeks' supply of fuel on hand and entertains little hope of securing additional supplies in time to avert suspension of operations. Consumers are also in distress for fuel and this is particularly true of gray iron and malleable foundries.

Demand for prompt foundry coke is very pressing and prices no longer concern the buyer so long as delivery can be secured. Spot inquiries for pig iron are also numerous with the available supply steadily diminishing. Local merchant pig iron has again advanced, this time to $30, base furnace. Among finished products, bar iron and hard steel bars have advanced, while warehouse prices have generally gone up.

Demand for finished steel shows remarkable buoyancy. For a leading local mill new tonnage booked last week was above the average, despite the fact that orders are accepted only for delivery at mills' convenience. These new commitments consist largely of plates, shapes and bars for buildings and storage tanks, although a fair amount of track fastening business was also booked. It is notable, however, that new orders from both railroads and car builders have fallen off, although specifications from the latter are still heavy. On steel for early delivery Pittsburgh base prices rule, as little material is to be obtained from local sources.

Pig Iron.—Local merchant iron has advanced to $30, base furnace. The Bay View stack of the Illinois Steel Co. was banked Monday and further furnace bankings in this district are regarded as inevitable. Demand for spot iron is exceedingly pressing. The situation is acute and is growing steadily worse rather than better, as production in this district declines and shipments from other centers are shut off. Quotations on Southern iron, in fact, have become practically nominal at $20 to $21, base Birmingham, owing to the fact that furnaces find it exceedingly difficult to move shipments beyond the Ohio River. Local producers are finding it necessary to allocate their output among their customers in an effort to tide them over the period, but even in this they are impeded by car shortage, freight blockade and the strike of train service employees on the Elgin, Joliet & Eastern. Among recent transactions may be noted sales of 300 tons of Southern foundry for fourth quarter delivery at $20, base Birmingham, and 300 tons of malleable for immediate shipment. A Michigan automotive plant wants 2000 tons of foundry for early delivery. Another Michigan automotive concern has placed 1000 tons of 9 per cent silvery for August and September shipment at $38, Jackson furnace. A Wisconsin melter has closed for 500 tons of 8 per cent silvery. Jackson County furnaces have withdrawn all prices, but material can still be obtained from electrolytic producers on a basis of $36, f.o.b. Jackson, for 8 per cent. An inquiry for 400 tons of low phosphorus is current, and the quotation on copper free material is about $36, Valley. A local melter has closed for 400 tons of 14 per cent Bessemer ferrosilicon at a reported price of approximately $40, delivered.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.00, delivered at Chicago	$33.1
Northern coke, No. 1, sil. 2.25 to 2.75	31.00
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	30.00
Northern high phos.	30.00
Southern No. 2	$26.00 to 27.00
Malleable, not over 2.25 sil.	30.00
Basic	30.00
Low phos. Valley furnace, sil. 1 to 2 per cent copper free	36.00
Silvery, sil. 8 per cent	40.79

Ferroalloys.—Spiegeleisen is stronger, prices ranging from $47 to $49, delivered. Neither spiegeleisen nor ferromanganese is active.

We quote 78 to 82 per cent ferromanganese, future, $75.06; prompt, $82.56, delivered; 50 per cent ferrosilicon, $57, delivered; spiegeleisen, 18 to 22 per cent, $47 to $49, delivered.

Bars.—Bookings in mild steel bars for indefinite delivery are heavy, while material for early shipment is scarce and is commanding 1.90c. to 2c., base Pittsburgh. With their operations rendered uncertain by the coal strike and with their books well filled, bar iron mills are picking their new orders. Prices have again advanced, the ruling market on bar iron being 2.15c. to 2.25c., Chicago. The minimum price on rail carbon steel bars is now 1.80c., Moline, or 1.955c., Chicago. The two Chicago Heights mills are still tied up by a strike.

Mill prices are: Mild steel bars, 2.15c. to 2.25c., Chicago, for indefinite delivery; common bar iron, 2c., Chicago; rail steel, 1.955c., mill or Chicago.
Jobbers quote 2.70c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 3.70c. for rounds and 4.20c. for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 2.50c. base; hoops, 3.70c.; bands, 3.45c.

Bolts and Nuts.—As the costs of makers increase, discounts are growing increasingly firm on the July 1 basis and the May 11 prices are now a thing of the past. Discounts on page 449 apply in this territory except that they are f.o.b. Chicago, instead of f.o.b. Pittsburgh.

Jobbers quote structural rivets, 3.35c.; boiler rivets, 3.45c.; machine bolts up to ⅞ x 4 in., 50, 10 and 10 per cent off; larger sizes, 50 and 10 off; carriage bolts up to ⅞ x 6 in., 50 and 5 off; larger sizes, 45 off; hot pressed nuts, squares and hexagons, tapped, $3.25 off; blank nuts, $3.50 off; coach or lag screws, gimlet points, square heads, 60 per cent off; quantity extras are unchanged.

Wire Products.—An Eastern independent has advanced wire nails to $2.60, cement coated nails to $2.10 and plain wire to $2.35. The leading interest, however, has made no change in prices and has given no intimation that advances are contemplated. New business is heavy, but it is suspected that some buyers have been stampeded into placing orders by the two national strikes. For mill prices see finished iron and steel, f.o.b. Pittsburgh, page 449.

We quote warehouse prices, f.o.b. Chicago: No. 9 and heavier black annealed wire and No. 9 and heavier bright basic wire, $2.95 per 100 lb.; common wire nails, $3.10 per 100 lb.; cement coated nails, $2.60 per keg.

Sheets.—Users are now dependent largely on Eastern mills for new supplies and are finding it difficult to place orders for early shipment. Galvanized is particularly scarce.

Mill quotations are 3.15c. to 3.30c. for No. 28 black, 2.40c. to 2.50c. for No. 10 blue annealed and 4.15c. to 4.30c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.
Jobbers quote blue annealed, 3.90c.; black, 4.60c.; galvanized, 5.60c.

Structural Material.—Structural mills continue to receive liberal orders for indefinite delivery, indicating that building activity is still buoyant in spite of the hindrances due to the two nation-wide strikes. Fabricating awards are still fairly numerous and some attractive new projects are making their appearance. Plain material for early shipment is bringing as high as 2c. and 2.10c., base Pittsburgh.

The mill quotation on plain material for indefinite delivery is 1.90c. to 2c., Chicago. Jobbers quote 2.80c. for plain material out of warehouse.

Plates.—The Standard Oil Co. has placed 46 oil storage tanks of 80,000 barrels capacity in addition to the 33 tanks reported awarded last week. Of the total of 79 tanks, 42 will be fabricated by the American Bridge Co. and 37 by the Chicago Bridge & Iron Works. Fully 24,000 tons of steel is involved. New orders for plates are above the average in tonnage, notwithstanding the fact that local mills are booking only for indefinite delivery. Specifications from carbuilders are heavy. Plates for early shipment are commanding 2c. Pittsburgh.

The mill quotation for indefinite delivery [illegible] Chicago. Jobbers quote 2.50c. for plates out of stock.

Reinforcing Bars.—Reinforcing bar distributors still have fair stocks of bars on hand, but replenishments from the mills are becoming so uncertain that they are selling cautiously, concentrating their attention on satisfying the imperative needs of customers. In line with the recent advance in mill prices, bar distributors have raised their warehouse quotation on reinforcing bars to 2.50c., Chicago. The paralyzing effect of the railroad and coal strikes is commencing to be felt and it is notable that fewer new building projects involving bars are appearing. Considerable highway work, however, is still in prospect. Recent awards include:

Advance-Rumely Co., warehouse, Omaha, Neb., 210 tons, to Concrete Steel Co.

Kansas City Title & Trust Co., building, Kansas City, Mo., 135 tons, to Concrete Steel Co.

High school, Maquoketa, Iowa, 120 tons, to Concrete Steel Co.

Convent, Milwaukee, Wis., 70 tons, to Concrete Steel Co.

Pending business includes:

Illinois State Highway Commission, highway work, 1200 tons, bids to be opened Aug. 18.

Chicago, Burlington & Quincy Railroad, two-story addition to Chicago freight house, 100 tons.

Wisconsin General Hospital, Madison, Wis.: 350 tons, to Corrugated Bar Co.

Cast-iron Pipe.—Shops located in the South are finding it difficult to make deliveries north of the Ohio River. Inquiry is not so active on account of the season and the national strikes. Minneapolis took bids yesterday on 1100 tons and Roanoke, Ill., receives tenders on 110 tons Aug. 29. Detroit takes bids today on 800 tons, instead of 200 tons as stated last week. Hinsdale, Ill., has placed 100 tons with the American Cast Iron Pipe Co. and is in the market for 1100 tons additional.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $50.20 to $51.20; 6-in. and above, $46.20 to $47.20; [illegible] pipe $2 extra.

Rails and Track Supplies.—New business in rails is light, a few orders aggregating 2000 tons having been placed by frog and switch makers. Four large Western roads, however, are working out their 1923 requirements with the likelihood that formal inquiries will be issued within a few weeks. Track fastening orders are still fairly numerous. Standard spikes are now quoted at a minimum of 2.60c. Chicago, while the bottom on track bolts is 3.60c. Chicago.

Standard Bessemer and open-hearth rails, $40; light rails rolled from new steel, 1.75c., f.o.b. makers' mills.

Standard railroad spikes, 2.60c. to 2.75c., Pittsburgh; track bolts with square nuts, 3.60c. to 3.75c., Pittsburgh; tie plates, steel and iron, 2c., f.o.b. mill; angle bars, 2.40c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.40c. base and track bolts 4.40c. base.

Steel Castings.—Most outstanding castings business has been closed and foundries are generally running full or nearly so. Due to a widespread use of oil in the open hearths, the coal strike has not forced curtailment of operation. Costs, however, are increasing, and an early advance in prices is looked for.

Warehouse Prices.—Local warehouses have announced advances of 10c. per 100 lb. on bars, plates, shapes, hoops, bands, rivets, track spikes, and bolts, and 15c. per 100 lb. on sheets, cold rolled bars and shafting. The new quotations are to be found under the appropriate paragraphs.

Coke.—The local by-product producer has advanced foundry coke to $13.50, delivered Chicago switching district. For Milwaukee the price is now $13.50, f.o.b. Milwaukee ovens. Demand for prompt foundry coke has almost reached the point of a panic. Mills are no longer concerned about prices; they want deliveries to avert a shut-down. There is practically no Connellsville coke reaching here. Some shipments of New River coke, which is quoted at $12, ovens, have managed to get through, and the same can be said of some brands of Southern coke, which are bringing $13 to $13.80, delivered Chicago. The available supply of coke, however, does not meet the demand, and if foundries are forced to shut down it will be due more largely to lack of fuel than of pig iron.

Old Material.—Current demand is widely distributed and is principally for small tonnages for prompt shipment. Gray iron, malleable and steel foundry grades are notably active, but there is little movement of iron mill grades or heavy melting, the last important sale of the latter having been made ten days ago. Railroads are not only tardy in making shipments, but their new offerings are almost nil. This fact, coupled with a general shortage of scrap for prompt shipment and an effort on the part of numerous users to hasten deliveries from sellers, has given the market added strength, numerous grades having advanced. The Chicago Great Western offers 200 tons.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$19.50 to $20.00
Cast iron car wheels	20.50 to 21.00
Relaying rails	22.50 to 27.50
Rolled or forged steel car wheels	19.00 to 19.50
Rails for rerolling	16.50 to 17.00
Steel rails, less than 3 ft.	18.50 to 19.00
Heavy melting steel	15.75 to 16.25
Frogs, switches and guards cut apart	15.75 to 16.25
Shoveling steel	15.25 to 15.75
Drop forge flashings	11.50 to 12.00
Hydraulic compressed sheet	13.00 to 13.50
Axle turnings	14.00 to 14.50
Per Net Ton	
Iron angles and splice bars	18.50 to 19.00
Steel angle bars	15.00 to 15.50
Iron arch bars and transoms	19.00 to 19.50
Iron car axles	23.50 to 24.00
Steel car axles	16.20 to 16.75
No. 1 busheling	13.00 to 13.50
No. 2 busheling	7.50 to 8.00
Cut forge	14.25 to 14.75
Pipes and flues	11.00 to 11.50
No. 1 railroad wrought	14.50 to 15.00
No. 2 railroad wrought	14.25 to 14.75
Steel knuckles and couplers	17.00 to 17.50
Coil springs	17.50 to 18.00
No. 1 machinery cast	18.50 to 19.00
No. 1 railroad cast	17.00 to 17.50
Low phos. punchings	15.00 to 15.50
Locomotive tires, smooth	13.50 to 14.00
Machine shop turnings	9.50 to 10.00
Cast borings	11.50 to 12.00
Stove plate	14.75 to 15.25
Grate bars	15.00 to 15.50
Brake shoes	15.25 to 15.75
Railroad malleable	17.00 to 17.50
Agricultural malleable	17.00 to 17.50

Activity in Springfield, Ohio

SPRINGFIELD, OHIO, Aug. 8.—All three piano plate plants in this city are operating with good-sized forces. The manufacturers say that they look for a steady improvement in business. Owing to the receipt of substantial orders for water turbines the James Leffel & Co.'s plant started Monday on a late run. The plant is now being operated until 8.15 p. m., according to announcement made by President A. F. Sparks. The present demand is for medium-sized turbines.

The next meeting of the district association of the Ohio Foundrymen's Association will be held in Springfield in September. The Ohio association will meet in Cleveland next month.

General Manager George Ireland, of the Steel Products Engineering Co., reports orders for dies and tools for automotive manufacturers in Detroit. These orders and others from the Government will require running overtime.

Although general prospects are good, there has been a slowing up at the plant of the Buffalo-Springfield Roller Co. The company is constructing an addition, 60 x 150 ft., to be used as an assembly room.

Equipment for Open-Hearth Plant

CHICAGO, Aug. 15.—The Wisconsin Steel Works, South Chicago, has let orders for the following equipment for its new open-hearth plant to the Alliance Machine Co., Alliance, Ohio: One 175-ton ladle crane, one 100-ton ladle crane, two open-hearth charging machines, two 10-ton overhead electric traveling cranes, one spare 10-ton trolley, two 7½-ton overhead electric traveling cranes.

New York

Little Steel Buying and Prices Higher—Large Sale of Low Phosphorus Iron

NEW YORK, Aug. 15.—Troubles connected with the delivery of coal and coke continue. While pig iron prices advance only moderate relief is furnished by foreign importations, although some coal as well as pig iron is being received from England and much more is expected. In finished steel, a majority of the mills are out of the market and those selling are dealing as a rule only with their regular customers. Quotations are $1 and $2 higher than a week ago on such business as can be placed.

Pig Iron.—A sale of 4000 tons of copper free low phosphorus iron has been made by a Northern New York furnace for delivery at Worcester, Mass., the price being somewhat under $35, furnace. Very little of this grade is obtainable. Following sales amounting to about 2000 tons, one seller of foundry pig iron has advanced to a price of $31 for No. 2 plain and $32 for No. 2X for early delivery. The Bethlehem Steel Co. has opened its books for fourth quarter at the following prices: No. 2 plain, $30; No. 2X, $31; No. 1X, $33, at furnace. It is believed that there will be no trouble in making sales for early delivery on the basis of $30 for No. 2 plain, although the last sales were $1 lower. The scarcity of domestic iron is more pronounced and sellers of foreign grades are more active, but the only new sale amounting to any considerable tonnage was 1000 tons of foundry iron to be imported from England. Prices of foreign iron are advancing and the minimum on Scotch, analyzing from 2 to 3 per cent silicon, now seems to be $28, while as high as $30 is asked. On high phosphorus iron from England and the Continent, there is a wide range in prices, from $22 to $27 being quoted. Buyers are not placing orders for foreign irons with much enthusiasm, owing to the uncertainty as to delivery and analysis. For delivery within Greater New York, a charge of about $1.50 must be added to the seaboard quotation.

Coke.—Difficulties in delivering coke are still great and prices high. For Connellsville grades, $14.25 to $14.75 is quoted for furnace coke and $15.50 to $16.50 for foundry. For by-product coke the nominal quotation is $14, but owing to an order of the New Jersey Fuel Commission requiring priority to be given public utility companies, very little can be delivered to foundries at present. A sale of coke for shipment from Terre Haute, Ind., to Buffalo was made on a basis of $12.50, Terre Haute ovens.

[illegible] the New York district [illegible] follows: [illegible] brought from eastern [illegible] and $34 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$33.77 to $34.27
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	32.77 to 33.27
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	31.77 to 32.27
Buffalo, sil. 1.75 to 2.25	32.91 to 33.91
No. 2 Virginia, sil. 1.75 to 2.25	31.44 to 32.44

Warehouse Business.—All warehouses including the Carnegie Steel Co. and the leading independent have increased prices. Bars, shapes and plates have been advanced 10c. per 100 lb. Hoops and bands have risen 25c., the quotation now being 3.63c. One large warehouse states that the market is stronger than it has been for the past two years. Blue annealed sheets have advanced 15c., now being quoted at 3.93c. No change has been marked in black or galvanized. Mill quotations on spring steel, which now range up to 2.35c. per lb. base, Pittsburgh, are being quoted consistently at 4c. at all warehouses. Brass and copper remain steady, the only change being noted in cold-rolled copper sheets, 14 oz. and heavier, which are quoted at 3c. advance over hot-rolled. The spread between mill and warehouse continues at about $12 per ton.

Cast Iron Pipe.—Prices are strong and some foundries have increased quotations slightly. While foundries in this district are fairly well situated for pig iron, the coal shortage is being felt as shipments received become smaller. No municipal buying is in evidence at present, probably because of the realization by cities that purchases now would be rather uncertain as to delivery. The low bidder on the 2500 tons of pipe for the city of Poughkeepsie was the Warren Foundry & Machine Co., but alternate bids were also received on steel pipe and decision has not been made as to the type which will be purchased. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $54.50; 4-in. and 5-in., $59; 3-in., $64.80, with $4 additional for Class A and gas pipe.

Ferroalloys.—Sales of one lot of 500 tons and several lots of 50 and 100 tons each of British ferromanganese are reported for September and September-October shipment at the prevailing quotation of $67.50, seaboard. There is a fair demand for spiegeleisen and some domestic 20 per cent alloy is available at an advanced price of $3 per ton, or $39, furnace. One lot of British spiegeleisen has reached the seaboard and a little more is on the way. Buying of 50 per cent ferrosilicon is confined to small and carload lots at the prevailing quotations which are unchanged. No activity is reported in Brazilian or Indian manganese ore, but the receipt of several cargoes of Russian ore is reported. Quotations are as follows:

Ferromanganese, domestic, seaboard, per ton	$67.50 to $70.00
Ferromanganese, British, seaboard, per ton	$67.50 to $70.00
Spiegeleisen, 17 to 19 per cent	$38.00
Spiegeleisen, 20 per cent	$39.00
Ferrosilicon, 50 per cent, delivered, per ton	$52.00 to $55.00
Ferrosilicon, 10 to 15 per cent, delivered, per gross ton	$38.00 to $40.00
Ferrotungsten, per lb. of contained metal	40c. to 50c.
Ferrochromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr., delivered	12c. to 14c.
Ferrovanadium, per lb. of contained vanadium	$3.00 to $3.50
Ferrocarbontitanium, 15 to 18 per cent, in carloads, per net ton	$200.00
Ores	
Manganese ore, foreign, per unit, seaboard	28c. to 30c.
Tungsten ore, per unit, in 60 per cent concentrates, nominal	$3.25 up
Chrome ore, basis 48 per cent Cr_2O_3, crude, per ton, Atlantic seaboard	$15 to $18.50
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	45c. to 50c.

Old Material.—The market continues strong and some prices show an upward tendency. Most of the present buying is from eastern Pennsylvania mills. Western Pennsylvania mills are extremely particular at present as to quality and are inclined to reject when material is not entirely up to grade. No. 1 heavy melting steel continues firm, while railroad steel is now quotable at $11.75 to $12.25 per ton. There are some inquiries current from Japanese export houses for heavy melting steel for Japan, but the price evidently expected by these buyers is about $13 to $14 per ton, f.a.s. port.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$10.50 to $11.50
Steel rails, short lengths, or equivalent	11.75 to 12.25
Rerolling rails	12.50 to 13.00
Relaying rails, nominal	27.00 to 28.00
Steel car axles	17.00 to 18.00
Iron car axles	22.00 to 23.00
No. 1 railroad wrought	12.50 to 13.00
Wrought iron track	11.50 to 12.00
Forge fire	8.00 to 8.50
No. 1 yard wrought, long	11.00 to 11.50
Cast borings (clean)	9.[illegible] to [illegible]
Machine shop turnings	[illegible] to [illegible]
Mixed borings and turnings	9.25 to 10.25
Iron and steel pipe (1 in. diam., not under 2 ft. long)	9.00 to 9.50
Stove plate	11.00 to 11.50
Locomotive grate bars	11.50 to 12.00
Malleable cast (railroad)	10.50 to 11.00
Cast-iron car wheels	13.50 to 14.00

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$18.00 to $19.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	16.50 to 17.00
No. 1 heavy cast, not cupola size	13.00 to 13.50
No. 2 cast (radiators, cast boilers, etc.)	12.00 to 12.50

Finished Iron and Steel.—Very little business in finished steel is being done because of the mill situation due to coal and coke shortage. A few companies are in fairly comfortable position and are taking orders moderately, but the majority of steel companies are entirely out of the market. Those which have anything to sell are taking care of their own customers principally and at prices which usually range from 2c., Pittsburgh, upward for plates, shapes and bars when prompt delivery is required. Plates are quoted from 2c. to 2.15c.; soft steel bars at 1.90c. to 2.15c. and shapes at 1.90c. to 2c., Pittsburgh. Bar iron makers now quote 1.80c., Pittsburgh, or higher for carload lots. The New

York Central has asked for bids by Aug. 21 on 30,000 railroad spikes. A sale of 100 tons of soft steel billets at $37, Pittsburgh, by an Eastern mill for shipment to New England illustrates the strength of the semi-finished market.

We quote for mill shipments, New York delivery, as follows: For indefinite delivery soft open hearth structural shapes and steel plates, 2.14c. for deliveries from Pittsburgh mill works; soft steel bars, 2.24c. to 2.49c.; plain structural material, 2.24c. to 2.34c.; steel plates, 2.34c. to 2.49c.; bar iron, 2.34c.

Buffalo

BUFFALO, Aug. 15.

Pig Iron.—Seven furnaces are now in operation in this district, but it is generally believed that there will be about 50 per cent curtailment of this operation before the end of the current month. The one interest which has had iron to sell is rather reluctant to handle the volume of business available and has virtually adopted a policy of selling only to regular trade. This situation was brought about through the exhaustion of its stock of piled iron and the fact that the product of the one furnace in operation is being sold rapidly. There are no big inquiries coming into the Buffalo district; tonnages usually being from carload lots to 100 tons. There is no bright prospect with reference to the fuel situation in this vicinity and pig iron men generally feel that the situation will be worse before it is better. On scattered sales, prices range from $30 to $32 base. A broker sold a small lot of No. 2X iron for $31, whereas $32 has been done for No. 2 plain filling an emergency order. The Lackawanna Steel Co. has banked two of the four blast furnaces in operation.

We quote f.o.b. per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$32.00
No. 2X foundry, 2.25 to 2.75 sil.	31.00
No. 2 plain, 1.75 to 2.25 sil.	30.00
Basic	26.00
Malleable	30.00
Lake Superior charcoal	33.28

Finished Iron and Steel.—Except on cold finished material, black sheets and bolts, there is hardly any other sales activity in this district. Occasionally small tonnages of bars are sold, but these sales are made conditional on immediate specifications and at a minimum of 2c. Some inquiries for small tonnages of reinforcing bars have come out within a few days. The one selling agency taking business in black sheets has established a base price of $3.30, but is not taking any galvanized business whatever. While the local branch of an independent which does a large business in tin plate has not withdrawn on this product, it is not pressing the selling but has withdrawn within the week on wire, pipe and spikes.

Warehouse Business.—Prices on cold-rolled round shafting advanced to 3.80c., effective Monday, Aug. 14, and further advances all along the line are expected before many days. A majority of buyers seeking warehouse material are asking for tonnages greater than warehouses can supply at the time. There is every likelihood that merchant business will be active throughout the remainder of the year, regardless of how quickly the coal and rail difficulties are settled.

We quote warehouse prices, Buffalo, as follows: Structural shapes, 2.85c.; plates, 2.85c.; soft steel bars, 2.75c.; hoops, 3.55c.; bands, 3.40c.; blue annealed sheets, No. 10 gage, 3.80c.; galvanized steel sheets, No. 28 gage, 5.60c.; black sheets, No. 28, 4.60c.; cold rolled round shafting, 3.80c.

Old Material.—Only one mill is buying heavy melting steel, while the others are not out of the market, but they are inactive for the present. There is a good demand for machinery cast scrap and low phosphorus and both grades of old material are scarce. Dealers are finding it difficult to obtain cars to ship material on old contracts.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$16.75 to $17.00
Low phos., 0.04 and under	18.00 to 19.00
No. 1 railroad wrought	16.00 to 16.50
Car wheels	17.00 to 18.00
Machine shop turnings	10.50 to 11.00
Cast iron borings	14.00 to 14.50
Heavy axle turnings	14.00 to 14.50
Grate bars	14.00 to 14.50
No. 1 busheling	15.00 to 15.50
Stove plate	15.00 to 15.50
Bundled sheet stampings	11.50 to 12.00
No. 1 machinery cast	18.50 to 19.50
Hydraulic compressed	15.00 to 15.50
Railroad malleable	17.00 to 17.50

St. Louis

ST. LOUIS, Aug. 15.

Pig Iron.—The week was marked by an active demand and increased prices in pig iron. The price of Northern iron has advanced to $28, f.o.b. Chicago for prompt shipment and $27 for shipment during the rest of the year, with a premium of $2 a ton for silicon 2.25 to 2.75. Southern iron is quoted at $20 to $21, Birmingham, but the railroad strike has so hampered shipments that there is virtually no movement of iron from the Birmingham district. The coal strike is making it increasingly difficult to produce iron. The Granite City maker is still on a 100 per cent production basis, and has made arrangements to move coal from the Kentucky fields by barge. Buying is more active, as users who thought they had been fully protected in their purchases now find they cannot get iron they had counted on and are looking about for material they will need. There is also an active demand for iron for third and fourth quarter delivery, and there is one inquiry before the market for 300 tons for first quarter of next year. There is still a most pressing demand for iron of high silicon. The principal sales of the Granite City maker were 850 tons of malleable for shipment to Ohio; 500 tons of malleable to an Indiana melter, and 100 tons to an Illinois foundry. Inquiries are being received here from Indiana and Ohio melters, who usually look to other markets for their supplies. The principal inquiries before the market are: 1000 tons of foundry iron for a South Bend, Ind., melter; 500 tons for another Indiana melter; 300 tons for a Columbus, Ohio, concern; 200 tons for a Quincy, Ill., user, 300 tons for a Terre Haute melter, and 400 tons for delivery September to December. The markets for ferroalloys are quiet this week.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago and $5.17 from Birmingham and 31 cents average switching charge from Granite City:

Northern foundry, sil. 1.75 to 2.25 (forward delivery)	$29.16
Northern malleable, sil. 1.75 to 2.25 (forward delivery)	29.16
Basic (third quarter)	29.16
Southern foundry, all rail, sil. 1.75 to 2.25	$25.17 to 26.17

Finished Iron and Steel.—The shortage of coal is curtailing production at steel mills so that it is becoming more and more difficult to place business. This fact seems to be generally recognized by the trade, and inquiries are being confined largely to material for which there is immediate need. The largest railroad inquiry of the week for material was from the Missouri-Kansas-Texas Railroad, which is in the market for 800 kegs of standard track spikes, the other inquiries being for material such as could be gotten readily from warehouse stock. The Wabash order for 240,000 tie plates, which inquiry was reported in THE IRON AGE of last week, went to the Illinois Steel Co., at a price understood to be $37, f.o.b. Chicago. A Tulsa manufacturer who last week bought 1000 tons of tank plates, bought 2000 additional tons this week, and there continues to be an active demand for tanks from the Oklahoma oil fields, a situation largely aided by the shortage of coal. Bids have been asked on the Shrine Hospital, St. Louis, W. B. Ittner, architect, involving about 200 tons of billet reinforcing bars, and the Bankers' Reserve Life Building, Omaha, F. A. Henninger, architect, in which 700 tons of structural steel will be used. The demand for tool steel is very active, a leading factor in the trade reporting that sales for August were much larger than for any month this year. Sheets are in good demand, but the mills seem to have none to offer.

For stock out of warehouse we quote: Soft steel bars, 2.70c. per lb.; iron bars, 2.70c.; structural shapes, 2.80c.; tank plates, 2.80c.; No. 10 blue annealed sheets, 3.85c.; No. 28 black sheets, cold rolled, one pass, 4.45c.; cold drawn rounds, shafting and screw stock, 3.50c.; structural rivets, $3.35 per 100 lb.; boiler rivets, $3.45; tank rivets, $\frac{7}{8}$ in. and smaller, 60 per cent off list; machine bolts, large, 50 and 10 per cent; small, 50-10 and 10 per cent; carriage bolts, large, 55-5 per cent; small, 60 and 10 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon blank, $3.50; and tapped, $3.25 off list.

Coke.—Coke continues in big demand, with the sources of supply continually being made smaller because of the coal and railroad strike. Urgent demand is being made by users for shipments against pur-

chases. The Granite City by-product maker is still holding its production down to the minimum required to supply municipalities depending upon them for gas, while the local by-product plant has been out of the market for some time. The Granite City producer is taking orders for coke, subject to price prevailing when they are able to ship it. No coke is to be had from the South on account of railroad conditions. Some Connellsville coke is being sold on a basis of $15 a ton at the ovens.

Old Material.—The market for old material continues to advance. No scrap is coming in, the railroads not offering anything because of the scarcity of labor required to pick up the material, and consumers are eager to get supplies. Mills are showing considerable anxiety about material they have on back orders with dealers, and in some cases are giving a premium of $1 a ton for anything on which deliveries in ten days to two weeks can be guaranteed. There is a tremendous shortage in the specialty market. Cast scrap in car wheels is in very good demand.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

	Per Gross Ton	
Old iron rails	$17.75 to	$18.75
Rails for rerolling	16.75 to	17.25
Steel rails, less than 3 ft.	16.75 to	17.25
Relaying rails, standard section	25.00 to	28.00
Cast iron car wheels	19.50 to	20.00
No. 1 heavy railroad melting steel	15.50 to	16.00
No. 1 heavy shoveling steel	14.00 to	14.50
Ordinary shoveling steel	13.75 to	14.25
Frogs, switches and guards, cut apart	15.75 to	16.25
	Per Net Ton	
Heavy axle and tire turnings	10.50 to	11.00
Steel angle bars	14.75 to	15.25
Iron car axles	24.00 to	24.50
Steel car axles	17.00 to	17.50
Wrought iron bars and transoms	19.00 to	19.50
No. 1 railroad wrought	13.50 to	14.00
No. 2 railroad wrought	13.00 to	13.50
Railroad springs	18.00 to	18.50
Steel couplers and knuckles	18.00 to	18.50
Cast iron borings	9.00 to	9.50
No. 1 busheling	12.00 to	12.50
No. 1 railroad cast	17.50 to	18.00
Stove plate and light cast	14.75 to	15.25
Railroad malleable	14.50 to	15.00
Pipes and flues	9.75 to	10.25
Machine shop turnings	9.25 to	9.75

Cincinnati

Pig Iron More Active and Prices Higher—Coke Advances

CINCINNATI, Aug. 15.

Pig Iron.—The market is showing more activity, both as regards inquiry and sales. Last week some fair-sized tonnages were booked, principally for Northern irons, as, with two exceptions, all Southern interests are out of the market for the present. One Southern furnace is quoting $21, Birmingham, for fourth quarter, and another has a small tonnage available for shipment in September, on which it is quoting $24, Birmingham. Northern furnace prices range from $28 to $30, sales having been made at both the minimum and maximum figures. A West Virginia melter bought 1100 tons of foundry and malleable grades at $28 to $30, Ironton basis. A central Ohio melter took 200 tons of malleable at $30, southern Ohio, furnace, and 100 tons of Lake Superior charcoal at $30, furnace. An Indiana melter is understood to have placed 500 tons of malleable with a Chicago district furnace at $28, and another Indiana melter took 200 tons of foundry at the same price. A southern Ohio melter bought 300 tons of foundry at $30, southern Ohio furnace, for fourth quarter. A sale of a round tonnage of basic to a northern Ohio melter is reported to have been made at the equivalent of $26, Valley. A Michigan melter placed an order for approximately 1500 tons of silvery, at a price understood to be around $38, furnace, for the grade purchased. The market on silvery is regarded as nominal, there being little iron under 9 per cent to be had, but it is at least $3.50 higher on grades obtainable. A Hamilton melter is inquiring for 1000 tons for September and October shipment; a Louisville melter for a similar tonnage; a local melter for 500 tons of foundry and 100 tons of Bessemer. Two inquiries from Indiana total 1000 tons. Practically all Southern furnaces are reported to be piling their make, as embargoes have been placed on all open top equipment. Shipments are coming through slowly and the practice of borrowing iron to keep running is being more generally resorted to. Norton Furnace at Ashland, Ky., has been banked on account of the fuel situation.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$24.05 to $25.05
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	24.55 to 25.55
Ohio silvery (nominal), 8 per cent	38.27
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	30.27 to 32.27
Basic Northern	28.27
Malleable	30.27 to 32.27

Plant Operations.—All plants in the Cincinnati district are running at last week's schedule, the rail and coal strikes having caused only slight inconvenience. With the exception of lines serving the South, traffic is moving away from steel mills in good shape, and consumers are suffering little from delayed shipments. Pittsburgh district mills are moving tonnages by the river route to points as far as Louisville, but owing to the low stage of the Ohio, it has been found impossible to send heavily laden barges to points below that city.

Finished Material.—Consumers are more concerned with securing deliveries on contracts than in placing new business, and as a result the market is rather quiet. The only inquiry of consequence comes from a large tank manufacturer, who is in the market for approximately 700 tons of plates. Repair work taken by car manufacturers in this district has also caused a good demand for plates, and a recent inquiry called for approximately 5000 tons. While the ruling price apparently is 1.80c., this is for rather indefinite delivery. A Youngstown mill which recently resumed operations is understood to have booked a heavy tonnage at 2c., and is now contemplating an advance to 2.15c. The demand for sheets has fallen off considerably, as most consumers are covered for third quarter requirements. Speculation is keen as to prices mills will name for fourth quarter, and if the rail and coal strikes continue for an indefinite period, considerably higher prices are looked for. There is a fair demand for steel pipe, coming mostly from jobbers whose stocks are running low. The wire market is fairly active, nails particularly being in good demand. A southern Ohio mill has advanced its prices 10c. a keg, to $2.50 mill. Pittsburgh district mills, which had been equalizing the Ironton rate on nails, have abandoned this practice, and are quoting strictly on an f.o.b. Pittsburgh basis, with rail freight added. There was little activity in the structural field. The Pollak Steel Co. has taken 200 tons of bars for a school building in Cincinnati. A 10-story office building in Cincinnati, permit for which has been secured but no contract let, will take approximately 400 tons of bars. Tank manufacturers report a large number of repair orders, and while they are having no difficulty in securing plates on their contracts, shapes are coming in slowly, and they are forced to depend on local warehouses to take care of rush orders.

Warehouse Business.—Jobbers' stocks are moving in heavy volume as a result of the railroad situation, and some of them report having difficulty in replacing steel. The demand for reinforcing bars and small angles is particularly insistent, with nails and other wire products also moving at a greatly increased rate. Prices are very firm, and it is expected that an advance in nail prices will be made shortly. In the meantime, quotations are unchanged.

Jobbers quote: Iron and steel bars, 2.75c. base; hoops, 3.60c.; bands, 3.35c. base; shapes and plates, 2.85c. base; reinforcing bars, 2.82½c. base; cold-rolled rounds, 3.50c. base; flats, squares and hexagons, 4c. base; No. 10 blue annealed sheets, 3.60c.; No. 28 black sheets, 4.50c.; No. 28 galvanized sheets, 5.60c.; No. 9 galvanized wire, $2.70 per 100 lb.; annealed wire, per keg, $2.50 per keg, base.

Coke.—The coke situation is tightening and prices are steadily advancing. Very little coke is available from any district, although by-product producers are shipping steadily on contracts, and coke is moving in slightly better volume. Prices are higher, Connellsville being quoted at $17, New River $15, Pocahontas $14, and Wise County $13. By-product fuel on August com-

mitments remains unchanged at $9, Connellsville basis, but September prices will, it is expected, show an advance of at least $1. A West Virginia steel company is in the market for 5000 tons.

Old Material.—On account of the railroad situation there is little activity in the scrap market. A blast furnace out of the district has sent out an inquiry for approximately 2000 tons of turnings, and this is being worked on. Rolling mill grades are very quiet.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

Per Gross Ton	
Bundled sheet	[illegible]
Iron rails	[illegible]
Relaying rails 56 lb. and up	[illegible]
Rails for rerolling	[illegible]
Heavy melting steel	[illegible]
Steel rails for melting	13.00 to 13.50
Car wheels	14.50 to 15.00
Per Net Ton	
No. 1 railroad wrought	11.50 to 12.00
Cast borings	[illegible]
Steel turnings	8.00 to 8.50
Railroad cast	[illegible]
No. 1 machinery	[illegible]
Burnt scrap	9.50 to 10.00
Iron axles	18.00 to 18.50
Locomotive tires (smooth inside)	11.00 to 11.50
Pipes and flues	6.50 to 7.00

Birmingham

BIRMINGHAM, ALA., Aug. 15.

Pig Iron.—Iron deliveries had grown so difficult so far as north of Nashville is concerned at the close of last week that Alabama makers had begun declining new business for prompt delivery because unable to make promises in that respect. The market might be said to be a $20 one for the usual run of business, but 15,000 to 20,000 tons for third and fourth quarter delivery to pipe concerns brought a base not much above $19. Competitive buying markets reported a base of $19.50 to $21 for Birmingham iron last week. Some lots are known to have brought over $20, but one large maker was quoting $19.50 to $20 on competitive business. But for the large consumption in the Birmingham district, several blast furnaces would probably have banked by this time, but this consumption remains at an unprecedented level and, delivery being a matter of switching, yard stocks are not piling iron as would otherwise be the case. However, the car shortage for delivery purposes out of the district is more and more acute and, if the rail strike lasts much longer, there will be some decrease in production. For the present, that has not been curtailed either at blast furnaces or at consuming plants. Pressure pipe plants are turning out more tonnage than in their history and in that quarter deliveries are fairly satisfactory so far as the South and Southeast are concerned. The blast furnace of the Central Coal & Iron Co. did not blow in last week as was expected. It was decided to wait on a less embarrassing car situation. Stocks of iron of the Sloss-Sheffield Steel & Iron Co., at Providence, R. I., which were piled two years ago, are understood to be dwindling with base of $20 being obtained from New England consumers. The 22 active furnaces on the first of the month are still active. All makers are piling some iron.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon 1.75 to 2.25	$19.50 to $20.00
Basic	18.50 to 19.00
Charcoal, warm blast	30.00 to 32.00

Finishing Mills.—There has been no curtailment of production at finishing mills, although complaint of the car shortage for deliveries is growing. The Tennessee company continued double turn this week at Bessemer, Fairfield and Ensley mills with 100 per cent ingot production. The American Steel & Wire Co., the Gulf States Steel Co. and the Conners Steel Co. maintain undiminished production in finishing mills. Structural steel works are very busy.

Cast Iron Pipe.—There has not been much new business in the pipe market, but all plants labor under an accumulation of orders. The high pressure base remains at $37 and that of sanitary pipe at $60 with some sales at $65. The pipe melt is the largest on record.

Coal and Coke.—Alabama's coal production is the largest on record, having reached 405,000 tons a week. Western railroads furnish a large supply of cars for the extra demand in that quarter. All industries so far are getting the coal required for operation. Spot coal is easily selling for $4, sometimes more. Coke is in very strong demand with spot base very close to $7. Still higher prices have been obtained. The production is at a maximum.

Old Material.—The old material market is steady and the quoted prices are brought in actual transactions. No. 1 cast is up $1 and larger quantities are leaving yards than in some time.

We quote per gross ton f.o.b. [illegible] as follows:

Steel rails	$13.00 to $15.00
No. 1 steel	16.00 to 17.00
No. 1 cast	15.00 to 16.00
Car wheels	15.00 to 16.00
Tramcar wheels	14.00 to 15.00
Stove plate	13.00 to 14.00
Cast iron borings	6.00 to 7.00
Machine shop turnings	[illegible]

Boston

BOSTON, Aug. 15.

Pig Iron.—Buffalo and western and eastern Pennsylvania furnace shipments of iron into this territory are backward. The demand for spot iron, therefore, is more active. Some foundries with more No. 2X and No. 1X than wanted have resold to other foundries, but the supply of such iron is limited. Buyers are forced to take Alabama or foreign iron if round tonnages are wanted. Sales of Alabama for the past week aggregate 1500 tons, mostly No. 2X and No. 1X, for August and September delivery at $30 dock Providence, R. I., base, and for fourth quarter at $20 furnace base. Sales of foreign again totaled 5000 to 6000 tons, mostly Scotch, for August and September arrival. Buying for last quarter has diminished. The largest individual sale was 1500 tons Scotch equal to our No. 2X and No. 1X, to a Massachusetts melter, August shipment. Foreign irons are higher. Scotch, the past week, sold at $28 to $32 dock here, English at $28 to $30, Belgian at about the same price, and French at $27 to $29. On Saturday last, 1000 tons Middlesboro, Eng., iron arrived on order at this port. This lot originally was shipped in July, but the steamer was forced to return to port for repairs. Other lots of English, as well as of Scotch, are due to arrive within the next ten days or two weeks. A small tonnage of Scotch, August delivery, is offered at $29.50, dock Bridgeport, Conn. Inquiries in the market aggregate several thousand tons. Business in foreign iron has been hampered by serious delays in cable service. A special sale of 150 tons of Buffalo, silicon 3.25 to 3.75, October-November shipment, at $31 furnace, is reported, which figures out about $29 furnace base.

We quote delivered prices, on the basis of the latest reported sales, now infrequent, and as follows, having added to furnace prices $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia and $9.60 from Alabama:

East. Penn., sil. 2.25 to 2.75	$32.15 to $34.15
East. Penn., sil. 1.75 to 2.25	31.65 to 33.65
Buffalo, sil. 2.25 to 2.75	30.41 to 31.41
Buffalo, sil. 1.75 to 2.25	29.91 to 30.91
Alabama, sil. 2.25 to 2.75	29.60 to 30.10
Alabama, sil. 1.75 to 2.25	29.10 to 29.60

Warehouse Business.—Warehouse prices on iron and steel are very firm. Some interests are getting 3c. per lb. for merchant bars and slightly better for concrete bars, the latter being in comparatively short supply. A majority of warehouses, however, are on a basis of $2.75½ for merchant bars, stocks of which are in fairly good condition. The supply of steel bands is shortening, and prices for same are stiff. The general movement of iron and steel out of warehouses holds up well, being better than at any previous period this year. Bolts and nuts are moving in reasonable quantities and prices are firm. Nails and rivets are in fair demand. Cap and set screws are up 5 per cent at 65 and 5 per cent discount.

Jobbers quote: Soft steel bars, $2.75½ per 100 lb. base; flats, $3.40½; concrete bars, $2.90 to $3.03; structural steel, $2.75½ to $2.90½; tire steel, $4.15 to $4.50; open-hearth spring steel, $4.50 to $6; crucible spring steel, $11.50; steel bands, $3.90; hoop steel, $4.40; cold rolled steel, $3.50 to $4; refined iron, $2.75½; best refined iron, $4.25; Wayne iron, $5.50; Norway iron, $6 to $6.50; plates, $2.85½ to $3.04; No. 10 blue annealed sheets, $3.90 per 100 lb. base; No. 28 black sheets, $4.90; No. 28 galvanized sheets, $5.90.

Finished Material.—New England producers of iron and steel by-products, generally speaking, are less concerned over coal than they are over metal supplies. This territory is so located geographically it can easily draw on British and Dominion coals in a pinch. Consumption of electric power and fuel oil is on the increase, especially at inland industrial centers like Worcester and Springfield, Mass. New England bolt and nut makers report trouble in getting steel. Buffalo and Pennsylvania mills still refrain from taking on new business except at unspecified deliveries. Structural steel bookings are largely confined to small tonnages. Bids closed yesterday on 7200 lb. chrome alloy steel for barrels of machine rifles to be made at the Springfield, Mass., arsenal.

Coke.—Several thousand tons of English foundry coke are reported sold in this territory. One melter took 1500 tons for delivery during the next six to eight weeks. Prices for this fuel figure out slightly higher than New England by-product delivered within the $3.10 local freight points. The first cargo of English coke for Boston sailed Aug. 12. A second will shortly follow. Both the New England Coal & Coke Co. and the Providence Gas Co. are still quoting by-product foundry coke to apply to contracts at $16.50 delivered where the local freight does not exceed $3.10 a ton. They are not in the markekt for spot business. Crushed coke has been advanced another $2 a ton to $16 ovens. The producers, due to the scarcity of certain grades of coking coals, are unable to make deliveries as promptly as desired by the foundry trade.

Old Material.—New business the past week was limited to a few hundred tons of borings and turnings and miscellaneous material like horseshoes, shafting, etc., at unchanged prices. Round tonnages of cast iron borings are wanted, but material is lacking. A moderate tonnage of heavy melting steel, borings, turnings and bundled skeleton was shipped from this territory to Pennsylvania on old contracts.

The following prices are for gross ton lots delivered consuming points:

[illegible]	$19.00 to $20.00
No. 2 machinery cast	17.00 to 18.00
[illegible]	15.50 to 16.50
Railroad malleable	15.00 to 15.50
Street car wheels	18.00 to 19.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$11.00 to $11.50
No. 1 railroad wrought	11.50 to 12.00
No. 1 yard wrought	10.00 to 10.50
Wrought pipe (1 in. in diam., over [illegible])	[illegible] to [illegible]
Machine shop turnings	9.00 to 9.50
Cast iron borings, rolling mill	9.50 to 10.00
Cast iron borings, chemical	12.00 to 12.50
Blast furnace borings and turnings	9.00 to 9.50
Forged scrap and bundled skeleton	8.00 to 8.50
Street car axles and shafting	14.50 to 15.00
Rails for rerolling	11.00 to 11.50

Philadelphia

Coke Shortage Causes Further Curtailment of Pig Iron Production Prices Higher

PHILADELPHIA, Aug. 15.—Coal and coke shortage has caused further curtailment of pig iron production in the Eastern district. Fuel oil is saving the situation to some extent in the manufacture of steel, but as the pig iron shortage grows more acute, it will, of course, have its effect upon steel rollings, which up to this time have not suffered greatly. The Bethlehem Steel Co. now has only five of its 12 active furnaces in blast, three at Bethlehem, one at Steelton and one at Sparrows Point. Three furnaces at Bethlehem and two each at Steelton and Sparrows Point are banked. The Cambria Steel Co. on Sunday banked two additional furnaces at Johnstown, making three that are banked there, with two active. The Adrian furnace at Dubois, Pa., which was making merchant iron, went out of blast last Friday and the Warwick stack at Pottstown, which has been banked for more than two weeks, will probably be blown out this week. The Alan Wood Iron & Steel Co. has let its No. 3 furnace, the largest of its three stacks, go out of blast because of the fact that the Rainey-Wood Coke Co., from which it obtains by-product coke, has been called upon by the American Gas Association to furnish more coke to gas plants. The two active furnaces of the Alan Wood Iron & Steel Co. are making basic.

There is now an acute shortage of both pig iron and steel, so far as the ability of mills and furnaces to accept business is concerned, though this shortage has not seriously affected consumers in general as yet, many of them having stocks on hand. When a consumer is obliged to come into the market, it is now difficult, however, to obtain promise of early shipment of either pig iron or steel. The foundry pig iron situation is relieved to a certain extent by continued importations of foreign iron.

Meanwhile prices are rising,, bars, shapes and plates fetching from 2c. to 2.25c., Pittsburgh, according to the needs of the buyer and the attitude of the seller. Foundry pig iron is well above $30 for the higher silicon grades, either domestic or imported.

The iron and steel industry does not see much hope for early amelioration of its difficulties, even though the partial settlement of the bituminous coal strike at Cleveland should increase coal production speedily. It is believed that it will be at least 30 to 60 days before there is any appreciable relief in the coal and coke shortage. If steel companies which have their own non-union coal mines are obliged to pay practically the union scale to obtain miners, this would bring about an additional cost of 50c. to 60c. per ton for their coal. The scarcity of common labor at steel plants, already acutely felt at some points, is bound to become a more restrictive factor when the industry is operating at a fuller rate.

Pig Iron.—The banking of more blast furnaces, due to lack of coke, has created a more serious shortage of domestic pig iron, which is being relieved to some extent by continued importations of foreign iron. The cutting down of the Bethlehem Steel Co.'s active stacks from 12 to five has left that company in a position where it cannot take care of its merchant trade, while the banking of the Alan Wood Iron & Steel Co.'s No. 3 furnace leaves that interest without any foundry iron, the other two furnaces being on basic. The blowing out of the Adrian furnace, which is in the western Pennsylvania group, removes another source of merchant iron, considerable of its product having been shipped recently into this district. The Warwick furnace, which has been banked, will probably be blown out this week with considerable unshipped business on its books. The Wharton furnace of the Replogle Steel Co., Wharton, N. J., and the Brooke furnace are the only stacks now making foundry iron and these are selling in a very limited way at about $31 for No. 2 plain and $32 for No. 2X, f.o.b. furnace. Some consumers who have been getting sufficient domestic iron for their immediate needs are now turning to foreign iron as a protection against a possible shortage and sales of the latter are growing. A pig iron sales company with offices in Philadelphia, New York and Boston has bought about 25,000 to 30,000 tons of British and Continental iron, most of which is on the way and has been contracted for by melters. Scotch iron, 2.25 to 2.75 per cent silicon, is quoted at $31, c.i.f. Philadelphia, with higher silicon grades held at $33 to $34; English iron of standard phosphorus content is quoted at $28, c.i.f. Philadelphia, with higher phosphorus grades $1 a ton less, and Continental iron, in which the phosphorus runs from 0.80 to 1.75 per cent, is being sold at $26.50 to $27, c.i.f. Philadelphia. The buyer agrees to pay any duty that may be levied under the tariff bill now before Congress. There is a renewed demand for steel-making iron. A Pennsylvania plate manufacturer and a structural subsidiary of the Steel Corporation are in the market for a total of 10,000 to 20,000 tons of basic for early delivery, but furnaces are loath to quote. The Standard Steel Works Co. has bought 2000 tons or more of copper bearing low phosphorus iron at about $33, furnace, and the last of the copper free low phosphorus iron in the East, 4000 tons, which was in stock at a New York State furnace, has been sold to a Worcester, Mass., wire manufacturer at slightly under $35, furnace. An eastern Pennsylvania furnace making copper bearing low phosphorus iron last week sold about 4000 tons, a part of which brought $35, furnace, and it

is now quoting $40. A competing furnace is holding its price at $35. One of the important producers of eastern Pennsylvania foundry iron has opened its books for fourth quarter at $30 for No. 2 plain, $31 for No. 2X and $33 for No. 1X, f.o.b. furnace. The most important sale of domestic foundry iron the past week was to the Pennsylvania Railroad, covering its second half requirements, the amount being about 7000 tons. The business was taken by a western Pennsylvania furnace, but the price was not disclosed. Prices quoted below on basic, gray forge and malleable grades are nominal and do not represent the levels that consumers would now be obliged to pay.

The following quotations are with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 76 cents to $1.64 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$32.14 to $32.64
East. Pa. No. 2X, 2.25 to 2.75	33.14 to 33.64
East. Pa. No. 1X	34.14 to 34.64
Virginia No. 2 plain, 1.75 to 2.25 sil.	29.17 to 30.17
Virginia No. 2X, 2.25 to 2.75 sil.	30.17 to 31.17
Basic delivery eastern Pa.	29.00 to 30.00
Gray forge	29.00 to 31.50
Malleable	29.00 to 30.00
Standard low phos. (f.o.b. furnace)	35.00
Copper bearing low phos. (f.o.b. furnace)	35.00 to 40.00

Ferroalloys.—There has been no change in the price of British ferromanganese, which remains at $67.50, Atlantic seaboard, but none is available for early shipment. Spot ears of ferromanganese, mostly resale material, have brought $75 and $80 per ton.

Semi-Finished Steel.—Very little semi-finished steel is being sold, but when quoted, it is usually on a basis of about $37.50, Pittsburgh, for rerolling quality and $42.50, Pittsburgh, for forging quality, some mills asking even higher prices.

Plates.—From the weakest of the heavy steel products, a few months ago, plates have become the strongest and prices above 2c., base, Pittsburgh, are obtainable when mills can promise early deliveries. The withdrawal of Pittsburgh, Youngstown and Chicago mills from the market has brought a large demand from the Central West to the few mills in the East that are accepting orders. The Lukens Steel Co., with three months business on its books, has attempted to withdraw from the market and has advanced its price to 2.25c., Pittsburgh. Another Eastern mill continues to sell at 2c., Pittsburgh, and this is to-day the minimum at which plates are to be had for early delivery. A Youngstown steel company started one of its plate mills to-day and is offering small lots to its regular customers at 2c., Pittsburgh, for desirable rollings and at 2.25c. for less desirable specifications. Many customers of the leading interest, unable to obtain deliveries, are turning to the independent mills. Instances of consumers paying $6 to $8 a ton more for plates than their contracts call for with other mills are frequent. The Union Pacific Railroad is inquiring for 65 locomotives and there are inquiries from two other roads totaling 30 engines. The Coatesville mills of the Midvale Steel & Ordnance Co. are rolling plates for about 100 engines recently booked by the Baldwin Locomotive Works. The Pennsylvania Railroad last week inquired for about 13,000 tons additional car repair steel, but is reported to have had difficulty placing all of the business. We quote sheared plates, ¼ in. and heavier, at 2c., Pittsburgh.

Structural Material.—Though occasional attractive lots of plain material have been sold by one producer at 1.95c., Pittsburgh, the current market for early delivery is more nearly 2c., while for 24-in. and other heavy beams buyers will pay 2.25c., Pittsburgh. There is a good demand, particularly from fabricators who are not getting deliveries as expected from their regular sources of supply.

Bars.—Steel bars are unobtainable except from one source at less than 2c., Pittsburgh. This one producer is selling a very little soft steel at 1.90c., Pittsburgh, most of its bars being for drop forging work. Bar iron makers have advanced their quotations to 2c., Pittsburgh, for carloads. While bar iron is fairly plentiful and is being substituted by some consumers for steel bars, the quantity of steel bars to be had is very limited. Few steel bar mills are taking business at any price.

Sheets.—There is a good demand for sheets, with mills quoting 2.50c. to 2.60c. for blue annealed; 3.30c. to 3.40c. for black and 4.30c. to 4.40c. for galvanized, all base Pittsburgh.

Wire Products.—Wire nails have been advanced to $2.60 and plain wire to $2.35 per 100 lb. by a Pittsburgh independent, an advance of $2 a ton.

Warehouse Business.—Prices for steel out of stock have been advanced $2 or more a ton, the new quotations going into effect to-day. We now quote for local delivery as follows:

Soft steel bars and small shapes, 2.90c.; iron bars (except bands), 2.80c.; round edge iron, 3c.; round edge steel, iron finish, 3c.; ½-in. or smaller pointed edge steel, processed, 3.75c.; tank steel plates, ¼-in. and heavier, 2.90c.; tank steel plates, ⅜-in., 3.10c.; blue annealed steel sheets, No. 10 gage, 3.50c.; black sheets, No. 28 gage, 4.30c.; galvanized sheets, No. 28 gage, 5.40c.; square twisted and deformed steel bars, 2.90c.; structural shapes, 2.90c.; diamond pattern plates, ¼-in., 4.80c.; ⅜-in., 5c.; spring steel, 3.50c.; round cold-rolled steel, 3.35c.; squares and hexagons, cold-rolled steel, 3.70c.; steel hoops, No. 13 gage and lighter, 4c.; steel bands, No. 12 gage to ⅜-in., inclusive, 3.45c.; rails, 2.80c.; tool steel, 8c.; Norway iron, 5.50c.

Manganese Ore.—About 3000 tons of Brazilian manganese ore, imported by a New York broker, is reported to have been sold to a Pittsburgh steel company at 29c. per unit, Baltimore.

Coke.—Ten cars of blast furnace coke were sold yesterday at $14.50, Connellsville. Foundry coke, when obtainable, is being sold at $15.50 to $15.75, Connellsville. A cargo of about 5000 tons of British by-product coke is on the way and all except about 1000 tons has been sold to gas plants at prices ranging from $14 to $15 c.i.f. Philadelphia.

Old Material.—The shortage of pig iron has created a better demand for scrap and prices have strengthened. Heavy melting steel has been sold within the past few days at $15, Nicetown, and $15.50, Claymont and Bethlehem, but it is doubtful if the lower price could be duplicated. Scrap brokers are holding for $15.50 to $16. Railroad and yard wrought, cast borings, No. 1 cast, stove plate, railroad grate bars and wrought iron and soft steel pipe are all at least 50c. a ton higher than a week ago. Blast furnace borings and turnings are firm, but not in much demand, owing to the wholesale banking of blast furnaces. We now quote for delivery at consumers' works in this district as follows:

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$15.00 to $15.50
Scrap rails	15.00 to 15.50
Steel rails, rerolling	17.00 to 17.50
No. 1 low phos., heavy 0.04 and under	22.00 to 24.00
Cast iron car wheels	17.50 to 18.50
No. 1 railroad wrought	18.00 to 18.50
No. 1 yard wrought	15.50 to 16.50
No. 1 forge fire	13.00 to 13.50
Bundled sheets (for steel works)	13.00 to 13.50
No. 1 busheling	12.50 to 13.00
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	13.00 to 13.50
Mixed borings and turnings (for blast furnace use)	13.00 to 13.50
Machine-shop turnings (for steel works use)	13.00 to 13.50
Machine-shop turnings (for rolling mill use)	13.50 to 14.00
Heavy axle turnings (or equivalent)	14.00 to 14.50
Cast borings (for steel works and rolling mills)	14.50 to 15.00
Cast borings (for chemical plants)	17.00 to 17.50
No. 1 cast	19.00 to 20.00
Railroad grate bars	15.50 to 16.00
Stove plate (for steel plant use)	15.00 to 16.00
Railroad malleable	15.00 to 15.50
Wrought iron and soft steel pipes and tubes (new specifications)	13.50 to 14.00
Shafting	21.00 to 22.00

Youngstown Takes More Hopeful View

YOUNGSTOWN, Aug. 15.—Youngstown iron and steel interests take a more hopeful view of the industrial coal outlook following the agreement in Cleveland between large operators and union miners. The action is also expected to have important bearing on non-union field operations. It is expected that non-subscribers in the Connellsville district, from which the bulk of the coal supply for Valley industries ordinarily comes, will gradually get back into production. Owing to the agreement, steel executives now see a possibility of averting important plant suspensions scheduled for the next two weeks under the present fuel supply.

Cleveland

Little Early Relief Expected from Partial Settlement of Coal Strike

CLEVELAND, Aug. 15.—The steel industry looks for little immediate relief from the partial settlement of the coal strike in the bituminous fields. Not much improvement in the situation is expected until the railroad strike is settled. A strike of the trainmen on the Louisville & Nashville Railroad Monday will probably tie up shipments of coal over that road from the nonunion fields of Kentucky, on which Cleveland and several Valley mills are depending for fuel supply, and will make the fuel situation more acute. Transportation facilities on other roads bringing Kentucky coal to Cincinnati for Ohio steel plants are badly crippled and these apparently cannot increase their present limited coal shipments. Two furnaces were added to the idle list during the week. The American Steel & Wire Co. banked a Central furnace, leaving two in blast, and the Perry furnace at Erie went out. The Bourne-Fuller Co. is considering shutting down its steel plant as soon as its present pig iron supply is exhausted.

Semi-Finished Steel.—Considerable inquiry is coming out for round lots of sheet bars, slabs and billets for the fourth quarter, indicating that consumers are figuring on consuming semi-finished steel at about the same rate during that period as they have for the past few months. However, the leading local producer has not yet named the fourth quarter prices. The market is regarded as around $40.

Iron Ore.—Shipping conditions at the head of the lakes show further improvement. The Great Northern Railroad, which apparently has been the most seriously affected by the shopmen's strike, is now moving ore to Superior at about 90 per cent of normal. Shippers are still experiencing difficulty in moving ore over the Northwestern Railroad, particularly to Escanaba. At the lower end of the lakes the only difficulty reported is in shipments to southern Ohio points, cars not being available for ore because of the priority orders for the movement of coal. On Aug. 1 there was 7,396,842 gross tons of ore on Lake Erie docks as compared with 8,840,824 tons on the corresponding date last year. July receipts at Lake Erie docks were 6,646,679 tons as compared with 2,793,955 tons during the same month last year. Receipts at Lake Erie ports for the season until Aug. 1 were 11,949,884 tons as compared with 7,249,435 tons during the same period of 1921.

We quote delivered lower lake ports: Old range Bessemer, [illegible] Old range non-Bessemer, 51½ per cent iron, $5.20; Mesabi Bessemer, 55 per cent iron, $5.70; Mesabi non-Bessemer, 51½ per cent iron, $5.05.

Coke.—Car lot sales of Connellsville foundry coke are reported at $15, but both the demand and supply are very light. Wise County foundry coke is quoted at $12 to $12.50 and New River coke at $15.

Pig Iron.—The Perry furnace of Pickands, Mather & Co., Erie, Pa., was blown out Sunday because of the fuel shortage and there is an increasing evidence of the scarcity of all grades of pig iron. However, demand is light, indicating that most foundries are supplied for their immediate requirements and prices have not been further advanced. In anticipation of their requirements, foundries sent in shipping orders a few weeks ago and some producers report that they are not being crowded for deliveries as much as they were last month. The only northern Ohio iron that is now available is being made by a local producer. This interest is so well sold up that it is taking orders only from consumers that are in urgent need of iron and report several sales ranging from car lots up to a few hundred tons. These sales were made at $30. Sales of small lots of Buffalo iron are reported at $31 for shipment to Valley points. There is no activity in basic iron, but it is doubtful whether this grade could be purchased below $27. Low phosphorus iron is fairly active, but is becoming very scarce and is firm at $35. We note the sale of 400 tons at that price to a Pittsburgh district consumer. Small resale lots of Ohio silvery iron have sold at the regular price of $32.50. Although there is a shortage of this grade the price on Ohio silvery iron has not been advanced since May.

Quotations below are f.o.b. local furnace for Northern foundry iron not including a 50c. switching charge. Other quotations except basic and low phosphorus are delivered Cleveland, being based on a $3.02 rate from Jackson and a $6 rate from Birmingham:

Lake Valley furnace	$27.00
Northern No. 2 fdy., sil. 1.75 to 2.25	30.00
Southern fdy. sil. 1.75 to 2.25	26.50
Malleable	30.00
Ohio silvery, sil. 8 per cent	[illegible]
Standard low phos., Valley furnace	$35.00 to 36.00

Finished Iron and Steel.—Mills are getting considerable inquiry for steel from consumers who are either unable to secure deliveries from or place orders with their regular sources of supply. With a number of producers entirely out of the market and deliveries getting further behind, consumers are finding it increasingly difficult to buy steel, and mills that can promise fairly early shipments have further advanced prices. About 8000 tons of plates for oil tank work are pending. The placing of this work seems to have been delayed because of the trouble tank shops are having in finding mills that can supply plates in time to meet the requirements of the oil companies. The Brier Hill Steel Co. started up its 132-in. plate mill to-day and can still promise early delivery. The minimum price on steel bars, plates and structural material is 1.80c., for indefinite delivery, but 2c. is the more general quotation, and higher prices are prevailing for early shipment. One Valley mill during the week advanced its price on plates from 2c. to 2.25c. for early shipment and some small producers are quoting as high as 2.50c. Some fabricators have advanced their quotations on structural work from $5 to $12 a ton owing to the advancing cost of steel. It is understood that approximately 2000 tons of structural material for additions to the Lima Locomotive plant was placed with an Eastern mill at 2c., and 350 tons of plates for the same job with a Valley mill at the same price. The Otis Steel Co. has sent out an inquiry for bids for its new steel plant requiring 9000 tons of structural material.

Jobbers quote steel bars, 2.66c.; plates and structural shapes, 2.76c.; No. 9 galvanized wire, 3c.; No. 9 annealed wire, 2.50c.; No. 28 black sheets, 4c.; No. 28 galvanized sheets, 5c.; No. 10 blue annealed sheets, 3.50c. to 3.61c.; hoops and bands, 3.31c.; cold-rolled rounds, 3.45c.; flats, squares and hexagons, 3.95c.

Old Material.—The McKinney Steel Co. has commenced to take shipments of heavy melting steel on contracts for round tonnages placed two years ago. Deliveries on this were held up when the company's plant was shut down. This scrap was purchased at various prices, some of it as high as $30 per ton. Price adjustments are being made with dealers having contracts for this scrap. It is claimed that these dealers either have the scrap in their yards or purchased and the releasing of the scrap by the consumer is not expected to stimulate buying. However, it is believed that the cleaning up of these contracts will have a stiffening effect on the market. The market continues dull but firm. Some consumers have held up shipments owing to curtailment of operations. Sales are reported by a local producer of 1500 tons of heavy melting steel scrap at $16.25 and 300 tons of shoveling turnings at $13.25, but these prices are somewhat above the usual market quotations.

We quote gross tons f.o.b. Cleveland as follows:

Heavy melting steel	$15.00 to $15.25
Steel rails under 3 ft.	15.25 to 15.50
Rails for rolling	15.00 to 15.25
Iron rails	14.00 to 14.50
Rails for rolling	18.00 to 20.00
Low phosphorus melting	16.00 to 16.25
Cast borings	12.00 to 12.50
Machine shop turnings	12.00 to 12.25
Mixed borings and short turnings	12.00 to 12.25
Compressed steel	13.50 to 14.00
Railroad wrought	14.00 to 14.50
Railroad malleable	14.00 to 16.00
Light bundled sheet stamp'gs	10.00 to 10.50
Steel axle turnings	16.00 to 16.50
No. 1 cast	17.00 to 17.50
No. 1 busheling	10.75 to 11.00
Drop forge flashings over 10 in.	10.25 to 10.50
Drop forge flashings under 10 in.	10.00 to 10.50
Railroad grate bars	13.75 to 14.25
Stove plate	13.75 to 14.25
Pipes and flues	10.00 to 11.00

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Plates

Sheared, tank quality, base, per lb.....1.80c. to 2.00c.

Structural Material

Beams, channels, etc.....1.80c. to 2.00c.

Iron and Steel Bars

Soft steel bars, base, per lb.....1.80c. to 2.00c.
Refined iron bars, base, per lb.....2.25c.

Hot-Rolled Flats

Hoops, base, per lb.....2.50c. to 2.75c.
Bands, base, per lb.....2.50c. to 2.75c.
Strips, base, per lb.....2.50c. to 2.75c.
Cotton ties, per bundle of 45 lb.....$1.11

Cold-Finished Steels

Bars and shafting, base, per lb.....2.25c.
Strips, base, per lb.....4.00c.

Wire Products

Nails, base, per keg.....$2.40 to $2.60
Bright plain wire, base, per 100 lb.....2.25 to 2.35
Annealed fence wire, base, per 100 lb.....2.25 to 2.35
Galvanized fence wire, base, per 100 lb.....2.75 to 2.85
Galvanized barbed, base, per 100 lb.....3.05 to 3.15
Galvanized staples, base, per keg.....3.05 to 3.15
Painted barbed wire, base, per 100 lb.....2.55 to 2.65
Polished staples, base, per keg.....2.55 to 2.65
Cement coated nails, base, per count keg.....1.90c. to 2.10c.
Woven fence, carloads (to jobbers).....73 per cent off list
Woven fence, carloads (to retailers).....70½ per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads, 60, 10 and 10 per cent off list
Machine bolts, small, cut threads.....60 and 10 per cent off list
Machine bolts, larger and longer.....60 and 10 per cent off list
Carriage bolts, ⅜ x 6 in.:
Smaller and shorter, rolled threads.60 and 10 per cent off list
Cut threads.....60 per cent off list
Longer and larger sizes.....60 per cent off list
Lag bolts.....60, 10 and 10 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads.....50 and 10 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.:
Smaller and shorter.....50 and 10 per cent off list
Larger and longer sizes.....50 and 10 per cent off list
Hot pressed square or hex. blank nuts.....$4.50 off list
Hot pressed nuts, tapped.....$4.50 off list
C.p.c. and t. sq. or hex. nuts, blank.....$4.50 off list
C.p.c. and t. sq. or hex. nuts, tapped.....$4.50 off list
Semi-finished hex. nuts:
9/16 in. and smaller, U. S. S.....80 and 10 per cent off list
⅝ in. and larger, U. S. S...75 and 10 and 10 per cent off list
Small sizes, S. A. E.....80, 10 and 10 per cent off list
S. A. E. ⅝ in. and larger..75 and 10 and 10 per cent off list
Stove bolts in packages.....80 and 5 per cent off list
Stove bolts in bulk.....80, 5 and 2½ per cent off list
Tire bolts.....65 per cent off list
Track bolts in carloads.....3.25c. to 3.50c. base
Track bolts, less than 200 kegs.....4.25c. to 4.50c. base

Cap and Set Screws

Milled square and hex. head cap screws, 75 and 10 per cent off list
Milled set screws.....75 per cent off list
Upset cap screws.....80 per cent off list
Upset set screws.....80 and 5 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb.....$2.65
Large boiler rivets, base, per 100 lb.....2.75
Small rivets.....70 to 70 and 5 per cent off list

Track Equipment

Spikes, ⅝ in. and larger, base, per 100 lb.....$2.35 to $2.50
Spikes, ½ in. and smaller, base, per 100 lb..... 2.75 to 3.00
Spikes, boat and barge, base, per 100 lb..... 2.75 to 3.00
Track bolts, base, per 100 lb..... 3.25 to 3.50
Tie plates, per 100 lb..... 2.00 to 2.25
Angle bars, base, per 100 lb..... 2.40

Welded Pipe

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛	54½	28	⅛ to ⅜	+ 3½	+22½
¼ to ⅜	60	33½	½	36½	18½
½	65	50½	¾	42½	27½
¾	69	56½	1 to 1½	44½	29½
1 to 3	71	58½			

Lap Weld

2	64	51½	2	39½	25½
2½ to 6	68	55½	2½ to 6	42½	29½
7 to 8	65	51½	7 to 12	40½	27½
9 to 12	64	50½			

Butt Weld, extra strong, plain ends

⅛	50½	33	¼ to ⅜	+ 4½	+37½
¼ to ⅜	56	38½	½	35½	23½
½	62	50½	¾	42½	28½
¾	67	55½	1 to 1½	44½	30½
1 to 1½	69	57½			
2 to 3	70	58½			

Lap Weld, extra strong, plain ends

2	62	50½	40½	27½
2½ to 4	66	54½	43½	31½
4½ to 6	65	53½	42½	30½
7 to 8	61	47½	35½	23½
9 to 12	55	41½	30½	18½

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 and 2½ per cent.

Boiler Tubes

Lap Welded Steel		Charcoal Iron	
1¾ in.	26½	1½ in.	5
2 to 2¼ in.	41	1⅝ to 1⅞ in.	15
2½ to 3 in.	52	2 to 2¼ in.	25
3¼ to 13 in.	57	2½ to 3 in.	30
		3¼ to 4½ in.	32

To large buyers of steel tubes a supplementary discount of 5 per cent is allowed.

Standard Commercial Seamless Boiler Tubes

Discounts on cold-drawn or hot-rolled tubes in carload lots, f.o.b. Pittsburgh, follow:

1 in.	60	2½ and 2¾ in.	43
1¼ and 1½ in.	52	3 in.	47
1¾ in.	36	3¼ to 4 in.	52
2 and 2¼ in.	39	4¼ in. to 5 in.	44

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Tin Plate

Standard cokes, per base box.....$4.75

Terne Plate

(Per package, 200-lb.)

8-lb. coating	$9.30	25-lb. coating I. C.	$14.25
8-lb. coating I. C.	9.60	30-lb. coating I. C.	15.25
15-lb. coating I. C.	11.80	35-lb. coating I. C.	16.25
20-lb. coating I. C.	13.00	40-lb. coating I. C.	17.25

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....2.40c. to 2.60c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.15c. to 3.40c.

Galvanized

No. 28 (base), per lb.....4.15c. to 4.40c.

Tin-Mill Black Plate

No. 28 (base), per lb.....3.15c. to 3.40c.

Manufacturers have pamphlets, which can be had upon application, giving price differentials for gage and extras for length, width, shearing, etc.

Freight Rates

All rail freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic	$0.325	Buffalo	$0.265	St. Louis	$0.43
Philadelphia, export	0.265	Cleveland	0.215	Kansas City	0.735
Baltimore, domestic	0.315	Cleveland, Youngstown		Kansas City (pipe)	0.705
Baltimore, export	0.255	Comb.	0.19	St. Paul	0.595
New York, domestic	0.34	Detroit	0.295	Omaha	0.735
New York, export	0.285	Cincinnati	0.295	Omaha (pipe)	0.705
Boston, domestic	0.365	Indianapolis	0.31	Denver	1.275
Boston, export	0.285	Chicago	0.34	Denver (pipe)	1.215

Pacific Coast	$1.50	Memphis	0.385
Pac. Coast, ship plates	1.20	Jacksonville, all rail	0.50
Birmingham	0.69	Jacksonville, rail and water	0.415
		New Orleans	0.515

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha, and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 30c. to 40c.; ship plates, 30c. to 40c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 30c. to 40c.; sheets and tin plates, 50c.; rods, wire rope, cable and strands, 75c.; wire fencing, netting and stretcher, 50c.; pipe, not over 8 in. in diameter, 50c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
Aug.	Lake	Electrolytic*	New York	New York	St. Louis	New York	St. Louis
9	14.12½	13.75	32.12½	5.87½	5.52½	6.60	6.25
10	14.12½	13.75	32.12½	5.87½	5.52½	6.60	6.25
11	14.12½	13.75	32.00	5.87½	5.52½	6.55	6.20
12	14.12½	13.75	32.12½	5.87½	5.52½	6.55	6.20
14	14.12½	13.75	32.12½	5.90	5.55	6.52½	6.17½
15	14.12½	13.75	32.12½	5.90	5.55	6.50	6.15

*Refinery quotation.

New York

NEW YORK, Aug. 15.

The markets are only moderately active, due to midsummer dullness and also to the effect of the strikes. Domestic buying of copper continues in fair volume with prices steady. The tin market is only moderately active. Demand for lead is not quite as heavy, but the market is stronger. A reaction in the zinc market has resulted in lower prices.

Copper.—The price situation in the electrolytic copper market continues unchanged and firm at 14c., delivered, or 13.75c., refinery, for delivery through October, with 14.12½c., delivered, or 13.87½c., refinery, for last quarter, with sales for domestic consumption in fairly good volume for both positions. There is some inquiry for first quarter. Several days ago there was some slackening in demand, due to industrial conditions, but in the last day or two business has increased both for domestic and foreign consumption. Lake copper continues firm at 14.12½c., delivered.

Tin.—Until toward the end of last week, when interruption of cable service became serious, the market for Straits tin had been dull and uninteresting, with business confined to light sales of spot and future delivery. Last Friday, however, Aug. 10, due to the cable difficulties, buyers became more anxious and came into the market and, as a result, fair sales were made, mostly to consumers, the total being close to 250 tons. The larger part of these sales were spot delivery, with some October shipment from the East, all at around 32c. Late in the same day there were offerings at 32.12½c., with buyers at 32.10c. Because of the cable situation business was done on Saturday, Aug. 12, in good volume with buyers at 32c. Yesterday about 250 to 300 tons of spot and nearby shipment changed hands at 32.12½c. for the former and 32.25c. for the later position. The market to-day has been very quiet, with quotation at 32.12½c., New York, for spot Straits. Quotations in the London market to-day were about £1½ per ton less than a week ago, with spot standard quoted at £159, future standard at £159 2s. 6d. and spot Straits at £160. Arrivals thus far this month have been 2050 tons with the quantity afloat reported as 4175 tons.

Lead.—This market continues very firm, with the volume of business not quite as heavy as in the last two or three weeks, but demand continues good and specifications on contract show no let-up. Prices in the outside market have been hardening until quotations have reached a level of 5.90c., New York, or 5.55c., St. Louis, but there has been no change in the asking price of the leading interest which continues at 5.75c., New York, and 5.55c., St. Louis.

Zinc.—About the middle of last week a slight reaction set in in this market with a distinct easing in prices; the issuing of statistics for July of the American Zinc Institute has caused this tendency to accelerate. These data showed a reduction in stocks for July smaller than had been generally expected and they also revealed an increase in the number of retorts in operation, amounting to 2322. These facts, coupled with the necessary decrease in consumption due to the strike, have had some effect upon the market. The production for July was 31,917 tons, or 3370 tons more than June, and the shipments are returned as 32,875 tons, or 6505 tons less than June. The surplus stocks at the end of July were 28,618 tons. The fact is pointed to, however, that the reserve stocks are less than a month's consumption, which has averaged about 32,000 tons thus far this year. Prime Western for early delivery is quoted and has sold at 6.15c., St. Louis, or 6.50c., New York, which we quote as the market, a decline of 15 points in the week. Demand, however, is fairly good.

Antimony.—The market is quiet and wholesale lots for early delivery are quoted unchanged at 5.25c. per lb., duty paid, New York.

Aluminum.—Wholesale lots of virgin metal, 98 to 99 per cent pure, are still obtainable from the leading interest at 19.10c. per lb., f.o.b. plant, for early delivery, while the same grade of foreign metal, imported by dealers, is offered at 17.75c. to 18c. per lb., New York, duty paid.

Old Metals.—Business has been fairly active this week and the market has been firm. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	13.50
Copper, heavy and wire	12.75
Copper, light and bottoms	11.25
Heavy machine composition	10.50
Brass, heavy	8.25
Brass, light	6.50
No. 1 red brass or composition turnings	9.00
No. 1 yellow rod brass turnings	7.50
Lead, heavy	5.00
Lead, tea	4.00
Zinc	3.75

Chicago

AUG. 15.—Some zinc users fearing a car shortage have shown anxiety to get immediate shipments. This prompt demand, however, has been insufficient to sustain the market. All of the metals are quieter, not alone zinc, but tin has declined. The old metals are unchanged. We quote, in carload lots, lake copper, 14.25c.; tin 33c. to 33.50c.; lead 5.60c.; spelter, 6.25c.; antimony, 7c.; in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 10.75c.; copper bottoms, 9.25c.; red brass, 8.75c.; yellow brass, 6.75c.; lead pipe, 4.50c.; zinc, 3.50c.; pewter, No 1, 20c.; tin foil, 22.50c.; block tin, 26c., all buying prices for less than carload lots.

St. Louis

AUG. 15.—The lead market is steady at 5.52½c. to 5.50c. carlots; slab zinc is steady at 6.30c. On old metals we quote light brass, 3.50c.; heavy red brass and light copper, 7c.; heavy yellow brass, 4c.; heavy copper and copper wire, 7.50c.; zinc, 2c.; lead, 3c.; pewter, 15c.; tin foil, 16c.; tea lead, 2c.; aluminum, 9c.

General Electric to Build Pacific Coast Factory

The General Electric Co. will build a new factory at Oakland, Cal., part of which will be devoted to increased facilities for the manufacture of switchboards and the remainder occupied by motor and instrument laboratories, service shops and offices. Official announcement of the project, which represents an investment of about $200,000, has just been made from the headquarters of the company at Schenectady.

The tract upon which the new factory will be erected comprises 23 acres on East Fourteenth and Fifty-fourth Streets, Oakland. The floor space of the factory will be 32,000 sq. ft. The building will be 131 by 236 ft., of brick and steel construction, with concrete floors and foundation, and will embody all the best features of modern construction. The contract has been let to the Foundation Co.

British Iron and Steel Market

American Coal Purchases Continue—America Has Bought 1,000 Tons of Cleveland Iron—All Prices Sag Except Galvanized Sheets

(By Cable)

LONDON, ENGLAND, August 15.

American demand for coal and coke continues and purchases are on a good scale. Canada also is inquiring for Welsh coal.

America is inquiring for ferromanganese and special and foundry pig iron, but the business done is unimportant; 1000 tons of special Cleveland foundry iron was sold last week for prompt shipment. Further business has been hampered by an increase in freight rates from Glasgow to Boston.

Scotch foundry iron has hardened to £5 5s. ($23.42) f.o.b. Other makes of pig iron show an easy tendency and home buying is dull. Italy is buying hematite. Makers are anxious to reduce stocks, which makes prices easier. Germany has been buying hematite; 500 tons of East Coast mixed numbers have been sold.

Export inquiry for finished steel is improving. India and Australia are buying plates, sheets and angles, but no large tonnages are involved. Home trade price fixing on finished steel was temporarily abandoned last week, and quotations generally are lower. Some works are not disposed to accept the new prices. Substantial orders for structural material have been placed on the Northeast Coast.

Iron and steel exports for July amounted to 251,473 tons.

There is improved Continental demand for steel, but it is difficult to set prices, owing to vagaries in exchange. South America, Chile and China have purchased plates. Sales have been made of merchant bars, angles, tees and sheets. India and Japan are endeavoring to resell wire, wire nails and plates. Belgian wire nails are now quoted at 14s. ($3.12) basis f.o.b., for October and November shipment.

Tin plate is easier for forward position, due to poor demand. South America and Canada are inquiring and Welsh makers anticipate securing orders. European buying is dull. Wasters stocks are decreasing. Welsh output was reported last week to be between 80 and 85 per cent of normal.

Demand for galvanized sheets is increasing and quotations are firm. South America paid £16 10s. (3.29c. per lb.) basis, f.o.b.

Continental black sheets have been sold at £10 7½s. (2.07c. per lb.) c.i.f., India. Japan is inquiring here, and also offering to resell.

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $4.46 per £1, as follows:

Durham coke, delivered	£1	6¾s.			$5.96	
Cleveland No. 1 foundry	4	15			21.19	
Cleveland No. 3 foundry	4	7	& £4	8s.*	19.40 &	$19.62*
Cleveland No. 4 foundry	4	5	to 4	7	18.96 to	19.40
Cleveland No. 4 forge	4	2½	to 4	5	18.60 to	18.96
Cleveland basic	4	0			17.84	
East Coast mixed	4	10	& 4	10½*	20.07 &	20.18*
Ferromanganese	15	0			66.90	
Ferromanganese*	14	10	to 14	15	61.65 to	65.79
Rails, 60 lb. and up	7	15	to 9	0	34.37 to	40.14
Billets	7	0	to 8	0	31.22 to	35.68
Sheet and tin plate bars, Welsh	7	7½			32.89	
Tin plates, base box	0	19⅜	to 0	19½	4.27 to	4.35
					C. per Lb.	
Ship plates	9	0	to 9	10	1.79 to	1.89
Boiler plates	11	10	to 12	10	2.29 to	2.49
Tees	9	5	to 10	5	1.84 to	2.04
Channels	8	10	to 9	10	1.69 to	1.89
Beams	8	5	to 9	5	1.64 to	1.84
Round bars, ¾ to 3 in.	9	5	to 10	0	1.84 to	1.99
Galvanized sheets, 24 g.	16	5	to 16	10	3.24 to	3.29
Black sheets	12	0			2.39	
Steel hoops	12	0	& 12	7*	2.39 &	2.44*
Cold rolled steel strip, 20 g.	23	2½			4.60	
Cotton ties, Indian specifications	15	0			2.99	

*Export price.

Continental Prices, All F. O. B. Channel Ports, Delivery as Specified

No. 3 foundry pig iron:						
Belgium, September	£4	2½s.			$18.40	
Luxemburg, Sept.	4	0			17.84	
France, September	4	2½			18.40	
Billets:						
France	5	15			25.65	
Luxemburg	6	5			27.88	
Lorraine	6	5			27.88	
Wire nails (keg basis):						
Germany, August	0	14½			3.23	
Belgium	0	20½			4.57	
Wire rods, 5 mm. (0.2 in.):						
Belgium	7	5	to £10	7½s	32.34 to	$46.28
					C. per Lb.	
Angles:						
Belgium, September	7	7½			1.47	
Tees:						
Belgium	8	5			1.64	
Merchant bars:						
Belgium, October	7	7½	to 7	15	1.47 to	1.54
Luxemb'g, October	7	7½	to 7	15	1.47 to	1.54
Germany, October	7	15	to 7	17½	1.54 to	1.57
France, October	7	7½	to 7	15	1.47 to	1.54
Channels:						
Belgium	7	10	to 7	12½	1.49 to	1.52
Joists (beams):						
France, Sept. Oct.	7	0	to 7	5	1.39 to	1.44
Belgium, Sept., Oct.	7	0	to 7	5	1.39 to	1.44
Luxemb'g, Sept., Oct.	7	0	to 7	5	1.39 to	1.44
⅜-in. plates:						
Germany, Sept.	8	0	to 8	5	1.59 to	1.64
Belgium, Sept.	7	17½	to 8	0	1.57 to	1.59
Luxemburg and France, not offered.						
¼-in. plates:						
Germany	9	0			1.79	
No. 8 gage wire:						
Belgium, August	14	10⅝			2.89	

New Labor Troubles Threatened—Markets Quiet and Easy—Better Export Prospects

LONDON, ENGLAND, July 27.—A further labor crisis has arisen which seems likely to seriously retard the long-looked-for revival in iron and steel in this country. At the end of the three months lockout of the engineers last month, a conference was held, when the employers proposed to introduce wage reductions amounting to 16s 6d in three instalments. A ballot has now been taken on these terms, and in a total poll of nearly 115,000, a majority of nearly 27,000 have declared for refusal of acceptance. What will be the actual result, however, is not quite clear at the moment, but it is certainly interesting to note that, of the total membership, only about 8 per cent returned votes at all.

In the meantime business in both pig iron and manufactured iron and steel has been quiet. Of course the holiday periods both in the North of England and in Scotland are partly responsible, but there seems to be a general opinion among consumers that, if they wait long enough, they will be able to place all their future requirements at considerably below to-day's prices. The freeing of Cleveland pig iron from minimum fixed selling prices has resulted in a drop in this material of about 2s a ton, while substantial business could doubtless be placed for still less money. There are quite plentiful supplies of No. 3 foundry, but the stock of No. 1 is scarce, and sellers hold firmly to the old price of 95s. It is hoped that America will buy again if the labor troubles continue in that country, but at the present time such purchases are confined to ferromanganese and special irons.

In finished iron and steel business does not improve, and, as a result, though prices generally are quotably unchanged, suitable specifications can be placed at less money. Export buying is quiet, but there are signs that demand from such sources is looking up, and hopes are being entertained of some good business with India before long. Continental competition is again being felt, not only for export but also with the home trade here, and though home trade prices on this side have been subject to a fixed agreement for a long time, instances have been found recently where makers have been allowed to make their own quotations to get the business which is badly needed. Consequently it is thought in many quarters that the only natural result is that this price fixing should be definitely abandoned.

PERSONAL

Carmi A. Thompson, Republican nominee for governor of Ohio, has been identified with the iron business since 1913. He was born in Wayne County, W. Va., Sept. 4, 1870, and his first work was that of a coal miner. He graduated from Ohio State University in 1892, was admitted to the bar in 1895, and later filled the following positions: member of the House of Representatives of Ohio, 1904 to 1907; Secretary of State of Ohio, 1907 to 1911; secretary to President Taft, July 1, 1912, to Nov. 20, 1912; treasurer of the United States, Nov. 20, 1912 to April 1, 1913. Mr. Thompson then became associated with James J. Hill as general manager of the Great Northern Iron Ore Properties and continued in that position until Oct. 1, 1917. He was president of the Cottonwood Coal Co. and South Butte Mining Co. of St. Paul from 1913 to 1917, when he resigned his positions in St. Paul and became associated with the Tod-Stambaugh Co., Cleveland becoming financially interested in that company and taking an active interest in its affairs as vice-president, which position he now holds. He is also chairman of the board of directors of the Marting Iron & Steel Co., Ironton, Ohio, in which the Tod-Stambaugh Co. is financially interested.



CARMI A. THOMPSON

A. R. Gould, a director and general manager of the St. Louis Malleable Casting Co., St. Louis, has resigned to become vice-president Malleable Iron Range Co., Beaver Dam, Wis. He will be associated in the active management with F. W. Rogers, president and general manager.

Henry Harnischfeger, president Pawling & Harnischfeger Co., Milwaukee, has returned from a business and recreation tour of the Far East, lasting six months. He visited Japan, China, the Philippines, India and other foreign countries with the primary object of investigating business conditions and possibilities with special reference to gasoline-driven excavating units manufactured. He witnessed the operation of one of the large type of excavators on the Imperial Japanese Railways by the Musashi Engineering Corporation. Mr. Harnischfeger said that, contrary to the general opinion, there is a growing market in the Far East for labor-saving machinery of all kinds.

Clark M. Osterheld, assistant general superintendent Stoughton Wagon Co., Stoughton, Wis., in charge of the motor truck manufacturing department, resigned Aug. 15 to assume active duty as president and general manager of the Stoughton Mfg. Corporation, which with associates he incorporated recently to engage in the manufacture of electric water heaters and other electrical devices of his design.

H. E. Collins of Rogers, Brown & Co., Boston, has resigned, effective Sept. 1, to accept a position with the Harry M. Hope Engineering Co., Boston. He formerly was associated with this engineering firm.

C. O. Rowe has been appointed manager of the steel department of Carson & Co., Pennsylvania Building, Philadelphia, broker in pig iron, steel, coal, coke, etc.

A. G. Bolenbaugh has resigned from the engineering department of the Truscon Steel Co., Youngstown, Ohio, to accept a position with the United Erecting Co., Los Angeles, Cal., effective Sept. 1.

Harold L. Stevens, who has been appointed general sales manager of Central Iron & Steel Co., Harrisburg, Pa., has spent practically his entire life in the steel business. He was employed in the Sweet mills at Syracuse, N. Y., and later by the Sweet's Steel Co., Williamsport, Pa. Some years later he joined the Lackawanna Steel Co., in the Buffalo sales department. He was made New England district sales manager of the Lackawanna Steel Co. about eleven years ago, with headquarters in Boston. A native of Portland, Me., he attended Cornell University and is an ex-president of the Cornell Club of New England. The change takes effect Sept. 1.

W. C. Robbins, for the past two and a half years general manager of the Eberhart Steel Products Co., Inc., Buffalo, is no longer with that company but is carrying on consulting and manufacturing work in the same city.

W. H. White, formerly connected with the United States Naval Ordnance plant, Charleston, W. Va., has been appointed superintendent of the open-hearth department Pittsburgh Crucible Steel Co., Midland, Pa., succeeding L. A. Lambing, resigned.

E. W. Rossiter has been appointed engineer of construction for Freyn, Brassert & Co. He was previously chief engineer of the Interstate Iron & Steel Co., Calumet River, Chicago, and prior to that was with the American Sheet & Tin Plate Co., the Minnesota Steel Co., and the Canadian Steel Corporation, Ltd., Ojibway, Ont.

E. L. Ford is president of the Youngstown Steel Co., Youngstown, Ohio, which is installing a mechanical puddling plant at Warren, Ohio. Mr. Ford is a son-in-law of Joseph G. Butler, Jr., Youngstown, and has been associated for many years with the development of the iron and steel industry of the Mahoning Valley. Mr. Ford is a director of the Youngstown Sheet & Tube Co. and a member of the executive committee of the Brier Hill Steel Co. The mechanical puddling machine to be used in the Warren installation is the result of years of experimentation by Mr. Ford and associates. It is modeled after a design by Mr. Ford, fully covered by patents. Plans provide for an extensive plant to consist of two blast furnaces, by-product coke oven complement and 16 mechanical puddling machines.



E. L. FORD

LeRoy Richards, for several years connected with the sales department of the Alan Wood Iron & Steel Co., Philadelphia, on Sept. 1 will become associated with A. B. Ambler, Pacific Coast representative of the same company, San Francisco. Mr. Richards will locate in Los Angeles, where he will be resident sales representative, with offices in the Higgins Building.

Paul H. Diver, who for four years has been sales representative of the Ohio Electric & Controller Co., Cleveland, has been appointed manager of sales.

C. J. Pagel, who has been associated with the Robbins & Myers Co. in the Cleveland district, has been appointed sales representative of the Ohio Electric & Controller Co., Cleveland, effective Sept. 1.

Charles E. Hulick, superintendent of blast furnaces of the Thomas Iron Co., Hokendauqua, Pa., has resigned, effective Sept. 1.

H. G. Naylor, formerly with the United States Radiator Corporation at Corry, Pa., has been appointed manager of the Niagara Radiator & Boiler Co. plant at Chicago.

Capt. Robert W. Hunt, Robert W. Hunt & Co., engineers, specializing in rail inspection, Chicago, has

Joseph G. Butler, Jr., at Home

A VISIT to the venerable manufacturer in Youngstown and to the McKinley Birthplace Memorial at Niles, Ohio.

(*Editorial Correspondence*)

YOUNGSTOWN, Aug. 10.—It was my privilege to-day to come to this busy capital of the Mahoning Valley to pay my respects to its First Citizen, Joseph G. Butler, Jr., the grand old man of the iron industry. Mr. Butler, now in his 84th year, sits in his big, comfortable chair —comfortable as any chair could be for one who suffers as he does. For more than two years Mr. Butler, as a result of being struck by an automobile after returning from the funeral of Henry C. Frick, has been unable to walk without assistance and at times the pain which he heroically endures is very severe. Although Mr. Butler admitted to-day that those dreadful pains were troubling him, there was nothing to indicate that fact as he most cordially received his visitors and talked of the past, present and future.

Emphasis should be placed on the present and future rather than on the past, for, while Mr. Butler delights in talking over the early days of iron making and politics, his thoughts are largely on the problems of to-day and of his plans for writing a new book and enlarging the beautiful art gallery, across the street from his home, which he had erected for the people of Youngstown. He is constantly adding to the art treasures and has in mind important enlargements of the building.

The large room in which Mr. Butler now spends so many of his hours overlooks an extensive lawn, made beautiful by the rich green of the grass and the choice flowers of many colors. The walls are lined with books and almost hidden by pictures. Everything has some historic interest, recalling the progress of the iron industry, stirring days of politics from the time of Lincoln to Harding, or delightful journeys to many parts of this country and Europe. Inscriptions on photographs, particularly that of President Harding, written the night he received the news that he would be the next occupant of the White House, show gratitude and affection. A year or so ago a part of the Butler home was destroyed by fire. Numerous paintings and other treasures were burned. One, a photograph of the King of Belgium, with whom Mr. Butler became well acquainted while visiting Brussels with other steel manufacturers a few years ago, has been graciously replaced by his majesty.

Mr. Butler's visitors include from time to time some of the most distinguished men in the United States. Charles M. Schwab never misses an opportunity to drop in on "Uncle Joe." Justice John H. Clarke of the United States Supreme Court is a resident of Youngstown and while spending his vacation at home, is a frequent caller upon Mr. Butler.

After reluctantly bidding Mr. Butler good-bye, I was driven past the homes of countless happy, prosperous mill workers to Niles, the birthplace of William McKinley, and visited the McKinley Memorial at Niles, which is indeed a monument to Mr. Butler, who conceived the idea and with untiring energy worked in carrying it out, as well as to Ohio's second martyr President, whose life was so closely connected with the prosperity of the iron industry, especially the tin plate industry, established through the McKinley law, despite all the ridicule that was heaped upon the author. Although I had heard much about the memorial, it was far beyond my expectations. The great beauty of the marble structure is a pleasant surprise to one who had gotten his idea of it from the photographs, which do not do it justice. The heroic statue of McKinley is, of course, the center of attraction and is a real work of art, as indeed are almost every one of the bronze busts of leaders of industry and statesmanship —Taft, Roosevelt, Root, Harding, Gary, Farrell and others. The relic room chains the attention and the library wins the admiration of all, while the assembly room is a most important feature.

One can hardly resist regretting that this memorial was not erected in a greater center of population, where a much larger number of people would be able to see it and be impressed by it, but after all the relatively few who do visit it go there from many parts of this country because it has a genuine attraction for them and the citizens of the Mahoning Valley, to whom it is most easily accessible, are not satiated by sightseeing and are more deeply impressed than would be the citizens of a large city. "Uncle Joe" was right. Niles is the proper place for the McKinley Memorial.

G. S.

recovered from a severe illness which confined him to his home and has resumed his duties at the office of the company. Captain Hunt is in his eighty-fourth year.

Joseph Edmonds, formerly superintendent structural mill finishing ends, Illinois Steel Co., South Chicago, was recently appointed superintendent of finishing mills, No. 2 plant, Inland Steel Co., Indiana Harbor, Ind.

Morris W. Lee, formerly vice-president, Frank D. Chase, Inc., Chicago, has established an advertising agency at 220 South Michigan Avenue, Chicago.

Obituary

WILLIAM G. FLAIG, sales representative specializing in railroad work, Niles-Bement-Pond Co., at Chicago, died suddenly in that city on August 11, at the age of 43.

VALENTINE B. CHAMBERLAIN, JR., mill superintendent Stanley Works, New Britain, Conn., died suddenly Aug. 5, at Oak Bluffs, Mass. Mr. Chamberlain was born in New Britain thirty-six years ago.

CHARLES GRAY COOPER, whose death on Aug. 4 after an illness dating from April, 1918, was mentioned in this column last week, was for forty-five years identified with the C. & G. Cooper Co., engine builder, Mt. Vernon, Ohio. He was born in Mt. Vernon Dec. 11, 1845, and was the son of Elias Cooper, who, with his brother Charles Cooper, founded Cooper company 90 years ago. He was educated in the public schools of Mt. Vernon and at Oberlin College. He served in the Civil War and became connected with the Cooper company in 1866, at which time it was a partnership. At its incorporation in 1898, he became secretary and served in this capacity until the death of the president, F. L. Fairchild, in 1912, when he was made president. He served as president until his illness in 1918, when B. B. Williams was made president and Mr. Cooper became chairman of the board of directors. Mr. Cooper was one of the pioneer engine builders of this country and practically his entire life was spent in the developing and building of Cooper steam and gas engines. He was a member of the Masonic bodies of Mt. Vernon and for many years an officer of the Congregational Church. The members of his immediate family who survive him are a widow, two daughters and a son.

WILLIAM C. PEARSON, senior member of D. G. Gautier & Co., iron and steel jobbers, 50 Church Street, New York, died at his home on Saturday, Aug. 12

Machinery Markets and News of the Works

STRIKES AFFECT TOOL TRADE

August Business Not Up to That of July, but Prospects Are Good

Rising Costs of Manufacture Disturbing to Machinery Manufacturers Who Consider Advances

The fact that August sales of machine tools are not up to the July record is attributed solely to the uncertain conditions which have arisen because of the continuation of the coal miners' and railroad shop mechanics' strikes. A considerable volume of business is pending, which it is expected will be released when a settlement of the strikes has made the outlook clearer.

Railroads which have recently made known their machine-tool requirements are taking no action and are not expected to do so until their labor troubles are over. There has been some small buying by a few roads, but the large lists of the New York Central, Illinois Central and other roads are dormant.

Industrial companies are also losing interest in new equipment, as fuel shortage threatens their operations. Some plants have already reduced their working forces or the number of working hours, while a few are at the point of being shut down because of inability to get coal. The General Electric Co., Schenectady, N. Y., is getting prices on a large number of tools preparatory to issuing a formal inquiry, this being the largest new prospect in the market.

It is expected that the Milwaukee Sewerage Commission will be in the market in about two or three months for machine tools and other equipment for a shop to be erected on Jones Island. The Lima Corporation, Lima, Ohio, will require a number of tools, but the list has not as yet been issued.

Machine-tool builders are becoming more disturbed over rising costs of manufacture. Pig iron, steel and labor costs are all on the upturn, and with a low rate of operations the overhead charges on new machine tools, it is stated, not only make any further general reductions out of the question but are causing manufacturers to study seriously the question of putting into effect advances which will cover their higher costs. In all probability these advances will come in the fall.

New York

NEW YORK, AUG. 15.

THE machine-tool trade has its attention focused largely on the termination of the coal and railroad strikes in the belief that the present business uncertainty will continue as long as these strikes remain unsettled. While some in the trade enjoyed a fairly good July business there is no indication thus far that August will keep pace. Yet prospects are encouraging for better business as soon as the industrial situation has become clarified. The General Electric Co., Schenectady, N. Y., has asked for preliminary prices on a large number of machine tools, these prices, it is stated, to be used as a basis for preparing a machine-tool budget to cover a formal list which will be issued soon. This is the outstanding development of the week as regards future business.

Railroads are buying in a small way, the larger purchases that were expected being postponed until the shop mechanics' strike is ended. The Chesapeake & Ohio Railroad has bought a 42-in. boring and turning mill and a 1100-lb. hammer; the Texas & Mexican Railroad has ordered a 79-in. driving wheel lathe from a New York company, and the Denver Tramways have ordered a 42-in. car-wheel borer.

The crane market has been quiet the past week, few new [illegible] awards being reported. The 10-ton, 44-ft. span overhead traveling crane inquired for recently by the American Car & Foundry Co. has been postponed. Other small inquiries which have been in the market for some time are reported to have been postponed.

The sale of 36 locomotive cranes at Boston on Aug. 9, by the Navy Department, resulted in high bids being submitted on the various lots by the General Equipment Co., New York; Thomas F. Carey, 120 Liberty Street, New York; the Dobmeier Power Co., Hagerstown, Md.; E. M. Wa[illegible] Philadelphia, and Philip T. King, 30 Church Street, New York. The cranes, which will probably be awarded to these high bidders, consist of ten 15-ton and one 10-ton, Brownhoists; a 25-ton and 20-ton Brownings; one 15-ton American; four 5-ton and one 10-ton Osgoods; two 20-ton, two 15-ton and one 22-ton Orton & Steinbrenner cranes; four 15-ton and one 10-ton Industrials; one 30-ton Ohio, 20-ton Linkbelt, 12-ton McMyler-Interstate, 15-ton Bucyrus, 15-ton Browning Engine Co. and a 7-ton Victor R. Browning.

Among recent purchases are:

American Car & Foundry Co., New York, a 15-ton locomotive crane from the Orton & Steinbrenner Co.

Southern Pacific Co., 165 Broadway, New York, a 25-ton locomotive crane with bucket from the Ohio Locomotive Crane Co.

General Electric Co., for Atlanta, Ga., a 10-ton, 22-ft. 6-in. span overhead traveling crane from the Northern Engineering Works.

Bethlehem Steel Co., Bethlehem, Pa., a 10-ton, 40-ft. span overhead traveling crane from the Northern Engineering Works.

Utica Heater Co., Utica, N. Y., a 5-ton, 35-ft. span overhead traveling crane from the Niles-Bement-Pond Co.

Warner Sugar Refining Co., New York, a 10-ton overhead traveling crane, for use in Cuba, from the Reading Chain & Block Corporation.

Johns-Manville Co., Inc., New York, two industrial trucks for Waukegan, Ill., from the Towmotor Co., Cleveland.

Valabhas Runchordas & Co., 70 Apollo Street, Bombay, India, have written to THE IRON AGE stating that they are in the market for the following equipment and desire to buy against cash in New York: Dynamo for copper plating and nickel plating; complete installation for copper and nickel plating; oil engines, steam engines, small boiler, electric motors, lathes, milling machines, band saws, planers and tools for small work shop; complete machinery for the manufacture of phonograph horns and toys; machinery for manufacturing phonograph and sewing needles on small scale; complete machinery for making phonograph records; wood-working machines for phonograph cabinets; also other equipment for a complete phonograph manufacturing plant. Specifications may be examined at the New York office of THE IRON AGE or information will be given by [illegible]

A one-story power house and refrigerating plant will be erected at the new candy factory to be built by Ridley's, Inc., 345 West Fortieth Street, New York, at Long Island City, estimated to cost in excess of $100,000. W. Kenneth Watkins, company address, is architect.

The Board of Education, Saratoga Springs, N. Y., is arranging a list of equipment for installation in the machine shop and vocational department of its new high school.

The Egyptian Lacquer Mfg. Co., 5 East Fortieth Street, New York, is taking bids for a one-story building, 50 x 100 ft., on Maple Avenue, Los Angeles, for a Pacific Coast works. Mott M. Marston, 533 San Fernando Building, Los Angeles, is architect.

Parker Axles, Inc., 1819 Broadway, New York, manufacturer of automobile axles, with plant at Poughkeepsie, N. Y., has tentative plans for a new factory at York, Pa.

An automobile service and repair works for company trucks will be constructed by the Holland Laundry Co., 373 President Street, Brooklyn, on Twenty-fifth Street, in connection with a new three-story plant building.

The Superior Aluminum Corporation, 175 Fifth Avenue, New York, has leased floors in the building at 132 Bleecker Street for local works.

Jacob Roth, New York, has leased the building at the northwest corner of Ninth Avenue and 209th Street for the operation of an automobile service and repair works. Immediate possession will be taken.

The American Lamp Co., 25 West Forty-third Street, New York, organized with a capital of $2,000,000 to manufacture incandescent and electric lamps, is concluding the purchase of the former plant of the New England Products Co., Stamford, Conn., manufacturer of kindred specialties, now in receivership. The company is also planning the establishment of branch plants at Newark, N. J.; Philadelphia, Detroit, Chicago and New Orleans. It is proposed to operate one of the largest works at Long Island City where a site will be selected. William H. Young is president, and Walter L. Tremper, vice-president and treasurer.

Charles R. Barnes, 246 Washington Avenue, Albany, N. Y., has awarded a contract to the William G. Sheehan Building Co., 28 DeWitt Street, for a one-story automobile service and repair works, 65 x 165 ft., on Central Avenue, to cost about $85,000.

Material-handling machinery, etc., will be installed in the new warehouse to be erected by the Republic Storage Co., 541 West Thirty-fourth Street, New York, estimated to cost about $200,000. Russell G. Cory, 30 Church Street, is architect and engineer.

The Tidal Oil Co., 11 Broadway, New York, a subsidiary of the Tide Water Oil Co., same address, operating oil refineries and gasoline plants in Oklahoma and Kansas, has received an appropriation of $1,000,000, from the parent company, to be used for extensions and improvements. The bulk of the fund will be used for oil refinery additions, including new equipment.

The Electric Supply & Equipment Co., Hartford, Conn., will take bids at once for a new four-story building, 40 x 60 ft., at Broadway and Church Street, Albany, N. Y., for branch works. It will cost about $50,000.

The State Highway Department, 8 Elizabeth Street, Utica, N. Y., L. D. Brownell, division engineer, will commence the erection of a one-story machine shop, 45 x 210 ft., with storage department for road machinery and equipment.

A vocational department will be installed in the new high school, 53 x 170 ft., to be erected at Greenburgh, N. Y. Jallade, Lindsay & Warren, 129 Lexington Avenue, New York, are architects.

Francis J. Sheridan, New York, has leased the four-story and basement building at 147-51 West Eighty-third Street, for an automobile service and repair works

A vocational department will be installed in the new high school, 160 x 200 ft., to be erected at East Hampton, L. I., estimated to cost in excess of $150,000. A. F. Gilbert, 80 Maiden Lane, New York, is architect.

The West India Sugar Finance Corporation, 129 Front Street, New York, operating plants in the West Indies, is arranging for an increase of $835,000 in its preferred stock, the proceeds to be used for extensions and improvements, including the consolidation of other sugar refining properties in the same district.

Hoisting equipment, conveyors, loading and unloading machinery, etc., will be installed in the new distributing and storage plant to be constructed at Roosevelt, N. J., by Ichabod T. Williams & Sons, Eleventh Avenue and Twenty-fifth Street, New York, lumber merchants. Waterfront property totaling 69 acres has been acquired from the Bethlehem Shipbuilding Corporation, heretofore used in connection with the Moore shipbuilding plant. The lumber terminal will occupy the entire site.

A vocational department will be installed in the two-story and basement high school, 60 x 195 ft., to be erected at Bridgeton, N. J., for which foundations are now being laid. It will cost about $200,000. Ritter & Shay, North American Building, Philadelphia, are architects.

An electrically operated pumping plant and industrial railroad will be constructed in connection with the new sewerage disposal plant to be built by the Hackensack Improvement Commission, Hackensack, N. J., to cost about $481,000. A general contract for the project has been let to the Public Service Production Co., Public Service Terminal, Newark, N. J.

Robert O. Beebe, director Essex County Vocational Schools, 316 Essex Building, Newark, will lease a building in the Watsessing district, Bloomfield, N. J., for the establishment of a Boys' Continuation School. The initial shop space will approximate 4000 sq. ft. In connection with the new Seymour Vocational School, Sussex Avenue and First Street, Newark, which will be ready for occupancy in September, a number of departments will be omitted from immediate service and equipped later; one of these will be the foundry and another, the steam fitting department.

The Durant Motors, Inc., 1819 Broadway, New York, is arranging to transfer different features of production from the Long Island City plant to the new works at Elizabeth, N. J., as soon as the latter plant is ready for service, about the middle of September. The Long Island City works will then be arranged to manufacture a limited number of Flint automobiles for the Flint Motor Co., a recently organized subsidiary. The machinery installation at the new Elizabeth works will require several months for entire completion.

An electrically operated pumping plant will be installed by the Township Committee, Cove and Centre streets, Pensauken, N. J., in connection with a new sewerage system. Remington & Vosbury, 601 Market Street, Camden, N. J., are engineers.

Chicago

CHICAGO, Aug. 14.

THE machine-tool market has become exceedingly quiet, inquiries having disappeared almost entirely and others having dropped to the vanishing point. The railroads are taking no action on their inquiries and industrial plants are losing interest in new equipment as the fuel shortage threatens operations. In a number of instances local machinery houses have received reports that certain plants have reduced operations because of lack of coal and some of them, in fact, are at the point of closing down entirely. The Continental Motors Co., Muskegon, Mich., has added a boring mill and a large special manufacturing grinding machine to its recent list of purchases. This order is one of a very few which are reported in the local market.

The Pullman Co., Pullman, Ill., has ordered a railroad coach hoist from the Whiting Corporation, Harvey, Ill.

The E-K Mfg. Co., 31 North State Street, Chicago, recently incorporated with $60,000 capital stock, will manufacture electric soldering machines for jewelers, opticians and dentists, and has leased a plant at 1775 Ogden Avenue. Very few metal-working machines will be used as most of the parts are to be manufactured outside. A steel cutting shear is the only machine used at present. The officers are P. N. Nelson, president; D. C. Spencer, vice-president and secretary; L. S. Nelson, treasurer.

The West Woodworking Co., 304-08 North Ada Street, Chicago, has let contract for a one-story factory to cost $16,000.

The Duffin Iron Works, 4843-55 South Kedzie Avenue, Chicago, has let contract for a one-story addition, 40 x 65 ft., to cost $10,000.

The Manufacturers Terminal Co., Waukegan, Ill., has had plans prepared by Fox & Fox, architects, 38 South Dearborn Street, Chicago, for remodeling a three and five-story factory, 43 x 62 ft., and for providing a small addition.

A contract has been awarded by George S. Kingsley, 109 North Dearborn Street, for a one-story garage, 100 x 125 ft., at 916-22 Madison Street, Oak Park, Ill., for A. Y. Lucal, to cost $25,000.

The Schuessler Foundry Co., Alton, Ill., has let contract

for a new foundry, 120 x 250 ft., around which are to be constructed a number of smaller buildings.

The Sloan Valve Co., 4300 West Lake Street, Chicago, will build a one-story plant, 39 x 142 ft., to cost $10,000.

The McDonald Loose Leaf Co., 638 Federal Street, Chicago, has let contract for a one-story factory, 95 x 125 ft., at 1809-17 Summerdale Avenue, to cost $30,000.

The report that the Ford Motor Co. has purchased a site in the Calumet industrial district of Chicago has been confirmed. A tract of 80 acres has been purchased from the Calumet & Chicago Canal & Dock Co. The property is southeast of the Calumet River and west of Torrence Avenue, running south to the South Shore Railroad at about 130th Street. An assembling plant will be erected.

The McKelvey Pulverizing Co., 136 West Lake Street, Chicago, recently incorporated, will grind or pulverize pigments by a new method, using the McKelvey patent machine for pulverizing by compressed air. The company has equipped a plant at Utica, Ill., formerly occupied by the Black Ball Cement Co. Its work for a time will be of an experimental nature and it will not manufacture any machinery at present outside of the initial McKelvey machine which is now completed. The officers are H. V. Gressang, president; David McKelvey, general manager, and J. Neuburger, secretary and treasurer.

The Public Service Co. of Northern Illinois will commence the construction of a new generating station at Waukegan, Ill. about Sept. 1. The first unit will contain a 20,000-kw. turbine, a condenser and three boilers of 1430 hp. each. Plans provide for an ultimate layout comprising eight turbine units, developing 250,000-kw. A tract of 80 acres adjoining Waukegan will be occupied by the plant.

The American Foundry & Furnace Co., manufacturer of furnaces and boilers, Bloomington, Ill., is building an addition.

The Bowman Dairy Co., 140 West Ontario Street, Chicago, will build a new one-story machine shop, 45 x 90 ft., at its plant at Harvard, Ill.

Fred Riebel & Co., 6221 Wentworth Avenue, Chicago, manufacturer of sheet iron and metal products, is said to be planning the installation of machinery to manufacture metal cans and containers.

A vocational department will be installed in the new three-story high school, 150 x 250 ft., with one-story extension, 40 x 90 ft., to be erected at St. Paul, Minn., estimated to cost about $325,000, for which revised bids will be called. F. X. Lewes is city architect.

The Northwestern States Portland Cement Co., Mason City, Iowa, will commence the immediate erection of a new one-story machine shop.

The United States Government, Post Office Department, Washington, has tentative plans under consideration for new works in the vicinity of Maywood, Ill., to manufacture aeroplanes and parts, primarily for mail service. The plant is estimated to cost in excess of $500,000.

The Advance Rumely Co., Laporte, Ind., manufacturer of agricultural machinery, etc., is taking bids for a two-story and basement building, 100 x 132 ft., at Ninth and Farnam streets, Omaha, Neb., for a factory and distributing branch, estimated to cost about $200,000, including equipment. John Latenser & Sons, 732 Peters Trust Building, Omaha, are architects.

The Chicago, Burlington & Quincy Railroad Co., Omaha, Neb., will commence the construction of a new electric power plant at Plattsmouth, Neb., to cost about $50,000.

W. F. Bleck & Co., 1846 Lamon Avenue, Chicago, is taking bids for a one and two-story and basement addition to its sash and door manufacturing plant, 180 x 200 ft., to cost about $100,000, including machinery. H. H. Green, 304 South Wabash Avenue, is architect.

The Commonwealth Edison Co., Chicago, has awarded a general contract to the George A. Fuller Co., 140 South Dearborn Street, for a new electric generating plant at 100th Street and the Calumet River, six-stories, 120 x 280 ft., estimated to cost $1,000,000.

The St. Paul Casket Co., 227 West Seventh Street, St. Paul, Minn., is completing plans for a new four-story plant, 95 x 150 ft., at Griggs and University avenues, estimated to cost about $140,000, including machinery. A. H. Stein, 601 Endicott Building, is architect. Ernest C. Reiff is president.

The Pullman Co., 79 East Adams Street, Chicago, is planning for enlargements in its automobile body manufacturing works. Up to the present time manufacture to a large extent has been limited to bodies for the Packard Motor Co., Detroit.

The Universal Office Devices Co., Inc., 56 East Superior Street, Chicago, desires to get in touch with companies equipped to manufacture a sheet metal part about 0.025 in. thick and 3 in. long by 1⅝ in. wide, with a ¾-in. flange, and having two slots cut lengthwise 2⅝ in. by ⅛ in. wide. Parts made from wire about 0.125 in. thick, bent in horseshoe form, 2⅝ in. long and 1⅜ in. between legs, and notched on each leg, are also required.

Philadelphia

PHILADELPHIA, Aug. 14.

THE Jones Machine Works, Inc., Fifty-third Street and Lansdowne Avenue, Philadelphia, manufacturer of machinery and tools, will break ground at once for a new plant on property recently acquired at Primos, Pa., to include a machine shop, foundry, pattern shop and minor structures. The erection of the foundry will be deferred for several months.

The Logan Ice Mfg. Co., Tenth Street and Windrim Avenue, Philadelphia, has plans in progress for four one-story buildings to comprise a new plant. J. T. Hockstra, 1713 Sansom Street, is architect. C. W. Roberts is president.

A one-story power house, with cooling tower and other auxiliaries, will be constructed by the Philadelphia Brewing Co., Philadelphia, at Fairhill and Clearfield streets.

The Corrugated Container Co., Trenton and Venango streets, Philadelphia, will install new cutting and creasing machinery at its plant.

The F. W. Hosbach Cabinet Works, 2415 South Street, Philadelphia, will build a new two-story plant, 65 x 76 ft., at Twelfth and Brown streets.

The George W. Blabon Co., Twenty-first Street and Hunting Park Avenue, Philadelphia, will install additional tools and equipment in the machine shop at its linoleum plant.

The Northeastern Ice Mfg. Co., Front and Luray streets, Philadelphia, has awarded contract to E. R. Hall, 34 South Seventeenth Street, for a new building to cost $50,000.

The Philadelphia Rapid Transit Co., 810 Dauphin Street, Philadelphia, has arranged for a bond issue of $2,150,000, a portion of the proceeds to be used for extensions and improvements, including power houses and equipment. W. C. Dunbar is vice-president.

The Hurley Motor Co., 219 North Broad Street, Philadelphia, has awarded contract to Cramp & Co., Denckla Building, for a new two-story service and repair building, 100 x 204 ft., at Thirty-first and Thompson streets, estimated to cost in excess of $140,000. J. Scott Hurley is president.

A one-story automobile service and repair works, 90 x 105 ft., for company trucks and automobiles, with department for wagon work, will be constructed by the Breyer-Sharpless Milk Co., Ninth and Cumberland streets, Philadelphia. In connection with a new dairy building the structure will cost about $100,000.

The William Cramp & Sons Ship & Engine Building Co., Richmond & Norris streets, Philadelphia, is reported to be planning for enlargements in the drydocks, including the addition of shop and repair facilities.

Charles B. Warren, superintendent of purchases, Board of Education, 9 South Stockton Street, Trenton, N. J., will receive bids until Aug. 18 for manual training supplies needed at the public schools during the coming school year, as per specifications on file.

The Coatesville Boiler Works, Coatesville, Pa., is disposing of a bond issue of $300,000, a portion of the proceeds to be used for the purchase of additional equipment.

The Excelsior Coal Co., West Excelsior, Pa., has authorized the immediate preparation of plans for rebuilding its anthracite coal washery, recently destroyed by fire. A list of equipment is being arranged.

The Board of Education, Herrick Center, Pa., is planning for the early purchase of equipment for installation in the vocational department at the local high school. G. B. Giles is secretary.

The Reading Hardware Co., Sixth and Willow streets, Reading, Pa., has plans in progress for a new power house, 50 x 96 ft., to be used in connection with a seven-story addition. George Gerhard & Sons, 619 Penn Street, are architects.

The Stalium Metals Co., Temple, Pa., recently organized to manufacture special metal products, will commence the erection of a new one-story foundry and machine shop, estimated to cost in excess of $150,000, including equipment. S. S. Staley heads the company.

A vocational department will be installed in the proposed high school to be constructed in the Allison Hill district, Harrisburg, Pa., estimated to cost in excess of $250,000. A site is being selected and plans will be prepared at an early date.

The York Mfg. Co., York, Pa., manufacturer of ice-making and refrigerating machinery, has plans under consideration for a new five-story building at its plant, 60 x 100 ft., estimated to cost in excess of $300,000.

The Boyertown Burial Casket Co., East Greenville, Pa., is planning for the erection of an electric light and power plant for works service.

A vocational department will be installed in the new two-story high school, 90 x 180 ft., to be erected at Jenkintown, Pa., for which revised plans are being drawn. It is estimated to cost about $225,000. Heacock & Hokanson, 1218 Chestnut Street, Philadelphia, are architects.

The Coopersburg Casket Co., Coopersburg, Pa., has construction under way on a new two-story plant.

The Solomon's Radiator Repair Works, Harrisburg, Pa., recently organized, will operate a general sheet-metal works and repair shop at 252 Hamilton Street. M. Solomon is general manager.

A vocational department will be installed in the new two-story junior high school to be erected at Ardmore, Pa., estimated to cost about $540,000, for which foundations will be commenced at an early date. Savery & Scheetz, Stephen Girard Building, Philadelphia, are architects.

A power house will be built by the Worth Chocolate Co., Hershey, Pa., in connection with its new factory at Cleona, Pa. Harvey T. Hauer, 829 Cumberland Street, Lebanon, Pa., is architect. Harry Worth heads the company.

Albert Hanker, New Cumberland, Pa., operating a box factory, has tentative plans for a new one-story plant for the manufacture of a patented window, with lifting and locking devices, etc., for which he has purchased the patents. He is also interested in the erection of a new local automobile body manufacturing works.

Fry Brothers, 310 West Fourth Street, Williamsport, Pa., will commence the erection of a new one-story automobile service and repair works, 125 x 130 ft., on West Fourth Street.

The Audubon Wire Cloth Co., Audubon, N. J., is adding another one-story unit to its plant to take care of growing business. When completed the present floor space will be doubled and will cover an area 145 x 180 ft. Robert F. Korb is president and general manager.

New England

BOSTON, Aug. 14.

UNCERTAINTY of the coal and railroad labor situation continues to restrict business in the New England machine-tool market. A sale of a ½ x 8 in. full automatic lathe, costing about $1,500, to a Rhode Island manufacturer, with a prospect of the firm taking an additional dozen machines, is the most noteworthy development for new tools. The Lawrence, Mass., school list is still pending, the trade being inclined to hold off because of conditions connected with the deal. The list includes 10 12-in. engine lathes, one 16-in. and one 14-in. lathe, a milling machine, planer, drill press, shaper, sensitive drill and other machinery, in addition to considerable wood-working equipment, all motor driven, and a complete blacksmith outfit. A New Bedford, Mass., piston ring maker, who recently purchased four lathes, two with turret attachments, is in the market for additional new tools costing about $5,000. Three or four other sizable inquiries for new tools are out, details being withheld. One of these inquiries is for export. Business in used machine tools has been further restricted by the announcement that the equipment of a Quincy, Mass., shop of fair proportions, will be sold at auction this week.

A Middle West maker of drill presses whose prices were considerably out of line with other drill presses, has made a substantial reduction in prices. New England machine-tool builders are understood to be working on new price schedules, which will show an advance and be announced probably in September or October.

A Worcester machine tool builder has contracted with the Wickwire-Spencer Steel Co. for the building of special machinery, the order being of sufficient size to keep the plant running on its present schedule two months.

The Boston & Maine Railroad Co., Springfield, Mass., has work under way on an addition to works at Holyoke, Mass., which will be used for repairing locomotives. It is proposed to provide a capacity for handling 20 engines at one time.

The Walsh Boiler Works, Holyoke, Mass., has contracted with the Boston & Maine Railroad for a considerable amount of locomotive boiler repair work. No new equipment is required.

The Hoyt Silver Co., 338 Pearl Street, New York, has incorporated to manufacture stainless metal to be used in cutlery at Milford, Conn. Plans call for a factory to give employment to about 300. William T. Hoyt is president.

A vocational department will be installed in the new two-story and basement high school, 66 x 161 ft., to be erected at Shrewsbury, Mass. Chester R. Stacey is superintendent of schools in charge.

The Holyoke Supply Co., 210 Race Street, Holyoke, Mass., manufacturer of pipe, plumbing equipment, etc., has awarded a contract to P. J. Kennedy, 464 Maple Street, for a five-story addition to cost about $50,000.

The Bassick Co., Austin Street, Bridgeport, Conn., manufacturer of casters and hardware specialties, is planning for the installation of a number of machine tools, including lathe, milling machine and drill press.

William H. Hickey, Jr., Dorchester, Mass., has acquired the building at 1233-45 Dorchester Avenue, corner of Hancock Street, and will remodel the structure for an automobile service and repair works. A machine shop will be installed.

A vocational department will be installed in the new three-story high school to be erected at Fall River, Mass., in the North Park district, estimated to cost about $400,000. N. S. Chase, 583 Center Street, is architect.

The Gloucester Electric Co., Gloucester, Mass., has made application for permission to issue capital stock for $91,600, the proceeds to be used for extensions and improvements.

The Boston Ice Co., 262 Heath Street, Boston, will build a new plant to cost about $200,000, including machinery. Plans have been completed.

The Standard Oil Co., 26 Broadway, New York, has surveys under way for its proposed new oil distributing plant at Middletown, Conn., estimated to cost in excess of $500,000 with equipment.

The Deerfield Valley Paper Co., recently organized, has acquired the plant and business of the Monroe Bridge Paper Co., Monroe Bridge, Greenfield, Mass., and will operate the mill in the future. Extensions and improvements are planned.

E. H. Blake, 18 Harvard Avenue, Dorchester, Mass., will commence the erection of a new one-story automobile service and repair building, 100 x 120 ft., on Harvard Avenue. James T. Ball, Trinity Court, Boston, is architect.

The Metropolitan Concrete Block Co., Danbury, Conn., will build a plant and install complete automatic machinery for lowest production cost. Charles Woods is in charge.

The Dasco Spring Cover Co., Allston, Mass., has leased a floor of the Wilcox factory at Athol Highlands, Athol, Mass., for a new works to manufacture spring covers for automobile service.

Baltimore

BALTIMORE, Aug. 14.

J. ROSENBLATT & CO., 32 South Howard Street, Baltimore, desire to hear from companies equipped to cut, stamp and curl flat, decorated tin sheets into trays 13¼ in. square in lots of 10,000. Other stampings wanted are doors 11 x 15 in., from galvanized sheets in quantities of 5000 or more.

The Edro Richardson Brass Co., 318 North Holliday Street, Baltimore, will break ground at once for a one-story addition to its foundry, estimated to cost about $35,000.

The Board of Awards, office of the City Register, City Hall, Baltimore, will take bids until Aug. 23, for machinery in the vocational department of Junior High School No. 47, as per specifications at the office of the Board of School Commissioners, Madison and Lafayette avenues. John H. Roche is secretary of the board.

The Security Cement & Lime Co., Equitable Building, Baltimore, is planning for enlargements in its plant at Hagerstown, Md., to increase the capacity about 50 per cent. New equipment will be installed.

The Charlottesville & Albemarle Railway Co., Charlottesville, Va., will install new electrical and other equipment at its power plant.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until Sept. 5 for one I-beam crane, for the Mare Island Navy Yard, San Francisco.

The Post Office Department, office of the purchasing agent, will receive bids until Aug. 18, for two trip hammers.

The Kneip Motor Car Co., 1017 Eutaw Street, Baltimore, has awarded contract to the Consolidated Engineering Co., Calvert Building, for a two-story service and repair building, 40 x 150 ft. The Franklin Motor Car Co., will occupy

a portion of the structure. Otto C. Simonson, Inc., Maryland Casualty Building, is architect.

A vocational department will be installed in the new one and two-story high school, 80 x 150 ft., to be erected at Smyrna, Del., for which bids are being asked until Sept. 5. The Delaware School Auxiliary Association, du Pont Building, Wilmington, is in charge.

The Metallic Press Cloth Co., Augusta, Ga., is planning for the establishment of a factory to manufacture metallic cloth for oil mill service. William A. Lee is president.

Fleming Aytes, 1006-A Bacon Street, Richmond, Va., is planning for the establishment of a factory to manufacture special automobile parts.

A vocational department will be installed in the new two-story and basement high school, 54 x 100 ft., to be erected at Franklin, Va. W. Newton Deihl, Monroe Building, Norfolk, Va., is architect.

S. J. Schmenner, 1422 Whitelock Street, Baltimore, has filed plans for a two-story automobile service and repair building, 50 x 81 ft., at 2913-37 Walbrook Avenue.

Hugh McRae, Wilmington, N. C., is organizing a company to build and operate several industrial plants in a portion of New Hanover County, including a machine shop, crate manufacturing plant, and basket factory.

The Strickland Machine Shop, 2322 East Main Street, Richmond, Va., is planning for the installation of a new lathe and drill press.

The Consolidated Gas, Electric Light & Power Co., Lexington Building, Baltimore, is planning to rebuild the coal handling tower at its Spring Garden power plant, recently destroyed by fire with loss of about $25,000.

The Atlanta Glass Mfg. Co., P. O. Box 439, Atlanta, Ga., is inquiring for glass manufacturing machinery and mechanical equipment.

H. C. Richardson, 1918 East Franklin Street, Richmond, Va., is planning for the installation of a lathe, bench tools and other mechanical equipment in his machine and automobile repair shop.

A vocational department will be installed in the new high school to be erected at Vanceboro, N. C., estimated to cost about $150,000, for which foundations will be laid at once.

The L. C. Isenhour Co., Colon, N. C., has tentative plans for the establishment of new works to manufacture brick, tile, etc.

The Chapin-Sacks Mfg. Co., First and M streets, N. W., Washington, will build a new three-story ice plant, 109 x 120 ft., estimated to cost about $75,000.

The Reding Gold Mining Co., Danville, Va., recently organized, will establish a power house in connection with its proposed plant in the vicinity of Ashboro, N. C. Motors and other electrical and mechanical equipment will be installed. E. L. Walton is president.

The Port Development Commission, Baltimore, has preliminary plans in progress for a large storage plant on the municipal wharf at Hughes Street.

A vocational department will be installed in the new high school to be erected at Newton, N. C., estimated to cost about $100,000. Benton & Benton, Wilson, N. C., are architects.

Henry M. Earle, Spartanburg, S. C., representing bond holders of the Carolina Light, Power & Railway Co., is arranging for the purchase of the plant and property at a receiver's sale. A new company will be organized to operate the works and extensions and improvements will be made.

The Wilson-Hock Co., City Point, Va., is planning for the installation of new gas engine equipment to be used in connection with a new combination saw.

A. J. Lucas, 2112 East Main Street, Richmond, Va., is planning to purchase sheet-metal working machinery for installation in a local building.

Detroit

DETROIT, Aug. 14.

THE Paige-Detroit Motor Car Co., 100 Fort Street, West, Detroit, will commence the erection of a new building to be used as an enameling department and other operating service. William B. Cady is secretary.

The Michigan Central Railroad Co., Detroit, is considering the erection of new car shops at Bay City, Mich., to replace its present main shops at Detroit. The City Board of Commerce, Bay City, is negotiating with the company regarding a site.

The Columbia Motor Co., 6501 Mack Street, Detroit, has leased the plant of the Saxon Motor Co., and will take immediate possession. It will be used for increased production, developing an output of about 200 cars a day, compared with a present production of about 60.

The Lincoln Motor Co., Detroit, has revised plans in preparation for an addition, one-story, 250 x 880 ft. Albert Kahn, 1000 Marquette Building, is architect.

The City Commission, Cadillac, Mich., has tentative plans under consideration for a municipal electric light and power plant. A bond issue will be arranged.

A vocational department will be installed in the new three-story high and grade school, 185 x 250 ft., to be erected at Houghton, Mich., estimated to cost about $340,000.

The Detroit Marvel Brass Mfg. Co., 1742 Rivard Street, Detroit, is planning the installation of additional equipment for machining and finishing work.

The Filer Fibre Co., Filer City, Mich., manufacturer of pulp and paper products, has arranged for a bond issue of $500,000, the proceeds to be used in connection with the erection of a new mill, estimated to cost considerably in excess of this amount with machinery.

The Detroit Edison Co., Detroit, will commence the immediate erection of an addition to its Superior power plant on the Huron River, near Ann Arbor, Mich., estimated to cost about $50,000. Gardner S. Williams, Cornwell Building, Ann Arbor, is consulting engineer.

The Ford Motor Co., Highland Park, Mich., has had plans prepared for a new two-story slag-crushing plant at River Rouge, Mich. The machinery will be electrically-operated. Albert Kahn, 1000 Marquette Building, Detroit, is architect.

Pittsburgh

PITTSBURGH, Aug. 14.

MACHINE tool business has not been brisk the past week and inquiries are also fewer. Apparently, prospective buyers are awaiting a clearing up of the labor situation before closing against inquiries. The Lima Corporation, Lima, Ohio, will require a number of tools in connection with the extension of its plant, but the list has not yet been issued.

The Weirton Steel Co., Weirton, W. Va., has put out an inquiry for an 8-stand sheet mill with a 2000-hp. motor for the drive. In connection with this installation the company is taking bids for a ladle crane and soon will inquire for three or four mill type cranes. It recently closed with the Koppers Co., Pittsburgh, for a by-product coke nd motor fuel recovery plant, the coking plant to consist of 37 ovens. This business forecasts an inquiry for at least one hoist and probably other equipment. The Otis Steel Co., Cleveland, which is to install a strip mill, is taking bids for the continuous furnaces, and is expected to shortly inquire for the cranes and other equipment. The H. C. Frick Coke Co., is taking bids on a conveyor system for installation in its Scottdale, Pa., mines and the National Mining Co., another Steel Corporation coal mining subsidiary, has just placed through the Dravo-Doyle Co., Pittsburgh, an order for two Nordburg hoists, for operations near Bridgeville, Pa. The Jones & Laughlin Steel Co. has ordered three 10-ton cranes and one 15-ton crane, all of 35 ft. span, for installation at the South Side works, Pittsburgh, for which Manning, Maxwell & Moore, Inc., was the successful bidder.

A local foundry is in the market for a 7½-ton, 3-motor overhead crane and the Standard Steel Spring Co., Coraopolis, Pa., has not yet acted on a 10-ton crane, with two-point lift, for which it inquired several weeks ago. The United Engineering & Foundry Co., which is taking bids on three cranes for the National Enameling & Stamping Co., St. Louis, has revised the specifications and asked for new bids.

S. S. Jones, 30 Sixth Street, Belle Vernon, Pa., has awarded a contract to the Austin Co., Union Arcade, Pittsburgh, for a two-story automobile service and repair plant, 65 x 100 ft., at Donner Avenue and Ninth Street, Monessen, Pa.

The Kurtz Brass & Wood Bed Co., Corry, Pa., will build a two-story addition, 100 x 150 ft.

A new corporation is being formed with capital of 150,000 shares of stock, no par value, to take over and operate the plant and property of the United States Glass Co., South Ninth and Bingham streets, Pittsburgh, the consideration involving $1,920,000. Extensions and improvements will be made at the works. Ernest Nickel is secretary of the company.

The Board of Education, Oil City, Pa., is reported to be arranging a list of machinery for installation at the new local high school, for which plans are being prepared by E. E. Bailey, Chambers Building.

The Freedom Oil Works, Freedom, Pa., has plans under way for a two-story addition, 48 x 75 ft., to its automobile service and repair works. J. E. Martsolf, 513 Third Avenue, New Brighton, Pa., is architect.

A vocational department will be installed in the new high school to be erected at Woodlawn, Pa., estimated to cost about $500,000. Carlisle & Sharrer, Jenkins Arcade, Pittsburgh, are architects.

Fire, Aug. 2, destroyed the plant of the Superior Glass Products Co., Adams Avenue and Nineteenth Street, Huntington, W. Va., with loss estimated at $150,000, including machinery. It is planned to rebuild.

The Miller Motor Co., 228 West Seventh Avenue, Homestead, Pa., is taking bids for a new two-story service and repair works, 75 x 110 ft., at Munhall, Pa., estimated to cost about $50,000. J. E. Dwyer, 5808 Forbes Street, Pittsburgh, is architect.

The Carmichael Motor Co., Clarksburg, W. Va., is planning the erection of a new one-story automobile service and repair works, estimated to cost $50,000. Floyd Carmichael is head.

A vocational department will be installed in the new two-story and basement junior high school building to be erected at Sisterville, W. Va., estimated to cost $100,000. Holmboe & Pogue, Empire Bank Building, Clarksburg, W. Va., is architect.

The Pittsburgh, Lisbon & Western Railroad Co., Lisbon, Ohio, is said to be planning for the installation of machinery at its locomotive repair shops at New Galilee, Pa. N. B. Billingsley is general manager.

The Beatty Motor Co., Fairmont, W. Va., recently organized, has plans under way for a new three-story automobile service and repair works. Carl E. Beatty is president.

The Clarksburg Ice & Storage Co., Clarksburg, W. Va., has plans under way for a new ice and cold storage plant, with daily capacity of about 4500 tons. The Engineering Department of the American Ice Co., is in charge.

The Central South

ST. LOUIS, Aug. 14.

THE Missouri Pacific Railroad Co., Railway Exchange Building, St. Louis, has awarded contract to the T. S. Leake Construction Co., 608 South Dearborn Street, Chicago, for a one-story addition to its car repair shops at Sedalia, Mo., and improvements in present shop.

The Eldorado Development Co., Eldorado Springs, Mo., recently organized with a capital of $300,000, is planning for the installation of additional machinery at its zinc works and will take bids early in the fall. A. B. Stricklett is president and general manager.

The Louisville Garage Co., Louisville, has plans in preparation for a new three-story and basement automobile service and repair building estimated to cost about $250,000, including equipment. D. X. Murphy & Brothers, Louisville Trust Building, are architects. Lee R. Miles is president.

The Arkansas Light & Power Co., Pine Bluff, Ark., is planning the construction of new hydroelectric generating works on the Illinois River, near Russellville, Ark., estimated to cost about $250,000, with machinery. H. C. Couch is president and general manager.

The United States Engineer Office, Nashville, Tenn., will receive bids until Sept. 5 for steel gates for Lock F, Cumberland River, as per specifications on file.

Fire, Aug. 4, destroyed the power house at the plant of the Madill Grain & Elevator Co., Madill, Okla., with loss estimated at $25,000. It is planned to rebuild.

The Southern Lumber & Mfg. Co., Nashville, Tenn., will commence the erection of two buildings, 30 x 150 ft., and 60 x 200 ft., with warehouse, 50 x 200 ft. The machinery installation is estimated to cost close to $50,000. L. Frank is secretary and general manager.

A vocational department will be installed in the new two-story high school, 70 x 120 ft., to be erected at Hickman, Ky., for which foundations will be placed under way at once. W. Earl Gore, City National Bank Building, Paducah, Ky., is architect.

The Joplin Foundry Co., East Seventh Street, Joplin, Mo., is planning for the installation of two new chain hoists, about 1 and 3-ton capacity, respectively.

The Duncan Machinery Co., 721 North Central Avenue, Knoxville, Tenn., machinery dealer, is inquiring for a lathe, 12-in. swing, belt driven, provided with hand feed and compound rest; also for boilers, horizontal, tubular type, 150 and 200 hp., and for a 150-hp. engine, throttling or slide valve type.

The Central Electric Co., North Market Avenue, Wichita, Kan., will install a lathe, drill press and other equipment at its shops.

The Union Electric Power Co., St. Louis, has been acquired by the American Edison Co., which will extend and improve its power plants and system in this section. The new company will operate with a capital of $25,000,000, and 650,000 shares of common stock, no par value.

The Dixie Power Co., Memphis, Tenn., recently organized, will commence work early in the coming year on its new hydroelectric generating plant on the White River, near Cotter, Ark. The plant will have a capacity of close to 100,000 hp., and is estimated to cost about $15,000,000, including dam and machinery. It will be supplemented by two other hydroelectric plants on the same river, the first to be known as the Buffalo dam, and the other as the Big North Fork dam, with installation to total 25,000 hp. and 30,000 hp., respectively, estimated to cost $5,000,000 and $6,000,000. An extensive transmission system will be built, totaling about 400 miles of steel towers. Colonel Henry A. Allen, 154 West Rand Street, Chicago, is engineer. Walter Powell is president.

The M. J. S. Radio Co., 128 Loraine Avenue, Wichita, Kan., will install a lathe, drill press and other equipment at its local plant.

The Tennessee Electric Power Co., Nashville, Tenn., comprising a recent consolidation of the Tennessee Power Co., Chattanooga Railway & Light Co., and the Chattanooga & Tennessee River Power Co., is disposing of a preferred stock issue of $3,000,000, a portion of the proceeds to be used for extensions and improvements in plants and system.

The Prairie Pipe Line Co., Jenks, Okla., is planning to rebuild the portion of its oil storage and distributing plant, recently destroyed by fire with loss estimated at $75,000, including equipment.

A vocational department will be installed in the new three-story and basement high school to be erected at Liberty, Mo., 140 x 189 ft., estimated to cost about $125,000, for which new bids will be asked at an early date. C. A. Smith, 602 Finance Building, Kansas City, Mo., is architect.

Cincinnati

CINCINNATI, Aug. 14.

MACHINE-TOOL orders slowed up perceptibly last week but no diminution in inquiries was evident. Favorable developments in the rail and coal strikes are confidently expected to release a number of orders for machine tools, purchase of which is being deferred on this account. While there are no new inquiries of size, the aggregate of those outstanding amounts to a considerable sum, and if only a portion of the business is placed, would mean fair activity in the industry. Orders now being booked are mostly for special machinery, suitable for rapid production. A local manufacturer is asking prices on four punch presses and an Indiana manufacturer on six tools, new or used.

Some manufacturers have declared that higher prices are certain to come as wages are steadily advancing and the cost of materials has added as much as 25 per cent to the cost of certain tools. In some cases tools are being sold, it is said, at an actual loss to clear stocks to make room for new designs, prices of which will be higher than those now in effect.

Some shops have taken considerable machine work from railroads, and while this will be only a temporary arrangement, it will keep organizations intact until the railroad difficulty is adjusted and the industry gets back to the position it held before the strike.

The Shartle Brothers Machine Co., Middletown, Ohio, manufacturer of paper mill machinery, has let contract for an addition to its plant on Clark Street, to be used principally as a warehouse.

The Indiana State Reformatory is a prospective purchaser of machine tool and foundry equipment, two new buildings for which are being erected at Pendleton, Ind., 125 x 300 ft. Work is under way on the power house.

A company will shortly be organized in Columbus, Ohio, to manufacture shafting, bolt and nut machinery and automatic screw machine products. C. W. Brightman, G. F. Brightman, H. L. Brightman and H. M. Brightman, all formerly connected with the Brightman Mfg. Co., are the organizers, and contemplated plans call for the erection of a factory.

The Clark Grave Vault Co., Columbus, Ohio, will move to a new location following the sale of its plant to the Herb Paper Box Co. It is understood that the Clark company has purchased property in the north end of the city on which a factory will be erected. No official announcement of plan has been made.

Indiana

INDIANAPOLIS, Aug. 14.

A NEW one-story steel and concrete [illegible] will be erected by the Metals Refining Co., 627 Hohman Street, Hammond, Ind., to cost about $35,000.

The Indiana Oil Refining Co., Columbus, Ind., will install an electric generator and other electrical and mechanical equipment in its plant. Stephen Schwartz is chief engineer.

The Indianapolis Street Railway Co., Indianapolis, has plans under consideration for new car shops and extensions and improvements in the power plant and electrical system.

A vocational department will be installed in the two-story and basement high school, 124 x 140 ft., to be erected at Chesterton, Ind., estimated to cost $200,000, and for which work is under way. Herbert E. Erickson, 17 East Fifth Avenue, Gary, Ind., is architect.

The Beveridge Paper Co., Pearl Street, Indianapolis, has filed plans for an addition, estimated to cost $50,000.

The Kentucky Tire Pump Co., Madisonville, Ky., has acquired the building of the Heyns Furniture Co., West Franklin Street, Evansville, Ind., for its new plant. Immediate possession will be taken and the present business will be removed from Madisonville. A new company will be organized.

A vocational department will be installed in the new high school to be constructed at Upland, Ind., estimated to cost close to $100,000. Albert Fisherbuck, Jefferson Township Trustee, is in charge.

The Board of Education, Fort Wayne, Ind., has awarded contract to the Austin Co., 208 South La Salle Street, Chicago, for a one-story vocational and mechanical training school, 40 x 120 ft., estimated to cost about $100,000.

The Mileage Oil Refining Co., Kokomo, Ind., has been reorganized and the capital increased from $100,000 to $800,000, a portion of the proceeds to be used for extensions and improvements in its refinery and system. It is planned to resume operations at the works at Fairmount, Ind., with capacity of about 1200 bbl. per day. J. C. F. Martin is president and S. W. Winder, secretary-treasurer.

The Simplex Lock Rim Co., Petersburg, Ind., manufacturer of metal rims, has work in progress on an addition to its plant. It is proposed to double, approximately, the present capacity. Considerable new machinery will be installed.

The Illinois Central Railroad Co., 135 East Eleventh Place, Chicago, has tentative plans under way for a new engine house and locomotive repair shops at Evansville, Ind., estimated to cost approximately $75,000. C. C. Kunz is general agent at this location.

Milwaukee

MILWAUKEE, Aug. 14.

AS an uncertainty growing out of the dual strikes the machine-tool trade is suffering more restriction. While industries have not abandoned hope of early settlement, the prolongation of the labor difficulties in coal mines and railroad shops has created an unfavorable prospect which has checked fall and winter plans of manufacturers. A fair amount of tool business is passing, but it is limited to the barest necessities. On the other hand, there is a relatively large volume of new business in the foreground, placement of which is to some degree delayed by the labor situation. Included in this prospective volume are the large needs of railroad shops and railroad supply industries which await strike solution.

The Milwaukee Sewerage Commission, City Hall, Milwaukee, will be in the market in about 60 or 90 days for a list of machine tools and shop equipment, including lathes, milling machines, drill presses, boring mills, etc., for a machine and service shop to be erected on Jones island. This will serve the steam generating plant, pumping plant, boiler house, and other units of the sewage disposal plant now under construction at an estimated cost of $10,000,000. Definite specifications of equipment requirements will be available within a short time. T. C. Hatton is chief engineer, and John H. Fowles, secretary of the commission.

The American Airway Transport Co of Milwaukee, capital stock $100,000, has been incorporated in Wisconsin as a preliminary step in the proposed establishment of a large American aircraft plant and transportation system by A. H. G. Fokker of Amsterdam, Holland, in Milwaukee. The incorporators are Clarence R. Falk, vice-president Falk Corporation; T. C. Hatton, chief engineer Sewerage Commission of Milwaukee; E. M. McMahon, S. J. McMahon, and Fritz Cremer, representative of the Fokker interests in the United States. The new [illegible] at 290 Third Street, Milwaukee, with the Netherlands Aircraft Mfg. Co.—Fokker, Amsterdam and New York. It is now engaged in its initial activities, consisting of a survey of manufacturing and commercial transportation facilities, prospects and possibilities.

The Seaman Body Corporation, 1732 Richards Street, Milwaukee, manufacturer of passenger car bodies, will let contracts this week for two factory extensions, one for metal work and the other for wood-working processes. The new building will be ell-shaped, 100 x 423 and 100 x 225 ft., four stories, of brick and mill construction. The present factory was erected two years ago. The Nash Motors Co., Kenosha and Milwaukee, is one of the principal owners of the Seaman company. Harold S. Seaman is secretary.

The Baraboo Linen Mills, Baraboo, Wis., owned by George S. McArthur & Sons, has plans by C. N. Ward, consulting engineer, Madison, Wis., for improvements and enlargement of its hydroelectric generating plant costing about $30,000. New water wheels and additional generating capacity will be installed.

The Superior Iron Works, Superior, Wis., has taken the contract to manufacture and install practically all of the hoisting machinery for the new ore dock being erected by the Great Northern Railway at Allouez, suburb of Superior. The plant has also booked other orders which require its maximum capacity for 10 to 12 months. While no new plant construction is in immediate prospect, miscellaneous tool and equipment needs are being filled steadily. Ewart H. Williamson is president and general manager.

The Nekoosa, Wis., Motor & Machine Co. is erecting a new brass foundry and machine shop estimated to cost about $15,000, to replace the portions of the plant destroyed by fire early in July.

Jerome Terwilliger, automobile dealer, Clinton, Wis., will build a garage, sales and service building in Beloit, Wis., at 510-512 Broad Street, to be 75 x 135 ft., two stories and basement, and cost about $50,000. Cunningham Bros., Beloit, have taken the general contract.

The Chicago, Milwaukee & St. Paul Railway Co. has ordered the abandonment of the division shop at Tomahawk, Wis., and the transfer of all machinery and equipment to the main shop of the Wisconsin valley division at Wausau, Wis., which is to be enlarged.

The Milwaukee Steam Appliance Co. of West Allis, Wis., has been organized with a capital stock of $100,000 as successor to the Steam Appliance Co., with works and offices at 709 Sixty-third Avenue, West Allis. The articles are signed by L. E. Fichaux, Gustave R. Hoffman and M. E. Engle, all of Fish, Marshutz & Hoffman, attorneys, 120 Wisconsin Street, Milwaukee.

A Maisano, 821 Regent Street, Madison, Wis., has broken ground for a garage and repairshop, 60 x 110 ft., part two stories, estimated to cost $22,000 complete.

The Milwaukee Board of Industrial Education, Seventh and Prairie streets, will soon issue lists of requirements for shop equipment for the second unit of the new Central continuation school, which will be completed about Jan. 1. So far no details are available. R. L. Cooley is director.

The Twin Ports Marine Construction Co., Superior, Wis., has been incorporated with a capital stock of $100,000 preferred and 1000 shares of common stock with no par value, to build and repair vessels. The principal is C. A. Massey, Superior, who has been engaged in general vessel repair work for many years. C. J. Hartley and Louis A. Hanitch, attorneys, appear with Mr. Massey as incorporators.

The Kaerwer Auto Co., Oshkosh, Wis., has let the general contract to the Fluor Brothers Construction Co., local, for a machine shop and service addition, 60 x 130 ft., to its sales and service building. With equipment the improvement will cost about $35,000.

The Scholzen Spring Cushion Co., Milwaukee, has been incorporated with $10,000 capital stock as the development of a factory owned and operated by N. Scholzen at 502 Cherry Street for the manufacture of springs for automobile and furniture cushions, upholstering, etc. C. D. Marks and P. O. Koplin appear with him as incorporators.

The Wisconsin Auto Top Mfg. Co., Racine, Wis., which is enlarging its works, has increased its capital stock from $300,000 to $600,000, consisting of 5000 shares of common and 1000 shares of preferred stock.

The J. Feldman Paper Box Co., Madison, Wis., which recently opened a paper box and container factory on Regent Street, is starting work on a permanent plant on North Charter Street to cost about $45,000, including machinery, motors, etc.

The Tractor & Truck Improvement Co., Merrill, Wis., has been organized with $25,000 capital stock by Daniel Healy, J. G. Frogner and R. E. Kile to manufacture mechanical devices and appliances for the automotive industries. Announcement will be made later relative to plans and equipment needs.

Buffalo

BUFFALO, Aug. 14

CONTRACT has been awarded by the Leutz Marble Corporation, 861 Main Street, Buffalo, to the Turner Construction Co., for a new one-story plant, 90 x 175 ft., estimated to cost about $125,000, including cutting, grinding, polishing, conveying machinery, etc.

The Western New York Electric Co., 316 North Main Street, Jamestown, N. Y., is planning for extensions and improvements in its power plant and system at Falconer, N. Y., and vicinity, estimated to cost about $454,000.

A machine repair shop will be installed in the new garage and service building to be erected by the New York Telephone Co., Buffalo, at Jefferson and Delevan avenues.

The Eastman Kodak Co., Kodak Park, Rochester, N. Y., has awarded a contract to the Ridge Construction Co., Rochester, for a new two-story building, 160 x 260 ft., estimated to cost $125,000.

The Western New York Utilities Co., Main Street, Medina, N. Y., is arranging for a bond issue of $200,000, a portion of the proceeds to be used for extensions and improvements. C. S. Sweet is vice-president.

A vocational department will be installed in the new two-story high school, 50 x 130 ft., to be erected at Clarence, N. Y., for which excavation work will commence at once. It will cost in excess of $150,000. Herbert C. Swain, 52 West Chippewa Street, Buffalo, is architect.

The Chautauqua Cabinet Co., Mayville, N. Y., is planning for enlargements in its plant to include the installation of additional equipment.

The Chapin-Skelton Machine Co., Syracuse, N. Y., recently organized, will operate a plant to manufacture clothes pressing machinery and parts. The company is closely affiliated with the Brown-Lipe-Chapin Co., manufacturer of automobile transmissions and gears. E. I. Chapin, of the latter company, will act as factory manager. O. H. Green is president.

T. Kennard Thomson and Peter A. Porter, Marine Bank Building, Buffalo, have made application to construct and operate a hydroelectric power plant at Foster Flats, Lower Niagara River. The ultimate project will develop an excess of 1,000,000 hp., and is estimated to cost more than $40,000,000.

The Champion Rotary Motors, Inc., Buffalo, care of L. F. Lindall, attorney, Erie County Bank Building, representative, has tentative plans for a new factory to manufacture rotory engines.

The plant of Jewett & Co., stove manufacturers, Military Road, Tonawanda, N. Y., was destroyed by fire Aug. 10 with an estimated loss of $200,000.

The Gulf States

BIRMINGHAM, Aug. 14.

PLANS are nearing completion for the establishment of works for the Crown Shock Absorber Co., 517 West Building, Houston, Tex., recently organized to manufacture shock absorbers, a part of initial operations to be devoted to assembling. A machine shop will be equipped, as well as departments for enameling and nickel plating. S. B. Segura is president.

The Board of Electric Commissioners, Austin, Tex., will make extensions and improvements in the municipal power plant, estimated to cost about $150,000. New equipment will be installed, including a 5000-kw. generator. Walter L. Eyres is head of the board.

The Merrill-Stevens Drydock & Repair Co., Jacksonville, Fla., has acquired the local plant and business of the T. Murphy Iron Works and will use the property for enlargements.

The Barclay Petroleum Co., Linz Building, Dallas, Tex., has acquired the plant and property of the Star Oil Co., Breckenridge, Tex., for about $100,000. The new owner will continue the operation of the property, and plans for extensions and improvements. George Harris is vice-president and general manager.

The Rockett Foundry & Machine Co., Hattiesburg, Miss., has plans nearing completion for an addition and the installation of new equipment. N. W. Rockett is president.

The Board of City Commissioners, Jacksonville, Fla., will receive bids until Aug. 24 for electrical equipment for the city power house. W. A. Evans is chairman.

A power house will be constructed by the Allied Chemical Co., Dallas, Tex., in connection with its new two-story plant, 40 x 125 ft., at Alma Street and Santa Fe Avenue, for which work will soon be placed under way. It will cost about $50,000. W. R. Sparkman is president, and H. H. Howard, vice-president and general manager.

William H. Kempler, Deer Park, Fla., has plans under way for the construction of a new ice and cold storage plant, 55 x 80 ft., at Melbourne, Fla.

The City Council, Quincy, Fla., will receive bids until Aug. 24 for electrical and other equipment in connection with extensions to the municipal power plant and waterworks, including electric generator, uniflow engine, pumps, boilers, air compressors, motors, etc. The J. B. McCrary Engineering Corporation, Atlanta, Ga., is engineer. J. P. Smith is city clerk.

The mills and timber properties of the Miller-Link Lumber Co., in the vicinity of Shreveport, La., have been acquired by A. J. Peavy, Shreveport, and associates, for $800,000. The new owners will organize a company to operate the plant and contemplate extensions and improvements in the mills. Randall T. Moore, vice-president, Commercial National Bank, Shreveport, is interested in the enterprise.

The United States Engineer Office, 329 Custom House, New Orleans, will take bids until Sept. 5 for the construction of two steel oil barges, each with a capacity of 4000 bbl, for use on the Mississippi River, as per plans and specifications on file.

The Common Council, Brownfield City, Tex., will make extensions and improvements in the municipal electric light and power plant. Additional equipment will be installed.

Hoisting and conveying machinery, elevators and other freight-handling equipment will be installed in the new five-story and basement warehouse, 190 x 250 ft., to be erected by Raymond P. Caruth, Dallas, Tex., and associates, estimated to cost about $550,000. Bertram C. Hill, Dallas, architect, is in charge.

A. C. Campbell, Winnfield, La., is organizing a company to build and operate a plant to manufacture concrete blocks, tiles and kindred products.

The Keystone Lime Works, Keystone, Ala., recently organized, has acquired a local building and will install hydrating, electrical and general equipment for a daily output of 1000 bbl. George L. Scott, Longview, Ala., and W. A. Hammond, Saginaw, Ala., head the company.

The Marion Machine, Foundry & Supply Co., Mexia, Tex., specializing in the production of oil well equipment, is planning to rebuild the portion of its works recently destroyed by fire with loss of $65,000.

The Pacific Coast

SAN FRANCISCO, Aug. 8.

ABOUT five acres has been acquired by the Highland Mfg. Co., Lafayette, Cal., as a site for a new plant to manufacture automobile equipment. A large part of initial operations will be devoted to assembling. A housing development for employees will also be built.

The Guaranteed Battery Equipment Co., 1105 West Pico Street, Los Angeles, is planning to rebuild the portion of its plant, destroyed by fire, Aug. 2, with loss reported at $20,000.

A vocational department will be installed in the new high school to be erected by the Kerman Union High School District, Kerman, Cal., estimated to cost about $150,000. A. Johnson, Kingsburg Bank Building, Kingsburg, Cal., is architect.

The Atchison, Topeka & Santa Fe Railway Co., Kerckhoff Building, Los Angeles, is taking bids for a new electric power plant at San Bernardino, Cal., 80 x 103 ft., estimated to cost about $100,000. The engineering department of the company is in charge.

The Consumers' Milk Co., Los Angeles, has preliminary plans for a new two and three-story ice-manufacturing, cold storage and bottling plant, 60 x 150 ft., to cost about $200,000. Truesdell, Purrington & Newton, 304 San Fernando Building, are architects.

The Atlas Imperial Gas Engine Co., foot of Twenty-second Avenue, Oakland, Cal., has plans under way for an addition to provide extra floor area of about 45,000 sq. ft.

The Pioneer Rubber Co., 68 Sacramento Street, San Francisco, will soon award a general contract for a new two-story plant, 80 x 200 ft., at Pittsburg, Cal., estimated to cost about $150,000.

A vocational department will be installed in the new three-story high school, 145 x 150 ft., to be erected at Selma, Cal., estimated to cost about $200,000, for which bids will be called soon. Norman F. Marsh, 211 Broadway-Central Building, Los Angeles, is architect.

The Eames Co., 55 First Street, San Francisco, manufacturer of factory hand trucks, etc., will soon commence the erection of a new one-story plant at Fifth and Howard streets.

The Potlatch Lumber Co., Spokane, Wash., has commenced the erection of a new mill, estimated to cost about $100,000, including machinery and electrical equipment.

The Peterman Mfg. Co., Tacoma, Wash., is planning to rebuild its lumber mill recently destroyed by fire with loss estimated at $175,000, including machinery. It will be electrically-operated. T. A. Peterman is president.

The Bunker Shingle Mill Co., Bunker, Wash., will soon commence rebuilding its plant, recently destroyed by fire. It is estimated to cost close to $60,000, or approximately the amount of the fire loss. Jesse Wasser heads the company.

The Northwestern Wire & Fence Co., Portland, Ore., has acquired a two-story building at Eleventh and Flanders streets, which will be remodeled for new works.

The Tonga Lumber Co., Seattle, Wash., has tentative plans for rebuilding the portion of its mill recently destroyed by fire, with loss estimated at $150,000, including equipment.

Canada

[illegible] Aug. 11.

THE past week machine tool buying has been limited, but dealers and manufacturers are still of the opinion that business will begin to show steady improvement early next month. The coal strike and transportation difficulties in the United States are being reflected in some commodities in the Dominion, but interests in practically all lines hold to the expectation that these troubles will shortly be overcome and business will be resumed on something of the old basis in the near future.

The automotive industry continues to hold up its end in equipment buying, but foundries and steel plants generally are only entering the market for special lines from time to time. Wood-working tools and equipment are moving freely and according to the number of plants under construction will be in active demand later in the year. Extensive lists are expected from automobile concerns in Toronto, Windsor and Walkerville, which are erecting factories at these points. Equipment for water-works, sewage and electric plants is holding up and companies turning out this class of machinery are deriving considerable business from this source. Small tools are in brisk demand with users buying for immediate requirements and stock purposes. Prices are holding firm in most cases, but some shading is again reported in certain districts.

G. W. Gordon, clerk; Port Credit, Ont., is asking for equipment for a waterworks plant, including pumps, valves, castings, erecting overhead steel tank, building settling basin, filters, reservoir and pumping station, meters, gages, hydrants, etc.

Stanley & Aylward, manufacturer of Norman silver plate, will establish a plant at Kingston, Ont., and the removal of machinery from the Toronto plant will begin immediately.

Brodeur & Pilon, architects, Hull, Que., are preparing plans for a factory to be erected at Hull for the Lion Tire Co.

Several thousand dollars damage was done Aug. 7 to the plant of the Galt Malleable Iron Co., Galt. Reconstruction work will be started immediately.

The Bassick Mfg. Co., of Chicago, Ill., manufacturers of Alemite system of lubrication, will establish a manufacturing plant at Belleville, Ont.

The Johnson Wire Works, Ltd., Montreal, has been incorporated with a capital stock of $225,000 by Alexander C Casgrain, Leslie G. Bell; Sadi C. Demers and others as provisional directors. It will acquire and take over the plant and business of C. H. Johnson & Sons, Ltd., and will continue as agents in Canada for the company.

Receivers who for several months have had charge of the affairs of the American Flexible Bolt Co., Pittsburgh, with a plant at Tionesta, [illegible] by Judge Reid of the Common Pleas Court, Pittsburgh, Aug. 5. A petition presented in behalf of important creditors declared that the affairs of the company had been straightened out in a manner satisfactory to both creditors and stockholders and that as a result of a financial rehabilitation, the company now was in a solvent condition.

Plans of New Companies

[No news in regard to new incorporations is published in THE IRON AGE until it has been investigated by correspondence or by personal call.]

The Allan Mfg. & Welding Co., Inc., was recently organized to take over and conduct the business of the Allan Mfg. & Welding Corporation, and is located at 726 Washington Street, Buffalo, N. Y. The new company will continue to make the Allan polyphase welder, also conducting a general welding repair business.

The Florandin Equipment Co. has been organized by C. H. Florandin with offices at 110 West Fortieth Street, New York, to act as representatives of the Conveyors Corporation of America, Chicago. The new company will also do general contracting business in boiler rooms and industrial plants in the vicinity of New York.

The Oneonta Storage Battery Corporation, Oneonta, N. Y., will have its new structure ready for operation by Oct. 1. It will manufacture Kalo storage batteries.

The Jamestown Malleable Products Corporation, Jamestown, N. Y., has installed a modern foundry and has a plant equipped ready to produce 25 tons daily of malleable castings for automobile and railroad use. H. E. Kies will head the organization.

The Metro Electric Mfg. Co., has been incorporated with a capital stock of $100,000, to manufacture electrical equipment. Plans for operation will be determined in the near future. Address M. Eichner, 1545 Broadway, New York.

The Standard Electro-plating Co. has been chartered under the State laws to manufacture metal goods and to do plating work. It is doing electro-plating in nickel, brass and silver in limited quarters at 155 West Fifty-sixth Street, New York. The erection of a new plant is being contemplated. Incorporators: G. S. Harris, A. Fraun and I. Mines. Hirschman & Roeder represent the company.

The Shuman-Nicholas Co., 2581 Beecher Street, Detroit, Mich., which was recently organized, will handle machinery and other factory supplies as a selling agency. At the present time it is introducing the Chesterfield Cutting Metal, a non-magnetic, non-temperable alloy for use in machining operations on cast iron, cast steel and malleable.

The Accurate Die & Stamping Co., 467 West Thirty-first Street, Chicago, was recently incorporated with a capital of $25,000, to manufacture metal products. It announces that for the present it will manufacture dies and small metal specialties. Incorporators: T. L. Lusk, F. A. Gingerella and J. Schmidt.

The Clifton Mfg. Co., 189 Market Street, Newark, N. J., is in the market for radio equipment parts, which it will assemble to complete its product, the Clifton radio detector.

The Crown Shock-Absorber Co., Houston, Tex., is in the market for compressed steel wire springs, bolts, nuts and name plates. It has been incorporated under the Texas laws to manufacture shock absorbers for Ford cars. Malleable iron castings will be made by the Ross-Meehan Foundries, Chattanooga, Tenn. In the near future the new company plans to open an assembling plant in Houston to assemble the Crown shock absorber, which it is placing on the market. S. B. Segura is president of the company.

The Canton Malleable Iron Co., Canton, Ohio, is adding an annealing department to its plant. It will be in the market for electric charging trucks for annealing ovens in the near future.

The United States Metal Products Manufacturers and Export Corporation, Tampa, Fla., recently incorporated, will manufacture a line of metal products used in the agricultural and automotive industries.

A. Lamy & Son, pattern maker, has purchased the business and property of Parsons Mfg. Co., consolidating the organizations, which have been incorporated under the name A. Lamy & Son, Inc. The business of the Parsons Mfg. Co., which consisted in manufacturing stokers, ash-ejectors, burners and kindred equipment, will be continued together with the pattern making business, which has been conducted by A. Lamy & Son for nearly 30 years. Edward J. Lamy, 535 Livingston Street, Elizabeth, N. J., is secretary.

The Paramount Radio Co., Inc., Warsaw, Ill., has been incorporated to manufacture radio equipment, including a special receiving instrument known as the Paramount. It will also do jobbing and wholesaling in radio supplies.

The Lead-Kote Process, Inc., has been chartered with a capital of $100,000 to coat all kinds of ferrous articles with lead or lead alloys. Temporarily the company will occupy a plant at Sixth Street, Long Island City, L. I., which it is remodeling and hopes to have ready for operations by Sep-

tember. The officers are: M. Robinson, president; I. Lavine, vice-president, and L. C. Bardi, secretary.

The Boiler & Radiator Corporation, Rochester, N. Y., has been incorporated to manufacture heating, plumbing, electrical and builders' supplies with a capital of $30,000, consisting of $100 shares. The directors, all of whom live in Rochester, are: M. S. Welsh, W. F. Devendorf, 470 Court Street, and C. E. Bostwick.

The Erie Enameling Co., Erie, Pa., recently incorporated in Pennsylvania with a capital of $50,000, will do a general line of jobbing enameling work. The company will lease a building of fireproof construction containing 7000 sq. ft. of floor space, now under construction. Officers are H. E. Schabacker, president; H. R. Spencer, secretary-treasurer.

The Commercial Electric Mfg. Co., 442 First Ave., Pittsburgh, recently incorporated with a capital of $25,000 and will manufacture switch boards and electrical control apparatus, and has leased a plant at the above address. The company has supplied its machinery requirements. Officers are R. F. Clark, president; J. M. Miller, treasurer; S. M. Miller, secretary, J. L. Lynds, general manager.

The Ellwood Steel Corporation, Ellwood City, Pa., recently incorporated with a capital of $5000, will manufacture wire nails. The company will install a wire drawing mill and about 20 additional nail machines. This equipment already has been purchased. The company is undecided whether to build an extension to the existing plant or to buy an adjoining factory building.

The Precision & Thread Grinder Mfg. Co., South Twenty-first Street, Philadelphia, has been acquired by A. T. Doud, Philadelphia. The officers are A. T. Doud, president and treasurer, and F. V. Doud, secretary. They together with C. A. White, are the directors. President Doud is a mechanical engineer graduated from Purdue University. He was formerly mechanical engineer for Hale & Kilburn Co., Philadelphia; general superintendent of the Speakman Co., Wilmington, Del. and works manager of the Diehl Mfg. Co., Elizabeth, N. J. During the war he was general manager of the Hero Mfg. Co., Philadelphia, which made gas masks for the American Expeditionary forces under plans and methods developed under Mr. Doud's direction. After the war he was manager of manufacturing for the American Tube & Stamping Co., Bridgeport, Conn. Mr. White is secretary of Leeds & Northrup Co., Philadelphia. He was associated with Mr. Doud at both the Hero and the American Tube & Stamping Companies. F. Rodger Imhoff will be associated with the new organization as consulting engineer. The company's multi-graduated precision grinder is used for grinding thread gages, taps, dies, chasers, etc., also for internal grinding. The company also manufactures a thread lead variator for obtaining precision lead from the ordinary lathe lead screw; also to elongate the lead on parts which are subsequently to be hardened, to compensate for the approximate shrinkage in lead, eliminating correction grinding in non-precision work; and reducing the grinding correction necessary in precision work. Metric threads and any threads of odd or unusual lead may be cut by the use of the variator without requiring special or transplanting gears. Among other things the company makes a gage block for testing lead screws and for setting and testing the lead variator and a permanent alinement wheel truing head for use on all the grinders. The company will be reorganized in all departments.

Trade Changes

The Thompson Foundry & Machine Works, Burlington, N. C., and the Universal Heater & Metal Mfg. Co., Charlotte, N. C., have combined, the merged plant representing invested capital to the amount of $75,000.

Homer F. Livermore, Inc., 85 Pearl Street, Boston, has changed its firm name to the Guaranteed Parts, Inc., at the same address.

B. L. Schmidt & Co., Davenport, Iowa, has changed its name to the Micro Grinder Co., and has moved to Bettendorf, a suburb of Davenport.

Holt & Merrall, Inc., 342 Madison Avenue, New York industrial real estate, has changed its name to William B. Merrall, Mr. Holt having resigned from the company.

The Boustead Electric & Mfg. Co., Inc., Minneapolis, Minn., has been appointed northwestern distributers for the Ideal Electric & Mfg. Co., Mansfield, Ohio, manufacturer of squirrel cage, direct current, and synchronous motors, AC and DC generators up to 1000 kw., motor generator sets, electro-plating outfits, etc. The Boustead company for years has specialized in rebuilt motors and generators and manufactures switchboards.

The U. S. Electro Galvanizing Co., 32 Stockton Street, Brooklyn, has changed its name to the U. S. Galvanizing & Plating Equipment Corporation. Personnel remains unchanged, and it will continue to manufacture mechanical and automatic cleaning, pickling, acid dip, neutralizing, washing and galvanizing apparatus.

The Press Weld Products Co., recently formed, will take the place of the Pennsylvania Iron & Steel Products Co., which was reorganized three weeks ago. D. E. Frew, First National Bank, Ellwood City, Pa., is interested.

The Chapin & Baker Mfg. Co., Inc., and the Skelton Tool Co., both of Syracuse, N. Y., completed a merger in July. The corporate name of the new company is the Chapin-Skelton Corporation, located in the same city at 406 Ash Street. It will manufacture reamers, boring bars and production tools.

The Lonergan Cutting Die Co., 4514 Lexington Street, Chicago, has changed its name to the Lonergan Die Co. It makes dies for cutting soft materials.

The Mercury Radio Products Co., 51 Thomas Street, Orange, N. J., is moving to its new plant in Little Falls, N. J.

The Norwalk Iron Works, Norwalk, Conn., which recently absorbed the plants, patents, designs and property of the Automatic Carbonic Machine Co., Peoria, Ill., is planning the removal of the business to Norwalk.

The Spaulding Electric Co., is now at 1346 Michigan Avenue, Detroit.

The Chicago Flexible Shaft Co., Chicago, announces the change in address of its New York office for Stewart Industrial Furnaces, from 350 Broadway to 16 Read Street, New York.

The American Machine Products Co. has changed its name to the Ampco Twist Drill & Tool Co., Detroit.

The Pittsburgh office of E. J. Lavino & Co. has been removed from 1922 Oliver Building to room 509 of the same building.

The Westinghouse Electric & Mfg. Co., announces the transfer of the industrial heating section from the supply sales department to the industrial sales department. Wirt S. Scott, is directing the activities of this unit and associated with him are M. R. Armstrong, A. T. Ruttencutter, H. W. Lincoln, John M. Strait and C. R. Dakin.

William E. Hoblitzelle, who with his associates recently purchased the controlling interest in the Smith & Davis Mfg. Co., St. Louis, maker of bed springs and beds, has been elected president of the company. Other officers are: Vice-president, James C. Harvey; secretary, J. H. Kentnor, and treasurer, W. H. Whitehill.

The Globe Steel Tubes Co. has been incorporated under the laws of Delaware following the change in the principal interest in the Globe Seamless Steel Tubes Co., Milwaukee, as recently announced. The new corporation has a capital stock of $500,000 preferred and 100,000 shares of common without par value. The incorporators are C. F. Schlundt, Charles G. Jarchow and Thomas J. Christian, all of Chicago. By the recent transfer of ownership, William Renshaw, Chicago, president, and Lawrence Fitch, Milwaukee, vice-president and secretary, retire. Frank J. O'Brien continues as vice-president and general manager. The new ownership is represented by Robert P. Lamont, president American Steel Foundries, Chicago; Paul J. Kalman, president Paul J. Kalman Co., St. Paul, Minn., and Mr. O'Brien. As part of the financing planned when the property was sold, a first mortgage loan of $1,200,000 has been made by the First Trust & Savings Bank, Chicago.

The Curtain Supply Co., 350 West Ontario Street, Chicago, will move to Elkhart, Ind., where a one-story plant, 179 x 400 ft., is being constructed.

The Cherrytree Machine Co., Cherrytree, Pa., following a recent reorganization and change of name to the Brown Mine Equipment Co., has arranged for the removal of its business to Johnstown, Pa., where extensive increase in manufacturing facilities will be provided. The plant will specialize in the manufacture of hoisting machinery, pumps, etc., for mine service. H. V. Brown is president, H. J. Meehan, vice-president, and J. C. Cosgrove, secretary.

The Electro-Magnetic Tool Co., 2902 Carroll Avenue, Chicago, has changed its address to Nineteenth Street and Fifty-second Avenue, Cicero, Ill.

The Barnes Foundry Co., Inc., 169 Second Street, Jersey City, N. J., has moved its office and salesroom to 515 West Fifty-sixth Street, New York. The foundry is now located in a new plant at Freeland, Pa.

Carson & Co., Pennsylvania Building, Philadelphia, has been appointed selling agent in the Philadelphia district by the Sizer Steel Corporation, Buffalo.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossbile to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

	Per Lb.
Bars:	
Refined iron bars, base price	2.83c.
Swedish bars, base price	7.00c.
Soft steel bars, base price	2.83c.
Hoops, base price	4.03c.
Bands, base price	3.63c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	2.93c.
Channels, angles and tees under 3 in. x ¼ in., base	2.83c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	2.83c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	2.93c.
Toe-calk, ½ x ⅜ in. and larger	3.70c.
Cold-rolled strip, soft and quarter hard	6.25c. to 7.25c.
Open-hearth spring steel	4.00c. to 6.00c.
Shafting and Screw Stock:	
Rounds	3.65c.
Squares, flats and hex	4.15c.
Standard cast steel, base price	12.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	2.93c.

Sheets

Blue Annealed

	Per Lb.
No. 10	3.93c.
No. 12	3.98c.
No. 14	4.03c.
No. 16	4.13c.

Box Annealed—Black

	Soft Steel C. R., One Pass, Per Lb.	Blued Stove Pipe Sheet, Per Lb.
Nos. 18 to 20	4.00c. to 4.30c.	.....
Nos. 22 and 24	4.05c. to 4.35c.	4.60c.
No. 26	4.10c. to 4.40c.	4.65c.
No. 28	4.20c. to 4.50c.	4.75c.
No. 30	4.45c. to 4.75c.	.....

No. 28 and lighter, 36 in. wide, 10c. higher

Galvanized

	Per Lb.
No. 14	4.30c. to 4.60c.
No. 16	4.45c. to 4.75c.
Nos. 18 and 20	4.60c. to 4.90c.
Nos. 22 and 24	4.75c. to 5.05c.
No. 26	4.90c. to 5.20c.
No. 27	5.05c. to 5.35c.
No. 28	5.20c. to 5.50c.
No. 30	5.70c. to 6.00c.

No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
⅛ in. Butt..	—56	—40	⅛ in. Butt..	—30	—13
¾ in. Butt..	—61	—47	1½ in. Butt..	—32	—15
1-3 in. Butt..	—63	—49	2 in. Lap....	—27	—10
3½-6 in. Lap.	—60	—46	2½-6 in. Lap.	—30	—15
7-8 in. Lap..	—56	—34	7-12 in. Lap.	—23	— 7
9-12 in. Lap.	—55	—33			

Steel Wire

BASE PRICE* ON No. 9 GAGE AND COARSER. Per Lb.

Bright basic	3.50c. to 3.75c.
Annealed soft	3.50c. to 3.75c.
Galvanized annealed	4.25c. to 4.50c.
Coppered basic	4.00c. to 4.25c.
Tinned soft Bessemer	5.50c. to 5.75c.

*Regular extras for lighter gage

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	18¾c. to 19¾c.
High brass wire	19¼c. to 20¼c.
Brass rod	16¼c. to 17¼c.
Brass tube, brazed	25⅝c. to 26⅝c.
Brass tube, seamless	22½c. to 23 c.
Copper tube, seamless	24¾c. to 25 c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 21¾c. to 22¾c. per lb. base.

Cold rolled 14 oz. and heavier, 3c per lb advance over hot rolled.

Tin Plates

Bright Tin Grade "AAA" Charcoal 14x20	Bright Tin Grade "A" Charcoal 14x20	Coke—14-20 Primes	Coke—14-20 Wasters
		80 lb..	$6.05 $5.80
		90 lb..	6.15 5.90
		100 lb..	6.25 6.00
IC..	$10.00 $8.50	IC..	6.40 6.15
IX..	11.50 10.00	IX..	7.40 7.15
IXX..	13.00 11.25	IXX..	8.40 8.15
IXXX..	14.25 12.50	IXXX..	9.40 9.15
IXXXX..	16.00 14.00	IXXXX..	10.40 10.15

Terne Plates

8-lb. coating, 14 x 20

100 lb.	$7.00
IC	7.25
IX	7.50
Fire door stock	9.00

Tin

Straits, pig	35c.
Bar	42c. to 46c.

Copper

Lake ingot	15¼c.
Electrolytic	15 c.
Casting	14¾c.

Spelter and Sheet Zinc

Western spelter	8 c. to 8½c.
Sheet zinc, No. 9 base, casks	8¾c. open 9¼c.

Lead and Solder*

American pig lead	6¾c. to 7c.
Bar lead	8c. to 8½c.
Solder, ½ and ½ guaranteed	25c.
No. 1 solder	23½c.
Refined solder	20¼c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	75c.
Commercial grade, per lb.	35c.
Grade D, per lb.	25c.

Antimony

Asiatic	6½c. to 7c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.	25c. to 27c.

Old Metals

The market continues firm and business is fair. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy crucible	11.75
Copper, heavy wire	11.25
Copper, light and bottoms	9.25
Brass, heavy	6.25
Brass, light	5.25
Heavy machine composition	8.50
No. 1 yellow brass turnings	6.50
No. 1 red brass or composition turnings	8.00
Lead, heavy	4.50
Lead, tea	3.50
Zinc	3.25

THE IRON AGE

New York, August 24, 1922

ESTABLISHED 1855 VOL. 110, No. 8

Continuous Heating Furnaces for Steel*

Importance of Careful Attention to Roof Slope—Flow of Gases Outlined to Prevent Uneven Heating of Ingots or Billets

BY W. E. GROUME-GRJIMAILO

THE only continuous reheating furnace type whose design has been correctly established is that of the Morgan furnace. All of the other continuous reheating furnaces contain many constructional errors. These may be analyzed in this order.

The hearth may be flat, though latterly there has been a tendency to prefer for this purpose furnaces where the material to be heated is supported upon skids or chairs above the masonry hearth or for low temperature work upon conveyor chains or a "walking beam." These latter constructions are thoroughly logical. In the same manner as with all other mechanisms within which work is placed, and from which it is to be withdrawn after the completion of the operation, a furnace should be correctly fed with the heated gases coming from the combustion chamber. At the same time the products of combustion must be carried away from the heating chamber.

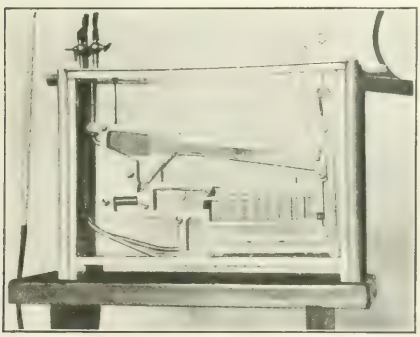


Fig. 1. Model Demonstration of the Circulation of Hot Gases in a Morgan Continuous Heating Furnace

The stagnation or pocketing of partially cooled gases in these furnaces will result in considerable damage to the material being heated, since the hot gases coming from the combustion chamber are thus prevented from passing through the heating chamber, and this reduces the time of contact between the hot gases and the material being heated.

When the ingots or billets are carried upon pipe skids, the channel thus formed below them must be of sufficient height to carry the partially cooled gases dropping below the material being heated and to carry these cooled gases to the waste gas port as it follows the hearth of the furnace, and thus permit their replacement by hotter gases. This arrangement results in a uniform circulation of the gases within the heating chamber. The flame occupies the highest and hottest portion of the furnace under the roof, where the reactions of combustion can be completed before the gases are cooled below their ignition temperature. Then the hot gases drop upon the ignots or billets, losing their heat on coming in contact with them, the colder gases descending to the lower level, from which they flow to the waste gas port.

Compare this type of construction with the working system of many of the continuous heating furnaces of widely known and used designs. Fig. 1 is a photographic demonstration of the circulation of the hot gases (colored kerosene) in a Morgan continuous heating furnace. Fig. 2 is a similar demonstration of the pocket of chilled gas (water) which forms in those continuous heating furnaces having a roof rising toward the charging end. It is readily seen, in this last case, that the forcing out of the chilled gases by the inflowing hot gases is obstructed to the last degree.

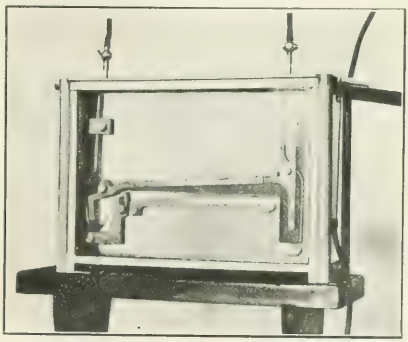


Fig. 2. Model Showing Pocket of Chilled Gas Which Forms in a Continuous Heating Furnace Having a Roof Rising Toward the Charging End

The working of the continuous heating furnace with a horizontal hearth will be slightly better. It does not form a pocket for the cold gases, but the flow of the colder gases to the waste gas port is badly obstructed by the ingots or other material being heated. In the computations for determining the width of the hearth of the furnace, careful consideration must be given to the fact that the cooler gases must be removed from the heating chamber by flowing along the hearth. In practice, the hearth is frequently given a width equal

*From "The Flow of Gases in Furnaces," to be published by Wiley and Co., translated and copyrighted by A. D. Williams, P. O. Box 92, Newark, N. J.

to twice the length of the ingots to be heated, the purpose being the formation of a wide channel past the ends of the ingots.

What reason can be assigned for making the hearth so wide? Would it not be better to proportion the width of the furnace more closely to the length of the ingots or billets to be heated? The author has been unable to find any other reply to the foregoing questions than the following: In order that the furnace of the ingots, the lower the frictional resistance d_1; and, therefore, there will be little reason to fear that the hot gases will reach the waste gas outlet without giving up their heat to the ingots.

When the ingots are placed upon pipe skids, Figs. 4 and 5, a channel *pp* will be formed below them through which the cooler waste gases pass to the port *q*; further, the heating chamber having a descending roof, a well defined combustion chamber *mm* is formed

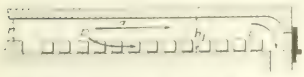


Fig. [illegible] Continuous Heating Furnace with Horizontal Hearth and Roof

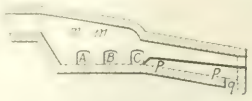


Fig. 4. Furnace with Inclined Roof, Giving Combustion Chamber at *m m* Which Holds Gases Until Combustion Is Complete

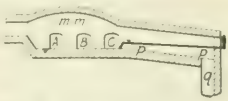


Fig. 5. Morgan Type of Roof, with Slope Retarding the Flow of Burning Gases Until Combustion Is Finished

may work well, and heat uniformly, it is absolutely necessary that the waste gases shall be rapidly and completely removed from the heating chamber and from contact with the material being heated. The side channels at the two ends of the row or file of ingots being reheated form the only clear path by which these gases may flow to the waste gas port.

If it is desired to have the rear or charging end of the furnace at a low temperature, it will be necessary to give these side channels considerable width.

Fig. 3 shows a continuous heating furnace with a

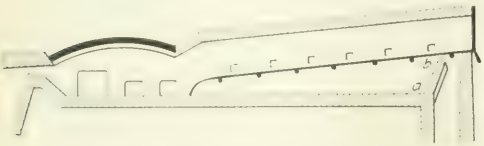


Fig. 6. Longitudinal Section of a Large Furnace of Swedish Design, Built in Russia, Which Had to Be Rebuilt

horizontal hearth and roof, in which the height of the gas port over the bridge wall is *h*; the height of the working doors of the furnace is less than this dimension. The waste gases are carried away from the heating chamber by a port at the level of the hearth. The velocity of the current of hot gases in the heating chamber is retarded, as the chamber is constructed as an inverted weir with a reservoir, the height of the roof above the hearth h_1 being greater than *h*. As the ingots rest directly upon the hearth, two paths for the



Fig. [illegible] Showing Change in Slope of Skids and of Roof and Removal of Bridge

current of gases flowing through the furnace are possible: *aa* following the roof and *bb* following the hearth. To reach the waste gas outlet, the hot gases *aa* must descend a distance h_1 and expend in doing this a certain hydrostatic pressure, say *d* in. of water. The current of gases *bb* must overcome the frictional resistance offered by the ingots, etc.

It is evident that the current of hot gases *aa* cannot pass directly to the waste gas flue unless the resistance offered to the passage of the current of gases *bb*, equal to d_1 in. of water, is greater than *d*. The greater the width of the furnace in comparison with the length at the highest part of the furnace, making a rational construction for the heating chamber of a continuous furnace.

Note: This design is supplied with a sand hearth upon which the ingots may be turned to get rid of the cold spots formed by the water cooled skids.

Figs. 4 and 5 show two methods by which the flow of the reacting gases during combustion will be slowed down sufficiently to permit the completion of the reaction in the fore part of the heating chamber, before the gases have an opportunity to come in contact with anything which will cool them below the ignition temperature. In Fig. 4 this is accomplished by an inclined roof, which in the fore part of the furnace is sprung upward. The tongues of flame, until combustion is completed, are held within this higher portion of the chamber.

Fig. 5 shows the Morgan type of roof. The downward slope of the roof acts to retard the flow of the burning gases. The combustible gases and air enter the heating chamber at a considerable elevation above the hearth. The author is of the opinion that there is

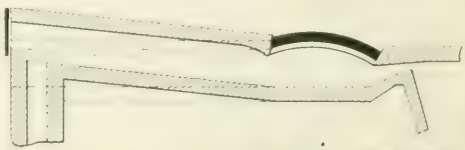


Fig. 8. Another Furnace Design (Solid Lines) Which Had to Be Changed (into the Form Shown by Dotted Lines)

very little choice between these two methods of holding the reacting gases in the fore part of the chamber until combustion is completed.

However, attention must be called to an error frequently embodied in furnace structures: The working door openings, *A*, *B*, *C*, etc., should all be located at the same level. If they are located at different levels, the highest door acts as a chimney in connection with lowest door. Cold air will be drawn into the heating chamber at the lowest opening while flame and smoke will escape at the highest door. The sills of all the openings should be at the same level.

The reconstruction, according to the directions of the author, of two costly continuous furnaces of Swedish design, follows. These furnaces were installed at a plant in the Oural district of Russia. Fig. 6 is a longitudinal section of the large furnace as originally built. During its operation it became evident that the wall *a b* caused the formation of a pocket of relatively stagnant cooler gases. As a remedy for this condition, the author suggested the removal of this wall and the

reconstruction of the furnace according to the sketch, Fig. 7.

Note by translator: Furnaces with ascending roofs and hearths may usually be forced to heat with a certain amount of satisfaction, but the fuel expenditure will be several times as great as it should be. One serious trouble with these furnaces is that any delays which cause the material to be held in the furnace result in overheating. Frequently the billets or blooms will sag in the center between the pipe skids and the ends will catch in the roof. When this occurs, it causes considerable trouble and the furnace is frequently damaged in attempts to turn the bent billet or to remove it from the furnace.

The longitudinal section of a smaller, but similar, furnace is shown in Fig. 8. The changes made in reconstructing are shown by the dotted lines. As a consequence of these changes the production of the furnace increased from 11.2 tons to 14.7 tons per hour, about 30 per cent, while the fuel consumption remained the same.

With regard to the form which should be given to the roof of a continuous heating furnace, the following general suggestions may be of service:

If the mixing of the combustible gases and the air is not sufficiently intimate to insure complete combustion in the combustion chamber, recourse is sometimes made to a strangulation of the stream of gases in the port. A big disadvantage of this method arises from the fact that it impresses upon the gases forming the flame an increased velocity. To absorb and reduce this velocity, two special forms of roof construction are used, which are shown in Figs. 7 and 8. If the mixing in the firebox is complete, or if the gases forming the flame flow into a free space in the heating chamber immediately below the roof, which acts as a combustion chamber and is sufficiently large to permit the completion of the reaction, there will be no necessity for reducing the area of port through which the gases enter the heating chamber.

If the rear end of the furnace roof slopes upward, recourse is frequently made to short arches dropped below the roof level, to restrict the flow of the gases. The height of these arches above the hearth may be determined by the formula of Yesmann for the inverted weir. For the ascending or rising roof, and when the hearth is so arranged that it formes a pocket within which the colder gases accumulate, these mixing or strangulating arches will be useless.

As a general conclusion, it may be stated that a roof which drops toward the charging end will result in the concentration of the hottest gases at the front end of the furnace, and is conducive to uniform heating and economy of fuel. A roof which rises toward the charging end will cause the hottest gases to flow toward the charging or rear end of the furnace, where they come in contact with the coldest material. For these reasons, continuous heating furnaces should be built with the roof and hearth dropping toward the charging end. Long furnaces for the uniform heating of long shafts, billets, etc., should be given a roof rising toward the end of the furnace at which the waste gas port is located.

BURNING MINE WASTES

Thirty-Day Test of High Ash and Low Volatile Fuel in Pulverized Form in French Boiler Plant

A series of tests on burning mine wastes has recently been completed by La Societe des Mines de Houille de Blanzy, at Montceau-les-Mines. These tests demonstrated that mine waste of not over ⅛ in. size, corresponding in analysis to low grade American anthracite or river coal, could be burned in pulverized form under boilers with a combined furnace and boiler efficiency of 82 to 85 per cent, although the boiler used was not equipped with superheater or economizer.

The fuel employed corresponded, after drying, to the following average analysis: ash, 29.2 per cent; volatile matter, 11.2 per cent; fixed carbon, 59.1 per cent; moisture, 0.5 per cent; B.t.u. per pound, 10,728; fusing temperature of ash. 2120 to 2228 deg. Fahr.

The installation for the test consisted of one Babcock & Wilcox boiler, having 2368 sq. ft. of heating surface. The test consisted of an uninterrupted 30-day run of 704 hr. During this period the hourly evaporation for each 10 sq. ft. of heating surface was 30.19 lb. of water per hour, which exceeded the 29 lb. guarantee. Evaporation of 36 to 45 lb. of water per 10 sq. ft. was easily attained for periods of several hours at a time. The average evaporation per pound of coal was 6¾ lb. of water, which also well exceeded the guaranteed performance of 5½ lb.

During the first 12 days of the test, the best method of operation and regulation was determined, and once having been attained was maintained until the end without any difficulty. The hourly evaporation per 10 sq. ft. of heating surface showed an average of 30 lb. of steam, and the average evaporation per pound of fuel was 7.38 lb. of steam, which corresponds to an overall efficiency of 82 per cent for furnace and boiler. During periods of more than 48 hr., the evaporation per pound of fuel was maintained between 7.61 and 7.65, which is equivalent to an efficiency of 85 per cent.

During the whole time of the test, the ash was extracted easily—partly in a state of dust and partly in a spongy and vitrified state. The smoke leaving the stack was light and of a clear color and caused no deposit of dust in the neighborhood or surroundings of the installation. After cooling off, the combustion chamber was found in good condition and ready to operate again without making any repairs whatever.

Coal preparing and burning equipment consisted of one 5-roller pulverizer, one dryer; two powdered coal feed controllers and two low-pressure burners at the combustion chamber with the necessary blowers for supplying air, for carrying the coal from the powdered coal feeders into the burners. The equipment for the powdered coal installation was manufactured in France along American lines by Societe Quigley-France (Emploi des Combustibles Pulverises) with the assistance and guidance of Quigley Fuel Systems, Inc., New York, and their engineer resident with the Quigley-France company.

Distribution of Iron and Steel Exports

Figures of the Department of Commerce show that 106,647 tons of American iron and steel products were shipped in June to destinations in Asia, with Japan taking 80,806 tons of this amount. North America and the West Indies took 61,534 tons, most of which went to Canada. South and Central America absorbed 26,069 tons, Argentina taking more than one-third of this. Europe took only 11,080 tons and Australasia 8139 tons. Details by countries are shown in the table.

Leading Foreign Markets for United States Iron and Steel in June

Countries	Tons	Countries	Tons
Japan	80,806	Chile	3,015
Canada	47,343	Persia	2,856
Argentina	9,666	Colombia	2,657
Mexico	9,348	Peru	2,645
China	8,941	Chosen	2,289
United Kingdom	8,609	Hongkong	1,611
Brazil	6,237	Honduras	1,240
British India	6,223	Norway	1,057
Cuba	4,843	France	867
Philippine Islands	4,236	Dutch East Indies	791
Kwantung (leased territory)	3,301	Straits Settlements	626
Australia	3,112	Guatemala	607
		Denmark	547

At the Usines Metallurgique du Hainaut, at Couillet, last week, a blast furnace which had been re-kindled a few hours previously suddenly exploded, apparently owing to the charge having dropped after having been choked. Fifteen men were killed outright, including the engineer in charge, and 30 others injured.

Improves Line of Pipe Machinery

The Curtis & Curtis Co., Bridgeport, Conn., manufacturer of the Forbes pipe cutting and threading machinery, has placed on the market a line of improved pipe threading machines for hand, belt or electric power, in all commercial sizes, from the small, ¼ to 2 in. size, to a machine for 8 to 16 in. pipe.

The new line is said to be almost 100 per cent greater in speed and the design simplified so that operation is now semi-automatic. A die release and lock, attached to the die head, serves to lock the dies in position during the threading operation and to automatically unlock and open the die at the completion of the thread. A turn of a lever instantly resets the die. When running on a certain size, all threads will be identical, both as to length and diameter. The cutting off device provided is automatic in its feed and simple in design, cutting the pipe off square and leaving no burr.

High speed steel tools are provided as regular equipment. Spur gears are used throughout, no bevel



Machine for Threading and Cutting Pipe. Increase of speed and semi-automatic operation are among the improvements of the new design. Spur gears are employed throughout

or worm gears being employed. They are machine cut from fibre, machine steel and cast iron, and suitable gear guards are provided.

These machines do not require special foundations, are portable and occupy a small amount of space. They are designed to thread pipe bends or other crooked work.

Melt of Ohio Foundries Increases

The melt in Ohio foundries increased during July from approximately 50 per cent to over 58 per cent according to the monthly report of the Ohio State Foundrymen's Association, which based its data on reports received from 69 members. These reports showed some decrease in the total stocks of pig iron on hand as well as in the amount of pig iron received, these decreases being attributed to conditions resulting from the coal and rail strikes.

The association, of which Arthur J. Tuscany is secretary-manager, has moved its offices from the Wade Building to 405 Century Building, Cleveland.

Lower Spanish Duties for American Products

WASHINGTON, Aug. 22.—Iron and steel, machinery, motorcycles, automobiles, motor trucks, chassis and detached parts made in the United States are included in products which are given the benefit of reductions in Spanish tariff duties. These reductions are similar to those which had recently been granted to France as a result of the Franco-Spanish treaty, and gives assurance that American products will continue to enjoy most-favored-nation treatment which they have thus far been accorded in Spain. The concessions and duties granted by Spain to Switzerland by the treaty of May 16, 1922, which in practice had already been extended to similar American products, are likewise confirmed by the present order of the Minister of Finance of Spain. Owing to conflicting interpretations on the part of the Spanish customs officials as to the application of the concessions granted to France to similar products of other countries, a definite ruling from the Spanish Minister of Finance was informally requested by Commercial Attache Cunningham, working in co-operation with the American embassy. The concessions in duties granted to France by the terms of the Franco-Spanish treaty and extended to the United States amount to reductions of 20 to 25 per cent from the second column, which has heretofore been the minimum scale of import duties into Spain. Among the principal lines of goods affected by these reductions, which are of interest also to American exporters, are pipe fittings, locomotives, printing and electric machinery, motorcycles, automobiles, motor trucks, etc.

More Hearings on Pittsburgh Basing Case

WASHINGTON, Aug. 22.—The Federal Trade Commission has concluded to submit additional direct testimony in the Pittsburgh base case and will reopen hearings for this purpose on Sept. 11. At the offices of the commission, it was stated that the place of the hearing is to be determined by Examiner Bennett and Attorney Steinhauer of the commission, who now are on vacation. The nature of the additional testimony also was unknown to the commissioners here, but it was said that the taking of this testimony will require only a brief time after which the Steel Corporation's side is to be presented, followed by rebuttal testimony by the commission.

Renewal of Merger Efforts Expected

YOUNGSTOWN, Aug. 21.—With the return of executives from their vacations, more definite developments in connection with merger of several Valley independents are expected. The two companies most prominently mentioned now as merger possibilities are the Brier Hill Steel Co. and the Trumbull Steel Co. To round out its finishing capacity, it would be necessary for the Brier Hill company to expend a large sum and probably necessitate some financing. An alternative would be a merger with the Trumbull company, to which Brier Hill would bring valuable raw material resources.

It is known that the possibilities of such an amalgamation have been very seriously considered.

Little Increase in Coal Output

WASHINGTON, Aug. 22.—The Geological Survey in making its report on coal production for the twentieth week of the strike (Aug. 14-19) said it was too early to learn the immediate effect of the agreements signed at Cleveland between mine workers and operators; that the production from the mines that were already operating is estimated at about 4,300,000 tons, and that it is unlikely that the union mines now reopening in Ohio and elsewhere will raise the total output for the week much above the 4,576,000 tons produced in the preceding week. It was pointed out that while mines long closed are reopening, there has been a recurrence of acute railroad disability in certain of the non-union and open shop fields. Reports made to the Central Fuel Committee at the same time indicated that only a little new coal production had resulted from the reopening of mines in Pennsylvania, but these were followed by reports that there were likely to be appreciable increases in Ohio and Pennsylvania early this present week.

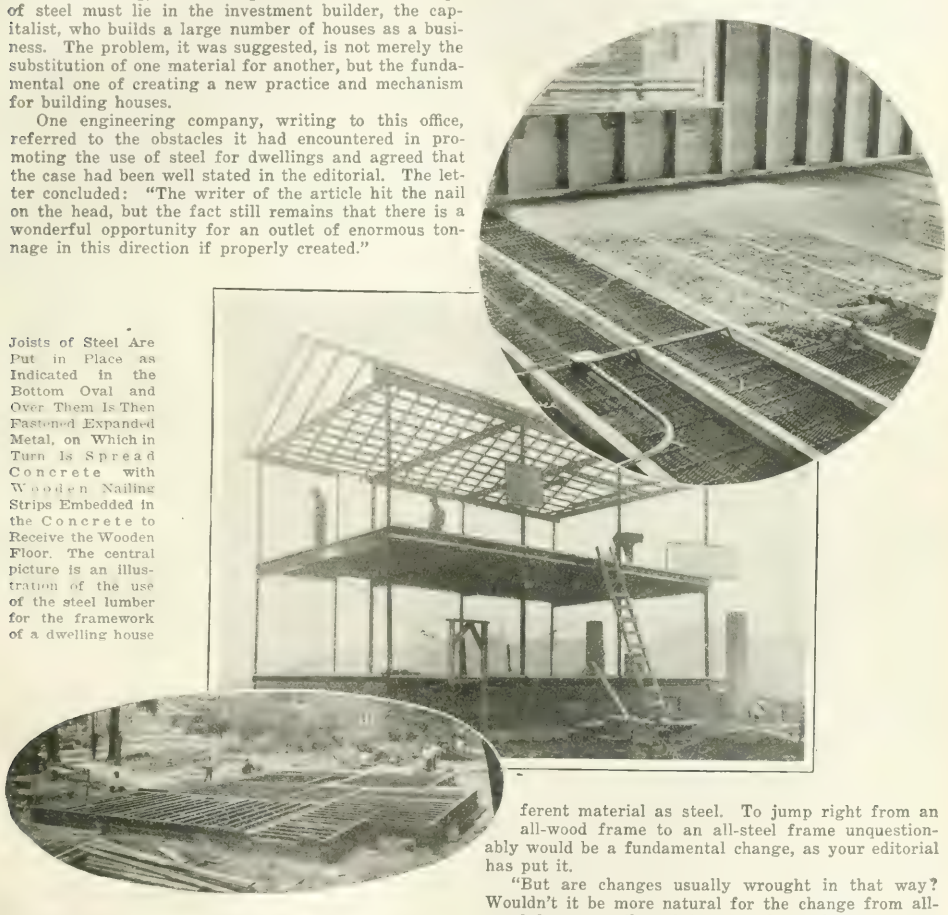
In a notable bridge souvenir edition, the Springfield (Mass.) *Republican* has commemorated the dedication of the new Hampden County Memorial Bridge over the Connecticut River, a project which is costing the county some $6,000,000. Several supplements to the paper are devoted to this and other notable bridges and to historical and biographical articles relating to the locality. The new bridge, of reinforced concrete, takes the place of a covered wooden bridge, erected in 1805 and still in service. The engineers were Fay, Spofford & Thorndike, Boston, and the contractors were H. P. Converse & Co., Boston.

For Greater Use of Steel in Dwellings

Potential Tonnage Is Large, Calculated on the Building Movement of 1922—Some Figures Based on the Employment of Pressed Steel Joists

SOME interesting comments have been made on the editorial "Steel in Dwelling Houses," which appeared in THE IRON AGE of Aug. 3, page 291. The point was made in the editorial that the first barrier to the general use of steel in the construction of dwelling houses is in the training and habits of those who are engaged to build houses. The carpenter's work in wood has not yet been standardized, after several generations of house-building, and it was pointed out that the hope of steel must lie in the investment builder, the capitalist, who builds a large number of houses as a business. The problem, it was suggested, is not merely the substitution of one material for another, but the fundamental one of creating a new practice and mechanism for building houses.

One engineering company, writing to this office, referred to the obstacles it had encountered in promoting the use of steel for dwellings and agreed that the case had been well stated in the editorial. The letter concluded: "The writer of the article hit the nail on the head, but the fact still remains that there is a wonderful opportunity for an outlet of enormous tonnage in this direction if properly created."



Joists of Steel Are Put in Place as Indicated in the Bottom Oval and Over Them Is Then Fastened Expanded Metal, on Which in Turn Is Spread Concrete with Wooden Nailing Strips Embedded in the Concrete to Receive the Wooden Floor. The central picture is an illustration of the use of the steel lumber for the framework of a dwelling house

Gilbert Canterbury, of the Central Steel Co., Massillon, Ohio, in commenting on the editorial, said that if the writer had in mind dwellings in which rolled (heavy) sections were used, his position was undoubtedly right, and such a change would be fundamental and revolutionary. "I submit, however, that his line of reasoning is incorrect when applied to the principle of fire-safe, first floor construction with light (pressed) steel joists and metal lath."

Mr. Canterbury's letter is so interesting that we reproduce it in large part below:

"Let us establish common ground by stating that available timber is growing scarce and that in twelve years there will not be enough timber left for use as 'dimension lumber.' Something will have to take the place of wood in dwelling frames. Steel is the logical material.

"Now, on my part I can grant that the change from wood to steel will have to be 'sold' to the entire consuming public and that the building trades will have to be educated in the handling of such a radically different material as steel. To jump right from an all-wood frame to an all-steel frame unquestionably would be a fundamental change, as your editorial has put it.

"But are changes usually wrought in that way? Wouldn't it be more natural for the change from all-wood frame to all-steel frame to be made a step at a time? I think it would, and I have spent a lot of effort guessing what the first step would be.

"In your editorial the statement is made that it is easy to 'substitute' metal lath for wood lath. Right. Now, then, what will be the first step in the 'fundamental' change? I say it will be by the substitution of light steel joists in the first floor in place of wood 2 x 8s, 2 x 10s and 2 x 12s. Here is my line of reasoning:

Some Advantages of Steel

"Joists are plain sections, be they wood or steel. The only field work done on a wood joist is to cut to

length and 'fire-bevel' the ends. It wouldn't be much of a trick to cut steel joists in the field, but there is no earthly reason why it shouldn't be done at the structural steel yard before the material is taken to the job. Fire bevels are not necessary for steel joists.

"Steel joists are as light as wood joists. They are set in place exactly the same as wood joists. Steel joists will not warp, shrink, sag or burn.

"Most dwelling fires originate in the basements or actual first floor sections. In the basements (of all dwellings except in the extreme South) are located such major fire hazards as heating equipment, open-flame laundry stoves, hot water heaters, gas meters, horizontal hot water and hot air pipes, coal and wood supplies, etc. Support the first floor on steel joists, spread over them a thing slab of cinder concrete reinforced and centered by metal lath and you have established a good non-combustible bulwark between these basement fire hazards and the livable sections of the dwelling. Furthermore, such a floor section is dust-proof and vermin-proof. You can nail wood sub-floor directly to the steel joists if you want to use the steel joists only, or you can imbed screeds in the concrete slab for a wood floor finish.

"A 7-in. pressed steel joist weighing 5½ lb. to the lineal foot will take care of most first floor spans in dwelling construction. Space these joists 19 in. on centers and you have about 3½ lb. of steel to the square foot of floor area. A dwelling measuring 30 x 30 ft., which would be about average, is 900 sq. ft., and would require a total of 3150 lb. of steel joists—a ton and a half.

"Steel joists now sell at a price which means that this substitution, including metal lath and a concrete slab for the first floor, would not add over 1 per cent to the cost of the dwelling, or in round figures, about $100.

"There wouldn't be anything so very revolutionary about this one step. Carpenters would still have plenty of work. Two men would set the steel joists for a first floor (bearing wall job) in four or five hours. From that point on it would be regular construction practice. A lot of lumber would be saved and thus the day would be deferred when steel sections would have to be used in such difficult and complicated construction as partitions, walls, roofs, etc.

If All Dwellings Used Steel

"Now, from the standpoint of the steel industry, this may look like small potatoes. Let me point out, however, that the building industry is erecting this year (1922) about 280,000 single dwellings in the United States. The normal for several years will be about 250,000 annually.

"Counting 1½ tons to the dwelling, as above, one and one-half times 250,000 equal 375,000 tons. Pressed steel joists weigh approximately one-third the corresponding section in rolled structural steel. If rolled I-beams were used in this construction, the total of steel thus consumed would be close to 1,000,000 tons. The country's capacity for structural steel shapes (exclusive of pressed joist sections) is only 180,000 tons monthly. These figures will give you an idea of the importance of potential tonnage in the first floors of dwellings.

"T. J. Foster, of the National Bridge Works, Long Island City, N. Y., read a paper on 'Steel Lumber' (pressed steel joists) at the American Iron and Steel Institute meeting last autumn. You printed it in THE IRON AGE of Nov. 24, 1921, p. 1331. I believe you would be surprised if you were to look up the amount of steel joists actually being produced and sold this year. This industry, which is new in the iron and steel trade, is growing very rapidly. The subject of metal lath would also be interesting to you as a growing outlet for steel sheets.

"The whole subject of steel for the building trade is a big one and I verily believe it will show the most pronounced development during the next ten years."

JULY IN FABRICATED STEEL

Almost the Entire Industry Reporting to Department of Commerce Figures for Second Quarter Revised Upward

In its collections of the sales of fabricated steel work, the Department of Commerce now reports that it is getting figures from "almost the entire fabricating industry." Reports were received from 121 firms and figures were obtained from these companies not only for the business done in July but for the sales of the three months preceding, April, May and June. One result has been a sharp upward increase of the figure taken as indicating the fabricating capacity of the country, the 121 firms being credited with having a total capacity of 204,540 tons against 180,000 tons, the amount which has been taken for a number of years as the monthly capacity of the bridge and structural shops of the country. The new capacity is 13.6 per cent greater than the former, and the apparent rate of contracting has therefore been scaled down from the figures originally given. However, the revised tonnages for the second quarter of the year bring the actual volume of business above any of the estimates previously given.

The actual sales in July of the 121 concerns was 127,765 tons, which is 62.5 per cent of the shop capacity of these same concerns, given as stated, as 204,540 tons. The Department uses the figure of 204,540 tons as capacity against which to indicate the rate of contracting.

The extent of the cooperation which the Department is getting from the industry is indicated by mentioning that compared with hearing from 121 concerns in the latest canvass, the number heard from in June was 96, in May 82, in April 75, while the Bridge Builders and Structural Society in issuing the March statistics based the figures on returns from 64 companies.

The subjoined table gives the tonnage of bookings for April, May, June and July for the 121 identical firms, together with the corresponding percentage of capacity put under contract. These figures thus replace those given already for the second quarter and now put the total amount of business taken in fabricated steel work for the seven months of this year at a total larger than any of the preceding ten years, even including those in which there was active building of factories for the prosecution of the war. While the total for July at 127,765 tons represents but 62.5 per cent of capacity, the monthly total is still a large one, seeing that the average for the last ten years was barely 55 per cent of capacity.

Actual Fabricated Steel Sales for the Past Four Months of 121 Identical Firms

Month	Tonnage Booked	Per Cent of Capacity
April	[illegible]	[illegible]
May	[illegible]	[illegible]
June	[illegible]	[illegible]
July	[illegible]	[illegible]

To meet enlarged freight requirements of steel plants at Warren and Niles, the Pennsylvania Railroad has mapped out a program of development which will require the expenditure of a large sum. According to the schedule, 11 tracks, each one mile long, are to be built west of Niles, Ohio, four additional tracks are to be established at the Mosier yard, immediately west of Youngstown, while another main line track is to be built from Youngstown to Niles. The Trumbull Steel Co. and the Brier Hill Steel Co. are among the interests which will benefit from this program.

A pulverized coal system is to be installed in the Owosso, Mich., plant of the American Malleables Co., Lancaster, N. Y. The Holbeck system is to be employed and will be installed by the Bonnot Co., Canton, Ohio. The equipment will cover 24 annealing furnaces, three melting furnaces and two small boilers, with provision for equipping core ovens at a later time.

Free Zone System Included in Tariff Bill

Departure of Interest to Many Manufacturers—Not Certain the Plan Will Be Adopted in Conference

BY L. W. MOFFETT

WASHINGTON, Aug. 22.—Establishment of foreign trade zones in ports of entry of the United States, proposed in an amendment to the tariff bill adopted by the Senate last Wednesday, upon the motion of Chairman Jones of the Committee on Commerce, opens a wide range of interest and would mark a highly important change in the American tariff system. Proponents of the measure, which was recommended for passage by the Committee on Commerce on Aug. 15, 1921, claim that the "free" zone system recognizing the more intimate and interdependent character of world relations would effect a vast improvement in perfecting the means of intercourse between nations and that it would be a great aid to the American Merchant Marine.

The proposed "free" zone system is of importance to all business interests of the country engaged in foreign trade, including iron and steel, machinery and automobile manufacturers. It remains to be seen whether the amendment will be adopted in conference and enacted into law. Senator McCumber, chairman of the Committee on Finance, in charge of the tariff bill, accepted the amendment with the statement that it would be given serious consideration in conference. He conceded that the Senate had not given this broad subject the necessary study. Previous attempts had been made to pass legislation of this kind in a separate bill, after it had been reported out favorably by the Committee on Commerce, whose Republican members unanimously favor it. It also is favored by Democrats. President Harding was a member of the committee when the legislation was being considered by it and it is therefore assumed that he would accept the "free" zone system if it is adopted in conference. One of the outstanding features of the free zone system, which Republicans maintain is not an assault upon the protective system, would be to wipe out the intricacies and red tape involved in tariff customs regulations under the present system of bonded warehouses, the drawback and the bonded manufacturing warehouse. These apply with particular stress to certain lines using metal products, assembling automobiles and warehousemen.

Plan of the Zone System

The proposal under the free zone system is to authorize the establishment of places at the various ports, in which, under proper regulations and precautions to protect the Treasury of the United States, goods designed not for domestic consumption, but for transshipment, may be landed without the various restrictive regulations which now apply to such goods in the bonded warehouses. Then, when the time has come for transshipment to the place where they are intended to go, they may be taken out without further restriction. Regarding metals, the drawback system, which would be abolished by the "free" zone plan, has applied particularly to aluminum, tin plate, lead ore, and zinc, although application of the drawback system to tin plate has progressively decreased in importance owing to the ability of the American tin plate industry to meet foreign competition. In this connection it is noted that in 1907 under the tariff act of 1897, drawbacks on tin plate imports, which were remanufactured into finished products in this country and then exported, amounted to $1,525,282, while in 1918, they totaled $2,359,486, and in 1913 declined to $45,271. In 1915 they were increased to $451,246, while in 1916 they dropped to $22,473. The tin plate drawbacks under the tariff acts of 1897, 1909 and 1913, represented 0.14 per cent of the total drawbacks under those acts, up to and including 1916.

The legislation has been recommended by the Tariff Commission, which in a report made to the Committee on Commerce last year, pointed out conditions in Europe and the conditions in the United States and the advantages of the proposal and the disadvantages of the present systme.

As pointed out by Senator Jones, the proposed free zone system means that if, for instance, someone in Europe desires to send 500 tons of goods to South America and that is all he has to ship, and a vessel bound from Europe to New York can take on that tonnage as a part of its cargo, it may do so, bring in the 500 tons of goods and discharge them in the zone where they may be kept until there is a ship ready to take it into South America. The senator declared that the plan would facilitate the assembling and transshipment of commodities which constitute a large item in the world's commerce and it was estimated that such business amounts to about $4,000,000,000 annually. Where some of the products to be brought to free zones in the United States require completion, they could be added to for purpose of assembly. For instance, automobile bodies, chassis, or engines could be provided by American interests, the finished product being assembled in warehouses in the free zone territories, which would be practically foreign territory and exempt from tariff duties. The bill was amended to prohibit manufacturing in the zones but probably this will be made allowable later. Under the present system, goods that are to be completed and transshipped, go to bonded warehouses where there is heavy expense for producers, because of a complicated system of Government regulations and a drawback of 99 per cent of the duty is granted when the transshipment takes place. Senator Jones pointed out that in the past a great deal of American business heretofore has been done in a sort of triangular way and that much of American produce destined for South America has left this country and gone to Europe and then to South America through transshipment in foreign vessels. It is desired, he said, to avoid that, so the United States can do much of the business from Europe to South America by making American ports one apex of the triangle by encouraging the shipment of goods to this country which are destined for South America, and then transport them to South America. It was stated that this will not only give American interests the business in this country, but it would also furnish cargoes for American ships. It was declared that one of the great difficulties with the American Merchant Marine is in securing cargoes bound for this country on return voyages. He said that the main thing is not to provide for what cannot now be done, but is to remove the restrictions under which goods intended for transshipment must be placed in bonded warehouses and comply with the drawback provisions provided by law and in the proposed legislation. The proposal was declared to be simply an expansion of the drawback and the bonded-warehouse systems, providing a freer and better facility for the distribution of goods to the markets of the world. As pointed out by the Senate Committee on Commerce, the system does not do away with the present Government agencies, but it does open the way for another agency that may be made use of to avoid many of the vexations of the present system.

Relation to Protective System

The committee in its report on the bill last year said that the only substantial objection that had been urged is that the measure is a subtle device to undermine the protective tariff system. The Republican members of

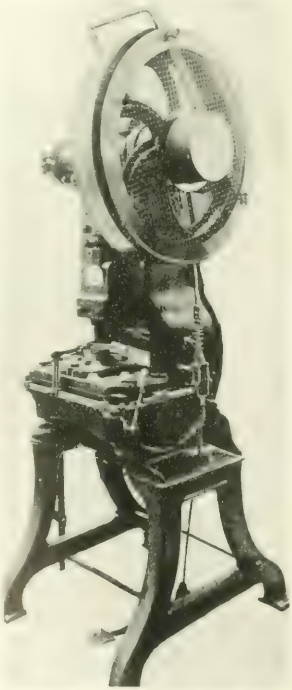
the committee gave this objection special consideration, the report pointed out. It added: "They are protectionists from principle and would not favor any measure inimical to that system. They came to the conclusion that this measure does not affect in any way the principles of a tariff either for revenue or for protection. It provides for a very valuable instrument in connection with either system. If it has any special relation to either system, it is especially desirable in connection with the enforcement of a protective tariff and will strengthen rather than weaken that policy. Action under it will add greatly to the value of protection."

The Tariff Commission recommended the free zone system after the investigation covering so-called free zone ports of the world, including those at Hamburg and Copenhagen. Because the term "free" in connection with "port" or "zone" is misleading, inasmuch as it has no relation either to port charges or to any policy of free trade or protection, the Tariff Commission says that a "neutral" zone would be more properly descriptive. Those who have urged the establishment of so-called free zones, have suggested that there be three or more ports on the Atlantic Coast, including New York, Philadelphia and Boston and at least two ports on the Pacific Coast, possibly San Francisco and Portland. Suggestions also have been made for the establishment of one or two such ports on the Gulf Coast, particularly at New Orleans.

New Safety Guard for Power Presses

A safety guard for power presses designed to protect the operator at the point of operation and also to prevent the press from repeating, has been developed by J. J. Flynn, 72 Grand Street, New York.

The device is illustrated as attached to an inclinable press but can be applied also to straight-sided upright, and double-crank machines, and can be used in blanking, stamping, piercing, and forming operations. The press is under the operator's control at all times, a feature which is claimed to permit of increased production by relieving the operator of the monotony of having an arm swinging before him, giving him also a free hand to feed the blanks to the die.



Arranged to Give Protection at Point of Operation and to Prevent Press from Repeating

The operator in pulling the hand lever of the guard has an advanced motion which moves the guard at the point of operation, forcing the operator's hand away. Further movement of the hand releases the treadle stop, permitting the treadle to be forced downward and releasing the clutch. The lever inside of the press is set within ⅛ in. of the downward stroke of the press before it starts on its upward motion. This forces the lever downward, releasing a dog connecting the upper and lower treadle rods and permitting the upper rod to move upward, locking the press and thus preventing it also from repeating.

When released the hand lever is forced back by spring pressure, which locks the upper rod. To start the press the pressure treadle must be released so that it will move upward, re-engaging the dog in the upper rod.

The position of the hand lever and the mounting of the treadle rod are shown clearly in the illustration.

Advance in Price of Seamless Steel Tubes

The Detroit Seamless Steel Tubes Co., Detroit, announces that due to the continued heavy demand for seamless steel tubes, the advancing prices for raw material, and higher labor costs, the following prices have been put into effect by the company:

Seamless Steel Merchant Boiler Tubes—Carloads

1 in.	57 per cent
1¼ in.	48 per cent
1½ in.	47 per cent
1¾ in.	30 per cent
2 in. and 2¼ in.	32 per cent
2½ in. and 2¾ in.	36 per cent
3 in.	40 per cent
3¼ to 4 in. inclusive	45 per cent
4½ in. and 5 in.	37 per cent

The usual differential applies for less than carload quantities.

The usual extra for heavy gages and long lengths remains the same.

Seamless Steel Mechanical Tubing

Base discounts on direct shipment from mill in large quantities on all steels under 0.30 carbon, 85 base discount.

On 0.30 to 0.40 carbon steel, 83 base discount, plus usual differentials and extras for cutting.

Seamless Steel Locomotive and Superheater Tubes

Outside Diameter		Net Price
2 in.	No. 12 gage	14c. per ft.
2 in.	No. 11 gage	15c. per ft.
2 in.	No. 10 gage	16½c. per ft.
2¼ in.	No. 12 gage	16c. per ft.
2¼ in.	No. 11 gage	16½c. per ft.
2¼ in.	No. 10 gage	18¼c. per ft.
3 in.	No. 7 gage	35½c. per ft.
1½ in.	No. 9 gage	13c. per ft.
5⅜ in.	No. 9 gage	53c. per ft.
5½ in.	No. 9 gage	55c. per ft.

Plus extras for forming and for long lengths.

Increased Use of Scrap

YOUNGSTOWN, Aug. 22.—Valley interests are purchasing old material for steel making purposes on a broader scale, indicating preparations for expanded production. In some cases, open-hearth furnaces are being charged 60 per cent scrap, and the rest pig iron. Under ordinary conditions, the reverse ratio is maintained. Shortage of pig iron and its high price are compelling steel makers to resort to scrap in larger tonnages.

Prices are very susceptible to supply and demand. Heavy melting grades are nominally quoted at $18, but any firm buying movement will produce a markup. One recent purchase of hydraulically compressed scrap, involving several thousand tons, was closed at $16.50.

New Rail Rates Ordered

WASHINGTON, Aug. 22.—In a decision handed down last Thursday in connection with a complaint of the West Virginia Rail Co., the Interstate Commerce Commission held that lines serving Huntington, W. Va., Pittsburgh, and Johnstown, Pa., Newark, Ohio, and Cumberland, Md., must not later than Nov. 11 establish rates on new light iron and steel rails to points in the Pittsburgh-Buffalo and Central territories, no greater than 78 per cent of the sixth class rates from the points of origin to the destinations. The rates on this class of rails are to be 20 times the rate per unit of 112 lb.

Bethlehem-Lackawanna Merger Approved

Directors Act Without Waiting for Action of Federal Trade Commission—Extensive Building Program Announced

THE merger of the Bethlehem Steel Corporation and the Lackawanna Steel Co. was approved at the meeting of the board of directors of the former company held last Thursday, Aug. 17. President Eugene G. Grace, of the Bethlehem Steel Co., announced that there would be a readjustment of the capitalization of Bethlehem, calling for a retirement of all classes of stock now outstanding and exchanging them for new preferred and common stock, both of which will have complete voting power. The readjustment is subject to the approval of the stockholders, who will meet on Sept. 18. This is a departure from the old plan under which control of the company's operations rested in the hands of a few large stockholders.

400,000 Tons Additional Capacity

President E. G. Grace of the Bethlehem Steel Co. made an announcement in the past week concerning extensions the company is to make at the Sparrows Point, Md., plant. These lately authorized improvements include the addition of a 250-ton tilting open-hearth furnace to the present No. 2 open-hearth plant, making a complete unit of five such furnaces. In addition to the present five 70-ton rebuilt stationary furnaces in the No. 1 open-hearth building, four 100-ton stationary furnaces are to be built. Thus the increase in ingot output at Sparrows Point, through the new additions, will be about 400,000 tons per year. This additional steel will be rolled down in the present finishing mills.

Another important improvement authorized at Sparrows Point is the installation of a 10,000-kw. turbo-generator with boiler plant, condensing system, etc., as an auxiliary to the present gas engine station and to provide power for the additional ingot tonnage.

Chairman Schwab's Statement

Charles M. Schwab, chairman of the board of directors, and President Grace said in a letter to Bethlehem stockholders:

While no additional financing is required in connection with the Lackawanna purchase, it will eventually be wise to spend from $10,000,000 to $15,000,000 in improving and enlarging the Buffalo plant. Your board prefers to raise this money and be in a position to meet other future capital needs through the sale of stock instead of bonds. Your corporation is advised by its bankers that it should be in a position to offer cumulative 7 per cent preferred stock instead of the present non-cumulative 7 per cent preferred stock. Your board therefore recommends the authorization of $15,000,000 of new 7 per cent cumulative preferred stock.

Your board has become convinced that it will be to the advantage of the stockholders and greatly strengthen your corporation in meeting future capital requirements if its financial structure can be simplified by consolidating its entire outstanding stocks into two classes, 7 per cent cumulative preferred stock with full voting powers and common stock with full voting powers. Argument seems to be unnecessary to show the advantages of the substitution of this simple financial structure in place of the present capitalization involving four classes of stock, to which a fifth class would be added by the creation of the proposed new 7 per cent cumulative preferred stock. In order to accomplish this it is proposed to offer to the stockholders the opportunity of exchanging their holdings on the following bases:

1. The existing $30,000,000 8 per cent cumulative convertible preferred stock to be exchangeable for new 7 per cent cumulative preferred stock for a limited period on the basis of $115 in new stock for each share of the old stock, and thereafter, until the privilege shall be terminated by the board of directors, on such basis, not exceeding that specified, as shall be fixed by it.

2. The existing $15,000,000 of 7 per cent non-cumulative preferred stock (and the additional stock of that class to be issued in connection with the Lackawanna purchase) to be exchangeable for new 7 per cent cumulative preferred stock for a limited period, which may be extended by the board, dollar for dollar.

3. The existing Class B common stock (and the additional stock of that class to be issued in connection with the Lackawanna purchase, to be exchangeable for common stock with full voting powers, dollar for dollar.

It is proposed that a sufficient increase in the capital stock shall be authorized to accomplish the purposes above stated and provide an additional amount of common stock of approximately $38,000,000, to be available for use, in the discretion of the board of directors, in the payment of stock dividends and for any properties that may be acquired.

Upon the consummation of the Lackawanna purchase, the sale for capital purposes of $15,000,000 of the new 7 per cent cumulative preferred stock and the consolidation of the existing classes of stock as above proposed, the outstanding capital stock of your corporation would be as follows:

7 per cent cumulative preferred stock... $77,000,000
Common stock 82,608,500

Members of your board of directors (whose holdings consist principally of preferred and common shares with full voting powers) and other large stockholders have already approved the plan above outlined, which the board of directors recommends to the stockholders for their favorable action.

Federal Trade Commission Investigation

Regarding the purchase of the Lackawanna Steel Co., the letter points out that "the fact that a formal complaint by the Federal Trade Commission is pending would seem to furnish no reason for further delaying the call for the meeting of stockholders to act upon the proposed purchase, the legality of which is supported by the opinions of counsel of both companies." The Attorney General of the United States some time ago investigated the consolidation and said "I am unable . . . to find in the exhaustive investigation I have made any reasonable warrant for asserting that the public will suffer if this consolidation is consummated."

Under the contract of purchase the consideration to be paid for all the properties of the Lackawanna company, in addition to the assumption by Bethlehem of the existing liabilities and obligations of the Lackawanna company, is $308,680 in cash and Bethlehem stock for Lackawanna stock par for par. The new Bethlehem stock thus to be issued is divided as follows: $12,500,000 7 per cent non-cumulative preferred and $22,608,500 Class B common stock.

President Grace's View of Conditions

A resumption of the prosperity which was interrupted when the strikes broke out will again be ushered in with heavy buying, according to President Eugene G. Grace. This prosperity, however, qualified Mr. Grace, will be short-lived unless settlements of strike troubles are made upon a sound and economic basis. This means a liquidation of labor which represents the important factor in the cost of production.

"Unless the settlement eventually contemplates the liquidation of cost as represented through labor, then the settlement is not sound and will stand in the way of reinstatement of prosperous times," said Mr. Grace, following the meeting of the Bethlehem Board of Directors.

"If the settlement is on a basis which increases the cost of production and requires increases in the selling prices of steel," said Mr. Grace, "it will have the effect of stopping investment money from going into business and, therefore, will curtail business rather than stimulate it."

Inclusions in Aluminum Alloy Sand Castings

Technical Paper 290, "Inclusions in Aluminum Alloy Sand Castings," by Robert J. Anderson, metallurgist, has been issued by the United States Bureau of Mines.

In aluminum alloy foundry parlance, metallic and non-metallic inclusions are termed "hard spots," and in aluminum alloy sand castings and in die castings they are very troublesome. The inclusions differ so widely that the term "hard spots" is only roughly descriptive at best; in fact, the term is exceedingly undesirable and should not be accepted in the nomenclature of metallography. However, because it has been in common usage for such a long time, it is used in this paper to include all kinds of metallic and non-metallic inclusions that cause difficulty in polishing and machining aluminum alloy castings. Hard spots in aluminum alloy sand castings are well known to founders, and certain kinds of hard spots are frequently found in aluminum base die castings. Ordinarily, hard spots are not noticed during the routine inspection of rough castings in the foundry, but usually come to light during machining. Much difficulty may be experienced when machining aluminum alloy castings containing hard spots, and their presence may be one of the principal causes of machine shop scrap, in addition to ruined milling cutters, lathe tools, and drills. Certain kinds of hard spots may be found when gates are being sawed off at the band saw, or on cutting at the sprue cutter, or when chipping and grinding is being done. Furthermore, several kinds of hard spots may be readily detected in the foundry by fracturing the gates; if hard spots are present in the gates, they will normally be present in the castings. Whether or not hard spots are numerous in an aluminum alloy casting, this defect may be such as to cause much difficulty in machining and, at times, even to prevent the finishing of machine work after it has begun. Milling cutters, turret lathe tools, drills, and other machine tools can be quickly dulled and rendered unfit for cutting when the cutting edges strike hard spots in a casting. When hard spots are present in aluminum alloy castings, they slow down machining, cause many castings to be scrapped, involve loss of machine work, reduce production, ruin cutting tools and irritate machine operators.

Although many representative aluminum alloy founders, by care in practice, have been able practically to eliminate hard spots and resulting trouble when aluminum alloy castings are machined, others still have periodic difficulties because of this defect. A number of foundrymen have suggested at various times that the Bureau of Mines investigate hard spots, put the available information on record and suggest preventive methods. Such an investigation was undertaken and carried out in connection with the Bureau's work on casting losses in aluminum alloy foundry practice. The present paper is published as a contribution to the literature of aluminum foundry practice and as a guide to founders in preventing scrap losses from hard spots in castings.

Study of Uranium and Other Alloy Steels

The results of studies in the experimental production of certain alloy steels are given in Bulletin 199, by H. W. Gillett, chief alloy chemist, and E. L. Mack, assistant alloy chemist, which has just been published by the United States Bureau of Mines.

The Bureau of Mines has recently made up experimental heats of alloy steels for the army and the navy. The steels for the army were desired for work on gun erosion, especially as regards the effect of nitrogen on the steel. The request from the war department for this experimental work was made during the course of the world war and followed the receipt of information from a creditable source that Germany was using uranium steel in the liners of some high-power naval guns. It was stated that uranium stiffens steel at high temperatures, and raises the softening point some 200 deg. C., so that gun erosion is reduced. The fact that the German guns retained accuracy of fire at the end of the Jutland naval engagement was ascribed to the uranium steel gun liners. Somewhat similar reports had been received as to the use of molybdenum steel.

The ingots made for the navy were in two series, the first being rolled, heat-treated, and given physical tests by the Bureau of Standards. The second series was made in larger ingots, which were rolled into plates, cut up into smaller plates, and heat-treated to different Brinell hardness numbers by the Halcomb Steel Co. Physical tests of this series under several heat treatments are being made by the navy.

Another series of alloy steels was made up in the course of co-operative work with the Vanadium Corporation of America and the Welsbach Co.; various impact and endurance tests are being made on these steels, the results to be given in a later publication. The present report deals only with the preparation of the ingots on any of the series of steels.

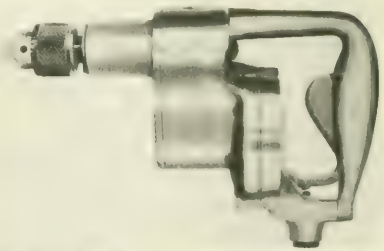
Some of the points brought out in preparing the steels, particularly as to the recovery of the alloying elements from the various ferroalloys entering the steel, may be of interest and are therefore put on record at this time. The indirect arc furnace finally used seems also to be a sufficiently useful piece of experimental apparatus to justify its description.

Detailed information regarding tests made with uranium, silicon, manganese, molybdenum, chromium, vanadium, nickel, copper-nickel, aluminum, zirconium, cerium and boron as alloying agents are given in Bulletin 199, which may be obtained by addressing the Bureau of Mines, Washington, D. C.

Turbine Air Drill

A portable drill, known as the No. 2-A Tiny turbine, having a capacity of 5/16 in. in steel and ⅜ in. in wood, and weighing 6 lb. complete, is being offered by the Turbine Air Tool Co., Cleveland.

The propelling portion of the tool is of turbine construction, and is made from an aluminum-magnesium alloy which is said to have the strength of mild steel with about one-third the weight. The speed of the turbine being high, a gear reduction is employed, the



The Propelling Member Is of Turbine Construction Made from an Aluminum-Magnesium Alloy

shafts and gears of which are of high-carbon chrome-nickel steel, oil treated. Ball bearings are used throughout. The housing is of an aluminum alloy. Lubrication of the tool is accomplished by having all bearings and gears in one housing and using a semi-liquid lubricant sufficient for 3 to 6 months run.

The member containing the nozzles has been designed to permit of easy cleaning of dirt or foreign matter that may become lodged in the nozzles.

Announcement was made last Friday by the Navy Department of the sale of the old fleet refrigerator ship Glacier to the Bardo Steel & Machinery Co., Seattle, Wash., for $22,000. The same company also purchased for $15,000 each the hulks of submarines F-2 and F-3. The three vessels were sold at Mare Island Navy Yard. The navy tanker Alameda, also on the West coast, was sold for $100,000 to the Newport Engineering Co., Washington, D. C.

Numerous Changes in the Metal Schedule

Few Are, However, Important—Duty on Pig Iron and Scrap Reduced—Bill Now in the Hands of the Conference Committee

BY L. W. MOFFETT

WASHINGTON, Aug. 22.—With the Tariff Bill passing the Senate last Saturday by a vote of 48 to 25, after being before that body for four months, and 13 months after it was first acted upon in the House, the metal schedule is largely similar to the form in which it passed the House. While numerous changes have been made in it by the Senate, they are not taking them as a whole, of any essential importance with certain exceptions, as they relate to the duties themselves. It is generally conceded that in phaseology and in reclassification the Senate improved the metal schedule, but its final action has left the more important rates not much changed from those provided in the House bill. The Senate Committee on Finance itself had made some important changes, such as placing manganese ore on the free list and reducing the duty on ferromanganese to $2.50 per ton. The Senate, however, upset the action of the committee and restored the House duty of 1c. per lb. on manganese ore and placed a duty of 1⅞c. per lb on ferromanganese containing more than 1 per cent carbon as against a duty of 2½c. per lb., provided in the House bill. The Senate bill also makes 30 per cent the division between ferromanganese and spiegeleisen. The Senate, as reported previously, also made substantial reductions in duties on tool steel ores and alloys. The changes made during the past week by the Senate in the metal schedule are shown in the accompanying table, as well as the change made in duties on magnesite, the latter restoring those reported originally by the Senate Committee on Finance.

Among the changes included is a reduction from $1.25 to 75c. per ton on pig iron and from $1 to 75c. per ton on scrap; a slight reduction in rates on structural and fabricated material and a reduction from 7-40 of 1c. per lb. on steel rails to 1-10 of 1c. per lb.; and an additional duty of 10 per cent on cold-worked nickel, alloys, bars, etc., and slight decreases in the duty on tool steel.

Senatorial Discussion

In reply to a suggestion by Senator Lenroot of Wisconsin that with the rate on pig iron reduced the reduction should be carried throughout the metal schedule, Senator Smoot of Utah, a member of the Finance Committee, said that the reduction amounted to so little that he did not know how it could be done throughout the schedule. He stated that importations are of the heavy products made from pig iron, which before becoming finished material generally come into the United States as ballast. The Senator from Utah said that the committee did not think it worth while to take that class into consideration, but called attention to the fact that reduction had been made in the rates upon steel rails and structural steel. He also said that it is to be remembered that the committee added considerable expense to the manufacture of steel in the United States "through what I call the very high rate on the

Changes Made in Metal Schedule of Tariff Since Tuesday, Aug. 15

PARAGRAPH 301—Duty on pig iron reduced from $1.25 to 75c. per ton and duty on scrap reduced from $1 to 75c. per ton.

Paragraph 302—"Tantalum" struck from list of alloys taking a duty of 25 per cent, an amendment added providing a duty of 40 per cent on ductile tantalum metal or ductile nonferrous alloys of tantalum metal.

Paragraph 312—Rate of 7/20 of 1c. per lb. on structural steel reduced to 1/5 of 1c. per lb.; also duty on fabricated material reduced from 25 to 20 per cent ad valorem.

Paragraph 318—Duty on woven wire cloth with meshes finer than 30 and not finer than 90 wires increased from 30 to 35 per cent.

Paragraph 322—Duty of 7/40 of 1c. per lb. on steel rails reduced to 1/10 of 1c. per lb.

Paragraph 385—Amendment adopted providing an additional duty of 10 per cent over the 25 per cent substantive duty on nickel, alloys, bars, rods, plates, sheets, etc., when cold-rolled, cold-drawn, or cold-worked.

Paragraph 388—Amended so that duty of 1½c. per lb. on lead in ores and mattes of all kinds shall not be applied to the lead contained in copper mattes, unless actually recovered, the provision that the duty should not be applied until after 2000 tons of such lead had been imported in one year, having been eliminated.

Paragraph 347 amended so as to include sew-on fasteners, to take a duty of 60 per cent ad valorem, included in item referring to snap fasteners and clasps.

Paragraph 304—Duty on alloy, ingots, blooms, slabs, sheets and plates, etc., valued above 16c. per lb., reduced from 25 to 20 per cent ad valorem.

Paragraph 305—Duty on tool steel containing more than 6/10 of one per cent of nickel, cobalt, vanadium, chromium, tungsten, molybdenum, or any other metallic element, used in alloying steel, reduced from 10 to 8 per cent.

Paragraph 360—Proviso added admitting free of duty philosophical and scientific instruments, etc., which are imported for educational purposes.

Paragraph 375 (Substituted for original paragraph)—Metallic magnesium: Crude, ingots, magnesium alloys and scrap, 10c. per lb.; in coils, plates, sheets, bars, rods, circles, disks, blanks, strips, rectangles, squares and other unfinished forms, 20c. per lb. on the metallic magnesium content; ribbons, tubing, wire, powder, and all other finished articles, 40c. per lb. on the metallic magnesium content and 20 per cent ad valorem.

Paragraph 204a (Earthenware schedule)—Amendment of Senator Calder of New York, restoring duties of Senate Committee on Finance on magnesite adopted. The duties now provided are 5/16 of 1c. per lb. on crude, ⅝ of 1c. per lb. on caustic calcined and 4/10 of 1c. per lb. on dead, burned and grain magnesite. The Senate Committee of the Whole had previously increased these duties to a level of the House rates carrying ½ of 1c. on crude and ¾ of 1c. on the other grades.

alloys." He declared that the rates on alloys far exceed the reduction that was made upon pig iron. Senator Lenroot, showing his lack of knowledge of the steel industry, said that, "There is one corporation that fixes the price; and the higher the rate the greater their ability to fix the price to the American consumer." Senator Smoot made the rather surprising statement that "If it were simply for the United States Steel Corporation, these rates would not be as high as they were. I frankly admit that; but the independents are fearful that the prices here will drive them out of business." Senator Lenroot expressed regret that the committee had not seen fit to carry on the reductions in the duties on rolled products in accordance with that made on pig iron.

Senator Phipps' Amendment

The substitute amendment on metallic magnesium was offered by Senator Phipps of Colorado, and replaces the original paragraph 375. The amendment provides that crude material shall come in at the rate of 10c. per lb. instead of 40c.; that the semi-finished forms take a rate of 20c. and that the highly finished forms pay a duty of 40c. per lb. and 20 per cent ad valorem. Senator Phipps explained that metallic magnesium is a substance lighter than aluminum and has greater strength. He stated that it has been found useful in automobile and airplane construction, and that its uses have developed during the last few years, and particularly during and since the war. It was his opinion that the original amendment did not give a proper differential as between the crude, the semi-finished and the finished forms, and because of that he offered the amendment. He told the Senate that the material is made by an electrical process and can be generally introduced in the United States. It is now largely used in Germany, it was stated, where it is most largely produced, and to a great extent supplements the use of aluminum. Chairman McCumber of the Committee on Finance said that the matter is one which is in disagreement, and that the amendment would be accepted and the rates determined upon in conference.

Senator Calder's Position

Senator Calder, in offering his amendment reducing the duties on magnesite, pointed out that this commodity is now on the free list and while he favored giving it some protection, he supported his amendment on the ground that the calcined magnesite is used in building operations. Senator Pomerene of Ohio, who supported the reduced rates, said that while some time ago magnesite occupied a certain field in the steel industry, some of the manufacturers have found a substitute for it. He declared that the higher rate which had been proposed may cut off all importations and that, if so, it would defeat the revenue feature of the bill so far as it relates to magnesite. He added that he did not think that the higher rate should be put on at the expense of every user of steel in the country. Senator Jones of Washington and Senator Gooding of Idaho defended the higher rates.

An amendment by Senator Fletcher of Florida to place common horseshoes on the free list and an amendment by Senator Jones of New Mexico to restore the House duty of 35 per cent on card clothing, which in the Senate bill carries a duty of 45 per cent, were rejected.

Efforts to Reduce Rates

The metal schedule was an object of much debate and vigorous but vain efforts were made, particularly by Democratic Senators, to reduce many other rates, such as those on aluminum, kitchen utensils, and cutlery. The metal schedule also was the object of an elaborate and detailed analysis submitted by Senator Simmons of North Carolina, ranking Democratic member of the Committee on Finance, who in having tables and data concerning the metal schedule inserted in the *Congressional Record*, said that the material was furnished by "official experts assigned to the minority of the Committee on Finance in collaboration with the experts of the Fair Tariff League." To say the least, this analysis occupying 9½ pages of 6 point type in the *Record* is interesting even if its value as a statistical study might not be seriously considered. The material takes up each item in the schedule, except some important parts, such as the ferroalloy section, and in its arguments either against the duties proposed or for free listing many of the iron and steel products now dutiable, discusses alleged costs of production, selling prices, profits, exports, imports, relation of wages to prices and makes a comparison of tariff rates under the Payne-Aldrich and Underwood-Simmons Tariff acts and the Senate bill. The big point intended is to show the so-called tariff protections to manufacturers, the cost to the consumers and the revenue to the Government. The table gives the remarkable figure of $1,197,000,000 as the tariff "allowance" to iron and steel manufacturers and the still more amazing figure of $2,504,000,000, as the cost to consumers of seven heavy and 21 light products. The revenue to the Government is given as only $6,890,950. Senator McCumber, chairman of the Committee on Finance, who says that the total revenue from the tariff bill will be $400,000,000 annually, estimates that duties in the metal schedule will raise $18,000,000. Tables submitted by Senator Simmons give figures for the individual items. As to the ratio of wages to factory selling price, the minimum on rolled products is 5.9 per cent, relating to tin plate, while the maximum on rolled products is 22.2 per cent pertaining to bar steel, but cast iron pipe is given a rating of 29.3 per cent. Roughly, the cost to consumers has been arrived at merely by doubling the alleged tariff "allowance" to manufacturers. Those preparing the table apparently recognized that its figures would be questioned, as indicated by comment in the following paragraph:

Criticism Invited

"We invite the criticism that these figures are preposterous. The Senate bill is preposterous. Consequently, its effect upon American life can only be preposterous. Its evil proposals can never be fully availed of by its beneficiaries. It gives these beneficiaries, however, the supporting arm of the Government for price rigging and price maintenance, with the consumer's recourse only to the Department of Justice against unlawful practices to which the bill incites its beneficiaries."

It points out that the figures represent a potential and mostly unnecessary addition to the American cost of living on heavy steel products, plus only 20 per cent on the great number of highly finished steel products.

Sent to Conference

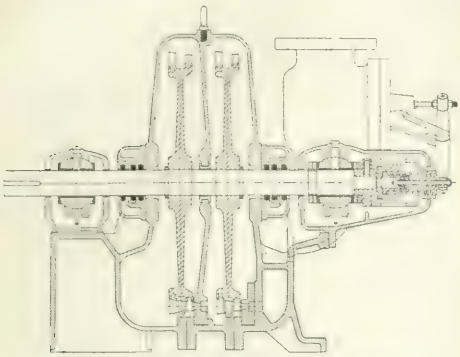
The tariff bill has gone to conference under a special rule and Republican leaders say they hope to have it enacted into law by Oct. 1. While there have been reports that it will be the object of sharp controversy in conference, particularly as it relates to the American valuation and foreign valuation plans, the former being the House and the latter the Senate plan, the general belief is that Chairman Fordney of the House Committee on Ways and Means will yield to the Senate. The adoption by the Senate of a provision for flexible tariffs, it is believed, will be important in influencing House conferees to accept foreign valuation as a basis for assessing duties.

The adoption by the Senate also of the so-called foreign trade zone system may likewise be the object of controversy. But on the vast number of 2000 odd amendments made by the Senate, there promises to be comparatively little disagreement. The only Republican Senator who voted against the bill was Senator Borah of Idaho. It was supported by three Democrats, Senators Broussard, Kendrick and Ransdell. The conferees are Senators McCumber of North Dakota, chairman of the Committee on Finance; Smoot of Utah, and McLean of Connecticut, Republicans, and Simmons of North Carolina, and Jones of New Mexico, Democrats. House conferees are Representatives Fordney of Michigan, chairman of the Committee on Ways and Means; Green of Iowa, and Longworth of Ohio, Republicans, and Garner of Texas and Collier of Mississippi, Democrats.

Turbine for Steel Mill Service

The Standard Turbine Corporation, Wellsville, N. Y., a company recently formed, is placing on the market a new steam turbine, said to be particularly adapted to steel mill service. It is suitable for connection to pumps, blowers and generators, either direct or through gears. Manufacture of this equipment on more of a production basis than has been customary in steam turbine work is planned.

Features of the machine are its heavy construction and simplification of component parts. The coupling-end bearing is supported on a pillow block resting on a pedestal integral with the lower half of the exhaust end, to eliminate vibration and misalinement. The steam-end bearing support is large in diameter and is placed directly under the bearing. The disks are in one



Steam Turbine for Connection to Pumps, Blowers and Generators. Heavy and simple construction are features peculiarly fitting it to steel mill use

piece, each carrying two rows of buckets. Although making necessary the use of forgings instead of plate steel, this construction, it is emphasized, permits a longer fit on the shaft and reduces disk stress at the hub.

The governor is of simple construction. It is connected to the valve with a single lever, the fulcrum of which is rigidly attached to the turbine casing and there are no encumbrances on this connection which may shift its position and cause over-speeding. The emergency governor is independent of the main governor, the valve of the former being also independent of the main valve.

Butterfly valves are used, the seats of which are swept continuously by steam at low velocity, keeping them clean. The governor valve bushing and seats form an integral part, and are of bronze. This construction is said to permit closing both valve seats at the same time at all temperatures, which would be difficult if seats were screwed into a casting of a different material, having a different coefficient of expansion.

The so-called pivot block of the governor is located in the interior, the governor spindle being stationary, which eliminates vibration and permits positive lubricaton of the governor parts. The governor may be removed without dismantling. Thrust collars are said to be made by a special process which assures their faces being exactly perpendicular to the shaft. Bearings, valve seats and packing are made to gages and are interchangeable and readily removable. There are no high pressure joints on the horizontal face of the machine. The nozzles are reamed to suit the steam conditions and capacities. The blading is of bronze, monel metal, or cupro nickel, according to steam conditions.

The two members of the unit are self contained and standard, and one may be replaced conveniently without dismantling the other member. The machines will be built in capacities up to 600 hp. for condensing and non-condensing service. They will also be offered complete with generator, pump and fan sets.

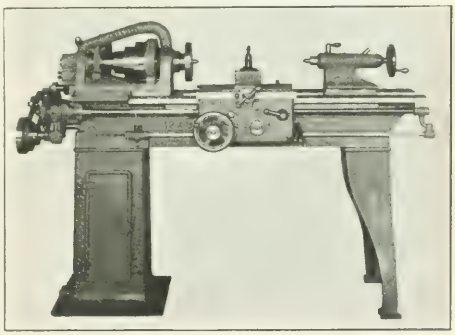
Light Manufacturing Engine Lathe

The latest addition to the line of the Hendey Machine Co., Torrington, Conn., is the Junior model 12-in. engine lathe, shown in the accompanying illustration. This is a plain-geared lathe with belt feed and is intended essentially for light manufacturing and also for use in technical and vocational institutions.

The headstock, tailstock, carriage, apron and lead screw are of the company's standard design. The leg at the headstock end is of the cabinet type, fitted with shelves and partitions for storage purposes. Suitable guards are provided for inclosing the feed belt and the feed gears. The screw cutting is effected through ordinary change gears, the power cross feed and longitudinal feed being driven by a feed belt over two 3-step cones. The feed-belt speed is modified within a wide range by the use of change gears. A two-speed countershaft is provided and both speeds may be run in the same direction at different r.p.m., giving 16 spindle speeds. The starting, stopping and reversing of feeds is controlled from the apron.

The lathe shown has an actual swing of 12⅝ in., and a 5 ft. length of bed, other lengths of bed being available. The swing over the carriage is 7¼ in. and the distance between centers is 27¼ in. The length of carriage bearing on the bed is 16⅝ in. The dimensions of the front and the back bearing are 1⅞ to 2⅜ in. taper, 3 11-16 in. long; and 1 13-16 to 2 3-16 in. taper, 2⅜ in. long, respectively. The hole through the spindle is 15-16 in., the nose of the spindle being 2 in. in diameter, 8 threads per in. and the tail spindle 1 21-32 in. in diameter.

The proportion of gearing in the head is 10.4 to 1. Feeds are by belt or gear. The lead screw is 1 in. in diameter, 6 threads per inch, and the machine will cut screws 2 to 36 per in. Feed and screw cutting reverse is at the apron, and the cross-feed screw is graduated in thousandths of an inch. Cone diameters are 2⅝,



Plain Geared Engine Lathe with Belt Feed for Light Manufacturing

4¼, 5⅞ and 7½ in., countershaft pulleys being 12 by 3½ in. and running at 160 and 210 r.p.m.

All attachments for the 12 in. standard lathe are applicable to this machine. A compound rest, center rest, power cross feed, and large and small face plates are included in the equipment.

New Bureau of Standards Standard Samples

A new standard sample of tin-base bearing metal No. 54 is now being issued by the Bureau of Standards with a provisional certificate. This sample has the approximate composition: Tin, 88 per cent; antimony, 7 per cent, and copper, 4 per cent. In addition it contains small amounts of lead, iron, bismuth and arsenic. The price of this sample is $2 per 140 grams.

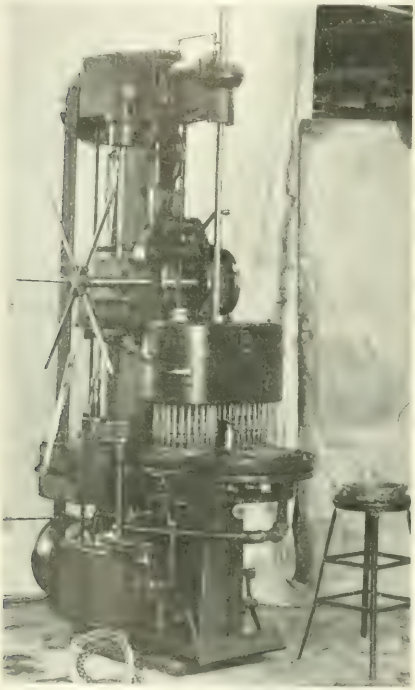
The following renewals are also ready for distribution at the price of $2 per 150 grams: Renewal No. 14b of basic open-hearth 0.8 per cent carbon steel No. 14a; renewal No. 19b of acid open-hearth 0.2 per cent carbon steel No. 19a; renewal No. 20b of acid open-hearth 0.4 per cent carbon steel No. 20a.

High Production Countersinking Machine

An automatic machine in use at the plant of the Hudson Motor Car Co., Detroit, for countersinking holes in both sides of a clutch ring, the production from which is 600 plates per hr., or 520 holes countersunk per min., is shown in the accompanying illustration.

This equipment was built by the Fox Machine Co., Jackson, Mich., and is claimed to have displaced three of four men, whom it was hard to keep on the job because of the muscle exertion in keeping up the continuous hand movement. On a single spindle drill 60 pieces were done an hour and on the machine illustrated 300 pieces.

The machine is full automatic, the head moving ½ in. up and down by a cam movement at the rate of 10 cycles per min. The table is rotated by gearing which is timed to move while the head is going



Automatic Machine for Countersinking the Holes in Both Sides of a Clutch Ring. The two cluster heads have 26 spindles each, and the production is 600 plates, 31,200 holes, an hour

up, the rotation being one-third of a revolution per cycle on head, or 3 1-3 r.p.m. A two cluster special head having 26 spindles each, is employed, as shown, Forced lubrication is provided both in the gear box on top of the column and also in gear chest on the reciprocating head. Oil is prevented from running down on the spindles by a special construction. Drilling compound is delivered by pump directly to the center of the table.

The drive is through an automobile-type dry-disk clutch at the top of the column and controlled by the foot lever shown at the bottom. The weight of the machine is 2450 lb. It is designated as the No. 12 automatic countersinking machine.

The safety trophy awarded by the Carnegie Steel Co. to the plant making the best showing in accident prevention each month, was won by the Edgar Thomson works, Braddock, Pa., for the month of July. The plant had no lost time accidents during the month.

Plans of the Coast Range Steel Co.

The Coast Range Steel Co., Vancouver, B. C., has been given support by the British Columbia government to the extent of a legislative measure guaranteeing one-third of the company's bonds. In return the company proposes to construct a blast furnace plant within 18 months, to have a capacity of 500 tons per day. It is also proposed to erect a large steel plant later. Industrial men in British Columbia anticipate that the establishment of a steel industry in the Province will make it possible to produce a wide variety of finished products at a cost that will enable the company to take care of both local and export business. H. J.-Landahl, a member of the deputation that waited on the Provincial Cabinet seeking Government support for the proposed industry, made the following statement:

"We have already been assured by the advisory committee, under the Trade Facilities Act, of Imperial Government support for one-third of our proposed issue of $10,500,000. We have been assured by the Dominion Government that it will do its part. We now have the Provincial Government assuring us of the remaining third. The money awaits us in London, conditional only upon our receiving these assurances. We can now go ahead."

Mr. Landahl further stated that the company has rich ore deposits in the province, and that behind the organization are the skill and experience of three of the greatest iron, steel and coke oven firms in the British Empire. "These three firms have undertaken to come into British Columbia and build up an iron and steel industry," he said. "The plant will be erected under the direction of Vickers, Ltd., as the company's technical adviser. The furnaces and ovens will be manufactured by Simon Carves, Ltd., builder of furnaces and coke oven plants. The steel mills which are to follow in the course of the next few years will be built by the Wellman-Smith-Owen Engineering Co. These arrangements have already been made and it was this information the company laid before the legislature."

Algoma Steel Corporation Activities

TORONTO, Aug. 21.—Wilfrid H. Cunningham, of Philadelphia, president of the Lake Superior Corporation, Sault Ste. Marie, Ont., while passing through Toronto on his way to the Soo to make the annual inspection of the company's plant, stated that business was fair with the Algoma Steel Corporation. Its rail mills are running to capacity on orders received from the Canadian Pacific Railway and the mills have plenty of coal on hand to complete all existing business. Regarding future business, Mr. Cunningham said all depends on coal supply. The plant to-day has some 60 days' supply on hand and a little more coming in, with some more arranged for. It was very doubtful, however, whether the mills would accept any big orders offering for spot delivery, until the coal situation clarified. The small work mills are operating at a fair rate, though more or less on hand to mouth orders.

Will Open Fluorspar Mine

The Webber-Wood Spar Mining Co., 911 Third Street, Eldorado, Ill., recently incorporated with $50,000 capital stock, will soon open a fluorspar mine on land which the company owns five miles from Rosiclaire, Ill. A force is now at work cutting through the vein to determine how much fluorspar is available. Until this has been ascertained, no mining machinery will be purchased. Officers are C. E. Webber, president; D. L. Wood, vice-president; W. E. Troutman, second vice-president; Charles Burks, secretary-treasurer.

Haverstick & Co., steam and mill supplies, Rochester, N. Y., have entered on a program of large expansion of their business. A new concrete warehouse, pipe and machine shop, with private railroad siding, is now in course of construction, at an expenditure of $100,000 and will be ready for occupancy about Jan. 1. The following men have been added to the sales organization: Jas. C. Bashford, Victor C. Bassage, W. D. Hasley, H. A. Hopkins, R. Richardson, A. M. Seymour.

STEEL TREATERS' CONVENTION

Program for October Meeting and Exhibition in Detroit—Drop Forgers to Join

Final arrangements are being made for the fourth international steel exposition and conventions of the American Society for Steel Treating and the American Drop Forging Institute to be held in the General Motors Building, Detroit, Oct. 2 to 7. The exposition will be the largest of the kind ever held, as 99 per cent of the floor space has been sold and many exhibitors who desired to be present will be unable to be accommodated. There will be quite a number of exhibitors who have not been present at previous shows because the drop forging institute is holding its annual convention simultaneously and in the same building with the American Society for Steel Treating, and many members of the Drop Forging Supply Association are accepting the opportunity to exhibit.

The General Motors Building is especially adapted for exhibition purposes. In the large exhibition hall there are 30,000 sq. ft., while the two wings on the same floor leading to the exhibition hall have 20,000 additional square feet of display space. Arrangements have been made so that in one section of the hall gas furnaces will be in operation, while electrical furnaces and other equipment requiring power will be displayed throughout the hall. Practically all of the exhibits will be in operation.

At the three previous expositions held at Chicago, Philadelphia and Indianapolis, the attendance has been in excess of 10,000 and it is expected that because of the great interest in Detroit as a heat treating center as well as a market for steel productions the attendance will be in excess of 15,000. The railroads have granted fare and one-half for the round trip to Detroit on account of the conventions.

The following tentative program is announced:

Monday, Oct. 2

2 p. m.—Opening session; L. A. Danse, chairman:
Address of welcome, L. A. Danse; welcome to Detroit, Mayor Cousins; response, President F. P. Gilligan; report of tellers, C. G. Shontz; report of national secretary, W. H. Eisenman; report of treasurer, J. V. Emmons; president's address, F. P. Gilligan.

Tuesday, Oct. 3

10 a. m.—Carburizing session:
"Carburizing and Decarburizing in Case Hardening," by H. B. Knowlton.
"Case Hardening," by A. H. d'Arcambal.
"Irregularities in Case Hardened Work Caused by Improperly Made Steel," by E. W. Ehn.
"Some Features of Industrial Heat Treating Electrically," by C. L. Ipsen.
2 p. m.—Delegate session; chairman T. D. Lynch, vice-chairman, A. W. F. Greene:
"The Mining and Metallurgy of Nickel" (illustrated), by A. J. Wadhams.
4 p. m.—Symposium on metallurgical education: "Not How but What to Teach."
4 p. m.—Practical round table discussion on heat treating; H. J. Lawson, chairman.
9:30 p. m.—Smoker and entertainment in auditorium, General Motors Building.

Wednesday, Oct. 4

10 a. m.—General heat treating problems:
"Heat Treating in Lead," by R. B. Schwenk.
"Furnace Atmospheres and Their Relation to Formation of Scale," by G. C. McCormack.
Paper by J. H. Nelson.
"Thermal Transformation of Some Chrome-Vanadium Steels," by J. S. Vanick.
"Heat Treating of Auto Springs," by A. E. Fuller.
2 p. m.—American Drop Forge Institute session:
The papers presented by the American Drop Forging Institute will be of interest and practical value to the forging industry.
4 p. m.—Practical round table discussion on heat treating; chairman, John Halbing.
9 p. m.—Carnival, frolic and dance; auditorium, General Motors Building.

Thursday, Oct. 5

10 a. m.—Tool steel session:
"The Uses and Abuses of Tool Steels from the Standpoint of the Producer and Consumer," by [illegible].
Paper by A. E. White.
"Effects of Structure upon Machining of Tool Steel," by J. V. Emmons.
"A Metallographic Study of Hollow Drill Steel," by N. B. Hoffman.
2 p. m.:
"Some Failures in Aircraft Plane and Engine Parts," by J. B. Johnson.
Paper by H. J. French.
Paper by F. M. Nair.
"Deterioration of Steel and Wrought Iron in Hot Gaseous Ammonia," by J. S. Vanick.
4 p. m.—Practical round table discussion on heat treating problems; Robert Vincent, chairman.
7 p. m.—Annual banquet of American Society for Steel Treating and American Drop Forging Institute; ball room, Statler Hotel.

Friday, Oct. 6

10 a. m.:
"Heat Treatment and Properties of Duralumin," by H. C. Kneer.
10:45 a. m.—Meeting of Standards Committee of American Society for Steel Treating; T. D. Lynch, chairman.
10:45 a. m.—"Modern Methods in the Manufacture of Steel," moving pictures.
2 p. m.—Research session; A. E. White, chairman:
"Governmental Research," by W. M. Corse.
"Research on Activities of Technical Societies," by A. D. Flinn.
"The Research Laboratory," by F. O. Clements.
"The Executive and Research," by Dr. John A. Mathews.

Plant Visitation

W. B. Hurley, chairman of the plant visitation committee, is making arrangements for the visitation of the following plants: Ford Motor Co., Highland Park and River Rouge Plants; Cadillac Motor Car Co., Central Forge & Gear Co., Lincoln Motor Car Co., Detroit Steel Products Co., Detroit Twist Drill Co. and Hudson Motor Car Co.

There will be two sessions of plant visitations each day, both of them starting from the General Motors Building, the morning trip at 10 and the afternoon trip at 2.

Symposium on Metallurgical Education

Owing to the requests from many members of the American Society for Steel Treating in the teaching profession that an opportunity should be given them to have a conference with metallurgical engineers who are engaged in commercial industries so that the universities and colleges might better prepare their students for the greatest usefullness, a symposium on metallurgical education has been placed on the program of the convention of the steel treaters.

Prof. S. L. Goodale, Carnegie Institute of Technology, will be chairman of the session, while others contributing to the symposium will be Howard J. Stagg, assistant manager Halcomb Steel Co.; H. B. Knowlton, central continuation school, Milwaukee; Prof. John Keller, iron and steel extension department of Purdue University; Prof. H. M. Boylston, professor of metallurgy, Case School of Applied Science; Dr. N. B. Hoffman, metallurgist Colonial Steel Co.; Mr. McCleary, metallurgist Dodge Motor Car Co.; Dr. John A. Mathews, president Crucible Steel Co. of America; Prof. O. A. Knight, State College, Pa.; Prof. Frederick Crabtree, Carnegie Institute of Technology, and Dr. C. M. Johnson, Crucible Steel Co. of America.

This symposium is the first of its kind and is expected to be productive of desirable results and to be a regular feature of the future conventions of the American Society for Steel Treating.

Symposium on Hardness Testing

The hardness testing committee of the National Research Council will hold an important symposium during the convention. The symposium will be in charge of Major A. E. Bellis, formerly metallurgist, U. S. Armory, Springfield, and at present president, Bellis Heat Treating Co., New Haven, Conn. The program follows:

"Object of Committees, Investigation and Questionnaire."

by Major A. E. Bellis, chairman of hardness testing committee.

"Significance of Hardness Tests," by Dr. H. P. Hollnagel, General Electric Co.

"Hardness and Its Relation to Magnetic Properties," by Prof. R. S. Williams, Oberlin College, Oberlin, Ohio.

"Discussion of Methods of Hardness Testing."

At the annual banquet of both societies C. F. Kettering, president Dayton Engineering Laboratories Co. and a member of the American Society for Steel Treating since its organization, will serve as toastmaster. President Burton of the University of Michigan, one of the best dinner speakers in the country, will address the banqueters. There will be other speakers of national prominence, including the Governor of Michigan and some chief executives of the largest steel companies in the country. The number of banqueters will be limited to 1000.

Entertainment

Extensive plans have been made by the Detroit chapter for the entertainment of members and guests. Monday evening, Oct. 2, has been left open in order that the visitors may have the opportunity to thoroughly study the exhibits which will be open nearly every evening as well as each day. On Tuesday evening, Oct. 3, beginning at 9.30, Frank G. Davis, chairman of the entertainment committee, with the assistance of the Detroit chapter, will give a smoker in the large auditorium of the General Motors Building. Extensive plans and arrangements are being made which promises to eclipse everything that has ever been offered to the members of the society.

On Wednesday evening, Oct. 4, beginning at 9 in the main auditorium of the General Motors Building, the Detroit chapter will hold a carnival, frolic and dance for the members of the Society and their guests. All of the entertainment features of the carnival as well as the necessary adjuncts for a joyous frolic will be on hand and the local committee is sparing no expense to make this event one long to be remembered by those fortunate enough to be able to attend. On Thursday evening, Oct. 5, is scheduled the annual banquet at the Statler Hotel.

METAL TRADES CONFERENCE

Branch Secretaries Hold Their Semi-Annual Meeting at Milwaukee

All but four of the twenty-four local branch secretaries of the National Metal Trades Association met on Aug. 16 and 17 at the Milwaukee (Wis.) Athletic Club for their semi-annual conference. In opening the meeting, W. W. Coleman, Bucyrus Co., president of the national association, gave an interesting review of the political history of Milwaukee and Wisconsin. He pointed out that immigrants of a radical and socialistic tendency were in the majority among the early settlers. At one time a bill was introduced in the State legislature which required that all property be divided every Saturday, or oftener if necessary. It was defeated.

Some of the visiting secretaries were surprised to learn that for many years the metal trades have predominated in the industrial activity of Milwaukee instead of the brewing industry.

Papers on various phases of their work were discussed by the secretaries. These included "An Up-to-Date Employment Bureau," by Chester M. Culver; "Objections to Legislation Favoring Unemployment and Health Insurance and Old Age Pensions," by J. M. Manly; "Experience of the Grand Rapids Branch of the National Metal Trades Association with Its Mutual Workmen's Compensation Insurance Bureau," by A. W. Blodgett; "Comparative Wage Schedules," by W. J. Cronin; "What is 'Normal,'" by Lewis Atherton; "Legislation," by H. A. Jansen; "Superintendents' and Foremen's Clubs," by Paul Blatchford; "Need and Value of Economic Education of Employees," by Donald Tulloch, and "Turnover—Causes and Remedy," by T. F. Silkman.

A committee was appointed by Chairman Fairbairn to devise a more comprehensive comparative statement of wages paid in the various localities, than that which has been issued for some time by the local branches and the national office of the association.

The result of the survey recently completed by the association in regard to industrial betterment work was presented in tabulated form.

H. J. Wiegand, Cutler-Hammer Co., who is president of the Milwaukee branch; Commissioner Sayre, Councilor Hibbard and Secretary Fischer of the National Metal Trades Association and some ten secretaries of allied associations; J. B. Doan, American Tool Works Co., Cincinnati; Paul T. Norton, Case Crane & Engineering Co., Columbus, Ohio, and J. W. O'Leary, Arthur J. O'Leary & Son Co., Chicago—the last three being members of the executive committee of the national association—attended the meeting.

American Electrochemical Society's Fall Meeting

Final arrangements for the forty-second general meeting of the American Electrochemical Society, at Montreal, Que., Sept. 21, 22 and 23, are being made. The technical program for Thursday, Sept. 21, will include papers on electrolysis and electroplating. The recently organized division on electrodeposition (G. B. Hogaboom, chairman; William Blum, secretary) will be well represented and take active part in the discussion. One of the papers will deal with the physical properties of electrolytic iron. There will also be papers on zinc, brass, and other electro deposited metals.

On Thursday afternoon and Friday morning, a symposium on "Industrial Heating" will be in progress. The electrothermic division (Bradley Stoughton, chairman; Colin G. Fink, secretary) which held a successful symposium on "Electric Cast Iron" at the Baltimore meeting, in April, will again be in charge. Twelve papers especially prepared for this session and dwelling on industrial heating in electric furnaces, will cover history of industrial heating; principles of design of furnaces; comparison of fuel costs in different types of electric furnaces, and with combustion furnaces (in this connection, electric energy would be estimated as a "fuel cost"); resistor materials; specific heats; electric conductivity of insulating materials at industrial furnace temperatures; heat emissivity, and heat transfer.

There will be an excursion to Shawinigan Falls to inspect the various industrial plants of one of the most interesting centers on the continent. A popular lecture on the "Progress in Physical Science" is scheduled for Thursday evening. Section Q will be in charge of an old-fashioned smoker on Friday evening. The headquarters for this meeting will be the Hotel Windsor.

International Chamber of Commerce

The second general meeting of the International Chamber of Commerce will be held in Rome, Italy, March 18-24, 1923. Present indications are that there will be from 200 to 300 American business men in attendance. Among those who have made reservations on the Steamship Caronia for the cruise organized by the American Section for the meeting are:

A. C. Bedford, chairman Standard Oil Co., New Jersey, 26 Broadway, New York; Julius H. Barnes, president Barnes-Ames Co., 42 Broadway, New York; William Butterworth, president Deere & Co., Moline, Ill.; Edward N. Hurley, Hurley Machine Co., Chicago, formerly Chairman United States Shipping Board; R. P. Lamont, president American Steel Foundries, Chicago; and Clarence H. Howard, president Commonwealth Steel Co., St. Louis.

General Resumption of Mining Is Probable

Decided Change Comes Suddenly in the Pittsburgh District —Signing of the Cleveland Agreement Is Now Expected

PITTSBURGH, Aug. 22.—A marked change has developed in the past 24 hours with regard to the prospect of a settlement of the coal strike. It is now believed that a general resumption of bituminous coal mining will come within the next few days. Even as recently as yesterday the thought was that coal operators representing the great bulk of the tonnage in this and nearby fields would continue to hold out against signing the agreement reached last week in Cleveland, but to-day has brought definite signs of a break in the ranks of these operators and the general feeling is that before the week ends the Cleveland terms will be accepted by practically all of the producers who hitherto have operated under agreement with the unions.

Disappointment is felt in a good many quarters over the sudden change in the situation since it apparently spells a victory for the union miners and some express the view that it merely means the postponing of a definite settlement until next spring when a new agreement will have to be negotiated.

The H. C. Frick Coke Co. to-day posted a notice restoring the Sept. 1, 1920, wage scales in the Connellsville district except on common labor, which goes to $3.60 per day of nine hours, as compared with $5.40 per day in the 1920 scale. This class of labor lately has been getting $3 per day and the increase figures out exactly 20 per cent, the same increase which the Steel Corporation will make in the steel mills effective Sept. 1. The increase in the wages of the coal miners and coke oven operators goes into effect to-morrow, and the scale of inside mine labor, which has been from $5 to $5.05, now goes to $7.50 to $7.55.

The one favorable development in connection with the coal strike, from the standpoint of the steel industry here, is that the largest gains in production have been in the Connellsville district, where so many of the steel companies have their own mines. The failure of the union leaders at the Cleveland meeting to give consideration or recognition to those in the non-union fields that joined the union during the strike convinced these men that they have not been fairly dealt with and they have been showing considerable anxiety lately to get back to work. The H. C. Frick Coke Co., a Steel Corporation mining subsidiary in the Connellsville district, has benefited particularly as a result of this change in the attitude of the men.

The Pittsburgh Coal Producers' Association, the Freeport Thick Vein Operators' Association, the Northern West Virginia Coal Producers' Association, and the operators in the Kanawha, W. Va., district and in the Cumberland, Md., district all have had the Cleveland agreement before them for consideration, and all of them so far have refused to sign, but may do so. The Cumberland operators announced that they would pay the scale in effect prior to the strike, but in taking this action they emphasized that it did not carry with it recognition of the union or a continuance of the check-off scheme.

Desperate Efforts of Union Leaders

UNIONTOWN, PA., Aug. 19.—Production in the Connellsville bituminous region continues to increase with a larger number of workmen manning plants in the territory. The Monongahela division, Pennsylvania Railroad, today placed cars at 12 plants on the division which, it is said, will resume work on Monday morning after an idleness since last April 1.

A gain of some 500 cars in the week's shipments over shipments for the preceding week out of the region is indicated in estimates available here this evening.

It is estimated that between 150 and 200 men are being imported into the region every 48 hours. Operators, it is understood, have given their former employees their last opportunity to return to work. Failure to comply will result in immediate evictions and the placing of new workmen in the homes.

Desperate efforts are being made by union leaders in the Connellsville region to hold their men in line while other union workers go back to work in the union fields. Outwardly, the union men in the region seem more determined than ever. Under the surface, however, a far different condition exists. There is a pretty general feeling that the union is preparing to throw overboard the Connellsville miners who struck out of sympathy with the union men and then affiliated themselves with the union. That these men are asking questions was indicated in a statement issued over the signature of William Feeney and three other union leaders in which they declared that the "full support" of the union would be placed back of the men in this region until they win their fight. What this "full support" is was not stated. Most observers believe there will be a break in the union ranks within the next fortnight or so unless the union extends material assistance in the way of financial benefits and commissary. The strikers in the region are continuing their solicitations for help throughout the county, but are not getting very much support. The answer to their appeal usually is "go back to work and earn the money you need." The strike is almost wholly lacking in public support in the county.

Reports that there would be an increase in wages in the region were spread during the week. These were effectually suppressed by operators. The position of the operators is unmistakable. The mines will be operated under the present scale and there will be no recognition of the union. Developments during the week have served to emphasize this stand by the operators.

May Reduce Number of Foreigners

New phases in the labor situation are developing which are being watched with great interest by those involved in the industrial development of the region. Stories were published during the week that a large element of the foreign population in the region would be weeded out in the return to operating normalcy and would be replaced by men being brought into the region. The majority of the men imported are Americans and negroes. One large company alone brought in 350 new men in three days.

Just to what extent the alien workers in the region will be eliminated remains to be seen. A large part of the responsibility of the strike in the region, in the opinion of observers, may be charged to activities of certain alien organizations. These activities have been brought formally to the attention of the Department of Justice and an investigation is under way, although the department hesitated to proceed, it is stated, for a time until the facts were more elaborately presented. The demand for action was taken to the Federal department by the new Fayette County Operators' Association.

No specific alien organizations have been named and no specific foreign group is charged with these activities in the absence of complete investigation by Federal officials.

There is a growing sentiment against the influx of

colored workmen. In some labor groups there is a tendency to demand that the men who have joined the union recognize the fact that they have lost the fight for the organization of the region and return to work in order to prevent a further influx of workers.

The whole situation is one of watchful waiting. The operators, for the most part, are proceeding with efforts to return to normal operation. Especially is this true of the H. C. Frick Coke Co., which is now operating at around 40 per cent.

Further Recessions in the Mahoning Valley

YOUNGSTOWN, Aug. 22.—Though operating schedules of Valley iron and steel interests continue to show recessions, makers express hope that the low point in the current movement has been reached, and the next change of consequence will be upward. Plants are operating on a narrow margin of coal, but it is expected additional suspensions will be largely averted.

The Youngstown Sheet & Tube Co. has suspended the third blast furnace in its East Youngstown complement, leaving but three independent stacks pouring in the Mahoning and Shenango Valleys, and nine furnaces of the Carnegie Steel Co., five at the Ohio Works, Youngstown, and four at New Castle, Pa. The Brier Hill Steel Co. and the Republic Iron & Steel Co. are each operating one furnace.

The Bessemer department of the Sheet & Tube company is scheduled for three days' production this week, when it will become idle. One merchant bar mill and one skelp mill, which were active last week at the Sheet & Tube property, are down, while schedules of the Republic company provide for one less bar mill at the Brown-Bonnell works.

The Girard plant of the A. M. Byers Co., Pittsburgh, producer of wrought iron pipe, is wholly idle.

While 106 sheet mills are scheduled by Valley interests, the actual operating number is somewhat less, varying from day to day, and dependent upon labor supply. Last week, for instance, schedules met serious interruption because of the hot wave which engulfed Middle Western States, causing many hot mill workers to desert the rolls.

Of the 51 independent open-hearth furnaces in the Mahoning Valley, 33 are charged. Fabricators are short on some steel supplies, their stocks being unbalanced, but their production is largely unaffected.

Aside from the suspension of its blast furnace, the Trumbull Steel Co. has met with little interference to its activity. The company is maintaining its open-hearth department and finishing mills at a normal rate.

Schedules of the principal Valley interests, for the week of Aug. 21, are:

Youngstown Sheet & Tube Co.—One blast furnace, six open hearths, Bessemer three days, two blooming and bar mills, three skelp mills, nine pipe furnaces, 14 sheet mills, and partial wire, rod and conduit operations.

Republic Iron & Steel Co.—One blast furnace, eight open hearths, one blooming and one bar mill, one skelp mill, four pipe furnaces, three merchant bar mills and 16 sheet mills at the Niles plant.

Brier Hill Steel Co.—One blast furnace, seven open hearths, blooming and bar mills, both plate mills and 28 sheet mills scheduled.

Trumbull Steel Co.—Seven open hearths, blooming and bar mills, three strip mills and 44 sheet and tin plate mills.

Sharon Steel Hoop Co.—Five open hearths, blooming and bar complements, nine sheet and four strip mills.

Carnegie Steel Co.—Ohio Works, 90 per cent; Upper Union Works, normal; Lower Union Works, idle; McDonald bar mills at 90 per cent.

Serious Shortage in Copper Country Feared

DETROIT, Aug. 19.—The Lake Superior copper country, including the properties of the Calumet & Hecla Mining Co., is facing the prospect of a fuelless winter and consequent suspension of operations, according to information which has come to the office of the Michigan Manufacturers' Association in Detroit. Practically all coal used in both the copper and iron ore mines of the upper peninsula of the State is shipped by boat from Lake Erie ports and as less than 3,000,000 tons of the 8,000,000 annually required at upper lake ports has gone forward this season, this represents proportionately what the fuel situation is in the mining region of the State which is included in the "head of the lakes" area.

Because of the fact that the copper mines have been closed during the last two years due to market and labor conditions, only reopening during the last spring and summer, the prospect of another enforced shutdown at a time when market conditions are constantly improving is causing considerable anxiety among both operators and workers. A shut-down of the Michigan mines would have a far reaching effect in the industry, as the State ranks third in copper production, with a normal output of between 150,000,000 and 200,000,000 pounds.

Federal Fuel Administrator Spencer, at Washington, has given assurance that increased shipments of coal would be consigned to the head of the lakes while the season of navigation is open, but current shipments are far from sufficient to preclude the possibility of a large shortage.

Grover C. Good, of the Globe Knitting Co., Grand Rapids, has been named chief of the manufacturers' division of the State Fuel Administration office. He will serve as chairman of a committee of manufacturers named by the Michigan Manufacturers' Association which will devote its time to the task of procuring enough fuel to keep as many industries of the State going as is possible.

The industries of Michigan have contracts with the coal mine companies which not a few have declared they will not permit to be broken. They contend that there is no existing Federal or State legislation authorizing the priority rules laid down by the Federal fuel office whereby certain industries may be classed as nonessential in the distribution of coal and they declare that they will hold railroads liable for damages in the event coal loaded at the mines, in compliance with contracts, is shipped elsewhere. The Chesapeake & Ohio Railroad, over which much of Michigan's industrial fuel is shipped, has taken the stand that all fuel consigned to its lines will be delivered to consignees regardless of priority orders to the contrary, so far as it is able to handle such shipments.

Survey of Fuel Conditions

John L. Lovett, managing director of the Michigan Manufacturers' Association, representing 1200 industrial firms, with approximately 500,000 employees, is completing a questionnaire to determine the amount of fuel on hand for industrial purposes. Out of the 1200 forms sent out, about 400 have been returned showing a surplus of 250,000 tons for those industries reporting. This is equivalent to a 30 days' supply, on the average. Fully 90 per cent of the industries of Michigan are almost exclusive users of power furnished by the two largest public utilities of the State, the Detroit Edison Co. and the Consumers' Power Co.

Effects of the coal shortage are beginning to be reflected in the closing of some of the smaller factories and the suspension of work in certain departments of the larger plants. Two of the largest motor car factories in Detroit are running with less than a week's supply of coal ahead. Suspension of these two plants alone would throw 50,000 to 60,000 men out of employment.

Railroad bidding for coal in the open market has created a runaway market in the Detroit area, $12 and $15 a ton frequently being paid speculators who are in some unexplained manner obtaining large shipments while the State Fuel Administration reports that practically no so-called priority coal has been shipped to

Michigan because of the fact that such orders have not been accompanied by guarantees of payment as required by the Federal Administration.

Motor car manufacturers have been forced generally to curtail operations owing to their inability to obtain freight cars for both in and out bound shipments. Body makers report considerable difficulty in obtaining sheet metal. Most of the factories are using motor trucks between Detroit, Chicago, Cleveland, Toledo and other nearby parts producing centers in obtaining materials which the railroads have been unable to move. These truck shipments, however, are confined to smaller parts. Inventories are at a very low mark owing to the fact that manufacturers, this season, have been wary of again being caught with huge supplies on hand as they were last year when prices began tumbling.

The Employers' Association of Detroit reports a gain of 812 in employment among 79 firms reporting during the current week. The total this week is 182,545.

British Miners' Reaction to Supplying Coal to America

In connection with American coal orders placed in England and Wales, the miners in the Rhondda district have passed a resolution requesting the South Wales executive council to take steps to prevent the coal from being supplied, as its shipment would tend to break the strike of the American miners. This resolution has been referred, by the executive council, to the International Miners' Committee.

It is also questioned whether the coal-loading docks are equal to the demands made upon them by the rush of American orders. This has resulted in some discussion favoring the three-shift system of working at the docks, but it is reported unlikely that such a step will be taken. It is regarded as possibly opening the door to labor trouble, and the railroad and dock interests are both opposed to it, especially as the present two-shifts (each of 8 hr. actual work) are reported giving results considered satisfactory.

Washington More Optimistic

WASHINGTON, Aug. 22.—Negotiations between miners and operators during the past week have brought about additional production of bituminous coal at the rate of approximately 85,000,000 tons per year, and it is now estimated that the total output is at the rate of about 285,000,000 tons, against a normal output placed at 550,000,000 tons. This has given a tone of optimism to the coal strike situation, enhanced by the gradual reopening of fields that have followed one after another such as in southern Ohio, sections of Virginia, West Virginia, and Kentucky, with the hope that other settlements are on the verge of being put into effect so as to reopen all of the fields, especially in Pennsylvania. It also is believed the anthracite strike is about to be settled and output resumed in the near future.

The railroad strike is to be the subject of a further parley in New York on Wednesday of this week, and while administration circles which are closely following negotiations between railroad executives and representatives of the brotherhood as "mediators," a more cautious tone has been adopted as to their outcome. At the same time officials profess to believe that a settlement of the seniority right issue is near at hand. It is recalled, however, that a number of favorable predictions have failed to materialize, and for that reason forecasts are made with considerable circumspection.

It is reported that 60 car-loads of Russian manganese a day are shipped from Tchiatouri, Georgia, and transhipped in Shorapani, where the loading is delayed owing to a lack of cars. Preliminary work is going on at Tchiatouri for the exploitation of further mines, which causes an influx of workmen.

LOWER COAL PRICES

Valley Manufacturers Obtain Some Relief—Pipe Inquiry Is Active

YOUNGSTOWN, Aug. 22.—Firmer steel demand is reported by Valley makers, with price advances becoming applicable on sheets, pipe, bars, plates and wire products. While coal prices are perceptibly softening, producers do not look for a restoration of prices existing prior to July 1 for some time. Pennsylvania coal is now purchasable at $6.50, in comparison with recent maximums of $8 and $9, and industrial consumers believe that further reductions impend which will bring coal down to a $5 base price for the time being.

Coal supply continues to be the dominating influence in the market. Larger tonnages are coming into the Valleys from the Connellsville district, but railroad congestion is still holding up supplies from the West Virginia, Kentucky and Tennessee fields.

Pipe makers report more active inquiry for lapweld sizes, with substantial unfilled commitments on buttweld sizes. The Republic company is operating three lapweld units and one buttweld mill. Line pipe and oil country goods are in active demand.

One Valley interest has made substantial purchases of Bessemer steel lately, getting some tonnage from a Steel Corporation subsidiary and some from an independent maker at Pittsburgh. The $35 quotation on semi-finished material is now only nominal, applying simply to contract business. Where new tonnage may be placed, it is necessary to pay from $2 to $3 more per ton.

Sheet production has been affected very little by the current strikes. Price advance by the American Sheet & Tin Plate Co. on fourth quarter business strengthens the position of those independents which have been quoting from 2.50c. to 2.60c. for blue annealed; 3.30c. to 3.40c. for black and 4.30c. to 4.40c. for galvanized.

Strip demand from the automobile industry is maintaining production in this direction, with prices firm. Hot-rolled strips range from 2.50c. to 2.75c. The Ford Motor Co. is absorbing large tonnages produced in the Valleys.

The Brier Hill Steel Co. has been entering some important plate business and both its 84-in. and 132-in. mills are working off tonnages. Fabricating interests and tank builders are the principal factors in the market. One boiler and tank interest in the Valley, which recently enlarged its capacity, is operating day and night shifts.

Automobile Production High

Reports to the National Automobile Chamber of Commerce indicate that July production of passenger cars and trucks approximated 246,600, compared with the high record of 288,000 in June. This is the highest July in the history of the industry, exceeding July, 1921, by 39 per cent and July, 1920, the best previous July, by 20 per cent. "The July record," says *Automotive Industries*, "brings total production for the year up to 1,403,000 cars and indicates that 1922 will be the industry's greatest year—unless the railroad and coal strike situation exerts a serious curtailing influence on manufacturing activities for the rest of the year."

The St. Louis Coke & Chemical Co., Granite City, Ill., has completed a 17-in. gas line which takes surplus gas from its blast furnace to a gas holder at the nearby Roberts coke oven plant for use at the ovens. A gas washing plant has also been built at the blast furnace. At the coke ovens, a Schuette and Koerting blower is used, having a capacity of 500,000 cu. ft. of gas per hour.

The plant of the Ohio Steel Products Co., Mineral Ridge, Ohio, which has been shut down for about 18 months, will be offered for sale shortly. The company was organized with a capital stock of $500,000, $300,000 of which has been issued and engaged in the manufacture of conduit tubing and other steel products.

COST OF THE THREE-SHIFT DAY

Canvass Being Made of Iron and Steel Manufacturers to Determine What the Increase Will Be

The committee of the American Iron and Steel Institute appointed after the conference with President Harding in May to deal with the problem of the 12-hour day in the iron and steel industry is making a thorough canvass of the situation preparatory to making its report in the coming fall. In gathering facts the committee is carrying its inquiry into all branches of the industry, and all producers of pig iron, steel ingots and semi-finished and finished steel products are being asked to contribute information.

The questionnaire adopted, as will be seen in the data sheet on the following page, goes thoroughly into the problem. The aim is to get complete statistics of the present distribution of forces in respect to 8-hour and 12-hour shifts, also of the number of workers whose day is 10 hours, as in the case of machinists, molders, electrical workers and workers in other trades tributary to mill operations.

The manufacturers are asked to indicate what percentage of hourly wage advance would be necessary in their opinion to compensate for the fewer hours' pay under the three-shift plan. They are also asked to indicate what the increase in their annual pay roll would be, assuming that the hourly rate of pay is increased 50 per cent under a change from 12-hour to 8-hour turns. Calculations are also to be made indicating the increased cost per ton of all products under a change from 12-hour to 8-hour shifts.

TRIBUTE TO CALVIN W. RICE

A Mission to the Congress in Brazil as Representative of American Engineers

Calvin W. Rice, secretary of the American Society of Mechanical Engineers, was the guest of honor at a dinner given at the Engineers' Club in New York, Monday evening, Aug. 21, marking his departure for the engineering congress in connection with the International Exposition which opens at Rio de Janeiro, Brazil, on Sept. 9. Mr. Rice was selected for this mission by the council of the American Society of Mechanical Engineers. He sails from New York on Aug. 24 on the steamer Pan-America, which will convey Secretary of State Charles E. Hughes and party to the Brazilian capital.

The dinner of Monday evening was attended by about 50 members of the various engineering societies, including a number of presidents and past presidents, and was presided over by J. W. Lieb, vice-president of the New York Edison Co. The speakers, in addition to Mr. Lieb, were Dean Dexter S. Kimball, Ambrose Swasey, J. V. Davies, Charles F. Rand, John R. Freeman, A. R. Ledoux, Gano Dunn and E. J. Mehren. Much was said in tribute to Mr. Rice's talents as a diplomat and in recognition of the marked accomplishment of his 16 years in the secretaryship of the mechanical engineers. It was brought out that Mr. Rice had steadily worked for a larger place for the engineer in American life, and had achieved much in the furtherance of closer international relations among engineering organizations. In the United States, through a national net work of local sections, professional divisions, and administrative committees, the combined engineering societies have enlisted the co-operation of nearly 200,000 members. Always the aim had been for an increasing contribution by the engineering profession to the public good.

Among them, the speakers pieced together noteworthy features of Mr. Rice's work, particular reference being made to his stay at Skibo Castle, when Andrew Carnegie's co-operation was secured in the plan for the erection of the engineering societies' building and that of the Engineers' Club, in New York, and to Mr. Rice's management of the visit of American mechanical engineers to Great Britain in 1910. Confidence was expressed that his mission to South America would bind more closely together the associated engineers of the two Americas, just as had been done by the mission of American engineers to Europe last year and by other efforts for closer co-operation in which Mr. Rice had been a prime mover. He was referred to as one who had succeeded well in the difficult role of servant to many masters; but another speaker, in the light of Mr. Rice's mastery of the art of getting others to work, thought it might more appropriately be said that he had been "served by many masters."

In addition to the American Society of Mechanical Engineers, Mr. Rice will represent at the congress at Rio the Federated American Engineering Societies, the American Institute of Electrical Engineers, the Engineering Foundation, the John Fritz Metal Board and the Engineering Division of the National Research Council. The American Institute of Mining and Metallurgical Engineers will be represented by Thomas T. Read, Bureau of Mines, Washington, and the American Society of Civil Engineers by Verne L. Havens, editor of *Ingenieria Internacional*, New York.

Mr. Rice, in addition to his work at the congress, will visit South American engineering centers in behalf of organized engineering. There are Latin American engineering societies at Montevideo, Buenos Aires, Santiago, Lima and Havana. In Buenos Aires, Santiago and Havana there are associations of members of American engineering societies and at Rio de Janeiro and Lima similar associations are being formed. Mr. Rice plans to return to New York about Nov. 10.

Purchases of Machine Tools

CHICAGO, Aug. 22.—The Union Pacific has closed for approximately $200,000 worth of machine tools. The list of this equipment has been pending for some time, having been published in THE IRON AGE of June 29.

The Illinois Central has also commenced to buy against its outstanding list of machine tools with the probability that purchases totaling $150,000 will be completed before the end of the week.

Wire Goods Makers Merge

The Wire Goods Co., Worcester, Mass., the Cassady-Fairbank Co., Chicago, and the Andrews Wire & Iron Co., Rockford, Ill. and Watford, Canada, have consolidated as a $1,000,000 corporation with headquarters at 28 Union St., Worcester. Several other concerns are involved, including the Ayres Mfg. Co., Pawtucket, R. I., and the Wood-Sherwood Co., Lowell, Mass. The new name will be the Washburn Co. The Wire Goods Co. was established in Worcester in 1880, while the Lowell, Mass., concern is the oldest making kitchenware in the country.

The officers of the new company are: Charles G. Washburn, president; Arthur C. Andrews, Rockford, Ill., Perry M. Shepard, Chicago, and William L. Walker, vice-presidents; Reginald Washburn, treasurer and general manager; Irving A. Green, secretary. The officers constitute the board of directors.

American Iron and Steel Institute—Data Sheet for Committee on Twelve-Hour Day

DEPARTMENTS	(A) Number of Employees	(B) Percent:	(C) If 12-Hour Day Eliminated, Number of Employees	(D) Increase $ in annual pay roll based upon increasing hourly rate of wages ... to compensate for the fewer hours worked and also based upon adjustment in wage of others to maintain differential. NOTE: Please fill in the percentage hourly wage increase which in your opinion would be necessary and base the figures in this column upon that advance.	(E) Increase $ in annual pay roll based upon increasing hourly rate of wages 50% so that 12-hour men changed to 8 hours would receive the same daily wage and also based upon adjustment in wage of others to maintain differential. NOTE: Figures based upon this rate of wage increase are requested in order that the returns may be standardized and more easily compared.	(F) Increase in Cost: Dollars per G.T. From Column "D"	(G) Increase in Cost: Dollars per G.T. From Column "E"	(H) Total or Cumulative Increase in Cost: Dollars per G.T. From Columns ...	(I) Total or Cumulative Increase in Cost: Dollars per G.T. From Columns ...
COKE OVENS: 8-hr. Men; 10-hr. Men; Annual Capacity G. T. Over 10-hr. Men					Coke Ovens: $	Coke: $	Coke: $		
Total		100	..% Increase of Total:						
BLAST FURNACES: 8-hr. Men; 10-hr. Men; Annual Capacity G. T. Over 10-hr. Men				Blast Furnaces: $.....	Blast Furnaces: $	Pig Iron: $ (From Coke)	Pig Iron: $ (From Coke)	$	$
Total		100	..% Increase of Total:						
PUDDLING FURNACES: 8-hr. Men; 10-hr. Men; Annual Capacity G. T. Over 10-hr. Men				Puddling Furnaces: $	Puddling Furnaces: $	Muck Bar: $	Muck Bar: $	Muck Bar: $	$
Total		100	..% Increase of Total:						
STEEL WORKS: 8-hr. Men; 10-hr. Men; No. of O. H. Fcs.... No. of Converters... Over 10-hr. Men; Annual Capacity G. T.				Steel Works: $	Steel Works: $	Slabs, Sheet Bars, Billets: $..... (From Pig Iron)	Slabs, Sheet Bars, Billets: $ (From Pig Iron)	Slabs, Sheet Bars, Billets: $	Bars, Billets: $
Total		100	..% Increase of Total:						
ROLLING MILLS: **Structural:** 8-hr. Men; 10-hr. Men; Annual Capacity G. T. Over 10-hr. Men				Structural Mills: $	Structural Mills: $	Structurals: $ (From Semi-Fin)	Structurals: $..... (From Semi-Fin)	Structurals: $	$
Total		100	..% Increase of Total:						
Bar 8-hr. Men; 10-hr. Men; Annual Capacity G. T. Over 10-hr. Men				Bar Mills: $	Bar Mills: $	Bars: $ (From Semi-Fin)	Bars: $..... (From Semi-Fin)	Bars: $.....	Bars: $
Total		100	..% Increase of Total:						
Plate: 8-hr. Men; 10-hr. Men; Annual Capacity G. T. Over 10-hr. Men				Plate Mills: $	Plate Mills: $	Plates: $ (From Semi-Fin)	Plates: $ (From Semi-Fin)	Plates: $	$
Total		100	..% Increase of Total:						
Rail: 8-hr. Men; 10-hr. Men; Annual Capacity G. T. Over 10-hr. Men				Rail Mills: $	Rail Mills: $	Rails: $ (From Semi-Fin)	Rails: $ (From Semi-Fin)	Rails: $	$
Total		100	..% Increase of Total:						
Sheet: 8-hr. Men; 10-hr. Men; Annual Capacity G. T. Over 10-hr. Men				Sheet Mills: $	Sheet Mills: $.....	Sheets: $ (From Semi-Fin)	Sheets: $ (From Semi-Fin)	Sheets: $	$
Total		100	..% Increase of Total:						
Tin: 8-hr. Men; 10-hr. Men; Annual Capacity G. T. Over 10-hr. Men				Tin Mills: $	Tin Mills: $	Tin Plates: $ (From Semi-Fin)	Tin Plates: $ (From Semi-Fin)	Tin Plates: $	$
Total		100	..% Increase of Total:						
Tube: 8-hr. Men; 10-hr. Men; Annual Capacity G. T. Over 10-hr. Men				Tube Mills: $	Tube Mills: $..	Tubes: $ (From Semi-Fin)	Tubes: $ (From Semi-Fin)	Tubes: $	$
Total		100	..% Increase of Total:						
All Other Depts.: 8-hr. Men; 10-hr. Men; Over 10-hr. Men				All Other Depts.: $	All Other Depts.: $				
Total		100	..% Increase of Total:						
GRAND TOTAL			..% Increase of Grand Total	Grand Total: $	Grand Total: $				

The total or cumulative costs in Cols. "H" and "I" should be obtained:—

For Pig Iron: by adding to the Pig Iron figures of Cols. "F" and "G" the proper prorated increase in Coke costs from Cols. "F" and "G."

For Semi-finished: by adding to the Semi-finished costs of Cols. "F" and "G" the proper prorated increase in Pig Iron costs from Cols. "H" and "I."

For finished material: by adding to the finished material costs of Cols. "F" and "G" the proper prorated increase in Semi-finished costs of Cols. "B" and "I."

N. B.—All figures to be based upon operating at full capacity.

IRON MAKERS PROTEST

Objections Made to Proposed Reduction on Pig Iron Rates from South

WASHINGTON, Aug. 22.—Blast furnace interests at Ashland, Ky.; Ironton, Jackson and Wellston, Ohio, and in the St. Louis, Mo.-Granite City, Ill., switching district have filed protests with the Interstate Commerce Commission against proposed reductions by Southern carriers in rates on pig iron from the Alabama district to Ohio River crossings. Contention is made by the protestants that the lowered rates from the Southern iron producing district will unduly prejudice them in the marketing of pig iron in the Ohio River and Northern markets. Representing the St. Louis-Granite City switching district interests, the St. Louis Coke & Chemical Co. claims that the Louisville & Nashville, Illinois Central, Southern, Mobile & Ohio and St. Louis-San Francisco railroads are participants in joint rates on pig iron from the St. Louis district to points reached under the rates from the Alabama furnaces, and that consequently these carriers are proposing to unjustly and directly discriminate against pig iron makers in the St. Louis district.

Meanwhile the Arrow Transportation Co., a river line serving Sheffield and Florence, Ala., with the Chicago, Burlington & Quincy railroad as a participant, has filed a tariff with the commission proposing an even greater reduction in rates on pig iron than that proposed by the all-rail carriers as pointed out by THE IRON AGE last week. The Arrow line and the Burlington Railroad propose to reduce, effective Sept. 15, the rate from Sheffield and Florence to Chicago from $4.98 to $4.18 per gross ton and the St. Louis rate from $3.85 to $3.28. It is proposed to establish these rates from the Arrow line rate of $1.96 to Metropolis, Ill., plus the divisions to be received by the Burlington from its connections south of the river on all-rail traffic by way of Metropolis. Its division to Chicago would be $2.22 and to St. Louis $1.32.

Attention is called by the Arrow lines to parts of decisions of the Commission in which it said the rail carriers should not charge carriers by water more for carrying the freight given to them by water lines than they charged for performing similar service for their rail connections.

It is believed that concurrence of the Burlington in the tariff of the Arrow line would put before the rail lines south of the Ohio the question as to whether they will bring their all-rail rates down to the point of actually meeting the rate made by the river line. The rate by the latter and the Burlington will be not quite 20 per cent under the all-rail rate to Chicago, 20 per cent less being generally regarded as giving the carrier by water an opportunity to compete with all-rail routes on terms of equality. Considerable interest is being shown in the possibility of the transfer of traffic at Metropolis, making it an important rate making route.

METAL TRADES WAGES ABROAD

Figures from England, France, Belgium and Germany Show Varying Trends

In Research Report No. 53, the National Industrial Conference Board presents a comprehensive view of the wage situation in Europe, tracing the principal changes in wages from the end of 1920 to the beginning of 1922. Some of the principal data covering the iron and steel industry are put into our tables.

In the heavy iron and steel trades of Great Britain recent wages show an excess over pre-war rates varying from 20 to 120 per cent, compared with 150 to 350 per cent at the end of 1920. In the tin plate and sheet steel trade in South Wales the net increase over pre-war rates now amounts to about 34 per cent, compared with a range of 150 to 231 per cent in December, 1920. The general conditions are shown by the table of sliding scales during 1921.

	Cleveland Basis (England and Scotland)	Steel Melters' Scale (England and Scotland)	
Average Standard	Furnacemen	Basic	Acid
January, 1921	170¾	190	165
April, 1921	144	166¼	141
July, 1921	123¾	138¾	113¾
October, 1921	77¼	93¾	68¾
January, 1922	26		
February, 1922		60	35
April, 1922	34½		

At the beginning of 1922 certain standardized wage rates were in force in different sections of Great Britain, of which the following table is illustrative:

Weekly Wages in Certain Engineering Trades at Beginning of 1922

	Lancashire*		Total	
	s.		s.	
Turners	48	($11.52)	51½	($12.36)
Machinists	48	(11.52)	51½	(12.36)
Fitters	48	(11.52)	51½	(12.36)
Coppersmiths	48	(11.52)	51	(12.24)
Erectors	48	(11.52)	51½	(12.36)
Planers, borers, slotters	48	(11.52)	51½	(12.36)
Millers	48	(11.52)	51½	(12.36)
Toolmakers (first class)	48	(11.52)	51½	(12.36)
Pattern makers	48	(11.52)	51½	(12.36)
Electricians	48	(11.52)	51½	(12.36)
Moulders	48	(11.52)	51½	(12.36)
Laborers	48	(11.52)	51½	(12.36)

*Normal working week. Wages in other districts are slightly less except in London.

These rates as quoted, subject to minimum and maximum limits, included all bonuses. They were highest in Wales and Monmouthshire and lowest in North Midland, with London in an intermediate position.

While wage rates in Paris are considerably higher than elsewhere in France, the difference is less marked than formerly. A tendency to come to a standard 8-hr. workday is observed, both in Paris and outside, which accounts for the fact, shown by the table, that the percentage of increase over 1911 is much greater in hourly wages than in daily wages. Previous hours varied from 9 to 10 per day.

Average Hourly and Daily Wages in Paris in 1921

	Daily (8 Hr.)		Per Cent Increase Over 1911 Daily Wage	Hourly Wage
Tinsmiths	28 fr.	($2.24)	250	337
Blacksmiths	32	(2.56)	220	300
Locksmiths	26	(2.08)	225	261
Metal turners	28	(2.24)	240	280

Wages in Brussels appear to be lower than in Paris. The following table gives those of the principal classifications of metal workers:

Average Hourly Wages in Brussels, November, 1921

Mechanics, electricians, tool makers, molders, polishers, lathe workers, welders and steel workers	3.00 fr.	(21.1c.)
Boiler makers and tin workers	2.75	(19.4c.)
Grinders	2.65	(18.6c.)
Blacksmiths, tinsmiths, locksmiths, etc.	2.50	(17.6c.)
Borers and metal filers	2.25	(15.8c.)
Unskilled factory hands	1.75	(12.3c.)

For Berlin, the figures given are official. The sharp distinction between single men and married men, nonexistent in 1914, is interesting, as is also the closeness of the unskilled worker's present wage to that of the skilled operative.

Weekly Wages in Berlin Metal Trades

	July, 1914—		February, 1922		Per Cent Increase (Nom.)
Single Men:					
Skilled	42.14 m	($10.15)	195.23 m	($2.19)	1,067
Semi-skilled	39.96	(9.55)	169.67	(2.36)	1,075
Unskilled	30.62	(7.32)	455.70	(2.29)	1388
Married Men:					
Skilled	42.44	(10.15)	634.73	(7.20)	1,396
Semi-skilled	39.96	(9.55)	569.15	(6.57)	1,434
Unskilled	30.62	(7.32)	395.20	(5.00)	1,844

The new building of the Ellwood City Forge Co., Ellwood City, Pa., of mill type construction 95-ft. x 120-ft. which is to be used as a press shop, is nearing completion. The company is installing a new 500-ton forge press, built by the United Engineering & Foundry Co., Pittsburgh, supplementing 6000-lb. and 3000-lb. hammers, now erected, furnished by the Chambersburg Engineering Co. Two new 40-in. x 32-in. turning lathes are to be installed. The new shop is expected to be in operation in about three weeks. The company is now running on a two-turn schedule.

CONTENTS

August 24, 1922

Continuous Heating Furnaces for Steel 465

Importance of Careful Attention to Roof Slope—Flow of Gases Outlined to Prevent Uneven Heating of Ingots or Billets

For Greater Use of Steel in Dwellings 469

Potential Tonnage Is Large, Calculated on the Building Movement of 1922—Some Figures Based on Use of Pressed Steel Joists

Free Zone System Included in Tariff Bill 471

Departure of Interest to Many Manufacturers—Not Certain the Plan Will be Adopted in Conference

Bethlehem-Lackawanna Merger Approved 473

Directors Act Without Waiting for Action of Federal Trade Commission—Extensive Building Program Announced

Numerous Changes in the Metal Schedule 475

Few Are, However, Important—Duty on Pig Iron and Scrap Reduced—Bill Now in Hands of Conference Committee

General Resumption of Mining Is Probable 481

Decided Change Comes Suddenly in the Pittsburgh District—Signing of the Cleveland Agreement Is Now Expected

Burning Mine Wastes 467
Distribution of Iron and Steel Exports 467
Improves Line of Pipe Machinery 468
Melt of Ohio Foundries Increases 468
Lower Spanish Duties for American Products 468
More Hearings on Pittsburgh Basing Case 468
Renewal of Merger Efforts Expected at Youngstown 468
Little Increase in Coal Output 468
July Tonnage in Fabricated Steel 470
New Safety Guard for Power Presses 472
Advance in Price of Seamless Steel Tubes 472
Increased Use of Scrap 472
New Rail Rates Ordered 472
Inclusions in Aluminum Alloy Sand Castings 474
Study of Uranium and Other Alloy Steels 474
Turbine Air Drill 474
Turbine for Steel Mill Service 477
Light Manufacturing Engine Lathe 477
New Bureau of Standards Standard Samples 477
High Production Countersinking Machine 478
Plans of the Coast Range Steel Co 478
Algoma Steel Corporation Activities 478
Will Open Fluorspar Mine 478
Steel Treaters' Convention 479
Metal Trades Conference 480
American Electrochemical Society's Fall Meeting 480
International Chamber of Commerce 480
British Miners' Reaction to Supplying Coal to America 483
Lower Coal Prices 483
Automobile Production High 483
Cost of the Three-Shift Day 484
Tribute to Calvin W. Rice 484
Purchases of Machine Tools 484
Wire Goods Makers Merge 484
Iron Makers Object to Proposed Reduction on Pig Iron Rates from South 486
Metal Trades Wages Abroad 486
Editorials 488
The Strike and "Rights"—The Cleveland Surrender—The Case of Repetitive Operations—British Capacity and Output—Government Advice for Railroads.
Correspondence 491
Electric Furnaces for Steel Manufacture in Italy.
German Foreign Trade 491
German Prices Again Raised 492
Orders for Springfield, Ohio, Plants 493
French Prices Unsteady 493
Little Steel for Export 493
Railroad Equipment Business 506
Fabricated Steel Business 508
Steel Corporation Wages Advanced 508
Cost of Living Slightly Higher 509
New Officers of Steel Treaters 510
Directory of Ohio Metal Working Industries 510
British Iron and Steel Market 512
Industrial Finances 522
Trade Changes 525

Iron and Steel Markets 494
Comparison of Prices 495
Prices Finished Iron and Steel, f.o.b. Pittsburgh 507
Non-Ferrous Metal Market 509
Personal Notes 510
Obituary Notes 511
Machinery Markets and News of the Works 513
New York Jobbers' Prices 524

ESTABLISHED 1855

THE IRON AGE

EDITORS:

A. I. FINDLEY WILLIAM W. MACON GEORGE SMART

CHARLES S. BAUR, *Advertising Manager*

Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

[illegible] U. S. A. [illegible]

Detroit: 317 West Fort St. Chicago: Mercantile Library Bldg. Buffalo: 881 Elliott Square. Washington: 816 Fifteenth St. N. W. [illegible] 220 Market St. London, Eng.: 11 Haymarket, S.W.1.

Subscription Price: United States and Possessions, Mexico, Cuba, Shanghai, $6.00. Canada, $8.50. Foreign, $12.00 per year. Single copy, 25 cents.

[illegible] 1874, at the Post Office at New York, N. Y., under the Act of March 3, 1879.

The Strike and "Rights"

No phase of the railroad and coal strikes is of graver concern than that of which President Harding spoke in these words in his address to Congress:

> It is fundamental to all freedom that all men have unquestioned rights to lawful pursuits to work and to live and choose their own lawful ways to happiness. In these strikes these rights have been denied by assault and violence, by armed lawlessness. In many communities the municipal authorities have winked at these violations, until liberty is a mockery and the law a matter of common contempt. It is fair to say that the great mass of organized workmen do not approve, but they seem helpless to hinder. These conditions cannot remain in free America. If free men cannot toil according to their own lawful choosing, all our constitutional guarantees born of democracy are surrendered to mobocracy and the freedom of 100,000,000 is surrendered to the small minority which would have no law.

Then as he closed the President said this:

> Wherefore I am resolved to use all the power of the Government to maintain transportation and sustain the right of men to work.

In the newspaper accounts we are told that these ringing words were applauded with spirit. The press of the country applauded, also, as did most of the reading men and women among the round 100,000,000 whose freedom to live and to choose their work has been challenged by the terrorism the two strikes have developed here and there throughout the country.

But the labor union leadership that is responsible for much of this terrorism does not believe that American citizens have any such "unquestioned rights" as these which the President asserts are "fundamental." Labor union leaders have not joined in the applause which greeted the President's utterances on the floor of the Congress. The labor union creed admits no such right in the case of a man who offers to do the work which a union man has refused to do. Under the "law" of the labor union, as expressed by the president of the United Mine Workers of America, men who attempt to mine coal in places which striking mine workers have given up are to "be treated as ordinary strike breakers." When railroad workers stop the wheels of transportation and in defiance of the Government's Railroad Labor Board seek to paralyze industry and destroy the country's prosperity, all men who come to the help of the people by moving the food and fuel on which their lives depend are branded as "scabs" and pariahs. The West Virginia coal miner with whom President Church of the Carnegie Institute talked at Pittsburgh the other day, and who wanted to go back to his job after three months with neither work nor strike benefits, knew what he was talking about. When asked why he did not go back he said simply, "They would shoot me."

President Harding leaned backwards in saying that "the great mass of organized workmen do not approve" of assault and violence by armed lawlessness. When Mr. Gompers called the President's address "ill-timed" he was giving unmistakable expression to the spirit which has actuated the labor union leadership of the two strikes from the beginning. The only right which that leadership has asserted in all the suffering it has brought upon the country is the sacred "right" to strike and to enforce its demands after the manner of the highwayman.

Out of all the distress of this time a way must be found for treating workers in coal mining and transportation—in respect to what they may do by striking—more nearly as the Boston policemen were treated when they attempted to force their will upon the people by making them defenceless against the assaults of thugs and other criminals. If the way is not found, the 100,000,000 or more of the American people against whom the coal miners and railroad workers are striking should do the honest thing and admit that Presidential proclamations of "fundamental rights" are only barren idealities and that minorities—even small minorities—may rule if only they are sufficiently menacing and politically powerful.

A sales promotion letter, offering syndicate

matter on the export trade, has come to this office. It opens with this sentence:

> You can be thankful when the rail and coal strikes are settled, for then prosperity will smile again.

Whether prosperity is to "smile again" depends much on the way these most disastrous of recent labor conflicts are settled. The railroad strike is still on and the basis on which its embargo on industry will be lifted is yet unknown. The Cleveland settlement of the coal strike, as fast as it becomes effective, fastens on the country even higher than war-time coal mining costs. With other wage advances that are to come in its train, the steel industry has again started on a spiral ascent in prices which must raise a serious question as to the duration of demand even on the reduced scale of to-day. The country cannot have prosperity on a 2-cent to 2.25-cent basis for steel, and on the labor and fuel costs that are now in sight steel manufacturers may make up their minds to a diminishing share in the export trade. If reinflation to war-time prices is what the country wants, it has been set well on its way to that condition by the events of the past week. The mine workers' leader, in proclaiming their victory, announces that the "much heralded theory of deflation or liquidation of labor . . . has now suffered another collapse as far as affecting the mining industry is concerned." But the consequences of that settlement will have little of the aspect of victory when the reaction comes, as come it must, from the folly of attempting to build prosperity on war-time prices.

The Cleveland Surrender

The so-called Cleveland settlement by union miners and a few operators representing a small percentage of the bituminous coal mined in this country was an ignominious surrender. The member of the Cleveland iron trade who commented that it was a case of organization against demoralization told the truth, for the union was united and firm while the operators were torn by dissension. Even on the question of arbitration there was serious disagreement among the operators, and at the last minute, when all provision as to arbitration was omitted, some of the leading operators refused to sign the compact.

For any one who has followed the history of the coal strike, it is clear that while many of the operators, controlling a large percentage of the output, were willing and anxious to deal fairly with employees, the public and all concerned, even to the extent of losing "literally millions," in the language of Secretary Hoover, "in order to maintain themselves and their industry in public repute," others cared little for honor so long as they could add to their exorbitant profits. Doubtless some who signed the Cleveland agreement were among those so vigorously denounced by Secretary Hoover, while others may have been driven to the action by financial necessity. Whatever the cause, the fact stands out that the union won in its principal contentions, including the obnoxious "check off," by which the operators must continue to collect union dues; and in all this there is no assurance that there will not be another and a much more serious strike next April. For many months coal was being stored in anticipation of the strike which was started April 1, but by April 1 of next year stocks will be virtually exhausted and the union will be in a much stronger position than it has been during the present troubles.

The hope of the country rests on some definite plan of action being adopted to prevent another industrial struggle much more disastrous to the industries than any that has been seen. In his letter of Aug. 18 to Senator Borah, Secretary Hoover pointed out that even the $6.25 average price which had been mentioned by the Senator is "an average of a lot of decent men selling fair price coal with a minority of bootleggers selling it up to $12." The secretary also declared that "the substantial and public spirited coal operators themselves feel that their only protection from unjust criticism lies in some workable method that will compel a minority to righteous business practices."

We believe that the better class of operators will help in bringing about the enactment of necessary legislation and in taking any steps necessary to prevent an industrial catastrophe; but it will not do to depend upon too much from the proprietary side of the industry as it is now constituted. The fair-minded American citizen—particularly the employer who is determined to deal fairly with the public and the miners—must do his full part and do it courageously. It will not be enough to mean well and do nothing. Unfortunately this last is the description of far too large a proportion of officialdom at Washington.

The Case of Repetitive Operations

Seldom does any one appear in defense of the task of repetitive operations so common in modern manufacturing. Many decry the dulling effect on the intellect, of highly subdivided processes, but these champions of the machine operator are usually apart from industry, while those who direct manufacturing remain silent. Thus unanswered charges gain credence. Yet in informal discussions those in daily contact with the conditions show no concern lest deadening of the mind, for example, result from simple operations repeated time after time. The testimony of industrialists is difficult to get. Being neither writers nor speakers their views are not widely known, and being well entrenched through the evolution of the factory their attitude seems to be that they are not on the defensive.

But sooner or later they must be smoked out. Too much is being written against modern factory procedure for the factory side to disregard the making of favorable public sentiment. All the good features of repetitive work and mass production, as affecting the human being, need to be set out in an authoritative way, if demands for a change are to be stayed. Any breaking down of present practices through legislative or other pressure may be far off, but in this day of increasing emphasis on the welfare of the indi-

vidual, new laws affecting industrial relations are always in the reckoning.

Apologists for the industrial system have been wont to say that large numbers of machine operators are adults of arrested mental development. Having only child minds, they are not supposed to find their work especially irksome. This is important, if true, in that the system has provided for a group that has been reared as superior to so-called common-labor service and generally is not physically equipped for it. In accommodating this class the system has also released workers of more resourcefulness for the problems higher up in the industrial scale. There are also in the shops those of adult intellects but without special education. Their minds are capable of development, and it may not be granted that they are immune to the effects of monotony. However, whether moron or not, the social uplifter will demand a showdown.

Some explanations coming from the workshop have reached the public, and they may be indeed the complete answer to "The Iron Man in Industry" and similar criticism. They emphasize the inertia of the human being and the propensity of all of us to do most of our daily acts along the lines followed in the past. Plant managers tell how hard it is to get a worker to change his methods and they assert that fully as much effort would be needed for the worker to break a new habit and resume the old. Mental satisfaction comes in part from moving in accustomed paths. It may be that man's desire to act and think along well known lines in most of his activities safeguards him fully against the "iron man." But we need the facts from the authorities of industry.

British Capacity and Output

According to reliable estimates British steel-making capacity increased in the period 1914 to 1921 from almost 7,000,000 tons to about 11,000,000 tons per year. But the 1922 statistics covering blast furnaces seem to indicate a nearly static condition, for the actual number had decreased by five in the same period. It is known that the productive capacity of the 494 furnaces at the beginning of 1922 was somewhat larger than that of the 499 in 1914. It is certain, however, that the seven years' increase in steel-making capacity has decidedly outstripped that in pig iron.

Several interesting questions are suggested by this situation. If the pig iron producing capacity is practically no greater than before the war, whence will come the needed pig iron for the enlarged steel furnace capacity, or must imports of pig iron and semi-finished steel be increased? Also, must not steel exports be augmented considerably to provide an outlet for the additional 4,000,000 tons of steel ingots or their equivalent in rolled products?

The answer to these questions is not found in the course of the British industry thus far this year. The production of both pig iron and steel has been far below even pre-war capacity. In the first half of this year only 2,149,300 tons of pig iron and 2,562,400 tons of steel ingots and castings were produced. In the case of steel the present rate is only 45 per cent of rated capacity. In exports a better showing has been made, the total to July 1 having been not far from the corresponding 1920 total, but only 61 per cent of the 1913 rate.

American, French and German steel outputs, in spite of strikes and other disturbances, make a far better showing, both in relation to capacity and to pre-war records. Great Britain, with its labor and political problems, has not yet undergone a sufficient readjustment either in prices or in labor.

Government Advice for Railroads

For many years the public has been treated to charge after charge that the railroads are poorly operated. Scarcely a point in the management of railroads has escaped criticism. Some friends of the railroads insist that this is chiefly "propaganda" looking to Government ownership. That may be the chief cause of all the criticism, and it may not be. There is no doubt that in some respects the railroads have not been run so well as they might have been run. It is possible that human nature has a good bit to do with it; that railroads, being so much in the public eye and being public servants in such a broad manner, are naturally picked out when one wishes to exercise his critical bent.

Whether or not the cause of the criticism is a desire for Government ownership, or at least operation, there is one experiment that is well worth trying. Beyond question the experiment would throw a great deal of light not only upon railroad operations as we find them but upon this continuous criticism itself. The experiment is for the Government to establish a bureau of advice. Merely the form and scope would be new, not the principle itself. Year by year the Interstate Commerce Commission has gone further into railroad operation, but only upon certain relatively narrow lines. It has prescribed safety devices; and while the fundamental basis has been the protection of the public, the financial aspect has been considered. The Interstate Commerce Commission is already burdened and the duties of the body as now constituted ought not to be increased.

When it appeared that the mining operations of the country could be improved it was not proposed that the Government own or even operate all the mines. The action taken was to establish the Bureau of Mines. The work of that bureau has greatly improved mining operations in the United States, as every one knows, and repeatedly mining interests have appealed to Congress to let the bureau have more money so as to increase its usefulness.

A Bureau of Railroads, conducted on somewhat the same principle as obtains with the Bureau of Mines, would be of great benefit to the railroads. All the large railroads conduct extensive research work, yet no road does all that it might do, and the results are not, as a rule, common property, even though railroad men with their

various associations and conventions have shown a strong co-operative spirit.

While a Bureau of Railroads might well be modeled in a general way after the Bureau of Mines, one of its important duties should be to consider these criticisms that are constantly being made of the railroads. Let the criticisms be run down so that all may know whether or not there is anything in them. If there is anything in a particular criticism, improvement can be effected. If it is shown that there is not, the critic will be discredited. If there are improper or ulterior motives in the criticism the motives will eventually be laid bare, to the vindication of the railroads and the comfort of a public which while long suffering has been growing rather tired of the criticism continuing without anything coming of it.

An objection raised to suggestions of this general character is that it is necessary to use compulsion with the railroads. That is not proved. The establishment of an advisory bureau would determine. If the railroads were given good advice and did not follow the advice, crucial cases would be presented, affording definite basis for considering whether compulsion should come next.

CORRESPONDENCE

Electric Furnaces for Steel Manufacture in Italy

To the Editor: Replying to an article by Edwin F. Cone which appeared in THE IRON AGE, Jan. 5, 1922, entitled "Status of the Electric Steel Industry," and in which it is stated that there were about 50 electric furnaces in Italy in 1921 for the manufacture of steel, A. Stromboli in the April number of *La Metallurgia Italiana* states that the above figures should be corrected.

According to Dr. Stromboli there were at the end of 1921 about 180 electric furnaces between large and small distributed in about 50 different establishments. Many furnaces were installed in the Acciaierie Martin, and other new establishments were opened with complete electric equipment. The total capacity of these furnaces was about 800 tons and if all were in a condition to work regularly, it is estimated that about 1,000,000 tons of steel per year could be produced. The production of 1921, however, was only about 130,000 tons.

The most important plants and largest furnaces are in the north of Italy. There are 23 furnaces of the Héroult type of 15 tons, and 10 of from 6 to 8 tons capacity. They are distributed as follows:

	No.	Capacity, Tons
Acciaierie Ern. Breda, Sesto San Giovanni	6	15
Acciaierie e Ferriere Lomb., Sesto San Giovanni	5	15
Stabilimento di Dalmine	4	15
	2	6
Acciaierie Ansaldo Aosta	1	15
Acciaierie Franchi Gregorini Allione	3	15
Acciaierie di Terni	1	15
Acciaierie Redaelli, Rogoredo	3	7
Acciaierie Cravetto Verrès	3	6
Acciaierie Caleotto, Lecco	1	7
Acciaierie Ceretti, Villadossola	1	8

There are also 6 furnaces of the Fiat type of 5 to 6 tons capacity in the Acciaierie Fiat at Turin and one of 1½ tons capacity, as well as four of the Fiat type of 20 to 25 tons capacity and two of 6 and 3 tons capacity in the Ferriere Piemontesi.

There are 11 furnaces of the Girod type of 3 to 5 tons capacity in the Acciaierie Franchi Gregorini at Allione, 2 of 3 to 5 tons capacity in the Acciaierie Franco Tosi at Legnano, and 3 of 5 tons capacity in the Acciaierie di Castelnuovo dei Sabbioni.

There are about 30 furnaces of the Stassano type in various establishments, many of which are of 2 to 5 tons capacity, and 3 of 1½ tons capacity in the Acciaierie Breda at Sesto San Giovanni, and there are others in the Acciaierie Franchi Gregorini at Lovere, in the Fonderie Milanesi di Acciaio at Milan, in the Acciaierie Redaelli at Rogoredo, in the establishment of Darfo of the Ferriere di Voltri, in the Acciaierie Ansaldo at Cornigliano Ligure, in the Acciaierie Cravetto at Verrès, at the establishment of the Società Whitehead at Naples, and in the Acciaierie of Piombino.

In conclusion there are about 60 to 70 furnaces of the types Stassano-Bassanesi and Stassano-Angelini dispersed in numerous small foundries, the majority of them being of one ton capacity and some of three tons capacity.

I. C. FUNK,
American Consul.

Genoa, Italy, June 30.

GERMAN FOREIGN TRADE

Export Iron and Steel Movement Steady—Imports Increasing

Exports of steel and iron from Germany in April and May were 200,676 and 209,432 metric tons respectively, according to data published by *Stahl und Eisen*. The following table gives the details of the German foreign trade for May and the five months in metric tons:

	Imports, 1922, Jan. to May	Exports, 1922, Jan. to May	Exports, May, 1922
Pig iron	93,314	82,555	10,321
Ferroalloys	5,843		
Scrap	163,532	9,848	1,393
Cast iron pipe	16,971	17,469	4,954
Rolls	86	3,422	540
Machine parts	643	2,681	360
Other castings	3,884	37,030	7,604
Brooms, billets, sheet bars	87,686	15,620	2,632
Bars, joists, strips	211,051	217,488	40,787
Plates and sheets	19,166	84,115	22,978
Tin plates and other sheets	3,229	12,117	2,357
Wire (rolled and drawn)	20,828	59,779	12,431
Tubes	4,789	56,537	13,649
Rails, sleepers, fishplates	34,238	128,507	33,560
Wheels, axles, tires	40	19,721	5,606
Forgings, etc.	3,583	52,280	8,341
Structural work	601	23,257	4,181
Boilers, etc.	1,250	13,057	2,378
Anchors, hammers, etc.	116	2,575	475
Agricultural implements	484	16,062	3,277
Tools	347	17,045	3,351
Rail joint studs	2,154	7,440	2,030
Other railway materials	193	3,039	553
Bolts, nuts, rivets	2,591	13,302	2,612
Carriage and cart axles	94	1,394	312
Railway and cart springs	202	2,457	502
Wire ropes	69	4,315	817
Other wire goods	134	24,473	5,961
Wire and other nails	114	24,009	5,578
House utensils	44	17,901	3,633
Chains	30	2,982	381
Miscellaneous	18,474	47,635	5,932
Total iron and steel included above	695,776	1,021,112	209,432
Machinery	4,327	187,387	40,497

The leading items of export to June, this year, have been pig iron; bars, beams and strips; plates and sheets; wire; tubes and rails, etc.

In imports the outstanding item is scrap with both semi-finished and finished steel heavy.

Receipts of iron and manganese ores are given as 4,629,542 tons to June 1.

Export and import totals by months have been as follows to date in metric tons:

	Exports	Imports
January, 1922	221,743	100,907
February	172,709	81,878
March	211,979	125,158
April	200,676	166,131
May	209,432	221,701
Average per month to June, 1922	204,221	139,155
1921 (average per month, 8 months)	202,881	
1920, average per month	145,883	34,951

A marked steadiness in export volume but a large increase in the import rates are to be noted.

GERMAN PRICES AGAIN RAISED

Steel Syndicate Further Advances Ingots and Finished Steel

(By Cable)

BERLIN, GERMANY, Aug. 20.

Steel Syndicate prices, to prevail from Aug. 19 to the end of the month, have been announced, as follows:

Ingots .....17,880 marks per metric ton ($15.21 per gross ton)

Thick plates. 27,000 marks per metric ton (1.03c. per lb.)

[Exchange at 8⅝c. per 100 marks.]

Other steel prices have been raised proportionately.

The Eisenwirtschaftsbund has rejected a proposal to reimpose maximum prices on the Steel Syndicate's products.

[These quoted prices replace 14,480 marks for ingots, 21,070 for bars and 23,660 for thick plates. Collapse of exchange, however, makes the present prices lower, in American money, than before.

In THE IRON AGE of July 27, page 229, it was noted that "while the legal maximum pig iron prices" (which are fixed by the Eisenwirtschaftsbund) "have been raised four times since May 1, the Stahlbund products have been raised only twice. However, the new fall in mark exchange has again thrown German prices far below those of the world market and for a time German complaints of English, French and Belgian underselling of Stahlbund products have ceased. * * * A marked divergence as to price policy * * * among the groups represented in the Stahlbund * * * has tended to keep down Steel Syndicate prices."—EDITOR.]

CHAOTIC GERMAN MARKET

Weekly Readjustments Owing to Exchange Situation—Russian Business Developing

(Special Correspondence)

BERLIN, GERMANY, Aug. 2.—The depreciation of the currency will hardly lead to an increase in export orders in the iron trade, especially in semi-finished material, as the recent increases in prices have outstripped the rise in foreign currency. The Iron Trade Association (Eisenwirtschaftsbund), which fixed prices every few weeks, usually every month, has now decided to do so every week, in view of the rapid depreciation of the German currency and the almost daily change in the cost of production. The rapid decline of the mark seems, however, to have led to a bewilderment in some manufacturing quarters, and the increases in the prices by the Iron Trade Association have aroused much comment.

The surcharge for open-hearth material is 900 marks over the Bessemer product at present; but this will come up for decision at the meeting of the Steel Syndicate (Stahlbund), when it may be altered, together with the base prices, if the rate of exchange is further declining.

The prices for scrap iron are stiffening perceptibly and the import is increasing. Russian scrap is arriving in larger quantities lately. Some time ago the import duty for different sorts of scrap had been taken off, and now the duty for turnings, filings and sheet metal scrap is also to be abolished in order to stimulate imports. The Federal commissioner for the iron trade has been given power to requisition stocks if necessary to provide sufficient supplies for the industry. Steel scrap is quoted at about 7,500 to 7,600 m. per ton, but prices show a further upward tendency, and cast iron machine scrap has already reached 8,500 m. and higher per ton.

Among the engineering firms those building grinding mills occupy a special position, inasmuch as the prices of their products directly influence the prices of flour, bread and other food stuffs. The rigorous price policy of the grinding mill manufacturers has, therefore, elicited much comment. In 1921, five of the largest firms in this line formed a sort of syndicate, the "Miag" (Mills and Industry Aktien Gesellschaft), and the firms are now selling at prices fixed by the Miag. The syndicate endeavors to extend its influence among the mills in Germany, and all the firms belonging to it are increasing their capital as follows: Amme, Giesecke & Konnegen, Braunschweig, from 26 to 50 million marks; G. Luther, A. G. in Braunschweig from 18 to 30 million marks; Gebrüder Seck, Dresden, from 20 to 40 million marks; Hugo Greffenius, A. G. from 12 to 18 million marks, and Kapler, A. G., Berlin, from 4 to 8 million marks.

A new firm in this line Kallenberg, A. G., Berlin, has been formed with a capital of three million marks by interests closely connected with the Miag. The firms combined in the syndicate have almost a monopoly in grinding mill construction in Germany, and importation of machines from abroad is impossible on account of the unfavorable German exchange.

The Russian market receives increasing attention in nearly every industry in Germany. Representatives of the electric industry are negotiating with the Soviet government. Electrical manufacturing being in a sound financial position and having a good export organization (about 40 per cent of the production is exported at present) is especially adapted to develop its trade with Russia.

The automobile industry is also making endeavors to regain its pre-war position in Russia. The Russian railroad system being only poorly developed, there is a large market for motor lorries and tractors. The revival of agricultural activities and the improvement of transport facilities are receiving the foremost consideration of the Russian Government at present. A large number of automobiles is required to bring agricultural produce and other goods to the railroad stations, and competition in automobiles was keen before the war. Germany supplied the greatest number of cars. France was second and Great Britain, Italy, Belgium and America followed. Most of the American automobiles were of the Ford production, and a number of American motors, both stationary and automobile, are still in use in Russia at the present time.

Orders for Springfield, Ohio, Plants

SPRINGFIELD, OHIO, Aug. 22.—Orders have been booked by the Steel Products Engineering Co. for ten sets of Liberty stub tooth gears for aeronautical engines, General Manager George Ireland states. The company also received orders for punches, dies and jig fixtures. The plant, Mr. Ireland states, is gradually getting back into its old swing. The large order for balloon equipment received recently is about one-fourth finished. Shipment will be made within the next three months. The company added a number of skilled machinists during the week.

A good sized order for seeding machines was left with the American Seeding Machine Co. by representatives of the company located in Buenos Aires, South America, and New York. The shipment to South America will be started in October. The representatives say that business conditions in South America are improving. Officers of the company report that there is a more optimistic feeling prevailing among the dealers and travelers, as farmers are manifesting an interest in the purchase of agricultural implements.

Business is steadily improving at the plant of the Springfield Malleable Iron Co., President T. W. Ludlow states. There is a shortage of molders due to the general demand for men.

Several of the Springfield manufacturing companies which have individual power plants are in a serious condition as a result of the coal shortage and the fact that they are in class 5 of the Government's priority order. Among these are the Buffalo-Springfield Roller Co. and the Safety Emery Wheel Co. The former company hauled two carloads of coal from a nearby city by motor trucks.

FRENCH PRICES UNSTEADY

Mills Soon to Attempt to Get Reduced Costs—Sheets Active

(Special Correspondence)

PARIS, FRANCE, Aug. 10.—Domestic demand for iron and steel remains restricted, except as regards sheets. Some business is being done for export, but at disputed prices, and the fall of the German mark is having a restrictive influence. Nevertheless, the situation is much better than it was one year ago, and most of the works have orders on hand which will carry them until October.

French ironmasters met in Paris in the third week of July, prior to the holiday season, and, in the face of higher coke, decided to oppose by all means possible any further crumbling of prices. Some of the largest concerns are now sustaining losses, and as soon as holidays are over, that is, toward the end of September, they will actively canvass the question of remedial measures. Foremost among them are: 1, the financial support of exports; 2, the constitution of an international trust for working export markets, based on corresponding national organizations; 3, reduction of the present rail transportation rates; 4, an improvement of the now deficient labor supply.

The French production of pig iron in June was 415,752 tons. It was 442,206 tons in May. The steel production likewise decreased from 363,803 tons in May to 358,097 tons in June.

Iron Ore.—The French production of iron ore in June was 1,621,624 tons, as against 1,546,122 tons in May; while stocks decreased from 3,446,084 tons at the end of May to 3,330,970 tons at the end of June. The French Railway Board, at its meeting of Aug. 9, adopted the principle of further reductions on rail transportation rates for iron ore (at the same time as for coal and coke). The detail of these reductions is not yet obtainable.

Pig Iron.—The current inland price of chill-cast foundry pig iron, No. 3 P. L., remains 205 to 210 fr., but the price of 202 fr. was accepted for a contract of 250 tons. On the other hand, for small contracts or superior quality pig iron, prices of 210 to 215 frs. are still being paid. We note, however, that producers refuse now to bind themselves, except for a short time ahead. With sterling exchange at 55.83 fr., French hematite can easily push back British competition.

Beams.—The volume of orders is satisfactory. The present export price, f.o.b. Antwerp, of beams from Lorraine works, is about 360 fr. (French currency), or 1.35c. per lb.

Sheets.—The market is now extremely active, and there is quite a rush of orders in anticipation of an increase of prices and of a further lengthening of times of delivery. These are at present 10 or 12 weeks for thin sheets and about six weeks for medium and thick sheets. The base prices of the Comptoir des Tôles have not, so far, been officially modified. Nevertheless, it seems certain that this organization is already now varying them, according to required tonnages and delays of delivery, to suit the present tendency of the market.

For export, the following prices f.o.b. Antwerp (French currency) have been done for sheets and plates from Lorraine works:

Mild steel:		
Sheets of 5 mm. (0.2 in.) and over	440 fr.	1.65c. per lb.
Medium sheets	520 fr.	1.95c. per lb.
Open-hearth steel:		
Boiler plates	620 fr.	2.3c. per lb.

Rails.—Luxemburg rails are selling for export at 410-415 fr., f.o.b. Antwerp (Belgian currency), or $32 a metric ton.

Rolled Merchant Products.—This market is now inactive and the mills are badly needing orders. Prices, however, are rather well maintained and, while the price of 400 fr. has been accepted for one big order of a plain assortment, the current price at Lorraine works is 410-430 fr. (1.53c. to 1.60c. per lb.)

Times of delivery are not below 8 to 12 weeks for medium and small shapes, and even 16 weeks at some works. This applies to iron works in the East and in Lorraine. In the Center and West of France, delays may be shorter, but prices are much higher.

Semi-finished Steel.—The market is rather active for export. Lorraine and Saar works are quoting the following prices, f.o.b., Antwerp (French currency):

Basic Bessemer steel:	
Ingots	290 to 300 fr.
Blooms	310 to 320 fr.
Billets	325 to 335 fr.
Flat billets	340 to 350 fr.
Open-hearth steel:	
Blooms	320 fr.
Billets	350 fr.
Flat billets	370 fr.

Wire.—The present price is 450-470 fr. (or 1.68c. to 1.75c. per lb.).

Castings.—Improvement is maintained, but prices remain very low. For instance, the price of 400 fr. (1.50c. per lb.) per metric ton was recently tendered to the Compagnie des Chemins de fer du Nord for brake shoes.

LITTLE STEEL FOR EXPORT

American Mills Almost Wholly Out of Market Except for Deferred Deliveries

NEW YORK, Aug. 22.—Unable to meet the demands of their domestic trade, American steel mills have almost wholly dropped out of the export market for the time being. The United States Steel Products Co. is quoting on plates, shapes and bars and a few other products, but only for deferred deliveries, and is entirely out of the market on wire rods. Independent steel companies are doing practically no quoting. Exporters who are receiving cables from their customers abroad are frequently unable to obtain any satisfactory quotations.

Just how long this situation will continue is contingent almost entirely upon the resumption of coal mining and the ability of the mills to catch up with their current orders. Fortunately the American mills are not losing a great deal of foreign business through their inability to ship because the demand from abroad is decidedly limited in volume. Japan is again the principal buyer, but its current requirements are not large, though it is expected that the next few months will bring another buying wave from this Far Eastern customer.

Next to Japan the best demand is from South America, particularly from the east coast. Wire products, including fencing and barbed wire for the livestock ranges of the Argentine, are more generally sought for than any other steel products.

When quotations are made they are still considerably below the level of domestic prices. In Canada the leading interest is now asking 1.65c., Pittsburgh, for plates, shapes and bars, but most of the Canadian buyers covered a few months ago at $5 or $6 a ton below this figure. No more is heard of the anti-dumping provisions of the Canadian law since the Canadian mills have at present all of the business that they can comfortably take care of.

Prominent among the current Japanese inquiries is one for 16½ miles of 60 lb. rails, about 1700 tons, on which bids close Aug. 31; another inquiry is for 2500 tons of structural steel for towers, on which bids close Aug. 25. An inquiry for about 5000 boxes of tin plate from a Japanese oil interest has probably been closed within the past few days.

Iron and Steel Markets

HIGHER WAGES, HIGHER STEEL

Steel Corporation Labor Up 20 Per Cent and Independents Follow

Coal Strike Settlement Points to Steel Prices That May Check Demand But Railroads Still Buy

The Steel Corporation's 20 per cent wage advance and the establishment of the $7.50 basis for coal miners make this the pivotal week of the year in iron and steel. It is well realized in the industry that in a scarcity market these advances in cost mean higher prices for steel, and the uppermost question is how far this further rise will act to check business.

Independent producers had been looking week by week for this action by the Steel Corporation, and on Sept. 1 they also will increase wages 20 per cent. In the Central West this will put common labor up to 36 cents per hour. At Eastern mills, which have had a 25-cent basis for more than a year, the new rate will be 30 cents.

The winning of the 1920 rate by union coal miners means a like rate at non-union mines, representing $1.50 to $2 increase in the cost of a ton of steel. But market prices of coal and coke add several times more than $2 to the costs of such steel works as must buy coal and coke in the market.

What change the week's advances in fuel and labor will make in the Steel Corporation's price policy is of first consequence to other makers and to all buyers of steel. Advances are expected, but to what extent will develop after the meeting of the corporation's sales managers now being held in New York.

Sales of steel fell off sharply after the Cleveland agreement on coal. Buyers were in the market, but sellers could not name prices. Some plate makers indicated that 2.50c. would probably be their next price. The disappearance of the recent 1.80c. figure of the Steel Corporation on plates, shapes and bars was freely predicted.

A marked change has come since Monday in coal mining in western Pennsylvania. Large operators who had refused the Cleveland terms appear to be falling in line, with indications that the week will see nearly all union mines starting up. At non-union mines in the Connellsville field miners have been advanced from $5 to $7.50.

Thus steel companies having their own mines are in position to increase their coal supply when the railroad strike is settled, but transportation, as for several weeks, is still the limiting factor in the turning out of steel.

Plants depending on Kentucky and West Virginia fuel have had no better deliveries in the past week. Priority orders will send much of this coal to the Northwest.

Pig iron and steel output is slightly less than last week's.

Further considerable railroad buying in the Chicago district is looked for in case the strike is settled, 12,000 cars being under consideration. How many cars the Pennsylvania Railroad will buy, of the 25,000 on which its inquiries were withdrawn some weeks ago, does not yet appear. Locomotive works are doing well. Among the week's orders are 80 for the Union Pacific and 30 for the Erie.

A number of large western railroads are quietly putting out inquiries for rails for 1923, and in view of the unusual conditions their orders are likely to be placed earlier than in several years.

Two other items in the railroad market are the buying of $200,000 worth of machine tools by the Union Pacific, and negotiation for $150,000 worth by the Illinois Central.

Poland has bought some 8000 cars which the United States had built for war use in Europe and had lately expected to sell from the storage yards in Virginia for the old material they would yield.

With awards of 24,000 tons, including 9500 tons for the new Otis steel plant, fabricated steel demand in August appears fully up to the rate of July, which at 62.5 per cent of capacity compares with 55 per cent for all of the preceding decade.

In the midst of advancing prices, large buyers of tin plate are still able to cover at $4.60 a base box with the contract market quoted at $4.75.

Scarcity of pig iron is much more pronounced and prices soar. In the East, only two blast furnaces have any product for sale and important buyers who are in the market, including electric and radiator companies, are considering the buying of foreign grades. In the Mahoning Valley, virtually no iron is obtainable. In Philadelphia, inquiries have come from such distant points as Pittsburgh, Chicago and Buffalo. In the South, $21 is now the minimum paid to furnaces, and as high as $25 has been paid on limited tonnages, but some resale Southern iron is still to be had at Cincinnati at $20, Birmingham. Iron from Cleveland and Buffalo is being sold in Pittsburgh at high prices.

Presumably because of the extent of the demand from the United States, British pig iron producers are fixing an export premium. German prices are now being advanced weekly, but the violent jumps exceed the drops in mark exchange and check export business.

Pittsburgh

Prices Still Moving Upward—Little Increase in Coal for Industries

PITTSBURGH, Aug. 22.—The upward surge of iron and steel prices continues, and apparently further advances on top of those which have taken place in the past week or so are immediately ahead, in view of the wage increase just announced by the Steel Corporation, which will affect all other producers. Meanwhile, the coal strike gives signs of ending in a victory for the union, which will mean that the miners from now until April 1, 1923, are to enjoy post war peak wages and working conditions. The payment of these wages alone would not be sufficient reason for the maintenance of the present high coal price, but the big loss of production sustained during the strike means that a good

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton	Aug. 22 1922	Aug. 15 1922	July 25 1922	Aug. 23. 1921
No. 1 Valley furnace*	$33.14	$33.14	$ 28.58	$20.84
No. 2, Valley furnace†	**33.00**	30.00	25.00	20.00
No. 2, Southern, Cin'ti	24.05	24.05	22.55	23.50
No. 1 Foundry, Chicago*	**20.00**	19.00	18.00	14.00
No. 2 Foundry, Chicago*	20.00	20.00	20.00	20.00
Basic, del'd, eastern Pa.	**28.64**	27.25	25.75	19.00
Basic, Valley furnace	26.00	26.00	24.00	18.00
Valley Bess., del. Pitts.	**31.76**	28.76	26.76	21.96
Malleable, Chicago*	30.00	30.00	25.00	20.00
Malleable, Valley	**31.50**	28.00	27.00	20.00
Gray forge, Pittsburgh	**34.76**	30.00	26.26	21.46
L. S. charcoal, Chicago	**34.65**	33.15	31.65	33.50
Ferromanganese, seab'd	67.50	67.50	67.50	70.00

Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$40.00	$40.00	$40.00	$47.00
Bess. billets, Pittsburgh	**37.50**	35.00	35.00	29.00
O.-h. billets, Pittsburgh	**37.50**	35.00	35.00	29.00
O.-h. sheet bars, P'gh	**37.50**	35.00	35.00	30.00
Forging billets, base, P'gh	**43.00**	40.00	40.00	34.00
O.-h. billets, Phila.	42.67	42.67	40.17	35.74
Wire rods, Pittsburgh	**45.00**	42.00	40.00	42.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	2.00	2.00	1.70	1.75
Light rails at mill	1.90	1.90	1.75	1.85

Finished Iron and Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.325	2.325	1.925	2.00
Iron bars, Chicago	2.15	2.15	2.00	1.75
Steel bars, Pittsburgh	**2.00**	1.90	1.70	1.75
Steel bars, Chicago	2.35	1.90	1.75	2.13
Steel bars, New York	**2.34**	2.24	2.04	2.13
Tank plates, Pittsburgh	**2.00**	1.90	1.70	1.80
Tank plates, Chicago	**2.20**	1.90	1.75	2.18
Tank plates, New York	2.34	2.24	2.04	2.18
Beams, Pittsburgh	**2.00**	1.90	1.70	1.80
Beams, Chicago	**2.35**	1.90	1.75	2.18
Beams, New York	**2.34**	2.24	2.04	2.18
Steel hoops, Pittsburgh	**2.75**	2.50	2.50	2.25

Sheets, Nails and Wire, *Per Lb. to Large Buyers:*	Aug. 22 Cents	Aug. 15 Cents	July 25 Cents	Aug. 23. 1921 Cents
Sheets, black, No. 28, P'gh	**3.35**	3.15	3.15	2.75
Sheets, galv., No. 28, P'gh	**4.35**	4.15	4.15	3.75
Sheets, blue an'l'd, 9 & 10	**2.50**	2.40	2.40	2.25
Wire nails, Pittsburgh	**2.60**	2.40	2.40	2.75
Plain wire, Pittsburgh	**2.35**	2.25	2.25	2.50
Barbed wire, galv., P'gh	**3.15**	3.05	3.05	3.40
Tin plate, 100-lb. box, P'gh	$4.75	$4.75	$4.75	$5.25

Old Material, Per Gross Ton:				
Carwheels, Chicago	**$21.00**	$20.50	$19.50	$13.00
Carwheels, Philadelphia	**19.00**	17.50	17.50	17.00
Heavy steel scrap, P'gh	**18.25**	17.50	17.25	13.00
Heavy steel scrap, Phila.	**15.50**	15.00	15.00	11.50
Heavy steel scrap, Ch'go	**16.00**	15.75	15.50	11.00
No. 1 cast, Pittsburgh	19.00	19.00	19.00	16.50
No. 1 cast, Philadelphia	19.00	19.00	17.50	17.00
No. 1 cast, Ch'go (net ton)	**19.50**	18.50	17.00	13.00
No. 1 RR. wrot., Phila.	**18.50**	18.00	17.50	14.00
No. 1 RR. wrot., Ch'go (net)	**15.25**	14.50	14.00	11.00

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	*$12.00*	$14.00	$14.00	$2.75
Foundry coke, prompt	*13.00*	15.00	14.00	3.75

Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York	14.12½	14.12½	14.00	12.00
Electrolytic copper, refinery	13.75	13.75	13.75	11.75
Zinc, St. Louis	**6.22½**	6.15	5.95	4.17½
Zinc, New York	**6.57½**	6.50	6.30	4.67½
Lead, St. Louis	**5.60**	5.55	5.40	4.25
Lead, New York	5.90	5.90	5.75	4.40
Tin (Straits), New York	**32.50**	32.12½	32.12½	26.12½
Antimony (Asiatic), N. Y.	5.25	5.25	5.25	4.50

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Aug. 22, 1922, Finished Steel, 2.412c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel

Aug. 15, 1922,	2.375c.
July 25, 1922,	2.169c.
Aug. 23, 1921,	2.321c.
10-year pre-war average,	1.689c.

Composite Price, Aug. 22, 1922, Pig Iron, $26.86 Per Gross Ton

Based on average basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Aug. 15, 1922,	$26.77
July 25, 1922,	24.05
Aug. 23, 1921,	18.97
10-year pre-war average,	15.72

many holes will have to be filled and practically all of the production that can be gotten out between now and cold weather will be wanted. Hence prices seem bound to remain high.

The past week has produced further advances of $1 to $3 per ton in pig iron, while among steel products bars, plates and shapes have gone to a minimum of 2c. for reasonably early delivery. The recent advance of $4 to $6 per ton in steel pipe has been followed by one of $10 per ton in wrought iron pipe, and independent makers of commercial seamless steel tubes have raised prices $6 to $14 per ton. Practically all of the independent makers of sheets have gone to 2.60c. base for blue annealed, 3.50c. base for black and 4.50c. base for galvanized, and on hot-rolled flats, independent producers have made an advance of $5 per ton to a base of 2.75c. Pittsburgh.

The Steel Corporation continues to move with extreme caution in the matter of price advances. It has not yet followed the independent increase in tubular goods nor in wire products and it still holds to 1.80c. Pittsburgh on plates, shapes and bars.

While there has been some increase in the coal production in this part of the country in the past week, the steel industry does not seem to profit thereby, and although operations are only slightly changed from a week ago, the drift has been toward a lower rate. The Wheeling Steel Corporation will bank its furnace at Wheeling to-night and Youngstown Sheet & Tube Co. a few days ago banked one of its two active furnaces. These losses bring the total number of active furnaces in the area bounded by Johnstown, Pa., on the East, Wheeling, W. Va., on the South, and Warren, Ohio, on the North, to 50 out of a total of 139 stacks. This is a loss of 26 from the recent peak, but compared with a total of 25 furnaces active in that territory around July 1, 1921.

A paucity in the buying has produced a weaker market in coal and coke with coal down about $1 to $1.50 per ton compared with prices of a week ago, and coke about $2 per ton off from the prices at last reports.

Pig Iron.—As far as the steel making grades are concerned, the market has passed out of the hands of producers into those of the middlemen. All sales recently noted have been of tonnages bought on speculation some time ago by brokers. An Ohio maker of ingot molds recently closed for 2100 tons of Bessemer iron, all but 100 tons of which was from speculative stocks. This iron commanded $30, Valley furnace, and establishes the market at that level, a clear advance

[illegible] $2 per ton over the price of a [illegible]. We [illegible] a sale of 1000 tons of Bessemer iron, also of brokerage ownership, to a West Virginia maker of melting bars at $30, Josephine, Pa. A sale of 2000 tons of basic iron to a Pittsburgh district sheet maker recently was made at $26, Valley furnace, the tonnage coming from a lot of iron held by a scrap firm, which took the iron in exchange for old material. It is doubtful if the latter sale could be duplicated because the supply available for market is now extremely limited and brokers are understood to have bid as high as $27 without securing any. We quote the market at $26, Valley furnace, as that is the basis of the last known transaction. A scarcity approaching a famine of foundry and other special analysis iron exists. Practically no Valley iron is available and the Westinghouse Electric & Mfg. Co., which recently closed for 1650 tons of No. 1, No. 2 and No. 2X grades paid $33, $32 and $32.50 respectively, f.o.b. Cleveland. On iron coming into the Pittsburgh district plant of this company, this would be equivalent to about $33, Valley furnace, for the base grade. Sales of Buffalo iron have been made in this district at a price equivalent to $33.50, Valley furnace, for No. 2 and apparently the same price can be obtained for No. 3 and gray forge grades as for No. 2, since those grades now are being melted in place of No. 2 iron. Evidently the shortage of iron extends into southern Ohio since an inquiry has been received here for 5000 tons of basic, from the Andrew Steel Co., Newport, Ky. Malleable iron has been sold in this market from Buffalo on a basis equal to $31.50, Valley furnace. A feature of the market is that foreign basic iron has been offered here, Scotch hematite basic on a basis of $24.50 c.i.f., Atlantic seaboard. So far as can be learned, no sales of this iron have been made here.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.76 per gross ton:

Bessemer	$26.00
[illegible]	30.00
[illegible]	33.00
No. 1 foundry	33.00
No. 2 foundry	33.00
No. 3 foundry	33.00
Malleable	31.50

Ferroalloys.—Interest in the market on the part of consumers is at low ebb. The partial settlement of the coal strike has not stayed the downward trend of steel works operations and consumption naturally is decreasing. Not only that, but most steel makers are well protected against their requirements for the next few months, and possibly for a longer period in the event that coal priority distribution plans of the Government are not modified. British ferromanganese has been offered for September shipment at $67.50 without takers, possibly because of the fear delivery could not be made in time to escape the duty proposed in the new tariff bill. There is also an expectation that domestic producers, once the tariff is effective, will take business for less than the price of British material plus the duty. The latter now are asking $75, c.i.f. Atlantic seaboard, for carloads of 76 to 80 per cent material and $100 to $110 for small lots. The leading commercial producer of spiegeleisen is asking $39 furnace, or about $44 delivered this district, for 19 to 21 per cent for a limited tonnage for fourth quarter shipment. Imported material is reported to be available about $3 per ton less delivered. Makers of Bessemer ferrosilicon and silvery iron are out of the market, having little or no tonnage to sell. They have made no change in the official quotations, but on the bases of the most recent business the market is quotable about $3.50 a ton above the last regular quotations.

We quote 10 to 11 per cent [illegible] $[illegible] Atlantic seaboard for domestic; British, spot, $72.50; British, future, $67.50; German, 76 to 80 per cent, $67.50 to $70. Average [illegible] $[illegible] nace, freight allowed. Bessemer ferrosilicon is quoted f.o.b. [illegible] 10 per [illegible] 13 per cent, $55.60; 14 per cent, $58.60; silvery iron, 6 per cent, $33.50; 7 per cent, $34.50; 8 per cent, $36; 9 per cent, $38; 10 per cent, $40; 11 per cent, $42.50; 12 per cent, $45. The [illegible] Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Billets, Sheet Bars and Slabs.—Hardly enough business is passing to establish quotations, but with steel production still decreasing and makers experiencing no easing in costs, it is evident that when there is some business it will be at well above the prices which hitherto have been regarded as the market. The Cleveland coal strike settlement has not resulted in an increase in the production of coal sufficient to encourage hopes among steel makers of being able to obtain normal supplies in the near future and they are indifferent about taking on additional obligations. The most recent sale of sheet bars was at $37.50, and this probably is as low as sheet bars, billets or slabs could be had to-day. A West Virginia sheet maker is in the market for 2000 tons of billets for rolling down to sheet bars or would buy the same tonnage of sheet bars. In general the demand is very light.

We quote 4 x 4-in. soft Bessemer and open-hearth billets at $37.50; 2 x 2-in. billets, $37.50; Bessemer and open-hearth sheet bars, $37.50; slabs, $37.50; forging billets, ordinary carbons, $43 to $45, all f.o.b. Youngstown or Pittsburgh mills.

Wire Rods.—As far as sales for early delivery are concerned, the market is no longer quotable at less than $45 for the base size of common soft rods. Only one producer in this district remains in the market, and this interest recently sold one lot of 500 tons and another of 250 tons at $45. Other producers are shipping as best they can on contracts, but are taking no new business, and the market therefore seems quotable on the basis named by the one producer who remains in the market.

We quote No. 5 common basic or Bessemer rods to domestic consumers, $45; chain rods, $45; screw stock rods, $50; rivet and bolt rods and other rods of that character, $45; high carbon rods, $52 to $55, depending on carbon, per gross ton, f.o.b. Pittsburgh or Youngstown.

Iron and Steel Bars.—Prices have further stiffened on steel bars and those makers in a position to take business for reasonable quick shipments are now quoting from 2c. to 2.25c., base, Pittsburgh. The Steel Corporation price remains at 1.80c. base, Pittsburgh, but such business as is being accepted is for indefinite delivery. Iron bars have been advanced $2 per ton.

We quote steel bars rolled from billets at 1.80c. to 2.25c.; reinforcing bars, rolled from billets, 1.80c. to 2c. base; rail steel reinforcing bars, 1.80c. to 1.90c.; refined iron bars, 2.35c. in carloads, f.o.b. mill, Pittsburgh.

Structural Material.—A considerable volume of structural business remains in sight, but is not being closed with much rapidity because of the uncertainty about delivery. A good many projects already under way are being held up because the fabricating companies are unable to obtain steel promptly. The wage increase just announced by the Steel Corporation will affect fabricating shops and it is claimed will cost the latter heavily on work that remains uncompleted. Orders for plain material now are hard to place at less than 2c. Prices are given on page 507.

Sheets.—Several of the independent manufacturers since a week ago have announced bases of 2.60c. for blue annealed, 3.50c. for black and 4.50c. for galvanized on such business as they can take on for fourth quarter shipment. These prices are $2 per ton over those announced by the American Sheet & Tin Plate Co. on blue annealed and $3 per ton higher on black and galvanized. There has been no formal opening of books for the last quarter, because all makers will carry over much third quarter business and are uncertain at present as to coal and steel supplies. The fourth quarter prices become current quotations in view of the fact that few, if any, of the producers can take on business now for shipment before the fourth quarter. Prices are given on page 507.

Iron and Steel Pipe.—Leading makers of wrought iron pipe, on Aug. 16, issued new cards, dated Aug. 15, advancing prices of standard pipe $10 per ton. This follows closely advances of $4 to $6 per ton announced Aug. 15 by Youngstown Sheet & Tube Co., and since adopted by most other independent producers, but not yet by the National Tube Co. The latter still is on the Dec. 15, 1921, card, quoting 71 per cent off list for the base size of black, and 58½ per cent off list for the base size of galvanized pipe. The Wheeling Steel Products Co., sales subsidiary of Wheeling Steel Corporation, has announced an advance of $8 per ton in all sizes of standard pipe, both black and galvanized. Independent companies generally have advanced line pipe $6 per ton, but none of them yet has issued new discount lists on oil country pipe. Changes of the past

week have resulted in increasing the premium on a standard black wrought iron pipe over steel pipe, from $53 per ton to $57 per ton, in comparison with the new independent discounts, and to $63 per ton as compared with National Tube Co. discount. Quotations given on page 507 represent most of the independent companies in the lower discounts and the National Tube Co. in the higher discounts.

Steel Rails.—Resumption at coal mines as a result of the Cleveland settlement has not yet been extensive enough to have materially stimulated the demand for light rails, but makers are holding firm to recent advances on account of high costs.

We quote 25 to 45-lb. sections, rolled from new steel, [illegible] standard rails, $40 per gross ton mill for Bessemer and open-hearth sections.

Wire Products.—Recent advance in nails and wire by the Pittsburgh Steel Co. has not been followed by other producers, most of whom are out of the market and are taking on no new business. The scarcity of coal and steel is so great that most of them are behind in their deliveries, and, while the demand is not heavy, it exceeds the supply, and $2.60 base per keg, Pittsburgh, is being paid for nails and $2.35 base per 100-lb. Pittsburgh for plain wire, for specified shipments. For early delivery these prices now are minimums. Quotations are given on page 507.

Boiler Tubes.—No change yet has taken place in lap welded steel or in charcoal iron boiler tubes except that extra discounts beyond the regular ones have been withdrawn by those who recently were giving them. The Detroit Seamless Tubes Co. has increased prices of commercial seamless boiler tubes from $6 to $14 per ton and has cut the discount on seamless mechanical tubing three points, besides revising upward prices of seamless locomotive and superheater tubes. It is probable that other independent makers will follow this advance, but to date the National Tube Co. has made no change. Several of the independent makers are sold up for the remainder of the year, and with these interests the new quotations will be merely quotations. Discounts and prices given on page 507.

Cold-Finished Steel Bars and Shafting.—The fact that hot-rolled steel bars now are not available for early delivery at below 2c. base, Pittsburgh, has found no reflection in prices of cold-finished bars, which remain at 2.25c. base, Pittsburgh, for carload lots. This is a spread of only $5 per ton between hot-rolled and cold-finished bars and, as some shading of 2.25c. is noted on the latter, it is evident that some makers are sharing the advantage of low-priced hot-rolled bars with their customers. Demand is not very brisk. Ground shafting is unchanged at 2.65c., base f.o.b. mill for carloads.

Rivets.—There is no change in prices, but the market is very firm, due to the scarcity of coal and a falling away in deliveries of steel. Since the demand holds strong, higher prices are expected. Discounts and prices are given on page 507.

Track Equipment.—The one maker in this district who still is in the market has further advanced prices on account of the coal and steel shortage. This interest now is quoting large spikes at $2.50 base per 100 lb. and small railroad and boat and barge spikes $3 base per 100 lb. There is not much demand for tie plates in this market, but on account of the steel supply situation, makers regard $45 per net ton to be as low as they should sell. Prices are given on page 507.

Steel Skelp.—It is doubtful if any of the independent makers to-day would consider less than 2c. for sheared skelp and that price is as low as grooved material can be bought.

Tin Plate.—There seems to be a slightly firmer tendency to prices, but this is apparent in the withdrawal of preferential quotations to preferred customers rather than in an actual advance in prices. Mills are comfortably well off on orders, but current demands are not urgent.

Hot-Rolled Flats.—Independent makers have generally advanced the price $5 per ton to a base of 2.75c. Pittsburgh. So far the Steel Corporation has not met this change, but is so heavily committed as to be only a small factor as far as prompt tonnages are concerned. Its last price was 2.50c. As the cotton crop is turning out in excess of early estimates, there are demands for additional tonnages of cotton ties.

Cold-Rolled Strips.—In keeping with the advance in hot-rolled strips, independent makers have marked up the price of cold rolled strips $5 per ton to a base of 4.25c., Pittsburgh. Demand is reported to be heavier than it was recently, and this price also is based upon higher labor, steel and fuel costs.

Independent makers in a position to make specified deliveries are quoting 2c. to 2.25c., Pittsburgh, and because of the increase in wages there is talk already of an advance in independent prices to 2.50c. Tank builders are seeking protection on considerable tonnage for oil storage tanks for the Southwest. Prices are given on page 507.

Nuts and Bolts.—Makers in this district are having trouble in getting enough fuel to keep up with their orders and with an increased labor cost immediately ahead, there are suggestions of an advance in prices. Discounts are given on page 507.

Coke and Coal.—A fairly substantial gain in production, coupled with the fact that buyers have been hesitant about purchases pending the results of the Cleveland conference, has weakened prices rather sharply. On coal, the market has fallen from $7.50 to $8 per net ton at mines, to $5.50 to $6, while furnace coke for spot delivery has dropped to $12 per net ton at oven as compared with $14 last week's minimum. Foundry coke is still held by some producers at $14 per net ton at oven, but on sales the market generally is quotable at $13.

Old Material.—The market trend is upward and on heavy melting steel of railroad or industrial origin the range now is $18.25 to $18.50, based on recent sales to a Pittsburgh district steel company, which in all took 10,000 tons at those prices. Sales of yard heavy melting steel have been made anywhere from $16.50 to $17.50. For the present, a distinction is necessary to clearly define the market on this class of material. This will disappear when the mills are more eager for supplies and less exacting about quality than they are now. At present the mills must pay a premium for quality scrap because dealers are not inclined to sell yard stocks, since they expect higher prices later and the railroads are not pressing tonnages upon the market. Current offerings, therefore, are moderate. Improvement in prices of rerolled bars and rails has stiffened the market on rails for rerolling. Although only one user of machine shop turnings in this district is in the market, the price is firmer, due to the fact that Eastern shippers lately have been getting as high as $14, Harrisburg, this being equal to at least $15 Pittsburgh, and of course shutting off Eastern shipments to this market. Scant offerings rather than a brisk demand sustain sheet scrap prices.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

Per Gross Ton

Heavy melting steel, railroad and industrial	$18.25 to $18.50
Heavy melting steel, yard	16.50 to 17.50
No. 1 cast, cupola size	19.00 to 19.50
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va.; Franklin, and Williamsport, Pa.	18.00 to 18.50
Compressed sheet steel	16.00
Bundled sheet sides and ends	15.00
Railroad knuckles and couplers	19.00 to 19.50
Railroad coil and leaf springs	19.00 to 19.50
Low phosphorus standard bloom and billet ends	22.00 to 22.50
Low phosphorus, plates and other grades	20.00 to 20.50
Railroad malleable	16.00 to 16.50
Iron car axles	27.00 to 28.00
Locomotive axles steel	25.00 to 26.00
Steel car axles	20.00 to 20.50
Cast iron wheels	19.50 to 20.00
Rolled steel wheels	19.00 to 19.50
Machine shop turnings	14.00 to 14.50
Heavy steel axle turnings	15.50 to 16.00
Short shoveling turnings	15.50 to 16.00
Cast iron borings	16.00 to 16.50
Heavy breakable cast	18.50 to 19.00
Stove plate	14.50 to 16.00
Sheet bar crop ends	19.50 to 20.00
No. 1 railroad wrought	15.50 to 16.00

Chicago

Advancing Pig Iron and Steel Prices with Further Curtailment of Output

CHICAGO, Aug. 22.—The fuel situation is now on the road to improvement as a result of the partial settlement of the strike last week at Cleveland and the agreement signed by Illinois operators and miners in Chicago to-day. The shortage of coal, however, is still acute so far as iron and steel works are concerned and relief will depend entirely upon the rapidity with which the production of the mines is resumed and the dispatch with which railroads handle shipments. In the meantime the Illinois Steel Co. has been forced to bank four more blast furnaces, two at Gary and two at South Works. This producer now has only 9 active stacks out of 29. Of the 10 other furnaces still in blast in the Chicago, Milwaukee and Duluth districts, five are merchant stacks. Steel output has also suffered further curtailment. The production of the Illinois Steel Co., which was on a 67 per cent basis last week, has dropped to 52 per cent. The Inland Steel Co. is still maintaining a 65 per cent rate of output, but a reduction will prove unavoidable if additional coal is not obtained by Sept. 1.

Buying of steel for indefinite delivery shows little diminution. Steel for early delivery is difficult to obtain and is commanding premiums. Little is available from local sources, but whether it is bought here or from Eastern mills, prices are higher and advancing. On plates, shapes and bars 2.35c., Chicago, is about the best that can be done, with considerable business moving at $2 to $3 higher. The Inland Steel Co. is out of the market on plates, shapes, bars and sheets, but expects to open its books for the last two months of the year as soon as costs can be determined with reasonable certainty.

Ferroalloys.—Sales of spiegeleisen and ferromanganese have been confined to carload lots. Spiegeleisen has advanced to a minimum of $49, delivered. Sales of prompt ferromanganese have been closed at as low as $70 seaboard.

We quote 78 to 82 per cent ferromanganese, future, $75.00, prompt $77.56 to $82.56, delivered. 50 per cent ferrosilicon, $55, delivered on contract and $57 prompt delivery, spot shipment, 18 to 22 per cent, $47 to $49, delivered.

Pig Iron.—While there have been no further losses in merchant pig iron production in the past week, a number of blast furnaces are about to run out of coke and will be forced to bank unless additional coal is obtained. A prompt resumption of mining in the Illinois bituminous fields may relieve the situation soon enough to tide them over, although the production of coke requires the use of large percentage of low volatile coal, shipments of which are moving slowly because of railroad difficulties between here and Eastern mines. Spot demand for pig iron is very active and in some cases melters are running dangerously short of metal. Forward buying is less conspicuous. A Wisconsin manufacturer of sanitary ware, however, has closed for 5000 tons of Southern foundry iron for fourth quarter delivery and another melter in that State has bought 500 tons of Northern foundry for the remainder of the year. Among sales for early shipment, 500 tons of malleable bought by a Michigan user for August and September delivery is prominent. Southern iron for early shipment is difficult to obtain owing to freight congestion in the South. Southern prices are uncertain because most furnaces have temporarily withdrawn from the market. Quotations of $22, Birmingham, for early shipment and $21 for fourth quarter are still reported, however. Charcoal iron is advancing, one important producer having raised the base quotation to $31.50, furnace, while others have gone up to $33, base. The demand for silvery is heavy both because of its relative lowness compared with standard foundry iron and the greater use of scrap by melters. With Jackson County producers out of the market, silvery is scarce, although it can still be obtained from electrolytic makers. There is also a dearth of low phosphorus iron and copper free material has advanced to $38, Valley furnace. On the eve of the advance in charcoal iron a Wisconsin melter closed for 1000 tons for the rest of the year at the old base of $30 furnace.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$34.65 to $36.15
Northern coke, No. 1, sil. 2.25 to 2.75	31.00
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	30.00
Northern high phos.	30.00
Southern No. 2	27.00 to 28.00
Malleable, not over 2.25 sil.	30.00
Basic	30.00
Low phos. Valley furnace, sil. 1 to 2 per cent copper free	38.00
Silvery, sil. 8 per cent	40.79

Bars.—New business in mild steel bars for indefinite shipment shows little diminution and demand for early delivery is incessant as the scarcity of material becomes more pronounced. Prices on material for specific shipment range from 2.35c. to 2.45c., Chicago. Buyers with bars on contract are receiving their share of present reduced output as apportioned by the mills. The situation in bar iron is strong with one mill taking no further orders and preparing to shut down in about a week when its coal supply is used. The Moline rail steel bar plant has advanced its product to 1.85c., f.o.b. mill, or 2.095c., delivered Chicago. The strike-bound Chicago Heights mills still have some hard steel in stock which they are quoting at 2c., Chicago.

Mill prices are: Mild steel bars, 1.90c. to 2.45c., Chicago; common bar iron, 2.15c. to 2.25c., Chicago; rail steel, 2c. to 2.005c., Chicago.

Jobbers quote 2.70c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 3.70c. for rounds and 4.20c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 2.50c. base; hoops, 3.70c.; bands, 3.45c.

Bolts and Nuts.—Automobile makers and railroads continue to buy liberally and makers find it difficult to meet the demand owing to raw material shortage, which is reducing production. The market is firm at the July 1 discounts. The prices on page 507 apply in this territory except that they are f.o.b. Chicago, instead of f.o.b. Pittsburgh.

Jobbers quote structural rivets, 3.35c.; boiler rivets, 3.45c.; machine bolts up to ⅞ x 4 in., 50, 10 and 10 per cent off; larger sizes, 50 and 10 off; carriage bolts up to ⅞ x 6 in., 50 and 5 off; larger sizes, 45 off; hot pressed nuts, squares and hexagons, tapped, $3.25 off; blank nuts, $3.50 off; coach or lag screws, gimlet points, square heads, 60 per cent off; quantity extras are unchanged.

Wire Products.—Mill operations have declined so sharply that a number of important producers find it impossible to take care of commitments without accepting new business. The Steel Corporation prices remain unchanged, but independents in a position to make delivery are selling at higher figures without difficulty. For mill prices see finished iron and steel, f.o.b. Pittsburgh, page 507.

We quote warehouse prices, f.o.b. Chicago: No. 9 and heavier black annealed wire and No. 9 and heavier bright basic wire, $3.25 per 100 lb.; common wire nails, $3.35 per 100 lb.; cement coated nails, $2.75 per keg.

Sheets.—Prices are now firmly established at the figures announced for fourth quarter by the American Sheet & Tin Plate Co. It is difficult to get material from any source for reasonably prompt delivery. The Inland Steel Co. still has some fourth quarter tonnage open, but will not take on new commitments until its fuel costs can be determined.

Mill quotations are 3.35c. for No. 28 black, 2.50c. for No. 10 blue annealed and 4.35c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote blue annealed, 4c.; black, 4.85c.; galvanized, 5.85c.

Structural Material.—There is a notable decline in new building projects attributable, no doubt, to the approach of the winter season together with the great difficulty encountered in getting new steel for reasonable delivery. Fabricating awards are still fairly numerous and mills report no appreciable decline in bookings of plain material for indefinite shipment. A tendency toward contraction in building activity is nevertheless apparent. Plain material for reasonably early delivery is bringing from 2.35c. to 2.45c., delivered Chicago. The steady reduction in local mill output is causing further delay in shipments against contracts. The Inland Steel Co., which is now out of the market

on structural steel plates and bars, will open its books for the last two months of fourth quarter as soon as fuel costs can be ascertained with a fair degree of certainty.

The mill quotation on plain material is 1.90c. to 2.45c., Chicago. Jobbers quote 2.50c. for plain material out of warehouse.

Plates.—Notwithstanding declining mill operations which will push deliveries further into the future, bookings of new business for indefinite shipment are practically as heavy as in the eight weeks just past. Plates for specific shipment are scarce and are commanding from 2.20c. to 2.50c., delivered Chicago. Specifications are beyond the ability of mills to deliver with the result that output is being rationed among customers.

The mill quotation is 1.90c. to 2.50c., Chicago. Jobbers quote 2.50c. for plates out of stock.

Reinforcing Bars.—Uncertain mill deliveries make it difficult for reinforcing bar companies to quote on new projects or to make further sales from warehouse. There is an active demand for small tonnages, but as fall approaches it is notable that few large jobs are being undertaken, as there is a disinclination to start building work which might be interrupted by the cold weather. Recent awards include:

American Can Co., building, New Orleans, La., 772 tons to Paul J. Kalman Co.

Streeterville apartment hotel, Chicago, 594 tons to unnamed company.

Atchison, Topeka & Santa Fe, 400 tons to Paul J. Kalman Co.

Hampshire Spinning Co., mill, Clover, S. C., 350 tons to Paul J. Kalman Co.

Pending work includes:

Western Electric Co., wire plant, Hawthorne, Ill., 280 tons.

Chesbrough Mfg. Co., plant, McKee's Rocks, Pa., plans being revised, 600 tons.

Paducah, Ky., sanitary sewers, 260 tons, to Truscon Steel Co.

Warehouse Prices.—Local jobbers have advanced plain wire and wire nails 25c. per 100 lb. and cement coated nails 15c. a keg. New prices are given under wire products. Sheets have been advanced also, blue annealed $2 a ton and black and galvanized $5 a ton. New prices are published under sheets.

Cast Iron Pipe.—Prices have advanced to a minimum of $38.50, base Birmingham, for 6-in. and larger. Martinsville, Ill., has awarded 600 tons to the American Cast Iron Pipe Co. New business is notably lighter, but this is causing little concern to pipe shops, which are heavily loaded with tonnage.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $50.70 to $51.70; 6-in. and above, $46.70 to $47.70; class A and gas pipe, $3 extra.

Rails and Track Supplies.—A number of large western railroads have quietly put out inquiries for their 1923 rail requirements. It is altogether likely that rail orders for the coming year will be placed earlier than is usually the case in view of the present condition of the steel market. Light rails have advanced to 1.90c., mill. Inquiry for light rails for the coal mines is reviving. New business in track fastenings is largely in small lots, a notable exception being an order for 20,000 kegs of spikes and 10,000 kegs of bolts placed by a large Western line.

Standard Bessemer and open-hearth rails, $40; light rails rolled from new steel, 1.90c., f.o.b. makers' mills.

Standard railroad spikes, 2.60c. to 2.75c., mill; track bolts with square nuts, 3.60c. to 3.75c., mill; tie plates, steel and iron, 2c., f.o.b. mill; angle bars, 2.40c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.40c. base and track bolts 4.40c. base.

Old Material.—The market is strong both on account of widespread demand and increasing scarcity of certain grades due to the lack of railroad offerings. Buying of cast, malleable and steel foundry scrap is particularly active and in most cases early delivery is desired. There is no doubt that the rapid rise of pig iron has made scrap appear more desirable in the eyes of melters, who see an opportunity to keep their costs down by using a larger proportion of scrap in their charges. There is little activity in steel mill grades, but moderate purchases of iron mill scrap have been made. Shipments of scrap are now largely from dealers' yards with the result that stocks of certain materials are becoming depleted. There are no railroad offerings of consequence this week, but the Chicago surface lines are taking bids on 1500 tons.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

	Per Gross Ton	
Iron rails	$20.00 to	$20.50
Cast iron car wheels	21.00 to	21.50
Relaying rails	22.50 to	27.50
Rolled or forged steel car wheels	19.50 to	20.00
Rails for rolling	17.00 to	17.50
Steel rails, less than 3 ft	19.00 to	19.50
Heavy melting steel	16.00 to	16.50
Frogs, switches and guards cut apart	16.00 to	16.50
Shoveling steel	15.50 to	16.00
Drop forge flashings	11.50 to	12.00
Hydraulic compressed sheet	13.00 to	13.50
Axle turnings	14.00 to	14.50
	Per Net Ton	
Iron angles and splice bars	19.00 to	19.50
Steel angle bars	15.50 to	16.00
Iron arch bars and transoms	19.50 to	20.00
Iron car axles	23.50 to	24.00
Steel car axles	17.00 to	17.50
No. 1 busheling	13.00 to	13.50
No. 2 busheling	8.00 to	8.50
Cut forge	14.50 to	15.00
Pipes and flues	11.00 to	11.50
No. 1 railroad wrought	15.25 to	15.75
No. 2 railroad wrought	14.50 to	15.00
Steel knuckles and couplers	17.50 to	18.00
Coil springs	18.50 to	19.00
No. 1 machinery cast	19.50 to	20.00
No. 1 railroad cast	17.50 to	18.00
Low phos. punchings	16.00 to	16.50
Locomotive tires, smooth	15.00 to	15.50
Machine shop turnings	9.50 to	10.00
Cast borings	11.50 to	12.00
Stove plate	16.00 to	16.50
Grate bars	15.50 to	16.00
Brake shoes	16.00 to	16.50
Railroad malleable	17.50 to	18.00
Agricultural malleable	17.50 to	18.00

New York

Conditions Favor Continuance of High Prices —Coke Still Scarce

NEW YORK, Aug. 22.—The action of the United States Steel Corporation in advancing wages 20 per cent is regarded as adding one more factor of importance in keeping prices on a high plane. It is also believed that despite the partial settlement of the coal strike, iron and steel industries will continue to be seriously embarrassed for lack of fuel and for this reason high prices will prevail.

Pig Iron.—The market has been very active and a number of important inquiries are still pending. The domestic supply is not equal to the demand and foreign iron is still being considered by buyers, but sales of the imported product have not been large the past week. A local agency selling domestic iron disposed of about 3000 tons last week and an equal amount the first two days of this week, and has advanced prices $1 per ton, its basis now being $32 for No. 2 plain, while $33 is asked for No. 2X and it is offering a moderate tonnage of 4 per cent silicon iron for $36. Inquiries include 5000 tons for the American Radiator Co., which asks for the beginning of deliveries within two weeks. On this tonnage 3500 is No. 2 plain and 1500 is of silicon, 1.50 to 1.75. The General Electric Co. is inquiring for 3250 tons of foundry grades, high silicon, delivery to begin Oct. 1. A Rhode Island malleable concern is in the market for 3000 tons of malleable and another New England malleable interest has been in the market for from 2000 to 3000 tons and has purchased a part, if not all, of that tonnage. The ruling price on malleable is $32, furnace. A New England radiator company is in the market for 2000 to 3000 tons of foundry grades. Lake Superior charcoal has been advanced by one company to a basis of $33, furnace.

We quote delivered in the New York district as follows, having added to furnace prices $2.27 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$36.27
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	35.27
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	34.27
Buffalo, sil. 1.75 to 2.25	34.91
No. 2 Virginia, sil. 1.75 to 2.25	32.44

Ferroalloys.—Demand for ferromanganese continues moderate and fair sales of the British alloy are noted, among them being one lot of 500 tons and several other smaller lots for September shipment at the

prevailing quotation of $67.50, seaboard. British representatives still have some September shipment available. Almost nothing is heard of sales of domestic alloy. Some business has been done in the 20 per cent grade of spiegeleisen at the new price of $39, furnace. The quotation of the lower grade is nominal at $38, furnace, but scarcely any is reported offered. The 50 per cent ferrosilicon market is characterized by heavy specifications on contracts made some time ago and there are only sales of spot and early delivery lots at $55 to $60, delivered. The ferrochromium market is quiet, but specifications on contract are fairly brisk. Quotations are as follows:

Ferromanganese, domestic, seaboard, per ton..$67.50
Ferromanganese, British, seaboard, per ton...$67.50
[illegible]
Ferrosilicon, 50 per cent, delivered, per gross ton, carloads .....$55.00 to $60.00
Ferrosilicon, 10 to 15 per cent, delivered, per [illegible]
Ferrotungsten, per lb. of contained metal..40c. to 50c.
[illegible]
70 per cent Cr., per lb. Cr., delivered...12c. to 14c.
Ferrovanadium, per lb. of contained vanadium, $3.00 to $3.50
Ferrocarbontitanium, 15 to 18 per cent, in carloads, per net ton.....$200.00
[illegible]
Manganese ore, foreign, per unit, seaboard.28c. to 30c.
Tungsten ore, per unit, in 60 per cent concentrates, nominal .....$3.25 up
Chrome ore, basis 48 per cent Cr_2O_3, crude, per ton, Atlantic seaboard.....$15 to $18.50
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York.....45c. to 50c.

Cast Iron Pipe.—The city of Poughkeepsie has placed an order for 2700 tons of 24 and 30-in. pipe with the Warren Foundry & Machine Co. in competition with steel pipe. The East New Jersey Pipe Co. submitted a bid of $105,516 on steel pipe and the Warren Foundry & Machine Co. was $27,000 higher. Woonsocket, R. I., is inquiring for 2000 tons. We quote per net ton f. o. b., New York, in carload lots, as follows: 6-in. and larger, $54.50; 4-in. and 5-in. $59; 3-in. $64.80, with $4 additional for Class A and gas pipe.

Warehouse Business.—Business is fairly active in most quarters with prices holding generally firm. An advance of $6 per ton on black steel pipe and $2 on galvanized pipe by the mills resulted in a corresponding increase in warehouse prices as noted elsewhere in this issue. The prices on wrought-iron pipe for the present remain unchanged. However, change has been noted in the price of boiler tubes from stock, which now ranges from 23c. per foot for lapwelded and 21c. for seamless steel in 1¾ in. size, to 39c. for lapwelded and 43c. for seamless in 4 in. size. Further reduction of output and continued strong demand are expected to bring further price advances in bars, shapes and plates. A better volume of business is expected upon settlement of the strikes. It is felt by the trade that increased business will be showing after Labor Day.

High Speed Steel.—Business is fairly active, but there is no marked improvement over last week. Considerable business continues despite the threatening effect of the strikes. Prices remain steady.

Finished Iron and Steel.—The tight mill situation, due to coal and coke shortage, is making it very difficult for consumers to buy. The latter seem to have fully appraised the seriousness of the situation, but instead of crowding the mills to accept orders, as is usually the case in a time of stress, they are showing a marked degree of moderation. Evidently the memories of the wave of over-buying in 1919 and 1920 are too fresh to encourage a repetition of that runaway market. While relatively high prices have been paid for steel, particularly for plates, shapes and bars, it is of interest that nearly all of the orders placed at the top figures have been for small tonnages, and there has been no great number of such orders. The price situation is wholly in the hands of the producers, with the buyers bidding quotations up to a slight extent. Some of the Eastern mills are in better position with respect to their ability to fill orders than mills in the Pittsburgh-Youngstown district, most of which are selling little or nothing. The mills which are operating the most successfully are, of course, getting the most inquiries. A central Pennsylvania plate mill operating on fuel oil has broken all of its production records so far this month and is taking orders from regular customers for shipment within a few weeks. Large buyers of plates have not been able to get their orders accepted at less than 2c., Pittsburgh, and some quotations are as high as 2.25c. The same range applies also to bars and shapes. Tin plate and cold finished steel bars are less affected by the present coal and rail situation than other products. Tin plate prices have not stiffened materially and large buyers are still able to place attractive orders at not over $4.60 per base box, Pittsburgh. A large can company has bought fully 50,000 base boxes of tin plate within the past week and is still buying. The fruit and vegetable crops throughout the country are the largest in many years and are from two to four weeks earlier in maturing than usual. Due to the rail situation making shipping difficult, a larger share of such farm products will be canned this year.

We quote for mill shipments, New York delivery, as follows: For indefinite delivery soft steel bars, structural shapes and steel plates, 2.14c.; for delivery in a number of weeks, soft steel bars, plain structural material and steel plates, 2.34c. to 2.59c.; bar iron, 2.34c.

Coke.—Although the market seems to be somewhat easier as to obtaining supplies, prices are about the same, being on Connellsville grades $14.25 to $14.75 for furnace coke and $15.50 to $16.50 for foundry. For by-product coke, $15, seaboard, is quoted and there is very little to be obtained for foundries owing to priority orders requiring shipments to hospitals and utility companies. The outlook is very unsatisfactory for obtaining adequate supplies any time in the near future.

Old Material.—A better demand for scrap from mills and foundries and a stronger tone to prices are developments of the past week. The Bethlehem Steel Co. has bought between 20,000 and 30,000 tons of steel scrap, paying $15 and $15.50, delivered Bethlehem. Dealers have paid as high as $12.85, New York, for shipment on these orders. Yard steel is not particularly in demand, as mills are specifying only the best quality of railroad steel or its equivalent. Iron car axles, No. 1 railroad wrought, wrought iron track, borings and turnings and other grades are all quoted higher. For shipment to Weirton, W. Va., $15, delivered, has been offered for blast furnace borings and turnings. Local foundries are buying cast scrap a little more liberally due to the scarcity and high prices of pig iron. While $20, delivered, has been paid recently by large eastern Pennsylvania and New Jersey foundries, local melters have not been obliged to pay more than $18.50 to $19.50.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$10.25 to $10.75
Steel rails, short lengths, or equivalent	12.25 to 12.75
Rerolling rails	12.50 to 13.00
Relaying rails, nominal	27.00 to 28.00
Steel car axles	17.00 to 18.00
Iron car axles	23.00 to 24.00
No. 1 railroad wrought	13.00 to 13.50
Wrought iron track	11.75 to 12.25
Forge fire	8.00 to 8.50
No. 1 yard wrought, long	11.00 to 11.50
Cast borings (clean)	10.75 to 11.25
Machine-shop turnings	9.25 to 10.25
Mixed borings and turnings	9.25 to 10.25
Iron and steel pipe (1 in. diam., not under 2 ft. long)	9.75 to 10.25
Stove plate	11.25 to 11.75
Locomotive grate bars	11.50 to 12.00
Malleable cast (railroad)	11.00 to 11.50
Cast-iron car wheels	13.50 to 14.00

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$18.50 to $19.50
No. 1 heavy cast (columns, building materials, etc.), cupola size	16.50 to 17.00
No. 1 heavy cast, not cupola size	14.00 to 14.50
No. 2 cast (radiators, cast boilers, etc.)	12.00 to 12.50

The Interstate Commerce Commission in a decision based on the complaint of the Standard Rail & Steel Co., St. Louis scrap dealer, against the Missouri Pacific, et al., has condemned rates on scrap iron and steel from Hot Springs and Pine Bluff, Ark., to Quincy, Ill., to the extent that they exceed the combination based on St. Louis.

Birmingham

BIRMINGHAM, ALA., Aug. 22.—The absolute minimum in the Birmingham iron market to-day is $21. Lot on lot from car loads to 200 tons has been sold in the past two days for spot and fourth quarter delivery at $25. These bookings have been made by the largest foundry maker heretofore selling at the lower prices. One thousand tons of Birmingham iron stored at Providence, R. I., brought $35 at Providence yards. Only one maker quotes as low as $21 and that is one booked to capacity for the remainder of the year and accommodating only preferred customers to the extent possible. Next to the largest maker said this morning, "I would not sell even at $24. The market is very nervous and jumpy."

Pig Iron.—At the close of the past week, Birmingham spot iron was on a base of $21 and fourth quarter iron on a base of $20, the latter tending to advance. One maker booked 6000 tons of fourth quarter iron during the week at $20. The lots ran from 100 to 2000 tons. Another maker booked spot iron in car lots and up to 200 tons at $21. The $20 base was paid by large interests able to command the lowest base price and their paying $20 established that as the base. Approximately 2000 tons of northern Alabama iron on yards at Providence, R. I., brought $30, which is the equivalent of a Birmingham base of $20.40. One maker declined during the week to make any bookings for delivery prior to Nov. 15 and another would book none prior to Oct. 15. One maker is sold to capacity through the fourth quarter except for grades that may develop in the making. Production, which was increased by the blowing in of two blast furnaces in July, was further augmented by the blowing in of the blast furnace of the Central Coal & Iron Co. at Holt on Monday. This stack has been overhauled and is now ready for a long run. With the going in of this plant all operations of the Iron Products Corporation in Alabama were practically at 100 per cent, coal and coke included. Stocks have not accumulated as heavily as was thought probable owing to the nearness of Southern consumers and the enormous amount of iron which they continue to melt. No iron and steel industries have slackened pace, raw materials coming handily on account of being on company lands and, in some instances, hauled by company motive power and cars. The Warrior River has helped the raw material situation by bringing in manganese ore from Brazil, sulphur for acid mills from Texas and Chilean nitrates for powder mills, the river barges enabling an all-water route.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon 1.75 to 2.25	$21.00 to $25.00
Basic	20.00 to 25.00
Charcoal, warm blast	30.00 to 32.00

Finishing Mills.—All finishing mills maintain the pace of July 1. The Tennessee company, as usual, is on double turn at Fairfield, Ensley and Bessemer mills this week. The rail mill is turning out 9000 to 10,000 tons and the ingot mill is at 100 per cent. The car plant is turning out 15 new cars and 12 repaired ones per diem. Progress is made on the new 10 and 12-in. bar mill at Fairfield. The Gulf States Steel Co., the American Steel & Wire Co. and the Conners Steel Co. continue on full turn in finishing departments, although the product is being piled owing to car shortage. China has ordered 50 tons of steel hoops. Shipments to the Pacific Coast out of Mobile last week included nails and wire.

Cast Iron Pipe.—J. R. McWane, president, announces the purchase by the McWane Cast Iron Pipe Co. of 30 acres in North Birmingham and immediate construction of a cast iron pipe plant with initial capacity of 8000 ft. per diem and employing 150 men to begin with in the first unit. Mr. McWane is one of the founders and for a long time was president of the American Cast Iron Pipe Co. He has made a marked success this year in a leased plant in the manufacture of smaller sizes of pressure pipe running from 6 to 1¼ in. An especially good business has been done with the Pacific Coast and Honolulu. Pressure pipe is still quoted at $37 and sanitary pipe at $60 to $65. Little new business has developed, but all plants are on full turn with enough business for several months.

Coal and Coke.—The Western demand for Alabama coal remains acute and production remains at 400,000 tons a week. Prices have ranged from $3 to $3.50 on the average for this spot business with some coal going higher. Spot coke is selling at $6 and $7 and some higher still. Production bids fair to remain at the present prices and high level for some time.

Old Material.—There is an active demand for cast scrap by the foundries and the market is firm at the prices quoted. Steel is also stronger with fancy and select cupola grades selling at as high at $15.50 to $16 at yards. No. 1 steel as a rule is bringing $12 to $14, according to tonnage involved.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Steel rails	$13.00 to $15.00
No. 1 steel	12.00 to 15.00
No. 1 cast	15.00 to 16.00
Car wheels	15.00 to 16.00
Tramcar wheels	11.00 to 14.00
Stove plate	13.00 to 14.00
Cast iron borings	6.00 to 7.00
Machine shop turnings	4.00 to 5.00

Buffalo

BUFFALO, Aug. 22.—The Lackawanna Steel Co. has banked another furnace and now has but one in blast. In a total of 9000 tons of pig iron inquired for with one interest, one inquiry is for 5000 tons, from outside the district, and others are for 1500 and 600 tons. Lackawanna Steel Co. and the Donner Steel Co. have three open hearths each in operation. The Lackawanna furnaces are burning oil.

Pig Iron.—There is no effect in this district as yet from the partial settlement of the strike of bituminous coal miners. Furnace interests generally feel pessimistic about the fuel situation for the remainder of the year. There is little likelihood that any of the furnaces recently banked will be started within 60 days. Prices on pig iron depend on the urgency confronting the consumer and his ability to place his order. On No. 2 plain iron $32 has been paid in several cases and $33 has been done on isolated transactions. The one furnace which had iron to sell while competitors were doing no business has now exhausted its supply on all grades except No. 2 plain and No. 2X. There is a lively demand for No. 1X iron. Sales continue to be for small quantities—the largest in the week not exceeding 200 tons.

We quote f.o.b. per gross ton Buffalo as follows, the higher prices being for early shipment:

No. 1 foundry, 2.75 to 3.25 sil.	$32.00 to $35.00
No. 2X foundry, 2.25 to 2.75 sil.	31.00 to 35.00
No. 2 plain, 1.75 to 2.25 sil.	30.00 to 34.00
Basic	26.00
Malleable	30.00
Lake Superior charcoal	33.28

Finished Iron and Steel.—Two local interests having black sheets for sale have advanced prices and are now quoting 3.50c. base. One independent made two advances within the week and both sellers booked considerable business on the new basis. It is still possible to buy occasional quantities of bars at the minimum price of 2c. No effect from the settlement of the bituminous coal strike is noticeable; in fact, a local mill paid the highest price for coal this year since the settlement of the differences between operators and miners. Inquiry in the structural field has fallen off and no resumption is expected the remainder of this year. There has been no further curtailment of steel mill operations.

Warehouse Business.—Prices have advanced in keeping with the general advance in warehouse schedules at other centers; local warehouses do not regard the increase as being in keeping with mill advancements. There is considerable difficulty encountered by warehouses in obtaining steel.

We quote warehouse prices, Buffalo, as follows: Structural shapes, 2.90c.; plates, 2.90c.; soft steel bars, 2.80c.; hoops, 3.70c.; bands, 3.55c.; blue annealed sheets, No. 10 gage, 3.90c.; galvanized steel sheets, No. 28 gage, 5.55c.; black sheets, No. 28, 4.55c.; cold rolled round shafting, 3.80c.

Old Material.—Mills are buying small lots of steel

and there is a general impression that larger orders would be placed if a break should occur in the price of heavy melting steel. There is a strong local demand for railroad malleable, No. 1 machinery cast, and car wheels, but the market for cast iron borings is practically at a standstill, due to blast furnace operations having been curtailed. Dealers believe that settlement of the various strike disturbances would bring about a big demand for all grades of old material and a consequent advance in prices.

We quote dealers' [illegible] per gross ton as follows:

Heavy melting steel	[illegible]
Low phos. melting steel	[illegible]
No. 1 machinery cast	[illegible]
[illegible]	[illegible]
Machine shop turnings	10.50 to 11.00
[illegible]	[illegible]
Heavy axle turnings	14.00 to 14.50
[illegible]	[illegible]
No. 1 busheling	15.00 to 15.50
Stove plate	15.00 to 15.50
Bundled sheet stampings	11.50 to 12.00
[illegible]	[illegible]
Hydraulic compressed	15.00 to 15.50
Railroad malleable	18.00 to 19.00

Boston

Increased Demand for Alabama Iron—Scotch Prices Advance

BOSTON, Aug. 22.

Pig Iron.—Sales of foreign iron in this territory the past week amounted to about 4000 tons, mostly Scotch for August and September shipment. The outstanding feature of the market, however, is the increased demand for Alabama iron. Alabama iron, f.o.b. Providence, R. I., has advanced from $30 to $35 a ton base, with sales the past week including 500 tons silicon 2.75 to 3.25 to a Providence foundry, a duplicate lot to another Providence melter, 300 tons No. 2 plain to a Massachusetts heater maker, 150 tons No. 1X to a Massachusetts stove maker, 150 tons No. 2X to a Hartford, Conn., machine tool builder, and 200 tons in carload lots to various small users. Quotations are out on an additional 1000 tons, which, if closed, will reduce Providence stocks of Alabama iron to about 3000 tons, as against 8000 tons plus on Aug. 1. Another Alabama furnace sold 1500 tons of fourth quarter iron in lots ranging from cars to 300 tons, at $20 furnace base. No. 3 Scotch sold at prices ranging from $28.50 to $33 on local dock. The lowest available Scotch iron to-day is $29, consequently the market is 50c. to $1 a ton higher. Local brokers are buying foreign irons from each other. A small tonnage of French iron was landed here the past week.

We quote delivered prices, on the basis of the latest reported sales, now infrequent, and as follows, having added to furnace prices $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia and $9.60 from Alabama:

East. Penn., sil. 2.25 to 2.75	$32.15 to $34.15
East. Penn., sil. 1.75 to 2.25	31.65 to 33.65
Buffalo, sil. 2.25 to [illegible]	30.41 to 31.41
Buffalo, sil. 1.75 to 2.25	29.91 to 30.91
Virginia, sil. [illegible]	29.60 to 30.10
Alabama, sil 1.75 to 2.25	29.10 to 29.60

Warehouse Business.—Local warehouse prices on galvanized and black sheets and on special plates in stock sizes have been advanced 25c. per 100 lb., and on cold rolled steel 15c., while everything else on the list with the exception of best refined, Wayne and Norway iron and toe calk steel, has gone up 10c. Small rounds, bands and light bars and angles are in small supply, but heavier material supplies are ample for requirements during the next two months or more. The demand for iron and steel is as active as at any previous time this year. The advance in independent mill prices on nails is not reflected in jobbing quotations. Large rivets are more active, and bolts and nuts are moving in normal quantities. Prices for these products are unchanged, but very firm.

Jobbers quote: Soft steel bars, $2.85½ per 100 lb. base; [illegible] $2.50; [illegible] $2.50 to $3; [illegible] $4 to $4.50; spring steel, $4 to $4.50; [illegible] bands, $4; [illegible] refined iron, $5 to $5.50; best grade of [illegible] $5.50. Norway iron, $6 to $6.50; [illegible] No. 10 blue annealed sheets, $4.50 to $4.60; No. 10 black sheets, $5.15; No. 28 galvanized sheets, $6.15.

Coke.—The New England Coal & Coke Co. and the Providence Gas Co. continue to quote by-product contract foundry coke at $16.50 a ton delivered where the local freight does not exceed $3.10. The market for spot fuel is nominal, both producers being out of the market. The aggregate shipments of contract fuel by these two concerns the past week show improvement, but have remained behind foundry shipping instructions. Contrary to report, no foundry in New England has been obliged to close for lack of fuel. Competition from English made foundry coke continues, a further sizable tonnage reported being sold on a delivered basis slightly above the domestic.

Old Material.—The market for old material is a little more active, but business centers largely in heavy melting steel and borings and turnings. A considerable tonnage of railroad heavy melting steel was purchased in this territory the past week at around $11.50 shipping point for Pittsburgh district mills. Offers were made yesterday at $12, but that price has not become general, and the material involved is strictly No. 1. The undertone of the market for heavy melting steel, however, unquestionably is firmer. Borings and turnings also are being taken for shipment to the Pittsburgh district. Prices take a wide range owing to material involved. The best grades are taken at $9 to $9.50 on cars shipping point, but where considerable bushing is involved, the average price is around $8.75. A fair demand for shafting continues, a Portland, Me., rolling mill still being a factor. Steel car axles are firmer, dealers having paid about $2 a ton more for them than for shafting. One broker reports sales of 500 tons of machinery cast the past week, but New England foundries as a rule continue to buy in a hand-to-mouth manner from local or nearby yards at around 80c. per 100 lb. with 30-day terms.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$19.00 to $20.00
No. 2 machinery cast	17.00 to 18.00
Stove plate	15.00 to 16.00
Railroad malleable	15.50 to 16.50

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$11.00 to $11.75
No. 1 railroad wrought	12.50 to 13.00
No. 1 yard wrought	10.00 to 11.00
Wrought pipe (1-in. in diam., over 2 ft. long)	8.50 to 9.00
Machine shop turnings	8.50 to 9.00
Cast iron borings, rolling mill	9.50 to 10.00
Cast iron borings, chemical	11.50 to 12.00
Blast furnace borings and turnings	8.75 to 9.50
Forged scrap and bundled skeleton	8.00 to 8.50
Street car axles	17.50 to 18.00
Shafting	16.00 to 16.50
Rerolling rails	11.00 to 12.00
Street car wheels	13.50 to 14.00

Cincinnati

No Southern Iron Being Shipped—Tuscaloosa Stack Blown in

CINCINNATI, Aug. 22.

Pig Iron.—The demand for pig iron for prompt shipment continues active, but the supply is exceedingly short. There is almost no Southern iron available on which shipments can be made, and as a result melters are turning to Northern furnaces located on roads which are not greatly affected by railroad strike. Most of the iron now being sold is coming from the Valleys, with Chicago being quoted where freight rates make it possible. All southern Ohio furnaces are out of the market, being completely sold up. Prices are very firm, Valley iron being quoted in this district at $30, base. The last sale of southern Ohio iron reported was on $28, Ironton, basis, for 500 tons for shipment to a southern Ohio melter. Iron from the Ironton district was sold into Pittsburgh district early last week at $30, furnace, one lot being for 300 tons. A nearby melter bought 1000 tons at $30, Valley, and another melter took 500 tons at the same figure. A Michigan melter bought 3000 tons at a reported price of $30, Chicago furnace. A sale of silvery iron for last quarter was made at $38.50, Jackson County furnace, for 8 per cent. Inquiries include one for 5000 tons for basic for a Kentucky steel plant, 800 tons of malleable for northern Ohio,

500 tons of silvery for Detroit and several lots of 200 tons for nearby melters. Tuscaloosa furnace in Alabama blew in to-day, and will have iron available for third and fourth quarter shipment. Some Southern furnaces are quoting as high as $27 for immediate delivery, but resale material is available at $20 to $21, and several furnaces are reported to be willing to book fourth quarter business at the former figures.

Based on freight rates of Sloss Iron, Birmingham and $2.27 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (No. 2 [illegible])	$34.00 to $37.05
Southern coke, sil. 2.25 to 2.75 (No. 2 [illegible])	34.00 to 37.05
Ohio silvery (nominal), 8 per cent	38.27
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	30.27 to 32.27
Basic Northern	28.27
Malleable	30.27 to 32.27

Finished Material.—While the demand for finished materials has abated somewhat, anything offered for prompt delivery is quickly snapped up. This is especially true of galvanized sheets, which are very scarce. Shapes also are in good demand for immediate delivery. Opening of the books of the American Sheet & Tin Plate Co. for fourth quarter at 2.50c. for blue annealed, 3.35c. for black, and 4.35c. for galvanized sheets has been followed by announcements from several independent makers that prices for fourth quarter will be 2.60c., 3.50c. and 4.50c., respectively. A fair tonnage of sheets has been booked for this delivery at the new prices. An inquiry for 500 tons of reinforcing bars for delivery during the first quarter of next year has been received, but no action taken. Prices have been advanced from $6 to $10 a ton on pipe, the discount on black pipe having been reduced 3 points and on galvanized two points. Wrought iron pipe has been advanced $10 per ton. On bars, shapes and plates practically all of the orders placed carry a price of 2c., and on the less desirable business as high as 2.25c. is being quoted. Some railroad equipment business has appeared. The Louisville & Nashville Railroad has sent out an inquiry for 250 tons of locomotive tires, and the Kentucky & Indiana Railway is in the market for 250 tons of heavy rails. Two inquiries for 300 tons each of shapes are current.

Warehouse Business.—Local jobbers have announced advances of $2 to $5 per ton on all products, with the exception of black and galvanized sheets and wire nails. The demand continues strong.

Cincinnati jobbers quote: Iron and steel bars, 2.85c. base; reinforcing bars, 2.95c. base; hoops, 3.85c. base; bands, 3.60c. base; shapes and plates, 2.95c. base; cold-rolled rounds, 3.65c. base; cold-rolled flats, squares and hexagons, 4.15c. base; No. 10 blue annealed sheets, 3.75c.; No. 28 black sheets, 4.50c.; No. 28 galvanized sheets, 5.50c.; No. 9 annealed wire, $2.70 per 100 lb.; common wire nails, $2.85 per keg, base.

High-Speed Steel.—A reduction of 5c. per lb. has been made in prices of high-speed steel, which is now quoted at 70c. per lb. for 18 per cent tungsten. The demand is light.

Coke.—Easing up in the Connellsville field is seen in offers of coke at $14.50 for shipment this week. The demand is fairly active, and shipments, with the exception of Wise County, are coming forward in fair time. Prices are unchanged with the exception of Connellsville from last week.

Old Material.—Local dealers report the demand for scrap light but nevertheless the market is showing strength, as dealers are holding tight for higher prices when the railroad situation clears up. Shipments are very slow, with steel plants in no hurry for material. Prices are not quotably changed.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

Per Gross Ton	
Bundled sheets	$8.00 to $8.50
Iron rails	13.50 to 14.00
Relaying rails, 50 lb. and up	26.50 to 27.00
Rails for rerolling	13.50 to 14.00
Heavy melting steel	13.00 to 13.50
Steel rails for melting	13.00 to 13.50
Car wheels	14.50 to 15.00
Per Net Ton	
No. 1 railroad wrought	11.50 to 12.00
Cast borings	9.00 to 9.50
Steel turnings	8.00 to 8.50
Railroad cast	14.00 to 14.50
No. 1 machinery	17.00 to 17.50
Burnt scrap	9.50 to 10.00
Iron axles	18.00 to 18.50
Locomotive tires (smooth inside)	11.00 to 11.50
Pipes and flues	6.50 to 7.00

St. Louis

ST. LOUIS, Aug. 22.

Pig Iron.—Continued strength features the market for pig iron. Prices have advanced further, the upturn being due in large measure to the fact that certain industries are in urgent need of material and are seeking tonnages from nearby to take the place of those which have been delayed by the transportation disabilities. At Chicago $30 is being asked for No. 2 Northern, silicon 1.75 to 2.25 per cent, an increase of $2 on prompt and $3 on contract iron. The Southern market is also very strong. Sales as high as $22 Birmingham were reported, and one prominent furnace interest in that locality is asking $24. The leading local producer had not advanced his price, but was expected to lift it to correspond to the rise at Chicago. Sales reported include 1600 tons of foundry and 2500 tons of malleable to Ohio ports; 700 to 800 tons to Indiana melters; 1000 tons to a Michigan melter and 200 tons to scattering interests in this district. All the above tonnages were supplied by the St. Louis Coke & Chemical Co. A Southern furnace sold 450 tons to local stove and job plants, and other sales ranging from car lots to 150 tons will total about 350 tons. There is an inquiry from an Indiana melter for 300 tons of foundry iron, and a central Illinois interest is inquiring for 3000 tons. Miscellaneous inquiries from melters in the district proper total from 1500 to 2000 tons. All users of iron are anxious to get in their quotas, and there are numerous complaints of delayed shipments, especially from the South, in which general region embargoes have been placed by several roads against this gateway.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago and $5.17 from Birmingham and 81 cents average switching charge from Granite City:

Northern foundry, sil. 1.75 to 2.25 (forward delivery)	$32.16
Northern malleable, sil. 1.75 to 2.25 (forward delivery)	32.16
Basic (third quarter)	32.16
Southern foundry, all rail, sil. 1.75 to 2.25	$26.17 to 28.17

Finished Iron and Steel.—The feature of the trade at the moment is the large volume of demands for material for immediate delivery. Consumers with contracts, especially with manufacturers located at a distance, are experiencing difficulties in securing deliveries, and are endeavoring to eke out with material purchased nearer home. The result has been a heavy draft on warehouse stocks, which are reported generally at a low ebb. Local mills are burdened with orders, and are behind on deliveries, some as long as four weeks. The demand for steel bars is in excess of the supply, and plates are urgently sought. A local boiler manufacturer is inquiring for 2000 tons of plates. Wire and wire products are active. Novelty and hardware industries are furnishing a broad outlet for steel bars of forging quality. Warehouse prices hold firm, but no specific changes were reported.

For stock out of warehouse we quote: Soft steel bars, 2.70c. per lb.; iron bars, 2.70c.; structural shapes, 2.80c.; tank plates, 2.80c.; No. 10 blue annealed sheets, 3.85c.; No. 28 black sheets, cold rolled, one pass, 4.45c.; cold drawn rounds, shafting and screw stock, 3.50c.; structural rivets, $3.35 per 100 lb.; boiler rivets, $3.45; tank rivets, 7/16 in. and smaller, 60 per cent off list; machine bolts, large, 50 and 10 per cent; small, 50-10 and 10 per cent; carriage bolts, large, 55-5 per cent; small, 60 and 10 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon blank, $3.50; and tapped, $3.25 off list.

Coke.—Virtually no metallurgical coke is arriving from Eastern or Southern ovens, and melters in the district continue to rely on supplies from local by-product manufacturers. The few cars from Connellsville drifting in are bringing fancy prices, two cars having sold on a basis of $20 ovens, which is equal to about $24.40 delivered in St. Louis. Buying is from hand to mouth, as no consumer wants to take more than absolutely necessary at present levels. During the past several days there has been a lull in the demand, attributable to improved prospects for strike settlement, but prices have not receded. The Granite City producer continues to quote $12, f.o.b. ovens for foundry coke. The Indiana Coke & Gas Co., Terre Haute, which supplies large tonnages to this center, is quoting $15 to

$16. Latest Chicago prices are $11.55 for domestic and $13.50 for foundry grades.

Old Material.—The market for scrap iron and steel scored further price advances during the past several days, under an urgent demand from both mills and foundries for all grades and descriptions. With the exception of the two plants closed down through lack of coal, all users in the district are operating, and are eagerly seeking all the scrap they can get. The railroads are offering nothing, and will not attempt to ship their scrap until the strike of shop men has been disposed of. Heavy melting steel and steel specialties are especially active, and there seems to be a limitless demand for cast scrap. Yard stocks are feeling the effects of recent heavy shipments, and are at the lowest ebb in many months. Rails for rerolling have advanced further, though the leading consumer is out of the market. All industries are taking in everything offered, and urging prompter deliveries upon dealers. Liberal premiums are being paid for quick shipment.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Old steel rails	$17.75 to $18.75
Rails for rerolling	17.00 to 17.50
Steel rails, less than 3 ft.	17.00 to 17.50
[illegible]	24.00 to 25.50
Cast iron car wheels	20.00 to 20.50
No. 1 heavy railroad melting steel	16.00 to 16.50
No. 1 heavy shoveling steel	15.00 to 15.50
Ordinary shoveling steel	14.50 to 15.00
Frogs, switches and guards, cut apart	16.25 to 16.75
Per Net Ton	
Heavy axle and tire turnings	10.50 to 11.00
Steen angle bars	15.25 to 15.75
[illegible]	24.00 to 24.50
Steel car axles	17.00 to 17.50
Wrought iron bars and transoms	19.00 to 19.50
No. 1 railroad wrought	13.50 to 14.00
No. 2 railroad wrought	13.00 to 13.50
[illegible]	19.00 to 20.00
Steel couplers and knuckles	18.00 to 18.50
Cast iron borings	9.00 to 9.50
No. 1 bushelling	12.00 to 12.50
No. 1 railroad cast	17.50 to 18.00
Stove plate and light cast	14.75 to 15.25
Railroad malleable	14.50 to 15.00
Pipes and flues	9.75 to 10.25
Machine shop turnings	9.25 to 9.75

Cleveland

No Improvement in Fuel Situation—Pig Iron Advances $2

CLEVELAND, Aug. 22.—No improvement has developed in the fuel situation since the partial settlement of the coal strike in the bituminous fields and better conditions are not expected for some time. One additional blast furnace in this district has been banked, this being a Central furnace of the American Steel & Wire Co., leaving only one of four furnaces in blast. Ohio mines are resuming operations, but little coal has commenced to move. Plans are being perfected for pooling coal shipments for the Northwest by the Ore and Coal Exchange in this city. Priority orders for fuel for the Northwest are expected to divert considerable of the Kentucky and West Virginia coal that has been going to Ohio coke and steel plants, shipments of which have been greatly reduced because of the lack of transportation facilities resulting from the shopmen's strike. Plants depending on Kentucky and West Virginia fuel report no improvement in receipts.

Iron Ore.—The ore shipping situation at Escanaba and Ashland has become worse, service on the Northwestern railroad which reaches both ports and on the Chicago, Milwaukee & St. Paul which serves Escanaba being badly crippled. The ore movement to these ports is only 60 to 70 per cent of shippers' schedules. In order to keep mines in operation, shipments from stock piles have been discontinued and available transportation facilities are being used only for moving the production of the mines. At Superior where the Great Northern Railroad experienced difficulty, normal conditions have been restored in the shipment of ore. So far the railroad situation has interfered very little with the ore movement from Lake Erie docks. With the resumption of operations by Ohio mines, except in the Hocking district, coal is beginning to move to lake docks for the Northwest under priority orders, but it is expected that it will be ten days before the movement becomes anywhere near normal.

Lake Superior ore on hand at furnaces and Lake Erie docks Aug. 1 amounted to 31,127,303 tons according to the monthly report of the Lake Superior Iron Ore Association. On the same date a year ago, the amount was 32,628,786 tons. The ore on hand at furnaces Aug. 1 was 23,830,461 tons. During July the amount of Lake Superior ore consumed was 3,582,715 tons as compared with 3,440,583 tons during June.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $5.95; Old range non-Bessemer, 51½ per cent iron, $5.20; Mesabi Bessemer, 55 per cent iron, $5.70; Mesabi non Bessemer, 51½ per cent iron, $5.00.

Pig Iron.—The Cleveland price on foundry iron has been advanced $2 and a local producer has sold a 1000-ton lot and small lots aggregating several hundred tons at that price for early shipment. Two or three lake furnaces are still taking orders for small lots of prompt shipment foundry iron from regular customers who are in urgent need of material, but are turning down all other inquiries. There are no reports of foundries being compelled to shut down because of lack of pig iron but some will probably have to do so shortly. Malleable iron is even scarcer than foundry grades. Price is of not much consideration to consumers who must have iron. Sales are reported at $30 to $31 for foundry grades. Small lots of southern Ohio iron have sold in this territory at the same price and some is still available at $30.50 to $31. A Lorain consumer paid $33 for a car lot of Buffalo iron, but the Buffalo market now seems established at $34 for August and September shipment, a sale in Buffalo of 500 tons of No. 2-X being made at $35. For the fourth quarter Buffalo furnaces are still quoting the $30 price. With almost famine conditions prevailing considerable inquiry is coming out, some for round lots. The Westinghouse Electric & Mfg. Co. has purchased about 1000 tons of various grades of foundry iron for its Cleveland plant and has inquired for 800 tons for Trafford, Pa., and 100 tons for Springfield, Mass. The General Electric Co. is inquiring for 1000 tons for its Erie, Pa., plant for prompt shipment and the U. S. Malleable Co., Toledo, has an inquiry out for 1500 tons of malleable iron for September shipment. The Andrews Steel Co. has an inquiry out for 5000 tons of basic for August and September shipment. An Indiana melter is inquiring for 250 tons of foundry iron. A resale lot of 200 tons of foundry iron brought about $30. Southern producers are making little effort to sell iron in this territory because they are able to ship only a very limited amount on what they have sold. On Southern iron $23 Birmingham is regarded as a nominal price, but one Tennessee producer is asking $27 for September and $28 for October shipment. Low phosphorus iron has advanced $1 per ton. A Valley interest reports several sales aggregating about 1000 tons at $35 to $36, but has withdrawn the $35 price and on an inquiry this week for 300 tons quoted $37. The same interest sold 300 tons of off low phosphorus iron to a Bessemer consumer in the Pittsburgh district at $32.50 to $33, indicating an acute shortage of Bessemer iron. Practically no Ohio silvery iron is available and on this grade $86 is a nominal quotation for 8 per cent silicon iron. One quotation of $39.80 was made for 9 to 10 per cent silicon. The sale of two car lots of 10 per cent Bessemer ferrosilicon at the regular schedule of $41.50 has been made to a consumer who will use this iron in the place of silvery.

Quotations below are f.o.b. local furnace for Northern foundry iron, not including a 50c. switching charge. Other quotations except basic and low phosphorus are delivered Cleveland, being based on a $3.02 rate from Jackson and a $6 rate from Birmingham:

Basic, Valley furnace	$27.00
Northern No. 2 fdy., sil. 1.75 to 2.25	31.00 to 32.00
Southern fdy., sil. 1.75 to 2.25	26.50
Malleable	31.00 to 32.00
Ohio silvery, 8 per cent silicon	39.00
Standard low phos., Valley furnace	$36.00 to 37.00

Semi-Finished Steel.—Some orders for sheet bars, slabs and billets are being booked for the fourth quarter by a local mill subject to prices to be agreed on later, the producer being unwilling to name prices at the present time.

Finished Iron and Steel.—Inquiries and orders have fallen off and consumers are devoting their attention to

pushing the mills for deliveries. Several independent mills are keeping out of the market until they get caught up on their orders. There is considerable demand for steel bars, inquiries including several lots aggregating 4000 tons, mostly for car repair work. A northern Ohio consumer is inquiring for 1500 tons of automobile rim steel. The demand from agricultural implement manufacturers, which has been light, shows an increase. On steel bars, plates and structural material 1.80c. is still the minimum price for indefinite delivery. On plates 2.25c. has become a common quotation by mills able to make fair deliveries, and considerable business is being booked at that price. An Eastern plate mill has advanced its price to 2.50c. In structural lines the American Bridge Co. has taken the buildings for the new steel plant of the Otis Steel Co. requiring 9500 tons and considerable new work is being bid on. The settlement of the coal strike in Ohio has resulted in an active demand for small lots of light rails from mining companies and these are quoted at 1.90c. to 2c. A manufacturer is inquiring for 300 tons of light rails.

Jobbers quote steel bars 2.66c.; [illegible] shapes, 2.76c.; No. 9 galvanized wire, [illegible]; No. 24 black sheets, [illegible]; sheets, 5.25c.; No. 10 blue annealed sheets, 3.50c. to 3.61c.; hoops and bands, 3.31c.; cold-rolled rounds, 3.45c.; flats, [illegible] and bandages, 3.95c.

Sheets.—The demand for sheets is heavy, but some mills can still make fairly good deliveries. Some independent mills, while not taking fourth quarter contracts, are booking orders at 3.50c. for black and 4.50c. for galvanized or $3 a ton above the American Sheet & Tin Plate Co. price, on which delivery will be made during that quarter. Independent mills quote blue annealed sheets at 2.55c. to 2.65c. and automobile body sheets at 4.75c.

Reinforcing Bars.—The market on hard steel reinforcing bars is firm at 1.90c. and a fair tonnage of new work is coming out. The Concrete Steel Co. has taken 300 tons for the filtration plant in Toledo.

Warehouse Business.—Local warehouses have advanced prices on black and galvanized sheets $5 a ton. These were not changed at the time of the recent advance on blue annealed sheets.

Bolts, Nuts and Rivets.—There is talk of another price advance on bolts and nuts owing to the constantly increasing costs. Makers report a good volume of specifications on contracts and considerable new business.

Coke.—Car lot sales of Connellsville foundry coke are reported at $15 with the supply very limited. Furnace coke is offered at $14.50.

Old Material.—Local scrap prices have advanced about $1 per ton on heavy melting steel and a number of other grades as a result of the release of about 45,000 tons of heavy melting steel and compressed steel scrap by the McKinney Steel Co., that was purchased two years ago at the high prices then prevailing. This company has made adjustments with dealers on the basis of a $5 a ton reduction from the contract price on heavy melting steel and $3 per ton on compressed steel. The acceptance of this scrap has created only a limited amount of activity, as most dealers purchased material against their contracts at the time they sold the scrap. There is virtually no demand from mills. Valley district mills are taking shipments rather slowly, some being held up. Local dealers report that they can sell heavy melting steel at $18 Youngstown, subject to acceptance of deliveries by consumers.

We quote per gross ton, f.o.b. [illegible]:

Heavy melting steel	$16.00 to $16.50
Steel rails, under 3 ft	16.00 to 16.50
Rails for rolling	16.75 to 17.25
Iron rails	[illegible]
Iron car axles	18.00 to 19.00
Low phosphorus melting	17.00 to 17.25
Cast borings	12.50 to 12.75
Machine shop turnings	12.00 to 12.25
Mixed borings and short turnings	12.00 to 12.25
Compressed steel	14.50 to 14.75
Railroad wrought	14.00 to 14.50
Railroad malleable	16.50 to 16.75
Light bundled sheet stampings	11.00 to 11.25
Steel axle turnings	13.50 to 14.00
No. 1 cast	17.00 to 17.50
No. 1 busheling	11.25 to 11.50
Drop forge flashings over 10 in	10.50 to 10.75
Drop forge flashings under 10 in	10.50 to 10.75
Railroad grate bars	13.75 to 14.25
Stove plate	13.75 to 14.25
Pipes and flues	10.00 to 11.00

Philadelphia

Demand for Pig Iron Increases—Eastern Steel Plants to Advance Wage Rates

PHILADELPHIA, Aug. 22.—The announcement of a 20 per cent advance in wages by the United States Steel Corporation, effective Sept. 1, was not unexpected, and Eastern steel companies were prepared to-day to announce that they would put into effect a similar advance, which will make the wage rate in this district 30c. an hour. There will be a further added cost in steel making if the coal mining rates adopted at the recent Cleveland conference become general. It is stated by steel companies in this district, including those which operate their own non-union mines, that this rate will mean an additional cost of $1.50 to $2 per ton of steel.

On the whole, the Eastern steel companies are operating at a better rate than those in the Pittsburgh and Youngstown districts, and there has been no further curtailment of pig iron production within the past week. The blast furnaces now operating have coke enough in sight for at least a month.

Despite the fact that a bituminous coal production of 6,000,000 tons is indicated for this week, the Pennsylvania mines are not gaining. A report of the Pennsylvania Coal Commission at Harrisburg showed that about 100,000 tons less was shipped last week than in the week preceding. Production was at its highest in the Westmoreland district, where it was reported as having reached 88 per cent of normal. In the Pittsburgh district, production amounts almost to nothing, and in other sections outside of the Westmoreland district it is from 12 to 50 per cent of normal.

Ferroalloys.—A sale of a carload of ferromanganese for prompt shipment at $72.50, seaboard, is the only transaction reported within the week. British ferromanganese for forward delivery is still available at $67.50, seaboard.

Semi-finished Steel.—Prices on billets remain nominally at $37.50 for open hearth rerolling quality and $42.50 for forging quality, but there is very little demand. No sales are reported.

Pig Iron.—The scarcity of domestic pig iron is indicated by inquiries which have come to this city from the Pittsburgh, Cincinnati and Buffalo districts for foreign iron. A West Virginia steel company has tried to buy 5000 tons of basic iron in the East. It is reported here that a Pittsburgh steel company has bought 13,000 tons of foreign basic. There is very little domestic basic available. An Eastern Pennsylvania steel company bought several thousand tons of offgrade iron from another steel company for immediate shipment. An Eastern subsidiary of the Steel Corporation decided not to buy merchant iron and will continue to depend on the Corporation furnaces. The cheapest basic available is 2000 tons, which was offered at $27, furnace, but others will not sell below $30, furnace. Domestic foundry iron is to be had from only two Eastern furnaces, both of which are quoting $31 for No. 2 plain and $32 for No. 2 X, f.o.b. furnace. One will advance these quotations $1 a ton within a day or two. Higher silicon iron has sold at $34 for 3.80 per cent silicon and at $35 for 4 per cent silicon, f.o.b. furnace. Foreign iron is in good demand and sales are being made at prices which range from $28 to $33, Philadelphia, the price varying according to the source and silicon content, No. 3 Scotch, which is practically equivalent to domestic No. 2 X, bringing the highest prices. The American Radiator Co. is in the market for 5000 tons of foundry and will probably take a large share in foreign iron. The General Electric Co. has inquired for 4000 tons and the Westinghouse Electric & Mfg. Co. for 2000 tons of foundry, all for delivery within the next two months. There are numerous other small inquiries, and it is apparent that all of the current demand cannot be satisfied from the small quantity of iron now being produced. According to the estimates of those engaged in importing foreign iron, the total that has been received at various Atlantic ports since the movement began is 75,000 tons or more.

Of this a cast iron pipe manufacturer has brought in about 20,000 tons; a pig iron sales company has brought in an additional 20,000 tons, and a New York importer adds to this about 30,000 tons, all of the latter having been sold to brokers. Scattering lots brought in by other pig iron dealers would probably total 5000 to 10,000 tons.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 76 cents to $1.64 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$32.14 to $32.64
East. Pa. No. 2X, 2.25 to 2.75 sil.	33.14 to 33.64
East. Pa. No. 1X	34.64
Virginia No. 2 plain, 1.75 to 2.25 sil.	29.17 to 30.17
Virginia No. 2X, 2.25 to 2.75 sil.	30.17 to 31.17
Basic delivery eastern Pa.	28.64 to 31.14
Gray forge	29.64 to 31.50
Malleable	30.00 to 32.00
Standard low phos. (f.o.b. furnace)	35.00
Copper bearing low phos. (f.o.b. furnace)	35.00 to 40.00

Plates.—Three or four Eastern mills are selling plates in limited tonnages, and sales are restricted mostly to regular customers. One or two mills have not raised their price above 2c., Pittsburgh, but the others are quoting 2.25c. and have made sales on this basis. A Youngstown mill is now offering plates in this district and has sold nearly 1000 tons at 2.25c., Youngstown. The Lukens Steel Co. has now equipped nearly half of its open-hearth furnaces with fuel oil burners. The Baldwin Locomotive Works have received orders for 30 locomotives for the Erie Railroad and 15 for the Union Pacific.

Structural Material.—Prices quoted for plain material range from 2c. to 2.25c., Pittsburgh, with the possibility that attractive jobs might be protected at slightly under 2c. Structural work has fallen off somewhat. Two West Philadelphia apartment houses, requiring 1500 to 2000 tons, are being figured, and a State building at Richmond, Va., requiring a few hundred tons, is also in the market.

Bars.—Soft steel bars are hard to get. The few mills that are selling are asking not less than 2c., Pittsburgh, and some quotations are higher, up to 2.25c. having been paid. With steel bars scarce, bar iron is in better demand and Eastern mills have no difficulty in getting 2c., Pittsburgh, for carloads and 2.10c. for less than carload lots.

Sheets.—Independent mills are quoting from $2 to $3 a ton higher on sheets than the new prices named by the American Sheet & Tin Plate Co. On blue annealed the usual quotation of independents is 2.60c.; on black, 3.50c., and on galvanized, 4.50c., all base Pittsburgh. Deliveries in from two to eight weeks are being promised.

Warehouse Business.—A steady demand for steel out of stock continues and some warehouse stocks are running low with replenishment difficult. Prices of sheets and cold-rolled steel have been advanced. We quote for local delivery out of stock as follows:

Soft steel bars and small shapes, 2.80c.; iron bars (except bands), 2.80c.; round edge iron, 3c.; round edge steel, iron finish, 1½ x ½ in., 3c.; round edge steel planished, 3.75c.; tank steel plates, ¼-in. and heavier, 2.90c.; tank steel plates, 3/16-in., 3.10c.; blue annealed steel sheets, No. 10 gage, 3.60c.; black sheets, No. 28 gage, 4.45c.; galvanized sheets, No. 28 gage, 5.60c.; square twisted and deformed steel bars, 2.90c.; structural shapes, 2.90c.; diamond pattern plates, ¼-in., 4.80c.; 3/16-in., 5c.; spring steel, 3.50c.; round cold-rolled steel, 3.50c.; squares and hexagons, cold-rolled steel, 4c.; steel hoops, No. 13 gage and lighter, 4c.; steel bands, No. 12 gage to 3/16-in., inclusive, 3.45c.; rails, 2.80c.; tool steel, 8c.; Norway iron, 5.50c.

Old Material.—The tone of the scrap market is considerably stronger. The Bethlehem Steel Co. has bought a large tonnage of No. 1 steel scrap at $15.50 and $16, delivered, and the same prices are obtained from one or two other mills. The only weak item on the list is blast furnace borings and turnings, this being due to the banking and blowing out of many furnaces due to coke shortage. Cast iron car wheels, No. 1 railroad wrought and machine shop turnings for rolling mill use are particularly strong. We quote for delivery at consumers' works in this district as follows:

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$15.50 to $16.00
Scrap rails	15.50 to 16.00
Steel rails, rerolling	17.00 to 17.50
No. 1 low phos., heavy 0.04 and under	22.00 to 24.00
Cast iron car wheels	19.00 to 19.50
No. 1 railroad wrought	18.00 to 18.00
No. 1 yard wrought	17.00 to 17.50
No. 1 forge fire	14.00 to 14.50
Bundled sheets (for steel works)	13.50 to 14.00
No. 1 busheling	12.50 to 13.00
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	13.00 to 13.50
Mixed borings and turnings (for blast furnace use)	13.00 to 13.50
Machine-shop turnings (for steel works use)	13.50 to 14.00
Machine-shop turnings (for rolling mill use)	14.50 to 15.00
Heavy axle turnings (or equivalent)	14.50 to 15.00
Cast borings (for steel works and rolling mills)	14.50 to 15.00
Cast borings (for chemical plants)	17.00 to 17.50
No. 1 cast	19.00 to 20.00
Heavy breakable cast (for steel plants)	19.00 to 19.50
Railroad grate bars	15.50 to 16.00
Stove plate (for steel plant use)	15.00 to 16.00
Railroad malleable	15.00 to 15.50
Wrought iron and soft steel pipes and tubes (new specifications)	14.00 to 14.50
Shafting	21.00 to 22.00

Railroad Car and Locomotive Buying

Activity in car repairing continues to be the conspicuous feature of the railroad equipment market, but the buying of new locomotives is also notable. The following are the items of chief interest:

The St. Louis & San Francisco has let 500 hopper bodies to the American Car & Foundry Co.

The Monon has awarded 300 gondola cars to the Pullman Co.

The Chicago & Northwestern has placed 1000 box car repairs with Western Steel Car & Foundry Co.

The Cincinnati, Indianapolis & Western is inquiring for 200 to 300 composite gondola cars.

The Union Pacific has ordered 55 mountain type and 10 Mallet type locomotives from American Locomotive Co. and 15 locomotives from the Baldwin Locomotive Works.

The Erie has placed 30 Mikado type engines with Baldwin Locomotive Works.

Central Railroad of New Jersey has awarded car repairs on 200 cars to the Koppel Car Repair Co., and a round lot to the Standard Steel Car Co.

Chicago, Rock Island & Pacific has ordered repairs to 1500 National dump cars from the Western Steel Car & Foundry Co.

Lehigh Valley is believed to have ordered repairs on 500 steel cars.

The Central of Georgia is inquiring for 100 new freight cars.

Two inquiries have appeared from India, one for 270 cars for the South Indian Railway Co., and 516 cars for the Burmah Railways.

Some 8000 freight cars, which had been bought by the United States for use in France in the war and which have been in storage largely near Norfolk, have been sold to the Polish-Silesian Railway Administration. The cars are taken as they are, at a bid somewhat higher than various American concerns were bidding, but the latter bids were based on a demolition of the cars and the disposition of the material as scrap.

According to a report from the British Empire Steel Corporation, Montreal, Que., a second blast furnace may shortly be blown in at the plant of the Dominion Steel Corporation at Sydney, N. S., if general labor and business conditions permit. The second furnace will turn out foundry pig iron. It is further reported that a battery of 90 coke ovens will also be put into operation.

At the request of President John A. Logan, Youngstown, the sale of the property at Mineral Ridge, Trumbull County, Ohio, of the Ohio Steel Products Co., was postponed last Saturday. The plant was to have been sold at sheriff's sale, because of financial difficulties. It was organized to manufacture conduit, but the plant never really got into production in any substantial way.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Plates

Sheared, tank quality, base, per lb.....1.80c. to 2.25c.

Structural Material

Beams, channels, etc.....1.80c. to 2.25c.

Iron and Steel Bars

Soft steel bars, base, per lb.....1.80c. to 2.25c.
Refined iron bars, base, per lb.....2.35c.

Hot-Rolled Flats

Hoops, base, per lb. .....2.50c. to 2.75c.
Bands, base, per lb. .....2.50c. to 2.75c.
Strips, base, per lb.....2.50c. to 2.75c.
Cotton ties, per bundle of 45 lb.....$1.11

Cold-Finished Steels

Bars and shafting, base, per lb.....2.25c.
Strips, base, per lb. .....4.00c.

Wire Products

Nails, base, per keg.....$2.40 to $2.60
Bright plain wire, base, per 100 lb..... 2.25 to 2.35
Annealed fence wire, base, per 100 lb..... 2.25 to 2.35
Galvanized wire, base, per 100 lb..... 2.75 to 2.85
Galvanized barbed, base, per 100 lb. ..... 3.05 to 3.15
Galvanized staples, base, per keg ..... 3.05 to 3.15
Painted barbed wire, base, per 100 lb. ..... 2.55 to 2.65
Polished staples, base, per keg ..... 2.55 to 2.65
Cement coated nails, base, per count keg.....1.90c. to 2.10c.
Woven fence, carloads (to jobbers).....73 per cent off list
Woven fence, carloads (to retailers)....70½ per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads, 60, 10 and 10 per cent off list
Machine bolts, small, cut threads....60 and 10 per cent off list
Machine bolts, larger and longer.....60 and 10 per cent off list
Carriage bolts, ⅜ x 6 in.:
Smaller and shorter, rolled threads. 60 and 10 per cent off list
Cut threads .....60 per cent off list
Longer and larger sizes .....60 per cent off list
Lag bolts .....60, 10 and 10 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads....50 and 10 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.:
Smaller and shorter .....50 and 10 per cent off list
Larger and longer sizes .....50 and 10 per cent off list
Hot pressed square or hex. blank nuts .....$4.50 off list
Hot pressed nuts, tapped .....$4.50 off list
C.p.c. and t. sq. or hex. nuts, blank .....$4.50 off list
C.p.c. and t. sq. or hex. nuts, tapped .....$4.50 off list
Semi-finished hex. nuts:
9/16 in. and smaller, U. S. S.....80 and 10 per cent off list
⅝ in. and larger, U. S. S...75 and 10 and 10 per cent off list
Small sizes, S. A. E. .....80, 10 and 10 per cent off list
S. A. E. ⅝ in. and larger..75 and 10 and 10 per cent off list
Stove bolts in packages .....80 and 5 per cent off list
Stove bolts in bulk .....80, 5 and 2½ per cent off list
Tire bolts .....65 per cent off list

Cap and Set Screws

Milled square and hex. head cap screws, 75 and 10 per cent off list
Milled set screws.....75 per cent off list
Upset cap screws .....80 per cent off list
Upset set screws .....80 and 5 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb.....$2.65
Large boiler rivets, base, per 100 lb..... 2.75
Small rivets .....70 to 70 and 5 per cent off list

Track Equipment

Spikes, ⅝ in. and larger, base, per 100 lb.....$2.35 to $2.50
Spikes, ½ in. and smaller, base, per 100 lb..... 2.75 to 3.00
Spikes, boat and barge, base, per 100 lb..... 2.75 to 3.00
Track bolts, base, per 100 lb..... 3.25 to 3.50
Tie plates, per 100 lb. .....2.00 to 2.25
Angle bars, base, per 100 lb. 2.40

Welded Pipe

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛ 47½-54½	26	-28	¼ to ⅜.....	—11½	+27½
¼ to ⅜..57	-60	31½-33½	½	31½	13½
½ 62	-63	34½-36½	¾	37½	22½
¾ 66	-69	54½-56½	1 to 1½.....	39½	24½
1 to 3...68	-71	56½-58½			

Lap Weld

2 61	-63	48½-51½	2	34½	20½
2½ to 6.65	-68	53½-55½	2½ to 6.....	37½	24½
7 to 8...62	-65	49½-51½	7 to 12.....	35½	22½
9 to 12..61	-64	48½-50½			

Butt Weld, extra strong, plain ends

⅛ 47½-50½	31	-33	¼ to ⅜.....	—9½	+42½
¼ to ⅜..53	-56	36½-38½	½	30½	18½
½ 59	-62	48½-50½	¾	33	23½
¾ 64	-67	53½-55½	1 to 1½.....	36½	25½
1 to 1½..66	-69	55½-57½			
2 to 3...67	-70	56½-58½			

Lap Weld, extra strong, plain ends

2 59	-62	48½-50½	2	36½	22½
2½ to 4.63	-66	52½-54½	2½ to 4.....	38½	26½
4½ to 6.62	-65	51½-53½	4½ to 6.....	37½	25½
7 to 8...58	-61	45½-47½	7 to 8.....	33½	18½
9 to 12..52	-55	39½-41½	9 to 12.....	29½	13½

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 and 2½ per cent.

Boiler Tubes

Lap Welded Steel		*Charcoal Iron*	
1¾ in.	26½	1½ in.	5
2 to 2¼ in.....	41	1¾ to 1⅞ in.....	15
2½ to 3 in.....	52	2 to 2¼ in.....	25
3¼ to 13 in.....	57	2½ to 3 in.....	30
		3¼ to 4½ in.....	32

To large buyers of steel tubes a supplementary discount of 5 per cent is allowed.

Standard Commercial Seamless Boiler Tubes

Discounts on cold-drawn or hot-rolled tubes in carload lots, f.o.b. Pittsburgh, follow:

1 in.	57 to 60	2½ and 2¾ in.....	36 to 43
1¼ in.	48 to 52	3 in.	40 to 47
1½ in.	47 to 52	3¼ to 4 in	45 to 52
1¾ in.	30 to 36	4¼ in. to 5 in.....	37 to 44
2 and 2¼ in.....	32 to 39		

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base, 85 per cent off list. Carbon 0.30 to 0.40, base, 83 per cent off list. Plus usual differentials and extras for cutting.

Seamless Locomotive and Superheater Tubes

Cents per Ft.		Cents per Ft.	
2-in. O.D. 11 gage.....15		2¼-in. O.D. 10 gage....18¼	
2-in. O.D. 12 gage.....14		3-in. O.D. 7 gage.....35½	
2-in. O.D. 10 gage.....16½		1¾-in. O.D. 9 gage.....13	
2¼-in. O.D. 12 gage....16		5⅜-in. O.D. 9 gage....53	
2¼-in. O.D. 11 gage....16½		5½-in. O.D. 9 gage.....55	

Tin Plate

Standard cokes, per base box.....$4.75

Terne Plate

(Per package, 200-lb.)

8-lb. coating	$9.30	25-lb. coating I. C.....$14.25	
8-lb. coating I. C.....	9.60	30-lb. coating I. C.....	15.25
15-lb. coating I. C.....	11.80	35-lb. coating I. C.....	16.25
20-lb. coating I. C.....	13.00	40-lb. coating I. C.....	17.25

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....2.50c. to 2.60c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.35c. to 3.50c.

Galvanized

No. 28 (base), per lb.....4.35c. to 4.50c.

Tin-Mill Black Plate

No. 28 (base), per lb.....3.35c. to 3.50c.

Manufacturers have pamphlets, which can be had upon application, giving price differentials for gage and extras for length, width, shearing, etc.

Freight Rates

All rail freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic.	$0.325	Buffalo	$0.265	St. Louis	$0.43
Philadelphia, export...	0.265	Cleveland	0.215	Kansas City	0.735
Baltimore, domestic...	0.315	Cleveland, Youngstown		Kansas City (pipe)...	0.705
Baltimore, export.....	0.255	Comb.	0.19	St. Paul	0.595
New York, domestic...	0.34	Detroit	0.295	Omaha	0.735
New York, export.....	0.285	Cincinnati	0.295	Omaha (pipe)	0.705
Boston, domestic	0.365	Indianapolis	0.31	Denver	1.275
Boston, export	0.285	Chicago	0.34	Denver (pipe)	1.215

Pacific Coast	$1.50		
Pac. Coast, ship plates	1.20		
Birmingham	0.69		
Memphis	0.385		
Jacksonville, all rail..	0.50		
Jacksonville, rail and water	0.415		
New Orleans	0.515		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha, and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 30c. to 40c.; ship plates, 30c. to 40c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 30c. to 40c.; sheets and tin plates, 50c.; rods, wire rope, cable and strands, 75c.; wire fencing, netting and stretcher, 50c.; pipe, not over 8 in. in diameter, 50c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

FABRICATED STEEL BUSINESS

Bridge and Building Awards and Tonnages Pending at Leading Centers

Awards for fabricated steel work for the past week include the following:

Publishing building for Street & Smith, West Fifteenth Street, New York, 800 tons, to Harris Structural Steel Co.

Public school No. 130, 300 tons, to A. E. Norton, Inc.

Hospital at Jamaica, Long Island, 300 tons, to George A. Just Co.

The United Gas Improvement Co., power house, Devon, Conn., 2000 tons, to McClintic-Marshall Co.

Phoenix Utilities Co., for Utah Power & Light Co., 800 tons of steel saddles, Grace, Idaho, to Virginia Bridge & Iron Works.

Federal Sugar Refining Co., Yonkers, N. Y., 160 tons, to Pittsburgh Bridge & Iron Works.

Fifteenth Regiment Armory, 142nd Street, New York, 1200 tons, to Post & McCord, Bethlehem Steel Bridge Corporation to fabricate.

New York Baseball Club, Polo Grounds, 2000 tons, to Post & McCord, Levering & Garrigues Co. to fabricate.

Public school No. 57, New York, 300 tons; No. 161, Brooklyn, N. Y., 800 tons, and No. 139, New York, 800 tons, all to Easton Structural Steel Co., Easton, Pa.

State Hospital, Brooklyn, N. Y., 200 tons, to Easton Structural Steel Co.

Communipaw Co., coal conveyor, 200 tons, to Easton Structural Steel Co.

Gas holder at Evansville, Ind., 350 tons, to Stacey Mfg. Co.

First National Bank, Long Beach, Cal., 481 tons, to American Bridge Co.

First National Bank, Whittier, Cal., 250 tons, to Baker Iron Works.

Three 120-ft. spans for bridge, Quimby, Iowa, 143 tons, to unnamed fabricator.

California Institute of Technology, high voltage building, Pasadena, Cal., 189 tons, to Llewellyn Iron Works.

Curry County, Oregon, bridge over Sixes River, 150 tons, to American Bridge Co.

Crown Willamette Paper Co., roof trusses, Camas, Wash., 128 tons, to Western Structural Steel & Tank Co.

Bankers Reserve Life Building, Omaha, Neb., 750 tons, to Mississippi Valley Structural Steel Co.

Heil Packing Co. Building, St. Louis, 200 tons, to Spuck Iron & Foundry Co.

Houghton, Mich., high school, 500 tons, to Worden-Allen Co.

Seaman body plant, Milwaukee, 500 tons, to Worden-Allen Co.

The Otis Steel Co., Cleveland, new plant, 9500 tons to the American Bridge Co.

Western Reserve University Buildings, Cleveland, 800 tons, to the American Bridge Co.

Addition to Summit County Court House, Akron, 250 tons, to the Burger Iron Co.

Outbound freight house for Pennsylvania and Detroit Railroad, 2000 tons, to American Bridge Co.

Structural Projects Pending

Inquiries for fabricated steel work which may be added to lists of pending projects include the following:

Hotel in New York, 1000 tons.

Office building for Burroughs-Wellcome Co., East Forty-first Street, New York, 1000 tons.

Public school building, New York, 3000 tons. New York City has let contracts for 26 new public schools, with 34 more, requiring perhaps 15,000 to 20,000 tons of steel, to be built within the next year.

Solvay Gas, Electric Light & Power Co., office building, Baltimore, 900 tons.

Bridge over Pennsylvania Railroad, Fortieth Street, for Philadelphia, 1000 tons.

Warehouse for James Butler, Astoria, Long Island, N. Y., 2000 tons.

New York Telephone Co., Third Avenue and 77th Street, Brooklyn, 700 tons.

Norfolk & Western Railroad, bridge at Clinchfield, Va., 250 tons.

Office building for Virginia at Richmond, 750 tons.

National Box & Lumber Co., Newark, N. J., 300 tons.

National Bank, Baltimore, 400 tons.

Highway bridge, Norfolk County, Virginia, 400 tons.

Bridge for the New York, New Haven & Hartford, Capital Avenue, New Haven, 400 tons.

Public Service Co. of Northern Illinois, power house, Waukegan, Ill., 2000 tons.

Atchison, Topeka & Santa Fe Railroad, shop, San Bernardino, Cal., 250 tons.

Crossett Lumber Co., power house, Crossett, Ark., 160 tons.

Addition to plant of Gardner-Harvey Paper Co., Middletown, Ohio, 300 tons, bids in.

Braun office building, Columbus, Ohio, 200 tons, bids in.

High school, Owensboro, Ky., tonnage unstated, bids being taken.

New York Telephone Co., Buffalo, 400 tons, bids taken.

Parcel Post Building, Cleveland, 500 tons.

Highway Bridge, Cook County, Illinois, 600 tons.

Union Pacific Railroad bridge over the Columbia River, 2500 tons.

STEEL CORPORATION WAGES

Advance of 20 Per Cent Is Announced Effective September 1

The United States Steel Corporation Tuesday announced an advance of 20 per cent in wages. In past years, a statement as to advances or declines has frequently been accompanied by an explanation of the cause, such as the prosperity of the company when an advance has been made and a decline in prices of products when a decrease has been made effective, but the latest announcement was in the simplest terms as follows:

"The wage rates of day labor at the manufacturing plants of the Steel Corporation have been increased about 20 per cent, to become effective September 1. Other rates will be equitably adjusted."

Other announcements by the Steel Corporation have been as follows:

Jan. 6, 1916, 10 per cent increase.
May 1, 1916, 10 per cent increase.
Dec. 15, 1916, 10 per cent increase.
May 1, 1917, 10 per cent increase.
Oct. 1, 1917, 10 per cent increase.
April 15, 1918, 15 per cent increase.
Aug. 1, 1918, 10 per cent increase.
Oct. 1, 1918, 8-hr. basic day adopted.
Feb. 1, 1920, 10 per cent increase.
May 16, 1921, 20 per cent decrease.
June 6, 1921, basic 8-hr. day abolished.
Aug. 29, 1921, decrease to 30c. per hr.

Following table shows the wages of common labor after each advance or decrease in wages by the United States Steel Corporation:

Date	Wages 10-Hr.	Date	Wages 10-Hr.
1915	$2.00	Aug. 1, 1918	$4.20
Feb. 1, 1916	2.20	Oct. 1, 1918	*4.62
May 1, 1916	2.50	Feb. 1, 1920	5.08
Dec. 15, 1916	2.75	May 16, 1921	†4.05
May 1, 1917	3.00	July 16, 1921	†3.70
Oct. 1, 1917	3.30	Aug. 29, 1921	3.00
April 15, 1918	3.80	Sept. 1, 1922	3.60

*Eight-hour basic day established and time and one-half paid for overtime.
†Approximated.

Independents Will Meet Advance—Higher Prices Expected

YOUNGSTOWN, Aug. 22.—Independents will meet the 20 per cent wage advance effective Sept. 1 announced by the Steel Corporation. The new common labor rate will be 36c. per hour. Wages of skilled and semi-skilled workers will be equitably adjusted. Since July 16, 1921, independent producers in this district have been paying common labor 30c. per hour, with straight time for all overtime. Previously the going labor rate in the Valleys had been 37c.

Independents which will participate in the advance are the Youngstown Sheet & Tube Co., Republic Iron & Steel Co., Brier Hill Steel Co., Trumbull Steel Co. and Sharon Steel Hoop Co. It is estimated 40,000 steel workers in the two Valleys will benefit.

As recent advances in steel were largely based solely on higher fuel charges, the 20 per cent advance in the labor cost of steel making points to still higher finished steel prices.

"Wage increase will place common labor in the steel mills slightly above the rate paid common labor on the railroads," says President James A. Campbell of the Sheet and Tube company. "The miners will receive wartime wages for another year and it is only fair that steel workers should get an advance."

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
Aug.	Lake	Electrolytic*	New York	New York	St. Louis	New York	St. Louis
16.....	14.12½	13.75	32.62½	5.90	5.55	6.50	6.15
17.....	14.12½	13.75	32.87½	5.90	5.55	6.50	6.15
18.....	14.12½	13.75	32.75	5.90	5.55	6.52½	6.17½
19.....	14.12½	13.75	....	5.90	5.55	6.55	6.20
21.....	14.12½	13.75	32.75	5.90	5.55	6.57½	6.22½
22.....	14.12½	13.75	32.50	5.90	5.60	6.57½	6.22½

*Refinery quotations.

New York

NEW YORK, AUG. 22.

Only moderate activity prevails, but prices are steady to higher. Transactions in copper continue in fair volume with prices unchanged. A moderate business is reported in tin at slightly higher values. Demand for lead is good and prices are higher. Quotations for zinc are again advancing on only moderate transactions.

Copper.—Domestic demand for electrolytic copper continues in moderate volume and is being satisfied by one or two sellers at 14c., delivered, or 13.75c., refinery, for delivery throughout October, which we quote as the market. There are some large sellers who quote nothing less than ⅛c. above these levels. There is some demand for last quarter, for which 14.12½c., delivered, or 13.87½c., refinery, is obtained, but there are not yet any transactions for first quarter. Foreign demand continues steady. Lake copper continues quiet and firm at 14c. to 14.25c., delivered.

Tin.—Transactions in Straits tin since Aug. 15 have been practically confined to one day. On Aug. 16 fair sales of spot and nearby were made, amounting to 200 to 250 tons, with dealers almost exclusively the buyers, and the market a narrow one. On other days, including yesterday and to-day, the market has been dull and without feature. The slightly better prospect in the strike situation has imparted a better tone and, when a definite settlement finally comes, more active buying is expected. Spot Straits tin was quoted to-day at 32.50c., New York, and the London market was about £1 per ton higher than a week ago at £160 5s. for spot standard, £160 7s. 6d. for future standard and £161 5s. for spot Straits. Arrivals thus far this month have been 2515 tons, with 6210 tons reported afloat.

Lead.—The leading interest advanced its price yesterday, Aug. 21, from 5.75c. to 5.90c., New York, and from 5.55c. to 5.70c., St. Louis, or $3 per ton. A large demand is reported at these prices. In the outside market the metal can still be obtained in the West at 5.60c. to 5.65c., St. Louis, with the New York price still 5.90c.

Zinc.—Prices for prime Western have advanced in the week to 6.20c. to 6.25c., St. Louis, or 6.55c. to 6.60c., New York. This is due more to the sold up position of producers and their disinclination to sell than to any large demand. Hesitancy characterizes the attitude of most consumers and there is a speculative element in the market which is having some effect and which is meeting some of the light demand.

Antimony.—Wholesale lots for early delivery are still obtainable at 5.25c. per lb., duty paid, New York. There is no change in the general situation and demand is light.

Aluminum.—The leading interest continues to quote wholesale lots of virgin metal, 98 to 99 per cent pure, at 19.10c. per lb., f. o. b. plant, for early delivery and foreign metal of the same grade is obtainable from importing dealers at 17.75c. to 18c. per lb., New York, duty paid.

Old Metals.—The market continues strong and trading is fairly active. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	13.50
Copper, heavy and wire	12.75
Copper, light and bottoms	11.25
Heavy machine composition	10.50
Brass, heavy	8.25
Brass, light	6.50
No. 1 red brass or composition turnings	9.00
No. 1 yellow rod brass turnings	7.50
Lead, heavy	5.00
Lead, tea	4.00
Zinc	3.75

Chicago

AUG. 22.—Tin, lead and spelter have advanced on a quiet market. Lead is stronger, principally because of an advance yesterday by the leading producer. The firmness in zinc is accounted for in part by the inability of idle smelters to start production under present fuel conditions. Among the old metals, copper wire, crucible shapes and copper clips alone have advanced. We quote, in carload lots, lake copper, 14.25c.; tin, 33.50c. to 34c.; lead, 5.75c.; spelter, 6.35c.; antimony, 7c.; in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 11c.; copper bottoms, 9.25c.; red brass, 8.75c.; yellow brass, 6.75c.; lead pipe, 4.50c.; zinc, 3.50c.; pewter, No. 1, 20c.; tin foil, 22.50c.; block tin, 26c., all buying prices for less than carload lots.

St. Louis

AUG. 22.—The lead market is higher at 5.55c. carlots; slab zinc is steady at 6.30c. On old metals we quote light brass, 3.50c.; heavy red brass and light copper, 7c.; heavy yellow brass, 4c.; heavy copper and copper wire, 7.50c.; zinc, 2c.; lead, 3c.; pewter, 15c.; tin foil, 16c.; tea lead, 2c.; aluminum, 9c.

Cost of Living Slightly Higher

Monthly figures of the Bureau of Labor Statistics show the wholesale prices of all commodities during July to be 55 per cent above the average for 1913, compared with 50 per cent in June. Six of the nine individual groups showed a rise in July compared with June. Chemicals and house-furnishings showed slight decreases.

Metals and metal products, which now stand at 21 per cent above the 1913 average, are far lower than the average group. This item is now 14 points below farm products. The highest item on the list is now fuel and lighting.

Our table shows the figures for the two most recent months and for July, 1921, and the peak in 1920. It shows also the amount of liquidation, between the 1920 peak prices and the present, of the excess of the peak prices over the average of 1913. Metals have been liquidated to a greater extent than any other specific group except chemicals.

Index Numbers of Wholesale Prices, by Groups of Commodities
(1913 equals 100)

	1920 Peak	1921 July	1922 June	1922 July	Liquidation, Per Cent
Farm products	247	119	131	125	76.2
Food, etc.	248	141	140	142	71.6
Cloths and clothing	346	172	179	180	67.5
Fuel and lighting	281	186	225	254	14.9
Metals and metal products	203	124	120	121	79.6
Building materials	300	160	167	170	65.0
Chemicals and drugs	213	129	122	121	81.4
House-furnishings goods	275	180	176	173	58.3
Miscellaneous	208	123	114	114	87.0
All commodities	247	141	150	155	62.6

Figures of the National Industrial Conference Board, based on the workman's family budget, show an increase of 0.1 per cent in July over June. Food and clothing are higher and sundries lower than in June. Shelter and fuel remained unchanged. The cost of living is now placed at 55.6 per cent above that of July, 1914. It has been slowly rising since the low figure (54.7 per cent above 1914) registered in March. In July, 1921, it was 63.1 per cent above 1914; in July, 1920, the peak was reached at 104.5 per cent above 1914.

PERSONAL

Parker F. Wilson has been elected vice president of the Otis Steel Co., Cleveland, filling the vacancy caused by the recent resignation of H. F. Deverell. Mr. Wilson has been with the Otis company 10 years, starting as field engineer, and later went through successive promotions, being mill superintendent and general superintendent and recently assistant to the president and general manager. B. D. Quarrie succeeded him this month as general manager.

Maj. David A. Reed, who last week took oath of office as Senator from Pennsylvania, by appointment of Governor Sproul, to complete the unexpired term of the late Senator Crow, was one of the leading attorneys of the U. S. Steel Corporation in the dissolution suit brought against it by the Government. He made a very able argument in the Supreme Court. He is a son of Judge J. H. Reed, who has long been counsel for the Steel Corporation.

E. M. Wise, who recently assumed the position of Pittsburgh district manager, Alliance Machine Co., Alliance, Ohio, formerly for 23 years had been identified with the Westinghouse Electric & Mfg. Co., the last 12 years in charge of the resale division, industrial department, Pittsburgh district office. Mr. Wise is a native of Maryland. After completing the apprenticeship course of the Westinghouse company, he was sent to England to assist in the construction of the British Westinghouse plant at Manchester and did road and construction work in England for about three years.



E. M. WISE

A. L. Rea has become general manager, and W. H. Watt superintendent of the Federal Radiator Co., Zanesville, Ohio. This company has resumed operations in its foundry after being shut down for about a year.

Paul Brooks, manager of the Philadelphia office of the Deveboise-Anderson Co., pig iron and coke, has been elected a director of the Temple Furnace Co., Temple, Pa.

P. D. Brown, who for the past 13 years has been Baltimore branch manager of the Crucible Steel Co. of America, resigned on Aug. 15.

Harry H. Bean, for 45 years identified with the Thomas Mfg. Co., manufacturer of agricultural implements, Springfield, Ohio, has been elected president to fill the vacancy caused by the death of William S. Thomas, who died several months ago. The other officers elected are: First vice-president and treasurer, Wallace S. Thomas; second vice-president, C. A. Schaefer; secretary, C. L. Aldrich. The directors are the officers and the following: B. J. Carr, Richmond, Ind.; J. L. Thomas and F. S. Thomas, Springfield. Mr. Schaefer has been with the company 32 years and Mr. Aldrich 25. Mr. Bean has been secretary and sales manager for several years.

Ernest J. Wood, who for two years has been working on the cost and factory control system outlined by Scovell, Wellington & Co., for the steel enameling industry, has resigned as manager of the factory control department at the Terre Haute, Ind., plant of the Columbian Enameling & Stamping Co., accepting a position with the Automatic Electric Co., Chicago. Previous to the war, he was with the Westinghouse Electric Co., doing cost and industrial engineering work at the East Pittsburgh plant.

C. H. Hobbs, formerly district sales manager of the Lackawanna Steel Co. at Detroit, has been appointed vice-president in charge of sales of the Detroit Seamless Steel Tubes Co., Detroit, effective Aug. 14. C. C. Rosser will continue as general manager of sales.

David S. Green, Hartford, Conn., has been appointed assistant trade commissioner to Paris, France. Mr. Green has been employed in the Bureau of Foreign and Domestic Commerce of the Department of Commerce since July, 1920.

Oswald Fowler, of Rogers, Brown & Co., 30 Church Street, New York, sailed Saturday, Aug. 19, for Europe, to be gone about one month.

George R. Woods, manager, R. S. Stokvis, Inc., New York, plans to leave for Europe on Sept. 16 for a six weeks trip to Holland, Belgium, France and England.

New Officers of Steel Treaters

The tellers of election have counted the ballots cast by the membership of the American Society for Steel Treating and the following new officers have been elected: President, T. D. Lynch, research engineer Westinghouse Electric and Manufacturing Co., East Pittsburgh, Pa.; second vice-president, W. S. Bidle, president W. S. Bidle Co., Cleveland, Ohio; secretary, W. H. Eisenman, 4600 Prospect Avenue, Cleveland; director, S. M. Havens, assistant treasurer and manager, Ingalls-Shepard Division, Wyman Gordon Co., Harvey, Ill.



T. D. LYNCH

The board of directors of the Society will be composed of the newly elected officers and the following: First vice-president, R. J. Allen, metallurgist Rolls-Royce Co. of America, Springfield, Mass.; treasurer, J. V. Emmons, metallurgist Cleveland Twist Drill Co., Cleveland; director, J. J. Crowe, metallurgist Philadelphia Navy Yard, Philadelphia; Director, A. E. White, past-president, director engineering research University of Michigan, Ann Arbor, Mich.; director, F. P. Gilligan, past-president, secretary-treasurer Henry Souther Engineering Co., Hartford, Conn.

The new officers will begin their duties at the close of the annual convention of the society at Detroit Oct. 2 to 7.

Directory of Ohio Metal Working Industries

A directory of the metal working industries of Ohio, intended for use in establishing a buying or selling contact with this field, serving as a ready and reliable source of information and as an authentic mailing list, has been published by the Buckeye Listing Co., 208 St. Clair Avenue, N.W., Cleveland.

The directory is 8½ x 11 in., bound in paper and contains 168 pages, 141 of which are devoted to the lists. The arrangement is alphabetically by towns and cities and under these are grouped the names, addresses and names of executive personnel of the various companies in the metal working field, symbols at the left of the name denoting the nature of the companies' operations. An index of the cities and towns is included, as well as a page explaining the various symbols.

It is planned to issue this service yearly. The price is $8, plus postage and insurance.

Prof. A. T. Kinsey, advisory service engineer, Air Reduction Sales Co., will address the Metropolitan section of the American Welding Society on the "Manufacture and Use of Welding and Cutting Gases," at a meeting of the section in New York, Sept. 12.

OBITUARY

JOHN OSBORNE PEW, 68, former president of the old Youngstown Iron & Steel Co., Youngstown, Ohio, absorbed in 1917 by the Sharon Steel Hoop Co., Sharon, Pa., died Aug. 19 at his home in Ravenna, Ohio, following an illness of two years.



JOHN O. PEW

Mr. Pew was for many years one of the active figures in the iron and steel industry of the Mahoning Valley. He was born Sept. 7, 1854, in Brookfield, Trumbull county. Upon completion of his schooling in 1873, he became identified with a sheet iron mill at Niles, Ohio. Next he joined the McCormick Harvesting Machine Co., Chicago, as a traveling salesman in the Middle West. After engaging for seven years in the hardware business at Ashtabula, Ohio, Mr. Pew removed to Youngstown, where, in 1894, he became one of the organizers of the Youngstown Iron & Steel Roofing Co., with which he served as vice-president and general manager. Subsequently its name was changed to the Youngstown Iron & Steel Co., and in 1913 Mr. Pew was elected president and general manager, a position he retained until the property was disposed of. Mr. Pew was likewise a director of the Youngstown Pressed Steel Co., now a subsidiary of the Sharon Steel Hoop Co., of the Mahoning Foundry & Machine Co., and of the Commercial National Bank, Youngstown. He was one of the organizers of the Marsh-Capron Mfg. Co., Chicago, which he also served as vice-president and director. Following his retirement in 1917 from the Youngstown Iron & Steel Co., Mr. Pew purchased the Dan R. Hanna farm near Ravenna, where he had since engaged in stock raising with his son, William H. Pew, who had been professor and general manager of the Iowa Agricultural College, in the animal husbandry department. He was a member of the Union Club, Cleveland; the Youngstown Club and the Ohio Society of New York.

FRANK BURR SMITH, Milford, Conn., works manager of the Bullard Machine Tool Co., Bridgeport, Conn., died August 16, at Grace Hospital, New Haven, Conn., after a short illness. He was in his 50th year, having been born at Mohican Springs Farm, Fairfield, Conn., Nov. 22, 1872. He obtained an education in the public schools, and after leaving the high school of Bridgeport, entered the employ of the Bullard Machine Tool Co. as a machinist apprentice. Upon completing his apprenticeship, he was connected with the company's engineering department until 1894, when he went to Colorado. He was engaged in various positions in the East and West and returned in 1911 to the Bullard Machine Tool Co. in a sales capacity. The last year of his sales work was spent in England in 1914. He returned to Bridgeport in 1915, becoming manager of the employment and industrial relations department at the Broad Street plant. He was highly successful in this capacity and when the Broad Street plant was disbanded in 1920, and all manufacturing was transferred to the Black Rock plant, he was made works manager, continuing in that capacity until his death.



F. B. SMITH

JOHN W. RAPP, College Point, Queens, president of the Empire Art Metal Co., dropped dead last Wednesday night, Aug. 16, in the Bellevue-Stratford Hotel, Philadelphia, from apoplexy at the age of 61. The steel parts for fireproof buildings which Mr. Rapp devised and manufactured have been used in many of New York's large buildings.

THEODORE HAMMETT COLVIN, dean of Providence, R. I., foundrymen, and founder of the Colvin Foundry Co., died Aug. 13 at his home, 435 Elmwood Avenue, that city, in his seventy-sixth year, following an illness of two weeks. Born in Plainfield, Conn., in 1846, he went to Providence in 1872 after learning the trade of molder in Danielson and Worcester, Mass. Forming a partnership under the name of G. & T. H. Colvin, Mr. Colvin in 1876 bought controlling interest, and in 1896 incorporated as the Colvin Foundry Co. In 1917 he retired from active business, turning over the management of the business to his two sons.

SAMUEL H. CARPENTER, president and general manager of the Atlas Drop Forge Co., Lansing, Mich., died suddenly on Wednesday morning, July 26.

LOUIS FOLLET, president Standard Tin Plate Co., Canonsburg, Pa., died at the Homeopathic Hospital, Pittsburgh, Aug. 17, as a result of injuries sustained in an automobile accident Aug. 16. His death removes a man who has been identified with the tin plate industry practically from its inception in this country, as he was among those who learned the business in Wales and came to this country about the time the McKinley tariff law made possible the establishment of the industry in this country. He was born in Melbourne, Australia, 58 years ago, his father at that time being French consul-general of Australia. Following his graduation from the University of Paris he emigrated to Wales, where he learned the tin plate trade. He came to this country when 24 years of age, and became identified with the Morewood Tin Plate Co., Gas City, Ind., which was absorbed by the American Tin Plate Co. He came to Pittsburgh in 1901 as commercial manager of the Standard Tin Plate Co., which in that year started its plant at Canonsburg, Pa. He was an active figure in the steel trade circles in Pittsburgh and was a member of the Pittsburgh Field Club, the Union Club, the Fellows Club and the Pittsburgh Athletic Association. He made his home in Carrick, a suburb of Pittsburgh. Mrs. Follet, three sons and a daughter, Mrs. Robert Eaton, survive.



LOUIS FOLLET

JOHN C. NEFF, for many years identified with the coke and coal business in western Pennsylvania, died in the Howard Kelley Hospital, Baltimore, Aug. 15. Until illness forced his retirement about three years ago, he was general manager, Connellsville Central Coke Co., with offices in Pittsburgh. He was born in Masontown, Pa., 68 years ago, and lived most of his life in Pittsburgh.

RICHARD D. REED, formerly with the H. B. Smith Co., Westfield, Mass., heating appliances, died at his home in that city Aug. 16, at the age of sixty years. Mr. Reed was known for his many improvements in the construction of heating boilers.

MESHECH FROST, president National Machinery Co., Tiffin, Ohio, died Aug. 6 after a three week's illness, age 75 years. He was prominent in civic and industrial activities in Tiffin and took an active part in the organization of the National Machinery Co., after which he disposed of his interest. Twenty years ago he re-purchased a large interest in the company and effected its reorganization and had been its president since that time.

British Iron and Steel Market

United States Still Buying British Pig Iron—British Steel in Better Demand, Due to Exchange Chaos

(By Cable)

LONDON, ENGLAND, Aug. 22.

America has made further purchases of Scotch pig iron and there are additional inquiries for 1500 tons of special Cleveland foundry iron. Some Cleveland producers are fixing an export premium on No. 3 G. O. B. Home buying is dull.

East Coast hematite is weak. Mixed parcels of hematite coke have been sold to America. East Coast mixed numbers are being done at 89s. ($19.94) and less.

There is improved demand for British steel and more business, owing mainly to the chaotic condition of Continental exchanges. India has bought plates; steel bars have been sold to Australia at £7 17½s. (1.58c. per lb.) f.o.b. South America has purchased hoops, plates and sheets; ⅛-in. plates have been sold for £9 17½s. (1.975c. per lb.)

A Belfast shipyard has secured an order for an Atlantic liner. Yarrow is reopening the Scotstoun plant.

Continental steel sales are quieter, owing to uncertainty as to the course of prices. India has bought sheets. Merchant bars and sections have been sold to South America. China has purchased plates, angles and checker plates.

Tin plate is quiet but steady. Export buying generally is dull. Japan is inquiring for some and buying is increasing.

There is some demand for galvanized sheets for Australia, India and the Far East, and small sales have been made. Quotations are firm.

Little business is being done in black sheets. Belgian 6/8's are quoted at £11 (2.20c. per lb.) f.o.b. India has bought Continental 2/5's at £10 7½s. (2.08c. per lb.) c.i.f. Scotch makers have reduced prices, quoting 28-gage under £13 (2.60c. per lb.) f.o.b.

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $4.48 per £1, as follows:

			$5.82 to	$6.05
Cleveland No. 1 foundry	4	15	21.28	
			19.49 &	20.16*
			19.04 to	19.49
			18.48 to	19.04
			17.92	
			19.04 to	20.16*
			64.29	
			64.96 to	66.08
			64.72 to	10.37
			64.56 to	3.84
			33.04	
			4.28 to	4.37
			C. per Lb.	
			1.80 to	1.90
			2.20 to	2.30
			1.85 to	2.05
Channels	8	10	to 9 10	1.70 to 1.90
				1.85
Round bars, ¾ to 3 in.	9	5	to 10 0	1.85 to 2.00
Galvanized sheets, 24 g.	16	5	to 16 10	3.25 to 3.30
Black sheets	12	0	2.40	
				2.40*
Cold rolled steel strip.				
Cotton ties, Indian speci-				

*Export price.

Continental Prices, All F. O. B. Channel Ports, Delivery as Specified

No. 3 foundry pig iron:				
Luxemburg, Sept. ..	4	0	17.92	
France, September...	4	0	17.92	
Billets:				
Wire nails (keg basis):				
Germany, August ...	0	14½	3.25	
Wire rods, 5 mm. (0.2 in.):				
Angles:			C. per Lb.	
Belgium, September..	7	7½	1.48	
Tees:				
Belgium	8	5	1.65	
Merchant bars:				
Belgium, October ...	7	7½ to 7 15	1.48 to	1.55
Luxemb'g, October..	7	7½ to 7 15	1.48 to	1.55
Germany, October...	7	15 to 7 17½	1.55 to	1.58
France, October	7	7½ to 7 15	1.48 to	1.55
Channels:				
Belgium	7	10 to 7 12½	1.50 to	1.53
Joists (beams):				
France, Sept., Oct...	7	0 to 7 5	1.40 to	1.45
Belgium, Sept., Oct..	7	0 to 7 5	1.40 to	1.45
Luxemb'g, Sept., Oct.	7	0 to 7 5	1.40 to	1.45
¼-in. plates:				
Germany, Sept.....	8	0 to 8 5	1.60 to	1.65
Belgium, Sept., Oct..	7	10 to 8 0	1.50 to	1.60
Luxemburg and France, not offered.				
⅛-in. plates:				
Germany	9	0	1.80	
No. 8 gage wire:				
Belgium, August ...	14	10⅝	2.91	

Heavy American Demand for British Coal—Some Pig Iron Still Sought by United States

LONDON, ENGLAND, Aug. 10.—During the past fortnight business in the iron and steel trades has been affected by holiday intervals, but now that these are more or less over, trading is getting on its feet again. The outlook, however, is none too bright, especially in view of the precarious political situation, which naturally makes for nervousness. Moreover, all over the country are cropping up fresh individual difficulties, the latest concern to go into voluntary liquidation being the Brotherton Ediswan Tubes & Conduits Co. A large merchant firm, doing some considerable business with the East, has also failed, the liabilities totaling over £1,000,000, but of this total only a small portion is concerned with the iron and steel trades, the major being concerned with textiles.

In the meantime, however, coal markets are showing considerable strength, and prices in numerous cases have been advanced. The American demand for British coal continues, and over last week-end about 500,000 tons were booked, both for the United States and Canada, which means that the total booked so far must be over 1,500,000 tons, and the delivery is spread over September and into October.

America is also endeavoring to continue buying pig iron here. Last week a parcel of 1000 tons of special Cleveland foundry iron was shipped but, since the taking of that order, an increase of 4 to 5s. (89c. to $1.11) was incurred in the freight rate from Glasgow to Boston, and this of course has made further business in this connection impossible. We also hear of Continental pig iron being sold to the United States, and understand that shipments of Belgian material have already been made. Germany is also buying moderately of hematite pig iron.

As regards the home trade for pig iron here, there is not much of interest that is moving and prices of Cleveland continue fairly steady, with No. 3 G. M. B. quoted at 87 to 88s. ($19.31 to $19.54). Scotch pig iron is somewhat firmer on increased values of fuel, and sellers of No. 3 Scotch foundry now ask 100s. ($22.20) f.o.b. Glasgow.

The fixing of steel prices for the home trade, by the Association of Scottish and North-Eastern steel makers, has been abandoned for a month, and steel quotations in consequence have been lowered for the home trade, ranging from 5 to 30s. ($1.11 to $6.66) drop. It has been anticipated that this step would have to be taken, as a considerable amount of business for shipbuilding material has been placed with North-Eastern makers since steel makers were given the option of selling at export prices to bridge builders and others in this country, on the condition that the bridge building material was for shipment overseas.

Generally speaking, however, ordinary merchant business in steel is hard to find, and it remains to be seen whether this cut in prices will have the desired effect. Export prices are quotably unchanged, but it is possible to do business below the minimum figures mentioned, steel bars having sold at £8 17½s. (1.76c. per lb.) f.o.b. British prices, of course, are still above those quoted by Continental makers, but whereas our makers can give almost prompt delivery, purchasers from the Continent must wait six to eight weeks.

Machinery Markets and News of the Works

PROSPECTS IMPROVING

Machine-Tool Trade Looks for a Good Fall Demand

Lima Locomotive Works Inquiries for About 25 Machines Purchases May Total $500,000

Despite the fact that the coal and railroad strikes continue to restrict buying of machine tools, manufacturers of tools are more hopeful than they have been at any time in the past two years. Prospects of a very substantial improvement in the volume of buying are multiplying. While many buyers whose inquiries have been sent out in the past two months have held back purchases pending the final settlement of strike troubles they have asked to be kept advised of any price changes so that they may place their orders before such advances take effect.

During the past week some manufacturers of milling machines, shapers and turret lathes have notified the trade of higher prices on their lines and a back saw manufacturer has advanced prices about 6 per cent.

Prominent among the new inquiries is that of the Lima Locomotive Works, Lima, Ohio, which asks prices on about 25 heavy tools for plant extensions. It is stated that its purchases will total about $500,000. It recently ordered eight or ten Shaw traveling cranes. Its requirements include eight or ten 6-ft. radial drills, boring mills, engine lathes, slotters, turret lathes, etc.

The J. A. Fay & Egan Co., Cincinnati, is expected to issue an inquiry for a fairly large quantity of machinery for its new plant, for which nine cranes and a number of hoists were recently purchased.

Agricultural implement and machinery manufacturers, particularly those making farm power equipment, are coming back into the market in a small way, which is an encouraging sign, as they have not been buyers of tools for two years or more. Industrial companies are buying conservatively. The Studebaker Corporation, South Bend, Ind., and the Continental Motors Co., Muskegon, Mich., continue to round out their recent purchases by the addition of a few machines. In the East the principal buying has been done by the Spicer Mfg. Corporation, Plainfield, N. J., and the Wright Aeronautical Corporation, Paterson, N. J., the latter taking used tools exclusively.

Railroads are buying a few single tools, but action on the large lists which have been pending for some time is still being deferred.

New York

NEW YORK, AUG. 22

BOTH inquiries and orders for machine tools are in light volume, prospective buyers in most instances holding off until there is a more definite outlook as to coal supply and railroad transportation. The needs of the railroads for shop equipment are evidenced by occasional small orders, but the larger requirements of the roads continue to be held in abeyance. The New York Central has ordered a duplex boring machine, the Missouri Pacific has bought a 2500-lb. steam hammer, and the Los Angeles street railroad has ordered a No. 1 carwheel lathe, all of this business coming to a New York company.

The Wright Aeronautical Corporation, Paterson, N. J., has continued its buying of used tools, the enlargement of its shop facilities being due to a contract recently received from the U. S. Government for airplane motors. The Spicer Mfg. Corporation, Plainfield, N. J., has been buying new equipment for its plants. The Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., will probably buy this week five vertical boring mills, 44-in., and two 6-ft. radial drills.

Inquiry for cranes has fallen off and few orders are being placed.

The Nevada Consolidated Mining Co., New York, has bought a 40-ton Shaw crane for one of its Western mines. Sanderson & Porter, New York engineers, have bought a 40-ton Milwaukee crane for the Springfield Gas & Electric Co.'s power plant at Springfield, Mo. The United Lead Co. will probably buy several 5-ton monorail hoists for its plant at Perth Amboy, N. J. A 25-ton grab-bucket locomotive crane has been ordered from the Industrial Works, Bay City, Mich., by the Wilkoff Co., Youngstown, Ohio, for its scrap yard.

The Queens Borough Gas & Electric Co., 347 Central Avenue, Brooklyn, will build a new two-story electric power house at Lynbrook, L. I. Morrell Smith, Far Rockaway, L. I., is architect.

A vocational department will be installed in the new two-story high school to be erected at Amityville, L. I., estimated to cost $200,000, for which bids on a general contract will be received until Sept. 30.

H. Medalie, 460 East 164th Street, New York, operating a machine shop at 961 Washington Avenue, is planning for the installation of new equipment.

Fire, Aug. 17, destroyed the garage, service and repair shop of Samuel Kaufman, 752-60 Bedford Avenue, Brooklyn, with loss approximating $75,000, including equipment and damage to cars.

The Estate of Gustave Schock, 514 West Fifty-seventh Street, New York, has awarded contract to the Turner Construction Co., 244 Madison Avenue, for an eight-story automobile service and repair building, 75 x 100 ft., at 503-7 West Fifty-sixth Street, estimated to cost $150,000. Howard Chapman, 315 Fifth Avenue, is architect.

The Goodwin-Gallagher Sand & Gravel Corporation, 21 East Fortieth Street, New York, will install equipment at its plant at Port Washington, L. I., for the elimination of the pollution of the waters of Hempstead Harbor, caused by screening and separating work. The plant forms a portion of the local property of the War Department and gives employment to about 300.

The superintendent of State prisons, Capitol Building, Albany, N. Y., will extend the power house at Clinton Prison, Dannemora, N. Y., to include the installation of additional equipment. Charles F. Rattigan is superintendent.

Goldberg & Chadkin, New York, have leased the building now being erected at Whitlock and Bryant avenues, for twenty-one years, for the establishment of an automobile service and repair works.

W. R. Ostrander & Co., 371 Broadway, New York, manufacturers of electrical equipment and supplies, have taken title to the six-story factory at 83-91 Clifton Place, Brooklyn, for a new plant. It is now operating a branch factory at 193 Broadway, Brooklyn.

The New York Air Brake Co., 165 Broadway, New York, with plant at Watertown, N. Y., is arranging for stock issue to approximate $5,000,000, of which about $500,000 will be used for extensions and improvements, additions to working capital, etc.

A vocational department will be installed in the new high school and grade school, two-stories, 60 x 175 ft., to be erected at Mamaroneck, N. Y., estimated to cost about $215,000, for which bids will close about Sept. 1. A. G. C.

Dickinson, 147 East Forty-fourth Street, New York, is architect.

The United States Rubber Co., Broadway and Fifty-eighth Street, New York, has disposed of a bond issue of $7,000,000, a portion of the proceeds to be used for plant extensions and improvements, financing, etc. C. B. Seger is chairman of the board.

S. B. Allen, 506 West 113th Street, New York, will build a three-story automobile service and repair works, 50 x 100 ft., on Bronx Street, estimated to cost $60,000. Adolph Mertin, 34 West Twenty-eighth Street, is architect.

John Viviani, New York, has leased the building, 75 x 100 ft., at 332-36 East Thirty-fifth Street, for a term of years for the establishment of an automobile service and repair works.

Emile Gauthier, New York, has leased the building at 4507 Third Avenue for the operation of an automobile service and repair works.

The Brazilian Traction, Light & Power Co., Rio de Janeiro, Brazil, is arranging a fund of more than $3,000,000 for the construction of a new electric generating plant about 100 miles from the city, to have a capacity of about 140,000 hp.

The Morristown Electric Steel Co., 13 Water Street, Morristown, N. J., recently organized, has acquired the former plant of the Liberty Steel Co., in the Shelley Terminal section, for the manufacture of electric steel castings. The company is headed by Richard A. Eurich, Samuel B. Illingworth and J. Lovell Paulmier.

Hoisting equipment, conveyors, loading and unloading machinery, etc., will be installed in the plant to be erected on Pavonia Avenue, Jersey City, N. J., by the Standard Milling Co., 49 Wall Street, New York, comprising a six-story building, 90 x 380 ft., estimated to cost about 1,000,000. A complete blending plant will be operated in connection with the main warehouse. A subsidiary organization, the Standard Warehouse Corporation, is being formed to operate the plant. The Baxter Engineering Co., Ellicott Square, Buffalo, is engineer. A. P. Walker is president.

The Kimberley Phonograph Co., 228 Fayette Street, Perth Amboy, N. J., manufacturer of talking machine equipment and parts, has been reorganized as the Kimberley Phonograph Co. of New Jersey. Plans are under way for enlargements, to include remodeling a portion of the present works and additional equipment. Leo Jacobson is president.

Freight-handling, loading and conveying machinery, industrial trucks, etc., will be installed in the new two-story, reinforced-concrete freight house to be erected by the Lehigh Valley Railroad Co., at the foot of Chapel Avenue, Jersey City, N. J., estimated to cost $650,000.

A vocational department will be installed in the new war memorial school to be erected in the Second Ward Park, Passaic, N. J., estimated to cost about $800,000. Plans have been prepared.

R. Mazzoni, 584 Ninth Street, West New York, N. J., has had plans prepared for a one-story automobile service and repair works, 75 x 90 ft., at Ninth Street and the Boulevard, estimated to cost about $35,000. Leo Feinen, 3697 Boulevard, Jersey City, N. J., is architect.

Hoisting equipment, conveying apparatus and other material-handling machinery will be installed in the six-story warehouse, 175 x 200 ft., to be erected on Newark Avenue, Jersey City, N. J., by I. M. Barren, care of the Industrial Engineering Co., 30 Church Street, New York, engineer, estimated to cost about $300,000. Leo Feinen, 3697 Boulevard, Jersey City, is architect.

The Board of Education, City Hall, Newark, N. J., will take bids until Aug. 31, for a new cast iron boiler, repairs to present boilers and grates at a number of schools, as per specifications on file at the office of Cephas I. Shirley, business manager, third floor, City Hall.

The Public Service Electric Co., Newark, has authorized the preparation of plans for an addition to its Essex Power Station, Point-no-Point, estimated to cost $4,250,000 with machinery. N. A. Carle is chief engineer.

The Pittsburgh Plate Glass Co., 290 Elizabeth Avenue, Newark, has filed plans for the erection of two new buildings at its local plant, to be one-story, 66 x 110 ft., to cost $160,000, and four-stories, 46 x 46 ft., to cost $40,000.

R. Gasior, 310 Washington Avenue, Elizabeth, N. J., will purchase a wire-bending, pointing and die-casting machine.

The De Cozen Motor Car Co., 20-24 Branford Place, Newark, has completed plans for a three-story service and repair building, 50 x 180 ft., at 968-70 Broad Street, estimated to cost about $80,000. Frank Grad, 245 Springfield Avenue, is architect.

George W. Heath & Co., 206 First Street, Newark, manufacturers of fountain pens, are in the market for a used automatic screw machine, Brown & Sharpe, late model, in good condition.

In connection with the removal of its plant to Little Falls, N. J., the Mercury Radio Products Co., 51 Thomas Street, Orange, N. J., has been reorganized as a State corporation, with capital of $100,000, to succeed a former partnership. The Little Falls plant will be given over to the manufacture of radio sets and parts. Myron S. Shiels is president, and Edmund B. Osborne, Jr., treasurer.

The National Carbon Co., 30 East Forty-second Street, New York, manufacturer of electric equipment, etc., has arranged for the operation of two new finishing plants for emergency service at 337 East Forty-first Street, New York, and 560 West Congress Street, Chicago, respectively. They will be used to supplement the emergency works now operated at the main plant at Cleveland.

Charles L. Cadle, superintendent of Public Works, Albany, N. Y., will receive bids until Sept. 6, for a power house and all work incidental thereto at the Crescent Dam, Cohoes, N. Y., to be used in connection with the power development project on the State barge canal.

Philadelphia

PHILADELPHIA, Aug. 21

ELECTRIC motors, conveying and other mechanical equipment will be installed in the new four-story, reinforced-concrete plant to be erected at Memphis and Eyre streets, Philadelphia, by the A. J. Reach Co., Tulip and Palmer streets, manufacturer of sporting goods, estimated to cost about $120,000, with machinery. A general contract has been let to the F. W. Mark Construction Co., Commercial Trust Building.

H. Kaiser & Co., Inc., Twenty-third and Race streets, Philadelphia, manufacturer of automobile bodies, has acquired a group of factory buildings at Schuylkill Avenue and Catherine Street, on a site 200 x 260 ft. The property will be used for a new plant.

The Keystone Power Corporation, Philadelphia, has issued bonds for $719,000, the proceeds to be used for the purchase of property of the State Center Electric Co., Center County, including plant and system, and for extensions and improvements. A fund of $25,000,000 has been authorized, to be used as required for expansion.

The Trenton Steel & Wire Co., 599 Ingham Avenue, Trenton, N. J., recently acquired by the Maryland Steel Co., Baltimore, has preliminary plans under consideration for enlargements for the production of cold-rolled flat wire. It is proposed to provide facilities for about 80 men, as compared with about one-third this number at the present time. A three-shift operating schedule will be adopted in the near future. John Robinson is managing director.

Reorganization plans are being perfected by a committee of trustees of the Empire Tire & Rubber Co., East Clinton Avenue and Mulberry Street, Trenton, N. J. New working capital to an amount of $600,000 will be provided for operation and expansion. The new company will be headed by former Governor E. C. Stokes, W. T. Baird, A. W. Pickford and H. J. Lyall.

A vocational department will be installed in the new two-story and basement high school, 75 x 100 ft., to be erected at West Reading, Pa., excavations for which will be made at an early date. Edward E. Scholl, 136 Robeson Street, Reading, is architect.

The Montgomery Foundry & Fittings Co., Conshohocken, Pa., is planning for the erection of a new foundry with output of about 100 tons a day.

The Scranton Electric Co., Scranton, Pa., has arranged for a bond issue of $373,000, a portion of the proceeds to be used for extensions and improvements.

S. D. Chandler, 82 Main Street, Carbondale, Pa., is planning the erection of a three-story automobile service and repair works to replace the plant recently destroyed by fire. It will cost close to $50,000.

The Board of Directors, Mary M. Packer Hospital, Edward Rohrback, president, Sunbury, Pa., has revised plans in progress for a new one-story power house. W. R. Rockefeller, 214 Market Square, is architect.

The Lehigh Coal & Navigation Co., Lansford, Pa., will commence the immediate construction of new coal-loading docks and storage plant on the Lehigh Canal, near Northampton, Pa., to replace its present plant at Coalport, near Mauch Chunk, Pa., which it is proposed to abandon. The docks will be of reinforced concrete, and will be equipped

with cranes and complete loading machinery, the storage plant, similarly equipped, will have a capacity in excess of 2,000,000 tons. The project will cost about $500,000, including machinery.

W. L. Craig, Twelfth Avenue, Sharpsville, Pa., is planning for the establishment of a new machine shop. A list of equipment will be prepared at an early date.

The East Penn Electric Co., Pottsville, Pa., is perfecting plans for the merger of 13 electric companies, operating in different parts of Schuylkill County, as approved by the Public Service Commission. Extensions and improvements will be made in plants and system. C. A. Hall is president.

J. W. Miller, Bareville, Pa., is planning to rebuild his automobile radiator shop and sheet-metal works, destroyed by fire Aug. 17.

The Frick Co., Waynesboro, Pa., manufacturer of refrigerating machinery, etc., is reported to be planning the purchase of a number of traveling cranes, 5, 10 and 25 tons capacity.

The Luzerne County Gas & Electric Co., Wilkes-Barre, Pa., is planning for extensions and improvements in its plant and system to cost about $200,000.

The Board of Directors, Knights of Malta, Granville, Pa., will commence the immediate erection of a new two-story power house, 26 x 60 ft. Harvey T. Hauer, 829 Cumberland Street, Lebanon, Pa., is architect.

The Clinton Natural Gas & Oil Co., Williamsport, Pa., is planning for the installation of new pumping machinery at its plant in the Kettle Creek Field. D. D. Kline is secretary in charge.

A. N. Greenfield, Fifteenth and Chestnut streets, Philadelphia, is taking bids for the erection of a three-story automobile service and repair plant, 26 x 100 ft., estimated to cost about $200,000. F. E. Hahn, 1112 Chestnut Street, is architect.

Buffalo

BUFFALO, Aug. 21.

THE International Casement Co., 84 Hopkins Street, Jamestown, N. Y., manufacturer of rolled steel and bronze window casements, will commence the erection of a one and one-half story addition, 120 x 150 ft.

The Dynamo & Motor Exchange, 41 Court Street, Buffalo, has acquired a two-story building, totaling about 7000 sq. ft. of floor area, at 45 Elm Sreet, for the establishment of a new motor and electrical shop for parts production, repairs, etc. A portion of the structure will be used as a warehouse.

The Umbsen Mfg. Co., 155 Sanford Street, Rochester, N. Y., manufacturer of spraying devices, etc., has tentative plans under consideration for the establishment of a new branch factory at San Francisco. R. E. Chester is seretary.

The plant of the Tonawanda Board & Paper Co., Tonawanda, N. Y., on Goose Island, operated for some time past by the Beaverboard Co., Buffalo, will revert to the original ownership, and in the future will be run under the company name first noted. It has been reorganized and is now headed by Maurice W. Simon, Buffalo. Improvements will be made in the works.

The Jewett & Co., Stove Works, Military Road, Buffalo, has tentative plans for rebuilding the portion of its works destroyed by fire Aug. 10, with loss reported at $200,000, including equipment and stock. Two of the five buildings were destroyed; the other three structures, comprising pattern shop, foundry and office, were not affected and will continue in operation.

W. J. Henry, 128 South Street Auburn, N. Y., is organizing a company to construct and operate a new plant on York Street, to manufacture tools and other mechanical equipment. It will cost in excess of $75,000, with machinery.

The Massey-Harris Harvester Co., Inc., Batavia, N. Y., manufacturer of farm implements, has tentative plans for enlargements at Toronto, Ont. It is proposed to place the works in operation early in September, advancing production to a working force of about 1500 men as soon thereafter as possible. The Brantford, Ont., plant will also be placed in service, with a working force of approximately 800 operatives.

The Sill Stove Works, Inc., 524 Oak Street, Rochester, is planning for the erection of a one-story addition to its plant. A portion of the structure will be used for casting cleaning operations.

The Rochester Telephone Corporation, 59 Stone Street, Rochester, has plans under way for a new two-story service and repair building on St. Paul Street, to include a parts and machining department, cabinet shop, as well as a service shop for company cars and trucks. It will cost about $125,000. J. F. Warner, company address, is architect.

The Batavia Car Works, Inc., Batavia, N. Y., recently organized with a paid-in capital of $350,000, is arranging for the immediate operation of its new plant on Clinton Street, to be devoted for the present to railroad car repair work. Contract has been made with the Erie Railroad for the repair of about 3000 cars, to be delivered in allotments of about 50 at the plant. John G. Baukat is president, and Edward P. Pattison, Mount Morris, N. Y., vice-president and treasurer. The directors include Theodore H. Wickwire, president Wickwire Steel Co.; Ralph Plumb, vice-president Buffalo Bolt Co.; and R. H. Griffith, president Buffalo Car Wheel Foundry Co., all of Buffalo.

The Binghamton Light, Heat & Power Co., Binghamton, N. Y., has tentative plans under consideration for a power house at the Rockbottom Dam property, recently acquired, to be operated in conjunction with its other plants. It is converting its former Court Street plant into a service and repair department for company cars and trucks, and will use a portion of the structure for a storehouse.

New England

BOSTON, Aug. 21

ALTHOUGH not active, the machine tool market in this district displayed more life the past week than at any time this month. Sentiment among the trade in general has improved as a result and indications point to enough additional business being booked to bring August sales to a much higher level than anticipated early in the month. Business closed the past week includes a sale of 20 tools, comprising one 36-in., one 18-in., one 12-in. lathe, planer and miscellaneous shop equipment to a Massachusetts textile interest, which is the largest individual order placed in this section this month; a large gear hobber to a Massachusetts manufacturer of electrical appliances; a fairly large punch and shear to a New London, Conn., interest; a New England made coach wheel lathe to the Boston & Maine Railroad; miscellaneous metal-working equipment to the city of Boston for its Hyde Park and Thompson schools, and a 14-in. sensitive drill as well as a used 12-in. x 6-ft. lathe to the Normal School, Fitchburg, Mass.

A Middle West maker of shapers has advanced prices 20 per cent, while the Peerless Machine Co., Racine, Wis., has advanced one size of metal sawing machines $10 and its shaping saw $20. Other machine tool builders, although not actually putting up prices, have tightened on discounts, which virtually amounts to an advance.

Several inquiries for new tools developed last week, mostly for single machines. The most important is a list of five or six tools, including a milling machine, grinding machine and presses wanted by a Providence, R. I., concern, and an inquiry from the General Electric Co., Lynn, Mass., for a horizontal boring machine of a more or less special design. Local representatives of machine tool builders report a strong possibility of business under consideration for some time being closed before Labor Day.

Sales of used equipment have been few and far between. There is, however, more interest shown in this class of equipment. Most inquiries concern single machines and customers are given to shopping in the hope of picking up bargains. A Springfield concern wants five used W & S screw machines and reports the supply extremely limited. (A Naugatuck Valley, Conn., foundry is in the market for two 10 in. vertical boring machines.

The demand for small tools has increased. Some local machine tool houses report sales for the first half of August equal to or better than the aggregate for July. Last month, it will be recalled, was a profitable one in small tools.

The crane market is slightly more active. The Turner Center System, Providence, has purchased a hand crane with an electric hoist, and two other crane jobs are reported as

Proctor, Vt., is inquiring for a 25-ton crane with a 70 ft. span.

The auction sale of the equipment of the Ross Machine Co., Wollaston, Quincy, Mass., held last week was largely attended, but mostly by dealers. A majority of the tools went at very reasonable prices and at about one-half the appraised value.

Fire last week destroyed No. 1 mill of the Wickwire-Spencer Steel Corporation, Spencer, Mass. It was used for fine wire drawing. About 40 operators were employed. Damage is estimated at about $20,000.

Plans will be ready next month for a four-story and basement packing plant, costing about $300,000, to be erected by the Confederate Home Abattoir Co. The Gorman & Brown Engineering Co., 357 Westminster Street, Providence, is the engineer.

The plant of the Westfield Machine Co., Westfield, Mass., was considerably damaged by fire last week. It will rebuild as quickly as possible. A large amount of radio work is on its books.

The Wico Electric Co., West Springfield, Mass., plans the erection this fall of four monitor type, 90 x 400 ft. manufacturing units, the first to be ready for operation Jan. 1. Phelps Brown, 44 Avon Place, Springfield, is president; Arthur W. Lamson, vice-president and works manager, and E. L. Stoughton, treasurer and sales manager.

The Automatic Refrigerating Co., 618 Capitol Avenue, Hartford, Conn., will erect an addition to cost $50,000.

The Quidnick-Windham Mfg. Co., Willimantic, Conn., is planning for extensions and improvements in the power plant at its cotton mill, to include a new 300-hp. water wheel, head gate and other equipment.

The Homer D. Bronson Co., Beacon Falls, Conn., manufacturer of metal stampings, hardware products, etc., has awarded contract to the Oscar La Croix Construction Co., Waterbury, Conn., for a two-story addition.

The H. L. Judd Co., Wallingford, Conn., operating a plant for the manufacture of brass furniture and other brass products, has filed articles of incorporation under Delaware laws with capital of $5,400,000 for proposed expansion.

The Tide Water Oil Co., 60 Cambridge Street, Allston, Mass., will commence the erection of a one and two-story oil distributing and storage plant on Dorchester Avenue, Dorchester, Mass., to cost about $75,000, including equipment.

Fire, Aug. 16, destroyed a portion of the plant of the Danbury Metal Ball, Danbury, Conn., with loss estimated at $40,000, including equipment.

The Bay State Tap & Die Co., Mansfield, Mass., has acquired the plant of the Blancke Twist Drill Co., Taunton, Mass., bankrupt, for a branch plant. It is expected to commence operations early in September.

The Safety Car Heating & Lighting Co., Hamden, Conn., has filed plans for two additions, each one-story, 106 x 115 ft., and 56 x 195 ft., estimated to cost about $40,000 and $50,000, respectively. The last noted structure will be equipped to manufacture battery plates and similar apparatus. Stovel & Brinkerhoff, 136 Liberty Street, New York, are engineers and contractors.

The New Bedford Boiler & Machine Co., 42 Front Street, New Bedford, Mass., will erect a new three-story building at Water and Commercial streets, 60 x 165 ft., estimated to cost close to $75,000.

The Portland Terminal Co., Portland, Me., is said to be considering plans for rebuilding the portion of its locomotive repair shops, destroyed by fire Aug. 13, with loss of about $1,000,000, including a number of locomotives of the Maine Central and Boston & Maine railroads. The structures destroyed included engine house, machine repair shop, air brake shop, fuel oil plant and other departments.

Druker & Rudbick, Brighton, Mass., will build a one-story automobile service and repair building at 125-31 Harvard Avenue, estimated to cost $75,000. Plans have been drawn.

The H. N. Blanchard Electrical Co., Inc., Portland, Me., recently organized with a capital of $50,000 to manufacture electrical equipment and supplies, has acquired a building at 25-27 Casco Street for its plant. Operations will begin at once. Harry N. Blanchard, formerly connected with the Hay-Blanchard Electric Co., Portland, is president.

The Penobscot Power Co., Medway, Me., recently organized, is perfecting plans for a hydroelectric generating plant on the Penobscot River, in the Rockabemis Rips section, Medway. The company will issue capital stock for $300,000 and bonds for $600,000 to provide for the erection. A transmission system will be constructed from Medway to Howland and Enfield.

The Gilbert & Bennett Mfg. Co., Georgetown, Conn., manufacturer of wire cloth, etc., will commence the erection of a three-story addition to its plant a Wilton, Conn., 50 x 130 ft., estimated to cost about $75,000. Greenwood & Noerr, 847 Main Street, Hartford, Conn., are architects.

Chicago

CHICAGO, Aug. 21

THERE is no doubt that the coal and railroad strikes continue to restrict new buying, notwithstanding the partical settlement of the former. The machine tool trade, however, is keeping up its spirits, as it believes that business will improve as soon as the present uncertainty regarding transportation and fuel has disappeared. In the meantime, no action is being taken on the railroad lists and outside of a few additional purchases by the Continental Motors Co. and the Studebaker Corporation, little buying is being done by industrials.

Rising costs, due in part to a scarcity of fuel and labor shortage, are causing much concern among machine tool manufacturers, and general advances in the near future are regarded as inevitable. A few price changes have already been made. The Warner & Swasey Co., manufacturer of turret lathes, Cleveland, which announced revised prices on some of its smaller machines July 1, has adjusted prices on some of its larger sizes and semi-special machines, the advances ranging from less than 5 up to 20 per cent. By Sept. 1 this company expects to complete an entire revision of its prices. The Peerless Machine Co., Racine, Wis., has advanced hack saws approximately 6 per cent.

The Wisconsin Steel Works has awarded five 7½-ton spout hoist jib cranes to the Whiting Corporation for its new open hearth plant at South Chicago. These are in addition to the cranes let to the Alliance Machine Co., as reported in THE IRON AGE of Aug. 17.

The Byllesby Engineering & Management Corporation, Chicago, has placed an order for a 65-ton 4-motor electric traveling crane with the Whiting Corporation for the Western States Power Co. at Placerville, Cal.

Bliss & Laughlin, Inc., Harvey, Ill., has ordered a 5-ton electric traveling crane from the Whiting Corporation. A number of traveling cranes, as well as considerable foundry equipment, will be purchased for a large foundry now being constructed for the Pullman Co., Pullman, Ill.

Fred H. Schanze, 1443 Roosevelt Road, Chicago, has let a contract for a one-story automobile repair shop, 48 x 82 ft., at 1443-45 West Roosevelt Road, to cost $7,500.

The McDonald Loose Leaf Co., 638 Federal Street, Chicage, has let contract for a one-story factory, 95 x 125 ft., at 1809-17 Summerdale Avenue, to cost $30,000.

Lawder Brothers, 6916 LaFayette Avenue, Chicago, have let contract for a one-story garage and service station, 125 x 164 ft., at 5229-5305 Lawrence Avenue, to cost $27,500.

The Damascus Crucible Steel Casting Co., New Brighton, Pa., will soon start the construction af a plant on Summer Street, Hammond, Ind., opposite the works of the Metals Refining Co.

The Victor Auto Body Co. has leased for three years the property at 1638-40 South Wabash Avenue, Chicago, and will manufacture a special sport model for automobiles.

Fire recently damaged the plant of the Novelty Iron Works, Sterling, Ill., to the extent of from $5,000 to $8,000. Reconstruction work has been started.

The Hartford Foundry, Hartford City, Ind., is completing improvements and enlargements totaling $15,000.

The Rich Steel Products Co., Battle Creek, Mich., plans to erect a four-story factory to cost $500,000. Construction will probably not be undertaken until next year.

The Payne Motor Co., 1301 Hennepin Avenue, Minneapolis, Minn., has let contract for a three-story garage and sales building, 100 x 150 ft., at Fourteenth Street and Harmon Place, to cost $117,000.

The Dayton Co., Seventh Street and Nicollet Avenue, Minneapolis, Minn., has awarded contract for a two-story

[illegible] at Eleventh Street and East Avenue, [illegible]

The Ruggles Truck Co., Bad Axe, Mich., has let contract for a factory, 80 x 160 ft., to build truck bodies. The building with equipment will cost $30,000.

The Brown-Sebco Terminal Mfg. Co., 5616 Harper Avenue, Chicago, recently incorporated with $25,000 capital stock, will manufacture the Sebco battery post terminal clamp for use in connection with the storage battery on an automobile. It also has other products under consideration which will be soon put on the market. A plant has been leased at the address given. The only equipment for which the company is now in the market is an electro-lead plating apparatus. The officers are Max Brown, president; J. D. Cameron, treasurer; A. M. Brown, vice-president and secretary.

The Carlin Foundry Corporation is being formed by George E. Carlin, Alex A. Stewart and John Friese to purchase the plant of the Northern Foundry Co., La Porte, Ind. The new company will make light gray iron castings for the jobbing trade. The foundry is well equipped and will probably start operations about Sept. 1.

The City Council, Oskaloosa, Iowa, has plans under way for the initial unit of its new hydroelectric generating plant on the Des Moines River, near Harvey, Iowa, estimated to cost about $270,000, and will call for bids after the first of the year. The Fargo Engineering Co., Jackson, Mich., is engineer.

Freight-handling and conveying, and other mechanical equipment will be installed in the new freight terminal to be constructed by the McDougall Terminal Warehouse Co., Duluth, Minn., estimated to cost about $1,750,000. The work will include a power plant, with ice-manufacturing and refrigerating plant adjoining. A. Miller McDougall is president.

Arthur Berner, Rosemount, Minn., will take bids at once for a one-story automobile service and repair building, 52 x 110 ft., with machine shop. A. L. Garlough, 882 Cherokee Avenue, St. Paul, Minn., is architect.

A complete machine shop for automobile parts manufacture and repair work will be established in connection with the new building of the Johnson Automotive Trade School, Denver, Col., for which work will be placed under way at once. It will cost about $100,000.

The Payne Motor Co., 1301 Hennepin Avenue, Minneapolis, will commence the erection of a three-story automobile service and repair works, 100 x 150 ft., at Harmon Place and Fourteenth Street, estimated to cost close to $120,000.

A vocational department will be installed in the the two-story and basement high school, 90 x 172 ft., to be erected at Argo, Ill., estimated to cost about $125,000, for which work is under way. Ashby, Ashby & Schultz, 1511 West Jackson Boulevard, Chicago, are architects.

The Tilden Produce Co., 65 East Third Street, St. Paul, Minn., is planning for the installation of additional equipment at its ice and refrigerating plant. W. A. Tilden is president.

The People's Auto Co., Red Lake Falls, Minn., is planning to rebuild its service and repair works, recently destroyed by fire. The new shop will be 50 x 110 ft. John Helm, is general manager.

The Commonwealth Edison Co., 72 West Adams Street, Chicago, will soon take bids for two one-story power houses, 78 x 100 ft., and 35 x 75 ft., respectively, at 707-15 South La Salle Street, and 19 East Twenty-first Street.

The Illinois Traction System, 200 Peoria Life Building, Peoria, Ill., will build a one-story addition to its power house at La Salle, Ill., estimated to cost close to $50,000.

Detroit

DETROIT, Aug. 21.

THE Jennison Hardware Co., 901 North Water Street, Bay City, Mich., will commence the erection of a new plant at Second and Water streets, consisting of three one-story units, 100 x 250 ft., 60 x 200 ft. and 40 x 200 ft. respectively, estimated to cost about $400,000. H. W. Jennison is president.

A vocational department will be installed in the proposed high school to be erected at Almont, Mich., for which bonds for $90,000 have been voted.

The Maxwell Motor Corporation, Oakland Street, Detroit, is concluding negotiations for the acquisition of the entire property of the Chalmers Motor Co., Detroit, including the East Jefferson Street plant, equipment, manufacturing rights, etc.

The Republic Glass Co., Monroe, Mich., will commence the erection of a new one-story plant, 200 x 400 ft., on Kentucky Avenue, estimated to cost close to $50,000.

A vocational department will be installed in the new high school to be erected at Lapeer, Mich., estimated to cost $200,000, for which a site is now being selected. R. A. LeRoy, Pratt Building, Kalamazoo, Mich., is architect.

The Saxon Motor Car Corporation, Beaufait Street, Detroit, has arranged for a stock issue of $1,000,000, to net about $750,000, a portion of the proceeds to be used for extensions and improvements, and general expansion.

The Liberty Tractor Corporation, 535 Griswold Street, Detroit, is completing plans for the first unit of its new plant in the Lincoln Park section, one-story, 60 x 160 ft., and will commence construction early in the fall. Other units will be erected later.

The Grand Rapids Tire & Rubber Co., Grand Rapids, Mich., is planning the erection of a new unit to manufacture cord tires, estimated to cost about $250,000, including machinery. L. A. Brown is president and general manager.

A vocational department will be installed in the new two-story high school, 75 x 196 ft., to be erected at Bellevue, Mich., estimated to cost about $90,000, for which new bids will soon be asked. C. S. Patterson, Hauselman Building, Kalamazoo, Mich., is architect.

L. N. Bates, Sixteenth Street and Grand River Avenue, Detroit, is taking bids for a one-story automobile service and repair building, 65 x 100 ft., at Mackinaw Street and Grand River Avenue, estimated to cost close to $50,000. A. M. Hull, Room 1205, Detroit Savings Bank Building, is architect.

A vocational department will be installed in the new two-story high school, 130 x 160 ft., to be erected at St. Johns, Mich., estimated to cost $175,000, for which bids will be asked in September. R. A. LeRoy, Pratt Building, Kalamazoo, Mich., is architect.

The Holley Carburetor Co., Vancouver Avenue and the Pere Marquette Railroad, Detroit, has awarded contract to Culvertson & Kelly, 872 West Milwaukee Avenue, for a one-story addition, 120 x 195 ft.

The Wolverine Metal Specialty Co., Grand Rapids, Mich., is planning for the installation of new machine shop equipment.

Cleveland

CLEVELAND, Aug. 21.

BUSINESS with local machinery houses is holding up at about its recent volume, orders being mostly for single and in some cases for two machines. The Youngstown Board of Education has purchased six 11-in. engine lathes from a Cleveland dealer, completing the equipment required for the Reyan school.

A local manufacturer of automatic machinery reports a fairly good volume of inquiries from the Pacific Coast. This company continues to take a few orders for one or two machines. There is still some demand from the Detroit automotive industry and two automobile companies in that city are expected to be in the market shortly for considerable equipment.

The Lima Locomotive Works, Lima, Ohio, has come into the market for 25 or more machines, nearly all heavy tools, for equipping its plant extensions. Several inquiries have been sent to dealers and manufacturers covering different lines of equipment required, but it is stated that the company has not yet fully decided on all the machinery it will purchase. It is understood that its requirements will amount to approximately $500,000. Orders have been placed for eight or ten electric traveling cranes with the Shaw Electric Crane Co. Its tentative machinery list includes the following:

One 20-in. x 10-ft. axle lathe.
One 36-in. vertical boring mill.
Two 42-in. vertical boring mills.
One 90-in. vertical boring mill.
Eight or 10 6-ft. radial drilling machines.
Three 60-in. to 90-in. planers.
Four geared head 20-in. engine lathes.
Two slotters.
Two turret lathes for brass working.

The Milwaukee Electric Crane Mfg. Co., has taken an order for an electric traveling crane with an 80-ft. span and a 3-cu. yd. bucket for the Sandusky Cement Co., Cleveland.

D. Round & Son, Cleveland, manufacturers of chain

hoists, have placed contract for a one-story foundry addition, 60 x 300 ft. It will be used largely for the manufacture of automobile pistons for the Dall Motor Parts Co., Vermillion, Ohio. The firm has also purchased an interest in the Dall business, which will be moved to one of the buildings of the Round plant. No new equipment will be required for the foundry extension.

The National Pressed Gear Co., Canton, Ohio, recently incorporated with a capital stock of $100,000, will establish a plant for the manufacture of pressed gears, largely for the automotive and allied industries. The company has effected its organization by the election of A. L. Lewis, president and sales manager; Harry W. Maigaard, vice-president and chief engineer; Ernest Strong, vice-president and superintendent; Frank L. DeCorps, treasurer, and Harry Nesbaum, secretary.

The Crucible Steel Castings Co., Cleveland, has placed contract for a steel foundry, 102 x 240 ft., at Almira Avenue, Southwest, and West Eight-fourth Street. The George S. Rider Co. is the engineer and architect.

The Yelser Co., Cleveland, has placed contract for a new plant, 24 x 84 ft., at 1183 Holmden Avenue, Southwest, for the manufacture of plumbers brass goods. The company will purchase additional screw machine equipment.

The National Razor Mfg. Co., Lisbon, Ohio, is planning the erection of a machine shop. Die-making and other equipment will be installed.

The O-B Co., Lima, Ohio, has been incorporated with a capital stock of $100,000 to manufacture kerosene oil burners for domestic purposes. W. H. Nangester, 528 Market Street, and others are interested.

O. H. Sebring, Sebring, Ohio, has commenced the erection of a plant to manufacture aluminum kitchen ware. It will be 100 x 312 ft.

Frank A. and C. L. Sebring plan the erection of a nine kiln pottery plant at Alliance, Ohio, involving an expenditure estimated at $500,000. The building will be 176 x 700 ft.

Pittsburgh

PITTSBURGH, Aug. 21.

PRICE advances in machine tools have been fairly numerous in the past week. Some manufacturers of milling machines, shapers, and turret lathes quite generally have named higher prices, the advance amounting to about 10 per cent in the three lines. Although business is considerably less in volume than it was in June or in the fore part of July, sales of individual tools reach a fairly satisfactory aggregate and much prospective business is in sight. The trade is hopeful that larger sales are immediately ahead, now that the coal and railroad strikes give promise of an early termination.

Individual sales of drill presses have been greater in volume the past week, one dealer alone recording a sale of two 20-in., one 25-in. and one 14-in. presses. The Titusville Forge Co., Titusville, Pa., recently bought four 26-in. lathes, and a sale is noted in this district of a 24-in. lathe on a 14-ft. bed. The Struthers-Wells Co., Warren, Ohio, is in the market for a 6-ft. boring mill and the Pittsburgh & Lake Erie Railroad is taking bids on three combination truing machines. The Lima Corporation, Lima, Ohio, still is doing preliminary work on a number of tools wanted in connection with its plant enlargement. The Dravo Contracting Co., Pittsburgh, is another prospective tool purchaser, and the Center Foundry & Machine Co., Wheeling, W. Va., which is building a new plant at Warwood, W. Va., is in the market for a few tools, although it will remove all the equipment from its old plant in Wheeling to the new one.

The crane trade [illegible]. The Standard Steel Spring Co., Coraopolis, Pa., has placed the order for a 10-ton, 65-ft. span double hook crane with the Pittsburgh Crane & Equipment Co., and the Westinghouse Electric & Mfg. Co. has ordered a 10-ton, 59-ft. span, yard magnet crane from the Cleveland Crane & Engineering Co. The Pennsylvania Railroad, central region, has put out an inquiry for a 5-ton hand-power crane. Inquiries are not very numerous and pending business is inactive.

The National Transit Pump & Machine Co., Oil City, Pa., has plans under way for a new one-story foundry, 80 x 200 ft.

The Buick Motor Co., Baum Boulevard, Pittsburgh, has leased a four-story building to be erected at Baum Boulevard and Rebecca Street, estimated to cost $175,000, for the establishment of a service and repair works.

The War Department, Washington, has leased property at Hoboken, Pa., from the Aero Club of Pittsburgh, and will soon commence the erection of two hangars, with shop and repair facilities, for the establishment of a flying field. Lieut. R. B. Lea, Ninety-ninth Division, United States Army, is in charge.

The Universal Machine & Mfg. Co., 407 Rebecca Avenue, Wilkinsburg, Pa., is planning the installation of a drill press and other equipment at its works. G. P. Rhodes is head.

The Pittsburgh Typewriter & Supply Co., 39 Thirty-fifth Avenue, Pittsburgh, is in the market to contract with a metal-working shop for the manufacture of small parts used for typewriters and duplicating machines, including key levers, soft metal rivets, binder screws, rods, nuts, grease cups, etc.

The Board of Directors, Duquesne University, Bluff Street, Pittsburgh, will build a new power house. A. F. Link, 407 North Craig Street, is architect.

The McGraw Co., Bellaire, Ohio, agency for the Ford Motor Co., has plans nearing completion for a new two-story service and repair building at 2011 Main Street, Wheeling, W. Va., 85 x 125 ft., estimated to cost about $45,000.

The West Virginia & Maryland Power Co., a subsidiary of the West Penn Power Co., Pittsburgh, has acquired the plant and property of the Home Light Co., Terra Alta, W. Va., and will make improvements and extensions in this district.

The Robinson Coal Co., Gypsy, W. Va., has tentative plans for rebuilding the portion of its coal tipple recently destroyed by fire, with loss estimated at $22,000, including machinery.

The Fairmont-Chicago Coal Co., Fairmont, W. Va., recently organized to take over the local plant and properties of the Chesapeake Coal Co., for $1,000,000, has plans under way for the installation of additional machinery, including motors, hoisting equipment, mine cars, etc. E. F. Hartley is president, and W. E. Watson, general manager. The company is capitalized at $600,000.

A vocational department will be installed in the new two-story and basement high school, 115 x 180 ft., to be erected at Charleroi, Pa., estimated to cost about $150,000, for which J. C. Branton, Charleroi, is architect.

The Pittsburgh Engineering Works, Union Building, Pittsburgh, has leased space in the building at Duquesne Way and Garrison Alley for a local plant.

The Damascus Crucible Steel Castings Co., New Brighton, Pa., has acquired a tract of land along the line of the Nickel Plate Railroad, Hammond, Ind., for a new plant. Work will be placed under way at an early date.

The Board of Education, Patton, Pa., is said to be arranging a list of equipment for installation in the vocational department at its new high school. F. L. Brown is secretary.

The Pittsburgh & West Virginia Gas Co., Clarksburg, W. Va., has acquired property in the Montpelier section, for the erection of new repair shops, automobile service building and warehouse.

The Mutual Coal Co., Maidsville, W. Va., is planning to rebuild the portion of its tipple destroyed by fire Aug. 7.

The West Virginia Glass Mfg. Co., Huntington, W. Va., will install additional equipment at its plant. B. G. Landau is general manager.

Allison S. Fleming, Fairmont, W. Va., will soon commence the erection of a new three-story automobile service and repair building.

Cincinnati

CINCINNATI, Aug. 21.

THE machinery market, generally, is quiet, although engine lathe manufacturers report a fair volume of orders from widely scattered points. While inquiries continue, a very small percentage are being turned into orders, although it is conceded that with a settlement of the coal and rail strikes much of the business now under negotiation will be booked. The Louisville & Nashville Railroad has decided to defer purchases and has notified manufacturers to this effect. When the strike situation improves, however, its list of tools will be bought, as the equipment will be needed in various shops for replacement. Many prospective buyers who have withdrawn inquiries are asking to be notified previous to price advances, as they desire to take advantage of present quotations. A local manufacturer is in receipt of an inquiry from a large automobile manufacturer for a number of

special machines. The J. A. Fay & Egan Co., which will shortly call for bids on its new plant at Cincinnati, is expected to issue an extensive list of equipment. This company recently placed an order for nine cranes and a number of hoists for the new plant.

Local manufacturers report a scarcity of skilled help, most of the machinists out of work having accepted positions with railroad companies where much overtime work is being done.

The Marion F. Stout Co., Covington, Ky., has been incorporated with a capitalization of $175,000. It had been operating as a partnership and manufactures concrete blocks and tile. Plans are being prepared for additions and equipment to take care of increasing business. Marion F. Stout is president.

The Thomas & Armstrong Co., sheet metal manufacturer, London, Ohio, has increased its capitalization to $1,000,000 and plans additions to its works, including the equipment of a galvanizing plant and a manufacturing building. In addition to its present lines, the company recently embarked on the manufacture of steel shelving and will shortly engage in the manufacture of formed sheet metal products, such as roofing, siding, eaves trough, etc.

The plant of the Master Tire & Rubber Co., Dayton, Ohio, has been acquired at receiver's sale by the Universal Securities Co., for $75,000. Charles W. Hoffritz, president Securities Co., will reorganize the company to manufacture a complete line of automobile tires.

The Crawford, McGregor & Canby Co., Dayton, Ohio, manufacturer of golfing equipment, will build an extension to its plant, the contract for which has been placed with Frank Hill Smith, Inc.

Milwaukee

MILWAUKEE, Aug. 21.

MANUFACTURERS of agricultural machinery, particularly power farm operating equipment, are becoming more of a factor of demand for machine-tools, and while their requirements as yet are meager, inquiries indicate that a moderate volume of new business may be expected in the next few months. Automotive industries continue to buy one or two tools at a time to fill pressing needs, but otherwise the market remains spotty. The strike situation still handicaps industries and in addition has a restrictive effect upon plans of various metal-working industries because of uncertainties with respect to the immediate future.

The Kissel Motor Car Co., Hartford, Wis., has started preliminary work on a new power plant construction and equipment project involving an estimated investment of $100,000. The work is in charge of Cahill & Douglas, consulting engineers, 216 West Water Street, Milwaukee. A new boiler house, 40 x 80 ft., and 40 ft. high, will be erected first. This will be equipped with three 300-hp. Sterling boilers with automatic stokers, coal and ash handling and conveying machinery. A 175-ft. brick stack, with an 8-ft. flue, will be erected. The present power house will be enlarged and additional generating equipment installed, as soon as the increased boiler capacity is available. The Kissel company also will build a new battery of dry kilns and lumber curing rooms. W. L. Kissel is president.

The Roddis Lumber & Veneer Co., Marshfield, Wis., is taking figures on a 40-ft. chain or belt type of bucket conveyor and other equipment additions and extensions. Cahill & Douglas, Milwaukee, are consulting engineers.

The Russell Co., Kenosha, Wis., has been organized by A. M. Russell, formerly a sales executive of the Packard and Locomobile automobile companies, to manufacture gas motor coaches for passenger service on steam railroads. For the present manufacturing will be done under contract with the Russell Co. by the Winther Motors Co. of Kenosha, which already has built several coaches for demonstration purposes. The Russell Co. has orders valued at more than $1,000,000 for coaches from various railroads, including the Maryland & Pennsylvania of Baltimore, the New York, New Haven & Hartford, and others.

The La Crosse Motors Equipment Co., LaCrosse, Wis., has been organized by Jerome H. Chopiska, Frank Chopiska and J. V. Nigro to manufacture patented piston rings and other gas engine and general automotive machined specialties. A machine shop at 227-229 North Third Street has been leased and equipped. Initial operations are limited to piston ring manufacture. The partners formerly were associated with the Chopa Piston Ring Co., Auburn, Ind.

The Acme Tool Co., West Allis, Wis., has been incorporated with a capitalization consisting of 600 shares of common stock having no par value. It will lease or buy an existing shop building and install machinery for manufacturing tools, jigs and fixtures, and is authorized also to manufacture machinery, instruments, etc. The principals are J. F. Schnaufer, George Hoffman and Peter H. Mayes.

The Northwest Engineering Works, Green Bay, Wis., manufacturing a crawler type of locomotive crane, is preparing to engage in quantity production of gasoline-driven excavators, as distinguished from the so-called steam shovel.

The Winnebago County Board of Supervisors, Oshkosh, Wis., is asking bids until Aug. 23 for a one-story brick and steel garage and service shop, 68 x 120 ft., for highway construction and maintenance equipment. Inquiry is also being made for new and used tools. Otto Labbs is in charge.

The Rhinelander Refrigerator Co., Rhinelander, Wis., contemplates the erection of a factory addition for production of porcelain stock and parts used in the manufacture of iceboxes and refrigerators. An investment of $50,000 is planned. R. H. Reik is general manager.

The Twin Ports Marine Construction Co., Superior, Wis., which has been incorporated with $200,000 capital stock, has acquired the site and remaining buildings of the former Globe Shipbuilding Co., Superior, and will undertake some new construction as well as thorough re-equipment for the building and repair of steamships and other power craft. Chester A. Massey, associated with the Globe company, which during the war moved its plant and headquarters to the Atlantic seaboard, is president and general manager of the new corporation.

The Ft. Howard Paper Co., Green Bay, Wis., has engaged the Ludolf M. Hansen Co., local contractor, to design and construct a three-story mill addition, 100 x 120 ft., with a separate boiler house and power plant, at an estimated cost of $350,000, including equipment. A. E. Cofrin is general manager.

The D. J. Murray Mfg. Co., Wausau, Wis., founder, machinist and manufacturer of logging lumber manufacturing machinery, boilers, tanks, etc., has completed plans for a two-story brick and steel machine shop and assembly floor addition, 60 x 230 ft., and will soon be ready to purchase new equipment, including a 10-ton electric traveling crane. D. L. Bellinger is general manager.

The Scolding Locks Hairpin Co., Appleton, Wis., is purchasing miscellaneous wire-working, japanning and other equipment for its new factory, 40 x 200 ft., which will be ready about Sept. 10. Power plant and boiler equipment has been purchased.

The Madison Tool & Stamping Co., Madison, Wis., has orders on its books which will keep the plant busy for the next five months. It is contemplating the purchase of additional tools.

Baltimore

BALTIMORE, Aug. 21.

THE James Robertson Lead Works, 827 South Howard Street, Baltimore, has awarded contract to the Consolidated Engineering Co., Calvert Building, for a two-story addition, estimated to cost $65,000, for the manufacture of pipe and kindred specialties. Charles E. McPhail is general manager.

The Office of the Chief of Air Service, Washington, will take bids until Aug. 29 for vertical duplex fuel pumps, originally advertised to be opened on Aug. 18.

The Consolidated Gas, Electric Light & Power Co., Lexington Building, Baltimore, will make extensions at its plant at Westport, Md., to cost in excess of $300,000, including equipment.

The Atlantic Coast Line Railroad, Wilmington, N. C., is planning for extensions and improvements in its Southover shops at Savannah, Ga., to cost about $100,000. The work will include a new engine house, repair shop and considerable machinery.

The Board of Public School Commissioners, Charleston, S. C., will take bids on a general contract until Sept. 5, for the erection of a new vocational school on Chisholm Street. David B. Hyer, Peoples' Building, is architect.

The Pine Hall Brick Co., Pine Hall, N. C., recently organized with a capital of $100,000, has acquired the plant and property of the Dan River Brick Co. in this section. Extensions and improvements are planned, including the installation of additional equipment.

The W. T. Gray Co., 511 West Clay Street, Richmond, Va., operating an automobile service and repair works, is

planning for the installation of a lathe, drill press and other equipment.

The Reynolds-Lybrook Farm Co., R. F. D. No. 1, Winston-Salem, N. C., is planning the installation of an electric power house, with ice-manufacturing department, in connection with a new dairy plant. D. J. Lybrook is general manager.

The Travelers' Garage Corporation, Armory Building, Norfolk, Va., has awarded contract to Baker & Brinkley, Dickson Building, for a new one-story service and repair works, 120 x 160 ft., on Cove Street, estimated to cost close to $50,000. B. Gray Tunstall is head.

Electrical and mechanical equipment for converting mill operation from steam to electric power will be installed at once at the plants of the Hudson Cotton Mfg. Co., Hudson, N. C., and the Lenoir Cotton Mill, Lenoir, both operated under the same management.

The Gate City Motor Co., High Point, N. C., has acquired a site for a two-story service and repair building, 63 x 200 ft. Plans will be prepared at once.

The McDonald Brick Co., Ludowici, Ga., recently organized to take over the local plant of the Ludowici-Cedalon Co., manufacturer of tile, etc., is said to have preliminary plans under way for extensions and the installation of additional equipment.

A vocational department will be installed in the new high [illegible] for which plans will be prepared at an early date. The Board of School District Trustees is in charge.

The Carolina Machinery Co., Sumter, S. C., is planning for the purchase of a quantity of leather and rubber belting for transmission service. E. W. Moise is president.

The Office of the Public Printer, Government Printing Office, Washington, will receive bids until Aug. 31 for two motor-driven air compressors and one general service pump.

W. H. Chapman, 840 West Market Street, Greenboro, N. C., is planning the establishment of a factory to manufacture drain tile and kindred products. Inquiries are being made for machinery.

The City Commission, Frostburg, Md., will install new electric pumping machinery at the municipal waterworks in connection with improvements and extensions to cost about $60,000.

A. P. Gilbert, Durham, N. C., is making inquiries for a used double cylinder, double drop hoisting engine, with auxiliary equipment, in good condition.

The Purchasing Agent, Post Office Department, Washington, will receive bids until Aug. 28, for one two-wheel tire buffer, with stand, direct motor-driven.

The White Provision Co., Atlanta, Ga., will commence the immediate construction of a power house at its plant. It has preliminary plans under way for a new unit to comprise, in part, a five-story ice and cold storage plant. W. H. White, Jr., is president.

The Central South

ST. LOUIS, Aug. 21.

THE Muskogee Gas & Electric Co., Muskogee, Okla., will soon commence the construction of a new hydroelectric generating plant on the Arkansas River, with transmission system, estimated to cost about $1,000,000, including machinery. George Wilmarth is general manager.

The Indiahoma Refining Co., Federal Reserve Bank Building, St. Louis, with refineries at East St. Louis, Ill., and Okmulgee, Okla., is negotiating for the purchase of the plant of the Chickasaw Refining Co., Ardmore, Okla., which has been closed for more than a year. Upon acquisition, extensions will be made and new equipment installed. E. E. Schock is head of the purchasing company.

The Bradford Motor Works, Tulsa, Okla., is completing the construction of a local plant for the manufacture of oil well equipment, parts, etc.

Miller Brothers, Ponca City, Okla., operating the 101 Ranch Co., will commence the immediate erection of a new electric power plant to replace the one recently destroyed by fire.

George H. Siedhoff, Broadview Hotel, Wichita, Kan., will soon commence the erection of a four-story automobile service [illegible]

The Duncan Machinery Co., Dempster Building, Knoxville, Tenn., machinery dealer, has inquiries out for steel derricks for quarry service; also stiff leg derricks, with capacity from [illegible]

The M[illegible] Leon to Dublin, Tex., where increased facilities will be provided.

The Townley Metal & Hardware Co., Second and Main streets, Kansas City, Mo., has construction under way on a new one-story and basement addition, 50 x 100 ft.

The Walker Coal Co., Chelsea, Okla., is planning for the installation of electrical and other machinery on property recently acquired, including motors, hoisting equipment, mine cars, etc.

A one-story automobile service and repair building for company trucks and cars will be constructed by the Gray-Von Allmen Sanitary Milk Co., Louisville, estimated to cost close to $40,000. Frederick Arhart, Norton Building, is architect.

A vocational department will be installed in the new two-story and basement high school, 96 x 100 ft., to be erected at Highland, Kan., for which bids on revised plans will be called at an early date. C. W. Squires, Emporia, Kan., is architect.

The Mahan-Kerr Motor Co., Knoxville, Tenn., has plans under way for a three-story automobile service and repair building, 130 x 160 ft. Frank L. Kerr is general manager.

Electric motors, conveyors, traveling oven equipment and other mechanical apparatus will be installed at the plant of the Ward Baking Co., Kansas City, Mo., comprising the former plant of the Campbell Baking Co., recently acquired. The installation is estimated to cost about $100,000.

The Lester Carriage & Wagon Co., 115-19 South Fourteenth Street, St. Louis, is planning to rebuild the portion of its works recently destroyed by fire with loss of about $35,000.

A vocational department will be installed in the two-story and basement high school to be erected at Eighteenth and Freiticher streets, Owensboro, Ky., estimated to cost about $250,000, for which bids will be asked on a general contract in September. A. F. Hussander, 25 South Dearborn Street, Chicago, is architect.

The Calhoun Machinery Exchange, El Reno, Okla., machinery dealer, is making inquiries for a used pipe-bending machine to handle material up to 3 in. in diameter, in good condition.

The Fibre Mfg. Co., Room 612, New Orpheum Building, Wichita, Kan., is planning for the installation of new transmission equipment, including shafting, pulleys, belting, hangers, etc. C. T. Banon is head.

A. B. Cunningham, Poyen, Ark., is planning to rebuild his power house and saw mill, recently destroyed by fire.

The Sewanee Coal & Iron Co., Chattanooga, Tenn., will construct a steel coal tipple at its property in Sequatchie County, recently acquired. It is planned to install equipment in all departments to provide for a capacity of close to 5000 tons per day.

The Atlantic Ice & Coal Co., Chattanooga, Tenn., will soon commence the erection of a new ice and refrigerating plant. A site has been selected on McCallie Avenue.

A vocational department will be installed in the two-story high school to be erected at Belle, Mo., for which bids on a general contract will soon be taken. H. S. Bill, Miller Building, Columbia, Mo., is architect.

The Wichita Water Works Co., 211 North Market Street, Wichita, Kan., is planning for the installation of new electrically-operated pumping machinery. Extensions and improvements to cost $100,000 will be made.

The Stockton Roller Mills, Springfield, Mo., are planning for the rebuilding of their ice-manufacturing and power house, recently destroyed by fire.

The Gulf States

BIRMINGHAM, Aug. 21.

THE Otis Elevator Co., 419 South Akard Street, Dallas, Tex., has completed plans for a two-story building, 75 x 150 ft., at Young Street and Park Avenue for local headquarters, to cost close to $100,000. The present repair and machine shops at the South Akard Street works will be removed to [illegible] and extended. C. C. Perkins [illegible] manager.

The Utilities Commission, Orlando, Fla., W. T. Bland, chairman, is taking bids until Aug. 30 for a municipal power plant and equipment. Alvord, Burdick & Howson, First National Bank Building, Orlando, are architects.

F. Kassel Dallas, Tex., [illegible] erection of a new one-story metal-working plant at Kate Street and Second Avenue.

The Alabama Dry Dock & Shipbuilding Co., Mobile, Ala., [illegible] property on Pinto Island and plans the construction of a new shipyard. The present plant will be removed to the new location and extended.

[redacted] repair shops of the Wichita Falls & Northwestern Railway Co., Wichita Falls, Tex., including engine house, machine repair shops, etc. An official estimate of loss has [redacted]

The Planters' Cotton Oil Co., Navasota, Tex., has preliminary plans under consideration for rebuilding the portion of its oil mill recently destroyed by fire with loss estimated at $50,000, including equipment. John D. Rogers is president.

Plans are under way for a reorganization of the New Orleans Light & Railway Co., New Orleans, recently purchased by a bondholders' committee for $14,500,000. Extensions will be made.

The San Juan Garage Co., Sanford, Fla., recently organized, will commence the erection of a one-story service and repair works, 85 x 100 ft., on site lately acquired. W. D. Rogers is president.

The Board of Education, Baton Rouge, La., is said to be arranging a list of equipment for installation in the vocational department of its new high school. R. C. Gordon is president of the board.

The New Orleans Compress Co., New Orleans, recently formed with a capital of $1,000,000 by officials of the Anderson-Clayton Co., New Orleans, raw cotton merchant, will build a large cotton compressing plant on local site.

The Seminole Canoe Club, Inc., Jacksonville, Fla., recently organized, is planning the establishment of a factory for the construction and repair of motor boats, canoes and other small craft. Louis E. Rothernal is head.

The Pennsylvania Sugar Co., Delaware and Shackmaxon streets, Philadelphia, has construction under way on a new sugar mill near Miami, Fla., with capacity of about 1000 tons of sugar cane per day. A power house will also be erected. George H. Earle, Jr., is president.

The Wisconsin-Alabama Lumber Co., Sylacauge, Ala., has plans under way for a new lumber mill estimated to cost in excess of $50,000, including equipment.

The Common Council, Brookhaven, Miss., will take bids until Sept. 5 for pumping machinery, motors, control apparatus and other mechanical equipment, in connection with extensions and improvements in the waterworks. The Kramer Engineering Co., Magnolia, Miss., is consulting engineer. F. A. Cameron is city clerk.

Freight-handling and conveying machinery, elevators, etc., will be installed in the new warehouse to be erected by the Dallas Terminal Warehouse Co., Dallas, Tex., estimated to cost about $250,000. Plans have been completed.

A vocational department will be installed in the two-story and basement high school to be erected at Hillsboro, Tex., estimated to cost about $125,000, for which foundations will commence at once. J. O. and T. J. Galbraith, Hillsboro, are architects.

An ice and cold storage plant will be installed in the new two-story building, 100 x 150 ft., to be erected by the Boren-Stewart Co., Dallas, Tex., wholesale grocer, estimated to cost $125,000.

A vocational department will be installed in the new high school, 60 x 105 ft., to be erected at Catchings, Miss., estimated to cost $160,000. Charles Deas, Goodwyn Institute, Memphis, Tenn., is architect.

The George C. Brown Lumber Co., Grenada, Miss., has plans under way for the construction of a new lumber and saw mill on its timber properties on the Yalabousha River.

The Groveland Novelty Works, Groveland, Tex., has plans nearing completion for a factory to manufacture wood and other specialties. Wood-working machinery, bench tools, oil-operated engine and other mechanical equipment will be installed. H. H. Prashun heads the company.

The Pacific Coast

SAN FRANCISCO, Aug. 15.

THE Hebern Electric Co., Oakland, Cal., has plans under way for a new three-story, reinforced-concrete plant on West Harrison Street, to manufacture electrical equipment and supplies, estimated to cost about $200,000, including equipment. Reed Corlett, Oakland Bank of Savings Building, are architects.

The Southern California Edison Co., Los Angeles, will build a new power house on Los Angeles Street, Inglewood, Cal., with capacity of about 7000 hp., estimated to cost approximately $60,000.

The Illinois Electric Co., Los Angeles, has awarded contract to the R. E. Millsap Co., Marsh-Strong Building, for a new four-story factory branch at North Boyd and San Pedro streets, estimated to cost about $80,000. Headquarters are at 314 West Madison Street, Chicago.

The Green Mill Amusement Park Co., Fresno, Cal., will build an ice-manufacturing and refrigerating plant in connection with its new skating rink. The entire project will cost in excess of $300,000. Ellery, Frost & Patten, 1913 Fresno Street, are engineers.

Tilden & Tilden, Santa Rosa, Cal., have leased a two-story, reinforced-concrete building, 75 x 150 ft., to be erected on B Street, estimated to cost $35,000, for the establishment of an automobile service and repair works, including machine shop.

The Automobile Assembling Co., Los Angeles, has awarded contract to the Austin Co., Pacific Electric Building, for a new one-story plant on Sixteenth Street, 165 x 200 ft., estimated to cost $55,000.

F. S. Webster, city clerk, Burbank, Cal., will take bids until Sept. 5, for a deep well centrifugal pump, with capacity of 1350 gal. per min.

The Board of Public Works, San Francisco, will receive bids until Sept. 6 for car bodies, trucks, motor equipment and air brake apparatus for the municipal railroad system.

Freight-handling and conveying machinery will be installed in the new three-story automobile warehouse to be erected at Sixth and Clarence streets, Los Angeles, by the Union Pacific Railroad Co., and occupied by the Sinclair & Bowman Co., 100 x 380 ft., estimated to cost about $75,000. The Union Pacific company is said to be planning the installation of a traveling crane at its new loading dock.

The Bear River Water & Power Co., care of J. L. Rollins, P. O. Box 22, Auburn, Cal., is planning the construction of a new hydroelectric power house in the Wilson Valley, Placer County.

A vocational department will be installed in the new high school to be erected at Oakland, Cal., estimated to cost about $700,000, for which bids on a general contract will be received until Sept. 11. C. W. Dickey, 2149 Broadway, is architect.

The Pacific Fruit Express Co., 65 Market Street, San Francisco, will soon commence the erection of a new ice plant at Nampa, Idaho, to cost $40,000.

The Chehalis Mill Co., Chehalis, Wash., has tentative plans under way for rebuilding its lumber mill, recently destroyed by fire with loss estimated at $300,000, including machinery.

The Marine Equipment Co., Aberdeen, Wash., will soon commence the erection of the first unit of a new plant on site between Aberdeen and Hoquiam, Wash., recently acquired, estimated to cost in excess of $200,000, including machinery.

Canada

TORONTO, Aug. 21

DURING the week a slight improvement was noted in the demand for machine tools. The present call, however, is from the smaller industries which are adapting plants to present requirements of the trade and are handling new lines of manufacture. Buying on a moderate scale continues from automobile concerns, but more activity is expected from this source within the next month or two. The demand for wood-working equipment is showing steady improvement and companies manufacturing this line are finding it necessary to increase their operations. Despite the fact that the shortage of coal is beginning to have a telling effect on various industries, announcements continue with regard to the construction of new plants and additions, with the result that dealers and manufacturers look forward to considerable demand for machinery and tools. Inquiries for practically all lines of equipment, both for domestic and export account, are improving. The call for machine shop supplies and small tools generally continues on an encouraging basis.

The Joliette Steel Products, Ltd., 211 McGill Street, Montreal, has been incorporated with a capital stock of $375,000 by Walter R. L. Shanks, Linton H. Ballantyne, Charles R. McKenzie and others as provisional directors. It has acquired the plant and equipment of the Joliette Steel Co., Joliette, Que., and will continue manufacturing the latter's line of equipment as well as new products. W. A. McCallum is vice-president.

[redacted]

acquired the plant and equipment of the Dominion Forgings & Stampings, Ltd., Merritton, Ont.

E. W. Bassick, president, and Mr. Bassick, general manager Bassick Mfg. Co., Chicago, have completed negotiations and will take over the H. A. Wood plant on Pinnacle Street, Belleville, Ont., to manufacture Alemite products. The necessary machinery and equipment will be forwarded to Belleville and installed as soon as possible.

The plant of the Canadian Pipe Co., Vancouver, B. C., was destroyed by fire with a loss of $100,000. Although no definite announcement has been made, it is expected that it will be rebuilt without delay.

It is reported that the Dominion Glass Co., Montreal, will shortly undertake the construction of a local plant to cost approximately $1,000,000. At present the company is operating two smaller plants which will be abandoned when the new structure is ready. Besides the Montreal plants the company has works at Radcliffe, Alta., Hamilton, Toronto and Wallaceburg, Ont.

Work on the construction of an addition to the paper mills of the Belgian Industrial Co., Shawinigan Falls, Que., is underway. The building will be 112 x 265 ft., and is designed to contain two paper machine units, one of which has been ordered from Charles Walmsley & Co., Ltd., Bury, England. An electric crane operated by four motors and having a span of 82 ft. and a capacity of 30 tons, will also be installed, as well as a crane of the same capacity with a span of 30 ft. The company contemplates the completion of one unit by January and has under consideration the purchase of the second unit to be in operation by October, 1923.

The Libby-Owens Glass Co., Ltd., Kenilworth Avenue North, Hamilton, Ont., which completed the erection of a new plant a short time ago at a cost of approximately $3,000,000, is having plans prepared for an addition which when in operation will practically double the present capacity.

The Price Brothers Co., 56 St. Peter Street, Quebec, is preparing to erect two pulp mills at Kenogami, Que.

The Dominion Insulator Co., Niagara Falls, Ont., has started work on the erection of a plant to cost $150,000.

Indiana

INDIANAPOLIS, Aug. 21.

THE Duesenberg Co., South Harding Street, Indianapolis, manufacturer of automobile engines, etc., will commence the erection of an addition estimated to cost about $30,000.

The Chapman-Price Steel Co., Shelby Street, Indianapolis, will hold in abeyance the construction of its proposed addition estimated to cost about $500,000, including equipment. It is expected to commence work during 1923. Preliminary plans are being drawn.

The Terre Haute, Indianapolis & Eastern Traction Co., Indianapolis, has made application to the Public Service Commission for permission to enlarge its electric generating plant on West Tenth Street. A new 15,000-kw. generator and auxiliary equipment will be installed.

Following the completion of its new plant at Michigan City, Ind., for which excavations for a number of buildings are now under way, the Sullivan Machinery Co., 122 South Michigan Avenue, Chicago, manufacturer of mining machinery, air compressors, etc., will remove its Chicago works to this location, utilizing the equipment and later disposing of the buildings. A tract of 125 acres has been acquired for the new plant with buildings to include foundry, machine shop, assembling plant, etc., estimated to cost close to $1,000,000, including additional equipment to be installed. Office headquarters will be maintained at Chicago, as heretofore.

The Standard Oil Co., Indianapolis, will build a new distributing and storage plant at Fairmount, Ind., in the western part of the city.

R. W. Voorhees, Frankfort, Ind., has plans under way for a new one-story lumber plant, 45 x 140 ft., estimated to cost close to $40,000, including machinery.

Leslie Gee, 208 North Sixth Street, Vincennes, Ind., will erect a new automobile service and repair building at Lawrenceville, Ill., estimated to cost close to $30,000.

The Indiana Quarries Co., Bedford, Ind., has tentative plans for rebuilding its plant recently destroyed by fire. The new mill, with machinery and power equipment, is estimated to cost in excess of $350,000. Nelson Joynon is general superintendent in charge.

The Durant Motor Co. of Indiana, Muncie, is reported to be planning for enlargements in its local plant, devoted exclusively to the manufacture of six-cylinder automobiles, to include the installation of additional equipment. W. R. Willett is president.

IRON AND STEEL STOCKS

Better Demand and Higher Prices Noted the Past Week

Steel shares were in good demand and higher the past week, investment being attracted by developments in connection with plant consolidations and by advancing prices for mill products. United States Steel common shares sold at a new high level for 1922. The demand for industrial shares in general, however, has been more or less limited and comparatively little improvement in values is noted. The coal strike situation, although somewhat better, is by no means settled. Yet the fuel supply situation is improving, while the carriers are slowly but surely overcoming labor troubles. Textiles are in better demand, reflecting a larger retail buying power. Raw cotton is appreciating in value. Grain and livestock values, on the other hand, are declining and in turn will be reflected in industry. The cost of living continues to advance, which tends to check wage reductions.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

Allis-Chalm.	52¾ - 55⅛	Lack. Steel	77 - 81½
Am. B. S. & F.	70½ - 72	Lima Loco	52⅝ - 58½
Am. Can	56½ - 58⅞	Lima Loco. pf	110¼ - 115
Am. Can pf.	109½ - 109¾	Midvale Steel	34 - 36½
Am. Car & F.	171½ - 177	Nat.-Acme	16¼ - 16⅝
Am. Car & F. pf.	122½ - 125	Nat. E. & Stm	56⅝ - 59¼
Am. Loco.	117½ - 120⅜	Nat. E. & S. pf.	93 - 94
Am. Loco. pf.	118¼ - 118¾	N. Y. Air Brake	74⅝ - 78
Am. Radiator	110½ - 115⅜	Nova Scotia Steel	34½ - 34¾
Am. Stl. Fdries.	40¼ - 42	Otis Steel	11 - 11¾
Am. Stl. F. pf.	99½ - 100	Pressed Steel	80½ - 81¾
Bald. Loco.	121¾ - 126½	Pressed Steel pf	99¾ - 99¾
Bald. Loco. pf.	- 114	Ry. Steel Spring	109 - 111
Beth. Steel	76½ - 78½	Replogle Steel	31¾ - 33½
Beth. Stl. Cl. B.	78 - 80	Republic	71⅛ - 74⅝
Brier Hill	17⅜ - 18¾	Republic pf	92½ - 93½
Br. Em. Steel	10⅞ - 11	Sloss	47 - 48
Br. E. Stl. 1st pf	- 72⅞	Sloss pf	- 75½
Br. E. Stl. 2d pf.	30½ - 33⅜	Steel of Can.	74½ - 77½
Cambria Steel	- 90	Un. Alloy Steel	37⅜ - 39
Chic. Pneu. Tool	66¼ - 69⅝	U. S. Pipe	33 - 35⅝
Colo. Fuel	29½ - 32	U. S. Pipe pf	- 72
Cruc. Steel	90¼ - 95	U. S. Steel	100¾ - 104¼
Cruc. Steel pf.	93½ - 94	U. S. Steel pf.	119¾ - 121¾
Gen. Elec.	178 - 184	Vanadium Steel	47¼ - 50⅜
Gt. No. Ore Cert.	39¾ - 42½	Va. I. C. & Coke	55¼ - 56
Gulf States Steel	81 - 84⅞	Wlhouse Air Br.	94 - 95
Inland Steel	- 50¾	Wlhouse E. & M.	61¼ - 62¾
Int. Har.	112¼ - 115⅞		

Industrial Finances

Assets of the defunct Barton Axle Co., Barton, Washington county, Wis., will be sold at public auction by the receiver, Henry J. Driessel, on Sept. 2 at 10 a. m. The court has fixed $80,000 as the minimum bid acceptable, and requires payment of $2,500 in cash at time of bid as a deposit. The property will be offered in parcels and as a whole. The shop is 100 x 200 ft., and was erected about two and a half years ago to manufacture automobile, motor truck and tractor axles.

The plan for the liquidation of the indebtedness of the Locomobile Co. of America, Bridgeport, Conn. is approved by half of the creditors and so far there have been no objections. The plan, if it becomes operative, should net creditors 17½ per cent in new bonds and 18½ per cent in cash.

During the first half of this year the American Can Co. did about 20 per cent more business than it did in the corresponding period last year. Earnings, however, were not at a rate to warrant expectations of a dividend on the common stock for some time.

The United Alloy Steel Corporation's operating profits for the six months ended with June were $1,913,113, and its total income $1,959,029. For interest and depreciation $684,106 was charged off, leaving a net income of $1,274,923, which after preferred dividends is equal to $1.45 a share on the 800,000 outstanding common shares, which have no par value.

The Transue & Williams Steel Forging Corporation showed a deficit in the first half of 1922 of about $116,000, after all charges. The company has been reported operating on a profitable basis, but necessary adjustments in inventory, etc., resulted in the showing made. At the close of June the company had about $100,000 cash on hand and Government securities of about $1,300,000.

The Saxon Motor Car Corporation, 3733 Beaufait Street, Detroit, has arranged for a stock issue of $750,000, a portion of the proceeds to be used for extensions and improvements.

The Supreme Motors Corporation, Warren, Ohio, has been placed in receivership as a result of a bankruptcy petition filed in the Federal Court, Cleveland. N. A. Wolcott, War-

ren attorney, was appointed receiver. The company was organized about three years ago and engaged in quantity production of automobile motors.

A revaluation of the plant and equipment of the Barney & Smith Car Co., Dayton, Ohio, preparatory to its being offered for sale by the receiver, has been completed. The reappraisal value was $2,273,708.87, or nearly one million dollars below the figures at which the property was appraised last April. When confirmation of the appraisal is made, the plant will be offered for sale by the sheriff of Montgomery Co.

The Metz Co., Waltham, Mass., automobiles, has been petitioned into bankruptcy by three creditors.

A group of bankers is offering a block of stock of the Timken Roller Bearing Co., Canton and Columbus, Ohio, maker of tapered roller bearings.

Upon the petition of the Allis-Chalmers Mfg. Co. and other creditors, Judge Lawrence W. Halsey of the Milwaukee County Circuit Court has appointed Julius J. Goetz receiver of the Milwaukee Shaper Co., 1020-1040 Chestnut Street, Milwaukee, manufacturer of shapers and other tools.

Appraisals of the properties of the defunct Molle Typewriter Co., Oshkosh, Wis., filed Aug. 14, show total assets of $179,431.04 represented by physical property, in addition to a nominal valuation of the patent rights at $450,000. Jigs, dies, etc., are valued at $82,500; finished goods on hand, $13,275, and materials, $38,292.94. Charles D. Breon is trustee.

F. Clyde Sullivan and William L. D'Oller, receivers for the United States & Cuban Allied Works Engineering Corporation, Bradford, Pa., will dispose of the plant and machinery of the company at a public sale, Oct. 2, including machine tools, bench tools, fixtures, etc.

Half Year of American Steel Foundries

As evidence of the turnabout in the steel and allied industries during the early part of this year, the report of the American Steel Foundries for the six months ended with June is a case in point. Net earnings for that period were $2,098,139, or $1,320,592 greater than for the corresponding period last year. After charging off $406,031 for depreciation, as against $267,373 last year, there was a balance of $1,692,108. With federal tax reservations and all other charges deducted, there was a surplus of $1,452,859, just $1,118,084 greater than the surplus for the first half of 1921. This surplus, after deducting preferred dividends, is equal to $1.89 a share on the $20,401,000 common stock. In the same six months last year the company earned 6c. a share on its common stock. According to President Lamont the company has two months' supply of coal on hand and enough unfilled business on the books to maintain present plant operations of 75 to 80 per cent of capacity over the balance of the year. Earnings during the second three months were double those of the first three, and according to Mr. Lamont should further improve during the last half of 1922.

American Locomotive Deficit

The American Locomotive Co. reports gross earnings of $7,399,934 for the six months ending June 30, as against $25,989,781 for the first half of 1921, and after all charges a deficit of $2,591,780, the first time since 1915 that the company has operated at a loss in any half year period. For the half year ending with June, 1921, a surplus of $2,276,043 was shown.

The financial position of the company is very strong, however. For instance, on June 30, it did not have a loan note outstanding, while cash and marketable securities amounted to $24,448,304. After providing for reserves, there was a net of current assets of $39,113,392. In addition, unfilled orders on the books of the company have increased about 100 per cent since June 30, the actual value of which stands at $9,067,980.

Wickwire-Spencer Earnings

The income account of the Wickwire-Spencer Steel Corporation for the three months ending June 30 gives sales as $4,556,744. After deducting the cost of sales and other administrative expenses there is a net of $465,343, and after miscellaneous and credit charges, without allowing for depreciation and bond interest, a net profit of $188,033, contrasted with a net profit of $42,427 for the previous three months.

Thus the showing for the second quarter was slightly better than for the first three months of 1922, even after allowing more liberal miscellaneous charges. Sales for the six months ending with June amounted to $8,761,216, and after allowing for cost of sales, administration, etc., there was a net of $801,755. Miscellaneous changes, plus credits, resulted in net profits of $230,461.

Midvale's Second Quarter

The income account of the Midvale Steel & Ordnance Co. for the second quarter showed a deficit of $1,435,111, contrasted with one of $1,289,393 for the corresponding three months last year. For the first half of the year a deficit of $2,587,938 is shown, whereas for the same period last year there was a deficit of $2,684,595. The amounts charged off in the first six months this year for depreciation and depletion were $429,146 less than was the case in 1921.

The quarter compares as follows:

	Second Quarter, 1922	First Quarter, 1922	Second Quarter, 1921
Net earnings	$352,374	$387,970	$87,499
Add oper. profit adjust. from first quarter	.....	.....	659,614
Net	$352,374	$387,970	$571,824
Interest	737,209	743,249	755,439
Deficit	$384,835	$355,279	$183,915
Depreciation, etc.	1,050,276	797,548	1,105,478
Deficit	$1,435,111	$1,152,827	$1,289,393

The Porcupine Co., Bridgeport, Conn., manufacturer of boilers, tanks, etc., and fabricators of structural steel, with a large plant at Fairfield, Conn., recently voted to increase the capital stock from $150,000 to $250,000, for expansion.

Trade Changes

Fred T. Ley & Co., Inc., Springfield, Mass., announces the removal of its Boston office to the sixth floor of the Bradbury building, 230 Boylston Street.

The general sales, accounting and financial offices of the Wickwire-Spencer Steel Corporation will be moved from Worcester, Mass., to New York. The operating department headquarters and other general offices will remain in Worcester. The corporation's New England business will be handled through a divisional sales office at Worcester, with C. K. Hardy, assistant sales manager, in charge. Allan S. Fraser, general sales manager, will be located in New York and Frank Kilmer, treasurer, and John A. Denholm, assistant sales manager, will spend most of their time there. The office of T. H. Wickwire, Jr., president, will be moved from Buffalo to New York.

Frank W. Williams has purchased from Mrs. Giertsen all of the stock of the Chicago Machinery Exchange, an Illinois corporation, and the West Side Iron Works, a Michigan corporation. He will continue these businesses at the present address, 1219 Washington Boulevard, Chicago, until Sept. 30. After Oct. 1 he will remove to buildings which he owns at 1506-22 West Twenty-second Street, which he considers more suitable than the present location. He expects to cover the country thoroughly with woodworking machinery salesmen. The smaller and rural trade will be handled by mail.

The T. J. Flynn Metal Works, 31-35 Albany Street, Cambridge, Mass., which dissolved in 1918, has been reorganized. A complete line of metal working equipment has been installed in the plant.

Pratt & Cady Co., Inc., Hartford, Conn., announce that the heater business formerly conducted by them, as successor to I. B. Davis & Son, has been purchased by the Whitlock Coil Pipe Co., Hartford.

David W. Allen, formerly associated with Edgar E. Brosius, Pittsburgh, and Edward T. Morgan, who formerly handled sales in the Pittsburgh district for the Chesapeake Iron Works, Baltimore, have formed a partnership with offices in the State building, Pittsburgh, under the firm name of the Allen-Morgan Engineering Co., and will specialize in material-handling equipment. The firm represents the Barber-Foster Co., Cleveland, and the Columbus Conveyor Co., Columbus, Ohio.

The Heisler Locomotive Works, Sixteenth and Hickory streets, Erie, Pa., and the Globe Iron Works, Fifteenth and Myrtle streets, Erie, have been merged under the name of the first noted company, with a capital of $400,000.

The Western Iron Stores Co., Milwaukee, of which John A. Camm, formerly sales manager, Kearney & Trecker Corporation, became president and general manager on Aug. 1, is remodeling its store and warehouse. The Western company announces that it has taken the representation in Wisconsin of the Hoefer line of machine tools manufactured at Rockford, Ill.

The Hartford Tap & Gage Co., Hartford, Conn., has recently changed the name of the company to the Hanson Tap & Gage Co. The personnel of the company remains the same.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossbile to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

	Per Lb
Bars:	
Refined iron bars, base price	2.83c.
Swedish bars, base price	7.00c.
Soft steel bars, base price	2.83c.
Hoops, base price	4.03c.
Bands, base price	3.63c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	2.93c.
Channels, angles and tees under 3 in. x ¼ in., base	2.83c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	2.83c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	2.93c.
Toe-calk, ½ x ⅝ in. and larger	3.70c.
Cold-rolled strip, soft and quarter hard	6.25c. to 7.25c.
Open-hearth spring steel	4.00c. to 6.00c.
Shafting and Screw Stock:	
Rounds	3.65c.
Squares, flats and hex	4.15c.
Standard cast steel, base price	12.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	2.93c.

Sheets

Blue Annealed	Per Lb.
No. 10	3.93c.
No. 12	3.98c.
No. 14	4.03c.
No. 16	4.13c.

Box Annealed—Black

	Soft Steel C. R., One Pass, Per Lb	Blued Stove Pipe Sheet, Per Lb.
Nos. 18 to 20	4.00c. to 4.30c.	.....
Nos. 22 and 24	4.05c. to 4.35c.	4.60c.
No. 26	4.10c. to 4.40c.	4.65c.
No. 28	4.20c. to 4.50c.	4.75c.
No. 30	4.45c. to 4.75c.	.....

No. 28 and lighter, 36 in. wide, 10c. higher

Galvanized	Per Lb.
No. 14	4.30c. to 4.60c.
No. 16	4.45c. to 4.75c.
Nos. 18 and 20	4.60c. to 4.90c.
Nos. 22 and 24	4.75c. to 5.05c.
No. 26	4.90c. to 5.20c.
No. 27	5.05c. to 5.35c.
No. 28	5.20c. to 5.50c.
No. 30	5.70c. to 6.00c.

No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
½ in. Butt	—53	—38	¾ in. Butt	—30	—13
¾ in. Butt	—58	—45	1½ in. Butt	—32	—15
1-3 in. Butt	—60	—47	2 in. Lap	—27	—10
2½-6 in. Lap	—57	—44	2½-6 in. Lap	—30	—15
7-8 in. Lap	—53	—30	7-12 in. Lap	—23	— 7
9-12 in. Lap	—49	—30			

Steel Wire

	Per Lb
Bright basic	3.50c. to 3.75c.
Annealed soft	3.50c. to 3.75c.
Galvanized annealed	4.25c. to 4.50c.
Coppered basic	4.00c. to 4.25c.
Tinned soft Bessemer	5.50c. to 5.75c.

*Regular extras for [illegible]

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	18¾c. to 19¾c.
High brass wire	19¼c. to 20¼c.
Brass rod	16¼c. to 17¼c.
Brass tube, brazed	25⅝c. to 26⅝c.
Brass tube, seamless	22½c. to 23 c.
Copper tube, seamless	24¾c. to 25 c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 21¾c. to 22¾c. per lb. base.

Cold rolled 14 oz. and heavier 3c. per lb. advance over hot rolled

Tin Plates

Bright Tin		Coke—14-20		
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20		Primes	Wasters
		80 lb.	$6.05	$5.80
		90 lb.	6.15	5.90
		100 lb.	6.25	6.00
IC..$10.00	$8.50	IC..	6.40	6.15
IX.. 11.50	10.00	IX..	7.40	7.15
IXX.. 13.00	11.25	IXX..	8.40	8.15
IXXX.. 14.25	12.50	IXXX..	9.40	9.15
IXXXX.. 16.00	14.00	IXXXX..	10.40	10.15

Terne Plates

8-lb. coating, 14 x 20

100 lb.	$7.00
IC	7.25
IX	7.50
Fire door stock	9.00

Tin

Straits, pig	35c.
Bar	42c. to 46c.

Copper

Lake ingot	15¼c.
Electrolytic	15 c.
Casting	14¾c.

Spelter and Sheet Zinc

Western spelter	8 c. to 8½c.
Sheet zinc, No. 9 base, casks	8¾c. open 9¼c.

Lead and Solder*

American pig lead	6¾c. to 7c.
Bar lead	8c. to 8½c.
Solder, ½ and ½ guaranteed	25c.
No. 1 solder	23½c.
Refined solder	20¼c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	75c.
Commercial grade, per lb	35c.
Grade D, per lb	25c.

Antimony

Asiatic	6½c. to 7c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb. 25c. to 27c.

Old Metals

Prices generally are unchanged but the market is strong. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy crucible	11.75
Copper, heavy wire	11.25
Copper, light and bottoms	9.25
Brass, heavy	6.25
Brass, light	5.25
Heavy machine composition	8.50
No. 1 yellow brass turnings	6.50
No. 1 red brass or composition turnings	8.00
Lead, heavy	4.50
Lead, tea	3.50
Zinc	3.25

THE IRON AGE

New York, August 31, 1922

ESTABLISHED 1855 VOL. 110, No. 9

Costs of Electric Steel Melting

Comparison of Methods Shows Basic Higher Than Acid* —Power Charge, Electrodes and Labor Chief Controlling Items

BY CHARLES WELLMAN FRANCIS

IT is the purpose of the author in this article to give the readers the benefit of a cost calculation which is based on actual operating data taken from practice in the field of electric furnace work. Elaborate charts and tables for figuring costs and methods for handling the same might be given, including overhead, depreciation, insurance, etc., but, after all, there would be no meaning to such information which would only apply to one particular case. However, if figures, giving the material and labor used in an electric furnace heat, are tabulated to arrive at a der. Assuming the use of a 3-ton furnace, charged about 15 per cent over capacity, using raw materials at prices f.o.b. Pittsburgh, the table shows the comparison in detail of acid and basic electric furnace operations.

Foundry and Purchased Scrap

Considering the items as they appear in order in this table, let us take up the problem of the foundry scrap. This item includes all gates and risers that have been cut from the castings together with floor

Table of Comparison in Detail of Acid and Basic Electric Furnace Operation, 3½ Tons per Heat

Material	Price per Net Ton	Acid Practice Amount	Acid Practice Cost	Basic Practice Amount	Basic Practice Cost	Remarks
Foundry scrap	$13.80	2,760	$19.04	2,760	$19.04	40 per cent of charge
Punchings	15.00	1,035	7.76	1,035	7.76	15 per cent of charge
Plate scrap	13.20	1,380	9.11	1,380	9.11	20 per cent of charge
Heavy axle turnings	13.20	1,725	11.39	1,725	11.39	25 per cent of charge
Melting loss 3 per cent	0.42	207	1.43	207	1.43	
Scrap handling	0.50	...	1.70	...	1.70	
Laboratory costs	0.50	...	1.70	...	2.00	
Ferromanganese	67.50	55	1.86	38	1.28	
Ferrosilicon	60.00	27	0.81	40	1.20	
Aluminum	380.00	6	1.14	4	0.76	
Ganister	...	130	1.70	...	...	
Silica sand	...	50	1.70	...	...	
Lime	12.00	...	...	150	0.90	
Coke	15.00	...	...	40	0.30	
Dolomite	20.00	...	...	175	1.74	
Electricity	1½c. per Kwhr	2,040 Kwhr	30.60	2,550 Kwhr.	38.25	
Electrodes	180.00	74 ½ lb.	6.73	102 lb.	9.18	
Furnace and roof brick	0.50	...	1.70	...	2.55	
Fire clay	0.50	...	1.70	...	1.70	
Fuel oil ladle heaters	2.00	...	6.80	...	6.80	
Miscellaneous operating expenses	1.00	...	3.40	...	3.40	
Labor	...	...	4.25	...	6.39	
Total		7,185	$114.70	7,185	$126.88	
Cost per net ton			32.77		36.25	

cost per ton of molten metal in the ladle, one will have information which is valuable and applicable to any foundry.

For such comparison the writer has chosen for his basis of figuring the ordinary type of mild steel for castings, analyzing 0.20 to 0.25 per cent carbon; 0.65 to 0.75 per cent manganese; 0.30 per cent silicon, acid steel specification for phosphorus and sulphur being 0.06 per cent or under while the basic specification to be met is 0.04 per cent phosphorus and sulphur or unscrap and any small ladle skulls. This total usually amounts to from 40 to 50 per cent of the weight of the metal melted which is, of course, exclusive of the 3 per cent melting loss. Consequently in order to use up all of the foundry scrap each charge must contain at least 40 per cent foundry scrap which is figured at the average cost of the purchased scrap.

The purchased scrap is made up of the best grades of quick melting basic scrap and it will be noted that the same charges are figured for both acid and basic heats. By this method the most outstanding differences between the two types of practice can be noted. Using punchings, plate scrap and heavy axle turnings on the acid bottom will generally give a final analysis of approximately 0.055 per cent phosphorus and sulphur,

*In the issue of July 27, p. 201, the author discussed the choice of an electric furnace; in the issue of Aug. 3, p. 277, the economy features of electric foundry design and equipment; in the issue of Aug. 10, p. 345, acid electric furnace practice, and in the issue of Aug. 17, p. 421, basic electric furnace operation.

while with the use of two slags in the basic furnace a specification of 0.04 per cent phosphorus and sulphur as an upper limit can be readily met.

A figure of 50c. per net ton is allowed for handling the scrap which includes its unloading from railroad cars to the stock bins, exclusive, however, of charging the furnace which is taken care of in another item.

Laboratory Costs and Repairs to Bottoms

The laboratory costs of 50c. per ton figure approximately $1.75 per acid heat and $2.00 per basic heat, the reason for the difference being that, in the case of the basic heat, an additional preliminary analysis for manganese is usually made which is dispensed with in the acid heat because the manganese is practically all lost in the acid melting and a 100 per cent addition is generally necessary. However less ferrosilicon is used in the acid heat, the reason being self-explanatory. In the case of aluminum, however, we have to deal with an addition which is up to the melter himself, no specified amount being necessary; the entire item might be considered a precautionary addition. Two pounds per ton can be considered ample under these conditions in both acid and basic practice.

It is not the easiest matter to figure costs on bottom repairing and slag materials, due to the fact that the amounts used fluctuate according to the working of the furnace. For example the amount of rust on the scrap has considerable to do with the amount of slag necessary, but the figures given in the table may be considered sufficient for these purposes.

Electric Power and Refractories

The electric power supplied to the furnace can be readily measured by the watt hour meter connected in the circuit. The current is not usually supplied on a flat rate but the demand and peak-load enter into this cost appreciably. Good consistent acid operation will utilize an average of approximately 600 kw. per net ton of metal melted while basic operation, which is considerably slower due to the manipulation of the slags, will consume 725 to 750 kw. per net ton of metal melted. The electrode consumption is consequently less in acid operation than in basic operation, the element of time entering into this question.

Refractory cost is another item which varies considerably. The less expensive acid refractories do not last as long, due to the fact that hotter metal is usually poured from the acid furnace and also because less protection is offered by the slag. On the other hand the more expensive basic refractories have a longer life, due to colder metal being poured and the protection which is given by the heavier basic slag. This additional expense is lessened considerably by using acid refractories for the roof and sidewalls above the slagline on the basic furnace. In this case the costs of acid and basic refractories will be nearly equal, and in instances where heavy work only is being poured in the foundry, the cost of the acid refractories may even exceed that of the basic.

The item of operating expense includes the incidental operations around the furnace such as furnace tools, mechanical repairs, etc. The same amount of labor is necessary for operating an acid and basic furnace, but here the element of time plays an important part, approximating about $2.00 per hr.

Three Controlling Items

A close analysis of the table will show that there are three items which enter into the cost of electric steel which are responsible for practically the entire difference, namely, power, electrodes and labor. The governing factor throughout is the element of time. In other words if an acid and a basic heat could be made in the same length of time, other factors being equal, the cost would be practically the same for both.

PROPOSED ADDITIONS

Trumbull Steel Co. Will Build More Open-Hearth Furnaces—Other Valley Plant Plans

Plans of the Trumbull Steel Co., Warren, Ohio, provide for the installation at some future time of eight additional open hearth furnaces. The company now has a complement of seven open hearths, but its blooming mill and bar mill have sufficient capacity to roll the output of eight additional units. In recent years, the company has been gradually increasing its capacity, until it can now produce 40,000 tons of steel products per month, including billets, sheet bar, blue, black and galvanized sheets, galvanized and painted roofing, electric sheets, tin mill black, tin plate, hoops, bands and hot and cold-rolled strip steel.

It employs about 6000 men, or nearly half the working population of Warren, and is self-contained. Its ore mines in Minnesota will take care of its present needs for 15 or 20 years. The Trumbull Coal Co., a subsidiary, operates coal mines in Greene county, Pennsylvania. The Trumbull-Cliffs Furnace Co., in which the Trumbull Steel Co. is a joint owner, operates the largest blast furnace in the Mahoning Valley, with a rating of 600 tons per day, but which can easily produce up to 700 tons daily under normal circumstances. The ore yard is 500 ft. long and has a capacity of 500,000 tons.

Another projected expansion in the Youngstown district is a four-mill addition to the sheet plant at Niles, Ohio, of the Falcon Steel Co. The Brier Hill Steel Co. has developed plans for an extensive expansion program, which will probably be worked out, at least in part, unless a merger is effected with an interest supplying additional capacity. It is understood the program of the Brier Hill company calls for the expenditure of between $7,000,000 and $8,000,000. No extensions have been authorized, however, pending merger developments.

The principal current construction in the Mahoning Valley by steel interests includes the erection of a mechanical puddling plant at Warren, by the Youngstown Steel Co., and a six-mill addition by the Newton Steel Co., at Newton Falls, Trumbull county. This expansion will increase the facilities of the plant to 16 complete units, and bulk of the output will consist of full finished sheets.

Will Make Recommendations as to Periods of Depression

WASHINGTON, Aug. 29.—Announcement was made last week that the President's Conference on Unemployment has begun to prepare recommendations for lessening the severity of intermittent business depressions, and in consequent reducing unemployment. After having been in the hands of a number of experts for several months, the report on "Unemployment and Business Cycles" has been transmitted to the Committee on the Business Cycle, and the latter is now at work on its recommendations. Final action on the recommendations will be taken when the committee meets in Chicago on Oct. 2. The committee consists of Owen D. Young, chairman; Joseph H. DeFrees, Matthew Woll, Clarence Mott Woolley, Miss Mary Van Kleeck, and Edward Eyre Hunt. The report, with an introduction by Secretary of Commerce Hoover, will be published on Dec. 1.

Employment in Great Britain is improving. The number of unemployed on July 31 is given as 1,400,000, against 1,455,000 at the end of June. It is officially stated that Great Britain has paid out £85,000,000 under the unemployment insurance acts, since November, 1920. At an average of $4 per £1, this amounts to $340,000,000.

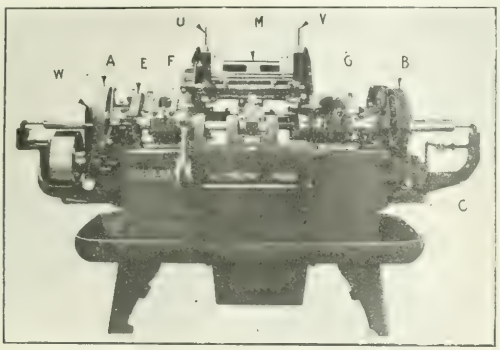
STAYBOLT THREADING MACHINE

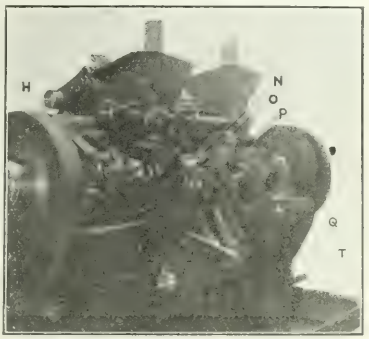
Full-Automatic High-Speed Unit Threads Both Ends Simultaneously Operation Outlined

The Cleveland Automatic Machine Co., Cleveland, has placed on the market a fully automatic machine which, although designed primarily for threading simultaneously both ends of a forged or rolled staybolt is equally useful for all double-ended turning and threading work, such as studs, pipe nipples and short shafts. Both threaded ends are in line, and the lead continuous from one threaded portion to the other.

The machine has two heads and is adapted to high speed operations. It will thread staybolts up to 1 15/16 in. in diameter and from 7 to 18 in. long, the time to complete a bolt being from 35 to 60 sec., according to the diameter and length of thread. Little time is required for chucking the work, the time of cutting a bolt being that required for threading the longest end. One man can operate five machines, his job being to keep the magazine full, keep the chasers sharp and remove the finished bolts.

The general construction of the machine may be noted from the accompanying illustrations. It is made up of a hopper which holds the supply of staybolt blanks, a work-feeding mechanism, a pair of floating jaws which hold the staybolt and present it to the dies so that both ends are in exact alinement, two spindles to carry the die-heads and a large lead screw with long bronze nuts. Cam mechanisms operate the various parts automatically.





Double-Ended Threading Machine for Staybolts and Similar Work. Front view is shown at left and details of clamping jaws above

The spindles are driven from the main driving shaft by gears at *A* and *B*. Helical gears drive the feed shaft at *C*, which in turn drives the camshaft through change gears located in a box at the rear. Gears at *E* drive the lead screw which is mounted directly back of the die spindles. During the cut, the lead screw controls the two die slides, *F* and *G*, after which the heads are opened by stops shown at *H* in the detail. The lead screw nuts are tripped by cams and the slide returns rapidly by means of cams on the cam drums. When the die heads are just clear of the work, the work-holding jaws open and move backward. The finished staybolt is then ejected, dropping into the pan, and a rough staybolt automatically placed in position for threading.

The magazine is located at *M* and the carriers at *U* and *V*. Part of the backward movement of the toggle mechanism for controlling the work-holding jaws withdraws the slide on which the jaws are mounted, permitting another staybolt to drop from the magazine. The carriers then move down, bringing the blank in line with the dies. The toggle mechanism advances the slide with its jaws open until the latter are ready to close on the staybolt, at the same time seating the bolt against two V-blocks provided to line it up. The jaws then close on the bolt, and the two carriers return to their upper position, the die moving forward.

Allowances for variation in the diameters of the centers of the bolts are made by the bearing spring, *N*, in the upper jaw. The two parts of the gripping jaws are pivoted on a stud and operated by the toggle shown at *P* in the detail, which is operated by the lever *Q*. The lever in turn is controlled by cams through another lever. The lower end of the slot in lever *Q* is enlarged to give a slight movement, permitting the jaw slide to shift forward or back and the jaws to oscillate or float on the stud to accommodate a bent staybolt. A shearing pin is provided to prevent damage should a blank be very much out of shape.

Starting and stopping is controlled by handle *W* which operates the friction clutch. A heavy stream of cutting oil is pumped through each spindle to wash out chips and cool and lubricate the chasers.

No Profiteering in Farm Implements

That there was no profiteering in the farm equipment industry either during or after the war is confirmed in Part 3 of the Report of the United States Commission on Agricultural Inquiry, made public at Washington. To quote in part: "It will be noted that the peak reached in prices of agricultural implements over 1913 or 1914 was 75 per cent, whereas the wholesale prices of all commodities reached a peak of 172 per cent. From investigations made by this commission, it was also found that the present factory prices of agricultural implements, if power equipment and twine are not included, when compared with prices of 1914, show an increase of 41 per cent; if power equipment and twine were included in the computation, the increase in prices over those of 1914 would be less than 20 per cent, while the present prices of all commodities when compared with 1914 prices show an increase of 52 per cent." (The comparisons are between prices in January, 1922, and those prevailing before the war.)

Detroit Scrap Market Active

DETROIT, Aug. 28.—The local scrap market is active and shows a tendency to follow the advances registered in pig iron. Relatively little scrap produced in Detroit is consumed here, going principally to Cleveland and Valley points, and prices realized are governed largely by what can be obtained from mills and furnaces in those districts. The local production, judging from the tonnages offered by automobile concerns, so far shows no decline. The Dodge awards will be announced during the week and will include around 3000 tons of borings, turnings, flashings and hydraulic compressed, with perhaps 500 tons of shoveling, melting, busheling and miscellaneous grades. Good machinery scrap is in demand, reflecting the shortage of pig iron.

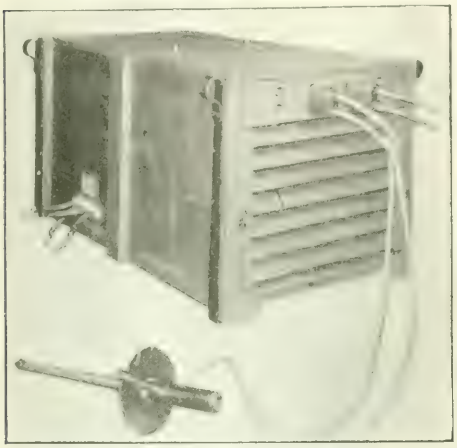
The following prices are on a gross-ton basis, f.o.b. cars producers' yards:

Heavy melting steel	$14.50 to $15.50
Shoveling steel	14.00 to 15.00
No. 1 machinery cast	16.00 to 16.50
Cast borings	12.00 to 13.00
Automobile cast scrap	20.50 to 21.50

Arc Rivet Cutting Apparatus

A 600-amp. arc-welding and cutting machine operated by alternating current and adapted especially to rivet cutting, but for use also in carbon arc welding, is being offered by the Electric Arc Cutting and Welding Co., Newark, N. J.

As an example of the economy of the machine in cutting rivets, it is stated that an hourly outlay of 10 to 15 cents for power and practically no other costs excepting one man's labor, will cut from 100 to 200 rivets per hour. The average cost per rivet is ¾ cents. In addition to claims as to being the cheapest method of rivet cutting, it is further said to be the quickest



Welding and Cutting Transformer. Both the core loss and magnetizing core are cut off when not in use

and is far safer than rivet busting, with the additional advantage that the sheet itself is not impaired.

The arc will cut any metal. For heavy work or for careful work gas is recommended, although for rough work, such as cutting up scrap or for work requiring machining subsequently, the electric arc is said to be the cheaper if the pieces are not too thick. For cutting non-ferrous metals this method is said to be pre-eminent. For straight arc cutting the thickness that can be economically "eaten through" by the arc lies between 2 and 6, depending on price of power and other considerations. If the method of nicking and breaking is used, the machine is said to be employed to advantage. It is to be noted that the cutting characteristics of the machine are different from the welding characteristics. The voltage across the arc is higher and the drooping characteristics desirable in welding for a close arc are pared down in arc cutting. The machine gives lower voltages with increase of current.

A high grade of silicon steel of low current density, double asbestos covered is used in the construction of the transformer and the primary magnet wire has micanite between the layers. Double micanite and ¼-in. asbestos spacers are placed between the primary and secondary. There are large air ducts between the iron and the copper and between the copper layers, a special bucket-type ball-bearing blower being provided to drive air through these spaces continuously when power is being used by the transformer.

Both the core loss and magnetizing core are cut off when not in use by means of a magnetic switch in the primary, which remains open when the electrode is not in contact with the work or when the arc is not drawn. This is accomplished by a small pilot transformer of 100 watts capacity, which also operates the blower. The pilot transformer circuit is made by the electrode touching the work and the primary load used to hold the magnetic switch in the closed position. When the pilot circuit has been broken by the auxiliary contact having [illegible] the main [illegible] tacts and the cutting current broken at the arc, the magnetic switch opens automatically and cuts the machine, leads and even the magnetizing current dead. This is a patented arrangement and is claimed to be both an effective safety device and a money saver.

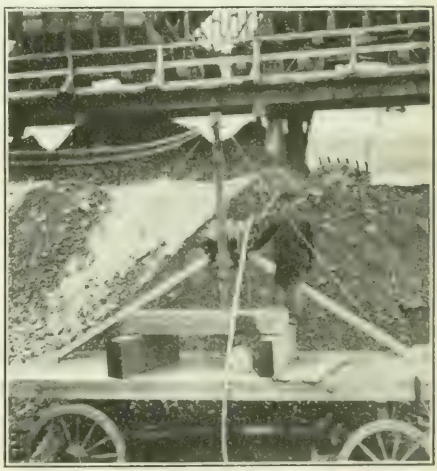
A description of the company's arc welding apparatus appeared in THE IRON AGE of Sept. 12, 1918. In addition to the 600-amp. machine described above a type CW, 300-amp. machine for combination welding and cutting is available, and also a 1000-amp. machine for cutting alone.

Machine Replaces Men in Grading Coal Pile

An iron mining company in the Lake Superior district, fortunate in finding available a large supply of coal, was confronted with the problem of storing it. Storage facilities were not adequate and the problem resolved itself into either enlarging the coal dock or piling the coal in such a manner that it could be stocked with the existing facilities. The latter course was followed.

As shown in the accompanying view of a section of the dock, coal is dumped below the trestle. Grading off is necessary to permit dumping the successive loads of coal, and hand shoveling was the method first employed, twelve men, six on each side of the trestle, being used for this work. Later on a mechanical method for doing the work was installed, the Ingersoll-Rand company's Little Tugger hoist equipped with drag scraper, as shown in the illustration, being pressed into service. With this equipment one man operated the scraper in both the forward and backward motions.

The machine illustrated is a small double-drum hoist developing 7 to 8½ hp. on 60 to 80 lb. air pres-



Apparatus Used in Grading Coal Pile. One man operates the scraper in both the forward and backward motions

sure. One drum is called the haulage drum, the other the tail-rope drum and when either of these is engaged the other runs free. The haulage rope is laid from the drum directly to the front of the scraper, the tail-rope being laid from its drum to a snatch block or sheave mounted conveniently behind the coal pile, and attached to the back of the scraper by a clevis.

Lull in Scrap Buying

YOUNGSTOWN, Aug. 29.—There has been somewhat of a lull in scrap buying, as melters are "sitting tight" for the time being and awaiting developments. One interest recently contracted for hydraulically compressed sheets at $17, but strictly specified that the material is to be Grade A. Other contracts for this class of scrap, but of inferior grades, have been made lately at $16.25. Heavy melting is nominal at $18.25.

Iron Castings by the Centrifugal Process*

British Plant Producing Piston Ring Sleeves and Engine Cylinders —Chilled Wheels and Rolls—Unique Melting Arrangement—Chemical and Physical Properties

BY F. E. HURST

THE process, as at present operated in the works with which the author is connected, is being applied to cast iron for the purpose of producing large size castings for piston ring sleeves, gas, oil, and Diesel engine cylinder liners, chilled wheel and chilled roll castings, and cylindrical castings of all descriptions. The machines at present in operation are capable of producing castings up to a maximum length of 36 in., and of varying diameters from 10 in. up to 30 in. Other machines for the production of both smaller and larger-sized castings are at present in the course of construction.

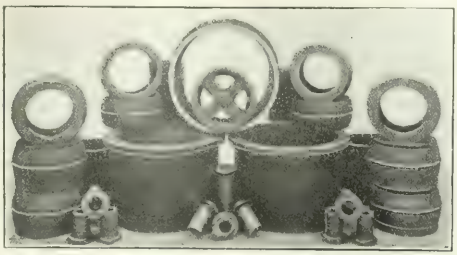
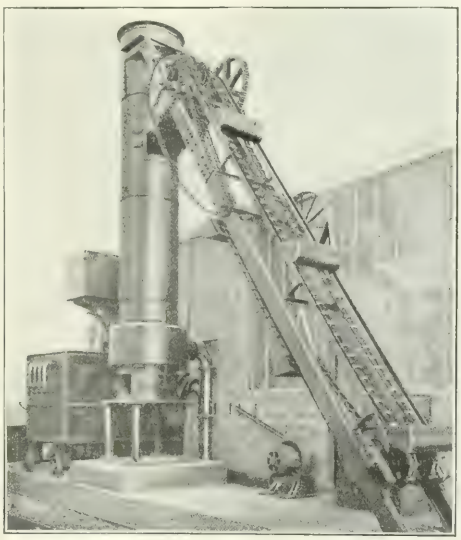


Fig. 1 (Above) Some of the Cast-Iron Products Made Centrifugally in Great Britain

Fig. 2—The Novel Cupola and Its Accessories, Known as the Hurst Melting Equipment



The principle of operation of the centrifugal casting process consists of the introduction of molten metal into the mold or die, which is rapidly rotating about a horizontal axis. For cylindrical articles no core is used, and a perfectly cylindrical interior surface is produced direct by virtue of the centrifugal force under which the metal solidifies and the rate of introduction of the metal into the mold. Castings other than chilled castings are produced at the author's works, directly machinable, a feature which is arrived at by strict control of the chemical composition of the metal and the details of the mold and casting operation. Fig. 1 shows some of the product up to date, consisting of from 30-in. diameter flanged sleeves for piston rings to cylinder liners 36 in. in length. Attention is directed to the 14-in. diameter cast iron wheel with a chilled tread for use on small trucks and pit trams.

The machine consists essentially of a face-plate mounted on a shaft carried in bearings arranged to be rotated at the required speeds. The molds are attached to the face-plate by bolts, and when rotating the molten metal is introduced by tilting a specially designed pourer which has been moved into position inside the rotating mold.

The molds themselves are constructed in two parts: An outer holding casting which is arranged to bolt to the faceplate and an inner liner which is arranged to fit loosely inside the holder casting. The liner is bored internally to the size and dimensions of the outer surface of the casting to be produced, and the outside of the liner is bored to fit the holder casting, which is designed to take a group of a series of liners, the dimensions of which are arranged to produce flanged cylindrical castings of a standard series of dimensions. By this means the cost of the renewals of dies for the production of a given size is considerably reduced, and as a rule the series of holders will take most special liners required for the production of castings of special shapes.

The back end of the liner next to the face-plate of the machine is closed by a plate attached to the end of a screwed rod passing through the hollow shaft of the machine and arranged for the ejection of the castings. The front of the liner is closed by an annular plate having the internal diameter of the annular ring corresponding to the internal diameter of the casting to be produced. This plate is arranged to be removable after the completion of the casting operation, in order to allow of the extraction of the casting.

As indicated, a series of standard dimensions of flanged cylindrical castings has been drawn up, and the installation of the necessary holders and liners, to produce these, makes it possible to produce a wide variety of cylindrical castings within the limits of dimensions mentioned above and with comparatively trifling alterations. For example, the only alteration to the die required to produce castings thicker than a given standard casting is an alteration to the diameter of the inner circle of the closing plate. Castings shorter than the standard range of size can be produced by an alteration in the position of the ejector plate. Castings having specially shaped flanges or external projections require a special liner, but here again, in the majority of cases, a special liner only is required, and the expense is not necessarily prohibitive. Castings having internal projections, or closed cylinders or dish-shaped castings, cannot yet be produced on a commercial basis.

For larger-sized castings a somewhat different scheme is under installation, but this possesses sufficient flexibility not to place an undue burden on the cost of the castings. This scheme consists essentially of the use of a complete mold or die which, on comple-

*From a paper, "Centrifugal Castings," presented before the West of Scotland Iron and Steel Institute and published in the Society's *Journal* for January-February, 1922.

tion of the casting operation, is arranged to be removed from the machine along with the casting for stripping purposes. For the production of large numbers of single castings more than one mold would be in progress in order to maintain the sequence of operations. In the case of a casting where the initial cost of more than one die would be prohibitive, it can be arranged to interpose the single die in series with another die for a different casting, thus still maintaining the sequence of operations. The operation is very similar to the casting and stripping of ingots in an open-hearth steel shop.

Chemical Composition of Centrifugal Castings

So far as experience has gone up to the present, it is found that the influence of the various constituents of cast iron follow the same rules as in the case of sand castings. There is an increase in the percentage of rejected hard castings as a result of the increase in sulphur content. This is corrected by a slight increase in silicon content. In cases like these there is no doubt that in the centrifugal casting process the castings are more sensitive to the effects of small changes in the chemical composition.

Carbon.—The advantage of a somewhat lower total carbon content than that of normal foundry irons is well known, and following on this practice it is endeavored to produce high grade castings for cylinder and piston ring work in cast iron with a total carbon content within the range of 2.75 to 3.00 per cent. This

Table 1. Variations in Combined Carbon

Sequence Number of Casting	Inside Surface C. C., Per Cent	Outside Surface C. C., Per Cent
1	0.66	0.47
4	0.49	0.00 trace
8	0.55	0.10
12	0.17	0.15
16	0.42	0.05
20	0.22	0.15
24	0.24	0.14
28	0.22	0.14

is rendered possible by the use of the special melting plant described later.

The combined carbon, on account of the higher silicon content usually worked to, is lower than what is usually obtained in ordinary foundry practice. This is advantageous in castings such as piston rings and the like, which are subject to comparatively high temperature conditions. A series of figures given below, Table 2, show that the variations in combined carbon within the limits of the figures given have practically no influence on the tensile strength value. Starting with a cold mold at normal temperature, the first few castings are invariably chilled on the outer surface or the surface next to the metal mold. As the temperature rises, the chilled surface on the castings rapidly disappears, and the combined carbon gradually reaches a constant value. The figures given serve to show the variation in combined carbon with the order of casting.

The remarkable feature of this series of figures is that the combined carbon is higher on the inside surface than the outside. This is worthy of recording, and is met with quite frequently. The author has preserved a specimen for future examination of a casting showing a layer approximately ⅛ in. deep on the outside surface of the casting, which on examination shows no trace of combined carbon. These figures are included with the object of showing the possibility of variation in the combined carbon values. The average value usually maintained is from 0.3 to 0.5 per cent, unless specially desired when higher values are readily obtained by reduction of the silicon content.

The proportion of graphite present naturally varies with the combined carbon; no case has yet been met of any segregation of the graphite during the casting process. This is strong confirmatory evidence that in cast iron below and up to the eutectic composition the graphite does not form in the liquid state, and is formed quite late in the solidification range. If the contrary were the case, then one would certainly expect to find some indication of the segregation of the graphite to the inner surface of the casting, particularly in view of the wide disparity in the specific gravities of graphite and iron.

Silicon.—The average value of the silicon in centrifugal castings is about 2.75 per cent. This is a somewhat higher value than is usually used in sand-casting practice for high grade work. Lower value than this can be cast.

Sulphur and Manganese.—Sulphur existing as the manganese-sulphur compound which, as is now known, is insoluble in cast iron at the temperatures usually met with in foundry practice, and is also lower in specific gravity, tends to segregate, under the influence of the centrifugal action, to the inner surface.

In castings of thinner cross-section the effect of the segregation is much less owing to the increase in rapidity of the solidification. The use of low manganese irons, or increased casting temperature accompanied with rapid pouring, tends to practically eliminate this segregation in all but very thick castings. As a general rule excess of metal is poured into the rotating mold, which is thrown out in castings of comparatively small length, and along with it the segregates in the shape of sulphur and slag inclusions which have collected on the inner surface.

Phosphorus.—For the successful production of centrifugal castings highly fluid iron is desirable. The well-known effect of phosphorus on this property would appear to be of considerable value in this process. Unfortunately the influence of phosphorus on the properties of centrifugal cast iron appears to be very undesirable and in so far as our investigations have gone it is largely to that element that low tenacity and, what is more serious, "brittleness" in centrifugal castings, is to be attributed. This particularly appears to be the case when the phosphorus is present in conjunction with fairly high silicon values. For high grade castings, therefore, on this account only, low phosphorus material is desirable, and a maximum of 0.60 per cent for special castings is now worked to. This is obtained by the use of steel scrap or hematite, preferably the former, and the necessary fluidity, and incidentally uniformity, is obtained by maintaining a high casting temperature in the melting plant specially designed for this purpose.

Before leaving the question of phosporus, it is of interest to mention a curious tendency noticed on several occasions for the phosphorus to segregate to the outside surface of the castings. This the author believes is worth recording as a similar tendency has been noticed in the case of the eutectic in the die casting of copper aluminum alloys.

The composition of some of the different articles recently made on the centrifugal casting machines are

Table 2.—Direct Tensile Tests on Centrifugal Iron Castings

No.	Tensile Strength, Per Cent	Silicon, Per Cent	Manganese, Per Cent	Sulphur, Per Cent	Phosphorus, Per Cent	Ultimate Strength, Lb. per Sq. In.	Remarks
1	3.21	2.75	0.31	0.11	0.64	17.46	Direct cupola melted.
2	2.99	2.70	0.39	0.09	0.64	19.40	Metal from receiver.
3	2.95	2.85	0.28	0.10	0.92	19.95	Metal from receiver.
4	2.99	1.98	0.35	...	...	19.50	Determined on ring.
5	3.10	2.55	0.29	...	...	19.31	Determined on ring.
6	3.15	2.75	0.29	...	...	18.71	Determined on ring.

included in Table 2. These figures are included with the object of giving some idea of the range of composition which can be dealt with by this process.

Nickel-Chrome Castings

The cast iron containing nickel and chromium is being used for the production of the chilled iron wheels previously mentioned and illustrated. The author is yet unable to give data of the physical properties of this material as centrifugally cast, and its use for this purpose has suggested itself on the basis of certain stationary chill casting experiments of which the author has had previous experience. The main object in using this material is the desirability of producing a chill having an extremely close grain, as distinct from the somewhat coarser grain of plain cast irons. The com-

position is at present being obtained by melting nickel-chrome steel scrap in the mixture.

Physical and Mechanical Properties

The consideration of the mechanical properties of centrifugal castings should always be made in conjunction with the chemical composition, and this must be taken into consideration when making comparisons between centrifugal and sand castings. So far as the investigation of the properties of centrifugal cast iron has gone, in all cases a distinct improvement in the mechanical properties has been found. An improvement would, of course, be expected on the grounds of the use of a metal mold, although there is no doubt that the centrifugal method itself has considerable influence in modifying the properties of the cast iron.

The figures given in Table 2 are the results of tensile strength determinations on bars and rings cut from centrifugal castings of the compositions as given. These results show the influence of the reduction in total carbon content in increasing the tensile strength and the slight falling off in strength with increased silicon content. In all cases the values are slightly higher than would be obtained from sand castings of identical composition. Where the determination was made on rings, the procedure recommended in British Engineering Standards Specification, 2 K. 6, was followed, using the formula set out therein for obtaining the breaking load per square inch of section.

Resistance to Wear

The results of some determinations of the resistance to wear determined by the use of a special machine designed by the author are given in the following table, Table 3. Both samples tested were of the same composition and from the same cast. The sand cast specimens were prepared from standard ¾-in. diameter round bars, and the centrifugal cast specimens were machined from cylindrical castings having a wall thickness of approximately ⅝ in. The tests were made under strictly comparable conditions. These figures are the only long series that the author has yet available, and are taken on a material with high silicon.

Table 3.—Results on Resistance to Wear

CENTRIFUGALLY CAST METAL

	Grams	Loss, Grams
Original weight of specimen	6.7500	
Weight after 3,000,000 revolutions	6.7349	0.0151
Weight after 4,000,000 revolutions	6.7339	0.0010
Weight after 5,000,000 revolutions	6.7335	0.0004
Weight after 7,000,000 revolutions	6.7331	0.0004
Total loss		0.0169

SAND CAST

	Grams	Loss, Grams
Original weight of specimen	6.7530	
Weight after 3,000,000 revolutions	6.7455	0.0075
Weight after 4,000,000 revolutions	6.7425	0.0030
Weight after 5,000,000 revolutions	6.7325	0.0100
Weight after 7,000,000 revolutions	6.7220	0.0105
Total loss		0.0310

The state of our knowledge of the factors governing wear in materials is insufficient to allow of the broad conclusion that these results are characteristic of centrifugal castings, and they are included merely as the results of a long comparative test. The figures in themselves are rather remarkable, indicating as they do a greater loss in weight in the centrifugal casting of the above composition in the earlier stages of the test. The magnitude of this loss in weight in the centrifugal casting decreases as the test is prolonged, and has apparently reached a constant value, whereas in the sand casting the loss in weight increases steadily with the prolongation of the test.

[The author discusses the microstructure of centrifugal castings of iron and his conclusions agree with other articles published in THE IRON AGE. There are also a few paragraphs on pin and blowholes.]

Novel Melting Plant

An improved melting plant has been designed and installed, to supply hot metal of regular and uniform composition for the production of castings by this process.

The ordinary type foundry cupola is used, but this has been arranged to charge direct from the ground level into the charging door by means of a bucket-type elevator. The tap hole of the cupola furnace is directly connected by a refractory lined channel to a specially designed auxiliary oil fired receiver, and the molten metal is allowed to run freely into the receiver.

The receiver consists of an inclosed shallow hearth capable of holding two or three tons of molten metal. Four oil burners of the low-pressure type, supplied with air at about 20 to 25 in. water pressure, and fuel oil from an elevated tank, are arranged as shown in Fig. 2. The air for the oil burners is arranged to pass through a series of re-heater pipes, built into a chambered space above the roof of the hearth, through which the hot waste gases from the combustion of the oil in the hearth are led. By this means a portion of the heat from the waste gases is utilized and hot air is supplied to the burners which aids the efficiency and contributes somewhat to the economy of the furnace. An inspection door is also provided on the oil-fired receiver.

No reduction has been made in the height of the coke bed of the cupola furnace in this instance for special reasons, but in the ordinary way there is no reason why the bed should not be lowered to within a few inches of the bottom of the cupola. This would, of course, effect considerable economy in the coke consumption of the cupola section of the plant.

An auxiliary tuyere has been provided on the cupola, leading air from the tuyere belt to the bottom of the bed. This has been found a considerable advantage in starting up and in maintaining the bed very hot in the earlier stages of the melting, thus preventing the choking of the outlet into the oil-fired receiver. This auxiliary tuyere is closed up after the cupola has been running for some time. An additional tap hole (not visible) and spout are attached to the cupola. This serves the dual purpose of enabling metal to be taken direct from the cupola if desired, and enables slag and metal to be drawn off from the cupola without spoiling the main tap hole leading to the receiver.

In actual operation the burners of the oil-fired receiver are lighted after the bed of the cupola has been charged. Starting from dead cold, the oil-fired receiver is heated up to a temperature high enough to receive the molten metal from the cupola in 40 to 60 min. with the full burner power. With the furnace in constant use, this initial heating period is reduced to from 20 to 30 min. During this period the cupola is being charged, after the completion of which melting is started. Immediately the cupola commences to melt and molten iron collects in the receiver, the burners are gradually closed down until, with constant running and constant demand for molten metal by the foundry the temperature can readily be maintained with one burner working at less than half its capacity. With this burner system any adjustment can be made according to the demands of the foundry, and as an example of the utility of the system we have during the initial stages repeatedly held and maintained as small a quantity as 10 cwts. of molten metal at a perfect casting temperature for periods varying from one to two hours.

The molten metal collecting in the receiver is tapped out from a tap hole provided (not shown) in small or large quantities according to the requirements of the foundry. This tap hole is provided with a hinged spout, which when dropped down releases a sheet iron cover holding up a sand breast, which can readily be knocked down for the purpose of cleaning and fettling the receiver after each day's melt. The receiver is also mounted on truck wheels, so that it can be moved from the cupola for relining or any other purpose, when the cupola can be used in the ordinary manner.

The average oil consumption including the starting-up period, varies from 5 to 8 gal. per hr. These figures have been taken over the last few months, during which the oil furnace has been working under very disadvantageous intermittent conditions. With continuous daily working a much lower consumption figure would result. The additional oil fuel cost is largely off-set by the reduced labor cost, charging, etc.

This plant enables low total carbon mixtures and steel mixtures to be produced regularly, and for high grade castings this is its primary advantage.

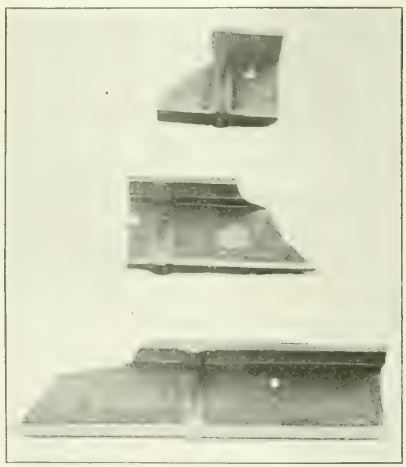
THERMIT INSERT RAIL WELD

Modified Collar to Reduce Cost and Increase Strength of Weld—New Mixture Developed

Savings varying from $2 to $3 per joint are announced as possible by the recent development by the Metal & Thermit Corporation, New York, of a modified thermit insert rail weld, wherein the usual reinforcing collar is proportioned to give a weld with considerably less thermit than was formerly believed necessary.

The modified weld, known as the center pour weld, involves no fundamental changes from the type of thermit insert weld which has been used extensively for 10 yrs. by street railroads throughout the United States. By making a great many welds and then breaking them, it was found possible to change gradually the design of the pattern to utilize the thermit steel collar in the most scientific manner and to the best advantage. A slight rearrangement has also been made in the proportions and locations of the pouring gate, heating gate and riser. A narrower gap is also used between rail ends. It has been found that an average of ½ in. gap will give the best results.

The saving in using the new weld consists not only in a saving of the thermit welding portions but also in the crucibles, as a smaller crucible can be used, which in turn gives several more reactions per crucible lining. An average of 25 or more reactions per crucible lining, it is stated, can be obtained.



Section of Broken Rail Welded with the Modified Thermit Insert Collar

When used in conjunction with new style self-luting mold boxes, which require no hand luting, the operations merely require clamping the molds to the rails, preheating and pouring. The preheating takes 20 min. to ½ hr. per joint and the number of joints which can be welded in a day is only limited to the number that can be preheated. When two joints are preheated at a time, there should be no trouble in making 35 to 40 joints per day with a comparatively small gang.

Thermit insert rail welding operations have also been simplified by the perfection of a new thermit mixture which develops such heat that the additions can be mixed cold in it instead of being put in a can and preheated.

Under recent repeated drop tests, sections of rail welded by this method, broke entirely outside of the weld in every instance, thus demonstrating that the weld was as strong as the rail. The detailed results of some of the six drop tests reported are shown by the following data and in the accompanying illustrations:

Test No. 1: Rail [illegible] Co. 134-506.

Nature of Test: [illegible]—the rail supported on semi-elastic foundation, i. e., steel plates were laid on the dirt floor of the welding shop, on the top of which was placed a 6 in. T-rail, and the rail to be tested in turn placed upon this T-rail on 3 in. centers.

Weight used: 2500 lb. Heights of drops: 20 in., 30 in., 48 in., 79 in.

Results: The last drop was as high as could be given and no deflection or breakage occurred.

Test No. 2: Rail section welded—same as in Test No. 1.

Nature of Test: Foundation and support of rail tested; foundation consisted of two 10 in. square steel billets each 3 ft. 8 in. long imbedded horizontally in the dirt floor of the welding shop. On these billets were placed 6 in. T-rail on 3 ft. center.

Weight used: 2000 lb. Height of drop: One 9 ft. drop only.

Results: Rail tested broke entirely through the rail steel adjacent to the thermit collar.

Test No. 5: Type of rail tested and nature of test similar to Test No. 2 except: Heights of drops 30 in., 48 in., 66 in.

Results: No deflection took place at the 30 in. drop. A deflection of 0.008 in. occurred at the 48-in. drop and the rail broke at the 66-in. drop. The fracture occurred 17 in. from the weld at the base and fractured diagonally up through the rail emerging through the head of 4½ in. from the weld, thus showing a rail and not a weld failure.

Note: In none of the Tests Nos. 1-5 inclusive, did the total length of rail after welding exceed 4 ft.

Test No. 6: Rail section welded—9 in. L. S. Co. 134-470. This section and section L. S. Co. 134-506 (used in previous tests) are almost identical; the only difference being that the 506 section has a slightly curved contour on the running surface of the head, whereas 470 is flat.

Results: No deflection occurred at the 30 in. or 48 in. drop. A deflection of 0.005 in. occurred at the 66-in. drop and the rail broke at the 104-in. drop. The break occurred through the base 8 in. from the weld and ran diagonally upward toward the weld, breaking through the head alongside of the insert and 1¼ in. away from the weld through the lip. There was a bolt hole through the web of this rail about 2 in. away from the weld and the broken specimen shows a crack extending from this bolt hole toward and through the weld. It is possible that had this crack at the bolt hole been absent, the rail may have broken completely through the head away from the weld.

The modified insert weld was demonstrated on May 12 before the members of the committee on way matters of the American Electric Railway Association at the Jersey City plant of the Metal & Thermit Corporation. One man was able to make a mold, preheat and pour a weld in less than one hour's time.

Steel Plant Electrical Engineers to Meet

During the week of Sept. 11 to 15 the Association of Iron and Steel Electrical Engineers will hold its sixteenth annual convention, at Cleveland Public Hall, Cleveland. A list of the eighteen papers to be read was published in THE IRON AGE, July 20, page 138. In addition to the technical sessions there will be an exhibit of apparatus of particular interest to steel mill engineers, covering some 30,000 sq. ft. of floor space in the same building. All of the meetings as well as the exhibits, are open to visitors.

An operating foundry exhibit is to be one of the convention features. The foundry will be equipped for making steel castings, and gray iron and alloy steel. The Pittsburgh Electric Furnace Corporation will supply a 500-lb. Lectromelt furnace.

The West Virginia-Kentucky Association of Mine, Mechanical and Electrical Engineers will hold its second annual convention Sept. 19 to 22, inclusive, at the City Hall, Huntington, W. Va. The papers announced have to do largely with the engineering problems of mining. In connection with the convention will be a coal and industrial exposition at the Chamber of Commerce Building, Huntington. Among the features will be an illustrated lecture on the manufacture of steel, using motion pictures, by William Richardson, Cambria Steel Co., Johnstown, Pa., and also a showing of films furnished by the Bureau of Mines, illustrating mining and transportation of coal. Herbert Smith, Huntington, W. Va., is secretary-treasurer of the association.

Economic Basis of the Scrap Business*

Its Large Proportions—Place of the Dealer Between Producer and Consumer—Problem of Disposal of Light Scrap

BY CHARLES DREIFUS

THE United States Tariff Commission estimated that for the year 1918 the total consumption of wrought iron and steel scrap in the United States was approximately 18,000,000 tons. This is, of course, only an estimate. It is arrived at by taking the ingot production of the country, deducting the basic and Bessemer pig iron production, allowing for open hearth furnace losses and adding the scrap used by the wrought iron mills and the rerolling trade.

There are no real statistics to show exact consumption, but we may be warranted in the following estimate for 1918:

	Tons
Consumption of iron and steel scrap in open-hearth, Bessemer and electric furnaces (85 per cent of 18,000,000)	15,500,000
Consumption in rolling mills for bushelling, puddling, piling and rerolling	2,500,000
Consumption of blast furnaces, 3 per cent of pig iron production	1,000,000
Consumption in foundries, 20 per cent of foundry pig production	1,000,000
	20,000,000

When we reflect that the total production of pig iron for the year 1918 was only 39,000,000 tons, we gain a new idea of the importance of scrap.

Sources of Scrap

Of course, only a part of this vast total constitutes the scrap trade. Considering the first and most important item in our estimate, the 15,500,000 tons consumed in open hearth, Bessemer and electric furnaces, probably 10,000,000 tons are produced by the plants themselves, in the form of crops taken at various stages of manufacture, leaving perhaps 5,000,000 to be furnished from the outside. This 5,000,000 tons together with the 2,500,000 consumed by the rolling and rerolling mills, 1,000,000 consumed in blast furnaces, and 1,000,000 consumed in foundries, totals about 10,000,000 tons, which for the purpose of our discussion can be considered the volume of the scrap business. In tonnage it is about one-half as great as the United States Steel Corporation's annual production of finished product.

Where does all of this scrap come from? The most important source of supply is the manufacturing plant. Every manufacturing plant that buys iron or steel produces scrap iron or steel. It is estimated that 40 per cent of all iron and steel scrap comes from this source. Production covers every grade, from billet and bloom crops, down to machine shop turnings.

In point of tonnage, scrap yards are the next largest source of supply, with about 35 per cent of the total. Most of the scrap produced by the yards is received from railroads or industrial plants in the form of unassorted or unsheared material that must undergo manipulation before it is in shape to be handled by consumers.

The third source of supply is the railroads, with about 25 per cent of the total.

Thus from industrial plants comes 40 per cent of the scrap; from scrap yards, 35 per cent and from railroads, 25 per cent.

The Work of the Scrap Dealer

The dealer sorts into commercial grades, miscellaneous scrap that is not in a form suitable for consumption. Let us assume a small industrial town, with a few small manufacturing plants. During the course of, say, a month, one plant produces: 2 tons of bar ends; 3 tons of steel turnings; 2 tons of cast iron borings; 300 lb. of burnt cast iron; 800 lb. defective castings.

Four or five months would be required to gather together enough to make a mixed carload, but of course no consumer could use such a mixture. Many months would be required to accumulate a car of steel, a car of borings, a car of turnings and because of the time required, some of the material would deteriorate unless protected.

In such a community the scrap dealer acts as an assembling station. He hauls the monthly accumulations of each plant to his yard, and is thus enabled to ship a car of steel per month, and a car of turnings in two months, a car of borings in three months, and so on. In addition to his function as a sorter and assembler, he shears, or breaks scrap material, which the producers are not equipped to prepare. The relationship above described applies to thousands of small manufacturing plants and hundreds of small dealers scattered all over the country.

A step higher, in point of tonnage, are the manufacturing plants who produce scrap in carload lots. In some cases, these producers sell direct to consumers, but in most cases they sell to dealers, who in turn sell to consumers. In such transactions the dealer functions again as an assembler, for, while the scrap is produced only in lots of one or two carloads, it must be sold to the consumer, because of demand, in lots of hundreds or thousands of tons. But the dealers' service to the producer in such cases goes further. The dealer is in daily touch with consuming markets and knows just where to place each grade to the best advantage. The directing head of the producing plant has no time to keep in touch with a number of markets for a multiplicity of grades. Indeed, for the small amount that he produces, it would be an economic loss to spend so much of his time or of the time of a subordinate doing something that the dealer does as part of his regular daily work.

In effect then, the dealer acts as sales agent for the producer. Competition among dealers is so keen that the producer is usually assured of the highest offers that the market affords.

Mention has been made of the fact that material is usually bought in large tonnages because of demand. A steel plant whose requirements for outside scrap totals 25,000 tons per month, purchases the entire amount from a few dealers. These dealers ship part of the order from their own yards, and then operate as purchasing agents for the consumer, seeking scrap from producers and other dealers, and completing the chain that extends back to the small producer.

Were the consuming plant to attempt to take care of its consumption with its own force of buyers, it would undoubtedly be found that the cost of gathering would exceed the dealers cost plus profit. In the first place, the mills' purchasing force must of necessity be large enough to take care of maximum demand, and would be idle during slack times. The dealers' organization, on the other hand, is flexible. When one market is dull, it concentrates on another. The purchasing force of the industrial consumer would learn also that it fails to render the proper service to the producer. Few consumers buy more than a half dozen grades. Scrap is produced in fifty or sixty grades. The dealers' organization handles all grades for the producer. The dealer also has a broader knowledge of all markets than the consumer could hope to gain. In a time of active demand, consumers, who are in reality competing against one another, must be reluctant to

*From an address before the National Association of Sheet and Tin Plate Manufacturers; Mr. Dreifus is president of Charles Dreifus Co., Pittsburgh.

give one another full information as to their respective markets. But such information is readily available to the dealers, through actual negotiations or transactions.

Storage Function of Scrap Dealer Activity

During periods of depression, after all consumers have filled their scrap storage space, the dealer continues to buy, prepare and store. This demand by the dealer keeps up to any extent the market for the producer The scrap stored finds its way to market when demand is active and prices higher, filling needs that could not be met by current production.

In going into these details of the scrap dealers' place in the commercial world, there has been no thought of holding a brief for him, but merely to explain why he is in business. If he did not fill an economic want, he would not be in business.

We must not close our eyes to the fact that scrap as produced is not all No. 1 heavy melting steel scrap, ¼ in. thick and heavier. There is a huge production of lighter and therefore less desirable grades for which an outlet must be provided.

Better preparation may make this scrap available for open hearth use, or the experience now being gained as a result of the present coke and pig iron shortage may prove that the blast furnace is the most practical outlet. It is certain that for economic reasons a continuing demand for these lighter grades must be stimulated, and a determined effort made to study the best methods to use them.

AMOUNT OF GASES IN STEEL

Results of Some New German Methods of Analysis on Basic Bessemer Metal

THE question of the kind and amount of gases contained in steel has always been of great interest, because of the possible large effect of these on the soundness, strength, and other properties of the steel. An important paper was published in *Stahl und Eisen*, May 25 by Oberhoffer and Piwowarsky of the Universities of Aachen and Breslau on their methods of investigation, and some very interesting results given.

Oberhoffer and his students had previously worked out an improved method of melting samples of steel in a vacuum, and measuring and analyzing the gases evolved, which is one method of attacking this problem. It is believed this method is liable to error, due to oxides in the steel reacting with the carbon and giving wrong values for CO and CO_2. Also the hydrogen in the steel may react with these metallic oxides to form water, which is absorbed by the P_2O_5 of the pump train of bulbs. A method was worked out of dissolving the steel drillings in mercuric chloride solution, the iron being changed to chloride and the gases set free. A detailed description of the apparatus used and the method is given in the original paper.

The first tests were carried out on a basic Bessemer low carbon steel, before and after de-oxidation. Results on the metal before de-oxidation by melting in a vacuum and also by solution in the cold by mercuric chloride, are given below as an average of 10 determinations. The amount of gas is cubic centimeters, at 0 deg. Cent. and 760 mm. pressure, per 100 grams metal. In regard to gas analysis the CO_2, CO, and H_2 were carefully determined and the nitrogen constituted the balance. The initials H.E. signify hot extraction, and K.U. the cold solution methods:

GASES IN BASIC BESSEMER STEEL

Before Deoxidation

Method	Total Gas, Cu. Cm.	CO_2, Per Cent	CO, Per Cent	H_2, Per Cent	N_2, Per Cent
H.E.	10.00	1.10	[illegible]	24.81	6.59
K.U.	9.22	18.1	10.25	44.28	26.02

After Deoxidation

H.E.	102.96	9.00	62.75	22.05	6.20
K.U.	9.64	9.76	13.18	41.90	35.16

Results on a commercial soft steel containing carbon 0.15, manganese, 0.45, phosphorus, 0.025, and sulphur, 0.026 per cent, were as follows:

Method	Total Gas, Cu. Cm.	CO_2, Per Cent	CO, Per Cent	H_2, Per Cent	N_2, Per Cent
H.E.	118.93	1.9	75.3	19.9	3.4
K.U.	35.80	14.8	23.7	52.5	9.0

A comparison of results by the two methods shows first that the total amount of gas obtained by cold solution is only about 25 to 30 per cent of that found by the hot extraction method. This is understandable in regard to CO and CO_2, but it is noticeable that hydrogen also shows a marked decrease. This may be due to reaction between nascent hydrogen and the mercuric chloride with formation of free hydrochloric acid. A comparison of the results on the basic Bessemer steel before and after de-oxidation is very interesting. Further experiments were carried out on the 0.15 per cent carbon steel by both the methods mentioned above, and also by dissolving in cold bromine water so as to obviate the hydrogen reaction. The results were:

Method	Total Gas, Cu. Cm.	CO_2, Per Cent	CO, Per Cent	H_2, Per Cent
H.E.	114.8	2.0	77.83	20.17
K.U.	32.6	16.3	26.09	57.61
K.U. (bromine)	56.36	10.1	16.4	73.5

Tests were also carried out on an open-hearth steel of about 0.50 per cent carbon, before and after deoxidation, with the following results, the method being solution in cold bromine water:

Sample	Total Gas, Cu. Cm.	CO_2, Per Cent	CO, Per Cent	H_2, Per Cent
Before deoxidation..	31.7	14.44	16.27	71.03
After deoxidation....	40.5	7.15	10.60	82.25

G. B. W.

Proposed Aid for War Plants

WASHINGTON, Aug. 29.—Presentation of a report by Brigadier-General Williams, Chief of Ordnance, War Department, is being awaited by Secretary of War Weeks, before acting upon the proposal suggested to him recently by President Samuel Vauclain of the Baldwin Locomotive Works, that Government aid be given to industrial establishments created during the war to furnish munitions and other materials. Secretary Weeks told Mr. Vauclain that the question of aiding these plants was largely a matter of dollars and cents and would require Congressional authorization before the policy could be made effective. The Secretary did not commit himself one way or the other, but said that the proposal would be studied after the report of General Williams has been submitted. Mr. Vauclain is said to have told the Secretary that there are numerous plants created during the war whose maintenance in idleness during peace times represented a heavy cost to the owners who do not wish them destroyed, because of the high cost of building during war and the saving that would be effected and the immediate aid given to the Government in case of future emergencies. Secretary Weeks said that Mr. Vauclain did not ask help for the Baldwin company, but for another industrial enterprise with which he is associated as director. The Secretary stated that the Chief of Ordnance has been instructed to make an investigation of all large war plants which cannot be used during time of peace.

Metal Containers for Bolts and Nuts

Sheet iron containers for nuts, bolts and rivets, are preferred by Chilean importers, according to the Department of Commerce. They do not want shipments to come in wooden casks that break in handling. Europeans use the sheet iron containers and get the orders. One European firm recently got an order for 15 tons of rivets by cable because American concerns are disregarding instructions to ship in double bags of heavy material which, while not as good as sheet iron kegs, are vastly better than wooden containers. On one shipment 80 per cent of the wooden kegs burst when they were let over the ship's side into lighters, the contents were scattered over the floor and had to be shoveled into bags and later sorted out by hand.

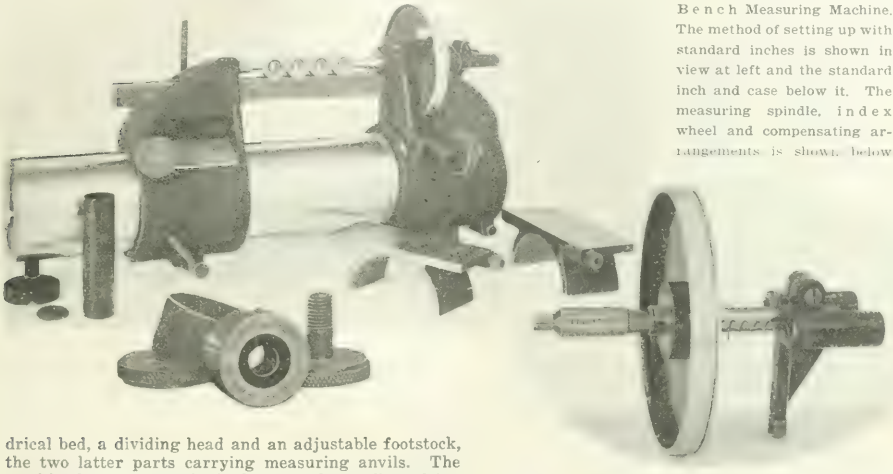
BENCH MEASURING MACHINE

Micrometer Accurate to One Ten-Thousandth of an Inch—Construction and Operation Outlined

A new bench measuring machine called the Super-micrometer which will give accurate measurements to the nearest ten-thousandth of an inch has been brought out by the Pratt & Whitney Co., Hartford.

The new machine is intended to cover the intermediate field between the ordinary micrometer measuring thousandths and the company's standard measuring machine, which subdivides ten-thousandths. It is rugged, simple and relatively inexpensive and is for use on the inspectors or toolmaker's bench by any workman of average skill.

The component parts, may be noted from the illustrations, the machine being made up of a rigid cylindrical bed, a dividing head and an adjustable footstock, the two latter parts carrying measuring anvils. The machine has a range of 8 in. between the anvils and 3¼ in. between anvils and table. It has three point support on the bench. The bed and the supports up to the measuring anvils are unusually rigid and give a firm, definite touch at the instant of contact with the work. Measurements can be repeated within close limits by the sense of touch alone.



Bench Measuring Machine. The method of setting up with standard inches is shown in view at left and the standard inch and case below it. The measuring spindle, index wheel and compensating arrangements is shown below

The setting of the machine is obtained by the use of standard inch blocks which are machine-lapped by a modification of the Hoke process and are accurate within five millionths of an inch. One of these blocks and its case is shown in the insert. The screw has a working range of ½ in. indicated by graduations on a forged Duralumin index wheel and on the measuring spindle. Means are provided to compensate for wear or any slight error in lead, while springs take up back lash and keep a constant pressure on the thrust bearing.

A square bar with a channel in one side is provided to hold the standard inches in place during the set-up or to serve as a work rest. This bar passes through the footstock and is mounted on a pin under the measuring spindle as shown in the illustration. It is conveniently stored in a hole in the bed when not in use.

The footstock is moved into position along the bed by a rack and pinion and may be clamped securely in place. Two tables are provided to clamp to the bed for supporting large work. The zero arm, held by friction, is adjustable to position and the knurled knob provides for fine adjustment of the zero line.

The index wheel has 500 divisions, 1/32 wide, each representing a spindle movement of 0.0001 in. These divisions are numbered at thousandths and are direct reading. The index wheel is revolved by a fine round belt, the slipping of which permits the operator to apply the same pressure each time to the measuring anvils. Variations in belt tension are said to not affect the accuracy of the readings, as the same pressure is applied when setting up to zero as when measuring the work.

The knurled handwheel has two diameters, the smaller for quickly spinning the spindle up to the work and the larger for the final slow movement to the point at which the belt slips. The spindle graduations are 0.050 in. apart, with etched figures at each 0.100 in.

Car Movement in Strike Times

The Matthew Addy Co., Cincinnati, under date Aug. 26, says of the strike situation:

"Week by week the effects of the coal and railroad strikes become cumulative—and this week there has been a frantic effort to keep plants going. It is not so much a question of the supply of raw materials, although these are very short, as it is a question of transportation. Things have been growing worse. The movement of freight is slow and the volume is small—and this is particularly true of the great trunk lines south of the Ohio River. They are jammed with loaded freight cars from beginning to end. Before the railroad strike, the L. & N. moved north in one day 1800 cars across its bridge into Cincinnati; yesterday it moved 800 cars, yet as illustrating the enormous expansion in business recently, the L. & N. before the war did not move to exceed 600 cars daily over the bridge. And the Southern's figures are in the same ratio. The C. & O. bridge had a movement before the strike of 4000 cars daily; yesterday it had 2400 cars—yet before the war it did not have to exceed 2000 cars daily—and even with strike conditions the movement of freight across the bridges is much greater now—more than double—than it was at this same time last year. So in spite of all the present difficulties business is being done on a large scale, but not in the volume that the needs of the country demand."

The Western Iron Stores Co., Milwaukee, Wis., dealer in machinists', mill and factory supplies, will add a line of machine tools to the products which it carries. The company has already been appointed representative for the Hoefer line of drilling machines, group drilling heads and drills.

In the reported negotiations over scrap supplies in South America, but at large amounts, the Hyman-Michaels Co., Chicago, is not interested, and Joseph Michaels, vice-president and treasurer of the company, says that it is not likely to be.

TO DISCUSS MANAGEMENT

Local Sections of Engineering Societies Plan Special Meetings for One Week—Topics of Practical Interest

The direction of labor so as to utilize constructive human abilities to the greatest extent is recognized as a fundamental function of management and the special meetings for management week, being planned by various local sections of the American Society of Mechanical Engineers and other societies, are expected in the relating of actual experiences to bring out facts of value to students of this subject.

Suggested topics for discussion include the following:

In what way does the management problem [illegible] rising prices and activity differ from the management problem on a market of falling prices and activity? How is this difference being met by local business houses?

How is the manager using periodical statistics of production of basic commodities in shaping his own production policy?

Will profits average higher in the long run if reserves are established during periods of activity to carry operations at a loss during times of depression?

Where are the concrete illustrations of the reductions in cost of producing and of selling that have resulted from refinement of management methods? Do such refinements pay?

Will the period of intense competition ahead force industry to more thorough standardization of product, materials, equipment and processes? Will this benefit the worker as well as the investor?

Is it practical to make master plans for operations a year or eighteen months ahead? How and where has it been done?

Given a seasonal consumption of product, how do you determine when it pays to stabilize production by storing finished product made in dull season for sale during the season of active consumption?

Can participation in management by the worker ever be practical without his equal participation in responsibility? Can the former precede the latter?

Is the cost of living a practical basis for fixing wages under a condition of free competition for the product?

How can you measure definitely a man's ability as a salesman? Is past performance a safe guide under new conditions?

How is the engineer helping the salesman?

The compilation in a special volume of the papers and discussions of management week is under consideration, and it is expected that every section will be represented.

Several sections have formulated plans. The relation of labor to national progress will be the topic about which discussion will center in the management week meeting of the New Haven branch of the Connecticut section of the American Society of Mechanical Engineers, to be held Oct. 16. It is expected that the subject will be treated not only in the broad sense indicated but also will be illuminated by discussions of concrete experiences of the local engineers and managers. The meeting will be under the direction of H. R. Westcott, president, Westcott & Mapes, Inc, New Haven, assisted by Prof. H. L. Seward, Yale University, and N. E. Horn, Winchester Arms Co.

The Metropolitan section will combine with the local sections of the Society of Industrial Engineers and the Taylor Society, the date of the meeting being Oct. 17. It is planned to invite the local representatives of manufacturing and financial interests to participate in the discussion of changes in management methods essential in the changing economic situation. A joint committee of six will be in charge of the meeting, the chairman being W. H. Leffingwell, president, Leffingwell-Ream Co., industrial engineers, New York.

New Orleans will hold its management week meeting in co-operation with the Louisiana Engineering Society. The leading paper will be on management of a ship-repair plant, to be presented by Orloff Henry.

The topic of Boston's management week meeting, which will be held Oct. 17, has not yet been decided. The Waterbury branch has also planned a meeting, the topic to be announced later. The meeting planned by the Hartford section will be in the hands of A. W. Honeywill, chairman of the local program committee.

A joint meeting with the Technology Club of Syracuse and local members of other national societies is planned by the Syracuse section.

Meeting of Lake Superior Mining Institute

The twenty-second annual meeting of the Lake Superior Mining Institute was held in the Michigan copper country the first three days of this week. Headquarters were at Houghton and a number of trips were taken. The Michigan College of Mines was visited Wednesday morning. The following papers were presented at the sessions on Monday and Tuesday evening:

"Co-operative Effort in the Study of Mining Methods," with an outline for papers on mining methods, compiled by the Mining Methods Committee of the American Institute of Mining and Metallurgical Engineers—Charles F. Jackson, secretary, Cleveland.

"Why We Need a Classification of Methods of Mining"—F. W. Sperr, Michigan College of Mines, Houghton, Mich.

"Calumet & Hecla Reclamation Plant"—C. Harry Benedict, Calumet, Mich.

"Handling Underground Waste Rock Through Underground Skip Dump, Quincy Mining Co."—T. C. DeSollar, Hancock, Mich.

"Recent Practice in the Use of Scrapers on Sub-Levels"—Lucien Eaton, superintendent Cleveland-Cliffs Iron Co., Ishpeming, Mich.

"Compond Steam Hoist Installation of the Quincy Mining Co."—Ray W. Armstrong, Hancock, Mich.

"Faulting on the Gogebic Range"—William O. Hotchkiss, State geologist of Wisconsin.

"Geology of the Eastern Menominee Range"—Major L. P. Barrett, mining geologist of Michigan.

[illegible] H. Newhouse, Vancouver, B. C.

British Engineering Institutions Co-operating

It is announced that proposals for closer co-operation among the leading engineering institutions, which have recently been under consideration, have now received the approval of the Institution of Civil Engineers, Institution of Mechanical Engineers, Institution of Naval Architects and Institution of Electrical Engineers, and that an engineering joint council composed of representatives of these bodies has been formed.

The objects of the joint council will be, among others, to improve the status of engineers, to secure the better utilization of their services in the company's interests and the appointment of properly qualified individuals to responsible engineering positions, and to prevent unnecessary duplication of activities. At a later stage the number of bodies represented on the joint council may be increased.

COMING MEETINGS

September

American Engineering Council. Sept. 8 and 9. Executive board meeting, Boston. Report on three-shift day in industry. Secretary, L. W. Wallace, 719 Fifteeth Street, N. W., Washington.

Association of Iron and Steel Electrical Engineers. Sept. 11 to 15, inclusive. Annual convention, New Auditorium, Cleveland. Secretary, J. F. Kelly, 513 Empire Building, Pittsburgh.

National Exhibition of Chemical Industries. Sept. 11 to 16. Grand Central Palace, New York.

American Electrochemical Society. Sept. 21, 22 and 23. Fall meeting, Windsor Hotel, Montreal, Canada. Secretary, Dr. Colin G. Fink, Columbia University, New York.

American Institute of Mining and Metallurgical Engineers. Sept. 25 to 29. Pacific Coast meeting, Engineers' Club, San Francisco. Secretary, F. F. Sharpless, 29 West Thirty-ninth Street, New York.

Regeneratively Fired Heating Furnaces*

Conditions Necessary for Freeing the Hearth of Waste Gases—Good and Bad Examples—Krupp Not Infallible

BY W.-E. GROUME-GRJIMAILO

FURNACES of the Siemens or open-hearth type are symmetrical and the flues and ports through which the gas and air pass to the heating chamber serve also for the removal of the products of combustion. When regenerative heating furnaces are built, the head construction of the open-hearth melting furnace is frequently copied, although there is no necessity for such construction, and it is undesirable, when the difference in the purpose for which the heating furnace is employed is considered.

Nevertheless, this difference is a most essential factor in their design:

I.—The temperature to which the ingots are to be reheated for rolling or forging does not exceed 1300

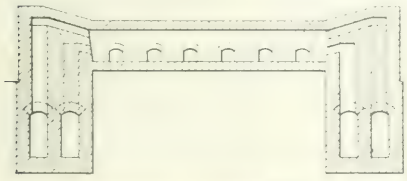


Fig. 1. Regenerative Heating Furnace with Roof Like an Open-Hearth Furnace. The dotted lines at ends show how the roof was there lowered to get better and more uniform heating

deg. Cent. (2372 deg. Fahr.) and, for this reason, the jet of flame from the ports must not impinge upon the material being heated. In the open-hearth furnace this restriction does not exist and, on the contrary, it is desirable that the jet of flame should impinge upon the surface of the bath.

II.—The surface of the bath in the open-hearth melting furnace boils, which causes an elevation of the surface occasionally of from 20 to 24 in. (500 to 600 mm.). The surface of the hearth of the heating furnace is solid, except for the thin layer of melted cinder which slightly wets the surface. For this reason, in the open-hearth furnace it is absolutely necessary that the bridge or port sills should be at a level higher than the surface of the bath during the boil. But there is no reason that the ports of the heating surface should be higher than the hearth.

Actually, if the port sill or bridge of a reheating furnace is raised above the hearth level a height equal to the thickness of the ingots to be heated, as is ordinarily done, it becomes completely impossible to get rid of the layer of stagnant colder gases which lies upon the hearth and in which the material being heated is placed. It is evident that the heating of the material would be much better accomplished if this layer of colder gases were drained away from the hearth. To accomplish this result, the bridge wall or port sill should coincide with the hearth level.

Fig. 1 shows the longitudinal section of a curious regenerative fired furnace. The length of the hearth is 26 ft. 4 in. (8020 mm.); the roof is 3 ft. 3⅜ in. (1 meter) above the hearth and the width is 6 ft. 6¾ in. (2 meters). The heads are of the type usually used on melting furnaces. Originally the roof of the furnace was straight from end to end. Later it was lowered, in the neighborhood of the heads to 2 ft. 3 in. (680 mm.) above the hearth.

It is evident that, with a hearth 26 ft. 4 in. long, the hot gases from the flame did not touch the hearth of the furnace, and did not heat the material (ingots) near the waste gas outlet. This is the same phenomenon which occurs in the open-hearth melting furnace when, by reason of the complete absorption of the live force of the jet of flame, it rises to the roof and the thickness of the layer of hot gases becomes normal for its rate of flow, as may be computed by the formula of Yesmann. At the corner, close to the waste gas port, a pocket of colder gases will be formed, and the bath will tend to freeze. In the Goujon works, at Moscow, a case of this kind occurred, with a furnace 46 ft. (14 meters) long, and to correct this it was necessary to install two burners for oil, one in back of the other.

In the case under consideration, a different procedure was followed: that of dropping the roof of the furnace, close to the heads, to the height required for the inverted weir, forcing, in this manner, the stream of burning gases to lick the hearth, not only where it issued from the ports but also farther on. This is illustrated by dotted lines in Fig. 1. While estimating at its true value this method of reconstruction for the type of head universally in use, it is believed that much better results can be obtained in another way.

> *Note by translator:* Glass pot furnaces are a good example of this defective form of construction. Correct construction would undoubtedly eliminate a great many of the melting troubles experienced in the glass industry, as well as reduce the percentage of pot failures.

Figs. 2 and 3 are sketches of two forms of construction which may be employed for these cases. These two methods are based upon the following considerations:

The chilled gases are drawn off at the level of the hearth of the reheating furnace; this manner of getting

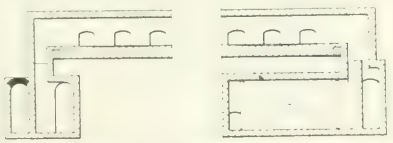


Fig. 2 (Left) and Fig. 3 Show Better Methods of Building Regenerative Heating Furnace Ends Than Given in Fig. 1

rid of the waste gases results in the active and regular action of the hot gases upon the material being heated, and favors their rapid and uniform reheating;

The producer gas, and the preheated air entering the heating chamber, do so at a very low velocity, to the end that combustion takes place throughout the entire heating chamber and the points of sharp combustion close to the ports, which occur in a jet of flame, are eliminated. When the gas and the air are preheated nearly to the temperature of the jet flame, which may be 1500 to 1600 deg. Cent. (2732 to 2912 deg. Fahr.) the material being heated will be burnt if exposed to the impinging action of a jet. This assumes that the producer gas and the air are mixed outside the heating chamber of the furnace.

To prevent the melted cinder from flowing into the ports of the furnace, the hearth is given a slight drain-

*From "The Flow of Gases in Furnaces," to be published by Wiley & Co., translated and copyrighted by A. D. Williams, P. O. Box 92, Newark, N. J.

age slope from both ends toward the center. The port sills or bridges are, moreover, cooled by inverted troughs of iron below them, through which a forced circulation of cold air is maintained by means of an aspirating chimney.

An extremely interesting example may be cited, from the point of view that the fundamental principles of rational furnace construction were completely neglected. This is a regenerative fired furnace for the carbonizing and tempering of armor plate according to the Krupp system.* This furnace is distinguished by the backward state which it shows in furnace construction.

According to Fig. 4, it may be seen that the vertical heads of the furnace are elevated 31.5 in. (800 mm.) above the hearth. The armor plate to be heated was

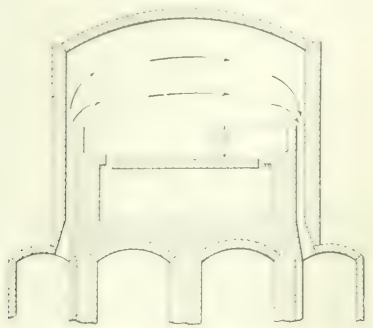


Fig. 4. An Armor Plate Heating Furnace Which Was Not a Success

to be placed upon a car and supported above its deck by a short brick column, and then run into the furnace. It was found, nevertheless, to be within a pocket of colder gases, which could not be drained away from the armor plate. Moreover, the furnace was intended to work with a negative pressure in the heating chamber, with the result that the reheating of the plate had to be accomplished while it was surrounded with currents of colder air drawn into the furnace. The results of such a method of working are clearly apparent.

It had been planned to carbonize and heat two armor plates at a time, placing one above the other and separating them with a layer of charcoal. It may be stated that the lower plate was carbonized much more slowly than the upper; and it was necessary to abandon the idea of carbonizing two plates at a time. Actually, these plates were carbonized one by one, and double the number of furnaces were required with twice the expense of operation. Moreover, the Russian works were so thoroughly impressed by the reputation of the Krupp company that they would not consent to the cutting down of these heads to the level of the hearth of the furnace.

*[illegible] using the Krupp system.

Emergency Fuel

WASHINGTON, Aug. 29.—As an emergency fuel, a mixture of fuel oil with fine coal in as large proportions as the coal will absorb and hold is suggested by the United States Bureau of Mines to steam coal users and gas manufacturers to augment their fuel supply during the present shortage.

Slack coal that has a high percentage through an 8-mesh screen, or which may be crushed to sizes of ⅛-in. or less, will take up in oil from 30 to 40 per cent of its own weight and make a fuel high in calorific value. Coarse slack coal, however, as judged by a representative sample from the Pittsburgh market, will absorb oil to only 3 to 10 per cent of its own weight, which would give a fuel having only about 4 to 15 per cent increased heating value. The finer the size of the coal, therefore, the larger is the amount of oil which will be held. Tests made by the Bureau of Mines at Pittsburgh indicate that the mixture can be made with either bituminous slack or anthracite culm.

ROEBLING INSURANCE PLAN

Protection Given to 6,000 Families—Pension System Also Established

The John A. Roebling's Sons Co., Trenton, N. J., announces that all employees who have been with the company a year or longer, on Sept. 1, 1922, will be protected by group life insurance and pension plans. The insurance will go into force automatically at midnight of Aug. 31. The insurance is graded according to length of service, all employees more than one year and less than two years with the company to receive $500, increasing $100 for each additional year of service until the maximum of $1,500 is reached for 11 years and over. The insurance benefits will be payable to the beneficiary named by the employee, or, in the event of his becoming totally and permanently disabled before reaching age 60, it will be paid to him.

The pension plan contemplates retirement at 60 for men and at 55 for women, and in the event of 20 years' service or more, such an employee may request a pension or be retired at the discretion of the company. Any employee, however, who has served 30 years or more, or any male employee 55 years of age or female employee 50 years of age whose term of service is 25 years or more, may at the discretion of the company be retired from active service and granted a pension.

The plan also provides that pensions may be allowed in cases of total disability arising from non-occupational injuries and illnesses, provided the employee has served 15 years or more.

The amount of pension is determined by multiplying one per cent of the average annual pay during the ten years preceding retirement by each year of service. A minimum of $25 per month and a maximum of $250 a month has been established and will apply, except where the pension is being paid in cases of total disability above referred to, in which the minimum may be less than $25 per month.

Professor Stumpf Entertained

Prof. Johann Stumpf, Berlin, Germany, inventor of the Unaflow engine, who is making a tour of the United States, was the guest of Manager Neil C. Lamont, Laidlaw Works of the Worthington Pump & Machinery Corporation, Cincinnati, on Aug. 22. Mr. Lamont had invited the members of the American Society of Mechanical Engineers, Cincinnati branch, to meet at the plant for the purpose of inspecting the latest type of engines and compressors, and also to hear Professor Stumpf deliver an address on the latest developments in the Unaflow engine. Following an inspection of the shops and a number of engines in operation, dinner was served in the dining room at the plant, at which, in addition to the visiting engineers, officials and shop foremen of the company were present.

Professor Stumpf delivered an exceedingly interesting address, illustrated by lantern slides, paying particular attention to the results obtained in Unaflow locomotives now in operation on German and Russian railroads. Within the next few months Professor Stumpf expects to introduce the Unaflow principle into the automobile field in a new type of steam car.

Figures made public by the Pennsylvania Railroad indicate that a probable total of 137,250 tons of steel rails will be laid by that system this year, compared with a total of 149,765 tons in 1921. This estimate is based on figures for the first seven months of the current year, which show a total of 82,250 tons already laid down. Pennsylvania's commitments in the way of new rails have reached a total of 80,000 tons for 1922. With a carryover of 74,000 tons of rails from last year, the total available for replacements becomes about 154,000 tons.

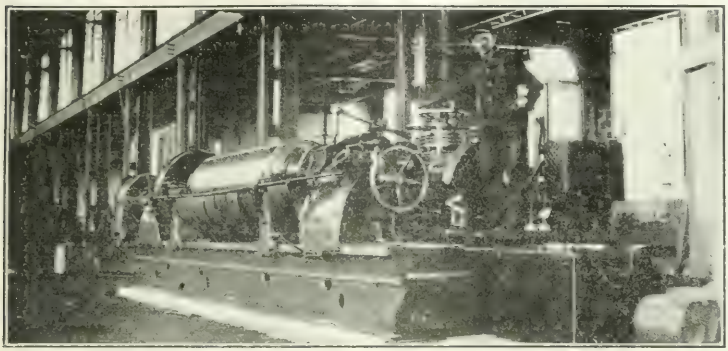
The Maine Central Railroad's Portland, Me., machine repair shop, air brake repair shop and other property were burned Sunday, Aug. 13, the approximate loss being $1,000,000. The shops will be rebuilt as quickly as possible.

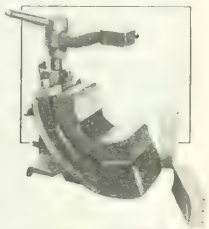
New Machine for Grinding Mill Rolls

A heavy-duty roll-grinding machine for finishing all types of hot and cold mill rolls is being offered by the Landis Tool Co., Waynesboro, Pa. The general construction may be noted from the accompanying illustration which shows the 40 x 168 in. machine in use at one of the plants of the Aluminum Co. of America finishing a 16,000 lb. roll.

The machine is driven by three motors and is entirely self contained. It is stated that under actual operating conditions the machine has removed 7 cu. in. per min. of chilled iron, accuracy and sensitiveness being maintained throughout. The standard sizes available are 20, 30 and 40 in. and in lengths to suit requirements.

The work is driven by a motor which is mounted on the bed of the machine and connected directly to the headstock. A motor mounted on a carriage and traveling on a track at the back of the machine is used for driving the grinding wheel, and a small motor is provided to drive the water pump. The motors are controlled by push buttons on the operator's platform.





New Roll Grinding Machine. The operator's platform is on the grinding wheel carriage. The two-bearing type of roll head is shown above

To permit the operator a clear view of the wheel and work at the point of contact, the operator's platform is mounted on the grinding wheel carriage. The carriage-traverse and reversing mechanism is embodied in one unit which is mounted on the grinding-wheel carriage within convenient reach of the operator. Gears are of chrome-nickel steel and run in oil. For smooth operation, the main drive on the grinding-wheel carriage is through a worm and rack, and provision has been made for a tarry at the point of reversal. Power movement on the grinding wheel base permits rapid moving of the wheel toward and away from the work.

A special feature is the attachment provided for grinding the face of the roll either concave, convex or straight as desired. The amount of crown or concavity is obtained by a simple system of gearing at the back of the machine and can easily be determined by a chart provided for the purpose. The gearing is engaged or disengaged by means of a lever on the operator's platform.

The roll supports are of the two bearing type which permits grinding the journal without changing the position of the roll, thereby getting the body of the roll and the journal concentric, which is essential, particularly on rolls used in the cold rolling of thin metal to close limits. The bearing block in the roll supports are made adjustable to accommodate journals of varying diameters.

Leather belting sales are reported by the Leather Belting Exchange, Forrest Building, Philadelphia, as having amounted for July to $779,951. This compares with $721,037 for June and $548,290 for July, 1921. The reports represent about 60 per cent of the total product of the industry. The increase over June is 8.2 per cent; over July, last year, 42.2 per cent.

Fewer Metal Workers and Lower Wages

Iron and steel plants, according to figures of the Bureau of Labor Statistics, show for July a loss from June of 1316 employees in 108 establishments. This loss of 0.9 per cent was accompanied by a loss of 11.8 per cent in amount of payroll and a corresponding reduction in the average pay envelope from $46.78 to $41.67, or 10.9 per cent.

In the automobile industry there was a gain in 40 establishments of 1.6 per cent in number of employees, but a reduction of 1.1 per cent in payroll total. In car building and repairing there was a loss of only 7.8 per cent in number of employees in 54 establishments, in spite of the strike, and a loss of 40.1 per cent in amount of payroll.

Compared with a year ago, there has been a gain, all told, of 32.2 per cent in number of men employed, and a gain of 22.9 per cent in total payroll. This connotes a loss of 7 per cent in contents of the average pay envelope.

Wages per half-month per man in automobile plants, which are exceptionally busy, are 63 per cent over those prevailing in steel plants. Details are shown in the table.

Period	Number of Establishments	Number of Men	Half-Month Payroll	Average Pay Envelope
Iron and Steel				
June, 1922	108	142,852	$6,673,150	$46.75
July, 1922	108	141,338	5,889,278	41.67
July, 1921	110	98,537	3,772,352	38.29
*Automobiles**				
June, 1922	40	104,889	7,377,743	70.34
July, 1922	40	106,619	7,243,249	67.95
July, 1921	42	89,714	6,280,350	70.00
Car Building and Repairing				
June, 1922	54	51,699	3,071,000	59.39
July, 1922	54	47,661	1,838,207	38.57
July, 1921	56	40,067	2,351,014	58.68
Metal Workers (the three groups above)				
June, 1922	202	299,250	17,122,193	57.21
July, 1922	202	295,616	14,970,734	50.64
July, 1921	208	228,318	12,403,696	54.33

*Payroll figures are reported as "weekly"; they have been made "half-monthly" by multiplying by 2 1/6.

Canada's Iron and Steel Output in July

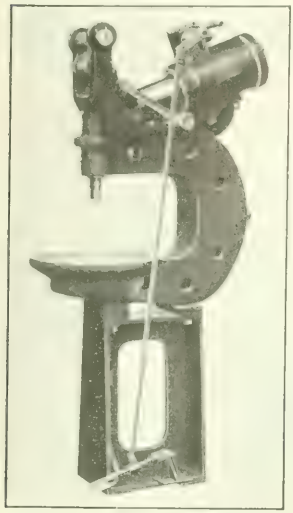
The production of pig iron in Canada during July presented an increase of 10.2 per cent over the record for June. The output during July was 31,705 tons as compared with 28,763 tons in June. The production of steel during July showed a surprising advance. The output in June was 32,805 tons while in July the production amounted to 62,767 tons, constituting an increase of 91 per cent.

A new electro-graphitic brush, known as No. 259, has been developed by the National Carbon Co., Inc., Long Island City, New York. It is stated that tests made on direct current motors and generators have showed the brush adapted to a wide range of voltages, current densities and speeds.

General Utility Pneumatic Press

Of particular interest perhaps to makers of heat-treated gears, forgings and automobile parts, and for use in packing carbonizing material in pots around parts to be case hardened, is the press shown in the illustration, a recent development of the Hanna Engineering Works, 1765 Elston Avenue, Chicago.

The machine is designed as a general utility press and is operated by compressed air or steam. Various forms of platens, tables or work-supporting structures may be used, making it adaptable to straightening, bending, forcing, marking, embossing, forging, briquetting, multiple-riveting and similar operations. Ten sizes, from 15 to 200 tons, are available.



General Utility Pneumatic Press

The power mechanism is that used on the company's riveters and the manipulation of the operating valve is by hand or foot. The length of the die stroke is variable and no more than the rated pressure is exerted by the die regardless of where the die travel stops. The connecting mechanism between the die and the actuating air piston is a combination of toggle and lever. The air piston while traveling at a uniform speed imparts to the die a gradually decreasing speed and increasing pressure relative to the movement and pressure of the piston during the first portion of its stroke and at substantially uniform speed and pressure, also in substantially uniform relation to the movement of the piston during the last portion of its stroke. The first portion of the die stroke, or increasing-pressure stroke, is from 1½ to 4⅝ in. long, according to the rating of the machine. The last portion of the die stroke, or uniform-pressure stroke, is from ⅜ to 1⅛ in. long. The die is mounted on an adjusting screw.



It is emphasized that the press is particularly adaptable in bending and straightening operations, since the pressure on the die only builds up as the air pressure builds up on the piston. By throttling the air and bringing the pressure up slowly, just sufficient pressure may be brought on the work to deflect it the desired amount, the pressure then being released.

If the die travel is stopped by the resistance of the work at any point within the uniform pressure stroke, which is anywhere beyond half the piston stroke, the pressure on the die is a known predetermined amount in direct proportion to the air-line pressure. The line air pressure is controllable by a regulating valve to within 5 per cent.

In marking, embossing and forging exact uniformity of results is said to be obtainable because just the proper amount of pressure for each requirement is available regardless of the minipulation of the operating valve or the variation in thickness of stock within the limits of the length of the uniform pressure stroke, ⅝ to 1⅛ in.

The floor space required is comparatively small and the machine is portable in the sense that it can be moved without moving any auxiliary equipment.

Chicago Mill Strikes Ended

CHICAGO, Aug. 26.—The strike at the rail steel bar mills of the Inland Steel Co. and the Calumet Steel Co. at Chicago Heights, Ill., has been settled by granting the demands of the men for a 20 per cent increase in wages. This action was taken by the companies following the announcement of an advance of 20 per cent in the wages of common labor by the United States Steel Corporation. The strike has been in effect since Aug. 7.

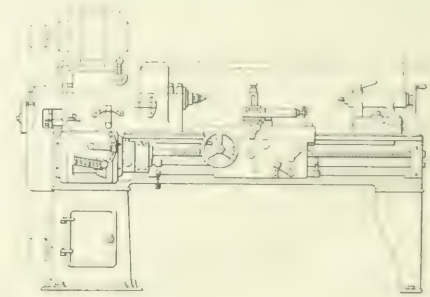
New Line of Geared-Head Engine Lathes

A new line of geared-head lathes in sizes from 16 to 30 in. has been placed on the market by the Cincinnati Lathe & Tool Co., Cincinnati.

The machines are equipped for either belt or motor drive, the direct-connected motor-driven lathes being provided with either chain or belt drive with idler pulley. When equipped for single-pulley belt drive from the line shaft, a rod as shown on top of the lathe, or a handle at the front of the head are provided for starting and stopping. If required apron control is supplied. The motor may be mounted on the headstock or at rear of the cabinet leg.

Surplus power is a feature emphasized by the makers, it being claimed that all sizes develop approximately double the horsepower, size for size, of the usual design. The 16-in. lathe will develop a high pulling torque of 9.2 hp. with 56 lb. per in. of effective belt pull. The 22-in. geared head lathe is said to develop 15 hp.

The disk clutch with brake provided has a neutral position, which disconnects the spindle from the gearing, removing the fly wheel effect of the heavy gears on the spindle. This feature is intended to save time while centering irregular work in a chuck or in the machining of smaller parts where chucking time is a large factor. Twelve spindle speeds are available, these being conveniently manipulated by the three handles shown in the front of the head. The range of the 16 in. lathe illustrated is from 13.5 to 400 r.p.m., in geometrical progression. The full range of these changes is said to be made in 12 seconds.



Gear-Head Engine Lathe Arranged for Belt or Direct Motor Drive. Either the rod at top or handle at front is furnished for starting or stopping

As an example of the wide adaptability of the new machines for general shop conditions, the 16-in. machine shown is stated to machine work at full swing of the lathe at a cut speed of 55½ ft. per min. Smaller work can be machined at similarly economical speeds. ½-in. work for instance being operated at 54 ft. per min.

The M. S. Little Mfg. Co., 151 New Park Avenue, Hartford, Conn., and the A. J. Beaton Mfg. Co., New Britain, Conn., plumbing and heating supplies, are to merge. Full details will not be available until next month, when stockholders vote on the consolidation. Present plans call for the moving of the New Britain company's equipment to Hartford.

Progress in Human Relations in Industry†

Wages Not the Only Factor in Making Men Contented —Mistakes in Employee Representation Plans

BY R. H. WEITZEL*

RELATIONS between employers and employees in future are of greater moment and of more profound significance in their influence upon the future life of the nation than any other one matter which concerns us to-day. The proper solution of these problems depends upon the success with which the management on the one hand and the worker on the other are able to view each other's position with reasonableness.

The happenings of the last few months are likely to give the impression that high wages are all that is necessary to keep men in industry satisfied and contented. However, those of us who have had to handle the details of any considerable operation in industry know that this is a mistake. We are all wage earners, whether we work for day's wages or for a salary, and we all know how much easier it is to be happy on comparatively small pay, even though the work is very hard, if other things in connection with our employment are satisfactory.

We have all seen men leave their jobs for one offering higher pay, and soon be anxious to return to the old job at the old pay, and to work for the old boss. Satisfactory living and working conditions are of the utmost importance, but the "boss" is, after all, the big factor. The laborer is not any different in this respect from the clerk, foreman, superintendent or manager. All of us measure the value of our jobs to a larger extent than we realize by the relationships we sustain with our immediate superiors.

Representative Plans

Up until perhaps ten years ago, thousands of employees in industry had never seen an officer of the company except those connected with the local management, and had no means by which they could take up a grievance except with their foremen and through their own individual efforts. Many thousands of them now have representatives, chosen by themselves, who can, when they think it necessary, take up any matter concerning their employment or living conditions with higher officers of the management, and feel confident of receiving sympathetic consideration.

This new method of dealing with employees was such a radical departure from what had been the practice for so many years that naturally a great many mistakes were made, and the most common mistake, to my mind, was that the machinery employed failed to consider the foreman. The plan usually provided for a meeting of the officers of the company with the representatives of the employees without the foremen being present.

The Foreman's Position

The foreman had been trained to feel that his authority was supreme; he hired or fired as he pleased, and made his own rules of discipline and enforced them. He suddenly found that his subordinates had a way of going around him or over his head, and I think sometimes the management was inclined to listen to one side of the story and form judgments before hearing what the foreman had to say. Much better results would have been obtained at the start if the foreman had been called in and had explained to him the necessity for the change, and had an effort been made to get his sympathetic co-operation. This mistake, I think, has been to a large extent corrected, and the foremen have been made to see the justice of the new arrangement, and are now working sympathetically with the new methods. It is obvious that little real progress can be made except with the hearty co-operation of the foreman. He is really the most important link in the chain of industrial management.

To my mind, the modern industrial organization is similar, in many respects, to a modern central power plant, with a generating station, step-up transformers, transmission lines, step-down transformers, low tension lines, controllers and motors. The president, or board of directors, represent the central station. They devise and initiate the policy. The policy may be of the very highest character, and the officials may have the highest aims and ideals, just as the power plant may have the best boilers, the best fuel, good water, good draft, and efficient engines and generators, but if the transmission line is weak, has too small copper or poor joints, the voltage will not be delivered to the step-down transformers at the point of operation. If the connection between the president and the operating people is weak and has not a good transformer, the operating official will not be imbued with the spirit at headquarters. Lack of co-operation between managers and superintendents, or between superintendents and foremen corresponds to bad joints in the transmission line. You may have capable men, just as you may have good wire of sufficient size, but if they are not hooked together properly and do not co-operate, you will have the same result as you get from a poor joint on the transmission line. The foreman represents the controller. Very often a controller is put in in an emergency, and is too small to carry the current necessary. The result is that it heats up and burns out. All the other factors from the plant, through the transmission line, transformers, and up to the controller may be perfect, and if the controller has poor contacts, or is too small, the motor will not operate properly. There may be men of the highest type, from the president down, they may all co-operate, but if the foreman who has the direct control of the labor is too light for the job, or heats up too quickly, the operation will be poor.

Selection of Foremen

The foremen have been receiving a great deal of attention in the last few years, and very properly so. In addition to this, the managers and superintendents are paying a great deal more attention to the character of men they select for foremen. In former years the principal qualifications for a foreman were that he be a good hustler and have a knowledge of the work to be done. In fact, not so many years ago I believe foremen were selected for their driving qualities. We still need the foremen with knowledge of the work and plenty of initiative and hustling ability, but we now feel that we need a foreman who is a leader rather than a driver. The foreman's position is perhaps the most difficult in all the chain of industrial management. Besides having the initiative, energy, skill and executive ability, to be successful to-day, he must be patient, tactful, considerate, thoughtful, and above all, honest, friendly and sympathetic. What cannot the foreman accomplish who is able to impress his subordinates with the feeling that he is always ready to assist the incompetent with advice, to overlook small and unintentional mistakes, to talk over with them their small difficulties, whether connected with the work or outside their employment?

I know that many believe that only the sternest discipline will produce results and that any unbending on the part of a superior tends to produce inefficiency. I am sure, however, that no greater fallacy exists.

*General manager Colorado Fuel & Iron Co., Pueblo, Col.

†From an address at a conference on human relations in industry held at Estes Park, Col., July 28-30.

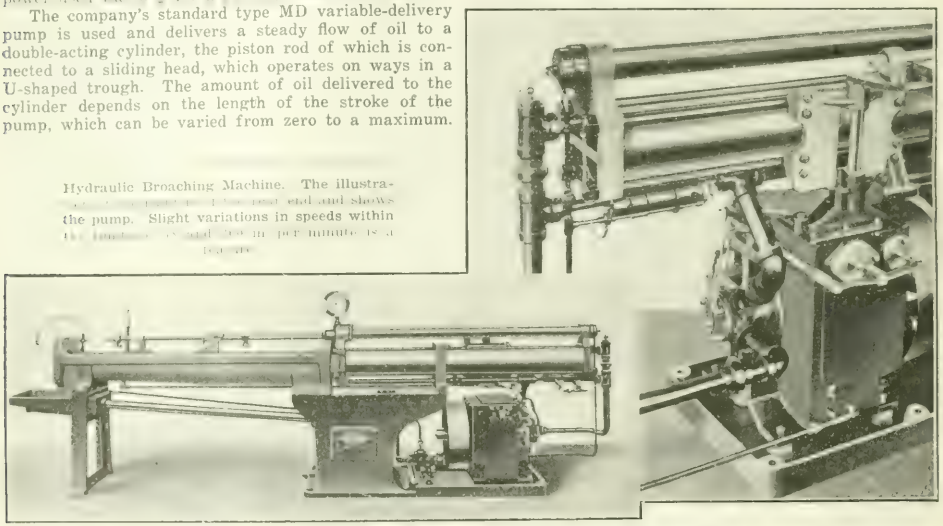
HIGH-SPEED BROACHING UNIT

Increased Production Claimed for New Hydraulic Machine—Features Described

Increased production ranging from 75 to 200 per cent over the usual type of single or double-pull broaching equipment is claimed for the new hydraulic broaching machine illustrated, a product of the Oilgear Co., Milwaukee. The features underlying the increased output include the higher speed available, 360 in. per min. maximum; practically unlimited choice of speeds; and the automatic control of the cutting and return strokes, entirely independent of each other. Decreased unit labor cost and lower unit power cost are also claimed.

As an example of the efficiency of the machine, the production figures of the work of broaching four solid keys in a differential gear, 1¼ in. bore by 2 in. long, and of 0.22 carbon steel are given. The cutting speed was 288 in. per min. and the return speed, 312 in. There were two broaches in the set and the draws per hour were said to average 145. The maximum horsepower used was 5½ for a cutting time of 6½ sec.

The company's standard type MD variable-delivery pump is used and delivers a steady flow of oil to a double-acting cylinder, the piston rod of which is connected to a sliding head, which operates on ways in a U-shaped trough. The amount of oil delivered to the cylinder depends on the length of the stroke of the pump, which can be varied from zero to a maximum.



Hydraulic Broaching Machine. The illustration [illegible] the pump. Slight variations in speeds within the limits [illegible] per minute is a feature

The speed of the piston travel being dependent on the amount of the oil pumped into the cylinder, this speed can be changed at will by changing the stroke of the pump. It is emphasized that it is this method of controlling the speed, together with the even flow of oil delivered by this type of pump, that makes it possible to use higher speeds than usual. The cutting stroke is started without shock and the pull is steady. The choice of speed within the limits of 48 in. and 360 in. per min. is practically unlimited for either the cutting or return stroke and slight variations are easily obtainable. This range permits selection of correct speeds for different materials and broaches.

The speed of the return stroke is adjustable independently of that selected for the cutting stroke. Automatic stops are provided; these being set for any desired length of stroke and the stroke remaining fixed. Reversal of the machine is by simply pressing a push button, the control being also set for automatic reversing. An emergency lever is provided for stopping the machine instantly at any point of the stroke. Quick-acting relief valves intended to prevent the pulling apart or the buckling of a broach are provided. One of the valves is mounted on the cutting end and another on the return end. They automatically relieve the pressure and stop the machine when the pressure builds up to a predetermined point.

The machine is driven by vertical belts from the line shaft or motor, the latter being mounted above the main cylinder on an adjustable support. The pulling capacity is 16,000 lb., equivalent to that required by a 2-in. square broach, and the stroke 56 in. The diameter of the hole in the face plate is 5 in. and the vertical adjustment of the drawhead 1⅝in. above and below center. A 10 hp. motor is used. The floor space occupied is 26 in. by 16 ft., and the weight of the machine 2900 lb., net.

Orders for Locomotive Castings

SPRINGFIELD, Ohio, Aug. 29.—An order to furnish castings for 45 locomotives booked by the Lima Locomotive Works was secured Friday by the Ohio Steel Foundry Co., which has plants in Springfield and Lima. The locomotives are to be built for the Missouri, Kansas & Texas Railroad Co. During the past 60 days, the company has been awarded orders for locomotive castings for 180 engines, including the order just received. The Springfield and Lima plants will be rushed with work for months. Substantial orders for miscellaneous castings for agricultural and motor truck companies are being received. Indications are that the force at the Springfield plant will soon be increased. At present 200 men are employed.

The Lima plant of the Ohio Steel Foundry Co. has been running full time for the last seven months. The Springfield plant has also been speeding up. The Lima plant turns out heavy castings and the Springfield works makes the light castings. The company is equipped to handle the business coming to it. The only handicap at present is the scarcity of material. Owing to the strike some rolling mills cannot furnish steel.

High Cost of Strikes

Although industrial disputes in Pennsylvania in the first six months of this year numbered only 257, outside the coal, railroad and printing strikes, a very favorable showing as compared with any of the past four years, the loss in wages greatly exceeds that of any of these years, according to a report by the bureau of mediation and arbitration, Pennsylvania Department of Labor and Industry. For the first six months of the year, strikers in Pennsylvania lost in wages a total of $117,546,466, this being exclusive of the railroad shopmen's strike, which did not begin until the end of the period. Striking coal miners are estimated to have lost a total of $114,502,914. Adding the further losses since June 30 makes a total approaching $200,000,000. In 1921, in 1210 labor disputes, the strikers lost in wages $38,375,104.

Call for Higher German Export Duties

Great Increase in Home Demand—Exports Confined Largely to Highly Finished Products—Labor Scarcity—Discarding 8-Hour Day

BERLIN, GERMANY, Aug. 9.—The question facing producers is the shortage of fuel and skilled labor. For the first time on record the Steel Syndicate has twice raised its prices with only an eight days interval. The agitation for reintroduction of compulsory maximum prices (abolished in April, 1921) for Steel Syndicate products continues. (The Berlin cable of Aug. 20, published in THE IRON AGE of Aug. 24, page 492, reported the rejection of the proposal by the Iron Trade Association.) The complaint of consumers is that the syndicate is exploiting the general scarcity in order to raise its rates more than is justified by the rise in production cost.

Exporters' profits in marks have been greatly increased by the sudden exchange collapse; and the Government, with aim of getting some of the extra profits for the public, has submitted to the Reichswirtschaftsrat a bill doubling the export duties on iron and steel. These duties are mostly around 6 per cent and on no goods do they exceed 10 per cent. Exporters and various bodies, including the German Trade and Industry Congress, are opposing the bill, declaring that a system of rigid export duties, which cannot be rapidly adapted to varying exchange conditions, must fail. For heavy iron and steel the export duty question is not important, as the scarcity is so great that imports actually exceeded exports in recent months.

The prices of finished metal goods, machinery, electro-technical plant, etc., are far below world market level at present exchange. The *Frankfurter Zeitung's* index for Aug. 1 shows that the mark prices of finished goods average 85½ fold more than in 1914. At the mark's present gold exchange of around 200 to 1, gold prices of finished goods are therefore less than half those of 1914; and a heavy export duty could be levied without danger of causing under-selling by foreign competitors. As instance, the latest standard price of the best quality full-sized German typewriters, corresponding in ambitions if not in quality to the dearest American machines, is only 20,000 marks (or at exchange of 800 m. only $25 and at 1200 m. nearer $17).

The shortage of pig iron is acute. Lack of coke in July caused some smelting works to reduce output, and the use by other works of dear English fuel was a factor making for higher prices.

The home demand for semi-finished material is enormous; and foreign demand, though small, cannot be satisfied. In railroad permanent way material, the works are behindhand with their orders for the State, and the private demand for light and mine rails cannot be met. In early July, export was checked by the fact that German prices had about reached foreign levels, and after the new mark drop changed this, the home demand grew so enormously that there is practically an embargo on export. One cause here is a sudden revival of building. Bars and girders are in great demand; and the supply has long been inadequate. Even in exports the last monthly trade report shows exports of only 40,780 metric tons of these rolled products against imports of 51,220 tons. The same is true of tubes, of which exports were 4950 tons against 16,971 tons imports.

The increasing tendency is to consume the relatively cheap heavy and semi-finished metal in home manufacturing, and to export high-priced machines and other highly finished goods. This policy is leading to an ever greater insufficiency of skilled labor. The number of unemployed on July 1, 1920, was 322,923; on July 1, 1921, it was 314,475, and on July 1, 1922, 19,864. The last figure is about one-fourth of the normal unemployment in good pre-war years. Reports from Westphalia show that the 8-hr. day is being increasingly broken in the heavy metal branches. The Upper Provincial Court of Cologne has decided on appeal that violation of the 8-hr. law by employers is not punishable if the employees are consenting parties.

New iron ore fields have been discovered at Wolfenbuettel in Brunswick, and a concession to mine has been granted. Ore prices have risen rapidly, Siegerland Rostspat being now 1922 m. per metric ton, as against 750 m. at end of 1921 and 19½ m. in 1914. The Mannesmann Tubes Co. has absorbed the Bergwerks A. G. Consolidation. The Association of Electro-Technical Concerns reports that Germany in this branch has lost her pre-war rank of leading exporter. In 1913, the order was Germany, England, United States, France and Switzerland. The present order is United States, England, Germany, France and Switzerland. In 1913 Germany's exports were 52 per cent of those of all five, England's 22 per cent, and the United States' 16 per cent; in 1921 the United States' proportion was 40 per cent, England's 28 per cent, and Germany's 21 per cent. Former enemy countries exclude German electrical products, and some of the former neutrals have imposed customs barriers and import prohibitions. The monthly value of German electrical exports in 1921 averaged 12,000,000 gold marks against 30,000,000 gold marks in 1913.

GERMAN INDUSTRIAL STANDARDS

Their Spread and Their Impression on Import Countries—American Engineer's Report

"The day may not be far distant when American manufacturers will receive inquiries from oversea countries to furnish goods according to the German national standards, and it behooves us to plan in time to meet such conditions."

This statement is contained in a communication to the American Engineering Standards Committee from Oscar R. Wikander, an American engineer, who has just returned from Germany, where he represented the committee in conferences concerning the international standardization of ball bearings. Describing the great strides in standardization that have been made by German industries during the last few years and the important foreign trade advantages accruing to German industries because of their intense standardization activities, Mr. Wikander said:

There is no doubt that one of the main reasons why forward-looking Germans force their standardization work is because they want to introduce German standards in the great importing countries, and possibly in the whole world. Many European countries follow the German lead very closely. The great German deliveries in kind to France will no doubt be made as far as feasible according to German standards, thereby introducing them in that country.

It was only a few years ago that the "Normenausschuss der Deutschen Industrie," an organization corresponding to our American Engineering Standards Committee, was formed but the amount of work which it has already accomplished is stupendous. It has already issued several hundred sheets of approved standards, and about twice as many are already published as proposed standards. By personal investigation I found that the great output of standards was merely due to the enormous efforts put forth and to the enthusiasm of the great majority of the interested parties.

This enthusiasm is due to a more or less general recognition of the great economic value of standardization, and to the very generally accepted opinion that a standardized industry would be one of the strongest weapons in Germany's struggle for economic rehabilitation and financial reconstruction.

To give a concrete illustration: At the time of my visit, a syndicate of 19 German manufacturers and one Swedish

manufacturer were executing an order for 700 locomotives for Russia, all of the same design, and every part in every one of them was being made interchangeable with the corresponding part in all the others, all parts having been manufactured to the same fits and tolerances. This feature will have the great advantage of permitting the Russian railroads to use any disabled locomotive as a store of spare parts for all the others. It is easy to realize what great advantages German manufacturers of locomotives will have over those of other nations when competing on the basis of such specifications, and this example illustrates the economic advantage which can be gained by German industry in introducing its standards in all countries importing mechanical equipment.

Another error in our conception of German standardization is the belief that the 'Normenausschuss" is autocratic in its methods and is not in as close contact with the industries as our own standardizing bodies. I found, on the contrary, that [illegible] arrive at national standards. It is a large organization, built up along the same lines as the American Engineering Stand- [illegible]

grade type of men, only there are more of them and their work is greatly facilitated on account of the eager response from the German industry, whose leaders look to standardization as one of their greatest hopes for salvation.

It was proposed that they should send to the American Engineering Standards Committee all the drafts of any importance submitted to their own committees for consideration, so as to make it possible for them to obtain American comments on important propositions, which might be of value in making final decisions. It was also suggested that the American Engineering Standards Committee keep the "Normenausschuss" posted on its more important work. England seems to have realized fully the importance of recognition of her standards, and is trying to force the adoption of them in her colonies and dominions.

In conclusion, I hope that the example of the German engineers and manufacturers may spur us to make equally large contributions in work and money to the cause of standardization, and that our leading engineers may try to realize the enormous economic importance of both national and international standards.

FRENCH MARKET IMPROVED

Price Tendency Is Upward—Exports Aided by Strikes in United States—The Blast Furnace Status

(*Special Correspondence*)

PARIS, Aug. 17.—The iron and steel market is showing a real improvement. Inland markets are affected and prices are firm, with a rising tendency. But the improvement has been caused principally by the progress of exports, favored by the rise of British currency; strikes in the United States, which permit French and Belgian producers to supplement decreasing American supplies in export markets; also the extreme instability of the German mark, which prevents German producers from booking forward orders.

On June 30, of the 220 blast furnaces in France, 91 were in blast (2 less than on May 31). The following shows the situation in Lorraine on Aug. 11:

	Total Furnaces	In Blast
[illegible]	15	12
[illegible]	6	4
[illegible]	10	[illegible]
[illegible]	5	3
Terres Rouges		
[illegible]	4	3
[illegible]	3	[illegible]
[illegible]	3	3
Thionville		
[illegible]	[illegible]	[illegible]
[illegible]	4	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	6	5

During the first six months of 1922, France produced 2,261,000 tons of pig iron and 2,045,000 tons of steel.

Iron Ore.—On Aug. 9 the French Railway Board increased from 15 per cent to 25 per cent the previous reduction on rail transportation rates for exported iron ore. The prior reduction of 5 per cent for full trainloads of 180 tons and more has been supplemented by a reduction of 4 per cent on shipments of 120 to 180 tons. A revision of the whole rate schedule will be made in October.

Coke.—The adjusted price of German reparations coke delivered to French blast furnaces will be maintained for September at 97 fr., at the frontier.

Pig Iron.—Foundry iron is slightly firmer. The current price is 205 to 210 fr.

Negotiations for the renewal of the Comptoir des Fontes Hématites have failed, and the Comptoir stands dissolved as from Aug. 31. The dissolution of the Comptoir des Fontes Hématites is generally deplored, as was the dissolution, last year, of the Comptoir des Fontes phosphoreuses de Longwy, to which may be attributed the bad state of the pig iron market.

British East Coast hematite, mixed numbers, at 90s. f.o.b. (about 250 fr.), is now selling in French Northern ports at 310 to 320 fr.

Semi-Finished Steel.—Prices are unchanged, but the inland demand has improved and prices of billets and flat bars show a rising tendency. Deliveries are from eight to ten weeks.

Works in the North of France are considering delay in relighting their blast furnaces, and operation of their rolling mills on semi-finished steel products purchased in Lorraine. It is reported that one company in Meurthe-et-Moselle is purchasing semi-finished products in Lorraine.

Beams.—The situation is quiet but the volume of business satisfactory. The price, f.o.b. Antwerp, now quoted for export is 385 to 390 fr. (Belgian), or 365 to 370 fr. (French). Some small tonnages have been booked by French works, notably for India.

Rails.—The French railroads have not yet allocated their orders for rails. Lorraine works have taken orders for nine rails in France and in Germany.

Rolled Merchant Products.—The demand for rolled merchant products has improved and prices are rising. The basis price is now 430 to 440 fr. in the East and in Lorraine. A good demand for angles is reported, and the Cie. du Chemin de Fer d'Orléans has placed an order for angles (used in electrification work) at 395 fr.

Sheets.—The situation in the sheet market is improving. Orders in August are better than in July, which was a better month than June. No advance in price has been indicated by the Comptoir des Tôles, but the concession formerly made on light sheets to induce purchasers to buy ahead has been discontinued. British offers of sheets are appearing again in the import market.

Steel Wire.—Prices are firmer at 460 to 480 francs.

Castings.—Previous improvement continues but prices are low. Recently a Western foundry booked an order for *coussinets* from the French State Railways at 445 fr.

Scrap.—The following prices are now quoted per metric ton, on truck at selling works:

	Fr.
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]

British Steel Exports and Imports in July

British exports of iron and steel in July, according to a cable to *Commerce Reports*, were 251,743 gross tons, a considerable improvement over those for June which were 236,298 tons but less than those in May at 272,437 tons. Imports in July were 55,893 tons as compared with 52,775 tons in June and 60,939 tons in May.

Aluminum producing firms in England have been asked to supply Bulgaria with enough aluminum to produce coins of 1 and 2 leva denominations to the total nominal value of 60,000,000 leva. This is in connection with a new law permitting the use of aluminum for this purpose. At normal exchange the lev is valued at 19.3c.; at present, however, $1 will purchase about 150 leva.

Detroit Does Not Take Gloomy View

Some Manufacturers Are Hopeful Despite Announcement of Plan to Close Ford Plants—Coal Being Delivered to Foundries More Freely

DETROIT, Aug. 28.—Despite the announcement last Saturday of the plan for closing the Ford plants, Detroit is not in a gloomy condition. The distinct impression is that the whole truth in regard to the reason for the Ford announcement has not been told. Other manufacturers are of the opinion that conditions are improving to a moderate extent. Coal is being more freely received by leading dealers and deliveries to foundries are more satisfactory. There is a chance for decided improvement in a few weeks.

The Ford Announcement

The Ford Motor Co. announced that its three local plants, Highland Park, River Rouge and Lincoln Motor, would close Sept. 16. By that time, according to Mr. Ford's view, with coal receipts continuing at their present rate, its reserve stocks would be exhausted and it would have on hand only sufficient fuel to bank its one active blast furnace and keep its coke ovens warm. In making the announcement, Henry Ford said this decision was arrived at because his companies "were confronted by the situation that, under the present handling of coal, there would never be a time when they would have sufficient coal to operate the several departments of the plants simultaneously. Of necessity, therefore, they must close down sooner or later. We wish to keep enough coal to keep our furnaces and coke ovens warm: to let them get cold would cause us a loss of hundreds of thousands of dollars."

Shipments Suspended

Mr. Ford further announced that notices to suspend shipment had been sent out by telegraph to nearly 2000 concerns supplying his companies with materials and parts. In the local Ford plants, probably 55,000 men are now employed, turning out about 5200 cars per day, while the assembling plants in various parts of the country employ some 30,000 additional.

This announcement followed several curtailment steps calculated to stretch the Ford coal supply to the limit. Two or three months ago, shipments of pig iron to concerns making Ford parts were either reduced to the exact tonnages required or were cut off completely, and two weeks ago all outside shipments of both coke and pig iron were discontinued. Announcement was then made Wednesday that the tractor plant would close, and Saturday the decision was reached to close the entire three plants.

In the face of this announcement, it is interesting to note that, as a whole, Detroit industries have held their own through August, with employment near the maximum for the year.

This is shown by the Employers' Association report. The end of the first week in August bore all the earmarks of the beginning of a decline in employment where the figures dropped from 183,000 to 181,000 during this second week, but were regained during the third week and present figures are approximately at the peak of the year, or 183,000. These figures do not yet include the retrenchment at the River Rouge tractor plant of the Ford Motor Co., where from 3000 to 6000 men were notified of an indefinite suspension of operation on Wednesday, Aug. 22. The Ford Tractor Co. has accordingly withheld shipments of castings and other material for tractor assembly.

Pig Iron Distribution Curtailed

Priority measures within the Ford Company have likewise curtailed the distribution of pig iron to their outside sources for castings. Consequently, there has been a rush of these melters to cover on pig iron requirements and this has had the effect of bringing in iron from unusual sources.

Probably on an average the public utilities companies are no worse off for fuel than they were two or three weeks ago. The week was marked by a particularly acrimonious exchange of courtesies between State Fuel Administrator William W. Potter and Federal Administrator H. B. Spencer. A disturbing factor of the week was a scarcity of open top equipment, due to the mandate of the Interstate Commerce Commission that this equipment be returned to the mines empty. There has been some scarcity of box and automobile cars for some time past, so that this will be an added incentive to greater "drive-aways" from the automobile plants. The Saginaw district mines are getting into production, but their normal markets are within a 100-mile radius and Michigan as a whole depends on outside sources for its fuel.

The automobile industry, particularly in the lighter cars, while not at the year's peak of production, has not shown the usual and predicted seasonal slump. In numerous cases, production is hampered by lack of raw and assembling materials, sheets being a determining factor. Manufacturers have been unable to get their quota of sheets even where they are protected by several sources of supply on this material, due to the fact that many of the sheet manufacturers do not produce their own steel.

Dissension Among Unions in Connellsville Region

UNIONTOWN, PA., Aug. 28.—Posting of notices of the Sept. 1, 1920, scale, the highest ever paid in the Connellsville bituminous region, injected a new situation into the Connellsville bituminous strike last week. The H. C. Frick Coke Co. posted the notices of the wage increase late Tuesday evening, and this action was followed by the posting of similar notices at the independent plants on Wednesday morning.

The posting of these notices was the signal for meetings at practically every plant throughout the region at which the strikers discussed the new wage situation. The last half of the week saw no great increase in return of strikers to places in the pits but observers are watching with interest developments during this week.

The afternoon the new wage scale was posted, union leaders were meeting delegates from each of the new union locals at a convention held at Brownsville Junction. This meeting developed that there is a decided split in the union ranks with a large element of the men desiring to return to work. The fight came over the adoption of a resolution approving the wage agreement at Cleveland, one faction here opposing the approval because the agreement was not national in its scope. While the resolution was finally ratified, it was not without a fight and with indications that a break is more than likely in the union ranks.

Older employees of the region are leading in the agitation for acceptance of the new wage scale and return to work. The principal agitation for a fight to the finish is led by the union organizers and the younger workers in the region.

The action of the Frick company and independents in posting the new wage scales at this time came as a complete surprise. Observers did not expect a break in the strikers' ranks the past week, but are looking for some drastic changes during the next ten days. As a matter of fact quite a few of the strikers in the region

have returned to work already, but not in large numbers. Importation of men continues into the region and the production is being increased rapidly. The older workers who are on strike realize that the new wage scale is a lure for men in other mining regions and that unless they return soon all their places will be filled by outside workers. As a matter of fact, a number of men from union fields are coming into the region.

The new scale here averages slightly higher than the union scale and in addition the workers have the advantage of paying no union dues and better working conditions than exist in the union fields.

Coal and coke shipments are showing big gains throughout the regions, new records having been set by railroads each succeeding day this week. Shipments on Friday are indicative of the production and were 1166 coal cars and 290 coke cars. Daily average shipments over the Baltimore & Ohio for the Smithfield district during the week were 184 cars, considered above normal. There has been an increase in shipments over the entire Baltimore & Ohio Connellsville region lines. For the week ending Aug. 19, there was an increase of 300 cars over the preceding week which increased 500 cars over the week preceding that. A high water mark also was reached last week in river shipments of coal and coke. On Friday 26,400 tons or 464 cars of coal and 1709 tons or 36 cars of coke passed through Lock No. 5 on the Monongahela River at Brownsville.

Transportation Problems in Valleys More Serious

YOUNGSTOWN, Aug. 28.—The transportation situation is growing more serious in its effects on the industry. A sheet producer reports that it is shipping four-fifths of its output in bad order cars. Another company has been shipping some sheets in open top equipment, covering them as much as possible. One interest is using stock cars occasionally for the shipment of nails.

Car shortage is expected to prove more of an impediment to the industry as coal movement increases. Occasionally refrigerator cars are being employed in shipping tin plate. Leaders in the industry, such as President James A. Campbell of the Youngstown Sheet & Tube Co., do not believe better than 50 per cent operations are possible before the close of lake navigation.

Coal supply is still wofully inadequate, though the output is increasing and the outlook in this respect, as viewed by Valley executives, is much brighter than it has been. Prices are receding to between $5.50 and $6, at the mines, for coking coal, but these are still regarded as out of line by industrial consumers in this territory, who are making little effort to buy in a large way.

Inbound coal shipments for one large Valley producer last week varied from six to 10 carloads per day, whereas its normal consumption averages 135 cars daily.

Valley interests have posted notices at their Pennsylvania coal mines, re-establishing the Sept. 1, 1920, wage scale, but as yet there has been little response on the part of the men. In the non-union fields, it is claimed that the wage issue has now become secondary to the demand of the men for recognition of the unions. Steel companies in this territory operate their mines either non-union or open shop.

Independents which have provided housing facilities for their miners have as yet made no attempt at eviction of the men and their families. One such interest, though, is planning a move in this direction, unless the men display a desire to return to work. It is felt that the approach of cold weather and the urge for funds will prompt many of the workers, who have now been idle for nearly five months, to resume digging at an early date.

In view of the improved outlook, a number of interests are tentatively sounding out the market for coke supplies, among them the Trumbull-Cliffs Furnace Co., the Sharon Steel Hoop Co. and the Struthers Furnace Co., whose stacks are idle. Blast furnace coke now ranges from $12 to $13 per ton, against a recent high of $15.

No surplus pig iron is available in this territory. The $35 quotation still rules in a nominal way on semi-finished material, but all Valley interests are out of the market. Non-integrated rollers are still getting sufficient supplies to enable them to maintain operations at a normal rate. One such interest was promised 1000 tons during the week by a Valley producer.

Price advances covering the semi-finished market will probably apply on fourth quarter business. The practice is to adjust prices on such contract business quarterly.

Contractors Protest Against Coal Order

WASHINGTON, Aug. 29.—Hearing granted by the Interstate Commerce Commission last Friday to the Associated General Contractors of America on their application for the elimination of the fifth or "all other purposes" classification of priorities for coal in Car Service Order No. 23 was attended by representatives of the iron and steel, lumber, and coal industries, but they did not participate in the proceedings. Iron and steel and lumber interests have shown an interest in the proposal because they are included in the fifth classification, which the Associated Contractors maintain is superfluous. The Associated Contractors contend that it is necessary to speed up the movement of building materials.

The only witness was R. C. Marshall, general manager of the Associated Contractors. In the course of the hearing, lasting less than one hour, Mr. Marshall submitted figures to justify the claim that unless the order was changed so as to provide coal other than for uses specified in the four preferred classes of priority, construction operations would shut down. He admitted that there would not be enough cars for loading all the coal offered, but contended that no preference for coal loading should be given for anything other than that intended in the four preferred classes.

Commissioner Aitchison, in charge of the hearing, who is a member of the Federal Fuel Distributing Committee, wanted to hear from industries on the subject of the service orders in order to be prepared to change them quickly if conditions warranted such action, but it was intimated that there would be no further formal hearings regarding the question. It was indicated by Commissioner Aitchison that more formal hearings would not be helpful because the law authorizes the commission to act without holding hearings.

Independent Production Very Low

YOUNGSTOWN, Aug. 29.—Curtailment of iron and steel production in the Mahoning and Shenango Valleys is reaching to finishing lines in a more decisive way. The Brier Hill Steel Co. is operating its by-product coke oven department at 30 per cent, while the Youngstown Sheet & Tube Co. has but one battery of six on the active list. Thirteen tin plate mills at the plant of the Trumbull Steel Co. are inactive.

Independent iron and steel production is virtually at the lowest rate this year. No Bessemer steel is being produced by independents, and the number of active open hearths has been reduced to 30, of 51. Only three independent blast furnaces are operating, though the Shenango Furnace Co. planned to put its No. 1 stack at Sharpsville in blast.

This furnace will supply hot metal to the Valley Mold & Iron Corporation, supplying ingot molds to Valley open-hearth departments.

Bar production is negligible, as only one unit is

scheduled at the plant of the Republic Iron & Steel Co., for three days' production. The company's plate mill was placed on the active list for the same period.

Skelp rolling has been reduced to one mill each at the plants of the Republic and Sheet & Tube companies.

A shortage of semi-finished steel is cutting heavily into the time of rolling crews on blooming and bar mills. In at least two plants, rolling mill crews are working only five and six hours on a 12-hr. turn.

A gain of one pipe furnace over last week brings the total number of operating mills to 14, of 17, in the Mahoning Valley.

Fabricators are slowing down in some departments, due to inability to get steel and depletion of stocks.

Increased Production of Coal

WASHINGTON, Aug. 29. — An output of at least 6,000,000 tons for the week of Aug. 21-26, the twenty-first since the strike began, was assured by reports for Monday, Tuesday and Wednesday, the Geological Survey states in its weekly report on coal production, but additional tonnage from other districts that have signed the Cleveland agreement may raise the total to 6,250,000 tons. Production of anthracite remains practically zero. The increase in production was chiefly in central Pennsylvania, western Pennsylvania, the Fairmont and Panhandle districts of West Virginia and Ohio. In these districts collectively the daily rate of production exceeded by 156,000 tons, or 130 per cent, that of the week before. The increase in central Pennsylvania was about 90 per cent; in western Pennsylvania, 40 per cent; in northwest Virginia, about 170 per cent, and in Ohio, 115 per cent. Even with an output of 6,250,000 tons of bituminous coal a week, production is greatly below normal. In the corresponding period of 1921, production totaled 9,640,000 tons, of which 7,750,000 tons was bituminous. The year before that, the total raised was 13,250,000 tons. In comparison with these figures, the output last week was from 4,000,000 to 6,000,000 tons short.

Few Operators Oppose the Cleveland Surrender

PITTSBURGH, Aug. 28.—Crumbling of the opposition by union coal operators to signing the Cleveland agreement continues in this district and while companies representing a large tonnage remain obdurate, the belief prevails that many of them will abandon their stand during the coming week and go along with those which have signed. An interesting development over the week end has been the acceptance of the Cleveland agreement by the Midvale Steel & Ordnance Co. and the Lackawanna Steel Co. The Vesta Coal Co., the Jones & Laughlin Steel Co. subsidiary, resumed operations to-day in five of its mines, while six of the operations of the Union Coal & Coke Co., the Midvale Steel & Ordnance Co. subsidiary, reopened, and also three mines of the Ellsworth Collieries Co., owned by the Lackawanna Steel Co. Resumption at the Jones & Laughlin mines should have immediate effect upon the blast furnace and steel works operations of that company, since its mines are located on the Monongahela River and it can bring down practically all of its production by water and thus avoid interference from priority regulations, to which rail shipments are likely to be subject.

Some Conditions Worse

But while the situation with regard to hitherto union mines is improving, the situation in the Connellsville district, hitherto non-union, if anything, is worse than it has been. The announcement a week ago by H. C. Frick Coke Co. restoring the Sept. 1, 1921 scale, effective Aug. 23, instead of leading to a return to work on the part of its men, seems to have increased their inclination to stay out until this and other companies sign an agreement with the union. The union organizers have told the men that the re-establishment of the 1920 scale is the result of the union efforts and that only by remaining out until the Frick Company and others in the Connellsville district recognize the union, will the advantage gained be safeguarded. Since the great bulk of the operators in the Connellsville district are opposed to recognition of the union, it begins to look as though the trouble in that district would be rather long drawn out and a general resumption of the mine and coke oven operations is not near at hand.

The Priority System

Setting up the machinery for carrying out of the priority system is making rather slow progress, at least so far as actual results are concerned. The Pennsylvania Fuel Commission, at meetings last week, set up "fair" prices and named regional directors, but so far as actual control over shipments goes, the market still is an open one and coal is going where the price is highest without much regard to preferential consumers. The "fair" prices set up by the Pennsylvania authorities are $3.75 per net ton at mines for thick vein and easily mined coal and $4.50 for thin vein coal, which is more costly to get out. These prices are to govern on interstate shipments, but it is believed they eventually will also apply on intrastate business. Brokerage commissions are limited to 25c. per ton regardless of the number of hands through which a sale passes. In other words, thick vein coal sold through brokers must go to the consumer at not more than $4 at the mine and thin vein coal at not more than $4.75 at the mine. The market, however, still is far above these levels.

Will Go Ahead with Clairton By-Products Coke Plant

PITTSBURGH, Aug. 28.—The Carnegie Steel Co. has definitely decided to go ahead with the addition to its Clairton, Pa., by-product plant and has just signed a contract with Koppers Co., Pittsburgh, for 366 by-product coke ovens, together with auxiliary plants. This addition will bring the total number of ovens at this plant to 1134, having a carbonizing capacity of 21,500 tons of coal a day. The plant as it now stands consists of 768 ovens and has a carbonizing capacity of 13,000 tons of coal daily, or about 17 tons per oven per day. In the 366 ovens to be built, 8500 tons of coal can be carbonized daily, an average of more than 23 tons per oven per day.

The new ovens are of a design recently perfected by the Koppers Co. and are of a combination type, so arranged that they may be heated with producer or blast furnace gas, releasing all of the coke oven gas for use in the steel mills. Improved quality of coke produced, making possible more economical blast furnace practice by reducing the consumption of coke per ton of pig iron produced, faster coking time, giving greater capacity per oven per day and stronger construction are the principal advantages claimed for this new type of oven, the inventor of which is Joseph Becker, consulting engineer, Koppers Co. An experimental battery of these new ovens has been in operation at the plant of the Koppers Co. in Chicago for the past year with remarkable results as regards speed of coking and the quality of the coke produced.

Furnaces will be installed by the Weldless Tube Co., Wooster, Ohio, in its new seamless tube plant from designs Buell, Schieb, Mueller, Inc., Pittsburgh, which designed and is supervising the installation of two furnaces for the Fort Pitt Spring & Mfg. Co., at McKees Rocks, Pa.

PRICES RISE, OUTPUT LESS

Slackening in Production Due to Labor Troubles—Decline in Building Contracts

Under the above title, the Department of Commerce summarizes the industrial situation in the advance sheets of its monthly "Survey of Current Business." The slackening of industrial output, while partly seasonal, is attributed chiefly to labor troubles, resulting in scarcity of fuel supplies and in difficulties in transportation. With the accumulating shortage of many commodities prices have risen at an increased rate, most notably in coal, animal products, cotton and sugar. Wholesale prices in general in July were higher than at any time since February, 1921, and were 12 per cent higher than those of last January.

Stocks of merchant pig iron declined to the lowest point reached since September, 1920, being 245,000 gross tons at the end of July, compared with 702,000 tons one year previous. Receipts and shipments of both lead and zinc declined, though zinc production, at 63,854,000 lb., made a higher record than for any month since the close of 1920.

Bituminous coal production in July was 5,000,000 tons less than in June. Compared with 1921, the accumulated deficit for seven months has reached 20,000,000 tons. The corresponding anthracite deficit reached almost 30,000,000 tons, production of 161,000 tons in July being only 2 per cent of normal. Gasoline production in June made a new high record, at 525,941,000 gal., more than 12,000,000 gal. above May—the previous high record.

Car loadings declined in July to an average of 828,029 per week, compared with 851,700 in June, most of the loss being in coal loadings. The number of surplus cars in good order July 31 was reported at 174,927, the lowest, except when a strike threatened last fall, since the end of 1920. Shortage of cars, at 24,973, was the highest since the end of 1920.

Building contracts let in July declined 9,000,000 sq. ft. from June, to 51,705,000 sq. ft., the lowest figure since April. The four months, however, constitute a high record of construction activity. Building costs continued to rise. Brick and lumber production declined, but cement made a new high record.

Cotton consumption in July was the lowest since one year ago. Consumption of raw silk and bank clearings also declined, due in part to seasonal influences.

PLANT OPERATIONS

New England Manufacturers of Some Products Report Improvement

New England manufacturers of grinding machines are busier than they have been before this year, but not all of them are back on a normal basis. The demand for abrasive wheels, on the other hand, shows decided improvement. The Norton Co., Worcester, Mass., is employing 2100, of which 1850 are in the wheel division. In the recent business depression the number of employees was down to 1200. Abrasive wheel makers in Waltham, Mass., and at other New England points also are employing more people in an effort to keep up with incoming business.

Steel plants in the Cincinnati district are maintaining their customary schedules of operations, although the difficulties in the way of transportation are reported to be growing. The American Rolling Mill Co. is operating at capacity at both Middletown and Zanesville works, with the Ashland plant on a 50 per cent basis. The Andrews Steel Co., Newport, Ky., facing a shortage of basic iron, is nevertheless maintaining operations on a 70 per cent basis, while the Whitaker-Glessner Co. at Portsmouth is running at its schedule of last week, and from present indications will continue to do so for some time.

The Wilson Foundry & Machine Co., Pontiac, Mich., a subsidiary of the Willys-Overland Co., is advancing production of automobile engines to a basis of 300 complete motors daily.

The New Jersey Zinc Co., Palmerton, Pa., is increasing production to a capacity basis in practically all departments at its local plant, giving employment to a full working force on full-time schedule.

The American Car & Foundry Co., Berwick, Pa., has resumed operations at the puddle mill at its local plant, following a shut down for about a month. The finishing mill, also recently closed, has been reopened. A full working force will be employed.

E. I. du Pont de Nemours & Co., Wilmington, Del., are arranging for the resumption of production at its Ashburn Works, near Hannibal, Mo., used for high explosives. The mill has been closed for about a year past.

The Remington Typewriter Co., Syracuse, N. Y., has resumed operations at its local plant, following a two weeks' shut down. Manufacture of portable typewriters will be maintained on a basis of 1800 complete machines per week.

The J. G. Brill Co., Philadelphia, has increased production at its local car works to about 60 per cent of capacity, as compared with a 50 per cent operating basis two months ago, and 25 per cent of normal the early part of the year.

The Hudson Motor Co., and the Essex Motor Co., Detroit, affiliated, have increased production to a basis of 300 complete automobiles per day, and will maintain this schedule for an indefinite period.

The Wallingford Steel Co., Wallingford, Conn., a new organization, capitalized at $200,000, has completed the erection of a local plant and plans to commence operations by the close of the month. The works will be devoted to the production of cold rolled steel products.

The Kelly & Jones Co., Greensburg, Pa., manufacturer of valves, pipe, etc., has closed its plant temporarily owing to a strike of employees. The men have asked for an increased wage scale. The plant has been employing about 1400 operatives.

The United States Lock & Hardware Works, Columbia, Pa., is developing capacity operations at its plant, following a return to work of employees, recently out on strike.

The Willys-Overland Co., Toledo, Ohio, has established a production basis of 750 automobiles a day at its plants, about 175 of which are being equipped with Knight motors. Employment is being given to about 10,000 men.

The strike of laborers at the plant of the H. B. Smith Co., Westfield, Mass., heating appliances, has ended following a conference between the company officials, its employees and a business men's committee, recently formed to end the controversy. The strike was called May 1, as a result of an announcement of a reduction in wages. The molders' union was not involved in the dispute, but was thrown out of employment by the action of unskilled help. The plant employs something more than 1000 workers.

Production was recently started at the newly completed Youngstown plant of the Paul J. Kalman Co., Chicago, fabricating interest. It will manufacture steel reinforcing materials, largely for construction purposes. The company plans to erect an additional unit at the Youngstown plant next spring. Capacity of the plant is now about 100 tons daily.

Arundel Cotter's book, "United States Steel—a Corporation with a Soul," has been translated into Japanese and copies of the Japanese edition, which closely resemble in binding the last American edition, have been received in this country. All the illustrations accompanying the original text have been reproduced in the Japanese edition.

CONTENTS

August 31, 1922

Costs of Electric Steel Melting 525

Comparison of Methods Shows Basic Higher Than Acid—Power Charge, Electrodes and Labor Chief Controlling Items

Iron Castings by the Centrifugal Process 529

British Plant Producing Piston Ring Sleeves and Engine Cylinders—Chilled Wheels and Rolls—Unique Melting Arrangement

Economic Basis of the Scrap Business 533

Its Large Proportions—Place of the Dealer Between Producer and Consumer—Problem of Disposal of Light Scrap

Regeneratively Fired Heating Furnaces 537

Conditions Necessary for Freeing the Hearth of Waste Gases—Good and Bad Examples—Krupp Not Infallible

Progress in Human Relations in Industry 541

Wages Not the Only Factor in Making Men Contented—Mistakes in Employee Representation Plans

Coal Situation in Industrial Districts 545

Some Manufacturers Hopeful Despite Announcement to Close Ford Plants—Coal Being Delivered to Foundries More Freely

Proposed Additions in Youngstown District 526
Will Make Recommendations as to Periods of Depression 526
Staybolt Threading Machine..... 527
No Profiteering in Farm Implements..... 527
Detroit Scrap Market Active..... 527
Arc Rivet Cutting Apparatus..... 528
Machine Replaces Men in Grading Coal Pile 528
Thermit Insert Rail Weld..... 532
Iron and Steel Electrical Engineers to Meet 532
Amount of Gases in Steel..... 534
Proposed Aid for War Plants..... 534
Metal Containers for Bolts and Nuts.... 534
Bench Measuring Machine..... 535
Car Movement in Strike Times..... 535
Engineering Societies to Discuss Management 535
Meeting of Lake Superior Mining Institute 536
British Engineering Institutions Co-operating 536
Association Meetings 536
Emergency Fuel Suggested..... 538
Roebling Insurance Plan..... 538
Professor Stumpf Entertained..... 538
Machine for Grinding Mill Rolls..... 539
Fewer Metal Workers and Lower Wages. 539
Canada's Iron and Steel Output in July... 539
General Utility Pneumatic Press..... 540
Geared Head Engine Lathes..... 540
Labor Notes 540, 544
High Speed Broaching Machine..... 542
Orders for Locomotive Castings..... 543
High Cost of Strikes..... 543
Call for Higher German Export Duties.. 543
German Industrial Standards..... 543
French Iron and Steel Market..... 544
British Steel Exports and Imports in July 544
Clairton By-Products Coke Plant Addition 547
Prices Rise, Output Less..... 548
Plant Operations 548
Editorials 550
Advance in Steel Works Wages—Steel Capacity and Orders—Verging on Revolution—Uneven Tax Burdens—Creative Intelligence Hampered.
President Opposes Drastic Strike Action. 553
Refractories Market 554
Wire Cloth Merger..... 554
Railroad Car and Locomotive Buying.... 554
Sheet Sales Drop..... 554
Fabricated Steel Business..... 555
Dr. Waterhouse Accepts Chair of Metallurgy 555
Advance of 20 Per Cent in Steel Workers' Wages 555
Puddlers' Wages Advanced..... 571
New Weirton Steel Mill..... 571
New Trade Publications..... 583
New Book Received..... 583

Iron and Steel Markets 556
Comparison of Prices 557
Prices Finished Iron and Steel, f.o.b. Pittsburgh 569
Non-Ferrous Metal Market 571
Personal Notes 572
Obituary Notes 573
Machinery Markets and News of the Works 574
New York Jobbers' Prices 584

ESTABLISHED 1855

THE IRON AGE

EDITORS:

A. I. FINDLEY WILLIAM W. MACON GEORGE SMART

CHARLES S. BAUR, *Advertising Manager*

Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

[illegible] Printed in U. S. A. George H. Griffiths, *Secretary*

Owned by [illegible] 239 West 39th Street, New York. [illegible]

Detroit: 317 West Fort St. Cincinnati: Mercantile Library Bldg. Buffalo: 881 Ellicott Square. Washington: 816 Fifteenth St., N. W. San Francisco: 320 Market St. London, Eng.: 11 Haymarket, S.W.1.

BRANCH OFFICES [illegible] Pittsburgh: Park Building. [illegible] Philadelphia: 1420-1422 Widener Building. Cleveland: Guardian Building.

Subscription Price: United States and Possessions, Mexico, Cuba, Shanghai, $6.00; Canada, $8.50; Foreign, $12.00 per year. Single copy 25 cents.

Entered as second class matter June 18, 1879, at the Post Office at New York, New York, under the Act of March 3, 1879.

The Advance in Steel Works Wages

The 20 per cent wage advance made by the Steel Corporation and in turn by the independent producers is not the result of prosperity that has come to the steel industry. The balance sheets of all steel companies for the first half of the year, especially those of the independent companies, few of which have earned dividends in that period, are sufficiently convincing on that point. Steel works common labor has been scarce since mid-spring and even on a 70 to 75 per cent operation in steel it has been difficult to maintain working forces, since other employments for common labor were paying more than 30 cents an hour. Four months ago it was recorded in these columns that in the Chicago district steel companies had had some difficulty in securing labor for some classes of work, and in the intervening weeks repeated references have been made in our market review to the higher labor costs that might have to be reckoned with as the year advanced. On May 25, three months ago, THE IRON AGE said: "There is no great hope in the steel industry of freight reductions sufficient to make a marked change in costs for 1922. On the other hand are the prospect of fairly high fuel and of possible labor shortage and higher wages."

Newspaper writers whose comments in the past week have treated the 20 per cent wage advance at steel works as a surprise, or as springing from some hidden motive, simply confess that they have not been alive to the labor situation as it has been developing in the past three months. There has been much shifting from one employment to another in that period, particularly in the Central West. What has happened at many plants, in the drawing of workers to higher priced jobs in automobile works at Detroit, is well known. No executives are better versed than those in the steel industry in the effect of the existing immigration act on the supply of "fetch-and-carry" labor, the kind that is in demand at steel works. The advance in common labor from 30 cents to 36 cents an hour simply recognized the fact that the supply of such labor has not been equal to the demand at some Central Western plants, and that public work and other outdoor employment had established a level which steel companies would have to meet.

The steel companies simply met the situation. With non-union coal mines announcing advances averaging more than 40 per cent on the heels of the Cleveland agreement, there is little point to the criticism that the steel companies' 20 per cent advance was "unfortunate" on the eve of the hearing at Chicago in the case of the railroad maintenance of way workers. The steel companies did not do the choosing when some of their leading products went to a 1.30-cent basis last spring. Supply and demand did that, and steel company balances have been written in red at the same time that railroad car orders and steel building contracts have been putting large tonnages on rolling mill books. The steel trade, through no will of its own, was simply illustrating the old Carnegie maxim that the way to lift the market is to get under it. Prices went below the cost line, the mills grew busier, and better times would have been well on the way ere this but for the bitter conflicts in coal and transportation.

The effects on steel consumption of the "victory" of the union coal miners, the unavoidable advance in steel works wages, and the scarcity prices for fuel that will be a factor in iron and steel making costs for months are another story. Apart from war time, the country has never known a sustained demand for steel on a 2-cent market or anything approaching that level. To-day it is obvious that 2 cents for plates, shapes and bars would mean a loss for not a few of even the larger producers—companies whose statements for the third quarter of the year will show that again they have failed of making a profit. And after railroad work and building and oil development and automobile manufacture have been stimulated by 1.30-cent steel, how far can the stimulation be carried with steel prices $15 to $20 a ton higher?

The steady foreign demand for American copper is still a prominent feature of our export trade. Its magnitude is a surprise even to those in closest touch with events in copper. The statistics show that shipments abroad for the fiscal year ending with June exceeded all post-war records, even the heavy movement in 1921. The actual figures are 677,487,300 pounds as compared with 596,117,247 pounds in the calendar year 1921. A continuing surprise is the heavy buying by Germany, despite the fall of the mark to a line's width from zero. At

33.7 per cent of the total, exports to Germany exceed even the large buying in 1913 when stocks were being accumulated for war. Buying by France is also unprecedented at 16.6 per cent of the total. And in the last six months Japan has increased her takings to 13 per cent of the total, against 9.9 per cent in 1921. All these records are significant of the well-nigh indispensable place of the ancient metal in the world's work and also of its historic capacity for doing the unexpected.

Steel Capacity and Orders

In the annual statistical report of the American Iron and Steel Institute, issued recently, information is given as to rated capacity of steel works. The ingot capacity—disregarding castings—is as follows for Dec. 31, 1921, in gross tons per annum:

Open-hearth	42,066,110
Bessemer	12,830,400
Crucible	189,380
Electric	731,395
Miscellaneous	400
Total	55,817,685

The question is what allowance should be made for possible excess rating, to determine the practical capacity. Actual experience alone can be the guide. The last year in which there was full operation was 1916, ingot production being 41,401,917 tons. The compiled capacity was 43,822,600 tons at the beginning and 47,585,395 tons at the end of the year. Taking the mean of these as representing the average during the year and dividing into the actual production gives 91 per cent, as the relation of output to compiled capacity. As a check on this conclusion the experience of 1913 may be taken. It was commonly taken then that production was about 90 per cent of full operation. The statistical report did not give capacity at the beginning of 1913 but gave 37,933,475 tons for capacity at the close. The Annual Review Number of THE IRON AGE, Jan. 1, 1914, gave the new capacity completed during the year at 2,900,000 tons. Deducting one-half of this gives 36,500,000 tons as the average rated capacity during the year. Production was 30,280,130 tons. Assuming that this was 90 per cent of what would have been made if orders had not begun playing out in the late months of the year, the actual capacity averaged 33,600,000 tons during the year, which is 92 per cent of the compiled capacity, this agreeing quite well with the factor of 91 per cent found by the experience of 1916.

Applying the 92 per cent factor to the compiled capacity at the beginning of the present year gives 51,350,000 tons, and applying 91 per cent gives 50,750,000 tons as the actual practical capacity.

It is, however, well recognized that in present circumstances the steel industry, no matter how well supplied with orders, cannot produce 50,000,000 tons of ingots in a year. That is, it cannot function as it did function in 1916 and in 1913, or, it may be added, in practically all its history prior to half a dozen years ago. In the first nine months of 1920 the industry strained every nerve to produce, yet made ingots only at the rate of about 42,000,000 tons a year. It was hampered, at one time or another, by fuel shortage, labor shortage, labor inefficiency and transportation shortage.

It is not a gratifying situation. It is a new thing for the steel industry to be unable to operate freely when it has the orders. Until six years ago the industry had only two troubles, more or less recurrent—inability to sell steel up to its capacity and inability to obtain remunerative prices. When demand was equal to capacity fair prices were obtained and the good years evened up for the bad years. We are in a new era. Before the war a 50 per cent operation was considered almost indescribably bad, profits being quite impossible. Now the industry is operating at but little more than 50 per cent, and prices are mounting rapidly.

Verging on Revolution

Governor Miller of New York is a man of courage, a man of conviction and he knows how to use the English language. In his message to the special session of the Legislature, last Monday evening, he painted a vivid picture of the pending industrial disputes, which, he said, are impairing transportation and the production of both anthracite and bituminous coal, and threatening the paralysis of industry as well as widespread distress next winter from shortage of domestic fuel. Then the Governor added:

> A nation-wide industrial dispute involving essential industries verges on revolution, and in fact is the method advocated by those who plot revolution, of whom there are still, unfortunately, too many in this country. Such a dispute, irrespective of its merits, is revolutionary because it subordinates the general interest to the selfish interests of a few. It is subversive of free government because it subjects all the people to the tyranny of a few, and a Government established to promote the general welfare cannot tolerate the tyranny of any interest, group or individual and endure.

These are strong words and should cause every patriotic American, not only of the State of New York but throughout the Union, to stop and think. They should appeal especially to well-meaning people who in the past have been apologists for men like William Z. Foster. The New York *Times*, speaking of the new charges against Foster, observes that "the evidence to be presented would be of interest to the committee of nine clergymen, including three bishops, who gave the authority of their names to the Interchurch World report on the steel strike, which—though with somewhat greater subtlety and address—glossed over Foster's past and that of his fellow-organizer, John Fitzpatrick."

Then the *Times* calls attention to the little red book, "The Syndicalist," an almost forgotten revolutionary pamphlet written by Foster and another radical, dug up in September, 1919, by THE IRON AGE, which published liberal extracts showing Foster's revolutionary teachings. Foster did not then repudiate his extreme views, and only recently, in a friendly periodical, he asserts that the American working class is not moving fast enough, declaring that what is needed in this country is to adopt methods used in foreign countries—above all to arouse the militants to stop the open shop drive. "The fate of the American labor movement," said Foster, "depends upon whether or not the militants and others in the ranks arouse themselves to action."

It is high time for the people in this country,

whether heretofore they have been apologists for the radicals or not, to aline themselves against the militants, within and without the unions.

Uneven Tax Burdens

According to a statement made public Aug. 27 by the United States Commissioner of Internal Revenue, residents of New York State paid 25 per cent of the total of all taxes collected by his office and 25 per cent of the total income and profits taxes, during the fiscal year 1922. Details from the statement show that New York, New England, New Jersey and Pennsylvania paid income and profits taxes amounting to $1,039,088,000, against $1,033,912,000 for the other 39 States and the District of Columbia. The respective populations, 1920 census, were 29,662,000 and 76,049,000. The tax collections per head were $35.03 and $13.60—nearly three to one.

Apportionment of taxes is supposed to bear some relationship to opulence. So is the ownership of automobiles. But the nine States which paid more than half of the tax had, in 1921, only 2,484,360 automobiles; the others had 8,021,300. The amount of tax collected from the nine States, per automobile registered in them, was $418; from the other States, $129. This ratio is 3.24 to one—yet the taxes were one to one. New York paid $653 in income and profits taxes for each registered automobile.

All of this goes to emphasize how onerous and unevenly distributed are our present income and profits taxes. They are so adjusted that they tax initiative, hamper industry and put a burden on those whose efforts toward better and more stable business might otherwise bear good fruit. The most heavily taxed regions are those, normally, of greatest and intensest activity—those of concentrated manufacture and of congested population. The question may well be raised whether a taxing policy is wise that puts special hobbles on enterprise and productiveness.

It was estimated in 1917 by a British Governmental agency that 30 per cent of the total consumption of steel in Great Britain before the war was used in shipping and marine engineering. Special interest therefore attaches to the reports of Lloyd's register as to the tonnage of ships under construction and the effect on the British steel industry. These reports for the second quarter help to explain why the present rate of British steel production is only 45 per cent of estimated capacity. For the quarter ended June 30, vessels under construction represented about 1,438,500 tons. The quarterly average in the twelve months immediately preceding the war was 1,890,000 tons, so that operations are now at 451,000 tons less than the average before the war. In the second quarter of 1920 the average tonnage of vessels under construction was 3,578,153, and even so recently as the end of the first quarter last year the figure was 3,798,593 tons. The shrinkage since then has been over 50 per cent. In 1920 the steel output was nearly three times the present rate. It is clear, therefore, that a revival in the British steel industry is contingent upon a marked stimulation of shipbuilding.

Creative Intelligence Hampered

Computations are made from time to time of the loss involved in labor disputes, and the figures are always impressive, as of course they are intended to be. Some of the assumptions might be questioned on the basis that perhaps some of the "loss" can be made up later. There is one loss that is rarely mentioned, yet it very important and it is permanent. That is the loss of exercise of creative intelligence due to men being busied with industrial disputes, and in fact the whole matter of the relation of employer and employed.

The great source of wealth or of prosperity is not labor or capital *per se*. The workman may work hard, may perspire copiously and thoroughly exhaust himself day by day and yet not prosper or produce wealth. Capital may stand at the call of any one, at low interest rates, yet not be employable in a way to produce wealth. Capital furnishes the tools and workmen use the tools. The tool may be a pneumatic riveter, a steam shovel or a blast furnace. The net result of the use of the tool, however the division of the proceeds may be between capital and labor, depends on the efficiency of the tool, and it is creative intelligence that makes the tool efficient.

When the brains of the country must be directed to the solution of strike questions and industrial unrest, when a first duty of the manager of an enterprise is to determine, for example, how much stock of each raw material he must carry as insurance against shortage from strikes, creative intelligence is hampered. The loss thus produced is not only to the individual enterprise but to society at large. If an improved turret lathe is brought into use, the profits fall not alone to the producer. The users, collectively, probably make much more money out of it than the producer, and the customers of the machine shop are benefited also.

But the loss through men being deprived of time and energy that might otherwise be devoted to the exercise of the inventive faculty is not all of the loss caused by labor disputes and the mental attitude that gives rise to them. The exercise of creative intelligence is hampered by doubt whether a new tool or device or process would work advantageously with labor in its present frame of mind. The one who would create must think not only of the intrinsic value of the new thing, but the value, perhaps limited, it would have in future with labor conditions as they may come to be. In the light of this fact it is not difficult to understand the slow development of the molding machine in its earlier history, before it was settled that it would not be under labor union control.

It was due chiefly to improvements resulting from the exercise of creative intelligence that the purchasing power of a week's earnings of workmen tripled in somewhat less than a hundred years preceding the world war. So closely is all prosperity related to the fruits of creative intelligence that the hampering influence of labor conditions should impress every one and encourage every effort for their improvement.

President Opposed to Taking Drastic Action

White House Policy Clearly Indicated—Secretary Hoover Disappointed by Attitude of Henry Ford, and Hopes Plant Will Not Close

WASHINGTON, Aug. 29.—Considering that the bituminous coal situation actually is cleared up and that there is strong hope for an early settlement of the anthracite strike, the Administration now is centering its attention on the railroad problem. It was stated to-day at the White House that the President is firmly convinced that Congress should give him authority at once to take over the railroads and coal mines, but at the same time exercise of such authority would be avoided, if possible, and resorted to only in case of the gravest necessity in the interest of the public. The attitute of the President is represented to be that he does not think there is any existing reason to turn to this drastic measure, but that power to do so should be be given him if the occasion demands it. It would not be adopted with the view of settling labor trouble. Rather it would be used as a means to insure control over the lines so as to provide the necessary distribution of coal and other necessities. It is declared that the President feels he already has power to take over the mines and railroads, but that direct and actual authority should be granted through specific legislation. The power would be directed at proper transportation and not as a means to insure production of coal, confidence being expressed that in view of the settlements brought about and pending, coal production soon will be proceeding at a normal rate.

While the seizure of railroads and coal mines is altogether unlikely, this is especially so with regard to the mines, and Secretary Hoover said this morning that the taking over of the latter is not even contemplated. Sentiment in Congress over granting authority to the President to take over either the carriers or mines is divided, with opposition to the plan growing and it is quite possible that the authority sought by the President will not be granted.

Congress Is Conservative

To indicate that its attitute toward drastic action in the labor situation is cooling, Congress has definitely abandoned the proposal of the President to establish a Federal coal agency for the purchase, sale and distribution of fuel, according to an announcement by Chairman Winslow, of the House committee on Interstate and Foreign Commerce. Resumption of coal mining is assigned as the reason for the change in the attitude of the committee, whose action is said to have been acquiesced in by the President.

The Ford Announcement

The announcement of Henry Ford that he will close his plants on Sept. 16, throwing 105,000 men out of employment, has been a source of disappointment to Secretary Hoover. The Secretary said he hoped Mr. Ford will not feel constrained to take such sweeping action because he thinks the prices of coal are too high. It is felt that legislation under way will control the price situation sufficiently to assure Mr. Ford that coal can be obtained at reasonable figures. It was declared that Mr. Ford uses 3800 tons of coal daily, and produces approximately 5200 cars in a day. Even if he pays $2 a ton more for coal than the $4.50 price, it was stated the added production cost of a Ford car would be not more than $1.50.

One reason for the view taken of Mr. Ford's action is not the single move proposed at the Ford plant, important as it is, but the fact that it might be accepted as an indication of far-reaching and serious consequences. Thought was given to its establishing a precedent for other important industrial employers and consumers that would slacken production in the iron and steel and many allied lines, develop much unemployment during the winter and cause general distress throughout the country. On the other hand, the Administration plainly is hoping that the coal and rail strikes, inevitable causes of rising costs and prices, will not develop a period of wild inflation, such as occurred in 1920, followed by sharp and demoralizing liquidation.

Important Order Issued

WASHINGTON, Aug. 29.—Marked improvement in the bituminous coal situation is reflected in an order issued this afternoon by the Interstate Commerce Commission by which it eliminated classifications four and five in its priority list. Included in the fifth classification are the iron and steel, lumber and allied lines. They now automatically come under class three, which is the lowest. Reports already have reached Washington that the greater freedom of coal for the market has indicated that softer prices are in immediate prospect which may go well under those named by the Government. The probable effect of this order is an increase in the output of industries, including iron and steel and lumber. In its announcement the Interstate Commerce Commission said that the increase in production of bituminous coal and the opening of fields recently closed, near to important markets, have made it possible to rearrange the list of priority uses embraced in service order No. 23 as previously amended, but by the amendment, to-day the emergency uses are all embraced in class two. Class one is reserved for such cases as may be designated from time to time by the commission. All other uses fall within class three. Certain pressing needs of the railroads and of the portion of the Northwest which must practically be served by water before the close of navigation will be met by proper assignment of particular shipments to class one. Certificates from State fuel administrators or committees as to the character of use and the bona fides of the transaction will be deemed sufficient evidence for the railroads in carrying out the direction for priority as to coal for domestic and building heating purposes, as well as other evidence of the right of a particular shipment to be placed within the priority class.

Removal of the fourth and fifth classes more than meets the recent request of the Associated Contractors of America, who asked the commission to dispense with class five as superfluous. The purpose of the request was to expedite transportation of building materials and to afford coal for those engaged in their production.

The order of the commission has resulted in a much more optimistic tone in the fuel situation and is expected to bring early relief to industries of the country by reason of its being based on increased coal production.

No. 1 furnace, Shenango Furnace Co., Sharpsville, Pa., resumed operations Aug. 29 after being banked since the latter part of July.

REFRACTORIES ADVANCE

Prices Marked Up on Account of Higher Cost of Mining Coal

PITTSBURGH, Aug. 29.—Effective Aug. 23, leading makers of refractories advanced prices of fire clay brick $5 per 1000, ground fire clay $1 per ton, silica brick $7 per 1000, ground silica clay $1 per ton, magnesite brick $4 per 100, grain magnesite $2 per ton and chrome brick $3 per 1000. There is only one explanation and that is the virtual settlement of the coal strike on the terms of the strikers, which involves the restoration of the peak wages in the coal mines and puts a heavy increase in the producing costs of the manufacturers. Makers of fire clay and silica brick could not advance wages to the coal miners without also adjusting those of the clay miners and the brick plant workmen and as a result of the increases it is estimated that producing costs have advanced fully 30 per cent as compared with those prior to Aug. 23.

While the new prices have not yet found basis in sales, due to the fact that most manufacturers have rather sizable orders on their books carrying lower prices, which are not affected by the advance, the present quotations are declared to be only tentative and are likely to be further advanced if demands are such as to force manufacturers into the labor market. Pennsylvania makers are finding it hard to secure a sufficient supply of common labor in competition with other industries, and because of that situation they are indisposed to give protection on prices very far ahead. Forward business will be taken only on a basis of prices in effect at time of shipment, as it is asserted that even present prices would not show a fair profit if there were any further increase in labor costs.

The new price of Birmingham silica brick has not yet been announced. The leading producer in that district has withdrawn its most recent quotation of $43, but has not yet decided on a new price.

We quote per 1000, f.o.b. works:

Fire clay	High Duty	Moderate Duty
Pennsylvania	$40.00 to $43.00	$36.00 to $40.00
Ohio	40.00 to 43.00	36.00 to 40.00
Kentucky	40.00 to 43.00	35.00 to 39.00
Illinois	40.00 to 42.00	37.00 to 39.00
Missouri	40.00 to 42.00	35.00 to 39.00
Ground fire clay, per net ton		7.00 to 8.00
Silica brick:		
Pennsylvania		45.00
Chicago		53.00
Birmingham		Nominal
Ground silica clay, per net ton		9.00
Magnesite brick:		
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.)		60.00
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)		32.00
Chrome brick:		
Standard size, per net ton		45.00

WIRE CLOTH MERGER

Wickwire-Spencer Steel Corporation Acquires American Wire Fabrics Co.

WORCESTER, MASS., Aug. 29—The Wickwire-Spencer Steel Corporation, Worcester and Buffalo, has acquired the American Wire Fabrics Co., Blue Island, Ill., and Mount Wolf, Pa., manufacturer of wire cloth. The price paid is nearly $4,000,000. The purchase has been approved by the directors of the Wickwire-Spencer company and final action will be taken at a meeting of the stockholders called for Worcester, Sept. 8. The transaction will involve various changes in the capitalization of the Wickwire-Spencer corporation, including $1,775,000 of ten-year secured convertible 7½ per cent notes, retiring the class A common shares and increasing the common stock from 250,000 shares to 600,000 shares.

The American Wire Fabrics Co. was organized in 1911 through the consolidation of the American Wire Cloth Co., Clinton, Iowa, the National Wire Cloth Co., Niles, Mich., the New Freedom Wire Cloth Co., New Freedom, Pa., and the Pennsylvania Wire Cloth Co., Mount Wolf, Pa. The products of the company's plants are similar to those of the wire cloth company departments of the Wright & Clinton works of the Wickwire-Spencer company. The American Wire Fabrics Co. will retain its corporate identity. It is now an Iowa corporation and will change to a Delaware charter.

Railroad Car and Locomotive Buying

Orders for 100 locomotives have been placed in the last week and activity in car repair orders and inquiries continues. New car orders are light:

The Louisville & Nashville has ordered 30 Mikado locomotives from the American Locomotive Co.

The Missouri, Kansas & Texas has ordered 45 locomotives from the Lima Locomotive Co. and 10 switching from the American Locomotive Co.

The Illinois Central has awarded 15 locomotives to the Baldwin Locomotive Works.

[illegible] locomotives.

The Pacific Electric is in the market for 200 dump cars.

The Chicago & North Western is inquiring for repairs on 1000 gondola cars.

The Pere Marquette is in the market for repairs on 1000 box cars.

The Santa Fe has ordered 8 buffet library cars from the Pullman Co.

The Monon has placed 4 passenger cars with the Pullman Co.

The Chicago & Eastern Illinois is inquiring for 17 baggage cars.

The Washburn Lignite Coal Co., Wilton, N. D., is inquiring for 75 steel mine cars.

The Municipal Railway of San Francisco is in the market for 40 part steel street cars.

The Erie is inquiring for 100 steel underframes.

The Lehigh & New England for 100 gondola cars.

The New York Central is having repairs made to 50 locomotives at the shops of the Rome Locomotive Works.

The Central Railroad of New Jersey is having 200 steel hopper cars repaired by the Pressed Steel Car Co.

The Philadelphia & Reading has ordered 100 refrigerator cars from the American Car & Foundry Co.

Sheet Sales Drop

The monthly report of the National Association of Sheet and Tin Plate Manufacturers to the Bureau of the Census, Department of Commerce, for the month of July, discloses conditions quite the reverse of those for June. Sales of members of the association who reported were 143,563 net tons, this total representing only 58.2 per cent of the monthly capacity of the association membership. June sales were 268,032 net tons or 110 per cent of the monthly capacity. Production exceeded the sales by 35,537 tons and shipments were 37,818 tons in excess of the new bookings. In June the sales exceeded production by almost 58,000 tons and the shipments by 65,000 tons, resulting in an increase in unfilled tonnages. The latter item decreased in July, and Aug. 1 found the mills with orders equal to 1663 months' capacity as compared with bookings equivalent to 1797 months' capacity on July 1. Stocks on hand waiting shipment on Aug. 1 were 82,053, an increase of 4802 tons as compared with a month before, but unsold stocks in July were reduced 2591 tons. Deducting stocks awaiting shipment and the unsold stocks, the net obligations of the mills as of Aug. 1 were 308,246 tons as compared with 338,425 on July 1.

The July report compares with that for June as follows:

	July		June	
	Net Tons	Per Cent Capacity	Net Tons	Per Cent Capacity
Total sales	143,563	58.2	268,032	110.0
Total production	179,100	72.7	210,460	86.4
Total shipments	181,381	73.6	202,022	83.3
Unfilled tonnage	409,885	166.3	437,853	179.7
Stock to be shipped	82,053	33.2	77,251	31.7
Stock unsold	19,856	8.0	22,177	9.8

The total number of hot mills in the United States is 641, having a monthly capacity of approximately 365,000 tons and the percentage of the capacity to which the above figures are related is 67 per cent.

FABRICATED STEEL BUSINESS

Bridge and Building Awards and Tonnages Pending at Leading Centers

Awards for fabricated steel work for the past week include the following:

Building for a gas company, Baltimore, 1000 tons, to the Belmont Iron Works.

Manufacturing building, Ansonia, Conn., 250 tons, to the American Bridge Co.

Loft building, Thirty-third Street, New York, 300 tons, to the Paterson Bridge Co.

Highway bridge, Saratoga Springs, N. Y., 500 tons, to the American Bridge Co.

Mill building, Holyoke, Mass., 1100 tons, to the Shoemaker-Satterthwaite Bridge Co.

Building, Philadelphia Trust Co., 200 tons, to the Keystone Structural Co.

New mechanical puddling plant for Youngstown Steel Co., Warren, Ohio, 2000 tons, to American Bridge Co.

Public Service Co. of Northern Illinois, power station, Waukegan, Ill., 2100 tons, to Milwaukee Bridge Co.

Building, Hardie Brothers Co., Pittsburgh, 2200 tons, to American Bridge Co.

National Enameling & Stamping Co., sheet mill addition, Granite City, Ill., 1500 tons, to Mississippi Valley Structural Steel Co.

Vaults and repairs, Union Trust Co., Union Arcade, Pittsburgh, 750 tons, to American Bridge Co.

Buildings, Western Reserve University, Cleveland, 775 tons, to American Bridge Co.

Louisiana & Arkansas Railway Co. shops, Stamps, Ark., 711 tons, to unnamed fabricator.

South Park Commissioners, field house, Chicago, 300 tons, to A. Bolter's Sons.

Highway viaduct, Dubuque County, Iowa, 246 tons, to Pittsburgh-Des Moines Steel Co.

Boiler house, Peshtigo (Wis.) Paper Co., 100 tons, to Worden-Allen Co.

Illinois State Penitentiary Commission, dining hall at Lockport, 150 tons, to Milwaukee Bridge Co.

Coaling station for Union Pacific system, Carter, Wyo., 148 tons, to unnamed fabricator.

Shelter shed for wagon yard, St. Louis, the Supply Commission, City of St. Louis, 147 tons, to Stupp Brothers.

Exchange National Bank Building, Tulsa, Okla., 250 tons, to Kansas City Structural Steel Co.

Spring Street viaduct, Atlanta, Ga., 1200 tons, Virginia Bridge Co. low bidder.

Addition to plant of Gardner-Harvey Paper Co., Middletown, Ohio, 300 tons, to Bellefontaine Bridge Co.

Four-story office building of Chamber of Commerce of United States, Connecticut Avenue and H Street, N. W., Washington, D. C., 1800 tons, to American Bridge Co.

National Bank building, Baltimore, 300 tons, to Dietrich Bros.

Bolton Square Apartment, Cleveland, 700 tons, to the Forest City Iron & Steel Co.

New York Central subway work at Elyria, Ohio, 120 tons, to the McClintic-Marshall Co.

Structural Projects Pending

Inquiries for fabricated steel work which may be added to lists of pending projects include the following:

Power house for the State of New York, Crescent, N. Y., 200 tons.

Highway bridge, Norfolk, Va., 500 tons.

Federal building, Manville, R. I., 200 tons.

Three manufacturing buildings for Lockwood Greene & Co., 300 tons.

Julia Richmond High School, 1600 tons.

Factory building for Fay & Egan Co., Cincinnati, 900 tons, bids close Sept. 11 with Clifford Stegner, architect, 1700 Union Trust Building, Cincinnati.

Addition to office building, United Brethren, Dayton, Ohio, approximately 1000 tons. Plans prepared and bids to be taken shortly.

Stadium at University of Illinois, Champaign, Ill., 500 tons of steel and 1000 tons of reinforcing bars (estimated), general contract reported to be awarded to Chicago contractors.

Large garage for Consolidated Gas & Electric Light Co., Baltimore, 800 tons.

South Side High School, St. Louis, 300 tons.

Collinwood High School, Cleveland, 1500 tons. Bids to be taken Sept. 18.

Feldman Apartment, Detroit, 500 tons.

Commodore Perry Building, Toledo, 1000 tons.

Dr. George B. Waterhouse Accepts Chair of Metallurgy at M. I. T.

Dr. George B. Waterhouse, for the past 16 years connected with the Lackawanna Steel Co., Buffalo, N. Y., has accepted the appointment as head of the department of metallurgy at the Massachusetts Institute of Technology, Boston, and will assume his new duties at the beginning of the college year this fall.



DR. GEORGE B. WATERHOUSE

Doctor Waterhouse will take to his new work a broad practical experience in metallurgy, fortified by a liberal education. He was born on May 25, 1883, and received his early education in Great Britain. Five years of his university training were spent in England, the greater part of which was at the University of Sheffield under Professors J. O. Arnold and Andrew McWilliam. In the United States he had three years at Columbia University under Dr. Henry M. Howe and Bradley Stoughton. Since 1906 he has been with the Lackawanna Steel Co. as metallographist and metallurgist and for the last few years as metallurgical and inspecting engineer. In this work his theoretical training has been broadened by practical experience, especially in the making and working of steel. At the same time he has kept in close touch with developments in this and other countries and has paid particular attention to the work of French and German investigators. His intimate knowledge of the French and German languages has been no small factor in these later studies and in his translated abstracts for THE IRON AGE, which have been a feature in these columns for a number of years.

He is a member of the American Iron and Steel Institute, the Iron and Steel Institute (British), the American Institute of Mining and Metallurgical Engineers, and the American Society for Testing Materials. To most of these societies he has contributed papers and discussions. In the work of the American Association of Steel Manufacturers he has been a regular participant.

Doctor Waterhouse succeeds Prof. H. O. Hofman, who resigned last June as head of the department at the Boston institution, after many years of service. The new appointment represents a change, in that Professor Hofman has been known particularly in connection with non-ferrous metallurgy, whereas the new appointee's life work has been in the metallurgy of iron and steel.

General Advance of 20 Per Cent in Wages of Steel Workers

Since the announcement of the advance of 20 per cent in wages of steel workers by the United States Steel Corporation, advances by independent companies have become general. In some cases, independents had made advances previous to the Steel Corporation announcement, as, for example, the Replogle Steel Co. made an advance of 2c. per hr. July 1. In these cases, advances to bring the scale up to the Steel Corporation schedule have been made. The advance made by operators of Alabama coal mines is 20 per cent and applies to 27,000 men. The usual form of notice posted by independent companies is the same as that of the Steel Corporation constituents, 20 per cent for all day labor and equitable adjustment in wages of all other classes.

Iron and Steel Markets

SEE HIGHER PRICES

Steel Producers Make Advances But Do Little Selling

Better Promise of Fuel But Coke Region Workers Are Still Out—Steel Corporation Prices

A flood of price advances, covering nearly the whole range of iron and steel products from pig iron to nuts and bolts, has followed the wage advances at steel works and at non-union mines. Little steel has been booked at these higher prices, as few producers can promise deliveries, and most of them see further advances later in the year.

To add to the confusion, promises of increase in soft coal production have gone out from Washington, pointing to a more rapid improvement in industry than is indicated in steel. The wiping out of the fourth and fifth classes in the priority scheme of the Commerce Commission, leaving steel in the third but still the last class, is looked on as making no important change. Transportation is to-day, as it has been for weeks, the chief hampering factor.

Thus far the wage advances of 40 per cent and more by non-union mines in the Connellsville region have not brought back the workers and production in this important coke center is still restricted. The attempt to unionize these mines may prolong the idleness of blast furnaces dependent on Connellsville coke.

It is not yet clear how far the 20 per cent advance in steel works wages will relieve the shortage in common labor. That factor is more important in any reckoning as to steel supply in the remainder of the year than is commonly appreciated.

While the Steel Corporation refrains from making price announcements, it has made some late advances. On Aug. 23 it followed an independent producer of standard pipe going up $6 on black and $4 on galvanized, with a $6 advance on oil country goods. On wire products it has gone up $4 per ton to the new independent level of $2.60 per keg for wire nails and to $2.35 per 100 lb. for plain wire, an advance of $2 per ton.

Some independent producers of sheets indicate that their prices for fourth quarter will be considerably above those of the Steel Corporation. Also on bars, plates and shapes, independent prices take a wide range, as high as 2.50c. being asked for plates.

Railroad buying goes on apace. At Chicago three important trunk lines have entered the rail market with inquiries for 1923 amounting to 60,000 tons. It is quite certain that the price will be above the $40 level of 1922, but how far has not yet developed. The week's orders for new locomotives total 100.

New structural steel orders aggregate about 15,000 tons. Of this 2000 tons is for the new mechanical puddling mill of the Youngstown Steel Co. and 1500 tons for a sheet mill addition at the National Enameling & Stamping Co.'s plant.

Considerable new business is offered in plates. Lake Erie shipyards have inquiries for three boats which will take 15,000 tons of steel. Ohio tank shops are figuring on contracts calling for 6500 tons of plates.

The announced purpose to shut down the Ford plant is not accepted as a finality, in view of official assurance from Washington that Detroit industries will get fuel before Sept. 16 and at reasonable prices. However, orders to hold up shipments of Ford materials after Sept. 5 have gone out and have affected several steel plants, sheet mills, manufacturers of forgings and others.

Heavy buying of foreign pig iron has continued in the New York district, where orders for about 40,000 tons were placed, and in other Eastern centers. Seaboard prices on imports are several dollars below those quoted on domestic iron, of which the tonnage obtainable is very limited. One feature of the domestic market has been the shipping of iron long distances. The furnace at Granite City, Ill., has been shipping to Wisconsin, western Pennsylvania, Ohio and Indiana, while Canadian iron has come into Northern States. The Birmingham market has advanced rapidly and as high as $25 has been paid for spot shipment. At Cincinnati and Cleveland, foundry grades have been marked up $3, but the upward trend has halted in Chicago. At Pittsburgh, the market has come to a standstill because virtually no iron is to be had.

THE IRON AGE composite price for finished steel remains at 2.412c. per lb., as last week. This is the highest it has been since July 12, 1921. At the beginning of last January it was 2.062c.

Pig iron has advanced to $29.52 from $26.86 last week. This is the highest point reached by THE IRON AGE pig iron composite price since the $29.93 of Feb. 8, 1921.

Pittsburgh

Continued Curtailment of Steel Production Little Pig Iron Business

PITTSBURGH, Aug. 29.—The iron and steel industry in this district as yet has made no decided response to the virtual conclusion of the coal strike in the union field, but, on the contrary, appears to have lost additional ground in the matter of steel production, due to the fact that the strike in the hitherto non-union coal districts has not been settled by the recent restoration of peak wage scales and also because the shortage of labor in the steel mills still is unrelieved.

Expectations that the big wage increase would bring the men back to work in the Connellsville district and thus make for a somewhat easier fuel situation for so many of the steel company and blast furnace interests in this and nearby districts, have not been fulfilled. The fuel situation both as regards coal and coke is slightly easier, but not to an extent that makes possible the putting on of additional furnaces or steel plants. Some steel companies will be helped by the resumption of idle union mines, but already the matter of car supplies is bothersome and the fear is expressed that when steel production is increased, difficulty will be encountered in securing a sufficient number of cars to move the finished product. Desire of buyers to get a place on mill books

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton.	Aug 29, 1922	Aug. 22, 1922	Aug. 1, 1922	Aug. 30, 1921
No. 2X, Philadelphia..	**$34.14**	$33.14	$29.26	$ 20.84
No. 2, Valley furnace†	33.00	33.00	28.00	21.00
No. 2, Southern, Cin'ti†	**27.05**	24.05	22.55	23.50
No. 2, Birmingham, Ala.†	**23.00**	20.00	18.50	19.00
No. 2 foundry, Chicago*	30.00	30.00	26.00	21.00
Basic, del'd, eastern Pa..	28.64	28.64	27.25	19.00
Basic, Valley furnace....	**30.00**	26.00	25.00	19.00
Valley Bess, del, Pitts..	**33.76**	31.76	26.76	21.96
Malleable, Chicago*	30.00	30.00	26.00	21.00
Malleable, Valley	**33.00**	31.00	27.00	21.00
Gray forge, Pittsburgh...	34.76	34.76	27.76	21.96
L. S. charcoal, Chicago..	**36.15**	34.65	33.15	33.50
Ferromanganese, seaboard	67.50	67.50	67.50	70.00

Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill..	$40.00	$40.00	$40.00	$47.00
Bess. billets, Pittsburgh..	**38.00**	37.50	35.00	29.00
O.-h. billets, Pittsburgh..	**38.00**	37.50	35.00	29.00
O.-h. sheet bars, P'gh....	**38.00**	37.50	35.00	30.00
Forging billets, base, P'gh	43.00	43.00	40.00	34.00
O.-h. billets, Phila.....	**45.17**	42.67	40.17	35.74
Wire rods, Pittsburgh....	45.00	45.00	40.00	40.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb..	2.00	2.00	1.70	1.75
Light rails at mill.....	**2.00**	1.90	1.75	1.75

Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia...	2.325	2.325	2.025	2.00
Iron bars, Chicago.....	**2.25**	2.15	2.00	1.75
Steel bars, Pittsburgh....	2.00	2.00	1.70	1.70
Steel bars, Chicago.....	2.35	2.35	1.75	2.08
Steel bars, New York....	2.34	2.34	2.04	2.08
Tank plates, Pittsburgh..	2.00	2.00	1.70	1.70
Tank plates, Chicago.....	2.20	2.20	1.75	2.00
Tank plates, New York...	2.34	2.34	2.04	2.08
Beams, Pittsburgh	2.00	2.00	1.70	1.75
Beams, Chicago	2.35	2.35	1.75	1.85
Beams, New York.....	2.34	2.34	2.04	2.13
Steel hoops, Pittsburgh...	2.75	2.75	2.50	2.25

Sheets, Nails and Wire,	Aug. 29, 1922	Aug. 22, 1922	Aug. 1, 1922	Aug. 30, 1921
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh	3.35	3.35	3.15	2.75
Sheets, galv., No. 28, P'gh	4.35	4.35	4.15	3.75
Sheets, blue an'l'd, 9 & 10	2.50	2.50	2.40	2.25
Wire nails, Pittsburgh....	2.60	2.60	2.40	2.75
Plain wire, Pittsburgh....	2.35	2.35	2.25	2.50
Barbed wire, galv., P'gh..	3.15	3.15	3.05	3.40
Tin plate, 100-lb. box, P'gh	$4.75	$4.75	$4.75	$5.25

Old Materials, Per Gross Ton:				
Carwheels, Chicago	**$22.50**	$21.00	$19.50	$13.75
Carwheels, Philadelphia...	19.00	19.00	17.50	17.00
Heavy steel scrap, P'gh..	**18.50**	18.25	17.00	13.00
Heavy steel scrap, Phila..	15.50	15.50	15.00	11.50
Heavy steel scrap, Ch'go..	**17.00**	16.00	15.50	11.00
No. 1 cast, Pittsburgh....	19.00	19.00	19.00	16.50
No. 1 cast, Philadelphia..	19.00	19.00	18.00	17.00
No. 1 cast, Ch'go (net ton)	**20.00**	19.50	17.00	13.00
No. 1 RR. wrot, Phila....	18.50	18.50	17.50	14.00
No. 1 RR. wrot, Ch'go (net)	**15.50**	15.25	14.25	11.00

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt....	*$10.00*	$12.00	$11.00	$3.00
Foundry coke, prompt....	*12.00*	13.00	11.50	4.00

Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York..	14.12½	14.12½	14.12½	12.00
Electrolytic copper, refinery	13.75	13.75	13.75	11.62½
Zinc, St. Louis.....	**6.25**	6.22½	6.25	4.12½
Zinc, New York.....	**6.60**	6.57½	6.60	4.62½
Lead, St. Louis.....	*5.55*	5.60	5.47½	4.20
Lead, New York.....	5.90	5.90	5.80	4.40
Tin (Straits), New York..	*32.30*	32.50	32.75	26.75
Antimony (Asiatic), N. Y.	5.25	5.25	5.25	4.50

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.
The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Aug. 29, 1922, Finished Steel, 2.412c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

Aug. 22, 1922,	2.412c.
Aug. 1, 1922,	2.169c.
Aug. 30, 1921,	2.293c.
10-year pre-war average,	1.689c.

These products constitute 85 per cent of the United States output of finished steel.

Composite Price, Aug. 29, 1922, Pig Iron, $29.52 Per Gross Ton

Based on average basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Aug. 22, 1922,	$26.86
Aug. 1, 1922,	24.38
Aug. 30, 1921,	19.64
10-year pre-war average,	15.72

still is greater than that of manufacturers to enter orders, and the supply situation still being very acute and increased labor costs immediately ahead, the trend of prices is strongly upward. Few additional advances have been made by independent producers in the past week, but the Steel Corporation, pursuing the same sort of a policy as it did in the decline of 1921 of following rather than making price changes, has in the past week generally followed the advance recently set up by independent manufacturers. The Corporation really has no official quotations on any of its products except pipe and sheets, but on wire products is naming the independent levels on such business as it can take, and on the same basis is naming 1.90c. base, Pittsburgh, on bars and 2c. on plates and shapes.

Announcement by the Ford Motor Co. of its intention to shut down its plants on Sept. 16 and asking that shipments of steel on order be suspended, is viewed in various ways here. Some regard the movement as merely one of publicity, because it is believed that the company was nearing the end of its active producing season. The Carnegie Steel Co., in setting up its recent priority system of mill schedules, virtually had cut off the automotive industry. Suspensions will probably be granted by makers of some lines of automotive steel, but among independent sheet makers the disposition is to refuse suspensions, unless the Ford Motor Co. is willing to pay the prices in effect when shipments are resumed. It is not believed here that the Ford movement will have a very widespread effect.

Pig Iron.—Business has dwindled almost to the vanishing point since a week ago, not so much because of a lack of demand, but because there is so little iron with which to do business. Few producers have any iron to sell and middle interests seem to have sold such stocks as they had. Those who must have supplies find that it is necessary to meet sellers' price views in order to obtain them. The Valley furnaces have no foundry iron to sell and it is impossible now to get supplies in Buffalo or in Cleveland and while iron can be had in southern Ohio and in the South, it is almost impossible to bring it into this district on account of the railroad congestion. Only an appraisal of the price at which special analysis iron from Valley furnaces would sell is possible at this time. Based on prices made elsewhere, the Valley basis on foundry or

malleable iron is about $33. Small sales of standard Bessemer have been made at $32, Valley furnace, and that probably is as low as any more could be bought Basic iron is no longer available at less than $30, Valley furnace, and $32 is the price now demanded by a scrap firm having some Valley iron taken in payment for old material. The Colonial Steel Co., Pittsburgh, is inquiring for 2000 tons of basic iron, but in general the demand for the steel making grades is not very active. Foreign iron of both foundry and steel making grades has been offered here, but no business is reported. The general asking price of foreign iron is $24.50 c.i.f. Atlantic seaboard, which is equivalent to about $27 f.o.b. cars. The Shenango Furnace Co. to-day started up its No. 1 furnace and it is is reported that the Struthers Furnace Co. is accumulating coke and will start its furnace in a few weeks.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.76 per gross ton:

[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
No. 2 foundry	33.00
[illegible]	[illegible]
Malleable	33.00

Iron and Steel Bars.—Although the Steel Corporation is naming 1.90c., base Pittsburgh, on such tonnages of soft steel bars as it can take from regular customers, in keeping with its priority schedule, buyers who must have specified delivery are finding independents uninterested at less than 2c. As high as 2.25c. is demanded by some.

We quote steel bars rolled from billets at 1.90c. to 2.25c.; reinforcing bars, rolled from billets, 1.90c. to 2.25c. base; rail steel reinforcing bars, 1.90c. to 2c.; refined iron bars, 2.35c. in carloads, f.o.b. mill, Pittsburgh.

Ferroalloys.—The situation presents no material change. Demand generally is slow and prices recently prevailing still hold. It is reported, however, that on account of liberal shipments of coal from British mines to this country, the fuel situation has grown firmer across the water and that British makers of ferromanganese are less anxious for business than they were a short time ago. Domestic spiegeleisen is slightly easier with regard to supplies, due to the fact that coke is available in somewhat larger quantities than it was recently. The quotations of the leading commercial producer of $39 furnace for 20 per cent material and $38 for 16 to 19 per cent are being named on small tonnages, and are being shaded about $1 per ton on round lots.

We quote 78 to 82 per cent ferromanganese, $75 c.i.f. Atlantic seaboard for domestic; British, spot, $72.50; British, future, $67.50; German, 76 to 80 per cent, $67.50 to $70. Average 20 per cent spiegeleisen, $39 furnace; 16 to 19 per cent, $38 furnace; 50 per cent ferrosilicon, domestic, $55 to $60 furnace, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, $45; 11 per cent, $48.30; 12 per cent, $51.60; 13 per cent, $55.60; 14 per cent, $58.60; silvery iron, 6 per cent, $33.50; 7 per cent, $34.50; 8 per cent, $36; 9 per cent, $38; 10 per cent, $40; 11 per cent, $42.50; 12 per cent, $45. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per [illegible].

Billets, Sheet Bars and Slabs.—Open market offerings still are exceedingly limited due to the fact that insufficient supplies of fuel and labor shortages render impossible any appreciable increase in steel works operations. Not much business is passing, but this is due more to the lack of supplies than an absence of inquiries. The only sale of consequence that has come to light lately is one of 2000 tons of sheet bars which went at $38, Pittsburgh. This is probably as low as makers would go on billets or slabs if they had any tonnage for sale, and with pig iron at $30 or more, many feel that the price should be at least $40. Any quotations these days are little more than appraisals because actual business is so limited.

We quote 4 x 4-in. soft Bessemer and open-hearth billets at $38 to $40; 2 x 2-in. billets, $38 to $40; Bessemer and open-hearth sheet bars, $38 to $40; slabs, $38 to $40; forging billets, ordinary carbons, $43 to $45, all f.o.b. Youngstown or Pittsburgh mills.

Cold-Finished Steel Bars and Shafting.—A good many makers in this district are supplied with hot-rolled bars by the Carnegie Steel Co. and lately have been largely shut off as a result of a priority scheduling of mills recently set up by that company. Since bar supplies are available from other sources only at high prices, some makers of cold finished bars now regard 2.50c. base, Pittsburgh to be as low as they should sell. There is basis, however, for a price of 2.25c. base, Pittsburgh. The Ford Motor Co. has entered suspensions against all orders with makers here, but this action has not yet been followed by other automobile manufacturers. Ground shafting is unchanged at 2.65c. base, f.o.b. mill for carload.

Wire Rods.—The American Steel & Wire Co. is understood to have named $43, Pittsburgh, for the base size of common soft rods on such business as it could take, but as it is not taking any business at the moment the quotation has no significance. The most recent business was at $45 and that is probably as low as any can be had.

We quote No. 5 common basic or Bessemer rods to domestic consumers, $45; chain rods, $45; screw stock rods, $50; rivet and bolt rods and other rods of that character, $45; high carbon rods, $52 to $55, depending on carbon, per gross ton, f.o.b. Pittsburgh or Youngstown.

Iron and Steel Pipe.—Effective Aug. 23, the National Tube Co. issued new cards meeting the advance made Aug. 15, by the Youngstown Sheet & Tube Co. and subsequently followed by other independent. The leading interest also issued new oil country and line pipe cards, making a horizontal cut of three points in the discount, or an advance in price of $6 per ton. The shortage of the smaller sizes of steel pipe is unrelieved and probably will continue until cold weather halts building work or until labor, rail and fuel conditions are exacting less of a toll on steel productions. Makers are not nearly as heavily obligated on the lap welded sizes as on the butt weld, but are not eager for more business until operating conditions are more settled. The Pure Oil Co. is in the market for 30 miles of 8-in. 29-lb. oil line pipe with couplings, for September delivery. An old inquiry for 200 miles of 20-in. line pipe for the Southwest has been revived. Recent advance in wrought iron pipe seems to have halted buying. Discounts are given on page 569.

Bolts and Nuts.—There is a stronger tendency to prices and actual advances are likely to be announced soon, due to the strength of bar prices, which it is now figured can not be lower in the near future with pig iron at $30 or more and billets appraised at close to $40. Some makers believe that small machine bolts, with rolled threads, should be at 50, 10 and 5, as against the present official quotation of 60, 10 and 10, and other products up accordingly. One local producer in the past week reduced the discount on cold-pressed nuts 50c. per 100-lb. and also on semi-finished nuts, now quoting the latter at 80 per cent off list on small and 75 per cent off list on large. Discounts are given on page 569.

Wire Products.—The American Steel & Wire Co. recently abandoned the prices it has so consistently observed since the early part of the year and has gone to the levels announced two weeks ago by leading independent manufacturers, but only on such business as it is able to take. This company is as heavily committed as it cares to be and is virtually out of the market. Most of the independent manufacturers still are out of the market, but state that if they could take business, they would name $2.60 base per keg, Pittsburgh, for nails and $2.35 base per 100-lb. for wire. The Cambria Steel Co., which is out of production at present, has some nails in stock on which it is quoting $3.25 base per keg, Pittsburgh. The few manufacturers who can take business are not committing themselves very far ahead because it is claimed that the recent advance did not provide for the wage increase which becomes effective Friday and which will add, it is estimated, about $5 per ton to producing costs. Prices are given on page 569.

Steel Rails.—On light rails rolled from new steel the market no longer is quotable at less than 2c. base, this now being the minimum price of the Carnegie Steel Co. One independent producer offering steel rails out of stock has gone to 2.25c. base. Light sections rolled from old standard rails now range from 1.90c. to 2c.

We quote 25 to 45-lb. sections, rolled from new steel, 2c. base; rolled from old rails, 1.90c. to 2c. base; standard rails, $40 per gross ton mill for Bessemer and open-hearth sections.

Boiler Tubes.—The National Tube Co., effective Aug. 23, reduced the discounts on steel lap welded and com-

mercial seamless boiler tubes three points, this being equivalent to an increase of $6 per ton. In its new seamless tube card, the company segregates cold-drawn and hot-rolled tubes. The carload discount on 3¼-in. to 4-in. hot-rolled tubes now is 51 per cent off list, or only three points less, or $6 per ton higher than the base sizes of lap-welded steel tubes. The National Tube Co. cards have been generally adopted by independent makers. A new card, dated Aug. 25, has been issued by makers of charcoal iron boiler tubes in which the discounts on all sizes have been cut seven points, thus increasing the price $14 per ton. New discounts are given on page 569.

Steel Skelp.—Tubular goods producers who have to buy their skelp are having much difficulty in securing supplies because of the shortage in the general supply of steel. Corporation customers whose product does not come within the priority classifications recently set up have been shut off. Prices range from 2c. to 2.25c., but premiums undoubtedly would have to be paid for early deliveries, particularly of grooved skelp.

Track Equipment.—A further advance of $5 per ton has been made in spikes since a week ago, this change finding its chief explanation in the shortage of steel. Some makers also have advanced track bolts $5 per ton, but the old price of $3.50 base per 100-lb. still is possible on attractive business. Prices are given on page 569.

Tin Plate.—Independent makers, on account of increasing labor costs, are beginning to talk higher prices, and it is possible will soon announce an advance of $5 per ton. It is claimed that preferential prices to large buyers are disappearing and that $4.75 per base box, Pittsburgh, now is minimum on new business to either large or small buyers. Container manufacturers seem to be amply covered, and new business is not especially heavy.

Hot-Rolled Flats.—The Steel Corporation has made no public announcement, but is believed to be naming 2.75c. base, Pittsburgh, the price recently set up by independents for fourth quarter business, on such orders as it can take. Some of the makers of strips in this district will suffer as a result of the suspension by the Ford Motor Co.

Cold-Rolled Strips.—The price of 4.25c. base, Pittsburgh, recently named on fourth quarter business by independents, is being generally observed.

Cut Nails.—The Reading Iron Co. has announced an increase of $3 per ton to a base of 2.90c., mill, for carloads and 3c. for less than carloads.

Rivets.—One large maker has announced an advance in large rivets of $7 per ton, and a 5 per cent reduction in the discount on small rivets. Some makers still are taking business at the former price level of $2.65, base, per 100 lb., for button-head structural, and $2.75 for cone-head boiler rivets, but all makers are on a base of 70 per cent off list for small rivets. The strength of the market is explained largely by the scarcity and increasing costs of bars and rods. Prices and discounts are given on page 569.

Structural Material.—Shortage of steel and inability of fabricators to obtain shipments even on old orders is seriously restricting business. Prices on structural jobs have not fully reflected the advances which have taken place to date on plain material, but investors are deterred from closing because of the very indefinite delivery promises that can be made. The Steel Corporation cannot take on much business, but on such tonnages as it is accepting its price is 2c., Pittsburgh. This price now would not interest independent mills. Prices are given on page 569.

Warehouse Business.—The Jones & Laughlin Steel Co. and Carnegie Steel Co. have made further advances in warehouse prices. Bars, plates and shapes have been advanced $3 per ton and bands $6 per ton. New prices are 2.60c. base for bars, 2.70c. for plates and shapes, 3.40c. for bands.

Sheets.—While the Ford Motor Co. has asked for suspensions on shipments of sheets because it proposes to shut down on Sept. 16, other automobile manufacturers, anxious to keep going, still are pressing urgently for delivery. Outside of automobile sheets, the supply situation does not appear to be as taut as it was recently, presumably because the independent mills have managed to keep going until this week at a fairly high rate of operations, and undoubtedly have provided for a good many wants. Operations of independent mills in the first half of this month were in excess of 87 per cent of capacity. No such showing is likely during the second half of the month, because of the decline in the production of steel. In the matter of steel supplies, the leading interest is worse off than the independents, and since it is making no material reduction in its obligations is obliged to turn down much business for delivery over the remainder of this year. Independents are asking advances over the Steel Corporation prices of $3 to $8 per ton, but some independent producers say they have lost business in black sheets at 3.50c. Prices are given on page 569.

Coke and Coal.—There has been a further easing in prices since a week ago, due to increased production. The gain is greater in the union than in the non-union coal fields, because so far the increased wages recently announced in the non-union fields have not resulted in the return to work of many men. The coal market now is quotable at $5 to $5.25 at mines for steam coal, $5.25 to $5.50 for by-product coal, and from $5.50 to $6 for gas coal. Generally the supply of furnace coke is insufficient to attract much furnace buying, but we note sales for Eastern shipment at $10.50 and to the Valley district as low as $10. Furnace coke appears to be quotable from $10 to $11 per net ton at oven. Demand for foundry grade is more constant than that for furnace fuel and the premium of the former over the latter is greater than usual, sales being noted from $12 to $14.

Old Material.—The market maintains all of its recent strength and still is inclined higher, because of light offerings and an increased disinclination on the part of dealers to let go of yard stocks. A Pittsburgh district steel maker still is offering $18.50 for railroad or equivalent heavy melting steel, but has found no takers because dealers feel they would have to pay at least $19 for such material and to sell yard stocks at this price would entail a loss, it is claimed. Since no sales have been made above $18.50 nor below, the market is quotable at that price. On yard heavy melting steel $17.50 seems to measure the top and bottom of the market. All other open-hearth grades are more firmly held than they were recently. This also is true of blast furnace material.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

	Per Gross Ton	
Heavy melting steel, railroad and industrial		$18.50
Heavy melting steel, yard		17.50
No. 1 cast, cupola size	$19.00 to	19.50
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va.; Franklin, and Williamsport, Pa.	18.50 to	19.00
Compressed sheet steel		19.50
Bundled sheet sides and ends		15.50
Railroad knuckles and couplers	19.00 to	19.50
Railroad coil and leaf springs	19.00 to	19.50
Low phosphorus standard bloom and billet ends	22.00 to	22.50
Low phosphorus, plates and other grades	20.00 to	20.50
Railroad malleable	17.00 to	17.50
Iron car axles	27.00 to	28.00
Locomotive axles, steel	25.00 to	26.00
Steel car axles	20.00 to	20.50
Cast iron wheels	20.00 to	20.50
Rolled steel wheels	19.00 to	19.50
Machine shop turnings	14.25 to	14.75
Heavy steel axle turnings	16.00 to	16.50
Short shoveling turnings	16.00 to	16.50
Cast iron borings	16.00 to	16.50
Heavy breakable cast	18.50 to	19.00
Stove plate	14.50 to	15.00
Sheet bar crop ends	20.50 to	21.00
No. 1 railroad wrought	15.50 to	16.00

The Illinois Car Mfg. Co., Hammond, Ind., has purchased the American Nut Co., Columbus, Ohio, and will move the business to Hammond.

Chicago

Heavy Advances in Prices of Finished Products —Many Inquiries

CHICAGO, Aug. 29—The 20 per cent increase in the wages of the steel works labor has been followed by advances in finished steel prices. The minimum quotation on mild steel bars for indefinite delivery has gone up $1 a ton to 1.95c., Chicago, while plates and shapes have advanced $3 a ton to a minimum of 2.05c., Chicago. Tie plates, spikes and bolts, axles and hoops and bands have also been raised, and among the semi-finished products, axle and forging billets are higher and early advances are expected on re-rolling billets and sheet bars. Prices for early shipment are not clearly defined, as buyers are dependent largely on Eastern sources quoting f. o. b. Pittsburgh. The Inland Steel Co., however, is expected to re-enter the market soon when it will announce prices on plates, shapes, bars, sheets and other products for delivery in the last two or three months of the year. Bar iron has advanced to 2.25c., Chicago, and wire products have gone up to the independent level of prices. Discounts on bolts and nuts are expected to be revised upward in view of advances in raw material.

Forward buying of steel shows no decline. In fact, for one large mill, August bookings were slightly heavier than these of the previous month. Inquiries for 1923 delivery are now being received. Quotations have been asked on a substantial tonnage of sheets for first quarter shipment and an inquiry for 3200 tons of nut stock for January and February shipment has been put out by a new local nut and bolt plant. Mills are disinclined to quote that far ahead, although the recent setback in production may result in delaying the delivery of some business now on the books until the first of the year.

The local production situation remains unchanged.

Pig Iron.—No additional merchant furnaces have been banked in this district and while fuel supplies are still low, it is hoped that the next change in the operating situation will be in the direction of greater production. The performance of the merchant stacks in this territory has been remarkable in view of conditions that obtain in other sections of the country. Of the 10 furnaces represented by the leading seller, five are still active, namely, two Iroquois, one Federal, one Mayville, and the Zenith stack. Reports from the East indicate that only one merchant furnace, a Toledo stack, is in blast in Ohio and none is active in Western Pennsylvania. The dearth of iron in that territory is indicated by numerous inquiries received by Chicago producers from various points in Ohio and even in West Virginia. Local prices remain unchanged, although a few spot tonnages have brought premiums, a lot of 150 tons having been sold at as high as $32 base furnace. Melters not only appear to be in need of iron but seem satisfied that present prices are here to stay, if indeed further advances are not made. Demand for prompt iron is unabated and purchases for the remainder of the year are being made freely. The movement of iron from the South is blocked by railroad embargoes. A local broker, however, has made a sale of 1200 tons of Southern foundry for delivery to an Ohio plant of a Chicago concern. A limited amount of consignment iron is finding its way to Chicago, though some of this has been in transit for weeks. Southern prices have generally advanced, the market now being quotable at $24 to $25 base Birmingham. While Southern producers are largely cut off from the Chicago territory at present, this is not true of furnaces in the St. Louis district. A number of large sales of foundry for delivery in this section have been closed at $30 base furnace, f. o. b. St. Louis, a Wisconsin melter having bought 2000 tons, a company with plants in Chicago and Michigan having purchased 1500 tons and a northern Illinois user having ordered 250 tons, all for prompt shipment. Charcoal is now generally quoted at $33 base furnace, and a sale of 400 tons has been made at that price. Copper free low phosphorous is firmly established at $38, Valley Furnace, a sale of 1000 tons having been closed at that quotation. Most low phosphorous furnaces are idle and stocks on furnace banks are low. Silvery has advanced to a minimum of $37.50 f. o. b. Jackson, for 8 per cent. While most melters are confining their attention to their immediate and fourth quarter needs, an inquiry for 500 tons of foundry for first quarter shipment has been received by local sellers. Interest in freight rates from the South has again been aroused by the announcement of a combination rate of $4.18 on shipments via barge from Sheffield and Florence, Ala., to Metropolis, Ill., and by rail over the Chicago, Burlington & Quincy to Chicago. The new rate will become effective Sept. 15 unless suspended by the Interstate Commerce Commission. This rate has been subject to numerous changes. Until July 1 it was $4.66. It was then reduced to $4.33 and on July 20 was advanced to $4.98.

Quotations on Northern foundry, high phosphorus malleable and basic iron are f.o.b. local furnace and do not include a switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$36.15
Northern coke, No. 1, sil. 2.25 to 2.75	31.00
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	30.00
Northern high phos.	30.00
Southern No. 2	$30.00 to 31.00
Malleable, not over 2.25 sil.	30.00
Basic	30.00
Low phos. Valley furnace, sil. 1 to 2 per cent copper free	38.00
Silvery, sil. 8 per cent	42.29

Ferroalloys.—A local company has closed for 200 tons of ferromanganese for delivery to plants at various locations. The purchase was made at $67.50, seaboard, and shipment is to be made from foreign sources. Otherwise the ferroalloys are quiet and the price situation is unchanged.

We quote 78 to 82 per cent ferromanganese, future, $75.06; prompt, $77.56 to $82.56, delivered; 50 per cent ferrosilicon, $55, delivered on contract and $57 prompt delivered, specifications 10 to 12 per cent $47 to $49 delivered.

Plates.—Plates are now quoted at from 2.05c. to 2.25c., Chicago, for indefinite delivery, while material for reasonably early shipment is commanding from $2 to $7 a ton above the maximum on forward business. Demand is still active.

The mill quotation is 2.05c. to 2.50c. Chicago. Jobbers quote 2.50c. for plates out of stock.

Cast Iron Pipe.—Minneapolis has awarded 1100 tons to the American Cast Iron Pipe Co. There are no other lettings to report and business generally is quiet. Prices continue to show strength and some makers are now quoting a minimum of $40, base, Birmingham, for 6-in. and larger. Freight congestion in the South is bad as ever and shipments from plants in that section are blocked.

We quote per net ton, f.o.b. Chicago as follows: Water pipe, 4-in., $50.70 to $52.20; 6-in. and above, $46.70 to $48.20; class A and gas pipe, $2 extra.

Warehouse Prices.—Advances in mill prices have been reflected in higher warehouse quotations. Bars, shapes, plates and bands have been advanced $2 a ton, structural and boiler rivets $3 a ton and hoops $4 a ton. Cold-drawn steel bars have also gone up $2. Revised prices are to be found under appropriate paragraphs. A $5 advance on cold-rolled strip steel brings that commodity up to 6.40c. base. Jobbers' prices on standard spikes and track bolts have been advanced $2 a ton to 3.50c. and 4.50c. respectively. Light rails have also been advanced on 25 to 45-lb. sections to 2.70c., 16 to 20-lb. sections to 2.745c., 12-lb. to 2.79c., and 8-lb. to 2.835c. Prices on 50-lb. and heavier sections remain unchanged. Billet prices have also gone up, 0.15 to 0.25 per cent carbon now being quoted at 2.75c. and 0.35 to 0.45 per cent carbon at 2.795.

Wire Products.—Minimum prices on wire, wire nails and cement coated nails are now $2.35, $2.60 and $2.10, Pittsburgh, respectively. With mill operations still far below capacity, demand is considerably in excess of current production. For mill prices, see finished iron and steel, f.o.b. Pittsburgh, page 569.

We quote warehouse prices, f.o.b. Chicago: No. 9 and heavier black annealed wire and No. 9 and heavier bright basic wire, $3.20 per 100 lb.; common wire nails, $3.35 per 100 lb.; cement coated nails, $2.75 per keg.

Bolts and Nuts.—The Nash Motor Works is in the market for a large quantity of nuts. The report that the Ford Motor Co. will shut down Sept. 16 has caused some concern among sellers although it is felt that the

necessity for closing may be averted. Demand from all sources is satisfactory and an early advance in prices is looked for in view of higher material costs. The prices on page 569 apply to this territory except that the basing point is Chicago instead of Pittsburgh.

Jobbers quote structural rivets, 3.50c.; boiler rivets, 3.60c.; machine bolts up to ⅞ x 4 in., 50, 10 and 10 per cent off; larger sizes, 50 and 10 off; carriage bolts up to ⅞ x 6 in., 50 and 5 off, larger sizes, 15 off; hot pressed nuts, squares and hexagons, tapped, $3.25 off; blank nuts, $3.50 off; coach or lag screws, gimlet points, square heads, 60 per cent off; quantity extras are unchanged.

Bars.—Soft steel bars for indefinite delivery are now quoted from a minimum of 1.95c. to 2.15c., Chicago. Demand is still insistent notwithstanding the fact that owing to recent curtailment in production shipments may no be made until first quarter. The scarcity of bars for early shipment continues, with prices ranging from 2.35c., Chicago, up. Bar iron is now firm at 2.25c., Chicago, with demand somewhat lighter. One important producer has obtained additional fuel and has reentered the market. With the settlement of the strike at the Chicago Heights hard steel mills, those plants are again producing. Prices are unchanged on hard bars, the Moline mill quoting 1.85c., f.o.b. plant, or slightly over 2c., Chicago, while local mills are quoting a flat price of 2c., Chicago.

Mill prices are: Mild steel bars, 1.95c. to 2.45c., Chicago; common bar iron, 2.25c., Chicago; rail steel, 2c. to 2.005c., Chicago.

Jobbers quote 2.80c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 3.80c. for rounds and 4.30c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 2.50c. base; hoops, 3.90c.; bands, 3.55c.

Rails and Track Supplies.—Three important trunk lines entered the market last week with inquiries calling for a total of 60,000 tons of rails for 1923 delivery. Three or four other lines are about to issue inquiries and in view of the fact that rail orders for this year were relatively light, heavy purchases of both rails and fastenings are looked for this fall. Tie plates and spikes and bolts have advanced, tie plates being quoted at $43 to $45, mill, spikes at 2.75c. to 3c., mill, and bolts at 3.75c. to 4c., mill. Light rails are also up, now being quoted at 2c. to 2.25c., mill.

Standard Bessemer and open-hearth rails, $40; light rails rolled from new steel, 2c. to 2.25c., f.o.b. makers' mills.

Standard railroad spikes, 2.75c. to 3c., mill; track bolts with square nuts, 3.75c. to 4c., mill; tie plates, steel and iron, 2.15c. to 2.25c., f.o.b. mill; angle bars, 2.40c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.50c. base and track bolts 4.50c. base.

Semi-Finished Steel.—Axle billets are now quoted at a minimum of $40 and forging billets at $45, f.o.b. Chicago district mill. Sheet bars and rerolling billets are still quoted at $35 to $40, mill, but early advances are looked for.

Pending work includes:

Three-story garage for Paul Cornell estate, Chicago, 150 tons.

Ben Franklin office building, Indianapolis, 185 tons.

Public Service Co. of Northern Illinois, power plant, Waukegan, Ill., 110 tons.

Sheets.—Independent mills are getting $2 more on blue annealed and $3 more on black and galvanized than the prices recently announced for fourth quarter delivery by the American Sheet & Tin Plate Co. The Inland Steel Co. is still out of the market, but is expected to announce fourth quarter prices soon.

Mill quotations are 3.35c. to 3.50c. for No. 28 black, 2.50c. to 2.60c. for No. 10 blue annealed and 4.35c. to 4.50c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote blue annealed, 4c.; black, 4.85c.; galvanized, 5.85c.

Hoops and Bands and Axles.—These products have been advanced, hoops and bands now being quoted 2.75c. to 3c., f.o.b. mill, and axles at 2.50c. to 2.75c., mill.

Steel Castings.—Rising labor and material costs make advance in steel castings appear inevitable. Those foundries which have not anticipated the wage advances made by the Steel Corporation now find that they must raise their men to a parity with those employed by the mills. Meanwhile prices of pig iron and scrap are going up rapidly, with the result that the question of costs is receiving careful consideration.

Structural Material.—The market on plain material for indefinite delivery now ranges from a minimum of 2.05c. to 2.25c., Chicago. Reasonably early shipment is hard to get, but prices of from 2.35c. to 2.55c., delivered Chicago, are not unusual with the trend strongly upward. Fabricating awards for the week are liberal, but competition on new work is declining because shops are filled up and deliveries of material from the mills are slow.

The mill quotation on plain material is 2.05c. to 2.45c., Chicago. Jobbers quote 2.90c. for plain material out of warehouse.

Reinforcing Bars.—In view of limited mill shipments, reinforcing bar sellers are following a careful policy, lest they find themselves unable to discharge present obligations from their warehouse stocks. Their customers are exerting increasing pressure upon them for steel, emphasizing the present scarcity, at the same time indicating a general expectation of further price advances. The slowness of mill shipments has further complicated the situation by increasing the relative demand for material out of warehouse.

Union Electric Light & Power Co., power station, East St. Louis, Ill., 1500 tons, to Paul J. Kalman Co.

Igoe Printing Co. building, Chicago, 650 tons, to Paul J. Kalman Co.

Exchange National Bank, Tulsa, Okla., 350 tons, to Concrete Steel Co.

Hotel building for Main Street Corporation, Evanston, Ill., 176 tons, to Concrete Steel Co.

Masonic Temple building, Guthrie, Okla., 160 tons, to Concrete Steel Co.

Coke.—Local by-product foundry prices remain unchanged. While the Chicago producer has not yet been able to increase its production above 25 per cent, it is making every effort to keep foundries in this section supplied with sufficient coke to avert a suspension of operations. Some coke is also coming in from outside sources, although deliveries, particularly from the East, are uncertain. Considerable Southern by-product foundry coke is moving into this territory, and the fact that shipments are managing to get through is explained by the fact that Southern railroad embargoes apply to pig iron and not to fuel. This coke is selling at the same price as the local product on contract and at higher prices for spot delivery. Connellsville coke has weakened, foundry now being quoted at $14.50, ovens.

Old Material.—The market has mixed characteristics, with caution actuating the attitude of some consumers while others are willing to pay high prices to get spot shipment. At the same time, dealers are paying advancing quotations for such material as is offered. Little scrap is coming from the railroads, the largest producers, with the result that sellers are finding themselves short of some materials or have had to draw heavily on yard stocks. That scrap prices are moving up sympathetically with advances in finished iron and steel products and pig iron is also evident.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

	Per Gross Ton	
Iron rails	$20.50 to	$21.00
Cast iron car wheels	22.50 to	23.00
Relying rails	22.50 to	27.50
Rolled or forged steel car wheels	21.50 to	22.00
Rails for rolling	18.00 to	18.50
Steel rails, less than 3 ft.	20.50 to	21.00
Heavy melting steel	17.00 to	17.50
Frogs, switches and guards cut apart	17.00 to	17.50
Shoveling steel	16.50 to	17.00
Drop forge flashings	12.50 to	13.00
Hydraulic compressed sheet	14.00 to	14.50
Axle turnings	15.00 to	15.50
	Per Net Ton	
Iron angles and splice bars	19.50 to	20.00
Steel angle bars	17.00 to	17.50
Iron arch bars and transoms	20.50 to	21.00
Iron car axles	24.00 to	24.50
Steel car axles	18.50 to	19.00
No. 1 busheling	14.00 to	14.50
No. 2 busheling	9.00 to	9.50
Cut forge	15.00 to	15.50
Pipes and flues	11.50 to	12.00
No. 1 railroad wrought	15.50 to	16.00
No. 2 railroad wrought	15.00 to	15.50
Steel knuckles and couplers	18.50 to	19.00
Coil springs	19.00 to	20.00
No. 1 machinery cast	20.00 to	20.50
No. 1 railroad cast	18.50 to	19.00
Low phos. punchings	16.00 to	16.50
Locomotive tires, smooth	15.50 to	16.00
Machine shop turnings	10.00 to	10.50
Cast borings	12.00 to	12.50
Stove plate	16.50 to	17.00
Grate bars	16.50 to	17.00
Brake shoes	16.50 to	17.00
Railroad malleable	18.00 to	18.50
Agricultural malleable	18.00 to	18.50

Philadelphia

Active Demand for Plates and Bars—Foreign Pig Iron Coming Freely

PHILADELPHIA, Aug. 29.—With the 20 per cent advance in wages going into effect in the iron and steel industry on Friday of the present week, producers will face a further increase in costs which already have been so great that profits either are extremely narrow or have entirely disappeared. But the trade here feels that the wage advance was justified. Estimates have been made by makers that production costs in finished lines increased $5 per ton in August over July. Because September will see further increases, advances in prices in some lines have been made and others are considered to be inevitable. Operations continue at practically the same rate in the Philadelphia district as they were last week, but caution is shown in making commitments, owing to the fuel supply situation. Since the return of miners to work under the Cleveland agreement, the coal supply has improved somewhat, but the iron and steel industry, being in the lowest priority classification, has not so far received any particular benefit.

Demand for pig iron, plates, and bars is active, but sales are limited. Practically no iron is being offered in this district. The chief demand is for foundry grades. Prices of No. 2 plain and No. 2X have advanced $1 per ton and now take a range of $33.14 to $33.64 for the former and $34.14 to $34.64 for the latter, delivered at Philadelphia. Foreign iron is coming in freely, particularly foundry grades. Ferromanganese and manganese imports are also reported to be brisk, especially the former, owing to the impending high tariff duties. Sheets are being quoted at $6 and billets at $2.50 per ton higher by some makers in this district.

The announcement by Henry Ford that he will close his plants on Sept. 16 is widely commented on. Its probable effect is variously interpreted. It is pointed out that this suspension will cut off demand in some lines, as forgings, sheets and accessories, and at the same time reduce the output of scrap, in which there now is a shortage; but it is doubted that Ford's action, unless followed by other large consumers, will halt prices. Some in the trade maintain that another period of inflation already has set in and are apprehensive of the consequence.

Ferroalloys.—No prompt tonnages of ferromanganese are available in this district, except for small lots occasionally obtainable from middlemen. This delivery commands $72.50, seaboard. Third and fourth quarter tonnage is quoted at $67.50 on foreign shipments for 78 to 80 per cent alloys. The trade reports that car wheel makers are showing a tendency to turn to standard spiegeleisen, 19 to 21 per cent, in view of difficulty in getting ferromanganese. Spiegel is quoted and has sold at $38.50. Fair sized shipments of foreign manganese ore are en route to this country. This ore is quoted at 28.50c. to 29c. per unit, a light lot being sold the past week at the lower price.

Pig Iron.—Iron is coming in freely from abroad, especially from the Cleveland district, England. Other shipments are coming from Scotland and France. The greatest demand is for foundry grades, which constitute most of the imported tonnage. Only two furnaces in this district are quoting on foundry. They are able to take but small lots and have advanced prices $1 per ton, No. 2 plain now being quoted at $33.14 to $33.64 and No. 2X at $34.14 to $34.64. Some consumers have vainly scoured the market for small lots of foundry, finding makers out of the market and brokers unable to provide requirements. Small lots of foreign low phosphorus steel making iron have been sold in the past week. One lot of 0.08 phosphorus is reported to have been sold by a British maker of hematite iron. A consumer in Cumberland, Md., is inquiring for 5000 tons of basic iron for immediate shipment, but was unable to find the tonnage in this district. Indicating the scarcity of iron, it is reported that an Eastern seaboard steel works has sold a fair sized lot of off basic to a Pittsburgh district consumer. French, Scotch, and English sales of foundry iron, 2.50 to 3 per cent silicon, have been sold in this district at $31, c.i.f. for the Scotch and $29 for the English and French grades. Three boatloads of this kind of iron will be delivered within two weeks, most of it being Scotch iron. One maker of basic has increased the price 50c. per ton and now is asking $28, furnace.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 76 cents to $1.64 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$33.14 to $33.64
East. Pa. No. 2X, 2.25 to 2.75 sil.	34.14 to 34.64
East. Pa. No. 2X, [illegible]	32.61
Virginia No. 2 plain, 1.75 to 2.25 sil.	29.17 to 30.17
Virginia No. 2X, 2.25 to 2.75 sil.	30.17 to 31.17
Basic delivery eastern Pa.	28.64 to 31.14
Gray forge	29.64 to 31.14
Malleable	30.00 to 32.00
Standard low phos. (f.o.b. furnace)	35.00
Copper bearing low phos. (f.o.b. furnace)	35.00 to 40.00

Semi-Finished Steel.—Makers of open-hearth forging and rerolling billets are asking an increase of $2.50 per ton for September-October delivery, but are not quoting beyond that period. This brings the price of the former to $45, base, Pittsburgh, and the latter to $40, base, Pittsburgh, the freight rate to Philadelphia being $5.17. No sales have been reported during the past week.

Plates.—While most makers of plates continue to quote 2.25c. base, Pittsburgh, one prominent producer has advanced to 2.50c. Demand is heavy, particularly from locomotive works and railroads. Car repairs are bringing large inquiry. Most makers are taking orders from regular customers only and are not quoting beyond the third quarter. Considerable business is being declined owing to restricted operations and uncertainty of the market. A producer with 24 open-hearth furnaces is able to operate only 10 and is using oil for fuel. Deliveries on universal plates are being promised in four to six weeks and on sheared plates in eight to twelve weeks. An inquiry is out for 2000 tons of plates for Eastern shipyards for fourth quarter delivery. The M. K. & T. railroad has placed orders for 50 locomotives, 45 going to the Lima Locomotive Works, Inc. and five to the American Locomotive Co. The Illinois Central has placed an order for 15 locomotives with the Baldwin Locomotive Works.

Structural Material.—While the range of 2c. to 2.25c., Pittsburgh, still exists for plain material, the market is firmer and the higher figure is being quoted by most interests, and it is now doubtful whether any sizeable tonnage could be obtained at the lower quotation. Inquiry for structural material is only fair. Reluctance is shown by mills to quote on anything but immediate specifications. Dietrich Bros. have been awarded a contract for 300 tons for the National Bank building, Baltimore. Inquiries include 700 tons for an office building at Richmond for the State of Virginia and 800 tons for a large garage for the Consolidated Gas & Electric Light Co., Baltimore.

Bars.—Soft steel bars are being inquired for in fair-sized volume, some of the prospective business coming from jobbers. Prices are firm and the price of 2c., base, Pittsburgh, has practically disappeared, giving place to quotations ranging from 2.15c. to 2.25c. Delivery is being promised in four to six weeks. Iron bar demand also is fair, with the price range from 2c. to 2.25c., Pittsburgh, for car lots, and it is probable less than carloads could be bought at the higher figure.

Warehouse Business.—Active demand exists for stock material and is most marked for light bands and spring steel, the prices of which have been increased. Spring steel has been advanced from 3.50c. to 4c. and light bands from 3.45c. to 3.60c. Higher costs are assigned as the cause for the greater levels, at which tonnage is moving.

Soft steel bars and small shapes, 2.80c.; iron bars (except [illegible] 2.80c.; round edge iron, [illegible]; round edge plate iron finish, 1½ x ½ in., 3c.; round edge steel planished, [illegible]; flat plates, ¼-in. and heavier, 3.00c.; flats steel plates, 3/16-in., 3.10c.; blue annealed steel sheets, No. 10 [illegible]; No. 28 gage, 4.10c.; galvanized sheets, No. 28 gage, 5.60c.; square twisted and deformed steel bars, 2.90c.; structural shapes, 2.90c.; diamond pattern plates, ¼-in., 4.80c.; 3/16-in., 5c.; spring steel, 4c.; round cold-rolled steel, 3.50c.; squares and hexagons, cold-rolled steel, 4c.; steel hoops, No. 13 gage and lighter, 4c.; steel bands, No. 12 gage to 3/16-in., inclusive, 3.60c.; rails, 2.80c.; tool steel, 8c.; Norway iron, 5.50c.

Sheets.—Independent makers now are asking 3.50c. for one-pass No. 28 black sheets, 4.70c. for No. 28 galvanized sheets and 2.75c. for No. 10 blue annealed sheets for September-October shipment. Inquiry is only moderate.

Nuts, Bolts and Rivets.—Standard railroad spikes have been advanced by a prominent producer in this district to 2.50c. per lb., Pittsburgh, this including sizes 5/16-in. and larger, while an increase from 2.90c. to 3c. has been made on the smaller sizes, 1/2-in., 7/16-in. and 3/8-in. Railroad demand is heavy. Fair inquiry is being made for bolts and nuts. Rivet demand is extremely quiet. Large machine bolts are quoted at 60 and 10 per cent off list.

Old Material.—No change has been made in prices of iron and steel scrap during the past week, but the market has developed a firmer tone. Higher quotations are expected to be made in the near future. Demand is active and considerable business is being declined. Dealers are holding back. One reason assigned for further advances is an expected car shortage. It also is contended that less scrap is being produced by the railroads and that the closing down of the Ford plant will restrict the output. Coupled with this is the shortage of pig iron, calling for heavy charges of old material in open-hearth furnaces. Demand is strongest for cast iron car wheels, No. 1 heavy melting, No. 1 railroad wrought and machine shop turnings somewhat better inquiry for blast furnace borings and turnings has come out. These grades have been in smallest demand owing to the blowing out and banking of furnaces, but are being used more freely owing to the high price of coal and coke.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$15.50 to $16.00
Scrap rails	15.50 to 16.00
Steel rails for rolling	17.00 to 17.50
No. 1 low phos., heavy 0.04 and under	22.00 to 24.00
Cast iron car wheels	19.00 to 19.50
No. 1 railroad wrought	15.00 to 15.50
No. 1 yard wrought	17.00 to 17.50
No. 1 forge fire	14.00 to 14.50
Bundled sheets (for steel works)	13.50 to 14.00
No. 1 busheling	12.50 to 13.00
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	13.00 to 13.50
Mixed borings and turnings (for blast furnace use)	13.00 to 13.50
Machine shop turnings (for steel works use)	13.50 to 14.00
Machine-shop turnings (for rolling mills use)	14.00 to 14.50
Heavy axle turnings (or equivalent)	14.50 to 15.00
Cast borings (for steel works and rolling mills)	14.50 to 15.00
Cast borings (for chemical plants)	17.00 to 17.50
No. 1 cast	19.00 to 20.00
Heavy breakable cast (for steel plants)	19.00 to 19.50
Railroad grate bars	15.50 to 16.00
Stove plate (for steel plant use)	15.00 to 16.00
Railroad malleable	15.00 to 15.50
Wrought iron and soft steel pipes and tubes (new specifications)	11.00 to 11.50
Shafting	21.00 to 22.00

Buffalo

BUFFALO, Aug. 29.

Pig Iron.—The market for pig iron is very firm with furnaces showing no disposition to shade the higher prices which have recently been established in this district. No. 2 plain is being sold at $33, sales made on this basis ranging well above 2500 tons. A high silicon grade of foundry iron has sold at $36 with other grade ranging between these two prices. Inquiry shows some improvement, being close to 15,000 tons. One consumer is in the market for 4000 tons of iron. Present operation is not likely to be changed, it is indicated by producers. Scotch iron is being offered here at prices just below those asked for the product of local furnaces.

We quote f.o.b. per gross ton Buffalo as follows, the higher prices being for early shipment:

No. 1 foundry, 2.75 to 3.25 sil.	$35.00 to $36.00
No. 2X foundry, 2.25 to 2.75 sil.	34.00 to 35.00
No. 2 plain, 1.75 to 2.25 sil.	33.00 to 34.00
Basic	26.00
Malleable	32.00 to 33.00
Lake Superior charcoal	33.28

Finished Iron and Steel.—There has been a slackening in demand for most finished materials. The demand for bars, shapes and plates has declined, but the ruling price of $2.25 is being firmly maintained. There is some disposition to look for higher prices after Sept. 1, when wage increases go into effect, as fuel costs have not yet declined to anything like normal levels. Buffalo mills have taken on some good-sized bar orders including one of 1000 tons. It is possible to get business at the 2.25c. price as the Corporation is giving no promise of shipment while quoting 1.90c. A Buffalo fabricator has taken an 800-ton contract, the material to be used in an ore bridge.

Warehouse Business.—Warehouses report an excellent demand for materials, due to consumers' inability to get prompt deliveries from any of the mills or selling agencies in this district. Prices which were recently fixed at higher levels than those which had been in effect are being maintained. Warehouses are coming into the market for tonnage to replenish depleted stocks.

We quote warehouse prices, Buffalo, as follows: Structural shapes, 2.90c.; plates, 2.90c.; soft steel bars, 2.80c.; hoops, 3.70c.; bands, 3.55c.; blue annealed sheets, No. 10 gage, 3.90c.; galvanized steel sheets, No. 28 gage, 5.55c.; black sheets, No. 28, 4.55c.; cold rolled round shafting, 3.80c.

Old Material.—There is a good demand for heavy melting steel with most of the mills here in the market for material. Prices paid range from $17 to $17.25. There is little free tonnage on the market, due to the delay in railroad lists. Outside demand and offers of higher prices have resulted in advanced prices in some materials, notably machinery cast, which is now bringing $19 to $20 and car wheels which are selling for $18.50 to $19.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$16.75 to $17.00
Low phos., 0.04 and under	18.00 to 19.00
No. 1 railroad wrought	16.00 to 16.50
Car wheels	18.50 to 19.00
Machine shop turnings	10.50 to 11.00
Cast iron borings	14.00 to 14.50
Heavy axle turnings	14.00 to 14.50
Grate bars	14.00 to 14.50
No. 1 busheling	15.00 to 15.50
Stove plate	15.00 to 15.50
Bundled sheet stampings	11.50 to 12.00
No. 1 machinery cast	18.00 to 19.00
Hydraulic compressed	17.00 to 17.50
Railroad malleable	18.00 to 19.00

Cleveland

Pig Iron Prices Advance $3—Hold Up Orders for Ford Supplies

CLEVELAND, Aug. 29.—The fuel situation has improved in that with the operation of Ohio mines, steam coal is available, but shipments of Virginia and Kentucky coking coal curtailed by the impairment of transportation facilities show no improvements. The Bourne-Fuller Co. will advance wages at its Upton Steel Plant Sept. 1 to the new Steel Corporation scale. Recently the McKinney Steel Co. and the Otis Steel Co. advanced wages for common labor to 35c. per hour or 1c. less than the new Corporation rate and their present schedule will probably remain in effect. The announcement of the Ford Motor Co. that it will close its plant Sept. 16 because of the lack of fuel and the broadcasting of orders cutting out shipment of parts on contract after Sept. 5 has affected several Ohio steel plants and a number of manufacturers of forgings and other parts. Mills have received hold up orders on steel bars for Ford forgings and alloy steel makers have been ordered to suspend shipments for 30 days on some contracts. Some sheet mills have been instructed to discontinue shipments after orders are filled on August specifications. A number of Cleveland consumers report that their shortage of steel is acute.

No announcement as to whether the 20 per cent wage advance of the Steel Corporation will apply to its iron ore mines has as yet reached local Corporation officers or local ore men. Reports from the mining districts state that no notices have been posted at the mines advising the wage increase. Independent mining companies are naturally deeply interested, as they will probably meet any wage advance made by the Corporation. The blowing out of blast furnaces has resulted in the temporary holding up of ore shipments of some

consumers, but no requests for cancellations are reported.

Pig Iron.—With the pig iron shortage daily becoming more acute the Cleveland price on foundry iron advanced $3 a ton to $35 during the week and some producers are predicting that the price will reach $40 or higher. With stocks growing low, foundries are crowding furnaces for deliveries. A local producer, the only lake furnace interest except at Buffalo that has any iron available for early shipment, has sold 1000 to 2000 tons in lots of 400 tons and under at $35 for delivery in Cleveland and vicinity. With advancing prices, considerable inquiry came out during the week for foundry iron for early shipment and for the fourth quarter. Several inquiries, including two for 1000 to 1500 tons and another for 900 tons were made for foundry iron for the first quarter of next year, but producers declined to quote on these inquiries. A limited amount of foundry iron is being offered in northern Ohio by the southern Ohio furnace of a steel-making plant and a Canadian steel maker has sold some foundry iron in Indiana. Local sales of southern Ohio foundry iron are reported at $30 to $32 at furnace and one car lot of resale iron brought $36 or $33 at furnace. In Buffalo an 800-ton lot of No. 2X iron for prompt shipment brought $35. In the Michigan territory, a small lot sale was made by a lake furnace at $33 for prompt shipment and a 1500-ton lot of malleable iron was placed for the fourth quarter at $31. Many inquiries are coming from outside of this territory. Larger inquiries pending include 3000 tons of malleable iron for the Eastern Malleable Iron Works, Bridgeport, Conn., 500 tons of foundry iron for the Titusville Iron Works, Titusville, Pa., both for September and October shipment, and 500 tons of malleable iron for the Mount Vernon Car & Mfg. Co., Mount Vernon, Ill., for the fourth quarter. No new inquiries have come out for basic iron, but a local producer would probably quote not less than $35 for this grade. Low phosphorus iron has advanced $1 a ton to $38 on several sales aggregating 1000 tons and including a 500-ton lot. This iron is also very scarce and a Valley producer is evidently the only one that has any low phosphorus iron in stock. Little, if any, Southern iron is being offered in this territory, producers being unwilling to name prices, as they are unable to get cars for shipment. One producer of Ohio silvery iron has announced a price of $37.50 for 8 per cent silvery and $46.50 for 10 per cent Bessemer ferrosilicon for delivery during the remainder of the year, or a $5 advance above the regular schedule. Another furnace that has a small tonnage of the 9 per cent silvery iron available for prompt shipment is offering this at $43.50 or on a $41.50 base.

Quotations below are f.o.b. local furnace for Northern foundry iron, not including a 50c. switching charge. Other quotations except basic and low phosphorus are delivered Cleveland, being based on a $3.02 rate from Jackson and a [illegible]

Basic, Valley furnace, nominal	$27.00
Northern No. 2 fdy., sil. 1.75 to 2.25	35.00
Southern fdy., sil. 1.75 to 2.25	30.00 to 31.00
Malleable	35.00
Ohio silvery, nom., sil. 8 per cent	40.52 to 43.52
Standard low phos., Valley furnace	38.00

Iron Ore.—Shipping conditions in the Mesabi district are fairly good, but the Chicago & Northwestern and the Chicago, Milwaukee & St. Paul Railroads are still badly crippled. Consequently, shippers are moving only mine production from the old ranges to Ashland and Escanaba. Ore continues to move freely fr[illegible] lake ports, as the transportation facilities of roads that carry the bulk of the ore are not badly crippled. However, two coal-carrying roads, the Baltimore & Ohio and Wheeling & Lake Erie, are unable to keep up their normal movement of ore.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $5.95; Old range non-Bessemer, 51½ per cent iron, $5.20; Mesabi Bessemer, 55 per cent iron, $5.70; [illegible]

Semi-finished Steel.—A local mill has sold to an Ohio consumer 3000 tons of sheet bars at $40 for prompt shipment or an advance of $2.50 above sales previously reported, but has no more to sell for early delivery. Considerable business in semi-finished steel has been taken for the fourth quarter subject to prices prevailing at time of shipment.

Finished Iron and Steel.—The price tendency continues upward. Premium prices on steel bars, plates and structural material for early shipment were more in evidence the past week than heretofore. A heavy volume of inquiries came out, due evidently to the fact that many consumers wanted to get under contract before prices further advanced. A wide range of quotations is appearing, depending largely on delivery. On steel bars there is a spread of prices from around 1.90c. to 2.25c. and higher. One producer is now offering bars only at warehouse prices. Considerable plate business has been booked at 2.25c. and quotations by independent mills generally range from 2c. to 2.35c. A Valley mill has advanced its car-lot price to 2.50c. An Eastern mill now quotes 2.75c. Local shipyards have new inquiries for three boats requiring 15,000 tons of plates and structural material and Ohio tank shops are figuring on inquiries for tanks requiring 6500 tons of plates. A Buffalo district car builder is inquiring for 2000 tons. The Lima Locomotive Works has taken 40 locomotives for the Missouri, Kansas & Texas Railroad and for these has placed 1200 tons of boiler plates with a local mill. Inquiry for steel for building work continues heavy.

Jobbers quote steel bars, 2.81c.; plates and structural shapes, 2.91c.; No. 9 galvanized wire, 3c.; No. 9 annealed wire, 2.50c.; No. 28 black sheets, 4.25c.; No. 28 galvanized sheets, 5.25c.; No. 10 blue annealed sheets, 3.50c. to 3.61c.; hoops and bands, 3.61c.; cold-rolled rounds, 3.60c.; flats, squares and hexagons, 4.10c.

Sheets.—Demand for sheets is not as heavy as it has been and only a limited amount of buying is reported for the fourth quarter. Some mills can still make good deliveries. The most common quotations for independent mills are unchanged, at 3.50c. for black; 4.50c. for galvanized and 2.50c. for blue annealed.

Alloy Steel.—Alloy steel manufacturers have advanced prices $5 per ton because of the increased production costs. Mills have large tonnages on their books and cannot make definite delivery promises. The new prices on bars are 5.75c. for 3.50 per cent nickel steel; 4.75c. for chrome nickel steel and 5.25c. for chrome vanadium.

High Speed Steel.—The demand for high speed steel has improved, but prices are still irregular. Quotations of 60c. per lb. are being made to large consumers.

Old Material.—The market is firmer on nearly all grades and prices are from 50c. to $1 a ton higher. There is still some demand from dealers for scrap to fill high-priced orders released by the McKinney Steel Co., but virtually no demand from the mills. As high as $18.50 is being offered for selected steel scrap delivered at the McKinney plant, but $17.50 more nearly represents the market. Sales during the week range from $16.50 to $18.50. Dealers are offering $15.25 to $15.50 delivered for compressed steel scrap, and cast iron borings have sold up to $13.75 delivered. Sales of No. 1 cast scrap to a local foundry are reported at $16.50 to $17 per net ton. Higher prices have not brought out much scrap. Some dealers are holding to their yard stock, expecting further advances.

We quote per gross ton, f.o.b. Cleveland, as follows:

Heavy melting steel	$16.75 to $17.25
Steel rails, under 3 ft.	16.75 to 17.25
Rails for rolling	16.75 to 17.25
[illegible] rails	14.00 to 15.00
[illegible]	18.00 to 19.00
Low phosphorus melting	17.25 to 17.75
[illegible]	12.75 to 13.00
Machine shop turnings	12.25 to 12.50
Mixed borings and short turnings	12.25 to 12.50
[illegible]	14.00 to 14.75
Railroad wrought	14.00 to 14.50
Railroad malleable	16.50 to 16.75
Light bundled sheet stampings	11.00 to 11.25
Steel axle turnings	13.50 to 14.00
No. 1 cast	17.00 to 17.50
No. 1 busheling	12.00 to 12.50
Drop forge flashings over 10 in.	11.50 to 12.00
Drop forge flashings under 10 in.	11.50 to 12.00
Railroad grate bars	13.75 to 14.25
Stove plate	13.75 to 14.25
Pipes and flues	10.00 to 11.00

Reinforcing Bars.—Mills have made another $2 per ton advance on hard steel reinforcing bars to 2c. Deliveries are very slow. New inquiries include a 300-ton

lot for the Collinwood High School, Cleveland. Local warehouses have made another price advance of $3 per ton on steel bars, plates and structural material and on cold-rolled steel and $4 per ton on hoops and bands. Warehouse sales are heavy.

Coke.—Sales of 20 carlots of Indianapolis by-product foundry coke are reported at $15 at oven. A few carlot sales of Connellsville foundry coke were made during the week at $15, the price that has prevailed recently.

New York

Heavy Buying of Foreign Pig Iron—Large Sales of Charcoal Boiler Tubes

NEW YORK, Aug. 29.—Partial settlement of the coal strike on the basis of the Cleveland agreement has not improved the general situation. There has been a temporary easing in the coke market and as low as $12 has been done on a rather poor grade of furnace coke, but the price tendency is now distinctly upward and furnace coke is quoted at from $13 to $14, and foundry grades from $14 to $15.50. Many users of anthracite coal, seeing that they probably will not be able to get their usual supplies, are buying coke and bituminous coal. This has strengthened the market for those fuels. Coal can be had at from $5.25 to $6.25 a ton, which is a decline of $1.50 below recent quotations, and compares with $2 on April 1, when the strike was declared. The outlook is that there will be many complications in getting an increased production of coal and coke, owing to the arbitrary attitude of the labor unions. All reports indicate that the struggle in the Connellsville region is to be a desperate one between the union organizers and sympathizers and the non-union men who have just obtained an advance in wages variously estimated to average from 40 to 47 per cent.

Pig Iron.—Activity has been confined during the past week largely to foreign iron, of which one firm has sold 25,000 tons and others about 15,000 tons. A radiator company which was in the market for 5000 tons is credited with purchasing foreign iron, but most of the buying has been in small lots. Scotch iron, analyzing 1.75 to 2.25 silicon, has sold at $29, c.i.f. New York, French iron of about the same analysis at $28 and British at $29. Scotch iron analyzing 2.50 to 3.25 silicon has commanded $32. Domestic selling has been confined to two furnaces and most of the sales have been made on a basis of $32 for No. 2 plain and $33 for No. 2X, although some sales have been made $1 higher.

We quote delivered in the New York district as follows, having added to furnace prices $2.27 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$36.27 to $37.27
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	35.27 to 36.27
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	34.27 to 35.27
Buffalo, sil. 1.75 to 2.25	34.91 to 35.91
No. 2 Virginia, sil. 1.75 to 2.25	34.44 to 36.44

Iron Ore.—The reduced freight rates on iron ore became effective Monday, but there is very little activity among Eastern operators on account of the limited demand from furnaces, many of which are well supplied with Lake Superior and foreign ores.

Ferroalloys.—Sales of moderate amounts of ferromanganese continue to be made for shipment in September, transactions for the week being several hundred tons at the prevailing price. There have also been sales of 1500 to 2000 tons for October shipment. Spot delivery, if available, is slightly higher. There are also other inquiries but the volume is not heavy and operations in the steel mills, together with the large quantities contracted for, tend to make a quiet market. The spiegeleisen market is moderately active, sales aggregating to 1500 tons of both domestic and imported alloy and prices ranging from $37.50 to $39, furnace. There are also inquiries before the market. One Eastern steel company is reported to have contracted for a cargo of manganese ore at 28.50c. per unit, seaboard, but there is no marked activity in this market. Specifications on contract for 50 per cent ferrosilicon continue satisfactory and there are also sales of prompt lots at prevailing quotations. The same is true of the ferrochromium market. Quotations are as follows:

Ferromanganese, domestic, seaboard, per ton	$67.50
Ferromanganese, British, seaboard, per ton	$67.50
Spiegeleisen, 17 to 19 per cent, furnace	$38.00
Spiegeleisen, 20 per cent, furnace	$39.00
Ferrosilicon, 50 per cent, delivered, per gross ton, carloads	$55.00 to $60.00
Ferrosilicon, 10 to 15 per cent, delivered, per gross ton	$28.00 to $31.00
Ferrotungsten, per lb. of contained metal	40c. to 50c.
Ferrochromium, 4 to 8 per cent carbon, 65 to 70 per cent Cr., per lb. Cr., delivered	12c. to 14c.
Ferrovanadium, per lb. of contained vanadium	$3.00 to $3.50
Ferrocarbontitanium, 15 to 18 per cent, in carloads, per net ton	$200.00

Ores

Manganese ore, foreign, per unit, seaboard	28c. to 30c.
Tungsten ore, per unit, in 60 per cent concentrates, nominal	$3.00 up
Chrome ore, basis 48 per cent Cr_2O_3, crude, per ton, Atlantic seaboard	$15 to $18.50
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	42.50c. to 45c.

Finished Iron and Steel.—Substantial inquiries for plates, shapes, bars and other finished material are reported, but several large companies are unable to quote because of restricted operations or fully booked mills. Some sellers report sales of various products at advancing prices, or at recently established new prices. The outstanding feature continues to be a scarcity of coal with the amount of relief in sight very uncertain. The danger of a runaway market is admitted, but a restraining factor is the fresh experience of 1920. Some predict a shortage of coal and of cars, the extent of which is hard to measure. One seller would not be surprised to see a 2.50c. market for plates, shapes and bars in the not distant future. Plates are firm at 2.15c. to 2.25c., Pittsburgh, for early delivery from independent producers where obtainable, with shapes and bars at 2c. to 2.25c. Two large inquiries from a large oil company, one for 1000 tons of plates, and another for 4000 to 5000 tons of plates and shapes, 3300 tons of which is plates, has been partly satisfied. The former has been placed with a large Alabama producer, but the latter is still under negotiation. An inquiry for 3000 tons of reinforcing bars from a New Jersey consumer is noted. Sales of bar iron in substantial quantities have been made at advancing prices. There have also been fair transactions in black and galvanized sheets and it is doubtful if the latter can be obtained at less than 4.50c. to 4.60c. for any reasonable delivery from independent producers. There have also been large sales of charcoal boiler tubes. The coal mines of a large independent Pittsburgh steel producer have been started again and, at a meeting of sales representatives later this week, a definite sales policy may be decided. In fabricated steel, inquiries are not as numerous and new business in railroad cars is at a low ebb. It is rumored that the Pennsylvania Railroad is to inquire for 30,000 new cars and the New York Central for 10,000.

We quote for mill shipments, New York delivery, as follows: For indefinite delivery, soft steel bars, structural shapes and steel plates, 2.14c.; for delivery in a number of weeks, soft steel bars, plain structural material and steel plates, 2.34c. to 2.59c.; bar iron, 2.34c.

Bolts, Nuts and Rivets.—Bolt and nut manufacturers are getting a good volume of orders largely in specifications on contracts. The market is very firm with talk of higher prices. Specifications on rivet contracts are fairly heavy and production is being hampered by the lack of steel. Some manufacturers are quoting rivets at an advance of $7 a ton or at 3c. for structural and 3.10c. for boiler rivets for small lot orders and sales have been made at these prices. While the old prices have not been withdrawn, an early general price advance seems probable.

Cast-Iron Pipe.—Demand continues heavy and prices are firm. Producers in this district are fairly well situated on fuel, although supplies are low, but there has been some difficulty in obtaining iron shipped by Southern furnaces, which is delayed in transit by the railroad strike. One pipe producer reports that out of 56 carloads recently shipped from the South, he has

received but one. Receipts of foreign iron, however, are aiding materially. No new municipal tenders are noted. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger $54.50; 4-in. and 5-in. $59; 3-in. $64.80, with $4 additional for Class A and gas pipe.

Warehouse Business.—Effective Aug. 28, quotations in this district on bars, shapes, plates, hoops and bands were again advanced, the second increase this month. Both iron and soft steel bars are now quoted at 2.94c. per lb. base, shapes 3.04c. per lb., plates 3.04c. per lb., hoops 4.14c. per lb. and bands 3.74c. per lb. These prices represent a $3 per ton advance and are based upon the current mill quotation of 1.95c. per lb. base, Pittsburgh, plus the current freight rates. Effective Aug. 24, blue annealed, black and galvanized sheets, prices on which were not changed when iron and steel items were previously increased, were increased to 4.04 per lb. for No. 10 blue annealed, 4.60c. per lb., base, for black, and 5.60c. per lb., base, for galvanized sheets. Some sellers, however, are still under the market and quotations are being made on black and galvanized as low as 4.35c. per lb. and 5.35c. per lb. Tire steel has been advanced to 2.94c. per lb. with smooth finish at 3.14c. per lb. and toe-calk is now 4c. per lb., an advance of 30c. per 100 lb. over the previous quotation of 3.70c. per lb. Both wrought iron and steel pipe schedules have been advanced. The wrought iron pipe discounts represent an advance of about $10 per ton. We quote prices on page 584.

Old Material.—The market is firm and prices strong, in some instances exhibiting an upward tendency. Steel is in greater demand than cast-iron, but on the whole, buying is not heavy.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$10.50 to $11.00
Steel rails, short lengths, or equivalent	12.25 to 12.75
Rerolling rails	12.50 to 13.00
Relaying rails, nominal	27.00 to 28.00
Steel car axles	17.00 to 18.00
Iron car axles	23.00 to 24.00
No. 1 railroad wrought	13.50 to 14.00
Wrought pipe	12.00 to 12.75
Under 2 ft. long	8.00 to 8.50
No. 1 yard wrought, long	11.00 to 11.50
Cast borings (clean)	10.75 to 11.25
Machine shop turnings	9.25 to 10.25
Mixed borings and turnings	9.25 to 10.25
Iron and steel pipe (1 in. diam., not under 2 ft. long)	9.75 to 10.25
Stove plate	11.25 to 11.75
Locomotive grate bars	11.50 to 12.00
Malleable cast (railroad)	11.00 to 11.50
Cast-iron car wheels	13.50 to 14.00

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$18.50 to $19.50
No. 1 heavy cast (columns, building materials, etc.), cupola size	16.50 to 17.00
No. 1 heavy cast, not cupola size	14.00 to 14.50
No. 2 cast (radiators, cast boilers, etc.)	12.00 to 12.50

British Iron and Steel Market

Export Premium on Pig Iron Dropped—America Gets Glasgow Tramway Order

LONDON, ENGLAND, Aug. 29 (*By Cable*).

There have been further American purchases of Cleveland, Scotch and Midland pig iron. Cleveland producers have dropped the export premium on No. 3.

The United States Steel Products Co. has secured the contract for tramway material for Glasgow at £15,000. The lowest British tender was £18,000.

Wales has secured orders for 250,000 boxes of oil plates for Eastern markets at 19¼s. ($4.29) basis, f.o.b., October to December.

The Otis Steel Co., Cleveland, has placed an order with the Mackintosh-Hemphill Co. for a 40-in., two-high reversing blooming mill for its new steel plant.

St. Louis

Granite City Company Ships Pig Iron to Pennsylvania and Other Distant Points

ST. LOUIS, Aug. 29.

Pig Iron.—The scarcity of pig iron was emphasized by the sales last week of the Granite City maker for shipments to points logically served by other territories because of freight rates. They sold 3000 tons of low silicon, off grade iron for Wisconsin delivery at a high price; another lot of considerable tonnage for Indiana delivery; another lot of considerable tonnage for Pennsylvania delivery and several small lots for Ohio and Indiana delivery. For this iron the makers obtained the full market price f.o.b. furnace at Granite City, without allowance for freight differential. No other Northern iron was obtainable, largely due to the coal situation. As for Southern iron, there is a serious situation because of the railroad strike. With the exception of a car or two that trickles through owing to sheer luck, there are no arrivals from the South. A Sheffield producer sold two lots, 500 tons and 200 tons respectively. The market may be said to be $30, Chicago, for Northern iron for prompt shipment, with neither buyers nor sellers inclined to make contracts for forward delivery because of the uncertainty of conditions. Southern iron has been sold at prices ranging from $22 to $24, f.o.b. Birmingham. Those who have made purchases are pressing for deliveries. A southern Illinois car company is in the market for 1000 tons of Northern iron. Perhaps there would be more inquiries, but consumers realize conditions and the difficulties in getting iron. Lake Superior charcoal iron has advanced $3 a ton, making the market $33 at the furnaces. There is an inquiry before the market for 300 tons of 80 per cent ferrosilicon.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago and $5.17 from Birmingham and 81 cents average switching charge from Granite City:

Northern foundry, sil. 1.75 to 2.25	$32.16
Northern malleable, sil. 1.75 to 2.25	32.16
Basic	32.16
Southern foundry, all rail, sil. 1.75 to 2.25	$27.17 to 29.17

Finished Iron and Steel.—Fabricators report that there has been a brisk demand for their products within the last few days. This situation they attribute to the prospect for an advance in steel, following the announcement of the wage increase in the steel trade. The most important letting for several weeks went to the Mississippi Valley Structural Steel Co., being 1500 tons of structural steel for the new plant of the National Enameling & Stamping Co., Granite City. The award of 1200 tons for the shops of the Louisiana & Arkansas Railway at Stamps, Ark., went to the Virginia Bridge & Iron Co. The most important pending business is the South Side High School, St. Louis, involving about 300 tons of structural steel and 500 tons of reinforcing bars. No new business is being developed in sheets, and warehouses are not crowding manufacturers for deliveries. With the renewal of operations in southern Illinois coal mines, have come a number of inquiries for light rails. Implement manufacturers are showing some interest in buying, and are pressing for deliveries of purchases previously made. Fifteen of the mills of the Granite City steel works have reopened. Warehouses have advanced the price of sheets.

For stock out of warehouse we quote: Soft steel bars, 2.70c. per lb.; iron bars, 2.70c.; structural shapes, 2.80c.; tank plates, 2.80c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, cold rolled, one pass, 4.85c.; cold drawn [illegible] new sizes, [illegible] rivets, $3.35 per 100 lb.; boiler rivets, $3.45; tank rivets, 7/16 in. and smaller, 60 per cent off list; machine bolts, large, 50 and 10 per cent; small, 50-10 and 10 per cent; carriage bolts, large, 55-5 per cent; small, 60 and 10 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon blank, $3.50; and tapped, $3.25 off list.

Coke.—The settlement of the coal strike in southern Illinois has had no effect so far in solving the shortage of coke in this territory. Users still are depending largely upon local by-product plants for their supply, although some by-product coke made in Terre Haute is being sold here. There is virtually none to be had from the South because of the railroad situation, and only an occasional car gets through.

Old Material.—The market for old material continues to advance, demand and a lack of supplies shooting prices up as high as $2 a ton. Stocks in hands of dealers are being depleted, and very little material is coming; none at all from the railroads, as they are without the labor necessary to handle it. A number of sales of large tonnage were made during the week.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

	Per Gross Ton	
Old iron rails	$17.75	$18.75
Rails for rolling	18.00	18.50
Steel rails, [illegible]	17.00	18.00
Relaying rails, standard section	[illegible]	[illegible]
Cast iron car wheels	20.00	20.50
No. 1 heavy railroad melting steel	17.50	18.00
No. 1 heavy shoveling steel	17.00	17.50
Ordinary shoveling steel	16.50	17.00
Frogs, switches and guards cut apart	16.25	16.75
Per Net Ton		
Heavy axle and tire turnings	11.50	12.00
Steel angle bars	15.25	15.75
Iron car axles	25.00	25.50
Steel car axles	19.00	19.50
Wrought iron bars and transoms	20.50	21.00
No. 1 railroad wrought	14.50	15.00
No. 2 railroad wrought	13.50	14.00
Railroad springs	18.00	18.50
Steel couplers and knuckles	18.00	18.50
Cast iron borings	11.00	11.50
No. 1 busheling	13.00	13.50
No. 1 railroad cast	18.50	19.00
Railroad malleable	15.50	16.00
Machine shop turnings	9.50	10.00

Birmingham

Rapid Advance of Pig Iron Continues in the South

BIRMINGHAM, ALA., Aug. 29.—Firm offers of $24 for October and November iron in lots of 1000 tons were made to-day and two lots of 500 tons each for the same delivery were booked yesterday at the same price. Some makers will not accept $24. All spot business is on a base of $25 with an enormous tonnage being turned down on account of embargoes. The spot market is $25 and fourth quarter $24 to $25 to-day.

Pig Iron.—The abrupt advance of Birmingham spot iron from a base of $20 and $21 to $23 and $25 between Saturday, Aug. 19, and Monday, Aug. 21, was among the most spectacular feats of this market in several years. Before the middle of the week, no spot iron was being sold under $25. The tonnage booked was not large because in the majority of instances where iron was applied for the makers saw impossibility of making spot delivery; so they declined the business. No fourth quarter iron worth speaking of came to the fore during the week. What was brought to the surface was business quoted on prior to that time, but closed during the week. One lot of 200 tons for fourth quarter brought $25. The Birmingham makers are holding aloof from the fourth quarter market for the remainder of what they have unsold and waiting on a firmer basis than the excited current one. Raises of wages by the Steel Corporation followed by that of the Alabama coal operators have served to bolster the idea of $24 to $25 base for fourth quarter. The most significant sales have been those of Sheffield iron of the Sloss-Sheffield Steel & Iron Co. from its Providence, R. I., yards, first at $30 base and then at $35, Providence base. The rail rate from Birmingham is $9.60, but rail and water is $7.67.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon 1.75 to 2.25	$23.00	$25.00
Basic	[illegible]	[illegible]
Charcoal, warm blast	32.00	34.00

Finishing Mills.—There has been no change in practically a 100 per cent production in Alabama finishing mills with the exception of the Conners Steel Co.'s reducing from two to one mill. The Tennessee company continues double turn at Bessemer, Ensley and Fairfield mills and 100 per cent of ingot capacity. The 20 per cent wage advance effective Sept. 1 will affect approximately 8000 employees of the Tennessee company and 2000 employed in other steel mills. The Tennessee company's lead was generally followed throughout the Birmingham district and in Alabama.

Cast Iron Pipe.—Several orders for good tonnages of pressure pipe followed the advance from the base of $37 to that of $38.50, the American Cast Iron Pipe Co. booking 600 tons for Martinsville, Ohio, and North Carolina towns placing several orders with the United States Cast Iron Pipe & Foundry Co. Sanitary pipe is firm at $65 and a lot of new business has been booked. Stocks are piling, but operations have not been curtailed.

Coal and Coke.—Alabama coal operators, following the lead of the Tennessee company's wage advances and adjustments, have announced a mine wage advance of approximately 20 per cent effective Sept. 1 and affecting 27,000 men. Spot coal rules from $3.50 up and spot coke rules at $7 to $10 with an especially large business done at $8. New England is taking a large tonnage of coke at $8 via steamers out of Southern ports. The Western distress demand is as great as ever, but the car and locomotive situation grows worse and production has not gotten beyond 400,000 tons on a call for fully 500,000 tons a week.

Old Material.—The scrap market is stronger and if the present spot prices for pig iron find themselves in the price for fourth quarter metal scrap will rise materially. Yard men are inclined to hold for advances over the present quotations and small consumers are paying from $1 to $2 over the scale for spot deliveries.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Steel rails	$13.00	$15.00
No. 1 steel	12.00	15.00
No. 1 cast	15.00	16.00
Car wheels	15.00	16.00
Tramcar wheels	14.00	15.00
Stove plate	13.00	14.00
Cast iron borings	[illegible]	[illegible]
Machine shop turnings	4.00	5.00

De Lavaud Process Tested

BIRMINGHAM, ALA., Aug. 28.—The De Lavaud pipe casting machines installed at the North Birmingham plant of the United States Cast Iron Pipe & Foundry Co. have been tested on 6, 8- and 10-in. sizes of pipe and the tests have been more than satisfactory to factory experts. Presumably tests on 12-in. sizes will also be satisfactory. This pipe is now practically ready for the market and early announcement to that effect is expected together with price schedules.

Cincinnati

Pig Iron Prices Advance $3 to $5 Per Ton—Very Little Is Obtainable

CINCINNATI, Aug. 28.—Steadily advancing prices with a steady diminution of the available supply of pig iron featured the market during the week. While practically all inquiries are for prompt shipment, a number of melters have tested the market for fourth quarter delivery, and the net result of their efforts has been to get quotations from about two furnaces in the entire country. Should improvement in the railroad situation be delayed for a month or six weeks, many in the trade are looking for a return of the high prices prevailing in the early part of 1920.

Pig Iron.—The available supply of pig iron is very small. There is very little coming in from the South, though occasional shipments are being made by furnaces using the river and rail route. Northern furnaces are in better shape as regards transportation, but cannot begin to take care of the needs of their customers, as practically all of them are now sold up for the entire third quarter. Prices are from $3 to $5 higher than last week, and sales of Southern iron have been made as high as $27, Birmingham. The market, however, can be quoted at $23 to $25, the former price having been named by at least two furnaces for fourth quarter, while the latter applies to September shipments. Included in sales are one of 700 tons and one of 1000 tons, both at the minimum figure quoted above. Southern

Ohio iron, in carload lots, brought $33, Ironton base, last week, but on a 500-ton sale $30 was done. This interest has since raised its price to $31 for prompt shipment, and has taken 300 tons at this figure. One silvery furnace has advanced its price on 8 per cent to $41.50, but we note a sale of 1000 tons and 700 tons respectively for fourth quarter at $37.50 for 8 per cent, and this can still be done. Other sales of Northern foundry iron include two lots of 1000 tons each to a radiator company, 500 tons of malleable, and several ranging from 100 to 300. An inquiry for an unstated tonnage for fourth quarter and first quarter of next year is current from a piano plate manufacturer, and a central Ohio malleable foundry is asking for 500 tons for the fourth quarter. Jisco silvery furnace is scheduled to go in blast Sept. 15.

[illegible] and $2.27 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$27.05 to $29.05
Southern coke, sil. 2.25 to 2.75 (No. 2 [illegible])	[illegible] to 29.55
Ohio silvery (nominal), 8 per cent	39.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	[illegible] to [illegible]
Basic Northern	28.77
Malleable	33.77 to 35.77

Finished Material.—It is becoming more difficult to place orders for finished materials, as mills are not in a position to make deliveries, and with uncertainty of future operations, are advising buyers that for the present at least all energies will be devoted to clearing up orders now on the books. There continues to be a good demand for early delivery, and many consumers are anxious to place orders for fourth quarter. Prices are steadily advancing, a fair tonnage of plates for immediate delivery having been placed with a Valley mill at 2.15c. On bars and shapes 2c. to 2.10c. for delivery within eight to ten weeks has been quoted, but 2c. seems to be the prevailing price for indefinite delivery. Some sheet mills have been taking small orders for early delivery on the basis of 2.60c. for blue annealed, 3.50c. for black and 4.50c. for galvanized, but are not quoting these prices through the fourth quarter. The American Sheet & Tin Plate Co. has taken a fair tonnage of fourth quarter business at its recently announced prices. While the American Steel & Wire Co. has not yet met advances of independent companies in nail and wire prices, it is expected that an announcement will be made shortly advancing wire products approximately $4 per ton. Tank builders in the district are busy, as are railroad equipment companies on repair work. The Indiana Railroad Co. is inquiring for 500 tons of 100-lb. A.E.R.A. rails for delivery at Indianapolis. It is expected that the Louisville & Nashville Railroad will shortly issue an inquiry for 25 locomotives, for use on the Corbin, Ky., branch. The demand for reinforcing bars continues good, an inquiry having been received for 500 tons for a stadium for the University of Illinois at Champaign, Ill., the general contract for which has been awarded. A warehouse at Covington, Ky., will take approximately 200 tons of bars, and miscellaneous inquiries for smaller buildings total in the neighborhood of 1000 tons. A number of new projects appeared in the structural field, the principal one being the new plant for the Fay & Egan Co., Cincinnati, bids for which will be received until Sept. 11. This project will take approximately 900 tons.

Warehouse Business.—Local jobbers report business continuing in good volume, with inquiries being received from many points outside the district. Light angles and reinforcing bars are very active, and black and galvanized sheets are moving well. Nails are also in fair demand. There have been no further price changes, although it is expected that black and galvanized sheets will be advanced approximately $4 a ton during the coming week, with nails taking a 15c. advance on Sept. 1.

Cincinnati jobbers quote: Iron and steel bars, 2.85c. base; [illegible] base; shapes and plates, 2.95c. base; cold-rolled rounds, [illegible] base; No. 10 blue annealed sheets, 3.75c.; No. 28 black sheets, 4.50c.; No. 28 galvanized sheets, 5.50c.; No. 9 annealed wire, $2.70 per 100 lb.; common wire nails, $2.85 per keg, base.

Coke.—Connellsville foundry coke is easier at $14 to $15. New River is quoted at $14 to $15; Wise County at $13, and Pocahontas at $14. Producers have named $11, Connellsville basis, as the price for September shipments, and the Indianapolis producer is holding its tonnage at $15, ovens. Southern coke is quoted at $8, ovens. We note one sale of 2000 tons and one of 700 tons to Michigan melters.

Old Material.—The scrap market is very strong and fairly active. A district steel plant purchased a round tonnage of open-hearth grades last week, and a better demand from outside districts is also reported. Scarcity of pig iron is also creating a demand for machinery cast. Prices generally are higher and dealers are of the opinion they may go even higher. Shipments are becoming increasingly scarce, but yard stocks are in fair shape.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

Per Gross Ton

Bundled sheets	$9.50 to $10.00
Iron rails	15.50 to 16.00
Relaying rails, 50 lb. and up	26.50 to 27.00
Rails for rerolling	14.50 to 15.00
Heavy melting steel	14.50 to 15.00
Steel rails for melting	14.00 to 14.50
Car wheels	16.50 to 17.00

Per Net Ton

No. 1 railroad wrought	13.00 to 13.50
Cast borings	10.00 to 10.50
Steel turnings	9.00 to 9.50
Railroad cast	16.00 to 16.50
No. 1 machinery	19.00 to 19.50
Burnt scrap	10.50 to 11.00
Iron axles	28.50 to 29.00
Locomotive tires (smooth inside)	12.50 to 13.00
Pipes and flues	7.50 to 8.00

Boston

Sales of Foreign Iron Increase as Alabama Furnaces Retire from Market

BOSTON, Aug. 29.

Pig Iron.—The withdrawal of Alabama furnace interests from the market reduced sales of Southern iron to a minimum the past week. Sales of foreign iron increased as a result, amounting to 6000 to 7000 tons. One house sold 2800 tons of "Continental," silicon 2.25 to 2.75 iron, October and November shipment, at $26.75 c.i.f. Boston, and French was offered at $24 to $25 and English at $25.50 to $27 c.i.f. here. Most of the iron sold in this territory, however, was No. 3 Scotch at $29 and $32, and higher silicon at $33, c.i.f. Boston, prices quoted last week. Local houses are informed Scotch iron supplies for September shipment are now limited due to purchases by Germany, so no weakening in values is anticipated. Boston firms the past week also sold English silicon 2.50 plus to Cincinnati melters at $32 c.i.f. dock here, and Scotch and English silicon 3.50 plus to western New York foundries at $33, September shipment, several thousand tons being involved. Sales for the week included more than 500 tons of Lake charcoal iron at $33 furnace base, an advance of $3, and small tonnages of Alabama high silicon spot iron at $25 furnace base, an advance of $5, as well as small tonnages of Alabama at $35 dock Providence, R. I., where the movement is hampered by a lack of cars. Several large tonnages, including one for 2000 tons Belgian or Alabama from a textile machinery maker, and many small lots are under negotiation.

We quote delivered prices, on the basis of the latest reported sales, now infrequent, and as follows, having added to furnace prices $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia and $9.60 from Alabama:

East. Penn., sil. 2.25 to 2.75	$36.15 to $37.15
East. Penn., sil. 1.75 to 2.25	35.65 to 36.65
Buffalo, sil. 2.25 to 2.75	40.41
Buffalo, sil. 1.75 to 2.25	39.91
Alabama, sil. 2.25 to 2.75	31.10 to 35.10
Alabama, sil. 1.75 to 2.25	30.60 to 34.60

Warehouse Business.—Warehouse prices on iron and steel are mixed. The two largest interests hold to $2.85½ for steel bars. One fairly important house is on a $3 base, and most of the others are asking as much on those sizes in small supply. For instance, stocks of ¼ in., ⅝ in. and 1 in. steel rounds are badly broken, and a majority of the trade quotes these sizes at $3. Popular sizes of flats, as well as 1⅛ in. and 1¼ in. angles are in short supply, and generally quoted at

(*Continued on page* 570)

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Plates

Sheared, tank quality, base, per lb. ..... 2.00c. to 2.25c.

Structural Material

Beams, channels, etc. ..... 2.00c. to 2.25c.

Iron and Steel Bars

Soft steel bars, base, per lb. ..... 1.90c. to 2.25c.
Refined iron bars, base, per lb. ..... 2.35c.

Hot-Rolled Flats

Hoops, base, per lb. ..... 2.75c.
Bands, base, per lb. ..... 2.75c.
Strips, base, per lb. ..... 2.75c.
Cotton ties, per bundle of 45 lb. $1.11

Cold-Finished Steels

Bars and shafting, base, per lb. ..... 2.00c. to 2.50c.
Strips, base, per lb. ..... 4.25c.

Wire Products

Nails, base, per keg ..... $2.40 to $2.60
Bright plain wire, base, per 100 lb. ..... 2.25 to 2.35
Annealed fence wire, base, per 100 lb. ..... 2.25 to 2.35
Galvanized wire, base, per 100 lb. ..... 2.75 to 2.85
Galvanized barbed, base, per 100 lb. ..... 3.05 to 3.15
Galvanized staples, base, per keg ..... 3.05 to 3.15
Painted barbed wire, base, per 100 lb. ..... 2.55 to 2.65
Polished staples, base, per keg ..... 2.55 to 2.65
Cement coated nails, base, per count keg ..... 1.90c. to 2.10c.
Woven fence, carloads (to jobbers) ..... 73 per cent off list
Woven fence, carloads (to retailers) ..... 70½ per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads, 60, 10 and 10 per cent off list
Machine bolts, small, cut threads ..... 60 and 10 per cent off list
Machine bolts, larger and longer ..... 60 and 10 per cent off list
Carriage bolts, ⅜ x 6 in.:
Smaller and shorter, rolled threads. 60 and 10 per cent off list
Cut threads ..... 60 per cent off list
Longer and larger sizes ..... 60 per cent off list
Lag bolts ..... 60, 10 and 10 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads ..... 50 and 10 per cent off list
Other style heads ..... 20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.:
Smaller and shorter ..... 50 and 10 per cent off list
Larger and longer sizes ..... 50 and 10 per cent off list
Hot pressed square or hex. blank nuts ..... $4.50 off list
Hot pressed nuts, tapped ..... $4.50 off list
C.p.c. and t. sq. or hex. nuts, blank ..... $4.00 to $4.50 off list
C.p.c. and t. sq. or hex. nuts, tapped ..... $4.00 to $4.50 off list
Semi-finished hex. nuts:
9/16 in. and smaller, U. S. S. ..80 to 80 and 10 per cent off list
⅝ in. and larger, U. S. S. ..
..75 to 75 and 10 and 10 per cent off list
Small sizes, S. A. E. ..... 80, 10 and 10 per cent off list
S. A. E. ⅝ in. and larger. .75 and 10 and 10 per cent off list
Stove bolts in packages ..... 80 and 5 per cent off list
Stove bolts in bulk ..... 80, 5 and 2½ per cent off list
Tire bolts ..... 65 per cent off list

Cap and Set Screws

Milled square and hex. head cap screws, 75 and 10 per cent off list
Milled set screws ..... 75 per cent off list
Upset cap screws ..... 80 per cent off list
Upset set screws ..... 80 and 5 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb., $2.65 to $3.00
Large boiler rivets, base, per 100 lb. ..... 2.75 to 3.10
Small rivets ..... 70 per cent off list

Track Equipment

Spikes, 9/16 in. and larger, base, per 100 lb. $2.75
Spikes, ½ in. and smaller, base, per 100 lb. 3.25
Spikes, boat and barge, base, per 100 lb. 3.25
Track bolts, base, per 100 lb. ..... $3.50 to 3.75
Tie plates, per 100 lb. 2.25
Angle bars, base, per 100 lb. 2.40

Welded Pipe

Butt Weld

Inches	Steel Black	Steel Galv.	Inches	Iron Black	Iron Galv.
⅛	51½	26	⅛ to ¼	+11½	+27½
¼ to ⅜	57	31½	⅜	31½	13½
½	62	43½	½	37½	22½
¾	66	54½	¾	37½	24½
1 to 2	68	56½	1 to 1½	39½	

Lap Weld

2	61	49½	2	31½	20½
2½ to 6	65	53½	2½ to 6	37½	24½
7 to 8	62	49½	7 to 12	35½	22½
9 to 12	61	48½			

Butt Weld, extra strong, plain ends

⅛	47½	31	¼ to ⅜	+9½	+12½
¼ to ⅜	53	36½	½	30½	18½
½	59	48½	¾	37½	23½
¾	64	53½	1 to 1½	39½	24½
1 to 1½	66	55½			
2 to 3	67	56½			

Lap Weld, extra strong, plain ends

2	59	48½	2	35½	22½
2½ to 4	63	52½	2½ to 4	38½	26½
4½ to 6	62	51½	4½ to 6	37½	
7 to 8	58	45½	7 to 8	30½	18½
9 to 12	52	39½	9 to 12	25½	13½

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 and 2½ per cent.

Boiler Tubes

Lap Welded Steel		*Charcoal Iron*	
1¾ in.	23½	1½ in.	2
2 to 2¼ in.	38	1¾ to 1⅞ in.	7
2½ to 3 in.	49	2 to 2¼ in.	
3½ to 13 in.	54	2½ to 3 in.	23
		3¼ to 4½ in.	

To large buyers of steel tubes a supplementary discount of 5 per cent is allowed.

Standard Commercial Seamless Boiler Tubes

Discounts on cold-drawn tubes in carload lots, f.o.b. Pittsburgh, follow:

1 in.	57	2½ and 2¾ in.	40
1¼ and 1½ in.	49	3 in.	44
1¾ in.	33	3½ to 4 in.	49
2 and 2¼ in.	36	4½ in. and 5 in.	41

Hot Rolled

3 in.	46	3½ to 4 in.	51

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base, 85 per cent off list. Carbon 0.30 to 0.40, base, 83 per cent off list. Plus usual differentials and extras for cutting.

Seamless Locomotive and Superheater Tubes

	Cents per Ft.		Cents per Ft.
2-in. O.D. 12 gage	13	2¼-in. O.D. 10 gage	17¾
2-in. O.D. 11 gage	14	3-in. O.D. 7 gage	33
2-in. O.D. 10 gage	15	1½-in. O.D. 9 gage	13
2¼-in. O.D. 12 gage	15	5⅜-in. O.D. 9 gage	51
2¼-in. O.D. 11 gage	16	5½-in. O.D. 9 gage	53

Tin Plate

Standard cokes, per base box $4.75

Terne Plate

(Per package, 200-lb.)

8-lb. coating	$9.30	25-lb. coating I. C.	$14.25
8-lb. coating I. C.	9.60	30-lb. coating I. C.	15.25
15-lb. coating I. C.	11.80	35-lb. coating I. C.	16.25
20-lb. coating I. C.	13.00	40-lb. coating I. C.	17.25

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb. ..... 2.50c. to 2.60c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb. ..... 3.35c. to 3.50c.

Galvanized

No. 28 (base), per lb. ..... 4.35c. to 4.50c.

Tin-Mill Black Plate

No. 28 (base), per lb. ..... 3.35c. to 3.50c.

Manufacturers have pamphlets, which can be had upon application, giving price differentials for gage and extras for length, width, shearing, etc.

Freight Rates

All rail freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic.	$0.325	Buffalo	$0.265	St. Louis	$0.43
Philadelphia, export	0.265	Cleveland	0.215	Kansas City	0.735
Baltimore, domestic	0.315	Cleveland, Youngstown		Kansas City (pipe)	0.705
Baltimore, export	0.255	Comb.	0.19	St. Paul	0.595
New York, domestic	0.34	Detroit	0.295	Omaha	0.735
New York, export	0.285	Cincinnati	0.295	Omaha (pipe)	0.705
Boston, domestic	0.365	Indianapolis	0.31	Denver	1.275
Boston, export	0.285	Chicago	0.34	Denver (pipe)	1.215
				Pacific Coast	$1.50
				Pac. Coast, ship plates	1.20
				Birmingham	0.69
				Memphis	0.385
				Jacksonville, all rail	0.50
				Jacksonville, rail and water	0.415
				New Orleans	0.515

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha, and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 30c. to 40c.; ship plates, 30c. to 40c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 30c. to 40c.; sheets and tin plates, 50c.; rods, wire rope, cable and strands, 75c.; wire fencing, netting and stretcher, 50c.; pipe, not over 8 in. in diameter, 50c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Iron and Steel Markets

(*Concluded from page 568*)

advanced prices. Warehouses are well covered on small sizes, but mills are unable to make shipments. Some substitution of iron for steel bars is noted. Local wire nail prices remain unchanged notwithstanding reports of a shortage before the turn of the year. Some firms have more bolt and nut business than they can properly handle, while others say the movement out of stock is only fair at best.

Jobbers quote: Soft steel bars, $2.85½ per 100 lb. base; [illegible] $2.85½ to $3.05½; tire steel, $4.25 to $4.60; open-hearth spring steel, $4.50 to $6; crucible spring steel, $11.50; steel bands, $4; hoop steel, $4.50; cold rolled steel, $3.65 to $4.15; refined iron, $2.85½; best refined iron, $4.25; Wayne iron, $5.50; Norway iron, $6 to $6.50; plates, $2.95½ to $3.15; No. 10 blue annealed sheets, $4 per 100 lb. base; No. 28 black sheets, $5.15; No. 28 galvanized sheets, $6.15.

Soil Pipe.—New England makers of soil pipe have advanced prices $7 a ton, as compared with $6 by the big producers. No letup in the demand for this product is noted. Pennsylvania and other makers outside this territory are reported considerably behind on deliveries, while New England makers are in a position to make spot deliveries, which accounts for the higher prices quoted by them. The general market on soil pipe is 33, 10 and 5 per cent discount from list prices.

Coke.—New business in foundry coke is confined to English and Alabama brands, both the New England Coal & Coke Co. and the Providence Gas Co. confining activities to contract deliveries on a basis of $16.50 delivered where the local freight does not exceed $3.10. Several thousand tons of English coke sold the past week on a basis of $15 to $16 c.i.f. dock here, both to New England and New York State foundries. The steamship Norfolk Maru with a cargo of English coke is due shortly and the Maron Lovatt is loading abroad this week for Boston. A cargo of Sloss by-product foundry coke is loading for New England and is expected to arrive within two weeks. This coke is offered at $19 delivered subject to prior sale and confirmation. Present plans call for shipments of 50,000 tons of this Alabama coke into New England this year, deliveries to be made at Bridgeport, Conn., Providence, R. I., Boston, and Portland, Me.

Old Material.—Dealers' prices for old material at yards are firmer on expectations of increased business within the next two months. Little material is coming out and floating supplies are easily absorbed, but the market really is less active than it was a week ago. New inquiries from Pennsylvania mills have dropped to unimportant tonnages, and New England users, generally speaking, have enough stock on hand or on contract to cover requirements the rest of 1922. Heavy melting steel the past week sold in a small way at $17, Pittsburgh, which brings the local price down to around $11.50. Within the last few days, dealers have offered $12 on cars, shipping point. The demand for mixed borings and turnings has dropped almost to the vanishing point, following the withdrawal of a West Virginia mill from the market. Rejections are exceptionally heavy, according to local dealers. Chemical borings are in demand, dealers in some instances offering as high as $12.50 on cars, shipping point, for them. Shafting also is wanted, but consumers refuse to raise bids, and sales therefore are restricted. New England foundries continue to show little interest in cast scrap.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$19.00 to $20.00
No. 2 machinery cast	17.00 to 18.00
[illegible]	[illegible]
[illegible]	[illegible]

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$11.50 to $12.00
No. 1 railroad wrought	12.50 to 13.00
No. 1 yard wrought	10.00 to 11.00
W[illegible]	[illegible]
2 ft. long)	8.50 to 9.00
Machine shop turnings	8.50 to 9.00
Cast iron borings, rolling mill	9.50 to 10.00
Cast iron borings, chemical	11.50 to 12.50
Blast furnace borings and turnings	8.75 to 9.50
Forged scrap and bundled skeleton	8.00 to 8.50
Street car [illegible]	[illegible]
Steel [illegible]	[illegible]
[illegible]	[illegible]
Street car wheels	13.50 to 14.00

San Francisco

Moderate Trading in Foreign Iron and Coke —Price Trend Is Upward

SAN FRANCISCO, Aug. 23.

Pig Iron.—The market on the Coast has not shown any great expansion of activity during the past fortnight. A moderate business in foreign iron has been done, perhaps around 1000 tons for Los Angeles and San Francisco together. This tonnage comprises both English and Belgian materials, and is for late August, early September delivery. It is understood prices were around $29, ex-ship, coast ports. At present there appears to be an upward trend in prices of foreign pig iron, probably resulting from higher exchange rates and firmness in original markets. Domestic material is still neglected here, as prices and delivery favor the foreign. Foundries report a steady current business, but the volume of their operations does not seem to be materially larger than that which has been prevailing for several months.

Finished Iron and Steel.—A moderately good business is being done in iron and steel products along the Coast, perhaps the most consistent feature being the building industry. Reports from all parts of the State suggest a very satisfactory development in real estate construction, and in the urban centers the volume of large and medium commercial buildings, and the better class steel-frame apartment houses, is unusually large. Steel interests report a continuation of steady demand for structural materials, usually in moderate quantities. Local mills have advanced their prices on concrete reinforcing bars from $2.55 to $2.80, f.o.b. cars, San Francisco. The situation in the heavy materials is not particularly active, although some regular business is being handled. It seems that consumers are disposed to await the settlement of the strikes and other transportation uncertainties before taking on more stocks than are essential for current needs. Some items are reflecting the upward tendency in prices, but the Steel Corporation level on plates, shapes and sheets is fairly well adhered to, except by those interests which are offering prompt shipment at premiums.

Cast-Iron Pipe.—Quietness still pervades this market, possibly intensified by the industrial conditions of the country. Buyers are holding off, awaiting a settlement of difficulties. The only business of consequence has come from municipal sources. Los Angeles has just closed for 3000 tons of 4-6-8-in. pipe. Healdsburg closed last week for 145 tons of 4 to 8-in. Prices in some cases have been advanced about $1.50 per ton, making the new delivered price from $51.50 to $52 for 6-in. Shops are generally sold up for several months. Soil pipe factors are doing very little at present, as both buyers are hesitant and mills are not encouraging any volume of new business. No change in prices.

Coke.—Offerings of foreign material continue liberal, and buyers are taking steadily for their immediate needs. No particularly large sales were reported for the two-week period, but the total amount of business is estimated to aggregate some 1000 tons. This English coke is scheduled for late August and early September shipment. The price was close to $17.50, ex-ship. The foundry trade was the principal buyer. Domestic prices are quoted higher here, following strike developments, and beehive was named at as high as $12.50, f.o.b. ovens, West Virginia. By-product coke is held around $8.50, f.o.b. Birmingham. At these prices the amount of business transacted is very small.

Old Material.—Very little business is to be reported in scrap over the past two weeks. The regular routine requirements were taken care of, and that was about all. One merchant reports having sold three cars of cast iron scrap at $24 per net ton, delivered at consumer's plant; but it is understood that a firm offer would bring lower prices, as the market is generally considered from around $22 to $23. Heavy melting steel showed no activity of any consequence, but prices appear to be holding to the $11 level established a few weeks ago.

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
Aug	Lake	Electrolytic*	New York	New York	St. Louis	New York	St. Louis
23.....	14.12½	13.75	32.37½	5.90	5.55	6.60	6.25
24.....	14.12½	13.62½	31.87½	5.90	5.55	6.60	6.25
25.....	14.12½	13.62½	31.87½	5.90	5.55	6.60	6.25
26.....	14.12½	13.75	.....	5.90	5.55	6.60	6.25
28.....	14.12½	13.75	32.05	5.90	5.55	6.60	6.25
29.....	14.12½	13.75	32.30	5.90	5.55	6.60	6.25

*Refinery quotations.

New York

NEW YORK, Aug. 29.

Moderate activity prevails in most of the markets and prices are steady to firm. Buying of copper is not heavy and prices are steady. The tin market is dull, with prices fluctuating with conditions in London. Buying of lead is steady and prices are firm. The market for prime Western zinc has stiffened slightly, but demand is not active.

Copper.—There is some hesitancy on the part of consumers to enter the market in a large way, but domestic demand is reported as fairly good. In the latter part of last week there was one producer which took some business at 13.87½c., delivered, but this situation no longer prevails and it is not possible to buy from first hands electrolytic copper at less than 14c., delivered, or 13.75c., refinery, the quotation which has prevailed for some time. There has been and still may be a little resale metal available at slightly under the market, but it is not an important factor. Some producers will not even sell at 14c., delivered, but are asking ⅛c. to ¼c. higher for any delivery this year. The business referred to as having been booked under 14c., delivered, last week is understood to have been for delivery not earlier than November. Lake copper continues unchanged at 14c. to 14.25c., delivered.

Tin.—The week as a whole has been a quiet one in Straits tin, total sales having amounted to not more than 500 tons, mostly prompt and nearby delivery, with the latter position neglected, although a little business was done in far-off shipments. Consumers are naturally hesitating in this as in other markets because of the coal and railroad situation. Prices for Straits tin here are generally below the cost to import and foreign sellers cannot compete with local sellers. A little business was done yesterday in spot Straits at 32c. to 32.12½c., most of it going at 32c. In the market to-day moderate sales of spot and nearby have been made at 32.25c. to 32.37½c., with the quotation for spot Straits at 32.30c., New York. The London market to-day was about £1 per ton less than a week ago, at £159 10s. for spot standard, £159 15s. for future standard and £160 for spot Straits. Arrivals thus far this month have been 3140 tons, with 5990 tons reported afloat.

Lead.—A moderate demand is reported by most sellers and the market is steady at the quotations prevailing a week ago, except that in the West the metal can be obtained in the outside market at 5.55c., St. Louis. The quotation in New York is the same for both the leading interest and independents at 5.90c., New York, but the quotation of the former at St. Louis is 15 points higher than the outside market at 5.70c.

Zinc.—Prime Western has advanced slightly during the week and is now quoted at 6.25c., St. Louis, and 6.60c., New York, as a minimum. The market is firm and business is light, consumers not entering the market to any great extent and producers disinclined to press their product. It is possible to buy prime Western to the end of the year at the same prices prevailing for the early positions. It is reported that prospects for coal in the zinc smelting districts of the West are none too good and there are those who fear a reduction in output.

Antimony.—The general situation is unchanged and wholesale lots for early delivery are quoted at 5.25c. per lb., duty paid, New York.

Aluminum.—Wholesale lots of virgin metal, 98 to 99 per cent pure, are quoted by the leading interest at 19.10c., f.o.b. plant, for early delivery, with the same grade of foreign metal obtainable from importing dealers at 17.75c. to 18c., duty paid.

Old Metals.—Business is quiet but values are fairly stationary. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	13.00
Copper, heavy and wire	12.50
Copper, light and bottoms	11.25
Heavy machine composition	10.50
Brass, heavy	7.50
Brass, light	6.50
No. 1 red brass or composition turnings	9.00
No. 1 yellow rod brass turnings	7.50
Lead, heavy	5.00
Lead, tea	4.00
Zinc	3.75

Chicago

AUG. 29.—While there has been no particular pressure to sell, business has been unsatisfactory and prices of lead, zinc and tin have weakened. The only recent buying of note has been the closing of first quarter business in copper at current prices. The failure of future buying to bring out a premium is an unfavorable sign. Old metal prices are unchanged. We quote, in carload lots, lake copper, 14.25c.; tin, 33c. to 33.50c.; lead, 5.65c.; spelter, 6.30c.; antimony, 7c., in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 11c.; copper bottoms, 9.25c.; red brass, 8.75c.; yellow brass, 6.75c.; lead pipe, 4.50c.; zinc, 3.50c.; pewter, No. 1, 20c.; tin foil, 22.50c.; block tin, 26c., all buying prices for less than carload lots.

St. Louis

Aug. 29.—Lead was stronger for the week, advancing 10 to 15 points to 5.65c. to 5.70c., car lots, while slab zinc was steady at 6.25c. to 6.35c. On old metals we quote light brass, 3.50c.; heavy red brass and light copper, 7c.; heavy yellow brass, 4c.; heavy copper and copper wire, 7.50c.; zinc, 2c.; lead, 3c.; pewter, 15c.; tin foil, 16c.; tea lead, 2c.; aluminum, 9c.

Wages of Puddlers Advanced

PITTSBURGH, Aug. 29.—The average price of bar iron shipments in the 60 days ended Aug. 20 as disclosed in the bi-monthly examination of the sales books of selected manufacturers in the Midwestern district at Youngstown yesterday was 1.70c. This is an advance of 10c. per lb. over the April-June average and means an increase of two points or 40c. per ton increase in the boiling rate to be paid in the September-October period. The new boiling rate is $8.93 per ton. Puddlers in the July-August period were paid $8.53 based on the 1.60c. card.

New Weirton Steel Mill

The Weirton Steel Co., Weirton, W. Va., which will soon start work on the construction of a new sheet mill, is expected to begin placing the contracts shortly for the mills and equipment. This plant is to consist of eight hot mills arranged in two trains of four mills, each train to be driven by 1200-hp. motor and also four cold mills. This plant will make black and galvanized and special sheets and will provide work for 600 additional men.

PERSONAL

Arthur J. Grey of New York has been appointed American Commodity Trade Commissioner in Berlin and will sail on the President Harding Sept. 6. His selection follows the policy of the Department of Commerce to select men who have a practical knowledge of various industries in order to promote the interests of American manufacturers to the greatest extent. Mr. Grey's appointment is of particular value to the machinery trade, as he has spent seven years in machine building, and in addition to this has devoted four years to law practice, dealing with technico-legal and commercial problems, such as immigration, unemployment and industrial conditions in New York. For nine years he taught machine construction and design and commercial law in the New York day and evening schools. For the past six years, Mr. Grey has been engaged in foreign trade, first as a traveling representative in France and Belgium for American companies, and later as principal with offices in New York, Paris and Buenos Aires. His early education was received in the public schools of New York and New Jersey. He graduated from New York University in 1898 with the degree of Bachelor of Laws and in 1912 received the degree of Bachelor of Science from the same institution. Until his departure for Europe, Mr. Grey is making his headquarters at the Bureau of Foreign and Domestic Commerce, Custom House, New York.



ARTHUR J. GREY

Frank E. Dyson, assistant general agent, Universal Winding Co., Providence, R. I., a position he held for 17 years, has resigned to devote his entire attention to the affairs of the Electrical Products Mfg. Co., of that city, of which he is president.

Donald R. Simonds, Arcade Malleable Iron Co., Worcester, Mass., has associated himself with the Boston office Rogers, Brown & Co.

H. Owesen, formerly mechanical engineer of the Apollo Steel Co., has become assistant chief engineer of the Youngstown Sheet and Tube Co., Youngstown, Ohio.

Gilbert H. Johnson, of Isaac G. Johnson & Co., iron founders, New York, has been elected to the board of directors of the Bank of America, New York.

G. A. Binz, sales manager of the American Steam Gauge & Valve Mfg. Co., Boston, was appointed sales manager also of Schaeffer & Budenberg Mfg. Co., Brooklyn, upon the consolidation of these two companies on Aug. 1.

W. Irving Bullard, vice-president E. H. Jacobs Mfg. Co., manufacturer of mill supplies, Danielson, Conn., will sail Sept. 30 for Rio de Janiero, Brazil, where he will attend the International Centennial Exposition as a delegate from the States of Connecticut and Massachusetts.

W. H. Cogswell, formerly with the Miller-Owen Electric Co., Pittsburgh, has become associated with H. F. Randolph, consulting electrical engineer, Oliver Building, Pittsburgh.

Charles A. Anderson, Jr., for the past five years in charge of the Philadelphia office, Pittsburgh Valve, Foundry & Construction Co., Pittsburgh, has been transferred to the home office and promoted to the position of assistant sales manager.

E. C. Griffiths and Don B. Graze have opened offices in the Marshall Building, Cleveland, as sales engineers under the name of Griffiths & Graze, and will handle electrical material for the M. B. Austin Co., Appleton Rubber Co., and S. H. Couch Co., Inc. Mr. Griffiths has been associated with the M. B. Austin Co., in the same territory for the past three years and Mr. Graze has devoted his attention to power apparatus in the same territory for the past nine years.

Prof. S. Timoshenko, recently of the Zagreb Polytechnic Institute of Jugo-Slavia, has joined the staff of the Vibration Specialty Co., Philadelphia, and is handling the work on elasticity of structures.

H. B. Reppetto, for many years connected with the stove manufacturing business at Wheeling, W. Va., has been made manager of the Regent Stove Co., Wyandotte, Michigan.

W. A. Shepard has resigned as secretary of the Consolidated Tool Works, Inc., 296 Broadway, New York, effective Sept. 1.

W. Clayton Farris has returned recently to New York from Japan, where he has been for three years with the Horne Co., Ltd. The first two years he spent in the Tokio office and during the remaining year he acted as manager of the Osaka branch. While in the United States, Mr. Farris will be at the New York office of the Horne Co., Ltd., 51 Chambers Street.

George Scherr of the George Scherr Co., 126 Liberty Street, New York, machine tools, left Aug. 26 on a business trip to Europe, through Italy, Austria and Germany. While in Europe his address will be care Messrs. Schuchardt & Schutte, 59 Spandauer Strasse, Berlin.

Thomas H. Wickenden and Charles McKnight, Jr., have recently joined the development and research department of the International Nickel Co., New York, to undertake development work in connection with alloy steels. Mr. Wickenden was for many years associated with the Studebaker Corporation as engineer-in-charge at the South Bend plant, and more recently associated with Zeder-Skelton-Breer Engineering Co. in a consulting capacity. Mr. McKnight was formerly works manager of the Carbon Steel Co. and engaged for many years in the production of alloy steels.

P. F. Merit, formerly vice-president of the Eastern Fuel Co., 302 Broadway, New York, has resigned. F. W. Prussen has been transferred from the New York office of this company to the traffic department in the main office, Frick Building, Pittsburgh.

Frank King has been made factory manager of the American Steam Truck & Car Co., Chicago, having resigned a similar position with the Dearborn Truck Co.

Harry Isenhart, formerly in charge of the Pittsburgh office, Bethlehem Steel Co., and later in the Buffalo office, Jones & Laughlin Steel Co., has joined the sales force of E. W. Mudge & Co., Pittsburgh.

Edward M. Adams, first vice-president and general manager of sales Inland Steel Co., Chicago, underwent an operation for appendicitis at St. Luke's Hospital, in that city, Aug. 28. His condition is reported to be satisfactory.

Engineers to Meet at Springfield

The Springfield, Mass., local sections of the American Society of Mechanical Engineers, in co-operation with the Engineering Society of Western Massachusetts and the Springfield Chamber of Commerce, will hold a regional meeting Sept. 25 to 27. The technical program will include sessions on paper, power, textiles and the machine shop.

Machine tool standardization, standardization of small tools, and a group of papers on the new alloys of aluminum, copper and nickel will be presented at the machine shop session.

Visits to educational institutions in Springfield and a visit to the industrial plants of Holyoke, Mass., are planned, a day being given over to an automobile trip through the Connecticut Valley to Greenfield, Mass.

OBITUARY

Death of Coleman Sellers, Jr.

COLEMAN SELLERS, JR., president of Wm. Sellers & Co., Inc., Philadelphia, died on Tuesday, August 15, in his 70th year after an illness of several months. His connection with the Sellers house, then a firm, began in 1873 on his graduation from the University of Pennsylvania. After serving a practical course in the shops for several years, he took a position in the drafting room of which he soon became the head. He was appointed assistant manager in 1887, becoming at the same time a director of the company. He was elected engineer in 1902 and president in May, 1905.



COLEMAN SELLERS, JR.

His forebears in the four preceding generations showed unusual mechanical and engineering ability. The first of them came to this country from Derbyshire, England, in 1682.

His father, Coleman Sellers, a member of the Sellers firm in 1873, was one of the most brilliant mechanical engineers of his time. Coleman Sellers, Jr., also was a man of parts and of liberal ideas, and while his principal inclinations and activities were in mechanical and engineering lines, he took keen interest in science, literature, education and the arts, and was active in the civic life of Philadelphia as well as in city, State and national betterments.

He was long active in the affairs of the Franklin Institute, of which he was vice-president at the time of his death. He was a member of the Board of Commissioners of Navigation of Pennsylvania, to which he was appointed in 1907. He took special interest in the work of the American Philosophical Society, the American Society of Mechanical Engineers, the American Society of Naval Architects and Marine Engineers, and the Engineers' Club of Philadelphia, of which he was one of the founders. He was president of the Chamber of Commerce from 1909 to 1913.

As chairman of a local draft board in the early stages of this country's entrance into the war he served with such fidelity and assiduity as seriously to impair his health.

Mr. Sellers was a man of charm, kind and considerate to all with whom he had contact, whatever their station in life. He had a special sympathy for the young men of his profession. His keen sense of humor was coupled with a most unusual fund of anecdote. He was quick in repartee, but never caustic or resentful; was sedate or gay, so that his presence in any gathering imparted an atmosphere suited to the occasion.

FRANK PERLEY HOWE died at his summer home in Bristol, R. I., Aug. 24, after an illness of nearly two years. He was in his 70th year and had lived most of his life in Philadelphia, which was his birthplace. After graduating at Brown University in 1872 he took a course in mining engineering at Lehigh University. For many years he had been a factor in the Eastern iron trade, having offices in Philadelphia but spending much time at Johnson City, Tenn., in connection with the operations of the Cranberry Coal & Iron Co. and the Cranberry Furnace Co., of which he was president in recent years, succeeding H. M. Howe. He was also president of the Eastern Tennessee & Western North Carolina Railroad, a line running from Johnson City, Tenn., to Cranberry, N. C. The furnace at Johnson City was well known in the trade as a producer of low phosphorus pig iron, which was made from the Cranberry ores brought from the adjoining State. Mr. Howe was for a number of years secretary and treasurer and later president of the Allentown Rolling Mill Co., Allentown, Pa. Other executive positions which he held at various times were the following: general manager Montour Iron & Steel Co., Danville, Pa.; president North Branch Steel Co., vice-president William Wharton Jr. & Co., president Philadelphia Roll & Machine Co.; also, for some years, president Musconetcong Iron Works, Stanhope, N. J. He was a member of the American Institute of Mining and Metallurgical Engineers.

LEWIS R. BLISS, president Ajax Iron Works, Corry, Pa., died at the Allegheny General Hospital, Pittsburgh, Aug. 26. He was born in Corry, Pa., 45 years ago, and had lived there all his life. He was active in the civic, business and fraternal circles in that city.

OLIVER A. BLACKBURN, president Eclipse Gas Coal Co., and also of the Pittsburgh Coal Producers' Association, died at the Columbia Hospital, Wilkinsburg, Pa., Aug. 25, following an illness of several months. He was born at Peters Creek, Pa., Nov. 9, 1862, but had been a resident of Pittsburgh most of his life.

JOHN STEPHANS, general manager since 1902 of the Inland Steel Co.'s plant at Indiana Harbor, Ind., died of apoplexy at his home in that city, Aug. 24. He was 78 years old.

THEODORE H. COLVIN, whose death at his home in Providence, R. I., Aug. 12, was recorded in THE IRON AGE of Aug. 24, was well known in the foundry trade.



THEODORE H. COLVIN

He was a charter member of the American Foundrymen's Association, serving one year as vice-president and during a part of the year as acting president. It was a great source of pride to him that he made his own career without any financial assistance from anyone. He was one of eight children brought up on a hilly farm of Connecticut, and had only six months' schooling at a country school. He started out from home at the age of 17 to work for a farmer at the rate of $12 a month and the next year went into the foundry to learn the trade which he followed until he started in business at about the age of 26 with money saved since starting to work. He always found ways of acquiring such education as he required in doing business notwithstanding his limited education, and never went to any school or employed teachers. He could keep books, figure the weights and strains of any casting, making them up to 25 tons wholly from blue prints without any pattern and he devised many methods of molding heavy work which were great improvements on former methods. He designed and built the foundry plant of the Colvin Foundry Co., and although it is 25 years old, it compares favorably with many jobbing foundry plants in that section of the country to-day. He seemed to have the ability to overcome all obstacles. He was at once a remarkable executive, a thorough mechanic, a successful financier, a deep thinker and one who took great pleasure in helping others.

LEVY MAYER, prominent Chicago attorney and representative of the Inland Steel Co. in recent merger negotiations, died of heart failure in Chicago on Aug. 14, at the age of 63.

LOUIS C. STEGER, member of the board of directors and director of purchases and stores of S. F. Bowser & Co., Inc., Fort Wayne, Ind., died on Sunday, Aug. 20.

EDMUND S. CONANT, an auctioneer of national reputation and especially prominent in the New England machine tool field, died Aug. 26, at his home in Lowell, Mass.

Machinery Markets and News of the Works

AUGUST A QUIET MONTH

Some Centers Show Increased Activity—Prospects for September Good

Several Price Advances—Otis Steel Co. Inquires for Cranes and Other Equipment

In some centers, notably Cincinnati and Milwaukee, the business in August is expected to come well up to that of June and July. In New York, Cleveland and Pittsburgh on the other hand, purchases have not been up to the previous month. There is a definite feeling throughout the trade, however, that September will bring increased activity.

Several price advances are to be noted. The Landis Tool Co., Waynesboro, Pa., has announced a 10 per cent advance, effective Aug. 15, and the Warner & Swasey Co., Cleveland, will issue new lists Sept. 1 with further price advances. Increases ranging from 5 to 15 per cent have been made in turret machinery at Cincinnati, and announcements from other manufacturers in that district are expected. In the Pittsburgh district dealers have been notified by a maker of lathes of an increase of about 10 per cent.

The Otis Steel Co. has sent out inquiry for about 25 cranes for its new steel plant and is figuring on mills, furnaces and other equipment, some of which is expected to be placed shortly. This company purchased a 36 in. lathe and is inquiring for a 96 in. shear.

The General Electric Co., Schenectady, N. Y., is still in the market, and now has a list out for eight or 10 machines, and a Cleveland company which is expected to purchase 30 tools has asked quotations.

The Weirton Steel Co., Weirton, W. Va., will probably require equipment for a new sheet mill.

The Chesapeake & Ohio Railroad contemplates the purchase of tools, but no list has been issued.

The Public Service Department of Los Angeles is inquiring for a 15 and 20-ton single-motor crane, and the Department of State Railways, Santiago, Chile, is in the market for a 25-ton, two five-ton and two three-ton cranes, also two special ore chutes.

Railroad business is coming to a head and the resumption of railroad buying noted last week in connection with the Union Pacific and Illinois Central was stimulating to the trade. The Chicago, Burlington & Quincy, which has two lists before the trade, is expected to place orders for a large number of machines this week and to close for 11 cranes.

In view of the fact that these railroad inquiries have been pending for months, present buying is regarded in some quarters as an indication that the carriers are looking for general price advances.

While railroad orders will considerably expand the bookings of dealers they suffer in comparison with buying by automotive interests, which has been going on quietly since May. The automotive industry was the principle source of gain in Milwaukee and pending inquiry is said to forecast even better activity.

New York

NEW YORK, Aug. 29.

WHILE the machine-tool trade continues to look forward with confidence it can not be said that present conditions are satisfactory. Purchases of tools have dropped off materially during August as compared with June and July. The General Electric Co., Schenectady, N. Y., is still in the market and now has inquiries out for eight or ten machines, but otherwise there is very little activity except in single tools.

The Landis Tool Co., Waynesboro, Pa., has announced an advance of 10 per cent on its grinding machines and machine parts, effective Aug. 15.

The crane market is also quiet, there being few sales or inquiries.

The Department of State Railways, Santiago, Chile, is [illegible] two motor and two 3-ton cranes and two special ore chutes, but it is not certain that the orders will come to the United States.

The Public Service Department, Los Angeles, Cal., is inquiring for one 15-ton and one 20-ton single-motor cranes.

The Southern California Edison Co. opened bids last week on a 100-ton power plant crane.

The Keystone State Construction Co., Philadelphia, has bought two used Brown Hoist locomotive cranes formerly [illegible]

The Crampton Co., Kenilworth, Ky., contractor, has bought from Philip T. King, New York, a used 20-ton Brown Hoist locomotive crane.

Roehm & Davidson, Detroit, have bought a 5-ton, 75-ft. span, 3-motor crane from the Northern Engineering Works.

The city of Detroit has ordered a 15-ton Northern crane.

The Detroit Pressed Steel Co., Detroit, has bought a 5-ton electric crane from the Northern Engineering Works.

The [illegible] Co. [illegible] Detroit, has bought a [illegible] crane from the Northern Engineering Works.

Charles L. Cadle, superintendent of Public Works, Albany, N. Y., has plans in progress for the construction of three drydocks and repair shops at the State Barge Canal divisions at Waterford, Baldwinsville and Pittsford, N. Y. The equipment will comprise yard cranes and other material-handling machinery.

John Arfman, 431 East Ninetieth Street, New York, will soon take bids for a one-story automobile service and repair building, 75 x 100 ft., at 1731 Avenue A, estimated to cost $100,000.

The Consolidated Machine Tool Corporation, 17 East Forty-second Street, New York, is disposing of a bond issue of $3,600,000, a portion of the proceeds to be used for extensions and improvements.

The Ohio Brass Co., 50 Church Street, New York, manufacturer of brass and other electrical equipment, with plant at Mansfield, Ohio, will commence the erection of a new plant at Niagara Falls, Ont.

Power equipment, conveying machinery, tanks, etc., will be installed in the new plant to be constructed on Foster Avenue, Long Island City, by the National Liquid Bleach Co., 18 Purvis Street, New York, estimated to cost about $500,000, with equipment.

The Eastern Sugar Corporation, a subsidiary of the Cuba Cane Sugar Corporation, 112 Wall Street, New York, has arranged for a bond issue of $10,000,000, a portion of the proceeds to be used for extensions and improvements, additions to working capital, etc.

Joseph R. Greenwood, Long Island City, has organized a company to manufacture enameled products and has leased a building at 66 Myrtle Avenue from the Commercial Research Corporation, for a plant and headquarters. The structure approximates about 25,000 sq. ft. of floor area.

The Standard Oil Co. of New York, 26 Broadway, is perfecting plans for a refinery at Sparkill, N. Y., where it recently acquired about 1500 acres. It is said that the new refinery will cost in excess of $1,000,000, with equipment.

The Imperial Oil Co. of Canada, a subsidiary of the Standard Oil Co. of New Jersey, 26 Broadway, New York, has plans under consideration for a new refinery at Calgary,

Alta., estimated to cost in excess of $2,000,000, including machinery.

Benjamin G. Hutchins, Inc., 990 East Thirty-fourth Street, Brooklyn, will make extensions in its two-story power house, at Avenue H and East Thirty-fifth Street, to cost about $25,000. Lockwood, Greene & Co., 101 Park Avenue, New York, are architects.

Loading and unloading machinery, conveying equipment, power elevators, and other mechanical apparatus will be installed in the new reinforced-concrete warehouse to be constructed at Long Island City, by James Butler, Inc., 391 Washington Street, New York, wholesale grocer, estimated to cost in excess of $1,500,000, for which bids on a general contract are now being taken. William Higginson, 21 Park Row, New York, is architect.

The American Yellow Taxi Operators, Inc., 119 West 145th Street, New York, has leased the building fronting on the East River, between Forty-ninth and Fifty-first Streets, now in course of erection, for a new service and repair works and garage.

The Koken-Chisholm Co., 178 Ce tre Street, New York, manufacturer of metal chairs and fixtures, will commence the erection of a two-story plant, 100 x 100 ft., at Willow Avenue and 134th Street, to cost about $65,000. Charles B. Chisholm is head.

A vocational department will be installed in the new high school to be erected at Arlington, Poughkeepsie, N. Y., for which preliminary plans are being prepared. The Union Free School District No. 7, John F. Hooper, president, Poughkeepsie, is in charge.

The Conley Tinfoil Co., 521 West Twenty-fifth Street, New York, has filed plans for a one-story works, 152 x 362 ft., at Glendale, L. I.

The Timken Roller Bearing Co., 230 West Fifty-sixth Street, New York, with plants at Canton and Columbus, Ohio, is disposing of a stock issue of $12,000,000, a portion of the proceeds to be used for extensions, improvements, etc., and general expansion. H. H. Timken is president.

Barnett Schacht & Sons, 279 East 148th Street, New York, operating a general iron works, will build a new one-story plant, 50 x 100 ft., on Timpson Place to cost about $30,000.

A vocational department will be installed in the new high school addition to be erected at Manhassett, L. I., estimated to cost about $250,000, for which bids have been asked on a general contract. F. H. Briggs, Plandome, L. I., is architect.

The Westchester Lighting Co., First Avenue and First Street, Mount Kisco, N. Y., will soon take bids for an automobile service and repair works for company trucks and cars, in connection with the new two-story, L-shaped storage building. May & Hilliard, 15 East Fortieth Street, New York, are architects.

Walter Butterfield, Wildwood, N. J., is said to be arranging a list of equipment for installation at his machine shop, now in course of completion.

The Technical Products Co., 300 Madison Avenue, New York, manufacturer of machine equipment, etc., has leased a portion of the building on Hudson Avenue near Twelfth Street, Hoboken, N. J., totaling about 10,000 sq. ft., for a new works.

The East Brunswick Mutual Power & Light Co., 40 Patterson Street, New Brunswick, N. J., has been organized with a capital of $125,000 to equip and operate an electric power plant and system in East Brunswick Township. Klemmer Kalteissen heads the company.

The Kessler Chemical Co., 575 Nassau Street, Orange, N. J., is in the market for one Yale & Towne duplex hoist, from 2 to 3-ton capacity.

The C. A. Buscham Mfg. Co., 1126 South Grove Street, Irvington, N. J., is in the market for a De La Vergne oil engine, about 40 hp.

A vocational department will be installed in the new high school to be erected at Somerville, N. J., two-stories, 55 x 205 ft., estimated to cost about $250,000, for which bids are now being taken. J. N. Pierson & Son, 175 Smith Street, Perth Amboy, N. J., are architects.

Schloss, Held & Schloss, foot of Astor Street, Newark, operating an abattoir, will build a new ice and refrigerating plant to cost $35,000. William E. Lehman, 738 Broad Street, is architect.

J. J. Henry Muller, 113 Springfield Avenue, Newark, will build a one-story automobile service and repair building, 30 x 150 ft., at 149 William Street, for automobile trucks and cars employed in his furniture business. A. M. Kleeman, 987 Springfield Avenue, is architect.

L. W. Brazier, Basking Ridge, N. J., is in the market for a 100 hp. return tubular boiler, low pressure, self-sustained.

Chicago

CHICAGO, Aug. 28.

RAILROAD business is suddenly coming to a head. As reported in THE IRON AGE of Aug. 24, the Union Pacific placed orders for about $200,000 worth of machine tools. The Illinois Central has completed negotiations for $250,000 worth of tools, exclusive of motors, the distribution of the confirming orders now being in progress. The Chicago, Burlington & Quincy is expected to place orders this week for a large number of machines. This road has two lists before the trade, one comprising 117 items for its new Denver shop, which was published in THE IRON AGE of June 29, and the other embracing seventy-eight items for existing shops at various points on the system, which appeared in our issue of May 1. The latter list has been cut down materially, but it is understood that the Denver equipment will be purchased in toto. In view of the fact that these railroad inquiries have been pending for months, present buying is regarded as an indication that the carriers are becoming apprehensive of general machine tool advances. While these orders will considerably expand the bookings of dealers, they suffer by comparison with buying by automotive interests which has been going on quietly since May. It is estimated that the Studebaker Corporation has thus far placed orders for metal working equipment involving close to $700,000, while the purchases by the Continental Motors Co. have also been large. In the latter case a considerable share of the business went to Detroit dealers, although by no means to the exclusion of Chicago sellers.

The Chicago, Burlington & Quincy is also about to close for eleven cranes, the inquiry for which was noted in our issue of June 12. Nine of these cranes are overhead electric travelling machines for the Denver, Col., shop, consisting of two 225-ton, three 15-ton, two 50-ton, and two 10-ton cranes. There are also two gantry cranes, 105 ft. between legs and 155 ft. overall to be bought for the Aurora, Ill. scrap yard of the road. The Atchison, Topeka & Santa Fe has placed a 10-ton hand power crane of 37 ft. span with the Whiting Corporation.

The Marshall Metal Corporation, 2608 South Wells Street, Chicago, recently incorporated with $100,000 capital stock, will manufacture a product known as Bull Dog metal, which will be used for welding aluminum. It will also manufacture steel wire brushes to be used in applying the metal. A plant containing 3000 sq. ft. of floor space has been leased at the address given. The company employs no metal-working machines, but operates coke forges, graphite crucibles, specially made molds and brush making machines. The officers are Frank E. Chamberlain president; John J. Stream, vice-president; John R. Marshall, treasurer; Harry B. Clapp, secretary.

The Atlas Copper & Brass Mfg. Co., 3740 High Street, Chicago, has let contract for a one-story machine shop, 50 x 123 ft., at 2742-4 High Street, to cost $12,000.

The Neely Printing Co., 412 Orleans Street, Chicago, has let contract for a three-story printing plant, 81 x 100 ft., 18 x 23 ft., and 34 x 34 ft., at 871-77 North Franklin Street, to cost $100,000.

E. J. Brach & Sons, confectioners, 215 West Ohio Street, Chicago, have had plans prepared by Alfred S. Alschuler, 28 East Jackson Boulevard, for a three-story factory, 100 x 300 ft., to be built in three units on a site bounded by Cicero, Austin, Kilpatrick Avenues and West Kinzie Street, to cost $1,000,000.

The Valentine Seaver Co., furniture manufacturer, 1721 Sedgwick Street, Chicago, has had plans prepared for a four-story factory, 103 x 171 x 272 ft., at George Street and North Crawford Avenue.

The Sandbo Mfg. Co. has opened a plant at 1518 Third Avenue, Moline, Ill., to manufacture automobile accessories and a patented pneumatic pump. The officers are A. I. Sandbo, Frank Maehr, Jr., and Thomas Sincox. Mr. Sandbo was the founder of the Bear Mfg. Co., Rock Island, and at present is vice-president of that corporation.

A recent gas tank explosion followed by fire resulted in $40,000 damage to the plant of the Stockland Road Machinery Co., 3327 Easy Twenty-seventh Street, Minneapolis, Minn. The blaze was confined to the paint shop and a section of the machine shop.

The Elgin Stove & Oven Co., 14 Chicago Street, Elgin, Ill., has plans under way for a new three-story plant at North State and Schiller Streets, estimated to cost about

$100,000. Frank D. Chase, Inc., 642 North Michigan Avenue, Chicago, is architect and engineer.

The Northeastern Iowa Power Co., Clermont, Iowa, has completed plans for a new hydroelectric power plant on the Wapsipinicon River, near Independence, Iowa. The Fargo Engineering Co., Jackson, Mich., is engineer.

The Andrews Wire & Iron Works, Inc., Preston Street, Rockford, Ill., is planning for the installation of new wire manufacturing equipment for the production of ornamental wire goods.

The United States Reclamation Service, Denver, Col., will take bids until Sept. 8, for cast iron gates, radio gates, hoists and hand rail, in connection with the Klamath, Orland and North Platte projects. The bids will be handled under specification 286-D.

The Common Council, Kewanee, Ill., has arranged for a bond issue of $125,000, for the construction of a municipal electric light and power plant. Plans will be prepared under the direction of J. Valmer, city engineer.

A vocational department will be installed in the new two-story and basement high school, 70 x 165 ft., to be erected at Maquoketa, Iowa, estimated to cost $150,000, for which foundations are under way. A power house will also be built. Arthur Ebeling, Kahl Building, Davenport, Iowa, is architect.

A vocational department will be installed in the new four-story high school at Ottumwa, Iowa, estimated to cost $700,000, for which date for receiving bids on general contract has been extended to Sept. 11. Croft & Boerner, 106 Marquette Avenue, Minneapolis, Minn., are architects.

The Chicago, Burlington & Quincy Railroad Co., 547 West Jackson Boulevard, Chicago, has completed plans for a new two-story electric power plant at McCook, Neb., estimated to cost $85,000. A new power house will also be built at Plattsmouth, Neb., to cost $110,000, and a similar plant at Alliance, Neb., one-story, 48 x 65 ft. A one-story addition will also be erected to the present power house at Lincoln, Neb.

The General Superintendent of Air Service, Post Office Department, Washington, will take bids early in September for a new aircraft plant at Maywood, Ill., including hangars, repair shops, service and warehouse building, estimated to cost about $90,000.

A. W. Lucal, care of H. D. Moreland, 3701 Sheffield Street, Chicago, architect, will build a one-story automobile service and repair works, 100 x 125 ft., at 916 Madison Street, Oak Park, Ill., to cost in excess of $70,000.

Buffalo

BUFFALO, Aug. 28.

PLANS are under way by the Skelton Shovel Co., care of Chamber of Commerce, Dunkirk, N. Y., for the erection of new works, estimated to cost close to $100,000.

The Common Council, Angelica, N. Y., has approved a bond issue for the construction of a municipal electric light and power plant.

The Niagara, Lockport & Ontario Power Co., Lockport, N. Y., is planning the erection of a new power plant in the vicinity of Jamestown, N. Y., and extensions in its system, estimated to cost in excess of $750,000.

A vocational department will be installed in the new three-story high school to be erected at Cortlandt, N. Y., estimated to cost about $400,000 for which bids will be taken at once. George W. Conable, 46 West Twenty-fourth Street, New York, is architect.

The Auto Sales & Service Corporation, 228 Williams Street, Rochester, N. Y., is planning the erection of a new service and repair building to cost about $150,000, including machine tools and other equipment.

A vocational department will be installed in the new two-story and basement high school to be erected at Fulton, N. Y., estimated to cost about $400,000, for which foundations will be placed under way at once. Wilson Potter, 22 East Seventeenth Street, New York, is architect.

The power house and other machinery at the plant of the Sikes Chair Co., 500 Clinton Street, Buffalo, were destroyed by fire Aug. 20, with loss estimated at $20,000. The department will be rebuilt. Albert D. Sikes is president.

The Bolivar-Richburg Electric Co., Bolivar, N. Y., is planning for extensions in its plant and system to cost about $30,000.

The Powertown Tire Corporation, Ridgeway Avenue, Rochester, N. Y., is planning the erection of a new one-story building, 40 x 125 ft., on East Avenue, to cost about $45,000.

The Northeast Electric Co., 348 Whitney Street, Rochester, will erect a steel and concrete addition, 51 x 90 ft. and 25 ft. high, to cost about $30,000.

The recent fire at the plant of Jewett & Co., Buffalo, did not damage the foundry or the power plant in any way. The heating plant can easily be put in order. The warehouse was but slightly damaged and has already been repaired. Only the assembly building was a total loss and will necessitate suspension of production until the completion of a new building, which was tarted on Aug. 16, six days after the fire. The contractor, the Turner Construction Co., has promised to complete the construction on Sept. 30 and the company expects to resume production on Oct. 15. The company has a large quantity of stoves which were not in any way damaged.

Philadelphia

PHILADELPHIA, Aug. 28.

THE Bloch Go-Cart Co., 1136 North American Street, Philadelphia, is taking bids for a new plant at 1143-47 North Third Street. Frank E. Hahn, 1112 Chestnut Street, is architect.

The Scott Paper Co., Weightman Building, Philadelphia, is planning for the completion of a new plant unit at its factory, foot of Market Street, Chester, Pa., and is arranging for the machinery installation at an early date. It will cost in excess of $300,000, including equipment. Other extensions and improvements will bring the total investment to close to $500,000.

A one-story power plant will be erected by the Fisher High Grade Dairies, Inc., 1935 East Willard Street, Philadelphia, in connection with its new plant on Worth Street, estimated to cost in excess of $70,000. William H. Timm, Perry Building, is architect. Frederick Fisher is head.

The William Kyle Co., 520 Arch Street, Philadelphia, manufacturer of lighting equipment, lamps, etc., has leased the entire building at 2107-9 Vine Street, for new works.

The Fennessey & Kobler Co., Twenty-sixth and Parrish Streets, Philadelphia, manufacturer of automobile bodies, is planning for the installation of new metal-working machinery and other equipment.

A one-story power house will be constructed by the St. Joan of Arc School, Frankford Avenue and Venango Street, Philadelphia, for which plans have been prepared by Eugene S. Powers & Son, 315 South Fifteenth Street, consulting engineers.

A one-story power house to cost about $25,000, will be constructed by Walter E. Knipe & Sons, Hancock Street, Philadelphia, at their new textile dye works at Wyoming and G Streets. W. E. S. Dyer, Land Title Building, is engineer.

The Pennsylvania Railroad Co., Broad Street Station, Philadelphia, will build a new shop at its plant at Enola, Pa., for the repair of steel car wheels. The company is said to have plans under consideration for the construction of five or more new engine houses, with repair shops, on sites to be selected in the State. Plans have been completed for the construction of a new grain elevator in the Girard Point section, to supplement the present plant. Contract has been let to the Sun Shipbuilding Co., Chester, Pa., for three new steel barges, to be used in connection with the new elevator.

The Wills-Sainte Claire Co. of Pennsylvania, 2033 Market Street, Philadelphia, has awarded contract to the John N. Gill Construction Co., Otis Building, for erection of a new service and repair building on Thirty-second Street, to be operated as a factory branch. W. J. Foss is president.

H. A. Jacobs, 1001 Market Street, Philadelphia, manufacturer of paper products, has purchased the five-story factory, 23 x 121 ft., at 923 Locust Street, for a new plant.

The De Frain Sand Co., Beach and Berk Streets, Philadelphia, is planning for the installation of a number of machine tools.

Fire, Aug. 24, destroyed a portion of the plant of M. L. Shoemaker & Co., Inc., Venango Street and the Delaware River, Philadelphia, manufacturer of fertilizer products, with loss estimated at close to $200,000, including machinery. It is planned to rebuild.

L. J. Faulkner, 14 North Paxton Street, Philadelphia, has taken bids for a new two-story automobile service and repair works at 1745-51 North Broad Street, estimated to cost about $100,000. J. J. Carroll, Middle City Bank Building, is architect.

Motors, controllers, conveying and other equipment will be installed in the new eight-story printing and publishing plant, 75 x 115 ft., to be erected by the Lutheran Publishing Co., Ninth and Sansom Streets, Philadelphia, estimated to cost about $500,000.

The Water Bureau, Room 216 City Hall, Philadelphia, Frank H. Caven, director, will receive bids until Sept. 7, for mechanical and electrical equipment for the new Southwest sewerage pumping station.

The Ford Motor Co., Highland Park, Mich., is reported to be negotiating for the purchase of the plant of the Taubel-Scott-Kitzmiller Co., Chestnut and Elm Streets, Trenton, N. J. It will be used as an automobile assembling plant.

Andrew J. Palasky, Trenton, N. J., has acquired property in the De Cou section, Broad Street Park, and will commence the erection of a new one-story machine shop and cabinet works.

The Free Bridge Motors Co., Morrisville, Pa., is planning for the construction of a two-story machine shop and automobile service works on Bridge Street, 86 x 90 ft. O'Rourke & Haig, 87 Liberty Street, Trenton, N. J., architects.

The Blair Ice & Cold Storage Co., 3124 Fifth Avenue, Altoona, Pa., has plans nearing completion for a new three-story ice and cold storage plant, 60 x 100 ft. F. H. Seitz, address noted, is head.

Oven and power equipment, conveying machinery, etc., will be installed in the new plant to be constructed by the Power City Baking Co., Hazleton, Pa., on property recently acquired. Plans are being drawn.

The Eastern Pennsylvania Power Co., Easton, Pa., will build a new one-story power house at Phillipsburg, N. J.

A. K. Wetzel & Sons, Shamokin, Pa., have awarded contract to the Shamokin Lumber & Construction Co. for a new two-story automobile service and repair works, 80 x 100 ft. A list of equipment is being arranged. William H. Lee, 32 South Seventeenth Street, Philadelphia, is architect.

The Bell Safety Bumper Co., Inc., 68 Thirty-fourth Street, Brooklyn, N. Y., manufacturer of automobile bumpers, etc., has tentative plans for a new factory at Bethlehem, Pa., and the removal of its present works to this location. The initial plant will give employment to about 250. The company has recently been acquired by new interests, headed by Aaron Potruch, Bethlehem, who is president.

The Confederated Home Abattoir Co., Odd Fellows Building, Bethlehem, Pa., will construct a cold storage plant in connection with its new packing plant at Allentown, Pa., estimated to cost in excess of $300,000. The Gorman-Brown Engineering Corporation, 40 Rector Street, New York, is engineer.

A vocational department will be installed in the new high school to be erected in Conyngham Township, near Aristes, Pa., estimated to cost close to $100,000. The Board of Education is in charge.

The Veterans' Bureau, Williamsport, Pa., is planning for the establishment of an automobile and machine repair shop and electrical repair works in the two-story building on Pine Street, recently acquired. It will be used as a trade school. Charles Billman is in charge.

The York Haven Water & Power Co., York Haven, Pa., is planning for the installation of a number of new generating units at its local power plant, to double approximately the present capacity, estimated to cost about $1,000,000.

F. H. Wagan, Philadelphia Street and Court Alley, York, Pa., has plans under way for a three-story automobile service and repair works, 100 x 100 ft., to cost about $75,000. J. A. Dempwolf, Casset Building, is architect.

The Anthracite Supply Co., 75 South Penn Avenue, Wilkes-Barre, Pa., is taking bids for a new four-story building, 35 x 150 ft., to cost about $45,000. Henry A. Maier, Coal Exchange Building, is architect.

Detroit

DETROIT, August 28.

THE L. A. Young Industries, Inc., Detroit, manufacturer of steel springs has acquired the plant of the Denby Motor Truck Co., adjoining its works at Holbrook Street and the Grand Trunk Railroad. The building comprises about 100,000 sq ft. of floor area, located on a 5-acre tract, and will be used entirely by the new owner for spring production. The company also has work under way on a five-story addition to its main plant, to provide about 125,000 sq. ft. of space.

The Common Council, North Branch, Mich., is planning for the installation of new pumping machinery, water tank and tower, and other equipment at the waterworks. C. B. Farnsworth is clerk.

The Filer Fibre Co., Filer City, Mich., manufacturer of pulp and paper products, has awarded contract to J. Olsen, Muskegon, Mich., for a two and three-story addition, 70 x 420 ft., with extensions, 60 x 60 ft., and 30 x 50 ft., estimated to cost about $125,000, exclusive of equipment. The company recently disposed of a bond issue of $[illegible] for this and other expansion.

The Barley Motor Car Co., Kalamazoo, Mich., manufacturer of the Roamer automobile, is planning for expansion for the production of a new automobile to sell at a medium price. The manufacture of the Roamer car will be continued.

The Studebaker Corporation, Piquette Avenue, Detroit, has awarded contract to H. G. Christman, Stevens Building, for a five-story addition, 60 x 443 ft., to be known as plant No. 3.

The Rich Steel Products Co., Springfield Place, Battle Creek, Mich., has preliminary plans for a new three and four-story plant, estimated to cost about $500,000, including machinery. It is expected to complete plans and proceed with the project after the first of the year.

The Common Council, Omer, Mich., has authorized the purchase of property on the Rifle River as a site for a municipal electric light and power plant. Plans will be prepared at an early date.

The Consumers Power Co., Grand Rapids, Mich., will make extensions and improvements to its power plant and system to cost about $900,000.

The American Malleables Co., Owosso, Mich., suffered a serious fire loss on Aug. 18, but operations are again normal.

The allied Ford and Lincoln interests have the following plant units contemplated or under construction: Factory building to be erected at River Rouge, the general contract having been let to the Everett Winters Co.; alterations to the heat treating building and shipping plant of the Lincoln Motor Co. on West Warren Avenue, and a new building 1600 ft. long for general manufacturing. The Walbridge-Aldinger Co., is the general contractor on both the Lincoln additions.

Bids are being taken by Mildner-Eisen architects, on a one-story reinforced concrete factory, 37 x 195 ft., at West Fort Street and Swain Avenue for the Liberty Starter Co.

Awards on the new filtration plant, Bay City, Mich., will be decided early in September. Frazier, Ellms & Sheal, Cleveland, are the engineers.

A two-story reinforced concrete factory, 200 x 400 ft., will be erected by the Fisher Ohio Body Co., Flint, Mich.

Baltimore

BALTIMORE, Aug. 28.

A NEW coal tipple to cost about $300,000 including machinery will be erected by the Richmond, Fredericksburg & Potomac Railroad Co., Richmond, Va.

The Purchasing Agent, Post Office Department, Washington, will receive bids until Sept. 8, for 1000 automobile jacks; until Sept. 6, for 4000 adjustable pliers; until Sept. 8 for 400 sets of branding iron, 110 burglar-proof locking devices for Government safes, and for 20,000 ft. of single electric cable, low tension, and 5000 ft., high tension electric cable.

The Southern Yarn Conditioning Co., Winston-Salem, N. C., recently organized with a capital of $200,000, is planning the establishment of a plant to manufacture textile machinery. A. A. Johnson and Spencer B. Hanes, both of Winston-Salem, head the company.

The Board of Harbor Commissioners, room 351 Municipal Building, Wilmington, Del., will take bids until Sept. 8 for the following equipment: One railroad track scale, 200 lb. capacity; one steam locomotive crane, 20 tons capacity, 50 ft. boom; one steam locomotive crane, 20 tons capacity, 60 ft. boom; one steam locomotive crane, 20 tons capacity, 70 ft. boom; one and two light duty, traveling, electric portal cranes, 2½ tons capacity; four portable electric dock winches, 2 tons capacity; one mechanical cargo ramp; six electric tractor trucks, with two spare battery equipments; three load carrying trucks; fifty trailers for electric tractors; fifty stevedore hand trucks. The contractor will be required to complete his contract between Jan. 1, and Feb. 1, 1923.

The West Maryland Power Co., Garrett National Bank Building, Oakland, Md., has been organized with a capital of $250,000, by officials of the West Penn Electric Light & Power Co., Pittsburgh, as a subsidiary organization. It will take over the local municipal electric plant and system and operate as private property. Extensions and improvements will be made. Plans are also in progress for other expansion in this section.

The Office of the Public Printer, Government Printing Office, Washington, will take bids until Sept. 7 for synchronous converters, 6600-volt, 4500-kw. capacity, together with all switchboards, instruments, cable, etc.

The Chesapeake & Ohio Railroad Co., Norfolk, Va., is planning for extensions and improvements in its freight terminal to cost about $4,000,000, including coaling pier construction and the installation of additional coal-handling machinery. It will also extend its terminal facilities at Hampton Roads, Va.

The B. Mifflin Hood Brick Co., Atlanta, Ga., has acquired the plant of the Rome Fireproofing Co., Rome, Ga., with adjoining property. It will continue the operation of the works and plans for extensions and improvements to cost about $75,000, including the installation of additional equipment.

The Apex Coal Co., Lynchburg, Va., is perfecting plans for a new coal tipple in the vicinity of Sargent, Ky.

The Elkin Veneer & Mfg. Co., Elkin, N. C., is preparing plans for the rebuilding of the portion of its plant recently destroyed by fire. Equipment to be installed included Corliss engine and auxiliary power apparatus.

The Potomac Public Service Co., Hagerstown, Md., recently acquired by the American Water Works & Electric Co., 50 Broad Street, New York, is planning for the installation of additional machinery at Millville, W. Va., on the Shenandoah River.

The Baltimore Paper Box Co., Howard and West Streets, Baltimore, has acquired the property of the Key Mfg. Co., Key Highway, Stockholm and Covington Streets, totaling about 100,000 sq. ft. of floor area, on a two-acre site. The company will use the building for expansion, and plans for the installation of new machinery to cost about $75,000.

The Stahl Toy & Novelty Co., New Bern, N. C., is planning for the installation of an automatic lathe and other mechanical equipment in a building acquired for a local plant. It will specialize in the manufacture of mechanical toys. K. E. Stahl is head.

A vocational department will be installed in the high school to be erected at Concord, N. C., estimated to cost about $150,000, for which bids will be asked about Sept. 15. C. Gadsden Sayre, Anderson, S. C., is architect.

The Georgia Railway & Power Co., Atlanta, Ga., is arranging for a preferred stock issue of $2,500,000, a portion of the proceeds to be used for extensions and improvements.

Electric pumping machinery and other power equipment will be installed in connection with the extensions to the water filtration plant at Montebello, Baltimore, estimated to cost about $1,500,000, with equipment. Plans will be prepared under the direction of Chief Engineer Megraw, Water Bureau, Baltimore.

A vocational department will be installed in the high school to be erected at Bamberg, S. C., for which plans will be prepared at an early date. The District Board of School Trustees is in charge.

The Parry-Mann Electric Co., Columbia, S. C., is planning for the purchase of an engine-generator set, with 300 hp. engine and 225 kw. generator, with exciter, switchboard and auxiliary equipment. W. M. Parry is president.

Indiana

INDIANAPOLIS, Aug. 28.

A NEW municipal electric power plant will be erected by the Board of Sanitary Commissioners, Indianapolis, in connection with a sewage disposal plant, estimated to cost about $115,000.

The White-Wood Products Co., Crothersville, Ind., manufacturer of handles and other turned wood products, is planning to rebuild the portion of its plant destroyed by fire Aug. 16, with loss estimated at $50,000, including machinery. Harlan White is general manager.

The Board of Blackford County Commissioners, Hartford City, Ind., will take bids until Sept. 4 for two cast iron sectional, down draft boilers, header type, 1500 sq. ft. of surface. W. C. Hughes is county auditor in charge.

The Bertsch Co., Cambridge City, Ind., manufacturer of heavy type machine tools, will soon take bids for a one-story addition, 30 x 100 ft. C. E. Werking & Son, Palladium Building, Richmond, Ind., are architects.

The Inland Body Co., Indianapolis, is perfecting plans for the removal of its plant to Columbus, Ind., where it will occupy a portion of the building of the Emerson-Brantingham Co. Charles S. Murphy is in charge.

The Universal Burner Co., Logansport, Ind., recently incorporated, with $25,000 capital stock, is seeking a site for a plant to manufacture crude oil burners, storage tanks, etc. Allen E. Nelson, Logansport, is head of the concern.

The Interstate Car Co., Massachusetts Avenue and Sherman Street, Indianapolis, manufacturer of automobiles, has filed plans for a one-story addition.

The Conduitt Automobile Co., Indianapolis, local representatives for the Peerless, Maxwell and Chalmers automobiles, has completed plans for a new three-story building, 63 x 200 ft., at Meridian and St. Joseph Streets, estimated to cost about $150,000. The third floor will be used entirely as a machine and repair shop. A portion of the second floor will also be equipped for similar service for the used car department. John A. Boyd is general manager.

The Louisville Cement Co., Louisville, has arranged an appropriation of about $500,000 for a new cement mill at Speed, Ind., to replace the portion of the works recently destroyed by fire with loss of about $300,000. The new mill will be equipped for a capacity of 2500 bbl. per day, as compared with 1800 bbl. at the former plant. All machinery will be electrically operated.

New England

BOSTON, Aug. 28.

THE improvement in going business, manifested a week ago in the machine-tool market, apparently is dissipated. The total bookings in this district of new and used tools the past week dropped to infinitesimal figures, practically the only sale to which much importance is attached being a new vertical milling machine to a Rhode Island firm against a list of seven or eight tools. The lack of new business generally is ascribed to vacations.

The machine-tool trade is looking forward to increased business next month, when at least some of the prospects give promise of closing. The position of New England builders apparently is slowly improving and new active spots are appearing. A Hudson, Mass., maker of broaching machines is operating overtime and supplying meals to employees working evenings. The company has a substantial order from automobile makers, which includes machines as well as broaches. A northern New England gear shaper manufacturer is busy, while a Connecticut maker of lathes is on full time and a Worcester maker of grinding machinery is very busy on machines for the automobile trade. Producers of grinding wheels are increasingly busy, the demand for quick deliveries being a feature. Prices for abrasive wheels are very firm with the tendency, if anything, upward. The New England abrasive industry is slightly better than 50 per cent of normal, including export business, which is coming back slowly, contrasted with 20 per cent of normal, the low point during the business depression.

Sale by auction of the machine tools at the plant of the Morris Metal Products Co., Union Avenue, Bridgeport, Conn., Aug. 31, at 10:30 a.m., includes about 300 tools, of which there are a large number of lathes as well as milling machines, drills, etc. The auction is in charge of J. E. Conant & Co., Lowell, Mass.

Bids will be taken this week by the Boston Elevated Railway Co., Boston, for the first two units of the proposed consolidated machine shop, at Everett, Mass.

The United Electric Railway Co., Providence, R. I., is about to accept figures on a one and two-story garage and service station, 78 x 250 ft.

Contract has been awarded by the Wickwire-Spencer Steel Corporation, Worcester, to replace the structure recently destroyed by fire. The new unit will be three-stories 33 x 100 ft. and will be devoted to wire drawing.

The Atlas Body Works, Inc., McKinley Avenue, Bridgeport, Conn., will build a one-story addition, 45 x 90 ft. The present factory will be remodeled and improved, and a new power house, 15 x 30 ft., constructed. Harry E. Koerner, Bridgeport, is architect.

The Norton Co., Worcester, Mass., will commence the immediate erection of a new four-story building, 50 x 125 ft., on site near plant No. 6.

Fire, Aug. 19, destroyed a portion of the plant of the Haverhill Box Board Co., Haverhill, Mass., with loss reported at close to $90,000, including equipment and stock.

Chaplin & Chaplin, 376 Main Street, Springfield, Mass., will erect a new automobile service and repair building, 50 x 100 ft., at Mill and Orange Streets.

A vocational department will be installed in the new four-story high school, 75 x 100 ft., to be erected at Revere, Mass., estimated to cost about $250,000, for which work will

be placed under way at once. The local Board of Education is in charge.

J. John Kruse, 721 North Main Street, Waterbury, Conn., has inquiries out for metal card holders, about 3 x 7 in., and desires to contract with a metal-working plant to manufacture specialties of this kind.

The Carlson Brothers Tool & Machine Co., Boston, has leased the building at 15 B Street, South Boston, for a machine shop.

The Water Department, Fall River, Mass., is taking bids until Sept. 6 for a new machine and repair shop in connection with a two-story administration building to cost about $40,000. N. C. Chase, 11 Pleasant Street, is architect. John F. Moran is superintendent of the department.

Fire, Aug. 19, destroyed a portion of the plant of the Cambridge Automobile & Wagon Co., 141-49 First Street, Cambridge, Mass., with loss estimated at $50,000. It will be rebuilt.

The Colonial Automobile Co., 1279 Main Street, Hartford, Conn., has awarded contract to the Austin Co., 217 Broadway, New York, for a one and two-story automobile service and repair building on the Connecticut Boulevard, estimated to cost close to $50,000.

A merger is being arranged between the M. S. Little Mfg. Co., 151 New Park Avenue, Hartford, Conn., and the A. J. Beaton Mfg. Co., New Britain, Conn., both manufacturers of heating equipment and supplies, under the name of the first noted company. The new organization will be capitalized at $500,000. Plans are being considered for enlargements in the Hartford plant to accommodate the machinery and equipment of the Beaton company.

Milwaukee

MILWAUKEE, Aug. 28.

PROGRESS in operations and production continues to be made by manufacturers of machine tools despite the railroad shop strike which has had a serious effect on buying by the railroads. The resumption of coal shipments to local industries has made their situation more substantial and hopeful, but a free swing is not expected until transportation matters are settled. Reports from jobbers and dealers in tools show a slightly better average of business in August than in July, due largely to the fact that last month witnessed a seasonal letting down of production in the iron, steel and machinery industries, including the automotive trade. The last-named industry has furnished most of the gain this month, and pending inquiry forecasts even better activity in September and October.

The Common Council, Madison, Wis., expects to select a site before Sept. 15 for the proposed new municipal sewage disposal plant estimated to cost from $741,000 to $821,000. It is hoped to start construction before the end of the year. E. E. Parker is city engineer

The Phoenix Cheese Co., Plymouth, Wis., has plans for a five-story reinforced concrete cold storage warehouse, 40 x 65 ft., the equipment of which includes a 300-hp. steam generating plant and a 20-ton artificial ice making unit. Bids will be taken after Sept. 1. R. A. Page is general manager.

The Sheboygan Foundry Co., Eighteenth Street and Union Avenue, Sheboygan, Wis., will build a two-story addition, 40 x 80 ft., to be used as a pattern shop, pattern vault, grinding room, etc. Fred Ristow is general manager.

The Automatic Seating Co., Superior, Wis., is completing the remodeling of the plant of the former American Bedding Co., at Butler Avenue and North Twenty-sixth Street, and expects to commence initial operations in September. It is a $200,000 Wisconsin corporation which will build an all-metal frame chair. Perry J. Elkstrand is president; George Carlson, vice-president, and John Greiff, secretary and treasurer.

The Allis-Chalmers Mfg. Co., Milwaukee, has taken an order valued at approximately $100,000 for pumps and other equipment for the Regala & Marianas Water Works Co. of Regala, Cuba. The order was placed in person by Senor M. Ortiz, general manager.

The Spring City Auto Co., Waukesha, Wis., has plans by Monroe Heath Blake, local architect, for a garage, machine shop and sales building, 65 x 200 ft., one story and basement, estimated to cost $35,000 with equipment.

The Thompson Brothers Boat Co., Peshtigo, Wis., manufacturing metal and wooden hull power and rowboats, will build a three-story brick and mill factory addition, 60 x 100 ft., for sheet metal and wood working operations, assembling and storage. The investment in building and machinery will be about $60,000.

The Dells Paper & Pulp Co., Eau Claire, Wis., has awarded the general contract to the C. R. Meyer & Sons Co., Oshkosh, Wis., for a new hydroelectric generating plant to develop 1000-hp. It will cost about $165,000.

The Green Bay, Wis., Board of Vocational Education has ordered competitive plans for the new $180,000 central continuation school at Pine and Jefferson Streets. A selection is to be made by Oct. 15 so that initial construction work may be undertaken before the close of the year. The equipment of the present school in leased quarters at 102 North Adams Street will be transferred to the new institute but much additional miscellaneous equipment will be purchased early in 1923. H. G. Stewart is director.

The Philip Meyer Mfg. Co., Racine, Wis., has been incorporated with a capital stock of $25,000 to take over and develop the business of Philip and John Meyer, manufacturers of food choppers and other metal household utensils. A larger plant is being sought.

The Walsh Harness Co., 137 Keefe Avenue, Milwaukee, will build a two-story factory addition, 50 x 75 ft., costing about $20,000 with equipment.

The Bergman Coal Co., Eau Claire, Wis., will establish a branch plant in Chippewa Falls, Wis., with an investment of about $25,000. A storage building with a capacity of 1500 tons, including hoppers, screening plant, etc., for gravity loading, will be erected. A Godfrey conveyor system for unloading cars has been purchased. W. C. Bergman is manager of the new branch.

M. D. Robrecht, Antigo, Wis., will build a three-story cold storage warehouse, 40 x 100 ft., on Morse Street, which will require a 150 to 200-hp. power plant and an artificial ice and refrigerating unit. Definite specifications will be issued shortly.

The Madison Tool & Stamping Works, 1917 Helena Street, Madison, Wis., will erect a new boiler room and coal storage building to cost about $10,000.

The Green Bay Dry Dock Co., Green Bay, Wis., expects to ask figures shortly on the construction of a new floating dry dock estimated to cost $600,000. It will be of reinforced concrete and consist of twelve 50-ft. sections, making the dimensions 60 x 600 ft. E. J. Morrison, 53 West Jackson Boulevard, Chicago, is engineer in charge of mechanical and structural engineering. Carl Hartman is president of the drydock company.

The Anko Mfg. Co., Wausau, Wis., is increasing its capitalization to provide more adequate facilities for the production of a device for permanent installation in smokestacks and chimneys for soot absorption and fire prevention. The company was incorporated for $50,000 a year ago and built a new machine shop, 50 x 150 ft., on a two-acre site. No immediate new construction is planned, but the equipment will be enlarged. T. G. Kohl is president.

The Dallman Machine Co., 935 Winnebago Street, Milwaukee, has purchased the rights to the manufacture of sliding gears and clutches developed by the Smith Sliding Gear & Clutch Co., North Lake, Wis. The Smith company will continue to manufacture pulleys and transmission devices, principally for tractors, traction engines and threshing outfits.

The Federal Rubber Co., Cudahy, suburb of Milwaukee, has ordered resumption of construction work on a seven-story manufacturing addition, 120 x 250 ft., of which the basement and first floor were completed about eighteen months ago. Three additional floors will be erected at this time. The general contractor is the Thomas Sideritis Co., 1591 Second Street, Milwaukee. Arthur A. Frank is general manager of the Federal company.

Ernest Heinemann of Seymour, Wis., has leased the former Paige garage building at Antigo, Wis., and will establish a machine, welding and cutting shop.

The Corona Pen Co., Janesville, Wis., has been organized with $25,000 capital stock by S. V. Corona, J. L. Pitt and E. H. Damrow to manufacture fountain pens, metal pencils and similar goods. A plant is being established at 22 West Academy Street.

The Ingersoll-Rand Co., Minneapolis branch, will furnish and install two Cameron deep well pumps in the new municipal waterworks improvement at Stevens Point, Wis., at $4,065 each.

William C. Schultz, Watertown, Wis., has resigned as vice-president, treasurer and general manager of the Watertown, Wis., Table Slide Co., and is organizing a new corporation with $125,000 capital to manufacture hardwood specialties. A new factory will be erected, but the exact location has not been divulged, although it is likely that it will be in Fond du Lac, Wis.

Pittsburgh

AUGUST has been a [illegible] sales in this district, but since there were good reasons for such a condition, the trade is hopeful that September will show improvement. Inquiry has been good throughout the month and in the past week some of the trade have been called upon to quote prices on an unusually large number of prospective orders. Cases are reported by machine tool salesmen who have called upon customers to find that the man in charge of purchases has been away seeking coal.

An unnamed maker of lathes in the East is reported to have [illegible] adjustment in prices, which means an increase of about 10 per cent. Makers of shapers are reported to be adhering more rigidly to quoted discounts.

While current business in cranes and other heavy equipment is quiet, prospective business is good. The Jones & Laughlin Steel Co. is in the market for a ladle crane and an open hearth furnace charging machine. The Carnegie Steel Co. is asking bids on a gantry crane. The Weirton Steel Co., Weirton, W. Va., will want considerable equipment in connection with a new sheet mill it proposes to construct. Action on cranes and other equipment for the new Gary, Ind., plant of the National Tube Co., is not looked for now until next month. The Shepard Electric Crane & Hoist Co., recently took orders for three 2-ton and one ½-ton hoists for the Morrow Mfg. Co., Wellston, Ohio; two 2-ton and two 5-ton hoists for the American Bridge Co., Pittsburgh; one 2½-ton hoist for the Pittsburgh & Lake Erie Railroad, Pittsburgh; and a 1-ton and ½-ton hoist for the Edwin M. Hill Lumber Co., Pittsburgh.

The Stroh Steel-Hardening Process Co., Westinghouse Building, Pittsburgh, has plans under way for an addition to its foundry at Ridge Avenue and Chateau Street and the remodeling of the present building, estimated to cost in excess of $200,000 with equipment. W. Y. Stroh is president.

The American Window Glass Co., Farmers' Bank Building, Pittsburgh, is planning the erection of an addition to its plant at Jeannette, Pa., to comprise a 12-machine building, with blowing machinery, tanks, glass conveyors and other equipment, estimated to cost $1,500,000. W. L. Monro is president.

Walling & Co., 518 Washington Street, Johnstown, Pa., is completing plans for a three-story automobile service and repair works estimated to cost $150,000. S. E. Dickey & Co., Johnstown, are architects.

The Englert Mfg. Co., 2131 Carson Street, Pittsburgh, operating an automobile battery manufacturing and repair works, has acquired property, 68 x 120 ft., at South Twenty-fifth and Jane Streets, for a new plant. Harry N. Englert heads the company.

The Keystone Hair Insulator Co., 1243 Spring Garden Avenue, Pittsburgh, has filed plans for an addition to cost about $39,000.

The Kund & Eiben Mfg. Co., 204 Warrington Avenue, Pittsburgh, manufacturer of cabinets, etc., has plans nearing completion for a new one-story factory, 60 x 170 ft., at Bedford, Pa.

The Equitable Gas Co., 435 Sixth Avenue, Pittsburgh, a subsidiary of the Philadelphia Co., is taking bids for new mechanical and repair shops on Reedsdale Street, Northside. A warehouse will also be built.

The Westinghouse Electric & Mfg. Co., Union Building, Pittsburgh, has filed plans for a new building at Lang Avenue and Susquehanna Street, to cost about $150,000.

The Monongahela Incline Plane Co., West Carson Street, Pittsburgh, will build a one-story power house at 106 Grandview Avenue.

The Standard Seamless Tube Co., 313 Sixth Avenue, Pittsburgh, is planning for a one-story addition at Ambridge, Pa. [illegible]

The Du Roth Steel Truck & Car Wheel Co., 611 Keystone Building, Pittsburgh, has awarded contract to the Pittsburgh Bridge & Iron Works, Bessemer Building, for the initial building at its new plant at Osgood, Pa., one-story, 100 x 200 ft. C. Edward Long, 1202 People's Bank Building, is engineer.

The E. E. White Coal Co., Glen White, W. Va., has arranged an appropriation of about $200,000 for additional electrical and mechanical equipment. E. E. White is president.

The American Coal Co., Piedmont, W. Va., has tentative plans for rebuilding its tipple destroyed by fire Aug. 16, with loss estimated at $60,000, including equipment.

The Diamond Ice & Coal Co., Charleston, W. Va., is planning for enlargements in its ice and refrigerating plant, including the installation of a 160-ton refrigerating machine and auxiliary equipment.

The Board of Education, 2105 Chapline Street, Wheeling, W. Va., is said to be arranging a list of equipment for installation at its vocational schools.

The Hughes Coal Co., Shinnston, W. Va., is planning to rebuild its tipple, including the installation of new machinery. W. C. Hawkins, Fairmont, W. Va., is engineer.

S. J. Hyman, Huntington, W. Va., is organizing a company to build and operate a plant to manufacture coal by-products, estimated to cost in excess of $80,000, including machinery. A site has been acquired.

Power equipment, a traveling oven, conveying machinery and other mechanical apparatus will be installed in the addition, 100 x 250 ft., to be erected by the Stroehmann Baking Co., Huntington, W. Va., estimated to cost about $100,000.

Cincinnati

CINCINNATI, Aug. 28.

THE month of August in the machine-tool industry will come well up to the aggregate of June and July. In the early part a noticeable falling off in orders was seen, but along toward the middle of the month buying was resumed at a fair rate, with the result that August will show a satisfactory volume of business. Manufacturers of milling machines and boring mills experienced one of the best months since the quiet period set in in 1920, while some lathe manufacturers report good orders, closely approaching the aggregate of June, which was the best month recorded for a year and a half. With a resumption of railroad buying, noticed last week in connection with the Union Pacific and Illinois Central lists, the trade generally looks for a much better situation the remaining months of the year. A local manufacturer received an order for five machines from a North Carolina railroad last week. The Westinghouse Electric & Mfg. Co. was a purchaser in the local market, negotiations having been completed for a number of machines, including a large planer. The Chesapeake & Ohio Railroad is contemplating the purchase of a fairly large number of tools, but the list has not yet been issued. Small lathes for vocational schools are in fair demand, as are multiple spindle drills.

Manufacturers of turret machinery have announced increases in prices ranging from 5 to 15 per cent, and it is expected that other manufacturers will make advances shortly.

The Cropper-Kinney Auto Spring Co., Lebanon, Ohio, has been organized with a capitalization of $50,000 to manufacture automobile springs and will erect a plant in Lebanon. George W. Cropper is president and S. W. Kinney, vice-president.

The Clark Grave Vault Co., Columbus, Ohio, which recently disposed of its plant, has purchased the property of the Monitor Motor Car Co. at Fifth Avenue and the Big Four Railroad, and will occupy the premises immediately. Some new equipment will be installed.

The Columbus Showcase Co., Columbus, Ohio, has awarded contract to Frank Hill Smith, Inc., for a new plant, 82 x 382 ft., two stories, of reinforced concrete and brick.

Two large buildings of the American Car & Foundry Co., Jeffersonville, Ind., were damaged by a wind storm Aug. 24. The loss, including railroad equipment under repair, will amount to approximately $200,000.

The T. J. Callahan Co., Dayton, Ohio, manufacturer of ventilating equipment, heretofore operating as a partnership, has been incorporated with a capitalization of $200,000. No definite plans for extensions have been completed, but it is expected to install additional machinery from time to time to increase the output. T. J. Callahan is president.

The Alco Foundry & Machine Co., Hamden, Ohio, has been incorporated with a capitalization of $50,000. It has been operating as a partnership. While no definite plans have been completed, the company expects to add a machine shop to its works in the near future and is contemplating extensions to present buildings. M. C. Abele is president.

The Engineer Division, Air Service, McCook Field, Dayton, Ohio, will take bids until Sept. 5, for one rolling mill, with one pair of plain rolls, direct-connected to electric motor.

Cleveland

CLEVELAND, Aug. 28.

AUGUST has been a disappointing month with machine tool builders, due largely to restrictions in buying, resulting from the railroad and coal strikes, but the trade looks for considerable improvement next month. One local machine tool manufacturer reports August sales up to 75 per cent of July, but another has done only about 50 per cent as much business this month as in the previous month. Dealers' sales are holding up fairly well and new inquiries show a little improvement. Among inquiries is one from a new Cleveland company which has asked for quotations on several machines and is expected to purchase 30 or more tools.

During the week the Cleveland Board of Education purchased several machines against its recent list. Some railroad orders were closed on lists pending for some time. The New York Central purchased two large turret lathes, the Illinois Central two small turret lathes and the Union Pacific one turret lathe from a Cleveland manufacturer. A builder of automatic machinery booked four orders, each for a single machine. The Otis Steel Co. purchased a 36-in. lathe and has sent out an inquiry for a 96-in. shear. The Lima Locomotive Works, Lima, Ohio, has not yet purchased any of the equipment required for its new plant for which it has issued a tentative list.

The Warner & Swasey Co., Cleveland, following its recent price advances on turret lathes will issue new lists Sept. 1, making further slight advances on all of its machines in order to balance selling prices with production costs.

The Otis Steel Co. has sent out an inquiry for about 25 cranes of various sizes and types for its new steel plant and is figuring on mills, furnaces and other plant equipment. Some of this business will probably be placed shortly.

The Ohio Brass Co., Mansfield, Ohio, has purchased a 16-acre site at Niagara Falls, Ont., and will erect a large factory to take care of its Canadian trade.

The Firestone Tire & Rubber Co., Akron, Ohio, has about completed a new automobile rim plant which it expects to place in operation about Sept. 1. This is a one story building 880 ft. long and 250 ft. wide, brick and steel, and has a floor space of over five acres.

The Superior Steel Wool Co., Perrysburg, Ohio, has about completed a new plant, 100 x 400 ft., for the manufacture of steel wool.

The Cleveland Board of Education will receive bids Sept. 11 for a 30 in. single finishing plane for the West technical high school.

The Barberton Machine Shop & Foundry Co., Barberton, Ohio, recently organized, will shortly begin the erection of a new plant on Robinson Avenue.

The plant of the Shunk Mfg. Co., Bucyrus, Ohio, will be moved to the former Allen Motor Co.'s plant, Bucyrus, which was purchased some time ago by John O. Shunk. New equipment will be added for the manufacture of plow units for use with tractors.

The Trump Rubber Co., East Akron, Ohio, operating at the plant formerly occupied by the Denmead Rubber Co., is planning the erection of an addition for the manufacture of automobile tires.

The Gulf States

BIRMINGHAM, Aug. 28.

THE Thomas Grate Bar Co., Birmingham, is planning for the installation of a new 10-ton overhead electric traveling crane, with 29 ft. span and lift of 20 ft.

The McWane Cast Iron Pipe Co., Birmingham, will break ground early in September for the first unit of a new plant on property recently acquired at East Birmingham. It will specialize in small pipe from 1 to 6-in. in diameter. Employment will be given to about 150. J. R. McWane is president.

The American Can Co., 120 Broadway, New York, has awarded contract to the Turner Construction Co., 242 Madison Avenue, for a four-story addition to its plant at New Orleans, 200 x 200 ft., estimated to cost about $750,000, including machinery.

The Dallas Power & Light Co., Dallas, Tex., will erect an electric generating plant addition, estimated to cost $2,180,000, including machinery. Plans will be completed and work placed under way at an early date. A new 15,000-kw. turbo-generator, exciter, switchboard, boilers, pumps and auxiliary equipment will be installed.

The Baton Rouge Ice Co., Baton Rouge, La., is planning for an addition, including the rebuilding of the present structure. Machinery will be installed to double the capacity. G. E. Wells, St. Louis, is architect.

A vocational department will be installed in the new high school to be erected at Commerce, Tex., for which bonds for $120,000, have been voted.

The United States Engineer Office, Mobile, Ala., will receive bids until Sept. 18 for one hydraulic turbine, 1000 hp. capacity, with governor, as per specifications on file.

The White Eagle Oil & Refining Co., Kansas City, Mo., has tentative plans for a new oil terminal at Beaumont, Tex., estimated to cost about $250,000, including pumping and power equipment, tanks, etc.

The Common Council, Pelahatchie, Fla., has authorized the preparation of plans for a municipal electric light and power plant. Swanson-McGraw, Inc., New Orleans, are consulting engineers.

The Missouri, Kansas & Texas Railroad Co., St. Louis, has arranged an appropriation of about $5,000,000 for extensions and improvements in its shops, freight houses, yards and other properties in Texas. The shops at Denison will be made the largest on the system and about $3,500,000 will be expended at this point. The new locomotive shops to be built at Waco will cost close to $1,000,000, including machinery, and will be equipped for re-building locomotives. New freight depots will be constructed at Waco and Wichita Falls, each one and two-stories, 60 x 600 ft., estimated to cost about $200,000 each, including freight-handling machinery.

The Common Council, DeQuincy, La., is arranging a bond issue of $120,000, for a municipal electric light and power plant, and waterworks.

The Houston Power Co., Newton, Ala., will construct and operate a hydroelectric power plant at Waterford, Ala., with initial capacity of about 3000 hp. The Southern Engineering Corporation, Albany, Ga., is engineer.

The Simmons & Trawick Crate Co., Tallahassee, Fla., recently organized with a capital of $200,000, is planning for the installation of crate and box-making machinery, conveying apparatus, etc. J. M. Simmons is president.

The Pacific Coast

SAN FRANCISCO, Aug. 22.

THE Yuba Development Co., Hobart Building, San Francisco, is taking bids for equipment for installation at its new power plant near Marysville, Cal.; R. H. Elliott, general manager, is in charge.

The Long Beach Paper Co., Long Beach, Cal., has plans under way for a new plant on Cherry Avenue, including new equipment.

The Bureau of Yards and Docks, Navy Department, Washington, is taking bids until Sept. 13, for new shops to be erected at the naval base, San Diego, Cal.

Alexander Hursh, 12 Locust Avenue, Los Angeles, is having plans prepared for a new oil refinery at Cherry and Newport Avenues, Long Beach, Cal., to cost about $55,000.

Perry E. Fritz, 2941 Sunrise Street, Los Angeles, has filed plans for a new one-story machine shop.

The Northwestern Electric Co., Portland, Ore., has preliminary plans under way for a new hydroelectric generating plant estimated to cost in excess of $2,500,000 with machinery and transmission system.

The Baker Street Garage, Bakersfield, Cal., is planning for the rebuilding of its service and repair works, recently destroyed by fire. New equipment will be installed.

The Puritan Ice Co., Santa Barbara, Cal., has completed plans for a new ice-manufacturing plant at Guadalupe, Cal., estimated to cost close to $100,000, including machinery.

The Reedley School District, Reedley, Cal., has had plans prepared for a one-story vocational and manual training building. Floyd Caskey is clerk.

The Ames Shipbuilding & Drydock Co., Seattle, Wash., will make extensions and improvements in its plant on the West Waterway, estimated to cost about $30,000. It will include a mold loft.

The Washington Iron Works, Seattle, Wash., will commence work on the first unit of its new plant, to comprise a two-story steel building, 70 x 570 ft., estimated to cost $100,000. It will be equipped as a boiler and tank shop. Other units will be built later. The entire plant will cost about $500,000.

Fire, Aug. 17, destroyed the plant of the A. C. White Lumber Co., Laclede, Idaho, including buildings, machinery, power equipment, etc., with loss estimated in excess of $500,000. It is planned to rebuild.

The Booth-Kelly Lumber Co., Eugene, Ore., is completing plans for the construction of a new mill at Wendling, Ore., to replace the plant recently destroyed by fire. A. C.

Dixon, manager, is in charge. It will be electrically operated.

Brewer & Baldwin, Winlock, Wash., are considering rebuilding their shingle mill, recently destroyed by fire. Electrically-operated machinery will be installed.

The Central South

ST. LOUIS, Aug. 28.

PLANS are in progress for a new three-story factory for the Davis Boring Tool Co., 3722 Forest Park Boulevard, St. Louis, estimated to cost $160,000, including machinery.

The Edina Light Co., Edina, Mo., has acquired the electric plant and property of the Merchants' Power & Light Co., Novinger, Mo. The new owner plans for extensions and improvements.

Fire, Aug. 18, destroyed a portion of the plant of the Brooklyn Cooperage Co., Poplar Bluff, Mo., with loss estimated at about $100,000, including machinery. It is planned to rebuild. Headquarters of the company are at 142 Kent Avenue, Brooklyn, N. Y.

The City Ice Co., Twenty-first and Campbell Streets, Kansas City, Mo., is arranging for the construction of a new ice and cold storage plant with initial capacity of about 3000 tons.

The Air Terminal Association, 422 Reliance Building, Kansas City, Mo., recently organized, will install a repair shop in connection with its new hangars and air terminal buildings on local site. James B. Harvey is general manager.

Paul Sheridan, Fort Smith, Ark., has awarded contract to the J. H. Reddick Co., Fort Smith, for a two-story addition, 72 x 140 ft., to his automobile service and repair works, estimated to cost $35,000, exclusive of equipment.

The Thomas Fruit Co., Sixth and Kentucky Streets, Joplin, Mo., is arranging for extensions and improvements in its ice and refrigerating plant, estimated to cost about $35,000. Smith & Van Pelt, 819 Frisco Building, are architects. A. B. Thomas is president.

The Memphis Sash & Door Co., 673 South Dudley Street, Memphis, Tenn., is planning for the erection of a new three-story factory 200 x 300 ft., estimated to cost in excess of $80,000.

A vocational department will be installed in the new two-story high school to be erected at Dadesville, Mo., 60 x 100 ft., for which plans are nearing completion. Earl Hawkins & Co., McDaniel Building, Springfield, Mo., are architects.

The Indiana Board & Filler Co., Vincennes, Ind., recently organized a capital of $750,000, has acquired the plant and business of the Tennessee Fibre Co., North Memphis, Tenn., and will operate the plant for the manufacture of strawboard and fibre specialties. Plans are under way for enlargement and the installation of additional machinery.

The Dexter Helium Co. of America, Winfield, Kan., M. W. Baden, president, has preliminary plans in progress for a new helium plant at Dexter, Kan., estimated to cost about $1,000,000. It will include power house, mechanical shop, etc.

The White Trunk Co., 217 West Lewis Street, Wichita, Kan., is planning for the installation of machine tools, belting, shafting and other transmission equipment. J. F. Kemel is manager.

The Missouri Lumber Co., Hot Springs, Ark., is planning to rebuild the portion of its plant on Gaines Avenue, recently destroyed by fire with loss estimated at $80,000, including equipment.

A vocational department will be installed in the three-story and basement high school to be erected at Lockwood, Mo., for which foundations are now under way. Charles Sudhoelter & Co., 715 Joplin Street, Joplin, Mo., are architects.

The Log Mountain Coal Co., Middleboro, Ky., recently organized with a capital of $2,500,000 to form a merger of seven coal mining companies operating in Bell County, Ky., has plans under consideration for the installation of new electrical and mechanical equipment, including mine cars, etc. E. S. Helburn is president, and J. R. Ramey, treasurer, both of Middleboro. J. E. Justice, Williamsburg, Ky., is chief engineer.

The Continental Asphalt & Petroleum Co., Oklahoma City, Okla., will install new crushing, grinding and mixing machinery at its rock asphalt deposits at Sapulpa, Okla., for the establishment of a new plant. A power house will also be established.

A vocational department will be installed in the two-story and basement high school to be erected at Wetumka, Okla., estimated to cost about $100,000, for which bids on a general contract are being received. Tonini & Bramblet, Terminal Building, Tulsa, Okla., are architects.

Canada

TORONTO, Aug. 28.

MACHINE-TOOL buying on a conservative scale was noted the past week. The opening of the Canadian National Exhibition at Toronto on Aug. 26, which will be continued until Sept. 9, gives dealers and manufacturers an opportunity to show their special lines of tools and general equipment in actual operation, and as a result a buying movement is expected to develop next month. Notwithstanding the limited amount of buying, manufacturers state they have considerable orders on their books and that the outlook for the future is bright. Plant operations have been steadily increasing and if a fuel famine does not strike the country this winter a continuation of present activities is looked for. Many industrial concerns have recently been organized for the purpose of locating manufacturing plants in Ontario and other provinces and numerous plants are under construction for which requirements have not yet been placed. Equipment for public works is still moving steadily and manufacturers of paper making machinery report active operations with a steady increase in productive capacity. Small tools are moving freely.

The Fedders Mfg. Co., Ltd., Bridgeburg, Ont., is in the market for a spot welder, similar to No. 312B Federal machine; 220 volts, 25 cycle, three phase.

The sawmill owned by Ritchie Brothers, Aylmer, Que., was destroyed by fire with a loss of $50,000. Rebuilding operations are expected to start at an early date.

Bids will be called shortly by the town of Chilliwack, B. C., for the construction of a sewage system. The work will include an additional pumping station equipped with 4-in. vertical centrifugal pumps, electrically driven with automatic float control.

John S. Martin, Reeve, Port Dover, Ont., will receive bids until Sept. 8 for waterworks plant and necessary equipment to cost $60 000. James, Proctor & Redfern, Ltd., 36 Toronto Street, Toronto, are engineers. Gas and electric pumps will be installed.

The Canadian National Railways have started work on the erection of car shops at Edmonton, Alta., to cost $200,000.

D. Brill, Georgetown, Ont., contemplates erecting factory there to cost $10,000.

The Canadian Brake Shoe & Foundry Co., 354 St. James Street, Montreal, contemplates erecting a foundry at Sherbrooke, Que.

Fire at the plant of the Groves-Bigwood Lumber Co., Byng Inlet, Ont., caused damage to machinery and buildings to the amount of $175,000. The power plant and planing mill are a total loss.

The Bruce Wood Workers, Ltd., Chesley, Ont., are in the market for a 30-hp., 60-cycle, three phase, 220 volt motor.

The round house and machine shop owned by the Eastern British Columbia Railway at Cordin, near Fernie, B. C., were totally destroyed by fire Aug. 21, with loss to buildings and equipment estimated at $70,000.

The Dryden Paper Co., Dryden, Ont., is making progress in the development and expansion of its plant. It is developing a further 1200 hp., and the paper plant is being enlarged with a view to doubling the present capacity. A small ground wood mill is also being constructed.

The Brightman Mfg. Co., Columbus, Ohio, manufacturer of finished steel, shafting machinery and cold-finished nuts, which for 26 years has been jointly owned by L. H. Brightman, Long Beach, Cal., and his seven children, now passes into the control of Mrs. Brighton, who will operate the business with the assistance of S. D. Shearer, Cleveland, her brother-in-law. The business was brought to Columbus 12 years ago from Shelby, Ohio. L. H. Brightman has not been active for several years. In the near future the four sons will erect a plant at Columbus, to manufacture the same products and an added line of screw machine products.

At the directors' meeting of the Sharon Pressed Steel Co., 47 West Broadway, New York, held Aug. 7 to fill vacancies in the directorate and executives, the following officers were elected: H. W. Torney, president; A. E. Swan, vice-president; T. A. Pierce, treasurer; Harold G. Mosier, secretary. The retiring directors were: W. L. Ulmer, W. H. Watkins, L. L. Knox and W. J. Parker. These vacancies were filled by L. B. Le Bel, vice-president and director Cleveland Discount Co.; Edward O. Peck, secretary and director Cleveland Discount Co.; Harold G. Mosier, attorney, Cleveland, and A. E. Swan, first vice-president Sharon Pressed Steel Co.

NEW TRADE PUBLICATIONS

Pumps.—The Trane Co., La Crosse, Wis., Bulletin No. 2, a handbook of practical information on condensation, circulating and similar pumps. The bulletin has been enlarged from an 8-page bulletin which was exclusively devoted to Trane condensation pumps, the present 24-page publication being the company's response to requests from its customers for practical information on other pumps used for the mechanical equipment of buildings. It is intended especially for engineers, architects and heating contractors.

Hoists.—The Northern Engineering Works, Detroit. Bulletin illustrative and descriptive of type D electric hoist, electrically operated and portable. The hoist comes in three sizes of 500, 1000 and 2000 lb. capacity.

Mine Apparatus.—Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Illustrated publication of 64 pages on mining apparatus. In addition to line material, the publication, known as Catalogue 6-M, contains much information about mine safety switches, Frankel solderless connectors, tapes, babbitts, solders, micarta gears, mine locomotives and mine locomotive headlights.

Centrifugal Pumps.—Pennsylvania Pump & Compressor Co., Easton, Pa. Bulletin No. 202 describing the company's line of double suction single stage centrifugal pumps and containing useful engineering data.

Railroad Equipment.—Whiting Corporation, Harvey, Ill. Catalog No. 160, 12 in. x 9 in. Devoted to improved methods in hoists and transfer tables. Data are supplied comparing methods in use. A model plant layout and hoist installment are shown in blueprints. The catalog is elaborately illustrated on coated paper, the larger share of the 52 pages being devoted to actual pictures, with brief, direct descriptions.

Mayari Pig Iron.—Bethlehem Steel Co., Bethlehem, Pa. Booklet 19. Treating of the native content of various elements in Mayari pig iron, with particular reference to its qualifications for making castings. Fractures of the iron of varying silicon content are shown, with descriptions and illustrations of its uses, such as power plant headers, motor cylinders, etc. The introduction portrays the region where the nickel-chromium Mayari ore is obtained. In the last three of the 30 pages appears complete analyses in tabular form of products made from Mayari ore.

Metal Sash.—David Lupton's Sons Co., Philadelphia. Catalog No 11. Consisting of 191 pages, elaborately bound, tracing the advance in making sold steel sash for commercial and residential buildings. Improvements for securing abundant fresh air and sunlight are described and illustrated. Suggestions for builders and helpful hints for ordering and making specifications are given in tables, diagrams and charts. Special tables aim to show the principles governing air currents in large structures. A separate 42-page catalog, similar in design, but with prints in color and tinted pictures, shows the adaptations of modern casements and double-hung windows. By diagram and description special features and new designs are shown.

Factory Drinking Water Systems.—Armstrong Cork & Insulation Co., Pittsburgh. Illustrated booklet, "A Neglected Source of Economy," presenting the merits of modernized drinking water systems in industries, showing possibilities for economy in time and labor.

Cast Iron Storage Tanks.—Conveyors Corporation of America, 326 West Madison Street, Chicago. Booklet, 4 x 8 in., giving details of the construction and installation of the American cast iron storage tank, designed for loose, bulky, dry materials. Engravings show tanks in use. Comprehensive tables of weights and measures employed in tank construction are included.

Oil Burning.—Schütte & Koerting Co., Philadelphia. Catalog devoted to mechanical fuel oil-burning systems and atomizing by low or high pressure air or steam. Installation, use and maintenance of oil-burning agents are covered at length. The relative merits of mechanical spray oil burners, the purpose of air control registers, and the effects of carbon deposits are demonstrated. The catalog is richly illustrated in colors and contains 25 tables of valuable data.

Material Handling.—Roeper Crane & Hoist Works, 1720 North Tenth Street, Reading, Pa. Catalog No. 52, which illustrates and describes trolleys, chain hoists, turntables and switches, and also shows by descriptive diagrams the relation of parts when installed.

Shears.—Niagara Machine & Tool Works, 637 Northland Avenue, Buffalo. A special bulletin treating on the proper care of squaring shear knives and carrying instruction in attaching, regrinding and adjustment. Suggestions for shear tests are offered.

Architects' Hand Book.—Truscon Laboratories, Caniff and Grand Trunk Railroad, Detroit. An architects' and engineers' aid, entitled, "Architects' Specification Handbook," of 108 pages, 8½ x 11 in. in size, in loose leaf binding. The specifications relate especially to waterproofing, damp-proofing or other coating work.

Boiler Tubes.—Parkesburg Iron Co., Parkesburg, Pa. Illustrative folder sketching in brief the processes of making charcoal iron boiler tubes.

Wire Forming and Special Machinery.—Baird Machine Co., Bridgeport, Conn. Circular outlining the needs and development in machinery for specific industries, sprinkled with human interest discussions of a business flavor. Some 25 Baird bulletins on special machinery are listed on the back cover.

Optical Pyrometer.—Scientific Materials Co., Pittsburgh. Generously illustrated. 16-page booklet, 6 x 10 in., giving a scientific exposition on the theory, design and use of the F. & F. pyrometer, and including a Fahrenheit-Centigrade conversion table, formulas governing pyrometer construction, and tables for determining the true when given the apparent temperature.

Ash Conveyor.—United Conveyor Corporation, 1500 Old Colony Building, Chicago. Bulletin 105, contrasting old and new methods of ash disposal. Illustrations and lettered diagrams give data on installing the equipment.

Feed Water Softeners.—Graver Corporation, East Chicago, Ind. Bulletin No. 504, covering feed water softening in steam power plants and the Graver hot process water softener, designed especially for such work. The booklet consists of 20 pages and goes into the subject with thoroughness.

Motor Starters.—Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Folder 4500, describing a line of motor starters, with numerous comprehensive illustrations.

Tumbling Barrels.—J. W. Paxson Co., Philadelphia. Bulletin No. 40, superseding No. 27, pages 36, gives complete illustrated information concerning steel channel stave rumbler tumbling barrels and cleaning room equipment.

Hardening Furnaces.—Tate-Jones & Co., Inc., Pittsburgh. Illustrated bulletin No. 164-B, superseding 164-A, describes general hardening furnaces of the semi-muffler type for oil or gas fuel.

Automatic Electric Hardening Furnaces.—Automatic & Electric Furnaces, Ltd., 281 Gray's Inn Road, London, England, W. C. 1. Illustrated description and discussion of the principles and applications of the Wild-Barfield automatic furnaces for the correct hardening of steel.

Electric Heating Furnaces.—F. J. Ryan & Co., Philadelphia. Pamphlets, Common Sense Talks Nos. 1 and 2 on "Electric Heat; What Is It"? and "The Electric Resistor."

New Books Received

Mexican Petroleum. Pages 300, 5½ x 7¾ in. Published by the Pan American Petroleum & Transport Co., 120 Broadway, New York, N. Y.

World Metric Standardization. By Aubrey Drury. Pages 524, 6 x 9 in., illustrated. Published by World Metric Standardization Council, 681 Market Street, San Francisco. Price, $5.

The Journal of the Institute of Metals.. Vol. XXVII. Edited by G. Shaw Scott, secretary. Pages 621, 5¼ x 8½ in., illustrated. Published by the Institute of Metals, 36 Victoria Street, London, S. W. I. Price, 31s. 6d.

Petroleum, Where and How to Find It. By Anthony Blum. Pages 367, 4¾ x 6¾ in. Published by the Modern Mining Book Publishing Co., 905 North Dearborn Street, Chicago. Price, $2.

Factory Storeskeeping. By Henry H. Farquhar. Pages 182, 6 x 9 in.; illustrations 36. Published by McGraw-Hill Book Co., Inc., 370 Seventh Avenue, New York. Price, $2.50.

Methods of the Chemists of the United States Steel Corporation for the Sampling and Analysis of Pig Iron. Pamphlet, pages 40, 6 x 9 in. Published by the Carnegie Steel Co., Bureau of Instruction, Pittsburgh.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossbile to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	
Refined iron bars, base price	2.94c.
Swedish bars, base price	7.00c.
Soft steel bars, base price	2.94c.
Hoops, base price	4.14c.
Bands, base price	3.74c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	3.04c.
Channels, angles and tees under 3 in. x ¼ in., base	2.94c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	2.94c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	3.14c.
Toe-calk, ½ x ⅜ in. and larger	4.00c.
Cold-rolled strip, soft and quarter hard	6.25c. to 7.25c.
Open-hearth spring steel	4.25c. to 6.00c.
Shafting and Screw Stock:	
Rounds	3.65c.
Squares, flats and hex	4.15c.
Standard cast steel, base price	12.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	3.04c.

Sheets

Blue Annealed

	Per Lb.
No. 10	4.04c.
No. 12	4.09c.
No. 14	4.14c.
No. 16	4.24c.

Box Annealed—Black

	Soft Steel C. R., One Pass, Per Lb.	Blued Stove Pipe Sheet, Per Lb.
Nos. 18 to 20	4.15c. to 4.40c.	.....
Nos. 22 and 24	4.20c. to 4.45c.	4.60c.
No. 26	4.25c. to 4.50c.	4.65c.
No. 28	4.35c. to 4.60c.	4.75c.
No. 30	4.60c. to 4.85c.	.....

No. 28 and lighter, 36 in. wide, 10c. higher

Galvanized

	Per Lb.
No. 14	4.45c. to 4.70c.
No. 16	4.60c. to 4.85c.
Nos. 18 and 20	4.75c. to 5.00c.
Nos. 22 and 24	4.90c. to 5.15c.
No. 26	5.05c. to 5.30c.
No. 27	5.20c. to 5.45c.
No. 28	5.35c. to 5.60c.
No. 30	5.85c. to 6.10c.

No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
⅛ in. Butt	—53	—38	¾ in. Butt	—23	—5
¾ in. Butt	—58	—45	1½ in. Butt	—25	—7
1-3 in. Butt	—57	—44	1 in. Lap	—10	—3
2½-6 in. Lap	—51	—44	2½-6 in. Lap	—23	—7
7-8 in. Lap	—53	—30	7-12 in. Lap	—5	+1
9-12 in. Lap	—49	—30			

Steel Wire

Base per 100 lb, f.o.b. Pittsburgh, Cleveland, Chicago or Duluth

Bright basis	3.50c. to 3.75c.
Annealed soft	3.50c. to 3.75c.
Galvanized annealed	4.25c. to 4.50c.
Coppered basic	4.00c. to 4.25c.
Tinned soft Bessemer	5.50c. to 5.75c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	18¾c. to 19¾c.
High brass wire	19¼c. to 20¼c.
Brass rod	16¼c. to 17¼c.
Brass tube, brazed	25⅝c. to 26⅝c.
Brass tube, seamless	22½c. to 23 c.
Copper tube, seamless	24¾c. to 25 c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 21¾c. to 22¾c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14-20		
	Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	Primes	Wasters
			80 lb.	$6.05	$5.80
			90 lb.	6.15	5.90
			100 lb.	6.25	6.00
IC	$10.00	$8.50	IC	6.40	6.15
IX	11.50	10.00	IX	7.40	7.15
IXX	13.00	11.25	IXX	8.40	8.15
IXXX	14.25	12.50	IXXX	9.40	9.15
IXXXX	16.00	14.00	IXXXX	10.40	10.15

Terne Plates

8-lb. coating, 14 x 20

100 lb.	$7.00
IC	7.25
IX	7.50
Fire door stock	9.00

Tin

Straits, pig	36c.
Bar	43c. to 47c.

Copper

Lake ingot	15¼c.
Electrolytic	15 c.
Casting	14¾c.

Spelter and Sheet Zinc

Western spelter	8 c. to 8½c.
Sheet zinc, No. 9 base, casks	9c. open 9½c.

Lead and Solder*

American pig lead	6¾c. to 7c.
Bar lead	8c. to 8½c.
Solder, ½ and ½ guaranteed	25c.
No. 1 solder	23½c.
Refined solder	20¼c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	75c.
Commercial grade, per lb	35c.
Grade D, per lb	25c.

Antimony

Asiatic	6½c. to 7c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb	25c. to 27c.

Old Metals

Business is quiet but the market holds up fairly well. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy crucible	11.75
Copper, heavy wire	11.25
Copper, light and bottoms	9.25
Brass, heavy	6.25
Brass, light	5.25
Heavy machine composition	8.50
No. 1 yellow brass turnings	6.50
No. 1 red brass or composition turnings	8.00
Lead, heavy	4.50
Lead, tea	3.50
Zinc	3.25

THE IRON AGE

New York, September 7, 1922

ESTABLISHED 1855 VOL. 110, No. 10

Making Steel Without Using Pig Iron

"Scrap and Carbon" Basic Open-Hearth Process as Employed at an Eastern Plate Mill—Residual Manganese an Essential Feature

BY EDWIN F. CONE

INDEPENDENT of fuel or pig iron scarcity, a Pennsylvania producer of steel plates is operating at 100 per cent capacity, and in August broke its record in open-hearth output. It has been known for some time that the Central Iron & Steel Co., Harrisburg, Pa., was making steel in a manner different from the practice at any other open-hearth plant in the country. Various reports concerning the metallurgical operations have gained currency, some of them entirely at variance with the actual procedure. With a view to presenting the facts, the writer visited the plant and secured information for this article from Robert H. Irons, president of the company; Robert M. Keeney, general superintendent; Sidney D. Williams, superintendent of the open-hearth department, and Ashton D. Peace, engineer of tests.

Basic open-hearth steel of high quality is being produced daily at Harrisburg without the use of any pig iron, but entirely from scrap. In fact, no pig iron has been used in the company's six large open-hearth furnaces since late in 1918. Three blast furnaces on the property, which have been idle since late in the war, are mute testimony to what has been going on in the steel department.

Steel has been made in basic open-hearth furnaces without the use of pig iron in several other instances. The substitution of petroleum coke for pig iron was practiced by several American companies during the war, as it had been here and there in years previous, and it is still followed to some extent on the Pacfic Coast, where the dependence of steel companies is chiefly on scrap. At various other plants also departures are being made from the established pig and scrap process; but the Central Iron & Steel Co.'s practice differs from them all.

The first reaction to the statement that pig iron is eliminated and only scrap is the basis of a heat is likely to be criticism. It has been the common view that quality steel could not be made in open-hearth furnaces except virgin iron, as pig iron, was a part of the charge. Yet high grade tool and alloy steels are made in electric furnaces in which not a pound of pig iron is used. It is possible to produce by an all-scrap process quality steel in quantity in basic open-hearth furnaces and at a low cost. The Harrisburg company has been doing this for more than four years, and under several sets of exacting specifications. To-day it is shipping tank, fire box, boiler and other grades of plate into Pittsburgh and the Middle West and into other markets not commonly regarded as tributary.

TWO facts are outstanding in connection with the open-hearth process described in this article.

One is the advantage of independence of pig iron supply, which is emphasized in this time of fuel shortage. The other is the key feature of the operation, namely, the maintenance of residual manganese throughout the heat.

A charge consists of varying proportions of the following raw materials:

Scrap steel
Scrap iron
Manganese ore
Carbon as river coal, coke or charcoal
Lime

For the past four years plate steel has been made at Harrisburg without the use of any pig iron.

The steel-making process under which the Central Iron & Steel Co. is operating is covered by a process patent (U. S. 1,345,192—June 29, 1920), granted to Robert H. Irons and assigned to the company. Patents have been allowed in various other countries and some foreign applications are pending. The distinguishing feature of the process is the maintenance of a high residual manganese throughout the period of the heat.

For several years the use of manganese-bearing pig irons in open-hearth practice has been advocated, and the subject has been discussed in various papers before the American Iron and Steel Institute and the American Institute of Mining and Metallurgical Engineers.* The presence of certain quantities of manganese during the melting down period now characterizes the operation both in acid and basic open-hearth steel making at many plants. The practice at Harrisburg may be considered as the

*"Utilizing Domestic Manganese Supplies," THE IRON AGE, Nov. 29, 1917, p. 1291; "Manganese in the Basic Open-Hearth," THE IRON AGE, Nov. 29, 1917, p. 1305; "Manganese Conservation in Steel Making," THE IRON AGE, June 6, 1918; "Manganese Alloys in Open-Hearth Practice," THE IRON AGE, May 22, 1919, p. 1363; "Use of Manganese Alloys in Open-Hearth Steel Practice," THE IRON AGE, April 17, 1919, p. 1012, and "High Manganese Iron in Basic Open-Hearth Practice," by E. A. Wheaton, THE IRON AGE, Oct. 28, 1920, p. 1112.

development of this feature to its largest possibilities.

Two well-known features of open-hearth practice are at once recognized in reading the patent. First, the use of carbonaceous matter to reduce the charge of pig iron; second, the use of manganese-bearing materials, thereby bringing about the elimination of sulphur as manganese sulphide, and securing the advantage of tapping with a high residual manganese. The patentee claims that steel made by his process is of superior quality by reason of the high residual manganese and the care with which the steel is made, and that it has several advantages over steel made by the ordinary pig and scrap process.

To secure this residual manganese, high grade manganese ore from Brazil is regularly a part of each charge. About 2 to 2½ tons is ordinarily used in a 90-ton heat. The reduced manganese from the ore is alloyed with the steel, the slag being at the same time brought to the point of saturation with manganese. The desired manganese in the bath is thus obtained, and at the time when the heat is ready for tapping the amount of residual manganese is fairly constant at 0.15 to 0.30 per cent. To prevent the steel from losing any of this residual manganese because of insufficient oxide of manganese in the slag, the capacity of the slag in lime and oxide of iron is increased which, combined with the manganese oxide acting as a base, exerts the desired effect on the manganese of the bath.

The rôle of this residual manganese is two-fold: First, its presence during the whole refining operation prevents any oxidation of the iron in the bath; second, it is an important factor in eliminating sulphur.

Aside from the manganese ore and the regular and necessary amount of lime, the charge is made up of scrap steel and scrap iron in proportions varying from 60 to 90 per cent of the former and from 40 down to 10 per cent of the latter, largely heavy melting grades. The regulation of the mixture depends on market conditions and requires a constant study of the price and availability of the scrap brought in from outside. The flexibility of the charge is its feature, it being possible to make a heat with 90 per cent steel scrap or up to 40 per cent scrap iron, with no variation in quality.

Another factor in the charge is carbon in the form of coal, coke or charcoal, the amount depending on conditions. A most interesting feature of present operations is the use of river coal, really buckwheat anthracite. Tons of this are being taken daily from the Susquehanna River, which parallels the plant. The coal is carefully washed, dried and screened and used in each charge in varying proportions with the scrap and other materials. It furnishes carbon and plays other lesser rôles in the refining process. The same coal at present is fired under boilers to raise the steam used in the plant.

The purifying effect of the residual manganese, which is the key to the success of this unique "scrap and carbon" process, is not a new principle, but the method of its application is. All ingots are bottom poured, requiring a metal of high temperature. Special features in the construction and operation of the furnaces make the attainment of this temperature easy and the presence of the manganese prevents oxidation. The surface of the ingots is unusually smooth, with piping and blowholes at a minimum. Although a larger slag volume is carried than in the regular pig and scrap method, there is no difficulty in operating the heats for one acquainted with all the details and refinements of the process.

Heats are regularly made not exceeding 0.05 per cent in sulphur, more often much less, and the phosphorus content is normal. Physical tests, made by inspectors representing railroads, the Government and other buyers, reveal a high elongation and reduction of area. Typical results from the company's records, taken at random, are given in the table. In fact it has been a surprise to the operating forces to find that steel made by this process has higher properties than steel of the same analysis made in the old way. The management states that yields are larger than in the former practice, and the fact that the total rejections of finished plates, including shipping errors, shearing mistakes, qualities of the steel, etc., are less than three-quarters of one per cent of the finished product, justifies the management's statements as to larger yields. In other words, 99.25 per cent of the finished product as manufactured meets all requirements.

The stage to which the process has been brought has not been reached easily. Many difficulties have had to be overcome, and success requires constant watchfulness and a high-grade organization with an open mind. The results represent seven years of operation and research on the part of the inventor, together with large expenditures for experimental purposes.

Equipped for the use of either producer gas or oil, the furnaces are largely using fuel oil. River coal supplies other needs besides its rôle in the steel making. Coke is unnecessary in any department, and pig iron is and has been a stranger outside the gates for several years.

Table of Certified Physical and Chemical Tests of Fire Box and Boiler Steel Plate Made by Central Iron & Steel Co.

Heat No.	Dimensions of Test Piece: Width, In.	Thickness, In.	Area, Sq. In.	Yield Point Lb. Per Sq. In.	Ultimate Strength Lb. Per Sq. In.	Final Elongation in 8 In. Per Cent	Reduction of Area Per Cent	Carbon, Per Cent	Manganese Per Cent	Phosphorus Per Cent	Sulphur Per Cent
[illegible]	[illegible]	0.377	0.594	37710	55220	33.0	64.0	0.15	0.46	0.017	0.037
12017	131 x 52½x5⅜	0.375	0.576	38720	58520	28.0	56.2	0.16	0.30	0.016	0.040
22209	[illegible]	1.250	1.875	35700	52590	29.0	57.3	0.15	0.31	0.016	0.034
[illegible]	[illegible]	0.385	0.574	35300	57800	28.0	61.7	0.16	0.35	0.017	0.040
[illegible]	[illegible]	0.385	0.606	37470	62210	28.0	60.4	0.22	0.33	0.017	0.033
42067	[illegible]	0.585	0.919	35000	59600	32.0	58.2	0.20	0.48	0.016	0.034
[illegible]	[illegible]	1.250	1.838	35200	52990	30.0	56.5	0.12	0.36	0.018	0.030
42071	[illegible]	0.546	0.786	35300	59800	30.0	61.8	0.19	0.34	0.018	0.037
52101	[illegible]	0.428	0.608	35000	60300	30.0	60.5	0.20	0.45	0.015	0.030
52108	[illegible]	0.383	0.645	37370	59550	28.0	62.8	0.18	0.50	0.019	0.040
52109	[illegible]	0.377	0.594	39060	63470	27.0	56.2	0.20	0.46	0.016	0.035
52118	[illegible]	0.365	0.573	35430	55330	33.0	65.4	0.16	0.50	0.017	0.040
52126	[illegible]	0.692	1.045	35120	55400	31.0	57.9	0.18	0.42	0.016	0.030
52127	[illegible]	0.440	0.678	35200	55160	32.0	67.5	0.16	0.39	0.022	0.040
52128	[illegible]	0.681	1.011	35400	55390	35.0	60.4	0.18	0.39	0.018	0.040
52186	[illegible]	0.475	0.703	35560	59320	34.0	58.1	0.19	0.50	0.022	0.040
[illegible]	[illegible]	0.443	0.625	35300	55200	34.0	61.6	0.18	0.48	0.015	0.037
62106	[illegible]	0.436	0.632	35200	55300	29.0	65.2	0.17	0.42	0.017	0.034

IMPORTANT COAL TOPICS

Southern Ohio Pig Iron and Coke Association Considers Various Problems

The August meeting of the Southern Ohio Pig Iron and Coke Association was held at the Marting Hotel, Ironton, Ohio, Aug. 29. The meeting was called primarily to discuss the present coal situation, and after hearing reports from various members of the association, it was decided that, inasmuch as the volunteer and appointed coal committees were ceasing to function, any matters pertaining to fuel in the southern Ohio territory should be taken up direct with the Interstate Commerce Commission, and the following telegram was despatched to the secretary of that body:

The members of this association operating a number of blast furnaces and by-product coke plants in southern Ohio and eastern Kentucky believe that the opening of Ohio, Indiana and Illinois mines has modified conditions which brought about your Service Order No. 23. Conservation of transportation facilities will mean the forwarding of coal from these short haul mines to the Great Lakes and Northwest, thereby releasing for industrial purposes the by-product coal of West Virginia and eastern Kentucky. We therefore urgently ask that immediate consideration be given to the amendment of Service Order No. 23, whereby this coal will resume its usual course of consumption. Only by this action do we believe complete paralysis of the pig iron and steel industry in this district will be averted.

Good Work of Blast Furnaces

A most interesting discussion regarding the good work done at blast furnaces in the district took place, and it was the consensus of opinion among the operators that a great deal of the credit can be traced to the good, clean coal supplied to the coke plants. The association is pushing its activities along this line among the coal operators and is meeting with fairly satisfactory co-operation.

It was forcibly brought out at the meeting that the shipment of high volatile coal from West Virginia and Kentucky to the Northwest, as railroad fuel and domestic fuel, was a most wasteful diversion of coal that should go direct to the coke ovens. The long haul across two or three States and the shipment by boat required so much fuel and so much coal car capacity that it seemed a shameful practice. The members all advocated as short and direct a haul as possible so that coal cars would be kept on the home lines, especially in the production of by-product coke. The need for shipping clean coal as a matter of conservation of car supply was also brought out.

Elevating the Coal Industry

An interesting discussion on the question of having the coal industry put on the same high plane as that of the iron ore industry, took place. President Sweetser felt that if the same attention was given to the quality and the marketing and the mining of coal as is given to the iron ore trade, there would be no such confusion and difficulties as now pravail in the coal industry. More attention should be paid to shipping the kind of coal best suited to the needs of the consumer. W. D. McKinney, secretary of the Southern Ohio Coal Exchange, thought that if the Government would license coal mines and give each mine a number which would follow a car of coal through to the ultimate consumer, there would be some kind of responsibility attached to a car of coal as is now attached to a car of iron ore. Although some of the members thought it would be too great a job to educate 15,000 wholesale coal men in the country, it was felt that much good could be done by hindering the shipment of coal from mines that furnished notoriously inferior coals.

F. W. Davis of the Bureau of Mines explained the experiments that are being conducted on the combustibility of coke, and also described some of the experimental work planned by the bureau. The association voted that complete co-operation would be given to the bureau, especially in the experiments that are going to be conducted at the blast furnaces of one of the members.

Five new members were elected, these being Dr. Lowry, Ironton; C. E. Burch, and C. O. Brown, Jackson; Henry Willard, Wellston, and Thos. DeVenny, of the Portsmouth By-Product Coke Co.

Reports submitted to the association showed that 14 of the 17 blast furnaces represented are blown out or banked on account of coal shortage.

In the evening, the customary dinner, presided over by President R. H. Sweetser, was held, at which addresses were made by members of the association and their guests. A nominating committee was also appointed to draw up a list of officers which will be submitted to the annual meeting to be held later in the month.

Program for Montreal Meeting of American Electrochemists

The program for the annual fall meeting of the American Electrochemical Society at Montreal, Canada, Sept. 20, 21 and 22, is announced in part as follows:

Wednesday, Sept. 20

6:00 p. m.—Registration at Windsor Hotel.

Thursday, Sept. 21

10:00 a. m.—Session for reading and discussion of papers:

"Effect of Heat Treatment on the Hardness and Microstructure of Electrolytically Deposited Iron," by Norman B. Pillings.

"The Preparation and the Mechanical Properties of Vacuum Fused Alloys of Electrolytic Iron with Carbon and Manganese," by R. P. Neville and J. R. Cain.

"The De-Zincification of Brass," by Ralph B. Abrams.

2:00 p. m. Session on "Industrial Heating". Bradley Stoughton, chairman, electrothermic division:

"The Underlying Principles of the Industrial Heating Problem," by Charles P. Steinmetz.

"Electric Heat: Its Generation, Propagation and Application to Industrial Processes," by E. F. Collins.

"Principles of High Temperature Furnace Design," by E. J. Smalley.

"Advantages of Industrial Electric Heating," by Wirt S. Scott.

"Some Electrical Properties of Alloys at High Temperatures," by M. A. Hunter and A. Jones.

"Resistivities of Some Granular Resistor Carbons," by C. E. Williams.

"Heat Insulating Materials for Electric Heating Apparatus," by J. C. Woodson.

Friday, Sept. 22

9:30 a. m.—Session on "Industrial Heating": Part II:

"Methods of Economically Handling Materials in Electric Furnaces," by Frank W. Brooke.

"The Development of Industrial Electric Heating for Low Temperature Enameling," by Wirt S. Scott.

"Treatment of Ceramics," by E. T. Smalley.

"Electric Annealing of Malleable Iron," by C. B. Gibson.

"Electric Steam Generators and their Application," by P. S. Gregory.

"A New Type of Induction Furnace," by J. Murray Weed.

"A Simple Electric Crucible Furnace for Melting Aluminum," by A. Glynne Lobley.

2:00 p.m.—Reading and discussion of papers on miscellaneous electro metallurgical subjects.

8:00 p. m.—Smoker at Windsor Hotel.

11:30 p. m.—Special Excursion to Shawinigan Falls. Train leaves Windsor Station at 11.30 p.m. The return train from Shawinigan Falls will arrive in Montreal on Saturday evening in ample time to permit members wishing to make connections for all through night trains to Toronto, Buffalo, Niagara Falls, Chicago, New York, Boston, Philadelphia, Washington, et al.

An illustrated lecture by Prof. A. S. Eve, on "The New Philosophy of Physics," will be given Thursday evening.

Underneath the Ore Bins, Showing the Continuous Line of Segmental Gates for Filling the 80-Cu. Ft. Capacity Scale Car, [illegible] in the Background



Blast Furnace Rebuilt to Save Labor

Mechanical Charging Equipment Installed on 17 x 75-Ft. Furnace of Emporium Iron Co.—New Bins and Pig Casting Machine

BUILT during the years 1887-88, the plant of the Emporium Iron Co., Emporium, Pa., has operated since that time with substantially the original equipment. During the past year, however, the old hand-filling system has been replaced with a complete new set of storage bins, skip bridge, furnace top, etc. The furnace has been relined and partially remodeled, and new mechanical pig casting equipment installed. Arthur G. McKee & Co., Cleveland, as engineer and contractor for the reconstruction work, did the designing and erection.

The alterations to the furnace below the mantle consisted of installing a new hearth jacket, 8 ft. deep by 16 ft. 4 in. inside diameter, made up of 1⅛ in. steel plate. Twenty-one cast iron hearth cooling plates were provided, approximately 8 ft. long by 2 ft. wide and 3 in. thick. The old copper coolers were utilized, no new copper being furnished. Eight new tuyere stocks were installed, including elbows, blow pipes and base castings for attaching to the bustle pipe.

The storage bin and trestle structure, of steel and reinforced concrete, is approximately 432 ft. long. The coke bin, occupying three bays in the trestle structure, is 48 ft. in length and is made up of steel plate sides and bottom, suspended from the concrete bents. This coke bin is centrally located, discharging direct into the skip car, over cascade type coke screens.

Eight ore and limestone bins of the Baker suspension type were installed, each bin being approximately 12 ft. in length and constructed of ⅜ in. steel plate sides and bottom. The bins are provided with a continuous line of segmental type gates arranged for convenient operation from the scale car platform, and discharge into an 80 cu. ft. capacity scale car, which delivers the material to the skip pit. The scale car is of heavy construction, electrically driven and equipped with air brakes.

The charge is carried to the furnace top in a skip car of 80 cu. ft. capacity, traveling on a single track skip bridge, which is provided with deck plates to prevent materials falling through to the ground. The skip is supported by a hinged leg from the furnace top platform, and rests on the old hoist tower as an additional means of support. At the upper end of the skip bridge is provided a sheave platform with a 5 ft. diameter cast iron sheave for accommodating the 1 in. plow steel skip hoist cable, idler sheaves being placed at different points along the bridge. A 12 x 12-in. single drum Otis hoisting engine was installed in a brick hoist engine house, having concrete foundations and steel roof supports.

No changes were made to the existing furnace shell, a new top ring casting being furnished to fit the present design. There was also provided a new large bell hopper, made of cast steel in four sections, and a new gas seal of ½-in. steel plate with cast steel bottom ring and cast iron top ring. The gas seal contains two hinge type manholes, 30 in. in diameter, for removal or inspection of the small bell.

On top of the gas seal is mounted a McKee revolving stock distributer, consisting of small bell, bell hopper, small bell rod, ball races and drive mechanism. For its operation a 7½-hp. Crocker-Wheeler, 220-volt, d.c. motor was supplied, located on the furnace top platform and inclosed with proper housing. Control of the distributer is accomplished automatically by means of a limit switch connected to the hoist engine drum.

The furnace charge is discharged from the skip car into a receiving hopper constructed of ⅜-in. steel plate and provided with ½-in. wearing plates. Directly beneath this receiving hopper is a revolving hopper, which is of ¾-in. steel plate and which attaches to and revolves with the distributer.

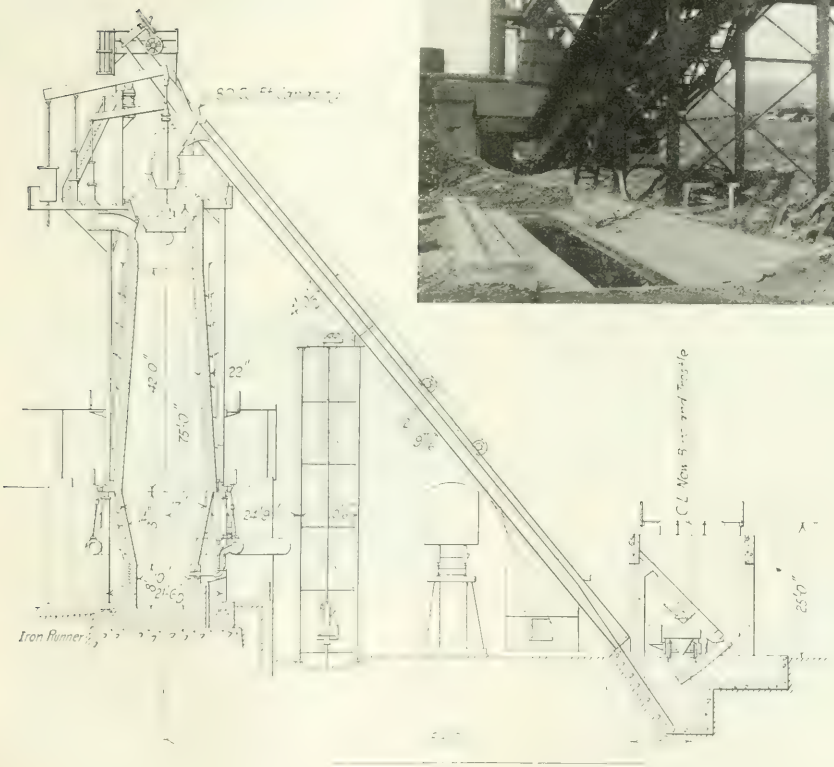
An entirely new furnace top platform was erected.

Supported on the top platform is a hand operated jib crane for raising and lowering the large bell, hopper and other equipment. The operation of the large and small bells is accomplished by means of a bell rig mounted on the furnace top platform and consisting of 14-in. and 10-in. steam cylinders, bell beams, counterweights, bearings and shafts. A modern test rod mechanism and indicator were also installed.

In the cast house, new iron and cinder runners were provided. The iron pours into a 50-ton Pugh type hot metal car and is then transported to the pig casting machine. The latter is a single strand machine furnished by the Pittsburgh Coal Washer Co. It has a speed of approximately 20 ft. per min., carrying one pig mold per foot of chain, each mold casting a pig weighing from 100 to 125 lb.

At Right—Delivery End of the New Single Strand Pig Casting Machine, Showing Chute for Loading the Cast Pig into Cars Below—Section Through the Furnace, Showing the New Skip Bridge, Furnace Top and Storage Bins and Their Relations to Each Other





Employment at Bridgeport

According to the report from the Manufacturers' Association of Bridgeport, Conn., based on the number of employees in 31 Bridgeport factories, industrial activity reached its ebb on Jan. 7, last. From previous data three figures were determined which are to represent the estimated normal as follows:

	Estimated Normal
Number of employees	25,318
Number of man-hours	1,240,582
Number average factory hours per week	49

The data show the gradual decline and subsequent increase in all three of these figures over the period from Feb. 5, 1921, to Aug. 31, 1922. On the first date, Feb. 5, the number of employees was 17,392, or 68.6 per cent of the normal. The gradual decline reached low mark on Jan. 7, 1922, with 10,346, or 40.9 per cent of normal. Thenceforth, the number increased steadily with a single break in July to 15,869, or 62.7 per cent of normal for Aug. 26. The percentage of man-hours for the starting date was 54, and the average factory hours per week 81.2 per cent, falling to 32.4 and 80.8 per cent, respectively, then rising to 62.9 and 100.4 per cent, respectively. The average number of hours worked per employee last week was 49.2, or 0.2 hour above the estimated normal.

New Pulley-Grinding Machine

A machine to produce convex, flat or concave faces on pulleys, wheels, rollers and similar pieces and with which the edges may also be faced by using the attachment provided, has been brought out by the Diamond Machine Co., Providence. Pulleys or similar castings ranging from 2 to 18 in. in diameter, and with faces 1 to 6 in. wide may be ground.

Among the advantages claimed for the machine are high production, less metal required to be removed, and better surface obtained. The metal is cut at the rate of 300 linear ft. per min. and fixtures are provided for quickly setting up and taking down the work.



Machine Designed for Grinding Pulleys Having Either Crown or Straight Face

As an example of the production it is stated that 6-in. pulleys with ¾ in. face have been ground in 24 sec. to 2½ min. and 8-in. by 4-in. pulleys in 1 min. 50 sec. to 4 min. and 20 sec., the time varying according to stock removed and finish required. Pulleys 12 in. by ¾ in. have been ground in approximately 2½ min. In the company's own production the grinding time from floor to floor on 18 in. by 4½ in. pulleys was 10 min. each; and on 9 in. by 4½ in. pulleys, 3 min. each.

A substantial chuck, 15 in. outside diameter, with an abrasive wheel 14 in. outside diameter, 1-in. face, constitutes the grinding unit. The spindle is mounted in ball bearings and runs at 1500 r.p.m. Cutting speeds may be varied by changing the back gears. The machine is driven by a 10 hp. 1800 r.p.m. motor, with silent chain drive to the spindle.

The floor space occupied is 3½ by 4½ ft. and the weight of the machine approximately 2000 lb. The height of the spindle from the floor is 44 in. The machine is equipped with a vertical spindle pump provided for wet grinding, which has an adjustable spray nozzle, and ample passages to the sediment tanks.

The edge-facing attachment can be put on or removed in 2 or 3 min. and heavy permanent dowels, as well as large holding-down screws are incorporated to assure alinement with the machine. The weight of the attachment is about 50 lb.

The Morris Metal Products Co., with plants at Bridgeport, Conn., was purchased Aug. 31 by Kenneth W. McNeil, president Karm Terminal Co., Bridgeport, for $220,500. The property was sold by order of the United States District Court. The purchase includes three manufacturing buildings, including a two-story 190 x 373 brick and steel machine shop structure.

Powdered coal will be used for the new Cahokia station of the Union Electric Light & Power Co., St. Louis. The equipment will be provided by the Combustion Engineering Co., 43 Broad Street, New York, and will include 10 Raymond six-roller low side mills for grinding the coal.

Decrease in German Coal Output

The increasing importation of British coal into Germany is due primarily to the decrease in German production which has been going on steadily since March, when the peak of post-war production was reached, says Vice-Consul Davis, Berlin, in a report to the Department of Commerce. Statistics of production for the first five months of the year are here presented:

Months	Working Days, Number	Production, Total, Tons	Production, Daily Average, Tons
January	25	8,132,763	322,090
February	24	7,737,974	322,416
March	27	9,014,278	333,862
April	23	7,512,646	326,637
May	26	8,081,951	310,844

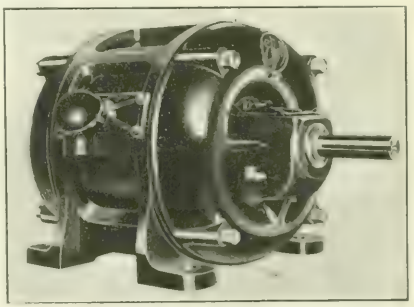
Mr. Davis's report states it is estimated that the average daily production for June will be less than 300,000 metric tons. German industrial circles, the report continues, are much concerned over the constantly rising cost of German coal as compared with British.

Statistical reports show fuel exports from Germany to be greater than before the war, and the suggestion has been made, both in the Reichstag and in the press, that all exports of coal be forbidden in order that the needs of German industry may be met without resort to imported fuel. The total export of coal from Germany in 1921 was about 26,500,000 metric tons, including 18,000,000 tons delivered as reparations.

New Squirrel Cage Induction Motor

A squirrel-cage induction motor for which broad claims are made, in view of the incorporation of new ideas in motor design, has been placed on the market by the Electric Controller & Mfg. Co., Cleveland. The advantages claimed include not only mechanical features, but also increased efficiency, power factor and torque.

Careful manufacture is a feature emphasized and in assembling the various parts of the machine no filing or fitting is permitted, the parts being built to fit or being rejected. To assure rigidity and alinement



New Squirrel Cage Induction Motor

the stator frame is cast around the stator laminations. Shrinkage of the frame after pouring puts the laminations under heavy pressure and eliminates the tendency of the motor to become noisy. The frame is of the skeleton type, the major portion of the stator laminations being exposed to the air. Fan blades are used on only a few of the 900 r.p.m. machines and no fan blades are employed on the 1200 and 1800 r.p.m. motors, as most of the cooling is done by the direct contact of the laminations with the air.

Stator windings are impregnated twice, once after the coils are wound and again after the stator is assembled and wired. All coils are form-wound and open-slot construction is used. Bearings are large and each bearing has two oil rings, one of which is said to be sufficient to lubricate adequately, the extra ring being employed as a safety factor. The oil wells are made unusually large to give further protection against hot bearings.

The rotor has cast end rings and the shaft is said to be larger than standard practice demands.

Metal Wool and Methods of Making It

Processes Vary With Raw Materials Used—Shaving a Steel Wire—How the Specialized Apparatus Operates

BY L. W. MOFFETT

DEVELOPMENT of the art of manufacturing metal wool is interestingly reflected in specifications on file in the Patent Office in Washington. Yet but little is known generally of the process of manufacture. The product is employed in a variety of ways as a cleaning and abrasive agent. Among the purposes to which it is put are the grinding and polishing of objects; cleaning floors; and in applying lubricant to car axle journals, with cotton waste or other absorbent capillary material being mixed with it. Material used by the machines making the wool also varies. It includes molten slag, sheet metal and fine wire. The oldest specifications on file, involving patents of Oct. 13, 1885, an invention of Hugh Kennedy and John W. Higgs of Sharpsburg, Pa., called for the use of molten slag. Jets of steam or air, by this method, are blown through or against a small stream of molten slag, by which the latter is converted into fine vitrified fibers.

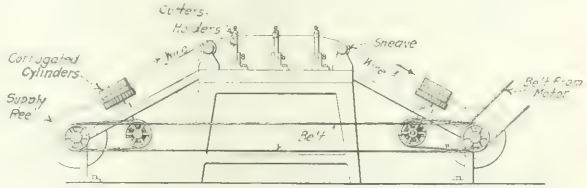
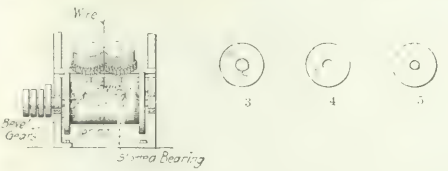


Fig. 1 (Top). Side View of Paton and Koenig Machine Set Up for Operation

Fig. 2 (Lower Left) Shows the Apparatus from One End



Figs. 3, 4 and 5 Are Successive Cutting and Shaping Dies. It will be noted that 3 and 5 have teeth, while 4 is smooth

By a patent of Feb. 7, 1899, granted to Sigmund Feust, of New York, a machine makes the wool from sheet metal in the roll. A patent of Nov. 27, 1900, granted to Friedrich Wilhelm Bühne, who described himself as a German citizen, called for the use of thin metal wires from which chips are cut. Only the first named patent had molten slag as the raw material, while all the others used either shot, metal or fine wire. Improvements claimed provided the basis for the patents granted from time to time.

The latest on file is that of Francis A. Paton and Henry L. Koenig, of Fitchburg, Mass. Patented April 8, 1919, their machine successively removes shavings from the surface of a steel wire. The shavings are of suitable fineness so that when bunched together in a mass they constitute steel wool. This being among the later methods of producing steel wool, a description of this process will afford a clear idea of how the art has developed.

The invention resides in the provision of mechanism adapted to produce steel shavings at a rapid rate, by acting upon the entire outside diameter of the wire material, and so arranged as to effect successive reductions in the diameter of the wire, each reduction producing a quantity of shavings of the desired fineness. The invention contemplates the final reduction of the wire material to such a small size that no more shavings can be removed. The wire, when thus reduced in size, still retains its round cross section and is a salable by-product of the machine.



Fig. 7. The Group of Nozzles Used in the Kennedy and Higgs Method of 1885 to Make Metal Wool from Molten Slag

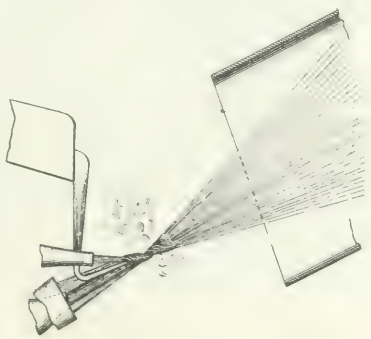


Fig. 6. Molten Slag Being Formed into Fine Vitrified Fibers by the Action of Steam or Air Jets—Kennedy and Higgs Method of 1885

Fig. 1 is a side view of the machine, the parts being shown assembled and in operation. Fig. 2 is a view showing certain of the parts in end elevation. Figures 3, 4 and 5 illustrate various sizes and forms of cutting and shaping devices. The machine includes a number of wire reducing, cutting and shaping devices, which

are mounted upon a stand or support, each device being held in a bracket attached to the support. The brackets have slots or recesses for the reception of holders, which are detachably held in the slots by set screws.

Each holder has near the top a circular recess in one face, the recesses communicating with apertures opening on the other face of each holder for the free passage through of the material or wire. The recess in each holder is provided for the reception of a flat circular cutting or shaping device, of the form shown, for example, by Figs. 3, 4 and 5, respectively, this device filling and fitting snugly within the recess, and detachably held in it by means of a set screw which may engage a depression on the periphery of the device to hold it firmly and rigidly in position.

Elements of the Machine

At each end of the support, beyond the alined cutting and shaping devices above described, is provided a guiding sheave for the wire in its passage to and from the cutting and shaping devices. As shown in Fig. 1, the wire is assumed to be traveling in the direction of the arrow, the wire being drawn from a supply reel at the left side of Fig. 1 and passing between two cylinders whose surfaces are corrugated longitudinally to obtain a bite on the wire. The supply reel is driven through a pulley and belt connection from a second reel, which has rotation imparted to it in either direction, as desired, from a belt connected to a source of power.

Adjacent to the second reel, on which the wire, traveling in the direction of the arrow is wound, are corrugated cylinders identical in construction and arrangement with those adjacent to the supply reel, the surfaces of the cylinders having cooperating longitudinal corrugations to obtain a bite on the wire in its passage between them. The cylinders of each pair are adapted to be rotated in unison through intermeshing spur gears, the teeth of the gears being somewhat elongated and preferably meshing loosely, so as to permit of a slight relative movement of the cylinders toward and from each other as hereafter described, while still maintaining the driving connection.

One cylinder of each pair has its shaft journaled in a fixed bearing on the frame, the shaft having a bevel gear connection in each case with a shaft which has a belt and pulley drive from the shaft of the adjacent reel. The shaft of the other cylinder of each pair is journaled in a bearing which is slidable, transversely, in ways on the framework, a spring operating at all times to draw the sliding bearing and the cylinder toward the other cylinder of the pair, thus causing the longitudinal corrugations of the cylinders to make contact with a wire passing between, regardless of the diameter of the wire.

Method of Operation

In the operation of the mechanism, the wire is threaded through the cutters and shapers carried by the several holders and passed between the two pairs of cooperating cylinders, and then is ready to be wound up on the receiving reel. For operation in this direction, as indicated by the arrow, Fig. 1, the left hand holder carries in its recess a shaping device such as that shown by Fig. 3, there being an aperture running through, with a series of small triangular or pointed teeth formed in its circumference, the diameter at the base of the teeth corresponding substantially with the diameter of the wire. The next holder to the right contains a cutting device, such as that shown in Fig. 4, having a plain aperture running through, corresponding in diameter substantially to the diameter at the apex of the teeth in Fig. 3. The third holder, if it is found desirable to make another reduction in the wire in the same draft, has a shaping device in its recess such as that shown in Fig. 5, having a toothed aperture running through, with the diameter at the base of the teeth corresponding substantially to the diameter of the plain aperture in Fig. 4.

Drawing relatively soft steel wire through alternately toothed and plain shaping and cutting apertures, as described, results in the production of shavings of sufficient fineness to constitute, when assembled, the desired steel wool. The movement of the wire is effected, not only by the draft of the receiving reel but by the bite of the two pairs of cylinders, both pairs rotating in the proper direction to move the wire in the direction of arrow "A."

In the operation as described, the first shaping device, by the action of its teeth, removes a number of fine shavings from the surface of the wire, the latter emerging from the device with its surface having a number of raised portions formed by the scoring action of teeth. These raised portions are shaved off or removed by the passage of the wire through the smooth aperture of the second cutting device, the shavings from this, as well as from the previous operation, being collected, as they fall, in a suitable receptacle. If desired, the wire thus emerging with an unscored surface, may be wound up on the second reel without further reduction, or the third shaping device may be used to produce the same result on the reduced wire as the first device and, if practicable, other alternating shaping and cutting devices, gradually decreasing in diameter toward the end of the draft, may be employed.

After all the wire from the supply reel has been wound up on the receiving reel, the cutting and shaping devices in the several holders are removed, the holders being reversed to make their apertures face in the opposite direction and a new series of alternating shaping and cutting devices are inserted and held in the recesses of the holders by screws. These new wire reducing devices are substantially as those already shown, except that their alternating plain and toothed apertures are smaller in diameter. The wire on the right hand reel is then threaded through the apertures and between the adjusting cylinders, to be wound up on the left hand reel, the direction of the motor belt being reversed for this operation. Successive reductions of the wire in this fashion, each with the production of shavings of requisite fineness, are carried out until the diameter of the wire is so much reduced that no further reduction is practicable, and then the wire, removed from the reels, constitutes itself a salable product.

Steel Wool and Shavings

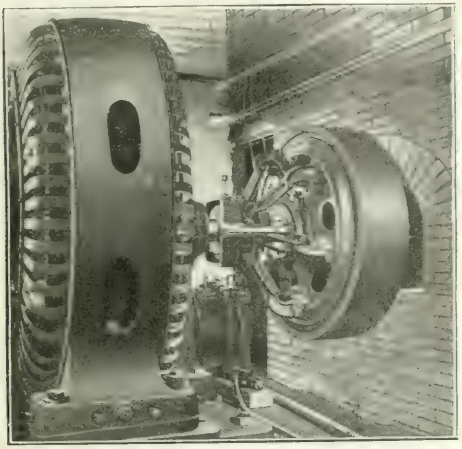
Steel wool consists of long steel fibers resembling curled hair. The fibers are of triangular cross section, and are graded according to fineness from coarse shavings to wool. Steel wool is used as an abrasive, and is a substitute for sandpaper and emery cloth or pumice stone, being regarded as superior to them for certain purposes. It is used in shipbuilding, in other building, in factories and in the household. No accurate figures of production are available. In 1917 the yearly consumption was estimated at between 1,000,000 and 1,500,000 lb., which (imports being cut off) virtually represented domestic production. Germany and Switzerland are also producers.

To help solve the country's problems of water supply and flood control, leaders of American engineering are urging Congress to establish a national hydraulic laboratory. Dean Mortimer E. Cooley, University of Michigan and president of the American Engineering Council, and John R. Freeman, president of the American Society of Civil Engineers, will advocate the laboratory proposal before a sub-committee of the Senate committee on commerce the latter part of this month.

Improves Clutch for Heavy Work

The Universal Giant friction floating disk-type clutch of the T. B. Wood's Sons Co., Chambersburg, Pa., has been improved to withstand severe shocks, such as in picking up a machine or a battery of machines under full load after the prime mover has been brought up to speed.

The disks and plates of the clutch are of iron, and hard wood blocks are fitted in the former so that the two end grain surfaces come in contact with the latter. The improvement consists of the use of a new friction lining on the clutch disks, instead of the wood blocks used formerly. The new lining is known as "non-burn," and is said not to burn out and to wear considerably longer than anything used heretofore for the purpose.



Heavy Duty Double Disk Clutch Between Motor and Main Line Shaft. The wearing qualities of the new friction lining on clutch disks is a feature

The clutch may be used in connection with standard pulleys, gears or rope sheaves, by boring them to fit the clutch sleeve. It may also be used to connect two shafts, a motor and a machine or an engine and the main line shaft, or bolted directly to machines.

The No. 36 double-disk type clutch is shown in the illustration direct connected between a synchronous motor and main line shaft. The motor is brought up to full speed of 200 r.p.m. and the clutch gradually thrown into engagement, picking up a starting load of 700 to 800 hp. without reducing the speed of the motor. It is claimed that in the case of this installation only one slight adjustment on the adjusting bolts has been necessary in 18 months.

Sizes ranging from 5½ to 480 hp. at 100 r.p.m. are available, the clutch having one, two or three friction disks as required.

Effects of Strike in Ohio

SPRINGFIELD, Ohio, Sept. 4—Bauer Brothers Co. is feeling the effects of the general uncertain situation. Orders have been slowing up for the past week. The company has only about thirty days' supply of coal for its foundry. The main plant is operated with power from the power house of the Springfield Light, Heat & Power Co. The Bauer Brothers Co. started recently running full time. Mr. Bauer says the outlook is encouraging if the strikes are settled.

President P. E. Montanus, Springfield Machine Tool Co., reports that the railroad companies will be in the market for tools as soon as the strike is ended, but at present the machine tool business is quiet. The Springfield plant is working only a limited force of men.

There has been a slump in orders at the plant of the Superior Gas Engine Co. during the last 10 days. This is probably due to the rail strike and the inability of companies to get material.

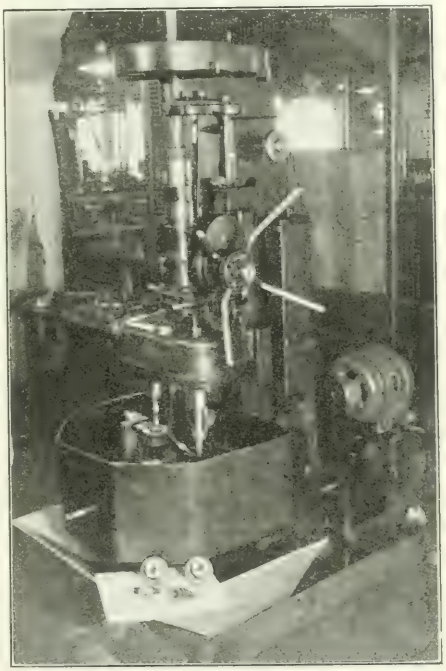
At the plant of James Leffel & Co. orders are coming in for water power equipment from various parts of the country.

Drill Arranged for High Production

The illustration shows a 20-in. box-column drilling machine of the Rockford Drilling Machine Co., Rockford, Ill., arranged to rough drill, rough taper ream and face and finish taper ream the yoke and flange members of a new oil-lubricated universal joint. A production of 250 of these pieces in a 10-hr. day is said to be obtained by the Mechanics Machine Co., Rockford, Ill.

In this arrangement a four-station rotary table, with the index plunger worked by a foot treadle, is applied to the regular table. The rotary table is indexed by hand after the locating plunger is pulled. Four two-jaw chucks with formed jaws to suit the work are provided for the table, an extended wrench being used for tightening the chuck screws, which takes place outside of the chip guard. The chucks are under the work spindles, three of them being in operation while the fourth is being loaded. A finished piece is removed at each index.

A three-spindle drive head equipped with a V-gibbed slide is mounted on the table ways as shown. The machine spindle serves to drive and feed this head, which is fully counterweighted. A positive micrometer adjustment stop on the quill is provided for a depth gage. An adjustment for height and diameter of drill, drill-bushings support is provided under the left-hand spindle.



Drilling Machine Equipped with Four-Station Rotary Table and Three-Spindle Drive Head, Mounted as Shown

The machine is regularly rated as having a capacity to drive a 2-in. high-speed drill in solid steel. The drive is direct by silent chain from an electric motor through interchangeable pick-off gears for speed changes. Four feed changes are regularly provided in a simple feed box. The diameter of the rough-drilled hole in the yoke and flange members shown is ¾ in. and the length 2⅝ in.

ACTIVITY IN METAL TRADES

Worcester, Mass., Operations Typical of Betterment in New England

WORCESTER, Mass., Sept. 2.—Metal and kindred industries of Worcester and of Central Massachusetts generally have been working back to normal ever since the beginning of the year, and in some lines have reached that point. The wire mills are running full, the only limit being the supply of labor. The manufacturers of screw machine products are driving their machinery to the limit. The pressed and stamped metal plants are fairly busy, but there is a question as to raw material supply. The Osgood-Bradley Car Co. is pretty well filled up, a recent $2,000,000 order being for steel passenger cars for the Boston & Maine Railroad. The car shops at the Summit have been employing 1500 men and the number is being increased.

The screw business, as represented here by the large works of the Reed & Prince Mfg. Co., operating on a 60 per cent basis, is neither good nor bad, but is much better than at any time since the slump. The textile machinery industry as represented in Worcester was hit less than most in that line.

Machine Tools an Exception

The one exception to the general report is the machine tool industry, especially firms building the older standard types such as lathes, planers, milling machines, drilling machines and shapers. Concerns such as the Reed-Prentice Co. and the Woodward & Powell Planer Co. report a certain degree of improvement, but by no means a large one. The grinding machine situation is markedly better, however.

The sum total of improvement in the machinery industry, according to a past president of the National Machine Tool Builders' Association, is represented by the average percentage gathered by the association from its members. In 1920 these firms, representing a large part of the industry, furnished the association with their average monthly sales in dollars for the first quarter of the year. Ever since that time, the same firms have submitted monthly reports, in percentage of that monthly average. In 1921 the returns indicated only 8 per cent of the basic month, in a few cases running up to ten per cent. Since the beginning of 1922 there has been an increase, until July gave twenty-five per cent. That is to say, the machine tool business of the United States as represented by sales of new equipment was one quarter of what it was early in 1920. The correction should be made, however, that reduced prices, probably averaging upward of twenty-five per cent, have made a larger volume of actual business necessary to secure a given total in dollars. Consequently, at the 1920 prices the business for July would be considerably greater than the twenty-five per cent.

The machine tool shops of this section are operating with very small forces indeed, as a rule, because when the depression fell upon them they had large inventories. A planer builder, for example, reports that to fill an order for any standard size machine in his line he has only to order in a bed and table, the rest of the machine being ready at hand in stock, ready for assembling.

The Norton Co., manufacturer of abrasive wheels and grinding machines, is increasing production rapidly in both wheel and machine divisions. The big plant six, which was added during the war and operated up to the time of the depression, has been started up again, which, together with normal production in other units of the wheel division, has meant a large increase in working force, operating on full schedule. The machinery division was even flatter than the rest of the works until early this year, when orders began to come in, and now operations have so increased as to mean the employment of 400 hands in the machine shops. The orders for machinery not only include the automobile industry, but industrial activities generally. Preparations are now making to manufacture grinding machines for stock. The company had a considerable inventory to carry over, but this has largely disappeared, and since the dull times set in several new types have been added to the line and will now figure in stock production.

The manufacturers of abrasive wheels have felt in a very serious way the great stocks of wheels in the factories of their customers, notably in the automobile industry. These cared for all requirements, with occasional exceptions, for months after manufacturing resumed an active form. Now, the wheel makers have learned, the accumulation of wheels is down close to normal proportions and buying has increased.

The Heald Machine Co. is moderately busy. This company bridged the dull times by specializing on a line of garage machines, but the demand is now including standard lines.

The Graton & Knight Mfg. Co. finds a material demand for export figuring in its increase in leather belting business. But exports to Europe are not in large volume, South America and the Far East figuring more importantly.

The Baldwin Chain & Mfg. Co. specializes on chain drives for a diversity of uses which are increasing constantly. At present some 400 names are on the payroll, a large increase since the year began. Some of the new demand is from the tractor trade, but the larger part is from machinery builders producing a great variety of equipment, chiefly automatic.

Screw Machine Operators Scarce

The screw machine situation is complicated by a scarcity of operators. The Parker & Harper Co. is running full force overtime; the Liberty Screw Co. is operating day and night, and the Walden-Worcester, Inc., which does a large general business in screw machine products, is operating that department twenty-four hours a day. Incidentally this company, now operating under the management of J. Verner Critchley, in August had a record month in the manufacture of its wrenches.

Employers are beginning to bid for screw machine operators. The Worcester rate is sixty and sixty-five cents an hour. Local managements report that agents of Connecticut factories have offered seventy-five cents an hour and upward, and the result has been a mild but annoying exodus.

Wire Works Well Employed

The wire industry of Worcester is prosperous. The coal and railroad strikes have had little effect up to the present time, as the necessary fuel and raw materials were on hand in quantity when the trouble began. The Worcester works of the American Steel & Wire Co. buy large quantities of power from the New England Power Co., which has exceptional reserve waters on the Connecticut River and its tributaries, this wet season, and the Wickwire-Spencer Steel Corporation depends wholly upon the Worcester Electric Light Co. which has fuel to last for months.

The one great trouble is labor. The American Steel & Wire Co. has been handicapped in this respect, but the announced advance in wages should help to some extent, and with the coming of cold weather large numbers of men will be released from outdoor employment, which has been much greater than usual this year.

In the effort to secure workers, agents have met incoming steamers in Boston. But they found immigrants of the brawn and muscle type in very small percentage, in sharp contrast to former experience.

The Worcester Wire Works, Inc., one of the young wire concerns, which makes high carbon steel wires, has been busy for months, its product going chiefly to the automobile factories, and to the wire rope manufacturers, particularly of the Pacific Coast, to be fashioned into rope for logging and mining operations. There is a stiffening of prices, due to the growing cost of raw material.

Improvement in the wire specialty business is shown in the experience of Sleeper & Hartley, Inc., manufacturers of special wire forming machinery. Not many months ago the large shop was practically idle. To-day it is operating on nearly a normal basis, with orders for many different customers. In this the

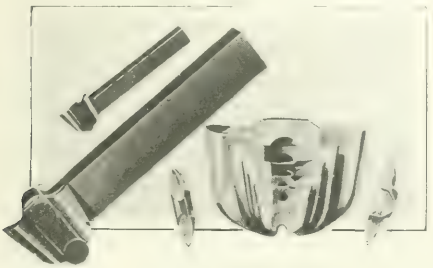
management shares the experience of the many special machinery builders of New England.

The pressed and stamped metal companies are beginning to worry over their raw material supply, for the steel mills are not shipping in required quantities. The industry in Worcester is otherwise very well off. The Worcester Pressed Steel Co., largest of the local concerns, is running its plant as full as in the high tide of production, but, with the exception of some of the mills of the cold rolled strip department, there are no night shifts. Most of the orders are from the New England territory, both in metal products and in strip. Orders average small, but there are many of them. The Boston Pressed Metal Co. is equally busy, its trade being divided between the East and the Middle West. The Worcester Stamped Metal Co. and other concerns in this line of business are operating at a good rate.

Toolholder and Interchangeable Cutters

Toolholders and cutters, constructed as shown in the illustration, are being offered by the Morris Tool Co., 7 Beekman Street, New York. They are for use on lathes, planers, shapers, boring mills and slotters, and are intended to permit the most economical use of high-speed steel, furnishing, it is claimed, unusually rigid support for the cutter point and maximum heat transference.

The cutter blade is double, as shown, either cutting edge being used until worn out, without affecting the other. They are secured to the chrome-nickel steel holder by two heat treated steel bolts. The holder is made with straight and offset shanks, and being reversible, one offset shank provides for both right-hand and left-hand positions. The cutters are interchangeable for either position and may be used until practically ground down to nothing at the cutting point. A unique feature is the vertical offset of the cutter-holding bolts with respect to the holder center line, which provides for adjusting the point to the proper height as it wears down. The clamp system is pointed out as being not only simple and efficient, but very well fitted to hold the cutters without breaking them.



Toolholder and Interchangeable Cutters. The holder is made with straight and offset shanks. Unusually rigid support for cutter point is emphasized

A complete working set of tools consists of one each straight, right-offset and left-offset toolholders, three left-hand and three right-hand roughing tools; two 60-deg. U. S. S. or V-thread tools; two cut-off tools, and one right-hand and one left-hand side tools. There are 10 sizes, from the No. 3 with a ½ x ¾ by 5¼-in. holder, blade ¼ in. thick, to the No. 17 with 2½ by 3 by 24-in. holder, blade 1⅛ in. thick. Complete sets are made up to size No. 11.

It is claimed that in a test the No. 11 roughing tool, with standard tool blade and 7/16 in. depth of cut with ⅛-in. feed, traversed 1 mile, 4270 ft., 5½ in. in three 21-in. torpedo flasks without re-grinding.

Using Mexican Coke Exclusively

The blast furnace of the Compañia Fundidora de Fierro y Acero de Monterey, S. A., (Monterey Iron & Steel Co.) Monterey, N. L., Mexico, which was blown in on July 24, is being operated entirely on Mexican coke. This is the first successful operation with the exclusive use of domestic coke. The furnace products are basic, foundry and high manganese irons.

To Make Knobbled Charcoal Iron Sheets and Roofing Ternes

The Charcoal Iron Products Co., organized a few months ago to take over the plant of the Griffiths Charcoal Iron Mills, Wylie Avenue, Washington, Pa., has practically completed the rehabilitation of the old plant and expects to start operations about Oct. 1.

Eight knobbling furnaces of an improved type have been installed; also a new heating furnace while an old one has been rebuilt. Both of the heating furnaces are served by waste heat boilers. The bar mill, the steam-hammer and the rolling mills have been renewed and the company also is changing the pickling machine so that it can be used for either large or small pieces. Formerly the pickling machine could be used only for 20-in. x 28-in. sheets. Furnaces for serving the two hot mills are new installations. The sheet mill building is served with a new type of monorail hoist which runs out into the loading yard over the tracks of the Pennsylvania Railroad, a branch of which runs alongside the plant.

The company will make knobbled charcoal iron sheets and heavy coated roofing ternes and later will go in for the manufactured products, as it has the facilities for making conductor pipe and eave troughs and also corrugating and roll roofing machines.

John Slater is president, George N. Wolf, vice-president; Ray G. Zelt, treasurer; E. T. McNulty, secretary and general manager, and H. M. Wade, superintendent. Mr. McNulty formerly was superintendent of the Yorkville, Ohio, works of the Wheeling Steel Corporation and Mr. Wade also was connected with that plant before making his present affiliation.

American Iron and Steel Exports to Brazil

WASHINGTON, Sept. 5.—Prospects are good for the sale of American iron and steel in Brazil, but orders are being held up on account of the uncertainty of delivery due to the coal and rail strikes, according to a cable dispatch received by the Department of Commerce from Commercial Attache Schurz, Rio de Janeiro. The State of Rio Grande do Sul will receive bids for 300 kilometers of 65-lb. rails on Sept. 10, and for 90 kilometers on Sept. 23. The Great Western of Brazil Railroad will also order about 6000 tons of rails in September.

From July 21 to Aug. 20 imports at Rio de Janeiro and Santos included the following: Wire, over 2098 tons from the United States; steel bars, 386 tons from the United States, and heavy shipments from England; sheets, 1382 tons from the United States and considerable shipments from England; miscellaneous iron and steel products, over 1000 tons from the United States and considerable shipments from England, Germany and Belgium; tin plate, 510 tons from the United States.

A cable from Cuba states that August produced no marked changes in the iron and steel market there. Practically no business of importance is being transacted in sugar mill machinery owing to the policy of economy being followed.

The principal iron and steel works of Mexico, located in the city of Monterey, a report states, anticipates new workings in its iron deposits in the State of Durango, due to the prospective demand for manufactured products by the mining industry.

Tablet to Commemorate First Production of Bessemer Steel in America

Probably one of the most interesting events to occur during the international steel exposition and convention of the American Society for Steel Treating at Detroit, Oct. 2 to 7, will be the unveiling of a bronze tablet dedicated to the memory of those pioneers of the steel industry who in 1864, at Wyandotte, Mich., erected the first Bessemer steel converter used commercially for the manufacture of Bessemer steel in America. This tablet is to be erected by the Detroit chapter of the American Society for Steel Treating through its executive committee and Messrs. Atkinson, Hamilton and McCloud, acting as a special committee

The site of the Wyandotte Iron Works where Kelly's first tilting Bessemer steel converter was erected is the present location of the Wyandotte public library, and permission has been secured from the library board for the placing of this tablet on the front of the building. It will be 24 x 36 in. and at the head of it will be a bas relief of the original converter.

The unveiling exercises will probably be held on Thursday afternoon, Oct. 5, and the Governor of Michigan has indicated his intentions of being present, and other speakers of prominence are being invited.

The erection of this tablet is the first public recognition of the achievements of William Kelly who made his first Bessemer steel in 1847 and finally patented his process in 1856, although it was eight years later before the Wyandotte Iron Works produced the first Bessemer steel for commercial purposes. Shortly before Mr. Kelly's death, he said to his children, "The day will come when some one will do me justice." It remained for the Detroit chapter of the American Society for Steel Treating to commemorate the achievement of the early pioneers in the development of the process that caused the United States to become the supreme steel-making nation in the world.

Dinner to Harold L. Stevens

Some twenty-odd Boston iron and steel representatives gave an informal dinner Thursday evening, Aug. 31, at the Algonquin Club, that city, in honor of Harold L. Stevens, who recently resigned as New England sales manager, Lackawanna Steel Co., to become general sales manager Central Iron & Steel Co., Harrisburg, Pa. Among those present were: W. S. Locke, Carnegie Steel Co.; C. N. Fitts and W. B. Douglas, New England Structural Co.; H. O. Russ; R. B. Sanderson, E. P. Sanderson Co.; C. A. Beale, Alan Wood Iron & Steel Co.; J. G. Andrews and M. F. Brown, Boston Bridge Works; A. C. Harvey, A. C. Harvey & Co.; W. H. Hayes and C. H. Carter, Midvale Steel & Ordnance Co.; H. G. Porch, Lukens Steel Co.; H. G. Austin, Central Iron & Steel Co.; S. Wiley Wakeman, Fore River Works, Bethlehem Shipbuilding Corporation, Ltd.; George Dennyven; Frank Sargent, Chicago Pneumatic Tool Co.; R. B. Wallace and Frank Brigham, Bethlehem Steel Co.; and W. E. Clark.

Mr. Austin served as toastmaster. Mr. Hayes spoke in behalf of those present and those unable to attend, wishing Mr. Stevens success in the new field. Mr. Fitts and Mr. Carter were in charge of arrangements.

The Basset Process

Speaking at the annual meeting of the Ougrée-Marihaye Co., Belgium, Gustave Trasenster, chairman, mentioned the Basset process, which, he said, had already yielded satisfactory results, according to the London *Iron and Coal Trades Review*. The production of a high temperature in a reducing atmosphere, which is the basis of this new process, represented indisputable progress. The intentions of the directors had been to follow very closely the trials which were being continued, and to secure for the company the exclusive patent rights for Belgium, Luxemburg, and a portion of France. Under these circumstances the company had considered it advisable to participate in the French company to the extent of 1,000,000 f. Among other results obtained with the new process, the speaker said that it had been possible to abstract the metal from the ore, leaving only 1 per cent of iron in the slag. Certainly the lining of the furnace was not yet what it ought to be.

Henry Marion Howe Medal Founded by Steel Treaters

The Board of Directors of the American Society for Steel Treating, with the approval of Mrs. Howe, has set aside a fund from the treasury of the Society to be known as the Henry Marion Howe Fund, the proceeds from which will apply on an annual medal to be known as the Henry Marion Howe Medal.

The medal will be of gold and will be presented to the author of the paper considered of highest merit on any subject within the field covered by the Society.

The establishment of this medal is as a tribute to the exceptional contributions made by the late Doctor Howe to the science of metallurgy, and in this way the society will commemorate annually the career of its distinguished honorary member.

The rules governing the award of the medal will be announced during the international steel exposition and convention of the American Society for Steel Treating at Detroit, Oct. 2 to 7.

Meeting Committee A-1 of American Society for Testing Materials

F. M. Waring of the Pennsylvania Railroad Co., Altoona, Pa., chairman of committee A-1 on steel of the American Society for Testing Materials, has issued a call for a meeting of his full committee to be held at Detroit, Oct. 5 and 6, during the international steel exposition and convention of the American Society for Steel Treating. The following meetings are scheduled for October 5: 10:00 a. m., sub-committee II; 11:00 a. m., sub-committee XIV; 12:00 noon, sub-committee VIII; 2:00 p.m., sub-committee XIX.

On Friday Oct. 6: 10:00 a. m., advisory committee of committee A-1; 11:00 a. m., important session for purpose of effecting an organization for coming year besides discussion of the work before the committees and the hearing of committee reports.

All of the meetings will be held at Hotel Statler, and practically all of the 134 members are expected to be present.

Meeting of Drop Forge Supply Association

H. N. Taylor, president, N. & G. Taylor Co., and president for the past eight years of the Drop Forge Supply Association, has made arrangements for the holding of a meeting of the members of his association during the international steel exposition and conventions of the American Society for Steel Treating and the American Drop Forging Institute in Detroit. The meeting will be held at 12:30 on Tuesday, Oct. 3, in the General Motors Building.

Engineers Elected to Eye-Sight Council

Election of several engineers and educators to the board of councillors of the Eye-Sight Conservation Council of America is announced from the headquarters of the Council in New York. Engineers chosen include Prof. Joseph E. Roe, head of the department of industrial engineering, New York University, and Dr. F. C. Caldwell, professor of electrical engineering, Ohio State University.

Professor Roe is a member of the executive board of the American Engineering Council of the Federated American Engineering Societies and president of the Society of Industrial Engineers. Professor Caldwell is chairman of the committee on education of the Illuminating Engineering Society. Further enlistment of the co-operation of the engineering profession is being planned by the Council.

Trade Commission Objects to Merger

Complaint Filed Against Republic, Midvale and Inland Steel Companies Conflicts with Position of Department of Justice—Plans for Combining Will Proceed

BY L. W. MOFFETT

WASHINGTON, Sept. 5.—Issuance last Thursday by the Federal Trade Commission of a complaint against the Midvale Steel & Ordnance Co., the Republic Iron & Steel Co., and the Inland Steel Co., charging that the proposed merger of these interests is an unfair method of competition in violation of Section 5 of the Federal Trade Commission act, was expected, but at the same time it created an anomalous position as between the commission and the Department of Justice. The department, in its report to the Senate on July 21, gave its emphatic approval to the proposed mergers of the Bethlehem Steel Co. and the Lackawanna Steel Co., as well as of the three companies against which the commission has just issued a complaint, after it had taken similar action with regard to the Bethlehem and Lackawanna companies. While it is true that the report of Attorney General Daugherty was confined from a point of jurisdiction to the Sherman, Clayton and Webb-Pomerene acts, and the Federal Trade Commission is proceeding under the Federal Trade Commission act, the Department of Justice, in the course of commenting on the proposed merger of the Midvale, Republic and Inland companies (to be known as the North American Steel Corporation) said that there is but one underlying purpose in the combination; that is, to enable the new company to compete with the United States Steel Corporation. It was added: "Instead, therefore, of being in restraint of trade the new combination will be in furtherance of trade." A similarly clean bill was given by the Department to the Bethlehem-Lackawanna merger, and Samuel Untermyer, in one of his attacks on the Steel Corporation, said he could see no violation of law in the mergers.

But the Federal Trade Commission, with a sharp dissent from its newest member, Judge Vernon W. Van Fleet, only followed its own precedent and did the expected in issuing the complaint. Chairman Gaskill, in explaining his attitude in a somewhat elaborate legalistic disquisition, and asserting the views are his own and not necessarily those of the commission, seeks to justify the complaint on a matter of public policy. Judge Van Fleet directly challenges this view and supports that of the Department of Justice, with which Mr. Van Fleet was formerly associated, and expresses the opinion that the merger is in the public interest. Lawyers who have studied the documents of Chairman Gaskill and Commissioner Van Fleet, both of whom are admittedly able attorneys, have expressed the view that the latter in this case expresses much the sounder law.

The statement of Commissioner Van Fleet, tart in its tone at different points, speaking of the United States Steel Corporation as the chief competitor of the respondents, says the former controls about 45 per cent of the steel business of the country, as against a possible 7½ per cent of the Midvale, Republic and Inland companies. He adds: "We seek to prevent this small combined competition. We strain at the gnat and swallow the camel." This observation is made after reference to the fact that the United States Supreme Court held that the Steel Corporation did not violate the Sherman act.

In view of the sharp difference of opinion between the majority members of the commission and the Department of Justice, it is interesting to consider the possible course of the proceedings. Should they reach the Supreme Court, jurisdiction before that tribunal on the part of the Government would rest with the Department of Justice. The Solicitor General of the department, acting under the Attorney General, can assign any attorneys he sees fit. While it is conceivable that he might defer to the Trade Commission and select counsel from that body, he could select counsel from the department, which has approved of the proposed mergers so far as the Sherman, Clayton and Webb-Pomerene acts are concerned. Going further, the department, taking a view directly opposite to that of the commission, said they would be in the public interest, or favor "public policy."

The commission announced that the Midvale, Republic and Inland companies are given 30 days within which to file answers. In the formal complaint it is stated that Oct. 20 has been fixed as the date when a hearing will be had on the complaint so that the respondents may "show cause why an order should not be entered by said commission requiring you to cease and desist from the violation of the law charged in this complaint."

Merger Plans Will Proceed

Thomas L. Chadbourne, of the law firm of Chadbourne, Babbitt & Wallace, who was one of the chief figures in the negotiations that brought the steel companies into agreement last spring, makes the following statement:

"Inasmuch as the Attorney General has reported favorably on the proposed merger, and all of the eminent counsel whose opinion has been sought have approved the project as entirely legal, the three interested concerns have authorized me to announce that they intend to proceed with the necessary steps to make the project effective."

In their decision the three companies are following the precedent set by the Bethlehem Steel Corporation and the Lackawanna Steel Co., which after receiving a clean bill of health from the Attorney General are proceeding to consummate the merger of those two companies.

Commissioner Van Fleet's Reasons

Commissioner Van Fleet in voting against the issue of the complaint, filed the following memorandum setting out the reasons for his dissent.

In the matter of Midvale Steel & Ordnance Co., Republic Iron & Steel Co., and Inland Steel Co.

In this case the salient facts are that one corporation competitor of the respondents controls about 45 per cent of the steel business of the country; that the proposed merger if consummated would control about 7½ per cent of such business and the other so-called independents would control about 47½ per cent of such business; that the proposed merger is to be accomplished by the acquisition of the physical assets of the constituent corporations and not by the acquisition of

their shares or share capital. The plants of respondents are widely separated, being in Pennsylvania, Ohio and Indiana. It is true that there is some competition between them as there is between them and their chief competitor and between them and all other independents. It is, of course, true that the proposed merger would do away with competition between the merging companies. This must be the case in all mergers of competing companies. It is plain under the decisions of the Supreme Court of the United States, which decisions have now become so well known that it is unnecessary to cite them, that it is not every lessening of competition that is against the Sherman law, but only that which is in unreasonable restraint of trade and in the case of the United States vs. the United States Steel Corporation, a combination controlling a very much larger proportion of the steel business, was held not to be in unreasonable restraint of trade nor a monopoly. If this is so—and it is the law of the land as long as such decision stands—it cannot well be argued that the proposed merger is against such law. Indeed, I do not understand that it is contended that the proposed merger in within the inhibition of the Sherman law as interpreted by the Supreme Court. My personal idea is that the decisions of that court are of binding effect upon us. The Clayton act provides that "no corporation engaged in commerce shall acquire, directly or indirectly, the whole or any part of the stock or other share capital of another corporation engaged also in commerce, where the effect of such acquisition may be to substantially lessen competition between the corporation whose stock is so acquired and the corporation making the acquisition, or to restrain such commerce in any section or community, or tend to create a monopoly of any line of commerce."

Far-Reaching Act

It will be seen that this act is much more far-reaching than the Sherman act in cases coming within its provisions for the reason that it prohibits substantial lessening of competition between the corporations themselves, and if its language were broad enough to include every combination however effected, it would prohibit all combinations of competing businesses.

In such case and under such construction, the Sherman act would become obsolete. There would be no need ever to resort to it because always the combination, though it did not contravene its provisions, would come within the provisions of the Clayton act. So the Clayton act specifically limits its operation to a case where the combination is effected by the acquisition of shares or share capital, thus under the well known maxim of statutory construction "expressio unius," etc., excluding its application to any other state of facts. Thus it seems plain that the proposed merger does not come within the inhibition of either the Sherman act or the Clayton act. The Attorney General in an opinion, recently rendered to the Senate of the United States, in a response to a resolution, has held that the proposed combination is not in violation of either of these acts. While such opinion is not of binding effect on this commission, I think it is sound and entitled to great weight. But it is argued that the proposed merger comes within the Federal Trade Commission act as a method of unfair competition because said act prohibits all methods which are against public policy and it is argued that the proposed merger is against public policy as declared in the Clayton act. I concede that all methods of competition which are against public policy are to be deemed unfair and within the act.

Lessening Competition

It is contended because the Clayton act prohibits mergers which substantially lessen competition between the merging companies, under certain conditions, that this is a declaration of public policy to prevent such mergers under all conditions. In other words, we are to reach down into the Clayton act and take a part therefrom and supplementing it with the Federal Trade Commission act, make that unlawful which is not declared to be unlawful by the act itself. It is contended that such a merger is against public policy. Who says so? Congress did not say so. It said that such merger should be unlawful only when accomplished by the acquisition of shares or share capital. If its intent had been to make it against public policy to combine in any other manner, it would have said so. It might have used the words "capital assets" or "by any means," or "in any other manner," but it did not.

It seems to remain for the Federal Trade Commission to do this, thus making the inhibition of the act apply to a state of facts not enacted by Congress. Thus adding to the law provisions Congress did not make. Thus making that unlawful Congress did not make unlawful. Thus in plain terms judicially legislating. There was a well defined purpose in the Clayton act, namely, to prevent secret combinations by the acquisition of stock and a reference to the debate over the bill clearly demonstrates this and clearly shows it did not have in mind the prohibition of the merging of competing companies under all circumstances. I do not think any support for this theory can be obtained from the Beechnut case. The argument is that in that case, although there was no violation of the Sherman act in terms because no contract in restraint of trade, yet the court held the acts unlawful which were in violation of the terms of that act as against public policy. But the acts inhibited by the Sherman act are and for hundreds of years have been unlawful at common law. Acts in unreasonable restraint of trade and tending to create monopoly have always been against the common law and consequently against public policy, so that this public policy exists although the terms of the Sherman act are not violated.

A Different Case

But the case of the Clayton act is different. It has never been per se unlawful, nor against the common law for two or more competing businesses to combine, thus substantially lessening competition between them. In and of itself without more such a combination has always been legal. It is only when it goes further and results in unreasonable restraint of trade or tends to create a monopoly that it becomes unlawful unless it also comes within all the terms of the Clayton act. The mere fact of the elimination of competition between merging corporations never having heretofore been illegal, it cannot be made illegal by the mere fiat of the Federal Trade Commission. As said by the Supreme Court in the Gratz case: "The words unfair methods of competition . . . . are clearly inapplicable to practices never heretofore regarded as opposed to good morals because characterized by deception, bad faith, fraud or oppression, or as against public policy because of their dangerous tendency unduly to hinder competition or create monopoly."

The usual method of procedure has been somewhat varied in this case in that a full hearing was given prior to the issuance of a complaint.

Would Prevent Economies

What I deem to be a full disclosure of the facts has been made with a thorough presentation of the law. It appears that the chief competitor of the respondents is the United States Steel Corporation controlling about 45 per cent of the steel business of the country as against a possible 7½ per cent of the combined respondents. This great corporation is reputed to be probably the most efficiently managed business concern in the world. It has vast power, albeit wisely administered.

It can produce a ton of steel at from $3 to $5 a ton cheaper than its competitors. It would seem that the so-called independents exist by its wise tolerance. It evidently dominates the trade. Yet in such a condition of affairs, we seek to prevent this comparatively insignificant combination, whose object plainly is to effect economies. That such a combination could if it wished restrain trade or create a monopoly is out of the question. The one does exist. We seek to prevent this

small combined competition. We strain at the gnat and swallow the camel.

For the foregoing reasons, I dissent from the action taken by the majority in this case.

VERNON W. VAN FLEET,
Commissioner.

Commissioner Gaskill's Statement

Commissioner Gaskill filed the following memorandum expressing the reasons underlying his vote to issue the complaint:

In the matter of Midvale Steel & Ordnance Co., Republic Iron & Steel Co., and Inland Steel Co.

The Federal Trade Commission, having reason to believe that the pending proceedings of Midvale Steel & Ordnance Co., Republic Iron & Steel Co., and Inland Steel Co., looking to a combination or merger, are in violation of law, and that action by the commission in respect thereof is in the public interest, has issued a complaint against these three companies stating its charges in that regard. In ordinary circumstances, I should consider that an expression of the reasons underlying my vote for such action would be premature lest it be mistakenly accepted as a binding declaration controlling my final judgment. Such a statement more properly accompanies the commission's decision at the conclusion of a case.

But the circumstances are peculiar. The case, like that of the complaint against the Bethlehem-Lackawanna combination, is of paramount importance to the parties involved and to the public. The Attorney General of the United States, in a careful and learned opinion, has advised the Senate of the United States that the companies involved are not acting in violation of the Sherman law. With due deference to the jurisdiction of the Federal Trade Commission, the Attorney General refrains from any expression of opinion as to the application of the Federal Trade Commission act. Nevertheless, the distinction is not clear to the general public, nor yet to the whole of the legal fraternity.

Views Differ Widely

The views which I entertain as to the state of the law applicable in this instance apparently differ widely from those which are held by counsel for the several respondents since neither their briefs which were submitted to the commission nor their arguments in conference, were directed along these lines. It seems proper therefore that I should state my view of the applicable law in order that counsel may be fully informed and may direct the case upon the complaint in such manner that the commission will receive the full benefit of their consideration of the possible aspect of the law, which is now suggested.

The Sherman law is both a declaration that restraint of trade and monopoly are contrary to public policy and a prohibition of the use of certain specified methods of accomplishing either of the unlawful objects. This definition of unlawful methods is a limitation upon the scope of that law. And so in a great body of decisions upon the Sherman law, the judicial function is concerned with the question of method rather than object, to determine whether the method under examination is within the limitations created by the legislative definitions.

Under the Federal Trade Commission act, on the contrary, the question is solely related to the nature or character of the object. If that is unlawful, it matters not what the method used to accomplish it may be. This is the great and controlling distinction between the two laws.

The Federal Trade Act

Section 5 of the Federal Trade Commission act reads in its significant part as follows: "Unfair methods of competition in commerce are hereby declared unlawful * * * The commission is hereby empowered and directed to prevent persons, partnerships, or corporations, except banks, and common carriers, subject to the acts to regulate commerce, from using unfair methods of competition." In this all inclusive declaration is condemnation of all and every method of establishing unfair competition. There is no limitation created by legislative definition as there is in the Sherman law. Congress declined the attempt to define unfair competition, or to specify the methods which are to be prohibited. It placed this duty of interpretive definition upon the commission subject to review by the courts. The commission as an administrative body must determine in the first instance whether a given action is an unfair method of competition and upon review the court determines not whether it would have reached the same conclusion had it been sitting in place of the commission, but whether the commission was permitted under the law to reach the conclusion which it stated.

There was no need for any other form of legislation. As Mr. Justice Brandeis stated in his dissenting opinion in the Gratz case, "What Section 5 declares unlawful is not unfair competition. That had been unlawful before. What that section made unlawful were 'unfair methods of competition'; that is, the method or means by which an unlawful end might be accomplished."

What is the unlawful end, object, under the Federal Trade Commission act which may not be accomplished by any method?

Unfair Methods Defined

Explaining the phrase "unfair methods of competition," Mr. Justice McReynolds speaking for the majority of the Supreme Court in the Gratz case, said:

"The words 'unfair methods of competition' are not defined by the statute and their exact meaning is in dispute. . . . They are clearly inapplicable to practices never heretofore regarded as opposed to good morals because characterized by deception, bad faith, fraud or oppression, or as against public policy because of their dangerous tendency unduly to hinder competition or create monopoly."

If we set aside as not bearing upon the question now under consideration, that part of this statement which refers to practices contrary to good morals, and cancel the double negatives so as to state the proposition in the affirmative, the rule laid down by the court for determining the nature or quality of the unlawful object prohibited by the Federal Trade Commission act is:

"The words 'unfair methods of competition' are applicable to practices heretofore regarded as against public policy because of their dangerous tendency unduly to hinder competition or create monopoly."

The word "heretofore" cannot be construed to limit the application of the act to specific prior definitions either in law or judicial decisions. It is merely recognition of the fact that public morals and public policy have heretofore been regarded as the standards of fair competition. To apply it literally and strictly is to make section 5 merely a confirmation of a series of judicial precedents. The act must include all methods which fall within the boundaries of public morals and public policy. And manifestly, it must at least be broad enough to include subsequent legislative declarations of public policy.

Section 5, in so far as it is now applicable, may then be stated thus, "Any method which is against public policy because of its dangerous tendency unduly to hinder competition, is unlawful."

Sherman Law Declaratory

The Sherman law is declaratory of public policy, coming within even the most limited view of the meaning of the word "heretofore." Therefore, whatever method is used to accomplish an object contrary to the public policy as declared in that act, may be "prevented" under the Federal Trade Commission act. Not as a violation of the Sherman law and for that reason an unfair method of competition, but being in contravention of public policy as declared in the Sherman law, it is an unfair method of competition under the Federal Trade Commission act.

In the Beechnut case, the commission avowedly put its complaint outside the Sherman act by stipulating

that there was no contract present in that case. The respondent practically argued that unless the Sherman law applied, the order of the commission should be reversed. The court said, "The Sherman act is not involved here except in so far as it shows a declaration of public policy to be considered in determining what are unfair methods of competition, which the Federal Trade Commission is empowered to condemn and suppress."

The Clayton law stands with reference to the Federal Trade Commission act in precisely the same relationship as the Sherman law. It is a declaration of public policy which is to be considered in determining unfair methods of competition.

That it was passed subsequent to the Federal Trade Commission act cannot foreclose the commission from looking to the Clayton act for declarations of public policy. Even if it had no power to enforce any of its specific provisions as it has no power to enforce the specific provisions of the Sherman law, what language of section 5, permitting the commission to accept the public policy of the Sherman act, precludes it from regarding the Clayton act in like manner?

Public Policy Involved

The Clayton law, like the Sherman law, is a declaration of public policy with definition of specific methods which are prohibited. But these definitions, while they are limitations upon the application of the act in which they appear, are not limitations upon the provisions of section 5 of the Federal Trade Commission act, nor do they define its scope. Because the act confers jurisdiction in part upon the commission, it may in a given case proceed to issue a complaint founded on the Clayton law. In which case, the facts charged and proven must conform with the specific definition of that act's prohibition. But if the public policy of that act is contravened by the use of a method not specifically outlined in the act, the invasion of the public policy may be prevented none the less, under the power of the commission to prevent the use of all unfair methods of competition. In such case the Supreme Court might well say of the Clayton law, as it said of the Sherman law in the Beechnut case, "The Clayton law is not involved here except in so far as it shows a declaration of public policy to be considered in determining what are unfair methods of competition, which the Federal Trade Commission is empowered to condemn and suppress."

Section 7 of the Clayton act prohibits the substantial lessening of competition between competing corporations or the restraint of trade in any section or community or the creation of monopoly of any line of commerce where any one of these conditions may be the effect of any direct or indirect acquisition of the whole or part of the stock or other share capital of one competitor by another or of two or more competitors by a third competitor.

Three Competing Companies

In the pending case it seems to be clear that each of the three companies is a competitor of the other two. It is apparent that by the consummation of the proceedings now under way all competition between them will cease. The contention is that the Clayton act has no application because the plan does not contemplate the acquisition of any "stock or other share capital," but will be carried out by a purchase of assets. In other words, the public policy declared in the Clayton law may be ignored and competition between competing corporations be entirely eliminated because it is not done by the specific method prohibited in that statute.

If it were not for the continuing application of section 5 of the Federal Trade Commission act to any method which contravenes public policy whenever and however properly declared, because of a dangerous tendency unduly to hinder competition, the argument might be sound. The Beechnut case probably could not have been prosecuted to a successful conclusion under the Sherman law because there was no contract, combination or conspiracy present. If the Clayton law stood alone, upon the facts stated, I question whether the appearance of a violation of that law appears in the instant case and doubt whether the commission could proceed as for a violation of that law.

The Federal Trade Act

But the Federal Trade Commission act has provided as an administrative agency equipped with an interpretive discretion, operative between the legislative act and the judicial review, authorized to take notice of all declarations of public policy in the field of free and fair competition and to prevent the use of any and all methods whether specifically defined by statute or not, which, because of a dangerous tendency unduly to hinder competition, contravene the public policy wherever found to be authoritatively declared.

In this aspect of the law it seems to me that it is unnecessary to consider whether the Sherman law or the Clayton law have been or will be violated by the proposed merger. The public policy as declared in the Clayton law is certainly opposed to the proceedings under consideration. That fact appearing, in my view of the law, the issue of a complaint under section 5 of the Federal Trade Commission act, is indicated as the necessary and proper procedure. For it is that act, if any, which has been violated by the pending merger of these three companies.

I do not commit myself to adherence to this view on final decision. It is the line of thought which has led me to vote for the issue of a complaint. I shall await the arguments of learned counsel with much interest and I hope, an open mind. Of course this is merely an individual expression. It is not to be attributed to the commission—nor to any other commissioner.

NELSON B. GASKILL,
Commissioner.

Broadening Control of Railroad Shipments

WASHINGTON, Sept. 5.—Broadening its scope of control under its car service No. 24, the Interstate Commerce Commission last Thursday brought all railroads under its scope when it directed those west of the Mississippi river to give priority and preference to the movement of food for human consumption, feed for live stock, live stock, perishable products and fuel and to return empty cars intended to be used to carry these commodities. The order previously covered railroads east of the Mississippi river only. The order possesses the possibilities of delaying shipments of iron and steel and other products not included in the priority classification mentioned.

At the time this order was issued, the Federal Fuel Distributer announced details for the expedition of the movement of coal to the upper Great Lakes region, the statement being made that the plan was intended to be put into effect on Monday, Sept. 4 with the hope that 1,000,000 tons of coal may be started lakeward this week.

The circular points out that amendment No. 4 to service order No. 23 of the Interstate Commerce Commission transfers lake coal from class 3 to class 2 and covers all bituminous coal consigned to pools, or large cargo, or bunkerage coal, at any port on Lake Erie for transshipment by water to ports above Lake Erie. Pool coal will be consigned to the Ore and Coal Exchange at Lake Erie ports, but under the rules of the exchange, may not be so consigned until a permit has been issued by the exchange admitting the coal to the pools.

A. W. Gregg, general superintendent, the Whiting Corporation, Harvey, Ill., will address the first fall meeting of the Chicago Foundrymen's Club at the City Club, Chicago, on the evening of Sept. 9. He will discuss molding sand, the condition of foundry floors and various labor saving devices in the foundry.

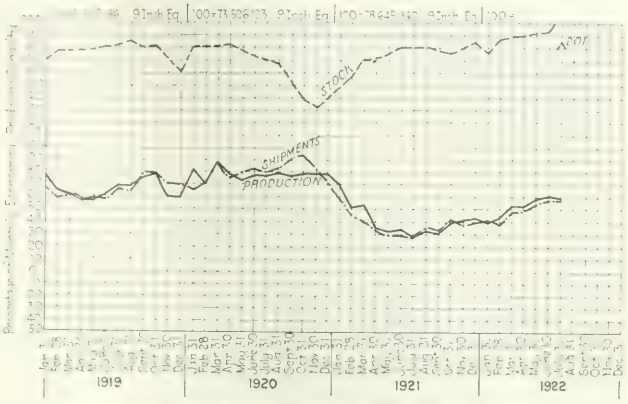
The Magma Copper Co., Superior, Ariz., is planning to increase the capacity of its plant from 300 to 600 tons per day, and to erect a smelter. It expects the initial capacity to be about 500 tons per day.

Charts Showing Condition of Brick Industry

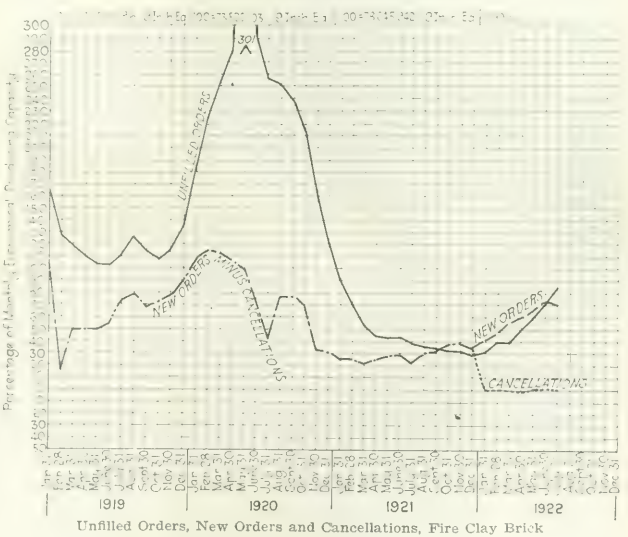
Monthly charts compiled by the Refractories Manufacturers' Association, giving the production, shipments, stocks, new orders, unfilled orders and cancellations of fire clay and silica brick, expressed in percentages of the monthly economical producing capacity of the membership of that organization, for the month of July, has been issued. Since a large part of the production of these refractories finds its way into the iron and steel industry, and that industry lost ground as to plant operations in July, it is natural that the report should make a rather unfavorable showing as compared with the two previous months, when the effect of the coal strike was not being seriously felt and bad railroad transportation conditions were still in the future.

As of July 31, stocks of fire clay brick were about 201 per cent of monthly economical producing capacity, against about 193 per cent a month before; production at the end of July was at the rate of 60 per cent, against 61 per cent at the end of June, and July shipments were about the same as those of the previous month, or approximately 59 per cent. Unfilled orders were boosted to 87 per cent, as compared with 70 per cent in June, this being ascribable to the inability of Southern manufacturers to ship freely on account of railroad congestion and a slowing down in specifications on orders in other sections. Cancellations were equal to about 1 per cent of the monthly economical capacity, or about the same as in June.

Stocks of silica brick, as of July 31, were about 138 per cent of monthly producing capacity, against 142 per cent at the end of June; production 41 per cent, against 42 per cent; shipments 146 per cent, against 139 per cent; unfilled orders 75 per cent, against 74 per cent, and new orders 59 per cent, against 51 per cent. There were cancellations in July equivalent to 3 per cent of monthly capacity, as contrasted with none in June.



Stocks, Shipments and Production, Fire Clay Brick



Unfilled Orders, New Orders and Cancellations, Fire Clay Brick

Large Increase in Coal Output

WASHINGTON, Sept. 5.—Soft coal production for the week of Aug. 28-Sept. 5 took a decided and expected upward turn, the Geological Survey estimating that it amounted to 9,200,000 or possibly 9,700,000 tons. It is a direct reflection of the result of the resumption of mining operations under the Cleveland agreement. For the week preceding the output was 6,700,000 tons, so that the gain aggregated between 2,500,000 and 3,000,000 tons. It emphasizes more than ever that the problem now faced by the country is one of transportation more than of bituminous production. Concern as to an adequate supply of soft coal now has passed, but legislation looking to distribution under Government authority, with priorities over car movements, has in mind the proper distribution of soft coal. There are those who think legislation of any kind now is unnecessary, but the Government apparently fears that many industries, as well as households, would be deprived of coal by unduly heavy shipments to some sources not given preferred ratings.

The rapid gain in output is indicated by the daily carloadings. Following a sharp increase on Friday and Saturday of week before last, as coal began to flow in volume from the mines of Illinois and Indiana, last week opened with loadings of 30,054 cars on Monday. A decline to approximately 28,000 cars on Tuesday and Wednesday marked the first tightening of car supply. On Thursday additional shipments began from western Pennsylvania, and loadings reached 29,027 cars. Complaints of lack of cars already have been received from the union districts of eastern Ohio and northern West Virginia. One week previously it was the supply of mine labor; now it is transportation.

With the accumulation of orders for steel products, particularly rails, the plant of the Monterey Iron & Steel Co., Monterey, Mexico, is being taxed almost to capacity. It is announced that the limited output will be increased to 600 tons within a short time. At present the number of employees has risen to 3500, and an increment of 1500 will be set at work as soon as the fourth open-hearth furnace is ready for operation. It is also announced that the plant of the Monterey Wire Nail Co., which was established by St. Louis interests, is once more in operation and will soon be running to capacity.

Stove and furnace manufacturers in Detroit report a heavy demand for gas stoves, with furnace sales below anticipation. This may be a reflection of the building conditions which are badly hampered by lack of brick and cement.

Iron and Steel Exports Fall Heavily

Drop 26 Per Cent Below June, and July Shows Smaller Than Any Other Month Since February— Japan Buys Less Here

WASHINGTON, Sept. 5.—Exports of iron and steel in July showed a sharp decline to 157,169 gross tons, valued at $14,611,590, and were the lowest for the current year, or since December, 1921, when the total was 134,415 tons. Compared with June, the decrease was 55,126 tons, or 26 per cent. The falling off is attributed to restricted buying by foreign sources, especially Japan, and to the hampered condition of the iron and steel industry in this country on account of the fuel and rail situation.

It is interesting to observe that Canada, normally the largest consumer outside of the United States, of American iron and steel, again took first place in July, after this rank had been held for a long period by Japan. Exports to these countries were 48,010 and 37,585 tons, respectively. Indicative of the restricted character of foreign markets for American iron and steel products in July, it will be observed that the shipments to these two countries amounted to 85,595 tons, or 54.1 per cent of the total exports for that month. The figures also are significant in showing how Japanese buying has contracted. Shipments to that country

Exports, January, 1920, to July, 1922, Inclusive

	Gross Tons		
	All Iron and Steel	Pig Iron	Semi-finished Material
Calendar year 1919	4,239,837	309,682	258,907
January, 1920	333,601	18,468	19,937
[illegible]	[illegible]	15,739	22,693
March	417,216	22,740	30,444
[illegible]	[illegible]	14,608	19,032
[illegible]	[illegible]	13,032	16,370
[illegible]	[illegible]	17,075	29,811
Fiscal year 1920	4,212,732	248,126	288,766
July	458,866	29,647	17,245
[illegible]	[illegible]	22,645	20,920
[illegible]	[illegible]	22,724	18,113
October	452,015	17,296	11,853
November	434,297	13,929	7,942
December	498,765	10,055	3,415
Calendar year 1920	4,961,851	217,958	216,873
January, 1921	547,394	3,710	315
February	393,328	1,307	92
March	230,635	2,220	1,023
April	162,592	1,234	678
[illegible]	[illegible]	2,541	749
June	119,081	1,689	1,106
Fiscal year 1921	4,168,619	129,541	82,549
July	86,523	2,744	363
[illegible]	[illegible]	2,424	2,447
September	[illegible]	3,078	1,318
October	[illegible]	2,830	153
[illegible]	[illegible]	1,299	1,869
December	134,415	2,550	250
Calendar year 1921	2,213,042	28,305	10,363
January, 1922	160,920	1,043	4,683
February	133,975	1,420	6,627
March	208,843	2,724	10,002
April	198,830	2,750	9,376
[illegible]	[illegible]	3,897	13,091
[illegible]	[illegible]	1,996	13,178
Fiscal year 1922	1,721,418	28,330	63,127
July	157,169	1,943	10,149

Destination of July, 1922, Exports of Iron and Steel in Lots of 500 Tons or More

Country	Gross Tons	Country	Gross Tons
[illegible]	[illegible]	Peru	2,414
Canada	48,010	Chile	1,882
[illegible]	[illegible]	Hongkong	1,861
Cuba	11,414	Chosen (Korea)	1,186
[illegible]	[illegible]	Honduras	991
Argentina	7,538	Dutch East Indies	943
Mexico	5,140	Great Britain	732
Great Britain	4,273	Kwangtung	699
Colombia	3,799	[illegible] Africa	604
[illegible]	[illegible]	Venezuela	603
[illegible]	[illegible]	[illegible]	538
China	3,171	Guatemala	501
[illegible]	[illegible]	Ecuador	
British South Africa	2,804		

Countries of Consumption

The principal countries of consumption of some of the leading iron and steel products exported in July, 1922, were as follows:

Plates

[illegible]	[illegible]
[illegible]	1,493
[illegible]	[illegible]
[illegible]	10,886
Cuba	4,284
Canada	2,364

Black Steel Sheets

[illegible]	[illegible]
Canada	3,526
[illegible]	[illegible]
Argentina	2,657
[illegible]	[illegible]
Central America	893
[illegible]	[illegible]

Number and Values of Machine Tools Exported in June and July

	June, 1922		July, 1922	
	Number	Value	Number	Value
Lathes	64	$84,145	76	$61,443
Boring and drilling machines	273	68,580	65	28,059
Planers, shapers and slotters	45	52,280	26	33,881
Bending and power presses	32	31,531	18	7,351
[illegible]	15	15,927	37	26,791
Milling machines	39	51,622	25	27,597
Sawing machines	24	6,678	12	1,013
Thread cutting and screw machines	33	17,290	24	16,756
Punching and shearing machines	62	20,685	31	9,581
Power hammers	38	3,162	12	8,973
[illegible]	1	[illegible]	20	129,881
Wood-working machines	130	3,162	2	2,475
Polishing and burnishing machines	4	894	1	330
Sharpening and grinding machines	1,270	69,297	1,062	54,483
Total	2,039	425,891	1,411	407,614

Exports of Iron and Steel—Gross Tons

	July, 1921	July, 1922	Seven Months Ending July 1921	Seven Months Ending July 1922
Pig iron	2,744	1,943	15,493	15,773
Ferromanganese	15	179	413	908
Ferrosilicon	64	[illegible]	218	249
Scrap	1,524	3,939	24,198	49,298
Ingots, blooms, billets, sheet bar, skelp	363	10,149	4,326	111,710
Iron and steel bars	5,534	12,927	163,990	114,428
Alloy steel bars*	[illegible]	146	[illegible]	2,781
Wire rods	854	1,844	10,964	34,135
Plates, iron and steel	6,205	6,932	282,414	65,993
Sheets, galvanized	2,634	9,245	40,578	73,312
Sheets, black steel	6,819	12,830	70,459	182,368
Sheets, black iron	552	923	9,756	7,562
Hoops, bands, strip steel	1,263	3,237	13,393	19,855
Tin plate, terne plate, etc.	3,024	4,038	77,302	49,452
Structural shapes, plain material	11,320	8,676	244,810	63,636
Structural material, fabricated	294	3,221	9,491	24,443
Steel rails	20,074	29,919	256,938	184,363
Rail fastenings, switches, frogs, etc.	16	3,500	6,558	21,995
Boiler tubes, welded pipe and fittings	14,723	11,879	290,322	105,904
Cast iron pipe and fittings	2,634	2,948	37,814	15,203
Plain wire	1,860	9,529	55,689	78,394
Barbed wire and woven wire fencing	1,432	10,250	20,372	42,187
Wire cloth and screening*	[illegible]	154	[illegible]	776
Wire rope and cable*	[illegible]	620	[illegible]	2,601
Wire nails	992	2,881	17,296	42,160
All other nails and tacks	487	760	3,831	5,421
Horseshoes	12	145	564	485
Bolts, nuts, rivets and washers, except track	1,028	1,725	19,449	10,436
Car wheels and axles†	[illegible]	1,524	[illegible]	10,453
Iron castings†	[illegible]	749	[illegible]	5,882
Steel castings†	[illegible]	108	[illegible]	1,358
Forgings†	[illegible]	238	[illegible]	1,500
Machine screws	[illegible]	11	[illegible]	98
Total	86,523	157,169	1,676,348	1,345,129

MACHINERY EXPORTS
By Value

	July, 1921	July, 1922	Seven Months Ending July, 1921	Seven Months Ending July, 1922
Locomotives	$876,840	$289,250	$21,621,713	$5,471,714
Other Steam Engines				33,311
Boilers	282,080	1,[illegible]	4,053,350	563,665
Accessories and Parts		1,170,763		1,550,225
Automobile Engines	148,472	551,189	1,195,920	3,773,086
Other Internal Combustion Engines	700,057	[illegible]	4,450,701	[illegible]
Accessories and Parts		191,[illegible]		1,[illegible]
All Other Parts of Engines	551,284		9,090,197	
Gasoline Traction (Road) Locomotives	29,[illegible]	525	[illegible]	79,612
Electric Locomotives	12[illegible],170		1[illegible]	
Other Electric Machinery and Apparatus	1,716,198	444,404	10,813,207	5,435,918
Excavating Machinery	144,241		1,684,493	
Cement Mills	[illegible],140	93,702	451,666	[illegible]
Road Making Machinery	68,500		643,548	
Elevators and Elevator Machinery	190,170		1,[illegible]	
Mining and Quarrying Machinery	482,677	303,727	5,702,109	2,210,046
Oil Well Machinery	708,[illegible]		8,869,353	
Pumps	513,730	471,[illegible]	9,713,679	3,276,063
Lathes	101,983	61,443	2,526,987	463,935
Boring and Drilling Machines		28,[illegible]		365,087
Planers, Shapers and Slotters		33,881		181,861
Bending and Power Presses		7,351		246,676
Gear Cutters		25,791		63,094
Milling Machines		27,597		186,242
Screw Machines		1,013		28,281
Thread Cutting and Screw Machines		16,756		103,591
Punching and Shearing Machines		9,581		106,130
Power Hammers		8,973		64,771
Rolling Machines		129,881		154,385
Wire-drawing Machines		2,475		[illegible]
Polishing and Burnishing Machines		[illegible]		13,[illegible]
Sharpening and Grinding Machines	365,[illegible]	54,[illegible]	87[illegible]	[illegible]
Other Metal Working Machinery and Parts of	1,[illegible]	489,306	1[illegible]	3,112,798
Textile Machinery	[illegible]	1,471,016	1[illegible]	10,314,101
Sewing Machines	[illegible]	640,470	[illegible]	3,468,550
Shoe Machinery	[illegible]	127,087	1,[illegible]	584,114
Flour-Mill and Gristmill Machinery	[illegible]	18[illegible]	1[illegible]	[illegible]
Sugar-mill Machinery	441,87[illegible]	[illegible],[illegible]	12[illegible]	1,[illegible]
Paper and Pulp Mill Machinery	228,[illegible]		1,840,506	
Sawmill Machinery	[illegible]	[illegible]	856,598	[illegible]
Other Woodworking Machinery	110,[illegible]	191,[illegible]	2,106,663	[illegible]
Refrigerating and Ice Making Machinery	102,[illegible]	101,256	1,262,151	1,214,420
Air Compressors	154,[illegible]	166,475	3,079,683	1,180,899
Typewriters	726,[illegible]	884,427	8,689,946	6,812,059
Power Laundry Machinery	[illegible]	70,536	702,631	349,539
Typesetting Machines	[illegible]	207,176	2,417,235	2,254,279
Printing Presses	422,[illegible]	218,062	5,794,320	2,253,640
Agricultural Machinery and Implements				
All Other Machinery and Parts	11,687,829	10,351,967	135,563,191	73,259,972
Total	$23,797,800	$19,830,443	$306,507,444	$137,230,755

in June amounted to 85,806 tons. The greatest single item of export in July was steel rails, the total amounting to 29,919 tons, of which Japan took 16,886 tons.

In the table showing tonnage exports to those countries which took 500 tons or more, only 2798 tons are unaccounted for, this representing the sum of the smaller lots. Of those shown, 66,093 tons went to North and Central America and the West Indies, 48,212 tons to Asia, 24,880 tons to South America, 7410 tons to Oceania, 4273 tons to Europe (Great Britain) and 3503 tons to Africa.

July exports for this year, however, were much heavier than they were for the same month of last year, when they totaled only 86,523 tons. For the seven-month period ending with July, 1922, exports amounted to 1,345,129 tons, valued at $115,076,182, compared with 1,682,104 tons for the first seven months of 1921.

Machinery exports, exclusive of vehicles, were valued at $19,830,443, as compared with $23,554,356 in June and with $23,797,800 in July, last year.

The number of metal working machine tools in July amounted to 411 as against 2039 in June. Because of the wide difference in the sizes of these tools, a mere statement of the number exported does not give a clear view for a study of the market, and for that reason the accompanying table is given showing both the number and the value of these tools exported in June and July.

Imports during July amounted to 71,971 gross tons, compared with 10,296 tons in July, 1921. For the seven months the imports were 187,684 tons, against 62,438 tons last year. Thus the imports for the one month, this year, exceeded the imports for the seven months, last year. Pig iron accounted for 18,828 tons in July, 1922, or more than the 15,595 tons for the first seven months of 1921. Ferromanganese imported in July, 1922, was 25,841 tons, or nearly five times the amount for seven months, last year.

Imports of Iron and Steel—Gross Tons

	July 1921	July 1922	Seven Months 1921	Seven Months 1922
Ferromanganese	275	25,841	5,481	53,134
Ferrosilicon	[illegible]	2,300	1,922	7,076
Pig Iron	2,567	18,828	15,595	45,227
Scrap	1,650	9,795	21,381	38,960
Steel Rails	340	232	1,343	988
Bar Iron	274	10,131	1,006	11,531
Structural steel	16	[illegible]	405	275
Billets, without alloys	2,469	[illegible]	2,916	5,648
All other billets	[illegible]	232	1,020	[illegible]
Steel rails	2,597	4,077	11,898	20,435
Sheets and plates	10	1,[illegible]	1,822	329
Tin and terne plates	[illegible]	[illegible]	308	2,118
Wire rods	77	244	[illegible]	[illegible]
Total	10,296	71,971	62,438	187,684
Manganese ore and oxide	5,368	62,518	298,746	210,747

British Steel Exports Increase—Imports Smallest Thus Far in 1922

The July official returns on British foreign trade in steel iron show that the total exports were 251,743 gross tons. This is a slight increase of 2654 tons over the June total. The July exports make the average for the first seven months 268,160 tons per month. Exports of scrap are included in these totals. To Aug. 1, this year, total exports has been 1,791,681 tons against 935,950 tons for the same seven months in 1921.

The July imports were 55,893 tons or the lowest this year. The average for the first seven months is now 72,370 tons per month. In the first quarter the monthly average was 82,536 tons. These data include scrap. The following table shows comparative data:

British Steel Exports and Imports, Gross Tons

	Exports	Imports
May, 1922	300,981	72,427
June, 1922	249,089	58,856
July, 1922	251,743	55,893
Aver. per month, first quarter, 1922	267,047	82,536
Aver. per month, second quarter, 1922	274,830	67,785
Aver. per month, third quarter, 1922	267,271	62,392
Aver. per month, 1921	144,885	152,734
Aver. per month, 1920	274,881	128,685
Aver. per month, 1919	188,519	50,801
Aver. per month, 1913	420,757	195,264

The following table covers the principal exports:

Principal British Exports, Gross Tons

	Average per Month 1913	Average per Month 1921	July 1921	July 1922
Pig iron	78,771	8,602	7,777	27,675
Steel rails	41,676	14,698	1,581	6,955
Steel plates	11,162	10,673	2,680	6,238
Galvanized sheets	63,506	17,635	2,691	37,739
Steel bars	20,921	8,927	2,702	20,221
Tin plates	41,208	18,873	8,827	40,809
Black plates	5,679	1,178	500	5,429
Steel sheets	[illegible]	[illegible]	779	13,356
Total exports, first 7 months, 1922				1,791,681
Total exports, first 7 months, 1921				935,950

The most marked recovery in the July exports this year over those in July, 1921, has been in tin plates, galvanized sheets, steel bars, pig iron and steel sheets.

Pig iron imports in July were 6738 tons, compared with a monthly average in 1921 of 55,564 tons.

Iron ore imports in July were 287,213 tons, which compares with a monthly average in 1921 of 157,298 tons.

Manganese ore imports in July were 27,415 tons. Last year they were 14,405 tons per month and in 1913 they were over 50,000 tons per month.

Tense Conditions in Connellsville Region

Coal and Coke Production Increasing—Frick Company and Some Independents Still Resist Unions—Demonstration on Labor Day

UNIONTOWN, Pa., Sept. 5.—Ten thousand United Mine Workers marched in a Labor Day parade here yesterday under the auspices of the Uniontown Trades and Labor Council, but in effect it was a United Mine Workers demonstration. Fifteen thousand people heard the speaking program in a baseball park during which James H. Maurer, head of the Pennsylvania Federation of Labor, bitterly assailed Attorney-General Daugherty for his action in securing Federal injunction in the railroad strike and attacked the Administration officials at Washington as dumb-bells and fossils. He charged the Administration action in the strike situations as being in the interest of big business. Organizer William Feeney of the Mine Workers claimed that the union efforts, being centered in the Connellsville bituminous region, were succeeding, and that 50 plants had been signed, denying that all of the plants were small operations. John O'Leary, mine worker organizer, said appeals were being sent union miners for financial assistance for Connellsville region strikers. A copy of a circular appeal says: "Five of our miners have been brutally murdered, and 25 others shot by hired gunmen. Thousands have been beaten by coal company thugs and State police, many of them made cripples for life." It adds: "Five thousand of the miners, with their wives and children, have been evicted from their homes, and 10,000 others have been served with eviction notices. The jails are filled with miners through trumped up charges brought against them by coal company hirelings." The circular closes with these words: "Immediate assistance is necessary to insure victory for these miners who are still on strike."

Financial Aid Imperative

The union apparently realizes immediate financial assistance is necessary to keep the men out and that returns from the check-off at union plants which have just resumed will come too late to count.

The demonstration was orderly and no trouble marked the day. Last night, however, a mine deputy was shot from ambush at Smock, as a result of which eight men were arrested. The deputy is believed to be dying.

Coal and coke production in the region is increasing rapidly. Big gains are being made in the Fair Chance district, where the famous strike of 1891 was broken. The union leaders declared that formal appeals had been made to the operators to get and sign the scale, and, if this is ignored, the strike will be fought to a finish. Miner delegations met at Brownsville yesterday in convention to discuss organization of a separate union district.

Small Operators Sign

Operators signing the scale, possibly totaling 30, are small producers, most of them team track mines. The Frick company and the large independents are firm in their stand. In fact they say that the strike has been broken.

The effect of the big miner demonstration is expected to be the temporary bolstering up of the organization. Most observers say, however, that immediate financial assistance will be necessary to hold the men in line. Reports of disorders in the county being published outside grossly exaggerate conditions. It is admitted that the situation is tense, but it is believed that the State police and deputies have the situation well in hand.

The Frick and independent companies are centering their efforts on increasing production. Failure of the men to accept the new scale is being met with resumption of evictions as room is being made at company houses for imported workers.

Conditions in Detroit Are More Hopeful

DETROIT, Sept. 5.—Detroit and Michigan industries are hopeful that the arterial railroads will be able to deliver the fuel promised them. Most of the lines operating into Detroit claim to be in a position to handle speedily all coal delivered to them. About 3000 cars, or a little more than half of Detroit's needs, have been brought into the city in the last seven days. With increasing daily shipments in transit, hopes are high for adequate supply for industrial purposes. The real burden is now placed on the railroads. Numerous rumors, which always supplement any announcement by the Ford company, are prevalent, but the original closing down notification effective Sept. 16 has not been modified in any way.

The leading coke producer has announced an appreciable advance on all grades for September delivery. Foundries are limited to their actual melt. The first dwindling supply of silvery iron has developed requests for maximum silicons in the regular grades.

Priority listings have placed sand and fire brick in a position that is causing the foundrymen caught short of these materials to worry.

The automobile industry maintains its unprecedented stride for this time of the year. Present production schedules carry through the fourth quarter and manufacturers generally are covered for raw and finished materials over this period. The heaviest demand is now coming from the agricultural sections for passenger cars. This is a direct switch, as the early and mid-season demand for this type of car came from the industrial and commercial centers. With the exception of one or two makers that have advanced slightly, manufacturers with large production have set their lists for the remainder of the year.

The recent lay-off at the Ford tractor plant is recorded in the figures of the Detroit Employers' Association which shows 177,000 employed as against 183,000 a week ago.

The Michigan Manufacturers' Association, citing the railroad situation as having threatened production and looming even more as a menace in the present fuel shortage, has appealed to President Harding and Congress to put teeth in the Esch-Cummins bill. It specifically asks that laws be enacted to prohibit conspiracies resulting in strikes or interruption of the transportation system of this country and provide penalties therefor.

Pipe jobbers are unable to obtain their requirements of standard pipe or boiler tubing. Manufacturers will not promise definite delivery dates. Full finish and auto body sheets are still in urgent demand with deliveries about meeting weekly needs.

The Steel Corporation subsidiary is quoting 3.35c. on black sheets and 4.35c. on galvanized sheets. How-

ever, deliveries at these prices are extended and indefinite. The independents, with one exception, are quoting 3.50c. on black and 4.50c. on galvanized. Full finished sheets are quoted at 4.70c. to 4.85c.

Slowly Recovering in Mahoning Valley

YOUNGSTOWN, Sept. 4.—This district is beginning to recover in an operating way from the restrictions imposed by the coal strike, the settlement of which has eased up the fuel supply to a point which has permitted the starting up of four idle blast furnaces. The Youngstown Sheet & Tube Co. has put on two stacks, now having three of its six furnaces making iron, while the Brier Hill Steel Co. has put on a furnace and the Shenango Furnace Co., Sharpsville, Pa., has started its No. 1 stack. It is possible that the list of active furnaces will be further swelled before the week ends, as the Republic Iron & Steel Co. is preparing to-day to put on a furnace and the same is true of the Sharon Steel Hoop Co., with regard to its Mary furnace at Lowellville, Ohio; the Trumbull-Cliffs furnace at Warren, Ohio, and the Struthers furnace at Struthers, Ohio.

Starting of the Sharon and Struthers stacks will be governed a good deal by conditions in the Connellsville district and local advices are to the effect that between the demands of the men for recognition of the union and an increasing shortage of cars for coke shipments, the production of beehive oven coke is not increasing materially nor with much rapidity. Coke prices have eased down considerably from their peak levels, but the complaint still is heard that it is difficult to secure sufficient tonnages to insure sustained operation of blast furnaces and the coke producers still are cautious about committing themselves to long time contracts. It seems that all open-top cars are being taken for coal shipments and lacking sufficient cars, operators are reluctant to charge the ovens.

Steel works operations have increased with most of the independent companies, which now have 42 open-hearth furnaces in operation, as against 30 last week, and one Bessemer plant as against none last week. Pig iron production has gained, but not to the extent indicated by the starting up of so many steel-making units, which may be at least partly ascribed to increased use of scrap. Suspension of shipping instructions on scrap contracts has been quite generally lifted and some fresh buying is noted, notably on the part of a Warren, Ohio, steel maker, who has lately taken several thousand tons of cast iron car wheels to replace pig iron at a price of about $22 per gross ton delivered.

The best showing in operations of finishing mills is in the sheet mills. Out of a total of 110 such units all but 12 are scheduled. It is said that sheets are more profitable at present prices than any other product made in the Youngstown mills and steel consequently is going pretty heavily to that use.

In the steel market advances over Steel Corporation prices of sheets of $2 to $3 are asked by independents and from $3 to $5 on top of that for very early shipment. On plates the independent market here is from 2.25c. to 2.50c. The bar market is not clearly defined, because so little tonnage is available, but it is certain that less than 2c. can not be done. On strips the local makers are at 2.75c. base on hot-rolled and 4.25c. base on cold-rolled for fourth quarter shipment.

To provide 30,000,000 new cement sacks every year, 17,000 miles of 30-in. cotton cloth are required. This calls for 30,000 bales, or 15,000,000 lb., of cotton, and a year's work for 1600 cotton looms. Practically 90 per cent of the 380,000,000 sacks of Portland cement shipped in the United States last year was delivered in cotton sacks each containing 94 lb. of cement. The mills carry some 200,000,000 sacks in reserve.

Voters of Martins Ferry, Ohio, will vote in the November election on a bond issue of $400,000, the proceeds of which will be used for a new water works and power plant.

Industrial Activities

At the Boston & Maine Railroad, Concord, N. H., repair shops, 620 men were at work last week, contrasted with 800, a normal force. Of the 620, 253 are in the motive power department and the rest in the car department.

The Bethlehem Shipbuilding Corporation, Ltd., has approximately 3200 men on the payroll at its Fore River Works, Quincy, Mass., whereas in 1914, 3000 were employed. The plant is engaged in converting a battle cruiser into an airplane carrier for the Government.

The closing of the Ford plant is reflected in various New England manufacturing centers, where plants were engaged in turning out Ford parts. A majority of such plants, however, have sufficient other business on their books to keep fairly well occupied. New England's automobile industry is curtailed. The Locomobile Co., Bridgeport, Conn., is getting on its feet after having been taken over by new management, and the Rolls-Royce Co. of America, Inc., has sufficient business on its books to keep its plant running on present schedule the rest of 1922, at least. The other two most important concerns remain in the hands of receivers.

Henry Disston & Sons, Inc., Philadelphia, manufacturer of saws, files, etc., is operating its plant at close to capacity, giving employment to more than 3500 persons. At this same time a year ago the works were running at about 50 per cent of normal.

The Singer Mfg. Co., Elizabethport, N. J., manufacturer of sewing machines and parts, has advanced production by five hours a week, effective Sept. 5, affecting about 6500 employees. The working schedule will be changed from 8 a. m. to 4:45 p.m., five days a week, as operative for about 18 months past, to 7:30 a. m. to 5:15 p. m. with continuance of a five-day week for the present.

The American Car & Foundry Co., Terre Haute, Ind., is gradually increasing the working force at its local plant, and is now giving employment to approximately 1000 men under a full-time schedule. It is said that orders on the books insure this basis of operation for at least 12 months ahead.

The Gilbert & Barker Mfg. Co., Springfield, Mass., manufacturer of gasoline tanks, pumps, etc., has placed a night shift in operation at its plant to handle increased orders. All departments are now running on full time, or overtime, with a total working force of about 1200 persons.

Refractory manufacturing plants at Mount Union, Pa., are running at full capacity and effective Sept. 1, the wages of all classes of employees have been increased; laborers have been advanced from $2.70 to $3.50 a day, and corresponding increase given to skilled workers. The plants affected are those of the Harbison-Walker Co., the General Refractories Co., and the United States Refractories Co.

The Tacony Steel Co., Tacony, Pa., is maintaining production on a full 100 per cent basis at its rolling mills. Other plant departments are running at from 40 to 50 per cent of normal.

The Manganese & Steel Foundry, Ltd., has reopened the plant of the Sherbrooke Iron Works, Sherbrooke, Que., recently acquired, closed for some time past. Initial production will require about 3 tons of pig iron daily, and this rate will be increased gradually until capacity is reached.

Following the recent wage advance of 16 2/3 per cent at the main plant of the Nicholson File Co., Providence, R. I., and the adoption of a full time working basis, effective Sept. 5, replacing a five-day week, the company has made a corresponding advance at its branch plant at Anderson, Ind., as well as at the works of its subsidiary, the G. & H. Barnett Co., Philadelphia. About 1200 employees are affected at the Providence plant, and approximately 500 workers at each of the other two factories.

AUGUST PIG IRON OUTPUT

Loss in August 19,006 Tons Per Day as Compared With July

Thirty-seven Furnaces Blown Out or Banked, Nine Blown In

The full effect of the railroad and coal strikes on the country's pig iron output is shown by the August returns for blast furnace production, particularly in the net loss of furnaces in active operation. During August there were 37 furnaces blown out or banked and nine blown in, a net loss of 28. This compares with a net loss in July of 20. Despite this sharp loss in active operation, the August total was substantially higher than the January or February output and not far from twice that of August, 1921, when the depression was at its height. The actual loss in daily output in August from that in July was 19,006 tons per day.

The production of coke and anthracite pig iron for the 31 days in August amounted to 1,816,170 gross tons, or 58,586 tons per day, as compared with 2,405,365 tons, or 77,592 tons per day in July, also a 31-day month. In February this year the daily output was 58,214 tons, so that the effect of the strikes has been to put the industry back to where it was early in the year.

The total number of furnaces in blast on Sept. 1 was 144, as compared with 172 on Aug. 1, and with only 69 on Aug. 1, 1921, the low point in last year's depression. The capacity of the 144 furnaces in blast on Sept. 1 is estimated at 54,645 tons per day, as compared with 70,605 tons per day for the 172 furnaces in blast on Aug. 1. The fact that most furnaces at the end of the month were operating at a very slow rate because of fuel and other conditions, makes the estimated capacity lower than it ordinarily would be.

The manganese alloy output for August also suffered a decline. The total was 19,327 tons, as compared with 26,049 tons in July. Of the August output 11,402 tons was ferromanganese and 7925 tons was spiegeleisen.

Daily Rate of Production

The daily rate of production of coke and anthracite pig iron by months, from August, 1921, is as follows:

Daily Rate of Pig Iron Production by Months—Gross Tons

	Steel Works	Merchant	Total
[illegible]	[illegible]	4,743	30,780
[illegible]	[illegible]	5,661	32,850
[illegible]	[illegible]	6,850	40,215
[illegible]	[illegible]	9,223	47,182
[illegible]	[illegible]	12,023	53,196
[illegible]	[illegible]	10,933	53,063
[illegible]	[illegible]	11,387	58,214
[illegible]	[illegible]	12,128	65,675
[illegible]	[illegible]	12,140	69,070
[illegible]	[illegible]	13,790	74,409
June	62,534	16,167	78,701
[illegible]	[illegible]	15,297	77,592
[illegible]	[illegible]	[illegible]	58,586

The figures for daily average production, beginning with January, 1916, are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since Jan. 1, 1916—Gross Tons

	1916	1917	1918	1919	1920	1921	1922
Jan.	102,746	101,643	77,799	106,[illegible]	87,264	77,945	53,063
Feb.	[illegible]	[illegible]	[illegible]	105,006	102,720	69,187	58,214
Mar.	107,667	104,882	103,648	99,685	108,900	51,463	65,675
Apr.	107,592	111,165	109,607	82,607	91,327	33,768	69,070
May	108,422	110,228	111,175	68,002	96,312	39,394	74,409
June	107,053	109,002	110,793	70,495	101,451	35,494	78,701
July	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	27,889	[illegible]
Aug.	103,316	104,772	109,341	88,496	101,529	30,780	[illegible]
Sept.	106,745	104,465	113,942	82,932	104,310	32,850	[illegible]
Oct.	113,189	106,550	112,482	60,115	106,212	40,215	[illegible]
Nov.	110,394	106,859	111,862	79,745	97,830	47,183	[illegible]
Dec.	102,537	92,997	110,762	[illegible]	[illegible]	53,196	[illegible]

Among the furnaces blown in during August were the following: One No. 6 furnace of the Lackawanna Steel Co. in the Buffalo district; B furnace of the Bethlehem Steel Co. in the Lebanon Valley; B furnace of the Bethlehem Steel Co. in the lower Susquehanna Valley; Nos. 2 and 3 Clairton furnaces and No. 2 Duquesne furnace of the Carnegie Steel Co. and one furnace of the Jones & Laughlin Steel Co. in the Pittsburgh district; one Shenango furnace in the Shenango Valley; Mary furnace in the Mahoning Valley (Sept. 1) and Tuscaloosa furnace in Alabama.

Output by Districts

The accompanying table gives the production of all coke and anthracite furnaces for August and the three months preceding:

Pig Iron Production by Districts, Gross Tons

	August (31 days)	July (31 days)	June (30 days)	May (31 days)
New York	77,222	145,831	148,115	150,141
New Jersey	11,604	10,745	10,725	5,636
Lehigh Valley	[illegible]	[illegible]	[illegible]	[illegible]
Schuylkill Valley	35,286	54,675	60,925	66,669
Lower Susquehanna and Lebanon Valleys	[illegible]	[illegible]	29,501	21,313
Pittsburgh district	432,178	493,963	485,401	479,106
Shenango Valley	58,812	99,325	87,156	79,145
Western Penna.	62,659	81,927	91,494	103,072
Maryland, Virginia and Kentucky	41,324	58,506	54,687	47,862
Wheeling district	57,752	65,753	74,710	66,148
Mahoning Valley	130,555	233,813	240,470	227,053
Central and Northern Ohio	191,880	261,084	236,374	218,547
Southern Ohio	15,305	29,517	30,272	29,311
Illinois and Indiana	342,363	472,371	454,937	459,631
Mich., Minn., Mo., Wis. and Colo.	67,265	101,656	93,723	89,147
Alabama	[illegible]	[illegible]	[illegible]	[illegible]
Tennessee	17,543	15,764	9,470	1,222
Total	1,813,070	2,405,365	2,361,028	2,306,679

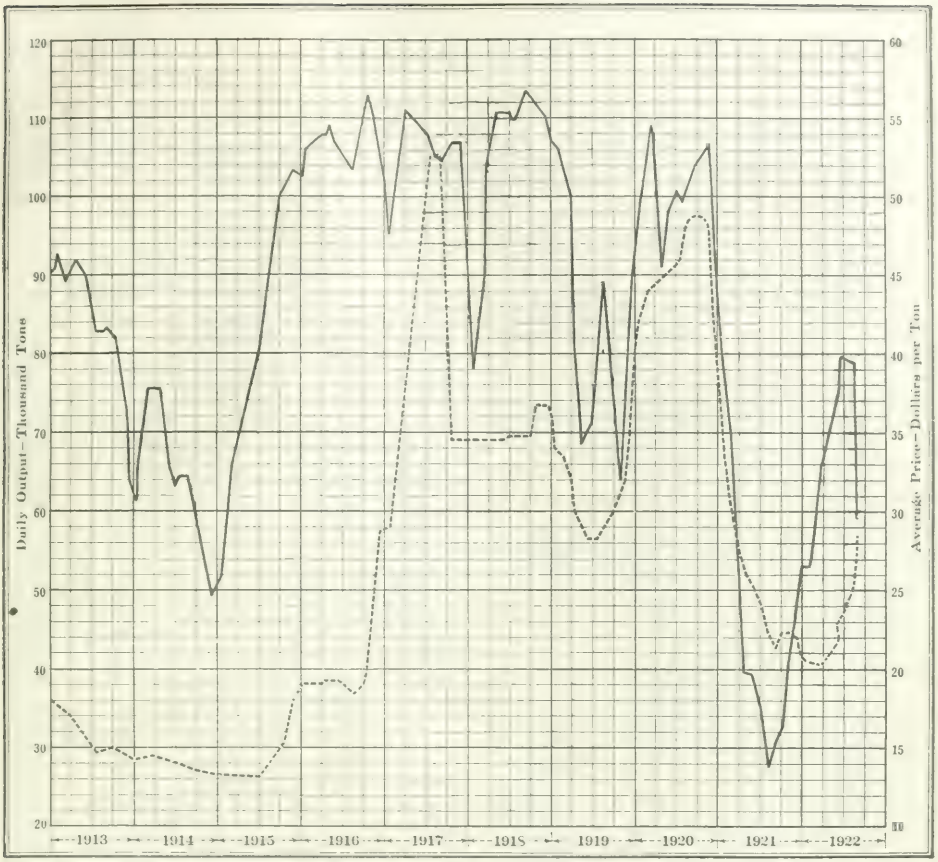
Capacities in Blast Sept. 1

The following table shows the number of furnaces in blast Sept. 1 in the different districts and their capacity, also the number and daily capacity in gross tons of furnaces in blast Aug. 1:

Coke and Anthracite Furnaces in Blast

Location of Furnaces	Total Stacks	Sept. 1 In Blast	Sept. 1 Capacity per Day	Aug. 1 In Blast	Aug. 1 Capacity per Day
New York:					
Buffalo	22	7	2,700	10	3,300
Other New York	4	0	....	0	....
New Jersey	4	1	375	1	340
Pennsylvania					
Lehigh Valley	18	4	1,760	3	1,350
Spiegeleisen	2	1	150	1	155
Schuylkill Valley	15	4	1,025	5	1,635
Lower Susquehanna	10	2	815	1	375
Lebanon Valley	6	1	150	1	150
Ferromanganese	2	1	50	1	60
Pittsburgh District	55	34	12,100	34	15,400
Ferromanganese	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
and Spiegel	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Shenango Valley	19	5	2,030	7	3,000
Western Pennsylvania	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Maryland	5	2	730	2	790
Ferromanganese	1	0	....	1	80
Wheeling District	15	4	1,865	4	2,035
Ohio					
Mahoning Valley	28	9	4,500	11	5,025
Central and Northern	26	11	6,000	16	8,200
Southern	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Illinois and Indiana	42	17	9,000	24	13,900
Mich., Wis. and Minn.	11	5	1,875	6	2,150
Colorado and Missouri	6	0	....	3	1,100
The South:					
Virginia	16	0	....	0	....
Kentucky	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Alabama	40	22	6,770	21	6,360
Ferromanganese	1	1	70	1	50
Tenn., Ga. and Texas	16	6	565	6	510
Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Among the furnaces blown out or banked during August were the following: Buffalo A furnace of the Hanna Furnace Co., Harriet Y furnace of the Wickwire-Spencer Steel Co. and Nos. 6 and 8 furnaces of the Lackawanna Steel Co. in the Buffalo district; No. 3 Swede furnace of the Alan Wood Iron & Steel Co. in the Schuylkill Valley; No. 2 Lucy furnace of the Carnegie Steel Co., two furnaces of the Jones & Laughlin Steel Co. and one Midland furnace of the Pittsburgh Crucible Steel Co. in the Pittsburgh district; Nos. 1, 2 and 3 Farrell furnaces of the Carnegie Steel Co. in the Shenango Valley; two Johnstown furnaces of the Cambria Steel Co., one Dunbar furnace and the Perry and Adrian furnaces in western Pennsylvania; one furnace of the Bethlehem Steel Co. at Sparrows Point, Md.; the Norton furnace of the Norton Iron Works in Kentucky; A and B furnaces of the Youngstown Sheet & Tube Co. in the Mahoning Valley; one Central furnace of the American Steel & Wire Co., No. 1 furnace of the Otis Steel Co. and Nos. 2 and 5 furnaces of the National Tube Co. in central and northern Ohio; No. 3 Joliet furnace and Nos. 2, 4 and 8 South Chicago furnaces of the Illinois Steel Co., one Iroquois furnace and Nos. 5 and 7 Gary furnaces in



The Full Line Represents the Daily Production of Pig Iron and the Dotted Line Is the Average of the Price Per Ton of No. 2 Southern Pig Iron at Cincinnati, Local No. 2 Iron at Chicago and No. 2X Iron at Philadelphia

the Chicago district; one Bay View furnace of the Illinois Steel Co. in Wisconsin; and A, D and E furnaces of the Colorado Fuel & Iron Co. in Colorado.

Production of Steel Companies—Gross Tons

Returns from all furnaces of the United States Steel Corporation and the various independent steel companies, as well as from merchant furnaces producing ferromanganese and spiegeleisen, show the following totals of steel making iron, month by month, together with ferromanganese and spiegeleisen. These last, while stated separately, are also included in the columns of "total production."

Production of Steel Companies—Gross Tons

	Total Production			Spiegeleisen and Ferromanganese		
	1920	1921	1922	1920	1921	1922
Jan.	2,232,455	1,932,159	1,306,045	23,957	22,228	6,874
Feb.	2,181,679	1,625,695	1,311,170	28,038	29,013	8,540
Mar.	2,480,668	1,323,443	1,629,982	35,275	41,294	13,695
Apr.	1,968,542	1,015,621	1,707,902	27,628	24,310	19,209
May	2,128,720	1,024,678	1,879,180	33,407	9,232	20,334
June	2,209,770	883,312	1,876,033	34,751	4,536	23,090
July	2,230,567	715,664	1,931,138	36,789	5,524	26,049
Aug.	2,254,943	807,144	1,415,832	36,985	3,878	19,327
Sept.	2,247,250	815,692	.....	39,546	3,289	.....
Oct.	2,393,644	1,024,312	.....	34,786	3,902	.....
Nov.	2,150,075	1,138,789	.....	26,944	3,525	.....
Dec.	2,047,167	1,276,381	.....	28,023	3,853	.....

Diagram of Pig Iron Production and Prices

The fluctuations in pig iron production from 1913 to the present time are shown in the accompanying chart. The figures represented by the heavy lines are those of daily average production by months of coke and anthracite iron. The dotted curve on the chart represents monthly average prices of Southern No. 2 foundry pig iron at Cincinnati, local No. 2 foundry iron at furnaces in Chicago, and No. 2X at Philadelphia. They are based on the weekly quotations of THE IRON AGE.

Production of Coke and Anthracite Pig Iron in the United States by Months, Beginning Jan. 1, 1918—Gross Tons

	1918	1919	1920	1921	1922
Jan.	2,411,768	3,302,260	3,015,181	2,416,292	1,644,951
Feb.	2,319,299	2,940,168	2,978,879	1,937,257	1,629,991
Mar.	3,213,091	3,090,243	3,375,907	1,595,522	2,035,920
Apr.	3,288,211	2,478,218	2,739,797	1,193,041	2,073,114
May	3,446,412	2,108,056	2,985,682	1,221,221	2,306,679
June	3,323,791	2,114,863	3,043,540	1,064,833	2,361,028
½ year.	18,002,572	16,033,808	18,138,986	9,428,166	12,050,683
July	3,429,983	2,428,141	3,097,495	954,520	2,495,365
Aug.	3,379,571	2,748,884	3,147,492	854,193	1,816,170
8 mos.	24,813,145	21,205,737	24,353,431	11,246,914	16,272,218
Sept.	3,418,270	2,487,965	3,129,323	985,529	.....
Oct.	3,486,941	1,863,558	3,292,597	1,246,676	.....
Nov.	3,304,074	2,302,350	2,934,008	1,415,481	.....
Dec.	3,433,617	2,633,268	2,703,855	1,649,086	.....
Ttl. yr.*	38,506,047	30,582,878	36,414,114	16,543,686	.....

*These totals do not include charcoal pig iron. The 1921 production of this iron was 94,730 tons.

Building permits issued for improvements in St. Louis during August totaled $2,206,670 against $1,307,206 in August, 1921, a gain of $1,307,206. Of the expenditures last month $1,780.450 was for new structures and $426,220 for alterations.

LARGE LOCOMOTIVE BUYING

One Company Books Orders for 138—Pennsylvania Railroad Orders 100

A total of 238 locomotives have been ordered from the two leading locomotive builders within the past week, these including 100 placed with Baldwin Locomotive Works by the Pennsylvania Railroad and 50 by the Chicago & Northwestern and 50 by the Missouri Pacific placed with the American Locomotive Co. In detail the week's orders were as follows:

The Missouri Pacific and the Chicago & Northwestern each ordered [illegible] Mikado type and 4 of the mountain type, while the latter ordered 40 Mikado locomotives and 10 Pacific.

The Louisville & Nashville bought 12 of the Mikado type, these being in addition to 30 that were recently ordered.

Missouri, Kansas & Texas, 10 eight-wheel switching engines.

Chicago, Indianapolis & Louisville, 4 Mikado type and 3 Pacific type.

Gibbs & Hill, 4 double unit electric locomotives.

Wheeling Steel Corporation, 1 six-wheel tank locomotive.

Superior Portland Cement Co., 1 four-wheel tank locomotive.

Vacuum Oil Co., 1 six-wheel tank locomotive.

Tavares & Gulf Railroad, 2 Prairie type.

Inquiries for freight cars have been issued as follows:

The St. Louis & San Francisco is inquiring for 1500 steel underframe hopper cars of 50-tons capacity, 1500 single-sheath 40-ton box cars and 300 steel underframe 40-ton stock cars.

The Northern Pacific is inquiring for steel center construction for 1000 cars.

The Baltimore & Ohio is inquiring for 1000 50-ton steel hopper cars.

The Belt Line Railroad of Chicago has asked bids on 150 55-ton hopper cars.

The Chicago & Northwestern is inquiring for repairs to 500 to 1000 gondolas.

The Cincinnati, Indianapolis & Western is in the market for 200 to 300 composite gondolas.

The Chicago & Eastern Illinois has inquired for prices on 17 baggage cars.

The Pennsylvania Railroad has ordered 100 locomotives from the Baldwin Locomotive Works and will build 15 additional at its own shops at Altoona, Pa.

Export Trade Dull, but Japanese Buying of Rails Continues

NEW YORK, Sept. 5—Export trade is quiet. There is some activity from Japan, a large portion of which is still Government business. One inquiry, in the market from a private source in Japan, calls for bids on 27 miles of 60-lb. rails, A. S. C. E. specifications, closing Sept. 10. The Imperial Government Railways closed Sept. 4, on 4700 tons of 75-lb., 20-lb. and 16-lb. rails, with splice bars. One Japanese export house recently received an order for 5000 boxes of oil-can tin plate from the Nippon Oil Co.

The Chinese market is dull, but exporters to the Far East dealing with China report fairly active business with the Philippine Islands. In the past fortnight, one exporter has booked orders for about 5000 kegs of nails, 400 tons of bars and 500 tons of sheets for shipment to Manila. During this period, 400 tons of flat bars was booked from China by this exporter.

Exporters and importers, which have been importing pig iron recently, continue to bring in small tonnages, largely of Scotch iron. Freight rates on iron from Glasgow to Boston, and from Glasgow to Montreal were formerly 15s. per ton. Recently the rates to Boston have increased to 18 to 20s., while the rate to Montreal is unchanged.

The Ritter Dental Mfg. Co., recently incorporated at Rochester, N. Y., is securing figures on equipment for a brass and aluminum foundry. R. J. Rosa is purchasing agent.

FABRICATED STEEL BUSINESS

Shipbuilding Company Gets Large New York Hotel Job—Other Awards

Among the fabricated steel awards of the past week are the following:

Hotel for the United Hotels Co., Forty-sixth Street and Madison Avenue, New York, 5000 tons, to New York Shipbuilding Corporation.

State Office Building, Richmond, Va., 750 tons, to Lehigh Structural Steel Co.

United Lutheran Publishing House, Philadelphia, 800 tons, to Bethlehem Fabricators, Inc.

Bridge at Fortieth Street, Philadelphia, 1300 tons, to Bethlehem Steel Bridge Corporation.

Apartment building for Clarence R. Siegel, Philadelphia, 1100 tons, to Bethlehem Fabricators, Inc.

Julia Richman High School, Second Avenue, New York, 1600 tons, to McClintic-Marshall Co.

Shore Road telephone building, Brooklyn, 800 tons, to Eidlitz & Ross. Steel to be fabricated by Bethlehem Steel Bridge Corporation.

Office building for Burroughs-Wellcome Co., East Forty-first Street, New York, 750 tons, to Hinkle Iron Works.

Apartment house in East Forty-second Street, New York, 600 tons, to Hinkle Iron Works.

Store building, Elizabeth, N. J., 400 tons, to Hedden Iron Construction Co.

Highway bridge, Binghamton, N. Y., 200 tons to American Bridge Company.

Highway bridge, LaSalle, N. Y., 100 tons to American Bridge Co.

Western Cartridge Co. buildings, Alton, Ill., 600 tons to Mississippi Valley Structural Steel Co.

Lawndale Theatre Building, Chicago, 375 tons to Gage Structural Steel Co.

International Harvester Co., five steel stacks for Wisconsin Steel Works, South Chicago, 221 tons to Graver Corporation.

South Park Commissioners, park buildings at Calumet Park, Chicago, 313 tons to unnamed fabricator.

Memorial Union Building for Purdue University, Lafayette, Ind., 160 tons to Insley Mfg. Co., Indianapolis.

Atlas Tack Co. shop building, St. Louis, 381 tons to a St. Louis fabricator.

Cleveland-Cliffs Iron Co., stocking trestle at Ishpeming, Mich., 350 tons to Worden-Allen Co.

Seaman Body Corporation, Milwaukee, automobile body shop extension, 798 tons to Worden-Allen Co.

Lehigh Portland Cement Co., Mason City, Ia., extension to crane runway, 100 tons.

Marathon Motor Car Co., Wausau, Wis., Ford garage and service building addition, 275 tons.

Steel for addition to by-product plant Carnegie Steel Co., Clairton, Pa., 6400 tons, placed through the Koppers Co.

Structural Projects Pending

Inquiries for structural steel work now being figured on include the following:

Loft building at Seventh Avenue and Thirty-seventh Street, New York, 1000 tons.

Methodist Episcopal Hospital, Brooklyn, 500 tons.

Addition to American Museum of Natural History, New York, 900 tons.

Five bridges for the Pennsylvania Railroad, 1000 tons.

Walker Hotel, Washington, D. C., 4000 tons; former inquiry revived.

Chicago, Burlington & Quincy Railroad, girder spans, 1500 tons.

Cleveland Illuminating Co., switch house, 200 tons.

Pumping station, Cleveland, 1000 tons.

Proposed Pig Iron Freight Reductions Are Suspended

WASHINGTON, Sept. 5.—The Interstate Commerce Commission has suspended from Sept. 1 to Dec. 30 tariffs proposing reductions in rates on pig iron from Southern producing points to Northern destinations. Protest had been made against the reductions by blast furnace interests in southern Ohio and the St. Louis district. Protest was also made against the proposed reduced joint rates of the Arrow Transportation Co., to apply from Florence and Sheffield, Ala., to Metropolis, Ill., by Robert Hula on behalf of the Steel & Tube Co. of America and five other iron and steel companies in the Chicago district.

CONTENTS

September 7, 1922

Making Steel Without Using Pig Iron 585

"Scrap and Carbon" Basic Open-Hearth Process as Employed at an Eastern Plate Mill—Residual Manganese an Essential Feature

Blast Furnace Rebuilt to Save Labor 588

Mechanical Charging Equipment Installed on 17 x 75-ft. Furnace of Emporium Iron Co.—New Bins and Pig Casting Machine

Metal Wool and Methods of Making It 591

Processes Vary With Raw Materials Used—Shaving a Steel Wire—How the Specialized Apparatus Operates

Trade Commission Objects to Merger 597

Complaint Filed Against Republic, Midvale and Inland Steel Companies Conflicts with Position of Department of Justice—Plans for Combining Will Proceed

Iron and Steel Exports Fall Heavily 602

Drop 26 Per Cent Below June, and July Shows Smaller Than Any Other Month Since February—Japan Buys Less Here

Tense Conditions in Connellsville Region 604

Coal and Coke Production Increasing—Frick Company and Some Independents Still Resist Unions—Demonstration on Labor Day

Pig Iron Production in August 606

Loss in August 19,006 Tons Per Day as Compared with July

Trend of the Safety Movement 613

Day of Spectacular Accident Reduction Over—Steel Corporation a Pioneer in Safety Work—Meeting of National Safety Congress in Detroit

Southern Ohio Pig Iron and Coke Association Meets 587
Program for Montreal Meeting of American Electrochemists 587
Labor Notes 589, 593, 604, 612
New Pulley-Grinding Machine 590
Decrease in German Coal Output 590
New Squirrel Cage Induction Motor 590
Improved Disk Clutch for Heavy Work 593
Effects of Strike in Ohio 593
Drill Arranged for High Production 593
Activity in Metal Trades in New England 594
Toolholder and Interchangeable Cutters 595
To Make Knobbled Charcoal Iron Sheets and Roofing Ternes 595
American Iron and Steel Exports to Brazil 595
Tablet to Commemorate First Production of Bessemer Steel in America 596
Dinner to Harold L. Stevens 596
The Basset Process 596
Henry Marion Howe Medal 596
Meeting Committee A-1 of American Society for Testing Materials 596
Meeting of Drop Forge Supply Association 596
Engineers Elected to Eyesight Council 596
Broadening Control of Railroad Shipments 600
Charts Showing Condition of Fire Brick Industry 601
Large Increase in Coal Output 601
British Foreign Trade 603
Industrial Activities 605
Large Locomotive Buying 608
Fabricated Steel Business 608
New York Export Market 608
Editorials 610
Prepare for April 1—The Railroad Injunction—Saving Fuel in Steel Making—Pig Iron Imports Overstated
Correspondence 612
Interchangeability in the German Locomotives for Russia
Automobile Production Heavy in August 612
French Market Advances 628
German Market Active 628
Electric Alloy-Atlas Crucible Merger 628
New Honorary Member of Steel Treaters 628
Chicago Building Permits Decline 628
Association Meetings 596, 629
Copper Use in the Automotive Industry Increases 630
New Cement Plants in Alabama 630
Russian Manganese Ore for Germany 630
Alabama Coal Prices 630
Heavy Expenditure for Dams 630
Utilizing Russian Scrap Iron and Steel 630
British Iron and Steel Market 632
New Trade Publications 641
Industrial Finances 641
Plans of New Companies 642
Trade Changes 643

Iron and Steel Markets 614
Comparison of Prices 615
Prices Finished Iron and Steel, f.o.b. Pittsburgh 627
Non-Ferrous Metal Market 629
Personal Notes 631
Obituary Notes 631
Machinery Markets and News of the Works 633
New York Jobbers' Prices 644

ESTABLISHED 1855

THE IRON AGE

EDITORS:

A. I. HOGABOOM W. MACON GEORGE SMART

CHARLES S. BAUR, *Advertising Manager*

Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

U. S. A. George H. Griffiths, Secretary

Detroit: 317 West Fort St. Cincinnati: Mercantile Library Bldg. Buffalo: 881 Ellicott Square. Washington: 816 Fifteenth St., N. W. San Francisco: 320 Market St. London, Eng.: 11 Haymarket S.W.1.

1420-1422 Widener Building. Cleveland: Guardian Building.

Subscription Price: United States and Possessions, Mexico, Cuba, Shanghai, $6.00; Canada $8.50; Foreign $12.00 per year. Single copy 25 cents.

Entered as second class matter October 1, 1879, at the Post Office at New York, New York, under the Act of March 3, 1879.

Prepare for April 1

Hopes are entertained that the United States Government will establish a "fact finding commission" in connection with the coal industry. If facts are to be secured, an answer to this question should first be sought: "Why does a man go into the coal producing business?" The answer would help to throw light upon the situation. The operators have been insisting that the profits, on the whole, are very moderate, although they manifest an indisposition to give the Government all the details. If profit has not been the attraction, what has? To an outsider the business does not seem to be particularly interesting. Yet it is admitted that there is a great excess of capacity, and indeed this excess is put forth as a justification for a larger margin per ton to the operator than would otherwise be fair.

A similar situation applies to the miners. There are too many miners and they do not work full time. Hence they demand extra high rates per ton, to make up. In the ordinary walks of life a trade or profession that is overcrowded pays poorly. Not so with coal mining. The more crowded it is, the longer are the vacations, with pay, for that is what the high tonnage rates amount to.

Apparently the ordinary economic laws are completely reversed when it comes to coal producing and coal mining. Why? One observes this fact, which may or may not be pertinent, that while the laws of the country forbid producers from combining to restrict output, it has been found that the law does not forbid the coal operators to disagree with the United Mine Workers, while the labor union is always careful to furnish the operators good ground for disagreement.

Coal strikes in the past have represented a guessing contest. Coal consumers endeavor to guess how long the prospective strike will be and lay in stocks accordingly, while the operators and miners endeavor to guess how long the stocks, once laid in, will last.

Now, however, a new condition is presented. The bituminous coal scale has been settled, but only for seven months. There will be no opportunity between now and April 1 to lay in any stocks. Even the current requirements are unlikely to be met. The United Mine Workers have made no secret of the fact that their opposition to arbitration is based upon recognition of the fact that there is no comparison that could be made, with the cost of living, the rates of wages in other occupations, or anything else, that would begin to justify the rates they demand.

Only a brief respite, and a very expensive one, has been provided. If adequate preparation for meeting the situation that will confront the country on the first day of next April is not made, in the short time allowed, a still worse condition will be imposed upon the public.

All possible avenues of escape should be explored. The miners cannot be beaten at their own game. Last March coal went begging at $1.50 a ton in some districts, yet the public did not stock up enough to prevent the miners winning by far the most brilliant victory in the history of labor disputes in this country. The study that is to be made should not lose sight of a detail which in itself is of considerable importance. That is, that the country is decidedly short of the very kind of labor that coal miners can perform. The country is particularly in need of the very workmen who by the existing system are maintained in idleness at public expense for long periods of time.

The Railroad Injunction

Strong adjectives have been used in describing the injunction secured Sept. 1 by the Attorney General against the railroad strikers. The injunction does appear strong and drastic, yet upon scrutiny there are few things enjoined by it that are not illegal in themselves. The event, for this injunction is more than an incident, should prompt some serious reflection.

Injunctions are in vogue largely because court actions, whether criminal or civil, are slow. It having been decided recently by the Supreme Court that labor unions are suable, civil as well as criminal action can be had against conduct that marks the ordinary strike. The slowness of court procedure is a disgrace. While we grow

warm over the liberties taken by strikers, we should remember that there are other things seriously wrong with our management of affairs.

We do not look matters squarely in the face when it comes to labor disputes. We say glibly that no one should think of denying a man's right to quit work. We all know perfectly well that that is no strike. The right to strike, as defined by labor unions, means the right to prevent other men from taking the places union men have left. Whether we admit it to ourselves or not there is a common feeling outside of the unions that strikers ought to be allowed a little more leeway than simply to quit their jobs. Otherwise striking in its familiar form would never have survived to this date. We are not honest in this matter. There seems to be a lurking fear that employers would become too powerful if strikers were not allowed some latitude, were not allowed to break the law in a mild way at least.

If it were established that no act done in connection with a strike is less culpable than a similar act done in some other connection, there would be little need of injunctions in labor disputes and this injunction against the rail strikers would not present the appearance of being "drastic." It is not so established, however. Our habits of thought have led us otherwise, and it is even a part of the laws of the United States that labor unions are in a class by themselves. Section 3 of the Clayton Act says that "it shall be unlawful for any person to lease or make a sale or contract . . . on the condition, agreement or understanding that the lessee or purchaser thereof shall not use or deal in the goods . . . of a competitor." The same principle would prohibit a labor union from making an agreement for the closed shop. This being recognized, Section 6 of the act decreed that labor is not a commodity and made the sweeping provision that nothing in the act or in any of the anti-trust acts should apply to labor unions.

What we need to do is to clean house all around, and we should begin by clearing our minds. We shall get nowhere as long as some men are simply down on all labor unions on general principles and other men have a deep-seated and unrecognized feeling that they ought to be given some latitude. Two wrongs do not make a right. If the way is not clear to require that when a man quits work he must leave the field and forget it, we should either make the way clear or define how much dynamite per day he is entitled to explode in the exercise of his rights as a striker.

River coal has been playing a part in the relief of the fuel stringency. For years fine coal from the anthracite regions has been carried down the Susquehanna and other rivers. Deposits have been left on the beds of these rivers in many places and particularly where dams and obstructions occur. Two Pennsylvania steel companies are daily removing, from one river running by their plants, many tons of this buckwheat anthracite and are using it for making steam. One of the companies makes it a part of its open-hearth furnace charges, as told elsewhere in this issue. Near Baltimore a large metallurgical company, which uses water power for its manufacturing operations, has for some time been selling this grade of coal, removed in large quantities from behind its dam. While the necessity for turning to them may be removed when anthracite production is again ample, these river deposits will probably be drawn upon for some time to come. In a period of scarcity prices for fuel they have saved a number of cost curves from a sharp turn upward.

Saving Fuel in Steel Making

More than ever will fuel economy be a vital question in steel operations in view of the settlement of the miners' strike. For an indefinite time coal is to be more expensive in view of the higher wages at non-union mines, and its advance beyond the pre-war basis is far in excess of that in steel. Reduction of fuel consumption thus becomes of first importance in both blast furnace and open-hearth operations, and particularly in the latter, because progress in the improvement of open-hearth practice, until very recently, has not been so rapid as in the case of the blast furnace.

Several discussions have been published in THE IRON AGE recently, bearing directly on this problem and pointing to more economical fuel efficiency in open-hearth furnaces. One referred to the application of the blow-torch principle. In THE IRON AGE of July 20 the advantages of this process were detailed in an article, "Progress in Open-Hearth Practice." The significant statement was made that at a large steel plant in Ohio a furnace operating on the blow-torch principle has produced approximately 300 tons of high grade basic steel per day against only 200 tons when working under the old conditions. This is an increased efficiency of about 50 per cent. Also important is the statement that 20 per cent scrap was used and 15 per cent hot metal. So far as data go, fuel economies are estimated at 20 to 25 per cent. Contrast with this the author's statement that

> a careful test 10 years ago at the Homestead works of the Carnegie Steel Co., extending over seven to eight months, showed that the losses due to the temperature of the escaping gases, radiation, conduction and other causes amounted to 95.77 per cent of the heat units supplied by the combustion of the incoming fuel. This brings us to the startling conclusion that, if we could eliminate all such losses, there would be only about 20 to 30 pounds of coal required per ton of steel produced.

In addition to increased fuel economy and greater output there are the advantages of more accurate control of fuel and air. A communication to THE IRON AGE of Aug. 3 pointed out that

> it would be economical to inclose the checker chambers in a steel jacket, if only for the saving of heat effected by insulation, letting alone the great possibilities to be obtained by delivery of the gas and air under pressure. . . . Burn your gas in your furnaces and the checkers will take care of themselves.

Furnaces so designed that the fuel is more completely burned over the bath itself are one answer to the fuel cost problem. Refractories to

withstand the consequent higher temperatures are practically assured. Attendant advantages are better steel and the cutting down of the pig iron percentage in the charge.

On other pages of this issue a striking illustration is given of one result of fuel economy. In the production of high grade basic open-hearth steel from all-scrap charges, in the presence of manganese, no small factor is the high temperature resulting from better fuel efficiency in special furnaces, insuring the fullest refining effect of the chemical reactions.

Unquestionably much fuel is wasted in open-hearth furnaces. An abundance of cheap coal, and of natural gas while it lasted, has been one cause. The necessity for radical reforms has been forcibly impressed upon steel makers by recent events. Recently the prediction was made that the transition through which the open-hearth process is passing will so increase the output of existing units as to make the building of new furnaces unnecessary for several years. However that may be, the industry is evidently in the first stages of remarkable improvements which have come all too slowly and to-day meet a need of immediate urgency.

Pig Iron Imports Overstated

July statistics of British and American iron and steel exports, elsewhere in this issue, emphasize the steadiness of the former and the sharp decline in the latter. The British July movement at 251,700 gross tons is about the same as the average per month for the year thus far, while American exports for July at 157,169 tons are next to the lowest for the year. While the coal and rail strikes have been a factor in this reduction, their full effect will be seen in still lower figures for August. A feature of the British statement is the export of 50,700 tons of pig iron and ferroalloys, of which the United States is credited with 25,560 tons. These figures are not a measure, however, of the pig iron movement to this country as probably half of the total is ferromanganese.

Current statements in various reviews of the Eastern pig iron market have exaggerated greatly the amount of foreign pig iron received in the United States at Atlantic ports. In June, 17,750 tons of pig iron and ferromanganese left Great Britain for the United States. As only 5850 tons of pig iron came into this country in June and only 43,000 tons of pig iron and ferromanganese left Great Britain in June and July, for the United States, it is evident that the statement in a recent pig iron review that in the 90 days preceding Sept. 1 about 100,000 tons of foreign pig iron came in at Atlantic ports and was distributed throughout the East is quite wide of the mark. Making an allowance for French iron, it would have required the clearing of 60,000 to 75,000 tons of pig iron from British ports bound for the United States, in the first week of August, to have August receipts here bring the June and July totals up to anything like 100,000 tons. And it is doubtful if early August clearings were one fourth of 60,000 tons.

CORRESPONDENCE

Interchangeability in the German Locomotives for Russia

To the Editor: In the Aug. 31 issue of your paper, Mr. Wikander says on page 544 apropos of the German industrial standards:

"To give a concrete illustration: At the time of my visit a syndicate of 19 German manufacturers and one Swedish manufacturer were executing an order for 700 locomotives for Russia, all of the same design, and every part in every one of them was being made interchangeable with the corresponding part in all others, all parts having been manufactured to the same fits and tolerances. This feature will have the great advantage of permitting the Russian Railroad to use any disabled locomotive as a store of spare parts for all others."

Mr. Wikander refers evidently to the order of the Russian Soviet Government for 700 locomotives to be made in Germany. The contract of the purchaser with the manufacturer does specify (in paragraph 5) that the parts are to be interchangeable, no matter at which of the works they are made; but the same contract also has a clause (in the same paragraph 5) stating that it is permissible to make these interchangeable parts fit one another by hand operations (filing, scraping, etc.).

It can be readily seen that this latter clause kills entirely the preceding one and the whole idea of interchangeability.

R. POLIAKOFF.

709 Sixth Avenue, New York,
Sept. 1, 1922.

St. Louis Labor Conditions

ST. LOUIS, Sept. 5.—The labor situation in the Eighth Federal Reserve District is reflected in the following table compiled by the Federal Reserve Bank of St. Louis from reports received from 200 leading employers in 20 of the largest cities in the district.

	Wage Earners				Per Cent of	
	Men	Women	Total	Normal	Normal	Pay Roll
July 31, 1922..	112,918	21,150	134,068	155,410	—13.7	$10,274,603.20
June 30, 1922..	109,365	24,217	133,582	157,684	—15.3	9,947,894.52
July 31, 1921..	102,969	19,986	122,955	155,410	—20.9	10,278,307.80

From the above tabulation it will be noted that the number of employees of reportng interests increased 11,113 or 9 per cent (men increased 9.6 per cent, while women increased 5.8 per cent) between July 31, 1921, and July 31, 1922. Wages, figured on a semi-monthly basis, decreased 8.3 per cent between July 31, 1921, and July 31, 1922.

Automobile Production Heavy in August

Figures of the National Automobile Chamber of Commerce estimate the August production of pleasure cars and trucks at 264,000 machines, compared with 244,444 in July and 180,785 in August, 1921. For the first seven months of 1922 the total number of cars produced was 1,395,066. Adding the tentative figure for August, the eight months show 1,659,066 cars, compared with 1,668,550 cars for the twelve months of 1921.

In connection with the railroad strike situation, there has already been some handling of materials overland by truck that would ordinarily travel by rail, and the driving of finished cars overland has increased through lack of automobile freight car supply. Connecticut manufacturers of small tonnage items, including cold-rolled strip steel, are making a heavy proportion of their deliveries by motor truck. This is especially true of some concerns unusually favorably situated geographically, with most of their customers within a circle of 30 miles radius.

Trend of the Safety Movement

Day of Spectacular Accident Reduction Over—Steel Corporation a Pioneer in Safety Work—Meeting of National Safety Congress in Detroit

THAT the day of spectacular accident reduction in large individual groups is practically over, that a progressive though probably slow decline in the severity of accidents may be expected with a clearer view of the engineering factor, and that there will be renewed study of the causes and remedies of fatal accidents as the seriousness of those accidents becomes more evident, were among the prophesies as to the probable trend of the safety movement, made by Lucian W. Chaney, United States Bureau of Labor Statistics, Washington, in a paper read at the eleventh annual safety congress of the National Safety Council, held in Detroit, Aug. 28 to Sept. 1.

The meetings were held at the Cass Technical High School and were attended by about 3000. The Congress received whole hearted support from the city of Detroit. The city had numerous exhibits at the convention headquarters and delegates were welcomed in the industrial plants where safety talks were given.

At the meeting held Thursday afternoon, Aug. 31, the following officers were elected to serve on the National Safety Council for the ensuing year:

President, Marcus A. Dow, general safety agent New York Central Railroad Co.

Vice-president in charge of industrial safety, Charles B. Auel, Westinghouse Electric Co., East Pittsburgh.

Re-elected vice-president in charge of public safety, David Van Schaack, Aetna Life Insurance Co., New York.

Vice-president in charge of sectional activities, George T. Fonda, Fonda & Tolsted, Inc., Washington.

Vice-president in charge of safety councils, L. A. DeBlois, Delaware Safety Council, Wilmington, Del.

Treasurer and chairman of finance committee, Homer Niez, Commonwealth Edison Co., Chicago.

Managing director and secretary, William H. Cameron, Chicago.

Safety in Iron and Steel Plants

Mr. Chaney's paper dealt with the outstanding safety features in the iron and steel industry, the subject being treated under three heads, historical, practical and prophetic.

Individual plants in which standard practice is introduced will still make records in spectacular accident reduction, he said, but as a whole the trend is toward a slow decline, with fluctuations corresponding to the variations of industrial conditions. The great variable in the accident records, he emphasized, is the number of minor injuries, which, when reduced, as they may easily be, would necessarily make further progress slower.

As an illustration of the possibilities of minor injury reduction the case of a large group of plants where a foreman's accident-reduction bonus was instituted was cited. Previously more than 50 per cent of the accidents caused disability of one week or less, and about 25 per cent of the disabilities terminated in the second week. Under the foreman's bonus the minor injuries immediately declined, the number terminating in the first week being finally less in number than those in the second week. This was pointed out as entirely contrary to established opinion, it having been accepted without question that the minor injuries were due to careless habits of the workers, and that they would be difficult to eradicate. Experience proves, he said, that minor injuries are the easiest of all to control.

Decline In Severe Accidents May be Expected

That a progressive though probably slow decline in the severity of accidents may be expected with a clearer view of the importance of the engineering factor, was also prophesied. The serious problem confronting the safety movement is the control of the severer forms of injury, Mr. Chaney stated. Referring to bulletin No. 298 of the Bureau of Labor Statistics in which are charted the severity of accidents in various relations, he pointed out that in almost every instance the black portion is the large and conspicuous element. When the various kinds of accidents are weighted in some reasonable relation to their importance death is shown to be conspicuously the most important. Death is the dark shadow in the field of accident prevention.

Renewed study of the causes and remedies of fatal injuries will come as the relative seriousness of this class of accidents becomes more evident. That the severity rating throws up in true proportions the importance of death, is one of its chief merits, he said. Under ordinary conditions, even in the most haphazard industries, death is comparatively rare and but if judgment is based on this rarity rather than on the seriousness of the occurrence, such judgment is likely to be very much in error.

If the movement is to progress satisfactorily the more thorough study of death cases must result in further reconstructions and rearrangements as radical as any hitherto attempted Mr. Chaney stated.

Steel Corporation a Pioneer in Safety Work

The steps by which the safety movement has advanced, the historical background, were taken up at length by Mr. Chaney. He began with the conference in 1906 of the casualty managers of the Steel Corporation's subsidiary companies, giving as an emphatic reason for the calling of such a conference that American industry reached a climax of slaughter in 1905 and 1906. Regarding the formation by the Steel Corporation in 1908 of the central safety committee and several of its subsidiaries, he said, "the curious inquirer can doubtless find scattered instances of similar organizations in other fields, but the committee system as an important feature of the accident prevention program began with these organizations and has contributed more largely than any other single feature of that program to its present degree of success."

The establishment of compensation plans by the Steel Corporation early in the development of safety effort was characterized as of utmost importance, every personal injury then becoming a potentional cost item and instead of looking for defenses against a possible suit, casualty managers began to look into the causes of accidents and a way to prevent them.

The interest of the Association of Iron and Steel Electrical Engineers, the advent of the first safety congress in 1912, and the establishment of statistical data by the U. S. Bureau of Labor Statistics were outlined.

"Historically the iron and steel industry has made five outstanding contributions to the safety movement," said Mr. Chaney in concluding this phase of his subject. "The industry represented by the Steel Corporation initiated the movement and established the committee system. It made the first large trial of compensation. Through the Association of Iron and Steel Electrical Engineers it laid the foundation of the National Safety Council. It has directed attention in a new way to the importance of the engineering factor in accident prevention."

In discussing what have been the practical results of the safety movement, Mr. Chaney pointed out that the ordinary expression of success, such-and-such percentages of decreased accident occurrence, are apt to be misleading. Nothing is more striking he said than the decline of minor injuries which can be secured by certain kinds of appeal to the men. They respond remarkably, and to outward appearance success has been very great. Closer analysis, however, may show the old stubborn difficulties scarcely touched. Only by maintaining a continuous record for a considerable period and massing a sufficient body of data is it possible to secure dependable results, he emphasized.

Iron and Steel Markets

SOME GAIN IN OUTPUT

August Low Point in Pig Iron—Furnaces and Steel Plants Resuming

Promise of Rail Buying at Chicago — The Strike Factor in Finished Steel Prices

Steel works are now gaining in output, after touching low point in the last week of August. The increase is not large as yet, but it promises to be greater next week. The betterment in the railroad situation is not marked, and after being down below 50 per cent the industry is satisfied for the present to aim at a 60 per cent operation.

Pig iron output went down rapidly for most of the second half of August. For the month the total was 1,816,170 tons, or 58,586 tons a day, against 2,405,365 tons in July, or 77,592 tons a day. The net loss in active furnaces in the month was 28 and the daily capacity of the 144 furnaces in blast September 1 was 54,645 tons, against 70,605 tons a day for 172 furnaces on August 1.

The upward turn in the few days since the opening of the month has already brought back nine furnaces to the active list—five in Pennsylvania, including three in the Pittsburgh district, three at Youngstown, and one at Cleveland. From half a dozen to a dozen more are preparing to go in in the next ten days.

A gain, but not a large one, has been made in Connellsville coke output, as the non-union men are still holding out, but for some time increase in steel production will come faster than that in pig iron production. Merchant companies whose blast furnaces are out must make wage adjustments and besides must get cheaper coke before they can start up to make deliveries on contracts taken much below to-day's prices.

Steel companies are unable to get sufficient box cars for the movement of products like wire and tin plate and this shortage promises to be worse. The use of open top cars for coal movement is also curtailing the supply of such cars for steel mills. Still overhanging the industry is the cloud of common labor shortage. In respect to railroad equipment what has been called a car shortage is more truly motive power trouble.

Consumers of steel in a number of lines are showing more concern over their ability to secure continuous supplies from the mills. However, the strike factor in the higher prices the mills are now asking prevents any large business on this basis and the general belief is that deliveries will grow easier even though progress in that direction be but slow.

The Chicago district as the largest railroad buying center, gives more definite promises than any other in respect to future demand. It reports that orders for 300,000 tons of rails for next year await only the naming of the 1923 price; also that there is new interest in railroad bridge material. There is increased buying of track fastenings at Chicago, one order calling for 15,000 tons of tie plates.

Locomotive buying continues on a large scale, orders for 238 being entered in the week, including 100 for the Pennsylvania and 50 each for the Chicago & Northwestern and the Missouri Pacific. Car orders are not numerous, but there are inquiries for about 5000 new cars and repairs for 1500 to 2000.

Independent sheet companies still average a better operation than the Steel Corporation, the figures being 80 per cent and 60 per cent. Generally they are asking $2 to $3 a ton more than the corporation's prices. There is practically no suspension of shipments of automobile sheets. In tin plates there have been intimations of an advance beyond $4.75 in view of increased steel costs.

The price of Southern pig iron has advanced $2 and $25, Birmingham, is now the prevailing quotation, but the shipment of iron to the North has almost entirely ceased on account of the railroad congestion. In the North, shipments show improvement in most centers. Prices at Chicago and in the East have advanced $2 on most grades. Foreign iron is being sold in moderate tonnages with a tendency of prices to advance. It is not easy to buy abroad for delivery before November, but a considerable tonnage has been shipped or is in the hands of importers, though the total of arrivals thus far has been much overstated.

Iron and steel exports dropped to 157,000 tons in July, or 26 per cent below the June total, and August figures are expected to show further recession.

Finished steel, according to THE IRON AGE composite price, remains at 2.412c. per lb., as for the last two weeks. This compares with 2.279c. one year ago and 2.062c. on Jan. 1.

Pig iron has advanced, THE IRON AGE composite price having risen from $29.52 to $30.52, the highest since Jan. 25, 1921. The price one year ago was $19.64; on Jan. 1 it was $18.68.

Pittsburgh

Settlement of Coal Strike Brings Moderate Improvement in Steel Plant Operations

PITTSBURGH, Sept. 5.—From an operating standpoint, the iron and steel industry in the past week has begun to show definite betterment as a result of the recent settlement of the coal strike, although this settlement appears to be confined to the union districts and the non-union production has not shown expected gains. The Jones & Laughlin Steel Co., since the resumption at its mines Aug. 28, has turned on the blast at two of its Eliza blast furnaces and one Aliquippa stack, which were banked when the pinch in coal supply became acute in July. The Youngstown Sheet & Tube Co. has put on two blast furnaces since a week ago and the Brier Hill Steel Co. and the Sharon Steel Hoop Co. each one. The Carnegie Steel Co. also has added one furnace to its active list and with the furnace of the Shenango Furnace Co., which started Aug. 29, there are now 58 active furnaces in the district bounded by Johnstown, Pa., on the East, Wheeling, W. Va., on the South, and Warren, Ohio, on the North. This is a gain of eight stacks in about 10 days and several others, chiefly steel works furnaces, are being made ready to start. In-

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Sept. 5, 1922	Aug. 29, 1922	Aug. 8, 1922	Sept. 6, 1921
No. 2X, Philadelphia†...	**$36.14**	$34.14	$31.14	$20.84
No. 2, Valley furnace†...	**35.00**	33.00	29.00	21.00
No. 2, Southern, Cin'ti†...	**29.05**	27.05	24.05	23.50
No. 2, Birmingham, Ala.†.	**25.00**	23.00	19.50	19.00
No. 2 foundry, Chicago*..	**32.00**	30.00	27.00	21.00
Basic, del'd, eastern Pa...	**32.00**	28.64	27.25	19.00
Basic, Valley furnace.....	30.00	30.00	26.00	19.00
Valley Bess., del. Pitts...	**34.77**	33.77	28.76	21.96
Malleable, Chicago*	**32.00**	30.00	27.00	21.00
Malleable, Valley	33.00	33.00	28.00	20.00
Gray forge, Pittsburgh...	34.76	34.76	28.76	21.96
L. S. charcoal, Chicago..	36.15	36.15	33.15	33.50
Ferromanganese, seaboard	67.50	67.50	67.50	70.00

Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill.	$40.00	$40.00	$40.00	$47.00
Bess. billets, Pittsburgh..	38.00	38.00	35.00	29.00
O.-h. billets, Pittsburgh..	38.00	38.00	35.00	29.00
O.-h. sheet bars, P'gh....	**40.00**	38.00	35.00	30.00
Forging billets, base, P'gh	43.00	43.00	40.00	34.00
O.-h. billets, Phila.....	45.17	45.17	42.67	35.74
Wire rods, Pittsburgh....	45.00	45.00	40.00	38.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	2.00	2.00	1.80	1.70
Light rails at mill.....	2.00	2.00	1.75	1.75

Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia...	**2.42**	2.325	2.025	2.00
Iron bars, Chicago.....	2.25	2.25	2.00	1.75
Steel bars, Pittsburgh....	2.00	2.00	1.80	1.65
Steel bars, Chicago.....	*2.10*	2.35	1.90	1.85
Steel bars, New York....	2.34	2.34	2.14	2.03
Tank plates, Pittsburgh...	2.00	2.00	1.80	1.70
Tank plates, Chicago.....	**2.30**	2.20	1.90	1.75
Tank plates, New York..	2.34	2.34	2.14	2.08
Beams, Pittsburgh	2.00	2.00	1.80	1.70
Beams, Chicago	*2.30*	2.35	1.90	1.80
Beams, New York.....	2.34	2.34	2.14	2.08
Steel hoops, Pittsburgh...	2.75	2.75	2.50	2.25

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire,	Sept. 5, 1922	Aug. 29, 1922	Aug. 8, 1922	Sept. 6, 1921
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28 P'gh	3.35	3.35	3.15	2.75
Sheets, galv., No. 28, P'gh	4.35	4.35	4.15	3.75
Sheets, blue an'l'd, 9 & 10	2.50	2.50	2.40	2.25
Wire nails, Pittsburgh...	2.60	2.60	2.40	2.75
Plain wire, Pittsburgh....	2.35	2.35	2.25	2.50
Barbed wire, galv., P'gh..	3.15	3.15	3.05	3.40
Tin plate, 100-lb. box, P'gh	$4.75	$4.75	$4.75	$5.25

Old Material, Per Gross Ton:				
Carwheels, Chicago $22.50		$22.50	$19.50	$13.75
Carwheels, Philadelphia...	**20.00**	19.00	17.50	17.00
Heavy steel scrap, P'gh...	18.50	18.50	17.50	13.00
Heavy steel scrap, Phila..	15.50	15.50	15.00	11.50
Heavy steel scrap, Ch'go..	**17.50**	17.00	15.50	11.00
No. 1 cast, Pittsburgh....	19.00	19.00	19.00	16.50
No. 1 cast, Philadelphia..	19.00	19.00	18.00	17.00
No. 1 cast, Ch'go (net ton)	**21.50**	20.00	18.00	13.25
No. 1 RR. wrot, Phila....	18.50	18.50	17.50	14.50
No. 1 RR. wrot, Ch'go (net)	**17.50**	15.50	14.25	11.50

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt....$10.00		$10.00	$14.00	$3.60
Foundry coke, prompt....	12.00	12.00	15.00	4.00

Metals,				
Per Lb. to Large Buyers	Cents	Cents	Cents	Cents
Lake copper, New York...	14.12½	14.12½	14.12½	12.00
Electrolytic copper, refinery	13.75	13.75	13.75	11.75
Zinc, St. Louis.....	6.25	6.25	6.30	4.20
Zinc, New York.....	6.60	6.60	6.65	4.70
Lead, St. Louis.....	5.55	5.55	5.50	4.20
Lead, New York.....	5.90	5.90	5.85	4.70
Tin (Straits), New York..	**32.50**	32.30	32.62½	27.25
Antimony (Asiatic), N. Y.	**5.37½**	5.25	5.25	4.50

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Sept. 5, 1922, Finished Steel, 2.412c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel

Aug. 29, 1922	2.412c.
Aug. 8, 1922,	2.212c.
Sept. 6, 1921,	2.279c.
10-year pre-war average,	1.689c.

Composite Price, Sept. 5, 1922, Pig Iron, $30.52 Per Gross Ton

Based on average basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Aug. 29, 1922;	$29.52
Aug. 8, 1922.	25.94
Sept. 6, 1921,	19.64
10-year pre-war average,	15.72

crease in blast furnace operations has been attended by some gain in steel works operations. The Carnegie Steel Co. this week is expected to get out close to 60 per cent of its capacity of ingots, as against about 55 per cent last week while in Youngstown active open hearth furnaces have increased in number from 30 to 42. There has as yet been little change in operating conditions in the Wheeling district plants.

Permanence of the upward slant of operations still is a matter of doubt, however, for while production of coal in Western Pennsylvania and Northern West Virginia, as measured by railroad reports of loadings, is above 75 per cent of normal capacity, transportation conditions already are affecting shipments and the trade also fears that the application of the priority system of distribution may affect supplies. There is much talk of car shortages, but as yet such a condition does not exist. The trouble is with the motive power. Car shortages are expected, when the troubles incident to the opening of mines long idle are ironed out and there is a relatively full production of coal. A number of the steel companies are finding it hard to get a sufficient allotment of box cars for the movement of such products as wire and tin plate and this shortage is likely to be worse before it is better, with the crop movement immediately ahead while demands for open top cars for coal movements will mean a curtailment in the supply of that kind of equipment for the steel mills. Hanging like a cloud over the industry is the continued shortage of mill labor. Following the increase in plant operations a large Pittsburgh independent has re-entered the market in a moderate way for new tonnages of plates and bars for early delivery, but as a general proposition, the situation as far as prompt shipments are concerned is not yet materially easier.

Pig Iron.—Such business as is being done—and it is entirely for small lots for immediate delivery—is confined very largely to foundry iron. We note sales of Bessemer iron amounting to 700 tons, but a recent inquiry for 2000 tons of basic iron from a local melter has been withdrawn and there have been no new inquiries of any account lately in these grades. Prices

quoted on the 2000-ton inquiry for basic ranged anywhere from a little above $32 delivered, this being by an Eastern steel company, to $32, Valley furnace basis. Bessemer iron on the basis of recent sales now is quotable at $33 Valley furnace, an advance of $1 a ton over last week's prices. In absence of sales, basic iron still is nominally rated at from $30 to $32. The N. & G. Taylor Co., Cumberland, Md., which recently inquired for 2500 tons of basic, is understood to have placed the business in the East. It is interesting to note, in face of current prices for Valley basic and Bessemer iron, that the August averages of W. P. Snyder & Co. on these grades were $28.67 for Bessemer and $25.41 for basic. Evidently little of the month's business was at the prices reached late in the month. July averages were $25 for Bessemer and $24.56 for basic. On the basis of late sales of foundry iron, the market now is quotable at $35 Valley furnace, an advance of $2 a ton over the recent price. The whole market is on a spot basis and not very representative of the price of forward deliveries. Until coke prices are definitely settled, producers will be in the dark as to costs; consequently they are not making prices on future shipments, but it also is true that few melters are interested at the moment in future requirements.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.76 per gross ton:

[illegible]	$33.00
Bessemer	33.00
Gray forge	33.00
[illegible]	33.00
[illegible]	33.00
[illegible]	33.00

Ferroalloys.—New schedules have been announced on silveries and Bessemer ferrosilicon by one Jackson, Ohio, producer, who now is quoting 8 per cent silveries at $41.50 and 10 per cent Bessemer ferrosilicon at $50.50. This is an advance of $5.50 a ton over recent nominal quotations and $9 over the last previous official prices. Other ferroalloy prices are unchanged. British ferromanganese still is available for deferred shipment at $67.50 c.i.f. Atlantic seaboard, but spot material has sold recently at $70 and is held at $72.50 by some sellers. Domestic material is available for prompt delivery at $75, c.i.f. Atlantic seaboard, for carload lots. An Ohio maker of alloy steels is seeking a round tonnage of 80 per cent material. Spiegeleisen is held at $39 furnace for 20 per cent, but we note no sales that high, most recent business having been at least $1 per ton less.

We quote 78 to 82 per cent ferromanganese, $75 c.i.f. Atlantic seaboard for domestic; British, spot, $70 to $72.50; British, future, $67.50; German, 76 to 80 per cent, $67.50 to $70. Average 20 per cent spiegeleisen, $39 furnace; 16 to 19 per cent, $38 furnace; 50 per cent ferrosilicon, domestic, $55 to $60 furnace, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, $50.50; 11 per cent, $53.80; 12 per cent, $57.10; 13 per cent, $61.10; 14 per cent, $64.10; silvery iron, 6 per cent, $39; 7 per cent, $40; 8 per cent, $41.50; 9 per cent, $44.50; 10 per cent, $45.50; 11 per cent, $48.80; 12 per cent, $52.10. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is [illegible]

Iron and Steel Bars.—The general range of prices on steel bars is from 1.90c. to 2.25c., the lower figure representing about what the Steel Corporation is charging regular customers on such business as it can take, and this for indefinite delivery and the higher prices what some independents are demanding for early delivery. The leading independent maker here is quoting from 2c. to 2.15c. Iron bars are higher, now being quotable at 2.45c. for refined iron.

We quote steel bars rolled from billets at 1.90c. to 2.25c.; reinforcing bars, rolled from billets, 1.90c. to 2.25c. base; rail steel reinforcing bars, 1.90c. to 2c.; refined iron bars, 2.45c. in carloads, f.o.b. mill, Pittsburgh.

Billets, Sheet Bars and Slabs.—The present market is a small affair, because makers generally are more inclined to let the material go to their own finishing mills than to sell, and are asking prices which are intended to, and in fact do, discourage purchases. Some mills having more billets than can be rolled down on account of labor shortages, might take a little business at $38, Pittsburgh, but as a general rule, $40 is as low as is being named on either billets or sheet bars and on slabs the same price is asked.

We quote 4 x 4-in. soft Bessemer and open-hearth billets at $38 to $40 [illegible] $40 [illegible] spot; hearth sheet bars, $40; slabs, $40; forging billets, ordinary carbons, $43 to $45, all f.o.b. Youngstown or Pittsburgh mills.

Cold-Finished Steel Bars and Shafting.—In keeping with the strength of hot-rolled bars and the difficulty which makers of cold-finished bars are having in securing supplies, prices of the latter product have been advanced $5 per ton. All makers of cold-rolled, drawn and turned bars now are quoting 2.50c, base, Pittsburgh, per carload, while ground shafting has advanced to 2.90c. base, f.o.b. mill, for carloads. The less than carload price is $5 per ton more.

Hot-Rolled Flats.—The market is firm on the basis of 2.75c., Pittsburgh, with makers as heavily committed as they care to be and not anxious to add to their obligations.

Bolts and Nuts.—Leading makers have announced an increase in prices averaging about 10 per cent. Large machine bolts now are quoted at 50, 10 and 10 per cent off list. This change reflects the strength and security in raw materials, although increased labor costs also are a factor. Demand, independent of specifications on third quarter contracts, is reported to be good. New discounts are given on page 627.

Rivets.—There has been a further revision upward of prices and all makers now are quoting large button head structural rivets at $3, base, per 100 lb., Pittsburgh, and large cone head boiler rivets at $3.10. Small rivets have been advanced to 65 and 5 per cent off list. It is claimed that rivets cannot be made profitably even at these prices with steel bars at 2c. to 2.15c. base and wire rods at $45 per ton. Prices and discounts are given on page 627.

Structural Material.—The situation with regard to deliveries still is bad, but some encouragement is afforded by the fact that the Jones & Laughlin Steel Co. is benefiting by the improved fuel situation, and because the Homestead Works, Carnegie Steel Co., is on a higher operating rate as to both steel works and rolling mills. Prompt shipments are not easy to secure, except at high prices, but on the bulk of current inquiries the quotation is right around 2c. Prices are given on page 627.

Plates.—The leading independent here has reentered the market in a moderate way, quoting a minimum of 2.25c. This appears to be as low as early deliveries can be placed and some independents are asking 2.50c. for prompt shipment. The Steel Corporation price nominally is 2c. on such business as it can take and this strictly from its regular customers. Prices are given on page 627.

Sheets.—Independent companies still are making a better showing as regard operations than the leading interest. The latter is running less than 60 per cent while the independents are averaging about 80 per cent. Some of the independents are quoting the Corporation sheet prices, but most of them are asking $2 to $3 a ton above these levels and even more when quick shipment is wanted. Specifications are coming along freely and much new business is being passed up because of the fear that conditions may not be as good with regard to operation as they now promise to be. Labor shortages are common. Automobile parts manufacturers still are urging shipments on contracts and among sheet makers the general belief is that the Ford suspension will not be as complete as was announced by Mr. Ford recently. Prices are given on page 627.

Tin Plate.—Demand is fairly brisk, but is putting no strain upon production and prices show no change. The movement toward an advance to a base of $5 has not crystallized, but it is still talked about on account of increased producing costs. Stock tin plate is available at $4.50 per base box.

Steel Skelp.—Available tonnages are so small that business necessarily is limited. It is doubtful whether independent makers would consider less than 2.50c. and some probably would ask 2.50c. So far as it is able, the Corporation is taking business at 2c.

Track Equipment.—There has been no further change in spikes, but track bolts have advanced to a minimum of $3.75, base, per 100 lb. Pittsburgh. As high as $4.50 is quoted by some makers, but these makers for some time past have not charged the usual extra of 1c. per lb. over the carload base for less car-

loads. On carload lots of a size $3.75 still can be done. The general quotation on tie plates is $45 per net ton, the most recent business was 400 tons placed by Pennsylvania Railroad with a local maker at $39 per net ton. Prices are given on page 627.

Steel Rails.—Shortage of steel makes for a firm market, with light rails rolled from new steel not available at less than 2c., and some makers are asking 2.25c. on shipments from stock. Those rolled from old rails are priced at 1.90c. to 2c.

We quote [illegible] lb. sections, rolled from new steel, 2c. base; rolled from old rails, 1.90c. to 2c. base; standard rails, $40 per gross ton mill for Bessemer and open-hearth sections.

Iron and Steel Pipe.—The general situation is without material change. All makers of steel pipe still are about 90 days behind their orders for butt welded pipe, but on the lap welded lines are not nearly so heavily committed. A recent inquiry for 30 miles of 8-in., 29-lb. line pipe has been withdrawn, as the company seeking this line was able to pick up a good second-hand line. Wrought iron pipe is not selling freely at the recent advance in prices. Discounts are given on page 627.

Boiler Tubes.—Liberal orders recently placed for locomotives point to continue good demand for boiler tubes, particularly for seamless steel tubes. The recent advance in prices is well observed on new business. Discounts are given on page 627.

Wire Rods.—Available supplies are confined solely to such tonnages as makers are unable to use in their own mills, owing to a shortage of wire drawers. One company here which has a small surplus as a result of this condition is offering it at $47.50 base, Pittsburgh. This price has not yet been obtained, but it is doubtful whether supplies can be had at any less since most other makers still are out of the market.

We quote No. 5 common basic or Bessemer rods to domestic consumers, $45 to $47.50; chain rods, $45 to $47.50; screw stock rods, $50 to $52.50; rivet and bolt rods and other rods of that character, $45 to $47.50; high carbon rods, $52 to $57.50, depending on carbon, per gross ton, f.o.b. Pittsburgh or Youngstown.

Wire Products.—Buyers still are finding it difficult to enter orders for early delivery and quite as difficult to interest manufacturers in fourth quarter business. This condition is explained by the fact that practically all producers have obligations which will tax productive capacity for some time to come, owing to labor shortages while lately a scarcity of box cars has been backing up shipments. These manufacturers remain out of the market and the one company which has not formally withdrawn is not accepting business in excess of the regular requirements of its customers. A further advance in prices is probable because it is claimed that present prices do not allow a fair profit in view of the recent wage increase. Some companies state that when they come back into the market, it will be on a basis of $2.75 per keg for nails and $2.50 per 100 lb. for plain wire. The advance in wire products from the low point has been small by comparison with that in other steel products, but it is also a fact that wire products did not sustain as heavy a drop from the 1921 peak prices as did the other products. Prices are given on page 627.

Cold-Rolled Strips.—Demand holds good in the face of the recent advance, chiefly because the automobile makers are heavily committed and are getting few, if any, cancellations. For fourth quarter shipment, which is about as promptly as makers now can make deliveries, the market is at 4.25c., base Pittsburgh.

Coke and Coal.—Bee Hive oven coke production is not increasing much because many miners and oven operatives in the Connellsville district still are holding out for recognition of the union as a condition of their return to work. It is doubtful whether any of the operators is getting much in excess of 50 per cent production and many are well below that rate. Prices are unchanged with furnace grade quotable from $10 to $11 per ton at ovens based on sales to blast furnaces while foundry fuel commands anywhere from $12 to $14, depending on quality. It is reported that furnace coke has been sold to replace anthracite coal at $11 to $12 but that is well above what furnace operators lately have paid or will pay at today's prices of pig iron. The coal market is soft and hardly quotable above $5 per net ton at mines. We note sales of several large lots of gas coal at that figure. Production of coal in this district is gaining more rapidly than the demand and priority distribution rules are not yet very effective.

Old Material.—Dealers, confident that much higher prices are immediately ahead and that the railroads will not be in position to press material upon the market, are bidding high against railroad scrap lists. The steel scrap offered by the Pennsylvania Railroad, Central Region, sold at $17.25 to $17.30 per net ton, or $19.32 to $19.37 per gross ton, almost $1 per ton above the highest price paid or offered by any of the steel companies in this district, and almost $2 per ton above what one large Pittsburgh independent is bidding. So far, mills in this district have not increased their price ideas, but Youngstown and Canton are taking on tonnages at higher prices than prevail here and with the market also stronger East, it is hard to figure how Pittsburgh mills can escape paying the advance. Another argument in favor of higher prices is the unusually big premium on pig iron over scrap iron. The Pennsylvania Railroad, Central Region, list contained 5800 net tons, the Southwestern Region list 1900 net tons and the Eastern Region list approximately 19,000 net tons. A good many cast iron car wheels lately have been bought for Warren, Ohio, delivery, at $22 per gross ton delivered.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

Per Gross Ton	
Heavy melting steel, railroad or equivalent	$18.50 to 19.00
Heavy melting steel, ordinary	17.50
No. 1 cast, cupola size	$19.00 to 19.50
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va.; Franklin, and Williamsport, Pa.	18.50 to 19.00
Compressed sheet steel	16.50
Bundled sheet sides and ends	15.50
Railroad knuckles and couplers	19.00 to 19.50
Railroad coil and leaf springs	19.00 to 19.50
Low phosphorus standard bloom and billet ends	23.00 to 24.00
Low phosphorus, plates and other grades	21.00 to 22.00
Railroad malleable	17.00 to 17.50
Iron car axles	27.00 to 28.00
Locomotive axles, steel	25.00 to 26.00
Steel car axles	20.00 to 20.50
Cast iron wheels	21.50 to 22.00
Rolled steel wheels	20.00 to 21.00
Machine shop turnings	14.50 to 15.00
Heavy steel axle turnings	16.50 to 17.00
Short shoveling turnings	16.00 to 16.50
Cast iron borings	17.00 to 17.50
Heavy breakable cast	18.50 to 19.00
Stove plate	15.50 to 16.00
Sheet bar crop ends	23.00 to 23.50
No. 1 railroad wrought	16.00 to 16.50

Judge Gary Returns—Expresses Optimistic Views on Conditions

Judge Elbert H. Gary, chairman United States Steel Corporation, accompanied by Mrs. Gary, returned to New York Thursday after a pleasant sojourn of about a month at Colorado Springs, Col. He was interviewed at Chicago last Wednesday and took an optimistic view of business conditions. He said that throughout the West there seemed to be a general feeling that business activities were increasing and that great prosperity would be witnessed whenever conditions relating to transportation and production would permit. "I think," he said, "there is still a great deal of profiteering in business, such as in building materials and in some trades as well." He said he looked upon the reported action of the Ford Motor Co. as simply a protest against paying extortionate prices.

"For the last two years at least," said Judge Gary, "the people of this country in increasing numbers have withheld purchases to supply their necessities because of the unconscionable selling prices which have been demanded. The inexorable law of supply and demand ultimately will bring about adjustments concerning prices and remuneration which are just and equitable. There is nothing the matter with this country. Opportunities here are greater than ever before. The fault is in individuals.

"It behooves every one of us to make certain we are doing the right thing up to the limit of our intelligence and moral courage."

Chicago

Railroad Buying Gives Promise of Much Activity—Pig Iron Prices Higher

CHICAGO, Sept. 5.—The undiminished buoyancy of business after months of strike conditions has strengthened the faith of the trade in the future. Purchases of steel for indefinite delivery are slightly above the average for August and for an important local mill that month was an improvement over July in orders booked. With the market so active under handicaps, it is felt that now that the coal mines are producing again, the only remaining step necessary to usher in a sustained period of heavy buying is a settlement of the shopmen's strike. Even now the railroads are indicating that their purchases this fall will be very liberal. One line has placed 9000 tons of plates, shapes and bars to be used on car repairs and other roads are preparing to buy material for the same purpose. Orders for 300,000 tons of rails for next year await only the announcement of the 1923 mill prices. Purchases of track fastenings are in increasing volume, one order alone calling for 15,000 tons of tie plates. Renewed interest is also manifested in bridge material. Whereas, the carriers rarely place large orders for bridge steel except at the beginning of the year, one large road has entered the market for 1500 tons of girder spans to be used at 25 different locations.

Prices for indefinite shipment remain unchanged, but the market level on material for specified delivery has clarified with the appearance of quotations of 2.10c., Chicago, on soft steel bars, 2.25c., Chicago, on structural shapes and 2.30c., Chicago, on tank plates. The advance in bolts and nuts forecast a week ago amounts to approximately 10 per cent.

The operating situation in this district is unaltered, but the next change will probably be for the better. Fresh supplies of coal, however, are arriving very slowly and steel works are conserving their stocks by using oil for operations to which it is adapted.

Ferroalloys.—The market is quiet in all of the ferroalloys. Prices are unchanged, although owing to the increasing difficulty of getting rail shipments through from New Orleans, some recent consignments of ferromanganese have been handled through Baltimore.

We quote 78 to 82 per cent ferromanganese, future, $75.06; prompt, $82.56, delivered; 50 per cent ferrosilicon, $55 delivered on contract and $57 prompt delivery; spiegel- [illegible] $51.50, delivered.

Pig Iron.—Local iron has again advanced, this time to $32, base furnace. Inquiry for forward delivery has fallen off, as is generally the case immediately after an advance, but demand for spot iron is unabated. Among current inquiries for prompt delivery is one for 500 tons of malleable. Local producers are being subjected to increasing pressure for iron by consumers in other territories where blast furnace output has practically ceased and furnace stocks have been exhausted. Because of the desperate situation in those sections, a number of small tonnages have been sold for shipment from Chicago district stacks, the freight from Chicago to certain destinations in Ohio running up to over $4.25 a ton. The heavy sales of foreign pig iron in the East have given rise to speculation whether local prices will advance sufficiently above the present level to bring European competition into this district. There have been several occasions within the memory of the local trade when shipments of British iron have reached Chicago. Southern competition is temporarily at least practically non-existent because of the railroad embargoes which block shipments from the furnaces to points in this territory. Southern quotations, however, are stiffer, $25 base, Birmingham, being the minimum with a dollar differential for each added 0.50 per cent of silicon. A sale of 250 tons of charcoal for third and fourth quarter shipments has been made at $33 base furnace. In view of the fact that local coke iron is now up to $32, furnace, another advance in charcoal is looked for. Low phosphorous iron is in an exceedingly strong position because of lack of production and rapid depletion of furnace stocks. An inquiry for 500 tons of low phosphorous for delivery within 60 days is before the trade. Silvery is in a similar position, and while one furnace is still quoting $37.50 f. o. b. Jackson on 8 per cent, all sales subject to confirmation, another Jackson County furnace is quoting $4 higher.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$36.15
Northern coke, No. 1, sil. 2.25 to 2.75	33.00
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	32.00
Northern high phos.	32.00
Southern No. 2	$31.00 to 32.00
Malleable, not over 2.25 sil.	32.00
Basic	32.00
Low phos., Valley furnace, sil. 1 to 2 per cent copper free	38.00
Silvery, sil. 8 per cent	42.29

Plates.—Buying of railroad cars and oil storage tanks has fallen off for the time being, but demand on the mills for plates is still heavy. The railroads are expected to place liberal orders for steel this fall for car repairs. One road alone recently closed for 9000 tons of plates, shapes and bars to be used for the rehabilitation of equipment. For indefinite delivery the minimum quotation on tank plates remains 2.05c., Chicago, while for relatively early shipment the best local price is 2.30c. The leading independent is allocating its fourth quarter tonnage and is accepting no orders unaccompanied by specifications.

The mill quotation is 2.05c. to 2.50c., Chicago. Jobbers quote 2.90c. for plates out of stock.

Cast Iron Pipe.—La Porte, Ind., will open bids on 1750 tons of 18-in. Class C pipe on Sept. 11. Eloise, Mich., has taken tenders on 1230 tons of 12-in., but has not yet made an award. Detroit, likewise, has failed to make a decision on 800 tons on which bids were taken three weeks ago. The explanation appears to lie in the fact that pipe shops are unable to give the deliveries desired. Hinsdale, Ill., will soon take bids on 585 tons of 12-in. and 10-in. While most makers are now firm on a base of $40, Birmingham, for 6-in. and larger, at least one pipe producer is still quoting $38.50.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $50.70 to $52.20; 6-in. and above, $46.70 to $48.20; class A and gas pipe, $3 extra.

Wire Products.—Demand is heavy for all forms of wire products, not excepting barbed wire. Two large orders for the latter material from the Northwest are apparently in anticipation of fall fencing work. Mill operations have not improved. For mill prices, see Finished Iron and Steel, f.o.b. Pittsburgh, page 627.

We quote warehouse prices, f.o.b. Chicago: No. 9 and heavier black annealed wire and No. 9 and heavier bright basic wire, $3.20 per 100 lb.; common wire nails, $3.35 per 100 lb.; cement coated nails, $2.75 per keg.

Bolts and Nuts.—Following advances in raw material, bolt, nut and rivet makers have increased their prices approximately 10 per cent. New discounts as announced up to date will be found on page 627, but the basing point is Chicago.

No changes have been announced in the discounts of plow bolts and stove bolts and it is probable that they will remain the same. Prices are f.o.b. Chicago. Buyers are specifying heavily against their contracts to get the benefit of the lower prices. At the same time new business is being closed at the revised figures.

Jobbers quote structural rivets, 3.50c.; boiler rivets, 3.60c.; machine bolts up to ⅞ x 4 in., 50, 10 and 10 per cent off; larger sizes, 50 and 10 off; carriage bolts up to ⅞ x 6 in., 50 and 5 off; larger sizes, 45 off; hot pressed nuts, squares and hexagons, tapped, $3.25 off; blank nuts, $3.50 off; coach or lag screws, gimlet points, square heads, 60 per cent off; quantity extras are unchanged.

Reinforcing Bars.—Sellers continue to accept orders cautiously although they are being pressed to take a multiplicity of small tonnages. At the same time new projects of more than 100 tons are fewer. Awards include:

Nurses' home, Chicago, Wm. Carnegie, general contractor, 100 tons to Paul J. Kalman Co.

School, Mankato, Minn., 180 tons to Concrete Steel Co.

Neely Printing Co. plant, Chicago, 100 tons to Corrugated Bar Co.

Pending work includes:

Hotel, Chicago [illegible]

Sheets.—The Inland Steel Co. has opened its books for fourth quarter at the same prices as were previously announced by the leading producer. Tonnage will be allocated among customers. Demand is insistent and is coming from all parts of the country as well as from abroad, indicating a pronounced scarcity of material.

Mill quotations are 3.35c. to 3.50c. for No. 28 black, 2.50c. to 2.60c. for No 10 blue annealed and 4.35c. to 4.50c. for No 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 24c per 100 lb.

Jobbers quote blue annealed, 4c.; black, 4.50c.; galvanized, 5.85c.

Bars.—Demand for soft steel bars continues heavy, with 1.95c., Chicago, the minimum price for indefinite shipment and 2.10c., Chicago, the best quotation on material for specific delivery. As high as 2.50c., Chicago, is being paid for prompt shipment. Demand for bar iron is not so active, but prices are firm at a minimum of 2.25c., Chicago, with some business going at as high as 2.50c., Chicago. Buying of hard steel bars is sustained, although not spectacular, and prices are unchanged.

Mill prices are: Mild steel bars, 1.95c. to 2.50c., Chicago; common bar iron, 2.25c. to 2.50c., Chicago; rail steel, 2c. to 2.10c., Chicago.

Jobbers quote 2.80c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 3.80c. for rounds and 4.30c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 2.50c. base; hoops, 3.90c.; bands, 3.55c.

Rails and Track Supplies.—Fully 300,000 tons of rails for 1923 delivery will be placed as soon as a price for next year is announced. Of this tonnage, from 125,000 to 200,000 tons will be placed by the New York Central. Other pending lots include two of 40,000 tons each, one of 20,000 tons, one of 10,000 tons and another of 6000 tons. Track fastening business is in satisfactory volume. A single order for 15,000 tons of tie plates is the largest placed in this district for a considerable period, if not the largest on record. There has been a marked improvement in inquiry for light rails since the settlement of the coal strike.

Standard Bessemer and open-hearth rails, $40; light rails rolled from new steel, 2c. to 2.25c., f.o.b. makers' mills.

Standard railroad spikes, 2.75c. to 3c., mill; track bolts with square nuts, 3.75c. to 4c., mill; tie plates, steel and iron, 2.15c. to 2.25c., f.o.b. mill; angle bars, 2.40c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.50c. base and track bolts 4.50c. base.

Structural Material.—Sustained building activity is indicated by numerous fresh fabricating awards. The taking of new business is restricted, however, by slow deliveries from the mills. In fact, fabricators are experiencing difficulty in obtaining shipments from the mills on present orders. Plain material continues to command a minimum of 2.05c., Chicago, for indefinite delivery, while the lowest quotation on reasonably early delivery is 2.20c., Chicago. The leading independent is allocating its fourth quarter production and is taking no orders unaccompanied by specifications.

The mill quotation on plain material is 2.05c. to 2.15c., Chicago. Jobbers quote 2.90c. for plain material out of warehouse.

Coke.—Local by-product foundry has advanced to $15, delivered in the Chicago switching district. Connellsville foundry is weaker at $12, ovens, but is difficult to obtain because of the transportation situation. The same trouble is incurred in connection with shipments from other outside producing centers.

Steel Castings.—An early announcement of advanced prices effective Oct. 1 is acknowledged. It is probable advances will apply particularly to certain classes of castings which are now relatively low, such as car castings in large quantities. Others may be advanced little, if at all.

Old Material.—Not only are the railroads offering few new lists, but they are slow in making deliveries against old sales and in some instances have tried to cancel unfilled contracts. As a result, sellers are short of scrap with which to fulfill their obligations with users and are bidding against each other for what little material is on the market. In one extreme instance, a dealer was forced to pay $9 a ton above his selling price in order to fill an old order. At the same time, users are paying steadily increasing prices on their new purchases. Prices are exceedingly strong and it is difficult to ascertain the true level of the market because what is being paid depends upon how badly the buyer needs the material. With scrap generally scarce, there is considerable variation in the prices governing current transactions. A conservative estimate, however, would place present quotations at from 50c. to $1 a ton or more above those of last week. An interesting development lies in that fact that prices on No. 2 wrought, which were practically identical with those on heavy melting when purchases by the steel works dominated the market, have risen above that level on a strong iron mill demand. Scrap prices are still generally low in comparison with pig iron and further advances are regarded as inevitable in view of the improbability of important railroad offerings while the carriers are concentrating on the movement of coal and grain. The Michigan Central and the New York Central offer blind lists.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

	Per Gross Ton	
Iron rails	$20.50	to $21.00
Cast iron car wheels	22.50	to 23.00
Relaying rails	25.00	to 30.00
Rolled or forged steel car wheels	22.00	to 22.50
Rails for rolling	18.50	to 19.00
Steel rails, less than 3 ft.	21.00	to 21.50
Heavy melting steel	17.50	to 18.00
Frogs, switches and guards cut apart	17.50	to 18.00
Shoveling steel	17.25	to 17.75
Drop forge flashings	12.50	to 13.00
Hydraulic compressed sheet	14.00	to 14.50
Axle turnings	15.00	to 15.50
	Per Net Ton	
Iron angles and splice bars	21.50	to 22.00
Steel angle bars	17.50	to 18.00
Iron arch bars and transoms	21.50	to 22.00
Iron car axles	24.00	to 24.50
Steel car axles	18.50	to 19.00
No. 1 busheling	14.50	to 15.00
No. 2 busheling	9.00	to 9.50
Cut forge	16.50	to 17.00
Pipes and flues	12.50	to 13.00
No. 1 railroad wrought	17.50	to 18.00
No. 2 railroad wrought	16.50	to 17.00
Steel knuckles and couplers	19.00	to 19.50
Coil springs	20.50	to 21.00
No. 1 machinery cast	21.50	to 22.00
No. 1 railroad cast	19.00	to 19.50
Low phos. punchings	16.50	to 17.00
Locomotive tires, smooth	15.50	to 16.00
Machine shop turnings	10.00	to 10.50
Cast borings	12.50	to 13.00
Stove plate	17.00	to 17.50
Grate bars	17.00	to 17.50
Brake shoes	17.00	to 17.50
Railroad malleable	19.50	to 20.00
Agricultural malleable	19.50	to 20.00

Arthur G. McKee & Co., Cleveland, have been awarded a contract by the Rochester & Pittsburgh Coal & Iron Co. for designing and installing a new trestle and storage bins at the plant of the Adrian Furnace Co., Dubois, Pa. The improvements will include a steel and reinforced concrete trestle structure, approximately 480 ft. long, six ore bins, coke bin and coke breeze handling equipment. The coke bin will be centrally located, discharging direct over Cascade type screens into the skip cars, and will provide storage for approximately 135 tons of coke. Two 80 cu. ft. capacity scale cars will be furnished for handling materials from the ore and limestone bins. Arthur G. McKee & Co. have also taken a contract from the Cambria Steel Co. for designing and furnishing materials for a furnace top for one of its Johnstown, Pa., stacks. The order includes a McKee revolving distributor and auxiliary top equipment.

At a recent meeting of tube department foremen of the Youngstown Sheet & Tube Co., Youngstown, Ohio, three employees were awarded safety fobs for having shown extraordinary quickness of thought and action resulting in saving a fellow workman from serious injury or death. Samuel P. Finch, turn foreman, received a gold fob for having pulled a fellow employee from the welding rolls pit, into which he had fallen in trying to assist in rolling a tube from the welding table. Two other employees received silver fobs. Since 1914 the company has awarded 18 gold fobs. James M. Woltz, safety director, made the presentations.

New York

Readjustment Proceeds Slowly — Moderate Rates of Foreign Pig Iron

NEW YORK, Sept. 5.—It is evident that readjustment following the partial settlement of the coal miners' strikes will not be easily or quickly made and it does not seem probable that the production of pig iron in the East will be materially increased for a month or two. While some shippers report that they are getting excellent service from the railroads, others, particularly those shipping to New England, report very slow movement owing to crippled equipment. Some furnaces, which still have iron, sold at $18 to $20 to deliver will hesitate about going into blast until costs can be materially reduced. Some of these furnaces had contracts for coke at $4 which they did not receive, and were compelled to buy coke at $10, or even higher prices, before blowing out.

Pig Iron.—Moderate inquiry has come from various interests in this district, including one for 1500 tons No. 2 plain from a New England stove manufacturer and 1000 tons of No. 2X from a house furnace manufacturer for prompt delivery. The latter is understood to have bought 250 tons of foreign iron on this inquiry. A coupler company is in the market for from 1000 to 2000 tons of malleable. Prices have again become advanced $1, and $34 Eastern furnace is now apparently the minimum for No. 2 plain. Southern iron orders can be placed at $25, but deliveries are unsatisfactory. Some Southern iron sold several weeks ago has been on the road for two or three weeks, with no definite promise of reaching its destination. Foreign iron is being sold in moderate quantities, but is becoming increasingly difficult to obtain for early delivery. No Scotch iron can be bought abroad to be shipped before Nov. 1, but there is still a limited quantity on the ocean or in the hands of importers in this country. Prices on Scotch equivalent No. 2X range from $30 to $32. On French, Belgian and Luxemburg irons running rather high in phosphorus and analyzing 2.50 to 3 per cent silicon, prices range from $26.50 to $28, c.i.f. New York. A limited tonnage of German iron is being offered, but it is low in silicon and high in sulphur and is not at all attractive.

We quote delivered at the New York district as follows, [illegible] freight rates $2.72 from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25..	$38.27
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	37.27
East. Pa. No. 2 fdy., sil. 1.75 to 2.25..	36.27
Buffalo, sil. 1.75 to 2.25.....$37.91 to	38.91
No. 2 Virginia, sil. 1.75 to 2.25.....	No sales

Finished Iron and Steel.—Larger production of bituminous coal has resulted within the past week in better mill operations and a slight lessening of the restrictions which steel companies have been placing upon sales. One large independent, which has been out of the market almost entirely for several weeks, is now selling plates, shapes, bars, cold-finished bars and tin plate in limited quantities to its regular trade. Another large independent, for the first time in about two months, is alloting small tonnages to its district offices for distribution among regular customers who are in dire need. The Jones & Laughlin Steel Co., Pittsburgh, whose blast furnace operation got down to three active stacks, now has six in blast and this week will put on two more, having gotten fairly liberal supplies of coal within the past week by barge from its mines. Other steel companies which have non-union mines or those which are entirely dependent on railroads for transporting coal are not faring as well as they would like to, but their coal receipts are larger than a week or 10 days ago. There is a disposition in the trade to believe that the peak prices which have been reached on some of the heavier products, such as 2.50c., Pittsburgh, on plates, for example, will not last under the better operating conditions which the mills will now enjoy. One independent is offering bars and shapes at 2c., Pittsburgh, and plates at 2.25c. for fairly early shipment; another asks 2.25c. for all three products. In general, bars and shapes range from 2c. to 2.25c., plates from 2.10c. to 2.50c., with a majority of transactions at about 2.25c., Pittsburgh. Some makers of cold finished steel bars are quoting 2.50c. Bands are quoted at 3c., Pittsburgh, by at least one or two mills. Tin plate is now firm at $4.75 per base box, with an advance predicted for the near future, this product not having gone up in keeping with other advances. In semi-finished steel, there is great strength and it is now almost impossible to buy billets, slabs or sheet bars under $40, with wire rods strong at $45, Pittsburgh. An Eastern mill has sold 6000 tons of soft steel billets for shipment to the Chicago district at a price which corresponds to $42, Pittsburgh. A fair volume of business in structural steel continues to come into the market notwithstanding advanced prices on fabricated steel. Concrete reinforcing bars are in good demand, current inquiries aggregating several thousand tons, including one from the Lock Joint Pipe Co. for 3000 tons and others of 2000, 1350 and 1000 tons. The largest structural contract of the week involved 5000 tons for a hotel building in New York for the United Hotels Co., on which the New York Shipbuilding Corporation, a newcomer in structural steel work, was the successful bidder.

We quote for mill shipments, New York delivery, as follows: For indefinite delivery, soft steel bars, structural shapes and steel plates, 2.14c.; for delivery in a number of weeks, soft steel bars, plain structural material and steel plates, 2.34c. to 2.59c.; bar iron, 2.34c.

Ferroalloys.—Demand for ferromanganese has fallen off, due to the holiday and the strike situation, but a few sales of small lots, amounting to about 300 tons, are reported for October shipment at the regular quotation, all being British alloy. Offerings of domestic alloy are not heard of. Inquiries are light. Sales of the high grade spiegeleisen, amounting to 300 or 400 tons, were made last week at $39, furnace, for early delivery. Practically none of the lower grade alloy is being offered. There are no reports of any activity in the manganese ore market and prices are nominal. Demand for 50 per cent ferrosilicon is moderate. One large American producer announces an advance in its price to $65 per ton, delivered, as the minimum. The ferrochromium market is quiet and specifications on contract are fairly good. Quotations are as follows:

Ferromanganese, domestic, seaboard, per ton	$67.50
Ferromanganese, British, seaboard, per ton	$67.50
Spiegeleisen, 17 to 19 per cent, furnace	$38.00
Spiegeleisen, 20 per cent, furnace	$39.00
Ferrosilicon, 50 per cent, delivered, per gross ton, carloads	$55.00 to $60.00
Ferrosilicon, 10 to 15 per cent, delivered, per gross ton	$38.00 to $40.00
Ferrotungsten, per lb. of contained metal	40c. to 50c.
Ferrochromium, 4 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. delivered	12c. to 14c.
Ferrovanadium, per lb. of contained vanadium	$3.00 to $3.50
Ferrocarbontitanium, 15 to 18 per cent, in carloads, per net ton	$200.00

Ores

Manganese ore, foreign, per unit, seaboard	28c. to 30c.
Tungsten ore, per unit, in 60 per cent concentrates, nominal	$3.00 up
Chrome ore, basis 48 per cent Cr2O3, crude, per ton, Atlantic seaboard	$15 to $18.50
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	42.50c. to 45c.

Cast-Iron Pipe.—Business is good, demand continuing strong. Among municipal tenders, upon which pipe makers are now bidding, opening Sept. 9, there is one calling for 450 tons of 8-in. pipe from Voorheesville, N. Y., one for 200 tons of 16-in. and 18-in. pipe from Rye, N. Y., and 50 tons of 6-in. pipe from Attleboro, Mass. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $54.50; 4-in. and 5-in., $59; 3-in., $64.80, with $4 additional for Class A and gas pipe.

High-Speed Steel.—The market is unchanged and producers continue to quote 18 per cent tungsten high-speed steel at 75c. per lb., base, with special brands of some companies ranging up to 90c. per lb.

Warehouse Business.—Effective Sept. 5, a number of the warehouses in this district and the leading independent increased prices on black and galvanized sheets from 4.60c. per lb. and 5.60c. per lb. base to 4.90c. and 5.90c. per lb., while blue annealed sheets were raised from 4.04c. per lb., the price set recently, to 4.19c. per lb., base. Other factors in the sheet business here,

however, are quoting 4.75c. and 5.75c. per lb., base, on black and galvanized respectively. Bars, shapes and plates are unchanged, but hoops have been increased by most warehouses to 4.29c. per lb., base. Cold-rolled shafting and screw stock has again been advanced by 50c. per 100 lb., and is now quoted at 3.90c. per lb. for rounds and 4.40c. for squares, flats and hexagons. Cold-rolled strip steel is now on a basis of 6.75c. per lb. Brass and copper warehouses report an advance in price on copper products of 1c. per lb. and on brass of ½c. per lb. Business in this line is good, consumers of all kinds having come into the market. Manufacturers of radio equipment are reported as again active. We quote prices on page 644.

Coke.—The coke market is somewhat easier, but deliveries are not satisfactory. Furnace coke is quoted at $10.50 to $12 Connellsville ovens and foundry $13.50 to $14.50. By-product is quoted at $14, seaboard, and the fuel administrator is still requiring that a large percentage be sent to public utility corporations. The outlook is that prices of coke will be high for a long time.

Old Material.—The market continues active and prices still show an upward tendency. Heavy melting steel is quotable at $11.50 to $12 per ton. Buying is noted from Wierton, Lebanon, Bethlehem and Alan Wood. While mills are undoubtedly in need of scrap, there is said to be a feeling that prices are rising to too high a level. Bethlehem is paying $15.50 for No. 1 heavy melting steel and on mixed borings and turnings Wierton will pay $15.25 per ton. Most of the steel now moving from this district is going either to Bethlehem or is being shipped by barge to Buffalo. No. 1 yard wrought is quotable this week at $11.50 to $12.50, machine shop turnings at $10.25 to $10.75 and specification pipe at $10.25 to $10.75.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$11.50 to $12.00
Steel rails, short lengths, or equivalent	12.25 to 12.75
Rerolling rails	12.50 to 13.00
Relaying rails, nominal	27.00 to 28.00
Steel car axles	17.00 to 18.00
Iron car axles	23.00 to 24.00
No. 1 railroad wrought	13.50 to 14.00
Wrought iron track	12.25 to 12.75
Forge fire	8.00 to 8.50
No. 1 yard wrought, long	11.50 to 12.50
Cast borings (clean)	10.75 to 11.25
Machine-shop turnings	10.25 to 10.75
Mixed borings and turnings	10.25 to 10.75
Iron and steel pipe (1 in. diam., not under 2 ft. long)	10.25 to 10.75
Stove plate	11.25 to 11.75
Locomotive grate bars	11.50 to 12.00
Malleable cast (railroad)	11.00 to 11.50
Cast-iron car wheels	13.50 to 14.00

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$18.50 to $19.50
No. 1 heavy cast (columns, building materials, etc.), cupola size	16.50 to 17.00
No. 1 heavy cast, not cupola size	14.00 to 14.50
No. 2 cast (radiators, cast boilers, etc.)	12.00 to 12.50

Buffalo

BUFFALO, Sept. 5.

Pig Iron.—None of the Buffalo sellers is rushed with business and orders placed here are for carload lots and tonnages slightly in excess of that quota. One furnace is quoting $34 base and another $35 and they sell for immediate delivery only. Imported iron being bought in the Eastern territory has impaired demand for Buffalo iron. Coal is a little easier and one interest expects to start a furnace recently banked. The market is without feature.

We quote f.o.b. per gross ton Buffalo as follows, the higher prices being for early shipment:

No. 1 foundry, 2.75 to 3.25 sil.	$35.00 to $36.00
No. 2X foundry, 2.25 to 2.75 sil.	34.00 to 35.00
No. 2 plain, 1.75 to 2.25 sil.	34.00 to 34.50
Basic	30.00
Malleable	36.00
Lake Superior charcoal	36.50

Finished Iron and Steel.—The return to the selling field of the local branch of a large independent and the fact that coal is slightly easier to obtain have created a little more activity in this district. This seller is again quoting on structural shapes and plates after weeks of inactivity, and ability to quote on bar business is expected. The quotations are 2c. on shapes and 2.25c. on plates. The Steel Corporation subsidiary is quoting 1.90c. on bars and 2c. on plates. The largest local independent is advancing its minimum price on bars to 2.25c. from the 2.15c. base. Cold-finished material is in big demand; a price of 2.50c. is expected to be reached in September. Considerable business in all materials is awaiting placement and the general situation is brighter. A shortage of labor and the growing dearth of cars are matters of reckoning for the near future. Sheet prices are on the upward trend. Structural awards are for small quantities and the aggregate tonnage is fairly large, but no important jobs are expected this year.

Warehouse.—Especially heavy demand for all products appears from all corners and another advance in price has been made. The call for structural shapes is exceptionally heavy and transcends the demand for all other products.

We quote warehouse prices, Buffalo, as follows: Structural shapes, 3.10c.; plates, 2.90c.; soft steel bars, 3c.; hoops, 4c.; bands, 3.80c.; blue annealed sheets, No. 10 gage, 3.90c.; galvanized steel sheets, No. 28 gage, 5.85c.; black sheets, No. 28, 4.85c.; cold rolled round shafting, 3.95c.

Old Material.—With heavy melting steel firm at $17 to $17.25, mills are buying various sized tonnages, but there is a scarcity of big sized tonnages. The demand for machine shop turnings outside the district is good and there is generally a better feeling all around. The car situation is steadily growing serious and the shortage is expected to become acute with the settlement of coal and railroad strikes. These settlements will, in the opinion of dealers, bring about a complete withdrawal of gondola cars for the transportation of old material.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$17.00 to $17.25
Low phos., 0.04 and under	18.00 to 19.00
No. 1 railroad wrought	16.00 to 16.50
Car wheels	19.50 to 20.50
Machine shop turnings	10.50 to 11.00
Cast iron borings	14.00 to 14.50
Heavy axle turnings	14.00 to 14.50
Grate bars	14.00 to 14.50
No. 1 busheling	15.00 to 15.50
Stove plate	15.00 to 15.50
Bundled sheet stampings	11.50 to 12.00
No. 1 machinery cast	19.50 to 20.50
Hydraulic compressed	15.00 to 15.50
Railroad malleable	19.50 to 20.50

St. Louis

Large Stove Plants Close on Account of Pig Iron Shortage

St. Louis, Sept. 5.—The question of getting pig iron is becoming more and more a serious problem with melters in the St. Louis district, two of the largest stove foundries and a job foundry closing down within the last week because of a lack of iron. One of the stove plants expects to resume operations shortly. Between the shortage in coal and the rail situation there is very little pig iron to be had or that can be moved. A Sheffield maker has been shipping some pig iron by rail and water, sales last week amounting to 1000 tons, but no other iron of any consequential tonnage is coming through from the South. The northern makers are in a bad way for coal, and are well booked up with orders. The Granite City maker sold 1000 tons of foundry iron during the week, some of it to distant points, and negotiations now are on for the sale of 1000 tons of foundry grades to an Eastern melter. The same maker also sold a considerable tonnage of low-silicon iron at a good price. The market is around $32 Chicago for Northern iron for spot shipment, while Southern iron is quoted around $23 to $25 Birmingham. The Sheffield maker, which has been making water and rail shipments, is now out of the market.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago and $5.17 from Birmingham and 81 cents average switching charge from Granite City:

Northern foundry, sil. 1.75 to 2.25	$32.16
Northern malleable, sil. 1.75 to 2.25	32.16
Basic	32.16
Southern foundry, all rail, sil. 1.75 to 2.25	$27.17 to 29.17

Finished Iron and Steel.—The week was featured by a renewal of interest in steel by the railroads. The principal inquiry came from the Wabash, which wants 20,000 tons of 90-lb. rails, together with the necessary

splice bars and track bolts. The Missouri Pacific has an inquiry for its requirements for spring steel for the remainder of the year. A car manufacturer has asked for quotations on 2400 wheels for 300 gondola cars to be built by the Cincinnati, Indiana & Western. Interest also is being shown in the wheel requirements for the 55 locomotives to be built for the Missouri-Kansas-Texas Railway. A jobber bought 50 tons of spring steel during the week. Jobbers are showing very little interest in buying, a situation largely due to the conditions existing in the trade, as they believe it useless because of the scarcity of steel to make inquiries Fabricators are endeavoring to make some purchases covering their immediate requirements, but they, too, realizing the conditions existing in the industry, are not showing much interest in the future. The principal letting of structural steel of the week was 650 tons for the plant of the Western Cartridge Co., East Alton, Ill., in the St. Louis industrial district, which went to the Mississippi Valley Structural Steel Co. There has been a good demand for sheets.

[illegible] bars, 2.70c. per lb.; iron bars, 2.70c.; structural shapes, 2.80c.; tank plates, 2.80c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, cold rolled, one pass, 4.85c.; cold drawn rounds, shafting and screw stock, 3.50c.; structural rivets, $3.35 per 100 lb.; boiler rivets, $3.45; tank rivets, 7/16 in. and smaller, 60 per cent off list; machine bolts, large, 50 and 10 per cent; small, 50-10 and 10 per cent; carriage bolts, large, 55-5 per cent; small, 60 and 10 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon blank, $3.50; and tapped, $3.25 off list.

Coke.—The coke situation is very serious. But little relief has come so far as a result of settlements in the coal industry. The demand is increasing, and prices are steadily advancing. Connellsville coke is now quoted at $15 at the ovens, while Chicago by-product coke has advanced $1.50 a ton to $15 furnace, while domes to grades have advanced $1. Some Alabama coke is being sold, and a car is coming through now and then.

Old Material.—The market for old material continues steadily to advance. No material is coming in either from the country or from the railroads. The demand is heavy, and some of the mills are beginning to order for their winter requirements. Foundry grades are especially strong. Car wheels are strong and scarce. There also is a good demand for special steel grades. Relaying rails are being called for by coal mines and lumber mills.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Old iron rails	$17.75 to $18.75
Rails for rolling	18.00 to 18.50
Steel rails less than 3 ft	17.50 to 18.00
Relaying rails, standard section	26.00 to 29.00
Cast iron car wheels	21.00 to 21.50
No. 1 heavy railroad melting steel	17.50 to 18.00
No. 1 heavy shoveling steel	16.50 to 17.00
Ordinary shoveling steel	16.50 to 17.00
Frogs, switches and guards cut apart	16.50 to 17.00
Heavy axle and tire turnings	11.50 to 12.00
Steel angle bars	15.75 to 16.25
Iron car axles	25.50 to 26.00
Steel car axles	19.00 to 19.50
Wrought iron bars and transoms	20.50 to 21.00
No. 1 railroad wrought	15.25 to 15.75
No. 2 railroad wrought	14.50 to 15.00
Railroad springs	18.50 to 19.00
Steel couplers and knuckles	18.50 to 19.00
Cast iron borings	11.00 to 11.50
No. 1 busheling	13.00 to 13.50
No. 1 railroad cast	19.00 to 19.50
Railroad malleable	15.50 to 16.00
Machine shop turnings	9.50 to 10.00

The Yawman & Erbe Mfg. Co., Rochester, N. Y., has placed a contract with the Cleveland Crane & Engineering Co., Cleveland, for an extensive overhead conveying system for handling cabinets through its assembling and painting departments to the shipping department. The system will include 54 one-ton carriers and electric elevators for dipping. This system will serve six baking ovens.

The Colorado Fuel & Iron Co. advanced wages of unskilled labor a little more than 21 per cent, effective Sept. 1. Common labor, which has been receiving 33c. an hour, has been increased to 40c. Advances for skilled labor will be announced later.

Boston

Sales of Foreign Iron Continue—Coke Sales Largely English

BOSTON, Sept. 5—The intervening holiday had but slight influence on the demand for foreign iron in this territory the past week, sales again amounting to several thousand tons. Business in these irons is largely confined to Scotch and "Continental," the former being the more popular of the two kinds. "Continental" iron takes a wide range, $25 to better than $27 c.i.f. dock Boston for silicon $2.50 plus, the price depending on phosphorous and manganese content. No. 3 Scotch iron sold at $30 to $32 c.i.f. Boston and No. 1 at $31 to $32, sales ranging from 1000 tons taken by a Massachusetts heater maker, to car lots. Small lots of No. 1 Scotch, part of a 3000 to 4000 ton cargo which arrived during the week, sold for spot shipment at $34 dock. About the only Scotch iron available to-day is for October shipment. Sales of domestic iron are almost nil, because furnaces are unable to ship. A small tonnage of resale high manganese Buffalo sold at $34 furnace, and No. 2X and No. 1X Alabama at prices having little bearing on the market because sales represented negotiations between foundries. Alabama iron at $35 base, Providence, R. I., dock is still available. Eastern Pennsylvania iron is quoted higher, but little is taken by melters due to the comparative cheapness of foreign brands.

We quote delivered prices, on the basis of the latest reported sales, now infrequent, and as follows, having added to furnace prices $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia and $9.60 from Alabama:

East. Penn., sil. 2.25 to 2.75	$38.15 to $39.15
East. Penn., sil. 1.75 to 2.25	37.65 to 38.65
Buffalo, sil. 2.25 to 2.75	39.41 to 41.41
Buffalo, sil. 1.75 to 2.25	38.91 to 40.91
Alabama, sil. 2.25 to 2.75	35.10 to 38.10
Alabama, sil. 1.75 to 2.25	34.60 to 37.60

Warehouse Business.—Following the advance at other large distributing centers, local warehouse prices underwent two uplifts the past week, which in the aggregate ranged from 25c. to 50c. per 100 lb. on steel, the largest spread coming in open-hearth spring steel. Plates advanced 40c., blue annealed sheets 15c., and black and galvanized sheets 25c. per 100 lb. Norway iron remains unchanged, while refined iron is 25c. to 40c. higher. Stocks of small rounds and flats, concrete bars, bands and angles are still broken. The demand for iron and steel has been stimulated by the higher prices. Wire nails have gone up 20c. to 30c. per keg. Bolts, nuts, washers and rivets are moving in normal quantities.

Jobbers quote: Soft steel bars, $3.25 per 100 lb. base; flats, $3.85; concrete bars, $3.25; structural steel, $3.25 to $3.50; tire steel, $4.50 to $4.85; open-hearth spring steel, $5 to $6.50; crucible spring steel, $12; steel bands, $4.25; hoop steel, $4.75; cold rolled steel, $4 to $4.50; refined iron, $3.25; best refined iron, $4.50; Wayne iron, $5.50; Norway iron, $6 to $6.50; plates, $3.35 to $3.55; No. 10 blue annealed sheets, $4.15 per 100 lb. base; No. 28 black sheets, $5.40; No. 28 galvanized sheets, $6.40.

Coke.—Going business in foundry coke the past week centered largely in English brands to arrive and in Southern fuel, aggregate sales for consumption in this territory exceeding 3000 tons. Most of the English coke was taken on a basis of $15 to $16 c.i.f. local dock, while Southern brought $19 delivered consuming point. The first cargo of the latter, 2500 tons, is due to arrive within 10 days and is sold. New York Interests are offering 1800 tons of English foundry coke in this territory at a little less than $15 c.i.f. dock, that city. New England producers of by-product foundry coke for September are quoting $16.50 delivered, where the local freight does not exceed $3.10, for contract fuel, but remain out of the market for spot business. The New England Coal & Coke Co. is securing a much better supply of coals and therefore will be in a position shortly to make freer deliveries of foundry coke. This fact undoubtedly will have some bearing on the market for foreign cokes.

Old Material.—The firmer feeling among yard interests, noted last week, since then has resulted in a

general marking up of old material used by mills. The higher prices are not based on any improvement in the demand for scrap, but on a growing belief that material will be scarce before the turn of the year. Present activity is confined largely to shipments against contracts previously made. Heavy melting steel values have not increased. On the other hand, those on railroad wrought, pipe, chemical borings, axles, wheels and rerolling rails are 50c. to $1 a ton higher on the average, and in a few instances even more so. Forged scrap and bundled skeleton prices are on a par with those quoted on machine shop turnings and blast furnace borings and turnings. New England foundries are showing slightly more interest in machinery cast, and the market is firmer as a result. Round tonnage lots are limited, the largest sale made the past week being 200 tons at $21.50 delivered. Stove plate also is wanted but prospective buyers and sellers are considerably apart in price.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$20.00 to $21.00
No. 2 machinery cast	18.00 to 19.00
Stove plate	15.00 to 16.00
Railroad malleable	16.50 to 17.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$11.50 to $12.00
No. 1 railroad wrought	13.50 to 14.00
No. 1 yard wrought	11.50 to 12.00
Wrought pipe (1 in. in diameter, over 2 ft. long)	9.00 to 9.25
Machine shop turnings	8.75 to 9.00
Cast iron borings, rolling mill	9.50 to 10.00
Cast iron borings, chemical	12.50 to 13.00
Blast furnace borings and turnings	9.50 to 10.00
Forged scrap and bundled skeleton	9.50 to 10.00
Street car axles	18.00 to 19.00
Street car wheels	15.00 to 15.50
Rerolling rails	12.50 to 13.00
Shafting	17.50 to 18.00

Cincinnati

Melters Not Inclined to Buy as Pig Iron Prices Continue to Advance

CINCINNATI, Sept. 5.—The proposed new pig iron rate from Birmingham to Ohio River crossings has been suspended until Dec. 31 by the Interstate Commerce Commission. Three furnaces in southern Ohio and St. Louis made objections to the proposed rate and a hearing will be held shortly to hear objections. In the meantime the old rate of $4.05 prevails.

Pig Iron.—While a number of sales are reported for fourth quarter shipment, most of the orders are for carload lots for immediate shipment. Melters generally are not inclined to contract at high prices, as most of them have low-priced iron now under contract and are willing to wait till the railroad situation loosens up and shipments are resumed. Prices are very firm and Southern iron is at least $2 higher than last week, $25 Birmingham being the minimum. We note one sale of 800 tons at this figure for fourth quarter for September delivery. The range is $25 to $28 and a number of carloads have been sold where shipment could be guaranteed. In southern Ohio $32 represents the market, although $34 has been done on carload lots for immediate shipment. We note a sale of a round tonnage of malleable to a central Ohio melter for fourth quarter, the iron coming from Chicago district on the basis of $32 furnace. A Michigan melter bought 1500 tons of foundry and malleable grades at the same figure. Small lot sales of silvery are also reported at the schedule though for immediate shipment it is said that $43.50 has been done for 9 per cent. Inquiries mostly are for carload lots to 200 tons for immediate shipment. Embargoes are holding up the shipment of iron from southern Ohio furnaces, the only road supplying cars being the Detroit, Toledo & Ironton.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$29.05
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	29.55
Ohio silvery (nominal), 8 per cent	39.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	34.27
Basic Northern	32.27
Malleable	34.27

Finished Material.—While inquiries continue to come in for prompt shipment material, consumers generally are not actively contracting for future shipment, and mills are equally averse to taking orders with any definite delivery promises. While 1.90c. can still be done on bars, shapes and plates for indefinite delivery, 2c. more generally represents the market, and on small tonnages for quick shipment 2.15c. is easily secured. The demand for sheets continues good, and mills are booking fourth quarter business from regular customers, with the understanding, however, that all the tonnage may not be shipped during the period. Some customers are anxious to cover for their sheet requirements at present prices for first quarter of next year, but are meeting with little encouragement. Mills are being handicapped in their operations by a shortage of cars for shipment of materials, and in order to secure a car as much red tape as was customary during the war period has to be gone through. Shipments south of the Ohio River are very poor. Some mills are using the river for points between Pittsburgh and Louisville, but the river packets generally will carry only a small tonnage of iron and steel products, the general restriction being a single carload. Prices on all products are advancing steadily, but with a resumption of coal mining operations, it is hoped that mill operations will increase in the near future. Inquiries in the structural field are limited to jobs taking less than 100 tons, and during the past week no awards of importance were made.

Plant Operations.—Steel plants in the district are maintaining their schedule of operations, but difficulties are increasing owing to coal and car shortage. It is hoped, however, that it will not be necessary to further curtail operations, which are running close to 85 per cent of capacity among all the plants.

Warehouse Business.—Prices on all products have been advanced from $2 to $4 per ton during the week, and it is considered probable that further advances will be made within a short time. The demand for materials, with the exception of wire products, is heavy, and jobbers' stocks are badly broken.

Cincinnati jobbers quote: Iron and steel bars, 2.95c. base; reinforcing bars, 3.05c. base; hoops, 4.05c. base; bands, 3.85c. base; shapes and plates, 3.05c. base; cold-rolled rounds, 3.75c. base; cold-rolled flats, squares and hexagons, 4.25c. base; No. 10 blue annealed sheets, 4c.; No. 28 black sheets, 4.70c.; No. 28 galvanized sheets, 5.75c.; No. 9 annealed wire, $2.85 per 100 lb.; common wire nails, $3.05 per keg, base.

Coke.—It is expected that at least two furnaces in the Jackson and Wellston district will be in blast before the end of the month, as arrangements are now being completed for fuel supply. All available coke is eagerly snapped up. The situation appears to be easing up, but prices remain firm.

Old Material.—As last quoted, the scrap market is much stronger and inquiries are good, particularly for cast grades. We note a sale of 1000 tons of railroad wrought to a melter in the South and inquiries ranging from 100 to 500 tons are more prominent. Prices, while inclined to advance, are not quotably higher.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

Per Gross Ton	
Bundled sheets	$9.50 to $10.00
Iron rails	15.50 to 16.00
Relaying rails, 50 lb. and up	26.50 to 27.00
Rails for rerolling	14.50 to 15.00
Heavy melting steel	14.50 to 15.00
Steel rails for melting	14.00 to 14.50
Car wheels	16.50 to 17.00
Per Net Ton	
No. 1 railroad wrought	13.00 to 13.50
Cast borings	10.00 to 10.50
Steel turnings	9.00 to 9.50
Railroad cast	16.00 to 16.50
No. 1 machinery	19.00 to 19.50
Burnt scrap	10.50 to 11.00
Iron axles	19.50 to 20.00
Locomotive tires (smooth inside)	12.50 to 13.00
Pipes and flues	7.50 to 8.00

Railroad Strike Ended

The strike of train service employees on the Elgin, Joliet & Eastern Railroad, which was called in sympathy with that of the shopmen, has been settled. This road is a Steel Corporation subsidiary in the Chicago district.

Birmingham

Pig Iron for Spot Delivery Sold at $27.50—Offers of $25 Refused

BIRMINGHAM, Sept. 5.—Birmingham pig iron for spot delivery has been sold at $27.50 by one maker and quoted by another. The lots were small ones. This price is easily gotten where prompt delivery is assured. Firm offers for round lots at $25 for fourth quarter have been made and declined. At the same time, two makers remain on the base of $25 for such iron as they can book in view of the state of order books. The spot and fourth quarter markets seem to be converging. The market is very nervous. Last week's business was small and deliveries were for nearby points, a large inquiry for spot requirements having been declined on account of the rail embargoes. The only sale of consequence for fourth quarter delivery that came to the surface was one involving 2000 to 3000 tons, most of which is for October and November and brought a base of $24. Larger tonnage was proffered at a shade under that base, but was not taken. A consumer, who was offered $24 for fourth quarter, said he could do better, but there was no sale denoting that he could. Makers as a rule are out of the market for the fourth quarter. Makers now regard $25 as the base for fourth quarter because the 20 per cent wage advance announced by the Steel Corporation and to which all have conformed means $2.50 to $3 a ton more in cost of producing pig iron. Charcoal iron has been fairly active at $33 and $34. Makers seem agreed that spot and fourth quarter iron prices have about reached the same base. Birmingham iron operators have received official notice of the suspension of the lower rates on iron to Louisville, Cincinnati and St. Louis proposed by Louisville & Nashville and other Southern carriers to go in effect Sept. 1 pending further investigation. No order has been received as to lower rates proposed by the Arrow Transportation Co. and Burlington Railroad on northern Alabama iron to Chicago effective Sept. 15. The Sloss-Sheffield Steel & Iron Co. has made a shipment of 3000 tons of by-product coke to New England foundries by vessel out of Charleston. The oven price was $8, it is announced.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon 1.75 to 2.25	$25.00 to $27.00
Basic	24.00 to 25.00
Charcoal, warm blast	33.00 to 34.00

Finishing Mills.—The finishing mills of the district remain on full turn. The Tennessee company is on double turn in the mills at Fairfield, Bessemer and Ensley. The Chickasaw Shipbuilding & Car Co. has turned out about 500 of the new cars out of the 1750 ordered by the Seaboard Air Line and they are coming out at the rate of 15 new ones and 10 to 12 repaired ones per day. The Louisville & Nashville order for 1000 cars comes next. The mills of the Gulf States Steel Co. and the American Steel & Wire Co. are on full turn in finishing departments. Mills do not seem worried over accumulations in view of the strength of the market.

Cast Iron Pipe.—The pressure pipe trade is momentarily expecting to hear of scheduled prices for the De Lavaud machine made pipe which has undergone all kinds of tests at the North Birmingham plant of the United States Cast Iron Pipe & Foundry Co. and satisfied all experts. The 6-, 8- and 10-in. sizes have been given the acid test and proven all right and the same results are expected of the 12-in. sizes. The base remains at $38.50 with many small orders, but not many new large ones coming in. Sanitary pipe has been less active and the base is $60 where it was $65. The former figure is regarded as high enough. Unfilled tonnage of sanitary pipe is believed to be less than it was. All pipe plants operate on full turn most of the time with occasional interruptions following delay in receiving pig iron. The Chattanooga plant of the leading interest was down the better part of last week, but the Birmingham plants operate on full turn. The leading interest is moving 4000 tons to the Government barracks in Honolulu via ship out of Mobile.

Old Material.—Demand for scrap is picking up and prices are much firmer with advances momentarily expected. Cast has already sold more than $1 over quoted prices to small consumers.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Steel rails	$13.00 to $15.00
No. 1 steel	12.00 to 15.00
No. 1 cast	15.00 to 16.00
Car wheels	15.00 to 16.00
Tramcar wheels	14.00 to 15.00
Stove plate	13.00 to 14.00
Cast iron borings	6.00 to 7.00
Machine shop turnings	4.00 to 5.00

Cleveland

Fuel Conditions Improved—Active Demand for Finished Materials

CLEVELAND, Sept. 5.—The fuel situation improved considerably during the week and the steel situation eased up somewhat owing to the fact that some independent mills that had been entirely out of the market are increasing operations now that steam coal has become fairly plentiful and are again entering orders. The American Steel & Wire Co., which has been operating but one of four Central furnaces in Cleveland, started up a second furnace Friday and expects to get a third stack in operation within a week. Some of the independent steel companies and merchant furnaces are now figuring on coke and coking coal, which have declined in price, and expect to resume operations shortly. The question now seems to be more one of price of fuel rather than difficulty in securing a supply. Fuel shipments from Kentucky and West Virginia, curtailed by the inability of the railroads to operate at normal capacity, show no improvement.

Pig Iron.—The market was less active during the past week than for some time. With the available supply very limited, sales were confined mostly to car lots. The price advance seems to have been checked with a maximum price of $35 that is being named on foundry iron by a Cleveland producer. Some of the lake furnaces are still able to take care of the urgent needs of their customers and are adhering to their recent price of $32 to $33 for foundry iron for early shipment and southern Ohio iron is available at the same price. Considering the scarcity, the demand for spot iron is rather light, indicating that most consumers have stocks. Now that easing up of the situation is looked for, foundries are expected to show less haste in placing orders to cover their early requirements. Inquiries include one from the Gould Coupler Co. for 1000 to 2000 tons of malleable iron for early shipment. Some new inquiries have come out for the fourth quarter contracts and on these a local furnace quoted $35, but this price failed to bring any orders. Some fourth quarter business in foundry iron is being booked in Detroit at $32, and in Buffalo at $33. No further advance has been made on low phosphorus iron. We note the sale of 1000 tons to a Pittsburgh district consumer for the remainder of the year and 700 tons in small lots all at $38.

Quotations below are f.o.b. local furnace for Northern foundry iron, not including a 50c. switching charge. Other quotations except basic and low phosphorus are delivered Cleveland, being based on a $3.02 rate from Jackson and a $6 rate from Birmingham:

Basic, Valley furnace, nominal	$27.00
Northern No. 2 fdy., sil. 1.75 to 2.25	35.00
Southern fdy., sil. 1.75 to 2.25	$30.00 to 31.00
Malleable	35.00
Ohio silvery, from sil. 8 per cent	40.52 to 42.52
Standard low phos., Valley furnace	38.00

Iron Ore.—Ore shipments from the Lake Superior district during August showed a gain over July in spite of the slowing down of the movement from a few ports caused by the curtailment of the railroad transportation facilities. Shipments during the month amounted to 9,016,426 gross tons as compared with 8,942,336 tons in July. Shipments for the season up to Sept. 1 were 26,309,939 tons as compared with a total movement last year of 22,300,726 tons. The rail situation on lines leading to Ashland and Escanaba has improved. At the

lower end of the lakes, railroad conditions are interfering with shipments to southern Ohio, but the ore movement to other points is about normal.

We quote delivered lower Lake ports, Old range Bessemer, 55 per cent iron, $5.95; old range non-Bessemer, 51½ per cent iron, $5.20; Mesabi Bessemer, 55 per cent iron, $5.70; Mesabi non-Bessemer, 51½ per cent iron, $5.[illegible]

Bolts, Nuts and Rivets.—A price advance of 10 per cent on bolts and nuts was made by leading manufacturers Aug. 31 and rivet manufacturers on the same date advanced prices $7 per ton to 3c. for structural and 3.10c. for boiler rivets. One or two rivet manufacturers made this advance the previous week on some small lot orders. Small rivets have been advanced to 60 and 5 per cent off list, with 65 per cent off list for less than car lots. The advances are due to the increasing cost of steel. Bolt and nut manufacturers are taking orders for both immediate shipment and fourth quarter at the new prices. Some of the rivet manufacturers, in view of market conditions, are declining to make fourth quarter contracts. There was a spurt in the demand during the week, particularly from jobbers who wished to get their orders entered before the price advance.

Finished Iron and Steel.—The demand for finished iron and steel is fairly heavy, showing no falling off as compared with the past few weeks. Many consumers are badly in need of material, but it is expected that with the increased mill operations the supply will become more plentiful in the next two or three weeks. There is a very active inquiry for structural material, the demand for which is about equal to that of steel bars. The suspension of steel shipments at the Ford Motor Co. has not been followed by a holding up of orders by a number of large consumers making automobile parts and suspension orders have not come from other automobile plants. About the only change in the price situation during the week was an advance of $5 per ton to 2.50c. on plates by a local mill. Plate quotations now range from a 2c. minimum, with much of the business being placed at 2.25c., although some boiler plates are being sold at 2.50c. Quotations on steel bars range from 1.90c. to 2c. and on structural shapes from 2c. to 2.10c., although some mills are quoting higher prices for early shipment, as high as 2.35c. being quoted for shapes. The advance in steel prices has not checked building activity. The city of Cleveland will shortly ask for bids for a pumping station requiring 1000 tons of steel. The Great Lakes Engineering Works has taken a large ferry-boat for the Detroit River.

Jobbers quote steel bars, 2.81c.; plates and structural shapes, 2.91c.; No. 9 galvanized wire, 3c.; No. 9 annealed wire, 2.50c.; No. 28 black sheets, 4.25c.; No. 28 galvanized sheets, 5.25c.; No. 10 blue annealed sheets, 3.50c. to 3.61c.; hoops and bands, 3.61c.; cold-rolled rounds, 3.60c.; flats, squares and hexagons, 4.10c.

Reinforcing Bars.—The demand is fairly heavy for early shipment and much of the material is being taken out of warehouses. Prices on hard steel reinforcing bars are unchanged at 2c.

Sheets.—The demand for sheets continues fairly heavy and prices are firm. A local mill has advanced its price to 2.70c. for blue annealed in heavier gages and to 5c. for automobile body sheets, the latter for the last half of October delivery. Black sheets can still be purchased at 3.50c. and galvanized at 4.50c. for early shipment.

Coke.—Offerings of Connellsville foundry coke are more plentiful and the market is easier. While $14.50 is being quoted for better grades, lower prices are expected this week.

Old Material.—Scrap prices have further advanced and the market is very firm. There is not a great deal of activity, although there is still some demand for heavy melting steel and compressed steel to cover orders recently released by the McKinney Steel Co. Dealers have been able to buy some heavy melting steel at $16.50 from producers, but dealers are asking higher prices. The advances in pig iron prices together with the fact that railroads are not offering a great deal of scrap this month, owing probably to a scarcity of labor, have resulted in a stiffening of prices on cast scrap. A local foundry has purchased railroad malleable at around $17.50 delivered, but the market has evidently further advanced. No. 1 cast scrap is from $2 to $3 higher. A local mill has held up shipments on turnings.

We quote per gross ton, f.o.b. Cleveland, as follows:

Heavy melting steel	$17.00 to $17.25
Steel rails under 3 ft	17.25 to 17.75
Rails for rolling	17.25 to 18.00
Iron rails	[illegible]
Iron car axles	18.00 to 19.00
Low phosphorus melting	18.00 to 18.25
Cast borings	13.00 to 13.50
Machine shop turnings	12.25 to 12.50
Mixed borings and short turnings	12.25 to 12.50
Compressed steel	15.00 to 15.25
Railroad wrought	[illegible]
Railroad malleable	17.25 to 17.75
Light bundled sheet stampings	11.50 to 12.00
Steel axle turnings	14.50 to 15.00
No. 1 cast	[illegible]
No. 1 busheling	12.00 to 12.50
Drop forge flashings over 10 in	12.00 to 12.25
Drop forge flashings under 10 in	12.00 to 12.25
Railroad grate bars	15.00 to 15.50
Stove plate	15.00 to 15.50
Pipes and flues	11.50 to 12.00

Philadelphia

Foundry Pig Iron and Steel Prices Advance Still Further

PHILADELPHIA, Sept. 5.—The iron and steel trade in this district has moved to higher price levels during the past week. Increasing costs, together with better demand, and greater commitments have brought about the changes. They cover many lines. Among them are foundry pig iron, plates, structural material, iron and steel bars, nuts, bolts and rivets, light rails, wire rods, wire products and scrap. The price increases range from 50c. and $1 a ton in the case of scrap, $2 in pig iron, and up to $5 in finished lines.

Operations have shown only slight improvement and no substantial increase is expected during the next two weeks. With heavier deliveries of coal made under priority rulings, however, it is expected that the transportation situation will become better, affording more adequate deliveries of raw materials to steel works and of manufactured products to consumers. The railroads are actively in the market for locomotives, cars, and steel tonnage for repair work in preparation for growing demands upon them.

Among the transportation difficulties which have risen is the declaration of an embargo on steel and other shipments on the Baltimore & Ohio Railroad east of Cumberland, Md.

The general tone of the trade is one of growing cheerfulness. Rollings at low prices have been entirely completed by some makers, while others have almost finished production at these levels. September therefore finds them on a higher scale which affords better margins consistent with the greater costs.

Ferroalloys.—Most consumers of ferromanganese have covered their requirements so that the greater portion of shipments, if not all of them, will have been delivered before the high tariff duty becomes effective. Inquiry is light. Last quarter standard ferromanganese is quoted at $67.50, Atlantic seaboard, while spot material is quoted at $72.50 to $75. Prompt spiegeleisen is quoted at $38.50 and is in light demand.

Pig Iron.—With a greater scarcity of domestic iron, the market continues its upward swing. No. 2 plain and No. 2 X have advanced $2 per ton, with No. 1 X quoted nominally at $37.14 to $37.64, delivered Philadelphia. No. 2 now is quoted at $35.14 to $35.64 and No. 2 X at $36.14 to $36.64. Foreign iron continues to come in good sized lots, although the incoming tonnages are said to have been overstated in some reports. Foreign iron is being delivered at approximately $5 per ton under domestic prices. It is understood that for deferred delivery Continental No. 2 plain iron can be bought for $26 and less, delivered. Sales of foreign iron include Continental, Scotch and English. Scotch iron, 2.50 to 3.25 per cent silicon, is commanding $32 to $33, delivered, for shipments over next month, Con-

tinental and English iron, 2.25 to 2.75 silicon, high in phosphorus, $28 for September shipments from abroad. Scotch iron for prompt shipment is said to have sold during the past week at more than $35. Sales of domestic iron have been extremely limited owing to restricted operations, the tonnages moving being chiefly foundry grades. Active furnaces are getting delivery on coke so that they can continue to operate. One large steel maker will blow in two additional blast furnaces this week. A round tonnage of foreign low phosphorus iron, copper, nickel, and chrome free, silicon 2 to 2.50 per cent, for delivery the middle of September has been sold at $37, c.i.f. Foreign iron ore still is coming in in fair volume, including Swedish magnetic and African hematite, at lower prices than domestic ore.

[illegible] Those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 76 cents to $1.64 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$35.14 to $35.64
East. Pa. No. 2X, 2.25 to 2.75	36.14 to 36.64
[illegible]	[illegible]
Virginia No. 2 plain, 1.75 to 2.25 sil.	29.17 to 30.17
Virginia No. 2X, 2.25 to 2.75 sil.	30.17 to 31.17
Basic delivery eastern Pa.	32.00 to 33.00
Gray forge	31.00 to 32.00
[illegible]	[illegible]
Standard low phos. (f.o.b. furnace)	38.00 to 40.00
Copper bearing low phos. (f.o.b. furnace)	35.00 to 40.00

Semi-finished Steel.—The market for semi-finished steel in this district is comparatively quiet and prices remain unchanged. Forging billets and rerolling billets have been sold the past week at the higher prices which went into effect at that time. The former is quoted at $50.17 and the latter at $45.17, delivered Philadelphia.

Plates.—Growing strength is reflected in the market for plates and more independent makers are asking as high as 2.50c., Pittsburgh, and sales at this figure are reported. The market is quoted at 2.25c. to 2.50c., attractive tonnages being available at the lower figure. Demand is of a miscellaneous character, but comes principally from the railroads for car repair work and also for new cars and locomotives. The trade is expecting increasing demands with the approach of fall. The Baldwin Locomotive Works has taken 100 locomotives for the Pennsylvania Railroad, which, in addition will build 15 locomotives at its Altoona, Pa., shops. It is expected that the 4000 to 5000 tons of plates for the 100 locomotives will be placed at once if this has not already been done. Deliveries of plates range from two to 16 weeks, depending on the sizes and kinds. A maker in this district has taken approximately 700 tons for a Wilson Line boat. Most producers are cleaned up on low priced tonnage and are on the new and higher basis.

Structural Material.—Fabricators report that a good volume of business is being taken, most of it representing small individual lots. Deliveries are being made in six to eight weeks. Plain material has advanced and now is quoted at 2.10c to 2.25c., Pittsburgh, by independent mills. Mills continue to be reluctant to quote for extended delivery.

Bars.—Independents are quoting the same range on soft steel bars, 2.25c. to 2.50c., Pittsburgh, as on plates, and sales at 2.35c. have been reported. Inquiry is fair. Light demand still exists for common iron bars. The minimum quotation on the latter now has advanced to 2.10c. from 2c., while a price as high as 2.25c. is being asked for small tonnages.

Warehouse Business.—Demand for warehouse tonnage is fair and comes from various sources, including railroads desiring prompt delivery. Prices are unchanged.

[illegible] tool steel, 8c.; Norway iron, 5.50c.

Nuts, Bolts and Rivets.—An increase of approximately 10 per cent has been made by a prominent producer in this district in bolts, nuts and rivets, effective Sept. 1. The following are the new prices, Pittsburgh base: machine bolts with hot pressed nuts, increased to 50, 10 and 10 off list from 60 and 10 off list; United States standard hot pressed nuts, cold punched, square, hexagon, blank and tapped, increased to 3.75c. per pound off list from 4.50c.; steel boiler rivets increased to 3.10c. per pound from 2.50c.; structural buttonhead rivets increased to 3c. per pound from 2.40c. and small rivets increased to 65 and 5 off list from 70 and 10 off. Demand for all three products is growing and deliveries are being made in two to three weeks. The demand for rivets is, however, light but is improving. Requirements for the railroads are the greatest.

Light Rails.—Light rails, 45 pounds and under, have been advanced $5 per ton to 2.25c., Pittsburgh.

Wire Rods and Wire Products.—Soft wire rods have been increased $5 per ton in price by an independent maker and now are quoted at $45, Pittsburgh. Demand has increased. Nails now are quoted at 2.75c., Pittsburgh, and plain wire at 2.50c., Pittsburgh.

Old Material.—Most grades of scrap have been advanced from 50c. to $1 per ton. The increase does not include some of the leading grades, such as heavy melting steel and No. 1 cast scrap. Dealers still are cautious about selling, expecting still higher prices. Rolling mill demand has shown particular activity.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$15.50 to $16.00
Scrap rails	15.50 to 16.00
Steel rails for rolling	17.00 to 17.50
No. 1 low phos., heavy 0.04 and under	22.00 to 24.00
Cast iron car wheels	20.00 to 20.50
No. 1 railroad wrought	18.50 to 19.50
No. 1 yard wrought	17.50 to 18.00
No. 1 forge fire	14.00 to 14.50
Bundled sheets (for steel works)	13.50 to 14.50
No. 1 busheling	13.50 to 14.50
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	13.50 to 14.00
Mixed borings and turnings (for blast furnace use)	13.50 to 14.00
Machine-shop turnings (for steel works use)	14.00 to 14.50
Machine-shop turnings (for rolling mill use)	14.50 to 15.00
Heavy axle turnings (or equivalent)	14.50 to 15.00
Cast borings (for blast furnace and rolling mills)	15.00 to 15.50
Cast borings (for chemical plants)	17.50 to 18.00
No. 1 cast	19.00 to 20.00
Heavy breakable cast (for steel plants)	19.00 to 19.50
Railroad grate bars	16.00 to 16.50
Stove plate (for steel plant use)	16.00 to 16.50
Railroad malleable	15.00 to 15.50
Wrought iron and soft steel pipes and tubes (new specifications)	14.50 to 15.50
Shafting	21.00 to 22.00

Detroit Scrap Market

DETROIT, Sept. 5.—Cast scrap is in demand and there has been a tendency to cover on this material for the remainder of the year. As usual, the larger tonnages of scrap produced by the automobile plants has been sold for delivery to Cleveland and Valley points for September delivery. The following prices are on a gross ton basis f.o.b. cars producers' yards:

Heavy melting steel	$15.25 to $15.75
Shoveling steel	14.50 to 15.50
No. 1 machinery cast	15.50 to 16.50
Cast borings	12.00 to 13.00
Automobile cast scrap	20.50 to 21.50
Stove plate	14.00 to 14.50

The Warren Foundry & Machine Co., Phillipsburg, N. J., maker of cast-iron pipe, has changed its name to the Warren Foundry & Pipe Co. The name, which has been borne by that company since its establishment in 1856, was changed by a resolution of the stockholders and authorization of the Secretary of State of New Jersey, as it was somewhat of a misnomer, the company never having entered into the manufacture of machinery. No other change has been made.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Plates

Sheared, tank quality, base, per lb.....2.00c. to 2.50c.

Structural Material

Beams, channels, etc.....2.00c. to 2.25c.

Iron and Steel Bars

Soft steel bars, base, per lb.....1.90c. to 2.25c.
Refined iron bars, base, per lb.....2.45c.

Hot-Rolled Flats

Hoops, base, per lb.....2.75c.
Bands, base, per lb.....2.75c.
Strips, base, per lb.....2.75c.
Cotton ties, per bundle of 45 lb.....$1.12

Cold-Finished Steels

Bars and shafting, base, per lb.....2.25c. to 2.50c.
Strips, base, per lb.....4.25c.

Wire Products

Nails, base, per keg.....$2.60
Bright plain wire, base, per 100 lb.....2.35
Annealed fence wire, base, per 100 lb.....2.35
Galvanized wire, base, per 100 lb.....2.85
Galvanized barbed, base, per 100 lb.....3.15
Galvanized staples, base, per keg.....3.15
Painted barbed wire, base, per 100 lb.....2.65
Polished staples, base, per keg.....2.65
Cement coated nails, base, per count keg.....2.10c.
Woven fence, carloads (to jobbers).....73 per cent off list
Woven fence, carloads (to retailers).....70½ per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads..60 and 10 per cent off list
Machine bolts, small, cut threads..50, 10 and 10 per cent off list
Machine bolts, larger and longer..50, 10 and 10 per cent off list
Carriage bolts, ⅜ x 6 in.:
  Smaller and shorter, rolled threads, 50, 10 and 10 per cent off list
Cut threads.....50 and 10 per cent off list
  Longer and larger sizes.....50 and 10 per cent off list
Lag bolts.....50 and 10 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads....50 and 10 per cent off list
  Other style heads.....20 per cent extra
Machine bolts c.p.c. and t. nuts, ⅜ x 4 in.:
  Smaller and shorter.....45 and 10 per cent off list
  Larger and longer sizes.....45 and 10 per cent off list
Hot pressed square or hex. blank nuts.....$3.75 off list
Hot pressed nuts, tapped.....3.75 off list
C.p.c. and t. sq. or hex. nuts, blank.....3.75 off list
C.p.c. and t. sq. or hex. nuts, tapped.....3.75 off list
Semi-finished hex. nuts:
  9/16 in. and smaller, U. S. S.....80 per cent off list
  ⅝ in. and larger, U. S. S.....75 per cent off list
  Small sizes, S. A. E.....80 and 10 per cent off list
  S. A. E. ⅝ in. and larger.....75 and 10 per cent off list
Stove bolts in packages.....80 and 5 per cent off list
Stove bolts in bulk.....80, 5 and 2½ per cent off list
Tire bolts.....50, 10 and 10 per cent off list

Cap and Set Screws

Milled square and hex. head cap screws, 75 and 10 per cent off list
Milled set screws.....75 per cent off list
Upset cap screws.....80 per cent off list
Upset set screws.....80 and 5 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb.....$3.00
Large boiler rivets, base, per 100 lb.....3.10
Small rivets.....65 per cent off list

Track Equipment

Spikes, 9/16 in. and larger, base, per 100 lb.....$3.75
Spikes, ½ in. and smaller, base, per 100 lb.....3.25
Spikes, boat and barge, base, per 100 lb.....3.25
Track bolts, base, per 100 lb.....$3.75 to 4.50
Tie plates, per 100 lb.....2.25
Angle bars, base, per 100 lb.....2.40

Welded Pipe

Butt Weld

Inches	Steel Black	Steel Galv.	Iron Black	Iron Galv.
⅛	51½	26	⅛ to ¼	+11½
¼ to ⅜	57	31½	⅜	31½
½	61	43½	½	37½
¾	64	51½	¾	43½
1 to 1¼	66	54½	1 to 1½	39½
2 to 3	68	56½		

Lap Weld

Inches	Steel Black	Steel Galv.	Iron Black	Iron Galv.
2	61	43½	2	34½
2½ to 6	65	53½	2½ to 6	47½
7 to 8	62	49½	7 to 12	35½
9 to 12	61	48½		22½

Butt Weld, extra strong, plain ends

Inches	Steel Black	Steel Galv.	Iron Black	Iron Galv.
⅛	47½	31	⅛ to ¼	+2½
¼ to ⅜	53	36½	⅜	30½
½	59	48½	½	37½
¾	64	53½	¾	43½
1 to 1½	66	55½	1 to 1½	39½
2 to 3	67	56½		

Lap Weld, extra strong, plain ends

Inches	Steel Black	Steel Galv.	Iron Black	Iron Galv.
2	59	48½	2	34½
2½ to 4	63	52½	2½ to 4	38½
4½ to 6	62	51½	4½ to 6	37½
7 to 8	58	44½	7 to 8	30½
9 to 12	52	39½	9 to 12	25½

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 and 2½ per cent.

Boiler Tubes

Lap Welded Steel		Charcoal Iron	
1¾ in.	23½	1¼ in.	2
2 to 2¼ in.	38	1¾ to 1⅞ in.	3
2½ to 3 in.	49	2 to 2¼ in.	18
3¼ to 13 in.	54	2½ to 3 in.	23
		3¼ to 4½ in.	25

To large buyers of steel tubes a supplementary discount of 5 per cent is allowed.

Standard Commercial Seamless Boiler Tubes

Discounts on cold-drawn tubes in carload lots, f.o.b. Pittsburgh, follow:

1 in.	57	2½ and 2¾ in.	40
1¼ and 1½ in.	49	3 in.	44
1¾ in.	33	3½ to 4 in.	43
2 and 2¼ in.	36	4½ in. and 5 in.	41
		Hot Rolled	
3 in.	46	3½ in.	51

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base, 85 per cent off list. Carbon 0.30 to 0.40, base, 83 per cent off list. Plus usual differentials and extras for cutting.

Seamless Locomotive and Superheater Tubes

	Cents per Ft.		Cents per Ft.
2-in. O.D. 12 gage	13	2¼-in. O.D. 10 gage	17¾
2-in. O.D. 11 gage	14	3-in. O.D. 7 gage	33
2-in. O.D. 10 gage	15	1½-in. O.D. 9 gage	13
2¼-in. O.D. 12 gage	15	5⅜-in. O.D. 9 gage	51
2¼-in. O.D. 11 gage	16	5½-in. O.D. 9 gage	53

Tin Plate

Standard cokes, per base box.....$4.75

Terne Plate

(Per package, 200-lb.)

8-lb. coating	$9.30	25-lb. coating I. C.	$14.25
8-lb. coating I. C.	9.60	30-lb. coating I. C.	15.25
15-lb. coating I. C.	11.80	35-lb. coating I. C.	16.25
20-lb. coating I. C.	13.00	40-lb. coating I. C.	17.25

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....2.50c. to 2.60c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.35c. to 3.50c.

Galvanized

No. 28 (base), per lb.....4.35c. to 4.50c.

Tin-Mill Black Plate

No. 28 (base), per lb.....3.35c. to 3.50c.

Manufacturers have pamphlets, which can be had upon application, giving price differentials for gage and extras for length, width, shearing, etc.

Freight Rates

All rail freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic	$0.325	Buffalo	$0.265	St. Louis	$0.43
Philadelphia, export	0.235	Cleveland	0.215	Kansas City	0.735
Baltimore, domestic	0.315	Cleveland, Youngstown		**Kansas City (pipe)**	0.705
Baltimore, export	0.225	Comb.	0.19	St. Paul	0.595
New York, domestic	0.34	Detroit	0.295	Omaha	0.735
New York, export	0.255	Cincinnati	0.295	**Omaha (pipe)**	0.705
Boston, domestic	0.365	Indianapolis	0.31	Denver	1.275
Boston, export	0.255	Chicago	0.34	Denver (pipe)	1.215

Pacific Coast	$1.50
Pac. Coast, ship plates	1.20
Birmingham	0.69
Memphis	0.385
Jacksonville, all rail	0.50
Jacksonville, rail and water	0.415
New Orleans	0.515

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha, and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 30c. to 40c.; ship plates, 30c. to 40c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 30c. to 40c.; sheets and tin plates, 50c.; rods, wire rope, cable and strands, 75c.; wire fencing, netting and stretcher, 50c.; pipe, not over 8 in. in diameter, 50c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

FRENCH MARKET ADVANCES

Recent Improvement in Exports Followed by Domestic Demand—More Furnaces in Blast

(Special Correspondence)

PARIS, Aug. 24.—The situation for the present is satisfactory. The improvement in exports, due to the appreciation of British currency, to the strikes in the United States and to the inability of German sellers to book ahead, has been followed by an increase in domestic orders, and prices generally are firm. More blast furnaces have been blown in.

French iron and steel exports and imports during the first half of 1922 were as follows, as compared with last year:

	First Half 1922, Metric Tons	First Half 1921, Metric Tons
Exports		
Pig iron	24,000	316,000
Semi-finished steel	357,000	240,000
Iron ore	4,328,000	2,666,000
Imports		
Pig iron	35,000	15,000
Semi-finished steel	161,000	90,000
Hoops and strip	15,000	8,000
Tin plate	23,000	7,500

Pig Iron.—Chill-cast foundry pig iron No. 3 is firm. One Lorraine concern, probably overstocked, is still quoting 205 francs, but this price is now the exception, the present average being 205 to 215 francs. For export, Lorraine and Luxemburg producers, intent on sales to Germany, are offering but small quantities f.o.b. Antwerp at 225 to 230 francs (Belgian currency), which is equivalent to 213 to 218 francs (French currency). Belgians are quoting 220 to 225 francs, in their own currency, f.o.b. Antwerp.

Hematite pig iron, which will not be controlled by the Comptoir des Fontes Hématites after August, is now showing some hesitation. The price of 270 francs at producing works in the north of France is considered as likely to take business against British competition. This is a low price, especially as these works are only a short distance from seaports. British East Coast hematite, mixed numbers, is quoted now at about 310 to 315 francs in French northern ports.

Orders booked in July by the Comptoir des Fontes Hématites, which goes out of existence Aug. 31, totaled more than in June.

Semi-Finished Steel.—This market is active, especially for export, and a rise of 5 francs per ton is reported on mild steel products, which are now quoted f.o.b. Antwerp, per metric ton, as follows:

	Francs (French)
Ingots	300 to 305
Blooms	315 to 320
Billets	325 to 330

Delivery is becoming extended and is now not less than three months.

Beams.—Although the present demand for beams is not strong, the Comptoir Sidérurgique will not book ahead beyond October, which would indicate a belief that there will be a rise of prices after the holidays.

Rails.—A rail proposition from several tramway companies, which have agreed upon common specifications, is now being considered. The base price for rails of 20 kg. and heavier is still 500 francs.

Sheets.—Delivery is now two months for heavy and medium sheets and three months for light sheets. The Comptoir des Tôles has now entirely discontinued paying bounties on its products, which are firm and tending to rise.

Rolled Merchant Products.—Demand is good, both in the inland market and for export. Quotations range from 435 to 445 francs at producing works in Lorraine or in the East, 5 francs more than last week. Delivery is not under three months and in some cases it reaches five months for medium and small specifications.

Steel Wire.—Demand is better, at an average price of 460 francs.

Castings.—Improvement continues, particularly at works making agricultural machinery. Prices, however, remain low.

Coke.—French collieries of the Nord and Tas-de-Calais have agreed to sell to the Société des Cokes de Hauts-Fourneaux, from Aug. 10 to Oct. 31, metallurgical coke at 95 francs at ovens and coking slacks at 67 francs at mines. These are to be pooled with German cokes, the price on which has been maintained at 97 francs, Franco-German frontier, for September.

GERMAN MARKET ACTIVE

Prices Mounting Rapidly—Present Scale Scheduled for Ten Days Only—Still Below World Prices

(By Cable)

BERLIN, GERMANY, Sept. 2.

IRON and steel market is active, with prices going rapidly upward. The home demand is enormous. The iron industry union henceforth will fix prices according to dollar exchange, instead of according to mark production cost.

Foundry iron No. 1, from Sept. 1 to Sept. 10, is priced at 24,491 m. per metric ton ($19.28 per gross ton, at 7¾c. per 100 m.). Other grades of pig iron have been raised proportionately, so that the average is now about 375-fold pre-war rates.

The Steel Syndicate has raised ingots to 27,530 m. ($21.68); bars to 37,020 m. (1.30c. per lb.); sheets exceeding 5 mm. (25½ United States gage) to 41,580 m. (1.46c. per lb.); other items proportionately.

Prices at current exchange are still below world market prices and new increases are probable Sept. 10 unless the mark meanwhile makes a big recovery.

Electric Alloy-Atlas Crucible Merger Plans Progressing

YOUNGSTOWN, Sept 4.—Final details of the combination of the Electric Alloy Steel Co., plant of which is at Charleroi, Pa., and the Atlas Crucible Steel Co., Dunkirk, N. Y., are now being worked out, according to Louis J. Campbell, president of the former, who a short time ago was elected chairman of the Atlas company. Financing the merger has been completed, Mr. Campbell says, and a meeting of the stockholders of the Electric Alloy Steel Co., will be called, probably late this month, to ratify the amalgamation.

New Honorary Member of Steel Treaters

Professor Henry LeChatelier, Paris, France, has been elected to honorary membership in the American Society for Steel Treating. The celebration of the 50th anniversary of his scientific career was recently observed in Paris, and at that time Professor LeChatelier was notified and accepted his election as an honorary member. The other honorary members of the American Society for Steel Treating are:

Sir Robert Hadfield, Bart., F.R.S., London, England; Albert Sauveur, Sc.D., Cambridge, Mass.; Edward DeMille Campbell, Sc.D., Ann Arbor, Mich.; John Alexander Mathews, Sc.D., New York City; Elwood Haynes, B.S., Kokomo, Ind.

Chicago Building Falling Off

Building permits issued in Chicago in August showed a decline as compared with July. Permits were granted for 1048 buildings, fronting 30,382 ft. and involving $17,919,950, as against 1144 permits involving 33,074 ft. of frontage and $16,214,300 for the previous month. While the cost total is greater than for July, when the first decline in permits was noted, it falls nearly $10,000,000 short of the total estimated cost for permits issued in June. Taking out a single permit for the Belden Hotel covering $4,000,000, the August figure would be considerably less than that for July.

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
Aug.	Lake	Electrolytic*	New York	New York	St. Louis	New York	St. Louis
30.....	14.12½	13.75	32.62½	5.90	5.55	6.60	6.25
31.....	14.12½	13.75	32.50	5.90	5.55	6.60	6.25
Sept.							
1.....	14.12½	13.75	32.62½	5.90	5.55	6.60	6.25
2.....	14.12½	13.75	....	5.90	5.55	6.60	6.25
5.....	14.12½	13.75	32.50	5.90	5.55	6.60	6.25

*Refinery quotation.

New York

NEW YORK, Sept. 5.

The Labor Day holiday has interfered with the general course of the markets and only light business is reported in any of the metals. In all of them, however, the price situation is firm.

Copper.—Toward the close of last week some sellers reported an increase in inquiries for electrolytic copper, but because of the holiday these have not yet resulted in orders. Moderate sales were made last week. While there is no change in the price situation the tone is, if anything, firmer, and quotations are steady at 13.75c., refinery, or 14c., delivered, for the remainder of the year. Some sellers are either out of the market or asking at least ⅛c. higher. Lake copper is steady at 14.12½c., delivered.

Copper Averages.—The average price of Lake copper for the month of August, based on daily quotations in THE IRON AGE, was 14.12½c., New York. The average price of electrolytic copper was 13.74c., refinery, or 13.99c., delivered.

Tin.—The market for Straits tin has been exceedingly quiet and devoid of feature. The moderate sales referred to as having been made a week ago to-day, Aug. 29, amounted to about 300 tons, mostly near future delivery. On Aug. 31 there was some pressure to sell, metal for any position being offered at 32.50c., but buyers were not interested and the market was stagnant. Other days of the week, including to-day, have been extremely inactive. In the entire week, futures have been neglected. Spot Straits tin to-day was quoted at 32.50c., New York, and the London market stood practically the same as a week ago at £159 10s. for spot standard, £159 17s. 6d. for future standard and £160 per ton for spot Straits. Deliveries into consumption during August are returned as 4150 tons, with 2166 tons in stock and 640 tons landing on Aug. 31. Imports for the first eight months this year have been 3825 tons as against 12,978 tons for the same eight months last year.

Lead.—The market is quiet with a fairly steady demand at unchanged prices. For September delivery the quotation of the leading interest is 5.70c., St. Louis, or 5.90c., New York, with the outside market at 5.55c., St. Louis, or 5.90c., New York, which we quote as the market.

Zinc.—The general situation is unchanged with only a moderate demand and no particular pressure to sell. Prime Western is quoted firm at 6.25c., St. Louis, and 6.60c., New York, as a minimum, with some sellers asking 6.30c., St. Louis, and 6.65c., New York. There is some uneasiness regarding the ore situation in the West, due to lack of cars and inability of railroads to transport ore or even coal. Equipment is also reported as very bad on some railroads in the ore district. If this situation continues it will interfere with production.

Antimony.—Wholesale lots for early delivery are quoted unchanged at 5.37½c. per lb., duty paid, New York.

Aluminum.—Virgin metal, 98 to 99 per cent pure, in wholesale lots for early delivery, is quoted by the leading interests at 19.10c., f.o.b. plant, with importers offering the same grade from foreign producers at 17.75c. to 18c., per lb., duty paid, New York.

Old Metals.—Prices are practically stationary but the tendency of the market seems better. Dealers' selling prices are as follows:

	Cents
Copper, heavy and crucible	13 ..
Copper, heavy and wire	12 ..
Copper, light and bottoms	11 ..
Heavy machine composition	10 ..
Brass, heavy	7 ..
Brass, light	6 ..
No. 1 red brass or composition turnings	6.50
No. 1 yellow rod brass turnings	7.50
Lead, heavy	5 ..
Lead, tea	4 ..
Zinc	3 ..

Chicago

Sept. 5.—In a very quiet market tin has advanced slightly and spelter has declined. Among the old metals zinc has advanced. We quote, in carload lots, lake copper, 14.25c.; tin, 33.50c. to 34c.; lead, 5.65c.; spelter, 6.25c.; antimony, 7c., in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 11c.; copper bottoms, 9.25c.; red brass, 8.75c.; yellow brass, 6.75c.; lead pipe, 4.50c.; zinc, 3.75c.; pewter, No. 1, 20c.; tin foil, 22.50c.; block tin, 26c., all buying prices for less than carload lots.

St. Louis

SEPT. 5.—Lead was easier for the week, while slab zinc held steady at unchanged prices. We quote: Lead, 5.60c., car lots, against 5.65c. to 5.70c. last week; slab zinc, 6.25c. On old metals we quote: Light brass, 3.50c.; heavy red brass and light copper, 7c.; heavy yellow brass, 4c.; heavy copper and copper wire, 7.50c.; zinc, 2c.; lead, 3c.; pewter, 15c.; tin foil, 16c.; tea lead, 2c.; aluminum, 9c.

British living costs are dropping. The July excess over 1914 is given as 81 per cent, against 84 per cent in June. The reduction is ascribed entirely to reduction in the price of potatoes.

COMING MEETINGS

September

American Engineering Council. Sept. 8 and 9. Executive board meeting, Boston. Report on three-shift day in industry. Secretary, L. W. Wallace, 719 Fifteenth Street, N. W., Washington.

Association of Iron and Steel Electrical Engineers. Sept. 11 to 15, inclusive. Annual convention, New Auditorium, Cleveland. Secretary, J. F. Kelly, 513 Empire Building, Pittsburgh.

National Exhibition of Chemical Industries. Sept. 11 to 16. Grand Central Palace, New York.

American Electrochemical Society. Sept. 21, 22 and 23. Fall meeting, Windsor Hotel, Montreal, Canada. Secretary, Dr. Colin G. Fink, Columbia University, New York.

American Institute of Mining and Metallurgical Engineers. Sept. 25 to 29. Pacific Coast meeting, Engineers' Club, San Francisco. Secretary, F. F. Sharpless, 29 West Thirty-ninth Street, New York.

October

American Society for Steel Treating. Oct. 2 to 7. Convention and exposition, General Motors Co. Building, Detroit. Secretary, W. H. Eisenman, 4600 Prospect Avenue, Cleveland.

Society of Industrial Engineers. Oct. 18 to 20. McAlpin Hotel, New York. Secretary, George C. Dent, 327 South LaSalle Street, Chicago.

American Gear Manufacturers' Association. Oct. 9, 10 and 11. Semi-annual meeting, Chicago. Secretary, F. D. Hamlin, 4401 Germantown Avenue, Philadelphia.

COPPER USE INCREASES

Automobile Industry Will Require 30,000,000 Pounds More This Year Than in 1921

Approximately 100,000,000 lb. of copper will be utilized this year in the manufacture of automobiles in the United States, according to a survey just completed by the Copper and Brass Research Association. This is an increase of 30,000,000 lb. over 1921, and is about 750,000 lb. more than for 1920, in which year the automobile industry consumed 7.63 per cent of the total copper production.

Commenting on the use of copper in the automotive industry, the survey says in part:

"In pre-war days, particularly since the time when the automobile definitely emerged from the luxury class, the demand was in excess of the supply. Consequently, there was practically no incentive to cheapen material costs; and copper, brass and bronze were widely used in construction, where their properties, according to the best principles of machine design, established by generations of engineering experience, made them of service.

"During the war years, an abnormal condition arose. The price of copper increased, its use was restricted to non-essential industries, and the automobile manufacturer was forced to substitute inferior metals.

"In 1919, with removal of war-time restrictions, copper was still relatively high, and the automobile manufacturer continued this practice of substitution. During the period of inflation after the armistice there was a tremendous increase of manufacturing facilities, in order to keep up with the increasing demand for automobiles.

"Then came the 'buyers strike' in 1920. The demand for automobiles dwindled, and in an effort to revive sales, manufacturer vied with manufacturer in successive price cuts.

"Under insistent pressure to lower costs, automobile manufacturers turned their attention first to the more expensive metal, copper, and carried still further the principle of substitution, first generally established during the war years.

"Substitution took many forms, among them being sheet-iron water tanks in place of brass or copper; malleable or cast-iron water line fittings in place of brass; cast-iron carbureter bowls in place of brass; die-cast babbitt main bearings and crank pin bearings in place of bronze-backed babbitt.

"Other substitutions were cast iron bushings in place of bronze in camshaft bearings, rocker arm bearings, spring eyes, shackle bolts, brake equalizers, etc. (in many cases, there are no bushings at all); cut-steel or aluminum alloy small gears, for pump drive, timer shaft, etc.; cast iron water-pump casing and impeller in place of bronze or brass; aluminum or pressed steel hub caps in place of nickeled brass; aluminum, enameled iron, or sherardized steel windshield trim, body trim, hardware and hood trim; steel latches in place of brass; steel screws, nuts and bolts in place of brass; malleable or cast iron special fittings such as caps, covers, plugs, glands, control links, in place of cast brass."

New Cement Plants in Alabama

BIRMINGHAM, Ala., Sept. 5.—The Phoenix Portland Cement Co., Nazareth, Pa., has purchased 80 acres of limestone-laden land from the Sloss-Sheffield Steel & Iron Co., contiguous to the latter's by-product coking plant in North Birmingham, and is assembling materials for construction of a 1,500,000-barrel cement plant to cost over $2,500,000 and scheduled to be completed by next May. Contracts for the machinery have been awarded as follows: Converters to the Worthington Pump & Machinery Co.; driers and kilns to the Vulcan Iron Works, Wilkes-Barre, Pa.; tube mills to the Traylor Engineering & Mfg. Co., Allentown, Pa.; electrical equipment to the General Electric Co.; locomotive cranes to the Orton & Steinbrenner Co., Huntington, Ind.; traveling cranes to the Champion Engineering Co., Kenton, Ohio; Bradley Hercules mills to the Bradley Pulverizer Co., Allentown, Pa.

The Lehigh Portland Cement Co. is assembling materials for rush work on construction of a 1,000,000-barrel plant on a tract of 300 acres of limestone-laden land in the vicinity of the Alabama By-Products Co. coking plant in East Birmingham and very close to the plant being built by the Phoenix Portland Cement Co. of Nazareth, Pa.

Russian Manganese Ore for Germany

According to reports from Kharkoff, the concession commission in the Ukraine recently examined various applications from foreign firms for concessions. One leading foreign firm submitted an offer for the leasing of the iron ore mines at Kholaczevskie, in the basin of the Krivoi-Rog, but the commission refused to grant a concession on the ground that the iron ore mines can only be leased if blast furnaces are operated. The German Mining Association of Essen—the Berk und Hüttenwerke—is reported to have been more successful. After protracted negotiations with the Ukraine commission in Berlin, the association is said to have arranged for the annual supply of a large quantity of manganese ore in return for the delivery to the Ukraine Mining Administration of materials for the working of the mines, including cables, pumps, etc. The German association will only accept the delivery of high-grade ore.

Alabama Coal Prices

BIRMINGHAM, Ala., Sept. 5.—Governor Kilby has, through Fuel Administrator Roy R. Cox, announced the following maximum prices for coal from Alabama mines: Big seam, run of mine $2.60, domestic lump $3.45; Pratt, Jagger and Corona group, run of mines $3, domestic lump $4.45; Cahaba and Black Creek group, run of mine $3.60, domestic lump, $5.20; Montevallo and Climax group, run of mine $4, domestic lump $6 per ton. These are maximum prices for the fall and winter. The retail prices are lower than at this time last year and the steam coal prices are regarded as reasonable, the extra mine wage of 20 per cent effective Sept. 1 considered.

Will Spend $12,000,000 in Dams

BIRMINGHAM, Ala., Sept. 5.—The Alabama Power Co. has asked permits of the Federal Power Commission for the construction of four dams on the Tallapoosa River in Alabama, a non-navigable stream. Work will begin shortly after permits are granted and will involve $12,000,000, the power created to be 140,000 hp. The company also announces the construction at once of a high tension transmission line from Mitchell dam to the Georgia State line at Lanet, where a large group of cotton mills is located. This is to cost $1,000,000. Mitchell dam, which will generate 120,000 hp., is expected to be completed by next March and the power is practically bidden for already.

Utilizing Russian Scrap Iron and Steel

Owned jointly by the Soviet Government and a German combine, a German-Russian company called Deutsch-Russische Metall-Gesellschaft, or Derumetall, has been formed to collect, purchase and utilize the immense quantities of scrap iron in Russia. Several shipments have already been made to Germany. It is estimated that there are in Russia over 3,000,000 tons of scrap iron, of which nearly 500,000 tons is in Petrograd, and 200,000 tons at the Black Sea ports. The company will for the moment deal only with the latter, as the cost of bringing the scrap from the interior would be too high to leave a profit. From these easily accessible supplies the Soviet Government, it is estimated, will receive about ten million gold rubles (£1,000,000 or $4,865,000).

PERSONAL

J. N. Garfield has been appointed district manager for Ohio of the Isthmian Steamship Lines, a subsidiary of the United States Steel Corporation, which operates its ocean boats, and has opened an office at 1235 Guardian Bldg., Cleveland. This is the second district office to be opened by the Isthmian Lines. An office was established recently by Mr. Garfield in Buffalo, which has now been placed in charge of W. C. Shields, Jr.

John D. Wise, who for the past year has had charge of the foundry school at the University of Illinois, has returned to the sales department of the Osborn Mfg. Co., Cleveland, and will devote his attentions to sales engineering work in connection with foundry equipment.

Samuel W. Hilt, formerly district manager of sales, Camden Forge Co. at New York, has been appointed manager of sales of Pennsylvania Steel Export Co., Philadelphia, effective Sept. 1.

D. J. Felkel, formerly superintendent of the Covington, Va., blast furnace plant of the Low Moor Iron Co., is now superintendent of the blast furnace department of the Cia. Fundidora de Fierro y Acero de Monterrey, S. A., Monterrey, N. L., Mexico.

Lawrence M. Keeler, of the Whitin Machine Works, manufacturer of textile mill machinery, Whitinsville, Mass., sailed from New York the past week for Havre, France, on a business trip through France and Spain.

A. G. Douglas, chief engineer, and W. H. Mortlock, production manager, Hoskins Iron & Steel Co., Ltd., Lithgow, New South Wales, Australia, recently visited the plant of the St. Louis Coke & Chemical Co., Granite City, Ill. These gentlemen are visiting a number of representative iron and steel plants in this country and Canada for the purpose of familiarizing themselves with American practice.

Robert H. Libke, until recently a member of the sales force of the E. L. Essley Machinery Co., Chicago, has been appointed manager of the Chicago office of the Toledo Machine & Tool Co., Toledo, Ohio, manufacturer of presses and squaring shears, succeeding Edward Brucker. Mr. Libke will have his office in Machinery Hall, corner of Clinton Street and Washington Boulevard.

H. J. Swanson, formerly sales manager Detroit Machine Tool Co., Detroit, Mich., has been appointed manager the Peerless Machine Co., manufacturer of hack saws and metal shaping saws, Racine, Wis.

Robert N. Todd, for the past two years in the New York sales office of the Pawling & Harnischfeger Co., Milwaukee, Wis., cranes, hoists and excavators, has resigned to become associated with Walter Price, Philadelphia, agent for the Ford Motor Co. Mr. Price was formerly Eastern sales manager of the Pawling & Harnischfeger Co. Mr. Todd was previously with the Bethlehem Steel Co.

Thomas M. Rees, Jr., for the past ten years in the Pittsburgh office of Motch & Merryweather Machinery Co., has been appointed Pittsburgh district sales representative of Treadwell Engineering Co., Easton, Pa., and will assume his new duties Oct. 1.

J. Brynmor Hill, director Gorsienon Steel & Tinplate Works, Swansea, Wales, who spent several weeks in this country in visiting steel plants, was a passenger on the Majestic, which sailed from New York, Aug. 26.

W. C. Allen, who has been in charge of the Chicago branch of the Black & Decker Mfg. Co., Towson Heights, Baltimore, for the past year, has been promoted to sales supervisor. R. S. Mitten has been appointed to fill the vacancy caused by the promotion.

Owen K. Parmiter, metallurgist, Firth Sterling Steel Co., McKeesport, Pa., was the speaker at the monthly meeting of Pittsburgh Chapter, American Society for Steel Treating at the William Penn Hotel, Pittsburgh, Tuesday evening, Sept. 5. His subject was "Stainless Steels."

John W. Porter, vice-president Alabama Co., who has been resting from his duties for several weeks, has returned to Birmingham and is again at his desk fully restored to normal health.

Russell E. Fox, formerly connected with the Philadelphia sales office of the American Sheet & Tin Plate Co., is now with N. & G. Taylor Co., manufacturer of tin plate, Philadelphia, as production manager.

Alfred J. Lewis has been appointed Cleveland district representative, Pittsburgh Grinding Wheel Co., Rochester, Pa., with offices at 208 Fountain Building, West Second Street, Cleveland. Mr. Lewis has had more than 15 years' shop experience with Babcock & Wilcox Co., Barberton, Ohio; American Steel Foundries, Alliance, Ohio; Ferro Machine & Foundry Co., Cleveland; Detroit Steel Casting Co., Detroit, and the Otis Steel Co., Cleveland.

OBITUARY

EDWIN NEWTON OHL, one of the organizers of the Cherry Valley Iron Co., with a blast furnace at Leetonia, Ohio, and who was active in other iron and steel companies, died in New York, Sept. 3. He was born in Ohltown, Ohio, 72 years ago. For the past 30 years he had made his home in Pittsburgh. He was a director of the Pittsburgh Radium Co. and president and director of the American Roller Bearing Co. He also was a director of the Keystone National Bank, Pittsburgh, the Amortization Mortgage Co. and the Republican Casualty Co.

JAMES S. HUMBIRD, of Pittsburgh, at one time general manager Westinghouse Electric & Mfg. Co., East Pittsburgh, died in Atlantic City, Sept. 2, while on a visit at that resort. He was born in Cumberland, Md., 60 years ago and was a graduate of Washington and Jefferson College, Washington, Pa. Prior to becoming affiliated with the Westinghouse company, Mr. Humbird for a number of years was general manager Western Electric Co., Chicago.

JOHN T. MCHUGH, assistant superintendent of the Farrell, Pa., plant American Steel & Wire Co., died at his home in Farrell, Aug. 30. He was 65 years old and had been identified with the Sharon wire mills for the past 22 years. He had been identified with the wire industry for 55 years, having been an early associate, in the mills of the old National Wire Co., New Haven, Conn., of James A. Farrell, now president United States Steel Corporation, when the latter was a wire drawer. When they went West together, both went to work in the Braddock, Pa., mills of the American Steel & Wire Co. Before going to Sharon, Mr. McHugh was employed in the nail plant which the American Steel & Wire Co. once operated in Salem, Ohio.

HERBERT S. DORNBERGER, professor structural engineering, Carnegie Institute of Technology, who also was chief engineer in the Pittsburgh district for the Truscon Steel Co., Youngstown, Ohio, died at the Mercy Hospital, Pittsburgh, Aug. 30. He was 38 years old. He was graduated from Gettysburg College and for two years was a member of the faculty of that institution. Later he took a post-graduate course at Massachusetts Institute of Technology.

EDMUND L. FRENCH, a director of the Crucible Steel Co. of America and manager of its Syracuse plants, died suddenly from heart disease Thursday afternoon, Aug. 31, at Tully Lake Park. He was 52 years of age.

British Iron and Steel Market

United States Still Buying British Pig Iron — British Steel in Better Demand, Due to Continental Exchange Chaos

(By Cable)

LONDON, ENGLAND, Sept. 5.

Pig iron is firm on further sales on American account, including 5000 tons of West Coast hematite. Further shipments of this material are expected. Canada is buying Cleveland pig iron. Home trade consumers are contemplating entering into contracts extending over the end of the year. Cleveland makers are well booked up and an increased output is expected. Seven or eight furnaces, it is said, will be re-lighted. There is an improved demand for East Coast hematite, but stocks are still heavy.

Steel business is increasing. Northeastern works have secured good orders for shipbuilding materials. Prices are thought to be too low and advances are anticipated if substantial demand develops. The Clyde shipbuilding output for August was 53,123 [gross register] tons.

Variations in exchange rates affect the Continental position. Belgian works have accepted joist (beam) orders at £6 15s. (134c. per lb.) f.o.b., October, November, shipments, but the general quotation is higher. China and India are buying moderately. Belgian merchant bars have been sold at £9 7½s. (1.87c. per lb.) cost and freight to China. Three-eighths-in. plates have been sold at £8 2½s. (1.62c per lb.) cost and freight to India.

Tin plate is steady but quiet. The oil plate orders [for Eastern markets, reported last week at 250,000 boxes] have been increased to 350,000 boxes. Exports generally are quiet, though there is a fair demand from Canada and some business is reported. Home trade buying is fairly steady. Obi sizes are being done at 19s. ($4.24) basis, f.o.t.

Canada is buying Welsh black plate. Galvanized sheets are quiet and black sheets are dull. Japan is inquiring for thin gages and sheets for galvanizing.

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $4.46 per £1, as follows:

[illegible]	£1	[illegible]		86 02	
[illegible]	1	[illegible]		21 19	
[illegible]	1	[illegible]	& £4	7½*	19.51 & $19.51*
[illegible]	1	[illegible]	to 4	7	18.96 to 19.40
[illegible]	1	[illegible]	to 4	5	18.40 to 18.96
[illegible]	1	[illegible]			17.84
[illegible]	1	[illegible]	to 4	10*	19.85 to 20.07*
[illegible]	1	[illegible]			66.50
[illegible]	14	[illegible]	to 14	15	64.67 to 65.79
Rails, 60 lb. and up	7	15	to 8	15	34.57 to 39.03
[illegible]	7	[illegible]	to 8	0	31.78 to 35.68
Sheet and tin plate bars, Welsh	7	[illegible]			32 89
Tin plates, base box	0	19¼	to 0	19⅜	4.29 to 4.32
					C. per Lb.
[illegible]	[illegible]	[illegible]	to 9	10	1.79 to 1.89
[illegible]	11	[illegible]	to 12	10	2.29 to 2.19
[illegible]	[illegible]	[illegible]	to 10	[illegible]	1.84 to 2.04
Channels	8	10	to 9	10	1.69 to 1.89
[illegible]	[illegible]	[illegible]	to 8	5	1 64 to 1 84
[illegible]	8	[illegible]	to 8	0	1 84 to 1 99
Galvanized sheets, 24 g.	16	5	to 16	10	3.23 to 3.28
[illegible]	[illegible]	[illegible]			2 39
[illegible]	[illegible]	[illegible]	& [illegible]	*	2 39 & 2.41*
Cold rolled steel strip, 20 g.	23	2½			4.60
Cotton ties, Indian specifications	15	0			2.99

*Export price.

Continental Prices, All F. O. B. Channel Ports, Delivery as Specified

No. 3 foundry pig iron:					
Belgium, October	£4	2½s.			$18.40
Luxemburg, October	4	2½			18.40
[illegible]	[illegible]	[illegible]			18 40
Billets:					
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	24 53 to $25.65
Luxemburg, Oct., Nov.	[illegible]	[illegible]	to [illegible]	[illegible]	24 53 to 25.65
Luxemburg, Oct., Nov.	[illegible]	[illegible]	to [illegible]	[illegible]	24 53 to 25.65
Wire rods (Oeg basis):					
Germany	[illegible]	[illegible]			2 23
Belgium	[illegible]	[illegible]			4 57
Wire rods, 5 mm. (0.2 in.):					
Belgium	[illegible]	[illegible]	to 10	7½	32 31 to 46 27
Angles:					C. per Lb.
[illegible], September	7	7½			1.47
Tees:					
Belgium	8	5			1.64
Merchant bars:					
Belgium, Nov., Dec.	7	7½	to 7	12½	1.47 to 1.52
Luxemburg, Nov., Dec.	7	7½	to 7	12½	1.47 to 1.52
France, Nov., Dec.	7	7½	to 7	12½	1.47 to 1.52
Germany, Dec.	7	15	to 8	0	1.54 to 1.59
Channels:					
Belgium	7	10	to 7	12½	1.50 to 1.52
Joists (beams):					
France, Oct., Nov.	7	0	to 7	2½	1.39 to 1.42
Belgium, Oct.	7	0	to 7	2½	1.39 to 1.42
Luxemburg, Oct.	7	0	to 7	2½	1.39 to 1.42
¼-in. plates:					
Germany, Nov., Dec.	8	0			1.59
Belgium, Sept., Oct.	7	10	to 8	0	1.49 to 1.59
Luxemburg, Oct., Nov.	7	17½			
France, not offered.					
⅜-in. plates:					
Germany	9	0			1.79
No. 8 gage wire:					
Belgium, August	14	10¾			2.89

Coal Exports to America and Canada—American Pig Iron Buying—Irish Urged to Buy Direct

LONDON, ENGLAND, Aug. 24.—America is still booking large quantities of coal here, mostly from Wales, with the result that prices of the latter have recently advanced 1s. a ton. There has, however, been a reduction in shipping freights of 5s. a ton. Canada is also still showing a fair amount of interest, and has booked some orders for Welsh anthracite coal.

Conditions in the pig iron market have not shown much improvement, though sales continue to be made on American account. The Middlesbrough market has been closed this last week owing to holidays, so that it is difficult to judge the position accurately, but there is no doubt that stocks of pig iron are accumulating, and that makers would be glad to get rid of them even at a low price. Export demand, apart from that of America is still very dull, and home trade consumers are not disposed to enter into any forward commitments during the present uncertainties. In view of this position it is, therefore, rather obscure as to why Cleveland producers should fix an export premium for foundry pig iron. Nevertheless they have done so, and some makers are now asking 90s. for No. 3 G. M. B. for shipment, while they are willing to accept 87s., and possibly less, for the same material for use in the home trade. Hematite is a very weak market, and East Coast Mixed Numbers have sold at 88s., and it is quite possible to place substantial contracts at an even lower figure. At one time it was thought that Italy might be coming in to buy, but the recent disorganization of the whole of the continental exchanges has naturally precluded buying from those quarters.

In finished iron and steel there has been a little more business, India and South America in particular having recently placed some good orders for plates and shapes, but Australia is still the mainstay of the export markets, though even here no important tonnages are mentioned. Prices have not been changed, but there are some works who are disposed to accept less money for the business going, while others prefer to pass the business by rather than cut the price by so much as 2s. 6d. a ton. A small demand has set in for boilers, both for land and submarine purposes, which has enabled Yarrow & Co., of Scotstoun, Glasgow, to reopen their plant, which has been closed down since last November. These orders have been taken for the Far East.

Harland & Wolff are getting busier at Belfast, having received instructions to resume work on a number of vessels which was on hand, and had been suspended owing to the depression in the shipping trade. It is stated that already this year the production on the Lagan is greater than that for the whole of last year.

It is interesting to note the attitude of the Irish Free State as regards iron and steel business. The department of Commerce of that country is sending out communications to industrialists and business men in Belgium, urging them to trade directly with the buyer in Ireland rather than make use of an intermediary in England. Of course, the means of transport between Belgium and Ireland are few and expensive, and there is consequently quite a good price margin in favor of firms here which make purchases in bulk in Belgium, and sell in small parcels throughout the British Isles.

Machinery Markets and News of the Works

OUTLOOK MORE PROMISING

More Activity in Machine Tools Is Indicated for September

Price Advances Are Expected to Bring Action on Much Pending Business

With some of the uncertainty removed from the industrial situation by the virtual settlement of the bituminous and anthracite coal strikes, it is predicted that the machine-tool trade will feel the stimulus of business recovery during September. Another factor tending toward the more liberal buying of machine tools is the tendency now shown by manufacturers to advance prices in keeping with rising costs. For example, it is reported from one or two centers that sales of turret lathes have taken a spurt in anticipation of price advances which become effective this month.

A prominent line of boring mills has been advanced 10 per cent, effective Sept. 16; a manufacturer of engine lathes and shapers has also announced a price advance approximating 10 per cent; a well-known line of shapers and a well-known line of small lathes have been advanced. Other advances are predicted and many will probably go into effect before Oct. 1.

Announcement of these various price advances is expected to have the effect of closing up much of the business that has been pending. Railroad buying in particular is expected to increase. At Chicago it is expected that the Chicago, Burlington & Quincy will buy on its recent large list within a week or two. The Chicago, Milwaukee & St. Paul may close on a small list, and the list of the Chicago, Rock Island & Pacific is still pending, and action on this and remaining requirements of the Atchison, Topeka & Santa Fe would not be surprising in view of the rising prices of machine tools.

A good deal of the past week's activity took place in the automobile manufacturing districts. The Studebaker Corporation, South Bend, Ind., bought additional piston turning equipment, and the International Harvester Co. bought a number of tools. The Nash Motor Co. is expected to place orders shortly for special purpose machinery.

The American La France Co., Elmira, N. Y., has bought a small list of tools, including five or six turret lathes; the Ternsted Mfg. Co., Detroit, has bought 70 small punch presses; the Lima Locomotive Co., Lima, Ohio, is expected to place orders for about 25 tools within a week or so. Pickands, Mather & Co., Cleveland, has issued a list calling for bids on nine machines for a mine at Ely, Minn.

In New England not much buying has been done, but there is an inquiry for 20 used presses, and another inquiry calls for bending and rolling equipment. The New York market has been quiet.

There is more activity in cranes, and prominent among current inquiries is one from the Pennsylvania Railroad for 12, most of them for heavy loads.

New York

NEW YORK, Sept. 4.

QUIETNESS still rules in this district, undoubtedly accentuated this week by the usual pre-holiday dullness. In general, sellers of used tools state that August was a fairly satisfactory month and they look forward to about the same satisfactory conditions in September. One dealer here reports the sale of two large tools the past week. Sellers of new machines, on the other hand, feel that but little improvement in the present dullness is to be expected until the strike situation clears up. In some types of used tools a growing scarcity of machines in good condition is said to exist. Such a scarcity, should it become more marked, will undoubtedly force some buyers, who have been satisfying requirements with used tools, into the new machinery market. The General Electric Co. is still buying, one or two tools at a time.

Few purchases of cranes are noted this week but several good inquiries are current. One of these, which is the largest that has appeared in this district for some time, is from the Eastern Region of the Pennsylvania Railroad, Philadelphia, and calls for bids on two 250-ton, 80-ft. 11-in. span double trolley overhead traveling cranes; one 60-ton, 104-ft. 4-in. span, double trolley overhead crane; one 60-ton, 90-ft. 9-in. span, double trolley overhead crane; two 25-ton, 79-ft. 9-in. span, single trolley overhead cranes; and six 15-ton, 77-ft. 6-in. span, single trolley overhead traveling cranes. There is also a request for bids from the Board of Harbor Commissioners, Municipal Building, Wilmington, Del., Closing Sept. 8, which includes equipment for the Wilmington Marine Terminal. This tender includes three 20-ton, 50-ft., 60-ft. and 70-ft. booms, steam locomotive cranes; three 2½-ton, light duty, electric portal cranes; four 2-ton capacity portable electric dock winches; six electric tractor trucks with spare batteries; three load carrying trucks; 50 trailers for the electric tractors; and a 200-ton railroad track scale.

Among recent sales are:

Ed. Edinger Co., Cedar Rapids, Iowa, a 5-ton, 40-ft. span, 3-motor overhead traveling crane from the Northern Engineering Works.

Parke Davis & Co., Detroit, Mich., a 12-ton, 35-ft. span overhead crane from the Northern Engineering Works.

Metropolitan Edison Co., Reading, Pa., a 10-ton, 1-motor crane from the Roeper Crane & Hoist Works.

American Ice Co., New York, a 5-ton, hand power crane from the Roeper Crane & Hoist Works.

The Hudson Wire Co., 62 North Water Street, Ossining, N. Y., has awarded a contract to the McClintic-Marshall Co., Pittsburgh, for a one-story plant, 100 x 150 ft., estimated to cost about $50,000. Charles Royle heads the company.

The Montauk Mfg. Co., 841-43 Union Street, Brooklyn, manufacturer of talking machines, parts, etc., is planning for the installation of new equipment in its machine shop.

Parker Axles, Inc., Gotham National Bank Building, Fifty-ninth Street and Broadway, New York, will commence the immediate erection of the superstructure of its new one and two-story plant, 100 x 160 ft., at Poughkeepsie, N. Y., for the manufacture of automobile axles.

The Kewanee Boiler Co., 47 West Forty-second Street, New York, has filed plans for two one-story buildings, each 24 x 50 ft., on 141st Street, near Walnut Avenue, for local branches of the main factory at Kewanee, Ill.

The Car Lighting & Power Co., 61 Broadway, New York, has arranged for a preferred stock issue of $1,000,000, the proceeds to be used for plant construction and expansion. The company will build an ice manufacturing plant, and will make extensions and improvements in existing ice manufacturing units.

The Electric Supply & Equipment Co., 103 Allyn Street, Hartford, Conn., will soon commence the erection of a new plant on Broadway, Albany, N. Y., four-stories, 40 x 65 ft., estimated to cost $50,000.

The New York office of the American Lamp Co., recently mentioned in these columns, is at 30 Church Street. The officers are William H. Young, president; Walter L. Tremper, treasurer, and Harold A. Young, secretary. The company maintains a factory at Mianus, Conn.

The Utica Motor Car Co., Genesee Street, Utica, N. Y., is taking bids on a general contract for [illegible] service and repair works, estimated to cost about $100,000. Linn Kinne, Mayro Building, is architect.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until Sept. 8 for oil pumps, wrenches and spares, as set forth in schedule 131; also for oil purifier, heater and spares, as specified in schedule 129; two oil separators and spares, schedule 130; and for six fuel oil heaters and spares, schedule 132, all for the Brooklyn Navy Yard.

Joseph Pearlbinder, 1428 Bryant Avenue, New York, is taking bids for a one-story automobile service and repair building, 100 x 300 ft., on Westchester Avenue, estimated to cost about $100,000. Charles Kreymborg, 2534 Marion Avenue, is architect.

The Air Reduction Sales Co., 342 Madison Avenue, New York, manufacturer of acetylene welding apparatus, etc., has tentative plans under consideration for the erection of a new plant at Buffalo.

The Baltimore & Ohio Railroad Co., division operating offices, St. George, S. I., has plans in progress for the electrification of the entire system of the Staten Island Rapid Transit Co., its subsidiary organization. The work will include power houses and substations, with electric equipment, lines, etc. E. W. Murray is manager of the subsidiary company.

The Rubel Coal & Ice Corporation, Glenmore Avenue, Ozone Park, Brooklyn, will commence the erection of a new two-story ice-manufacturing plant, 34 x 116 ft., on Ocean Avenue, Ozone Park, to cost about $200,000 including machinery. Edward M. Adelsohn, 1778 Pitkin Avenue, Brooklyn, is architect.

Officials of the Texas Co., 17 Battery Place New York, have organized the Texas Producers' Co., as a subsidiary organization, capitalized at $1,000,000, to handle production in the Northwestern part of the country. Following the securing of leases, etc., for which negotiations are said to be under way, refineries and distributing plants will be established. Headquarters will be at Denver, Col., and Casper, Wyo.

Excavations will be placed under way at once, for a one-story power house for the Teachers' College, Columbia University, New York, in connection with a new library building on 120th Street.

The Kovat & Knauber Iron Works, 800 Edgewater Road, New York, are making inquiries for an air compressor of about 100 cu. ft., electrically operated.

Power equipment, conveying apparatus and other mechanical equipment will be installed in the three-story plant, 45 x 100 ft., to be erected at Hopkins and Atlantic Avenues, Brooklyn, for the Great Atlantic & Pacific Tea Co., 150 Bay Street, Jersey City, N. J., estimated to cost $65,000. L. S. Beardsley, 116 West Thirty-ninth Street, New York, is architect.

Fire, Aug. 30, caused by an explosion, destroyed a portion of the power house at the paperboard manufacturing plant of R. R. McEwan & Sons, Malapardis, near Morristown, N. J., with loss estimated at close to $35,000. The plant will be rebuilt.

The City Commission, Jersey City, N. J., has authorized a bond issue of $1,500,000 for the construction of a sewage disposal plant near Boonton, N. J., to include power equipment, electrical apparatus, mechanical gates, etc. Clyde Potts, 30 Church Street, New York, is consulting engineer.

The J. S. Mundy Hoisting Engine Co., 696 Frelinghuysen Avenue, Newark, has filed plans for a one-story building, 40 x 100 ft.

The Cole Motor Car Co., 1848 Broadway, New York, has acquired the works and business of the Wallace Motor Co., 894 Broad Street, Newark, including the service and repair department at 8 Green Street, which will be arranged as a direct factory branch of the main plant at Indianapolis.

Electrical and mechanical equipment, power apparatus, etc., will be installed in the new plant, 40 x 145 ft., to be erected at Blanchard Street and the Passaic River, Newark, by the Alcohol Products Co., now operating in this section. Fred A. Phelps, Union Building, Newark, is architect and engineer.

Chicago

ALTHOUGH new inquiries for machine tools are fewer, considerable pending business is being closed for the reason, no doubt, that buyers wish to have their orders entered before prices advance. Some lines of machines have already gone up and others are scheduled to advance in the near future. A notable spurt in sales of turret lathes preceded an advance of a certain make which became effective Sept. 1. Orders are likewise being brought to a head in other lines which will go up the middle of this month. The King Machine Tool Co., Cincinnati, will advance boring mills about 10 per cent, effective Sept. 16. A Central Western manufacturer of engine lathes and shapers will also mark up prices about 10 per cent on Sept. 15. Among price changes already made may be mentioned an advance in shapers by the Ohio Machine Tool Co., which varied in percentage according to different sizes. The South Bend Lathe Works, South Bend, Ind., announces the discontinuance of its June 1 prices and the return to the quotations of March 7. This amounts to an advance averaging about 17 per cent.

No further railroad buying has taken place, but the Burlington is expected to buy against its pending machine tool lists within a week or two. The Santa Fe has given no indication that it would purchase the remainder of the list which was partially bought some time ago, but in view of the advancing tendency of machine tool prices, such action would not be surprising. It is also possible that the Chicago, Milwaukee & St. Paul will close for a small outstanding list and that the Rock Island may decide to buy certain equipment which it has been considering for several months. Among industrial companies the automotive concerns are the most prominent purchasers. The Studebaker Corporation has placed a second order for special piston turning lathes. The Nash Motor Co. is expected to close for considerable special purpose machinery for its Milwaukee plant some time this month. Among other classes of users, the International Harvester Co. has closed for four thread-milling machines, a number of turret lathes and several special purpose machines. From the standpoint of sales, August was a satisfactory month, in the case of one dealer being the best month this year and for others on a par with or slightly under July.

Whereas the Burlington has not yet taken action on its machine tools, it has commenced to place its crane equipment. An order has been given to the Whiting Corporation for two 125-ton electric overhead traveling cranes, each with 97-ft. 5½-in. span, one 125-ton hoist and one auxiliary 15-ton hoist. The Public Service Co. of Northern Illinois has awarded a 100-ton overhead electric traveling crane for a new power-house at Waukegan, Ill., to the Whiting Corporation.

The Shafer Bearing Corporation, 4500 Ravenswood Avenue, Chicago, manufacturer of automobile accessories, has purchased the plant of the All-American Truck Co., 6501 Grand Avenue, to provide for expansion. The property covers 8½ acres and includes a one-story building containing 66,000 sq. ft.

The Red Top Steel Post Co., 38 South Dearborn Street, Chicago, has purchased the factory property in Chicago Heights, Ill., formerly owned by the Chicago Pneumatic Tool Co., and in 1919 sold to the Giant Truck Corporation of Delaware.

Fire recently destroyed a two-story warehouse of A. M. Castle & Co., iron and steel jobber, Blackhawk and North Branch Streets, Chicago. The loss will exceed $100,000, of which $40,000 is represented by a hydraulic press which was destroyed.

The reported sale of 80 acres to the Ford Motor Co. in the Calumet industrial district of Chicago by the Chicago & Calumet Canal & Dock Co. has been emphatically denied by a representative of the latter company. Although agents of the Ford company have been looking over the property, no sale has been consummated.

The Pullman Co., 79 East Adams Street, Chicago, manufacturer of railroad cars, trucks, etc., is taking bids for a new one-story foundry, 300 x 500 ft., at Pullman, Ill., estimated to cost $40,000, exclusive of equipment. Frank D. Chase, Inc., 645 North Michigan Avenue, is architect and engineer.

A vocational department will be installed in the new North high school to be erected on Twenty-fourth Street, Omaha, Neb., estimated to cost $750,000, for which bids will be asked this month. John Latenser & Sons, Peters Trust Building, are architects.

The Hot Springs Water, Light & Power Co., Hot Springs, S. D., has plans under way for a new power house, to replace a generating plant recently destroyed by a flood. The installation will comprise two 450-kilowatt generators, waterwheel, pumping equipment and auxiliary machinery. The Hollister Engineering Co., Bankers' Life Building, Lincoln, Neb., is engineer.

Kang & Zeisler, South Schuyler Avenue, Kankakee, Ill., will soon take bids for a two-story and basement automobile

service and repair building, 81 x 145 ft., to cost about $55,000. C. K. Henry, 219 Arcade Building, is architect.

The Quartermaster Department, Chicago General Intermediate Depot, Chicago, will take bids until Sept. 14 for one gasoline pump, as specified in circular 23-27-128.

William Driscoll, Olivia, Minn., is completing plans for a new one-story machine shop. A list of equipment is also being arranged.

The W. H. Maze Co., Peru, Ill., manufacturer of metal specialties, has construction under way on a one-story addition, 75 x 140 ft., estimated to cost $60,000.

A vocational department will be installed in the new two-story and basement high school, 96 x 120 ft., to be erected at Braham, Minn. G. L. Lockhart, Inc., 1643 University Avenue, is architect.

Philadelphia

PHILADELPHIA, Sept. 5.

A TWO-STORY machine shop at 1528-48 North Fifth Street, to cost about $42,000 will be erected by the James H. Billington Co., 113 Chestnut Street, Philadelphia, mill supplies.

The Philadelphia Electric Co., Tenth and Chestnut Streets, Philadelphia, has completed plans for additions to its power houses at American Street and Susquehanna Avenue, and on Ontario Street. Work has been commenced on two new power houses at other locations. W. H. Johnson, senior vice-president, is in charge.

Officials of the Baldwin Locomotive Works, 500 North Broad Street, Philadelphia, have organized the Cuba Locomotive & Machine Works, as a subsidiary organization, to construct and operate repair shops in Cuba.

Henderson Brothers, Twenty-fifth and Spruce Streets, Philadelphia, have awarded a contract to the J. H. Hunkle Co., Twenty-fifth and Delancey Streets, for a two-story automobile service and repair building, 40 x 118 ft., with one-story extension, 30 x 115 ft., estimated to cost about $100,000.

The Fidelity Machine & Mfg. Co., 4015 Paul Street, Philadelphia, has construction under way on a new machine shop and mechanical works at 3936-40 Frankford Avenue to cost about $70,000, including machinery.

The Pennsylvania Railroad Co., Broad Street Station, Philadelphia, is completing plans for the conversion of the engine house at its Altoona, Pa., shops, now being used as a freight car shop, into a locomotive repair works. Plans are also in preparation for new machine and erecting shops on the site of engine house No. 3. At the Juniata, Pa., shops, work will soon commence on a new machine shop and erecting works, 340 x 675 ft.; the present locomotive shops here will be extended and improved, including the installation of additional equipment. Plans have also been completed for a new three-story service and store house building, 60 x 400 ft., at the same point.

The Bureau of Supplies and Accounts, Navy Department, Washington, will take bids until Sept. 19 for four tractors for use at the Philadelphia Navy Yards, as set forth in schedule 127.

Thomas J. Luttrell, Philadelphia, operating a sheet-metal working and heating equipment shop at 3830 Market Street, has plans under consideration for a new one-story works.

The Hoffman Henon Co., Finance Building, Philadelphia, architects, have plans under way for a new automobile service and repair building, 50 x 160 ft., at 1229 North Broad Street, estimated to cost about $200,000. The name of the owner will be announced later.

The General Asphalt Co., Land Title Building, Philadelphia, affiliated with the Royal-Dutch-Shell Co., will build a pipe line from its oil fields in the Mene Grande district, near Lake Maracaibo, Venezuela, to a distributing point on the Atlantic Ocean, estimated to cost about $1,000,000, including pumping plants, pipe, and other mechanical equipment.

A high-pressure steam plant, electric generators, and auxiliary equipment, ice-making and refrigerating apparatus, and miscellaneous power equipment, will be installed in the new power plant to be constructed at the State Normal School, Trenton, N. J., for which bids on a general contract are being taken. The Commissioner of Education, State House, is in charge. Gilbert & Betelle, 546 Broad Street, Newark, N. J., are architects.

The Atlantic Woodworking Co., 2320 Fairmount Avenue, Atlantic City, N. J., has plans under way for a new two-story plant, 45 x 70 ft., on Island Road.

The Penn Central Light & Power Co., Altoona, Pa., has arranged for a bond issue of $167,000, a portion of the proceeds to be used for extensions and improvements.

Tilghman Yager, Dorneyville, Pa., will soon take bids for the construction of a two-story automobile service and repair building, 60 x 110 ft., estimated to cost close to $70,000. Charles W. Gossart, 603 Hamilton Street, Allentown, is architect in charge.

The Lehigh Portland Cement Co., Allentown, Pa., has preliminary plans for a new cement mill at East Birmingham, Ala., totaling about 250 acres. The new mill will have an annual capacity of 1,000,000 barrels, and is estimated to cost in excess of $500,000, with machinery.

The Monitor Bi-Loop Radiator Co., Lancaster, Pa., manufacturer of radiators and kindred specialties, will soon commence the erection of an addition, to provide increased floor area of about 25,000 sq. ft.

The Peerless Folding Box & Crate Co., Columbia, Pa., is planning for the construction of a new one-story factory, 50 x 200 ft., to cost in excess of $40,000, with machinery. F. S. Sheeman, Swank Annex, Johnstown, Pa., is architect and engineer.

The Advance Rumely Co., Laporte, Ind., manufacturer of agricultural implements and equipment, has acquired property on South Cameron Street, Harrisburg, Pa., 130 x 150 ft., for a factory branch. Work will commence in September.

The Hanover Power Co., Scranton, Pa., has arranged for a bond issue of $75,000, to be used in part for extensions and improvements.

A vocational department will be installed in the new two-story high school, 90 x 135 ft., to be constructed at Nazareth, Pa., estimated to cost about $95,000, for which foundations are being started. Rasmussen & Wayland, 1133 Broadway, New York, N. Y., are architects.

The Stewart Artificial Ice Co., Williamsport, Pa., will commence the immediate erection of a new one-story ice manufacturing plant, 35 x 75 ft.

Fire, Aug. 28, destroyed a portion of the plant of the Scranton Electric Steel Co., Scranton, Pa., comprising a part of the former works of the Spencer Heater Co. An official estimate of loss has not been made. It is planned to rebuild.

The Metropolitan Edison Co., Reading, Pa., is concluding negotiations for the purchase of the plants and properties of the York Haven Water & Power Co., and the York Haven Electric Transmission Co., both of York Haven, Pa. Extensions and improvements will be made. The company has arranged for a preferred stock issue of 28,186 shares, a portion of the proceeds to be used in connection with the expansion.

Buffalo

BUFFALO, Sept. 5.

THE Robertson-Cataract Electric Co., Mohawk and Elmwood Avenues, Buffalo, operating the Robertson Electric Construction Co., manufacturer of switchboard equipment and other electrical apparatus, has arranged for an issue of preferred stock, the proceeds to be used for extensions, improvements, and additions to working capital. James D. Robertson is president.

The Watson Mfg. Co., 63 Taylor Street, Jamestown, N. Y., manufacturer of steel sash, metal screens, etc., is planning the erection of a four-story addition.

The W. A. Case & Son Mfg. Co., 31 Main Street, Buffalo, manufacturer of boilers, heating equipment, etc., has called a special meeting of stockholders, Sept. 7 to arrange an increase of capital of $2,500,000, a portion of the proceeds to be used for extensions and improvements. Joseph P. Fell is president.

The Keystone Tool & Metal Co., 56 Oak Street, Buffalo, has tentative plans under consideration for the erection of an addition.

The Webster Fruit Growers' Co-Operative Association, Lake Road, West Webster, N. Y., will commence the erection of a four-story ice and cold storage, and packing plant, 90 x 110 ft., estimated to cost about $150,000. George W. Dunn is in charge.

The Dittmer Gear & Mfg. Co., Grand Street, Lockport, N. Y., has preliminary plans under way for an addition to its plant.

The Chautauqua Association, Colonade Building, Chautauqua, N. Y., has plans for the erection of a new automobile service and repair works, in connection with a garage with capacity of 500 cars, to replace the building recently destroyed by fire. C. S. Arnold is in charge. It will cost about $55,000.

A vocational department will be installed in the new three-story high school to be erected at Orchard Park, N. Y. Colson & Hudson, 35 Dun Building, Buffalo, are architects.

The Ulrich Plan File Co., 516 West Fourth Street, Jamestown, N. Y., manufacturer of office equipment, has filed plans for a one-story factory on Murray Avenue, estimated to cost $25,000.

The Rectograph Co., 282 Hollenbeck Street, Rochester, N. Y., manufacturer of photographic devices and appliances, is planning the erection of a one-story [illegible].

A vocational department will be installed in the new three-story school to be erected at Boonville, N. Y., to replace a structure recently destroyed by fire, to be 110 x 142 ft. and estimated to cost close to $200,000.

The J. Spaulding & Sons Co., 484 Broome Street, New York, manufacturer of fiber products, is said to be arranging a list of machinery for installation at its new plant at Tonawanda, N. Y., on which work has been commenced. It will comprise two one and two-story buildings, 108 x 300 ft., and 60 x 200 ft., estimated to cost about $250,000. George F. Hardy, 309 Broadway, New York, is engineer.

The Ralph Gypsum Co., LeRoy, N. Y., is planning for the installation of new machinery and equipment at its properties.

Detroit

DETROIT, Sept. 4.

THE [illegible], 718 Russell Street, Detroit, is taking bids for a one-story addition, 165 x 275 ft., to be partly equipped as a valve manufacturing department. Headquarters are at 165 Broadway, New York.

The Gray Motor Co., Mack and Railroad Streets, Detroit, manufacturer of automobiles, will commence the erection of a one-story unit, 60 x 600 ft., adjoining a new one-story extension, 60 x 400 ft., just completed. It is planned to build other units in the near future, providing for a daily production of 200 completed cars. F. L. Klingensmith, formerly connected with the Ford Motor Co., heads the organization.

The Eagle Ottawa Leather Co., Grand Haven, Mich., will install new mechanical stokers and other equipment in its power house. Cahill & Douglas, 217 West Water Street, Milwaukee, are engineers.

Fire, Aug. 24, destroyed a portion of the plant of the Standard Hoop Co., Bay City, Mich., with loss estimated at about $35,000, including equipment.

The Solar Polar Storm Sash & Screen Co., Muskegon Heights, Mich., has completed plans for a new one-story factory, to cost about $25,000. J. J. Gillman, connected with the Brunswick-Balke-Collender Co., Muskegon, Mich., heads the organization.

The Paige Motor Co., McKinstry Street, Detroit, has filed plans for a one-story steel addition, to cost $30,000.

The Hammond-Wieneke Co., 206 Court Street, Saginaw, Mich., will soon call for bids for a new one-story and basement automobile service and repair building, 80 x 100 ft., estimated to cost about $55,000. J. F. Beckissinger, 114 South Jefferson Avenue, is architect.

The Common Council, North Muskegon, Mich., has approved a bond issue of $39,000 for the construction of a new municipal electrically-operated pumping plant. Plans will be prepared at an early date.

The Ruggles Truck Co., Bad Axe, Mich., will commence the immediate erection of a new plant, 80 x 160 ft., for the production of truck bodies, estimated to cost $35,000. Julius Kirby is president.

The following buildings will be erected at Flint, Mich., for the Durant Motor Car Co., for the production of the Flint Six: Main building, 80 x 900 ft., three stories; plant No. 4, 400 x 80 ft., three stories; plant No. 5, 257 x 400 ft., one story; plant No. 6, 100 x 500 ft., one story. A power house to be erected will be known as plant No. 7. The Christman Construction Co., Lansing, Mich., has been awarded the contract.

Baltimore

BALTIMORE, Sept. 5.

PRELIMINARY plans are in progress by the Potomac Public Service Co., Hagerstown, Md., for a hydroelectric power house on the Cacapon River, at Edes Fort, Morgan County, W. Va. The installation will comprise about 30,000 hp. capacity, and with transmission system is estimated to cost close to $2,500,000. The company is operated by the American Water Works & Electric Co., 50 Broad Street, New York.

H. S. Block, Edgar and Cathedral Streets, Baltimore, has revised plans for a three-story addition, 42 x 125 ft., to his automobile service and repair works, estimated to cost about $100,000. J. E. Moxley, Jr., Equitable Building, is architect.

The Red "C" Oil Mfg. Co., Keyser Building, Baltimore, has tentative plans for rebuilding the portion of its plant at Lawrence Street and the Key Highway, recently destroyed by fire [illegible].

The Bureau of Supplies and Accounts, Navy Department, Washington, will take bids until Sept. 19, for 21 ventilating sets and spare parts, schedule 126; also for 19,500 ft. of electric cable, schedule 128.

The Bureau of Yards and Docks, Navy Department, Washington, is taking bids until Sept. 13, for a new hangar, with repair facilities at the Naval Air Station, Anacostia, D. C., as set forth in specification 4691.

The Mutual Cold Storage & Refrigerating Co., Broadway, Va., is completing plans for a new four-story ice and cold storage plant, 75 x 150 ft., estimated to cost abou $150,000. E. H. Mosher, Munsey Building, Washington, D. C., is architect and engineer.

The Republic Boiler & Radiator Co., Union Avenue, Woodbury, Baltimore, has awarded contract to Claiborne Johnston & Co., Garrett Building, for two one-story buildings, 60 x 150 ft., and 20 x 150 ft., respectively, to cost $50,000 William C. Ceown is engineer in charge.

George C. Sheehan, Asheville, N. C., has acquired property at Fletcher, N. C., for a new plant to manufacture brick and kindred products. The initial works will cost about $55,000.

The Southern Steel Products Co., Fourth and Bainbridge Streets, Richmond, Va., is planning for the installation of bar benders, and kindred equipment, at its plant.

The Chief Signal Officer, United States Army, Washington, will receive bids until Sept. 25, for two 80-ft. steel radio towers, to be erected on the United States Military Reservation, Montgomery Intermediate Depot.

Warren W. Biggs, 1310 Fourteenth Street, N.W., Washington, has awarded a contract to the W. P. Lipscomb Co., District National Bank Building, for a new two-story automobile service and repair building, 75 x 180 ft., estimated to cost about $100,000. E. H. Mosher, Munsey Building, is architect.

The Richmond, Fredericksburg & Potomac Railroad Co., Broad Street Station, Richmond, Va., has awarded a contract to the Arnold Co., 105 South La Salle Street, Chicago, for new locomotive repair shops and engine house at Richmond to cost about $200,000 with equipment. E. M. Hastings is chief engineer, in charge. Plans have been completed for two new locomotive coaling plants. Each structure will be equipped with five 15-ton steel hoppers with elevating equipment, sanding apparatus, etc., with capacity of about 200 tons per hour and will cost in excess of $190,000.

Frank B. Essex, Washington, has awarded a contract to the R. P. Whitty Co., Union Trust Building, for a four-story automobile and service building, 50 x 105 ft., at 1509 Fourteenth Street, N.W., estimated to cost $70,000.

The Herfurth Engine & Machinery Co., Camden, S. C., is making inquiries for a 75-hp. oil engine; also for an ice-making machine, inclosed belt-driven type.

The Western Paper Makers Chemical Co., Kalamazoo, Mich., has acquired property at Savannah, Ga., and plans the construction of a new paper mill, estimated to cost in excess of $500,000, with machinery. A rosin refining plant will also be established.

The Richmond Pressed Metal Works, Sixth and Stockton Streets, Richmond, Va., plans the installation of new metal-working equipment. S. M. House is in charge.

The Standard Electric Co., 1821 East Main Street, Richmond, Va., operating a repair works, will install new equipment at its plant.

Thomas & Fulford, 336 Smith Avenue, Thomasville, Ga., have acquired a local building for the establishment of an automobile service and repair works. The structure will be remodeled. T. H. Fulford is in charge.

Indiana

INDIANAPOLIS, Sept. 4.

REVISED plans have been prepared by the Paramount Wheel & Engineering Co., Hartford City, Ind., for its new factory to manufacture steel automobile wheels, which will increase the works and expenditure over the amount originally planned. The company was organized recently with a capital of $300,000.

The American Gas & Electric Co., 30 Church Street, New York, has acquired a controlling interest in the Indiana & Michigan Electric Co., South Bend, Ind., and will operate the property in conjunction with its other electric utilities in this section. Extensions and improvements are planned.

The Faulkner-Burge Packing Co., Railroad Avenue, Marion, Ind., is planning to rebuild its power house partially destroyed by fire Aug. 16, with loss estimated at $25,000, including a portion of the warehouse, adjoining.

The Falls City Hydraulic Brick Co., Jeffersonville, Ind., is planning for the installation of new machinery. Robert Akers is superintendent in charge.

The Olin Sales Co., 315 North Meridian Street, Indian-

apolis, is taking bids on a three-story automobile service and repair works, 60 x 195 ft, estimated to cost $150,000. Walter G. Olm is president.

The Sterling Products Co., Evansville, Ind., operating a local ice-manufacturing and cold storage plant, has tentative plans under consideration for the establishment of a branch works to manufacture refrigerators and refrigerating equipment. The company was reorganized recently with a capital of $400,000. O. A. Klamer is president, and Charles F. Hartmetz, secretary and treasurer.

New England

BOSTON, Sept. 4.

SALES of machine tools in this district the past week were again restricted, due to the vacation period and to the holiday. There was, however, a slight increase in sales over last week, particularly of used tools. The local trade attaches considerable significance to several new inquiries which are in the nature of private negotiation and it is felt that September will see quite a revival in business. Individual inquiries developing the past week, in all but two or three instances, concern new tools and the aggregate showing is encouraging. Inquiries for used tools include a list of 20 presses and another a considerable amount of bending and rolling equipment.

Sales since last reports include a new cold saw having 12-in. and 36-in. diameter blades, purchased by an eastern Connecticut concern; a new multiple drill and a disk grinder by an East Boston firm; a fairly large new shear by a Worcester mill; a 18 in. x 6 ft. Flather lathe by a North Andover, Mass., manufacturer; and about a dozen used tools, of which a universal milling machine, taken by a local textile interest, is the most costly. A local manufacturer in the market for used Acme machines and Brown & Sharpe grinding equipment has been unable to locate these tools which emphasizes the fact that certain kinds of used machinery are practically unobtainable in this section. An export inquiry for a new large lathe and radial drill, which has been in this market for some time, has been transferred to New York, West Indies Sugar Finance Corporation, 129 Front Street.

The demand for small tools and machine parts has fallen off. Consumers apparently are buying from month to month, orders placed in this market semi-monthly indicating this condition.

Bids close this week for a proposed two-story, 30 x 142 ft. machine shop and administration building, contemplated by the Fall River Water Department, Fall River, Mass.

The Fred T. Ley Co., Springfield, Mass., has the contract for the first manufacturing unit of the new Wico Electric Co., West Springfield. It calls for completion by Jan. 1.

The Buol Machine Co., New Britain, Conn., special machinery and general machine shop business, is being organized and manufacturing quarters have been secured in the rear of 168 Arch Street. Abraham Buol, for many years superintendent New Britain Machine Co. is at the head of the company.

The Erwin M. Jennings Co., 27 Harrison Street, Bridgeport, Conn., will build a garage and service station 51 x 152 ft., on West Avenue, Norwalk, Conn. Repair equipment will be installed.

The Sieman Hard Rubber Corporation, Bridgeport, Conn., has awarded a contract to John R. Sheehan, Bridgeport, for a new one-story plant, 60 x 167 ft.

The Hood Rubber Co., Nichols Avenue, Watertown, Mass., manufacturer of automobile tires, has awarded contract to William H. Illiffo, Bailey Road, for a two-story addition, 96 x 210 ft., estimated to cost $75,000.

The Marmon-Boston Co., Boston, recently organized by officials of the Nordyke & Marmon Co., Indianapolis, manufacturer of automobiles, has leased property at Commonwealth Avenue and St. Paul Street, totaling about 40,000 sq. ft., as a factory branch.

The Automatic Refrigerating Co., 618 Capitol Avenue, Hartford, Conn., manufacturer of refrigerating machinery, has awarded contract to M. A. Conner, 668 Broadview Terrace, for a three-story addition, 53 x 95 ft. J. T. Henderson is engineer.

The Berwick & Salmon Falls Twin State Co., South Berwick, Me., will commence the construction of a new hydroelectric generating plant on the Great Works River, near South Berwick, estimated to cost $130,000.

The Cambridge Rubber Co., 748 Main Street, Cambridge, Mass., has awarded a contract to the Scully Co., Cambridge, for a four-story addition, 85 x 102 ft.

A vocational department will be installed in the new two-story high school to be erected at Conway, N. H., estimated to cost $100,000, for which work will soon be placed under way. C. R. Whitcher, Beacon Block, Manchester, N. H., is architect.

The Hartley Clock Co., Attleboro, Mass., has commissioned Monks & Johnson, 99 Chauncy Street, Boston, architects, to prepare plans for a new three-story factory, 60 x 240 ft., estimated to cost about $125,000.

The Electrolytic Iron Co., Bridgeport, Conn., will make extensions and improvements in the factory of Page & Nettleton, Milford, Conn., recently leased, and will soon commence the installation of equipment for the production of pure iron under a special process. The works will also include a complete laboratory.

A one-story power house addition, 30 x 50 ft., will be constructed by the Aeolian Co., Meriden, Conn., at its local factory.

Butterfield & Co., division Union Twist Drill Co., Derby, Line, Vt., manufacturer of taps, dies, reamers and screw plates is occupying its new brick and concrete fire proof buildings recently completed. The main factory building is 70 ft. x 170 ft. three stories and a basement, with annex one-story, 60 ft. x 170 ft. and basement, and an ell to the main building 70 ft. x 85 ft., three stories, all of the latest approved construction. This move has necessitated the purchase of considerable new equipment and machinery, and when completed gives the company nearly double its previous capacity, which is necessary to take care of growing business.

Milwaukee

MILWAUKEE, Sept. 4.

NEW business continues to develop slowly but steadily in the machine-tool trade, but it does not seem to get beyond the barest necessities. The strong trend toward hesitancy noted during the latter part of July and throughout August, due to the influence of the coal and roalroad shop strikes, has been relieved to some degree by the resumption of mining operations, although deliveries as yet are meager in volume and the fuel crisis is by no means past. Competition from used tools still exists, but is far less than earlier in the year. Construction of public garages and service stations throughout Wisconsin is more active than at any time in about two years and furnishes a good market for the lighter types of shop equipment, as well as for used tools, principally lathes.

The Allis-Chalmers Mfg. Co., Milwaukee, has broken ground for a one-story brick and steel manufacturing building, 175 x 400 ft., as an addition to the main works in West Allis. It will be devoted to the production of flour mill and sawmill machinery, and upon its completion about Jan. 1, the entire equipment of the present Reliance works in Milwaukee, will be transferred to the main plant. The Reliance works has been placed on the market.

The Behnke Vapor Burner Mfg. Co., Manitowoc, Wis., has been incorporated with a capital stock of $100,000 and will lease a building to manufacture heating devices using low grade fuel for installation in furnaces, boilers, stoves, etc. Albert J. Behnke is president; Adolph C. Behnke, vice-president, and Otto H. Behnke, secretary and treasurer. Patents were granted in 1913 but since that time no concerted effort has been made until now to place the Behnke vapor burner into quantity production for the market.

George Wheary, Racine, Wis., has resigned as vice-president and general manager Hartmann Trunk Co., to organize a new corporation with $500,000 capital stock which is equipping a factory in three floors of the Sattley Industrial Community Building, Racine Junction. It is planned to commence operations Jan. 1 with 200 operatives. The new concern will make wardrobe trunks and general traveling goods under patents granted to Mr. Wheary during nineteen years of association with the Hartmann company. Harry L. Burg, until now general Western sales manager Hartmann Trunk Co., is associated with Mr. Wheary in the new enterprise. Machinery is now being purchased.

The Minneapolis, St. Paul & Sault Ste. Marie Railway Co. is taking bids at the division headquarters, Rhinelander, Wis., for the construction and equipment of a new 20-stall roundhouse and a machine and locomotive shop at Gladstone, Mich., to replace the plant destroyed by fire in March. The investment will be in the neighborhood of $75,000.

The Hathaway-Buick Co., Oshkosh, Wis., has started work on a two-story garage, sales and service building, 60 x 70 ft., to be ready Nov. 1 and cost about $25,000, including equipment.

The Corona Pen Co., Janesville, Wis., a new $25,000 cor-

poration which will manufacture fountain pens, metal pencils, etc., will for the present conduct manufacturing operations in the plant of the Janesville Tool Co., owned by S. V. Corona and James Pitt, the principals in the new organization. A small list of equipment is being purchased.

Strong & Manley, automobile dealers and repairmen, Eagle River, Wis., has let contract to the Hub City Construction Co., Stoughton, Wis., for a garage and machine shop, 60 x 120 ft., part two stories and basement. It will cost about $20,000 completely equipped.

The Air Reduction Sales Co., New York, which recently purchased the former machine shop of the Petit Mfg. Co., at 1505 Buffum Street, Milwaukee, for the establishment of a new branch plant, will erect a brick and concrete addition, 30 x 80 ft., part two stories. The plant is scheduled to start operations Nov. 15.

The D. F. Murray Mfg. Co., Wausau, Wis., manufacturer of sawmill, pulp and paper mill machinery, advises it has placed all contracts for material and equipment for its new plant and is now out of the market.

The Milwaukee Steam Appliance Co., West Allis, which has been incorporated with $150,000 capital stock, represents a reorganization and consolidation of the interests of the Steam Appliance Co. and the Milwaukee Ice Machine Co., occupying jointly a large machine shop at 709-715 Sixty-third Avenue, West Allis. The complete lines manufactured by both companies will be continued. Charles H. John, formerly president and general manager Wisconsin Motor Mfg. Co., is president of the consolidated corporation.

The Service Auto Co., Clintonville, Wis., will start work in a few days on the erection of a new sales and service building, 50 x 120 ft., of which about 30 x 50 ft. will be set aside for machine shop purposes. A small list of new and used shop equipment will be purchased.

Pittsburgh

PITTSBURGH, Sept. 4.

MACHINE tool business in this district still is better in the promise than in the performance. Buying goes on with marked constancy, but sales of more than one tool to a buyer are exceptional and lists, except for estimating purposes, are very few. The price tendency is higher, due to the fact that stiff increases in costs are immediately ahead. It is pointed out that the quotations which have prevailed until the past few weeks bore very little relation to costs and were almost entirely the result of efforts by manufacturers and dealers to liquidate stocks. The wage increases just announced by the steel companies are bound to extend to the machine shops and attention now is drawn to the fact that in the wage revision which took place during 1921, skilled labor, which forms the bulk of that engaged in the manufacture of machine tools, was not called upon to take nearly as much of a reduction as was made in unskilled labor rates. It is a fact also, that a good many prospective plant improvements, involving machine tool purchases, have been held up because the money has not been available. It is believed that stocks of tools in first and second hands are pretty well cleaned up, at least to a point where they are not likely to offer much competition to new tools.

In cranes and other heavy equipment, inquiry is brisk and pending business is of large volume, but actual orders are not closing very rapidly. The order for three cranes for the Granite City, Ill., plant of National Enameling & Stamping Co., is expected to be placed soon and another live prospect is the Weirton Steel Co. sheet mill addition for which four cranes will be wanted. It is reported that the Jones & Laughlin Steel Co. is getting prices for estimating purposes on considerable equipment for its Pittsburgh steel works, and there are intimations that the recent placing of the contract for an addition of 366 ovens to the Clairton by-product plant, Carnegie Steel Co. is merely the first step in an extensive program of modernizing some of the Monongahela River plants of that company.

The Meadville Iron Co., Mill Street, Meadville, Pa., is taking bids for a one-story addition, 60 x 88 ft., to be equipped as an annealing plant. Shutts & Morrison, Marine Bank Building, Erie, Pa., are architects. Otto Kohler is president.

The Blystone Mfg. Co., Cambridge Springs, Pa., has awarded contract to the Austin Co., Cleveland, for a new plant, 90 x 260 ft., for the manufacture of concrete blocks, etc., estimated to cost close to $50,000.

Fire, Aug. 28, destroyed a portion of the plant of the Atlantic Bottle Co., Brackenridge, Pa., with loss estimated at about $300,000, including machinery. It is planned to rebuild. Headquarters of the company are at 90 West Broadway, New York.

The Gulf Refining Co., Frick Annex, Pittsburgh, has acquired property, 144 x 175 ft., bounded by Aloe, Mathilda and Gross Streets, as a site for the new oil works. The buildings on the property will be razed at once.

The Standard Steel Spring Co., Coraopolis, Pa., has inquiries out for a special steel crane, equipped with long hoisting drums and hooks on 12 ft. centers.

The D. N. Carlin Co., 125-27 Denniston Avenue, Pittsburgh, manufacturer of toys, has preliminary plans for an addition.

A vocational department will be installed in the new three-story and basement high school, 68 x 130 ft., to be erected at Beaver Falls, Pa. Carlisle & Sharrer, Jenkins Arcade, Pittsburgh, are preparing plans.

The Standard Seamless Tube Co., 313 Sixth Avenue, Pittsburgh, is planning the erection of a one-story addition at Ambridge, Pa., 80 x 480 ft.

A. Staab, Pittsburgh, has acquired the building, 86 x 185 ft., at 313-17 West Main Street for an automobile service and repair works.

A vocational department will be installed in the new high school to be erected at Tenth and Indiana Streets, Monaca, Pa., estimated to cost about $150,000, for which plans are being completed by J. H. Phillips, Fulton Building, Pittsburgh, architect.

The Koppel Car Repair Co., Koppel, Pa., is planning for the erection of an addition.

Carbocite, Inc., Huntington, W. Va., recently organized with a captial of $250,000, has acquired the plant and property of the Huntington Coal Distillation Co. Plans are under way for the construction of works to manufacture and refine coal by-products, estimated to cost in excess of $100,000 with machinery. S. J. Hyman is president, and R. D. Lamie, vice-president.

The Gulf States

BIRMINGHAM, Sept. 5.

A STRUCTURE has been acquired by the Hendry Machine & Engineering Co., Fort Myers, Fla., recently organized, for a boat-building and repair works. A department will be established for cylinder grinding work. W. F. Lusk is general manager in charge.

The Producers' Creamery Co., Fort Worth, Tex., will install an ice and refrigerating department in its proposed new plant, estimated to cost $75,000.

The Williams Yellow Pine Co., Poplarville, Miss., has tentative plans for rebuilding the portion of its mill destroyed by fire Aug. 25, with loss estimated at $100,000, including machinery.

The Electrolock Mfg. Co., Vicksburg, Miss., recently organized with a capital of $100,000 to manufacture locking devices for automobiles and other automotive equipment, is perfecting plans for the operation of a local factory. W. Hemingway, Jr., is president and general manager.

The Missouri, Kansas & Texas Railroad Co., St. Louis, is perfecting plans for the removal of its car and locomotive repair shops from DeLeon to Dublin, Tex., and will concentrate operations at the latter place. Enlargements will be made.

The Johnson Iron Works, Dry Dock & Shipbuilding Co., New Orleans, will commence the immediate installation of a new 5,000-ton dry dock, forming an additional section to dock No. 1, estimated to cost about $100,000, including equipment.

The Kosse Light & Power Co., Kosse, Tex., is planning for the installation of additional machinery. Enlargements will be made to increase the present capacity. H. E. Blumberg is head.

The Hernando County Dairy Co., Brooksville, Fla., will install an ice-making and refrigerating plant in connection with a new dairy to cost in excess of $60,000.

The Lee Lumber Co., Tioga, La., has plans for a new saw mill and lumber plant to cost about $100,000, including machinery.

Fire, Aug. 23, destroyed a portion of the plant of the Excelsior Brick Co., 1001 North McDonough Street, Montgomery, Ala., with loss estimated at about $35,000, including equipment. It is planned to rebuild. Frank Rhodes is president.

The Orlando Utilities Co., Orlando, Fla., will soon commence the erection of a new electric generating plant, 75 x 175 ft., to be operated in conjunction with a waterworks plant, estimated to cost about $300,000, including machinery.

The installation will comprise turbo-generators, boilers, electrically-operated pumps, and auxiliary machinery. George D. Moffatt, 140 Court Street, is general manager.

The Humphries-Pure Oil Refineries Corporation, Mexia, Tex., has plans for an electrically-operated pumping plant in the new Kosse, Tex., oilfields. A tank farm will be constructed with an initial capacity of about 110,000 bbl., with pipe line, distributing machinery, etc.

The Everglade Cypress Co., Loughman, Tex., has plans for the erection of new mills, 50 x 160 ft., and 30 x 65 ft., with initial capacity of about 50,000 ft. of lumber and 20,000 ft. of lath per day. The equipment will be provided with individual motor drive. A power plant will also be built. The entire project is estimated to cost in excess of $125,000. J. Wade Tucker, general manager, is in charge.

A. P. Jordan, Winters, Tex., is organizing a company to build and operate a refinery for gypsum products in the vicinity of Odessa, Tex. A site has been secured and plans are under way for the initial unit, estimated to cost $35,000 with machinery. Headquarters will be established at Odessa.

The Empire Fuel & Gas Co., Tulsa, Okla., operating oil refineries, a subsidiary of the Cities Service Co., 60 Wall Street, New York, has acquired the properties of the Planet Petroleum Co., near Wichita Falls, Tex. The new owner plans additions as well as extensive development work.

The Department of Public Utilities, St. Petersburg, Fla., will take bids until Sept. 11 for a new power plant, 70 x 120 ft. W. S. Shull, St. Petersburg, is architect.

The Ford Motor Co., Jacksonville, Fla., is arranging for the erection of an assembling plant and has selected a site. Slocum Ball is manager at Jacksonville.

The Biscayne Yacht & Machine Works, Miami, Fla., has plans under way for enlargements, and will install new machinery for the construction and repair of yachts and other light craft. S. Pearlman is general manager.

The Pacific Coast

SAN FRANCISCO, Aug. 29.

THE C. F. Braun Co., 604 Mission Street, San Francisco, manufacturer of heaters, valves, etc., will commence the erection of a branch factory at Shorb, Cal., 140 x 225 ft., to be equipped as a machine shop and foundry. Other units will be constructed at a later date.

The Southern Pacific Railroad Co., 65 Market Street, San Francisco, has arranged an appropriation of about $29,000,000 for extensions and betterments during the current year. Approximately $700,000 will be used for shop expansion and additional equipment.

The Newman High School District, Newman, Cal., will build a new one-story vocational shop at the high school. S. Wade is general secretary in charge.

L. D. Palmer, manager of the Orange County Fruit Exchange, and H. Warren Nice, secretary of the Chamber of Commerce, both of Orange, Cal., have organized a company to build and operate an ice-manufacturing and cold storage plant. A site has been secured and plans are being drawn for the first unit, estimated to cost $50,000. Mr. Palmer will be president.

The Utah Oil Refinery Co., Salt Lake City, Utah, a subsidiary of the Standard Oil Co. of Indiana, Indianapolis, has plans for additions in its Salt Lake refinery to increase the capacity from 5000 to 6000 bbl. of crude oil per day. The expansion will cost close to $600,000, including equipment.

The Birtschmann Ranch, operating near Antioch, Cal., is arranging for a series of electrically-operated pumping plants, with centrifugal and other pumping units, power equipment, etc., estimated to cost $100,000. Easley & Anderson, Antioch, are engineers.

The Jet Oil Refining Co., National City, Cal., will commence the immediate construction of a new refinery to specialize in lubricating oils.

The Crane Co., Los Angeles, with headquarters at 836 South Michigan Avenue, Chicago, is taking bids for a one-story building, 116 x 150 ft., on West Anaheim Road, Long Beach, Cal. W. Horace Austin, 222 First National Bank Building, Los Angeles, is architect.

A vocational department will be installed in the new high school to be erected at Mountain View, Cal., estimated to cost about $200,000. The Mountain View High School District is in charge. W. H. Weeks, 369 Pine Street, San Francisco, is architect.

The Republic Consolidated Mining & Refining Co., Mackay, Idaho, recently organized with a capital of $3,000,000, has plans under way for a new hydroelectric generating plant, in connection with a cyanide mill. W. P. Barton is in charge.

The Harold Furnace Co., Spokane, Wash., will commence the immediate erection of a new one-story factory estimated to cost $17,000.

The Willamette Iron & Steel Works, Portland, Ore., will make extensions and improvements in its one-story boiler shop, estimated to cost $40,000.

The Associated Lumber & Box Co., Dorris, Cal., has tentative plans for the rebuilding of the portion of its works destroyed by fire Aug. 17, with loss estimated at $150,000, including equipment.

A vocational department will be installed in the new high school to be erected at Heliz, near Pendleton, Ore., for which plans have been authorized by the Union High School District No. 1, Umatilla County, to cost close to $75,000. Raymond W. Hatch, Pendleton, is architect.

C. E. Taylor, Stayton, Ore., formerly head of the Stayton Light & Power Co., has acquired a power site and plans the construction of a new power house to serve Stayton, Aumsville, and vicinity. It is said that a company will be organized, headed by Mr. Taylor, to operate the plant and system.

The Little Rock Power & Water Co., Los Angeles, has made application for permission to use two power sites on Little Rock Creek, Los Angeles County, for the construction of two hydroelectric power plants, estimated to cost $350,000 and $300,000, respectively.

Cincinnati

CINCINNATI, Sept. 4.

A STIFFENING in prices marked the machine tool market the past week, and while no actual advances in list quotations have yet been made, it is probable that announcements will be forthcoming within the next few weeks. The practice of some dealers and manufacturers with large stocks of giving additional discounts has now entirely disappeared and the next step is expected to be a substantial increase in list prices.

While there were no outstanding sales during the week the aggregate was satisfactory, in view of prevailing industrial conditions. Included in orders booked were several machines for a can manufacturer, and a number of cranes for the Warner Elevator Co. The Ideal Concrete Machinery Co. was also a purchaser of a crane for its new plant and the Mitchell Steel Co. is expected to close on one crane this week. School business is making up quite a fair percentage of the business in lathes, scattered orders being reported from all sections of the country. A report is current that a Michigan industrial corporation has closed on equipment, including 90 presses and approximately 50 lathes, but confirmation is lacking.

The Buffalo-Springfield Roller Co., Springfield, Ohio, manufacturer of road rollers, is erecting an addition to be in better position to take care of repair work at Springfield. Formerly the bulk of the repair work was done in Buffalo. The Buffalo shop will be continued.

The finishing plant of the Standard Bolt Corporation, Columbus, Ohio, was damaged by fire on Aug. 29 with a loss of $75,000. It will be rebuilt.

The plant and equipment of the Elwood Iron Foundry Co., Elwood, Ind., has been sold to a company headed by Joseph G. Field, which plans to operate the works. The company recently was placed in the hands of a receiver.

The Master Tire & Rubber Co., Dayton, Ohio, has been reorganized with C. L. Cappel, president; R. S. Shuey, secretary, and C. W. Hoffritz, general manager. The new company, which is capitalized at $200,000, is now operating on a small scale, but plans to increase the output to 500 tires daily. It also plans to manufacture rubberized cloth in the near future.

The Hochstetter Research Laboratories Co., Dayton, Ohio, has been incorporated with a capitalization of $100,000 by Frederick Hochstetter, president; Hubert Estabrook, secretary, and Samuel L. Finn, treasurer. The company was organized for the purpose of scientific research and manufacture.

The Central South

ST. LOUIS, Sept. 4.

BIDS are being taken by the St. Louis Wire & Iron Co., 926 Chauteau Avenue, St. Louis, for a two-story and basement addition, 50 x 150 ft., estimated to cost $40,000. Theodore R. Piesler is president.

The Standard Machine Co., 311 Fifth Avenue, S., Nashville, Tenn., has plans under way for a new two-story machine shop.

The Watkins Mfg. Co., 200 North Waco Street, Wichita, Kan., manufacturer of automobile parts, has plans for a new branch factory in the East. It is said that negotiations are under way for a location in the vicinity of Syracuse, N. Y. C. A. Watkins is head.

The United States Zinc Smelting Co., Dewar, Okla., has plans under way for rebuilding its crushing and mixing departments destroyed by fire on Aug. 21. New equipment will be installed.

The Allen & Lee Mfg. Co., Union National Bank Building, Wichita, Kan., manufacturer of oil-burning equipment, is planning for enlargements and the installation of new tools.

A vocational department will be installed in the central high school to be constructed at Waverly, Tenn., estimated to cost in excess of $100,000. Dougherty & Gardner, Nashville, Tenn., are architects.

A one-story power house will be constructed by the City Hospital Association, Twenty-second and Cherry Streets, Kansas City, Mo. W. E. Gillham, 309 Mutual Building, is engineer.

The Federal Chemical Co., Nashville, Tenn., has tentative plans for rebuilding its sulphuric acid plant destroyed by fire, Aug. 28 with loss reported in excess of $1,000,000, including buildings and equipment.

L. O. Mitchell, Kansas City, Mo., operating a machine shop at 713-15 Central Street, plans for the installation of a number of new machine tools.

The United States Quartermaster, Fort Leavenworth, Kan., will receive bids until Sept. 9, for machine shop supplies, as set forth in circular 23-6.

The Blanchard & Campbell Coal Co., Harriman, Tenn., recently organized, has plans under way for the installation of electrical and mechanical equipment at its mining properties. N. C. Blanchard is president; and T. F. Campbell, secretary.

C. B. Wilson, 1212 Arlon Avenue, Wichita, Kan., is making inquiries for a lathe, drill press, and other machine shop equipment.

A vocational department will be installed in the new high school to be constructed at Rockwell, Tenn., estimated to cost close to $100,000, for which work will be placed under way at once. Manley & Young, Knoxville, Tenn., are architects.

The Universal Car Co., 2228 Oak Street, Louisville, has awarded contract to J. Besser & Co., 2142 Frankford Avenue, for a new one and two-story service and repair works at Twenty-fifth Street and Broadway, estimated to cost about $60,000.

The Common Council, Rich Hill, Mo., is arranging for the installation of new equipment at the municipal electric power plant. A bond issue has been arranged.

The Guarantee Repair & Construction Co., First and Waco Streets, Wichita, Kan., is planning for the installation of a number of machine tools, and other equipment. J. B. Phillips is in charge.

A vocational department will be installed in the new high school to be constructed at Coal Creek, Tenn., estimated to cost approximately $90,000.

The Cynthiana Carriage Co., Cynthiana, Ky., has plans under way for a branch factory at Covington, Ky. J. W. Leek heads the company.

The White Co., 2001 Grand Avenue, Kansas City, Mo., manufacturer of motor trucks, with plant at Cleveland, will commence work at once on the super-structure for its two-story and basement service and repair building, 100 x 250 ft., to cost about $100,000. Clifton B. Sloan, 321 East Eleventh Street, is architect.

A vocational department will be installed in the new one and two-story high school, 90 x 95 ft., at Kanopis, Kan., estimated to cost $75,000, for which plans have been completed by Charles W. Shaver, Salina, Kan., architect.

Canada

TORONTO, Sept. 4.

DEMAND for machine tools is slowly showing improvement and inquiries coming out indicate a heavier buying movement before the end of the month. The Canadian National Exhibition is renewing interest in the machinery market and buyers are paying keen attention to new lines, especially those for labor saving purposes. The outlook in the fuel situation, while still far from favorable, is improving and it is the general opinion that if coal supplies begin to make their appearance in increased quantities companies which have deferred purchases will commence buying on a more extensive scale. Another factor which is expected to have some bearing on the market is that the holiday season is about over and as a general rule business picks up about this time. Good crops are predicted and manufacturers of farm machinery look forward to a brisk demand for their products. The call for mining equipment is also more pronounced and machinery for electrical development purposes is in active demand. Woodworking machinery continues to lead the market in activity. Small tools and supplies are moving more freely.

W. S. Fenton, Port Elgin, Ont., is in the market for an engine lathe, about 12-ft. bed, back geared and compound rest.

The ratepayers of Milton, Ont., carried a by-law to loan Smith & Stone $40,000, in return for which the company will erect an addition to their plant for the manufacture of electrical supplies, etc.

The Keystone Watch Case Co., 15 Maiden Lane, New York, will establish a factory and distributing centre at Toronto to take care of Canadian trade. A six-story reinforced concrete factory will be erected on George Street, and building operations will begin within the next few weeks.

H. S. Cook & Co., have leased the foundry and stove department of the New Burrell-Johnson Iron Co. at Yarmouth, N. S., and will carry on a general foundry business.

Bids will be called immediately for the erection of a shingle mill to cost $74,000 for the Phillips-Hoyt Lumber Co., Burnaby, B. C.

Cleveland

CLEVELAND, Sept. 4.

LOCAL machine tool sales keep at about the recent volume. While business with some manufacturer fell off in August as compared with July, pending small lot inquiries indicated an improvement in sales this month. The American La France Co., Elmira, N. Y. during the week purchased 5 or 6 turret lathes from a Cleveland manufacturer and it is understood to have placed orders for a number of grinding, milling and other machines. The Ternsted Mfg. Co., Detroit, recently purchased 70 small punch presses. The Lima Locomotive Co., Lima, is expected to place orders within a day or two for about 25 machine tools for its plant extensions.

The price situation is still an important feature of the market and it is expected with increased costs machine tool manufacturers who have not already made advances will be forced to mark their prices up. Gould & Eberhardt announced an advance in varying percentages Sept. 1 on their line of shapers. Dealers are looking for advances on vertical boring mills about Sept. 15.

Pickands Mather & Co., Cleveland, have sent out the following list of metal and wood-working machinery required for their Zenith mine, Ely, Minn.

One 2-in. single head bolt and pipe cutter.
One 24-in. x 24-in. metal planer.
One vertical wood boring machine.
One power hack saw.
One 800-lb. steam hammer.
One 36-in. band saw.
One single cylinder surfacer.
One 6-in. pipe threading machine.
One 100-ton portable hydraulic press.

With the exception of the pipe threading and bolt cutting machine the company will give preference to used machinery.

The White Co., Cleveland, during the week took an order from New York City for 128 5-ton trucks.

The Johnston & Jennings Co., Cleveland, has purchased the business of the U. S. Molding Machine Co., and will manufacture the line of molding machines that has heretofore been made by the company.

The National Sanitary Co., Salem, Ohio, has commenced rebuilding its foundry, recently burned, and expects to place it in operation about Oct. 1.

The Youngstown Boiler & Tank Co., Youngstown, Ohio, will build a one-story, structural steel addition. The contract has been placed with the Niles Forge & Mfg. Co.

The Armington Engineering Co., Euclid, Ohio, is erecting a one-story steel frame factory addition, 34 x 100 ft., for assembling purposes.

NEW TRADE PUBLICATIONS

Spaders, Air Compressors and Coal Cutters.—Sullivan Machinery Co., 122 South Michigan Avenue, Chicago. Six bulletins, 70-X, compressed air spader; 77-D, portable air compressors; 79-C, "Ironclad" coal cutters for room and pillar and long wall mining; 79-D, "Ironclad" coal cutters for room and pillar mines; 79-E, long wall "Ironclad" cutters; 79-F, motors, driving gear, cutters and feed for "Ironclad" coal cutters. Well illustrated and containing tabular specification details and dimensions, these bulletins feature mining machinery for the production of coal.

Waugh-Sinclair Portable Compressor Plant.—Denver Rock Drill Mfg. Co., Denver, Col. A 16-page pamphlet devoted to portable air compressors for use in isolated locations or in city streets. Gasoline drive, rugged construction and adequate cooling of both engine and compressor cylinders are features. Tabular specifications are given of a 32-hp. size weighing, complete on its own truck, 9200 lb., and a 20-hp. size weighing 6800 lb. The bare truck, in each case, accounts for 1600 lb. of the total given.

Rolling Steel Shutters and Metal Shop Fronts.—S. W. Francis & Co., Ltd., 64-70 Gray's Inn Road, London, W. C. 1, England. A 48-page catalog of steel rolling shutters, wood lath shutters, spring roller shutters, awnings, metal work for store fronts, collapsible steel gates and sections of metal moldings and beadings, angles, channels, nosings, etc., both plain and backed by wood. Diagrams are freely used in showing construction, operation and clearances for both steel and wood-lath rolling shutters, and tables give the space requirements.

Metallic Packing for Condensers.—Crane Packing Co., 1800 Cuyler Avenue, Chicago. A 24-page pamphlet dealing with condenser tube packing problems and their solution. Special attention is paid to tube disintegration through electrolysis and to deformation and splitting of tubes, due to metal fatigue, abuse and other causes. Use of Crane metal packing rings, built of many spiraled layers of thin babbitt foil, is described and advocated.

Koerting Fuel-Oil Burning Systems.—Schutte & Koerting Co., Philadelphia. Volume 5, 84 pages, contains Bulletins 16 OA, mechanical oil-burning system; 16 OD, auxiliary apparatus for burning oil; 16 OG, Asko type oil-burning system; 16 OJ, steam and air pressure oil-burning systems; 16 OM, fuel oil, its properties and advantages. The bulletins are profusely illustrated, with the aid of colors and diagrams, sections and installation views. Tables of sizes and capacities are given, and discussions of engineering features of the various types of apparatus. Instructions for operation of oil-burning systems and apparatus are given. Combustion is treated separately.

The Fitzgibbon Boiler.—Fitzgibbon's Boiler Co., Inc., 47 West Forty-second Street, New York. A 16-page catalog of cylindrical fire-tube boilers designed for both power and heating. Tables of dimensions and capacities are given for both types of service and for differing power pressures. The boiler is internally fired and is constructed under the boiler code of the American Society of Mechanical Engineers.

Rayco Pulverized Coal Systems.—Raymond Brothers Engineering Co., 1315 North Branch Street, Chicago, Catalog No. 15, 32 pages. This describes complete engineering and manufacturing service for preparing, distributing and burning pulverized coal. One page, devoted in small type to the savings from the use of pulverized coal, as shown by experiences in 15 different plants, gives both a brief description of each installation and a definite measure on the results. These installations include annealing, puddling, forge, melting, heating and smelting furnaces and power plant boilers. A chart of the growth in the use of powdered coal shows a gradual increase from 1895 up to 5,000,000 tons consumption per year in 1917, jumping thence in four years to 30,000,000 tons per year.

Getting Business With Graphics.—Esterline-Angus Co., Indianapolis. A 4-page leaflet concerned with the possibilities of selling technical products with the aid of graphic records, assisting the customer to visualize the subject. The use of automatic records is featured, with specially graduated paper used in appropriate recording instruments.

Multiple Plate Friction Draft Gear.—Hall Draft Gear Corporation, Watervliet, N. Y. Two leaflets describing railroad draft gear with opposing steel gear housings inclosing and protecting friction plates, springs and other parts. Three sizes are made, besides special twin spring gears. Results of tests are given, showing resistance to distortion and damage. Car impact tests show the closing speed of the gear to be 5¼ miles per hour.

Reliance Steam Specialties.—Reliance Gage Column Co., 5902 Carnegie Avenue, Cleveland. Catalog M of 16 pages, describing safety water columns, electric alarms for water columns, seamless copper floats, water gages, gage cocks and steam traps. Illustrated by both halftones and diagrams, the catalog contains also tabular matter of value in connection with the use of the specialties described. One float which had been in service 28 years is shown.

Safety Car Equipment.—Reasons for the safety car described in Bulletin 44015 of the General Electric Co., Schenectady, N. Y., are improvement in service, increase in riding habit, lower maintenance cost, reduction in labor cost and in power consumption and freedom from accidents. The standard safety car most commonly used is about 28 ft. long and seats 32 passengers. The body is mounted on a single truck, with 26-in. wheels and wheel base of about 8 ft. Completely equipped, it weighs about 15,000 lb. It is of all steel construction and is built to a standard form and size.

Industrial Finances

The plant and equipment of the Barney & Smith Car Co., Dayton, Ohio, will be offered at sheriff's sale at Dayton, Oct. 10, 2 p. m. This is the second time the plant has been offered, no bids having been received on July 12. A reappraisal of the property has just been completed which reduced the appraised value of the plant by nearly one million dollars, to $2,273,708.87.

The Wickwire-Spencer Steel Corporation, Worcester, Mass., and Buffalo, has called a special meeting of stockholders Sept. 8 to vote on the acquisition of all the capital stock of the American Wire Fabrics Co., Chicago.

The directors of the Worthington Pump & Machinery Corporation at a recent meeting declared the regular quarterly dividends of 1¾ per cent on class A preferred and 1½ per cent on class B preferred stock, payable Oct. 1. No action was taken on the common stock dividend.

The Burton Engineering & Machinery Co., Spring Grove Avenue, Cincinnati, has been placed in the hands of a receiver. The company manufactures gasoline locomotives and other road-building machinery. The plant will be continued in operation.

The directors of the Reynolds Spring Co., Jackson, Mich. have declared a dividend of 1¾ per cent on the preferred A stock and preferred B stock.

The directors of the Crucible Steel Co. of America at a recent meeting declared the regular quarterly dividend of $1.75 on the preferred stock.

The Dayton, Toledo & Chicago Railroad, recently placed in the hands of a receiver, was bid in for $50,000 by William Stroop, Dayton, Ohio, tobacco dealer, at receiver's sale Aug. 24. It is understood that the new owner will spend approximately $500,000 in equipment for the road, the plans calling for five locomotives, 50 freight and passenger cars, and the relaying of rails on the greater part of the line.

The sale of 300,000 shares of Otis Steel Co. common stock at $11 a share to present shareholders, as proposed by the directors of that corporation, has been approved by stockholders.

Subscriptions to the new stock issue of the Lima Locomotive Works, Inc., have provided more than $3,300,000 cash, which is sufficient to finance half of a $3,000,000 construction program and to retire approximately $1,300,000 outstanding bonds.

For the six months ending with June, last, sales of the Winchester Repeating Arms Co., New Haven, Conn., amounted to $6,588,012, and net operating profits $403,343. Interest charges for that period amounted to $459,844, thus a loss of $56,501 was shown for the first half of the year.

The New York Air Brake Co. reports earnings for the first half of 1922 amounting to $309,507, after all charges, or the equivalent of $3.09 per share on $10,000,000 capital stock outstanding.

The net profit of the Keystone Steel & Wire Co. for the year ended June 30 was $412,047 and, after providing for all charges and federal taxes, the surplus was $29,540. The balance sheet as of June 30, last, showed total assets and liabilities of $8,649,787, and profit and loss surplus $178,081. Current assets, including $263,965 cash, were $2,014,191, compared with current liabilities of $319,496. No bank loans were outstanding.

Plans of New Companies

At a recent meeting of the Temple Furnace Co., Temple, Pa., a permanent organization was effected with Nils Anderson, president; G. A. Coulton, vice-president; C. A. Sleicher, treasurer, and H. Sellers, secretary. Repairs and improvements of the furnace at Temple, Pa., are being pushed rapidly in order to get the furnace in blast at an early date.

The Liberty Tool & Die Corporation, Rochester, N. Y., has been incorporated with a capital of $10,000 to manufacture machinery, tools, dies, etc. The directors of the company, all residents of Rochester, are: C. F. Mallick, 25 Pullman Avenue, C. M. Meyer and F. E. Wegner.

The J. D. Tire Jack Corporation, 15 Journal Square, Jersey City, N. J., is planning to start operations on the J. D. tire jack which it will manufacture under contract. This company is now receiving bids with a view to an early production date.

The Globe Steel Tubes Co., a reorganization of the Globe Seamless Steel Tubes Co., Milwaukee, was recently incorporated under the Delaware laws and will continue to manufacture the line handled by the old company. Its factories are at Milwaukee. The officers are: R. P. Lamont, chairman; P. J. Kalman, president; F. J. O'Brien, vice-president and general manager; G. O. Ross, secretary and treasurer.

The Brady Elevator Equipment Co., Inc., 95 Liberty Street, New York, recently incorporated for $1,000,000 under the Delaware laws, is now having its manufacturing done by contract until it starts operations in its new plant. It will do its own construction work and will continue to manufacture elevator door closers. The officers are T. Brady, president and general manager; L. G. Hagenbuch, secretary and treasurer.

The Defiance Auto-Lock Corporation, 836 Hamilton Street, Allentown, Pa., recently incorporated, will manufacture automobile radiators and other metal products. At the present time it is in the market to contract for brass and solder. The officers are: E. W. Reuber, president; R. H. Peterson, vice-president and general manager, and A. F. Landis, secretary.

The Universal Machine & Equipment Co., Greensburg, Pa., has been incorporated with a capital of $200,000 to manufacture machinery and parts. For the present its manufacturing will be done by contract.

The Marfield Radio Mfg. Co., New York, has been incorporated with a capital of $20,000 to manufacture wireless equipment and parts, chief of which is the Clarion radio horn. Manufacturing for the present will be done partly by contract. Epstein & Axman, 175 Fifth Avenue, represent the company.

Leo Schlesinger & Co., Inc., 64 Wooster Street, New York, has been incorporated with a capital of $100,000 to manufacture tinware and general metal goods. The new company will take over the business of Leo Schlesinger & Co., and contemplates expansion. Jenks & Rogers, 67 Wall Street, New York, represent the company.

The O. C. Jensen Machine Corporation, New York, has recently incorporated with a capital of $15,000, and will manufacture machinery and parts. Plans for manufacturing are yet undecided. F. Bien, 280 Broadway, New York, represents the company.

The Vulcan Radio & Electric Corporation, New York, has been incorporated with a capital of $100,000 to manufacture wireless equipment and parts. It will do its own manufacturing for the present. The company is represented by W. F. Ashley, Jr., 156 Broadway, New York. The incorporators are: C. S. Ashley, P. R. Bassett and T. O. Hall.

The Arrow Body & Wagon Works, New York, has been incorporated with a capital of $15,000 to manufacture automobile bodies. It is still in the process of organization and undecided as to the date of beginning operations. The incorporators are: H. Brown, H. Melnic and L. Rubin. The company is represented by R. H. Schenk, Aeolian Building, West Forty-second Street, New York.

The Progressive Iron Works, Inc., 104 Court Street, Reading Pa., was recently incorporated to do structural and ornamental iron and brass work. It has purchased equipment for a plant located in Reading, Pa., and has already started operations.

The Gorlov Heater Co., 34 South East First Street, Miami, Fla., has started operations in manufacturing several types of automatic water heaters. Most of its work will be let out to contract.

The International Chain & Mfg. Co., 1207 Vine Street, Philadelphia, recently incorporated, is a re-organization comprising the chain business of George J. Campbell, Philadelphia, and the Victory Chain & Mfg. Co., York, Pa. The factory at York will be enlarged to meet the requirements of the expansion, and new equipment will be needed for making certain lines of electric welded chain. The officers of the new company are: G. J. Campbell, president and general manager and J. L. Mueller, vice-president.

The Unique Brass Foundry Co., 833-841 Grant Street, Buffalo, recently incorporated, will manufacture storage batteries and parts. It has an equipped plant and is now manufacturing.

The King-Schultz Co., New York, has been incorporated to manufacture iron and steel products. Its plant is located at 351 East Thirty-third Street. The incorporators are: H. King, A. Schultz and S. Tobias.

The Gottwik-Scheffer Thermometer Co., New York, has been incorporated with a capital of $20,000, to manufacture thermometers and other instruments. It is looking for a plant of considerable capacity somewhere in Brooklyn and hopes to be able to transfer its equipment about Sept. 1. Its offices for the present are located at 15 Park Row. The incorporators are: J. E. Gottwik, and H. S. Scheffer, Sr. and Jr.

The Flower City Pipe & Iron Corporation, Rochester, N. Y., has acquired the iron yard formerly conducted by Coates, Bennett & Reidenbach, Inc., and plans to operate a general iron and steel business, specializing in pipe and pipe products. The plant is equipped to handle scrap, to cut, thread and refit used pipe, and to manufacture cellar columns, fence posts, etc. The officers of the company are: B. Rosenthal, president; R. H. Coates, treasurer and general manager and J. E. Gore, secretary.

The Brantford Computing Scale Mfg. Co., New York, was recently incorporated with a capital stock of $100,000, to manufacture scales. This company is a subsidiary of the Brantford Computing Scale Co., Ltd., Brantford, Ont., which expects to set up a number of distributing offices in the United States. An assembling plant is also being contemplated for the near future. It will probably be located in or near Buffalo. The incorporators are: W. Mendell, D. P. Ritchey and W. F. Donelly. The New York offices will be located at 30 East Forty-second Street.

The Udall & Landan Mfg. Co., 205 Lafayette Street, New York, has been incorporated with a capital of $20,000, to manufacture tools and other metal products. It will also do some repair work. The incorporators are: P. A. Udall, J. A. Landan and I. Hecker. Mr. Udall was mechanical engineer in charge of the Panama Canal Exhibit. The company will take over the business of J. A. Landan & Co., Inc., and plans to do most of its work at the present location, but some parts will be manufactured by contract.

The Smith-Hamburg-Scott Welding Co., New York, has been incorporated with a capital of $20,000, to manufacture metal products and to do general welding and repair work. The incorporators are: C. P. and L. W. Scott, and H. Sancier. Its offices will be located at 505 West Fifty-seventh Street.

The Hunter Saw & Machine Co., Fifty-seventh and Butler Streets, Pittsburgh, has opened an office at 56 Pine Street, New York, F. E. Harrison in charge; also at Manhattan Building, Chicago, P. W. Wendt in charge. Both offices will carry a complete stock of metal-cutting circular saw blades, pneumatic hammer rivet sets and chisel blanks.

The Celite Products Co., Ltd., New Birks Building, Montreal, Canada, has been established to market Sil-O-Cel and Filter-Cel as produced by the Celite Products Co., Chicago. Sil-O-Cel is a product used for the prevention of excessive heat loss from boilers, furnaces, etc. Filter-Cel is a filtering aid. L. Russel is manager of the Montreal office.

The Fire Pump & Equipment Co., 2237 Insurance Exchange Building, Chicago, recently organized, will do construction work throughout the United States. It has been buying machines to the extent of $8500 per month since May and will now buy from $5000 to $10,000 worth of machinery each month. It is also in the market for Duplex Underwriter Pumps. The officers of the company are: Edward Maher, president; E. G. Maher, secretary and treasurer and E. E. Maher, vice-president.

The George F. Foss Machinery Co., 174 Lafayette Street, New York, has been purchased by L. Cohan, Woodcrafts Equipment Co., and is being operated under the name Lafayette Machine Tool Co.

The Maxim Spark Plug Corporation, 2 Duane Street, New York, recently incorporated, is manufacturing a spark plug the main operation of which involves die casting. This phase of the work will be done by contract.

The Marion Electric Mfg. Co., 24 Cliff Street, Jersey City, N. J., has filed notice of organization to manufacture electrical products. It is operating in its own plant at the above address. A. B. Dittmar heads the company.

The Standard Lock Corporation, represented by Bond, Schoeneck & King, 421 Union Building, Syracuse, N. Y., was recently incorporated and will manufacture locks.

The Boiler & Radiator Corporation, 154 East Avenue, Rochester, N. Y., will act as representative for complete lines

of boilers, radiators, steam specialties and kindred lines, devoting particular attention to Kewanee heating and power boilers.

Consolidation of the Prima Radio Corporation, New York, and the Manufacturers Tool & Die Works, under the corporate title of the Prima Radio Corporation, has been announced. The capitalization of the new company is $50,000 in 8 per cent preferred stock of $10 par value and 1,500,000 shares of $1 par value common. William Schilling is president and Andrew E. Puckrin is chairman of the board of directors.

The McPhilben Corporation of New Jersey, Newark, N. J., has been incorporated with a capital of $25,000, to manufacture electrical equipment and parts. For the present it is doing jobbing business only, future developments depending upon the resumption of normal conditions. It does not expect to do its own manufacturing. Address H. Citrit, 747 Broad Street, Newark, N. J.

The Minden-Edgar Iron Works, Inc., Long Island City, N. Y., has been chartered under State laws to manufacture iron and steel products and to operate a general iron works. It has acquired a plant and will do its own work temporarily. The incorporators are E. F. Minden and P. F. Edgar. The company is represented by J. G. Snyder, 256 Broadway, New York.

The Niagara Welding & Boiler Works, Inc., 1140 Whitney Avenue, Niagara Falls, N. Y., was recently incorporated to manufacture boilers and other iron products. It has taken over the business of the Niagara Welding Works and will continue boiler making and welding. It does not intend to manufacture at present. The incorporators are W. I. Grantham, J. Karon and H. J. Cantara, all of Niagara Falls.

The Consolidated Foreign Motor Car Co., 135 West Seventy-second Street, New York, has been incorporated under the Delaware laws with a capital of $22,500,000 to manufacture automobiles. At present it plans to equip chassis of foreign manufacture with coachwork built in the United States. Agencies will be established in all the principal cities.

The Detroit Automatic Vending Machine Co., Detroit, is ready for operations, manufacturing automatic food vending and liquid dispensing machines for use in restaurants.

The Gerson Rolling Mill Co. has been incorporated under the name Southern Steel & Rolling Mill, Inc., Birmingham, Ala., with a capital of $200,000. At present it is installing a 16-in. bar mill, to be equipped with two four-door sand bottom furnaces. The company's 8-in. mill will be changed to electric power, increasing the yearly capacity to 30,000 tons. It will specialize in reinforcing bars and fence posts in addition to the merchant bar trade.

The Medina Lake Boat Works, Medina Lake, Tex., recently organized, is in the market for boat equipment of all sorts. Its business is building and repairing boats.

The Perfection Ice Scoring Machine Co., Gainesville, Tex., manufacturer of ice scoring machines, will have some of its manufacturing done by contract in the North at a later date. At present these machines are being made in three plants in Waco, Tex. The officers are: R. H. Roark, president, and W. McKemie, vice-president and general manager.

The Huron Mfg. Co., Detroit, which was recently incorporated, has made tentative arrangements for manufacturing. It is undetermined about its final plans. H. N. Reynolds is president.

The McChesney Foundry & Mfg. Co., 812 Texas Street, El Paso, Tex., was recently incorporated to manufacture iron and steel specialties. It is operating in a plant which was built last November, but plans are under way to increase its capacity. Some of its products are cast-iron grates, tanks and soil pipe, furnaces, boilers and heaters. The company also has a pattern shop. The incorporators are: L. P. McChesney, president, W. S. Dobie and S. J. Isaacs.

The consolidation of the firm Marks & Fiske, distributors of iron and steel supplies, and Louis Zeiger & Co., operators in iron and steel in the Middle West for the past 15 years, is announced. The merged firms are to be incorporated as the Marks-Fiske-Zeiger Co. with offices and warehouse at 2503-07 Twenty-fourth Street, Detroit. Plans for expansion of warehouse and yard facilities have been put into operation. A complete stock of steel will be handled. A separate department will be devoted to the handling of rails and railroad equipment. Harry J. Marks is president of the new concern; Louis Fiske, vice-president, and Louis Zeiger, treasurer and chairman of the board.

The Lees-Bradner Co., manufacturer of gear generators, thread millers and gear tooth grinders, Cleveland, has established a direct sales office at 32 North Clinton Street, Chicago, in charge of Frank E. Artz.

Trade Changes

The Charcoal Iron Co. of America announces the removal of its general offices from Detroit to Union National Bank Building, Marquette, Mich.

The Illinois Tool Works, manufacturer of cutters, hobs and reamers, Chicago, has appointed the Commercial Steel & Supply Co., Plymouth Building, Cleveland, as its representative in the Cleveland district. Complete facilities are available to the Commercial Steel & Supply Co. for rendering service to customers.

W. A. Jones Foundry & Machine Co., manufacturer of speed reducers and power transmitting machinery, with general offices and factory at 4401-4451 West Roosevelt Road, Chicago, announces the opening of another branch sales and engineering office at 2482 University Avenue, St. Paul, Minn. C. F. Ford, who is in charge of the new branch, is a transmission engineer, experienced in working out elevating, conveying and power transmitting problems.

The Morse Chain Co., Ithaca, N. Y., has changed the location of its Philadelphia offices to 612 Franklin Trust Building and 18-22 South Fifteenth Street.

The Wagner Electric Mfg. Co., St. Louis, has changed its name to the Wagner Electric Corporation.

The Erie Mop & Wringer Co., Erie, Pa., has changed its address to East Rochester, N. Y.

The Republic Pipe & Iron Corporation, 1185 Flushing Avenue, Brooklyn, N. Y., has changed its address to 23-29 Varick Avenue, Brooklyn.

The C. C. Carter Machinery Co. has changed its address from 36 Garnet Street to 150 Chestnut Street, Providence, R. I. Its new warehouse, which trebles the storage space in the old location, is at 37-39 Bassett Street.

Samuel W. Hay's Sons, 1410 Keenan Building, Pittsburgh, has been appointed representative of the Diamant Tool & Mfg. Co., Inc., 91 Runyon Street, Newark, N. J., for the sale of standard punch and die sets in a part of Pennsylvania.

The Mechanical Appliance Co., Milwaukee, has changed its name to the Louis Allis Co. There is no change in ownership or personnel.

The American Electric Fusion Corporation has changed its address from 1906 North Halsted Street, to 972 Montana Street, Chicago.

Scheid Engineering Corporation, 90 West Street, New York, has been appointed metropolitan and export representative for the Franklin Moor eCo., Winsted, Conn., manufacturer of material handling machinery for industrial plants.

Charles Eisler, mechanical engineer, has moved his factory and offices from 15 Kirk Alley to 736 South Thirteenth Street, Newark, N. J., where he has a new brick factory of 6000 sq. ft. capacity.

The Montgomery Chemical Works, Inc., Elmtree and Doremus Streets, Detroit, has changed its address to Buffalo and Doremus Streets.

The Milwaukee Machinery Co., Milwaukee, will move from its present location, Sycamore Building, to its new offices and display room at 93 West Water Street, on Sept. 1.

The American Pipe & Supply Co., 1420 South Eighth Street, Philadelphia, has leased the entire building at 305 Cherry Street, for a new plant.

The Sayre-Level Radio Co., 905 Filbert Street, Philadelphia, manufacturer of wireless equipment, has tentative plans for a factory. New equipment will be installed.

The Nashua Gummed & Coated Paper Co., announce that the transfer of business of the National Binding Machine Co. is completed, forming a new division of the former company known as the Package Sealing Division, located at 291 Broadway, New York.

H. T. Henning & Co., Shubert Building, 250 South Broad Street will remove its offices to 724-725 Land Title Building, Broad and Chestnut streets, Philadelphia on August 31.

Frazer & Co., 30 Chuch Street, New York, announce the opening of an office in Zurich, Switzerland.

Phillip A. Udall, for several years with the Holt Mfg. Co., Peoria, Ill., in the capacity of mechanical engineer, and engineer in charge of the Panama Exhibit under George W. Goethals, has formed a company with J. A. Landon, Inc., the new firm to be known as the Udall & Landon Mfg. Co., 205 Lafayette Street, New York. It has acquired the properties of the former company and is developing two new patents which it will put on the market in the near future.

The O. & J. Machine Co., Worcester, Mass., has moved from 116 Gold Street to quarters one-third larger at 60 Ellsworth Street. In addition to Oslund continuous wire-drawing machines, described in these columns last February, the company continues the manufacture of automatic corking, crowning and labeling machines for all purposes and has added a new line in automatic testing tanks for testing bottles.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossbile to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	
Refined iron bars, base price	2.94c.
Swedish bars, base price	7.00c.
Soft steel bars, base price	2.94c.
Hoops, base price	4.29c.
Bands, base price	3.74c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	3.04c.
Channels, angles and tees under 3 in. x ¼ in., base	2.94c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	2.94c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	3.14c.
Toe-calk, ½ x ⅜ in. and larger	4.00c.
Cold-rolled strip, soft and quarter hard	6.75c. to 7.25c.
Open-hearth spring steel	4.50c. to 6.00c.
Shafting and Screw Stock:	
Rounds	3.90c.
Squares, flats and hex	4.40c.
Standard cast steel, base price	12.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	3.04c.

Sheets

Blue Annealed

	Per Lb.
No. 10	4.04c. to 4.19c.
No. 12	4.09c. to 4.24c.
No. 14	4.14c. to 4.29c.
No. 16	4.24c. to 4.39c.

Box Annealed—Black

	Soft Steel C. R., One Pass, Per Lb.	Blued Stove Pipe Sheet, Per Lb.
Nos. 18 to 20	4.55c. to 4.70c.	.....
Nos. 22 and 24	4.60c. to 4.75c.	4.60c.
No. 26	4.65c. to 4.80c.	4.65c.
No. 28	4.75c. to 4.90c.	4.75c.
No. 30	5.00c. to 5.15c.	.....

No. 28 and lighter, 36 in. wide, 10c. higher

Galvanized

	Per Lb.
No. 14	4.85c. to 5.00c.
No. 16	5.00c. to 5.15c.
Nos. 18 and 20	5.15c. to 5.30c.
Nos. 22 and 24	5.30c. to 5.45c.
No. 26	5.45c. to 5.60c.
No. 27	5.60c. to 5.75c.
No. 28	5.75c. to 5.90c.
No. 30	6.25c. to 6.40c.

No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
⅛ in. Butt	—53	—38	¾ in. Butt	—23	—5
¼ in. Butt	—58	—45	1½ in. Butt	—25	—7
1-3 in. Butt	—60	—47	2 in. Lap	—19	—3
2½-6 in. Lap	—57	—44	2½-6 in. Lap	—23	—7
7-8 in. Lap	—53	—30	7-12 in. Lap	—15	+1
9-12 in. Lap	—49	—30			

Steel Wire

Base Prices* to No. 9 Iron and Coppered Per Lb

Bright basic	3.50c. to 3.75c.
Annealed soft	3.50c. to 3.75c.
Galvanized annealed	4.25c. to 4.50c.
Coppered basic	4.00c. to 4.25c
Tinned soft Bessemer	5.50c. to 5.75c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	19¼c. to 20¼c.
High brass wire	20¼c. to 20¾c.
Brass rod	16¾c. to 17¾c.
Brass tube, brazed	26¼c. to 27¼c.
Brass tube, seamless	23 c. to 23½c.
Copper tube, seamless	25¾c. to 26 c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 22¾c. to 23¾c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14-20		
	Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	Primes	Wasters
			80 lb.	$6.05 $5.80
			90 lb.	6.15 5.90
			100 lb.	6.25 6.00
IC	$10.00	$8.50	IC	6.40 6.15
IX	11.50	10.00	IX	7.40 7.15
IXX	13.00	11.25	IXX	8.40 8.15
IXXX	14.25	12.50	IXXX	9.40 9.15
IXXXX	16.00	14.00	IXXXX	10.40 10.15

Terne Plates

8-lb. coating, 14 x 20

100 lb.	$7.00
IC	7.25
IX	7.50
Fire door stock	9.00

Tin

Straits, pig	36c.
Bar	43c. to 47c.

Copper

Lake ingot	15¼c.
Electrolytic	15 c.
Casting	14¾c.

Spelter and Sheet Zinc

Western spelter	8 c. to 8¼c.
Sheet zinc, No. 9 base, casks	9c. open 9½c.

Lead and Solder*

American pig lead	6¾c. to 7c.
Bar lead	8c. to 8½c.
Solder, ½ and ½ guaranteed	25c.
No. 1 solder	23½c.
Refined solder	20¼c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	75c.
Commercial grade, per lb	35c.
Grade D, per lb	25c.

Antimony

Asiatic	6½c. to 7c

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb	25c. to 27c.

Old Metals

Business is quiet but the market is a little firmer this week. Dealers' buying prices are as follows:

	Cents Per Lb
Copper, heavy crucible	11.75
Copper, heavy wire	11.25
Copper, light and bottoms	9.25
Brass, heavy	6.25
Brass, light	5.25
Heavy machine composition	8.50
No. 1 yellow brass turnings	6.50
No. 1 red brass or composition turnings	8.00
Lead, heavy	4.50
Lead, tea	3.50
Zinc	3.25

THE IRON AGE

New York, September 14, 1922

ESTABLISHED 1855 VOL. 110, No. 11

Steel Lumber Developed for Buildings*

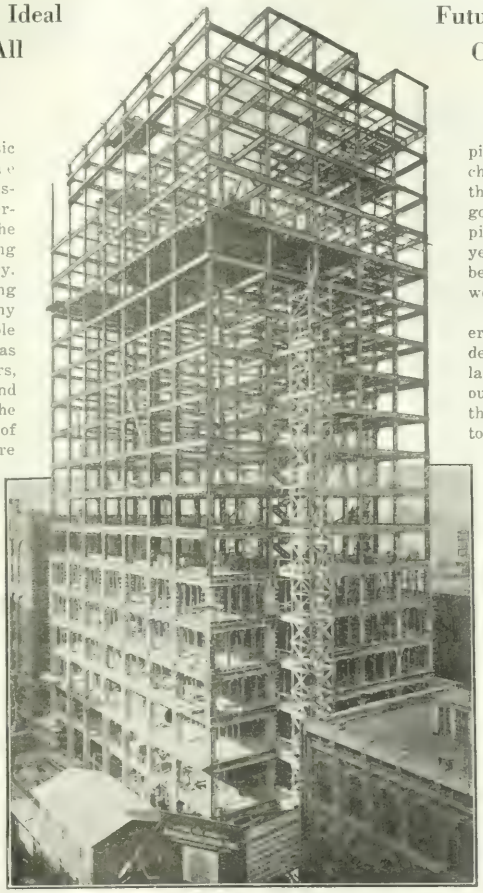
New Light Sections Ideal for Dwellings and All Other Easy Loads

Future Assured by Its Own Qualities and a Dearth of Timber

AS a producer of basic raw materials, the iron and steel industry must have a keen interest in the expansion of the building industry now taking place throughout the country. The outlet which the building industry has been for many years, for a fairly sizable tonnage of such items as sheets, shapes and bars, henceforth must widen and grow in importance. The reasons for this advance of steel in construction are fundamental. It is the old story of the abundance and superior quality of steel against a growing shortage and inferior quality of wood.

Statistics on timber land, usually given in terms of millions of acres, and sawed lumber, given in terms of billions of board feet, afford the casual person little hint of this shortage, but the persistently increasing prices of marketable wood should be notice to everyone that the supply is gradually falling below demand. In an exhaustive treatise on timber depletion, lumber prices, etc., published by the Forestry Bureau of the Department of Agriculture in June, 1920, the clear cut statement is made that 4419 saw mills, representing 82 per cent of all the saw mills operating on virgin Southern pine, will have "cut out" in five years. The further unqualified statement is made that by 1930 the South will produce less pine than the Southern or home market will demand. Long leaf and short leaf yellow pine of the South, now the chief structural lumber of the East and Middle West, is going the way of the white pine of the North. In a few years only enough of it will be left for use as a specialty wood.

As the depletion of Southern pine increases, greater demand will be made on the last great timber stand of our country, the fir trees of the Pacific Slope. Even there, to quote the Department of Agriculture, "are already local evidences of depletion, warnings that the conclusion of our store of soft woods will be the same as that of other regions and in far less time than has generally been estimated."



American Exchange National Bank, Dallas, Texas, 21 Stories High, in Which the Floor and Other Loads Between Main Structural Girders Are Carried by Light Steel Lumber Joists

Steel must take the place of wood for all structural purposes in building construction, for the simple reason that no other material suitable for the same purpose will be available. Specifically, this means that steel joists and steel studs, steel columns and steel beams must provide the frames or skeletons of buildings.

In considering this new outlet for steel tonnage, some new steel materials are coming into prominence. Chief of these are the light-weight structural sections known as steel lumber and expanded steel lath. Both of these products have made tremendous strides in the last few years. Steel lumber has developed to a mill production basis, with distribution through structural steel fabricators, in precisely the way heavy rolled structural shapes were developed. Steel lath has likewise secured public recognition and its use has devel-

*By Gilbert Canterbury, 619 Twelfth Street, N.W., Canton, Ohio.

oped to a point where a goodly tonnage of sheets is now consumed annually in the making of this product. Materials are now available to make two tons of steel grow in the building industry where one grew before.

Another factor helping to bring about a general change to steel in the building industry is the increasing public consciousness of the importance of more fire-safe construction of buildings. As wood lumber has grown more scarce and more expensive, builders have harkened more and more to the teachings against combustible construction that have been flooding the country in gradually increasing volume during the last twenty years. Ever-mounting fire losses, now flourishing at the rate of $365,000,000 annually, are becoming recognized as a great economic waste, and the fact that an average of 15,000 human lives are also lost in fires annually has helped to establish that public recognition.

Still another factor in the progress of construction, appealing to the steel industry, is the unquestioned need for greater permanency in buildings, aside from the hazards of fire. Wood is a porous, moisture-absorbing material which, generally speaking, has but a short life of usefulness under normal conditions. It rots and warps and shrinks and the yearly depreciation and annual bill for necessary repairs on a wooden building are notoriously large. The difficulty of maintaining our modern ideas of sanitation in wooden buildings produces another tendency toward the general adoption of some other building material.

Slow Development

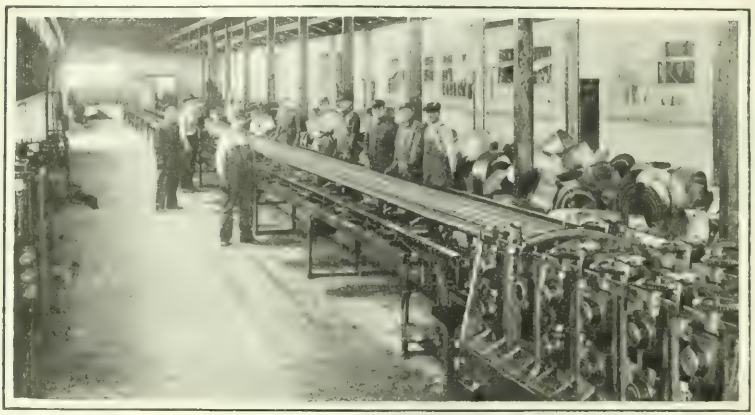
Though some few elements of the steel industry have been aware of these changing conditions for a long time, steel makers as a whole have not given the attention to the building question that such a potentially large outlet for tonnage deserves. Fifty years ago, cast iron and wrought iron constituted the industry's sole contribution to the business of construction.

Not so many years ago engineers were still experimenting with vastly different materials, in vain efforts to expand the usefulness of those materials beyond their physical limitations. Buildings with solid brick bearing walls were attempted to heights beyond the crushing point of bricks. The Monadnock Building, in Chicago, was achieved in one of these experiments by methods which to-day would be utterly prohibitive in cost. The building still stands as an engineering marvel. The Pulitzer or World Building, in New York, has foundation walls 13 ft. thick.

Hot rolled structural steel sections were at length developed. With these, steel frames or skeletons of buildings were erected so that masonry walls were supported by the steel, and each story was a separate unit so far as the masonry was concerned. The 10-story Tower Building, in lower Broadway, recently razed to make way for a larger structure, was the first steel frame building of modern type, but the famous Flatiron Building, in New York, was the first outstanding achievement with this steel material. Since then, with it has been developed America's chief contribution to the world's architecture, the American skyscraper.

Fifteen years ago an entirely new structural steel section was perfected and placed at the disposal of the building industry. This new product, furnished in I-sections and channels, weighed only one-third as much as standard rolled structural steel I-beams and channels. These new sections were made from sheet steel originally. The channels were made by slitting and forming the sheets and the I-sections were made by placing two channels back to back and riveting them. This section formed the nucleus of what is now popularly known as the steel lumber industry.

Steel lumber, as its popular name applies, was originally designed to take the place of wood joists and studs in building construction. Through the associate use of expanded metal lath, which serves as a base for concrete or plaster, steel lumber has developed into structural material for thoroughly fireproof floor and wall construction. In the mill production of this product, slabs 6 to 8 in. wide, 3½ in. thick and weighing from 300 to 750 lb., constitute the raw material. Specially designed strip mills roll down these slabs gradually to strips of light gage, 130 ft. long and ranging in widths up to approximately 17 in.



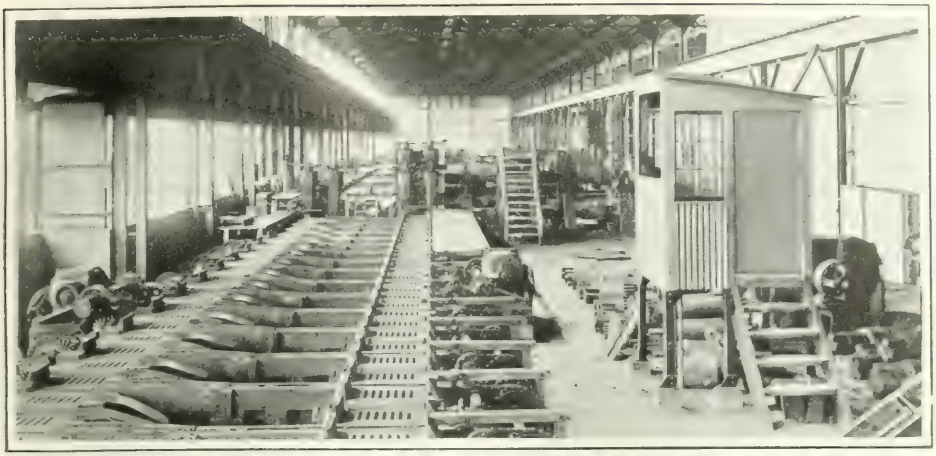
Forming Light Steel Structural Sections from Hot Rolled Strip Steel Coils. The forming is done cold on the machine shown in right foreground, by means of the rolls, governed by the screws at the top

These strips are finished hot and coiled. The coils, when cold, are fed into cold-forming mills which produce the steel lumber channel sections. The steel lumber I-sections are produced by placing two channels back to back and feeding through automatic electric spot welders. Ends are trimmed with high speed friction saws and the shop coat of paint is applied immediately after forming by dipping the sections into paint vats. The steel for these operations, up to the point of painting, is handled on a series of roll-tables and a remarkably efficient practice on heavy tonnage has been established.

Distribution of the mill-produced steel lumber is through the same companies which fabricate and erect heavy rolled structural steel shapes. The steel lumber sections, shipped from the mill in lengths limited only by transportation facilities, are cut to exact length for use by the distributer-fabricator. In large buildings steel lumber sections pick up the light loads of floors and partitions and accumulate them to a point where they can be more economically carried by heavy steel sections. In small structures, like dwellings, they take the place of wood joists and studs.

What Steel Offers

The steel industry now provides, for building construction, (a) heavy rolled structural shapes capable of carrying all heavy loads and stresses in a building, (b) light, pressed steel sections capable of carrying the lighter loads and (c) expanded steel lath as a base for plaster or cement stucco. With these products, practi-



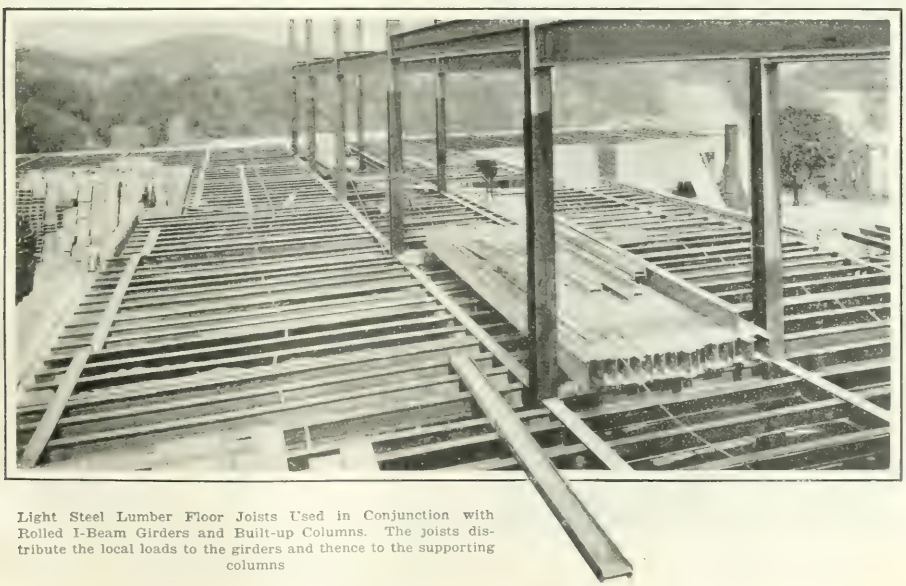
Finishing Train and Run-out Rollers, in the Plant of the Central Steel Co., Massillon, Ohio, Used in the Manufacture of Metal Lumber from Hot Rolled Strip Steel

cally every kind of building can be erected for which there is present-day use.

In addition, the industry provides now, as it has in the past, cast iron columns and other building products, wrought iron for fire escapes, grills, pipe, nails, concrete reinforcing rods and a host of sheet steel products such as corrugated sheets, ventilators, door and window frames, base board, stamped roofing, stamped ceiling, etc. At the dawn of the era of building with steel, the steel industry finds itself well equipped to discharge its responsibilities in the direction of building construction with the same efficiency with which it took over the construction of ships, railroad cars, wagons and automobiles and the thousand and one other industries in which the use of wood has become obsolete.

The light structural steel or steel lumber sections and metal lath are leading the van of this fine array of steel materials in the advancement of sales methods. And much of this work is necessary, if our steel material manufacturing facilities are to be built up sufficiently to take care of the inevitable demand. Sales effort must carry the industry over the period of transition from wood to steel. As an industry, steel has not been a good salesman; and nowhere has poor salesmanship been so apparent as in the handling of steel for the building industry.

Many fallacies exist in regard to such points as the resistance of steel to fire, to corrosion and other destructive agencies. It was upon this foundation of a general misunderstanding of steel that concrete stepped into a prominent position in the building industry. Used first in sidewalks, foundations and similar work, concrete came finally to function as structural building material, displacing steel sections designed specifically for that purpose. This practice afforded outlet to the steel industry only for reinforcing bars, and greatly reduced total steel tonnage. Concrete columns and beams came into use and through the adroit use of a little steel in the way of bars, and the height of concrete structures was run up over 200 ft. The early incomplete line of steel building materials, and the consequent dependence of the industry upon foreign accessory materials, aided this advance of concrete. For instance, a structural steel frame of a large building used masonry



Light Steel Lumber Floor Joists Used in Conjunction with Rolled I-Beam Girders and Built-up Columns. The joists distribute the local loads to the girders and thence to the supporting columns

walls and depended upon concrete, hollow tile or some similar material to carry the lighter loads of floors and roof.

Light steel lumber sections now remedy this condition. Buildings are being erected with heavy rolled steel frames and floors and roof supported on steel lumber I-sections. Expanded steel lath spreads across these steel floor joists and acts as centering and reinforcement for a thin slab of concrete. Thus steel has come back to its original function of serving as structural material, and concrete is used only in sufficient quantities to provide additional fire resistance. Remarkable economies are being achieved in this practice. Besides enormously decreasing the dead weight of buildings, great savings are made in labor. No dead work applies to steel construction, while in concrete construction falsework must be built up to form and support the concrete until it hardens.

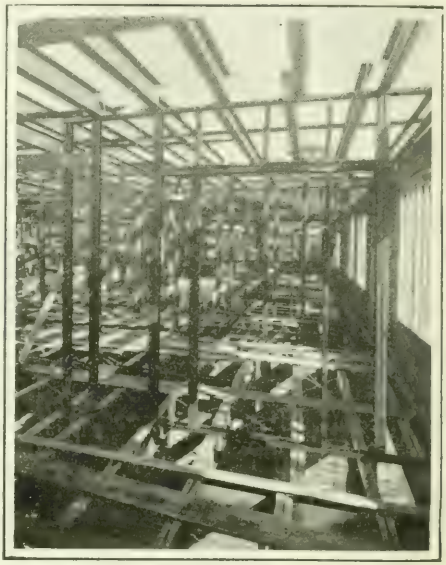
But the larger sized fireproof buildings represent only a portion of the outlet for steel to the building industry since the advent of light steel lumber sections and expanded steel lath. Steel joists and steel lath now find a market in small commercial buildings, where the heavy rolled structural steel a few years ago had no market whatsoever. Steel joists and steel lath are used in floor and roof construction in strictly masonry bearing wall buildings of two and three stories in height. In buildings of this character the steel joist tonnage alone averages approximately 200 tons per 100,000 sq. ft. of floor surface. In the larger buildings, where floor joist spans are usually greater, the steel joist tonnage will run from 275 to 300 tons per 100,000 sq. ft. of floor surface.

The steel lath required for such construction is double the amount of floor surface to be built, since the lath is used as centering and reinforcement for the concrete slab on top of the joists and is also attached to the bottom flanges of the joists as a base for ceiling plaster. A certain amount of heavy rolled steel shapes are required even for these small commercial buildings as lintels, and as supporting beams to break joist spans, and some cast iron posts are likewise frequently used.

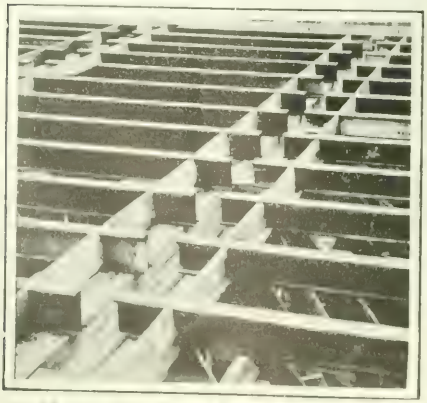
The general utility of the steel lumber floor joists and steel lath are causing them to find market, also, in construction of public schools, hotels, theaters, apartments, garages and practically every type of occupancy where the live floor loads are not excessive and where, a few years ago, steel found no appreciable outlet.

In cities, all buildings of these types in certain zones are required to be constructed fire-safe and some buildings, like schools, theaters, etc., are often required by State laws to be built fire-safe, regardless of location. Thus the use of combustible or wood materials gradually falls off through enforcement of safety measures, leaving reinforced concrete as the only competitor of steel in strictly structural materials.

Steel joists and expanded sheet steel lath are opening a market, also, among the builders of dwellings, even to the inclusion of the small, single-family bungalow. This field represents the absolute base of the building construction industry. It has well been said that no producer of building materials has really invaded the building industry until he has provided something for use in dwellings. Normally, dwelling construction outstrips all other types of buildings and represents about 30 per cent of the entire activity of the building industry. During the first eight months of 1922 the Dodge reports show that 37½ per cent of all awards has been for residential property. The bare statement, made so many times during the last year, of a United States shortage of 1,500,000 homes, gives sound reason for the conjecture that residence construction will continue for many years to consume a large portion of the materials going into the building industry.



Light Steel Joists and Light Pressed Steel Sections for Bearing Partitions, with Rolled Structural Steel Main Framing



Steel Lumber Joists Set to Form Seats for Plates to Be Embedded in Reinforced Concrete Tie Beams in the Y. M. C. A. Building at Hagerstown, Md.

It is the function of steel to reduce and eventually eliminate the hazard of fire in dwellings and its medium for this purpose is the light structural section of steel joists and steel studs. The preliminary effort of steel in this direction should be in furthering the practice of building fire-safe first floors. The logic for this practice is found in the fact that the major fire hazards of the home are located in the basement. A large majority of dwelling fires originate either in the basement or in the first floor. Here are located such well known fire hazards as furnaces, hot-water heaters, horizontal heating pipes, coal, ash bins and frequently open-flame laundry stoves, gas jets, etc., as well as cooking and other stoves, open grates, etc.

A high measure of fire protection may be secured if a steel joist fire-safe first floor is spread across the foundation walls. In this construction metal lath may be attached to the underside of the steel joists and plastered, after which the regular double wood floor surface can be laid on the tops of the joists. Nails can be driven right into the webs of the joists. Another practice is to leave the joists exposed or open in the basement and to lay metal lath on the top sides of the joists, and cover with a 2-in. concrete slab, embedding wood screeds to which the wood floor surface may be nailed. The cost of this steel joist first floor construction closely parallels the cost of combustible and dangerous wood joist floor construction.

The first principle of fire-safe and more permanent construction is the elimination of cumbustible and rap-

id'ly deteriorating materials. It follows, then, that added advantages are secured through the use of steel joist second floors and roofs, steel stud partitions and steel framed or solid masonry walls. The first installation of steel lumber joists and studs was a duplex dwelling, built fifteen years ago at Tuxedo Park, N. Y., and originally designed for wood lumber structural members. H. M. Naugle, who had conceived the idea of the light steel structural sections, re-designed the building, replacing every stick of wood shown on the plans with the steel lumber sections.

This 16-room building was erected by the Taft-Howell Co., Cornwall-on-the-Hudson. About 18 tons of steel lumber were used. The building was started in May and finished in October. The cost at that time was $5,700. Some miscalculations were made by the contractors in their estimate of this very first steel frame dwelling ever erected, but the same contractors agreed to duplicate the house at that time for $6,300. As early as 1912 the United States Government, recognizing the economy and advantages of steel lumber construction, purchased 44 carloads of steel lumber and shipped it to Honolulu, where it was used in the erection of 33 16-room and eleven 14-room structures at the army barracks there. In these buildings the steel lumber took the place of all structural wood material.

The general size of the great building industry to which these various steel products appeal has never been accurately estimated. No systematic record is kept of total building construction in cities, and no record at all is kept of total building work on the farms. The "Statistical Abstract of United States" gives data on building permits issued in 69 cities, with an aggregate population of 26,000,000, for the year 1920; the number of permits is set forth as 249,368 and the total valuation $1,115,151,000. The Dodge reports show building contracts awarded in 1919 to a valuation of $2,077,000,000, in 1920 to a valuation of $1,996,894,000, in 1921 to a value of $2,356,000,000 and in eight months of 1922 to $2,362,872,000. These reports cover only 27 States and only towns of over 3000 population in those States. It appears safe to estimate that our annual building construction amounts to something well over two billions of dollars annually. In King's "Wealth and Income of the People of the United States," the total income of the people of the country is set at 18 billions of dollars in 1900 and 31½ billions of dollars in 1910. Estimates for 1920 have run as high as 55 billions of dollars.

But the question of the relative importance of the building industry in the general commercial activity of the nation is of slight importance. Certainly it is vast and assuredly it now presents for the steel industry, with its fine line of steel materials, an enormous outlet for tonnage.

So far the record of steel in building construction is practically flawless. It is popularly known to possess an enviable line of virtues, the chief of which lies in the fact that steel is a definitely known and uniform quantity. There is little or no guess work about building with steel. Factors of safety in all the steel products are large and definite. The performance, particularly, of the heavy rolled shapes and the steel lumber sections has set the building industry's standard for long life, economy and general reliability.

Casting Aluminum Bronze for French Coinage*

The French Government has decided to replace the paper money notes at present in circulation with small, golden-like coins of aluminum bronze.

In 1909 the French Ministry of France set up a Commission to propose a likely metal to replace the old coins then in existence. This commission asked an engineer who specialized in the question of alloys, P. H. Gaston Durville, to prepare bronzes of aluminum which should approach as near as possible to the metal of Sainte-Claire Deville, who experimented half a century ago, calling it French metal.

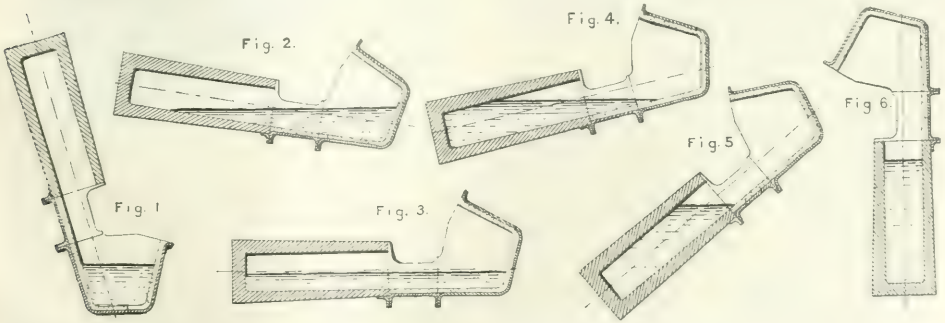
M. Durville is now preparing homogeneous ingots possessing a greenish-gold color, which can be polished as well as the hardest steels. One of the chief difficulties to be faced was the inclusion of slags, air bubbles and other oxidized bodies when pouring the ingots. To overcome this, M. Durville invented and patented, in 1913, the apparatus illustrated. It is composed of an ingot mold and a pocket or ladle rigidly connected with each other by a communicating canal. These three elements are kept in a straight line, once they are brought together. The ladle and the canal are lined with a refractory material.

At the factory at Mouy-Bury, where the Alloy and Forgeable Bronze Company employs the Durville method, the alloy is melted in a crucible, its free surface oxidizes and becomes covered with a film of alumina, which protects the parts of the bath below it from further oxidation. Once the alloy is melted, the pouring must be effected without the slightest agitation.

From the crucible the alloy is poured into the ladle, which is then rapidly attached to the ingot mold. The whole apparatus is then tilted, as shown successively in Figs. 1 to 6, and the molten mass flows gently from the ladle into the four compartments into which the ingot mold is divided. As will be seen, the surface of the liquid bronze is kept horizontal throughout the operation. The alloy occupies successive positions without the least jerk, until it arrives in the ingot mold, where it solidifies. Its passage from one to the other is accomplished gently and evenly, in spite of the rapidity of the flow. As soon as solidification has taken place the ingots are withdrawn.

The aluminum bronze leaves the factory in the form of rectangular plates, each one weighing 60 to 70 kilos (130 to 150 lb.), which are then reduced to strips from which the coin blanks are stamped.

*From *Engineer*, London.



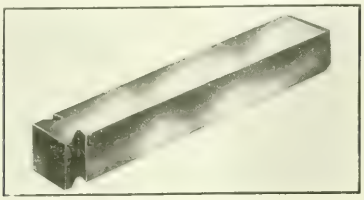
Six Successive Positions in Transferring the Molten Metal from the Ladle into the Ingot Mold. The two are joined by an intermediate section which acts as a runner

Self-Fitting and Cutting Keys

Self-fitting keys known under the trade name of Keytite, which by being driven into the keyway cut their own seats, and intended to save hand fitting as in the case of the usual square keys, are being offered by Smith & Serrell, Central Avenue, Newark, N. J.

One of the keys is shown in the accompanying illustration. A tough chisel stock is used and ground to a size slightly larger than the nominal keyway width. A cutting edge and chip recess are provided near the front end of the key, and ahead of these there is a pilot which is slightly smaller than the nominal keyway width. To install the key, the pilot is entered first with the cutting edge at the side, the key then being driven home with a hammer or a sledge, depending upon the size of the key.

The cutting edge cuts the keyway to fit the key body, the job being done, it is said, in a fraction of the



The Cutting Edges Cut the Keyway to Fit the Key Body. Chip recess and pilot are shown at left end of key

time necessary to hand fit a key. The cut fit is tight, yet not too tight to burst a hub. Oversized keys refit old keyways quickly and thus may serve to keep important machines in operation.

In the larger sizes cutting edges may be provided on both sides and when it is desired to fit top and bottom as well as on the sides, a cutting edge is also provided at the top. Gib keys and other modifications, incorporating the self-fitting feature, can be furnished as required. Keys with heads are available for places where headless keys cannot be drifted out, and many of the larger sizes can be provided with a hole tapped in the end permitting the key to be pulled out by a bolt. Taper keys, with or without heads, are available, although top and side self-fitting keys are recommended on heavy duty work where it is desired that the key fit top and bottom as well as sideways.

August Construction Ahead of Last Year

Building contracts awarded in the 27 Northeastern States during August amounted to $322,007,000, according to the F. W. Dodge Co. This figure was 46 per cent over that of August, 1921, and only 8 per cent under that of July, 1922. A seasonal decline set in after four months of unprecedented activity and the decline is slight.

The August figures brought the total for the year to date up to $2,362,872,000, which is not only the largest figure for the first eight months of any year, but is greater by $7,000,000 than the total for the entire year 1921. Comparing this year with 1921 on the eight months' basis, the year is 58 per cent ahead.

The outstanding feature of the August statistical statement is the increase in industrial plant construction, which amounted to $67,373,000, or 21 per cent of the month's total. This is the largest monthly figure for this class since March, 1920. One project accounted for $35,000,000 of this large total, the by-product coke plant of the Carnegie Steel Co. near Pittsburgh. Even omitting this large single project, the remaining amount is greater than any monthly total since November, 1920.

Residential building still maintains the lead in August, with $100,882,000 worth of contracts, or 31 per cent of the total. Residences for the eight months amounted to $887,250,000, or 37½ per cent of the total, against 40 per cent for the first six months of the year, a slackening in this item having occurred since July 1. Public works and utilities in August amounted to $49,825,000, or 15 per cent; business buildings, $38,122,000, or 12 per cent; and educational buildings, $32,055,000, or 10 per cent.

Contemplated new work reported during the month amounted to $371,249,000.

Business Conditions Still Sound

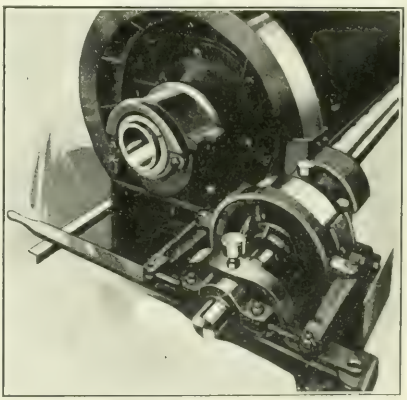
In reviewing the state of industry, the advance sheets of the Department of Commerce for the month of July lay stress upon the comparison with July of last year rather than with June, 1922. The belief is expressed that the very serious labor difficulties through which we are now passing would under many conditions have completely demoralized business. Instead of this, however, real progress has been made in many lines. Thus, the shipment of iron ore through the "Soo Canal" in July was 35 per cent greater than in June and was more than double the figure for July, 1921. The output of crude petroleum, more than 46,500,000 barrels, was 2 per cent greater than in June and, with the exception of last March, shows the greatest total in our history. Consumption of petroleum, exceeding 51,000,000 barrels, is the highest for any month on record.

Production of sheets—blue, black and galvanized—fell off from 86.4 per cent of capacity in June to 72.7 per cent in July. Both may be compared with 19.7 per cent in July, 1921. Shipment of steel barrels dropped from 267,000 in June to 221,000 in July, against 96,750 in July, 1921. Building costs increased in July to 173 per cent of the pre-war figure, against 170 per cent in June. These compare with 204 per cent in July, 1921. The total stock of money in the United States, held outside the Treasury and the Federal Reserve system, decreased from $4,376,000,000 in June to $4,337,000,000 in July, the figure in July, 1921, having been $4,866,000,000. The latest figure represents $39.47 per head of population.

Clutch and Brake for Tumbling Mills

A combination clutch and brake mechanism for tumbling mills arranged as shown in the accompanying illustration, and intended to contribute to the safe operation of the mills, has been placed on the market by the Whiting Corporation, Harvey, Ill.

With this mechanism a loaded mill can be brought to rest at the proper point for unloading, and without



Combination Clutch and Brake for Tumbling Mills. Control is by the hand lever shown

loss of time. Holding the mill in place by a wood prop or a bolt thrust into the gearing, as commonly done, is always dangerous. With the combination clutch and brake it is impossible for the barrel to turn after the brake is set, even though the barrel is unequally loaded.

It is designed as a simple and fool-proof device and is controlled by a hand lever, the shifting of which toward the mill engages the clutch and starts the mill. To stop the mill, the lever is moved in reverse direction, passing through neutral to the braking position.

NEW THREAD SNAP GAGE

Gages by Sight and Touch Interchangeable Rotatable Gaging Elements Used—Lasting Accuracy a Feature

A new type of adjustable thread snap gage, intended to afford a proper "feel" of the dimension, and an unobstructed view for "seeing" the elements of a screw thread, singly or collectively, and which may be used either as a working or an inspection gage, has been placed on the market by the Johnson Gage Works, Hartford. By elements of a screw thread is meant size, lead, form, roundness and straightness.

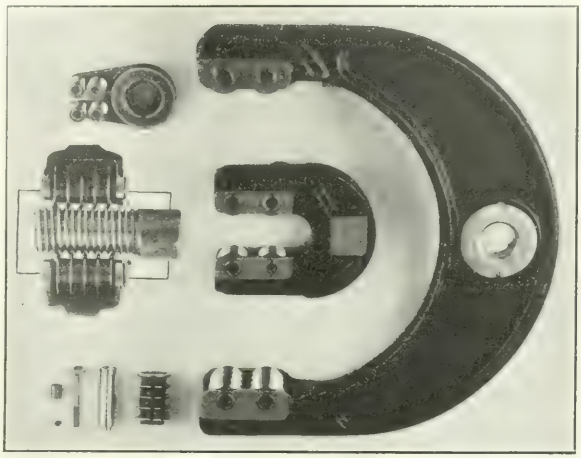
An advantage of the snap gage is that the sense of sight as well as that of feeling may be used in checking up the piece being inspected. The relation between the gaging elements and the piece can be determined because light passes through a very small opening and is shut out entirely where contact has been effected. The principles used in the design and construction of these gages vary, the instrument illustrated being a recent contribution to gages of this type.

Among the claims for the new gage are that its accuracy is permanent and its adjustment simple and positive. It incorporates a "go" and "not go" limit, and gages single, double, left and right-hand threads. The three styles available are shown in the accompanying illustration. In style A, which is for general use except where a lead check of length is necessary or in pitches coarser than 10, the gage elements are approximately ⅝ in. long. In style B the gaging elements are about 1 in. long. Style C is for the A. S. M. E. sizes from No. 0 to No. 12, inclusive.

It may be noted from the illustrations that the gages employ rotatably mounted circular gaging elements, or rolls. The advantage of this principle of construction, as explained by the makers, is that the circular element gives a line contact, affording a proper "feel" of the dimension and an unobstructed view for "seeing" the elements of the screw thread. In rotating, friction and wear is comparatively eliminated, serving to lengthen the life of the gage.

Two sets of gaging rolls are provided, the outer rolls being the "Go" set and the inner the "Not Go" set. The annular ribs of the rolls are the same in form as the thread to be inspected, and these ribs are spaced to project between every second thread. Functioning without relation to the helix angle of the thread, the gage may be used on left and right hand, single or double threads. By using one rib of the gaging element the pitch diameter of the thread can be accurately determined. By using the entire length of the rolls the form of the thread and the lead can be determined at a glance, and also the presence of any taper detected. A staggered thread or one that is out of round can be detected by rotating the piece while it is engaged. Another feature is that the gaging elements are interchangeable and threads of the same diameter but different pitch can be inspected with the same gage. Work cannot be cramped between the gaging rolls.

Adjustment of the rolls is by rotating the eccentric bushings on which they are mounted, the total adjustment being 0.040 in. The gage is set to a soft master or setting plug and after being set the adjustment is locked by a binding screw. A soft plug may be used in the place of a hardened and ground sizer, because, it is claimed, there is no wear in the setting process.



Adjustable Thread Snap Gages. The larger gage is style B and the one within it style A. Style C is shown at upper left. Details at lower left belong to style B. The gage in use is shown in the insert

Number of Employees Decreased

WASHINGTON, Sept. 12. — The unsettled industrial situation is held by the United States Employment Service to be largely responsible for a decrease of 1381 employees in the aggregate number employed during the month ending Aug. 31, as reported by 1428 concerns usually employing more than 500 workers each. The decrease in the iron and steel industry under July was only 270, while for metals and metal products other than iron and steel the decrease was 2048. Other decreases were: Vehicles for land transportation, 3676; food and kindred products, 1895; paper and printing, 636; miscellaneous, 603; lumber and its manufacture, 571; textiles and their products, 292, and liquor and beverages, 18. The greatest increase, 3941, was made by the chemical industry. Other increases were: Leather and its finished products, 2244; stone, clay and glass products, 1205; railroad repair shops, 900; tobacco, 268.

The showing was better than many had expected in view of the rail and fuel situation. The report says that building operations are satisfactorily increasing employment. It is pointed out that some industries are suffering from a labor shortage, this including iron and steel, but that the harvesting season is drawing to a close in Minnesota, North Dakota and Montana, which will cause a surplus of labor. The demand for labor in those States, however, indicates this surplus will be readily absorbed. A strong trend toward increased employment in face of many obstacles, it is declared, signifies a progressve march toward stabilization of industry.

During the first six months of 1922, according to information received by the Department of Commerce, French exports of iron ore reached 4,328,455 metric tons as against 2,666,428 tons during the first six months of 1921. The exports of iron ore from one period to another increased, especially for Germany (1,160,058 tons against 505,702 tons). They remain stationary for Belgium and show an increase for the Saar and the Netherlands.

The Philadelphia Foundrymen's Association resumed its monthly meetings Wednesday evening, Sept. 13, at the Manufacturers' Club, Philadelphia. A part of the program was a memorial service for the late Thomas Devlin, who was president of the association for 15 years.

AUGUST STEEL OUTPUT

Ingot Production Rate About 30,273,900 Tons Per Year Daily Output 15,360 Tons Less Than in July

According to the steel ingot statistics, as collected by the American Iron and Steel Institute, the 30 companies, which in 1921 made 87.50 per cent of the total, had an output in August of 2,214,582 gross tons. This compares with 2,487,104 tons in July and is a decline of 272,522 tons.

On the assumption that companies reporting are supplying the same percentage of the total as they did last year, the output for the 26 working days of August was about 2,530,900 tons or 97,340 tons per day. The July production on the same basis was about 2,842,400 tons or approximately 113,700 tons per day. The August output was at the rate of about 30,273,900 tons per year; in July it was about 35,360,000 tons and in June about 36,000,000 tons per year.

The statistics of the American Iron and Steel Institute since January, 1921, follow in gross tons:

Months	Basic	Bessemer	All Other	Total
January, 1921	1,591,281	608,276	3,629	2,203,186
February	[illegible]	[illegible]	2,756	1,749,477
March	1,175,591	392,983	2,404	1,570,978
April	1,000,053	211,755	2,150	1,213,958
May	1,047,810	216,497	1,543	1,265,850
June	808,286	193,644	1,476	1,003,406
July	689,489	113,312	575	803,376
August	915,334	221,116	1,621	1,138,071
Total 8 months	[illegible]	2,108,401	16,194	10,948,302
September	908,381	265,152	1,207	1,174,740
October	1,269,945	345,837	1,028	1,616,810
November	1,294,371	363,912	1,718	1,660,001
December	1,129,174	296,380	1,539	1,427,093
Total—Whole yr.	13,125,578	3,679,682	21,686	16,826,946
January, 1922	1,260,809	331,851	822	1,593,482
February	1,395,835	348,571	616	1,745,022
March	1,918,570	451,386	795	2,370,751
April	1,997,465	445,939	1,109	2,444,513
May	2,214,774	494,893	1,474	2,711,141
June	2,143,708	487,851	2,918	2,634,477
July	2,020,572	464,047	2,485	2,487,104
August	1,807,310	404,379	2,893	2,214,582
Total 8 months	14,759,043	3,428,917	13,112	18,201,072

The August daily estimated output of 97,340 tons compares with 70,019 tons per day in January and with 114,717 tons per day in May.

Large Increase in Imports of Iron Ore

WASHINGTON, Sept. 12.—Incoming shipments of iron ore for July of this year totaled 166,711 tons and for the seven months period ending with July, 1922, aggregated 374,407 tons. These figures compare with 70,040 tons for July, 1921, and 266,186 tons for the seven-month period ending with July, 1921. The increase in imports is ascribed partly to the lower freight rates that prevailed on import shipments than applied to domestic shipments. Since July, 1922, however, the rates have become equalized.

Import figures follow:

Imports from	July, 1922 Gross Tons	Total Value	Seven Months ending July, 1922 Gross Tons	Total Value
Spain	1,001	$2,000	20,851	$124,618
Newfoundland	[illegible]	[illegible]	[illegible]	[illegible]
Canada	894	1,326	1,321	[illegible]
Cuba	56,275	225,102	133,572	[illegible]
Other countries	50,300	296,250	93,997	[illegible]

Iron and Steel Exports

Figures of the Department of Commerce, supplementing the general statistics covering exports as published on page 602, Sept. 7, show the composition of the shipments to various countries. Thus, of Canada's July purchases, aggregating 48,010 tons, no less than 8630 tons consisted of semi-finished material in the shape of ingots, blooms, billets, sheet bar and skelp. Iron and steel bars and rods, other than wire rods, provided the next largest group, amounting to 6427 tons. Structural shapes, not fabricated, accounted for 5780 tons. There were 3808 tons of iron and steel plates, 3526 tons of black steel sheets, 3101 tons of galvanized sheets, 2369 tons of steel rails and 1899 tons of hoops, bands and strip steel.

Japan, with 37,585 tons, was the second largest customer for American iron and steel. Nearly half of this amount (16,886 tons) was steel rails. There were 8153 tons of black steel sheets, 1339 tons of tin plate and terne plate, 1330 tons of rail fastenings, switches, frogs, etc., 1284 tons of iron and steel bars and rods, 1210 tons of unfabricated structural steel and 2746 tons of scrap.

Steel Corporation's Unfilled Orders

The monthly report of the United States Steel Corporation shows 5,950,105 tons of unfilled business on its books as of Aug. 31, or 173,944 tons more than reported on the books July 31. This increase compares with increases of 140,630 tons in July, 381,303 tons in June, 157,315 tons in May, 602,765 tons in April and 353,079 tons in March, and with decreases of 100,609 tons in February and 26,736 tons in January. The Corporation on Aug. 31, last, had 1,681,691 tons more of unfilled business on its books than it did on Jan. 1, and 1,418,179 tons more than a year ago, and the largest amount for any previous time since March, 1921, when 6,284,765 tons remained unfilled. Following is the unfilled tonnage as reported by months since January, 1920:

	1922	1921	1920
Jan. 31	4,241,678	7,573,164	9,285,441
Feb. 28	4,141,069	6,933,867	9,502,081
Mar. 31	4,494,148	6,284,765	9,892,075
Apr. 30	5,096,913	5,845,224	10,359,747
May 31	5,254,228	5,482,487	10,940,465
June 30	5,635,531	5,117,868	10,978,817
July 31	5,776,161	4,830,324	11,118,468
Aug. 31	5,950,105	4,531,926	10,805,038
Sept. 30	.....	4,560,670	10,374,804
Oct. 31	.....	4,286,829	9,836,852
Nov. 30	.....	4,250,542	9,021,481
Dec. 31	.....	4,268,414	8,148,122

The largest total of unfilled orders was on April 30, 1917, when it was 12,183,083 tons. The lowest was on Dec. 31, 1910, at 2,605,747.

Lake Iron Ore Shipments in August

Shipments of iron ore from the Lake Superior region in August were much larger than those in August, 1921. This year there were 9,016,426 gross tons which compares with 4,329,158 tons in August, 1921. This increase over last year was therefore 4,687,268 tons or 108.27 per cent. The totals by ports, with season shipments and a comparison with 1921, are given below:

	August, 1922	August, 1921	To Sept. 1, 1922	To Sept. 1, 1921
Escanaba	900,975	309,111	2,505,105	758,173
Marquette	465,380	129,691	1,314,145	263,105
Ashland	1,134,577	468,283	3,713,633	1,429,308
Superior	2,338,080	917,693	6,703,043	3,508,928
Duluth	2,896,979	1,833,247	8,023,724	6,472,640
Two Harbors	1,280,435	671,133	4,050,289	2,315,918
Total	9,016,426	4,329,158	26,309,939	14,748,072

The increase in season shipments to Sept. 1, 1922 has been 11,561,867 tons or 78.39 per cent as compared with a decrease for the same period a year ago of 20,601,802 tons or 58.27 per cent.

Of the season's total to Sept. 1, the Great Northern dock contributed 22.90 per cent as against 21.92 per cent a year ago. Duluth is credited this year with 30.49 per cent of this season's total as compared with 43.89 per cent a year ago.

Inland Steel Co. Plans

The Inland Steel Co. has filed two plans for record in the office of the county recorder at Valparaiso, Ind., locovering 1200 acres of land east of Gary, Ind. The or ompany has been purchasing land on the shore of calwake Michigan, just east of Gary, for three years, and Lara ow owns two miles of lake front. No plans for the rbra evelopment of the property have yet been announced, d ht with the final consummation of the merger with bu e Midvale and Republic companies, it is likely that a thwa struction program will be launched. At the Indiana coh sarbor plant of the Inland Steel Co. there is little room Han, t for expansion.

Electric Steel Production of the World

Record of the Leading Countries from 1913 to 1921—Post-War and Present Conditions—Pig Iron from Electric Furnaces

BY EDWIN F. CONE

THE world's production of steel in electric furnaces, as represented by the leading producing countries, was partly covered by an article contributed by the author to THE IRON AGE of Dec. 25, 1919, entitled "World's Output of Electric Steel and Pig Iron." It is now possible to cover the years 1919 and 1920 and much of the 1921 production.

Except in two or three countries practically no electric steel was made prior to 1913. In the United States, Germany and France, particularly the latter two, electric furnaces were making steel as early as 1908 and 1909. The industry, however, did not attain any magnitude until 1913. In that year Germany was its acknowledged leader.

1921, has varied with the peculiar conditions existing in each country. Data for the German speaking countries are not yet available, but assuming them to have been proportionate to those in other countries, the total for each of the three years present a strong contrast to those of the years preceding 1919.

Despite the falling off, however, the showing is a good one. The 1919 total for six countries is larger than the 1916 total for eight nations. The 1920 total for six countries, assuming Germany to have made as much as in 1919, exceeds the 1917 output for eight. In 1921, the year of world-wide depression and strikes, probably over 425,000 tons was produced by the six countries including Germany, or a figure nearly equal

Table 1.—Output of Electric Steel Ingots and Castings in the Leading Countries in Tons

	1913	1915	1916	1917	1918	1919	1920	1921
United States	30,180	80,412	168,918	394,548	511,364	384,452	502,152	169,499
Germany	88,256	131,579	190,036	219,700	240,037	55,382	....	....
Great Britain	None	22,000	46,709	98,592	115,448	77,000	89,100	27,100
Canada	None	*5,625	19,639	50,467	119,130	15,502	28,301	16,344
Austria-Hungary	26,837	23,895	47,247	47,152	41,163	....	....	....
France	21,124	21,000	44,429	54,031	58,222	42,559	58,080	24,457
Italy	2,276	22,387	22,376	36,948	†40,000	89,000	†100,000	†140,000
Sweden	2,276	2,187	6,648	10,664	†15,000	....	....	....
Total	168,673	298,085	546,002	822,097	1,140,364	663,895	777,633	377,900

*1 year in 1914 †Estimated

Due to the stimulus of the war, the electric furnace industry of all these countries expanded until the peak was reached in 1918, when over 1,140,000 tons was produced against only 168,600 tons in 1913. In this period, however, the United States gradually displaced Germany from the lead, with an output in 1918 nearly equal to that of the seven other countries combined.

The expansion up to and including 1918 varied with each year. The total output in 1915 was about 80 per cent greater than in 1913, while in 1916 it was about 90 per cent greater than in 1915. From 1916 to 1917 the increase was about 50 per cent, and from 1917 to 1918 the expansion was about 40 per cent.

The most striking feature of the growth of this industry up to 1919 is the relative progress of Germany and the United States. In 1913 Germany produced over 50 per cent of all the electric steel then made. Although the United States ranked second in that year, the industry had only just started. Germany and Austria-Hungary were credited with close to 70 per cent of the world's output in 1913. But by 1918 the situation had radically changed. Although Germany had increased its electric furnace production about 2½ times, the United States output had expanded 17 fold, easily leading all nations. Its output was not only twice the two so-called Central Powers, but it was not far from half of the total of all the producing countries.

Another feature of the development of this industry up to 1919 was the rapid growth of the British and Canadian production. In 1913 there is no record of any such industry in those countries, but in the four years 1915 to 1918 inclusive, this British industry had expanded five fold and the Canadian about 21 fold.

The progress of the industry as a whole in the readjustment period since the war, or in 1919, 1920 and to the output of 1913 and 1915 combined. This is no insignificant achievement.

American Record Since the War

In the United States the course of the electric steel industry in the last three years has been discussed at various times in the columns of THE IRON AGE. In each of the last three years the output has been large, nearly reaching in 1920 the second output in 1918. Even in the disastrous year of 1921, the total of 169,499 tons was over five times the 1913 production and in excess of the world's total at that time. Even in new furnace installations, 1921 showed a net gain of about 9 per cent over 1920.

The most striking features of the 1921 record, however, were the large increase in electric steel castings and the phenomenal rise in the output of electric alloy castings. The following table reveals this in gross tons:

	Total Electric Steel	Total Electric Steel Castings	Total Electric Alloy Steel Castings
1913	30,180	9,207	443
1916	168,918	42,870	926
1918	511,364	108,296	3,076
1920	502,152	155,196	11,710
1921	169,499	85,095	10,084

The broad expansion in the electric steel casting industry is evident from these figures, the progressive increase having been very large since 1913—reaching the maximum in 1921 at over 50 per cent of the total electric steel production. Still more significant is the fact that last year, of the total output of electric alloy steel ingots and castings, 15.9 per cent was alloy castings. In 1920 this proportion was 6.50 per cent and in 1917 and 1918 only about 1 per cent. The broader use of electric alloy castings, in some industries as sub-

stitutes for forgings, is the explanation. The trend of the American electric steel industry in 1921 demonstrated the firm hold of the electric furnace in the steel foundry.

Broad Expansion in Italy

The outstanding feature among the other electric steel producing countries has been Italy. As shown by Table 1, the Italian electric steel industry has risen from a relatively low position six or seven years ago to a commanding one at present or second last year to the United States. Reliable data indicate that there are at least 180 electric furnaces in the Italian steel industry, among which are several 20 to 25-ton furnaces and about 23 furnaces of the 15 ton capacity. A large number of them are the Heroult type, but the rapid introduction of the Fiat and other Italian types is a feature.

British Post-War Progress

British data recently published call attention to the considerable expansion in number and size of the electric furnaces since 1914. The following table gives the number and size of such furnaces in Great Britain at the beginning of 1922:

Unit Capacity	Number of Furnaces	Capacity per Charge, Tons
3 cwt	1	0.25
6 cwt	1	0.30
½ ton	15	7.50
18 cwt	2	1.80
1 ton	5	5.00
1¼ tons	1	1.25
1½ tons	19	28.50
2 tons	20	40.00
2½ tons	3	7.50
3 tons	18	54.00
3½ tons	6	21.00
4 tons	5	20.00
5 tons	3	15.00
6 tons	11	66.00
7 tons	10	70.00
7½ tons	2	15.00
10 tons	8	80.00
15 tons	2	30.00
20 tons	1	20.00
Miscellaneous (estimated at 1½ tons)	15	22.50

The data also show that 16 companies had some 21 electric furnaces in their equipment during 1914 and that this score of furnaces ranged within the narrow limits of 1 to 3¼ tons per charge. In 1922 there are nearly 150 installations with a range from 5 hundredweight to 20 tons per charge, the majority holding around 2 tons, but 60 or more of them being in the 3-ton class or larger. In 1921 an electric furnace was started in a steel foundry in Ireland, the first one in that country.

Because the circumstances surrounding the operation of electric furnaces are so uncertain, an authoritative estimate of the annual British potential output is not advisable. The maximum output was reached in the year 1918. While small, then, this industry has made but little progress. The most striking fact is the following: In 1915 the British electric steel output was 22,000 gross tons, of which only 2000 tons were castings; in 1921, though the total was only 27,100 tons, 16,700 tons were castings, another case of the predominance of the electric furnace in the steel foundry.

Since the war the Canadian electric steel industry has remained largely stationary so far as output is concerned. There was a decided drop in 1919 with a moderate increase in the post-war boom of 1920. The interesting feature has been the marked proportionate increase in electric steel castings, shown by the following table in gross tons:

In 1919 the electric steel casting output was 43.6 per cent of the total; in 1921 this had expanded to 83.2 per cent, a still more striking example of the growth of the electric steel casting industry.

	Total Electric Output	Total Electric Ingots	Total Electric Castings
1919	15,502	8,741	6,761
1921	16,844	2,860	13,984

German Electric Steel

For Germany the only post-war data available thus far are for 1919. In that year German electric furnaces produced only 55,382 tons against 240,000 tons in 1918 and 88,256 tons in 1913. An explanation is that the partition of Germany as a result of the war removed several important electric furnace producing districts. There are good reasons for believing that it will be some time before Germany can regain a leading position in the world's industry, and that the American and Italian industries will for some years predominate.

No data regarding Austria nor Hungary are available since 1918 and nothing has been found as to Sweden's output.

Pig Iron Made Electrically

Two kinds of pig iron are being made in electric furnaces: The regular reduction of iron ore by means of electricity and coke or charcoal; and the production of synthetic iron or the re-conversion of steel scrap into pig iron or iron castings.

Sweden, Norway and Italy have always led in the former, while France and Canada are the most active in the latter. The war was a great stimulus to this industry, particularly the synthetic iron. Table 2 presents such data as are available covering both kinds of iron over a period of years. The United States during the war made some synthetic iron, but the exact data are not available.

The future of the industry is full of promise. As more normal conditions return in all countries, the use of the electric furnace for making steel will broaden. Statistics for 1922 and later will show a large proportionate increase over 1919 to 1921, because the record of 1919 to 1921 is, under abnormal economic conditions everywhere, a strong contrast to the more meager outputs in the early pre-war years. The 1921 production of five countries was over twice that of six in 1913, or 377,900 tons against 168,673 tons.

A post-war development in the American industry of wide interest, importance and possibilities is the application of electric furnaces to the iron foundry in refining cupola iron or in the direct melting of scrap. No statistics of the output of electric iron castings are available, but the industry is rapidly broadening. In the steel industry as a whole, not only in the United States but in the other nations here considered, the electric process has established itself as essential in certain fields.

Table 2.—Output of Electric Pig Iron in the Leading Countries in Tons

	1913	1915	1916	1917	1918	1919	1920
France	....	....	....	13,691	32,031	7,701	8,835
Sweden	28,753	————	————	†150,000	————	....	59,656
Italy	....	35,075	44,782	67,059	...	....	....
Norway	...	3,800	17,298	56,524	.....	....	....
Canada	...	*8,742	....	6,295	9,007	....	....

*160 tons in 1914 †Estimated

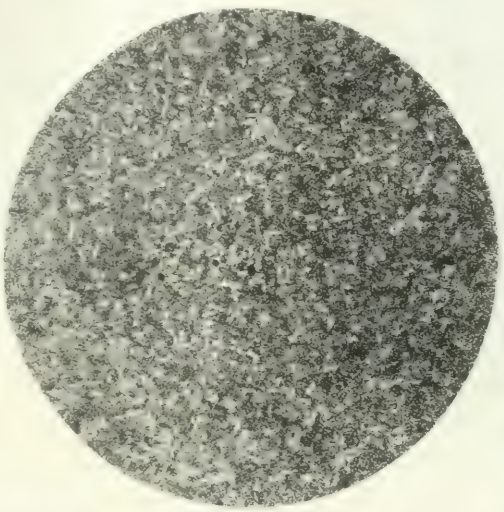
Chromium Alloy Steel Cast Centrifugally

Annealed, It Has the Same Structure as Mechanically Worked Metal. from Ingots Cast in Stationary Molds—Dendritic Structure Absent and Grain Structure Small

BY L. CAMMEN

ONE of the most interesting and at the same time difficult problems in steel metallurgy is the production of good high carbon chromium steel such, for example, as is now used for ball-bearing races. The problem has been solved to a large extent by several manufacturers of this material, but only at a cost of a large outlay in time and money devoted to experimental work. The process as used to-day is still fairly expensive and requires the utmost care in order to give the high grade material which the better class of ball bearings manufacturers insist on getting.

In good steel for ball-bearing races the carbon should be around 1.1 per cent and the chromium about 1.5 per cent, although slightly different proportions may give good results with proper handling and heat treatment. When cast in a stationary mold, the ingot has a clearly dendritic structure, with large, coarse grains, and the carbide is almost entirely in solution.



Photomicrograph of High Carbon Chrome Steel, Cast Centrifugally and Heat Treated. Etched in picric acid. Magnification 100 dia.

To obtain a finer grain structure, the ingot has to be worked; an 8-in. sq. ingot, for example, is "welded" under a hammer into a 6-in. sq. billet. The forging must be done at a good red heat and with powerful blows, and requires great care and expert attention to temperature and the handling of the hammers, which naturally affects the cost of the product.

At the same time there are certain conditions in the structure of the metal which steel for ball bearing races must satisfy, viz., the grain must be fine, there should be no appreciable excess of cementite, and the cementite in the pearlite should be all "globularized." This latter is very important because, as pointed out by H. C. Ihsen in a recent issue of *Forging and Heat Treating*, steel with the cementite in the spheroidal condition shows excellent wear-resisting properties, as the small globules of cementite, which are very hard, will resist wear, while the soft ferrite matrix gives ductility to the material.

Hitherto the spheroidization of the cementite has been obtained by annealing, and the production of the fine grain by expert hot working (forging) of the billet. That the latter part of the process is not necessary is proved by the photomicrograph herewith reproduced of a ring of high carbon chromium steel taken from a centrifugally cast steel tube. As shown by this, the structure of the metal is purely pearlitic, no excess of cementite being present; the pearlitic grains are small, notwithstanding the fact that the casting has not been subjected to any mechanical working, either hot or cold, the tube having been simply annealed as cast and cut into rings.

This is, the writer believes, the first instance that a casting in alloy steel has shown the same grain on annealing as a forged billet, and opens up important theoretical and practical possibilities, indicating that it is possible to *cast* steel in such a manner as to avoid the dendritic ingot structure, a fact which has been repeatedly stated by the late Dr. Henry M. Howe.

Just why centrifugal casting in this case has given such a fine structure it would be difficult to say at the present time. The metal was cast in a rotating mold having a temperature, at the time of the casting, of about 1700 deg. Fahr. The cooling of the metal was therefore comparatively slow and, in a stationary mold operated under the same conditions, one would have obtained columnar crystals and a coarse grain structure. And yet, in a spinning mold one gets a fine structure similar to that of a well-forged material.

The most likely explanation is that it is the mechanical stirring due to the rapid rotation of the mold (1400 r.p.m.) that affects the grain size, and possibly also the powerful impingement of hot particles of the metal on the layer next to it outwardly; then, in the process of freezing, this impingement may prevent by purely mechanical means the growth of the crystals and the peculiar ingot dendritism.

In any event, at least for ball-bearing race steel, it is now possible to produce by simple casting and annealing, a material equal in structure to a forging, and thus eliminate the forging operation, a fact which any steel man who has had to carry the forging department payroll, will have no trouble in appreciating.

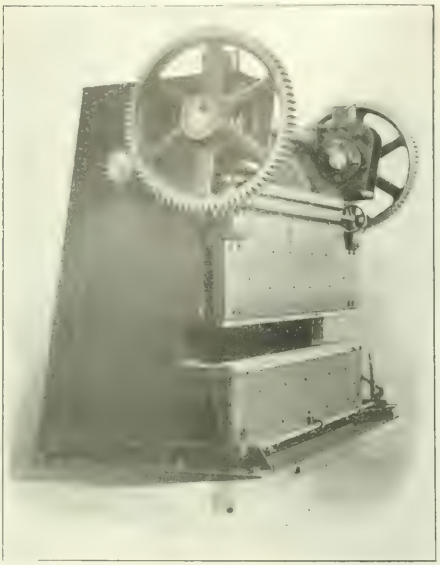
Despite the fact that the shortage of cement has delayed the completion of many paving and concrete road projects throughout Michigan, building permits for the first week in Detroit reflect optimism. These permits cover 297 new buildings, costs estimating $5,196,105 comparing with $1,856,445 for the preceding week.

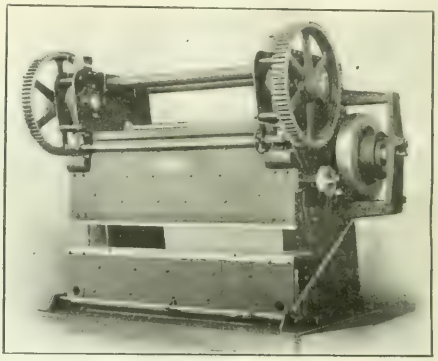
NEW HEAVY FORMING BRAKE

Steel Plate Construction and Open Throat Housing Erection Simplified Speed Increased

A line of all-steel power press brakes in capacities from 50 to 600 tons, for material from No. 16 gage to ¾ in. thick, and incorporating new features has been brought out by the Cincinnati Shaper Co., Cincinnati.

The advantages claimed for the new machine include maximum strength and power with minimum weight and greatly reduced deflection as compared with previous machines of corresponding capacities. Open-throat construction, reduction of the headroom required, quick action and increased operating speed, unusual ease of installation and erection, and a greater factor of safety than usual are also features emphasized.





The Cincinnati Shaper Co.'s Brake for Forming Heavy Sheet Metal and Plates Is Now Built of Steel Plates with Most of the Parts Electrically Welded Together Rather Than Riveted or Bolted. The open-throat construction, with clear working space in front of the machine, and space between the housings in the rear for operating or stacking sheets, are features

Outstanding changes in design are the employment of steel plate in the construction and the use of the open-throat type of housing to give a clear extended working space in front of the machine and to facilitate the handling of material. As most bends are made near the edge of the plate, the full length of the die-holding surface can be utilized. Thus, it is pointed out, for most classes of work this type of machine can be rated according to the length of the die-holding surface instead of the length between the housings. This feature is emphasized also as permitting of a narrower and more rigid machine, with a saving in cost and floor space. The space between the housings in the rear of the machine is available for operating or stacking sheets, and work requiring more than one operation may be passed through the machine, the turning of work end for end being eliminated.

To a large extent bolts and rivets have been eliminated by electric welding many of the parts, uniting the component members of the machine in a way that gives the effect of a solid unit rather than that of a built-up section. Where bolts are used in the solid members to draw plates into place, the bolts themselves are welded as well as the plates, so that they become an integral part of the member and remove the danger of working loose.

The driving mechanism is entirely contained within the housings, the latter being shipped with the mechanism assembled, it only being necessary to place them on their foundations and attach the cross members and drive shaft. The machine is shipped as four main pieces with the drive shaft and cross brace in addition, making six pieces to be assembled. To aid in the erection of the machine, self alining features have been incorporated.

The bed and ram are of heavy plates and bars, which with the cross ribs are welded to each other, this construction serving to make a heavy, solid beam of box section with the metal placed where needed. The housings are framed of steel plate with cast steel members interlocked and welded to the plates. These members are provided with heavy trunnions for supporting the bed. A large factor of safety has been used, it is stated, thus to provide additional strength against accidental or excessive overloading.

Automatic sight feed lubrication is provided on all power-driven bearings. The flywheel, clutch, worm and worm wheel in the ram-adjusting device, and the power drive for this, all run in a bath of oil. Shafts are of high-carbon steel, the eccentric shafts being 0.50 to 0.60 per cent carbon forgings with the eccentrics forged integral with them. Main-drive bearings are of special bronze.

A splined trip shaft running the full length of the machine has mounted on it a foot treadle which permits the operator to engage the clutch from the most convenient position. The ram is gibbed endways as well as sideways, which is essential when using the machine as a gang punch.

The machines have been designed to operate at a greater number of strokes than usual, thus increasing productive capacity. When motor driven, the motor is mounted on a bracket attached to the housing, the drive being through a belt held in tension by a weighted idler on the slack side. The flywheel is mounted on ball bearings. Cut gears and steel pinions are used throughout. The clutch, it is stated, has been especially developed for the machine and accessibility and simple adjustment are features. It is of the multiple-disk type, operated in oil and low unit pressures are used in its operation.

Widths between housings are from 6½ to 14½ ft., and the weights of the machines from 18,000 to 120,000 lb.

The Westinghouse Electric & Mfg. Co., which now is working on an order for 120 electric locomotives for Paris-Orleans Railway, France, recently was awarded the contract for the electric control equipment.

The Three-Shift Day at Steel Works

A Special Report by Bradley Stoughton to the Federated American Engineering Societies Puts Cost of the Change Below Common Estimates

IN view of the investigation of the same subject now being made by a committee of the American Iron and Steel Institute, headed by the institute's president, Judge E. H. Gary, special interest attaches to the report on the three-shift day at iron and steel works, which was prepared recently by Bradley Stoughton, consulting engineer, New York. Mr. Stoughton, after a period of plant experience and of consulting work, was for a number of years secretary of the American Institute of Mining and Metallurgical Engineers and is the author of a well-known work on the Metallurgy of Steel. His report on two-shift and three-shift operation was presented on Friday, Sept. 8, at a meeting in Boston of the executive board of the American Engineering Council of the Federated American Engineering Societies. At the same meeting Horace B. Drury presented a voluminous report on "Two-Shift and Three-Shift Operations in the Continuous Industries." Mr. Drury is the author of a paper on the "Three-Shift System in the Steel Industry," which he read before a joint meeting of the Taylor Society and the Metropolitan and Management sections of the American Society of Mechanical Engineers in New York, Dec. 3, 1920. This paper was the result of an investigation Mr. Drury had made for the Cabot Fund, Boston. Mr. Stoughton's report is based on an investigation he carried on, also under the auspices of the Cabot Fund.

Progress in the Direction of the Shorter Work Day

Mr. Stoughton's report consists of 51 closely typewritten pages and the subject is considered under 19 sectional heads. Beginning with historical data, these sections treat of the reasons why the 12-hour day exists in the iron and steel industry, technical considerations in changing from two shifts to three shifts, cost of labor under the three-shift and two-shift systems, labor cost in relation to total costs, handling of peak labor loads at the blast furnace and at open-hearth furnaces, possible economy in rolling mills, consequences that must be realized if the change from two shifts to three shifts is to be a commercial success, and other considerations. Mr. Stoughton's own summary of his report is as follows:

THE 12-hour day is strongly established in the iron and steel industry by long custom, and by its unusual adaptability to the requirements of this industry. However, recent progress in the industry has been in the direction of a shorter work-day, as well as a reduction in the proportion of those men who are on duty for seven days a week.

Peak Loads: An Original Cause for the Persistence of the 12-Hour Day

For some decades past the labor requirement of the iron and steel industry has included some peak loads of great intensity, from the standpoint of physical endurance, or of heat exposure, or both. Between these peak loads will come periods of rest, or of very light labor. This type of labor requirement has been due in part to the special liability of iron and steel furnaces, rolling mills, or accessory apparatus, to break-downs, which necessitate intense activity of the "maintenance men" until they are repaired, with consequent idleness of the other men. Another cause of peak and valley loads is the nature of the operations themselves: For example, during and immediately after the "tapping" of blast furnaces or open-hearth furnaces all hands are subjected to severe labor. The same is true of the charging of the old-fashioned type of open-hearth furnace. This makes it almost imperative to rest thereafter, in the case of all three examples.

Recent improvements in equipment, and the adoption of electrical appliances, have greatly decreased the frequency and the duration of interruptions of the different processes due to break-downs, especially in the rolling mills. Also mechanical and other labor-saving devices have lessened the severity of peak loads due to the processes themselves, both in respect of physical endurance and heat exposure.

Notwithstanding the improvements mentioned above, break-downs still occur at times, and the labor requirements of some of the processes are still variable. For this last reason, and because of habit due to established custom, it is usual to allow the men periods of rest while on duty, with the result that the 12-hour shift is not always over-taxing, and the 8-hour shift is sometimes too short from the economic standpoint to employ the energy of the men to the best advantage. But this is not always so. When the blast furnace "goes on a bum"; when emergencies arise in other departments; and often when a mill runs without interruption and with unusual vigor, the 8-hour day is long enough for any workman, and it is not uncommon to meet emergencies when all hands are occupied with severe labor and scarcely any opportunities for a few minutes rest for 12 consecutive hours.

In the majority of cases, however, labor at the blast furnaces and open-hearth furnaces is more or less variable and irregular. The more efficient, alert and careful the laborers, the less will emergencies arise, and the less the break-downs. This has been urged as one of the advantages of the 8-hour day, because the men are more alert and efficient.

Labor-Saving Devices Promote the Economy of the 8-Hour Day

To work three crews instead of two crews per 24 hours involves the necessity of increasing the labor costs per day, unless either daily wages per man are reduced, or else any four men, working only 8 hours per day can do as much work as six men working 12 hours. It is obvious that the six men will be almost as efficient and productive per hour as the four men, provided they have so much resting time as to keep them in good condition. Therefore, anything which tends to eliminate peak loads and idle periods increases the relative efficiency per day of the 8-hour men as

compared with that of the 12-hour men, and consequently decreases the added labor cost per ton of working three shifts. Labor-saving devices also reduce the labor cost per ton, by actually eliminating some of the labor; this factor renders less serious an increase of the proportionate labor cost. (For example: If labor costs $1 per ton on the 12-hour system, and it must be increased by 20 per cent to adopt the 8-hour system, then the increase will be 20c. But if, by means of labor-saving devices, the labor costs are reduced to 60c. per ton on the 12-hour system, then a 20 per cent increase will only amount to 12c. per ton.)

To the last argument objection will be made by some that cost reductions due to labor-saving devices should benefit the stockholders rather than the workmen; but this suggests the general principle stated elsewhere in this report, namely, that the main object is to run the industry economically under competitive conditions. The investigator has found that the majority of managers and executives interviewed believe that if by means of labor-saving devices the plant can be commercially operated upon an 8-hour shift system instead of a 12-hour system, the good of the industry can be better served by eliminating the 12-hour shift than by increasing dividends.

Some Plants Having the 8-Hour Day Are Operating With Commercial Success

The circumstance that already many plants are operating successfully under competitive conditions on the three-shift system, indicates that profits need not suffer, if the change is made with wisdom. Opponents of the three-shift system explain these instances by declaring that they find always some special condition in the case of every plant that employs successfully the three-shift system: Either they are owned by the interest that purchases their product, and so do not have to compete, or else they are making a special product at a special price, or they are geographically removed from the center of competition, etc. But this argument does not always hold; although it applies in many such cases. And, even if it did hold good, it would not prevent the experience of these plants applying generally in the industry, because there are special circumstances operating in every iron and steel district of the country, whereby each has an advantage or disadvantage in competition which is far greater than the labor cost per ton as influenced by this problem. For example, it is well known that the cost of labor which must work at the blast furnaces either on the 12-hour shift or the 8-hour shift is well under $1 per ton of pig iron. If this sum be doubled it would still be small in comparison with the advantages some companies have because of wise purchasing policy, technical skill, low overhead and ample capital. Judge Gary recently (June, 1922) testified before the Lockwood Committee in New York that the United States Steel Corporation could produce at $3 per ton less than its competitors.

Conditions to Be Assured in Advance and Conditions to Be Avoided

The experience of those who have made the change from the 12-hour shift to the 8-hour shift with commercial success gives very definite information as to the conditions which must be prepared in advance in order to produce the desired result; they include:

1. Having the equipment in satisfactory condition:

3. Assuring that the necessary labor will be available.

Likewise this experience indicates what conditions must be avoided if the change is to be made without disaster to the industry. For example, the change should not be made:

2. After strife, or when bitterness is rife and mutual con-

3. When labor is arrogant or elated by a defeat of the

5. Any conditions which lessen the power that management can exert on labor to prevent misuse of the extra hours of free time, tardiness, absence, deliberate shirking, etc., will defeat the commercial benefits of the three-shift system.

The fear has been expressed that if 12 hours pay were given for 8 hours work, the men would soon ask for 12 hours work at the advanced hourly rate. Concerning this there is a difference of opinion, with a rather general agreement that foreign laborers want to make the most money that the work will bring, regardless of how many hours they labor, but that the better class of laborers, and Americans, are satisfied with the shorter day if it brings a living wage. The remedy that has been applied with apparent success to the discontent which some show with the 8-hour shift is a very simple one, namely: Precede the change from 12 to 8 hours' work by time observations to determine how much the crew could produce if working at some greater efficiency; then pay the same hourly rate for 8 hours as for 12, but add a bonus so adjusted that the men will earn the same daily wage as before, provided they work hard for 8 hours. It is said with some positiveness that, if the crew works as diligently as it can for 8 hours, none of them will be agitating for 12 hours' work, and it is also said that the crew itself can be relied upon to see that every man does his work without shirking; disciplinary measures are not necessary for this when a bonus depends on the result. The working of this plan was so good at one plant that the manager declares that 8 hours' work with a bonus will pay for itself.

When wages are paid to the 12-hour men on the tonnage basis, they have an incentive to work hard and it is not reasonable to expect any greater efficiency for 8 hours' work, unless the men are actually more capable on the shorter shift.

Disadvantages of the 12-Hour Shift

In some departments of the iron and steel industry 12 hours' work has been found too long for the men, and it is customary to have "spell hands" to relieve them at intervals. In one case, at least, the crews are actually doubled, and each man works only one-half the time. Where the work is not so continuous, with peak and valley loads, the 12-hour duty is not overtaxing, but here there arises another very serious objection. It is customary for the night men to work 13 hours and the day men 11 hours; in cases of emergency at the furnaces (at the blast furnaces this is technically known as "going on a bum"), the night men, exhausted by 13 hours of taxing labor, often find it impossible to get sufficient rest in their congested homes, especially in hot weather and when the children are at home from school. It is then not a matter of being exhausted by the labor, but of not having sufficient resting time between periods, so they return to their work with lowered efficiency. On the 8-hour shift they always have time to rest, and always some hours for sleep during darkness and when the rest of the family is quiet and when it is comparatively cool.

To deliberately permit laborers to loaf while on duty is wrong from the standpoint of morale and discipline. A few minutes breathing spell after exertion may be wise, but the peak and valley loads of the iron and steel industry require more than this, when operating on the 12-hour shift. We now tacitly accept the sight of men idling, resting, and even sleeping, on duty, as a relic of the days before the severe labor was performed by mechanical appliances, and are apt to forget that the principle of sleeping during paid time is evidence of economic waste. At some plants, sleeping on the night shift is not officially tolerated, but the practice is allowed to go unobserved, when the men are not needed. On the three-shift system rest or sleep during working hours is not necessary, even at the blast furnace.

Advantages of the 8-Hour Shift

Results from working the 8-hour shift have disclosed the following economic advantages, which compensate in part for the extra cost of working three crews instead of two. It is not to be supposed that all of these advantages will be experienced in every case and in every department, but any of them may result when the hours of labor are reduced below 12 per day.

(*Continued on page* 689)

Bituminous Coal Moving More Freely

Relief Coming to Many Industries—Large Increase in Number of Cars Loaded—Legislation Enacted at Washington

WASHINGTON, Sept. 12.—That industries of the country have already received relief from the fuel and transportation situation is indicated by a growing production of soft coal and the increased movement of cars. While distribution of coal by the Government is to be continued on the strength of legislation passed to that end as well as to prevent profiteering through a system of car distribution, there is no longer any concern as to supplies of bituminous coal. Transportation is the outstanding problem. This, however, seems to be growing less serious, as is evidenced by the action of the Interstate Commerce Commission in exempting all open top cars with sides 42 in. and under in height from being given preference as to coal loading. It is estimated that this adds 34,000 cars for use by industries of the country over and above 62,000 open top cars which did not come under the preference ruling.

The success of the railroads in loading cars with coal is shown in the report of the Association of Railway Executives which says that 167,428 cars were loaded with coal during the week ended Sept. 2. This was the largest number of cars loaded since the strike of miners began on April 1 and also exceeded the preceding week by 49,610 cars. The railroads also are reducing the number of surplus cars, as is shown by the fact that on Aug. 23 there were 120,961 surplus freight cars, representing a decrease of 19,292 cars compared with the total on Aug. 15. Subsequent reports show further improvement.

Movement to Great Lakes Region

Movement of coal to the upper Great Lakes region under the program of the Federal fuel distribution committee is proceeding satisfactorily. It is estimated that a lakeward movement of 800,000 tons was attained last week. The coal from West Virginia and Kentucky districts directed lakeward under priority orders is now arriving at lake ports in considerable quantity and comprises a large percentage of present dumpings at these ports. Lake coal now being loaded is moving almost entirely under its natural Class 2 movement and with only a very limited application of the No. 1 priorities. A problem in the transportation of lake coal has arisen because of delays in the unloading at lower lake ports of cargoes of iron ore from the Northern ranges from boats which carry coal on their return trips to Lake Superior ports. This delay in unloading ore boats which has been occasioned by deficiencies in the railroad car supply, will be obviated, it is hoped, by the issuance of special permits for the use of cars to transport iron ore.

While enough coal is being mined to take care of the country's current needs, the supply is not yet sufficient to provide for proper storage demands and for the special lake program in addition to general current requirements. Instructions were given last week to the various district coal committees to wind up the affairs of their offices with the completion of priority orders of the committee.

Fact Finding Commission

Legislation for coal distribution and establishing of a fact-finding commission with regard to the coal industry has been passed by both branches in Congress. The Senate fact-finding commission provides for five members to investigate the coal industry and make recommendations. The House bill fixes the membership at nine. By an amendment adopted, the Senate measure calls for separate and distinct inquiries in the soft and hard industries. The general purposes of the two measures, however, are similar. The Senate bill provides that work of the commission shall be begun immediately after its members are named and that a report on the soft coal industry shall be made within five months after the law goes into effect, while the report regarding the anthracite coal industry is to be made on or before July 1, 1923. The commission also is called upon to make a study and report regarding the wisdom or advisability of nationalizing the coal industry. This was the subject of sharp debate in the Senate, as was also the question of Government regulation and control. The other bill covers car distribution for coal shipments and is designed also to prevent profiteering. Arguments were made by some members of the Senate that this legislation is unnecessary and that it would have been better to allow the law of supply and demand to operate, for the benefit of the public, as well as of the coal industry itself. There are those who think that the supply of coal will within a short time be so great, provided the transportation situation is satisfactory, that fuel will be selling under prices agreed upon by the Government and operators.

Moderate Increase in Production in Connellsville Region

UNIONTOWN, PA., Sept. 9.—Observers in the Connellsville bituminous region, with the Labor Day demonstration, in which 10,000 men marched as affiliated with the United Mine Workers, still fresh in their minds, are declaring that the strike in the non-union district here has been broken. Union leaders declare that their cause is stronger than ever, but the appeals being sent out for financial assistance and developments during the past few days hardly carry out that conviction.

Yesterday the tent colony at Filbert folded up their tents en bloc and flitted away—to Cokeburg, where the miners of the colony are reported to have gone to work.

The number of evictions in the region has been increased during the week, an average of nearly 100 eviction warrants a day being issued. Further temporizing, apparently, has been done away with on the part of the companies, which are determined to resume operations at capacity and have been permitting some of their old employees to remain in company houses with the hope that they would return to work. The situation now apparently has narrowed down to the fact that the companies have given the old employees their last opportunity to return to work and are making places now for men who are coming into the region by hundreds.

W. J. Rainey, Inc., this week prepared to resume on an intensive scale and several hundred imported workers have been sent to their plants in the region. Arrival of one large group was the signal for the explosion of dynamite in a field near Royal, apparently to intimidate the new arrivals. No damage was done.

A trip over the county shows unmistakably that the coal and coke industry is on the upgrade. At night the flare of coke ovens is a welcome sight again and the shipments on the railroads tell the story of increased production with even more effect than do the production figures.

The H. C. Frick Coke Co. alone added 300 ovens to its active list this week. Estimated production of coke

in the Connellsville region during the week ending Sept. 2 was 90,300 tons, an increase of 4200 tons over the preceding week. The production for the week ending Sept. 9 will show an even greater gain.

Operators already are giving serious consideration to the prospect for car shortage. The strike situation has ceased to be a problem insofar as there was any doubt as to the success of the campaign against unionization of the field. The fight put up by the H. C. Frick Coke Co., backed by some of the larger independent companies, has brought its result, in the view of most observers, and the union has again failed in its efforts in the region. Of course the battle is not entirely over and the union leaders will not give up the region without a struggle, for they realize that this will mark the last chance of unionizing the field. The county has lost several hundred of its miners who have moved to other fields, West Virginia, principally; but many observers declare that the majority of these will return to the Connellsville region when the present tensity has been relaxed. Coming into this field are hundreds of experienced mine workers, some from union fields. The high wage scale, equal to that of the union and without the union checkoff, lures many men.

Many of the mines now operating signed the scale with the union in order to take advantage of the present situation, protect their investments and make a good profit before the bottom drops out of the market as production figures soar. Coal is selling now at $4.75 and $5 in this region. Car shortage may hold this price all through the winter, but if there is an adequate car supply, many observers look for a lower price.

Transportation Is the Controlling Factor

WASHINGTON, Sept. 12.—Pointing out that the limiting factor in the supply of soft coal has now become transportation, the Geological Survey says that instead of the 9,400,000 tons suggested by the first report, final returns on soft coal production show only 9,142,000 tons in the week ended Sept. 2. The record of the week was awaited with interest as an indication of the supply to be expected after general resumption of mining under the Cleveland agreement. For the week of Sept. 4-9, because of the Labor Day holiday, the Survey says that the output can hardly exceed 8,700,000 tons. On Labor Day, 10,021 cars were loaded by non-union mines, confirming the experience of other years, that the day counts for a third of an ordinary working day. The double holiday on Sunday and Monday increased the number of empty cars available for placement on Tuesday and on that day 33,085 cars were loaded, the largest number for any day since last March. On Wednesday, Sept. 6, however, loadings dropped to 30,652 cars and on Thursday to 28,238 cars.

It is true that some thousands of miners are still on strike, notably in the Connellsville and Kanawha districts, but the tonnage offered for shipment by the other mines at work will absorb the available transportation facilities, says the Survey. It adds that the demand for coal is active and prices are high. Under such conditions coal is offered for shipment up to the limit of the ability of the railroads to transport it.

Dealing with the by-product and beehive coke situation in August, as affected by the coal supply, the Survey says:

Shortage of coal cut deeply into the production of by-product coke during the month of August. The total output was 1,794,000 net tons, a decrease when compared with July of 692,000 tons or 28 per cent. The average daily production in August was 57,868 tons, as against 80,182 in July. The ovens operated at 48.9 per cent, or less than half of capacity. Of the 71 plants 57 were active and 14 idle.

These statistics are based upon reports from 67 plants and include estimates for four small plants not heard from at the date of publication.

The loss in by-product coke was in part compensated for by an increase of 89,000 tons in the production of coke at beehive ovens. A gradual recovery from the strike in the Connellsville district brought the output of beehive coke from 450,000 tons in July up to 539,000 tons. The total of all coke produced 2,333,000 tons was 10 per cent above the average for 1921, though still 46 per cent short of the 1920 average.

To produce the coke manufactured in August required 3,427,000 tons of coal, of which 2,577,000 tons were used in by-product ovens and 850,000 tons in beehive ovens. The cut in consumption in by-product plants was nearly 1,000,000 tons as compared with July. The districts in which the greatest difficulty was experienced in obtaining coal were Buffalo, Baltimore, Youngstown, Cleveland, Pittsburgh and Chicago. In New Jersey, New England, the South and the Far West no great curtailment of operations was reported through failing coal supply.

Detroit Expects Ample Fuel Supply

DETROIT, Sept. 12.—The consensus of opinion among coal and railroad operators that Michigan will receive an ample fuel supply for current needs seems to be substantiated by the receipt of 3100 cars in Detroit during the past week. Industries in general have not suffered as yet. Dependent upon car supply, Michigan should receive from 60 to 80 per cent of its normal fuel requirements. This will not permit of any reserve stacks being piled. Two of the railroads operating in the State have placed an embargo on open top equipment excepting the low-sided type, and with the improved railroad situation manufacturers are planning production schedules for the remainder of the year. The Ford company's scheduled closing on Sept. 16 seems to be more probable as the date approaches. Suspension of shipment to the Ford plants has been to the advantage of other consumers, as it has released a large portion of the D., T. & I. equipment for general fuel delivery.

Persistent rumors indicate that at least two local automobile manufacturers will cut their production in half by Sept. 15. A general survey of the industry, however, shows a production schedule equalling August figures, with enough orders already placed with parts and accessory manufacturers to keep them busy until Jan. 1. The Detroit Employers' Association figures show 178,000 now employed as against 177,000 a week ago, and indicate that unemployment is below normal.

The recent action of the Interstate Commerce Commission in relieving certain types of open top equipment, heretofore listed as coal carriers, has given contractors and builders some hope that the present shortage of building materials will be relieved.

Sheet quotations show an upward tendency, 3.75c. being the prevailing price on black and 4.75c. for galvanized. Manufacturers are receiving a sufficient supply for their weekly needs, and probably the shortage of sheets is no more acute than many other materials. In general, Detroit industries are receiving current supplies on all materials.

The Lockhart Iron & Steel Co., Pittsburgh, which several months ago acquired the plant of the Sligo Iron & Steel Co., Connellsville, Pa., soon will start operations at the purchased unit. Extensive alterations have been made in the Sligo works, which now has 21 puddling furnaces. J. Porter Gillespie is manager of the Sligo plant.

The force at the plant of the Robbins & Myers Co., Springfield, Ohio, has been increased this week. It is expected that by Oct. 1 the company will have greatly increased its force and that all departments will be in operation.

The Nicholson File Co. and the American Screw Co., Providence, R. I., effective Sept. 5, have advanced wages of all plant employees 16 2 3 per cent, and will operate on a full-time schedule.

German Price Advances Causing Uneasiness

Mills Heavily Booked, But New Building Work Checked —Dollar the Standard Unit of Reference Selling on a Sliding Scale

BERLIN, GERMANY, Aug. 25. — Present price increases assume dimensions which make business exceedingly difficult. Even trades which sold at fixed prices, with a certain increase in case of rising wages, are now reverting to prices on a sliding scale altogether. The dollar is now to a great extent the standard to whose fluctuations most trades adjust their prices, having lost all other bases for calculations. In some cases manufacturers and traders are increasing prices in advance of the depreciation. Most of the daily papers have the exchange value of the dollar printed every day in a prominent place and complaints about the spasmodic increase in the prices of commodities, etc., are even by the small shopkeeper retorted with a "Well, but look at the dollar!"

The rapid increase in cost of production has led to a suspension of building at several large works and there is less demand for labor. The increases in the wages in all trades are considerably behind those taking place in the prices of commodities and there is already considerable unrest among the workers and the salaried employees. Wages are about 60 times pre-war standard while foodstuffs alone have gone up to over 100 times pre-war prices.

Most firms in the iron trade have orders to last them till February, 1923. Wholesalers who had a stock of at least a thousand tons in ordinary times have hardly two hundred tons now; and any supply coming in is going straight to firms using the material. The insufficient home supplies have led to greater imports of Luxemburg, Belgian and French iron, which can be had within about a fortnight. The advances in foreign ore and coal has also greatly enhanced the capital requirements and bank credits have to be relied upon to a greater extent, which the banks are very careful in granting. In some industries as much as 50 per cent of the price is asked with the order. As private firms find it increasingly difficult to provide the large amounts of capital involved, and especially in buying raw material, quite a number of them are being transformed into joint stock companies.

Further Industrial Concentrations

Meanwhile concentrations in the industries and increases in capital are assuming great dimensions. The Siegen-Solingen Gussstahl Aktien Verein is increasing its capital to 114 million marks by the issue of new shares. The amount raised in this way (52.8 million marks) is to be used especially for the erection of new works at Gross-Kayna and for other enlargements of the concern.

A new combination similar to the Rhein-Elbe Schuckert-Union, which had been formed under the leadership of Stinnes, is now being developed. It includes the mining concerns of Phoenix and Rheinstahl, the Dessauer Gas Co. and the two electrical firms Sachsenwerk Licht und Kraft A. G. and Max Schorch & Co. A. G. Negotiations to include the General Electric Co. have not been successful. The Phoenix A. G. plans to build a new electric power station, a tube works, a Bessemer plant, and several blast furnaces near Düsseldorf and Hörde. The General Electric Co. (A. E. G.) has acquired the Iron and Steel Foundry of Hartung A. G. in Berlin in order to secure regular supplies of castings to its works.

The great works in the iron industry were prosperous last year which is also shown by the 1921-22 returns of the Becker Steelworks. The gross profit amounted to 123.9 million marks (44.8 million in the previous year), overhead charges amounted to 28.6 (10.3) million marks, and after a depreciation of 60.9 (20.5) million marks, the net profit is 37.9 (15.2) million marks. The capital of the company is 100 million marks and the reserve fund has been brought up to the same amount. Several other accounts which have figured largely in previous balance sheets have been written down to one mark. A dividend of 30 per cent is being paid.

Mark Exchange the Governing Factor

BERLIN, GERMANY, Aug. 23.—The market continues to be entirely governed by the mark exchange collapse. Prices are ever higher, the demand and the shortage ever greater, and the unwillingness of producers to commit themselves to long contracts ever stronger. The price-rises of the Eisenwirtschaftsbund for pig iron from Aug. 21, and of the Steel Syndicate for its semi-finished and rolled mill products from Aug. 19 have been briefly reported by cable. The following report has merely a historical interest, as prices are now being changed at weekly or ten days' intervals. The prices are in marks per metric ton:

	Aug. 21	Aug. 9	July, 1914
Hematite	16,548	11,317	79½
Foundry iron I	13,637	10,481	75½
Foundry iron III	13,567	10,411	70½
Siegerland steel-iron	12,472	10,642	79
Spiegeleisen	13,561	11,823	75

These increases in no way injure Germany's ability to compete. They are far more than equalized by the exchange drop. The Eisenwirtschaftsbund has, however, provided for supplements to the basic prices according to future exchange movements and to possible new increases in coal prices and railroad rates. Railroad rates will be increased 50 per cent on Sept. 1; but by then a new increase of the above basic prices is almost inevitable.

To the latest prices of the Steel Syndicate a considerable addition is also inevitable. On Aug. 15 a governmental proposal to reimpose legal maximum prices on the Steel Syndicate's products was defeated by a large majority. Only labor's representatives, and not all of these, supported the proposal. Present prices are:

	Aug. 19	Aug. 8	July, 1914
Ingots	17,800	15,670	82½
Blooms	19,560	17,140	87½
Billets	20,280	17,770	95
Slabs	20,800	18,320	97½
Construction forms	23,700	20,770	110
Bars	24,050	21,070	97-99
Wire rods	25,000	22,700	117½
Thick plates	27,000	23,660	105
Medium plates	30,680	26,880	110
Thin plates	32,980	28,900	127
Thin plates, under 1 mm.	34,620	30,330	

The Steel Syndicate's mark prices have of late risen considerably more rapidly than the prices of most other products, and the complaints of manufacturing consumers continue. The producers reply that they are using increased quantities of British coal, which at the present low mark exchange costs three or four times as much as German.

Qualifications of Fixed Price Contracts

Business is extraordinarily active. Western chambers of commerce report that 50 per cent more pig-iron and rolling-mill goods could be sold than is produced. The obstacle continues to be coal and labor shortage. The market for small iron goods and for fine steel articles is sharing in the industrial boom. The centers of these branches, Hagen, Solingen, Remscheid and Velbert, all report having abundance of orders; but working capital is short and the demand for advance payment of one-fourth to one-half of the contract price is the rule. Such contracts as contain fixed prices are qualified with the note "Freibleibend," which means that the producer may refuse to deliver at the agreed-on price if (as with present exchange conditions is inevitable) production cost continues to rise. A great stir has been made by recent decisions of the Leipzig

Court of Appeal freeing manufacturers from their fixed-price contracts on no other ground than that between the contract date and the date of delivery production cost underwent such a rise that contract fulfillment would have caused the seller a heavy loss.

Cutlery Exports

Solingen steel exports exceed the best pre-war periods. It is a fact, however, that exports to America rose abnormally in anticipation of the tariff legislation; and here a heavy decline is expected owing to saturation of the American market. The Solingen industry has always been predominantly an export branch. When its production of arms, other than luxury weapons, was stopped by the Versailles treaty, it largely went over to manufacture of bicycle parts, hair-cutting machines and tools, though the chief production is still in good-class cutlery.

Exports of Solingen goods classed as fine cutlery averaged annually in 1907-13 4500 metric tons, of the value 28,000,000 gold marks. Exports in 1920 were 4517 tons, valued at 632,000,000 paper marks. Solingen has almost entirely lost its French market. At present rates and present exchange, the hourly wage in the Solingen industry is under 3 American cents. This means extraordinarily low production costs.

FRENCH MARKET STRONG

Deliveries Becoming Extended—Foreign Competition Successfully Met

(*Special Correspondence*)

PARIS, FRANCE, Aug. 31.—The trade is now in a satisfactory situation, and producers, whose capacity of production is still somewhat restricted, have enough orders on hand to uphold prices. In the northern district, where no blast-furnace has been in operation since the war, because local works preferred to purchase semi-finished products from Lorraine, companies such as Denain et Anzin, Nord et Est, Firminy, etc., are contemplating the reconstruction of their blast furnaces.

Iron Ore.—Present prices of French iron ore at mines are:

	Francs
[illegible]	15
Thionville	11
[illegible]	10 to 13
[illegible]	30

Pig Iron.—Chill-cast foundry pig iron No. 3 P. L. is maintaining its newly acquired firmness. The present average price is 210 to 215 fr. The producers of hematite iron, freed from the control of the Comptoir des Fontes Hématites, have to build up a clientele of their own and are, of course, feeling their way. Very low prices are being quoted. The price of 270 fr. at producing works noted in last week's market was offered by the Société de Paris et d'Outreau and by the Société des Aciéries de France, the latter selling from an old stock. As low as 250 fr. has been proposed by a company in the center of France, which is outside the area of British competition.

Semi-Finished Steel.—Inland orders are satisfactory and prices are firmer. Quotations are as follows for basic steel: Blooms, 320 to 325 fr.; billets, 340 to 345 fr. From 20 to 25 fr. more is charged for open-hearth material. Delivery is from six to ten weeks. Exports of semi-finished products to Great Britain are reported.

Beams and Rails.—It is believed that orders for beams and rails received in August by the Comptoir Sidérurgique (which controls the inland sales of these products) will make a record for this year. Some beams have been sold at 385 to 390 fr. (Belgian currency) f.o.b. Antwerp.

Sheets.—The market on sheets is very firm. Delivery is now about six weeks for heavy and medium sheets and three months for light sheets. British competition is practically non-existent. Belgian sheets could still be sold in the northeast of France; but the Comptoir des Tôles is making special delivered prices which fully meet that competition. French producers are now able to cover fully all national requirements.

Rolled Merchant Products.—It seems that the question of price is subordinated to the question of delays of delivery. For instance, some works which agreed to deliver within six or eight weeks have obtained prices up to 450 to 480 fr.; while the average price quoted by Lorraine works is only 435 to 455 fr., but with protracted delays in delivery: four or five months for medium specifications and six months and more for small iron bars and flats under 7 mm.

On open-hearth steel merchant products there is a good export demand and orders were recently awarded by the Lorraine and P. L. & M. railroads. The prices now accepted by Lorraine works are: 420 to 440 fr. for large shapes and 440 to 460 fr. for other shapes.

Castings.—Improvement in castings continues. Foundries are well occupied with orders and deliveries are becoming more extended.

American Versus British Rails

Considerable controversy has arisen, according to the *Engineer*, London, over a contract for steel rails for the Glasgow Corporation tramways. The lowest tender, amounting to £15,325, came from an American firm, the lowest British offer being £18,262. The former was recommended for acceptance but, after discussion before the Tramways Committee, it was agreed to refer the recommendation back in order to inquire into the American conditions of labor. Labor members contend that American steel workers are obliged to work 12 hr. a day and are not allowed trade union rights, whereas in Britain the workers have an 8-hr. day and recognition of their unions. Laborists therefore assert that the "fair wage" clause in Corporation contracts is not observed by American producers.

As announced by the cable message on page 566, Aug. 31, the contract was eventually awarded to the United States Steel Products Co.

Fall Meeting of New York Steel Treaters

The first fall meeting of the New York chapter of the American Society for Steel Treating will be held Wednesday evening, Sept. 20, in the assembly room of the Merchants Association of New York, Woolworth Building. G. C. McCormick, metallurgist, Crompton & Knowles Loom Works, Worcester, Mass., will read a paper, "Furnace Atmospheres and Their Relation to the Formation of Scale." An illustrated paper on "Duralumin" will also be presented by H. C. Knerr, metallurgist Naval Aircraft Factory, Philadelphia. Both of these papers are part of the regular program for the annual convention in Detroit, Oct. 2 to 7, and the first one was published in the society, *Transactions* for August.

Sheet Bars Sold at $40 at Youngstown

YOUNGSTOWN, Sept. 12.—A Valley producer of semi-finished steel has sold upward of 9000 tons of sheet bars for September delivery at $40. Another interest has taken a substantial tonnage of black sheets for next quarter delivery at 3.50c. Several companies are endeavoring to establish a higher differential than 1c. on galvanized grades, owing to higher labor charges and spelter costs.

For the fourth quarter, the steel bar market is stabilizing at 2.15c. to 2.25c. One Valley interest is accepting plate tonnage on a basis of 2.25c. to 2.50c.

Coal prices are softening. Coking coal is now obtainable at $5 for run-of-mine material, at the mine. Merchant coke price averages around $12 per ton.

CONTENTS

September 14, 1922

Steel Lumber Developed for Buildings 645
Light Sections Ideal for Easy Loads—Future Assured by Its Own Qualities and a Dearth of Timber

Electric Steel Production of the World 653
Record of the Leading Countries from 1913 to 1921—Post-War and Present Conditions—Pig Iron from Electric Furnaces

Chromium Alloy Steel Cast Centrifugally 655
Annealed, It Has the Same Structure as Mechanically Worked Metal from Ingots Cast in Stationary Molds—Grain Structure Small

The Three-Shift Day at Steel Works 657
Report by Bradley Stoughton to the Federated American Engineering Societies Puts Cost of Change Below Common Estimates

German Price Advances Causing Uneasiness 661
Mills Heavily Booked But New Building Work Checked—Dollar the Standard Unit of Reference—Selling on Sliding Scale

Casting Aluminum Bronze for French Coinage 649
Self-Fitting Keys 650
August Building Construction 650
Business Conditions Still Sound 650
Clutch and Brake for Tumbling Mills 650
New Thread Snap Gage 651
Decrease in Employment 651
August Steel Output 652
Increase in Imports of Iron Ore 652
Iron and Steel Exports 652
Steel Corporation's Unfilled Orders 652
Lake Iron Ore Shipments in August 652
Inland Steel Co. Plans 652
New Heavy Forming Brake 656
Country's Fuel Situation 659
French Iron Market 662
American Versus British Rails 662
Fall Meeting of New York Steel Treaters 662
Editorials 664
Steel Prices and Wages—Greater Adaptability of Business—Economics and Psychology—Further Advance in Centrifugal Casting.
Correspondence 666
Further Federal Legislation to Control Industrial Relations — Suggestions to American Buyers of British Coal—New Fiat Electric Furnaces.
Engineers and 8-hr. Shifts 668
Export Market 669
Metal Tariff Schedule Changes 669
Refractory Markets 675
Railroad Equipment Buying 684
Fabricated Steel Business 684
British Iron Market 688
Immigration Law Unsatisfactory 692
Sine Plate for Compound Angle Work 693
All-Steel Flexible Coupling 693
Gear Association Quartered at Cleveland 693
Successful Co-Operative Dealing with Employees 694
Automatic Temperature Regulator 694
Combustibility of Coke 695
Southern Pig Iron Freight Rates 696
Railroad Cars Ordered 696
Pittsburgh Plus Case Hearing 696
Interstate Commerce Decisions 696
Wage Advance 696
Chemists Hold Metric System Conference 697
British Institute of Metals Lectures 697
Cost Accountants to Meet 697
Motion Pictures in Industry 697
High Grade Steels Neglected 697
Three New Books on Labor Problems 698
Accidents in Steel Industry 699
Foreign Conditions 700
German Steel Production 700
National Steel Lumber Sections 700
Report to Senate on Steel Merger 700
Industrial Finances 710
Plans of New Companies 711
Trade Changes 711

Iron and Steel Markets 670
Comparison of Prices 671
Prices Finished Iron and Steel, f.o.b. Pittsburgh 683
Non-Ferrous Metal Market 685
Personal Notes 686
Obituary Notes 687
Machinery Markets and News of the Works 701
New York Jobbers' Prices 712

ESTABLISHED 1855

THE IRON AGE

EDITORS:

A. I. FINDLEY WILLIAM W. MACON GEORGE SMART

CHARLES S. BAUR, *Advertising Manager*

Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

[illegible] PUBLISHED IN U. S. A. George H. Griffiths, *Secretary*

Office of the United Publishers Corporation, 243 West 39th Street, New York. H. M. Swetland, *Pres.* Charles G. Phillips, *Treas.* A. C. Pearson, *Asst.* E. J. Frank, *Secy.*

BRANCH OFFICES: Chicago: Otis Building, Pittsburgh: Park Building, Boston: Old South Building, Philadelphia: 1420-1422 Walnut St. [illegible], Cleveland: Guardian Building, Detroit: 317 West Fort St., Cincinnati: Mercantile Library Bldg., Buffalo: 881 Ellicott Square, Washington: 818 Fifteenth St., N. W., San Francisco: 320 Market St., London, Eng.: 11 Haymarket, S.W.1.

Subscription Price: United States and Possessions, Mexico, Cuba, Shanghai, $6.00, Canada, $8.50; Foreign, $12.00 per year. Single copy, 25 cents.

Entered as second class matter, June 18, 1879, at the Post Office at New York, New York, under the Act of March 3, 1879.

Steel Prices and Wages

Labor leaders recently have been boasting their success in keeping up war-time wages in employments in which militant unionism is strongest. Mr. Gompers has declared that "it is safe to say that the full volume of wage reductions, if spread over the working population and averaged up, would amount to less than 5 per cent. * * * This is a stark defeat for employers. It is a magnificent victory for the workers." He does not stop to inquire what sort of a victory it is that causes costs to rise and to that extent reduces the purchasing power of the pay-envelope for workers in industries apart from coal mining, transportation and building. That wages have not been reduced in harmony with the reduction of the cost of living is well attested by recent statistics. But Mr. Gompers evidently did not see what wreckage his boast of only a 5 per cent wage reduction—if it were true, as it is not—makes of all the claims of railroad workers and others that wages must be kept up to meet the rising cost of living.

The latest comprehensive information on the movement of living costs in the United States, as reported by the National Industrial Conference Board, shows that the increase in the cost of living, from the beginning of the war to July, 1922, was 55.6 per cent. The increase in the average wage paid by the steel companies is nearly 80 per cent, comparing 1915 with the rates to-day. These facts show one reason for the increase in the cost of manufacturing steel and prove that the purchasing power of the steel worker's dollar is now much greater than it was in 1915 and immediately before.

Although at the recent rehearings before the Railroad Labor Board in regard to wages of maintenance of way employees, some arguments were submitted to the effect that wage payments by the steel companies in the past year had not been so liberal as those of the railroads, a large buyer of steel sees clearly the present situation. Samuel M. Vauclain, president of the Baldwin Locomotive Works, who recently completed a 10,000-mile trip throughout the country, has given the results of his observation in an article in *Collier's* of Sept. 9. As to prices of steel, Mr. Vauclain says:

> Of more consequence to the country than the strikes and the passing disorders is the price of steel. This is preeminently a steel country. Steel is the basic industry of the nation, and when that great industry operates at a loss, the whole country suffers. A great many things have happened to increase the cost of production of steel—the high railroad rates, the high wages, the high coal prices, the lowering of the number of working hours. The most important factors in raising the cost of production have been the railroad rates and the price of high volatile coal. In the face of these increasing costs, the steel makers, in order to get business and keep their organizations together, lowered prices until now many of them are producing below cost. They thought that they would have to do this for only a little while, but the period has been longer than they looked for, and the steel trade is not prosperous.

Thus a broadminded man who has been in close touch with both railroads and steel plants for many years sees what some labor leaders and some railroad men and attorneys who attended the recent rehearing at Washington were unable to comprehend. Prices of some steel companies have risen so rapidly of late that Mr. Vauclain's statement, which doubtless was written a number of weeks ago, should be somewhat modified to-day. While steel manufacturers are not selling below cost to the extent that was true six months ago, the fact remains that the steel business is not on the sound basis of prosperity that it would be if both costs and selling prices were reduced. It is unfortunate that at a time when deflation was needed, a reinflation movement set in as the result of the "victory" of the coal miners over the farmers, the steel workers and employees in every industry that has had to share in the painful readjustments of the past two years.

The feature of the most significance in the world's electrical production in 1921 is the part played by the electric furnace in the steel foundry. In three countries, the United States, Great Britain and Canada, which had a total electric steel production in 1921 of 213,400 tons, 54.3 per cent or 115,700 tons was steel castings. This represents a large percentage gain in only two years,

the electric steel output of the same three countries in 1919 having been 476,900 tons, of which 31.1 per cent was castings. Viewed as a whole the electric steel industry suffered only a temporary set-back in the world-wide depression of 1921. The decline from 1920 is by no means as sharp as the decline for all countries in pig iron and total steel.

Greater Adaptability of Business

Much assurance as to the success of business in the United States in the next few years is furnished by the adaptability that was exhibited during the war and since, and even now is being shown. In steel the trade has managed to function despite price fluctuations that before the war would have been destructive of all stability and indeed productive of chaos. Steel prices nowadays move in a way that would have been considered violent before the war. Three of the ten years before the war showed a difference of 30 cents between the high and low price of nails, and one showed a difference of only 5 cents, while the average divergence, between the high and low points of each year, was only 21 cents. In merchant steel bars the years having great price swings showed differences of $7 a ton and the average difference was only about $4 a ton. Nowadays a single market change of 20 cents a keg in nails is not regarded as formidable. In bars an advance or decline of $5 a ton is not considered much, while at a given moment there may be a difference of $5 a ton or more between the cost of deliveries that are not very widely separated.

The great upward movement in steel prices in 1909 carried the average of all rolled steel products over a range of scarcely more than $5 a ton, while the average advance in 1912 was less than $7 a ton. Yet these were distinctly "major" price movements. Towards the close of each movement warnings were being sounded that should the mills advance prices any more they would destroy their demand.

The difference between conditions then and conditions of late is not that the dollar is inflated, so that a movement in dollars means less; for if the dollar is inflated the inflation cannot be claimed to be more than 50 per cent, and 50 per cent added to pre-war price fluctuations would not produce figures comparable with the fluctuations that are now common.

In all the history of American railroading before the war there was only one serious freight congestion—that which extended approximately from October, 1902, to March, 1903. In its time it was regarded as a calamity. The railroads were humble in their apologies, arguing that this was the first and possibly it would be the last. Since late in 1916 we have had several periods of traffic congestion and we are now faced with prospects of another.

Strikes before the war were numerous, but they were not so serious as those we have had since. They caused loss to the strikers and to their employers, but they did not injure the public as have recent strikes, nor did they interfere with the conduct of general business in any way at all comparable with the troubles business has had thrust upon it in the past three years.

If these disturbances, these handicaps to the orderly conduct of business, had been threatened before the war the menace would have been considered exceedingly serious. With the greater adaptability business has acquired they are simply regarded as obstacles to be overcome. They do not produce chaos or cause business to stop.

In gaging the future of business in the light of the "troubles" we have had and are likely still to have, a new and longer unit of measuring has to be used. It requires much more than formerly to make an impression on business, which has grown more alert and more able to bear trouble.

Economics and Psychology

Since the armistice all thinking men have directed their attention more than formerly to economics. Possibly we are still "a nation of economic illiterates" as we were dubbed about six years ago, but striking an average of all the people we are not altogether so illiterate as we were, and it may be suggested also that some foreign countries have not exhibited as much economic sense as might have been attributed to them.

Some individuals, possibly many, seem to have a feeling that this new interest in economics is more or less peculiar to them. They are not altogether certain that they have not acquired a sort of hobby, which they must be careful not to ride too hard or at least to exhibit too freely. These men should feel reassured. The interest in economics is general. It is no fad. The interest is the natural development of circumstances. There has been a great change in conditions and economic laws are working out results. Before the war the working was slow and almost invisible. Men could adapt themselves to such gradual changes as occurred without giving much thought to the underlying causes.

We are taking more interest in economics, as we ought to do and indeed must do, and no doubt we are making progress. But in connection with our increased study of economics a note of warning needs to be sounded. That is, that the aspect of psychology that involves considering what is in other men's minds must not be neglected.

In not a little of the current talk on economic subjects is an insistence that other men ought to obey economic laws that the speaker undertakes to lay down. Impatience is exhibited that some men are conducting themselves as they are. They are flying in the face of Providence, so to speak, in flouting these newly recognized economic laws, and punishment is on the way.

It may be, however, that these supposedly ignorant people know more about economics than appears. They may have motives of their own. They may have moderately good reasons to hope that they will escape direct punishment. Economic laws work out certain results, but never has it been shown that they punish each individual in the precise measure of his failure to

square his conduct with the general economic good.

It is found, for instance, that it would be for the general economic good for bricklayers to lay 1000 bricks a day instead of 500. It does not follow that the individual bricklayer deserves punishment. Study shows that a machine may be operated with seven motions when the operative takes ten. He may have reason for preferring the ten, particularly if he need not select the same ten each time. There are too many coal miners but it does not follow that it is the duty of any particular individuals to get out.

Further Advance in Centrifugal Castings

There are new evidences of progress in the centrifugal casting of metals. In THE IRON AGE of Aug. 31 an article described the production in a Scottish plant of a class of iron castings by this process which are apparently not made anywhere else. Piston ring sleeves, engine cylinder liners, even chilled wheels and rolls, are being cast, having properties quite different from those of sand-cast products. It is evident that there are large possibilities in the application of the centrifugal process to small castings of suitable section, besides straight pipe as in the De Lavaud process.

Attention is called to the author's comment on the centrifugal production of nickel-chromium chilled iron car wheels. The advantage of alloy iron car wheels, sand cast, was brought out at the June convention of the American Society for Testing Materials in 1921. Doubtless unusual properties would be secured by the centrifugal casting of wheels of this composition, due to the difference in structure, for one thing. This may be ultimately one solution of the chilled iron wheel problem in the United States.

Of equal interest and importance, in another field, is an article on another page describing the casting in a centrifugal machine of a high-carbon chromium steel, probably the first account of the successful production of an alloy steel casting by the centrifugal process. The chief feature is the attainment directly of a structure which only the most careful and time-consuming forging or rolling, with subsequent heat treatment, can develop in the same kind of alloy steel cast as an ingot. The centrifugally cast chromium steel, unworked and heat treated, is at least equal in structure and properties to similar metal treated by present methods. To this is added the possibility of producing an alloy with higher carbon and chromium than can be secured in ordinary working by present methods.

American engineers will learn with surprise that the London Electric Railways Co. is about to have five experimental all-steel cars built by as many different car-building concerns. Especially will this surprise be manifested in such cities as New York, Boston and Philadelphia, where the underground service has been performed for years by steel cars. So great has the superiority of the steel car been found, especially in its resistance to buckling in a collision and in its relative immunity from fire, that no other type now is permitted in trains underground in American cities. Some wooden or partly wooden vehicles still persist among the smaller cars, operated singly, as in the dense population area of Boston, but even on elevated structures the tendency is to get away from such construction as rapidly as possible.

CORRESPONDENCE

Further Federal Legislation to Control Industrial Relations

To the Editor: Apropos of your editorial, "The Railroad Injunction," may I submit some suggestions for Federal legislation to decentralize and control organizations of capital and labor. The leading motives of such legislation should be:

1. The recognition of the fact that co-operative effort, both by owners of capital and by workmen, is a legitimate outgrowth of a normally developing modern civilization.

2. For the common good, methods of safeguarding the public against the arbitrary and selfish use of the power gained by co-operation must be devised.

Public opinion already has rendered an adverse verdict against unrestrained combinations of capital. The present methods of restraint, such as the Sherman and Clayton acts, etc., should be carefully examined and revised along the line suggested above in (1).

Public opinion also has rendered a favorable verdict on the abstract question of the right of workmen to organize for common defense, etc. The arbitrary and selfish use of the power of association by workmen is also a menace to the public welfare. This has been strikingly illustrated by the action of some of the railroad unions and the United Mine Workers of America. Some practical methods must be adopted, therefore, to prevent the abuse of power by labor organizations.

The law encourages the association of men with capital in the form of corporations. It should also, by definite legislation, encourage the organization of the employees of a corporation into a "company union," which should be incorporated and thus made responsible for its acts.

The suspension, discharge, or other discrimination against an employee because of his relation to an association of fellow workmen should be prohibited under proper penalties.

The law aims to prevent two or more corporations from effecting combinations so powerful as to menace the common welfare. The law should also prevent like powerful combinations of the employees of two or more corporations, which would also menace the common welfare.

Certain industries, such as railroad companies, coal mining companies, and public utility companies, should be declared to be vested with a public interest.

For the purpose of adjudicating disputes between corporations vested with a public interest and incorporated company unions, there should be established one or more Federal industrial commissions. These commissions should have the usual powers of a court to call for witnesses, papers, etc., and after hearing both parties should render a decision as to the merits of the controversy.

This decision, however, *should be purely advisory and should not be legally binding on either party;* the idea being that such decisions will merely serve as an impartial guide in the formation of public opinion, which must be depended upon to bring sufficient pressure to bear upon the party refusing to accept the decision of the commission.

No incorporated company union of employees of public interest corporations should engage in a strike, nor should any such corporation lock out its employees,

until the questions at issue shall have been submitted to a properly constituted Federal tribunal. Proper penalties should be provided to be enforced against the individual at fault. PUBLIC INTEREST.

Suggestions to American Buyers of British Coal

To the Editor: It is estimated that nearly one and a half million tons of British coal has been purchased for importation to the United States, of which slightly more than one-third has reached its destination. Thus, only recently actual results as to its burning and heat-giving qualities have been ascertained, and already there is much complaint regarding the unsuitability as well as the poor quality of some of these coals. I have made inquiry as to the grounds of such complaints, because ordinarily a well chosen British coal should give in most cases almost the same satisfaction as a well chosen American coal.

On investigation among various consumers, including railroads, public utilities and industrial companies, I was more than surprised to find that, while the purchases have been made on analyses, no particular attention was given to other considerations which are highly important. No coal producing country in the world possesses such a variety of coals as Great Britain. There are the Welsh district, Scottish district, the Newcastle district, Yorkshire, Lancashire, Monmouthshire and other smaller districts; and it has not been appreciated in some cases that these districts have coals of differing qualities, ranging from high volatile by-product to low volatile steam coals.

A good many purchases have been made stipulating Welsh steam, or Monmouthshire steam, or Newcastle steam, with a certain percentage of volatile and sulphur, on the supposition that such coal should be equal to American coals of similar analyses coming under the classification of pools, these pools more or less clearly defining the general qualities of the coal. This is not the case.

Furthermore, a good many of these purchases have been made on the basis of two-thirds screened and one-third small, with the idea, I presume, of equaling coal that on this side would come under the category of run of mine. To my mind a great mistake has been made in purchasing such a mixture, as the majority of Continental railroads, public utilities and industrial companies, when purchasing coal from Great Britain, will only accept screened coal. The British coals, constituted as they are and worked in many cases in thin seamed mines, require the screening to improve the quality, and it has been customary for decades back to screen all coals with the exception of the high volatile. In fact, up to 25 years ago, the small coals were heaped at the pit's head because no use was found for them. Only with the introduction of special ratings and other mechanical improvements did these small coals become a marketable article. Therefore, by purchasing two-thirds large (otherwise screened) and one-third small, you get a poorer coal and yet have to pay for the cost of the screening.

My main purpose in writing is to suggest to purchasers of British coals not only to be careful that they do not purchase coals designated merely as from a given district but that they insist on coal from certain named collieries; furthermore, to insist that shipments be accompanied with colliery certificates duly attested by an American consul. British coal shipped to foreign countries has long been purchased on colliery certificates, which stand both for quality and quantity.

The average consumer in this country is at a disadvantage in not knowing which of the British collieries produce the quality suitable for his purpose. But a letter to any of the chambers of commerce in the respective coal districts, stating the writer's requirements and what he has been accustomed to use, would bring forth full information as to the best quality of coal to purchase. If consumers here continue to purchase by specifying simply steam or gas coal from a certain district, they are bound to have difficulties and in many cases find their coal unsuitable for their equipment. Those who do the stoking may have the best intentions, but will not be able to get satisfaction out of the coal. I know of cases in which the users of imported coal were actually unable to raise steam with it. While of the same volatile content as the American coals to which the buyer had been accustomed, they required entirely different handling under the boiler.

There is an impression that with the reopening of the mines in this country there will be no longer a necessity for purchasing British coal. I hold a different viewpoint. Although the productive capacity of the American mines may be even larger than the increased demand caused by the shortage owing to the strike, I am confident that the railroads will not be able to carry sufficient quantities to cope with such an extreme pressure as is caused by the shortage, owing to the long duration of the strike. Consequently within a month or so, especially with the approaching winter months, the pinch will be felt again and of necessity further large purchases will have to be made, principally as to hard coal. And although Great Britain would not be able to spare any consequential quantities of anthracite, yet there are certain dry coals, or so-called bastard anthracites, which will be a better substitute than the higher volatile coals.

The main mischief has been done so far by having bought coals somewhat indiscriminately merely on volatiles, without considering how the coal burns and how it requires to be stoked. The whole position can be improved by applying proper methods of handling the coal under a boiler according to the actual quality, in which case it will be necessary not only to know from what district the coal comes but also from what colliery in the district the coal was drawn.

Where it has been ascertained that the coal is absolutely unsuitable, it might be possible to arrange with consumers who could utilize such coals, as there are many consumers who are in the same dilemma. Some of them require just the coal the other has and yet cannot use, or if he is able to use it, is not able to get the fullest satisfaction out of it. Consumers should avoid the purchase of mixed cargoes of certain analyses, under which category the merchant would be left to consider his profits rather than the more important point whether the coals will be suitable or not. It is a mistake to consider dollars per ton as the most important factor, since a saving of 25c. a ton on the purchase might easily mean the losing of $2 or more a ton in results achieved.

To say that it would be difficult to exercise such careful discrimination would be far-fetched, as large buyers like the Swedish State Railway or other Continental lines will buy British coals by the millions of tons, as will gas works and industrial companies. They will all tell you they have bought British coals for decades by collieries and never by districts; have bought screened coals and never thought of purchasing a mixture of two-thirds large and one-third small.

R. C. MARTENS.

New York, Sept. 5.

The New Fiat Electric Furnaces

To the Editor:—In the article which appeared in THE IRON AGE, July 20, p. 151, "New Fiat Electric Furnace," it is stated that the Fiat should produce 1000 tons a month of steel ingots. This should be corrected, as the production was 1000 tons a month of steel castings for automobile and truck parts, which the Fiat produced in extraordinary numbers during the war for the Italian army and also the allies. The electric foundry for steel castings was of the greatest assistance in developing the campaign.

In another place the article mentions "carbon" electrodes. As the readers must have already understood by a consumption so small as 2.85 kg. per ton of steel, this did not refer to carbon electrodes, but American graphite electrodes.

DR. ALFRED STROMBOLI

Turin, Italy, Aug. 8.

ENGINEERS AND 8-HOUR SHIFT

Action at Boston on Reports Dealing with Continuous Industries

BOSTON, Sept. 9.—The Executive Board, American Engineering Council of the Federated American Engineering Societies, held a two-day meeting Sept. 8 and 9, at Hotel Bellevue, this city. The most important matter under consideration was the acceptance of two reports, one prepared by Horace B. Drury, industrial investigator and formerly of the faculty of Ohio State University, and the other prepared by Bradley Stoughton, consulting engineer, New York, formerly secretary American Institute of Mining and Metallurgical Engineers. These reports deal with the two-shift day and the three-shift day in continuous industries, and are based on two lines of inquiry extending over a period of nearly two years. The one directed by Mr. Stoughton embraces the iron and steel industry. While much of the report is favorable to the three-shift day, Mr. Stoughton raises some questions, including the following:

If [illegible] pay for 8 hours' work, will they not still be discontented or dissatisfied and agitate for 12 hours' work at the advanced rate? There seems to be good reason to fear such a result. Further, do the men want the 8-hour shift? If this question really means, Do the men want the 8-hour shift with 8 hours' pay at the present hourly rate? then I believe there can be no question that they do not. The present daily wage of $3.60, which is for 12 hours' work at 30c per hour, is as low as even "common labor" can live on in America and support a family.

The first question can be answered; the second one means that the "common labor" must be paid the same daily wage as at present, and some technical or commercial compensation found in the conduct of the operations, if possible. If it is not possible, and if profits at present cannot stand the extra production cost, then the 12-hour shift must be continued until a change occurs.

The investigations were made possible, under the direction of the council's committee on work periods, of which H. E. Howe, Washington, is chairman, by financial co-operation from the Cabot Fund, Boston. Presentation of the original reports was made to the council at Pittsburgh in May, at which time they were referred to a committee for editorial changes.

The question of accepting the reports developed rather vigorous opposition from a small minority of the council. Both reports subsequently were accepted and authorized to be published, with a few editorial corrections. The opposition took the stand that the American Engineering Council of the Federated American Engineering Societies should not accept the responsibility of these reports, which are sure to have a far reaching influence. It was argued that adverse criticism of the council would be invited, which might lead to unpleasant notoriety. It was brought out during the discussion that a group of ministers some time ago issued a report on working conditions in steel mills, which is the laughing stock of engineers the country over. It was intimated that this latter report might indirectly influence the public attitude toward the reports under consideration. It also was suggested that the two reports are not of an engineering nature, but more along social reform lines.

J. Parke Channing, New York, a member of the committee on work periods, as well as other members of the council, vigorously supported the reports. They stated that the nature of the data collected during the investigations is such that it cannot be set down in decimals and figures, which the opposition contended should constitute a basis for an engineering report. It was urged that the study ran into human as well as engineering problems, and that human problems cannot be tabulated.

As to the council's responsibility for the publication of the reports, it was contended that they recommended nothing, holding strictly to the findings of the investigators. Also that every man serving on the committee on work periods is an engineer, competent of judging the merits of the reports. In addition, the constitution and by-laws of the American Engineering Council of the Federated American Engineering Societies justifies that organization's sponsorship of the reports under question. Mortimer E. Cooley, president of the federation, as well as dean of engineering schools, University of Michigan, who presided at the session, during the discussion of acceptance turned the chair over to Calvert Townley, New York, in order that he might support acceptance. [Summaries of the reports appear on other pages.—EDITOR.]

Dean Cooley made the announcement, following the meeting, that he was about to start on a nationwide tour to arouse the engineering organizations of the leading industrial centers to greater zeal in the public service. A chief purpose of Dean Cooley's mission will be to familiarize American engineers with the findings of the council's committee on work periods. "The 12-hour day in continuous industry must go," said Dean Cooley. "A nationwide survey has shown conclusively that three shifts of eight hours each is desirable both for capital and labor. The eight-hour day makes for more harmonious labor relations, tends to safeguard management, and unquestionably brings about more contented workers and happier homes. Millions of men, women and children will profit when all continuous industries abolish the 12-hour shift."

PRODUCTION INCREASING

Improvement in Blast Furnace and Mill Operations in Mahoning Valley

YOUNGSTOWN, Sept. 12.—Iron and steel production is expanding in the Youngstown district, as coal shipments reaching the Valleys increase in volume. Improvement is reflected in both blast furnace and rolling mill operations. With the blowing in of the 600-ton stack of the Trumbull-Cliffs Furnace Co. at Warren, scheduled for resumption Sept. 13, 21 of 47 furnaces in the Mahoning and Shenango Valleys will be pouring. Mattie blast furnace at Girard of the A. M. Byers Co., Pittsburgh, will also be blown in at an early date.

Pig iron production is therefore approaching 50 per cent, as compared with an average of less than 30 per cent in August. Most of the hot metal being produced is used in steel making, comparatively little being sold in the merchant market.

Iron and steel makers show considerable optimism over fourth quarter business and production, one interest predicting a 70 per cent average for the final quarter of 1922.

Fifty-nine of 66 open-hearth furnaces in the Mahoning Valley are melting; independent operations in the Valley are estimated at 70 per cent. Three of four Bessemer plants are active, while 104 of 113 sheet mills were scheduled at the beginning of the week.

Production of merchant iron is being retarded by the scarcity and high cost of coke. In the Shenango Valley one merchant furnace is in blast, but the output is absorbed as hot metal by a producer of ingot molds and castings.

Sales executives reported undiminished demand for the lighter steel products.

Steel Works Electrical Engineers Meeting

CLEVELAND, Sept. 12.—The Association of Iron and Steel Electrical Engineers began its sixteenth annual convention in the Public Hall in this city yesterday with a registration of over 1100 for the first two days. Monday was devoted to a business meeting and reports of committees. Starting to-day technical sessions will be held until Friday noon. The annual banquet takes place Thursday evening and inspection trips will be made to Cleveland plants on Friday afternoon. A large exhibit of electrical equipment is being shown in connection with the convention.

The Norwalk Iron Works Co., South Norwalk, Conn., a builder of compressors, has merged with the Automatic Carbonic Machine Co., Peoria, Ill., the plant and equipment of which is being moved to South Norwalk. Through this consolidation the company will be able to supply, in addition to its standard ammonia equipment, a completely developed line of carbonic gas equipment for refrigeration and ice making.

METAL SCHEDULE CHANGES

House Recedes on Most Rates—Foreign Valuation Prevails—Zone Plan Abandoned

WASHINGTON, Sept. 12.—The metal schedule of the tariff bill as finally reported to-day from conference is left in the form in which it passed the Senate in all important respects. Almost invariably the House conferees receded, as was done with regard to the vast proportion of the rates and provisions throughout the bill.

The bill, which now is before the House, after which it will go to the Senate for final passage, retains the duty of 1c. per lb. on manganese ore and 1⅞c. per lb. on ferromanganese and continues the ferroalloy section in other respects as acted upon by the Senate. In the general steel section of raw and rolled products, the Senate rates also are carried with few exceptions of minor importance.

Alloy Steel Rates

One important change, however, made regarding alloy steel consists of a change in verbiage in paragraph 305, which provides that additional duties shall be applied to all alloy steels instead of only to those in paragraph 304 relating to ingots, blooms, billets, bars, etc. This change was made by inserting the word schedule instead of referring to the single paragraph.

On anti-friction balls and rollers, the conference retained the Senate specific duty of 10c. per lb. and adopted a House amendment carrying an additional duty of 45 per cent ad valorem instead of 55 per cent as proposed by the Senate. The House bill imposed a duty of 20 per cent American value on welded cylindrical furnaces and iron or steel tubes not specifically provided for, while the Senate bill provided 30 per cent foreign value. The House receded with an amendment making the duty 25 per cent foreign value. The House American value duty of 25 per cent on flexible metal tubing and rigid electrical conduit and the Senate foreign value duty of 35 per cent were changed to 30 per cent foreign value. Senate rates on chain were adopted except on chains less than ⅜ and not less than 5/16 in. in diameter, and less than 5/16 in., the House rates of 2½c. and 4c. per lb., respectively, being accepted. The conferees compromised on a duty of 35 per cent instead of the Senate duty of 40 per cent on the House duty of 30 per cent on spiral nut locks and lock washers. The House receded with an amendment restoring the classification on metallic magnesium and metal magnesium scrap, but making a duty of 40c. per lb. and 40c. plus 20 per cent on magnesium alloys, tubing, wire, etc.

Compromise on Magnesite

A compromise was reached on magnesite, the Senate rates being increased and House rates lowered. The duties finally determined upon are equivalent to $11.50 per net ton on dead burned and grain, or 23/40c. per lb.; $12.50 or ⅝c. per lb. on calcined, and $6.25 or 5/16c. per lb. on crude. The Senate rates on graphite were adopted except that the conference accepted a House amendment changing the rate on crystalline flake to 1½c. per lb. Senate rates on fluorspar were accepted. A number of compromises were made regarding cutlery, clocks and surgical instruments.

The House receded on the American valuation plan and accepted the Senate foreign valuation plan and the provisions for flexible tariff rates to be declared by the President under certain conditions. The Senate receded on its provision for the establishing of foreign trade zones.

EXPORT TRADE INACTIVE

Rail Orders Still Largest Item — Tonnage for Bolivia Bought—Chilean Railroads to Inquire

NEW YORK, Sept. 12.—Export trade to all markets, including Japan, is at an extremely low ebb. While business is still appearing from Japan, it is almost entirely from Governmental sources and the purchases are largely confined to rails. The black sheet business, which it was hoped would continue as large as it was last year, because of the municipal ordinances calling for fireproof roofs throughout the country and other uses, is at a minimum. This dullness in light gage sheets is partly explained by large stocks on hand, said by some to amount to as much as 80,000 tons and also by the fact that the Japanese are now purchasing British and Continental sheets, which are lower in price.

The recent tender of the Imperial Government Railways, which called for 4700 tons of 75-lb., 20-lb. and 16-lb. rails has been awarded to Suzuki & Co., New York, and the Government railroads have issued a new tender calling for 4000 tons of 60-lb. rails. Beside these official rail purchases, American export houses report that they are bidding on some small tonnages for private interests. One of these calls for about four miles of 25-lb. rails to be shipped c.i.f. Takao. The South Manchuria Railway Co., which, some time ago, received bids for furnishing about 700 tons of tie plates, has not yet awarded the contract to an exporter. Work on the hospital building for this railroad at Dairen, Manchuria, which it is estimated will cost about $1,500,000, will probably be started about Jan. 1. The contract was awarded to George A. Fuller of the Orient, New York. This company, which is working on several buildings in Tokio, Japan, generally purchases the major part of materials for construction work in the United States.

Tenders will be issued some time in October by the Chilean State Railways, 141 Broadway, New York, for furnishing locomotive tires, steel axles, plates and similar equipment. Request for bids on the annual rail requirement of the Chilean railroads will probably be made in December. The Ulen Contracting Co., 120 Broadway, New York, executing a contract with the Bolivian Government, which calls for the building of about 204 kilometres of railroad, has closed on the preliminary tonnage of rails for the work, amounting to about 60 per cent of the total amount needed. This tonnage of 8250 tons with accessories was placed with the United States Steel Products Co., which received 2250 tons, and with a Belgian mill, which will roll the remaining 6000 tons. Immediate delivery was given by the American seller, the rails being shipped to the north end of the road. The Belgian delivery was slightly extended but the price was lower. This is the extent of the rail purchases of the company for this year.

Between 12,000 and 13,000 tons of 60-lb. rails will be needed for completion of the railroad, but these will be purchased later. The Bolivian Government has announced that bids will be accepted on the construction of the remainder of the Potosi-Sucre Railroad, totaling about 60 miles, 40 miles of this road, from Potosi to Betanzos having been constructed under Government direction.

The most recent bids received on the project for electrification of the railroad from Durban to Pietermaritzburg, South Africa, will be opened in October. Bids for furnishing materials and performing the engineering work have been obtained and rejected several times during the past year. There have been some American bids submitted.

The Machinery Club of Chicago will hold its annual picnic at Thatcher's Woods, River Forest, Ill., Sept. 16.

Iron and Steel Markets

OUTPUT GROWING

Fifteen Blast Furnaces Resume in the Week—Steel Supply Easier

Railroads Pressing for Car Deliveries—Steel Works at 60 Per Cent

Blast furnace resumptions by steel companies are coming more rapidly than in the first week of September. Pittsburgh, Youngstown, Cleveland, Chicago and eastern Pennsylvania report 15 furnaces started in the past week, and indications are that all the August loss of 28 furnaces will be made up by another week or ten days.

Such an increase in pig iron production points to a correspondingly easier situation in the near future in respect to steel deliveries, subject to the handicap of insufficient car supply for the moving of certain rolling mill products.

The embargoes announced by various railroads in the past week have had no important effect as yet on steel shipments. Ample supplies of cars are still available for coal shipments and thus far the steel industry has not been directly affected by priority rulings.

One factor of uncertainty grows out of Washington proposals for co-operation by coal producers in furnishing tonnages for use as required to keep prices in check. Since steel makers are being pressed by railroads and car builders to supply steel for cars and locomotives they are making every effort to increase output.

In the past week special efforts have been made to expedite the delivery of railroad steel. With much equipment in bad order, the railroads are urging car works to make deliveries, since new equipment will operate for a considerable period without needing attention.

Locomotive works also are expediting deliveries on the unusual volume of business they have booked recently. Late orders include 75 locomotives for the New York Central and 50 for the St. Louis & San Francisco. A considerable item in the machine tool trade is a $500,000 list of shop equipment for the Missouri, Kansas & Texas.

The Steel Corporation ingot production this week is at more than 60 per cent of capacity and several independent companies are again close to 60 per cent, with prospects of some further increase.

August steel ingot output, as expected, fell off much less from the July rate than did pig iron—about 25 per cent for pig iron and only 11 per cent for steel. As against a 35,000,000-ton yearly rate in July, the August rate was nearly 31,000,000 tons, and to-day it is nearer 32,000,000 tons.

Buyers of steel are disposed to limit their purchases at present prices, which still show a considerable range, in view of the Steel Corporation's evident purpose to continue its conservative policy.

An important mill in the Chicago district has had in the past week the heaviest inquiry that has come to it in 18 months. However, agricultural buying in that market, which began on a moderate scale some weeks ago, has gradually fallen off as prices have advanced.

Eastern bar iron manufacturers have advanced their price $3 per ton, or to 2.25c., Pittsburgh. About 500 tons of Belgian steel bars have been brought in at Philadelphia for sale at about 1.90c., Pittsburgh.

Significant of an easing situation is the Ford Motor Co.'s release this week of a portion of the steel sheets it had held up at the mills when it published its plan to close down on Sept. 16.

Connellsville coke supply increases slowly, so that pig iron output at merchant furnaces can make only a gradual gain in production. The trend of pig iron prices at Pittsburgh is still upward, but in other sections the advance seems to be arrested and in eastern Pennsylvania a prominent steel company is selling foundry grades on a basis of $32, or $2 below the recent prevailing price. The leading Virginia interest, which expects to blow in a furnace in a few days, has announced a schedule based on $32 for No. 2 plain, but has made no sales. The Birmingham market seems to be settling to $25, although Southern basic has sold as high as $27.50. Deliveries from the South continue to be extremely slow.

The scrap market is in commotion. There is the cumulative effect of the abnormal use of old material at steel works since pig iron became so scarce, added to the scant offerings of railroad scrap during the strike, also the long curtailed production of scrap at many metal-working plants. In an excited market prices have advanced by $1 to $3 a ton in the past week.

Of 8250 tons of rails bought by Bolivia, Belgium will supply 6000 tons. The remainder for early shipment was placed in the United States. Somewhat later upward of 12,000 tons additional will be needed.

THE IRON AGE composite price for pig iron has advanced $1 to $31.52 per gross ton, the highest figure since the first week of 1921. Four weeks ago it was $26.77; one year ago it was $19.81 per ton.

Pittsburgh

Demand for Steel Still Exceeds Supply—Pig Iron Price Trend Upward

PITTSBURGH, Sept. 12.—Blast furnace resumptions in this and nearby districts have been so numerous lately as to give rise to hopes of an easier supply situation in steel in the near future. Practically all of the furnaces which have gone on—and the total for the western Pennsylvania, Wheeling and Valley districts since the settlement of the coal strike a little more than two weeks ago has been 18 with three more ready to start—have been steel works stacks. In another week, it is expected, the number of active will be close to the peak reached early in July of 76, out of a total of 139 furnaces.

So far, the increased production of iron has not caused any weakening in the steel situation. On the contrary, the demand, though showing less urgency in a number of lines, still exceeds the supply and because of that condition, prices can be based on costs,

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton	Sept. 12, 1922	Sept. 5, 1922	Aug. 15, 1922	Sept. 13, 1921
No. 2X, Philadelphia	$37.64	$36.14	$30.14	$20.84
No. 2, Valley furnace†	35.00	35.00	30.00	21.00
No. 2, Southern, Cin'ti†	29.05	29.05	24.05	23.50
No. 2, Birmingham, Ala†	25.00	25.00	19.50	19.00
No. 2 foundry, Chicago*	32.00	32.00	30.00	22.00
Basic, del'd, eastern Pa.	32.00	32.00	27.25	19.25
Basic, Valley furnace	**32.50**	30.00	26.00	19.00
Valley Bess., del. Pitts	34.77	34.77	28.76	21.96
Malleable, Chicago*	32.00	32.00	30.00	22.00
Malleable, Valley	33.00	33.00	28.00	20.00
Gray forge, Pittsburgh	**36.77**	34.77	30.00	21.96
L. S. charcoal, Chicago	36.15	36.15	33.15	33.50
Ferromanganese, seaboard	67.50	67.50	67.50	70.00

Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$40.00	$40.00	$40.00	$47.00
Bess. billets, Pittsburgh	**40.00**	38.00	35.00	29.00
O.-h. billets, Pittsburgh	**40.00**	38.00	35.00	29.00
O.-h. sheet bars, P'gh	40.00	40.00	35.00	30.00
Forging billets, base, P'gh	**45.00**	43.00	40.00	34.00
O.-h. billets, Phila	45.17	45.17	42.67	35.74
Wire rods, Pittsburgh	**47.50**	45.00	42.00	38.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	2.00	2.00	2.00	1.70
Light rails at mill	2.00	2.00	1.90	...

Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	**2.575**	2.42	2.325	1.95
Iron bars, Chicago	2.25	2.25	2.15	1.75
Steel bars, Pittsburgh	2.00	2.00	1.90	1.65
Steel bars, Chicago	2.10	2.10	1.90	1.85
Steel bars, New York	2.34	2.34	2.24	2.03
Tank plates, Pittsburgh	2.00	2.00	1.90	1.65
Tank plates, Chicago	2.30	2.30	1.90	1.75
Tank plates, New York	2.34	2.34	2.24	2.03
Beams, Pittsburgh	2.00	2.00	1.90	1.65
Beams, Chicago	2.20	2.20	1.90	1.80
Beams, New York	2.34	2.34	2.24	2.03
Steel hoops, Pittsburgh	2.75	2.75	2.50	2.15

Sheets, Nails and Wire,	Sept. 12, 1922	Sept. 5, 1922	Aug. 15, 1922	Sept. 13, 1921
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh	3.35	3.35	3.15	2.75
Sheets, galv., No. 28, P'gh	4.35	4.35	4.15	3.75
Sheets, blue an'l'd, 9 & 10	2.50	2.50	2.40	2.20
Wire nails, Pittsburgh	2.60	2.60	2.50	2.90
Plain wire, Pittsburgh	2.35	2.35	2.25	2.60
Barbed wire, galv., P'gh	3.15	3.15	3.05	3.50
Tin plate, 100-lb. box, P'gh	$4.75	$4.75	$4.75	$5.25

Old Material, Per Gross Ton:				
Carwheels, Chicago	**$23.50**	$22.50	$20.50	$13.50
Carwheels, Philadelphia	**21.00**	20.00	17.50	17.00
Heavy steel scrap, P'gh	**19.50**	18.50	17.50	13.50
Heavy steel scrap, Phila.	**16.00**	15.50	15.00	11.50
Heavy steel scrap, Ch'go	**18.50**	17.50	15.75	11.00
No. 1 cast, Pittsburgh	**21.50**	19.00	19.00	17.00
No. 1 cast, Philadelphia	**21.00**	19.00	19.00	17.00
No. 1 cast, Ch'go (net ton)	**22.00**	21.50	18.50	13.25
No. 1 RR. wrot, Phila	**21.00**	18.50	18.00	15.00
No. 1 RR. wrot, Ch'go (net)	**18.00**	17.50	14.50	11.50

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	**$11.00**	$10.00	$14.00	$3.25
Foundry coke, prompt	**12.50**	12.00	15.00	4.25

Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	14.12½	14.12½	14.12½	12.25
Electrolytic copper, refinery	13.75	13.75	13.75	12.00
Zinc, St. Louis	**6.37½**	6.25	6.15	4.20
Zinc, New York	**6.72½**	6.60	6.50	4.70
Lead, St. Louis	**5.60**	5.55	5.55	4.40
Lead, New York	**5.95**	5.90	5.90	4.60
Tin (Straits), New York	*32.12½*	32.50	32.12½	26.75
Antimony (Asiatic), N. Y.	**6.25**	*5.87½*	5.25	4.45

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Sept. 12, 1922, Finished Steel, 2.412c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

Sept. 5, 1922,	2.412c.
Aug. 15, 1922,	2.255c.
Sept. 13, 1921,	2.279c.
10-year pre-war average,	1.689c.

These products constitute 88 per cent of the United States output of finished steel

Composite Price, Sept. 12, 1922, Pig Iron, $31.52 Per Gross Ton

Based on average basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Sept. 5, 1922,	$30.52
Aug. 15, 1922,	26.77
Sept. 13, 1921,	19.81
10-year pre-war average,	15.72

which are not receding much, with labor scarce and not especially efficient and scrap prices advancing with much rapidity.

Pig iron prices still show an upward tendency and with coke so scarce as to prevent the blowing in of merchant furnaces, relief from the present scarcity is not believed to be immediately ahead. It is a question whether furnaces dependent upon Connellsville coke could find accommodation even if the prices of iron advanced sufficiently to permit the payment of present coke prices. The strike in that region still is far from being over.

The past week has seen further stiffening in semi-finished steel prices and this is generally considered to forecast further upward revisions of prices of finished products. The claim is set up that with sheet bars at $40, the base gage of black sheets should bring 4.25c. to net a fair profit. Some makers have advanced their prices to $5 to $7 a ton above the Steel Corporation bases. Premiums also are common on hot-rolled flats. An advance of $3 per ton has been made by all of the independent makers of wire products. In these several changes, the Steel Corporation has not yet followed and its price policy generally is a conservative one. Suggestions persist that tin plate must command more money to offset the higher producing costs.

Ample supplies of cars still are available for coal shipments and the steel industry as yet is unaffected by the priority regulations. The Connellsville region, however, on account of the curtailed production, is not demanding many cars and since union mines have not reached capacity operations, no real strain has been placed upon supplies, especially as there were available not only the railroad cars in storage, but those privately owned. Car shortages for fuel movements are looked for and makers of wire products and other steel products, which for sake of safety are moved in box cars, find it necessary to resort to the use of low-sided open top cars, because of the scarcity of box cars.

Blast furnace resumptions have caused a demand for coke that has sent the price up $1 a ton. Advances of 50c. to $3 are noted in scrap.

Pig Iron.—Although lacking in activity, the market has lost none of its recent strength and it is freely predicted that prices will go still higher before they take a turn in the other direction. It is believed that

production of the steel works furnaces which recently have gone on will be needed by the producers themselves, since reserves were quite generally exhausted while the furnaces were down and any surplus iron that is made will be put into reserves. Merchant furnaces probably could make iron profitably even at the current cost of $11 per net ton at ovens for beehive oven coke, but this does not mean that many such furnaces will go in immediately, because the strike in the Connellsville district is not yet over and the question of price is unimportant by comparison with lining up tonnages. Getting the men back to work is preliminary to getting coke supplies and when that can be accomplished is merely a guess. Little has been done here in the past week outside of a sale of 2000 tons of basic iron to an Allegheny Valley sheet maker at $32.50, Youngstown. This sale sets the market on basic at that figure. A Valley independent is negotiating a sale of 20,000 tons of basic. We quote foundry iron on the lower silicons at the same price as No. 2 grade for the reason that it is not available at less.

We quote Valley furnace the lowest rate for delivery to the Cleveland or Pittsburgh district being $1.76 per gross ton:

Basic	$32.50
Bessemer	35.00
Gray forge	35.00
No. 2 foundry	35.00
No. 3 foundry	35.00
Malleable	33.00

Ferroalloys.—Interest in the tonnage alloys is low, despite the increasing rate of steel works operations. Prices show little change. Spiegeleisen is $1 per ton lower at $38 furnace, for average 20 per cent material and $37 for 16 to 19 per cent, this being due to the fact that production is gaining owing to a better coke supply. British ferromanganese still is being offered for future delivery at $67.50, c.i.f. Eastern seaboard, but purchases are light since present indications are that the new tariff bill will be a law before shipments can be landed. There has been a rather good demand for ferrotungsten in this district lately, with several sales of foreign material at 45c. per lb. contained tungsten.

We quote 78 to 82 per cent ferromanganese, $75 c.i.f. Atlantic seaboard for domestic; British, spot, $70 to $72.50; British, future, $67.50; German, 76 to 80 per cent, $67.50 to $70. Average 20 per cent spiegeleisen, $38 furnace; 16 to 19 per cent, $37 furnace; 50 per cent ferrosilicon, domestic, $55 to $60 furnace, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, $50.50; 11 per cent, $53.80; 12 per cent, $57.10; 13 per cent, $61.10; 14 per cent, $64.10; silvery iron, 6 per cent, $39; 7 per cent, $40; 8 per cent, $41.50; 9 per cent, $43.50; 10 per cent, $45.50; 11 per cent, $48.80; 12 per cent, $52.10. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $3.66 per gross ton.

Tin Plate.—Demands of container manufacturers in connection with the pack of perishable foods have been pretty well satisfied and since current requirements are neither extensive nor pressing, the supply situation is comparatively easy. Costs, however, are much higher now than in the second quarter of the year and as they promise to remain rather high in the final quarter, prices are firm. On really large orders, slight concessions from the "official" quotation of $4.75 per base box, Pittsburgh, are being made, but instead of 15c. to 25c., this is now a matter of only 5c. to 10c. per box. Unless there is a drop in steel prices, or some other means of cutting costs, an "official" quotation of $5 per base box is likely by independents on first quarter, 1923 business. The leading interest is silent on the matter of future prices.

Cold-Finished Steel Bars and Shafting.—There has been no relief for most makers in this district in the matter of supplies of hot-rolled bars and while the demand for cold-finished bars is not of hugh proportions, it is sufficient to sustain the recent advance to 2.50c., base, Pittsburgh, for carload lots. The principal demand is from the automotive industry, makers of agricultural implements and machine tools still being negligible buying factors. Ground shafting is unchanged at 2.90c., base, f.o.b. mill for carloads.

Hot-Rolled Flats.—The market is at a minimum of 2.75c., but on orders calling for early delivery, 2.85c. to 3c. has been obtained and some makers will not consider narrow widths at less than 3c., and have quoted as high as 3.25c. Only small tonnages, however, are moving at the higher prices.

Cold-Rolled Strips.—With no easing in costs of hot-rolled material, there is no inclination on the part of makers of cold-rolled strips to consider less than 4.25c., base, Pittsburgh.

Nuts and Bolts.—The recent advance is well maintained and with the demand fairly active and no signs of an immediate easing in prices of raw material, it looks as though present prices soon would be minimums. Discounts are given on page 683.

Rivets.—Recent price advances do not seem to be affecting demand and the new prices daily are becoming more firmly established. With bars at 2c., base and rods at $47.50 per gross ton, it is claimed that present rivet prices are low enough. Prices and discounts are given on page 683.

Track Fastenings.—We make no change in prices this week. The market, however, is firm and there is a brisk demand for small spikes in connection with coal mine resumptions incident to the ending of the strike. Prices are given on page 683.

Billets, Sheet Bars and Slabs.—Producers still are hesitant about naming prices on fourth quarter tonnages because of the uncertainty as to costs. With blast furnace and steel works operation increasing, it is probable that costs will be less than they are at present, but this is not assured, since the coal strike is not over in the Connellsville district and transportation conditions now seem likely to interfere with plant operations. The market at present is entirely a spot affair and business is generally at sellers' valuations. Sales of several thousand tons of sheet bars recently have been made in the Youngstown district on a basis of $40 and that is as low as they can be had here. One local maker will take Bessemer sheet bars at $40, but does not want open-hearth bar business at that price. At the moment, Bessemer steel appears to be a little more plentiful than open hearth. Billets have sold at $40, Pittsburgh for 4-in. soft steel and there also have been sales at $42, mill, outside this district and of foreign steel at from $47 to $50, mill. The Steel Corporation is out of the market on all forms of semi-finished material.

We quote 4 x 4-in. soft Bessemer and open-hearth billets at $40; 2 x 2-in. billets, $40; Bessemer and open-hearth sheet bars, $40; slabs, $40; forging billets, ordinary carbons, $45 to $47, all f.o.b. Youngstown or Pittsburgh mills.

Iron and Steel Bars.—As a selling price, 1.90c., Pittsburgh, steel bars have disappeared even for indefinite delivery. The Steel Corporation has not yet succeeded in making headway against its obligations and can take little business for delivery as promptly as most buyers desire. Independents are quoting from 2c. up to 2.25c. for reasonably early delivery. The Carnegie Steel Co. priority scheduling of its mills still is in effect. Concrete bars rolled from billets are available at 2c. from independent mills. Iron bars are firm.

We quote steel bars rolled from billets at 2c. to 2.25c.; reinforcing bars, rolled from billets, 2c. to 2.25c. base; rail steel reinforcing bars, 1.90c. to 2c.; refined iron bars, 2.45c. in carloads, f.o.b. mill, Pittsburgh.

Steel Rails.—No trouble now is experienced by makers of light rails rolling them from new steel in getting 2c., base, and some business with coal companies has been done a trifle higher. As high as 2.25c., base, is quoted, but sales at that price are few and small.

Iron and Steel Pipe.—There has been no material letup in the demand for merchant pipe, notably in the butt welded sizes, but due to better operating conditions resulting from the improved fuel situation, some progress is being made toward reducing obligations. Oil country and line pipe business is rather slow, because supplies of oil above the ground still are excessive and so long as this condition exists, prices must remain low and drilling be restricted. A move to definitely limit new drilling is reported to be afoot, but so far has not found general adoption. Business in wrought iron pipe seems to have suffered as a result of the advance of a few weeks ago. Discounts are given on page 683.

We quote 25 to 45-lb. sections, rolled from new steel, 2c. to 2.25c. base; rolled from old rails, 1.90c. to 2c. base; standard rails, $40 per gross ton mill for Bessemer and open-hearth sections.

Steel Skelp.—The market is quotable from 2c. to 2.50c., but only the Steel Corporation customers are

getting accommodation at the lower figure and then only for limited tonnages and not for specified delivery. Independent makers are not quoting less than 2.25c. and claim ability to obtain 2.50c. for prompt tonnages of narrow grooved skelp.

Wire Products.—Late last week, independent producers announced new prices, which as compared with those previously in effect and to which the Steel Corporation subsidiary still is adhering in a nominal way, show advances of $3 per ton. This puts the independent market at $2.75, base, per keg, Pittsburgh for nails, $2.50, base, per 100 lb. Pittsburgh, for wire and $2.25 base, per count keg for coated nails. One independent company, however, is quoting the latter product at $2.35. A cut of 1½ points in the discount on woven wire fence has been made by most independents, but one has cut the discount only one point. To jobbers, the discount on this product now is 70½ per cent off list, as quoted by independents and 72 per cent off list, the latest price of the leading interest. Discount to retailers is 2½ points less. The new prices generally have not yet found much basis in sales, because most makers owed considerable tonnage at lower figures and distributors naturally are specifying against these orders instead of buying. There has been, however, a strong effort to get the mills to take on more business at the old prices. Shortage of box cars has forced two makers here to resort to the use of open top cars, with tarpaulin covering, and one is making acceptance of shipments in this fashion a condition of early delivery. Prices are given on page 683.

Wire Rods.—Sales of ordinary soft rods have been made here at $47.50 for prompt shipment and that now is as low as any can be had, although the Corporation continues to quote $43. The latter, however, is taking no business. No prices yet have been named on fourth quarter tonnages. Whether they will be at the basis of recent business or below depends largely on whether the upward slant of steel works operations is checked by transportation difficulties and labor shortages. Both factors are operative now, but the mills are figuring that cool weather will bring about a better supply of help.

We quote No. 5 common basic or Bessemer rods to domestic consumers, $47.50; chain rods, $47.50; screw stock rods, $52.50; sweet and bolt rods and other rods of that character, $47.50; high carbon rods, $54.50 to $57.50, depending on carbon, per gross ton, f.o.b. Pittsburgh or Youngstown.

Structural Material.—Deliveries on plain steel to fabricating companies still are laggard, but improvement is expected in this direction, since new demands are lighter and a better operation of blast furnaces and steel works should be helpful to production. Building costs, notably in labor, are rising rapidly and the development is causing the postponement of some projected work. Here, the contractors find it necessary to pay bonuses to get men so they can live up to their contracts. The men are seeking the bonus jobs and neglecting others. The prevailing market on structural shapes is 2c., but on small tonnages for early shipment, premiums up to $5 a ton are demanded. Prices are given on page 683.

Plates.—Demand is not very heavy in this district, but it looms big in comparison with production and supplies. The market is quotable from 2c. to 2.50c., Pittsburgh, but independents are not interested in less than 2.25c. Tank builders are not getting many new inquiries. Prices are given on page 683.

Boiler Tubes.—Iron boiler tubes appear to be priced too high to sell well, but a satisfactory business is reported in steel boiler tubes, notably in seamless tubes, in connection with recent big locomotive orders. Discounts are given on page 683.

Sheets.—With the sheet bar market strong and sales of several thousand tons reported at $40, Youngstown, there is a disposition on the part of independent makers to seek higher prices. Several already are quoting blue annealed at 2.75c., base, Pittsburgh, black at 3.75c., base, and galvanized at 4.75c. base or $5 to $7 a ton above the Corporation prices. With sheet bars at $40, it is claimed that still higher prices must prevail, since it is figured that the cost of making No. 28 gage black sheets would be more than 3.70c. The Corporation sheet-making subsidiary is holding at third quarter prices, but is not letting customers specify beyond their usual average requirements. This company is operating at 65 per cent of capacity this week, a gain of 5 per cent, chiefly in the tin plate mills, due to a better supply of Bessemer sheet bars. Independent companies still are running above 80 per cent, the average for August having been about 85 per cent. Prices are given on page 683.

Coal and Coke.—The market on furnace coke is no longer quotable at less than $11 per net ton at ovens. That price has been paid on the requirements for two months of one furnace which will soon be blown in and on other sales, the total of which is 30,000 tons. It is hard to figure a much lower price, since beehive oven production cannot increase much so long as the men in Connellsville district insist on union recognition as a condition of their return to work and once the production does rise it will be wanted by furnaces which will be going in. Not much by-product coke is available for open market sale, as steel works stacks require about all of the production. Foundry coke also is stronger, not now being available at less than $12.50 per net ton ovens. The coal market is rather soft, as supplies are now ample for all demands. Gas coal lately has been at $5.50 at mines, against $6 previously, while coking coal is right around $5 and steam grade at $4.50 for tipple coal and as low as $4 from wagon and stripping mines.

Old Material.—Prices on most grades have advanced sharply since a week ago, due to increased interest on the part of melters, which has emphasized the shortage in the available supply and encouraged dealers to make still higher appraisals on their yard holdings. Actual sales, however, have been made at advances of from 50c. to $3 or more a ton. Some sales of heavy melting steel were made last week at $19, but this week, bids of $19.50 by melters have found no takers. Our specialties, such as railroad knuckles, couplers, springs and angle bars, as much as $23 recently has been paid, while the market has advanced on sales $1 a ton on billet and bloom crops. As much as $17 has been paid for short shoveling turnings, which are in demand in connection with blast furnace resumption. Compressed sheets are rated higher in sympathy with heavy melting grade. Pittsburgh mills as a rule are balking at paying the prices asked, but are not successful in weakening dealers' ideas since outside districts are paying the prices.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

Per Gross Ton	
Heavy melting steel	$19.50 to $20.00
No. 1 cast, cupola size	21.50 to 22.00
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va.; Franklin and Williamsport, Pa.	21.50 to 22.00
Compressed sheet steel	17.00 to 17.50
Bundled sheet sides and ends	16.00 to 16.50
Railroad knuckles and couplers	22.50 to 23.00
Railroad coil and leaf springs	22.50 to 23.00
Low phosphorus standard bloom and billet ends	24.00 to 25.00
Low phosphorus, plates and other grades	22.00 to 23.00
Railroad malleable	17.00 to 17.50
Iron car axles	27.00 to 28.00
Locomotive axles, steel	25.00 to 26.00
Steel car axles	21.50 to 22.00
Cast iron wheels	22.50 to 23.00
Rolled steel wheels	22.50 to 23.00
Machine shop turnings	14.50 to 15.00
Heavy steel axle turnings	17.00 to 17.50
Short shoveling turnings	16.50 to 17.00
Cast iron borings	17.00 to 17.50
Heavy breakable cast	19.00 to 19.50
Stove plate	16.00 to 16.50
Sheet bar crop ends	23.00 to 24.00
No. 1 railroad wrought	18.00 to 18.50

Detroit Scrap Market

DETROIT, Sept. 11.—The market has a firm tendency and the large producers have been able to secure equipment to maintain shipments to melting points in that these points are south or in the direction of the mines. Automobile cast has been very active—some few sales having been made as high as $23.50.

The following prices are on a gross ton basis f.o.b. cars producers' yards:

Heavy melting steel	$15.25 to $15.75
Shoveling steel	14.50 to 15.50
No. 1 machinery cast	15.50 to 16.50
Cast borings	12.00 to 13.00
Automobile cast scrap	22.00 to 23.50
Stove plate	14.00 to 14.50

Chicago

Heavy Demand for Steel from Many Sources — Railroad Buying Active

CHICAGO, Sept. 12—For one important local mill, inquiry during the past week was the heaviest in a year and a half. Demand is well distributed, covering practically all commodities and coming from all of the usual sources of business, except the farm implement industry. Agricultural equipment makers commenced to buy on a moderate scale some three months ago, but orders from them have grown more infrequent as steel prices have advanced. The railroads and the car builders are still the most conspicuous factors in the market. The latter are pressing the mills hard for deliveries against contracts because the carriers are anxious for deliveries against their car orders. With a heavy coal traffic thrust upon them as the grain movement is getting under way, the roads need cars badly. As much of their present equipment is in bad order and they are behind on repair work, they want their new cars, because new equipment will operate for a considerable period without requiring attention.

While the mills are still handicapped in making the desired deliveries to the car companies, the outlook for improvement in steel production is better. The Illinois Steel Co., for example, has been able to put on two more blast furnaces at Gary and one at South Chicago, giving it 12 active stacks out of 29 in the district. At the same time, it has increased its steel output from slightly over 50 per cent to 60 per cent of ingot capacity. The Inland Steel Co., however, remains on a 60 to 65 per cent basis. While coal deliveries have improved sufficiently to enable a steel producer to put in three blast furnaces, the supply of fuel is still uncertain because of car shortage, and one merchant stack, an Iroquois furnace, was forced to bank to-day.

Evidently the rapidity with which production is resumed depends entirely on transportation. The level of steel prices shows little change, with prompt material commanding premiums as heretofore. The Inland Steel Co. has allocated among its customers much of its fourth quarter tonnage and additional orders will have to be squeezed into present rolling schedules.

Pig Iron.—Prices of local pig iron remain unchanged, although production has been further curtailed. While the mines are again producing, a shortage of cars is interfering with coal movement. The seriousness of the transportation situation is indicated by the fact that an Iroquois furnace was forced to bank to-day. This reduces the number of active stacks represented by the leading Northern merchant to four, namely, one Iroquois, one Federal, one Mayville, and the Zenith furnace. Car scarcity is also impeding the shipment of iron, for the railroads will not give the furnaces gondola cars with sides exceeding 44 in. in height, as they are assigned exclusively to the movement of coal. Demand is largely for prompt iron, although some inquiries for both first and second quarter deliveries, regarded as in the nature of feelers, have been received. Additional sales of St. Louis iron have been made in this territory, one for 1000 tons of malleable for prompt shipment being placed with a Wisconsin melter and another for 200 tons of foundry for fourth quarter being closed with a Northern Illinois user. Southern iron is still difficult to obtain because of transportation conditions. Two Southern furnaces are quoting $25 base, Birmingham, with a dollar differential for each point 50 per cent of added silicon, and another stack is quoting $26. The Sloss-Sheffield Steel & Iron Co. entered the market last week at $25 base, Birmingham, with a 50c. differential, but has since withdrawn. The Virginia Iron, Coal & Coke Co. is soliciting business for fourth and first quarters at $32 base furnace, the freight to Chicago being $6.18. Silvery has advanced to a minimum of $41.50, Jackson furnace, for 8 per cent. A sale of two cars of 7 per cent on the new basis has been made in Chicago. Low phosphorous pig iron is scarce and both copper free and copper bearing are commanding about the same prices. A sale of 300 tons of copper bearing in Chicago and another of 100 tons of copper free in Milwaukee were both closed at the equivalent of approximately $38 Valley furnace.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$36.15
Northern coke, No. 1, sil. 2.25 to 2.75	33.00
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	32.00
Northern high phos.	32.00
Southern No. 2	$31.00 to 32.00
Malleable, not over 2.25 sil.	32.00
Basic	32.00
Low phos., Valley furnace, sil. 1 to 2 per cent copper free	38.00
Silvery, sil. 8 per cent	46.29

Ferroalloys.—A carload of spiegeleisen for local shipment has been sold at $50, delivered. Ferromanganese for October shipment is being offered at $67.50, seaboard, but prompt material is difficult to obtain. Prices on 50 per cent ferrosilicon have advanced to $65, delivered, for both prompt and future shipment.

We quote 78 to 82 per cent ferromanganese, future, $75.06; prompt, $82.56, delivered; 50 per cent ferrosilicon, $55 delivered on contract and $65 prompt delivery; spiegeleisen, 18 to 22 per cent, $50, delivered.

Plates.—Orders and inquiries for railroad cars and oil storage tanks are few, but demand on the mills for plates is still heavy. Plates, as well as shapes and bars, continue to be bought by the railroads for car repair works. The quotation on tank plates for indefinite shipment remains 2.05c., Chicago, while the minimum on material for specific delivery is 2.30c., Chicago. As high as 2.25c., Pittsburgh, is being paid for shipment within a few weeks. The Inland Steel Co. has allocated much of its fourth quarter tonnage among customers, but can still offer November shipments.

The mill quotation is 2.05c. to 2.59c., Chicago. Jobbers quote 2.90c. for plates out of stock.

Cast Iron Pipe.—Detroit has placed 800 tons with the United States Cast Iron Pipe & Foundry Co. and the same maker is low bidder on 188 tons for Milwaukee. Marshalltown, Iowa, took tenders yesterday on 140 tons and Chicago will receive bids on 200 feet of 12-in. and 1000 feet of 8-in. class B pipe Sept. 13.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $50.70 to $52.20; 6-in. and above, $46.70 to $48.20; class A and gas pipe, $3 extra.

Bars.—Demand for mild steel bars is heavy from all sources except the farm implement industry. The minimum price for indefinite shipment remains 1.95c., Chicago, while the best quotation on material for specific delivery is 2.10c., Chicago. A mill able to make prompt shipment is selling at from 2.50c. to 2.60c., Chicago. Sales by Eastern mills have been made at 2.25c., Pittsburgh. Demand for bar iron is decreasing, but prices remain firm at 2.25c. to 2.50c., Chicago. Rail steel buying is improving, with business coming largely from manufacturers, notably bedstead makers. Bar equipment manufacturers also are buying after a long absence from the market. Mills here are quoting 2c. to 2.10c., Chicago Heights, while the Moline mill has advanced to 2c. f.o.b. plant or slightly over 2.15c., delivered Chicago.

Mill prices are: Mild steel bars, 1.95c. to 2.50c., Chicago; common bar iron, 2.25c. to 2.50c., Chicago; rail steel, 2c. to 2.10c., Chicago mill.

Jobbers quote 2.80c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 3.80c. for rounds and 4.30c. for flats, squares and hexagons. Jobbers quote hand and medium deformed steel bars at 2.50c. base; hoops, 3.90c.; bands, 3.55c.

Rails and Track Supplies.—The placing of rail business for 1923 delivery still awaits the naming of a price. Inquiry for spikes, bolts, angle bars and tie plates is heavy and orders are in good volume, one mill having booked an aggregate of 50,000 kegs of spikes and bolts.

Standard Bessemer and open-hearth rails, $40; light rails rolled from new steel, 2c. to 2.25c., f.o.b. makers' mills.

Standard railroad spikes, 2.75c. to 3c., mill; track bolts with square nuts, 3.75c. to 4c., mill; tie plates, steel and iron, 2.15c. to 2.25c., f.o.b. mill; angle bars, 2.40c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.50c. base and track bolts 4.50c. base.

Wire Products.—Buyers continue to press business on the mills and the prospects for a heavy fall trade

are good. Orders from the South are particularly liberal and while there is some apprehension concerning the Western and Northern agricultural regions because of the low level of grain prices, it is pointed out that the crops are very large and the returns to the farmer will be sizable though the unit prices per bushel are low. Mill operations have not yet improved, but betterment is in sight. For mill prices, see finished iron and steel, f.o.b. Pittsburgh, page 683.

We quote warehouse prices f.o.b. Chicago, No. 9 and heavier black annealed wire and No. 9 and heavier bright wire, $2.50 per 100 lb.; common wire nails, $2.35 per 100 lb.; cement coated nails, $2.75 per keg.

Bolts and Nuts.—Specifications against contracts closed at the old discounts are heavy. Business at the new discounts is rather light, but buyers are expected to close contracts soon for their fourth quarter requirements. Ruling prices are those on page 683 except that the basing point is Chicago.

Jobbers quote structural rivets, 3.50c.; boiler rivets, 3.60c.; machine bolts up to ⅞ x 4 in., 50 per cent off, larger sizes, 50 off; carriage bolts up to ⅞ x 6 in., 40 off; coach screws, 45 off; hot pressed nuts squares and hexagons, tapped, $2.75 off; blank nuts, $2.75 off; coach or lag screws, gimlet points, square heads, 55 per cent off; quantity extras are unchanged.

Sheets.—The Inland Steel Co. has allocated practically all the fourth quarter tonnage it cares to book at this time. Customers took all the tonnage allocated to them and in most cases wanted more. Demand continues active with inquiries coming from all sections of the country and from abroad.

Mill quotations are 3.35c. to 3.50c. for No. 28 black, 2.50c. to 2.60c. for No. 10 blue annealed and 4.35c. to 4.50c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Reinforcing Bars.—A surprising number of new jobs, many of them large ones, are being placed notwithstanding the caution of sellers. Deliveries from the mills are still very slow, but improvement is looked for with the betterment in the fuel situation. In the meantime, however, dealers are carefully watching their warehouse stocks. Recent awards include:

Durant Motors Co., plant, Flint, Mich., 700 tons, to Paul J. Calman Co.

Reynolds Wire Co., plant, Dixon, Ill., 200 tons, to Paul J. Calman Co.

Illinois Improvement Co., Thirty-ninth Street sewer, Chicago, 375 tons, to Concrete Steel Co.

Kentucky highway work, 300 tons, to Corrugated Bar Co.

Bridge, Constantine, Mich., 100 tons, to Corrugated Bar Co.

High school, Wichita, Kan., 400 tons, to Concrete Engineering Co.

Filtration plant, Oklahoma City, Okla., 200 tons, to Concrete Steel Co.

Bridges, northern Minnesota, 250 tons, to Corrugated Bar Co.

Pending business includes:

Chicago Trust Co. Building, Chicago, 400 tons.

Pine Grove Apartment Building, Chicago, 300 tons.

South Side High School, St. Louis, 550 tons.

Public Service Co. of northern Illinois, power station, Waukegan, Ill., 100 tons.

Structural Material.—A considerable number of fabricating awards have been reported during the past week, some of them covering large tonnages. Shops are crowded with work, but continue to quote on new business. Demand for plain material is heavy with 2.05c., Chicago, the quotation on steel for indefinite delivery and 2.25c., Chicago, the minimum price for specific shipment. Eastern mills are taking business for prompt shipment at as high as 2.15c., Pittsburgh.

The mill quotation on plain material is 2.05c. to 2.49c., Chicago. Jobbers quote 2.90c. for plain material out of warehouse.

Warehouse Prices.—Local jobbers have advanced bolts and nuts in keeping with the advances of manufacturers. New discounts are to be found under bolts and nuts. Small rivets have also been advanced, the discount being 55.

Old Material—The market continues to advance in price in all departments. A feature of the week's business was the purchase of open-hearth grades by two of the leading steel mills. Buying of iron mill grades is not so brisk as a week ago, and variations in consumer demand for other grades are also to be noted, but in the aggregate the available supply of scrap is far short of demand. Recent advances have caused some scrap to be released by country dealers, but this has not been in sufficient volume to weaken the market at a time when railroad offerings are almost nil. The Santa Fe, the Soo Line and the Chicago Great Western are advertising about 300 tons each.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

	Per Gross Ton	
Iron rails	$22.00 to	$22.50
Cast iron car wheels	23.50 to	24.00
Relaying rails	25.00 to	30.00
Rolled or forged steel car wheels	22.50 to	23.00
Rails for rolling	19.50 to	20.00
Steel rails, less than 3 ft	21.50 to	22.00
Heavy melting steel	18.50 to	19.00
Frogs, switches and guards cut apart	18.50 to	19.00
Shoveling steel	18.25 to	18.75
Drop forge flashings	12.50 to	13.00
Hydraulic compressed sheet	14.25 to	14.75

	Per Net Ton	
Iron angles and splice bars	22.00 to	22.50
Steel angle bars	18.50 to	19.00
Iron arch bars and transoms	22.50 to	23.00
Iron car axles	24.50 to	25.00
Steel car axles	19.50 to	20.00
No. 1 busheling	15.50 to	16.00
No. 2 busheling	10.50 to	11.00
Cut forge	17.00 to	17.50
Pipes and flues	13.00 to	13.50
No. 1 railroad wrought	18.00 to	18.50
No. 2 railroad wrought	17.00 to	17.50
Steel knuckles and couplers	19.50 to	20.00
Coil springs	21.00 to	21.50
No. 1 machinery cast	22.00 to	22.50
No. 1 railroad cast	19.75 to	20.25
Low phos. punchings	17.00 to	17.50
Locomotive tires, smooth	16.00 to	16.50
Machine shop turnings	10.50 to	11.00
Cast borings	13.00 to	13.50
Stove plate	17.50 to	18.00
Grate bars	17.50 to	18.00
Brake shoes	17.50 to	18.00
Railroad malleable	21.00 to	21.50
Agricultural malleable	21.00 to	21.50

Little Change in Refractories

PITTSBURGH, Sept. 11.—The situation in refractories has undergone little change since last reports other than that with the upward slant of iron and steel plant operations, incident to the settlement of the coal strike, specifications by that industry are heavier than they had been recently. Strictly new business for blast furnace and steel works use, if by-product plant requirements are excluded, is not especially heavy, since orders for brick for iron making and steel melting units were pretty heavy prior to the advances made Aug. 23, and most current shipments are against those orders. The largest new projects are the new open-hearth furnace plants to be built by the Wisconsin Steel Co., South Chicago, and the Otis Steel Co., Cleveland, and the by-product plants at Clairton, Pa., and Weirton, W. Va. Because costs have been increased by the coal strike settlement and the wage increase made to other kinds of brick plant labor, the lately established prices are well observed on new business. The leading maker of silica brick in the Birmingham, Ala., district has announced a price of $48 per 1000. A further advance of $5 per 1000 has just been announced in the price of chrome brick, the new quotation being $45 per 1000.

We quote per 1000, f.o.b. works:

Fire clay	High Duty	Moderate Duty
Pennsylvania	$40.00 to $43.00	$36.00 to $40.00
Ohio	40.00 to 43.00	36.00 to 40.00
Kentucky	40.00 to 43.00	35.00 to 39.00
Illinois	40.00 to 42.00	37.00 to 39.00
Missouri	40.00 to 42.00	35.00 to 39.00
Ground fire clay, per net ton		7.00 to 8.00
Silica brick:		
Pennsylvania		45.00
Chicago		53.00
Birmingham		48.00
Ground silica clay, per net ton		9.00
Magnesite brick:		
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.)		60.00
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)		32.00
Chrome brick:		
Standard size, per net ton		50.00

New York

Much Uncertainty as to Embargoes—Foreign Iron Prices Lower

NEW YORK, Sept. 12.—Embargoes declared by nearly all Eastern railroads against almost all kinds of freight except foodstuffs and anthracite, have caused much apprehension among iron and steel manufacturers, and opinions vary as to what the effect will be. While it is hoped that it will not be necessary to continue the embargoes for a long time, there is great uncertainty and developments will be awaited with keen interest.

Pig Iron.—There is marked scarcity of domestic iron, but on the other hand, makers are not apparently very anxious to place orders. One broker who has a fair tonnage of iron for sale circularized his trade extensively and met little response. Prices of the domestic iron are on a basis of $32, Eastern furnace, for No. 2 plain, that price being made by a steel company, while other sellers ask $34. One broker who was unable to obtain a few hundred tons of domestic iron for prompt delivery paid $36, Boston, for foreign iron. The principal sales of the week were foreign iron, including 8000 to 10,000 tons by one firm and about 5000 tons by another. Reports as to prices on Scotch and Continental iron vary greatly. One importer has disposed of 2000 to 3000 tons at about $22.50, c.i.f. New York, for iron equivalent to No. 2X, but sales of Scotch are being made at from $30 to $32, and French, Belgian and other Continental irons analyzing 2.50 to 3 per cent silicon at $26.50 to $28, c.i.f. New York. The Virginia Iron, Coal & Coke Co. has announced that it will blow in a furnace in about 10 days and will sell on a basis of $32 for No. 2 plain for delivery the last quarter of this year and first quarter of 1923. So far no sales have been reported.

We quote delivered in the New York district as follows, having added to furnace prices $2.27 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$36.27 to $38.27
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	35.27 to 36.27
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	34.27 to 36.27
Buffaalo, sil. 1.75 to 2.25	37.91 to 38.91
No. 2 Virginia, sil. 1.75 to 2.25	No. sales

Ferroalloys.—An active demand for British ferromanganese continues and sales are reported of 3000 to 5000 tons in the last week at $67.50, seaboard. One seller has sold all the October shipment available and some of his November allotment. Very little spot alloy is offered, but two carloads are noted at a considerable advance above the prevailing quotation for forward delivery. The spiegeleisen market is only moderately active. Both domestic and foreign alloy are available at $38 to $39, seaboard or furnace, and sales of several lots of 50 to 100 tons each of British alloy for importation are noted. There is a fairly active demand for prompt and early delivery of 50 per cent ferrosilicon at a minimum of $57.50 per ton, delivered. Some producers are quoting a minimum of $65 per ton, delivered. Specifications on contract made some time ago at lower prices are good. No activity in the manganese ore market is noted, but importations in July were very heavy at 62,518 gross tons, the largest for any month this year. In this connection it is also of interest to note that Government statistics show that the importations of ferromanganese in July were 25,841 tons, also the largest for any month this year and for any month in several years. Quotations are as follows:

Ferromanganese, British, seaboard, per ton	$67.50
Spiegeleisen, 17 to 19 per cent, furnace	$38.00
Spiegeleisen, 20 per cent, furnace	$38.00 to $39.00
Ferrosilicon, 50 per cent, delivered, per gross ton, carloads	$57.50 to $65.00
Ferrosilicon, 10 to 15 per cent, delivered, per	
Ferrotungsten, per lb. of contained metal	40c. to 50c.
Ferrochromium, 4 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr., delivered	12c. to 14c.
Ferrovanadium, per lb. of contained vanadium,	
Ferrocarbontitanium, 15 to 18 per cent, in car-	
Ores	
Manganese ore, foreign, per unit, seaboard	28c. to 30c.
centrates, nominal	$3.50 up
Chrome ore, basis 48 per cent Cr_2O_3, crude, per ton, Atlantic seaboard	$15 to $18.50
Molybdenum ore, 85 per cent concentrates, per	

Finished Iron and Steel.—Though there is a continued easing in the steel mill situation, the willingness of the mills to sell a little more freely has not brought out a corresponding interest among consumers. Whether consumers believe that the increase in the coal and coke supply will eventually bring about an easier price situation in steel, or whether they are loath to commit themselves on steel purchasers until their coal supply is well assured, does not appear clear, but it is conceded that some influence has checked the eagerness of consumers which was displayed when steel was less easy to get. There is quite a wide, spread in the price which mills are quoting on plates, shapes and bars. On plates quotations have been made from 2.10c., Pittsburgh, to 2.50c., but very little business has been placed at the latter figure. A majority of the mills are asking 2.25c., Pittsburgh, but it is difficult to negotiate anything but small or very urgent business on that basis. Shapes and bars are somewhat easier than plates, and are to be had from 2c. to 2.25c., Pittsburgh. Wire products have been advanced by some makers to the basis of $2.50 per 100 lb. for plain wire and $2.75 per 100 lb. keg, base, for wire nails. There is a falling off in fabricated steel business which mills and fabricators are unable to account for, except that buying generally has been checked. Inquiry by railroads for rolling stock also appears to have become considerably smaller in volume. For construction work on the Queens Boulevard, Long Island, bids are being asked on 4000 tons of concrete reinforcing bars.

We quote for mill shipments, New York delivery, as follows: For indefinite delivery, soft steel bars, structural shapes and steel plates, 2.19c. to 2.24c.; for delivery in a number of weeks, soft steel bars and plain structural material, 2.34c. to 2.59c.; steel plates, 2.44c. to 2.84c.; bar iron, 2.59c.

Cast-Iron Pipe.—Pipe makers are well filled with orders for the remainder of the year. Deliveries on the small sizes are still extended, from three to four months being about the best offered by one foundry in this territory. No new municipal tenders are reported. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $54.50; 4-in. and 5-in., $59; 3-in., $64.80, with $4 additional for Class A and gas pipe.

Old Material.—Prices continue strong all along the line. The tendency generally is upward, with cast iron in greater demand than steel. Practically all mills are buying, the only obstacle to the movement of heavy tonnages being a disinclination on the part of dealers to sell large orders except on much advanced prices. Although $18.50 per ton is reported as the best price done in Pittsburgh on heavy melting steel, offerings at as high as $20.50 per ton without takers is reported. Shipments by barge to Buffalo are stated to have declined somewhat. No. 1 heavy melting steel is still quotable at $11.50 to $12, and railroad steel ranges from $12.75 to $13.25 per ton. Not only does the upward trend of prices seem to be continuing, but there are rumors of sales of various items at higher prices than those now prevailing.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$11.50 to $12.00
Steel rails, short lengths, or equivalent	12.75 to 13.25
Rerolling rails	12.75 to 13.25
[illegible]	[illegible]
[illegible]	[illegible]
Iron rail	[illegible]
No. 1 railroad wrought	15.00 to 15.50
Wrought iron track	12.75 to 13.25
Forge fire	10.00 to 10.50
No. 1 yard wrought, long	13.00 to 13.50
Cast borings (clean)	10.75 to 11.25
Machine-shop turnings	10.25 to 10.75
Mixed borings and [illegible]	[illegible]
Iron and steel pipe [illegible] under 2 ft. long)	10.75 to 11.25
Stove plate	12.00 to 12.50
Locomotive grate bars	12.00 to 12.50
Malleable cast (railroad)	13.00 to 13.50
Cast-iron car wheels	13.50 to 14.00

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$18.50 to $19.50
No. 1 heavy cast (columns, building materials, etc.), cupola size	16.50 to 17.00
No. 1 heavy cast, not cupola size	14.00 to 14.50
No. 2 [illegible] etc.)	12.50 to 13.00

Coke.—The coke market continues slightly easier and much difficulty is experienced in getting high-grade fuel. Furnace coke is quoted at $10.50 to $12, Connells-

ville ovens, and foundry at $13 to $14.50, with by-product $14, seaboard.

Warehouse Business.—Active business is reported by practically all warehouses here, those handling structural material stating that the demand is particularly good in this line. While prices are strong and the tendency undoubtedly upward, the consensus of opinion seems to be that in the main prices have about reached their limit. A slight decline in the demand for black and galvanized sheets is noted. Brass and copper warehouses report good business, but no change in prices. Wrought iron and steel pipe dealers state that there has been a considerable improvement in business during the past few weeks and a distinct shortage of small sizes in both the iron and steel pipe is being felt. We quote prices on page 712.

High-Speed Steel.—The market is quiet and prices unchanged. Producers continue to quote 18 per cent tungsten high-speed steel at about 75c. per lb., with special brands of some companies ranging up to 90c. per lb.

Birmingham

Round Lot of Basic Sold at High Price—Slight Increase in Stocks

BIRMINGHAM, ALA., Sept. 12.

Pig Iron.—At the close of last week, the Birmingham iron market base was a spread from $25 to $27.50 with business done at both prices. The chief business done at $27.50 was 10,000 tons of basic for delivery from October to January, and is said to have been taken by a Kentucky steel maker. Other sales at this base were car load and up to 100-ton lots for prompt delivery. For immediate delivery, any price asked was accepted by several stranded consumers. On the other hand, the principal foundry maker did not advance above $25, Birmingham base, and is understood to have sold several thousand tons during the week in lots as high as 500 tons. St. Louis is credited with having taken 1000 tons of Birmingham iron at $25 base. The leading steel interest, which does not consider itself a regular participant in the foundry iron trade, is known not to be holding iron at higher than $25, and it is presumed that a large tonnage might be placed at $24. The solider part of the market at the close of the week was at $25 base, and in this part is the largest remaining unsold tonnage. If the Eastern markets steady down this week, the Birmingham market should be back to a base of $25 maximum. Most makers wish the advance to stop. The surprise of the week was the showing of stocks on yards. On a production of 204,000 tons, only 35,000 tons was added to the low record of Aug. 1. Stocks on Alabama furnace yards Aug. 1 and Sept. 1 were as follows: foundry, 25,000 and 58,000 tons; machine cast, 1000 and 4800; warrants, 2000 and 1700; basic, 8500 and 7100; totals, 36,400 and 72,000 tons. The extreme low of basic indicates the heavy operations in finishing mills. The largest individual holdings were 21,000 tons.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon 1.75 to 2.25	$25.00 to $27.50
Basic	24.00 to 27.50
Charcoal, warm blast	33.00 to 34.00

Finishing Mills.—Except for slowing down to 5000 tons of rails a week in the Ensley mill on account of the car situation, the Tennessee company continues 100 per cent operations with double turn in Bessemer, Fairfield and Ensley mills. The plant of the Chickasaw Shipbuilding & Car Co. has begun turning out 25 new steel cars together with numbers of repaired ones daily. This quota of new cars is the capacity for which the plant was planned. The Conners Steel Co. is operating both Woodlawn mills and shipping cotton ties on a brisk demand. A small shipment of hoops was made to China. The Gulf States Steel Co. and the American Steel & Wire Co. operate finishing mills at or near capacity under a very active demand.

Cast Iron Pipe.—The pipe markets are strong, but new business is not so great owing to unsteadiness of iron prices and poor delivery of pipe. The pressure pipe base remains at $40 and the sanitary base at $60.

Coal and Coke.—The coal market has eased up since withdrawal of the Western demand. Steam coal maximum is at $3. Coke is very strong at $8 and $10. The Sloss-Sheffield Steel & Iron Co. reduced its by-product coke pile by 35,000 tons during the month.

Old Material.—The scrap market has shown much more life, with advancing prices and heavy movements from yards at these prices. The whole list has been revised.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Steel rails	$15.50 to $16.00
No. 1 steel	14.50 to 15.00
No. 1 cast	17.00 to 19.00
Car wheels	17.00 to 19.00
Tramcar wheels	16.00 to 18.00
Stove plate	15.00 to 16.00
Cast iron borings	8.00 to 9.00
Machine shop turnings	8.00 to 9.00

Boston

Sales of Foreign Pig Iron Continue in Lots Not Exceeding 300 Tons

BOSTON, Sept. 12.—A good business in foreign pig iron in lots not exceeding 300 tons is reported for the past week. A reliable estimate of aggregate sales cannot be given due to the fact that some lots of iron represented resales through brokers. Scotch continues the most active foreign iron with sales covering September, October, November and December sailings. Continental irons are more attractive to buyers than heretofore because of their relative cheapness. The demand for English iron is much less than either Scotch or Continental. No. 3 Scotch in this market is $30 to $33 c.i.f. local dock, English $27 to $29, and Continental $26.50 to $31, depending on analysis. A limited tonnage of spot Scotch sold at $35 on cars dock. It now develops a Massachusetts textile machinery maker bought 2000 tons Continental, silicon 2.50 to 3.00, at $26.50, instead of 1000 tons previously reported. In domestic irons, activity centers in Alabama. A small tonnage sold ex-dock Providence, R. I., at $35 base, and on cars at furnace at $28 base. Due to the condition of railroad equipment, car loadings are smaller. For instance, cars heretofore loaded with 60 tons are now loaded with 30 tons. This practice places an additional cost burden on the New England foundry.

We quote delivered prices, on the basis of the latest reported sales, now infrequent, and as follows, having added to furnace prices $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia and $9.60 from Alabama:

East. Penn., sil. 2.25 to 2.75	$38.15 to $39.15
East. Penn., sil. 1.75 to 2.25	37.65 to 38.65
Buffalo, sil. 2.25 to 2.75	39.41 to 41.41
Buffalo, sil. 1.75 to 2.25	38.91 to 40.91
Alabama, sil. 2.25 to 2.75	35.10 to 38.10
Alabama, sil. 1.75 to 2.25	34.60 to 37.60

Warehouse Business.—The recent advance in iron and steel has not checked business, which holds to the August rate of activity. Warehouse quotations in structural steel take a wider range than heretofore, holders of small stocks quoting as high as $4.50 a ton base, compared with $3.25, the low point of the market. Stocks of small rounds, flats and bands continue broken. Bolts and nuts have gone up 10 per cent, but no change in washer prices is noted. Cut and hard steel nails have advanced 15c. a keg, the former now being quoted at $4.05 per keg base, and the latter at $8 base. Small rivets are 50 and 10 per cent discount, contrasted with 60 per cent heretofore. The call for large rivets is only fair at best. Jobbers anticipate an advance in wood screws shortly. Coach and lag screws have advanced 10 per cent.

Jobbers quote: Soft steel bars, $3.25 per 100 lb. base; flats, $3.85; concrete bars, $3.25; structural steel, $3.25 to $3.50; tire steel, $4.50 to $4.85; open-hearth spring steel, $5 to $6.50; crucible spring steel, $12; steel bands, $4.25; hoop steel, $4.75; cold rolled steel, $4 to $4.50; refined iron, $3.25; best refined iron, $4.50; Wayne iron, $5.50; Norway iron, $6 to $6.50; plates, $3.35 to $3.55; No. 10 blue annealed sheets, $4.15 per 100 lb. base; No. 28 black sheets, $5.40; No. 28 galvanized sheets, $6.40.

Coke.—New England by-product foundry coke producers are making freer deliveries on contracts than heretofore, due to their better position as to coal supplies. Foundries therefore show less interest in coke made outside this territory. Definite arrangements have been made for further shipments of Alabama by-product coke into New England. Most of it will be unloaded at Providence, R. I., due to the risk of demurrage at Boston. At present there is a large fleet of foreign steamers in Boston harbor with coal under heavy demurrage. Alabama coke is $19 delivered and English coke continues at $15 to $16 on local dock. More of such cokes are being purchased by public utilities, etc., than by New England foundries. Connellsville coke is offered at $14.50 to $14.75 ovens with few takers.

Old Material.—Renewed activity in old materials is noted with a further strengthening in prices. The American Steel & Wire Co., Worcester, Mass., has purchased heavy melting steel at $14.50 a ton delivered, while sales against Pennsylvania mill contracts at $12 to $13 on cars shipping point are reported. A Rhode Island concern is in the market for railroad malleable at $15 a ton delivered. Sales of wrought iron at $18 delivered Pennsylvania, or about $13 on cars here, figure in the past week's transactions. The demand for mixed borings and turnings is brisk and the market is easily 50c. a ton higher. Short shoveling machine shop turnings easily command $10.25 while bush material has sold at around $9.25 and higher. Bundled skeleton suitable for steel mills sold at $9 to $9.50, while selected forged scrap changed hands at $10 and $10.50. The Sullivan Machinery Co. is in the market for 100 tons of No. 1 cotton mill machinery cast, and the Saco-Lowell Shops for 200 tons. Such material as well as general run of machinery cast is in limited supply. Foundries have absorbed stocks in small yards about as fast as accumulated. A sale of No. 2 machinery cast, the first noted in some time, at $17 delivered, is reported.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$20.00 to $21.50
No. 2 machinery cast	18.00 to 19.00
Stove plate	15.00 to 16.00
Railroad malleable	16.50 to 17.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$12.00 to $13.00
No. 1 railroad wrought	14.50 to 15.00
No. 1 yard wrought	12.50 to 13.00
Wrought pipe (1 in. in diameter, over 2 ft. long)	10.00 to 10.50
Machine shop turnings	9.25 to 10.25
Cast iron borings, rolling mill	11.00 to 11.50
Cast iron borings, chemical	13.50 to 14.00
Blast furnace borings and turnings	9.50 to 10.00
[illegible]	10.00 to 10.50
[illegible]	9.00 to 9.50
Sheet iron [illegible]	18.00 to 20.00
Steel axle turnings	15.00 to 15.50
Rerolling rails	12.50 to 13.00
Shafting	18.00 to 18.50

Cincinnati

Little Pig Iron for Prompt Shipment—Virginia Furnace Will Resume

CINCINNATI, Sept. 11.—There was little activity in the local pig iron market during the past week, the reason apparently being the lack of iron available for prompt shipment. Melters are not contracting ahead to any extent, the majority of the orders booked being carload lots for immediate shipment. The railroad situation is handicapping Southern furnaces greatly, and while a few carloads came through last week, most third quarter shipments are still en route. Receipt of this iron will mean that much less to be supplied during fourth quarter, but stocks on foundry yards have been depleted to such an extent that it is expected that melters will be willing to take in all iron now on contract, with enough additional tonnage to build up a stock for emergency purposes. Prices, while ruling at the same level as last week, are very firm, and with stocks so low and demand for fill-in purposes becoming more insistent, further advances are considered likely. A large Southern interest opened its books for last quarter at $25, Birmingham basis, but Southern iron has sold, for September shipment, at $27 and $30 is being quoted by several furnaces. Southern Ohio iron is available in limited quantities at $32 to $34, and silveries at $41.50 for 8 per cent. No standard basic is available, but there are several small lots of off-iron being offered. Sales include 700 tons of southern Ohio basic to an Indiana steel company, 500 tons of Southern foundry to an Indiana melter, and 500 tons of malleable to an Indiana foundry. We also note a sale of 500 tons of ferromanganese to a Wheeling district consumer and 3000 tons of spiegel to a northern Ohio interest. Two inquiries for malleable, for 800 and 500 tons respectively, are current. Jisco silvery furnace will blow in about Sept. 15, and a furnace of the Virginia company, the first to operate in that State for over a year, will go in in about ten days. One Ashland stack of the American Rolling Mill Co. has gone out for relining.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$29.05
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	29.55
Ohio silvery (nominal), 8 per cent	43.77
Southern Ohio coke, sil. 1.75 to 2.25 (No 2)	34.27
Basic Northern	32.27
Malleable	34.27

Plant Operations.—The American Rolling Mill Co.'s plants at Middletown and Zanesville continue to operate at capacity, with the Ashland works running at approximately 60 per cent. With a higher stage in the Ohio River following a "wave" the Whitaker-Glessner Co. at Portsmouth is assured of a coal supply sufficient to insure continuous operation for a few weeks. The Andrews Steel Co. and the Newport Rolling Mill Co. are maintaining their recent schedules of operations. It looks as though the steel plants in this district have passed through the worst of the coal shortage, and it is expected that current schedules will be maintained.

Finished Material.—The demand is insistent for prompt shipment materials, but more resistance is developing among purchasers to paying the higher prices asked. This is noticeably the case in the matter of plates, the demand for which has fallen off considerably. An independent company recently offered plates in the district, delivery in four to six weeks, at 2.25c. Pittsburgh, but the response by consumers has been disappointing. Bars, however, are in better demand, and 2.25c. has been done on several orders with delivery promises of six weeks. Sheets, too, are active. Most of the independent mills are not quoting further ahead than October, the prevailing prices being 2.75c. on blue annealed, 3.60c. on black, 4.50c. on galvanized and 4.95c. on automobile body sheets. The demand for wire products is improving, but shipments are poor owing to difficulty in securing box car equipment. No price changes in wire products have been made by mills in this district, though it is expected that further advances will soon be forthcoming. There is little activity in the structural field, three highway bridges being the only new inquiries out. In concrete reinforcing bars, a factory building in Cincinnati has been awarded, the Bourne-Fuller Co. receiving the order for approximately 250 tons.

Warehouse Business.—Local jobbers continue to do a heavy business, and are placing fair-sized orders to replenish their stocks. Concrete reinforcing bars and structural shapes are moving well, and nails and wire fence are being inquired for with more regularity. Roofing sheets are also in much improved demand. Prices, while strong, remain as last quoted, although there are prospects of a further upward movement of about $2 a ton.

Cincinnati jobbers quote: Iron and steel bars, 2.95c. base; reinforcing bars, 3.05c. base; hoops, 4.05c. base; bands, 3.85c. base; shapes and plates, 3.05c. base; angles, 3.75c. base; cold-rolled flats, squares and hexagons, 4.25c. base; No. 10 blue annealed sheets, 4c.; No. 28 black sheets, 4.70c.; No. 28 galvanized sheets, 5.75c.; No. 9 annealed wire, $2.85 per 100 lb.; common wire nails, $3.05 per keg, base.

Coke.—There is fair activity in the coke market, and we note a sale of 900 tons of by-product fuel at $16, ovens, for immediate shipment. On contract coke by-product producers are naming $11, ovens, for September shipment. Connellsville furnace is quoted at

$10 to $11, foundry at $12.50 to $14, Wise County furnace at $11, foundry at $13.50 to $14, New River foundry at $14 to $15 and Pocahontas foundry at $14.

Old Material.—The scrap market is strong and active. Several steel mills in this district are in the market for various tonnages, but with embargoes existing on a number of railroads, it is difficult to close deals. Cast grades are also more active, due to the shortage of pig iron, and some fair sized tonnages are being booked. Prices are very firm, with some grades bringing 50c. a ton over last week. We note an inquiry for 1000 tons of axles.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

Per Gross Ton	
Bundled sheets	[illegible]
Iron rails	[illegible]
Relaying rails, 50 lb. and up	26.50 to 27.00
Rails for rolling	[illegible]
Heavy melting steel	15.00 to 15.50
Steel rails for melting	14.00 to 14.50
Car wheels	17.00 to 17.50
Net Ton	
No. 1 railroad wrought	[illegible]
Cast borings	[illegible]
Steel turnings	9.50 to 10.00
Railroad cast	16.00 to 16.50
No. 1 machinery	[illegible]
Burnt scrap	10.50 to 11.00
Iron axles	19.50 to 20.00
Locomotive tires (smooth inside)	12.50 to 13.00
Pipes and flues	[illegible]

Buffalo

Marked Scarcity of Basic Pig Iron—Moderate Sales of Foundry Grades

BUFFALO, Sept. 12.—Increased blast furnace operation which several producers expect to put in effect in September is more likely to be devoted to the production of basic iron than foundry iron and several furnaces predict basic iron will be much higher in this district this year. None is available now and if sales were made under present conditions, it is likely this product would bring $35. Sales of foundry iron continue for small quantities and the aggregate business here does not exceed 2000 tons for the week. For No. 2 plain $35 has been asked and received by the only one of the five producers who has foundry iron for sale. All sales are scattered and are for spot shipment; only a small quantity of last quarter iron has been sold here. Two furnaces are preparing to put stacks in blast this month. The falling off of inquiry is not a matter of serious concern to Buffalo producers at this time because those who normally have merchant iron for sale have sufficient business booked ahead to warrant their disinterest in further sales. Rogers, Brown & Co. are working on the 70,000 ton order placed last spring by the American Radiator Co. and two other furnaces have in excess of 10,000 tons each contracted for, not permitting any addition to new business.

We quote f.o.b. per gross ton Buffalo as follows, the higher prices being for early shipment:

No. 2 foundry, 2.25 to 2.75 sil	[illegible]
No. 2X foundry, 2.25 to 2.75 sil	34.00 to 35.00
No. 2 plain, 1.75 to 2.25 sil	34.00 to 34.50
Basic	[illegible]
Malleable	[illegible]
Lake Superior charcoal	36.28

Finished Iron and Steel.—Return to the market on a wider variety of steel products by the local branch of a large independent is the only new development based on the easier fuel situation in this district. This interest is able to take bar business in a restricted way; acceptances subject to its ability to fit in tonnages on rolling schedules now existent. Acceptances on plates and structural shapes are freer. There is likelihood of an advance in tin plate prices and sheet demand with all sellers is strong. The labor shortage grows more serious and this is expected to be an obstacle to full acceptance of large tonnages regardless of any improvement in the coal situation. Demand for wire products is big and the leading wire maker is interested only in caring for its regular trade. No new structural projects have appeared and the general unsettled labor situation is expected to hold up a number of projects now in architects' offices. The maximum bar price is 2.25c. and bar tonnages named in inquiries range from carload lots to 200 tons. A price of 1.95c. is now said to be the lowest quotation on bars.

We quote warehouse prices, Buffalo, as follows: Structural shapes, 3.10c.; plates, 2.90c.; soft steel bars, 3c.; hoops, 4c.; bands, 3.50c.; blue annealed [illegible] galvanized steel sheets, No. 28 gage, 5.85c.; black sheets, No. 28, 4.85c.; cold rolled round shafting, 3.95c.

Old Material.—Heavy melting steel has advanced 25c. and the ruling quotation is now $17 to $17.50; with all mills buying, the situation amounts to a shortage of this product, or at least a shortage of large tonnages. Mills are not as rigid in their inspections as they were a few weeks ago when larger tonnages were available. A shortage of cars is holding up the movement of old material offered by the railroads and several roads are unable to ship material sold recently. A demand for other products has brought about new quotations which are listed below.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$17.00 to $17.50
Low phos., 0.04 and under	18.00 to 19.00
No. 1 railroad wrought	16.00 to 16.50
Car wheels	20.00 to 21.00
Machine shop turnings	13.00 to 14.00
Cast iron borings	15.00 to 16.00
Heavy axle turnings	14.00 to 14.50
Grate bars	14.00 to 14.50
No. 1 busheling	15.00 to 15.50
Stove plate	15.00 to 15.50
Bundled sheet stampings	11.50 to 12.00
No. 1 machinery cast	19.50 to 20.50
Hydraulic compressed	15.00 to 15.50
Railroad malleable	19.50 to 20.50

St. Louis

Pig Iron Strong—Good Demand for Structural Steel

ST. LOUIS, Sept. 12.—The market for pig iron continues strong, with Northern iron unchanged at the previous week's advance of $2 to $32, f.o.b. Chicago, while Southern iron has advanced to $25 to $27, f.o.b. Birmingham. The only sales of consequence during the week were made by a Sheffield maker, one of 500 tons, one of 350 tons and one of 150 tons for shipment by barge to Metropolis, Ill., thence by rail, and these shipments have been coming through. Other rail shipments from the Birmingham district have met with considerable difficulties in their movement northward. The sales for the most part were in small lots, melters seeming to realize the difficulties in getting orders placed and then shipped. The Granite City maker sold additional tonnage of low silicon iron during the week. Thirty days ago, it had 40,000 tons of this grade of iron in its yards; at the close of the week, it had sold all but 18,000 tons, with the prospect of the yard being completely cleaned out of it shortly. This maker is now negotiating for the sale to an Ohio melter of 750 tons of foundry iron and 750 tons of malleable. The Granite City furnace has sold its current make of foundry iron for the next 30 days. A Michigan melter wants 1000 tons of foundry iron.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago and $5.17 from Birmingham and 81 cents average switching charge from Granite City:

Northern foundry, sil. 1.75 to 2.25	$32.16
Northern malleable, sil. 1.75 to 2.25	32.16
Basic	32.16
Southern foundry, all rail, sil. 1.75 to 2.25	$27.17 to 29.17

Finished Iron and Steel.—There continues to be a good demand for structural steel, and one of the local fabricators has recently booked more than 10,000 tons. The E. C. Gerhard Building Co. was the low bidder on the South Side High School, St. Louis, and the contract will be signed after approval by the Board of Education this week. Inquiries continue to come in from the purchasing agents of railroads. The Missouri Pacific has asked for prices on its 1923 requirements for rails, the tonnage not being specified. The Mobile & Ohio Railroad wants 900 kegs of track spikes; the Wabash 370 kegs of track bolts, the St. Louis Southwestern 500 kegs of track bolts and 300 kegs of track spikes, and the St. Louis & San Francisco, 600 tons of structural

steel. The agricultural implement manufacturers have been pushing the mills hard for material, and there was an inquiry for 300 tons of cut plow shapes. The stocks of steel are very scarce, and with the demand continuing it is felt by some men in the trade that it will not be long before the mills will be allocating material, as was done during the war. Warehouse prices have advanced.

[illegible] 2.90c. per lb.; iron bars, 2.90c.; structural shapes, 3c.; tank plates, 3c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, cold rolled, one pass, 4.85c.; cold drawn rounds, shafting and screw stock, 3.90c.; structural rivets, 3.60c. per 100 lb.; boiler rivets, 3.70c.; tank rivets, 7/16 in. and smaller, 60 per cent off list; machine bolts, large, 50 and 10 per cent; small, 50-10 and 10 per cent; carriage bolts, large, 55-5 per cent; small, 60 and 10 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon blank, $3.50; and tapped, $3.25 off list.

Coke.—The market for coke is even stronger than last week, due to the increasing demand and limited sources of supply. The Terre Haute and Indianapolis by-product producers are out of the market, and other territories are looking more and more to St. Louis for their supplies. There is one inquiry for 50 carloads of foundry coke from an Ohio user. The Granite City by-product foundry coke is selling at $12 f.o.b. furnace, and domestic coke at $10.50. Very little Southern coke is getting through because of the railroad congestion.

Old Material.—The market for old material shows added strength. Very little material is coming in, the first railroad list in two months coming from the Louisville & Nashville Railroad, being about 300 tons that had been loaded onto cars before the strikes. The mills here are in the market for considerable tonnage, especially for melting grades, but dealers are not eager to sell at present prices.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

	Per Gross Ton	
Old iron rails	$17.75 to	$18.75
Rails for rolling	19.00 to	19.50
Steel rails, less than 3 ft.	17.50 to	18.00
Relaying rails, standard section	28.00 to	29.00
Cast iron car wheels	21.50 to	22.00
No. 1 heavy railroad melting steel	17.50 to	18.00
No. 1 heavy shoveling steel	16.50 to	17.00
Ordinary shoveling steel	16.50 to	17.00
Frogs, switches and guards cut apart	16.50 to	17.00
Per Net Ton		
Heavy axle and tire turnings	11.50 to	12.00
Steel angle bars	15.75 to	16.25
Iron car axles	25.50 to	26.00
Steel car axles	19.00 to	19.50
Wrought iron bars and transoms	20.50 to	21.00
No. 1 railroad wrought	15.25 to	15.75
No. 2 railroad wrought	14.50 to	15.00
Railroad springs	18.50 to	19.00
Steel couplers and knuckles	18.50 to	19.00
Cast iron borings	11.00 to	11.50
No. 1 busheling	13.00 to	13.50
No. 1 railroad cast	19.50 to	20.00
Railroad malleable	15.50 to	16.00
Machine shop turnings	9.50 to	10.00

Cleveland

Four Blast Furnaces Added to Active List—Easier Conditions Expected

CLEVELAND, Sept. 12.—The fuel situation is growing somewhat easier and as the result three additional furnaces are being placed in blast in this territory. The Trumbull Steel Co., Warren, Ohio, resumed the operation of its blast furnace to-day, the Otis Steel Co. has re-lighted one Cleveland stack and will resume making iron to-morrow, and Pickands Mather & Co., Cleveland, blew in a Toledo stack Sept. 8. Both Toledo furnaces are now in blast. The one just started up has been shut down for a number of months. In all, four furnaces have been added to the active list in this territory since the fuel situation began to improve. However, the improvement applies only to furnaces using by-product coke. Furnaces using beehive coke are waiting for lower fuel costs, not being willing to start up on $11 contract coke. Furnaces that use coking coal from West Virginia and Kentucky report that with bad transportation facilities and priority orders for lake coal their fuel shipments from these districts are not improving.

Owing to the increase in plant operations, due to the easing up of the fuel situation, steel for early shipment has become somewhat more plentiful. Various embargoes are in effect on a number of railroads and these are interfering with pig iron shipments from several furnaces. However, railroads are handling steel shipments fairly promptly, except to points south of the Ohio River. Owing to a scarcity of box cars, sheet mills are shipping their products in open top cars.

Pig Iron.—The blowing in of additional merchant furnaces is expected to result shortly in the easing up of the pig iron situation. One lake furnace that placed a stack in blast during the week is again booking orders for delivery over the remainder of the year. Another lake producer that has started up a furnace has no iron to offer from this stack during the remainder of the year, but will be able to make shipments on existing contracts. The market is dull but very firm. A Cleveland producer has again advanced prices $1 per ton to $36 for foundry grades and has taken a few small lot orders at that price. This producer has sold some foundry iron in small lots at $35, Cleveland, for Pittsburgh district delivery, or equivalent to $36.50, Valley. One lake furnace interest is quoting foundry iron at $32 to $33, depending on the location, and reports sales aggregating 2500 tons in lots of 500 tons and under at that price. One eastern Ohio consumer was able to buy foundry iron at $31.50 furnace, but the freight rate brought it around to about $33.50, Valley base. Southern Ohio iron is still being offered in this market at $32 to $33. Considerable pig iron inquiry is coming from far extended points, as far as Maine and Minnesota. Low phosphorus iron continues fairly active. A Valley interest during the week sold several lots aggregating 1200 tons at $38. One Ohio silvery manufacturer has made a $4 advance to $41.50 for 8 per cent. This now seems to be the price commonly named by silvery producers.

Quotations below are f.o.b. local furnace for Northern foundry iron, not including a 50c. switching charge. Other quotations except basic and low phosphorus are delivered Cleveland, being based on a $3.02 rate from Jackson and a $6 rate from Birmingham:

Basic, Valley furnace, nominal	$32.00
Northern No. 2 fdy., sil. 1.75 to 2.25	$35.00 to 36.00
Southern fdy., sil. 1.75 to 2.25	31.00
Malleable	35.00
Ohio silvery, nom., sil. 8 per cent	44.52
Standard low phos., Valley furnace	38.00

Iron Ore.—The effect of the coal and railroad strikes on the iron and steel industry will be reflected in a falling off in iron ore shipments this month. The Pittsburgh Steamship Co. is laying up all of its barges this week, and some steamers will go out of commission. Some independent consumers have asked shippers to defer deliveries on contracts until next year. With coal moving in better volume, the car supply for ore is now becoming short, as many cars are sent back empty to the coal mines. Both ore docks and furnace yards generally are well filled with ore and available dock space is becoming short. The amount of ore on dock increased over 600,000 tons during August. The amount on lower lake docks Sept. 1 was 8,064,101 gross tons as compared with 9,285,708 tons on the same date a year ago. Receipts at Lake Erie ports during August amounted to $6,721,735 tons and for the season till Sept. 1 18,671,619 tons. Shipments from these ports during the month were 4,204,611 tons and for the season until Sept. 1, 13,129,570 tons.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $5.95; Old range non-Bessemer, 51½ per cent iron, $5.20; Mesabi Bessemer, 55 per cent iron, $5.70; Mesabi non Bessemer, 51½ per cent iron, $5.05.

Bolts, Nuts and Rivets.—Jobbers and implement manufacturers are placing orders freely for bolts and nuts and specifications on old contracts are fairly heavy. Prices are firm at the advance and while manufacturers are not eager to book orders for extended deliveries, some are taking fourth quarter contracts at the present prices. Rivet specifications on third quarter contracts placed at the old prices are heavy and small miscellaneous lot sales are reported at the higher prices now prevailing. While 65 per cent off list is being quoted on small rivets, the 65 and 5 per cent discount has not disappeared.

Semi-Finished Steel.—There is considerable inquiry for sheet bars, billets and slabs, for prompt shipment and fourth quarter, but the supply is very limited. We note the sale of about 1000 tons of billets by a local mill at $40.

Finished Iron and Steel.—Two or three independent mills that had been out of the market but have increased operations are now taking orders for steel bars, plates and structural material and are making better delivery promises. Mills that can make shipments in 30 to 60 days are getting a fair volume of orders, but buying for more extended deliveries has fallen off. There is apparently a disposition among buyers to place orders for only what they need for early requirements, evidently expecting that with an increase in the supply of steel some of the premium prices will disappear and the market will settle down to around the present minimum prices. The market continues firm with little change in the price situation. Quotations of steel bars range from 1.90c. to 2.25c., but sellers do not appear able to get the maximum price except for prompt shipment. Plate quotations by independent mills range from 2.25c. to 2.50c. While the lower quotation is more common, some of the mills are taking a few small lot orders at the higher price. On structural material the minimum quotation is around 2c. On hoops and bands, 2.75c. now appears to be the minimum price. While hot-rolled strip steel is commonly quoted at 2.75c., the 2:60c. price has not disappeared. At least one independent mill has advanced its price on nails to 2.75c. and on plain wire to 2.50c. The higher steel prices evidently have checked building work in this city, as several contracts that have been pending have not been placed, and new inquiries are light. However, local fabricators are figuring on considerable new work in other districts.

Jobbers quote steel bars, 2.81c.; plates and structural shapes, 2.91c.; No. 9 galvanized wire, 3c.; No. 9 annealed wire, 2.50c.; No. 28 black sheets, 4.25c.; No. 28 galvanized sheets, 5.25c.; No. 10 blue annealed sheets, 3.50c. to 3.61c.; hoops and bands, 3.61c.; cold-rolled rounds, 3.60c.; flats, squares and hexagons, 4.10c.

Sheets.—The Ford Motor Co. has released a portion of the sheets that it held up recently when it announced that its plant would shut down Sept. 16. These sheets are shipped directly to the companies making car frames and other parts. The demand for sheets continues fair, although there has been some slowing down in orders from automobile manufacturers. The market is firm. Minimum quotations by independent mills are 3.50c. for black, 4.50c. for galvanized and 2.60c. for blue annealed.

Reinforcing Bars.—The demand for reinforcing bars continues active. An inquiry is pending for 3000 tons of mild steel bars for the Conners Creek sewer, Detroit, and as early shipment is desired, the order may be divided among several mills. Among new inquiries is one for 1100 tons for a filtration plant in Bay City, Mich., and another for 500 tons for the Tecumseh Storage Building, Toledo, Ohio. Hard steel bars are firm at 2c.

Coke.—Connellsville foundry coke has become more plentiful and the price has declined $1.50 per ton to $13. The supply is sufficient to meet the current demond, which is light.

Old Material.—With an increase in the consumption of steel making scrap, a scarcity due partly to the limited offering by the railroads and the difficulty in moving scrap because of transportation conditions, prices on many of the grades have further advanced 50c. to $1 per ton. Locally the activity is almost wholly due to purchases by dealers to cover old orders for the McKinney Steel Co. Dealers have bid scrap prices up to a higher point than mills may be willing to pay and believe there will be further advances. As high as $19.25 has been paid by a dealer for heavy melting steel delivered to a Cleveland consumer, but this price appears to be about 50c. a ton higher than the prevailing market price. The high price of pig iron has resulted in a further advance of various grades of cast scrap. A sale of steel car wheels is reported at $20.50 delivered, at the northern Ohio steel plant.

We quote per gross ton f.o.b. cars at Cleveland, Chicago and Pittsburgh:

Heavy melting steel	$17.75 to $18.25
Steel rails under 3 ft.	18.00 to 18.50
Steel rails for rolling	18.50 to 19.00
Iron rails	16.00 to 17.00
Iron car axles	21.00 to 22.00
Low phosphorous melting	18.00 to 18.25
Cast borings	13.50 to 14.00
Machine shop turnings	13.25 to 13.50
Mixed borings and short turnings	13.75 to 14.00
Compressed steel	16.00 to 16.25
Railroad wrought	16.00 to 17.00
Railroad malleable	18.00 to 18.50
Light bundled sheet stampings	12.00 to 12.50
Steel axle turnings	15.00 to 15.25
No. 1 cast	20.00 to 20.50
No. 1 busheling	13.00 to 13.25
Drop forge flashings over 10 in.	12.25 to 12.50
Drop forge flashings under 10 in.	13.25 to 13.50
Railroad grate bars	16.00 to 16.50
Stove plate	16.00 to 16.50
Pipes and flues	13.50 to 14.00

Philadelphia

Easier Situation in Iron and Steel Markets—Pig Iron Lower

Increasing operations at western and eastern Pennsylvania steel plants and blast furnaces have brought about an easier situation in finished steel and pig iron within the past week. The Bethlehem Steel Co. has put four furnaces in blast, now having 10 active stacks. The Midvale Steel & Ordnance Co. put one furnace in blast at Johnstown, now having four active there, and blew in a stack at Coatesville to-day. The Coatesville plate mill, which has been operated at a very low rate for many months, will now increase output as rapidly as business will permit. Steel is being offered more freely for early delivery, but prices show no change downward, and there have been some belated advances. With its increase in active furnaces, the Bethlehem Steel Co. has again become a seller of foundry and basic pig iron and is offering contracts over the remainder of the year.

The price situation is decidedly mixed. Bars and shapes are offering by various mills at prices ranging from 2c. to 2.25c., Pittsburgh, while on plates there is a spread of $8 a ton, 2.10c. being the minimum and 2.50c., Pittsburgh, the maximum. Tin plate is firm at $4.75 and may be advanced; sheets are firm at 2.60c., 3.50c. and 4.50c. for blue annealed, black and galvanized, respectively, and may go higher, some mills already quoting 2.75c. on blue annealed. Bar iron has been advanced by Eastern makers from 2.10c. to 2.25c., Pittsburgh, for carload lots. Wire products have been advanced $3 a ton by nearly all independent mills. Light rails have been sold freely since the reopening of the coal mines at 2.25c., Pittsburgh, an advance of $5 a ton. In semi-finished steel there is marked strength, as high as $50 having been received for forging billets and $47.50 has been paid for wire rods.

Opening its books for fourth quarter, an Eastern pig iron producer has offered No. 2 plain at $32, No. 2X at $33 and No. 1X at $34, f.o.b. furnace, these prices being lower than the emergency quotations which have prevailed in the past two weeks. Basic is offered at $30, furnace.

Pig Iron.—The most interesting development of the week is the announcement of a leading Eastern producer of pig iron that it will take orders for delivery over the remainder of the year at $32 for No. 2 plain, $33 for No. 2X and $34 for No. 1X, f.o.b. furnace. This producer has been out of the foundry iron market for some time due to the shortage of coal and coke. Two other merchant producers which are active sellers have made no change in their prices and are quoting $34 for No. 2 plain, $35 for No. 2X and $37 for No. 1X. Another interesting development is the announcement that the Virginia Iron, Coal & Coke Co. will put a furnace in blast shortly and sales for fourth quarter are authorized at $32 for No. 2 plain, $33 for No. 2X, and $34 for No. 1X, f.o.b. furnace, with a freight rate

of $5.17 to Philadelphia. This will be the first blast furnace operation in Virginia since October, 1921. Except for some increases at steel plant blast furnaces there has been no addition to active furnaces. The Robesonia stack has been added to the idle list because of coke shortage. Current sales of foundry pig iron are largely foreign grades, which are now being sold at prices ranging from $26 to $28 for Continental; $26 to $30 for English, and $31 to $34 for Scotch, all f.o.b. cars, Philadelphia. The variation in price is due to differences in analysis. Receipts at this port are now fairly heavy, but most of the iron coming in has already been sold and is being unloaded from ship on cars and dispatched immediately. Including that arriving this week, upward of 30,000 tons will reach Atlantic ports within the next three weeks. One broker has contracted for iron for shipment as late as next December and has about 10,000 tons of Scotch iron and smaller quantities of English and Continental iron still unsold. The largest lot sold to any one foundry is 5000 tons. Some foundries which have used foreign iron experimentally have had very successful results and have entered orders for larger tonnages than were first bought. Pig iron inquiries for fourth quarter are coming into the market more freely, the tonnages asked for usually ranging from 500 to 1000 tons. There is no demand for basic iron, which is to be had from one furnace company at $30, furnace, while another asks $33, furnace. Malleable iron is available at $33, furnace. Copper bearing low phosphorous iron is quoted at $37 to $38, furnace.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 76 cents to $1.64 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$33.64 to $35.64
East. Pa. No. 2X, 2.25 to 2.75	34.64 to 36.64
East. Pa. No. 2X	35.64 to 37.64
Virginia No. 2 plain, 1.75 to 2.25 sil.	37.17
Virginia No. 2X, 2.25 to 2.75 sil.	38.17
Basic delivered eastern Pa.	32.00 to 34.00
Gray forge	31.00 to 33.00
Malleable	35.00 to 36.00
Standard low phos. (f.o.b. furnace)	38.00 to 40.00
Copper bearing low phos. (f.o.b. furnace)	37.00 to 38.00

Semi-Finished Steel.—One company is still quoting $40 on open-hearth re-rolling billets and $45 on forging billets, Pittsburgh, but sales have been made by other producers at higher prices, $47.50 and $50, Pittsburgh, having been paid for forging billets. It is doubtful whether wire rods can now be obtained for early delivery at $45, which is the nominal quotation of some makers; sales have been made at $47.50, Pittsburgh.

Light Rails.—Re-opening of the coal mines has brought a renewed demand for light rails, which one large independent producer is selling from stock at 2.25c., Pittsburgh. Another producer still quotes 2c., but this is for deferred delivery.

Plates.—The wide spread in plate prices is one of the anomalies of the present steel situation. The lowest quotation is 2.10c. and the highest 2.50c., Pittsburgh, a difference of $8 a ton, and a peculiar thing is that business is being done at both levels, and also at 2.25c., Pittsburgh, which other mills are quoting. Three of the Eastern mills are quoting 2.50c. The volume of business is not large, but the mills have orders on their books ranging from a few weeks to two or three months' work. The Midvale Steel & Ordnance Co., which has been operating its Coatesville plate mill at low ebb for some months, is now willing to sell freely and will increase operations at Coatesville as rapidly as possible. A blast furnace there was blown in to-day. The Baldwin Locomotive Works will require about 1500 to 1800 tons of plates for 50 locomotives for the St. Louis & San Francisco Railroad.

Structural Material.—A Pittsburgh mill is offering shapes at 2c., Pittsburgh, but the sizes offered are mostly those from its 28-in. mill. Eastern mills are asking at least 2.25c., Pittsburgh, and one or two, which have little to sell, quote still higher. The largest job in the market is the addition to the Girard Trust Co. building, which will require about 1200 tons.

Bars.—Eastern makers of bar iron have advanced prices to 2.25c., Pittsburgh, for car-load lots and 2.50c. for less than car-loads. Advancing prices of scrap are a factor in this advance. Steel bars are generally quoted at 2.25c., Pittsburgh, but one Pittsburgh mill is offering bars at 2c. A local firm has imported 500 tons of Belgian bars of small sizes, which are being offered at a price equivalent to 1.90c., Pittsburgh.

Sheets, Strip Steel and Tin Plate.—An Eastern maker of blue annealed sheets has advanced its price $3 a ton to 2.75c., Pittsburgh. While other makers quote 2.60c., it is stated that a general advance by independents is probable. Black sheets are quoted at 3.50c. and galvanized at 4.50c., Pittsburgh, for early delivery and mills are not desirous of making fourth quarter contracts at this time. Cold rolled strip steel is firm at 4.25c. and hot rolled, except narrow bands, is quoted at 2.75c., Pittsburgh. Narrow bands are quoted at 3c. Tin plate is firm at $4.75 per base box and although business is limited an advance is predicted.

Warehouse Business.—Local warehouses have advanced prices all along the line about $2 a ton. Business continues in fair volume. We quote for Philadelphia delivery as follows:

Soft steel bars and small shapes, 2.90c.; iron bars (except bands), 2.90c.; round edge iron, 3.10c.; round edge steel, iron finish, 1½ x ½ in., 3.10c.; round edge steel planished, 3.85c.; tank steel plates, ¼-in. and heavier, 3c.; tank steel plates, 3/16-in., 3.20c.; blue annealed steel sheets, No. 10 gage, 3.85c.; black sheets, No. 28 gage, 4.60c.; galvanized sheets, No. 28 gage, 5.75c.; square twisted and deformed steel bars, 3c.; structural shapes, 3c.; diamond pattern plates, ¼-in., 4.50c.; 3/16-in., 5c.; spring steel, 4.25c.; round cold-rolled steel, 3.80c.; squares and hexagons, cold-rolled steel, 4.10c.; steel hoops, No. 13 gage and lighter, 4.10c.; steel bands, No. 12 gage to 3/16-in., inclusive, 3.70c.; rails, 2.90c.; tool steel, 8.50c.; Norway iron, 5.50c.

Coke.—Odd lots of blast furnace coke are available at prices ranging from $10 to $11, Connellsville, and foundry coke is quoted at $12 to $13, Connellsville. Supplies of coke are a little more plentiful, but the price of furnace coke is still too high to encourage furnace operators to make contracts.

Old Material.—Within the past week there has been a sharp advance in practically all grades of scrap. The advance on steel scrap has not exceeded 50c. to $1 a ton, but on some other grades there has been a rise of $2 a ton. With the settlement of the coal strike there have been increased operations at nearly all steel mills, but the coke supply has not increased rapidly enough to give these mills enough pig iron, hence most of them are seeking scrap. The railroad strike has seriously interfered with the gathering of scrap by the railroads, upon which considerable dependence must be placed during the next few months if steel mills are not to face an actual shortage of melting steel. Scrap sold by the Pennsylvania Railroad from its September list brought high prices, $21, Youngstown, for steel scrap and $21.50 for railroad wrought being examples. A Cumberland, Md., mill has paid $20 for heavy melting steel, this being the highest price steel scrap has reached in some time. Brokers are offering $21, Youngstown, for steel scrap. Johnstown, Pa., has paid $17.50 and $18, delivered.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$16.00 to $17.00
Scrap rails	16.00 to 17.00
Steel rails for rolling	17.00 to 17.50
No. 1 low phos., heavy 0.04 and under	22.00 to 24.00
Cast iron car wheels	21.00 to 22.00
No. 1 railroad wrought	21.00 to 22.00
No. 1 yard wrought	18.50 to 19.00
No. 1 forge fire	15.50 to 16.00
Bundled sheets (for steel works)	14.50 to 15.50
No. 1 busheling	13.50 to 14.50
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	13.50 to 14.00
Mixed borings and turnings (for blast furnace use)	13.50 to 14.00
Machine-shop turnings (for steel works use)	15.00 to 16.00
Machine-shop turnings (for rolling mill use)	15.00 to 16.00
Heavy axle turnings (or equivalent)	15.50 to 16.00
Cast borings (for steel works and rolling mills)	16.00 to 16.50
Cast borings (for chemical plants)	17.50 to 18.00
No. 1 cast	21.00 to 22.00
Heavy breakable cast (for steel plants)	19.00 to 20.00
Railroad grate bars	16.00 to 16.50
Stove plate (for steel plant use)	16.00 to 16.50
Railroad malleable	15.50 to 16.50
Wrought iron and soft steel pipes and tubes (new specifications)	15.00 to 16.00
Shafting	22.00 to 23.00

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Plates

Sheared, tank quality, base, per lb..... 2.00c. to 2.50c.

Structural Material

Beams, channels, etc.....2.00c. to 2.25c.

Iron and Steel Bars

Soft steel bars, base, per lb.....1.90c. to 2.25c.
Refined iron bars, base, per lb..... 2.40c.

Hot-Rolled Flats

Hoops, base, per lb.....2.75c. to 3c.
Bands, base, per lb.....2.75c. to 3c.
Strips, base, per lb.....2.75c. to 3c.
Cotton ties, per bundle of 45 lb.....$1.12

Cold-Finished Steels

Bars and shafting, base, per lb.....2.50c.
Strips, base, per lb.....4.25c.

Wire Products

Nails, base, per keg.....$2.60 to $2.75
Bright plain wire, base, per 100 lb..... 2.35 to 2.50
Annealed fence wire, base, per 100 lb..... 2.35 to 2.50
Galvanized wire, base, per 100 lb..... 2.85 to 3.00
Galvanized barbed, base, per 100 lb.... 3.15 to 3.40
Galvanized staples, base, per keg..... 3.15 to 3.40
Painted barbed wire, base, per 100 lb..... 2.65 to 2.90
Polished staples, base, per keg..... 2.65 to 2.90
Cement coated nails, base, per count keg.....2.10c. to 2.35c.
Woven fence, carloads (to jobbers).70½ to 72 per cent off list
Woven fence, carloads (to retailers).68 to 69½ per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads.60 and 10 per cent off list
Machine bolts, small, cut threads.50, 10 and 10 per cent off list
Machine bolts, larger and longer..50, 10 and 10 per cent off list
Carriage bolts, ⅜ x 6 in.:
Smaller and shorter, rolled threads, 50, 10 and 10 per cent off list
Cut threads .....50 and 10 per cent off list
Longer and larger sizes.....50 and 10 per cent off list
Lag bolts .....60 and 10 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads...50 and 10 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.:
Smaller and shorter.....45 and 10 per cent off list
Larger and longer sizes.....45 and 10 per cent off list
Hot pressed square or hex. blank nuts.....$3.75 off list
Hot pressed nuts, tapped..... 3.75 off list
C.p.c. and t. sq. or hex. nuts, blank..... 3.75 off list
C.p.c. and t. sq. or hex. nuts, tapped..... 3.75 off list
Semi-finished hex. nuts:
9/16 in. and smaller, U. S. S.....80 per cent off list
⅝ in. and larger, U. S. S.....75 per cent off list
Small sizes, S. A. E.....80 and 10 per cent off list
S. A. E., ⅝ in. and larger.....75 and 10 per cent off list
Stove bolts in packages.....80 and 5 per cent off list
Stove bolts in bulk.....80, 5 and 2½ per cent off list
Tire bolts .....50, 10 and 10 per cent off list

Cap and Set Screws

Milled square and hex. head cap screws, 75 and 10 per cent off list
Milled set screws.....75 per cent off list
Upset cap screws.....80 per cent off list
Upset set screws.....80 and 5 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb.....$3.00
Large boiler rivets, base, per 100 lb..... 3.10
Small rivets .....65 to 65 and 5 per cent off list

Track Equipment

Spikes, 9/16 in. and larger, base, per 100 lb.....$2.75
Spikes, ½ in. and smaller, base, per 100 lb..... 3.25
Spikes, boat and barge, base, per 100 lb..... 3.25
Track bolts, base, per 100 lb.....$3.75 to 4.50
Tie plates, per 100 lb..... 2.25
Angle bars, base, per 100 lb..... 2.40

Welded Pipe

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	51½	26	⅛ to ¼	+ 11½	+ 27½
¼ to ⅜	57	31½	⅜	31¼	13½
½	62	48½	½	37½	22½
⅝	66	54½	¾ to 1½	39½	24½
1 to 3	68	56½			

Lap Weld

2	61	49½	2	34½	20½
2½ to 6	65	53½	2½ to 6	37½	24½
7 to 8	62	49½	7 to 12	35¼	21½
9 to 12	61	48½			

Butt Weld, extra strong, plain ends

⅛	47½	31	⅛ to ¼	6½	4½
¼ to ⅜	53	36½	½	30½	18½
½	59	48½	¾	35½	23½
¾	64	53½	1 to 1½	39½	25½
1 to 1½	66	55½			
2 to 3	67	56½			

Lap Weld extra strong, plain ends

2	59	48½	2	35½	22½
2½ to 4	63	52½	2½ to 4	38½	26½
4½ to 6	62	51½	4½ to 6	37½	25½
7 to 8	58	45½	7 to 8	30½	18½
9 to 12	52	39½	9 to 12	25½	13½

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 and 2½ per cent.

Boiler Tubes

Lap Welded Steel

1¾ in.	23½
2 to 2¼ in.....	38
2½ to 3 in.....	49
3¼ to 13 in.....	54

Charcoal Iron

1½ in.	+ 2
1¾ to 1⅞ in.....	8
2 to 2¼ in.....	18
2½ to 3 in.....	23
3¼ to 4½ in.....	25

To large buyers of steel tubes a supplementary discount of 5 per cent is allowed.

Standard Commercial Seamless Boiler Tubes

Discounts on cold-drawn tubes in carload lots, f.o.b. Pittsburgh, follow:

1 in.	57	2½ and 2¾ in.....	40
1¼ and 1½ in.....	49	3 in.	44
1¾ in.	33	3¼ to 4 in.....	49
2 and 2¼ in.....	36	4¼ in. and 5 in.....	41

Hot Rolled

3 in.	46	3¼ to 4 in.....	51

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base, 85 per cent off list. Carbon 0.30 to 0.40, base, 83 per cent off list. Plus usual differentials and extras for cutting.

Seamless Locomotive and Superheater Tubes

Cents per Ft.		Cents per Ft.	
2-in. O.D. 12 gage.....	13	2¼-in. O.D. 10 gage....	17¾
2-in. O.D. 11 gage.....	14	3-in. O.D. 7 gage.....	33
2-in. O.D. 10 gage.....	15	1½-in. O.D. 9 gage.....	13
2¼-in. O.D. 12 gage....	15	5¾-in. O.D. 9 gage.....	51
2¼-in. O.D. 11 gage....	16	5½-in. O.D. 9 gage.....	53

Tin Plate

Standard cokes, per base box.....$4.75

Terne Plate

(Per package, 200-lb.)

8-lb. coating	$9.30	25-lb. coating I. C.....	$14.25
8-lb. coating I. C.....	9.60	30-lb. coating I. C.....	15.25
15-lb. coating I. C.....	11.80	35-lb. coating I. C.....	16.25
20-lb. coating I. C.....	13.00	40-lb. coating I. C.....	17.25

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....2.50c. to 2.75c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.35c. to 3.75c.

Galvanized

No. 28 (base), per lb.....4.35c. to 4.75c.

Tin-Mill Black Plate

No. 28 (base), per lb.....3.35c. to 3.50c.

Manufacturers have pamphlets, which can be had upon application, giving price differentials for gage and extras for length, width, shearing, etc.

Freight Rates

All rail freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic.	$0.325	Buffalo	$0.265	St. Louis	$0.43
Philadelphia, export...	0.235	Cleveland	0.215	Kansas City	0.735
Baltimore, domestic...	0.315	Cleveland, Youngstown		Kansas City (pipe)...	0.705
Baltimore, export.....	0.225	Comb.	0.19	St. Paul	0.595
New York, domestic...	0.34	Detroit	0.295	Omaha	0.735
New York, export.....	0.255	Cincinnati	0.295	Omaha (pipe)	0.705
Boston, domestic	0.365	Indianapolis	0.31	Denver	1.275
Boston, export	0.255	Chicago	0.34	Denver (pipe)	1.215

Pacific Coast	$1.50		
Pac. Coast, ship plates	1.20		
Birmingham	0.69		
Memphis	0.385		
Jacksonville, all rail..	0.50		
Jacksonville, rail and water	0.415		
New Orleans	0.515		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 30c. to 40c.; ship plates, 30c. to 40c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 30c. to 40c.; sheets and tin plates, 50c.; rods, wire rope, cable and strands, 75c.; wire fencing, netting and stretcher, 50c.; pipe, not over 8 in. in diameter, 50c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

RAILROAD EQUIPMENT BUYING

About 1000 Cars Bought and as Many Fresh Inquiries

The Great Northern Railroad has asked for prices on 100 tank cars for fuel oil.

The Pittsburgh, Shawmut & Northern Railroad is inquiring for 200 stock and 50 box cars and 150 to 200 stock car bodies.

The Central Railroad of Georgia has placed an order with the Virginia Bridge & Iron Works for 100 flat cars.

The St. Louis & San Francisco Railroad has let 500 hopper bodies to the American Car & Foundry Co. in addition to the 500 reported two weeks ago.

The Atlantic Coast Line is inquiring for 2000 steel underframe box cars of 40 tons capacity.

The Pacific Electric has awarded 220 dump cars to the American Car & Foundry Co.

The Western Pacific is in the market for 100 gondola cars.

The Great Northern is inquiring for 100 tank cars.

The Texas & Pacific has ordered 150 10,000-gal. tank cars from the American Car & Foundry Co.

The Union Pacific has revived an inquiry for 50 caboose cars.

The New York Central system has awarded repairs on 11,000 cars to various builders.

The Elgin, Joliet & Eastern is inquiring for 200 steel gondola cars of 50 tons capacity.

The Peoria & Pekin has placed 6 switch engines with the Lima Locomotive Co.

New York, New Haven & Hartford is inquiring for 10 mountain type engines.

The Texas & Pacific is in the market for 8 Pacific type locomotives.

The St. Louis & San Francisco Railroad has ordered 50 locomotives from the Baldwin Locomotive Works.

FABRICATED STEEL BUSINESS

Shipbuilding Company Gets Large New York Hotel Job Other Awards

Among the fabricated steel awards of the past week are the following:

An apartment hotel at 299 Park Avenue, New York, 4000 to 5000 tons, to New York Shipbuilding Corporation. Erroneously reported last week as the new Roosevelt Hotel to be built by the United Hotels Co. The latter job, which requires about 5000 tons, is still in the market.

Highway bridge over Passaic River at Paterson, N. J., 400 tons, to Phoenix Bridge Co.

Warehouse for Butler Brothers at Long Island City, 1800 tons, to Levering & Garrigues Co.

Addition to store of Oppenheim, Collins & Co., New York, 250 tons, to Hay Foundry & Iron Works.

Hotel at Manhattan Beach, New York, 400 tons, to Paterson Bridge Co.

Apartment house on West Ninety-fifth Street, New York, 300 tons, to Hedden Iron Construction Co.

Apartment hotel at Park Avenue and Thirty-seventh Street, New York, 650 tons, to Hedden Iron Construction Co.

Cornelia Copper Co., smelter, Ajo, Ariz., 2100 tons, to Wisconsin Bridge & Iron Co.

Robinson Building, Los Angeles, Cal., 2500 tons, to Llewellyn Iron Works.

Three 55,000-bbl. storage tanks, Crockett, Cal., for California Hawaiian Sugar Refining Co., 663 tons, to Pittsburgh Des Moines Steel Co.

Six ordnance buildings for United States Navy, Pearl Harbor, Hawaii, 300 tons, to American Bridge Co.

Allis Chalmers Mfg. Co., West Allis, Wis., plant addition, 250 tons, to Milwaukee Bridge Co.

Power house for Crossett Lumber Co., Crossett, Ark., 221 tons, to American Bridge Co.

Bridge across Bear River near Auburn, Cal., for California Highway Commission, 112 tons, to Minneapolis Steel & Machinery Co.

Crane runways for Richmand, Fredericksburg & Potomac Railroad, 130 tons, to unnamed fabricator.

Mayo Building, Tulsa, Okla., 2000 tons, to Mississippi Valley Structural Steel Co.

Warehouse and storage hopper bottoms for Fred Uhlman, Kansas City, Mo., 124 tons, to unnamed fabricator.

Harrisburg (Ill.) Bank, 70 tons, to Mississippi Valley Structural Steel Co.

Agey & Stead Building, Centralia, Ill., 61 tons, to Mississippi Valley Structural Steel Co.

Structural Projects Pending

Inquiries for structural steel work now being figured on include the following:

[illegible]

Addition to the Girard Trust Co.'s building, Philadelphia, 1200 tons.

Apartment house on East Forty-eighth Street, New York, 700 tons.

Addition to American Museum of Natural History, New York, 900 tons, James Stewart & Co., low bidder on general contract.

Kalan Bridge over Columbia River for Union Pacific System, 2800 tons, American Bridge Co. low bidder.

Pennsylvania Railroad, grade crossing elimination in New Jersey, 1100 tons.

Bridge in Clarksville, Tenn., 500 tons.

Missouri Pacific Railroad, bridge, 300 tons.

Fair ground grandstand, Russell, Ky., 1000 tons.

Denison University, chapel, Granville, Ohio, 125 tons.

Oxford University, dormitory, Miami, Ohio, 200 tons.

Highway bridge in Tennessee, 500 tons, bids being taken.

Highway bridge, Montgomery Co., Ohio, approximately 600 tons, bids in.

Highway bridge, Hamilton Co., Ohio, 300 tons, bids close Oct. 6.

Bascule bridge, Los Angeles, Cal., 2200 tons.

PACIFIC STEEL CORPORATION

Three Companies Merged—To Build Furnace and Steel Plant

SAN FRANCISCO, Sept. 12.—Filing of articles of incorporation in Delaware Sept. 6 discloses the formation of another large steel group for the Pacific Coast, to be known as the Pacific Steel Corporation. It is capitalized at $20,000,000 preferred stock and 200,000 shares of no par common. The corporation comprises the Pacific Coast Steel Co., San Francisco, Seattle and Portland; the Southern California Iron & Steel Co., Los Angeles, and the Milner Corporation, Salt Lake City, to which possibly will be added the Judson Mfg. Co., Oakland.

It is proposed to manufacture steel products by utilizing the resources of Utah, and extensive iron ore deposits have been acquired, along with coal holdings producing 750,000 tons yearly near the Utah Fuel Co. mines in Carbon County. A blast furnace plant in Utah is to be erected as soon as possible. T. T. C. Gregory, of San Francisco, the lawyer making arrangements, is expected to return from the East to-day.

Railroad Inquiries for 116 Tools

CINCINNATI, Sept. 12.—The Missouri, Kansas & Texas Railroad has issued a list of approximately a half million dollars' worth of machine shop equipment for Bellmead, Tex., shops. The list includes 30 lathes, six planers, six radial drills, six crank shapers, two boring mills, two carwheel lathes, five turret lathes, three grinders, five milling machines, besides shears, bulldozers, box lathes, bolt cutters, pipe threaders and other miscellaneous equipment, all machines to be motor driven with push button control. The list comprises 116 separate classifications.

To get out the large orders booked for castings for locomotives and other equipment the Ohio Steel Foundry Co., Springfield, Ohio, is working longer hours and has increased its force. Part of the force is working ten hours and others 12 hours a day.

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery

Sept.	Copper, Lake	Copper, Electrolytic*	Tin, Straits New York	Lead, New York	Lead, St. Louis	Zinc, New York	Zinc, St. Louis
6	14.12½	13.75	32.50	5.95	[illegible]	[illegible]	6.22½
7	14.12½	13.75	[illegible]	5.95	[illegible]	[illegible]	6.22½
8	14.12½	13.75	32.25	5.95	5.60	6.60	6.25
9	14.12½	13.75	....	5.95	5.60	6.65	6.30
11	14.12½	13.75	32.25	5.95	5.60	6.70	6.35
12	14.12½	13.75	32.12½	5.95	5.60	[illegible]	6.37½

*Refinery quotation.

New York

NEW YORK, Sept. 12.

Sentiment in all the markets is optimistic and the price tendency is upward. Buying of copper is better, but the tin market has been dull. Although the lead market is quiet prices are a little higher. The indication in zinc points to a scarcity and prices are advancing.

Copper.—Buying in electrolytic copper since the holidays has increased and some substantial orders have been booked at 14c., delivered, or 13.75c., refinery, which is the minimum, any cheaper lots no longer being available. There is also a good inquiry and specifications on contract are also liberal. Some sellers are unwilling to sell at these levels and ask about ⅛c. higher. Lake copper is unchanged at 14c. to 14.25c., delivered.

Tin.—With the exception of one day, Sept. 6, the market has been without feature and stagnant and prices have been largely nominal. On that day about 200 tons of Straits tin was sold at a range of 32.25c. to 32.37½c. Prices have hovered close to 32.25c. each day and to-day the quotation is 32.12½c., New York, for spot Straits. Late to-day fairly liberal sales were made. There has also been very little change in the London market, quotations to-day being £158 12s. 6d. for spot standard, £159 10s. for future standard and £159 per ton for spot Straits, all very close to the quotations a week ago. The British market is also without feature. Arrivals thus far this month have been 2510 tons, with 6815 tons reported afloat.

Lead.—A moderate business is reported booked daily for September shipment, but the market is generally quiet and without feature. The rush which characterized this market last month is absent. The possibility of a duty on lead in the new tariff bill, if enacted soon, is having some effect because considerable of the metal and the ore is imported from Mexico. Prices in the outside market have stiffened a little to 5.95c., New York, or 5.60c., St. Louis, with those of the leading interest unchanged at 5.90c., New York, and 5.70c., St. Louis.

Zinc.—A sharp rise in the quotations for prime Western has been established by sales in the last two days. For early delivery sales were made on Saturday at 6.30c., St. Louis, and on Monday at 6.35c., St. Louis, the advance being due to peculiar conditions existing in the market and indicating a possible shortage of the metal. Consumption has been curtailed in the West, due to lack of coal or inability of the railroads to handle the ore and also to scarcity of labor. Some companies would like to increase their output but are unable to do so. These conditions are also attended by a better demand since the practical settlement of the strike and there is also a prospect that there may be a scarcity of the metal in England. Should there develop any demand from that source, this would accentuate the conditions referred to. We quote prime Western for early delivery at 6.35c. to 6.40c., St. Louis, and 6.70c. to 6.75c., New York.

Antimony.—The prospect of an early duty on antimony and the lack of offerings from China have increased values in this market. Wholesale lots for early delivery are quoted to-day at 6.25c. per lb., New York, duty paid. It is interesting to note that the imports of antimony for the first eight months of this year are only 5308 gross tons, as compared with 7677 tons and 9238 tons in the same months of 1921 and 1920, respectively.

Aluminum.—Wholesale lots of virgin metal, 98 to 99 per cent pure, for early delivery, are quoted by the leading interest at 19.10c. per lb., f.o.b. plant, with the same grade made by foreign producers offered by importers at 17.75c. to 18c. per lb., duty paid, New York.

Old Metals.—The market is firmer but there has been practically no change in values. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	12.50
Copper, heavy and wire	12.75
Copper, light and bottoms	11.25
Heavy machine composition	10.50
Brass, heavy	8.25
Brass, light	6.50
No. 1 red brass or composition turnings	9.00
No. 1 yellow rod brass turnings	7.50
Lead, heavy	5.00
Lead, tea	4.00
Zinc	3.75

Chicago

SEPT. 12.—The metals remain quiet with lead spelter and antimony slightly higher than a week ago. The old metals remain unchanged. We quote, in carload lots, lake copper, 14.25c.; tin, 33.50c. to 34c.; lead, 5.70c.; spelter, 6.40c.; antimony, 7.50c., in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 11c.; copper bottoms, 9.25c.; red brass, 8.75c.; yellow brass, 6.75c.; lead pipe, 4.50c.; zinc, 3.75c.; pewter, No. 1, 20c., tin foil, 22.50c.; block tin, 26c., all buying prices for less than carload lots.

St. Louis

SEPT. 12.—The lead market was steady for the week at 5.60c. to 5.65c., car lots, against 5.60c. the previous week, while slab zinc held steady at 6.25c. On old material we quote: Light brass, 3.50c.; heavy red brass, and light copper, 7c.; heavy yellow brass, 4c.; heavy copper nad copper wire, 7.50c.; zinc, 2c.; lead, 3c.; pewter, 15c.; tin foil, 16c.; tea lead, 2c.; aluminum, 9c.

American Low Bidder on Bridge in Uruguay

WASHINGTON, Sept. 12.—Submitting a figure of 621,000 Uruguayian gold pesos, an American fabricating interest was the lowest bidder for the construction of the Santa Lucia River bridge in Uruguay, which will require 3000 tons of steel. Announcement of the bids was made to-day in a cable received by the Department of Commerce from Commercial Attache Edward F. Feely, Buenos Aires, Argentina. The other bidders were Belgian, 700,000 pesos; Germany, 850,000, and British, 900,000.

Two of the Nagle Steel Plants Sold

The Glasgow and Seyfert plants of the Nagle Steel Co., which has been in financial difficulties, were sold at private sale last week to George H. Heck and associates, 518 Commercial Trust Building, Philadelphia, who will form a company to operate them. The Rahway and Pottstown plants of the Nagle Steel Co. have not yet been sold. The Glasgow works has an annual capacity of 20,000 tons of plates up to 84 in. and the Seyfert works is equipped to produce about the same tonnage of plates. The price paid for the two plants is reported to have been $90,000.

Wages of Sheet Mill Workers Advanced

YOUNGSTOWN, Sept. 12.—Tonnage rates of sheet mill workers operating under the sliding scale of the Amalgamated Association of Iron, Steel and Tin Workers will be advanced 4½ per cent of the base rate, for the September-October period as a result of the bimonthly examination of sales sheets, held Sept. 11 at Youngstown. The rates for tin mill employees will remain unchanged.

PERSONAL

George F. Downs, president Lackawanna Steel Co., has tendered his resignation effective upon the selection of his successor. Other and important changes in the Lackawanna organization are expected in connection with his withdrawal. Mr. Downs has been president of the Lackawanna Steel Co. since August, 1920, succeeding Charles McCullough, who died April 3, 1920. At the time of his election to the presidency, Mr. Downs was vice-president in charge of operations.

William H. Woodin, president of the American Car & Foundry Co., 165 Broadway, New York, also director of the Westinghouse Electric & Mfg. Co., General Motors Co., American Locomotive Co., and several other companies, has given over to a large extent his duties in these connections to direct his efforts to his new commission as New York State fuel administrator, to which he was appointed by Governor Miller on Sept. 6. The appointment met with general approval, and there is every reason to believe that Mr. Woodin will fulfill his promise to ration the coal equitably and in keeping with established channels of trade. In the 15 plants of the American Car & Foundry Co., Mr. Woodin is a familiar figure. He learned the business from the ground up. Some of his employees can recall the time when he cast his first wheel. Upon entering his father's employ, just after leaving the Columbia School of Mines, he was granted no exemptions. There is an ironclad rule that all officials of the company must spend three years in the works. This he did until one day he took a prize which his father offered for casting the best wheel. From this point, young Woodin left the ranks and rose gradually to president of the company as well as director of several others. Mr. Woodin is a man of genial presence, but of few words. The great responsibilities surrounding his positions are not irksome. In his room hangs a letter commending his prompt delivery of cars during the war, and telling of the resultant savings to the Government. His patriotism again bids him give up some business duties to serve in a large public capacity.



WILLIAM H. WOODIN

John A. Oartel, chief of the safety bureau, Carnegie Steel Co., will be the speaker at the regular monthly meeting of the Pittsburgh Foundrymen's Association at the General Forbes Hotel, Pittsburgh, on Monday evening, Sept. 18. His subject will be, "One Hundred Per Cent Safety in the Foundry."

A. D. Neal, formerly associated with the Duquesne Steel Foundry Co., Pittsburgh, in its roll sales department, has joined the sales force, Pittsburgh Rolls Corp., Pittsburgh. Mr. Neal, prior to joining the Duquesne Steel Foundry Co., was with the Carnegie Steel Co. at its Homestead works and in the sales department.

Colonel C. H. Crawford, South American manager of the Baldwin Locomotive Works, and Clifford Shoemaker, Washington, have been appointed representatives of the American Association of Engineers at the International Engineering Congress held this month at Rio de Janeiro. The purpose of the conference is to establish closer contact among those engaged on problems of economic progress in all the Americas.

C. T. Pratt has resigned as treasurer of the Brown Hoisting Machinery Co., Cleveland, and Alex. C. Brown, president of the company, has assumed the additional duties of treasurer. J. F. Pierce has resigned as auditor and director of the same company. This vacancy probably will not be filled for the present.

Irving S. Kemp, sales manager Vaughan & Bushnell Mfg. Co., Chicago, has resigned to become vice-president Evansville Tool Works, Evansville, Ind.

J. D. Powell, for several years with L. S. Starrett Co., Chicago, but latterly handling manufacturers' lines, has become associated with the Lufkin Rule Co., with headquarters at Saginaw, Mich.

Robert C. Yates, for many years identified with the Union Drop Forge Co., Chicago, has resigned to become general manager of the Interstate Drop Forge Co., Milwaukee. Mr. Yates, after graduating from Union College, was connected with the American Locomotive Co. at Schenectady, N. Y., and Bethlehem Steel Co. having also been manager for a time of the Chicago district office of Bethlehem. The Interstate Drop Forge Co., which was organized in 1919 for the manufacture of small commercial forgings, is closely allied with the Chain Belt Co., Sivyer Steel Casting Co. and Federal Malleable Co., all of Milwaukee.



ROBERT C. YATES

F. C. Schreiber, formerly with Stocker-Rumely-Wachs Co., machinery dealers, Chicago, but of late in the sales department of the Packard Motor Car Co., has returned to his former position with Stocker-Rumely-Wachs Co.

Mark A. Brown, general manager, J. M. Leach Mfg. Co., Kokomo, Ind., has been appointed general manager of the Globe Stove & Range Co. of the same city.

A. W. Van Buren, formerly Chicago manager of the Betts Machine Co., Rochester, N. Y., has been appointed district sales manager in the Chicago territory of the Consolidated Machine Tool Corp., New York. Charles M. Robertson, who had been Chicago manager of the Dale Machinery Co., has been appointed manager of the Chicago office of the Consolidated Machine Tool Corp.

C. E. Reese, editor of Gas Engineering and Appliance Catalog, and associate editor of *Gas Age-Record*, has joined the Stoker sales department of the Westinghouse Electric & Mfg. Co., at South Philadelphia. He was previously cadet engineer and combustion engineer with Henry L. Doherty & Co., and assistant engineer of the Illinois Public Utilities Commission. Mr. Reese is a graduate gas and electrical engineer and a member of the Editorial Conference and executive committee of the New York Business Publishers' Association, Inc.; American Gas Association, and American Institute of Electrical Engineers.

A number of changes were made recently in the organization of the United Alloy Steel Corporation, Canton, Ohio. H. C. Thomas was promoted from general superintendeent to assistant general manager; J. B. Thorpe was appointed general superintendent of the Alloy Division, and H. T. McBratney, general superintendent of the Sheet Division. Mr. Thomas and Mr. Thorpe formerly were connected with the Gary Steel Works of the U. S. Steel Corporation, the former as assistant general superintendent and the latter as open hearth superintendent, both going to the United Alloy Corporation in 1918. Mr. McBratney was for a number of years general superintendent of the sheet mills of the Allegheny Steel Co., Breckenridge, Pa.

Weaver H. Rogers, formerly vice-president and general manager the Pittsburgh Iron & Steel Foundries

Co., Pittsburgh, has organized Weaver H. Rogers & Co., with offices in the Farmers Bank Building, Pittsburgh. The company has been incorporated under the Pennsylvania laws for the purpose of acting as intermediary and in an advisory way in connection with business changes and financial matters.

B. D. Quarrie, vice-president and general manager Otis Steel Co., Cleveland, has been elected a director of the Guardian Savings & Trust Co., Cleveland.

Fay, Spofford & Thorndike, consulting engineers, 200 Devonshire St., Boston, specializing in bridges, industrial plants, commercial buildings, foundations, and port and hydraulic developments, have admitted to partnership John Ayer, Bion A. Bowman, Carroll A. Farwell, Ralph W. Horne, Ralph T. Jackson, George L. Mirick, Barzillai A. Rich and Warren D. Trask, all of whom have long been associated with the firm.

A. W. Robbins, who for the past few years has been identified with the ball bearing industry through his connections with the Standard Roller Bearing Co. and the Bearings Service Co., is now associated with the Bearings Co. of America, and will travel from the Detroit offices of that company, which are located in the Ford Building, Detroit.

OBITUARY

JOHN HALDANE FLAGLER, founder and general manager of the National Tube Co., McKeesport, Pa., died last Friday night, Sept. 8, in his home at Greenwich, Conn., at the age of 70, after a week's illness with pneumonia. Although he had virtually retired from business during the last few years, he retained the directorship of several organizations. In the field of finance and in iron and steel circles, Mr. Flagler was a prominent figure for nearly 40 years. His career began with Haldane & Co., New York, with whom he rose rapidly from clerk to manager of the Boston branch. In East Boston, the National Tube Co., had its beginning in 1868. Two years later it was moved to McKeesport where its extensive plants are now operated by the United States Steel Corporation, with which it was merged in 1901. Mr. Flagler contributed several improvements to the steel industry, among which was a new method of uniform heat treatment. He was also instrumental in the introduction of gas for furnace use. At the time of his death, Mr. Flagler had been director of the National Bank of North America and the American Union Line Insurance Co. Besides his wife he leaves a daughter, a sister and a brother, Harvey K. Flagler.



JOHN H. FLAGLER

FREDERICK W. COOKE, aged 62, for many years general manager Cooke Locomotive Works, Paterson, N. J., a subsidiary of the American Locomotive Co., died last Sunday, Sept. 3, from heart disease in his summer home, Quoque, L. I., following a brief illness. He was a graduate of Stevens Institute. His father, John Cooke, was founder of the Cooke Locomotive Works, which was sold to the International Power Co. in 1901, and in 1907 passed into the hands of the American Locomotive Co. F. W. Cooke remained general manager until he retired in 1914.

EDWARD B. RAYMOND, vice-president in charge of operations, Pittsburgh Plate Glass Co., also consulting engineer and a director, Pittsburgh Valve & Fittings Co., dropped dead in his office, Frick Building, Pittsburgh, Sept. 8. He was 53 years old and a native of Massachusetts. He was a graduate of Massachusetts Institute of Technology and was with the General Electric Co., Schenectady, N. Y., for several years.

EDWIN NEWTON OHL, whose death was reported in THE IRON AGE, Sept. 7, was born in Ohltown, Ohio, 72 years ago, but went to Sharon, Pa., more than 50 years ago and long had been a prominent figure in the iron and steel industry. In Sharon he was associated with Peter Kimberly, a pioneer steel man in that district. In the early '90's, he went to New Castle, Pa., to become associated in the steel business with A. W. Thompson, afterward president, Inland Steel Co., Chicago. When the Atlantic Iron & Steel Co., New Castle, of which Mr. Ohl and Mr. Thompson were officers, was absorbed by the Republic Iron & Steel Co., Mr. Ohl became vice-president and general manager of that company. He was one of the organizers of the Cherry Valley Iron Co., with a furnace at Leetonia, Ohio, now owned by the Hanna Furnace Co., Cleveland, of which company Mr. Ohl was a director at time of his death. He was also vice-president of the Miami Iron & Steel Co., Hamilton, Ohio, which was succeeded by the Hamilton Furnace Co. in 1917. He went to Pittsburgh about 30 years ago and made his home in that city thereafter. He was a member of the American Iron and Steel Institute and was president of the American Roller Bearing Co., Pittsburgh, a director the Keystone National Bank, Pittsburgh, of the Republic Casualty Co., of the Valley Steamship Co., and of the Amortization Mortgage Co. He is survived by Mrs. Ohl, a son, Edwin N. Ohl, Jr., a student at Harvard University, and two brothers and three sisters.



EDWIN NEWTON OHL

JOHN H. TOBIN, former vice-president, Wehr Steel Co., Milwaukee, died Aug. 23 at his summer home at Muskego Center, Wis., following an illness of several months. He was 64 years of age.

JOHN A. LEONARD, business manager of the Crane Co., Bridgeport, Conn., died at his home in Bridgeport on Sept. 2. Mr. Leonard was 50 years old, having been born in Livermore Falls, Me., Oct. 25, 1872.

JAMES W. KINNEAR, attorney and business man, Pittsburgh, died at Rochester, Minn., Sept. 8. He was president of the American Stainless Steel Co., vice-president Firth-Sterling Steel Co. and Washington Steel & Ordnance Co., also a director of the Pittsburgh Cold Rolled Steel Co. He was born in Tidioute, Pa., Aug. 2, 1850.

JOHN MILTON POTTER, treasurer Northwestern Malleable Iron Co., Milwaukee, died Sept. 6 at the age of 61 years. He was born in Elmira, N. Y., and went to Milwaukee as a youth, being connected with the Northwestern company 32 years ago.

A. N. WHEELER, president Standard Foundry & Mfg. Co., DeKalb, Ill., died Aug. 29, at the hospital at Rochelle, Ill., following an operation. Mr. Wheeler was born in New York in 1850.

The Dutch steamer Bellatrix, which brought 4700 tons of soft coal from Immingham, England, was unloaded in nineteen hours by John Grace's Sons with their ore and coal discharging plant at the Girard Point terminals on the Schuylkill, Philadelphia.

Strike of the employees of Kelly & Jones Co., Greensburg, Pa., which caused a suspension of operations has been amicably settled and the plant is again running full.

British Iron and Steel Market

American Buying of British Pig Iron Has Reduced Stocks—British Steel Prices Weakening in Face of Better Demand

(By Cable)

LONDON, ENGLAND, Sept. 12.

America continues to purchase pig iron from British makers, with the result that stocks are decreasing and prices firm. Cleveland producers have relighted two more furnaces. Scotch producers are contemplating restarting others. Prompt supplies are scarce and most makers are now quoting for November shipment.

There is improved demand for hematite on spasmodic Continental sales. Quotations are firm.

Demand for finished steel is improving. Northeastern ship repair plants are getting orders, but price concessions still are necessary in most cases.

British Mannesmann [seamless rolled] tube makers have secured large orders for oil pipe lines in Burma.

British iron and steel exports for August totaled 269,983 tons.

Continental iron and steel is quiet, with India and China the chief purchasers, but only in moderate parcels. Few Belgian works are able to offer merchant bars before November or December delivery.

Tin plate is quiet but steady. Recent oil plate orders now total 500,000 boxes [first reported at 250,000 boxes; last week increased to 350,000]. Canada has made small purchases. The Far East is quiet.

Galvanized sheets are quiet but there are signs of improving inquiry.

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $4.46 per £1, as follows:

Durham [illegible]	£1	6½s.	to £1 7s.	$5.91 to	$6.02
Cleveland No. 1 foundry	1	17½		21.74	
Cleveland No. 3 foundry	1	10		20.07	
Cleveland No. 4 foundry	1	7½		19.51	
Cleveland No. 4 forge	1	5		18.95	
Cleveland basic	1	0		17.84	
East Coast mixed	4	9	to 4 11½	19.85 to	20.40
Ferromanganese	15	0		66.90	
Ferromanganese*	14	10	to 14 15	64.67 to	65.78
Rails, 60 lb. and up	7	5	to 8 0	32.33 to	35.68
Billets	7	2½	to 8 0	31.78 to	35.68
Sheet and tin plate bars, Welsh	7	7½		32.89	
Tin plates, base box	0	19¼	to 0 19⅝	4.26 to	4.32
				C. per Lb.	
Ship plates	8	15	to 9 5	1.74 to	1.84
Boiler plates	11	10	to 12 0	2.29 to	2.39
Tees	9	0	to 9 10	1.79 to	1.89
Channels	8	5	to 8 15	1.64 to	1.71
Beams	8	5	to 8 15	1.64 to	1.74
Round bars, ⅜ to 3 in.	9	0	to 9 10	1.79 to	1.89
Galvanized sheets, 24 g.	16	5	to 16 10	3.23 to	3.28
Black sheets	12	0		2.39	
Steel hoops	11	0	& 11 10*	2.19 &	2.29*
Cold rolled steel strip, 20 g.	20	23		4.60	
Cotton ties, Indian specification	15	0		2.99	

*Extra.

Continental Prices, All F. O. B. Channel Ports, Delivery as Specified

No. 1 foundry pig iron:					
Belgium, October	£4	2½s.		$18.40	
Luxemburg, October	4	2½		18.40	
France, October	4	2½		18.40	
Billets:					
France, Oct., Nov.	5	10	to £5 15s.	24.53 to	$25.65
Luxemburg, Oct., Nov.	5	5	to 5 10	23.42 to	24.53
Lorraine, Oct., Nov.	5	10	to 5 15	24.53 to	25.65
Wire nails (keg basis):					
Germany	0	19½		4.35	
Belgium	0	20½		4.57	
Wire rods, 5 mm. (0.2 in.):					
Germany	9	0		2.01 to	2.05
Belgium, October	9	0		2.01 to	2.05
Angles:				C. per Lb.	
Belgium	7	10	to 7 12½	1.50 to	1.52
Tees:					
Belgium	7	10	to 7 12½	1.50 to	1.52
Merchant bars:					
Belgium	7	10	to 7 12½	1.50 to	1.52
Luxemburg, Oct., Nov.	7	5	to 7 7½	1.48 to	1.49
France	7	10	to 7 12½	1.50 to	1.52
Germany	7	10	to 7 12½	1.50 to	1.52
Joists (beams):					
Belgium, October	7	10	to 7 12½	1.50 to	1.52
Belgium, Sept., Oct.	7	10	to 7 12½	1.50 to	1.52
Luxemburg, Oct., Nov.	7	17½		1.59	
Channels:					
Belgium	7	10	to 7 12½	1.50 to	1.52
⅜-in. plates:					
Germany, Nov., Dec.	8	0		1.59	
Belgium, Sept., Oct.	7	10	to 7 12½	1.50 to	1.52
Luxemburg, Oct., Nov.	7	17½		1.59	
France, not offered.					
¼-in. plates:					
Germany	9	0		1.79	
No. 8 gage wire:					
Belgium, August	14	10⅝		2.89	

BLAST FURNACES RESUME

Numerous Steel Works Stacks Added to Active List or Will Be Soon

PITTSBURGH, Sept. 12.—Resumption by blast furnaces in western Pennsylvania, Wheeling and Valley districts has gained momentum in the past week and to-day of a total of 139 furnaces in those districts 68 are active. That compares with a minimum of 50 in the closing week of August and 76 in blast in early July, before the railroad shopmen's strike made the coal strike effective. Since preparations are being made to start up several more furnaces in the near future, the prediction is safe that by Oct. 1 there will be as many, if not more, active stacks as there were in July.

All but one of the furnaces which have resumed are steel works as distinct from merchant stacks and the one merchant furnace which has resumed is making Bessemer iron for ingot molds and at the moment is not strictly in the merchant class. Most of the merchant furnaces in this and nearby districts depend upon the Connellsville district for coke supplies and right now it is almost impossible to line up tonnages in that district because the strike of the miners and oven operatives has not been settled and production still is very limited in relation to potential capacity. The wages now being paid in the Connellsville region are satisfactory, but a good many men now are members of the union and insist upon recognition of the union as a condition of their return to work. This the operators decline to do. The prices which prevail on the moderate offerings of bee hive oven furnace coke are too high to interest merchant iron producers at the present prices of iron. The steel companies do not have this obstacle to contend with since most of them have by-product plants and are able to get ample supplies of coking coal.

In the Pittsburgh district, seven furnaces have been added to the active list in the past two weeks. The Jones & Laughlin Steel Co., which during the pinch in the fuel supply had only two furnaces on, already has put on four furnaces and has ordered on two more, one of which is to make ferromanganese. The company plans to have 10 furnaces on by the end of the month. The Carnegie Steel Co. has one more furnace active in this district than it had during the last week of August, 25 of 34 stacks here now being active. It is reported that the Pittsburgh Steel Co. is getting ready to start up its second furnace and also that the Pittsburgh Crucible Steel Co. will turn on the blast in one of its furnaces soon.

In the Mahoning and Shenango Valley districts, 21 furnaces of a total of 48 now are making iron, a gain of nine in the past two weeks. Brier Hill Steel Co. has put on two stacks, Republic Iron & Steel Co. two, Sharon Steel Hoop Co. one, Shenango Furnace Co. one and Youngstown Sheet & Tube Co. three. The A. M. Byers Co. soon will light its Mattie furnace at Girard, Ohio, and blast will be turned on to-night at the Trumbull-Cliff furnace and a second Shenango furnace company stack will go on shortly. Starting up of one of the furnaces at the Farrell, Pa., works Carnegie Steel Co. is an early possibility.

In the western Pennsylvania district, including Johnstown, five of 17 furnaces are in blast, these all being Cambria Steel Co. furnaces. This is a gain of three furnaces by that company. In the Wheeling district, three out of 15 stacks are in blast, two at the Mingo, Ohio, works Carnegie Steel Co. and one at Labelle Iron Works, Steubenville, Ohio. The stack of the Weirton Steel Co., Weirton, W. Va., was banked last Thursday.

The Three-Shift Day at Steel Works

(Continued from page 658)

in consequence of better care, better attention, better morale, or increased alertness or expertness on the part of the men:

1. Increased efficiency, due in part to better physical and mental condition of the men, and in part (after the industry has been working the shorter hours for several months or years) to a better class of men attracted by better working conditions. This increased efficiency has manifested itself in increased production per man per hour and per machine per day, thus decreasing overhead expense. It has also appeared in better conduct of the operations, greater uniformity and regularity of operation and of quality of product, less fuel used, less waste, less repairs of equipment, better life of apparatus, etc.
2. Better morale, resulting in less absences, less tardiness, less shirking, and better discipline. The better discipline is due in part to the spirit of the men, and in part to the pressure which the foreman can, and will, exert, because he does not have to hold back out of sympathy for tired men.
3. Elimination of the "floating gang." This floating gang is an expedient, not a real remedy; it is an expense; it does not content the men, because it gives them their free day only occasionally on Sunday.
4. Finally an advantage which is not to be lightly considered in the event of labor disputes, the company which is working its men only 8 hours a day enjoys much greater prestige with the public, whose influence in a labor dispute is always important. This influence may, indeed, be the factor which decides whether a strike is long and costly, or short and comparatively inexpensive. The 12-hour shift, even with resting periods, leaves something to be explained to the public; necessitates a campaign of education at a time when the public is not always ready to be educated.

Comparative Labor Costs of 12-Hour and 8-Hour Shifts

It has often been pointed out that, in the ultimate analysis, the total cost of any manufactured product is composed chiefly of labor. To illustrate: Pig iron is made, by means of labor, out of ore, flux and fuel. The cost of the materials used is far greater than the cost of the labor, but labor produced the ore, the flux, and the fuel; and so it can be shown that labor is the basis of all cost, if one goes back far enough. However, the labor cost in the iron and steel industry, as affected by the 12-hour vs. the 8-hour shift is only a fraction of the total cost. To return to the illustration: The ore, the flux and the fuel do not represent any labor on the 12-hour shift basis, except a fraction of the cost of the fuel in some cases. And the operating labor in the manufacture of pig iron is only from 5.5 per cent to 8 per cent of the total manufacturing cost, while that much of it which still works on the 12-hour shift is a still lower percentage. So that those persons who argue, as some do, that the change from the 12-hour to the 8-hour shift would effect an increase of 90 per cent in the cost of the product are dealing in generalities which will not bear analysis.

Likewise, in the case of the open-hearth furnace: At least 50 per cent of the raw material used in the open-hearth is scrap, the price of which is determined by market conditions, and is not affected by any proposed change in the labor in the industry from 12-hour to 8-hour shifts.

Finally, only a part of the laborers in the industry are working the 12-hour shift. If that proportion of the men were changed to the 8-hour shift, and paid as much per day as they are now receiving for 12 hours' work, without, at the same time securing any compensating economic advantages through increased efficiency, increased morale, etc., the total manufacturing cost would be affected by only 3 per cent to 15 per cent. This is, in most cases, less than the variations in cost already experienced by plants competing with one another, due to efficiency of equipment, technical skill, wisdom in purchasing, location, capital resources, overhead expense, etc. If the increase in labor cost were compensated, at least in part, by resulting or accompanying economies in operation, the result would be correspondingly better.

As a matter of actual experience, it is known that some plants, or departments of plants, have changed from the 12-hour to the 8-hour shift and reduced their labor costs. Others are operating on the 8-hour shift with satisfaction to their management and stockholders. Others have changed and reduced their total manufacturing cost. Finally, there are other plants which have had experience with the 8-hour shift, the exact economic result of which is not known, but as to which there seems to be reason to believe that the total manufacturing cost is, at most, not much greater when working the 8-hour than the 12-hour shift.

Considerations That Have Held Back the Three-Shift Day

Mr. Drury's report consists of 125 typewritten pages and deals with the two-shift and three-shift day in the continuous industries. Such industries are considered under four group heads. The first group takes in iron and steel, non-ferrous metals, glass, Portland cement, lime, brick and pottery. In view of the prominence given to Mr. Drury's first report, comparing two-shift and three-shift operations in the iron and steel industry, we give below the portion of his Boston report dealing with iron and steel:

THE steel industry has received separate consideration in three special reports which may be considered as parts of this investigation.[1] In order, however, that the steel industry, which is by far the most important of the continuous industries, may not be omitted from the present general survey, there will be inserted a sketch of the general situation as respects hours.

For almost a generation, a few minor branches of iron and steel making have been carried on on three shifts, or an approximate equivalent. This has been true of the making of wrought iron and of what are known as "hot mills" in sheet mills. Here and there a few specially difficult jobs have been on eight hours; and once in a great while, an entire department. But these places where custom has long established an eight-hour shift occupy a small place in the steel industry as a whole. Prior to the war, the major branches of the steel industry were, practically without exception, operated on a two-shift basis. About one-half or a little less than one-half, of the employees in the continuous plants were on day work, which was usually ten hours. The other half (or more) of the employees worked twelve hours, or an alternation of eleven hours one week and thirteen the next (or ten hours one week and fourteen the next). In 1919, the United States Steel Corporation gave the number of its twelve-hour employees as between 69,000 and 70,000 and the number in the entire industry probably ran as high as 150,000.

Formerly steel plants were also on a seven-day week. But beginning about a dozen years ago, efforts

[1] See "The Three-Shift System in the Steel Industry," a paper read by the writer before a joint meeting of the Taylor Society, the Metropolitan and Management Sections of the American Society of Mechanical Engineers, and the New York Section of the American Institute of Electrical Engineers, in New York, Dec. 3, 1920, and published in the February, 1921, issue of the *Bulletin* of the Taylor Society. A more analytical study by the same writer, entitled "The Technique of Changing from the Two-Shift to the Three-Shift System in the Steel Industry," was prepared for the Cabot Fund, and a small edition privately distributed in May, 1922. This has not yet been released for general publication. See also Bradley Stoughton's report.

have been made to reduce the volume of seven-day work. Seven-day work is almost entirely extinct in rolling mills and to a large degree is absent in open-hearth and Bessemer work. Coke ovens and blast furnaces must, however, run seven days a week. In these branches of the industry the Steel Corporation and some of the "independents" have adopted arrangements by which the individual men are relieved one day in the week. Others among the "independents" still employ the men in these departments, a full seven days a week, as is true also of open-hearth work when business is normal.

Tendency to Shorter Hours

At one time it was thought that the steel industry could not be operated on any other basis than two shifts. Later, any tendency towards shortening hours was counteracted by the introduction of labor saving machinery; which has gone so far in the steel industry as practically to remove the strain from the majority of jobs. Furthermore, such work as is left is generally intermittent, so that, in most cases, the twelve-hour steel worker does not actually work more than 6 or 7 hours. Combined with these conditions, which seem to make a twelve-hour shift feasible from the physical standpoint, there were many, especially among the foreign born steel workers, who were willing and eager to work for as long as twelve hours, provided that by so doing they could earn slightly more money. Finally, the tendency towards ten or eleven hours for the day shift and thirteen or fourteen for the night shift, represented a crude approach to a ten-hour day, for on the long night shifts there was usually a certain amount of sleeping. All of these considerations together somewhat mitigate—but they do not remove—the fact that an average daily employment of twelve hours, added to the hour or so lost in coming and going, keeps a man away from his family or his other outside interests a large portion of his waking hours.

During the war, there was some tendency towards three shifts in the steel industry, in harmony with the larger movement in this direction which was taking place outside. But the movement did not reach very large proportions, partly because there was in the industry an acute shortage of labor, and in steel towns a shortage of houses, which made the large companies hesitate to attempt to put on an extra shift. By the end of 1920, about twenty of the "independent" steel plants—some large, but more of them small—had gone to three shifts—a number impressive enough to deserve some attention, but not large enough to affect very greatly the proportion of twelve-hour works in the industry. Thus as late as the beginning of the present period of depression, the steel industry was apparently almost as fully on a two-shift basis as it had ever been.

There is reason for believing that a changed attitude had been developing influenced by:

1. The general pressure throughout the country towards shorter hours;
2. The steel strike in 1919;
3. The attacks on the twelve-hour day in Congress;
4. The Inter-Church report on the steel industry; and
5. The conviction on the part of many steel men that the twelve-hour day was too long a period for men to work.

The Steel Corporation's Position

The Steel Corporation had appointed a committee empowered to consider and report on the practicability of abolishing the twelve-hour day. As the pressure for production and the shortage of labor in the steel industry subsided in the fall and winter of 1920-1921, the work of this committee became more active. A number of statements were issued regarding the progress of the committee's work; and finally, in the spring of 1921, Judge Gary issued for the corporation a statement to the effect that the corporation hoped to be able to eliminate the twelve-hour day, as the difficulties of doing so were overcome.

There is reason for believing that the officers of the Steel Corporation regarded the statement cited as a definite declaration of policy on the part of the corporation, that they intended to be understood as announcing a program of abolishing the twelve-hour day in corporation plants within the course of a year or so. But the statement was embodied in explanations as to the difficulties in the way of abandoning twelve hours. It came at a time when throughout the country there was a tendency towards lengthening rather than shortening hours. The Steel Corporation's proposed course met the moral opposition of some of the "independent" steel manufacturers. The investigator found during his studies in 1921 that there was a prevalent impression abroad both among the "independent" producers and the outside public, that the matter of abolishing the twelve-hour day had been allowed to drop.

Without calling into question the sincerity of the Steel Corporation's intention of eventually eliminating twelve-hour work, there can be no question that, by the time the Corporation had issued its statement, conditions were rapidly becoming more unfavorable for going to three shifts. A moderate slackening in business activity would have been favorable to introducing a third shift; but the depression which came on the steel industry was so severe that, while it interposed no mechanical obstacle to going to three shifts, it yet had the effect of turning people's thoughts in quite other directions. There were times in the summer of 1921 when steel production fell as low as thirty per cent of normal or lower. During this time overtime was abolished and wage rates on twelve-hour work were reduced almost one-half.

Business Conditions Made the Decision

Under these conditions the question of re-organizing the system of shifts in the steel industry was perhaps not unnaturally put in the background, while thought was turned on problems which were for the moment more grave. Moreover, men hesitated to put into effect a reduction of hours by one-third, when wages had just gone down by one-half; or to talk of making changes which might increase cost, when cost was already above selling price. What enthusiasm could be aroused for getting out more output, when, in some of the plants, at least the greater the output the greater the losses? For reducing labor force when it meant discharging key men, whom it was desired to keep on the pay roll? Why shorten hours when men were fortunate if they had employment one week out of two? It is not surprising, considering the many harassing circumstances, that for some months practically no thought was given to making any far-reaching changes in the shift system.

It does appear that from the standpoint of external conditions and from the sentiment in the industry circumstances were favorable in 1920 and 1921 for the Steel Corporation to have changed from a two to a three-shift basis. Some "independents" believed that the corporation was going to make a change and they had their new manning schedules ready so that they too might promptly change.

There was no reason, however, why shifts could not in many cases be shortened during 1921, even if the development of a permanent three-shift system had to come later. In fact, the very depression and accompanying unemployment were the strongest of reasons why work should, wherever practicable be divided among as large a number of men as possible through shortening the hours worked by individual workers. And this course, was in fact, followed to a large extent. The movement, however, had its drawbacks and limitations. In some cases, the older and more valuable employees, whose incomes had already been radically affected by cuts in the hourly rates and perhaps by temporary transfer to positions below their regular grade, were unwilling to have hours reduced, in order to give work to men who belonged to the less stable element of workers. There is some risk in a company's going too far in giving all employees a small amount of work as competitors may coax away the pick of the employees by offering full-time employment. This general situation was the cause of some oscillation between twelve-hour and eight-hour shifts.

Notwithstanding the circumstances just discussed, the proportion of twelve-hour work in the steel industry was materially reduced during 1921 but all of this was not done as a matter of permanent policy. Most of the reduction in hours was by way of putting what had been on two twelve-hour shifts on two ten-hour shifts, or by having as much of the shift work as could be done by day workers. Thus the Steel Corporation ran rolling mills on ten-hour shifts. All sorts of arrangements as twelve, ten, nine, eight and even six-hour periods have been in use. Men were also worked a week and laid off a week. The net result was a substantial reduction in the amount of twelve-hour work. At times the proportion of twelve-hour workers in plants would be only ten or fifteen per cent, whereas formerly the common proportion was fifty or more per cent. The tendency was to retain on twelve-hour shifts only such work as absolutely had to be continuous through the twenty-four hours.

While some of these innovations of 1921 could be maintained as a part of permanent shift policy, yet it is evident that much of the development is essentially temporary. If and when the steel industry recovers, it is doubtful if large plants will want to run their rolling mills only twenty-hours out of the twenty-four. Nor did the steel mills in 1921 do much to lessen the proportion of twelve-hour work on blast furnaces, open-hearth furnaces, or other continuous-process work. In the absence of some firmer policy than was followed in 1921, there would likely be a drifting back towards the twelve-hour day in the steel industry as times improve.

We will omit for the steel industry the presentation of evidence regarding the results which have been met with in such plants as have gone to three shifts; because the facts have been published separately. It is opportune to say here that most of the plants reported upon in 1920 now state that they have lost some by operating upon the three shifts. However, in almost all cases, the managements state that, considering the intangible as well as the tangible factors, they were better satisfied with three-shift than with two-shift operation. One of the larger of the three-shift plants mentioned in the 1920 report went back to two shifts at the beginning of 1921 (as was noted in the paper as published) stating that the arrangements had not worked well. Such of the other three-shift plants as the writer has been in touch with have remained on three shifts.

Favorable Testimony

In fact, the evidence after a year of depression is now considerably more favorable to three-shift operation than it was in 1920. This would seem to be the case, partly because, down to the close of 1920, conditions were not favorable for getting the greater efficiency which might be expected on shorter hours, and because of more experience and hence the management would have more confidence in the change. Thus only a few miles from the company which in 1921 returned to two shifts, another plant, engaged in all the states of steel manufacturing from blast furnace to rolling mills, had reported in 1920 that its labor costs were almost, but not quite, as low on three-shift as on two-shift operation. A year later they were in the position of doing better on three shifts than on two. This company followed a policy of giving ten hours pay for eight hours work.

Another prominent steel company, which followed a policy of paying as much for eight as for twelve hours, was cited in the 1920 report as coming out almost even. But at that time the company was reluctant to pronounce its three-shift system a permanent success until it had withstood depression as well as prosperity. In the fall of 1921, this company reported that in its producing departments—open-hearth and rolling mills—it would not gain anything by going back to two shifts. In the service departments expenses would be cut to some extent if the company were willing to go back to two shifts; but as to the amount of the loss which three-shift operation meant in these departments, the company was not certain. It did not intend to go back to two shifts.

Another three-shift company, whose plant ranks among the largest in the steel industry, and whose employees originally petitioned for and accepted three shifts on a basis of no higher earnings per hour than were paid in two-shift plants, reported in 1920 that its manning had increased 50 per cent. In January, 1922, this company gave the increase as 35 to 50 per cent; and, after reiterating its feeling of satisfaction with the working of three shifts, added: "We are strongly opposed to twelve-hour working shifts, though not opposed to a ten-hour day where conditions seem to make that desirable. We believe that industry in this country can be so conducted as to permit of eight-hour shifts in continuous operations."

Eight Hours at Ten Hours' Pay

The evidence collected in 1920 and a weighing of the experience of 1921 and 1922 would indicate that it is doubtful whether all the departments of a steel plant can be operated as cheaply on three shifts as on two shifts, if the men receive as much pay for eight hours as for twelve. But there is tangible evidence strengthened by the developments of the last year, which indicates that under active and able management and with reasonable co-operation on the part of labor, costs on the three-shift system can be kept as low as on the two-shift system, provided wage rates are compromised so that eight-hour men receive pay equivalent to ten hours work instead of for twelve hours pay. Such a compromise, or even one less liberal, is ordinarily satisfactory to the men.

At the same time care should be taken not to be over confident. Most managements do not give the attention which they might give to the matter of securing the highest attainable degree of labor efficiency; so that it is probable that, in case of a general change from two to three shifts in the steel industry, assuming a fifty-fifty compromise on daily wages, the greater proportion of the plants, for the time being at least, would note some increase in labor cost. But, as has been shown in the two special reports on steel, this increase in cost could not be large; and there is no reason why it should not be practically offset by intangible improvements in relations and operations, due to the plant being on a more satisfying day.

It is very significant that, during the late period of very acute depression, exceedingly few companies, either in the steel industry or in other industries, have seen fit to go back from eight-hour to twelve-hour shifts.

Total Manufacturing Cost Would Be Increased by 3 to 15 Per Cent

The Federated American Engineering Societies' Committee on Work-Periods in Continuous Industry, in summarizing for last week's Boston meeting the reports of Messrs. Stoughton and Drury, devote a short chapter to the iron and steel industry. Some extracts are given below from what the committee says in commenting on the three-shift and two-shift systems:

IN 1919, the United States Steel Corporation employed approximately 70,000 12-hour employees. Altogether, there are perhaps 150,000 wage earners in the entire steel industry on 12-hour shifts.

A wise executive policy takes into full consideration the importance of the intellectual, the psychological and the physical well-being of labor, realizing that an immediate saving secured by over pressure inevitably becomes a loss in the long run. A refusal to co-operate on the part of the workers is an economic loss. Furthermore, it is obviously of no permanent benefit to the men if their hours are shortened beyond the point where

the industry can survive under competitive conditions.

The twelve-hour day is strongly established in the iron and steel industry by long custom and by its unusual adaptability to production requirements. Recent progress, however, has been in the direction of a shorter day as well as in the reduction of the proportion of men on duty seven days a week. This is shown by the following tabulation which gives the percentage of men so employed:

	7 Days per Week Per Cent		Working 12 Hr. Per Cent	
	[illegible]	[illegible]	1910	1920
Blast furnaces	25	9	69	63
Bessemer mills	18	12	65	75
Open-hearth	24	17	58	50

The above figures are from a Report of the U. S. Department of Labor, released for publication May 24, 1922, and on Documents Nos. 110 and 301 of the 62d Congress. From the same publication the following figures are also compiled showing the pencentage of laborers in the same three departments working the long shift and the short shift respectively in 1910 and 1920.

	Working 12 Hr. Per Cent		Working 8 Hr. Per Cent	
	1910	1920	1910	1920
Blast furnaces	69	63	1	18
Bessemer mills	65	75	16	22
Open-hearth	58	50	2	30

The proportion of men working 12 hours in the Bessemer mills is an exception to the general trend, but the Bessemer process has been on the wane for many years, and the number of men employed is probably very much reduced since 1910.

It is emphatically asserted by blast furnace managers working the eight hours that the higher grade of labor attracted by the shorter hours, the greater care and alertness, better work, and more skilful operation are all reflected in a saving in cost of production. Cost figures are confidential, but furnace operators working under the 8-hour day assured the investigator on more than one occasion that the cost of producing pig iron is less on the eight-hour than on the 12-hour day.

The operating labor in the case of pig iron is from 5.8 to 8 per cent of the total manufacturing cost. Only a part of the labor in the industry is working the 12-hour day. If that labor was changed to the eight-hour day and paid as much per day as it is now getting for 12-hour work even without securing any compensating advantages through increased efficiency, morale, etc., the total manufacturing cost of the product would be increased only from 3 to 15 per cent. This is in most cases less than the variations in cost already experienced by competing plants, due to difference in efficiency of equipment, technical skill, purchasing, location, capital resources, overhead expense and advantages due to good management.

The United States has the most profitable iron and steel industry in the world, making more money and more output than all the rest of the world put together and exporting its product in successful competition with foreign countries. The majority of managers and executives with whom the matter was discussed believe that the good of the industry can be better served by eliminating the 12-hour day than by increasing dividends provided by means of labor saving devices and in other ways this step can be taken without serious injury to the industry.

As a matter of actual experience it is known that some plants have changed from the 12-hour to the eight-hour day and reduced their labor costs. Others have reduced their total manufacturing cost. Others are operating on the eight-hour day with satisfaction to management and stockholders. Results in such plants may be summarized as follows:

a. The plants which have adopted the three-shift system, though paying wages a little less than is paid in corresponding plants working 12-hour shifts, have sufficient labor, both skilled and unskilled.

b. The management believes that the shorter hours attract a better class of labor.

c. Every executive interviewed stated that the labor turnover is less on the three-shift system than on the two-shift system.

d. Sufficient skilled labor can be trained in the plant if the change is made with the co-operation of the men, and if it is made gradually.

e. It is unnecessary to pay a full 12-hour wage to skilled labor to secure a sufficient number to work the 8-hour day.

Immigration Law Has Proved Unsatisfactory

Secretary Davis Says Temporary Measure Has Outlived Its Usefulness—Various Plans Proposed

WASHINGTON, Sept. 12.—While industrial interests of the country are complaining of threatened shortage of labor that promises to be serious, and are strongly of the opinion that the immigration laws should be liberalized, so as to admit more workers, it is a perplexing problem as to how this may be done satisfactorily. It is evident from correspondence coming to members of Congress and the Department of Labor that employers, in view of the many labor troubles that have developed since the signing of the armistice, are showing more interest in the quality of the immigration than heretofore. That the Administration is alive to the situation is evident by repeated statements coming from the Department of Labor and from members of Congress.

In a formal statement recently, Secretary of Labor Davis said that the 3 per cent immigration restrictive law, enacted one year ago to halt immigration, had outlived its usefulness, declaring that "a radically different program for dealing with the immigration problem" must be evolved. Mr. Davis maintained "that the 3 per cent law has served very well as a temporary measure under the conditions responsible for its enactment," but "a permanent policy should be upon an entirely different basis." Criticism was made by Mr. Davis and some industrial interests share the same view that immigration stock which has played so important a part in the upbuilding of America is not forthcoming under the present program. Figures show that the quota of immigrants allowed under the 3 per cent law has been either entirely filled or exceeded where it relates to the most undesirable types, but there is a deficiency of the more desirable class of immigrants. It is charged that this is one element that has played an important and serious part with regard to agitation and in connection with labor troubles. It is, of course, well known that organized labor has always advocated stringent and unduly restrictive immigration laws, including such absurd provisions as the literacy test and would welcome further obstacles to immigrants. The attitude of the Department of Labor often has been criticized for being entirely too sympathetic with the attitude of organized labor. Secretary Davis in the program he has outlined has taken into account the quality of immigration and based his reasoning on a theory that has been advocated by industrial economists. Mr. Davis makes the point that under the present passport systems in effect throughout the world power is lodged in the hands of foreign governments to say who shall and who shall not migrate to the United States. He said that the selection of America's future citizens "is therefore reposed in some other government which may refuse passports and keep at home those whom it wishes not to leave." The remedy he proposes would be to empower American officials at ports of emigra-

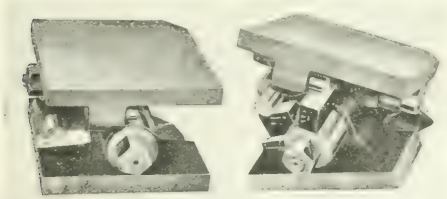
tion, in lieu of visé requirements, to subject aliens to examinations involving mental, physical and other characteristics so as to insure immigrants of a constructive type. Legislation of this character already is pending before the House Committee on Immigration and probably will be pressed for passage at the next regular session of Congress. It is quite conceivable that the program will carry provisions of such a restrictive character that they will be opposed by industrial interests, but at the same time it is known that many of them favor the basic principle of raising the quality of immigration, rather than of lowering the quantity and thereby to bar incoming aliens of radical tendencies. Many of them, it has been pointed out, do not constitute a laboring class, and consequently do not add to the labor supply, but do engage in industrial agitation.

Mr. Davis said that it is not the intention of the Department of Commerce to create an espionage system as a check upon alien residents of the United States, but said there should be an annual census of the foreign born who are not naturalized citizens. He also said that an annual fee should be demanded of each alien, the money to be used to educate the immigrants. Such a system, he believed, would permit the checking up of all of those who have violated the law in securing admission to the United States.

"If their regard for American law is such that they violate it in the first place by illegal entry," he added, "how can we expect that they will have any more regard for other laws? We will be able to trace surreptitious entries of Orientals, and we will be in a position to know our self-appointed enemies who are designing to rule America by revolution, as opposed to our settled principle of advanced government by evolution."

Sine Plate for Compound Angle Work

The numerous precision grinding operations encountered in modern tool-room problems frequently include operations of grinding compound angles. These generally have to be handled by some make-shift device or



Multi-Angle Sine Plate Designed to Set Work to a Compound Angle by Simple Angles Measured by Simple Sine Bar

by setting a simple sine bar to an angle determined from mathematical calculations that will produce the compound angle. To provide an easy and economical means of setting work to a compound angle the appliance illustrated has been developed and is being marketed by the Carling Tool & Machine Co., Hartford, Conn.

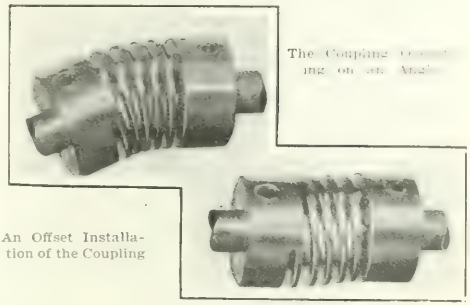
The device is designed to set work to a compound angle through the medium of simple angles determined and measured by the simple sine bar. Angles up to 46 deg. can be set precisely by the use of size blocks applied and computed in the same manner as a simple sine bar. Its pivot shafts are at exactly 90 deg. to each other and permit inclination of the table in a forward and sideways direction up to the maximum angle capacity. From this feature it might be called a two-way sine bar. The edges, table top and base seat are accurately aligned with the pivot shafts, permitting of quick, accurate set-ups on a grinder table.

In setting to an angle size blocks are selected, placed on the desired gage point and the pivot shaft bound. The binding action will be against the size blocks and supporting walls so that the setting will not be disturbed in clamping. The clearances cut in the base have kept the height in a level position to a minimum, well within the range of small surface grinders.

The size available at present has a 5 in. by 5 in. table 3½ in. high when level, 46 deg. capacity of inclination and 2 in. center distances of sine plugs. Special sizes can be developed if required. The square table is said to be the most efficient design, as it keeps the height to a minimum, reduces overhang of the table and presents the least interference when handling on a machine.

All-Steel Flexible Coupling for Light Duty

All-steel cut spring flexible couplings, as shown in the illustration, for shafts up to 1 in. in diameter have been placed on the market by the Steel-Flex Coupling Corporation, Detroit. They are intended for use in



The Coupling [illegible] ing on an Angle

An Offset Installation of the Coupling

connecting light-duty motors directly to small drill presses, blowers, fans and other machinery where shafts are slightly out of line, and where it is desired that the coupling act to reduce friction in shaft bearings and act to absorb shocks incident to sudden starts.

One of the illustrations shows the coupling operating at an angle, the other illustration being of an installation where there is considerable offset. It is always desirable, however, to have the shafts as nearly in line as possible. The couplings are formed from a cylindrical tube of steel said to be especially suitable for power transmission purposes. Safety set screws are used for securing the couplings to the shaft.

A standard line of coil spring flexible couplings for shafts 1 to 12 in. in diameter and having helical driving coils formed of rectangular chrome-vanadium steel bars, tempered to provide high elasticity, are also offered by the company. In the couplings the coils are mounted, one within the other, on machine steel plugs and on the end of the coils are shrunk steel headers intended to bind these parts into a continuous flexible unit. Flanges are attached by means of safety cap screws.

Gear Association Quartered at Cleveland with Permanent Secretary

The American Gear Manufacturers' Association moved its headquarters from Philadelphia to Cleveland last week and is now located at 2443 Prospect Ave., S. E., in that city. F. D. Hamlin, who has been secretary of the association since its organization, has resigned, and T. W. Owen, who has been associated with the Johns-Manville Co. in its Cleveland office for ten years, has been named acting secretary. With the growth of the organization, the secretarial work has increased to the extent that it requires all the time of the secretary, and Mr. Owen will devote his entire attention to the association activities.

F. W. Sinram, president, VanDorn & Dutton Co., Cleveland, has been president of the association since it was founded in 1917. The semi-annual meeting of the association will be held in Chicago, Oct. 9, 10 and 11.

CO-OPERATIVE DEALING

Plan of Youngstown Sheet & Tube Co. Proves Successful Growing in Popularity

In line with the theory of President James A. Campbell of the Youngstown Sheet & Tube Co., Youngstown, Ohio, that to be successful a company must have contented employees, the company has established a co-operative system which is proving successful. It began three years ago in a small way and has now become an important part of the good work being accomplished under the plan of Employee Representation in effect at the company's plants. The amount of sales in June, 1922, was in excess of $33,000, and it is claimed that the prices charged were, on an average, twenty per cent under retail prices.

The system was established at the request of the committee on housing and domestic economics, and was in response to the urgent desire of the men in the mills, who complained that they were forced to pay excessive prices for the goods bought by them in local stores. They complained that every time wages advanced, and before the advance became effective, there was an increase in the cost of living, prices of meats, groceries and other supplies being raised.

"Knowing of the failure of many co-operative movements, the management hesitated to start a co-operative store," states W. C. Reilly, general superintendent. "It recognized, however, the justice of the request of the men and after a thorough investigation of co-operative stores in other localities, it was decided by the joint committee on housing and domestic economics to start simply a co-operative buying system, and gradually expand it as experience and patronage justified."

Business Expands

In the opinion of officials, the experiment has proved successful. The business has expanded and a greater variety of commodities is carried, embracing groceries, canned goods, shoes for men, clothing and other supplies required by men in the mills. Seasonable goods are also purchased when they can be distributed at a saving. It is pointed out that only first-class goods are accepted, and care is exercised in the quantities purchased so as not to secure an over-supply. The company furnished the capital for the enterprise and provided a place for the store, but caution is necessary in making purchases because the fluctuations of wholesale prices might at any time leave on hand a stock of goods that could not be disposed of without loss.

In May of this year the business had increased to such an extent that the company recommended abandonment of the stores within the plant and the establishment of a main distributing station, with several branches, for the convenience of the workmen. This was accordingly done and a central store was created at Struthers, near the main plant. All goods are received at the Struthers store and all orders to be delivered to customers are distributed from this store. A stock of goods is carried in both the East Youngstown and South Gate auxiliary stores, but no deliveries are made from these points. They are simply for the convenience of the men going and coming from the plant, or the families of workmen living in the vicinity.

Selling at Wholesale

"The purpose is to sell supplies of all kinds to workmen and their families at wholesale cost and the actual cost of handling," says Mr. Reilly. "The company does not realize any return on the capital invested and makes no charge for the space occupied by the stores. It will be well satisfied if the other necessary expenses are met. Up to this time it has been impossible to avoid some loss, owing to the expense of fitting up the stores, but it is believed that increased business will take care of the expenses from this time forward, without any increase in the small margin at which goods are sold.

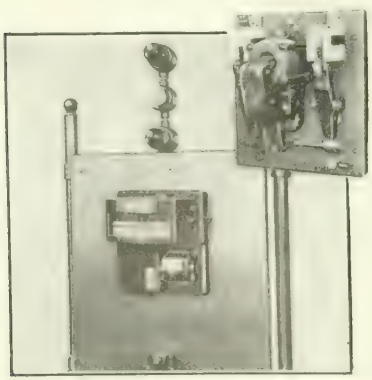
Keeps Down Prices

"The co-operative buying system has not only saved considerable money to patrons of the stores, but the principal benefit from it has been its tendency to keep local retail prices down to a reasonable level, a benefit shared by the entire community," Mr. Reilly points out. "The company is not particularly interested in the amount of business done in the stores, since it makes no profit from them; and it recognizes that the volume of business they do is not the full measure of their success, for the reason that while the patrons of the stores make a direct saving on all of their purchases there, they and other employees who do not patronize the stores are saved considerable money on account of the regulating influence the prices charged at these stores have on the prices charged by other dealers.

"In effecting the object for which it was established, distributing goods at cost to the patrons, and regulating the retail prices in this vicinity, we have not made the mistakes which have wrecked so many co-operative movements and believe the plan will continue to be a success."

Automatic Temperature Regulator

The Hoskins Mfg. Co., Detroit, has placed on the market the temperature regulating apparatus shown in the accompanying illustration. It is known as type R E and is designed to indicate and control the temperature of oil, gas, or electric furnaces of any type.



Temperature Regulating Equipment for Electric, Oil and Gas Furnaces

The control mechanism operates every 30 sec. and permits a temperature variation of the thermo-couple of plus or minus 10 deg. Fahr. When used on electric furnaces, the instrument operates a small relay, which in turn actuates the main power switch, which is of the magnetic type.

When the furnace is operating at the desired temperature, within 8 deg. Fahr., a white signal lamp is lighted. If the temperature goes above or below this limit the heat is shut off or put on, a red or green light appearing respectively. The control mechanism is operated by a small motor.

The illustration shows the complete equipment for electric furnace control, although the instrument can be furnished without the other apparatus if required.

Effective Sept 1, an increase of approximately 30 per cent in wages has been announced by the Harbison-Walker Refractories Co., the General Refractories Co. and the United States Refractories Co. Common labor now receives $3.50 per day as compared with the former rate of $2.70, and wages of skilled working men have been advanced in proportion.

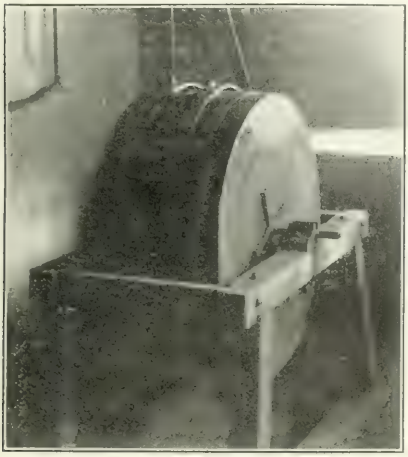
COMBUSTIBILITY OF COKE*

A Laboratory Method for Its Determination — Hardness Test

BY WILLIAM A. HAVEN

THE experiments herein described originated in an attempt to confirm by a laboratory test an apparently considerable difference in the combustibility of two kinds of by-product coke used at the Haselton furnaces, one from a coal mixture containing 85 per cent Klondike, the other from a mixture containing 85 per cent Upper Freeport coal.

The results obtained did not confirm our interpretation of the furnace practice in this particular case but in the course of the laboratory work we secured some satisfactory comparisons between the burning curves of charcoal, coke and the dense carbonaceous deposit found on the walls of by-product ovens. We were also able to verify the pronounced effect upon burning speed produced by variations in the size of coke. Our investigations were then extended to other grades of coke produced in the Mahoning Valley and to samples from by-product plants in Southern Ohio and the Chicago districts. We have now added the combustion test to the daily routine laboratory determinations for chemical analysis and hardness.



The Tumbling Drum Used for Hardness Testing of Coke

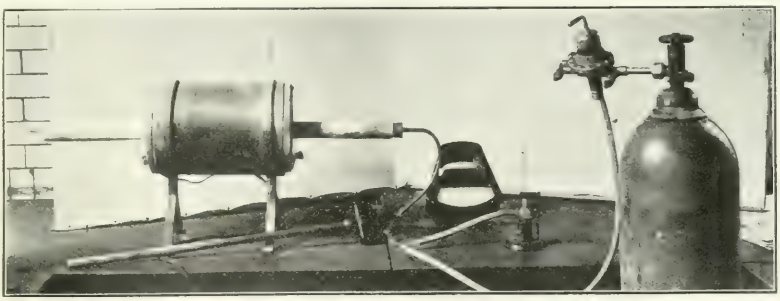
For the purpose of the test a large sample is secured from not less than five cars. From this a portion is taken, by quartering down, for chemical analysis and the remainder, after being dried for 24 hr., is crushed through a 3-in. screen onto a 1-in. screen. Ten kilograms of the portion which stays on the 1-in screen is placed in a steel drum for the Barrett tumbling test. The drum is rotated at a speed of 24 r.p.m. for a period of one hour. The sample is then taken out and passed through a ¼-in. screen. The weight of the coke remaining on the ¼-in. screen, expressed in percentage of the total sample put in the drum, is taken as the hardness factor.

Discarding the coke from the drum which passes through the ¼-in. screen, the remainder is quartered down to a ½-kg. sample, the entire amount of which is crushed to pass through a ¼-in. screen and that portion of it which remains on the ⅛-in. screen is used for the combustion test.

The furnace used in the test is made of ⅛-in. steel pipe, 12 in. long and 8 in. in diameter. In the center of the pipe is a hollow asbestos core around which is wrapped about 90 grams of from 19 to 22 gage wire. The core is packed in the pipe with asbestos and through it is inserted a silica tube, 1⅛ in. in diameter and 31 in. long. Oxygen is led into the furnace through a rubber stopper and the discharge end is packed with asbestos through which there is a small glass tube for the escaping gases.

A 1 gram sample of coke, sized as described above, is weighed in a platinum boat, ⅝-in. wide, ½-in. deep and 3⅛ in. long. The temperature of the furnace is brought to a constant at about 1800 deg. Fahr. The boat is placed in the furnace and the sample burned for one minute in an excess of oxygen which is assured by maintaining a pressure of 2 in. of mercury. It is then removed and weighed to determine the loss of carbon. In the same manner the loss in 2, 2½, and 3 min. is determined, or at ½ min. periods, until the combustible matter is nearly all consumed. The average of these results expressed in centigrams per minute is taken as the burning speed.

The determinations are run in duplicate or until a satisfactory check is secured for each period. In order that results may check closely it is essential to use platinum boats, identical as to size and shape, and to distribute the samples evenly within the boats so that the surface exposed to oxidation shall be as nearly constant as possible. About 45 min. work in the laboratory is required.



The Laboratory Apparatus Used in the Combustion Test of Coke

*From a paper before the Eastern States Blast Furnace & Coke Oven Association. The author is superintendent Northern Furnaces Republic Iron & Steel Co.

Nails Made by Minnesota Steel Co.

The first shipment of wire and nails made in the new plant of the Minnesota Steel Co., Duluth, Minn., was recently made. It consisted of 500 spools of wire and 1000 kegs of nails. For the time being the mill is reducing billets shipped to Duluth by the Illinois Steel Co., but later it will use its own steel. The output of the wire plant is marketed by the American Steel & Wire Co., just as the other products of the Minnesota Steel Co. are sold by the Illinois Steel Co.

Directors of the Crucible Steel Co. of America have offered to both common and preferred stockholders of record Sept. 11 an additional 50,000 shares of common stock at $100 per share on a pro-rata basis, according to a statement by H. S. Wilkinson, chairman. The object is to provide additional working capital.

REPLY TO PROTEST

Arrow Company Gives Reasons for Establishing Lower Pig Iron Rate

WASHINGTON, Sept. 12.—Reply to the protest of the Steel & Tube Co. of America, and other Chicago district producers, who have filed a protest with the Interstate Commerce Commission against the plan to establish a joint rail-and-water rate on pig iron from Florence and Sheffield, Ala., to the Ohio River and beyond, the Arrow Transportation Co. has asserted that irreparable damage would be done to it if the commission suspended the tariffs as suggested by the protestants. It is pointed out by the Arrow Transportation Co., which has proposed joint rates with the Chicago, Burlington and Quincy Railroad, that it has already invested $40,000 for the construction of barges to transport pig iron. The claim is further made that the company had contracted for delivery on Oct. 1 of a steel towboat at a cost of $120,000 when fully equipped. It is maintained by the company that even brief suspension of the tariffs would make entirely useless the equipment provided for to carry pig iron from Florence and Sheffield to Metropolis, Ill., for shipment beyond by the Burlington Railroad. The Arrow company makes an emphatic denial of the claim that its tariff is detrimental to the carriers' interest. It is contended that the commercial conditions involved simply are the desire of the Southern furnaces to take advantage of the rail and water transportation.

The through rate published in the Arrow tariff is made up of the $1.96 local rate of the boat line from Florence and Sheffield to Metropolis and the $2.22 division going to the Burlington Railroad on pig iron, brought to Metropolis by a railroad south of the Ohio River.

The Arrow company says that it serves only the furnaces at Florence and Sheffield, "the production of which is insignificant in amount, compared to the production at Birmingham. The figures are 2,500,000 tons per year at Birmingham as compared with 150,000 tons at Florence and Sheffield."

Fire Damages Inland Plant

CHICAGO, Sept. 11.—Fire of unknown origin broke out in the coal mixer serving the coke ovens of the Inland Steel Co. plant, Indiana Harbor, Ind., Sept. 7. Damage to machinery and equipment is estimated at $60,000. A most serious result of the conflagration is its interference with coking operations. Temporary arrangements are being made to take care of the mixing and conveying of coal for the ovens, but in the meantime operations have been interrupted in certain units of the plant dependent on coke oven gas, such as the annealing and galvanizing departments in the sheet mills.

Railroad Cars Ordered or Under Construction

WASHINGTON, Sept. 12.—For the seven months from Jan. 1 to Aug. 1 of this year, railroads of the United States had 25,763 more new cars, either ordered and under construction or installed in actual service than during the entire year of 1921, according to reports carriers have just made to the car service division of the American Railway Association. The railroads had installed or had on order 95,199 freight cars of various kinds during the seven months ending on Aug. 1, 1922, while for the year 1921 a total of 69,436 were ordered or installed in service. Of the total ordered or already installed, 41,405 were coal cars. Orders calling for the delivery of 29,175 coal cars were in the hands of car manufacturers on Aug. 1 last, and delivery of these cars is under way daily. Up to Aug. 1 of this year 12,230 new coal cars had actually been installed and during 1921, new coal cars either placed in service or ordered totaled 30,698.

There were also 39,612 box cars, either installed or on order during the first seven months of this year. The reports showed that orders for 31,610 cars existed on Aug. 1 last, while 8002 had actually been delivered and placed in service this year up to that time, while 21,543 new box cars were ordered and actually placed in service in 1921. The carriers also are augmenting their supply of refrigerator cars as is shown by the fact that on Aug. 1 orders had been placed for 6428. During the seven-month period, 3870 had actually been installed and placed in service, making a total of 10,318 installed or on order. During 1921 the number of refrigerator cars ordered or installed totaled 9355, exclusive of new refrigerator cars purchased by private companies.

Coal Companies Merged

PITTSBURGH, Sept. 11.—Details were made public last week by J. H. Sanford, vice-president Carnegie Coal Co., Pittsburgh, of a merger of several bituminous coal companies in the Pittsburgh and western Pennsylvania districts. The new company, now in process of formation, based on 1920 production figures, will have a normal annual output of 8,000,000 tons, and this may be increased by the inclusion of other producers to a total of 9,500,000.

The companies to enter the combination and the production of each for 1920 are: John A. Bell interests, 2,000,000 tons; Carnegie Coal Co., 1,350,000 tons; Verner Coal & Coke Co., 345,000 tons; Burgettstown Coal Co., 255,000 tons; Henderson Coal Co., 325,000 tons; Chartiers Creek Coal Co., 270,000 tons; McClane Mining Co., 475,000 tons; Meadowlands Coal Co., 500,000 tons; Pittsburgh & Eastern Coal Co., 240,000 tons; Pittsburgh & Erie Coal Co., 430,000 tons, and the western Pennsylvania mines Youghiogheny & Ohio Coal Co., 1,120,000 tons.

Pittsburgh Plus Case Hearing

WASHINGTON, Sept. 12.—Plans for resuming hearings in the Pittsburgh base case not having been completed, the date of Sept. 11, when representatives of the Federal Trade Commission had proposed to start taking additional testimony, has been abandoned. It is expected to set a definite date and place within a few days.

Interstate Commerce Decisions

WASHINGTON, Sept. 11.—The petition of the Northern Pacific Railway Co., on behalf of the Minnesota & International Railway Co., Big Fork & International Railway Co., and other carriers, for authority to continue the charge on structural steel and machinery from Duluth, St. Paul, Minneapolis and Minnesota transfer and Superior, Wis., to International Falls, Minn., without observing provisions of the fourth section of the interstate commerce act was denied to-day by the Interstate Commerce Commission.

The commission also issued an order to defer operation of schedules filed by F. W. Gomph relating to iron and steel articles from Utah common points to California points. The order defers the operation of schedules specified until Oct. 23.

Wages Advanced

The Walworth Mfg. Co., Kewanee, Ill., has advanced common labor from 30c. to 36c. an hour, following similar action by Chicago district subsidiaries of the United States Steel Corporation.

The Gifford-Wood Co., Hudson, N. Y., manufacturer of conveying, handling and elevating machinery, has purchased the property at Hulton, Pa., on the Alleghany River, formerly occupied by the Crescent Forging Co., and lately by the Mendel Box Co. Work of remodeling the buildings has been started. Officers of the company are William B. Wood, president; Benjamin Gifford, vice-president, and W. T. Wood, secretary-treasurer.

American Chemists Hold General Conference on Metric System

PITTSBURGH, Sept. 11.—The sixty-fourth meeting of the American Chemical Society, held here last week at Carnegie Music Hall and in several buildings of the Carnegie Institute of Technology, attracted one of the largest gatherings in the history of the society, registration reaching 1335. A meeting of the councilors was held on Sept. 4, and the business of the convention began with general meetings on Tuesday, Sept. 5. Wednesday and Thursday were given over to divisional meetings, while Friday and Saturday were devoted to excursions. That on Friday was a general one and took in a visit to the by-product plant and steel works, Carnegie Steel Co., Clairton, Pa., and to the Monongahela City, Pa., works, American Window Glass Co. Saturday the visitors were given a selection of places to go to and excursions were by groups.

A conference on world metric standardization held, Sept. 6, with Prof. Eugene C. Bingham, Lafayette College, Easton, Pa., chairman, brought together by invitation representatives of practically every scientific society in this country. The general topic was "Aid to World Metric Standardization," and a resolution was adopted favoring a gradual rather than a sudden adoption of the metric system. The United States Department of Education and other educational agencies will be asked to broaden the teaching of this system in the schools. Early discussion disclosed that several manufacturing companies were opposed to the adoption of the system owing to the expense involved by the change. Another resolution adopted by a narrow margin urged the adoption of the double marking system on merchandise, one marking to be under the metric system and the other under the present English system.

British Institute of Metals New Series of Lectures

A notable feature of the forthcoming Swansea meeting of the Institute of Metals will be the inauguration of a series of annual public lectures on "Subjects of Practical Interest to Those Engaged in the Non-Ferrous Metals Industry." The lectures are additional to the annual May lectures of the Institute of Metals, which have constituted a feature of the institute's work since 1910. Dr. R. S. Hutton, a member of council of the institute, and director of the British Non-Ferrous Metals Research Association, is to deliver the first of the new lectures, entitled "The Science of Human Effort (Motion Study and Vocational Training)". The lecture will be delivered at 8 p. m. on Tuesday, Sept. 19, at the Y. M. C. A., Swansea. The subsequent proceedings at Swansea include the discussion of 15 papers on various metallurgical subjects, civic and other receptions and entertainments, visits to works and a motor tour round the Gower Peninsula, the meeting lasting from Sept. 19 to Sept. 22.

Cost Accountants to Meet

Topics to be discussed by the National Association of Cost Accountants at their third international cost conference at Atlantic City, N. J., Sept. 23 to 28, include the following:

Actual costs as compared with Replacement Costs; Sales and Administrative Costs; Standards as a Means of Reducing Costs; Budgets—Their Construction and Use; the Place of Costs in Business Management; Cost Problems of the Textile Industry.

Among those who will participate are Ambrose Downs and N. D. Farmer, Carborundum Co., Niagara Falls, N. Y.; R. H. Gregory, Western Electric Co., New York; S. C. Allyn, National Cash Register Co., Dayton, Ohio; Irving Berndt, consulting industrial engineer, New York; R. W. Darnell, Ritter Dental Mfg. Co., Rochester, N. Y.; John M. Scanlon, Hess-Bright Mfg. Co., Philadelphia; S. L. Whitestone, General Electric Co., Schenectady, N. Y.; C. M. Finney, Worthington Pump & Machinery Corporation, New York; C. E. Patterson, vice-president, General Electric Co., New York.

Under the topic "The Place of Costs in Business Management" will be covered in a practical way, the broad question of the relationship which ought to exist between the cost department and the other departments and the general management. This should be of particular interest not only to cost men, but, also, to managing executives who are interested in getting full value out of their cost departments.

Motion Pictures in Industry

On Thursday afternoon, Sept. 14, at 2 o'clock during the week of the National Exposition of Chemical Industries at the Grand Central Palace, New York, several papers are to be presented before members of the Technical Photographic and Microscopical Society, which is to hold a general meeting in the lecture hall at that time.

Among the papers to be presented is one entitled "The Motion Picture as an Aid to Industry" by Dr. Alfred B. Hitchins, director of the Ansco Research Laboratory, Ansco Co., Binghamton, N. Y.

High Grade Steels Neglected

Any improvement there may be in the steel trade of Great Britain, according to the *Engineer*, London, is practically restricted to the basic and cheaper grades. Acid steel is meeting with very little demand and the high-speed and other special steels for engineers' tools will not, of course, be wanted until there is a revival in the engineering industry. The serious competition Sheffield steel makers have of late been experiencing from the Lincolnshire furnaces has, if anything, been intensified, with the result that Sheffield soft billets have been reduced by 5s. to £7 5s., but this is still dearer than similar steel delivered by Lincolnshire makers in Sheffield.

Chileans Want Machinery Catalogs

The American Commercial Attaché at Santiago, Chile, advises the Department of Commerce that although that office receives catalogs from American manufacturers in each mail, it is not collecting them with sufficient rapidity to meet the requests for information which are steadily being received. There is an especially active demand for catalogs of machinery of all kinds, not because of any particular prosperity among Chilean manufacturers, but for the reason that the representation for specialized American machinery is rather lacking in Chile except in certain lines where the makers are represented by their own salesmen or by an unusually alert agency. Many orders for machinery have been placed in Europe simply because of a lack of knowledge of the American product or in default of accessible American catalogs and price lists. It is suggested that catalogs be sent to the American Commercial Attache at Santiago, Chile, (Casila 27-D, Santiago, Chile), by such American machinery builders as are interested in export trade. At present there is particular interest in wood-working machinery, especially that equipped with electric motor drive.

Equipment for Air Service

SPRINGFIELD, OHIO, Sept. 11. — A conference of McCook field men was held Friday afternoon with General Manager George E. Ireland and experts of the Steel Products Engineering Co. regarding the manufacture of special equipment for the balloon section of the United States Air Service. The company is making a balloon tender, which is to be used in pulling down a captive balloon. It is also turning out a compressor which will be used in refilling balloons in the field. Each will be placed on a four-wheel drive truck chassis. The company is not only making the balloon equipment but it is building special truck axle drive, axles and other parts of the machines. The company has received an order from the Government for 14 crankcases for 18 cylinder engines for the Air Service.

Three New Books on Labor Problems

Immigration, Radicalism and Other Problems Discussed from Varied Viewpoints

REVIEWED BY CHARLES MORRIS MILLS

The Federal Administration and the Alien. By Frances Kellor. Pages xvi + 64. Published by George H. Doran Co., New York. Price, 50 cents.

The Peril of the Republic. By David Chauncey Brewer. Pages vi + 354. Published by G. P. Putnam's Sons, New York. Price, $1.75.

Industrial Unionism in America. By Marion Dutton Savage, Ph.D. Pages v + 344. Published by the Ronald Press, New York. Price, $2.25.

FRANCES KELLOR is pre-eminently fitted through training, experience and position to deal constructively with the immigration problem. Her little book, "The Federal Administration and the Alien," is a supplement to her larger work, "Immigration and the Future," published in January, 1921. Up to the present time our governmental policy toward the alien has been to guide him toward the point of entry or rejection. The three per cent restriction law has sought a numerical solution. Miss Kellor, writing just previous to the final passage of the three per cent law, does not touch on the regulation of the amount of immigration, but with the even larger question of the policy of the present Federal Administration, particularly from an international point of view.

Restrictive immigration measures, passed in a time of supposed emergency, do not reach many fundamental problems. The reorganization of our Federal immigration service; the development of domestic markets by using aliens as salesmen for foreign goods and of foreign markets by returning aliens; the safeguarding of immigrant savings; the stimulation of the investment of such savings in this country; the protection of the alien temporarily residing in this country; the training toward citizenship of the alien permanently remaining; and the promotion of international good-will through the immigrant are among some of the more pressing questions not included in regulatory methods.

As Miss Kellor lucidly points out, "the Government should not lose sight of the immediate program, which is to restore Ellis Island to a basis of pre-war efficiency; to enforce and recodify the existing immigration law; to rearrange Federal immigration duties so as to avoid overlapping; to stabilize immigration through the Department of Commerce to capitalize the immigrant's resources through the Treasury Department; to protect aliens; to overhaul the antiquated naturalization service, and to institute an inquiry which will provide a permanent substitute for emergency measures." In many States unjust discriminatory laws break down the alien's respect for law, and he retires to the racial colony for protection—to become an unassimilated element in our population. The relationship of Federal officials and racial leaders built up during the war should be continued, for "if there is any one subject upon which the foreign born voter can help the country it is immigration," and "it is his point of view and personal interest that needs to be joined to those of the native born to secure an all-around policy which will fully represent American interests."

In international relationships the immigration problem has reached an added importance through the creation of the Emigration Commission of the International Labor Office of the League of Nations; in the development of the control of emigration from certain countries; and in the competition of more sparsely settled countries for immigration. If we are to deal intelligently with the alien as an international human being, we should construct as sound a policy as on international finance or commerce.

Many industrial leaders are realizing to-day that the present three per cent law, effective in holding back huge tides of immigrants, is not furnishing us with the type of immigrant necessary to upbuild the nation's resources. The present statute will be revised sooner or later. Miss Kellor's book is of timely importance to those interested in a practical solution of this great problem.

Pessimistic Views as to Aliens

A FRANKLY pessimistic view of the alien situation is pictured by Mr. Brewer in "The Peril of the Republic." The sub-title, "Are We Facing Revolution in the United States?" is sufficiently indicative of the general outline of the book, which "is written with the sole purpose of pointing out that the alien invasion has quickened the drift to political revolution." Unquestionably the vast changes in our nation during the last 100 years in homogeneity, environment, and general personnel have transformed our democracy far from its original basis, but surely the individualistic conceptions of the founders of the Republic cannot be applied in entirety to the problems of the heterogeneous nation of 110,000,000 people to-day. Nor has the change in the form of government been confined to America—the foremost nations during the same period have moved from individualistic laissez-faire monarchies to social democracies. The great task and contribution which American democracy can make lies in applying the pith and substance of our Constitution to our great social and industrial problems. Our profound confidence in the Republic is justified in the very sureness of the triumph of American democracy in adjustment and solution during the course of the twentieth century.

Therefore, most of us will find it difficult to agree with the alarmist point of view of Mr. Brewer in feeling that we are on the brink of a social and industrial revolution which may be directly traced to the alien invasion of the last 30 years. All of us recognize the vast difference in political antecedents, language, and racial characteristics of the more recent type of immigrant with those of America. Undoubtedly a small minority of these newcomers are professedly dangerous radicals with extreme views, but the great, vast majority of these people are industrious, sober workers. It is difficult to believe that "the Government of the United States as at present administered cannot live"—principally (as the author says) because it does not adequately protect itself against the machinations of communistic groups and extremely socialistic propagandists sufficiently large and powerful enough to threaten the life of the Republic. The thorough patriotism of the thousands of foreign born and first generation Americans who served faithfully through the Great War is sufficient refutation for such extreme views.

Certain portions of the book dealing with the exploitation of the immigrant, naturalization and Americanization are more mild and somewhat constructive, but in naming perverse education as one of the causes of the downfall of democracy, the author actually questions the worth of our educational system. At least,

"the founders of the Republic recognized the value of education for those who could use it advantageously, but they did not attempt to provide more of this education, even for those whose faculties fitted them to absorb it, than was commensurate with the safety of the Republic. Mr. Brewer then suggests that moral training and suitable environment be substituted for years misspent in the classroom under socialistically inclined teachers supported by huge taxes. Just how our "extravagant and artificial school system" is to be reconstructed is not explained!

Summing up, we must "hold fast to whatever rights and privileges we still retain—by calling back to private life the army of office holders who form a large percentage of the population, using the schools to teach democracy instead of sociology, regulating the alien population, and providing a censorship for the non-English press—in short, by doing the obvious things to block revolution, whether it comes by fire or sword, or possibly by the art of the adroit autocrat." Surely such words may bring great comfort to the heart of the reactionary who thinks the country is on the verge of the bow-wows, but for the middle-of-the-way citizen, interested in an open-minded discussion of the alien problem, there is little of fact or fancy in "The Peril of the Republic."

Different Kinds of Labor Unions

FOR some time there has been a widespread demand for reliable and impartial information regarding the development of the newer type of American labor union organized around a complete industry, in contrast with the "old-line" unions organized by crafts or trades. Dr. Savage's "Industrial Unionism in America" is an able presentation of the facts and factors in the growth of industrial unionism. It makes no attempt to discuss the right of labor organization, but deals with an analysis of the various types of industrial unions. The chief difference between the old and new unionism lies, not in the structure, but in the spirit and philosophy of industrial unionism. In the main, the industrial union is based on the idea of the solidarity of labor, laying stress on the mutual dependence of both skilled and unskilled workers in their struggle against the capitalist system, and the majority of industrial unions "are distinctly hoping for the abolition of the capitalist system and the ultimate control of industry by the workers themselves."

The book is divided into three sections: the first deals with industrial unions within the ranks of the American Federation of Labor, such as the United Brewery Workers, United Mine Workers and Mine, Mill and Smelter Workers; the second discusses radical industrial unions, including the workers of all industries, such as the I. W. W. and the One Big Union; and the third with independent industrial unions, such as the Amalgamated Clothing Workers, Needle Trade Workers' Alliance, United Textile Workers, Amalgamated Textile Workers and numerous small unions.

Many matters of considerable momentary importance are ably discussed. The struggle between the conservative and the radical elements for the control of the policy of the United Mine Workers; the effect of prohibition upon the United Brewery Workers; the historical development of the Western Federation of Miners; the unrelenting non-co-operative policy of the I. W. W., and the educational and co-operative program of the Amalgamated Clothing Workers are interesting sidelights on the present industrial crisis.

In the conclusion, the author touches upon the psychological and social influence of industrial unionism, particularly the effect of their radical philosophy on the expansion of craft unionism. The main tenet of industrial unionism is class consciousness. Is the latter an unmitigated evil? Would the control of industry by workers be more efficient? Why is the general attitude of industrial unions toward present collective agreements restrictive? Are industrial unions more democratic than craft unions? Is there any social idealism connected with radical industrial unionism? These are some of the questions which the author discusses at the end of his analysis, leaving final judgment with the reader.

For the industrial executive and the student of our industrial relations problems, this analysis of some of the most important elements in the labor movement to-day should be of considerable value, although the antipathy of more conservative readers may be aroused by the discussion of the various doctrines of radical unionism.

Causes and Prevention of Accidents in the Iron and Steel Industry

In a 400-page volume, the United States Bureau of Labor Statistics has gathered data and made a comprehensive analysis of the accidents during the 10 years, 1910 to 1919, in the iron and steel plants of the United States. This has been published as bulletin No. 298. It consists very largely of tabular matter grouped according to the kind of plant and further grouped under several combinations according to the character of the accident cause, the character of the damage inflicted, and further with regard to the severity of the accident—whether fatal or causing permanent or temporary disability. In the latter case, the average duration of the disability forms another classification.

Blast furnaces, Bessemer and open-hearth plants, foundries, heavy rolling mills, plate mills, tube mills, sheet mills, fabricating, electrical and mechanical departments and yards form the different classifications according to the kind of plant, to which should be added one unclassified heading. The accident cause is grouped under the several headings of machinery, steam apparatus and power vehicles, hot substances (including both molten metals and other materials) fall of the worker, falling objects, handling tools and other objects and unclassified.

Numerous diagrams illustrate the text and bring out more clearly than figures the subjects of accident frequency, severity, etc. A number of half-tone illustrations, showing situations under which accidents occur and safeguards against their occurrence, illustrate the text.

In a 32-page pamphlet, "The Finances of Disarmament," the Mechanics & Metals National Bank, New York, traces the work of the late Washington conference on the limitation of armament and presents figures to show the ultimate financial saving to the principal nations involved. For the United States, Great Britain and Japan these savings, based on probable naval costs in 1928, are placed at $270,000,000, $260,000,000 and $250,000,000, respectively, per year. Based on completion in 1924 of known naval programs, these annual savings are placed at $90,000,000 less, for each country, than for 1928. Even this, however, results in an aggregate saving, for the three powers, of $510,000,000 annually.

The Arcade Malleable Iron Co., Worcester, Mass., is operating its third 20-ton reverberatory furnace in a newly constructed plant unit, which gives employment to 30 additional molders. The company's present 60-ton furnace capacity compares with 38 tons a year ago. The plant is operating five days a week and has sufficient business on its books to continue on that basis the balance of 1922 at least.

FOREIGN CONDITIONS

Observations of W. P. Snyder, Jr., During Two Months in Europe

Impressed greatly by the energy and application of foreign workmen, W. P. Snyder, Jr., president Shenango Furnace Co., Pittsburgh, who has just returned from a two months' trip to Europe, fears that the foreign trade of the United States will suffer, unless American workmen develop some of that spirit of willingness to work, which is the prevailing characteristic of workmen abroad. This becomes essential in view of the recent wage increase in the iron and steel industry, Mr. Snyder says, for not only did he find foreign workmen laboring faithfully, but putting in long hours and in most countries at very low wages.

In France, common labor was being paid 15 to 20 francs per day, equal, at the rate of exchange when Mr. Snyder was in that country, to only about $1.50 in American money and for that rate the men were working 12 to 14 hours daily. In the war ravished areas in that country, remarkable industry was being shown in reconstructing homes and an interesting feature of this work to Mr. Snyder was the use of steel to support the exteriors of stone. In England, wage scales are more comparable to those in this country, but employers had the situation well in hand and there were no signs of trouble.

In Germany, however, working conditions were almost chaotic, due chiefly to the frequent fluctuations in the value of the mark. The 8-hour day is generally established, and not only does production suffer from that fact, but also because of the frequent interruptions occasioned by the changing value of the money unit of the country. The men apparently keep well informed on the mark value and when it declines, they make instant demands for increases. One day the rate of pay for common labor in such establishments as Krupps was 35 marks per hour, but the next day it was 50 marks because of a drop in the exchange value. Marks sold as low as 1400 for $1 during Mr. Snyder's visit, but generally are rated at 1000 to the $1. At the latter rate, German laborers are receiving the equivalent of 5c. per hour in American money, or 40c. per day of eight hours.

Mr. Snyder commented upon the absence of new automobiles in either England or on the continent, saying that most of the cars he saw were models of five to seven years ago. So many American-made trucks remained overseas at the conclusion of the war that everywhere, especially in France, practically no other makes are seen. These trucks were disposed of at very low prices and much below what foreign trucks could be produced for, even to-day.

GERMAN STEEL INDUSTRY

Production Data for 1920 and 1921—Exports and Imports for June, This Year

Based on data published in two German journals, the National Federation of (British) Iron and Steel Manufacturers makes public the German pig iron and steel production for 1919 and 1920. So far as known this is the first information regarding the activity within German industry in those two years. Compared with pre-war years the data are as follows in gross tons per month:

	Pig Iron	Steel
1912	1,279,200	1,339,600
1913	1,373,000	1,445,000
1920	464,000	552,000
1921	405,000	724,000

These figures do not include Luxemburg.

Data have also recently appeared in *Stahl und Eisen* covering the exports and imports for June, which were 213,220 tons and 215,022 tons respectively. Compared with pre-war data, the movement this year and in 1920 and 1921 is as follows in tons per month:

	Exports	Imports
1912	482,400	22,300
1913	516,900	25,000
1920	143,600	26,200
1921 (8 months)	203,600	.....
1922 (6 months)	205,700	151,800

The chief items in German exports in the last two months of this year (May and June), have been rails, shapes and plates. The chief countries of destination have been, besides Holland, the Argentine, Sweden, Japan, United Kingdom, British India. The large imports are made up of a considerable influx of scrap iron and steel.

National Steel Lumber Sections

In a little cloth bound volume measuring 4 x 6½ in. and carrying more than 180 pages, the National Pressed Steel Co., Massillon, Ohio, has put out a handbook of steel lumber of the same general scope as the familiar handbooks of structural steel sections issued by the various manufacturers of those sections. The book is full of information regarding the use of the light sections covered under the general heading of steel lumber, as used both separately and in conjunction with the heavier rolled steel shapes long familiar in building construction. Numerous diagrams show the method of handling the steel lumber, while tables of strength, safe loads, deflection, etc., give the same sort of information as obtains elsewhere with regard to the heavier sections.

This subject has become one of increasing importance in the past few years, owing to a deepening realization on the part of forward looking observers of the ultimate and rapid exhaustion of our most available timber supplies, together with the desirability of having a building material of greater permanence than wood. A paper before the American Iron and Steel Institute last year dealt with this subject in some detail. Another paper heading this issue of THE IRON AGE covers the same subject from a somewhat different angle. Still a third contribution to this subject appeared on page 469 of THE IRON AGE for Aug. 24.

It is evident, therefore, that a handbook permitting the architect and engineer to specify intelligently the light sections required for buildings of different character and with differing floor loads should be of great interest to the building profession.

Formal Report to Senate on Proposed Steel Merger

WASHINGTON, Sept. 12.—Acting Chairman Victor Murdock of the Federal Trade Commission last Thursday made a formal report to the Senate, in response to a resolution of Senator LaFollette of Wisconsin, advising that the commission had issued a complaint against the Midvale Steel & Ordnance Co., the Republic Iron & Steel Co., and the Inland Steel Co., in connection with their proposed merger. The report carries the usual statement that the complaint is merely the institution of formal proceedings to test the legality of the merger. It is stated that at the conclusion of testimony and after argument, the commission will determine the facts and apply the law thereto.

"And only if such a conclusion is justified by the facts will an order to cease and desist from the proposed merger be issued," says the report. "Otherwise the complaint will be dismissed. In other words, in the issue of the complaint the Federal Trade Commission expresses no final judgment as to the legality of the proposed merger. If an order to cease and desist from the proposed merger is issued, it is, of course, subject to review by the United States Circuit Court of Appeals."

The Cleveland-Cliffs Co. has announced that it will resume operations at its iron and chemical plant at Gladstone, Mich., on full production by Oct. 15. With this stack in blast all charcoal furnaces in Michigan are again in production, a condition that has not obtained since 1920.

Machinery Markets and News of the Works

FURTHER PRICE ADVANCES

Some Milling Machine Manufacturers Raise Quotations 10 to 12½ Per Cent

Not a Large Volume of Business Is Being Done, But Considerable Is on the Point of Closing

The practical certainty that machine-tool prices will be generally advanced, coupled with announcements of price advances already made, is responsible largely for the volume of tool business now being placed, which, though not large, continues to show an improvement over the first half of the year.

At least two or three of the principal manufacturers of milling machines have sent out notices of price advances averaging 10 to 12½ per cent. A manufacturer of screw machines has adjusted prices slightly upward. One line of shapers has been advanced 20 per cent and a line of boring machines 10 per cent.

Considerable business is at the point of closing, but it cannot be said that a marked turn for the better has come yet. Much is expected from the railroads, but such business is materializing very slowly. The Chicago, Burlington & Quincy will buy against its recent lists soon and the Chicago, Rock Island & Pacific has shown renewed interest in some items on a list it put out months ago. The Atchison, Topeka & Santa Fe has purchased two milling machines and still has one or two machines to buy. There have been other purchases of individual machines by other roads, including a 90-in. driving wheel lathe by the Boston & Albany.

The Studebaker Corporation, South Bend, Ind., has practically completed buying for its No. 2 plant, but has begun construction of an addition to its No. 1 plant. The International Harvester Co. continues to place orders for its tractor plant in Chicago. The Universal Portland Cement Co. has bought about $7,000 worth of tools for its plant at Buffington, Ind. A new Cleveland plant has acquired 11 manufacturing lathes.

Steel mill equipment is being purchased by the Otis Steel Co. for additions to its works at Cleveland and the National Enameling & Stamping Co. is about to buy for sheet mills at Granite City, Ill. The Weirton Steel Co., Weirton, W. Va., has bought rolling mill equipment.

New York

NEW YORK, Sept. 11.

BUYING in this district is almost entirely confined to single tool purchases. Some lists from railroads, which buy here, are anticipated, in view of the activity in railroad buying in other parts of the country. Used tool dealers continue to report business good, but many of the sales are not in this territory. One used tool dealer in New York reports sold the past week a 48-in. and a 60-in. lathe and two grinders. The two grinders were the only part of these sales purchased here, the two lathes being for shipment to the Middle West. Within the next 10 days or two weeks an advance in price is expected on milling machines. Railroads which have recently purchased tools outside of New York include the Union Pacific, one radial drill, two wheel presses, one 42-in. lathe and one boring mill; Boston & Albany Railroad, one driving wheel lathe; Oregon & Washington Railroad & Navigation Co., one side head milling machine and one 30-in. planer; Los Angeles & Salt Lake City Railroad, two wheel presses, one radial drill and one car wheel drill. The Illinois Central Railroad will close on a list of between 10 and 12 tools. The General Electric Co. still has some tools pending.

Extreme dullness has characterized the crane market here in the past week. The only new inquiry of size that has appeared is a preliminary request for prices on furnishing two 150-ton overhead traveling cranes, issued by Thomas E. Murray, 55 Duane Street, New York, for the Brooklyn Edison Co., Brooklyn, N. Y. Specifications on the 60-ton, 71-ft. span, 4-motor electric traveling crane for the Phoenix Utility Co., 71 Broadway, New York, have been devised. The tender of the Board of Harbor Commissioners, Wilmington, Del., bids on which were opened Sept. 8, resulted in a low bid of $61,000 submitted by the Brown Hoisting Machinery Co., for furnishing the three 20-ton locomotive cranes and two 2½-ton portal cranes. The Orten & Steinbrenner Co. was the low bidder on the three locomotive cranes, but did not quote on furnishing the two portal cranes. Other bidders were the Browning Co., Heyl & Patterson, Dravo Contracting Co., Wellman-Seaver-Morgan Co. and the Lakeside Bridge & Steel Co. Bids are being received by the Board of Harbor Commissioners until Sept. 16 from dealers in used equipment.

Among recent sales are:

Hood Rubber Co., Watertown, Mass., a 7½-ton, 22-ft. 6-in span electric traveling crane from the Milwaukee Electric Crane & Mfg. Co.

Superior-Portland Cement Co., Concrete, Wash., a 3-cu. yd., 62-ft. 10-in. span grab bucket crane from the Shepard Electric Crane & Hoist Co.

American Car & Foundry Co., New York, eight 2-ton and 3-ton electric hoists from the Shepard Electric Crane & Hoist Co.

Navy Department, Hawaii, three 1-ton and 2-ton capacity cranes, one electric, one motor-driven and one hand power, from the New Jersey Foundry & Machine Co.

New Britain Waterworks, New Britain, Conn., a 5-ton, 33-ft. span hand power crane from the New Jersey Foundry & Machine Co.

Standard Oil Co., 26 Broadway, New York, a 20-ton, hand power crane from an unnamed builder.

P. C. Weil & Son, Bethlehem, Pa., a 10-ton, 40-ft. span, double I beam hand power crane from the Roeper Crane & Hoist Works.

Chester Paper Co., Chester, Pa., a 2-ton, 45-ft. 10-in. electric traveling crane from the Roeper Crane & Hoist Works.

The U. S. Sales Co., manufacturers' representative, 120 Liberty Street, New York, desires to get in touch with manufacturers of rolling machinery, oil burning furnaces and other equipment necessary for rolling angles, flats and other bars from old rails.

The American Brake Shoe & Foundry Co., 30 Church Street, New York, has purchased 17 acres at Portsmouth, Va., as a site for new works. Officials of the company have organized the Ramapo-Ajax Corporation to acquire the plants of the Ramapo Iron Works, Hillburn and Niagara Falls, N. Y., and Niagara Falls, Ont., and the Ajax Forge Co., with plants at Chicago and Superior, Wis. The works will be continued in operation for the manufacture of railroad track material, and improvements will be made. To carry

[illegible] sidiry organization is being sold.

The Staten Island Marble & Tile Works, West New Brighton, S. I., has acquired property, 100 x 140 ft., on Richmond Terrace, as a site for a new plant.

The Baltic Ice Mfg. Co., Inc., 91 Columbia Street, Brooklyn, has plans nearing completion for remodeling the one-story building, 100 x 200 ft., recently acquired, for a new ice-manufacturing plant, estimated to cost about $50,000. A list of equipment will be arranged at an early date. Max Hirsch, 26 Court Street, is architect. Jacob Swartz is president.

The American Can Co., 120 Broadway, New York, has acquired a six-story factory at 118-24 Pearl Street, Brooklyn, on site 100 x 125 ft., adjoining its present plant, and will equip the building for extensions.

The Imperial Hardware Mfg. Co., 511 Flushing Avenue, Brooklyn, plans the installation of equipment for the production of small U-shaped channels and affiliated specialties.

In connection with the acquisition of the Manufacturers' Tool & Die Forks, 185 Twenty-second Street, Brooklyn, by the Frima Radio Corporation, the merged organization will manufacture a line of animated toys at the Brooklyn works. The wireless equipment branch will provide an average production of 2000 radio tube sets and 3000 crystal sets, monthly. William Schilling is president.

Simon Bruner, 64 Fulton Street, New York, manufacturing jeweler, has leased a floor in the building on the southeast corner of Seventh Avenue and Furteenth Street, totaling about 10,000 sq. ft., for the establishment of new works.

John Stahl & Son, 4761 White Plains Avenue, New York, will soon take bids for a four-story addition to their automobile service and repair plant, estimated to cost about $60,000.

The Superintendent of Light Houses, Staten Island, N. Y., will take bids until Sept. 18 for six fuel oil and 14 illuminating oil tanks, as set forth in proposal 13215.

The Alpha Electric Co., 151 West Thirtieth Street, New York, has leased the building at 396-402 Eleventh Avenue, totaling about 50,000 sq. ft., for a new works and distributing plant.

The Leonard Oil Development Co., care of R. H. Weatherhead, Jr., syndicate manager, 61 Broadway, New York, is disposing of a stock issue of $1,400,000, the proceeds to be used for the installation of machinery and development of company properties in Colombia and Ecuador, including drilling equipment, pumping machinery, etc. John W. Leonard, Washington, Pa., is president.

The board of digectors, Masonic Home, Utica, N. Y., will build a new refrigerating and cold storage plant, with warehouse, to cost about $100,000, including equipment. H. P. Knowles, 21 West Forty-ninth Street, New York, is architect.

Leon Nadel, New York, has leased the building at the southwest corner of Whitlock and Bryant Avenues, on site 140 x 150 ft., for an automobile service and repair works.

The Department of Police, 240 Center Street, New York, will build a two-story garage, with machine shop and repair department, at Richmond Terrace and Wall Street, St. George, S. I.

The Wire Wheel Repair Co., 148 West Fifty-fifth Street, New York, has leased the two-story building at 137 West Fifty-sixth Street for a new plant. The structure will be remodeled.

The Schaeffer & Budenberg Mfg. Co., 338 Berry Street, Brooklyn, manufacturer of thermometers, engineering specialties, etc., has been consolidated with the American Steam Gage & Valve Mfg. Co., 208 Camden Street, Boston, manufacturer of a similar line of products. Both plants will be continued in operation.

The New York Central Railroad Co., Grand Central Terminal, New York, will convert its electric generating plant at Yonkers, N. Y., for oil-burning instead of coal. Plans for the new installation are being completed.

Officials of the Sinclair Consolidated Oil Corporation, 45 Nassau Street, New York, have organized the Mammoth Oil Co., under Delaware laws, with capital of $200,500,000, as a subsidiary organization. The new company will operate properties, refineries, etc., in the Teapot Dome fields, Wyoming.

The M. W. Kellogg Co., 117 Westside Avenue, Jersey City, N. J., manufacturer of power plant specialties, piping, etc., has filed plans for a one-story addition, to cost about $150,000, including equipment.

The B. C. Tillinghast Rubber Mfg. Co., Stockton, N. J., recently organized with a capital of $100,000, has acquired the plant of the Stockton Rubber Co. from the receiver. The mill has been closed for more than a year and will be remodeled and improved; new machinery to cost about $30,000 will be installed. It is expected to have the plant ready for operation late in October. William J. McLaughlin is vice-president and general manager, and Dominick Price, secretary and treasurer.

The Hackensack Improvement Commission, Hackensack, N. J., will receive bids until Sept. 25 for pumping equipment, motors and switchboards, to be installed in the municipal sewage plant now in course of construction. Lemuel Lozier, room 3, Bank Building, Main and Mercer Streets, is engineer.

Fernando C. Mesa, Newark, operating an ammunition plant on Chancellor Avenue, Irvington district; R. D. Mesa and Hugo F. Bente have acquired the plant of the Independent Lamp Works, 80 Bergenline Avenue, Union, N. J., from Isadore Haber, receiver. The new owners will reorganize the company and operate the works for the manufacture of incandescent electric lamps.

The Pennsylvania- Jersey Power Co., Jersey City, N. J., recently organized with a capital of $125,000, is planning the construction of a hydroelectric power plant on the Delaware River. The company is headed by Alfred B. Nelson, Charles W. Alpaugh and H. Otto Wittpenn, and represented by Frederick W. Rugge, 75 Montgomery Street, Jersey City.

The J. W. Murray Mfg. Co., 1975 Clay Street, Detroit, manufacturer of automobile bodies and fenders, has leased a portion of the plant of the Durant Motors, Inc., Elizabeth, N. J., for a branch plant. The works will be devoted to the manufacture of bodies and fenders for the Star automobile and other Durant cars. Equipment will be installed to provide for the employment of about 500 men.

The Department of Streets and Public Improvements, City Hall, Newark, Thomas L. Raymond, director, will receive bids until Sept. 21 for a quantity of castings for Watson wagons used by the department.

Charles H. Bennett, 39 Saybrook Place, Newark, N. J., has plans under way for a new two-story automobile service and repair works, to cost about $100,000. Guilbert & Betelle, 546 Broad Street, are architects.

The Newark Automobile Corporation, 436 Clinton Avenue, Newark, will erect a new two-story building at Clinton Place and Quitman Street, to include service and repair departments, estimated to cost about $50,000.

Chicago

CHICAGO, Sept. 11.

MACHINE tool sales have been comparatively light the past week, although considerable business is at the point of closing. General machine shops are taking little interest in the market, but further orders are expected from the railroads and some of the larger industries. The Chicago, Burlington & Quincy will buy against its machine tool lists soon. The Atchison, Topeka & Santa Fe has purchased two milling machines against its old inquiry and still has one or two additional tools to purchase. The Studebaker Corporation, South Bend, Ind., has practically completed buying for its No. 2 plant, but has commenced the construction of an addition to its No. 1 plant. This increased capacity will be used for the manufacture of bodies and springs, and considerable equipment is to be bought. The Nash Motor Co. will duplicate some of its machine tool equipment at its Milwaukee plant, but has not yet done any buying. The International Harvester Co. continues to place orders for its local tractor plant, although some call for special purpose machines, a local tool manufacturer having been awarded an order for several special boring machines. The company looks forward to good business in 1923 and is expected to purchase considerably more machine tool equipment. The Universal Portland Cement Co., Buffington, Ind., has finally purchased a few machines, involving about $7,000, which were listed in an inquiry issued last spring. The Chicago, Rock Island & Pacific is also displaying an interest in a few items on a list which it put out months ago.

Further price advances are reported. The Cincinnati Milling Machine Co. has readjusted its prices, effective Sept. 15, advances ranging from 10 per cent up. The Cincinnati Shaper Co. will advance prices about 20 per cent, effective Oct. 1. The Universal Boring Machine Co., Hudson, Mass., has raised prices on horizontal boring mills approximately 10 per cent.

The remaining electric traveling cranes on the Burlington inquiry have not yet been purchased. The Chicago & North-

western has ordered a 15-ton locomotive coal handling gantry crane, 60 ft. between legs, from the Milwaukee Electric Crane & Mfg. Co. The crane will be leased to the Armour Grain Co. for use at the large grain elevator at South Chicago.

Stephen & Wolff, Inc., Buchanan & Loomis Streets, Rockford, Ill., recently incorporated with $25,000 capital stock, has taken over the former business of Stephen & Wolff and is leasing a small foundry at this location for the manufacture of dental flasks, articulators, bolts for dental flasks, and a general line of bronze, brass, aluminum and white metal castings. The company expects to purchase an engine lathe and several milling machines and turret lathes.

The Electric Fireplace Mfg. Co., 3950 Prairie Avenue, Chicago, recently incorporated with $20,000 capital stock, has leased a plant at the address given for the manufacture of electric fireplaces. No additional manufacturing equipment will be purchased for a time. The officers include Daniel L. Carlin, Daniel N. Meany and J. T. McDermott.

The Imperial Clock Co., Collinsville, Ill., recently incorporated with $28,000 capital stock, has leased a plant at the corner of Main Street and Morrison Avenue, containing about 4000 ft. of floor space. Self-winding weight-driven clocks will be manufactured. The company will use about three multiple-spindle high-speed drill presses, three precision lathes to cost about $2,000 each, gear cutters, milling machines, screw machines, saws, grinders, punch presses and woodworking machines. The officers are J. W. Wick, president, who is also president of Wick Pipe Organ Factory, Highland, Ill.; R. G. Kneedler, vice-president, and Arno Fowler, secretary and treasurer, who is also superintendent in active charge of the management of the business.

The Mid-West Boat & Barge Co., Inc., Grafton, Ill., recently incorporated with $50,000 capital stock, will manufacture boats, barges, tanks, bridges, boat equipment and supplies, structural steel of all kinds, sheet metal work, life boats, work boats and life rafts. A plant containing 25,000 sq. ft. of floor space has been leased at Water Front and Oak Streets. Equipment has been purchased. Officers are Albert A. Coyle, president; John F. Erdelen, vice-president; Samuel Edwards, secretary and treasurer, and Maurice Killeen, manager.

The Acme Tool Co., West Allis, Wis., recently incorporated, has leased buildings at 487-495 Fifty-sixth Avenue, West Allis, Wis., and will manufacture a full line of mason's, carpenter's and cement finisher's tools. The plant is fully equipped for the time being. Officers are J. F. Schnaufer, president; P. H. Mayes, vice-president and George Hoffmann, secretary and treasurer.

The Holmes Projector Co., recently incorporated with $30,000 capital stock, has leased a plant at 432 West Superior Street, Chicago, and will manufacture a motion picture machine. Equipment has been purchased. Officers are C. J. Holmes, president; A. B. Gould, vice-president, and C. M. Swan, secretary and treasurer.

Snow Brothers, automobile dealers, 1011 South Boulevard, Oak Park, Ill., have let contract for a one-story service station and garage, 66 x 165 ft., to cost $50,000.

Luther Brothers, 3523 North Cicero Avenue, Chicago, are asking bids through an architect on a one-story garage, 100 x 150 ft., to cost $60,000.

The Bates Water Bag Co., 7310 South Chicago Avenue, Chicago, will build a two-story factory, 100 x 120 ft., at 8232-40 South Chicago Avenue, to cost $60,000.

The Florence Art Co., 671 West Ohio Street, Chicago, manufacturer of lamp standards, book ends, and candle sticks, from composition material, is receiving bids through Michin, Spitz & Co., 19 West Jackson Boulevard, on a four-story factory, 50 x 108 ft., in North California Avenue and Stave Street, to cost $150,000.

The General Porcelain Enameling Co., 4554 West Congress Street, Chicago, has let contract for a one-story factory, 125 x 170 ft., at 4101-29 Parker Avenue, to cost $48,000.

The Western Electric Co., Hawthorne, Ill., will commence work Sept. 15 on a one-story building, 175 x 556 ft., for the manufacture of heavy rods and wire. The structure will cost $1,000,000.

The Reynolds Wire Co., Dixon, Ill., is completing plans for a new four-story factory, 150 x 150 ft., and will take bids at once. The W. W. Beach Co., Warnock Building, Sioux City, Iowa, is engineer.

The Common Council, Loveland, Colo., is planning for the construction of a hydroelectric power house on the Big Thompson River, Loveland Canyon, estimated to cost close to $400,000, including equipment. L. C. Osborn is engineer.

George McArthur & Sons, Baraboo, Wis., operating the Baraboo Towel Mills, are having plans completed for a new hydroelectric power plant on the Baraboo River. The intiial unit will cost about $30,000.

The Perfection Radio Laboratories Co., 525 Kenilworth Court, Clinton, Iowa, manufacturer of wireless equipment, has preliminary plans under way for a new two-story factory, 100 x 300 ft., to cost $100,000, including machinery. Barger & Musse, 1010 South Fourth Street, are engineers.

A. R. Jensen, Albert Lea, Minn., is arranging a list of equipment for installation in a local automobile service and repair works.

The Post Office Department, Washington, is arranging for the erection of a new aircraft plant at Broadview, Ill., for the Chicago mail service. It will comprise an assembling plant, 40 x 100 ft.; aircraft factory, two stories, 100 x 140 ft., with machine shop, wood-working and other departments, and general warehouse. A power house will be equipped and two hangars, each 100 x 100 ft., constructed. The general superintendent, room 320, Post Office Building, Washington, is in charge.

The Herrick Refrigerator Co., Waterloo, Iowa, has acquired a site for a two-story addition, 42 x 80 ft., with one-story structure adjoining, 32 x 50 ft., estimated to cost about $30,000.

The Waukegan Generating Co., Waukegan, Ill., has plans nearing completion for a new steam-operated electric power house on Dewey Street, estimated to cost in excess of $600,000. The initial unit will have a capacity of 25,000 kw. Sargent & Lundy, 72 West Adams Street, Chicago, are mechanical engineers.

The board of directors, North Shore Sanitary District of Lake County, 295 Anderson Building, Lake Forest, Ill., will receive bids until Sept. 28 for pumping machinery, motors, tanks, filters and other equipment in connection with the two new sewage treatment plants to be constructed. Pearse, Greeley & Hansen, 39 West Adams Street, Chicago, are consulting engineers.

The State Highway and other departments, Pierre, S. D., A. C. Hunt, Secretary of State, have commissioned J. C. Buckbee & Co., 38 South Dearborn Street, Chicago, engineers, to prepare plans for the proposed State-owned cement manufacturing works at Rapid City, S. D., estimated to cost close to $2,000,000, including machinery.

A vocational department will be installed in the new high school to be erected at Lake City, Iowa, for which bonds for $100,000 will be voted at a special election, Sept. 15. William Gordon, Hubbell Building, Des Moines, Iowa, is architect.

Philadelphia

PHILADELPHIA, Sept. 11.

A FIVE-STORY factory, 75 x 160 ft., to be erected by Joseph J. Greenberg, Morris Building, at Broad and Thompson Streets, has been leased by the Nash Automobile Co., Philadelphia, for local headquarters, with service, repair and parts departments. Bids for construction will be asked at once.

The Autocar Co., Ardmore, Pa., manufacturer of motor trucks, is disposing of a preferred stock issue of $1,000,000, a portion of the proceeds to be used for extensions and additional working capital.

The L. H. Gilmer Co., Cottman and Keystone Streets, Philadelphia, manufacturer of belting, etc., has plans under way for an addition. A power house will also be built. Norman Hulme, 1524 Chestnut Street, is architect.

The Department of Supplies, Board of Education, Nineteenth and Chestnut Streets, Philadelphia, is planning to purchase lathes, drill press, jaw chucks, etc., for the vocational department at one of the city schools.

The Pennsylvania Railroad Co., Broad Street Station, Philadelphia, is taking bids until Sept. 14 for new repair shops at Enola, Pa., for steel freight work. A. C. Shand is chief engineer.

The Bureau of Accounts and Supplies, Navy Department, Washington, will receive bids until Sept. 26 for 200 storage batteries for the Philadelphia Navy Yard.

Alfred Box & Co., 813 North Front Street, Philadelphia, manufacturer of hoisting machinery and parts, cranes, etc., has awarded contract to the John N. Gill Construction Co., Otis Building, for a new building at Janney and Ontario Streets.

The Trenton Patent Mfg. Co., 219 Park Street, Trenton, N. J., manufacturer of metal products, has plans for a new factory at East Trenton, where a site has been acquired, for the manufacture of a special cylinder grinding machine, new type piston rings, and kindred specialties. The company has arranged for an increase in capital from $200,000 to $500,000. W. H. Jaeger is president and treasurer.

The Magnetic Pigment Co., Cass Street, Trenton, N. J., has filed plans for an addition, estimated to cost $50,000.

The Hinde & Dauch Paper Co., Gloucester, N. J., manufacturer of corrugated paper products, will build a one-

and other operations. Headquarters of the company are at Sandusky, Ohio.

The Hummel Electric Steel Foundry Co., Conshohocken, Pa., has acquired the plant and business of the Conshohocken Electric Steel Foundry, which it will continue as a branch works. Improvements are planned. The two organizations will be consolidated.

Samuel H. Bell, Reading, Pa., is negotiating for the establishment of a plant to manufacture inner tubes and other rubber specialties.

A one-story power house will be constructed by the Gilbert Wall Paper Co., 728 Linden Avenue, York, Pa., in connection with its new plant. J. A. Dempwolf, Casset Building, is architect.

A vocational department will be installed in the new high school to be constructed at Dallas, Pa., estimated to cost about $150,000. The Board of Education will select an architect to prepare plans at an early date.

The Board of Cumberland County Commissioners, 32 West High Street, Carlisle, Pa., will take bids at once for a central power house and heating plant for the County institutions. Frank G. Fahnestock, Jr., Patriot Bldg., Harrisburg, Pa., is architect.

Vocational departments will be installed in the two new junior high schools to be erected at Lancaster, Pa., estimated to cost about $450,000, each, for which bonds have been voted. The Board of Education will complete plans and commence work at an early date.

C. K. Stadler, Scranton, Pa., head of the C. K. Stadler Co., recently organized, has acquired a site for a factory to manufacture iron and steel products. Plans will be prepared at an early date.

The Holmes Garage Co., West Fairview, Pa., is planning to rebuild its service and repair works recently destroyed by fire. The loss included tools and equipment.

The Lowhill Power & Light Co., Lowhill, Pa., is being organized by C. M. Walters, L. K. Bingaman and P. B. Sawyer, all of Allentown, Pa., to build an electric light and power plant and system in Lowhill Township. The same interests are also organizing the Heidelberg Light & Power Co., to operate a plant and system in Heidelberg Township. The companies are represented by Thomas J. Perkins, Allentown.

The Standard Provision Co., 212 North Front Street, Philadelphia, will install an ice and refrigerating plant in its three-story packing house, 70 x 160 ft., at Willow and Callowhill Streets, estimated to cost $150,000. Conveying and other mechanical apparatus will be installed.

Gaul, Derr & Shearer, 212 North Broad Street, Philadelphia, will build a two-story automobile service and repair works, 56 x 105 ft., at Fairmount Avenue and Sixteenth Street, estimated to cost $100,000. Durham Brothers, 1609 Sansom Street, are architects.

The Phoenix Portland Cement Co., Real Estate Trust Building, Philadelphia, with plant at Nazareth, Pa., will build a power house, machine shop and other buildings in connection with its new plant at North Birmingham, Ala., estimated to cost in excess of $2,000,000. Lindley C. Morton is president, and R. S. Scott, consulting engineer.

Buffalo

BUFFALO, Sept. 11.

CONTRACT has been awarded to John A. Zoll, 398 Bird Avenue, by the Angola Tire & Rubber Co., 270 North Division Street, Buffalo, for a one story addition, 30 x 80 ft.

The General Metalsmiths, Inc., 313 Prendergast Avenue, Jamestown, N. Y., manufacturer of architectural and other bronze, copper and metal products, has awarded contract to Chapman & Graham, 132 Blackstone Avenue, for a new one-story plant, 60 x 250 ft., to cost about $140,000, including equipment. B. C. Davis is general manager.

T. W. Warner, vice-president Durant Motors, Inc., 1819 Broadway, New York, has acquired at a public sale the plant of the New Process Gear Corporation, Syracuse, N. Y., a subsidiary of the Willys Corporation, for $1,904,-000. The purchase, it is said, has been made for individual account. The plant will be continued in operation and tentative plans are under consideration for enlargements.

Klepfer Brothers, 1029 Main Street, Buffalo, are taking bids for a two-story automobile service and repair building, 235 x 570 ft. Albert H. Hopkins, 447 Main Street, is architect.

The Carborundum Co., Niagara Falls, N. Y., manufacturer of abrasive products, has awarded contract to the Turner Construction Co., 242 Madison Avenue, New York, for an addition, 50 x 60 ft.

The Tonawanda Board & Paper Co., Tonawanda, N. Y., operating on Goose Island, is planning for the construction of a new water power plant, estimated to cost $50,000. Maurice W. Simon is president..

Vocational departments will be installed in the two high schools to be erected at Jamestown, N. Y., to be known as the North and South Junior high schools, each two stories and basement, 150 x 190 ft., and 150 x 185 ft., respectively, for which bids on a general contract will be asked at once. The schools will cost $375,000, and $335,000, respectively. Guilbert & Betelle, 546 Broad Street, Newark, N. J., are architects.

The Syracuse Intercepting Sewer Board, room 104, City Hall, Syracuse, N. Y., will receive bids until Oct. 10 for equipment for the pumping station now in course of construction, including four 24 in. centrifugal pumps, direct-connected to 75-hp. variable speed motors; priming pumps and sump pumps; 10-kw. motor generator sets; switchboard and control mechanisms, hydraulically operated sluice gate valve, and three electrically operated sluice gate valves; one 7½-ton, hand-operated, traveling crane; tramrail, with electrically operated hoist and ½-cu. yd. capacity clam shell bucket, piping, wiring, etc. Harry J. Hamlin is secretary.

The Board of Education, Lockport, N. Y., is arranging a list of metal-working and other equipment for installation in the vocational shop at the Chestnut Street school.

J. B. White, Bemus Point, N. Y., has plans in preparation for a two-story automobile service and repair works. Johnson & Ford, Fenton Building, Jamestown, N. Y., are architects.

The Globe Malleable Iron & Steel Co., 101 Greenway Avenue, Syracuse, N. Y., is planning for the erection of an addition to be used for the most part for the manufacture of oil-operated engines and parts. H. E. Elmer is treasurer and general manager.

The Board of Public Works, North Tonawanda, N. Y., has plans nearing completion for the installation of three lift pumping stations, with electrically operated machinery, estimated to cost $50,000.

Christian Schlicker, 12 Bloomingdale Street, Rochester, N. Y., is planning to purchase precision and other equipment for the manufacture of surgical instruments.

A vocational department will be installed in the new high school to be erected at Attica, N. Y., for which bonds for $262,000 have been voted.

New England

BOSTON, Sept. 12.

WITH the month almost half over, September promises to be an unprofitable period for machine tool dealers in this section. The only sale of importance reported the past week was a 90-in. driving wheel lathe purchased by the Boston & Albany Railroad for its Springfield shop. Sales of individual tools of much less value are noted, but the aggregate is not more than a dozen. Garages predominate among the purchasers of used equipment. Reports from machine tool builders are more encouraging than from dealers. Prices on new machine tools hold firm. The cost of castings, labor, etc., has reached a point where production and selling prices are close. It is difficult to size up used tool prices because of the inactivity in the market.

Small tools continue to move fairly well, but not as freely as last month. Prices are steadily maintained. Manufacturers of files have advanced prices 10 per cent.

Bids have closed on a proposed plant, three stories, 60 x 240 ft., to be erected at Attleboro, Mass., by the Hartley Clock Co., 68 Devonshire Street, Boston.

The H. & B. American Machine Co., Pawtucket, R. I., has awarded contract for a one-story addition, 100 x 280 ft., to its Attleboro plant.

J. E. Conant & Co., Lowell, Mass., auctioneers, report that approximately $236,000 in real estate, machinery and mechanical equipment was disposed of at the recent sale of the Morris Metal Products Co. Bridgeport, Conn., plant.

Some New England builders of wood-working machinery are busy and instances are noted where work has been given to outside firms in an effort to keep up with orders. Trade schools and foundries are among the largest buyers of such equipment. The Board of Education, Westfield, Mass., has taken bids for a considerable amount of wood-working and pattern making equipment for a trade school.

The Westinghouse Electric & Mfg. Co., Pittsburgh, has leased 10,000 sq. ft. of space in the factory of the Bridgeport Engineering Co., Seymour Street, Stratford, for the establishment of a service and repair plant for the Naugatuck Valley

district. L. D. Canfield, district sales manager in charge of the New York territory, will have the supervision of the new plant.

The Belknap Mfg. Co., 149 Water Street, Bridgeport, Conn., manufacturer of steam and water goods, etc., has purchased the machine shop of the former Morris Metal Products Co., on Union Avenue. It is two stories, 190 x 375 ft., of brick and steel. Price is said to be $100,000. The Belknap company is moving from its factory on Water Street.

The Salmon Falls Mfg. Co., cotton goods, Salmon Falls, N. H., has awarded contract for the construction of the new hydroelectric power station to the Central Engineering & Construction Co., Central Falls, R. I. It will be one story, 30 x 80 ft., of reinforced concrete, and will cost about $250,000. C. T. Main, 200 Devonshire Street, Boston, is the engineer.

The Boston Sand & Gravel Co., 88 Broad Street, Boston, will build a new one-story machine shop on Condor Street, East Boston, to cost about $13,000. P. F. Ayer is secretary.

The Shambow Shuttle Co., Woonsocket, R. I., manufacturer of textile equipment, has acquired the plant of the Saluda Co., near Greenville, S. C., for the establishment of a branch plant. The present buildings will be remodeled.

The Westfield Machine Co., Westfield, Mass., manufacturer of wireless equipment, etc., is said to be planning to rebuild the portion of its factory destroyed by fire Aug. 15.

Herbert B. Rust, Concord, N. H., and associates, have made application for permission to construct a hydroelectric power plant on Ayer's Island, Penigewasset River, near Bristol, N. H., to cost close to $1,000,000, including dam and transmission system.

H. Frederick Hadden, South Berwick, Me., is in the market for a machine to turn hammer and axle handles.

The Board of Contract and Supply, Providence, R. I., will install two portal gantry cranes at the municipal wharf, Fields Point.

Pittsburgh

PITTSBURGH, Sept. 11.

THE local machine tool trade still is sustained by hope rather than performance. There is no lack of inquiry and some prospects which run into fairly large sums of money have been quoted against, but orders for the most part are for individual tools and generally out of dealers' stocks. Dealers having tools, which they have carried for some time, have been making an effort to clean them out and some extremely low prices have been named. With manufacturers' quotations showing a strong upward tendency, prices quoted on dealers' stocks have been exceptionally attractive. As far as results are concerned, however, buyers have figured the low prices to mean that the tools were out of date and have been cautious. The demand does not yet appear to be broad or strong enough to sustain advances in quotations and it is admitted that on recent business competition ruled the prices that were paid.

In heavy equipment the past week has been featured by the placing of the mills and drives for the new sheet mill of the Weirton Steel Co., Weirton, W. Va., the mills being awarded the United Engineering & Foundry Co., while the drives, two 1200-hp. motors, equipped with liquid slip regulators, will be furnished by the Allis-Chalmers Mfg. Co. The Allis-Chalmers Mfg. Co. also has taken a 100-hp. motor for a mill drive for the American Nickel Corporation, Hyde, Pa. The Westinghouse Electric & Mfg. Co., recently was awarded a 3000-kw. turbo-alternator by the U. S. Coal & Coke Co., a Steel Corporation subsidiary, Gary, W. Va. The crane market is slow as far as sales go, but there seems to be no decline in inquiry and cranes for the sheet mill of the Weirton Steel Co. and for the Granite City, Ill., plant of the National Enameling & Stamping Co. are expected to be placed this week.

The Gifford-Wood Co., 26 Second Hill, Hudson, N. Y., manufacturer of elevating and conveying machinery, ice machinery, etc., has purchased property at Hulton, near Pittsburgh, for a branch plant. The present buildings will be remodeled and operations commenced at an early date. About 150 men will be employed for initial production. William B. Wood is president, and Benjamin Gifford, vice-president.

The Chevrolet Motor Co., Baum Boulevard, Pittsburgh, has leased two floors in the building at Bennett Street and Girt's Alley, for extensions in its service and repair departments.

The board of directors, Duquesne University, Pittsburgh, will build a new power house to cost about $150,000, including gymnasium building, adjoining.

The Keystone Garage, Monongahela, Pa., will soon take new bids for a two-story service and repair works, 60 x 200 ft., estimated to cost close to $50,000. C. K. Downer, 248 Boylston Street, Boston, is architect.

The West Penn Traction & Water Power Co., West Penn Building, Pittsburgh, has tentative plans for a new power house near Charleroi, Pa., to cost about $850,000, including transmission system.

E. M. Bowen, Oil City, Pa., operating a Ford automobile agency, is taking bids for a three-story service and repair works, 70 x 80 ft., estimated to cost $45,000. W. H. Crosby, Masonic Building, is architect.

The Buick Motor Co., Baum Boulevard and Euclid Street, Pittsburgh, has awarded contract to Conley & DeMey, Pittsburgh, for a new building for local headquarters, including service and repair departments, etc., estimated to cost $200,000.

The Beech Bottom Power Co., Beech Bottom, W. Va., is planning to rebuild the portion of its power house destroyed by fire Sept. 1, with loss estimated at about $30,000, including equipment.

The Centre Foundry & Machine Co., 2011 Main Street, Wheeling, W. Va., is planning for the installation of additional equipment at its Warwood, W. Va., foundry.

R. E. Matticks, Logan, W. Va., is preparing plans for a three-story automobile service and repair building, 52 x 120 ft., to cost $50,000. Meanor & Handloser, Robson-Pritchard Building, Huntington, W. Va., are architects.

The Guyan Machine Shops, Logan, W. Va., are making inquiries for a slitting shear and punch, to handle ½-in. plate.

The A. C. Love Co., Huntington, W. Va., is in the market for a 40-hp. locomotive boiler with engine.

The Ellwood Steel Corporation, Elwood, Pa., plans the installation of new wire-drawing and other equipment at the plant of the Sharon Pressed Steel Co., recently acquired.

Detroit

DETROIT, Sept. 11.

INQUIRIES for machine tools have been very light since the latter part of August. That month, however, showed a good volume of business, one representative reporting the best business for any month this year. The Ford Motor Co. notified machine tool manufacturers that it would receive all orders placed and continue repairs on all machinery.

Dodge Brothers, Detroit, have announced that work will begin immediately on the construction of an eight-story addition to their plant, to cost about $1,500,000. The new building will contain approximately 500,000 sq. ft. and will be 400 ft. long. It will be used entirely for manufacturing purposes and will enable the company to increase its production from 650 to 900 or 1000 cars per day.

Campbell, Wyant & Cannon, Muskegon, Mich., are completing the second unit of their foundry, on which operations were suspended in 1920, and expect to take off the first heat the latter part of September. The plant is being equipped with special machinery for the production of automobile castings and will cost $1,500,000.

The Green Wrench Co., Marshall, Mich., has been incorporated with a capital stock of $50,000 and will let contracts for drop forging and screw machine work. Other machining and assembling will be done at the company's plant. It is in the market for disk grinders, milling machines, geometric threading machines, light horizontal drilling machines and supplies. Paul G. Green is president.

The Minneapolis, St. Paul & Sault Ste. Marie Railroad Co., Minneapolis, Minn., is planning to rebuild its shops at Gladstone, Mich., destroyed by fire a few months ago. The new buildings will include engine house, machine shops, rail shop, assembling works and, with machinery, will cost approximately the amount of the fire loss.

The Hayes Wheel Co., Jackson, Mich., will commence the immediate erection of a one-story addition, 100 x 160 ft., and one-story power house, 50 x 60 ft., estimated to cost in excess of $200,000, with equipment. The company has closed contracts with the Durant Motors, Inc., New York, for wheels for the Durant, Star and other automobiles under this management.

The Munising, Marquette & Southeastern Railway Co., and the Lake Superior, Ishpeming Railway Co., affiliated roads, both of Marquette, Mich., have plans for new shops on local site, including general machine repair shop, coach works, steel

car shops and other buildings, estimated to cost $300,000 with machinery. H. R. Harris is general manager of both roads, which are operated by the Cleveland-Cliffs Iron Co., Cleveland.

The J. & S. Plating Co., Jackson, Mich., recently organized, will operate a plant at 112 East Washington Street for the manufacture of plated metal products, primarily for automobile service. George J. Sights is general manager.

Baltimore

BALTIMORE, Sept. 11.

THE Smith & Williams Shipbuilding Co., Salisbury, Md., has acquired about 8 acres adjoining its plant for extensions. Plans are under way for a new cradle railroad, 250 ft. long, with hauling capacity for 1000-ton vessels and smaller, with additional construction and repair shops, estimated to cost about $40,000.

The Richmond Pressed Metal Works, Inc., 601 Stockton Street, Richmond, Va., has awarded contract to the F. H. Boatwright Co., Richmond, for a new one-story plant, 110 x 160 ft., to cost about $30,000. The installation will include shears, punch presses, plating equipment etc. The company recently increased its capital to $150,000 for expansion.

The Parker Mfg. Co., Suffolk, Va., manufacturer of carriages, wagons and parts, has tentative plans for rebuilding the portion of its plant recently destroyed by fire with loss of about $50,000. The new structure will cost approximately a like amount, including equipment. C. E. Parker is head.

The Wilmington Sugar Refining Co., South Wilmington, Del., is perfecting plans for the early resumption of construction of its local refinery, held in abeyance for a number of weeks. The proposed buildings with machinery will cost [illegible] of $[illegible],000,000.

A vocational department will be installed in the new two-story high school, 80 x 280 ft., to be erected at Claymont, Del., estimated to cost $275,000, for which bids will be called at once. Coffin & Coffin, 522 Fifth Avenue, New York, are architects.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until Oct. 3 for an industrial electric truck for the Mare Island Navy Yard, San Francisco, as set forth in schedule 136; until Sept. 19, for 19,500 ft. of electric cable for the Portsmouth, N. H., Navy Yard, as specified in schedule 128.

Lane Brothers, 3117 West North Avenue, Baltimore, are completing plans for a two-story automobile service and repair building, 50 x 150 ft., on North Avenue. Bids will soon be asked by W. B. Gerwig, 600 Equitable Building, architect.

The Youghiogheny Power & Electric Co., Rockwood, Pa., is perfecting plans for hydroelectric power plants on the Youghiogheny River, near Oakland, Md., and on Muddy and Deep creeks, in the same district, estimated to cost in excess of $500,000.

The Potomac Public Service Co., Hagerstown, Md., has acquired property at Williamsport, Md., for a new steam-operated electric generating plant, estimated to cost approximately $1,500,000, with machinery and transmission system. The company is a subsidiary of the American Water Works & Electric Co., 50 Broad Street, New York.

The Saco-Lowell Shops, Charlotte, N. C., manufacturers of textile machinery, have awarded contract to T. C. Thompson & Brother, Charlotte, for a two-story machine shop, 80 x 160 ft.; repair and distributing shop and office at Mint and Commerce Streets, estimated to cost about $150,000. Headquarters of the company are at 77 Franklin Street, Boston. Lockwood, Greene & Co., Atlanta, Ga., are architects and engineers.

A vocational department will be installed in the new high school to be constructed at Edgecombe, N. C., estimated to cost $90,000, for which bids have been asked. The Board of Education, Tarboro, N. C., R. E. Sentell superintendent, is in charge. J. M. Kennedy, Merchants' Bank Building, Raleigh, N. C., is architect.

The Norfolk & Western Railway Co., Norfolk, Va., will install new electrically-operated coal dumping and handling machinery at its Pier No. 3, to double, approximately, the present capacity. It will also make improvements in install new machinery at its Lamberts Point coaling piers. The entire work will cost approximately $600,000.

The Shambow Spool Co., Greenville, S. C., has tentative [illegible] made destroyed by fire Aug. 28 with loss estimated at $60,000, including machinery. The company formerly was known as the Greenville Spool & Mfg. Co.

The Lamar Welding Co., Atlanta, Ga., recently organized, has acquired the plant of the Standard Gas Products Co., [illegible] welding and general repair works. John Lamar heads the company.

John B. Billey, Richmond, Va., will build a two-story addition to his automobile service and repair works at 408 North Third Street, estimated to cost about $15,000, exclusive of equipment.

The Board of Commissioners, St. Michaels, Md., is disposing of a bond issue of $20,000, the proceeds to be used for extensions and improvements in the municipal electric plant and system. Thomas H. Sewell is town clerk.

The Purchasing Agent, Post Office Department, Washington, will take bids until Sept 18, for 500 boxes of lock washers, ¾ x 3/16 x 3/32 in.

The Dawson Variety Co., Dawson, Ga., is planning to rebuilt its machine shops recently destroyed by fire. An official estimate of loss has not been announced.

A vocational department will be installed in the new junior high school to be erected at Atlanta, Ga., to be known as the Northwest Junior High School, for which bids have been asked. It will cost in excess of $190,000. Marye, Alger & Alger, Inc., Atlanta, are architects.

The Georgia Cement & Stone Co. Portland, Ga., is remodeling its works and plans to place the mill in operation at an early date. New equipment will be installed. The company was acquired recently by the Nicholson Corporation. John A. Blank is general superintendent.

Walden & Massengill, McIntyre, Ga., recently organized, will operate clay properties in this section and contemplate the installation of a refinery later. The company is headed by H. A. Walden and C. G. Massengill.

Cleveland

CLEVELAND, Sept. 11.

MACHINE-TOOL business continues dull, although there seems to be a little improvement in some lines. A local manufacturer of vertical boring mills reports an increase in orders but manufacturers of turret lathes have made few sales this month. No new inquiry is coming from the railroads. A local dealer the past week booked an order for 11 lathes for equipping a new plant in Cleveland to manufacture automobile parts, and the same interest, recently reported as inquiring for about 40 machines, is understood to have also purchased eight other tools. With this exception dealers' sales were limited to single machines.

Announcements of price advances continue. The Rockford Milling Machine Co., Rockford, Ill., on Sept. 15 will advance prices 10 per cent on cone drive milling machines and 12½ per cent on single pulley drive machines. The Foster Machine Co., Elkhart, Ind., has announced a slight advance on its line of screw machines.

Locomotive crane builders report an improvement in inquiries. The Alpha Portland Cement Co. has placed an order with the Whiting Corporation for a 30-ton locomotive crane.

The Otis Steel Co. continues to purchase equipment for its new plant. It has placed orders with the Alliance Machine Co., Alliance, Ohio, for eight cranes for its open-hearth blooming mill and sheet bar mill departments. The order includes a 175-ton and a 100-ton ladle crane and six cranes of 50 tons and smaller capacity. Six or eight cranes for its strip mill are still to be placed. The company has placed with the Mackintosh Hemphill Co. an order for a 24-in. sheet bar mill and recently placed an order for a 40-in. blooming mill with the same company.

The American Coach & Body Co., Cleveland, has purchased two plants of the James Holam Mfg. Co., of that city, one at Clark Avenue and West Thirty-eighth Street, for the manufacture of automobile bodies, and the other at Clark Avenue and West Forty-first Street, to be used for a metal-working shop. The Holam company has retained a third plant on Brook Park Road.

The Industrial Tool Co., Cleveland, has been formed to engage in jobbing and special machine work and has placed orders for a number of machine tools for its plant at 5518 Euclid Avenue. George Somerfield is the manager.

The Cleveland Stone Co., Cleveland, has purchased the plant of the Sterling Grinding Wheel Co., Tiffin, Ohio, manufacturer of grinding wheels and grinding machines. The purchase of stock of some of the large owners was made recently and a few days ago the remainder of the stock of the company was purchased. The deal is reported to have

involved approximately $250,000. The new owners plan to enlarge the plant and extend the line of manufacture of abrasive wheels and materials. The Cleveland Wheel company has been reorganized with the election of H. W. Caldwell president, D. W. Walker, vice-president, and J. R. Miller secretary. These men are respectively vice-president, president and secretary of the Cleveland Stone Co.

Milwaukee

MILWAUKEE, Sept. 11.

INCREASING activity is noted by machine tool manufacturers so far this month which is an improvement over the average for August. Some requirements are coming from the railroads and a considerably larger volume is expected to develop when shops of the transportation companies are on a more nearly normal basis. Automotive industries are buying steadily against current needs but placing no large lots. Inquiry the past week has been more active than for about three to four weeks, probably owing to the better industrial and transportation outlook and the prospect of higher prices. Actual business, however, is slow to develop. Tool builders are able to maintain operations without any let-down, with some showing small but steady gains in schedules and working forces.

The plant and property of the Conradson Machine Tool Co., Green Bay, Wis., has been purchased by Joseph T. Ryerson & Son, Chicago, for $55,000, including the assumption of a mortgage of $10,000. It is stated, however, that the Ryerson company expects to redispose of the property, since it is not engaged in the manufacturing business. It has been marketing the output of the Conradson company since this business was established about four years ago to manufacture turret lathes and other machine tools, bearing the name Conradson-Ryerson.

The Wheary-Burge Trunk Co., Racine, Wis., has been incorporated with a capital stock of $500,000 by George W. Wheary, Harry L. Burge, Charles O. Bergener and Morton E. Walker, attorney. As previously noted, the interests which have been incorporated are establishing a factory on three floors of the former Racine-Sattley carriage works at Racine Junction, to manufacture trunks and other traveling goods. Machinery and other equipment is now being purchased.

The Sewerage Commission of Milwaukee, 508 Market Street, is asking bids until Sept. 29 for the complete equipment of a feed water softening and purification plant in connection with the steam generating plant under construction on Jones Island. John H. Fowles is secretary.

The M. Hilty Lumber Co., 3-15 Twelfth Street, Milwaukee, will build a general wood-working factory with a separate power plant representing an estimated investment of $350,000 at the east approach to the Grand Avenue viaduct. It will be of brick and mill construction, 102 x 132 ft., three stories. The power plant will be equipped with a 500-hp. uniflow type engine, two 150-hp. boilers and superheaters, and a 250-kw. generator set. Cahill & Douglas, consulting engineers, 217 West Water Street, local, are designing the power plant and will purchase the equipment.

The Board of Education, Hayward, Wis., has engaged E. F. Johnson, architect, Superior, Wis., to draw plans for a new high school, with a vocational training department, to cost not more than $150,000.

The Nekoosa Iron Works, Nekoosa, Wis., founder and machinist, has let the general contract to Manske & Henry, Wood Building, Wisconsin Rapids, Wis., for a one-story addition, 36 x 75 ft., estimated to cost $15,000 with equipment. M. J. Powers is president.

The Marathon Motor Car Co., Wausau, Wis., Ford dealer, is buying additional equipment for a $75,000 extension to its sales and service building now under construction. Miscellaneous floor equipment, shop fixtures, etc., are included in the requirements.

The Badger Cabinet Co., Plymouth, Wis., manufacturer of veneers, panels, cabinets, talking machines, etc., has decided to rebuild its factory, destroyed by fire Jan. 1 with loss of $150,000. The present investment will be about $75,000. The building will be of brick and tile, one story, 150 x 200 ft. A full complement of new machinery is being purchased.

E. H. Ramm, New London, Wis., has plans for a new garage and service shop building, 50 x 120 ft., to accommodate his branch house business at Clintonville, Wis. The cost is estimated at $20,000 complete.

The Modern Auto Parts Co., Sheboygan, Wis., has been chartered to manufacture a general line of automobile accessories, parts and specialties. It is capitalized at $18,000 and the principals are J. J. McNulty, R. P. Loop and H. J. Sieners. A small shop will be equipped at once.

The John Torrance & Son foundry, LaCrosse, Wis., was damaged about $5,000 by fire Sept. 5, but little replacement of equipment will be required, and operations have been only slightly interrupted.

W. H. St. John, 205 North Van Buren Street, Green Bay, Wis., has engaged Earl F. Miller, Inc., architect, Appleton, Wis., to design a garage and machine shop, 48 x 120 ft., part two stories and basement, to be erected in Appleton. The cost is estimated at $25,000.

The Kidwell Boiler & Engineering Co., 288-292 East Water Street, Milwaukee, has taken over the plant of the defunct Northwestern Bridge & Iron Co., at Thirty-second Street and Hopkins Road. Some re-equipment work is under way. The company specializes in the manufacture of high pressure boilers. J. F. Jackson is president and Edgar Kidwell general manager of the company.

The M. Hilty Lumber Co., 3-15 Twelfth Street, Milwaukee, will build a wood-working factory and power plant, representing an investment of $350,000, at the east approach to the Grand Avenue viaduct. It will be three stories, 102 x 133 ft., of brick and mill construction, and was designed and will be erected under the supervision of Cahill & Douglas, consulting engineers, 217 West Water Street, Milwaukee. The power plant equipment to be purchased includes a 500-hp. uniflow type engine, two 150-hp. boilers and superheaters, and a 250-kw. generator set and appurtenances.

The Hohman-Nelson Co., Eau Claire, Wis., has been incorporated with a capital stock of $14,000 to take over a foundry and machine shop business operated by A. B. Hohman and A. J. Nelson. J. G. Owen is associated with them in the development of the business. Plans for enlargement are under consideration, but details are not available.

Cincinnati

CINCINNATI, Sept. 11.

SO far this month the machinery market has not shown great activity, due to unsettled conditions as a result of the railroad strike and announcements that many manufacturing plants are about to close for lack of fuel. The tone of the market is distinctly improved, however, and a fair number of long outstanding inquiries are being closed. The certainty that prices of machine tools will advance, coupled with the announcements already made, is responsible in a large measure for a number of orders booked by local manufacturers the past week. Formal orders have not yet been received by makers who participated largely in the recent railroad buying, but these are expected this week. The only new inquiry of size comes from the Central of Georgia Railway Co., which has issued by telegraph a list of approximately 15 miscellaneous machines.

A manufacturer of boring mills has advanced prices approximately 10 per cent and it is expected that other announcements will follow shortly. The Cincinnati Milling Machine Co. has made an advance of approximately 12½ per cent on milling machines, effective Sept. 15.

Agricultural implement manufacturers report steadily increasing business, both for domestic and foreign account. Makers of wood-working machinery are running nearly full time and road-making machinery builders are operating at capacity. The foundry situation in this district shows but slight improvement, and if the Ford Motor Co. closes its plants on Sept. 16 a number of shops will be obliged to greatly reduce forces.

The Gardner-Harvey Paper Co., Middletown, Ohio, will build an addition to its plant to cost about $150,000. New paper-making machinery will be installed.

The Rayner Auto Safe Lock Co., Louisville, Ky., has been incorporated with a capitalization of $25,000 to manufacture a safety automobile lock invented by H. L. Rayner, who heads the company as president.

The Standard Bolt Corporation, Columbus, Ohio, which

was damaged to the extent of $[illegible] by fire. A [illegible] will be rebuilt. Plans have been completed for a new blast furnace mill to replace the one destroyed and it is expected that work will commence within the next two weeks.

Work will commence shortly on an addition to the power plant of the Dayton Power & Light Co., Millers' Ford, Ohio. The new station will house three 2000-hp. boilers, and a 20,000-kw. steam turbine. The addition will also include a completely equipped machine shop, [illegible] x 140 ft.

Indiana

INDIANAPOLIS, Sept. 11.

A NEW one-story plant will be erected by the Automotive Gear Co., Richmond, Ind., care of J. W. Mueller, Richmond, [illegible] x 600 ft., estimated to cost $[illegible].

The Franklin-Indianapolis Co., Indianapolis, recently organized as a branch of the Franklin Automobile Co., Syracuse, N. Y., will establish a service and repair department in the building at 1112-14 North Meridian Street, to include a complete machine shop. H. H. Alexander and E. J. Erber head the company.

The Carbon Fire Brick & Coal Co., Carbon, Ind., will build an addition to its fire brick and refractory plant to cost about $150,000, including equipment. E. E. Dean is president.

The Yellow Cab Line, Douglas and Harrison Streets, Indianapolis, will build a one and two-story and basement automobile service and repair works, 150 x 250 ft., at Fulton and Main Streets.

The Glencoe Coal Co., operating the Glencoe mine No. 1, near Terre Haute, Ind., plans for the early rebuilding of the power house at its properties, destroyed by fire, Sept. 3.

A vocational department will be installed in the two-story high school to be erected at Evansville, Ind., 30 x 250 ft., to cost about $300,000. J. C. Llewellyn, 38 South Dearborn Street, Chicago, is architect.

The International Lead Refining Co., McCook Avenue, East Chicago, Ind., will soon commence the erection of a one-story addition, 50 x 100 ft., estimated to cost about $30,000.

J. E. Ford, Harrison and Douglas Streets, Fort Wayne, Ind., is completing plans for a two-story automobile service and repair building, 150 x 250 ft., estimated to cost $75,000. C. R. Weatherhogg, Citizens' Trust Building, is architect.

The Universal Burner Co., Logansport, Ind., recently organized to manufacture oil burners and oil-burning devices, is selecting a site for a new plant. Allen Nelson, Logansport, heads the company.

The Rochester Bridge Co., Rochester, Ind., will arrange a portion of its local works for car repair operations. A contract has been secured from the Erie Railroad for light railroad car repairs.

The Gulf States

BIRMINGHAM, Sept. 11

PLANS are being drawn for a new plant for the Trinity Paper Mills Corporation, Dallas, Tex., organized with a capital of $6,000,000. It is estimated to cost in excess of $300,000, including machinery. J. V. Webb is president; J. M. Irwin, vice-president, and Adam H. Davidson, treasurer.

The Birmingham Stove & Range Co., Birmingham, has preliminary plans for the construction of an addition. A new department will be installed for the manufacture of gas ranges. B. H. Hartsfield is general manager.

The La Feria Water Improvement District, Cameron County No. 3, La Feria, Tex., will receive bids until Sept. 27 for a Diesel or semi-Diesel engine, direct-connected to a centrifugal volute pump. A. W. Anthor is manager.

The Kreiss Process Products Co., room 205 Graham Building, Jacksonville, Fla., recently organized, has plans under way for a new factory to manufacture fertilizer products. The installation will include mixing apparatus, rotary dryers, screens, etc. William B. Taber is general manager.

Fire, Sept. 5, destroyed the sugar refinery of the Elm Hall Refinery, Napoleonville, La., with loss estimated in excess of $1,000,000, including machinery. The company is operated by the I. Godchaux Sugar Co. It is planned to rebuild.

Paul O. Trahan, Gueydan, La., and associates, are organizing the Tractor Safety Attachment Co., to establish and operate a plant for the manufacture of patented mechanical specialties.

The Stringer Brothers Foundry Co., 109 North Dearborn Street, Chicago, manufacturer of cast iron plumbing products, has commenced the erection of an addition to its branch plant at Gadsden, Ala.

The Atlantic Ice & Coal Co., Montgomery, Ala., is planning the erection of a new cold storage and ice-manufacturing plant to cost about $250,000, including machinery.

The Sewerage and Water Board, New Orleans, will receive bids until Oct. 10 for one 6000-kw. steam turbine and auxiliary equipment, for municipal service. A. G. Moffat is secretary.

The Texas Power & Light Co., Dallas, Tex., has arranged for an increase in capital of $500,000, the proceeds to be used for extensions and improvements in power plants and systems. The company is operating in 90 counties of Texas. J. E. Horn is treasurer.

The Sour Lake Lumber Co., Sour Lake, La., has tentative plans for rebuilding the portion of its mill destroyed by fire, Aug. 31, with loss close to $300,000, including machinery.

Edward Michel and E. H. Madere, 205 Whitney Central Building, New Orleans, associated, are organizing a new company capitalized at $100,000, to establish and operate a plant for the manufacture of special rotating cutting equipment.

The Common Council, Monroe, La., is arranging for a bond issue of $15,000, the proceeds to be used for extensions and improvements in the municipal power plant.

The Alabama Machinery & Supply Co., Montgomery, Ala., is arranging for an increase in capital of $100,000, a large part of the proceeds to be used for extensions and improvements.

The Bacon Motor Co., Miami, Fla., has awarded contract to P. J. Davis, Miami, for a two-story automobile service and repair building, 80 x 140 ft., estimated to cost close to $90,000.

Fire, Sept. 2, destroyed a portion of the car shops and pumping plant of the Atlantic Coast Line Railroad, Lakeland, Fla. An official estimate of loss has not been made. It is planned to rebuild. Main offices of the company are at Wilmington, N. C.

The Gulf States Portland Cement Co., Demopolis, Ala., has plans for enlargements to double the present capacity of 1200 bbl. per day. Work will commence at an early date and a list of equipment prepared.

The Jarreau Motor Co., New Orleans, has acquired property at Carrollton Avenue and Fontainbleau Drive, for a two-story service and repair building, 30 x 110 ft.

Strickland & Hazard, Ripley, Miss., are planning to rebuild their lumber plant, including saw mill and planing mill, recently destroyed by fire with loss estimated at $60,000, including equipment.

The Central South

ST. LOUIS, Sept. 11.

THE Kaw Boiler Works, Parallel Avenue, Kansas City, Mo., is planning for an addition to its local works to double approximately the present capacity. The main plant and headquarters are at Kansas City, Kan.

J. C. Conley, 623 Murdock Street, Wichita, Kan., operating a general machine and repair shop, will install a new lathe, drill press and other tools.

The Arkansas Light & Power Co., Arkadelphia, Ark., is planning the installation of a hydroelectric power plant on the Illinois River, near Russellville, Ark., to include two electric generators, wate rturbines and auxiliary machinery, estimated to cost close to $100,000. Plans are also under way for a new pulverized fuel plant in the vicinity of Bernice, Ark., to utilize mine waste. H. C. Couch is president.

The Central Mfg. Co., Inc., 2521-29 Montgomery Street, St. Louis, manufacturer of electrically-operated washing machines, is planning to rebuild the portion of its factory destroyed by fire Aug. 29. An official estimate of loss has not been made.

The Theiling-Lothmann Mfg. Co., 3810 North Ninth Street, St. Louis, is considering tentative plans for rebuilding the portion of its wook-working plant destroyed by fire Aug. 27, with loss approximating $90,000, including machinery.

The Casey-Hedges Co., Chattanooga, Tenn., manufacturer of boilers, tanks, stacks, etc., has acquired over 40 acres in the Missionary Ridge section, a portion of the site to be used for a new plant.

A vocational department will be installed in the new high school to be erected at Jennings, Kan., two-stories, 61 x 132 ft., estimated to cost $80,000, for which work will commence at once. Smith & English, Nelson Building, Hutchinson Building, Hutchinson, Kan., are architects.

The Van Buren Glass Co., Van Buren, Ark., has been organized to take over the plant and business of the Arkansas Products Co., specializing in the manufacture of steam gage

tubing and other precision glass specialties. The plant, which has been closed for about a year, will be remodeled and additional equipment installed for the production of a new line of glass products. Howard Pratt is manager.

The DeLong Machine Co., East Murdock Street, Wichita, Kan., plans the installation of a lathe, drill press and other machine tools. J. F. DeLong is head.

Vocational departments will be installed in the three new junior high schools to be erected at Springfield, Mo., upon which work will be placed under way at an early date. The structures will be each three-stories, 63 x 175 ft.; 60 x 172 ft., and 60 x 170 ft., estimated to cost $180,000, $200,000 and $200,000, respectively. Earl Hawkins & Co., 400 McDaniel Building, are architects.

The Central Power & Light Co., Walnut Ridge, Ark., is arranging for the installation of additional equipment at its power plant.

The Missouri Electric Light & Power Co., St. Louis, is being organized by officials of the Union Electric Light & Power Co., to succeed the latter company, under a plan approved by the Public Service Commission. The new company will be capitalized at $25,000,000 and plans are being perfected for the expenditure of a large fund for extensions and improvements in power plants and system, including the construction of a power plant near the municipal bridge.

The Imboden Hydro-Electric Power & Mfg. Co., Imboden, Ark., recently organized with a capital of $100,000, is considering plans for the establishment of a factory to manufacture agricultural equipment. W. R. Lane is president.

The Common Council, McCracken, Kan., has plans nearing completion for a new municipal electric power plant to cost close to $50,000. The Ruckel Engineering Co., Hutchinson, Kan., is engineer.

The Meade Fibre Co., Kingsport, Tenn., is perfecting plans for erection of a factory to manufacture paper and fibre products, estimated to cost in excess of $600,000, including machinery. J. H. Thickens is general manager.

The Clover Farm Dairy Co., 789 Union Avenue, Memphis, Tenn., will build a new ice-manufacturing plant in connection with a three-story dairy, 60 x 140 ft., at Union Avenue and Walnut Street. A power plant will also be constructed. The entire works will cost about $250,000, including equipment. L. N. Leonard is general manager.

A vocational department will be installed in the new high school, 75 x 164 ft., to be erected at Coal Creek, Tenn. Manly & Young, Knoxville, Tenn., are architects.

A one-story power plant will be constructed by the Dixie Spinning Mill, affiliated with the Dixie Mercerizing Co., Chattanooga, Tenn., in connection with its new spinning mill, estimated to cost $200,000. Carter Lupton is president.

The Bevis Salt Co., Lyons, Kan., is arranging a list of power and other equipment to be installed in its addition, estimated to cost about $175,000.

The Pacific Coast

San Francisco, Sept. 5.

PLANS are in progress by the Pacific Coast Borax Co., 2 Pine Street, San Francisco, for the first unit of its new refinery at San Pedro, consisting of a two-story building, 250 x 400 ft., with foundations to provide for three additional floors later. Albert C. Martin, 430 Higgins Building, Los Angeles, is architect.

The California Gypsum Co., National City, Cal., is perfecting plans for new works on the waterfront for the manufacture of blocks and other gypsum products, estimated to cost in excess of $75,000.

The Anaheim Sugar Co., Anaheim, Cal., has awarded a contract to G. E. Fickett, 638 South Western Avenue, Los Angeles, for a new five-story addition, 44 x 260 ft., estimated to cost about $160,000.

The Atchison, Topeka & Santa Fe Railroad Co., Kerchkoff Building, Los Angeles, has plans under way for an addition to its ice-manufacturing and car-icing plant at Bakersfield, Cal., and for the erection of a similar plant at Needles, Cal., estimated to cost about $150,000 each. The company will also rebuild the portion of its engine house and shops at the latter point, damaged by storm Sept. 2.

The Moore Shipbuilding & Drydock Co., Oakland, Cal., has been reorganized as the Moore Drydock Co., with capital of $3,000,000. Operations will be continued at the plant for new ship construction and ship repair work. The company is headed by Joseph A. Moore, Ira S. Lillick and L. H. Cromwell.

The Teetor Adding Machine Co., Pomona, Cal., has selected a site for the erection of a new plant to manufacture calculating machinery and parts. The initial works will total about 50,000 sq. ft. and with machinery are estimated to cost close to $200,000. The local Chamber of Commerce is interested in the project. C. J. Carr and J. A. Heaton are heads of the company.

The Oregon Pulp & Paper Co., Salem, Ore., will soon commence the erection of a third mill unit, to be four stories, of reinforced concrete, 75 x 80 ft., estimated to cost approximately $300,000, including machinery. Knighton & Howell, United States Bank Building, Portland, Ore., are architects.

The Grays Harbor Port Commission, Aberdeen, Wash., will receive bids until Sept. 23 for one 5-ton, mill type, traveling crane, 75 ft. span, equipped with lumber grapple. Frank H. Lamb is president.

The Webster Chair Co., Superior, Wis., is arranging for the erection of a new four-story plant, 100 x 200 ft., at Portland, Ore., on property recently acquired at Nicholai and Twenty-sixth Streets, for a Pacific Coast branch.

The Long Bell Lumber Co., Kansas City, Mo., is planning the construction of two plants on the Columbia River, one near Kelso, Wash., and the other at Rainier, Ore. A railroad line 15 miles long will be constructed from the timber properties of the company in this section. The project will cost in excess of $600,000, including machinery.

Canada

Toronto, Sept. 11

BUYING of one or two machine tools is still well maintained, and while inquiries calling for fairly large lists are appearing none of this business has so far been closed. Additional contracts for extensions to the Leaside plant of the Durant Motors of Canada have been placed, but nothing has so far been done in the equipment line and dealers and manufacturers are looking forward to a sizable order from this quarter. Building activities among industrial plants continue, and as many concerns have been holding back orders pending a settlement in the fuel situation it is expected that a number of these will enter the market before the end of the year. The general outlook with regard to orders and the possibility of securing fuel is having a stimulating effect on business in general and not a few industrial concerns are preparing for active operations through the winter. Prices are beginning to show an upward tendency and while increases have not been general one or two companies have announced higher quotations on their equipment.

C. Alfred Maguire, chairman of the Board of Control, Toronto, will receive bids until Oct. 3 for the supply and installation of two 2,880,000 Imperial gallon centrifugal sewage pumps and motors. Specifications can be seen at room 6, City Hall.

Graves, Bigwood & Co., Bank of Hamilton Building, Toronto, will rebuild a box factory recently destroyed by fire at Byng Inlet, Ont., and are interested in equipment.

The Anaconda American Brass Co., New Toronto, Ont., is contemplating the erection of a foundry. A. H. Quigley is general manager.

The Hull Electric Co., 117 Main Street, Hull, Que., will erect a power plant in Low Township, Que.

Contract for the construction of a power plant, dam and intake at Price, Que., for the Lower St. Lawrence Power Co., Rimouski, Que., has been awarded to the Foundation Co., Ltd., 511 St. Catharine Street West, Montreal.

The National Castings, Ltd., Belleville, Ont., is making additions to its plant and installing a Pittsburgh electric furnace and other equipment.

Considerable improvements and extensions are under way at the plant of the Electric Steel & Metals, Ltd., Welland, Ont., which is being converted for the production of manganese and other metals, heavy castings and mining equipment. The electric furnace capacity is also being increased.

Contracts for the construction of new buildings at Leaside, Ont., to cost approximately $1,000,000, for the Durant Motors of Canada, Ltd., Toronto, have been awarded. The new plant will have floor space of 500,000 sq. ft. and will be used exclusively for the manufacture of Star cars. Production for 1923 calls for 18,000 cars, of which 10,000 will be for the domestic trade and 8000 for export.

It is reported that construction will be started this season on the plant at Petrolia, Ont., for the Peninsula Sugar Co., which will cost approximately $800,000. Machinery of special design, electrically driven, will be installed and it is expected that the plant will be in operation by September, 1923.

The Imperial Radiator Co., Ltd., Toronto, an organization

[illegible] taken over the assets and property of the latter company at Toronto and St. Catharines for $[illegible]. Since it began [illegible] the plant has been in operation [illegible] year. The new concern will have improved financial standing and attention will be confined entirely to the production of radiators and heating boilers. J. E. McAllister, Toronto, [illegible]

IRON AND INDUSTRIAL STOCKS

No Desire to Liquidate Prices High Owing to Production Costs

Steel and industrial stocks held by consumers may be large, but there seems to be no desire to liquidate them. On the contrary, the disposition is to build up stocks against the fully expected traffic congestion. Prices are more or less inflated owing to the increased production costs, and will likely be looking up for six or eight months, according to several estimations. Apparently both buyers and sellers have stopped to make fresh appraisals of the situation in the light of strike developments and the predicted congestion. However, the situation is full of cross currents and one view discredits the inflationary trend, holding optimistically that the usual September turn in business will show renewed vigor.

Acquired by American Brake-Shoe & Foundry Co.

The American Brake Shoe & Foundry Co., 30 Church Street, New York, recently acquired the Ramapo Iron Works, which has plants at Hillburn and Niagara Falls, N. Y., also at Niagara Falls, Ont., and the Ajax Forge Co., with plants at Chicago and Superior, Wis. The assets of the acquired companies will be held by a new corporation to be known as the Ramapo Ajax Corporation. Announcement has been made by Marshall Field, Glore, Ward & Co. that in order to finance the purchase $2,250,000 of first mortgage, 20-year, 6 per cent sinking fund gold bonds of the Ramapo Ajax Corporation will be offered for public subscription at par. The American Brake-Shoe & Foundry Co. covenants in the mortgage to retain control of the new company as long as any of the bonds are outstanding. The acquired corporations have been in business since 1883 and manufacture railroad track material, as well as industrial cars and car equipment.

Industrial Finances

Approximately $42,000 will be available for distribution among creditors of the Conradson Machine Tool Co., Green Bay, Wis., whose claims amount to between $150,000 and $175,000. The plant, real estate, machinery, patents, etc., have been sold to Joseph T. Ryerson & Son, Chicago, which has been marketing the bulk of the output of the Conradson company since it was established in Green Bay about four years ago with an investment of about $125,000 in buildings and equipment. The Ryerson bid was $55,000, including the assumption of a $10,000 mortgage. Representatives of the Ryerson company said the plant probably would be resold, as the company is not engaged in manufacturing and it is not likely that any change in policy will be made.

The Security Trust Co. of Detroit has been appointed receiver for the W. J. Baird Machinery Co., 2232 West Fort Street. The creditors have filed a petition alleging bankruptcy, and it is not expected that the company will protest these proceedings.

For the year ending with June, the Canadian Locomotive Co. shows an operating loss of $191,351 after taxes, contrasted with a profit of $827,091 the previous year. After providing for interest, dividends, etc., the company for the past year showed a deficit of $446,299, whereas for the previous year there was a surplus of $340,291.

The terms of the proposed merger of the Atlas Crucible Steel Co. and the Electric Alloy Steel Co. will be submitted this month to the stockholders. The plan as it now stands calls for a new capitalization of approximately $12,000,000 made up in bonds, two classes of preferred stock, as well as no-par common shares.

Between Jan. 1 and Aug. 31, last, the Baldwin Locomotive Works booked $30,389,611 business, or practically double the $15,654,390 taken during the corresponding period last year. In August, business totaled $12,292,342, as against an aggregate of $11,824,687 in the first six months of the year.

The Lima Locomotive Co., Lima, Ohio, on Nov. 1 will call for redemption the outstanding 6 per cent first mortgage sinking fund bonds at the principal amount and a premium of 10 per cent. The original issue was $2,000,000, but the number of outstanding bonds has dwindled to a comparatively small amount.

The Autocar Co., Ardmore, Pa., motor trucks, is offering for public subscription $1,000,000 8 per cent cumulative preferred stock at $102 a share. The stock is callable at $115 a share. Temporary receipts bearing 6 per cent interest per annum until Sept. 15 have been issued to subscribers of the new stock issue.

A public offering was made last week of $1,775,000 Wickwire-Spencer Steel Corporation 7½ per cent ten-year secured convertible notes at 100 and accrued interest.

The Dayton Coal & Iron Co. cases, involving $1,000,000 in claims, have finally been settled after having been in the courts nine years. Non-resident creditors are to get 60 per cent without interest, Tennessee creditors 100 per cent without interest, and the remainder of the assets are to be paid to the Commercial Bank of Scotland and the Bank of Scotland, which are to secure releases of the claims of James Watson & Co. and Dunlop & Co.

The stockholders of the Wickwire-Spencer Steel Corporation have ratified the action of the board of directors in arranging for the acquisition of the entire capital stock of the American Fabrics Co., Chicago. Although under the supervision of the corporation, the acquired company will operate independently. It was also voted to authorize the sale of $1,775,000 principal amount of ten-year 7½ per cent secured convertible gold notes of the Wickwire-Spencer Corporation to finance the purchase.

The Westinghouse Electric & Mfg. Co. has declared the regular quarterly dividends of $1 on both the common and preferred stocks. The common stock dividend is payable Oct. 31, and the preferred Oct. 16, to stockholders of record Sept. 30.

The New York Air Brake Co. has plans under way in which the present capital stock will be retired and new common stock without par value will be issued as well as a series of class A preferred. The new common issue will be in approximate ratio to the present $10,000,000 of outstanding common stock at $100 par value. The success of the plan will raise about $5,000,000 of new capital which will enable the company to retire its bank loan which amounts to about $4,500,000. The remainder will be added to working capital.

The American Locomotive Co., for the six months ended June 30, reports a total deficit of $966,780, as compared with a net profit for the corresponding period in 1921 of $4,566,043, a decrease of $5,522,823. The gross earnings amounted to $7,399,934, against $25,989,781 for the first half of last year. Manufacturing, maintenance and administrative expenses, and depreciation however, was only $8,323,500, as compared with $21,390,554 for the same period in 1921. The gross earnings over the first half of 1922 were the lowest of any six months since the early part of 1915. The strong cash position of the company due to conservation of its net earnings during years of greater earnings, warranted the payment in the six months period of two quarterly dividends, each of 1¾ per cent on its preferred stock, and two quarterly dividends of 1½ per cent on its common stock, a total of dividends paid of $1,625,000 during the half year.

The Carroll Engineering Co., Dayton, Ohio, has been placed in the hands of a receiver, Joseph F. Westendorf being appointed by the court. The company, which manufactures tools and other machine shop equipment, has been operating at a loss for the past six months. It has not been decided whether, in view of improving business conditions, operations will be continued for the time being or the plant closed entirely.

Rogers-Brown Finances

The balance sheet of the Rogers-Brown Iron Co. and subsidiaries, as of Dec. 31, 1921, follows:

Assets: Property account, $18,547,842; Liberty bonds held on behalf of employees, $8,116; deferred charges, $487,856; cash, $542,115; other current assets, $2,720,785; cash in hands of fiscal agents for coupon interest, $106,700; total, $22,413,414.

Liabilities: Common stock, $5,000,000; preferred stock, $1,550,000; first mortgage 5 per cent bonds, $1,483,000; debenture 5 per cent bonds, $980,000; first and refunding mortgage bonds, $3,794,000; notes payable, $3,034,626; other current liabilities, $970,782; bond coupon interest, $106,700; reserves for depreciation, etc., $5,051,414; surplus, $442,891; total, $22,413,414.

The Wickwire Spencer Steel Corporation sales office, 120 Franklin Street, Boston, is to be discontinued. A New England divisional sales office will be maintained at the company's Hammons Street, Worcester, Mass., plant, with Charles K. Hardy, assistant general sales manager, in charge.

Plans of New Companies

The E. J. Longyear Co. of Minneapolis, has for many years been engaged in mining engineering contract diamond core drilling, diamond core drill manufacturing, and shaft sinking and mine development work. In order that the various activities of the company might be segregated, separate corporations were recently organized to take over the respective branches of the company's business. The E. J. Longyear Development Co., Inc. (Alabama), handles shaft sinking and mine development; E. J. Longyear Exploration Co. (Delaware) does contract diamond core drilling, and E. J. Longyear Mfg. Co. (Delaware) manufactures diamond core drills. The new manufacturing company, whose general office is in the Security Building, Minneapolis, has taken over in its entirety the plant at Marquette, Mich., formerly operated by E. J. Longyear Co. No expansion of the present activities is under contemplation.

The Baldwin Aircraft Corporation, Baldwin, L. I., has obtained possession of the properties of the Ordnance Engineering Corporation, and has announced that it is in a position to execute orders for aircraft, aircraft parts and for various machine shop, sheet metal and wood work. Its plant is located midway between Mineola and Far Rockaway, which makes it possible to deliver both land and water machines by air. W. F. Bennett, formerly secretary and treasurer of the Lewis & Vought Corporation, is president, and J. J. Rooney is general manager.

The Arras Equipment Co., 68 Cortlandt Street, New York, has been incorporated with a capital of $5,000, to manufacture mechanical and electrical equipment. For the present it will engage in the reconstruction of motors and in general repair work. The incorporators are: T. N. Pfieffer and M. P. Bloch.

The A. E. Thurber Elevator Co., Brooklyn, has been incorporated with a capital of $10,000 to manufacture elevators and parts. It will have its work done under contract. The incorporators are: A. E. Thurber, J. L. Walton and J. J. Hayden. The company is represented by Hastings & Hastings, 258 Broadway, New York.

The Triangle Lamp Mfg. Co., New York, has been incorporated with a capital of $5,000 to manufacture electric lamps. It is conducting a jobbing business and does not intend to manufacture for the present. The incorporators are: E. Max, A. Bernstein and E. Levy. The company is represented by Goodman & Werner, 51 Chambers Street, New York.

The Adelphia Mfg. & Plating Co., Bridesburg, Philadelphia, manufacturer and plater of iron, brass, steel and metal products, has been incorporated with a capital of $20,000, and will continue the business of the Adelphia Plating Co., established in 1917. It is in the market for complete foundry equipment. A brass foundry is being added and the company will specialize in aluminum castings. It is also erecting a new one-story building at Orthodox and Belgrade Streets which will be permanent headquarters. J. F. O'Brien, 4514 Paul Street, is secretary and treasurer.

The F. Wilson Ille Electric Corporation has been incorporated with a capital of $10,000 to manufacture X-ray equipment and electrical apparatus. It will represent the Burdick Cabinet Co., Thompson Plaster X-Ray Co. and the Morse-Chapman Co., handling galvanic and sinusoidal outfits, scales, violet ray outfits, lamps, generators and accessories. This company does not plan to manufacture for the present. Its offices after Sept. 15 will be at 111 East Twenty-third Street, New York. The incorporators are: F. Wilson Ille, J. Ferguson and J. Wolfert.

The Liberty Tool & Die Corporation, 215-217 North Water Street, Rochester, N. Y., general tool and die manufacturer, mentioned in last week's issue of THE IRON AGE under new companies, announces that while it has not undertaken to do a general manufacturing business, it nevertheless has the space and equipment for such an enterprise and is willing to consider propositions of that nature.

The Alemite Grease Cartridge Co., 61 Broadway, New York, has been organized with a capital stock of $600,000 to manufacture metal grease cartridges for automobile lubrication. Operations have already begun with an initial output of 20,000 cartridges per day at the plant in Philadelphia. Provision has been made for gradual expansion. The company is headed by C. E. Roberts and E. C. Landgren. C. M. Russell, 50 Church Street, New York, is the corporate representative.

The Universal Darning Machinery Corporation, New York, has been incorporated with a capital of $500,000 to manufacture textile machinery and parts. Its plans for manufacturing are still pending. The incorporators are: S. Sims and C. M. Fyfe. The company is represented by E. A. McAllister, 2 Rector Street, New York.

The Ohio Auto Parts Mfg. Co. will establish a plant in Lima, Ohio, for the manufacture of castellated nuts. It is now located in Marion, Ohio. O. B. Prime is secretary.

The National Lamp Works of the General Electric Co., Cleveland, has commenced the erection of a $75,000 factory and storage building in Youngstown, Ohio. It will be 97 x 134 ft., three and four stories.

The Multiple Oil Well Tool Co., Detroit, was recently incorporated with a capital of $30,000, to manufacture oil well machinery and tools. Its work for the present will be done under contract.

Trade Changes

Allen Ashley, associated with the domestic sales department of the Westinghouse Electric & Mfg. Co. for 10 years and with the foreign sales department of the Allied Machinery Co. of America for four years, has established a clearing house to handle surplus machinery and supplies at 152 West Forty-second Street, New York.

The Oilgear Co., Milwaukee, has opened a New York office at 39 Cortlandt Street in order to be in direct touch with the entire Eastern territory. Russell, Holbrook & Henderson, 30 Church Street, New York, have been appointed sales representatives for the district in and near New York. Cadillac Machinery Co., Lafayette and Beaubien Streets, Detroit, will handle Oilgear products in Michigan, and R. E. Ellis Engineering Co., 621 Washington Boulevard, Chicago, will represent the Oilgear Co. in Chicago and the surrounding district.

The New Process Gear Division of the Willys Corporation, with plants at Syracuse, N. Y., was bought last week at receivers' sale by Tom Warner, Toledo, Ohio, for $1,904,000. Mr. Warner, who is vice-president of the Durant Motors, Inc., said that he acted individually.

The Detroit office of the Reed-Prentice Co. is now located at 6526 Cass Avenue. T. C. McDonald, formerly of the Indianapolis office, is in charge of the Detroit office, assisted by E. B. Barber, former superintendent of the Lafayette Motor Corporation, Indianapolis.

The Racine Metal Stamping Co., Racine, Wis., has amended its corporate articles to provide for a change in title to Racine Screw Works, to better describe the nature of the principal business in which the concern is now engaged.

The Murdoch Dishwashing Machinery Co., Marion, Ohio, recently incorporated with a capital stock of $250,000, placed its plant in operation a few days ago. H. A. McKinnon is president and general manager.

The Plainville Engineering & Supply Co., Russell building, Plainville, Conn., has purchased the Aldridge Block, which it will occupy as soon as alterations can be made.

The R. F. Carpenter Mfg. Co., Cleveland, metal toilet and office partitions, has discontinued its Boston office. Seeley & Lawson, 73 Tremont Street, Boston, will represent the firm.

The plant of the Victoria Chain Co., York, Pa., has been acquired by the International Chain & Mfg. Co., which will erect new buildings. George G. Campbell, who purchased the stock a year ago, continues as president. J. L. Mueller is vice-president in charge of production. The board constitutes these and R. L. Hunt and A. V. Brown, both of Philadelphia, and H. B. North, York.

The Weller Construction Co., Inc., general contracting and engineering, Equitable Building, Washington, has sold or removed all equipment from Carlisle and is not doing any road work at present.

The Goodman-Krohngold Co., Cleveland: the Goodman Engineering Co., Zanesville, Ohio, and the Electrical Repair & Engineering Co. have consolidated to form the Industrial Electric Co., 5230 St. Clair Avenue, Cleveland. The company will specialize in power equipment.

The White Co., Cleveland, Sept. 1, moved its executive offices from 6611 Euclid Avenue to the plant on East Seventy-ninth Street.

The Mehl Machine Tool & Die Co., Roselle, N. J., makers of jigs, fixtures, dies, gages and special machines, has opened an engineering branch in Cleveland for the purpose of closer engineering co-operation with Middle West customers.

G. H. Patten & Co., 1901 Pine Street, St. Louis, manufacturer of special machinery, has changed the firm name to the Patten Mfg. Co.; also its address to Chattanooga, Tenn.

The Ludlum Steel Co., Watervliet, N. Y., announces the discontinuance of its Pittsburgh office and the consolidation of the business of that office with the Cleveland office. P. R. Thurston, who has been in charge of the Pittsburgh office for the past three years, remains with the company and will continue to handle sales in the territory formerly embraced by the Pittsburgh office, with some additional territory, out of the Cleveland office, 637 Guardian Building, that city.

The Bathurst Co., Ltd., Bathurst, N. B., will build a paper mill in the near future for the manufacture of newsprint. It will adjoin the present buildings and will be of steel and concrete. The initial capacity will be 50 tons per day, to be increased later to 100 tons.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	
Refined iron bars, base price	2.94c.
Swedish bars, base price	7.00c.
Soft steel bars, base price	2.94c.
Hoops, base price	4.29c.
Bands, base price	3.74c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	3.04c.
Channels, angles and tees under 3 in. x ¼ in., base	2.94c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	2.94c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	3.14c.
Toe-calk, ½ x ⅜ in. and larger	4.00c.
Cold-rolled strip, soft and quarter hard	6.75c. to 7.25c.
Open-hearth spring steel	4.50c. to 6.00c.
Shafting and Screw Stock:	
Rounds	3.90c.
Squares, flats and hex	4.40c.
Standard cast steel, base price	15.00c.
Extra cast steel	18.00c.
Special cast steel	23.00c.

Tank Plates—Steel

¼ in. and heavier ..... 3.04c.

Sheets

Blue Annealed

	Per Lb.
No. 10	4.04c. to 4.19c.
No. 12	4.09c. to 4.24c.
No. 14	4.14c. to 4.29c.
No. 16	4.24c. to 4.39c.

Box Annealed—Black

	Soft Steel C. R., One Pass, Per Lb.	Blued Stove Pipe Sheet, Per Lb.
Nos. 18 to 20	4.55c. to 4.70c.	.....
Nos. 22 and 24	4.60c. to 4.75c.	4.60c.
No. 26	4.65c. to 4.80c.	4.65c.
No. 28	4.75c. to 4.90c.	4.75c.
No. 30	5.00c. to 5.15c.	.....

No. 28 and lighter, 36 in. wide, 10c. higher

Galvanized

	Per Lb
No. 14	4.85c. to 5.00c.
No. 16	5.00c. to 5.15c.
Nos. 18 and 20	5.15c. to 5.30c.
Nos. 22 and 24	5.30c. to 5.45c.
No. 26	5.45c. to 5.60c.
No. 27	5.60c. to 5.75c.
No. 28	5.75c. to 5.90c.
No. 30	6.25c. to 6.40c.

No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
½ in. Butt	—53	—38	¾ in. Butt	—23	—5
¾ in. Butt	—58	—45	1¼ in. Butt	—25	—7
1-3 in. Butt	—60	—47	2 in. Lap	—19	—3
2½-6 in. Lap	—51	—44	2½-6 in. Lap	—23	—7
7-8 in. Lap	—53	—30	7-12 in. Lap	—15	+1
9-12 in. Lap	—49	—30			

Steel Wire

	Per Lb.
Bright basic	3.50c. to 3.75c.
Annealed soft	3.50c. to 3.75c.
Galvanized annealed	4.25c. to 4.50c.
Coppered basic	4.00c. to 4.25c.
Tinned soft Bessemer	5.50c. to 5.75c.

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	19¼c. to 20¼c.
High brass wire	20¼c. to 20¾c.
Brass rod	16¾c. to 17¾c.
Brass tube, brazed	26¼c. to 27¼c.
Brass tube, seamless	23 c. to 23½c.
Copper tube, seamless	25¾c. to 26 c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 22¾c. to 23¾c. per lb. base.

Cold rolled, 14 oz. and heavier 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke 14x20	
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	Primes	Wasters
		80 lb.	$6.05 $5.80
		90 lb.	6.15 5.90
		100 lb.	6.25 6.00
IC. $10.00	$8.50	IC.	6.40 6.15
IX. 11.50	10.00	IX.	7.40 7.15
IXX. 13.00	11.25	IXX.	8.40 8.15
IXXX. 14.25	12.50	IXXX.	9.40 9.15
IXXXX. 16.00	14.00	IXXXX.	10.40 10.15

Terne Plates

8 lb. coating, 14 x 20

100 lb.	$7.00
IC	7.25
IX	7.50
Fire door stock	9.00

Tin

Straits, pig	36c.
Bar	43c. to 47c.

Copper

Lake ingot	15¼c.
Electrolytic	15 c.
Casting	14¾c.

Spelter and Sheet Zinc

Western spelter	8½c.
Sheet zinc, No. 9 base, casks	9¼c. open 9¾c.

Lead and Solder*

American pig lead	6¾c. to 7c.
Bar lead	8c. to 8½c.
Solder, ½ and ½ guaranteed	25c.
No. 1 solder	23½c.
Refined solder	20¼c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	75c.
Commercial grade, per lb.	35c.
Grade D, per lb.	25c.

Antimony

Asiatic ..... 6½c. to 7c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb. 25c. to 27c.

Old Metals

Prices show little change and the market generally is stronger. Dealers' buying prices are as follows:

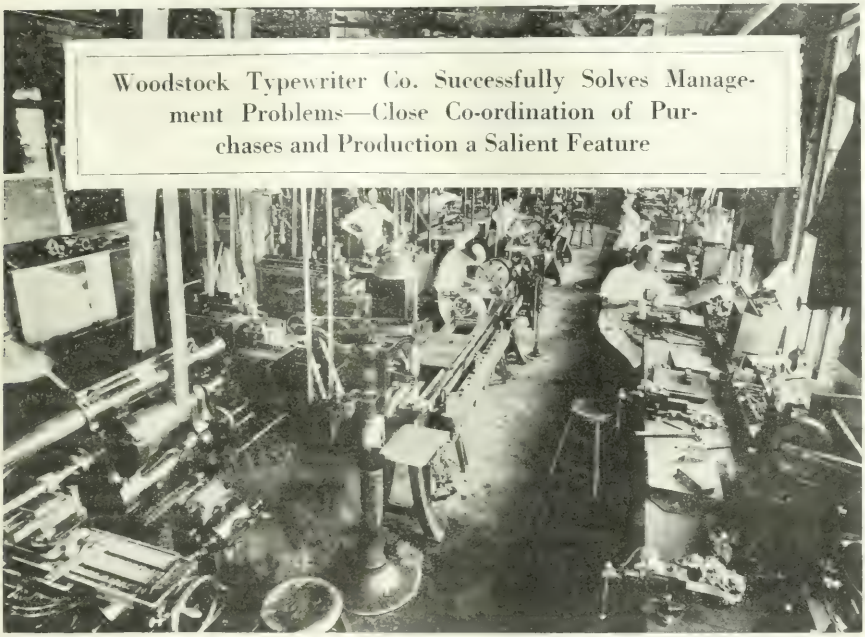
	Cents Per Lb.
Copper, heavy crucible	11.75
Copper, heavy wire	11.25
Copper, light and bottoms	9.25
Brass, heavy	6.25
Brass, light	5.25
Heavy machine composition	8.50
No. 1 yellow brass turnings	6.50
No. 1 red brass or composition turnings	8.00
Lead, heavy	4.50
Lead, tea	3.50
Zinc	3.25

THE IRON AGE

New York, September 21, 1922

ESTABLISHED 1855 VOL. 110, No. 12

Control of Raw Material to Suit Output



Woodstock Typewriter Co. Successfully Solves Management Problems—Close Co-ordination of Purchases and Production a Salient Feature

BY GILBERT L. LACHER*

CONTROLLING raw material stocks has an importance now generally recognized. Those manufacturers who did not give this feature of management due attention had it forcibly thrust upon them late in 1920 when inventory values dropped suddenly and large stocks were transformed from assets into liabilities. The prevention of losses resulting from quick changes in market condition, essential as it is, is not, however, the sole reason for keeping down raw material supplies. In certain lines of manufacture, where the finished product is undergoing almost continuous change, owing to the development of improvements in design, excessive stocks prove a handicap to the extent that a new design calls for different materials than were contained in the older product. This consideration is potent in the typewriter field and perhaps explains why so much attention has been given the subject of raw material control by the Woodstock Typewriter Co., Woodstock, Ill. In a similar manner, the regulation of stocks of finished products and the management of the production department itself show the results of a thorough study of the problems attending typewriter manufacture.

This company, employing 500, is not large compared with such mammoth institutions as have grown up in the steel or automotive industries, which consume great quantities of materials. Its product, however, is one consisting of such a multiplicity of different parts as to make proper regulation of raw material stocks more complex than in many larger industries. There are 1400 pieces in the Woodstock typewriter, and, allowing for the use of several of the same pieces in a single machine, there are still 600 absolutely different parts. To maintain a minimum supply of materials for these parts, without running the risk of exhausting the stocks and thereby interrupting plant operation, was a problem which called for the creation of a practicable system, founded on accurate records of production in relation to the consumption of materials.

Materials going into a typewriter fall into three main classes: gray iron castings, strip steel and screw

*Resident editor of THE IRON AGE at Chicago.

The illustration at the head of this page depicts the tool room of the plant, with benches located where they get adequate light.

rod. A typical inventory would show in stock about 85,000 lb. of screw stock, 90,000 lb. of strip steel and 18,000 lb. of castings. In the purchasing department a careful record is kept of the amount of each material in store, requisitions by the plant and purchases of additional material. This applies not only to the three main classes mentioned, but also to every other material that goes into the typewriter, including purchased finished parts, such as key rings, and semi-finished parts, such as wood cores for platens, and likewise to manufacturing supplies used in the factory, purchased small tools and to office supplies, such as stationery, etc. The records are kept on what are termed "raw stock cards," on which are indicated the minimum amounts of the materials used which should be kept in stock. In other words, the purchasing agent makes it his business to place additional orders before the stock on hand falls below the safety line.

Control of Raw Materials

It is to be noted that on the separate raw stock card kept for each size of material is recorded the typewriter part which is made from that material. If several parts are made from the same size material, as is sometimes true, especially in the case of screw rod, all such parts are entered on the card. The amount of steel required to make each part for 1000 machines is also recorded.

At the top of the card is entered the total amount of that particular size of steel required for 10,000 typewriters, for the part or parts for which it is used. This figure is recorded on the card as a "minimum," although it does not actually represent the minimum amount of material which the company proposes to carry, but is analogous to a list price on a commodity. To obtain the actual minimum, this figure must be multiplied by a certain percentage which will vary according to three factors: (1) rate of production by the factory in typewriters per day; (2) time required for obtaining this material from the steel mills; (3) the possibility of governing inventories so carefully that orders may be lumped to secure a carload instead of a less-than-carload freight rate, thereby effecting a saving.

Information for the rate of production must be estimated and is based on the sales department's survey of prospective business. The time which must be allowed for delivery of materials depends largely on market conditions: in dull periods mill shipments are sometimes obtained in two weeks, whereas at other times deliveries may take ten or twelve weeks. Together with the matter of mill deliveries is considered the trend of steel prices. In a rising market it is advantageous to buy heavily, while in a declining market the incentive is to hold back purchases as much as possible. Speculation as to the course of prices, however, must never permit stocks to drop down to a day's or even a week's supply, thereby incurring the danger of stopping factory operations for lack of material.

Necessity for keeping stocks above the danger point is also a prime consideration when lumping orders to get the benefit of the carload rate. In connection with screw rod, which is used in a great variety of sizes, ranging from 1/16 in. in diameter to 1½ in., it has been found that the larger sizes are easier to get from the mill than the smaller ones. The sizes used by the plant, therefore, have been divided accordingly into two main groups. In the case of the smaller sizes, much more time is allowed for the receipt of new shipments than for the other class. In the case of strip steel the same group principle has been applied, except that, owing to the nature of typewriter construction, the sizes form three groups, one of which is easier to get than the other two.

The raw stock card shown in Fig. 1 is typical of those kept by the company. The number of entries, however, has been limited so that the purport of the card can be easily grasped by the reader. This card contains the record for round ½-in. screw rod, from which four different parts and eight separate pieces are made for each Woodstock typewriter. After each part number are recorded the number of parts used in each typewriter and the weight in pounds of screw rod for 1000 parts. To secure the weight of screw rod required for 1000 typewriters, the weight per part is multiplied by the number of parts per machine. Thus, the weight of steel used to make 1000 pieces of part No. R-317 is 24.6 lb. As two of these parts are used in each typewriter, 24.6 lb. is doubled to secure the weight per 1000 machines, or 49.2 lb. In this manner the weight of all the parts made from ½-in. screw stock is computed and the total weight per 1000 machines is finally multiplied by 10 to secure the "minimum" amount, or that required for 10,000 machines.

It will be noted from the card that, on Dec. 27, stock ordered out of store by the factory, 1067 lb., reduced the balance in the stock room to 1336 lb., or considerably below the "minimum" of 2249 lb. This was a signal to the purchasing agent to place an order for additional material, which he did, 2000 lb. being ordered on Jan. 13. On Feb. 13 the material arrived, being 2065 lb. in weight, or 65 lb. in excess of the order. The receipt of this amount thereby increased the balance then remaining in store to 2612 lb.

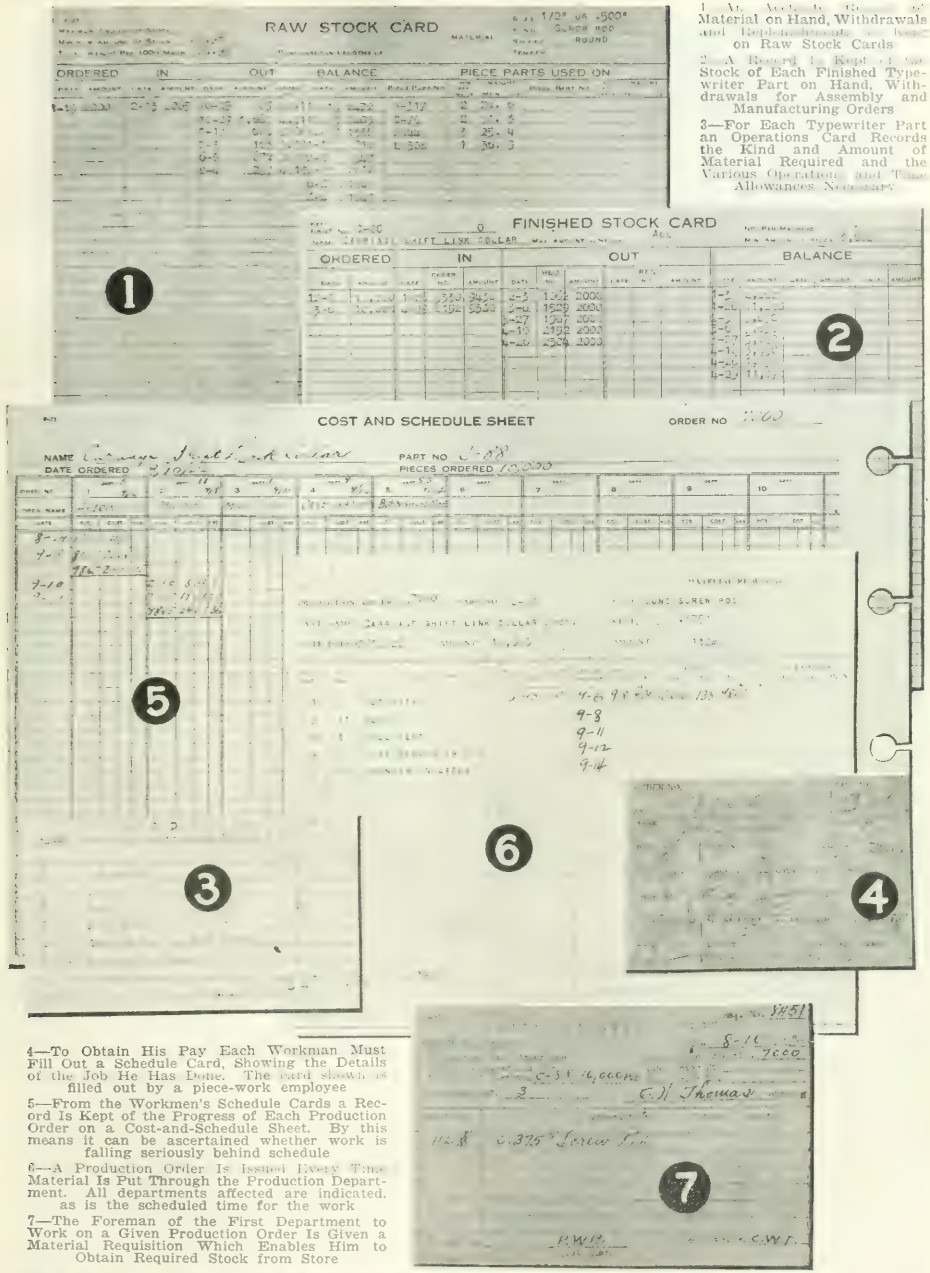
Withdrawals of material from store are easily checked with stock room records by means of production orders, which must be made out whenever any typewriter part is made. On each order is indicated the name and size of the material used and the amount required to make a specified number of parts.

How Finished Material Is Controlled

The care used in controlling raw material supply is no greater than that exercised in regulating finished material stocks. For each finished part also a "minimum" is established which serves a purpose similar to that of the minima for the various sizes of raw material. With the latter, the function of the minimum is to enable the purchasing agent to determine when new orders should be placed to replenish store room stocks; in the case of finished parts the minimum indicates when the factory should be ordered to make more pieces. Like the minimum for raw material, that for finished parts is a list figure. The minimum recorded on the finished stock card shown in Fig. 2 is 8000 pieces. The factors affecting this figure are the number of typewriters assembled in the plant per day and the time required to make a new lot of the part. In this case it is estimated that 8000 pieces form a safe balance to have in stock for a production of 100 typewriters per day. As two of these parts go into each typewriter, this means a stock sufficient for 4000 machines, or 40 working days.

By referring to the card it will be noted that on Jan. 3 the balance of parts in stock had dropped to 2260. That the need for additional parts had been anticipated is indicated by the fact that on Dec. 8 an order for 10,000 pieces had been given to the factory. On Jan. 26 this order had been completed and 9430 pieces were added to the balance, bringing the total up to 11,690 in stock. Requisitions from stock by the assembling department on Feb. 3, March 6, March 27, April 10 and April 26 again reduced the balance to 1690. On April 29, however, another order, placed March 6, was completed by the factory and the balance in stock was swelled to 11,070.

As a check on the balance shown on the card, a perpetual inventory is kept in the store room. Ordinarily the difference, if any, between the computed balance and the inventory is small and is ascribable to the handling of the pieces on scales which weigh in terms of pieces, thus eliminating the necessity for



1—Material on Hand, Withdrawals and Replacements Are Kept on Raw Stock Cards

2—A Record Is Kept of the Stock of Each Finished Typewriter Part on Hand, Withdrawals for Assembly and Manufacturing Orders

3—For Each Typewriter Part an Operations Card Records the Kind and Amount of Material Required and the Various Operation and Time Allowances Necessary

4—To Obtain His Pay Each Workman Must Fill Out a Schedule Card, Showing the Details of the Job He Has Done. The card shown is filled out by a piece-work employee

5—From the Workmen's Schedule Cards a Record Is Kept of the Progress of Each Production Order on a Cost-and-Schedule Sheet. By this means it can be ascertained whether work is falling seriously behind schedule

6—A Production Order Is Issued Every Time Material Is Put Through the Production Department. All departments affected are indicated, as is the scheduled time for the work

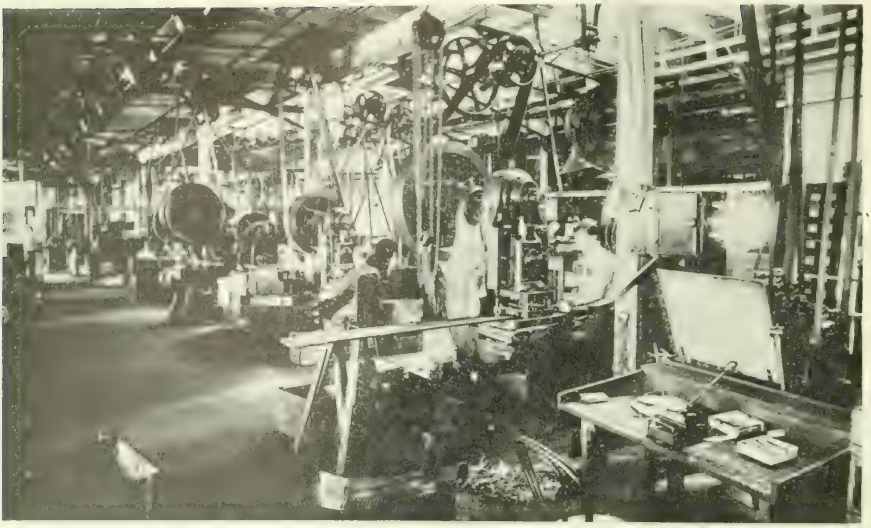
7—The Foreman of the First Department to Work on a Given Production Order Is Given a Material Requisition Which Enables Him to Obtain Required Stock from Store

Seven Forms or Cards Used in Controlling Raw and Finished Materials and Their Movement Through the Processes of Manufacture

counting. If a wide discrepancy develops, however, a second check is made of the parts in store.

Ordering of parts from the factory is handled by means of production orders, given to the manufacturing department whenever it appears from the finished stock card that a new supply of parts is needed. All orders must be placed far enough in advance to permit plenty of time for their execution. The proper time allowance is not a matter of guess, but has been worked out carefully from a study of individual operations. For each typewriter part, in fact, an operations card has been prepared. The card shown in Fig. 3 is for part No. C-88, a carriage shift link collar, of which there are two for each machine.

This part is made from ⅜-in. cold drawn round steel, of which 1000 typewriters require 11.2 lb., as indicated on the card. The figures at the extreme left of the card indicate the number of each operation in order, there being five operations in this instance. Next to the right are the numbers of the respective



Punch Press Department This and the Screw Machine Section of the Plant Are the Two Primary Departments for the Production of Small Parts

departments in which these operations are to be performed. In the middle of the card a brief description of each step in the manufacture is indicated. Thus "automatic" means that the part is to be formed in the automatic screw machines. "Inspect," when used, indicates that an inspection must be made after the parts leave the screw machines. "Burr" means that any burrs remaining on the parts are to be removed in a drilling machine. "Mill flat" calls for the milling of the surface of the part, and "case harden in salt peter" and "burnish on lathe" require no explanation. The figure 12 at the top of the column on the right of the card signifies that an allowance of 12 days is permitted before the starting of the operations. This tolerance is to allow each foreman to arrange all the work within his department. Perhaps some of the cams required on a job just received may be in use on another job then running, or for other reasons the work can not be started immediately.

Under the figure 12 are indicated the number of working days set aside for each operation. Thus, 7 days are allowed for screw machine operations. The total number of days permitted for the completion of the parts, including the 12 days initial allowance, is 30. To this total is always added an additional flat allowance of 10 days, the theory being that new stock should arrive in the store room 10 days before the bins are empty. The significance of the figure 40 is appreciated by computing the number of parts required in 100 typewriters per day—assuming that this be the production of the plant. As two parts go into each machine, 200 parts are required daily, or 8000 in 40 days. This means that when only 8000 pieces are in stock, a new production order should be issued to insure replenishment of the supply by the time the existing stock is used up, i.e., in 40 days.

Checking Progress of Work

Of course, the mere placing of production orders does not insure their execution on time. It is evident that the management cannot sit back supinely and let matters take their course. Delays may result from numerous causes, such as the breakdown of a machine, the illness of an operator, etc. A means of checking the progress of the work is essential, and such a means has been supplied.

To obtain his pay each workman must fill out a schedule card, Fig. 4, showing his name, the number of the part he has worked on, of the production order, of the department, of the department section, the name of the operation, the number of hours worked and of pieces produced, the number rejected, returned and accepted, the rate of pay and the total day's wages. From these cards the cost department keeps a record of the progress of the work, on a cost-and-schedule sheet, Fig. 5. By comparing the time of completion of a given operation with the scheduled completion (as given on the operations card) which is indicated at the top of the sheet, it can be ascertained whether the work is falling behind.

Frequently a delay in one department is so slight that it suffices to speed up the work in a subsequent department. Sometimes, however, it is necessary to rush through an emergency order, known as a "sub order," calling for the completion of only a portion of the original order. At other times it may prove desirable to start an entirely new production order, as the delays to the first order might result in the requisition of all of the parts as soon as they reached the stock room, thereby again putting the factory behind the assembly department.

A cost-and-schedule sheet is made out for each production order. On both are indicated the number of the production order and of the part, the date of issuing the order, the number of pieces ordered and of operations in order, the department numbers, the name of each operation and the scheduled time for its completion. In addition, the production order shows the kind and amount of material required. Thus, in Fig. 6 it is indicated that 112 lb. of ⅝-in. round screw rod is required to make 10,000 pieces of part No. C-88. The production order also provides columns for the insertion of the number of the machine on which the work is done, the time taken for each operation, the number of the time clock, the date when each operation is actually finished, the O.K. of the inspector, the gross number of pieces produced, the rejections and the number accepted. Columns have also been provided to keep a record of sub-orders.

With each production order is issued a material

(*Continued on page* 761)

Scarcity of Common Labor in Industry

Immigration Law Operates to Hamper Manufacturing and Skilled Workmen May Yet Suffer from Present Policy

BY ACHESON SMITH*

IN view of the intimation that employers will seek the repeal of the present immigration law in order that they may procure low priced labor, it will be of interest to outline the situation as it confronts manufacturers and other employers in the United States. Those who have discussed immigration usually have done so with the necessity for severe restrictions in mind, either as to numbers or quality or both. The matter will be considered, therefore, from the standpoint of our actual need of men to do our laboring work, for such is obviously the case.

While it is, of course, true that every employer finds it necessary to procure his labor as cheaply as possible, it is not true that employers are anxious for more alien labor simply because it is cheap. The cost of labor is dependent both upon the wage paid and upon the amount of work done, and it has been our experience in this country that labor working for low rates is not always the cheapest. At present the output of many manufacturers is limited by the shortage of men, and employers are therefore desirous of having the number of immigrants increased because they need help, and they are perfectly willing to pay the prevailing wage rates.

The use of the word labor is likely to be rather ambiguous, as it is frequently used to cover the skilled trades and sometimes used to include all wage earners. In what follows the term labor is meant to include what is ordinarily known as common labor and does not include skilled workers.

Actual Loss in Day Laborers

There is at present a very definite scarcity of labor and there is evidence that many localities are seriously affected. Undoubtedly one of the principal contributing causes to the present shortage is our immigration law. In the eleven months of the Government year, ending with May 31, 1922, we gained by immigration 98,605 persons. In other words, about 98,000 more people came into the country than left it during that period. An analysis of the figures by races, however, shows that we actually lost in the nationalities that do our labor calling for muscular strength, while we gained largely in those people who come in to trade and follow other employment than labor. The adjoining tabulation, issued by the Bureau of Immigration, shows the immigrants and emigrants during eleven months of the Government year.

An inspection of the above figures indicates that we actually lost over 33,000 who labor and gained very largely in those who will probably not do the work of common labor. Too much cannot be said about the desirability of English, French and Scotch immigrants, for they certainly raise the standard of our foreign born population and are highly desirable. Looked at from the standpoint of the need for laboring men, they do not, however, help our present situation. We could get along without the 48,000 Hebrews whom we gained during the eleven months; but we are absolutely dependent upon alien labor to use the shovel and other simple implements of industry.

Dependence Upon Alien Labor

In the highly developed industrial sections of the United States practically no native born American will do laboring work, and the children of our foreign born, if they go to our public schools, will not do the work of a common laborer. The tendency to rise socially and the natural tendency to avoid laborious tasks both make men shun such work. The result is that within our country we are not producing laboring men, and we are actually by our social and educational systems drawing men rapidly away from work of that class. Our experience for a great many years has shown that we are entirely dependent upon alien labor to do most of the manual laboring work, and unless an adequate supply is admitted the development of the country inevitably will be retarded.

Race or People	July 1, 1921, to May 31, 1922	
	Immigrants	Emigrants
African (black)	4,631	1,905
Armenian	2,238	231
Bohemian and Moravian (Czech)	[illegible]	4,128
Bulgarian, Serbian and Montenegrin	1,358	5,559
Chinese	3,866	5,855
Croatian and Slovenian	3,755	3,914
Cuban	610	792
Dalmatian, Bosnian and Herzegovinian	284	710
Dutch and Flemish	3,503	1,981
East Indian	214	216
English	27,195	8,407
Finnish	2,301	1,117
French	12,467	3,099
German	28,462	5,311
Greek	7,794	7,117
Hebrew	49,388	763
Irish	15,127	2,104
Italian (North)	6,033	6,849
Italian (South)	34,843	43,475
Japanese	5,264	4,005
Korean	62	43
Lithuanian	1[illegible]	4,395
Magyar	5,993	4,579
Mexican	14,223	5,541
Pacific Islander	7	3
Polish	6,260	29,986
Portuguese	1,774	5,830
Rumanian	1,501	4,094
Russian	2,237	2,667
Ruthenian (Russniak)	673	436
Scandinavian (Norwegians, Danes and Swedes)	15,570	3,868
Scotch	13,973	1,519
Slovak	7,947	3,203
Spanish	1,791	7,456
Spanish-American	1,257	1,603
Syrian	1,388	1,344
Turkish	38	250
Welsh	872	136
West Indian (other than Cuban)	886	769
Other peoples	712	1,115
	324,780	186,175

It has been said that organized labor is largely responsible for the present immigration law—at least the unions strongly favored the passage of the act. They, of course, thought by curtailing the supply of labor to strengthen the union cause and help to keep up wages, and while the temporary effect will be in that direction they are bound to suffer in the long run. The work done by common laborers is fundamental and absolutely necessary. We have no means at present of avoiding the pick and shovel work which laborers are required to do.

Many labor saving devices have been brought out, and undoubtedly much more will be done in that direc-

*Vice-president and general manager Acheson Graphite Co., Niagara Falls, N. Y.

tion, but they can go only so far toward relieving the situation. It is safe to assume that there will always be a large amount of work that will have to be performed by men willing to exercise their muscles and in a very literal sense earn their bread by the sweat of their brows. Houses cannot be built if there are no men to make the excavations for the foundations. Bricklayers cannot work if there are no laborers to carry up the bricks. In fact, skilled labor of all kinds will soon find its employment restricted if there is a serious lack of laborers to do their part of the work. It is, therefore, to the interest of skilled labor, to the interest of the manufacturer and to the best interests of the country to admit more laboring men.

Organized Labor May Be a Loser

If it is true that organized labor wishes to restrict immigration in order to help the union cause, it is laboring under a great delusion, for the very success of the unions in increasing their wages has been due to the fact that they can benefit themselves at the expense of the rest of the people in the country. If by limiting immigration the wages of common laborers are forced to a high level, organized labor will inevitably have to accept lower wages—at least their wages will be lower comparatively. In other words, as it is impossible to increase the income of every one in the country except by greater production, it is obvious that if common laborers are largely increased in their wage others will have to take somewhat less. This is simply an economic truth that neither labor unions nor legislation can change.

It might interest some people to remember that immigrants become consumers as well as producers, and are therefore of distinct value to the country from both standpoints. When an immigrant is domiciled in his native land he is not a potential customer of the United States; that is, he probably will not buy anything from us. On the other hand, when he comes into our country he not only becomes a worker and a very important aid to the wealth producing agencies of the nation, but he also at once becomes a consumer to practically the extent of his income. Everything that he buys he purchases in this country, and our foreign born residents provide one of the largest single markets we have for our cotton, wool and foodstuffs.

There are important social reasons for limiting immigration and we should enforce strict regulations regarding physical health and mental capacity. It is well to insist upon a blood test and an intelligence test, such as has been proposed, for the purpose of raising the mental standard of those coming into the country. It is desirable to have such selection made in the country of origin and not permit the immigrant to start for the United States until he has received a certification regarding the necessary qualifications. We must insist upon freedom from disease and on mental capacity sufficient for intelligent citizenship. This is particularly true when we contemplate the second generation, for the descendants of foreign born parents have become a large percentage of our population and are wielding a very large influence in our social and political affairs.

The Question of Citizenship

It has been suggested that we admit only those who declare their intention of becoming citizens; but this would seem to be a very unimportant and perhaps useless provision. In the first place, the immigrant probably will not know what he intends to do when he leaves his native land, but will declare his intention to become a citizen solely for the purpose of being admitted to the United States. In the second place, if he finds congenial work here and becomes anchored in some locality he will very probably desire to become a citizen, anyway, and take the necessary steps. In the third place, the heavy flow of alien labor out of the United States and to the various European countries in times of business depression in the United States is a feature that has distinct advantages to our country, and as the alien has probably rendered full value for the wages received we should not object to his return to his native land.

If, as has been said, the children of foreign born tend away from common labor, we have a system of evolution which would seem to be very desirable, both from the standpoint of the immigrant and from the standpoint of the country. The class of immigrants who come here to labor have little or no education but they are capable of doing very useful work. After they have been in the United States for some years they begin to get into the semi-skilled jobs, and their children, after passing through our public schools, find themselves fitted by education and by inclination for work that is somewhat higher in the social scale than common labor. As the first generation passes away we are dependent upon new arrivals for the distinctly laboring work, and such new arrivals will in a generation become Americanized both politically and socially. We thus have an upward movement which, as has been said, seems to be very desirable both from the standpoint of the immigrant and a healthy trend among that class of our population.

Defects in Present Law

Our immigration law at present has three serious defects:

1. By the quota system it cuts down the number of entries into the United States to 3 per cent of the number of foreign born persons of such nationalities resident in the United States, as shown by the Census of 1910.
2. Apparently no allowance is made for those who go out of the country. For example, there might be an emigration of 5 per cent, whereas we restrict the immigration to 3 per cent, which would of course mean a net loss instead of the gain for which the law apparently provides.
3. A literacy test is required which, from the standpoint of the good of the country, is a farce. The immigrant is required to be able to read and understand at least one language, which means that many able-bodied men who wish to do some honest work are excluded, while every educated radical who does not wish to work may enter the country.

It would seem possible to work out a figure indicating the number of additional laborers annually needed to take care of the increasing demand; that is, the growth of the country plus the laborers who forsake laboring work. Immigration to at least that extent should be provided for and it should be a net figure. In other words, the number that is admitted should take into account those leaving the country so as to be sure that we have a certain net gain in men each year. The literacy test should be abolished, as it is of no value whatever and prevents many an industrious peasant from entering our country at a time when he is badly needed. Authority should be placed in the hands of the President, or power given a commission, to increase or decrease immigration in accordance with the needs of the country.

Due to the increased industrial activity we now have a shortage of laboring men, and if we are actually losing that grade of labor by emigration we are going to be in a serious situation. Steps should be taken to correct this condition as far as this can be done by legislation. Not only is the country working back to a normal state of activity, but we must remember that the country is growing steadily from year to year, which of course means that more and more common laborers will be needed, and if they are not admitted as immigrants it is not apparent at present whence they will come.

[By continents, the figures in the table on the preceding page show the following:

	Immigrants	Emigrants
Africa	4,631	1,905
[illegible]	[illegible]	[illegible]
Southern Europe	70,033	96,714
Northern Europe	130,014	65,026
[illegible]	[illegible]	8,705
Miscellaneous	50,107	1,881

EDITOR.]

DROP FORGING INSTITUTE

Scheme of Operations of American Association Which Is to Meet in Detroit

In writing about the annual convention of the American Drop Forging Institute, to be held in Detroit on Oct. 3 to 6, concurrently with the convention of the American Society for Steel Treating, Scovell, Wellington & Co., commissioners of the association, have supplied some information of the objects and workings of the organization.

The institute was formed in 1920. The executive membership from the beginning has concerned itself with problems affecting the production of drop forgings for sale, including a study of raw material and supply markets, industrial relations, production and accounting methods, supply and demand for drop forgings, and the extension of the market therefor. Information, collected and distributed at regular intervals, covers: The total volume of purchases of the important classes of material, with current market prices. The rates of wages and earnings, hours of labor, and number of men employed, by classes. The total hammer-hours operated, as compared with the capacity of the membership, in each of several classes of equipment. The total tonnage of steel consumed, and the total volume of shipments made. The total volume of new business booked and of unfilled business on the books of the membership. As the product of the institute is almost exclusively contract forgings (the institute does not concern itself with finished product such as tools, wrenches, etc.) there are no average prices available, and the institute does not deal in any manner with the question of market prices of its product.

It was soon apparent that, in the consideration of many of these problems, the experience and knowledge of drop forgers whose product does not reach the market, but is absorbed either by themselves or by closely affiliated interests, would be valuable. In order to enlist their support, a manufacturing committee was appointed, with a director of the institute as general chairman, the members of which are chairmen of various regional groups. At present there are four such groups, as follows:

Atlantic, including New England, eastern New York and Pennsylvania, and the Atlantic Coast States. Chairman, J. B. Sehl, second vice-president Billings & Spencer Co., Hartford.

Central, including western New York and Pennsylvania, and Ohio. Chairman, E. E. Adams, general superintendent Cleveland Hardware Co., Cleveland.

Indiana-Michigan, including also Ontario. Chairman, R. T. Herdegen, vice-president and general manager Dominion Forge & Stamping Co., Ltd., Walkerville, Ont.

Western, including all territory west of the Indiana-Michigan boundaries. Chairman, F. A. Ingalls, vice-president Ingalls-Shepard Division, Wyman-Gordon Co., Harvey, Ill.

Ferdinand Barnickol, president Indianapolis Drop Forging Co., Indianapolis, is general chairman of the manufacturing committee, and A. D. Armitage, vice-president and general manager J. H. Williams & Co., Buffalo, is member-at-large.

These groups hold quarterly meetings, primarily to consider problems of production, engineering, shop accounting, and industrial relations, which are available to any drop forger interested in such problems, either through executive membership in the institute, if eligible, or as an associate member, if the character of his business is such as to make him ineligible for executive membership. The manufacturing committee is also in charge of the annual convention of the institute.

As the activities of the manufacturing committee would duplicate in large measure the work of the American Drop Forge Association, overtures were made to that organization looking toward amalgamation of the two bodies, and this was finally accomplished on Jan. 1, 1922, all members of the association being carried as associate members of the Institute until July 1, at which time they were given opportunity for continuing either as executive or associate members, depending upon their eligibility.

Among the first actions of the institute was the appointment of a cost committee to study cost accounting methods. A report on a survey of the industry, with recommendations for uniform methods, previously prepared for some of the larger members by Scovell, Wellington & Co., was made available to all members. Data on the present methods of cost accounting and estimating employed by the members have been collected periodically; and the committee, composed of J. B. Sehl, chairman; C. C. Winn, assistant treasurer; Wyman-Gordon Co., Worcester, Mass., and F. S. Hatch, assistant treasurer Moore Drop Forging Co., Springfield, Mass., is now issuing a series of articles to all members, both executive and associate, comprising a treatise on the "Essential of Drop Forging Accounting."

Besides the manufacturing division, in charge of the group meetings and of the annual convention, a purchasing agents' division was established early in the institute's history; and the organization of an accounting division, to further the work of the cost committee, is now contemplated. Other standing and special committees look after specific items in the institute's program.

The direction of the institute's policies is in the hands of a board of directors of nine members, three of whom are chosen each year for a three-year term. From among their number a president and two vice-presidents are chosen annually. Neither directors nor officers can serve for more than one term consecutively, except that ex-presidents are ex-officio advisory members of the board of directors. The present officers of the institute are:

President, J. H. Williams, president J. H. Williams & Co., Brooklyn, N. Y.

Vice-presidents, H. G. Stoddard, vice-president and treasurer Wyman-Gordon Co., Worcester, O. F. Transue, president and general manager Transue & Williams Steel Forging Corporation, Alliance, Ohio.

Directors, C. E. Adams, president Cleveland Hardware Co., Cleveland; F. C. Billings, president Billings & Spencer Co., Hartford; C. A. Brauchler, president and general manager Canton Drop Forging & Mfg. Co., Canton, Ohio; Ferdinand Barnickol, president, Indianapolis Drop Forging Co., Indianapolis; A. H. Chapin, president Moore Drop Forging Co., Springfield, Mass.; J. F. Connelly, vice-president Champion Machine & Forging Co., Cleveland.

Ex-president, F. A. Ingalls, vice-president Ingalls-Shepard Division, Wyman-Gordon Co., Harvey, Ill.

The affairs of the institute are administered by its commissioners from their office at 1168 Hanna Building, Cleveland.

Nagle Steel Plants to Resume Sept. 20

George H. Heck and associates, 518 Commercial Trust Building, Philadelphia, who, as announced in last week's issue, have purchased the Pottstown and Seyfert plants of the Nagle Steel Co., state that these plants will resume operations in the manufacture of sheets under the new management on Sept. 20. Details as to organization of the new company will be announced shortly. The Pottstown and Seyfert plants will be continued under the name of the Nagle Steel Co.

Minnesota Steel Company's First Steel

The recently completed wire rod mill of the Minnesota Steel Co., Duluth, Minn., rolled its first steel on Sept. 11. The mill will furnish rods to the new wire plant of the same company which, up to the present time, has been receiving rods from the Joliet mill of the American Steel & Wire Co.

Bone coal, formerly considered a waste, is to be used as a boiler fuel by the United States Coal & Coke Co., Gary, W. Va. The fuel will be utilized in pulverized form, and a pulverizing, distributing and burning system is being installed by the Fuller-Lehigh Co. Each 800-hp. boiler is to be equipped with five vertical burners, taking the fuel from five 3-in. screw feeders.

Laying Out and Drilling Machine

A new tool room machine, which in conjunction with the Johansson compound slide and blocks is calculated to make a complete, independent laying out and drilling machine for the spacing of holes in dies, jigs, templates, master-plates, etc., and to do it with Johansson accuracy in less time than it takes to do the work in any other way—in one-tenth of the time it takes using buttons, it is stated, is being manufactured by Franz K. Krag, Chicago.



The head of the K-N machine swings a full 360 deg., allowing drilling to be done at any point in the circle. It has an interchangeable bushing supported in a rigid arm, integral with the machine, immediately above the work, to prevent any spring of the drill. The machine has six changes of speed, from 400 r.p.m. to 4300 r.p.m., furnishing the proper speeds for drills up to ¼ in. in diameter.

Without the use of the Johansson compound slide and blocks, the K-N machine is a precision, high-speed drilling machine with swinging head and drill guided immediately above the work, to insure speed and accuracy. The head is constructed so that it may be removed from the column and mounted on the milling machine in five minutes and may then be used for laying out and drilling directly from the milling machine screw, or for greater accuracy, in connection with the Johansson compound slide and blocks.

As a routing and milling machine, it works with a single lip cutter, which can be made up quickly for any shape desired. A locking screw is provided for locking the spindle in a fixed position. The spring idler keeps the belt at the proper tension, allowing the belt to slip, if too great pressure is exerted on the cutter, and thereby saving the cutter from breaking. The speed, which is seven times the milling machine speed, makes it possible to use a very small cutter.

E. L. Krag & Co., 50 West Randolph Street, Chicago, Ill., are the distributers for the K-N machines and attachments.

Inventories of the estate of Ferdinand Schlesinger filed in the probate court at Milwaukee show a valuation of $2,062,709.55, exclusive of gifts aggregating $6,374,678.34 made to members of his family over a period of six years prior to his death. The bulk of stocks consists of 60,711 shares of common stock of the Steel & Tube Co. of America, appraised at $667,821, and shares in the Newport Mining Co., Detroit Iron & Steel Co., and Harrow Spring Co., Kalamazoo, Mich.

Ball Bearing Notable for Its Size

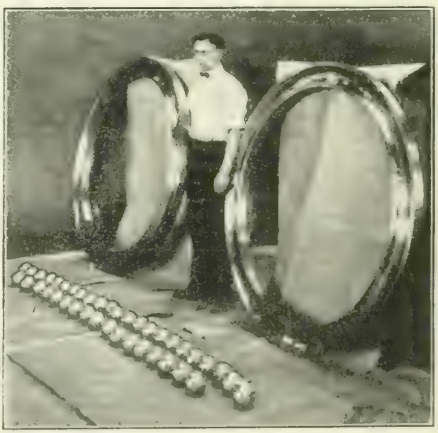
The Standard Machinery Co. Auburn, R. I., has completed a ball bearing which, it is believed, is the largest of its kind ever produced. It is worthy of note also because of the success attendant upon its manufacture and its recent duty in service as well.

The bearing is of the conventional design and consists of an upper raceway, a lower raceway, and 40 balls. The raceways are alike, being 56.25 in. plus 0.003 in. outside diameter, with inside diameter of 46 in. minus 0.003 in. and a thickness overall of 2.75 plus or minus 0.01 in. The balls are 4 in. in diameter and lapped to a tolerance of plus 0.003 in., minus zero. The raceways and balls are of chrome bearing steel hardened and ground, both showing a scleroscope hardness reading of 92 to 96.

The races are capable of carrying a sustained load of 100,000 lb. on one ball applied at any point in the circumference of the groove and each ball will stand a load of 100,000 lb. when placed between the finished races without showing any permanent deformation or surface cracks.

The balls were tested by the manufacturer under a Riehle testing machine using the three-ball method, wherein three balls are superimposed, the center ball being the one actually under test. The three-ball method has proved itself to be the most reliable for testing, and is replacing the old way of testing one ball between two hardened steel plates, this three-ball method being regarded as more severe, due to the fact that the ball under test is only supported by an actual point of contact, with the results likely to be accurate, consistent and reliable.

The formula used by the Standard Machinery Co. for crushing strength of steel balls under the three-ball method is $100 \times D^2$ where D represents the diameter of the ball in one-eighth inches. This would mean that the 4-in. balls would crush at a load of about



1,024,000 lb., while the design requires only a strength of 100,000 lb., so that an ample factor of safety was thus obtained. From the above analysis of this ball thrust bearing, it would thus be possible to subject it to a perfectly safe load of 4,000,000 lb., providing the stresses were equally divided on all the balls, and it would collapse under a load of 40,960,000 lb. under a uniformly distributed stress. The static load on this thrust bearing in service is about 550,000 lb.

At the top of page 589, in our issue of Sept. 7, it is stated that the new pig casting machine of the Emporium Iron Co., Emporium, Pa., was furnished by the Pittsburgh Coal Washer Co. We are now informed that this is an error; the machine was furnished by Heyl & Patterson, Inc., Pittsburgh.

Iron and Steel Electrical Engineers Meet

Cleveland Convention Was Notably Successful—Power Problems. Combustion and Electrification Discussed—Efficiency of Electric Power Supply

BOTH from the standpoint of attendance and interest taken in the technical sessions, and in the size and attractiveness of the exhibits, the sixteenth annual convention of the Association of Iron and Steel Electrical Engineers, held in the Public Hall, Cleveland, Sept. 11 to 14, was declared the most successful ever conducted by the association. Registration amounted to about 2300, including both members and visitors. The meeting place proved particularly well suited for the convention as the large exhibit room of the hall provided ample space for display and permitted the 85 exhibitors to make a more complete showing of their products than they could have done with a more limited space. The exhibits included electrical apparatus, handling equipment and other appliances used in steel plant operations.

Technical sessions, held in adjoining rooms on the same floor, were scheduled to continue until Friday noon, but a change was made in the program and the last session took place Thursday afternoon. These technical sections proved of much interest and several of the papers brought out considerable discussion. One entire day was devoted to the subject of fuel economies.

At the annual banquet, held at the Statler Hotel Thursday evening, several interesting speakers were on the program. These included Charles P. Steinmetz, chief consulting engineer General Electric Co.; the retiring president, W. S. Hill, electrical engineer Illinois Steel Co., South Chicago; J. S. Unger, manager of the research department Carnegie Steel Co., and C. L. Collens, president Reliance Mfg. Co., Cleveland. H. P. Bope, formerly general sales manager of the Carnegie Steel Co., was toastmaster. The Cleveland section entertained the visitors Tuesday evening with a dance and organ recital at the Public Hall. An interesting lecture on the science of numbers was given by E. Kieft, engineer of tests at the Gary plant of the Illinois Steel Co.

At the business meeting Monday forenoon R. B. Gerhardt, electrical engineer Bethlehem Steel Co., Sparrows Point, Md., was elected president for the ensuing year. Other officers elected were as follows: First vice-president, L. F. Galbraith, electrical engineer West Penn Steel Co., Brackenridge, Pa.; second vice-president, R. L. Shoemaker, superintendent of maintenance American Rolling Mill Co., Middletown, Ohio; directors, A. C. Cummins, electrical superintendent Carnegie Steel Co., Duquesne, Pa.; E. H. Wentz, electrical superintendent National Tube Co., Lorain, Ohio; B. G. Beek, electrical engineer American Sheet & Tin Plate Co., Gary, Ind.; George Schaeffer, electrical superintendent Carpenter Steel Co., Reading, Pa., and A. L. Freret, assistant chief electrical engineer Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.; treasurer, John Farrington, electrical superintendent LaBelle Iron Works, Steubenville, Ohio; secretary, John F. Kelly, Pittsburgh.

Papers and Discussions

L. W. Heller, general superintendent power stations, Duquesne Light Co., Pittsburgh, in a paper on "Steam Turbine Operation," said that the trend of steam turbine manufacture at present seems to be toward increasing the reliability of the equipment and refinement in design, and manufacture and operation are receiving more attention than ever before. His paper was devoted largely to a discussion of the methods used by the Duquesne Light Co. in the operation of its steam generating equipment. Tables were presented showing increasing size of the units installed, and their thermal efficiency and average performance. The author held that the larger capacity power stations now required make the installation of turbine driven units desirable, and pointed out that the concentration of power allowed by these insulations means the saving of building space and the operation of greater power with a smaller number of attendants.

"Internal Combustion Engines for Power Generation in Steel Mills" was the subject of a paper by D. M. Petty, electrical engineer Bethlehem Steel Co., South Bethlehem, Pa., a gas engine rated at 4000 kw. being taken as the basis. A table was given showing that the average installed cost of a gas engine power plant, made up of three or more 4000-kw. units, is $132 per kw. Operating costs were also tabulated. A 2700-kw. Diesel oil engine was also discussed. The speaker called attention to one point for future improvement in net operating efficiency, in the utilization of the heat contained in the exhaust gases. He said that reclaiming this energy is somewhat similar to the application of condensers to the steam turbine and that this field is merely scratched to-day in a few plants where boiler feed water is heated in a small way.

He pointed out that one of the principal items in operating costs in the past, the renewal of worn steel parts such as cylinders, piston rods, etc., has been materially reduced by the use of electric welding. Formerly, when the grooves of the piston became worn sufficiently to cause excessive leakage, it was necessary to remachine them and put in oversize piston rings. Now the worn pieces are filled by electric welding and machined out so that the life of the steel piston is almost indefinite. Formerly cylinders had to be scrapped because of cracks, but these are now welded. Cast steel was favored for gas engine parts because it can be welded, as well as for other reasons. Comparing internal combustion engines with steam engines for power station work the speaker pointed out that one great weakness of the steam power station is its standby losses or the coal that must be burned under the boilers to keep up steam pressure when all the power generating apparatus is shut down.

There was an interesting combined discussion on the two papers of steam turbine operation and internal combustion engines for steel plants, which brought out varying views on reliability, fuel costs, cost of repairs, etc., and some conflicting opinions as to the comparative merits of gas engines and steam engines in steel plants. W. M. Hampton, superintendent gas engine department of the Gary works of the Illinois Steel Co., discussed the operation of gas engines at that plant, where electricity is largely generated by the use of 56 gas engines. These engines at Gary are loaded up to their maximum power and steam turbines take the fluctuation in the load. Gas engines have proved their efficiency and reliability after nearly fifteen years of service and the United States Steel Corporation, particularly the Illinois Steel Co., is still buying gas engines. He declared that repair costs compare favorably with those for steam units of the same sizes. While some cylinders have cracked, others have been used fourteen years.

This discussion brought out remarks regarding more extensive uses of gas in steel plants. J. R. McDermott, chief engineer South works of the Illinois Steel Co., Chicago, favored developing the use of blast furnace gas for heating and melting in steel plants. He said that the South works has a gas surplus for reheating and contemplates its use for the open-hearth furnaces. R. B. Gerhardt stated that the Bethlehem Steel Co. proposes to use a mixture of blast furnace and coke oven

gas for heating furnaces, soaking pits, annealing furnaces and eventually for its open-hearth furnaces.

Combustion and Boiler Practice

W. W. Witting, assistant chief engineer Illinois Steel Co., Gary, Ind., presented a comprehensive paper on "Judging the Combustion of Gaseous Fuel from Gas Analysis" which indicated a large amount of research work on his part. He stated that fuel losses in a large steel plant are great, in spite of efforts to minimize them. Efforts are made to cut down fuel consumption and to obtain perfect combustion with a minimum surplus of air. In pursuit of this goal efforts are directed toward finding improved methods of producing such combustion, and the author stated that there is large room for improvement in design of burners, furnaces,, etc., but that even of greater importance is the most efficient handling of equipment. He advocated the better utilization of the waste gas analysis and warned against the indiscriminate use of gas analyses. Various formulas were embodied in the paper. The writer stated that his purpose was to call attention to the fact that guesswork can be eliminated from the solution of combustion problems by means of waste gas analysis and to present a method that will extend the possibilities of their application. Another purpose was to point out the error that he declared is commonly committed in judging the quality and heating value of producer gas entirely from an analysis of the fixed gases it contained and neglecting the tarry vapors.

A topical discussion was held on "Boiler Practices of 1922." J. B. Crane, Geo. T. Ladd Co., Pittsburgh, Pa., discussed the present tendency in boiler design and said that with increasing cost of coal, higher boiler pressure and greater average loads economizers are justified on an investment basis in more cases than heretofore. R. E. Butler, Babcock & Wilcox Co., said that the average size boiler for large industrial plants is now probably around 1000 hp. as compared with 500 hp. ten years ago. To attain higher efficiency from boiler units more heating surface is being installed per foot of furnace width. The advantages of mechanical operation recently have led to experiments in the use of coal on forced blast chain grates and in a powdered form, blown into the furnace. In his opinion the blast chain grate seems particularly adapted to the lower grades of coal and coke braize. Theoretically the burning of powdered coal in suspension is an ideal way, but he declared a number of difficulties must be overcome before this method will to any great extent supersede the under feed stoker or blast chain grate stoker. R. M. Rush, Springfield Boiler Co., Pittsburgh, Pa., discussed the modern sectional head boiler and E. R. Fish and Alfred Cotton, Heine Power Co., St. Louis, discussed the Heine boiler practice.

Electrification

"A Review of Steel Mill Electrification," prepared by B. G. Lamme, chief engineer Westinghouse Electric & Mfg. Co., and W. Sykes, vice-president Canadian American Alloy Corporation, was read by G. E. Stoltz of the Westinghouse company. The writers held that one of the great defects of individual power plants of large industries is that the plant has not been laid out for future needs. Extensions are made as required but without looking ahead. With practice crystallizing in certain directions there is no longer much excuse for haphazard power developments. Mixed systems and mixed operations almost always represent a handicap in some form.

The authors held that from an efficiency standpoint the electric system as a whole is far ahead of anything else in power generation, transmission and utilization; from the flexibility standpoint it possesses great advantages and from the durability and maintenance standpoints electrical machinery ranks high. It was declared that the general trend in all industries is toward electrification and that there is a tendency toward securing power from central plants. The development of adequate and reliable gearing was credited with being a great impetus to the advance of electric drive.

One objection found to the use of steam for a prime mover was that a power house is usually located close to the blast furnace to use the blast furnace gas and as the plant expands either long steam lines are required to supply distant power units or a multiplicity of power plants is required, both of which were declared uneconomical. In case of steam-driven units the power unit under the best conditions of load is less economical than a turbo generator unit.

Operating figures were checked up for two plants producing largely the same class of products and having approximately the same tonnages, one being electrically and the other steam driven. After making due allowances in every case for the value of blast furnace gas used and making adjustments for slight variations in the output, the figures showed that the electrically driven plant produced steel at between $3 and $4 per ton less than the steam-driven plant. Another investigation gave the electrically driven plant an advantage of $2.50 per ton. The only comments on the paper were made by Dr. Unger, research department Carnegie Steel Co., who expressed the view that electricity will replace mechanical movers in steel plants.

"Generating Station Development" was discussed by David R. Rushmore and E. Pragst, General Electric Co., Schenectady, N. Y. Their paper called attention to the increase in capacity and efficiency of hydro-electric units, to marked advancement in turbine design, to rapid boiler development and to the increase in boiler size. The paper stated that it has been considered impractical in most cases to burn coal on stokers and gas in the same furnace. However, the Ford installation at River Rouge has proved that it is practical to burn both fuels in the same furnace, thus materially reducing the boiler capacity and resulting in various other economies.

It was declared that the developments in turbines during the past two or three years have been more pronounced than during any similar period. Attention was called to a recent development in air-cooling systems for use in connection with generators which should be of particular interest to the iron and steel industry. This includes a closed air circulating system and water sprays for cooling the air before it again re-enters the generator. The system is expected to find its principal application where impure air only is available for cooling. Looking into the future, the writers predicted the use of new fuels and among them probably the use of the energy of the sun as stored in plant life and utilized in some such form as alcohol.

F. C. Watson, electrical superintendent International Nickel Co., described in detail that company's works for the manufacture of monel metal at Huntington, W. Va.

Separation of Power Production from Manufacturing

A paper by Charles P. Steinmetz, chief consulting engineer General Electric Co., on "Improvement in Efficiency of Electric Power Supply" attracted an unusual amount of interest because of the author's prominence. He declared that power production has become a separate industry and that the best economy requires the separation of power production from the industries it serves. Economy also requires that by-product power of an industry be not wasted, even partly, but that it be used to its fullest extent for raw material for power. Power production is cheaper in large central stations than in small isolated stations. However, it would be uneconomical for an industry like the steel industry, producing blast furnace gas, to pay for power and waste the gas. Where considerable energy is available as a by-product of an industry this may be converted into power at a lower cost than power bought from a central station. Theoretically the most economical arrangement between a local station using the by-product energy of an industrial plant and a central power station would be an interchanging of power, power deficiencies being supplied by a central station, which would take any surplus power that might be produced by the isolated station.

Dr. Steinmetz held that the difficult problem in the relation between the electric power company and the individual corporations that use electric power and produce by-product energy is the financial one of the rate for power and energy. These rates should be based on

cost plus a fair profit. However, this is often difficult to work out, owing to the uncertainty as to the cost, this applying to the electric power and to the by-product energy such as blast furnace gas. He said that the best way to solve the problem would be to work out the engineering economy of the relation without regard to the rate question, and have a committee of both corporations make a continued study of the cost relations with a view to arriving at a fair agreement. He believed that a great step in the industrial development of the country would be taken were these economy relations worked out between a power company and a company producing by-product energy.

"The Electrification of Steel Plant Railroad Yards" was discussed by R. B. Gerhardt, electrical superintendent Bethlehem Steel Co., who dwelt on the power supply, conductor rail location and the locomotive design. He expressed the opinion that the day is almost here when the steam locomotive will take a back seat in some of the steel plants. In the discussion, Chairman W. S. Hall stated he was inclined to think that the electrification of steel plant yards depends almost wholly on the individual plants but he believed the tendency in the direction of electrification. E. Friedlander, Carnegie Steel Co., Braddock, Pa., said he did not think there is a steel plant in the country that could not electrify its yard. At his plant a third rail system has been operated for three years without an accident and the replacing of 25 steam locomotives with electric locomotives is being considered. He thought storage battery locomotives, where 12 or more are used, would be unsatisfactory, and held that a third rail track could be put anywhere in the mill yard, even in front of a blast furnace. Dr. Steinmetz discussed some of the electric problems involved and Dr. Unger predicted that in time all mill yards will be electrified.

Reports of Technical Committees

A comprehensive report of the Electrical Development Committee was submitted by its chairman, R. B. Gerhardt. A list was given of the main roll drives installed or placed on order during the year. Named as of foremost importance was the main roll drive ordered by the Youngstown Sheet & Tube Co. for a 30-in. reversing universal skelp mill. The list showed several mills of the continuous type using individual motor drives for separate stands. It was pointed out that, by the introduction of individual motors, particularly on the finishing stands, the speed relations between these stands can be adjusted and, due to the very flat relations, this speed is maintained regardless of the load. With this advantage the delivery speed of the mill can be increased and larger tonnages rolled at higher temperatures, so that more accurate gages are obtained. The list also showed a tendency to use direct current motors supplied by power from a motor generator set or a rotary converter, in preference to obtaining adjustable speed by means of auxiliary equipment used in connection with a wound rotor motor. The use of d.c. motors, particularly where several are desired, simplifies the equipment considerably, which reduces the amount of attention and inspection required.

Attention was called to a new type of variable speed alternating current motor drive known as the frequency converter set, the first installation of this kind having been made at the plant of the Scullin Steel Co., St. Louis. Another development was a new type of speed control for rod steel drives. This will keep the speed of the reels in synchronism with the delivery speed of the mill at all times. The a.c. adjustable speed brush shifting motor, although applied several years ago, has recently begun to receive the prominence to which it is entitled. Its particular field of application is in driving variable speed loads of high load factor, where the efficiency of operation is of importance, as in the case of draft fans, pumps, etc. The report stated that there has been a continuous effort on the part of power house designers and manufacturers of apparatus to improve the methods and means of electric energy production. Other means of increasing station economies were probably overshadowed by two more fundamental ones, namely, an increase in prime mover thermal economy and an increase in the range of the heat cycle. Steam turbines have been greatly improved in detail during the past year and substantial advancement has been made in generator design. The steel industry requirements for oil breakers during the past year have shown a tendency toward the isolated cell type, with increased rupturing capacity and voltage rating.

Satisfactory advance during the year in the use of industrial heating in the iron and steel industry was reported. Consideration has been given in one or two cases to the possibilities of electrically heated soaking pits. Several steel plants have considered the metallic resistor type of furnace for low temperature heat treatment. In general, however, the possibilities of this type of furnace for working up to a temperature of 2000 deg. Fahr. have not been followed by steel manufacturers to the same extent as in industries using steel in making their products. In arc welding the principal developments during the year were in the modification and adaptation of the automatic arc welder.

On the subject of yard electrification, the committee stated that several large steel plants have this under consideration. The merits of each type of electric locomotive depends to some extent on the particular plant but, from a purely economical standpoint, the committee stated that the straight locomotive has considerable advantages over the storage battery or combination locomotive. The storage battery type has reached a high state of development in the mining industry and the committee saw no reason why the mining type cannot be enlarged to fill the needs of the steel plant. On the subject of lighting, reference was made to a new form of filament lamp with a tipless bulb which is regarded as exceptionally serviceable for portable cords and drop lights.

F. W. Cramer, engineer of tests Cambria Steel Co., chairman of the control committee, reported that for ten years the committee had devoted its time to the problems of control standardization but, other than submitting reports making recommendations, the work has produced no tangible results. Consequently, this year it was desired to have a subcommittee on control located in each of its section districts to obtain a general opinion of steel producers on what is desired in the way of standardization. The committee believed that the association should suggest to electrical manufacturers that all new designs contemplated should be submitted to a committee for approval or criticism. By following this plan, standardization could be gradually brought about.

Reports submitted by the Pittsburgh, Chicago, Philadelphia, Cleveland and Youngstown sections indicated that, while there is a difference of opinion as to the way standardization should be carried out and what part should be given first consideration, there is a great demand for standard parts. Following the recommendation of the committee, the association passed a resolution requesting the Cutler-Hammer Co., Electric Controller & Mfg. Co., General Electric Co. and Westinghouse Co. to delegate two men each to meet with the committee of the association to devise ways and means of standardizing contractor ratings, grid resistance and other parts of control apparatus, with a view to reducing the number of spare parts that a user must carry in stock.

In its report, submitted by R. G. Bauer, electrical engineer Clairton works of the Carnegie Steel Co., Clairton, Pa., the sub-committee on illumination stated that the incandescent lamp is now almost universally used, R. L. M. standard reflectors are used extensively throughout steel plants and safety requirements are given first consideration, resulting in lamps being placed in accessible places and provided with hangers for lowering. The committee adopted a plan of compiling solutions of different lighting problems. In one case marine fittings replace wire guards to shield lamp globes that were a target for boys. In one plant breakage of yard lamps and shades was cut down by using stationary instead of swinging fixtures.

Through D. M. Petty, Bethlehem Steel Co., the standardization sub-committee on motors recommended the appointment of a committee to confer with a committee of the Boiler Club to devise ways and means of standardizing ratings and dimensions for mill type motors.

A questionnaire on the use of anti-friction bearings was sent to 25 of the largest steel plants and the tabulation showed that the highest percentage of motor failures was due to oil. Some of the replies indicated that most of the failures could be eliminated by roller bearings. The committee recommended that bearing and motor manufacturers adopt standard anti-friction bearings.

In the report submitted by F. A. Wiley, electrical superintendent Wisconsin Steel Works, South Chicago, the safety committee declared that the accident problems involve two essential elements, safeguarding and education. An organization plan for safeguarding and a list of general safety rules were submitted.

Exhibits

The exhibitors included the following:

Cleveland Crane & Engineering Co., Wickliffe, Ohio, [illegible] wire coils; VanDorn Electric Tool Co., Cleveland, drill, reaming and grinding machines; American Blower Co., Detroit, fans; Johns-Manville, Inc., New York, insulating material; Baker R & L Co., Cleveland, trucks and tractors; Chicago Pneumatic Tool Co., New York, drilling machines; Taylor Instrument Companies, pyrometers; Allen Bradley Co., Milwaukee, electric controlling devices; Atlas Car & Mfg. Co., Cleveland, low lift storage battery trucks; Reliance Electric & Engineering Co., Cleveland, motors; Wilson Welder Metals Co., New York, welding outfits; Cutler-Hammer Mfg. Co., Milwaukee, 60-in. magnetic clutch; Leeds & Northrup, Philadelphia, electric furnace; American Steel & Wire Co., Cleveland, cable and other wire products; Hayward Co., New York, buckets; Alliance Machine Co. Alliance, Ohio, models of ladle, crane and other trolleys; R. H. Beaumont Co., Philadelphia, miniature skip hoisting system, steel bunker and coal weighing larry; Electric Controller & Mfg. Co., Cleveland, control equipment and lifting magnets; Westinghouse Electric & Mfg. Co., control panels, automatic pressure regulators, safety switches, arc welding outfits, electric furnace and lighting equipment; National Lamp Works, and Ivanhoe Regent Works of General Electric Co., Cleveland, lamps and reflectors; General Electric Co., Schenectady, N. Y., 40-ton storage battery locomotive, arc welding machine, control panels; Crocker-Wheeler Co., Ampere, N. J., motors; Cutler Electric & Mfg. Co., Philadelphia, circuit breakers; Mercury Mfg. Co., Chicago, tractors; R. D. Nuttall Co., Pittsburgh, helical gears; Mutual Electric & Machine Co., Atlanta, Ga., safety switches; Tool Steel Gear & Pinion Co., gears and pinions; Thompson Electric Co., Cleveland, lighting fixtures; Aldrich Pump Co., Allentown, Pa., hydraulic pumps; Lakewood Engineering Co., Cleveland, clam shell bucket, tractors and lifting trucks; Louis Allis Co., Milwaukee, motors; Shepard Electric Crane & Hoist Co., Montour Falls, N. Y., electric hoists; Euclid Crane Hoist Co., Euclid, Ohio, hoists and switches; Ohio Electric & Controller Co., Cleveland, controllers; Pittsburgh Transformer Co., Pittsburgh, transformers; S. K. F. Industries, Inc., New York, ball bearings.

Welding Meeting in Chicago

The fall meeting of the American Welding Society will be held in Chicago, Oct. 2, 3, 4 and 5, in the rooms of the Western Society of Engineers, 1735 Monadnock Block. Among the committee reports to receive consideration are the following: Specifications for steel to be welded, W. J. Beck, chairman; electric arc welding, H. M. Hobart, chairman; gas welding, S. W. Miller, Union Carbide and Carbon Research Laboratories, chairman; welded rail joints, Dr. G. K. Burgess, Bureau of Standards, chairman.

Among the papers scheduled are the following: Gas Welding of Cast Iron, by S. W. Miller; Thermit Welding and Cast Iron, by J. H. Deppeler, chief engineer Metal & Thermit Corporation; Electric-Arc Welding of Cast Iron, by William Namack, Davison-Namack Foundry Co.

Co-operation Between Engineering School and Foundries

LAFAYETTE, IND., Sept. 14.—During July and August E. E. Wendt, of the engineering staff of Purdue University, visited 57 foundries in Indiana and interviewed 100 foundrymen in an effort to help them solve their problems. Mr. Wendt teaches foundry work. Many of the foundrymen were in favor of holding a conference or meeting at Purdue University next spring and a number expressed a willingness to take Purdue students into their plants during the summer vacations.

Machine Tool Exhibition at New Haven

The machine tool exhibition to be held at the Mason Laboratory of mechanical engineering of Yale University, New Haven, under the auspices of the New Haven branch of the American Society of Mechanical Engineers, Yale University, and the New Haven Chamber of Commerce, is taking on large proportions. It will be opened at 7 p.m., daylight saving time, Thursday, Sept. 21, and will be open in the daytime on both Friday and Saturday. The list of exhibitors numbers 109 and comprises mostly New England manufacturers of machine tools and machine shop accessories with a number of scattering exhibits from other parts of the country. It is planned to have motion pictures on all three evenings and speakers of authority on a number of subjects. There is no admission charge for spectators. The exhibition is a co-operative undertaking intended to serve manufacturers, buyers and users of machine tools with the idea of helping to improve business conditions, particularly in New England.

The tentative program of speakers includes the following: Dean Charles H. Warren, Sheffield Scientific School, on Co-operation between the Colleges and the Machine-Tool Industry; Henry B. Sargent, Sargent & Co., New Haven; Melville D. Liming, of the Boston Chamber of Commerce, on outlook for industry in New England; Earle Buckingham on machine tools, standardization and interchangeable manufacture; Oscar R. Wikander on standardization activity in Germany; William Calkins on design, manufacture and performance of twist drills; Gardner T. Swarts, Jr., on application of graphic control to machine-tool manufacture; and Oswald W. Knauth, secretary National Bureau of Economic Research, on analysis of income in the United States.

The National Association of Farm Equipment Manufacturers will hold its twenty-ninth annual convention at the Congress Hotel, Chicago, Oct. 18 to 20, inclusive. The program has not yet been announced.

COMING MEETINGS

September

Machine Tool Exhibition. Sept. 21, 22 and 23. Mason Laboratory, Yale University, New Haven, Conn. Connecticut section American Society of Mechanical Engineers. Harry R. Westcott, 207 Orange Street, New Haven, Chairman Exhibition Committee.

American Electrochemical Society. Sept. 21, 22 and 23. Fall meeting, Windsor Hotel, Montreal, Canada. Secretary, Dr. Colin G. Fink, Columbia University, New York.

American Institute of Mining and Metallurgical Engineers. Sept. 25 to 29. Pacific Coast meeting, Engineers' Club, San Francisco. Secretary, F. F. Sharpless, 29 West Thirty-ninth Street, New York.

October

American Society for Steel Treating. Oct. 2 to 7. Convention and exposition, General Motors Co. Building, Detroit. Secretary, W. H. Eisenman, 4600 Prospect Avenue, Cleveland.

American Drop Forging Institute. Oct. 3 to 6. Annual convention, General Motors Building, Detroit. Commissioners, Scovell, Wellington & Co., 1168 Hanna Building, Cleveland.

Society of Industrial Engineers. Oct. 18 to 20. McAlpin Hotel, New York. Business manager, George C. Dent, 327 South LaSalle Street, Chicago.

American Gear Manufacturers' Association. Oct. 9, 10 and 11. Semi-annual meeting, Chicago. Secretary, T. W. Owen, 2443 Prospect Avenue, S. E., Cleveland.

Labor Problems in Electric Melting*

Best Melter One with No Previous Furnace Training—Bonus for Charging—Metallurgist in Charge of Laboratory and Furnaces

BY CHARLES WELLMAN FRANCIS

THERE is a great tendency to use foreign labor in present-day electric furnace practice. This fact may be partly explained by the inability to get American-born laborers to stick to furnace work. While the alien often makes a good, steady workman on the furnaces, his inability to cope with emergencies, due largely to the fact that he does not readily comprehend the orders given him, is a great handicap to him on a job where quick action is often necessary. The foreigner trains himself to go about his duties in sequence and, by observing what other workmen on similar jobs at his side are doing, he thus becomes methodical in various tasks. This attribute is a valuable one provided his fellow workmen are of the proper caliber; otherwise he often becomes a detriment to the department.

Training a Melter

In training a man for the position of melter it is essential to secure one of at least the average intelligence who is English-speaking, active and energetic. It is my experience that the man who has had no previous furnace training often makes the most receptive pupil and finally develops into the best melter. Many electric steel foundry executives have tried at short notice to break in converter blowers as melters, or have taken an open-hearth helper for a melter rather than pay the higher salary for a man who thoroughly understands the electric furnace, only to change their policy after they have paid dearly for the experiment. It is not intended to detract from the ability of the converter or open-hearth men in this respect, for they were placed in a position which they could not learn in a week, the entire situation tending in many instances to give the electric furnace the discredit which it in no way deserved.

One side of the labor question vital to the highest efficiency in electric furnace operation is the attitude of the melter toward his furnace helpers. I regret to say that there are certain types of experienced workmen, especially among steel melters, who hide the scrap of paper on which they figure a furnace charge or work out an alloy addition as though it were the only thing that kept them from being discharged. Fortunately this narrow-mindedness is gradually being eliminated, especially so in the last few years when more young college and university men are getting into electric furnace departments.

Metallurgist in Charge of Furnaces

There are very few furnace departments in which we do not find the melter and the chemist at times working at odds. These differences, perhaps petty, often lead to more serious troubles, which in turn are sometimes more noticeable than the results both men should desire to obtain. A good arrangement is to have a metallurgist who is both a steel melter and a chemist in charge of both laboratory and furnaces. The chemist will report to the metallurgist on the analysis of preliminary heat tests, together with the time required to make the determinations, while the melter will make a report to the metallurgist on the alloy additions he makes as a result of the chemist's analysis. Thus the majority of the friction can be eliminated.

Probably the greatest labor problem encountered is that of the furnace charging. It is difficult to get men to stick to the work, especially in hot weather. The best plan is to place this work on a bonus basis, allowing a certain length of time for charging a given amount of scrap. If the men better this time, pay them extra money at a given rate per minute for each minute less than the allotted time. This will give an incentive for fast work and at the same time the melter must see that the furnace is not charged carelessly.

Friction Between Electricians and Furnacemen

There is often considerable friction between the electricians and the furnace helpers which is absolutely unnecessary. This often comes when the electric furnace helpers begin to feel that they know the electrical side of the installation as well as the electricians themselves. Consequently when electrical troubles arise, instead of calling immediately for the electricians, they try to remedy the difficulty themselves and often make matters worse. I have seen this occur time after time, especially concerning the automatic electrode regulators. These electro-mechanical devices for manipulating the electrodes are extremely sensitive equipment, and no one should be permitted to tamper with them who does not thoroughly understand their workings.

The heats come so fast and frequently from an electric furnace, especially the acid furnace, that unless the proper supervision and co-operation of the helpers is given, the entire equipment will soon become extremely dirty; this in many instances has been the cause of long delays and even accidents and injuries.

There are a number of tasks about the furnace which must be performed after each heat if the equipment is to be kept in the best working condition; namely, cleaning out the furnace pit and placing clean dry sand on the bottom; blowing off the furnace roof with an air hose; repairing the sill of the charging door and the runway of the pouring spout, also a thorough cleaning of the switchboard and panels by means of an air hose. The use of an air hose on the electrode arms is advisable about once a day, because the dust which settles in the foundry is very high in iron and consequently may readily cause the breaking down of the insulation, which might result in the short-circuiting of the equipment and burning out of some very valuable parts, hard to replace at short notice. It is for this same reason that the furnace sub-station should be sealed as tightly as possible to prevent this iron-impregnated dust from settling.

Familiarity with the workings of an electric furnace frequently makes furnace helpers exceedingly careless around the electrical equipment. One habit which they often acquire first is to push or pull the

(*Concluded on page* 763)

*In the issue of July 27, p. 201, the author discussed the choice of an electric furnace; in the issue of Aug. 3, p. 277, the economy features of electric foundry design and equipment; in the issue of Aug. 10, p. 345, acid electric furnace practice; in the issue of Aug. 17, p. 421, basic electric furnace operation, and in the issue of Aug. 31, p. 525, costs of electric melting. This is the concluding article.

Metal Duties in Fordney-McCumber Tariff

A Return to Protection, with High Rates on Ferroalloys and Raw Materials—President May Be Called on to Change These—Foreign Valuation the Basis

BY L. W. MOFFETT

WASHINGTON, Sept. 19.—With the passage of the new Fordney-McCumber bill, the country returns to a protective tariff, and on the whole the measure is quite similar to the Payne-Aldrich act so far as rates are concerned. This is reflected in the metal and other schedules, though in some respects the metal schedule carries high rates not even approached previously. This is particularly true of the ferroalloy and cutlery sections. The rates on rolled steel products, however, do not vary much from, and in some cases are identical with, the Payne-Aldrich rates. All duties when on an ad valorem basis are fixed on foreign valuation.

The chief factors in making the rates, perhaps, were the so-called agricultural bloc and the Western mining interests, as shown by the protection given on their products and the reduction in rates on some of the products they consume. The metal schedule has been left in the form in which it was reported out by the conference.

The most significant portions of the new measure, however, are its administrative features. Outstanding among these is a provision which establishes an altogether new method of handling the tariff. By some it is interpreted as to an extent taking the tariff out of politics, though obviously it is far from doing this completely. This provision relates to authority granted the President, at his request, to determine flexible rates under certain conditions, more fully described elsewhere in this issue. Directly related is another provision giving broader authority to the United States Tariff Commission and in a degree providing for reorganization of the commission.

Possible Changes in Iron and Steel Duties

It now becomes an interesting question as to the use that will be made of these provisions. For instance, it is quite conceivable that iron and steel interests, who are greatly dissatisfied with the duties levied on raw products they consume, will appeal under these provisions to have an investigation made by the commission and to have the President reduce the duties through proclamation. At the same time the right is given to interests supplying these, as well as all other products, to ask for an investigation and request that the President through the same course increase the duties, which may be fixed on either foreign or American valuation. The iron and steel trade, as is well known, strongly opposed the duties fixed on manganese ore, ferromanganese, ferrosilicon, magnesite and several other products. The new administrative features are held to be a substantial move toward a scientific tariff; and while opposition to them has been raised on the ground that they are unconstitutional, it was broken down and the features adopted. They yet may become the subject of tests in the courts. Under the new provisions the Tariff Commission is clothed with authority to study conditions under the existing tariff law and report upon the competitive conditions in American industry with respect to the relationship between the domestic and foreign branches of the industry and state what rates would be needed to equalize those conditions. Previously the commission had no authority to make recommendations as to rates.

The metal schedule itself was the object of prolonged hearings and considerable debate on the floors of Congress, especially in the Senate. Independent iron and steel interests made suggestions as to rates, and while some were adopted, many were disregarded, particularly as to the ferroalloy section. Most of the rates on the rolled products met with no strong opposition from the industry, though suggestions were made which would have balanced the schedule more satisfactorily. An example is the disposition made of barbed wire, in compliance with the supposed wishes of agricultural interests. This commodity is left on the free list. While it is just as costly to make because of labor and other costs as other forms of wire, it is left free of duty, while wire products in general are made dutiable.

The new tariff measure was before Congress for an unusually long period, even for legislation of this kind, traditionally a party issue. Hearings were started before the House Committee on Ways and Means on Jan. 6, 1921. The bill was passed in the House on July 21, 1921, and it was passed by the Senate on Aug. 19, 1922, after which it was reported to conference. The Underwood-Simmons bill was under consideration from April to October, 1913.

Below is given the metal schedule of the new act. Inserted in the schedule are the corresponding provisions of the Underwood-Simmons tariff and of the previous tariff, the Payne-Aldrich act. The Underwood-Simmons duties are given in parentheses ( ), while the Payne-Aldrich duties are given in brackets [ ].

New Duties Compared with Underwood Schedules

steel, (all scrap on free list) [scrap $1 per ton] valued at not more than 7c. per lb., 75c. per ton: Provided, That spiegeleisen for the purpose of this Act shall be an iron manganese alloy containing less than 30 per cent of manganese: Provided further, That nothing shall be deemed scrap iron or scrap steel except secondhand or waste or refuse iron or steel fit only to be remanufactured.

302. Manganese ore or concentrates containing in excess of 30 per cent of metallic manganese, (free list) 1c. per lb. on the metallic manganese contained therein; molybdenum ore or concentrates, 35c. per lb. on the metallic

molybdenum contained therein, tungsten ore or concentrates, 45c. per lb. on the metallic tungsten contained therein; ferromanganese containing more than 1 per cent of carbon, (free list) [$2.50 per pound] 1⅜c. per lb. on the metallic manganese contained therein: Provided, That ferromanganese for the purpose of this Act shall be such iron manganese alloys as contain 30 per cent or more of manganese; manganese metal, manganese silicon, manganese boron, and ferromanganese and spiegeleisen containing not more than 1 per cent of carbon, (free list) [$2.50 per ton] 1⅜c. per lb. on the manganese contained therein and 15 per cent ad valorem; ferromolybdenum, metallic molybdenum, molybdenum powder, calcium molybdate, and all other compounds and alloys of molybdenum, 50c. per lb. on the molybdenum contained therein and 15 per cent ad valorem; ferrotungsten, metallic tungsten, tungsten powder, tungstic acid, and all other compounds of tungsten, 60c. per lb. on the tungsten contained therein and 25 per cent ad valorem; ferrochromium tungsten, chromium tungsten, chromium cobalt tungsten, tungsten nickel, and all other alloys of tungsten not specially provided for, 60c. per lb. on the tungsten contained therein and 25 per cent ad valorem; ferrosilicon, containing 8 per cent or more silicon and less than 60 per cent, 2c. per lb. on the silicon contained therein; containing 60 per cent or more of silicon and less than 80 per cent, 3c. per lb. on the silicon contained therein; containing 80 per cent or more of silicon and less than 90 per cent, 4c. per lb. on the silicon contained therein; containing 90 per cent or more silicon, and silicon metal, 8c. per lb. on the silicon contained therein; ferrochrome or ferrochromium containing 3 per cent or more of carbon, 3½c. per lb. on the chromium contained therein; ferrochrome or ferrochromium containing less than 3 per cent of carbon, and chrome or chromium metal, 30 per cent ad valorem; ferrophosphorus, ferrotitanium, ferrovanadium, ferrouranium, ferrozirconium, zirconiumferrosilicon, ferroboron, titanium, zirconium, chromium nickel, vanadium nickel, zirconium nickel, chromium vanadium, chromium silicon, zirconium silicon, calcium silicide, and all alloys used in the manufacture of steel not specially provided for, 25 per cent ad valorem; cerium metal, $2 per lb; ferrocerium and all other cerium alloys, $2 per lb. and 25 per cent ad valorem; ductile tantalum metal or ductile nonferrous alloys of tantalum metal, 40 per cent ad valorem. (ferroalloy paragraph carried 15 per cent) [ferroalloys 20 to 25 per cent]

303. Muck bars, bar iron, and round iron in coils or rods, iron in slabs, blooms, loops, or other forms less finished than iron in bars and more advanced than pig iron, except castings; all of the foregoing, valued at not over 1c. per lb., 2/10 of 1c. per lb.; valued above 1c. and not above 1½c. per lb., 3/10 of 1c. per lb.; valued above 1½ and not above 2½c. per lb., 5/10 of 1c. per lb.; valued above 2½ and not above 3½c. per lb., 8/10 of 1c. per lb.; valued above 3½ and not above 5c. per lb., 1c. per lb.; valued above 5c. per lb., 1½c. per lb. (5 per cent) [6/10c., 4/10c. and 3/10c. per lb., according to size]

304. Steel ingots, cogged ingots, blooms and slabs, by whatever process made; die blocks or blanks; billets and bars, whether solid or hollow; shafting; pressed, sheared, or stamped shapes, not advanced in value or condition by any process or operation subsequent to the process of stamping; hammer molds or swaged steel; gun-barrel molds not in bars; alloys not specially provided for, used as substitutes for steel in the manufacture of tools; all descriptions and shapes of dry sand, loam, or iron molded steel castings; sheets and plates and steel not specially provided for; all of the foregoing valued at not over 1c. per lb., 2/10 of 1c. per lb. [7/40c. per lb. on value of ¾c. per lb. or less and ranging up to 4.6c. per lb. on value of 16c. to 24c.]; valued above 1c. and not above 1½c. per lb., 3/10 of 1c. per lb.; valued above 1½ and not above 2½c. per lb., 5/10 of 1c. per lb.; valued above 2½ and not above 3½c. per lb., 8/10 of 1c. per lb.; valued above 3½ and not above 5c. per lb., 1c. per lb.; valued above 5 and not above 8c. per lb., 1 7/10c. per lb.; valued above 8 and not above 12c. per lb., 2½c. per lb.; valued above 12 and not above 16c. per lb., 3½c. per lb.; valued above 16c. per lb., 20 per cent ad valorem: Provided, That on steel circular saw plates there shall be levied, collected and paid an additional duty of ¼ of 1c. per lb. (Ingots, billets, etc., by Bessemer, or open-hearth process, free list; electric, crucible and alloy ingots, etc., 15 per cent)

305. In addition to the rates of duty provided for in this schedule on steel in all forms and shapes, by whatever process made, and by whatever name designated, whether cast, hot or cold rolled, forged, stamped, or drawn, containing more than 6/10 of 1 per cent of nickel, cobalt, vanadium, chromium, tungsten, molybdenum, or any other metallic element used in alloying steel, there shall be levied, collected, and paid 8 per cent ad valorem: Provided, That manganese and silicon shall not be considered as alloying material unless present in the steel in excess of 1 per cent manganese or silicon: Provided further, That an additional cumulative duty of 65c. per lb. on the molybdenum content in excess of 6/10 of 1 per cent, and 72c. per lb. on the tungsten content in excess of 6/10 of 1 per cent shall be levied, collected, and paid on any material provided for in paragraph 304 containing molybdenum and tungsten.

306. All metal produced from iron or its ores, which is cast and malleable, of whatever description or form, without regard to the percentage of carbon contained therein, whether produced by cementation, or converted, cast, or made from iron or its ores, by the crucible, electric, Bessemer, Clapp-Griffith, pneumatic, Thomas-Gilchrist, basic, Siemens-Martin, or open-hearth process, or by the equivalent of either, or by a combination of two or more of the processes, or their equivalents, or by any fusion or other process which produces from iron or its ores a metal either granular or fibrous in structure, which is cast and malleable, excepting what is known as malleable-iron castings, shall be classed and denominated as steel.

307. Boiler or other plate iron or steel, except crucible plate steel and saw plate steel, not thinner than 100 9/1000 in., cut or sheared to shape or otherwise, or unsheared, and skelp iron or steel sheared or rolled in grooves, valued at 1c. per lb. or less, 7/20 of 1c. per lb. [from 3/10c. on 8/10c. value to 6/10c. on 3c. value]; valued above 1c. per lb. and not above 3c. per lb., 5/10 of 1c. per lb.; valued at over 3c. per lb., 20 per cent ad valorem [20 per cent]: Provided, That all sheets or plates of iron or steel thinner than 100 9/1000 in. [No. 11 to No. 12 wire gage] shall pay duty as iron or steel sheets. (all plates 12 per cent)

308. Sheets of iron or steel, common or black, of whatever dimensions, and skelp iron or steel, valued at 3c. per lb. or less, thinner than 100 9/1000 and not thinner than 38/1000 in., 45/100 of 1c. per lb.; thinner than 38/1000 and not thinner than 22/1000 in., 55/100 of 1c. per lb.; thinner than 22/1000 and not thinner than 10/1000 in., 75/100 of 1c. per lb.; thinner than 10/1000 in., 85/100 of 1c. per lb.; corrugated or crimped, 75/100 of 1c. per lb.; all the foregoing when valued at more than 3c. per lb., 20 per cent ad valorem: Provided, That all sheets or plates of common or black iron or steel not thinner than 100 9/1000 in. shall pay duty as plate iron or plate steel. (All black sheets 12 per cent) [5/10c. on 3c. value and less and thinner than No. 10 wire gage ranging up to 9/10c. on thinner than No. 32 gage; over 3c. value, 30 per cent]

309. All iron or steel sheets, plates, bars, and rods, and all hoop, band, or scroll iron or steel, excepting what are known commercially as tin plates, terneplates, and taggers tin, when galvanized or coated with zinc, spelter, or other metals, or any alloy of those metals, shall pay 2/10 of 1c. per lb. more duty [same] than if the same was not so galvanized or coated; sheets or plates composed of iron, steel, copper, nickel, or other metal with layers of other metal or metals imposed thereon by forging, hammering, rolling, or welding, 30 per cent ad valorem [40 per cent]; thermostatic metal in sheets, plates, or other forms, 50 per cent ad valorem (new provision); sheets and plates of iron or steel, polished, planished, or glanced, by whatever name designated, 1¼c. per lb. [1½c.]: Provided, That plates or sheets of iron or steel, by whatever name designated, other than polished, planished, or glanced, herein provided for, which have been pickled or cleaned by acid, or by any other material or process, or which are cold-rolled, smoothed only, not polished, shall pay 2/10 of 1c. per lb. [same] more duty than the rates provided on corresponding thicknesses of common or black sheet iron or steel. (For all above, except new provision 15 per cent ad valorem.)

310. Sheets or plates of iron or steel, or taggers iron or steel, coated with tin or lead, or with a mixture of which these metals, or either of them, is a component part, by the dipping or any other process, and commercially known as tin plates, terneplates, and taggers tin, 1c. per lb. [1.2c. per lb.]

311. No article not specially provided for which is wholly or partly manufactured from tin plate, terneplate, or sheet, plate, hoop, band, or scroll iron or steel, or of which such tin plate, terneplate, sheet, plate, hoop, band, or scroll iron or steel shall be the material of chief value, shall pay a lower rate of duty than that imposed on the tin plate, terneplate, or sheet, plate, hoop, band, or scroll iron or steel from which it is made, or of which it shall be the component thereof of chief value.

312. Beams, girders, joists, angles, channels, cartruck channels, tees, columns and posts, or parts or sections of columns and posts, deck and bulb beams, and building forms, together with all other structural shapes of iron or steel, not assembled, manufactured or advanced beyond hammering, rolling, or casting, 1/5 of 1c. per lb. (10 per cent) [3/10c. to 4/10c. per lb.]; any of the foregoing machined, drilled, punched, assembled, fitted, fabricated for use, or otherwise advanced beyond hammering, rolling, or casting, 20 per cent ad valorem (10 per cent) [45 per cent]; sashes, frames, and building forms, of iron or steel, 25 per cent ad valorem.

313. Hoop, band, and scroll iron or steel, not specially provided for, valued at 3c. per lb. or less, 8 in. or less in width, and thinner than 3/8 and not thinner than 100 9/1000 in., 25/100 of 1c. per lb. (10 per cent) [3/10c. per lb.]; thinner than 100 9/1000 and not thinner than 38/1000 in, 35/100 of 1c. per lb. (10 per cent) [4/10c. per lb.]; thinner than 38/1000 in., 55/100 of 1c. per lb. (10 per cent) [6/10c. per lb.]: Provided, That barrel hoops of iron or steel, and hoop or band iron, or hoop or band steel, flared, splayed, or punched, with or without buckles or fastenings, shall pay no more duty than that imposed on the hoop or band iron or steel from which they are made; bands and strips of iron or steel, whether in long or short lengths, not specially provided for, 25 per cent ad valorem. (10 per cent) [35 per cent]

314. Hoop or band iron, and hoop or band steel, cut to lengths, or wholly or partly manufactured into hoops or ties, coated or not coated with paint or any other preparation, with or without buckles or fastenings, for bailing cotton or any other commodity, ¼ of 1c. per lb. (free list) **[3/10c. per lb.]**

315. Wire rods: Rivet, screw, fence, and other iron or steel wire rods, whether round, oval, or square, or in any other shape, nail rods and flat rods up to 6 in. in width ready to be drawn or rolled into wire or strips, all the foregoing in coils or otherwise, valued at not over 4c. per lb., 3/10 of 1c. per lb. (10 per cent) [3/10c. per lb.]; valued at over 4c. per lb., 6/10 of 1c. per lb.; (10 per cent) [3/10c. per lb.] Provided, That all round iron or steel rods smaller than 20/100 in. in diameter shall be classified and dutiable as wire: Provided further, That all iron or steel wire rods which have been tempered or treated in any manner or partly manufactured shall pay an additional duty of ¼ of 1c. per lb. (10 per cent) [½c. per lb]: Provided further, That on all iron or steel bars and rods of whatever shape or section which are cold rolled, cold drawn, cold hammered, or polished in any way in addition to the ordinary process of hot rolling or hammering, there shall be paid ⅛ of 1c. per lb. [same] in addition to the rates provided on bars or rods of whatever section or shape which are hot rolled; and on all strips, plates, or sheets of iron or steel of whatever shape, other than polished, planished, or glanced sheet iron or sheet steel, which are cold hammered, blued, brightened, tempered, or polished by any process to such perfected surface finish or polish better than the grade of cold rolled, smoothed only, there shall be paid 2/10 of 1c. per lb. (10 per cent) [4/10c. per lb.] in addition to the rates provided on plates, strips, or sheets of iron or steel of common or black finish of corresponding thickness or value.

316. Round iron or steel wire, not smaller than 95/1000 in. in diameter, ¾ of 1c. per lb.; smaller than 95/1000 and not smaller than 65/1000 in. in diameter, 1¼c. per lb. (15 per cent) [1¾c. per lb.]; smaller than 65/1000 in. in diameter, 1½c. per lb. (15 per cent) [1¾c. per lb]: Provided, That all of the foregoing valued above 6c per lb. shall pay a duty of 25 per cent ad valorem; all wire composed of iron, steel, or other metal, not specially provided for (except gold, silver, or platinum); all flat wires and all steel in strips not thicker than ¼ in. and not exceeding 16 in. in width, whether in long or short lengths, in coils or otherwise, and whether rolled or drawn through dies or rolls, or otherwise produced, 25 per cent ad valorem (15 per cent) [35 per cent]: Provided, That all wire of iron, steel, or other metal coated by dipping, galvanizing, sherardizing, electrolytic, or any other process with zinc, tin, or other metal, shall pay a duty of 2/10 of 1c. per lb. in addition to the rate imposed on the wire of which it is made; [same] telegraph, telephone, and other wires and cables composed of iron, steel, or other metal (except gold, silver, or platinum), covered with or composed in part of cotton, jute, silk, enamel, lacquer, rubber, paper, compound, or other material, with or without metal covering, 35 per cent ad valorem (15 per cent) [40 per cent]; wire rope and wire strand, 35 per cent ad valorem; spinning and twisting ring travelers, 35 per cent ad valorem (30 per cent) [maximum wire duty and 1c. per lb.]; wire heddles and healds, 25c. per 1000 and 30 per cent ad valorem. (30 per cent) [25c. and 40 per cent.]

317. All galvanized wire not specially provided for, not larger than 20/100 and not smaller than 8/1000 in. in diameter, of the kind commonly used for fencing purposes, (free) [wire duty plus 2/10c. per lb.] galvanized wire fencing composed of wires not larger than 20/100 and not smaller than 8/100 in. in diameter, and all wire commonly used for baling [illegible] than 40 per cent]

318. Woven-wire cloth: Gauze, fabric, or screen, made of wire composed of steel, brass, copper, bronze, or any other metal or alloy, not specially provided for, with meshes not finer than thirty wires to the lineal inch in warp or filling, 25 per cent ad valorem; with meshes finer than 30 and not finer than 90 wires to the lineal inch in warp or filling, 35 per cent ad valorem; with meshes finer than 90 wires to the lineal inch in warp or filling, 45 per cent ad valorem. (15 per cent) [maximum wire duty plus 1c. per lb.]

319. Iron or steel anchors and parts thereof [1c. per lb.]; forgings of iron or steel, or of combined iron and steel, not machined, tooled, or otherwise advanced in condition by any process or operation subsequent to the forging process, not specially provided for, 25 per cent ad valorem. (12 per cent) [30 per cent]

320. Electric storage batteries and parts thereof, storage battery plates, and storage battery plate material, wholly or partly manufactured, all the foregoing not specially provided for, 40 per cent ad valorem. (20 per cent) [45 per cent]

321. Antifriction balls and rollers, metal balls and rollers commonly used in ball or roller bearings, metal ball or roller bearings, and parts thereof, whether finished or unfinished, for whatever use intended, 10c. per lb. and 45 per cent ad valorem. (35 per cent) [45 per cent]

322. Railway fishplates or splice bars, and tie plates, made of iron or steel, ¼ of 1c. per lb. (10 per cent) [3/10c. per lb.]; rail braces, and all other railway bars made of iron or steel, and railway bars made in part of steel, T rails, and punched iron or steel flat rails, 1/10 of 1c. per lb. (free) [7/46c. per lb.]

323. Axles and parts thereof, axle bars, axle blanks, and forgings for axles, of iron or steel, without reference to the stage or state of manufacture, not specially provided for (10 per cent), valued at not more than 6c. per lb., 6/10 of 1c. per lb. [¾c. per lb.]: Provided, That when iron or steel axles are imported fitted in wheels, or parts of wheels, of iron or steel, they shall be dutiable at the same rate as the wheels in which they are fitted. (same) [same]

324. Wheels for railway purposes, and parts thereof, of iron or steel, and steel-tired wheels for railway purposes, wholly or partly finished, and iron or steel locomotive, car, or other railway tires and parts thereof, wholly or partly manufactured, 1c. per lb. (20 per cent) [1¼c. per lb.]: Provided, That when wheels for railway purposes, or parts thereof, of iron or steel, are imported with iron or steel axles fitted in them, the wheels and axles together shall be dutiable at the same rate as is provided for the wheels when imported separately.

325. Jewelers' and other anvils weighing less than 5 lb. each, 45 per cent ad valorem; all other anvils of iron or steel, or of iron and steel combined, by whatever process made, or in whatever stage of manufacture, 1⅝c. per lb. (15 per cent) [1⅝c. per lb.]

326. Blacksmiths' hammers, tongs, and sledges, track tools, wedges, and crowbars, of iron or steel, 1⅝c. per lb. (10 per cent) [1⅝c. per lb.]

327. Cast-iron pipe of every description [¼c. per lb.], cast-iron andirons, plates, stove plates, sadirons, tailors' irons, hatters' irons, but not including electric irons, and castings and vessels wholly of cast iron [8/10c. per lb.], including all castings of iron or cast-iron plates which have been chiseled, drilled, machined, or otherwise advanced in condition by processes or operations subsequent to the casting process but not made up into articles, or parts thereof, or finished machine parts [2/10c. per lb. extra]; castings of malleable iron not specially provided for [7/10c per lb.]; cast hollow ware, coated, glazed, or tinned [1½c. per lb.], but not including enameled ware and hollow ware containing electrical elements, 20 per cent ad valorem. (All the above 10 per cent)

328. Lap-welded, butt-welded, seamed, or jointed iron or steel tubes, pipes, flues, and stays, not thinner than 65/100 in. if not less than ⅜ in. in diameter, ¾ of 1c. per lb.; if less than ⅜ and not less than ¼ in. in diameter, 1¼c per lb.; if less than ¼ in. in diameter, 1⅜c. per lb: (All 20 per cent) [1c. to 2c.] Provided, That no tubes, pipes, flues, or stays made of charcoal iron shall pay a less rate of duty than 1¼c. per lb. [1½c.]; cylindrical and tubular tanks or vessels, for holding gas, liquids, or other material, whether full or empty; welded cylindrical furnaces, tubes and flues made from plate metal, whether corrugated, ribbed, or otherwise reinforced against collapsing pressure, and all other finished or unfinished iron or steel tubes not specially provided for, 25 per cent ad valorem [30 per cent]; flexible metal tubing or hose, whether covered with wire or other materials, including any appliances or attachments affixed thereto, not specially provided for, and rigid iron or steel tubes or pipes prepared and lined or coated in any manner suitable for use as conduits for electrical conductors, 30 per cent ad valorem. (all 20 per cent)

329. Chain and chains of all kinds, made of iron or steel, not less than ¾-in. in diameter, ⅞ of 1c. per lb.; less than ¾ and not less than ⅜ in. in diameter, 1¼c. per lb.; less than ⅜ and not less than 5/16 in. in diameter, 2⅛c. per lb.; less than 5/16 in. in diameter, 4c. per lb.; sprocket and machine chains, of iron or steel, and parts thereof, 35 per cent ad valorem (25 per cent); anchor or stud link chain 2 in. or more in diameter, 1½c. per lb., less than

2 in. in diameter, 2c. per lb. (All except sprocket and machine, 20 per cent) [chains 7c. to 3c. per lb. but not less than 45 per cent]: Provided, That all articles manufactured wholly or in chief value of chain shall not pay a lower rate of duty than that imposed upon the chain of which it is made, or of which chain is the component material of chief value.

330. Nuts, nut blanks, and washers, of wrought iron or steel, 6/10 of 1c. per lb. (5 per cent); bolts, with or without threads or nuts, and bolt blanks, of iron or steel, 1c. per lb. (10 per cent); spiral nut locks, and lock washers, of iron or steel, 35 per cent ad valorem, (30 per cent) [all 1¼c. per lb.]

331. Cut nails and cut spikes, of iron or steel [4/10. per lb.], exceeding 2 in. in length, 4/10 of 1c. per lb.; cut tacks and brads, hobnails and cut nails, of iron or steel, not exceeding 2 in. in length, 15 per cent ad valorem; horseshoe nails, and other iron or steel nails, not specially provided for, 1½c. per lb. [1½c. per lb.]; nails, spikes, tacks, brads, and staples, made of iron or steel wire, not less than 1 in. in length nor smaller than 65 1000 in. in diameter, 4/10 of 1c. per lb.; less than 1 in. in length and smaller than 65/1000 in. in diameter, ¾ of 1c. per lb. [⅝c. per 1000 to ¾c. per lb.]; spikes, tacks, brads, and staples, not specially provided for, 6/10 of 1c. per lb. (all on free list)

332. Rivets, studs, and steel points, lathed, machined, or brightened, and rivets or studs for nonskidding automobile tires, 30 per cent ad valorem (20 per cent) [45 per cent]; rivets of iron or steel, not specially provided for, 1c. per lb. (20 per cent) [1¼c. per lb.]

333. Common horse, mule, or ox shoes, of wrought iron or steel, 1/5 of 1c. per lb. (free) [¾c. per lb.]; horse, mule, or ox shoes, punched, drilled or tapped, of wrought iron or steel, for use with adjustable wrought-iron or steel skid calks, and solid drop-forged calked shoes of wrought iron or steel, 1c. per lb.

334. Steel wool, 10c. per lb. (20 per cent) [40 per cent]; steel shavings, 5c. per lb. (20 per cent) [40 per cent]; and in addition thereto, on all of the foregoing, 30 per cent ad valorem

335. Grit, shot, and sand of iron or steel, in any form, ¾ of 1c. per lb. (30 per cent) [1c. per lb.]

336. Corset clasps, corset steels, and dress steels, whether plain or covered with cotton, silk, or other material, 35 per cent ad valorem. (15 per cent) [35 per cent]

337. Card clothing not actually and permanently fitted to and attached to carding machines or to parts thereof at the time of importation, when manufactured with round iron or untempered round steel wire, 20 per cent ad valorem; when manufactured with tempered round steel wire, or with plated wire, or other than round iron or steel wire, or with felt face, wool face, or rubber-face cloth containing wool, 45 per cent ad valorem. (all 10 to 35 per cent) [all 20 to 55c. per sq. ft.]

338. Screws, commonly called wood screws, of iron or steel, 25 per cent ad valorem. (25 per cent) [3 to 10c. per lb.]

339. Table, household, kitchen, and hospital utensils, and hollow or flat ware, not specially provided for; composed of iron or steel and enameled or glazed with vitreous glasses, 5c. per lb. and 30 per cent ad valorem [40 per cent]; composed wholly or in chief value of aluminum, 11c. per lb. and 55 per cent ad valorem (all above, 25 per cent); composed wholly or in chief value of copper, brass, steel, or other base metal, not specially provided for, 40 per cent ad valorem; and in addition thereto, upon any of the foregoing articles containing electrical heating elements as constituent parts thereof, 10 per cent ad valorem.

340. Crosscut saws, mill saws, pit and drag saws, circular saws, steel band saws, finished or further advanced than tempered and polished, hand, back, and all other saws, not specially provided for, 20 per cent ad valorem (12 per cent) [5c. per ft. to 5c. per lb. and 20 per cent extra]; jewelers' or piercing saws, 40c. per gross. [25 per cent]

341. Steel plates, stereotype plates, electrotype plates, halftone plates, photogravure plates, photo-engraved plates, and plates of other materials, engraved or otherwise prepared for printing, and plates of iron or steel engraved or fashioned for use in the production of designs, patterns, or impressions on glass in the process of manufacturing plate or other glass, 25 per cent ad valorem (15 per cent) [25 per cent]; lithographic plates of stone or other material engraved, drawn, or prepared, 25 per cent ad valorem. (25 per cent) [50 per cent]

342. Umbrella and parasol ribs and stretchers, composed wholly or in chief value of iron, steel, or other metal, in frames or otherwise, and tubes for umbrellas, wholly or partly finished, 50 per cent ad valorem. (35 per cent) [same]

343. Spring-beard needles, and other needles for knitting, sewing, shoe, or embroidery machines of every description, not specially provided for, and crochet needles, $1.15 per 1000 and 40 per cent ad valorem; latch needles, $2 per 1000 and 50 per cent ad valorem [above, $1 to $1.15 per 1000 and 25 to 35 per cent extra]; tape, knitting, and all other needles, not specially provided for, bodkins of metal, and needle cases or needle books furnished with assortments of needles or combinations of needles and other articles, [25 per cent] 45 per cent ad valorem. (all 20 per cent)

344. Fishhooks, fishing rods and reels, artificial flies, artificial baits, snelled hooks, leaders or casts, and all other fishing tackle and parts thereof, fly books, fly boxes, fishing baskets or creels, finished or unfinished, not specially provided for, except fishing lines, fishing nets, and seines, 45 per cent ad valorem (30 per cent); Provided, That any prohibition of the importation of feathers in this Act shall not be construed as applying to artificial flies used for fishing, or to feathers used for the manufacture of such flies.

345. Saddlery and harness hardware: Buckles, rings snaps, bits, swivels, and all other articles of iron, steel, brass, composition, or other metal, not plated with gold or silver, commonly or commercially known as harness hardware, 35 per cent ad valorem (15 per cent); all articles of iron, steel, brass, composition, or other metal, not plated with gold or silver, commonly or commercially known as saddlery or riding bridle hardware, 50 per cent ad valorem; all the foregoing, if plated with gold or silver, 60 per cent ad valorem.

346. Belt buckles, trouser buckles, and waistcoat buckles, shoe or slipper buckles, and parts thereof, made wholly or partly of iron, steel, or other base metal, valued at not more than 20c. per 100, 5c. per 100; valued at more than 20 and not more than 50c. per 100, 10c. per 100; valued at more than 50c. per 100, 15c. per 100; and in addition thereto, on all of the foregoing, 20 per cent ad valorem. (15 per cent)

347. Hooks and eyes, wholly or in chief value of metal, whether loose, carded, or otherwise, including weight of cards, cartons, and immediate wrappings and labels, 4½c. per lb. and 25 per cent ad valorem. (15 per cent)

348. Snap fasteners and clasps, and parts thereof, by whatever name known, or of whatever material composed, not plated with gold, silver, or platinum, and not mounted on tape, 55 per cent ad valorem; mounted on tape, including sew-on fasteners, 60 per cent ad valorem. (15 per cent)

349. Metal trouser buttons (except steel) and nickel bar buttons, 1/12 of 1c. per line per gross; steel trouser buttons, ¼ of 1c. per line per gross; buttons of metal, not specially provided for, ¾ of 1c. per line per gross; and in addition thereto, on all of the foregoing, 15 per cent ad valorem; metal buttons embossed with a design, device, pattern, or lettering, 45 per cent ad valorem: Provided, That the term "line" as used in this paragraph shall mean the line button measure of 1/40 in.

350. Pins with solid heads, without ornamentation, including hair, safety, hat, bonnet, and shawl pins; and brass, copper, iron, steel, or other base metal pins, with heads of glass, paste, or fusible enamel; all the foregoing not plated with gold or silver, and not commonly known as jewelry, 35 per cent ad valorem. (20 per cent) [35 per cent]

351. Pens, metallic, not specially provided for, 12c. per gross (8c.) [12c.]; with nib and barrel in one piece, 15c. per gross. (12c.) [15c.]

352. Penholder tips, penholders and parts thereof, [5c. per gross and 25 per cent] gold pens [25 per cent], combination penholders comprising penholders, pencil, rubber eraser, automatic stamp, or other attachments, 25c. per gross and 20 per cent ad valorem [45 per cent]; mechanical pencils made of base metal and not plated with gold, silver, or platinum, 45c. per gross and 20 per cent ad valorem (all 25 per cent): Provided, That pens and penholders shall be assessed for duty separately.

353. Fountain pens, fountain-pen holders, stylographic pens, and parts thereof, (25 per cent) [30 per cent] 72c. per doz. and 40 per cent ad valorem: Provided, That the value of cartons and fillers shall be included in the dutiable value.

354. Penknives, pocketknives, clasp knives, pruning knives, budding knives, erasers, manicure knives, and all knives by whatever name known, including such as are denominatively mentioned in this Act, which have folding or other than fixed blades or attachments, valued at not more than 40c. per doz., 1c. each and 50 per cent ad valorem; valued at more than 40 and not more than 50c. per doz., 5c. each and 50 per cent ad valorem; valued at more than 50c. and not more than $1.25 per doz., 11c. each and 55 per cent ad valorem; valued at more than $1.25 and not more than $3 per doz., 18c. each and 55 per cent ad valorem; valued at more than $3 and not more than $6 per doz., 25c. each and 50 per cent ad valorem; valued at more than $6 per doz., 35c. each and 55 per cent ad valorem; blades, handles, or other parts of any of the foregoing knives or erasers shall be dutiable at not less than the rate herein imposed upon knives and erasers valued at more than 50c. and not exceeding $1.25 per doz.; cuticle knives, corn knives, nail files, tweezers, hand forceps, and parts thereof, finished or unfinished, by whatever name known, 60 per cent ad

valorem (35 to 55 per cent) [40 per cent and up to 20c each with 40 per cent extra] Provided, That any of the foregoing, if imported in the condition of assembled, but not fully finished, shall be dutiable at not less than the rate of duty herein imposed upon fully finished articles of the same material and quality, but not less in any case than 15c. each and 55 per cent ad valorem: Provided further, That all the articles specified in this paragraph, when imported, shall have the name of the maker or purchaser and beneath the same the name of the country of origin die sunk conspicuously and indelibly on the shank or tang of at least one or, if practicable, each and every blade thereof.

355. Table, butchers', carving, cooks', hunting, kitchen, bread, cake, pie, slicing, cigar, butter, vegetable, fruit, cheese, canning, fish, carpenters' bench, curriers', drawing, farriers', fleshing, hay, sugar-beet, beet-topping, tanners', plumbers', painters', palette, artists', shoe, and similar knives, forks, and steels, and cleavers, all the foregoing, finished or unfinished, not specially provided for, with handles of mother-of-pearl, shell, ivory, deer, or other animal horn, silver, or other metal than aluminum, nickel silver, iron or steel, 16c. each; with handles of hard rubber, solid bone, celluloid, or any pyroxylin, casein, or similar material, 8c. each; with handles of any other material, if less than 4 in. in length, exclusive of handle, 2c. each; if 4 in. in length or over, exclusive of handle, 8c. each; and in addition thereto, on all of the foregoing, 45 per cent ad valorem (25 to 30 per cent) [not under 40 per cent]; any of the foregoing without handles, with blades less than 6 in. in length, 2c. each and 45 per cent ad valorem; with blades 6 in. or more in length, 8c. each and 45 per cent ad valorem: Provided, That all articles specified in this paragraph, when imported, shall have the name of the maker or purchaser and beneath the same the name of the country of origin die sunk legibly and indelibly upon the blade in a place that shall not be covered.

356. Planing-machine knives, tannery and leather knives, tobacco knives, paper and pulp mill knives, roll bars, bed plates, and all other stock-treating parts for pulp and paper machinery, shear blades, circular cloth cutters, circular cork cutters, circular cigarette cutters, meat-slicing cutters, and all other cutting knives and blades used in power or hand machines, 20 per cent ad valorem.

357. Nail, barbers', and animal clippers, pruning and sheep shears, and all scissors and other shears, and blades for the same, finished or unfinished, valued at not more than 50c. per dozen, 3½c. each and 45 per cent ad valorem; valued at more than 50c. and not more than $1.75 per doz., 15c. each and 45 per cent ad valorem; valued at more than $1.75 per doz., 20c. each and 45 per cent ad valorem [15c. per doz. and 15 per cent to 75c. per doz. and 25 per cent] (all above, 30 per cent); Provided, That all articles specified in this paragraph, when imported, shall have die sunk conspicuously and indelibly, the name of the maker or purchaser and beneath the same the name of the country of origin, to be placed on the outside of the blade, between the screw or rivet and the handle of scissors and shears (except pruning and sheep shears), and on the blade or handle of pruning and sheep shears and clippers.

358. Safety razors, and safety razor handles and frames, 10c. each and 30 per cent ad valorem; razors and parts thereof, finished or unfinished, valued at less than 75c. per doz., 18c. each; valued at 75c. and less than $1.50 per doz., 25c. each; valued at $1.50 and less than $3 per doz., 30c. each; valued at $3 and less than $4 per doz., (35 to 55 per cent) [35 per cent up to 15c. each and 35 per cent] 35c. each; valued at $4 or more per doz., 45c. each; and in addition thereto, on all of the foregoing, 45 per cent ad valorem: Provided, That finished or unfinished blades for safety razors shall pay a duty of 1c. each and 30 per cent ad valorem: Provided further, That all articles specified in this paragraph, when imported, shall have the name of the maker or purchaser and beneath the same the name of the country of origin die sunk conspicuously and indelibly on the blade or shank or tang of each and every blade and on safety razors and parts thereof.

359. Surgical instruments, and parts thereof, composed wholly or in part of iron, steel, copper, brass, nickel, aluminum, or other metal, finished or unfinished, 45 per cent ad valorem; dental instruments, and parts thereof, composed wholly or in part of iron, steel, copper, brass, nickel, aluminum, or other metal, finished or unfinished, 35 per cent ad valorem (20 per cent) [45 per cent]: Provided, That all articles specified in this paragraph, when imported, shall have the name of the maker or purchaser and beneath the same the name of the country of origin die sunk conspicuously and indelibly on the outside, or if a jointed instrument on the outside when closed.

360. Philosophical, scientific, and laboratory instruments, apparatus, utensils, appliances (including drawing, surveying, and mathematical instruments), and parts thereof, composed wholly or in chief value of metal, and not plated with gold, silver, or platinum, finished or unfinished, not specially provided for, 40 per cent ad valorem (20 per cent) [45 per cent]: Provided, That all articles specified in this paragraph, when imported, shall have the name of the maker or purchaser and beneath the same the name of the country of origin die sunk conspicuously and indelibly on the outside, or if a jointed instrument on the outside when closed.

361. Pliers, pincers, and nippers of all kinds, finished or unfinished, 60 per cent ad valorem (30 per cent) [8c. per lb. and 40 per cent]; Provided, That all articles specified in this paragraph, when imported, shall have the name of the maker or purchaser and beneath the same the name of the country of origin die sunk conspicuously and indelibly on the outside of the joint.

362. Files, file blanks, rasps, and floats, of whatever cut or kind, 2½ in. in length and under, 25c. per doz.; over 2½ and not over 4½ in. in length, 47½c. per doz.; over 4½ and under 7 in. in length, 62½c. per doz.; 7 in. in length and over, 77½c. per doz.

363. Sword blades, and swords and side arms, irrespective of quality or use, wholly or in part of metal, 50 per cent ad valorem. (30 per cent) [50 per cent]

[illegible]-loading muskets, shotguns, rifles, and parts th[illegible] r cent ad valorem. (15 per cent) [25 per cent]

[illegible]le or single barreled breech-loading and repeat-i[illegible] rifles, and combination shotguns and rifles, valued at [illegible]t more than $5 each, $1.50 each; valued at n[illegible]5 and not more than $10 each, $4 each; valued at more than $10 and not more than $25 each, $6 each; valued a[illegible] $25 each, $10 each; and in addition thereto, on all [illegible] foregoing, 45 per cent ad valorem; barrels for b[illegible] peating shotguns and rifles, further ad[illegible] manufacture than rough bored only, $4 each; stocks fo[illegible] breech-loading shotguns and rifles, wholly or partly manufactured, $5 each; and in addition thereto, on all of the foregoing, 50 per cent ad valorem (35 per cent) [75c. each and 25 per cent extra on $2 each and 35 per cent extra]; on all parts of such guns or [illegible] and fittings for such stocks or barrels, finished or unfinished, 55 per cent ad valorem (35 per cent): Provided, That all breech-loading shotguns and rifles imported without a lock or locks or other fittings shall be subject to a duty of $10 each and 55 per cent ad valorem.

366. Pistols: Automatic, magazine, or revolving, and parts thereof and fittings therefor, valued at not more than $4 each, $1.25 each; valued at more than $4 and not more than $8 each, $2.50 each; valued at more than $8 each, $[illegible] each; and in addition thereto, on all of the foregoing, 55 per cent ad valorem.

367. Watch movements, whether imported in cases or otherwise, assembled or knocked down, if having less than seven jewels, 75c. each [70c.]; having seven and not more than 11 jewels, $1.25 each [$1.35]; having more than 11 and not more than 15 jewels, $2 each [$1.85]; having more than 15 and not more than 17 jewels, unadjusted, $2.75 each [$1.25 and 25 per cent]; having 17 jewels and adjusted to temperature, $3.50 each; having 17 jewels and adjusted to three positions, $4.75 each; having 17 jewels and adjusted to five positions, $6.50 each; having more than 17 jewels, adjusted or unadjusted, $10.75 each (all above, 30 per cent); watchcases and parts of watches, chronometers, box or ship, and parts thereof, 15 per cent ad valorem (30 per cent) [40 per cent]; all jewels for use in the manufacture of watches, clocks, meters, or compasses, 10 per cent ad valorem (10 per cent); enameled dials for watches or other instruments, 3c. per dial and 45 per cent ad valorem: Provided, That all watch and clock dials, whether attached to movements or not, when imported shall have indelibly painted or printed thereon the name of the country of origin, and that all watch movements and plates, assembled or knocked down, and cases shall have the name of the manufacturer or purchaser and the country of manufacture cut, engraved, or die sunk conspicuously and indelibly on the plate of the movement and the inside of the case, respectively, and the movement and plates shall also have marked thereon by one of the methods indicated the number of jewels and adjustments, said numbers to be expressed both in words and in Arabic numerals, and if the movement is not adjusted, the word "unadjusted" shall be marked thereon by one of the methods indicated, and none of the aforesaid articles shall be delivered to the importer unless marked in exact conformity to this direction: Provided further, That only the number of the jewels which serve a mechanical purpose as frictional bearings shall be marked as herein provided.

368. Clocks and clock movements, including lever clock movements, and clockwork mechanisms, cased or uncased, whether imported complete or in parts, and any device or mechanism having an essential operating feature intended for measuring time, distance, or fares, or the flowage of water, gas, electricity, or similar uses, or for regulating or controlling the speed of arbors, drums, disks, or similar uses, or for recording, indicating, or performing any operation or function at a predetermined time or times, any of the

foregoing whether wholly or partly complete or knocked down (in which condition they shall be appraised at the valuation of the complete article); cases and casings for clockwork mechanisms imported separately; all the foregoing, 45 per cent ad valorem (30 per cent) [18 per cent]; and in addition thereto, upon any of the foregoing articles or parts thereof, having jewels, but not more than two jewels, in the escapement, $1 each; having more than two but not more than four jewels, $2 each; having more than four jewels, $4 each; if without jewels in the escapement and valued at not over $1.10 each, 35c. each; valued at more than $1.10 and not more than $2.25 each, 70c. each; valued at more than $2.25 but not more than $5 each, $1 each; valued at more than $5 but not more than $10 each, $2 each; valued at more than $10 each, $3 each; all parts and materials for use in any of the foregoing if imported separately, and not specially provided for, 50 per cent ad valorem: Provided, That all dials, whether attached to movements or not, when imported, shall have indelibly painted, printed, or stamped thereon the name of the country of origin, and the front or back plate of the movement frame of any of the foregoing when imported shall have the name of the maker or purchaser, the name of the country where manufactured, and the number of jewels, if any, indelibly stamped on the most visible part of same; but if such mark [illegible] whole or in part sufficiently similar to the trade name or trade-mark of an established American manufacturer as to be liable to deceive the user in the United States, entry thereof shall be denied if such trade name or trade-mark has been placed on file with the collector of [illegible]

369. Automobiles, automobile bodies, automobile chassis, motor cycles, and parts of the foregoing, not including tires, all of the foregoing whether finished or unfinished, [illegible] per cent ad valorem (30 per cent [illegible] per cent; parts, 30 per cent): Provided, That if any country, dependency, province [illegible] of government imposes a duty on any article specified in this paragraph, when imported into the United States, in excess of the duty herein provided there shall be imposed upon such article, when imported either directly or indirectly from such country, dependency, province, or other subdivision of government, a duty equal to that imposed by such country, dependency, province, or other subdivision of government on such article imported from the United States, but in no [illegible] such duty exceed 50 per cent ad valorem.

370. Airplanes, hydroplanes, motor boats, and parts of the foregoing, 30 per cent ad valorem.

371. Bicycles and parts thereof, not including tires, 30 per cent ad valorem (25 per cent) [45 per cent]: Provided, That if any country, dependency, province, or other subdivision of government imposes a duty on any article specified in this paragraph, when imported from the United States, in excess of the duty herein provided, there shall be imposed upon such article, when imported either directly or indirectly from such country, dependency, province, or other subdivision of government, a duty equal to that imposed by such country, dependency, province, or other subdivision of government on such article imported from the United States, but in no case shall such duty exceed 50 per cent ad valorem.

372. Steam engines (15 per cent) [30 per cent] and steam locomotives, 15 per cent ad valorem (15 per cent) [45 per cent]; sewing machines (free) [30 per cent] and parts thereof, not specially provided for, valued at not more than $75 each, 15 per cent ad valorem; valued at more than $75 each, 30 per cent ad valorem; cash registers, (free) [30 per cent] and parts thereof, 25 per cent ad valorem; printing presses (15 per cent) [30 per cent], not specially provided for, lawn mowers (free) [45 per cent], and machine tools and parts of machine tools, 30 per cent ad valorem (15 per cent) [30 per cent]; embroidery machines, including shuttles for sewing and embroidery machines, lace-making machines, machines for making lace curtains, nets and nettings, 30 per cent ad valorem (25 per cent) [45 per cent]; knitting, braiding, lace braiding, and insulating machines, and all other similar textile machinery or parts thereof, finished or unfinished, not specially provided for, 40 per cent ad valorem; all other textile machinery or parts thereof, finished or unfinished, not specially provided for, 35 per cent ad valorem; cream separators valued at more than $50 each, (free) [45 per cent on value not exceeding $75] and other centrifugal machines for the separation of liquids or liquids and solids, not specially provided for, 25 per cent ad valorem; combined adding and typewriting machines, 30 per cent ad valorem; all other machines or parts thereof, finished or unfinished, not specially provided for, 30 per cent ad valorem: Provided, That machine tools as used in this paragraph shall be held to mean any machine operating other than by hand power which employs a tool for work on metal.

373. Shovels, spades, scoops, scythes, sickles, grass hooks, corn knives, and drainage tools, and parts thereof, composed wholly or in chief value of iron, steel, lead, copper, brass, nickel, aluminum, or other metal, whether partly or wholly manufactured, 30 per cent ad valorem, (20 per cent) [45 per cent]

374. Aluminum, aluminum scrap, and alloys of any kind in which aluminum is the component material of chief value, in crude form, 5c. per lb. (2c.) [7c.]; in coils, plates, sheets, bars, rods, circles, disks, blanks, strips, rectangles, and squares, 9c. per lb. (3½c.) [11c.]

375. Metallic magnesium and metallic magnesium scrap, 40c. per lb.; magnesium alloys, powder, sheets, ribbons, tubing, wire, and all other articles, wares, or manufactures of magnesium, not specially provided for, 40c. per lb. on the metallic magnesium content and 20 per cent ad valorem. (10 per cent) [20 per cent]

376. Antimony, as regulus or metal, 2c. per lb.; needle or liquated antimony, ¼ of 1c. per lb. (10 per cent) [1½c. per lb.]

380. German silver, or nickel silver, unmanufactured, 20 per cent ad valorem (15 per cent) [25 per cent]; nickel silver sheets, strips, rods, and wire, 30 per cent ad valorem.

381. Copper in rolls, rods, or sheets, 2½c. per lb. (5 per cent) [2½c. per lb.]; copper engravers' plates, not ground, and seamless copper tubes and tubing, 7c. per lb.; copper engravers' plates, ground, and brazed copper tubes, 11c. per lb.; brass rods, sheet brass, brass plates, bars, and strips, Muntz or yellow metal sheets, sheathing, bolts, piston rods, and shafting, 4c. per lb.; seamless brass tubes and tubing, 8c. per lb.; brazed brass tubes, brass angles and channels, 12c. per lb.; bronze rods and sheets, 4c. per lb.; bronze tubes, 8c. per lb. (20 per cent) [45 per cent]

382. Aluminum or tin foil less than 6/1000 in. in thickness, 35 per cent ad valorem; bronze powder, 14c. per lb. (25 per cent) [12c. per lb.]; aluminum powder, powdered foil, powdered tin, brocades, flitters, and metallics, manufactured in whole or in part, 12c. per lb.; bronze, or Dutch metal, or aluminum, in leaf, 6c. per 100 leaves (25 per cent) [6c. per 100 leaves]. The foregoing rate applies to leaf not exceeding in size the equivalent of 5½ x 5½ in.; additional duties in the same proportion shall be assessed on leaf exceeding in size said equivalent.

383. Gold leaf, 55c. per 100 leaves. The foregoing rate applies to leaf not exceeding in size the equivalent of 3⅜ x 3⅜ in.; additional duties in the same proportion shall be assessed on leaf exceeding in size said equivalent. (35 per cent) [35c. per 100 leaves upward]

384. Silver leaf, 5c. per 100 leaves. (30 per cent) [10c. per 100 leaves] Tinsel wire, made wholly or in chief value of gold, silver or other metal, 6c. per lb. and 10 per cent ad valorem (6 per cent) [5c. per lb.]; lame or lahn, made wholly or in chief value of gold, silver, or other metals, 6c. per lb. and 20 per cent ad valorem (6 per cent) [5c. per lb.]; bullions and metal threads made wholly or in chief value of tinsel wire, lame or lahn, 6c. per lb. and 35 per cent ad valorem (25 per cent) [5c. per lb. and 30 per cent]; beltings, toys, and other articles made wholly or in chief value of tinsel wire, metal thread, lame or lahn, or of tinsel wire, lame or lahn and india rubber, bullions, or metal threads, not specially provided for, 45 per cent ad valorem (40 per cent) [15c. per lb. and 60 per cent]; woven fabrics, ribbons, fringes, and tassels, made wholly or in chief value of any of the foregoing, 55 per cent ad valorem. (40 per cent) [15c. per lb. and 60 per cent]

386. Quicksilver, 25c. per lb. (10 per cent) [7c. per lb.]; Provided, That the flasks, bottles, or other vessels in which quicksilver is imported shall be subject to the same rate of duty as they would be subjected to if imported empty.

389. New types, 20 per cent ad valorem. (15 per cent) [1½c. per lb. on the lead contained therein]

390. Nickel oxide, 1c. per lb.; nickel, and nickel alloy of any kind in which nickel is the component material of chief value, in pigs, or ingots, shot, cubes, grains, cathodes, or similar forms, 3c. per lb. [6c. per lb.]; in bars, rods, plates, sheets, strips, strands, castings, wire, tubes, tubing, anodes, or electrodes, 25 per cent ad valorem (sheets or strips 20 per cent, all other 10 per cent) [sheets or strips, bars, rods, plates, 35 per cent]; and in addition thereto, on all of the foregoing, if cold rolled, cold drawn, or cold worked, 10 per cent ad valorem.

391. Bottle caps of metal, collapsible tubes, and sprinkler tops, if not decorated, colored, waxed, lacquered, enameled, lithographed, electroplated, or embossed in color, 30 per cent ad valorem (30 per cent) [½c. per lb.]; if decorated, colored, waxed, lacquered, enameled, lithographed, electroplated, or embossed in color, 45 per cent ad valorem. (40 per cent)

392. Lead-bearing ores and mattes of all kinds, 1½c. per lb. on the lead contained therein (¾c. per lb.) [1½c. per lb.]: Provided, That such duty shall not be applied to the lead contained in copper mattes unless actually recovered. [Here follows the usual administration provision—Editor]

393. Lead bullion or base bullion, lead in pigs and bars

(*Continued on page 765*)

Features of Modern Blast Furnace Practice

American and British Methods and Design Discussed by the Iron and Steel Institute—Variant Opinions on High-Speed Steel —Recent Molding Sand Investigations

(Special Correspondence)

LONDON, ENGLAND, Sept. 9.—The autumn meeting of the Iron and Steel Institute was held in the ancient city of York on Sept. 5 and 6, and was largely attended. Although York has lost the prominence it once enjoyed as an industrial and trade center, it has of recent years attracted some important manufacturing industries, and, as the headquarters of the North Eastern Railway Co., it remains one of the most vital centers in the network of British railroads. But it is as the capital of the county which is virtually the home of the Iron and Steel Institute that the city was an appropriate meeting place. The president of the institute, Francis Samuelson, who occupied the chair on both days, is a Yorkshireman. The treasurer is of Yorkshire by virtue of long residence, and the list of past presidents contains the names of many Yorkshiremen, including that of Sir Hugh Bell.

The meeting opened with a civic welcome. In acknowledging it the president took the opportunity of pointing out that the bulk of members of the institute are directly engaged in the production of iron and steel and that only a small minority are connected with the scientific side. The president's reminder was timely, for the papers usually presented before the meetings show a greater tendency to discuss purely technical problems than those of a practical character. Thus it is often the case that more interest is taken in informal conversations in the lobbies than in the proceedings in the lecture hall.

Routine business is invariably deferred to the annual spring meetings held in London, and the only business of this nature taken at York was a proposal by the council to alter the method of procedure in the election of a president. This means that a president will be elected for one year, but if it is desired to reelect the hands of the institute will not be tied.

Modern Blast Furnace Practice

The first paper considered was by A. K. Reese, Cardiff, who described the bases upon which modern blast furnace practice has been built up, and showed how their wider adoption would lead to a very desirable improvement in pig iron production as regards output and economy, in localities where the older practice is still in vogue. In discussing the preparation of the raw materials, Mr. Reese advised the use of uniform size of coke lumps, not exceeding 4 to 6 in., and screened to remove smalls. The crushing of ore to 3 and 4 in. sizes was advocated. The author has long been a user of "dry blast" and believes it has distinct advantages, chief among them the saving secured from being able to employ high temperatures without the usual trouble of sticking. As regards design, Mr. Reese contended that the output capacity of the furnace is in proportion to the effective bosh area. The low bosh is the outcome of attempts to increase outputs by increasing the volume of blast per minute. He enumerated the various advantages of the machine method of handling molten pig iron over the sand-casting method Mr. Reese characterized the object of modern blast-furnace practice as the attainment of the greatest possible quantity consistent with quality.

[A synopsis of the paper will appear in a later issue.—EDITOR.]

Discussion

PROF. HENRY LOUIS, Newcastle, controverted the author's statement that James Gayley was first to introduce and demonstrate dry blast, in 1904. He believed that the honor of first seeing and using the dry blast method belonged to England and not to the United States; and in support of his contention he referred to Charles Cochrane's experiments 30 or 40 years back. He (the speaker) characterized as an American idea the author's description of his object as the attainment of the greatest possible quantity consistent with quality, and he urged as an alternative object to be aimed at the greatest possible economy consistent with quantity, for economy and quantity were by no means identical. Mr. Reese advocated the huge blast furnace of 600 tons per day and if he had to produce 1800 tons per day he would put in three blast furnaces. He (Prof. Louis) was inclined to think that it would be far better to put up six blast furnaces, producing half the quantity each. As far as his recollection went the greatest economy, at any rate in fuel consumption, which nowadays was very important, had been attained in furnaces of relatively moderate size. Six blast furnaces would be more expensive plant than three larger ones, but in the manufacture of pig iron the item of interest and depreciation of capital does not bear any very important ratio to the total, and economy in fuel is probably the most important thing to aim at.

GUY BARRETT, Wigan, suggested that small coke was detrimental for more reasons than its size; it very often contained a large proportion of moisture and of ash. Discussing the grading of ores, he was in favor of requiring greater uniformity. With regard to the question of dry blast, he had been informed in the United States that it had been given up and he said that probably no other conclusion could be reached than that the modern practice had not been altogether a great success financially. Speaking of design, he had found that the low bosh gave the best results.

F. CLEMENTS, Parkgate, said he had listened to the paper with just a tinge of disappointment, not because he disagreed with any of the bases laid down by Mr. Reese, but because he was left rather in the dark as to how far those bases were supported by Mr. Reese's own experience. There were three points in the paper which he wished to traverse. Th first was relative to the breaking of ironstone. He was in agreement with Mr. Reese as to the logical argument on that point, but it was rather different when they came to consider it from a practical point of view. For instance, at the Staveley and Parkgate works where the amount of ore handled was over 2000 tons per day, containing only 28 per cent of iron, 1s. per ton was added to the cost of ore in handling it. This meant 3s. per ton on the pig iron that was produced. He doubted whether it was really worth while breaking the ore although it was strictly logical. The paper gave eight specific advantages of gas cleaning, and he would ask Mr. Reese how far in his experience the technical results justified the installation of gas cleaners at considerable expense. They were limited in the choice of gas cleaners, and he thought the right type had still to be evolved. He agreed that it was the effective area of the bosh that governed the output of the blast furnace. American practice showed that this law held good in that country as in the home practice.

E. C. EVANS took issue with the author's statement that the reaction of carbon dioxide upon a porous fuel in the blast furnace is wasteful; far from being detrimental he considered it as of the greatest benefit to the blast furnace man. He believed that the use of such a coke will result in a considerable diminution of temperature at the top of the furnace; it will lower the swing of reaction in the furnace. He considered

that the main factor is not so much the porosity of the material as the character of the pores, and the foresaw a radical change in the economic production of pig iron by the use of a fuel with the burning qualities of charcoal.

W. J. FOSTER was of opinion that much of the coke was not dense enough; what is required is a dense coke to correspond with the beehive coke in the matter of hardness. In grading materials he would give preference to the size of the coke and limestone rather than the ironstone, as the latter melted above the bosh line. In 1907 he discussed Mr. Gayley's paper and later discussed the subject with him in America and he (the speaker) thought that what he had discovered in respect to effective calories in those days in the use of the dry blast was very nearly what they found in practice today.

J. H. HARRISON, Middlesbrough, emphasized the importance of the right distribution of materials in the furnaces. His view was that the diameter of the bell should be half the diameter of the throat, and they found in Cleveland that the best results had been obtained in furnaces of this type.

H. K. SCOTT urged that a great responsibility rested upon the owners in the matter of putting in proper equipment for the working of blast furnaces.

C. H. RIDSDALE considered that every blast furnace manager should be able to understand and work out heat balance sheets, otherwise he could not expect to get the best results.

MR. REESE, replying to the discussion, took up first the comments of Professor Louis. The latter had not agreed that the greatest output consistent with quality was the object of modern blast furnace practice, and his idea was that they could not get a low fuel consumption or fuel economy with large outputs of pig iron. The speaker suggested that if Professor Louis would consult some of the results obtained in later years in the United States with furnaces making 700 tons a day he would find that the fuel consumption ran as low as, if not a good deal lower than, anything done in this country under the old practice. Within the last three months details had been published of the results from a modern blast furnace, one of the most recently built in the United States in which the fuel consumption was very low, something like 16 or 16½ cwt. per ton, with outputs of 700 and 800 tons a day for a short period. That compared favorably with anything that could be done or had been done in the slow driven old type of furnace. Professor Louis spoke of enormous furnaces, but the speaker wanted to point out that the furnaces in which these practices were carried out were not enormous. They reached 85 to 90 ft. in height, and there were many furnaces under the old practice that were 85 feet in height and a few were built of 100 to 105 ft. That practice had died out and 85 to 90 ft. was the standard size for modern blast furnaces. So there was nothing very enormous about them. The internal volume of the furnaces was a good deal smaller than that of the old furnace of 80 to 85 ft. under the old practice. They were now much smaller in their diameter. He had no doubt that large output had a very decided effect on economical output, because it divided cost of fixed charges, reduced labor costs and everything but the cost of raw material and fuel. Under the new practice the fuel consumption was unquestionably much lower in proportion. It was as low as it was under the old practice and had all the other advantages of the high output from a single furnace. With regard to the size of the ore, the usual practice was to break it down to 3 in. long, the degree depending somewhat on the characteristics of the ore. A very dense ore could be usefully broken down to 2 in. In his opinion and experience an ore ½ in. in size was not a fine ore, and even ¼-in. ore would work well in a blast furnace. It was the fine dusty material that caused the difficulty. Mr. Barrett had asked some questions about the crushed ore being placed in the rotary. In northern New York State it was done as a regular thing and the ore was roasted. His answer to Mr. Clements on the point of crushing ore was that he did not know what he got out of his furnace. It would pay him a good deal more than 3s. a ton when he put ore that size into his furnace if he was going to adopt modern practice. Mr. Evans had put forward a question by which he suggested the possibility of a very radical change in the economic production of pig iron. It was so radical and his claim was so enormous that it was beyond the present discussion, but he suggested to Mr. Evans that the proper thing for him to do, having confidence in his convictions was to produce a sufficient quantity of his "charcoke" (as he would term the new material) to test it properly in a blast furnace. He would recommend that Mr. Evans should do that in a blast furnace operated under modern conditions and not in one of the older type. There had been several references to his statement that it took approximately a quarter of the weight of coke to simply take care of the slag. Apparently the gentlemen had misunderstood. They seemed to have an idea that a fourth of the coke in the furnace was required to take care of the slag. But his statement was that 25 per cent of the weight of slag produced was required in coke. How much coke was required depended on how much slag there was.

Molding Sands

C. H. W. Holmes presented a paper describing his investigations with a view to estimating quantitatively the effect produced upon the essential properties of sand by the various processess to which molding sands are subjected. A large increase both in bond value and in mechanical strength occurs after milling and disintegration of the sands. The author concluded that the mechanical and physical properties of sands for gray iron founding are equally important with chemical analysis; that the bond absorption value obtained in the raw sand may be greatly modified by mechanical treatment, and that the most successful molding sands contain both static and mobile bond.

Discussion

Several speakers suggested that too little investigation of foundry sands had been conducted in Great Britain and that in particular the difficulty of mixing sands had not received sufficient attention.

J. E. FLETCHER directed attention to the difficulties in mixing sands. When once sand had been deposited under watery conditions, and the wet sediment dried off, and an attempt was made to mix those constituents, a very difficult proposition presented itself. In many cases the use of water in mixing is responsible for a great many of the molder's troubles. The use of the die was undoubtedly a qualitative sort of test, but to him it did not yet seem quite satisfactory, as in some cases the absorption tests had not quite borne out the hope that had been formed of them. He asked whether the author had tried the circular transverse test as against the square one.

DR. W. H. HATFIELD considered that what was of more interest to the iron and steel industry than the various physical and mechanical properties of sands was that there should be devised simple, ready and effective methods of determining the suitability of a given sand for the manufacture of steel castings or cast iron. After all, the actual casting operation was an empirical test and the only test which hitherto was able to demonstrate successfully for them the real merit of a sand. Some years ago, he noticed in the Pas de Calais a foundry working actually on the sand dug up in the next field. That sand was simply carted into the works, milled, and then used as a green sand in the making of excellent steel castings. The various methods of investigating sands were incomplete until there were some quantitative forms of test which could show without the casting operation the suitability of a sand.

ISAAC LESTER said that the only good test of a casting was the casting itself and what it did. The same applied to molding sand—if a sand was good enough for a certain casting, let them keep on using it; if it was not, then it should be discarded in favor of some other.

H. SCOTT asked the author whether he was working in conjunction with investigators in the United States and whether he had synchronized his method of

investigation with the methods in vogue across the Atlantic. He uttered a warning that before carrying on this investigation, some effort should be made to discover whether people who were working on similar lines were in fact working with similar materials and similar dimensions.

MR. HOLMES in reply said that the average foundry was very badly equipped as regards sand preparing machinery, and he predicted that sand preparation would be revolutionized to a great extent in the next few years. He hoped some day to devise the simple methods advocated by Dr. Hatfield but he was afraid that day was a long way off. In regard to the suggestion on standardization, as far as possible he had adopted the methods used by American workers. The transverse bar as he had taken it in his experiment was used by Hanley and Simmons, who were, he would say, among the leading workers in America. The reduction of bond by coal dust and the possibility of getting a variety of coal dust that would be successful in use and would reduce the bond as little as possible opened up a big field of its own. Detailed work on sand at the present time was so very wide and one had so little help in the meagre work which had gone before that the position was rather appalling. If they cast an article in a sand that had a good deal of coal dust in it they could see just above the surface of the metal, the gas actually coming off.

High-Speed Steel Work

H. K. OGILVIE, Coventry, described the practical details of the manufacture of high speed steel in the basic-lined electric furnace. The advantages of this method over the crucible were detailed and the refining action of the electric furnace method commended. The charge used generally consists of high-speed steel scrap, with a small amount of turnings. Heavy clean scrap with high tungsten content was most economically used, and light or rusty castings rejected. Ten per cent of loss occurred in melting, which might rise to 20 per cent with more turnings. Good steel could be made in a 3 or 4-ton furnace in about 4½ hours from starting. The use of ferrosilicon was found to obviate the tendency of the steel to rise in the molds when cast. The file and Brinell hardness tests were not considered satisfactory, as rapid means for testing the cutting hardness of hardened high-speed steel. Both may serve to separate material within fairly wide limits, but cases are numerous where one method of testing gave quite different impressions from another. Scratch and rebound hardness tests do not give consistent results and even magnetic and electrical tests have not succeeded in solving the problem of a good rapid test for this steel.

Discussion

C. G. CARLISLE, Sheffield, thought the author made rather an illogical statement when he said that steels properly made by the crucible and the electric method seemed to be equally good. Then Mr. Ogilvie proceeded to say that it sometimes happened in the crucible steel process that small particles of tungsten powder have not been completely melted. Obviously if it was not melted in the crucible, the two processes were not equal, and seeing that the electric furnace was capable of melting tungsten powder the electric furnace must be the better. Mr. Ogilvie rather fell into the error of a specified time limit for his charges. He said, "In any case the time should not exceed 4½ hr. for a 3 or 4-ton furnace." It was rather a tall order to say "in any case" in connection with an electric furnace. Many things might happen and did happen, which stopped any calculation as to what time they were going to get the heat out. It was all right to discuss the time limit when they had got the heat out, but previous to that it was best to leave that alone. Members who had the commercial intinct to the fore rather than the technical instinct preferred to talk about time limits. The metallurgical problem that Mr. Ogilvie set for himself there, and which he did not solve, was the gas trouble he mentioned. There was no electric furnaceman who had not passed through that stage and been exasperated by it. Mr. Ogilvie said there was gas trouble and then proceeded to say that the slag was all right. He (Mr. Carlisle) contended that the slag was not perfectly all right when there was gas trouble. First of all was there overoxidation of the bath? The furnace firer might be contending with some carbon difficulty. He wanted to reduce the carbon in the bath and by an oversight he had too much oxygen in the form of oxide of iron which was not pulled out and was left there at the time he raked his slag off, persisting throughout the subsequent refining. Then another and obvious error crept in, and that was in the refining slag when he did not obtain sufficient fusibility of his slag at an early stage. The consequence of that was that they got the electric arc to play on the slag. If they had got the slag too limey and with not sufficient fusibility about it they had the direct arc playing on the bare metal, and they got the lumpy slag without any coating of thin slag to protect it. In consequence they might get overheated metal and fiery metal and one that gave trouble in the molds. His method of cooling was one that he (Mr. Carlisle) had had to adopt on occasions and which was almost always successful. He could not understand re-action except that it must throw out oxide in solution. He was rather surprised to find that Mr. Ogilvie did not anneal his billets after forging and before he ground them. In Sheffield a good deal of high-speed steel was spoiled during the war through being in too much of a hurry, and through grinding billets that were not annealed. If they began to grind a small crack without hardening the billet, they simply made it worse. If it was in somewhat hardened condition they made it rather better by grinding. Mr. Ogilvie forgot to anneal or temper his machined tools before hardening. He remembered a machine tool firm which was very persistent but finally yielded to advice and found that they were much more successful than hitherto in obtaining good tools without any danger of cracking through annealing or tempering before finally hardening.

H. BREARLEY, Sheffield, thought the economic basis of the process described by Mr. Ogilvie, was not quite clear. Some of the conclusions seemed to him extremely doubtful. Mr. Ogilvie referred, for example, to the cost of billets per ton, but whether he melted the metal in an electric furnace or in the crucible was not clear. As he did not tell the kind of crucible furnace he was comparing with the electric furnace, obviously his comparison was not of very much value. In Sheffield, at any rate, in pre-war days, the cost of sound bars, things like tool steel, high speed steel and so on was pretty much the same whether the material was melted in a gas-fire crucible furnace or an electric furnace. Of course if the author were making comparisons with coke he dared say they would be in favor of the electric furnace. It was considered, or used to be in Sheffield, that the only way to put tungsten into high speed steel or any other kind of tungsten steel was in the form of tungsten powder. He was very glad to see that a comparatively young man in Coventry had risen to tell them that it was a wrong thing to do and that they should use ferrotungsten. He was inclined to agree with Coventry on that. He did not understand the author when he said that "To attempt to make good high speed steel from turnings alone, or where the greater part of the charge consists of turnings, is not in this country commercially possible." He did not understand why it should not be possible in this country if it was possible anywhere else. It was explained further on in the text that one of the difficulties was that some of the turnings were greasy and would probably carbonize and that some of them were rusty and would probably oxidize the melt. He could not understand why it was not possible to mix part of the rusty turnings with part of the greasy turnings and so ease things up. There was one other thing in Mr. Ogilvie's paper that was extremely interesting. He told them about a low tungsten chromium steel which, although it had a Brinell hardness of 650, was easily filed. In the same tungsten chromium steels in which the Brinell number

(*Concluded on page* 760)

CONTENTS

September 21, 1922

Control of Raw Material to Suit Output 713
Woodstock Typewriter Co. Successfully Solves Management Problems—Close Co-ordination of Purchases and Production

Scarcity of Common Labor in Industry 717
Immigration Law Operates to Hamper Manufacture and Skilled Workmen May Yet Suffer from Present Policy

Iron and Steel Electrical Engineers Meet 721
Cleveland Convention Notably Successful—Power Problems, Combustion and Electrification Discussed

Labor Problems in Electric Melting 725
Best Melter One with No Previous Furnace Training—Bonus for Charging—Metallurgist in Charge of Laboratory and Furnaces

Metal Duties in Fordney-McCumber Tariff 726
Return to Protection Duties, with High Rates on Ferro-Alloys and Raw Materials—May Ask President to Change—Foreign Valuation the Basis

Features of Modern Blast Furnace Practice 732
American and British Methods and Design Discussed by the Iron and Steel Institute—Opinions on High-Speed Steel—Molding Sand Investigations

Drop Forging Institute 719
Minnesota Steel Co.'s First Steel 719
Laying Out and Drilling Machines 720
Ball Bearing Notable for Its Size 720
Welding Meeting in Chicago 724
Co-operation Between School and Foundries 724
Machine Tool Exhibition at New Haven 724
Coming Meetings 724
Editorials 736
Commercial Conditions Not Bad—German Steel Industry To-Day—Cycles and Current Phenomena—Is Welfare Work Overdone?
Correspondence 738
Income Taxes and Industry.
Low Iron Rates from Alabama 738
Car Shortage Troubles 739
Car Orders Modified 741
Reduced Rail Rate on Imported Iron 747
Bethlehem-Lackawanna Personnel Changes 751
Consolidated Steel Corporation to Be Reorganized 751
British Iron and Steel Exports 752
British Pig Iron and Steel Output 752
Russian Iron and Steel Production 752
Export Market Dull 752
Demand for Ore in Sweden 752
Copper Demand from Japan 753
German Steel Prices Go Up 753
Railroad Charge for Placement of Ore Cars 753
Ohio Foundry Activities 753
Iron and Steel Imports in July 753
Swedish Foreign Trade in Ore and Steel 753
Copper Shipments Making Records 753
British Iron Market 754
Fabricated Steel Business 756
Railroad Equipment Buying 756
New England Foundrymen's Association. 760
National Tube's Fiftieth Anniversary 760
Scrap Shortage Predicted 762
Gage Steel Investigation 762
New Type of French Electric Furnace 763
Bounty-fed Versus British Steel 764
Large Output of Portland Cement 764
Rail Price Advanced 766
Industrial Finance 776
Plans of New Companies 776
Zinc Coating 777

Iron and Steel Markets 742
Comparison of Prices 743
Prices Finished Iron and Steel, f. o. b. Pittsburgh 755
Non-Ferrous Metal Market 757
Personal Notes 759
Obituary Notes 759
Machinery Markets and News of the Works 767
New York Jobbers' Prices 778

ESTABLISHED 1855

THE IRON AGE

EDITORS:

WILLIAM W. MACON GEORGE SMART

Advertising Manager

Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

Detroit: 317 West Fort St. Cincinnati: Mercantile Library Bldg. Buffalo: 881 Ellicott Square. Washington: 816 Fifteenth St., N. W. San Francisco: 320 Market St. London, Eng.: 11 Haymarket, S.W.1.

Park Building. Boston: 410 Unity Building. Philadelphia:

Subscription Price: United States and Possessions, Mexico, Cuba, Shanghai, $6.00; Canada, $8.50; Foreign, $12.00 per year. Single copy 25 cents.

of March 3, 1879.

Commercial Conditions Not Bad

The average observer feels that there is much in present commercial and industrial conditions to be regretted. On the basis of pre-war standards and viewpoints the feeling is justified, but from the broader and newer viewpoint we plainly see that the clouds have silver linings.

The steel industry feels that it has reason to complain of its rising costs and inability to operate at an efficient rate, but if the industry were miraculously put in the position of being able to operate at its full capacity it would probably find itself faced with very unsatisfactory market prices. The industry is almost bewildered by the succession of "troubles" it has had. Before the war it was practically always able to operate at capacity when it had a sufficient order book, but this exception was an important one, and for quite a while prior to the war the periods of relative inactivity were tending to lengthen, at the expense of the periods of great activity.

Relations between employers and employees are considered as being on the whole unsatisfactory, but they were also unsatisfactory before the war. The most important difference is that before the war there was no very rapid trend toward improvement, while in this post-war period improvement is being forced. At some points there seems to be a trend in the wrong direction, but in such cases a righting will necessarily be forced. It is better to bring things to an issue.

The coal situation is not wholly objectionable. Circumstances that have made the present situation were in existence before the war and presumably would have made trouble sooner or later had there been no war. It is inconceivable that a satisfactory solution will not be worked out in time. The solution may perchance be one that will run counter to the wishes of many men, as to the part the Government should play in industry and commerce, but all experience shows that when men are forced to change their opinions they prove more adaptable than had been imagined.

The episode of the railroad shopmen's strike now appears after all to prove rather a vindication of the Transportation Act than an accident requiring a reopening of the whole subject. Certainly the act has not scored a failure. It may not be working altogether so well as expected, but it has a vastly more difficult labor situation to meet than any that existed before the war.

Dissatisfaction that the Government has not been more helpful to business since the Armistice should be tempered by reflection that business has shown its resourcefulness by getting along without such help. It is easy to recall the amount of talk there was just before the Armistice that a reconstruction program was absolutely necessary, and it is very pleasant to reflect how much trouble we have escaped by failing to try to impose any program upon business. While the legislative department of the Government has done little constructive work, the Treasury Department has done remarkably well, so well that few men have bothered themselves noticing that fiscal problems of very serious importance have been smoothly and perfectly solved. The advantage that American business enjoys by the Government's finances being in such excellent condition is incalculable.

German Steel Industry To-Day

New light on the present capacity of the German steel industry is given by statistics recently made public and published in THE IRON AGE last week. While only total pig iron and steel production for 1920 and 1921 are set down, with no details, it is the first information that has come out of Germany regarding these two years.

Steel output is returned as 725,000 gross tons per month for 1921, as compared with 1,445,000 tons per month in 1913. Assuming that Germany lost about one-third of its steel-making capacity as a result of the war, then the production last year, which was about one-half that of 1913, is a significant achievement under all the circumstances, representing an increase of nearly one-third over 1920.

In pig iron the comparison is not so striking. At 508,000 tons per month in 1921, the rate is about 37 per cent of that in 1913. Of interest also is the wide spread last year between the pig iron and steel production as compared with 1913, and even

with 1920, steel output in 1921 exceeding pig iron by a larger margin than in any of the years under review. One explanation is the much larger use of scrap in German furnaces. In 1920, taking importations as a basis, scrap receipts were only 8371 tons per month, increasing to 21,901 tons per month in 1921. For the first half of this year, however, these importations averaged no less than 39,782 tons per month and 75,162 tons was received in June. The liberal use of scrap in steel making is not confined to Germany; it is a marked feature of open-hearth operations in the United States, Great Britain and other countries.

In 1913 and 1914 Germany stood second only to the United States as a producer of pig iron and steel, and that is her rank to-day, four years after the end of the great war. As a factor in world competition Germany is still to be reckoned with, the alternative of her political and industrial collapse being unthinkable, in spite of the débâcle in the mark which has led to so many gloomy predictions in recent weeks. Thus far in 1922 she has been second only to Great Britain as an exporter of steel.

Cycles and Current Phenomena

The two general methods of forecasting the future in commerce are by consulting the cycles and by considering the current phenomena. Of late we have been giving much attention to the business cycle, which is now rather popular. The chief objection to the cycle method is that the cycles are not of predetermined length and extent. Taking bank clearings for illustration, we do not know how long it will be from one low point to the next, nor, when the clearings increase, do we know in advance what the maximum will be. We know when we have passed the peak, but we do not know when we are closely approaching the peak.

More illumination could be obtained from current phenomena if there were more careful study of them. It can hardly be denied that usually there is very loose thinking on the subject. A rather substantial proof is the great vogue for many years of the digest that catalogues first the "favorable" and next the "unfavorable" items. The inference is that the "favorable" items are all of the same character, and similarly with the unfavorable. One may well suspect that the writers of these digests so feel, and it is obvious that such is the impression made upon the reader.

Yet in these digests items of widely different character are included. One just published mentions, as co-ordinate, that "banking and credit conditions are wonderfully good" and that "prices of many manufactured products are advancing." Both these indications may be good or encouraging, but a subject of this sort is worthy of more careful study. The two items are quite different in character. It is conceivable for banking and credit conditions to remain good for an indefinite period, while it is patently impossible for prices to continue advancing indefinitely. This same digest mentions as favorable that the country has "apparently passed safely" through the coal strike. That statement deserves study and analysis. It is not to be taken simply as a favorable vote for better business in future. It is good that the coal strike is settled, in the sense that the country is better off with the strike settled than it was during the strike, but it is not better off with this particular settlement than it would be with a different settlement, or than it was when coal miners were not being paid an unfair proportion of the country's total income.

In another review there are named among other favorable factors the building boom, the activity in automobile construction and the abundant crops. Probably the writer did not regard these items as co-ordinate, but the reader, whom it is desirable to educate, is likely to receive that impression. If we are to study economics for enlightenment and improvement in judgment, such items should be considered in detail. The abundant crops are an economic advantage, there being so much more of this world's goods for us to enjoy. The very phrase, "great building boom," used by the writer of the review is disquieting. A "great boom" suggests that men are paying too much and are not getting the worth of their money. The farmers do a certain amount of work in the year, and if that work produces large crops we are better off than if it produces small crops. A "great building boom" suggests precisely the opposite—that the results are small, instead of large, in proportion to the time the workmen put in.

The "unfavorable" items catalogued from time to time also deserve analysis. One current review mentions as "unfavorable" that "building activities are expected to decline with rents." We are here to live in houses, not to build them. It may not be good for carpenters, but it is better for the nation to have enough houses than not enough.

Carefully studied, the current phenomena will illuminate the future, but making two hodge-podges, one of "favorable" and the other of "unfavorable" phenomena, is not conducive to straight thinking and safe conclusions.

Is Welfare Work Overdone?

One factor in the readjustments made during the recent depression was what has been termed the liquidation of welfare work in industrial establishments. In many cases this phase of management had passed reasonable bounds. Even before the slump in business compelled curtailment not a few employers had been looking askance at what had been developed in the effort to procure and maintain contentment and esprit de corps. In some instances owners had made of their welfare departments a hobby; funds being ample, they had ridden the hobby much further than they had realized. In other cases there had been a rapid growth to formidable proportions in the competition for labor in a market where the supply was much under the demand. Another influence was the employment of specially trained men and women to conduct the department. Naturally they were altruistic in their aims.

In cases where the system was carried too far an unfavorable reaction had begun to be felt. Employees, among themselves and outside, had openly expressed the wish that some of the welfare money might better be spent in wages, though probably few of them at that time thought that

wages were low. Then came dull times, and this being an expense that could be dropped quickly, the item was eliminated in many establishments, with the double satisfaction of effecting needed economy and of getting rid of a top-heavy burden.

Whatever the motive for industrial welfare work, whether it be philanthropy or cool-headed business or both, as is usually the case, the aim is the same—to keep men and women cheerful of mind, strong of body, loyal to the firm. Naturally when this condition exists it spells efficiency of production and reduced overhead, notably in labor turnover. But in the past few years it has been proved that the system may defeat its own ends and result in a measure of discontent. Much of the means of securing contentment, such as well-lighted, well-ventilated working places, with accident hazard reduced to the lowest possible point, does not class with welfare work. The same is to be said, too, of the hospital or infirmary, with the shop physician and nurse, and some other things which in their beginning were established from kindly rather than from business motives.

The real welfare work has many sides—the recreation and athletic field and athletic teams; garden plots; recreation hall, playground for employees' children, restaurant; house building plan, in which the company assists in financing the establishment of a home; group insurance, thrift-encouraging projects; Americanization classes, part-time classes for the training of boys and girls, and evening classes for any who may care to join them; clubs to bring together employees having some common interest—and so on through a long list of activities. Every one of them is a good thing, in its place, when carried forward wisely and not extravagantly.

The trouble comes from attempting too much, if one is to judge from recent experiences. Every industrial plant is the better for the introduction of some phase of the work, but there are few that can carry them all. It should be recognized as a fact that such a system may become an actual burden to workers. They are offered too much and feel a sort of duty in accepting, until a good part of the time they have to themselves is eaten up in affairs auxiliary to their labor. They have lost the spontaneity of their recreation.

One genuine evil has crept into some of the welfare systems, particularly in connection with athletics. A ball nine or football team is organized from among the regular employees. As competition gets keen with rival works or departments, men begin to be hired with fully as much attention to their athletic skill as to their expertness as workers. The next step is hiring athletes, or it may be musicians for the band, or other specialists, and giving them sinecure jobs. Fellow employees do not like that. Men resent working hard at their daily tasks side by side with one who not only is not up to his job, but is permitted to soldier at will. Thus the purpose of creating shop spirit by a common pride in the ball nine, for example, is frustrated. It would be better to hire professionals without pretense of giving them other employment. But, give a man a nine or a crew made up of bona-fide workers, his own friends, and no more ardent partisan could be asked for when the shop turns out to see the game. It is a good rule for an executive, that the aim of his welfare department is to better the employees' condition and not to add glory to the name of his company or to his own department.

CORRESPONDENCE

Income Taxes and Industry

To the Editor: Your recent editorial entitled "Uneven Tax Burdens" is in a sense rather misleading. If, for example, the people of New York State actually produced the income which furnished 25 per cent of all taxes collected by the Bureau of Internal Revenue, then your conclusions would be sustained.

However, such is not the case. New York is the center of large corporate interests whose properties ramify throughout the United States. Thus, for example, taxes are paid in this State upon the wealth produced by the development of oil in Oklahoma, or copper in Arizona. These examples could be multiplied indefinitely. If taxes were distributed back to the States where the actual production occurred, there would be decided leveling up of the revenues complained of.

Furthermore, the regions most heavily taxed are those of greatest industrial development. Naturally they contain the greatest amount of invested capital and have the largest means of production. Taxes, like wages, must in the last analysis be paid out of the wealth created in this way. It is difficult, therefore, to comprehend a system of taxation which would not take its largest toll in the regions of greatest production.

If, on the other hand, taxes were levied on consumption rather than upon income, the showing based upon population would be more uniform, but not equal. Consumption is always greatest where production is greatest and the same regions would still pay the largest share of the tax.

In this connection another serious question can be raised. Would not a direct consumption tax result in the decreased use of commodities, so that the market for the products of the now "unhampered industry" would be destroyed?

ALWIN SCHALLER,
General manager McEwen Brothers.

Wellsville, N. Y., Sept. 6.

Lower Rates on Pig Iron from Sheffield and Florence, Ala.

WASHINGTON, Sept. 19.—The Interstate Commerce Commission last week declined to suspend the Arrow Transportation Co. river-and-rail rate on pig iron from Florence and Sheffield, Ala., to points north of the Ohio River on the basis of $1.96 per ton to Metropolis, Ill., for river transportation and $2.26 from the river to Chicago, the rail movement being by way of the Chicago, Burlington & Quincy Railroad. This makes a rate of $4.18 from the furnaces in Florence and Sheffield to Chicago and $3.28 to St. Louis. The tariff was opposed by some Chicago interests and was supported by interests in southern Ohio and St. Louis. The tariff became effective Sept. 15.

The Attorney General of the United States has called the attention of the metal trades to the fact that throughout the country there are many instances in which manufacturers of metal badges, worn usually by officers of the law, have made or sold to unauthorized individuals metal badges purporting to be official insignia of Government officers. As a result of the promiscuous sale of such badges, many individuals have been arrested, charged with the false impersonation of Federal officers. A manufacturer of badges may be subjected to liability or at least to embarrassment because of the manufacture and sale of badges to unauthorized officers.

Car Shortage Follows Strike Troubles

Delivery of Iron and Steel Plants Delayed as Plants Resume —One Hundred Thousand Men Are Idle Owing to Closing of Ford Factories

YOUNGSTOWN, Sept. 19.—In the Mahoning Valley the steel industry shows evidences of rapid recovery from restrictions on production imposed by the railroad strike. Lack of suitable cars is still a deterrent, however, and is impeding shipments of finished steel to some extent. One sheet interest, for instance, reports that it has approximately 3000 tons of sheets held up on its shipping platforms or in its warehouses by inadequacy of car supply. All of this tonnage represents business against which consumers have issued shipping instructions, and it is ready to go out as soon as cars are available.

Lack of cars is likewise retarding coal shipments in some measure. In shipping sheets and wire products, refrigerator cars have been employed for shipment direct into Chicago. In other cases, open top cars are being used, but the material is protected as much as possible against the weather by coverings.

Blast Furnace Operations

Of the 47 blast furnaces in the Youngstown district, 23 are now pouring, representing in excess of 60 per cent of the total iron capacity. On Sept. 14, the Republic Iron & Steel Co. turned the blast on a fourth stack in its Haselton group, while on Sept. 13 the Brier Hill Steel Co. started its third stack, and the Trumbull-Cliffs Furnace Co. its stack at Warren. In the Shenango Valley, two furnaces are being modernized by the William B. Pollock Co., and their capacity enlarged, one for the Sharpsville Furnace Co. and the other for the Shenango Furnace Co. A new stack of 400 tons capacity is being built for the Sharpsville Furnace Co., and a bin system installed for handling ore. The furnace of the Shenango Furnace Co. will be 500 tons capacity.

The Warren stack of the Trumbull-Cliffs company is producing basic iron, while the Republic company's latest active furnace is on Bessemer iron. In consequence, the company's Bessemer department, idle during the last 18 months except for brief and intermittent operation, resumed on Monday, and constitutes the most important addition to active Valley steel capacity this week. For the first time in many months, all four Bessemer departments in the Mahoning and Shenango Valleys are active, two operated by the Carnegie Steel Co., one by the Youngstown Sheet & Tube Co. and the fourth by the Republic company.

Mattie blast furnace of the A. M. Byers Co., Pittsburgh, will be blown in at an early date. No. 1 puddle mill of the company's plant at Girard, Ohio, resumed Sept. 15. It consists of 44 units. It is expected other furnaces in this territory will get under way before the end of September. Until the rail strike interfered with coal shipments, 26 of 47 stacks in both Valleys were pouring last Spring.

Steel Plants and Mills

Ingot capacity of the district is operating at 80 per cent. In the Mahoning Valley 45 of 51 independent open-hearth furnaces are charged. Six merchant bar mills are active, besides the finishing mills of the Carnegie Steel Co. at its Upper Union and McDonald plants. The Republic company has its large merchant mill at Haselton under power, and four smaller bar mills at its Brown-Bonnell works. The Sheet & Tube company's merchant bar mill was also scheduled to resume. This represents the highest bar mill operation in many months.

Tinplate production is an exception to the upward trend, the Liberty plant at Leavittsburg of the Trumbull Steel Co. being idle. The tin mills at its Warren property are active, however, while the Falcon Tin Plate Co. is operating its Canton plant on a normal production basis.

The Valley's sheet industry is practically on a normal basis, with 108 of 113 mills scheduled. The increase over last week is due to the additional mills operated by the Sheet & Tube company. This company and Republic are dividing 15 active pipe furnaces, out of a total of 17.

Manufacturers Confer—President Campbell Predicts Ample Supplies When Late Season Ends

WASHINGTON, Sept. 19.—The iron and steel and all other industries of the United States as well as the household will have adequate supplies of coal and prices will be lower after the navigation season on the Great Lakes closes, in the opinion of President James A. Campbell of the Youngstown Sheet & Tube Co., Youngstown, Ohio. This view was expressed to THE IRON AGE by Mr. Campbell last Friday when with other iron and steel executives he participated in the conference of business men regarding the bituminous coal situation held at the Department of Commerce. The meeting was made up of officials of the United States Chamber of Commerce, the American Railway Association, the National Association of Manufacturers, the National Association of Purchasing Agents, and the Public Utility Associations, who conferred with Secretary of Commerce Herbert Hoover, H. Foster Bain, director of the Bureau of Mines, and C. B. Aitchison of the Interstate Commerce Commission. The opinion of Mr. Campbell accorded with the general view of the conference.

Public Unduly Alarmed

Mr. Campbell said that there has been an undue alarm on the part of the public on account of the coal situation. He predicted that there would be a scarcity of coal until the lake navigation season ends and that high prices would prevail until then. But after the closing of navigation, he said there will be plenty of coal to take care of industry and households and that prices will be lower. He pointed out that it now is a question of railroad transportation, but that the railroads have placed tremendous orders for cars and locomotives and that the coal strike being settled and the rail strike being virtually over, the outlook is cheerful. It is to be expected, therefore, that after the Northwest has been supplied with its coal requirements, fuel will move in abundant quantities to industries and that increased production in steel and other lines will follow.

Lower Prices Expected

The conference itself went formally on record as believing that the natural processes of increased supply, provided distribution is facilitated, will bring down the price of coal and assure complete supplies to the householders and industry. A definite pledge on the part of commercial interests to aid in expediting those natural processes and determination on the part of the Government that advantage shall not be taken of

the recent strike in an effort to exact high coal prices from the public were evidenced at the conference. One of the most interesting points discussed was the question of priorities in the coal movement. In this connection, relief to the iron and steel and other industries, which are not on the preferred list, was indicated by the opinion of the meeting that mobility will be given to movement with less opportunity for speculation if the priorities to special uses which have been necessary prior to the re-opening of the union mines should be relaxed and priority parallel with agricultural produce should be given to the movement of all coal without discrimination as to consignees. It was also pretty generally the opinion of the meeting that all re-consignment rights upon coal should be abolished in order to prevent speculation in coal. This prompted the decision to organize special committees under the leadership of the Chamber of Commerce of the United States to advance these purposes.

Purposes to be Carried Out

The three major purposes for which the conference voted to organize voluntarily campaigns, were as follows:

1. To induce railroads, public utility corporations, and buyers generally not to purchase coal beyond their day-to-day needs until the flow of coal becomes more normal.

2. To persuade holders of contracts not to call for delivery on those contracts past their day-to-day needs. It was considered that above one-half of the coal in the country is under contract at normal prices and that a relaxation in the demand for this coal to the minimum daily requirements would allow an increase in supply to the general public.

3. To expedite the movement of coal in every possible way.

Secretary Hoover's Views

In opening the conference, Secretary Hoover said it was most desirable that re-adjustments in prices and distribution should take place by natural means of increased supply and the holding down of consumption pending such increases. Production for the public must come, he warned, by one means or another.

The Secretary stated that while the bill pending in Congress would give powers to embargo shipments of extortionate priced coal moving in interstate commerce, the Federal Government could exert no constitutional control over coal produced and sold within State boundaries or over-speculation in interstate coal, once it had reached its destination. Many States were taking drastic legislative powers in these domestic matters and unless the situation quickly improved, no doubt many more of them would do so in order to protect their citizens.

It was agreed that the mines had ample capacity, even to the point of surplus, to meet the situation, that the problem was wholly one of transportation, and that the price would ameliorate if transportation could be increased and if in the meantime consumers would purchase only for their immediate needs.

Losses Overestimated

On the day preceding the conference, Secretary Hoover said that while the losses to the country, due to the two great strikes, are considerable, they are easily overestimated. He stated that the estimate of current coal miners' wages lost in the five months, is not a correct basis of estimation, because over a period of 18 months "we will probably consume approximately the same amount of coal." In other words, the Secretary pointed out, the miners will work more days in the week and produce more coal in the next six or eight months than they would have produced if there had been no strike, and thus the wage roll the next six or eight months will be larger and will, in a considerable degree, compensate the loss during this suspension.

Secretary Hoover added:

Farmers Are Heaviest Losers

"The real loss would lie more in the loss of productivity in industries that have, or might have, to close down as a result of the coal strike. If all of our industries can be kept in motion, the loss will be much less from the coal strike than is currently estimated.

"The greatest loss to-day is the one being met by the farmer as a result of the railway strike. The export of farm produce has been seriously interfered with by the inability of the railways to transport produce. Prices are therefore unduly depressed in the agricultural regions and the farmer is suffering grievously.

"The inability to transport manufactured products will create some degree of loss, but not so serious as that to agriculture.

"There are other losses that must be counted into the National balance sheet, such as the damage to the railways, the extra charges which they have been put to, the cost of keeping the mines open and maintaining them during the period of suspension, and a hundred other items that are of importance. In the broad view, however, if we can get back to business, if we can secure a resumption of transportation and rapid distribution of coal and agricultural produce, we will not have received such an economic wound as cannot be very quickly recovered from. We will probably not be on such a high plane of business prosperity during the next six months as we would have been, had the strikes not taken place, but we will undoubtedly be on a much higher and much more comfortable plane than that of last year."

Those in Attendance

Among those who attended the conference on last Friday were the following:

James A. Campbell, president Youngstown Sheet & Tube Co., Youngstown.

E. A. S. Clarke, president Consolidated Steel Corporation, New York.

Harry Coulby, Pickands, Mather & Co., Cleveland.

R. P. Lamont, president American Steel Foundries, Chicago.

A. A. Landon, vice-president American Radiator Co., Buffalo.

Charles K. Foster, vice-president American Radiator Co., Chicago.

S. M. Vauclain, president Baldwin Locomotive Works, Philadelphia.

J. E. Edgerton, president National Association of Manufacturers, Nashville, Tenn.

Alexander Legge, president International Harvester Co., Chicago.

Ford Furnace Plant Operating on a Reduced Scale

DETROIT, Sept. 18—The Ford layoff became an actuality Friday night when several thousand men reporting for duty at 11 o'clock at the Rouge plant were ordered to turn in their tools. A few were retained at the foundry, coke ovens and blast furnaces. The night force at the Highland Park plant were released early Saturday morning so that by Saturday night the suspension of Ford manufacturing in Detroit was complete. This means that approximately 70,000 men in Detroit have been thrown out of work at the Ford plants and another 30,000 employed by companies dependent upon Ford production will likewise be idle, making a total of 100,000. A conference of Ford executives held Friday afternoon was for the purpose of determining whether it would be possible to keep part of the plants in operation. The coal situation is admittedly better but no statement has been made by the Ford officials as to whether their fuel situation would have permitted a continued operation.

Although definite announcement was made about three weeks ago that the Ford industries would close on Sept. 16, considerable doubt existed until the last moment as to whether this program would be carried out.

The Ford blast furnace and coke ovens are in operation on a reduced scale. Probably 10,000 to 15,000 men were retained at both plants. Highland Park and River Rouge parts manufacturers are feeling the effects and reducing working forces. There are numerous predictions that the shut-down will not last more than three weeks. No statement has been made by the Ford Motor Co.

It is significant that reports from the members of the Detroit Employers Associations show very few increases in employment, figures for the week giving 175,800 which is a decrease of 2,200 as compared with 178,000 employed a week ago.

The General Motors plants in the State of Michigan have shown no signs of reducing their production schedules and Arthur T. Waterfall, vice-president of Dodge Brothers, announced Friday that this company is running to capacity and does not expect any retrenchment.

Efforts to Unionize Connellsville Miners Fail

UNIONTOWN, PA., Sept. 18.—Increased production was the feature of the situation in the Connellsville bituminous region last week. This is being brought about by the importation of hundreds of additional workers and increased efficiency on the part of the men who have been coming into the region during the past few weeks.

Efforts at unionization of the Connellsville field have failed. The developments of the past week have strengthened the situation as pertains to the larger operations and it is not believed that another single operation will affiliate with the union.

Evictions in the various plants continue with increased force. At one plant, 40 persons about to be evicted went to the management and asked to return to work. They are working and are still in their houses.

Action of the United Mine Workers in sending a telegram to the United States Senate through Senator Tom Watson asking for an investigation of the evictions in the region, failed to cause a ripple among operators in the region. Such an investigation would receive no opposition whatsoever from the operators in the region. Men who refused to work were allowed to remain in the houses for weeks before they were put out.

In every instance, they were given an opportunity to accept their old jobs back and upon their refusal eviction warrants were issued and served at the expiration of the time limit prescribed. Observers in the region declare that the operators have more than played square in these proceedings. One operator, after informing his men that they might have an opportunity to go back to work, and the men refused, told them he would pay their moving expenses, up to $20 a family, if they wanted to move to other plants.

The situation narrows down to this: Those workers who went out on strike on April 1 and refuse to return to work at the present wage scale must make way for the hundreds of workers who are coming into the region to go to work.

Transportation Still Dominates the Situation

WASHINGTON, Sept. 19.—Increased production of coal gives further confirmation to the fact that the problem now is one of transportation and not mining. This situation is generally recognized and it is restated in a communication from the Chamber of Commerce of the United States to industries of the country in seeking their co-operation for the purpose of stabilizing the coal situation. The letter follows the conference held last Friday between Government officials and business interests and the plan of the Chamber was put into operation to-day. At the same time, the Congress has passed the so-called anti-profiteering fuel bill.

The other piece of legislation regarding the coal situation provides for an investigation of the coal industry by a Federal coal commission and suggestions for the investigation have been made by Secretary of Labor Davis in a letter to Senator Shortridge of California.

Production of all coal, anthracite and bituminous, in the week ended Sept. 16, is estimated by the Geological Survey at 10,200,000 to 10,500,000 tons. The output of bituminous coal is not expected to exceed 9,500,000 tons. The rate of production has not been under this figure during the three weeks period following the general resumption of mining under the Cleveland agreement. Loadings on Monday, Sept. 11, were 35,808 cars, a larger number than reported for any day since March. However, there was a drop on the following days and on Thursday, the latest day of which there is a report, loadings totaled 26,923 cars.

"Transportation is the dominant and limiting factor in soft coal supply," the Geological Survey says. "Restricted by transportation difficulties the rate of soft coal production is seemingly fixed temporarily at 1,600,000 tons a day, or 9,600,000 tons a week—this in spite of a strong market and prices sustained at high levels not only by demand for current consumption but also by the need for rebuilding ordinary reserves and by extraordinary call for household sizes.

CAR ORDERS MODIFIED

Interstate Commerce Commission Grants Greater Freedom in Moving Certain Commodities

WASHINGTON, Sept. 19.—Greater freedom in the movement of iron and steel, lumber and other products generally will be allowed as the result of car service order No. 25 issued this afternoon by the Interstate Commerce Commission to become effective midnight, Sept. 21. The order increases the number of commodities to which the railroads are to give preference movement, provided they can move all traffic as ordered, and at the same time abolishes the priorities created for the benefit of preferred users of coal, except when such preferences may be ordered by the Commission itself.

This will result in greater movement of coal also to iron and steel and lumber plants which have not been on the preferred list. The order of the Commission reduces the number of its service agents to four, three of whom are in the Washington office, and one left in the field to take care of Lake cargo traffic at Cleveland. This order supersedes order No. 23, which is to be suspended at midnight, Sept. 20.

Commodities added to the list of those given preferred movement are mine supplies, medicines, fertilizers, seeds, newsprint paper and petroleum and its products.

The new orders allow the use of open top cars for loading with other commodities while they are on their way back to the mines, and among other things this will be helpful for the movement of iron ore. This is made contingent upon the fact that loading is to points not beyond the mines, and such loading will not delay or minimize the production and transportation of coal. By this order use of cars will be allowed for hauling road and building material and fluxing stone for furnaces.

The Commission simultaneously issued an order changing order 24 so as to conform to order 25 in the list of commodities to be given preferred movement. This has no effect on order 22 relating to routing of traffic so as to avoid congestion. The changes made accord with recommendations made at the Hoover coal conference last Friday.

Addition to the list of commodities given preferred movement was made necessary by the fact that the railroads in the issuance of embargoes included in the prohibited lists commodities which the Commission considered to be essential and permitted commodities to move which were not so considered.

Iron and Steel Markets

LARGE RAIL ORDERS

Heavy Tonnages Likely to Be Closed Before Oct. 1

Steel Output Increases and the Volume of Business at Premium Prices Is Less

Further increases in output of pig iron and steel are reported from all producing centers, and at the same time there is a falling off in the volume of new business done at premium prices. Both movements represent progress out of the scarcity market conditions created by the double strike.

Eight additional blast furnaces, chiefly in Ohio and Western Pennsylvania districts, have been blown in. As a whole the steel industry is probably running at a 65 per cent rate, and there is the unusual condition of several large independent companies exceeding the rate of the Steel Corporation. Connellsville coke output gains but slowly, and most of the blast furnaces just started are getting their coke elsewhere.

Of first importance in the week's developments was the decision of the Steel Corporation to advance its rail price to $43 on Oct. 1, and meanwhile to book orders for the first half of 1923 at $40. At least one large independent company has announced a like policy.

It already appears that a large tonnage of rails will be booked for next year by Oct. 1. At Chicago orders for 100,000 tons have been placed already, and a total of 300,000 is expected by the end of the month. In the East an initial inquiry of 125,000 tons for the New York Central has appeared, and options are asked on 25,000 tons more up to March 1 and 50,000 tons up to June 1. Other tentative tonnages are 25,000 for the Norfolk & Western, 13,000 for the Reading and 8000 for the Long Island. If the Pennsylvania inquiry equals the 200,000 tons distributed for 1922 and the B. & O. and other lines come forward in the way that now seems likely, the rail mills will have much better backlogs for the winter than were in sight last autumn.

Buyers of steel regard the efforts of the mills to insure winter rail rollings an index to the expected easing of conditions in the heavier products later in the year. It is recognized, however, that heavier coal deliveries mean also shortages of cars for certain finished products.

For the 1000-mile joint pipe line of the Standard and Sinclair companies the National Tube Co. will furnish 100,000 tons of 8, 10 and 12-in. pipe.

An order of the Commerce Commission effective Sept. 21 abolishing certain priorities on coal will result in a larger coal movement to iron and steel plants. More freedom is granted also in the use of open-top cars. However, the transportation situation at Pittsburgh is not good and no marked improvement is in prospect. With car shortages limiting production, coke has gone to $11.50, an advance of 50 cents in the week and of $1.50 in two weeks.

New locomotive orders total 189 and fresh inquiries 68, not including 100 expected shortly from the Santa Fe and 50 each from the Burlington and Rock Island. Special efforts are being made to expedite deliveries on locomotive steel.

At Chicago track spikes and bolts are $2 a ton higher, and light rails $3, in line with the new price for standard sections.

September fabricated steel contracts are below the rate of any of the last six months, but at 55 per cent of capacity are fully up to the average of the last decade. A further falling off is indicated as fresh projects are fewer. In reinforcing bars a water project at Tulsa, Okla., will mean a large tonnage, probably 7500 tons.

Cast iron pipe has been advanced to a $40 base, Birmingham, for 6-in. pipe and larger and business is still moving in fair volume.

Advances in steel castings, ranging from 15 to 20 per cent, are looked for, effective Oct. 1.

The price of Southern pig iron again has been advanced $2, and $27, Birmingham, is now the usual quotation, but owing to freight congestion, very little Southern iron is being delivered. The sale of 20,000 tons of basic at $34, Valley, apparently represents an advance of $1.50, although the transaction is understood to have some special features. Owing to reduced freight rates on pig iron from Florence and Sheffield, Ala., by barge and rail, Southern iron promises to be a more important factor in St. Louis and Chicago. Foundry iron prices show little change, and in some centers conditions are easier, but delays in deliveries are frequent. At 161,000 tons on Sept. 1 merchant pig iron stocks of regularly reporting furnaces were the lowest in many months.

Low phosphorus iron is now figuring in import sales. One lot of 5000 tons has been closed for an eastern Pennsylvania foundry and considerably more is under negotiation.

Pittsburgh

Number of Sellers Increases, But Price Trend Is Still Upward

PITTSBURGH, Sept. 19.—Increased production of pig iron by the steel companies has begun to show in a moderate way in the production of steel, and in a few lines, notably in steel bars, there are more sellers than there were recently. Prices, however, are no softer; on the contrary, the trend is still in the other direction and must necessarily hold to this tendency so long as the demand exceeds the supply, as is still the case. The Steel Corporation in this district does not seem to be able for one reason or another to greatly increase output or reduce its obligations and of course cannot take on much, if any, business for early delivery. The bulk of the demand is for early shipments and the position of the Steel Corporation naturally throws most of the orders to the independents. The latter are not taking long time obligations with serious transportation difficulties believed to be immediately ahead, and moreover, selling for brief periods will enable them to apply promptly any increases in costs to selling prices.

Partial settlement of the strike of the railroad shopmen has not had much effect yet upon the operation of

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Sept. 19, 1922	Sept. 12, 1922	Aug. 22, 1922	Sept. 20, 1921
No. 2X, Philadelphia	$34.26	$34.64	$33.14	$21.34
No. 2, Valley furnace†	**36.50**	35.00	33.00	21.00
No. 2, Southern, Cin'ti†	29.05	29.05	24.05	23.50
No. 2, Birmingham, Ala.†	25.00	25.00	20.00	19.00
No. 2 foundry, Chicago*	32.00	32.00	30.00	22.00
Basic, del'd, eastern Pa.	*37.00*	32.00	28.84	19.25
Basic, Valley furnace	**34.00**	32.50	26.00	19.25
Valley Bess., del. Pitts.	**35.77**	34.77	31.76	21.96
Malleable, Chicago*	32.00	32.00	30.00	22.00
Malleable, Valley	**34.00**	33.00	31.50	20.00
Gray forge, Pittsburgh	**37.77**	36.77	34.76	21.96
L. S. charcoal, Chicago	36.15	36.15	34.65	33.50
Ferromanganese, seaboard	67.50	67.50	67.50	60.00

Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$40.00	$40.00	$40.00	$47.00
Bess. billets, Pittsburgh	40.00	40.00	37.50	29.00
O.-h. billets, Pittsburgh	40.00	40.00	37.50	29.00
O.-h. sheet bars, P'gh	40.00	40.00	37.50	30.00
Forging billets, base, P'gh	45.00	45.00	43.00	34.00
O.-h. billets, Phila.	45.17	45.17	42.67	35.74
Wire rods, Pittsburgh	47.50	47.50	45.00	41.00
Skelp, gr. steel, P'gh, lb.	2.00	2.00	2.00	1.65
Light rails at mill	**2.25**	2.00	1.90	1.75

Finished Iron and Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.575	2.575	2.325	1.95
Iron bars, Chicago	2.25	2.25	2.15	1.75
Steel bars, Pittsburgh	2.00	2.00	2.00	1.60
Steel bars, Chicago	2.10	2.10	2.35	1.75
Steel bars, New York	2.34	2.34	2.34	1.98
Tank plates, Pittsburgh	**2.25**	2.00	2.00	1.60
Tank plates, Chicago	2.30	2.30	2.20	1.75
Tank plates, New York	**2.49**	2.34	2.34	1.98
Beams, Pittsburgh	2.00	2.00	2.00	1.60
Beams, Chicago	2.20	2.20	2.35	1.80
Beams, New York	2.34	2.34	2.34	1.98
Steel hoops, Pittsburgh	2.75	2.75	2.75	2.15

Sheets, Nails and Wire, *Per Lb. to Large Buyers:*	Sept. 19, 1922 Cents	Sept. 12, 1922 Cents	Aug. 22, 1922 Cents	Sept. 20, 1921 Cents
Sheets, black, No. 28, P'gh	3.35	3.35	3.35	2.75
Sheets, galv., No. 28, P'gh	4.35	4.35	4.35	3.75
Sheets, blue an'l'd, 9 & 10	2.50	2.50	2.50	2.00
Wire nails, Pittsburgh	2.60	2.60	2.60	2.00
Plain wire, Pittsburgh	2.35	2.35	2.35	2.60
Barbed wire, galv., P'gh.	3.15	3.15	3.15	3.55
Tin plate, 100-lb. box, P'gh	$4.75	$4.75	$4.75	$5.25

Old Materials, Per Gross Ton:				
Carwheels, Chicago	**$24.50**	$23.50	$21.00	$14.50
Carwheels, Philadelphia	**23.00**	21.00	19.00	17.00
Heavy steel scrap, P'gh	**21.00**	19.50	18.25	14.00
Heavy steel scrap, Phila	**18.00**	16.00	15.50	11.50
Heavy steel scrap, Ch'go	*18.00*	18.50	16.00	11.50
No. 1 cast, Pittsburgh	**24.00**	21.50	19.00	17.00
No. 1 cast, Philadelphia	**23.00**	21.00	19.00	17.00
No. 1 cast, Ch'go (net ton)	*21.00*	22.00	19.50	13.25
No. 1 RR. wrot., Phila.	**22.00**	21.00	18.50	15.00
No. 1 RR. wrot. Ch'go (net)	*17.50*	18.00	15.25	11.50

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	**$11.50**	$11.00	$12.00	$3.25
Foundry coke, prompt	12.50	12.50	13.00	4.25

Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York	14.12½	14.12½	14.12½	12.25
Electrolytic copper, refinery	13.75	13.75	13.75	12.12½
Zinc, St. Louis	**6.65**	6.37½	6.22	4.17½
Zinc, New York	**7.00**	6.72½	6.57½	4.67½
Lead, St. Louis	**5.90**	5.60	5.60	4.45
Lead, New York	**6.25**	5.95	5.90	4.65
Tin (Straits), New York	32.12½	32.12½	32.50	26.50
Antimony (Asiatic), N. Y.	**6.75**	6.25	5.25	4.45

*The average switching charge for delivery to foundries in the Chicago district is 60c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.
The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Sept. 19, 1922, Finished Steel, 2.419c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel

Sept. 12, 1922,	2.412c.
Aug. 22, 1922,	2.412c.
Sept. 20, 1921,	2.200c.
10-year pre-war average,	1.689c.

Composite Price, Sept. 19, 1922, Pig Iron, $32.54 Per Gross Ton

Based on average basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Sept. 12, 1922,	$31.52
Aug. 22, 1922,	26.86
Sept. 20, 1921,	20.01
10-year pre-war average,	15.72

those roads in this part of the country which were most seriously affected. The trouble, primarily, has been due to the crippled condition of motive power and now that so many cars have been loaded with coal there is a shortage of cars for the movement of steel. The Carnegie Steel Co. has suffered especially from car shortages lately, and is likely to inaugurate before long river deliveries at least in and around the Pittsburgh district. If the transportation conditions get as bad as they are expected to, it is probable that all of the steel makers here in a position to do so will use the river for getting material away from the mills.

Suspension by the Ford Motor Co. last Saturday was a surprise to a good many of the steel trade who had looked upon the announcement with some skepticism. It is now stated that the step was necessary to avoid being regarded as a bluff, and that there will be a resumption by the Ford company at an early date. It is said that the Ford company did not suspend because of lack of orders and that consequently it is not likely to remain down long. The real effect of this suspension has not yet been fully felt, because there were a good many modifications of the original orders suspending shipment of materials. This, however, will be felt later on when the Ford company does resume, as it is reliably reported that as a result of the late shipments the company has fully a month's stock of material on hand.

A further advance of $11 per ton has been announced since a week ago in wrought iron pipe, making a total of $21 per ton in about a month. A further advance in steel pipe appears to be likely since it is claimed that the higher wages more than offset the increase announced by independents Aug. 15 and followed by the National Tube Co. Aug. 23. A feature of the tubular goods market has been an order for a 1000-mile pipe line by the Standard Oil Co. of Indiana and Sinclair Oil Co. jointly. The National Tube Co. will furnish more than 100,000 tons of 8, 10 and 12-in. pipe for this line.

Announcement of the increase in the price of rails, effective Oct. 1, has not yet been productive of many orders to the local maker, although it is stated that railroads ordinarily served from Pittsburgh are figuring on their requirements and will get the orders in before the new prices are in effect.

Most grades of pig iron have advanced since a week

ago, basic going to $34 on a sale of 20,000 tons by a Youngstown steel maker. Largely as a result of the activities of dealers, there has been a further sharp advance in scrap prices. With car shortages limiting production, coke prices have gone up further.

Pig Iron.—Those who must have pig iron for early delivery find they must meet sellers' price ideas. A Youngstown steel maker recently sold 20,000 tons of basic iron at $34, furnace, and while there has been some disposition to question the sale, some claiming that some sort of a trade was involved and that consequently the transaction could not be regarded as setting the market at that figure, it is a fact that on two or three good sized inquiries which lately have been out, the quotations have been above $34. Moreover, it is believed that two companies now seeking round tonnages would pay $34 to secure them. The market, therefore, cannot be well quoted below this price. Bessemer iron has advanced $1 per ton, to $34, Valley furnace, on a number of small sales, but the largest sale of this grade in this district lately was one of 1000 tons, the iron being sold by a western Pennsylvania steel maker at $33.50, furnace, the freight rate to Pittsburgh being the same as from the Valley, or $1.77. We note a sale of 1500 tons of foundry iron to a local sanitary ware manufacturer on a basis of $36, Cleveland, for the base grade. This means $38.55, delivered Pittsburgh, and figures $36.88, Valley furnace. There is no foundry iron available at present from any of the Valley furnaces, but it is possible that the A. M. Byers Co., which will light up its Mattie furnace at Girard, Ohio, late this week, will have some tonnage for market, and there is also a possibility that some of the steel companies may make some foundry iron. There is no Valley basis on foundry iron, but based on prices in other markets, it is probable that the price would be $36.50 to $37 for shipment to Pittsburgh.

We quote Valley furnace the freight rate for delivery to the Cleveland or Pittsburgh district being $1.76 per gross ton:

Basic	$34 00
Bessemer	34 00
Gray forge	36 00
No. 2 foundry	$36 50 to 37 00
No. 3 foundry	36 00
Malleable	34 00

Ferroalloys.—With indications of an early passage of the tariff bill, imposing a duty of $33.60 per ton on 80 per cent imported ferromanganese, there is little disposition on the part of domestic producers or dealers who have stocks of foreign material in this country to consider selling and prices either on the domestic or foreign material for spot shipment are nominal. British material still is priced at $67.50 c.i.f. Atlantic seaboard for 80 per cent for future shipment, but whether it will stay at that price after the tariff goes into effect depends on the prices named on domestic material. Collection of the new duty is going to be more bothersome than former ones, since it provides for 1⅞c. per lb. contained manganese and this entails close analysis of every shipment. The Jones & Laughlin Steel Co. has started making its own ferromanganese and is understood to have a supply of ore sufficient to run it more than two years. Spiegeleisen is about $1 a ton lower. The asking prices still are $38, furnace, for average 20 per cent material and $37 for 16 to 19 per cent, but sales of the former grade have been made at $37. There has been no change in 50 per cent ferrosilicon, but ferrotungsten already has been marked up to 60c. per lb. contained in anticipation of the passage of the tariff.

We quote 80 per cent ferromanganese, $[illegible] c.i.f. Atlantic seaboard for domestic; British, spot, $70 to $72.50; British, future, $67.50; German, 76 to 80 per cent, $67.50 to $70.

[illegible]

New Straitsville, Ohio

[illegible]

The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $2.60 [illegible]

Steel Skelp.—As high as 2.50c. still is obtainable on all tonnages of narrow grooved skelp for early delivery, but the prevailing market is about 2.25c. and large users, buying on contract, are beginning to find accommodation from independent makers at 2c. for their requirements of both grooved and sheared material.

Wire Products.—While a fair amount of business is passing in nails at $2.75 base per keg, Pittsburgh, the failure of the leading interest to follow the advance recently set up by independent manufacturers appears to be exerting conservatism among buyers with regard to their general requirements. This condition, however, does not disturb the strength of the market because a shortage of wire drawers is felt in all products and a shortage of box cars impedes deliveries. Prices are given on page 755.

Iron and Steel Pipe.—Leading makers of wrought iron pipe have issued new cards, dated Sept. 12, further increasing prices of standard pipe $11 per ton, by a reduction in the discount of 5½ points. This makes a total advance in wrought iron pipe in about a month of $21 per ton and the new discounts of the largest producer now are only slightly below those quoted by this interest throughout the greater part of 1920. Some business pending at the former discount was driven in by the advance, but trading at the new prices is very limited. Prices of steel pipe are firm at the advance of about a month ago. One independent producer is said to be contemplating a further advance of $6 per ton next week. A feature of the week in steam pipe has been the placing of a 1000-mile line to tap the Wyoming field by the Standard Oil Co. and Sinclair Oil Co., jointly. This order was placed with National Tube Co. and will aggregate about 100,000 tons. It is the largest individual order on record. There is no appreciable let up in the demand for merchant pipe, least of all in the butt weld sizes. Discounts are given on page 755.

Boiler Tubes.—Withdrawal of quotations by some makers of charcoal iron boiler tubes is taken to mean a further advance in prices in line with the advance recently announced in wrought iron pipe. Iron tubes are not selling with much freedom in competition with steel tubes. There is good demand for the latter. Discounts are given on page 755.

Wire Rods.—The market does not grow any easier, because available supplies consist of the small tonnages resulting from the inability of wire manufacturers to secure a sufficient number of wire drawers. For early delivery the market still is quotable at $47.50, base, for common soft rods, this having been the basis of the most recent business. Steel production is gaining, however, and makers may soon name prices on fourth quarter contracts. The common expectation is that the price will be around $45. The leading interest has made no public announcement of any change from $43 for the base size of soft rods.

We quote No. 5 common basic or Bessemer rods to domestic consumers, $47.50; chain rods, $47.50; screw stock rods, $52.50; rivet and bolt rods and other rods of that character, $47.50; high carbon rods, $54.50 to $57.50, depending on carbon, per gross ton, f.o.b. Pittsburgh or Youngstown.

Billets, Sheet Bars and Slabs.—The supply situation is growing slightly easier with independent producers, notably on Bessemer steel, due to the more abundant supply of coal and the increase in pig iron production. It is comparatively easy to secure Bessemer billets and sheet bars at $40, Pittsburgh, but there is still some difficulty in obtaining supplies of open-hearth material, for up to this time open-hearth operations have not risen as rapidly as have those of the blast furnaces, because few manufacturers had any stocks of cold pig iron when the fuel situation eased up. A change for the better with respect to open-hearth steel supplies is expected shortly, however, and while fourth quarter prices are not yet being announced, it is believed they will not be above $40 on sheet bars, billets or slabs. For early delivery $42 is being asked by some makers on open-hearth sheet bars.

We quote 4 x 4-in. soft Bessemer and open-hearth billets, $40; 2 x 2-in. billets, $40 to $42; Bessemer sheet bars, $40; open-hearth sheet bars, $40 to $42; slabs, $40; forging billets, ordinary carbons, $45 to $47, all f.o.b. Pittsburgh or Youngstown mills.

Sheets.—The market still exhibits considerable firmness, more in galvanized and full finished stock than in ordinary black sheets, but this condition is due to a large extent to costs, rather than to the urgency of the demand. The leading interest because of its inability to secure sufficient supplies of steel has relatively heavier obligations than the independents. The latter have been operating at a pretty high rate over the past month or six weeks, and running at the recent rate their net obligations are equal to slightly less than 1½ months' production. It is a question whether this showing is not due to an unwillingness of buyers to commit themselves as much as the unwillingness of makers to sell. The American Sheet & Tin Plate Co. last week operated 71 per cent of its mills, but probably will not do that well this week, because transportation conditions are interfering with steel supplies. Independent companies are averaging well above 80 per cent operations. Prices are given on page 755.

Tin Plate.—The situation is without special change. This is the quiet season of the year and with supplies ample for all requirements, increased costs as yet are without effect upon selling prices.

Cold-Finished Steel Bars and Shafting.—The market is fairly steady in spite of the loss of the Ford tonnage for the time being and a slightly easier supply situation with respect to hot-rolled bars. Some of the independent makers of the latter lately have resumed rolling and shipping. Corporation deliveries, however, still are limited and if there were a really active demand for cold-finished bars the market would be stronger. All makers are quoting 2.50c. base Pittsburgh for carloads, but there are some deviations from this base. Ground shafting is unchanged at 2.90c. base, f.o.b. mill, for carload.

Hot-Rolled Flats.—The market is firm at 2.75c. base, Pittsburgh minimum, on the ordinary widths and gages, but for prompt delivery premiums of $2 to $3 are fairly common and on narrow light stock some makers are unwilling to consider less than 3c. base. Suspension of the Ford Motor Co. has not yet been seriously felt by makers of strips.

Cold-Rolled Strips.—Most makers still are open to business at 4.25c., base, Pittsburgh, but there are instances where premiums for prompt delivery of as much as $5 per ton have been paid.

Iron and Steel Bars.—Some of the independents are slightly freer sellers than they were recently and generally are quoting 2c. base, Pittsburgh, on desirable tonnages for delivery in four to six weeks. As much as 2.25c. still is asked by some for small tonnages, but the real market appears to be crystallizing around 2c. The Carnegie Steel Co. still is having trouble in catching up with its obligations, and is largely out of the market. Iron bars are firmer at 2.50c. base, for refined iron in carload lots.

We quote steel bars rolled from billets at 2c. to 2.25c.; reinforcing bars, rolled from billets, 2c. to 2.25c. base; rail steel reinforcing bars, 1.90c. to 2c.; refined iron bars, 2.50c. in carloads, f.o.b. mill, Pittsburgh.

Nuts and Bolts.—Demand is reported to be brisk and with supplies of steel still difficult to obtain, prices are firmly maintained. Discounts are given on page 755.

Rivets.—The market holds firm since there is a demand that is hard to meet because of the scarcity of railroad material. Prices and discounts are given on page 755.

Track Fasteners.—Good demand is noted for small spikes and as makers are heavily committed and find it hard to get sufficient supplies of steel, they are inclined to seek higher prices. The minimum now is 3.25c. base, Pittsburgh, and some are asking 3.50c. Large spikes also are firm, with 2.75c. the minimum and some makers quoting 2.85c. Demand is moderate, but few makers are anxious for additional business. It is expected that angle bars will advance with standard rails on Oct. 1. Prices are given on page 755.

Structural Material.—The market still shows considerable firmness, although the approach of the end of the active building operations is reflected in fewer structural awards and fewer new inquiries. The market has not lately been much above 2c. on sizable inquiries, but on small tonnages for quick delivery is quotable up to 2.25c. Prices are given on page 755.

Plates.—Specific tonnages are not especially numerous, but there are some orders from tank and boiler makers for stock. Independents seem to be getting the bulk of the business because of the heavily committed condition of the steel corporation and the independent price on plates is 2.25c., Pittsburgh. Lately that price has not been exceeded much or frequently. Prices are given on page 755.

Steel Rails.—It is expected that independent rail makers will meet the advance recently announced by the Steel Corporation of $3 per ton on standard rails, effective Oct. 1. While not many orders have been placed with local makers, it is expected the railroads tributary to Pittsburgh will get in their specifications in time to escape the increase. Light rails rolled from new steel are quoted by all makers at 2.25c., base.

We quote 25 to 45-lb. sections, rolled from new steel, 2.25c. base; rolled from old rails, 2c. base; standard rails, $40 per gross ton mill for Bessemer and open-hearth sections.

Coke and Coal.—While it is reported that there has been some weakening among the strikers in the Connellsville district, and in a number of places the men are seeking work, production has not increased because the limited supply of cars will not permit the putting on of additional men. The demand for furnace coke exceeds the offering and as high as $12 per net ton at ovens lately has been done. On the basis of recent sales, the market is quotable at $11.50 to $12, but the indications are that $12 soon will be minimum. Foundry coke is quotable from $12.50 to $13.50, but is not plentiful. The coal market has softened lately due to a lighter demand, and steam coal of fairly good quality lately has been offered as low as $4 per net ton at mines, for mine run grade. Good quality steam coal, however, commands $4.50, while by-product grade is at $5 and gas coal at $5.50 to $6.50.

Old Material.—Further sharp advances have been established since a week ago, partly as a result of purchases by melters, but chiefly because of high prices offered by dealers with contracts with mills in the Youngstown district. Dealers are offering as high as $22.50 for heavy melting steel at Youngstown, and while this is about $1 per ton higher than has been paid by any of the Pittsburgh district plants, $21.50, Midland, Pa., having been done, and fully $2 more than some mills here are offering, it is hard to see how further advances can be prevented here with prices where they are in Youngstown and available supplies still very limited. Dealers still are counting on purchases by Pittsburgh mills at an early date, and their firm position on prices also is ascribable to the wide disparity between scrap and pig iron prices. Evidently little consideration is being given to the fact that as pig iron production increases and steel works and rolling mills activities expand, the steel mills will be less dependent on outside scrap.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

Per Gross Ton	
Heavy melting steel	$21.00 to $21.50
No. 1 cast, cupola size	24.00 to 25.00
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va.; Franklin and Williamsport, Pa.	22.00 to 22.50
Compressed sheet steel	19.00 to 19.50
Bundled sheet sides and ends	17.00 to 17.50
Railroad knuckles and couplers	23.00 to 23.50
Railroad coil and leaf springs	23.00 to 23.50
Low phosphorus standard bloom and billet ends	25.00 to 26.00
Low phosphorus, plates and other grades	23.00 to 24.00
Railroad malleable	18.00 to 18.50
Iron car axles	28.00 to 30.00
Locomotive axles, steel	26.00 to 27.00
Steel car axles	21.50 to 22.00
Cast iron wheels	22.50 to 23.00
Rolled steel wheels	23.00 to 23.50
Machine shop turnings	15.00 to 15.50
Heavy steel axle turnings	17.50 to 18.00
Short shoveling turnings	16.50 to 17.00
Cast iron borings	17.00 to 17.50
Heavy breakable cast	19.50 to 20.00
Stove plate	17.00 to 17.50
Sheet bar crop ends	24.00 to 25.00
No. 1 railroad wrought	17.00 to 17.50

Chicago

Heavy Contracting for Rails—Buying by the Carriers Still Active

CHICAGO, Sept. 19.—The advance to $43 on rails effective Oct. 1 has caused railroads to contract for their needs to get the benefit of the present price. Fully 100,000 tons has thus far been placed and the total may reach 300,000 tons before the month closes. Other advances include $1 a ton on plates, shapes and bars for indefinite delivery, $2 a ton on track spikes and bolts and $3 on light rails. Bookings of a leading mill are somewhat heavier than in recent weeks because of rail orders. On the other hand, the feverish demand for steel for prompt shipment, which was at its height a week or two ago, has abated with the improvement in mill operations. Plates, shapes and bars for three to six weeks' delivery are now available at 2c., Pittsburgh, or 2.34c., Chicago.

Railroad buying continues to be the feature of the market. The carriers are not only buying rails and fastenings but they are placing liberal orders for plates, shapes and bars for car repair work and are letting numerous contracts for bridges. It is notable that while buildings are less numerous among fabricating projects railroad bridge work is accounting for an increasing amount of tonnage. Four railroad bridge awards this week aggregate over 4000 tons. Railroad car building has fallen off very materially, but locomotive purchases are heavy. Car shortage is interfering with shipments of both iron and steel. Present regulations restrict the furnaces and mills to the use of gondola cars with sides under 42 in. in height and do not even permit them to load other equipment in the direction of the coal mines. This difficulty is forcing some mills to revise their rolling schedules to include only such material for which adequate storage space is available.

Production has registered another gain, the Illinois Steel Co. having added one blast furnace each at Gary and South Chicago, giving it a total of 14 active stacks. At the same time, it has increased its steel output to 65 per cent of ingot capacity. The Inland Steel Co. continues on a 65 per cent basis with no prospect of immediate improvement. Merchant blast furnace operations remain unchanged.

Ferroalloys.—An inquiry for 400 tons of spiegeleisen is current. The imminent passage of the tariff bill foreshadows a material advance in ferromanganese. It is probable that some foreign shipments now on the sea will arrive too late to escape the imposition of the duty.

We quote 80 to 82 per cent ferromanganese, future, $75.06; prompt, $82.56, delivered; 50 per cent ferrosilicon, [illegible] and $50 prompt delivery spiegeleisen, 19 to 21 per cent, $38 delivered.

Pig Iron.—Merchant furnace operations are unchanged and improvement is delayed by slow deliveries of low volatile coal required for coking. Just how soon the fuel situation will permit the blowing in of additional furnaces cannot be foreseen at this time, but it is hoped that such action will be possible by Oct. 1. Two Iroquois stacks are scheduled to go in before the remaining idle capacity in the district. Demand for prompt iron is active and a considerable number of contracts for fourth quarter have been closed. Current inquiries include 600 tons of foundry for local delivery during fourth quarter, 300 tons of foundry for October and November shipment wanted by a northern Indiana melter and 100 tons of malleable for prompt delivery. A Michigan buyer has closed for 500 tons of malleable for fourth quarter and is still in the market for an equal tonnage. Prices on Northern iron remain unchanged, but Southern foundry has advanced to a minimum of $27 base Birmingham. Shipments from the South show slight improvement, although still very uncertain. Southern iron shipped by barge and rail will again be a factor in this market as the result of failure of the Interstate Commerce Commission to suspend a river and rail rate of $4.18 from Florence and Sheffield, Ala., to Chicago. The company which could take advantage of this rate, however, is not now in the market. Charcoal iron remains unchanged in price and two sales of 250 tons each for fourth quarter shipment are reported. Inquiry for charcoal is active.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$36.15
Northern coke, No. 1, sil. 2.25 to 2.75	33.00
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	32.00
Northern high phos.	32.00
Southern No. 2	33.00
Malleable, not over 2.25 sil.	32.00
Basic	32.00
Low phos., Valley furnace, sil. 1 to 2 per cent copper free	38.00
Silvery, sil. 8 per cent	16.29

Plates.—Material for indefinite delivery has advanced to a minimum of 2.10c., Chicago, while the best quotation for specific shipment remains 2.30c., Chicago. Demand is still in good volume, although not so pressing as a week or two ago. An Eastern mill is soliciting business in this territory for three to six weeks' delivery at 2c., Pittsburgh, or 2.34c., delivered Chicago. This price appears to be the top of the market.

The mill quotation is 2.10c. to 2.34c., Chicago. Jobbers quote 2.90c. for plates out of stock.

Cast-Iron Pipe.—Prices have advanced to a minimum of $40 base, Birmingham, for 6-in. and larger, and considerable business is moving at higher figures. The United States Cast-Iron Pipe & Foundry Co. has contracts for 1230 tons for Eloise, Mich.; 1750 tons for Laporte, Ind.; 600 tons for Chicago and 188 tons for Milwaukee.

We quote per net ton f.o.b. Chicago as follows: Water pipe, 4 in., $52.20 to $54.20; 6 in. and above $48.20 to $50.20, class A and gas pipe, $3 extra.

Bars.—The spread between the minimum and maximum prices on soft steel bars has contracted as a result of an advance of the former and a decline of the latter. The minimum quotation on material for indefinite delivery is now 2c., Chicago, while the best price for specific shipment is 2.10c., Chicago. Bars for three to six weeks' delivery are now being offered by an Eastern mill at 2c., Pittsburgh, or 2.34c., delivered Chicago. This price is now the top of the market. Demand is good, although not so urgent as a week or two ago. New business in bar iron is not equal to mill production, but specifications against contracts are in good volume. Prices are unchanged. Demand for hard steel bars is steady with prices the same and the mills comfortably booked.

Mill prices are: Mild steel bars, 2c. to 2.34c., Chicago; common bar iron, 2.25c. to 2.50c., Chicago; rail steel, 2c. to 2.10c., Chicago mill.

Jobbers quote 2.80c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 3.80c. for rounds and 4.30c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 2.50c. base; hoops, 3.90c.; bands, 3.55c.

Rails and Track Supplies.—The advance in standard section rails for 1923 delivery effective Oct. 1, is causing many roads to place their orders to get the benefit of the $40 price, thereby effecting a saving of $3 a ton. Fully 100,000 tons has already been placed in Chicago and it is probable that the total will reach 300,000 tons before the end of the month. A considerable quantity of track supplies is being bought with the rails. Standard spikes have advanced to a minimum of 2.85c., mill, and bolts to a minimum of 3.85c., mill, while the plates have gone up to $45 a ton. Light rails have advanced to 2.15c., mill. Inquiry for light rails is active, although orders are not yet heavy.

Standard Bessemer and open-hearth rails, $40; light rails rolled from new steel, 2.15c., f.o.b. makers' mills.

Standard railroad spikes, 2.85c. to 3c., mill; track bolts with square nuts, 3.85c. to 4c., mill; tie plates, steel and iron, 2.25c., f.o.b. mill; angle bars, 2.40c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.50c. base and track bolts 4.50c. base.

Wire Products.—Mill operations are commencing to show considerable improvement, but production is still far behind demand. Mills are experiencing difficulty in taking care of specifications and are accepting new or-

ders only when satisfied that they cover actual needs. No speculative business is wanted. Demand for nails is exceedingly active and business in barbed wire is good. There is an abnormal demand for small track spikes, used largely in coal mines. The leading producer has made no change in prices, while most independents are quoting $3 a ton higher. For mill prices, see finished iron and steel, f.o.b. Pittsburgh, page 755.

We quote warehouse prices, f.o.b. Chicago: No. 9 and heavier black annealed wire and No. 9 and heavier bright basic wire, $3.20 per 100 lb.; common wire nails, $3.35 per 100 lb.; cement coated nails, $2.75 per keg.

Bolts and Nuts.—Buyers are specifying heavily against contracts to get the benefit of the old discounts. Contracts for fourth quarter are being closed at the new prices in considerable number. Ruling discounts are those on page 755 except that the basing point is Chicago instead of Pittsburgh.

Jobbers quote structural rivets, 3.50c.; boiler rivets, 3.60c.; machine bolts up to ¾ x 4 in., 50 per cent off; larger sizes, 50 off; carriage bolts up to ¾ x 6 in., 45 off; larger sizes, 45 off; hot pressed nuts, squares and hexagons, tapped, $2.75 off; blank nuts, $2.75 off; coach or lag screws, gimlet points, square heads, 55 per cent off; quantity extras are unchanged.

Sheets.—Demand is less pressing than recently, but this is explained by the fact that much of the business which was pending has now been placed. The Inland Steel Co. has allocated practically all of its remaining 1922 output. Sales at premiums above the prices of local producers are growing less frequent.

Mill quotations are 3.35c. to 3.50c. for No. 28 black, 2.50c. to 2.60c. for No. 10 blue annealed and 4.35c. to 4.50c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Reinforcing Bars.—Inquiry is unusually active, particularly for small tonnages, ranging from 20 to 60 tons each. Some large jobs also are before the trade, an exceptionally large one being the Spavina water project, Tulsa, Okla., requiring 7500 tons. With an improvement in mill shipments in sight, sellers of concrete bars are taking more interest in new business. Additional inquiries include:

Power plant, Grand Tower, Ill.; 500 tons.

Prince Wells garage, Louisville, Ky.; 250 tons.

Kentucky highway department, bridges, 150 tons, bids to be in Sept. 30.

Oak Park Club, Oak Park, Ill.; 75 tons.

Awards include:

Pine Grove Apartments, Chicago, 265 tons, to Tucson Steel Co.

Foundations for Equitable Life Insurance Building, Des Moines, Ia. 125 tons, to Corrugated Bar Co.

Loyola University gymnasium, Chicago, 100 tons, to Concrete Steel Co.

Illinois Improvement Co., Sanitary District, Chicago, 125 tons, to Concrete Steel Co.

Pullman Co., foundry, Pullman, Ill, 100 tons, to Concrete Steel Co.

Public Service Co. of Northern Illinois, power plant, Waukegan, Ill., 100 tons, to Olney J. Dean.

Steel Castings.—Advances in prices ranging from 15 to 20 per cent, effective Oct. 1, will probably be announced next week.

Structural Material.—Probably two-thirds of the fabricators in this district are operating at capacity and have considerable work ahead with the result that they are not quoting on new work except for extended delivery. Other shops are rapidly getting into the same condition, fabricating awards are still numerous, but there is less new work up for bids. There is no doubt that the advancing season and advancing labor and material costs are discouraging the bringing out of new projects. Demand for plain material is satisfactory, although not so insistent as recently. The minimum price on material for indefinite delivery has advanced to 2.10c., Chicago, while the best quotation for specific shipment is 2.20c., Chicago. An Eastern mill is quoting 2c., Pittsburgh, on three to six weeks' delivery, which is the equivalent of 2.34c., delivered Chicago.

The mill quotation on plain material is 2.10c. to 2.34c., Chicago. Jobbers quote 2.90c. for plain material out of warehouse

Coke.—The local by-product producer is operating at less than 30 per cent of capacity, having been unable to increase production because of slow deliveries of low volatile coal. It is hoped that the situation will improve by Oct. 1. Prices of local foundry coke remain unchanged. Southern by-product foundry continues to be sold here at the same price, $15, Chicago, as that quoted by Chicago ovens. Sales of fully 25,000 tons were made in this district by one Southern producer during August. The Algoma Steel Corporation, Saul Ste. Marie, Ont., has shut down all departments of its plant except one blast furnace because of fuel shortage.

Old Material.—Prices are in the balance, those on some grades being stronger while others have weakened. On the whole, the market has lost the momentum which carried prices up so rapidly in recent weeks and a reaction seems due, although whether it will be of short or long duration is not yet clear. Railroad offerings are no larger than heretofore, but large yard holdings both here and in the country have been placed on the market. Evidently the prospects for further advances are not regarded bright and the present price level is considered a satisfactory one at which to liquidate this material. Whereas this movement is relieving the general shortage of old material, the scarcity of cast scrap is disappearing as a result of weekly offerings of 1500 to 2000 tons from a local Government warehouse. Sensing the possibility of a turn in prices, consumers have largely withdrawn from the market and trading is between dealers. Railroad lists include the Santa Fe, 500 tons, and the Northern Pacific, 800 tons.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

	Per Gross Ton	
Iron rails	$25.00 to	$25.50
Cast iron car wheels	24.50 to	25.00
Relaying rails	27.50 to	32.50
Rolled or forged steel car wheels	22.50 to	23.00
Rails for rolling	19.50 to	20.00
Steel rails, less than 3 ft	21.50 to	22.00
Heavy melting steel	18.00 to	18.50
Frogs, switches and guards cut apart	18.00 to	18.50
Shoveling steel	17.75 to	18.25
Drop forge flashings	12.50 to	13.00
Hydraulic compressed sheet	15.00 to	15.50
	Per Net Ton	
Iron angles and splice bars	22.50 to	23.00
Steel angle bars	18.50 to	19.00
Iron arch bars and transoms	22.50 to	23.00
Iron car axles	25.50 to	26.00
Steel car axles	19.50 to	20.00
No. 1 busheling	15.00 to	15.50
No. 2 busheling	10.00 to	10.50
Cut forge	17.00 to	17.50
Pipes and flues	12.50 to	13.00
No. 1 railroad wrought	17.50 to	18.00
No. 2 railroad wrought	17.00 to	17.50
Steel knuckles and couplers	19.50 to	20.00
Coil springs	21.50 to	22.00
No. 1 machinery cast	21.00 to	21.50
No. 1 railroad cast	19.50 to	20.00
Low phos. punchings	17.00 to	17.50
Locomotive tires, smooth	17.50 to	18.00
Machine shop turnings	10.50 to	11.00
Cast borings	13.00 to	13.50
Stove plate	17.00 to	17.50
Grate bars	17.50 to	18.00
Brake shoes	17.50 to	18.00
Railroad malleable	22.00 to	22.50
Agricultural malleable	22.00 to	22.50

Reduced Rail Rate Asked for Imported Iron

WASHINGTON, Sept. 19.—Application was made to the Interstate Commerce Commission to-day by the Chesapeake & Ohio Railroad to establish low rates on short notice on imported pig iron from Newport News, Va., to Lynchburg and Richmond, Va. The application seeks to publish a rate of $2.25 per gross ton to Lynchburg and $1.50 to Richmond, with a minimum of 20 tons. The carrier explained the application on the ground that a ship is expected soon at Newport News with a cargo of pig iron which could not be distributed profitably by the importers because the domestic rates from the port are too high. The rate of $2.25 to Lynchburg was proposed, it is stated, because that is the rate from Reusens, Va., 4 miles beyond Lynchburg, to Newport News for export or coastwise shipments. The rate from Reusens, it was pointed out, had been established by the Norfolk & Western, which was represented as having acquiesced in the proposal to establish the import rates named on short notice.

New York

Large Tonnages of Rails Under Negotiation — Serious Car Shortage

NEW YORK, Sept. 19.—Transportation problems continue to be very serious. The car shortage is pronounced and deliveries, particularly from the South, are extremely slow. In some cases, the delivery of pig iron has been delayed fully a month.

Pig Iron.—The week has been one of rather numerous transactions in domestic irons, but the volume of business has not been large. The largest purchase was by the American Locomotive Co., which took 1500 tons of foundry grades and 500 tons of charcoal for immediate delivery and is now in the market for 700 tons of charcoal. A stove manufacturer at Port Chester, N. Y., bought two 500-ton lots of foreign iron. Inquiries include one for 300 tons of No. 1 iron for last quarter delivery from a New England melter; 150 tons for the General Electric Co.; 200 tons for the American Car & Foundry Co., and 500 tons for a range manufacturer. Makers of Scotch iron are not able to sell for delivery earlier than November, but there is still some of this iron in the hands of brokers in this country. The price ranges from $30 to $32. On French, Belgian and other continental iron averaging from 2.50 to 3 per cent silicon prices range from $26.50 to $28 c.i.f. New York. On domestic irons, some sales are being made on a basis of $32 for No. 2 plain and others on a basis of $33.

We quote delivered in the New York district as follows, [illegible] prices $27 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$36.27 to $37.27
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	35.27 to 36.27
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	34.27 to 35.27
Buffalo, sil. 1.75 to 2.25	37.91 to 38.91
No. 2 Virginia, sil. 1.75 to 2.25	No sales

Ferroalloys.—Demand for ferromanganese is not so active as it has been during the last two months but moderate sales have been made. At least 2500 to 3000 tons of British alloy have been sold, part for October and part for November shipment. Quotations are unchanged at $67.50, seaboard. There is also a moderate inquiry. There have also been sales of moderate quantities of spiegeleisen, both domestic and foreign, at $38 to $39, seaboard or furnace, for early delivery. Quotations for manganese ore are unchanged but nominal. A statement is made that British blast furnaces are running at full capacity on ferromanganese and that a scarcity of ore is feared due partly to the trouble in the near East. Practically all sellers of both domestic and imported 50 per cent ferrosilicon are on a $65, delivered, basis. Moderate sales have been made at this level and specifications on contract are very good. Imported 14 to 16 per cent electric ferrosilicon is quoted at $42, delivered. The market for ferrochromium is moderately active with the quotation for the 4 to 6 per cent carbon variety at 12c. per lb., delivered.

[illegible]
Ferromanganese, British, seaboard, per ton ... $67.50
[illegible]
Spiegeleisen, 20 per cent, furnace ... $38.00 to $39.00
Ferrosilicon, 50 per cent, delivered, per gross ton, carloads ... $57.50 to $65.00
Ferrosilicon, 10 to 15 per cent, delivered, per gross ton ... $38.00 to $40.00
Ferrotungsten, per lb. of contained metal ... 40c. to 50c.
Ferrochromium, 4 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr., delivered ... 12c. to 14c.
Ferrovanadium, per lb. of contained vanadium.
[illegible]
Ferrocarbontitanium, 15 to 18 per cent, in carloads, per net ton ... $200.00
[illegible]
28.50c. to 29.50c.
Tungsten ore, per unit, in 60 per cent concentrates, nominal ... $3.50 up
Chrome ore, basis 48 per cent Cr_2O_3, crude, per [illegible]
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York ... 45c. to 50c.

Cast-Iron Pipe.—The season of intense activity in purchasing of pipe is drawing to a close and few municipal tenders are now noted. Makers are operating full time and find the shortage of raw materials much less acute. Deliveries are still extended and prices are strong. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $54.50; 4-in. and 5-in., $59; 3-in., $64.80, with $4 additional for Class A and gas pipe.

Finished Iron and Steel.—The stiffening price situation of the last few weeks seems to be resulting in a large amount of orders against contracts. Buying for fresh enterprises is relatively dull as it was a week ago. The conspicuous development is negotiation by railroads for rail needs of the first half of 1923, to secure the $40 per ton price before the advance to $43 becomes effective on Oct. 1. Among rail inquiries are 200,000 tons for the New York Central (125,000 at the outset, 25,000 tons on a March 1 option and 50,000 tons on a June 1) option, 25,000 tons for the Norfolk & Western and 8000 tons for the Long Island. Price ranges on plates, bars and shapes are narrowing. The leading interests appear to be quoting 1.90c. and 2c. on the heavy tonnage products and probably only one independent company remains asking 2.50c., Pittsburgh, for plates. Prices generally range between 2c. and 2.25c. with large lots of bars obtainable for relatively early delivery at 2c. to 2.10c.; beams at 2c. to 2.15c. and plates 2.15c. to 2.25c. There is a feeling that the cost of the strike to the railroads may reduce the volume of their purchases for the remainder of the year and that the present lull in new inquiries results from a feeling that we are entering an area of inflation which is calculated to stop new enterprises. These two views are calculated to have opposite effects on the price situation and the present indications point to a more or less stationary level of prices forced by the definitely increased costs of steel manufacture.

We quote for mill shipments, New York delivery, as follows: For indefinite delivery, soft steel bars, structural shapes and steel plates, 2.24c. to 2.34c.; for delivery in a number of weeks, soft steel bars and plain structural material, 2.34c. to 2.59c.; steel plates, 2.49c. to 2.59c.; bar iron, 2.59c.

Warehouse Business.—Although prices are unchanged, warehouses in this district are again looking forward to a slight advance in quotations on bars, structural material and plates. The present warehouse quotations are based upon the Steel Corporation schedule, but the higher prices charged by the independent mills are believed to warrant a further advance. Sheet prices are said to be firm, but quotations cover a wide range, from 4.50c. and 5.50c. per lb., base on black and galvanized, the quotation of some warehouses on large lots from stock, to 4.90c. and 5.90c. per lb., base, the schedule being maintained by the leading independent and other iron and steel warehouses here. Selling of blue annealed sheets on a 3.93c. per lb. basis is reported. On wrought iron and steel pipe, warehouses, following an advance by the makers, have increased prices about $12 per ton and report business good. There is no change in brass and copper warehouse quotations. We quote prices on page 778.

High Speed Steel.—While the market is quiet, prices continue firm at about 75c. per lb. for 18 per cent tungsten, the quotation of most producers, with special brands of some companies ranging up to 90c. per lb.

Coke.—The coke market is firmer than it was a few days ago. The quotations are slightly higher, furnace coke being quoted at $11 to $12, Connellsville ovens and foundry at $14 to $14.50, while by-product is still quoted at $14 seaboard.

Old Material.—The market continues to move upward, heavy melting steel being quotable at $13 to $13.50 per ton this week compared with a price of $11.50 to $12 per ton last week. Dealers, as a rule, state that there is no evidence of weakening in the price situation. Railroad steel is stronger this week at $13.75 to $14.25 per ton and specification pipe is quoted at $11.75 to $12.25 per ton. Buying by mills is general and tonnages are fairly large. The Bethlehem Steel Co. and the Alan Wood Iron & Steel Co. are both pay-

ing $17 per ton for heavy melting steel and it is stated that the Midland plant of the Pittsburgh Crucible Steel Co. is in the market for a heavy tonnage.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$13.00 to $13.50
Steel rails, short lengths, or equivalent	13.75 to 14.25
Rerolling rails	13.75 to 14.25
Relaying rails, nominal	27.00 to 28.00
Steel car axles	17.00 to 18.00
Iron car axles	23.00 to 24.00
No. 1 railroad wrought	15.00 to 15.50
Wrought iron track	12.75 to 13.25
Forge fire	10.00 to 10.50
No. 1 yard wrought, long	13.00 to 13.50
Cast borings (clean)	11.50 to 12.00
Machine-shop turnings	10.75 to 11.25
Mixed borings and turnings	10.75 to 11.25
Iron and steel pipe (1 in. diam., not under 2 ft. long)	11.75 to 12.25
Stove plate	12.00 to 12.50
Locomotive grate bars	12.00 to 12.50
Malleable cast (railroad)	13.00 to 13.50
Cast-iron car wheels	13.50 to 14.00

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$19.50 to $20.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	17.00 to 17.50
No. 1 heavy cast, not cupola size	14.50 to 15.00
No. 2 cast (radiators, cast boilers, etc.)	13.00 to 13.50

Boston

Largest Number of Orders for Foreign Iron Noted This Year Are Placed

BOSTON, Sept. 19.—The past week witnessed a larger number of individual orders placed in this territory for foreign iron than in any previous similar period this year. A few 500-ton lots were purchased, but nothing larger. From that amount, tonnages, ran down to carlots, aggregate bookings being estimated at 4000 to 5000 tons, largely fourth quarter delivery. No sales for first quarter, 1923, delivery are reported. Scotch iron continues the most, Continental the next and English the least active. No. 3 Scotch sold at $30 to $31 c.i.f. dock Philadelphia and $32 dock here, Belgian high phosphorus at $26 and phosphorus and manganese 0.60 to 0.80 at $26.50 c.i.f. dock, while French fetched slightly better prices. English iron sold at $27 to $29 on cars, dock. About 2000 tons of domestic iron, Alabama at $28 furnace base and Virginia at $32 furnace base, and 200 tons of malleable, the market for which is $34 furnace, are included in the week's transactions. Sellers of foreign iron report greater difficulty in securing cars in which to make local shipments. Most cars available are in poor order and are loaded far below capacity. Instances are cited where as little as eight tons have been loaded.

We quote delivered prices, on the basis of the latest reported sales, now infrequent, and as follows, having added to furnace prices $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia and $9.60 from Alabama:

East. Penn., sil. 2.25 to 2.75	$36.15 to $38.15
East. Penn., sil. 1.75 to 2.25	35.65 to 37.65
Buffalo, sil. 2.25 to 2.75	39.41 to 41.41
Buffalo, sil. 1.75 to 2.25	38.91 to 40.91
Alabama, sil. 2.25 to 2.75	38.10
Alabama, sil. 1.75 to 2.25	37.60
Virginia, sil. 2.25 to 2.75	38.92
Virginia, sil. 1.75 to 2.25	37.92

Warehouse Business.—Recently advanced prices on iron and steel are firmly maintained, with the movement out of warehouses on the increase, Local stocks of small sizes of bars, flats, concrete bars, etc., continue broken, shipments from the mills still being backward. Substitution of iron for steel bars is noted in certain sizes. The higher prices for bolts and nuts, put into effect recently, has stimulated rather than hurt business. Small rivets have again advanced, now being quoted at 50 per cent discount, as against 50 and 10 per cent, heretofore. Wood screws are approximately 2½ points higher.

Jobbers quote: Soft steel bars, $3.25 per 100 lb. base; flats, $3.85; concrete bars, $3.25; structural steel, $3.25 to $3.50; tire steel, $4.50 to $4.85; open-hearth spring steel, $5 to $6.50; crucible spring steel, $12; steel bands, $4.25; hoop steel, $4.75; cold rolled steel, $4 to $4.50; refined iron, $3.25; best refined iron, $4.50; Wayne iron, $5.50; Norway iron, $6 to $6.50; plates, $3.35 to $3.55; No. 10 blue annealed sheets, $4.15 per 100 lb. base; No. 28 black sheets, $5.40; No. 28 galvanized sheets, $6.40.

Finished Material.—Slightly more activity is noted in construction, but individual tonnages of structural steel required in most cases are small. The Edison Co.'s requirements for its South Boston plant addition, approximately 950 tons, is expected to be placed this week. Bids have been asked on 235 tons for a Lowell, Mass., bridge by Fay, Spofford & Thorndike, Boston engineers. Mills report a better demand for plain material from shipyards and structural steel concerns. Warehouse supplies apparently are in good condition. The demand for plates is active in point of number of orders received, but aggregate tonnages are small. The plate market here is 2¼c. to 2½c., Pittsburgh. The city of New York has placed an order for 15 trackless trolley cars, costing $12,000 each, with the Osgood-Bradley Car Co., Worcester, Mass.

Coke.—Both the New England Coal & Coke Co. and the Providence Gas Co. are making freer shipments of by-product foundry coke on contract, notwithstanding increased demands upon them due to a larger aggregate melt in this territory. New England foundries therefore show less interest in foreign and in Alabama fuel, but firms handling these cokes have no difficulty in disposing of stocks in transit and due to arrive, to public utilities, coal dealers, etc. Although New England coke producers are making a better showing on contracts, they remain practically out of the market for spot business. Connellsville foundry coke sold in carlots the past week, first at $14.50 ovens, and subsequently at $12.50, the latter price representing slightly better than $18 delivered, contrasted with $16.50 delivered for New England by-product fuel.

Old Material.—The market is more active than noted in some time, possibly two years or so. Greater activity would exist, were the car supply better, dealers being forced to exercise more or less caution in making purchases because railroads cannot guarantee cars. The better demand, coupled with a limited supply of certain materials, caused an appreciable strengthening in values the past few days, the market bordering on a runaway affair. For shipment to the Pittsburgh district, $14 shipping point is the common offer for heavy melting steel, whereas early in the week $11 was paid for shipment to eastern Pennsylvania. As high as $14 shipping point is offered for No. 1 yard wrought for eastern Pennsylvania delivery. The last actual business put through was at $13.50. No. 1 railroad wrought easily commands $15 to $15.50 shipping point, 50c. a ton more than a week ago. Car wheels and bundled skeleton have jumped $1 a ton, and rerolling rails and shafting are 50c. dearer. Dealers paid $9 shipping point for cotton ties for eastern Pennsylvania consumption. Prices on machine shop turnings take a wider range than heretofore. If suitable for rolling mills, $11 usually is bid, otherwise the market is 50c. a ton or more less. The best bid reported on chemical borings is $15.50 shipping point, $1.50 higher for the week. Actual sales of borings, steel turnings and mixed borings and turnings are limited, however, due to their scarcity. One local melter offers $10 shipping point for steel turnings, but New England consumers of old material in most cases have withdrawn from the market. Inquiry for machinery cast is on the increase, with prices easily $1 higher and no increase in tonnage coming out. A sale of No. 1 and No. 2 mixed machinery cast, the first reported in several months, at $17.50 delivered New England is noted.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$21.00 to $22.00
No. 2 machinery cast	19.00 to 20.00
Stove plate	16.00 to 16.50
Railroad malleable	16.00 to 16.50

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$13.50 to $14.00
No. 1 railroad wrought	15.00 to 15.50
No. 1 yard wrought	13.00 to 13.50
Wrought pipe (1 in. in diam., over 2 ft. long)	9.75 to 10.25
Machine shop turnings	9.75 to 11.00
Cast iron borings, rolling mill	10.50 to 11.00
Cast iron borings, chemical	14.00 to 15.50
Blast furnace borings and turnings	9.75 to 11.00
Forged scrap and bundled skeleton	10.00 to 10.50
Street car axles and shafting	18.50 to 19.50
Street car wheels	16.00 to 16.50
Rerolling rails	13.00 to 13.50

Cincinnati

Southern Iron Advances $2—Conditions Improve Very Slowly

CINCINNATI, Sept. 19.—While there were a few round tonnage lots disposed of during the past week, the market as a whole was quiet, and little inquiry is now before the trade. The lull in buying is accounted for by the feeling on the part of melters that with the railroad strike on the verge of being settled, iron will move more freely, and shipments now under contract will come through. The situation in the South, while showing some improvement, still remains very much unsettled, as some roads serving the iron producing centers are not parties to the settlement, and the settlement of the Southern Railway has not yet had any effect. Though buying is light, prices remain very firm, and Southern iron is at least $2 a ton higher at $27, Birmingham base, with some furnaces asking $28 to $30. Some tonnage was booked early in the week at $25, but this price has been withdrawn, and the interest making it is understood to be holding for $27.50. In the North $32 is the minimum figure at which iron can be purchased, and in some districts $36 has been quoted. More important sales during the week included one of 5000 tons of malleable to a northern Ohio interest from a Lake furnace, and 1500 tons of foundry to a central Ohio melter, both sales being reported at $32. An Indiana melter bought 500 tons of malleable from a Chicago district furnace at $32, furnace, and a sale of foundry iron was made to an Indiana stove manufacturer on the same basis. Two sales of silvery iron, 300 tons each, were made at $41.50 for 8 per cent. A sale of basic, estimated at 10,000 tons, is reported to have been made by a Southern interest to a Middle Western steel manufacturer on the basis of $27, Birmingham. Jisco furnace at Jackson will blow in on Sept. 25 on silvery, and Belfont furnace at Ironton on Bessemer during the present week.

Based on freight rates of $4.61 from Birmingham and $2.27 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$31.05
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	31.55
Southern coke, sil. 2.75 to 3.25 (No. 2 X)	32.05
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	34.27
Basic Northern	32.27
Malleable	34.27

Finished Material.—An increasing demand for finished materials is evident, and the aggregate tonnage booked last week was fully up to the average set before the rail and coal strikes slowed up general business conditions. While the orders generally were from carload lots to 200 tons, several of 500 tons are reported, and one for 1000 tons of plates was placed by a safe manufacturer. Several 500-ton shape inquiries are current, and a car manufacturer is in the market for 1500 tons of plates for car repair work. A spring manufactuer is also inquiring for 500 tons of spring steel for fourth quarter. The demand for sheets is being steadily maintained, and independent mills continue to quote for October delivery only. Prices on sheets continue to range from 2.50c. to 2.75c. for blue annealed, 3.35c. to 3.75c. for black, and 4.35c. to 4.75c. for galvanized. On automobile body sheets, the range to-day is 4.75c. to 5c. It is expected that tin plate prices will be advanced shortly to approximately $5 per base box. The demand is expected to be heavy, particularly from the Northwest, where a great part of the fruit crop was left on the ground this year owing to failure on the part of container manufacturers to supply sufficient cans to take care of it. On bars and plates, 2.25c. is easily done, as most of the orders placed this week were at this figure. Bars, however, were available in the early part of the week at 2.15c. for rather indefinite delivery. Plate prices are very firm at 2.25c. Shapes, however, continue to lag for some unexplainable reason, and 2c. can still be done from several independent mills. Wire prices generally are up approximately $3 per ton, and we note a sale of 100 tons of plain wire at $2.50 per 100 lb. Nails are firm at $2.50 to $2.75, per keg, base, and while most of the jobbers are covered by contracts at the lower figure, sales are now being made at the higher price. There is a fair demand for track fastenings, particularly small spikes, but light rails are inactive. The demand for pipe is steady. A number of fair-sized awards were made in the structural field, but new inquiries are few.

Warehouse Business.—Local jobbers continue to report a good volume of business. Inability of mills to secure cars in which to make shipments is proving a boon to the warehouse trade, and stocks, as a result, are moving very fast. The number of inquiries from outside the Cincinnati district is steadily increasing, and bids fair to continue. There have been no further price changes, and jobbers do not expect further advances.

Cincinnati jobbers quote: Iron and steel bars, 2.95c. base; reinforcing bars, 3.05c. base; hoops, 4.05c. base; bands, 3.85c. base; shapes and plates, 3.05c. base; cold-rolled rounds, 3.75c. base; cold-rolled flats, squares and hexagons, 4.25c. base; No. 10 blue annealed sheets, 4c.; No. 28 black sheets, 4.70c.; No. 28 galvanized sheets, 5.75c.; No. 9 annealed wire, $2.85 per 100 lb.; common wire nails, $3.05 per keg, base.

Tool Steel.—A slight improvement in the demand for tool steel is noted, but orders are largely of the hand to mouth variety. However, with the railroad strike settled and prospects of increasing activity among local manufacturing plants, a better demand for tool steel is expected. Prices are unchanged, high speed steel being generally quoted at 70c. per lb., base.

Coke.—There is little activity in the coke market, though prices are holding very firm. Inquiry is light. Most producers have a comfortable order book. Production is not increasing to any extent in New River or Wise County, as difficulty is still being experienced in moving coal. Prices are unchanged from last week.

Old Material.—The scrap market was very active during the early part of the week, and prices moved up sharply on some grades, but offerings by the smaller dealers had the effect of softening the market, and as a result prices lost most of their gain. There is still a good demand for cast grades, and steel plants outside the district are inquiring for blast furnace and rolling mill grades. Many plants that have been embargoed are now open, and scrap is moving in fair volume. Offerings by producers are light. Prices are not quotably changed.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

	Per Gross Ton	
Bundled sheets	$9.50 to	$10.00
Iron rails	15.50 to	16.00
Relaying rails, 50 lb. and up	26.50 to	27.00
Rails for rolling	14.50 to	15.00
Heavy melting steel	15.00 to	15.50
Steel rails for melting	14.00 to	14.50
Car wheels	17.00 to	17.50

	Per Net Ton	
No. 1 railroad wrought	13.50 to	14.00
Cast borings	10.50 to	11.00
Steel turnings	9.50 to	10.00
Railroad cast	16.00 to	16.50
No. 1 machinery	19.50 to	20.00
Burnt scrap	10.50 to	11.00
Iron axles	19.50 to	20.00
Locomotive tires (smooth inside)	12.50 to	13.00
Pipes and flues	7.50 to	8.00

Buffalo

Blast Furnace Operations Increased by Two Stacks—Sales Light

BUFFALO, Sept. 19.—Furnace operation in this district is strengthened by the addition of two stacks this week. The Donner Steel Co. is placing one stack in blast to run on basic iron and the Hanna Furnace Co., operating the Buffalo Union plant, is placing a foundry iron furnace in operation. This operation is not due to any increased demand, but the fuel situation is more encouraging and contracts now on the books call for this addition to active stacks. Sales and inquiry are extremely light. The only furnace having merchant iron for sale has sold tonnages of No. 2 plain at $33 and ranging from that figure to $35. Sales are scattered and none of the large consumers is in the market. There is not enough activity at present to have any effect on the present schedule of prices. One interest which has occasional lots of high silicon iron for its regular trade has sold carload lots of silicon 3.25 to

3.75 at $38 and silicon 3.75 to 4.25 at $39, but these transactions were for immediate coverage of urgent needs. The American Locomotive Co. inquiry for 1400 tons has not been filled in the Buffalo district up to date.

We quote f.o.b. per gross ton Buffalo as follows, the higher prices being for early shipment:

No. 1 foundry, 2.75 to 3.25 sil.	$35.00 to $36.00
No. 2X foundry, 2.25 to 2.75 sil.	34.00 to 35.00
No. 2 plain, 1.75 to 2.25 sil.	34.00 to 34.50
Basic	34.00
Malleable	36.00
Lake Superior charcoal	36.28

Warehouse.—Heavy bars are in especial demand at warehouses and all products generally are moving briskly. The unusual call for bars of large sizes is due to the fact that mills are not rolling these sizes. Certain sizes in mills are difficult to buy.

Finished Iron and Steel.—Several sellers are able to take bar business on a wider plane than has existed in this vicinity since last spring, but the situation is far from normal. Demand is unabated for practically all products and sheet business is especially brisk. The leading local sheet maker is quoting 3.50c. base for No. 28-gage blacks and all quotations are for delivery at convenience of the mill. A local bar maker quoting a minimum price of 2.15c. is booking considerable business—as much as it can turn out. The maximum quotation by this maker is 2.25c. Some attractive 300 and 400-ton loads have been booked.

We quote warehouse prices, Buffalo, as follows: Structural shapes, 3.10c.; plates, 2.90c.; soft steel bars, 3c.; hoops, 4c.; bands, 3.80c.; blue annealed sheets, No. 10 gage, 3.90c.; galvanized steel sheets, No. 28 gage, 5.85c.; black sheets, No. 28, 4.85c.; cold rolled round shafting, 3.95c.

Old Material.—Heavy melting steel and other products have been advanced in price brought about by a very active demand by all the mills. Dealers, however, are reluctant to sell, believing that heavy melting steel will go higher, some estimating that it will touch the $25 mark before long. Higher prices prevail outside the district. Government restriction on the use of coal cars is seriously interfering with the movement of scrap. There is a pronounced shortage in the production of cast iron borings and machine shop turnings.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$18.00 to $18.50
Low phos., 0.04 and under	20.00 to 21.00
No. 1 railroad wrought	18.00 to 19.00
Car wheels	21.00 to 22.00
Machine shop turnings	13.50 to 14.50
Cast iron borings	15.00 to 16.00
Heavy axle turnings	16.50 to 17.50
Grate bars	15.50 to 16.00
No. 1 busheling	16.00 to 16.50
Stove plate	16.50 to 17.00
Bundled sheet stampings	12.50 to 13.00
No. 1 machinery cast	20.00
Hydraulic compressed	16.50 to 17.00
Railroad malleable	19.50 to 20.00

Birmingham

Very High Prices Obtained for Limited Tonnages of Pig Iron

BIRMINGHAM, ALA., Sept. 19.—Sales in the Birmingham pig iron market last week included 1000 tons for a pipe maker at $27 and numerous lots of 200, 300, 400 tons at $27.50 and $28. As high as $29.50 base was gotten on a special grade of iron. Total sales approximated 4000 tons in addition to what may have been made of Alabama iron stored at Providence, R. I. The largest foundry maker withdrew from the market at beginning of the week and that left all selling foundry makers quoting and selling at not under $27.50. It is claimed that reports of $25 Birmingham iron sales made last week were based on business done the week before and not during the current week in which reported. The car situation is still very bad and deliveries are slow and uncertain. The inquiry during the week was not especially active and large pipe makers have been especially quiet. Only one maker has much unbooked tonnage for this year. The Tennessee company will blow in its No. 1 furnace at Ensley this week. It has been rebuilt and enlarged and its stated capacity is 550 tons, but it will probably average much more than that, one small stack at Ensley having attained a production of 600 tons a day. The company having consumed all the basic iron on hand last month as well as the make of six furnaces, will probably blow in No. 1 on basic. The Central Iron & Coal Co. has advanced wages of furnace, mine and pipe shop workers 20 per cent effective Sept. 1 in line with advances made by other operators. The Southern melt has been curtailed to an extent by difficulty in securing pig iron on account of the car shortage, but, so far as this allows, iron-using plants are very close to a 100 per cent turn.

New Freight Rates

The lower rates to St. Louis, Chicago and Iowa points on Sheffield and Florence iron of the Sloss-Sheffield Steel & Iron Co. published by the Arrow Transportation Co. and the Burlington system were allowed by the Interstate Commerce Commission and went in effect Sept. 15. They are: To St. Louis, $3.28 vs. former rate of $3.85; to Chicago, $4.18 vs. former rate of $4.99. It is expected that other roads will come to the position of the Burlington. The Sloss-Sheffield Steel & Iron Co. will load 2000 tons of northern Alabama iron for delivery by this route during the week.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon 1.75 to 2.25	$27.00 to $28.00
Basic	27.00 to 28.00
Charcoal, warm blast	33.00 to 34.00

Cast Iron Pipe.—The pipe markets have been quieter. Sanitary pipe jobbers are holding off pending reception of some of their numerous consignments somewhere in transit. The United States Cast Iron Pipe & Foundry Co. took 800 tons for Detroit and smaller tonnages for Southern municipalities. Its production at Anniston and Chattanooga has been curtailed through irregular shipments of iron. The De Lavaud pipe has not yet figured in contracts entered into. The pressure base is $40 and sanitary base $60 to $65.

Finishing Mills.—The South has a new car building plant, the Virginia Bridge & Iron Co. having completed its car making adjunct to its structural steel works in Birmingham and secured these initial contracts: Rebuilding 500 composite cars for the Seaboard Air Line, rebuilding 500 steel hopper cars for the Central of Georgia Railroad and building 100 steel flat cars for the latter. The Tennessee company's double turn schedule in finishing mills is continued and independent steel plants are on full turn in finishing departments. The Tennessee company shipped 3000 tons of sulphate of ammonia, 500 tons of pig iron and 3000 tons of steel rails and track accessories to Yokohama, Kobe, Shanghai and Chemulpo out of Mobile last week.

Old Material.—The scrap market has been very excited on nervous jumps up and down, mostly up, but does not know just how to mark up. Yard men are slow in closing large contracts on expectancy of hardening of new base prices.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Steel rails	$17.00 to $19.00
No. 1 steel	16.00 to 18.00
No. 1 cast	18.00 to 20.00
Car wheels	18.00 to 20.00
Tramcar wheels	17.00 to 19.00
Stove plate	16.00 to 17.00
Cast-iron borings	8.00 to 9.00
Machine shop turnings	9.00 to 10.00

Scrap Advances at Detroit

DETROIT, Sept. 19.—Advances have been recorded on practically all grades of scrap with automobile cast leading the list. This material is much in demand and sales have been made as high as $25.00 per net ton. Hydraulic compressed registered an advance of $1.50 per ton and No. 1 machinery cast advanced $2.00 per ton. The following prices are on a gross ton basis f.o.b. cars producers' yards, excepting stove plate, automobile and No. 1 machinery cast, which are quoted on a net ton basis:

Heavy melting steel	$15.50 to $16.00
Shoveling steel	14.75 to 15.75
No. 1 machinery cast	17.50 to 18.50
Cast borings	12.00 to 13.00
Automobile cast scrap	24.00 to 25.00
Stove plate	14.50 to 16.00
Hydraulic compressed	14.50to 15.50

St. Louis

Inquiries for 13,500 Tons of Basic—Southern Prices Higher

ST. LOUIS, Sept. 19.—The pig iron market is particularly strong, with more orders placed than during the preceding week. A number of melters are seeking iron for immediate shipment, and more interest is being shown in prompt-shipment iron than in future shipments. The market is unchanged on Northern iron at $32 f.o.b., Chicago, while the market on Southern iron has advanced to $27 to $28, f.o.b., Birmingham. A shipment of 1200 tons of Southern iron made at Sheffield was moved by water to Metropolis, Ill., thence by rail to St. Louis during the week, and an additional sale by the same maker for St. Louis shipment totaled several hundred tons during the week. A few cars moved by all-rail from Birmingham via the Louisville & Nashville Railroad. The principal transaction of the week of the Granite City maker was the sale of 1,000 tons of foundry iron to an East Side melter and various lots ranging from 100 to 200 tons and totalling about 800 tons of low silicon iron, which were taken in the absence of standard grades which were not available. A number of melters are negotiating for additional tonnages without sending out inquiries. The principal inquiry before the market is for 10,000 tons of basic for melt at a point outside of the territory usually covered by the St. Louis maker, and 3500 tons of basic to another point outside the territory. Many melters are seeking high silicon iron, which is not available from the Granite City maker.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago and $5.17 from Birmingham and 81 cents average switching charge from Granite City:

Northern foundry, sil. 1.75 to 2.25	$32.16
Northern malleable, sil. 1.75 to 2.25	32.16
Basic	32.16
Southern foundry, sil. 1.75 to 2.25	$32.17 to $33.17

Finished Iron and Steel.—Reports from steel mills tell of improvement in production conditions, and concerns that have been out of the market are now looking for "desirable" business. But orders are not so plentiful. Steel ordered now can hardly be delivered until November or December, and jobbers, especially, are not inclined to buy for such deliveries. The principal railroad item is the inquiry of the Missouri-Kansas-Texas Railroad for 10,000 tons of 90-lb. rails for delivery next August, and it is understood that it is having difficulty in placing the business at present prices for delivery so far off. The St. Louis & San Francisco bought 500 tons of plates at better than $2.25, Pittsburgh. The Missouri Pacific Railroad bought 1,000 kegs of track spikes and the Mobile & Ohio 900 kegs. It is expected that bids will be asked this week on the new building of the Broderick & Bascomb Rope Co., involving a considerable tonnage of re-inforcing bars.

For items out of warehouse we quote: Soft steel bars, 2.90c. per lb.; iron bars, 2.90c.; structural shapes, 3c.; tank plates, 3c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, cold rolled, one pass, 4.85c.; cold drawn rounds, shafting and screw stock, 3.90c.; structural rivets, 3.60c. per 100 lb.; boiler rivets, 3.70c.; tank rivets, ⅞ in. and smaller, 60 per cent off list; machine bolts, large, 50 and 10 per cent; smaller, 50-10 and 10 per cent; carriage bolts, large, 55-5 per cent; small, 60 and 10 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon blank, $3.50; and tapped, $3.25 off list.

Coke.—The demand for coke is steadily increasing, with the call for domestic coke overwhelming. The Granite City by-product foundry coke is quoted at $14.00 at the furnace, but the company has withdrawn from the market. Coal is moving very poorly into this market.

Old Material.—The market for old material has advanced considerably during the week, which was featured by heavy purchases. The Scullin Steel Co., National Enameling & Stamping Co., and the American Steel Foundries are reported to have bought 15,000 tons each, while the Helmbacher Forge & Rolling Mills Co. bought 10,000 tons. No old material is coming in, and users are relying entirely upon the local yards, whose stocks are almost depleted. One of the largest yards in the district has sold all of its stock on hand.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton

Old iron rails	$20.50 to $21.00
Rails for rolling	20.75 to 21.25
Steel rails, less than 3 ft.	20.00 to 20.50
Relaying rails, standard section	26.00 to 29.00
Cast iron car wheels	24.50 to 25.00
No. 1 heavy railroad melting steel	18.50 to 19.00
No. 1 heavy shoveling steel	18.00 to 18.50
Ordinary shoveling steel	18.00 to 18.50
Frogs, switches and guards cut apart	20.00 to 20.50

Per Net Ton

Heavy axles and tire turnings	12.75 to 13.25
Steel angle bars	18.00 to 18.50
Iron car axles	26.00 to 26.50
Steel car axles	20.50 to 21.00
Wrought iron bars and transoms	20.50 to 21.00
No. 1 railroad wrought	17.50 to 18.00
No. 2 railroad wrought	17.00 to 17.50
Railroad springs	21.00 to 21.50
Steel couplers and knuckles	21.00 to 21.50
Cast iron borings	11.00 to 11.50
No. 1 busheling	13.50 to 14.00
No. 1 railroad cast	21.50 to 22.00
Railroad malleable	19.75 to 20.25
Machine shop turnings	9.50 to 10.00

San Francisco

Mild Interest in Foreign Pig Iron—Effects of Strikes Seen in Finished Materials

SAN FRANCISCO, Sept. 19.—The pig iron market along the Coast continues rather quiet. There is a moderate interest in foreign offerings, which at the moment are abundant, but the volume of sales recently has not been large. It appears that consumers have about taken their requirements for the time being, and under present conditions do not feel sufficiently secure of the trend to warrant liberal purchasing. Moreover, steamer space from England is available only in very limited amount during September and October. What little new business was reported, perhaps around 500 tons for San Francisco and Los Angeles, was transacted on a basis of close to $29, ex-ship, coast ports. It is understood there are a few offerings in the market at present for material analyzing 1.75 to 2.25 silicon, 0.05 sulphur, 0.020 to 0.040 phosphorus and 0.08 to 0.10 manganese, at around $27, c.i.f., San Francisco. Very high quotations from the East and South make business in domestic pig iron impossible. Even by water, with iron at about $20 at producing point, freight and incidental charges bring the total much higher than prices at which foreign material is offered.

Cast Iron Pipe.—Water pipe has been advanced again in this district, and prices are now around $54 for 6-in., delivered, and $58 for 4-in. Business continues rather small, especially from private sources. Some few prospects from municipalities are in sight, but the tonnage involved is not of much consequence. Los Angeles awarded the contract for 3000 tons to the National Cast Iron Co. Santa Barbara is inquiring for 900 tons of mixed sizes. There are no new developments in the soil pipe market, and mills are not encouraging business, having already more than can be conveniently handled.

Finished Iron and Steel.—Strike conditions are brought home to buyers in this section principally through advancing prices and uncertain deliveries. Virtually every product is reflecting the strong tone of the market, but buyers are becoming more hesitant with each price advance, for they apparently do not feel justified in making large purchases, believing that with an early settlement of the deadlocks, prices will readjust themselves quickly. That opinion, however, is gravely questioned by many of the sellers, who point to higher wages and the serious check which both the steel industry and transportation have received. A little business in plates has been done at prices ranging from 2.60c. to 3c., delivered, according to mill and delivery. An oil company is inquiring for around 200 tons for several phlange and dish heads, 12 ft. in diameter. The Steel Corporation was awarded about

850 tons of 75-lb. A.S.C.E. rails, with fittings, to be used on the San Pedro harbor work. The rails are understood to have gone at about $44 net. Sheets have been quiet, and not much interest is reported in shapes at prices as high as 2.75c. Rivets have been advanced to 3c. to 3.10c., Pittsburgh. Structural steel demand is holding up pretty well at the new prices. The Baker Iron Works was awarded a contract involving 700 tons in the South. The bascule bridge planned for Badger Avenue, Los Angeles, will require about 2200 tons of material. Bids open Sept. 29. The city of Sacramento is planning to add to its facilities a filtration plant, with a capacity of 50,000,000 gallons per 24 hours, at a cost of approximately $800,000.

Coke.—About the same condition that prevails in pig iron applies to coke. New contracts are lighter in volume, only a meager business of this nature being reported. Spot material, however, is more active, and quite a trade, in 5-ton to carload lots, has been done. Spot is quoted from about $26 to $27, ex-yard and imports range from $17 to $20, ex-ship, according to quality. Under prevailing conditions, interest in domestic coke is negligible. The U. S. Navy is in the market for about 150 tons of coke for its Mare Island base, bids closing September 7.

Old Material.—The scrap market here appears to be in a good position, although sales have not been particularly large during the past week or two. Unsettled conditions in the East, doubtless, are tending to give some strength to the situation on the Coast, and prices on both cast and heavy melting material are well maintained at $11 per gross ton, delivered, for the latter and close to $24 per net ton, for cast. Ship scrap is coming on the market soon.

Cleveland

Sales of Moderate Tonnages of Pig Iron—Scrap Again Advances

CLEVELAND, Sept. 19.—Blast furnace operations continue to increase with the easing of the fuel situation. The American Steel & Wire Co. has started another stack in Cleveland, now operating three out of four Central furnaces and the Hanna Furnace Co. will blow in its Dover and the second Detroit stack this week, the latter furnace having been out of blast for a long time. This will make seven more active furnaces, four of them merchant stacks, than were being operated by Cleveland interests at the time of the coal strike settlement. None of the seven furnaces resuming operations will use Connellsville coke. The movement of bituminous coal has become heavy and as a result the car shortage for other products has become more acute. This is noticeable particularly in the shipment of pig iron against which a number of railroads have embargoes. It is also interfering with steel shipments from the Pittsburgh district. The suspension of operations by the Ford Motor Co. so far has not resulted in the holding up of shipping orders for pig iron by producers having Ford contracts and with but few suspensions of steel going directly to the plants making Ford parts. The Ford company has instructed its parts manufacturers to accumulate a backlog of finished parts, so that car production will not be delayed when the Ford plant starts up.

Iron Ore.—The wage advance of the U. S. Steel Corporation in the Lake Superior mining district ranges from 10 to 15 per cent above the old scales, as is shown by the rate sheets issued during the past few days. The wage rates in the mines have generally been higher than in the mills, which evidently explains why the miners were not given the 20 per cent increase granted common labor in the mills. Some of the independent mining companies will place corresponding wage advances in effect. Ore shipments are tapering off considerably. One large shipper has made a 10 per cent cut in maximum tonnages of outside vessel capacity it had contracted to take. One furnace that is resuming operations has commenced to take ore off the docks, but most furnaces have large yard stocks. With curtailed blast furnace operations stocks of Lake Superior iron ore at furnace yards increased over 5,500,000 tons in August. The amount on hand at furnaces Sept. 1 was 29,565,935 tons as compared with 23,830,461 tons on Aug. 1. The amount at furnace and Lake Erie docks Sept. 1 was 37,630,036 tons as compared with 31,127,303 tons on Aug. 1 and with 35,486,757 tons on Sept. 1 last year. The above figures appeared in the monthly report of the Lake Superior Iron Ore Association, which also shows a falling off of nearly 1,000,000 tons in the consumption of lake ore in August, the amount consumed during that month being 2,589,251 tons as compared with 3,582,715 tons in July.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $5.95; Old range non-Bessemer, 51½ per cent iron, $5.20; Mesabi Bessemer, 55 per cent iron, $5.70; Mesabi non Bessemer, 51½ per cent iron, $5.05.

Pig Iron.—The market continues fairly active in foundry and malleable grades. Prices on these grades are the same as quoted last week and while the market is very firm, there seems to be a disinclination among sellers to move prices to any higher level. A Pittsburgh district sanitary interest has purchased 1500 tons of No. 2X iron for October shipment from a Cleveland producer at $36.50, Cleveland, or at the base price of $36. The same interest which is offering iron only for October shipment also took a number of orders in Cleveland and vicinity at the same price. The Westinghouse Electric & Mfg. Co. is expected to close to-day on an inquiry for 1200 tons of foundry iron for early shipment, 1050 tons for Cleveland and 150 tons for Springfield, Mass. Another lake furnace interest reports sales of several thousand tons of foundry and malleable iron during the week for fourth quarter delivery, the prices ranging from $32 to $33.50 at furnaces. The orders include one 1000-ton lot of foundry iron and another for 1000 tons of malleable iron, both from Ohio melters. Southern Ohio iron is still available at $32. The demand for high silicon foundry iron has been stimulated by the fact that foundries are not getting Alabama iron as needed because of slow shipments. In some cases it has taken over 60 days for Southern iron to reach its destination. The only activity in basic iron is the reported sale of 20,000 tons by a Valley steel maker at $34. There was considerable activity during the week in Southern iron, one interest making a number of sales in this territory in lots of 400 tons and under at $25, Birmingham. Late in the week the price was raised to $28 and some business was booked at that base price. For iron running 2.25 per cent and higher in silicon, this seller is quoting 50c. differential or $28.50.

Quotations below are f.o.b. local furnace for Northern foundry iron, not including a 50c. switching charge. Other quotations except basic and low phosphorus are delivered Cleveland, being based on a $3.02 rate from Jackson and a $6 rate from Birmingham:

Basic, Valley furnace, nominal	$34.00
Northern No. 2 fdy., sil. 1.75 to 2.25	36.00
Southern fdy., sil. 1.75 to 2.25	31.00
Malleable	36.00
Ohio silvery, sil. 8 per cent	44.52
Standard low phos., Valley furnace	38.00

Semi-Finished Steel.—No quotations are being made on semi-finished steel in this territory, although there is considerable inquiry for fourth quarter contracts. With an advance in basic pig iron, the market on billets, sheet bars and slabs is regarded as around $44.

Finished Material.—With increasing steel production, buyers are showing less disposition to pay the maximum prices, particularly on steel bars and structural material. While mills that are quoting these at 2c. for delivery in 30 to 60 days are getting a heavy volume of orders, others that are asking 2.25c. are booking very little business, although in some cases as high as 3c. is being paid for steel bars in small sizes for quick shipment. Plates continue in good demand, with quotations ranging from 2c. to 2.50c., most of the larger orders for early delivery going at 2.25c. The Gulf Refining Co. is inquiring for stills requiring 600 tons of plates and another new inquiry has appeared for stills that will require 360 tons. The $3 a ton advance on steel rails by the Steel Corporation has brought

no announcement from the independent mills as to their attitude on rail prices. It is expected that some of the railroads in this territory will close for their 1923 rail requirements before Oct. 1, when the advance goes into effect. The leading interest has also made a $3 per ton advance on light rails to 2.15c. The Illinois Steel Co. has announced a $2 a ton advance on track bolts to 3.85c., and on spikes to 2.85c. Splice bars will be advanced Oct. 1 to 2.75c. Sales of wire rods are reported at $46. In the building field there is a falling off in inquiries and some work on which bids were received is being held up. One large inquiry has appeared, being for 5000 tons of structural material for a plant for the Toledo Libby-Owens Sheet Glass Co., Toledo. With the approach of the winter the demand for reinforcing bars in round lots has fallen off, but considerable business continues to come out in small lots. Hard steel reinforcing bars are unchanged at 2c.

Jobbers quote steel bars, 2.81c.; plates and structural shapes, 2.91c.; No. 9 galvanized wire, 3c.; No. 9 annealed wire, 2.50c.; No. 28 black sheets, 4.25c.; No. 28 galvanized sheets, 5.25c.; No. 10 blue annealed sheets, 3.50c. to 3.61c.; hoops and bands, 3.61c.; cold-rolled rounds, 3.60c.; flats, squares and hexagons, 4.10c.

Sheets.—While some independent mills are now asking higher prices, others are adhering to 3.50c. for black, 4.50c. for galvanized and 2.60c. for blue annealed sheets. There is a fair demand for sheets for prompt shipment, but the seasonal falling off in orders from the automobile field is noticeable.

Bolts and Nuts.—Specifications on contracts taken at the old prices that expire Oct. 1 are heavy, and manufacturers are booking a great deal of business in fourth quarter contracts. Prices are firm. Production by some manufacturers is curtailed by a shortage of wire and steel bars. Rivet manufacturers are getting a good volume of orders, particularly from locomotive manufacturers, and are closing many contracts for the fourth quarter at the recent advance in prices. The market is very firm.

Coke.—Connellsville foundry coke is still held at $13 with a supply sufficient to meet the demand, which is light. We note the sale of 25 cars of Indianapolis by-product coke to a Cleveland consumer at $16. No activity is reported in furnace coke. Furnaces in this territory that have resumed operations or will start up this week are using by-product coke.

Old Material.—Heavy melting steel scrap has further advanced $1 per ton and most grades were marked up from 50c. to $1 per ton or more during the week. With the limited supply of scrap and the scarcity of pig iron and higher prices, the trend of the market still seems to be upward and dealers and producers are holding for a further advance. Valley dealers are offering $21 for heavy melting steel and a Youngstown mill is understood to have offered the same price. Some dealers are asking $22 for this grade for Valley delivery. A Cleveland dealer bid $21.60 delivered Youngstown to a Sharon producer for heavy melting steel scrap, but evidently was outbid. Local dealers have paid $19 for heavy melting steel scrap and $19.50 is understood to have been offered. Outside of heavy melting steel, turnings and borings are the more active items. Sales of machine shop turnings at $14 and mixed borings and short turnings at $14.50 are reported.

Heavy melting steel	$18.75 to $19.25
Steel rails, rerolling	21.00 to 22.00
Iron rails	17.00 to 17.50
Low phosphorus melting	19.00 to 20.00
Mixed borings and short turnings	14.00 to 14.50
Railroad wrought	17.75 to 18.50
Light bundled sheet stampings	12.50 to 13.00
Steel axle turnings	15.25 to 15.50
Drop forge flashings over 10 in.	13.00 to 13.50

Philadelphia

Railroad Requirements Loom Large in a Somewhat Halting Market

PHILADELPHIA, Sept. 19.—In some respects the iron and steel markets have come to one of those halting periods which develop when buyers expect conditions and prices to turn in their favor. It seemed to have been the opinion of many that a few weeks of large coal production would bring decided relief all along the line. That such has not yet been the case, except to a minor degree, is the cause of considerable perplexity. Sellers freely concede that prices are on too high a level for large or sustained buying, but they hesitate making reductions until costs also have gone down. Coke, which is an important factor in the situation, was expected to show quickly the effects of freer coal supply, but prices of coke weakened last week only to advance $1 a ton this week. The firmer tone is due not to coke shortage but to shortage of cars. The opinion prevails that while there may be some easing in prices of pig iron and steel any marked tendency in that direction over the remainder of this year, at least, is unlikely because of the effect which inadequate car supply will have upon production costs and the supply of material.

The more important developments of the market have to do with railroad requirements, in which rails now figure prominently since the announcement by the Steel Corporation of an advance to $43 per gross ton, effective Oct. 1. Independent rail producers have followed in this advance. Orders for several hundred thousand tons from Eastern roads are now pending.

Pig iron and steel are in better supply, and while there have been no marked changes in prices, the price situation is slightly easier in that the buyer no longer is obliged to pay the top prices. In scrap, sensational price advances have occurred, amounting in a few instances to several dollars a ton within the week.

Pig Iron.—With increased production of pig iron in sight, both for steel-making purposes and for foundry use, the attention of both buyers and sellers is more closely focused on the probable price situation over the remainder of the year than on the current market. Domestic iron is being offered more freely, and while concessions from the peak prices have been comparatively slight, buyers are not now paying these prices unquestioningly as they did during the most critical period of the coal strike. One Eastern furnace which went as high as $34, base, for foundry iron is adhering to that level, but another, which also went to $34, is now selling at a reduction of $1 a ton, and still another furnace interest, as reported last week, is offering foundry iron freely at $32, furnace, for No. 2 plain, $33 for No. 2X and $34 for No. 1X. A furnace which has been making ferromanganese produced about 1000 tons of foundry iron in preparing to bank, and this iron has been placed on the market on a $32 base at furnace. Foreign iron continues to sell more freely than domestic grades, as more melters have found that they can use the imported iron successfully in their mixtures. There has been no weakness in prices of foreign iron, which can be had slightly below the quotations on domestic iron of similar analysis. Importation of low phosphorus iron has been a new development, a Chester steel castings plant taking 5000 tons of copper bearing iron, maximum 0.04 per cent phosphorus, at $28.50, c.i.f. Philadelphia. A locomotive company subsidiary manufacturing forgings is also reported to have bought a tonnage of the same grade at about the same price. A small lot of imported copper free low phosphorus iron, maximum 0.035 per cent phosphorus, was sold at $32, c.i.f. Philadelphia, and more is available at the same price. No domestic copper free low phosphorus iron is to be had in the East, but copper bearing iron is quoted at $37 to $38, furnace. Important sales of domestic iron within the week included 4000 tons of basic at $30, furnace, to a

(Continued on page 758)

BETHLEHEM-LACKAWANNA

Timothy M. Burns General Manager at Buffalo—Many Changes in Sales Offices

Stockholders of the Bethlehem Steel Corporation and the Lackawanna Steel Co. in special meetings Sept. 18 formally approved plans under which the latter company's property will be absorbed by the Bethlehem Steel Corporation. Although the exchange of stock will not be completed until the lapse of two or three weeks the transfer of the Lackawanna's plants to Bethlehem took place Sept. 19 and henceforth all sales will be made in the name of the latter company.

Coincident with the taking of control by Bethlehem on Tuesday, Timothy M. Burns became general manager of the plants at Lackawanna, N. Y. For some years he has been general superintendent of the Saucon plant at South Bethlehem. George W. Whitehead, who has been general superintendent of the Lackawanna plant, under the presidency of George F. Downs, who has resigned, becomes assistant general manager. The Lackawanna operating organization as to department superintendents remains unchanged.

A number of changes in the sales department of the Bethlehem Steel Co. are announced, in view of the taking on of Lackawanna products. Edward S. Illig becomes Buffalo district sales manager, being transferred from the Bethlehem Steel Co.'s Pittsburgh office. The Buffalo sales district will hereafter include Toronto and adjacent Canadian territory, in view of the recent action by which Canada has been separated from the foreign territory covered by the Consolidated Steel Corporation. Mr. Illig's successor at Pittsburgh will be E. B. C. Goyne, heretofore in charge of sales at St. Louis. William Chapman goes from the Chicago office to take charge of sales at St. Louis. Robert E. Belknap, who has had charge of sales at Chicago, becomes manager of sales in the Boston district. He is suceeded at Chicago by E. E. Goodwillie, heretofore Bethlehem's sales manager at Cleveland. R. B. Wallace remains at Boston as assistant manager of sales. The Cleveland office hereafter will be in charge of John C. Chandler, who for a number of years has represented the Lackawanna Steel Co. in that territory. New Bethlehem sales offices will be opened at Los Angeles, Cal., and Seattle, Wash.

Consolidated Steel Corporation to Be Reorganized

The companies which have been members of the Consolidated Steel Corporation, incorporated Jan. 2, 1919, to act as their export representatives, recently decided that they would prefer to handle their export business to Canada themselves, and as this is an important part of the business of the Consolidated Steel Corporation, it has been decided to reorganize the corporation. Details have not been determined. The original member companies were: Bethlehem Steel Co., Brier Hill Steel Co., Lackawanna Steel Co., Lukens Steel Co., Midvale Steel & Ordnance Co., Republic Iron & Steel Co., Sharon Steel Hoop Co., Trumbull Steel Co., Whittaker-Glessner Co., Youngstown Sheet & Tube Co. Three other companies—the Railway Steel Spring Co., Standard Steel Works Co. and Edgewater Steel Co.—have done their export business through the corporation, although not included in its membership.

Brier Hill Steel Co. Authorizes Large Expenditure

YOUNGSTOWN, OHIO, Sept. 19.—Directors of the Brier Hill Steel Co. Tuesday authorized an expenditure approaching $1,000,000 to rebuild the Thomas plant at Niles, consisting of 12 sheet rolling units. The rehabilitation will enlarge the Thomas plant's capacity 25 per cent. Plans include new steam drive installation, relocating rolling mills, rearranging buildings, installing new annealing furnaces and warehouses. Work is started at once and will require six months for completion.

Decision to proceed with an expansion program was withheld, but directors will meet Sept. 25 to discuss such a program.

The directors declared the usual quarterly preferred dividend of $1.75 per share, payable Oct. 1 to stock of record Sept. 20.

The directors of the Trumbull Steel Co., Warren, Ohio, have increased the common dividend from 20 to 25c. for the third quarter, and authorized the usual quarterly preferred payment.

Stockholders of the Electric Alloy Steel Co., Youngstown, will meet Sept. 30 to ratify the merger with the Atlas Crucible Steel Co., Dunkirk, N. Y., details of which are now being completed, following four months negotiations. The merged interests will have an annual productive capacity of 45,000 tons of highspeed tool and special analysis steels. Details of financing arrangements have been submitted to shareholders of both constituents.

Jones & Laughlin Steel Co. Operations

Jones & Laughlin Steel Co., Pittsburgh, recently started up 300 of its beehive coke ovens near its South Side works, Pittsburgh. The company has 1820 ovens of this type and has not operated them for about two years. The company now is making sufficient coke to meet the requirements of 10 blast furnaces and it expects to have that number active by the end of this month. The company is unusually fortunate in that its coal mines are located near the Monongahela River and it is able to bring down practically all of its production by water and escape the restrictions of railroad snarls or priority distribution orders.

The company is making preparations for a resumption of river shipments of steel products. River transportation is difficult during the summer months, when the rivers are shallow and a number of barges sent south by this and other companies in early summer still are tied up at southern points. There will be plenty of barges for the fall shipments and with deeper water the Jones & Laughlin company and other steel makers in Pittsburgh will be partly able to overcome any railroad transportation snarls which may grow out of the lack of cars or insufficient motive power.

The Southern Wire & Iron Mfg. Co., Dallas, Tex., headed by W. A. Sedwick, has purchased seven acres of industrial property south of the city, and will build four factory units there by Jan. 1, at an estimated cost of $50,000. Ornamental iron, structural steel, fire and elevator doors, fire escapes and miscellaneous products will be fabricated in the new plant. Seventy-five men are to be employed. The company is an old one in Dallas, and the present project is an enlargement of its activities.

Motor car production for August aggregated 272,640, by far the heaviest August production on record, and an increase of 12 per cent over July, according to reports received by the National Automobile Chamber of Commerce. It is estimated that the yearly production will reach the 2,000,000 mark.

Standard Steel Car Co., Butler, Pa., has advanced wages of workmen paid on a daily basis 15 per cent and has made a corresponding adjustment in the scales of piece and tonnage workmen, effective Sept. 16.

BRITISH IRON AND STEEL

Exports and Imports Both Increase in August Over July and June

WASHINGTON, Sept. 19.—The United Kingdom imported 80,113 gross tons of iron and steel during August and exported 269.983 tons, according to a cable received by the Department of Commerce from Commercial Attaché, Walter S. Tower, London. These figures compare with exports of 251,743 tons in July and 249,089 tons in June and with imports of 55,893 tons in July and 58,856 tons in June. The month's cargoes consisted chiefly of the following:

	Gross Tons	
	Imports	Exports
Pig iron and ferroalloys	15,482	46,250
Ingots, blooms, billets, slabs, etc.	21,441	451
Steel rods, bars, angles, etc.	11,245	18,087
Iron bars, rods, angles, etc.	5,972	2,702
Structural steel	5,473	4,585
Rails	1,715	22,470
Other railroad material	636	15,401
Plates and sheets	1,616	24,850
Galvanized sheets	.....	47,404
Tin plate	.....	36,817
Wire	2,941	5,893
Wire cable and rope	.....	1,986
Wire nails, including staples	3,192	322
Other wire manufactures	329	1,509
Hoops and strips	2,911	4,834
Wrought tubes, pipes and fittings	2,023	8,395
Cast tubes, pipes and fittings	1,964	8,093
Bolts, nuts, including screws for metals	391	1,803
Nails, tacks, rivets and washers	171	1,042
Rough iron and steel castings	240	253
Rough iron and steel forgings	139	45

Production of pig iron of all classes by the United Kingdom in August totaled 411,700 tons, and the output of steel ingots and castings was 520,800 tons. At the end of August there were 126 blast furnaces and 251 open-hearth furnaces in operation.

British Pig Iron and Steel Output for August

LONDON, ENGLAND, Sept. 16 (*By Radio*).—The production of pig iron in Great Britain in August was 411,700 gross tons and that of steel ingots and castings 520,800 tons. These compare with 399,100 tons of pig iron and 473,100 tons of steel ingots and castings in July.

The pig iron and steel output for Great Britain by months so far this year has been as follows in gross tons:

1922	Pig Iron	Steel Ingots and Castings
January	288,000	327,500
February	300,100	418,800
March	389,800	549,400
April	394,300	464,200
May	407,900	462,300
June	369,200	400,200
July	399,100	473,100
August	411,700	520,800

The August output of pig iron is the largest month of the year, while that of steel is second to the March production. The 1921 pig iron production averaged 217,600 tons per month and the steel output 302,100 tons per month. In 1913 the two figures were 855,000 tons and 639,000 tons per month respectively.

Russian Iron and Steel Production

BERLIN, GERMANY, Sept. 6.—The Russian iron and steel production is gradually improving. The supplies of ore and fuel going to the works are, however, still irregular. Production is therefore fluctuating. The figures for the first three months of 1922, for instance, were much higher than those for the second quarter.

Several great works in the South are being restarted and those already working have been able to increase their output during the present year considerably. During the first half of 1921, 69 per cent of the Russian pig iron was produced in the Ural, 11 per cent in the South, and 20 per cent in Central Russia. This year the percentage of production has changed to 44 per cent in the Ural, to 40 per cent in the South, while the output of the works in Central Russia remained about the same.

The Russian production of pig iron during the first six months of 1922 amounted to 88,600 metric tons of which the works in the Ural produced 39,600 tons, those in the South 36,200, and those in Central Russia 12,800 tons. The whole output of open-hearth steel was 163,200 tons, and the share of the three districts amounted to 70,100 tons, 63,700 tons and 29,400 tons respectively. Rolled material was produced to the amount of 55,800 tons in the Ural, 52,600 in the South and 16,700 in Central Russia.

Export Market Dull

NEW YORK, Sept. 19.—Dullness in export trade now prevails not only in all foreign markets, but in what has recently been a fairly large item, purchases from government sources in Japan. Although the Japanese are at present evidently doing most of their buying of light gage black sheets on the Continent of Europe, they continue to manifest some interest in American material and several exporters are handling requests for quotations on standard American brands of black sheets of light gage, which they doubt will materialize into business because of price.

Purchases of rails are still about the most important of any business coming from the Far East. On a recent tender issued by a municipality in Japan, calling for 27 miles of 60-lb. rails, a bid of 524 fr. Belgian (about $37.57) per ton, c. and f. Japanese port, was submitted by a Belgian mill and £9 2s 6d (about $40.20) per ton, c. and f. Japanese port, which was later reduced to £9 per ton (about $39.87) by the Krupp works in Germany. The Belgian delivery was about 16 weeks, against a promised shipment by Germany in 12 to 14 weeks. The business is not yet reported as placed. The tender of the South Manchuria Railway Co., issued several weeks ago, calling for 700 tons of tie plates for 100-lb. rails, has been awarded to the Mitsubishi Shoji Kaisha, 120 Broadway, New York, and will be filled by the United States Steel Products Co.

The Chinese market is dull, the little buying evidently being done in European markets, because of lower prices. An annual inquiry for 2,000,000 No. 26 gage black sheets, which recently came up, received a bid of £16 6s, c.i.f. Tsientsin, against the bid of the American seller of £17, c.i.f. Tsientsin. The previous year's business from this source was equally divided between American and British mills, 1,000,000 sheets to each. Companies in touch with conditions in China do not expect any general improvement in business until the political situation is more settled.

Increased Demand for Ore in Sweden

WASHINGTON, Sept. 19.—Decided improvement in the market for iron ore in Sweden has been reported to the Department of Commerce by Consul Murphy, Stockholm. By the end of June, it is stated, 460,000 more tons of ore were shipped from Narvik, one of the principal shipping ports, than at the close of June, 1921. Shipments from Lulea, another important shipping port, were considerably in excess of those of January-June, 1921. Stocks of ore at the mines have largely diminished.

German dumping is declared to be the great disturbing factor in both iron and steel. In rolled products only, it is declared, is there a noticeable return to normal prices and fair demand. Prices of iron are said to be below cost of production.

Increased exports of iron ore from the Lorraine mines are reported by Assistant Trade Commissioner Green, Paris, the total for the first six months of the present year aggregating 4,328,453 metric tons, valued at 99,000,000 francs, according to official figures. These figures indicate an encouraging increase over the export during the corresponding period of 1921, which totaled 2,666,428 metric tons, valued at 61,000,000 francs. Germany is taking an increasing proportion of the Lorraine output.

COPPER DEMAND FROM JAPAN

Speculative Stocks Are Being Absorbed and Imports from United States May Increase

TOKIO, JAPAN, Aug. 1.—In anticipation of the high price of electrolytic copper in Japan after the revised customs tariff rate was brought into force, orders for electrolytic copper had been placed in the American market and more than 10,000 tons was imported into Japan speculatively. When the revised rate of customs was enforced, the price of copper showed an improvement by 5 to 6 yen per 100 kin (133 lb.). Last spring, when the customs tariff was revised, the monthly consumption of copper was estimated at 5500 tons or more, but afterward consumption tended to decrease by degrees, and the Japanese market continued to be much affected by the excess supply. Owing to the fact that the quotation in the American market remained below 14c., the price of copper in Japan stood at about 45 yen per 100 kin (or about 17c. per lb.) in May and June last. At that time the net stocks of copper in the hands of producers, putting aside the quantity which is to be consumed in Japan, amounted to about 5000 tons.

The monthly output of the Kuhara, the Fujita, the Mitsubishi, the Furukawa, the Sumitomo and other copper companies amounts to about 3500 tons, while their monthly consumption aggregated 2500 tons, the remainder, approximately 1000 tons, being added to stock.

On the other hand, the monthly consumption of the Fujikura Copper Mfg. Co., the Denki-Bundo Kaisha and other copper manufacturers is estimated to be 1300 tons, and adding the above to the consumption of arsenals, naval yards, the Government mint and others, the consumption of copper in Japan aggregates 5000 to 5500 tons per month. Thus consumption exceeds the output by 1500 to 2000 tons monthly, which represents the amount imported. Recently the demand for copper has improved and the stocks on hand, which are partly consumed by the copper and brass goods manufacturers and partly exported to China and elsewhere, have decreased considerably. If present operations continue, stocks on the Japanese market will be drawn down in the near future. It is expected in that case that the quotation for electrolytic will become stable at 46 to 47 yen per 100 kin, if the price is maintained around 14c. on the American market.

GERMAN STEEL PRICES GO UP

Advances Made Over Figures Prevailing from Sept. 1 to Sept. 10

By Cable

BERLIN, GERMANY, Sept. 18.—Prices of ingots have gone to 34,370 marks per metric ton ($24.44 per gross ton, at 7c. per 100 marks); of bars to 46,930 marks (1.49c. per lb.); of sheets exceeding 5 mm. (No. 6 United States gage) to 52,750 marks (1.675c. per lb.). Foundry iron is now quoted at 36,242 marks ($25.78).

These prices replace 27,530 marks ($21.68) for ingots; 37,020 marks (1.30c. per lb.) for bars; 41,580 marks (1.46c. per lb.) for sheets and 24,491 marks ($19.28) for foundry iron No. 1, all figured at the rate of 7¾c. per 100 marks, prevailing Sept. 2.

Railroad Charge for Placement of Ore Cars Held to Be Reasonable

WASHINGTON, Sept. 19.—In a tentative report made to-day Examiner Hunter recommends that the Interstate Commerce Commission find that the delivery charge of 3c. per gross ton on ex-lake iron ore in carload lots at the Youngstown, Ohio, plant of the Carnegie Steel Co. is applicable to placement of cars on the company's incline tracks and that it is not unreasonable. It was charged by the Carnegie company that the delivery charge does not apply on service performed by the carriers and that if such a charge is applicable it is unreasonable and should be eliminated. It was claimed that the road haul rate includes or should include placement on the incline tracks and the removal of empties to out-bound tracks.

Ohio Foundry Activities

The report of the Ohio State Foundrymen's Association, issued Sept. 16, and covering the operations of the member foundries for August, shows that operations have now reached 70 per cent of normal, as compared with 58 per cent in July. The report states that many foundries were confronted with great difficulty in maintaining operations due to a shortage of raw materials, but that some relief is now in sight. The non-ferrous foundries had been able to maintain operations throughout August practically at a normal rate, and have sufficient raw materials on hand to keep running through September. Shipments on contracts, particularly from northern furnaces, were good during the month, but with the increased melt the stocks on foundry yards have declined to the lowest level since the organization was formed.

Iron and Steel Imports in July

More than one-third of the total tonnage of iron and steel entering the United States in July was ferromanganese and over 60 per cent was ferromanganese and pig iron. Canada and the United Kingdom, considered together, furnished us with more than 70 per cent of our total import tonnage of iron and steel items. The aggregate of 72,426 tons came from the eleven sources detailed in the table below.

Countries	Tons	Countries	Tons
United Kingdom..	30,972	China	500
Canada	19,908	Germany	241
Sweden	10,990	Virgin Islands....	145
Brazil	7,800	Dominican Republic	3
Belgium	766		
France	611		
Netherlands	500	Total	72,426

It is of interest to note that the imports of ferromanganese in July, 25,841 tons, were almost as great as the 27,288 tons for the entire six months preceding. Similarly, the pig iron coming in during July, 18,828 tons, amounting to more than two-thirds of the tonnage, 26,399 tons, for the entire six months preceding. Of smaller tonnage, but more striking in the proportion entering in July, was bar iron, of which the month's tonnage amounted to 10,131 against 1400 tons in the six preceding months.

Swedish Foreign Trade in Iron Ore and Steel

The following table shows the Swedish imports and exports of iron and steel, and the exports of iron ore last June and the six months ended therewith, compared with the same periods in 1921 in gross tons:

	June, 1921	June, 1922	Jan.-June, 1921	Jan.-June, 1922
Iron ore exports.....	420,084	560,680	2,129,034	2,084,104
Iron and steel exports..	10,890	15,487	61,335	81,396
Iron and steel imports..	13,527	9,182	72,219	54,260

Copper Shipments Making Records

Shipments by American copper producers in August are reported to have exceeded 170,000,000 lb., compared with 172,418,000 lb. in July and 176,774,000 lb. in June. About 70,000,000 lb. was for export and 100,000,000 lb. for domestic consumption. The figures for these three months represent the largest shipments for any three "peace" months in the history of the industry.

British Iron and Steel Market

American Buying of British Pig Iron Has Stiffened Prices—British Steel Prices Weak in Face of Better Demand

(By Cable)

LONDON, ENGLAND, Sept. 19.

Cleveland pig iron is strong as a result of continued American demand, up to 95s. ($21.00) being paid for No. 3 G.M.B. Better grades are practically unobtainable for prompt shipment. Most makers are quoting November as the earliest date. Home business is quiet.

Hematite is weak. East Coast mixed numbers are sold at down to 88s. ($19.45) and stocks are accumulating.

There is improved demand for finished iron and steel, especially plates and angles, and some orders have been placed. Prices generally are unchanged, though some works are willing to grant concessions.

Continental steel generally is quiet. India and China are buying a little, but other markets are holding aloof.

Tin plate is easier on decreased sales. Makers are perturbed at falling prices and are considering cutting down production. Some small sales have been made to India, Canada, South America and Australia. There is a fair home trade demand. Odd sizes are being done at 18¾s. ($4.14) f.o.t. There is moderate inquiry for wasters, these being quoted at 16¾s. ($3.70) to 17s. ($3.76) basis, f.o.t.

Galvanized sheets are quiet, but there are signs of improving demand. India has bought small parcels and anticipations are entertained of substantial business before long. Australia and South Africa are buying small lots steadily.

Black sheets are steady. There is some revival of demand for Japanese specifications, but sales are only meager.

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $4.42 per £1, as follows:

				C. per Lb.
				1.46
				18.79
				17.68
				1.83
Sheet and tin plate bars,				
				1.25
				C. per Lb.
				1.83
				1.87
				1.88
				1.83
Galvanized sheets, 24 g.	16 5	to 16 10	3.21 to	3.26
Cold rolled steel strip,				
Cotton ties, Indian speci-				

Continental Prices, All F. O. B. Channel Ports, Delivery as Specified

				C. per Lb.
				1.46
				1.62
Merchant bars:				
Belgium, Nov., Dec..	7 10	to 7 12½	1.48 to	1.51
Luxemb'g, Nov., Dec.	7 10	to 7 15	1.48 to	1.53
France, Nov., Dec....	7 10	to 7 12½	1.48 to	1.51
Germany, Jan., Feb.	7 10		1.48	
Joists (beams):				
France, Oct.	6 15	to 7 2½	1.33 to	1.41
Belgium, Oct.	6 15	to 7 2½	1.33 to	1.41
Luxemb'g, Oct., Nov.	7 0	to 7 2½	1.38 to	1.41
Channels:				
Belgium	7 10	to 7 12½	1.48 to	1.51
⅜-in. plates:				
Germany, Nov., Dec.	8 0		1.58	
Belgium, Sept., Oct..	7 10	to 8 0	1.48 to	1.58
Luxemburg, Oct.	7 12½	to 7 15		
France, not offered.				
⅛-in. plates:				
Germany	9 0		1.78	
No. 9 gage wire:				
Belgium, August ...	14 10⅝		2.87	

American Pig Iron Buying—More Blast Furnaces to Start—German Offer for Old Liners

LONDON, ENGLAND, Sept. 7.—The continued demand for pig iron from American consumers has led to an improved tone, and already some prices have been advanced by about 2s 6d a ton. America has been buying Cleveland, Midland and Lincolnshire material, as well as some small purchases from the continent. Scotch pig iron seems now to be too dear. In the Cleveland district there are 29 furnaces in blast, but if the demand from the United States is sustained some increase in output is likely. There is talk of relighting another seven or eight furnaces soon. No. 3 Cleveland is now quoted at 90s—for either the home trade or for export. Hematite quotations keep firm in spite of only a moderate demand, and makers still have considerable stocks to work off before increasing the output. Sellers of East Coast mixed numbers quote 89s to 91s 6d.

In the finished iron and steel market, now that the holidays are over, traders are beginning to look to some good autumn business. The home trade is showing more interest, but the export markets, particularly on the continent, are quiet. Steel makers' order books, however, are somewhat healthier, but the volume of new business is far from equal to capacity. The reductions in prices since control was abolished, were of course right, but the continent is still able to compete, though deliveries from that side are much prolonged.

Among some recent contracts of interest is one for water turbines and an electrical plant for India, which has been secured by Messrs. Vickers & Co. Sir William Arrol & Co., Glasgow, have been awarded a large part of the contract for the construction of a new dry dock at Sunderland. The dock is to be 500 ft. long and 75 ft. broad, and will be considerably larger than any existing dry dock on the river Weir.

Some of the leading shipping companies of Germany have been making definite offers for some of the German liners, which were handed over to this country under the peace treaty terms, and were bought by British companies from the reparations commission. It is stated that these vessels are required for services between Germany and the United States. The prices which the German buyers are offering are considerably above those which the British companies pay. So far, however, all offers have been rejected.

A Walworth warehouse is being erected on Jackson Avenue, Long Island City, New York, for the Walworth Mfg. Co., Boston, by Dwight P. Robinson & Co., New York. The plant will include a three-story and basement concrete building capable of receiving three floors later on, a garage to accommodate eight trucks, a pipe storage building and a pipe shop extension at the rear of the main building, besides the necessary retaining walls, platforms, railroad sidings and the like. The pipe storage building is to be 60 x 214 ft., served with a crane running out over the railroad siding.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Plates

Sheared, tank quality, base, per lb.....2.00c. to 2.25c.

Structural Material

Beams, channels, etc.....2.00c. to 2.25c.

Iron and Steel Bars

Soft steel bars, base, per lb.....1.90c. to 2c.
Refined iron bars, base, per lb.....2.50c.

Hot-Rolled Flats

Hoops, base, per lb.....2.75c. to 3c.
Bands, base, per lb.....2.75c. to 3c.
Strips, base, per lb.....2.75c. to 3c.
Cotton ties, per bundle of 45 lb.....$1.12

Cold-Finished Steels

Bars and shafting, base, per lb.....2.50c.
Strips, base, per lb.....4.25c. to 4.50c.

Wire Products

Nails, base, per keg.....$2.60 to $2.75
Bright plain wire, base, per 100 lb..... 2.35 to 2.50
Annealed fence wire, base, per 100 lb..... 2.35 to 2.50
Galvanized wire, base, per 100 lb..... 2.85 to 3.00
Galvanized barbed, base, per 100 lb..... 3.15 to 3.40
Galvanized staples, base, per keg..... 3.15 to 3.40
Painted barbed wire, base, per 100 lb..... 2.65 to 2.90
Polished staples, base, per keg..... 2.65 to 2.90
Cement coated nails, base, per count keg.....2.10c. to 2.35c.
Woven fence, carloads (to jobbers).70½ to 72 per cent off list
Woven fence, carloads (to retailers).68 to 69½ per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads.60 and 10 per cent off list
Machine bolts, small, cut threads.50, 10 and 10 per cent off list
Machine bolts, larger and longer..50, 10 and 10 per cent off list
Carriage bolts, ⅜ x 6 in.:
Smaller and shorter, rolled threads, 50, 10 and 10 per cent off list
Cut threads .....50 and 10 per cent off list
Longer and larger sizes.....50 and 10 per cent off list
Lag bolts .....60 and 10 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads....50 and 10 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.:
Smaller and shorter.....45 and 10 per cent off list
Larger and longer sizes.....45 and 10 per cent off list
Hot pressed square or hex. blank nuts.....$3.75 off list
Hot pressed nuts, tapped..... 3.75 off list
C.p.c. and t. sq. or hex. nuts, blank..... 3.75 off list
C.p.c. and t. sq. or hex. nuts, tapped..... 3.75 off list
Semi-finished hex. nuts:
9/16 in. and smaller, U. S. S.....80 per cent off list
⅝ in. and larger, U. S. S.....75 per cent off list
Small sizes, S. A. E.....80 and 10 per cent off list
S. A. E., ⅝ in. and larger.....75 and 10 per cent off list
Stove bolts in packages.....80 and 5 per cent off list
Stove bolts in bulk.....80, 5 and 2½ per cent off list
Tire bolts .....50, 10 and 10 per cent off list

Cap and Set Screws

Milled square and hex. head cap screws....75 per cent off list
Milled set screws.....75 per cent off list
Upset cap screws.....75 and 10 per cent off list
Upset set screws.....80 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb.....$3.00
Large boiler rivets, base, per 100 lb..... 3.10
Small rivets .....65 to 65 and 5 per cent off list

Track Equipment

Spikes, 9/16 in. and larger, base, per 100 lb....$2.75 to $2.85
Spikes, ½ in. and smaller, base, per 100 lb..... 3.00 to 3.50
Spikes, boat and barge, base, per 100 lb..... 3.00 to 3.50
Track bolts, base, per 100 lb..... 3.75 to 4.50
Tie plates, per 100 lb..... 2.25
Angle bars, base, per 100 lb..... 2.40

Welded Pipe

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	51½	26	¼ to ⅜	+7	+33
¼ to ⅜	57	31½	½	26	8
½	62	45½	¾	12	15
¾	66	54½	1 to 2	13	19
1 to 3	68	56½			

Lap Weld

2	61	49½	4	3	2
2½ to 6	65	53½	4½ to 6	4	3
7 to 8	62	49½	7 to 12	3	2
9 to 12	61	48½			

Butt Weld, extra strong, plain ends

⅛	47½	31	¼ to ⅜	15	1
¼ to ⅜	53	36½	½	21	1
½	59	48½	¾	20	1
¾	64	53½	1	21	1
1 to 1½	66	55½	1¼ to 2	21	1
2 to 3	67	56½			

Lap Weld, extra strong, plain ends

2	59	48½	2	30	17
2½ to 4	63	52½	2½ to 4	33	21
4½ to 6	62	51½	4½ to 6	32	20
7 to 8	58	45½	7 to 8	25	13
9 to 12	52	39½	9 to 12	20	8

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 and 2½ per cent.

Boiler Tubes

Lap Welded Steel		*Charcoal Iron*	
1¾ in.	23½	1½ in.	+2
2 to 2¼ in.	38	1¾ to 1⅞ in.	8
2½ to 3 in.	49	2 to 2¼ in.	18
3¼ to 13 in.	54	2½ to 3 in.	23
		3¼ to 4½ in.	25

To large buyers of steel tubes a supplementary discount of 5 per cent is allowed.

Standard Commercial Seamless Boiler Tubes

Discounts on cold-drawn tubes in carload lots, f.o.b. Pittsburgh, follow:

1 in.	57	2½ and 2¾ in.	40
1¼ and 1½ in.	49	3 in.	44
1¾ in.	33	3¼ to 4 in.	49
2 and 2¼ in.	36	4¼ in. and 5 in.	41

Hot Rolled

3 in.	46	3¼ to 4 in.	51

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base, 85 per cent off list. Carbon 0.30 to 0.40, base, 83 per cent off list. Plus usual differentials and extras for cutting.

Seamless Locomotive and Superheater Tubes

Cents per Ft.		Cents per Ft.	
2-in. O.D. 12 gage	13	2¼-in. O.D. 10 gage	17¾
2-in. O.D. 11 gage	14	3-in. O.D. 7 gage	33
2-in. O.D. 10 gage	15	1¼-in. O.D. 9 gage	13
2¼-in. O.D. 12 gage	15	3¼-in. O.D. 9 gage	51
2¼-in. O.D. 11 gage	16	5½-in. O.D. 9 gage	53

Tin Plate

Standard cokes, per base box.....$4.75

Terne Plate

(Per package, 200-lb.)

8-lb. coating	$9.30	25-lb. coating I. C.	$14.25
8-lb. coating I. C.	9.60	30-lb. coating I. C.	15.25
15-lb. coating I. C.	11.50	35-lb. coating I. C.	16.25
20-lb. coating I. C.	13.00	40-lb. coating I. C.	17.25

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....2.50c. to 2.75c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.35c. to 3.75c.

Galvanized

No. 28 (base), per lb.....4.35c. to 4.75c.

Tin-Mill Black Plate

No. 28 (base), per lb.....3.35c. to 3.50c.

Manufacturers have pamphlets, which can be had upon application, giving price differentials for gage and extras for length, width, shearing, etc.

Freight Rates

All rail freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic.	$0.325	Buffalo	$0.265	St. Louis	$0.43
Philadelphia, export	0.235	Cleveland	0.215	Kansas City	0.735
Baltimore, domestic	0.315	Cleveland, Youngstown		Kansas City (pipe)	0.705
Baltimore, export	0.225	Comb.	0.19	St. Paul	0.595
New York, domestic	0.34	Detroit	0.295	Omaha	0.735
New York, export	0.255	Cincinnati	0.295	Omaha (pipe)	0.705
Boston, domestic	0.365	Indianapolis	0.31	Denver	1.275
Boston, export	0.255	Chicago	0.34	Denver (pipe)	1.215

Pacific Coast	$1.50		
Pac. Coast, ship plates	1.20		
Birmingham	0.69		
Memphis	0.385		
Jacksonville, all rail	0.50		
Jacksonville, rail and water	0.415		
New Orleans	0.515		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 30c. to 40c.; ship plates, 30c. to 40c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 30c. to 40c.; sheets and tin plates, 50c.; rods, wire rope, cable and strands, 75c.; wire fencing, netting and stretcher, 50c.; pipe, not over 8 in. in diameter, 50c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

AUGUST IN FABRICATED STEEL

Bureau of Census Has Figures for Five Months from 125 Firms

WASHINGTON, Sept. 19.—Sales of fabricated structural steel in August showed a slight increase over the figure reached in July, according to the Bureau of Census. August sales amounted to 65.2 per cent of shop capacity, compared with 62 per cent in July and 72 per cent in June.

Reports have been received from 125 firms for each of the five months April to August, inclusive. Those 125 firms report a total shop capacity of 208,245 tons per month. The actual sales for the past five months reported by those 125 identical firms have been as follows:

Month	Tonnage Booked	Per Cent of Capacity*
April	[illegible]	[illegible]
May	[illegible]	[illegible]
June	124,867	72.0
July	129,160	62.0
August	135,843	65.2

*The [illegible] of each month has made slight revisions in the per cent of capacity reported previously.

FABRICATED STEEL BUSINESS

Drop in Volume of New Inquiry But Numerous Awards

Among the fabricated steel awards of the past week are the following:

National Theater, Richmond, Va., 350 tons, to the Richmond Structural Steel Co.

Power house for New York State at Crescent, N. Y., 300 tons, to the American Bridge Co.

Walker Hotel, Washington, 4000 tons, to the American Bridge Co.

Two wings, American Museum of Natural History, New York, 1600 tons, to American Bridge Co.

Addition to the Girard Trust Co. building, Philadelphia, 1200 tons, to the Phoenix Bridge Co.

Five bridges, Pennsylvania Railroad, 1000 tons, to the Phoenix Bridge Co.

Ballinger Building, Philadelphia, 1300 tons, to the Shoemaker-Satterthwait Bridge Co.

Magnetic Pigment Co., Trenton, N. J., 200 tons, to the American Bridge Co.

Horn & Hardart, Philadelphia, 230 tons, to McClintic-Marshall Co.

Apartment hotel, 299 Park Avenue, New York, 4000 to 5000 tons, reported awarded to the New York Ship Building Corporation, may be awarded, it is now stated, to Post & McCord.

School and church, Knickerbocker Avenue, Brooklyn, 350 tons, to A. E. Norton, Inc.

Apartment, East Eighty-sixth Street, New York, 1000 tons, to the Hinkle Iron Co.

Union Pacific system, single track through riveted spans for bridge over Columbia River, east of Hedges, Ore., 2735 tons, to American Bridge Co.

Chicago, Burlington & Quincy, bridge work, 1056 tons, to American Bridge Co.

Foundry building, Seattle, for Washington Iron Works, 911 tons, to the Austin Co., Cleveland.

Two single-track through plate girder spans for Missouri Pacific, 275 tons, to American Bridge Co.

Power house for Santa Fe at San Bernardino, Cal., 246 tons, to American Bridge Co.

Steel for housing machinery, Missouri Portland Cement Co., Prospect Hill, St. Louis County, Mo., 230 tons, to American Bridge Co.

Draw span over Nehalem River for Tillamook County, Ore., 188 tons, to Pacific Iron Works.

Tractor works, wheel shop building, International Harvester Co., Chicago, 170 tons, to unnamed fabricator.

Extension to Commonwealth Steel Co., Granite City, Ill., [illegible]

Through plate girder span, Spadra, Ark., for Missouri Pacific, 135 tons, to American Bridge Co.

Buildings for Sanitary District, Chicago, 104 tons, to unnamed fabricator.

Morris & Co., Stockyards Building, Chicago, 200 tons, to A. Holters Sons.

Eagles' clubhouse, Davenport, Iowa, 100 tons, to Davenport Machine & Foundry Co.

Auditorium, Washington, 1100 tons, to Lehigh Structural Steel Co.

Skelton Shovel Co., Dunkirk, N. Y., 150 tons, to Kellogg Structural Steel Co., Buffalo.

Odd Fellows' new building at Silver Creek, N. Y., 150 tons, to Kellogg Structural Steel Co.

National Life & Accident Assurance Co. office building, Nashville, Tenn., 500 tons, to International Steel & Iron Co.

Highway bridge, Clarksville, Tenn., 540 tons, to Nashville Bridge Co.

Highway bridge, Montgomery County, Ohio, 600 tons, to Brookville Bridge Co.

Chapel at Denison University, Granville, Ohio, 125 tons, to Mott Iron Works.

High school, Somerville, Mass., 150 tons, to the New England Structural Co., Boston.

High school, Medford, Mass., 150 tons, to the New England Structural Co.

Westinghouse Lamp Co., Bloomfield, N. J., 150 tons, to the Phoenix Bridge Co.

Power station, Bennings, D. C., 100 tons, to the New York Shipbuilding Co.

Structural Projects Pending

Inquiries for structural steel work now being figured on include the following:

Edison Co. power station, South Boston, 950 tons.

Highway bridge, Lowell, Mass., 235 tons.

Exchange National Bank, Tampa, Fla., 140 tons.

Eighteen-story addition to First National Bank Building, Chicago, 400 tons.

State Library, Lawrence, Kan., 500 tons, bids received and project postponed.

Consumers Power Co., Jackson, Mich., heating plant at Grand Rapids, 115 tons.

Indiana Quarries Co., Bedford, Ind., new plant, 600 tons, bids in.

J. A. Fay & Egan Co., new plant, Cincinnati, 900 tons, bids in.

Hotel at Bridgeton, N. J., 300 tons; general contract let to F. V. Moore, Philadelphia.

Addition to Corn Exchange Bank, Philadelphia, 300 tons; bids close Sept. 27.

Plant for the Toledo Libby-Owens Sheet Glass Co., Toledo, 5000 tons.

Baseball grandstand, Buffalo, tonnage unnamed.

Cuyahoga County grade crossing elimination, Cleveland, 500 tons.

RAILROAD EQUIPMENT BUYING

Activity in Locomotives Continues Conspicuous With Some Fresh Car Inquiries

Buying of locomotives is noteworthy, although inquiries of railroad cars and car parts continue in fair volume. Some of the notable items are as follows:

New York Central, 90 locomotives, placed with American Locomotive Co.

Baltimore & Ohio, 50 Mikado type locomotives, awarded to Baldwin Locomotive Works.

Erie Railroad, 30 additional Mikado type locomotives, placed with Baldwin Locomotive Works.

Nashville, Chattanooga & St. Louis, 7 locomotives, placed with Baldwin Locomotive Works.

The Santa Fe expects to enter the market for 100 locomotives and the Rock Island and the Burlington for about 50 each. The Duluth & Iron Range is inquiring for 8 Mikado type engines.

The Western Maryland is inquiring for 10 consolidation type engines.

The Chesapeake & Ohio is in the market for 50 Mallet type locomotives.

The Norfolk & Western has placed 12 Mallet type engines with Baldwin Locomotive Works.

Fruit Growers Express Co., 1000 underframes under inquiry.

Baltimore & Ohio, in the market for 30 baggage cars.

Chicago & Northwestern, in market for 800 50-ton gondolas and 200 55-ton flat cars.

Norfolk Southern, inquiring for 240 steel center constructions.

Champlin Refining Co., Enid, Okla., ordered 500 tank cars of Pennsylvania Tank Car Co., Sharon, Pa.

The Chicago & Eastern Illinois has placed 17 baggage cars with the Pullman Co.

The Illinois Central has placed 75 caboose cars with the American Car & Foundry Co.

The Pittsburgh Street Railways Co. is inquiring for 100 street cars.

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
Sept	Lake	Electrolytic*	New York	New York	St. Louis	New York	St. Louis
13	14.12½	13.75	32.20	6.05	5.—	6.75	6.40
14	14.12½	13.75	32.12½	6.10	5.75	6.80	6.45
15	14.12½	13.75	32.12½	6.12½	5.80	6.85	6.50
16	14.12½	13.75	....	6.12½	5.80	6.90	6.55
18	14.12½	13.75	32.12½	6.12½	5.80	6.95	6.60
19	14.12½	13.75	32.12½	6.25	5.90	7.00	6.65

*Refinery quotation.

New York

NEW YORK, Sept. 19.

The most inactive and dullest of the markets is tin, but the rest show different degrees of activity and strength. The copper market is moderately active and strong. Pronounced activity and advancing prices characterize both the lead and zinc markets. The antimony market is also strong.

Copper.—Producers and selling agencies report a good business in copper almost daily but prices have not increased though they have become firmer and the absence of any cheaper lots is pronounced. There is also a very good demand for export. Electrolytic copper is firm at 14c., delivered, or 13.75c., refinery, for the balance of the year. Not much interference with deliveries is reported because of railroad transportation conditions.

Tin.—On only two days in the past eight has there been any activity in the Straits tin market. The principal feature of the market has been that there were sellers at 32.12½c. and buyers at 32c. with difficulty as to an agreement as to a sale price. The fairly liberal sales referred to in this paragraph a week ago, as having been made Sept. 12, amounted to about 500 to 600 tons of Straits tin. On Sept. 13 there was also some business amounting to 250 to 300 tons. On other days the conditions referred to prevailed because of the relative attitude of sellers and buyers. It has been believed in the market that when the price reached 32c. there would be a rush to buy but this was only partly realized on Sept. 12. The market today has been moderately active with the quotation at 32.12½c., New York, for spot Straits. The London market today was approximately the same as a week ago at £158 15s for spot Standard, £159 17s 6d for future Standard and £159 per ton for spot Straits. Arrivals thus far of this month have been 3350 tons. The quantity afloat is reported as 7728 tons.

Lead.—A heavy demand resulting in a very strong market has characterized the week. The American Smelting & Refining Co. advanced its prices on Sept. 14, 10 points to 5.80c., St. Louis, or 6c, New York, and again today to 5.90c., St. Louis, or 6.10c., New York, but the outside market has advanced almost daily until today the sales have been made up to 5.90c., St. Louis, or 6.25c., New York. Practically all sellers have disposed of their September production and in some cases their October output has been heavily sold. Undoubtedly a scarcity of the metal is likely to develop.

Zinc.—The advancing tendency of the market noted a week ago has gone on rapidly until prime Western for early delivery is difficult to obtain. Sales were made today at 6.65c. to 6.70c., St. Louis, or 7c. to 7.05c., New York, the advance having been progressive practically every day since a week ago. The increase in quotation for the week represents about 30 points. The metal is selling higher than at any time in 1921 or since. Difficulty in obtaining ore as well as labor, together with coal and transportation hindrances, are the controlling causes, accentuated of course by an increased demand from consumers. Producers have sold practically all of their September output and some of their October, as in the case of lead.

Antimony.—Wholesale lots of Chinese metal for early delivery are quoted at 6.75c. per lb., New York, duty paid.

Aluminum.—The leading producer continues to quote wholesale lots of virgin metal, 98 to 99 per cent pure, for early delivery at 19.10c. per lb., f.o.b. plant, with the same grade offered by importers and produced in various foreign countries at 17.75c. to 18c. per lb., duty paid, New York.

Old Metals.—The market continues strong, but business appears to be marking time. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	13.50
Copper, heavy and wire	12.75
Copper, light and bottoms	11.25
Heavy machine composition	10.50
Brass, heavy	8.25
Brass, light	6.50
No. 1 red brass or composition turnings	9.00
No. 1 yellow rod brass turnings	7.50
Lead, heavy	5.00
Lead, tea	4.00
Zinc	4.00

Chicago

Sept. 19.—Lead, zinc and antimony have advanced in a quiet market. The strength in lead and zinc is attributed to the long idleness of numerous smelters. The old metals remain unchanged. We quote, in carload lots, lake copper, 14.25c.; tin, 33.50c. to 34c.; lead, 5.95c.; spelter, 6.70c.; antimony, 8.50c., in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips,, 11c.; copper bottoms, 9.25c.; red brass, 8.75c.; yellow brass, 6.75c.; lead pipe, 4.50c.; zinc, 3.75c.; pewter, No. 1, 20c.; tin foil, 22.50c.; block tin, 26c., all buying prices for less than carload lots.

St. Louis

Sept. 19.—The lead market was strong during the week at an advance of 15 points, while slab zinc was firm and 25 points higher. We quote carlots: Lead, 5.80c.; slab zinc, 6.50c. On old metals we quote: light brass, 3.50c.; heavy red brass and light copper, 7c.; heavy yellow brass, 4c.; heavy copper and copper wire, 7.50c.; zinc, 2c.; pewter, 15c.; tin foil, 16c.; tea lead, 2c.; aluminum, 9c.

Effects of Railroad Congestion in the Youngstown District

YOUNGSTOWN, Sept. 19.—Congestion at shipping platforms of sheet rolling plants because of car shortage may force curtailment of production, as rollers are disinclined to accumulate large stocks of the finished product against possible decline in buying.

President James A. Campbell of the Youngstown Sheet & Tube Co. believes railroads will be able to deliver coal in sufficient quantities to maintain independent production in this territory at 70 per cent. The company will not re-light its two Hubbard blast furnaces until after the close of navigation. Mr. Campbell looks for continued interruption to shipping through the winter because of inadequate condition of locomotive equipment.

The A. M. Byers Co. has arranged to secure Connellsville beehive coke for its Girard stack scheduled to be blown in this week. The Republic Iron & Steel Co. is preparing its Hannah furnace at Youngstown and the fifth stack in its Hazleton group for re-lighting.

The Atlas Steel Corporation will be the name of the new company to be formed by the merger of the Electric Alloy Steel Co., Youngstown, Ohio, and the Atlas Crucible Steel Co., Dunkirk, N. Y., producers of high-speed and special analysis steels. Gross capital assets of the two constituents are about $12,000,000. Until completion of the merger the companies are operating under unified management, with L. J. Campbell, president of the Electric Alloy company, as chairman of the board and chief executive officer, located at Dunkirk.

Philadelphia Iron and Steel Market

(*Continued from page 750D*)

Pennsylvania steel company; 2000 tons of basic to a New England wire company at about the same price; 5000 tons of gray forge iron to a maker of bar iron at well above $30, furnace, this iron, however, being of special quality, and 1000 tons of No. 2X to an electrical machinery manufacturer at $33, furnace. A Virginia cast iron pipe manufacturer is reported to have placed an order for a substantial tonnage with a Virginia furnace which will be blown in shortly. The Midvale Steel & Ordnance Co. will blow in a second furnace at Coatesville on Oct. 1, which will operate for at least two weeks on foundry iron, which is being offered for sale, and the same company now has five stacks in blast at its Johnstown plant and a sixth will be blown in next Sunday. Foundry iron is also being offered for shipment from Johnstown. The Alan Wood Iron & Steel Co. is having its No. 3 furnace relined and as soon as this work is completed it will be blown in. Prospects of regular merchant furnaces becoming active are not bright under present conditions in the coke market.

The following quotations are, with the exception of those [illegible] for delivery at Philadelphia, and include freight rates varying from 76 cents to $1.64 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$33.26 to $35.64
East. Pa. No. 2X, 2.25 to 2.75	34.26 to 36.64
East. Pa. No. 1X	35.26 to 37.64
Virginia No. 2 plain, 1.75 to 2.25 sil.	37.17
Virginia No. 2X, 2.25 to 2.75 sil.	38.17
Basic delivered eastern Pa.	31.00 to 33.00
Gray forge	31.00 to 33.00
Malleable	35.00 to 36.00
Standard low phos. (f.o.b. furnace)	38.00 to 40.00
Copper bearing low phos. (f.o.b. furnace)	37.00 to 38.00

Ferroalloys.—Car load lots of resale ferromanganese have been sold at $85 and $90, seaboard. For forward delivery importers of British ferromanganese continue to offer at $67.50, seaboard, the buyer to pay the new duty. The New Jersey Zinc Co. is keeping its furnace in blast on spiegeleisen, having obtained coke from abroad, and is offering the 16 to 19 per cent grade at $38 and the 19 to 21 per cent grade at $39, furnace.

Semi-Finished Steel.—Prices quoted for semi-finished steel are firm. Rerolling billets can not be obtained for less than $40, Pittsburgh, nor forgings billets for less than $45, while on some lots higher prices have been paid. A sale of 1000 tons of forging billets at $47.50, Pittsburgh, is reported. The American Locomotive Co. is in the market for about 5000 tons of forging billets of special quality.

Rails.—Nearly all of the Eastern railroads are figuring on their 1923 rail requirements, and although formal inquiries have not been issued in all cases, it is expected that the Pennsylvania will require about 200,000 tons, the Philadelphia & Reading, 13,000 tons, the Norfolk & Western, 25,000 tons. The Baltimore & Ohio will also buy, but its tonnage has not been named. Eastern companies which roll rails have quoted on 200,000 tons for the New York Central. Light rails are in good demand at 2.25c., Pittsburgh.

Plates.—Locomotive buying is responsible for most of the important plate demand. About 4000 tons has been placed by the Baldwin Locomotive Works for the 100 engines recently ordered by the Pennsylvania Railroad; about 2000 tons for 50 ordered by the Baltimore & Ohio; about 1000 tons will be required for 30 additional locomotives ordered by the Erie; the Norfolk & Western has contracted for 12, and the Nashville, Chattanooga & St. Louis for 7. The Chesapeake & Ohio is inquiring for 50. Otherwise plate orders are in small volume, and mills which are quoting 2.25c. to 2.50c., Pittsburgh, are not finding it easy to book orders except in very small lots. The minimum on plates appears to be 2.10c., Pittsburgh, quoted by only one mill, but some others have named 2.15c. and 2.20c. on desirable lots. Plate production at Eastern mills is increasing. The Midvale plant at Coatesville will this month turn out about 15,000 tons, which is slightly more than 50 per cent of capacity. We quote sheared plates at 2.10c. to 2.50c., Pittsburgh.

Structural Steel.—Prices on fabricated steel work are working lower. An office building in Philadelphia, for which contract has been let, went at $81, erected, which was about $10 per ton below the next lowest price. Several structural jobs in the Philadelphia district which have been let are reported in another column. Plain material is quoted from 2.10c. to 2.25c., Pittsburgh.

Bars.—Steel bars are selling from 2c. to 2.25c., Pittsburgh, but it is becoming more difficult for the mills quoting 2.25c. to get that price and some concessions of $2 or $3 a ton have been made. Business is in moderate volume. One mill is quoting bar iron at 2.15c., Pittsburgh, but others in the East ask 2.25c. for carload lots.

Sheets.—The new level of prices on sheets is 2.75c. for blue annealed, 3.75c. for black and 4.75c. for galvanized, all base Pittsburgh, with lighter gages of galvanized having been quoted as high as 4.90c. Many consumers are covered at the former prices, but some business has been done for early shipment at the higher level.

Warehouse Business.—Local jobbers have advanced cold rolled steel $5 a ton. Other prices are unchanged. We quote for local delivery as follows:

Soft steel bars and small shapes, 2.90c.; iron bars (except bands), 2.90c.; round edge iron, 3.10c.; round edge steel, iron finish, 1½ x ½ in., 3.10c.; round edge steel planished, 3.85c.; tank steel plates, ¼-in. and heavier, 3c.; tank steel plates, 3/16-in., 3.20c.; blue annealed steel sheets, No. 10 gage, 3.85c.; black sheets, No. 28 gage, 4.60c.; galvanized sheets, No. 28 gage, 5.75c.; square twisted and deformed steel bars, 3c.; structural shapes, 3c.; diamond pattern plates, ¼-in., 4.80c.; 3/16-in., 5c.; spring steel, 4.25c.; round cold-rolled steel, 3.85c.; squares and hexagons, cold-rolled steel, 4.35c.; steel hoops, No. 13 gage and lighter, 4.50c.; steel bands, No. 12 gage to 3/16-in., inclusive, 3.70c.; rails, 2.90c.; tool steel, 8.50c.; Norway iron, 5.50c.

Coke.—Much to the surprise of those who had expected that coke prices would continue to show declines because of better coal supply, the market has stiffened within the past few days, due, it is stated, to inadequate car supply rather than to lack of coke. Whereas a week ago furnace coke was offered at $10, Connellsville, it now is quoted at not less than $11, and foundry coke is also $1 a ton higher at a minimum of $13, Connellsville. By-product coke is offered at $13.50 to $14, Swedeland, Pa.

Old Material.—There have been advances on nearly all grades of scrap from 50c. to $3 or more a ton on top of similar advances which were recorded a week ago. A strong demand, coupled with rising prices, has created an excited market. Brokers are freely offering $21, Pittsburgh, for No. 1 heavy melting steel and $18, delivered at eastern Pennsylvania steel works. The Alan Wood Iron & Steel Co. bought 10,000 tons at this price, and the market advanced so rapidly that the sellers, it is reported, were unable to cover fully at a profit. Our quotation on low phosphorus scrap has been advanced $3.50 a ton, based on a sale of 1000 tons of plate croppings at about $25.50, delivered, while an Eastern mill has quoted $26, f.o.b. mill, on a tonnage of billet crop ends.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$18.00 to $18.50
Scrap rails	[illegible]
Steel rails for rolling	21.00 to 22.00
No. 1 low phos., heavy 0.04 and under	25.50 to 26.00
Cast iron car wheels	23.00 to 24.00
No. 1 railroad wrought	22.00 to 23.00
No. 1 yard wrought	[illegible]
No. 1 forge fire	[illegible]
Bundled sheets (for steel works)	[illegible]
No. 1 busheling	14.50 to 15.50
Turnings (short shoveling grade for [illegible])	[illegible]
Mixed borings (for [illegible])	[illegible]
Machine-shop turnings (for steel works use)	[illegible]
Machine-shop turnings (for rolling mill use)	[illegible]
Heavy axle turnings (or equivalent)	17.00 to 17.50
Cast borings (for steel works and rolling mills)	[illegible]
Cast borings (for chemical plants)	23.00 to 25.00
No. 1 cast	[illegible]
No. 1 [illegible]	[illegible]
Railroad grate bars	16.00 to 16.50
Stove plate (for steel plant use)	16.00 to 16.50
[illegible]	[illegible]
[illegible]	[illegible]
Shafting	23.00 to 24.00
Steel axles	28.00 to 30.00

PERSONAL

J. G. Carruthers, manager of sales, Chicago district, Illinois Steel Co. and special sales agent Carnegie Steel Co., with headquarters at Chicago, has resigned to become general sales manager of the Otis Steel Co., Cleveland. Mr. Carruthers was born at Covington, Ky., Feb. 9, 1878. His first connection with the steel industry was with the Columbus Bridge Co., Columbus, Ohio, of which he was secretary. From Columbus he went to Cincinnati, where he was assistant manager of sales Cambria Steel Co. In 1908 he was appointed manager of sales the Cincinnati district office Carnegie Steel Co., remaining in that position until 1919, when he went to Chicago to take the office he is now leaving. He succeeds D. W. Glanzer, resigned, who has been associated with the sales department of Otis Steel Co. for over 20 years.



J. G. CARRUTHERS

David T. Buffington, of the structural and plate bureau, general sales department, Illinois Steel Co., has been appointed manager of sales, Chicago district, for that company and special sales agent of Carnegie Steel Co., with offices at Chicago, succeeding J. G. Carruthers, resigned.

Gustavus Pratt has been in the employ of the Stanley Works, New Britain, Conn., for 60 years. Mr. Pratt's father was employed in the same company for 65 years, the combined service being 125 years. In these times of unusual labor turnover, this record of long and efficient service is noteworthy.



GUSTAVUS PRATT

H. T. Burrows, Appleton, Wis., has been elected secretary Malleable Iron Range Co., Beaver Dam, Wis., to fill the vacancy caused by the death of A. S. Bowron. Mr. Burrows for some time has been associated with the Fox River Valley Paper Co., Appleton.

George R. Fink has resigned as general sales manager West Penn Steel Co., Brackenridge, Pa., to become affiliated with a new company which will build a sheet plant in Detroit.

J. Fred Townsend, traffic manager National Tube Co., Pittsburgh, has been elected vice-president of the Lake Terminal Railroad, the McKeesport Connecting Railroad and the Benwood & Wheeling Connecting Railroad, rail subsidiaries of the National Tube Co.

Harry J. Foss has been elected president of the Berkshire Mill Supply Co., Pittsfield, Mass., filling the vacancy caused by the recent death of Charles E. Hibbard.

Louis H. Egan, president Union Electric Light & Power Co., St. Louis, has been elected president of the Union Colliery Co., a subsidiary of the electric company, to succeed Eugene McAuliffe, resigned. Frank J. Boehm, vice-president and L. E. Young, manager of the steam heating department of the electric company, have been made vice-president and general manager respectively of the colliery company.

R. A. DeVlieg has resigned his position as chief engineer and factory manager of the Handley-Knight Co., Kalamazoo, Mich., to become tool engineer of the Maxwell Motor Corporation, Detroit.

W. S. Rugg, assistant to vice-president, Westinghouse Electric & Mfg. Co., has been appointed to the newly created position of general manager of sales of that company.

E. K. Morgan, general superintendent Rockford Drilling Machine Co., has resigned his position to assist in supervising the design of special machinery for the Ingersoll Milling Machine Co., also of Rockford, Ill. He retains his financial interest in the Rockford Drilling Machine Co., and is still a member of its board of directors.

OBITUARY

Death of H. H. Campbell

HARRY HUSE CAMPBELL, for years superintendent and general manager of the Pennsylvania Steel Co. at Steelton, Pa., died last week at the age of 63. Following his graduation from Massachusetts Institute of Technology, he took up work at Steelton in a minor capacity, and for practically all his career in steel making he was identified with that plant. As metallurgical engineer he was connected also with the kindred companies, the Maryland Steel Co. and the Spanish-American Iron Co. Mr. Campbell's most important investigations were into the principles and practice of the open-hearth steel process, these being embodied in his well-known work, "The Manufacture and Properties of Steel." For the past twelve years, due to serious illness, he has lived in retirement. More extended reference to Mr. Campbell's work will be made in a subsequent issue.



H. H. CAMPBELL

FRANK ADAM, chairman of the board, Frank Adam Electric Co., pioneer manufacturer of electrical goods in St. Louis, died there recently. Mr. Adam came from Germany to the United States in 1853 and went to St. Louis in 1865. He entered the electrical business in 1890.

THOMAS BEADLING, SR., president, North East Coal Mining Co., and treasurer, Colonial Coal & Coke Co., died at his home in Crafton, Pa., Sept. 13. He was an active figure in the coal and coke business in Pittsburgh for many years.

Steel Mill Equipment Orders Placed

The Otis Steel Co., Cleveland, has placed orders for the following additional equipment for its new steel plant: Hot strip mill to the United Engineering & Foundry Co.; 10 cold rolls with the Mesta Machine Co.; five with the Philadelphia Roll & Machine Co. and with the Farrel Foundry & Machine Co.; six strip mill cranes with the Morgan Engineering Co. and a 10,000 kw. turbo-generator and blooming mill and sheet bar mill motors with the General Electric Co.

Evening and Saturday afternoon courses in engineering, beginning Monday evening, Oct. 2, are announced by New York University (engineering section, extramural division, University Heights), New York. The bulletin gives information as to the courses, requirements of admission and tuition costs.

Features of Modern Blast Furnace Practice

(*Concluded from page 734*)

was not over 550 it was not possible to file them. He mentioned these examples in relation to the method of using Brinell as some indication of the successful hardening properties of high speed steel. These statements were rather startling, and he would suggest that quite a number of the members of the institute would like to have small samples of these materials which could be easily filed at Brinell number 650, but which could not be filed at Brinell number 550.

V. STOBIE, Durham, also referred to the point Mr. Brearley had mentioned about not making commercial high-speed steel from turnings. One could not go on getting high-speed steel from scrap, and must start to make something from raw materials. He had had a lot of experience in this direction and had made ten-ton charges of high-speed steel from turnings and had not found the difficulties mentioned in the paper, nor did he find anything like the losses Mr. Ogilvie mentioned. The paper told them that they must expect anything between ten and twenty per cent loss on turnings, if they were going to make high speed steel, but he did not think that the average would be anything like that. It would rather look as though Mr. Ogilvie had not had the best metallurgical conditions in his furnace. That seemed to be proved when he said that if he used high-speed scrap most of the vanadium would have been removed. That was totally unnecessary nowadays. He had plenty of instances where they had melted scrap containing 1 per cent of vanadium and 0.8 was easily left in the bath. When told that it was impossible to use turnings in this country and make the thing commercially practicable one must ask what the experience was on which such an opinion had been founded. He would rather suggest that Mr. Ogilvie see what could be done elsewhere before he turned down as uncommercial the method which alone could give them new material.

Flow of Steels

J. H. S. DICKENSON, Sheffield, presented a paper on the flow of steels at a low red heat, giving details of recent developments in the manufacture of metallic containers capable of withstanding considerable stress at elevated temperatures for long periods. It was found that the nickel-chromium alloy selected for synthetic ammonia producers was better able to resist occasional and intermittent heavy loads at high temperatures than the next best metal, a high-speed steel. Next in order came high chromium steel, with nickel-chrome steel, and 0.3 per cent carbon steel lowest. The most remarkable resistance to oxidation was shown by the nickel-chromium alloy, the next in rate of scaling being the 14 per cent chromium steel, then the high nickel (25 per cent), with high-speed (tungsten), nickel-chrome steel and carbon steel in that order.

In the subsequent discussion H. Brearley remarked that the results which Mr. Dickenson had set out appeared to extend very considerably the knowledge of the properties of steels at high temperatures over and above that type of knowledge that may be obtained by making an ordinary tensile test piece. The paper had focused attention on the behavior of structural parts at high temperatures. He (Mr. Brearley) thought that for most of them the interest of the properties of steels at high temperatures rather resided in the relative difficulty or ease with which they could be deformed under rolls and hammers and so on, and in this particular respect he drew attention to the results of a number of tests which could be very simply made, but which were extremely difficult to explain. He produced a ¼-in. steel bar—almost any kind of steel, so far as he knew, would serve—which had been raised to a temperature of about 1000 to 1100 deg. C. at one end, and then the heat had been allowed to taper down until, 2 in. from the colder end, it was perhaps about 600 C. This bar was gripped at the hot end in a vise, and then on the other end was put an ordinary joiner's brace, and the bar was twisted. One would naturally expect, from all tensile determinations made on steels at high temperatures, that the bar would twist most where it was hottest. What happened in nearly all cases was that where it was hottest they got a twist of a short pitch, and then somewhere down the metal they got a twist of a longer pitch, and then they got a twist of the shortest pitch of all where the end was coldest.

A long paper by G. A. V. Russell on "Reversing Cogging Mills: Their Drives and Auxiliary Equipment" was withdrawn before the meeting. Other papers were very briefly discussed.

Visits were paid to the works of the Staveley Coal & Iron Co., Ltd., and to the works of the Parkgate Iron & Steel Co., Ltd., while on Tuesday W. McConway gave a film demonstration descriptive of his new process for the production of steel discs by centrifugal methods direct from molten steel.

New England Foundrymen's Association

At the September meeting of the New England Foundrymen's Association, held Sept. 13, at the Exchange Club, Boston, cupola practice was the subject under discussion. One of the most important points brought out was that too many foundries relied on common labor to make proper charges in cupolas, whereas instructions often were not closely followed, which resulted in unsatisfactory castings. The opinion was expressed that some person in authority, preferably a foreman, should be maintained on the charging floor.

The executive committee of the association have arranged for a number of addresses by some of the best and most prominent men connected with the foundry industry, during the coming season. H. P. Blumenauer, Arcade Malleable Iron Co., Worcester, Mass., at the October meeting of the association, will deliver an address on handling of materials around the shop. George A. Ray, Taylor-Fenn Co., Hartford, Conn., vice-president of the association, presided at the September meeting in the absence of E. H. Ballard, president.

Plant Observes Fiftieth Anniversary

On Sept. 13, 1872, the first pipe was turned out at the McKeesport, Pa., plant of the National Tube Co., and last Wednesday, the fiftieth anniversary of that event was observed by officials and veteran employees. Among the latter were two who were employed at the plant at its opening and who still are in active harness, Daniel Turley and Patrick Bligh.

The first product of the plant was 2-in. boiler tubes. Now the range of products includes all kinds of tubular goods, of sizes running from ⅛ in. to 30 in. in diameter. The original plant occupied only four acres and consisted of one small building. There are now scores of buildings, one of which is the largest mill under one roof in the world, while the plant as a whole is the largest devoted to tubular products in the world. The number of employees has increased from 100 in 1872 to between 7000 and 8000, and the monthly pay roll, which 50 years ago was about $11,000, now runs up to $1,000,000 when the plant is running full. From 10 car loads a day, production has grown to an average of 100 car loads, and as high as 150 car loads have been produced in one day.

The first general manager of the plant was John H. Flagler, who died recently in Greenwich, Conn. His successors in that position have been the late E. C. Converse, Horace Crosby, G. G. Crawford, William B. Schiller, now president of the National Tube Co., and Taylor Allderdice, now vice-president in charge of operations of the company, while the present general manager is William A. Cornelius.

The Tourist Camp Body Co., Inc., 1726 Prairie Avenue, Chicago, was recently incorporated with a capital stock of $10,000, to manufacture automobile bodies. It is building a plant at the above address. It will build bungalows on wheels, including kitchenette equipment, heating systems and electric lighting. The sheet metal work will be let out to contract. The incorporators are: G. B. Haskell, C. Oscar and H. Joshims.

Control of Raw Material to Suit Output

(*Continued from page 716*)

requisition, Fig. 7, which is the order on the stores department to give the factory the stock required for a certain number of pieces of a specified part. Thus, the requisition for 10,000 pieces of part No. C-88 calls for 112 lb. of ⅜-in. screw rod. This material is given to the foreman of the first department to work on the manufacture of the part, in this case Dept. No. 3.

How the Production Department Is Managed

In the manufacturing methods employed in the plant are observed the same careful principles which are applied in the control of raw and finished material stocks. One feature which impresses the visitor is the paucity of special purpose machines. The explanation lies in the determination of the management to attain efficiency without sacrificing flexibility in production. In other words, the introduction of changes in typewriter design is rendered difficult when special manufacturing machinery is used, because it may require the purchase of entirely new equipment and scrapping the old. On the other hand, alterations in the product are relatively easy to effect with standard machines, as all that is required is the use of new dies, jigs or fixtures.

For the manufacture and repair of dies, jigs and fixtures, as well as circular tools for screw machines, the company has a well-equipped tool room. The benches of the tool makers are placed next to the windows so that they have the best of light. The grinding department is set off in an inclosed chamber in one corner. The tool room also has its own individual hardening department which, because it needs light the least, is located in a part of the room farthest from the windows. Replacements and repairs constitute the principal output of the tool room, as the bringing out of a new typewriter model calls for so much new tooling that purchases must be made outside.

All large tools are kept in a fireproof vault when not in use. There are three compartments in the vault, one for dies, one for jigs and fixtures and a third for circular tool sets. The dies and the jigs and fixtures are stored in metal racks, and are arranged according to the parts of the typewriter for which they are used, being identified by both alphabetical and numerical designations. In addition, the dies are differentiated, as to whether they are used for forming or blanking, by the word "form" or "blank." The screw machine tools are arranged in drawers according to the commoner jobs. This scheme is to prevent unnecessary duplication of tools, as one combination of cams may be used for several jobs and likewise a cam in one drawer may sometimes be used in combination with others in different drawers. Both the tool foreman and the master mechanic have records indicating the location of the tools making up all the combinations used.

All of the smaller tools, such as milling cutters, reamers, slitting saws, taps and dies, drills and counterborers, are purchased, as this is cheaper than to make them. These tools are kept in a tool crib adjacent to the vault. An accurate record, of course, is kept of all tools requisitioned by the production department.

Situated near the tool crib and vault, the raw material store room is, like them, conveniently located with reference to the production department. In point of quantity the two principal materials stored are cold rolled strip steel, from which all stampings are made, and cold drawn steel bars, from which the screw machine products are manufactured. Here also is kept all the tool steel used by the tool room. In filling the daily requisitions for this material, received from the tool room foreman, the store department cuts the steel to length in a hack saw machine. Occasionally, when large diameter material is called for, it is necessary to use a large band saw located in the tool room. All purchased miscellaneous parts, such as wooden cores for the typewriter platens, rubber covers for the platens, knobs, key rings, etc., as well as general factory supplies, are kept in the store room. On an adjacent covered platform castings are stacked to season.

The raw material room is connected by a short aisle with the punch press and screw machine sections of the factory, which are the two primary departments for the production of small parts. Most of the other departments are devoted to secondary or finishing operations, with the drilling, milling, vertical grinding, riveting and polishing machines, and the plating, japanning and hardening divisions of the plant.

Every part of a typewriter is protected in some manner from rust—by white nickeling, black nickeling, oxidizing or japanning. But the precautions taken against rust are no greater than the care exercised in inspection of the parts as they come from the various machines. In some instances, of course, examination by the eye suffices, but parts which must be within close limits are measured with calipers, blueprints indicating the maximum permissible tolerances for the parts being before the inspector while he is measuring.

Castings for the heavier parts of the typewriter are bought outside. There are four main castings in a machine—base, top plate, carriage frame and subframe. Each is machined in a department by itself, for the reason that frequent movement of a bulky material is poor shop practice. The polishing and japanning of the castings must of necessity be done in separate departments devoted to this work, in the one case because of the dust generated and in the other because the parts must be baked in ovens. To minimize the movements between these divisions, therefore, the top plate, sub-frame and base departments are situated between the polishing and the japanning rooms. As the carriage frame is neither polished nor japanned, it is handled in another part of the plant. The operations on the three heavy parts just referred to are similar. First, fins are snagged off and the rust is polished off, whereupon the castings are brought to their respective departments and profiled, drilled and milled—generally in the order stated. The last step is the japanning.

Because of both the relative bulk and the expensiveness of the castings, the production system is arranged so that each part is manufactured by daily quotas. The castings thus are kept moving through the plant, with the result that parts are passing simultaneously through each step in the various finishing operations. This differs from the principle observed in the manufacture of small parts, as already explained. The stock of two-thirds or three-fourths of the small finished parts is normally above minimum, while the remainder will be below—a signal for replenishment.

All completed parts are kept in what is known as the finished stock room. This department has two divisions, one containing all minor units and such single parts as go directly into the final assembly of the typewriter, the other embracing all parts which are entirely finished in themselves but must be assembled into minor units before going into the final typewriter assembly. The assembling of these minor units is done in a department located as near the stock room as proper lighting accommodations permit.

Nesting Done by Women Only

Final assembly of the typewriter is performed in a bay with ample light both from roof monitors and continuous sash in the side walls. In the first stages of the assembly the work is divided into three separate sections according to the three major parts, i.e., the base, top plate and carriage castings. These depart-

ments are parallel to each other and lead into a fourth department where the three units are joined together and various other small parts are inserted.

One of the small assemblies which precedes the complete joining of all parts is "nesting." This consists of fitting all of the 42 typebars so that each will strike exactly "true" in the center of the typebar guide of the machine. To accomplish this the bar is slightly bent or twisted by specially designed pliers. The result required is that each bar fits in the guide so that a piece of cigarette paper will slip past either side without binding or without being loose. This work is extremely exacting and requires an unusual co-ordination of brain and fingers which, it has been found, is possessed only by women. Men tried at this work have failed and, even among women, the number who succeed is not over one in ten.

After the typewriter is completely assembled it passes to the aligning department, where the keys are adjusted so that all letters and figures when typed on a page are on a straight line; thence to the adjusting department, where adjustments are made to obtain a uniform touch for all keys; next to an inspection department, and finally to a dust-proof stock room, from which the machines are withdrawn to be boxed and shipped.

As has just been observed, there is certain work for which women are better adapted than men. In fact, fully one-third of the 500 employees are of the gentler sex. Often they are the daughters or sisters of other operatives and, in some instances, their wives. As typewriter manufacture is the only industry in the city of Woodstock, a community of 6000 people, 50 miles Northwest of Chicago, a large stable body of skilled typewriter mechanics is being developed, with the likelihood that individual families will become as closely identified with the work as is now the case in certain industrial centers in the East, where for generations son has succeeded father in his craft. The population is thoroughly American in the sense that direct foreign ties date back at least to the parents and are no longer strong.

Radical ideas such as make headway among unskilled aliens gain no foothold in this community. As a matter of fact, there is little work about a typewriter plant that might be termed common labor. Most operations require considerable skill, with compensation proportionate, and superior skill is recognized by a piece-work basis of pay. Some work, of course, is of such a character that it cannot be placed on a piece rate scale, and straight hourly wages are therefore paid. The extent and manner of compensation, however, is not the sole factor affecting the psychology of the employees. The personal relations between management and operatives, who know each other as only neighbors in a small town can, and mingle in a spirit of friendly fellowship, have done much to simplify the industrial relations problem.

The Woodstock Typewriter Co. is a growing institution. In 1918 its production was 35 typewriters daily. An addition, housing the present assembly department, was completed in the winter of 1920, and to-day the output is 100 machines per day. It is evident, therefore, that the careful manner in which both raw material and finished stocks are controlled, the well-worked out organization of the production and assembly departments, and the attention paid to employee personnel are producing results.

Scrap Shortage Predicted by Dealers

Is there a potential shortage of steel scrap? Scrap brokers and large dealers who have canvassed the situation thoroughly claim that there is apt to be less scrap this fall than the steel mills will require and that a steadily advancing market is inevitable. Some mills have stored large quantities of scrap which was bought when prices were low. One Eastern mill has a sufficient quantity on hand for several months' operation, but this is not the situation generally.

An eastern scrap company in analyzing the situation finds that the mills in the East, not including those in the Pittsburgh-Johnstown-Youngstown district, are consuming about 90,000 tons of steel scrap a month, and all of these mills are at present active buyers.

This scrap company says that there is practically no steel scrap left in the hands of the small dealers. There are some large stocks held by large dealers, but it is estimated that these stocks in the aggregate are not more than one month's supply for the eastern mills.

Scrap dealers continue to point to the wide spread in the prices of basic pig iron and steel scrap, a difference of $13 a ton in the Pittsburgh market; $11.50 in the Youngstown market, and at least $14 in eastern Pennsylvania, based on last week's market prices. They say that under more normal conditions of steel plant and blast furnace operation it is inevitable that pig iron shall come down and scrap go up, or that both these movements will develop.

Relief for any threatened shortage of scrap must come chiefly from the railroads and it is probable that large stocks will be available from that source between now and the time snow flies if the resumption of work by shop mechanics results in the speedy repair of a large number of cars and locomotives. The difficulties which the transportation companies have had incident to the shopmen's strike have prevented many of the roads from gathering their usual offerings of scrap.

First Progress Report on Gage Steel Investigation

A program for laboratory work on the wear of gage steels, to be conducted at the Bureau of Standards has been prepared. Arrangements have been made with Dr. John A. Mathews, president Crucible Steel Co. of America, to get a supply of 1.10 per cent carbon and 1.40 per cent chromium-steel for hardening experiments and wear tests and of 0.45 per cent carbon steel for testing the wear of hard disks against soft. As the chromium-bearing steel is at present the most universally used gage steel, it is planned to make the most elaborate tests on it.

While waiting the receipt of appropriate steels for the study of hardening problems, some quenching experiments have been made to determine the characteristic curves, cooling power, and reproducibility of the common quenching media. The heat treatment of several steels in the form of 4-in. cylinders has been studied with the principal object of determining the effect of rate of heating on the dimensional changes. Some of these cylinders showing large dimensional changes on hardening are being measured for time changes.

Labor Conditions in Pennsylvania

PITTSBURGH, Sept. 19.—Restricted immigration is responsible for a general shortage of competent labor in the steel and construction industries, according to the reports of the Pennsylvania State employment agencies. Reports show that as of Sept. 1 the unemployed in the State totaled 32,770, which compares with 125,000 registered for jobs on July 1.

The strike of more than 300 employees of the Steel Car Forge Co., Ellwood City, Pa., was settled Sept. 9 when laborers were given a 20 per cent increase, skilled workmen an increase of 6c. per hour and piece workmen a proportionate increase. The strike was on two weeks.

Labor Problems in Electric Melting

(*Concluded from page 725*)

disconnecting knife switches on the primary side without making use of the insulated stool or the rubber gloves provided. That they do not care to take the time or expend the energy to play safe should be reason for immediate discharge. If this careless disregard of human life is tolerated from one workman, it is not long before the "disease" spreads among the others.

Things Not to Do

To promote the best results a set of rules should be posted together with a series of "Don'ts." Some of the latter should read: "Don't throw in the main switch while men are working on the furnace roof"; or "Don't touch the relay coils on the automatic regulators, as the electrician is here for that purpose"; or "Don't try to slip an electrode with the power on." It may seem strange that such matters must be kept constantly before the workmen; and indeed it is not for green workmen that these "Dont's" are necessary, but for protection against the "wise" workman who always feels that he wants to go his fellow-workman one better. The green workman will always refrain from touching anything which he fears and does not understand, whereas his "wise" companion is probably thinking of how he can best show off his newly acquired ability before the new workman. Many furnace men jeopardize themselves daily by the use of such tactics, to say nothing of an untold amount of trouble they cause their employers. When these rowdy methods are dispensed with and furnace men do their work the safer way, then and then only will they find that their jobs are safe for themselves as well as their fellow-workman.

New Type of French Electric Furnace*

Closed Crucible with Special Features—Girod, Keller and Other Types Compared

THE furnace described in this paper, the idea of which is due to T. Levoz, a French metallurgist, presents certain interesting features, and illustrates one of the latest French developments. The use made of it during the war for the production of high-speed steel demonstrated the principles on which it is constructed.

The refining of a steel bath is effected by the action of the slag, of a fixed composition, on the molten metal. This action is made up of several reactions which require for their realization certain conditions already laid down by Prof. Campbell in the course of a meeting of the (British) Iron and Steel Institute, when the first practical trials of electric furnaces were being made. He laid stress upon the following important points, the realization of which appeared to him essential:

> The furnace should be closed as much as possible and should be of the simplest possible construction; the furnace should be entirely separated from the electrical fittings of the generators and transformers, which should be maintained at their highest capacity in order to increase the power of the installation; the wear of the refractory materials of the linings should be saved by applying the heat at the center of the bath, and those of the roof by protecting them from the direct radiation of the arc by the electrodes themselves; the slag should be given as large an area as possible, so as to increase the refining surface; and the temperature of the slag should be maintained above that of the steel, so as to secure fluidity and facilitate the high basicity required by an intensive refining process.

Professor Campbell also advised the use of a homogeneous and solid hearth, and with this in view, recommended that electrodes should not be allowed to pass through it. On the other hand, Dr. W. Borchers, who was one of the pioneers of electro-metallurgy, has spoken of the satisfactory results obtained by this latter type of furnace. The principle of this, the Girod furnace, was based on a combination of the resistance arc furnace. The metal to be melted constituted one of the electrodes, the slag covering it forming an electrolytic conductor, the metal constituting the resistance and the current being distributed by one or several carbon electrodes traversing the roof and by multiple contacts passing through the bottom. There was no question of the solidity of this furnace. The advantages arising from a uniform distribution of the current, effected by the arrangement of the contacts passing through the bottom, constituted one of its essential characteristics, namely that of insuring the efficacy of the furnace's refining action.

The section and length of these contacts were such that no one of them could carry more than a certain fraction of the total current without becoming overheated and, consequently, without its resistance being excessively increased. The regulation of the temperature and resistance of each contact was effected by cooling the hollow extremities by a water circulation system. Certain inconveniences were thus remedied, and as a result of the uniform arrangement of the contacts round the prolonged axis of the carbon electrodes the advantage of a uniform rabbling of the bath was obtained. Professor Campbell's one objection thus disappeared; moreover, the results already obtained at that time demonstrated the furnace's merits.

Girod, Keller and Hewitt Types Compared

When regularly working, the lining, which was chiefly composed of burned dolomite, withstood at least 80 heats. The bottom of the furnace stood 120 to 160 heats without repair and had then lost 100 mm. in thickness. With charges of molten metal the lining could stand 200 operations, and the roof about 20 to 35. The wear of the other parts of the furnace was comparatively slight and the consumption of carbon electrodes was from 12 to 15 kg. (27 to 33 lb.) per ton of steel.

The principle adopted in the Girod-type furnace, which was also to be adopted in the Keller-type furnace with a better distribution of current, thus marked an advance in the construction of electric furnaces. In the Keller-type furnace the distribution of the current in the bath, instead of being merely carried round a certain number of contacts, was effected over the whole depth of the bath by means of a bundle of iron bars surrounded by refractory clay which formed the furnace bottom. The current was introduced by a large carbon electrode rectangular in section.

As in the Girod-type furnace, the intensity of current necessary was high, as it had to reach 3000 amp.; but this high intensity had fewer disadvantages as the current was better distributed and the electric resistance in the large single electrode and in the conducting hearth was not as great. The difficulty of water cooling and of overheating of the carbon electrodes was avoided. The principles laid down by Professor Campbell therefore were observed in this furnace, notwithstanding the fact that the conductors passed through the hearth.

On the other hand, it might be objected that they were not followed in the first furnaces of the Heroult type, in which the better basic action was counteracted by the imperfect closing of the furnace, which was

*Abstract of a paper, contributed through the courtesy of the Association Technic de Fonderie de France, by R. Sylvany and presented at the convention of the American Foundrymen's Association at Rochester, N. Y., in June.

opened by three lateral doors and had the two electrodes passing through it from the roof. Nevertheless the effectiveness of the furnace was not as great as it might have been, although the rectangular surface of the bath was extended, because of the action of the arc being concentrated only in the vicinity of the electrodes. The intensity of the current alone was greatly reduced. The rectangular section, therefore, was unsuitable and at Remscheid it was reduced only to the zone of action of the arcs. The circular form introduced by Nathusius seems to be preferred, and it was this form of section which Heroult adopted for the 15-ton furnace which he built in the United States.

Details of the New Type

All these considerations led the inventor, previously mentioned, to produce a special type of electrical furnace, in which the principles already indicated were further developed and the various defects were minimized. He sought on the one hand, to secure rapidity of fusion and on the other to insure good purification by making the current pass as directly as possible—but at the same time with uniformity of distribution—through the metallic mass and the slag, the furnace being simple in construction, strong and well closed, without an excessive intensity of current being necessary.

For this purpose he constructed a closed crucible with only one opening for charging the material and the additions and for pouring the finished metal. He also placed the large carbon electrode in a sheath to obviate air currents in the space left free between the electrode and the roof. Thus he facilitated a better basic action.

Moreover, certain trials made for the first time at the electric power station of the commune at Jambes in Belgium enabled him to discover the possibility of placing electrodes in the lateral linings of the crucible without their being affected by wear at that level. In fact, as the lateral linings of the furnace presented a larger surface than that of the hearth (bottom), the number of iron conductor bars embedded in the linings can be increased so that their section can be lessened.

Thus a strong magnesite bottom can be composed which resists the action of the overheated metal much better than an armored hearth. Wires of 6 to 10 mm. (No. 9 to No. 3, B.W.G.) were found sufficient to obtain currents of 1200 to 1500 amp, at 85 vlots capable of developing the temperatures necessary to purify the entire mass, notwithstanding the depth of the bath.

The electric resistance of the conductor electrodes thus constituted is almost negligible, for, as has already been pointed out, the surface of the linings permits bringing into play a considerable number of wires equivalent to such a large conductance section that, without taking account of the conductivity of the bottom, the loss is already practically nil.

The use of small section metal conductors tends to produce a more uniform circulation of the electric current than the use of large section conductors, and the large surface of the positive carbon electrode is well utilized owing to the excessive splitting up of the current at the surface of the bath. The slag is highly and uniformly heated throughout its surface, and its temperature may be raised to the point required to secure good fluidity and intense chemical action.

Two Rows of Electrodes

To facilitate the process of refining still further the inventor was led to adopt a special device which consists in introducing two rows of superimposed lateral electrodes, the lower ones being termed fusion electrodes and the upper ones refining electrodes.

The fusion electrodes, which vary in number with the capacity of the furnace, are formed by a bundle of pure iron wires imbedded at the base in a mixture of magnesia and tar and united at the top so as to give a good contact with the metal contained in the crosswise channels arranged in the furnace hearth.

These electrodes are joined in series by a copper bar, which is itself connected by cables to the negative pole of the current transformer. The refining electrodes, which are placed on a level above that of the others, facing the slag, are also variable in number according to the capacity of the furnace.

A special device enables the current to be taken from the fusion electrodes and afterwards from the refining electrodes, or alternatively from both rows of electrodes at once. The number of wires forming the electrodes, as also the section of these wires, varies with the capacity of the furnace. The wires of the fusion electrodes have always a larger section than those of the refining electrodes.

In every case the current enters by a large vertical carbon electrode passing through the furnace roof, its horizontal section being half that of the furnace crucible. When direct current is employed this large positive electrode is hollowed out and forms a heat reflector; moreover the oxygen of the bath is liberated and is carried to the positive pole instead of remaining in the bath and oxidizing it.

The furnace proper consists of a steel plate body with a non-conducting refractory lining and fitted with a cover. Hollow trunnions, through which the conductor cables pass, enable the whole apparatus to be tilted. The current always passes through a layer of relatively thin metal, which enables currents of much lower intensity to be used. An intensity of 1500 amp. is not exceeded; nevertheless the temperatures obtained are diffused throughout the entire mass of the slag and metal.

This furnace was employed during the war in the production of high-speed steel. It was installed at the Jarville works of the Eclairage Electrique Co., near Nancy, now amalgamated with the Thomson-Houston Co. The results obtained appear to indicate that, with continuous working and by treating 1000 kg. (2205 lb.) per heat with an amperage of 3000 at 80 volts it would be possible with one furnace to obtain an output of eight tons per day by deoxidizing the metal obtained from a converter.

Bounty-fed versus British Steel

A new handicap with which British steel makers are faced is the proposal of the Union of South Africa to grant a bounty for iron and steel produced within the Union. The bounties, according to the *Engineer*, London, will extend over eight years and, beginning at 15s. per ton, will be graded downward, until in the last year they will be only 2s. 6d. per ton. Only works with a minimum capacity of 50,000 tons per annum will be entitled to receive the bounty. Such a policy cannot fail greatly to stimulate the production of iron and steel within the Union and, added to the present handicap of the import duty, may prove a disastrous blow to those British manufacturers who have hitherto looked to South Africa as a market. On the other side, the passing of the "prohibitive" tariff bill by the United States will probably keep out British special steels, while foreign markets nearer home are for all practical purposes closed by the operation of the money exchange. The outlook for British steel is, therefore, anything but bright, and it is not surprising to find the spirit of pessimism rapidly spreading in Sheffield.

Large Output of Portland Cement

Figures of the United States Geological Survey show that the August production of Portland cement, 11,664,000 bbl., was the greatest of any month of the year to date and was more than 10 per cent greater than the largest month of 1921. The total production for eight months this year has aggregated 70,139,000 bbl., as compared with a total of 62,280,000 bbl. for the first eight months of 1921. Present indications are that 1922 will establish a new high record in the production of Portland cement, for 1921 was only slightly less than 1920, the high record year.

Shipments, similarly, were made higher in August than in any preceding month of the year and far higher than in any month of 1921. The figure for August was 14,361,000 bbl. and for the eight months was 76,240,000 bbl., thus reducing stocks by more than 6,000,000 bbl. Stocks reported at the end of August aggregated 5,737,000 bbl.

Metal Schedule of Fordney-McCumber Tariff

(*Continued from page 731*)

[2¼c. per lb.], lead dross [1½c. per lb.], reclaimed lead, scrap lead, antimonial lead, antimonial scrap lead, type metal, Babbitt metal, solder, all alloys or combinations of lead not specially provided for, 2½c. per lb. on the lead contained therein [2⅛c per lb.]; lead in sheets, pipe, shot, glazier's lead, and lead wire, 2⅜c. per lb. (25 per cent) [2⅜c. per lb.]

394. Zinc-bearing ore of all kinds, containing less than 10 per cent of zinc, shall be admitted free of duty; containing 10 per cent or more of zinc and less than 20 per cent, ½ of 1 per cent per lb. on the zinc contained therein; containing 20 per cent or more of zinc and less than 25 per cent, 1c. per lb. on the zinc contained therein; containing 25 per cent of zinc, or more, 1½c. per lb. on the zinc contained therein. [Here follows the administrative provision—Editor]

395. Zinc in blocks, pigs, or slabs, and zinc dust, 1¾c. per lb. [1⅜c. per lb.]; in sheets, 2c. per lb. [1⅝c. per lb.]; in sheets coated or plated with nickel or other metal (except gold, silver, or platinum), or solutions, 2¼c. per lb. [1⅞c. per lb.]; old and worn-out, fit only to be remanufactured, 1½c. per lb. (15 per cent) [1c. per lb.]

396. Print rollers and print blocks used in printing, stamping, or cutting designs for wall or crêpe paper, linoleum, oilcloth, or other material, not specially provided for, composed wholly or in chief value of iron, steel, copper, brass, or any other metal, 60 per cent ad valorem. (20 per cent) [45 per cent]

397. Cylindrical steel rolls ground and polished, valued at 25c. per lb. or over, 25 per cent ad valorem.

398. Twist drills, reamers, milling cutters, taps, dies, and metal-cutting tools of all descriptions, not specially provided for, containing more than 6/10 of 1 per cent of tungsten or molybdenum, 60 per cent ad valorem.

399. Articles or wares not specially provided for, if composed wholly or in chief value of platinum, gold or silver, and articles or wares plated with platinum, gold, or silver, or colored with gold lacquer, whether partly or wholly manufactured, 60 per cent ad valorem; if composed wholly or in chief value of iron, steel, lead, copper, brass, nickel, pewter, zinc, aluminum, or other metal, but not plated with platinum, gold, or silver, or colored with gold lacquer, whether partly or wholly manufactured, 40 per cent ad valorem.

400. No allowance or reduction of duties for partial loss or damage in consequence of rust or of discoloration shall be made upon any description of iron or steel, or upon any article wholly or partly manufactured of iron or steel, or upon any manufacture of iron or steel.

Free List

Agricultural implements: Plows, tooth or disk harrows, headers, harvesters, reapers, agricultural drills and planters, mowers, horse-rakes, cultivators, thrashing machines, cotton gins, machinery for use in the manufacture of sugar, wagons and carts, cream separators valued at not more than $50 each, and all other agricultural implements of any kind or description, not specially provided for, whether in whole or in parts, including repair parts: Provided, That no article specified by name in Title I shall be free of duty under this paragraph.

1508. Antimony ore.

1514. Articles the growth, produce, or manufacture of the United States, when returned after having been exported, without having been advanced in value or improved in condition by any process of manufacture or other means if imported by or for the account of the person who exported them from the United States; steel boxes, casks, barrels, carboys, bags, and other containers or coverings of American manufacture exported filled with American products, or exported empty and returned filled with foreign products, including shooks and staves when returned as barrels or boxes; also quicksilver flasks or bottles, iron or steel drums of either domestic or foreign manufacture, used for the shipment of acids, or other chemicals, which shall have been actually exported from the United States; but proof of the identity of such articles shall be made, under general regulations to be prescribed by the Secretary of the Treasury, but the exemption of bags from duty shall apply only to such domestic bags as may be imported by the exporter thereof, and if any such articles are subject to internal-revenue tax at the time of exportation, such tax shall be proved to have been paid before exportation and not refunded; photographic dry plates and films of American manufacture (except moving-picture films), exposed abroad, whether developed or not, and photographic films light struck or otherwise damaged, or worn out, so as to be unsuitable for any other purpose than the recovery of the constituent materials, provided the basic films are of American manufacture, but proof of the identity of such articles shall be made under general regulations to be prescribed by the Secretary of the Treasury; articles exported from the United States for repairs may be returned upon payment of a duty upon the value of the repairs at the rate at which the article itself would be subject if imported, under conditions and regulations to be prescribed by the Secretary of the Treasury: Provided, That this paragraph shall not apply to any article upon which an allowance of drawback has been made, the reimportation of which is hereby prohibited except upon payment of duties equal to the drawbacks allowed; or to any article manufactured in bonded warehouses and exported under any provision of laws.

1519. Bells, broken, and bell metal, broken and fit only to be remanufactured. (Free list)

1533. Brass, old brass, clippings from brass or Dutch metal, all the foregoing, fit only for remanufacture. (Free list)

1542. Linotype and all typesetting machines, typewriters, [30 per cent] shoe machinery, [45 per cent] sand-blast machines, sludge machines, and tar and oil spreading machines [all 45 per cent] used in the construction and maintenance of roads and in improving them by the use of road preservatives; all the foregoing whether in whole or in parts, including repair parts. (All on free list)

1547. Chromite or chrome ore. (Free list)

1548. Coal, anthracite, bituminous, [45c. per ton] culm, slack, and shale; coke [20 per cent]; compositions used for fuel in which coal or coal dust is the component material of chief value, whether in briquets or other form [20 per cent] (All above on free list): Provided, That if any country, dependency, province, or other subdivision of government imposes a duty on any article specified in this paragraph, when imported from the United States, an equal duty shall be imposed upon such article coming into the United States from such country, dependency, province, or other subdivision of government.

1550. Cobalt and cobalt ore.

1555. Composition metal of which copper is the component material of chief value, not specially provided for.

1556. Copper ore; regulus of, and black or coarse copper, and cement copper; old copper, fit only for remanufacture, copper scale, clippings from new copper, and copper in plates, bars, ingots, or pigs, not manufactured or specially provided for.

1557. Copper sulphate or blue vitriol; copper acetate and subacetate or verdigris.

1562. Metallic mineral substances in a crude state, and metals unwrought, whether capable of being wrought or not, not specially provided for.

1570. Emery ore and corundum ore, and crude artificial abrasives.

1596. Iridium, osmium, palladium, rhodium, and ruthenium and native combinations thereof with one another or with platinum.

1597. Iron ore, including manganiferous iron ore, and the dross or residuum from burnt pyrites.

1615. Materials, crude, or not advanced in value or condition by refining or grinding, or by other process of manufacture, not specially provided for.

1623. Needles, hand sewing or darning.

1634. Ores of gold, silver, or nickel; nickel matte; ores of the platinum metals; sweepings of gold and silver.

1644. Platinum, unmanufactured or in ingots, bars, sheets, or plates not less than ⅛ in. in thickness, sponge, or scrap.

1661. Shotgun barrels, in single tubes, forged, rough bored.

1684. Tin ore or cassiterite, and black oxide of tin: Provided, That there shall be imposed and paid upon cassiterite, or black oxide of tin, a duty of 4c. per lb., and upon bar, block, pig tin and grain or granulated, a duty of 6c. per lb., when it is made to appear to the satisfaction of the President of the United States that the mines of the United States are producing 1500 tons of cassiterite and bar, block, and pig tin per year. The President shall make known this fact by proclamation, and thereafter said duties shall go into effect.

1685. Tin in bars, blocks or pigs, and grain or granulated and scrap tin, including scrap tin plate. (Free list) [Free list]

1697. All barbed wire, whether plain or galvanized.

Items from Other Schedules

A number of products and materials in which the iron and steel trades are interested appear elsewhere than in the Metal schedule of the new tariff bill. Some of these are given below.

207. Bauxite, crude, not refined or otherwise advanced in condition in any manner, $1 per ton. (Free)

Fluorspar, $5.60 per ton. (Free)

201. Bath brick, chrome brick, and fire brick, not specially provided for, 25 per cent ad valorem; magnesite brick, ¾ of 1c. per lb. and 10 per cent ad valorem.

1536. Brick, not specially provided for: Provided, That if any country, dependency, province, or other subdivision of government imposes a duty on such brick imported from the United States, an equal duty shall be imposed upon such brick coming into the United States from such country, dependency, province, or other subdivision of government.

Graphite or plumbago, crude or refined: Amorphous, 10 per cent ad valorem; crystalline lump, chip, or dust, 20 per cent ad valorem; crystalline flake, 1½c. per lb. As used in this paragraph, the term "crystalline flake" means graphite or plumbago which occurs disseminated as a relatively thin flake throughout its containing rock, decomposed or not, and which may be or has been separated therefrom by ordinary crushing, pulverizing, screening, or mechanical concentration process, such flake being made up of a number of parallel laminæ, which may be separated by mechanical means. (Free)

216. Carbons and electrodes, of whatever material composed, and wholly or partly manufactured, for producing electric arc light; electrodes, composed wholly or in part of carbon or graphite, and wholly or partly manufactured, for electric furnace or electrolytic purposes; brushes, of whatever material composed, and wholly or partly manufactured, for electric motors, generators, or other electrical machines or appliances; plates, rods, and other forms, of whatever material composed, wholly or partly manufactured, for manufacturing into the aforesaid brushes; and articles or wares composed wholly or in part of carbon or graphite, wholly or partly manufactured, not specially provided for, 45 per cent ad valorem.

236. Grindstones, finished or unfinished, $1.75 per ton.

204. Crude magnesite, 5/16 of 1c. per lb.; caustic calcined magnesite, ⅝ of 1c. per lb.; dead burned and grain magnesite, not suitable for manufacture into oxychloride cements, 23/40 of 1c. per lb.

Provisions for Elastic Tariff

A distinct departure in tariff making for the United States is provided, the administrative provisions calling for an elastic tariff. The President is authorized to increase or decrease the duties and to shift to the American valuation plan (the ad valorem duties in the bill are based on the foreign valuation plan) under certain conditions.

Subdivision (a) authorizes the President to increase or decrease duties and to change classifications whenever necessary to equalize the ascertained differences in costs of production. No duty, however, may be increased or decreased more than 50 per cent of the duties specified in the bill and no authority is given to transfer from the dutiable list to the free list, or vice versa; nor may any duty be changed from specific to ad valorem, or vice versa. The conferees specified that the differences in costs of production are to be ascertained in the United States and in the principal competing foreign country, and removed the limit as to how long this provision may remain in effect.

Subdivision (c) prescribes the factors which the President is to take into consideration in determining differences in costs of production and also provides that investigations to assist the President in ascertaining such differences are to be made by the United States Tariff Commission. The conferees eliminated the provision of the Senate that the Tariff Commission hearings shall be public and that the President shall make the findings, hearings and testimony in all proceedings public as soon as practicable after the issuance of a proclamation. The President is not authorized to increase rates beyond the specified maximum ad valorem rates fixed in any paragraph. A new section also makes unlawful unfair methods of competition and unfair acts in the importation of merchandise into the United States, which threaten the stability or existence of American industry. Investigations of cases arising under this section are to be made by the Tariff Commission and its findings are subject to review, on questions of law, by the United States Court of Custom Claims. The final findings of the Commission are then transmitted to the President and he is authorized, in case such unfair methods or acts are established to his satisfaction, to impose additional duties upon merchandise imported in violation of the act, and in extreme cases he is authorized to prohibit the offending person from importing any merchandise into the United States. Another provision gives the President discretionary powers to impose additional duties or prohibition upon imports from any country discriminating against the overseas commerce of the United States, and is more far reaching than the precedent established by the Payne-Aldrich act.

Provision also is made for the United States to offer equality of treatment to all nations and at the same time insisting that foreign nations grant to American external commerce equality of treatment. A new section enlarges the powers of the Tariff Commission regarding investigations as to costs of production in this country and abroad, and it is authorized to establish an office in New York for the purpose of conducting investigations, calling witnesses, etc.

RAIL PRICE ADVANCED

Steel Corporation Announces First Change Since October, 1921

The United States Steel Corporation has recommended to its subsidiary companies that on Oct. 1 the price of standard steel rails be increased from $40 to $43 a ton, according to the following announcement late Sept. 13 by Elbert H. Gary, chairman:

"Until Sept. 30, 1922, the price of standard rails will continue to be $40 a gross ton base, f.o.b. mills, for deliveries to be made in about equal monthly installments prior to June 30, 1923. Commencing Oct. 1, 1922, the price will be increased to $43 a gross ton base, f.o.b. mills, for same deliveries."

The new price for steel rails fixed by the Steel Corporation is the first change since October, 1921, when the quotation was cut to $40 a ton from $47, the price recommended by the Industrial Board at Washington shortly after the armistice. In making his announcement Oct. 22, 1921, Chairman Gary Said:

"We have decided to recommend that our subsidiary companies reduce the selling price of standard rails to $40 per ton base, f.o.b. our mills. The present costs of production do not justify this action, but it is hoped and expected that reduction in freight rates and otherwise, together with larger operations, will soon have a beneficiary effect upon our costs."

Prior to that announcement, there had been a differential of $2 between Bessemer and open-hearth rails, but since the announcement the price has been on the same basis. From May, 1901, until January, 1914, the price of Bessemer rails was $28. This advanced to $30 and remained at that figure until May 1, 1916. After most of the requirements of the year had been contracted for, the makers announced an advance of $5 per ton, which put open-hearth rails at $35 and Bessemer rails at $33. Another advance was made in November, 1916, to $38 for Bessemer and $40 for open-hearth. These were the contract prices in 1917, but in line with the advance in other products, rail sales in the second half of that year were made at higher prices, ranging up to $57. In the early part of 1918, the $57 price for open-hearth rails was the basis of considerable sales, though at no time during the existence of the conference arrangement between the steel industry and the price fixing committee of the War Industries Board was there a controlled price on rails. Some mills realized considerable higher prices than $57 in the late months of 1917 and on through 1918 on sales for both domestic use and export. In early 1918, one road paid $73 on a 2500-ton order. As high as $85 was realized on some export business. For the greater part of 1918, Washington named $57 as the selling basis on Army and Navy purchases for the war, but otherwise prices were a matter of negotiation between buyer and seller.

When the Industrial Board announcement of reduced prices on steel products was made on March 21, 1919, a price of $47 for open-hearth rails was included and this was the basis of Steel Corporation contracts for that year, though it was the fact also that the Corporation reinstated on its books in the first half of 1919 considerable rail business that had been taken at the lower prices of 1917.

Fire at East St. Louis, Ill., did $10,000 damage to the plant of Benjamin Baits, manufacturer of well-drilling equipment, and $2,000 damage to the plant of the Atlas Boiler & Sheet Metal Works. The cause of the fire was undetermined.

Machinery Markets and News of the Works

RAILROAD NEEDS INCREASING

Buying of Machine Tools from That Source More Promising

Lima Locomotive Co. Buys $200,000 Worth of Shop Equipment—Baldwin Works Inquires for 32 Tools

The most promising development in the machine-tool industry is the renewed demand for tools for the repair and building of rolling stock for the railroads. The settlement of the railroad strike on certain roads has released some pending business and considerable more is in sight. The inquiry of the Missouri, Kansas & Texas Railroad at St. Louis for 116 machine tools and allied equipment, on which bids closed Monday, was the most cheering indication in some time of a resumption of railroad buying, which had been checked by the strike.

To keep pace with the demand for railroad locomotives, the Lima Locomotive Co., Lima, Ohio, has placed orders at Cleveland for about $200,000 worth of new shop equipment and another Ohio company, which is planning to devote its plant to the repair of locomotives, is in the market for $250,000 worth of new tools. The Baldwin Locomotive Works, Philadelphia, has issued an inquiry for 32 machines, most of them of heavy duty type.

Plans of the railroads apparently are to utilize every possible means to restore their rolling stock to normal condition, and it was recently announced by one road that it would work its repair shops 24 hr. a day. The Boston & Maine Railroad has contracted for the use of a New England machine-tool plant until March 1, 1923, and will utilize it as a repair shop. The effect of this, however, may be to defer some machine tool purchases that may have been contemplated.

Considerable railroad business is still pending at Chicago. The Chicago, Burlington & Quincy has not yet taken action on its inquiries, while the Chicago, Rock Island & Pacific has bought only a few tools that were imperatively needed. The Long Island Railroad has bought four machines at New York.

The industrial situation is clouded somewhat by the closing down of the Ford plants, which will affect many other industries wholly or partly dependent upon that automobile manufacturing company for business.

The General Motors Corporation, which is planning the manufacture of an air-cooled automobile, has revived a list issued earlier in the year. About 11 tools will be bought. The National Cash Register Co., Dayton, Ohio, has inquired for a number of tools. The Indiana Quarries Co., Bedford, Ind., has bought cranes and several tools.

Several steel companies in the Pittsburgh district have placed orders for steel rolling equipment and cranes for plant additions.

The prices of machine tools continue to strengthen and there have been fresh advances on a number of lines.

New York

NEW YORK, Sept. 18.

ASIDE from the inquiry of the Baldwin Locomotive Works, Philadelphia, for 32 machines, listed in detail in the Philadelphia report, and new inquiries from the General Electric Co., Schenectady, N. Y., for engine lathes, turret lathes, drill presses and other tools, there is no marked activity in the Eastern machine tool market. The Long Island Railroad has bought four machines, an axle lathe, a side-head boring mill, a hub facing machine and a wheel press, and the United Fruit Co. has bought two machines for export to one of its shops. Otherwise there has been no important buying during the week, but prospects continue to be numerous and the trade is hopeful of a growing volume of buying. The machine-tool price structure is strengthening, with fresh advances on a few lines of tools.

The crane market continues quiet, particularly on sales of electric and hand power cranes. Sellers of locomotive cranes still report some competition from the second-hand market. Current inquiries are in most cases for cranes of fairly large capacity, but in one instance, that of the Pennsylvania Railroad, Philadelphia, the original capacities of the inquiry have been reduced. The original tender, which called for two 250-ton, two 60-ton, two 25-ton and six 15-ton electric cranes of various spans, has been revised to ten 15-ton, two 60-ton and two 25-ton electric cranes, the two 250-ton cranes being dropped.

Among recent purchases are:

Presbey-Leland Co., Inc., Brattleboro, Vt., a 20-ton and a 40-ton, 50 ft. span, overhead traveling crane from the Pawling & Harnischfeger Co.

United Lead Co., Perth Amboy, N. J., four 4-ton, 27-ft., 10-in. span, transfer cranes from the Shepard Electric Crane & Hoist Co.

Phoenix-Portland Cement Co., Philadelphia, Pa., two 80-ft. span, 3 cu. yd. bucket handling cranes for Birmingham, Ala., from the Champion Engineering Co.

Lancaster Steel Products Co., Lancaster, Pa., a 10-ton, 45-ft. span, 3-motor overhead traveling crane from the Northern Engineering Works.

O. J. Dean Co., Chicago, two 5-ton electric traveling hoists from the Northern Engineering Works.

United States Cast Iron Pipe & Foundry Co., a No. 84 Newton cupola crane from the Northern Engineering Works.

Wiardi-Hall Acid Co., Brooklyn, N. Y., recently in the market for a 5-ton, double I-beam hand power crane, has purchased a second-hand crane.

Standard Oil Co., New York, reported last week as purchasing a 20-ton hand power crane, bought from Maris Bros., Philadelphia.

Third Avenue Railway Co., New York, two 3-ton pillar cranes mounted on flat cars from the Chesapeake Iron Works.

Phoenix Utility Co., 71 Broadway, New York, a 60-ton, 1-motor, 24-ft. span, overhead traveling crane from the Niles-Bement-Pond Co. This company is still in the market for a 60-ton, 4-motor, 71-ft. span, overhead traveling crane.

The New York Edison Co., 130 East Fifteenth Street, New York, has commenced erection of a one-story power house, 25 x 100 ft., at Thirty-second Street and Madison Avenue, to cost close to $200,000, including machinery. William Whitehill, Buckly Newhall Building, Forty-first Street and Sixth Avenue, is architect.

A vocational department will be installed in the new high school to be erected at Saranac Lake, N. Y., for which a bond issue of $400,000 is being arranged. C. B. Cutler, care of the local Board of Education, is architect.

The Mexican Petroleum Co., Ltd., 120 Broadway, New York, will expend about $1,000,000 for buildings and equipment for two gasoline extraction plants at its properties in the Tampico district, Mexico, one to be located in the Cerro

mated to cost $2,600,000, including machinery, pipe line, pumping plants, etc.

The Lindsay Light Co., 91 Chambers Street, New York, manufacturer of lighting equipment, gas burners, etc., is arranging for the removal of its plant from Chicago to [illegible]. The company is increasing its capital from $1,000,000 to $1,200,000.

Plans are in progress for reorganization of the Willys Corporation, 52 Vanderbilt Avenue, New York, manufacturer of automobiles, which has been in receivership, a large part of whose plant property recently has been sold. The new organization will take over the assets of the present company and will dispose of a note issue of $6,000,000, a portion of the proceeds to be used for the acquisition of necessary plants and equipment. John A. Willys, president Willys-Overland Corporation, Toledo, Ohio, is one of the heads of the company.

The Mutual Electric & Hardware Mfg. Co., 28 Verandah Place, Brooklyn, is planning for the installation of new equipment at its plant, including a number of presses.

Freight-handling machinery, cranes, conveying equipment and other mechanical apparatus will be installed at the proposed barge canal terminal to be constructed by the Department of Public Works, Albany, N. Y., on Staten Island. Charles L. Cadle is superintendent of public works, Albany.

The Aetna Auto Engineering Corporation, 258 West Sixty-ninth Street, New York, operating an automobile construction and repair works, has leased the building at 217-19 West Sixty-fourth Street, for a term of years, for plant enlargements. Additional equipment will be installed.

The Sinclair Pipe Line Co., 45 Nassau Street, New York, a subsidiary of the Sinclair Refining Co., has arranged for a bond issue of $25,000,000, the proceeds to be used in part for new construction, including the doubling of the present capacity of the steel trunk line from Texas, Oklahoma and Kansas to the Chicago district, and for extensions in the vicinity of Houston, Tex., and in the Wyoming fields, with new pumping plants, steel pipe, steel tank storages, etc. J. R. Manion is president.

The Braden Copper Co., 120 Broadway, New York, has preliminary plans under way for enlargements in its copper milling plant, to increase the capacity from 10,000 to 15,000 tons of ore per day. The work, including machinery, is estimated to cost about $1,500,000.

The Anderson Sheet Metal Co., Providence, R. I., has leased the one-story building at 185-87 Seventh Street, Brooklyn.

The Auto Safety Appliance Co., 1493 Broadway, New York, has leased space in the building at 549-51 West Fifty-second Street.

The William Bayley Co., 110 West Fortieth Street, New York, manufacturer of steel window frames and sash, with plant at Springfield, Ohio, has acquired about 8,000 sq. ft. at Seventh Street and Van Alst Avenue, Long Island City, as a site for a one-story building for an eastern factory branch.

The Shenandoah Steel & Iron Corporation, New York, has leased the four-story building, 40 x 100 ft., at 230-32 West Thirty-eighth Street. Improvements will be made in the building.

The Brunswick Laundry Co., 222 Tonnele Avenue, Jersey City, N. J., will erect a three-story power house, 32 x 38 ft., on a site adjoining its plant, and will use a portion for a machine repair shop.

The Mehl Machine Tool & Die Co., Roselle, N. J., manufacturer of machinery, jigs, dies, etc., will establish a branch engineering works at Cleveland.

A vocational department will be installed in the high school to be erected at Orange, N. J.

A vocational department will be installed in the new two-story high school to be constructed on Main Street, Dumont, N. J., estimated to cost about $275,000. Ernest Sibley, Palisade, N. J., is architect.

R. Miele, 622 Springfield Avenue, Newark, N. J., operating a forge and blacksmithing shop, is inquiring for an upright power trip hammer.

The Seagull Fishing Reel Co., operated by Schoenfeld & Gutter, Inc., Newark, N. J., manufacturer of metal fishing reels, has leased a floor in the building at 420 Ogden Street, for the establishment of a new plant.

The Commonwealth Water Co., 20 Northfield Road, West Orange, N. J., will make extensions in its pumping plant at Canoe Brook, including the installation of new pumping machinery, compressors and other equipment, estimated to cost about $[illegible].

Frutchey & Waddell, Woodbury, N. J., local representatives for the Studebaker automobile, are taking bids for the remodeling and improving of a local one-story building, [illegible] for a new service and repair works.

A one-story vocational shop will be installed in connection with the new addition to be built at the Hawkins Street school, Newark, N. J., estimated to cost about $235,000. Guilbert & Betelle, 546 Broad Street, are architects.

The Peters Chocolate Co., Fulton, N. Y., has awarded contract for boiler house, 40 x 80 ft., to Barto-Phillips Co., 52 Vanderbilt Avenue, New York. Estimated cost $50,000.

The Holbrook Co., automobile body manufacturer, has awarded contract for a manufacturing building 100 x 260 ft., boiler house 20 x 30 ft., service building 20 x 30 ft., and connecting passage 25 x 50 ft., to Barto-Phillips Co., 52 Vanderbilt Avenue, New York. Estimated cost $80,000. One 100 hp. boiler with 100 ft. radial brick stack and complete sprinkler system with 40,000 gal. steel gravity tank are included.

The Ritter Dental Mfg. Co., Inc., Rochester, N. Y., has been manufacturing dental equipment for several years and is now obtaining figures on equipment for adding a small brass and aluminum foundry to its present plant.

New England

BOSTON, Sept. 18.

A LARGER number of important machine tools was sold in this territory last week than during the previous week, but business was confined to a limited number of houses. The trade in general is fully as inactive as during the early part of the month. Among the sales of new equipment are: One 40-ton and one 20-ton P & H crane to a Vermont marble concern; one centering machine and one 1½-in. screw machine to a central Massachusetts conveyance builder; a reamer grinder to a Rhode Island concern; three automatic lathes to a Massachusetts textile machinery builder, and a multiple spindle drill to an East Boston concern. A 24-in. shaper constitutes one of the leading sales in the used machine tool market.

It is generally believed here that the ending of the railroad shopmen's strike with some of the railroads will have little influence on the New England carriers as possible machine tool prospects. The Boston & Maine Railroad and the New York, New Haven & Hartford Railroad apparently intend to ignore the union and to keep present shopmen on the payroll. Both roads have let out considerable work since the strike started. During the past week the Boston & Maine Railroad contracted with a New England machine tool builder for the use of its entire manufacturing equipment until March 1, next. With a sizable percentage of repair work farmed out on contract, and with shops well filled with new and more or less unexperienced shopmen, it is believed the purchase of new machine tools by these two roads will be deferred.

The demand for machine tool repair parts and for small tools is good, although spotty. Individual orders often run up well into four figures.

Contract has been let for the erection of a one-story, 40 x 90 ft., manufacturing unit on Columbus Avenue and Dimock Street, Roxbury, Boston, by the Albert Griffiths Saw Co., 30 Whittier Street, Roxbury.

Bids are in on a one-story manufacturing plant for the Thompson Electric Welding Co., 161 Pleasant Street, Lynn, Mass.

The Hamilton Mfg. Co., Lowell, Mass., has awarded a contract for the construction of a re-inforced concrete hydro-electric power plant.

The Crompton & Knowles Loom Works, Worcester, Mass., has sold its Star Foundry Co. property in that city to Edward D. Priest, Schenectady, N. Y. It has not been operated since the war. The property, consisting of a one-story and basement foundry, will be developed for manufacturing.

The Murray-Mack Co., a Pennsylvania concern, has secured a location for a plant to manufacture automobiles at Randolph, Mass., near the railroad and close to the Randolph Foundry Co. plant.

The Universal Winding Co., Cranston, R. I., manufacturer of textile machinery, has arranged for a bond issue of $2,000,000, a portion to be used for extensions and improvements.

The General Electric Co., Schenectady, N. Y., is planning

the erection of a four-story addition to its plant at West Lynn, Mass., 120 x 157 ft., to cost about $200,000.

The Star Foundry Co., Worcester, Mass., an interest of the Crompton & Knowles Loom Works, same city, has disposed of its plant to Edward D. Priest, Schenectady, N. Y., for about $20,000. The plant has been inactive for some time. The new owner will resume production soon.

The American Thermos Bottle Co., Laurel Hill Avenue, Norwich, Conn., has plans under consideration for the erection of a large plant addition.

The Springfield Gas Light Co., 23 State Street, Springfield, Mass., will commence at once erection of a new one-story steam power house, 51 x 58 ft. on Page Boulevard.

The Maine Power Co., Norway, Me., is planning for the installation of additional machinery at its local power plant, including waterwheel, generator and auxiliary electrical equipment.

Kenneth W. McNeil, president of the Karm Terminal Co., Bridgeport, Conn., is the purchaser of the local plant of the Morris Metal Products Co., securing the property at public sale for $220,500. It consists of a main two-story building, 190 x 375 ft., designed as a machine shop.

A vocational department will be installed in a new high school at Shrewsbury, Mass., estimated to cost about $150,000. J. William Beal, 62 Summer Street, Boston, is architect.

P. & F. Corbin, Inc., Orchard Street, New Britain, Conn., manufacturer of locks and hardware products, has awarded a contract to William H. Allen, 12 Hungerford Street, for the erection of a plant addition to cost about $25,000.

The M. S. Little Mfg. Co., New Park Avenue, Hartford, Conn., manufacturer of metal plumbing goods, recently reorganized with $400,000 capital, has had plans prepared for the erection of a one-story addition, 50 x 65 ft., to cost about $18,000, exclusive of equipment. The reorganizers, including M. S. Little and H. B. Carey, have also organized the Hartford Valve Mfg. Co., with capital of $50,000, to manufacture valves and kindred equipment.

Plans have been completed for the erection of a new one-story power house, 75 x 78 ft., at the School for Feeble Minded, Waverly, Mass. C. H. Tenney & Co., 201 Devonshire Street, Boston, are engineers.

The Hope Street Garage Co., Inc., Fourth Street, Providence, R. I., is planning the construction of a 100-car capacity garage and machine shop.

Buffalo

BUFFALO, Sept. 18.

The American Radiator Co., Buffalo, has acquired a tract of land at St. Paul, Minn., totaling about 15 acres, as a site for the erection of a new plant to cost about $1,000,000. Headquarters of the company is at 820 South Michigan Avenue, Chicago.

The Dunlop Rubber Co., Buffalo, manufacturer of automobile tires, is considering a bond issue of $10,000,000, a portion of the proceeds to be used for plant equipment and operations, extensions, etc.

The Marsh Valve Co., Fourth Street and Brigham Road, Dunkirk, N. Y., manufacturer of valves and kindred engineering specialties, is planning for the erection of a two-story plant addition, 25 x 35 ft.

The Electric Storage Battery Co., 184 Clinton Avenue South, Rochester, N. Y., manufacturer of storage batteries, plates, etc., has awarded contract to the William Steele & Son Co., Sixteenth and Arch Streets, Philadelphia, for the erection of a new plant on Plymouth Avenue, near Barton Street.

The Owen-Dyneto Electric Corporation, Syracuse, N. Y., recently organized, has taken over the plant and business of the Dyneto Electric Corporation, which has been in the hands of a receiver. Ray M. Owen, president of the new corporation, recently acquired the assets of the former company for $205,000. The plant will continue in the manufacture of electric starting and lighting equipment for automobile service, generators, etc. James D. Grant is vice-president and treasurer of the new organization.

The Air Sales Reduction Co., 342 Madison Avenue, New York, manufacturer of acetylene welding equipment, etc., has commissioned Francisco & Jacobus, 511 Fifth Avenue, architects, to prepare plans for a new plant at Buffalo, on site selected, estimated to cost about $50,000.

The North East Electric Co., 348 Whitney Street, Rochester, N. Y., manufacturer of electrical equipment, will erect a two-story addition to its plant, 50 x 90 ft., to cost $35,000.

The Erie Railroad Co., 50 Church Street, New York, has terminated its contract with the Hornell Repair & Construction Co., Hornell, N. Y., for the operation of its local car shops, as well as similar shops at Salamanca, N. Y., and Susquehanna and Bradford, Pa., effective Sept. 10. The Erie company will resume the direct management of the different plants and proposes to operate at full capacity as soon as men are available. The company is also arranging for the termination of the contract with other interests for the operation of the car and locomotive shops at Corning, Elmira and Binghamton, N. Y.

The Jamestown Novelty Mfg. Co., Gifford Avenue and Jones Street, Jamestown, N. Y., manufacturer of steel enameled bathroom fixtures and kindred products, is planning for installation of new equipment in a factory at River and Chandler Streets.

The International Casement Co., 84 Hopkins Street, Jamestown, N. Y., manufacturer of rolled steel and bronze window casements, etc., has awarded contract to the Warren Construction Co., Jamestown, for the erection of a one and one-half story plant addition, 120 x 150 ft., estimated to cost about $50,000.

The Skelton Shovel Co., Hamilton, Ont., is calling for bids through McPhie & Kelley, Hamilton, architects, for the erection of a one-story plant on East Lake Road, Dunkirk, N. Y., estimated to cost about $100,000, including equipment. The Chamber of Commerce, Dunkirk, is interested in the project. W. E. Skelton heads the company.

The Lisk Mfg. Co., Geneva, N. Y., has let contract to Curran-Mason Co., Inc., Rochester, N. Y., for construction of a factory building, 160 x 280 ft., for the manufacture of enamel ware, which with other improvements will involve a total expenditure of $1,000,000. C. C. Keehn is president of the Lisk Mfg. Co.

The Electric Storage Battery Co., Philadelphia, has obtained a permit for construction of a factory building and assembly plant at Rochester, N. Y., to cost about $60,000. It will be one story, 134 x 134 ft., and will be erected on Plymouth Avenue, near Barton Street.

Philadelphia

PHILADELPHIA, Sept. 19.

THE Baldwin Locomotive Works, Philadelphia, has issued an inquiry for more than 30 machine tools as follows:

Three 66-in. horizontal boring and drilling mills.
Two No. 9 vertical milling machines.
Two No. 1 plain milling machines.
Two rod milling machines.
Two frame slotters.
One frame drilling machine.
Four frame planers.
Fourteen standard planers.
Two turret lathes.

The Edward G. Budd Mfg. Co., Twenty-fifth Street and Hunting Park Avenue, Philadelphia, manufacturer of steel automobile bodies, is completing plans for the erection of a large plant addition. The Ballinger Co., Twelfth and Chestnut Streets, is architect and engineer.

The new building to be erected by Alfred Box & Co., 813 North Front Street, Philadelphia, manufacturer of cranes, hoisting machinery, etc., at Janney and Ontario Streets, will consist of a main one-story structure, 110 x 300 ft., with extension, 15 x 140 ft. The larger space will be equipped as a machine erecting shop and the other as a pattern shop.

The Philadelphia Suburban Gas & Electric Co., Philadelphia, has arranged for a preferred stock issue of $400,000, the proceeds to be used in part for extensions and improvements. An additional issue of $600,000, to make up a fund of $1,000,000 will be disposed of later.

The General Electric Co., Witherspoon Building, Philadelphia has completed plans for the erection of an addition to its local branch plant at Seventh and Willow Streets.

The Logan Ice Mfg. Co., Tenth and Windrim Streets, Philadelphia, is taking bids on a general contract for the erection of a new plant, consisting of four one-story buildings, with main structure, 96 x 182 ft.

Power equipment, ovens, conveying machinery and other mechanical equipment will be installed in a three-story baking plant for the Great Atlantic & Pacific Tea Co., at Ridge and Sedgley Avenues, Philadelphia, estimated to cost about $80,000, for which a general contract has just been awarded to the Turner Construction Co., Aramingo Street. Headquarters of the company is at 150 Bay Street, Jersey City, N. J.

A vocational department will be installed in the new high

school to be erected at Gloucester Heights, by the Board of Education, Gloucester City, N. J.

The plant of the Empire Tire & Rubber Co., Trenton, N. J., has been acquired by Campbell, Heath & Co., 5 Nassau Street, New York, stock brokers, for $1,675,000. W. W. Pepper, at one time president of the rubber company, is treasurer of the purchasing concern. It is proposed to form a new company to take over the property, with C. Edward Murray, Jr., Trenton, as head, and resume operations at an early date.

The National Radiator Co., East State Street, Trenton, N. J., has filed plans for the erection of a new one-story addition, to cost about $17,000.

A two-story and basement vocational school, 70 x 70 ft., to cost about $70,000, will be constructed by the Falls Township and Overfield Township School Districts, Mill City, Pa.

H. M. Spencer, Dunmore, near Scranton, Pa., is having plans prepared for the erection of a nearby two-story automobile service and repair building, 40 x 300 ft., on Drinker Street, estimated to cost close to $100,000. A list of equipment for installation is being arranged.

The Lehigh Valley Welding Co., Slatington, Pa., has been organized by Arnold Stoor and Oscar Roth, to operate a local machine shop and welding works.

The International Chain & Mfg. Co., York, Pa., has acquired the local plant of the Victoria Chain Co., manufacturing a kindred line of mechanical chains, and will take immediate possession. Plans are under way for the erection of additional buildings. George J. Campbell is president, and J. L. Mueller vice-president, in charge of production.

The Reading Transit & Light Co., Reading, Pa., is arranging facilities at its local shops for the construction of special cars for its local traction lines, including steel framework, bodies, fittings, etc.

The Stiffel & Freeman Co., Lititz, Pa., manufacturer of locks, safes, vaults, etc., is planning for the erection of a one-story addition, 140 x 175 ft.

The Blair Ice & Cold Storage Co., 3124 Fifth Avenue, Altoona, Pa., is preparing a list of equipment for installation at its new ice-manufacturing and cold storage plant, soon to be constructed. F. H. Sietz is president.

A vocational department will be installed in the new two-story and basement high school at Clarks Summit, Pa., estimated to cost about $100,000, for which bids on a general contract are being asked until Sept. 25.

A vocational department will be installed in the proposed new high school to be erected at Annville, Pa., estimated to cost in excess of $100,000.

Pittsburgh

PITTSBURGH, Sept. 18.

DEMAND for machine tools in this territory still runs largely for individual tools, with few lists coming before the trade. The Pittsburgh Board of Education on Sept. 12 took bids on 15 metal working tools and for a number of woodworking machines, but awards have not yet been announced. A maker of lathes is reported to have announced an increase in prices of 12½ per cent, effective Oct. 1, and there also has been a revision upward in prices of Bridgeport grinders. Heavy equipment has shown much activity. The Mackintosh-Hemphill Co., which recently was awarded a 40-in. blooming mill for the Otis Steel Co., Cleveland, in the past week received the award of the sheet bar and sheet mills for that plant. A new strip mill for this company has been placed with the United Engineering & Foundry Co., Pittsburgh.

In addition to the cranes recently placed by the Otis Steel Co. with the Alliance Machine Co., Alliance, Ohio, the company last week placed with the Morgan Engineering Co., Alliance, Ohio, an order for five cranes, one 25-ton with 10-ton auxiliary, 85 ft. span, one 40-ton with 10-ton auxiliary, 85 ft. span, one 10-ton, 25 ft. span, one 10-ton, 75 ft. span and one 10-ton, 105 ft. span.

The Morgan company also has taken a 25-ton crane with 10 ton auxiliary, 68 ft. span for the Republic Iron & Steel Co., Youngstown, Ohio.

The Weirton Steel Co., Weirton, W. Va., has ordered five Shaw cranes for its new sheet mill, one 10-ton, 70 ft. span to serve the galvanizing and pickling departments, one 10-ton, 70 ft. span, to serve the warehouse, one 15-ton, 55 ft. span for the bar yard, one 30-ton, 75 ft. span for the hot mill department and one 40-ton, with 10-ton auxiliary, 70 ft. span to serve the annealing furnaces.

The Babcock & Wilcox Co. has purchased a 50-ton Shaw trolley for its Barberton, Ohio, plant.

The Center Foundry & Machine Co., Wheeling, W. Va., which is building a new plant at Warwood, W. Va., has bought a 10-ton, 3-motor, 45½ ft. span crane from the Northern Engineering Works, Detroit, and a 66-in. and an 84-in. cupola from the same company.

George R. Fink, who resigned recently as sales manager, West Penn Steel Co., is interested in a new company which will build a sheet plant in Detroit.

The American Window Glass Co., Farmers' Bank Building, Pittsburgh, will take bids at once for the erection of the proposed addition to its plant at Jeannette, Pa., consisting of a main one-story, 12-machine building, estimated to cost close to $1,500,000. B. J. Pierce, company address, is engineer. W. L. Munro is president.

The International Motor Truck Corporation, 25 Broadway, New York, has leased the one-story building, 137 x 185 ft., now in course of construction at Liberty Avenue and Gross Street, Pittsburgh, for a service and repair works. A special shop for mechanical work will be arranged.

Bids for insulated wire, soft steel wire, tinned iron wire, annealed iron wire, annealed copper wire, wire nails, wire rope, boiler tubes, covering quantities for three months' requirements, will be received by the Pittsburgh & Lake Erie Railroad Co., Pittsburgh, until Sept. 26. C. M. Yohe is purchasing agent.

A vocational department will be installed in the two-story and basement high school to be constructed at Vandergrift, Pa., estimated to cost about $155,000, for which bids on revised plans are being received until Sept. 30.

The Armstrong Cork Co., Twenty-fourth Street, Pittsburgh, manufacturer of insulation products, is arranging for a stock issue of $13,000,000, a portion of the proceeds to be used for extensions and improvements, and additions in working capital.

A one-story automobile service and repair works, for company cars and trucks, will be constructed by the Fairmont Creamery Co., 301 Ferry Street, Pittsburgh.

The Raleigh Motor Co., Beckley, W. Va., has plans nearing completion for the construction of a new three-story service and repair building, 50 x 146 ft., estimated to cost about $65,000.

A vocational department will be installed in the new three-story and basement high school, 225 x 240 ft., to be erected at State and Case Streets, Sharon, Pa., for which bids on a general contract are being received until Sept. 29.

The Fleischmann Co., 508 West North Street, Pittsburgh, manufacturer of yeast, has had plans prepared for a new one-story automobile service and repair building at Western and Allegheny Avenues.

Chicago

CHICAGO, Sept. 18.

PRICE advances continue to feature the machine tool market. The Brown & Sharpe Mfg. Co. has marked up its line about 10 per cent and a Milwaukee manufacturer of milling machines has likewise announced advances averaging 10 per cent.

Considerable railroad buying is still pending. The Chicago, Burlington & Quincy has not yet taken action on its inquiries, while the Chicago, Rock Island & Pacific has placed a few tools and will buy others against its old list. The latter road has picked out of this list equipment that is imperatively needed and does not intend to buy the balance of the tools at this time. Business from industrial companies is scattered and rarely covers more than one or two machines per purchase. Some of these orders, however, call for large machines and therefore run into considerable money. One dealer, for example, has booked orders for a 36-in. x 36 in. x 12-ft. planer and a 3/16-in. x 8-ft. gate shear.

The Western Steel Car & Foundry Co., Hegewisch, Ind., has placed a 10-ton 88-ft. span electric overhead traveling crane with the Whiting Corporation. The Whiting company has also booked an order for a 120-in. cupola from the Pullman Co. for the latter's new carwheel foundry at Pullman, Ill.

The Electro-Magnetic Tool Co., Nineteenth Street and

Fifty-second Avenue, Cicero, Ill., has purchased the north portion of the G. S. Blakeslee Co. plant in Fifty-second Avenue, near Nineteenth Street, comprising 90,000 sq. ft. of land with buildings containing 15,000 sq. ft. The purchaser will erect an additional building.

The Bates Valve Bag Co., 7310 South Chicago Avenue, Chicago, has let contract for the construction of a two-story factory, 100 x 120 ft., 8232-40 South Chicago Avenue, to cost $60,000.

The Enterprise Parlor Furniture Co., 2315 West Huron Street, Chicago, has let contract for a third story addition, 100 x 125 ft., to cost $50,000.

The Florence Art Co., manufacturer of composition lamp standards, book ends and candle sticks, 671 West Ohio Street, Chicago, has let contract for a four-story factory, 50 x 108 ft., North California and Stave Streets, to cost $125,000.

The American Casket & Mfg. Co., 1317 West Division Street, Chicago, has let contract for a three-story factory addition, 25 x 70 ft., to cost $30,000.

Arthur Leher and Angelo Varna have formed a partnership and have opened the Herrin Sheet Iron Metal Works at 109 Madison Street, Herrin, Ill.

The Automotive Gear Works, a new company, will construct a one-story plant with 30,000 sq. ft. of floor space at Richmond, Ind.

The Central Illinois Public Service Co., Mattoon, Ill., will soon call for bids for the erection of a new power plant on the Mississippi River, near Grand Tower, Ill., estimated to cost about $2,000,000, including machinery. Sargent & Lundy, 72 West Adams Street, Chicago, are engineers.

The Eaton Metal Products Co., 3254 Walnut Street, Denver, Col., is planning for the installation of new equipment at its plant, including a number of presses for stamping and bending metal goods.

The Nebraska Power Co., Omaha, Neb., has arranged for a bond issue of $3,500,000, a portion of the proceeds to be used for extensions and improvements. A. S. Grenier is vice-president.

The City Council, Marshall, Ill., will receive bids until Oct. 5 for the construction of a new municipal power plant, with ice-making and refrigerating plant extension, to include two generators, Corliss engines, two water tube boilers, feedwater heater, feed pumps, piping, etc.; also ice-manufacturing machinery for an initial capacity of 15 tons a day. F. L. Wilcox, Chemical Building, St. Louis, is engineer.

J. J. Stone, International Falls, Minn., has plans prepared for the erection of a new one-story and basement automobile service and repair works, 75 x 85 ft., with machine shop. Bids will soon be asked. William P. Allard, Ferguson Building, Duluth, Minn., is architect.

A new one-story power house, 79 x 89 ft., will be constructed at the State Illinois Soldiers' and Orphans' Home, Normal, Ill. Bids for the plant are being received until Sept. 26 by C. R. Miller, chairman of Public Works and Buildings, Springfield, Ill. Edgar A. Martin, 410 South Wabash Avenue, Chicago, is architect.

The Chicago, Burlington & Quincy Railroad Co., 547 West Jackson Boulevard, Chicago, is completing detailed plans for the erection of its proposed new shops at Denver, Col., to be located on a 275-acre tract of land at Fifty-first Street, near Broadway, recently acquired. Six main buildings will be constructed, including machine shop, forge and blacksmith shop, boiler shop, oil house, power plant, and storehouse and office. The entire plant with machinery is estimated to cost in excess of $1,500,000. T. Krausch, engineer of buildings for the company, will be in charge of erection.

Detroit

DETROIT, Sept. 18.

INQUIRIES on machine tools have been very light since the first of the month but there have been no deliveries extended on orders already placed. Undoubtedly the fuel situation has had a depressing effect on new business. Representatives of machinery manufacturers are optimistic, however, and are anticipating a reflection of the improved industrial outlook early in October. The shut down of the Ford plants is apt to be seriously felt if long continued.

The Kalamazoo Blow Pipe Co., 408 North Church street, Kalamazoo, Mich., will soon take bids for the erection of a new one-story plant, 35 x 155 ft., on North Church Street, to cost about $50,000. E. S. Batterson, Hanselman Building, is architect. H. F. Brundage is president.

The Detroit Edison Co., Detroit, will build a new one-story power house at Mt. Clemens, Mich., to cost about $150,000, including equipment.

The Burr-Patterson Co., 4211 Woodward Avenue, Detroit, manufacturing jeweler, will commence the immediate erection of a new two-story plant, 40 x 105 ft., to cost close to $50,000, including precision tools and other equipment.

A vocational department will be installed in the three-story high school to be erected at Eaton Rapids, Mich., to cost about $125,000, for which bids on a general contract will be asked soon.

The Muzzy-Lyon Co., Detroit, manufacturer of engine bearings, babbitt alloys, etc., has removed its plant from 535 West Larned Street, to a new building on Shoemaker Street, near St. Jean Street. The structure will provide a total floor area of 36,000 sq. ft., which will be entirely utilized with present equipment from the former works and new machinery. J. H. Muzzy is president and general manager.

The Fisher-Ohio Body Corporation, General Motors Building, Detroit, manufacturer of automobile bodies, has awarded a contract to the Realty Construction Co., Flint, Mich., for the erection of a new two-story plant on Wilcox Street, Flint, 200 x 400 ft., to be equipped for assembling. Albert Kahn, 1000 Marquette Building, Detroit, is architect. Fred J. Fisher is president.

The Kessler Sales & Service Co., 4627 Dix Avenue, Detroit, is arranging for the installation of additional equipment at its service and repair works. A list of machinery will be prepared at an early date.

The Flint Steel Co., Flint, Mich., recently organized, has acquired the entire plant and business of the Perkins Structural Steel Co., which has been operating a local works for about a year past. The new company will take immediate possession. W. L. Perkins is president and general manager.

The Briggs Mfg. Co., Hamtramck, Mich., has plans under way for the erection of a new one-story power plant at its works, 80 x 83 ft. The company specializes in the manufacture of automobile bodies. M. L. Briggs is secretary.

The Department of Street Railways, Shoemaker Street, Detroit, is planning for the construction of a new one-story machine and mechanical repair shop on Woodward Avenue, estimated to cost about $100,000, including equipment. W. C. Markham, 312 Marquette Building, is engineer.

The Progressive Club, Montague, Mich, is arranging for the establishment of a new industry at the plant of the Montague Iron Works, which has been idle for about three years. The new company will remodel the works for the manufacture of piston rings and kindred automotive products, with the installation of new equipment.

The Bryant Paper Co., Kalamazoo, Mich., has announced an extensive building program including a new power plant and a machine shop.

The Monroe Auto Equipment Co., Monroe, Mich., is erecting a foundry, 64 x 100 ft., in connection with its present plant. This company manufactures automobile pumps and brake shoes and the new foundry will give it capacity for production work beyond its own needs. Officers of the company are C. S. McIntyre, president; W. S. Meyers, secretary and general manager.

The C. G. Spring Co., manufacturers of spring bumpers, has taken a five year lease on the building formerly occupied by the Detroit Stoker Co., West Grand Boulevard, east of Russell Street. The building contains approximately 17,000 sq. ft., which will be utilized for manufacturing purposes and as a service station.

The Ford Motor Co. will erect an experimental laboratory, one story, steel, 200 x 800 ft., at Dearborn, Mich. Albert Kahn is architect.

In connection with its entrance into Detroit, the Pennsylvania Railroad system has announced the awarding of contracts covering four building projects which will form the principal unit of the roads general operating plans for this territory and which before completed will involve an expediture of approximately $20,000,000. The present construction includes an engine house at Ecourse, freight house, 70 x 680 ft., at Third and Larned Streets, to cost $200,000 and a turn table, water and coaling station at Third and Summit Streets.

The Cerruti Aircraft Corporation, capitalized at $100,000, has begun operations at 3834 Grand River Avenue, Detroit, manufacturing airplanes. Officers of the company are Lieut. Frank A. Cerruti, president, Floyd F. Williams, vice-president and L. V. Martin, secretary and treasurer.

The Wheel Trueing Co. is erecting a modern factory building at Oakland and Victor Avenues, Highland Park. Special equipment has been ordered for the manufacture of trueing wheels, diamond dies for wire drawing, shaped carbon tools for turning hard rubber, fiber and celluloid and diamond saw teeth for cutting stone and marble. Harvey B. Wallace is general manager.

Baltimore

BALTIMORE, Sept. 18.

The Baltimore Steel Co., Eastern Avenue and Eden Street, Baltimore, has purchased property adjoining its plant, totaling about 20,000 sq. ft., as a site for an addition. Plans are under way for the new building, estimated to cost $200,000, including equipment. The company specializes in the fabrication of structural steel, ornamental steel and iron products, etc.

The Security Cement Lime Co., Equitable Building, Baltimore, has arranged for a note issue of $300,000, the proceeds to be used in part for extensions to its cement manufacturing plant at Security, Md. The present works will be enlarged and additional machinery installed to increase the capacity from 950,000 barrels to 1,400,000 barrels a year. Loring A. Cover is president.

A three-story automobile service and repair building for company trucks and cars, with machine and mechanical repair works, and fire plant, 76 x 110 ft., to cost about $75,000, will be erected by the Corby Baking Co., 2301-7 Georgia Avenue, N. W., Washington, D. C., on site in the vicinity of the baking plant. Col. P. M. Anderson, 705 Southern Building, is consulting engineer.

The Consolidated Machine Tool Corporation, 17 East Forty-second Street, New York, has awarded a general contract to the Shoemaker-Satterthwait Bridge Co., 4 South Fifteenth Street, Philadelphia, for the erection of a new two-story foundry at its Hilles & Jones plant, Ninth and Church Streets, Wilmington, Del., 98 x 240 ft., steel and concrete.

The City Council, Elizabeth City, N. C., has tentative plans for the construction of a new municipal electric light and power plant, in connection with new waterworks and pumping plant, to cost about $750,000. About five acres has been acquired in the Knobb's Creek district for the plants.

The Purchasing Agent, Post Office Department, Washington, D. C., will receive bids until Sept. 22, for 72 dozen steel oilers.

The Allen Transfer & Repair Co., 1715 West Cary Street, Richmond, Va., is planning for the installation of new equipment at its machine works, including lathe and drill press.

The City Manager, P. C. Painter, Greensboro, N. C., will receive bids until Oct. 10, for equipment to be installed in connection with a new filter plant at the waterworks, including one 1,000-gallon per minute, motor-operated pumping unit; steel wash water tank, 70,000 gallons capacity; piping, valves, and other kindred miscellaneous equipment. J. L. Ludlow is consulting engineer.

The Snapp Foundry, Inc., Winchester, W. Va., recently organized with a capital of $50,000, will take over the local plant and business heretofore operated as the Snapp Foundry Co. The company will continue the operation of the plant for the manufacture of power fce saws, etc., and contemplates expansion in the near future. C. Arthur Robinson is secretary.

The Queen City Iron & Metal Co., Charlotte, N. C., has acquired the plant of E. I. du Pont de Nemours & Co., at Georgetown, S. C., heretofore devoted to the manufacture of industrial alcohol and kindred products, and will use it for plant extensions.

The Consolidated Gas, Electric Light & Power Co., Lexington Building, Baltimore, has arranged for a bond issue of $5,000,000, a portion to be used for extensions and improvements. Herbert A. Wagner is president.

The Standard Variometer Co., City Point, Va., recently organized, has arranged for the operation of a local plant for the manufacture of radio equipment and parts, and kindred electrical specialties. P. B. Woodward is president.

In connection with its proposed new electric generating plant at Williamsport, Md., the Potomac Public Service Co., Hagerstown, Md., will install an electrically-operated overhead traveling bridge crane, with capacity of about 40 tons. The station will have a generating capacity of about 15,000 horsepower, and other machinery to be installed includes mechanical stokers, economizers, marine type boilers, condusers, vaporizers,, electric generators, exciters, switchboards, pumping machinery, and auxiliary equipment. The entire plant will cost approximately $1,500,000. Sanderson & Porter, 52 William Street, New York, are engineers. The company is operated by the American Water Works & Electric Co., 50 Broad Street, New York.

A vocational department will be installed in the new high school to be erected at Crisp, N. C., by the Edgecombe County School Board, Speed, N. C. Plans have been prepared.

The City Council, Harrisonburg, Va., is planning for the immediate construction of its proposed new steam-operated electric power plant, estimated to cost about $80,000, for which plans have recently been completed. It will have an initial capacity of 500 kilowatts and which will be increased at a later date.

The Anderson Motor Co., Rock Hill, S. C., manufacturer of automobiles, has preliminary plans for an addition to its plant.

The Imperial Tobacco Co., Richmond, Va., is planning for improvements in the power house at its plant, to include the installation of oil-burning equipment to replace the present coal burning plant. Inquiries are being made to different types of equipment.

Cleveland

CLEVELAND, Sept. 18.

AN Ohio company that will equip its plant for locomotive repair work will require approximately $250,000 worth of machinery and placed orders for a few tools during the week. One other important feature of the market is the purchase of 35 or more tools aggregating approximately $200,000 by the Lima Locomotive Co., for its plant extensions. Over half of this business went to the Niles Tool Works, the remainder being divided between three other distributors. The Niles Co. took 12 6 ft. Right Line radial drills, six Pond planers, five 60 in., one 90 in. and a 50 ft. triple head Bement locomotive frame slotting machine. Additional purchases reported included three planers, a vertical rod boring machine, a vertical rod milling machine, axle turning lathe, four 20 in. engine lathes, two tool makers' lathes, a 60 in. wheel press, cylinder boring machine, two 18 in. slotting machines, a horizontal boring and milling machine and two turret lathes.

Dealers are getting a fair volume of business in single tools. Turret lathe manufacturers report an improvement in a scattered demand for single tools.

More price advances are coming out, being made by manufacturers who had not previously marked up their prices to meet the increasing cost of manufacture. The Monarch Lathe Co., Sidney, Ohio, has advanced its line of lathes 10 per cent and an Ohio manufacturer of turret lathes has advanced its price approximately 10 per cent. A large Eastern machine-tool manufacturer withdrew outstanding quotations Saturday and will announce price advances this week.

The Sterling Stone & Lime Co., Delaware, Ohio, will erect a stone crushing plant with a capacity of 1200 tons per day. H. E. Culbertson is president and J. T. Herrick, vice-president and general manager.

The C. L. Dover Foundry Co., Bellaire, Ohio, has commenced the erection of a foundry addition 35 x 60 ft.

The Smokeless Oil Burner Co., Bucyrus, Ohio, has been incorporated with a capital stock of $25,000 and will manufacture oil burners for industrial purposes. The burner has been manufactured for two years under a partnership arrangement. C. W. Moore and P. H. Ryder are understood to be the principal owners of the company. They are associated with the Ryder Brass Foundry in Bucyrus.

The Barberton Machine & Foundry Co., recently incorporated with a capital stock of $10,000, has purchased the property and patents of the Keyless Lock Co., Akron, Ohio.

The American Shipbuilding Co. has placed a contract for a one story, 50 x 60 ft. factory building to be erected in connection with its Cleveland shipping yard.

The Towmotor Co., Cleveland, has just shipped two towmotors to New South Wales. Other recent purchases include two machines purchased by Ball Bros. Glass Mfg. Co., and one by the Carnegie Steel Co.

The L-M Axle Co., Cleveland, announced that it has completed negotiations for acquiring the plant of the Jones Gear Co., Wayside Road and the Nickel Plate Railroad, Cleveland. This is virtually a new plant. The main building is 100 x 200 ft. and there are other buildings including a heat treating department. It is reported that the buildings and machinery were sold for about $500,000. George B. Durell, treasurer of the American Fork & Hoe Co., is president of the L-M Axle Co., and J. S. Vaughan is secretary.

The plant of the New Process Gear Corporation, Syracuse, N. Y., which was a subsidiary of the Willys Corporation, has been sold to Thomas W. Warner, Toledo, Ohio, for $1,904,000. Mr. Warner has been prominently identified with

the automotive industry in the Central West and was formerly vice-president of the General Motors Corporation. He is at present vice-president of the Durant Motors, Inc., of Indiana.

The monthly report of the Ohio State Foundrymen's Association compiled from data supplied by about 50 members shows a considerable increase in operations during August. On Sept. 1 the plants reporting were melting at 70 per cent of capacity as compared with a 58 per cent melt Aug. 31.

Cincinnati

CINCINNATI, Sept. 18.

THE feature of the machinery market during the past week was the receipt of the Missouri, Kansas & Texas Railroad list, for shops at Bellmead, Tex., which calls for approximately $500,000 worth of equipment. The list includes complete equipment for a large shop, and as bids are to be in Sept. 18, it is expected that purchasing of tools will be begun in a short time.

The National Cash Register Co., Dayton, Ohio, has a list out for a number of tools on which action is expected this week. The General Motors Corporation, which is planning to turn out an air-cooled car, has revived a list of tools issued early in the year, and on which no action had been taken. It is expected that at least 11 miscellaneous machines will be purchased. The original inquiry called for 29, but some of these tools have been supplied by various units of the corporation. Inquiries for single machines show a fair improvement over the previous week, and with a settlement of the rail strike in sight, it is expected that the machinery market will be given a healthy stimulus, particularly as prices generally show strength. Recent announcements of stiffening prices have had the effect of bringing in quite a few orders, particularly for shapers. There have been no large orders placed.

The Indiana Quarries Co., Bedford, Ind., which will build a new plant to replace the one destroyed by fire some months ago, has placed orders for the equipment for its new buildings, which included a number of cranes, and miscellaneous machine tools. Agricultural implement manufacturers, who have been displaying their products at various fairs throughout the country, report very much interest being shown by farmers in their exhibits, and it is expected that buying will be good during this fall and next winter.

The Rahn-Larmon Co., Cincinnati, manufacturer of gap and engine lathes, has advanced its list price 12½ per cent effective Sept. 15.

The Ironton Boiler Works Co., Ironton, Ohio, has been incorporated with a capitalization of $50,000. The company has been operating as a partnership. Additions to plant and equipment, to take care of increasing business, are planned. P. F. Meehan heads the company.

The Cincinnati Valve Co., Cincinnati, has been incorporated with a capitalization of $10,000 and will manufacture a new type of steam valve. The plant will be located on Richmond Street. Thomas F. Bickett is general manager.

The Morton Last Co., Cincinnati, has been incorporated with a capitalization of $125,000, to manufacture shoe lasts. The plant will be located at Third and Eggleston Avenue. Charles P. Morton is president.

Contract will be awarded this week for the construction of the new plant of the J. A. Fay & Egan Co., Cincinnati, which will cost, with equipment, approximately $500,000. The plant will be located in the Bond Hill section of the city. The company is one of the largest manufacturers of woodworking machinery in the world, and when the new plant is in operation will greatly increase its capacity. Part of the equipment for the new plant has been contracted for. Clifford Egan is president.

Negotiations are being conducted for the purchase of the property of the Barney & Smith Car Co., Dayton, Ohio, now in receiver's hands, by a large Eastern car manufacturing company. It is understood that the company has made an offer close to $2,000,000 for the property, which is now being considered by the bondholders' protective committee. Should the deal go through it is planned to operate the plant at once, principally on car repair work.

Milwaukee

MILWAUKEE, Sept. 18.

ADMITTEDLY a great load has been removed from the minds of the men engaged in the machine-tool industry by the effect of the settlement of the railroad shop crafts strike, which likewise has eased the tenseness of the situation of general business. While the outcome had been discounted and at the outset opinion varied only with respect to the duration of the strike, it was probably of more moment to the tool trade than almost any other that such a contingency should arise. Unquestionably the calling of the shop strike caused railroad companies to postpone very heavy purchases of equipment sorely needed, and now that this trouble has been overcome, manufacturers as well as dealers expect to receive some sizable business affecting virtually every line of tools.

The Elwood Tractor Co., Madison, Wis., is moving works and offices to Paris, Ill., having taken over the entire business, plant and equipment of the Paris Mfg. & Engineering Co. For several years the Elwood company has maintained a small experimental and development shop in Madison, and it is now ready to engage in quantity production of tractors. An output of 1000 machines in 1923 has been laid out and purchases of materials as well as additional shop equipment are being made on this basis. H. A. Burd, general manager, and C. D. Elwood, chief engineer, continue in charge of the business under the physical merger with the Paris company.

The North Milwaukee Foundry Co., North Milwaukee, Wis., sustained an estimated loss of $35,000 in the destruction of its shop on Commerce Avenue by fire of undetermined origin on Sept. 15. No decision will be made concerning the erection of a new plant until the loss has been adjusted.

The Milwaukee Air Power Pump Co., 886-890 Third Street, Milwaukee, will build a new plant, 130 x 150 ft., one story, of brick and steel construction, on a new site on Keefe Avenue, west of Humboldt Avenue, at an estimated cost of $75,000. The Erich G. Schroeder Co., consulting engineer, 405 Broadway, local, is preparing plans and equipment specifications. Work is expected to start about Oct. 1. John R. Ball is president and treasurer.

The Wisconsin Regrinding Co., Sheboygan Falls, Wis., conducting a general machinery repair and automobile engine service shop, with a branch at Fond du Lac, Wis., will establish a second branch at Rhinelander, Wis. A new shop, about 30 x 75 ft., will be erected, and new equipment installed. Roy Nichols, vice-president, has been assigned to the Rhinelander branch as manager. William Findlay is president and A. P. Schneidewent, secretary and treasurer.

The C. C. C. Co., Oshkosh, Wis., manufacturer of patented folding beds, davenports, etc., has taken over the plant and business of the Juul-Peterson Mfg. Co., 83 High Street, local, which manufactures hardware specialties and metal parts and appliances for furniture, etc. It is the intention to erect a new factory and shop building during the winter and consolidate the operations, but for the present the C. C. C. Co. will continue to occupy its quarters at 29 Main Street, and the Juul-Peterson company its High Street shop, where it will continue to do a jobbing business in addition to supplying the needs of the parent concern.

The Board of Education, Drummond, Bayfield County, Wis., is taking bids until Oct. 3 for the construction of a new high, graded and vocational training school, 55 x 123 ft., three stories and basement, estimated to cost $150,000. E. G. Carter is clerk.

The Rex Typewriter Co., Fond du lac, Wis., is purchasing a small list of additional equipment and increasing its operating force gradually to facilitate quantity production of a new design of portable and demountable typewriter which has been perfected and is ready for the commercial market. An output of 100 to 125 machines a day is expected to be reached by Jan. 1.

The Burdick Cabinet Co., Milton, Wis., manufacturer of cabinets, radio cases, talking machine panels, etc., has engaged the Federal Engineering Co., 444 Milwaukee Street, Milwaukee, to design a brick and steel manufacturing addition, 80 x 160 ft., part two stories and basement, estimated to cost $50,000. Specifications of new equipment needs have not been completed.

The Motor Grinding Co., Milwaukee, is the style of a new corporation which has been organized to establish a general machine and repair business, specializing in regrinding gas engine cylinders. The incorporators are members of the law firm of Fish, Marshutz & Hoffman, 1115 Wells Building, Milwaukee.

The H. A. Poppert & Son Co., 421-423 Third Street, Mil-

waukee, manufacturer of metal and wood patterns, dies, etc., has [illegible]. The plant has been undergoing general improvement and enlargement for the past six months. Russell L. Poppert is secretary and treasurer.

The E. J. Woodison Co., Detroit, Mich., foundry facings, equipment, fire brick, platers and polishers' supplies, maintaining a branch shop and warehouse at 484-494 Virginia Street, Milwaukee, has been granted a Wisconsin charter. The application gives the capital stock as $600,000 and the Wisconsin proportion as $19,470. J. M. Witters is manager of the Milwaukee branch.

The Manitowoc Foundry Co., Manitowoc, Wis., has filed amendments to its corporate articles to effect a reduction in its capital stock from $50,000 to $30,000. David Balkansky is president, and H. L. Meyer, secretary.

The New Cornelia Copper Co., Ajo, Ariz., will build a new concentrator plant costing about $500,000 and has let the structural steel, amounting to 2,500 tons, to the Wisconsin Bridge & Iron Co., Milwaukee.

The Cleveland-Cliffs Iron Co., Cleveland, has acquired the entire properties of the Interstate Coal & Dock Co. at Green Bay, Wis., a port which accommodates the largest vessels operating on the Great Lakes. W. J. McCormick has been appointed resident manager. The property is to be improved and enlarged, but no definite details have been made public.

Indiana

INDIANAPOLIS, Sept. 18.

The Duesenberg Co., South Harding Street, Indianapolis, is said to be arranging a list of equipment for installation in its new one-story plant addition, 60 x 200 ft., on which construction was recently commenced, to be used for motor assembling. Chester S. Ricker is manager in charge.

The Studebaker Corporation, South Bend, Ind., manufacturer of automobiles, has awarded a contract to the J. G. Christman Co., South Bend, for the erection of two additional floors on the present two-story plant structure known as Building 79. Work will be commenced at once. Albert Kahn, 1000 Marquette Building, Detroit, is architect.

The Terre Haute, Indianapolis & Eastern Traction Co., Indianapolis, is completing plans for the erection of an addition to its electric power plant on West Tenth Street, and for extensions in its transmission system in this section. The work will include the installation of new equipment.

A vocational department will be installed in the new high school addition at Bloomington, Ind., now in course of erection, estimated to cost about $200,000.

Electric pumping machinery and auxiliary mechanical equipment will be installed in the new water plant to be constructed by the Upland Water Co., Upland, Ind. The Public Service Commission has granted permission for a bond issue of $45,000.

The Interstate Public Service Co., Indianapolis, is planning for extensions and improvements in its plant and system to cost about $500,000. Harry Reid is president.

The Wabash Electric Co., Clinton, Ind., has tentative plans under consideration for extensions and improvements in its plant and system to cost about $50,000.

The Pacific Coast

SAN FRANCISCO, Sept. 16.

The Doble Steam Motors Co., 714 Harrison Street, San Francisco, manufacturer of steam-operated automobiles, will soon take bids for the erection of a new plant at Atascadero, Cal., to consist of a main one and one-half story works, 100 x 500 ft., estimated to cost approximately $100,000, including machinery. The Home Builders' Service Bureau, Atascadero, is architect.

The San Gorgonia Power Co., First National Bank Building, San Francisco, has preliminary plans under way for the erection of a new hydroelectric power plant on the San Gorgonia River, San Bernardino County, Cal., with initial capacity of 4900 hp., estimated to cost approximately $300,000, including machinery and transmission line. Application has been made to the [illegible] Commission, for permission to use the power site.

The Orestimba Union High School District, Newman, Cal., has plans nearing completion for the erection of a new one-[illegible]. W. F. Reid, Concord, Cal., is clerk of the district board.

Edward Fletcher, 920 Eighth Street, San Diego, Cal., is forming a company to construct and operate a hydroelectric power plant on the Santa Ysabel and Black Canyon Creeks. It will have an initial capacity of about 3100 hp. and is estimated to cost approximately $350,000.

H. V. Glore, 2053 Thirty-eighth Avenue, Oakland, Cal., is planning for the erection of a new one-story machine shop on Fifth Street, near Alice Street.

The San Joaquin Light & Power Corporation, Fresno, Cal., has preliminary plans under consideration for the erection of a new hydroelectric generating plant on Whisky Creek, with capacity of about 24,000 hp. Application has been made to the State Water Supply Commission for permission to build the plant.

The Atchison, Topeka & Santa Fe Railway Co., Kerckhoff Building, Los Angeles, Cal., has awarded a contract to Charles A. Fellows, 500 Central Building, for the erection of a new one-story machine shop at Aubuquerque, N. M., 141 x 415 ft., divided into heavy machinery and erecting bays, respectively. A one-story adjoining building will be built for mechanical service, 84 x 86 ft. The installation will include a 90-ton and 15-ton electric traveling cranes.

The Union Pressed Steel Co., Twenty-ninth Avenue and Ford Street, Oakland, Cal., is planning for the rebuilding of its plant, destroyed by fire Sept. 2, with loss estimated at about $125,000, including machinery. The company is operated by the Union Construction Co.

The Central South

ST. LOUIS, Sept. 18.

THE list of machine tools and allied equipment inquired for by the Missouri, Kansas & Texas Railroad, comprising 116 items, for its shops at Bellmead, near Waco, Tex., closed to-day. Among the items listed were the following: Air compressor, feed water heater and pumps, water tube boilers, electric traveling cranes, armature machines, sensitive drills, band saw, rip saw, cut-off saw, squaring shear, splitting shear, tinner's roll, pipe threading machines, hydraulic driving box press, journal turning lathe, car wheel lathe, boring and turning mill, driving wheel press, piston rod grinding machine, hydraulic press, plain milling machines, draw-cut shaper, crank shapers, vertical turret lathes, vertical boring and turning mills, heavy duty planer, heavy duty slotter, emery wheel grinding machines, power hack saws, horizontal boring and drilling machine, crank planer, double-head bolt cutter, triple-head bolt cutter, rotary cold cut-off saw, high-power drilling machines, locomotive guide bar grinding machine, duplex locomotive rod boring machine, disk grinders, universal milling machines, drill grinder, engine lathes, electric tool hardening furnace, electrically heated oil tempering furnace, gas-fired oven furnace, multiple spindle drilling machine, staybolt drilling machine, plate annealing furnace, upright drill, flange clamps, double-end punch and shear, plate bending rolls, portable electric arc welders, pneumatic flanging machine, flue shop equipment, single-frame steam hammers, bar shear, bulldozer, forging machine, forge blower, turret lathes, centering machines, horizontal punch, electric rivet heaters, die grinder, link grinder, Fox lathes, clamp press.

The Kansas City Southern Railroad, Kansas City, Mo., has preliminary plans in progress for the erection of new locomotive and car shops at Pittsburg, Kan., to consist of a number of buildings, including steel car shop, engine shop, power house, etc., estimated to cost in excess of $1,000,000, including machinery.

The St. Louis Wire & Iron Co., 926 Chauteau Avenue, St. Louis, has awarded a contract to George Moeller, 3520 Staska Avenue, for the erection of a two-story and basement addition, 50 x 150 ft., estimated to cost $40,000.

The Common Council, Rich Hill, Mo., has approved a bond issue of $20,000, the proceeds to be used for the purchase of new equipment for installation in the municipal electric power plant.

The Kansas City Power & Light Co., Kansas City, Mo., has arranged for a bond issue of $21,000,000, a portion of the proceeds to be used for extensions and improvements. Work is now in progress for an increase in the capacity of the Northeast power plant from 60,000 to 90,000 kilowatts. Joseph F. Porter is president.

The Shaffer Refining Co., Cushing, Okla., has tentative plans under consideration for extensions and improvements in its oil refineries to cost about $500,000, including equipment. It is proposed to install a new four-unit cracking plant.

The Norton Taxi-Cab Co., Joplin, Mo., has plans under way for the construction of a new two-story and basement automobile service and repair works, 100 x 155 ft., on Wall Street, for company cars.

The Wichita Sheet Metal Works, 2400 East Douglas Street, Wichita, Kan., is planning for the installation of new equipment at its plant, including power lathe, drill press, hand tools, etc.

The Nashville Bridge Co., Nashville, Tenn., has acquired property totaling about 14 acres of land at Bessemer, Ala., and has plans in progress for the erection of a new steel fabricating plant for structural shapes. The works will consist of a number of buildings, estimated to cost in excess of $85,000, including equipment.

The Signal Mountain Mining Co., Chattanooga, Tenn., is planning for the development of extensive coal properties in the Suck Creek field, and will install electrical and other equipment, including hoisting machinery, conveying apparatus, etc. The project is estimated to cost close to $200,000. L. S. Berg is secretary and general manager.

The Wichita Auto Spring Works, 141 South Washington Street, Wichita, Kan., is planning for the installation of additional equipment in its repair department, to be used both for automobile and wagon work. C. E. Rischel heads the company.

The Marland Refining Co., Ponca City, Okla., is perfecting plans for extensions in its local oil refinery to increase the capacity from 6000 bbls. of refined products per day to 14,000 bbls. A number of new plant units will be constructed, to include a large addition to the storage and distributing plant, with the installation of new steel tanks, pumping equipment, etc., to provide an ultimate capacity of 1,900,000 bbls. A new waterworks system, with electrically-operated pumping machinery, will be installed. The entire project is estimated to cost about $1,500,000.

The Louisville Gas & Electric Co., 311 West Chestnut Street, Louisville, will commence the immediate erection of a new one-story cable house and works, 100 x 100 ft., with extension, 20 x 300 ft., on Washington Street, near Third Street, estimated to cost close to $1,000,000, including equipment. Donald McDonald is president.

The Douglas Coal Mining Co., 504 Fourth and First National Bank Building, Nashville, Tenn., recently organized, is planning for the development of properties in the vicinity of Island, Ky., to include the installation of electrical machinery, hoisting equipment, mine cars and other mechanical apparatus for a daily capacity of about 400 tons. A. C. Lackel is president.

The Tennessee Power Co., Parksville, Tenn., has been granted permission by the State Public Utility Commission to issue bonds for $250,000, the proceeds to be used for plant and system extensions and improvements.

The Common Council, Vinita, Okla., is planning for the construction of a municipal hydroelectric power plant on the Grand River. Work will be placed under way at an early date.

The Atkinson Armature Works, Pittsburg, Kan., has awarded a contract to the Helman Rogers Construction Co., Pittsburg, for the erection of a one-story and basement addition to its electrical equipment plant, 45 x 90 ft.

R. W. Parks, Wichita, Kan., operating a woodworking plant at 1832 South Wichita Street, is planning for the installation of new machinery, to include a saw, lathe, planer and other tools.

A vocational department will be installed in the new high school to be erected at Belle, Mo., estimated to cost close to $100,000 with equipment.

The Gulf States

BIRMINGHAM, Sept. 18.

Bids will be received by M. T. Sharp, city clerk, Corinth, Miss., until Sept. 26, for the installation of a complete municipal electric light and power plant. Fuller & Beard, 616 Title Guarantee Building, St. Louis, Mo., are consulting engineers.

The Modern Truck Mfg. Co., P. O. Box 1589, Mobile, Ala., recently organized, has acquired the local plants of the Modern Welding & Blacksmithing Co. and the Marine Equipment Co. The plants will be remodeled and improved, and both used by the new owner for the manufacture of a special tubular steel hand truck, gearing and transmission equipment for lumber mill machinery and other kindred mechanical products. Additional equipment will be installed. G. M. Bryde is general manager.

The Hialeah Coach Co., Hialeah, Fla., has tentative plans under way for the erection of a new plant for the manufacture of six-wheel coaches and other vehicles and parts. John Thiel is general manager.

The Standard Electric Works, Montgomery, Ala., recently organized, has arranged for the establishment of a plant at 17 Bibb Street, for the rebuilding and repair of electric motors and other electrical equipment. The company is headed by G. T. Key, Jr., and W. J. Howard.

The Citizens Light & Power Co., New Orleans, La., has plans under way for the construction of an addition to its electric generating plant on Carrollton Avenue, estimated to cost about $200,000, including machinery. H. K. Johnson is general manager.

The Common Council, Rayville, La., is planning for a bond issue of $150,000, for the installation of a municipal electric light and power plant.

The Van de Graff Coal Co., Tuscaloosa, Ala., recently organized, has acquired the local properties of the Brookwood Coal Co., and plans for an increase in the present output of about 50 tons a day. New electrical and mechanical equipment will be installed, including motors, hoisting equipment, mine cars, etc. Hargrove Van de Graff is president and general manager.

The Hardaway Construction Co., Marianna, Fla., is planning for the erection of a new hydroelectric power plant on the Chipola River. Permission to use the site has been secured from the Federal Water Power Commission, Washington, D. C. The plant is estimated to cost in excess of $100,000.

The Lone Star Gas Co., Dallas, Tex., is arranging a fund of about $1,000,000 for extensions and improvements, including the construction of a new compressor plant, pipe lines, auxiliary stations, etc. Work will be placed under way at an early date.

Canada

TORONTO, ONT., Sept. 18.

INQUIRIES for machinery and machine tools are beginning to make their appearance in larger numbers and dealers are of the opinion that many of these now coming in will shortly turn into actual sales. The greater part of the present demand, however, is one or two machines or tools to a customer. Manufacturers are fairly active and the majority are now operating between 75 and 100 per cent of capacity. The slight improvement which recently made its appearance in the fuel market is helping to stimulate activity in practically all lines of industry and many of those concerns which were beginning to think that it would be necessary to curtail operations are becoming optimistic and as a result the demand for equipment for replacement purposes is beginning to strengthen. Inquiries from concerns with industrial plants under construction are leaving the impression that a considerable buying movement will shortly develop from this source. Several automobile concerns have plants underway for which no equipment has so far been purchased. Canadian railways are still holding back but it is the opinion among dealers and manufacturers that buying from these will shortly be resumed on a more extensove scale.

The Sturgis Baby Carriage Co., Ltd., 60 Sumach Street, Toronto, Ont., contemplates establishing a manufacturing plant at Brampton, Ont.

The Dodds Canadian Iron Works, Ltd., recently incorporated with a capital stock of $200,000, will establish a plant at Welland, Ont., for the manufacture of flour mill machinery and equipment. The company has secured temporary quarters in the old M. Beatty & Son's plant there.

The Dominion Sheet Metal Corporation, Hamilton, Ont., is enlarging the capacity of its plant. When the addition is completed it will have capacity for 100 tons of galvanized sheets a day.

The Canadian By-Products Co., Ltd., Hamilton, Ont., has been incorporated with a capital stock of $600,000, for the purpose of manufacturing fire brick. The company will erect a modern plant with a capacity of 20,000 fire brick and miscellaneous refractories per day. The officers of the company include: President, Wendell L. Whitehouse; vice-president, George W. Esslinger; secretary, Capt. Chauncey H. Derby; treasurer, Earl V. Wagner, all of Scranton, Pa. Directors include Ernest H. Darling, C. V. Langs and John C. Callaghan of Hamilton, Ont.

The British Empire Steel Corporation, Sydney, N. S., has announced that wage increases running from 10 to 15 per cent and affecting all classes of workers at the steel plant will become effective shortly. The rate paid for common labor is increased from 24½ and 26 cents per hour to 28 and 30 cents per hour.

IRON AND INDUSTRIAL STOCKS

Hesitancy in Stock Trading Owing to Uncertainties of Market

checking element now being the limit on shipment in place of the limit on production. Various embargoes between certain points virtually preclude shipment. There is great concern over the car shortage, which before long will mean a piling up of steel products at the source. Relatively little business was placed at the prevailing high prices, which are regarded as premiums for prompt delivery. An undertone of hesitancy dominates stock trading. Though appearances would point to a strong rising market, no actual advances of moment are noted. The week's turnover was light and, in most cases, if prices were shorn of quick delivery premiums, advances would be negligible. In many quarters there is strong expectancy of a revival on a lower, firmer basis after a few months shall have removed the cause of delivery premiums.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

	Low	High
Allis-Chalm.	[illegible]	[illegible]
Allis-Chalm. pf...	101¼	103⅛
Am. Br. S. & Edry. Sec.	81¾	84¼
Am. B. S. & F. pf.	110	112
Am. Can.	61½	65¼
Am. Can. pf.	108½	110
Am. Car & F.	188	197
Am. Car & F. pf.	122½	124
Am. Locos.	124	135½
Am. Loco. pf....	121	121⅝
Am. Radiator.	113	122
Am. Sm. & R.	167	169½
Am. St. F. pf.	106	106½
Bald. Loco.	135½	140¼
Bald. Loco. pf.	111	111
Beth. Steel.	76	77⅞
Beth. Stl. Cl. B...	77⅞	79⅝
Beth. St. 8% pf..	114⅝	115½
Brier Hill, pf....	19	19
Br. Dy. Steel.	127	141½
Br. Dy. S. 1st pf.	71½	75
Br. Dy. S. 2d pf.	36½	39
Cambria Steel.	50	50
Chic. Pneu. Tool.	80⅝	87
Colo. Fuel & Iron.	32½	36⅜
Crucible Steel.	95	96
Crucible Steel pf..	95½	99
Deadw. pf.	76⅝	80½
Dom. Steel.	19	19
Gen. Electric.	179	183
Gt. No. Ore Cert..	40⅝	42
[illegible] Steel	82⅛	85¼
Harbison Walker.	110	110
Hollins Steel.	50	50
Int. Har. new.	110¾	113½
Lackawanna Steel.	79	82
Lima Loco.	62⅜	64½
Midvale Steel.	34	35
Nat. Acme.	156⅜	165⅛
Nat. E & Stm.	61	62¾
Nat. E. & Stm. pf.	102	103
N. Y. Air Brake.	77	81
Nova Scotia Steel.	77½	80
Otis Steel.	10⅝	11⅛
Pittsburgh Stl. pf.	97	97
Pressed Stl. Car.	59¾	65⅛
Pressed Steel, pf.	104	106
Ry. Steel Spring.	119⅞	126¼
Ry. Stl. Spring pf.	115	115
Replogle Steel.	32⅞	35
Republic.	69⅝	71
Republic pf.	92⅝	92⅞
Sloss.	19½	21½
Sloss pf.	78¾	78¾
Steel of Canada..	77¼	80
Superior Steel.	33	34¼
Superior S. 1st pf.	90	90
Un. Alloy Steel.	37	38¼
U. S. Steel.	104½	106⅜
U. S. Steel pf.	121½	122⅝
Vanadium Steel.	51	53
W'house Air Br.	102	104

Industrial Finance

At the annual stockholders' meeting of the Vanadium Corporation of America J. Leonard Replogle, chairman of the board, stated that the August earnings will be in excess of $90,000 net after all charges. Vanadium's current liabilities approximate $40,000, while quick assets are around $3,600,000, roughly 90 times its liabilities.

The Associated Motor Industries, a merger comprising eight motor and machine manufacturers, in its first balance sheet, as of July 15, showed total assets of $20,254,031, of which $9,564,555 were current and $10,135,378 represented land, buildings and equipment less depreciation. Current liabilities aggregate $1,210,060, which with $3,000,000 first mortgage bonds, $3,542,138 notes and dealers' deposits, $75,000 for reserve and $12,426,822 capital liabilities and surplus, made total liabilities $20,054,021.

Directors of the Youngstown Sheet & Tube Co., Youngstown, last week increased its common dividend from 50c. to 75c., owing to improved earnings. At the same time the regular preferred dividend of $1.75 per share was authorized. Both payments are due on Oct. 1 to stock of record Sept. 20. Since July 1, 1921, the company has been paying 50c. per share quarterly on its common stock. From the standpoint of earnings, June was the best month of the year for the company, and the third quarter showed a substantial gain both in gross and net earnings over the second quarter.

Directors of the Newton Steel Co., Youngstown, Ohio, [illegible] share on common and $1.75 on preferred, both payable Oct. 1 to holders of record Sept. 20.

[illegible] of $20,000, to manufacture automobile equipment and operate a general machine repair works. At present it is doing only garage work, specializing in auto brake relining under the Raybestos Co. The incorporators are A. C. and G. E. Hull and W. B. Ballinger.

Plans of New Companies

The Hendry Machine & Engineering Co., Fort Myers, Fla., was recently incorporated with a capital stock of $50,000, to manufacture iron and steel products. Its buildings are complete, but it will be in the market for machinery. B. L. Hendry is president, L. Hendry vice-president and W. F. Lusk secretary, all of Fort Myers.

The Bronze Hardware Mfg. Co., Buffalo, N. Y., has been incorporated with a capital of $100,000, to manufacture hardware products. It will manufacture its own products. Sufficient equipment has been purchased to start operations. The incorporators are: W. H. and E. K. Barlow and W. O. Kuhn D. E. Hart, attorney, Buffalo, represents the company.

The Universal Darning Machinery Corporation, 30 Church Street, New York, was recently incorporated with a capital of $500,000, to manufacture textile machinery and parts. Tentatively, it will lease a plant, preferably in Brooklyn, but expects to erect its own buildings as soon as operations are well under way. It is in the market for its entire equipment. The incorporators are S. Sims and C. M. Fyfe.

The Hartford Valve Mfg. Co., Hartford, Conn., has been incorporated with a capital of $50,000, to manufacture valves and kindred engineering specialties. Arrangements have been made for manufacturing a flush valve which has previously been made by the M. S. Little Mfg. Co. The incorporators are H. B. Carey, M. S. Little and M. H. Flynn, 113 Whitney Street, Hartford, Conn.

The Amplex Engineering Corporation, 52 Vanderbilt Avenue, New York, recently organized, has leased a plant and has purchased part of the necessary equipment. It is still receiving bids on the rest. This company was incorporated with a capital of $100,000, to manufacture packing wire baling and other mechanical specialties. The officers are: N. M. Goodlett, president; J. A. Rietmann, vice-president, and E. Palmer, secretary-treasurer.

The Open-Hearth Fire Brick Co., Wilmington, Del., has been incorporated with a capital stock of $500,000, to manufacture fire brick and other refractories. It expects to erect a plant and will be in the market for equipment. The company has over 1000 acres of upper Freeport coal seam, having taken over the plant formerly operated by W. A. McCreary, Freeport, Pa. Sleeves, nozzles, runner brick and silica brick will be the chief products. H. O. Williams, 1407 Keenan Building, Pittsburgh, is the corporate representative.

The Sutwa Mfg. Co., 17 West Forty-second Street, New York, has been incorporated with a capital of $100,000, to manufacture hangers and other metal products. For the present its manufacturing will be contracted for, but later it may put up a plant of its own. The incorporators are M. G. Newman, D. M. Meyers and C. Weil.

The Hydraulic Elevator & Machine Co., New York, was recently incorporated with a capital of $25,000, to manufacture hydraulic elevator equipment and parts. Its manufacturing will be done by the Thurber Elevator Co. The incorporators are J. O'Rourke, J. F. Higgins and M. Butler. Dooling & Waldman, 141 Broadway, New York, represent the new company.

The Henry Forge & Tool Co., Inc., Auburn, N. Y., has been incorporated with a capital stock of $200,000, to manufacture tools and machinery. It will specialize in drop forgings and machined parts for all purposes. Contracts have been awarded and the buildings are under construction. A large portion of the equipment has been purchased. The management expects to be in operation Jan. 1, next. W. J. Henry is president; W. M. Henry, vice-president and treasurer, and F. A. Henry, secretary.

The Plate Glass Machine Co., Butler, Pa., was recently incorporated to manufacture glass making machinery and parts. All its work is to be done by contract. F. E. Troutman, Butler, Pa., is treasurer.

The Universal Burner Co., manufacturer of liquid fuel burning equipment, Logansport, Ind., recently incorporated under the laws of Indiana at $25,000, all common stock, expects to build all of its equipment with the exception of large air compressors and steam pumps, which it will purchase on the market. It will also purchase motors for use in connection with small units and motor-driven oil pumps. The company is manufacturing oil burners for all industrial uses. It has a staff of engineers and has designed a burner eliminating the use of all needle valves and controlling the oil with a self-cleaning valve which will permit the use of the heavier grades of fuel oil without clogging. By the arrangement of a cone on the end of the valve, both mechanical and air atomizing is applied to the fuel, assuring complete combustion of the oil within the furnace.

ZINC COATING ON SHEETS*

Method for Determining the Amount by Measuring the Rise in Temperature of the Acid Employed

THIS paper describes a new method for the determination of spelter coating on iron and steel sheets, the value of the method lying in the fact that coating weights can be determined without the use of the analytical balance. A galvanized specimen is immersed in a measured amount of acid, the maximum temperature rise being recorded. Each one-tenth degree rise in temperature is equivalent to a definite weight of zinc.

Apparatus and Manipulation

The equipment needed consists of a ground-stoppered bottle containing concentrated hydrochloric acid, a graduated volumetric flask used to measure the acid, a testing jar, and a thermometer. Providing the sides and bottom are not too thick, almost any container would be satisfactory. The size of the jar should be approximately 2½ in. in diameter. An elliptical shaped container is very advantageous, as will be pointed out hereafter. The thermometer is the only precision instrument needed, being, in fact, the only item of apparatus which is in any way costly. It should be graduated in tenths of a deg. C. with a range of, perhaps, 50 deg. (90 deg. Fahr.)

A measured amount of concentrated hydrochloric acid is poured into the testing jar. The base metal may be slightly attacked without danger to accuracy, consequently, it is not necessary to add antimony trichloride to the acid. The volume of the acid chosen regulates the conversion factor, that is, the value in grams for each 0.1 deg. C. rise in temperature. The smaller the volume of acid used the greater will be the rise in temperature for each gram of zinc dissolved. Several series of experiments were run using volumes of acid which varied in amounts from 100 to 300 cc. and, although the conversion factor was different for each volume used, nevertheless the coating weight was accurately determined regardless of the acid volume employed. It must be pointed out, however, that when an exceptionally high coating weight is determined (3 or 4 oz. per sq. ft.) the acid volume for the usual size of specimen should never be less than 300 cc. The shape of the testing jar regulates to some extent the volume of acid needed. It is obvious that sufficient acid must be present to insure complete immersion of the sample. A smaller volume of acid can be used for the same height test piece if the tumbler is elliptical in shape rather than circular.

Other Shapes of Containers

Experiments were also conducted using a container rectangular in shape. Very close checks were obtained using all the various shaped containers mentioned. The height of the container is not important except that it must be at least of such height that no acid bubbles out at the moment the evolved gas causes the liquid to rise.

After the acid is poured into the container it is stirred thoroughly to insure an equalized temperature. The thermometer is immersed in the liquid, and when the temperature is constant the reading is recorded. The galvanized specimen is immersed in the acid (the spelter coating dissolving very rapidly), the heat evolved being absorbed by the acid. The action is so rapid that the spelter is dissolved and the maximum temperature reached in about 30 or 40 sec.; consequently, radiation does not interfere with accuracy. The maximum temperature is then recorded. The rise in temperature multiplied by an experimental conversion factor gives the grams of zinc originally carried by the test piece. The entire time required for a determination is very short, the entire operation being finished in 3 min. or less.

Samples and Experimental Data

The samples used must be clean. For this reason it is customary to wash them off with gasoline. The size of the sample is immaterial except that it must not be too large for the testing jar. Since the coating weight is customarily reported in ounces per square foot, a 2¼ by 2¼-in. test piece has been found convenient, as the weight of zinc in grams is then numerically equal to the ounces per square foot desired. When only irregularly shaped pieces are available, it is advantageous to use a planimeter for accurately measuring surface areas. The sample is placed on a sheet of plain white paper and a pencil run around the edge. The area of this figure, which is the area of the test piece, may then be read directly by means of the planimeter. The area obtained may be compared to the area of a 2¼ by 2¼-in. specimen (5.06 sq. in.) and the ounces per square foot calculated by proportion.

The table contains experimental data which shows the accuracy of the temperature rise method. The determinations obtained by the temperature rise method are compared with results obtained by the hydrochloric acid method. These comparative figures are all the more interesting because they are absolute comparisons. Each sample was weighed before the coating weight was determined by the temperature rise method. When the temperature was recorded the sample was dried and re-weighed, the difference in weight giving the coating weight by the hydrochloric acid method. The same sample was thus used for both determinations.

Table of Experimental Data on Temperature Rise Method of Coating Determination

Material	Size, In.	Gage, No.	Vol. of Acid Used, Cc.	Conversion Factor for Volume Used	Temperature Rise Deg. C.	Grams of Zinc per Sq. Ft. by Temperature Method	Grams of Zinc per Sq. Ft. by HCl Method	Difference
Galvanized iron	2 x2	14	100	0.168	12.1	2.03	2.02	0.01
Galvanized iron	2 x2	14	100	0.168	12.1	2.03	2.02	0.01
Galvanized iron	2 x2	10	100	0.168	12.0	2.02	1.98	0.04
Galvanized iron	2 x2	16	100	0.168	8.4	1.41	1.42	0.01
Galvanized iron	2¼x2¼	28	100	0.168	5.2	0.87	0.88	0.01
5 nails, electro galvanized	.....	..	120	0.191	3.0	0.57	0.60	0.03
10 nails, electro galvanized	.....	..	120	0.191	5.5	1.05	1.10	0.05
5 nails, hot-dip galvanized	.....	..	120	0.191	13.0	2.48	2.43	0.05
10 nails, hot-dip galvanized	.....	..	120	0.191	24.0	4.58	4.62	0.04
Metallic zinc sawings	.....	..	120	0.191	3.5	0.67	0.70	0.03
Metallic zinc sheet	.....	..	120	0.191	9.0	1.72	1.70	0.02
Metallic zinc sawings	.....	..	120	0.191	9.0	1.72	1.70	0.02
Metallic zinc sheet	.....	..	120	0.191	25.0	4.77	4.71	0.06
Galvanized iron	2 x3	26	120	0.191	10.5	2.01	2.02	0.02
Galvanized steel	2 x3	26	120	0.191	9.5	1.81	1.82	0.01
Galvanized steel	2 x3	26	120	0.191	8.5	1.62	1.68	0.06
Galvanized steel	2 x2	16	120	0.191	8.0	1.53	1.52	0.01
Galvanized steel	2 x2	16	120	0.191	7.0	1.34	1.34	0.00
Galvanized iron	2 x2	16	120	0.191	11.0	2.10	2.06	0.04
Galvanized iron	2 x2	16	120	0.191	12.0	2.29	2.27	0.02
Galvanized iron	irregular	20	120	0.191	8.3	1.59	1.61	0.02
Galvanized iron	2¼x2¼	12	120	0.191	15.0	2.87	2.88	0.01
Galvanized steel	2¼x2¼	16	200	0.305	4.1	1.25	1.28	0.03
Galvanized steel	2¼x2¼	24	200	0.305	3.9	1.19	1.23	0.04
Galvanized steel	2¼x2¼	24	200	0.305	4.1	1.25	1.26	0.01
Galvanized steel	2¼x2¼	24	200	0.305	4.2	1.28	1.29	0.01
Galvanized steel	2 x2	24	200	0.305	6.7	2.04	2.04	0.00
Galvanized iron	2 x2	20	200	0.305	7.3	2.23	2.23	0.00
Galvanized iron	2 x2	20	200	0.305	7.2	2.20	2.20	0.00
6 rivets	.....	..	200	0.305	1.3	0.40	0.41	0.01
Galvanized iron	2¼x2¼	10	300	0.425	10.1	4.29	4.25	0.04
Galvanized iron	2¼x2¼	10	300	0.425	12.3	5.22	5.30	0.08

[1] A. Supperl. "The Determination of Spelter Coating on Sheets and Wires." *Proceedings*, Am. Soc. Test. Mats., Vol. XV, Part II, p. 120 (1915).

Application to Other Products

The application of the method is not limited to sheet metal alone, but can be used equally as well for rivets, nails, wire or anything in fact which carries a coating weight and on which the surface area can be determined.

The temperature rise method of coating determination is very serviceable for field tests. The equipment needed can easily be packed in a small box and carried from place to place. The testing jar and the thermometer take the place of the analytical balance. To test a sample in the field it is only necessary to clip a piece from the sheet to be tested and drop it in the acid, after which the temperature rise is recorded.

*From a paper presented at the annual convention of the American Society for Testing Materials at Atlantic City, June 26 to 29. The author, D. M. Strickland, is research engineer the American Rolling Mill Co.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	
Refined iron bars, base price	2.94c.
Swedish bars, base price	7.00c.
Soft steel bars, base price	2.94c.
Hoops, base price	4.29c.
Bands, base price	3.74c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	3.04c.
Channels, angles and tees under 3 in. x ¼ in., base	2.94c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	2.94c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	3.14c.
Toe-calk, ½ x ⅜ in. and larger	4.00c.
Cold-rolled strip, soft and quarter hard	6.75c. to 7.25c.
Open-hearth spring steel	4.50c. to 7.00c.
Shafting and Screw Stock:	
Rounds	3.90c.
Squares, flats and hex	4.40c.
Standard cast steel, base price	15.00c.
Extra cast steel	18.00c.
Special cast steel	23.00c.

Tank Plates—Steel

¼ in. and heavier	3.04c.

Sheets

Blue Annealed

	Per Lb
No. 10	4.04c. to 4.19c.
No. 12	4.09c. to 4.24c.
No. 14	4.14c. to 4.29c.
No. 16	4.24c. to 4.39c.

Box Annealed—Black

	Soft Steel C. R., One Pass, Per Lb.	Blued Stove Pipe Sheet, Per Lb.
Nos. 18 to 20	4.30c. to 4.70c.	.....
Nos. 22 and 24	4.35c. to 4.75c.	5.00c.
No. 26	4.40c. to 4.80c.	5.05c.
No. 28	4.50c. to 4.90c.	5.15c.
No. 30	4.75c. to 5.15c.	.....

No. 28 and lighter, 36 in. wide, 10c. higher

Galvanized

	Per Lb
No. 14	4.60c. to 5.00c.
No. 16	4.75c. to 5.15c.
Nos. 18 and 20	4.90c. to 5.30c.
Nos. 22 and 24	5.05c. to 5.45c.
No. 26	5.20c. to 5.60c.
No. 27	5.35c. to 5.75c.
No. 28	5.50c. to 5.90c.
No. 30	6.00c. to 6.40c.

No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
⅛ in. Butt	—53	—38	¾ in. Butt	—16	+2
¾ in. Butt	—58	—45	1½ in. Butt	—19	—1
1-3 in. Butt	—60	—47	2 in. Lap	—13	+4
2½-6 in. Lap	—57	—44	2½-6 in. Lap	—16	+1
7-8 in. Lap	—53	—30	7-12 in. Lap	— 8	+8
9-12 in. Lap	—49	—30			

Steel Wire

Bright basic	4.00c. to 4.25c.
Annealed soft	4.00c. to 4.25c.
Galvanized annealed	4.65c. to 4.90c.
Copper-coated basic	4.[illegible]c. to 4.90c.
Tinned soft Bessemer	5.65c. to 5.90c.

[illegible]

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	19¼c. to 20¼c.
High brass wire	20¼c. to 20¾c.
Brass rod	16¾c. to 17¾c.
Brass tube, brazed	26¼c. to 27¼c.
Brass tube, seamless	23 c. to 23½c.
Copper tube, seamless	25¾c. to 26 c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 22¾c. to 23¾c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke 14-20	
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	Primes	Wasters
		80 lb.	$6.05 $5.80
		90 lb.	6.15 5.90
		100 lb.	6.25 6.00
IC $10.00	$8.50	IC	6.40 6.15
IX 11.50	10.00	IX	7.40 7.15
IXX 13.00	11.25	IXX	8.40 8.15
IXXX 14.25	12.50	IXXX	9.40 9.15
IXXXX 16.00	14.00	IXXXX	10.40 10.15

Terne Plates

8-lb. coating, 14 x 20

100 lb.	$7.00
IC	7.25
IX	7.50
Fire door stock	9.00

Tin

Straits, pig	36c.
Bar	43c. to 47c.

Copper

Lake ingot	15¼c.
Electrolytic	15 c.
Casting	14¾c.

Spelter and Sheet Zinc

Western spelter	8½c.
Sheet zinc, No. 9 base, casks	9¼c. open 9¾c.

Lead and Solder*

American pig lead	6¾c. to 7c.
Bar lead	8c. to 8½c.
Solder, ½ and ½ guaranteed	25c.
No. 1 solder	23½c.
Refined solder	20¼c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	75c.
Commercial grade, per lb	35c.
Grade D, per lb	25c.

Antimony

Asiatic	7c. to 8c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb	25c. to 27c.

Old Metals

Trading is quiet but the market is strong. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy crucible	11.75
Copper, heavy wire	11.25
Copper, light and bottoms	9.25
Brass, heavy	6.25
Brass, light	5.25
Heavy machine composition	8.50
No. 1 yellow brass turnings	6.50
No. 1 red brass or composition turnings	8.00
Lead, heavy	4.50
Lead, tea	3.50
Zinc	3.25

THE IRON AGE

New York, September 28, 1922

ESTABLISHED 1855 VOL. 110, No. 13

Recent Developments in Fatigue of Metals

Effects of Heat Treatment—Testing Machine Now Used—Endurance Limit Defined—Machine Design and Localized Stress

BY H. F. MOORE* AND T. M. JASPER†

THE failure of metal parts of machines after thousands or millions of repetitions of a load which, for a time, apparently does no damage is a phenomenon which has become of prime importance to metallurgists, machine designers, and materials engineers. The term "fatigue" has been applied to such a failure, and the testing of metals for resistance to "fatigue" has come to be an important problem in the testing laboratory.

The historical development of testing for "fatigue" of metals has been so often summarized that no such summary will be attempted in this article, except to call attention to the demolishing of the theory that, under repeated stress, metals "crystallized," and the demonstration, by means of the metallographic microscope, that fatigue failure consists in the progressive spread of minute cracks across a member subjected to repeated stress.

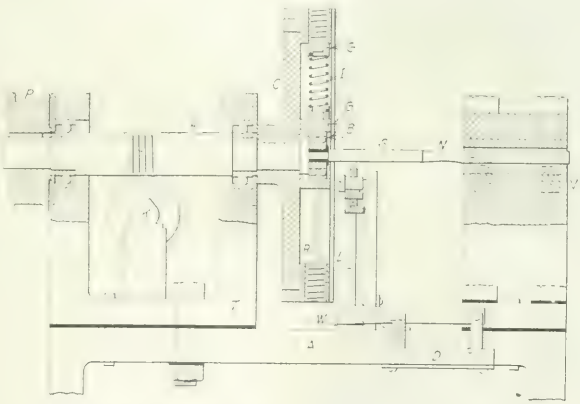


Fig. 1.—Section of the Latest Type of Testing Machine for Making Reversed Bending Tests as Used at the University of Illinois

During the war the subject of resistance to fatigue became of very great importance and, as a result of the attention called to the problem, there are in progress a number of important investigations of various phases of this problem. In this country important investigations are in progress at the following laboratories, and doubtless at other laboratories as well.

University of Illinois, investigation under the auspices of National Research Council, Engineering Foundation, General Electric Co., Engineering Experiment Station of the University of Illinois.

U. S. Naval Engineering Experiment Station, Annapolis, Md.

Cornell University, Ithaca, N. Y., investigation under the auspices of the U. S. Bureau of Mines.

Air Service Laboratories, McCook Field, Dayton, Ohio.

Aluminum Co. of America.

Although the above laboratories are all getting data of great value the opportunities for profitable research in fatigue of metals are very far from being exhausted. This particular field is one of prime importance and it would seem worthy the attention of any parties interested in engineering research.

Within the limits of this article it will not be attempted to give descriptions of special testing machines for making fatigue tests of metals*. It may be noted that most test results have been obtained by the use of reversed-bending tests of specimens. Probably there are many more machine members subjected to cycles of flexural stress than there are machine members subjected to cycles of direct axial stress.

Latest Type of Testing Machine Used.

Fig. 1 shows a diagram of the latest form of testing machine for making reversed bending tests, as used in the laboratories of the University of Illinois. In this machine the specimen S is held by one end in the vise V and the other end is rotated in a small circle being held in the bearing B. Sidewise pressure is brought on the bearing B by a calibrated indicator spring I and this pressure can be adjusted by means of a screw. The compression of the spring, and hence the load on the specimen is measured by means of a strain gage span-

*Research professor of engineering materials, University of Illinois, in charge of investigation of the fatigue of metals.

†Research assistant professor of engineering materials, University of Illinois, engineer of tests, investigation of the fatigue of metals.

*For descriptions of such machines see Unwin "The Testing of Materials of Construction," Chap. XVI.; B. Parker Haigh, "Alternating Stress Endurance of Steel," THE IRON AGE, May 11, 1916; Moore, Kommers and Jasper, "Fatigue or Progressive Failure of Metals under Repeated Stress." 1922 *Proceedings* of the American Society for Testing Materials.

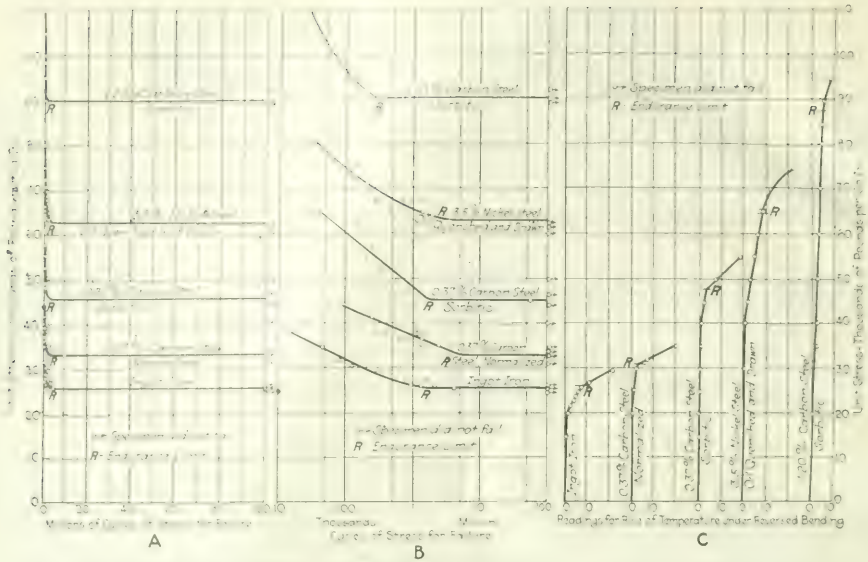


Fig. 2.—Typical Diagrams of Results of Repeated Stress Tests. Diagram (A) drawn to ordinary co-ordinates. Diagram (B) gives same test results as diagram (A), but is drawn to logarithmic co-ordinates

ning the gage holes GG shown near the ends of the spring. The rotating spring is carried in the crosshead C and sidewise motion of the bearing B is prevented by placing the bearing in a slot. Excessive displacement of the bearing when the specimen breaks is prevented by the rod R. The crosshead is driven by a shaft H, a pulley P and a motor not shown in the figure. The number of revolutions of the crosshead is measured by the revolution counter K which is driven by a worm on the drive shaft H.

When a test to destruction is carried out the fracture of the specimen occurs at the necked-down part N, and the broken end of the specimen hits a screw and kicks out the lever L. This releases the spring W, which then opens the motor switch D, thus stopping the machines.

This machine can be used for tests in which the rise of temperature of the specimen is measured. For this purpose fiber strips are placed between the headstock T and the base A, between the vise V and the base A, and a fiber bushing is placed between the end of the specimen and its bearing. A thermocouple (copper-constantan) is held against the specimen at the necked-down portion, and an opposed thermocouple is placed in an insulating bushing against the vise end of the specimen. From these couples wires lead to a delicate galvanometer. The fiber bushings serve to minimize the transfer of heat from the rotating parts of the machine.

The machine produces cycles of completely reversed bending stress, and can be run at a speed of 1800 r.p.m.

In studying the results of repeated-stress tests it is usually convenient to use a graph in which values of fiber stress computed by the ordinary formulas of mechanics of materials are plotted as ordinates and the numbers of cycles of stress necessary to cause failure are plotted as abscissae. Such a diagram has been given the name *S—N* diagram. Fig. 2 shows *S—N* diagrams for several typical series of tests of wrought ferrous metals in reversed bending. In Fig. 2 (a) the diagrams are plotted to ordinary coördinates; in Fig. 2 (b) the diagrams are plotted to semi-logarithmic coördinates. In Fig. 2 it will be noted that nearly all specimens which failed during the test failed below 10,000,000 cycles of stress. There seems to be a fairly well defined stress below which no failures occur, and at this stress the *S—N* diagram has a fairly well defined "break" and becomes horizontal, or very nearly so. That is, at this stress there seems to be a rapid change in the relation of fiber stress to number of cycles for rupture, and below this stress no failures occurred under 100,000,000 cycles of stress (one specimen run at a stress corresponding to the horizontal line has withstood 850,000,000 cycles of stress without rupture and another to 650,000,000 cycles.).

It can hardly be said dogmatically that this limiting stress is one which can be withstood for an infinite length of time because of the impossibility of testing to that point. Items of independent evidence however point to this endurance limit as the limiting value below which a ferrous metal will not fail, and these may be stated as follows:



Fig. —Effect of Varying Temperature of Draw on Tensile Strength, Hardness, and Endurance Limit of 1.20 Per Cent Carbon Steel

The first point of evidence is contained in the break in the stress-cycle curve at about 1,000,000 cycles.

A second is the horizontal nature of the curve after the break has been passed which, as far as has been tested, goes out beyond 850,000,000 cycles.

Some specimens which had run 100,000,000 cycles at the endurance limit without failure were again put into the machine at progressively higher stresses for a further 50,000,000 cycles per test until eventually a stress of 20 per cent above the original endurance limit in some instances was carried without failure. This constitutes a third point of evidence for the existence of a limiting stress for wrought ferrous metals below which failure will not occur under repeated stress. The specimens run at stress just below this limiting stress actually seem to be strengthened by the cycles of stress. Possibly this strengthening is due to cold-work during the progress of the test.

The endurance limit therefore has been defined for wrought ferrous metals as the stress below which a metal will withstand an indefinitely large number of cycles without failure and is found by locating the horizontal part of the stress-cycle curve.

Temperature Changes Under Repeated Stress

In connection with tests to failure under repeated stress, a study of temperature changes under repeated

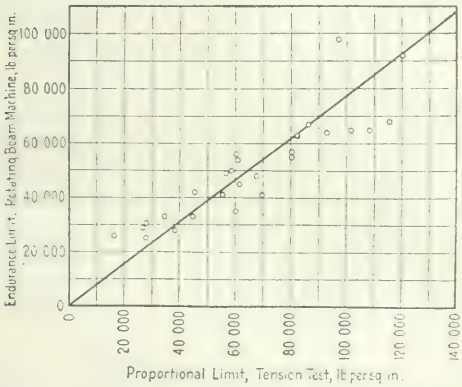


Fig. 5.—Correlation of Endurance Limit with Proportional Limit

stress gives data of interest for wrought ferrous metals. If a specimen is subjected to, say, a thousand reversals of stress below the endurance limit there is only a slight rise of temperature measurable with a delicate thermocouple and galvanometer,—only a few hundredths of a degree. If, however, the specimen is subjected to a thousand cycles of stress above the endurance limit it becomes "feverish" and shows a distinct rise of temperature. Fig. 2 (c) shows a diagram of test results plotted with fiber stresses as ordinates and rise of temperature after 1000 cycles of reversed bending stress as abscissas. The specimens were from the same bars of material as those from which were cut the specimens whose test results are shown in Fig. 2 (a) and Fig. 2 (b) and the distinct "break" of the temperature curve at the endurance limit is plainly shown.

This temperature test was first used by Stromeyer of Manchester, England. Recently Gough of the British National Physical Laboratory has made some tests which seem to give some promise that the deflection of a specimen under repeated cycles of reversed bending stress may also be used as a quick-test indicator of the endurance limit. This rise of

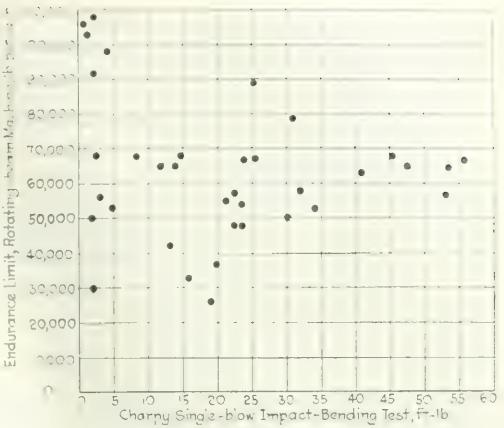


Fig. 4.—Correlation of Endurance Limit with Results of Charpy Single-Blow Impact-Bending Tests

temperature is a fourth item of evidence of some distinct development in internal progressive structural breakdown at the endurance limit.

All the foregoing discussion is applicable to wrought ferrous metals. Data are very few for non-ferrous metals, and almost entirely lacking for cast iron and steel castings. It is by no means certain that for non-ferrous metals there is a well-defined endurance limit, or that if such a limit exist, there is a well-marked development of heat under cycles of stress at that limit. The two fields of non-ferrous metals and of steel castings offer a wide opportunity for investigation.

Reversal of Axial Stress

As noted above most of the test results of repeated-stress tests have been obtained from tests in reversed bending. Some tests have been made on the resistance of steel to reversals of axial stress—a cycle of stress from tension to compression. British results seem to show that for such tests the endurance limit is slightly lower than for reversed-bending tests, and results at Illinois seem to show that the endurance limit is markedly lower than for reversed-bending tests. The British tests were mostly on normalized steel, while the results at Illinois were on sorbitic steel and on troostitic steel as well, and for the harder steels the discrepancy between tension-compression tests and reversed-bending tests was most marked.

Three explanations for the discrepancy are suggested:—

1.—Initial stresses, especially in heat treated steel:

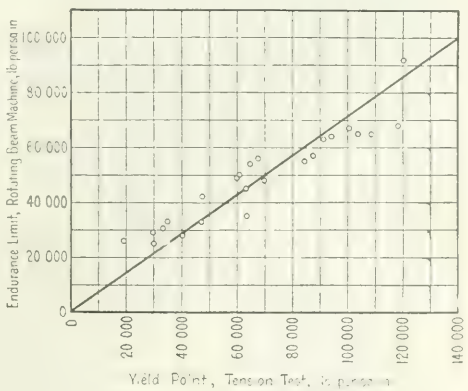


Fig. 6.—Correlation of Endurance Limit with Yield Point

as the outside surface of a specimen cools first the inside is in tension after final cooling. Hence in a bending test the outside is in initial compression and this initial compression must be overcome before the crystalline grains tear apart; in a tension-compression test the inside is in initial tension, and the tension applied during the test would be added to this initial tension.

2.—Tension-compression specimens (or parts) are never given an exactly axial load, there is always some eccentricity, and this means a higher maximum fiber stress than the computed tensile compressive stress.

3.—In a tension-compression specimen (or machine part) the whole area of cross-section is subjected to a maximum stress rather than the outside fibers only, as is the case with a flexural specimen; hence there would be more opportunity for the development of a crack into a fracture when all fibers were subjected to approximately the same stress.

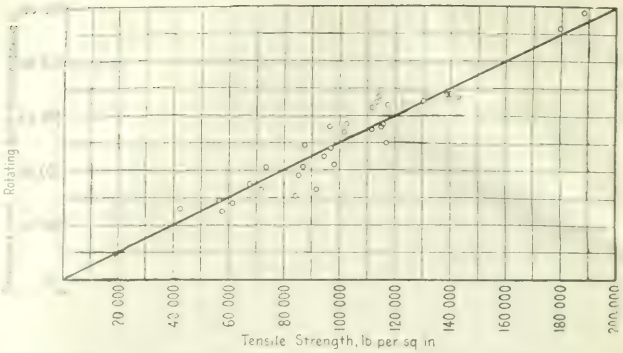


Fig. 7.—Correlation of Endurance Limit with Tensile Strength

Tests are in progress bearing on these three points, and while results so far obtained are tentative, the general indications seem to show that initial stress is an appreciable factor, especially for heat-treated steel; but that it can not explain all the observed discrepancies, that, since two machines of quite different design and action but each applying axial load to the specimen give fairly concordant results, the effect of eccentric loading can hardly be large, and that it seems reasonable to expect that, for specimens or machine parts in which a whole cross-section is subjected to maximum stress, the endurance limit will be somewhat lower than for specimens or machine parts subjected to repeated flexure. For rotating-beam tests the endurance limit is found at about one-half the static ultimate; for tension-compression tests of normalized or annealed steels the endurance limit is found at about one-third the static ultimate (this value should be regarded as tentative); and for heat-treated steels the results of alternate tension-compression tests give still lower values for endurance limit, for very hard steels, much lower.

Other Factors of Importance

In addition to the type of loading which has an effect on the strength of a metal in fatigue, the shape of a member under load and the surface finish are factors of importance. Poor surface finish may diminish the endurance limit by about 18 per cent. A sharp re-entrant angle may increase the liability of failure of a member 100 per cent, depending on the location of the sharp corner with reference to stress distribution.

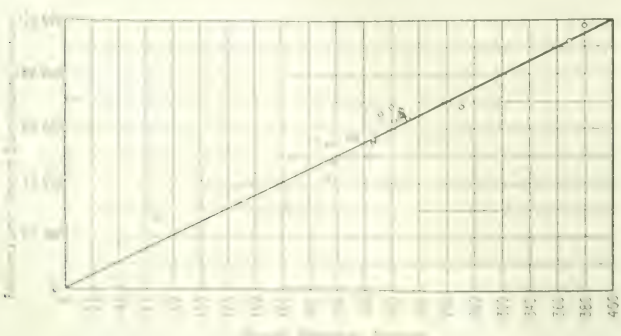
Experiments recently made to determine the effect of an occasional heavy overload bring out the following facts: The endurance limit for complete reversal of stress is consistently below the static yield point for nearly all the materials tested. If the member is overloaded, say, 20 times to just below the yield point, the endurance limit is decreased by about 6 per cent only. If it is overloaded above the yield point to about 70 per cent above the original endurance limit the resulting endurance limit is lowered about 23 per cent.

The test method of overloading consists in placing the specimen in a universal testing machine and applying an axial tensile load 20 times and then immediately placing the specimen in a rotating-beam fatigue testing machine. The endurance limit for specimens which are introduced into a bath of boiling water immediately after overloading and allowed to boil for about 1 hr. and then cooled before introducing the specimen into the fatigue machine does not seem much higher than the endurance limit for specimens placed directly in a fatigue testing machine after overloading. A complete series designed to give the specimen a period of three months' rest have been laid down so as to study the effect of rest after overstrain.

Effect of Drawing After Quenching

Results of tests of specimens of carbon steel, given different "draws" after quenching, indicate that, in general, a "draw" up to about 600 deg. Fahr. increases the ductility of steel without appreciably lowering its endurance limit.

The result of tests on heat-treated steel is most readily shown by Fig. 3. A suggested explanation of this phenomenon is that drawing steel after it is quenched produces two opposing effects: the hardness and strength of individual grains of steel are somewhat decreased by drawing, but at the same time the internal stresses set up in the process of quenching are somewhat relieved. These two contradictory effects seem to balance each other quite closely up to a drawing temperature of about 600 deg. Fahr. for the carbon steels tested; for higher temperatures the weakening effect overbalances the stress-relieving effect, and the steel is weakened. These tests suggest the importance of a careful heat-treatment survey of any given steel as a guide for its effective use.


Fig. 8.—Correlation of Endurance Limit with Brinell Hardness

Figs. 4 to 9 inclusive show the relations found between the endurance limits for various steels and other physical properties. It will be noted that the results of the Charpy impact test do not seem to be correlated at all with the endurance limit; that the static ultimate or the Brinell hardness number seems to be a better index of strength under repeated stress than is the elastic limit, and that the rise-of-temperature test seems to indicate the endurance limit for wrought ferrous metals with a good degree of accuracy.

The foregoing discussion deals with reversed-stress; and an important problem is the relative destructive effect of cycles of completely reversed stress and of cycles of stress not completely reversed. In a general way test data indicate that a steel will withstand a maximum stress 50 per cent above the endurance limit for completely reversed stress if, in the cycles of stress, the range of stress is from zero to a maximum. For intermediate cases the limiting stress lies between the values given above. *In no case can steel be depended upon to withstand repeated stresses above the yield point.*

Effect of Speed of Reversal of Stress

The question of the effect of speed of reversal of stress on the result of repeated stress tests is of importance. Tests have been made with the Farmer rotating beam machine at speeds of 200 r.p.m., 1500 r.p.m. and 5000 r.p.m.; the results are given in Table 1. These results show that at a speed of 200 r.p.m. the endurance limit averages about 6 per cent lower when using a specimen of 0.25 in. in diameter than at the speed of 1500 r.p.m. and that for a speed of 5000 r.p.m. the endurance limit averages no higher than at 1500 r.p.m. These variations are not large and, while for any given comparison of materials it would seem wise to make tests at the same speed throughout, the effect of speed of reversal of stress on small specimens and machine parts does not seem to be very great. For larger machine parts where the path traversed by the stress would be longer, especially for larger shafts, there may be a question of the interference of waves of stress as they traverse the member. In connection with large machine parts subjected to repeated changes of load (a steam turbine rotor disk, for example), it may be necessary to make a study of the transmission and interference of waves of stress.

It seems worth while to attempt to picture the progress of a repeated-stress failure in a ferrous metal as it spreads throughout the crystalline structure. Under any conceivable condition of application of load to a machine part it seems probable that some crystals, subjected to heavy localized stress at bearing points unfavorably located for resisting stress, will develop minute cracks. The failure of these few crystals may not be the starting of a general failure of the member, but may constitute an adjustment of the internal structure of the member as cycles of stress are applied. If, however, the stress is above the endurance limit, these minute cracks spread. The roots of the cracks constitute points of localized stress and the damage spreads much as if minute hacksaws were cutting into the material. When the cracks have penetrated to some critical depth, failure suddenly occurs as in the case of a sharp-notched test specimen under static or impact load.

Table I. Effect of Speed on Endurance Limit of Steel Under Reversed Bending Stress

Steel	Endurance Limit, Lb. Per Sq. In. 200 Cycles of Stress Per Min.	1500 Cycles of Stress Per Min.	5000 Cycles of Stress Per Min.
1.20 per cent carbon, normalized	48,500	50,000	50,000
1.20 per cent carbon, quenched and drawn	100,000	102,000	.....
0.48 per cent carbon, quenched and drawn	45,000	48,000	.....
Ingot iron	24,200	26,000	26,300
Chrome-nickel, quenched and drawn	64,500	65,000	.....
3.5 per cent nickel, water quench at 1490 deg. Fahr., draw at 1100 deg. Fahr.	65,000	64,000	.....
Same steel, oil quench at 1450 deg. Fahr., draw at 1000 deg. Fahr.	78,000	79,000	.....
Same steel, annealed	52,000	54,000	.....

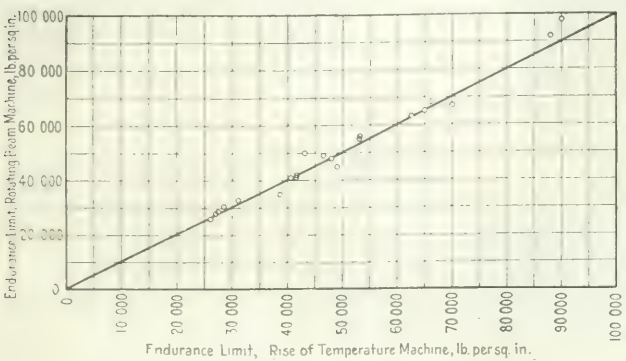


Fig. 9.—Correlation of Endurance Limit by Bending Test to Failure with Endurance Limit by Rise of Temperature

This progressive failure under repeated stress seems to be a very different phenomenon from the ductile flowing of metal stressed beyond the yield point. Localized stresses and localized areas of weakness are far more dangerous under repeated stress than they are under stress applied only a few times.

Machine Design and Localized Stress

The machine designer of parts subjected to repeated stress must first of all recognize that the ordinary concepts and formulas of the mechanics of materials must be supplemented by a consideration of localized stress. It can scarcely be over-emphasized that the ordinary formulas of the mechanics of materials neglect many localized stresses; the formulas are not wrong, but for parts subjected to repeated stress they do not give a complete concept of the dangerous stress acting.

In a few cases the intensity of localized stress may be estimated quantitatively. For example the localized stress at a sharp shoulder is about double the stress computed by ordinary formulas; the localized stress at a shoulder with an ordinary fillet or at the root of the standard screw thread may be estimated at about 50 per cent above the stress computed by the ordinary formulas.

In many cases, however, the amount of localized stress cannot be estimated even approximately, and in such cases the designer must avoid sudden changes of form, sharp corners, sharp bearing edges, and any other causes of localized stress.

Localized stress must be considered for all members subjected to thousands of repetitions of stress, whether the stress involves a complete reversal or not. If, however, the stress (including the estimate of localized stress) is applied in cycles in which the stress does not pass through zero (the stress at the chord members of a long-span bridge, for example), then the allowable stress can usually be determined by the

static yield point of a material rather than by its endurance limit under repeated stress.

It would be very unfortunate if the designer entertains the idea that machine parts, subjected to repeated stress, cannot be safely and economically designed. They can be so designed, but it is, however, necessary to consider both the static stress (including the effect of occasional overload) and also the strength under repeated stress, including both the strength of the material and the localized stress set up in the machine part.

Alloy Castings from Electric Furnaces

Nickel, Chromium and Chrome-Nickel Steel Made on Pacific Coast—Their Production, Properties and Heat Treatment

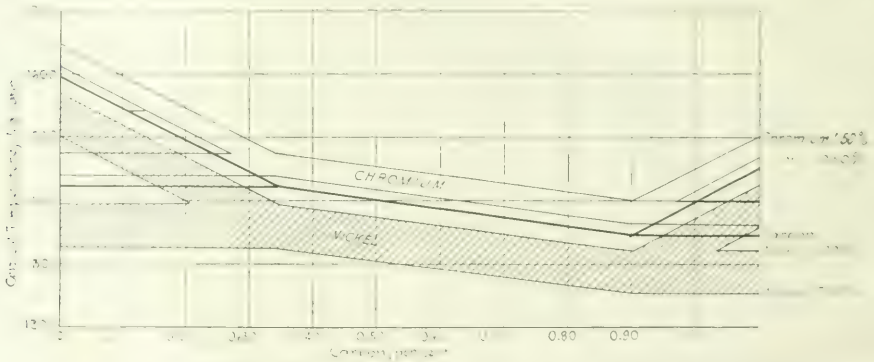
BY LARRY J. BARTON*

ONE of the newer lines of metallurgical endeavor is the manufacture of alloy steel castings to be heat-treated and used as a substitute for forgings, and for purposes where the ordinary grades of steel castings will not stand up under the duty imposed.

The first company on the Pacific coast to enter into this class of alloys is the Los Angeles Foundry Co., which is marketing its product under the name of Electro-Cast Products. There are many cases, in the oil field and mining work, where a superior product is desired, and quite often the shape is such as to make forging very difficult, if not impossible. For this work it has been found that a properly made and properly heat-treated alloy steel casting furnishes a material which will fit into the work desired with the greatest ease. Not only can certain conditions be met, but by changing the treatment the same metal can be used for several different purposes. This results in being able to send out to a mine several castings, all of the same chemical composition which, when treated according to the directions sent with them, will cover widely differing specifications.

There are many classes of work, formerly made of manganese steel, which are now made from other alloys. This is due to the fact that manganese steel cannot be machined, and if there are any small variations in the casting, it cannot be used unless put through the necessary grinding to alter it. Then, too, when the piece is scrapped, due to wear, it cannot be used for any other purpose. Alloy castings are made to overcome these points. They can be easily machined, can be made much harder than manganese steel and when scrapped can be used for other purposes.

After a great deal of experimentation and research covering a great many combinations of alloys it has been found that steels containing chromium, nickel and vanadium offered the most feasible and versatile products for the different classes of work covered. Some castings contain only nickel, some only chromium, some varying combinations of nickel and chromium, and some consist of different amounts of all three elements. Carbon contents are made suitable to the exact use of the casting.



Approximate Changes in Critical Temperatures as Caused by Alloys

The Melting Practice

All are cast from basic electric furnace, as are the company's other products, gray iron and "Duroloid," an alloy white iron for abrasive resisting work. The furnace is a standard 2-ton Greene type, lined to the slag line with magnesite, and similar in detail to any basic furnace. Steel scrap of varying composition is used for the charge which requires quite a large amount of chemical control work in order that specifications may be closely adhered to. Before the scrap is charged a light coating of lime is thrown on the hearth and the charge is melted down under a reducing atmosphere as far as possible in order that oxidizing conditions may be eliminated and alloys in the scrap saved. As soon as melted an analysis is run for the elements desired, usually carbon and manganese, although on certain heats nickel and chromium are also desired. While this sample is being analyzed the slag is brought up to a perfect carbide condition and the progress of the heat is checked by fracture tests. As soon as the

*Consulting metallurgical engineer, Los Angeles, Cal.

preliminary analysis is obtained the alloys are added and the heat is ready to tap. A skim gate is used and a tea-pot ladle for pouring.

Molding and Heat Treating

Great care must be used in the core making and molding for this class of work. Due to its heavy duty there must be no interior flaws such as small shrink cavities or blow holes, and as a result larger heads and different gating must be employed than would be used on ordinary steel casting work. This results in a smaller yield of cleaned castings from metal poured, but in a true quality product.

The heat-treating equipment is all standard, the ovens being both gas and oil connected. For quenching, standard oil and water baths are used. Some experimental work is being done with electrical heating but at the present time we have no results which are reliable or which have been tested over any length of time. All temperature checking is done by means of pyrometers and each class of steel has been accurately checked for critical points so it becomes an easy matter to keep the castings at the temperature desired. This is obtained by means of a central temperature station to which electrical leads come from each pyrometer. Each furnace has several different colored lights for the guidance of the operator. When the furnace is below the temperature desired, a light shows green; when correct, white; and when too high, red. This, together with recording meters, gives an excellent method of checking and supervising temperatures.

Nickel Steel Alloy Castings

Nickel has the same effect upon steel as carbon, although to a greater degree, that of lowering the transformation points. For the ordinary grades of nickel steel used in the above casting work, those of from 1.00 per cent nickel up to 4.00 per cent nickel, we find that 0.50 per cent nickel will lower the Ac_1 range about 10 deg. Fahr. and the Ar_1 on cooling about 20 deg. Fahr., from those of similar contents in plain steels. This is shown in the chart. The approximate

	Tensile Strength, Lb. per Sq. In.	Elastic Limit, Lb. per Sq. In.	Elongation, Per Cent	Reduction of Area, Per Cent
As cast	77,000	43,000	24.0	32.6
Annealed from 1500 deg., cooling in furnace	[illegible]	[illegible]	[illegible]	[illegible]
Air cooled using steam air blast from 1500 deg., drawing back to 900 deg.	[illegible]	57,000	[illegible]	[illegible]
Oil quenched from 1500 deg.	112,000	[illegible]	19.0	[illegible]

critical temperatures of these steels run from about 1325 to 1310 deg. Fahr. (Ac_1), 1250 to 1230 deg. Fahr. (Ar_1) for the 1.00 per cent nickel, to about 1250 to 1270 deg. Fahr. (Ac_1), 1100 to 1120 deg. Fehr. (Ar_1) for the 4.00 per cent nickel, depending on the differences in miscellaneous composition, carbon, manganese, etc. Nickel steels offer a distinct difference from plain carbon steels when heated above the critical points for any length of time, carbon steel tending to grow in grain size while nickel steels tend to become finer and closer in grain. This is an advantage in handling a large piece of work because the time of soaking may be prolonged and at the same time the grain refining becomes superior. This, of course, raises the cost of treating but in a strict quality product this is of secondary importance.

Treatment of Small Castings

On small size castings the general practice is to heat above the upper critical range, allow to soak until the heat is even throughout the piece of work being treated, withdraw from the furnace and either oil or water quench. These pieces are then drawn back to the temperature necessary to give the toughness required. On larger sized castings it is often necessary to give a double quench in order that the transformation may be complete, nickel having the tendency to retard this action.

A bearing casting was cast from metal analyzing carbon, 0.23 per cent; manganese, 0.75 per cent; silicon, 0.21 per cent; nickel, 1.53 per cent; phosphorus, 0.035 per cent, and sulphur 0.02 per cent. The first table gives a comparison of the different results which may be obtained by varying the treatments.

Some tests upon nickel steel averaging carbon, 0.25 to 0.30 per cent; manganese, 0.60 to 0.70 per cent; silicon, 0.20 to 0.25 per cent; nickel, 3.25 to 3.50 per cent; sulphur, 0.01 to 0.04 per cent, and phosphorus, 0.01 to 0.04 per cent follow:

	Tensile Strength, Lb. per Sq. In.	Elastic Limit, Lb. per Sq. In.	Elongation, Per Cent	Reduction of Area, Per Cent
As cast	85,000	46,000	20.0	48.0
Annealed from 1450 deg.	83,500	43,600	24.4	53.2
Quenched in water from 1400 deg., drawn back to 900 deg.	93,000	74,600	20.7	66.4
	102,640	81,100	19.8	71.7
Quenched in water from 1400 deg., drawn back to 550 deg.	137,600	113,800	13.4	58.8
	143,000	106,400	12.9	55.7

Brinell hardness numbers will range from about 175 on the annealed specimen to 400 on some of the harsher quenches.

Chromium Steel Alloy Castings

Chromium acts in a similar manner to nickel in changing the critical points of steels, but in the opposite direction, causing these temperatures to become slightly higher than those of plain steels of the same carbon contents. Chromium is exactly the opposite of nickel in regard to the effects of overheating for prolonged periods, rapidly deteriorating in strength and resistance to shock. For this reason a double quench gives superior qualities to these classes of steels. Chromium steels are capable of taking great hardness without a corresponding decrease of toughness, which makes them desirable for any such purpose as crusher jaws,, wearing plates and similar uses. As this hardness comes directly from the double carbide of iron and chromium the steel must be softened according to the amount of machining to be done. The general treatment on this class of steels is similar to that on nickel steels—quench from above the critical point, either draw back in air, or re-heat and re-quench at the lower temperature. Their properties are about as follows:

	Tensile Strength, Lb. per Sq. In.	Elastic Limit, Lb. per Sq. In.	Elongation, Per Cent	Reduction of Area, Per Cent
Analysis: Carbon, 0.60 to 0.70 per cent; chromium, 0.50 to 0.75 per cent. Quenched at 1500 deg., drawn back to 1300 deg.	79,000	64,500	34.4	66.6
Drawn back to 1050 deg.	100,600	94,300	20.1	60.0
Drawn back to 800 deg.	114,000	103,400	14.3	54.4

Nickel-Chromium Steel Alloy Castings

This class of steel probably represents the best general type of steel for heat-treated castings. The steel, when treated, shows the beneficial result of the toughness and ductility of the nickel together with the increased hardness and cohesion of the chromium. The best results are obtained by having a certain ratio of the two metals, usually about 2.50 per cent nickel to 1.00 per cent chromium. The general method of

treating is to quench in oil from a temperature higher than the critical point and draw back to the temper desired. For very high specifications a double quench

	Tensile Strength, Lb. per Sq. In.	Elastic Limit, Lb. per Sq. In.	Elongation, Per Cent	Reduction of Area, Per Cent
Analysis: Carbon, 0.30 to 0.40 per cent; chromium, 0.50 to 0.70 per cent; nickel, 1.30 to 1.70 per cent.				
Annealed from [illegible] deg.	66,700	37,000	[illegible]	25 8
Annealed from 1350 deg.	65,000	32,600	30.1	54 3
Quenched from 1500 deg., drawn to 1000 deg....	90,000	65,000	23.9	61.6
Quenched from 1550 deg., drawn to 900 deg.....	84,400	50,050	26.5	57.7

is used. Quench from about 200 deg. Fahr. above the critical point, re-quench from just above the critical point, and then draw back. Their properties are about as tabulated above.

The above results go to show in a general manner what can be accomplished along these lines, but are by no means put forward as a text or as the absolute figures which can be obtained. There are many times where castings poured from the same heat and treated in the same manner will show widely differing results. We attempt to explain this by a difference in structure caused by such points as a different temperature when poured, different texture and temperature of the mold, etc., but, as we have no microscopical test laboratory, we are undecided at this time. These points will be proven later when we have absolutely determined, through wider use, the true value of the product as shown by its ability, not to fulfill tests or laboratory specifications, but in the test under actual working conditions.

Pearlitic and Sorbitic Manganese Steels

A Plea for Castings Containing About One Per Cent Manganese—Some of the Literature on the Subject—Their Heat Treatment and Properties

BY JOHN HOWE HALL*

THE adoption this year of tentative specifications for steel castings for railroads by the American Society for Testing Materials, in which the upper limit for manganese is set at 0.85 per cent, calls attention again to a most curious and persistent fallacy,—that steel is rendered brittle by a manganese content of 1.00 per cent or a little higher.

This idea appears to have originated in the early days of the industry when chemistry was fighting to obtain a foothold in the steel works. Failure of various heats of the Bessemer rail steels of those days was traced to an unusually high manganese content, and a dead line was set at 1 per cent. "Men *are* sheep, —bloomin' sheep," as Ortheris remarked, and since those old days but a very few steelmakers have ventured beyond that ancient dead line at 1.00 per cent manganese, and for some curious reason the experience of those who have penetrated into the forbidden territory has not attracted the attention it deserves.

To some extent, the same thing appears to hold true of phosphorus and sulphur; the upper limits for these elements were set many years ago, when the scope of metallurgical knowledge was limited indeed, and until very recent years no one has thought it worth while to re-examine carefully the premises upon which the allowable content of these impurities is based. The joint committee on phosphorus and sulphur in steel, now investigating this subject carefully and thoroughly, may in time be followed by a similar committee to determine the desirable content of manganese and silicon.

As a young man fresh from technical school, the writer became familiar with a steel, made on a regular [illegible] basis, analyzing from 0.30 to 0.50 per cent carbon, and from 1 to 1.50 per cent manganese or a little over, used quite largely for purposes where a combination of strength and toughness was essential.

From his notes, dated 1902, are taken the following analysis and tests of some of this steel, made in the Bessemer converter, which show its freedom from brittleness, to say the least:

Carbon, Per Cent	Manganese, Per Cent	Phosphorus, Per Cent	Sulphur, Per Cent	Silicon, Per Cent
0.24	1.62	0.06	0.019	0.25

	Tensile Strength, Lb. per Sq. In.	Elastic Limit, Lb. per Sq. In.	Elongation, Per Cent	Reduction of Area, Per Cent
Annealed bars.....	97,780	67,230	27.5	63.02
Annealed bars.....	99,420	68,990	27.5	63.65
Oil quenched and annealed	118,000	98,000	24.0	60.00

It may readily be imagined that the idea that steel containing over 1 per cent manganese is brittle was early dislodged from the writer's mind. The late Maunsel White had much to do with the development of this steel as a regular commercial product.

In 1908 and 1909, the late Dr. Henry M. Howe and the writer were called upon to produce a steel for castings, made in a 3-ton bottom blown Bessemer converter, that could be used satisfactorily for gold dredge buckets. These castings were subjected to extremely severe stresses in service, and to heavy wear, —so much so that to-day they are regularly made of 12 per cent (Hadfield) manganese steel. Experiment had demonstrated that plain cast steel of 0.20 to 0.30 per cent carbon was too soft and weak for the service demanded, and that harder steels almost invariably failed by breaking under the tremendous stresses occasionally set up in the line of buckets. Experiments with nickel and chromium did not promise a steel with sufficient strength and toughness and remembering the manganese steel mentioned above, we tried it for these castings, which in addition were to be water quenched and annealed, to give the highest possible strength and elastic limit for an extension of 25 per cent and a contraction of area of 40 per cent or better. Buckets of this steel, protected by plates of 12 per cent manganese steel at the points of greatest wear, stood up in service successfully, and held their own until displaced by the one-piece 12 per cent manganese steel bucket.

*Metallurgical engineer, [illegible] Iron & Steel Co., High Bridge, N. J.

From a book "Etude Industrielle des Alliages Metalliques" by F. Guillet, published in 1906, the following extracts are taken:

> Of the steels containing about 0.50 per cent carbon, those of the first class (from 1 to 2 per cent manganese) possess a tensile strength and an elastic limit which rises slowly with the manganese content, while the extension and contraction of area diminish slightly; *these steels show a very great resistance to shock.** This point is extremely important, and to show it clearly, we have broken more than 100 Fremont test pieces. The results obtained contradict absolutely the very widespread opinion among metallurgists that manganese makes steel brittle. We believe we have demonstrated clearly, on the contrary, that manganese makes steel brittle only when it is present in sufficient amount, or better, when the sum of the carbon and manganese is high enough, to lead to the production of martensite. As long as the structure is pearlitic, the steel, far from being brittle, is extremely homogeneous and *possesses a resistance to shock which one finds only exceptionally in carbon steels.**
>
> They (manganese steels) can, up to a certain point, be substituted for nickel steels, and that the more readily since for equal physical properties they are much less costly.
>
> Much less manganese than nickel, in fact, is required to produce a given effect, about 2.2 times less. . . . The pearlitic (manganese) steels can be used in the place of similar nickel steels; that they are not more used, is due, we repeat, to the false idea of the brittleness produced by manganese. . . . There is, however, one point that should be made, which is that manganese steels become brittle upon annealing more readily than nickel or carbon steels. For this reason, one should not think of using them for case-hardening. . . . To sum up, we can say that the manganese steels have not yet been sufficiently studied from the industrial point of view.

*Italics are the author's.

This steel was described by the writer in a paper, "Heat Treatment of Hypo-eutectoid Carbon Steel Castings," *Proceedings* A. S. T. M. 1913, Vol. XIII page 514, in a paper, "Shock Tests of Cast Steels," [THE IRON AGE, Oct. 23, 1913], *Proceedings* American Inst. Min. and Met. Engrs., Vol. XLVII (1913), page 482; in his book, "The Steel Foundry," (1914), in a paper by Nissen, Taylor and Hall, "The Heat Treatment of Cast Steel," *Proceedings* American Inst. Min. and Met. Engrs., Vol. LXII (1920), page 353 and elsewhere. A careful search of technical literature would no doubt result in scores of other references,—among others an article by F. C. Langenberg, "Impact Tests on Cast Steel," *Proceedings* A. S. T. M., Vol. XXI (1921), page 840, in which the great toughness of these steels under shock is especially noted.

In a paper by George Lang, in *Stahl und Eisen*, February, 1911, "The Influence of Manganese on the Physical Properties of Soft Steels," results are given that show that manganese up to even 1.77 per cent or higher confers great toughness on steel of 0.1 per cent carbon. The following results are of interest:

Physical Tests of Rolled Steels with Varying Manganese Content

No.	Manganese, Per Cent	Elastic Limit, Lb. per Sq. In.	Tensile Strength, Lb. per Sq. In.	Elongation, Per Cent	Reduction of Area, Per Cent	Shock	Hardness
1	0.29	46,000	62,600	27.85	53.5	23.2	119
2	0.44	47,600	65,000	29.2	62.5	29.4	115
3	0.68	49,700	66,200	29.4	63.9	28.1	115
4	0.79	49,200	64,500	27.85	65.9	33.4	118
5	1.02	51,600	68,000	28.65	64.2	31.8	123
6	1.27	54,300	71,300	27.9	68.1	26.4	132
7	1.32	54,000	71,200	28.0	67.7	34.0	133
8	1.77	57,900	82,500	25.9	54.7	25.1	156
9	1.84	58,400	85,000	26.0	46.75	23.6	162
10	2.23	61,000	92,600	21.2	43.4	9.5	198
11	2.47	63,400	103,000	18.8	39.4	2.7	211

Physical Tests of Steel Heated to 900 Deg. C. and Quenched, Having Varied Manganese Content

1	0.29	42,900	78,700	19.6	61.0	23.6	116
2	0.44	47,900	82,500	19.18	62.0	27.0	165
3	0.68	48,600	84,100	16.0	62.2	29.4	154
4	0.79	49,600	85,000	14.1	56.1	30.0	157
5	1.02	54,200	96,800	15.52	53.0	27.2	179
6	1.27	61,550	107,900	15.24	48.2	18.4	230
7	1.32	66,000	111,200	16.3	47.8	18.1	235
8	1.77	86,000	155,000	9.0	44.6	14.8	293
9	1.84	89,000	157,300	6.7	41.7	14.5	288
10	2.23	91,000	164,500	4.91	26.6	12.3	326
11	2.47	92,200	166,600	3.1	18.9	11.7	344

Another reference worth quoting is an article "An Alloy Steel of Special Composition," in the *Journal* of the American Society of Naval Engineers, abstracted in THE IRON AGE, Dec. 30, 1915, page 1553. In this article is described a steel of the following composition:

> Carbon, 0.30 to 0.35 per cent.
> Silicon, 0.25 to 0.35 per cent.
> Phosphorus and sulphur, below 0.05 per cent.
> Manganese, 1.00 to 1.20 per cent.
> Nickel, 1.50 to 1.80 per cent.
> Copper, 0.50 to 0.80 per cent.

which gave physical properties comparing favorably with those of 3 per cent nickel steel. Some of the test results appear in the table below.

From a letter of the late Dr. Henry M. Howe, written in 1909, the following is quoted:

> The line N.P. (plotting elastic limit against extension) represents the upper limit of steel forgings of unusually high quality which I gathered many years ago, . . . you will see from this that our coupons (of 0.25 per cent C., 1.25 per cent Mn. cast steel, quenched and annealed) are better than the best published forgings at the time I made the compilation. I have in my notes 255 sets of published results of steel castings which I have taken the trouble to compare with these results. Out of these 255, only three cases come up to the line N.P. (representing high quality forgings) and these three are not so good as the average of our coupons by a good deal. It thus seems that we are making the best castings of which we have any knowledge.

From a paper by the late Dr. Henry M. Howe, "Manganese in Steel Making," *Proceedings* A. S. T. M.,

Physical Tests from Coupons Cast on Body of Castings

Heat	Carbon, Per Cent	Sulphur, Per Cent	Manganese, Per Cent	Silicon, Per Cent	Phosphorus, Per Cent	Nickel, Per Cent	Copper, Per Cent	Tensile Strength, Lb. per Sq. In.	Yield Point, Lb. per Sq. In.	Elongation, Per Cent	Reduction of Area, Per Cent	Bend. Degrees
201	0.36	0.036	0.81	0.31	0.034	1.60	0.76	92,283	55,767	22	37	120
204	0.30	0.037	0.93	0.36	0.04	1.44	0.85	92,334	55,003	21	31	120
207	0.33	0.030	1.02	0.38	0.035	1.15	0.49	88,616	54,494	25	40	120
208	0.34	0.034	1.04	0.36	0.033	1.14	0.52	92,691	56,277	22	34	120
214	0.35	0.035	1.11	0.33	0.042	1.34	0.60	95,543	59,078	22	37	120
215	0.30	0.032	0.93	0.35	0.043	1.12	0.77	90,042	57,550	23	37	120
216	0.27	0.04	1.18	0.35	0.046	1.60	0.61	92,691	55,003	22	36	120
218	0.34	0.042	1.15	0.35	0.035	1.58	0.69	94,830	54,748	22	36	120
219	0.27	0.035	1.02	0.30	0.047	1.47	0.42	85,510	56,022	23	34	120
223	0.38	0.029	1.02	0.35	0.049	1.10	0.80	88,718	55,512	23	38	120
228	0.30	0.031	1.15	0.38	0.046	1.60	0.56	96,510	59,587	23	37	120
230	0.36	0.036	1.18	0.31	0.049	1.37	0.80	94,117	50,929	23	36	120
232	0.36	0.036	1.03	0.35	0.039	1.47	0.63	90,144	55,225	23	34	120
233	0.36	0.035	1.03	0.40	0.04	1.73	0.21	96,052	59,087	25	41	120
234	0.32	0.036	1.21	0.36	0.049	1.24	0.65	91,366	55,003	25	44	120
236	0.31	0.032	1.15	0.34	0.043	1.54	0.70	81,343	60,096	25	41	120
241	0.31	0.033	0.96	0.39	0.042	1.27	0.64	87,343	53,457	23	36	120
245	0.31	0.032	1.15	0.37	0.037	1.80	0.62	92,181	55,288	23	36	120
248	0.33	0.032	0.79	0.42	0.048	1.69	0.65	87,191	54,239	23	38	120

vol. XVII (1917), page 5, abstracted in THE IRON AGE, for Aug. 2, 1917, page 239, the following is taken:

> Turning now to carbon steel, the retarding effect of manganese on the structural changes shows itself by leading in general to finer structure, to finer ferrite masses, finer network structure and finer pearlite, indeed probably often to the replacement of lamellar pearlite with sorbite. This greater fineness leads to better quality in general, and to a higher elastic limit in particular, though of course with a corresponding sacrifice of ductility. The great value of manganese for this purpose has not begun to receive the attention it deserves. It is probable that a manganese content of, say, 1.25 per cent, with a correspondingly lessened carbon content, may be used so as to lessen the danger of cracking and the residual stresses, when a high elastic limit is sought, because this large manganese content in and by itself raises the elastic limit by giving a fineness of structure which otherwise would be sought by increased violence of cooling, or by the use of a lower drawing temperature. In other words, the use of 1.25 per cent manganese lessens the needed violence of cooling, and permits the use of a higher residual drawing temperature, in both ways tending to mitigate the stresses, and in the former way lessening the chances of cracking.

As we have already stated, these are but a few of many references which might be quoted on this interesting subject, but all tell the same story—that manganese in excess of 1.00 per cent is a benefit, not a detriment, at least to low carbon steels.

The writer has referred before to the successful application of a similar steel in car coupler knuckles by one of the large manufacturers, is aware of the use of these steels for motor shafting subject to severe service, and with the employment of a steel of about 0.50 per cent carbon, with 1.00 per cent manganese in cylinders for oxygen, hydrogen, and other gases, an application where steel of great strength combined with great toughness, is an absolute essential. And yet, the advocates of the proposed upper limit of 0.85 per cent manganese in steel castings for railroads, mentioned at the beginning of this paper, stated that of course for his own protection, the producer of the castings would not think of exceeding that limit. Truly, a metallurgical fallacy has as many lives as a cat,—yet even a cat cannot live forever.

Influence of Mass in Heat Treatment

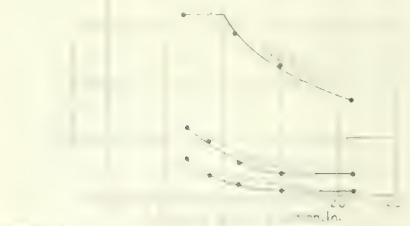
Rôle of Special Elements, Nickel, Chromium and Molybdenum, in Counteracting Effect of Size—Experimental Data on Sections 0.5 to 3 In. in Diameter

BY E. J. JANITZKY*

THE most important factor affecting constitutional changes in hardening pearlitic steels is the velocity of cooling.

According to the prevalent view, it is possible only in extraordinary cases to retain the phase at which the steel was at the quenching temperature and then only in the presence of special hardening elements. Of the special elements used for this purpose in structural pearlitic alloy steels, three are considered in this article: nickel, chromium and molybdenum. The latter element is used only in combination with the two former.

However, the beneficial properties obtained by the use of the special elements and their combinations are again counterbalanced by an increase of the mass of the object to be quenched, but to a remarkably lesser degree than in plain carbon steels.



-Case-Hardening Steels. Their heat treatment and composition are as follows:

	6.00 Per Cent Nickel	0.20 Per Cent Carbon	0.12 Per Cent Carbon
	1580 deg. Fahr.— H_2O	1650 deg. Fahr.— H_2O	1650 deg. Fahr.— H_2O
		1100 deg. Fahr. H_2O	1400 deg. Fahr.— H_2O
C.....	0.17	0.20	0.12
		0.99	0.71
			0.080
S.....	0.014	0.049	0.048
		0.11	0.05

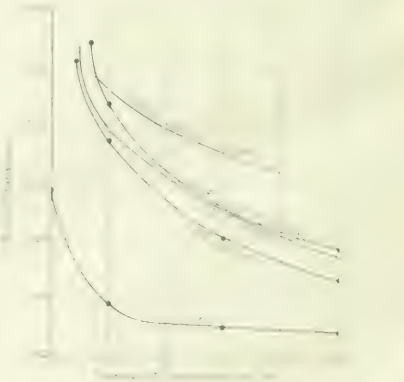


Chart 2.—Effect of Nickel and Chromium on the Influence of Mass in Heat Treatment in a Carbon Range of 0.29 to 0.34 Per Cent. Heat treatment and composition are as follows:

	High Nickel-Chrome 1510 deg. Fahr.— H_2O	Low Chrome-Nickel 1500 deg. Fahr.— H_2O	Chrome 1500 deg. Fahr.— H_2O	Nickel 1500 deg. H_2O	Plain Carbon 1600 deg. Fahr.— H_2O
..	0.29	0.34	0.33	0.32	0.29
Mn	0.37	0.50	0.56	0.56	0.37
Ni	3.—	1.20		3.25	
Cr	0.87	0.60	0.74		

*Metallurgist, Illinois Steel Co., South Chicago, Ill.

The merits of the special elements and their combinations on the physical properties (static, dynamic and others) are not considered here, as they do not come within the scope of this article. Data in this regard can be found in abundance in metallurgical literature.

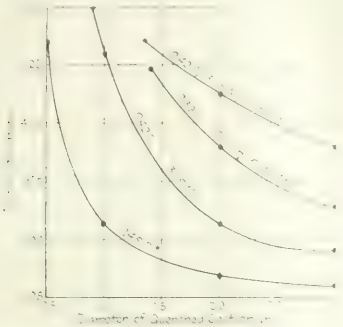


Chart 3.—Effect of Nickel, Chrome-Nickel and Chrome-Molybdenum on the Influence of Mass in Heat Treatment in a Carbon Range of 0.39 to 0.45 Per Cent. Heat treatment and composition are as follows:

	High Nickel-Chrome 1450 deg. Fahr.—H_2O	Chrome-Molybdenum 1525 deg. Fahr.—H_2O	Nickel 1450 deg. Fahr.—H_2O	Plain Carbon 1600 deg. Fahr.—H_2O
C.....	0.42	0.39	0.42	0.45
Mn.....	0.30	0.53	0.61	0.78
Ni.....	3.18	....	3.15	....
Cr.....	0.81	1.02	....	....
Mo.....	....	0.35	....	....

The writer has compiled data of cross-sectional central Brinell hardness tests of sections 0.5 in. to 3 in. in diameter and plotted these values against the corresponding diameters, it being felt that curves are more illustrative and convincing than tabulated figures. The maximum section, 3 in. in diameter, was selected because this size approaches the maximum used in crankshafts in the automotive industry.

The Brinell hardness test was chosen as it gives a general measurement of hardness gained by quenching and also bears a close relation to the ultimate strength. This relation is approximately 500 in the foot-pound system and holds good for all grades of carbon steel, whether heat-treated or in the natural state. A slight modification of the factor 500 gives fair approximate values for structural alloy steels. Furthermore, the Brinell hardness test is the most rapid and efficient one at the present time, as it avoids the expense and difficulties of machining hardened and non-tempered steel. A fracture of a circumferencially nicked round, or any other section, of quenched steel can be easily obtained and, after being ground, a study of the hardness gradient can be made.

The requirement for steel furnished by the steel manufacturer is uniform chemistry. Hence one expects that heat treating shall produce, after tempering, uniformity in cross-sectional hardness as, in drawing, the hardness gradient is first equalized before uniform tempering of the object begins.

A general idea, not accepted as a rule however, is that the difference in ultimate strength between test specimens taken circumferencially and centrally should not vary more than 7000 to 14,000 lb. per sq. in. after tempering in a 3-in. round. It is therefore obvious that on account of this relation between ultimate strength and Brinell hardness as previously mentioned, the latter test cannot be excelled by any other in studying this question.

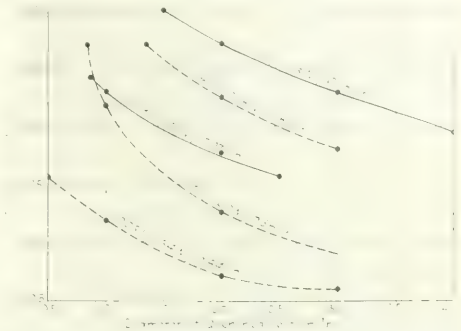


Chart 4.—Effect of Mass in the Heat Treatment of Nickel-Chrome Steels of Different Chemical Compositions. Their heat treatment and composition are as follows:

	Medium Nickel-Chrome 1470 deg. Fahr.—H_2O	High Nickel-Chrome 1450 deg. Fahr.—H_2O	High Nickel-Chrome 1510 deg. Fahr.—H_2O	Low Chrome-Nickel 1535 deg. Fahr.—H_2O	Low Chrome-Nickel 1600 deg. Fahr.—H_2O
C.....	0.52	0.42	0.29	0.34	0.25
Mn.....	0.39	0.30	0.37	0.50	0.64
Ni.....	1.73	3.18	2.22	1.20	1.34
Cr.....	0.98	0.81	0.97	0.56	0.54

The four charts illustrating the influence of alloying elements in increasing sections represent 14 steels

Table of Actual Brinell Hardness Numerals from Which Curves Were Plotted

Steel Uses, Per Cent	Chart No.	Maximum Brinell	Breaking Diameter, In.	0.5 In.	0.6875 In.	0.0875 In.	1 In.	1.125 In.	1.5 In.	2 In.	2.125 In.	2.5 In.	3 In.	4 In.
0.12 C.	1	...	...	...	201	179	...	167	159	...	156	...	...	...
0.20 C.	1	...	...	...	241	223	...	196	183	...	179	...	...	...
0.17 C. 6.00 Ni.	1	388	1.04	...	388	...	...	363	321	...	277	...	...	...
0.29 C.	2	364	0.5	364	. .	...	217	. .	.	187	. .	...	179	. .
0.45 C.	3	555	0.5	555	. .	. .	321	...	.	255	. .	...	241	...
0.32 C. 3.25 Ni.	2	532	0.73	532	. .	...	430	...	.	302	. .	.	248	...
0.42 C. 3.15 Ni.	3	600	0.896	600	. .	...	540	. .	.	321	. .	...	286	...
0.33 C. 0.74 Cr.	2	555	0.74	555	. .	. .	444	. .	.	340	. .	. .	277	...
0.25 C. 1.84 Ni. 0.54 Cr.	4	386	0.265	386	. .	...	330	...	.	258	...	. .	242	. .
0.34 C. 1.20 Ni. 0.56 Cr.	2 and 4	555	0.836	555	. .	...	477	...	. .	340	. .	...	286	. .
0.29 C. 2.22 Ni. 0.97 Cr.	2 and 4	512	0.875	512	. .	...	495	...	.	418	.	387	...	...
0.42 C. 3.18 Ni. 0.81 Cr.	3 and 4	555	1.35	555	...	...	546	...	...	487	. .	...	420	...
0.52 C. 1.73 Ni. 0.98 Cr.	4	600	1.485	600	...	...	600	...	...	555	. .	...	495	441
0.39 C. 1.02 Cr. 0.35 Mo.	3	520	1.38	520	...	...	496	...	. .	418	. .	...	342	...

of different chemical composition, divided into four groups:

Chart 1.—Casehardening group; two plain carbon steels, and one 6 per cent nickel steel.

Chart 2.—One plain carbon steel, one nickel, one high chrome-nickel and one low chrome-nickel steel. The carbon range of the five steels is from 0.29 to 0.34 per cent.

Chart 3.—One plain carbon steel, one nickel, one chrome-molybdenum and one high chrome-nickel steel. The carbon range of the four steels is from 0.39 to 0.45 per cent.

Chart 4.—This chart comprises five chrome-nickel steels, of which one is an air-hardening chrome-nickel steel, two are low chrome-nickel steels of respectively 0.25 and 0.34 per cent carbon content, and two high chrome-nickel steels of respectively 0.29 and 0.42 per cent carbon content.

The charts are self-explanatory, chemical analysis and heat treatment being given with each. The table is a key to the Brinell numbers, giving accurate readings.

The maximum hardness obtained is that at a point where for a smaller section the Brinell hardness does not increase, that is, the curve runs parallel to the X axis. Any section in this range should be considered as practically thoroughly penetrated. In fact in the smaller gages we would undoubtedly run into the austenitic condition. However, these smaller sizes have no practical application.

It is not out of place to mention that the curves were all checked by the author's hardness—mass formula and follow closely that hyperbolic curve. In all cases the quenching was done in water. Values for oil quenching or tempering or extension to larger sections can be obtained by following the method which the writer outlined in a paper, published in THE IRON AGE, March 9, 1922.

As to the origin of the 14 tests dealt with, all data are the writer's own, with the exception of the case-hardening group and the 0.45 per cent plain carbon steel, both of which were taken from Report No. 75 of the British Engineering Standards Association.

Concluding, the writer wishes to point out that in comparing Charts 2 and 3, it is evident that the maximum hardness obtainable is nearly constant, whereas the lesser decrease of the hardness gradient is remarkable in alloy steels of increasing mass as compared with the standard plain carbon steels.

It is hoped that in time more data of this kind will be available for all alloy structural steels so that one will be able to judge intelligently their merits as to sensitiveness to mass action.

PRICES STILL HIGH

Indications at Youngstown Are of Stabilization at Present Levels

YOUNGSTOWN, Sept. 26.—Basic pig iron is still pegged at $34. Steel makers point out that higher costs of iron, labor and scrap metals have contributed materially to advanced steel costs, necessitating higher price levels. Dealers are asking $22 to $22.50 for heavy melting scrap, up fully $8 from prices prevailing four months ago. At $34 pig iron is up $16 from the low of $18 in the spring, which remained the nominal quotation for some time. While coal at $4.50 to $4.75 for coking grades represents a decline from $9 and $10, coke is still high at $11 to $12 Connellsville, and is another contributing factor in high costs.

Though the major properties in this territory largely supply their own requirements of by-product coke, it is necessary for several to buy additional tonnages of coke in the merchant market. Other stacks, such as that of the A. M. Byers Co. and the Struthers Furnace Co., depend wholly on merchant coke production for their supplies.

Decrease in Buying

Steel makers, therefore, say that current quotations are fully justified by advanced costs, but admit there has been a reflex action in buying. In some important lines, consumers show less urgency for supplies. Higher prices have already adversely affected export sales, and are beginning to show effect on the domestic market. Demand in general, however, in this country, is being bolstered by the fact that production was materially interrupted during July and August because of coal shortage at industrial plants.

[illegible] at prevailing levels over the fourth quarter, affecting sheets, wire products and strip steel. Sheets are readily obtainable at 3.50c. for black and 4.50c. for galvanized, base gages. Resumption of Ford plants did not materially affect the sheet mill situation in the Mahoning Valley, because of the brief period of the suspension. There had been little or no let down in shipments of sheets or strip to the Ford factories from this territory. Just prior to the actual closing of the Detroit factories, the Ford company had ordered 1200 tons of sheets released from a Valley producer. The Detroit auto maker has been absorbing regularly about 1500 tons each week from a Valley interest.

Full finished sheets are in strongest demand of any grades at present, due to maintenance of high production schedules by important auto and body builders taking quotas regularly from the Valley. The price of No. 22 gage auto body stock has firmed to 5c. for the final quarter.

Sheet Bar Prices

In sheet bars, $40 is the governing price on fourth quarter shipments, contracts with non-integrated rollers being adjusted on this basis. It represents a horizontal advance of $5 over the third quarter price. One important Valley semi-finished maker is negotiating contracts at this price for the quarter, but another is still adhering to a 30 days' selling policy.

Tin plate business is experiencing seasonal inactivity, and ten mills of the leading independent maker here have been idle for several weeks. While an advance to $5 per base box is talked of, it is considered likely that producers would be willing to enter tonnage at $4.75, and possibly less where regular customers taking large quotas are involved.

The bulk of the strip steel produced by the three mills of one Valley interest is moving to the Ford plants. Makers have a comfortable volume of unfilled tonnage and the market appears firm at 2.75c. minimum for hot-rolled and 4.25c. for cold finishes. Premiums are being offered for delivery considerations, ranging from $2 to $3 per ton.

One recent purchase of heavy melting scrap by a Valley melter involved 8000 tons, for delivery over the rest of the year, at a reported price around $21.

Industrial Progress Continued in August

Advance figures of the Department of Commerce in connection with the Survey of Current Business show no significant recession in business activity in August, in spite of the trouble caused by coal and railroad strikes. The marked decline in the production of iron and steel was attributed to fuel shortage, but the increasing unfilled orders of the United States Steel Corporation indicated no apparent letup in the demand for steel products.

On the other hand there was increased activity in textiles, the mill consumption of both cotton and silk being the largest for any month in the past two years. The building industry showed the usual seasonal slump but the production of building materials continued at the high level of July. Assurance of good crops has been seen in increased sales of farm equipments and larger business by mail order houses. Freight car loadings showed a marked increase over the preceding month and were far greater than a year ago.

Growth of American Alloy Steel Industry

Statistics Since 1909—Record in Alloy Steel Castings —Output from Electric Furnaces—Rôle of Heat Treatment

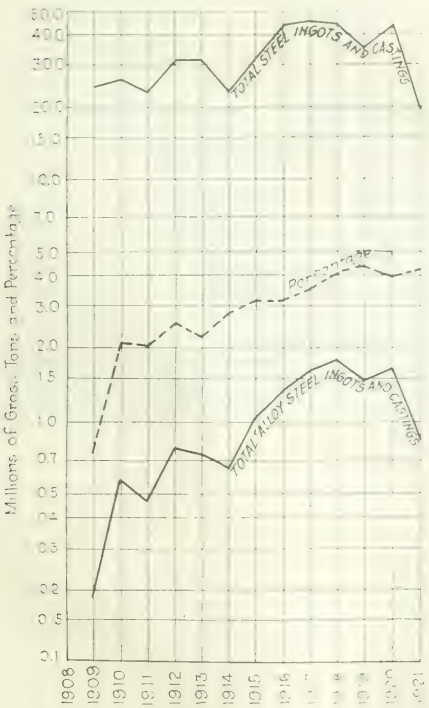
BY EDWIN F. CONE

YEAR by year, since their early introduction, alloy steels have advanced in importance, until to-day they play an indispensable role in industry. Prior to 1909 the production of anything but simple carbon steel ingots or castings in the United States was so small that very little attention was paid to them in the publication of the annual statistics of the American industry. Some high-speed steels were made earlier, but the amount was not large, expressed in tons.

Based on an analysis of the data of the American Iron and Steel Institute, and of other organizations this article presents a review of the progress of the American alloy steel industry in general. There is also discussed the alloy steel casting industry and then the progress made in the production, year by year, of electric alloy steels as a whole, and electric alloy steel castings.

Alloy Steel Industry as a Whole

Gradual but steady has been the increase in the proportion of alloy steels made in the United States in each of the 13 years, 1909 to 1921 inclusive. In actual figures from official data the course of this development is shown by Table 1 and graphically by the accompanying chart.



How the Proportion of Alloy Steel to the Total Steel Produced Has Been Gradually Increasing. The use of the ratio chart makes the rates of fluctuation truly comparable

Table 1.—Production of Steel Ingots and Castings and of Alloy Steel Ingots and Castings in the United States

	Total Steel, Gross Tons	Alloy Steel, Gross Tons	Alloy Steel, Per Cent of the Total, Per Cent
1909	23,955,021	181,980	0.75
1910	26,094,919	567,819	2.17
1911	23,676,106	481,459	2.03
1912	31,251,303	792,501	2.53
1913	31,300,874	714,357	2.28
1914	23,513,030	646,953	2.75
1915	32,151,036	1,021,147	3.17
1916	42,773,680	1,362,615	3.18
1917	45,060,607	1,644,335	3.65
1918	44,462,432	1,787,852	4.02
1919	34,671,232	1,481,188	4.27
1920	42,132,934	1,660,292	3.94
1921	19,743,797	809,548	4.10

In the infancy of the American alloy steel industry in 1909, only 0.75 per cent of the total steel output was alloy steel. By 1913 this had increased three-fold to 2.28 per cent. The peak was attained in 1919 at 4.27 per cent, but for the last four years, 1918 to 1921, the change has been slight.

The striking fact, however, is that, despite wide fluctuations in the country's total steel output, the alloy industry has really made larger gains than is apparent. Of special interest is the maintenance of a production of 4.10 per cent of the total in 1921, the year of the most severe depression since 1908.

Viewed from another angle, a still further comparison of interest is possible. As late as 1909 the rate of production of total steel to alloy steel was over 130 to 1, or there were about 130 tons of steel ingots and castings made for every one ton of alloy steel. Starting with 1909, this proportion for later years has been as follows:

1909	131.6
1910	45.9
1911	49.1
1912	39.4
1913	43.8
1914	36.3
1915	31.5
1916	31.3
1917	27.4
1918	24.8
1919	23.4
1920	25.3
1921	24.3

tons to 1 ton of alloy steel

According to these figures, the alloy steel industry first attained large proportions in 1910, when one ton of alloy steel was made to every 46 tons of total steel. Since then, with slight variations, the relative increase of the two industries has changed decidedly until this ratio dropped last year to 24 to 1.

The Alloy Steel Casting Industry

The extent to which alloy steels have been incorporated in castings presents an interesting phase of this analysis. Taking from the same statistics the total alloy steel and the total alloy steel as castings over the same period of years, the course of the development is shown by Table 2.

Here an unusual comparison between present and pre-war tendencies exists. Up to 1915, inclusive, with the exception of 1910, a much larger tonnage and percentage of alloy castings was made than for every year since. And since 1916 to the present time there

has been a much smaller proportion made at [illegible]. For the six years (omitting 1910) prior to 1916, the percentage of alloy steel castings of the total alloy steel averaged 11.69 per cent, while from 1916 to 1921, inclusive, this average was 4.01 per cent per year. Here, again, in 1921, despite the depression, there were

	Total Alloy Steel,	Total Alloy Castings,	Percentage of Castings
1909	[illegible]	[illegible]	[illegible]
1910	567,819	29,357	5.17
1911	[illegible]	[illegible]	[illegible]
1912	[illegible]	[illegible]	[illegible]
1913	[illegible]	[illegible]	[illegible]
1914	646,953	69,846	10.79
1915	[illegible]	[illegible]	[illegible]
1916	[illegible]	[illegible]	4.14
1917	1,644,335	67,529	4.10
1918	1,787,852	66,485	3.71
1919	1,481,188	45,372	3.06
1920	1,660,292	68,353	4.11
1921	809,548	40,255	4.97

more alloy steel castings made in proportion to the total alloy steel, or 4.97 per cent, than in any of the previous five years.

It is difficult to explain this large difference. In the few years just prior to 1915 a very large quantity of cast steel frames for locomotives was made containing vanadium. Many of the railroads ordered these partly as an experiment and partly as regular equipment. This, of course, ran the total of alloy castings into large figures as each frame is very heavy. While this practice by the railroads still continues, it possibly does not represent as large a tonnage as formerly. This may account in part for the difference referred to. The more reasonable conclusion, however, is that the increased use of alloy steels has been in rolled and forged material, which has consequently cut down the proportion of castings of the total.

Electric Alloy Steels

Turning to the electric furnace phase of the alloy steel industry, some interesting observations are possible. Comparing the total alloy steel production of the country with alloy steel made in electric furnaces, a marked increase in the latter is evident from the data in Table 3.

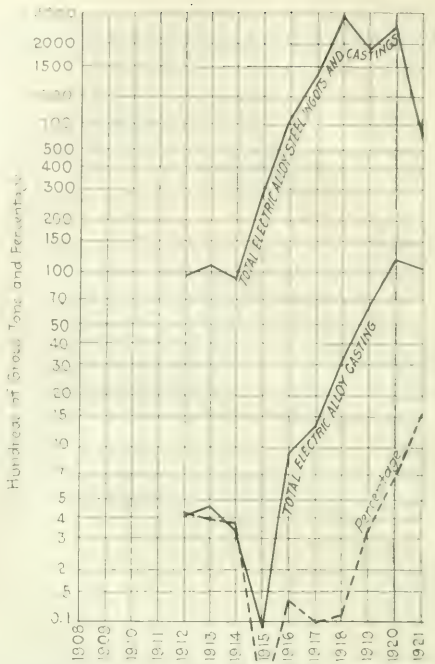
Table 3.—Production of Total Alloy Steel and of Alloy Steel in Electric Furnaces in the United States

	Total Alloy Steel, Gross Tons	Electric Alloy Steel, Gross Tons	Electric Alloy Steel of Total Alloy Steel, Per Cent
1909	181,982	.....	....
1910	567,819	608	0.10
1911	481,193	.....	....
1912	792,501	9,619	1.21
1913	714,357	11,264	1.57
1914	646,953	9,344	1.44
1915	1,021,147	27,944	2.73
1916	1,302,615	71,129	5.22
1917	1,644,335	130,578	7.94
1918	1,787,852	290,961	16.26
1919	1,435,816	181,632	12.63
1920	1,660,292	245,572	14.78
1921	809,548	63,246	7.81

Not until 1912 did the electric steel industry of this country attain any real importance. Since then the expansion in alloy steel made in electric furnaces has been rapid. The point of particular significance is that even during the war, except perhaps in 1918, the expansion was not as great as in 1919, 1920 and 1921. That the electric steel alloy production in 1921 should have been 7.81 per cent of the total in such a period of depression, or larger than in the war years of 1915, 1916 and 1917, is a notable fact, which only such an analysis as this brings out.

Large Output of Electric Alloy Castings

But the most remarkable development in the whole American alloy steel industry is the rapid growth re-



Castings of Electric Alloy Steel Have Rapidly Been Increasing in Tonnage and in the Percentage of All Alloy Steel Made in Electric Furnaces

cently in the production of alloy steel castings in electric furnaces. Table 4 and the chart reveal this.

Table 4.—Production of Total Alloy Steel and of Alloy Steel Castings from Electric Furnaces in the United States

	Total Electric Alloy Steel, Gross Tons	Electric Alloy Castings, Gross Tons	Electric Alloy Castings of Total Alloy Steel, Per Cent
1909	.....	.....	....
1910	608	8	1.12
1911	.....	.....	....
1912	9,619	402	4.18
1913	11,264	443	3.93
1914	9,344	340	3.64
1915	27,944	96	0.34
1916	71,129	926	1.30
1917	130,578	1,296	0.99
1918	290,961	3,076	1.05
1919	181,362	6,057	3.33
1920	245,572	11,710	6.50
1921	63,246	10,084	15.94

During the war the proportion of alloy steel castings from electric furnaces fell to percentages lower than in the infancy of the industry in 1910, and considerably lower than in 1912, 1913 and 1914. Since 1918 the expansion in this field has been striking, rising from 3.33 per cent in 1919 to 6.50 per cent in 1920 and culminating in the remarkable proportion of 15.94 per cent in 1921.

A satisfactory explanation of this is difficult. There was a decline in 1921 of 182,326 tons, or 75 per cent, in the total electric alloy steel production of the country, but in the output of electric alloy castings there was a decline of only 1626 tons, or 14 per cent. And this took place again in a year of acute depression in the whole steel industry.

In judging the usual development two tendencies in the electric steel industry are to be noted. One is the growing use of electric alloy steel castings, properly heat-treated, as a substitute for regular forgings. The other is the still more recent tendency in the making of manganese steel castings by the elec-

tric process rather than by the small converter. Several plants for the latter industry have been established or changed over to electric furnace equipment for the production of high manganese steel castings.

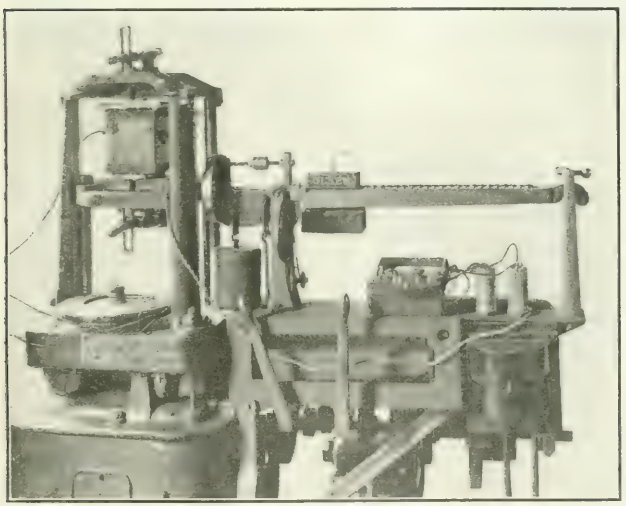
Most interesting would be information as to the distribution of the various kinds of alloy steel—how much of each kind, into what products they go, etc. In quantity production probably the nickel, chromium, nickel-chromium, chrome-vanadium and, of course, the regular high manganese steels, predominate. In the forging field, the first four of these, together with molybdenum steels are the leaders. The production of automobiles, which first reached large proportions in the five or six years following 1910, was the main cause of the development of alloy steels. Since then their use has broadened until they are a factor in locomotive construction, agricultural implements, mining machinery, rolls for rolling mills, die blocks, aircraft equipment, with the list constantly broadening. High-speed steels are, of course, prominent among alloy steels.

Electric Furnaces and Heat Treatment

Two modern developments have made the alloy steel industry possible. Their importance cannot be exaggerated. The first is the electric furnace. Its introduction made possible the production of most of the ferroalloys without which the large variety of alloy steels could not well be made. The second is the broadening of the art of heat treatment into a science and the production of equipment suitable for its use. Most alloy steels are of little value until after they have been heat treated, and upon their heat treatment depends the degree of their superiority. No more convincing proof of the growth of the alloy steel industry can be pointed to than the expansion of the American Society for Steel Treating from a beginning only four years ago to one of the largest technical organizations in the country. It celebrates its fourth anniversary by a large convention and steel exhibition in Detroit next week.

A New Phase and the Future

Mention should be made of a new phase of the alloy industry which is coming rapidly to the front. It should be included in any resumé of the alloy steel industry. It is the production of alloy iron castings. While only beginnings are thus far recorded in this field, these are of vital importance and full of large industrial possibilities. Ten years from now, or perhaps less, they are likely to take their place alongside of alloy steel castings in output and application. A review of these industries a few years from now will undoubtedly tell a story more interesting than the foregoing. Alloy steels may be revealed as practically revolutionizing the design and construction of equipment in use to-day, making possible devices hitherto not thought probable.



Tensile Tests of Cast Iron at Various Temperatures

Results of Work Done on Annealed Bars in a Special Apparatus—Comparison with Steel Under Similar Conditions

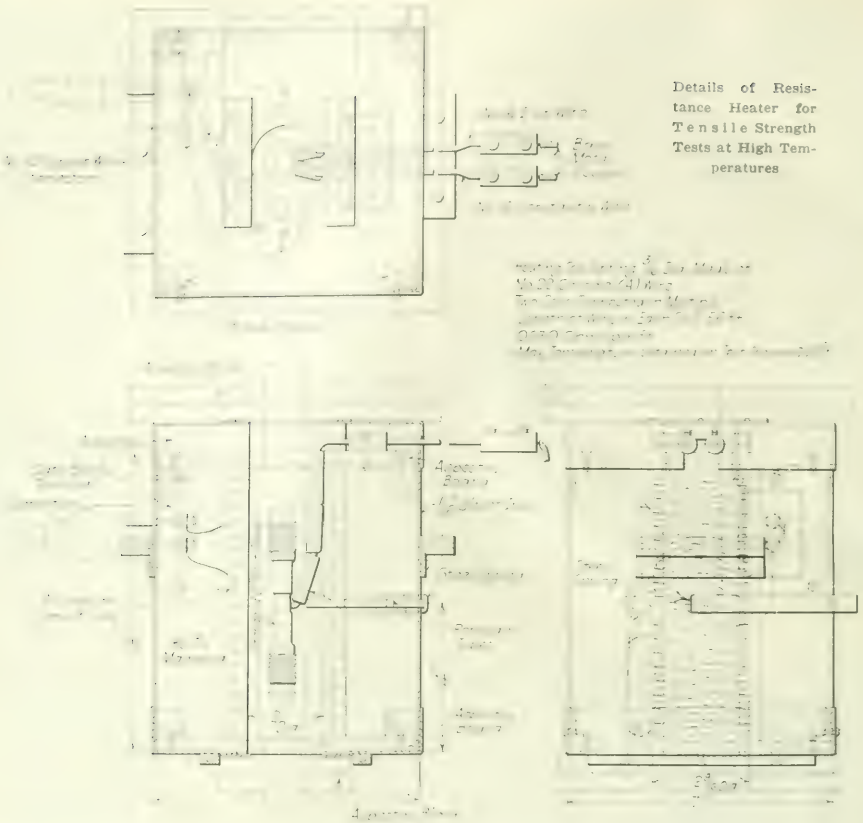
BY J. F. HARPER
AND
R. S. MAC PHERRAN*

THE question of the tensile strength of cast iron at various temperatures having been raised by the engineers of the Allis-Chalmers Mfg. Co. the following tests were made to establish a curve showing the general effect of an increase of temperature on the tensile strength of gray cast iron. This was a continuation of similar work on various grades of steel which was given in a paper, "Comparative Tests of Steel at High Temperatures" read before the June convention of American Society for Testing Materials 1921 and reported in THE IRON AGE, June 30, 1921.

The heating box used was 7 in. sq. by 9 in. high. The hole in which the test specimen was inserted was 2 in. in diameter and was lined with a core of alundum cement wound with No. 22 gage chromel wire. This wire was wound in two coils, one over the top and one over the lower half of the alundum core. They were connected in multiple. The coils were then covered with alundum cement and the box filled with magnesia as in Fig. 1.

The couple entered at the top of the box and ran down to such a position that the point was opposite the center of the test specimen. A spring on the outside of the box forced a porcelain rod through a hole and against the base metal couple, holding the point of this against the test specimen. The temperatures were taken by a Leeds and Northrup pyrometer, using a base metal couple. The specimens used had threaded ends and were machined to 0.564 in.

*Metallurgists, Allis-Chalmers Mfg. Co., Milwaukee, Wis.



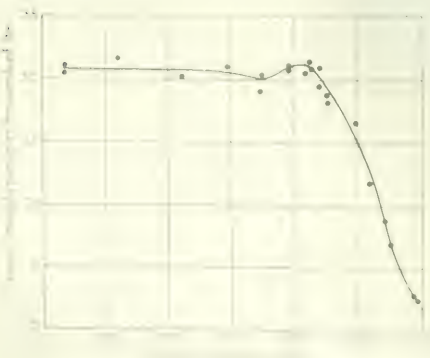
Details of Resistance Heater for Tensile Strength Tests at High Temperatures

in diameter for a clear space of ½ in. in the center of bar. All tests were held at constant temperature for 15 to 30 min. before pulling.

The test bars were all cast in green sand molds and from a single 2000-lb. ladle of cast iron. They were then annealed at a temperature of 1100 deg. Fahr. for one hour and allowed to cool slowly, in order to relieve all casting strains and to equalize cooling conditions. Preliminary tests showed a great variation in the tensile strength of bars not so treated.

The number of bars broken between 775 and 910 deg. Fahr. should be noted as this is the range in which the curve begins to drop.

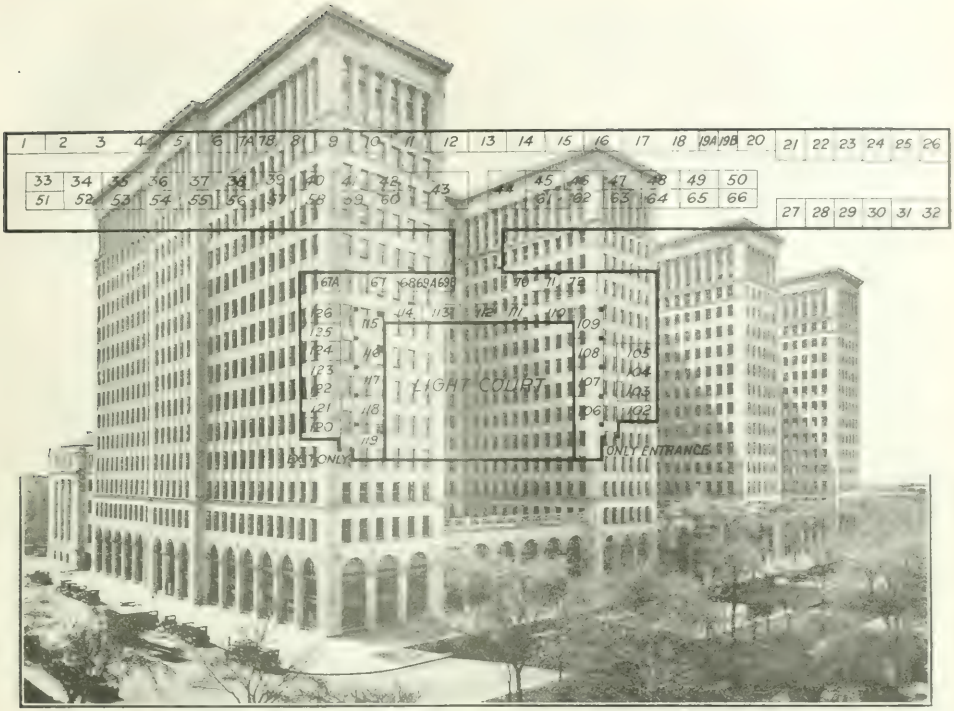
In the results above referred to the tensile strength of steels was found to drop sharply around 800 deg. Fahr. We are not as yet able to give the comparative result of fatigue tests at high temperature, but it is evident that for static loads cast iron maintains its strength slightly better than steels at high temperatures.



Tensile Strength of Cast Iron at Various Temperatures. ... phosphorus, 0.520, and manganese, 0.610 per cent

Cast Iron Tested Under Temperature, Annealed at 1100 Deg. Fahr.

Temperature, Deg. Fahr.	Tensile Strength, Lb. per Sq. In.
[illegible]	30,400
[illegible]	31,100
241	31,700
[illegible]	30,300
[illegible]	31,000
695	29,200
700	30,320
781	30,800
[illegible]	31,120
838	30,700
849	31,400
857	30,800
875	30,900
881	29,560
[illegible]	28,480
904	28,800
991	26,680
1,041	21,920
1,088	18,400
1,101	17,040
1,176	12,880
1,182	12,560



Steel Treaters' Week at Detroit

Annual Convention and Exhibition of the American Society for Steel Treating, Oct. 2 to 7— Drop Forgers Unite

THREE years ago in Chicago, in September, 1919, the first convention of technical men interested in the heat treatment of steel was held under the name of the American Steel Treaters Society. By a bold stroke, the same group of men also launched a successful exhibition of steel-treating equipment.

Since that auspicious beginning the rapid expansion of the society is a well-known fact. Next week in Detroit the national organization, now known as the American Society for Steel Treating, which resulted from the combination of the new society and the older one located at Detroit, will hold the largest convention and exhibition in its history. More than that, the week's activities include participation also by the American Drop Forging Institute, which unites with the steel treaters by holding its technical sessions at the same time and place and also joins in the exhibition, so that the latter is this year called the International Steel Exposition. This year's affair, which is to be held in the General Motors Building, is expected to eclipse easily the Chicago, Philadelphia and Indianapolis conventions and exhibitions, held in 1919, 1920 and 1921 respectively.

An interesting technical program has been prepared. A new feature is the pre-printing of most of the papers. There are also fewer papers than at previous meetings. Some of the subjects covered by the sessions are: Carbonizing, Tool Steel, General Heat-Treating Problems and Research. There are also to be two symposiums, one on hardness testing and another on metallurgical education.

The session to be held by the drop forgers is scheduled for Oct. 3.

This issue of THE IRON AGE presents its first six articles as special contributions to the subject of heat treatment in general.

Great Variety of Products Will Be Shown by Exhibitors

AJAX MFG. CO., Cleveland. A new model twin-geared, upsetting and forging machine embodying many improved features; a model of the company's motor-driven, direct-geared, connecting board, drop hammer; a display of sample forgings all made by Ajax machine methods. Represented by J. R. Blakeslee, president; R. A. Bannerman, Cleveland; W. W. Criley, Cleveland; H. D. Heman. Cleveland; A. L. Guilford, Chicago; J. A. Murray, New York.

ALLIED METAL PRODUCTS CORPORATION, Detroit. Nickel Alloys, Heat resisting—non-corrosive, in sheets, bars and castings and finished products. Represented by V. Hybinette and W. J. Moore.

AMERICAN BLOWER CO., Detroit. Man cooling fan—operates as a very large desk fan directing a cooling breeze over

workmen employed before furnaces or other hot machines; Pressure blower for furnishing blast for furnaces; utility blower for blowing scale from forging dies. Represented by G. C. Polk, manager, standard apparatus division; J. Dill, manager, Detroit sales office; O. F. Polk, manager, standard apparatus division; W. A. Rane, chief engineer.

AMERICAN [illegible] electrode rivet heater. Represented by J. M. Hayes.

AMERICAN CYANAMID Co., New York. Commercial packages of its new case hardening and heat treating compounds which are produced from cyanide made from air nitrogen at Niagara Falls. Represented by A. G. Bachman and O. D. Grier.

AMERICAN DROP FORGING INSTITUTE, Cleveland. Typical forgings supplied from the products of the executive members of the Institute. Represented by R. E. Waldron, Dominion Forge & Stamping Co., Walkerville, Ont.

AMERICAN KREUGER & TOOL CORPORATION, New York. Specimens of new hardening process, "Nitrol," for steel and iron; also metallurgical equipment. Represented by F. H. Holden.

AMERICAN REFRACTORIES Co., Pittsburgh. American silica brick coke oven shapes and gas retort shapes; ground ganister, silica fireclay; "AA" Austrian magnesite brick, dead burned magnesite and magnesite cement; American chrome brick and chrome cement; also samples of "Arcofrax," "Arco" fireclay, and American fireclay. Represented by A. F. Greaves-Walker, manager of production, and M. R. Stowell.

AMERICAN TWIST DRILL & TOOL Co., Detroit. High speed drills, cutters, saws and reamers. Represented by L. C. Gorham, F. E. Henderson, Stanley Sowder.

ARMSTRONG-BLUM MFG. Co., Chicago. Marvel metal band saw in operation, cutting die blocks and doing tool room work; Marvel automatic high speed hack saw, running continuously, cutting off bar steel automatically; marvel draw-cut hack saw, showing new design with motor attached as a portable outfit for operation from any lighting circuit; Marvel all-steel punch, shear and bender. Represented by Harry J. Blum, secretary, and George J. Blum, vice-president.

ARMSTRONG CORK & INSULATION Co., Pittsburgh. "Nonpareil" insulating brick for furnaces, ovens, boiler settings, kilns, etc.; "Nonpareil" high pressure covering, blocks and cement for steam lines and other heat equipment; "Nonpareil" corkboard for cold storage rooms, "Nonpareil" cork covering for brine; ammonia and other refrigerated lines and "Linotile" and Armstrong's cork tile floors. Also an electrically heated furnace demonstrating the heat retarding qualities of "Nonpareil" brick. Represented by W. C. Rasche and E. D. Summers, Detroit; S. L. Barnes and H. B. Gates, Pittsburgh.

ATLAS STEEL CORPORATION, Dunkirk and Charleroi, Pa. Full line of tool and high speed steels; also samples and fractures of same in various metallurgical conditions; full line of special steels, such as magnet, valve, non-corrosive and ball-bearing steels. Represented by W. C. Peterson, M. Grossman, Frank Lounsbury, William H. Wills.

B

BAUSCH & LOMB OPTICAL Co., Rochester, N. Y. Complete line of metallurgical microscopes and metallographic equipment, ranging from simplest types, suitable for general foundry use, to most complete equipments for research laboratory work. New contour measuring projector, by means of which contour of screw threads, gear-cutting tools and small machine parts may be accurately and rapidly checked. This equipment, it is claimed, will be the means of definitely settling the question of distortion due to heat treatment. Equipment will be in actual operation. Represented by W. L. Patterson and J. L. Nixon.

BELLEVUE INDUSTRIAL FURNACE Co., Detroit. A sectional view of the company's high speed furnace showing the inner construction; also same size furnace in actual operation. Represented by P. P. Barker, W. E. Hinz, L. J. Raymo, Chris. Voelker and Erich Hinz.

BETHLEHEM STEEL Co., Bethlehem, Pa. Mayari pig iron for motor castings; also Bethlehem rolled steel truck wheels for motor trucks and Bethlehem special high speed tool steel. Represented by Robert MacDonald, H. P. Kreulen, W. C. Cutler, W. H. Laury, T. J. Fitzgibbons, F. A. Wallen and W. R. Shimer.

ALFRED O. BLAICH Co., Detroit. Carbonizing materials; "Quick Case" for cyaniding purposes; "Quick Heat" for heat treating purposes; "Insulite" for selective hardening, "Leadcoat" for covering lead baths. Represented by Frederick Pugh, J. A. Howland and S. W. Baldwin.

BRISTOL COMPANY, Waterbury, Conn. A complete line of temperature recording instruments and pyrometers covering a range of from 30 deg. below zero to 3,000 deg. Fahr., together with temperature control apparatus. The Bristol-Fuller valve used in connection with temperature controller for gas, oil and steam is a new feature. Represented by C. C. Eagle, Jr., district manager at Philadelphia.

BROWN INSTRUMENT COMPANY, Philadelphia. Brown improved automatic temperature control and balanced valve for gas, oil, air and electric. The balanced control instruments in actual operation; Brown indicating and recording pyrometers; automatic cold end compensation and how this feature is applied to both Brown indicators and records shown by glass-covered instruments; Brown indicating and recording thermometers for oil-quenching baths and for all low temperature work up to 1000 deg. Fahr.; Brown indicating and recording pressure gages, tachometers, resistance thermometers and complete line of Brown instruments used throughout the industrial field. Represented by G. W. Keller, sales manager; J. J. Mungan, Detroit district manager; E. R. Robinson, Detroit; R. W. [illegible] W. H. [illegible] T. W. Barker.

BRITISH AMERICAN NICKEL CORPORATED, LTD. Nickel in ingot; Cathode and shot form. Represented by Mr. L. J. Buck.

BUREAU OF STANDARDS, DEPARTMENT OF COMMERCE, Washington. A recording chronograph for direct plotting of inverse rate heating and cooling curves, recently constructed at the Bureau, shown in operation. The production of pure metals such as iron and the preparation of gas free alloys, together with the melting of different industrial ferrous and non-ferrous metals by various methods illustrated. In connection with this work, methods developed for determination of gases in metals will be shown. Hot and cold working of metals, their heat treatment and testing including some applications of the 2,300,000 lb. emery testing machine will be shown; also results of recent studies of the properties of ferrous and non-ferrous metals at high temperatures and a model car wheel, showing a method of study of the distribution of stresses under conditions approximating those of service; a set of gages finished by the Hoke method and typical standard samples prepared by the Bureau will be at hand. Represented by H. J. French, J. S. Vanick, T. G. Digges, Miss D. E. Kingsbury and Dr. G. K. Burgess.

C

CALORIZING Co., Pittsburgh. Calite castings for various uses in high temperatures. These applications will be for temperatures up to about 2200 deg. Fahr. and will include case hardening and annealing boxes, lead pots, parts of continuous heat treating furnaces, rollers in continuous annealing furnaces, skids for enameling furnaces; also calorized steel tubes for recuperators. Some calorizing also shown for pyrometer protection tubes, gas and oil burners. Represented by Brooke L. Jarrett, president; A. V. Farr, vice-president; E. L. Malone, Eastern district representative, and Fred D. Rice, Pittsburgh representative.

CARBORUNDUM Co., Niagara Falls, N. Y. Standard high speed heat treating furnace equipped with "Carbofrax" hearth and lining, in operation; radiating combustion chamber unit composed of "Carbofrax"; collection of "Carbofrax" hearth tile, supports, baffles, etc., for high speed heat treating furnaces; standard "Carbofrax" plain tile and standard brick; "Carbofrax" and "Firefrax" cements; "Carborundum" fire sand for furnace linings; "Carbofrax" pyrometer tubes; "Carborundum" and "Aloxite" wheels and other abrasives. Represented by C. E. Hawke, sales manager, refractory division, New Jersey; R. M. Onan, refractory division, Chicago; E. W. Jones, refractory division, Cleveland, and Anthony Dobson, district sales manager, Detroit.

CASE HARDENING SERVICE Co., Cleveland. Samples of "Bohnite" for pack hardening and "Caseite" for cyanide hardening; also samples of work produced by representative manufacturers using the company's products. Represented by E. J. Gossett, C. E. Lovejoy, W. C. Bell, C. E. Pullum, J. L. Stroman and William H. Bell.

CELITE PRODUCTS Co., Chicago. Exhibiting a furnace, one wall of which is built of ordinary fire brick and the other wall of "Sil-O-Cel" insulating brick; a complete line of "Sil-O-Cel" heat insulation products including "Sil-O-Cel" brick, block, powder and cement; "Celite" high temperature cements and "Celcote" for waterproofing; also samples of "Filter-Cel" for better filtration and "Celite" mineral filler. Represented by A. B. Rogers, Detroit, assisted by L. M. Lindsey, Cincinnati, and C. L. Burnham, Chicago.

CENTRAL STEEL COMPANY, Massillon, Ohio. Alloy steels and various finished products made from alloy steels; high-finish automobile sheets; strip steel, hot rolled alloy steel and hot rolled carbon steel; physical charts, microphotographs. Represented by F. J. Griffiths, vice-president and general manager; J. M. Schlendorf, director of sales; Gilbert Canterbury, manager sales promotion; Earl Smith, chief metallurgical engineer; C. P. Richter, metallurgical engineer; Arthur Schaeffer, manager Detroit sales office.

CHICAGO FLEXIBLE SHAFT Co., Chicago. Double deck furnaces for high speed and carbon steel; a small oven furnace for annealing, carburizing, etc., and crucible furnace for lead or cyanide hardening, salt baths, etc.; also oil tempering furnace for drawing temper of tools, dies, etc., where color is not wanted. Represented by Peter Blackwood, manager of furnace department, and George P. Beck, manager of Detroit office.

CLIMAX MOLYBDENUM Co., New York. Following companies which are producing and advertising molybdenum steel products will be represented: Wood Shovel & Tool Co.—H. K. Wood's "Mo-lib-den-um" Shovel; A. Finkle & Sons, "Mo-lyb-die" steel; Parish Mfg. Co., Parish "Mo-lyb-den-um" frames; Wheeling Mold & Foundry Co., "Mo-lyb-den-um" roll; Cleveland Motorcycle Co., "Mo-lyb-den-um" motorcycle; Cox Brass Co., "Mo-lyb-den-um" bumper; Ohio Seamless Tube Co., "Mo-lyb-den-um" seamless tubing; Lancaster Steel Products Co., cold drawn "Mo-lyb-den-um" steel bars; Wills Sainte Claire, "Mo-lyb-den-um" Car; Driver-Harris Co., and Pioneer Alloy Products Co., makers of heat and acid resisting alloys; King Pneumatic Tool Co., "Mo-lyb-den-um" riveting hammer. Represented by B. F. Phillipson, J. D. Cutter, W. N. Bratton and C. H. Batchelow.

COLONIAL STEEL Co., Pittsburgh. Materials used in the manufacture of Colonial tool steels. Represented by J. Trautman, Jr., assistant general sales manager; Dr. N. B. Hoffman, metallurgist; G. W. Hampshire, manager Detroit branch; Colin McInnes, special representative; James E. Barry, special representative; C. O. Sternagle, manager Chicago branch; Lawrence Wood, manager Pittsburgh sales; J. M. Smith, special representative; F. L. Stevenson, manager Cleveland branch; Charles Kopenhoefer, special representative.

COMBUSTION UTILITIES CORPORATION, New York. Lead and oil tempering bath; muffle furnace rivet forge; recuperator sections; drawings for recuperative and regenerative furnaces; wooden models of recuperative forge furnace and recuperative heat treating furnace. Represented by

G. L. Ballard, Beloit, Wis.; F. J. Nutting and H. M. Henry, Toledo, Ohio.

CRUCIBLE STEEL CO. OF AMERICA, New York. Different classes of high speed steel for both cold and hot work; all grades of plain carbon tool steels, as well as alloy tool steels for every purpose; these to include both water hardening and oil hardening varieties; non-changeable tool steels, stainless steels and flame and rust resisting steel; also a variety of finished tools. Represented by Dr. John A. Mathews, president; R. Michener, general sales agent; Dr. C. M. Johnson, director of research department; A. L. Ralston, sales manager at Detroit; J. W. Taylor, manager of service department.

D

DEARBORN CHEMICAL Co., Chicago. No. OX-ID rust preventive; cleaners, liquid and powdered; cutting oils, quenching oils. Represented by E. M. Converse, Chicago; O. L. Flengel, Detroit and C. I. Loudenback, Detroit.

DRIVER-HARRIS Co., Harrison, N. J. Cast nichrome in the form of carbonizing containers, pyrometer protection tubes, furnace muffles, burning racks, etc. Represented by W. E. Blythe and H. O. Hartdegen.

E

ELECTRIC FURNACE Co., Salem, Ohio. Display of products showing range of materials which are being heat treated in company's electric furnace equipment; these will range from axles, crank shafts and anchor chain down to bolts, ball races and small steel parts. Represented by T. F. Baily, vice-president; R. F. Benzinger, sales manager; F. J. Peterson, Detroit representative; M. T. Ellis, salesman and R. F. Fletcher, advertising manager.

ELECTRO-ALLOYS STEEL Co., Youngstown, Ohio. Samples of tools and tool steels with special reference to exhibits of the fractures of different types of tool steels in different conditions of hardness. Represented by A. L. Garford, president; W. C. Whyte, special representative; E. C. White, Michigan representative; R. A. Miller, sales department, and Heman Ely, Jr., sales manager.

CHARLES ENGLEHARD, INC., New York. A complete display of various types of pyrometer indicating and recording instruments, including single-record and multiple-record recorders, featuring a frictionless moving system which is used in all of these instruments and by which delicate pivots are eliminated. The construction of the galvanometer is such that there is absolutely no friction. Thermo-couples: four different kinds of base metal thermo-couples and two different kinds of rare metal thermo-couples, including protecting tubes, both primary and secondary, and miscellaneous fittings will be shown. Tests showing the ability of Impervite (porcelain) pyrometer tubes to stand temperature shock, and their impermeability to gases at high temperatures will be demonstrated. The feature of the exhibit will be automatic temperature regulators in actual operation on both electric and gas-fired furnaces. A new instrument to record transformation points, both for laboratory and industrial use, in operation. A complete exhibit of "Impervite" porcelain ware for metallurgical and chemical purposes will be shown. Represented by E. S. Newcomb, J. H. Oetjen and H. L. Shippy.

F

A. FINKL & SONS Co., Chicago. Miscellaneous drop forgings up to 350 lb., and smaller; "Molyb-Die" steel piston rods with physical and microscopic tests of same; three grades of "Molyb-Die" steel, die blocks; namely F. S. in the treated state; F. X. hardened; "Durodi," annealed with physical and microscopic tests of same. Represented by Charles E. Finkl, Fred Finkl, William Finkl, T. P. Wallace, Frank J. Hunt and A. R. Lane.

FIRTH-STERLING STEEL Co., McKeesport, Pa. "Blue Chip" high speed steel; Firth-Sterling special tool and die steel. Represented by Edwin T. Jackman in charge; G. A. Jacobs, W. C. Royce, W. A. Nungester, I. Olsen, T. A. Larecy.

J. B. FORD Co., Wyandotte, Mich. Wyandotte metal cleaner. A model cleaning tank will be in operation showing practical tank construction and the advantages of the use of Wyandotte metal cleaner in modern production practice. Represented by B. N. Goodell, manager industrial department; J. S. Kelly, C. S. Tompkins, G. J. Lawrence, Paul Bombenek.

G

WILLIAM GANSCHOW Co., Chicago. Type A. B. & C. speed transformers; direct connected—type A; right angle drive—type B; vertical drive, type C.; automobile transmission gears; spiral bevel drive and differential gears; noiseless bakelite timing and rawhide gears for the commercial trade; spur gears from 1 in. outside dia. to 12 ft. dia., 20 in. face; also bevel and mitre gears. Represented by F. J. Niedermiller, Detroit representative.

GENERAL ALLOYS Co., Chicago. Q-alloys; wireless bulletins—all apparatus in booth. Represented by H. H. Harris and A. L. Grinnell.

GENERAL ELECTRIC Co., Schenectady, N. Y. Semi-cylindrical furnace, muffle furnace, air tempering oven, box type furnace and oil tempering bath. Represented by C. L. Ipsen and C. T. McLoughlin.

GODDARD & GODDARD Co., Detroit. Line of special "Go and Go" milling cutters as adapted for various lines of milling, special attention being paid to cutters for railroad work, automobile work and general purpose milling. Represented by A. N. Goddard, president; C. S. Goddard, sales manager; R. T. Rice, Ohio representative.

GENERAL STEEL Co., Massillon, Ohio. Finished and semi-finished products used in the automotive industry and a great many other industries and produced from various kinds of alloy steels will be the main feature. Examples will also be shown of difficult stampings made from the company's high finished sheet steel and its hot rolled strip steel. The exhibit will endeavor to give some visualization to the development of the general use of alloy steels in industries outside the automotive field. Represented by F. J. Griffiths, vice-president and general manager; J. M. Schlendorf, director of sales; Gilbert Canterbury, manager of sales promotion; Earl Smith, chief metallurgical engineer; C. P. Richter, metallurgical engineer; Arthur Schaeffer, Detroit district sales manager.

H

GEORGE J. HAGAN Co., Pittsburgh. Complete drawings, photographs and operating data concerning the majority of the company's electric furnace installations. Represented by R. E. Talley, C. F. Cone and A. D. Dauch.

HALCOMB STEEL Co., Syracuse, N. Y. A complete line of tool and alloy steels. Represented by Messrs. Stagg, Spalding, Schroeder, Atkinson, Disque and Baker.

HAYNES STELLITE Co., New York. All styles and sizes of "Stellite" welded tools; assorted line of "Stellite" milling cutters; a line of cloth and rubber cutting knives; various special castings, such as several types of dies, valves, shafts, etc. A device known as a hot billet scraping machine will be displayed. Represented by A. B. Leonard, W. S. Tromley, C. C. Pendrell and H. S. Bunn.

HEPPENSTALL FORGE & KNIFE Co., Pittsburgh. Hammer ram, machined complete; hammer guides, rough machined; solid head piston rod, rough machined; annealed die block in the condition in which they are shipped; treated die block as they are shipped; "Hardtem" die block; "Hardtem" die block cut in half and polished to show the effects of heat treatment; shear knife for shearing rounds such as are used in a drop forge shop; shear knife for shearing shapes.

HOLCROFT & Co., Detroit. Photographs and drawings of electric furnaces pertaining to the heat treatment of both ferrous and non-ferrous metals; also of melting equipment for both ferrous and non-ferrous metals; a renewable electric unit. Represented by C. T. Holcroft, president; R. T. Cadwell, secretary and treasurer, C. L. Joy, chief engineer; H. L. Ritts, sales manager; and Oscar E. Erisman, St. Louis representative.

HOSKINS MFG. Co., Detroit. Furnace and automatic control outfit employing a cast heating unit. Represented by A. S. Lee, J. W. Moore, J. D. Sterling, R. P. Ellis, W. A. Gatward and C. S. Kinnison.

HAUCK MFG. Co., Brooklyn. The new Hauck "Venturi" oil burners for open hearth and heat treating furnaces, pressure and siphon types, besides regular line of torches, portable burners and rivet heating forges. Represented by Herbert Vogelsang and A. F. Schumann.

E. F. HOUGHTON & Co., Philadelphia. Houghton's carburizing materials, rust preventives, leather packings and quenching and tempering oils. Represented by J. E. Burns, Indianapolis; H. E. Cressman, Detroit; C. A. Gesell, Cincinnati; H. G. Lloyd, Milwaukee; G. S. Rogers, St. Louis; A. J. Jennings, Kalamazoo; J. W. Kelley, Cleveland; W. A. Beuchner, Pittsburgh; G. W. Pressell, general sales manager.

I

INTERNATIONAL NICKEL Co., New York. Nickel products such as blocks, shot, electro and malleable nickel; nickel and monel metal in the automotive field; nickel steels in the automotive field. Represented by A. J. Wadhams, G. A. Wotherspoon, T. H. Wickender, C. McKnight and P. D. Merica.

INTERSTATE IRON & STEEL Co., Chicago. Moving pictures taken at the company's South Chicago plant, showing complete process of manufacture of alloy steels and exhibit of important parts of various makes of pleasure cars in which Interstate alloy steels are used. Represented by W. J. MacKenzie, Paul Llewellyn, R. S. LeBarre and E. Larned, Chicago representatives; F. Walter Guibert and H. L. Couzens, Detroit.

K

KELLER MECHANICAL ENGRAVING Co., Brooklyn. A new type "F" Keller automatic die sinking machine embodying revolutionary features; entirely electrically driven; push button controls for every movement; also several dies cut on company's machine. Represented by S. A. Keller, president; Jules Dierck, vice-president and sales manager; Charles Bitter and A. J. Benson.

KEYSTONE REFRACTORIES Co., New York. Dura-Stix, the high temperature cement; "Crundumsand," a dense high refractory granular material. These articles are used as refractories for furnace economy. Represented by F. W. Reisman, president; L. E. Turk, treasurer; G. M. Sherman, New England sales manager; H. A. O'Brien, S. W. Cole, representatives.

CHARLES KLEIST & SON, Jamestown, N. Y. Drop hammer boards for board drop forge hammers; (a) built-up hammer board (new principle); (b) cut-in hammer boards; (c) standard hammer boards. Represented by H. E. Kleist.

L

LEEDS & NORTHRUP Co., Philadelphia. "Potentiometer" pyrometers, both indicating and recording types; complete automatic temperature control equipment; an equipment for heat-treating steel according to the Hump method, which will be in full operation, actually hardening tools. Represented by G. W. Tall, Jr.; A. E. Tarr, E. B. Estabrook and O. Brewer.

E. LEITZ, INC., New York. Leitz "Micro-Metallograph" in conjunction with the new vibration absorber; also general metallurgical microscope equipments with a full line of "Apochromatic" objectives and new "Periplan" oculars; grinding and polishing machines for the preparation of microscopical specimens. Represented by G. Spindler and G. Sauppé

M

MIDVALE STEEL & ORDNANCE CO., CAMBRIA STEEL CO., Philadelphia. Reception booth. Represented by Stuart Hazlewood, manager [illegible] of tool steels; George A. Richardson, in charge of advertising, exhibits, etc., and representatives from various district offices.

MIDWEST STEEL & SUPPLY CO. "Midwest" standard unit air filters; "Midwest" type C & D filters; "Midwest" steel sections; nitrol. Represented by H. C. Murphy and T. W. Murray.

MONTGOMERY CHEMICAL CO., Detroit. Full line of case hardening compound. A miniature exhibit of part of the company's commercial heat-treating department in Detroit. Represented by L. C. Dunn.

MOTCH & MERRYWEATHER CO., Cleveland, Ohio. Complete line of machinery in operation. Represented by George Merryweather, Stanley Motch and George Lawrence.

N

NATIONAL MACHINERY CO., Tiffin, Ohio. Forging machine exhibit. Represented by E. R. Frost, Charles Harmon, K. E. Ernst, D. J. Crowley, F. J. Mawby and F. W. Klenk.

O

S. OBERMAYER CO., Chicago. A complete line of high temperature furnace cements, namely, "Hot Patch," "Esso Bond" and "Esso No. 33." Other refractories made from these cements such as special shaped brick, "Carborundum" fire sand, various grades of imported Ceylon, polishing material, sand blast material, various grades of powdered and granulated charcoal, insulating materials, etc. Represented by John L. Cummings, J. Frank Newman and L. M. Geer.

OHIO MACHINE TOOL CO., Kenton, Ohio. Metal working shapers. Represented by C. C. Swift, R. D. Shields, William Ochse, L. H. Peters, all of Kenton, Ohio.

TINIUS OLSEN TESTING MACHINE CO., Philadelphia. Complete line of small testing machines for determining the hardness of various materials, impact and alternate stress tests, repeated impact; ductility testing machines for determining the drawing quality of sheet metal as well as universal testing machines with all kinds of attachments for making hardness, ductility tests; also demonstrating for the first time the Owens test for welded material and welds as well as some new special Brinell hardness testing machines for determining Brinell hardness of sheet metals and softer metals. Will also demonstrate various extensometers, instrument strain gages, etc., as used in testing materials and also will have engineers available for discussing the Olsen-Carwen static-dynamic balancing machine as used by automobile manufacturers and others in balancing crankshafts, flywheels and various other types of rotors. Represented by Robert Bruce Lewis and Thorsten Y. Olsen.

P

[illegible] Baltimore, Md. A sand blast cabinet in operation; also photographs of installations of various types of sand-blast equipment in the steel-treating industry. Specimens of various grades of angular steel grit and Samsom steel shot, dustless sand-blast abrasives, will be shown in actual use in equipment demonstrating wearing qualities and finishes produced. Represented by John C. Pangborn, vice-president; H. D. Gates, sales manager; Charles T. Bird, district sales engineer, and W. C. Lytle, district sales engineer.

PARK CHEMICAL CO., Detroit. A complete line of materials for hardening and heat treatment of steel. Represented by D. W. Bauer, secretary, and J. N. Boring, vice-president.

PENN SEABOARD STEEL CORPORATION, Philadelphia. Die blocks, piston rods and trimmer steel and crankshafts. Represented by D. J. Crowley, Detroit district manager, and H. A. Baxter, general manager of sales.

Q

QUIGLEY FURNACE SPECIALTIES CO., New York. "Hytempite," a plastic refractory material for bonding fire brick and other refractories; "Carbosand," a highly refractory granular material for making rammed in linings, furnace bottoms, special tile, etc.; high temperature insulation in brick, block, powder and cement form for retarding heat flow through furnace walls, ovens and similar heated equipment. Represented by W. S. Quigley, president; Q. H. Gaylord, Jr., traveling sales manager; W. A. Teohill and H. M. Thompson.

R

W. S. ROCKWELL CO., New York. Automatic type heat-treating and annealing furnaces in operation. Represented by C. D. Barnhart and H. J. N. Voltman, New York; M. L. Hollister and R. M. Atwater, Detroit, and W. C. Squire and C. P. Cogswell, Chicago.

RODMAN CHEMICAL CO., Verona, Pa. "Carbo" case hardening compounds. "Sealright" luting material. Represented by [illegible] metallurgist.

S

SHORE INSTRUMENT & MFG. CO., Jamaica, N. Y. "C-1" bulb type scleroscope and "D" recording scleroscope; these instruments are for testing hardness in metals and various other products that are capable of taking a permanent indentation. [illegible]

pyrometers; these pyrometers are for indicating the temperature of articles within the furnace independent of the temperature of furnace. The range of these instruments is from 1200 deg. Fahr. to 3000 deg. Fahr.; also a display of "Durometer," an instrument to test the hardness of plastic articles such as rubber compositions, etc.; also "Elastometer" to test the elasticity of rubber; also "Local-Case," used for selective carbonizing, and "Local-Hard," used for selective hardening, as in tool steel. Represented by F. G. Kendall.

SIMONDS MFG. CO., Lockport, N. Y. Steel bars and products; saws and knives. Represented by C. R. Paffenbach.

SPENCER TURBINE CO., Hartford, Conn. Turbo compressors for supplying air for oil and gas burning furnaces, including one 900-c.f.m. machine at 1½-lb. pressure, in operation supplying air for the gas burning furnaces in operation; also a 450-c.f.m. machine. Represented by S. E. Phillips, secretary; H. M. Grossman, sales engineer; R. B. Richardson, Detroit, district manager.

STANDARD ALLOYS CO., Pittsburgh. Products obtained from the Carnotite ores of Colorado containing vanadium, uranium and radium. Will show views of the mines where these ores are found and something of the nature of the work necessary to recover these materials. Represented by Harry A. Kraeling, D. H. Horne, Hamilton Foley.

STANDARD FUEL ENGINEERING CO., Detroit. Several types of tool hardening furnaces showing a high-speed furnace under heat; will also show a line of refractories, including some very difficult shapes as well as high temperature cement; also oil burners. Represented by Theodore Q. Cleland, J. R. Dunne, Ellis B. Beeman and Herbert M. Bray.

STANDARD STEEL & BEARINGS, INC., Philadelphia. Annular ball bearings, single row and new style double row; steel balls in various stages of production; also the company's new style double row annular ball bearing. Represented by C. B. Wisenburgh, Western sales manager; B. H. Gilpin, sales engineer; L. A. Cummings, chief engineer, and H. A. Johnston, assistant to the sales manager.

SURFACE COMBUSTION CO., New York. Oven furnaces operating on surface combustion; low pressure system; impact and tunnel types of burners operating on surface combustion high pressure system. Represented by Messrs. Hollinger and Harris.

T

TAYLOR INSTRUMENT COMPANIES, Rochester, N. Y. Recording thermometers, pyrometers, oil tempering thermometers, molten metal thermometers, engraved stem thermometers and hydrometers. Represented by Mr. Howell, Pyrometer sales manager, and Mr. Hohes of the Coon-De-Visser Co.

N. & G. TAYLOR CO., Philadelphia. Forging bars of basic open-hearth straight carbon steel; samples of bars made by the company and examples of difficult forgings made from the company's product; also twisted and distorted bars, upset pieces, curious bends, etc. Represented by Hollinshead N. Taylor, president; C. H. Hallgath, Western sales manager; George I. Allen, northern Ohio representative, and A. L. Wurster, Eastern representative.

U

UNITED ALLOY STEEL CORPORATION, Canton, Ohio. Various grades of alloy steel in hot rolled, heat treated and cold drawn forms. Fractures and physical tests will give an idea of the physical properties and structures obtained. In addition there will be displayed fabricated articles made from the company's alloy steel, such as automotive parts, shovels, industrial bearings, edge tools and oil well drilling tools. Represented by H. H. Pleasance, general manager of sales; J. D. Jones, district sales agent, Detroit; R. Wykoff, Detroit; J. F. White, Detroit; R. E. Sherlock, Canton; F. B. Mulvaney, Canton; F. W. Krebs, Canton, and J. G. Bell, Canton.

V

VANADIUM ALLOYS STEEL CO., Latrobe, Pa. Spindles, rolls and dies manufactured from the company's steels. Represented by J. P. Gill, metallurgist; A. F. MacFarland, Detroit manager; D. D. Dodd, Detroit office, and A. G. Henry, special representative; W. R. Mau, district manager Chicago office; J. H. Caler, district manager Cleveland office; R. R. Aitz, Pittsburgh office, and D. A. Black, Boston office.

VANADIUM CORPORATION OF AMERICA, New York. Reception booth.

W

WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa. Full line of electric furnaces and controls in operation; ovens and space heaters; electric solder pots; tempering ovens; display of Krantz safety switches. Represented by Carl C. Boos, Wirt S. Scott and Brent Wiley.

WILSON-MAEULEN CO., New York. Pyrometers as suited to hardening and tempering furnaces; "Tapalog," which is a multiple type pyrometer recorder for annealing furnaces, and three sizes of the Rockwell direct reading hardness tester with diamond cone test point. Represented by C. E. Hellenberg, Harvey Lee and Harry Goldsen.

WITHEROW STEEL CO., Pittsburgh. Various forging and forging blanks as rolled by the Witherow process, together with exhibit entitled the "Evolution of an Axle." Represented by Mr. Witherow, president; G. R. Norton, steel works manager; W. C. Emory, metallurgist, and L. A. Daines, sales engineer.

Electricity Applied to Industrial Heating

American Electrochemists Conduct Symposium at Montreal Meeting—Equipment for Heat Treating Steel—Lower Temperature Applications

THE feature of the fall meeting of the American Electrochemical Society was a symposium on electric industrial heating. It was the society's forty-third convention which was held in Montreal, Canada, Sept. 21 to 23, at the Hotel Windsor. This is the first time that an American technical society has devoted the major part of its program to this subject.

Symposium on Industrial Heating

Two sessions out of four were entirely taken up with papers dealing with the principles which rule and the equipment which is necessary in the comparatively new but rapidly growing development of the use of electricity for industrial heating. The papers dealt largely with electric furnaces used in the ferrous and non-ferrous industry but more particularly in the field of low temperature work rather than in that of high temperatures. The symposium was managed by the electrothermic division, of which Bradley Stoughton is chairman.

At the two sessions comprising the symposium, 13 papers were presented. Of these, two dealt with new non-ferrous melting furnaces, one with electric steam generation furnaces, and two with electric heating as applied to the enameling and ceramic industries. The other eight papers covered largely the application of electric heating to heat-treatment and other phases of the metal industry, particularly furnace design.

Generation and Application of Electric Heat

The symposium was introduced at the session on Thursday afternoon by a paper by E. F. Collins, engineer General Electric Co., Schenectady, N. Y., entitled "Electric Heat, Its Generation, Propagation and Application to Industrial Processes." Asserting that heat generated electrically is not essentially different from that generated by combustion or application, the author classified the methods generally employed for the conversion of electric energy for industrial heating as follows:

1. By the passage of current through a solid, laminated or granular conducting medium or resistor.
2. By the flow of current through a liquid or fluid conductor.
3. By the flow of current through gas or air.

In the first case, the conducting medium may consist of material that is to be treated, or the heat developed in the resistor may be transferred by conduction, convection or radiation or by all three; and in the second case, electrolytic or non-electrolytic conditions may prevail, while in the third the most familiar example is arc furnaces, in which electric arcs play between two or more electrodes nearer the material to be heated or between one or more carbon electrodes and the material to be heated, as in electric steel melting furnaces.

The author then divides into 20 classes the industrial processes to which electric heat may be applied, from warmers and heaters up to steel melting and refining furnaces, as well as special furnaces, the latter applying to special high temperature furnaces. The paper from this point on is a discussion of the principles and laws which govern various branches of this subject, illustrated by tables and charts.

In closing the author has a word to say about the over-all cost of electric heating:

Cost of Electric Heating

I recently reviewed a table made up to show the cost of the electric heat treatment involved in terms of factory cost of the part. The entire cost of heat treating electrically averaged to be about 0.86 per cent of the total factory cost with electric power at 1c. per kw-hr. as against 0.29 per cent for oil at 3c. per gal. or a difference of [illegible] per cent, which is about 6-1000 over oil heating.

Whether that advantage comes from increased quality, increased production, decreased floor space, better working conditions, ability to duplicate results, temperature control, uniformity of product, decrease in rejects, decrease in labor or some other element entering into the total cost of production, matters not. Fortunately for electric heating, when these conditions are all taken at their increased value due to the electric process, the balance is in increasing numbers found to be on the side of the electric heat.

In the discussion of this paper F. J. Ryan, president F. J. Ryan & Co., Philadelphia, stated that agreement is general that too little attention has been paid, in the application of electricity to industrial heating, to the demands of consumers. What the consumer needs is now the chief question. "Our company is to-day receiving specifications from consumers for new equipment and it is no longer as necessary as it was to seek to interest the consumer. Manufacturers of electric equipment must now face this new condition. The time has passed when too much attention should be given to fundamentals which are now well established and, although much of the credit of the development of the industry is due to the consumer, particularly as to bearing the expense, it is now necessary to study each case in all its details."

Dwight D. Miller, industrial heating engineer Union Gas & Electric Co., Cincinnati, argued that electric heat accomplishes the same result in less time and turns out a larger quantity of material of better quality than fuel furnaces as a rule, or, in other words, that laboratory accuracy is obtained on a tonnage basis. He insisted that most users of heat-treating equipment do not know their actual cost.

At the close of the discussion, Mr. Collins insisted that electric heat should not be applied unless suited to the conditions and advocated a careful study of the application to which it is to be put before adopting it.

High Temperature Furnace Design

"The Principles of High Temperature Furnace Design" were discussed by E. L. Smalley, manager Electric Heating Apparatus Co., Newark, N. J. In his absence, Wirt S. Scott, of the Westinghouse Electric & Mfg. Co., presented an abstract, part of which is as follows:

The best electric furnaces, judged from the view points of highest quality of products, lowest cost of operation and maintenance, and greatest safety in operation at high temperatures, must have these attributes: Muffled type where best suited to the process. Exposed element or radiant form only when best adapted to a process. Must have elements of sufficient number of cheap renewal. Elements must be readily and easily renewable. Coils must be fully supported, and yet free for expansion. Refractory parts must be thoroughly supported, but free for expansion. No internal connections of coils should be tolerated. Terminal sizes should be larger than the element size. Source of heat must be uniformly distributed. Size of furnace must be governed by the charge. Placement of elements should not control the furnace size. Thermal efficiency should be a controlling feature in decision. Transverse section of heating elements should be round. Exposed elements should preferably be in corrugated grooves. Elements should not be chosen to suit a voltage. Total weight of heating element should be high in proportion to the weight of the charge. Efficiency of heat insulation must be adapted to the work to be performed. All of these characteristics, when properly combined with one another, will make the furnace most successful.

In commenting on the paper, Mr. Scott stated that

in the muffle type, a uniform temperature is more readily obtained than in the fuel combustion furnace and he also advocated the necessity of heating the four sides of a car bottom type of heat treatment furnace.

Alloys Used as Electric Resistors

A paper of considerable interest to the heat treatment phase of the industry was presented under the title of "Some Electrical Properties of Alloys at High Temperatures" by M. A. Hunter and A. Jones, both of the Rensselaer Polytechnic Institute, but the former also director of research for the Driver-Harris Co., Harrison, N. J. The paper deals largely with the alloys suitable for resistance materials in furnaces where electrical energy is converted into heat energy. The authors state that on the subjects of metals and alloys a considerable amount of information on their specific resistance and also as to their temperature co-efficients between room temperature and 100 deg. C. is available but that over higher ranges of temperature data are meager or entirely lacking. The author's paper is an attempt to clarify the situation and to give the results of determinations of the specific resistances of a number of metals and alloys now in commercial use over a range of temperature from room temperature to 1000 deg. C.

The materials used in the heating elements of commercial units may be divided into two classes, according to the authors. The first class comprises those which require materials with high specific resistance at the operating temperature. The second class includes those materials which, in addition to having a high specific resistance unit, must also withstand oxidation. The first class of materials can be operated successfully at temperatures not exceeding 500 deg. C. The second class may be used with more or less satisfaction up to 1100 deg. C. In the first class the various grades of nickel have been investigated, together with two alloys of copper and nickel—Monel and Advance—and two alloys of iron and nickel—alloy No. 141 and alloy No. 193. In the second class the various grades of nichrome have been considered.

It is claimed possible from the data contained in the paper to calculate the specific resistance of any material in either class at any operating temperature.

During the brief discussion of this paper, Dr. Colin G. Fink raised the question as to whether there would not be less oxidation if higher chromium alloys were used, in response to which Mr. Hunter, who presented the paper, said that this could not be made when the chromium was in excess of 25 per cent of the nickel contained. He also stated that wire usually breaks down due to segregation in the original metal more often than due to oxidation.

E. F. Collins testified that from practical experiments with many of these alloys he had found that, as between round wires and flat ribbons, preference should be given to the latter because they last longer.

Granular Resistor Carbons

A paper entitled "Resistivities of Some Granular Resistor Carbons," by Clyde E. Williams, metallurgist U. S. Bureau of Mines, Seattle, Wash., and Gordon R. Shuck, professor electrical engineering, University of Washington, also at Seattle, was presented in the absence of the authors by F. A. J. Fitz Gerald, Fitz Gerald Laboratories, Inc., Niagara Falls, N. Y. The paper is based upon experimental work being conducted at the Northwest Experiment Station of the Bureau of Mines, in co-operation with the University of Washington at Seattle, during which it was necessary to determine the electrical resistivities of a number of granular carbon resistor materials which are used in the heating elements of some types of electric furnaces. Disclosing the important requirements of a satisfactory resistor material, the authors outline these as:

1. [illegible]
2. A low ash content to obviate too frequent renewing of heating element.
3. [illegible]
4. Sufficient [illegible] to withstand mech[illegible]

Two common resistors are granular resistor carbon and granular resistor graphite, both made from petroleum coke. The paper contains a description of the furnace which was used and also several charts showing the resistance in ohms per cubic inch of the various materials investigated. A summary of the paper follows:

The resistivities of several different types of carbon have been measured. It is not suggested that these materials be used for resistors, their characteristics being described so that their limitations may be seen. The information should be of value for purposes other than the design and operation of resistance furnaces. For example, in the operation of electric smelting furnaces it is of value to know the electrical resistances of the various reducing agents that may be used, and in the operation of melting furnaces the resistivity of the carburizer should be known.

The difference in resistivities of various types and sizes of carbon resistors is not very large at 1000 deg. C. to 1200 deg. C.

The temperature co-efficient of resistivity is negative for all the forms of carbon tested up to 1000 or 1200 deg. C., at which temperature it approaches zero and then becomes positive as the temperature increases further. This change was more pronounced in graphite than in the other forms of carbon. The resistivity increases as the size of the particle decreases.

High resistivities are caused by the presence of volatile matter in the resistor material, the resistivity and volatile matter bearing a direct relation for the same material.

Ash contained within the particle of carbon increases the contact resistivity and the thermal co-efficient somewhat, but the effect is not nearly so large as is that of contained volatile matter. Extraneous ash or foreign matter of high resistivity increases the resistivity and the thermal co-efficient to a very marked extent.

A paper by Wirt S. Scott, manager industrial heating section, Westinghouse Electric & Mfg. Co., Mansfield, Ohio, which was not available in printed form, was presented in brief abstract by the author.

Heat Treating Steel Economically

At the second session of the symposium on electric industrial heating, one of the most interesting papers which was presented was entitled "Methods of Economically Handling Materials in Electric Furnaces," by Frank W. Brooke, engineer Swindell & Co., Pittsburgh. This paper was not available in printed or in manuscript form, but was delivered by the author and illustrated with lantern slides. He discussed several types of electric heat treatment furnaces at present in use in the American steel industry and showed that many of these were improvements over previous designs so that they now operate more economically than formerly.

In the heat treatment of steel castings, present practice in many plants involves the removal of the castings from the annealing furnaces after they have attained the proper temperature so that they can cool in the air. This involves the loss of a large amount of heat. To take advantage of some of this lost heat, Mr. Brooke described certain recuperative furnaces which involved the use of so-called dummy furnaces. Beside the regular furnace in which the castings are brought to a heat, there are two additional chambers of similar design built separate from the heating furnace but intercommunicated. Into one of these is brought the cold castings on a car and into the other chamber of this there is placed the car of hot castings as soon as it is removed from the heating furnace. In this way a cycle of operations is maintained so that while one car of castings is being brought to a heat, the car just removed from the furnace is communicating its heat, during the cooling period, to the other car of cold castings before it is pushed into the main heating furnace.

Another interesting type of furnace for the heat treatment of steel described by the author is the counter-flow type of furnace. This furnace really consists of two parallel compartments of seven zones each, through which cars are operated on tracks. The middle zone of each compartment is the furnace where the steel is brought to the proper temperature. The cars of material pass out of the heated furnace during the process of cooling them and are transferred through the other zones, at the same time passing cold material

moving in the opposite direction which absorbs heat from the hot cars as they are cooling off. In this way, the furnace is reciprocative on both sides.

Discussing continuous furnaces, Mr. Brooke stated that few of these are economical and are limited to the temperature which can be reached, as well as to the heat losses from one end to the other. In such furnaces where chains transfer the material mechanically through the furnace, the temperature which the chain can stand is a limiting factor. He also mentioned the doughnut continuous furnace, which is really a continuous chain, working in a circle, the steel being brought out near the spot where it is first put in. This type of furnace is quite generally used in the motor car industry on small parts. For continuous furnaces, Mr. Brooke advocated the pushing type as one of the best. There are some of these where the steel, after it has reached its proper temperature, falls into a quenching medium through a liquid seal; they are extensively used on connecting rods and on uniform cylinders in the motor industry. He considered this a coming type for economically heat treating materials.

Mr. Brooke also mentioned the walking beam type of heat-treating furnace as a fascinating one, but having certain disadvantages in that the material is often likely to form a bridge as it passes through the furnace. He mentioned particularly a type of furnace for the heat treatment of certain shapes of steel which employs a walking beam, having a saw tooth arrangement, which lifts the material from one tooth to another set of teeth, which are stationary, thus transferring the material from the furnace easily and regularly, resulting in what he considered uniform treatment but limited in certain ways to special materials. Another furnace mentioned by the author was one in which balls for ball bearings are treated, the material passing through special grooves and the whole furnace rotated. This, however, is more especially used in fuel-fired furnaces than in electric. This paper will be available in printed form later.

Heat Insulating Materials

The subject of heat insulating materials for electric heating apparatus was discussed in a paper of that title by J. C. Woodson. This paper also was not in printed form, but was abstracted by the author from his manuscript. Insulating materials, according to Mr. Woodson, are divided into five grades. The first two embrace temperatures up to 350 deg. Fahr.; the third from 350 to 600 deg. Fahr., particularly in the japanning industry; and the last two from 600 to 1000 deg. and from 1000 to 2000 deg. Fahr., both embraced in the heat-treating industry. In the last two groups the author stated that there were only three or four reliable insulating mediums, among which could be mentioned diatomaceous earths, silicates and other earths. In this field he claimed that chemists could do much efficient work.

In the discussion of this paper Dr. Carl Hering, consulting electrical engineer, Philadelphia, pronounced the subject full of interest and emphasized the fact that surface losses on the outside of heating equipment should be more fully considered and mentioned white wash as a better insulating medium for outside purposes than some of the more expensive. He also referred to some experiments of the General Electric Co. some years ago in the use of wool and similar materials as insulators, which showed that if these were compressed to a certain extent the insulation increased, but if compressed too far their efficiency in this respect was diminished.

The efficiency of air spaces as insulators was spoken of by Henry Howard, Grasselli Chemical Co., Cleveland, as being of little value at high temperatures but of some advantage in low temperature work. Dr. Alfred Stansfield called attention to the fact that the life of refractories in high temperature furnaces, as in steel-melting equipment, must be considered in the choice of insulators, and Mr. Brooke cited a case where a 4½-in. covering of silocel in a certain equipment caused disastrous results because of too much insulation.

The author in commenting on the discussion stated that in electric heating equipment, having for an outside surface black iron or galvanized sheets, the latter were 50 per cent better in efficiency and also that in cases where the density of the insulating material had to be considered, the insulating was better at certain densities than at others. In high temperature insulation the author stated that, in cases not above 2000 deg. Fahr., it was more a question of mechanical problems than otherwise.

Electric Heat Treating of Malleable Iron

The subject of the heat treatment of malleable iron electrically was covered by a paper by C. B. Gibson, Westinghouse Electric & Mfg. Co., Pittsburgh, entitled "Electric Annealing of Malleable Iron." This paper also was not in printed form, but was very briefly abstracted by the author from manuscript. Mr. Gibson stated that the electrical phase of this subject had not been carried very far and that very few electric furnaces were in operation on a commercial scale. It was his opinion, however, that on a B.t.u. basis fuel-fired furnaces had the better of the argument, but in electric furnaces he believed that the heat could be more effectively utilized. He stated that the American Malleable Castings Association was at present conducting extensive tests on the annealing of this iron by electricity. In the discussion E. O. Wilson raised the question as to whether a deposit of carbon on the resistor ribbon did not result when electric annealing of malleable iron was carried on without packing, but it was the opinion of the author that it had not been demonstrated that annealing could be carried on without packing.

Electric Steam Generators

The subject of the production of steam by electric generators was brought before the convention by a paper, "Electric Steam Generators and Their Application," by P. S. Gregory, Shawinigan Water & Power Co., Montreal, Canada. According to the author, the production of steam by means of electric energy is not a new process. The water resistance type of electric steam generator has been in use in Europe for about 15 years, though principally only in small sizes of 1000 kw. or less. In general, the cost of an electric energy is such that it cannot be used commercially for the production of steam, but there are certain circumstances under which, even on a large scale, this becomes economically feasible. The required conditions for such application are a surplus amount of electric power for which there is no other use at certain times or a cheap supply of power.

In conclusion, the author stated that the water resistance type of electric steam generator has now been developed to such a point that there is on the market to-day an apparatus suitable for the conversion of surplus electric energy into steam on almost any given condition. Furthermore, in cases where power is cheap and where fuel is expensive or in special industrial processes, the electric steam generator can economically replace the coal-fired boiler.

Alternating current is employed in these generators, and the question of the extent of electrolysis was brought up, to which P. H. Falter, general manager Canadian Electro Products Co., Montreal, replied that not much is known as to the amount of electrolysis and that electrodes wear out in proportion to the input of energy. He stated, however, that where current of 60 cycles is used there is less corrosion than when current of 25 cycles is employed.

New Melting Furnaces

The program at this session included two papers on electric melting furnaces, one entitled "A New Induction Furnace" by J. Murray Weed, power and mining engineering department, General Electric Co., Schenectady, N. Y., and another entitled "A Simple Electric Crucible Furnace for Melting Aluminum" by A. Glynne Lobley, director of electrochemical laboratories, Victoria University of Manchester, England.

The new induction furnace was described in THE

IRON AGE, Aug. 3, 1922. Dr. Hering introduced a discussion of this paper by stating that he was glad that this furnace was another example of the advantage derived from electromagnetic forces which work efficiently in the cleansing of molten metals in that they bring the impurities to the top. He stated that there were at least 100 furnaces similar to this in use, but that he could not agree with the author's explanation of the working of the furnace, which he regarded as too involved. John A. Seede, electric engineer General Electric Co., called attention to the uniflow principle of this furnace and also to the fact that it could successfully melt copper, aluminum, etc. The paper on an aluminum melting furnace describes a case in which electricity was applied for the melting and keeping molten of aluminum for die-casting small objects.

Electrolytic Iron

Two papers of general interest to the steel industry were among those presented at the first session Thursday morning, Sept. 21. The first of these was entitled "Effect of Heat Treatment on the Hardness and Microstructure of Electrolytically Deposited Iron" by Norman B. Pilling, metallurgist research laboratory, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. It has been found commercially practicable to deposit iron electrolytically on castings which have either been worn or which have turned out to be imperfect when cast, and this paper amplifies this subject, which was first introduced by a similar paper at the June convention of the American Society for Testing Materials. According to this practice, both in Great Britain and in the United States, this method has afforded a means of salvaging valuable machine parts in which certain critical dimensions were undersize. After an electric deposition of a layer of iron it has been possible to machine the parts back to the size desired.

The deposited iron has certain unusual physical characteristics and Mr. Pillings' paper discusses some of these and the method of overcoming their objectionable features. The results may be summarized in part as follows: By annealing to 300 to 400 deg. C., the initial hardness may be considerably increased and with the present material the scleroscope hardness was increased from 26 to 45, the latter equivalent to the hardness of an annealed high carbon steel containing 1.20 per cent carbon. The brittleness of the material as deposited may be removed by annealing at 300 to 400 deg. C. For complete and rapid softening, annealing at a relatively high temperature, 800 to 900 deg. C., is necessary.

The other paper in the electrolytic iron field described the "Preparation and the Mechanical Properties of Vacuum-Fused Alloys of Electrolytic Iron with Carbon and Manganese," whose compositions were so chosen as to bring out the specific effects on pure iron of additions of manganese of carbon, and of carbon and manganese together in varying relative proportions. The maximum content each of carbon and manganese in each series is about 1.5 per cent; the minimum, zero per cent, or pure iron. The data are tabulated in the paper in the order of increasing carbon for comparison and interpretation of results. The effects of carbon are shown by grouping the specimens according to manganese contents and plotting curves for each group, with values from tests for ordinates and carbon contents for abscissas. The effects of manganese are shown in a similar manner by regrouping the specimens according to carbon contents.

Electricity in Enameling Automobile Parts

There were two interesting papers on the application of electric heat to the enameling and ceramic industries. The first was by Wirt S. Scott, entitled the "Development of Industrial Electric Heating for Low Temperature Enameling." The paper is largely historical and relates various steps in the experience of the company toward perfecting apparatus, particularly in the automobile industry. In response to a question, the author stated that at least 90 per cent of low temperature enameling is now done by electric heat.

"Firing of Ceramics in Electric Furnaces" was the title of a paper in this field by E. L. Smalley. The author discusses in this paper properly designed furnaces and makes certain claims concerning the kind of product which it is possible to produce in these furnaces.

Dezincification of Brass

An interesting paper in the non-ferrous field was one entitled "The Dezincification of Brass," by Ralph B. Abrams, senior in chemical engineering, University of Wisconsin. The paper covers experiments, the results of which indicate that the maximum of dezincification appears to be: First, the dissolving of the brass as a whole; the redeposition of the copper in solution so as to replace brass as a unit, this redeposition not taking place unless there is some means of holding the dissolved copper in contact with the brass. How this can be done is described in the paper and the details of the experiments are also given.

The Next Conventions

The next meeting of the society will be held in New York in April, the date to be decided upon later. A symposium at this meeting will embrace the manufacture and use of some of the rarer metals as ferroalloys for steel and special alloys. This is to be in charge of F. W. Beeket, Electro Metallurgical Co. of America, New York. Another symposium will cover electrode potentials, in charge of Dr. William G. Hirsch, Massachusetts Institute of Technology, Cambridge, Mass.

At the annual fall meeting in 1923 an attempt is to be made to schedule a symposium on the electrolytic refining of metals and also one on conduction through gases.

The Montreal meeting this year was unusually well attended, total registration exceeding 200, which is equal to the average attendance at most of the conventions. A large majority of those attending made the special trip to Shawinigan Falls, Canada, on Saturday, where the electrochemical industries and the hydroelectric plant were visited. The regular session of "Section Q," which constitutes the smoker, was a successful meeting held on Friday evening before the departure for Shawinigan.

Blast Furnace Operations

The 500-ton merchant stack at Struthers, Mahoning County, operated by the Struthers Furnace Co., New York, formerly of Cleveland, will be blown in Oct. 2, following idleness since Jan. 20, 1921. Arrangements have been made for beehive coke, to be secured from the Connellsville region. The furnace, a producer of foundry and special irons, will go in on foundry grades. It employs 150 men.

Mattie blast furnace at Girard, Ohio, operated by the A. M. Byers Co., Pittsburgh, resumed Sept. 22, after being idle several months on account of interruption to fuel supply. Output is consumed in the puddle furnaces of the company's Girard property.

Of the 47 stacks in the Mahoning and Shenango Valleys, 24 are now pouring, 20 in the Mahoning Valley. This compares with a high of 26 in June in both Valleys. District iron capacity is operating at fully 65 per cent.

A St. Louis Blast Furnace Record

From Sept. 1 to 15, inclusive, the blast furnace of the St. Louis Coke & Chemical Co., Granite City, Ill., produced an average of 505 tons of foundry iron, daily, running from 1.75 to 2.75 per cent in silicon, on an average consumption of 1719 lb. of coke per ton of pig iron, the average ash of the coke being 13.38 per cent. In August the furnace averaged 485 tons of iron per day on 1852 lb. of coke per ton of pig. The coke ovens were using 100 per cent West Kentucky high volatile coal at that time. Since the settlement of the strike, the company's Illinois coal supply has been coming in with the result that the furnace has been running on Illinois coke during September.

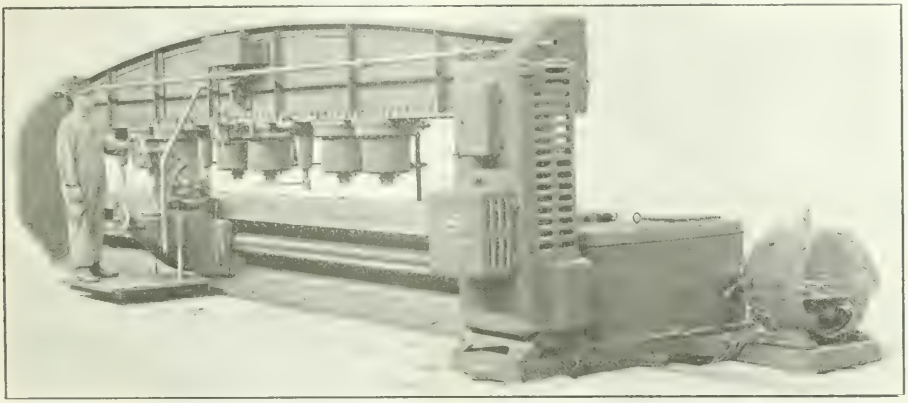
New Design Plate Planer

The accompanying photograph illustrates the new design of the Niles-Bement-Pond plate planers. The bed and the carriage are designed to prevent chips from getting on the bearing surface of the carriage and screw. The tool carriage is attached to the front vertical side of the bed. It is secured top and bottom by removable bearing supports, which will permit the carriage to be taken from the bed at any part of its length. The bearing surfaces are provided with taper gibs for taking up wear.

Two relieving tool holder slides are mounted on a standard and have simultaneous vertical adjustment by means of a screw and hand wheel, and horizontal adjustment to the standard through screw and hand wheel. Both tool slides are provided with swiveling feature to allow the planing of bevels. The drive screw is supported in a trough with an oil channel of sufficient depth to cover the full depth of the thread with oil. Roller bearings are provided to take the end thrust of the screw. The carriage is reversed automatically at any desired position by contact with stops adjustable on the shifter rod. The operator can start, stop, or reverse the carriage by manipulating this shifter rod by hand. This can be done with very little effort on the part of the operator.

The pneumatic jacks are of the two-way type, that is, air is admitted in the top for clamping the plate, and the air is admitted at the bottom for unclamping.

The main driving gears are enclosed in a box, and dip in oil. The motor is controlled by a master switch attached to the shifter rod, and an enclosed panel with forward, reverse, accelerating, and dynamic brake contactor. A push button is mounted on the right hand housing, so that the machine may be started and stopped without manipulating the shifter rod. The cutting speeds range from 20 to 40 ft. per min.



Bed and Carriage of Plate Planer Are Designed to Prevent Chips from Getting on Bearing Surfaces or Screw

Wrought Iron from an Old Chicago Bridge

A wrought iron bridge was built over the Chicago River in Chicago in 1884, known as the Rush Street drawbridge. It was recently dismantled and an examination of the character of the metal was made by C. A. Akerlind, machinery inspector, who made his report to Thomas G. Pihlfeldt, engineer of bridges for the city of Chicago. The *Engineering News-Record* gives an account of some of the results of this examination which are in part as follows:

Tensile tests on two samples from the web of a 10-in. channel gave the following results, the lower elongation in the second piece being due apparently to a crystalline spot.

Elastic limit, lb. per sq. in.....	33,050	34,180
Ult. tensile strength, lb. per sq. in.	49,950	49,300
Elongation in 8 in. (%).....	22	15

Etching tests were made on specimens cut from truss rods and eyebars, and the report on these is as follows:

The 1⅝-in. truss-rod specimens are particularly interesting as they show clearly that the bar is built up of muck bars and therefore is real new wrought iron. The 1⅞-in. specimen makes a rather prettier showing, but the bloom from which this bar was rolled was made up of scrap iron.

The 5 x 1-in. eyebar specimen shows the bar to have been rolled from a pile of muck bars, all new wrought iron. A small specimen cut from one of the broken test pieces of the channel iron indicates clearly that that channel was rolled from a bloom made up of scrap iron. This particular piece offered greater resistance to the acid than any of the others, indicating that some of the scrap used has consisted of "refined" or even "double refined" wrought iron. The 5 x 1-in. specimen indicates clearly the different qualities in the material to resist corrosion.

Cost of Living Stationary

Monthly figures of the Bureau of Labor Statistics show the wholesale prices of all commodities during August, as in July, to be 55 per cent above the average for 1913, compared with 50 per cent in June. Six of the nine individual groups showed a rise in August compared with July. Farm products and foods showed slight decreases.

Metals and metal products, which now stand at 26 per cent above the 1913 average, are far lower than the average group. The highest item on the list is now fuel and lighting.

Our table shows the figures for the two most recent months and for August, 1921, and the peak in 1920. It shows also the present status of net liquidation from the 1920 peak prices, of the excess of the peak prices over the average of 1913. Despite recent sharp advances, metals still stand liquidated to a greater extent than any other specific group except chemicals and farm products:

Index Numbers of Wholesale Prices, by Groups of Commodities

(1913 equals 100)

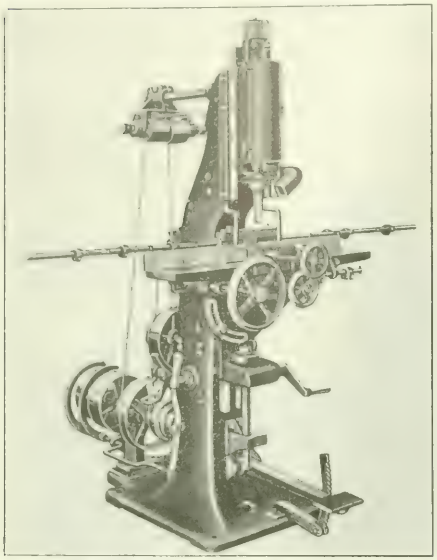
	1920 Peak	1921 Aug.	1922 July	1922 Aug.	Liquidation, Per Cent
Farm products	247	123	135	131	79.9
Food, etc.	248	146	142	138	74.3
Cloths and clothing..	346	171	180	181	67.1
Fuel and lighting....	281	184	254	271	5.5
Metals and metal products	203	117	121	126	74.8
Building materials...	300	156	170	172	64.0
Chemicals and drugs	213	129	121	122	80.5
House-furnishings goods	275	179	173	173	58.3
Miscellaneous	208	119	114	115	86.1
All commodities	247	142	155	155	62.6

The annual sales convention of the Kerr Turbine Co., manufacturer of steam turbines and gears, was held at the plant, Wellsville, N. Y., on Sept. 11, 12 and 13. General renewed activity in business was reported from all sections.

Power Feed Hollow Chisel Mortiser

New in a line of machines suitable for the pattern shop, the Oliver Machinery Co., Grand Rapids, Mich., has brought out the Oliver No. 92 hollow chisel mortiser. It will handle chisels from ¼ in. to ¾ in. square. The stroke is adjustable from 2½ in. to 4 in.

The power feed mechanism is actuated by a foot lever and is brought into action by a belt tightener. This, when released, brings a brake into action on the rim of the driving pulley. A ratchet is provided to hold



The Power Feed Hollow Chisel Mortiser of the Oliver Machinery Co. Is Designed to Handle Chisels of ¼ In. to ¾ In. Square with Stroke Adjustable from 2½ to 4 In.

the lever down for continuous feeding. The throwing out of the ratchet for the continuous feed mechanism may be done in an instant and the machine then operated by single strokes. The power feed has three rates, 18, 26 and 36 strokes per minute by means of cone pulleys and a feed belt shifter.

A universal table with screw clamp for 6-in. width stock and a hand wheel rack and pinion for longitudinal travel are furnished. The table is 36 in. long, 6 in. wide and 32 in. above the floor at the lowest position and 44 in. above the floor at the highest position. It is fitted with a vertically adjustable back fence, indicated in the illustration, which has a lip hold-down and also carries a 6-ft. layout stop rod with six spring stops for automatically locating mortises on the pieces. Two swinging hold-down fingers are held in the column of the machine, projecting over the table to prevent the work from rising when the chisel recedes.

Lathe for Turning Commutators in Place

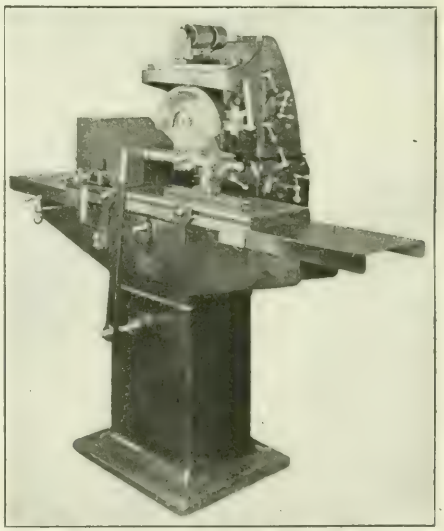
A portable commutator lathe for attachment to the motor or dynamo needing attention has been put on the market by George Bender, 122 Centre Street, New York. As ordinarily used, the device is clamped to the frame of the motor or generator with additional stays or supports to the bearing and other parts of the motor, and it is designed to take commutators of 2 to 12 in. face. It has an adjustable arrangement to take out end play of the rotating part of the motor. The lathe has six different set-ups. The slide rest is back geared in the ratio of three to one, so that a fine cut may be taken on the commutator.

As at present made, the lathe is available for caring for motors or dynamos of 5 to 200 hp., either direct current, or for alternating currents, slip ring turning. It is stated that a 30-hp. elevator traction motor was recently turned in position in three hours, whereas it might have take nine and a half days to take the armature out of the motor and do the turning and replace the armature. It is found usually desirable to slow down the speed of the machine, by means of resistance, to 300 ft. per min. and thus eliminate the danger of short circuiting the commutator.

Semi-Automatic Machine for Sharpening Hobs and Form Cutters

A machine for sharpening hobs and form cutters has been added to its line of special grinding machinery by the Harris Engineering Co., Bridgeport, Conn. It is designed to permit ready adjustment of the grinding face of the wheel so that hobs may be either ground radially or under-cut to give the necessary hook or top-rake; it is designed to take care of hobs with straight or helical flutes, to index hobs correctly as to the number of flutes, and in general it is designed to allow for adjustments that may be readily accessible so far as the operator is concerned so that accurate results may be obtained. As described by the Harris company, there are seven specific requirements in a machine for the work described and all of these are fulfilled by the Harris development. In a word, the machine is the answer to a call for a grinding machine to meet conditions where the amount and variety of work does not warrant the use of a full automatic grinding machine.

The hob or cutter to be sharpened is carried on an arbor with a taper shank fitting into the work carrying spindle. The outboard end of the work is supported by a center in an adjustable tailstock. Ball roller bearing mountings of the table are calculated to be so sensitive that the operator can tell from the feeling whether the grinding is too fast or too heavy. Hobs having helical flutes are rotated during the travel of the table by a sine bar which is adjustable to different



Harris Semi-Automatic Hob and Form Cutter Grinding Machine for Conditions Where the Character and Number of Jobs Does Not Warrant a Full Automatic Machine

angles. The index plates interchange with those on the full automatic hob grinding machine.

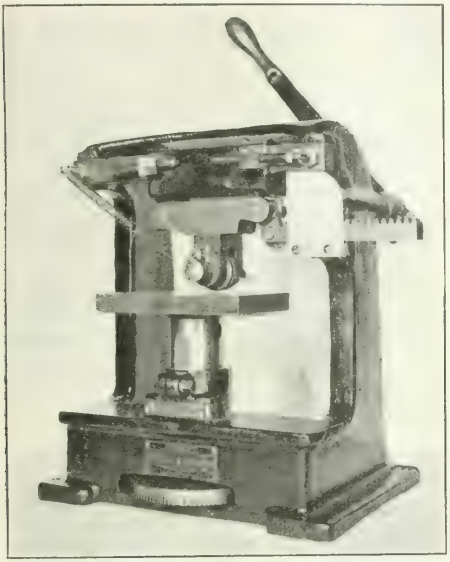
The machine is designed to take care of work of a maximum diameter of 8 in., and a length of 10 to 12 in., and of 4 to 26 flutes. It occupies a floor space of 50 x 90 in., and weighs 1760 lb.

The Morris Tool Co., Inc., manufacturer of tools and tool holders, mentioned in the Sept. 7 issue of THE IRON AGE, is located at 808 Lincoln Place, Brooklyn, N. Y., instead of the address there given.

Bench Type Marking Machine

To meet the demand for a marking machine capable of marking four lines of 1/16 in. lettering on round or flat articles up to 2 in. in diameter, the No. 13 bench type marking machine illustrated has been designed by the Noble & Westbrook Mfg. Co., Hartford, Conn., maker of marking and graduating machines and engaged also in steel die engraving.

The marking is done by means of steel marking die. On flat articles the die rolls over the article and on round articles both the die and the article roll together. The machine, which has a maximum distance



Machine Designed to Mark Four Lines of 1/16-In. Lettering on Round or Flat Articles

of mark of 2 in., is similar to the Noble & Westbrook marking machine, except that the pressure is applied from the top by a cam movement worked through a rack and pinion and not through the table as in the larger models of marking machines. The slide is fitted with roller bearing and the table can be raised by a hand wheel by the thousandths of an inch and locked in the proper position.

It is stated that small drills, reamers, knives, chisels or similar parts can be marked at the rate of about 700 an hour. The machine occupies a bench space of 10 x 12 in., and weighs 60 lb. It is furnished with one die holder of suitable design for either flat or round parts as desired.

Increasing Activity at Springfield, Ohio, Plants

SPRINGFIELD, OHIO, Sept. 26.—Forces at the Springfield manufacturing plants are being steadily increased. Manufacturers believe that the settlement of the rail and coal strikes will be followed by a marked improvement in business within the next few months.

More than 200 have been added to the force at the plant of the Robbins & Myers Co. during the past ten days. Within the next two weeks, it is expected that the force will be greatly enlarged.

Fifty men have been added to the force at the plant of the Ohio Steel Foundry Co. during the past week. The company is now employing 250 men on the day force and 50 on the night shift. Miscellanenous orders are coming in satisfactorily.

Heavy shipments are being made from the plant of James Leffel & Co.

An average of fifty motor trucks are being turned out each month at the plant of the Kelly-Springfield Motor Truck Co. The production in the last month was reported at 54 trucks. There is an increasing demand for trucks.

Fifty men were added to the sheet metal department at the plant of the International Harvester Co. in this city during the past week. Production is keeping up to schedule and shipments are going forward.

The Steel Products Engineering Co. received a good sized order during the past week for jigs and fixtures for the Studebaker Corporation, South Bend, Ind.

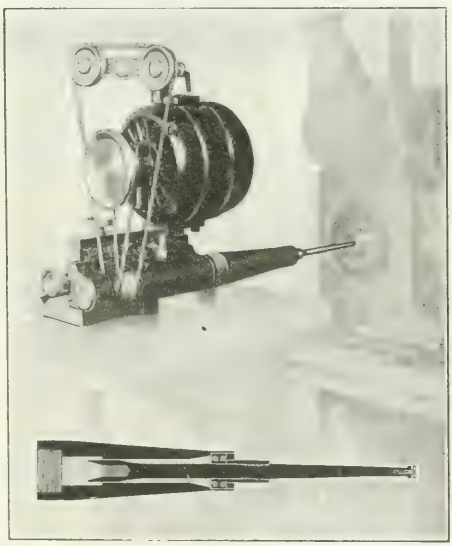
Extension Grinding Spindle Attachment

An attachment for its precision thread grinding machines, designed for internal grinding to a depth of 12 in. on holes of 2 in. or greater diameter, and a depth of 6 in. on holes of ½ in. diameter, has been developed by the Precision & Thread Grinder Mfg. Co., 1 South Twenty-first Street, Philadelphia.

A reproduced photograph shows an application in the grinding of a tapered bore in a milling machine spindle, a matter of importance to secure concentricity of the bore and thus to promote full service and long life of cutters, especially in cases of unhardened milling machine spindles.

Another application that is possible is that in which the grinding outfit with its extension spindle may be attached to the carriage of a lathe and thus employed to do grinding on a piece attached to the chuck, but having projecting obstructions which would otherwise render such grinding practically impossible. In a similar way lathe spindle tapered bores, which require truing occasionally to correct errors in concentricity and alinement, may be treated without the necessity of truing center each time a lathe is used on accurate work.

The extension housing is screwed to the projection



In Grinding the Tapered Bore in a Milling Machine Spindle the Grinding Machine Is Mounted on the Table as Indicated. Inserted sketch shows the means for securing rigidity of the extension grinder by means of a radial and thrust end ball bearing in the extension housing

threads in front of the regular spindle cap. This makes for accurate and speedy attachment. The extension spindle itself couples on the regular spindle by the tapered fitting joints, but is supported at the working end by a radial and end thrust ball bearing at the extreme outer end of the extension housing. The arrangement through the length of the spindle support aims at securing rigidity at the grinding end of the spindle.

Safety Wheel Dresser for Vertical Surface Grinder

A new style wheel dresser brought out by the Pratt & Whitney Co. for use on vertical surface grinding machines is shown in the accompanying illustration. It aims to give all the advantages of hand dressing without danger of injury to the operator. It consists of a bracket bolted or riveted to the wheel guard which supports the stem of the dresser. The dressing wheels are held in one end of the device, the bar being bent to fit under the wheel. The other end forms a handle so that the attachment can be easily moved into position. No change in the work and wheel relation is necessary and the device is quick acting and found to be efficient. It may be applied to grinding machines now in use and is furnished as regular equipment on new Pratt & Whitney machines.



The Grinding Wheel Dresser Is Carried by a Bracket and by Means of the Handle May Be Moved Readily into Position

Nitrol, New Case-Hardening Compound

A new case-hardening medium has recently been put upon the market by the American Kreuger & Toll Corporation, 522 Fifth Avenue, New York, under the name of Nitrol. The new compound is described as a nitrogenous powder, grayish to black in color. It is sold in two grades: Grade A, for surface hardening, and Grade E, for pack hardening purposes. The first grade is declared to be free from poisonous and obnoxious fumes; not to attack the pots and hence shorten their life; to effect an economy in fuel due to lower temperature than usual sufficing, and to leave a clean surface on the case-hardened material. Concerning the other grade, some of the advantages claimed are: Less fuel consumption; longer life of equipment; freedom from scaling and warpage; elimination of double heat treating and also the grain size of the core unaffected.

Calcium Silicide as a Deoxidizer

The use of calcium silicide as a deoxidizer of liquid steel is expanding in Great Britain, according to the London *Iron and Coal Trades Review*. This is due to the powerful deoxidizing characteristics of calcium, and will, under conditions where silicon alone is not sufficiently powerful, usually completely deoxidize the metal. Calcium metal has a powerful affinity for oxygen, and while the oxide, as well as silicon oxide, melts only at extremely high temperatures, mixtures of the two form silicate slags which melt at temperatures existing in the steel furnace. Such slags are insoluble in the metal, rise to the surface, and are easily incorporated in the normal slag, which is of the same nature.

The use of calcium as a deoxidizer under normal conditions should be quite safe, as any excess calcium left in the steel after the reaction is completed will be rapidly oxidized from external sources of oxygen in the surrounding air or volatilized, consequently there is little risk of leaving any trace of calcium in the steel.

Simple Device for Determining Critical Point in Steel

A new instrument for determining the critical point for steel, known as the Nilson Kritiskope, has been put upon the market by Herman H. Sticht & Co., 15 Park Row, New York. It is a light, self-contained, sensitive instrument and claimed to be entirely reliable in locating the definite critical point of any steel. The illustration shows the method of using this instrument in connection with a piece of steel being heated in a furnace. When the steel has nearly reached a cherry red, the door is opened partly and the Kritiskope inserted, so that the magneto-sensitive end first touches the material, and is then withdrawn a trifle. If the steel is still magnetic, the indicator is seen to remain in contact with the steel; the operation may be repeated from time to time as the temperature rises until the steel no longer attracts the indicator.

An important and special feature of this instrument is claimed to be the unique arrangement which guards it against loss of magnetism. The indicator itself, which comes into direct contact with the heated steel, is not itself magnetized and hence can be heated to a very high degree without injury. This indicator receives its magnetization solely by induction from a high grade permanent magnet located within the instrument itself. This magnet is protected against any undue rise of temperature by the design of the instrument and its thick walls. Since the device is exposed to the heat for a very short period of time only, injury to the permanent magnet is extremely remote. The instrument can be used in the course of hardening a small piece of steel like a tap when only a Bunsen flame is used for heating.



Nilson Kritiskope Determines the Critical Point of Steel by Indicating the Moment When the Steel Ceases to Be Magnetic

Some of the advantages claimed for this instrument are that it indicates by direct reading the condition of the steel; does not require any calibration; is not effected by vibration and is free of any leads or electrical connections.

The Neely Nut & Bolt Co., Pittsburgh, purchased 80 x 130 ft. with old buildings on South Twenty-second Street. The land adjoins the company's plant and will be used for extensions, bids for which now are being taken.

Tariff Commission Now More Important

May Make Broader Investigations and Recommend Rates — Possible Changes in Metal Schedule— Powers of the President

BY L. W. MOFFETT

WASHINGTON, Sept. 26.—Methods of procedure incident to its enlarged powers granted under the Fordney-McCumber act are being worked out by the United States Tariff Commission. Chairman Marvin of the commission said that when the work has been completed, rules and regulations will be made public.

The commission not only is authorized by the new act to make broader investigations than heretofore regarding the costs of production in the United States and in foreign countries, but also is authorized to recommend rates. Undoubtedly one of its greatest activities under the new law will be in connection with investigations made at the direction of the President, under authority given him by the flexible tariff section. This permits the President of his own volition to increase or decrease rates by not more or less than 50 per cent. Chairman Marvin has said that because of the added work conferred upon it, the commission's forces of experts must be tripled in size. The chairman called at the White House last Wednesday and informed President Harding of this fact. He also told the President that increased appropriations will be needed by the commission. Apparently this is one problem which was not given much consideration by Congress during its discussion of the tariff.

The President's Comment

The new tariff law went into effect at midnight, Sept. 21. The President signed the measure in the morning of that day. That the President looks to the flexible tariff provision as a real constructive force in fixing duties is indicated by the statement he made when he signed the tariff. He declared that "if we succeed, as I hope we will succeed, in making effective the elastic provisions of this bill, this will prove the greatest contribution toward progress in tariff making in a century."

Because of the increased powers given to the Tariff Commission, its rank has quite appropriately been compared with that of the Interstate Commerce Commission. The Tariff Commission undoubtedly from now on will be a more vital force in connection with the fixing of tariff rates. It is confidently believed that recommendations it makes based upon its investigations will be given much weight. Under its new powers it will report findings with recommendations regarding rates on the basis of valuation, American or foreign, to the President, when the latter seeks to make changes under the elastic provisions. Manufacturers, importers, or consumers making application for changes in rates, or in the basis of valuation may do so either directly to the President or to the Tariff Commission, but in any event changes will be preceded by an investigation and probably hearings, conducted by the Tariff Commission, to which all applications will be referred.

Cannot Change Free List

Inasmuch as the act prohibits the President from transferring articles on the free list, to the dutiable and vice versa, iron and steel manufacturers, for instance, will be unable to have certain raw products which they use placed on the free list for which they have contended. Among these products are manganese ore, ferromanganese and fluorspar. The President could, however, reduce duties on these products 50 per cent, regardless of whether or not they are fixed on an ad valorem or specific basis, although, as it happens, all of them carry specific duties. The President cannot, however, change rates from a specific to an ad valorem basis or from an ad valorem to a specific basis. This means, therefore, that the lowest possible duty the iron and steel interests could have fixed on manganese ore would be ½c. per lb. on the manganese contents, inasmuch as the duty is 1c. per lb., and the ferromanganese duty could not be reduced more than 50 per cent of the duty of 1⅞c. per lb. or .9375c. per lb. on the ferromanganese content, with more than 1 per cent of carbon, such as is used by the industry.

Comparison of Tariff Rates

	Fordney-McCumber Act	Underwood-Simmons Act	Payne-Aldrich Act
Iron ore	Free	Free	Free
Pig iron	[illegible] ton	Free	$2.50 ton
Scrap	75c. ton	Free	$1 ton
Scrap tin plate	Free		
Spiegeleisen	[illegible] more than 1 per cent carbon and less than 30 per cent Mn.	Free	$2.50 ton
Ferromanganese	1⅞c. per lb. when more than 1 per cent carbon and 30 per cent or more Mn.	Free	$2.50 ton
Manganese ore	1c. lb. Mn. content	Free	Free
Ferrosilicon (on silicon content)	2c. lb.; 8 to 60 per cent 3c. lb.; 60 to 80 per cent 4c. lb.; 80 to 90 per cent 8c. lb.; 90 per cent or more	15 per cent	20 to 25 per cent
Molybdenum ore (on metallic molybdenum content)	35c. per lb.	Free	Free
Tungsten ore (on metallic tungsten)	45c. lb.	Free	10 per cent
Ferromolybdenum (on molybdenum)	50c. lb. and 15 per cent ad valorem	15 per cent	20 to 25 per cent
Ferrotungsten, metallic tungsten and compounds (on tungsten)	60c. lb. and 25 per cent ad valorem	15 per cent	20 to 25 per cent
Ferrochromium tungsten, chromium tungsten, chromium cobalt tungsten, tungsten nickel and other alloys of tungsten not provided for	60c. lb. and 25 per cent ad valorem	15 per cent	20 to 25 per cent
Ferrochrome, 3 per cent or more carbon (on chromium content)	3½c. lb.	15 per cent	20 to 25 per cent
Ferrochrome, less than 3 per cent carbon and chrome metal	30 per cent ad valorem	15 per cent	[illegible]

	Dingley-McCumber Act	Underwood-Simmons Act	Payne-Aldrich Act
Steel ingots, blooms, slabs, billets, iron-			
1c. lb.	2/10c. lb.	Ingots, etc., by Bessemer or open-hearth process, free; electric or crucible, 15 per cent	Ranged from 7/40c. to 7c. lb. and 20 per cent ad valorem
1c. to 1½c. lb.	3/10c. lb.		
1½c. to 2¼c. lb.	5/10c. lb.		
2½c. to 3½c. lb.	8/10c. lb.		
3½c. to 5c. lb.	1c. lb.		
5c. to 8c. lb.	1 7/10c. lb.		
8c. to 12c. lb.	2½c. lb.		
12c. to 16c. lb.	3½c. lb.		
Above 16c. lb.	20 per cent ad valorem		
Circular saw plates	Additional duty of ¼c. lb.		
Boiler or other plate iron or steel, except crucible plate steel and saw plate steel, not thinner than 109/1000 in., and skelp valued at			
1c. lb. or less	7 20c. lb.	12 per cent	20 per cent
1c. to 3c. lb.	5 10c. lb.	12 per cent	20 per cent
Over 3c. lb.	20 per cent	12 per cent	20 per cent
Black iron and steel sheets, skelp iron or steel valued 3c. lb. or less:			
Thinner than 109/1000 in.	45/100c. lb.		
Thinner than 38/1000 in. to 22/1000 in.	55/100c. lb.		
Thinner than 22/1000 in.	75/100c. lb.		
Thinner than 10/1000 in.	85/100c. lb.		
Corrugated or crimped	75/100c. lb.		
Foregoing valued at more than 3c. lb.	20 per cent		
Galvanized sheets, plates, bars (for galvanizing)	2 10c. lb. extra	15 per cent	2/10c. lb. extra
Tin plate and terne plate	1c. lb.		1 2/10c. lb.
Structural, not assembled	½c. lb.	10 per cent	3/10c. to 4/10 c. lb.
Machined and fabricated	20 per cent	10 per cent	45 per cent
Sashes, building forms, etc.	25 per cent		
Hoop, band and scroll iron and steel not specially provided for. Value, 3c. lb. or less, 8/10 in. or less in width, thinner than ⅜ to 109/1000 in. thick	25/100c. lb.	10 per cent	3/10c. lb.
Thinner than 109/1000 to 38/1000 in.	35/100c. lb.	10 per cent	4/10c. lb.
Thinner than 38/1000 in.	55/100c. lb.	10 per cent	6/10c. lb.
Bands and strips not specially provided for, long or short lengths	35 per cent	10 per cent	35 per cent
Cotton ties	¼c. lb.	Free	3/10c. lb.
Wire rods. Value not over 4c. lb.	3/10c. lb.	10 per cent	3/10c. lb.
Value over 4c. lb.	6/10c. lb.	10 per cent	6/10c. lb.
Barbed wire	Free	Free	Free
Round iron or steel wire:			
Not smaller than 95/1000 in. diam.	¾c. lb.		1c. lb.
From 95/1000 to 65/1000 in.	1¼c. lb.		1¼c. lb.
Smaller than 65/1000 in.	1½c. lb.	15 per cent	1¾c. lb.
Galvanized wire (extra)	2/10c. lb.		35 per cent
Iron, steel anchors, iron, steel forgings not machined, tooled, etc.	25 per cent	12 per cent	30 per cent
Ball bearings and rollers	10c. lb. and 55 per cent	35 per cent	45 per cent
Railway fishplates, splice bars	¼c. lb.	10 per cent	3/10c. lb.
Steel rails	1 10c. lb.	Free	7/40c. lb.
Axles, bars, blanks, forgings. Value not over 6c. lb.	6 10c. lb.	10 per cent	¾c. lb.
Cast iron pipe	20 per cent	10 per cent	¼c. lb.
Lap and butt weld pipe, tubes, etc., not thinner than 65/1000 in.:			
Not less than ⅜ in. diam.	¾c. lb.		1c. lb.
[illegible]	1¼c. lb.	20 per cent	1½c. lb.
Less than ¼ in.	1¾c. lb.		2c. lb.
Iron and steel chain not less than ⅜ in. diam.	¾c. lb.		⅞c. lb.
Less than ¾ to ⅜ in.	1¾c. lb.	25 per cent	1¾c. lb.
Less than ¾ to ⅛ in.	1¾c. lb.		1 6/8c. lb.
Less than ⅛ in.	⅜c. lb.		3c. lb.
Nuts, washers of wrought iron, steel	6/10c. lb.	5 per cent	¾c. lb.
Bolts [illegible]	1c. lb.	10 per cent	1⅛c. lb.
Cut nails and spikes:			
[illegible]	4/10c. lb.	Free	4/10c. lb.
Not exceeding 2 in., including tacks	15 per cent		
Rivets, studs, etc.	30 per cent	20 per cent	45 per cent
Steel wool	10c. lb. and 30 per cent	20 per cent	40 per cent
Machine tools and parts	30 per cent	15 per cent	30 per cent
Aluminum, scrap and alloys	5c. lb.	2c. lb.	7c. lb.
Aluminum plates, rods, etc.	9c. lb.	3½c. lb.	11c. lb.
[illegible]	[illegible] lb.	5 per cent	2½c. lb.
Brass rods, sheets, plates, etc.	4c. lb.	20 per cent	45 per cent
[illegible]	[illegible]	Free	Free
[illegible]	[illegible] lead content	¾c. lb.	1½c. lb. lead cont.
Zinc-bearing ore:		Free	Free
[illegible]	[illegible] content		¼c. lb. zinc cont.
[illegible]	[illegible] content		½c. lb. zinc. cont.
[illegible]	[illegible] content		1c. lb. zinc. cont.
Manganese [illegible]	[illegible]	Free	Free
Dross [illegible]	[illegible] lb.	Free	Free
Fluorspar	[illegible] ton	Free	$3 ton
Graphite, crude or refined:			
[illegible]	[illegible]	Free	Free
[illegible]	[illegible] lb.		

Fordney-McCumber Tariff Is Approved

Iron and Steel Manufacturers Indorse Most of the Metal Rates and Hope for Good Results from Power to Change Given the President

THE sentiment of iron and steel manufacturers in regard to the Fordney-McCumber tariff act as expressed to representatives of THE IRON AGE in leading centers is on the whole one of mild approval. The flexible feature of the tariff, which gives the President authority to change rates under certain conditions, is regarded with favor by nearly all who have expressed an opinion, but some do not take it seriously and regard it as merely an effort to appease those who were dissatisfied with some of the schedules. Ferromanganese manufacturers are not satisfied with the bill and may appeal to the President. The duties on pig iron, steel products and scrap are not expected to have any important effect on business, but some of them will yield a fair revenue to the Government.

The attitude of many approaches indifference and is in striking contrast with that of the excitement which accompanied the enactment of some of the tariff bills of past years.

Most Pittsburgh Manufacturers Satisfied

PITTSBURGH, Sept. 25.—While sentiment with regard to the effect of the new tariff upon the iron, steel and machinery industries varies, it is commonly agreed that the new schedules compensate American manufacturers for the difference between American and foreign costs and most of the trade is satisfied. It is recognized that export business will suffer through the inability of European countries to pay for purchases in cash, and the fact that the new import duties will largely prevent payments with goods. Payment of the funded and unfunded war debt of European nations is paramount with large Eastern bankers who have become international in their viewpoint and naturally condemn the tariff on the ground that it will delay, if not entirely prevent, the payment of the debt. This, however, is not the view of the iron and steel industry, which as a whole takes the view that if payment of the debt is to be possible through paralysis of American industry, it is better that the debt remain unpaid.

It is pointed out that the export business for some months has been declining and leading manufacturers take the position that domestic requirements will absorb the full production that is possible to attain so long as the immigration laws prevent a full labor supply. It has been estimated that the world's requirements of steel annually for the next few years will average about 100,000,000 tons and that, in spite of the tariff, American manufacturers must be called upon to supply a considerable part of this tonnage. The fact that the President is given considerable latitude in changing schedules that might prove oppressive, to one industry or another, is regarded as favorable and some believe it is the forerunner of taking the entire matter of tariff making out of the hands of Congress and placing it with a commission, which would function along the line of the Interstate Commerce Commission. It is this provision of the new law which prompts the steel industry to accept gracefully the imposition of duties on the raw materials it uses. Many steel manufacturers do not like the duty on manganese ore, ferromanganese and other ferroalloys, but take comfort from the fact that an investigation of the whole matter can be had and if the import duties are found to be oppressive they can be lowered.

A leading manufacturer of tool steel believes that the tariff is fair, in that it bridges the gap between producing costs here and those abroad. Since the American industry started making tool and high-speed steel containing tungsten and other alloys, competition from abroad has been confined largely to carbon steels. Some foreign steel will continue to come in, it is declared, but the present status of the industry is that it is in the hands of American producers and will remain so.

The duties on foreign machine tools is not expected to have much effect one way or another. European manufacturers some time ago lost on the struggle for supremacy in American markets because of the superiority of the American products.

Ferromanganese Manufacturers Are Not Satisfied

NEW YORK, Sept. 26.—Calculated on the basis of 50 units of manganese per ton of manganese ore, the duty on imported ore under the new tariff act is $11.20 per ton. As it requires from two to two and a fifth tons of ore to make one ton of 80 per cent ferromanganese, the American producer of ferromanganese will pay from $24.60 to $28 duty on the material for a ton of ferromanganese. In return the American producer is protected to the extent of 1⅞c. per lb. of contained manganese in the ferromanganese. The duty, therefore, on imported ferromanganese of 80 per cent grade is $33.60 per ton. The American ferromanganese manufacturers figure their advantage on an average of $8 a ton. As their request was for a protection of at least 25 per cent on ferromanganese with ore admitted free of duty, the Fordney-McCumber bill provisions do not entirely satisfy them. Some steel manufacturers claim that a margin of $6 would have afforded ample protection to the domestic ferromanganese industry.

Little Interest at Cleveland

CLEVELAND, Sept. 25.—Iron, steel and machinery manufacturers in this city show very little interest in the Fordney-McCumber tariff. Few have given the tariff law sufficient study to comment either favorably or unfavorably on its provisions that affect their industries. Pig iron producers say that while the tariff on pig iron is a protection to Eastern blast furnaces it will have very little effect on Central Western furnaces. Generally, steel producers do not see that the tariff will have any appreciable effect on their business. Machine tool manufacturers also show a lack of interest in the new tariff, as they have little foreign competition. Comment on the provision permitting a revision of rates is generally favorable.

May Ask Reduction in Raw Materials

YOUNGSTOWN, Sept. 25.—Belief prevails that a formal complaint will be entered by iron and steel interests against duties imposed on such raw materials as ferromanganese, magnesite, ferrosilicon and manganese ore by the Fordney-McCumber act. It is yet too early for concerted action, as tariff provisions are just now being digested. District interests feel that a duty of $6 on 80 per cent ferromanganese would have been ample.

It is the impression that the tariff on rolled steel products affords ample protection for the American steel industry.

The theory of the leading district interest is that

products mined from the ground or coming under general classification of natural resources should carry only such a duty as will provide for the difference in labor costs in Europe and America of preparing such materials for marketing. Export trade has been of diminishing proportions for some time, and the tariff is not expected to exert any influence in that direction.

Michigan Will Be Benefited

DETROIT, Sept. 23.—Detroit and Michigan will not be vitally affected by the tariff revision in its relation to iron, steel and machinery. Exports are in excess of imports through Detroit, Port Huron and Sault Saint Marie, which are the principal ports of entry for Michigan. So far as pig iron is concerned, the situation is somewhat complicated. A number of melters along the border have been accustomed to purchase their iron requirements on the American side, although for a time during the early part of this year when iron was selling appreciably below furnace costs, this movement was interfered with through the enforcement of the Canadian anti-dumping law. On the other hand, considerable Canadian iron moves with more or less regularity into northern and western Michigan, taking advantage of the relatively high freight rates to melting points in this district from the nearest American producing points. With iron at its present level, the Fordney-McCumber tariff of 75c. per ton is not likely to prove much of a deterrent factor. At times, substantial tonnages of steel rails have been sold to Michigan roads by the Algoma Steel Co. from its plant at Sault Ste. Marie, Ontario.

The automotive industry, from the expert standpoint, will be stimulated, due to the reciprocal provisions of the tariff act and as this industry stands foremost in Michigan, the State as a whole will be benefited by this legislation.

The New Tariff on Machine Tools

NEW YORK, Sept. 25.—The advance in the duty on machine tools from 15 (Underwood tariff) to 30 per cent, provided for in the new tariff bill, is not seriously regarded by the few American importers who are bringing foreign-made machine tools into this country. There was no rush to bring foreign machine tools into the United States immediately preceding the enactment of the tariff bill, as is evidenced by the official statistics of the Department of Commerce, which show that only 84 tools came in during July, as compared with 89 in July, 1921. During the seven months ended July 31, the United States imported 922 machine tools of various classifications, having a declared value of $127,594, and of these a considerable part were plate fabricating machines, such as punches, shears, bending rolls, riveting machines, etc.

Henry Pels & Co., 90 West Street, who have been importing German-made plate fabricating machines, say that they have a small stock, such as they usually carry, but have not made any unusual purchases abroad in order to bring machines in prior to the time that the new tariff went into effect.

Varied Comment at Cincinnati

CINCINNATI, Sept. 25.—The passing of the Fordney-McCumber tariff bill was rather unexpected by manufacturers in Cincinnati and vicinity. The opinion seemed to be general that the bill would be left over until next session. The sentiment in the iron trade appears to be favorable to its passage, at least in part, opinions being expressed that the import duties will react to the benefit of this country by stimulating the production of ferroalloys particularly. The bill is considered to be only a tentative one, and many in the trade are of the opinion that many changes will be made in it at the next session.

The machinery manufacturers of the district are satisfied with the bill, though they have up to the present time manifested little interest in it. Sentiment among manufacturers is that the tariff bill will have little effect on their business, either domestic or export. This is particularly true at the present time, when conditions are bad, but even with a return to prosperity in foreign countries, local manufacturers of machine tools do not believe that the bill will affect their interests. So long as the American manufacturers of machine tools maintain their high standards, little fear is expressed that American machinery will be unable to compete in world markets, regardless of retaliatory tariffs that may be put into effect by other countries.

The sentiment among iron and steel men appears to be that a more thorough investigation of the conditions now existing should be made by the Tariff Commission, particularly as to the duties on raw materials, which are considered excessive, and which should, they believe, be reduced by Presidential proclamation.

Not Regarded as Protective

BOSTON, Sept. 25.—The consensus of opinion among melters and importers is that the new tariff affords no protection under existing conditions to the American furnace. The importation of iron is due entirely to an emergency and is made possible by its cost at the furnace. The duty of 75c. a ton at the moment therefore penalizes New England foundries without affording protection to the domestic furnace. But because of the disparity of foreign and domestic iron prices laid down in the foundry yard, this penalization is unoffensive. Until foreign furnaces stop selling iron at a loss and until production costs of furnaces on this side of the water are reduced, will the new tariff give protection.

Presidential Provision Indorsed in the South

BIRMINGHAM, ALA., Sept. 25.—Iron and steel operators of the Birmingham district, while inclined to believe that the Fordney-McCumber tariff has gone too far in the way of protection are inclined to view with favor the provision allowing the President from time to time to determine flexible rates and thus remove the oppressive features of the tariff as they reveal themselves. There was not a man, Republican or Democrat, who did not applaud that provision as stressed by Morris W. Bush, president Shelby Iron Co. They claim that this is a step in the direction of a business tariff and they believe that exercise of the Presidential privilege will tend to create more approval than the new tariff would receive without this flexible feature. Some are disappointed in the failure to have ad valorem basis fixed on domestic valuations.

Refractories Statistics

Shipments of fire clay brick in August, as reported by members of the Refractories Manufacturers' Association, were approximately 62 per cent of monthly economical producing capacity. This is a gain of about 4 per cent over the July shipments, but as there was an even greater gain in production, which rose from about 60 per cent in July to about 66 per cent in August, stocks rose to the highest point on record, standing as of Aug. 31 at 207 per cent, a gain of 6 per cent over a month before. New orders declined in August about 2 per cent, but unfilled orders gained about 7 per cent.

The slant of both production and shipments of silica brick was down in August, but as shipments were at the rate of 42 per cent of economical producing capacity and production was about 37 per cent, and cancellations were nil, stocks dropped to about 131 per cent of capacity as compared with 137 per cent in July. The loss in shipments in August as compared with July was 4 per cent, but that in production also was 4 per cent, while in July cancellations were 4 per cent as against none in August. New orders in August had a steep decline, dropping from 51 per cent to 39 per cent. Unfilled orders dropped about 3 per cent, standing at 72 per cent as of Aug. 31.

Comprehensive Exhibit of Machine Tools

New Haven Branch of American Society of Mechanical Engineers Sponsors Show and Meeting, Which Are Largely Attended

THE second annual machine tool exhibition in New Haven, Conn., was held Sept. 21 to 23 under the joint auspices of the New Haven branch, American Society of Mechanical Engineers, the Sheffield Scientific School of Yale University and the New Haven Chamber of Commerce in the Mason Laboratory of Mechanical Engineering of Yale University. Kenneth F. Lees, New Haven branch, American Society of Mechanical Engineers, was chairman of the executive committee and H. R. Westcott, of Westcott & Mapes, New Haven, was chairman of the exhibition committee.

The growth in number of exhibitors and scope of exhibits this year, as compared with last, was gratifying to those responsible for the undertaking and would appear to indicate its distinct value and promise of future growth. The attendance on all three days was large, at times somewhat cramping the space. Many exhibitors reported orders taken for their products.

Co-operation Between College and Machine Industry

The program was formally opened by Mr. Lees on Thursday evening, introducing Prof. L. P. Breckenridge of Yale University as chairman. The first address was by Dean Charles H. Warren, of the Sheffield Scientific School, on "Cooperation Between Colleges and the Machine Tool Industry." Professor Warren likened the mechanical engineering department of the university to a manufacturing concern. It has its raw material, the rawness varying with the individual boy, to be worked into a product to be delivered to the great consuming public. The problems confronting the faculty of such a school can best be solved by a hearty cooperation between the teachers, in this case the producers, and the manufacturers, or the consumers of the product.

Complementing the laboratory equipment, which illustrates fundamental principles and typical machines studied by the boys, there are now side trips, he said, into various manufacturing plants to study the more complicated machinery in actual use. This method shows the students the actual meeting place of theory and practice. To supplement the theory learned by students in the mechanical courses, the cooperation between the university and the manufacturers should be carried further, he added. A plan suggested was permission for students to work in the various plants during vacation periods and thereby gain actual experience and permit manufacturers to study their qualifications as possible future executives. Another plan for cooperation is the broader use of the university's research laboratories and the talents and acquirements of its staff. This would help the manufacturer and the students as the latter would then come in contact through their professors with actual problems and their solution. In some cases it might be possible for selected groups of advanced students to be put at work upon these problems, perhaps in the plants.

Another manner in which the university might help the manufacturer would be for its staff to assist in plans for the development of the schools operated by some manufacturers for the education of their operatives. Professor Warren informed the meeting that Professor Breckenridge of the university would undoubtedly be glad to help in working out some practicable schemes of co-operation.

Henry B. Sargent presented the greetings of the New Haven Chamber of Commerce to the machinery manufacturers. He gave an illustration of the manner in which the installation of American machinery in one class of factories in England was effective both in raising wages and increasing the profits of the manufacturers.

Governor Hartness on Country's Problems

The closing address was by Governor James Hartness of Vermont, who is president of the Jones & Lamson Machine Co., on "The Influence of the Machine Tool in America." Governor Hartness emphasized the importance of the machine tool as the father of machinery in extending the efforts of man in amplifying the product that he could turn out. We are now learning that our whole scheme of management of industrial affairs, financial affairs, business affairs, fails to keep pace with the development of the world as it has grown under the work of the machine tool and its products. Our government, which originally related to maintaining peace within the State and uniting us against a foreign enemy, is trying to handle the matters of business, matters of engineers, matters of farming, matters of finance with men elected to office by the popular ballot. You can not conceive of any quicker way to wreck a commercial company, he said, than to put it in the hands of men elected by that process.

We know, he continued, that one of the greatest misfortunes to our country is the interruption of work by strikes, which are the result of conditions that should not exist. In some cases the men strike for a fair wage, which they should get without striking. On the other hand, men sometimes strike for more than a fair wage, because they have been led to believe that they are entitled to more and that the larger portion is their just due. We will not get any settlement equitably without fighting unless some other means are devised for so doing.

Arbitrators Considering Strictly Economic Laws

There is a way to devise this means, he asserted, through our representative form of government. Our representatives are ready to give what the public demands. They must see the light, but first of all the light must be seen by all people. Every worker in every division must first know that strikes and other interruptions of our production are so harmful to the country that there is less value to be divided. We must go back to the commission type of arbitration, which has failed in the past, but need not be a failure in the future. Our laws would have gone wrong if it were not for our constitution. Arbitration commissions must be backed by a scheme which will start such boards not only composed of impartial members, but have back of them the power that holds them strictly to the letter of economic laws as applicable to our industrial life to-day.

We would then have a board that would say whether the miner was getting more than his share, or the bootmaker, or this or that. There would be taken into account the energy and initiative of invention as applied to business matters as well as machine design and all those things that count for progress. There would be taken into account the spirit of the organization, the spirit of the management. There would be valued all those things that are valued to-day. Manufacturers and others would still have a chance to bring in large money returns into the business and build it up if it is for the welfare of the country.

The machine tool that has built up this wonderful world of mechanism has built up something that will tread all over us. We will be strangled by interruption of our transportation and unless we use a small part of our brain area for adjusting this matter on lines different from any that are functioning at the present time, it will go very bad for civilization; it will

go very bad for America, especially if Germany or some other country is working truer to the laws of human industrial economics.

Friday and Saturday programs included moving pictures, showing the manufacture of various products. There were also addresses on precision, standardization, production, etc.

[illegible]
Co.
Ames, B. C., Co.
Anderson Machine Co.
Athol Machine Co.
Atkins, E. C., & Co.

[illegible]
Bickford-Switzer Co
[illegible]
Bilton Machine Co.
[illegible]
[illegible]

Brown & Sharpe Mfg. Co.
[illegible]

Campbell, Andrew Co., Inc.
Callophone Co.
Carborundum Co.
Card Tap & Die Co.
Cincinnati Electrical Tool Co.
Clipper Belt Lacer Co.
Cochrane & Bly Co.
Cronin-Waddell

Desean, Maurice S.
Detroit Belt Lacer Co.
Detroit Twist Drill Co.
Diamond Machine Co.
[illegible]
Dodge Sales & Engineering Co.

Eastern Machinery Co.
Eastern Machine Screw Co.
Eastern Sales Co.
Educational Exhibition Co.
Electric Alloy Steel Co.

Fafnir Bearing Co.

General Electric Co.
Geometric Tool Co.
Grant Mfg. Co.
Greenfield Tap & Die Corporation.

Hanson - Whitney Machine Co.
Hartford Mill Supply Co.
Hartford Special Machine Co.
Haynes-Stellite Co.
Hergi Mfg. Co.
Hill, Clarke & Co., Inc.
Hobbs, Clinton E.
Hoggson & Pettis Co.
Horton & Son Co., E.

Imperial Belting Co.

Jacobs Mfg. Co.
Johansson, C. E., Inc.
Johnson Belting Co.
Jones & Lamson Machine Co.

Kearney & Trecker Corporation
Keller Mechanical Engraving Co.
[illegible]
Kingsbury Mfg. Co.

Leland-Gifford Co.
Lucas, J. L., & Son, Inc.

Madden & Morrison
Manning, Abrasive Co.
Mantle & Co.
Martin Machine Co.
Meriden Press & Drop Co.
Monarch Machine Tool Co.

National Acme Co.
[illegible]
New Haven Electric Co.
New Haven Gas Light Co.
New Co., J. M.
Noble & Westbrook Co.
Norwalk Iron Works

Oven Equipment Co.

Page, Steel & Flagg
Peerless Surfacing Machine Co.
Plant, J. D.
Pratt & Whitney Co.
Purinton & Smith

Reed Prentice Co.
Rhodes Mfg. Co.
Rivett Lathe & Grinder Co.
Royal Waste Co.
Royersford Machine Tool Co.

Sellew Machine Tool Co.
Seneca Falls Mfg. Co.
Sidney Machine Tool Co.
Simmonds Mfg. Co.
S. K. F. Industries, Inc.
Skinner Chuck Co.
Slocomb, J. T., Co.
Standard Machinery Co.
Standard Safety Mfg. Co.
Standard Shop Equipment Co.
Standard Steel & Bearings Co. (Philadelphia)
Standard Steel & Bearings Co. (Plainville)
Stark Tool Co.
Starrett Co., L. S.

Taft Peirce Co.
Taylor & Fenn Co.
Thompson, H. G., & Sons Co.
Torrington Co., The
Triangle Tool Co.

Union Twist Drill Co.
Universal Boring Machine Co.

[illegible]
Vitrified Wheel Co.

Wallace, J. D.
Walls Sales Corporation
Walworth Mfg. Co.
Warner & Swasey Co.
Way, A. F., Co.
Welch, J. T.
Wescott & Mapes, Inc.
Whitney Mfg. Co.
Wisconsin Electric Co.
Wright Mfg. Co.

Blind Man Operates Power Press

Probably the most unique exhibit was by the Standard Safety Mfg. Co., New Haven, Conn. This showed a Bliss inclinable power press on which was mounted a Kartzmark safety guard. The press was operated by a blind man, 67 years of age, who had never seen a press, having been blind from his tenth year. A week before the exhibition was his first experience on a press. This demonstration showed conclusively the safety of the guard.

The Kingsbury Mfg. Co., Keene, N. H., showed a two-spindle bench type vertical drill and a single spindle horizontal bench type drill. Both of these machines were equipped with a frictional spindle control with adjustable gravity feed. With this device the drill feed is automatically adjusted to the maximum that the cutting capacity of the drill and the material worked will permit. Machines will stop automatically when the drill dulls.

The Martin Machine Co., Turners Falls, Mass., exhibited its standard hydraulic principle marking machine. Pressure of the work against the die is maintained in this machine by a rotary pump, pumping oil to pressure. The machine will produce uniform depth of impression on work varying in thickness.

A. F. Way Co., Hartford Conn., exhibited its portable electric drill which is rated at ⅝ in. capacity, but will stand a heavy overload; the motor built for this company by General Electric Co. appears to be nonstallable. The drill was shown mounted on a cleverly designed "old-man" and was arranged with screw feed having a capstan hand wheel.

Billings & Spencer Co., Hartford, Conn., showed two die milling machines—one a vertical spindle machine with ball bearing spindle mounted in the base. Blanking and trimming dies are held in a chuck or clamp which is bolted to the top slide. The latter has horizontal travel and is mounted on a lower slide which has transverse travel. Travel in either direction is controlled by conveniently placed handwheels. The cutter is held in a chuck of the collet type. The other machine shown by Billings & Spencer was a die sinking machine of the vertical type. This machine has ball bearing spindle similar to that in the machine described. A clutch is provided for starting and stopping without shifting the belt. The amount of power delivered to the cutter is variable. This feature is obtained by a friction device incorporated in the belt shifter, permitting the belt to ride partly on the tight and partly on the loose pulley, thereby accommodating the amount of power to the size of the cutter.

A Nibbling Machine

Andrew C. Campbell, Waterbury, Conn., exhibited the Campbell patent nibbling machine. This machine is designed to take the place of the ordinary circle shear, but has capacity for handling a much wider variety of work than is possible in that type of machine. It can also be used to take the place of other types of machines for cutting sheets or light plates. The operating portion of the machine consists of an overhanging arm carrying a rapidly reciprocating punch of small size. The feed is governed by a small stop pin on the extreme end of the punch. The metal is fed against the pin, thus allowing a small portion of stock to be removed with each stroke of the punch. The work is fed toward the cutter and can be guided to follow any shape or design which may be laid out on the sheet. The machine is rapid and throws no burr, but leaves the work entirely flat.

A vise for holding irregularly shaped work was shown by Mantle & Co., New York. The jaws of this vise consist of a series of blocks, reducing in size toward the center of the vise. These blocks consist of segments of a circle, each segment carrying two similar segments of smaller size. Each jaw consists of a total of fifteen of the blocks. It can be readily seen that by an arrangement of this kind the jaws of the vise will accommodate themselves to hold a piece of practically any shape. The base of the vise is of the swivel type.

A motor-driven tap grinder was exhibited by the Bickford-Switzer Co., Greenfield, Mass. This machine is used for grinding the cutting edges of taps, reamers, etc., giving assurance that all flutes will do an equal amount of cutting. The machine will handle tools having from two to six flutes.

The Ready Tool Co., Bridgeport, Conn., in addition to its regular line of tool holders, milling machine dogs, etc., exhibited a line of high-speed steel lathe centers. These lathe centers are made of "Hy-Ten" steel with a high-speed steel point, electrically welded to it, before grinding.

A similar center was exhibited by the Haynes-Stellite Co., Kokomo, Ind., except that the point welded to the "Hy-Ten" steel was of stellite rather than high-speed steel.

A fast-working machine for grinding pulleys from the rough, producing convex, flat or concave surfaces, was shown by the Diamond Machine Co., Providence. The grinding wheel employed is a ring wheel car-

ried in a heavy chuck, the work being mounted on an arbor in front of the wheel.

Centering Machine Attracts Attention

Much attention was attracted by the exhibit of the Hanson-Whitney Machine Co., Hartford, and the Hartford Tap & Gage Co. One of the machines shown by Hanson-Whitney was a centering machine which is of the lathe type and revolves the work to be centered. The spindle of the machine carries a triple left-hand thread chuck so that the work is simply pushed into the chuck and is immediately held, the other end resting on a roller steady rest. The tool carriage is controlled by one lever, but has two independent slides, one carrying a centering drill and the other slide carrying a shaving tool for trimming the end of the work. A dial carrying both metric and English measurements is provided for setting the adjustment of the roller rest for the proper diameter of work. Oil is delivered to the tools under pressure. The machine is of the single pulley drive type with a brake for instant stopping of the spindle.

The Meriden Press & Drop Co., Meriden, Conn., showed different sizes of a ball bearing polishing lathe recently brought out.

The motor-driven emery stand shown by the Diamond Machine Co., Providence, is different from the usual design of such machines in that the motor is manufactured by S. A. Woods Machine Co. The reason for their having selected this motor is that it is an induction motor with provision for cooling in the center of the frame. It is of the inclosed type without being large in size. That part of the motor directly near the grinding wheels is protected from the collection of dirt. The grinding machine is provided with wheel hoods which are adjustable to accommodate for wear in the diameter of the wheel.

Leland-Gifford Co., Worcester, Mass., showed two sizes of high-speed ball bearing drills, two spindle type. The smaller of these machines, capable of running at high speeds for drilling small holes, is equipped with an automatic feed device in connection with its power feed, permitting it to be set for continuous drilling. This machine is also equipped with a high speed tapping attachment. The larger machine shown was the heavy type, fitted on one spindle with tapping device and on the other spindle with power feed.

An automatic portable arc welder was shown by the General Electric Co., Schenectady, N. Y. This machine allows for repairing defective work at any place in the shop, even to the point of filling blow holes, etc., which may be discovered in the process of machining.

The General Electric Co. also showed a model in four parts, showing the faults of improper lighting due to poor voltage or too high wattage as compared with lighting by properly planned illumination. Also, in this model, was brought out the advantages from the light standpoint of motor-driven equipment as compared with belt-driven.

Many of the machines mentioned in the foregoing have been described at different times in THE IRON AGE.

NEW EXPORT COMPANY

Bethlehem Will Handle Its Own Products—Consolidated Stops Selling

The Bethlehem Steel Export Corporation has filed an application for a charter with the Secretary of State of Delaware. The company will handle the export business of the Bethlehem Steel Corporation, previously taken care of by the Consolidated Steel Corporation. The new corporation will have a capitalization of $1,000,000. The North American Steel Co., which is to take over the Midvale, Republic and Inland Steel companies, may also form its own export company.

E. A. S. Clarke, president Consolidated Steel Corporation, has issued the following statement: "Consolidated Steel Corporation has ceased selling, and will liquidate its affairs as rapidly as consistent with conditions. The member companies are now quoting directly for their own account for export. Liquidation, naturally, involves drastic reduction of personnel. The directors may later consider a modified plan which will enable them to avail of the provisions of the Webb law."

Steel Bounties Aid Japanese Merchant Marine

While the Japanese shipbuilding bounty law of 1896 was suspended in 1918, the work which it was designed to accomplish is being carried forward by a law dated August, 1917, for the encouragement of the steel industry. This exempts from income taxes and business taxes all those engaged in the steel industries and provides bounties for various domestic steel products. This system resulted, by 1921, in providing a domestic production of steel equal in volume to the amount of the imports.

Since July 20, 1921, the law encouraging the steel industry has been amended so that the bounties apply only to steel products used in building or repairing naval vessels or merchant ships. A bounty is provided for steel ingots and slabs made in Japan, equal to 12 per cent of the value of imported steel ingots and slabs, and a further bounty of 15 per cent of the value of the imported article in the case of bars, rods, shapes, T-shapes, angles, ship plates, sheets, tubes, pipes and turbine blades made in Japan. These bounties are paid only when the articles are used in the shipyards.

Navigation bounties, in addition to the direct shipping and steel bounties, have been a further air in developing a merchant marine which has grow tremendously in the past dozen years. These bounties are increased heavily in the case of vessels built according to the specifications of the Japanese government, particularly with regard to the possibility of converting the vessels in time of emergency to naval use.

Swedish Business Generally Dull

Cable advices to the Department of Commerce indicate that general business in Sweden is dull. The situation in the iron and steel industry is unsatisfactory. Production was poor during the first 7 months of 1922. The export of iron ore during the first six months of this year came to 2,600,000 tons as compared with 2,100,000 tons for the first six months of 1921. Blast furnaces are operating at a capacity of about 23 per cent of normal and electro-steel furnaces at 24 per cent. There seem to be no signs of an improvement. The machinery industry is depressed owing to general conditions, the loss of the Russian market, and German competition. Six plants have been forced to discontinue operation.

Much British Coal Arriving

Figures compiled by the New York *Herald* show that 26 ships loaded with British coal arrived at New York during the second week of September, compared with 20 ships during the previous week. The tonnage of coal brought in was 160,985 in the second week and 132,878 in the first week of the month. The August total for the port of New York is placed at 275,000 tons, and for all ports at 375,000 tons. It is expected that about 700,000 tons will arrive at all ports during September and many additional shipments are scheduled for arrival in October.

With the appointment of John C. Chandler as manager of the Cleveland district sales office of the Bethlehem Steel Co., the offices of the Lackawanna Steel Co. and Bethlehem Steel Co. have been combined in the latter company's offices in the Guardian Building. Mr. Chandler has been district manager of sales of the Lackawanna Steel Co. in Cleveland for over 12 years.

Prices of Steel Castings Are Advanced

Percentages Vary from 15 to 20—Increased Cost of Raw Materials and Labor Made Action Necessary—Changes in Arrangement of List

STEEL castings have been advanced in varying percentages, averaging from about 15 to 20 per cent, effective Oct. 1. In announcing its new list prices and discounts, the American Steel Foundries states that it was necessary to revise all outstanding discounts because of increased raw material and labor costs. A comparison of the prices of the more important raw materials entering in the production of steel castings shows increases since March, 1922, as follows: 70 per cent for Bessemer pig iron at Pittsburgh, 90 per cent for basic pig iron, f.o.b. Valley furnace, 40 per cent for heavy melting steel scrap at Pittsburgh, 10 to 30 per cent for ferromanganese and ferrosilicon delivered, 45 to 80 per cent on coal delivered and 15 to 25 per cent on stores and other materials delivered. It is also pointed out that costs continue to climb higher every day and it cannot be foreseen how long the new discounts will remain in force. In fact, further advances may prove necessary within the next month or six weeks.

In order to further simplify the plan of list and discounts for steel castings inaugurated by the company early this year, certain changes in the arrangement of the list have been made and the more important classes of castings have been grouped under different sections thereof. The weight divisions are exactly the same as heretofore, excepting in the case of castings weighing less than 10 lb. each. Designs of castings weighing less than this amount are so numerous and the metal sections so variable that it has been found necessary to incorporate prices for the lower weights.

Section A, drawn up on both a division of weight and also on a quantity basis, takes care of all the smaller classes of castings up to 100 lb. each and over. Heretofore several discounts have been made to take care of the prices on increasing quantities of the smaller classes of castings. Now with this revision one discount will take care of each design regardless of what the quantity may be.

Section B, covering rolls and mill pinions for rolling mills obviates the necessity of naming more than one discount on those classes of castings.

Section C, D and E take care of all steel castings used in the construction or repair of a locomotive and simplify the discounts thereon.

Section F covers miscellaneous castings of the most desirable designs, including the general run of miscellaneous castings for heavy machinery, rolling mills, etc.

Section G covers castings of the more intricate designs. Castings of this description slow up production, they call for the use of the highest class of mechanics, special equipment and generally a great deal of attention by the supervisory force.

Name of Casting:	Discount, Per Cent	Section
Accumulator cylinders:		
[illegible]		G
[illegible]		G
[illegible]		G
[illegible]		F
Annealing bottoms	55	F
Annealing boxes	35	F
[illegible]		F
Anode plates	52½	F
[illegible]		F
Arms for boiler riveters	Net	F
Ball and socket joints	17½	F
Bars, grizzly	32½	F
Bases, column:		
In lots of 1 to [illegible]	45	F
In lots of [illegible] and over	47½	F
Bells for blast furnaces	27½	F
Blades, propeller	17½	G
Blast furnace bells	27½	F
Blast furnace miscellaneous	32½	F
Blocks, anvil	45	F

Name of Casting.	Discount, Per Cent	Section
Blocks, bridge:		
In lots of 1 to 49 pieces	45	F
In lots of 50 pieces and over	47½	F
Blocks, die	40	F
Bodies, valve	17½	F
Boiler riveter arms	Net	F
Boiler saddles	17½	F
Bolster center fillers	35	F
Bosh plates	42½	A
Bottom plates, refractory	22½	F
Bottoms, annealing	55	F
Boxes, annealing	35	F
Boxes, charging	Net	F
Boxes, coupling	45	F
Boxes, journal	*	
Brackets, guide	40	G
Brake wheels, crane	40	G
Bridge blocks:		
In lots of 1 to 49 pieces	45	F
In lots of 50 pieces and over	47½	F
Bridge shoes:		
In lots of 1 to 49 pieces	45	F
In lots of 50 pieces and over	47½	F
Bumper hoods, crane	40	G
Bumper for mine cars	42½	A
Carriages, end for crane	47½	G
Car wheels, mine and industrial:		
Single flange, web plate with plain hub	42½	A
Single flange, spoke center with plain hub	35	A
Irregular design: Self-oilers, special flanges, etc.	27½	A
Casings for centrifugal pumps	*	
Cement mills miscellaneous	22½	F
Cement mill riding rings	50	F
Cement mill rollers	37½	G
Cement mill tires	50	G
Center fillers, bolster	35	A
Center plates	45	A
Center stems	40	G
Centrifugal pump castings	*	
Charging bar supports	40	G
Charging box heads and ends (cored):		
In lots under 100	37½	F
In lots 100 and over	42½	F
Charging box heads and ends (not cored):		
In lots under 100	42½	F
In lots 100 and over	47½	F
Charging boxes	42½	F
Circle plates, refractory	32½	F
Column bases:		
In lots of 1 to 49 pieces	45	F
In lots of 50 pieces and over	47½	F
Column guides for mine cars	27½	A
Columns, truck	35	A
Copper ladles	20	F
Copper mine miscellaneous	37½	F
Copper molds	37½	F
Counter balances	32½	F
Coupler carriers	17½	A
Coupling boxes	45	F
Couplings, sugar mill	42½	F
Covers for crane gears	40	G
Covers, handhole	17½	F
Covers, manhole	17½	F
Cradles for mine cars	27½	A
Crane castings, miscellaneous	35	F
Crane under structures	40	G
Crane truck [illegible]	17½	G
Crank discs	32½	F
Crank discs	32½	F
Crank webs	32½	F
Crossheads	17½	F
Crossovers	Net	F
Crown wheels for sugar mills	42½	F
Crusher frames, s.w.	22½	F
Crusher housings, gyratory	22½	F
Crusher rolls, hollow	37½	G
Cutter heads, dredge	*	
Cylinders, accumulator:		
With walls 1½ in. thick and simple flange on one end	47½	G
With walls 1½ in. thick or less and simple flange on one end	42½	G
All other designs	37½	G
Cylinders, hydraulic press:		
Plain surface with standard rectangular flange	22½	F
Irregular contour, with wings or special cored openings and flanges	12½	F
Die blocks	40	F
Discs, crank	32½	F
Draft lugs (short)	17½	A
Drawheads, link and pin	17½	A
Driving wheel centers	32½	D
Dredge cutter heads	*	
Dredge miscellaneous	*	
Dredge piping	17½	F
End carriages, crane	17½	G
Engine casting, miscellaneous	27½	F
Engine frames	27½	C
Fittings, ammonia	Net	F

*Discounts on this class of work will be furnished on receipt of inquiry and drawing showing the castings desired

List Prices for Steel Castings

All prices shown are in dollars per 100 lb.
Extras to be added to net prices and freight allowance are shown below:

Section "A"

Covering castings for freight cars, mine and industrial cars and small castings ordered in quantities of from one to more than 500 pieces from one pattern at one time.

Division of weight:	Weight ordered in quantities as shown below from one pattern at one time									
	1	2	3-5	6-9	10-24	25-49	50-99	100-249	250-499	500-Over
1-2 lb.	$75.00	$65.60	$56.05	$49.60	$43.15	$37.50	$34.70	$32.35	$30.15	$28.15
Over 2-5 lb.	56.40	49.60	43.65	38.40	33.80	29.75	27.65	25.90	24.25	22.70
Over 5-10 lb.	39.55	35.25	31.45	28.00	25.00	22.25	20.90	19.65	18.50	17.40
Over 10-25 lb.	34.00	30.75	27.65	24.90	22.40	20.20	19.05	18.00	17.05	16.10
Over 25-50 lb.	26.40	23.15	21.05	19.20	17.45	15.90	15.10	14.35	13.65	12.95
Over 50-100 lb.	19.40	17.85	16.45	15.15	13.90	12.80	12.40	11.65	11.15	10.65
Over 100 lb.	16.95	15.75	14.65	13.65	12.70	11.80	11.40	10.90	10.45	10.00

Section "B"

Covering rolls and mill pinions for rolling mills:

Weighing over	250-500	lb. each	$12.80
Weighing over	500-1,000	lb. each	11.50
Weighing over	1,000-2,500	lb. each	9.60
Weighing over	2,500-5,000	lb. each	8.60
Weighing over	5,000-10,000	lb. each	7.20
Weighing over	10,000-50,000	lb. each	6.95
Weighing over	50,000	lb. each	8.15

Section "C"

Covering locomotive frames:

Weighing over	500-1,000	lb. each	$13.65
Weighing over	1,000-2,500	lb. each	11.00
Weighing over	2,500-5,000	lb. each	8.65
Weighing over	5,000	lb. each	8.25

Section "D"

Covering wheel centers for locomotives:

Weighing 1,000 lb. each and under	$9.45
Weighing over 1,000 lb. each	8.80

Section "E"

Covering miscellaneous castings for locomotives:

Weighing 10 lb. each and under			Use Section "A"
Weighing over	10-25	lb. each	$20.20
Weighing over	25-50	lb. each	15.90
Weighing over	50-100	lb. each	12.80
Weighing over	100-250	lb. each	11.80
Weighing over	250-500	lb. each	10.85
Weighing over	500-1,000	lb. each	9.75
Weighing over	1,000	lb. each	9.05

Section "F"

Covering miscellaneous steel castings of simple design:

Weighing over	1-2	lb. each	Use Section "A"
Weighing over	2-5	lb. each	Use Section "A"
Weighing over	5-10	lb. each	Use Section "A"
Weighing over	10-25	lb. each	$20.20
Weighing over	25-50	lb. each	15.90
Weighing over	50-100	lb. each	12.80
Weighing over	100-250	lb. each	11.80
Weighing over	250-500	lb. each	10.85
Weighing over	500-1,000	lb. each	9.75
Weighing over	1,000-2,500	lb. each	9.05
Weighing over	2,500-5,000	lb. each	8.75
Weighing over	5,000-10,000	lb. each	8.40
Weighing over	10,000-50,000	lb. each	8.15
Weighing over	50,000	lb. each	9.50

Section "G"

Covering all other miscellaneous steel castings:

Weighing over	1-2	lb. each	$81.50
Weighing over	2-5	lb. each	67.25
Weighing over	5-10	lb. each	42.75
Weighing over	10-25	lb. each	36.50
Weighing over	25-50	lb. each	28.75
Weighing over	50-100	lb. each	23.25
Weighing over	100-250	lb. each	21.50
Weighing over	250-500	lb. each	19.75
Weighing over	500-1,000	lb. each	18.25
Weighing over	1,000-2,500	lb. each	16.50
Weighing over	2,500-5,000	lb. each	15.75
Weighing over	5,000-10,000	lb. each	15.25
Weighing over	10,000-50,000	lb. each	14.75
Weighing over	50,000	lb. each	17.50

"Extras Per 100 Lb. to Be Added to Net Prices Are as Follows:

For carbon 0.50 to 0.70	Add $0.25
For carbon 0.70 to 1.00	Add .50
For carbon 1.00 to 1.25	Add .75
For carbon 1.25 to 1.50	Add 1.00
For carbon 1.50 and over	Add 1.75
For 2½ to 3½ per cent nickel	Add 2.75
For 0.18 vanadium	Add 2.80
For 1 per cent chrome	Add 1.00
For 1 per cent chrome and 2 per cent nickel	Add 2.50
For 1 per cent chrome and 0.18 vanadium	Add 3.80
For steam test on any casting	Add .25
For all castings with water circulating pipes	Add 20%

Freight Allowance

The prices obtained after applying the discounts cover the castings in the rough, f.o.b. works, with published rate of freight allowed to the freight station of the purchaser, other than railroads, located within a line drawn from Boston through Schenectady, Rochester and Niagara Falls, N. Y., Detroit, Duluth, Minn., St. Louis, Cincinnati, Washington, Cape May, N. J., and other Atlantic Ocean terminal points between Cape May and Boston. Prices to railroads are f.o.b. maker's works, with published rate of freight allowed to the nearest point on the line of their road located in the territory mentioned above. For deliveries outside of the territory mentioned, on shipments to all purchasers, freight will be allowed only to the boundary line; the excess to be paid by the purchaser.

Name of Casting:	Discount, Per Cent	Section
Fittings, extra heavy flange	17½	F
Fittings, hydraulic	17½	F
Fittings, low pressure flange	Net	F
Flange castings:		
In lots of 1 to 49 pieces	37½	F
In lots of 50 to 99 pieces	42½	F
In lots of 100 pieces and over	47½	F
Flange fittings, low pressure	Net	F
Flange fittings, extra heavy	17½	F
Flywheel hubs	32½	F
Flywheel segments	32½	F
Flywheels	32½	F
Frames, handhole	17½	F
Frames, jaw crusher	22½	F
Frames, locomotive	27½	C
Frames, manhole	17½	F
Frames, ram	40	G
Frames, riveter	35	F
Frames, stern for merchant ships:		
When cast in one piece	42½	G
When cast in more than one piece	47½	G
Frames, trolley for crane	40	G
Freight car miscellaneous castings	40	A
Gear covers, crane	40	G
Gear segments:		
In lots of 1 to 49 pieces	30	F
In lots of 50 to 99 pieces	35	F
In lots of 100 pieces and over	40	F
Gears:		
In lots of 1 to 49 pieces	30	F
In lots of 50 to 99 pieces	35	F
In lots of 100 pieces and over	40	F
Gears, machine molded	*	
Gears, railway motor	*	
Grizzly bars	32½	F
Guards for sheave	40	G
Guide brackets	40	G
Gyratory crusher housings	22½	F
Gyratory crusher miscellaneous	27½	F
Hammer rams	40	F
Handhole covers	17½	F
Handhole frames	17½	F
Headers	Net	F

Name of Casting:	Discount, Per Cent	Section
Heads, dredge cutter	*	
Heads, hydraulic press	40	F
Heads, peel	40	G
Hearth jackets	42½	F
Hollow crusher rolls	37½	G
Hollow shafts for crane	40	G
Hollow stems for crane	40	G
Hoods, bumper for crane	40	G
Hopper castings	27½	F
Hoppers	27½	F
Hot metal or slag pots	27½	F
Housings, gyratory crusher	22½	F
Housings, pinion	45	F
Housings, roll	45	F
Housings, sugar mill	42½	F
Hubs, flywheel	32½	F
Hubs, propeller	37½	F
Hydraulic fittings	17½	F
Hydraulic press cylinders:		
Plain surface with standard rectangular flange	22½	F
Irregular contour, with wings or special cored openings and flanges	12½	F
Hydraulic press heads	40	F
Hydraulic press miscellaneous	27½	F
Hydraulic press nuts	47½	F
Hydraulic press platens	40	F
Impellers, centrifugal pump	*	
Industrial car, miscellaneous	35	A
Jaw crusher frames	22½	F
Jaw crusher, miscellaneous	27½	F
Joints, ball and socket	17½	F
Journal box wedges (cored type)	55	A
Journal box wedges (solid type)	60	A
Journal boxes	*	
Ladles, copper	20	F
Ladles, slag	20	F
Link and pin drawheads	42½	A
Lip rings for blast furnaces	27½	F
Locomotive frames	27½	C

*Discounts on this class of work will be furnished on receipt of inquiry and drawing showing the castings desired.

Name of Casting	Discount, Per Cent	Section
Truck columns	35	A
Tuyere jackets	27½	F
Tuyere stocks	22½	F
Valve bodies	17½	F
Valve castings	17½	F
Webs, crank	22½	F
Wheels, brake for crane	40	G
Wheel centers, driving	37½	D
Wheels, crown for sugar mill	42½	F
Wheels, fly	42½	F
Wheels, mine and industrial car:		
Single flange, web plate with plain hub	42½	A
Single flange, spoke center with plain hub	35	A
Irregular designs: Self-oilers, special flanges, etc	27½	A
Wheels, propeller	42½	G
Wheels, worm:		
In lots of 1 to 49 pieces	15	F
In lots of 50 to 99 pieces	20	F
In lots of 100 pieces and over	25	F
Worms and worm wheels:		
In lots of 1 to 49 pieces	15	F
In lots of 50 to 99 pieces	20	F
In lots of 100 pieces and over	25	F

*Discounts on this class of work will be furnished on receipt of inquiry and drawings showing the castings desired.
†Net prices on machine work will be quoted on application.

FORD PLANTS RESUME

Present Expectation Is That Detroit Industries Will Have Enough Fuel

DETROIT, Sept. 25.—The Ford industries resumed operations at midnight Thursday after a four days' shutdown. Representatives of the company in Cincinnati were able to secure sufficient West Virginia and Kentucky coal to warrant continued operations, and the idle employees were recalled after President Edsel B. Ford telegraphed orders to re-open all plants. In connection with the purchase of coal the only statement obtainable was that it was secured at a "fair" price. There is no doubt that the rescinding of Interstate Commerce Commission order No. 23 made this re-opening a possibility, and it has likewise benefited all Michigan industries. Unemployment contingent upon the Ford shut-down was accurately recorded in the figures of the Detroit Employers' Association as of Thursday, Sept. 21, which showed a decrease of 74,000 as compared with the figures issued a week previous. It will probably be a week or two before these figures return to their former level, as some parts manufacturers have accumulated stocks and there have been reduced schedules in effect since Sept. 15, at several of the local automobile plants. This is reflected in price cuts announced during the week by one important maker of motor cars.

The State fuel administrator does not expect any drastic conservation of fuel and at the present time has some coal available for distribution. In his opinion industries will be able to operate without interruption. Several Michigan cement plants have resumed operations, the wet process mills stating they have enough fuel in sight to carry them until their usual seasonal shut-down shortly after the first of the year. While there is not the volume of construction work which reasonably would be expected if conditions were favorable at this time of year, there is evidence that activitives will not fall away later in the season as in other years.

Stove and furnace manufacturers report increases in the demand for furnaces, mostly in replacements. With more open-top equipment available, builders are expecting relief in securing materials. The Pere Marquette has restored all trains withdrawn some weeks ago.

Analyses of coals from 25 States and Alaska are given in bulletin 193, "Analyses of mine and car samples of coal collected in the fiscal years 1916 to 1919," by Arno C. Fieldner, Walter A. Selvig, and J. W. Paul, issued by the United States Bureau of Mines. Information includes heating values. The distribution of the bulletin will be through the Superintendent of Documents, Government Printing Office, Washington, at a price of 35 cents per copy.

CONTENTS

September 28, 1922

Recent Developments in Fatigue of Metals 779
Effects of Heat Treatment—Testing Machine Now Used—Endurance Limit Defined—Machine Design and Localized Stress

Alloy Castings from Electric Furnaces 784
Nickel, Chromium and Chrome-Nickel Steel Made on Pacific Coast—Their Production, Properties and Heat Treatment

Pearlitic and Sorbitic Manganese Steels 786
A Plea for Castings Containing About One Per Cent Manganese—Their Heat Treatment and Properties

Influence of Mass in Heat Treatment 788
Rôle of Nickel, Chromium and Molybdenum in Counteracting Effect of Size—Experimental Data on ½-in. to 3-in. Sections

Growth of American Alloy Steel Industry 791
Statistics Since 1909—Record in Alloy Steel Castings—Output from Electric Furnaces—Rôle of Heat Treatment

Tensile Tests of Cast Iron at Various Temperatures 793
Results of Work Done on Annealed Bars in a Special Apparatus—Comparison with Steel Under Similar Conditions

Electricity Applied to Industrial Heating 799
American Electrochemists Conduct Symposium at Montreal Meeting—Equipment for Heat Treating Steel—Lower Temperature Applications

Tariff Commission Now More Important 807
May Make Broader Investigations and Recommend Rates—Possible Changes in Metal Schedule—Powers of the President

Comprehensive Exhibit of Machine Tools 811
New Haven Branch of American Society of Mechanical Engineers Sponsors Show and Meeting

Industrial Progress Continued in August. 790
Steel Treaters Week at Detroit..... 795
Blast Furnace Operations..... 802
St. Louis Blast Furnace Record..... 802
New Plate Planer 803
Wrought Iron from an Old Chicago Bridge 803
Cost of Living Stationary..... 803
Power Feed Hollow Chisel Mortiser..... 804
Lathe for Turning Commutators in Place. 804
Semi-Automatic Machine for Sharpening Hobs and Form Cutters..... 804
Bench Type Marking Machine..... 805
Extension Grinding Spindle Attachment.. 805
Safety Wheel Dresser for Vertical Surface Grinder 806
Nitrol, New Case Hardening Compound.. 806
Calcium Silicide as a Deoxidizer..... 806
Simple Device for Determining Critical Point in Steel 806
Tariff Is Approved by Manufacturers... 809
Refractories Statistics 810
New Bethlehem Export Company..... 813
Steel Bounties Aid Japanese Merchant Marine 813
Much British Coal Arriving..... 813
Prices of Steel Castings Are Advanced... 814

Editorials 818
Two-thirds Increase in Steel Output—High Prices and Prosperity—Electric Industrial Heating—Canada's Depression in Steel—Economics and Markets.
Correspondence 820
Improvements in Fuel Utilization a Factor in Economic Readjustment.
Pittsburgh Base Case Hearings..... 821
Ordnance Plant to be Converted Into Repair Shop 821
THE IRON AGE and its Readers..... 821
Proposed Youngstown Merger..... 827
British Market 835
Business Conditions 835
Gear Meeting Program..... 835
Lower Rates on Pig Iron..... 836
Export Market 836
Railroad Buying 838
No Surplus Cars..... 841
Increasing Coke Production in Connellsville Region 841
Iron and Industrial Stocks..... 851
Trade Changes 852
Plans of New Companies..... 852
New Trade Publications..... 853

Iron and Steel Markets 822
Comparison of Prices 823
Prices Finished Iron and Steel, f. o. b. Pittsburgh 837
Non-Ferrous Metal Market 839
Personal Notes 840
Obituary Notes 841
Machinery Markets and News of the Works 842
New York Jobbers' Prices 854

ESTABLISHED 1855

THE IRON AGE

EDITORS:

A. I. FINDLEY WILLIAM W. MACON GEORGE SMART

CHARLES S. BAUR, *Advertising Manager*

Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

F. J. Frank, *President* PRINTED IN U. S. A. George H. Griffiths, *Secretary*

Owned by the United Publishers Corporation, 239 West 39th Street, New York. H. M. Swetland, Pres.; Charles G. Phillips, Vice Pres.; A. C. Pearson, Treas.; F. J. Frank, Secy.

BRANCH OFFICES: Chicago: Old Colony Building. Pittsburgh: Park Building. Boston: 140 Federal Building. Philadelphia: 1420-1422 Widener Building. Cleveland: Guardian Building. Detroit: 317 West Fort St. Cincinnati: Mercantile Library Bldg. Buffalo: 881 Ellicott Square. Washington: 816 Fifteenth St., N. W. San Francisco: 320 Market St. London, Eng.: 11 Haymarket, S.W.1.

Subscription Price: United States and Possessions, Mexico, Cuba, Shanghai, $6.00; Canada, $8.50; Foreign, $12.00 per year. Single copy 25 cents.

Entered as second class matter, June 18, 1879, at the Post Office at New York, New York, under the Act of March 3, 1879.

Two-Thirds Increase in Steel Output

This year's steel ingot output will be approximately two-thirds greater than that of last year. A fairly close approximation of the production in the first eight months of this year can be made by using the output of the 30 companies that make monthly returns to the American Iron and Steel Institute as a basis, and allowing for the production not reported. Production in the present month may be estimated at approximately 60 per cent of capacity, while a forecast of a 65 per cent operation during the fourth quarter cannot be far out. It would require an average error of 7½ per cent in this forecast to make a difference of a single million tons in the year's total. On these assumptions the steel ingot output by quarters in 1922 would be as follows:

	Gross Tons
First quarter	6,650,000
Second quarter	9,050,000
Third quarter	8,000,000
Fourth quarter	8,400,000

The year's total would compare as follows:

	Gross Tons		Gross Tons
1912	30,284,682	1918	43,051,022
1913	30,280,130	1919	33,694,795
1914	22,819,784	1920	40,881,392
1915	31,284,212	1921	19,224,084
1916	41,401,917	1922	32,100,000
1917	43,619,200		

The percentages used in estimating production in the last four months of this year were applied to an assumed capacity of 52,000,000 tons. On this basis the year's output would be 62 per cent of capacity, against about 37 per cent for 1921.

In this department of THE IRON AGE for Feb. 2, 1922, it was argued that it was almost certain that this year would show a large increase in pig iron and steel production over 1921, even though the year should not prove anything like a "good" one; but it may be recalled that the trade did not feel assured that the year would be at all good. The 1921 output would be exceeded, of course, but it was not so certain, in the minds of many, that the rate of ingot production attained at the end of October, 1921, about 25,000,000 tons, would be materially exceeded, on an average. As a matter of fact, the rate promptly dropped to less than 20,000,000 tons in December. The 1922 output, however, as now forecast, at two-thirds more than the output of 1921, is more than one-fourth greater than the highest rate attained in the second half of 1921.

As compared with the best pre-war years, 1912 and 1913, the present year shows a gain of 6 per cent in steel output. There is a decrease in steel exports for 1922 as compared with 1912-13 equivalent to something like half a million tons of ingots, while there is also a decrease in manufactures of steel. If the equivalent ingot tonnage against all exports of steel and manufactures of steel were deducted, the production of steel for purely domestic consumption would show an increase of 10 per cent or more, by comparison with 1912 and 1913.

At long range view it is no small thing to beat the record of those two years immediately preceding the war. The tacit assumption that records in steel output are made only to be beaten held good fairly well before and during the war, but obviously does not rest upon any guaranteed foundation. While the 32,000,000 tons of ingots for this year compares with 30,000,000 tons in 1912 and 1913, it may be set also against the fact that the 25,000,000 tons made in 1910 was a record output in its time, while only five years earlier, in 1905, it required less than 20,000,000 tons to make a record. The pre-war high is quite different from the pre-war averages.

High Prices and Prosperity

The view has been put forth that the coal and railroad strikes have not been an unmixed evil because they have prolonged the current buying movement in the iron and steel market and have caused prices to advance much further than otherwise would have been possible. It has been argued also, in the same connection, that an acute car shortage, such as seems to be in prospect now because of the release of dammed-up coal traffic at a time when the fall grain movement is getting under way, will tend further to extend the duration of the present sellers' market by limiting both production and shipments.

If such thinking is sound, crippled transporta-

tion and interrupted coal output should be regarded as economic benefits, and another strike in the bituminous fields, which appears to be inevitable next year, should be welcomed. Thoughtful men, however, put quite a different interpretation on the present trend of iron and steel prices. This is true of sellers as well as of buyers. After listening recently to a prediction that pig iron would reach $50 on the present advance, a prominent pig iron broker replied that such a market would be nothing short of a calamity. And why?

Advances in prices are not undesirable per se. Under certain conditions they would be welcomed. The broker was not moved by predilection for the bear side of the market but rather by a fear lest the economic situation, already out of adjustment, become more unbalanced. Trade, after all, is an exchange of commodities. If prices of some products remain nearly stationary while those of others advance sharply, it is obvious that the ability and willingness of the producers of the first group of commodities to buy those of the second group will be reduced.

Farm products have risen little above the pre-war level and yet because of the coal strike and the railroad shopmen's strike, coal and iron and steel, basic materials, have advanced markedly, forcing up the prices of many things which the farmer consumes. The farmer buyers' strike which followed the precipitous decline in agricultural products had begun to die out this year with the sharp deflation in the prices of manufactures. That it may break out again is the fear some observers of business tendencies have not hesitated to express, and it is undeniably a cloud on the horizon.

Electric Industrial Heating

Rapid strides have been made in the application of electricity to industrial heating on a commercial scale. Convincing proof of this is the success of the symposium on this subject which American electrochemists conducted last week at their annual meeting in Montreal. Again this organization has been first to carry through a technical program on a new development. Its symposium on electric cast iron at Baltimore last April was notable.

Electricity applied industrially as a source of heat is no longer limited to the melting of ferrous and non-ferrous metals, the field of its most conspicuous successes. In recent years electric heating furnaces have established a place in several industries where lower temperatures rule than those required in the melting or refining of metals. Chief among these uses are the heat treatment of iron and steel and non-ferrous metals and alloys, the annealing of glass, the baking of enamels, the glazing of ceramics and the generation of steam.

The use of electricity as a source of heat has assumed commercial importance in all these fields, especially in the heat treatment of steel. In the enameling industry, particularly for automobiles, it is estimated that electricity furnishes 90 per cent of the heat now used. Its application to glass and ceramics has not been so extensive.

Because of ease of regulation, freedom from oxidizing and other gases, cleanliness and other considerations, over-enthusiasm as to the use of electricity has resulted in some mistakes and misapplications, as well as in extravagant claims. Manifestly there are cases in which other fuels are cheaper in the last analysis. It is to be said, however, that accuracy of control in heat treatment, resulting in a superior product handled more quickly and in larger quantities, is a vital consideration neutralizing the higher cost of electrical heat. But satisfaction and success in the operation depend greatly on proper equipment.

The Montreal symposium has served well to call attention to the mistakes that have been made, to the different kinds of equipment suited for certain work, and to the lines on which further progress will be made. It has been well said that a furnace must be designed with as much care and in such variety as machine tools are designed, for it is not simply a pile of bricks with a torch in it. Too much has been taken for granted in many cases and electric furnaces of low efficiency or doubtful economy have been applied to the wrong use. In no field are results more dependent upon direction by a resourceful engineer.

Canada's Depression in Steel

Acute depression persists in the Canadian steel industry. Production of both pig iron and steel has fallen below anything recorded in the past fifteen years. Monthly rates in gross tons for various years have been as given below:

	Pig Iron	Steel Ingots and Castings
1922 to Sept. 1	32,000	37,000
1921	50,000	56,000
1920	81,000	92,000
1918	89,000	140,000
1908	47,000	44,000

The rate for the first eight months of this year is only about 64 per cent of that in 1921—a year in which output in the United States was at minimum in relation to capacity. At the close of last month only three blast furnaces out of 17 in Canada were operating. The contrast with improving conditions in the American industry is marked.

The steel industry of Canada is far more dependent than that of the United States on the purchasing power of the railroads. There is no automobile industry and no widespread building campaign as on this side of the line. The present Canadian depression is due largely to the inability of the railroads to buy new equipment, even though sorely needed. Lack of coke and coal is also a factor. The dispute in the Nova Scotia coal industry has aggravated the situation and a deadlock between the railroads and their shop employees over a reduction in wages was for a time a serious menace. In general the industrial situation has been very precarious. Crop prospects, which for a time were unfavorable due to drought in portions of the Saskatchewan and Alberta districts, have turned for the better and the outlook is now for larger yields in the principal crops than in 1921. Strike settlements in the United States will be helpful and a gradual increase in railroad buying, following an almost unprecedented abstention over 18 months, should

give work to the steel companies. Heretofore they have found home demand affected by betterment in the United States, though never before has the response been so slow.

Economics and Markets

Right thinking along economic lines is undoubtedly increasing. The stimulus is necessity, not desire. The disruptions incident to the war have made economic laws work fast and with severe effect so that these laws cannot be lightly regarded as before the war.

It is helpful to reflect how right thinking on economic lines is handicapped by the constant attention given to market prices and market conditions. Every one wishes to sell goods or service. The conditions that make for a good market in the individual case are often not the conditions that make for economic progress in general. Yet economic progress is for the good of all, making for permanent benefit.

Here is really a complete antithesis. Something occurs that improves the market for the individual, yet at the same time it acts to retard the economic progress of the country. Unbiased reflection would discern both the good and the bad in that development, but as each one thinks for himself the good is impressed on the mind, the bad is not. Vice versa, a development may occur that injures a given market yet improves the economic position of society.

The individual probably feels that he is fully capable of appraising these things at their true value, giving due weight alike to the particular influence and the general influence when these are divergent in character, but in actual practice, in the crowded activities of the day, the necessary poise cannot be held to avoid over-rating the importance of the temporary influence as compared with the permanent influence. We are so busy with, and so full of, the details of "the market" in which we must sell our goods or services that we are handicapped in considering the general economic trend of the developments. The remedy is to recognize frankly that circumstances impose upon us what is virtually a personal equation, something that one must allow for, in reaching his general conclusions.

These cases of developments having opposite influences are numerous and varied. To illustrate, a condition develops in which the railroads are unable to place as many cars as the shippers desire for moving their goods. Particularly if one is a purveyor of railroad supplies the immediate influence is that the railroads must now buy more cars or locomotives, which will help to make business "good." The underlying and less recognized point is that the railroads lose revenue, and the country loses in productive accomplishment, by every car that is not placed when it is wanted. It would be better if transportation occurred without any work at all having to be done. Then we could make and wear more suits of clothes in a year, or produce and wear out more automobile tires, or take more afternoons off to play golf. Obviously we should be better off if transportation did not involve making and operating rolling stock. Or, again, in coal, if mining or transportation is difficult more money is paid and received for coal. This may be good temporarily for the coal producer, but developments involving the use of coal are hindered and the demand in future will be less, when the largest possible demand will be desirable to furnish employment for the capital invested.

Upon the public mind in general the great notoriety that is given to restrictions in supplies of commodities and advances in prices due to uneconomic conditions, and the little advertising received by developments that make for economies, the saving of material and mental and physical effort, militate against a proper appraisal of what makes for society's permanent progress and advancement. Transient market conditions should not crowd out of mind a full appraisal of what the economic trends will bring.

Iron ore importations have increased rapidly in the last few months and represent a movement of significance. The receipts for June and July were 300,500 gross tons or 80 per cent of the total for the seven months of this year; 257,000 tons of the 300,500 came from Sweden and Cuba, about equally divided. Compared with previous movements, the present is the largest since 1913, when the importations were 216,230 tons per month. In 1920 receipts of foreign iron ore were 101,120 tons per month and very much less in 1919 and 1921. At the rate at which importations are now coming the 1922 movement will probably exceed that before the war. Due to high cost of transportation on American railroads, ore from Sweden and Spain can be delivered to Pennsylvania blast furnaces at considerably less per unit than can the ores of Lake Superior.

CORRESPONDENCE

Improvements in Fuel Utilization a Factor in Economic Readjustment

To the Editor:—A survey of the world's natural resources and of its agricultural possibilities certainly would show no scarcity, or immediate prospect of a scarcity, of any of the raw materials essential to the present-day needs of man, varied and enlarged as are those needs with the civilized peoples. The obvious problem then in the economic restoration and continued well-being of the world's material affairs is to make these resources available under practicable cost conditions and to distribute them cheaply to the ultimate users. The degree of effectiveness attained with respect to the production and transportation of materials and commodities has been for some time one of the more or less vain boasts of the modern civilized man. But the results attained in these fields of man's endeavors to live and to live well have at times been offset or nullified by the continued, and in most cases unnecessary, inefficiency in the utilization of these natural materials and of the direct or intermediate products from them.

This inefficiency is especially true with respect to the use of coal for all purposes. The ordinary steam engine hardly realizes more than 10 per cent of the

total heat energy of the coal, and improved steam turbine engines and electrical operations based on the use of coal do not often attain to an efficiency greater than 15 per cent. This condition has led to belated but sound endeavors to improve the methods and equipment for the use of coal. The most promising efforts are directed to the special treatment of the coal in various ways for the different ends desired.

The present developments relating to the treatment of coal are most involved in methods, fundamentally similar but variously applied, by which the crude material is submitted to a low heat, thereby recovering some of the volatile gases and the oil and by-products, reconsolidating the residue by improved briquetting methods so that it becomes a very desirable hard fuel, better than the original coal and equal to the best coal for most purposes. The value of the gas, oil and by-products, and the enhanced value of the prepared coal products, are from two to three times as much as that of the untreated coal generally and in some cases coal which is practically unusable can be utilized by this method, which is variously called low temperature treatment or carbonization. New equipment and better technic have so increased the results from this method of coal treatment that it is likely soon to be very widely established, not only for low grade coal but also for coal now considered of the best quality.

The method, speaking very generally, is based on a regulated low heat variously applied to the exterior of a specially designed retort in which the coal, usually crushed fine, is placed. These retorts are continuous in operation and, while comparatively costly to install, are very cheap in operation. Its first applications in America are being determined by geographical considerations connected with the location of suitable low grade coal deposits tributary to a sufficient market and removed from the competition of cheap and good coal available through cheap transportation for present requirements. However, ultimately the idea may be substituted completely for the present wasteful and ineffective methods of the direct use of natural coal of any grade for fuel or power purposes.

Other plans for the conservation and better utilization of the great potential wealth stored by nature in the coal beds propose to convert the coal directly into gas at the mine and to convey the gas to distant centers of consumption. Another plan is to make "mouth-of-mine" electricity and to transmit this concentrated form of heat and energy to points of use.

It seems certain that the old methods of using coal direct for heat and power will be superseded soon and that thereby a new and large source of supply of oil, gas, ammonia and chemical by-product, all materials essential to present-day industrial needs, will be created. The need of the change of method in the use of coal is related to fundamental considerations based on the part which energy sources and supply must play in the development of the present-day complex industrial needs. The factor of waste in transportation is also becoming of increased concern as the volume and demands of modern conditions become more intense and varied. It is this matter of cost of delivery of the energy which is one of the largest considerations in the new movement to make better and different use of the energy possibilities of our fuels. The whole business is in its beginning, but the records of actual accomplishment and the special needs of the day will surely compel its rapid realization.

KIRBY THOMAS
Consulting Engineer.

New York.

Larger Earnings of Steel Workers

WASHINGTON, Sept. 26.—While the number of employees in the iron and steel industry declined from 155,030 in July to 153,260, or 1.1 per cent in August, in 125 establishments, the semi-monthly payroll increased from $6,523,949 in July to $7,424,212, or 13.8 per cent in August, according to the Bureau of Labor Statistics Department of Labor. The ratio of increase in per capita earnings was 15.1 per cent in August over July.

Pittsburgh Base Case Hearings

WASHINGTON, Sept. 26.—The Federal Trade Commission has not as yet determined the date or place for the resumption of hearings in the Pittsburgh base case. It was originally intended by the commission to renew the proceedings for the purpose of submitting additional direct testimony the fore part of the present month, but it is understood that the work of preparing for the testimony has delayed the time for resuming the hearings. It is now stated that they may not be begun for two or three weeks. While it has not been definitely decided upon, consideration has been given by representatives of the commission to the taking of additional testimony in Pittsburgh. After this is submitted, the Steel Corporation will present its side, to be followed by rebuttal testimony of the commission.

New York Steel Treaters to Try to Secure 1923 Convention for New York

A serious attempt has been inaugurated by the New York chapter of the American Society for Steel Treating to secure the 1923 national convention and exposition for New York City. A resolution was passed at the September meeting, Sept. 20, authorizing the officers of the local chapter to go to the Detroit convention next week and put forth every possible effort to achieve success.

Ordnance Plant to Be Converted Into Repair Shop

The ordnance plant of the Crucible Steel Co. of America at Harrison, N. J., built during the war to meet the demands of the United States and its Allies, and which has been idle for the greater part of the time since the ending of hostilities, will be converted into a locomotive repair shop. At the present time, there is urgent demand for such a shop.

Reduced Rate on Imported Iron

WASHINGTON, Sept. 26.—The Interstate Commerce Commission has permitted the Chesapeake & Ohio Railroad to put into effect a rate of $2.25 per gross ton to Lynchburg and $1.50 to Richmond, Va., from Newport News, Va., on imported pig iron.

The Iron Age and Its Readers

THE full text of the Metal Schedule of the Fordney-McCumber tariff act, which became a law at midnight on Thursday, Sept. 21, was given to IRON AGE readers in last week's issue. Many and important changes were made in the duties on metals and their products, particularly in duties imposed on various raw materials of iron and steel manufacture.

Our readers have learned to depend upon THE IRON AGE for information found nowhere else in the business press. No other publication of last week contained the text of this metal schedule, whose provisions and their effect have been so widely discussed among producers and consumers of iron and steel and other metals, and with it the corresponding duties of the Underwood-Simmons act and the Payne-Aldrich act.

As it has done with other tariffs, THE IRON AGE is reprinting in pamphlet form the new Metal Schedule and the duties in the two tariff acts which preceded it. Copies will be sent to any of our subscribers who ask for them.

Iron and Steel Markets

OVER 1,000,000 TONS OF RAILS

A Week of Unusual Buying Before the $43 Price Applies

Production Higher and Pig Iron and Steel Prices Easier—Car Shortage Hampers Greatly

The placing of large orders for rails at the $40 price, which on Oct. 1 is replaced by $43, has given the steel trade what is probably the most active week in railroad material it has ever known. All the important lines in the country and many smaller ones have either contracted for their 1923 rails, wholly or in large part, or made reservations which will become definite tonnages a little later. In the Chicago district this business amounts to about 450,000 tons and will be 500,000 tons by the end of the week. In the East nearly as much more is reported. Adding orders which will go to the Alabama and Colorado mills gives a total well above 1,000,000 tons.

In the above calculation the New York Central's quota is put at 125,000 tons, the Pennsylvania's at 80,000 and that of the B. & O. at 35,000 tons. These amounts are expected to be increased in the final negotiations.

The remarkable run of locomotive buying which followed the railroad shopmen's strike has kept up, the past week's orders being for 136, while fully 350 are pending. The latter include 100 for the New York Central, whose last two orders were for 240 in all. The week's total of new cars is 4450 and 8200 more are under negotiation.

In operations the industry has worked up close to 70 per cent of capacity, which represents rapid betterment in the past three weeks. But there is little hope of improving on this rate. The fear is that it may not be maintained, since car shortages have caused the piling up of considerable finished steel at mills, and some blast furnaces recently blown in have had to pile pig iron in their yards. Cars and motive power will be the gage of operations for a good many weeks.

However, the increase in fuel supply has been enough to relieve the tension in finished steel and to check, at least for the time, the upward tendency of prices.

Of the advance of $3 a ton in wire products, made by independent producers early in the month, $1 has come off this week, but the American Steel & Wire Co.'s prices apparently have gone up $2, making a more nearly uniform market than has been seen in months.

There are more indications, also, of a 2c. to 2.10c. range by the Steel Corporation on plates and shapes and of 1.95c. to 2c. on some of its bar business. At the same time 2.25c. is more commonly the maximum on new business in these three products that has gone to independent mills.

With a seasonal decrease in structural orders, fully one-third of the week's contracts have been for tank work. A new sheet mill building at Weirton, W. Va., calls for 2000 tons. In plates, locomotive firebox steel is the strong feature. On the Lakes a 600-ft. ore boat, taken by a Detroit yard, will mean 5000 tons of steel.

Generally speaking, it has been a quiet week for finished steel apart from rails.

Owing to increase in production and the waiting policy of many buyers, pig iron prices have developed a decided tendency downward and in some centers in the North quotations are from $1 to $3 lower. In the South, sales have been made at $27.50 and even higher, but the $27 quotation still prevails and resale Southern iron has been disposed of at $26. A very unusual recent shipment was 5000 tons of iron taken by lake vessels from Duluth to Buffalo and thence by rail to New England consuming points. Basic iron has declined $2 in eastern Pennsylvania. Foreign iron continues to dominate the Atlantic Coast markets.

Makers of beehive coke have made sales at an advance of 50 cents and more in the week. Car shortages rather than labor troubles are limiting production, the strike in the north portion of the Connellsville district being on the wane.

Prices of 80 per cent ferromanganese, under the new duty of $33.60 a ton, have not been established, since duty-free imports of the British product have been heavy in recent weeks. It remains to be seen how much of the new duty British producers will absorb and how far, in a competitive market, domestic consumers will get the benefit of the duty-free manganese ore brought in before Sept. 22. Similar uncertainties exist in the market for high-grade ferrosilicon, on which the duty was 15 per cent (or $7 to $9 per ton) and is now 2c. per lb. of contained silicon.

Pittsburgh

Car Shortages Curtail Shipments—Pig Iron Prices Lower

PITTSBURGH, Sept. 26.—Rising tendency of iron and steel production in this district, which has been marked over the past two weeks, is likely to be checked by car shortages, which already have seriously curtailed shipments and have resulted in the piling up of a considerable tonnage. Storage space is becoming exhausted in practically all districts because of the inability of the railroads to take care of the increased production. The problem of the most favored producer in this district is in getting finished material away from the mills. The scarcity of labor still is largely unrelieved and likely to continue so long as the weather is favorable enough to make outdoor work more attractive than indoor occupations.

On top of these developments there is a possibility of a fresh shortage of fuel, due to the fact that production of coal, like the shipments of steel, is affected by an insufficient supply of empty cars. The bulk of the current production of coal is being shipped to distant points and there is so much congestion at terminal

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At date, one week, one month, and one year previous

For Early Delivery

Pig Iron,	Sept. 26, 1922	Sept. 19, 1922	Aug. 29, 1922	Sept. 27, 1921
Per Gross Ton:				
No. 2X, Philadelphia†	$34.26	$34.26	$34.14	$21.84
No. 2, Valley furnace†	*33.00*	33.50	33.00	21.00
No. 2, Southern, Cin'ti†..	31.05	31.05	27.05	23.50
No. 2, Birmingham, Ala.†	27.00	27.00	23.00	19.00
No 2 foundry, Chicago**..	32.00	32.00	30.00	22.00
Basic, del'd, eastern Pa..	*29.00*	31.00	28.64	19.25
Basic, Valley furnace....	34.00	34.00	30.00	19.25
Valley Bess., del. Pitts...	35.77	35.77	33.76	21.96
Malleable, Chicago*	32.00	32.00	30.00	22.00
Malleable, Valley	34.00	34.00	33.00	20.50
Gray forge, Pittsburgh...	*34.27*	37.77	34.76	21.96
L. S. charcoal, Chicago..	36.15	36.15	36.15	31.50
Ferromanganese	67.50*	67.50	67.50	60.00

*C if.

Rails, Billets, Etc.,				
Per Gross Ton:				
O.-h. rails, heavy, at mill.	$40.00	$40.00	$40.00	$47.00
Bess. billets, Pittsburgh..	40.00	40.00	38.00	29.00
O.-h. billets, Pittsburgh....	40.00	40.00	38.00	29.00
O.-h. sheet bars, P'gh....	40.00	40.00	38.00	32.00
Forging billets, base, P'gh	45.00	45.00	43.00	34.00
O.-h. billets, Phila.....	45.17	45.17	45.17	35.74
Wire rods, Pittsburgh....	*45.00*	47.50	45.00	41.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	2.00	2.00	2.00	1.60
Light rails at mill.....	2.25	2.25	2.00	...

Finished Iron and Steel,				
Per Lb to Large Buyers	Cents	Cents	Cents	Cents
Iron bars, Philadelphia...	*2.475*	2.575	2.325	1.95
Iron bars, Chicago.....	2.25	2.25	2.25	1.75
Steel bars, Pittsburgh....	2.00	2.00	2.00	1.60
Steel bars, Chicago.....	2.10	2.10	2.35	1.75
Steel bars, New York.....	**2.44**	2.34	2.34	1.98
Tank plates, Pittsburgh..	2.25	2.25	2.00	1.60
Tank plates, Chicago.....	2.30	2.30	2.20	1.65
Tank plates, New York..	2.49	2.49	2.34	1.98
Beams, Pittsburgh	2.00	2.00	2.00	1.60
Beams, Chicago	2.20	2.20	2.35	1.75
Beams, New York.....	**2.44**	2.34	2.34	1.98
Steel hoops, Pittsburgh...	2.75	2.75	2.75	2.25

**The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Sheets, Nails and Wire,	Sept. 26, 1922	Sept. 19, 1922	Aug. 29, 1922	Sept. 27, 1921
Per Lb to Large Buyers	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh	3.35	3.35	3.35	3.00
Sheets, galv., No. 28, P'gh	4.35	4.35	4.35	4.00
Sheets, blue an'l'd, 9 & 10	2.50	2.50	2.50	2.25
Wire nails, Pittsburgh....	**2.70**	2.60	2.60	2.90
Plain wire, Pittsburgh....	**2.45**	2.35	2.35	2.60
Barbed wire, galv., P'gh..	**3.35**	3.15	3.15	3.55
Tin plate, 100 lb box, P'gh	$4.75	$4.75	$4.75	$5.25

Old Material,				
Per Gross Ton:				
Carwheels, Chicago $24.50	$24.50	$22.50	$15.00	
Carwheels, Philadelphia...	23.00	23.00	19.00	17.00
Heavy steel scrap, P'gh..	**21.50**	21.00	18.50	14.00
Heavy steel scrap, Phila..	18.00	18.00	15.50	11.50
Heavy steel scrap, Ch'go..	**18.50**	18.00	17.00	11.75
No. 1 cast, Pittsburgh....	24.00	24.00	19.00	17.00
No. 1 cast, Philadelphia.	23.00	23.00	19.00	17.00
No. 1 cast, Ch'go (net ton)	21.00	21.00	20.00	13.50
No. 1 RR. wrot., Phila....	22.00	22.00	18.50	15.50
No. 1 RR. wrot., Ch'go (net)	17.50	17.50	15.50	11.50

Coke, Connellsville,				
Per Net Ton at Oven.				
Furnace coke, prompt. .	**$12.00**	$11.50	$10.00	$3.25
Foundry coke, prompt...	**13.00**	12.50	12.00	4.25

Metals,				
Per Lb to Large Buyers	Cents	Cents	Cents	Cents
Lake copper, New York..	**14.25**	14.12½	14.12½	12.25
Electrolytic copper, ref'y.	13.75	13.75	13.75	12.12½
Zinc, St. Louis.....	**6.87½**	6.65	6.25	4.35
Zinc, New York.....	**7.22½**	7.00	6.60	4.85
Lead, St. Louis.....	**6.25**	5.90	5.55	4.45
Lead, New York.....	**6.50**	6.25	5.90	4.70
Tin (Straits), New York.	**32.50**	32.12½	32.30	26.75
Antimony (Asiatic), N. Y.	6.75	6.75	5.25	4.60

Composite Price, Sept. 26, 1922, Finished Steel, 2.433c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel

Sept. 19, 1922,	2.419c.
Aug. 29, 1922,	2.412c.
Sept. 27, 1921,	2.236c.
10-year pre-war average,	1.689c.

Composite Price, Sept. 26, 1922, Pig Iron, $32.54 Per Gross Ton

Based on average basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Sept. 19, 1922,	$32.52
Aug. 29, 1922,	29.52
Sept. 27, 1921,	20.10
10-year pre-war average,	15.72

points, not to mention the poor condition of so much of the railroad motive power, that long periods are consumed between the departure and return of cars to the mines. A very tight situation appears to be immediately ahead. However, the relief which has been afforded the industry by the comparative abundance of coal since the settlement of the strike has permitted production to increase sufficiently to bring about an easier supply situation and to halt, at least temporarily, the upward tendency of prices. The market appears to have crystallized at 2c. to 2.25c. for plates, shapes and bars, and while there are occasional sales of small lots of plates, as high as 2.50c., the more common maximum is 2.25c., and reasonably early deliveries are being promised at that figure.

The advance of $3 per ton in wire products, set up by independent producers early in the month, has been partially lost in the past week when the American Steel & Wire Co. made an advance of $2 per ton and most independents receded to that level. Independent sheet makers have firmer price ideas because it is claimed that with sheet bars at $40, recent prices will not let them out with a profit. The Steel Corporation sheet-making subsidiary, however, still is taking on moderate tonnages from its regular customers, at the old prices.

Increased pig iron production is reflected in a slightly softer market, but the downward slant of prices is likely to be short lived, since coke prices again are moving up strongly and this may deter blast furnace resumptions. The scrap market has lost none of its recent strength.

Pig Iron.—As a result of the resumption by a merchant furnace in the Valley district and sales from this furnace, it is once more possible to quote foundry iron from a Valley basis. This interest has taken about 1000 tons for October delivery on a basis of $33, furnace, for No. 2 grade. It is doubtful, however, whether this price could be duplicated because iron cannot be brought in from other districts at a price that low, and neither the seller of this lot nor other producers in the Valley district would go that low to secure an order. Some makers say $35 is as low as they would take business and they feel that this is little enough with coke commanding $12 per ton or more at ovens. There has been no change in the prices of the steel-making grades from Valley furnaces, $34 still being quoted on both basic and Bessemer products in that district. Sales at that level, however, are somewhat

difficult for shipment in this direction, since the Cambria Steel Co. is a seller and recently took 2000 tons of basic at $30, f.o.b. Johnstown, for shipment to a West Virginia sheet maker. The freight rate to consuming point from Johnstown is $2.52, which would be equivalent to $30.63 at Valley furnaces. The Jones & Laughlin Steel Co. will light its tenth furnace this week. The Cambria Steel Co., Johnstown, now has six furnaces blowing, an increase of one, and the Weirton Steel Co. will turn on the blast this week on the furnace which it banked a few weeks ago. These additions will bring the total number of furnaces in this and nearby districts to 75 out of a total of 139. This is a gain of 25 furnaces since the last week of August, and is only one less than the number in blast at the peak point during July.

We quote Valley [illegible] the Cleveland or Pittsburgh district being $1.76 per gross ton:

Basic	$34.00
Bessemer	34.00
Gray forge	33.50 to 33.50
No. 2 foundry	35.00 to 35.00
No. 3 foundry	33.50 to 33.50
Malleable	34.00

Ferroalloys.—Although the new tariff is a law, domestic manufacturers of ferromanganese have not yet announced prices and probably will be slow to do so until it is fully established that prices of British material are not going to decline, and until there is some assurance of a constant supply of coke. It is impossible to quote domestic material or to give any definite idea of what the price will be. Basing on the present price of British 80 per cent ferromanganese of $67.50 c.i.f. Atlantic seaboard, plus $33.60, which the duty of 1⅞c. per lb. contained manganese means on 80 per cent material, the American price would be $101.10, at seaboard. Hardly enough business lately has been done to determine prices. Spiegeleisen has stiffened in price again, one sale of 3000 tons of average 20 per cent material being noted to a central Ohio steel maker at $38, furnace, as against $37 the recent minimum. On small lots as high as $39 is now being asked.

We quote 78 to 82 per cent British ferromanganese, $67.50 c.i.f. Atlantic seaboard; domestic producers have not yet announced prices. Average 20 per cent spiegeleisen, $38 to $39 furnace; 16 to 19 per cent, $37 to $38; 50 per cent ferrosilicon, domestic, $55 to $60 furnace, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, $50.50; 11 per cent, $53.80; 12 per cent, $57.10; 13 per cent, $61.10; 14 per cent, $64.10; silvery iron, 6 per cent, $39; 7 per cent, $40; 8 per cent, $41.50; 9 per cent, $43.50; 10 per cent, $45.50; 11 per cent, $48.80; 12 per cent, $52.10. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $3.66 per gross ton.

Steel Skelp.—As a number of pipe makers who ordinarily make their own skelp, but who for some time have been buying are once more in production, demand has decreased considerably and sentimentally the market is easier than it has been. While small tonnages of narrow grooved skelp might possibly be sold at 2.50c., the more common maximum is 2.25c. and contract buyers are not believed to be paying more than 2c.

Wire Products.—There has been an increase of $2 per ton in the Steel Corporation prices but a decline of $1 per ton in the independent prices since last account. As of Sept. 21, the American Steel & Wire Co. announced an advance to $2.70 base, per keg, Pittsburgh, for nails; $2.45 base per 100-lb., Pittsburgh, for plain wire and $2.20 base per count keg for coated nails. Most independent manufacturers have adopted these bases and have revised to these prices orders which had been taken at the higher prices recently in effect. The only important exception is in manufacturers' wire, which is scarce, and for which $2.50 base per 100-lb., Pittsburgh, still is obtainable. Prices are given on page 837.

Iron and Steel Pipe.—Makers of merchant steel pipe in the butt weld sizes still are about 60 days behind in their deliveries, and the claim is made that not much progress is being made in reducing obligations because of the scarcity of labor and cars. Few manufacturers, consequently, are benefiting as yet by the advance in prices made Aug. 15, nor can they until old orders are cleaned up. This fact, together with the wage increase which became effective Sept. 1, which the manufacturers are obliged to absorb, finds reflection in frequent intimations of a further advance in prices. Makers are not nearly as heavily obligated on the lap welded sizes as on the small sizes and are making deliveries against new business as promptly as four and five weeks. Lack of heavier bookings in the lap welded sizes is accounted for largely by the depressed condition of the oil industry. It is now stated that the recent 1000-mile line pipe order placed by the Standard Oil Co. of Indiana and the Sinclair Oil Co. with the National Tube Co., will amount to about 125,000 tons. Prices recently announced on wrought iron pipe find very little basis in sales, indeed much of the tonnage moving is at the prices in effect prior to the advance of Aug. 15. Discounts are given on page 837.

Wire Rods.—In keeping with an increase of $2 per ton in wire products, effective Sept. 21, the American Steel & Wire Co. also advanced wire rods to a similar extent, its new price being $45 for No. 5 common soft rods, Pittsburgh or Youngstown. Independent makers who have been making spot sales lately at from $47.50 to $50, are expected to adopt the Corporation price on rods which most of them already have done on wire products.

We quote No. 5 common basic or Bessemer rods to domestic consumers, $45 to $47.50; chain rods, $45 to $47.50; screw stock rods, $50 to $52.50; rivet and bolt rods and other rods of that character, $45 to $47.50; high carbon rods, $52 to $57.50, depending on carbon, per gross ton, f.o.b. Pittsburgh or Youngstown.

Billets, Sheet Bars and Slabs.—While a considerable tonnage of sheet bars recently has been sold in the Youngstown district for both early and fourth quarter shipment at $40, a number of makers have yet to announce prices for the last three months of the year. The common impression is that the price will be $40, but this will be by independents rather than the Steel Corporation. The latter is believed to have so much tonnage due its customers on third quarter contracts that it will seek to ship what is still due, together with moderate additional allotments, at somewhat lower prices than are likely to be named by independent producers. Sales of soft billets of fair size are being done at $40, Pittsburgh. This price, however, refers to early deliveries and slightly less may possibly be named on fourth quarter contracts. There is little interest in slabs, but $40 also is regarded as a fair appraisal of to-day's market on that form. Bessemer capacity in the Youngstown district is operating full this week, while open-hearth operations are 90 per cent of capacity. A leading independent here is operating close to 75 per cent of capacity. The Steel Corporation's leading steel making subsidiary is operating close to 70 per cent, but shipments are below this rate because of car shortages.

We quote 4 x 4-in. soft Bessemer and open-hearth billets, $40; 2 x 2-in. billets, $40 to $42; Bessemer sheet bars, $40; open-hearth sheet bars, $40 to $42; slabs, $40; forging billets, ordinary carbons, $45 to $47, all f.o.b. Pittsburgh or Youngstown mills.

Sheets.—With a market on sheet bars fairly well established at $40, there is an increased disposition on the part of independent producers to seek more money for the finished product. Not only is there the factor of costs, but the leading interest is practically out of the market for tonnages for shipment over the remainder of the year, taking on only such tonnages as will fit in with its schedules and these only from regular customers. This means that independent companies are called upon to supply most of the current demand and on such business $3.50c. base is minimum on black sheets and 4.60c. on galvanized. Independent makers are operating at a very high rate, in the Youngstown district 95 per cent of the mills being in operation, and it is stated that several of them will have completed their third quarter obligations in full by the end of the month, or soon afterward. Inability to obtain sufficient supplies of steel, due to car shortages, checks the leading interest from catching up with its obligations. Prices are given on page 837.

Tin Plate.—Suggestions of independent prices for first quarter of 1923 as high as $5.25 per base box, Pittsburgh, are heard, and the common expectation is that $5 is as low as any of the independents will go for that period. The American Sheet & Tin Plate Co. is silent on the subject of early 1922 prices, and will not

announce them for at least a month. Current demands are seasonably light and are providing no strain upon production. On account of high producing costs, however, concessions from the official quotations of $4.75 per base box are much slighter and less frequent than usual.

Cold-Finished Steel Bars and Shafting.—The demand is good from the automotive industry, but is disappointing from others, especially from the manufacturers of agricultural instruments. Makers depending upon the Carnegie Steel Co. for supplies of hot-rolled bars are not yet getting very large shipments and purchases from independent mills usually are at prices ranging anywhere from 2c. to 2.15c., Pittsburgh, and occasionally higher. The high cost of hot-rolled bars largely explain the firmness in cold-finished stock, which is quoted at 2.50c., base Pittsburgh, for carloads and 2.75c. for less than carloads. Ground shafting is unchanged at 2.90c. base f.o.b. mills, for carloads and 3.15c. for less than carloads.

Hot-Rolled Flats.—The market holds firm at a minimum of 2.75c., base, Pittsburgh, but is 3c. on tonnages wanted promptly and on narrow, light stock. Few makers will consider less than 3c. The automotive industry still is the principal source of demand for strips.

Cold-Rolled Strips.—Demand still is sufficient to support 4.25c., base, Pittsburgh, and even a premium of $5 per ton on a few tonnages is wanted for early delivery. Costs are high on account of steel and labor shortages and there are intimations of an early advance to 4.50c., base.

Steel Rails.—The market on light rails is well established at 2.25c. base, mills, for those rolled from new steel. All makers are quoting this price and a fair amount of business is being entered. Railroads ordinarily served on standard rails from Pittsburgh are reported to be entering orders to escape the $3 per ton advance, effective Oct. 1, but tonnage details are not made public.

We quote 25 to 45-lb. sections, rolled from new steel, 2.25c. base; rolled from old rails, 2c. base; standard rails, $40 per gross ton mill for Bessemer and open-hearth sections.

Steel Chain.—An advance of $10 per ton in steel chain has been announced by leading manufacturers, effective Sept. 20. The new price is 6c., base, Pittsburgh, for proof coil chain. Steel loading chain has been advanced $40 to $90 per ton from the prices named in the last previous list, dated Jan. 4, 1922. Discounts on electric welded bright chain and on cow ties have been cut 5 per cent.

Iron and Steel Bars.—The market is still quotable from 2c. to 2.25c., base, Pittsburgh, on steel bars. The lower price is believed to be as low as the Steel Corporation now will accept business, although it has made no official announcement. Some of the independent makers are trying to "marry" old, low-priced contracts with new ones and this has resulted in some new contracts to replace old ones carrying averages prices well under 2c. Iron bars are firmer with refined bars now quotable at 2.60c.

We quote steel bars rolled from billets at 2c. to 2.25c.; reinforcing bars, rolled from billets, 2c. to 2.25c. base; rail steel reinforcing bars, 1.90c. to 2c.; refined iron bars, 2.60c. in carloads, f.o.b. mill, Pittsburgh.

Structural Material.—Prices show no material change, still ranging from 2c. to 2.25c., according to the size of the order. Structural mill activities lately have been on a rising scale, but they are not catching up very rapidly with their deliveries because of car shortages. Structural inquiries are seasonably light, most of the bookings of fabricating shops being for small tonnages. Bids will be taken this week by Weirton Steel Co., Weirton, W. Va., on its new sheet mill building, for which about 2000 tons of steel will be required. Plain material prices are given on page 837.

Plates.—The market here is quotable generally at 2c. to 2.25c. base, Pittsburgh, but for early deliveries 2.25c. is the prevailing price and 2c., which is believed to be the Steel Corporation price, refers to such tonnages as it can take from its regular customers for indefinite delivery. The Pennsylvania Tank Car Co. recently took 500 tank cars for the Chaplin Refining Co., Enid, Okla. Plates for this order have not yet been placed. Prices are given on page 837.

Boiler Tubes.—Good demand still is reported for steel tubes, both lap welded and seamless, and on the former some makers now are limiting their bookings. Prices are very firm owing to high costs entailed in labor and car shortages. Makers of charcoal iron tubes have not yet announced new prices as they were expected to, following the withdrawal recently of the old quotations. Discounts are given on page 837.

Track Fasteners.—The market is firmer on all products under this head. New prices have not yet been announced on angle bars. On spikes, most makers, including the Steel Corporation, now are quoting 2.85c., base, Pittsburgh, for 9/16-in. and larger and 3.85c., base, Pittsburgh, for track bolts in carload lots. Tie plates have sold as high as $50 per net ton, and $45 now is minimum. There is a brisk demand for small spikes and while one maker here holds to the 3.25c., base, the more common quotation is 3.50c., and there have been sales as high as 3.75c. Prices are given on page 837.

Nuts and Bolts.—There is a good deal of activity on the part of distributors in getting in specifications against third quarter contracts to escape the advance set up early this month and which is applicable to fourth quarter business. Discounts are given on page 837.

Rivets.—Prices are unchanged, but the market is firm because of the scarcity of steel and the fact that buyers still are specifying freely, while there is a very satisfactory amount of new business. Prices and discounts are given on page 837.

Coke.—A further advance of about 50c. per ton has taken place in beehive oven coke prices in the past week, due to the fact that demand still exceeds the supply, since car shortage rather than labor troubles are limiting production. Furnace coke lately has sold readily at $12 and some sales have been made as high as $13 per net ton ovens. On foundry grade, $13 has become the minimum and there has been some business at $14 or more. The strike in the northern portion of the Connellsville district seems to be on the wane as operators in that section lately have had a good many men apply for work.

Old Material.—The market does not yet give sign of having reached the top. Further advances of 50c. to $1 per ton have been established by sales in the past week and so little tonnage of the steel works grades is presently available that some dealers have set $25 as the minimum at which they would sell for delivery over the remainder of the year. Heavy melting steel has been sold at $21.50, at Butler, Pa., and at $22 at Vandergrift and Midland, Pa. Youngstown melters are reported to be smaller buyers than recently, but high prices for Youngstown delivery still are being offered by dealers short against sales at that point. With the markets east and west of Pittsburgh netting higher prices than are offered here, not much scrap is coming to this point.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

	Per Gross Ton
Heavy melting steel	$21.50 to $22.00
No. 1 cast, cupola size	24.00 to 25.00
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va.; Franklin and Williamsport, Pa.	22.00 to 22.50
Compressed sheet steel	19.00 to 19.50
Bundled sheet sides and ends	17.00 to 17.50
Railroad knuckles and couplers	23.50 to 24.00
Railroad coil and leaf springs	23.50 to 24.00
Low phosphorus standard bloom and billet ends	25.00 to 26.00
Low phosphorus, plates and other grades	23.00 to 24.00
Railroad malleable	20.00 to 26.50
Iron car axles	28.00 to 30.00
Locomotive axles, steel	26.00 to 27.00
Steel car axles	24.00 to 25.00
Cast iron wheels	23.50 to 24.00
Rolled steel wheels	23.50 to 24.00
Machine shop turnings	15.00 to 15.50
Heavy steel axle turnings	17.50 to 18.00
Short shoveling turnings	17.00 to 17.50
Cast iron borings	17.00 to 17.50
Heavy breakable cast	19.50 to 20.00
Stove plate	17.00 to 17.50
Sheet bar crop ends	24.00 to 25.00
No. 1 railroad wrought	17.00 to 17.50

Chicago

Production Checked by Car Shortage, But Operations Have Increased

CHICAGO, Sept. 26.—The placing of rail tonnage is proceeding rapidly as the end of the month draws near. Western roads have practically completed negotiations calling for approximately 450,000 tons and the total is expected to reach 500,000 tons before the advanced price of $43 becomes effective. The closing of this business gives local mills a backlog in rails compared with their already heavy commitments in plates, shapes, bars, sheets and other products. The demand for the latter commodities is still of healthy proportions, although not so pressing as earlier in the month. Local mills are either sold up for the rest of the year or so nearly so that there remain only small tonnages of certain sizes which can be added to rolling schedules. Notwithstanding this situation, buyers are less concerned about securing prompt material and are showing a decreasing disposition to pay premiums asked by producers in a position to make early shipment. Users appear to be awaiting developments in the belief that increases in blast furnace and steel works production will relieve the present tension in the market.

It is true that production continues to expand. The Illinois Steel Co. has added a furnace at Joliet, giving it 15 active stacks out of its total of 29, and has increased its steel output to 71 per cent of ingot capacity. The operations of the Inland Steel Co. remain unchanged, but one additional merchant stack is now producing as a result of the blowing in of a second Iroquois furnace. Notwithstanding gains in output, however, producers are severely handicapped by car shortage. While the rules governing the use of open top cars were modified last week to permit shipments in the direction of the mines, the change had hardly been made when the old regulations were restored in all particulars. The result is that practically all open top cars are being used for the movement of coal. Cars with sides under 42 in. in height which may be used for shipping other commodities are exceedingly difficult to find, there being only approximately 85,000 of them in the entire country with the likelihood that many are in bad order. One important local steel interest is also experiencing trouble in obtaining cars at its coal mines with the consequence that output is being interrupted two and three days at a time. This difficulty, together with the congestion of finished material at the mill which is backing up for lack of cars, may force the company to curtail operations again. In some quarters, it is felt that the present car shortage is not so much a lack of cars as a scarcity of serviceable motive power. This idea seems to be borne out by the unusually large number of current orders and inquiries for locomotives.

Pig Iron.—The Steel & Tube Co. of America has blown in a second Iroquois furnace, thereby recovering the ground lost when it was forced to bank an Iroquois stack two weeks ago. This was made possible by improvement in coke production and it is hoped that output will continue to increase sufficiently to permit other merchant furnaces to resume. While pig iron production is better, shipments from furnace are impeded by car shortage. Inquiry is fairly active, but is largely for prompt material. Some forward business is being closed, however, one of the largest orders calling for approximately 2500 tons of foundry for fourth quarter delivery having been placed by a melter in the immediate vicinity. In a few instances, orders have been taken for first quarter shipment at present prices. Among current inquiries is one for 600 tons of foundry for fourth quarter from a Minnesota user. An unusual development was the recent shipment of a cargo of 5000 tons of merchant iron from the Zenith furnace by water to Buffalo and from there by rail to New England destinations. It will be recalled that earlier in the year two water shipments of Buffalo iron were unloaded in Chicago. Southern iron is still difficult to obtain owing to the transportation situation, but a few carloads are managing to get through from time to time and some slight progress toward improvement is being made. Southern quotations range from $27 to $28, Birmingham. The Southern stack which is able to take advantage of the combination water and rail rate is quoting $30.40, f.o.b. furnace, or $34.58, delivered Chicago. Charcoal, low phosphorous and silvery prices remain unchanged. A Michigan melter has closed for 250 tons of charcoal.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil 1.50, delivered at Chicago	$36.15
Northern coke, No. 1, sil. 2.25 to 2.75	33.00
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	32.00
Northern high phos	32.00
Southern No. 2	$33.00 to 35.00
Malleable, not over 2.25 sil	32.00
Basic	32.00
Low phos., Valley furnace, sil. 1 to 2 per cent copper free	38.00
Silvery, sil. 8 per cent	46.29

Ferroalloys.—The new tariff imposes a duty of $33.60 a ton on 80 per cent ferromanganese, but prices have not been definitely determined. Spiegeleisen and 50 per cent ferrosilicon remain unchanged, although it is possible that the tariff may later result in an advance of the latter commodity. Prices are nominal.

We quote 78 to 82 per cent ferromanganese, future, $75.06; prompt, $82.56, delivered; 50 per cent ferrosilicon, $55 delivered on contract and $65 prompt delivery; spiegeleisen, 18 to 22 per cent, $50, delivered.

Plates.—Heavy specifications continue to be received from car builders and tank works, but there has been a decline in new inquiry, particularly for prompt material. Local mills continue to quote 2.10c. to 2.30c., Chicago, but purchases from Eastern mills at higher delivered prices are falling off. Buyers are growing more cautious in their attitude, evidently in the hope that increasing mill production will halt the advancing tendency of prices. The Standard Oil Co. has placed six oil storage tanks, involving about 1500 tons, with the Chicago Bridge & Iron Works.

The mill quotation is 2.10c. to 2.34c., Chicago. Jobbers quote 2.90c. for plates out of stock.

Cast Iron Pipe.—Hanover, Ill., takes bids on 200 tons for 4- to 8-in. to-day. Marshalltown, Iowa, will readvertise for 140 tons. It is felt that considerable demand would materialize if transportation difficulties would clear up. While the railroad situation is slightly improved, it is still difficult to get shipments through from pipe shops, particularly from those located in the South.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $52.20 to $54.20; 6-in. and above, $48.20 to $50.20; class A and gas pipe, $3 extra.

Bars.—Demand for soft steel bars is widespread, but there is less pressure for material for prompt delivery. Leading local mills are quoting 2c. to 2.10c., Chicago, and while some business continues to be placed at higher prices, it involves less tonnage than two or three weeks ago. Buying by the automotive industry has shown little change, notwithstanding the temporary shutdown by the Ford company. The farm implement manufacturers remain the one source of business which is not buying its customary tonnage. Bar iron is firm, but quiet. Hard steel bar mills are well booked and are expected to advance prices in view of rising material costs.

Mill prices are: Mild steel bars, 2c. to 2.34c., Chicago; common bar iron, 2.25c. to 2.50c., Chicago; rail steel, 2c. to 2.10c., Chicago mill.

Jobbers quote 2.80c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 3.80c. for rounds and 4.30c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 2.50c. base; hoops, 3.90c.; bands, 3.55c.

Rails and Track Supplies.—In rails western roads have thus far placed 450,000 tons, with the likelihood that the total will reach 500,000 tons before the end of the month. The rail purchases are usually accompanied by orders for angle bars, which, like rails,

have been advanced, effective Oct. 1, the new price being 2.75c., mill, or $7 above the present quotation.

Standard Bessemer and open-hearth rails, $40; light rails rolled from new steel, 2.15c., f.o.b. makers' mills.

Standard railroad spikes, 2.85c. to 3c., mill; track bolts with square nuts, 3.85c. to 4c., mill; tie plates, steel and iron, 2.25c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.50c. base and track bolts 4.50c. base.

Wire Products.—The leading producer has advanced wire nails, plain wire, annealed fence wire, galvanized wire and cement coated nails 10c. per 100 lb. and per keg respectively, and barbed wire and staples 20c. The new prices are still 5c. lower per product than those quoted by independents. Mill operations are improving slowly, but demand is still in excess of production. Demand is widespread, coming from all sections of the West and South, except Oklahoma and Arkansas. While the market is active, there is no doubt that much of the business now being placed represents accumulated needs which were not satisfied during the period of light production, from which the mills are now emerging. For mill prices, see finished iron and steel, f.o.b. Pittsburgh, page 837.

We quote warehouse prices, f.o.b. Chicago: No. 9 and heavier black annealed wire and No. 9 and heavier bright basic wire, $3.20 per 100 lb.; common wire nails, $3.35 per 100 lb.; cement coated nails, $2.75 per keg.

Bolts and Nuts.—To get the benefit of the old discounts, buyers are not permitting any of their material on contract to remain unspecified. This even holds true of farm implements manufacturers, who, while not particularly active, desire to secure a maximum of their requirements before advanced prices become effective. Business from the automotive industry shows no abatement. Confidence in the stability of the new discounts is indicated by a steady increase in the number of contracts closed for fourth quarter. Ruling discounts are those on page 837, except that the basing point is Chicago instead of Pittsburgh.

Jobbers quote structural rivets, 3.50c.; boiler rivets, 3.60c.; machine bolts up to ¾ x 4 in., 50 per cent off; larger sizes, 50 off; carriage bolts up to ⅝ x 6 in., 45 off; larger sizes, 45 off; hot pressed nuts, squares and hexagons, tapped, $2.75 off; blank nuts, $2.75 off; coach or lag screws, gimlet points, square heads, 55 per cent off; quantity extras are unchanged.

Sheets.—Local mills are committed practically through the fourth quarter and are not entertaining inquiries for first quarter, although some have been received. Demand is less pressing than recently and sales at premium prices are becoming less frequent.

Mill quotations are 3.35c. to 3.50c. for No. 28 black, 2.50c. to 2.60c. for No. 10 blue annealed and 4.35c. to 4.50c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote f.o.b. Chicago, 4c. for blue annealed, 4.85c. for black and 5.85c. for galvanized.

Reinforcing Bars.—Inquiry for concrete bars is as heavy as at any time this year. Present activity is ascribed by some to the fact that many projects were held back pending a settlement of the strikes. Sellers are still hampered by difficulty in securing steel from the mills, but with production improving, relief is looked for. Recent awards include:

Corn Products Refining Co. plant, Pekin, Ill., 195 tons, to Concrete Steel Co.

Western Electric Co., wire plant, Hawthorne, Ill., 300 tons, to Paul J. Kalman Co.

Paddock Hotel, Beatrice, Neb., 200 tons, to Concrete Steel Co.

Pending business includes:

J. Sterling Morton High School, Cicero, Ill., 115 tons.
W. H. Hatch Grade School, Oak Park, Ill., 100 tons.
New Hotel Racine, Racine, Wis., 350 tons.
Juneau Park Surf Hotel, Milwaukee, 380 tons.
Fairmont Creamery Co., plant, Green Bay, Wis., 200 tons.

Structural Material.—Fabricating awards show a marked decline this week, but whether this is merely a temporary recession or portends a quiet autumn is not yet apparent. The mills continue to receive heavy specifications for plain material and fresh demand is of healthy proportions, but there is less willingness on the part of buyers to pay premiums to secure prompt delivery. Local producers continue to quote 2.10c. to 2.20c., Chicago.

The mill quotation on plain material is 2.10c. to 2.34c., Chicago. Jobbers quote 2.90c. for plain material out of warehouse.

Old Material.—The market has stiffened after the slump of last week and prices are returning to their former levels. Consumer buying is not yet brisk, but it has been of sufficient volume to bring out higher quotations. A few thousand tons of heavy melting and allied grades have been placed and malleable is notably in demand, but iron mill scrap is less active. The most important cause of recent weakness lay in the offerings of yard accumulations, which had been held for a profit. This material was quickly absorbed by sellers having short contracts and the appearance of lower prices discouraged further sales. It is apparent, however, that country stocks are heavier than was generally thought and that present prices warrant shipments from considerable distances. Purchases by local dealers include material situated at such widely scattered points as Memphis and Texas. Export offerings are still light. Among current lists are the Pennsylvania Northwestern Region, 2500 tons; the New York Central, a blind list, and the Chicago & Western Indiana and the Belt Railway of Chicago, 600 tons each.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

	Per Gross Ton	
Iron rails	$25.00 to	$25.50
Cast iron car wheels	24.50 to	25.00
Relaying rails	27.50 to	32.50
Rolled or forged steel car wheels	23.00 to	23.50
Rails for rolling	20.00 to	20.50
Steel rails, less than 3 ft.	21.50 to	22.00
Heavy melting steel	18.50 to	19.00
Frogs, switches and guards cut apart	18.50 to	19.00
Shoveling steel	18.25 to	18.75
Drop forge flashings	12.50 to	13.00
Hydraulic compressed sheet	15.25 to	15.75
Axle turnings	16.00 to	16.50
	Per Net Ton	
Iron angle and splice bars	22.50 to	23.00
Steel angle bars	18.50 to	19.00
Iron arch bars and transoms	22.50 to	23.00
Iron car axles	25.50 to	26.00
Steel car axles	19.50 to	20.00
No. 1 busheling	15.50 to	16.00
No. 2 busheling	10.50 to	11.00
Cut forge	17.50 to	18.00
Pipes and flues	12.50 to	13.00
No. 1 railroad wrought	17.50 to	18.00
No. 2 railroad wrought	17.50 to	18.00
Steel knuckles and couplers	20.00 to	20.50
Coil springs	21.50 to	22.00
No. 1 machinery cast	21.00 to	21.50
No. 1 railroad cast	19.50 to	20.00
Low phos. punchings	17.00 to	17.50
Locomotive tires, smooth	18.50 to	19.00
Machine shop turnings	11.00 to	11.50
Cast borings	12.00 to	12.50
Stove plate	17.50 to	18.00
Grate bars	17.50 to	18.00
Brake shoes	17.50 to	18.00
Railroad malleable	22.00 to	22.50
Agricultural malleable	22.00 to	22.50

PROPOSED MERGER

Youngstown Sheet & Tube and Brier Hill Steel Co. May Be Combined

YOUNGSTOWN, OHIO, Sept. 26.—Directors of the Youngstown Sheet & Tube Co., at a prolonged meeting Tuesday afternoon, considered in detail a proposed merger with the Brier Hill Steel Co., operating plants at Youngstown, Warren and Niles. Upon the conclusion of the meeting, President James A. Campbell, of the Sheet & Tube company, stated it would be inadvisable at this time to make any public statement. He indicated, however, that while the Brier Hill company offered a valuable property, terms were not agreed upon.

Samuel Mather, of Cleveland, the largest individual stockholder in the Sheet & Tube company, sat in the meeting, as did John L. Severance and H. G. Dalton, other Cleveland directors.

It is understood the Brier Hill company seeks inclusion in a merger to avoid the expenditure of a large sum, approaching $8,000,000, to round out its finishing capacity. Brier Hill directors discussed the consolidation at a meeting Monday.

Sessions this week mark definite steps to effect a combination of the two interests, the largest independents in the Mahoning Valley. Additional conferences are being arranged to consider details.

Cleveland

Competition Develops Lower Prices on Pig Iron —Scrap Advances

With increased pig iron and steel production, the car shortage has become the predominating disturbing factor in the general situation. This is hampering the movement of both steel from the mills particularly from the Pittsburgh district and pig iron from the merchant furnaces. Some furnaces, behind in deliveries because of enforced shut downs, are compelled to lay part of their products on the ground because of an inadequate car supply. With Connellsville foundry coke it seems now to be more of a question of cars to move it than a supply of fuel. Pig iron production has further increased and as a result the acute shortage has to some extent been relieved and some easing up is noticed in the price situation in that prices lower than the recent maximum quotations have appeared on foundry iron. The Otis Steel Co. has blown in another Cleveland furnace and is now operating both stacks. The Girard furnace has gone in blast and the Struthers Furnace Co. stack at Struthers, Ohio, is scheduled to go in blast next week. The Hanna Furnace Co. started its Dover stack and its second Detroit stack late last week according to schedule.

Iron Ore.—Indications now are that Lake Superior ore shipments, during the present season, will amount to 40,000,000 tons and possibly 42,000,000 tons. Some early season estimates were that the movement would reach 45,000,000, but the curtailment of blast furnace operations caused some cutting off in shipments during the past few weeks and the late season's movement probably will be light. September shipments are expected to amount to 7,000,000 tons, making the movement to Oct. 1, approximately 33,000,000 tons. There is virtually no dock space left at Lake Erie ports. So nearly all of the ore is now going directly to furnace yards. Generally the car supply for ore is fair. Some of the railroads serving the southern Ohio districts have not been able to handle much ore, but conditions on these have improved during the past week.

We quote delivered lower lake ports: Old range Bessemer, 5[illegible] per cent iron, $5.95; Old range non Bessemer, 51½ per cent iron, $5.20; Mesabi Bessemer, 55 per cent iron, $5.70; Mesabi non-Bessemer, 51½ per cent iron, $5.05.

Pig Iron.—An easing up in the pig iron situation is in evidence, particularly in respect to foundry iron as the result of the blowing in of an additional blast furnace and lower prices have appeared on foundry iron than the maximum quotations that had been the basis of recent Cleveland transactions for both local and outside sales. Local furnaces that have been quoting foundry iron at $36 are still asking that price, but evidently must name somewhat lower prices if they care to meet outside competition. The Westinghouse Electric & Mfg. Co., which was quoted $36 by Cleveland furnaces on 1050 tons of foundry iron for its Cleveland plant, has placed its order with a Valley furnace at a price of about $34, furnace, or $35.76, delivered, and another Cleveland consumer has purchased 100 tons of 2.75 silicon iron at $36, Valley furnace, or on a $34 basis, figuring the differential for high silicon at $2. Ruling quotations by another producer would mean a Cleveland delivered price on foundry iron of $35 or lower. One lake furnace is adhering to its recent range of from $32 to $33.50 on foundry iron. The market has quieted down materially, sales during the week being limited for most part to small lots, none exceeding 500 tons. Some foundries that have been buying spot iron because they were unable to secure shipments from their regular sources of supply will be able to get iron on their regular contracts shortly, and consequently the demand for spot iron is expected to fall off. Several sales of Southern iron are reported in lots up to 300 tons at the unchanged price of $28. One producer of silvery iron has advanced its price $1 per ton for prompt shipment and during the week sold two 150-ton lots of 9 per cent silvery at a base price of $42.50. Another producer made sales for the fourth quarter at $41.50. A small lot sale of imported low phosphorus iron has been made in Chicago at about $31 seaboard. This would be equivalent to about $37 Valley furnace, as compared with $38 quoted by a Valley producer.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and a $6 rate from Birmingham.

Basic, Valley furnace, nominal	$34.00
Northern No. 2 fdy., sil. 1.75 to 2.25	$35.00 to 36.50
Southern fdy., sil. 1.75 to 2.25	34.00
Malleable	36.00
Ohio silvery, sil. 8 per cent	44.52 to 45.52
Standard low phos., Valley furnace	38.00

Bolts, Nuts and Rivets.—With the partial settlement of the shopmen's strike many railroads have come in the market for bolts and nuts for the fourth quarter and considerable business is also being placed by jobbers and automobile manufacturers.

Finished Material.—There is a moderate volume of new business, but many consumers are more concerned about getting shipments on existing contracts than in placing new orders. Plates are in fairly heavy demand, but steel bar orders have fallen off. On steel bars and structural material, the bulk of the business is being placed at 2c., although some independent mills are still asking 2.25c. The plate market continues firm with quotations by independent mills ranging from 2.25c. to 2.50c., and small mills are booking considerable business at the latter price. A fairly heavy demand has developed from the railroads for fire box plates. Another lake freight boat has been placed, the Cleveland-Cliffs Iron Co. having closed the contract with the Great Lakes Engineering Works, Detroit, for a 600-foot boat that will require 5000 tons of steel. A new inquiry has come from an oil company for 600 tons of plates for stills. Structural inquiries have fallen off considerably. The only new project of any size reported is the store addition for the Halle Brothers Co., Cleveland, requiring 2500 tons of structural material. The Cleveland Frog & Crossing Co. is inquiring for 1000 tons of rails and some of the railroads in this district are negotiating for their 1923 requirements. The Nickel Plate Railroad has an inquiry out for its requirements in axles and steel bars for the last quarter and the first quarter of next year.

Jobbers quote steel bars, 2.92c.; plates and structural shapes, 3.01c.; No. 9 galvanized wire, 3c.; No. 9 annealed wire, 2.50c.; No. 28 black sheets, 4.50c.; No. 28 galvanized sheets, 5.50c.; No. 10 blue annealed sheets, 3.70c. to 3.76c.; hoops and bands, 3.71c.; cold-rolled rounds, 3.60c.; flats, squares and hexagons, 4.10c.

Reinforcing Bars.—There is a good demand for reinforcing bars in lots of 50 tons and under. The James Sperling Co., Bay City, Mich., has taken the contract for the filtration plant in that city requiring 1200 tons of bars. Hard steel reinforcing bars are firm at 2c.

Sheets.—The market is very firm and fairly active and some mills can make good deliveries. There is still considerable demand from the automobile industry. Prices range from 3.50c. to 3.60c. for black, 4.50c. to 4.60c. for galvanized, and from 2.60c. up on blue annealed. On heavier gages 2.70c. and on light gages 2.80c. are quite commonly quoted. Automobile body sheets are quoted at 5c. for October delivery.

Warehouse Business.—Cleveland jobbers advanced prices Monday $2 a ton on steel bars, plates, structural material, hoops and bands, and the leading steel jobbers to-day advanced black and galvanized sheets $5 a ton and blue annealed sheets $4 a ton. The new prices are based on mill prices of 1.95c. for steel bars, 2.05c. for plates and shapes, and 2.75c. for hoops and bands. The warehouse demand continues heavy, but sales have fallen off owing to depleted stocks.

Coke.—The foundry coke market is firmer. Car lot sales for prompt shipment are reported at $13, but some producers are now asking $13.50 to $14. Quotations of $13 have been made on a local inquiry for 1500 tons for the last quarter. We note the sale of ten cars of Indianapolis by-product foundry coke at $16.

Old Material.—Prices have further advanced $1 more a ton on most grades of scrap and the higher prices are bringing out very little material. Cleveland and Valley dealers are freely offering $22 for heavy melting steel and $20 for compressed steel for Youngs-

town delivery, and local producers have been offered as high as $20.50 for heavy melting steel. Locally, compressed steel has brought over $19. The high prices, together with the partial settlement of the shopmen's strike, are expected to bring out considerable railroad scrap during October. The only list that has appeared so far is a blank list from the Big Four Railroad, which offered no scrap in September. Bids on this will be taken Oct. 5.

We quote per gross ton, f.o.b. Cleveland, as follows:

Heavy melting steel	$19.75 to $20.00
Steel rails under 3 ft	21.00 to 22.00
Steel rails, rerolling	24.00 to 25.00
Iron rails	18.50 to 18.50
Iron car axles	26.00 to 27.00
Low phosphorus melting	20.00 to 21.00
Cast borings	15.25 to 15.50
Machine shop turnings	14.00 to 14.25
Mixed borings and short turnings	14.75 to 15.25
Compressed steel	18.00 to 18.50
Railroad wrought	18.75 to 19.25
Railroad malleable	20.00 to 21.00
Light bundled sheet stampings	15.00 to 15.25
Steel axle turnings	16.00 to 16.50
No. 1 cast	21.00 to 22.00
No. 1 busheling	15.00 to 15.50
Drop forge flashings over 10 in	14.00 to 15.00
Drop forge flashings under 10 in	15.00 to 15.25
Railroad grate bars	17.00 to 18.00
Stove plate	17.00 to 18.00
Pipes and flues	11.50 to 14.75

Boston

More Domestic Pig Iron Sold in New England Than in Many Weeks

BOSTON, Sept. 26.—Sales of pig iron the past week approximated 5000 tons, including 1000 No. 2 plain special analysis Buffalo, last quarter, at about $33 furnace, to a local melter, 100 tons No. 2 western Pennsylvania, October delivery, at $33.50 furnace, or $39.42 delivered, and other small lots, Tennessee included, which swell the total to better than 1500 tons, the largest domestic iron business reported in many weeks. Scotch iron prices vary, being higher in some instances and lower in others. Advances are reported by the largest operators. A Bridgeport, Conn., melter bought silicon 2.25 to 2.75 at $30, c.i.f., with a $1.90 freight; a Massachusetts stove maker 400 tons at $31, while other sales ran as high as $32 plus the 75c. import tax duty, and $33 without the duty. English, to arrive, ranges from $27 to $31, plus duty. Continental, fairly low phosphorus and fairly high manganese, is offered as low as $24.50, plus duty, and better iron as high as $32. French iron is mostly $28 to $30. Importers are well cleaned up on October shipments. No foreign iron arrived in the week ending Sept. 23, but at least 1500 Scotch is due this week. One melter wants 300 to 600 tons No. 2X, delivery not specified, and the General Fire Extinguisher Co., Providence, R. I., 250 tons No. 1X, October shipment. Barges with 1315 tons of iron from Albany for the American Electrical Co., Phillipsdale, R. I., is in at Providence. The Philadelphia & Reading Railway announces that effective Oct. 16 the rate on pig iron at stations taking the Philadelphia and Scranton rate basis to points on the Maine Central Railroad taking the Brunswick rate basis, will be $4.28, as against $5.60 a ton as at present.

We quote delivered prices, on the basis of the latest reported sales, now infrequent, and as follows, having added to furnace prices $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia and $9.60 from Alabama:

East. Penn., sil. 2.25 to 2.75	$36.65 to $38.65
East. Penn., sil. 1.75 to 2.25	35.65 to 37.65
Buffalo, sil. 2.25 to 2.75	37.91 to 38.41
Buffalo, sil. 1.75 to 2.25	36.91 to 37.91
Alabama, sil. 2.25 to 2.75	38.10
Alabama, sil. 1.75 to 2.25	37.60
Virginia, sil. 2.25 to 2.75	38.92
Virginia, sil. 1.75 to 2.25	37.92

Ferroalloys.—Demand for ferroalloys in this territory is limited to pounds rather than tons, yet considerable activity exists at prices governed by those at more active centers. A lot of 1500 tons manganese ore arrived at this port from abroad the past week.

Warehouse Business.—Bookings the first half of this month averaged better than those for the corresponding period in August, which was the best month this year. Some let-down, more noticeable in structural steel than in other material, is reported since Sept. 15. Sheets are more active, however. Warehouse stocks are larger, due to increased mill shipments. Bolts and nuts also are coming forward more freely, some buyers claiming to have received stock not expected until December. Bolts, nuts and rivets are in demand, however, and mill shipments needed. Wire nails have advanced another 15c. a keg from stock, making 30c. since Sept. 1. The base is $3.60 a keg. Cut nails remain unchanged in price. Demand for nails is heavy and back orders are largest since war days.

Jobbers quote: Soft steel bars, $3.25 per 100 lb. base; flats, $3.85; concrete bars, $3.25; structural steel, $3.25 to $3.50; tire steel, $4.50 to $4.85; open-hearth spring steel, $5 to $6.50; crucible spring steel, $12; steel bands, $4.25; hoop steel, $4.75; cold rolled steel, $4 to $4.50; refined iron, $3.25; best refined iron, $4.50; Wayne iron, $5.50; Norway iron, $6 to $6.50; plates, $3.35 to $3.55; No. 10 blue annealed sheets, $4.15 per 100 lb. base; No. 28 black sheets, $5.10; No. 28 galvanized sheets, $6.10.

Cast Iron Pipe.—The Warren Foundry & Pipe Co. has been awarded 100 tons 6 in. and 8 in. pipe, November delivery, by the city of Attleboro, Mass., the only municipal business of any importance to be placed in this territory recently. Many feelers are being put out by cities and towns, however, as well as by gas and some of the largest engineering companies. Cast iron pipe makers expect considerable activity in the market during December, January and February for spring delivery. The market here for 6 in. pipe and larger is $57.10 delivered common Boston rate points, and for 4 in., $62.10. The usual $4 differentials apply to class A and gas pipe.

Finished Material.—The Boston & Maine Railroad this week closed on 17,000 tons of rails, 11,000 tons being 85 lb. and the rest 100 lb.; the Maine Central took 9300 tons, and other New England carriers, not including the New York, New Haven & Hartford and the Boston & Albany, which place their business through other than Boston sources, 7450 tons, making a total of 33,750 tons, 1923 delivery. Track accessory requirements by the carriers will not be placed until later. McClintic-Marshall Co. has taken 235 tons of structural steel for a Lowell, Mass., bridge, the only round tonnage placed in this territory the past week. Bids are in on 140 tons for the General Baking Co. garage, Charlestown, Boston. Bars, especially high carbon, are in excellent demand, although individual tonnages are only moderately large. The demand for plates still runs to small tonnages, but the number of orders is increasing. Fourth quarter sheet requirements have been mostly contracted for.

Coke.—Sales of Alabama by-product foundry coke were made at $16.50 delivered New England points the past week, contrasted with $19.50 heretofore. October deliveries are offered at $16.50. Small tonnages of Connellsville coke at $12.50 ovens, or $18.05 delivered, also were sold. The market for outside fuel is more or less restricted, however, due to better shipments against contracts by the New England Coal & Coke Co. and the Providence Gas Co. on a basis of $16.50 delivered within the prescribed freight zone. Local oven interests are now in a position to accept spot business at $19.50 delivered, but at that price sales are limited. Considerable coke made in this territory is going into New York State. Actual consumption of coke by New England foundries is expanding, but very slowly, and remains well below normal.

Old Material.—Continued activity, which broadened to include all old material on a rising scale of prices, was reported the past week. Strength was most pronounced in wrought pipe, cast iron borings and car axles, which average $2 a ton higher, and in heavy melting steel, car wheels, railroad malleable and stove plate, which average $1.50 higher. The car supply situation is more acute, while rejections are at a minimum. Local sales of heavy melting steel alone exceeded 1000 tons at $15 to $15.50, and 100 tons went at $15.75, a new high record price for this movement. Sales of chemical cast iron borings at $15, $15.50, $16, $16.50, $17 and even $17.50, shipping point, make it difficult to establish a general price level, which possibly is nearer $15 to $16.50 than otherwise. A Boston melter of rolling mill borings in the market at $15 delivered, which are

scarce, resorted to cast at $19 delivered. A local horseshoe interest wants round tonnages of horseshoes at $14, shipping point, a Maine rolling mill, having a $2.25 freight, is bidding $22 for shafting, while numerous inquiries for machinery cast are in dealers' hands. Otherwise most everything moving is going into Pennsylvania.

The [illegible] prices are for gross tons, delivered consuming points:

[illegible]	$ [illegible] to $ [illegible]
[illegible]	16.00 to 17.00
[illegible]	17.00 to 18.00
Sheet [illegible]	17.00 to 18.00
Rails and [illegible]	[illegible]

The [illegible] prices are for gross tons, delivered [illegible]

[illegible]	$ [illegible] to $ [illegible]
No. 1 heavy melting steel	[illegible] to 16.00
No. 2 heavy melting steel	[illegible] to 15.00
No. 1 railroad wrought	13.00 to 14.00
Wrought pipe (1 in. in diam., over 2 ft. long)	[illegible] to 12.00
Machine shop turnings	10.50 to 11.00
Cast iron borings, loading mill	12.50 to 13.00
Cast iron borings, chemical	15.00 to 16.50
Blast furnace borings and turnings	10.50 to 11.00
Forged scrap and bundled skeleton	10.50 to 11.00
Street car axles	21.00 to 22.00
Street car wheels	17.50 to 18.00
Rerolling rails	13.50 to 14.00
Shafting	18.50 to 19.75

Cincinnati

Quiet Week with Some Reselling of Southern Pig Iron at $26

CINCINNATI, Sept. 26.—The pig-iron market was exceptionally quiet during the week and only a few sales larger than 100 tons were reported. An Indiana melter bought 500 tons of Northern foundry iron on a basis of $32, Lake furnace, while another Indiana foundry took 300 tons of malleable at $32, Chicago. Several sales of Southern resale iron were made on the basis of $26, but this iron has now been cleared up and the Southern market is firm at $27, Birmingham. Very few furnaces are quoting for any delivery, the available supply of iron being very short, with shipments from Southern furnaces showing a slight improvement. Melters are waiting to see just what developments take place before buying further tonnages. The supply of foundry iron in the southern Ohio district has dwindled to practically nothing. The steel producer which had been supplying the bulk of the iron having gone back on basic. As a result, prices are very firm, and single carloads have brought as high as $34, base. Some Chicago and St. Louis iron is being shipped into this district as a result of the scarcity. But Lake furnaces are now in a position to take care of a bigger part of the trade. Belfont furnace resumed operations this week on Bessemer iron, which is being sold at $35, Ironton, and Jisco furnace will be making silvery at the end of the week. Those two will be the only merchant furnaces in blast in the southern Ohio district.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$31.05
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	31.55
Ohio silvery (nominal), 8 per cent	43.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	34.27
[illegible]	32.27
Malleable	34.27

Finished Material.—The chief concern of the trade seems to be in securing shipments from mills. There are, however, a number of inquiries current for fourth quarter, the principal one coming from the Big Four Railroad, which will take bids on Oct. 5 for its fourth quarter requirements of bolts and nuts, iron bars, steel billets, firebox and boiler plates, tank and car plates, shapes and steel bars, black and blue annealed sheets, nails, wire, fence, axles, boiler tubes and safe ends. No quantities are specified on the order, but the requirements of the road for this quarter are expected to be heavy. While sheet mills continue to book only for October shipment at current prices, tonnage reservations which will take up the capacity of the mills are being booked at prices to be named shortly after the first of the month. It is expected that these prices will show a $3 advance for November and December shipment. The demand for small [illegible] is reported to be heavy, coming chiefly from the mining districts, and a steady improvement is also noted in the demand for light rails. Small spikes will likely advance to $3.50 shortly, as this seems to be the present ideas of some manufacturers. An advance of 10c. a keg on track spikes has been made by one manufacturer, bringing the price to $2.85. On bars and shapes, 2c. has been quoted during the week but a fair number of orders are being booked at 2.15c. to 2.25c. on bars, and 2.10c. on shapes. On plates, the general quotation appears to be 2.25c., though orders are confined to one and two carloads each. Some orders were reported for wire and wire nails, the latter being a rather scarce commodity these days, due to poor shipments from manufacturers. Inquiry in the structural field is light, though a number of projects involving a considerable tonnage of reinforcing bars are now in architects' hands. Included in these will be a 7-story office building for the railroad brotherhoods to be erected in Cincinnati, bids on which will be taken about Oct. 15. The Union Savings Bank & Trust Co. is having plans prepared for a 10-story office building, 100 x 200 ft., bids on which will be taken about Jan. 1. A number of smaller projects are also up. Two hundred tons of bars for the Liberty National Bank Building at Covington, Ky., will be supplied by the Bourne-Fuller Co.

Warehouse Business.—Local warehouses continue to enjoy a good business. Delayed shipments from mills are beginning to filter through, but the movement is still comparatively light. Prices show no change, although an advance of 15c. a keg on wire nails will become effective Oct. 1.

Cincinnati jobbers quote: Iron and steel bars, 2.95c. base; reinforcing bars, 3.05c. base; hoops, 4.05c. base; bands, 3.85c. base; shapes and plates, 3.05c. base; cold-rolled rounds, 3.75c. base; cold-rolled flats, squares and hexagons, 4.25c. base; No. 10 blue annealed sheets, 4c.; No. 28 black sheets, 4.70c.; No. 28 galvanized sheets, 5.75c.; No. 9 annealed wire, $2.85 per 100 lb.; common wire nails, $3.05 per keg, base.

Tool Steel.—It is almost a certainty that tool steel prices will show an advance in the near future, and some good business was placed last week in anticipation of it. Prices range from 70c. per lb. on regular grades of high speed steel to 90c. on special brands of some companies.

Coke.—While the coke market is rather quiet, some fair sized sales of both furnace and foundry coke are reported. Prices are holding very firm, and furnace coke in particular is, if anything, higher. Connellsville furnace coke is quoted at $12, and foundry at $12 to $14. New River foundry remains at $14 to $15. Wise County furnace coke is quoted at $11 and foundry $13, the same range prevailing on Pocahontas. The Ashland by-product producer has advanced its price to $12, Connellsville basis for October shipment.

Old Material.—The local scrap market continues to show a fair amount of activity. Steel mills are buying in small tonnages and foundries are taking all cast scrap offered. The demand from other districts also is heavier. Prices are showing much strength and advances of from 50c. to $2 a ton are recorded.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

Per Gross Ton	
Bundled sheets	$9.50 to $10.00
Iron rails	15.50 to 16.00
Relaying rails, 50 lb. and up	26.50 to 27.00
Rails for rolling	16.50 to 17.00
Heavy melting steel	15.00 to 15.50
Steel [illegible] for melting	[illegible] to [illegible]
Car wheels	19.00 to 19.50

Per Net Ton	
No. 1 railroad wrought	14.00 to 14.50
Cast borings	11.50 to 12.00
Steel turnings	10.50 to 11.00
Railroad cast	16.50 to 17.00
No. 1 machinery	20.50 to 21.00
Burnt scrap	11.50 to 12.00
Iron axles	20.50 to 21.00
Locomotive tires (smooth inside)	13.50 to 14.00
Pipes and flues	8.50 to 9.00

The Detroit Foundryman's Association held its monthly meeting Thursday evening, Sept. 21, at which Henry M. Lane, of the H. M. Lane Co., Detroit, foundry engineers, gave a talk on "Foundry Troubles." Officers of the association for the year are: Fred Erb, Packard Motor Car Co., president; J. C. Babo, Dodge Bros., vice-president; Delos R. Hay, secretary.

New York

Strong Pressure for Deliveries—Domestic Pig Iron Prices Lower

NEW YORK, Sept. 26.—The car situation in the coal mining districts of Pennsylvania is more serious and a number of mines have been compelled to close on account of inability to obtain cars in which to load the coal. The present outlook is that prices of coal will advance.

Pig Iron.—One firm reports the sale of 5,000 tons of English foundry irons and others have disposed of smaller tonnages. Prices of foreign grades show a tendency to advance. They are still several dollars below those of domestic irons, and transactions are confined to a large extent to the foreign product. Prices on domestic iron are somewhat lower and $31 can be done in eastern Pennsylvania and $32 in Buffalo on No. 2 plain. These prices are about $1 lower than the recent minimum quotations. In addition to purchases made by the American Locomotive Co., as announced in this column last week, it is still in the market for 700 tons of charcoal and 3500 tons of foundry iron for immediate delivery. The American Car & Foundry Co. has not yet placed the 500 tons for which it has been inquiring. Very little foreign iron is now available for delivery prior to Nov. 1.

We quote delivered in the New York district as follows, having added to furnace prices $2.27 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$35.27 to $36.27
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	34.27 to 35.27
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	33.27 to 34.27
Buffalo, sil. 1.75 to 2.25	36.91 to 37.91
No. 2 Virginia, sil. 1.75 to 2.25	No sales

Ferroalloys.—Thus far the new duties on various ferroalloys have made very little difference in quotations. Demand, however, has slackened in most of the markets. Sales of small lots of British ferromanganese have been made at $67.50, c.i.f., to which a duty of $33.60 per ton on 80 per cent alloy is now added. Domestic producers have practically nothing to sell, although it is stated that an offer of some alloy has been made at $100 per ton, furnace. This would figure about the same as the British alloy which, with duty paid, would be $101.10 at the seaboard. On spiegeleisen there is now a duty on the foreign product of 75c. per ton. Some sales of the 20 per cent alloy have been made at $39.25, duty paid, but the quotations on the domestic product are unchanged for both grades. No business is reported in the manganese ore market and quotations are nominal. The new tariff law places a duty of $22.40 per gross ton on 50 per cent ferrosilicon. Domestic producers have not yet changed their quotations, which range from $65 to $70 per ton, delivered, but are taking very little business, although there is some inquiry for car load lots. Importers of ferrosilicon are at present not quoting; their future policy and prices will be determined later. There is a new duty of 3c. per lb. of contained chromium in ferrochromium, but there is very little business in this market and quotations are still unchanged. Quotations are as follows:

Ferromanganese, domestic, furnace, nominal, per ton	$100.00
Ferromanganese, British, c.i.f., per ton	$67.50
Spiegeleisen, 17 to 19 per cent. furnace	$39.00
Spiegeleisen, 20 per cent. furnace	$39.00 to $40.00
Ferrosilicon, 50 per cent, delivered, per gross ton, carloads	$65.00 to $70.00
Ferrosilicon, 10 to 15 per cent, delivered, per gross ton	$38.00 to $40.00
Ferrotungsten, per lb. of contained metal	50c.
Ferrochromium, 4 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr., delivered	14c.
Ferrovanadium, per lb. of contained vanadium	$3.50 to $4.00
Ferrocarbontitanium, 15 to 18 per cent, in carloads, per net ton	$200.00

Ores

Manganese ore, foreign, per unit, c.i.f.	29c. to 30c.
Tungsten ore, per unit, in 60 per cent concentrates, nominal	$3.50 up
Chrome ore, basis 48 per cent Cr_2O_3, crude, per ton, Atlantic seaboard	$18.00 to $18.50
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	50c. to 55c.

Warehouse Business.—Quotations have been advanced 10c. per 100 lb. in this district. Iron and steel bars are now 3.04c. per lb.; shapes, 3.14c. per lb.; plates, 3.14c. per lb.; hoops, 4.39c. per lb., and bands, 3.84c. per lb. Cold-rolled shafting and screw stock is 3.90c. per lb. for rounds and 4.40c. per lb. for flats, squares and hexagons.

Finished Iron and Steel.—Considerable pressure for deliveries indicates a continuing demand and the activity is broad in scope, save that there is some let-up in steel building work, this partly seasonal. Buying by jobbers is still noteworthy and shows how rapidly steel is going into consumption, seeing that minimum stocks in jobbers' hands are rarely more than 25 per cent below the maximum. Apparently all the rails for the Eastern railroads of the country have been bought or substantially closed. Concrete bar business is active, one office alone reporting some 5000 tons on which decisions have not been made. Among the active jobs are seven or eight buildings for a Government hospital at Northampton, Mass., involving 2000 tons. Railroad car and locomotive buying is still fairly active but very little railroad bridge work is under consideration. As to the immediate future in general terms, sellers of steel look for no cessation in demand for several months. Prices generally are higher in that the leading interest is apparently asking somewhat higher prices than recently for such business as it can entertain in view of its well filled order books; except to preferred customers, steel bars are a minimum at 2c., Pittsburgh basis, and shapes and plates 2.10c. The going market is $3 to $5 a ton higher for reasonably early delivery.

We quote for mill shipments, New York delivery, as follows: For indefinite delivery, soft steel bars, 2.34c.; structural shapes and steel plates, 2.44c.; for delivery in a number of weeks, soft steel bars and plain structural material, 2.44c. to 2.59c.; steel plates, 2.49c. to 2.59c.; bar iron, 2.59c.

High Speed Steel.—Although the market is generally quiet, some producers have advanced their quotations, pointing to the high percentage of increase in the cost of tungsten, effected by the tariff. Producers generally quote 18 per cent tungsten high speed steel at 75c. to 85c. per lb., with special brands of some companies ranging up to 90c. per lb.

Cast-Iron Pipe.—The situation in water pipe is unchanged. Prices are still strong, but new business is slow in appearing because of the usual seasonal dullness. Makers, however, are operating full. We quote per net, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $54.50; 4-in. and 5-in., $59; 3-in., $64.80, with $4 additional for Class A and gas pipe. The market in cast-iron soil pipe is active and makers report that present demand shows signs of lasting throughout the year. Jobbers stocks are low and with the present prices of pig iron, no weakening of present prices is expected. We quote per net ton, delivered, New York, discounts of both Southern and Northern makers, as follows: 2 to 6-in., standard, 25 to 30 per cent off list; heavy, 34 to 35 per cent off list.

Old Material.—The upward trend of prices continues, with active buying by all mills in both eastern and western Pennsylvania. Probably the greater portion of steel moving from this district is No. 1 heavy melting and is going to Bethlehem Steel Co. and the Alan Wood Iron & Steel Co., for which dealers are quoted as paying $17.50 per ton delivered.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$13.50 to $14.00
Steel rails, short lengths, or equivalent	14.50 to 15.00
Rails for rolling	14.50 to 15.00
Relaying rails, nominal	27.00 to 28.00
Steel car axles	17.00 to 18.00
Iron car axles	23.00 to 24.00
No. 1 railroad wrought	16.00 to 16.50
Wrought iron track	14.50 to 15.00
Forge fire	10.00 to 10.50
No. 1 yard wrought, long	13.00 to 13.50
Cast borings (clean)	12.50 to 13.00
Machine-shop turnings	11.50 to 12.00
Mixed borings and turnings	11.50 to 12.00
Iron and steel pipe (1 in. diam., not under 2 ft. long)	11.75 to 12.25
Stove plate	13.50 to 14.00
Locomotive grate bars	12.50 to 13.00
Malleable cast (railroad)	13.00 to 13.50
Cast-iron car wheels	14.50 to 15.00

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$19.50 to $20.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	17.00 to 17.50
No. 1 heavy cast, not cupola size	14.50 to 15.00
No. 2 cast (radiators, cast boilers, etc.)	13.00 to 13.50

San Francisco

Moderate Buying of Continental Pig Iron—Demand Not Urgent

SAN FRANCISCO, Sept. 20.

Pig Iron.—There has been a moderate volume of business in pig iron in the past two weeks, perhaps aggregating around 1000 tons for the ports of San Francisco and Los Angeles together. The majority of the contracts involve Continental iron, which is scheduled for September-October shipment. It is understood the price was in the neighborhood of $28, ex ship, Coast. Offerings of foreign material are liberally made, but the demand at present is not urgent, as consumers, for the most part, appear to have about sufficient stocks for their current needs. One special lot of foundry pig iron to be used for the making of ingot molds was in the market at something over $30.

Cast Iron Pipe.—Market conditions appear to be improving, and there is more interest on the buying side. While prices are unchanged at $52, delivered, for 6-in., the tone is firm. Private business is broader, it being reported by one large interest that in the last two-week period about 600 tons has been placed. Municipal business likewise has been better. Pasadena has just placed 800 tons of 4 to 12-in.; Santa Barbara awarded a contract for 1000 tons of 6 to 20-in., and Alhambra is in the market for a moderate quantity of 4 to 16-in. pipe. Demand for soil pipe continues steady, the most consistent call coming from house builders. The market price is unchanged.

Finished Iron and Steel.—The Coast market appears unsettled, and buyers are holding off from any great commitments, apparently believing that lower prices will follow the settlement of the strike situation. In some cases already, mills have eased their prices, but only in those instances where quotations were considerably in excess of the Steel Corporation levels. This development is due to several mills entering the market again after a period of inactivity, during which time fuel could not be secured. Plates are reflecting the price adjustment, those mills which were holding for 3c. to 3.15c., delivered, now asking from about 2.80 to 2.90c., against around 2.60c. from the largest makers.

Coke.—Business recently has been on a better scale, and it is estimated that around 2000 tons have been sold, virtually all of which is English. It is for September-October-November shipment. The price is understood to have ranged from $17 to $18, ex ship. The Navy has awarded its order to an importer, the price being around the equivalent of $17, ex ship.

Old Material.—Scrap generally is firmer as a result of limited amounts of materials in the market, and a somewhat improved demand from foundries, which have let their stocks dwindle to a very low point. Heavy melting is quoted around $12.50 a gross ton, delivered at consumers' works, with even higher prices heard. Holders are asking from $25 to $27 a net ton for heavy machinery scrap, and around $21 for light. A steady business, in small lots for the most part, is prevailing.

Buffalo

Prices of Pig Iron for Fourth Quarter Delivery Are Easier

BUFFALO, Sept. 26.—Sales of merchant pig iron are extremely light—in contrast with the big demand for steel products. Less than 2000 tons have been sold—the combined activities of all furnaces. The Lackawanna Steel mill, now owned by Bethlehem Steel Co., has four blast furnaces in operation and plans for a fifth. What the policy of the new organization will be with reference to selling pig iron has not been announced. The entry of the Lackawanna company into the merchant field was one of the last developments prior to the sale to Bethlehem. Lack of interest on the part of Eastern buyers in Buffalo iron is mainly due to the importation of foreign iron. Prices range from $32 to $34 for No. 2 plain for fourth quarter. The market for basic iron would be $34 if any of this grade were available and a buyer seeking 500 tons made this offer to a local furnace without success.

We quote f.o.b. per gross ton Buffalo as follows, the higher prices being for early shipment:

No. 1 foundry, 2.75 to 3.25 sil.	$34.00 to $35.00
No. 2X foundry, 2.25 to 2.75 sil.	32.00 to 34.00
No. 2 plain, 1.75 to 2.25 sil.	32.00 to 34.00
Basic	34.00
Malleable	34.00
Lake Superior charcoal	36.28

Finished Iron and Steel.—Bar orders are being taken more freely by several sellers, but the mills which these agencies represent are finding car and labor difficulties growing more serious with the fuel situation easier. The branch of an independent which was out of the market several months on bars, shapes and plates is now taking bar orders in a limited way and shape orders from established customers. On plates ¼ in. and heavier are being booked—without promise of delivery. This interest is quoting 2c. to 2.15c. on bars, 2c. on shapes and 2.25c. on plates. Tin plate buyers are interested in making contracts covering the last quarter and a few are inquiring for first quarter of 1923. The principal local tin plate seller has not booked any 1923 business to date. An independent interest which withdrew in August on pipe business is again able to consider orders from its regular trade and the same maker is nearer the point where it can consider bar specifications, but prices have not been fixed. Bolt prices now in effect are expected to stand throughout 1922. Structural business recently placed is for small tonnages and nothing exceeding 100 tons has come out.

We quote warehouse prices, Buffalo, as follows: Structural shapes, 3.10c.; plates, 2.90c.; soft steel bars, 3c.; hoops, 4c.; bands, 3.80c.; blue annealed sheets, No. 10 gage, 3.90c.; galvanized steel sheets, No. 28 gage, 5.85c.; black sheets, No. 28, 4.85c.; cold rolled round shafting, 3.95c.

Old Material.—Increased demand for heavy melting steel has brought the price up and sales at $18.50 to $19.50 have been made. Predictions are that it will go higher; all users being interested. No big tonnages are available. Demand for all grades of scrap is good and shortages in production of cast iron borings may bring about another advance in those prices.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$18.50 to $19.50
Low phos. [illegible]	20.00 to 21.00
No. 1 railroad wrought	18.00 to 19.00
Cast wheels	21.00 to 22.00
Machine shop turnings	13.50 to 14.00
Cast borings	14.00 to 16.00
Heavy axle turnings	16.50 to 17.50
Grate bars	15.50 to 16.00
No. 1 busheling	16.00 to 16.50
Stove plate	16.50 to 17.00
Railroad malleable	12.00 to 13.00
No. 1 machinery cast	20.00
Hydraulic compressed	16.50 to 17.00
Railroad malleable	19.50 to 20.00

Birmingham

Sanitary Pipe Makers Buy Round Lots of Pig Iron at $27.50

BIRMINGHAM, ALA., Sept. 26.—Late Saturday and yesterday Southern sanitary pipe makers entered the market for fourth quarter iron and paid $27.50 for round lots aggregating from 10,000 to 12,000 tons. One maker turned down a firm offer for 5000 tons on account of filled condition of order books. Small tonnages for prompt delivery sold to-day for $28.50. Western iron buyers were in the city in numbers desperately seeking prompt shipment, only to meet disappointment. The car shops took on full forces during the week and this promises a better car supply soon. Strength of the market is indicated by sales of stored Alabama iron at Boston on a base of $28, Birmingham. St. Louis took some additional northern Alabama iron last week. That iron is being delivered without interruption through the Arrow Transportation Co. and the Burlington Railroad at the new rail and water rate of $3.28. Much

iron is being piled. One day last week one furnace interest piled every ton of make. Another piled 50 per cent of make. The Tennessee company blew in No. 1 furnace at Ensley and blew out No. 5 for relining, but the total make is larger because No. 1 is a 550-ton furnace and No. 5 a 350-ton stack. Wage advances in the district have been completed by awards made by the Gulf States Steel Co. and Anniston pipe shops, the 20 per cent advance of the Steel Corporation effective Sept. 1 being now in vogue in all collieries, furnaces and mills. The iron market bids fair to hang fire until cars are more plentiful.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon 1.75 to 2.25	$27.00 to $28.00
Basic	27.00 to 28.00
Charcoal, warm blast	33.00 to 34.00

Finishing Mills.—The Tennessee company continues double turn at Bessemer, Ensley and Fairfield mills with a weekly production of 5000 tons of rails. Rapid progress has been made on the new 10 and 12-in. merchant bar mill at Fairfield. The following tonnages of Tennessee company products are scheduled to move out of the port of Mobile this week and next: 2500 tons of rails for Antefagasta, Chile; 2500 tons of duplex basic phosphate made by the Tennessee company at Ensley steel mills for New Zealand, and 6000 tons of rails, ammonium sulphate and other products for China, Korea and Japan. The last-named shipment will have similar tonnage and route of the Atlanta City, which left for the Orient last week. Practically full turn at the mills of the Conners Steel Co., the Gulf States Steel Co. and the American Steel & Wire Co. are reported. Cotton ties are in active demand.

Cast Iron Pipe.—The largest recent pressure pipe order is for 3000 tons placed by Los Angeles with the National Cast Iron Pipe Co. The United States Cast Iron Pipe & Foundry Co. has taken 1750 tons for Laporte, Ind., 1300 for Eloise, Mich., other Western orders and numerous small ones in the South. The base at the end of the week was $40, subject to rise if the next buying of the pipe makers is at present price of pig iron. Sanitary pipe still rules dull on account of cargoes en route, but prices are firm on base of $60 to $65.

Coal and Coke.—The Sloss-Sheffield Steel & Iron Co. moved its second shipment of 3000 tons of coke to New England via Charleston, S. C., last week. Coke is strong at $9 to $10 for spot deliveries.

Old Material.—The scrap market has been brisk and stocks in yards are running low. Shipments have been heavy to Chattanooga, Atlanta and Knoxville, as well as in the district.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Steel rails	$16.00 to $17.00
No. 1 steel	14.00 to 16.00
No. 1 cast	18.00 to 20.00
Car wheels	18.00 to 20.00
Tramcar wheels	17.00 to 19.00
Stove plate	16.00 to 17.00
Cast-iron borings	9.00 to 10.00
Machine shop turnings	9.00 to 10.00

St. Louis

General Withdrawal of Southern Furnaces from the Market—Foundries Busy

ST. LOUIS, Sept. 26.—Northern pig iron remains at $32, Chicago, while the market for Southern is at $27 to $28, Birmingham. Virtually all of the Southern makers are out of the market so far as this territory is concerned. Even the maker that has been shipping by water and rail has withdrawn from the market. No iron from the Chicago producing territory is to be had. There is an especially strong demand for high-silicon iron, of which there is a great scarcity all over the country. The Granite City maker, which has been operating on foundry iron for the last several weeks, went onto basic yesterday. Inquiries are good for iron outside of the St. Louis trade territory, but there is very little being done locally. All local mills and foundries are busy. Inquiries are pending for between 15,000 and 20,000 tons of basic for Ohio, Indiana and Wisconsin melters. Sales during the last week were not more than 1000 tons.

We quote delivered consumers' yards, St. Louis, as follows having added to furnace prices $2.16 freight from Chicago and $3.28 from Birmingham (rail and water) and 81 cents average switching charge from Granite City:

Northern foundry, sil. 1.75 to 2.25	$32.16
Northern malleable, sil. 1.75 to 2.25	32.16
Basic	32.16
Southern foundry, sil. 1.75 to 2.25	$30.28 to 31.28

Finished Iron and Steel.—Railroads centering in St. Louis are looking to secure their rail requirements for next year. The Missouri, Kansas & Texas Railroad placed with various mills 10,000 tons of 90-lb. rails and the fastenings for June delivery. Their original intention was to place the business for August delivery. The Wabash wants 20,000 tons of 90-lb. rails for Eastern and Western lines, and it is expected that Buffalo mills will get some of the business. Men in the trade are expecting an inquiry from the St. Louis Southwestern shortly after the election of a president on Oct. 3. The Missouri, Kansas & Texas is in the market for fourth quarter requirements of boiler tubes. The Pennsylvania Car Co., Kansas City, is in the market for 430 tons of universal plates and channels. A car of structural steel now and then is being sold. The market for sheets is quiet. Production conditions are better and sales representatives have been told that their mills will take on some business.

For stock out of warehouse we quote: Soft steel bars, 2.90c. per lb.; iron bars, 2.90c.; structural shapes, 3c.; tank plates, 3c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, cold rolled, one pass, 4.85c.; cold drawn rounds, shafting and screw stock, 3.90c.; structural rivets, 3.60c. per 100 lb.; boiler rivets, 3.70c.; tank rivets, $\frac{7}{8}$ in. and smaller, 60 per cent off list; machine bolts, large, 50 and 10 per cent; smaller, 50-10 and 10 per cent; carriage bolts, large, 55-5 per cent; small, 60 and 10 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon blank, $3.50; and tapped, $3.25 off list.

Coke.—The demand for coke is still in excess of the supply, and prices are very strong. The by-product producers have been compelled to hold down their output on account of the inability to get coal as a result of the scarcity of cars at the mines. Collinsville coke is quoted at $15, but this is meaningless, as none is coming through. The St. Louis by-product concern is still out of the market, and the Granite City producer is out of the market on domestic coke for the first time since beginning operations. Their price on foundry coke is $14 at the furnace.

Old Material.—Melting and shoveling steel are easier, as the country dealers in the South are now beginning to offer more liberal tonnages than in the past. The mills are comfortably taken care of on these items for the next 60 days. There is a good demand for couplers, springs and wheels, and in face of higher prices no large tonnages are coming out. The American Steel Foundries was a heavy purchaser during the week of rails, couplers, knuckles, springs and wheels.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton

Old iron rails	$20.50 to $21.00
Rails for rolling	20.75 to 21.25
Steel rails, less than 3 ft	20.00 to 20.50
Relaying rails, standard section	26.00 to 29.00
Cast iron car wheels	18.00 to 18.50
No. 1 heavy railroad melting steel	17.50 to 18.00
No. 1 heavy shoveling steel	17.50 to 18.00
Ordinary shoveling steel	17.50 to 18.00
Frogs, switches and guards cut apart	20.50 to 21.00

Per Net Ton

Heavy axles and tire turnings	12.75 to 13.25
Steel angle bars	18.00 to 18.50
Iron car axles	26.00 to 26.50
Steel car axles	21.00 to 21.50
Wrought iron bars and transoms	21.00 to 21.50
No. 1 railroad wrought	17.50 to 18.00
No. 2 railroad wrought	17.00 to 17.50
Railroad springs	21.00 to 21.50
Steel couplers and knuckles	21.00 to 21.50
Cast iron borings	11.00 to 11.50
No. 1 busheling	13.50 to 14.00
No. 1 railroad cast	21.50 to 22.00
Railroad malleable	19.75 to 20.25
Machine shop turnings	9.50 to 10.00

Directors of the Falcon Steel Co., Niles, Ohio, were re-elected Tuesday by stockholders at the annual meeting and declared the regular dividends.

Philadelphia

The Price Trend of Pig Iron and Finished Materials Is Downward

PHILADELPHIA, Sept. 26.—The buyer of pig iron and steel remains in a mood of hesitancy and is satisfying his wants on a hand-to-mouth basis. The only exception is in the railroad field, from which liberal orders are coming, particularly for locomotives. At the moment two leading locomotive builders are in the market for close to 20,000 tons of plates for locomotives that have already been ordered or are being figured on.

Ore.—Receipts of ore at the port of Philadelphia in the week ended last Saturday were 6000 tons of chrome ore and 2000 tons of manganese ore.

Pig Iron.—While foundry pig iron has not openly declined from the $32 base, which has been quoted the past two weeks, it is persistently reported that buyers have received quotations of $31.50, furnace, for No. 2 plain and $1 higher for No. 2 X. It is admitted that prices are slightly weaker, but sellers say that not enough desirable tonnage is in sight to bring about any marked reduction. In basic iron, however, the inquiry of an Eastern steel company for 10,000 tons or more has brought out at least one quotation of $28, furnace, while another furnace is reported to have quoted $30, delivered, equivalent to about $29, furnace. This business had not been closed to-day, but it was expected that orders would be placed before the end of the week. Foreign foundry iron continues to dominate the local market, and there is a tendency among some sellers to quote prices slightly below those recently named. Iron is coming in more freely, receipts at the port of Philadelphia for the week ended last Saturday being 1000 tons from England and 2500 tons from Scotland. Foreign low phosphorus iron, copper free, is now available at $30, c.i.f. Philadelphia.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 76 cents to $1.64 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$33.26 to $35.64
East. Pa. No. 2X, 2.25 to 2.75	34.26 to 36.64
East. Pa. No. 1X	35.26 to 37.64
Virginia No. 2 plain, 1.75 to 2.25 sil.	37.17
Virginia No. 2X, 2.25 to 2.75 sil.	38.17
Basic delivered eastern Pa.	29.00 to 30.00
Gray forge	31.00 to 33.00
Malleable	34.00 to 35.00
Standard low phos. (f.o.b. furnace)	38.00 to 40.00
Copper bearing low phos. (f.o.b. furnace)	37.00 to 38.00

Ferroalloys.—It has been reported that British producers of ferromanganese would reduce their c.i.f. price for shipment to the United States, but agents here have received no notification to that effect as yet. The new tariff bill places a duty of $33.60 a ton on 80 per cent ferromanganese, a total price at seaboard of $101.10. Domestic producers have not named new prices, but their quotations will probably be about $100 a ton, f.o.b. furnace. It is expected that steel companies which can do so will use spiegeleisen in preference to ferromanganese, as the former is admissible with a duty of only 75c. a ton, and foreign spiegeleisen is being offered here at $39, seaboard, duty paid, for the 18 to 20 per cent grade. Imports of ferromanganese in the week ended last Saturday totaled 1905 tons. Ferrotungsten receipts amounted to 44,184 lb.

Plates.—The plate market has weakened to the extent that the peak price of 2.50c., Pittsburgh, which had been quoted by three or four Eastern mills, has practically disappeared and 2.25c. now appears to be the top of the market, with some business going at $2 or $3 a ton under this figure. The American Locomotive Co. is in the market for 10,000 to 12,000 tons of plates for locomotives recently booked and the Baldwin Locomotive Works will also require several thousand tons additional for some of its recent new business. Inquiries now pending or about to be quoted on involve more than 200 locomotives. The Baldwin Locomotive Works has been awarded 25 by the Atlantic Coast Line and 25 by the Lehigh Valley.

Structural Material.—The New York Shipbuilding Corporation will fabricate 1300 tons for the Fortieth Street bridge, Philadelphia. The Corn Exchange Bank, Philadelphia, will require 800 tons. The demand for plain material is not large. Prices remain unchanged at 2c. to 2.25c., Pittsburgh, the top price being less frequently quoted.

Bars.—Steel bars for shipment in 30 days are to be had at 2c., Pittsburgh, but the mill making this price is selecting only certain sizes which suit its rolling schedules. On mixed specifications such as jobbers' stock orders, 2.25c. is being paid in most instances. Bar iron is quoted at 2.25c., Pittsburgh, by most of the Eastern mills, but it is obtainable at 2.15c. in carloads and 2.25c. in less than carloads.

Wire Products.—The American Steel & Wire Co. has advanced wire nails to 2.70c. per lb. and plain wire to 2.45c., Pittsburgh. Some of the independents are quoting 5c. per 100 lb. higher.

Warehouse Business.—Following the action of the New York jobbers in advancing prices 10c. per 100 lb., the Philadelphia warehouses will announce similar advances this week. Until the change is made the following are the quotations for local delivery:

Soft steel bars and small shapes, 2.90c.; iron bars (except bands), 2.90c.; round edge iron, 3.10c.; round edge steel, iron finish, 1½ x ½ in., 3.10c.; round edge steel planished, 3.85c.; tank steel plates, ¼-in. and heavier, 3c.; tank steel plates, 3/16-in., 3.20c.; blue annealed steel sheets, No. 10 gage, 3.85c.; black sheets, No. 28 gage, 4.60c.; galvanized sheets, No. 28 gage, 5.75c.; square twisted and deformed steel bars, 3c.; structural shapes, 3c.; diamond pattern plates, ¼-in., 4.80c.; 3/16-in., 5c.; spring steel, 4.25c.; round cold-rolled steel, 4.85c.; squares and hexagons, cold-rolled steel, 4.35c.; steel hoops, No. 13 gage and lighter, 4.10c.; steel bands, No. 12 gage to 3/16-in., inclusive, 3.70c.; rails, 2.90c.; tool steel, 8.50c.; Norway iron, 5.50c.

Rails.—Only one rail reservation has been made so far by Eastern roads which do their purchasing in this district, the Philadelphia & Reading placing 13,000 tons with the Bethlehem Steel Co. and 2000 tons with Cambria Steel Co. Inquiries for rails are noted in another column.

Semi-Finished Steel.—One steel company is holding at $45 for rerolling billets and at $50 for forging billets, but these prices represent the top of the market and very little business can now be closed at that level. Other steel makers are quoting $40 for rerolling quality and $45 for forging quality, f.o.b. Pittsburgh.

Coke.—A sale of blast furnace coke for October shipment has been made at $11, Connellsville, which is also the price for spot carloads. Foundry coke from Connellsville is quoted at $12 or higher. By-product foundry coke is to be had at $13.50 to $14, Swedeland, Pa.

Old Material.—While lacking the liveliness of the past two weeks, the scrap market still presents a strong front, with further advances on some grades. The situation is complicated by shortage of cars. Railroads have in some instances asked shippers to use box cars, which make loading and unloading a more cumbersome job. It is the opinion of some in the trade that a good many shippers of scrap are using the car shortage as a pretext to avoid shipments on orders taken at prices lower than those now quoted.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$18.00 to $18.50
Scrap rails	18.00 to 18.50
Steel rails for rolling	21.00 to 22.00
No. 1 low phos., heavy 0.04 and under	25.50 to 26.00
Cast iron car wheels	23.00 to 24.00
No. 1 railroad wrought	22.00 to 23.00
No. 1 yard wrought	20.00 to 21.00
No. 1 forge fire	16.00 to 16.50
Bundled sheets (for steel works)	15.50 to 16.00
No. 1 busheling	15.50 to 16.00
Turnings (short shoveling grade for blast furnace use)	14.50 to 15.00
Mixed borings and turnings (for blast furnace use)	14.50 to 15.00
Machine-shop turnings (for steel works use)	16.00 to 16.50
Machine-shop turnings (for rolling mill use)	17.00 to 17.50
Heavy axle turnings (or equivalent)	17.00 to 17.50
Cast borings (for steel works and rolling mills)	16.50 to 17.50
Cast borings (for chemical plants)	23.00 to 25.00
No. 1 cast	23.00 to 24.00
Heavy breakable cast (for steel plants)	21.00 to 22.00
Railroad grate bars	17.00 to 17.50
Stove plate (for steel plant use)	17.00 to 17.50
Railroad malleable	15.50 to 16.50
Wrought iron and soft steel pipes and tubes (new specifications)	17.00 to 17.50
Shafting	25.00 to 28.00
Steel axles	30.00 to 31.00

British Iron and Steel Market

American Buying of British Pig Iron Has Raised Prices—Steel Prices Weakened by Near East Disturbances

(By Cable)

LONDON, ENGLAND, Sept. 26.

Pig iron is firm on continued American and Canadian demand; 10,000 tons of Cleveland No. 4 foundry iron has been sold to America. Dealers are cautious still as to relighting furnaces, but dearness of fuel is the main obstacle. Home consumers generally are awaiting developments.

Steel outlook is unsettled, due to the Near East disturbances. India has placed a few orders, but substantial demand from all quarters is lacking. Some works are competing keenly; others are holding aloof. Ebbw Vale collieries and steel works have been closed for an indefinite period, owing to labor disputes.

Continental markets generally are quiet. India, China and South America have made small purchases of merchant bars, plates and sections. Belgian nut and bolt bar iron has been sold at £8 7½s. (1.65c. per lb.) delivered Midlands. Rangoon is inquiring for wire nails. America is purchasing Continental pig iron.

Tin plate is weak on forced selling by some makers anxious to secure orders for October shipment, being sold at 18½s. ($4.10) basis f.o.b. Odd sizes have been sold to the home trade at 18½s. f.o.t.

Galvanized sheets are quiet. The Continent is inquiring for some for re-shipment. There is some revival of demand for Japanese specifications of black sheets, but bids generally are too low.

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $4.42 per £1, as follows:

Durham coke, delivered	£1	7s.		$5.97	
Cleveland No. 1 foundry	4	17½		21.55	
Cleveland No. 3 foundry	4	12½	to £4 15s	20.44 to	$21.00
Cleveland No. 4 foundry	4	10		19.89	
Cleveland No. 4 forge	4	5		18.78	
Cleveland basic	4	0		17.68	
East Coast mixed	4	3	to 4 11	19.67 to	20.11
Ferromanganese	15	0		68.50	
Ferromanganese*	14	10	to 14 15	64.99 to	65.19
Rails, 60 lb. and up	7	5	to 8 0	32.04 to	35.36
Billets	7	2½	to 8 0	31.49 to	35.36
Sheet and tin plate bars, Welsh	7	7½		32.60	
Tin plates, base box	0	18½	to 0 19	4.10 to	4.20
				C. per Lb.	
Ship plates	8	10	to 9 0	1.68 to	1.78
Boiler plates	11	10	to 12 0	2.27 to	2.37
Tees	9	0	to 9 10	1.78 to	1.88
Channels	8	5	to 8 15	1.63 to	1.73
Beams	8	5	to 8 15	1.63 to	1.73
Round bars, ¾ to 3 in.	9	0	to 9 10	1.78 to	1.88
Galvanized sheets, 24 g.	16	5	to 16 10	3.21 to	3.26
Black sheets	12	0		2.37	
Steel hoops	11	0	& 11 10*	2.17 &	2.27*
Cold rolled steel strip, 20 g.	23	2½		4.56	
Cotton ties, Indian specifications	15	0		2.96	

*Export price.

Continental Prices, All F. O. B. Channel Ports, Delivery as Specified

No. 3 foundry pig iron:					
Belgium, October	£4	5s.		$18.78	
Luxemburg, October	4	5		18.78	
France, October	4	5		18.78	
Billets:					
France, Oct., Nov.	5	12½	to £5 15s.	24.86 to	$25.41
Luxemb'g, Oct., Nov.	5	12½	to 5 15	24.86 to	25.41
Lorraine, Oct., Nov.	5	12½	to 5 15	24.86 to	25.41
Wire nails (keg basis):					
Germany	0	14½		3.20	
Belgium	0	20½		4.53	
Wire rods, 5 mm. (0.2 in.):					
Belgium	7	5	to 10 7½	32.04 to	45.86
Angles:				C. per Lb.	
Belgium, September	7	7½		1.45	
Tees:					
Belgium	8	5		1.63	
Merchant bars:					
Belgium, Nov., Dec.	7	10	to 7 12½	1.48 to	1.50
Luxemb'g, Nov., Dec.	7	10	to 7 15	1.48 to	1.53
France, Nov., Dec.	7	10	to 7 12½	1.48 to	1.50
Germany, Jan., Feb.	7	10		1.48	
Joists (beams):					
France, Oct., Nov.	6	12½	to 7	1.31 to	1.38
Belgium, Oct., Nov.	6	12½	to 7	1.31 to	1.38
Luxemb'g, Oct., Nov.	6	12½	to 7	1.31 to	1.38
Channels:					
Belgium	7	10	to 7 12½	1.48 to	1.50
⅜-in. plates:					
Germany, Nov., Dec.	8	0		1.58	
Belgium, Sept., Oct.	7	10	to 8 0	1.48 to	1.58
Luxemburg, Oct.	7	12½	to 7 15	1.50 to	1.53
France, not offered.					
⅛-in. plates:					
Germany	9	0		1.78	
No. 8 gage wire:					
Belgium, August	14	10⅝		2.87	

Business Conditions Viewed by Hardware Association

W. L. Niekamp, president American Iron, Steel and Heavy Hardware Association, was the guest of 20 odd members of that body at a luncheon at the Exchange Club, Boston, Sept. 18. F. H. Butts, Butts & Ordway Co., Boston, presided. The gathering represented a wide variety of business interests and each one present was asked to tell the condition of trade in his particular line of business.

Several interesting points were brought out during the informal talks, among them being the fact that August, in a very large majority of cases, was the best month in point of orders booked experienced in ten months. Screw manufacturers are experiencing difficulty in securing material for their product, have more business on their books than they can properly handle and expect a shortage of goods this winter. A car shortage that will seriously affect business this winter, which cannot be avoided under the most favorable conditions between now and Jan. 1, is facing the country, according to one of the best posted men in New England on railroad conditions. Sheets are moving out of jobbing hands in larger weekly tonnages than at any previous time this year, while there has been a slump in sales of structural steel. Stress was laid on the fact that employers of this country, unlike organized labor, have no leader whom all merchants will follow. It was asserted ha never before in our business history has there been a need for such leadership as today.

Program of Gear Makers' Meeting

An interesting program has been prepared for the semi-annual meeting of the American Gear Manufacturers' Association, which will be held at the Drake Hotel, Chicago, Oct. 9, 10 and 11. A paper that is expected to prove of unusual interest will be the one on "Standardization of Gear Sounds," to be presented by Prof. Daniel L. Rich of the University of Michigan. This paper will probably be read Tuesday afternoon. With the exception of the time of presenting this paper, the program has been completed. During the different sessions reports of the various sub-committees will be submitted. The program includes the following:

Monday, Oct. 9

Meeting of executive committee; reports of officers, committees, etc.

Address by George L. Markland, Jr., president Philadelphia Gear Works, on the "Evolution of the Gear."

Address by P. C. Molter, superintendent of department of industrial relations National Metal Trades Association, on "Apprenticeship."

Oct. 10

Address by Frank D. Hamlin, vice-president Earle Gear & Machine Co., Philadelphia, on "What the Association Needs from Committeemen after Nearly Six Years' Secretarial Observations."

Meeting of the industrial group to consider conditions in the industry, George L. Markland, Jr., presiding.

Address by L. G. Hewins, sales manager VanDorn & Dutton Co., Cleveland, on "Why Buy a Pig in a Poke?"

Meeting of automotive group to consider conditions in the industry, R. P. Johnson presiding.

An informal banquet, with J. B. Foote as toastmaster. Gen. John V. Clinnin will speak on "The World War and Its Effects on American Business," and Hon. Marcus Kavanagh, judge of the Supreme Court, Cook County, Illinois, will speak on "Capital and Labor."

Oct. 11

Address by Prof. A. E. White, director, department of engineering and research, University of Michigan, on "Engineering Research."

INTEREST SHOWN IN IMPORTS

Beside Pig Iron, Importers Able to Offer Billets, Bars, Wire Rods and Plates—Japan Buys Rails

NEW YORK, Sept. 26.—The export market continues extremely quiet, the small merchant buying in both Japan and China still being reported as going to Great Britain and the Continent. The Chinese market is featureless except for small purchases of copper. One interest here has sold some small orders of copper and a small tonnage of wire shorts to Chinese markets. There is also a slight interest in pipe both in China and Japan. Although inquiries for standard American brands of black sheets continue to appear, no sales are noted. The latest tender of the Imperial Government Railways, which was closed Sept. 15, calling for bids on 4800 tons of 60-lb. rails and 30,000 splice bars, was awarded to Suzuki & Co. An order from an electric railway for 14 miles of 20-lb. rails and 30 miles of 70-lb. rails went to Mitsui & Co. The Imperial Government Railways have also closed on 4000 tons of car couplers.

The greatest interest at present seems to lie in imports of foreign material rather than exports, although, according to reports, with the exception of foreign pig iron, imports have been small up to the present, and the new tariff may have a tendency to diminish them. Recently, one British importing and exporting interest, with a branch in New York, brought in a small tonnage of mild steel bars at Philadelphia, selling them at 1.80c per lb. landed and this same interest points out that it is in a position to quote billets of United Kingdom origin at as low as $31.11 per ton, c. i. f. New York, Philadelphia or Baltimore. Both wire rods and ship plates, provided there was any demand, this interest claims, could be brought in profitably at present prices. Pig iron, however, is the only commodity being imported in quantities.

Foreign pig iron continues to be quoted at several dollars per ton below the domestic product. The larger portion of the imports and contracts for shipment on foreign iron have undoubtedly been for pig iron of British origin, although Continental iron—Belgian, Luxemburg and French—has played no small part in buying. At present Continental iron can be brought in at about $27 per ton, c. i. f. New York on foundry grades, according to one fairly large importer. German pig iron, very little of which has been offered as far as can be ascertained, is said by one importer, who has been dealing with British sellers, to be available at about $25, c. i. f. New York. The iron on this offer analyzed: Sil., 1.75 to 2.25 per cent; phos., 0.04 to 0.06 per cent; sul., 0.04 maximum and man., 1.5 to 2.25 per cent.

There is evident a slight range of quotations between different importers of British iron. One small importer states that No. 3 Scotch foundry iron can be obtained at £6 per ton, c. i. f. New York, Philadelphia, or Baltimore, while another interest, which represents a large number of British furnaces, quotes £6 10s. per ton, c. i. f. on all foundry grades, regardless of silicon content. On steel making iron this importer quotes £5 18s. per ton, c. i. f. These prices would be slightly increased on shipments to Boston, as the ocean freight to that port from the United Kingdom is about 2s. per ton higher.

An importing interest, which claims to have recently delivered or to have in transit or under contract for delivery pig iron, the greater part of which is British foundry grade, totaling about 180,000 tons, estimates recent purchases of foreign iron of all kinds at an unusually high figure. Another importer, however, discounts recent high estimates considerably, pointing out that there has been a tendency to overestimate through duplication of the tonnage when it passes through several hands.

While practically all British furnaces report themselves out of the market on October shipments of iron, the first bookings possible in almost all cases being for November or December shipment, it is explained by importers in close touch with the situation in England, that the recent demand from the United States stimulated speculation and that there are undoubtedly some fair-sized tonnages booked for delivery to speculators in October, which may be released for export.

Program of Drop Forging Convention

The program of the convention of the American Drop Forging Institute, to be held in the General Motors Building, Detroit, next week, is in part as follows:

Tuesday, Oct. 3

11 a. m.—President's address, by J. H. Williams, president J. H. Williams & Co., Brooklyn.

2 p. m.—Business session—
The Drop Forging Industry, by F. A. Ingalls, vice-president Ingalls Shepard division of Wyman-Gordon Co.
Business Trends in the Drop Forging Industry, with charts, by Scovell, Wellington & Co., commissioners of the association.
Suggestions for Institute Research Work, by Jules Dierckx, Keller Mechanical Engraving Co., Brooklyn.
How Supply Men Can Co-operate, by H. N. Taylor, president N. & G. Taylor Co., Philadelphia.

9 p. m.—Smoker and entertainment, arranged by American Society for Steel Treating.

Wednesday, Oct. 4

10 a. m.—Joint session with American Society for Steel Treating.

2 p. m.—Open session—
Some Fundamentals with Respect to the Labor Question, by Walter Gordon Merritt, organizer and counsel of the League for Industrial Rights, New York.
The Menace of the Sherman Act to This Country, and How It Should Be Amended, by Felix H. Levy, special assistant to the Department of Justice under President Roosevelt, New York.

Thursday, Oct. 5

10 a. m.—Business session—
Symposium on Drop Forging Cost Methods, by cost committee, J. B. Sehl, chairman, second vice-president Billing & Spencer Co., Hartford, Conn.; C. C. Winn, assistant treasurer Wyman-Gordon Co., Worcester, Mass., and F. S. Hatch, assistant treasurer Moore Drop Forging Co., Springfield, Mass.
Forging Furnace Construction, by H. Johnson, engineer, Ingalls-Shepard division, Wyman-Gordon Co., Harvey, Ill.
Power Plant Costs in Operating Steam Hammers, by R. E. Waldron, chief engineer Dominion Forge & Stamping Co., Walkerville, Ont.

2 p. m.—Business session—
Ideal Die Shop, by O. F. Transue, president and general manager Transue & Williams Steel Forging Corporation, Alliance, Ohio.
Flow of Metal in Forgings, by L. A. Danse, Cadillac Motor Car Co.
Field for Upsetters in the Drop Forging Industry and Comparison Between Board and Steam Drop Hammers, by representatives of the Drop Forge Supply Association.

7 p. m.—Banquet of American Drop Forging Institute, Drop Forge Supply Association, and American Society for Steel Treating.

Friday, Oct. 6

10 a. m.—Session for executive members of American Drop Forging Institute only.

Proposed Lower Rates on Pig Iron

WASHINGTON, Sept. 26.—Lower rates on pig iron from Virginia furnaces to Cincinnati and Lexington, Ky., and on imported iron ore to St. Louis and East St. Louis are proposed in a tariff filed with the Interstate Commerce Commission. The Chesapeake & Ohio, Norfolk & Western and Virginian railroads have filed tariff, proposed to be effective Oct. 27, establishing a rate of $3.95 per gross ton on pig iron from Virginia furnaces to Cincinnati and $4.42 from the same furnaces to Lexington. The present rates are $4.41 and $5.04, respectively.

The tariff proposing a lower rate on imported iron ore except from Canadian and New England, effective Oct. 25, calls for a rate of $5.48 per gross ton to St. Louis and East St. Louis from the following ports of Virginia: Lambert's Point, Newport News, Norfolk, Pinner Point, Portsmouth and West Norfolk. The present rate is $6.35.

High Price for Heavy Melting Steel

YOUNGSTOWN, OHIO, Sept. 26.—Heavy melting scrap sold in the Mahoning Valley this week at $23, a new high in the current movement. Firm prices are attributed to high operating rate of open-hearth furnaces and inability of railroads to make deliveries as usual, owing to pressure of other freight movement. Decline in offerings by the carriers has also compelled consumers to bid up the market.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Plates

Sheared, tank quality, base, per lb.....2.00c. to 2.50c.

Structural Material

Beams, channels, etc.....2.00c. to 2.25c.

Iron and Steel Bars

Soft steel bars, base, per lb.....2c. to 2.25c.
Refined iron bars, base, per lb.....2.50c.

Hot-Rolled Flats

Hoops, base, per lb.....2.75c. to 3c.
Bands, base, per lb.....2.75c. to 3c.
Strips, base, per lb.....2.75c. to 3c.
Cotton ties, per bundle of 45 lb.....$1.12

Cold-Finished Steels

Bars and shafting, base, per lb.....2.50c.
Strips, base, per lb.....4.25c. to 4.50c.

Wire Products

Nails, base, per keg.....$2.70
Bright plain wire, base, per 100 lb.....2.45
Annealed fence wire, base, per 100 lb.....$2.45 to 2.50
Galvanized wire, base, per 100 lb.....2.95 to 3.00
Galvanized barbed, base, per 100 lb.....3.35
Galvanized staples, base, per keg.....3.35
Painted barbed wire, base, per 100 lb.....2.85
Polished staples, base, per keg.....2.85
Cement coated nails, base, per count keg.....2.20
Woven fence, carloads (to jobbers).....70½ per cent off list
Woven fence, carloads (to retailers).....68 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads.60 and 10 per cent off list
Machine bolts, small, cut threads.50, 10 and 10 per cent off list
Machine bolts, larger and longer..50, 10 and 10 per cent off list
Carriage bolts, ⅜ x 6 in.:
Smaller and shorter, rolled threads, 50, 10 and 10 per cent off list
Cut threads .....50 and 10 per cent off list
Longer and larger sizes.....50 and 10 per cent off list
Lag bolts .....60 and 10 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads...50 and 10 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.:
Smaller and shorter.....45 and 10 per cent off list
Larger and longer sizes.....45 and 10 per cent off list
Hot pressed square or hex. blank nuts.....$3.75 off list
Hot pressed nuts, tapped.....3.75 off list
C.p.c. and t. sq. or hex. nuts, blank.....3.75 off list
C.p.c. and t. sq. or hex. nuts, tapped.....3.75 off list
Semi-finished hex. nuts:
9/16 in. and smaller, U. S. S.....80 per cent off list
⅝ in. and larger, U. S. S.....75 per cent off list
Small sizes, S. A. E.....80 and 10 per cent off list
S. A. E., ⅝ in. and larger.....75 and 10 per cent off list
Stove bolts in packages.....80 and 5 per cent off list
Stove bolts in bulk.....80, 5 and 2½ per cent off list
Tire bolts .....50, 10 and 10 per cent off list

Cap and Set Screws

Milled square and hex. head cap screws....75 per cent off list
Milled set screws.....75 per cent off list
Upset cap screws.....75 and 10 per cent off list
Upset set screws.....80 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb.....$3.00
Large boiler rivets, base, per 100 lb.....3.10
Small rivets .....65 to 65 and 5 per cent off list

Track Equipment

Spikes, 9/16 in. and larger, base, per 100 lb....$2.75 to $2.85
Spikes, ½ in. and smaller, base, per 100 lb..... 3.25 to 3.75
Spikes, boat and barge, base, per 100 lb..... 3.25 to 3.75
Track bolts, base, per 100 lb..... 3.85 to 4.50
Tie plates, per 100 lb..... 2.25 to 2.50
Angle bars, base, per 100 lb..... 2.40

Welded Pipe

Butt Weld

Inches	Steel Black	Steel Galv.	Iron Black	Iron Galv.
⅛	51½	26	¼ to ⅜.....	+2	+33
¼ to ⅜.....	57	21½	½	26	8
½	62	4½	¾	32	17
¾	66	5½	1 to 1½.....	34	19
1 to 3.....	68	56½			

Lap Weld

2	61	49½	2	29	15
2½ to 6.....	65	53½	2½ to 6.....	32½	19
7 to 8.....	62	49½	7 to 12.....	30	17
9 to 12.....	61	48½			

Butt Weld, extra strong, plain ends

⅛	47½	31	¼ to ⅜.....	15	+48
¼ to ⅜.....	53	36½	½	25	13
½	59	48½	¾	32	18
¾	64	53½	1 to 1½.....	34	20
1 to 1½.....	66	55½			
2 to 3.....	67	56½			

Lap Weld extra strong, plain ends

2	59	48½	2	30	17
2½ to 4.....	63	52½	2½ to 4.....	33	21
4½ to 6.....	62	51½	4½ to 6.....	32	20
7 to 8.....	58	45½	7 to 8.....	25	13
9 to 12.....	52	39½	9 to 12.....	20	8

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 and 2½ per cent.

Boiler Tubes

Lap Welded Steel		*Charcoal Iron*	
1¾ in.	23½	1½ in. .....+	2
2 to 2¼ in.....	38	1¾ to 1⅞ in.....	8
2½ to 3 in.....	49	2 to 2¼ in.....	18
3¼ to 13 in.....	54	2½ to 3 in.....	23
		3¼ to 4½ in.....	25

To large buyers of steel tubes a supplementary discount of 5 per cent is allowed.

Standard Commercial Seamless Boiler Tubes

Discounts on cold-drawn tubes in carload lots, f.o.b. Pittsburgh, follow:

1 in.	57	2½ and 2¾ in.....	40
1¼ and 1½ in.....	49	3 in.	44
1¾ in.	33	3¼ to 4 in.....	49
2 and 2¼ in.....	36	4¼ in. and 5 in.....	41

Hot Rolled

3 in.	46	3¼ to 4 in.....	51

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base, 85 per cent off list. Carbon 0.30 to 0.40, base, 83 per cent off list. Plus usual differentials and extras for cutting.

Seamless Locomotive and Superheater Tubes

Cents per Ft.		Cents per Ft.	
2-in. O.D. 12 gage.....13		2¼-in. O.D. 10 gage....17¾	
2-in. O.D. 11 gage.....14		3-in. O.D. 7 gage.....33	
2-in. O.D. 10 gage.....15		1½-in. O.D. 9 gage.....13	
2¼-in. O.D. 12 gage....15		5⅜-in. O.D. 9 gage.....51	
2¼-in. O.D. 11 gage....16		5½-in. O.D. 9 gage.....53	

Tin Plate

Standard cokes, per base box.....$4.75

Terne Plate

(Per package, 200-lb.)

8-lb. coating	$9.30	25-lb. coating I. C.....$14.25	
8-lb. coating I. C.....	9.60	30-lb. coating I. C..... 15.25	
15-lb. coating I. C.....	11.80	35-lb. coating I. C..... 16.25	
20-lb. coating I. C.....	13.00	40-lb. coating I. C..... 17.25	

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....2.50c. to 2.75c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.35c. to 3.75c.

Galvanized

No. 28 (base), per lb.....4.35c. to 4.75c.

Tin-Mill Black Plate

No. 28 (base), per lb.....3.35c. to 3.50c.

Manufacturers have pamphlets, which can be had upon application, giving price differentials for gage and extras for length, width, shearing, etc.

Freight Rates

All rail freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic.	$0.325	Buffalo	$0.265	St. Louis	$0.43
Philadelphia, export...	0.235	Cleveland	0.215	Kansas City	0.735
Baltimore, domestic...	0.315	Cleveland, Youngstown		Kansas City (pipe)...	0.705
Baltimore, export.....	0.225	Comb.	0.19	St. Paul	0.595
New York, domestic...	0.34	Detroit	0.295	Omaha	0.735
New York, export.....	0.255	Cincinnati	0.295	Omaha (pipe)	0.705
Boston, domestic	0.365	Indianapolis	0.31	Denver	1.275
Boston, export	0.255	Chicago	0.34	Denver (pipe)	1.215

Pacific Coast	$1.50
Pac. Coast, ship plates	1.20
Birmingham	0.69
Memphis	0.385
Jacksonville, all rail..	0.50
Jacksonville, rail and water	0.415
New Orleans	0.515

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 30c. to 40c.; ship plates, 30c. to 40c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 30c. to 40c.; sheets and tin plates, 50c.; rods, wire rope, cable and strands, 75c.; wire fencing, netting and stretcher, 50c.; pipe, not over 8 in. in diameter, 50c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

STEEL RAIL ACTIVITY

Over One Million Tons, Bought or Reserved, Indicated for First Half Next Year

Including the 250,000 tons for the New York Central, the Norfolk & Western, the Long Island and the Reading, mentioned last week, known items of rail purchases and rail reservations for the first half of 1923 indicate a total for the country of considerably over 1,000,000 tons. All this has been consummated practically in two weeks of September, or before the advance from $40 to $43 per ton taking effect on Oct. 1. The appended list shows 410,000 tons closed or closing in the Chicago territory, 575,000 tons closed or closing in the East, and a number of the leading roads yet to be heard from. Following is a brief tabulation of the current rail business:

Union Pacific has purchased 40,000 tons from Illinois Steel Co. and 20,000 tons from Colorado Fuel & Iron Co., a total of 60,000 tons.

The Great Northern has placed 10,000 tons with the Illinois Steel Co. and 5000 tons each with the Inland Steel Co. and the Lackawanna mill of the Bethelehem Steel Co., a total of 20,000 tons.

The Atchison, Topeka & Santa Fe has ordered 25,000 tons each from Illinois Steel Co. and Colorado Fuel & Iron Co., 11,000 tons from Inland Steel Co. and 3000 tons from Bethlehem Steel Co., a total of 64,000 tons.

The Chicago, Burlington & Quincy has ordered 15,000 tons from Illinois Steel Co. but expects to make additional reservations.

The Chicago & Eastern Illinois has reserved space with Illinois Steel Co. for 5000 tons.

The Chicago, Indianapolis & Louisville has placed 3000 tons with the Illinois mill.

The Chicago & Alton has made reservations for approximately 8000 tons.

The Chicago, Rock Island & Pacific has reserved space for 40,000 tons with Illinois Steel Co.

The Chicago, Milwaukee & St. Paul is about to close for 50,000 tons. It placed an order some time ago with the Lackawanna Steel Co. for 5000 tons for delivery this fall.

Joint orders of the Chicago & Northwestern and the Chicago, St. Paul, Minneapolis & Omaha will probably total 50,000 tons.

The Illinois Central is about to close, or has closed, for 60,000 tons.

The Northern Pacific is understood to have contracted for 35,000 tons.

The Philadelphia & Reading Railroad has placed 13,000 tons with the Bethlehem Steel Co. and 2000 tons with the Cambria Steel Co.

The Baltimore & Ohio Railroad will require 35,000 tons.

The Chesapeake & Ohio's inquiry calls for 20,000 tons.

The Southern Railway is in the market for 25,000 tons.

The Pennsylvania Railroad will probably require 80,000 to 100,000 tons, but no formal inquiry has been issued.

The Western Maryland wants 2000 tons.

The Pere Marquette has inquired for 13,000 tons.

The Grand Trunk has asked bids on 10,000 tons for delivery at Detroit and Portland, Me.

The Hocking Valley wants 4600 tons.

The Bangor & Aroostook calls for 1500 to 2000 tons.

The Erie has covered for 40,000 tons.

The Boston & Maine total is put at 15,000 tons.

The New Haven's needs call for 25,000 tons.

The Maine Central is likely to close for 7,500 tons.

The Delaware, Lackawanna & Western is understood to have covered for 15,000 tons.

The Lehigh Valley's total is understood to be 20,000 tons.

The Delaware & Hudson has arranged for 10,000 to 20,000 tons.

RAILROAD EQUIPMENT BUYING

Orders and Inquiries for Locomotives Continue in Large Volume

Large locomotive orders have been placed within the past week and pending inquiries, with business that is expected to develop shortly, involve several hundred additional. Car business is improving, but is not on a parity with the activity in the locomotive field. Some of the more important items of business follow:

The Baltimore & Ohio has ordered 1000 hopper cars of 55 tons capacity from the American Car & Foundry Co.

The Grand Trunk has placed 250 refrigerator cars with the American Car & Foundry Co.

The Chicago & Northwestern is inquiring for 200 flat and 800 gondola cars.

The Hocking Valley is inquiring for 800 freight cars of various types.

The Rock Island is expected to enter the market for 2500 freight cars and has already issued inquiries for 30 Mikado type and 10 mountain type engines.

The Texas & Pacific has placed 8 Pacific type and 8 switch engines with the American Locomotive Co.

The Santa Fe is inquiring for 75 locomotives.

The Northern Pacific contemplates entering the market for 50 to 80 engines and the Great Northern and the Cotton Belt also expect to inquire for power.

The New York Central, which recently made two successive purchases of 150 and 90 engines, respectively, is expected to place 50 more presently and another 50 shortly thereafter.

The Virginian Railroad is in the market for 10 Mallet type engines.

The Lehigh Valley Railroad has placed 25 locomotives with the Baldwin Locomotive Works.

The Atlantic Coast Line has ordered 25 locomotives from the Baldwin Locomotive Works.

In addition to the 12 locomotives ordered by the Norfolk & Western from the Baldwin Locomotive Works, reported last week, 30 have been placed by the same road with the American Locomotive Co.

The Chicago, Burlington & Quincy will have an inquiry out in a few days for 50 locomotives.

The Maine Central Railroad has inquired for 12 passenger locomotives.

The Chesapeake & Ohio Railroad has placed 25 Mallet type locomotives with the American Locomotive Co.

The Delaware, Lackawanna & Western has ordered 15 Mikado type locomotives from the American Locomotive Co.

The St. Louis-San Francisco has placed 500 50-ton hopper cars with the Pullman Co., 1000 50-ton hopper cars with Chickasaw Shipbuilding & Car Co., 1200 40-ton box cars with the American Car & Foundry Co., and 300 40-ton stock cars with the Mount Vernon Car Mfg. Co.

The Texas & Pacific has ordered 150 tank cars from the American Car & Foundry Co.

The Atlantic Coast Line is in the market for 2000 box cars.

The Maine Central is in the market for 350 box cars, 350 open rack, 50 general service cars and 10 dairy products cars.

The Detroit, Toledo & Ironton is inquiring for 500 to 1000 hopper cars.

The Pittsburgh, Shawmut & Northern is planning to buy 200 stock cars, 50 box cars and 150 to 200 stock car bodies.

The West Penn Power Co. bought 50 hopper cars from the American Car & Foundry Co.

Large Railroad Inquiry from Argentina

WASHINGTON, Sept. 26.—A cablegram to the Department of Commerce states that La Plata Meridiano Railroad, owned and operated by the Province of Buenos Aires, Argentina, has been authorized to construct and equip 650 kilometers of new lines provided proper financial arrangements can be made. Originally bids were to be opened on Oct. 31, but the date has been put off to Dec. 31. Some of the equipment includes 44,300 tons of 31 kg. rails, 470 30-ton closed freight cars, 30 30-ton half box cars, 50 30-ton flat cars, 130 30-ton cattle cars, 27 Pacific type locomotives, 10 first class American type passenger cars, 10 second class American type passenger cars, 39 baggage cars, machinery to equip the shops and numerous miscellaneous items.

Fabricated Steel Business

Inquiries for structural steel work now being figured on include the following:

Miscellaneous bridge work, New York Central, 800 tons.

Machine shop for the Pennsylvania Railroad at Juniata, 3000 tons.

Plate girder bridge work for the Virginian Railway, 300 tons.

Corn Products Refining Co., Pekin, Ill., plant addition, 600 tons.

Allerton Hotel, Chicago, 2300 tons, bids in.

Addition to First National Bank Building, Chicago, 1600 tons, bids in.

Halle Brothers Co., Cleveland, store addition, 2500 tons.

Ohio University, Athens, Ohio, 200 tons.

General Baking Co., Boston, garage at Charlestown, 140 tons.

NON-FERROUS METALS

The Week's Prices

	Copper, New York		Straits Tin	Lead		Zinc	
Sept.	Lake	Electrolytic*	New York	New York	St. Louis	New York	St. Louis
20.....	14.12½	13.75	32.25	6.25	5.90	7.10	6.75
21.....	14.12½	13.75	32.57½	6.30	6.00	7.10	6.75
22.....	14.12½	13.75	32.50	6.35	6.05	7.15	6.80
23.....	14.25	13.75	....	6.35	6.10	7.20	6.85
25.....	14.25	13.75	32.55	6.50	6.25	7.20	6.85
26.....	14.25	13.75	32.50	6.50	6.25	7.22½	6.87½

*Refinery quotation.

New York

NEW YORK, Sept. 26.

Demand in practically all of the markets is moderate but the price tendency in two of them is very strong. Quotations on all the metals, except copper, are higher than a week ago. Demand for electrolytic copper is better at unchanged prices. Transactions in tin are only moderate at slightly advanced quotations. Prices of both lead and zinc have again advanced to considerably higher levels, due largely to lack of ready supplies.

Copper.—Domestic demand for electrolytic copper is reported as having improved considerably in the last week, due largely to the better industrial conditions throughout the country. While prices have not changed, the minimum is, if anything, firmer than a week ago, with one or two producers sold up at present prices. Electrolytic copper for delivery this year is quoted at 14c., delivered, or 13.75c., refinery. While no advance in prices has as yet occurred, sentiment in the trade is rather confident that higher values will be realized in the near future. Lake copper is slightly stronger at 14.25c. to 14.50c., delivered.

Tin.—Moderate activity in the Straits tin market on Sept. 19, referred to in this paragraph a week ago, represented sales of about 300 tons for nearby delivery. On the following day, Sept. 20, the market was fairly active when about 300 tons changed hands at an average of 32.25c. On the following day, Sept. 21, the market was considerably quieter, but a small business was done on a scale from 32.62½c. down to 32.50c. Since that day the market has been exceedingly dull and prices have been largely nominal. September as a whole is regarded as an exceedingly good month in business transacted, with consumers almost entirely the buyers. Another favorable indication is that the metal purchased was mostly for nearby delivery, which would indicate that consumers were not as well covered as had been calculated, most of the metal going directly into consumption. Extreme dullness of the market in the last few days is due partly to the advance in London, which has caused a halt here. Should the market break there, more buying is expected to at once manifest itself here. Spot Straits tin was quoted to-day in a quiet market at 32.50c., New York. London quotations were about £3 per ton higher than a week ago at £161 5s. for spot Standard, £162 10s. for future Standard and £161 12s. 6d. for spot Straits. Arrivals thus far this month have been 3455 tons with 8078 tons reported afloat. It was not possible to confirm a Boston rumor published in a New York paper to the effect that domestic producers of electrolytic tin would cease operations on the expiration of present contracts for Bolivian ore because no duty had been obtained and also because a better price for Bolivian ore could be secured from European refiners.

Lead.—Because of limited supplies this market is exceedingly strong and quotations have continued to advance. The outside market at New York has advanced 25 points in the week until to-day quotations are 6.25c., St. Louis, or 6.50c., New York, at which business has been done. Small lots of 15 tons each have sold as high as 6.75c., New York, for spot delivery, but metal for this position is very hard to locate. On Sept. 22 the leading interest again advanced its quotation to 6.05c., St. Louis, or 6.25c., New York. The market is preeminently a sellers' market with the danger that consumers may advance quotations upon themselves to 7c., New York. Most producers are sold up for October and some well sold into November.

Zinc.—Scarcity of early delivery prime Western zinc, coupled with a disinclination on the part of producers to sell any more than necessary, has caused prices to advance to 6.87½c., St. Louis, or 7.22½c., New York, for early delivery. There has been a fairly insistent demand from consumers but it is believed that the situation to-day is a little easier in this respect, and it is possible that the advance has either reached its height or temporarily halted. The statistics, made public about a week ago, showed a substantial reduction in stocks; a corresponding lack of increasing production has also been a factor.

Antimony.—Wholesale lots of Chinese metal for early delivery are quoted at 6.75c. per lb., New York, duty paid.

Aluminum.—There has been no change in the price of the leading interest which continues at 19.10c., f.o.b. shipping point, for virgin metal, 98 to 99 per cent pure. The same grade of metal, imported from foreign producers, is quoted nominal at 18.25c. to 19c. per lb., New York, duty paid. Thus far the new duty on aluminum has had no pronounced effect upon quotations.

Old Metals.—Prices generally are unchanged except lead, which is higher. Business in red and yellow metals is quiet. Dealers' selling prices are as follows:

	Cents Per Lb
Copper, heavy and crucible	13.50
Copper, heavy and wire	12.75
Copper, light and bottoms	11.25
Heavy machine composition	10.50
Brass, heavy	8.25
Brass, light	6.50
No. 1 red brass or composition turnings	9.00
No. 1 yellow rod brass turnings	7.50
Lead, heavy	5.50
Lead, tea	4.50
Zinc	4.00

Chicago

SEPT. 26.—Copper, lead and zinc have advanced. While there has been some buying, it has hardly been of sufficient volume to account for the advances; in fact, lead and zinc are believed to be headed for a reaction. The old metals remain unchanged except for an advance in copper bottoms. We quote, in carload lots, lake copper, 14.50c.; tin, 33.50c. to 34c.; lead, 6.37½c.; spelter, 6.90c.; antimony, 8.50c., in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 11c.; copper bottoms, 9.50c.; red brass, 8.75c.; yellow brass, 6.75c.; lead pipe, 4.50c.; zinc, 3.75c.; pewter, No. 1, 20c.; tin foil, 22.50c.; block tin, 26c., all buying prices for less than carload lots.

Scrap Active at Detroit

DETROIT, Sept. 25.—The market has been very active and melters are interested in the offering by one of the largest local producers of approximately 3000 gross tons of turnings, borings, flashings and hydraulic compressed for October delivery. The award will be made the last of the month on a competitive basis and in all probability the peak of the market for the year on these materials will be established. Some advances were recorded during the week, several sales on automobile cast reaching the high point for the year at $26. Hydraulic compressed and shoveling steel registered advances of 50c. per ton. The following prices are on a gross ton basis f.o.b. cars producer's yards, excepting stove plate, automobile and No. 1 machinery cast, which are quoted on a net ton basis:

Heavy melting steel	$15.50 to $16.00
Shoveling steel	15.25 to 16.25
No. 1 machinery cast	22.50 to 24.00
Cast borings	12.00 to 13.00
Automobile cast scrap	25.00 to 26.00
Stove plate	14.50 to 16.00
Hydraulic compressed	15.00 to 16.00

PERSONAL

Timothy Burns, who has been appointed general manager of the Lackawanna plant of the Bethlehem Steel Co., has had an experience of over 20 years in steel works operation. Born in Lawrence, Kan., in 1877, his preparatory school work was taken at Yankton College, S. D. He graduated from Lehigh University, Bethlehem, in mechanical engineering in 1901, working in the summers of 1899-1901 on the Government Survey in the Bad Lands of South Dakota. His first employment in steel was in the bar mills of the Cambria Steel Co. at Johnstown in 1901 to 1908. In the latter year he went to the Carnegie Steel Co.'s Duquesne plant and was employed in the bar mills. In 1912 he connected with the Pittsburgh Crucible Steel Co. as general superintendent, having charge of the building of merchant mills. He was active also in the development of alloy steels. On Jan. 1, 1917, he entered the employ of the Bethlehem Steel Co., being engaged on general construction of furnaces and mills at the Sparrows Point plant. He was transferred in the following September to Bethlehem, becoming general superintendent of the Saucon plant. His appointment as general manager of the Lackawanna plant at South Buffalo, N. Y., became effective last week.



TIMOTHY BURNS

James A. Farrell, president United States Steel Corporation, sailed for Europe on the Olympic on Sept. 23. He will be absent about six weeks, sailing from the other side on Oct. 28.

Dr. Federico Giolitti, Turin, Italy, was guest of honor at a luncheon at the Bankers' Club, New York, on Tuesday, Sept. 26, given by members of the Iron and Steel Committee of the American Institute of Mining and Metallurgical Engineers. Doctor Giolitti, who is re-visiting the United States, was managing director in the years of the war of the famous Ansaldo works. He is a son of the Italian prime minister. His visit to this country is expected to result in furtherance of plans for international co-operation between engineering organizations.

William Breeden, sales manager Lackawanna Steel Co., Buffalo, for the past three years, has resigned in connection with the reorganization of the sales force resulting from the taking over of the company by the Bethlehem Steel Co. Mr. Breeden went to Buffalo from Philadelphia and had been connected with the sales department for 11 years.

H. H. Colbus, formerly sales representative of the Halcomb Steel Co., Philadelphia branch, will represent the Down Tool Works, Inc., Fleetwood, Pa., in Philadelphia territory to handle high speed tools and drills.

Pell W. Foster, Jr., has been appointed New England district manager of the Power Specialty Co., 111 Broadway, New York, with offices at 50 Congress Street, Boston. He was formerly in the New York sales office.

Frank Osler, who for the past year has been supervising management and construction engineer of the Rose Polytechnic Institute, Terre Haute, Ind., and previously had been connected with the metal working industry as works manager, became associated with O. C. Herdrich & Co. on Sept. 15, as consulting industrial management engineer.

John H. Smith, for the past five years superintendent of works, Nova Scotia Steel & Coal Co., Ltd., Trenton Works, Nova Scotia, Canada, has been appointed general superintendent, Trenton Works Nova Scotia Steel & Coal Co., Ltd., and Eastern Car Co., Ltd.

Jacob E. Mesta has resigned as superintendent of machine shops, Mesta Machine Co., Pittsburgh, to go into the mill supply business for himself in Cleveland.

W. D. Creider has been appointed manager of the Milwaukee branch store of the Federal Machinery Sales Co., Chicago, succeeding J. C. Whitney, resigned. Mr. Creider was manager of the Chicago store and sales office of the Reed-Prentice Co., the Whitcomb-Blaisdell Machine Tool Co., and the Becker Milling Machine Co., until those companies discontinued direct selling.

Theodore G. Remsen, formerly sales representative of Hill, Clarke & Co., Chicago, has joined the sales force of the Federal Machinery Sales Co., Chicago.

S. Glen Vinson, vice-president and general manager of the Ideal Electric & Mfg. Co., Mansfield, Ohio, has returned from an extensive trip through the Orient, where he made a careful survey of business conditions. He visited the prominent cities of Japan, Hawaiian Islands, China and India, and returned by way of the Suez Canal, visiting Egypt, Italy, Switzerland, France and England.

A. E. Quere, formerly vice-president and general manager of the Niles Steel Products Co., Niles, Ohio, and previously in the sales department of the Brier Hill Steel Co., has been appointed assistant general manager of sales of the Ashtabula Steel Co., Ashtabula, Ohio.

Joseph S. Ruble, formerly vice-president of the Austin Co., Cleveland, has been elected director and vice-president of the H. K. Ferguson Co., same city, building engineer and contractor. He will have charge of construction work.

William E. Matthews of Cleveland was elected president at the annual meeting last week of the Carroll Foundry & Machine Co., Bucyrus, Ohio. W. D. Jones, Galion, Ohio, was elected vice-president and F. B. Squire, Cleveland, secretary and treasurer.

A. E. Hughes, for eight years identified with the operating department of the Brier Hill Steel Co., Youngstown, Ohio, has resigned, effective Sept. 25, to become general superintendent of the Ashtabula Steel Co., producer of black and galvanized sheets, operating eight mills at Ashtabula, Ohio. Mr. Hughes was formerly superintendent of the Brier Hill company's Western Reserve sheet mill plant at Warren, but has lately been located at its Thomas works in Niles.

William Dette of Crocker Brothers, New York, returned from a trip of several months in Europe on the Mauretania, Sept. 23.

John H. Gray of the United States Steel Corporation, 71 Broadway, New York, returned this week from a month's stay in Europe.

R. H. Scott has been elected president of the Atlas Drop Forge Co., Lansing, Mich., filling the vacancy caused by the death of S. H. Carpenter. Mr. Scott is vice-president and general manager of the Reo Motor Car Co. O. C. Hartig has been added to the Atlas directorate.

E. M. Kuhns was elected secretary of the National Cash Register Co., Dayton, Ohio, at a meeting of the board of directors held recently. He will also act as general counsel of the company.

Frederick N. Holmes, vice president and general manager North & Judd Mfg. Co., New Britain, Conn., saddlery and buckles, has been elected president of that corporation to succeed his father-in-law, the late Howard C. Noble.

A. W. Lines, formerly sales manager of the Spencer Smith Machine Co., Howell, Mich., has become affiliated with the Muskegon Motor Castings Co., Muskegon, Mich., to direct the manufacture and sales of gray iron pistons.

V. W. Collins, auditor of the Buffalo branch, Rome Wire Works, has been appointed supervisor over costs in charge of the Buffalo, Rome and Diamond branches of the plant with headquarters in Rome, N. Y.

J. E. McAdams, president Steel Products Engineering Co., Springfield, Ohio, returned last week to his home at Dayton from an extended foreign trip. He visited England, France, Italy, Switzerland, Holland, Germany and Belgium.

OBITUARY

H. H. Campbell—An Appreciation

As recorded briefly in THE IRON AGE of Sept. 21, Harry Huse Campbell, formerly general manager of the Pennsylvania Steel Co. at Steelton, Pa., died on Sept. 17, 1922, at the Cathcart Home, Devon, Pa., aged 63 years. He was born at West Roxbury, Mass., where he attended the common schools, afterward taking the course in mining engineering, which included metallurgy, at the Massachusetts Institute of Technology, where he was graduated in 1879 with the degree of S. B. For over 25 years he was secretary of his class. Immediately after graduation he secured a position with the Pennsylvania Steel Co., under the late Major Bent, and remained with that company until his health failed in 1906. He started as a learner and rose step by step to have charge of the whole works.

He was active in the American Institute of Mining Engineers, of which he was a manager from 1893 to 1895, and in the American Society for Testing Materials, and made important contributions to their transactions. His book on "Manufacture and Properties of Iron and Steel," which ran through four editions, is even now one of the standard works on steel, and it is frequently quoted by writers on the subject.

Mr. Campbell did much for steel metallurgy. He was the first to work out the chain of phenomena in the open-hearth steel process, his first publication thereof being a monumental paper at the meeting of the American Institute of Mining Engineers at the World's Fair at Chicago, in 1893. His work comprised: (1) The scheme of combustion beginning with the gas producer; (2) the heat balance starting with the heat value of the fuel and oxidized ingredients of the charge and tracing its course through the various ways in which it was spent; (3) the chemistry of the operation, and (4) the metallurgical features. All these were dealt with more fully in his book which treated also of the other branches of iron metallurgy, including the blast furnace, Bessemer process, etc., and included statistics of production in the iron producing countries of the world.

Mr. Campbell was the inventor of several improvements relating to the production of steel, the most important of which was the tilting open-hearth furnace. The first design was circular in cross-section and could be rolled bottom up, if need be, as for patching an eroded roof with silica sand. His later tilting furnaces, however, were nearer the usual design as to hearth, the central tilting section of the furnace being mounted on rollers which rested on two or more tracks which were segments of circles set in vertical planes. The power to tilt was applied either by hydraulic cylinders or later by electric motors.

His illness, which prevented walking, did not affect his mind, as shown by some fine articles he contributed to THE IRON AGE relating to iron and steel in Europe during the early stages of the World War.

He was unusually strong physically, and had a good constitution, which enabled him to live long after the usual period for one so afflicted. He was devoted to his work, but in spite of his forced withdrawal from it and his malady he maintained his cheerfulness to the end in an inspiring though pathetic way. Mr. Campbell never married. He leaves behind him two sisters and a brother. HENRY D. HIBBARD.

M. L. BAILEY, treasurer of the Union Mfg. Co., New Britain, Conn., died at his home in that city on Tuesday morning, Sept. 26. Mr. Bailey was born in New Britain in 1856 and became associated with the Union Mfg. Co. in 1877. He was elected secretary seven years later, a member of the directorate in 1887 and treasurer in 1888, holding the last two offices at the time of his death. Mr. Bailey was an active figure in machinery and tool circles.

NO SURPLUS CARS

Demand Equals Supply for First Time Since November, 1920

WASHINGTON, Sept. 26.—Production of soft coal during the week of Sept. 18-23, according to the Geological Survey, is estimated at from 9,600,000 to 9,900,000 tons, a slight increase over the preceding week. A total output of anthracite coal for the week was estimated at 1,850,000 tons. Loadings of soft coal on Monday, Sept. 18, were 37,330 cars, the highest since the close of the strike, but they dropped sharply to 29,496 cars on Tuesday. On Friday they were 27,396 cars. The present output of soft coal is above that of the corresponding period of the year of depression, 1921, but is below that of the three years 1918 to 1920, the production in the second week of September of these three years having been 12,542,000, 11,046,000 and 10,685,000 tons, respectively.

A further increase has marked dumpings of lake coal during the week of Sept. 18-23. It is indicated that lake coal is now going forward at a rate close to the maximum of any time in the past. The total cargo coal dumped from the beginning of the season to Sept. 17 was in round numbers 7,000,000 tons. This was 10,100,000 tons behind 1921 and even 6,170,000 tons behind 1920, when priority was given to coal shipped to the Lakes.

For the first time since November, 1920, the number of surplus freight cars has been virtually absorbed by the growing demand for transportation facilities due to increased industrial activity, according to reports just received by the Car Service Division of the American Railway Association from the railroads of the country. Such a situation at this time is seasonable and normal, however, for there is always a heavier demand for freight cars in the fall than at other times, owing to the increase in the movement of crops and fuel, as well as all other commodities.

On Sept. 8 there were 43,168 surplus freight cars, 27,287 fewer than on Aug. 31. At the same time there were requests from shippers for 67,899 cars, which could not be complied with just at that time. This was 9,229 cars more than on Aug. 31.

Surplus coal cars numbered 34,685 on Sept. 8, a reduction of 19,881 since Aug. 31, while unfilled orders for cars on that date totaled 18,554 cars. Surplus box cars totaled 2187 cars, a reduction of 1703 in the same period, while unfilled orders for cars on Sept. 8 totaled 39,032 cars.

While the accumulation of surplus freight cars began in November, 1920, the peak was not reached until April 8, 1921, when there were 507,427 cars. Since then there has been a steady decrease which has been more pronounced since April this year when loading of revenue freight began to increase.

Increasing Production in Connellsville Region

UNIONTOWN, PA., Sept. 25.—Flare of coke ovens throughout the Connellsville bituminous region and moving coal trains tell the story of industrial resumption here in unmistakable terms. It is proof that the unionization of the Connellsville region again has failed, although union leaders are making a vigorous fight to strengthen their position.

Appeals have been issued broadcast for financial assistance. It is admitted in these appeals that the union is fighting with backs to the wall.

No gains have been made by the union in affiliating small operations while the H. C. Frick Coke Co. and independent operations in the region are pushing forward their production at a rapidly increasing rate. Reports for the week ending Sept. 16 show that the production for that week reached 97,750 tons, the highest since the strike developed. The Frick company is operating now at 60 per cent normal.

Eviction notices have been issued against employees at the Oliver Snyder Steel Co. at its three Oliver plants near Uniontown. To date, the company had maintained a watchful waiting policy with no effort to resume operations or to dispossess striking employees.

Machinery Markets and News of the Works

RAILROAD BUYING GROWS

Most of the Activity in Machine Tools and Cranes from This Source

Further Price Advances on Some Lines and General Rise Is Predicted

Railroad business continues as the principal activity in nearly all machine-tool markets, and inquiries for cranes and other heavy equipment from the railroads also are growing in number and importance. Those companies which specialize in railroad shop equipment have thus far in September had the best month of the year, while other machine-tool builders who have not shared in the railroad business to any extent report little, if any, improvement over the past month or two. Outside of railroad buying the volume of machine-tool buying this month has been below expectations.

The Illinois Central has within the past week placed orders for $70,000 worth of additional equipment, making about $600,000 that this road has expended within the past few months. The Rock Island continues to place orders, which now total in value about $60,000. The Chicago, Milwaukee & St. Paul has bought several tools and numerous other roads have placed orders for one or two machines. The Chicago, Burlington & Quincy is expected to buy at any time. The Missouri-Kansas-Texas Railroad, which inquired recently for 116 items for shops at Bellmead, Texas, has bought four milling machines and a crane and will probably place additional orders within a few weeks. The Long Island Railroad has now bought a total of eight or ten tools. In Canada the Canadian National Railways is inquiring for about 50 items.

An important probable source of buying is for locomotive repair work, for which many private plants are being engaged. The Crucible Steel Co. of America will utilize its ordnance plant at Harrison, N. J., for this purpose. A company at Cincinnati will require 20 heavy-duty machines for locomotive repair work and another company at Cincinnati, to engage in the same work, will probably come into the market shortly with a substantial list.

The reopening of the Ford plants, after a brief shutdown, has lifted the feeling of depression in some quarters caused by the shutdown less than two weeks ago. The Maxwell Motor Co., Detroit, has bought 12 special machines. The Continental Motors Co., Muskegon, Mich., continues to buy.

There is considerable inquiry in the hydroelectric field, which seems to have embarked upon a large era of expansion. Oil companies also are fairly good buyers. The Gulf Refining Co. has placed orders for five lathes and two radial drills. The Imperial Oil Co., Toronto, Ont., has issued a general machine-tool list.

While there have been some advances in machine-tool prices, it is expected that the general rise, which has been forecast for some weeks, will take place within the next 30 days. Recent changes in price include an advance of 10 per cent on lathes and drilling machines by a Cincinnati company and an advance of 5 to 7½ per cent by a Cleveland builder of automatic screw machinery.

There is active buying of cranes in the Central States, particularly by steel companies and railroads. The pending inquiry of the Pennsylvania Railroad for 17 cranes is an example of current activity in the crane market.

New York

NEW YORK, Sept. 26.

MACHINE-TOOL companies which specialize in railroad tools have had so far this month the best business of the year. Some of the dealers in general lines of machine tools have also enjoyed a good September trade, but representatives of individual manufacturers have not been so fortunate, particularly those making the lighter types of tools. Railroad buying in the East has not assumed the proportions reached in other sections, Chicago in particular, but the Eastern roads are buying a machine or two at a time and it is the belief of sellers that such business will show gradual expansion. The Long Island Railroad has purchased several tools in addition to the four mentioned last week. The New York Central is buying a tool [illegible] and has [illegible] for a hydraulic bushing press. Recent inquiries of the New York Central for 40 to 50 machines are still [illegible]. The Delaware & Hudson has bought a 500-ton wheel press. An Eastern company has received an order from the Union Pacific for a 6-ft. radial drill. The utilization of the ordnance plant of the Crucible Steel Co. of America at Harrison, N. J., for locomotive repair work will presumably mean a call for additional shop equipment [illegible] the whole [illegible] has been responding to many [illegible] the virtual ending of the railroad strike would bring about quick action on the inquiries which have accumulated in their files in recent months.

No new inquiries for cranes of any size are reported and but few sales have been made in this district during the week. The list of cranes for the Pennsylvania Railroad, Eastern Region, Philadelphia, has again been revised and bids taken on the 250-ton overhead cranes that appeared in the original inquiry. Bids were not received after Sept. 25. The Brooklyn Edison Co. has inquired for two 150-ton, 98-ft. span, 4-motor overhead traveling cranes, with 15-ton auxiliaries. The 90-ton overhead traveling crane recently inquired for by Suzuki & Co. for export to Japan is reported to have been placed with a Japanese builder.

Among recent purchases are:

Chemung Iron & Steel Co., Elmira, N. Y., a 10-ton, 25-ft. span, 1-motor overhead traveling crane from the Reading Chain & Block Corporation.

West Penn Power Co., Pittsburgh, two grab bucket trolleys for handling 3-cu. yd. buckets from the Milwaukee Electric Crane & Mfg. Co. Blaw-Knox buckets were purchased.

Maine Central Railroad Co., Portland, Me., a 150-ton wrecking crane from the Industrial Works.

Center Foundry Co., Wheeling, W. Va., a 10-ton, 45-ft. 6-in. span, 3-motor, overhead traveling crane and a No. 84 and No. 66 Newton cupola crane, from the Northern Engineering Works.

George W. Smith & Co., Philadelphia, a 5-ton, 72-ft. span overhead traveling crane from the Shepard Electric Crane & Hoist Co.

Viscose Co., Marcus Hook, Pa., a 5-ton, 43-ft. span over-

head traveling crane from the Shepard Electric Crane & Hoist Co.

Interborough Rapid Transit Co., New York, a 4-ton, cage-control monorail hoist from the Shepard Electric Crane & Hoist Co.

Central Iron & Steel Co., Harrisburg, Pa., six 2-ton electric hoists from the Shepard Electric Crane & Hoist Co.

T. S. Van Kirk Co., Paterson, N. J., a 3-ton, cage-control monorail hoist from the Shepard Electric Crane & Hoist Co.

Alfred Box & Co., Philadelphia, report the sale of the following cranes in the past four weeks: Patterson Foundry & Machine Co., East Liverpool, Ohio, a 5-ton electric jib crane; Fairmont Water Works, Fairmont, W. Va., a 1-ton, 15-ft. span electric crane; Logan Foundry & Machine Co., Logan, Ohio., a 10-ton, 38-ft. span hand power crane; Philadelphia Rapid Transit Co., Philadelphia, two 12-ton, 38-ft. span electric cranes; Proctor & Schwartz, Philadelphia, a 2-ton, 16-ft. span transfer crane; Lehigh Valley Railroad Co., New York, a 5-ton electric jib crane; E. Hoe & Co., New York, two 3-ton, 22-ft. span electric traveling cranes; Armstrong Cork Co., Lancaster, Pa., a 10-ton, 36-ft. span, 3-motor mill type crane and two 3-ton, 24-ft. span, 3-motor mill type cranes; J. G. White Engineering Corporation, New York, a 10-ton, 17-ft. span hand power crane for Pennsylvania Electric Co. This company also booked orders for seven 1-ton and 2-ton electric hoists for companies in New York, Michigan, Ohio, Texas and Pennsylvania.

The Department of Plants and Structures, Municipal Building, New York, has awarded a contract to the Contractors Service Corporation, 226 Jackson Street, Brooklyn, for the erection of a new four-story machine shop at Sixteenth Street and Avenue C. Grover A. Whalen is commissioner.

The Stevens & Thompson Paper Co., 45 West Eighteenth Street, New York, has arranged for a bond issue of $1,000,000, a portion of the proceeds to be used for extensions to its mills at Walloomsac and Greenwich, N. Y., and for the acquisition of a subsidiary company at Bloomfield, N. J. It is proposed to increase the plant capacity from 85 to 100 tons per day. Frank L. Stevens is president.

The Berg Auto Trunk & Specialty Co., 400 Lafayette Street, New York, manufacturer of metal and metal-reinforced product, has leased space in the Chicle Building, Thompson Avenue, Long Island City, for a branch plant.

A vocational department will be installed in the new high school to be erected at Arverne, L. I., estimated to cost $1,250,000. C. B. J. Snyder, Concord Street, Brooklyn, is architect and engineer.

The Crane Co., 77-81 Broadway, Troy, N. Y., manufacturer of valves, steam specialties, etc., with headquarters at 836 South Michigan Avenue, Chicago, has awarded a contract to the Metzgar Construction Co., 676 Genesee Street, Troy, for the erection of a new one-story factory branch, 200 x 280 ft., on Church Street, near Third Street. Frederick W. Zander is local manager.

Power equipment, hoisting and conveying machinery, and other kindred mechanical equipment will be installed in the nine-story storage building, 75 x 200 ft., to be erected at 370-90 Gates Avenue, Brooklyn, by Edward F. Jenkins, care of the Commonwealth Engineering Co., 103 Park Avenue, New York, contractor.

The Motive Parts Corporation, 136 West Fifty-fifth Street, New York, has leased property at 796 Tenth Avenue, for a branch works.

A vocational department will be installed in the new high school to be erected at Hicksville, N. Y., estimated to cost about $200,000. Coffin & Coffin, 522 Fifth Avenue, New York, are architects and engineers.

The General Electric Co., Schenectady, N. Y., has awarded a contract to the Austin Co., Bulletin Building, Philadelphia, for the erection of a new one-story plant building, 100 x 340 ft., estimated to cost about $125,000. The company has also awarded a contract to the Foundation Co., 120 Liberty Street, New York, for the construction of its proposed one-story branch plant, 100 x 300 ft., at Oakland, Cal., to cost about $100,000, and on which work will be commenced at once.

The Traymore Garage Corporation, New York, has acquired property at 36-42 Jumel Place, near Edgecombe Road, 100 x 100 ft., for the erection of a new two-story automobile service and machine repair works to occupy the entire site.

The Brooklyn Motor Service, Inc., Brooklyn, has leased property at Sixth Street and Third Avenue, a one-story building with about 12,000 sq. ft. of floor space, for a service and general machine repair plant.

The Diamond Match Co., 111 Broadway, New York, is arranging for a stock issue of $7,000,000, a portion of the proceeds to be used for plant extensions and improvements.

The Department of Public Works, Capitol Building, Albany, N. Y., has completed plans for the construction of a new hydroelectric power plant at Visscher's Ferry, N. Y. Charles L. Cadle is superintendent.

The Reid Ice Cream Co., 79 West 132d Street, New York, has acquired property on West 141st Street, near Fifth Avenue, and will use a portion of the site for the erection of an automobile service and repair building for company cars and trucks.

A vocational department will be installed in the two-story high school, 60 x 100 ft., to be constructed at Pine Bush, N. Y., by the Board of Education, Wallkill, N. Y.

The Detroit-Cadillac Motor Car Co., 1881 Broadway, New York, has tentative plans under consideration for the erection of a new service and repair building on site recently acquired on Columbus Avenue, between Sixty-second and Sixty-third Streets.

B. Landau, 516-18 West Forty-eighth Street, New York, operating an automobile service and general machine repair works, has filed plans for the erection of an additional story on the present two-story building.

John J. Townsend, referee in bankruptcy for the Aborn Steel Co., 22-24 Clarke Street, New York, is arranging for the sale of the property of the company, including cranes and other equipment at the location noted to W. E. Steinback, who has made an offer for the assets.

The Westchester Lighting Co., First Avenue and First Street, Mount Vernon, N. Y., has awarded a contract to the H. Wales Lines Co., Meriden, Conn., for a one-story automobile service and repair works at Mount Kisco, N. Y., estimated to cost $50,000.

Frank B. Lasette, 246 West Sixteenth Street, New York, heating and plumbing equipment, has acquired a factory building on Prospect Street, near the Bridge Plaza Station, Long Island City, to be equipped for the most part as a general metal-working shop.

The State Motors Co., Main Street, Mechanicsburg, N. Y., local agent for the Chevrolet automobile, now occupying temporary quarters, is considering the erection of a new service and repair works.

The L. M. Ward Co., 38 Bloomfield Avenue, Passaic, N. J., automobile dealer, has awarded a contract to J. J. O'Leary, 129 Prospect Street, for the erection of a one-story service and repair building at Main Avenue and Monroe Street, Clifton, N. J., to cost about $100,000. W. C. Pattison, Lawyers' Building, Main Street, Passaic, is architect.

Samuel A. Lerner, Lerner Building, Boulevard, Jersey City, N. J., is having plans prepared for a six-story automobile building, 100 x 200 ft., with complete repair, parts and service departments, at the Boulevard and Communipaw Avenue, estimated to cost close to $500,000. William Neumann, 999 Bergen Avenue, is architect.

The Shaw Insulator Co., 5 Kirk Place, Newark, N. J., manufacturer of electric insulators, has removed its plant to a new building at 148 Coit Street, Irvington district, where larger space is available for additional equipment.

The Ford Motor Co., Lincoln Highway, Kearny, Newark, N. J., will build a new one-story power house, 53 x 160 ft., at its local assembling plant. A gasoline storage building will also be erected. The expansion will cost in excess of $180,000.

Buffalo

BUFFALO, Sept. 25.

The Harrison Radiator Co., Washburn Street, Lockport, N. Y., manufacturer of automobile radiators, has plans in preparation for the erection of a three-story addition, 150 x 300 ft., at Washburn and South Streets. James R. Tyler, 715 Union Trust Building, Rochester, N. Y., is architect.

The Buffalo Bronze Die-Casting Co., 90 Arthur Street, Buffalo, is planning for the erection of a plant addition.

The United States Hoffman Machinery Co., 329 Temple Street, Syracuse, N. Y., manufacturer of clothes-pressing machines, irons, parts, etc., is planning for the erection of an addition. Capacity will be increased about 20 per cent.

A vocational department will be installed in the two-story and basement high school, 140 x 166 ft., to be erected at Eastwood, near Syracuse, N. Y., estimated to cost about $175,000.

The Bronze Hardware Mfg. Corporation, Buffalo, manufacturer of automobile hardware, has leased the two-story buildings at 106-8 College Street, 50 x 100 ft. and 25 x 120 ft., for the establishment of a new plant. W. H. Barlow is president.

The King Electric Mfg. Co., 20 North Niagara Street, Tonawanda, N. Y., manufacturer of battery equipment and other electrical apparatus, is planning for the installation of new machinery.

The Lockport Foundries Corporation, Lockport, N. Y., is

perfecting plans for the erection of a new one-story machine shop. Robert E. Bryant is treasurer.

A vocational department will be installed in the two-story and basement high school, 200 x 300 ft., to be erected at Cascade and Twenty-third Streets, Erie, Pa., estimated to cost about $450,000, for which a general contract has been awarded to H. J. Conrath, Ariel Building.

The Eastman Kodak Co., Rochester, N. Y., is perfecting plans for the erection of a new factory building at its plant at Kodak Park.

A vocational department will be installed in the two-story high school to be erected at Avoca, N. Y., 330 x 380 ft., estimated to cost about $300,000.

The Board of Education, Orchard Park, N. Y., is arranging a list of equipment to be installed in the vocational department at its proposed new high school.

The Keystone Tool and Metal Parts Corporation, 65 Oak Street, Buffalo, will erect a one-story addition, 34 x 75 ft.

Chicago

CHICAGO, Sept. 25.

RAILROAD buying still holds the center of the stage. The Illinois Central has placed orders duplicating some of the machines on its previous purchase. These additional machines represent an aggregate outlay of about $70,000 and the road's total purchases up to date are estimated at over $500,000. The Rock Island continues to place orders against its old list and has probably closed for $50,000 worth of machines thus far with the likelihood that the total will run up to $100,000 before buying is completed. The company is limiting its purchases to machines which are imperatively needed. The Chicago, Milwaukee & St. Paul has placed orders for a 44-in. boring mill, a 28-in. shaper, a 36-in. heavy duty sliding head drill, a 36-in. engine lathe and a 1500-lb. steam hammer. The Chicago, Burlington & Quincy is expected to place orders against its lists at any time.

Automotive interests continue to do some buying. The Nash Motor Co., Kenosha, Wis., has bought two "Simplimatic" turret lathes from the Gisholt Machine Co. and the Maxwell Motor Co., Detroit, has placed an order for 12 of the same machines. The Continental Motors Co., Muskegon, Mich., continues to place a few machines from time to time. Orders and inquiries for tools from general sources continue to improve slowly, but steadily.

Few additional price changes are reported. The Millholland Machine Co., Indianapolis, has advanced turret lathes approximately 16 per cent, effective Oct. 1.

The Erie has placed an order with the Morgan Engineering Co. for a 250-ton gap crane for the railroad's Hornell, N. Y., shops. The crane is designed to pull a locomotive up between the girders, in reality being two 125-ton cranes which may be used separately or in unison. The Atchison, Topeka & Santa Fe has ordered a 150-ton overhead electric traveling crane from the same builder for its Albuquerque, N. M., shops. The Pullman Co. is about to close for a number of cranes for its new car-wheel foundry at Pullman, Ill. Included in this equipment are two 10-ton 100-ft. span electric traveling cranes, two 2-ton crane bridges on which Shepard hoists have been specified, and three pitting cranes. The Pullman Co. has already placed 11 two-motor 3-ton hoists for its wheel foundry at Pullman and 10 five-ton hoists for its Michigan City works with the Shepard Electric Crane & Hoist Co. The same builder recently booked the following orders:

Six 3-ton hoists for the Ryan Car Co., Hegewisch, Ind.

Two 3-ton hoists for the Chicago, Milwaukee & St. Paul R. R.

Four 2-ton hoists for the Jeffery Mfg. Co., Columbus, Ohio.

One 2-ton single I-beam crane and hoist for the Motor Castings Co., South Bend, Ind.

Two 3-ton single I-beam cranes and hoists for the American Spiral Pipe Works, Chicago.

Four ½-ton hoists for the Allis-Chalmers Mfg. Co. at Cincinnati.

A 2-ton two-motor hoist for the Bates Expanded Steel Truss Co., Chicago.

A 2-ton underslung-type crane with electric hoist for the Wisconsin River Paper & Pulp Co., Neenah, Wis.

The Elgin Stove & Oven Co., 14 Chicago Street, Elgin, Ill., will construct a three-story plant at State and Schiller Streets, to cost $100,000. Frank D. Chase, Inc., Chicago, has prepared plans and is receiving bids.

The Illinois Central Railroad is taking bids on a one-story roundhouse and shop improvements at Evansville, Ind., to cost $75,000.

The James T. Igoe Co., printer, 117 West Harrison Street, Chicago, has let a contract for a 10-story printing plant, 99 x 125 ft., 600-612 West Van Buren Street, to cost $300,000.

The International Harvester Co., 606 South Michigan Avenue, Chicago, will construct a five-story factory and pattern storage building, 59 x 124 ft., Blue Island and Oakley Avenues, to cost $90,000.

Fleck & Buchholz, automobile service, 19 West Railroad Street, Downers Grove, Ill., will construct a service station and garage, 70 x 157 ft., La Grange, Ill., to cost $50,000. Fugard & Knapp, 212 West Superior Street, Chicago, are receiving bids.

The Keith Furnace Co., DesMoines, Iowa, is completing a new foundry at Twenty-sixth Street and Dean Avenue, to cost $150,000.

The Des Plaines Foundry, Des Plaines, Ill., has bought two tumblers from the Whiting Corporation.

The Woodruff & Edwards Co., Elgin, Ill., has commenced the construction of a foundry addition, 80 x 94 ft., and a three-story warehouse, 50 x 94 ft.

O. W. Bowman, Virden, Ill., is completing a blacksmith and machine shop, 30 x 90 ft.

The Evan L. Reed Mfg. Co., manufacturer of display racks and store fixtures, steel supply racks, etc., is moving from Sterling, Ill., to the former Moore Motor Co. plant at Danville.

The Star Foundry, Oshkosh, Wis., was recently damaged by fire.

The C. & P. Mfg. Co., 630 South Wabash Avenue, Chicago, recently incorporated with $5,000 capital stock, will manufacture a patented dish-washing machine. At present it is undecided whether to build a plant or have the parts made and assembled. Officers are: C. T. Coates, St. Louis, president; W. G. Beasley, Chicago, vice-president, and M. P. Phillips, Chicago, secretary and treasurer.

The Garage Service Co. has commenced the construction of a three-story building, 70 x 130 ft., at 210-214 South Peoria Street, Chicago. The building will be used for storage, repairing, painting and renovating of automobile trucks, and will cost $300,000. The Simpson Construction Co., Chicago, is the general contractor.

The Commercial Auto Body Co., 2540 South Wabash Avenue, Chicago, has leased the three-story and basement factory at 3548-58 Shields Avenue, for the manufacture of truck and delivery bodies.

The Cabranette Corporation and the Belson Mfg. Co. have jointly leased the three-story building at 800 South Sibley Street, Chicago, which is 100 x 120 ft. The lessees already occupy the second and third floors in the manufacture of sheet metal specialties and "cabranettes."

The Irving Park Ice Co., 4226 North Springfield Avenue, Chicago, has started the construction of the first unit of an ice manufacturing plant at the northeast corner of Kedzie and Harmon Avenues. The first unit, a one-story structure with a daily capacity of 150 tons of ice, will cost $150,000.

I. D. White & Co., Inc., 113-115 North Des Plaines Street, Chicago, recently organized with $15,000 capital stock, is an incorporation of a co-partnership of the same name. The company manufactures industrial sheet metal products. It occupies 5000 sq. ft. of floor space, but expects to move to larger quarters by next May. Officers are I. D. White, president and general manager; Arthur Miller, secretary and treasurer, and Harry Harvey, vice-president.

The Maquoketa Electric Power Co., Maquoketa, Iowa, is completing plans and will soon call for bids for the erection of a new one-story hydroelectric power plant, estimated to cost about $175,000. Holland, Ackerman & Holland, 53 West Jackson Boulevard, Chicago, are engineers.

A vocational department will be installed in the new two-story and basement senior and junior high school to be erected at Fifth Street and Thirteenth Avenue, Minneapolis, Minn., estimated to cost about $700,000. E. H. Eager, 245 Ninth Avenue, North, is architect.

Mechanical freight handling equipment, conveying machinery, trucks, etc., will be installed in the new two-story freight terminal, 30 x 450 ft., to be erected at Indianapolis, by the Illinois Central Railroad Co., 135 East Eleventh Place, Chicago, estimated to cost about $200,000.

The Council, Marshalltown, Iowa, has rejected all bids recently received for pumping machinery, electrical equipment and other mechanical apparatus for the proposed new municipal waterworks pumping plant, and will call for new

bids on revised plans at an early date. Burdick & Howson, 8 South Dearborn Street, Chicago, are engineers.

The McCarthy & Dowdle Auto Express Co., 332 Goodrich Avenue, St. Paul, Minn., will build a one-story automobile service and repair works, 66 x 105 ft., for company trucks and cars, on Smith Street, near Seventh Street. Mather & Fleischbein, 442 Endicott Building, are architects.

The Commonwealth Edison Co., 72 West Adams Street, Chicago, has revised plans in preparation for the erection of a one-story addition to its power house at Fifty-sixth and Lowe Streets.

A vocational department will be installed in the new two-story high school to be erected at Crystal Lake, Ill., 200 x 200 ft., estimated to cost about $200,000, for which new bids on revised plans will be asked at an early date. Joseph C. Llewelyn, 38 South Dearborn Street, Chicago, is architect.

The Board of Education, Hayward, Wis., has engaged E. F. Johnson, architect, Superior, Wis., to draw plans for a new high school, with a vocational training department, to cost not more than $150,000.

A vocational department will be installed in the new three-story and basement junior high school, 160 x 190 ft., to be erected at Cedar Rapids, Iowa, estimated to cost about $450,000, for which bids on a general contract will be received on Oct. 2. Herbert Rugh, 811 Security Building, is architect.

The Hewes Garage, 334 North Genesee Street, Waukegan, Ill., has plans nearing completion for the erection of a new two-story service and repair shop addition, 50 x 70 ft., estimated to cost about $45,000.

The Zenith Concrete Gravel Co., Earlton, Minn., has preliminary plans under consideration for the erection of a new one-story rock-crushing plant, estimated to cost about $50,000, including equipment. Herbert Kelly is general manager.

The Common Council, Hastings, Neb., will commence work at once on extensions and improvements in the municipal electric power plant, to cost about $25,000.

The International Harvester Co., 606 Michigan Avenue, Chicago, has filed plans for the erection of a new five-story plant addition, 59 x 124 ft., at Blue Island and Oakley Avenues, estimated to cost about $90,000. A portion of the structure will be equipped as a pattern shop for metal and wood pattern production.

A vocational department will be installed in the new three-story and basement high school to be erected at Bloomfield, Iowa, estimated to cost about $135,000, for which bids will be received on a general contract until Oct. 2. William Gordon, 317 Hubbell Building, Des Moines, Iowa, is architect.

The City Council, Stuart, Neb., will soon commence the construction of a municipal electric light and power plant. Plans have been completed.

Cincinnati

CINCINNATI, Sept. 25.

WHILE there was no great improvement evidenced in the machinery market during the past week, local manufacturers report that there was no decrease in the number of orders placed. The industry is holding its own very well, and with a complete settlement of the railroad strike greater activity is expected.

The only new inquiry of consequence to come before the trade during the past week was from a local manufacturer, who has taken a contract for locomotive repair work, and who will buy approximately 20 heavy duty machine tools. Another local manufacturer, who is also contemplating turning part of his plant into a railroad repair shop, is expected to come into the market within the next week or so with quite a substantial list.

The principal buying during the week came from the railroads. The Illinois Central bought a number of tools, in addition to those recently reported. The Long Island Railroad bought four machines from a Cincinnati manufacturer, and the Southern Railroad is about to close on seven tools. The Gulf Refining Co. bought five lathes and two radial drills. Scattered orders for one and two machines were reported by all manufacturers, and while the industry as a whole is not running anywhere near capacity, the number of orders being booked is entirely satisfactory in view of prevailing conditions.

Newport, Ky., is asking for bids on pumping equipment for the water works plant. Approximately $150,000 will be spent. Bids will be opened Nov. 14. Mayor Hermann is chairman of the City Commissioners.

The Vulcan Last Co., Portsmouth, Ohio, will rebuild its branch plant at Crandon, Wis., which was recently damaged by fire to the extent of $200,000. Work will be begun immediately.

The Superior Gas Engine Co., Springfield, Ohio, has completed plans for the erection of a three-story office building, to cost approximately $100,000.

Atzel Bros., Cincinnati, will build a public garage, which will include a service station and completely equipped repair shop, in the Madisonville section of the city. The building will be 75 x 150 ft., two stories high, of brick construction, and will cost, with equipment to be installed, approximately $50,000.

The Banner Die, Tool & Stamping Co., Columbus, Ohio, has moved to a new location at 529 North Park Street. The company manufactures dies, tools, gages, fixtures and special machinery.

The New Favorite Mfg. Co., formerly located in Columbus, has moved its plant to Troy, Ohio, and is now located on East Water Street. The company manufactures valve grinders, valve lifters and water motor washing machines.

The Crystal Laundry Co., Dayton, Ohio, will build an addition to its plant at 229 South Clinton St. The company will install about $10,000 worth of additional machinery.

The Trump Mfg. Co., Springfield, Ohio, has been authorized to increase its capital stock from $125,000 to $200,000. This step was taken, President John J. Hoppes states, to provide increased facilities needed for taking care of the large volume of business now offered to water wheel manufacturers, and for the purpose of reducing cost of operation. The company has been operating on a reduced schedule for some time, but has lately booked considerable business and immediate prospects are bright. Improved electric traveling cranes are to be installed in both the foundry and machine shop to facilitate the handling and assembling of material. The company also expects to install several new machine tools which will enable it to greatly increase its output.

Philadelphia

PHILADELPHIA, Sept. 25.

The Commercial Truck Service Corporation, Hunting Park and Itising Sun Avenue, Philadelphia, has awarded a contract to the William Steele & Sons Co., 1600 Arch Street, for the erection of a plant at Franklin and Vine Streets, to cost $370,000. A complete machine repair works will be installed.

Samuel W. Traylor, president of the Traylor Engineering Mfg. Co., Allentown, Pa., manufacturer of mining and smelting machinery, has awarded a contract to the William Steele & Sons Co., 1600 Arch Street, Philadelphia, for the erection of an eight-story plant, 124 x 205 ft., at Broad Street and Lehigh Avenue, Philadelphia, to cost about $455,000. It will be used as a direct factory branch.

The Supply Officer, Navy Department, Navy Yard, Philadelphia, will soon call for bids for 3500 ft. of steel tubing and 500 turnbuckles for the local aero service.

Robinson's Iron & Steel Co., Parker & Umbria Streets, Philadelphia, is planning for the purchase of a stiff-leg derrick, about 3-ton capacity, with 40 ft. boom. Roy A. Robinson is head.

The Kensington Hygeia Ice Co., Trenton Avenue and Huntingdon Street, Philadelphia, will build a one-story addition to its power house.

Ludwig Brothers, 3226 North Lee Street, Philadelphia, machinists, will install a number of new machine tools, including drill press, shaper, etc.

The Board of Freeholders, Trenton, N. J., is taking bids for the erection of a two-story automobile service and repair building on Brunswick Avenue, for county trucks and cars, estimated to cost about $40,000.

The Murray Rubber Co., Trenton, N. J., has been organized to take over and operate the plant of the Empire Tire & Rubber Co., North Clinton and Mulberry Streets, recently acquired at a public sale by W. W. Pepper, C. Eward Murray, Jr., and others. The new company will operate with a capital of $1,750,000 and 25,000 shares of common stock, no par value. Plans are under way for immediate plant expansion, to include the installation of additional equipment to balance the different lines of production. Mr. Murray will be president and general manager; Mr. Pepper, vice-president and treasurer; and Harvey R. Nason, secretary.

The Freeman Electric Co., Trenton, N. J., is perfecting plans for extensions in its plant, to include a new building on Prince Street, and the removal of the present works on East State Street to the new location. Equipment will be provided for the manufacture of switches, metal-jacketed

sockets, cutouts and kindred specialties. Edgar H. Freeman is head.

The Panelyte Board Co., Smith Building, 119-25 North Montgomery Street, Trenton, N. J., has acquired a tract of land on Railroad Avenue, totaling about 9½ acres, and will use a portion of the site for the erection of a new plant for the manufacture of fibre products. The company was organized recently with a capital of $300,000. D. Mason Sutherland, Jr., is president.

W. D. Crooks & Son, Park Street, Williamsport, Pa., manufacturer of doors, sash, etc., have plans in preparation for the erection of a two-story plant addition, 125 x 160 ft., to cost about $75,000.

A vocational department will be installed in the new high school to be erected at Bath, Pa., estimated to cost about $225,000.

The New York Central & Hudson River Railroad Co., Grand Central Terminal, New York, has plans under way for extensions in its engine and car shops at Jersey Shore, Pa., to include an addition to the locomotive shop, boiler shop, machine shop, erecting shop and power house. The new equipment to be installed is estimated to cost about $350,000, of which about $100,000 will be used for the machine shop. The capacity of the power house will be doubled, with installation to include electric generator, boilers, air compressors, pumps, etc.

A vocational department will be installed in the new two-story and basement high school to be erected at Gilberton, Pa.

The Reading Rubber Co., Reading, Pa., has acquired a factory at Kutztown, Pa., formerly used by Jacob K. Boyer as a box plant, and will establish a plant for the manufacture of rubber tubes and kindred products. The machinery installation is estimated to cost about $20,000. The present building will be improved to accommodate the new industry.

In connection with the purchase of the Ironton Railroad line, the Philadelphia & Reading Railroad Co., is reported to be planning for the construction of a locomotive repair shop at the West Catasauqua, Pa., yards, replacing the shop heretofore conducted at the plant of the Thomas Iron Co., former owner of the road.

The Keystone Garage Co., Canton, Pa., is planning for the installation of new machinery and tools at its service and repair works, in an addition now being constructed.

The plant of the Driscoll-Reese Steel Co., Hamburg, Pa., has been acquired by the Gilmore & Thompson Co. The new owner will continue the works in operation and plans for extensions and improvements.

The Rowe-Stuart Motors Corporation, Rossmere, near Lancaster, Pa., has awarded a contract to the Gibbs-Mueller Co., Real Estate Trust Building, Philadelphia, for the erection of a new one-story plant, 120 x 300 ft., for the manufacture of special pneumatic tires and other automotive rubber goods.

In connection with the purchase of the York Haven Water & Power Co., York Haven, Pa., now being consummated by the Metropolitan Edison Co., Reading, Pa., the new owner plans to increase the capacity of the plant. An appropriation of $1,000,000, is being arranged for this and other plant and line expansions. The company is also said to be perfecting arrangements for the purchase of the Lycoming-Edison Co., Williamsport, Pa., and the Lock Haven Electric Light & Power Co., Lock Haven, Pa.; additions are planned to both generating plants, that of the Lock Haven campany to be doubled, approximately, in capacity.

The Pennsylvania Railroad Co., Broad Street Station, Philadelphia, has arranged a fund of about $600,000, for the erection of its proposed new steel freight car construction and repair shop at Enola, Pa. A. C. Shand is chief

A complete machine and repair shop will be established in connection with the new automobile service works now being erected by Horlacher's Garage, Palmerton, Pa.

A vocational department will be installed in the new high school to be erected at Bridgeport, Pa

Final action in ratifying the purchase of the American Wire Fabrics Co. by the Wickwire-Spencer Steel Corporation was taken at the adjourned meeting of the stockholders, held Friday, Sept. 22, at Worcester, Mass. It was also voted to make various changes in the Wickwire-Spencer capitalization. The [illegible] $1,775,000 7½ per cent 10-year secured convertible debentures will retire [illegible]. A [illegible] the number of common shares from 250,000 to 600,000, and change the par [illegible] common stock from $[illegible]

New England

BOSTON, Sept. 26.

SALES of machine tools in this territory during the past week were again small, but a greater number of firms participated than during the previous week. For that reason and because several new prospects have developed and numerous old ones have come to life, the trade is more confident. Of old prospects, those calling for hammers and presses are the most important. Prices are strong. Those tool makers who have not announced advances are tightening up on discount inducements, which virtually amounts to an advance.

Sales for the week include two new 14 in. x 6 ft. lathes, one a tool room and the other a manufacturing tool, to a Rhode Island trade school; four new upright drills, a used 30-in. planer and three new standard lathes to a Springfield, Vt., concern, with additional production equipment under consideration; a new key seat milling machine, to a Lowell, Mass., firm; a used 28-in. x 18-ft. lathe, to an Alabama firm; a new 20-in. drill press to Vermont interests, who are negotiating for an 18-in. standard rating lathe; a used No. 70 Heald grinder, which is going into Pennsylvania; a large Cleveland punch and shear and a 12-in. pipe threader, both used machines, to New Jersey manufacturing interests; and two large used punch and shears, taken for another Alabama account. One used machine tool house reports sales of 10 tools, involving several thousand dollars. The Maine Central Railroad is in the market for a new 28-in. shaper and an 18-in. lathe for a new roundhouse.

E. Ingraham Co., Bristol, Conn., clocks, is completing an additional story to one of its units, giving several thousand additional feet of floor space, to be used for manufacturing purposes.

The Home Accessories Corporation, Worcester, Mass., a new $50,000 concern, has purchased a property at the corner of Gardner and Tainter Streets, that city, which includes a one-story plant. The company expects to soon start the manufacture of bathroom fixtures and kitchen accessories. Walter Enoch, formerly domestic goods department Wickwire Spencer Steel Corporation, Worcester, is president.

The Durham Mfg. Co., Middletown, Conn., sheet metal goods, recently organized with a capital of $25,000, has begun work on a manufacturing plant, 26 x 100 ft. Paul Mathewson is president.

A vocational department will be installed in the proposed East Side High School, to be erected, at a cost of $900,000, by the City of Bridgeport, Conn.

Arnold J. Booth will construct a $150,000 public garage and service repair station on Park Street, Worcester, Mass. It will be three stories, 95 x 103 ft.

The Massachusetts Oil & Refining Co., Quincy Avenue, East Braintree, Mass., will commence the immediate erection of an addition to its local plant, to cost about $50,000. Headquarters are at 209 Washington Street, Boston.

A new one-story power house, to cost about $80,000, will be erected at the plant of the Indian Orchard Co., Indian Orchard, Mass., manufacturer of yarns, etc. McClintock & Craig, Lyman Street, Springfield, Mass., are architects.

The Connecticut Foundry Co., Rocky Hill, Conn., has awarded a contract to C. F. Waterman, Inc., Hartford, Conn., for the erection of a new one-story plant.

The Wickwire Spencer Steel Corporation, Worcester, Mass., has preliminary plans under way for the erection of a new three-story plant, 33 x 100 ft., at Spencer, Mass., to replace a building recently destroyed by fire. It will cost about $45,000.

A vocational department will be installed in the new high school to be erected at Glastonbury, Conn., estimated to cost about $130,000, for which bids will be asked early in October. Brooks & Glazier, Lewis Street, Hartford, Conn., are architects.

The Sexton Can Co., 31 Cross Street, Everett, Mass., has awarded a contract to D. E. McIntyre, Inc., 74 Broad Street, for the erection of a new one-story addition.

The Hanshaw Motor Co., 389 Commonwealth Avenue, Brighton, Boston, local representative for the Dodge automobile, has leased property at 12-16 Griggs Street for a new [illegible] repair works

The Connecticut Light & Power Co., West Main Street, Waterbury, Conn., has broken ground for the erection of its proposed hydroelectric power plant on the Housatonic River, near Devon, Conn., estimated to cost close to $2,000,000, including machinery.

The Boston Elevated Railway Co., 108 Massachusetts Avenue, Boston, has awarded a contract to the Simpson Brothers Corporation, 77 Summer Street, for the erection of its proposed car repair shops at Everett, Mass., consisting of four general machine and equipment buildings, two, 150 x 300 ft. each, and two, 50 x 56 ft. each, and one-story transfer shop, 80 x 730 ft., estimated to cost in excess of $2,000,000, including equipment. Dwight P. Robinson & Co., 61 Broadway, New York, are engineers.

A vocational department will be installed in the new two-story and basement high school, 88 x 165 ft., to be erected at Fort Fairfield, Me., estimated to cost $125,000, for which superstructure work will soon be commenced. H. W. Rhodes, 564 Congress Street, Portland, Me., is architect.

The Sills-Chevrolet Co., Boston, local representative for the Chevrolet automobile, has leased the three-story and basement building at 1249 Boylston Street, corner of Ipswich Street, for the establishment of a new service and repair plant.

A vocational department will be installed in the new two-story high school to be erected at West Hartford, Conn., estimated to cost $450,000, for which bids on a general contract will be received until Oct. 2. W. T. Marchant, 36 Pearl Street, Hartford, is architect.

The United Electric Railways Co., 100 Fountain Street, Providence, R. I., has awarded a contract to Frederick L. Pierce, 170 Westminster Street, for the erection of a two-story automobile service and repair plant, 87 x 250 ft., at Melrose and Russell Streets, with capacity of about 50 company trucks and cars, estimated to cost about $100,000. A list of equipment to be installed will be prepared at an early date. H. W. Sanborn is chief engineer.

The plant of the Connecticut Brass Works, West Cheshire, Conn., has been acquired by new interests, headed by F. Cranston Thomas, president of the National Dyewoods, Ltd. The new owners plan for the erection of an addition and the installation of considerable new equipment.

The International Paper Co., 45 Milk Street, Boston, has tentative plans under consideration for the rebuilding of its pulp mill at Montague, Me., completely destroyed by fire, Sept. 5.

The McLaurin-Jones Co., Ware, Mass., manufacturer of paper products, has arranged for a bond issue of $400,000, a portion of the proceeds to be used for extensions and improvements. The company represents a consolidation of the Ware Coated Paper Co., Ware; Ideal Coated Paper Co., Brookfield, Mass.; and the Samuel Jones Co., Newark, N. J.

The Home Accessories Corporation of Worcester, Mass., manufacturer of bathroom fixtures and kitchen accessories, will build a two-story addition to its factory at Gardner and Tainter Streets, 45 by 112 ft. The company has been organized recently, capital stock $250,000, with Walter Enoch, recently head of the domestic goods department of the Wickwire-Spencer Steel Corporation, as its general manager and president. Irving D. Stern is the treasurer, and the other directors are Clarence J. Abbott and Edwin J. Seward of Worcester and I. Rennamocorr of New York. The company has purchased the business of the Patachet Co. of Stoneham, Mass., and will remove it to Worcester, to concentrate manufacturing in one plant.

The Erie Engine Works, Erie, Pa., filed a voluntary petition of bankruptcy in the United States district court, Pittsburgh, Sept. 20. Liabilities are placed at $261,165.82 and assets at $313,258.95. The liabilities are represented by taxes due states, counties and municipalities of $890.04; wages, $770.86; secured claims, $248,665.38; and unsecured claims $10,830.54. The assets include real estate, $126,000; cash on hand, $54.15; stock in trade, $94,843.25; machinery, tools, etc., $62,522.53; debts due on open accounts, $4,839.04 and insurance policies, $25,000. Attached to the petition is a resolution adopted by the board of directors on Sept. 19, in which it is shown the company is unable to pay its debts, and as a number of judgments recently were obtained against it, the property is in danger of being sacrificed. F. C. Lytle is secretary of the company and Adolph A. Claus, treasurer.

The American Seeding Machine Co. report for the year ended June 30, shows a net loss of $714,225, after expenses, as compared with a net loss of $259,226, in the previous year. After preferred and common dividends were paid, the deficit was $1,114,225, against a deficit of $709,226 in the preceding year.

Detroit

DETROIT, Sept. 25.

REPRESENTATIVES of machinery manufactures report a dearth of inquiries. Re-opening of the Ford industries with its far reaching effect on parts manufacturers, and the optimistic feeling generally on the fuel question have strengthened the general opinion that considerable inquiry will be forthcoming during October. It has developed in many cases, especially among automobile manufacturers, that where new equipment was needed to increase production, machinery has been available from their own stocks, having been carried for the past two years.

The Superintendent of Lighthouses, Room 340, Post Office Building, Detroit, will receive bids until 2 p. m., Oct. 10, for furnishing one 27-in. lathe and one 24-in. shaper, both individual motor driven. Information will be furnished on application.

The Monarch Foundry Co., Detroit, manufacturer of gray-iron castings, has been adjudicated a bankrupt by involuntary petition as of Sept. 8. No date has been set for the sale by the referee of the bankruptcy court.

The American Twist Drill & Tool Co., 2804 W. Jefferson Avenue, Detroit, suffered a severe loss by fire recently, the estimated damage being $240,000. The drill department was completely destroyed. Future plans have not been announced pending adjustment.

The Muskegon Motor Castings Co., Muskegon, Mich., has announced that beginning Oct. 1 it will produce light gray-iron pistons in addition to its present line of cam shafts. It is the company's plan to cast and machine this product.

The new power plant at Ludington, Mich., which has been under construction since last December, has been completed at a cost of $300,000. This plant is a unit of the Michigan United Light & Power Co. of Ludington, formerly the Stearns Light & Power Co., and assures this district, consisting of Ludington, Scottville, Pentwater, Hart, Shelby and New Era, of a light and power service.

The Bryant Paper Co., Kalamazoo, Mich., has asked for the stockholders' approval on a $5,000,000 bond issue to cover an extensive building program. Present plans call for the construction of a new power plant of four boilers, to replace four power houses containing 24 boilers; the remodelling of machinery and equipment at the Superior division to increase production and reduce costs; the installation of a central machine shop and supply department and a salvage plant for reclaiming and repairing supplies. The cost of the above program is approximately $1,500,000. Tentative plans to improve the Bryant and Milham divisions at a cost of approximately $2,000,000 are included in the present prospectus.

The Gray Motor Corporation, Mach Avenue and the Detroit Terminal Railroad, Detroit, has completed a new unit 400 x 60 ft. It has under consideration a unit 600 x 60 ft. and a loading track to run between these two new buildings. Present plans call for seven units and an administration building.

The Detroit Board of Water Commissioners has awarded to the D'Olier Centrifugal Pump & Machine Co. contract for furnishing and erecting three 100,000,000-gal. motor-driven centrifugal pumps.

The Acme Saw Co., 522 Fort Street West, Detroit, has been incorporated for the manufacture of band saws. Officers are H. E. Culverwell, president; Donald J. Bryant, secretary and treasurer, and Francis H. McCarthy, vice-president.

The General Testing Laboratories, 525 Woodward Avenue, Detroit, formerly operated by Joseph A. Wolf, has been incorporated with Joseph A. Wolf, president, and Paul H. Kramer secretary and treasurer. For the present its facilities will be devoted to general chemical and physical analysis and research work.

The Aman Foundry Co., Detroit, has been incorporated with a capitalization of $10,000 and has begun the production of gray-iron castings in the plant heretofore occupied by the Liberty Foundry Co., Davison and Turner Avenues. John Aman, formerly president of the Monarch Foundry Co., Detroit, is actively identified with the new company.

The Baker-Perkins Mfg. Co., 1204 Niagara Avenue, Saginaw, Mich., will commence the immediate erection of a one-story addition to its power plant. Cowles & Mutscheller, Chase Building, Saginaw, are architects.

The Robson-Stevens-Mackey Co., Lansing, Mich., local representatives for the Hudson and Essex automobiles, has acquired the plant of the Clark Carriage Works and will remodel and improve the structure for a new service and repair plant.

The Common Council, North Muskegon, Mich., will install an electrically operated pumping plant in connection with extensions and improvements in the municipal waterworks, to consist of two main motor-driven centrifugal pumping units, 350 and 500 gal. capacity per minute respectively, and other auxiliary equipment.

A vocational department will be installed in the new high school to be erected at Port Huron, Mich., estimated to cost about $300,000.

The Martin-Parry Corporation, York, Pa., manufacturer of automobile bodies, is arranging for the immediate occupancy of its new plant at Flint, Mich., comprising a remodeled warehouse formerly used by the Dort Motor Co. Initial production at the works will be devoted to truck bodies for the Durant Motor Co.

The Cadillac Lumber & Chemical Co., Cadillac, Mich., is said to be planning for the installation of mechanical conveying and hoisting equipment at its new local plant. W. L. Saunders is head.

A vocational department will be installed in the new three-story and basement high school, 87 x 129 ft., to be erected at Reed City, Mich., estimated to cost about $100,000.

The Board of Works, Detroit, will build a new two-story power house for municipal service on Byron Street, near Hazlewood Street, estimated to cost about $50,000. Albert Kahn, 1000 Marquette Building, Detroit, is architect.

Pittsburgh

PITTSBURGH, Sept. 25.

BUSINESS in machine tools during the past week has been disappointing. The month began with so much promise that a good many of the trade figured that it was going to prove to be a good one, but actual sales have been below expectations. The Pittsburgh & Lake Erie Railroad has closed for three combination truing machines for which it inquired a few weeks ago, and a local maker of steel pipe recently closed for an 18-in. motor-driven Springfield lathe. The Union Railroad, the interplant transportation system of the Steel Corporation in this district, has put out an inquiry for a 500-ton or 600-ton wheel press.

Interest in heavy equipment is well sustained. The Jones & Laughlin Steel Co. has put out an inquiry for a 50-ton crane, with 10-ton auxiliary, to serve the new power house for which the company recently placed a 10,000-kw. steam turbine with the General Electric Co. The Jones & Laughlin company also is taking bids on five cranes for installation at its Southside Pittsburgh works. The Pennsylvania Railroad has put out an inquiry for 17 cranes in connection with the rebuilding of its Juniata shops, Altoona, Pa. The list includes two 250-ton locomotive handling cranes; ten 15-ton, four-motor standard cranes, with 10-ton auxiliaries; four 60-ton double-trolley cranes and one 10-ton high speed crane. The Koppers Co. is expected to close this week for the oven pushers and other equipment in connection with its contracts for the by-product plant of Weirton Steel Co. and the extension of the Clairton, Pa., by-product plant of Carnegie Steel Co. The Northern Engineering Works has taken three 2-ton coal hoists for a Pittsburgh district user and the Milwaukee Electric Crane & Mfg. Co. has taken three bucket trolleys, cab control, for the West Penn Power Co. for installation at Weirton, W. Va. The Youngstown Steel Co., which is putting up a mechanical puddling plant at Warren, Ohio, has closed for six cranes with Morgan Engineering Co., Alliance, Ohio.

The Graham Nut & Bolt Co. 1317 West Carson Street, Pittsburgh, has awarded a contract to Harding & Crea, [illegible] Neville Island, to cost about $95,000.

The Duquesne Light Co., Pittsburgh, will build a new one-story plant at 1305-7 Sarah Street, to cost about $35,000.

The Fairmont Creamery Co., 301 Ferry Street, Pittsburgh, will build a new one-story automobile service and repair works for company trucks and cars at Twenty-fifth and Smallman Streets, with general machine equipment, the two structures to cost about $150,000.

The Board of Education, Monessen, [illegible] arranging a list of equipment for installation in the vocational department at the new local high school.

The Centre Foundry & Machine Co., 2011 Main Street, Wheeling, W. Va., has awarded a contract to the Riverside Bridge Co., Martins Ferry, Ohio, for erection of a one-story foundry on Warwood Avenue, 100 x 320 ft., estimated to cost about $35,000. J. H. Young is general manager.

The Brady-Warner Coal Corporation, Fairmont, W. Va., has arranged for a bond issue of $1,000,000, the proceeds to be used for plant extensions, to include the installation of new mining machinery, electric equipment, mine cars, etc.

A vocational department will be installed in the new two-story and basement high school to be erected at New Martinsville, W. Va., estimated to cost about $125,000.

The Pond Creek Coal Co., Williamson, W. Va., recently organized with a capital of $500,000, is planning for the installation of equipment, including power equipment, hoisting and mining machinery, mine cars, etc. T. N. Daugherty heads the company.

The Warren Sand & Gravel Co., Russell, Pa., is planning for the installation of new screening, conveying, hoisting and other equipment in connection with the rebuilding of its plant, recently destroyed by flood.

Cleveland

CLEVELAND, Sept. 25.

MACHINERY dealers are getting a fair volume of inquiries for single machines, the prospective business including several large tools. As a whole, sentiment in the trade has improved, although orders this month have fallen short of expectations. While some machine tool manufacturers and dealers have had more business during September than in August sales by others have shown a falling off this month. Very little business is coming at present from the automobile field and no sales are reported in the railroad field during the week excepting a single machine. Makers of automatic screw machinery and turret lathes report a few orders for single machines. Pickands, Mather & Co. have not yet made any purchases against their list of nine metal and woodworking machines for use in connection with an ore mine and are trying to line up used machinery. The Otis Steel Co. is expected to purchase some shearing machinery shortly, but has not yet indicated its requirements.

Additional price advances were announced during the week. The National Acme Co., Cleveland, has advanced its automatic screw machinery 5 per cent to 7½ per cent on most sizes and the American Tool Works, Cincinnati, has advanced lathes and drilling machines approximately 10 per cent.

There is still considerable activity in the hydroelectric field. The Wellman-Seaver-Morgan Co., Cleveland, has taken three 6,000 hp. vertical turbines with 105 ft. head for the United Hudson Electric Co., Poughkeepsie, N. Y., the order being placed through the J. G. White Engineering Corporation, New York. The equipment will be installed near New Platz, New York. The generator equipment will be supplied by the General Electric Co. The J. P. Morris Co., Philadelphia, has taken an order for two 11,000 hp. turbines with 75 ft. head and parts to go into concrete for two additional turbines to be installed in the Piney Creek Development of the Clarion River Power Co. in Pennsylvania. It is understood that this power company is working on two other developments in the same vicinity and that eventually installations will be made providing approximately 300,000 hp.

The Alliance Machine Co., Alliance, Ohio, has recently taken the following crane orders:

For International Harvester Co., two 175-ton, four-girder ladle cranes with 54-ft. span; one 100-ton, four-girder ladle crane with 78-ft. span; two 7½-ton open-hearth charging machines; two 10-ton standard cranes with 100-ft. span, and one 5-ton monorail hoist.

For Inland Steel Co., two 15-ton, double-drum cranes with 90-ft. span; one 75-ton, 5-motor crane with 80-ft. span.

For National Enameling & Stamping Co., through the United Engineering & Foundry Co., one 40-ton, 4-motor crane and one 10-ton, 3-motor crane, both with 75-ft. span, and one 10-ton, 3-motor crane with 40-ft. span.

For Maryland plant of Bethlehem Steel Co., Baltimore, two 150-ton, 4-girder ladle cranes with 65-ft. span, one 15-ton soaking-pit crane, and two 10-ton standard cranes with 80-ft. span and one 10-ton repair trolley.

For Mold & Mfg. Co., one 20-ton, 4-motor crane with 60-ft. span.

For Central Steel Co., one 2-ton floor slab charging machine.

For Wickwire Steel Co., one 15-ton magnet handling trolley.

For Rogers Brown & Co., one 6-ton magnet handling trolley. Recent orders also include seven cranes for the Otis Steel Co., Cleveland, the purchase of which was previously announced.

The Vapo Stove Co., Lima, Ohio, which has outgrown its present quarters, has made arrangements for the erection of a new plant in Lima. A separate corporation has been formed to erect the plant which the stove company plans eventually to purchase.

The Toledo Libbey-Owens Sheet Glass Co., Toledo, Ohio, is having plans prepared for the erection of a large plant near Toledo.

The Ravenna, Ohio, Chamber of Commerce has closed a contract for F. W. Phillips and associates of Cleveland to locate an automobile body plant in that city. The plans provide for the completion and equipping of the buildings of the McElrath Tire & Rubber Co. for use as a body plant.

The Fremont Metal Body Co., Fremont, Ohio, has acquired a site on which it plans to erect a factory.

Gallagher Brothers, Uhrichsville, Ohio, are erecting an addition to their machine shop which will be used for jobbing repair work.

H. K. Ferguson Co., Cleveland, has taken contracts recently for extensions to four plants in the automotive field. These include a factory building 80 x 440 ft. for the Maxwell Motor Co., Detroit, a six-story and basement building, 183 x 320 ft. for the Dayton Engineering Laboratories, Dayton, Ohio, a large extension for the Nash Motor Co., Milwaukee, and a spoke-turning plant and power house for the Hayes Wheel Co., Jackson, Mich.

Baltimore

BALTIMORE, Sept. 25.

The Toledo Bottle Cap Co., Toledo, Ohio, has leased about 6,000 sq. ft. of space in the Candler Building, Baltimore, for a branch plant for the manufacture of bottle caps and capping devices.

The Consolidated Gas, Electric Light & Power Co., Lexington Building, Baltimore, will build a new three-story plant, 105 x 227 ft., at 501-31 Madison Street, to cost about $113,000.

The General Purchasing Officer, the Panama Canal, Washington, will receive bids until Oct. 12 for supplies for the Canal Zone, including steel rivets and bolts, wire nails, electric motor, fans, cables, wire, voltmeter, steel conduit, wire grips, electrical supplies, valves, and other miscellaneous equipment as specified in Circular 1496.

The Lambert-Hudson Motors Co., Washington, local representative for the Hudson automobile, will build a new two-story automobile service and repair building, 75 x 130 ft., at Twenty-second and M Streets.

The Eastern Shore Electric Co., Harrington, Del., has acquired the plant and property of the Kent County Electric Light Co., Seaford, Del. Extensions and improvements are planned in the present power plant and system.

The Board of Harbor Commissioners, Municipal Building, Wilmington, Del., has arranged for a fund of $700,000 for the purchase of machinery and equipment for the new municipal marine terminal now under construction.

Pusey & Jones, Inc., Wilmington, Del., operating a local shipbuilding plant and now in receivership, is perfecting plans for a complete reorganization. The change will be made within the next 60 days.

The Common Council, Davidson, N. C., is planning for a bond issue of $60,000 for the installation of a municipal power plant and waterworks extensions.

A vocational department will be installed in the new two-story high school to be erected at Smyrna, Del., estimated to cost $165,000. Bids on equipment will be called for soon. The Delaware School Auxiliary, Wilmington, is in charge.

A one-story power house addition to cost about $50,000 will be constructed at the Virginia Polytechnic Institute, Blacksburg, Va.

Fire on Sept. 18 destroyed a portion of the plant of the P. A. Thomas Car Works, Inc., High Point, N. C., manufacturer of electric traction cars and equipment, with loss reported at $250,000, including machinery.

A vocational department will be installed in the new high school to be erected at Newark, Del., estimated to cost about $400,000, including equipment.

The Standard Electric Co., 1821 East Main Street, Richmond, Va., operating a general repair and service works, is planning for the installation of new equipment.

The Southern Bobbin & Spool Co., Greenville, S. C., recently organized with capital of $100,000, has awarded a contract to the Gallivan Building Co., Greenville, for the erection of a new two-story plant, 40 x 130 ft., to cost about $35,000, to be equipped for the manufacture of textile machine equipment.

The Pennsylvania Railroad and the Norfolk & Western Railroad will establish a joint locomotive plant, with repair facilities, at Hagerstown, Md.

The Battery Machinery Co., Rome, Ga., is planning for the installation of new equipment at its plant, including belt-driven air compressor, elecmotor and other apparatus. A. Butler is in charge.

The Beckerley & Trusler Co., 306 Stewart Building, Baltimore, machinery dealer, is making inquiries for a 20 in. 8 ft. metal lathe.

A vocational department will be installed in the proposed new high school to be erected on Peach Avenue, South Boston, Va., estimated to cost about $100,000.

Indiana

INDIANAPOLIS, Sept. 25.

The Ford Motor Co., Highland Park, Mich., has commissioned Albert Kahn, 1000 Marquette Building, Detroit, architect, to prepare preliminary plans for the erection of its proposed new plant at Hammond, Ind., to be used for assembling work, with initial daily capacity of about 15,000 cars.

The plant of the American Hominy Co., Terre Haute, Ind., was practically destroyed by fire on the night of Sept. 13, the damage being estimated at $1,000,000. Plans for rebuilding are now being made.

The Studebaker Corporation, South Bend, Ind., has completed plans for the erection of a new one-story addition to its power plant on Tuttle Street, estimated to cost about $125,000.

The Midwest Engine Corporation of Delaware, Indianapolis, has been organized to acquire the plant and property of the Midwest Engine Co. of Indiana, operating under a receivership for some time past. A consideration of $2,000,000 has been given by the new company for the plants at Indianapolis and Anderson, Ind., and plans are being perfected for the resumption of full operations. A bond issue of $3,000,000 is being arranged, a portion of the proceeds to be used for extensions and improvements.

The Commonwealth Edison Co., 72 West Adams Street, Chicago, is considering tentative plans for the erection of a new power plant at Hammond, Ind., to cost about $100,000.

A vocational department will be installed in the new senior and junior high school at Plymouth, Ind., two-story and basement, 163 x 180 ft., for which revised plans are now being prepared. Bids received on former plans have been rejected. Ernest W. Young, 512 Dean Building, South Bend, Ind., is architect.

The Indiana Battery Service Co., 1007 North Meridian Street, Indianapolis, local representative for the Milburn electric automobile, has acquired property at 1136 North Meridian Street, 80 x 320 ft., as a site for a new service and repair plant, with complete machine and electrical repair departments. Plans are being prepared for a one-story building. Henry C. Churchman is president.

The Associated Motor Industries, Inc., Indianapolis, recently organized with a capital of $40,000,000, to take over and merge a number of automobile interests, has perfected plans for immediate plant acquisition and operation under the new arrangement. The different plants include the National Motor Car & Vehicle Corporation, Indianapolis; Traffic Motor Truck Corporation, St. Louis; Recording & Computing Machine Co., Dayton, Ohio; Kentucky Wagon Mfg. Co., Louisville; Covert Gear Co., Lockport, N. Y.; M. & T. Corporation, Boston; Jackson Motors Corporation, Jackson, Mich.; and the Saginaw Sheet Metal Works, Saginaw, Mich. The company will concentrate operations at all plants on the manufacture of passenger automobiles of four and six-cylinder type, and on motor trucks from 1 to 3½ tons capacity. All other lines and special parts heretofore produced at some of the plants will be discontinued.

The Central South

ST. LOUIS, Sept. 25.

Of the machine tools and allied equipment listed [illegible] Railroad, which closed on Sept. 18, four milling machines and an electric crane were purchased. Two each of the milling machines were placed with Blackman-Hill-McKee Machinery Co. and Elliott & Stephens Machinery Co., both of St. Louis, and the crane order went to the Whiting Corporation, Chicago. The remainder of the list probably will be placed within the next few weeks. The equipment, which is for the shops at Bellmead, near Waco, Tex., probably will not be required for the next four or five months.

Manufacturers of piston rings, in which St. Louis leads, are doing an excellent business. That is the only field, outside of the railroads, that has shown any interest to speak of in machine tools. The Unico Motor Products Corporation, and the Inland Machine Works, both manufacturers of piston rings, each have purchased two Person & Arter automatic piston ring grinding machines.

The Automatic Water Pump Mfg. Co., 236 East High Street, Jefferson City, Mo., will take bids in October for the erection of a one-story plant, estimated to cost about $100,000, including equipment.

The Sheet Metal Products Co., 1819 Central Street, Kansas City, Mo., has plans for the erection of a one-story plant, 125 x 300 ft., at Thirteenth and Chestnut Streets, estimated to cost about $60,000. Wilkinson & Crans, 608 Interstate Building, are architects.

The Crossett Lumber Co., Crossett, Ark., will commence the immediate construction of a new power house at its plant.

The Common Council, Caruthersville, Mo., has plans under consideration for rebuilding the municipal electric power plant and ice-manufacturing plant recently destroyed by fire.

The United Railways Co., Thirty-ninth Street and Park Avenue, St. Louis, is completing plans for the erection of a number of new one-story power houses in different parts of the city.

An appropriation of $1,000,000 has been arranged by the Missouri, Kansas & Texas Railroad Co., St. Louis, for the erection of a new grain elevator at the Southwest Boulevard and Mill Street, Rosedale, Kan., to include electrically-operated hoisting machinery and other equipment.

Wyatt Wolf, Mountain Home, Ark., is organizing a company to construct and operate a local electric light and power plant and cold storage and refrigerating plant. Plans will soon be drawn.

The Atchison, Topeka & Santa Fe Railway Co., 80 East Jackson Boulevard, Chicago, has awarded a contract to the Wear Construction Co., El Paso, Tex., for the erection of a new one-story locomotive and car shop at Wynoka, Okla., to cost approximately $50,000.

The Kansas Gas & Electric Co., Wichita, Kan., has arranged for a bond issue of $3,000,000, a portion of the proceeds to be used for extensions and improvements. A. S. Grenier is vice-president.

The Joplin Supply Co., Joplin, Mo., has awarded a contract to the C. A. Dieter Constuction Co., Joplin, for the erection of a five-story automobile service and repair building, 75 x 120 ft., to cost about $200,000.

Greathouse Brothers, Louisville, operating a machine shop at 654 South Ninth Street, are planning for the installation of new punches, shears and other equipment.

A vocational department will be installed in the proposed new two-story high school to be erected at Sapulpa, Okla., estimated to cost about $125,000.

The Knoxville Power & Light Co., Knoxville, Tenn., is arranging for an increase in capital from $2,050,000 to $10,000,000, a portion of the proceeds to be used for extensions and improvements.

The North American Oil Co., Oklahoma City, Okla., has been organized with capital of $35,000,000 to take over and merge the following companies operating in Oklahoma and neighboring sections: North American Oil & Refining Co. Noco Petroleum Co., Noco Production Co., Noco-Mexican Oil Co., Puritan Petroleum Co., Black Petroleum Co., Lesh Oil Products Co., Noco Pipe Line Co., and the Petroleum Transit Co. The new company is planning for extensions in present oil refineries and systems, and for the construction of additional refineries at a later date. C. F. Colbord is president.

W. S. Taffar, Gainesville, Ga., has leased property at Athens, Ga., for a plant for the manufacture of show cases and kindred products. The structure will be improved and machinery installed at an early date.

The Ford Motor Co., Detroit, has leased a two-story and basement building, 150 x 300 ft., to be erected at Main Street and the line of the St. Louis-San Francisco Railroad, Tulsa, Okla., by Frank M. McCullough and associates, First National Bank Building, for the establishment of a new assembling plant. It will cost about $125,000. Stone & Deegan, 301 Drexel Building, are architects.

The Lexington Mine & Mill Supply Co., 544 West Main Street, Lexington, Ky., has taken bids on a four-story and basement works, 50 x 210 ft., on West Main Street, to cost about $55,000.

A vocational department will be installed in the new three-story high school to be erected at Vandalia, Mo

The Caddo Power & Irrigation Co., Little Rock, Ark., is perfecting plans for the erection of two new hydroelectric power plants on the Ouachita River, near Hot Springs, Ark. The site for the first station will be located about five miles from the city, with estimated cost of development, including equipment, of $3,000,000. The second station will be located at Blanchard Springs, and will cost close to $5,000,000, with machinery. The combined capacity will approximate 100,000 hp. It is also planned to construct a transmission system. H. L. Remmel is president.

A vocational department will be installed in the new high school to be constructed at Morristown, Tenn.

The Goldthorpe Refining Co., Oklahoma City, Okla., has been acquired by George Smith, Oklahoma City, and associates. The new owners will reorganize the company, and have plans under way for extensions, including the installation of additional machinery.

The Gulf States

BIRMINGHAM, Sept. 25.

The Southern Wire & Iron Works, Atlanta, Ga., has acquired property at Dallas, Tex., as a site for a new plant. Plans are being prepared for the erection of four one-story units, estimated to cost approximately $60,000.

The Common Council, St. Petersburg, Fla., will commence the immediate erection of a new municipal electric power plant, estimated to cost $55,000.

An electric pumping plant will be installed at the proposed new sewerage disposal plant to be constructed by the Board of City Commissioners, Forth Worth, Tex., to cost about $750,000.

The Abbott-Stuart Sign Co., 2814 Main Street, Dallas, Tex., is planning for the establishment of a new plant for the manufacture of electric signs and operating displays.

The Houston Power Co., Newton, Ala., has plans nearing completion for the construction of a new hydroelectric generating plant near Waterford, Ala., with initial capacity of about 3,000 hp. The Southern Engineering Corporation, Albany, Ga., is consulting engineer.

The Virginia Bridge & Iron Co., Roanoke, Va., has work in progress on enlargements and remodeling at the former plant of the Birmingham Steel Corporation, Birmingham, Ala., and will arrange the works for steel railroad car construction and repair. It is planned to have the entire plant equipped and ready for service at an early date.

The Texas & Pacific Railroad, Dallas, Tex., has plans in progress for extensions and improvements in its locomotive shops at El Paso, Tex., estimated to cost about $50,000. E. F. Mitchell is chief engineer.

The Great Lakes Western Refining Co., Houston, Tex., has acquired the local plant and property of the Port Houston Refining Co. The new owner is planning for the erection of a new oil refining plant, with initial capacity of about 3500 bbls. per day.

The Gulf Refining Co., Port Arthur, Tex., is arranging for the purchase of property totaling about 100 acres in the vicinity of its present plant, and will use a portion of the land for the construction of an addition to the oil refining plant, to double approximately the present output. A new steel tankage department will also be installed. George H. Tabor is vice-president.

A vocational department will be installed in the new high school to be erected at Canton, Miss., estimated to cost about $125,000.

Glen C. Tobias, Houston, Tex., is organizing a new company with capital of $5,000,000, to construct and operate a local plant for the manufacture of steel products. A portion

of the works will be equipped for reclaiming scrap iron. The initial plant is estimated to cost close to $500,000.

A vocational department will be installed in the new high school to be erected at Crystal Springs, Miss., estimated to cost about $80,000.

The Lubbock Iron Works, Lubbock, Tex., has removed its plant from the property heretofore occupied at Thirteenth Street and Avenue J, to another location, to provide for expansion in a number of departments.

The Common Council, Clifton, Tex., is planning for the erection of an addition to the municipal electric light and power plant to cost about $25,000, including equipment. Bonds have been approved.

A vocational department will be installed in the new three-story high school to be erected at Cisco, Tex., to cost about $160,000.

The Pacific Coast

SAN FRANCISCO, Sept. 23.

The Los Angeles Shipbuilding & Drydock Co., Los Angeles, is negotiating for the purchase of the plant of the Hanlon Shipyards & Drydock Co., Oakland, Cal., comprising about 33 acres, with drydock, shipyard, etc. The company plans to use the property as a branch plant, and will make a number of extensions and improvements.

The Martin Iron Works, Los Angeles, will build a new one-story plant, 90 x 115 ft., on East Twenty-eighth Street, near Naomi Avenue, to be equipped for iron and steel production.

The Utah Power & Light Co., Salt Lake City, Utah, has arranged for a preferred stock issue of $2,112,000, a portion of the proceeds to be used for extensions and improvements. D. F. McGee is vice-president.

The Los Angeles Railway Co., Pacific Electric Building, Los Angeles, has awarded a contract to the Lynch-Cannon Construction Co., Chapman Building, for the erection of a one-story car repair shop, 95 x 440 ft., on Fifty-fourth Street, near South Park Avenue, estimated to cost about $150,000. The engineering department of the company is in charge.

The Portland Railway, Light & Power Co., Portland, Ore., has arranged for a bond issue of $2,500,000, a portion of the proceeds to be used for extensions and improvements. Franklin T. Griffith is president.

The American Fire Brick Co., Mica, near Spokane, Wash., is planning for the rebuilding of the portion of its No. 2 plant, recently destroyed by fire with loss estimated at about $35,000, including equipment.

A vocational department will be installed in the new high school to be erected at Selma, Cal., estimated to cost in excess of $250,000, for which the time of receiving bids on a general contract has been extended from Sept. 25 to Oct. 10. Norman F. Marsh, 211 Broadway Central Building, Los Angeles, is architect.

Canada

TORONTO, Ont., Sept. 23.

MORE activity is now reported in the machinery and machine tool market and local dealers say that they are beginning to get results from demonstrations at the Canadian National Exhibition recently held in Toronto, and actual sales on this account are steadily mounting. Sales of equipment for garage purposes have improved considerably during the past couple of weeks.

The Canadian National Railways has issued a fairly good sized list of equipment required at the St. Malo, Que., and the Moncton, N. B., shops. In Canadian machine tool circles it is the general opinion that this list is long overdue and that even more extensive buying will be necessary in the early future, as it is generally known that railroad shops are in need of equipment for replacement purposes on a much more extensive scale than any list so far issued would seem to indicate.

The list for the St. Malo, Que., shop includes: One No. 2 Brown-Sharpe surface grinder; one No. 2A Brown-Sharpe universal milling machine; one electric drill; one funnel former; three chain blocks; one pneumatic molding sand rammer; one slip-roll forming machine; one No. 224 combined shear and punch; one No. 2 magnetic chuck; one No. 2 spindle pattern centering machine; one high speed power hack saw; one portable boring bar with motor; one portable oil rivet forge; four one-ton jib cranes; two half-ton jib cranes; one one-ton air hoist; three geared drills with motor drive; one small turner with stand complete; one LeBlond heavy duty production; one hairpin loop armature coil winder and spreader; one coil winding lathe head; one model C turbine air planer; one pneumatic punch; one emery-wheel dresser; one Davis expansion boring tool; four pneumatic chipping hammers; four pneumatic drills; two pneumatic grinders; one single bar shearing machine; one Bertram special crank pin turning and quartering machine; two quick change gear engine lathes. For the Moncton, N. B., shops the list includes two No. 13 crucible furnaces (Stewart); one combined shearing and hot punching machine; one 100-ton hydraulic banding press; one 100-ton spring stripping press.

In connection with the erection of its $2,500,000 oil refinery at Calgary, Alta., the Imperial Oil Co., Church Street, Toronto, Ont., is calling for tenders on a list of tools including lathes, planers, grinders and other machinery and equipment necessary in making and repairing oil refinery equipment.

The Eugene Phillips Electrical Works, which is erecting a plant at Brickville, Ont., expects to have the plant completed about Oct. 15. The company has installed upwards of $350,000 worth of equipment. The plant will be used entirely for the production of copper rods, etc.

McDougall & McNeill, Vancouver, B. C., have secured the general contract for the erection of a pulp and paper mill for the Wigwam Pulp & Paper Co., Elko, B. C., to cost approximately $3,000,000. Construction work will be started immediately.

The Hull Electric Co., 117 Main Street, Hull, Que., will start work next year on the erection of a hydroelectric power plant in Low Township, to have a capacity of 150,000 hp., and will take about two years to complete. The cost of the construction and equipment will be approximately $10,000,000.

The Dominion Insulator Co., manufacturer of insulators and other electrical accessories and equipment, is erecting a plant at Niagara Falls, Ont.

The Glen Motor Car Co. is preparing to establish a plant at Niagara Falls, Ont.

The Robert Mfg. Co., Lockport, N. Y., makers of knives for paper cutting in paper mills, has started work on the erection of a steel and concrete factory at Niagara Falls, Ont.

IRON AND INDUSTRIAL STOCKS

Decline Early in the Week with Recoveries Toward the Close

The bewilderment which prevailed throughout the week in the general market was felt no less in iron and steel stocks, though a few issues, including Baldwin Locomotive and American Can, rose against the trend. Monday's sharp decline was followed by intermittent advances and declines, ending with good recoveries on Saturday. Gulf States Steel before Saturday's closing equaled the year's high at 90. Republic suffered abrupt declines owing, it is believed, to news from Washington that the Federal Trade Commission will investigate the triple merger. Industrial prospects look brighter and the tendency to remove recent premiums has already set in. Most of the week's perplexing irregularity, it is generally thought, is attributable to professional speculators who sought to make large of the war scare.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

Allis-Chalmers ..	55	58	Inland Steel	49¼	49⅝
Allis-Chal. pf....	103	104	Int. Har.	109½	111⅜
Am. B. S. & Fdy.	77⅜	83	Int. Har. pf.....	119	119
Am. Can	58¾	62	Lackawanna St..	81	83
Am. Can pf....	109½	109¾	Lima Loco.	59¼	62¼
Am. Car & Fdy..	184	187	Midvale Steel ..	33½	36⅜
Am. Loco.	121	124⅜	Nat.-Acme	14½	15⅞
Am. Loco. pf...	118½	119½	Nat. Enam. & St.	59¼	62⅞
Am. Radiator ..	117¼	124	Nat. E. & S. pf..	100	102¾
Am. Steel Fdries.	42½	44⅞	N. Y. Air Brake	82	84⅞
Am. St. Fd. pf..	105	106	Nova Scotia St..	36½	36¾
Bald. Loco.	132¼	138	Otis Steel	10⅝	11⅝
Bald. Loco. pf..	115	115¼	Pressed Steel Car	88¼	92¼
Beth. Steel	75	76	Pressed Steel pf.	104½	105¾
Beth. St. Cl. B..	75¼	78½	Ry. Steel Spring.	116¼	120
Beth. St. 8% pf..	111	113	Ry. Steel Sp. pf.	115	115
Brier Hill	18¾	19	Replogle Steel...	32⅜	34½
Br. Em. Steel...	14⅝	14⅝	Republic	65½	70¾
Br. Em. St. 2 pf.	35½	36½	Republic pf.	91	92½
Cambria Steel ..	40	40	Sloss.	48	50
Chic. Pneu. Tool	80½	84⅝	Sloss pf.	78	78
Colo. Fuel	33½	35½	Steel of Canada.	72½	77
Crucible Steel ..	87	92	Un. Alloy Steel..	38¼	38¾
Crucible St. pf..	96¾	98	U. S. Steel.....	102½	104⅞
Deere pf.	76	76	U. S. Steel pf...	122	123
Gen. Electric ...	176	180	Vanadium Steel.	47	51½
Gt. No. Ore Cert.	39½	41	Va. I., C. & Coke	56¼	56¼
Gulf States Steel	78	90	Whouse Air Br.	102	103⅞

Trade Changes

W. Newton Jeffress, who has been [illegible] sales department, Philadelphia district, of the Carnegie Steel Co. for over 20 years, has resigned and has established a sales office in the International Building, 1319 F Street, N. W., Washington, as direct [illegible] following companies: The Boss Nut Co., Chicago; The Pittsburgh Knife & Forge Co., Pittsburgh; Standard Seamless Tube Co., Pittsburgh; Union Draft Gear Co., Chicago; Universal Draft Gear Attachment Co., Chicago; Verona Tool Works, Pittsburgh. Mr. Jeffress is well known in the Eastern railroad circles, particularly in the Baltimore, Washington and Southeastern districts.



W. [illegible]

The Modern Machinery Co. has removed its offices from 182 Centre Street, New York, to 25 Church Street. Its plant will remain at the former address. S. A. DeWitt, secretary-treasurer of the company, has resigned.

L. J. Krom, metallurgical engineer, who has served in advisory capacity with several steel and manufacturing companies here and abroad for a number of years, has established an office at 50 Church Street, New York, to conduct a consulting, metallurgical and engineering practice. Mr. Krom has 15 years of practical experience to draw from, and for 11 years was managing editor of *Metal Industry*. Latterly he has designed rolling mills, smelting plants and shops in Europe and Asia.

The B. C. Ames Co., Waltham, Mass., has acquired an interest in the Triplex Machine Tool Corporation, 18 East Forty-first Street, New York, and the Triplex combination lathe, milling machine and drill press is now being manufactured in the plant of the former company. General offices and show room of the Triplex company will remain at the same address.

The Chicago Flexible Shaft Co., Roosevelt Road and Central Avenue, Chicago, has opened a new district sales office, with headquarters at 305 Merchants Bank Building, Indianapolis, to handle furnace sales in southern Ohio and Indiana, and western West Virginia. F. W. Odemar is in charge.

The Angle Steel Tool Co., steel chairs and factory equipment, which began operations about 11 years ago at Otsego, Mich., recently moved to its new daylight factory at Plainwell, Mich. The new location offers considerable advantage over the old, since shipments now can be made over two steam roads and one electric.

Alfred Box & Co., Inc., Philadelphia, electric and hand cranes and hoists, opened a factory branch office at 30 Church Street, New York, on Sept. 15. N. C. Failor, an engineer who has specialized in handling these lines, is in charge. This is the beginning of a plan to establish direct factory branches in a number of large business centers.

Announcement has been made of the consolidation of the Foamite Firefoam Co., 151 Fifth Avenue, New York, and O. J. Childs Co., Inc., Utica, N. Y., into a new organization, to be known as the Foamite-Childs Corporation. The new company will handle chemical and motor fire apparatus, system installations and sprinkler systems. It will continue to develop the Firefoam method of extinguishing fires. The following officers were elected: W. J. Childs, president; F. M. Watters, vice-president; E. Janeway, secretary, and F. J. Maginniss, treasurer. Executive offices will be located at Utica, N. Y.

The Economy Fuse & Mfg. Co., Greenview Avenue, Chicago, has removed its Detroit sales office from 1012 Majestic Building to 1528 First National Bank Building.

The Diamond Chain & Mfg. Co., Indianapolis, announces the opening of an office at 340 Leader-News Building, Cleveland. H. I. Markey, for five years mechanical engineer with [illegible]

The United Brass Mfg. Co., Cleveland, announces that the co-partnership consisting of Benjamin F. Klein and William J. Schoenberger, which constituted that company, has been dissolved by mutual consent, effective Sept. 1. This company continues as before to manufacture water works brass goods under the sole ownership of Mr. Klein. Mr. Schoenberger takes over the gas valve and stove cock department [illegible] Harvard Avenue, Cleveland.

Plans of New Companies

The Modern Truck Mfg. Co., Box No. 1589, Mobile, Ala., has been incorporated with a capital of $50,000, to manufacture motor trucks, parts, etc. It has taken over the plant of the Marine Equipment Co., Tacon Station, Mobile, Ala.; also the Modern Welding & Blacksmithing Co., Inc., same city, and has removed the latter, with its equipment, to the Tacon plant. This combined plant now has a large foundry, machine shop welding plant, galvanizing plant and pattern shop. The new company is already manufacturing transmission gears, welding products, patterns and all-steel boltless hand trucks. G. M. Bryde is general manager and M. B. Scholtes is plant manager.

A consolidation of the Goodman-Krohngold Co., Cleveland, the Goodman Engineering Co., Zanesville, Ohio, and the Electrical Repair & Engineering Co., same city, has been effected, the new company to be known as the Industrial Electric Co., 5226-32 St. Claire Avenue, Cleveland. I. E. Goodman will head the firm and E. Levison is chief engineer. This firm will specialize in power equipment engineering, machinery and iron trade products.

The Arnold-Hellmuth Mfg. Co., 164 Emmett Street, Orange, N. J., was recently incorporated with a capital stock of $30,000, to manufacture machine tools and parts. The incorporators are: K. P. Hellmuth, A. W. and R. L. Arnold.

The Standard Enameling & Mfg. Co., Box 308, Camden, N. J., has been incorporated with a capital stock of $125,000, to manufacture stamped metal and enameled products. It is in the market for equipment for its new plant, which it is expected will be completed by Jan. 1. The incorporators are: O. S. Watts, J. Predow and M. Redi.

I. D. White, Inc., 115 North Desplaines Street, Chicago, has been incorporated with a capital of $15,000, to manufacture sheet metal products, light stampings and various specialties. The new company is a reorganization of a partnership whose properties and business it is taking over. It has adequate space and facilities for the present, but contemplates moving to larger quarters by next May. The officers of the company are: I. D. White, president and general manager; A. Miller, secretary and treasurer, and H. Harvey, vice-president.

The Paramount Machine Co., 20[illegible] Market Street, Newark, N. J., has been organized to manufacture engraving machines and tools. Its work is being done by contract. Samuel Clark, 241 Virginia Avenue, Jersey City, N. J., heads the company.

The Lackner Products Corporation, 132 West Sixteenth Street, New York, was recently incorporated under the Delaware laws with a capital stock of $500,000, to manufacture automatic wire rope cable lines and other mechanical equipment. It is now in experimental quarters, but expects to establish in New York or at Long Island City. Though bids have been asked, no contracts have been awarded, pending final approval of materials to be used, by the Underwriters' Laboratories, with whom it expects to co-operate. Among the devices which the new company will manufacture are: automatic, gravity operating rope clamps; steel cable roof anchors with snap-lockhook terminals and torsion grip tie; and steel cable, belt-trolley safety devices.

The Security Products Co., 255 Mill Street, Rochester, N. Y., has been incorporated with a capital of $25,000, to manufacture automobile parts and kindred products. Its needs are supplied for the present. L. H. and M. C. Harold and A. J. Gosselin are the incorporators.

The Pan-American Equipment Co., Canal-Commercial Building, New Orleans, has been organized by R. L. Wilson, formerly an officer of the Mid-Continent Equipment & Machinery Co., St. Louis, and will do a general rail and railroad equipment business, including cars, locomotives and track accessories.

Hoover-Rudge, Inc., 15 Park Row, New York, was recently organized for the purpose of manufaturing automobile accessories, but for the present will confine its operations to making a special sun shield. Its work will be let out to contract for a time. Eventually the company expects to equip its own plant. Z. L. Hoover is secretary.

The E. L. Essley Machinery Co., Chicago, has added four men to its sales force as follows: H. A. Bruce has been appointed representative in the Michigan territory, having been formerly connected with the Packard Motor Car Co. of Detroit and long identified with the machine tool industry. C. B. Burns, formerly with the Fairbanks Co., Chicago, and T. P. Nielsen have been appointed representatives in Chicago; and Ralph Wirth, formerly with the Toledo Press & Machine Co., also the Niagara Machine & Tool Works, has been appointed special representative in the sheet metal machinery department.

NEW TRADE PUBLICATIONS

Recording Meters.—Esterline-Angus Co., Indianapolis. Bulletin showing the application and results of a graphic wattmeter in maintaining a continuous check on the performance of a concrete-mixing plant and another showing the value of recording the waste of electric current in a building.

Grinding Wheels.—Norton Co., Worcester, Mass. Description of care and safe use of grinding wheels in the August issue of "Grits and Grinds," the house organ of the Norton Co.

Pig Iron.—Bedevoise-Anderson Co., Inc., 114 Liberty Street, 40-page booklet compiled to include information of interest to the foundryman. Paragraphs are devoted to the effect of the various elements in cast iron and pages are devoted to helpful text and tables of weights and measures. Several pages are given to the analysis of various kinds of coke sold by the company and also the various brands of pig iron handled. Brands of charcoal pig iron, ferromanganese, ferrosilicon are also mentioned together with their uses. Various brands of coal, iron and steel scrap and mica schist are included. Several pages are devoted to tables, formulas and other data pertinent to foundry processes.

Steel Truck Cabs.—International Motor Co., 25 Broadway, New York. Special booklet shows detail photographs of Mack AC, year round motor truck cabs; also description explaining construction and adjustable features for varying weather. Size 9 x 10 in., 10 pages.

Special Sheet Metal Work.—Canton Art Metal Co., Canton, Ohio. Special catalog describes and illustrates the wide scope of uses for sheet metal products. Specifications are given together with photographs showing equipment in use. Size 6 x 10 in., 32 pages.

Pumps.—Goulds Mfg. Co., Seneca Falls, N. Y., 1922 supplement to catalog K shows the types of pumps the company concentrates on in its movement toward standardization. It includes specifications on hand, power and sprayer pumps, and gives a complete list of repair parts. Size 7 x 10 in., 97 pages. Also bulletin 123, devoted to the adaptations and special tests of Gould steam turbine driven centrifugal pumps. Size 8 x 10 in., 16 pages.

Steel Water Tanks.—Chicago Bridge & Iron Works, 2121 Old Colony Building, Chicago; and Horton Steel Works, Ltd., 232 Janet Street, Bridgeburg, Ont. Quarterly bulletin, The Water Tower, discussing problems in water storage and the manner of solving them. It is generously illustrated to show the varying types of tanks and how they may be utilized for advertising purposes.

Centrifugal Pumps.—Dayton-Dowd Co., Quincy, Ill. Bulletin 248, showing in illustrations and detailed descriptions the construction and operation of the type CSU Multi-stage pumps. Data are given on various efficiency tests. Suction lift curves are plotted for use after installation. Size 9 x 11 in., 20 pages.

Electric Motors.—B. F. Sturtevant Co., Hyde Park, Boston. Circular of 4 pages illustrating A-C and D-C motors of 1-20 to 800 hp. in size.

Semi-Steel Grate Bars.—A 4-page bulletin issued by the Thomas Grate Bar Co., Birmingham, Ala., discusses the superiority of this iron for this purpose.

Automotive Service Equipment.—Jacobs Mfg. Co., Hartford, Conn. Booklet published for general distribution, printed in an attractive, readable style to promote a general appreciation of the importance of adequate shop equipment among service stations and repair shops. The products mentioned are not those of any specific make, as the purpose of the booklet is to suggest ways of improving practice.

High Speed Steel.—Firth-Sterling Steel Co., McKeesport, Pa. Booklet of 44 pages, 9¼ x 4 in., a part of the company's plan to issue separate books on all units of its field; tells the story of blue chip high speed steel. It explains the merits peculiar to steel which has undergone a special heat treatment, emphasizing "red and cold hardness," and reduced distortion and shrinkage. A brief account of the heat treatment tells of the variations made for different machines and tools. The barium chloride process, undergone in treating small tools, is explained separately. Other books ready for distribution are: the C. Y. W. Choice Steel Book, S-less Steel Book and Special Steel Book.

Boring, Drilling and Milling Machine.—Pawling & Harnischfeger Co., Milwaukee. Bulletin No. 3-T, featuring a new table type horizontal boring, drilling and milling machine, and giving specifications describing the features of construction, of operation and scope of work which the machine is designed to do, with detailed illustrations calculated to give all the information necessary for the intelligent selection of the machine.

Induction Motors.—Reynolds Electric Co., 2650 West Congress Street, Chicago. Bulletin 204 giving specifications, description and illustrations of type B, split-phase, A-C, induction motors.

Gear Cutting Machine.—Newark Gear Cutting Machine Co., 69 Prospect Street, Newark, N. J. Catalog No. 4 of 25 pages, 9 x 6 in., giving detailed description of the workmanship and design of No. 2-B automatic spur and bevel gear cutting machine; also specifications and illustration. Several pages give examples of its usefulness by pictures and footnotes. One section tabulates cutters to assist in selecting, and also gives a table of tooth parts.

Pulverized Fuel Equipment.—Quigley Fuel Systems, Inc., 26 Cortlandt Street, New York. Bulletin A, of 4 pages, 12 x 8 in., shows a lay-out of a typical coal milling plant and explains briefly the method of fuel distribution and control. Some of the appliances are also described and illustrated in detail. Dust-tight features are emphasized, and by diagram the equipment is shown as applied to a water tube boiler.

Boiler Tube Corrosion.—National Tube Co., Pittsburgh. Fourth edition of the National Bulletin, discussing boiler tube corrosion from three angles: locomotive, stationary and marine service. A dissertation on each type of problem by recognized authorities comprises most of the 25 pages. Results of research, together with important data, are also given. Special articles appear on alkalinity, water purification, scale accumulation and preventive measures to take against corroding elements.

Oil Drilling.—Sullivan Machinery Co., Peoples Gas Building, Chicago. Bulletin 69-O, explaining the processes and merits of diamond drilling. It also gives a detailed account of modern prospecting, tracing the development of methods in structure testing, production drilling, etc. Size, 40 pages, 8 x 6 in.

Coating Metals.—Metals Coating Co. of America, 495 North Third Street, Philadelphia. Illustrated pamphlet of 18 pages, 12 x 10 in., showing results obtained from the Schoop metal spraying process in protecting against chemical action, atmospheric corrosion and mechanical erosion, or against high temperatures. It also explains the use of this process for adding dimension or weight, and for electrical conduction through simultaneous melting, atomizing and impacting on a surface. The mass coating machine for treating small pieces in bulk is of special interest.

Electric Motors.—Ohio Electric & Controller Co., Cleveland. Bulletin 203, 8 pages, 8½ x 11 in., illustrates and describes ball-bearing motors from ⅛ to 1-3 hp. A. C. induction motors, one, two or three phase, 25 to 60 cycle; also D. C. motors, 32 to 250 volts, for application to domestic appliances, pumps and devices operated from lighting circuits. Details are shown in dimensional drawings.

Sprockets, Chucks, Tapers.—Collis Co., Clinton, Iowa. Catalog No. 10, of 19 pages, 6 x 9 in., describes and illustrates drill sleeves and sockets, lathe bushings and centers, chucks, arbors and special tools. Dimensional drawings of tapers and ordering lists are given.

Steel Windows.—David Lupton's Sons Co., Philadelphia. Catalog 110, freely illustrated and described on finished paper, gives detailed information on planning as well as supplying homes or factories with steel sash and related products. Diagrams and illustrations show working features and relative position for good ventilation. Building suggestions and tabulated data are given. Size, 10 x 12 in., 71 pages.

Conveying Systems.—Link Belt Co., Seventeenth and Western Avenue, Chicago. Book No. 490, 34 pages, 9 x 5 in., suggests conveying devices as particularly adapted to foundry service—conveyors for coal, coke or pig iron; for molds, cores, castings and refuse. Cranes, portable loaders, hoppers, bin gates and mixers in vivid illustration show where many economies have been effected by introducing mechanical conveying. The Rapp revivifier for molding sand and other Link-belt labor-saving machinery is shown in operation by diagrams.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	
Refined iron bars, base price	2.94c.
Swedish bars, base price	7.00c.
Soft steel bars, base price	2.94c.
Hoops, base price	4.29c.
Bands, base price	3.74c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	3.04c.
Channels, angles and tees under 3 in. x ¼ in., base	2.94c.

Merchant Steel

	Per Lb
Tire, 1½ x ½ in. and larger	2.94c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	3.14c.
Toe-calk, ½ x ⅜ in. and larger	4.00c.
Cold-rolled strip, soft and quarter hard	6.75c. to 7.25c.
Open-hearth spring steel	4.50c. to 7.00c.
Shafting and Screw Stock:	
Rounds	3.90c.
Squares, flats and hex	4.40c.
Standard cast steel, base price	15.00c.
Extra cast steel	18.00c.
Special cast steel	23.00c.

Tank Plates—Steel

¼ in. and heavier	3.04c.

Sheets

Blue Annealed	Per Lb.
No. 10	4.04c. to 4.19c.
No. 12	4.09c. to 4.24c.
No. 14	4.14c. to 4.29c.
No. 16	4.24c. to 4.39c.

Box Annealed—Black

	Soft Steel C. R., One Pass, Per Lb.	Blued Stove Pipe Sheet, Per Lb.
Nos. 18 to 20	4.30c. to 4.70c.	.....
Nos. 22 and 24	4.35c. to 4.75c.	5.00c.
No. 26	4.40c. to 4.80c.	5.05c.
No. 28	4.50c. to 4.90c.	5.15c.
No. 30	4.75c. to 5.15c.	.....

No. 28 and lighter, 36 in. wide, 10c. higher

Galvanized	Per Lb.
No. 14	4.60c. to 5.00c.
No. 16	4.75c. to 5.15c.
Nos. 18 and 20	4.90c. to 5.30c.
Nos. 22 and 24	5.05c. to 5.45c.
No. 26	5.20c. to 5.60c.
No. 27	5.35c. to 5.75c.
No. 28	5.50c. to 5.90c.
No. 30	6.00c. to 6.40c.

No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
⅜ in. Butt	—58	—45	¾ in. Butt	—16	+2
¾ in. Butt	—58	—45	1½ in. Butt	—19	—1
1-3 in. Butt	—60	—47	2 in. Lap	—13	+4
2½-3 in. Lap	—57	—44	2½-6 in. Lap	—16	+1
7-8 in. Lap	—53	—30	7-12 in. Lap	— 8	+8
9-12 in. Lap	—49	—30			

Steel Wire

Bright basic	4.00c. to 4.25c.
Annealed soft	4.00c. to 4.25c.
Galvanized annealed	4.65c. to 4.90c.
Coppered basic	4.65c. to 4.90c.
Tinned soft Bessemer	5.65c. to 5.90c.

*Regular extras for lighter gage

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	19¼c. to 20¼c.
High brass wire	20¼c. to 20¾c.
Brass rod	16¾c. to 17¾c.
Brass tube, brazed	26¼c. to 27¼c.
Brass tube, seamless	23 c. to 23½c.
Copper tube, seamless	25¾c. to 26 c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 22¾c. to 23¾c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin

Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20
IC	$10.00	$8.50
IX	11.50	10.00
IXX	13.00	11.25
IXXX	14.25	12.50
IXXXX	16.00	14.00

Coke 14-20

Primes	Wasters
80 lb.	$6.05	$5.80
90 lb.	6.15	5.90
100 lb.	6.25	6.00
IC	6.40	6.15
IX	7.40	7.15
IXX	8.40	8.15
IXXX	9.40	9.15
IXXXX	10.40	10.15

Terne Plates

8-lb. coating, 14 x 20

100 lb.	$7.00
IC	7.25
1X	7.50
Fire door stock	9.00

Tin

Straits, pig	36c.
Bar	43c. to 47c.

Copper

Lake ingot	15¼c.
Electrolytic	15 c.
Casting	14¾c.

Spelter and Sheet Zinc

Western spelter	8½c.
Sheet zinc, No. 9 base, casks	9¼c. open 9¾c.

Lead and Solder*

American pig lead	7c. to 8c.
Bar lead	8¼c. to 9c.
Solder, ½ and ½ guaranteed	25c.
No. 1 solder	23½c.
Refined solder	20¼c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	75c.
Commercial grade, per lb	35c.
Grade D, per lb	25c.

Antimony

Asiatic	8c. to 9c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb. 25c. to 27c.

Old Metals

The market continues firm but business is quiet, with the exception of lead, which is active. Dealers' buying prices are as follows:

	Cents Per Lb
Copper, heavy crucible	11.75
Copper, heavy wire	11.25
Copper, light and bottoms	9.25
Brass, heavy	6.50
Brass, light	5.50
Heavy machine composition	8.50
No. 1 yellow brass turnings	6.75
No. 1 red brass or composition turnings	8.00
Lead, heavy	4.75
Lead, tea	3.75
Zinc	3.50

THE IRON AGE

New York, October 5, 1922

ESTABLISHED 1855 VOL. 110, No. 14

Basic Business Conditions Favorable

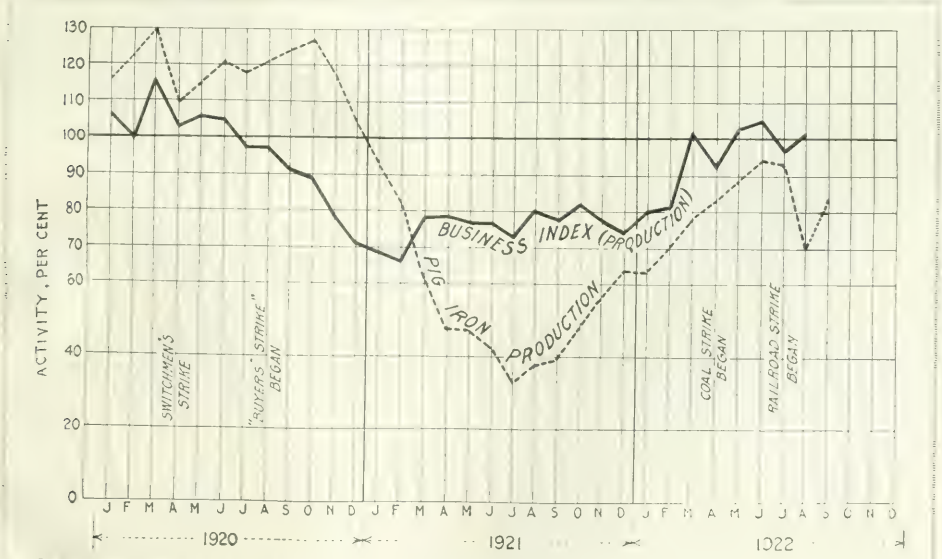
Production Running at 1919 and 1920 Rate of Activity—Iron and Steel Far Below, Due Largely to Coal and Locomotive Shortage

BY SIDNEY G. KOON

IT needs nothing more than the buoyancy already shown by general productive activity in the United States to establish its inherent soundness. After business had climbed from the doldrums of 1921 to a definite emergence, in March of this year, from the effects of the protracted slump, the coal strike beginning April 1 gave it a heavy setback. But May showed such a pronounced recovery as to push production above the figures set in March, themselves the highest since June, 1920. Then, when the railroad strike beginning July 1 dropped the curve for a second time below par, the rebound of August once more re-established it above par—which in this case is the average for the calendar year 1919.

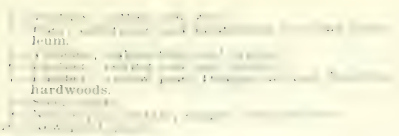
While the curve of productive activity shown on this page is similar in general to that on page 69 of our issue for July 13, there are some outstanding differences, due mainly to the fact that the present study is based wholly on 1919. In the previous curve the base was mainly 1913; but some items, for which data so far back could not be obtained, were referred to 1917, 1919 and even, in the case of silk, to 1920. Except for silk, which has now been omitted, the items are the same, and their groupings are the same, as before. Twenty-one separate items have been used in ten groups, as shown below. The first four groups represent food, shelter, clothing and heat—the primal necessities of human life.

1 Food; beef, flour and sugar.
2 Building construction.



In the Solid Curve Is the Story of Productive Activity in the United States from the Beginning of 1920. This is represented in tons, barrels, bales and square yards—not in dollars. The figures for each month are expressed as a percentage of the average month of 1919

Pig iron production, also in tons, appears in the dotted curve, which shows how much more heavily the iron and steel industry was hit by the slump of 1921 than was industry in general



Because 1919 was a year of greater activity than 1913 in every group of items, and in every single item, with the exception of coal and of lead, so far as 1913 figures are obtainable, 1919 furnishes in many ways a better present standard of comparison than 1913. Our 105,025,000 of population in mid-1919 was much closer to the 109,325,000 of Oct. 1, 1922, than was the 97,200,000 of mid-1913. The larger population of 1919 called for a larger production than in 1913—and got it. And conditions in 1922 are much nearer to those of 1919 than to those of 1913—labor in certain lines is getting a disproportionate share of the earnings of those lines—as in 1919; prices of commodities are higher now, and were higher in 1919, than in 1913, while at the same time lower than the post-war peak reached in 1920; both 1919 and 1922 have been years of unprecedented building construction; both years have had strikes of major importance which in both cases have seriously hampered the steel industry, in particular.

It may be emphasized that dollars do not enter the curve, which is a story of physical quantities, unaffected by prices or markets, except in so far as these may induce a larger or smaller productive activity. Thus, beef is expressed in thousands of pounds of inspected slaughter; flour, in thousands of barrels of wheat-flour produced; sugar, in gross tons of meltings; building construction, in square feet of floor areas built; cotton and wool, in the quantities consumed by textile mills as an index to the amount of cloth produced, etc. All averages of items into a group and of groups into the final index are direct, without giving any one a greater weight than another.

And the curve indicates, in a way difficult of expression otherwise, that we are no longer "hibernating" on the accumulated production of former years. We are again "on our own." With stocks in most lines largely and successively more largely depleted and retailers buying from hand to mouth, as has been the case for some two years, since the so-called "buyers' strike" of 1920 commenced to paralyze production, we have now reached, and probably passed, the point where production for current and future needs becomes an urgent necessity. The huge accumulations of the past have all but disappeared and production prospects for the immediate future—barring a renewal of labor troubles—appear unusually bright. Demand exists for goods and goods must be produced.

Intense activity through the first half of 1920 accounts for the high portion at the beginning of the curve. There was heavy building construction; the 1920 production of automobiles was more than 10 per cent in excess of the number built in any other year before or since; steel came within 7 per cent of the output of the three great war years, 1916, 1917 and 1918; the production of petroleum, to keep pace with the growing demand for gasoline and fuel oil, advanced rapidly, exceeding 1919 by 24 per cent; paper averaged 10 per cent above the previous year. Some of these dove-tailed into each other. Thus, both buildings and automobiles called for steel; the increasing output of petroleum made necessary large quantities of steel tanks, pipe, tin plate and other "oil country" goods. And the transportation of all this vast produce demanded more railroad cars—again calling for more steel.

All this stopped sharply in early summer. Building construction, 110 per cent in April, was 80 per cent in June, 60 per cent in July and 30 per cent in December—the latter, largely because of the season. Textiles fell steadily from 112½ in April to 49½ in December. Vehicles dropped, without a retarding movement, to 35 in December and reached low water at 19 in January, 1921. Leather fell without pause from 110 in May to 51½ the following February. Lumber was 102 in August, 69 in December. Non-ferrous metals declined from 102 in September to 50 in February. Steel, the last to be affected, was then hit by an avalanche of cancellations, and a steady fall was recorded, from 127½ in October to 51 in April and 34 in July. Food had to be produced; the people had to eat. But the 101½ of July gave place to 70 in December, January and February.

After February, 1921, the situation began to mend. The sharp recovery in March was due to food, building construction, textiles, automobiles and lumber, and to a lesser extent to fuel and leather, all of which showed marked gains during the month. From that point there was slight change for a year until, in March, 1922, another general advance took place. In this case building construction, leaping to 112 from 65 in February, led the van. Automobiles, fuel (partly in anticipation of the coal strike), lumber, paper, food, textiles, copper—all registered good gains. And steel, jumping from 74 to 100, kept pace.

To the beginning of the coal strike must be ascribed the drop in April. Fuel fell off more than half, only the heavy production of petroleum keeping it up to 61. Only buildings, automobiles and leather advanced. But the handsome recovery in May, in which every group except leather participated, more than made up the lost ground. In July, once more, labor's unwarranted demands took heavy toll from the nation's output; but recovery in August, while less complete and less impressive than in May, once more brought productive activity up above its 1919 average.

Unemployment, so live a topic in 1921, is no longer a fact. Every man who can render worthy service may have his opportunity. Shortage of labor is becoming a problem—in particular, the common labor so necessary for the rougher work in all industries. But the question now simmers down to the adequacy of transportation facilities. Hampered though they were by the long-contested strike of shopmen, the railroads report that there were 20,000 fewer "bad order" cars on their lines on Sept. 15 than on July 1, when the strike started. And the number Sept. 15 was 70,000 less than a year ago. Unfortunately, the same cannot be said as to the more complicated locomotives. Hence a shortage of motive power is now the big obstacle to the greatest activity.

Pig Iron Production

During this same period of 32 months, January, 1920, to August, 1922, both inclusive, the curve of pig iron production, as shown in the diagram, took quite a different course. Similar, in that low followed high and was succeeded by high, yet the changes in pig iron were so abrupt and so tremendous in their intensity that the two curves differ totally in appearance. General production, including steel ingots but not pig iron, had a maximum of 115.7 and a minimum of 66. The larger exceeded the smaller by 75 per cent. But pig iron, with its maximum of 130, had a minimum as low as 33. Here the larger exceeded the smaller by 294 per cent, or nearly four times as great a divergence as with the general group.

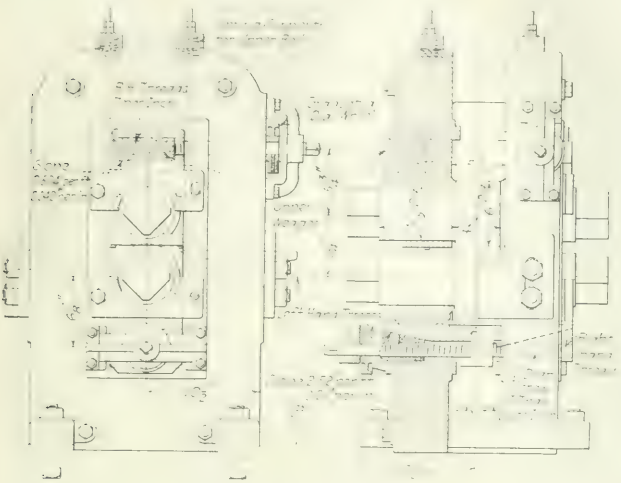
It has already been explained that steel (which in turn calls for pig iron) had been in such heavy demand until late in 1920 that the production for the year was the fourth largest in our history, and this, in spite of the sharp shrinkage of the last three months of the year. But the sudden stoppage of orders—cancellations of hundreds of thousands of tons—many of which had been filed with two or more steel producers,

(*Concluded on page* 902)

Cold Rolling Mill with Wedge Adjustment

Continuous Strip Mill of Worcester Pressed Steel Co. Has Exceptional Control for Both Gage and Speed

TWO stands of a continuous or tandem cold rolling mill for strip steel have been installed experimentally by the Worcester Pressed Steel Co., Worcester, Mass. As soon as this experimental installation has "found itself," in the sense that all of the features are functioning as well as can be desired, two more stands are to be added, making a group of four, all in tandem. Of chief interest in connection with the new mill are the methods of adjustment of rolls and of speed control.



Construction of the Mill Is Shown Clearly by the Cut at Left, the Wedges and Their Action Being Indicated

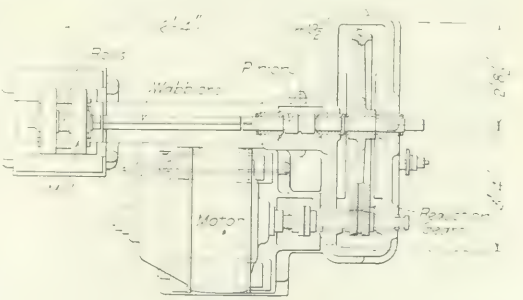
Below, the Plan of a Single Stand Shows How Compactly the Whole Layout Has Been Arranged, the Entire Unit Occupying a Space About 7 x 12 Ft.

Wedges, both top and bottom, actuated by screws handled by wheels, are used for roll adjustment, and so closely has the design been worked out that the top roll moves only 0.0001 in. for each of the 60 spaces on the "micrometer" wheel and an even closer range may be obtained by splitting these spaces, which measure about ¼ in. on the periphery of the wheel. These top wedges are independent, to permit correcting any tendency of the rolls to produce a material thicker on one side than the other. The slope is only 0.504 in. per ft. (0.042 in. per in.) and the screw has 7 threads per in. Hence, one complete turn of the screw raises or lowers that end of the roll 0.006 in. These wedges operate in a direction parallel to the motion of the material between the rolls.

As the wedge adjustment for the bottom roll is designed normally for use only when changing gage, it is made much coarser and both ends of the roll are raised or lowered together. The slope of this wedge, 2.52 in. per ft., is five times that for the top roll, and a single turn on the screw which is 7 threads per in., as before, changes the position of the roll 0.030 in. In this case the two wedges are on a single screw, one end of which has right-hand threads while the other has left-hand threads. These wedges operate in a direction parallel to the axis of the roll..

Speed control between the two stands, now running, is obtained by means of a rheostat governed by hand wheels adjacent to the second stand of the mill, and within easy reach of the roller. Normally, he keeps the second stand running just fast enough to permit the stock to sag gently between stands, which are some 8 ft. apart. As the two stands are driven independently by two adjustable speed, direct current, 70-hp. Westinghouse motors, through herringbone reduction gearing, adjustment of the speed of the one motor, to conform with that of the other, is all that is necessary. Finishing speeds run from 160 ft. per min. upward. The maximum being now about 350 ft. per min., or nearly double the usual practice.

Such fine adjustment as is had on the top roll results in giving a coil of perfectly flat edge, thus avoiding the waviness in the edge of the strip, sometimes experienced with rolls less well under control. This is of prime importance for many uses of the steel, particularly when it is for tubing, where a wavy edge is troublesome in the welding machine.



For the wedges, hardened steel is used against brass. The one feature, in this connection, which is not yet thoroughly satisfactory lies in the difficulty of tightening the wedges, and through them the rolls, while material is running through. There is so much binding, under full load, against the collar where the thrust is taken up (A, in the detail of the mill) that a ball bearing thrust is to be substituted. Ball bearings between wedges have been considered, also, but will probably not be used.

To promote precision through lack of spring in the mill, cast iron housings of extra size have been installed and, as the (chrome steel) rolls measure 6 in. in diameter by only 4 in. face, it has been found possible to get the two housing columns within 5 in. of each other. The mills were built by the United Engineering & Foundry Co., Pittsburgh, from plans developed in the Worcester plant by H. A. Fisher, works engineer.

When large reductions are required, the metal is

passed through the mill twice without intermediate annealing. This gives it four roll passes. When the two additional stands have been installed, a single operation will give the same four roll passes, with an added economy in labor, as the steel will then be handled only twice instead of four times.

Near the delivery side of the second stand is a motor-driven reel designed and built at the Worcester plant. Control of the speed of this machine is such as to permit the roller to maintain in the strip, as it is being coiled, any desired tension. A second and similar reel, which may be installed later, will permit larger tonnage, for trip coiling could be started on one reel during the time required for unloading the other, the two thus being used alternately from the same rolls.

ELECTRIC STRIP MILL DRIVE

New Features Provide Closer Control of Relative Roll Speeds

BY B. S. BEACH*

SPECIAL interest surrounds the recent installation of electrical equipment for a new 14-in. continuous hot strip mill of the Trumbull Steel Co., Warren, Ohio, described at page 1510, June 1. This equipment represents a totally new development in rolling mill drive and is the first installation of its type.

Built by the Morgan Construction Co., Worcester, Mass., the mill consists of a roughing train of four stands of horizontal mills, an intermediate train of two stands, and a finishing train of four stands. The roughing mill is driven by a 600-volt, shunt wound, direct current motor which will develop 1250 hp. at 50 deg. C. (or 90 deg. Fahr.) temperature rise, at any speed between 175 and 350 r.p.m., through reducing gears. The intermediate mill is driven by a similar motor, direct connected to stand No. 6 and, through reduction gears, to stand No. 5. The four stands of the finishing mill are each driven on individual 800-hp. motors of similar design, but different speeds, which are directly connected to the rolls.

Power to operate the whole mill is furnished by two synchronous motor generators, each consisting of a 2300-kw. 600-volt, compound wound direct current generator direct connected to a 3300-kva. 2200-volt, 60-cycle, 3-phase synchronous motor. The main shunt fields of the generators and direct current motors are separately excited from a 250-volt circuit. The electrical equipment was built by the General Electric Co.

Principles of the Control

The control which makes this drive possible does not work on the principle of maintaining a given ratio between stands, but maintains constant any speed at which a given motor is set; since each motor speed is constant, the ratio between stands must be constant. It is evident that this scheme is much simpler and more readily set up than one depending on change gears and cone pulleys.

On the shaft of each direct current motor is mounted a small alternating current "pilot" generator. The field of these generators is controlled through a voltage regulator which maintains constant excitation. Therefore the delivered voltage of any generator will be strictly proportional to its speed, which is that of its motor.

Adjustments of the speed on any individual motor are made from the pulpit of the mill by means of three rheostats, one being motor driven. The latter changes the resistance in the motor field and adjusts the voltage regulator coil circuit simultaneously. The second makes small changes in the resistance of the pilot generator field. The third is used as a "range finder" in connection with a meter in the operator's pulpit, to keep the regulator operating in approximately the middle of its range. The combination of the three gives what practically amounts to an infinite number of points, or a continuous curve between the maximum and minimum speeds of the motor, the regulator automatically maintaining any speed at which the motor is set. In addition there is mounted in the pulpit a special voltmeter for each motor, calibrated in r.p.m., and actuated by the voltage of a tachometer generator. These meters are particularly useful when a new set up of the mill is being made, and also serve as speed indicators while the set is in operation.

That this control will hold the motor speeds constant under changing load conditions, and will not allow the speed ratio to vary enough to cause loops or to pull the strip, was demonstrated in preliminary tests at the factory before the order was placed. Experience with the apparatus in actual production has fulfilled expectations. The mill may be set up for a different product in 15 or 20 minutes and the first piece is put through at full speed.

The control is so simple and easy to operate that the regular operators experienced no difficulty in handling the equipment. In fact, the first day of operation, in spite of the numerous delays for minor adjustments such as are always necessary when breaking in new machinery, the mill produced 130 tons of strip for shipment.

How Earlier Mill Speeds Were Controlled

Previous Morgan continuous strip mills have been driven from two or more sources of power and the ratio of roll speeds fixed by gears on the roughing and intermediate stands and by belts and pulleys on the finishing stands. It is evident, therefore, that, since the gears and pulleys were almost never changed, the only possible way to change the draft in any stand was to change the size of the roll. In other words, starting with a given sized billet, the reductions made in the various stands of a continuous mill were fixed and built into the mill. These can not be the drafts best suited to all the products to be rolled on that mill.

The ideal continuous mill would have individual drive for each stand, at least on the finishing end, thus allowing the use of any desirable combination of speed and draft. This has been done for many years on cold strip mills, where the speeds are very low and the distance between stands comparatively large, so that a change in the speed ratio of any two stands does not quickly stretch the metal or form a loop too large to handle. But a high speed hot mill such as that at Trumbull, finishes at speeds around 2000 ft. per min., and the distance between stands is 8 or 9 ft.; therefore the speed ratio between stands must be maintained with an accuracy closely approximating that of gearing.

*General Electric Co., Schenectady, N. Y

Cornell Pittsburgh Reunion

A "flying squadron" of members of the Cornell University Association of Western Pennsylvania will visit Cleveland, Cincinnati, Detroit, Buffalo, Baltimore and Philadelphia to invite Cornell graduates personally to go to Pittsburgh for the approaching Cornell reunion, Oct. 13 and 14. A. W. Wyckoff, president Wyckoff Drawn Steel Co.; William Metcalf, formerly president Braeburn Steel Co.; William K. Frank, Damascus Bronze Co.; C. M. Yohe, Pittsburgh & Lake Erie Railroad; Thomas Fleming, Oil Well Supply Co. and Karl W. Gass, Fort Pitt Engineering Co., the committee, each will spend a day in one of the cities named. Graduates more distant are being invited by mail.

Sheet Shipments Delayed

YOUNGSTOWN, Oct. 3.—A sheet maker reports it has between two and three weeks' output in its warehouses awaiting shipment, and predicts temporary operating suspension until rail situation clears.

Eight sheet mills of the Trumbull Steel Co., suspended for three weeks because of breakdown in motor drive, have resumed.

Iron the Main-Stay of Present Day Life

Fundamentals in the Metallurgy of Steel Stated in Terms of Familiar Speech—What Electrical Development Owes to Iron—Steel the Modern Supplanter

BY J. S. UNGER*

EVERYTHING this world of ours contains is made up of one or more of the 80 odd elements discovered by scientists up to the present time. I shall confine my remarks to but one element, iron, which in my opinion is the most important metal of all.

Many persons do not understand that the term "iron" is a general word describing the three common forms of iron, but believe that steel is something entirely different from iron. There is a slight difference in the three forms, but all are made from the element iron, varying from 92 per cent to more than 99 per cent of pure iron. When we speak of a hat we may refer to a straw hat, a stiff derby or a soft brown hat, but all are hats. In the same way, when we refer to iron, we may mean wrought iron, steel, or cast iron.

When Thales, the Grecian philosopher, about the beginning of the Christian era, found that after rubbing a piece of amber with a silk cloth it would attract small pieces of paper or cotton, he gave this effect the name electricity, from the Greek word electron, or amber. Doctor Gilbert, during the reign of Queen Elizabeth, produced the same effect by rubbing glass, wax, shellac and other substances. If you will rub your fountain pen on your coat sleeve you can duplicate these experiments.

About the middle of the 18th Century, Galvani, an Italian anatomist, found that by touching different parts of the body of a dead frog with separate pieces of wire and bringing the ends together, the legs of the frog twitched violently. During the 18th century, our own Benjamin Franklin, without knowing that he was risking his life, showed that electricity was present in the storm cloud. From such humble beginnings to the modern 50,000 hp. electric generator, is a giant stride. Further, this amazing development has taken place within the last 60 years. The middle aged members of my audience can recall when the only commercial use made of electricity was the telegraph. Then came the early telephones, and the arc lighting of large buildings and streets, and later incandescent lighting. As the electric motor was perfected, it was followed by the electric street car, this being an electric development within the history of almost everyone present.

Electricity Made Effective by Iron

I want to say that if it were not for iron, a strong, cheap metal, from which you construct your electric machines, and from one single property possessed only to a very slight extent by a few other metals, and by iron almost alone, electric machinery, as we know it today, would not exist. This particular property is that of being magnetized. This very banquet hall could not be as efficiently lighted, the elevators would probably be slower moving mechanical devices, the ventilating fans cumbersome, the street cars on which you came, horse or steam drawn, while your automobiles would be few in number, probably propelled by steam. Why this very association and your exhibition, together with all kindred associations, would not be in existence. You owe it all to the fact that iron and practically iron alone can be magnetized. I am bringing this out as strongly as I can to show the electrical engineer that his very art depends on the production and magnetism of iron. I am aware that certain alloys composed of metals which alone are not magnetic, such as copper, aluminum and manganese can be magnetized, but not as strongly as iron. The cost of such alloys, their brittleness and difficulty of fabrication would almost prohibit their use.

Beginnings

Little is known about the early history of iron. It is probable that gold and silver, being found by the ancients in the metallic state, were first discovered. After primitive man discovered how to make and use fire, the four common metals, copper, lead, iron and tin, were discovered.

Some historical writers are unwilling to admit iron was made by primitive man. One writer calls attention to the many legends of the ancients, claiming iron came from heaven and attempts to show that meteorites falling from the sky with a rush of fire and a loud noise would so impress primitive man as to cause him to believe it was an act of some god they worshipped who lived in the sky.

He further tries to show that the peculiar markings, figures, or striations on the famed Damascus sword blades were simply the Widmanstätten figures observed in all meteorites, caused by the difference in appearance of the two metals, nickel and iron, of which they are composed. I might add that the estimated weight of all known meteorites has been computed to be about 400,000 lb.; the largest one, of over 100,000 lb., lies in the Sierra Madre mountains in Mexico. Most of these meteorites are lying where they fell and could not account for the ancient iron articles found. Iron has been found in the pyramid of Cheops in Egypt, whose age is estimated at over 5,000 years.

According to this authority, iron used before 1200 B. C. was obtained from these sources, meteorites, by chance production of a camp fire, a flash of lightning, or a forest fire. However, we have at Delhi in India a wrought iron column which, from the inscription cut into the metal, archaeologists have determined dates from 900 B. C.

As an example of early iron it is remarkable, being a piece which is considered quite large even at the present day. This column, which is almost 3000 years old, is 24 ft. long, 21 ft. above the foundation, 16 in. in diameter and weighs over 13,000 lb. This column is in a fair state of preservation, showing that the iron workers of India possessed great skill in making iron in large masses and forging it into shape. Such a feat is envied by many of the modern iron manufacturers.

Common Forms of Iron

The metal iron exists in the arts in three common varieties, cast iron, wrought iron and steel. Absolutely chemically pure iron is unknown, as it is practically impossible to produce such material. Iron is usually found combined with many other elements, the principal and the one affecting its properties most strongly being carbon. When iron contains very little carbon, it is soft and ductile and can be easily bent and welded and is called wrought iron. Iron containing one ounce carbon to 100 lb. of iron is a soft, ductile material, almost like wrought iron, while that containing from 1 to 1¼ lb. is hard steel, such as can be tempered and made into springs, files or knives. When the carbon is raised to from 2½ to 4 lb. for every 100 lb. of iron, the metal can not be forged, but must be cast in a mold from a molten condition to obtain the desired shape. This va-

*Dr. Unger, the well known head of the research bureau of the Carnegie Steel Co., gave this address at the convention dinner of the Association of Iron and Steel Electrical Engineers at Cleveland, on Sept. 14. The address is reproduced in full, in view of Dr. Unger's success in putting succinctly, and at the same time investing with new interest and significance, familiar facts in iron and steel manufacture and use.

riety is called cast iron, which is the raw material used in the iron foundries.

Special Properties of Alloy Steels

In addition to the ordinary elements found in steel, other elements are purposely added to give certain qualities.

If but ¼ lb. of copper is added to 100 lb. of molten steel, the finished steel product will not rust nearly so fast as steel without copper.

When 12 lb. of manganese are added to 88 lb. of steel the resulting alloy is very hard and resistant to wear, and in addition very tough. Such steel is called manganese steel and is used in all frogs, switches and crossings of street car tracks, in many of the safes or vaults used in banks, and for many other purposes for which a hard, tough material is desirable.

When nickel up to 5 per cent is added to steel it increases the strength without seriously affecting the toughness. Such nickel steel is used where great strength and a reasonable toughness are necessary, as in guns, armor and large shafts. If the nickel be increased to 36 per cent an alloy called invar is obtained, which has the least expansion and contraction for each degree of heat at normal atmospheric temperatures of any metal known. Such material is used in making clock pendulums, measures, tape lines and other scientific instruments in which the least possible change in length as the temperature changes is essential.

Platinite, a nickel steel with 46 per cent of nickel, has the same expansion as platinum and has taken the place of platinum in the sealing-in wires of electric light bulbs with a great reduction in cost.

When 3 to 4 per cent of silicon, an element only one-fourth as heavy as iron, is added to steel it produces a very valuable alloy used in the manufacture of steels having certain magnetic and electric properties, and is employed in electric generators, motors and transformers, resulting in a very marked decrease in their weight. This steel is of particular interest to the electrical engineer.

Our magazines and newspapers contain articles relating to rust-resisting steels, sold under the trade names of stainless, flameless and resisto steels. Such steels are made by adding a high percentage, about 14 per cent of chromium, or chromium and nickel, to steel, which prevents rusting. Kitchen utensils, cutlery and other implements of such steels are coming into common use.

Physical Properties of Iron

An average piece of cast iron 1 in. square will break when a load of 20,000 lb. is applied. A similar piece of wrought iron has about twice this strength, or 40,000 lb. One square inch of soft steel will break at 50,000 lb. By adding carbon and other elements and heating and quenching the steel, its strength can be raised to over 300,000 lb., or a 1-in. square piece of such steel is as strong as a bar of soft steel 6-in. wide by 1-in. thick.

Steel is furnished in sizes from large masses weighing over 100 tons, such as the modern 16-in. gun or large armor plate, down to the smallest needle, or the small screw used in a watch, hardly visible to the eye.

New Uses for Steel

Steel is rapidly replacing wood, stone and bricks for many purposes. Your sky-scrapers, large bridges, large ocean steamships, and modern war materials are made possible by the use of steel. Without steel they could not exist.

Wood is becoming scarcer and more expensive, and the principal substitute is steel. Before many years the wooden railroad tie will disappear and be replaced by the steel tie. At this time this is true in some European countries. Steel furniture, steel packing boxes, steel telephone and telegraph poles and many other articles will replace wood.

Very few railroad cars are now made of wood. Your street cars and automobiles are made of steel. These new uses for steel, together with the increase in size and weight of many articles now made of iron or steel, and the increased use of steel in such countries as India or China, which use very little steel in proportion to their populations, makes the question of the future supply a serious problem.

In passing, it may be well to refer to the amount of steel consumed annually in the ordinary crown cap used to close bottles containing mineral waters, ginger ale or soft drinks of various kinds. The annual consumption is more than 500,000 boxes of tin plate or over 25,000 tons.

It may surprise you to learn that the women of the United States carry around every year about 4500 tons of wire in their hats and 7000 tons of steel in their corset stays. When this is translated into figures that all may comprehend, it means this tonnage of steel would fill 7 freight trains of 33 cars each, each car containing 50 tons of steel. The amount of steel consumed in small tacks, shoe nails and carpet tacks is about 30,000 tons annually or sufficient to fill a string of freight cars 7 miles long.

One-third of the world's population, or 500 million people, consume annually over 75 million tons of steel, or at the rate of one ton for every 7 people. When the entire world's population of 1½ billions consume steel at the same rate, which must be the result as civilization advances, the world must produce 2/3 million tons of steel every day. This enormous consumption will soon exhaust the rich iron ore beds of Central Europe, Norway, Russia, China, India, the United States, and Cuba and Chili. Beds of iron ore now considered entirely too poor to be worked will be worked before the middle of this century. The progress of civilization, in fact the future of the world, will largely depend on the ability of posterity to find an adequate supply of iron ore and of fuel, from which iron, the most important metal in the world, can be made.

Outing of New England Iron and Hardware Association

The New England Iron and Hardware Association held its annual fall outing at the Tedesco Country Club, Swampscott, Mass., Tuesday afternoon, Sept. 19. Considerably more than 100 members attended and the outing was one of the most successful ever experienced. The afternoon was given over to a golf tournament, the number participating being large. Play continued until late in the evening, following which dinner was served.

Myron B. Damon, Fitchburg Hardware Co., Fitchburg, Mass., president, presided. He introduced Austin H. Decatur, Decatur & Hopkins Co., Boston, president of the national body of hardware jobbers, who spoke briefly on the good fellowship evident at the gathering. Mr. Damon then called upon Harry L. Doten, chairman of the golf committee, to award the prizes. A. Perley Chase, Chase, Parker & Co., Boston, having the best gross score, won the distinction of having his name engraved on the president's cup, which must be won three times before it becomes the personal property of a contestant. Mr. Chase also was awarded a large silver platter. Paul Avery, Avery & Saul, Boston, with the best net score, was awarded the Loomis Cup for 1922.

Program of Farm Equipment Manufacturers' Convention

The program of the twenty-ninth annual convention of the National Association of Farm Equipment Manufacturers, which will be held at the Congress hotel, Chicago, Oct. 18 to 20, has been announced. Among the speakers will be C. H. Markham, president Illinois Central R. R., Chicago; F. R. Todd, vice-president Deere & Co., Moline, Ill., who will talk on "The Present and Future of the Implement Industry"; T. F. Wharton, secretary and controller, Deere & Co., Moline, who will speak on "Depreciation"; W. H. Stackhouse, general manager French & Hecht, Davenport, Iowa, whose address will be on "Industrial Freedom."

The McMyler Interstate Co., Bedford, Ohio, has become engaged in locomotive repair work on a limited scale and will install some additional equipment to handle this work.

Forming Gear Teeth by Hot Rolling

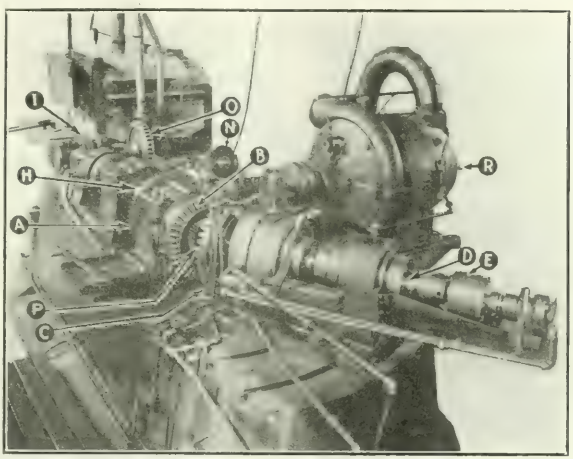
Improved Machine Finishes Teeth Complete in One Operation—Accuracy and Increased Output Features—Construction Outlined

IN THE IRON AGE of Nov. 3, 1910, the first gear rolling machine built by H. N. Anderson was described, and in the issue of April 10, 1913, important changes and improvements were announced. It is said to have been Mr. Anderson's original intention to use the tooth-rolling operation simply as a substitute for the gashing operation in gear cutting, the teeth being finished by a light generating cut or by grinding. The results obtained by the pioneer machine were said to indicate, however, that a gear rolling machine could be constructed to produce in one short operation gearing of extreme tooth accuracy.

A line of three gear rolling machines for the production of a wide range of spur and bevel gears and designed to finish the teeth completely in one operation, leaving only the cleaning up of the diameters, back faces, etc., by the usual automatic machine operations, is now being offered by the Anderson Rolled Gear Co., Cleveland.

In this process the teeth are formed by the molding-generating action of a hardened and accurately ground master-gear die that leaves the tooth surface highly polished and free from scale.

It is claimed that the hot-rolled teeth are superior in strength, finish, accuracy of form and wearing qualities. Economy and rapid production are naturally emphasized. The rolled gear blanks can be proportioned to effect 20 to 40 per cent saving in material, and are considered simple to forge. The operation requires one man as a machine operator, and one as a heater, intelligent laborers being qualified to do the work.



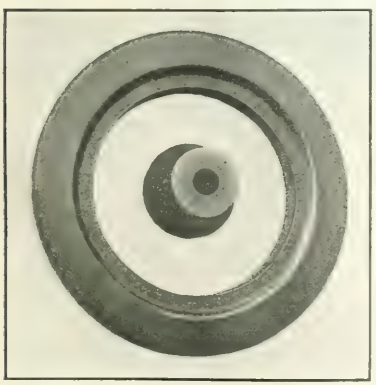
Anderson Machine for Making Bevel Gears by Rolling Teeth in a Blank Held at *C*

The output of one machine is found to be 60 to 90 gears an hour, which is calculated to be a saving in time of 90 to 95 per cent and a saving in labor cost of 25 to 80 per cent as compared to cutting methods of making.

The accompanying illustrations show the bevel gear machines. Both the die shaft and the blank shaft are positively driven through timing gears separate from the blank and die, and held continually in full mesh. The timing gears constrain the forming gear or die and the plastic blank to roll on one another in positive synchronized contact without transmitting driving power and thus eliminating the slippage and tooth distortion of early designs.

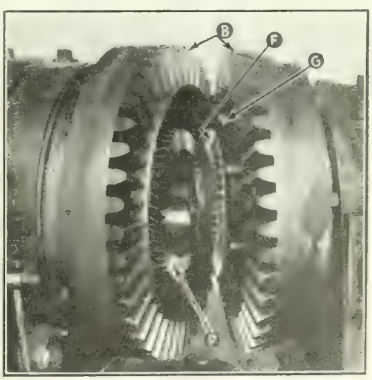
The component elements of the machine include two quills, one of which receives power from the motor through a pair of bevel gears, shown at *A*, and transmits it, through the heavy timing gears at *B*, to the other quill. Means are provided for adjusting the timing gears in mesh, so that there is no back lash between them. In the bevel gear machines one quill may be swung around the pitch cone center, *C*, for various gear settings, the angular adjustment overlapping to provide the full range from 0 to 90 deg.

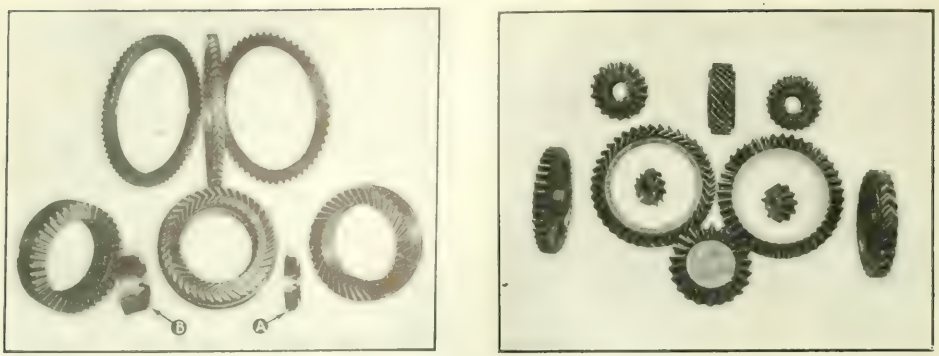
A "blank shaft," seen at *D*, is slidably mounted in one quill, and keyed to it. A pneumatic or hydraulic cylinder, *E*, mounted on the end of this shaft, actuates a piston, which extends through the shaft to clamp the gear blank, *F*, in the blank holder, *G*, on the other end of the shaft. The "blank shaft" may be adjusted endwise in its quill to accommodate blanks and blank hold-



The Gear Blank *F* Is Clamped in the Holder *G*. At *P* is the die to be duplicated, and *BB*, the timing gears, are kept in mesh without back lash

At the Left Are Shown Blanks for a Bevel Gear and for a Bevel Pinion





Hot Rolled Gears of Various Types and the Dies Used in Rolling Them

ers, which may be of various thicknesses, as required.

At *H* is shown the die shaft, which is slidably mounted in the other quill, and keyed to it. This shaft may also be adjusted endwise for dies of various thicknesses. To advance the die shaft gradually in its quill and with a smooth, positive motion, a cam and roller, shown at *I*, are provided.

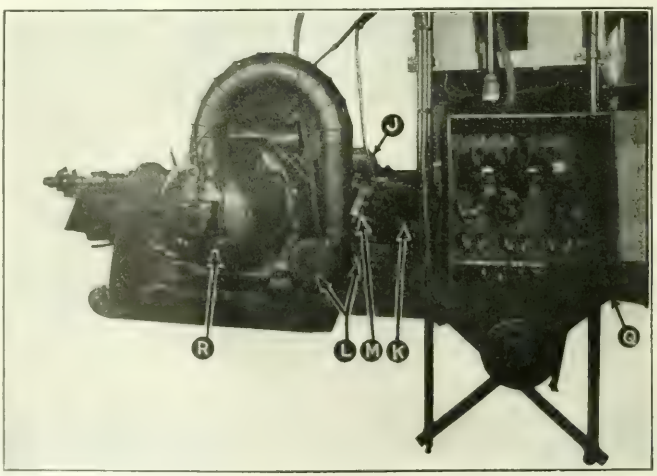
The drive for the cam seen at *O* is taken from an oscillating shaft at *N*, and passed through a ratchet mechanism seen at *M* in the rear view, that changes it to one-way motion. The advance of the cam is proportional to the movement of the main shafts, so that when they slow down and stop during reversals, the cam does likewise. The action of the cam is to advance the die rapidly to contact with the blank; to advance it gradually and to hold it at full depth while the tooth is taking permanent form and is cooling below its critical temperature; to step the die back slightly for one revolution; and to withdraw it quickly. The withdrawal is by a spring or by a return cam. The total cam cycle for rolling one gear is about 20 sec. End thrust on both shafts is taken on roller thrust bearings.

To build up the structure and profile symmetrically on both sides of the teeth, oscillating the two main shafts by repeated reversals in the direction of rotation was found necessary. This motion was previously effected by mechanical means but in the new machine is accomplished electrically by special motor equipment designed by the General Electric Co., and an adaptation of its planer-drive device. The total time of rolling a gear has been decreased by this equipment.

At *J* in the rear-view illustration may be seen the control board with three push-button boxes which provide the necessary flexible control. From one box the machine can be controlled to drive continuously forward or reverse and may be stopped at will, another box controlling the jogging of the machine slowly either forward or in reverse to provide small movements of the shafts during die set-ups, etc. The third box controls the automatic operation with its oscillating motion.

Pushing the start button causes the motor to turn automatically a pre-determined number of revolutions in one direction, stop, turn in the opposite direction, stop, reverse, and so on until the stop button is pushed. A limit switch, seen at *K*, driven by a one-way moving part of the machine, controls these automatic reversals. Its segments are arranged so that the die makes one and a fraction revolutions on the blank in each direction, but one of these overlaps is longer than the other so that the point of reversal on the blank moves around the blank as it is rolled. This distributes uniformly the slight cooling effect of the reversals around the blank.

The starting of the motor, bringing it up to speed, and stopping it, is accomplished in ½ to 1 sec. The motor rating is 12½ hp. at 150 r.p.m. The corresponding shaft speeds are 100 to 150 r.p.m. The operating panel with the solenoid contactors which effect the various operations, shown at *Q*, and the motor, seen at *R*, are entirely inclosed and equipped with forced ventilation and lubrication as shown at *L*.



Oscillation of the Two Main Shafts by Repeated Reversals of Rotation Is Done Electrically with a Mechanism Shown in This Rear View of the Machine

The blank holder is cooled with water during the brief space between rollings, and while rolling a baffle plate is interposed between the die and the blank, and water is directed on the face of the die, which serves to cool it. The water also acts to wash scale from the die, and the film retained on the die teeth as they enter the blank tends to loosen the scale on the blank, while the speed of rotation, aided by a fine blast of air from behind the intersection of the die and blank, serves to throw off the scale. The rolling is timed to continue until the blank is cooled below its critical temperature, when no more scale is formed. The temperature contrast between the hot blank and the cool die acts as a lubricant between them, and causes the rolled gear teeth to be formed with a tough and polished surface.

The gear blanks are used as they come from the drop hammers, with commercial forging tolerances. It is said to be unnecessary to maintain sharp edges, and

the hammer dies can be used for longer runs. The blanks are designed with a thickness about equal to that at the pitch line of the finished gear, as the metal is displaced both ways. This is said to effect a 20 to 40 per cent saving in material over a cut-gear blank. The edges are beveled so that the advancing die will cut through the metal and cause it to be extended endwise along the die teeth, the blank-holder allowing a certain space for free egress of the metal beyond the ends of the teeth. The blank is heated to about 2000 or 2100 deg. Fahr. and is clamped in the holder, which is designed to restrict the expansion of the blank while it is being rolled, and permits of its quick removal.

Dies Have Plane-Surface Tooth Profiles

The die shown at *P* in the detail view is in the form of a master gear with plane-surface tooth profiles similar to those of the involute rack teeth. The teeth of this form can be machined, hardened, and ground true to profile, with the utmost precision, permitting accurate redressing at minimum expense. The speeds of the die and blank are synchronized at the rotary speeds of their engaging pitch surfaces, through the heavy timing gears. There is no driving action between them, and as the die teeth are constrained to enter the blank on radial lines and in the same relative position at each successive revolution, there can be no distortion of the teeth formed. The temperature of the die is not appreciably raised during the rolling of a gear and the proportions of the die teeth are based on the expanded dimensions of the rolled gear at its critical temperature.

Bevel gear dies are made with the nearest whole number of teeth less than the crown gear. Theoretically this tooth should have a slightly curved profile, but it is ground to the plane surface. Thus the die tooth is correct at and near the pitch line, but is slightly too thick at the top and bottom. This rolls a tooth with the slight clearance above and below the pitch line. A true octoid crown die is shown at *A* in the illustration of the dies, the relieved die shown at *B*, however, rolling a better gear. The die is redressed by grinding 0.010 in. off the tops of the teeth and bottoms of the spaces, and the proper amount off the sides to restore the correct tooth proportions. One bevel-gear die may be dressed down 1½ in. and as 300 to 500 gears may be rolled with one dressing, one die will roll 30,000 to 60,000 gears or more.

Spur-gear dies are in the form of a circular rack 2 ft. in diameter. As the pitch of the average quantity-production spur gear is rather small, when it is divided into so large a circumference the resulting tooth profile so nearly approximates a plane surface that the difference is just sufficient to provide the requisite clearance above and below the pitch line of the rolled gear. Dressing these dies reduced their diameter, but this is compensated for by reducing the thickness of the teeth and spaces in proportion to the reduction in diameter. This die may be reduced more than ¼ in. in diameter without affecting the interchangeability of the gears produced, and because of the large number of teeth in the die the intervals between dressings is several times that of the bevel die.

During the rolling of a gear the hot metal of the blank is gradually worked by the advancing die under five to 20 tons pressure, which is said to cause an advantageous rearrangement of the structure of the metal. A dense fibrous structure is forged into a trussed formation about the periphery of the blank, serving to tie the teeth to the body of the gear to help equalize warpage in subsequent heat-treatment, and to give a tough, hard wearing surface to the working faces of the teeth. Laboratory tests and results obtained under operating conditions are said to have shown that a rolled gear tooth is some 25 per cent stronger and 20 per cent harder than a similarly proportioned cut tooth of the same metal.

The strength of rolled gears may be still further increased by retaining the shroud, which is normally formed at the ends of the teeth, tying them together, it is said, in a manner which can not be duplicated by gear cutting. In a gear combination both gears may be half shrouded; the ordinarily weaker member may be finished with a full shroud, removing the shroud from the other gear; or the shrouding on both gears may be proportioned so as to develop the maximum strength of the combination. The strength of gear combinations could, it is said, be increased in many cases 50 to 100 per cent by this means.

The simple straight line profile for die teeth is suitable for both axial and oblique arrangement, so that spur and bevel gears may be rolled with straight or spiral type teeth with equal ease. The spiral type dies are as simply redressed as the straight tooth type, and they roll with much less strain and wear. It is claimed that the rolling process not only makes these gears of a uniformity and strength formerly unattainable, but it reduces their cost by 40 per cent.

The spiral-type dies are also made in two parts of opposite hands, and are joined together to form herringbone dies in either spur or bevel form. These herringbone dies roll an integral gear which it is said promises to supplant the spiral-type gear for many purposes.

Would Increase Rates in Rails

WASHINGTON, Oct. 3.—Request is made in a brief filed with the Interstate Commerce Commission yesterday on behalf of the Baltimore & Ohio, Pennsylvania and Bessemer & Lake Erie Railroads that the commission vacate its suspension order prohibiting the carriers, pending investigation, from putting into effect sixth class rates on new iron and steel rails and cross ties from certain producing points in the United States to Canadian destination. It is proposed by these tariffs, which affect rates that have been the object of a long controversy between rail makers and American and Canadian railroads, to substitute sixth class for commodity rates, which would have the effect of increasing rates about thirteen per cent from some rail making points in the United States. The sixth class rates already apply from Youngstown, and Lorain, Ohio. The protestants are the Cambria Steel Co., Carnegie Steel Co., Lorain Steel Co., United States Steel Products Co., and the National Tube Co. The new rates proposed were filed to apply from points in Maryland, West Virginia and Pennsylvania, those specifically under attack applying from Sparrows Point, Md., and Bessemer, Johnstown and Steelton, Pa. An indication of the present rates is that of $3.40 per gross ton from Bessemer and Johnstown to Montreal.

Railmakers have protested against the proposed sixth class rates and have contended they could not meet competition of Canadian manufacturers and producers in England if the rates are increased.

Farrell Plant Resumes

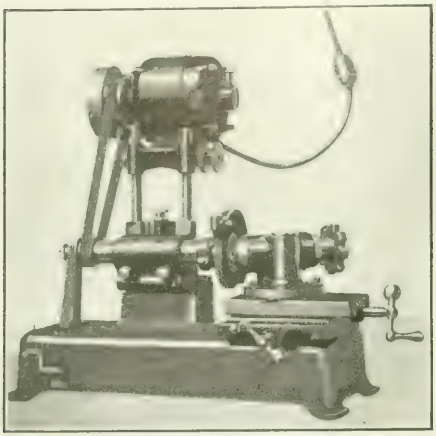
Operations were resumed this week at the Farrell, Pa., plant of the Carnegie Steel Co., idle seven weeks on account of coal and coke shortage. Resumption as scheduled of the three blast furnaces at this property will increase the number of active stacks in the Mahoning and Shenango Valleys to twenty-eight, of forty-seven, the highest operating number in the district this year. It will give the Carnegie company twelve active furnaces, of fifteen in the district.

As iron output gets under way, the company's fourteen open-hearth furnaces at Farrell will be charged. Enlarged production of semi-finished steel will enable the Mercer works of the American Sheet & Tin Plate Co. to operate on a broader basis.

Charles A. Moffett, president Gulf States Steel Co., Birmingham, Ala., who has spent a month on the Pacific Coast and in the Rocky Mountains, says connections on the West Coast for the marketing of Alabama iron and steel products are on a firm and permanent base. The large and regular movement of cast iron pipe, pig iron and steel products via ships out of Mobile at low transportation charges has served to build up a large and stable business, which he now regards as of a permanent nature.

Sapihl Portable Electric Grinding Machines

The General Tool & Equipment Co., Chicago, has put on the market a portable electric internal and external grinder for attachment to engine lathe, milling machine, shaper, etc., and a portable electric valve grinder which consists of a tool post grinder mounted on a base for valve grinding. The machines are manufactured by the Sapihl Electric Tool Co., Galesburg, Ill. An outstanding feature of the Sapihl tool post grinder is that the motor is held above the spindle on two supports and power is conveyed by belt from motor to spindle. This arrangement was made to prevent motor vibration from being carried to the work. The motor is furthermore specially built for speed and endurance. The grinder is made in two types, the No. 1 type having a ⅛-hp. ball bearing motor and the No. 2 type a ¼-hp. motor. Two sets of double row S.K.F.



The Portable Electric Valve Grinder Consists of a Tool Post Grinder Mounted on a Base for Valve Grinding

self-alining ball bearings are located in the spindle, one set next to the pulley and the other at the wheel-holding end.

The motor is held in position by a lock screw which is pressed against one of the two supports. The motor is lowered or raised by a knob operating a rack and pinion, one of the two motor supports serving as a rack.

The base is a solid steel casting of L-shape construction with a 1⅞-in. hole to fit over the tool post of a lathe. It is milled and ground for dovetail wheel slide base. Attached to the base also is a micrometer screw with collet graduated to one-thousandth of an inch and capable of moving the wheel slide base vertically to a delicate adjustment.

Both types of grinders are supplied with an extension for internal grinding. On the No. 1 type the emery wheel for external grinding is ⅜ x 4 in., while a ¾-in. diameter wheel is used for internal grinding. The speed of the spindle for external grinding is 6500 r.p.m. and for internal grinding 22,000 r.p.m. The No. 2 type carries a ½ x 6-in. wheel for external and a 2-in. wheel for internal grinding. The spindle speed for external work on this type is 4000 r.p.m. and for internal grinding 12,000 r.p.m.

Only the No. 1 type is mounted on the valve grinding attachment. It is detachable and is fastened to the attachment by a cast-iron washer and a ⅝-in. cap screw. A carriage on the attachment having both longitudinal and cross feeds carries a revolving head on which the work is mounted. On the end of the head is a nut for a draw-in collet. The head is equipped with two sets of ball bearings and rotates at 175 r.p.m. in a direction opposite to that of the grinding wheel. At the base of the head is a dial graduated up to 90 deg., so that the work can be accurately set at any angle within that range. A lock clutch on the attachment permits the operator to throw the head in or out while the motor is running.

The Sapihl grinder with valve-grinding attachment is sold largely to garages and service stations for valve grinding. Ordinarily valves are ground with the head of the attachment set at 45 deg. The standard No. 1 and No. 2 external and internal grinders are used for making tools, dies, special bushings, milling cutters, and in industrial machine shops for a large variety of work which does not justify the use of special purpose grinding equipment. It may also be used as a bench grinder as it can be readily moved from one place to another, being self-balanced and capable of standing without being fastened to another machine.

Motion Study Data Exhibited

An exhibition of management and motion study data including photographs and process charts, route models and motion study apparatus was given Sept. 21 to Oct. 1, at the Newark Museum, Newark, N. J., by Frank B. Gilbreth, Inc., consulting engineer, Montclair, N. J. The exhibition was well attended by executives, engineers and others interested in the problems of management, and representatives of the company were present to explain the various photographs and models. A large part of the photographs were 48 in. by 52 in., and many were enlargements from motion picture films.

An interesting exhibit was the picture of a girl in the act of making cores, selected as being the best operator. The picture was entitled "Capturing Skill," and revealed the motion which was responsible for high efficiency. Having thus found the one best method the motion was taught the other operators, and in this way the breaking of cores was greatly reduced.

A picture of a route model to scale of a factory, showing the present and proposed position of machinery, which was indicated by colored pieces of paper, was exhibited, the routes of the material being mapped out by colored strings. In the line of fatigue elimination a special one-purpose work bench, designed after a study of the operation in the laboratory, and said to have reduced the number and lengths of motion necessary to perform the job, eliminating greatly the fatigue formerly experienced by the worker, was shown. A Barney foot-rest barrel in use was shown in an enlarged photograph.

Molybdenum as an Alloying Element

The work on molybdenum as an alloying element in steel, conducted at the Ithaca, N. Y., field office of the U. S. Bureau of Mines, in co-operation with the Vanadium Corporation of America, will be continued in the present fiscal year as a Bureau of Mines problem. The object of this work is to add to the technical information on the value of molybdenum, one of the few elements entering into true alloy steels of which the United States possesses an abundance of high-grade ore, readily mined and handled. Besides the more common physical tests, single-blow impact and repeated impact tests have been made by the Bureau of Mines on the molybdenum and on comparison alloy steels in co-operation with the Wyman-Gordon Co.

Chief attention has been given endurance tests. This work has been expedited by conclusions drawn from the recently reported work on endurance testing at the University of Illinois and at the Naval Experiment Station. As the alloy steels are of much value when heat-treated to give high tensile strength and hardness, and as the investigators above mentioned have worked mainly with plain carbon steels or with alloy steels not heat-treated to great hardness, especial attention was paid to molybdenum and other alloy steels so treated as to give great strength. The making of the steels and the heat treatment and preparation of test bars have been completed. Actual endurance testing remains to be done before complete conclusions can be drawn.

Further study is also to be made on the relationship of the "rise of temperature" method of endurance testing, and the regular method of actually testing the steels to destruction by long-time tests.

British Meeting on Non-Ferrous Metals

Corrosion, Brasses and Bronzes for Superheated Steam Work and White Metal Bearing Metals Discussed at Meeting of Institute of Metals

SWANSEA, Wales, Sept. 21.—Swansea—where the Institute of Metals held its autumn meeting from Sept. 19 to Sept. 22—is one of the oldest and most important metallurgical centers in Great Britain, chiefly through its copper smelting industry. Copper smelting was first carried out at Neath 300 years ago, and in 1717 it was commenced at Swansea by Dr. Lane. Later the industry passed into the hands of the Vivian family, under whose control it still largely remains. Sheet steel, galvanized iron and tin plate manufacture are now extensively carried on in the neighborhood of Swansea, which is generally regarded as a link between the ferrous and non-ferrous metal industries, for practically the greater part of the non-ferrous metals in which the institute is closely interested are manufactured there.

Leonard Sumner, the president of the Institute of Metals, presided over the meetings, and the announcement made on the opening day that he had been nominated for re-election for another year was well received. F. W. Gilbertson, president of the South Wales Siemens' Steel Association, was unable to be present during the earlier part of the week, but the arrangements which he and a local committee had made for the reception of the visitors contributed largely to the success of the social side of the gathering.

The first annual lecture on subjects of practical interest to those engaged in the non-ferrous metals industry was delivered by Dr. R. S. Hutton, who chose as his subject "The Science of Human Effort." He described health, strength, comfort, environment and training as essential conditions for the satisfactory exercise of human effort. During his illustrations he stated that the percentage of deaths due to phthisis among grinders and in the general population of Sheffield was in the five years, 1908 to 1912, as follows: grinders 51.2 and general population 7.7 per cent; in the five years 1917-1921 the figures were grinders 37.8 per cent and general population 7.6 per cent. With regard to the need for good ventilation Dr. Hutton pointed out that the percentage reduction in summer in tin-plate rolling varied from 3 per cent in works where the state of artificial ventilation was good to 13.4 per cent where there was no artificial ventilation, the natural ventilation being poor. He also referred to recent investigations concerning time and action study applied to metal polishing, pointing out that time could be saved after instruction by specially trained workers who had previous experience in the trade.

Nature of Corrosive Action

The business side of the meeting commenced on Wednesday with the reading of a report prepared by Dr. G. D. Bengough and J. M. Stuart on "The Nature of Corrosive Action and the Function of Colloids in Corrosion." His report attempts to present a general discussion of corrosive phenomena, based on the study of several different metals, and to examine how far the electro-chemical theory of corrosion (usually called the electrolytic theory) can account for the observed phenomena. Corrosion is defined in the report in its widest sense as the oxidation of a substance. Facts which are difficult to explain on a purely electro-chemical theory are the following:

1. Certain depolarizers do not increase corrosion, but actually inhibit it.
2. The conductivity of electrolytes is not directly connected with the amount of corrosion.
3. Lambert's pure iron (probably the purest metal ever produced) was found to be readily attacked by sodium chloride solution and dilute acids.
4. According to the electro-chemical theory, the presence of ions of the corroding metal should depress the corrosion of most of the common metals. There are, however, numerous exceptions, and in some cases the presence of such ions actually increases corrosion.

As regards the effect of impurities on the corrosion of metals, a trace of impurity appears to assist local corrosion, but the amount of corrosion is not proportional to the amount of impurity. Even the presence of graphite does not appreciably stimulate the rate of corrosion of iron. The effect of a trace of impurity is probably a trigger action.

On the electro-chemical theory the action of oxygen is that of a depolarizer. It can be shown, however, that atmospheric oxygen has very little depolarizing power at ordinary temperatures. The main function of oxygen in corrosion is to oxidize directly the metal, and also in some cases the products of corrosion.

Two chief types of corrosion are distinguished: (1) The general type, usually characteristic of acid corrosion; (2) the local type, usually characteristic of corrosion in water and salt solutions. The second type is generally characterized by the formation of an adherent scale on the metal, and this scale may contain colloid.

A theory is developed regarding the part played by colloids in corrosion, and this theory may be briefly outlined as follows:

A metal immersed in water sends positively charged metal ions into the liquid, and becomes itself negatively charged. In the case of ordinary commercial metals, the metal also becomes superficially oxidized if dissolved oxygen is present. The hydroxide produced by this oxidation can take up the ions given off by the metal, and the hydroxide thereby passes into the state of a positively charged colloid. Some of this colloid will diffuse away, permitting further reaction between the oxygen and the metal surface, and thereby reforming the hydroxide film over the latter. Oxidation is then stopped till this hydroxide can pass into the colloidal state by acquiring positively charged metal ions. This, in general, does not take place till the colloid initially formed has diffused into the presence of electrolyte, when it is precipitated by the union of the dissolved salt, the action neutralizing the charge on the metal corresponding to that on the colloid. This allows the metal to send more ions into solution, and the uncharged hydroxide thereby acquires a charge. If the colloid so produced can diffuse away, the process can continue and corrosion develop.

For steady corrosion, therefore, the colloid must be produced under conditions which allow it to diffuse some distance from the metal before precipitation. If it precipitates directly on the corroding surface it will, in general, adhere to the latter and stop corrosion.

Prof. H. C. H. Carpenter, who opened the discussion, mentioned that the Brass & Copper Tubes Association had increased its contributions to the research fund from £300 to £500 annually. The Department of Scientific and Industrial Research had made a large grant toward the work, and it might be said that a stage had now been reached when the value of the work was becoming more and more widely recognized. He thought that the conclusion of Dr. Bengough and his collaborators tended to show that there was no solution to the corrosion problem and that no metal was really unoxidizable, but he did not share that view.

U. R. Evans expressed satisfaction that the authors of the report laid stress on the physical character of the corrosion product in determining the persistence of corrosion. He dwelt at length on the theories of corrosion.

W. H. J. Vernon put in a plea for the simplification of corrosion nomenclature, the need for which no one familiar with corrosion literature would dispute. Either the metal passed into solution in the ionic condition in virtue of its electrolytic solution tension, or the surface of the metal was attacked by molecular oxygen already present in solution.

Effect of Superheated Steam on Non-Ferrous Metals

Superheated steam is now very generally used on locomotives, the steam usually leaving the superheater at a temperature of 340 deg. C. Piston tail rod bushes in the Midland Railway practice were originally made of: copper, 87 per cent; tin, 9 per cent; zinc, 2 per cent

and lead 2 per cent, called M. R. A. 1 alloy. This was found to break in service. The cast iron which replaced it was found to score the rods, but a phosphor bronze of the following composition has been found to be satisfactory: copper, 88 per cent; tin, 11 per cent and phosphorus, 1 per cent.

McNamee piston rings of the following composition: copper, 75.5 per cent; tin, 8.5 per cent; zinc, 0.33 per cent; phosphorus, trace; nickel, 0.5 per cent and lead, 15 per cent, are used satisfactorily. These rings are to prevent the steam coming into contact with the white metal packing rings, of the following composition: lead, 70 per cent; antimony, 30 per cent. Recently when the temperature of the steam leaving the superheater has been as high as 425 deg. C, trouble has been experienced with the packing rings fusing. The full heat is only on these parts intermittently.

White Metals

A. H. Mundey, C. C. Bissett and J. Cartland reviewed the principal classes of white metals, their composition and physical properties, chiefly in relation to their uses and manufacture. They find that the chief value of white bearing metals is due to the way in which they maintain the oil film. This is effected by the hard constituents standing up in use in slight relief, the softer matrix thus forming numerous evenly distributed channels, which maintain the oil by capillarity. A single metal, or a metal consisting of a solid solution, will not function as a bearing metal.

The greatest care and skill must be exercised in the handling of bearing metals in practice, otherwise either the hardening constituents will be left in the ladle by liquidation or the metal will be overheated and the structure spoiled.

Sir Henry Fowler, who opened the discussion, said he was under the impression that for aeroplane work—aero-engines—the alloy was not one having tin 93 per cent, antimony 3.5 per cent and copper 3.5 per cent, but one having 86 per cent of tin, 10.5 per cent of antimony, and 3.5 per cent of copper. In locomotive work, where it was important to have a bearing metal which stood up to alternating pressures, the proportions were 85 per cent, 10 per cent and 5 per cent, this was universally used for locomotives and other engines where there occurred repeated alternating pressures. The authors' alloy having tin 20 per cent, antimony 15 per cent, copper 1.5 per cent, lead 63.5 per cent was also used, but the Brinell hardness was lower than the figure given by the authors. If there were no change in the stress this was a very satisfactory metal.

Dr. Walter Rosenhain doubted the "oil channel" formed in the body of bearings. There was, he held, no appreciable difference of level between the hard and the soft surfaces. The crystals were supported in a plastic matrix, and very probably a film of softer substance flowed over the harder and acted as a lubricant, forming a colloid of oil and softer metal.

Mr. Mundey, in his reply, said the paper dealt with representative metals which were actually in use, and the tests upon them were accurate. The figures of physical tests quoted were given so that the engineers could visualize the conditions of the metals they were using.

BRITISH FOREIGN TRADE

August Steel Exports Increase—Imports Second Largest for the Year

The August official data on British foreign trade in steel and iron show that the total exports were 281,954 gross tons. This is an increase of 30,211 tons over July. The August exports make the average for the first eight months 269,884 tons per month. Exports of scrap are included. To Sept. 1, this year, total exports have been 2,073,635 tons against 1,025,312 tons for the same eight months in 1921.

The August imports were 84,003 tons or next to the highest this year, those in January having been 100,178 tons. The average for the first eight months of this year is now 74,881 tons per month. These data also include scrap. The following table shows comparative data:

British Steel Exports and Imports, Gross Tons

	Exports	Imports
July, 1922	251,743	55,893
August	281,954	84,003
Aver. per month, first quarter, 1922	267,047	82,536
Aver. per month, second quarter, 1922	274,830	67,785
Aver. per month, third quarter, 1922	267,271	62,392
Aver. per month, 1921	144,885	152,734
Aver. per month, 1920	274,881	128,685
Aver. per month, 1919	188,519	50,801
Aver. per month, 1913	420,757	195,264

The following table covers the principal exports:

Principal British Exports, Gross Tons

	Month		Eight Months	
	1913	1921	1921	1922
Pig iron	78,771	8,602	3,336	30,643
Rails	[illegible]	14,698	4,848	22,358
Steel plates	11,162	10,673	6,174	6,273
Galvanized sheets	63,506	17,635	10,153	47,404
Tin plates	[illegible]	8,927	4,074	17,533
Bars	[illegible]	18,873	8,787	36,817
Pipes	[illegible]	1,178	388	4,722
Steel sheets	[illegible]	[illegible]	[illegible]	[illegible]
Total exports, first 7 months, 1922				2,159,074
Total exports, first 7 months, 1921				1,025,312

The most marked recovery in the August exports this year over those in August, 1921, has been in pig iron, rails, galvanized sheets, steel bars and tin plates.

Pig iron imports in August were 14,685 tons compared with a monthly average in 1921 of 55,564 tons.

Iron ore imports in August were 295,360 tons which compares with a monthly average in 1921 of 157,298 tons.

Manganese ore imports in August were 29,644 tons. Last year they were 14,405 tons per month and in 1913 they were over 50,000 tons per month.

Greater Use of Rivers for Steel Shipments Is Planned

Of more than casual interest to the Pittsburgh and Wheeling district's steel manufacturers was the meeting of the Ohio Valley Improvement Association in Louisville, Ky., Oct. 3 and 4. Out of this meeting it is expected will come a definite plan for the creation of a company which will construct freight and passenger terminals at various points along the Ohio River from Pittsburgh to Cairo, Ill. The chief hindrance to the more general use of the inland waterways in the delivery of iron and steel products is the lack of dockage and loading facilities at many points along the rivers which are ideally located to be distributing centers, not only in the matter of local supplies but for distant deliveries over the railroads tapping these points.

Pittsburgh and Wheeling district steel companies are alive to the importance of the rivers as arteries of trade, and already much activity is observed in the construction of wharves and loading equipment. The Carnegie Steel Co. has about completed plans for greater use of the rivers in getting materials away from its plants, most of which in Pittsburgh have access to the rivers. This company a few years ago, when railroad transportation snarls were frequent and exasperating, worked out plans for river shipments of steel, but abandoned them when the railroad situation improved. It is probable that this company will handle river shipments for other steel corporation subsidiaries, since it already has a fleet of tow boats. The Jones & Laughlin Steel Co. already has demonstrated the utility of the rivers and the Wheeling Steel Corporation is actively going ahead on betterments aimed to facilitate river deliveries.

Westinghouse Electric & Mfg. Co. has arranged for the construction of a building in Philadelphia at a cost of $850,000. It will provide about 200,000 sq. ft. of space and will house the company's offices, local service shop and warehouse.

Canada's Trade with United States Declines

Value Has Fallen Off 56 Per Cent in a Year—Outlook Is for at Least Partial Recovery—Better Economic Conditions in the Dominion

BY WILLIAM LEWIS EDMONDS

TORONTO, Sept. 19.—Canada's import trade with the United States in iron and steel and their products for the fiscal year 1922 will doubtless be remembered for the remarkable extent to which it declined in value as that of the previous year was noted for the new high record to which it attained.

The value of the trade was $99,951,737, a decrease for the year of $126,903,988, or about 56 per cent, while it is under that of two years ago by $78,709,869, or nearly 40 per cent. Not since 1916 has the trade had as low a value, although it exceeds that of the latter year by $28,491,966, or nearly 40 per cent. It is also in value more than a million dollars better than the trade of the fiscal year 1914, which ended a few months before the outbreak of the Great War, but, on the other hand, the 1922 trade is less than that of 1913 by over $20,500,000, the figures for the latter year being $120,636,597.

So general was the decrease that it extended to every general classification, but three alone were sufficient to account for a decline in the aggregate of nearly $88,000,000, or almost 70 per cent of the grand total. Of these three, the most remarkable was the decline in the imports of rolling mill products from the United States, the figures being smaller than those of the preceding year by $51,195,966, or over 72 per cent. Under the classification of "boilers, engines, pumps and windmills" there was a decline of $16,931,375, or over 67 per cent, and under that of machinery (not including agricultural machinery) a decrease of $19,789,712, or over 48 per cent.

Although total trade imports of iron and steel from the United States show such a remarkable decline, there has been only a slight reduction in the proportion relative to total imports from all countries, it being for the year under review 90.69 per cent, as compared with 92.35 the previous year, 94.81 in 1920, 93.58 in 1916, and 82.72 per cent in 1913.

Imports From United States Under Principal Classifications

The following table gives the principal imports from the United States for the fiscal years 1922 and 1921, together with the total from all countries for the former year:

			All Countries,
	1922	1921	1922
Iron ore	$1,721,438	$5,038,900	$1,936,247
Agricultural implements	5,326,141	11,430,226	5,479,617
Boilers, engines, pumps and windmills	8,289,063	25,220,438	8,554,540
Castings	1,171,193	2,336,218	1,291,561
Chains	361,648	994,189	464,189
Cutlery and hardware	2,094,983	3,815,885	3,470,476
Firearms	215,948	638,511	313,886
Machinery	20,974,568	40,764,280	23,310,672
Rolling mill products	19,554,392	70,750,358	21,791,664
Scrap iron or steel	338,042	2,405,913	343,380
Smelted products	805,706	3,750,261	916,094
Springs, all kinds	177,932	557,121	181,173
Stamped and enameled ware	784,342	938,242	868,286
Tools and hand implements	1,059,952	2,315,480	1,181,696
Vehicles, chiefly of iron	21,994,154	26,393,390	22,588,897
Wire	2,202,577	5,981,823	2,889,392
Axles, parts, etc.	1,563,946	2,309,168	1,565,128
Pipe fittings	462,632	1,065,582	483,224
Forgings	122,765	360,920	128,919
Drums, barrels, tanks	465,061	1,438,627	527,718
Scales, balances, etc.	199,410	258,213	209,768
Stoves, all kinds	267,836	424,867	272,866
Tin cans and containers	636,249	777,719	643,022
Valves, n.o.p.	435,658	880,863	493,075
Manufactures chiefly of steel	7,092,294	12,555,512	7,706,497

Features in Engine Imports

The most outstanding feature under the engine classification is farm traction engines costing not more than $1,400, the imports of which from the United States had a value of but $1,340,016, as compared with $10,160,949 the previous year, while for those of higher cost the figures were $521,832 and $2,436,367 respectively. Taking the two descriptions, there was a total decline in the imports of $10,735,468, or over 84 per cent, which may be ascribed to the agricultural depression obtaining and to a more adequate and cheaper supply of farm labor. In automobile engines the imports had a value of but $3,117,839, as compared with $5,387,416 the year before and $8,402,351 two years ago. With the improvement being experienced by the automobile industry, imports of engines should show a recovery during the current fiscal year; in fact, according to official returns, it is already under way. Imports of internal combustion engines, other than those for automobiles, had a value of $899,338, as against $2,175,077 the previous year, and locomotives for steam railways $110,320 against $542,643. Imports of power pumps and parts fell during the year from $1,201,506 to $683,209.

Many Declines in Machinery

With few exceptions, all lines of machinery imported from the United States experienced a decline. Under the classification of "Other machinery, wholly or in part of iron and steel," the trade fell from $19,704,650 to $8,521,363. Textile machinery, valued at $1,853,129, showed a decline of over three millions. Rolling mill machines dropped from $646,087 to $235,134, and saw mill machines from $320,543 to $115,233. Although there was an increase in the importation of paper mill machines, the value being $1,715,416, against $1,296,543 the previous year, pulp mill machines dropped from $415,252 to $41,218. Machine drills fell in value from $744,169 to $206,758, and power lathes from $542,246 to $116,091. Besides the influence of the industrial depression experienced during the past two years, the market has been carrying a surplus of both these types of machines over from the activity of the war period.

Rolling Mill Products Affected

A conception of the extent to which the various rolling mill products imported from the United States contributed to the marked decrease noted may be gathered from the following table dealing with the principal lines for 1922 and 1921 respectively:

	1922	1921
Bars, bands, hoop, etc., above 3½c. lb.	$2,028,209	$11,587,594
Hoop, band, scroll, etc., 14 gage and thinner	569,087	2,283,411
Bar iron or steel	1,483,834	4,690,905
Hammered, drawn or cold rolled iron or steel bars or shapes	1,231,317	5,492,046
Steel rails	858,608	980,191
Boiler plate	154,114	1,040,554
Canada plates, etc.	577,644	1,153,659
Tin plate	2,727,087	8,605,139
Steel plates, all kinds	2,829,116	9,684,177
Galvanized sheets	1,289,743	2,584,206
Skelp for making pipe	1,988,388	5,963,149
Wire rods	681,914	1,620,836
Angles, beams, channels, etc.	1,877,487	8,833,877
Steel plate for bridge and car work	189,212	1,532,521
Seamless tubing, all kinds	1,127,320	3,133,382
Beams, sheets, plates, etc., for shipbuilding	63,035	2,592,165

Contributing causes to the decrease in tin plate, aside from the trade depression, are larger imports from Great Britain—the value being $1,288,213, compared with $297,317 a year ago—and supplies from the new mill located at Toronto. The almost total disappearance of imports of steel for shipbuilding is of course the almost complete cessation of work at

the yards which sprang into existence during the war period.

In smelted products the principal declines in imports from the United States were: Pig iron, from $2,287,027 to $392,238; billets, not less than 60 lb. per lineal yard, from $476,503 to $322,474; ingots, blooms, etc., from $253,245 to $56,547; ferromanganese, from $577,505 to $23,855.

Features in Vehicle Imports

While under the general classification of vehicles, imports from the United States declined by nearly $4,400,000, there was one important line in which there was a fairly substantial increase, and that was in passenger automobiles, the number being 7,092 valued at $9,062,184, compared with 5,891 and $8,339,704, respectively, the previous year. On the other hand, imports of freight automobiles fell from $3,476,163 to $1,492,290 and automobile parts from $11,729,731 to $10,189,926. There was also a marked decline in railway cars, the aggregate value for all descriptions being $925,327, as compared with $2,210,166 the year before.

Cutlery and Hardware

Except in razors, the value of which was $61,147 against $41,109, there was an all-round reduction in cutlery imports from the United States, the total being $330,006 against $696,524. Under the hardware classification, there was a decrease in every line, the most outstanding being as follows: Builders' hardware, from $703,950 to $391,560; locks, $676,418 to $320,823; butts and hinges, $164,078 to $88,341; wire nails, $197,786 to $163,215; nuts, rivets and bolts, $389,355 to $213,638. Total value of the hardware imported from the United States was $1,764,977, as compared with $3,119,361 the previous year.

Outlook for Current Year

That the outlook for the current year in respect to importations from the United States warrants the belief that at least a partial recovery will be experienced there appears to be no doubt. The fact that the exchange situation is now approximately at normal should help to some extent. But that which promises to be a much more important factor is the development of a better economic situation throughout practically all parts of the Dominion. This year's harvest is undoubtedly the most bountiful experienced for seven years. There are extensive areas in Saskatchewan and Alberta where the yield is light, but the deficiency in these isolated instances is more than compensated for by the bountiful yields in Ontario and Manitoba, the generally fair crops in Quebec and the Maritime Provinces, and the excellent results obtained in the southern parts of both Alberta and Saskatchewan. The mining industry of the Dominion, and particularly in respect to the precious metals and coal, is experiencing an expansion, and the same is to be said in regard to both the lumber and fishery industries, while the pulp and paper mills are practically running to full capacity.

To Handle Pulverized Fuel with Compressed Air

Among the details of equipment to be used in handling pulverized coal at the new Cahokia station of the Union Electric Light and Power Co., St. Louis, the method of weighing the fuel and conveying it from the pulverizers to the boilers is of interest. Fuel requirements for the first group of units is estimated at 1000 tons in 16 hr.

Below the floor level of the pulverizing room will be placed five blowing tanks, which serve five twin pulverizing units. These blowing tanks will rest on platform scales, the dial of which will indicate to the operator in the pulverizing room the amount of fuel in the tank.

Fuel will feed into these tanks by gravity from pulverized fuel bins in the pulverizing room. Each charge will be automatically weighed and then elevated by compressed air to a height of about 75 ft. through 4-in. pipes. By means of a simple system of switching valves and parallel distributing mains, cross connected, any blowing unit can discharge into any of the eight inclosed storage hoppers in the boiler house. These hoppers serve the four pairs of boilers, of 1780 hp. each, comprising the first group of boiler units to be installed.

This equipment will be installed by Quigley Fuel Systems, Inc., 26 Cortlandt Street, New York.

Reducing Hematite to Magnetite with Methane

During recent experiments on the reduction of iron ores with fuel gases carried out at the Pacific Experiment Station of the Bureau of Mines, Berkeley, Cal., it was noticed that at temperatures up to 800 deg. C. (1472 deg. Fahr.) the methane in these gases was practically inert as compared with hydrogen or carbon monoxide. A number of experiments were then carried out with mixtures of methane and hydrogen over a wide range of temperatures, to find out when the methane would begin to function actively as a reducing agent. While it reacted slowly at all temperatures tested, its reaction in the reduction of hematite to magnetite, the first stage in the reduction of iron, did not become sufficiently rapid to be of industrial importance until temperatures of over 900 deg. C. (1652 deg. Fahr.) were used. A rough approximation of the velocity constant of this reaction was made for all the temperatures at which tests were made, in order to obtain some unit figures of value in designing industrial apparatus for carrying out this reaction.

Details of these experiments are contained in serial 2382, which can be obtained from the Bureau of Mines, Washington.

Philadelphia Bridge Towers

Each of the two steel towers of the new suspension bridge now being built to connect Camden, N. J., with Philadelphia will contain 5000 tons of steel, according to details made public by the engineering department of the Joint Bridge Commission. Of the total of 10,000 tons, 6000 tons will be of alloy steel and 4000 tons of steel castings. Each tower will measure 350 ft. above the top of its pier and 380 ft. above the water, the two legs of the tower being 89 ft. apart and 39 ft. wide at the pier, tapering to 12 ft. wide at the top.

Both piers, of concrete and granite, are approaching completion, and bids for the erection of the steel towers are to be asked for in October, in hopes of getting the awards made in November. The bridge, one of the greatest in the world, will have a main span of 1750 ft., comparing with 1600 ft. in the Williamsburg bridge, 1595 ft. in the Brooklyn bridge and 1470 ft. in the Manhattan bridge, the three largest of the suspension type now in service. The Quebec bridge, of cantilever type, has a main span of 1800 ft., while the cantilever Firth of Forth bridge has two spans of 1710 ft. each. All of these spans will be eclipsed by the 1803 ft. of the suspension bridge to be built between Windsor, Ontario, and Detroit.

Employees of James Leffel & Co., Springfield, Ohio, are working each night until 8.30 o'clock. President A. F. Sparks says prospects are bright for the fall and winter. Foreign orders were received during the past week from the Argentine and Columbia, South America, and from Mexico.

Lower Temperature in Preheating Cast Iron Thermit Welds

In order to compensate for the lower melting point of cast iron as compared with steel, the Metal & Thermit Corporation, New York, recommends that in preheating cast iron sections, preparatory to welding them with thermit, these sections be heated only a little more than necessary to show color, such as a dull red heat. If this advice is followed, a quieter pour will be obtained and the fusion will be just as perfect. This practice has now been tried successfully in numerous cases, the most important case being a weld on a large cast iron press head which required 1100 lb. of thermit. The weld is reported as perfect, with good fusion to the extreme of the edge of the collar, although the cast iron section was heated only to a dull red heat.

It is believed that this point is important and that operators will find that it will overcome possible difficulties which they may be experiencing in cast iron welding. One might suppose that as the cast iron of the parts being welded is not quite so fully expanded at this lower temperature there might, therefore, be a slightly greater tendency for hair line cracks to appear in the thermit steel collar perpendicular to the line of break. This has not been found to be the case, probably because the expansion curve is much greater up to a red heat than it is from the red heat to the white heat and that the sections are, therefore, practically fully expanded at this dull red heat. It is certainly also true that the thermit steel at first heats and expands the sections with which it comes in contact and, therefore, the slight difference in pre-heating is negligible.

Scrap in the Open-Hearth Process

Commenting on the greater use of scrap in the open-hearth process, the London *Ironmonger* has the following to say:

"In the United Kingdom it was formerly believed that good basic open-hearth steel could not be made if over 50 per cent of the charge was scrap. During the war years the presence of large quantities of scrap, and also, in some countries, a shortage of pig iron greatly stimulated efforts to develop a technique by which the proportion of scrap to pig iron used in the production of steel might be increased. It has now been demonstrated that it is possible to use more than half scrap in the basic open-hearth process with satisfactory results. The price of scrap in relation to the cost of production of pig iron will be a factor in future development, but there is every evidence that the limits of the use of scrap have by no means been reached. Large proportions of scrap are usually associated with the basic process, but some years ago a casting works in the United States was using over 90 per cent selected heavy acid open-hearth bloom ends in making up their charge. The scrap iron trade is almost as extensive as the pig iron business in that country. This practice is used by manufacturers in fluctuating markets, enabling them to play off the pig iron and scrap markets one against the other."

Powers of Congress Over State Corporations

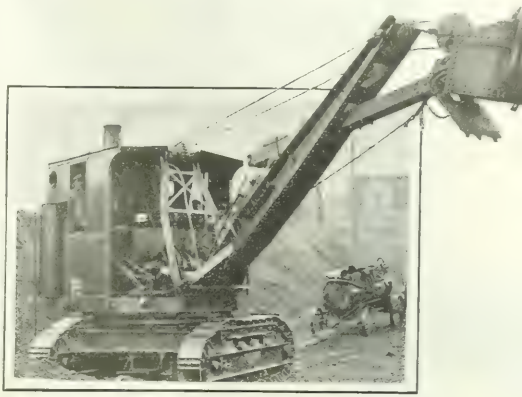
WASHINGTON, Sept. 26.—Dealing with the important question of the inquisitorial powers of Congress over State corporations, directly or through delegated agency, James A. Emery, counsel for the National Association of Manufacturers, has prepared an extremely interesting and informative opinion in response to an inquiry coming from a representative of a manufacturers' association in one of the States. While the opinion is based on a specific inquiry as to the right of the Federal Trade Commission to get certain information regarding factory, wholesale, and retail price conditions of the house furnishing goods industry and trade, beginning with January, 1920, as requested in a Senate resolution, the principles of the subject are so far reaching as to include all industries. It touches points that are particularly vital to the iron and steel industry in view of pending Government inquiries. The Senate resolution referred to asks the commission to ascertain the organization and interrelations of interests engaged in the house furnishing goods industry and whether there are unfair practices and methods of competition or restraints of trade, combinations or manipulations "out of harmony with the law of public interest, and if so, what effect the same have had on prices; and, serially to report the facts with its recommendations at the earliest possible time, as phases of the investigation are completed."

Hearing on Pig Iron Rate

ST. LOUIS, Oct. 2.—J. L. Koch, an examiner of the Interstate Commerce Commission, held a hearing at Hotel Jefferson recently to take testimony in objection to and in support of the new rates on pig iron from Birmingham to Ohio River crossings. The lower rates were to have gone into effect on Sept. 1, but were suspended as a result of protests.

Combination Crane and Shovel

In THE IRON AGE of April 14, 1921, was described the crawling tread crane of the Orton & Steinbrenner Co., 608 South Dearborn Street, Chicago. The machine has now been developed so that it is a combination crane and shovel. It is designed so that the crane boom may be removed in a short period of time and



The Crane Boom May Be Removed and the Shovel Boom Substituted, as Shown

a shovel boom substituted therefor, so that the crane may be readily converted from a clam shell rig to a steam shovel. The radius of the boom instead of being fixed at a certain degree, may be varied to suit the conditions of the job, making it possible, for example, to dig several feet below the normal operating level as well as increase the lift.

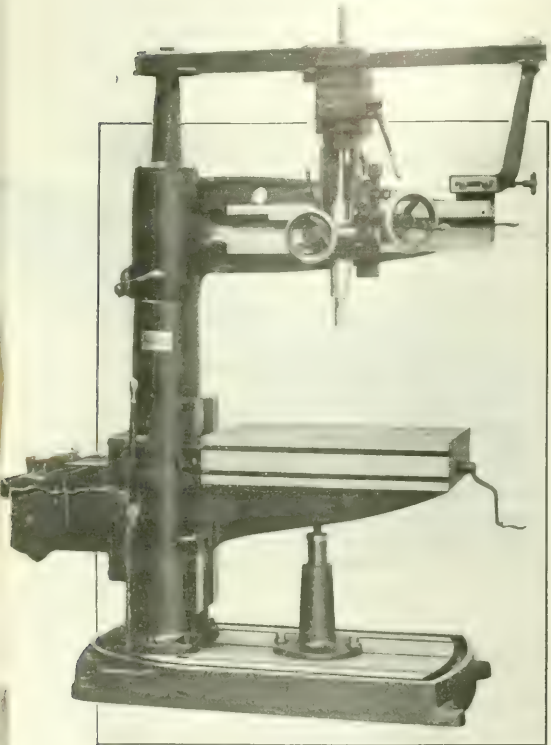
Motive power is supplied by only two engines. The hoisting, swinging and travelling operations are performed with double clutches by the main non-reversing engines, while the crowding motion of the dipper is actuated by a separate reversing engine placed midway along the boom. The rotating base turns on a live ring of rollers on a large diameter rail circle, thus to distribute the load evenly without requiring much power to swing.

The Electrical Alloy Co., Morristown, N. J., announces a new publication, "Electrical Heating Reference Data," embodying the experience and suggestions of an expert on electrical heating. It discusses the method of determining the material adapted to certain specific conditions, and the proper size and length of resistance wire to be used, and offers suggestions for the actual designing of the heating element. The current-carrying capacity of resistance ribbon and strip is published. To make the bulletin complete as a reference work, the publishers have included numerous reference tables for which the engineer or designer has daily need.

Fosdick High-Speed Ball Bearing Sensitive Radial Drilling Machine

The accompanying illustration shows a radial drilling and tapping machine recently developed by The Fosdick Machine Tool Co., Cincinnati. The object of the machine is to drill and tap work of too large an area for the high-speed sensitive upright drill, yet drilling and tapping small holes in the work which require much greater speed than is attained on the heavy duty type radial machine. Rapidity of positioning the drill, together with ease and convenience of operation is emphasized as minimizing the time "between holes," while high speeds and excess power reduce the actual drilling time.

The table is readily removed, allowing 49½ in. between the spindle and the base, which has a working surface of 28 x 36 in., and is planed and provided with



Machine for Speed Drilling and Tapping Work of Too Large an Area to Be Well Served by a Sensitive Drilling Machine

T-slots. The vertical movement of the table is 16 in. through a ball bearing telescopic screw. The working surface is 20 x 33 in., with 31 in. maximum to the spindle.

The arm may be swung completely around the column, and is supported on both annular and thrust ball bearings on the column, which extends through to the top. The spindle, as all other revolving members, is equipped with ball bearing journals. It has a No. 2 Morse taper, and a vertical traverse of 8 in. The horizontal movement of 28½ in. along the arm is through rack and spiral gear with handwheel at the right. This position of the handwheel enables the operator to swing the arm and move the head simultaneously with the right hand, while the left hand is free to raise and lower the spindle and clamp the arm. The sensitive feed and quick return are operated by the lever at the right, or the handwheel at the left.

Friction back gears, a new feature, permit instantaneous shifting from high drilling speeds to slow speeds for tapping or drilling the larger holes, the ratio being 4½ to 1. The tapping attachment frictions, like those of the back gears, are adjustable with an ordinary screw driver. The drive is regularly through tight and loose pulleys on the machine, which gives both a high and low speed forward and reverse. The pulley guard and belt shifter are adjustable to meet the belt from any angle.

A reservoir for coolant is cast in the base, and a pump with nozzle to the drill point may be supplied. Separate box or universal tables can be furnished as extras in place of the regular elevating rectangular table. Motor driven machines require a 1-hp. motor, either constant or variable speed, as desired. The machines are built with either 3 or 3½-ft. arms; the dimensions mentioned are for the 3-ft. size, which weighs 2650 lb.

Fewer Metal Workers and Higher Wages

Iron and steel plants, according to figures of the Bureau of Labor Statistics, show for August a loss from July of 1770 employees in 125 establishments. This loss of 1.4 per cent was accompanied by a gain of 13.8 per cent in amount of payroll and a corresponding increase in the average pay envelope from $42.08 to $48.45, or 15.1 per cent.

In the automobile industry there was a loss in 97 establishments of ½ per cent in number of employees, but an increase of 9.1 per cent in payroll total. In car building and repairing there was a loss of 5 per cent in number of employees in 72 establishments and a gain of 25.8 per cent in amount of payroll.

Compared with a year ago there has been a gain, all told, of 28.5 per cent in number of men employed, and an increase of 33.9 per cent in total payroll. This connotes a gain of 4.2 per cent in contents of the average pay envelope, which has advanced from $57.03 to $59.40.

Wages per half-month per man in automobile plants, which are exceptionally busy, are 44.3 per cent over those prevailing in steel plants. In fact, 152,827 automobile workers received over $3,260,000 more in the half month than did 153,260 steel workers.

Compared with July, per capita earnings increased in 29 industries and decreased in 13. Carbuilding and repairing led the increases with an advance of 32.4 per cent; iron and steel came next, with 15.1 per cent and automobile building third, with 8.6 per cent. Among the others, agricultural implement makers advanced 5.3 per cent; stove makers, 4.4 per cent; hardware makers, 3.2 per cent; electrical workers, 2.9 per cent; steel shipbuilding, 1.4 per cent. Details are shown in the table.

Period	Number of Establishments	Number of Men	Half-Month Payroll	Average Pay Envelope
Iron and Steel				
July, 1922.....	125	155,030	$6,523,949	$42.08
August, 1922.....	125	153,260	7,424,212	48.45
August, 1921.....	112	103,458	4,348,589	42.03
*Automobiles**				
July, 1922.....	97	152,147	9,792,560	64.37
August, 1922.....	97	152,827	10,685,454	69.92
August, 1921.....	48	99,207	7,084,458	71.41
Car Building and Repairing				
July, 1922.....	72	52,319	2,134,427	40.80
August, 1922.....	72	49,732	2,685,339	53.99
August, 1921.....	55	33,561	2,041,073	60.82
Metal Workers (the three groups above)				
July, 1922.....	215	359,496	18,450,936	51.32
August, 1922.....	294	355,819	20,795,005	58.44
August, 1921.....	215	236,226	13,474,120	57.03

*Payroll figures are reported as "weekly"; they have been made "half-monthly" by multiplying by 2 1/6.

At the annual meeting of the Cincinnati Association of Purchasing Agents, J. G. Kreis of the Weir Frog Co., was elected president. T. W. Marz, Newport Rolling Mill Co., and E. W. Simpkinson, of the F. H. Lawson Co., were elected vice-presidents. Fred G. Berling, Lunkenheimer Co., and J. H. Heitbrink, Morris Machine Tool Co., were elected secretaries. G. E. Merkel, Allis-Chalmers Mfg. Co., was re-elected treasurer. The election of officers followed the annual dinner, which was attended by practically the full membership of the association. T. W. Marz delivered an address on the "Development and History of Coal Mining."

Car Shortage Greatly Retards Shipments

Movement of Iron and Steel Products Delayed at Many Points—Large Tonnages Piled in the Youngstown District

YOUNGSTOWN, Oct. 3.—Inadequacy of car supply in the Mahoning and Shenango Valleys is seriously interfering with shipments of finished and semi-finished steel products. At the close of last week approximately 50,000 tons of steel were piled in Valley plants because of lack of cars to move mill output. The Republic Iron & Steel Co. has been obliged to suspend eight of the 16 sheet mills at its Niles plant because of its clogged condition. Fully 11,000 tons of sheet products were piled at this plant, awaiting shipment.

Of the delayed shipments, products requiring box cars, such as sheets, tin plate and plates, are in preponderance. A survey revealed 4200 tons of semi-finished piled at the Ohio Works of the Carnegie Steel Co.; 3600 tons, mainly bars, at the McDonald plant of the Carnegie company; 4000 tons at the Brier Hill plants; 2500 at the Youngstown Sheet & Tube mills and 12,000 at the Republic company's various properties. Material ready to be shipped by other Valley interests made the total fully 50,000 tons.

One Valley interest is taking advantage of the situation to balance and replenish its pipe stocks.

Where expedient, products of the mills are being delivered by motor truck. One such consignment from Youngstown to Pittsburgh involved 1000 tons, and the consumer expressed willingness to pay the additional hauling charges in order to obtain the material.

Coal Moves More Freely

With exception of low volatile grades, coal is moving into the district freely. A large interest, normally consuming 135 carloads daily, reports that shipments are at normal. Operators of by-product coke ovens in general complain that low volatile coal is being held up and supplies are inadequate. Much of such coal consumed in this territory comes from West Virginia, and congestion on roads tapping these mines is held responsible for the tardy shipments.

Limestone shipments are likewise being delayed, and furnace operators have been obliged in consequence to make inroads into reserve stocks. A Valley independent reports that limestone coming from Martinsburg, W. Va., has been cut off because of the disorganized car situation.

In view of the restrictions on movement of both raw materials and finished steel, due to lack of cars, district steel interests have requested the Interstate Commerce Commission to modify Priority No. 25, which limits open top cars with sides 42 in. in height or over to coal movement. Such cars may be loaded, however, with construction supplies and other classes of materials, when proceeding in direction of the mine. This provision has permitted the shipment of pipe in some cases.

An embargo imposed by the Baltimore & Ohio Railroad against coal shipments to its lake ports is relieving the stress to some extent, releasing mill type gondolas for the steel industry. The carrier's lake docks are loaded with coal and heavy tonnages are en route.

Shortage of Box Cars Acute

Shortage of box cars is acute. Traffic officials say that the scarcity is due to the diversion of box cars at this season to the West for the grain movement.

In mapping out operating schedules for the week, mill managers explained they are subject to change, dependent altogether on the car situation. Car supply is wholly irregular from day to day and shows many variations in the number of cars available for the steel plants.

Approximately 101 sheet mills were scheduled at the week's commencement. Falcon Steel Co. has been obliged to suspend part of its complement, four of its eight sheet mills being on the inactive list. There are therefore 12 less sheet mills active this week than last, in the Mahoning Valley.

Furnace and Mill Operations

Starting of Anna blast furnace by the Struthers Furnace Co., scheduled to go in Oct. 2, has been delayed until the latter part of the week because of interruptions to coke shipments. With this stack active, 25 of 47 in the two Valleys will be pouring, representing about 68 per cent of total iron capacity. Active ingot capacity continues at 85 per cent, while all three Bessemer converters in the Mahoning Valley are blowing.

In some instances mills are being inconvenienced by insufficiency of labor supply. This condition would be more pronounced if average operations were at a higher level and were not retarded by car scarcity. To prevent the working force of its Farrell, Pa., plant from disintegrating during idleness of the property, the Carnegie Steel Co. is giving such workers employment at other plants nearby, such as Youngstown and New Castle.

The Farrell plant is ready for resumption, but a shortage of coke and steel is delaying the order. Steel shortage is likewise hampering the independents. One interest would operate its plate mill on merchant tonnages except for this condition.

Locomotives Out of Repair

WASHINGTON, Oct. 3.—Locomotives out of repair showed an increase in number on Sept. 1 as compared with Aug. 15 and Aug. 1, according to the American Railway Association. On Sept. 1 there was a total of 64,294 on the lines, of which 16,260, or 25.3 per cent, required heavy repairs and of this latter number 9660 were freight locomotives and 3120 switching locomotives. On Aug. 15 the total number on the lines was 64,296, of which 15,312, or 23.8 per cent, required heavy repairs, and of this number 9107 were freight and 3027 were switching locomotives. On Aug. 1 the total number on the lines was 64,270, of which 14,505, or 22.6 per cent, required heavy repairs. Of this number 8594 were freight and 2893 were switching locomotives. Normally it is estimated that approximately 18 per cent of the locomotives of the country require heavy repairs, so that at present the number requiring this class of repair work is approximately 40 per cent over the normal, while the percentage of cars requiring repairs is about 100 per cent over the normal total, which is about 7 per cent of all cars, but is approximately 14 per cent to-day. ["Heavy repairs" means repairs requiring more than 24 hr. work.]

Sheet Shortage Feared at Detroit

DETROIT, Oct. 2.—The threatened unemployment situation in Detroit, due to the fuel and railroad tie-up has been overcome in the making. Figures of the Employers' Association of Detroit substantiate this in their report as of Sept. 26, which shows a net increase of 63,500 over the week previous, or a total of 165,000 employed as reported by the 79 members of the association. Several increases during the week are not reported in the above totals, so that the actual number employed this date is less than 10,000 below figures given two weeks ago.

Automobile production continues at a high rate with closed body models predominating. Maintaining schedules is a traffic problem both as to assembling and delivery on cars. The Interstate Commerce Commission has been appealed to for more cars to handle ship-

ments of automobiles from factories in the Michigan district. Several local railroad officials have been instrumental in this movement, requesting that all carriers utilize to the fullest extent standard box cars for the handling of priorities so that any surplus will be in the shape of automobile box cars. The carriers are likewise loading automobile cars wherever possible on shipments for delivery in this district.

Reports this week that one or two sheet producers that supply this district had curtailed their production due to lack of shipping equipment, caused manufacturers to be menaced by lack of this material. Deliveries at best have been only for current needs. Fuel has been reaching Michigan industries in sufficient quantities to relieve any threats of a shortage. The threatened strike of sailors of the Great Lakes carriers will not affect coal shipments to Detroit, as the small tonnage transported by water is carried by small vessels not members of the association.

Car Shortage in Connellsville Region

UNIONTOWN, PA., Oct. 2.—The past week has been marked by an acute car shortage in the Connellsville bituminous region and a falling off in price quotations for coal. Coke production is showing a material increase, although the principal output is for contract or use by the Steel Corporation.

Coal production in the region reached 105,340 tons for the week ending Sept. 23, within 40,000 tons of the production on April 1 when the sympathetic strike in the region developed.

Coke production in the region for the week ending Sept. 23 follows: Merchant, 24,390 tons; furnace, 80,950 tons; total, 105,340.

The production for the same week in 1921 was 43,760 tons. The total coke production in the Connellsville region so far this year is 3,247,450 tons as compared with 2,561,500 tons during the same period last year. Three additional plants and 684 ovens were placed in operation during the past week.

The strike has ceased to be a serious factor in the production in the Connellsville region. Output now is hampered principally by shortage of power and cars affecting all railroads in the region but being especially serious for plants shipping by the Baltimore & Ohio.

The newly organized Fayette Greene Coal Producers' Association has established headquarters in Uniontown at 46 East Main Street. The officers of the association are: George Whyel, president; W. W. Parshall, vice-president; E. D. Brown, secretary-treasurer, and J. Fred Shean, executive secretary.

Ground-Form Gear Cutters

The ground-form gear cutter shown in the accompanying illustration, which as its name implies, is ground on the tooth form, is a recent addition to the line of the Brown & Sharpe Mfg. Co., Providence. Grinding of the tooth form is intended to correct hardening distortions, give each tooth great accuracy of form and aline all teeth with the hole in the cutter. Longer cutter life is also a feature emphasized.



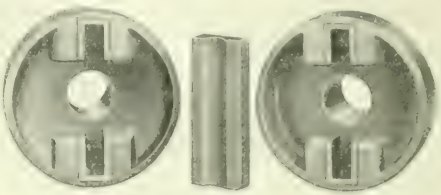
Form

The tooth form of the cutters, being accurate to close limits, the tooth spaces of the gears will correspond, the alinement of the cutter teeth contributing to accuracy in the spaces between the gear teeth. Grinding of the tooth form also gives a positive method of controlling the form of different cutters and securing duplicates, the latter being of particular importance perhaps to the manufacturer of gears in quantity where both accuracy and uniformity are required. The ground form cutter is intended therefore to solve a difficult problem in providing for the duplication of accuracy.

Free cutting action due to each tooth doing its share, and the keener cutting edges formed by the conjunction of the ground surfaces of the teeth, the latter feature serving also to greatly increase the production capacity, are features emphasized. Faster feed and the ability to cut more gears between resharpenings are claimed, the long life of the cutter being said to be due to the work of cutting being evenly distributed among all teeth, eliminating localized heating, which is one of the commonest causes of cutter wear. Another factor adding to the life of the cutter is that grinding of the form gives the teeth a positive clearance, eliminating "rubbing" of the form back of the cutting edge. The cutters are available in sizes from 1¾ to 12 pitch, inclusive.

Tilting Bar Flexible Coupling

While the tilting bar flexible coupling has been manufactured for some time, it has not been pushed on the market. Now the American Foundry & Mfg. Co., Frederick, Md., has taken it up. The coupling is of simple construction, being made of three parts, two



These Three Pieces Make the Coupling

flanged hubs with sockets in their faces and a steel bar fitting into the sockets.

Flexibility is obtained by the tilting and sliding of the bar in its sockets. In this manner misalinement is taken care of without throwing extra strain on the bearings of the two connected shafts. Driving being done through solid metal parts, none subject to deformation, the chances for breakdowns are considered to be practically eliminated. A number of these couplings have been in service, it is stated, for eight years without maintenance or repair, taking care, in some instances of misalinements up to 1/16 in. Breakdown tests have shown a factor of safety of about 12.

The flexibility of the coupling ranges from 1/16 in. in the smaller sizes to ⅛ in. in the larger, for parallelism, and up to 7 deg. for angularity. Its ability to take care of endwise motion of the shafts is regarded more than sufficient to meet any demand put upon it in practice. Standard sizes, designed for shafts ⅞ in. to 6½ in. in diameter, may be supplemented by larger sizes when ordered.

Springfield, Ohio, Industries Active

SPRINGFIELD, Ohio, Oct. 2.—A voluntary increase of 10 per cent in wages, effective Oct. 1, was announced Saturday by the Superior Gas Engine Co. This affects 500 men. The increase applies to hour men and others on premium work. A marked improvement in business has been experienced by the company in the past ten days. P. J. Shouvlin is president.

A gradual improvement in the machine tool business is reported by Edward Montanus of the Springfield Machine Tool Co. Orders are coming in and the force is being increased.

The American Radiator Co.'s plant in this city is keeping up to its heavy schedule, which it has maintained since last December. The local management reports that prospects are that the plant will be operated with a large force during the fall and winter.

Production of motors is being speeded up at the plant of the Robbins & Myers Co. Officers say October will be the best month in the output of motors in two years. More than 1200 persons are now employed.

Three-Company Steel Merger Abandoned

Midvale, Republic and Inland Officials Give Up Plans, Owing to Attitude of Federal Trade Commission —Surprise Expressed at Washington

THE plans for the consolidation of the Midvale Steel & Ordnance Co., the Republic Iron & Steel Co. and the Inland Steel Co. into one corporation to be known as the North American Steel Co., were abandoned Thursday, Sept. 28.

At the office of T. L. Chadbourne, legal adviser to those interested in the merger, the following statement was issued:

"W. E. Corey, chairman of the board of the Midvale Steel & Ordnance Co., John A. Topping, chairman of the board of the Republic Iron & Steel Co., and L. E. Block, chairman of the Inland Steel Co., have authorized the following statement:

"'At a meeting held to-day the entire situation arising from the action of the Federal Trade Commission was reviewed and the conclusion was reached that under existing circumstances, it is not possible to proceed with the proposed merger of the Midvale Steel & Ordnance Co., the Inland Steel Co. and the Republic Iron & Steel Co. While all of the eminent counsel who have been consulted agree that the proposed merger would be legal in every respect, and while its consummation would not have restrained but have intensified competition, the final determination of the questions involved would delay the carrying out of the plan to such an extent that the parties in interest do not deem it advisable to proceed. Pending such final determination of the questions involved, the financing of the proposed merger would not be possible and it is not feasible to proceed with the merger without such financing.'"

The legality of the merger of the three companies was attacked by the Federal Trade Commission in a report filed by that body as reported in THE IRON AGE of Sept. 7.

Washington Officials Surprised

WASHINGTON, Oct. 3.—Decision of officials of the Midvale Steel & Ordnance Co., Republic Iron & Steel Co., and the Inland Steel Co., to abandon their proposed merger, owing to proceedings instituted against them by the Federal Trade Commission, evidently came as a surprise to the commission when it was informed last Thursday afternoon by long distance telephone through a legal representative of the companies of the action taken. It was clearly the belief in official circles in Washington that the merger would proceed regardless of the complaint of the commission. The fact that the legality of the merger, so far as the Sherman, Clayton and Webb-Pomerene acts were concerned, had been upheld by the Department of Justice strengthened the opinion that it would be consummated. The complaint of the commission, however, was brought under the Federal Trade Commission act, and as in the case of the proposed merger of the Bethlehem Steel Co. and the Lackawanna Steel Co., alleged unfair methods of competition. Judge Van Fleet, a member of the commission, filed a vigorous dissent to the Midvale-Republic-Inland complaint and asserted that in view of the fact that this merger would represent only 7½ per cent of the steel output, as against approximately 45 per cent represented by the United States Steel Corporation, the commission was "straining at a gnat and swallowing a camel." He went on record as saying the merger would be in the public interest.

The abandonment of the merger is believed here to have been due to the unwillingness of bankers to finance it in view of the commission's complaint and because of the costs that would be involved pending a final decision in the proceedings. It is assumed that as a matter of form, and for the purpose of permitting the commission to close its record, written notice of abandonment of the merger will be sent to the commission.

President Grace's Statement

Following the announcement of the decision to abandon the three-company merger, Eugene G. Grace, president Bethlehem Steel Corporation, issued a statement in which he pointed out that the abandonment of the plan to merge the Republic, Midvale and Inland Steel companies because of the objections raised by the Federal Trade Commission, will in no way affect the recent taking over of the Lackawanna Steel Co. by Bethlehem.

"The decision of Midvale, Republic and Inland not to merge should have no significance whatever for persons interested in our acquisition of Lackawanna" said Mr. Grace. "The Bethlehem-Lackawanna combination already is virtually a fact, and the last step, the actual exchange of securities, will be made just as soon as possible, presumably within the next two or three weeks. The stumbling block for Midvale, Republic and Inland, floating securities of a new company in the face of a Federal Trade Commission complaint, we have not had to contend with and will not have to contend with at any time. The additional $15,000,000 preferred stock for plant improvements, which it is planned will be a regular Bethlehem security, will be beyond the pale of any Federal Trade Commission action."

Merger Abandoned—Brier Hill Steel Co. Will Make Extensions

Following failure of merger plans, the Brier Hill Steel Co., Youngstown, Ohio, is arranging to proceed with extensions to round out its finishing capacity. The first step in this program has been the disposal of $10,000,000 of first mortgage bonds to the Guaranty Trust Co., New York. The bonds will bear 5½ per cent interest. Proceeds will be used to finance expansion and changes.

The extensions will probably take the form of a strip steel mill, two lapweld tube mills and reconstruction of the company's 132-in. plate mill, so that it may be used as a sheared skelp mill. The strip unit will also be of such construction that it may be used as a small skelp mill, when necessary. Other extensions will probably be made at a later date, according to the program which has been outlined.

Only semi-official approval has been given the expansion outlined, and some deviations may therefore be made. Recently the company authorized the expenditure of $1,000,000 to modernize and improve its Thomas plant at Niles, a 12-mill sheet interest.

Decision by the Brier Hill company to proceed with an expansion program likely eliminates it from further merger negotiations at this time. Its representatives attended the negotiations connected with the originally proposed seven-company merger, which finally resulted in the Midvale-Republic-Inland combination, which collapsed last week.

Subsequently, efforts were made by the Brier Hill company to effect an amalgamation with the Trumbull Steel Co., but these plans fell through. On Tuesday, Sept. 26, directors of the Youngstown Sheet & Tube Co. attended a special meeting called by President James A. Campbell to consider a combination with the

Brier Hill properties. The plan was not to the liking of Sheet & Tube company interests, however, for Mr. Campbell issued a statement on Sept. 27, that directors were of the opinion the company should not further increase its investment in the Youngstown district.

"Brier Hill Steel is a splendid property," he stated, "with valuable ore and limestone properties, new and up-to-date blast furnaces, steel plant and finishing mills, but it is not so well balanced as it might be. With some additions in finishing capacity, it can be made a very strong and well rounded property."

Mr. Campbell denies reports that his company may be interested in a merger with the Inland Steel Co. It is considered likely, however, that the Sheet & Tube company will now direct its attention toward the establishment of a Chicago district manufacturing connection, either through construction of a plant, or acquisition of a going property producing pipe.

New Bethlehem Steel Co. Appointees

THE changes in the operating and sales departments of the Bethlehem Steel Co. due to its absorption of the Lackawanna Steel Co., announced in THE IRON AGE of Sept. 1, have become effective. George W. Whitehead, who has been appointed assistant general manager of the plants at Lackawanna, N. Y., started to work for the Illinois Steel Co. in 1900 and continued there until 1904, when E. A. S. Clarke became president of Lackawanna Steel Co. He then became connected with the Lackawanna company and served it as Bessemer superintendent, assistant general superintendent and general superintendent.



GEORGE W. WHITEHEAD

Robert E. Belknap, appointed district manager of sales Bethlehem Steel Co. at Boston, is a native of Yonkers, N. Y., and a graduate of Johns Hopkins University. After a few years with engineering contracting firms, Mr. Belknap joined the sales force of the Pennsylvania Steel Co. in 1901. In 1902 he went to Chicago, where up to that time the company had no representation. In 1906 he was promoted from assistant district sales manager to manager of sales of the Chicago district. He remained in that position until 1915, when he was appointed district sales manager in New York. In 1916 when the Pennsylvania Steel Co. was absorbed by the Bethlehem Steel Co., he returned to Chicago as district sales manager of the latter company. He has held this position continuously up to the time of his recent transfer to Boston.

R. B. Wallace, who continues at Boston as assistant manager of sales, entered the steel business with Bethlehem Steel Co. in 1909 and became its Boston agent in 1917.

Edward S. Illig, new Buffalo district sales manager, has been identified with the Bethlehem Steel Corporation since leaving college, almost 20 years. He started in the operating department of the Bethlehem, Pa., plant and after becoming fully acquainted with the manufacture of steel, in 1904 was assigned to the Pittsburgh office, becoming assistant sales agent in 1906. In 1907 he was transferred to the San Francisco office and placed in charge of Pacific coast sales of the company, holding this position until 1916. He then was transferred back to the Pittsburgh office and made manager of sales.

E. B. C. Goyne, formerly in charge of sales at St. Louis, succeeds Mr. Illig at Pittsburgh. Mr. Goyne's career is unusual because he left work to enter college. His first employment was with the American Locomotive Co., in 1901. After shop and drawing-room experience with it until 1908, he left to enter preparatory school, spending two years there, and then entering Lehigh University for a four-years' course in mechanical and civil engineering. In 1911, while at college, he did his first work for the Bethlehem Steel Co. After leaving Lehigh in 1914, Mr. Goyne did civil engineering work in connection with excavating and concrete construction until 1915, when he entered the Bethlehem service in machine operations on munitions work. He spent several months later in the open-hearth department, entering the sales department in July, 1916. In 1917 he was sent to St. Louis as district sales manager.

In connection with the re-organization of the executive departments of the Lackawanna mills of the Bethlehem Steel Corporation, Timothy Burns, general manager, announces several designations. Franc H. Burnett, formerly general purchasing agent of the Lackawanna Steel Co., has been named assistant to the general manager. Mr. Burnett entered the steel industry in 1895 at the Joliet works of the Illinois Steel Co. In 1904 he went to Lackawanna as assistant purchasing agent and in 1910 became general purchasing agent. C. B. Minnes, formerly assistant purchasing agent of Lackawanna, takes the designation of assistant to the purchasing agent of the Bethlehem Steel Corporation, with offices at Lackawanna. Harry J. Kelly, formerly assistant superintendent of the Lackawanna Steel Co., is appointed superintendent of rolling mills. H. F. Miller, also a former Lackawanna assistant superintendent, is appointed superintendent of open hearth and Bessemer departments.



ROBERT E. BELKNAP



R. B. WALLACE



FRANC H. BURNETT



E. B. C. GOYNE

Practically all of the 250 workers at the Ames Shovel & Tool Co. plant in the Brockton, Mass., district have gone on strike.

CONTENTS

October 5, 1922

Basic Business Conditions Favorable 855
Production Running at 1919 and 1920 Rate of Activity—Iron and Steel Far Below, Due Largely to Coal and Locomotive Shortage

Cold Rolling Mill with Wedge Adjustment 857
Continuous Strip Mill of Worcester Pressed Steel Co. Has Exceptional Control for Both Gage and Speed

Iron the Main-Stay of Present Day Life 859
Fundamentals in the Metallurgy of Steel Stated in Terms of Familiar Speech—What Electrical Development Owes to Iron—Steel the Modern Supplanter

Forming Gear Teeth by Hot Rolling 861
Improved Machine Finishes Teeth Complete in One Operation—Accuracy and Increased Output Features—Construction Outlined

British Meeting on Non-Ferrous Metals 865
Corrosion, Brasses and Bronzes for Superheated Steam Work and White Metal Bearing Metals Discussed at Meeting of Institute of Metals

Canada's Trade with United States Declines 867
Value Has Fallen Off 56 Per Cent in Year—Outlook for at Least Partial Recovery —Better Economic Conditions in Dominion

Pig Iron Production in September 882
Daily Output 9205 Tons More Than in August—Gain of 45 Active Furnaces

Electric Strip Mill Drive 858
Cornell Pittsburgh Reunion 858
Outing of New England Iron and Hardware Association 860
Farm Equipment Manufacturers' Convention 860
Railroad Rates 863, 869
Farrell Plant Resumes 863
Sapihl Portable Electric Grinding Machines 864
Motion Study Data Exhibited 864
Molybdenum as an Alloying Element 864
British Foreign Trade—Exports Increase. 866
Greater Use of Rivers for Steel Shipments. 866
To Handle Pulverized Fuel with Compressed Air 868
Reducing Hematite to Magnetite with Methane 868
Philadelphia Bridge Tower 868
Lower Temperature in Preheating Cast Iron Thermit Welds 869
Scrap in the Open-Hearth Process 869
Powers of Congress Over State Corporations 869
Combination Crane and Shovel 869
Fosdick High-Speed Ball Bearing Sensitive Radial Drilling Machine 870
Fewer Metal Workers and Higher Wages. 870
Car Shortage Greatly Retards Shipments 871, 872
Locomotives Out of Repair 871
Ground-Form Gear Cutters 872
Tilting Bar Flexible Coupling 872
Steel Mergers Abandoned 873

Editorials 876
International Debts and Trade—The Elastic Tariff Provisions—The Advance in Alloy Steels—Economy in Railroad Operation.
Correspondence 878
What "Laboratories for Research in Facts" Mean to Industry.
Japanese Inquiries Increase 879
No Early Improvement in Car Supply 879
German Price Rise Halts 880
French Market Improves 881
Officers of Steel Treating Society 883
Refractories Market 889
Fuel Problems to Engage Steel Institute. 896
Industrial Electrical Heating Exhibit 896
Fabricated Steel Business 898
Railroad Equipment Buying 898
Steel Rail Orders 898
Large Coal Production 899
Alabama Export Shipments 899
British Iron and Steel Market 902
Westinghouse District Office Personnel 903
Green Engineering Co. Absorbed 903
Armstrong Steel Co.'s New Plant 903
Colorado Fuel & Iron Co. Employees Work Throughout Strike 903
Atlas Steel Corporation Formed 903
Nagle Steel Co. Organized 903
Trade Changes 904
Plans of New Companies 904
Industries to Promote Safety 905
Iron and Industrial Stocks 915
Steel Corporation Stockholders 915

Iron and Steel Markets 884
Comparison of Prices 885
Prices Finished Iron and Steel, f. o. b. Pittsburgh 897
Non-Ferrous Metal Market 899
Personal Notes 900
Obituary Notes 901
Machinery Markets and News of the Works 906
New York Jobbers' Prices 916

ESTABLISHED 1855

THE IRON AGE

EDITORS:

A. I. FINDLEY WILLIAM W. MACON GEORGE SMART

CHARLES S. VAN [illegible], Advertising Manager

Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

E. J. Frank, President [illegible] U. S. A. George H. Griffiths, Secretary

Owned by the United Publishers Corporation, 239 West 39th Street, New York. H. M. Swetland, Pres. Otto Ruhe, Vice-Pres. A. C. Pearson, Pres. E. J. Frank, Secy.

BRANCH OFFICES: [illegible] Pittsburgh: Park Building. Boston: 410 Unity Building. Philadelphia: 1420-1422 Widener Building. Cleveland: Guardian Building.

Detroit: 317 West Fort St. Cincinnati: Mercantile Library Bldg. Buffalo: 881 Ellicott Square. Washington: 26 Jackson Place, N. W. San Francisco: 320 Market St. London, Eng.: 11 Haymarket, S.W.1.

Subscription Price: United States and Possessions, Mexico, Cuba, Shanghai, $6.00; Canada, $8.50; Foreign, $12.00 per year. Single copy 25 cents.

Entered [illegible] the year 1879, at the Post Office at New York, New York, under the Act of March 3, 1879.

International Debts and Trade

We have had now nearly four years of failure of international trade to get on a working basis, and with the passage of our tariff act emphasis needs to be laid upon the fact that something must be done. It ought not to be necessary to emphasize the point, since the circumstances stand out so plainly, but there is widespread and marvelous ignoring of the circumstances.

A debt of about 11 billion dollars is owed us by foreign governments. There are many who insist that this is a real debt. The attitude of our Government is that it is a real debt, since machinery for its "funding" has recently been established. Our "favorable merchandise trade balance" was about 4 billion dollars in 1919, 3 billions in 1920 and 2 billions in 1921. For the 47 months following the armistice the total may be taken at 10 billion. The two items would make a total due us of 21 billion dollars. There are other items, the net influence of which would be to reduce this total somewhat, but for the long range view a few billions one way or the other would matter little.

A large part of the excess of our merchandise exports has been funded in various ways. A portion of the indebtedness remains unfunded. It is more or less a detail whether the indebtedness is funded or unfunded.

Before the war we had an unseen balance against us of about half a billion dollars a year. This was equalized by our merchandise exports exceeding our merchandise imports by this amount. There is little if anything left of this unseen balance, and for a broad view the item may be ignored. Lately our merchandise trade balance has been running in our favor, to use the common phrase, by three-quarters of a billion a year. Five per cent on 20 billion would be 1 billion, so that we seem to be looking for payment to us of about 1¾ billions a year, not to speak of any repayment of principal. Yet we are complaining that our exports are not large enough.

In the early months of this year the country was absorbing foreign loans with considerable avidity. These loans represented a funding of old obligations rather than the establishment of credits for fresh merchandise purchases in the United States. Now such loans are not in demand, their flotation having become quite difficult. Such funding merely postpones payment, and meanwhile interest obligations must be met or be allowed to pile up, increasing the total upon which interest is expected.

If before the war any one had ventured to prophesy the condition now existing he would have been ridiculed. Various positive proofs of the impossibility would have been presented. One argument would have been that no country could grow so rich. Another would have been that if on paper it did grow so rich the obligations would not be worth their face.

Apart from the serious question of whether these debts are good, there is the riddle that we want payment while our debtors cannot pay, and we do not wish to accept payment; for when the practice of adding the interest to the principal stops, the interest must be paid in merchandise.

As to the European countries being unable to pay, the figures of their merchandise trade recently are impressive. In the first six months of this year the United Kingdom had imports 20 per cent above the exports, while France had an excess of 14 per cent. Italy in four months had imports approximately double its exports. Germany, which is expected to pay reparation, had imports 9 per cent above exports. The countries that are expected to make payments have been importing more than they exported, while the country that expects to receive payment has been exporting more than it imported and actually wants to increase this merchandise balance.

Activity in the tin plate branch of the British steel industry is marked and approaches pre-war proportions. This is not true of most other branches. At the end of June, 471 British tin plate mills were operating, which was the largest number for the year. At the peak of activity in the last four years, 514 mills were operating at the end of June and July, 1920. The recent prosperity is also reflected in British tin plate exports, which for this year averaged 37,270 gross tons per month to Sept. 1, or only about 3000 tons per month less than the average for 1912 and 1913. In contrast to this, the American export move-

ment, while only about 20 per cent in volume, at an average of 6300 tons per month to Aug. 1, this year, is practically equal to that of 1913. Of only one other steel product does Great Britain export more than of tin plate, and that is galvanized sheets, in which to Sept. 1, the 1922 movement averaged 43,800 tons per month. This is much less, however, than the pre-war rate, galvanized sheets having long been the premier export product of the British steel industry. Current world demand for tin plate may be said to be nearly equal to that before the war.

The Elastic Tariff Provisions

The announcement by the National Automobile Chamber of Commerce that immediate action under the elastic powers accorded the President by the new tariff law will be asked by representatives of the automobile industry who are arranging for a conference with the Tariff Commission in Washington is an indication that these provisions will not be allowed to lapse into desuetude. Our manufacturers of automobiles have enjoyed an important share in the world's business in motor vehicles and hope to retain it if Washington acts in accordance with their plans.

As the duty on automobiles has been reduced to 25 per cent, manufacturers believe that this is a basis for uniformity of tariffs in all countries. France now has a duty of 45 per cent on American cars. Italy has been collecting 35 per cent plus a duty based on weight, and the United Kingdom has a duty of 33 1/3 per cent. It is believed these duties could be adjusted easily to conform to the American tariff. The problem as to the colonies is not so easy. Mother countries have favored their colonies to the great disadvantage of American exporters. To meet this condition, the President, under the new law, can increase the duties by 50 per cent on products from any country that does not accord fair treatment to American commerce. Still other discriminations exist, in addition to those resulting from colonial policies, and it is pointed out as an example that Finland is allowing a French exporter a duty of only one-fourth of that charged the American shipper.

Automobile manufacturers have many grievances, as have other manufacturers, and the taking of the action above referred to is likely to be followed by similar proceedings, so that the President and the Tariff Commission will have a large number of important investigations to make. For this reason it is being urged by some writers in the newspapers and magazines that the President will be overwhelmed on account of the great weight which will be added to his already heavy burden. Doubtless the new provisions of the tariff act will add somewhat to the President's duties, but by far the greater part of the work connected with investigations will be carried on by the Tariff Commission and its large corps of assistants. Other Presidents of the United States have undertaken most important investigations, particularly in connection with the settlement of international boundary disputes, but no one imagined for a moment that the President himself would devote any large amount of time to the details of such investigations. Under the new law, the President will owe it as a duty to himself and to the country not to assume any burdens that can be entrusted to the Tariff Commission.

The country will share the hope of the President that much may be accomplished under the so-called elastic provisions of the Fordney-McCumber act. The question of their constitutionality has not yet been determined, but probably will be before many months and then, if the decision is affirmative, the manufacturers will have an opportunity to present their causes with the assurance that orders issued by the President, following investigations by the Tariff Commission, will be carried out. It will then behoove manufacturers to make appeals to Washington only when there is substantial ground for such action and to make the presentation of their cases as clear-cut and concise as possible.

The Advance in Alloy Steels

The fact that ferroalloys were the chief subject of contention in the preparation of the metal schedule of the Fordney-McCumber tariff is some measure of the new place alloy steels have taken in only recent years. The war had brought out in strong relief the resources of various countries for the production of special steels, giving their armies and navies preponderating strength, and thus a new factor has entered into the international reckoning in respect to certain metals. With all that was learned in the four years following 1914, of the military value of alloy steels, developments since the war make it quite evident that their advance in the industries of peace will be more rapid than ever. From being thought of during the war chiefly as military and political essentials, they are now being recognized in certain industries as absolutely necessary to the maintenance of a competitive commercial position.

An article on page 791 of THE IRON AGE of Sept. 28 showed how, from the small proportions of 1909, when the first statistics of their production were gathered, alloy steels have now come to occupy an indispensable place. In 1909 less than 1 per cent of the total steel production of the country was alloy steel. In 1917, when steel ingot and castings output reached high point at 45,060,607 gross tons, alloy steels were 1,644,335 tons, or 3.65 per cent. In 1921, despite an almost unparalleled industrial depression, and with a total steel production four million tons less than in 1909, the alloy steel output was nearly 4½ times as large as in the first statistical year. Of the 809,500 gross tons of alloy steel made in 1921, or 4.10 per cent of the total, a large proportion went into automobiles, particularly as forgings, and the locomotive industry also had an important place as a consumer of both forgings and castings.

The most spectacular feature of the alloy industry, as indicated in a diagram accompanying last week's article, has been the rise in the curve representing alloy castings made in electric furnaces. Such castings represent in part competitive substitutes for carbon steel forgings—a development admittedly having large possibilities. A comparatively recent factor is the production of large rolls of iron and steel which, after special

heat treatment are found to have superior properties.

In the non-ferrous industry, improvement in established alloys and the introduction of new ones are making such strides that it is difficult to keep pace with them. In industrial importance and metallurgical value these developments quite equal those in alloy steels. Brass and aluminum alloys are familiar, and more recently magnesium alloys have attracted attention. Aluminum and magnesium in steel have made air-plane progress more rapid, and are responsible for the all-metal plane. In the field of heat treatment non-ferrous alloys are notable in having made possible the electric resistance furnace.

The proceedings of the engineering societies and the pages of technical periodicals tell the same story as the statistics, of the march of the special steels. The space they thus occupy to-day probably represents not less than the ratio of 4½ to 1 between the production figures of 1921 and those of 1909. Their increasing importance finds fresh recognition in the program of the American Society for Steel Treating at Detroit this week, and that of the American Iron and Steel Institute, soon to be held in New York.

Economy in Railroad Operation

The general public probably does not realize the amount of trust it has placed in railroad officials by enacting the present transportation act. The act prescribes that railroad rates shall be such as to yield a certain annual percentage upon the value of railroad property. For the first two years of the act, or to March 1, 1922, this rate was to be 5½ or 6 per cent, according to the judgment of the Interstate Commerce Commission, the rate thereafter to be such as the commission should prescribe. The current rate, as fixed by the commission, is 5¾ per cent. Should a road earn more than 6 per cent, there are provisions as to the excess that make the chances of any road regularly disbursing to security holders more than 6 per cent relatively remote.

The important point about this arrangement, a point that hardly receives the attention it should, is the close connection between rates and investment. The connection is not between rates and service. Were there no restrictions, the position would be that no matter how much money the railroads should "invest" there would be a return practically assured upon that sum. It is true there are restrictions but they do not remove the general underlying principle. It is prescribed that the railroads shall be economically operated, but the act does not define any standard of economy. Expenditures for improvements must be sanctioned by the commission.

Yet with the restrictions the fact remains that the public has reposed great confidence in the men who operate the railroads, in trusting them to run the railroads with economy and efficiency. In nearly all other commercial enterprises the managers have the direct incentive of profit. The smaller the capital investment the enterprise can get along with, the greater the relative return. Any replacement of the ordinary laws of trade in favor of a system that would give a manufacturer or dealer a profit dependent upon the investment he chanced to have would be considered absurd and directly contrary to public policy.

The transportation act has not been criticized on account of this provision. Its labor provisions have been criticized very severely, yet it is not considered altogether probable that it will be amended in that respect. Thus there is no likelihood of its being amended in respect to the principle governing the making of rates. Accordingly, the public can expect to pay rates for an indefinite number of years that are based as nearly as circumstances may permit upon the investment.

Ideas that have long outlived their usefulness often die hard. It used to be the universal belief throughout commercial circles that railroad expenditures were "good" for business. As a rule there was no disposition to discriminate. Just so the railroads spent money, the influence was beneficial. The situation is fundamentally altered by the transportation act. The rest of the country may make a 10 per cent profit on railroad expenditures for improvements, but ever afterward it must pay something like 6 per cent a year on the capital sum. The interest of the public, therefore, is that railroad investment should increase only as becomes absolutely necessary in the interest of efficiency and economy.

Metal Schedule of New Tariff Law

The full text of the metal schedule of the Fordney-McCumber tariff act, which became a law Thursday, Sept. 21, and was published in THE IRON AGE of that day, has been reprinted in pamphlet form and copies will be sent free of charge to any subscribers who ask for them. The pamphlet gives also the duties in the two preceding tariff laws.

CORRESPONDENCE

What "Laboratories for Reseach in Facts" Mean to Industry

To the Editor: May I direct attention through the columns of THE IRON AGE to an admirable article in *Science* of Aug. 25, entitled, "The Record of Science"? This article is the address of William Warner Bishop, formerly chief of the reading room of the Library of Congress, before the Michigan Chapter of Sigma Chi. Mr. Bishop has taken for his text the statement that "Bibliography is the foundation of Research." No man could be better equipped to argue the case. The thought uppermost in his mind is that we are getting too far away from utilization of the records of science. We are depending too much upon observations made in the laboratory.

Facts seem to support Mr. Bishop, for we find that the National Research Council lists in its "Research Laboratories in Industrial Establishments (alone) in the United States" 526 firms operating laboratories for research. In *Science* for Jan. 13, 1922, on page 51, we find a summary of the publication issued by the National Research Council on funds invested in research. This summary indicates that there are available 565 separate funds for all kinds of research, from medicine to mathematics, representing an annual yield totaling over $22,000,000. Yet I venture to assert that not 50 per cent of the 526 industrial firms operating research laboratories maintain laboratories for research in facts or, to use Mr. Bishop's phraseology, research in the "book sciences."

The relative proportion spent on bibliography, or as

I choose to call it, research fact-oring, or searching for facts, is illustrated in a case I know of, where a large industrial organization invested over $400,000 in a research laboratory building and in the library included not one-tenth of that amount was expended in the original investment. Yet bibliography *is* the foundation of research.

And now let us look at the heart of the heart of the "workshop of the world." The Directory of Special Libraries, published in 1921, shows that in Pittsburgh there is no great laboratory for research factoring in iron and steel. Yet Mr. Carnegie has been reported to say that his firm wasted thousands of dollars because it did not find out what others had done first.

Pittsburgh is reported the center of the coal mining industry, yet we find no great laboratory of research factoring in coal mining.

The one bright spot in the workshop of the world is the unprecedented action of the Pittsburgh section of the American Chemical Society's library committee in raising a fund of over $2,000 which it turned over to the Technology Department of the Carnegie Library of Pittsburgh for the common good. Again the chemists are to the fore!

It is a little early yet, perhaps, to suggest to the hard-headed business man of this country that he should invest money in endowments for laboratories in research factoring and fellowships in "book sciences." But he might well begin to think about it. Even in Europe's unsettled condition we find that much attention is being given to the establishment of laboratories for research factoring.

In line with the above there appears in *Chemical News* (London), for Sept. 15, p. 153, the following statement: "Among the more specific problems which confront this board (a proposed board on regulation of research for the British Association for the Advancement of Science) are the following:

"1. The creation of research libraries where reference works can be consulted immediately.

"2. The provision of publication grants, so that where no periodical literature is available the work will not remain buried or obscure.

"3. The allocation of traveling grants to enable workers to visit libraries, to inspect manufacturing processes, and to attend the meetings of scientific societies."

These suggestions were brought forward by Principal J. C. Irvine in his address on "The Organization of Research." Evidently the British are going to make an attempt at building up the foundation of science, in other words, to build up bibliographic aids, which would seem to substantiate Mr. Bishop's assertion that "bibliography is the foundation of research."

K. C. WALKER,
Research Reference Assistant.
Bureau of Mines, Mining Experiment Station,
Pittsburgh, Sept. 27, 1922.

JAPANESE INQUIRIES INCREASE

Rails, Tin Plate and Locomotive Tires Included—German Quotations to Japan Low

NEW YORK, Oct. 3.—Although the situation in export trade shows no change, there is evidence of improvement in trade with Japan. At present trade is still largely confined to governmental and municipal buying, but inquiry from merchants is increasing. A request for prices on about 2000 tons of light gage black sheets was recently received by one Japanese house in New York, and although the business is not expected to materialize, this house reports booking some small orders, one of which was for about eighty tons of light gage black sheets. This exporter also received an order for about 600 tons of steel gas pipe of various specifications.

Bids are now being received from American mills on two good sized tin plate inquiries. One of these is from the Hokuyo, a large Japanese fishing organization with interests in the vicinity of Kamchatka and is being handled through a large Japanese export house which holds an interest in this organization. About 12,000 boxes of tin plate for canning is involved, but under present plans probably not more than 6000 boxes will be placed in the United States and the other half of the order will go to United Kingdom mills. Another tin plate inquiry from a Japanese oil company calls for 5000 boxes of oil can tin plate.

Among the Japanese railroad tenders is one from the municipality of Osaka, calling for bids on two miles of girder rails, one mile of 92-lb. and one mile of 102-lb. rails. The South Manchuria Railway Co., which has had a small order for about 700 tons of tie plates pending for some time, has placed it with the Mitsubishi Shoji Kaisha, 120 Broadway, New York and is now asking for bids on 250 locomotive tires. An inquiry for about 150 tons of structural steel for a bridge is pending from governmental sources.

German quotations on steel to Japan are still considerably below the best prices obtainable from British makers. On a recent inquiry from Japan for about 100 tons of ¾-in. to 3-in., mild steel bars, rounds, squares and flats, an exporter in New York received a bid of £11 14s 3d per ton, c and f. Japanese port from a British seller, and a price of £9 7s per ton, c and f. from a German house.

The Chinese market continues dull with the exception of the usual demand for wire shorts. According to the Bureau of Foreign and Domestic Commerce, the Sung Hang Railway Co., has been incorporated with capital stock of $600,000 (about $300,000 United States) for the purpose of constructing a narrow gage railroad from Sungkow, Kwangtung Province to Shanghang, Fukien Province, a distance of about fifty miles. One object of the railroad is to overcome the present necessity of transporting all cargoes from these districts across the Han River rapids and unnavigable parts of the river.

Twelve railroads, the total cost of which will be about £8,000,000 are under construction in Australia, says a report to the Bureau of Foreign and Domestic Commerce. In addition to these there are the city railroads and the Broken Hill line, the latter estimated to cost £1,277,440 completed. In addition to the twelve under construction five more railroad projects have been authorized but not begun. One of the largest projects under consideration is the Clarence River bridge to complete the North Coast Railway. Its cost is estimated at £500,000.

Early Improvement in Car Supply Not Expected

WASHINGTON, Oct. 3.—Complaints coming to the Federal Fuel Distributor from the iron and steel industry that large stocks have accumulated and are piling up on account of car shortages have met with the response that substantial relief probably will not develop for a month due to demands for the movement of coal under priority orders. It is believed that after this period and closing of the lake navigation season, the coal supply and transportation movement will be near normal and will make it possible to move steel stocks piled in mill yards and will result in increased production.

At the White House to-day it was announced that the President probably on Friday will name the fact finding commission to inquire into the coal situation. In as much as coal operators have declined the request of the President to select names outside of the industry, the commission will be selected without regard to the suggestions of the operators.

The Punxsutawney Furnace Co., Punxsutawney, Pa., is planning to light its furnace, which has been down for about 19 months, at an early date. The Adrian furnace, Dubois, Pa., is undergoing repairs and it is unlikely that the furnace will go into blast until after the first of the year.

GERMAN PRICE RISE HALTS

Temporary Cessation of Step-Like Increases in Iron and Steel

(By Radiogram)

BERLIN, GERMANY, Oct. 2. — Rising of prices has ceased temporarily. Foundry iron No. 1 is now 27,413 m. per metric ton. ($14.50 per gross ton, at 5⅜c. per 100 m.). Steel ingots are 34,370 m. ($18.18); steel bars, 46,930 m. (1.144c. per lb.); steel sheets 1 mm. (No. 19½ United States gage) thick, 69,750 m. (1.70c. per lb.).

[These prices replace 26,242 m. ($25.78) for foundry iron No. 1 on Sept. 18; 34,370 m. ($24.44) for ingots; 46,930 m. (1.49c. per lb.) for bars and 52,750 m. (1.675c. per lb.) for sheets exceeding 5 mm. (No. 6 United States gage), all figured at the exchange, 7c. per 100 m., then prevailing.]

Market conditions are continuing strong. The number of unemployed for all Germany has reached a new low record at 11,960, but officials predict a decline in activity.

Stocks of iron and steel corporations have undergone a new rise, the stock index average since Jan. 1 having risen from 229 to 429. The General Electric Corporation (Allgemeine Elektricitaets Gesellschaft) is raising its capital stock by 300,000,000 m. to 1,400,000,000 m.

Siemens-Schuckert interests have concluded a contract with the Soviet Central Electrical Board to supply large quantities of electrical goods on credit. Moscow *Izvestiya* says agents of Otto Wolff, Cologne, have arrived to propose a new scheme for the restoration of the Southern (Russian) steel works.

Otto Wolff, said to be the largest iron dealer in Germany and to control 80 per cent of the tin plate output of that country, has announced the formation of a far-reaching trust on the lines of the Stinnes electrometal combination. In co-operation with Commercial Counselor Haniel he has combined the Phœnix Coal & Steel Co. with the Rhenish Steel Co. The Phœnix company already controls nine important concerns, including the Reiersteig shipyard at Hamburg; while the Rhenish Steel Co. controls five corporations, of which the largest is the Arensberg Smelting Co., Essen. These sixteen corporations constitute the metal wing of the new combination.

An electric wing and a shipping wing are included also. The electric group is made up of the Dessauer Co., which controls thirteen electric and gas concerns, and the Schorch plant at Rheydt, in Westphalia. Schorch already has effected an alliance with Saxony's largest electric concern. The shipping group consists of the Argus, the Roland and the North German Lloyd lines.

It is estimated that the combined capital of this entire Wolff group is 3,000,000,000 m., of which 2,000,000,000 m. represents the companies other than shipping. The organization gathers strength financially from its backing by the florin capital of the Dutch Blast Furnace Corporation, which lately acquired a large block of Phœnix stock.

GERMAN RAPID PRICE CHANGES

Many Companies Quoting in Foreign Currency—Reparations in Goods Contract Explained

BERLIN, GERMANY, Sept. 11.—The contract which has been concluded by Hugo Stinnes and the Marquis de Lubersac for the reparation in goods may start a new era in the relations between France and Germany. It is doubtful whether deliveries could take place as swiftly as expected, as the scarcity of building materials is acute in Germany. Production at cement, brick and lime works is hampered considerably by the scarcity of fuel. It is a noteworthy feature of the agreement that a certain amount of reparations coal is to be retained by Germany for the production of the materials which are to be supplied. The works may thus be brought up to a higher rate of production with the additional supply of fuel.

Provided the details of the agreement can be satisfactorily arranged, the French people in the devastated area may at last see a reparation which is of advantage to them and German industry has a certain security against extensive unemployment in the crisis which is expected. The agreement is a private contract and the material delivered is to be paid for by the French customer with a check to the German producer which the German Government will send to the reparations committee. The direct demand for iron and steel products will probably not be great, and the heavy industry has shown little interest in the question of reparation in goods, but the contract concluded seems to be paving the way for similar agreements, and negotiations in the iron and steel and other industries are already reported.

The quotations for scrap iron and steel are at present about ten times the price at the beginning of the year, and are fluctuating between 18,500 to 20,000 m. for iron and steel and up to 30,000 m. for cast iron (machinery). The Metallotorg, the Russian metal trade office, has shipped 13,250 tons of scrap and an old ship of 5400 tons to Germany. Up to Aug. 15, the average daily shipments have been 500 to 650 tons, but it is intended to bring them up to about 1200 tons.

The scarcity of iron has been more pronounced lately. The supply of fuel to the works is still insufficient and production is also hampered considerably through the shortage of limestone. The import of foreign ore is decreasing because of the heavy decline in the mark. German ore is still considerably cheaper than imports in spite of the heavy increases which have taken place lately.

The Pig Iron Association has rationed supplies to customers in order to finish old contracts, and the rate of imports is being maintained. Luxemburg pig iron is quoted at about 200 fr. at the frontier. Of the present deliveries of the association about 15 per cent of the iron is imported. The demand for rolled material is undiminished. Bar iron and plates are in special demand. Business in heavy sheets is still quiet. Imports of material from the Saar districts and Lorraine have further increased. The demand for wires and tubes is brisk. Export duties have been increased 60 per cent despite protests of the industry.

Seeking a Currency for a Trading Basis

At the Leipzig autumn fair some firms were using their gold mark (pre-war) prices as a basis for calculation by multiplying that amount with a certain figure which they arrived at by dividing the present exchange value of the dollar by 4.20. As wages and other charges have not increased in the same proportion the prices thus obtained were too high. This practice and the demand by other firms for payment of home orders in foreign currency has added in no small degree to the unpopularity of the last autumn fair.

A recent meeting of the Federal Association of German Industry concluded that there would be no advantage in introducing a new kind of currency to which the amounts of all balance sheets, taxes, wages, etc., would have to be reduced. It was pointed out that it would be difficult to determine exactly the index numbers which were to be used in reducing the present inflated amounts to gold mark or index mark, and that the showing up of the real amount of the inflation and the paying of wages and salaries in gold marks would raise prices and would possibly lead to a further decrease in the present value of the mark.

Several industries are now quoting their prices

either altogether in foreign currency or, as this meets with considerable opposition by the customers, they are quoting in what is called "broken" currency. Part of the price especially for imported material is quoted in foreign currency, and the rest which is to constitute the German cost of production is quoted in marks. In some lines, Solingen hardware and cutlery for instance, the gold mark prices have caused a slackening of business.

The "Eisenwirtschaftsbund," while not prescribing actual payment for home deliveries in dollars, has adopted the system of fixing its prices once every ten days according to the dollar exchange, and not according to the home production cost in marks. This procedure is rapidly spreading; with the result of a dual currency, and the prospect of a favorable development as at close of the assignat and mandat system of the French Revolution.

The dollar has begun to play the rôle of the French hoarded gold and silver, and possibly foreshadows, as in France, an easy, automatic death for the paper currency by which bondholders and mere mark holders will lose, but trade and industry, as in France, will probably gain.

FRENCH MARKET IMPROVES

More Furnaces in Blast But Coke Difficulties Feared—Prices Firm and Mills Booked Ahead

PARIS, FRANCE, Sept. 14.—The situation is satisfactory, although inland demands, which are now covered for some time to come, are not as active as they were in August. Export sales, however, are still rather strong.

On the other hand, furnaces which feel anxious about future coke supplies, do not want to be bound too far ahead. The price of Ruhr metallurgical coke was raised Sept. 1 to 6,018 m. per ton at ovens, which, at to-day's rate of exchange is equivalent to about 54 fr. German freight rates have been increased fifty per cent. Therefore, any upward move of the mark would have a considerable effect on the delivered price of the coke supplied to French blast-furnaces. The September adjusted price of coke is 95 fr. at the Franco-German frontier.

Rumor of an agreement between French and German iron and coal interests for an exchange of French iron ore for German coke has been current recently, but so far there has been no official confirmation.

Iron Ore.—Production of the French mines is increasing and sales are now easier. Present prices of minette, at mines, per metric ton are: Thionville (average grade) 11.50 fr. to 12 fr.; Briey 14.50 fr. to 15 fr.

Pig Iron.—Production of pig-iron in July was 428,115 tons, against 415,752 tons in June. The production of steel was 368,666 metric tons in July and 2,413,170 metric tons for the first seven months of 1922.

On Aug. 1, 94 furnaces were in blast, 62 ready to blow in and 64 under construction or repair, compared with 91 in blast on July 1.

There is some export demand for basic pig-iron, but French ironworks absorb nearly the whole production and have very little to spare. In foundry iron, available supplies are now restricted and No. 3 chill cast foundry iron is firm at 220 fr. at Eastern producing works. A few small sales of pig-iron to the United States are being reported.

It is reported that the United States has made inquiries for large quantities of French hematite, low in phosphorus. The specification of low phosphorus may prove an obstacle to most French producers, as hematite currently used in France contains about 0.10 per cent phos.

Semi-finished Steel.—This market is firm, with a rising tendency, and delays of delivery up to three months' duration are sometimes asked for. Latest prices per metric ton at Lorraine works are as follows (basic steel): ingots, 310 fr.; blooms, 315 to 320; billets, 340 to 345; flat bars, 360 to 365.

A rise of 5 or 10 fr. on these prices is considered imminent.

Beams.—Although the season for beams is nearing its end, there is still good business. Delays of delivery are from 7 to 8 weeks.

Rails.—There is a rather good inland demand for rails and there have also been a few transactions for export. A concern in eastern France has sold a small quantity of mine rails, weighing less than 14 kg. (28 lb. per yard) at 410 fr. f.o.b. Antwerp.

Rolled Merchant Products.—Although the demand has slackened, mills have enough orders on hand to insure regular working for some time and, consequently, are not making any special effort to obtain new orders. Present base price at Eastern producing works is 440 to 455 fr. The price for large shapes is 425 fr. Delays in delivery are from 14 to 16 weeks for small and 10 to 12 weeks for large shapes.

Plates and Sheets.—Notwithstanding the lack of orders from ship yards, sheet mills are generally booked until November. The restarting of a few plants has increased the ouput and diminished delays of delivery, which are now from 8 to 10 weeks for light sheets, 4 to 6 weeks for medium and 4 weeks for heavy sheets. Base prices have so far not been changed, but it is possible that they may be raised at the next meeting of the Comptoir des Toles as Belgian prices for light sheets have just been increased by 25 fr.

Castings.—The improvement is being maintained and delays of delivery are increasing.

Scrap Higher at Detroit

DETROIT, Oct. 3.—Practically all grades of scrap materials in this district show advances as compared with prices a week ago. While the shortage of pig iron is reflected in these advances, the acute demand in other districts has worked to the disadvantage of local melters. It is presumed the Dodge lettings on 3000 tons of turnings, borings, flashings and hydraulic compressed for October delivery will go to Cleveland and Valley points as heretofore. Large tonnages of machinery cast and stove plate are going to the Chicago market despite the freight rate of $3.78 per gross ton on these materials. Production does not seem to have fallen off and producers report they have not experienced any shortage of equipment to make their scheduled deliveries. The following prices are on a gross ton basis, f.o.b. cars producers' yards, excepting stove plate, automobile and No. 1 machinery cast, which are quoted on a net ton basis:

Heavy melting steel	$16.00 to $16.50
Shoveling steel	15.50 to 16.50
No. 1 machinery cast	24.50 to 25.00
Cast borings	12.50 to 13.50
Automobile cast scrap	25.00 to 26.00
Stove plate	17.00 to 18.00
Hydraulic comp.	17.00 to 18.00

Proceedings of the eighth annual meeting of the International Association of Industrial Accident Boards and Commissions have been published in Bulletin No. 304 of the United States Bureau of Labor Statistics, in the series on workmen's insurance and compensation. It traces in a comprehensive way the progress of compensation legislation as discussed in the opening session on Sept. 19. Special stress was placed on administrative problems under state funds in this country. Among other subjects of special significance outlined in the report are: accident prevention, the rating of permanent disabilities, medical problems, methods of procedure in accident reporting, administrative troubles and whether compensation commissions should administer accident prevention and other labor laws.

Costello patent furnaces are to be installed by Tate-Jones & Co., Inc., in the eight mill plants which the Weirton Steel Co. is building at Weirton, W. Va. The equipment will cover pair furnaces, sheet furnaces and box annealing furnaces.

SEPTEMBER IRON OUTPUT

Gain Last Month 9205 Tons Per Day as Compared with August

Fifty-Two Furnaces Blown in and Six Blown Out or Banked

The expected upturn in the pig iron production of the country, following a settlement of the coal and railroad strikes, is distinctly evident from the returns of blast furnace production for the month of September. According to statistics collected almost entirely by telegraph, there was a net gain of 46 furnaces during September; 52 furnaces were blown in and 6 were blown out. During July and August there was a net loss of 48 furnaces. Therefore, at the beginning of October the industry has virtually retraced its steps so that the number of furnaces active on Oct. 1 was 190 as compared with 192 on July 1. The actual gain in daily output was 9205 tons per day in September over August.

The production of coke and anthracite pig iron for the 30 days in September amounted to 2,033,720 gross tons or 67,791 tons per day as compared with 1,816,170 tons or 58,586 tons per day in August, a 31-day month. This represents a gain of 217,550 tons over September, but because many of the furnaces which resumed operations in September came in near the end of the month, the October output will be more representative of the recovery of the industry than the record made in September.

The total number of furnaces in blast on Oct. 1 was 190 as compared with 144 on Sept. 1, with 172 on Aug. 1 and with only 69 on Aug. 1, 1921, the low point in last year's depression. The capacity of the 190 furnaces in blast on Oct. 1 is estimated at 77,500 tons per day, as compared with 54,645 tons per day for the 144 furnaces in blast on Sept. 1.

The manganese-iron alloy output for September also suffered a decline at 14,916 tons, which is the lowest since April. Of the September output 10,681 tons was ferromanganese and 4235 tons was spiegeleisen.

Daily Rate of Production

The daily rate of production of coke and anthracite pig iron by months, from September, 1921, is as follows:

Daily Rate of Pig Iron Production by Months—Gross Tons

	Steel Works	Merchant	Total
September, 1921	27,189	5,661	32,850
October	33,365	6,850	40,215
November	37,960	9,223	47,183
December	41,173	12,023	53,196
January, 1922	42,150	10,933	53,083
February	46,857	11,387	58,244
March	53,547	12,128	65,675
April	56,930	12,140	69,070
May	60,619	13,790	74,409
June	62,534	16,167	78,701
July	62,295	15,297	77,592
August	45,673	12,914	58,586
September	53,856	13,935	67,791

The figures for daily average production, beginning with January, 1916, are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since Jan. 1, 1916—Gross Tons

	1916	1917	1918	1919	1920	1921	1922
Jan.	102,746	101,643	77,799	106,525	97,264	77,945	53,063
Feb	106,456	94,473	82,835	105,006	102,720	69,187	58,214
Mar.	107,667	104,882	91,611	99,685	108,900	51,468	65,675
April	107,592	111,165	109,607	82,607	91,327	39,768	69,070
May	108,422	110,238	111,17	68,002	96,312	39,394	74,409
June	107,053	109,002	110,793	70,495	101,451	1,494	78,701
July	104,017	107,820	110,354	78,340	98,931	1,889	77,592
Aug.	[illegible]	[illegible]	[illegible]	88,496	101,529	1,780	58,586
Sept.	106,745	104,465	113,942	82,932	104,310	1,850	67,791
Oct.	113,189	106,550	112,482	60,115	106,212	[illegible]	[illegible]
Nov.	110,394	106,859	111,802	79,745	97,836	[illegible]	[illegible]
Dec.	102,537	92,997	110,762	84,944	87,222	[illegible]	[illegible]

Among the furnaces blown in during September were the following: Three furnaces of the Lackawanna Steel Co., No. 2 furnace of the Donner Steel Co. and Buffalo A furnace of the Rogers, Brown & Co. in the Buffalo district; G furnace of the Bethlehem Steel Co. in the Lehigh Valley; two Worth furnaces of the Midvale Steel & Ordnance Co. in the Schuylkill Valley; three Eliza furnaces, two Aliquippa furnaces and the Soho furnace of the Jones & Laughlin Steel Co. and one Midland furnace of the Pittsburgh Crucible Steel Co. in the Pittsburgh district; four Johnstown furnaces of the Cambria Steel Co., the Colonial, Perry and Punxy furnaces in western Pennsylvania; one furnace of the Bethlehem Steel Co. in Maryland; one La Belle furnace in the Wheeling district; two furnaces of the Brier Hill Steel Co., three furnaces of the Republic Iron & Steel Co., one furnace of the Youngstown Sheet & Tube Co. and the Mattie and Trumbull-Cliffs furnaces in the Mahoning Valley; one furnace of the American Steel & Wire Co., one furnace of the National Tube Co., two Otis furnaces of the McKinney Steel Co., one Toledo furnace and the Dover furnace in central and northern Ohio; the Belfont and Milton furnace in southern Ohio; one Joliet furnace, three South Chicago furnaces of the Illinois Steel Co. in Illinois and four Gary furnaces in Indiana; Thomas furnace at Milwaukee; D furnace of the Colorado Fuel & Iron Co. in Colorado and one Detroit furnace of M. A. Hanna & Co. in Michigan; No. 1 Ensley furnace of the Tennessee Coal, Iron & Railroad Co. and one Allen's Creek furnace in Tennessee.

Production of Steel Companies—Gross Tons

Returns from all furnaces of the United States Steel Corporation and the various independent steel companies, as well as from merchant furnaces producing ferromanganese and spiegeleisen, show the following totals of steel making iron, month by month, together with ferromanganese and spiegeleisen. These last, while stated separately, are also included in the columns of "total production:"

Production of Steel Companies—Gross Tons

	Total Production			Spiegeleisen and Ferromanganese		
	1920	1921	1922	1920	1921	1922
Jan.	2,232,455	1,932,159	1,306,045	23,957	22,228	6,874
Feb.	2,181,679	1,625,695	1,311,170	28,038	29,013	8,540
Mar.	2,480,668	1,323,443	1,629,982	35,275	41,294	13,695
Apr.	1,968,542	1,015,621	1,707,902	27,628	24,310	19,209
May	2,128,720	1,024,678	1,879,180	33,407	9,232	20,334
June	2,209,770	885,312	1,876,033	34,751	4,536	23,090
July	2,230,567	715,664	1,921,128	36,789	5,524	26,049
Aug.	2,254,943	807,144	1,415,832	36,985	3,878	19,327
Sept.	2,247,250	815,692	1,615,696	39,546	3,289	14,916
Oct.	2,393,844	1,034,312	.....	34,786	3,902	.....
Nov.	2,150,075	1,138,789	.....	26,944	3,525	.....
Dec.	2,047,167	1,276,381	.....	28,023	3,953	.....

Among the furnaces blown out or banked during October are the following: The Robesonia furnace in the Lebanon Valley; one Ashland furnace in Kentucky; one furnace of the Wheeling Steel & Iron Co. in the Wheeling district; one furnace of the American Rolling Mill Co. in central Ohio; one South Chicago furnace of the Illinois Steel Co. in Illinois and one Ensley furnace of the Tennessee Coal, Iron & Railroad Co. and one Woodward furnace of the Woodward Iron Co. in Alabama.

Output by Districts

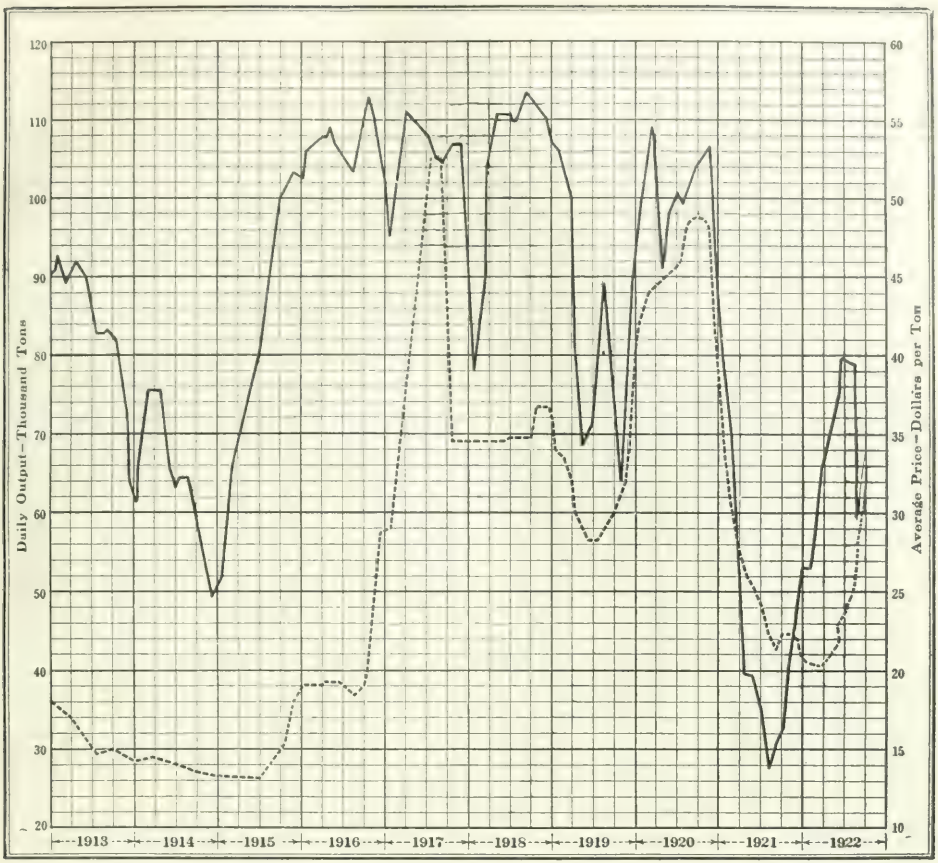
The accompanying table gives the production of all coke and anthracite furnaces for September and the three months preceding:

Pig Iron Production by Districts, Gross Tons

	Sept. (30 days)	August (31 days)	July (31 days)	June (30 days)
New York	115,635	80,322	145,831	148,115
New Jersey	10,736	11,604	10,475	10,725
Lehigh Valley	55,711	46,254	58,068	66,967
Schuylkill Valley	41,646	35,286	54,675	60,925
Lower Susquehanna and Lebanon Valleys	25,440	20,679	26,698	26,501
Pittsburgh district	502,804	432,178	493,963	485,491
Shenango Valley	63,841	58,812	99,335	87,156
Western Penna.	68,140	62,659	81,927	91,494
Maryland, Virginia and Kentucky	44,136	41,324	58,506	54,687
Wheeling district	43,366	57,752	65,753	74,710
Mahoning Valley	218,363	130,555	233,813	240,470
Central and Northern Ohio	184,914	191,880	261,084	236,374
Southern Ohio	17,909	15,305	29,517	30,272
Illinois and Indiana	346,380	342,363	472,371	454,937
Mich., Minn., Mo., Wis. and Colo.	67,656	67,265	101,656	93,723
Alabama	204,802	204,389	195,929	189,101
Tennessee	22,241	17,543	15,764	9,470
Total	2,033,720	1,816,170	2,405,365	2,361,028

Diagram of Pig Iron Production and Prices

The fluctuations in pig iron production from 1913 to the present time are shown in the accompanying



The Full Line Represents the Daily Production of Pig Iron and the Dotted Line Is the Average of the Price Per Ton of No. 2 Southern Pig Iron at Cincinnati, Local No. 2 Iron at Chicago and No. 2X Iron at Philadelphia

chart. The figures represented by the heavy lines are those of daily average production by months of coke and anthracite iron. The dotted curve on the chart represents monthly average prices of Southern No. 2 foundry pig iron at Cincinnati, local No. 2 foundry iron at furnaces in Chicago, and No. 2X at Philadelphia. They are based on the weekly quotations of THE IRON AGE.

Production of Coke and Anthracite Pig Iron in the United States by Months, Beginning Jan. 1, 1918—Gross Tons

	1918	1919	1920	1921	1922
Jan.	2,411,768	3,302,260	3,015,181	2,416,292	1,644,951
Feb.	2,319,299	2,940,168	2,978,879	1,937,257	1,629,991
Mar.	2,213,091	3,090,243	3,375,907	1,595,322	2,035,920
Apr.	3,288,211	2,478,218	2,739,797	1,193,041	2,072,114
May	3,446,412	2,108,056	2,985,682	1,221,221	2,306,679
June	3,323,791	2,114,863	3,043,540	1,064,833	2,361,028
½ year.	18,002,572	16,033,808	18,138,986	9,428,166	12,050,683
July	3,420,988	2,428,541	3,067,043	864,555	2,405,365
Aug.	3,389,585	2,743,388	3,147,402	954,193	1,816,170
Sept.	3,418,270	2,487,965	3,129,323	985,529	2,033,720
9 mos.	28,231,415	23,693,702	27,482,754	12,232,754	18,305,938
Oct.	3,486,941	1,863,558	3,292,597	1,246,676	.....
Nov.	3,354,074	2,392,350	2,934,908	1,415,481	.....
Dec.	3,433,617	2,633,268	2,703,855	1,649,086	.....
Ttl. yr.	*38,506,047	30,582,878	36,414,114	16,543,686	.....

*These totals do not include charcoal pig iron. The 1921 production of this iron was 94,730 tons.

Officers of Steel Treating Society

DETROIT, Oct. 2.—The American Society for Steel Treating opened its 1922 convention in the General Motors Building Monday afternoon with an expected attendance of between 15,000 and 20,000 at the convention and exposition. The exhibits, which are unusually elaborate, occupy the greater portion of an entire floor and attracted a large attendance at the opening sessions.

Announcement was made at the initial meeting by the retiring president F. P. Gilligan of the result of the mail ballot for officers for the ensuing year, as follows:

President, T. D. Lynch, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

First vice-president, R. J. Allen, metallurgist Rolls-Royce Co. of America, Springfield, Mass.

Second vice-president, W. S. Bidle, W. S. Bidle Co., Cleveland.

Treasurer, J. V. Emmons, metallurgist Cleveland Twist Drill Co., Cleveland.

Secretary, W. H. Eisenman, Cleveland.

Directors, S. M. Havens, Chicago; F. P. Gilligan, Henry Souther Engineering Co., Hartford, Conn.; J. J. Crowe, metallurgist Philadelphia Navy Yard, Philadelphia; A. E. White, department of engineering research, University of Michigan, Ann Arbor, Mich.

Iron and Steel Markets

PILING FINISHED STEEL

Car Scarcity More Acute, But Pig Iron Production Grows

With 190 Furnaces in Blast October 1, July and August Losses Are Made Up

Car shortages and the piling of finished steel at a number of rolling mills are featured in market reports from the Pittsburgh and Youngstown districts this week. A few shutdowns have resulted, and the possibility of others is mentioned. Specific cases are the piling of 100,000 tons of finished steel by the Carnegie Steel Co., a 10 per cent reduction in operations of the American Sheet & Tin Plate Co., considerable accumulations of stock at tube mills, and a 50 per cent shutdown at a sheet mill in the Youngstown district.

Much of this congestion is due to the 10-day embargo imposed by the Pennsylvania Railroad on shipments west of Altoona, and there is a promise of some relief, at least, when that embargo is lifted.

Coal supplies have ceased to be a limiting factor in steel production, and as most of the steel companies are equipped with by-product plants they are amply supplied with coke.

The production side of the industry, so far as pig iron and steel ingots are concerned, has shown further improvement, in spite of the shortage of cars at rolling mills, and blast furnace and steel works managers are evidently counting on being able to keep up the present rate of operations. In fact, there are plans for the early starting of several blast furnaces.

Recent indications that September blast furnace resumptions after the coal strike would nearly equal the suspensions of July and August have been borne out. On Oct. 1 furnaces in blast numbered 190, as against 144 on Sept. 1, 172 on Aug. 1 and 192 on July 1.

Pig iron output in the 30 days of September was 2,033,720 tons, or 67,791 tons a day, a sharp advance over the 1,816,170 tons in August, which was an average of 58,586 tons a day. The steel works furnaces made most of the gain, or 8200 tons a day, against 1000 tons a day gain for merchant furnaces, which brought them back practically to the rate of May.

The estimated capacity of the 190 furnaces active on Oct. 1 was 77,500 tons a day, against 54,645 tons a day for 144 furnaces on Sept. 1.

Railroads have furnished so much of the new business of the past fortnight that other buying is without significance. Every important line in the country and many small ones took on rails for 1923 before the $3 advance to $43 on Oct. 1, and the total of rail and track supply contracts is put at 1,500,000 tons.

Purchases of 5800 cars by five railroads have been uncovered in the week. Orders have been given for repairs to 2300 and fresh inquiries represent 11,800 cars. The Santa Fe has bought 59 locomotives.

Apart from the cutting off of a few peaks, prices of finished steel are quite well maintained. Sales above 2.25c. for plates are fewer and involve smaller lots than in early September. A few makers of lap-welded tubes have made a $4 advance and charcoal boiler tubes are up $10 a ton in some cases. Tie plates are higher at 2.35c. Pittsburgh, and angle bars have been sold as high as 2.75c. An advance of $3 a ton on painted barbed wire has been generally adopted. The sheet market has worked into easier prices in the Central West.

The blowing in of a number of merchant blast furnaces, the distribution of a round tonnage of pig iron made at Duluth to points in New England and New York, and somewhat easier conditions in the coke market have contributed to the sagging tendency of pig iron prices. A steel company in western Pennsylvania has been an active factor in selling at concessions. The largest transaction was the purchase of 16,000 tons of basic by an Eastern steel company. The recent buying of Alabama iron by soil pipe manufacturers amounted to 15,000 tons.

London reports that new buying of pig iron for the United States is falling off, but good sized amounts are still due for shipment.

Belgium has sold 50,000 tons of rails to Argentina and is negotiating with Brazil for 100,000 tons.

In pig iron, THE IRON AGE composite price fell in the week from $32.54 per gross ton to $32.11, the first recession since July 11. This compares with $19.93 a year ago.

Finished steel advanced from 2.433c. per lb. to 2.474c., a new high point on this movement, which compares with 2.236c. one year ago and is the highest since July 12, 1921.

Pittsburgh

Embargoes Seriously Interfere With Movement of Steel Products

PITTSBURGH, Oct. 3.—Car shortages and a very tight embargo set up by the Pennsylvania Railroad on shipments west of Altoona, Pa., extending from Oct. 2 until Oct. 11, already are beginning to take toll in the shape of plant suspensions. One Pittsburgh district strip maker has been forced to shut down as a result of conditions growing out of the railroad situation and a Youngstown sheet maker recently cut mill operations 50 per cent because its warehouse capacity became exhausted through inability to get cars for shipments. Operations of the American Sheet & Tin Plate Co. last week declined more than 10 per cent because of the transportation restrictions. Other companies are on the verge of curtailment or suspensions. The National Tube Co. and practically all other makers of pipe have been obliged to pile much of their production because of the car scarcity, while the Carnegie Steel Co. is said to have approximately 100,000 tons of steel piled up at its Monongahela River plant since cars are not available and the use of trucks has not made much of an impression on accumulations.

Coal supplies have ceased to be a factor in steel works operations, and as most of the steel companies are equipped with by-product plants, they are amply supplied with coke. The labor situation is not appreciably better, but the advent of cool weather is expected to bring men into the mills from outdoor occupations.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton	Oct. 3, 1922	Sept. 26, 1922	Sept. 5, 1922	Oct. 4, 1921
No. 2X, Philadelphia†	$34.61	$34.26	$34.11	$21.54
No. 2, Valley furnace†	33.60	33.00	35.00	21.00
No. 2, Southern, Cin'ti†	31.05	31.05	29.05	23.50
No. 2, Birmingham, Ala.†	27.00	27.00	25.00	19.00
No. 2 foundry, Chicago**	32.00	32.00	32.00	21.00
Basic, del'd, eastern Pa.	**29.50**	29.00	32.00	20.50
Basic, Valley furnace	*33.50*	34.00	30.00	19.25
Valley Bess., del. P'gh	35.77	35.77	34.77	21.96
Malleable, Chicago*	32.00	32.00	32.00	21.00
Malleable, Valley	*33.50*	34.00	33.00	20.50
Gray forge, Pittsburgh	34.27	34.27	34.76	21.96
L. S. charcoal, Chicago	36.15	36.15	36.15	31.50
Ferromanganese, seaboard	*67.50	*67.50	67.50	60.00

Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	**$43.00**	$40.00	$40.00	$47.00
Bess. billets, Pittsburgh	40.00	40.00	38.00	29.00
O.-h. billets, Pittsburgh	40.00	40.00	38.00	29.00
O.-h. sheet bars, P'gh	40.00	40.00	40.00	32.00
Forging billets, base, P'gh	45.00	45.00	43.00	35.00
O.-h. billets, Phila.	45.17	45.17	45.17	35.74
Wire rods, Pittsburgh	45.00	45.00	45.00	41.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	2.00	2.00	2.00	1.60
Light rails at mill	2.25	2.25	2.00	1.75

Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.475	2.475	2.42	1.95
Iron bars, Chicago	**2.50**	2.25	2.25	1.75
Steel bars, Pittsburgh	2.00	2.00	2.00	1.60
Steel bars, Chicago	2.10	2.10	2.10	1.75
Steel bars, New York	2.44	2.44	2.34	1.98
Tank plates, Pittsburgh	2.25	2.25	2.00	1.60
Tank plates, Chicago	2.30	2.30	2.30	1.65
Tank plates, New York	2.49	2.49	2.34	1.98
Beams, Pittsburgh	2.00	2.00	2.00	1.60
Beams, Chicago	2.20	2.20	2.20	1.75
Beams, New York	2.44	2.44	2.34	1.98
Steel hoops, Pittsburgh	**2.90**	2.75	2.75	2.25

Sheets, Nails and Wire,	Oct. 3, 1922	Sept. 26, 1922	Sept. 5, 1922	Oct. 4, 1921
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh	**3.50**	3.35	3.35	3.00
Sheets, galv., No. 28, P'gh	**4.50**	4.35	4.35	4.00
Sheets, blue an'l'd, 9 & 10	**2.60**	2.50	2.50	2.25
Wire nails, Pittsburgh	2.70	2.70	2.60	2.90
Plain wire, Pittsburgh	2.45	2.45	2.35	2.60
Barbed wire, galv., P'gh	3.35	3.35	3.15	3.55
Tin plate, 100-lb. box, Pgh	$4.75	$4.75	$4.75	$5.25

Old Material, Per Gross Ton:				
Carwheels, Chicago	$24.50	$24.50	$22.50	$16.00
Carwheels, Philadelphia	23.00	23.00	20.00	17.00
Heavy steel scrap, P'gh	**22.00**	21.50	18.50	14.00
Heavy steel scrap, Phila.	**18.50**	18.00	15.50	11.75
Heavy steel scrap, Ch'go	18.50	18.50	17.50	12.25
No. 1 cast, Pittsburgh	24.00	24.00	19.00	17.50
No. 1 cast, Philadelphia	23.00	23.00	19.00	17.00
No. 1 cast, Ch'go (net ton)	21.00	21.00	21.50	13.50
No. 1 RR. wrot., Phila.	**23.00**	22.00	18.50	15.50
No. 1 RR. wrot. Ch'go (net)	**18.25**	17.50	17.50	12.50

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$12.00	$12.00	$10.00	$3.25
Foundry coke, prompt	13.00	13.00	12.00	4.25

Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	14.25	14.25	14.12½	12.62½
Electrolytic copper, refinery	13.75	13.75	13.75	12.37½
Zinc, St. Louis	*6.80*	6.87½	6.25	4.55
Zinc, New York	*7.15*	7.22½	6.60	5.05
Lead, St. Louis	**6.30**	6.25	5.55	4.50
Lead, New York	**6.65**	6.50	5.80	4.70
Tin (Straits), New York	**32.87½**	32.50	32.50	28.75
Antimony (Asiatic), N. Y.	6.75	6.75	5.37½	5.00

*C.i.f.

**The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Oct. 3, 1922, Finished Steel, 2.474c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open hearth rails, black pipe and black sheets

Sept. 26, 1922,	2.433c.
Sept. 5, 1922,	2.412c.
Oct. 4, 1921,	2.236c.
10-year pre-war average,	1.689c.

These products constitute 88 per cent of the United States output of finished steel

Composite Price, Oct. 3, 1922, Pig Iron, $32.11 Per Gross Ton

Based on average basic and foundry irons, the basic being Valley quotation, the foundry at average of Chicago, Philadelphia and Birmingham

Sept. 26, 1922,	$32.54
Sept. 5, 1922,	30.52
Oct. 4, 1921,	19.93
10-year pre-war average,	15.72

Whether the situation will get easier, therefore, hinges largely on transportation conditions.

A somewhat remarkable condition, in view of the railroad situation, is the increase in blast furnace operations. In the past week the Jones & Laughlin Steel Co. started up its Soho furnace, which had been idle for about two years, bringing the number of active furnaces of that company to 10, out of a total of 12. The Pittsburgh Crucible Steel Co. has turned the blast on in one furnace and the Shenango Furnace Co. also has an additional stack in operation. Struthers furnace, Struthers, Ohio, will be lighted next Friday. By the end of the week there will be 80 active furnaces in this and nearby districts out of a total of 139, this comparing with 50, the low point in the last week of August, and 76 the previous peak point early in July. As soon as coke is available the Carnegie Steel Co. will start up one or two of its stacks at Farrell, Pa., and there will be resumptions by the Hanna Furnace Co. and the McKeefery Iron Co. at Leetonia, Ohio, the Reliance Coke & Furnace Co., Sharpsville, Pa., and the Kittanning Iron & Steel Mfg. Co., Kittanning, Pa.

The tendency of pig iron prices is lower as a result of the gain already registered in production. There is no appreciable weakening in steel prices; on the contrary, such changes as have taken place have been in the other direction. Hot rolled flats have advanced to the minimum of 2.90c. base, Pittsburgh, or $3 per ton above former quotations, while the American Sheet & Tin Plate Co. is out of the market for shipments for the remainder of this year, and this development establishes the independent prices as market minimums. Cold-rolled strips have advanced $5 per ton and charcoal iron boiler tubes $10 per ton. Independent makers of steel tubes have advanced prices $4 per ton and a change in the building method of leading pipe manufacturers, whereby the preferential and cash discounts are applied only to the f.o.b. Pittsburgh price, adds to the cost to buyers, especially at distant points. Under the lead of the American Steel & Wire Co. wire products have increased the extra for galvanizing nails $5 per ton, and prices of painted barbed wire have advanced $3 per ton.

Still higher prices have been established for scrap, but there is a feeling that this advance has about run its course for the present.

Pig Iron.—If there is a definite trend in prices in this market it is downward, chiefly because of the

activity of Cambria Steel Co. as a seller. That company recently sold 2000 tons of basic at $30, Johnstown, or more than $2 per ton delivered below what the iron could be bought for from Valley furnaces. The company now is quoting basic at $31, Johnstown; Bessemer $33, foundry $32.50 for the base grade, and malleable at $32.50. These prices all are well below the Valley furnace basis and the freight rate from Johnstown to Pittsburgh, common rate points, is $1.76 per ton, or practically the same as from the Valley. Valley furnaces, especially those depending upon Connellsville coke, cannot compete on costs with the Cambria company, and are not making much effort to do so. Actual business in this market lately has been very light. The largest sale was one of 1500 tons of basic at $33.50, Valley furnace, a decline of 50c. from the former quotation. Bessemer iron still is quotable at $34, Valley furnaces, on small sales. The range on foundry iron is extremely wide. Occasional sales have been made to melters whose requirements were specially pressing, at $35, but those more favorably situated in regard to supplies which could wait a few weeks for delivery have been able to buy as low as $33, Valley furnace. W. P. Snyder & Co. make the price of basic iron from Valley furnaces for September $32.93 against $25.41 in August, and Bessemer $33.50, against $28.67 in the previous month.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.76 per gross ton:

Basic	$33.50
Bessemer	34.00
Gray forge	$32.50 to 33.50
No. 2 foundry	33.00 to 35.00
No. 3 foundry	32.50 to 33.50
Malleable	33.50

Ferroalloys.—It is still impossible to quote domestic ferromanganese, as makers have not yet announced prices. Since consumers in this district are well covered against requirements for the remainder of the year at $67.50 or less, c.i.f. Atlantic seaboard, it is doubtful if domestic material could be sold at $101.10, Atlantic seaboard, the present price of British 80 per cent material plus the import duty. The uncertain supply of coke and its high cost also delay a price announcement, especially as American producers are believed to have in mind a price below the present delivered price of British material to secure control of the domestic market. The market has strengthened on 50 per cent ferrosilicon. Demand here is moderate, as most consumers covered their requirements for 1922 early in the year around $55 furnace, freight allowed. Only a few makers now are in production and they are quoting $65 to $70 furnace. A few carloads have been sold here at $65, Niagara Falls, the freight rate to Pittsburgh common rate points being $3.53.

We quote 78 to 82 per cent British ferromanganese, $67.50 c.i.f. Atlantic seaboard; domestic producers have not yet announced prices. Average 20 per cent spiegeleisen, $38 to $39 furnace; 16 to 19 per cent, $37 to $38; 50 per cent ferrosilicon, domestic, $65 furnace, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, $50.50; 11 per cent, $53.80; 12 per cent, $57.10; 13 per cent, $61.10; 14 per cent, $64.10; silvery iron, 6 per cent, $39; 7 per cent, $40; 8 per cent, $41.50; 9 per cent, $43.50; 10 per cent, $45.50; 11 per cent, $48.80; 12 per cent, $52.10. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $3.66 per gross ton.

Steel Skelp.—There is considerably less urgency to the demand now than there was a short time ago, due to the fact that several pipe makers, who ordinarily make their own skelp, but who recently were buyers, again are in production. We quote the market at from 2c. to 2.25c. except on small lots, which are urgent because of the delays to contract shipments on account of car shortages and railroad embargoes.

Wire Products.—Effective Sept. 27 the American Steel & Wire Co. increased the galvanizing extra on nails from $1.25 to $1.50 per 100-lb., on nails 1-in. and longer and from $1.75 to $2 on nails less than 1-in. in length. The company also has established a base of $3 on painted barbed wire and polished fence staples, an advance of $3 per ton. These changes have been adopted by leading independent manufacturers. Prices otherwise are unchanged. The leading interest is way behind in its deliveries and is accepting little or no new business even at the advanced prices recently named, since present obligations are believed to be equal to or in excess of probable production over the remainder of the year.

Iron and Steel Pipe.—Effective yesterday, leading manufacturers of pipe discontinued the practice of allowing the preferential and cash discount on delivered prices and hereafter such discounts are to be applied only on the f.o.b. Pittsburgh prices. This change applies to all classes of tubular goods, but involves no deviation from the custom of the absorption of freight by the producers. The total discount is reduced under the new method of billing to a simple net discount, from which the freight is deducted, and the discounts allowed on the value of the material at Pittsburgh. The change will mean a considerable addition to the price of pipe at points distant from Pittsburgh, but adds only slightly to the cost in the bigger centers of consumption.

Wire Rods.—Small sales for quick shipment still are being made by independent producers at $47.50, Pittsburgh, for the base size of common soft rods and some contract business also has been entered on the same basis, but it is subject to readjustment in the event that the market eventually crystallizes on a lower plane.

We quote No. 5 common basic or Bessemer rods to domestic consumers, $45 to $47.50; chain rods, $45 to $47.50; screw stock rods, $50 to $52.50; rivet and bolt rods and other rods of that character, $46 to $47.50; high carbon rods, $52 to $57.50, depending on carbon, per gross ton, f.o.b. Pittsburgh or Youngstown.

Billets, Sheet Bars and Slabs.—The market is holding firm at recent price levels, but this condition is due largely to the fact that car shortages are interfering with delivery rather than because production is insufficient. In general, sheet bars, slabs and 4-in. soft billets still are quotable at $40, Pittsburgh or Youngstown, that having been the base on the bulk of recent transactions. A premium of $2 to $2.50 on open hearth sheet bars is being asked over Bessemer bars by some makers and a little tonnage has been sold at $42.50, Pittsburgh. Steel works operations have not as yet suffered from transportation tangles, but all makers in this and nearby districts are piling considerable tonnage and with finished material accumulating to a point where there has been some curtailment of operations of finishing mills, early relief is necessary to prevent lighter steel works operation.

We quote 4 x 4-in. soft Bessemer and open-hearth billets, $40; 2 x 2-in. billets, $40 to $42; Bessemer sheet bars, $40; open-hearth sheet bars, $40 to $42.50; slabs, $40; forging billets, ordinary carbons, $45 to $47, all f.o.b. Pittsburgh or Youngstown mills.

Sheets.—The shortage of supplies has been intensified in the past week by an acute scarcity of cars, which has resulted in the piling of so much finished material as to threaten mill operations. One Youngstown independent has more than 10,000 tons of sheets stocked because of the lack of cars and has been obliged to cut mill operations 50 per cent. Non-integrated manufacturers have been forced to the use of trucks to get finished sheets to a point where cars were available and also in bringing sheet bars from producing plants to their mills. Demand is chiefly for early delivery, particularly on the part of the automotive industry, and prices are materially stronger for such service. One Youngstown independent recently announced prices of 2.75c. base, Pittsburgh, for blue annealed, 3.75c. base, for black and 4.75c. base for galvanized. Some of the independent makers are committed to take business at the Steel Corporation levels of 2.50c., 3.35c. and 4.35c., respectively, but as a general rule the independents are not going below 2.60c., 3.50c. and 4.50c. The leading interest is not yet ready to take on business for delivery after Jan. 1, and is so heavily committed as to be unable to take any business for shipment between now and that date. Minimum quotations given on page 897 are those of the American Sheet & Tin Plate Co., but refer only to deliveries on old orders. Independent makers of automobile sheets have increased the differential between body and other kinds of automobile sheets $3 per ton, now quoting body stock at 5c., base, for 22-gage and 5.25c., base, for fender, hood and cowl stock. The American Sheet & Tin Plate Co. prices are 4.70c. for body sheets and 4.80c. for fender, hood and cowl sheets.

Tin Plate.—There is a well-sustained and fairly active demand for tin plate in connection with dry food container requirements, but these demands are proving

no strain upon production. Shortage of box cars is hindering shipments, but not to the extent that premium prices can yet be obtained for definite deliveries. Concessions from the official price of $4.75 per base box, Pittsburgh, however, are infrequent, and if sheet bars hold at their present price of $40, it is likely that tin plate for first quarter of 1923 delivery will command at least $5 per base box.

Cold-Finished Steel Bars and Shafting.—An embargo established by the Pennsylvania Railroad to run from Oct. 2 to Oct. 11, on shipments west of Altoona, Pa., has added to the difficulties of a number of makers of cold-finished steel bars in getting supplies of hot-rolled bars and only a modification of the order or the granting of permits will prevent some of them from shutting down. Car shortages are interfering seriously with the movement of finished material from the mills in this district. The market is firm at 2.50c. base, Pittsburgh, for carload lots, while ground shafting also is unchanged at 2.90c. base, f.o.b. mills for carload,.

Hot-Rolled Flats.—There has been a further strengthening of the price with all of the independent makers now quoting a minimum of 2.90c. base, Pittsburgh, and from that up to 3.25c. for narrow, light material. No announcement yet has been made by the Steel Corporation, but it is so heavily obligated as to be a negligible factor as far as current demands are concerned.

Cold-Rolled Strips.—The market has gone to a minimum of 4.50c. base, Pittsburgh, since last reports, in keeping with the advancing hot-rolled material.

Bolts and Nuts.—Leading makers here have announced advances of from 5 to 10 per cent over the prices established early last month, with the average advance nearer 10 per cent. Consumers and distributors were allowed to specify liberally at the old discounts. New discounts are given on page 897.

Rivets.—There has been no change in prices, but the market is extremely firm because of irregular deliveries of raw materials, which with hindrances to shipments, due to railroad transportation conditions, increased producing costs. Prices and discounts are given on page 897.

Iron and Steel Bars.—Shipments of steel bars are seriously restricted by railroad transportation conditions, and it has been necessary for consumers in this district to either provide their own cars or to employ motor trucks to get supplies.

We quote steel bars rolled from billets at 2c. to 2.25c.; reinforcing bars, rolled from billets, 2c. to 2.25c. base; rail steel reinforcing bars, 1.90c. to 2c.; refined iron bars, 2.60c. in carloads, f.o.b. mill, Pittsburgh.

Structural Material.—New inquiries coming to fabricating companies in this district are fewer than they have been and are usually for small tonnages. Since shipments of plain material are hindered by car shortages, the let-up in demand is welcomed, since it provides the shops a chance to catch up with their back obligations. The most important structural lettings lately closed have been at prices of less than 2c. for plain material, plus 10 per cent for fabrication. Plain material prices are given on page 897.

Track Fastenings.—No change is noted in spikes, except that makers representing most of the capacity uniformly are quoting small track and boat and barge spikes at $3.50, base, per 100 lb. On large spikes, one maker here is quoting $2.75, base, per 100 lb., but 2.85c. is the more common quotation. Tie plates have further advanced, now being at 2.35c. minimum. Angle bars are up to 2.75c. Prices are quoted on page 897.

Plates.—Sales at more than 2.25c. base, Pittsburgh, are fewer and involve smaller tonnages than was the case recently. Generally, 2.25c. is the top, and an Eastern maker is understood to have been naming 2.15c., Pittsburgh, against some recent inquiries.

Boiler Tubes.—Leading makers of charcoal iron tubes have reduced discounts five points on all sizes, this being the same as an advance of $10 per ton, effective Oct. 2. There has been no change in steel tubes by the leading interest, but most of the independents have cut the discount on lap welded tubes two points, the equivalent of an advance of $4 per ton. New discounts will be found on page 897.

Steel Rails.—Pennsylvania Railroad has placed orders for standard rails as stated elsewhere in this issue. Light rails are firm at 2.25c., base, and find a good sale, chiefly to coal mining companies. Light sections rolled from old rails command 2c.

We quote 25 to 45-lb. sections, rolled from new steel, 2.25c. base; rolled from old rails, 2c. base; standard rails, $43 per gross ton mill for Bessemer and open-hearth sections.

Coke and Coal.—There has been no special change in the coke situation since a week ago. Shortage of cars still is exacting heavy toll upon the production of beehive oven coke and with a considerable portion of the Connellsville district still affected by the miners' strike, the output of the region is small in comparison with potential capacity. The labor situation is not as restrictive a factor in production as is the lack of cars. Steel companies operating by-product plants have ample supplies of coal, but apparently have no coke over and above their own requirements, and cannot help the smaller producers of pig iron. Demand for beehive oven coke exceeds the supply and the market remains very firm on spot tonnages at the prices of a week ago, or $12 to $12.50 per net ton at oven on furnace and $13 to $14 for foundry grade. Congestion at the lake ports has reduced the demand for coal and the market is rather soft in consequence. Mine run steam coal now is quotable from $3.50 to $4.25 generally, but Panhandle coal of extra good quality is held as high as $4.50. Mine run by-product coal ranges from $4 to $4.50 at mine, and gas coal from $4.50 to $5.

Old Material.—Prices have swept still higher since a week ago, sales of heavy melting steel having been made at $23 at Butler, Pa., and in the Youngstown district, but the Butler buyer has since withdrawn from the market and there is considerable doubt that $23 now can be obtained in Youngstown. On the whole, there is a much more conservative feeling about prices than there was recently, and not a few of the trade here believe that the top has been reached for the present. It is pointed out that in the past when an advance has been based upon the demand of one or two consuming points a break has ensued as a result of the inability of the strongest markets to absorb all the tonnage reaching them. None of the Pittsburgh steel makers has yet paid more than $22.50 for heavy melting steel and it is claimed that some fairly recent purchases were made as low as $21.50. The market is stronger here on compressed sheet steel with sales noted at $19.50 to $20. The material of this grade offered by Westinghouse Electric & Mfg. Co. for shipment this month sold at $19.85, f.o.b. East Pittsburgh. The market also is looking up on blast furnace grades, as high as $18.50 recently having been paid by a Pittsburgh district steel company for short shoveling turnings. Bids closed today on about 21,000 net tons of scrap offered by Pennsylvania Railroad, Eastern region. Close to 4000 tons of relaying rails are offered in this list.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

Per Gross Ton	
Heavy melting steel	$22.00 to $22.50
No. 1 cast, cupola size	24.00 to 25.00
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va.; Franklin and Williamsport, Pa.	22.00 to 22.50
Compressed sheet steel	19.50 to 20.00
Bundled sheet sides and ends	17.50 to 18.00
Railroad knuckles and couplers	24.00 to 24.50
Railroad coil and leaf springs	24.00 to 24.50
Low phosphorus standard bloom and billet ends	25.00 to 26.00
Low phosphorus, plates and other grades	24.00 to 25.00
Railroad malleable	21.00 to 22.00
Iron car axles	32.00 to 34.00
Locomotive axles, steel	26.00 to 27.00
Steel car axles	24.00 to 25.00
Cast iron wheels	24.50 to 25.00
Rolled steel wheels	24.00 to 24.50
Machine shop turnings	16.00 to 16.50
Heavy steel axle turnings	18.00 to 18.50
Short shoveling turnings	18.00 to 18.50
Cast iron borings	18.50 to 19.00
Heavy breakable cast	21.00 to 21.50
Stove plate	19.00 to 19.50
Sheet bar crop ends	24.00 to 25.00
No. 1 railroad wrought	19.00 to 19.50

Chicago

Heavy Buying by Railroads—Production Is Still Improving

CHICAGO, Oct. 3.—Total bookings of rails by local mills aggregate approximately 600,000 tons and accompanying orders for track supplies over 100,000 tons. With this heavy backlog added to commitments in plates, shapes, bars and sheets, which will carry them through the last quarter and probably into next year, local mills are in a very comfortable position. While it is true that new demands calling for early delivery of the common products just mentioned is not so pressing as some weeks ago, this is explained by the fact that local production has improved and users no longer find it so necessary to seek prompt material to tide them over. Considerable new business continues to develop, however, but much of it is for forward delivery. Car orders are resulting in further purchases of steel by car builders and railroads are seeking liberal tonnages of plates, shapes and bars for car repair work to be done by their own forces. Briefly, railroad buying is the dominant factor in the market.

Production continues to improve. The operations of the Illinois Steel Co. remain unchanged, but the Inland Steel Co. has blown in its third furnace, its steel output, however, remaining the same. The Thomas merchant furnace has gone in at Milwaukee and other merchant stacks may blow in before the end of the month. Better coal deliveries have enabled the by-product coke corporation to increase its operations at Chicago and Milwaukee materially. The local plant is expected to be producing at over 50 per cent of capacity by the end of the week.

While improvement is to be noted, transportation is still seriously hampering both production and shipments. Owing to the concentration of the movement of coal to the Northwest, coal cars are congested at Lake Erie ports with the result that Illinois and Indiana mines are able to operate only three and four days a week because of lack of equipment. Shipments of finished material from mills and blast furnaces are still backing up because of the limitations on the use of open top cars for other than coal traffic. One important local mill has been forced to pile 30,000 tons on this account. Shipments of iron and steel from the East are impeded by an embargo by the Pennsylvania system on all freight except perishable goods and coal. This embargo went into effect yesterday and will remain in force until Oct. 11. The seamen's strike which, it was feared, might interfere with ore shipments to local plants is apparently confined to deck hands and will not prevent the sailing of lake vessels.

Ferroalloys.—A sale of ferromanganese has been made to a local plant at the full price of $67.50 seaboard plus the duty of $33.60.

We quote 78 to 82 per cent ferromanganese, [illegible] per cent ferrosilicon, $55 delivered on contract and $65 prompt delivery; spiegeleisen, 18 to 22 per cent, $50, delivered.

Pig Iron.—The Thomas furnace at Milwaukee is producing malleable. The Inland Steel Co., which, at intervals has taken merchant iron business, has put in a third furnace. Better coke production will probably enable the leading merchant iron interests to add further capacity before the close of the month. Pig iron production is obviously improved, but car shortage is seriously interfering with shipments. Sellers having cars on track are having no difficulty in disposing of them, but forward buying is not so active. Inquiries of any size, in fact, are noticeably few. Shipments from the South are still very uncertain and buying from producers in that section is therefore restricted. Melters are more interested in getting delivery on the iron they have on contract than in placing new orders. A number of them, in fact, have sent representatives to the South to see what can be done to move their iron. Southern prices are not well defined and range from $27 to $30, base, Birmingham. Other irons remain unchanged as to price. A sale of a substantial tonnage of imported low phosphorus with a trace of copper was recently made at approximately $39.50 delivered, Chicago. This is the first tonnage of imported low phosphorous which has competed successfully with domestic material in this market this year.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$36.15
Northern coke, No. 1, sil. 2.25 to 2.75	33.00
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	32.00
Northern high phos.	32.00
Southern No. 2	$33.00 to 35.00
Malleable, not over 2.25 sil.	32.00
Basic	32.00
Low phos., Valley furnace, sil. 1 to 2 per cent copper free	38.00
Silvery, sil. 8 per cent	46.29

Plates.—Specifications are heavy and the placing of 4000 freight cars during the week will bring further business to mills in this district. The price situation is unchanged. Plates can still be obtained for fairly early delivery at 2.30c., local mill.

The mill quotation is 2.10c. to 2.34c., Chicago. Jobbers quote 2.90c. for plates out of stock.

Cast Iron Pipe.—Prices have advanced to a minimum of $43, Birmingham, for 6-in. and above. Clawson, Mich., will open bids Oct. 4 on 268 tons of 6 and 8-in. Chicago takes bids on Oct. 10 on 730 tons of 8 to 12-in. Detroit will take tenders Oct. 11 on 90 tons of 30-in. Fort Atkinson, Wis., closes bids on the same date for 3000 ft. of 6 and 10-in. and 23 tons of special. Franklin County, Ohio, Commissioners have awarded 400 tons to the Pitt Construction Co., Pittsburgh, but this tonnage has not yet been placed with a maker.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $55.20 to $57.20; 6-in. and above, $51.20 to $53.20; class A and gas pipe, $3 extra.

Bars.—Demand for soft steel bars for early shipment is less active, but present commitments of local mills carry them through the rest of the year, with the probability that they will lap over into first quarter, and this backlog is steadily being augmented by further orders for forward delivery. While Eastern mills are selling material for early shipment at as high as 2.25c., Pittsburgh, there is an increasing unwillingness on the part of users to pay premium prices. Bar iron is quiet, but has advanced to 2.50c., Chicago. Hard steel bar mills are well booked ahead and one maker has advanced prices to 2.10c. with the likelihood that others will follow, because of rising raw material and labor costs.

Mill prices are: Mild steel bars, 2c. to 2.34c., Chicago; common bar iron, 2.50c., Chicago; rail steel, 2c. to 2.10c., Chicago mill.

Jobbers quote 2.80c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 3.80c. for rounds and 4.30c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 2.50c. base; hoops, 3.90c.; bands, 3.55c.

Rails and Track Supplies.—Rail bookings by local mills aggregate approximately 600,000 tons. In the past, the railroads rarely bought track fastenings outside of angle bars with the rails. This time, however, nearly every rail contract was accompanied by orders for all the necessary track supplies, including angle bars, bolts and spikes, and tie plates. The tonnage of supplies bought totals close to 20 per cent of the rail tonnage, or about 120,000 tons. Both rails and angle bars advanced, effective Oct. 1. Iron tie plates have also gone up, the new quotation being $50, mill.

Standard Bessemer and open-hearth rails, $43; light rails rolled from new steel, 2.15c., f.o.b. makers' mills.

Standard railroad spikes, 2.85c. to 3c., mill; track bolts with square nuts, 3.85c. to 4c., mill; iron tie plates, 2.50c.; steel tie plates, 2.25c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.50c. base and track bolts 4.50c. base.

Wire Products.—Specifications showed a marked spurt last week, reflecting the desire of buyers to get a maximum amount of material before their contracts at lower prices expired. While production is increasing, mills will probably continue to have difficulty in

taking care of their trade throughout the remainder of the year. Shortage of cars is interfering with both deliveries of raw material and shipments of finished products. Reports from agricultural sections are rather gloomy, but as yet demand for wire products has not been affected. Wire rods are firm at a minimum of $45. Sales at higher prices are being made; in fact, as high as $50, Pittsburgh, has been paid on 300 tons of high quality rods. For mill prices, finished iron and steel, f.o.b. Pittsburgh, see page 897.

We quote warehouse prices, f.o.b. Chicago: No. 9 and heavier black annealed wire and No. 9 and heavier bright basic wire, $3.20 per 100 lb.; common wire nails, $3.35 per 100 lb.; cement coated nails, $2.75 per keg.

Bolts and Nuts.—Buyers are contracting freely for fourth quarter requirements. In some quarters a further advance in prices is looked for and one or two makers are reported to have taken such action already. Ruling discounts are those on page 897 except that the basing point is Chicago instead of Pittsburgh.

Jobbers quote structural rivets, 3.50c.; boiler rivets, 3.60c.; machine bolts up to ⅞ x 4 in., 50 per cent off; larger sizes, 50 off; carriage bolts up to ¾ x 6 in., 45 off; larger sizes, 45 off; hot pressed nuts, squares and hexagons, tapped, $2.75 off; blank nuts, $2.75 off; coach or lag screws, gimlet points, square heads, 55 per cent off; quantity extras are unchanged.

Sheets.—Local mills are booked through the quarter with the probability that their commitments will carry them over into next year. The mills of the leading interest have been forced to curtail operations materially because of lack of steel, a condition traceable no doubt to the car shortage.

Mill quotations are 3.35c. to 3.50c. for No. 28 black, 2.50c. to 2.60c. for No. 10 blue annealed and 4.35c. to 4.50c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote f.o.b. Chicago, 4c. for blue annealed, 4.85c. for black and 5.85c. for galvanized.

Reinforcing Bars.—There is an unusual number of projects up for figures, some of them large ones, and bookings in the next week or two are expected to be heavy. A large portion of the jobs contracted for within the past week are under 100 tons, but the aggregate business put on the books of dealers has been large. The market remains unchanged at 2.50c., Chicago warehouse, and while an advance is looked for, price shading has not entirely disappeared. Mill production continues to increase, but deliveries show little improvement owing to the car shortage. Contracts awarded include:

Gillett (Wis.) High School building, 100 tons, to Olney J. Dean Co., Chicago.

D. L. Plummer Memorial Hospital, Wausau, Wis., 275 tons, to Olney J. Dean Co., Chicago.

Filtration plant, Bay City, Mich., 1300 tons, to Paul J. Kalman Co.

Illinois road work, 300 tons, to Paul J. Kalman Co.

Apartment building, Minneapolis, Minn., 450 tons, to Concrete Steel Co.

St. Scholastica Academy, Atchison, Kan., 500 tons, to Corrugated Bar Co.

Office building, Des Moines, Iowa, 300 tons, to Concrete Steel Co.

Keenan Hotel, Fort Wayne, Ind., 250 tons, to Concrete Steel Co.

Cash Quality Store Co., Jamestown, N. Y., 100 tons, to Corrugated Bar Co.

Pending business includes:

McDougall warehouse, Duluth, Minn., 900 tons.

Structural Material.—Building activity shows remarkable buoyancy, notwithstanding the approach of the winter season. Fabricating awards are fairly numerous, although most of them are for relatively small tonnages. To a large extent early delivery is asked on new projects, with the result that many shops are unable to quote. Local mills are booked practically full for the rest of the year, and while Eastern producers continue to sell for early shipment at as high as 2.25c., Pittsburgh, demand for premium steel is not nearly so active as some weeks ago.

The mill quotation on plain material is 2.10c. to 2.34c., Chicago. Jobbers quote 2.90c. for plain material out of warehouse.

Old Material.—Excepting for a few advances, prices remain stationary in a rather quiet market. A large steel mill has made a substantial purchase of heavy melting at $19 and an iron mill has bought rolling mill grades at advanced prices, but in general consumers are rather apathetic. Among the foundries, gray iron shops are notably inactive, but malleable plants have made some fair purchases. Country scrap is being offered more freely and railroad lists are growing more numerous. When the transportation situation clears up sufficiently to permit uninterrupted shipping, the problem of scrap supply will probably grow less acute. Railroad offerings include the Burlington, 3000 tons; the Chicago & Northwestern, 3200 tons, and the Pennsylvania Southwestern Region, 1500 tons.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

	Per Gross Ton
Iron rails	$25.00 to $26.00
Cast iron car wheels	24.50 to 25.00
Relaying rails	27.50 to 32.50
Rolled or forged steel car wheels	23.50 to 24.00
Rails for rolling	20.50 to 21.00
Steel rails, less than 3 ft.	21.50 to 22.00
Heavy melting steel	18.50 to 19.00
Frogs, switches and guards cut apart	18.50 to 19.00
Shoveling steel	18.25 to 18.75
Drop forge flashings	12.50 to 13.00
Hydraulic compressed sheet	15.50 to 16.00
Axle turnings	16.00 to 16.50
	Per Net Ton
Iron angles and splice bars	23.00 to 23.50
Steel angle bars	19.00 to 19.50
Iron arch bars and transoms	22.50 to 23.00
Iron car axles	25.50 to 26.00
Steel car axles	19.50 to 20.00
No. 1 busheling	15.50 to 16.00
No. 2 busheling	10.50 to 11.00
Cut forge	17.50 to 18.00
Pipes and flues	12.50 to 13.00
No. 1 railroad wrought	18.25 to 18.75
No. 2 railroad wrought	17.50 to 18.00
Steel knuckles and couplers	20.50 to 21.00
Coil springs	21.50 to 22.00
No. 1 machinery cast	21.00 to 21.50
No. 1 railroad cast	19.50 to 20.00
Low phos. punchings	17.00 to 17.50
Locomotive tires, smooth	18.50 to 19.00
Machine shop turnings	11.00 to 11.50
Cast borings	13.00 to 13.50
Stove plate	17.50 to 18.00
Grate bars	17.50 to 18.00
Brake shoes	17.50 to 18.00
Railroad malleable	22.00 to 22.50
Agricultural malleable	22.00 to 22.50

FIRE CLAY BRICK HIGHER

Advance in Prices Becomes General—Very Little Buying Reported

PITTSBURGH, Oct. 2.—The increase of $3 per 1000 in fire clay brick announced by a few manufacturers about two weeks ago has been generally followed by others and the market now is quotable in practically all producing districts at $43 to $46 for high duty and $39 to $42 for moderate duty brick. In keeping with this change is an advance of 50c. per ton in ground fire clay. There has been no further change in silica brick nor in chrome brick, but because of the duty of $11.50 per ton in imported magnesite, brick from that material has been advanced $15 per ton to $75 per net ton at Baltimore and Chester, Pa.

The latest advance in fire clay brick finds its chief explanation in the fact that on account of the railroad situation operations of the brick plants are extremely irregular, and since organizations have to be maintained regardless of whether plants are running, costs are mounting with much rapidity. The new prices have not found a great deal of basis in sales, because most consumers had good-sized orders in at lower levels and naturally are specifying against such orders and not buying very freely. Such business as has been entered for fourth quarter delivery is believed to average about $40 per 1000, f.o.b. works. It is thought in some quarters that the stiff advance in magnesite brick will result in the substitution of chrome brick for open-hearth furnaces.

We quote per 1000 f.o.b. works:

Fire Clay	High Duty	Moderate Duty
Pennsylvania	$43.00 to $46.00	$39.00 to $42.00
Ohio	43.00 to 46.00	39.00 to 42.00
Kentucky	43.00 to 46.00	38.00 to 42.00
Illinois	43.00 to 45.00	40.00 to 42.00
Missouri	43.00 to 45.00	38.00 to 42.00
Ground fire clay, per net ton		7.50 to 8.50
Silica Brick:		
Pennsylvania		45.00
Chicago		53.00
Birmingham		48.00
Ground silica clay, per net ton		9.00 to 10.00
Magnesite Brick:		
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.)		75.00
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)		43.50
Chrome Brick:		
Standard size, per net ton		50.00

New York

All Shipments of Coal to Great Lakes Region Stopped—Pig Iron Prices Sagging

NEW YORK, Oct. 3.—Owing to the congestion of cars at lower lake ports, all shipments of coal to the lake region have been stopped and prices of steam coal have declined to $3.25, compared with $4.25 last week and $2 at the time the coal miners' strike was declared April 1. Five thousand cars of coal are loaded and are being held at lower lake ports. The releasing of a large tonnage of coal which would have been shipped to the lakes will undoubtedly result in further reductions of prices and a more ample supply to iron and steel industries. All coke prices may be affected later, but are still firm at $14 to $14.50, Connellsville ovens, for foundry grades, while prices of furnace grades are easier, ranging all the way from $10 to $13. By-product coke is still quoted at $14, seaboard. Efforts to increase the supply of coke by importations have not been very successful, as the wastage is large, due to the difficulty of handling from boats to cars.

Pig Iron.—The market is dull and the downward trend of prices noted last week has continued. Although the usual quotations are based on $31, eastern Pennsylvania, for No. 2 plain sales of No. 2X iron at $31 and No. 1X iron at $31.50 are reported. Part of the tonnage recently shipped from Duluth to Buffalo has found its way into this district, having been sold on a basis of $31, Buffalo, but most of the Duluth iron was shipped to New England points. A pump company is in the market for 400 tons for fourth quarter. Most of the inquiry is for carload lots for immediate shipment. Foreign iron is coming in in small quantities at recent quotations. Continental iron is not meeting with much favor, owing to unsatisfactory analysis.

We quote delivered in the New York district as follows, having added to furnace prices $2.27 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$35.27
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	34.27
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	33.27
Buffalo, sil. 1.75 to 2.25	36.91
No. 2 Virginia, sil. 1.75 to 2.25	No sales

Ferroalloys.—Demand for ferromanganese is exceedingly light and quotations are unchanged for both the British and domestic products. Practically none of the latter is available and the quotation is nominal. A little business has been done in spiegeleisen at the prevailing quotation. Sales of small lots of 50 per cent ferrosilicon at $65 to $70, freight allowed, are also reported. Demand for ferrochromium is light, but specifications on contract for both ferrosilicon and ferrochromium are heavy. Quotations are as follows:

Ferromanganese, domestic, furnace, nominal, per ton	$100.00
Ferromanganese, British, c.i.f., per ton	$67.50
Spiegeleisen, 17 to 19 per cent, furnace	$38.00
Spiegeleisen, 20 per cent, furnace	$38.00 to $39.00
Ferrosilicon, 50 per cent, delivered, per gross ton, carloads	$65.00 to $70.00
Ferrosilicon, 10 to 15 per cent, delivered, per gross ton	$38.00 to $40.00
Ferrotungsten, per lb. of contained metal	50c.
Ferrochromium, 4 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr., delivered	14c.
Ferrovanadium, per lb. of contained vanadium	$3.50 to $4.00
Ferrocarbontitanium, 15 to 18 per cent, in carloads, per net ton	$200.00
Ores	
Manganese ore, foreign, per unit, c.i.f.	29c. to 30c.
Tungsten ore, per unit, in 60 per cent con-	
Chrome ore, basis 48 per cent Cr_2O_3, crude, per ton, Atlantic seaboard	$18.00 to $18.50
Molybdenum ore, 85 per cent concentrates,	

Cast-Iron Pipe.—Municipal tenders have practically ceased for this year, but private buying still continues. Scarcity of 6-in. and smaller sizes is noted and most makers expect to continue full operation for the rest of the year at least. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $54.50; 4-in. and 5-in., $59; 3-in., $64.80, with $4 additional for Class A and gas pipe. The cast-iron soil pipe market is active, warehouse stocks are low and some difficulty is being encountered in making shipments. We quote per net ton, delivered New York, discounts of both Southern and Northern makers, as follows: 2 to 6-in. standard, 25 to 30 per cent off list; heavy, 34 and 35 per cent off list.

Warehouse Business.—Activity continues, but there is difficulty in obtaining shipments from mills. It is felt in some quarters that the freight embargo may have a temporary effect of increasing prices on some materials. Most warehouses in this district report a continued improvement in business for September. Tire steel has been increased to 3.10c. per lb., base, and toe-calk is 4.15c. per lb. Blue annealed sheets are now fairly firm at 4.19c. per lb. for No. 10 gage, but black and galvanized still cover a wide range of quotations from 4.50c. and 5.50c. per lb., base, to 4.90c. and 5.90c. per lb., the latter quotations being those of the leading independent in this district and most warehouses. Dealers in iron and steel pipe report business active with a distinct scarcity of the smaller sizes of steel pipe. Brass sheets, rods and wire have been advanced by warehouses ¼c. per lb. and brazed and seamless brass tubes, ½c. per lb., because of the higher prices prevailing in the zinc market. We quote prices on page 916.

High Speed Steel.—The market is again dull in contrast to the slight activity that recently prevailed. While there is evidently a feeling that prices should be advanced, producers generally are quoting 18 per cent tungsten high speed steel at 75c. to 80c. per lb., base, with special brands of some companies bringing up to 90c. per lb.

Old Material.—The upward trend of prices continues, heavy melting steel being quoted at $14 to $14.50 per ton, based upon $18 per ton paid by the Bethlehem Steel Co. and the Alan Wood Iron & Steel Co. Cast iron pipe has been active, shipments going to Milton, Lebanon and Columbia, Pa. As high as $21.50 per ton, Pittsburgh, is said to have been paid in this district last week on a small tonnage stated to be the equivalent of railroad steel. Railroad steel is extremely scarce at present. The embargo of the Pennsylvania Railroad is causing some difficulty in making shipments. The Brooklyn Navy Yard, Brooklyn, will open bids, Oct. 6 on a small tonnage of scrap, both steel and cast iron.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$14.00 to $14.50
Steel rails, short lengths, or equivalent	15.00 to 15.50
Rails for rolling	15.75 to 16.25
Relaying rails, nominal	27.00 to 28.00
Steel car axles	17.00 to 18.00
Iron car axles	23.00 to 24.00
No. 1 railroad wrought	16.00 to 16.50
Wrought iron track	14.50 to 15.00
Forge fire	11.50 to 12.00
No. 1 yard wrought, long	14.00 to 14.50
Cast borings (clean)	12.50 to 13.00
Machine-shop turnings	11.50 to 12.00
Mixed borings and turnings	11.50 to 12.00
Iron and steel pipe (1 in. diam., not under 2 ft. long)	12.75 to 13.25
Stove plate	14.00 to 14.50
Locomotive grate bars	14.00 to 14.50
Malleable cast (railroad)	13.50 to 14.00
Cast-iron car wheels	14.50 to 15.00

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$19.50 to $20.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	17.00 to 17.50
No. 1 heavy cast, not cupola size	14.50 to 15.00
No. 2 cast (radiators, cast boilers, etc.)	13.00 to 13.50

Finished Iron and Steel.—Buyers seem to continue in the belief that they will gain something by waiting until present price readjustments have become established; hence the buying of steel products is on an extremely moderate scale, being just enough to satisfy current requirements, with little or no provision for the future. The prices which the subsidiaries of the Steel Corporation and the independents are quoting are drawing nearer together. The apparent tendency of the Steel Corporation mills is to stiffen their prices, while those independents which had obtained advances during the coal emergency are gradually working to lower levels. To-day, for example, the minimum on shapes and bars is 2c., Pittsburgh, while on plates nothing lower than 2.10c. is known to have been quoted. These are the minimum prices which recently have been in effect, and the former maximum prices are melting so there is a difference of only $2 or $3 a ton now between

the bottom and top. It is true that some mills still quote 2.25c., Pittsburgh, on plates, shapes and bars, but this price is taking little business. The bulk of current sales in the heavier products is going at not above 2.10c. and 2.15c., Pittsburgh. Rail orders have been the only business of large volume in the past week. The New York Central distributed orders for 194,300 tons and other roads have placed contracts for smaller quantities. Including the New York Central and the Pennsylvania tonnage, the latter being for 170,000 tons, probably 500,000 tons or more of rails has been bought by Eastern roads within the past week or ten days.

We quote for mill shipments, New York delivery, as follows: For indefinite delivery, soft steel bars, 2.34c.; structural shapes and steel plates, 2.44c.; for delivery in a number of weeks, soft steel bars and plain structural material, 2.44c. to 2.59c.; steel plates, 2.49c. to 2.59c.; bar iron, 2.49c. to 2.59c.

Boston

Sales of Foreign Iron Fall Off, But Those of Domestic Hold Their Own

BOSTON, Oct. 3.—Sales of foreign pig iron the past week dropped to comparatively small proportions, while those of domestic just about held their own. Aside from offers of eastern Pennsylvania No. 2X at $32, furnace, by interests heretofore asking $34, quotations show little change. Reports of Buffalo iron being offered elsewhere at concessions cannot be verified in this territory, active selling interests holding to former schedules. Continental irons are offered as low as $26.50, duty paid, but in such instances phosphorus and manganese analysis is out of line with standard grades. Sales of Buffalo and eastern Pennsylvania were confined to small tonnages, but a fair aggregate of Alabama spot and fourth quarter and of Virginia fourth quarter has been bought, largely for mixture with Scotch iron. A small tonnage of lake charcoal sold at $33 furnace base, or $41.19 delivered. New England foundries are busier, but are not back to normal. Most of them are believed to be well covered on iron requirements for at least two months. The largest general inquiry in the market is for 300 tons from a New Hampshire foundry. Approximately 4000 tons of Scotch iron arrived at this port in the week ending Sept. 30; 3350 tons for three local accounts and the rest for Philadelphia. The Connecticut Foundry Co., Rocky Hill, Conn., purchased 500 tons of No. 1 Scotch, delivery direct to its dock, all water route, for November. Effective Oct. 23, the Boston & Albany Railroad will equalize its freights from Boston to such points as North Adams, Springfield, Westfield, Winchendon and Worcester, Mass., with Boston & Maine rates. For instance, the Worcester rate, now $3.45, will be $1.80.

We quote delivered prices, on the basis of the latest reported sales, now infrequent, and as follows, having added to furnace prices $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia and $9.60 from Alabama:

East. Penn., sil. 2.25 to 2.75	$35.65 to $37.65
East. Penn., sil. 1.75 to 2.25	34.65 to 36.65
Buffalo, sil. 2.25 to 2.75	37.91 to 38.41
Buffalo, sil. 1.75 to 2.25	36.91 to 37.91
Alabama, sil. 2.25 to 2.75	38.10
Alabama, sil. 1.75 to 2.25	37.60
Virginia, sil. 2.25 to 2.75	38.92
Virginia, sil. 1.75 to 2.25	37.92

Warehouse Business.—Norway iron bars have been advanced 50c. per 100 lb. Otherwise no change in iron and steel quotations is reported. Sales from Boston stock for September will equal or better those for August, which was the best month experienced this year. Local stocks are in very good condition, due to recent shipments by mills. A further advance in wire nails is reported, this time 10c. per keg, making 25c. during the past fortnight and 40c. within a month. From store they are $3.70 per keg base. Galvanized nails also have advanced, in proportion with wire.

Jobbers quote: Soft steel bars, $3.25 per 100 lb. base; flats, $3.85; concrete bars, $3.25; structural steel, $3.25 to $3.50; tire steel, $4.50 to $4.85; open-hearth spring steel, $5 to $6.50; crucible spring steel, $12; steel bands, $4.25; hoop steel, $4.75; cold rolled steel, $4 to $4.50; refined iron, $3.25; best refined iron, $4.50; Wayne iron, $5.50; Norway iron, $6.50 to $7; plates, $3.35 to $3.55; No. 10 blue annealed sheets, $4.15 per 100 lb. base; No. 28 black sheets, $5.40; No. 28 galvanized sheets, $6.40.

Coke.—The New England Coal & Coke Co., Boston, and the Providence Gas Co., Providence, R. I., announce no change in their October by-product foundry coke prices, the contract quotation remaining at $16.50 delivered where the local freight does not exceed $3.10, and the spot at $19.50 delivered. Both oven interests report the fuel situation as much clearer. Some trouble is experienced in securing sufficient cars at the mines in which to ship coking coals north, but the movement as a whole is steadily expanding. Contract customers' foundry coke needs are supplied with little, if any, delay, and both the New England Coal & Coke Co. and the Providence Gas Co. will accept spot business. Competition from cokes made outside New England therefore is lessening. Connellsville fuel is offered at $14.50 ovens, which brings the New England delivered price far out of range with local cokes. In addition, sellers cannot guarantee deliveries due to the car supply situation. Alabama foundry coke is offered at $16.50 delivered, and English at practically the same basis, with bookings limited.

Finished Material.—Levering & Garrigues Co. will fabricate 960 tons of structural steel for the Edison Co.'s Boston power house extension, and the New England Structural Co. 175 tons for the Flattery building, Boston. The Boston & Maine Railroad has purchased 5700 kegs of heat-treated track bolts from an eastern Pennsylvania mill, and its 1923 angle bar requirements from the Rail Joint Co. Inquiries for plates hold up fairly well, but individual orders are small. Business in bars has dropped to small proportions, as most buyers are well covered for fourth quarter.

Old Material.—Further advances in prices for all old material have resulted from a continued heavy demand. Sales for the week run well up into the thousand tons. Early in the week round tonnages of heavy melting steel were taken for Pittsburgh district mill accounts at $15 and $15.50 shipping point. The last few days have witnessed a stiffening in the market, the top price paid being $16.50, f.o.b. Cambridge, Mass., for Butler, Pa., shipment. Buying of skeleton for eastern Pennsylvania forge fire and other interests lifted prices $1, while urgent inquiries from eastern Pennsylvania and Connecticut for chemical borings brought prices $1 to $2 higher. Specification pipe is moving freely at an advance of 50c., and dealers have bought large tonnages of railroad wrought at $16 and $17 for eastern Pennsylvania rolling mills. Seven cars of cotton ties brought $9.60, shipping point. An unusual sale was 100 gross tons of charcoal iron columns at $22.50, delivered Boston. Foundries are taking more machinery cast than heretofore, but are not much of a factor in the market. Round tonnages are going to New England industries, however, at prices $1 to $1.50 better than a week ago. A Hyde Park, Boston, manufacturer this week will sell 1000 tons of No. 2 cast.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$22.50 to $23.00
No. 2 machinery cast	21.50 to 22.00
Stove plate	17.50 to 18.00
Railroad malleable	19.00 to 19.50

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$16.00 to $16.50
No. 1 railroad wrought	16.50 to 17.00
No. 1 yard wrought	14.50 to 15.00
Wrought pipe (1 in. in diam., over 2 ft. long)	12.00 to 12.50
Machine-shop turnings	10.50 to 12.00
Cast iron borings, rolling mill	14.00 to 15.00
Cast iron borings, chemical	17.00 to 17.50
Blast furnace borings and turnings	10.50 to 11.50
Forged scrap and bundled skeleton	11.50 to 12.00
Street car axles	23.00 to 24.00
Street car wheels	18.00 to 18.50
Shafting	18.00 to 19.50
Rails for rolling	16.50 to 17.00

The State Electricity Commission of Victoria, Australia, has invited tenders for the supply, delivery, etc., of a coal handling plant for the large Morwell electricity project. Copies of tender form, specification and drawings may be examined by American firms at the Bureau of Foreign and Domestic Commerce, Washington, or at its district offices in New York and Chicago and also at the office of the commissioner for Australia, Room 3012, 61 Broadway, New York.

Cleveland

Embargoes Delay Shipments and Some Mills Are Piling Steel

CLEVELAND, Oct. 3.—The car shortage has become very acute and an increased number of embargoes have added to the transportation difficulties. Some mills are piling steel and unless the situation improves operations will doubtless have to be curtailed. Some local consumers are trucking material from Pittsburgh district mills to points where they can secure cars. Locally pig iron is being trucked from furnaces to foundries because of the refusal of railroads to do the switching.

Iron Ore.—As was expected, ore shipments fell off sharply during September, being 6,801,299 gross tons, as compared with 9,016,426 tons during August. The movement for the year, until Oct. 1, was 33,111,238 tons as compared with a total movement last year of 22,300,726 tons. Shipments from Lake Erie docks are moving better than for several weeks, owing to the fact that the southern Ohio railroads are taking more ore than they have been recently. Other roads are handling ore promptly. A strike of lake seamen went into effect Oct. 1, but it is not expected that this will seriously interfere with the operation of boats.

Quotations below [illegible] phorus iron, are delivered Cleveland and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and a $6 rate from Birmingham:

Basic, Valley furnace, nominal	$34.00
[illegible]	[illegible] to 35.50
[illegible]	34.00 to 36.00
[illegible]	34.50 to 35.50
Ohio silvery, sil. 8 per cent	44.52 to 45.52
Standard low phos., Valley furnace	38.00 to 39.00

Pig Iron.—The market has settled down to an unusually dull spell and locally there was not sufficient business during the week to clearly determine the price situation, which has developed a softening tendency. One additional merchant stack, Perry furnace in Erie, went in blast Sept. 29. With the competition of other furnaces that can market their product in Cleveland and vicinity, there are indications that the local price on foundry iron will settle down this week to approximately $34. While one local producer reports some lot sales during the week at $36, another has taken orders at $35 and probably will go at least $1 a ton lower to meet the price of outside iron that can be purchased at a Cleveland delivered price of around $34.50. One producer continues to quote foundry and malleable iron at $32 to $33.50 and reports sales of a few thousand tons in lots of 500 tons and under for delivery over the remainder of the year. Some producers have advanced Southern iron $2 to $30. We note the sale of one lot of 600 tons and another of 500 tons of Ohio silvery iron at $42.50 for the last quarter delivery. Low phosphorus iron is firm, carlot orders being taken as high as $39.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $5.95; Old range non-Bessemer, 51½ per cent iron, $5.20; Mesabi Bessemer, 55 per cent iron, $5.70; Mesabi non-Bessemer, 51½ per cent iron, $5.05.

Alloy Steel.—The recent price advance on alloy steel did not hold, as quotations from ¼c. to ½c., a point below the schedule, are common. We quote 3½ per cent nickel steel at 5.25c. to 5.50c. Chrome nickel steel, 4.25c. to 4.50c., and chrome vanadium steel at 4.75c. to 5c. for spring steel and 5c. to 5.25c. for bars.

Water Pipe.—The City of Cleveland received alternative bids Oct. 2 for 10,400 ft. of 60-in. steel or cast iron pipe and also for 4280 ft. of 48-in. cast iron pipe. Martin & McDace and the Peter F. Connelly Co. were the low bidders.

Warehouse Business.—The leading sheet jobber who advanced prices last week $5 a ton on black and galvanized sheets has revised prices to a $2 a ton lower basis. Warehouse prices on wire have been advanced following the recent mill advance.

Semi-finished Steel.—The leading local producer has fixed $40, Youngstown, as the October price for sheet bars, billets and slabs for shipment to consumers with which it has contracts to make deliveries at the current market price during the month of September.

Finished Material.—While the chief concern of consumers now is to secure deliveries, a fair volume of new business is coming out. Prices show little change. Although on steel bars and structural material there is evidently not much business being placed above 2c., quotations range up to 2.25c. Plate quotations range from 2c. to 2.50c., with only small lot orders going above 2.25c. Lake shipyards are still figuring on boat inquiries and expect considerable repair work during the coming winter. The Virginian Railroad is inquiring for a coal-handling plant which will require 2000 tons of plates and shapes. Structural inquiries are light.

Jobbers quote steel bars, 2.91c.; plates and structural shapes, 3.01c.; No. 9 galvanized wire, 3.30c.; No. 9 annealed wire, 2.80c.; No. 28 black sheets, 4.40c.; No. 28 galvanized sheets, 5.40c.; No. 10 blue annealed sheets, 3.70c. to 3.76c.; hoops and bands, 3.71c.; cold-rolled rounds, 3.60c.; flats, squares and hexagons, 4.10c.

Sheets.—An easier price situation has developed in the sheet market. Mill stocks are being offered at 3.35c. for black and 4.35c. for galvanized. One mill that was quoting 2.70c. on blue annealed has reduced its price to 2.60c. On the other hand, one Valley producer has advanced its price $3 a ton. The demand for blue and galvanized sheets is fairly heavy, but black sheets are moving rather slowly.

Reinforcing Bars.—The demand for reinforcing bars continues heavy and prices are from 2c. to 2.10c. A large tonnage will be required for a warehouse for the Pillsbury Flour Mills Co. in Buffalo. Inquiries are also out for round lots for a Standard Oil Co. warehouse and a Board of Education warehouse in Cleveland and for 100 tons for a high school in Sharon, Pa.

Coke.—Pickands, Mather & Co. have arranged for a supply of by-product coke from the Youngstown district for their Perry furnace, which went in blast last week. The market on Connellsville foundry coke is very firm, with prices ranging from $14 to $14.50. Coke is available, but it is almost impossible to secure cars for shipment.

Bolts, Nuts and Rivets.—Leading bolt and nut manufacturers Monday made another advance in prices of from 5 to 10 per cent. Orders during the week on contracts expiring Oct. 1 were very heavy. The leading local rivet manufacturer Monday advanced prices $3 a ton for small lots of structural and boiler rivets, but is still quoting the old price of 3c. for the former and 3.10c. for the latter for round lots. Rivet orders continue heavy.

Old Material.—The market has continued its upward trend, although advances during the week were confined to heavy melting steel and a few of the other more active grades. Several Valley district mills made purchases of scrap during the week and most of the local transactions were for Valley shipment, although dealers bought some heavy melting steel for delivery to a Cleveland mill. For shipment to the Youngstown district, heavy melting steel has sold as high as $23 and compressed steel up to $20.

We quote per gross ton, f.o.b. Cleveland, as follows:

Heavy melting steel	[illegible] to $21.00
Steel rails under 3 ft	21.00 to 22.00
Steel rails, rerolling	24.00 to 25.00
Iron rails	18.00 to 18.50
Iron car axles	26.00 to 27.00
Low phosphorus melting	[illegible] to 22.00
Cast borings	15.25 to 15.50
Machine shop turnings	14.50 to 14.75
Mixed borings and short turnings	15.00 to 15.50
Compressed steel	18.00 to 18.50
Railroad wrought	[illegible] to [illegible]
Railroad malleable	20.00 to 21.00
Light bundled sheet stampings	15.00 to 15.25
Steel axle turnings	16.00 to 16.50
No. 1 cast	21.00 to 22.00
No. 1 busheling	15.00 to 15.50
Drop forge flashings over 10 in.	14.50 to 15.00
Drop forge flashings under 10 in.	15.00 to 15.25
Railroad grate bars	17.00 to 18.00
Stove plate	17.00 to 18.00
Pipes and flues	14.50 to 14.75

St. Louis

Principal Inquiries Are for Basic from Distant Consuming Points

ST LOUIS, Oct. 3. There is still an active demand in this market for the higher silicon grades of pig iron. Buying has not been so brisk as in the previous week, because melters are inclined to buy only for immediate needs in view of the price of pig iron and the difficulties encountered in transporting it. A Sheffield maker has been shipping about 1500 tons weekly by barge to Metropolis and thence by rail to this territory. Most of this is on old orders, and this concern is taking on little new business. Very little is coming by all rail from the Birmingham centers because of the shortage of cars and congestion. There also is very little coming from the Chicago producing territory, largely because of the transportation situation. The Granite City maker is now working only on basic and all the foundry iron it has is of low silicon. It has inquiries involving from 5000 to 15,000 tons of basic from points outside of the district and normally served by other territories than this. Its sales during the week of low grade foundry iron totaled between 1000 and 1500 tons. The market remains at $32, Chicago, for Northern iron. For Southern iron, the price generally ranges from $28 to $29.50, Birmingham, but the Sheffield maker, whose barge and rail shipments are coming through promptly is quoting $30, freight added. Three inquiries have been received for a car each of ferromanganese in this district. The market is at $100 a ton f.o.b. seaboard, the advance on foreign and domestic material following the adoption of the new tariff.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago, $3.28 from Birmingham (rail and water), $5.17 from Birmingham, all rail, and 81 cents average switching charge from Granite City:

Northern foundry, sil. 1.75 to 2.25	$34.16
Northern malleable, sil. 1.75 to 2.25	34.16
Basic	34.16
Southern foundry, sil. 1.75 to 2.25 (rail and water)	33.28
Southern foundry, sil. 1.75 to 2.25, all rail	33.67 to 34.17

Finished Iron and Steel.—Chief interest in these lines among the trade here has been in the requirements of the railroads centering in St. Louis. Actual purchases of rails in the last two weeks have been about 43,000 tons. Here is the rail situation:

Missouri, Kansas & Texas: Purchased 10,000 tons.

Missouri Pacific: Purchased 15,000 tons.

Wabash: Purchased 15,000 tons.

Terminal Railway Association: Purchased 3,000 tons.

Cotton Belt: 1920 purchase of 5000 tons and 1921 purchase of 15,000 tons not delivered. Question of purchase of 5000 additional tons will be taken up by new president after election to-morrow.

St. Louis & San Francisco: Requirements taken care of under contract.

All of the above 90-lb., except Terminal, which are 100-lb.

Other railroad inquiries follow:

Missouri, Kansas & Texas: 3000 net tons, high carbon, hot worked steel tie plates; 2000 kegs track bolts, 4500 kegs spikes.

Missouri Pacific: 3000 tons tie plates.

The contract for the structural steel in the new South Side High School, St. Louis, 600 tons, went to the Spuck Iron & Foundry Co., while the Reinforced Concrete Co., Chicago, got the contract for the bars (billet), 500 tons. Fabricators are becoming more interested in structural steel, and jobbers are buying bars more freely. The demand for nails is improving, one local jobben buying 1300 kegs of one size. Business generally is much better. An improvement is noted in deliveries.

For stock out of warehouse we quote: Soft steel bars, 2.90c. per lb.; iron bars, 2.90c.; structural shapes, 3c.; tank plates, 3c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, cold rolled, one pass, 4.85c.; cold drawn rounds, shafting and screw stock, 3.90c.; structural rivets, 3.60c. per 100 lb.; boiler rivets, 3.70c.; tank rivets, $\frac{7}{8}$ in. and smaller, 60 per cent off list; machine bolts, large, 50 and 10 per cent; smaller, 50-10 and 10 per cent; carriage bolts, large, 55-5 per cent; small, 60 and 10 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon blank, $3.50; and tapped, $3.25 off list.

Coke.—The demand for coke continues far in excess of production. The local and Granite City by-product makers are still out of the market. The Granite City producer has increased its production of coke, as the coal supply has increased, but still is making no more than is required to take care of accumulated orders. The price is $14 at the oven. Connellsville coke has advanced to $14.50 per ton at the ovens, and a few shipments are coming through. Some Southern coke is being sold, but it has been found well-nigh impossible to get deliveries.

Old Material.—The market for old material continues strong, with a few items advancing. There is a good demand for rolling mill grades, such as couplers, knuckles, springs and car wheels. Melting steel is a little easier, but there is very little pressure on the market. The United Railways Co. sold 3000 tons of street car rails to dealers at fancy prices. The first railroad list of any consequence in some time was issued by the Pennsylvania, carrying about 3800 tons. The Burlington Railway issued a list, but withdrew it.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Old iron rails	$20.50 to $21.00
Rails for rolling	20.75 to 21.25
Steel rails, less than 3 ft.	21.00 to 21.50
Relaying rails, standard section	26.00 to 29.00
Cast iron car wheels	24.00 to 25.00
No. 1 heavy railroad melting steel	17.50 to 18.00
No. 1 heavy shoveling steel	17.50 to 18.00
Ordinary shoveling steel	17.50 to 18.00
Frogs, switches and guards cut apart	20.50 to 21.00
Per Net Ton	
Heavy axles and tire turnings	12.75 to 13.25
Steel angle bars	18.50 to 19.00
Iron car axles	26.00 to 26.50
Steel car axles	21.00 to 21.50
Wrought iron bars and transoms	22.00 to 22.50
No. 1 railroad wrought	17.50 to 18.00
No. 2 railroad wrought	17.00 to 17.50
Railroad springs	21.00 to 21.50
Steel couplers and knuckles	21.00 to 21.50
Cast iron borings	11.00 to 11.50
No. 1 busheling	13.50 to 14.00
No. 1 railroad cast	21.50 to 22.00
Railroad malleable	20.25 to 20.75
Machine shop turnings	9.50 to 10.00

Buffalo

Pig Iron Prices Soften—Marked Scarcity of Labor in Mills

BUFFALO, Oct. 3.—Pig iron prices have softened and the furnaces which have iron for sale are quoting $32 base, and though no sales at less than that figure have been reported, reports have been circulated that $31 is possible. Inquiry is quiet and less than 4000 tons in scattered sales constitute the new business over the week. A sale of a small quantity of No. 2X at $34 shows consumers are willing to pay a slight bonus for the higher silicons. The American Locomotive Co. is understood to have bought iron, quantity not known, but will not melt it until next year. The Lackawanna mill of the Bethlehem Steel Corporation started its fifth furnace last week. This brings the total furnace operation in this district up to 13. All Lackawanna furnaces are producing basic iron.

We quote f.o.b. per gross ton Buffalo as follows, the higher prices being for early shipment:

No. 1 foundry, 2.75 to 3.25 sil.	$34.00
No. 2X foundry, 2.25 to 2.75 sil.	33.00
No. 2 plain, 1.75 to 2.25 sil.	32.00
Basic	34.00
Malleable	32.00
Lake Superior charcoal	36.28

Warehouse Business.—Bar demand for heavy sizes for use in car repairing and new cars and reinforcing bars to close up structural jobs before the advent of frost feature the warehouse market. All materials are in good demand with particular reference to blue annealed and galvanized sheets. New prices follow.

Finished Iron and Steel.—Prices are more stabilized than in many weeks, and demand for all products continues heavy. Minimum prices for bars are 2c., with shape prices 2c. to 2.10c., and plates 2.10c. to 2.25c. The labor shortage is becoming more serious and is having a direful effect on mill operations as against any other factor now existent. A free labor market

would bring full capacity operation in practically every steel interest in the Buffalo district. Wire business is especially brisk and a local seller is refusing new wire business on account of the labor difficulty, particularly in the shipping end. Cold rolled products are much sought and the 2.50c. price on carload lots rules. There is no change in the tin plate situation, the leading seller still declining to take 1923 business. Sheet business is brisk and the price of 3.50c. on No. 28-gage black base is uniform. A number of reinforcing bar contracts in the neighborhood of 100 tons average have been placed here, and the leading reinforcing bar maker is selling on a warehouse basis—2.50c., Pittsburgh. The Lackawanna mills of the Bethlehem Steel Corporation are operating at full capacity, 19 open-hearth furnaces going, rail and structural mills on single turn and plate, bar, blooming and billet mills on double turn.

We quote warehouse prices, Buffalo, as follows: Structural shapes, 3.20c.; plates, 3.20c.; soft steel bars, 3.10c.; hoops, 4.10c.; bands, 3.90c.; blue annealed sheets, No. 10 gage, 4.05c.; galvanized steel sheets, No. 28 gage, 5.85c.; black sheets, No. 28, 4.85c.; cold rolled round shafting, 3.95c.

Old Material.—A very active demand for all products and particularly for heavy melting steel has brought about another advance in prices and heavy melting steel is now quoted $19.50 to $20.50 here with the prospect of it going still higher because of better prices in the Youngstown district. About 7000 tons has been sold here in a week for delivery in Youngstown, the price on all sales being not less than $19.50. Dealers claim there will be a steadily increasing quantity of heavy melting steel moving toward Youngstown because of the reluctance of Buffalo district consumers to pay more than $18.50.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$19.50 to $20.50
Low phos., 0.04 and under	21.00 to 22.00
No. 1 railroad wrought	19.00 to 20.00
Car wheels	21.00 to 22.00
Machine-shop turnings	14.50 to 15.50
Cast iron borings	17.50 to 18.00
Heavy axle turnings	17.50 to 18.50
Grate bars	16.00 to 17.00
No. 1 busheling	17.00 to 18.00
Stove plate	17.00 to 18.00
Bundled sheet stampings	14.00 to 15.00
No. 1 machinery cast	21.00 to 22.00
Hydraulic compressed	18.00 to 19.00
Railroad malleable	20.50 to 21.50

Birmingham

Soil Pipe Makers Buy 15,000 Tons at $27.50 —Other Transactions Light

BIRMINGHAM, ALA., Oct. 3.—September went out with the Birmingham pig iron market at $27 to $30. Soil pipe makers purchased an aggregate of 15,000 tons on a base of $27.50 for fourth quarter delivery. The lots ranged from 1000 to 5000 tons. An especially large and desirable tonnage could have been placed at $27 probably. Pressure pipe makers were making inquiries toward the end of the week, but did not specify tonnage, hence just what 20,000 tons would bring out in the way of concessions could not be judged. The largest foundry iron maker was on a base of $30 during the last week of the month and made a few sales at that figure, offerings being restricted to 500 tons. The usual sale was at $27.50 to $28, with two makers getting $28.50 for lots up to 200 tons. Lifting of embargoes to Cincinnati and Washington by the Southern Railway system at the close of the week suggested easier movements to consuming points in the immediate future. The Southern also moved a quantity of box cars into the district during the week and finishing mills reported a better supply. Stove and radiator plants have remained at full turn in spite of piling stock, but report ease in movement recently. Export steel and iron products movable down the Warrior River to Mobile have gone out in unusually large volume and this has also served to maintain production in several large plants. Outside of the soil pipe business the week's iron tonnage was not great, and makers seem to regard the market as losing none of its recent strength.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon 1.75 to 2.25	$27.00 to $28.00
Basic	27.00 to 28.00
Charcoal, warm blast	33.00 to 34.00

Finishing Mills.—The Tennessee company went back to a schedule of 9000 tons of rails per week at its Ensley mill this week, following several weeks of a 5000-ton turn due to the car situation. The tie plate mill went to 50 per cent greater capacity. The American Steel & Wire Co. is reported at 100 per cent, out of the market, and making heavy shipments to the Pacific Coast and for export. The Conners Steel Co. is still on cotton ties in one mill, with an unusual demand for this season of the year. The Gulf States Steel Co. is on full turn in finishing mills. The Southern Railway has ordered 40,000 tons of rails, mostly of 100-lb. section, of the Tennessee company for the first six months of 1923. The Chickasaw Shipbuilding & Car Co. is well cared for into next year, the Frisco system's order for 1000 steel hopper cars being among the latest bookings.

Coal and Coke.—Spot coke rules at $9 and $10. Callao, Peru, has taken another cargo of Alabama coal. Industrial coal production is making new high records.

Cast-Iron Pipe.—Pressure pipe was advanced Monday from $40 to $43 for 6 in. and upwards. All plants are on full or near full turn. Alexandria, La., will receive bids for 1600 tons this week and Memphis bids for 800 tons. Soil pipe is selling at from $60 to $65 with plants busy, but unfilled tonnage below recent levels. Car lots were sold to Mexico and Porto Rico.

Old Material.—The scrap market remains lively and quoted prices are regularly obtained both in Birmingham and adjacent districts. The tendency is to advance. Transactions are on a good scale.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Steel rails	$16.00 to $17.00
No. 1 steel	14.00 to 16.00
No. 1 cast	18.00 to 20.00
Car wheels	18.00 to 20.00
Tramcar wheels	17.00 to 19.00
Stove plate	16.00 to 17.00
Cast-iron borings	9.00 to 10.00
Machine shop turnings	9.00 to 10.00

Cincinnati

Very Little Buying of Pig Iron—Southern Prices Show Wide Range

CINCINNATI, Oct. 3—Pig iron buying of the week has been of a hand to mouth character, sales and inquiries being for the most part light. The lifting of the embargo by the Southern Railroad, Sept. 30 is not expected to have an immediate effect on shipments of Southern iron as acute car shortage is a retarding factor. The outstanding sales reported was 1000 tons of charcoal iron for Michigan delivery. Among other sales were 350 tons of Southern iron and a 350- and a 400-ton lot of Northern iron. Two sales of Silvery iron were noted, 500 and 600 tons respectively, the reported price being $42.50. Inquiries current include 500 tons from a Toledo melter and 500 tons of malleable from a Northern Ohio melter. From the same district came an inquiry for 500 tons of low phosphorous iron. A first quarter inquiry from a central Ohio melter for 500 to 600 tons to Southern specifications is noted. Southern foundry iron is still quotable at from $27 to $30 base, Birmingham sales having been made at these and all prices between. The silicon differential generally quoted is $1, although at least one furnace still quotes 50c. an inquiry for 100 tons of Spiegelisen is noted, Southern Ohio foundry iron is variously quoted at from $32 to $34. The $32 iron is not a strictly foundry grade. A sale of 150 tons at $34 is noted.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$31.05 to $32.05
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	31.55 to 32.55
Ohio silvery (6 per cent sil.)	42.77 to 44.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	34.27 to 36.27
Basic Northern	34.77
Malleable	34.27 to 36.27

Finished Material.—The demand for finished materials is showing more life. Bars, particularly, are in good demand, and while 2c. can still be done, the majority of the orders being placed are taking a price of 2.15c. to 2.25c., where delivery is the most important factor. Shape prices are firming up, and the range is now 2c. to 2.25c., with orders for fairly early delivery bringing easily 2.10c. The minimum price quoted on plates by independent companies is 2.25c. against 2c., which is understood to be the price of the Steel Corporation. Several independent mills advanced prices on sheets for fourth quarter $1 a ton, but premiums as high as $5 per ton are being offered for prompt shipment. The new prices are 2.60c. for blue annealed, 3.65c. for black and 4.65c. for galvanized. The demand for wire products has shown much improvement during the past two weeks, and some fairly heavy orders have been placed at the new prices of $2.45 for plain wire and $2.70 per keg for wire nails. The Big Four Railroad is in the market for approximately 2500 tons of tie plates and 5000 kegs of track spikes, on which action will be taken early in the week. Should the makers quote favorable prices for next year's delivery it is reported that the road will place its full year's requirements, which would be in the neighborhood of 10,000 tons. Prices on tie plates are now $45 per ton, with $3 additional being quoted for copper bearing plates. On track spikes the lowest price obtainable appears to be $2.85 on lots of 1000 kegs or over. The Big Four inquiry calls for 1,250,000 bolts. On plates the quarter's requirements are estimated at 1500 tons, on shapes, 450 tons, and on iron bars, 650 tons. Bids will be opened on Oct. 5. There is little new activity in the structural field, the Big Four Railroad issuing the only inquiry of consequence, 200 tons for bridge work. A large number of reinforced buildings are about ready to break, which will involve substantial tonnages of bars. The only award of consequence was the steel work for the new plant of the J. A. Fay & Egan Co., Cincinnati, 800 tons having been awarded to L. Schreiber & Sons.

Warehouse Business.—Local warehouses continue to enjoy good business. Prices are showing considerable strength, and advances will likely be made on the heavier products within the next few days. Prices on wire products have been advanced $3 per ton, the new price on plain wire being $3 per 100 lb. and on wire nails $3.20 per keg.

Cincinnati jobbers quote: Iron and steel bars, 2.95c. base; reinforcing bars, 3.05c. base; hoops, 4.05c. base; bands, 3.85c. base; shapes and plates, 3.05c. base; cold-rolled rounds, 3.75c. base; cold-rolled flats, squares and hexagons, 4.25c. base; No. 10 blue annealed sheets, 4c.; No. 28 black sheets, 4.70c.; No. 28 galvanized sheets, 5.75c.; No. 9 annealed wire, $3 per 100 lb.; common wire nails, $3.20 per keg, base.

Coke.—A sale of 5000 tons of furnace coke was the leading activity of the week. While the market is quiet, prices are holding firm. Connellsville furnace coke is still at $12 and foundry coke is available from $13 to $14. New River foundry remains at $14 to $15, Wise County furnace coke is quoted at $11 and foundry $13, the same range prevailing on Pocahontas.

Old Material.—Fair activity continues in the scrap market, prices holding firm and in several items having advanced. There is some buying from steel mills and scrap for foundries is active.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

Per Gross Ton	
Bundled sheets	$13.00 to 14.50
Iron rails	17.00 to 18.00
Relaying rails, 50 lb. and up	26.50 to 27.00
Rails for rolling	18.50 to 19.00
Heavy melting steel	17.50 to 18.50
Steel rails for melting	16.00 to 17.00
Car wheels	20.00 to 21.00
Per Net Ton	
No. 1 railroad wrought	14.50 to 15.00
Cast borings	11.50 to 12.00
Steel turnings	10.50 to 11.00
Railroad cast	18.00 to 19.00
No. 1 machinery	21.00 to 21.50
Burnt scrap	12.00 to 12.50
Iron axles	20.50 to 21.00
Locomotive tires (smooth inside)	14.50 to 15.50
Pipes and flues	9.00 to 9.50

Philadelphia

Railroad Freight Embargoes Now Having Serious Effect Upon Movement of Steel

PHILADELPHIA, Oct. 3.—The embargoes on freight movement on some of the railroads, excepting coal and foodstuffs, particularly the embargo on the Pennsylvania West of Altoona, are having a serious effect upon shipments of steel from the Pittsburgh and Youngstown mills to the East. The Pennsylvania embargo will be in effect for at least another week. Some mills are shipping via other roads when customers are willing to pay the difference in freight. Consumers in this district will doubtless become more dependent on Eastern mills for current requirements. There is no shortage of steel anywhere, but the situation is being watched closely by both buyers and sellers because of its possible effect on supply and prices.

Steel and pig iron business continues in moderate volume. There is little change in steel prices, but pig iron is weaker. Scrap continues to go up, but the advances are more moderate than those of a few weeks ago.

Pig Iron.—There is a fair volume of pig iron business, but it is mostly for early shipment, though some consumers are covering their probable requirements over the remainder of the year. Neither buyers nor sellers have taken any active interest in commitments for the first quarter of 1923. The largest buying of the week was in basic, an Eastern steel company taking an aggregate of 16,000 tons from three furnace companies. One furnace quoted $28, f.o.b. furnace, but the delivered prices on all of the iron bought ranged from $29.50 to $29.75. Foundry iron is being offered at about 50c. to $1 a ton below last week's prices. A fairly large tonnage for shipment to a point having a freight rate of more than $3 a ton was sold at $31, furnace, for No. 2X, but for nearby shipment the market ranges from $31 to $32 for No. 2 plain; $32 to $33 for No. 2X and about $1 a ton higher for No. 1X. Foreign iron is being offered very aggressively and at slight concessions in prices from those recently quoted. Receipts of foreign iron at the port of Philadelphia in the week ended Saturday, Sept. 30, were 7852 tons, of which 3150 tons came from England; 3468 tons from Belgium; 500 tons from Scotland and 734 tons from France. The Midvale Steel & Ordnance Co. blew in a second furnace at Coatesville last Thursday and has sold a substantial amount of basic and foundry grades. The Eastern Steel Co. is planning to put one of its furnaces in blast shortly. The Punxsatawney furnace went in blast last week.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to $1.64 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$32.14 to $32.64
East. Pa. No. 2X, 2.25 to 2.75 sil.	33.14 to 33.64
East. Pa. No. 1X	34.14 to 34.64
Virginia No. 2 plain, 1.75 to 2.25 sil.	37.17
Virginia No. 2X, 2.25 to 2.75 sil.	38.17
Basic delivered eastern Pa.	29.50 to 29.75
Gray forge	31.00 to 32.00
Malleable	34.00 to 35.00
Standard low phos. (f.o.b. furnace)	38.00 to 40.00
Copper bearing low phos. (f.o.b. furnace)	37.00 to 38.00

Ore.—An Eastern steel company recently bought about 40,000 tons of Spanish steel-making ore at 8c. per unit, c.i.f. Atlantic port. Receipts of iron ore at the port of Philadelphia in the week ended Saturday, Sept. 30, included 7000 tons from French Africa; 7751 tons from Sweden and 386 tons from England. From Madras, British India, 1500 tons of chrome ore was received.

Coke.—The coke market has stiffened again, and blast furnace coke has been offered to Eastern furnaces within the past few days at $12.50 and $13, Connellsville.

Rails.—The Pennsylvania Railroad has distributed orders for 170,000 tons of 130-lb. rails as enumerated in another column. The Baltimore & Ohio has bought about 35,000 tons.

Semi-Finished Steel.—Open hearth rerolling billets are quoted from $40 to $42.50, Pittsburgh, and forging billets at $45 to $47.50, Pittsburgh.

Plates.—A good deal of the current plate business is going at prices ranging from 2.10c. to 2.25c., Pittsburgh, but 2.50c., Pittsburgh, has been received by one Eastern mill on a number of small orders aggregating about 1800 tons. The Baldwin Locomotive Works has placed orders for several thousand tons of plates for its recent locomotive contracts, this being the only large business done recently in this market. We quote the plate market from 2.10c. to 2.50c., Pittsburgh.

Structural Material.—Plain material is to be had from Eastern mills at 2.10c. and 2.15c., Pittsburgh, and a Pittsburgh mill is quoting 2c. Demand for new structural work is falling off, but a fair volume of business is being placed.

Bars.—Soft steel bars are quoted from 2c. to 2.25c., Pittsburgh, with only a moderate volume of business being placed. Bar iron is quoted from 2.15c. to 2.25c., Pittsburgh.

Sheets.—Most of the independent mills are asking 2.60c. to 2.75c. on blue annealed; 3.50c. to 3.75c. on black and 4.50c. to 4.75c on galvanized sheets, base, Pittsburgh.

Warehouse Business.—A further advance in warehouse prices has gone into effect, most of the prices named below being 10c. per 100 lb. or more above those of last week. We quote for local delivery as follows:

Soft steel bars and small shapes, 3.025c.; iron bars (except bands), 3.025c.; round edge iron, 3.20c.; round edge steel, iron finish, 1½ x ½ in., 3.20c.; round edge steel planished, 4c.; tank steel plates, ¼-in. and heavier, 3.125c.; tank steel plates, 3/16-in., 3.33c.; blue annealed steel sheets, No. 10 gage, 3.85c.; black sheets, No. 28 gage, 4.60c.; galvanized sheets, No. 28 gage, 5.75c.; square twisted and deformed steel bars, 3.15c.; structural shapes, 3.125c.; diamond pattern plates, ¼-in., 4.80c.; 3/16-in., 5c.; spring steel, 4.25c.; round cold-rolled steel, 3.85c.; squares and hexagons, cold-rolled steel, 4.35c.; steel hoops, No. 13 gage and lighter, 4.25c.; steel bands, No. 12 gage to 3/16-in., inclusive, 3.825c.; rails, 3.025c.; tool steel, 8.50c.; Norway iron, 6.50c.

Old Material.—Prices continue to move upward, but the advances are more moderate than those of a few weeks ago. There are several advances, ranging from 50c. to $1 a ton. Eastern mills are not buying heavily, but there is a steady demand from numerous sources.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$18.50 to $19.00
Scrap rails	18.50 to 19.00
Steel rails for rolling	21.00 to 22.00
No. 1 low phos., heavy 0.04 and under	25.00 to 26.00
Cast iron car wheels	23.00 to 24.00
No. 1 railroad wrought	23.00 to 23.50
No. 1 yard wrought	20.00 to 21.00
No. 1 machine	17.00 to 17.50
Bundled sheets (for steel works)	17.00 to 17.50
No. 1 busheling	15.50 to 16.00
Turnings (short shoveling grade	17.00 to 17.50
Mixed borings and turnings (for blast furnace use)	15.00 to 15.50
Machine shop turnings (for steel works)	17.00 to 17.50
Machine-shop turnings (for rolling mill use)	17.00 to 17.50
Heavy axle turnings (for equivalent)	17.00 to 17.50
Cast borings (for steel works and rolling mills)	16.50 to 17.50
Cast borings (for chemical plants)	23.00 to 25.00
No. 1 machinery cast	23.00 to 24.00
Heavy breakable cast (for steel plants)	22.00 to 22.50
Railroad grate bars	17.00 to 17.50
Stove plate (for steel plant use)	17.50 to 18.00
Railroad malleable	15.50 to 16.50
Wrought iron and soft steel pipes and tubes	15.00 to 15.50
Shafting	25.00 to 28.00
Steel axles	30.00 to 31.00

Swedish Contract to Carry Bethlehem Ore

The Bethlehem Steel Corporation has renewed the contract it had before the war with Axel Brostrom & Son, of Gottenborg, Sweden, for the transportation of a portion of its Tofo iron ore shipments from Chile to the United States. For the carrying out of the contract the Gottenborg firm expects to have built for it at a Hamburg shipyard two ore carriers of 21,000 tons dead weight capacity. The vessels will be equipped with 6000-hp. Diesel engines.

FUEL PROBLEMS

American Iron and Steel Institute Will Consider How to Effect Economies

Problems connected with the fuel situation due to recent strikes in the anthracite and bituminous regions will form an important part of the program of the twenty-second general meeting of the American Iron and Steel Institute, which will be held at the Hotel Commodore, New York, Friday, Oct. 27. It is announced that discussion from the floor will follow the reading of the papers. After the opening address by the president, Elbert H. Gary, the following papers will be read:

"Modern Methods of Mining Coal"—H. Foster Bain, director Bureau of Mines, Washington.

"The Storage of Bituminous Coal"—H. H. Stook, professor of Mining Engineering, University of Illinois, Urbana, Ill.; J. V. Freeman, director Coal and Coke Research Laboratory, United States Steel Corporation, Joliet, Ill.

"The Present Status of the Electric Furnace in Refining Iron and Steel"—J. A. Mathews, president Crucible Steel Co. of America, New York.

"Economic Importance of the Power Plant in the Steel Industry"—E. F. Entwistle, assistant general manager Steelton plant, Bethlehem Steel Corporation, Steelton, Pa.

"The Steel Requirements of the Automotive Industry"—C. H. Wills, president C. H. Wills & Co., Marysville, Mich.

"Heating Furnaces for Blooms, Slabs and Billets"—W. P. Chandler, Jr., fuel and experimental engineer Carnegie Steel Co., Duquesne, Pa.

"Use of Liquid Fuel in Metallurgical Furnaces"—R. C. Helm, director Worcester research laboratory of the American Steel & Wire Co., Worcester, Mass.

"The Thermal Efficiency of the Open Hearth Furnace"—C. L. Kinney, Jr., superintendent No. 1 open-hearth department, South Chicago Works, Illinois Steel Co., South Chicago.; G. R. McDermott, fuel engineer South Chicago Works, Illinois Steel Co., South Chicago, Ill.

"Fluorspar and Its Uses"—G. H. Jones, president Hillside Fluorspar Mines, Chicago.

Industrial Electrical Heating Exhibit

Devices for the industrial utilization of electric heat, apparatus used in connection with electric vehicles and industrial control equipment will feature an exhibit of the General Electric Co. in the Electrical and Industrial Exposition, New York, Oct. 7 to 14. Among other things will be shown an automatically controlled electric furnace for heat treating metals, annealing glass, baking vitreous enamel, and similar operations performed at temperatures of from 1000 to 2000 deg. Fahr.; an electric rivet heater for heating rivets up to five in. long and 1½ in. in diameter, an oil tempering bath, a tool room muffle furnace, immersion units for heating liquids, air heaters for ovens, special cartridge heating units for localized heating, electrically heated glue pots, and electrically heated pots for melting sealing wax, battery compound and similar substances.

The representatives of the company who will be present at the exhibit will be K. B. Jones and C. A. Treber, New York office, Messrs. Barker, Baldwin and Clendennin, Lynn, Mass., and Mr. Hammon, Schenectady, N. Y.

A wood screw with a square socket in the head, instead of the usual diametrical groove, has been put on the market by the P. L. Robertson Mfg. Co., Ltd., Milton, Ontario. The screw driver is made to fit into the socket and the screw is regarded as particularly valuable for overhead work, such as in electric wiring, and for spaces which it would be particularly difficult to reach with an ordinary screw and driver.

Figures of the Department of Commerce show the August production of automobiles to have been 246,941 passenger cars and 24,064 trucks. Figures for the 8 months ended Aug. 31 show a total of 1,507,495 passenger cars and 159,907 trucks, a total of 1,667,402 automobiles.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Plates

Sheared, tank quality, base, per lb.....2.00c. to 2.50c.

Structural Material

Beams, channels, etc.....2.00c. to 2.25c.

Iron and Steel Bars

Soft steel bars, base, per lb.....2c. to 2.25c.
Refined iron bars, base, per lb.....2.60c.

Hot-Rolled Flats

Hoops, base, per lb.....2.90c. to 3.25c.
Bands, base, per lb.....2.90c. to 3.25c.
Strips, base, per lb.....2.90c. to 3.25c.
Cotton ties, per bundle of 45 lb.....$1.13

Cold-Finished Steels

Bars and shafting, base, per lb.....2.50c.
Strips, base, per lb.....4.50c.

Wire Products

Nails, base, per keg.....$2.70
Bright plain wire, base, per 100 lb.....2.45
Annealed fence wire, base, per 100 lb.....2.10
Galvanized wire, base, per 100 lb.....2.95
Galvanized barbed, base, per 100 lb.....3.35
Galvanized staples, base, per keg.....3.35
Painted barbed wire, base, per 100 lb.....3.00
Polished staples, base, per keg.....3.00
Cement coated nails, base, per count keg.....2.20
Woven fence, carloads (to jobbers).....70½ per cent off list
Woven fence, carloads (to retailers).....68 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads...60 and 5 per cent off list
Machine bolts, small, cut threads....50 and 10 per cent off list
Machine bolts, larger and longer....50 and 10 per cent off list
Carriage bolts, ⅜ x 6 in.:
Smaller and shorter, rolled threads,
50, 10 and 5 per cent off list
Cut threads.....50 per cent off list
Longer and larger sizes.....50 per cent off list
Lag bolts.....60 and 5 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads....50 and 10 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.:
Smaller and shorter.....45 per cent off list
Larger and longer sizes.....45 per cent off list
Hot pressed square or hex. blank nuts.....$3.25 off list
Hot pressed nuts, tapped.....3.25 off list
C.p.c. and t. sq. or hex. nuts, blank.....3.25 off list
C.p.c. and t. sq. or hex. nuts, tapped.....3.25 off list
Semi-finished hex. nuts:
9/16 in. and smaller, U. S. S....75, 10 and 5 per cent off list
⅝ in. and larger, U. S. S....70, 10 and 2½ per cent off list
Small sizes, S. A. E.....80 and 5 per cent off list
S. A. E., ⅝ in. and larger.....75 and 5 per cent off list
Stove bolts in packages.....80 and 5 per cent off list
Stove bolts in bulk.....80, 5 and 2½ per cent off list
Tire bolts.....50, 10 and 10 per cent off list

Cap and Set Screws

Milled square and hex. head cap screws....75 per cent off list
Milled set screws.....75 per cent off list
Upset cap screws.....75 and 10 per cent off list
Upset set screws.....80 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb..$3.00 to $3.15
Large boiler rivets, base, per 100 lb.....3.10 to 3.25
Small rivets.....65 to 65 and 5 per cent off list

Track Equipment

Spikes, 9/16 in. and larger, base, per 100 lb....$2.75 to $2.85
Spikes, ½ in. and smaller, base, per 100 lb.....3.50
Spikes, boat and barge, base, per 100 lb.....3.50
Track bolts, base, per 100 lb.....3.85 to 4.50
Tie plates, per 100 lb.....2.35 to 2.50
Angle bars, base, per 100 lb.....2.75

Welded Pipe

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
¼	51½	26	¼ to ⅜	+7	+33
¼ to ⅜	57	31½	½	26	8
½	62	48½	¾	32	17
¾	66	54½	1 to 1½	34	19
1 to 3	68	56½			

Lap Weld

2	61	48½	2	30	15
2½ to 6	65	52½	2½ to 6	33	19
7 to 8	62	49½	7 to 12	30	17
9 to 12	61	48½			

Butt Weld, extra strong, plain ends

⅛	47½	31	⅛ to ⅜	+15	+18
¼ to ⅜	53	36½	½	25	13
½	59	48½	¾	32	18
¾	64	53½	1 to 1½	34	20
1 to 1½	66	55½			
2 to 3	67	56½			

Lap Weld, extra strong, plain ends

2	59	48½	2	30	17
2½ to 4	63	52½	2½ to 4	33	21
4½ to 6	62	51½	4½ to 6	32	20
7 to 8	58	45½	7 to 8	25	13
9 to 12	52	39½	9 to 12	20	8

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 and 2½ per cent.

Boiler Tubes

Lap Welded Steel		*Charcoal Iron*	
1¾ in.	21½ to 23½	1¼ in.	7
2 to 2¼ in.	36 to 38	1¾ to 1⅞ in.	3
2½ to 3 in.	47 to 49	2 to 2¼ in.	12
3½ to 13 in.	52 to 54	2½ to 3 in.	18
		3½ to 4½ in.	20

To large buyers of steel tubes a supplementary discount of 5 per cent is allowed.

Standard Commercial Seamless Boiler Tubes

Discounts on cold-drawn tubes in carload lots, f.o.b. Pittsburgh, follow:

1 in.	57	2½ and 2¾ in.	40
1¼ and 1½ in.	49	3 in.	44
1¾ in.	23	3½ to 4 in.	49
2 and 2¼ in.	36	4½ in. and 5 in.	41

Hot Rolled

3 in.	46	3¼ to 4 in.	51

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base, 85 per cent off list. Carbon 0.30 to 0.40, base, 83 per cent off list. Plus usual differentials and extras for cutting.

Seamless Locomotive and Superheater Tubes

Cents per Ft.		Cents per Ft.	
2-in. O.D. 12 gage	13	2¼-in. O.D. 10 gage	17¾
2-in. O.D. 11 gage	14	3-in. O.D. 7 gage	33
2-in. O.D. 10 gage	15	1¼-in. O.D. 9 gage	13
2¼-in. O.D. 12 gage	15	5⅜-in. O.D. 9 gage	51
2¼-in. O.D. 11 gage	16	5½-in. O.D. 9 gage	53

Tin Plate

Standard cokes, per base box.....$4.75

Terne Plate

(Per package, 200-lb.)

8-lb. coating	$9.30	25-lb. coating I. C.	$14.25
8-lb. coating I. C.	9.60	30-lb. coating I. C.	15.25
15-lb. coating I. C.	11.80	35-lb. coating I. C.	16.25
20-lb. coating I. C.	13.00	40-lb. coating I. C.	17.25

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....2.50c. to 2.75c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.35c. to 3.75c.

Galvanized

No. 28 (base), per lb.....4.35c. to 4.75c.

Tin-Mill Black Plate

No. 28 (base), per lb.....3.35c. to 3.50c.

Manufacturers have pamphlets, which can be had upon application, giving price differentials for gage and extras for length, width, shearing, etc.

Freight Rates

All rail freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic	$0.325	Buffalo	$0.265	St. Louis	$0.43
Philadelphia, export	0.235	Cleveland	0.215	Kansas City	0.735
Baltimore, domestic	0.315	Cleveland, Youngstown Comb.	0.19	Kansas City (pipe)	0.705
Baltimore, export	0.225	Detroit	0.295	St. Paul	0.595
New York, domestic	0.34	Cincinnati	0.295	Omaha	0.735
New York, export	0.255	Indianapolis	0.31	Omaha (pipe)	0.705
Boston, domestic	0.365	Chicago	0.34	Denver	1.275
Boston, export	0.255			Denver (pipe)	1.215

Pacific Coast	$1.50	Memphis	0.385
Pac. Coast, ship plates	1.20	Jacksonville, all rail	0.70
Birmingham	0.69	Jacksonville, rail and water	0.415
		New Orleans	0.515

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 30c. to 40c.; ship plates, 30c. to 40c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 30c. to 40c.; sheets and tin plates, 50c.; rods, wire rope, cable and strands, 75c.; wire fencing, netting and stretcher, 50c.; pipe, not over 8 in. in diameter, 50c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

RAILROAD EQUIPMENT BUYING

Orders and Inquiries for Locomotives and Cars Somewhat Diminished in Volume

Sharp advances in some of the specialties entering into the manufacture of railroad equipment may check somewhat further buying of cars and locomotives—at least such an opinion has lately been repeatedly expressed. The weeks activity is indicated in the following items:

The Atlantic Coast Line has ordered [illegible] cars from the Standard Tank Car Co., Sharon, Pa.

The Hocking Valley has contracted for repairs, dividing 1000 equally between the Pressed Steel Car Co. and the Greenville Steel Car Co.

The Seaboard Air Line has ordered repairs to 500 composite gondola cars at the shops of the Virginia Bridge & Iron Works.

The Union Pacific has bought 50 caboose cars of the Mt. Vernon Car Mfg. Co.

The Grand Trunk is inquiring for 1000 box and 2000 automobile cars for its lines in the United States, and for 3000 box and 700 refrigerator cars for its Canadian lines.

The Lehigh & New England is in the market for 100 composite gondolas of 50 tons capacity.

The Atchison, Topeka & Santa Fe Railroad has ordered 59 locomotives from the Baldwin Locomotive Works.

The Santa Fe has ordered 1000 refrigerator and 500 stock cars from the Pullman Co.

The Northwestern has placed 200 flat and 800 gondola cars with the General American Car Co.

The Chicago Great Western has awarded 1000 freight cars to the Pullman Co.

The Chicago & Alton has let repairs on 200 gondola cars each to the Illinois Car Co. and the Mt. Vernon Car & Mfg. Co.

The Cincinnati, Indianapolis & Western has placed 300 hopper cars with the American Car & Foundry Co.

The Rock Island has awarded repairs on 400 box cars to the Western Steel Car & Foundry Co.

The Nickel Plate has placed 300 underframes with the Illinois Car & Mfg. Co.

The Cotton Belt contemplates entering the market for 5000 cars and the Kansas City Southern is considering the purchase of freight equipment.

The Baltimore & Ohio is inquiring for 30 passenger cars and the Michigan Central for 7 baggage and mail cars.

Steel Rail Purchases

The Pennsylvania Railroad has distributed orders for 170,000 tons of 130-lb. rails for 1923 delivery among the following steel companies: United States Steel Corporation, 78,000 tons; Cambria Steel Co., 37,000 tons; Bethlehem Steel Co., 37,000 tons; Lackawanna plant of Bethlehem Steel Co., 9000 tons; Inland Steel Co., 9000 tons.

The New York Central's rail distribution is as follows, totaling 194,300 tons: Illinois Steel Co., 74,500 tons; Carnegie Steel Co., 16,464 tons; Bethlehem Steel Co., 85,036 tons; Inland Steel Co., 15,800 tons; Cambria Steel Co., 2500 tons.

The Southern Railway has purchased 40,000 tons of 100-lb. rails from the Tennessee Coal, Iron & Railroad Co., to be rolled at Ensley, Ala.

The Chicago, Burlington & Quincy has ordered 15,000 tons from the Illinois Steel Co., 4000 tons from the Inland Steel Co. and 15,000 tons from the Colorado Fuel & Iron Co., the last tonnage to be used on the Colorado & Southern and other subsidiaries as well as on the Burlington.

The Chicago, Milwaukee & St. Paul has placed 40,000 tons with the Illinois Steel Co. and 10,000 tons with the Inland Steel Co.

The Chesapeake & Ohio has ordered 10,000 tons from the Inland Steel Co. and 5000 tons each from the Illinois, Carnegie and Bethlehem companies.

The Chicago, Rock Island & Pacific has placed 5000 tons with the Inland Steel Co. and 35,000 tons with the Illinois Steel Co.

The Pere Marquette has ordered 3500 tons each from the Illinois and Inland companies and the Lackawanna mill of the Bethlehem Steel Co.

The Missouri-Kansas-Texas has placed 10,000 tons with Illinois Steel Co.

The Chicago & Northwestern and the Chicago, St. Paul, Minneapolis & Omaha have made reservations for their rail requirements, but have not yet decided on the exact tonnage which will be contracted for.

The Illinois Central has likewise reserved space with the privilege of changing the tonnage stipulated, but the division will probably correspond with the following: 40,000 tons to the Illinois Steel Co., 10,000 tons to the Inland Steel Co., 20,000 tons to the Tennessee Coal, Iron & Railroad Co. and 10,000 tons for the Central of Georgia, also to the Tennessee mill.

The Texas & Pacific has ordered 15,000 tons from the Tennessee mill.

The Nashville, Chattanooga & St. Louis has ordered 13,000 tons from the Tennessee mill.

The Nickel Plate Railroad placed 19,000 tons with the Carnegie, Lackawanna and Inland mills, the bulk going to the Carnegie Steel Co., which also took 8000 tons from the Clover Leaf Railroad and 800 tons from the Northern Ohio Traction & Light Co.

The Midvale Steel & Ordnance Co. took 3000 tons for the Ann Arbor Railroad and 500 tons for the Cleveland Frog & Crossing Co.

The Missouri Pacific and the Wabash have each purchased 15,000 tons.

FABRICATED STEEL BUSINESS

Drop in Volume of Awards as Well as of New Inquiry

Among the fabricated steel awards of the past two weeks are the following:

Oil tanks in Texas, 5100 tons, to the Petroleum Iron Works

Ford Motor Co., at Kearney, N. J., 300 tons, to the Belmont Iron Co.

John B. Stetson Co., Philadelphia, 800 tons, to the American Bridge Co.

Bridges, Lake County, Minn., 399 tons, to American Bridge Co.

Standard Oil Co., six 80,000-bbl. oil storage tanks, two at Sugar Creek, near Kansas City, and four at Wood River, near Alton, Ill., 1500 tons, to Chicago Bridge & Iron Works.

Lafayette Investment Co., office building, Minneapolis, 300 tons, reinforced concrete construction substituted for fabricated steel.

Miami University, Oxford, Ohio, 300 tons, general contract to Dayton fabricator.

Indiana Quarries Co., Bedford, Ind., 600 tons, to Indiana Bridge Co.

Highway bridge, Lowell, Mass., 235 tons, to the McClintic-Marshall Co.

Public Schools Nos. 192 and 193, New York, 800 tons each, to A. E. Norton, Inc.

Virginian Railroad, 300 tons of plate girder work, to Virginia Bridge & Iron Works.

Chicago Trust Building, Monroe and Clark Streets, Chicago, 1032 tons, to Duffin Iron Works.

S. Scott Joy, architect, Duluth, Minn., McDougal Warehouse, 247 tons, to Minneapolis Steel & Machinery Co., Minneapolis.

Building for Illinois Publishing & Printing Co., Chicago, 318 tons, to Morava Construction Co.

Edison Co., South Boston power house extension, 960 tons, to Levering & Garrigues Co.

South Side High School, St. Louis, 600 tons, to Spuck Iron & Foundry Co.

Plant of J. A. Fay & Egan Co., Cincinnati, 800 tons, to L. Schreiber & Sons.

Gas holder, Bristol, Conn., 1000 tons, to Stacey Mfg. Co.

Gas holder, Allentown, Pa., 1000 tons, to Bartlett-Hayward Co.

Sheet mill building, Weirton Steel Co., 1600 tons, including 300 tons of corrugated galvanized sheets, to McClintic Marshall Co.

Corn Products Refining Co., plant, Pekin, Ill., 695 tons, to Vierling Steel Works.

Structural Projects Pending

Inquiries for structural steel work now being figured on include the following:

Coal pier at Norfolk, Va., for Virginian Railroad, 5000 tons.

Apartment house at Fifth Avenue and Ninety-eighth Street, New York, 1000 tons.

Bridgework, Big Four Railroad, 200 tons, bids in.

High school, Sharon, Pa., 400 tons.

Pillsbury Flour Mills Co., warehouse in Buffalo, 200 tons.

Western Maryland Terminal Railway, building, Baltimore, 153 tons.

Oak Park Trust & Savings Bank Building, Oak Park, Ill., 252 tons.

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
		Electrolytic*	New York	New York	St. Louis	New York	St. Louis
Sept.	Lake						
27.....	14.25	13.75	32.87½	6.62½	6.25	7.20	6.85
28.....	14.25	13.75	32.57½	6.65	6.30	7.20	6.85
29.....	14.25	13.75	32.75	6.65	6.30	7.20	6.85
30.....	14.25	13.75	....	6.65	6.30	7.20	6.85
Oct.							
2.....	14.25	13.75	33.00	6.65	6.30	7.17½	6.82½
3.....	14.25	13.75	32.87½	6.65	6.30	7.15	6.80

*Refinery quotation.

New York

NEW YORK, Oct. 3.

Most of the markets are quiet and prices are steady to easy. Business in copper is fair at unchanged prices. Transactions in tin have been moderate at slightly higher values. The lead market continues strong but zinc is slightly easier.

Copper.—The electrolytic copper market continues its steady course with prices neither up or down in many weeks. Demand continues good and there is no let-up in export business. It is probable that, were transportation conditions better, business might be brisker and this is also true of the lead and zinc markets. Electrolytic copper to-day is quoted at 13.75c., refinery, or 14c., delivered, for the remainder of the year.

Copper Averages.—The average price of Lake copper for the month of September, based on daily quotations in THE IRON AGE, was 14.16c. The average price for electrolytic copper was 13.75c., refinery, and 14c., delivered.

Tin.—With the exception of one day in the past week the market has been quiet and featureless. On Thursday, Sept. 28, about 300 to 400 tons of Straits tin was sold, consumers being largely the buyers, and the deliveries involving spot to November-December shipment from the East. Most of this business was done at close to 32.50c. At the close of business on that day the market stiffened slightly with 32.60c. bid, but no sellers. Because of the Jewish holiday yesterday very little business was done and the market to-day has also been quiet. Spot Straits tin was quoted to-day at New York, 32.87½c. September deliveries into consumption were surprisingly large and exceeded the most optimistic estimates by 400 to 500 tons. The total deliveries were 5050 tons, with 1236 tons reported in stock and landing on Sept. 30. Imports to Oct. 1 this year have been 41,715 tons against 15,578 to Oct. 1, 1921. The London quotations to-day were £164 15s. for spot standard, £165 12s. 6d. for future standard and £165 2s. 6d. with the market strong.

Lead.—As compared with recent weeks, the market has turned rather quiet and while spot delivery is still scarce, there is not so much anxiety to buy. Sales have been made in the outside market at 6.65c., New York, with small lots of 15 tons or over in fair quantities for spot delivery at 6.75c. The leading interest advanced its quotations again on Sept. 27 to 6.35c., New York, and 6.15c., St. Louis, an increase of 10 points. We quote the outside market to-day at 6.30c., St. Louis, or 6.65c., New York, for early delivery.

Zinc.—Inability in many cases to deliver zinc on the part of producers and to make shipment of product on the part of users of zinc has caused an easing in the entire market and a slight drop in prices. Prime Western zinc for early delivery is quoted at 6.80c. to 6.85c., St. Louis, or 7.15c. to 7.20c., New York. Most producers are well sold up for October and in some cases into November, but some metal is available at second hand at the prices mentioned.

Antimony.—Chinese metal in wholesale lots for early delivery is quoted at 6.75c., New York, duty paid.

Aluminum.—The leading interest continues to quote 19.10c., f.o.b., for virgin metal, 98 to 99 per cent pure, while the same grade imported from foreign producers is quoted nominally at 18.25c. to 19c. per lb., New York, duty paid.

Old Metals.—Business has been better this week with a slightly higher market. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	13.50
Copper, heavy and wire	12.75
Copper, light and bottoms	11.25
Heavy machine composition	10.50
Brass, heavy	8.25
Brass, light	6.50
No. 1 red brass or composition turnings	9.50
No. 1 yellow rod brass turnings	7.50
Lead, heavy	5.50
Lead, tea	4.00
Zinc	4.25

Chicago

OCT. 3.—Tin has advanced slightly but otherwise the market is quiet and unchanged. Lead and zinc prices have apparently reached the peak and recessions are looked for. Among the old metals zinc, brass and certain grades of copper have gone up. We quote, in carload lots, lake copper, 14.50c.; tin, 34c. to 34.50.; lead, 6.37½c.; spelter, 6.90c.; antimony, 8.50c.; in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 11c.; copper bottoms, 9.75c.; red brass, 9c.; yellow brass, 7c.; lead pipe, 4.50c.; zinc, 4c. pewter, No. 1, 20c.; tin foil, 22.50c.; block tin, 26c., all buying prices for less than carload lots.

St. Louis

OCT. 3.—We quote: lead, 6.35c. and zinc, 6.85c., carlots. On old metals we quote: light brass, 3.50c.; heavy red brass, and light copper, 7c.; heavy yellow brass, 4c.; heavy copper and copper wire, 7.50c.; zinc, 2c.; pewter, 15c.; tin foil, 20c.; tea lead, 2c.; aluminum, 9c.

Large Coal Production

WASHINGTON, Oct. 3.—Production of bituminous coal for the week of Sept. 25-30, is estimated by the Geological Survey at from 9,600,000 to 9,900,000 tons. The output of anthracite for the same week is placed at 1,850,000 tons. Heavy loadings of soft coal in the early part of the week, 38,804 cars on Monday and 33,396 cars on Tuesday, were largely offset by a decline later in the week. Under the stimulus of active demand, soft coal is now being offered for shipment up to the ability of the rail and water carriers to transport it. The present weekly rate of production is nearly 1,000,000 tons above that of the year of depression, 1921, but is from 1,500,000 tons to 3,000,000 tons below the years 1917-1920, inclusive.

Alabama Export Shipments

BIRMINGHAM, ALA., Oct. 3.—Recent export movements from Alabama mines and mills, principally via the Warrior barge line and Mobile, have been as follows: 2000 tons of phosphate made of Ensley steel mill slag for New Zealand; 2000 tons (third cargo) of coal for Callao, Peru; 2195 tons of Ensley steel rails for Antofagasta, Chile; 6000 tons of sulphate of ammonia, steel rails, pig iron and track accessories from Fairfield and Ensley mills to China, Japan and Korea; wire mill products to Argentine and Brazil and the Windward Island; sugar house machinery to Antilla, Chaparra, Havana and other Cuban points; a small tonnage of steel hoops and bands to China. The Orient is to get another 6000-ton cargo of rails this week.

The General Electric Co. has acquired a tract of about 175 acres of farm and wood lands at Parsippany, N. J., for the establishment of a recreation center and probably a summer camp, with outdoor sport facilities, for employees of the Newark, Harrison, Ampere, Waverly and Belleville plants, all located in the northern New Jersey district. The company is now operating a similar recreation center at Lake George, N. Y.

PERSONAL

Howard Coonley, president Walworth Mfg. Co., Boston, was a guest of the Pilgrim Publicity Association at a luncheon at Hotel Bellevue, that city, last week. During his address, which was in the form of an appeal for New England business interests to forge ahead, he paid glowing tribute to Charles M. Schwab's personality and business ability. Mr. Coonley during the war, as a director of administration of the Emergency Fleet Corporation, came in contact with Mr. Schwab.

Charles L. Newcomb, Dean Works, Worthington Pump & Machinery Corporation, Holyoke, Mass., has been made chairman of a newly formed western Massachusetts section of the American Society of Mechanical Engineers.

A. L. Lee, who has been in the engineering department at the Ambridge, Pa., works, American Bridge Co., has been appointed resident engineer, United States Steel Products Co., at Bombay and Calcutta, India. He was tendered a farewell dinner and presented a gold watch by his former associates prior to his departure to his new post. Mr. Lee served overseas during the war, reaching the rank of major in the Engineer Corps.

H. F. King, formerly of the Kings Refractories Co., has joined the sales and service department of the Quigley Furnace Specialties Co. in New York.

John F. Miller, vice-chairman, board of directors Westinghouse Air Brake Co., Wilmerding, Pa., recently was elected a trustee of Wooster College, Wooster, Ohio, from which he was graduated in 1881. Beside his connection with the Westinghouse company, Mr. Miller is identified with several banks and Pittsburgh business enterprises.

P. L. Coyle, formerly bar mill superintendent Jones & Laughlin Steel Co., Pittsburgh, and later works manager Electric Alloy Steel Co., Charleroi, Pa., has been appointed superintendent of bar mills Witherow Steel Co., Neville Island, Pittsburgh.

Joseph Becker, consulting engineer, Koppers Co., Pittsburgh, will present a descriptive paper on the new Koppers combination oven at a meeting of the Eastern States Blast Furnace and Coke Oven Association, to be held Oct. 5 at the Lafayette Hotel, Buffalo. Mr. Becker is the inventor of the new Koppers oven, an experimental battery of which has been in operation in the plant of the Koppers Co. in Chicago for almost a year, and the type which will be installed in the new plant of the Weirton Steel Co., Weirton, W. Va., and the addition to the Clairton, Pa., plant, Carneige Steel Co.

Keith R. Roding has been appointed works manager of the Chrome Steel Works, Chrome, N. J.

Edwin C. Welch, who has been in charge of tubular products sales for the Consolidated Steel Corporation for the past three years, has resigned, effective Sept. 15, to become the Eastern representative of the Kelmet Metals Co., Inc., Cleveland. Mr. Welch will be located in New York and will devote a large part of his time to steel mills, for which his company manufactures a special rolling mill bearing.

Samuel McCutcheon, assistant secretary of the North & Judd Mfg. Co., hardware manufacturer, New Britain, Conn., during the past week was elected treasurer of the company.

P. G. Merrow, secretary and treasurer the Merrow Machine Co., Hartford, Conn., sailed recently for Great Britain and the Continent on a business trip in the interests of the company.

Prof. Alfred Stansfield, professor of metallurgy, McGill University, Montreal, Can., will address the Cleveland district section of the American Iron and Steel Electrical Engineers, Oct. 9, on "Electric Smelting of Iron Ores." The meeting will take place at the rooms of the Cleveland Engineering Society, Hotel Winton.

Oswald Fowler, Rogers, Brown & Co., New York, has returned from a short business trip to England.

Alexander D. MacDonnell, Lima, Ohio, has been elected president and general manager of the North Electric Co., Galion, Ohio, manufacturer of automatic telephone switch boards.

Roy C. Ellis, formerly assistant sales manager and field representative of the automotive division Standard Steel Car Co., Pittsburgh, has joined the sales staff of Courier Motors Co., Sandusky, Ohio, as factory representative.

W. K. Strickland, recently with the General Motors research laboratories, has become affiliated with the Cadillac Motor Car Co. as assistant chief engineer.

J. W. Floto, for four years district sales manager at Detroit of the Globe Seamless Tubes Co., has been appointed general manager of sales, with office in the Peoples Gas Building, Chicago. F. J. O'Brien, vice-president and general manager of the company, is moving his office to Milwaukee, where the mills are situated.

Raymond K. Bowden, Niles, Ohio, has been appointed instructor in metallurgy for 1922-23 at Carnegie Institute of Technology, Pittsburgh. He is a graduate of Ohio State University, class of 1920, with a bachelor's degree of Engineering in Mining. His practical experience covers two years as superintendent of inspection with the Central Steel Co. at Massillon, Ohio, and one year as assistant to the heat treater at the Crucible Steel Co. in Pittsburgh. The department of metallurgy at Carnegie Institute was recently selected by the United States Naval Academy as its graduate school of metallurgy. Beginning this year, two officers from the Naval Academy have been assigned to take up advanced work in metallurgical subjects at the Pittsburgh institution.

R. C. Kirk, who retired from the presidency of LaBelle Iron Works, Steubenville, Ohio, at the formation of the Wheeling Steel Corporation, a little more than two years ago, has become affiliated with the Follansbee Bros. Co., Pittsburgh, having been elected vice-president, treasurer and a director of that company. Mr. Kirk takes with him an experience of more than 25 years in the steel industry. He started in 1895 with the old Falcon Sheet & Tin Plate Co., Niles, Ohio, plants of which later were absorbed by the American Sheet Steel Co. and American Tin Plate Co. at the beginning of the present century. He then became an accountant in the New York office of American Sheet Steel Co., and held this position until 1903, when he joined LaBelle Iron Works as auditor. The following year he was made treasurer and in 1913 became secretary-treasurer of the company. He was elected president in 1915 and held this position until 1920, when he retired and severed his connection with LaBelle Iron Works. Mr. Kirk will make his headquarters in Pittsburgh, but for the present will continue to make his home in Steubenville, Ohio, and thus will be able to maintain contact with the plants of the Follansbee Bros. Co. at Follansbee, W. Va., and Toronto, Ohio.

James P. Davis, who has been chief of the shipping and order department, National works, National Tube Co., McKeesport, Pa., has been transferred to the general order department of the company, Pittsburgh, as assistant to J. A. Caughey, chief of that department. Mr. Davis's successor at McKeesport is C. H. Starr.

John F. Miller has been elected a trustee of Wooster University, Wooster, Ohio. He was formerly president and is now vice-chairman of the Westinghouse Air Brake Co., Wilmerding, Pa.

Sterling Hubbard, for many years resident manager at Cleveland for Rogers, Brown & Co., is now vice-president of the First National Bank of Santa Barbara, Cal.

James A. Buell has resigned as assistant general manager of the United Alloy Steel Corporation, Canton, Ohio, to become general superintendent of the Donner Steel Co., Buffalo, N. Y.

John R. Foster, formerly general manager and treasurer, National Sales & Trading Co., Cleveland, has become affiliated with the David J. Joseph Co., Cincinnati, and will have charge of pig iron and steel sales for that company, with headquarters at Youngstown, Ohio.

OBITUARY

EDGAR B. TYLER, vice-president of the Mississippi Valley Structural Steel Co., and one of the founders of the Decatur Bridge Co., died suddenly of heart trouble in St. Louis, Sept. 27. He had come from his home in Decatur, Ill., to inspect the company's steel plant. Mr. Tyler was born in Waukesha, Wis., 57 years ago, and at an early age became interested in the steel business, beginning his career with the Indiana Bridge Co., Muncie, Ind. In 1902, together with G. A. Caldwell, T. L. Blackburn and W. M. Wood, all employees of the Indiana Bridge Co., he founded the Decatur Bridge Co., which was located in Decatur, Ill., with T. L. Blackburn as president; G. A. Caldwell, vice-president; W. M. Wood, treasurer and chief engineer, and E. B. Tyler as secretary and general manager. This shop was started for bridge building, but its prosperity warranted expansion and it finally developed into a structural shop. In May, 1922, it was merged with the Christopher & Simpson Iron Works, St. Louis, the name being changed to the Mississippi Valley Structural Steel Co. Mr. Tyler was prominent in local affairs in Decatur.



EDGAR B. TYLER

WALTER CRAFTS WITHERBEE, chairman board of directors Witherbee, Sherman & Co., Port Henry, N. Y., died at Port Henry, Sept. 29. Mr. Witherbee was born in Port Henry, July 1, 1856, the son of Silas H. Witherbee, founder of the firm of Witherbee, Sherman & Co. He was graduated from Yale in 1880 and soon became a member of the firm. On the incorporation of the firm in 1900 he was made treasurer and retained that office until the death of his cousin, F. S. Witherbee, who was the president of the company. He then became chairman of the board. He was vice-president of the Port Henry Iron Ore Co. for many years. Mr. Witherbee made his home in Port Henry from the time he entered business and was active in local affairs. He was prominent in Republican politics and exerted a large influence in northern New York. President Roosevelt appointed him collector of the Port of Champlain, with headquarters at Plattsburg, where he served for many years. He was a member of the University Club, New York, New York Chamber of Commerce, American Iron and Steel Institute and American Institute of Mining and Metallurgical Engineers. He married Miss Annie E. Gautier, daughter of the late Dr. J. H. Gautier, who was identified with the Gautier Works, afterward the Cambria Steel Co. Mrs. Witherbee and three children survive: Silas H., Mrs. Merrill, wife of Lieutenant Commander Merrill, now in Constantinople, aide of Rear Admiral Bristol, and Miss Annie Witherbee.

J. P. PERO, former president of the American Foundrymen's Association, died on Saturday, Sept. 23, at Indian Orchard, Mass. Mr. Pero was born in Waltham, Mass., Dec. 9, 1856, the eldest of a family which for three generations has figured prominently in New England foundry development. When 13 years old, he made his start as an apprentice molder and he was foreman of a foundry at 25 having gained a reputation as a skillful heavy work molder. His activity in gray iron work covered a period of 30 years, but latterly he had been identified with malleable plants. He was identified with the management of some of the leading foundries in New England and the Middle West. In 1887 he organized the New England Foundrymen's Association. Besides being president of that organization in 1916 and 1917 he was a member of the directorate from the time of its organization. Recently he was general superintendent of the Canadian Steel Foundries Co., Ltd., Montreal, and previously for 11 years general superintendent and sales manager of the Missouri Malleable Iron Co., East St. Louis, Ill.

LAWRENCE DONAHUE, rolling mill superintendent, International High Speed Steel Co., Rockaway, N. J., was instantly killed when an automobile in which he was riding collided with a Lackawanna train at a crossing at Rockaway, N. J., recently. Mr. Donahue was employed by the Carpenter Steel Co., Reading, Pa., for 12 years and in 1916 he entered the service of the International High Speed Steel Co.

FRANK H. PARKER, president Parker Motor Truck Co., Mueller & Son Box Co., and numerous other important industrial enterprises in Milwaukee, died Sept. 29 at Columbia Hospital, following an operation. He was 68 years old.

WILLIAM G. LUITINK, secretary-treasurer Luitink & Sons Mfg. Co., Milwaukee, manufacturer of hardware specialties, wood and metal patterns, etc., died Sept. 22 at the age of 58 years from paralysis. Three brothers, John, Peter and Henry, are associated in the business.

HERBERT C. FOLLINGER, manager of the Chicago office, Chain Belt Co., died of pneumonia at his home in Chicago, on Sept. 27, aged 66. He had been ill but a few days, and the announcement of his death will come as a shock to his many friends in the industrial world, where he was well known. Mr. Follinger was born at Fort Wayne, Ind. In 1902 he was graduated from the Chicago Manual Training School, now a part of the University of Chicago, and entered the employ of the Otis Elevator Co. He became associated with the Chain Belt Co. in 1914, and in 1916 was appointed district manager of the Chicago territory.

PERRY HUME DAVIS, for 30 years superintendent Moline Malleable Iron Co., St. Charles, Ill., died recently at his home in that city, aged 66. He entered the employ of the Moline company as a molder and later went to the Union Malleable Iron Works at Moline as foundry foreman, holding that position for 13 years. He was then for two years in a foundry of the Southern Pacific Railroad at Sacramento, Cal., and upon returning to Moline was appointed superintendent of the Moline Malleable Iron Co. When the plant was destroyed by fire in 1893 he took charge of the new foundry, which was constructed at St. Charles. The St. Charles plant in turn was razed by fire in 1915 and Mr. Davis laid out the present plant. Resigning in June, 1920, he continued to give the company his counsel as a malleable castings specialist.

S. D. L. JACKSON, 67, prominent attorney of Youngstown, Ohio, and for many years legal adviser to managers of various steel properties, died Oct. 1 from acute diabetes, following a prolonged illness. For several years prior to his death he had been general manager of the Carbon Limestone Co., supplying flux stone to Valley blast furnaces. He was closely associated in other enterprises of Robert Bentley, director of the Youngstown Sheet & Tube Co., president of the Ohio Iron & Steel Co., and identified with many other industrial enterprises.

Work has been started on the demolition of the old Carnegie Steel Co. mill at Greenville, Pa., abandoned about four years ago when the McDonald mills, Youngstown, Ohio, were put in operation. Officials of the Carnegie company inspected the plant and decided that the equipment was out of date and worth more as junk than standing.

The Boston office of the Lackawanna Steel Co., fifth floor, 40 Central Street, has been discontinued, a consolidation with the Bethlehem Steel Co., tenth floor, 141 Milk Street office having been made.

British Iron and Steel Market

Less American Buying of British Pig Iron Belgium Sells 50,000 Tons of Rails to Argentina

(By Cable.)

LONDON, ENGLAND, Oct. 3.

American new buying of pig iron is diminishing, but substantial quantities are still due for shipment. Home consumers are more active. One more Cleveland furnace has been re-started, but no general increase in output is considered probable yet, owing to increased costs of fuel.

Hematite is steady. Moderate parcels have been sold to Belgium and Italy and makers' stocks are diminishing.

Finished steel is improving slowly. Australia has bought plates and angles. Canada is buying plates and Japan is inquiring for bridge-building material. India is inquiring for plates. The home trade is quiet, but the new contracts for the London tubes and for Soudan irrigation works will benefit some steel makers.

Clyde September output of ships was eleven vessels of 34,914 tons gross register.

Prospects of an early settlement of the Ebbw Vale dispute appear good.

Continental business is moderate, South America, India and China making purchases. The Far East is inquiring for material. Belgium has booked rail orders amounting to 50,000 tons for the Argentine and is negotiating with Brazil in connection with 100,000 tons.

Continental pig iron is firmer on good home demand, sales to Germany and to America.

Tin plate is firmer on increased demand and there is less inclination on the part of the works to accept low prices. A further 150,000 boxes of oil plates have been booked for the East.

Galvanized sheets are quiet and easier. Japanese specifications for black sheets have sold at £14 10s. (2.85c. per lb.) f.o.b.

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $4.40 per £1, as follows:

[illegible]	[illegible]			$6 05 to	$6 16
[illegible]	[illegible]			21.15	
[illegible]	[illegible]			20 35 to	20 90
Cleveland No. 4 foundry	4 10			19.80	
Cleveland No. 4 forge	4 5			18.70	
[illegible]	[illegible]			17.60	
[illegible]	[illegible]			19 58 to	20 02
[illegible]	15 0			66.00	
Ferromanganese*	14 10	to 14 15		63.80 to	64.90
[illegible]	[illegible]			31.90 to	35 20
[illegible]	[illegible]			31.35 to	35 20
Sheet and tin plate bars, Welsh	[illegible]			20 15	
Tin plates, [illegible]	[illegible]			4 04 to	4 07
				C. per Lb.	
[illegible]	[illegible]			1 [illegible] to	1 77
[illegible]	[illegible]			[illegible] to	2 36
[illegible]	[illegible]			1 [illegible] to	1 87
[illegible]	[illegible]			1 [illegible] to	1 77
[illegible]	[illegible]			1 [illegible] to	1 77
[illegible]	[illegible]			1 [illegible] to	1 87
Galvanized sheets, 24 g.	16	2½	upward	3.17	
[illegible]	[illegible]			[illegible]	
[illegible]	[illegible]			[illegible]	
Cotton ties, Indian speci-	[illegible]			[illegible]	

*Export price.

Continental Prices, All F. O. B. Channel Ports, Delivery as Specified

No. 3 foundry pig iron:

[illegible]	[illegible]			[illegible]	
[illegible]	[illegible]			[illegible]	
[illegible]	[illegible]			[illegible]	

Billets:					
France, Nov., Dec...	5 14	to	5 17½	25.08 to	25.85
Luxemb'g, Nov., Dec.	5 14	to	5 17½	25.08 to	25.85
Lorraine, Nov., Dec..	5 14	to	5 17½	25.08 to	25.85
Wire nails (keg basis):					
[illegible]	0 11½			3.19	
Belgium	0 20½			4.51	
Wire rods, 5 mm. (0.2 in.):					
[illegible]	7 5	to	10 7½	31.90 to	45.65
Angles:				C. per Lb.	
Belgium, September..	7 7½			1.45	
Tees:					
Belgium	8 5			1.62	
Merchant bars:					
Belgium, Nov., Dec..	7 2½	to	7 10	1.40 to	1.47
Luxemb'g, Nov., Dec.	7 10	to	7 15	1.47 to	1.52
France, Nov., Dec...	7 10	to	7 12½	1.47 to	1.50
Germany, Jan., Feb..	7 2½	to	7 10	1.40 to	1.47
Joists (beams):					
France, Nov., Dec...	6 15			1.33	
Belgium, Nov., Dec..	6 12½	to	7 0	1.30 to	1.37
Luxemb'g, Nov., Dec.	6 10	to	7 0	1.28 to	1.37
Channels:					
Belgium	7 10	to	7 12½	1.47 to	1.50
⅜-in. plates:					
Germany, Dec., Jan..	7 5	to	7 7½	1.42 to	1.45
Belgium, Nov., Dec..	7 12½	to	7 15	1.50 to	1.52
Luxemburg, Oct. ...	7 7½	to	7 15	1.45 to	1.52
France, not offered.					
⅛-in. plates:					
Germany	9 0			1.77	
No. 8 gage wire:					
Belgium	11 10			2.85	

Basic Business Conditions Favorable

(*Continued from page* 856)

in an effort to get delivery where delivery was almost ungettable, toppled both production and prices in a descent which did not pause for nine months.

Pig iron (and steel) having reached a point where their production was less than half as great, with respect to the base of 1919, as with production in general, with consequent great depletion of stocks everywhere, the slow climb back to normal became inevitable. With but a momentary check, at the beginning of this year, this climb was steady and fairly uniform until June, when pig iron stood at 94 per cent of the 1919 average and steel was well above 100. Even the coal strike of April produced, at the time, scarcely a flurry. But its insidious effects began to tell before the summer was far advanced and, coupled with the railroad strike in July, caused a sharp collapse in production in August—ingots falling from 101 to 90 and pig iron from 92½ to 70.

Of the Future

Production in all lines is almost certain to be higher, in the last quarter of 1922, than we have known since 1920. In many cases it should go above the output for that year. Steel will not, nor will pig iron, largely because of transportation difficulties which cannot be removed in time. And many other industries will be hampered by shortage of coal and by non-delivery of necessary materials, themselves delayed by lack of coal at points of production.

Such virile buoyancy as the productive capacity of this country has shown twice this year, however, in rebounding above "par" after a sharp setback due to strikes in essential services, is proof that demand exists and must be satisfied. And the only way it can be satisfied is through production. Food, buildings, vehicles, lumber, paper and non-ferrous metals all stood above 100 during August, in spite of all adverse circumstances. No group on the list, save steel ingots, showed a recession from July, and in that one case it was sheer absence of fuel which forced it. With both strikes now composed, industry may be expected to advance steadily for some months, and to be limited, chiefly, by the ability of the railroads to serve it.

Changes in Westinghouse District Office Personnel

Several changes in the personnel of several of its district offices have been announced by the Westinghouse Electric & Mfg. Co. The territory hitherto handled from its Buffalo office has been united with its New York office, with E. A. Allen, manager, New York office, as manager of the combined offices. C. W. Underwood, who has been Buffalo manager, has been made Northern representative with offices in Buffalo. Other changes affecting these offices include the appointment of W. R. Marshall as branch manager, Buffalo office; of E. W. Loomis as manager, industrial division New York office; of W. A. Rossell as special power representative of the combined districts and of G. T. Dunklin as manager merchandising division of the New York office. The supply and power divisions, New York office, have been merged into the central station division under C. E. Stephens, manager, and the present railway division will hereafter be known as the transportation division.

In the San Francisco office the power division is changed to the central station division and W. P. L'Hommedieu has been appointed manager. Mr. L'Hommedieu also will be responsible for the sale of supply apparatus in the San Francisco district. The railway division has been changed to the transportation division and E. A. Palmer has been appointed manager. The establishment of a merchandising division, with H. L. Garbutt as manager also is announced.

The appointment of S. W. Perry as chief clerk, of J. S. Warren as manager, central station division, and G. F. Leake as manager, merchandising division, comprise the changes made in the St. Louis office.

W. L. Southwell has been made manager, merchandising division, Atlanta office, and E. V. Peterson has been appointed to a similar position in the Seattle office. J. W. Robinson, manager, central station division, Chicago office, has also been assigned the general responsibility for the sale of supply apparatus in the Chicago territory and W. A. Dalrymple has been made district auditor in the Chicago district.

Changes in the Boston office include the establishment of a central station division with C. M. Bates as manager and F. L. Nason as assistant manager. A merchandising division has been established in that office with Mr. Nason as acting manager. J. P. Alexander has been appointed manager of a new transportation division in the Boston office.

Green Engineering Co. Absorbed

The International Combustion Engineering Corporation has acquired the entire capital stock of the Green Engineering Co., East Chicago, Ind., manufacturer of chain grate stokers, auxiliary boiler room equipment, special furnace arches, and general foundry work. Stockholders of Green Engineering Co. have received in full payment for all the stock of their company 47,000 shares of International Combustion Engineering stock.

The International Combustion Engineering Corporation, New York, has purchased the entire capital stock of the Green Engineering Co., East Chicago, Ind. The International company is a holding corporation which also controls the Combustion Engineering Corporation, New York.

Armstrong Steel Co.'s New Plant

The Armstrong Steel Co., Fort Worth, Tex., recently organized under Delaware laws with capital of $2,500,000, to take over and succeed to the iron and steel plant and business of the George W. Armstrong Co., is concluding negotiations for the purchase of property at Houston, Tex., for the construction of a new plant, estimated to cost in excess of $1,000,000. The proposed mills will be devoted to the production of steel products exclusively, utilizing a combination of pig iron and scrap iron under open-hearth process, and will be equipped for an annual output of approximately 60,000 tons. The company has recently disposed of an issue of preferred stock to provide funds for the expansion. The present Fort Worth plant, with capacity of about 40,000 tons a year, will be continued in service for some time, with company headquarters transferred to Houston, following the completion of the projected works. George W. Armstrong is chairman of the board, and R. L. Van Zandt, president.

Colorado Fuel & Iron Co. Employees at Work Throughout Strike Period

The Colorado Fuel & Iron Co. is much pleased by the showing its coal miners made during the strike period. Officials believe that this record furnishes additional evidence of the success of the industrial representation plan.

Early last year the company negotiated a reduction of wages with its employees. The new scale was about the same as that of 1917, 1918 and 1919, and was equivalent to a $2.50 reduction in day wages and 24c. per ton to the miner. After this arrangement was made the United Mine Workers called a strike and some of the employees quit work. The State Industrial Commission took jurisdiction, conducted hearings, and decided that a majority of the men had accepted the reduction and that the scale was a fair one. When the general strike was called, April 1, 1922, strenuous efforts were made by the organizers to induce the employees of the company to quit work, but without result except at two or three mines that were strongly organized. At a number of mines not a single individual quit work on April 1, and the production at the mines which were working increased from 222,048 tons in April to 285,503 tons in August. Throughout the summer the organizers and agitators were working among the company employees, doing their utmost to strengthen their organization, but without avail. The normal tonnage of the company, with all mines operating, is about 325,000 per month. Two of the mines have been idle since March, 1921, on account of lack of business. The monthly tonnages since Jan. 1 have been as follows:

January	215,426	May	278,486
February	211,557	June	277,540
March	269,278	July	256,736
April	222,048	August	285,503

Atlas Steel Corporation Formed

Shareholders of both the Electric Alloy Steel Co., Youngstown, Ohio, and the Atlas Crucible Steel Co., Dunkirk, N. Y., have formally ratified the merger of these interests into the Atlas Steel Corporation, a new corporation with a New York charter. For some time the properties have been operating under unified management. With an annual productive capacity of 45,000 tons of high speed and special analysis steels, the company will rank as the second largest independent producer in its field, in this country. Offices of the Electric Alloy company at Youngstown will be closed at once, and new executive quarters opened at Dunkirk. Louis J. Campbell, who was president of the Youngstown constituent, will be chairman of the board and chief executive officer of the new corporation, located at Dunkirk.

Nagle Steel Co. Organized

The Nagle Steel Co., Philadelphia, has been organized under Delaware laws with capital of $300,000, by George H. Heck, 518 Commercial Trust Building, and associates, to operate the plants of the company of the same name, bankrupt, recently acquired by the organizing interests, at Pottstown and Seyfert, Pa. Operations have been resumed at the plate mill at Pottstown, effective Sept. 21, under double shift, and the Seyfert mill will be placed in service about the middle of October.

The Colvin Foundry Co., Globe Street, Providence, R. I., has let the contract for an addition to its foundry, 60 ft. high, 100 x 100 ft., of brick and steel construction.

Trade Changes

The Bridgeport Brass Co., Bridgeport, Conn., announces the opening of a Detroit office in the General Motors Building, with Frank H. Longyear as district manager.

E. E. Steiner & Co., Inc., Newark, N. J., manufacturer of industrial ovens, and Tilley & Brown, metal heating engineer, Plainfield, N. J., have combined to promote the sales of the former company, the latter concern now being sole representative in all territories. Heretofore Tilley & Brown has specialized in high temperature furnace work.

Johns-Manville, Inc., has been appointed joint selling agent by the H. H. Robertson Co. All asbestos protected metal roofing, siding, accessories and ventilators will be manufactured and shipped from the plant of H. H. Robertson Co. at Ambridge, near Pittsburgh. In the manufacture of asbestos protected metal products by H. H. Robertson Co. Johns-Manville asbestos saturated felts will be used, thus affording the advantages of the experience of one company in the manufacture of saturated asbestos felts and also the experience of the other in the fabricating of the finished product. Asbestos protected metal is largely used for all conditions where an unprotected metal or other equally perishable roofing material would quickly disintegrate. Such conditions are frequently found in foundries, steel mills, chemical plants, mines, railroads and most industrial buildings in tropical countries.

Reorganization of the Commercial Shearing & Stamping Co., Youngstown, Ohio, has been effected. The company produces pressed and stamped metal products. Its plant is operating at a rate close to normal and new orders promise maintenance of such a rate. Additional machinery has been purchased, involving expenditure of $30,000. Stockholders have elected these directors: W. A. Beecher, George F. Alderdice, Guy Ohl, Charles B. Cushwa, George Donaldson and Nathan Folsom. Officers are: President, W. A. Beecher; vice-president, G. F. Alderdice; secretary, Guy Ohl, and treasurer, Nathan Folsom.

The Asa S. Cook Co., Hartford, Conn., manufacturer of wood screw and automatic bolt machinery, moved its Cleveland office Oct. 1 to 344 Engineers' Building. Ernest W. Duston has charge of this office, which covers the middle western territory. The Cook Co. has recently redesigned its bolt machinery and has also brought out a new automatic feed devised by Mr. Duston which is being applied to all of its machines. The company also has placed on the market a new cap screw shaver.

The Brown Instrument Co. announces the opening of its New England branch at 185 Devonshire Street, Boston. George Goodman is in charge.

C. F. Carrier, one of the founders of the Cronk & Carrier Mfg. Co., hardware specialties, Elmira, N. Y., has disposed of his holdings in the company to Fayette Nims, Hornell, N. Y. Owing to poor health, both C. F. and G. H. Carrier have retired from the company. Mr. Nims, whose experience in the wholesale hardware business covers a period of 15 years, took over the entire holdings of the Carrier family and is now president and treasurer of the company.

The London Steam Turbine Co., pumps, generators, stokers and all mechanical drives, P. O. Box 436, Troy, N. Y., has moved its office and factory from Springfield, Mass., to the above address. This company is successor to the Steam Motors Co.

Charles S. Roberts has formed The C. S. Roberts Co., Room 519, Machinery Hall, Chicago, for the sale of steel products, including sheets, strip steel, merchant bars and metal specialties. Mr. Roberts was in the structural sales department, Bethlehem Steel Co., Chicago, until three years ago, when he resigned to engage in other business.

The Phoenix Brass Foundry, 857 Springfield Avenue, Irvington, N. J., has completed the erection of its new brass foundry, which is equipped for making castings in bronze, brass and aluminum. In connection with the foundry it will also maintain a large shop for machining, finishing and assembling.

Offices of the Youngstown Steel Co., which is building a mechanical puddling plant at Warren, Ohio, will be removed from the Realty Trust Building, Youngstown, to a site near the plant by the end of the month. Construction has progressed to the point where the presence of engineers and officials is necessary, rendering the change advisable.

The Midland Steel Sales Co., Chicago, has moved its office

Directors of the Williams Tool Corporation deferred the regular dividend payment on the preferred stock at a meet-

at the rate of $2 per share.

Plans of New Companies

The Par-Kar Coach Co., St. Louis, Mich., which was recently incorporated, is manufacturing parlor car motor equipment. It is buying its materials in the open market for a time. C. O. Westfalt heads the company.

The Service Mfg. Co., 331 Monger Building, Elkhart, Ind., has been incorporated with a capital of $20,000 to manufacture automobile equipment, parts and accessories. It will specialize in the Service rim tool for which contracts have been awarded. H. M. Smith is general manager.

The Adams Weighing Machine Co., New York, has been incorporated with a capital of $20,000 to manufacture weighing equipment, foundry supplies and kindred products. The incorporators are: O. Adams, H. Allison and J. Dirnagi. J. M. Betts, 233 Broadway, is corporate representative.

The Mack Lock Co., 289 Astoria Avenue, Long Island City, has been incorporated with a capital of $20,000 to manufacture locks and locking devices for automotive service. The main item of manufacture is a patented locking device. Its offices will be located at 14 West Forty-ninth Street, New York. The incorporators are C. Mack and C Nessler.

The Massachusetts Gear & Tool Co., Woburn, Mass., which purchased the business and properties of the Woburn Gear Works some time ago, was recently incorporated under the laws of Massachusetts to manufacture gears, tools, etc. It is in a position to handle gears, worms, sprockets and ratchets of various kinds up to and including 4-P. E. R. Lyman is president of the new organization.

The Elmore Iron Works, Inc., 301-303 Third Avenue, Brooklyn, has been incorporated with a capital of $10,000 to operate a general iron-working and metal products plant. It will handle limited quantities of sheets. The incorporators are A. J. Vitale, L. Christen and J. Marro.

The Hendry Machine & Engineering Co., Fort Myers, Fla., which was recently incorporated, is conducting a general line of engineering and construction, boat building and general marine work, dry docks and marine ways. It designs and constructs steam electric power stations and industrial plants. Bard L. Hendry heads the company.

The Dil-Sul Instantaneous Water Heater Co., Inc., 625 Poydras Street, New Orleans, recently incorporated with a capital of $20,000, will manufacture electric water heaters by contract, confining the activities at this address to assembling the parts. It is receiving bids for the manufacture of those parts. Walter A. Dilzell is president of the company; O. P. Montagnet, vice-president; and A. Montagnet, secretary-treasurer.

The Highland View Mfg. Co., Marwood, Pa., recently incorporated, is starting the construction of a plant to manufacture wood and metal specialties. It is in the market for quantities of nickel steel, xylophone hammers and various tools; also for No. 1 tempered bell steel and piano wire of various gages. James Whewell is president.

The United Metal Box Co., 514-16 West Forty-sixth Street, New York, has been incorporated with a capital of $30,000 to manufacture metal containers, boxes, cutout cabinets and fireproof steel equipment. It is manufacturing at the above address, but purposes to erect a plant as soon as a site is decided upon. It is in the market for blue annealed sheets. The incorporators are D. Postal, S. Hammer and I. Klein.

The Norwalk Refrigerating Equipment Co., 35 Warren Street, New York, has been incorporated with a capital of $25,000 to manufacture refrigerating equipment and apparatus. Most of its manufacturing will be done by the Norwalk Iron Works Co., South Norwalk, Conn., while the new company, though a separate organization, will attend to sales and installation. Similar branch offices may be established in several large cities.

The Bay Ridge Polishing & Plating Co., 235 Forty-third Street, Brooklyn, has been incorporated with a capital of $10,000 to manufacture metal specialties and operate a general plating works. The incorporators are T. Collins, P. Larkin and C. Lynn.

The Radiaud Corporation, 94 Park Place, New York, has been incorporated with a capital of $20,000 to manufacture wireless equipment and parts. Its manufacturing will be let out to contract, leaving only the assembling to be done at the above location. The incorporators are E. H. Bronner, J. Perlmuth and E. A. Zadig.

The American Shipbuilding Co. and subsidiaries report for the year ended June 30 last gross income after manufacturing expenses of $1,369,757, as compared with $2,391,126 in the previous year, and a surplus after preferred dividends of $1,061,948, against $613,179 in the year ended June 30, 1921. M. E. Farr, president, stated before the stockholders that the plan to retire outstanding preferred stock with cash or equivalent was without success. A compromise was effected which resulted in the exchange of over 90 per cent of preferred for common shares.

PIG IRON PRICES EASIER

Finished Products, However, Are Firm in the Mahoning Valley

YOUNGSTOWN, Oct. 3.—Though various grades of pig iron are apparently easing in price, as compared with recent quotations, the steel market in general remains firm. Independents have well-filled order books for the rest of the year. The leading interest, like the independents, is handicapped by the scarcity of cars and is therefore unable to work off tonnage in such volume as would otherwise be done. Until mills are in better condition to meet the demand, the price structure will likely remain strong. As output approaches normal again and orders are worked off the books, an easing in prices may be expected.

Indicative of the current situation is the announcement by the Brier Hill Steel Co. that it has marked up sheet prices an average of $5 per ton above current minimums, establishing its prices at 2.75c for blue annealed, 3.75c for black and 4.75c for galvanized base gages. Its unfilled tonnage will be worked off, of course, at the old prices. Valley interests have considerable tonnages on their books accepted at the prevailing market minimums.

Active Plate Inquiry

Plate inquiry is active and tonnages are being placed, especially by builders of tanks and tank cars. Such interests have recently been in receipt of substantial orders. The Standard Tank Car Co. of Sharon, Pa., for instance, received last week an order from the Atlantic Coast Line Railroad for 2000 new box cars, announces President John Stevenson, Jr. This is in addition to an order for 700 box cars received by the company previously from the same source. The new order involves about $4,000,000. The company has unfilled orders on its books totalling $7,000,000, including car construction for the New York Central and the Erie railroads, it is officially stated.

The Pennsylvania Tank Car Co. and the Petroleum Iron Works are other concerns in the Sharon district operating at capacity, which were recently the recipients of substantial orders.

High Cost of Materials

High cost of coke is still a materially contributing factor in pig iron costs, especially where it is necessary to purchase beehive coke in the Connellsville region. Considering the poor quality of recent shipments, one Valley iron producer figures that supplies lately have cost it as much as $16 per ton, laid down in its yards. The market for beehive is firm at $12, at the ovens. Buyers fear that prices may reach yet higher levels owing to restricted output and demands of merchant stacks planning to resume.

The A. M. Byers Co., Pittsburgh, has lately offered surplus tonnages of foundry from its Girard, Ohio, furnace, at a reported price of $33 for No. 2 foundry. Among its bookings is one order involving 1000 tons.

Standard pipe demand is firm, say makers, especially in the smaller sizes used in construction. Makers still have a substantial backlog in buttweld pipe, but fairly prompt delivery is possible on the larger sizes. There has been somewhat less active demand lately for lapweld pipe from the oil fields, and marked by much irregularity. Producers have not yet received the benefit of the Aug. 15 price advance, which did not take into consideration higher costs arising from the wage increase effective Sept. 1. Hence there is some talk of another advance, which would likely have at this time the effect of stimulating releases and new business.

Merchant steel bars range from 2c to 2.25c. Several Valley interests are shipping to regular customers on new contracts signed at 1.85c, which represents a special adjustment. Old contracts carrying a price tag of 1.40c to 1.45c were changed, buyer and seller "splitting the difference" between the current market and the old prices involved.

Heavy melting scrap ranges from $22.50 to $23, while hydraulically compressed sheets are held at $21. Other grades of old metals are relatively high. Firmness in this market is due to the active demand on account of the higher operating rate of open hearth furnaces, and the fact that the railroads are not picking up scrap and making deliveries as usual on account of the car situation.

Producers of galvanized products, such as pipe and sheets, are now compelled to pay 6.85c per lb. for spelter, largely employed in the galvanizing process. This is fully 50 per cent above the post-war low of 4.125c.

Sheet bars have stabilized for the fourth quarter at $40. Slabs and billets carry the same price tag, but there is limited demand for these forms of semi-finished steel. In this territory sheet bars constitute the bulk of the semi-finished output.

TO PROMOTE SAFETY

Six Thousand Plants in New York Will Participate in the Campaign

More than 6000 industrial plants in New York employing close to 1,000,000 men and women will participate in the campaign for the prevention of accidents which will be launched during the week of Oct. 8 to 14 by the Safety Institute of America through the Public Safety Committee of which Elbert H. Gary is chairman. This announcement was made by Laurence Vail Coleman, director of the Safety Institute of America, following the appointment of Henry D. Sayer, commissioner of the New York State Department of Labor, as chairman of the Industrial Committee for the safety week campaign. In asking Commissioner Sayer to accept this post, Judge Gary wrote:

"We are sure you share the conviction of every progressive manager of industry that community safety has a vital bearing on industrial safety, that when workmen are reached in their homes they come back to the plants not only interested in safety as employees but believing in it as fathers and citizens.

"In the city-wide campaign the industries are each to be called upon to take advantage of the widespread community interest and to conduct an aggressive safety drive among their employees so that the workmen will not only work safely in the factory, but will also preach and practice safety in their homes and among their neighbors.

"During the 16 years of the safety movement in industry, we have demonstrated, as you are well aware, that 75 per cent of all deaths and serious injuries can be eliminated. I am convinced from my study of the experience of other large cities, that just as we have been able to so organize safety in a plant that the interest of every man is gripped, so it is possible to develop in New York an organized effort with sufficient influence and man power to conduct a year round campaign of education through the schools, the press, the industries and the various civic agencies that every man, woman and child of the six millions in our city will be reached.

"Knowing your wide acquaintance among the industrial managers of New York, and your recognized influence and leadership, I am certain that you will be able to secure the whole hearted co-operation of the industries in this city-wide drive to save human life."

In accepting the appointment, Mr. Sayer said:

"If New York's public safety campaign is as successful as industrial safety campaigns have been, there will be alive and happy in New York next Christmas hundreds of persons who would otherwise have been killed or crippled by accident. And, when one knows that the men back of New York's public safety campaign are practically all men who have had long contact with industrial accident prevention, one is certain of that success."

Machinery Markets and News of the Works

BUSINESS IS SPOTTY

Some Machine-Tool Companies Continue to Report Improvement

Others Say That September Sales Were Not Up to the Mark of Preceding Months

The outstanding impression gathered regarding current machine-tool trade is that it is decidedly spotty. While on the one hand some companies, particularly those specializing in railroad equipment, report that September business was the best of the year, other machine-tool sellers report quite the contrary. In at least a few instances September was the poorest month since the first signs of general improvement were noted a few months ago.

Prices continue to advance on many lines of tools, several leading companies having announced higher quotations within the past week.

Railroads are the most active buyers. The Chicago, Rock Island & Pacific has completed purchases totaling about $100,000 at Chicago. The Missouri-Kansas-Texas Railroad has closed at St. Louis for milling machines and shapers and other tools will probably be acted upon shortly. The Chicago, Milwaukee & St. Paul and the Southern Railroad have each purchased a number of tools. The Central of Georgia has a list out on which no action has yet been taken.

The Baldwin Locomotive Works has closed for practically all of the machines inquired for recently, totaling nearly 40. The McMyler-Interstate Co., Cleveland, which will engage in locomotive repair work, is understood to have completed fairly substantial machine-tool purchases.

In the industrial field the continued activity of the automobile industry is of outstanding interest. The Durant Motor Co. has work under way for its new plant at Flint, Mich., which will manufacture the Flint Six, and the Chevrolet Motor Co. and the Fisher Body Corporation are to build plants at Cincinnati, all of which will probably be buyers of machine tools. H. J. Walker, former president of the H. J. Walker Co., Cleveland, is lining up equipment for the manufacture of automobile parts.

The Hazel-Atlas Glass Co. was a buyer of about twelve tools for its Huntington, W. Va., plant. The Carnegie Steel Co. has inquired at Pittsburgh for ten woodworking and three metalworking machines for its Clairton, Pa., by-product coke plant.

New York

NEW YORK, Oct. 3.

A SLIGHT improvement in machine-tool sales was apparent the last week in September, but business is spotty and the betterment was not felt in all lines. The heavier tools, such as are required for railroad shops, are in much better demand than the lighter tools. The principal buying in the East the past week has been done by the General Electric Co., Schenectady, N. Y., and the Baldwin Locomotive Works, Philadelphia, each having purchased quite an extensive list of tools. The requirements of the General Electric Co. included 14 milling machines, turret lathes, drills, shapers, etc., while those of the Baldwin Locomotive Works were mostly in heavier machines for locomotive work. The Union Tank Car Line has bought a car wheel borer and an axle lathe.

The market in cranes in this district is dull despite activity elsewhere. While there have been some orders placed during the week, and there are a few pending, new inquiry is slack. There is some activity in locomotive cranes.

Among recent purchases are:

Barnet Weinstein, 53 Boerum Street, Brooklyn, N. Y., a 6-ton, 61-ft. span overhead traveling crane from the Pawling & Harnischfeger Co.

City Coal Co., Hartford, Conn., a 7-ton, crawl tread crane from the Orten & Steinbrenner Co.

Department of Public Works, Cleveland, a 10-ton crawl tread crane from the Northwest Engineering Co.

Manning Paper Co., Troy, N. Y., tramrail system of about 2000 ft. from the Cleveland Tramrail Co.

Phoenix Utility Co., 61 Broadway, New York, a 30-ton, 90-ft. boom, used, Ohio locomotive crane from Philip T. King, 30 Church Street, New York.

National Foundry Co., Brooklyn, N. Y., a 1000-ft. tramrail system from the Cleveland Tramrail Co.

Ideal Concrete Machine Co., Cincinnati, Ohio, a 10-ton, 37-ft. 2-in. span, used, Champion overhead traveling crane from the Industrial Equipment Co., 149 Broadway, New York.

City of Providence, R. I., two 5-ton, 90-ft. radius hammerhead type, revolving boom cranes for handling lumber from Heyl & Patterson, Inc.

A. C. Dutton Lumber Corporation, lessees Fields Point Lumber Storage Development, Providence, R. I., two 50-ton lumber-carrying portals from Heyl & Patterson, Inc.

Cambridge Cement Stone Co., Boston, a 5-ton, 43-ft. span, 3-motor, overhead traveling crane from the Northern Engineering Works.

Proctor & Schwartz, Philadelphia, a 3-ton, 52-ft. span electric traveling crane from the Northern Engineering Works.

Hillis & Sons, Ltd., Toronto, Ont., a 5-ton, 28-ft. span overhead traveling crane from the Northern Engineering Works.

Gilbert & Barker Mfg. Co., Springfield, Mass., two 1-ton, 25-ft. span, 2-motor, single I-beam cranes from the Shepard Electric Crane & Hoist Co.

Smith & McCrorken, Inc., Brooklyn, operating two local plants at 67 Engert Avenue and 45 Eckford Avenue for the manufacture of nails, spikes, etc., has acquired the two-

Frostholm Brothers, Syracuse, N. Y., tool manufacturers and cylinder grinders, have purchased a new daylight factory at 1009 South Clinton Street. The new equipment is being installed.

The New York Edison Co., 130 East Fifteenth Street, New York, will soon commence the construction of a new three-story power house, 44 x 123 ft., at 10-12 Stone Street, to cost in excess of $150,000. E. M. Van Norden is company engineer

story machine shop and foundry of the Clark Electric Mfg. Co., 75 x 100 ft., at 22 Vanderbilt Avenue, for the establishment of a third plant for the production of brass, bronze and other metal castings.

The Consolidated Machine Tool Corporation, 17 East Forty-second Street, New York, has arranged for a new bond issue of $600,000, a portion of the proceeds to be used for extensions and improvements. Ground has been broken for a two-story foundry at the Hilles & Jones Co. division plant, Wilmington, Del. C. K. Lassiter is president.

A two-story automobile service and repair works, 155 x 205 ft., for company trucks and cars, estimated to cost about $200,000, with equipment, will be erected on White Plains Avenue, White Plains, N. Y., by the New York Telephone Co., 15 Dey Street, New York. McKenzie, Voorhees & Gmelin, 432 Madison Avenue, New York, are architects.

The Superior Ice Co., Inc., 50 East Forty-second Street, New York, has acquired property at East Seventeenth Street and Avenue Z, Sheepshead Bay, Brooklyn, for the erection of a new ice-manufacturing plant and cold storage department. All machinery will be electrically-driven. The estimated cost is $250,000. Waldemar Mortensen, 209 West Seventy-sixth Street, is engineer.

The Corn Products Refining Co., 17 Battery Place, New York, has arranged an appropriation of $3,000,000 for extensions at its refineries at Edgewater, N. J., Pekin and Argo, Ill., including the installation of additional machinery. It will also expand its foreign plants in France and Germany and expects to expend in excess of $1,000,000 for buildings and equipment.

The Utica Motor Car Co., Genesee Street, Utica, N. Y., has awarded contract to R. Richards & Son, 114 Elizabeth Street, for a top story and rear addition, 48 x 250 ft., to its service and repair works, estimated to cost about $100,000. A list of equipment is said to be in preparation.

The Benedict Stone Corporation, 33 West Forty-second Street, New York, manufacturer of steel-reinforced stone products, is perfecting plans for the establishment of a new plant at Chicago, to be operated by a subsidiary organization soon to be formed. An existing building will be equipped, or a new plant constructed. The company is arranging to increase its present capitalization of $300,000.

The Rubel Coal & Ice Corporation, Glenmore Avenue, Ozone Park, Brooklyn, has plans under way for a new two-story ice-manufacturing plant, 100 x 150 ft., estimated to cost $500,000, including machinery.

The Utica Heater Co., Lafayette Street, Utica, N. Y., has awarded contract to H. R. Beebee, Utica City National Bank Building, for a one-story building at its Whitesboro plant, 72 x 100 ft., estimated to cost about $100,000.

A vocational department will be installed in the new high school to be erected on Lake Avenue, Saratoga Springs, N. Y., estimated to cost about $400,000, for which bids recently received have been rejected. New bids will be called at an early date. Coffin & Coffin, 522 Fifth Avenue, New York, are architects and engineers.

The Mason Tire & Rubber Co., 233 West Fifty-eighth Street, New York, with main plant and headquarters at Kent, Ohio, has plans in progress for enlargement in its branch works at Bedford, Ohio, comprising the former plant of the Owen Tire & Rubber Co., recently acquired. A bond issue of $2,000,000 is being arranged. O. M. Mason is president.

The International Combustion Engineering Corporation, 43 Broad Street, New York, manufacturer of stokers, boiler house equipment, etc., has acquired the plant and business of the Green Engineering Co., East Chicago, Ind., manufacturer of similar equipment, with property totaling about 12 acres. It will be operated as a subsidiary. George E. Learnard is president of the purchasing company.

The United Last Co., 191 Worth Street, New York, has awarded contract to the Turner Construction Co., 242 Madison Avenue, for a new three-story plant, 80 x 130 ft., at Classon Avenue and Clifton Place, Brooklyn. It will cost close to $100,000 with machinery.

The American Machine & Foundry Co., 511 Fifth Avenue, New York, has called a special meeting of stockholders on Oct. 17 to increase the capital from $2,000,000 to $10,000,000, a portion of the proceeds to be used for extensions and improvements.

The Brooklyn Edison Co., 360 Pearl Street, Brooklyn, has awarded contracts for the construction of the prime movers for its new electric generating plant on Hudson Avenue, consisting of two turbo-generators, to cost about $1,500,000 each, one machine to be built by the General Electric Co., Schenectady, N. Y., and the other by the Westinghouse Electric & Mfg. Co., East Pittsburgh. Foundations for the plant are being laid and it is expected to be ready for service late in 1923. It will cost about $10,000,000.

The State Hospital Commission, Albany, N. Y., will soon take bids for a number of new buildings for the Brooklyn State Hospital, Creedmore Division, to include a one-story power house, 115 x 145 ft., with installation to include a 600-kw. generator, two 300-hp. and one 150-hp. engines, two blower engines, pumps, compressors and auxiliary machinery. L. F. Pilcher is State architect in charge.

The Public Service Electric Co., Public Service Terminal, Newark, will build a one-story addition to its Duffield Avenue power plant, Jersey City, to cost about $40,000.

The Arctic Ice & Coal Co., Summit, N. J., recently organized, has tentative plans for a new artificial ice-manufacturing plant. Robert J. Murphy and William McCue, 156 Park Avenue, head the company.

A vocational department will be installed in the proposed high school to be erected at Paulsboro, N. J., estimated to cost $150,000. A site is being selected.

The Paragon Can & Cap Co., 241 Thirty-seventh Street, Brooklyn, has leased the two-story building at 204-8 Clay Street, Paterson, N. J., totaling about 25,000 sq. ft., for the establishment of a new plant. Robert A. Russell is president.

H. M. Nelson, 248-68 Thomas Street, Newark, manufacturer of machinery and parts, has filed plans for a new one-story machine shop, 79 x 100 ft.

A cold storage plant will be installed in the new four-story warehouse, 50 x 100 ft., to be erected by Joseph J. Kroeger, 546-48 Central Avenue, Newark, N. J., as an addition to his present plant, estimated to cost $100,000. Moores & Dunford, 38 South Dearborn Street, Chicago, are engineers.

Chicago

CHICAGO, Oct. 2.

THE Chicago, Rock Island & Pacific has completed its machine tool purchases, which probably total close to $100,000. The Chicago, Burlington & Quincy has not yet taken action on its lists, and the Atchison, Topeka & Santa Fe still has about a dozen items on its old inquiry which have not yet been ordered. Business from general sources continues to improve slowly. Fairbanks-Morse & Co., have placed an order for a 60-in. engine lathe and a 72-in. engine lathe for its Beloit, Wis., plant. These are unusually large machines, seldom built for users in this district. The Pullman Co., which has been in the market for a 24-in. engine lathe, a 4-ft. radial drill, a 60-in. boring mill, a planer and an electric grinder for its Michigan City, Ind., plant, is understood to have bought second-hand equipment. The International Harvester Co. continues to buy tools from time to time for its local tractor plant. September total sales for local machinery houses which participated in recent railroad orders were larger, or at least as large, as in any previous month this year.

Prices continue to advance. The Lodge & Shipley Machine Tool Co. and the Bradford Machine Tool Co. have each advanced engine lathes about 15 per cent, while prices on Greaves-Klusman lathes are up 10 to 15 per cent. The Columbia Machine Tool Co. has advanced shapers 10 per cent. Radial drills are expected to go up from 10 to 15 per cent within 30 days.

The American Steel & Wire Co. is in the market for a constant speed belt-driven universal milling machine, with 50-in. longitudinal, 14-in. cross, and 20-in. vertical range, for its Anderson, Ind., plant.

The Chicago, Burlington & Quincy has placed the remainder of the cranes on its extensive inquiry with the Pawling & Harnischfeger Co. Two 15-ton gantry cranes are for the Eola scrap yard near Aurora, Ill. The other seven cranes are all for the new shop at Denver, Col. They comprise one 25-ton 3-motor 68-ft. span crane, one 25-ton 4-motor 68-ft. span crane, one 50-ton 5-motor 97-ft. 8-in. span crane, one 15-ton 3-motor 94-ft. 8¾-in. span crane, two 15-ton 3-motor 66-ft. 8-in. span cranes and one 10-ton 3-motor 84-ft. span crane.

The Pullman Co. has ordered the remainder of its crane equipment for its new carwheel foundry at Pullman, Ill., as follows: Two 7½-ton 4-motor 100-ft. span cranes to the Shaw Electric Crane Co.; and one 3-ton 59-ft. 3½-span crane, one 3-ton 25 ft. 3½-in. span crane, and three 1-ton special 3-motor wheel-fitting trolleys, with 8-ft. 8-in. span, to the Shepard Electric Crane & Hoist Co. The Pullman Co. also placed an order for a 15-ton reservoir ladle and a number of small ladles for its carwheel foundry with the Whiting Corporation. The latter company also has received an order

[illegible] Co., Moline, Ill.

The Gits Brothers Mfg. Co., manufacturer of automobile parts, 1941 South Kilbourn Avenue, Chicago, has let contract [illegible]

Frank Gustafson, 5724 Kenmore Avenue, Chicago, has let contract for a one-story garage, 109 x 200 ft., at 405-423 East Erie Street, to cost $80,000.

The American Building Foundry Co., 2300 South Springfield Avenue, Chicago, has let contracts for a one-story addition [illegible]

The Central Illinois Public Service Co. has commenced the construction of a power plant at Grand Tower, Ill., to cost $6,000,000.

Fire recently damaged the plant of the Universal Truck Co., 1732 Kolmar Avenue, Chicago, as well as the adjoining structure of the Boss Nut Co.

A referendum recently held at Orange City, Iowa, showed a great majority in favor of the construction of a municipal light and power plant. The proposition to issue $45,000 in bonds for constructing the plant also carried.

The Reynolds Wire Co., Dixon, Ill., has let contract for a four-story addition, 150 x 150 ft., to cost $150 000.

S. G. Robbins, 140 North Dearborn Street, Chicago, has let contract for a one-story machine shop, at 4711-17 West Lake Street [illegible]

The Moore Battery Corporation, 14 South Wells Street, Chicago, recently incorporated with $2,500 capital stock, will manufacture automobile and radio batteries and will lease plant space from the Electric Service Construction Co., 10 South Wells Street. No metal-working equipment will be purchased at this time. The officers are P. C. Moore, president, and Marie Moore, vice-president and treasurer.

The Sure Seal Bottle Capper Co., 552 West Harrison Street, Chicago, recently incorporated, is a continuation of a partnership of the same name. It manufactures bottle-capping machines, wrenches, can-openers and other punch press products. There will be no change in the organization other than incorporating.

The Western Cartridge Co., East Alton, Ill., has awarded contract to the Wimmer Construction Co., Victoria Building, St. Louis, for a one-story addition, 85 x 240 ft., to its brass mill, estimated to cost $50,000.

The Copher Machine Mfg. Co., New Prague, Minn., has preliminary plans in progress for a new one-story machine shop, 60 x 100 ft. J. C. Niemeyer, St. Paul, Minn., is architect.

The Imperial Clock Co., Collinsville, Ill., is planning for the installation of precision lathes, drill presses, grinders, punch presses and other tools.

A vocational department will be installed in the new two-unit, three story high school to be erected at Evanston, Ill., estimated to cost in excess of $2,000,000, including equipment, for which bids will be called at an early date. Perkins, Fellows & Hamilton, 814 Tower Court, Chicago, are architects.

The Crystal Ice & Fuel Co., 110 North Washington Avenue, Danville, Ill., has plans under way for a new two-story plant, estimated to cost $50,000.

The Keystone Wire & Steel Co., South Bartonville, Ill., will commence the immediate erection of a one-story building, 220 x 280 ft., estimated to cost $55,000.

A vocational department will be installed in the new North High School to be erected at Thirty-first Street and Ames Avenue, Omaha, Neb., estimated to cost $500,000, for which bids on a general contract will soon be asked. John Latenser & Sons, 732 Peters Trust Building, are architects.

E. W. Nothstine, Liberty Building, Des Moines, Iowa, has awarded a contract to W. F. Kucharo, Hubbell Building, for a new six-story automobile service and repair building, 26 x 127 ft., at Chester and Fifth Streets, estimated to cost $300,000, including equipment.

The Kroeschell Brothers Co., 460 West Erie Street, Chicago, operating boiler, tank and plate works, and the Kroeschell Brothers Ice Machine Co., same address, an affiliated concern, manufacturer of ice and refrigerating machinery, are completing revised plans for a new one and two-story plant, 210 x 375 ft., on Diversey Avenue, to be used jointly by both companies, estimated to cost $300,000, including equipment. Davidson & Weiss, 53 West Jackson Boulevard, are architects.

The Western Light & Power Co., Boulder, Col., is planning for extensions and improvements in its Lafayette hydroelectric [illegible] ery, to cost about $200,000. The Cheyenne, Wyo., plant will also be extended and improved, with cost estimated at $125,-000. The [illegible] Wall Street, New York.

Buffalo

BUFFALO, Oct. 2.

THE King Electric Mfg. Co., 20 North Niagara Street, Tonawanda, N. Y., manufacturer of battery equipment, electric charging devices, etc., has taken over the building at 1671-75 Fillmore Avenue, Buffalo, for a new plant. The Tonawanda works will be removed to the new location.

Fire, Sept. 25, destroyed a portion of the plant of the Auto Wheel Coaster Co., North Tonawanda, N. Y., manufacturer of toy automobile equipment, etc., with loss estimated at $25,000. It will be rebuilt at once.

The Niagara, Lockport & Ontario Power Co., Lockport, N. Y., is disposing of a block of preferred stock, the proceeds to be used in part for extensions and improvements.

The controlling interest in the 1900 Washer Co., Binghamton, N. Y., manufacturer of electrically-operated washing machines, has been acquired by the Binghamton Washing Machine Corporation, organized under State laws with a capital of $800,000. The new owner will take immediate possession of the plant and proposes to increase the output. The purchasing company is controlled by the Maynard H. Murch Co., Union National Bank Building, Cleveland, investment securities, and Walter S. Quinlan, vice-president and secretary of the latter company, will be president of the new organization; T. W. Behan, formerly general manager of the 1900 Washer Co., will be vice-president, and Paul J. Bickel, secretary.

Following the completion of its addition, representing an investment of $250,000, the J. Spaulding & Sons Co., 484 Broome Street, New York, manufacturer of fiber products, will build another addition to its plant on Wheeler Street, Tonawanda, N. Y., estimated to cost about $150,000, including machinery. Plans are being drawn and it is expected to have the structure ready for occupancy in the spring. George F. Hardy, 309 Broadway, N. Y, is engineer.

The Burdick-Atkinson Co., Hamburg, N. Y., manufacturer of steel wire springs, etc., is arranging for the installation of machinery at its new plant on Scott Street. J. S. Burdick is president and general manager.

The Skelton Shovel Co., Hamilton, Ont., has awarded contract to the Trid Construction Co., Hamilton, for its proposed plant on East Lake Road, Dunkirk, N. Y., estimated to cost about $100,000, with machinery. W. E. Skelton is president.

The Western New York Utilities Co., Main Street, Medina, N. Y., is disposing of a bond issue of $600,000, a portion of the proceeds to be used for extensions and improvements. C. S. Swett is vice-president.

The National Roofing Co., Fillmore Street, Tonawanda, N. Y., has acquired property at Chattanooga, Tenn., for the erection of a new plant, estimated to cost about $350,000, including machinery.

The Aldrich Paper Co., Gouverneur, N. Y., has preliminary plans under way for a new plant to cost about $40,000. N. R. Caswell, First National Bank Building, is head.

The Pittsburgh & Freeport Coal Co., Bank of Jamestown Building, Jamestown, N. Y., will install new coal-handling machinery at its plant on Institute Street, now in course of erection.

Detroit

DETROIT, Oct. 2.

THE closing week in September fulfilled the predictions of machinery representatives and inquiries and actual business for the month fell considerably below the volume for any of the three months previous. There is a feeling of optimism, however, the latter part of the week developing prospective business for October and the last quarter. This has been more in the nature of statements by manufacturers of their probable needs rather than inquiries. Several representatives report manufacturers are asking for quotations to be optional until Oct. 15 with the privilege of specifying delivery from that date until Dec. 15. They are showing a desire to be protected at present prices on the machinery necessary for their production schedules beginning the first of the year.

Supplementing the recent announcement of Durant Motors, ground was broken Aug. 30 for the first group of factory buildings of the Flint Motor Co., Flint, Mich. The buildings, including seven units, will provide 579,925 sq. ft. of floor space. Construction work is being done by the Christman Construction Co., which recently completed the

plant of the Durant Motor Co. of Michigan at Lansing. The contract requires that the buildings shall be ready for production by March 1, 1923.

The Detroit Foundry Co., through Frank L. Bromley, president, announces that it has leased, with the privilege of purchase, the foundry of the American Blower Co., which discontinued the operation of its Detroit foundry about a year ago after purchasing the former plant of the Lane & Bodley Co., Cincinnati. This will provide the Detroit Foundry Co. with about twice the floor space of its present plant on East Grand Boulevard. The present plan is to operate both plants, although operations may later be consolidated in the larger foundry.

The Butt Welding & Mfg. Co., 4847 Bellevue Avenue, Detroit, has been reorganized as the Butt Welding Co. with the following officers: Charles A. Dunn, president; Earl M. Porter, vice-president; Ezra C. Wing, secretary; Percy C. Chesterfield, treasurer.

The Federal Pattern Co., manufacturer of wood and metal patterns, 8741 Kercheval Avenue, Detroit, has been incorporated for $5,000 with the following officers: B. M. Uhlig, president; E. F. Wunsch, vice-president; J. Louis Horn, secretary and treasurer. It has been operating since the early part of the year and plans in the near future to add foundry and machine supplies to its line of products.

The Hupp Motor Car Corporation, 3501 East Milwaukee Street, Detroit, has awarded contract to the Everett-Winters Co., Book Building, for three four-story and one one-story addition to its plant on Griffin and Moran Streets. Two of the four-story plants will cost $500,000, with equipment, and the other, $175,000; the one-story structure will be used in connection with the power house and will cost about $15,000.

The Chevrolet Motor Co., 3044 West Grand Boulevard, Detroit, has purchased about 29 acres at East Delavan Avenue and the Erie Railroad, Buffalo, and has plans in progress for new works, with aggregate floor area of 400,000 sq. ft., including machine shop, forge shop, assembling department, testing shop, power house, etc. On the same tract, the Fisher Body Co., Detroit, an affiliated organization, will build a new plant for body manufacture for Chevrolet cars, to total about 200,000 sq. ft. of floor space, for a daily output of 500 bodies. A similar project will be carried out by the two companies at Cincinnati, where property has been acquired in the Norwood section.

The Board of Directors, Detroit Municipal Tuberculosis Sanatorium, 1415 St. Antoine Street, Detroit, is taking bids until Oct. 9 for a conveyor system, elevating equipment, coal hoppers, bins, etc., for the power house at the institution, Northville, Mich. Stratton & Snyder, Union Trust Building, are architects.

The Pennsylvania Railroad, Penobscot Building, Detroit, will commence the erection of a new engine house, 60 x 210 ft., with repair department, at Ecorse, Mich.

A vocational department will be installed in the new two-story high school to be erected at Coleman, Mich., estimated to cost $110,000. The Warren S. Holmes Co., Lansing, Mich., is architect.

Philadelphia

PHILADELPHIA, Oct. 2.

THE Pennsylvania Railroad Co., Broad Street Station, Philadelphia, will soon commence the erection of new car shops at Pitcairn, Pa., to consist of a main one-story, steel freight car repair works, 100 x 750 ft.; one-story air-brake shop, 60 x 105 ft.; one-story paint shop, 103 x 425 ft., with oven department; oil house, oxygen and acetylene building, and other structures, estimated to cost close to $500,000, including equipment. A. C. Shand is chief engineer.

The addition to be erected at the plant of the General Electric Co., Witherspoon Building, Philadelphia, at Seventh and Willow Streets, 140 x 175 ft., will be used for the manufacture of electric switches and kindred specialties. Bids for construction are being taken.

Humphreys & Co., Philadelphia, operating structural steel and iron works at Front and Tusculum Streets, are taking bids for a new two-story plant.

The Paper Manufacturers' Co., 526 Cherry Street, Philadelphia, has commenced clearing the site at Fifth, Willow and Randolph Streets for a new five-story plant, for which plans are being completed. Clarence C. Wunder, 1415 Locust Street, is architect. Francis A. O'Neill is president.

Harper & Harper, 304 North Broad Street, Philadelphia, local representatives for the Hupmobile, have arranged for the establishment of a new parts and service department in the building at 625-35 North Watts Street. The installation will also include a body repair department, paint and trim works.

The Air Reduction Sales Co., Germantown and Allegheny Avenues, Philadelphia, manufacturer of oxygen and acetylene welding equipment, etc., will commence the immediate erection of a one-story addition.

The Philadelphia Electric Co., Tenth and Chestnut Streets, Philadelphia, has construction under way on the superstructure for a new two-story and basement power house, 60 x 120 ft. W. C. Elgin is chief engineer.

Mahlow & Wycoff, Brunswick Avenue and the East Trenton Railway, Trenton, N. J., machinists, have tentative plans for expansion for the manufacture of special coal-delivery bodies for Ford automobiles. The light-weight steel dump body now being produced in one size, will be developed in a number of larger sizes, with power hoists, for use on other type car chassis.

The Eastern Foundry Co., Boyertown, Pa., is completing plans for a new one and two-story pipe foundry, 100 x 150 ft. A. S. Kepner, 121 Hanover Street, Pottstown, Pa., is architect. E. M. Rhoads is president.

A vocational department will be installed in the high school to be erected on the Park Boulevard, Camden, N. J., estimated to cost $450,000, for which Clyde S. Adams, 2038 Spruce Street, Philadelphia, architect, will prepare plans.

The Penn Central Light & Power Co., 1809 Union Avenue, Altoona, Pa., is planning for extensions and improvements in its plant and system to cost about $165,000. Bonds are being arranged.

A vocational department will be installed in the new two-story and basement high school to be erected at Ashland, Pa., estimated to cost $125,000. Hersh & Sholler, Commerce Building, are architects.

The American Wire Fabrics Corporation, Mount Wolf, Pa., with branch plant at Blue Island, Ill., a subsidiary of the Wickwire-Spencer Steel Corporation, Worcester, Mass., has arranged for a bond issue of $1,500,000, a portion of the proceeds to be used for extensions and improvements.

The Pennsylvania Power & Light Co., Allentown, Pa., has acquired the Jersey Shore Electric Co. with other electric light and power plants and has arranged for a bond issue of $7,000,000, a portion of the fund to be used for extensions and improvements and the installation of new machinery. The purchasing company is operated by the Electric Bond & Share Co., 71 Broadway, New York.

The Ideal Dust Conveyor Co., Williamsport, Pa., has plans under way for the construction of a new plant to manufacture a patented metal dust conveyor. H. S. Schmidt is head.

A vocational department will be installed in the new two-story high school to be erected at New Holland, Pa., estimated to cost $100,000. Clifford Townsley, New Holland, care of the New Holland School Board, is architect.

The Pine Hill Collieries Co., Minersville, Pa., has arranged for a bond issue of $1,750,000, a portion of the proceeds to be used for improvements and the installation of mechanical and electrical equipment. Clarence B. Sturges is president. Headquarters are at 17 Battery Place, New York.

A manual training and vocational department will be installed in the new high school to be erected in the Washington Heights section, Morrisville, Pa., for which plans are now being prepared.

New England

BOSTON, Oct. 2.

SEPTEMBER closed with a moderate spurt of buying. Sales of both new and used equipment involved no large lists, but the number of individual orders probably was larger than for any previous period this year and represented buying from a wide diversity of maunfacturing interests. Many tools purchased were under negotiation for weeks. In addition, there is a noticeable increase in the number of inquiries, none of which is large.

Among sales was one of about 10 special new lathes to a Massachusetts machinery builder; six new upright drills to a Framingham, Mass., concern; a used Cameron punch and shear with a 48 in. throat, motor driven, to a New Jersey concern; a used 36-in. motor driven Cincinnati planer to a Syracuse manufacturing interest, and five miscellaneous new and used machine shop tools to a Providence interest, as well as additional equipment for trade school purposes. Other sales included gear cutting, motor-driven grinders, drill, lathe, threading and milling machines.

Bolt and nut makers are inquiring for rotary millers, screw machine product firms for slotting machines, tapping and threading tools; tap and die makers for lathes and special machines; textile machinery makers for drill and

planing equipment; stone working and electrical and textile machinery makers for cranes, railroads for lathes and shapers; electrical equipment manufacturers for special machinery, and general machine shops for a variety of tools, largely lathes.

A Vermont maker of stone cutting machinery has received an order from a Maine firm, involving lathes costing $18,000 to $20,000 each, and large planers.

A Western maker of drills advanced all machines above 20 in. 10 per cent, effective Oct. 1.

The Winter Brothers Co., Wrentham, Mass., taps and dies, contemplates an addition to its plant, but details have not been worked out. The company is six to eight weeks behind on deliveries and the plant is being operated 10 and 11 hr. per day.

The Reliance Machine & Specialty Co., oilless bushings, formerly located in Boston, but more recently in Fitchburg, Mass., is occupying quarters at the plant of the National Machine & Tool Co., 250 A Street, South Boston.

The Champion International Paper Co. contemplates the erection of a one-story, 62 x 112 ft. machine shop on Prospect Street, Lawrence, Mass.

The General Electric Co., West Lynn, Mass., has awarded contract for a four-story, 157 x 220 ft. addition to building No. 63.

The Fall River Water Department, Fall River, Mass., has awarded contract for the erection of a two-story machine shop and administration building.

The C. H. Tenney Co., 201 Devonshire Street, Boston, is the engineer on a power house to be erected for the Springfield Gas Light Co., Springfield, Mass., the contract having been let.

The Pruven Composition Products Co., a Delaware corporation capitalized at $250,000 to manufacture a substitute for hard rubber, has remodeled the recently purchased Askan Rubber Co., Milford, Conn. Considerable new machinery and other equipment will be installed.

The Colvin Foundry Co., Globe Street, Providence, has awarded a contract to the C. I. Bigney Construction Co., 357 Westminster Street, for a one-story addition, 100 x 100 ft.

The B. C. Ames Co., Waltham, Mass., manufacturer of lathes and metal-working machinery, has acquired an interest in the Triplex Machine Tool Corporation, 18 East Forty-first Street, New York, and will use the Waltham works for the production of different Triplex tools, including combination lathes, drill press, and milling machine. The Triplex company will continue to maintain headquarters at the present location.

An electrically operated pumping plant to cost about $125,000 will be constructed by the Board of Water Commissioners, Auburn, Me., for the local waterworks. Sawyer & Bean, 11 Lisbon Street, Lewiston, Me., are engineers.

The Electrical Appliance Mfg. Co., Waterbury, Conn., is perfecting plans for considerable increase in production. It recently increased its capital to $100,000.

William K. Brown & Son, 420 Central Street, Winchendon, Mass., have plans under way for a new one-story power house, 36 x 50 ft.

A vocational department will be installed in the new two-story high school, 104 x 250 ft., to be erected at Easthampton, Mass., estimated to cost $250,000. R. B. Warner and P. B. Johnson, 310 Main Street, Springfield, Mass., are architects.

The Supply Officer, Navy Department, Navy Yard, Boston, will take bids at once for one marine tilting furnace, two blacksmiths' forges and one portable oven, specified in engineering requisition 86.

The Cambridge Cement Stone Co., 156 Lincoln Street, Boston, will commence the immediate erection of a new plant to cost $25,000.

The Atlantic Refining Co., Hospital Trust Building, Providence, has plans under way for a new receiving and distributing plant in the Kettle Point district, including pumping plant, steel tanks, automobile service and repair building, etc., estimated to cost close to $75,000

The Cheshire Mfg. Co., West Cheshire, Conn., has been organized by F. Cranston Thomas and associates to operate a plant adjoining the Connecticut Brass Works, recently acquired, for the manufacture of wireless equipment and devices and other electrical specialties. Improvements will be made in the existing building to cost about $50,000. George A. E. Jones, United States Electrical Co., New London, Conn., is interested in the new company.

The Edison Electric Illuminating Co., 70 State Street, Boston, will build a new one-story power house, 51 x 60 ft., on Spring Street, Watertown, Mass.

The Kopp & Sandel Co., 69 Conant Street, Roxbury, Mass., manufacturer of sheet-metal products, is planning for the [illegible]

Cincinnati

CINCINNATI, Oct. 2.

RAILROAD buying featured the machinery market the past week. The Missouri-Kansas-Texas Railroad closed on its list of milling machines and shapers and other miscellaneous tools are now under negotiation. The Rock Island continues to place orders, taking nine lathes from one manufacturer, while the Chicago, Milwaukee & St. Paul, in addition to purchasing a number of slightly used tools, has placed orders for several new machines. The Burlington is expected to close on a fairly sizable list shortly. The Southern Railroad bought seven tools. No action has been taken on the list of the Central of Georgia. Industrial buying is showing a steady improvement. The largest order received from this source came from the Gulf Refining Co., reported last week as having bought seven machines. Later information places the total of this company's purchases at 28. A local manufacturer booked an order for three gear hobbers from an Eastern manufacturer and reports that the number of single inquiries received during the week is the largest for any week since 1920. The Dayton Engineering Laboratories Co., Dayton, Ohio, bought six 6-spindle drills last week. Many outstanding inquiries are being closed, though these are mostly for single machines. The Jeffrey Mfg. Co., which recently installed a battery of gear cutters, is understood to be contemplating additional equipment. The Chevrolet Motor Car Co., which is contemplating building an assembling plant at Cincinnati, is one of the leading prospects for future business. In connection with this, it is understood that the Fisher Body Corporation will also erect a large plant adjoining that of the Chevrolet plant. Plans of the two companies, reported last week as preparing to engage in locomotive repair work, have not been completed.

The Lodge & Shipley Machine Tool Co., Cincinnati, has advanced its line of lathes 10 per cent, effective Sept. 26, and the Cincinnati Planer Co. on Sept. 29 announced an advance of 10 per cent in its vertical boring and turning mills.

The Ohio Kennedy Co., Springfield, Ohio, has been incorporated with a capitalization of $10,000 to manufacture blow torches. The plant will be located at South Spring Street. George Cugley is president.

The plant of the Fairfield Engineering Co., Lancaster, Ohio, manufacturer of coal-loading machinery, was practically destroyed by fire on Sept. 25. The plant of the Carbon Products Co., adjoining, was also destroyed. The loss will amount to $250,000.

The Axton-Fisher Tobacco Co., 811 South Twentieth Street, Louisville, Ky., will build a second factory adjoining its present plant. It will be five stories with 60,000 sq. ft. of floor space. The cost, including equipment, will approximate $150,000.

The Indiana Borden Cabinet Co., Borden, Ind., has been incorporated with a capitalization of $100,000 to take over the plant of the Borden Cabinet Co. Harry B. Payne is the principal incorporator.

The plant of the Whitmore Handle Co., Mt. Vernon, Ind., was destroyed by fire Sept. 25, causing a loss of $25,000. It will be rebuilt immediately.

The Portsmouth Street Railway & Light Co., Portsmouth, Ohio, will make additions to its power plant at New Boston, buildings and equipment involving an expenditure of approximately $500,000. Preliminary work has commenced. Raymond D. York is president.

The Asheville Fireproof Co., Asheville, Ohio, has been incorporated with a capitalization of $30,000 to manufacture tile, hollow blocks, paving and building bricks, etc. It will erect a plant at Bell Siding, Ohio, which it expects to have in operation about Jan. 1. John Dum is president.

The Chevrolet Motor Co. has purchased 16 acres in Norwood, Ohio, on which it is proposed to build a plant for the production of Chevrolet cars to supply the Southern market. According to W. S. Knudsen, vice-president in charge of operations, the Norwood buildings will have 200,000 sq. ft. of floor space for the production of Chevrolet cars, and 150,000 sq. ft. devoted to the production of Fisher bodies. Production will run up to 300 cars daily.

Changes have been made in the plans of the new plant of the J. A. Fay & Egan Co. which it is estimated will effect a saving of $100,000 in construction costs. The building will

be 60 ft. shorter than originally contemplated, leaving the dimensions of the main plant 320 x 150 ft. Wood block flooring will also be omitted, as well as many of the plumbing features originally contemplated. Contractors who submitted bids on the original plans have been asked to file new proposals.

Pittsburgh

PITTSBURGH, Oct. 2.

MACHINE-TOOL business in this district continues dull as far as sales are concerned, but there still is a very fair inquiry and the trade is hopeful of the future. The Hazel-Atlas Glass Co. recently closed for six Hendey lathes, one Brown & Sharpe miller, one Cochrane-Bly cold saw, one Gould & Eberhardt shaper and three Reed & Prentiss drills. These tools are for the Washington, Pa., plant of the Hazel-Atlas Company, and are largely duplications of the machines that the company now is using. The Carnegie Steel Co. has put out a list of 13 tools for its Clairton, Pa., by-product plant. The list contains 10 wood-working machines, a drill press, pipe machine and grinder. A Pittsburgh maker of nuts and bolts has put out a list of five tools. Inquiries for single tools are fairly numerous. An advance of 15 per cent in Bradford lathes is reported, but no other price changes have been noted. The market on heavy equipment has quieted since the recent purchases by the Otis Steel Co., Cleveland, and Weirton Steel Co., Weirton, W. Va., against additions to those plants. However, the amount of pending business, notably in cranes, still is large and official announcement of the plans of the company which will build an 8-unit sheet mill plant in Detroit is awaited with considerable interest. The Lima Corporation, Lima, Ohio, has placed another 10-ton crane with the Shaw Crane Works, Muskegon, Mich. The Center Foundry & Machine Co., Wheeling, W. Va., has bought a 10-ton, 2-motor trolley from the Northern Engineering Works.

The Hanlon-Gregory Galvanizing Co., Pittsburgh, has filed an application for a permit to erect a brick manufacturing building on Butler Street, at a cost of $65,000.

The Titusville Iron Works, South Franklin Street, Titusville, Pa., manufacturer of engines, pumps, etc., has preliminary plans for an addition on South Washington Street, estimated to cost in excess of $125,000, including equipment.

Fire, Sept. 24, destroyed a portion of the plant of the Berney-Bond Glass Co., Clarion, Pa., with loss estimated at $400,000, including machinery. It is planned to rebuild.

The West Penn Power Co., West Penn Building, Pittsburgh, has plans nearing completion for a new power plant at Charleroi, Pa., to cost about $400,000 with equipment. Through its subsidiary, the Western Maryland Power Co., the West Penn company has acquired the municipal electric light and power plant at Oakland, Md., assuming control Oct. 1. Extensions and improvements will be made.

A one-story power house, 36 x 40 ft., and two-story tank house, 30 x 105 ft., will be erected by the Chesebrough Mfg. Co., 17 State Street, New York, manufacturer of vaseline products, in connection with its new plant at McKees Rocks, Pa., estimated to cost $750,000, with machinery.

The De Roth Steel Truck & Car Wheel Co., 611 Keystone Building, Pittsburgh, will soon break ground for the first unit of its new plant at Osgood, Pa., estimated to cost approximately $1,000,000, including equipment. A housing development for employees will also be carried out. C. Edward Long, 1202 People's Bank Building, Pittsburgh, is engineer; John D. Roth is president.

The Clarion River Power Co., Johnstown, Pa., has been granted permission to construct and operate a hydroelectric power plant at Piney Creek, Clarion River, estimated to cost $3,000,000. The company is affiliated with the Penn Public Service Co., Johnstown. F. T. Hepburn is president of both organizations.

A vocational department will be installed in the new three-story high school to be erected at Johnstown, Pa., estimated to cost $350,000, for which bids on a general contract are being received until Oct. 9. J. E. Adams, Nemo Building, is architect.

The Nitro Pencil Co., Nitro, W. Va., has plans under consideration for rebuilding its plant, including power house and other departments, destroyed by fire, Sept. 21, with loss estimated at $100,000, including machinery.

The Elm Grove Coal Co., Elm Grove, near Wheeling, W. Va., has plans nearing completion for a new steel tipple at its No. 1 mine.

Milwaukee

MILWAUKEE, Oct. 2.

FROM the standpoint of manufacturers of milling machines, September sales usually are reported to have been the best of the year and production made another small but encouraging advance over the previous month. Business on books and in sight for October shipment indicates that this month will again show a comparative increase. In most other lines of machine-tools, September business was an improvement over July and August. Automotive industries are still ordering single tools or small lots. Inquiry in the past 10 days indicates a broadening market, with railroad needs occupying a pre-eminent place. Business closed so far has not represented a great amount of railroad buying in favor of local manufacturers and dealers, but prospects are considered good. Metal-working industries in Milwaukee and throughout Wisconsin are optimistic now that the widespread labor troubles appear out of the way.

Considerable re-tooling of the works of the Samson Tractor Co. at Janesville, Wis., is in prospect as the result of the decision of the General Motors Corporation to liquidate its tractor business and convert the Janesville plant into a passenger car manufacturing group for the benefit of the Chevrolet division. The Samson works at Janesville represent an approximate investment of $4,500,000 and consist of a gray iron foundry, several machine shops, a steam generating plant, and auxiliary buildings. It is reported that the plant of the Janesville Machine Co., manufacturer of horse-drawn farm implements, and the foundry of the Waukesha Malleable Iron Co., affiliated with the Janesville group, will be disposed of by the General Motors Corporation. James A. Craig is general manager at Janesville.

The Allis-Chalmers Mfg. Co., Milwaukee, will soon be in the market for some additional machine-tool equipment for the tractor division of its main works in West Allis. The company is erecting a new building, 175 x 400 ft., at West Allis, to be ready about Jan. 1. Upon its completion this extension will accommodate the flour mill and sawmill machinery departments now occupying the Reliance works in Milwaukee, and a considerable number of other departmental production activities of various divisions. The extension now under construction will require considerable new equipment to supplement the present equipment of the various departments which will be transferred to it at the end of this year.

The Mound City Mfg. Co., Platteville, Wis., has completed a new machine shop, 40 x 80 ft., which is being equipped for the production of lawn-mowers, horticultural implements and tools. Most of the tool needs have been filled, although additional purchases will be made from time to time.

The Lux Fibre Furniture Co., 821 Meadow Street, Waukesha, Wis., has let contract to C. A. Dailey & Son, 202 Randall Street, local, for building a one-story brick and steel engine room, boiler house, service shop and garage, 45 x 90 ft., estimated to cost $25,000. Equipment is being purchased. Herman J. Esser, 82 Wisconsin Street, Milwaukee, is the architect.

The Fort Atkinson, Wis., Water, Light and Gas Commission, W. D. Leonard, superintendent, is asking bids until Oct. 11 for one 1000-gal. motor and engine-driven centrifugal pump, one 300-gal. motor-driven centrifugal pump, drilling of two new wells, and construction of 1600 ft. of 6-in. and 1400 ft. of 10-in. class C water pipe, for extensions of the municipal waterworks system.

The Fairmount Creamery Co., 200 North Broadway, Green Bay, Wis., will let contracts this week for an addition and power house, 100 x 115 ft., designed by Foeller, Schober & Stephenson, local architects. Inquiry is being made for additional generating equipment, ice machine, boilers, etc.

The Chippewa Valley Auto Co., 16 River Street, Chippewa Falls, Wis., is taking bids through E. J. Hancock, architect, Eau Claire, Wis., for a two-story sales and service building, 124 x 132 ft., estimated to cost $125,000. Fred A. Bigler is president and general manager.

The Superior, Wis., Board of Education is asking bids until Oct. 17 for the new East End high school in Allouez, estimated to cost $250,000. It will be 125 x 256 ft., two stories and basement and have vocational training facilities. L. A. Nichols is secretary of the board.

The Phenix Cheese Co., Plymouth, Wis., is in the market for two 150-hp. boilers, a steam generating unit, a 30-ton artificial ice machine and other equipment for a five-story brick and concrete plant and cold storage warehouse, 45 x 65 ft. The design, construction and equipment engineering is in charge of the Singer-Perlstein Co., 9 South Clinton Street, Chicago. R. A. Harbach is general manager of the Phenix company.

The Rockwell Mfg. Co., 572 Park Street, Milwaukee, has let the general contract to the Arthur Breest Co., local, for a [illegible] addition, 45 x 200 ft., to equipment for production of millwork, interior furniture, and hardwood specialties. It will cost about $100,000. George Zagel & Brother are the architects.

The Milwaukee Woven Wire Works, 3014 Clark Street, has broken ground for a three-story factory and warehouse addition, 131 x 138 ft., adjoining the present plant. The bulk of new equipment needs are yet to be placed. The investment in building and machinery will be about $80,000.

The Gillett, Wis., Board of Education let the general contract to the Hoeppner-Bartlett Co., Eau Claire, Wis., for a new high school and manual training building, estimated to cost $125,000 complete. The architects are Oppenhamer & Obel, Wausau, Wis.

The Six-Wheel Truck Co., Fox Lake, Wis., contemplates engaging in commercial production of its new design of six-wheeler motor truck and will build a factory, about 40 x 100 ft., during the winter. F. N. Pettigrew is president.

The Thompson Brothers Boat Co., Peshtigo, Wis., has started work on a $50,000 factory addition, three stories, 60 x 120 ft.

The Viroqua, Wis., Board of Education has engaged E. J. Hancock, architect, Eau Claire, Wis., to design a new $200,000 high school and continuation institute to be erected early in 1923. C. F. Dahl is president of the board.

The Nickerbocker Novelty Co., Janesville, Wis., is a new $35,000 corporation formed by M. A. McQuaid, T. J. Griffin and J. E. Gross, Jr., to manufacture metal specialties and novelties. A plant will be leased at once.

The Wisconsin Regrinding Co., Sheboygan Falls and Fond du Lac, Wis., has started work on a one-story machine shop, 40 x 80 ft., at Anderson and Davenport Streets, Rhinelander, Wis., where a branch is being established under the management of Roy Nichols, vice-president.

The F. J. Greene Engineering Works, 1028 Douglas Avenue, Racine, Wis., has engaged Edmund B. Funston & Co., architects, local, to design a three-story brick, concrete and steel machine and assembling shop addition, 53 x 103 ft., estimated to cost $50,000.

The Acme Brass & Metal Works, Waupaca, Wis., has been organized with $75,000 capital stock to manufacture brass and metal castings and products. The principals are B. C. Koepke, Louis Larson and J. M. Braum, all of Waupaca. It is understood that an existing brass foundry and machine shop will be taken over immediately and operations resumed shortly after Oct. 1.

The Woodwork Mfg. Co., 1218 Twenty-third Avenue, Milwaukee, will build a two-story brick and concrete manufacturing addition, 50 x 97 ft., and install additional equipment, the whole to cost about $45,000.

The Ajax Auto Products Co., Racine, Wis., manufacturer of lifting jacks and similar automotive specialties, will erect an addition to cost about $20,000 with equipment.

The August C. Beck Co., Milwaukee, manufacturer of boxes, shooks, etc., sustained an estimated loss of $220,000 by fire which virtually destroyed its factories and equipment on Sept. 20. As soon as adjustment of the loss is completed a new factory will be erected. Ernest E. Fair is secretary and treasurer.

Indiana

INDIANAPOLIS, Oct. 2.

THE White Valley Power Co., a subsidiary of the Indiana Power Co., Indianapolis, has acquired the plant and system of the Oakland City Light & Power Co., Oakland, Ind., and plans for extensions and improvements. Negotiations are also being concluded for the purchase of the plant of the Princeton Light & Power Co., Princeton, which will be enlarged.

A vocational department will be installed in the new high school to be erected at Marion, Ind., two-stories, estimated to cost $200,000, for which bids on revised plans will be called at an early date. Harry G. Bowstead, 410 Glass Building, is architect.

The Whitmore Handle Co., Mt. Vernon, Ind., manufacturer of turned wood products, has tentative plans for rebuilding the portion of its plant destroyed by fire Sept. 25, with loss estimated at $30,000, including equipment.

The Pullman Co., Pullman Building, Chicago, is completing foundations for the addition to its foundry at Michigan City, Ind., and will commence superstructure work at once. A new power plant will also be erected. The work is estimated to cost about $500,000, including machinery. Frank D. Chase, Inc., [illegible] engineer.

The Wabash Valley Electric Co., Clinton, Ind., will make extensions and improvements in its plant and system, including the installation of additional equipment, estimated to cost $50,000.

An electrically-operated pumping plant will be installed in connection with the new waterworks to be constructed at Bloomington, Ind., estimated to cost in excess of $1,000,000. The City Council has authorized the employment of an engineer to prepare plans.

The Universal Burner Co., Logansport, Ind., recently organized to establish a plant to manufacture oil-burning equipment, is planning to purchase motors, air compressors, pumps and other equipment. Allen Nelson, Logansport, is head.

The Board of Works, Laporte, Ind., will make extensions and improvements in the municipal waterworks, including pumping plant and other departments, with the installation of additional equipment, estimated to cost $125,000. J. H. Harding is superintendent.

Baltimore

BALTIMORE, Oct. 2.

CONSTRUCTION of a new engine and repair shop by the Atlantic Coast Line Railroad Co., Wilmington, N. C., will commence at Southover Junction, Savannah, Ga., to cost about $100,000.

A vocational department will be installed in the new junior high school to be erected at Gynns Falls Park, Baltimore, estimated to cost $500,000 for which bids on a general contract will be called soon. Smith & May, Calver Building, are architects.

D. C. Elpinstone, 408 Continental Building, Baltimore, machinery dealer, has inquiries out for a locomotive crane for handling a 2-cu.-yd. clam shell bucket.

The Purchasing Agent, Post Office Department, Washington, will receive the following bids: Until Oct. 11, for 864 dozen hack saw blades, 12-in. long and ½-in. wide; until Oct. 13, for one squirrel cage electric motor, three-phase, 220-volt; until Oct. 9, for six preheaters, gas fuel, oven type; until Oct. 13, for 4000 hub brake shoes complete with springs for Ford trucks; until Oct. 9, for 100 sets of connecting rod bolts for use on Ford trucks.

The Vulcanite Roofing Co., Beaver Road, Buffalo, a subsidiary of the Beaverboard Companies, same address, has tentative plans under consideration for a branch plant at Atlanta, Ga.

Traveling cranes, freight-handling and conveying machinery, etc., will be installed at the new pier and warehouse to be constructed at the foot of McComas Street, Baltimore, by the Port Development Commission, estimated to cost about $3,000,000. It will be leased to the Western Maryland Railway Co., for a period of 20 years.

A vocational department will be installed in the proposed boys' high school at Macon, Ga., estimated to cost close to $200,000. Bonds for $500,000 have been approved.

The Chief of Air Service, United States Army, 1650 Munitions Building, Washington, will receive bids until Oct. 9 for 300 oil tanks for Curtiss airplanes, as specified in Circular 23-27.

The Battey Machine Co., West Second Avenue, Rome, Ga., is making inquiries for a belt-driven air compressor and a 50-hp. motor.

The Salisbury Ice Co., Salisbury, Md., has plans under way for enlargements in its railroad car icing plant, and the erection of a new plant, with capacity for handling about 6000 tons. A site for the latter plant has been acquired along the line of the New York, Philadelphia & Norfolk Railroad. Jesse D. Price is president.

City Manager Paul J. B. Murphy, Radford, Va., is making inquiries for electrical equipment, in connection with extensions and improvements in the municipal electric plant, to cost close to $25,000.

A vocational department will be installed in the new three-story and basement high school, 70 x 140 ft., to be erected at Newport News, Va., estimated to cost about $100,000. Charles M. Robinson, Times-Dispatch Building, Richmond, Va., is architect.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until Oct. 10 for 200 engineers' wrenches for the Norfolk, Va., navy yeard, as specified in Schedule 193; until Oct. 17 for 7820 ft. of copper pipe for the Portsmouth, Va., Navy Yard, Schedule 185; and a miscellaneous quantity of copper pipe for the same yard, Schedule 186; also, until Oct. 24 for 100,000 ft. of bell wire for the Mare Island Navy Yard, San Francisco, Schedule 187.

James Reynolds, 819 Fourteenth Street, N. W., Washington, local agent for the Studebaker Automobile Co., has awarded a contract to Harry Waldman, 1430 K Street, N. W., for a three-story service and repair building, 75 x 100 ft., at Fourteenth and R Streets, N. W.

The Chief of Air Service, United States Army, Washington, will receive bids until Oct 9, for 500 landing gear axles for aeroplanes, as specified in Circular 23-26.

The Broadfoot Iron Works, Wilmington, N. C., has awarded contract to Walter Clark, Wilmington, for a new two-story building to cost about $75,000.

The Wilson-Hock Co., City Point, Va., machinery dealer, is making inquiries for a 30 to 40 kw. belt-driven electric generator; motor-generator set, with 30-kw. generator and 50-hp. motor; other motors, starting equipment and kindred electrical apparatus.

A vocational department will be installed in the two-story high school at Westernport, Md., estimated to cost $100,000. M. C. Pederson, 824 North Charles Street, Baltimore, is architect.

The Carolina Washboard Co., Raleigh, N. C., has acquired property, 300 x 300 ft., at High Point, N. C. and plans the erection of a new one-story factory to occupy the entire site. Randolph Jordan is president.

Cleveland

CLEVELAND, Oct. 2.

THE machine-tool market generally is quiet although some of the dealers report an improvement in inquiries, mostly for single machines. The McMyler-Interstate Co., Bedford, Ohio, which is adding locomotive repair work to its regular line of products, which will necessitate the installation of considerable machinery, is understood to have about completed its machine tool purchases. H. J. Walker, formerly president H. J. Walker Co., Cleveland, is lining up equipment for a plant to manufacture automobile parts, which he and associates plan to start in Cleveland and for which some machinery has been purchased. It is expected that 20 or 30 machine tools will be required. Some single tool orders are coming from Cleveland automobile plants, but there is no activity in the Detroit automobile field. Outside of tools for replacement not much business is expected from the large automobile companies in the Michigan territory during the next few months. No new railroad inquiries are reported. Lists from the Chicago, Burlington & Quincy and the Missouri, Kansas & Texas railroads, including about one dozen turret lathes in which local builders are interested, are still pending. As a whole, machine tool business in September was disappointing.

The only new price change reported is an advance of about 10 per cent by the R. K. LeBlond Machine Tool Co. on its line of horizontal milling machines.

H. F. Seymour has purchased the Columbian Hardware plant of the Consolidated Iron & Steel Co., at East Fifty-third Street and Hamilton Avenue, Cleveland, the purchase including the buildings, equipment and inventory. The purchase price was approximately $550,000. Mr. Seymour, who was vice-president Consolidated company, has organized the Columbian Hardware Co. Other officers are E. Watkins, vice-president; A. V. Cannon, secretary, and H. M. Hitch, treasurer. The Columbian company will continue the manufacture of vises, anvils and drop forgings that have heretofore been made in this plant. The Consolidated Iron & Steel Co. will continue to operate the Republic Structural Iron Works and the Taylor & Boggis Foundry, two subsidiary organizations and will manufacture a few hardware items, including lock sets, springs and hinges.

The Stuko Steel Co., Cleveland, has been organized to manufacture light steel frame work for stucco dwelling houses and other buildings and has established a plant at East 104th Street and Harvard Avenue. Offices are at 2300 Euclid Avenue. S. P. Aldgridge is general manager.

The Cleveland Crane & Engineering Co. has recently taken the following orders for its tramrail equipment: The National Foundry Co., Brooklyn, N. Y., complete tramrail system for handling flasks; Standard Car Wheel Co., Cleveland, tramrail system including electric carrier and hoist for handling carwheels from the foundry floor to the soaking pits and from there to the cleaning room; Manning Paper Co., Fullerton, N. Y., tramrail system, including two carriers for handling hemp rope; Western Clock Co. LaSalle, Ill., tramrail system for window cleaning.

The Universal Smokeless Boiler Co., formerly at Wheeling, Va., is reported to be planning to locate in Akron, Ohio.

The Ohio-York Ice Machine Co., 1106 Woodland Avenue, Cleveland, is erecting a new plant on Bulkley Boulevard.

The Gulf States

BIRMINGHAM, Oct. 2.

AN appropriation of $3,000,000 for extensions and improvements has been arranged by the Dallas Power & Light Co., Dallas, Tex., to include the construction of an addition to its local generating plant, to increase the capacity about 15,000 kw. Other stations will be erected and line extensions made.

The Marathon Lumber Co., Laurel, Miss., has tentative plans for rebuilding its sawmill and lumber plant destroyed by fire Sept. 21, with loss of about $100,000, including machinery.

The McWane Cast Iron Pipe Co., Birmingham, has awarded contract to the Ingalls Iron Works, Birmingham, for the first unit of its new pipe foundry at East Birmingham, to be one-story, 105 x 340 ft. J. R. McWane is president.

The United States Engineer Office, Jacksonville, Fla., will take bids until Oct. 12 for a heavy oil engine and accessory equipment, as per specifications on file.

The Common Council, Tulia, Tex., is planning for extensions and improvements in the municipal electric power plant to cost about $25,000.

The Travis Cotton Seed Products Co., Hearne, Tex., is planning to rebuild the portion of its oil mill destroyed by fire Sept. 17, with loss estimated at $125,000 including machinery.

The City Council, Dallas, Tex., has accepted a proposition tendered by the Missouri, Kansas & Texas Railroad for the electrification of its line from Dallas to Denton, Tex., as a substitute for the construction of a new interurban electric line. The work will include the erection of new power plants, lines, etc., and is estimated to cost in excess of $400,000.

Temple Terraces, Inc., 801 Citrus Exchange Building, Tampa, Fla., V. W. Helm, secretary-treasurer, will take bids Oct. 10 on an electrically driven water supply pump of 250-gal.-per-min. capacity and on an electrically driven fire pump of 500-gal. capacity. On Oct. 12 bids are asked on 15,400 ft. of 3, 4 and 6-in. cast-iron pipe, new or second hand, and on 21,600 ft. of ¾ to 2-in. galvanized steel or iron pipe.

T. D. Whiteborn, Atlanta, Tex., and associates have acquired property at Sweetwater, Tex., and will commence the installation of equipment for a new plant to manufacture automobile truck bodies.

A vocational department will be installed in the new high school to be erected at Gadsden, Ala., 190 x 240 ft., estimated to cost $200,000, for which bids on a general contract will soon be called.

The sawmill, lumber plant and power house of the Peavy-Moore Lumber Co., Deweyville, Tex., was destroyed by fire Sept. 23, with loss of about $200,000 including machinery. It is planned to rebuild.

A vocational department will be installed in the new high school to be erected at Lampasas, Tex., for which bids on a general contract have just been received.

The Sinclair Pipe Line Co., Houston, Tex., a subsidiary of the Sinclair Consolidated Oil Corporation, 45 Nassau Street, New York, has plans under way for new pipe lines from Mexia to Houston, about 165 miles, with a capacity of 25,000 bbl. per day. The work will include the installation of three new electrically-operated pumping plants, with additions to a number of present pumping stations. A steel tank department for storage will also be constructed at Houston, with six 55,000-bbl. units. The work is estimated to cost in excess of $500,000. J. R. Manion is president.

A vocational department will be installed in the new high school to be erected at Hammond, La., for which bonds for $100,000 have been voted.

The Kosse Light & Power Co., Kosse, Tex., has arranged an appropriation of $25,000 for improvements in its power plant, including the installation of new machinery. H. E. Blumberg is owner and manager.

The Common Council, Gordo, Ala., has authorized the preparation of plans for the installation of a municipal electric light and power plant.

The Magnolia Petroleum Co., Electra, Tex., has staked out property for seven new buildings, including machine shop, forge shop, tool works, general repair shop, etc., to cost about $150,000. Work on the initial structures has commenced.

The Volusia Cypress Co., New Smyrna, Fla., has tentative plans under way for a new sawmill, planing mill and lumber plant, with power house, estimated to cost $100,000 with machinery.

Following the recent partial destruction by fire of the industrial building at Birmingham, occupied jointly by the Walstrum Armature Works, the Atlas Machinery & Supply

Co. and the Interstate Belting & Packing Co., with loss estimated at close to $40,000, the different companies are arranging for the re-establishment of their respective plants, with the installation of new equipment.

The Central South

ST. LOUIS, Oct. 2.

BIDS have been taken by the Broderick & Bascom Rope Co., 4600 North Main Street, St. Louis, for two new buildings at Brown Avenue and the Union Boulevard, estimated to cost $250,000, including machinery.

The Missouri Public Utilities Co., Cape Girardeau, Mo., has plans for extensions in its electric power plant and system in southern Missouri. The work is estimated to cost in excess of $250,000, with equipment. E. A. Hart is general manager.

The Du Bois Tube & Rubber Co., Chattanooga, Tenn., has plans under way for enlargements to double, approximately, the present capacity.

Vocational departments will be installed in the two new junior high schools to be erected at Enid, Okla., estimated to cost $200,000, for which foundations will be laid at once.

The Meridian Trail Garage, 1840 North Lawrence Street, Wichita, Kan., is planning for the installation of additional equipment in its repair department, including cylinder grinding apparatus, drill press, etc.

The Common Council, Milan, Mo., has plans for extensions and improvements in the municipal electric light and power house and the installation of additional equipment.

The Joyce-Watkins Co., 332 South Michigan Avenue, Chicago, manufacturer of railroad ties, etc., and its subsidiary organization, the Arrow Transportation Co., have tentative plans for the establishment of a boat and barge building works on property at Paducah, Ky., recently acquired. A marine railway will also be constructed.

The Scott Garage Co., South Douglas and Lincoln Streets, Wichita, Kan., is planning the installation of lathe, drill press and other tools. W. Scott heads the company.

The Tower Gasoline Co., Oklahoma City, Okla., is planning for the construction of a new oil refinery on site selected at Blackwell, Okla., to include a gasoline absorption plant. The refinery is reported to cost close to $100,000. L. Z. Harrison is general manager.

The Noble Coal & Lumber Co., Whick, Ky., recently organized, is planning for the construction of a power house on its coal properties, lately acquired. Electrical and mechanical mining equipment will also be installed. George W. Noble is president and general manager.

The Common Council, Vinita, Okla., will build a new power house on the Grand River, vicinity of Ketchum.

W. A. Dilano, Wichita, Kan., operating a wood-working plant at 235 Wabash Avenue, is planning the installation of a new planer, lathe, saw and other tools, also power transmission equipment.

The Knoxville Railway & Light Co., Knoxville, Tenn., has arranged an appropriation of $250,000 for extensions and improvements in its electric plant and system.

The Tipton Power & Light Co., Tipton, Okla., is planning the installation of new equipment, including a complete electric lighting set.

The National Refining Co., Tulsa, Okla., has plans under way for two new electrically-operated pumping plants, in connection with the extension of its oil pipe line from its refinery at Coffeyville, Kan.

The Kansas Electric Power Co., Kansas City, Mo., has disposed of a preferred stock issue of $1,000,000, the proceeds to be used for extensions.

A vocational department will be installed in the new high school to be erected at Ponca City, Okla., estimated to cost about $200,000, to replace the school recently destroyed by fire.

The R. C. Wayne Supply Co., 608 West Jefferson Street, Louisville, machinery dealer, has inquiries out for a 20-ton locomotive crane, 8-wheel, with reversible engine.

The board of directors, State Reformatory, Frankfort, Ky., has plans for an addition to the wood-working plant at the institution, 45 x 180 ft.

A new power plant will be constructed at the factory of the Speer Vinegar Co., Kansas City, Mo., at Fayetteville, Ark. It will also install a new hydraulic press, drying equipment and other mechanical apparatus.

The Oklahoma Gas & Electric Co., Oklahoma City Okla., is planning the erection of a new power house in the vicinity of Drumwright, Okla. It has commenced work on extensions and improvements in its plants and system to cost approximately $500,000.

The Pacific Coast

SAN FRANCISCO, Sept. 26

THE C. F. BRAUN CO., 604 Mission Street, San Francisco, manufacturer of heaters, valves, etc., is completing plans for the second unit of its new plant at Shorb, Cal., two stories, 40 x 120 ft. John Reid, Jr., First National Bank Building, is architect.

The Little Rock Power & Water Co., Los Angeles, has been granted permission to construct a hydroelectric power plant on Little Rock Creek to cost about $300,000.

The Imperial Ice & Development Co., Calexico, Cal., will commence the immediate erection of an addition to its plant, estimated to cost $80,000. E. E. Anderson, assistant superintendent, is in charge.

The Chevrolet Motor Co., Detroit, is completing plans for a new two-story assembling plant, 145 x 685 ft., on Hillside Avenue, Oakland, Cal., estimated to cost in excess of $500,000, including machinery. Albert Kahn, 1000 Marquette Building, Detroit, is architect.

The Pacific Ready-Built Homes, Inc., Los Angeles, has tentative plans for an addition to cost about $150,000. The equipment will include several electrically operated loading cranes. Berne S. Barker is secretary.

The Pacific Gas & Electric Co., 445 Sutter Street, San Francisco, has tentative plans for the construction of seven hydroelectric generating plants on the Pit River to develop a total capacity of 600,000 hp. and estimated to cost in excess of $80,000,000, with machinery and transmission lines. Initial work has commenced on the first power plant.

The Washington Iron Works, Seattle, Wash., has awarded a contract to the Austin Co., Smith Building, for a one-story foundry, totaling about 65,000 sq. ft. of floor area.

The Nephi Plaster & Mfg. Co., Nephi, Utah, has plans under way for enlargements in its plaster mill and cement works. The equipment will include crushing and fine-grinding machinery, electric and power equipment, etc.

The Hebern Electric Co., Bank of Italy Building, San Francisco, manufacturer of electrical equipment, has awarded contract to the P. J. Walker Co., Monadnock Building, for a new three-story plant, 100 x 200 ft., at Harrison and Eighth Streets, Oakland, Cal., to cost about $150,000, including equipment.

The Skamania Light & Power Co., Stevenson, Wash., will commence the immediate erection of a new hydroelectric power plant on Hermon Creek, estimated to cost in excess of $150,000.

The Puget Sound Lumber & Box Co., 3725 Twelfth Avenue, Seattle, Wash., is completing plans for a new two-story factory, 50 x 210 ft., at 1201 East Northlake Avenue. A list of machinery will be prepared at an early date.

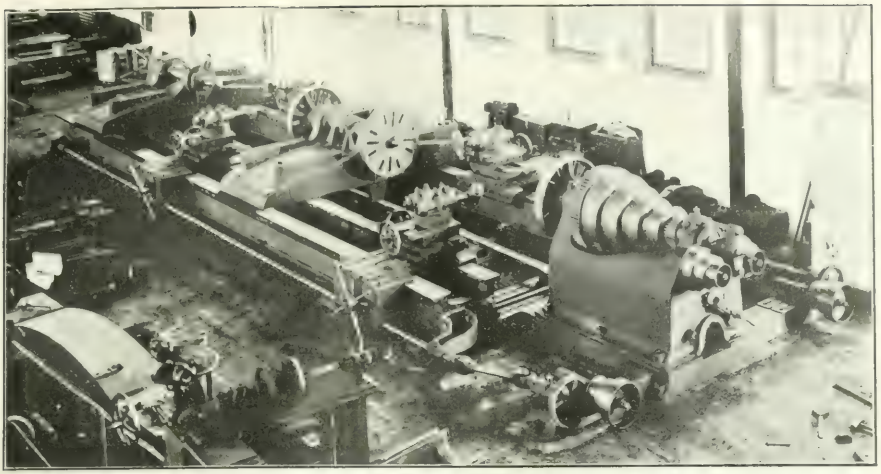
The Spokane Valley Irrigation District, Spokane, Wash., will install hydraulic turbine and auxiliary apparatus, two centrifugal pumps, electrical and other power machinery, in connection with a new irrigation project to cost $500,000. R. K. Tiffany, Old National Bank Building, is engineer.

Canada

TORONTO, Oct. 2.

MACHINE tool sales have been light during the week, but there is considerable prospective business in sight and a fair amount appears to be on the point of closing. The demand for wood-working equipment continues to keep the lead over that for iron working lines, but the latter is beginning to take on a brighter aspect and with the Canadian railroads entering the market much heavier buying is expected. In many lines prices have been showing more strength and advances have been common of late. The coal situation has recently developed changes for the better and the outlook is becoming brighter and supplies from across the border are making their appearance in larger volume. The announcement of new plant construction, together with additions which are under way or about to be started, are promising features of this market. Activities among automotive plants continue steady and while demand from this source has fallen off slightly the past month, a limited amount of buying continues. A steady demand prevails for small tools and buying is reported both for spot and future use

Officials of the Eugene Phillips Electrical Works, Montreal, announce that construction will start at an early date on the erection of the second unit to the plant at Brockville, Ont., the power cable mill. The company is installing equip-



This Lathe, Which Was Built by the F. R. Patch Mfg. Co., Maker of Heavy Duty Machinery, Rutland, Vt., Is 47 Ft. 1 In. Long, Is Supplied with a Center Stock Which Allows Two Articles to Be Turned at One Time and It Has an Extreme Width, When the Beds Are Extended the Maximum Distance, of 16 Ft. 2 In. The machine was built for the George A. Fuller Co., to manufacture columns at Stonington, Me., granite quarries for use in the New York County Court House, and of course a feature is that two sections of the granite columns may be turned at one time. The weight of the finished machine is 122,000 lb.

ment in the first unit and expects to commence operations soon.

The Premier Paper & Power Co., Hartville, N. S., proposes to install a standard newsprint machine in its plant. To provide the necessary power it will develop an additional 5000 hp.

The Thunder Bay Co., Port Arthur, Ont., proposes to increase the capacity of its groundwood pulp mill to 100 tons per day. It is also considering the erection of a paper mill unit.

The Canada Electric Castings Co., Ltd., Orillia, Ont., is completing the erection of new plant, 50 x 350 ft., which is expected to be in operation within the next few weeks. It is proposed to use 200 ft. of the building for steel and iron work and the remaining 150 ft. will be equipped for a brass foundry. Equipment being installed includes two 3-ton electric Heroult type furnaces, two shaft furnaces and ten crucible furnaces. About 50 men will be employed when capacity is reached. J. B. Tudhope is president and A. H. R. Burrows, vice-president and general manager.

The Nashwaak Pulp & Paper Co., Ltd., St. John, N. B., is reconstructing nearly every department of its plant and is installing new equipment in many departments with the intention of increasing the capacity from 60 to 80 tons of pulp per day.

The Hayes Wheel Co. of Canada, Ltd., Chatham, Ont., which recently took over the plant of General Forgings & Stampings, Ltd., at Merritton, Ont., is installing equipment for the manufacture of outside automobile rims. It is also transferring the metal stamping equipment to the Chatham plant. The forge plant will not be disturbed, but the business will be increased.

In the improvements being made to the plant of the Canada Cement Co., Lakefield, Ont., arrangements are being made for the development of electrical power from heat. The waste heat from the kilns, instead of being allowed to escape through flues as formerly, will pass around boilers and produce low pressure steam for the operation of engines and generators. The old plant is being demolished and a new one erected, which is expected to be completed and in operation within a year.

The Canadian Paper Board Co., Montreal, proposes to spend considerable money on new equipment for its plants at Montreal, Frankford and Campbellford, with the intention of increasing the capacity from 30,000 to 40,000 tons per annum. Improvements will be made to the boiler plant, hydroelectric installation, finishing departments as well as installing new paper machine and other equipment.

McDougall & McNeill, Ltd., Vancouver, B. C., have been awarded the general contract for the first unit of a pulp and paper plant at Elko, B. C., for the Wigwam Pulp & paper Co., Ltd., which, when completed, will represent an expenditure of $13,000,000.

IRON AND INDUSTRIAL STOCKS

Rumors of War Have Depressing Effect on Many Securities

Pronounced irregularity prevailed throughout the week in steel and industrial stocks, owing to a series of apprehensions, chief of which was the rumor of war, which is now viewed as improbable. The general trend for the week was uniformly downward. Some buying of importance was noted, especially in U. S. Steel common. Beginning erratic on Monday, sharp declines were suffered on Tuesday and Wednesday; then came a rally which ended in another decline. Acute reactions brought considerable buying varied with periods of dullness when prices merely sagged. Friday's recovery was the only one of note, U. S. Steel leading with a two-point rise. The average of 20 industrial stocks was 97.3, more than 1½ below last week. At Saturday's close, the more active stocks sold off from one to three points. The decline in some quarters is regarded more as a seasonal evolution and the outlook is said to be encouraging.

	Low	High
Allis-Chalmers ..	53½	56
Allis-Chal. pf....	101	103
Am. B. S. & Fdy.	76	77½
Am. B.S. & F. pf.	110⅝	110⅝
Am. Can	59⅜	60⅛
Am. Can pf.....	109	109¾
Am. Car & Fdy..	182¼	183½
Am. C. & F. pf..	122	122
Am. Loco.	120½	125¾
Am. Loco. pf....	119	119
Am. Radiator...	118¾	124¾
Am. Steel Fdries.	42¾	44⅞
Am. St Fd. pf..	101	104½
Bald. Loco.	130⅞	135⅜
Bald. Loco. pf...	115¼	115¾
Beth. Steel	70	76
Beth. St. Class B	69¾	76½
Beth. St. 8% pf..	111	112
Brier Hill	17¾	20
Br. Em. St. 1 pf.	74	74
Br. Em. St. 2 pf.	33½	34½
Cambria Steel...	40	40
Chic. Pneu. Tool	78	82⅛
Colorado Fuel...	32	34½
Crucible Steel...	81⅜	90¼
Crucible St. pf..	95	95⅜
Gen. Electric....	173½	179½
Gen. Electric 6%	11⅝	12

	Low	High
Gt. No. Ore Cert.	38⅞	39¾
Gulf States Steel	83	94⅝
Inland Steel ...	47	48
Int. Har., new..	105¼	109½
Int. H. pf., new.	119	119
Lackawanna St..	76¼	82⅛
Lima Loco.	56¾	60½
Midvale Steel...	30¾	35⅜
National-Acme..	14½	14¾
Nat. En. & Stm..	60	63¾
Nova Scotia Steel	34	36
Otis Steel	10½	11
Otis Steel pf....	54½	55
Pressed St. Car..	85	90½
Press. St. Car pf.	105	105
Ry. Steel Spring.	117	117½
Replogle Steel...	32¼	35
Republic	54½	57½
Republic pf.....	85	91½
Sloss Sheffield...	77	77
Steel of Canada.	72½	77
Superior Steel...	31¼	35
Un. Alloy Steel..	37½	37¾
U. S. Steel.....	100¾	104⅝
U. S. Steel pf...	121½	122¾
Vanadium Steel.	43⅜	49½
Va. I., C. & Coke	55	55½
W'house Air Br.	100	103

Steel Corporation Stockholders

The United States Steel Corporation reports 96,307 common stockholders on its books, according to the record taken in connection with the mailing of the dividend checks for the current quarter. This is a reduction of 3,205 in the past three months and a decrease of 11,132 from the record figure reported for all the time, the total of 107,439 reached at the close of last year. The number of stockholders on the books at the present time is the smallest since the last quarter of 1920, but it is larger than any total reported prior to 1921.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	
Refined iron bars, base price	3.04c.
Swedish bars, base price	7.50c.
Soft steel bars, base price	3.04c.
Hoops, base price	4.39c.
Bands, base price	3.84c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	3.14c.
Channels, angles and tees under 3 in. x ¼ in., base	3.04c.

Merchant Steel

	Per Lb
Tire, 1½ x ½ in. and larger	3.10c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	3.30c.
Toe-calk, ½ x ⅜ in. and larger	4.15c.
Cold-rolled strip, soft and quarter hard	6.75c. to 7.25c.
Open-hearth spring steel	4.50c. to 7.00c.
Shafting and Screw Stock:	
Rounds	3.90c.
Squares, flats and hex	4.40c.
Standard cast steel, base price	15.00c.
Extra cast steel	18.00c.
Special cast steel	23.00c.

Tank Plates—Steel

¼ in. and heavier	3.14c.

Sheets

Blue Annealed

	Per Lb.
No. 10	4.19c.
No. 12	4.24c.
No. 14	4.29c.
No. 16	4.39c.

Box Annealed—Black

	Soft Steel C. R., One Pass, Per Lb.	Blued Stove Pipe Sheet, Per Lb.
Nos. 18 to 20	4.30c. to 4.70c.	.....
Nos. 22 and 24	4.35c. to 4.75c	5.00c.
No. 26	4.40c. to 4.80c.	5.05c.
No. 28	4.50c. to 4.90c.	5.15c.
No. 30	4.75c. to 5.15c.	.....

No. 28 and lighter, 36 in. wide, 10c. higher

Galvanized

	Per Lb.
No. 14	4.60c. to 5.00c.
No. 16	4.75c. to 5.15c.
Nos. 18 and 20	4.90c. to 5.30c.
Nos. 22 and 24	5.05c. to 5.45c.
No. 26	5.20c. to 5.60c.
No. 27	5.35c. to 5.75c.
No. 28	5.50c. to 5.90c.
No. 30	6.00c. to 6.40c.

No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
⅛ in. Butt.	—53	—38	⅛ in. Butt.	—11	+13
¼ in. Butt.	[illegible]	[illegible]	¾ in. Butt.	—17	— 1
1-3 in. Butt.	—60	—47	1-1½ in. Butt.	—20	— 2
[illegible]	[illegible]	—44	2 in. Lap.	—14	+ 2
[illegible]	—53	—30	2½-6 in. Lap.	—18	— 2
9-12 in. Lap.	—49	—30	7-12 in. Lap.	—10	+ 6

Steel Wire

Bright basic	4.00c. to 4.25c.
Annealed soft	4.00c. to 4.25c.
Galvanized annealed	4.65c. to 4.90c.
Coppered basic	4.65c. to 4.90c.
Tinned soft Bessemer	5.65c. to 5.90c.

*[illegible]

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	19¼c. to 20¼c.
High brass wire	20¼c. to 20¾c.
Brass rod	16¾c. to 17¾c.
Brass tube, brazed	26¼c. to 27¼c.
Brass tube, seamless	23 c. to 23½c.
Copper tube, seamless	25¾c. to 26 c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 22¾c. to 23¾c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14-20	
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	Primes	Wasters
		80 lb..	$6.05 $5.80
		90 lb..	6.15 5.90
		100 lb..	6.25 6.00
IC..$10.00	$8.50	IC..	6.40 6.15
IX.. 11.50	10.00	IX..	7.40 7.15
IXX.. 13.00	11.25	IXX..	8.40 8.15
IXXX.. 14.25	12.50	IXXX..	9.40 9.15
IXXXX.. 16.00	14.00	IXXXX..	10.40 10.15

Terne Plates

8-lb. coating, 14 x 20

100 lb.	$7.00
IC	7.25
IX	7.50
Fire door stock	9.00

Tin

Straits, pig	36c.
Bar	43c. to 47c.

Copper

Lake ingot	15¼c.
Electrolytic	15 c.
Casting	14¾c.

Spelter and Sheet Zinc

Western spelter	8½c.
Sheet zinc, No. 9 base, casks	9¼c. open 9¾c.

Lead and Solder*

American pig lead	6¾c. to 7c.
Bar Lead	8c. to 8½c
Solder, ½ and ½ guaranteed	25c.
No. 1 solder	23½c.
Refined solder	20¼c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	75c.
Commercial grade, per lb.	35c.
Grade D, per lb.	25c.

Antimony

Asiatic	7c. to 8c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.	25c. to 27c.

Old Metals

The market is stronger and business more active. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy crucible	12.00
Copper, heavy wire	11.50
Copper, light and bottoms	9.50
Brass, heavy	6.25
Brass, light	5.25
Heavy machine composition	8.50
No. 1 yellow brass turnings	6.50
No. 1 red brass or composition turnings	8.00
Lead, heavy	5.00
Lead, tea	4.00
Zinc	3.75

THE IRON AGE

New York, October 12, 1922

ESTABLISHED 1855 VOL. 110, No. 15

Telling Workers All About Business

Employee Representation Has Proved Successful in Periods of Depression and Prosperity at the Plant of the American Multigraph Co.

BY GEORGE SMART

THE past few years have afforded unusual opportunities for testing various methods of improving the relation of employers and employees, for the reason that conditions as to prosperity and depression, employment and unemployment, have changed frequently. The tests have been sometimes very severe. Those efforts which required a large expenditure of money have in many cases been abandoned. During the war period, when profits were large and employers had plenty of money to expend—and incidentally reduce excess profit taxes—there was lavish outlay in so-called welfare work and in other forms of endeavor. But when profits declined, there was a tightening of the purse strings so far as many of these expenditures were concerned and even, in some cases in which large money outlay was not necessary, employers and employees alike lost interest.

Another reason for abandoning plans for improving industrial relations was the discouragement which resulted from the failure, or apparent failure, of plans for arbitration of disputes, for works councils and employee representation. It certainly was disheartening to many earnest believers in employee representation to see thousands of employees, in plants having this progressive plan, go on strike in very much the same fashion as did the employees of plants where there was no plan for having the employees represented, and nothing relating to shop management or wages except possibly for the treatment of safety. Fortunately, some among those employers who had this discouraging experience did not give up the plans which had been adopted but continued them in the belief that eventually they would prove effective. The report of the second industrial conference called by President Wilson, signed, among others, by Herbert Hoover, Prof. Frank W. Taussig and George W. Wickersham, said: "The conference finds that joint organization of management and employees, undertaken with sincerity and good will, has a record of success." This statement struck at the heart of the matter. Unless sincerity and good will prevail on both sides, no plan can be a permanent success, and the efforts which have been most successful are those in which there is not only sincerity but the most complete frankness, accompanied by painstaking intelligent effort to explain conditions to the workers.

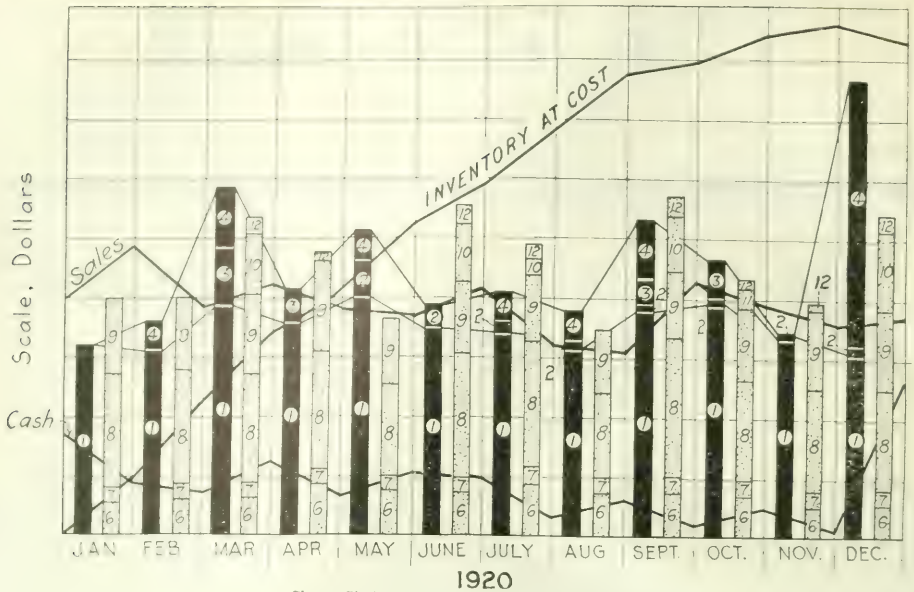
Plan Adopted in 1919

Among the companies which first adopted a plan of employee representation was the American Multigraph Co., Cleveland. This plan was put into effect March 1, 1919, and was then fully described by THE IRON AGE. The system was not devised by any one man. The ideas were obtained from many sources, and it is the product of the joint effort of officials and employees of the company, made to fit their own particular requirements, although in its fundamentals resembling other systems now in successful operation. There is a congress of 24 members elected by and from the workers; a cabinet consisting of the executives of the company is a prominent feature, and it is provided that in case of a total disagreement (which has never occurred) an arbitration board will be formed. Departmental representatives are elected by the workers and it is their duty to present to congress all matters of interest brought to them by the workers of their department. The congress has numerous working committees which are engaged constantly in solving problems presented to them. In the more than three years' experience, there has never been a serious disagreement between the committees and the management, and in many cases the management has been willing to go further than the committees have suggested.

Interview with President Osborn

The writer, having known of the adoption of the plan by the American Multigraph Co., was anxious to ascertain how it had stood the test of the period of depression of 1921, and therefore asked President H. C. Osborn what the experience of the company had been in the last year or two. Mr. Osborn talked with characteristic frankness and did not attempt to conceal that serious problems had been presented in connection with the rapid decline in business, which started late in 1920 and became serious in 1921, but his faith in the plan was unshaken.

"The fundamental trouble with many efforts of this kind," said Mr. Osborn, "is that the employers are not frank with their men. If the company officials are not willing to tell the employees all about the business, they might as well not try to have employee representation. But that is not all. Employers must not only be willing to tell, but must spend time and thought in presenting the facts in such a way that the employees can readily understand them. The trouble with most financial statements is that they are like so much Greek to the employees. Our effort has been to present the facts as to our business in graphic form to as great an extent as possible. We have sought especially to show the men the monthly cash income and outgo. Under income we include gross multigraph sales, sales of company securities, sales of Liberty bonds, borrowed money and interest on investments. We take these items and show them in a column on a monthly chart. At some periods as, for example, in January, 1921, the column was made up of almost entirely one item, such as gross multigraph sales. At another period as, for example, Decem-



Charts Similar to the Above Are Constantly on Display at the Plant of the American of the Company. The actual dollars and cents income and outgo for the several reproduced above. The black columns indicate the various sources of income as money; (5) interest. The shaded columns indicate the various sources of outgo as (10) taxes; (11) repayment of borrowed money; (12) dividends and

ber, 1920, the column was made up of multigraph sales and a large amount of borrowed money to carry an abnormal inventory on hand at that time.

"Then we take the various items of expenditure or cash outgo, such as factory payroll, office payroll, purchases, selling expense, taxes, repayment of borrowed money, dividends and interest, and construct another column alongside of the first. Having these two columns, it is very easy to explain to an employee that when the outgo column is larger than the income column, something must happen; that is, the size of the outgo column must be reduced and the income column increased before the affairs of the company can be put into satisfactory condition. In other words, when it is necessary to reduce wages, no fair-minded man can resist the argument made by the chart. We have found our men most reasonable. We have gone through several wage reductions. Let me explain to you briefly how this has been done.

Readjustment of Wages

"You seem to be particularly interested in the test of the period of depression—and that is natural. It would be strange if employees would not accept gracefully an increase in wages or reduction of working hours without loss to them; but the real question is what will the men do when wage reductions become necessary? That was the question presented to us. We talked over the matter very thoroughly with the wage and rates committee of congress. We showed them the charts, we told them the truth from beginning to end, we answered any questions. The problem was presented in all its bearings. For example, one committee made an investigation of inventories of raw and process material and finished stock which were increasing to such an extent that the borrowing of large amounts of money was necessary. The committee saw that this condition could not continue without causing most serious results to the company. The committee reported to congress that in justice to the owners of the company they recommended a complete shutdown until such a time as the abnormal inventories could be sold.

"Upon receipt of this report by congress, it was approved and passed on to the cabinet. The cabinet in turn offered the alternative of a three-day week without change of hourly rates, with the thought of maintaining as much of the organization as possible. This in turn was approved by congress and put into effect.

"The value of handling a matter in this way cannot be overestimated. The investigations and reports of workmen carry weight with their co-workers and stimulate confidence in the management. The men realized they were getting the best deal possible under the existing circumstances.

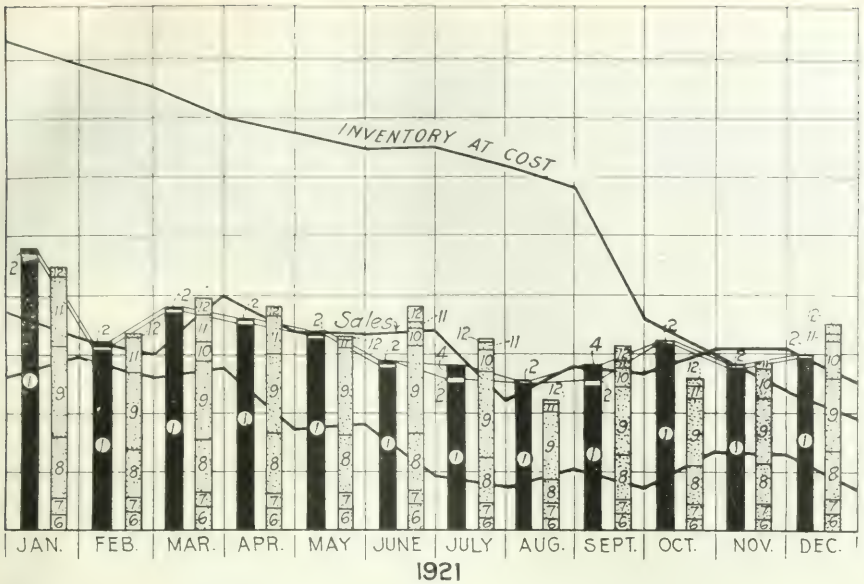
"It later became necessary to figure further retrenchment, due to reduced output and heavy overhead. The charts referred to above showed in detail actual financial conditions of the company and illustrated graphically how the company was depleting its liquid capital by building up an inventory unnecessarily; the factory payroll and purchase of raw material, being large factors of our outgo, were used to good effect.

Financial Conditions Shown

"These different items were so charted that they showed the relation between the cash income and outgo for each month of the company's 1920 operations. Charts were also made up showing actual inventories of raw materials, stocks in process and in finished stores, also at the company branches. Inventories and sales were shown for a period of ten years, and the increase of inventory in relation to sales for 1920 was very evident.

"Statements of manufacturing costs were given, with figures showing increase or decrease of hours necessary to produce our different products. Also the percentage of hourly increase in wages, increase in raw material and overhead spread over a term of six years; in fact, all possible information regarding the operation of the company's business was given to congress for investigation. The best available figures showing reduction in living costs in Cleveland were given to the men, all of which showed the justice and necessity of reducing hourly rates.

"It was finally recommended by cabinet to congress that the company change from a three-day week to full



Multigraph Co. to Give Full Information to Employees in Regard to the Finances items are posted each month, together with the graphic features of the charts follows: (1) gross sales; (2) multigraph stock; (3) Liberty bonds; (4) borrowed follows: (6) factory payroll; (7) office payroll; (8) purchases; (9) selling cost; interest. The curves show cash on hand, sales and inventory at cost

time basis of 44½ hr. per week, with an average wage reduction of 20 per cent. It was found from cost figures that the three-day week was an uneconomic basis of operation, due to the high fixed overhead which could not be eliminated. Also on the three-day week the men were earning a weekly rate of slightly over 50 per cent of their full time rate, whereas by working the full time with a 20 per cent cut their weekly pay would amount to considerably more.

"The wages and rates committee obtained all information needed for reclassifying the men according to efficiency and length of service. The committee established classifications for the work being performed. The worker's individual case was then taken up and all workers were placed in classifications according to rating made.

"In some cases, due to reducing the working force, assistant foremen were put back on the bench or machines from which they had been previously advanced; in which case their weekly reduction was in excess of 20 per cent, due to their having to take the regular bench or machine rate. In other cases the reduction was not so much as 20 per cent, due to individual conditions. However, the average cut in the factory payroll after reclassification by the committee was approximately 18 per cent.

"The method used in arriving at the new rate was as follows: the hourly rates then in effect in the various classes of work were averaged and the rate was then subjected to a 20 per cent reduction; the resulting rate was taken as the mean rate with a leeway of 5c. per hr. above or below, as a maximum and minimum rate to be paid for the different classes of work to be performed.

"The usual factors in determining the first, second and third class were then applied and the maximum, mean and minimum rates were thus set for each class of work.

"While no one likes to have his income reduced, our men were so thoroughly informed of the conditions that made a wage reduction necessary that it was accepted in a spirit of fairness as a result of their knowledge of the facts."

Mr. Osborn told in some detail how decisions were reached as to which employees should be retained and which should be dismissed, and Vice-President W. C. Dunlap, who is an enthusiastic believer in employee representation, added: "It certainly was fine to see the unselfish attitude of many of our men. Sometimes when a man knew that his position was perfectly secure, he voluntarily gave it up, or tried to give it up, in favor of another man who he thought was in needy circumstances, or for other reasons was more deserving.

"Another bright feature of the dark days of unemployment," said Mr. Dunlap, "was the action of the congress and committees in finding employment for men who had been dismissed. In many cases employent of a temporary character was found, but in this way we were able to help a large number of our former employees through the most serious period of unemployment."

When one visits the very attractive plant of this progressive concern, he is impressed by the enthusiasm, the sincerity, and the intelligent interest in each other, of employers and employees. The officials urge visitors to go out into the shops. To employers particularly, who come to the plant, Mr. Osborn is likely to say something like this:

"Get acquainted with your men. Get out in your shops and meet them. Let them meet you. They'll add considerably to your knowledge, and you can be of great assistance to them. Tackle this subject together. Tell them what they want to know about the business and let them see the basis under which capital and labor are working in your plant.

"Men would rather accept information from you than misinformation from an agitator. The trouble has been that hitherto the agitator has had no competition from those who knew the facts but would not pass them out.

"The time has come to change this. Business must sell itself to those who help make it. The workers must be appealed to on the basis of education.

"Give your men facts to think about and they will have no use for destructive theories."



New Cold Rolled Strip Steel Plant

Finishing Stands Driven Independently of Roughing Stands—Unusual Uniformity Obtained in Annealing Ovens of Special Design

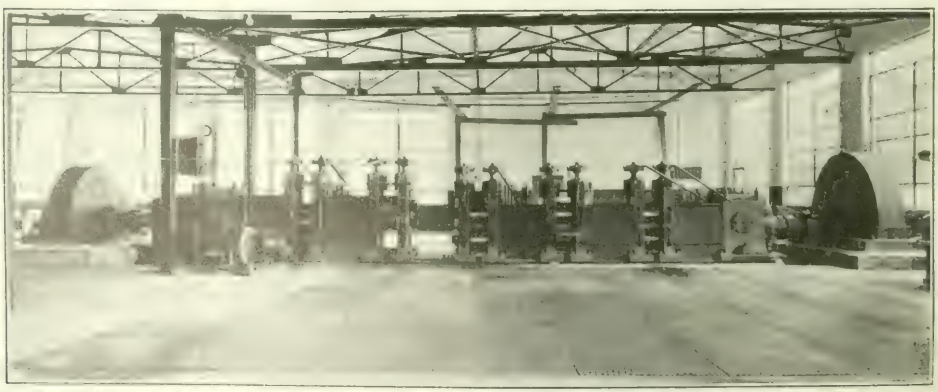
IN the five stands of the new cold rolling mill of the Wallingford Steel Co., Wallingford, Conn., and the other equipment subsidiary to this mill, a notable advance in design is believed to have been made in connection with the production of cold rolled strip in widths from 1½ to 12 in. The stands are arranged in two groups, of which the roughing group includes three sets of rolls driven by a 450-hp. General Electric motor, while the finishing group includes two similar stands driven by a 300-hp. motor. Each motor drives through a Falk reduction gear and in each case the design makes a notably compact unit.

Aside from the mill, the item of principal interest in the plant consists in the two annealing furnaces provided by the American Industrial Furnace Corporation, Boston. Each furnace is of single chamber with inside dimensions about 12 x 7 ft. They have been built according to the Smallwood patent (English) and are fired by coal on the under-feed principle. The fire box in each furnace is at the rear, from which the products of combustion flow under the furnace through the entire length, then double back toward the rear and again turn toward the front before being discharged through the furnace to the stack. They enter the furnace through 16 ports, 8 on each of the long sides. In each case, four of these ports discharge the hot gases toward the arched roof of the furnace, while the other four shoot them horizontally across the bottom of the furnace and under the annealing pots. In this way an unusually uniform distribution of heat is effected and the superintendent reports that the annealing problem, so frequently vital in connection with cold rolling, has practically disappeared. The blotchy appearance of many annealed products is not in evidence.

Control of the furnaces is aided by the use of three Bristol recording pyrometers for each furnace, two being inserted through the top and one near the bottom. The top pyrometer connections are located respectively in the northwest corner and in the center, while the bottom connection is at the southeast corner of the furnace. Observations of the record from the three pyrometers on the one furnace in operation, at the time of the writer's visit, showed 1440, 1445 and 1450 deg. Fahr. for the three.

To conserve furnace capacity, material is not allowed to cool in the annealing furnaces. It is withdrawn as soon as the temperature has been brought to the maximum desired and placed under cast steel annealing covers or hoods, located on saucers provided for the purpose. A sand seal between the cover and the saucer prevents the escape of hot gases. A certain amount of gas, gradually tapered down as the hours pass, is burned under these hoods. Control of the burning of this gas permits ready control of the rate of cooling of the coils of strip. The gas is made in a Galusha producer furnished by the Gas Producer & Engineering Corporation, New York. Hard coal is burned in these producers and a special quality, relatively free from sulphur, is used.

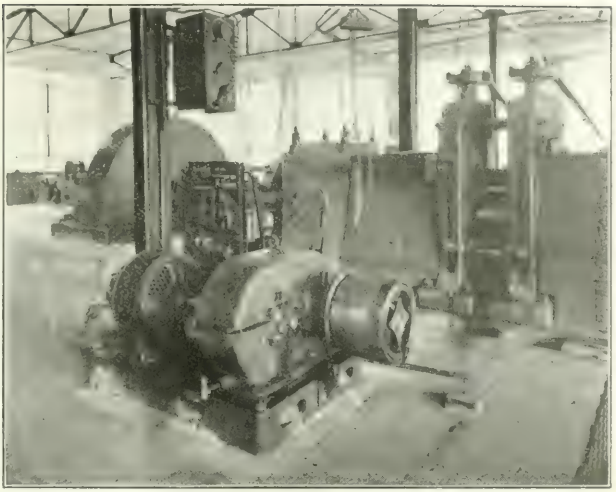
The mills were furnished by the Lewis Foundry & Machine Co., Pittsburgh. They are of particularly heavy construction in order to avoid spring while in



[illegible] at Entrance End of the Train of Roll Stands. Drive the Rolls [illegible] Reeling Rolls. While Taut at the Left Handles the Strip [illegible] from the pickling department. At rear of the [illegible] [illegible] [illegible] off foreground or may be handled on a portable [illegible]

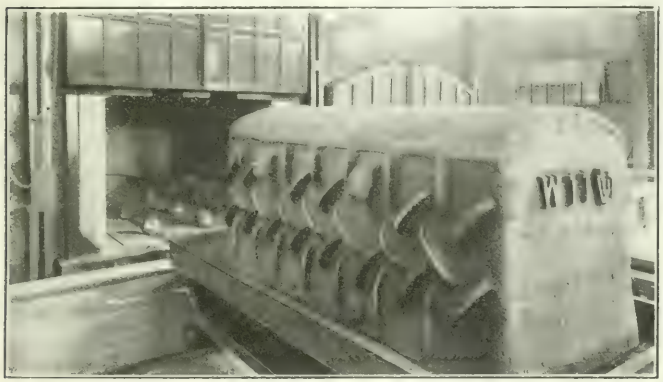
operation. For this purpose, cast steel housings are used in place of the ordinary cast iron. Each of the five stands carries three rolls, the upper and lower being 14 in. in diameter by 14 in. face, while the intermediate roll has a 7 in. diameter by 14 in. face. Material is passed either above or below the 7-in. roll, depending upon the direction of the pass with relation to the direction of rotation of that roll. In either case the advantage of low power consumption obtained from the small diameter roll is associated with the stiffness of the large diameter roll operating in direct contact with the small one throughout its whole length.

To test out the qualities of various makes of rolls for this purpose, rolls have been obtained from four or five leading American makers and also from the Poldi Steel Corporation in Czecho-Slovakia. Naturally, it will be some time before such a comparison can bear much fruit. The finishing speed is about 150 ft. per min.



Steel leaving the finishing rolls may be either reeled upon a Neale patent reel furnished by the Lewis Foundry & Machine Co., or coiled in a special coiler, furnished by the Sundh Engineering Co., Philadelphia. In the latter case, a permanent set is placed in the metal and it does not have to be bound to hold its coil for shipment.

Niles electric traveling crane operated from the floor. Other equipment in the plant includes a cold rolling

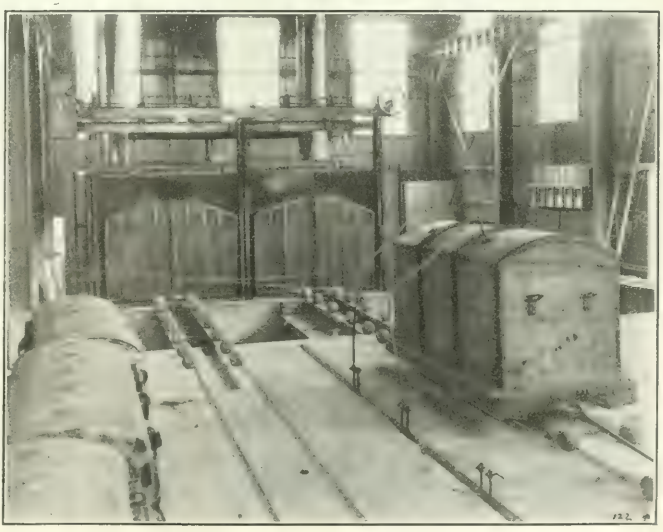


Above Is the Neale Patent Reel Which Takes the Cold Rolled Strip from the Last Stand of the Finishing Group, in Background, and Coils It for Shipment

At Left Is One of the Annealing Pots About to Enter the Oven on the Ball Race; in the Oven Appear the Horizontal and Vertical Ports for Hot Gases

Below Is an Annealing Hood in Which the Material Is Allowed to Cool After Being Heated in the Oven; Over It, Against the Wall, Appear the Six Pyrometer Records for the Two Furnaces

Preliminary to rolling, all material is pickled in the usual dilute sulphuric acid solution. This pickling is done in wooden tanks measuring about 7 x 14 ft. x 3 ft. deep, furnished by the A. T. Stearns Lumber Co., Boston. No lime tank is used, hot water being depended upon to remove surplus acid. To this end, two hot water tanks are supplied, these being used alternately. The slings which handle the trays of coils of metal are made of an acid-proof casting. The trays themselves are made of wood bolted together with acid-proof bolts. The pickling tanks are served by a 3-ton



mill for small material, consisting of a single stand made by the Standard Machinery Co., Auburn, R. I., and driven by a 25-hp. General Electric motor. The reel is run by a belt from the machine. This, together with two slitters (No. 0 and No. 3), were furnished by the Waterbury-Farrel Foundry & Machine Co. There is also a set of planish rolls 14 x 14 in. for taking light drafts when required after annealing. The Norton roll grinder is reported to give such a bright finish to the rolls that one could read a newspaper reflected in it.

This is an entirely new development since Jan. 1; on that date not a plan had been drawn. The first man on the job reported Jan. 19 and construction began almost immediately thereafter. The three buildings now in use include a furnace building 45 x 110 ft. with monitor roof, a brick and concrete mill building, 100 x 130 ft. and measuring 18 ft. to the lower chord of the roof truss, and a pickling building 30 x 100 ft. Storage of raw material is at present in the open behind the pickling building. It is intended to erect a shelter over this and to handle the material by means of a specially designed electromagnet from an overhead traveling crane.

About 40 men are at present employed. The product will go into the market, which is particularly lively within a radius of 50 miles of Wallingford. Delivery is in large measure by motor truck, because of the short distances involved and the relatively small tonnages in some of the orders. The material goes very largely into typewriter parts, telephone parts, buckles for belts, garters, suspenders, etc., metal buttons, eyelets for shoes, tips for shoe-laces and a myriad of other uses, many of which enter the daily life of everyone. Production is expected to reach 15,000 tons per year.

IRON ORE IMPORTS

Estimated That Tonnage Bought Abroad Is About a Half Million

The Department of Commerce statistics on imports of iron ore show that in the eight months of this year ended Aug. 31 a total of 534,580 tons had been brought in. Cuba furnished the largest quantity, 188,520 tons, and Sweden came next with 185,952 tons; Spain furnished 28,197 tons, and only 1408 tons came from Canada, which at times in the past has been a fairly important source of ore supply for blast furnaces near the Atlantic seaboard. This leaves 130,503 tons divided among other countries, which are not specifically mentioned in the Government figures.

Foreign ore of good quality can be delivered to furnaces near Atlantic seaports at less than the delivered prices of Lake Superior ore, hence there would undoubtedly have been much larger buying if furnaces had been working more actively this year and if many of them were not already overburdened with ore reserves carried over from 1920, when there was large accumulation of domestic ores. Spanish ore is being offered from 8.5c. to 11c. per unit, c.i.f. Atlantic ports, the higher price applying to low phosphorous grades, while Swedish ore is available at 10c. per unit. The last sales of Swedish ore were made at 9.5c. per unit, but this price, the importers state, is no longer being quoted.

Brazilian manganese ore is to be had at 28.50c. to 29c. per unit, while Caucasian manganese ore is 27c. to 28c. for the ordinary grade and 29c. to 30c. for the washed grade, containing 51 per cent manganese. We quote ore prices as follows:

Prices of foreign ores, ore [illegible] f Philadelphia or Baltimore.	
Iron ore, low phos., 55 to 58 per cent iron in dry [illegible]	11 7/8c
Iron ore, Swedish [illegible]	to 10c.
Manganese ore, [illegible] the Caucasus	29c. to 30c.
Manganese ore, ordinary, 48 per cent mn., from the Caucasus	27c. to 28c.
Manganese ore, Brazilian	28.5c. to 29c.

Award of European Type Cars to Poland

The War Department announces through the office of the Director of Sales that award has been made to the Republic of Poland of 7504 European type railway cars, consisting of the following: 75 Guerite box cars with cabs, 529 flat cars, 1850 low side gondola cars, 1450 high side gondola cars with tarpaulin frames and 3600 high side gondola cars without tarpaulin frames.

The cars, which are located at Norfolk and New York, were offered for sale by sealed bids, opened in the office of the Chief of Engineers July 6, 1922. Eleven bids were received, the highest being made by the Republic of Poland, which offered $4,802,560—$1,200,640 in cash and $3,601,920 in 6-year, 5 per cent notes of the Republic of Poland.

The Polish Government is arranging to start shipment at once and will complete the shipment in about ten months.

India Buying Less from the United States

It is pointed out in *Engineer* (London) that India's imports are falling off, particularly those from the United States. The total imports in the second quarter of 1922 fell from 100,000,000 to 64,000,000 rupees. The British share of this trade fell from 80,000,000 to 55,000,000 rupees, but increased in percentage from 80 to 86. The American contribution fell from 17,500,000 to 5,000,000 rupees, the percentage dropping from 17.5 to 8. German imports increased from 900,000 to 1,900,000 rupees, but are still far below even the diminished American total.

Although German shipments of machinery are increasing, the only serious competition Great Britain has in this field is from the United States. Our contemporary observes "with some satisfaction" that the imports from America have declined to a much greater extent than those from the United Kingdom. British electrical machinery sent to India increased from 7,100,000 to 7,400,000 rupees, while the Indian imports from the United States fell from 3,600,000 to 1,275,000 rupees. The imports of railway equipment and rolling stock for the three months fell from 650,000 to 450,000 rupees, of which latter figure Great Britain supplied 406,000 rupees.

In automobiles, however, American imports into India increased from 176 to 405 and those from Canada from 105 to 301, while British cars fell from 155 to 75. The total number of cars imported increased from 630 to 894. It is pointed out that the falling off of British, French and Italian cars may be traced to the 30 per cent import duty, which seriously affects the higher priced European product, to the advantage of some of the cheaper American models.

Refrigerator Cars in Japan

WASHINGTON, Oct. 10.—Among the measures adopted by the Japanese Government for the purpose of reducing the cost of living is the increasing of the number of refrigerator cars. It is proposed to provide 148 of these cars for Japanese railroads this year and 245 next year. This will prevent the deterioration of fish and other perishable commodities in transit, according to a report forwarded to the Department of Commerce, and it is thus expected to equalize their cost on the interior values. A great many other measures are proposed, including new plans of financing such as the discontinuance of the use of gold held abroad as reserve against note issues.

The Dominion Alloy Steel Corporation has acquired a tract of several acres just south of Sarnia, Ont., as a site for its steel plant projected several months ago. This land was part of an Indian reservation and the purchase price is given as around $300,000.

Strengthening Machine Tool Industry

Annual Meeting of Association Last Week at Lenox, Mass., Rounded Out Twenty Years of Activity—Now Taking on a Widened Scope

AN unusual meeting and one that left a deep impression that the position of the machine tool making industry is being steadily strengthened was held at Lenox, Mass., last week. It marked the rounding out of twenty years of existence of the National Machine Tool Builders' Association. The convention headquarters were in the Hotel Aspinwall. There were intimate extended contacts which helped to settle any misunderstandings that may have developed in the course of business competition in the interval between meetings. One outstanding fact was a general expression of satisfaction in the selection of a meeting place with its minimum of diverting influences, as compared with a city like New York. Thus questions of trade abuses, of alleged unethical practices, were not superficially covered as has sometimes been the case in earlier meetings. Instead the convention was notably a working one, which bore evidence of approval of the widened scope of the activities of the general manager. Noteworthy progress in the collection and dissemination by him of economic facts of different group interests has evidently been made, and several informal comments go to show that the machine tool manufacturer expects to get full value out of the increased dues which latterly obtain in the light it will give him of the trend in his own as well as in general business.



E. J. KEARNEY

President National Machine Tool Builders' Association

Another factor which helped to make the meeting intensive was the distribution of a list of what were called topics for round table discussion. Many of them came in for consideration at the regular sessions but they served in part for directing the discussions of some of the committee meetings. There were 13 administrative subjects included, covering accounting, ethics and statistics; 5 technical questions; 35 sales subjects, covering markets, methods, terms, abuses, etc.; and 5 on dealer problems. Part of the list is appended to this account, as indicating the broad interests of the convention as a whole.

The meeting began on Oct. 3 and came to adjournment on the evening of Oct. 5. Addresses were made by William A. Viall, Brown & Sharpe Mfg. Co., on "Self Respect of the Machine Tool Trade"; by O. B. Iles, president International Machine Tool Co., Indianapolis, on "Conditions that Create Unprofitable Prices," and by Joseph K. Schofield, chief of patent department, Niles, Bement, Pond Co., on "What Patents are Worth to the Machine Tool Industry." W. H. Rastall, chief of the machinery division of the Department of Foreign and Domestic Commerce of the Department of Commerce, Washington, outlined some of the ways in which there may be full co-operation between the machine tool trade and the Government.

August H. Tuechter, who is president of the Cincinnati Bickford Tool Co., completed his second year as president of the association. At the last session of the convention, he was the recipient of a number of complimentary remarks relating to his successful conduct of the office, and while some of these abounded in pleasantries, the underlying thought in every case showed a serious conviction that he had striven hard and well and his efforts were thoroughly appreciated. Informal between session remarks bore this out as well as a high degree of satisfaction for the contributions to the uplift of the industry being made by Ernest F. Du Brul, as general manager of the association.

It is generally understood there has been a considerable reduction in the number of association members. This is due in part to business reverses and to a withdrawal of companies whose business of making machine tools being not a major item was regarded as too secondary to warrant paying for the service now accorded membership. The participants at the Lenox convention were conspicuously those who have figured in other meetings and lend weight to the contention that the association has been strengthened through a larger percentage of active members than was formerly the case, especially in view of the business and economic service of the association's executive office, directed by Mr. Du Brul.

Officers Elected

Officers for the ensuing year were elected as follows, the convention selecting its board of directors and this in turn selecting the officers:

President, E. J. Kearney, secretary Kearney & Trecker Co., Milwaukee.

First vice-president, Winslow Blanchard, president Blanchard Machine Co., Boston.

Second vice-president, O. B. Iles, president International Machine Tool Co., Indianapolis.

Treasurer, James M. Heald, general manager Heald Machine Co., Worcester.

General manager, Ernest F. Du Brul, Cincinnati.

Other directors: August H. Tuechter, Frank N. MacLeod, president Abrasive Machine Co., Providence; Edward P. Welles, president Charles H. Besly & Co.; C. Wood Walter, vice-president Cincinnati Milling Machine Co.; Howard W. Dunbar, sales manager, Norton Co., Worcester.

President Tuechter's Address

President Tuechter in his address mentioned how on June 12, 1902, the National Machine Tool Builders' Association was organized by 17 lathe builders. The first annual convention was held on Oct. 14, 1902, "so that this convention marks the completion of our twentieth year as an organization. Of the 17 charter members only three have voluntarily resigned membership while continuing business. Three others have retired from the business and four gave up their membership through consolidations in which they have merged. This seems to me very good evidence that this association must have meant something in all these years to those charter members who started it and who have stayed with it ever since.

"I look back," he went on, "to the days of cut-throat competition that existed prior to the formation of this association, and I think of how much better things are to-day. All cut-throating, all unethical competition has not been removed by any means, for the strain of the last two years has revived some bad practices that we must seriously set about stamping out. I am encouraged by noting how much rarer we have found these bad practices than they ever were before in less severe depressions.

"Twenty years ago a printed price list was only the salesman's top limit in the vast majority of cases. To-day this is true in very few cases indeed. That is itself a tremendous advance, but we still must work to eliminate the abuse of discriminating prices in the few cases where it still exists or where a backslide took place in ethics. Deviations from one's published price list are

essentially unfair, and besides they hurt the very man who makes them. If you are quoted a confidential 5 per cent off a price list, you can never be certain that your competitor is not quoted a more confidential 10 per cent off. Any buyer buys with more confidence and respect from a seller whose price list means exactly what it says. Besides, this single price policy creates a good will and respect among competitors that is sure to improve competition.

"The whole automobile industry works on a basis of openly published prices and there is no reason why ours should not. Nothing leads to reprisal and cut-throating as much as giving secret discounts and rebates; nothing gives the unscrupulous buyer a strangle hold on sellers like the knowledge that an industry is shot through with such practices. On the other hand, nothing makes more for fair, honest, manly competition than openly announced prices that are not deviated from until replaced by other openly published prices."

He discussed the value of friendships formed within the association. "A single customer," he said, "is met only 'where is,' but a competitor is met everywhere. The bad opinion of a single customer affects us adversely only in proportion to the size of his individual trade, but the bad opinion of a competitor hurts us everywhere. To make a man a friend you must get to know him, and to know him you must meet him. You can meet your competitor under the best circumstances, on the common ground of mutual interest, where both are members of this association, he helping you and you helping him."

Case of Non-Members of the Association

He touched at length on the work of and results achieved by the association. Some members have resigned, he said, saying that the association costs too much. "Whether non-members realize it or not, this association is working for their interest as well as the interest of its members, and from that aspect it is unfair for them to have the members carry the non-members' share of the industry's load as well as their own. Of course we cannot expect all men to be far-sighted and realize the necessity of this work, so it remains for those who do realize its necessity to support this work and carry the 'White Man's Burden.' Only by education and demonstration can we hope to convert the others and get them to join with us in the work we must do for them as well as for ourselves.

"Some, members and non-members, may think that the things we are proposing to do are day dreams, but I can assure you that our general manager has not yet proposed any activity that he could not show to be in successful operation in some other association. Other industries have had more active associations than ours for many years. Our general manager has kept in touch with as many of these as possible. He does not lack knowledge of what is worth while, nor ability to carry out any good activities that any other association has.

Good Repute of the Association

"Essentially, every association is simply an information bureau. Nothing can be forced on members. They can merely be shown the facts and be asked to consider these facts in the management of their own business.

"Our association and its work has gained respect in other quarters. Secretary Hoover recently assigned a special agent to write a book on trade associations, to show business men what they could and should install in the way of proper association service, and what benefit such associations could and should be for the business men who support them. To get the information needed, this special agent consulted different association executives of long standing. Several of them told him by all means to get in touch with our general manager and to get his constructive ideas of what a trade association could and should do for its members. Letters on file say that our general manager's views were considered valuable contributions to the book. This shows that as time goes on our association gains in recognition and influence."

Mr. Tuechter devoted himself at some length also on the necessity of improving cost systems and the plans under way in that connection. "We are apt to think," he said, "that the excess capacity in our industry, which has loomed so large and so idle during the last two years, is wholly a result of the war activity, but this is only partly true. The machine tool industry has always needed a maximum capacity considerably in excess of its average demand, taken over a period of years." This is because the industry, he went on, naturally suffers as does the electrical industry from a "bad load factor."

"The electrical people," he pointed out, "have given this load factor serious attention, and the peak load consumers pay rates in proportion to the expense of carrying idle equipment. False bases for costs make false bases for prices. Too many of our industry use that method of dividing the total amount of expense incurred for a given period by the productive hours for that period, and calling the quotient their burden. This method has been sarcastically and truly described as a method of wasting money to give clerks simple exercises in long division to conceal costs. This method has some notable results to its discredit.

"Let us openly tell the world about the demand fluctuations this industry encounters and why its bad load factor necessarily increases a burden rate to a figure much higher than one in a more stable industry. Let us study these things ourselves and see that our customers recognize these costs as necessary parts of price, and we shall have no difficulty in getting fair prices for our product. Unless we study these things our customers will not be convinced that the facts really exist. The man who is ignorant of his true costs never has a firm basis for his price policy and can never command respect, either of his competitors or of his customers.

"In the cycle we are now entering our members should so well revise their cost systems as to prevent their repeating the errors of the past. Regional accountants' meetings every three months would do wonders in that particular, and the results of such meetings would repay their cost many fold. I ask our incoming board to consider well the advisability of such meetings.

Activities Respecting Amortization

"I need only mention the campaign made to stir up our members in the matter of amortization. Many of us had slept on our legal rights to claim large tax refunds on that account. As a result of that campaign, claims were filed in very large amounts. If the association were to have the interest at Liberty bond rates, on the amounts it will have saved its members in this matter alone, it would have an income considerably larger than it could spend with any show of reason."

In concluding, Mr. Tuechter dwelt on exposing and eliminating abuses and the problem of finance.

Patenting Machine Tool Parts Urged

In his address on the patent question, Joseph K. Schofield emphasized that machine tool builders do not regard the patent question of sufficient importance. Too often they seem to think that a new idea is too ovious and yet a patented device or a collection of patented devices in a given machine will secure the desired protection for the machine as a whole. He admitted that a machine is rarely new in its entirety. As it is there are about eight hundred patents on machine tools issued every week. Many of these doubtless have no good reason for being, as our many patent lawyers are not sufficiently familiar with machine tools to give the service desired to the machine tool builder. It remains, he urged, that too many machine tool builders fail to secure patent protection only to find that competitors have developed something uncomfortably close. It is largely when a given production involves a group of patents that the value of a given patent is shown. One of the obstacles a patent lawyer has to combat, he repeated, is the attitude of the machine tool manufacturers that the idea is of no great consequence. He emphasized, of course, that the manufacturer must always be alert to discover infringements. In his own work he is occupied part of the time to see if the developments of his own company are infringements or can be patented. Occasionally modifications can be

made to avoid an infringement. As yet he could see no definite improvement in patent office performance but admitted that probably it is too soon after the passage of the recent patent office bill. He pointed out the difficulty of patent searches in stating that there are between eight thousand and ten thousand patents on turning metal and probably nearly as many on grinding machines. His main contention was that the machine tool builders should adopt a definite patent policy.

In response to questions with regard to foreign patents, he said it was hard to see much value in the foreign patent. For one thing, it was difficult to watch for infringements. In Germany a violation must be claimed within six or seven years, while in England a protest against a patent grant must be made in the first few months after the application has been filed.

So far as machine tools are concerned, he felt that the holder of a patent was able to get very little in the way of damages. Instead his protection amounted to securing an injunction against manufacture of the same device by others. However, General Manager Du Brul mentioned cases in which the infringers had been forced to pay as damages all the profits on the machine, it then remaining for the infringers to prove that only part of the profits perhaps were due to the patent that was the subject of litigation. Mr. Schofield suggested there were very few such cases likely in the machine tool trade. He though a court of appeals, experienced in science and mechanics, would be a step in advance.

Co-operation with Department of Commerce

The committee to cooperate with the Department of Commerce announced through J. Wallace Carrel, vice-president Lodge & Shipley Machine Tool Co., Cincinnati, that the committee was shortly going to Washington to determine to what extent there could and should be cooperation between the association and the department. Mr. Rastall, in his address, emphasized the desire of the department to have put up to it the day-by-day problems of the industry, such as the matter of collections, information concerning commercial laws and patents, trademarks, copyrights, etc. He told of the intention of the department to collect a list of the dealers of the world and brought to the convention an extended compilation of the export figures for the leading manufacturing nations of the globe with the amount sent to each different importing country. Mr. Carrel expressed the thought that the machine tool builders are already informed as to the leading dealers and depended in part on trade papers for expanding export sales, but no expression was made as to the value which machine tool builders would place on the list.

Automobiles for Salesmen

One of the subjects submitted for round table talk had to do with the furnishing of automobiles for salesmen. One member said, on the basis of three years' experience, that it costs 8 to 9 cents per mile for general running charges and 6 cents for depreciation, and the total amounts to about 2½ per cent of the cost of selling. Another member put the cost of automobiles at 6½ cents a mile plus depreciation, using Ford automobiles in part, which were run up to 50,000 miles.

The proposed plan of one machine tool builder was explained at some length. It amounts to allowing a $1,500 car to each salesman. He is to be given 8 or 9 cents a mile, returning the mileage periodically for the distance in which the car has been used in business. Thirty per cent depreciation is allowed per year and the car is expected to last three years; at the end of the three years the salesman is to put up the remaining 10 per cent as chargeable to his own private use of the machine. The salesman may buy a more valuable car if he chooses, but is only allowed the 30 per cent depreciation annually on $1,500. The company expects that each car will be run about 10,000 miles per year and finds that four calls are possible in the ordinary case with the automobile as against one with dependence on railroad transportation.

To Establish with Dealers Standard Terms of Sale

Looking toward establishing standard terms of sale, such as 30 days net, the association voted that a committee should be appointed to meet with the association of machine tool dealers. The division of commissions for sales to scattered plants of a single company also came in for consideration. Such a company has often a central purchasing bureau and yet the sales may be effected in part by the agent at the plant of use as well as by the agent in the locality of the purchasing office.

In respect to the time studies that are often exacted in connection with a machine tool sale negotiation, it was the consensus of opinion that such time studies should be charged as engineering service whether or not the manufacturer succeeds in making the sale, the practice now being for the successful manufacturer to absorb the cost while the others have to bear the charge. Much complaint was made that railroad purchasing departments are not always observing the requests of the mechanical departments of the railroads in respect to machine tool specifications, but are buying chiefly for size desired without limiting themselves to the few definite machines requested in making the requisition.

Supplying Repair Parts

An active discussion followed the question of how long it is desirable to keep repair parts. The discussion did not crystallize into anything definite, but suggestions were made that repair parts should not be carried beyond 10 years after a machine is obsolete and possibly 5 years after the sale of a machine should be the limit, provided a machine tool builder desires to stand on such a limit. It was recognized that many are in a position to supply repair parts for a longer number of years. It was emphatically stated that caring for repair part orders in the manufacturing shop is expensive, and if a proper charge is made the buyer thinks he is being overcharged. One suggestion is that the buyer should have it shown to him that the making of repairs is special work and would have to be charged accordingly. One tool builder claimed that he was considering the developing of a repair department and while this will necessarily be carried at a loss, it will save the loss of good will. It was also suggested that a request for repairs should be sent to jobbing shops wherever possible, though before the war many machine users commonly attempted making their own repairs, but now have gotten out of the practice. One member stated that the cost of all repair parts of a given machine, if regarded as going into the assembly of a new machine, would give a cost twice that of the new machine. It is probable that a letter on the subject will be sent to the members to crystallize the views on the subject.

Some of the Topics Discussed

Among the topics for round table discussion submitted to the convention were the following:

What is a fair percentage of idleness to figure on in overhead costs due to depressions?

What are the prospective conditions of cost, labor, material, expense?

On what basis should the cost and selling price of repair parts be based?

Can a code of ethics be drawn to advantage?

Elimination of everything savoring of unfair competition.

Would it be well to exchange experience and information as to the men who are using unfair methods?

How can various statistics be used in guiding financial policies?

Are patents in the machine tool industry good?

Do you get sales departments to co-operate with the engineering departments on standardization?

What research work would it be well to undertake?

What standardization is common to various types of machines?

How far can we go in the elimination of unnecessary sizes?

What are the best prospective foreign markets at this time?

How can we secure complete information covering new developments in the machine tool line as made by leading European machine tool builders, and the specifications and prices thereof?

Does it pay to furnish automobiles for salesmen? Under what conditions are these furnished and what is cost of upkeep?

How can we raise the standard machine tool salesmanship?

What percentage of gross sales is best spent on salesmen's expense?

How prevalent is the demand for long time credits, and how [illegible]?

Can we establish a uniform basis of cash discounts and standard sales terms, i.e., time?

What would be considered fair credit and sales terms for special machinery sold direct to purchasers and machines sold through dealers?

What is the best method of handling matters of credit on extended terms?

What is a fair term of credit to be accorded to machine tool buyers?

Is there any abuse of standard 30-day terms by excessive credit extension?

How far is free engineering service abused? (Designs, time studies, data sheets, production studies, etc.).

How can the duplication of engineering work be avoided, that nowadays often involves more total expense than any possible profit to the one who gets the order?

How can the buyer be kept from unfairly working one competitor against the other?

Asking sales departments to create an unnatural demand for tools?

Has a liquidated damage clause stopped cancellations?

Attitude of some purchasers in attempting unwarranted pressure on machine tool builders?

Exchange the best arguments and develop methods of combating unfair practices of purchasers.

The buyer worries about the machine tool builder's cost of production, instead of figuring the utility of the machine to himself against the price asked.

How can we educate the buyer on value of machines to buy production, not pounds?

How long should we furnish repairs for old types of ma[illegible]?

What percentage of gross sales is best spent on direct mail advertising?

What percentage of gross sales is best to spend on journal advertising?

Is there any way to gage the efficiency of advertising expenditure?

Credit and sales information regarding dealers and agents.

How does present sales organization of the industry compare with pre-war conditions and how can we improve it?

What is fair practice when changing agents, as to taking back stock that is considered necessary to carry if the line is to be properly represented?

What is an equitable arrangement for division of commission between selling agents where purchases are made in one territory for shipment to another?

What provisions ought to be put in agency contracts?

What is a proper commission for agents?

How to get dealers to notify manufacturers of all pending deals and report progress made on same time to time?

Overstocking—especially on prices guaranteed against decline.

Pressure of dealers for cancellations.

Status of dealer contracts in view of recent court decisions.

What is a contract of agency and one of sale? Are exclusive sales contracts valid or binding?

TRADE ASSOCIATIONS

Attorney-General Daugherty Now in Favor of Closer Co-operation with Government

WASHINGTON, Oct. 10.—There should be some Government agency for the guidance of trade associations before which the associations could submit their plans of operations and receive Government verdict as to whether or not such proposed operations were legal or illegal under the anti-trust laws, according to a recent statement by Attorney-General Daugherty. This expression by the attorney general is directly in line with the position of Secretary of Commerce Hoover on the subject. Mr. Hoover has been of this opinion for months while Mr. Daugherty appears to have assumed a much more liberal attitude than he maintained formerly. This is apparent from reference to the lengthy correspondence on trade associations exchanged about one year ago between these two cabinet members. At that time the attorney general's position was interpreted as being that the Government could give no definite assurances to trade associations and that the activities of the latter would be subject to investigation and prosecution at all times.

"I am in favor of some plan that will prevent business being unduly disturbed," the attorney general said, "and some plan that will enable them to come and lay down their plans on the table and let somebody in the Government say that such plans do or do not conflict with the law, so that if they do not, they can be gone ahead with without fear of indictment. Such a system would stabilize the situation and do away with necessity for a lot of investigation and litigation. It would remove uncertainty and suspicion. There would be less sidestepping under it, and the general tendency would be to make parties interested more happy."

The Department of Commerce should have jurisdiction in the trade association matter, Mr. Daugherty said, in reply to a question. He added that the approval of the Department of Justice should also be had. Trade associations would then have some security, he said. The necessity for the Government seeking injunctions against some alleged activities of trade associations would be done away with, it was pointed out.

The attorney general believes that some benefit has been derived by industry and trade associations as a result of the exchange of correspondence between himself and Secretary Hoover, in which it was indicated, to an extent, what trade associations can do without violating the law. Mr. Daugherty thinks, however that there is still room for improvement. The Hardwood Lumber decision by the United States Supreme Court and other decisions have resulted in some clarification of the question as to how far a trade association can go, in the opinion of Mr. Daugherty, but some plan to simplify matters would help a great deal.

Secretary Hoover is said to believe that open price associations activities may be legal if the associations will announce prices for the benefit and information of the public. Under some circumstances, the Department of Commerce could co-operate with some such association, it is understood. Mr. Daugherty concedes that there is a possibility of co-operation between some associations and the Government in some respects, but he thinks the situation might be improved by certain additional legislation. He stated that he had recently conferred with Senator Edge of New Jersey regarding the plan of the latter for legislation dealing with the trade association problem; but he indicated a lack of definite information as to how the senator proposed to revise his bill.

At present prosecutions against some trade associations, including open price associations, are being held up, according to Mr. Daugherty, not as a result of the district court's decision against the Government in the Linseed Oil case, but because of the crowded condition of the dockets of some of the courts. The attorney general declined to name the suspended cases but intimated that some of them may be inaugurated when the courts shall have settled down to business after the summer recess.

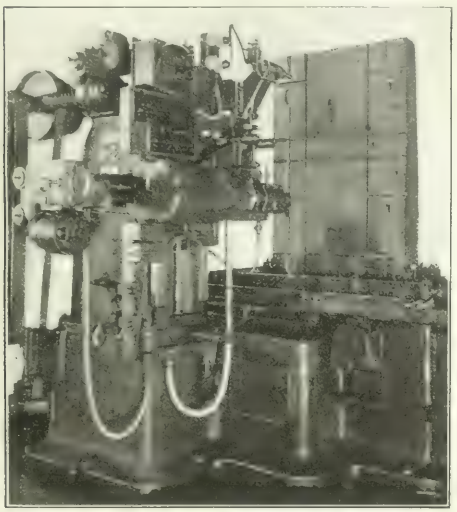
Domestic sales of oak leather belting reported by the Leather Belting Exchange show a total for August of 590,618 lb., valued at $967,433. This compares with 487,469 lb. in July, valued at $779,951, and with 340,500 lb. in August of last year, valued at $569,998. These figures indicate a slight increase in average price as compared with July, but a similar decrease from the average of August, 1921. They represent about 60 per cent of the total product.

The St. Louis Coke & Chemical Co. has begun the recovery of motor benzol at its plant at Granite City, Ill., having recently completed its benzol plant. The plant will take care of 7500 gallons daily. The output has been contracted for.

New Automatic Die Sinking Machine

The type F automatic die sinking machine shown in the accompanying illustration has been added to the line of the Keller Mechanical Engraving Co., 70 Washington Street, Brooklyn, N. Y. It is designed for work on forming, stamping, and forging dies, core boxes and pattern work requiring impressions up to 36 x 20 in., 8 in. deep, as a maximum.

The machine works from a master which may be either of plaster, cement, or wood. The control of the tracer is novel, only slight pressure being exerted against the master, all the pressure necessary being applied to the cutting tool. It is designed to combine tremendous cutting power with great accuracy in following and reproducing a pattern. The product is said to leave the machine in a condition requiring a minimum amount of hand work; most of the labor of fitting



The New Keller Automatic Machine Will Make Dies or Patterns Up to 20 x 36 In. in Size and 8 In. Deep from a Master of Plaster, Cement or Wood

having been eliminated. Even the allowance for stock thickness may be provided in the master or core box.

Setting up and operation are simple and the machine may be operated either automatically or semi-automatically. Control is by the single group of push buttons. Rectilinear motion in three dimensions is a feature. Automatic feeds both horizontal and vertical are provided and on the horizontal travel, quick returns in either direction is a feature. A contouring or profiling movement is also included by means of which a template or a ridge or groove or the side walls or cavity in the pattern may be followed.

The drive motor is of the variable speed type, ⅝ hp., and the cutter motor of 2 hp. capacity wound for 110 or 220 volts direct current. All moving parts of the machine are adequately provided with means for lubrication and cutter lubrication is by forced feed.

The table working surface is 53 x 22 in. The table has a horizontal travel of 36 in. and speeds of 1½ to 12 in. per min. are provided through rheostatic control and change gearing. The table also has horizontal feed per vertical stroke.

The vertical slide has a travel of 20 in., and the rate of feed is 0.10 in. to 0.83 in. per stroke, which can be increased if desired. Vertical travel for horizontal feed of 6 in. per min. is also provided. This slide is counterbalanced. The spindle head is carried on a wide vertical slide and has an in and out movement of 8 in. It is electrically controlled to follow the impression of the master. All moving slides have ample bearing surfaces and are provided with tapered gibs.

For following an outline template on one plane, a contouring attachment is provided which is similar to profiling. When this attachment is in use, the in and out movement may be made inoperative.

There is one slow and one high speed spindle. The spindle drive is by a separate motor direct connected with the lower cone pulley shaft on the rear side of the column. The upper cone pulley shaft carries the spindle driving pulley. Two spindle driving pulleys are provided, 4 and 6 in. in diameter, and interchangeable. The slow speed spindle pulley with the back gears are mounted as a unit on the spindle head. The high speed spindle is driven through a grooved pulley from the slow speed spindle pulley shaft. The ratio of back gearing is 3.724 to 1.

There are four speeds for slow speed spindles, from 80 to 216 r.p.m., backgeared, and from 298 to 808 with open belt. The speeds for the high speed spindles are from 894 to 2424, with open belt. These speeds are with a 4-in. driving pulley on the upper cone pulley shaft. With a 6 in. driving pulley on the upper cone pulley shaft the speeds are: Slow spindle, back geared 120 to 324 r.p.m., open belt, 447 to 1212 r.p.m. For the high speed spindles, open belt, the speeds are 1341 to 3636 r.p.m.

A feature is the control cabinet which is a separate unit connected to the machine by wiring in a flexible conduit. This cabinet contains the controlling equipment, which includes main switches, motor starters, reversing switches, relays, drum controller and motor generator set. The floor space occupied is 9 ft. x 8 ft. 1 in., and the height, about 6 ft. 8 in.

Less Red Lead in Pipe Joints Demanded

The National Association of Brass Manufacturers, at a meeting in Detroit, Sept. 8, voted in favor of action being taken to correct the present day evil in the practice of applying red and white lead and other such harmful products to the inside or so-called female threads of pipe fittings and other threaded joints in plumbing work. The result of this practice is believed to result in spreading throughout the water piping system a large amount of residue lead and other poisonous ingredients which contaminate the water for a time after installation, to the detriment of the public health.

The view was taken that this subject should be brought to the attention of master plumbers that they instruct their workmen to use only such amount of joint compound as is actually necessary and to be applied only to the male thread of fittings, etc. "As an aid to the efforts of master plumbers," the resolution adopted continued, "we believe this matter should be brought to the attention of public health boards and commissioners of public health, to secure a ruling in each and every community, by legislation if necessary, to have this harmful evil eradicated."

An Unusual Locomotive

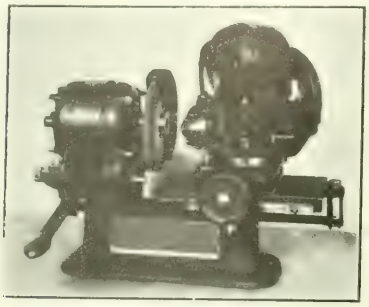
Much interest has been aroused by a new Michigan Central locomotive built by the Lima Locomotive Works for fast freight service. This engine is said to deliver more tractive power per ton of coal than any locomotive previously built. It has been in service for several months and has a record of having hauled a train from Toledo to Detroit which consisted of 147 cars, weighed 10,039 tons and was 1¼ miles long. The run of 47.6 miles was covered in 3 hr. 31 min., at the average speed of 13.54 mi. per hr., while the evaporation was 9.7 lb. of water per lb. of fuel.

Of the tractive effort of 74,500 lb., 11,000 lb. are provided by the booster. The locomotive weighs 334,000 lb.; the tender, with 10,000 gal. of water and 16 tons of coal, weighs 199,700 lb., making a total of 533,700 lb. for the unit. Cylinders of 28 in. diameter by 30 in. stroke provide 3070 hp. The boiler, 86 in. in diameter, is about 38 ft. long. Eight 63-in. driving wheels are used. It is understood that the performance of this locomotive has proved so satisfactory that the New York Central Railroad has placed orders for 150 duplicates of it, 75 with the Lima Locomotive Works and 75 with the American Locomotive Co.

Self-Contained Valve Grinder

The Van Norman Machine Tool Co., Springfield, Mass., has added to its line the machine illustrated, known as the Valvo, which is offered as a small self-contained machine for the grinding of engine valves and similar work.

In the new machine belts have been eliminated, and both the work head and wheel head have individual motors, as shown. The grinding wheel is mounted directly on the shaft of a ⅛ hp. ball-bearing motor which runs at 3450 r.p.m., this motor being rigidly attached to the base of the machine. The work-head spindle is driven by gearing from the motor, the whole work-head being carried on a movable slide operated by a convenient handle at the left. The valves are held by the stem in a split draw-in collet having a capacity up to ⅜-in. diameter. After the valve has been tightened and the work-head, which has graduations up to 80 deg., is set at the proper angle, the grinding is done by passing the valve across the face of the wheel, with



New Van Norman Grinding Machine

a back and forth movement of the handle at the left, while the work is fed into the abrasive wheel by the hand feed wheel at the right.

The machine is designed to take power from a lighting socket. An adjustable stop screw is provided for control when grinding on the face of the wheel and the intermediate gear between the work-head motor and spindle is of fibre to assure quiet running. The length of the machine is 20 in., and the width 15 in. The height is 16 in., and the weight 110 lb. The wheel is 6 in. x ⅜ in. The regular equipment includes one split chuck and a diamond with holder for truing wheel, re-seating reamer and one wheel, also a finger and holder for sharpening re-seating reamers.

To Safeguard Power Press Tools

Massachusetts is taking steps for safeguarding power press tools. A committee consisting of George E. Blake, secretary and superintendent Blake Mfg. Co., Boston; Edward Coffin, staff engineer Associated Industries of Massachusetts, Boston; Nathan M. Doen, mechanical superintendent General Electric Co., West Lynn; Henry F. Dyer, machinists' union, Boston; John W. Higgins, president and treasurer Worcester Pressed Steel Co.; Martin T. Joyce, secretary Massachusetts branch, A. F. of L., Boston; Lawrence Purtell, superintendent American Can Co., South Boston; George E. Sanford, president American Society of Safety Engineers, Lynn; Harry R. Sinclair, president Worcester Stamped Metal Co., Worcester; and Stephen E. Whiting, assistant chief engineer Liberty Mutual Insurance Co., Boston, last week held a hearing at the State House. The following recommendations for a tentative code in safeguarding the point of operation on power presses were given:

[illegible] the time of operation; if the speed of the press when running is more than 45 working strokes per minute, the stroke is less than 4 in. and the press is running continuously.

Second, that the power shall be off and press drive wheels shall be at rest while tools are being adjusted, except where the control allows the ram to be stopped at any point of the stroke.

Third, that no person shall render inoperative or fail to use any safety appliance which has been provided in accordance with section 1.

Safety appliances may be of the following types:

- Stationary guards.
- Movable guards of the sweep type, operating positively from the ram or shaft and not from the tripping mechanism.
- Movable guards of the gate type, closing in advance of the operation of the clutch.
- Mechanical means; such as chute, slide, dial, magazine or roll feeds.
- Double hand trips.
- Pliers or other hand implements.

Before adopting or rejecting the recommendations several hearings will be held in various sections of the State where power presses are operated. At the Boston hearing, no opposition was voiced.

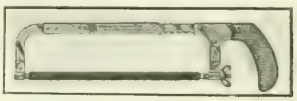
The Copper-Rich Aluminum Alloys

The structures of the alloys of copper with aluminum up to 20 per cent of aluminum have been investigated by D. Stockdale who used the thermal data supplied by a study of the cooling curves of the alloys and by quenching experiments in conjunction with microscopic examination in order to obtain the equilibrium diagram more exactly. In a paper before the (British) Institute of Metals, held in Swansea, Sept. 21, he discredits the opinion that the addition of small quantities of aluminum to pure copper raises the freezing point of that metal, and shows that the minimum in the liquidus curve at 1031 deg. Cent. (1888 deg. Fahr.) with 8.3 per cent of aluminum is a true eutectic point. A small arrest point at 1017 deg. Cent. with alloys containing between 16.5 and 18 per cent of aluminum has been discovered, but there is no indication of a minimum in the liquidus at about 16 per cent.

Copper at 1000 deg. Cent. (1832 deg. Fahr.) can hold only 7.4 per cent of aluminum in solid solution; at 500 deg. Cent. (932 deg. Fahr.) and at lower temperatures it can hold 9.8 per cent, although to obtain such an alloy a long annealing is required.

Hack Saw Frame with New Handle

A hack saw frame with a form of handle of hard wood designed to afford a comfortable grip has been brought out by the Consolidated Tool Works, Inc., 296



A Feature of the Hack Saw Frame Is the Position and Shape of the Handle

Broadway, New York. The blades are tightened by means of a winged nut which is located in the back so as not to cause an obstruction. The saw frame is known as the No. 40 and is of course adjustable for different lengths of blade.

Improvement in Leather Belting Business

The general improvement in the leather belting business is indicated by the report for the four weeks ending Sept. 9 of the Graton & Knight Mfg. Co., Worcester, Mass., which shows a profit for the period of $54,000, which is at the rate of $700,000 net profit per annum. The company divides its year into 13 four-week periods. In the first three periods of the year, business was at the rate of $600,000 a year net loss. Then the annual production was at the rate of $6,000,000 a year. In the last period reported production was at the rate of $10,000,000 a year. The tide turned with the arrival of summer. The first period of net profit was that ending Aug. 12, when the balance to the good was $32,000.

Problems in the Welding of Cast Iron

American Welding Society in a Meeting in Chicago Last Week Discussed Requirements of Various Welds Including Rail Joints

THE American Welding Society held its fall meeting in Chicago on Oct. 2 to 5, inclusive. The society is but three years old, whereas welding has been practiced commercially for twenty years. Despite its youth, however, the organization now has 600 members, with sections in nine leading industrial centers from Boston to San Francisco, and it already has established a number of standards accepted by the industrial world. Closely identified with the association is the American Bureau of Welding, organized about a year and a half ago, which is a joint advisory committee of the American Welding Society and the division of engineering of the National Research Council. It acts as the research department of the American Welding Society. Financial support of the bureau is assured by a gift to the National Research Council of $5,000,000 made by the Carnegie Corporation in December, 1919. The bureau aims to foster the improvement of welding methods, material and equipment, and to establish codes and standards. Eleven research committees are now working on specific problems. It is believed that research is most successful when it can call upon the joint efforts of scientist and engineer, practical man, manager, owner, worker and consumer. This coöperation and coördination the bureau has set out to promote.

The first two days of the sessions of the society were held in the rooms of the Western Society of Engineers in the Monadnock Block. On Monday, Oct. 2, W. J. Beck, chairman of the committee on specifications for steel to be welded, and director of research American Rolling Mill Co., Middletown, Ohio., read a progress report outlining the results of tests conducted under the direction of the committee, by the American Rolling Mill Co., the Westinghouse Electric & Mfg. Co., the General Electric Co. and the Union Carbide and Carbon Research Laboratories.

Activity of the Committees

On Tuesday morning, the electric-arc welding committee and the gas welding committee met jointly for the purpose of developing regional subsidiary committees in the Chicago district. This is in accordance with a regional plan of research developed by the American Bureau of Welding, which differs from the ordinary committee work in that the members of each regional committee live within a given locality and at no great distance from a common meeting place. The advantage of the plan is that it permits the holding of regular frequent meetings without unnecessary loss of time, it permits the sustained interest of members, as the frequency of meetings and their regularity do not allow time for the members to forget what happened at the previous meeting, it permits a particular investigation to be carried to a successful completion within a short time, and promotes interest in research in a particular locality at a minimum of cost. Such a regional committee, known as a sub-committee on the electric-arc welding of cast iron, was organized about a year ago under the auspices of the Northern New York Section of the American Welding Society. Members of the committee consist of representatives of the General Electric Co., the American Locomotive Co., West Albany shops of the New York Central Railroad, one or two foundries and Union College. Meetings are held fairly regularly at intervals of two weeks.

Welding of Cast Iron

In the afternoon session a joint report of the gas, electric and thermit welding research committees on the general properties of cast iron in so far as they affect weldability, was read. It was pointed out that cast iron differs widely in composition and characteristics. It always contains about three per cent of carbon, but this may be either in a combined graphitic state and it may hold widely varying amounts of other elements, such as silicon, manganese, sulphur and phosphorous. Not only the presence of these elements, but also the rate of cooling of the casting profoundly affect the physical characteristics and weldability of the metal.

In making a weld in commercial cast iron, the surfaces which are to be joined must again be melted. These surfaces consist of iron which contains carbon in both the free and combined states. When these surfaces are melted, several things happen. First both the graphitic and combined carbon go into solution in the molten metal. Second, some of the carbon, silicon and manganese is burned out by the heat, while the amounts of sulphur and phosphorus are practically unchanged. Silicon is most easily burned out, so the tendency is to produce cast iron in the weld that will be white when cold, owing to its low silicon and carbon content. Third, the surface of the molten metal oxidizes, making a slag, which in a measure prevents further oxidation. As soon as the welding heat is removed, the melted iron solidifies very quickly, owing to its proximity to the comparatively cold mass from which it has been melted and to its being exposed freely to the air. This sudden cooling causes a large amount of carbon to be retained in the combined state, resulting in a white, hard metal in the weld. Of course, if the casting has been pre-heated before welding, the cooling of the added metal will not be so sudden and a softer machinable weld may be secured. Experience has shown that the grade of cast iron which is most difficult to weld successfully is that which is soft and has an open grain. However, little difficulty is encountered when the metal is of comparatively thin section (½ in. or less).

When iron is molten or even red hot, it oxidizes very readily if exposed to air. In welding, the surface of the molten metal becomes covered with iron oxide, which may be deposited in the weld by mixing with the molten metal, or by being tapped between two layers of metal at different times. In either case the result will be a weak, non-homogeneous weld, for the oxide particles segregate and do not form a junction with the adjacent metal.

The shape of the castings also has an influence on the method of welding to be used. A casting comprising both light and heavy parts is subjected to more external stresses than one of homogeneous cross-sections. The stresses are caused by the different rates of cooling. light sections cooling more rapidly than heavy. There are also internal stresses set up at sharp angles.

When in the welding of cast iron, a filler metal of different composition than that of the casting is used, serious consideration must be given to the fact that the co-efficient of expansion and consequently the shrinkage of the metal in the weld may be different from that of the rest of the casting. The different shrinkages of the two metals will cause one to slide on the other as they pass from the liquid to the solid state. The shrinkage sets up internal strains which the ductility of the welding material must take care of. Altering the carbon content from the combined to the graphitic state helps increase the shrinkage. If the iron contains a weakening agent the internal strains set up by shrinkage often cause cracks to appear.

Acetylene for Cast Iron Welding

A progress report of the research committee on gas welding of cast iron was read by the chairman, S. W. Miller, Union Carbide & Carbon Research Laboratories. In the opinion of the committee, acetylene is

the best gas for welding because of its high flame temperature. Flame temperature, however, has no relation to the total heat given out by burning gas. This should be borne in mind so that the welder will not be confused by a common argument that because the welding gas has more total heat in it than acetylene, its flame temperature is higher. Acetylene, when burned in the presence of pure oxygen, gives the highest flame temperature, although the quantity of heat given off is no greater than for some other fuels. The oxy-acetylene flame in its practical application is very small and, therefore, the heat is applied in a small spot, rapidly raising it to the fusing point. This is of advantage during welding but may be a disadvantage by causing local strains at the melted part during cooling. These strains are specially dangerous in cast iron, which is weak and brittle, unless the part be reheated after welding to a uniform temperature all over, when the strains will be relieved, because cast iron will stretch a little when hot. Covering the piece with anything that will slow down the cooling will help because the strains will have more time to adjust themselves.

The average temperature of a casting as brought to the welder is about 70 deg. Fahr. The melting temperature of cast iron is about 2100 deg. Fahr., a difference of about 2030 deg. If the piece be preheated to only a dull red, its temperature will be about 1300 deg. Fehr., a difference of only 800 deg., which accounts for the good results from preheating.

The use of the oxy-acetylene flame for preheating is expensive even for small work, and for the sake of economy, other cheaper methods are used.

The greatest difficulty in cast-iron welding is to take care of the slow strains which occur during preheating, welding and cooling. Slow preheating, rapid welding followed by slow cooling, are the means to be employed, especially in restrained welds. In such welds, either strains or distortion can be prevented, at least for practical purposes, but it is not possible to avoid both. Strains, being dangerous, should always be avoided, even if some distortion is necessary. In concluding, the committee asserted that with thorough fusion, proper allowance for expansion and contraction, adequate preheating, slow cooling, use of proper welding rods and no more flux than necessary, the welding of cast iron is uniformly a success and produces a weld which is always stronger than the base metal and readily machinable.

Arc Welding of Cast Iron

A report on arc welding of cast iron was read by W. H. Namack, vice-president, Davison-Namack Foundry Co., Ballston Spa, N. Y., and chairman of the subcommittee on the electro-arc welding of cast iron of the Northern New York section. It was pointed out in this report that there are two fundamental methods of arc welding cast iron, first, by the carbon arc, and, second, by the metal arc. The latter may be divided into metal arc welding with studs and metal arc welding without studs.

The carbon arc process gives better results on heavy work than the metallic arc. The employment of steel studs with metallic arc welding is for the purpose of overcoming troubles due to shrinkage. The studs are screwed into the cast iron, the filler metal being welded to them. These studs pass through the brittle layer of iron at the weld and transfer the stresses to the mass of metal back of the weld. The report gives detailed descriptions of typical arc welding operations by the various methods, outlining the difficulties encountered and the degree of success thus far achieved.

A report on thermit welding of cast iron was read by J. H. Deppeler of the Metal & Thermit Corporation, who is chairman of the committee on thermit welding. He outlined researches which are being carried out by his company to improve the quality of thermit welds and to reduce their cost.

Co-operation with Electric Railroads

On Wednesday and Thursday the society held joint sessions with the American Electric Railway Engineering Association at the Municipal Pier. C. A. McCune, president of the society, outlined the purposes and scope of his organization and pointed out the manner in which the electric railway association might co-operate with his body to the mutual advantage of each. William Spraragen, secretary American Bureau of Welding, gave a history of the bureau, calling particular attention to its willingness to conduct research in fields of interest to the electric railroads. The co-operation which both speakers advocated, has already taken form through the membership of a representative of the railway engineering association on the welded rail joint committee of the American Welding Society. This member, E. M. T. Ryder, way engineer, Third Avenue Railway System, New York, who is also vice-chairman of the committee, addressed the joint session on welded rail joints. He pointed out that these joints had been in use since 1890, but that the electric railroad industry had not yet learned how to make joints that will last as long as the rail. For all types of welded rail joints, he asserted, present knowledge of physical, chemical and metallurgical problems involved is altogether inadequate. Neither the loads applied to the structure nor its powers of resistance are known. Little worth-while information has been assembled on the effect on the joints of rail wear, of the hammer blows of traffic, of temperature strains, of repeated bending, of corrosion, of time itself.

A paper by J. S. McWhirter, superintendent equipment and buildings, Third Avenue Railway System, New York, on "Welding for the Maintenance of 1600 Street Railway Cars" described the equipment and methods used in the shops of this company.

Copper and Brass in the Building Industry

Estimates by the Copper and Brass Research Association, 25 Broadway, New York, following a survey of the building situation, indicate that the 1922 consumption of copper, brass and bronze for building purposes will total 150,000,000 lb. This compares with estimates of 50,000,000 lb. in 1921, 54,000,000 lb. in 1920 and 77,000,000 lb. in 1919. It represents sheets, piping, hardware, lighting fixtures, wire, etc. In detail, the association estimated that the consumption will be approximately as follows:

Sheet metal work	68,000,000 lb.
Roofing	50,000,000 lb.
Plumbing	17,000,000 lb.
Electrical work	11,000,000 lb.
Hardware	4,000,000 lb.
Total	150,000,000 lb.

Consumption of copper and brass this year in buildings is the greatest of all time, particularly as building construction is breaking all records. It is estimated, however, that the potential market for copper and brass in this industry on the basis of 1922 building construction would be 650,000,000 lb., or more than four times the actual consumption.

Radical Union Men Win

Outvoting the conservatives almost four to one, radicals among the 1600 delegates attending the triennial convention of the United Brotherhood of Maintenance of Way Employees and Railway Shop Laborers at Detroit last Thursday adopted a resolution declaring for amalgamation into one huge body of all railroad labor unions in the United States.

Three separate resolutions of the same import, entirely unexpected save by their proponents, were offered and hotly debated and each was passed over the vigorous protest of the "conservative" element among the delegates, led by Edward F. Grable, president of the brotherhood.

Conservatives declared that the influence of Wm. Z. Foster, author of the little red book, the Syndicalist, who was present, predominated in the convention.

G. E. Stoltz, general engineer, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., will present a paper on "Improved Rolling Mill Practice Obtained by the Use of Direct Current Motors for Main Roll Drive," at a meeting of the Association of Iron and Steel Electrical Engineers, at the Hotel Chatham, Pittsburgh, Saturday evening, Oct. 14.

American Society for Steel Treating

Technical Papers, Symposiums and Exhibits at Fourth Annual Meeting in Detroit—Drop Forging Institute Holds Joint Meeting

AN unqualified success was the general verdict of those who attended the fourth annual convention and exhibition of the American Society for Steel Treating last week at Detroit, Oct. 2 to 7. The record made there by this society, only three years old, both in technical papers and in exhibits, insures it a place among the leading technical organizations in the country and stamps its annual meeting as one to be looked forward to and to be reckoned with. Both the convention and the exhibition, called this time an "international steel exposition," exceeded in scope and attendance the three previous affairs at Chicago, Philadelphia and Indianapolis in 1919, 1920 and 1921, respectively. The registered attendance of members only was about 1300 out of a total membership of a little over 3000. This is the first year that only membership attendance was recorded. An official estimate of those participating in all activities is 18,000 against 8000 to 9000 last year.

Uniting with the steel treaters was the first annual convention of the American Drop Forging Institute with which was also associated the Drop Forge Supply Association. Their registered attendance exceeded that of the recent meetings of the American Drop Forge Association, the older and parent organization.

The fourth floor of the spacious building of the General Motors Corporation afforded an ideal place for the technical sessions and the exposition, the former being held in close proximity to the latter. As for the city itself, Detroit probably contains in its automobile industries more extensive industrial applications of heat treatment than any other American city. Plant visitations were numerous and largely taken advantage of; they included both the Highland Park and River Rouge plants of the Ford Motor Co. and the plants of other large companies.

A new feature was the holding of regular sessions in Detroit of some of the committees and subcommittees of the American Society for Testing Materials.

Technical Sessions of the Steel Treaters

THE technical sessions of the steel treaters were not only well attended in most cases but, as contrasted with the Indianapolis meeting last year, there were fewer papers and almost no simultaneous sessions. As against nearly 75 papers scheduled on the program last year, this year the various sessions covered 20 to 25 papers, including several symposiums. The sessions were devoted to carburizing, heat-treating problems, tool steel, aircraft failures, with three practical round table discussions on heat treating and three symposiums on metallurgical education, on hardness testing and on research. Most of the papers were available in printed form, a commendable departure from previous conventions. The society's journal, *Transactions*, containing many of them, was distributed.

Session on Tool Steel

One of the most interesting sessions was devoted to tool steel. Five papers were presented during this session and, while considerable instructive information was brought out in the discussions, these were limited for lack of time with discussion of some of the papers omitted altogether. Charles N. Johnson, director of research Crucible Steel Co. of America, was chairman.

Breakdown Test of High-Speed Steels

The first paper on "Lathe Breakdown Tests of Some Modern High-Speed Tool Steels" was presented by H. J. French, physicist Bureau of Standards, Washington, with Jerome Strauss, chief chemist United States Naval Gun Factory, a joint author of this paper. This was an exhaustive report giving comparisons of the performance of modern high-speed tool steels in lathe breakdown tests, in which the endurance of tools was measured under definite working conditions, and also bringing out the limitations of this method when applied to the purchase of steel. The steels were classified according to chemical composition and this division was used in discussing the results obtained. Important features developed and conclusions drawn from the described tests were summarized as follows:

Breakdown tests in which tool endurance is determined under definite working conditions are not satisfactory as the basis for the purchase of high speed tool steels while competitive comparisons of brands of nearly similar performance are not justified, owing to the qualitative nature of this type of test. Relatively large differences may be ascertained with certainty providing sufficient tools are tested and averages of at least two grinds are used in interpreting results. In severe breakdown tests with roughing tools on 3 per cent nickel steel forgings in which high frictional temperatures were produced, it was found that the performance of commercial low tungsten—high vanadium and cobalt steels was superior to that of high tungsten—low vanadium type and special steels contained about ¼ per cent uranium or ¾ per cent molybdenum. The average power consumption was practically the same so that this factor need not be introduced in comparisons which may be made on the basis of endurance of the tools. The relatively poor endurance of high tungsten steel under superior working conditions was not observed in more moderate tests made on the same test log with equal cutting speed and depth of cut but with reduced feed, in which the frictional temperatures produced were not so high. In the latter tests the performance of cobalt steels was better than either the low or high tungsten steels. Hardness determinations and examination of fractures indicated that the various types of commercial high speed steel showed difference in behavior under heat treatment, and in physical properties which probably are of importance under moderate working conditions and might counterbalance steel advantage in performance. Changes in cutting speed more markedly affected the performance of steel containing cobalt or special elements, such as uranium or molybdenum, than that with the more basic types.

Discussion

Lantern slides of curves, photomicrographics and photographs were presented. The discussion of the paper led to a comparison of the Taylor and breakdown tests. Mr. French said his conclusions were based on the tests made and were not intended as general statements. In reply to questions he expressed the opinion that the pre-heating temperatures had no

effect on the cutting efficiency of the tools and that many of the tools were hardened in electric furnaces which had proved very satisfactory for this work. In his opinion cutting speed has a remarkable effect on the performance.

High-Speed Steel and Carbide Segregations

"Carbide Segregations in High-Speed Steel" was the subject of a paper by A. E. White, director of engineering research University of Michigan. He declared that since 1900 there has been no outstanding change in the composition of high-speed steel. The electric furnace and the crucible furnace share the honors in making the best steel and some, including the firm that introduced the electric furnace in this country, hold that the crucible process is superior to the electric furnace for the production of high-speed steel. In the opinion of the author, each process has a certain advantage. The troubles generally encountered in high-speed steel chargeable to the steel manufacturers are not due to the refining or melting methods employed, but rather to the conditions which take place in the cooling of the steel from the molten to the solid state. Certain of these defects are due to faulty practice on the part of the steel maker.

Photomicrographs were presented showing segregation and slag inclusions. The outstanding trouble of the high-speed steel chargeable to the mill, in the opinion of the author, is segregation of the carbides, and the elimination of this trouble is not in sight. As long as cooling methods are employed that allow segregations to take place, just so long will this trouble be found in high-speed steel, especially in the larger sizes.

The author declared that much of the segregation could be lessened and in some cases eliminated, provided the metal is reduced in cross-section sufficiently, but in many of the commercial sizes it is impossible to provide the required degree of reduction. The degree of segregation depends upon the initial casting temperature, rate of cooling, and the degree of reduction. These factors are appreciated by the mills and they are attempting to control them so as to get the minimum segregation. However, these efforts seem to be in the form of a palliative rather than a cure. He declared the time is ripe for experimental work in this field along lines somewhat more drastic than in the past, and especially worthy of consideration is the investigation of the effect of centrifugal casting on the elimination of segregation. The consumer has given little attention to these matters, his attention being from the complaintive rather than from the constructive side. The proper tool life is as much in the hands of the consumer as in the hands of the manufacturer or tool maker, depending upon proper lubrication, speed, rate of feeding, cutting edge, etc. In conclusion, the author said that very probably the next few years will bring about fundamental improvements in the manufacture of high-speed steel and he hoped that steel makers, tool makers and consumers would cooperate to bring about this improvement.

Discussion

During the discussion Mr. White remarked that much is heard of the superiority of European high-speed tool steel, but that Europe has not found a way to eliminate the excessive segregation. In his opinion the only way to eliminate this segregation is by making a very diligent inspection of the ingot.

Structure and Machining Tool Steel

A paper on "The Effect of Structure Upon the Machining of Tool Steel" was presented by J. V. Emmons, metallurgist Cleveland Twist Drill Co., Cleveland. The paper included observations made in the course of a study on the effect of the structure of tool steel upon various machine operations during a period of five years, and the writer said the accuracy of the conclusions had been confirmed by their successful application to commercial work during the preceding seven years. He declared that in the present age of quantity production low machining costs are essential to the success of many tool-making enterprises. The question of obtaining a suitable machined finish upon certain tools is often a deciding factor in the purchase of tool steel. Spoiled work, due to unsatisfactory machining, often causes appalling losses. The writer declared that, as a means of estimating the machinability of tool steel, a knowledge of the structure is as important as the knowledge of the hardness, but the study of both hardness and structure gives an index to the machinability of tool steel of surprising accuracy. The results of the series of experiments were embodied to show the detailed effect of the various microconstituents on the machinability of steel. Various machining operations were considered, including turning, milling, drilling, reaming and thread cutting.

General conclusions were drawn as to the most favorable structure for the various machine operations. In summing up the observations the writer stated that, when a single machine operation is to be performed upon tool steel and the quantity of steel involved justifies the expense, it is possible to select a most suitable structure with great exactness. When there are a number of different machining operations to be performed on the same steel, it is usually necessary to adopt a compromise structure which is fairly well suited to all operations. It will usually be found that the structure, which best satisfies the requirements of all the different operations, will be one of ferrite, spheroidized cementite and pearlite in which only a small per cent of lamellar pearlite remains.

Discussion

During the discussion it was brought out that tool steel that proves satisfactory in machinability in one plant often proves unsatisfactory in other plants.

B. H. DeLong, Carpenter Steel Co., in discussing the paper called attention to the fact that Mr. Emmons said a good word for lamellar pearlite in annealed carbon tool steel, although many users specify that the material must be free from this constituent. In his opinion, the paper would have had more value if details had been given of practices employed in each operation. He said that types of machines, tools used and speed at which metal is cut, and size of the steel are some of the factors that have a great influence upon the suitability of tool steel for a particular operation. Mr. DeLong declared that there is a wide difference of opinion among manufacturers as to the degree of hardness of steel that will result in the most economical production. Referring particularly to steel for taps, he said that one manufacturer required a maximum Brinell hardness of 160, and another of 200. Various limits between these two extremes are most often used. He pointed out that the requirements of the finished tool are the same but that, obviously, steel with a 160 Brinell hardness could not have the same structure as steel with a 200 Brinell hardness. He also referred to specifications of buyers of annealed chromium steel for ball bearing races. One customer specifies a maximum Brinell hardness of 170, another of 160 to 180, and another of 180 to 200. He agreed with Mr. Emmons that, where the quantity of steel justifies the expense, it is possible to select a most suitable structure for any operation with great exactness. However, he declared that a suitable structure and hardness for the same type of machining will vary greatly in different shops. Care should, therefore, be taken not to generalize from results secured in one investigation.

A. H. d'Arcambal, metallurgist Pratt & Whitney

Co., Hartford, Conn., said he wished to confirm the statement frequently made that tool steel of a certain Brinell hardness and microstructure is found ideal for machining in one plant and gives trouble in others making the same class of tools. Referring to the statement of Mr. Emmons that steel coming within the range of 160 to 185 Brinell hardness is difficult to machine, Mr. d'Arcambal declared that experiments conducted by his company showed a steel of that hardness is best for threading, fluting, etc., and that at the Pratt & Whitney plant they machined a great deal of steel within these Brinell limits and experienced no difficulty in machining ability. His remarks referred to a steel annealed by the mill after the cogging operation. He declared that the finishing temperature the steel has received at the mill also has a great effect upon the resultant microstructure of the annealed material.

Rock Drill Steel

N. B. Hoffman, metallurgist Colonial Steel Co., Pittsburgh, presented a paper on "A Metallographic Study of a Rock Drill Steel as Influenced by the Methods of Manufacture." He explained that in the manufacture of drill steel the most general and most satisfactory method is to drill a hole longitudinally through the center of the bar or billet. The hole is filled with a refractory material and both ends plugged. The steel is then rolled to size and when cold the ends are cropped and the refractory material removed. Until two years ago practically all rock drill was made of carbon steel, the alloys being neglected. However, he said the demand for production and the increase in size of pneumatic drilling machines caused a demand for a better quality of steel—one that would withstand the impact and, at the same time, retain a cutting edge, and a tool with a tough steel body with high fatigue values and a hard and tough point when forged and hardened. Such a steel must be one that any smith could easily forge and must be moderate in price.

The speaker said that various alloys had been tried in developing such a product, but he believed without result, due largely to the complexity of heat treating. A composition that has given excellent results so far has been a vanadium steel. Data showed that most of the breaks in rock drill occur in the early life of the steel, which seemed to indicate that the cause of the breaking of drill steel is usually traceable to faulty manufacturing, resulting from defects in the bore such as slags, oxides, etc. In his opinion, fatigue to withstand vibratory shocks and stresses is vital to the production of a successful rock drill steel. While feeling that breakage results from other causes, he held that a steel of high fatigue value would last longer than one with low fatigue value. He pointed out that fatigue tests have shown that vanadium steel has a life three times as long as plain carbon steel and that tests of actual drilling operations have shown that vanadium steel has fatigue values at least 50 per cent greater than carbon steel, or at least the breakage is reduced 50 per cent. While more carbon than alloy rock steel is used, he believed that before long the conditions would be reversed.

"The Deterioration of Steel and Wrought Iron Pipe in Hot Gaseous Ammonia" was discussed by J. S. Vanick, Bureau of Standards, Washington, D. C.

Session on Heat-Treating Problems

General heat-treating problems were discussed during the Wednesday forenoon session, which was presided over by J. Fletcher Harper, research engineer Allis Chalmers Mfg. Co., West Allis, Wis.

Heat Treating in Lead

A paper on "Heat Treating in Lead" was presented by R. B. Schenck, metallurgist Buick Motor Car Co., Flint, Mich. An abstract of Mr. Schenck's paper follows:

[illegible] molten lead is not an ideal heating medium, it is the only [illegible] and in comparison with the salts in commercial use as bath material it has a wider range of working temperatures and a much higher heat conductivity. These two properties permit the use of lead in units of large capacity for temperatures of 650 to 1700 deg. Fahr., thus covering the hardening and tempering ranges of most commercial steels.

The selection of materials for pots, the design of pots and brickwork, and the method of firing, must receive considerable attention to insure efficient operation. While some parts cannot be treated efficiently in lead, others can be handled very successfully. Axle shafts, transmission gears and various small parts are being hardened from lead pots, and a greater number are being tempered in lead. The greatest range of usefulness for a lead furnace is for tempering operations and many parts can be tempered in lead which cannot be efficiently quenched from this type of furnace. Comparing operating cost, the oven furnace is cheaper than the lead pot for hardening, but for tempering the costs are in favor of the lead pot. Taking everything into consideration, the greatest advantage of the lead pot is the high quality of the treated product resulting from uniform and accurate temperatures. It is difficult, if not impossible, with an oven furnace to obtain the degree of uniformity which exists throughout the lead pot. Experience has convinced the writer that when conditions permit its use, the lead pot can produce better work than any other form of heating unit.

In reply to questions, Mr. Schenck stated that caustic soda does not prove satisfactory as a protective covering. For some work he regarded cast steel pots as the more economical and for other work alloy steel pots. The most successful use of the alloy pots is for high temperature and large production work.

Furnace Atmospheres and Scale

A paper on "Furnace Atmospheres and Their Relation to Formation of Scale" by G. C. McCormick, assistant metallurgist Crompton & Knowles Loom Works, Worcester, Mass., was read by V. E. Hillman, metallurgist of that company. The paper included experimental data and procedure during the investigation of the scaling activity of oxidizing, neutral and reducing temperatures during the heat treatment of steel. The scale that was formed on low, medium and high carbon steels when heated to various temperatures and under varying conditions of furnace atmospheres, has been determined quantitively. Data obtained led to the conclusion that under certain conditions, oxidizing, neutral and reducing atmospheres permit the formation of scale. In an atmosphere containing 20 per cent of oxygen little or no scale forms on steel exposed to a temperature of 1200 deg. Fahr., for one hour. In straight carbon steel heated under identical conditions the quantity of scale formed varies inversely with the carbon content of the metal. The formation of scale becomes appreciable at 1200 deg. Fahr., in atmospheres containing 20 per cent oxygen and from that point increases rapidly. At 1600 deg. the scale formed is excessive. The neutral atmosphere, because of the carbon dioxide and water vapor which it contains, is active in the formation of scale. Steel may be heated in a mixture of carbon dioxide and illuminating gas without formation of scale, such gaseous mixture being described as non-scaling. Reducing atmospheres found under actual operating conditions permit the formation of scale when the temperature is of sufficient intensity and when the time of heating is of adequate duration. Pieces of steel may be heated for a short time in reducing atmospheres without the formation of appreciable quantities of scale.

Discussion

During the discussion the statement was brought out that in a Waterbury, Conn., plant high carbon steel is being heated practically without scale in a

furnace using artificial gas properly mixed with air, the supply being regulated with control valves.

Electric Furnaces for Steel Treating

"The Selection of Electric Furnaces for Steel Treating" was discussed by C. L. Ipsen, designing engineer Industrial Heating Dept., General Electric Co. He referred to the rapid increase in the use of electric furnaces and stated that for the past two or three years these furnaces have been built that withstand large scale production rather better than fuel fired furnaces. However, it still remains to prove or disprove the theory of the operating costs. Actual operation of the furnace showed the fallacy of putting too much emphasis on the B.t.u.'s. There are other considerations such as improved working conditions, reduction of labor, better product, lower rejections and lower cost of subsequent operations that outweigh the difference in fuel cost.

The speaker pointed out that electric furnaces are now available in almost every form to suit the varied requirements of the heat-treating field. The develop-fired furnaces. However, it still remains to prove or fired furnaces can be changed over to electricity, and one advantage of the electric furnace is, because of the absence of noise, waste heat and fumes, it can be located in the line of production instead of being restricted to a furnace room. He pointed out that this resulted in an actual saving and that this feature opened for the electric furnace a large future for small units of the automatic or semi-automatic type placed in the machine shop in the path of production. The author referred to various furnace installations of the direct type or open resistor type, showing lantern slides of photographs. These included furnaces for heating tools and dies, a car type furnace for annealing heat steel punchings, a car type furnace for annealing large gray iron castings, the compensation type for annealing cast iron, a furnace with a rotary hearth for heating small parts, a large furnace of this type and the pusher type furnace. He claimed that the operation of furnaces of the rotary type has resulted in large savings, due to the reduction of scale and warping, and that savings in subsequent operations alone had saved two or three times the total cost of electricity. The writer declared that the saving in handling charges alone in the tunnel type furnace will in many cases more than cover the cost of electricity.

Chrome-Vanadium Steels

"Thermal Transformation of Some Chrome Vanadium Steel" was discussed by G. S. Vanick, Bureau of Standards, Washington. The paper described the effect upon the thermal transformations of varying the carbon, vanadium and chromium contents of a typical chrome-vanadium steel. Transformations upon heating and upon cooling, and the relation between transformations, hardness and structure were discussed.

Session on Carburizing

The first technical session of the convention was held on Tuesday morning, Oct. 3, and was devoted to carburizing topics. Three papers were scheduled and Prof. H. M. Boylston, Case School of Applied Sciences, Cleveland, was chairman. Discussion of the papers was only general and somewhat haphazard.

Carburizing and Decarburizing

The session was introduced by a paper by H. B. Knowlton, instructor in metallography and heat treating, Milwaukee Vocational School, Milwaukee, on "Carburizing and Decarburizing in Case Hardening." The author discussed some of the carburizing and decarburizing factors which determine the success or failure of the case-hardening method in commercial practice. Primarily, successful case hardening must produce cases of the proper depth, the use of test bars, rather than thermocouples placed in the muffle of the furnace being advocated. Thermocouples in the furnace indicate the temperature of the gases only, which is affected by the temperature of the lining and the charge. The temperature of the lining of the furnace and the ratio of the weight of the charge to the weight of the lining are important factors determining the speed of heating. Pyrometers might fail to record the difference in speed of heating in a furnace where pots of different size were used while by using several test pieces the depth of case may be determined by withdrawing one of the test pieces and fracturing. The heat may be run longer if necessary until the test pieces show the desired depth of case. By means of photomicrographs it was shown that within reasonable limits it may be safely said that the depth of case on a small test piece may be taken as a criterion for judging the depth of case on the work in the same pot or box, providing the analysis of the steel is uniform, alloys affecting the speed of carburization. These supplementary experiments contrast the general objection to the test piece method on the premise that thin test pieces case deeper than larger and differently shaped pieces.

The carbon content of the case which is one of the most important factors was treated, in this paper, by using solid carburizers, which is the most common form of carburization. The amount of carbon at the surface will be affected by kind of carburizing material used, the temperature, the pressure, the method of packing, the speed of cooling, and sometimes the shape of the piece carburized. The use of the microscope in determining the carbon content rather than the scleroscope and file test is favored by the author. Referring to Giolitti's statement that "All other conditions being equal, the concentration of carbon in the cemented zone increases when the quantity of pure carbon-monoxide which comes in contact with unit surface of the steel during cementation increases," the author showed by photomicrographs of tests the good effects of selecting carburizing materials that would increase the amount of carbon-monoxide given off. Uniformity of mixture in carburizing compound is necessary for uniformity of results. Decarburization, a deterring factor in all case hardening, is best controlled by the use of strong carburizing materials and well sealed containers. Pieces should be placed in the pots well below the top of the carburizing material. Placing them so that they do not become uncovered during the heat is not sufficient.

Irregularities in Case Hardening

E. W. Ehn, metallurgist, Timken Roller Bearing Co., Canton, Ohio, in presenting his paper entitled "Irregularities in Case-Hardened Work Caused by Improperly Made Steel," emphasized the fact that this treatise was a summary of results obtained in research work in the Timken laboratories during the last few years, and that he had drawn freely on his previous papers which have been published adding the results of a few new experiences. He said in part:

"The quality of steel when made has a very material influence on the results obtained in carburizing and hardening, and it is necessary to have carefully made and deoxidized steel to secure successful results. Soft spots, shallow cases and uneven carbon penetration are caused by abnormal steel. Steel of the following composition was taken as standard plain carbon steel for experimental work in connection with this paper:

	Per Cent		Per Cent
Carbon	0.15 to 0.20	Phosphorus	Below 0.04
Manganese	0.30 to 0.60	Sulphur	Below 0.04
		Silicon	0.15 to 0.20

Some steels within this analysis are entirely unsuited for carburized parts and very careful checking is necessary to prevent losses. The variation of structure of a carburized piece gives a direct indication whether the steel is suitable for carburizing or not.

"Failures on heat treating have been traced back through the different stages of conversion of the steel and it has been determined that the carburizing and hardening qualities of the steel were inherent in the ingot itself, and remained unchanged in any way during the course of manufacture. Soft spots in case-

hardened steel were always combined with a special fine grained structure in the carburized parts. The author refers to steels which on hardening in water acquire a uniformly hard mortensite case as normal and steels giving soft spots as abnormal. Photomicrographs showed the successive phases from normal to abnormal steel.

"Carburizing on a laboratory scale with microscopical examinations is necessary to safeguard results and more than one specimen must be taken from each lot of steel. Tight fitting containers are imperative for successful laboratory work. The variation in carburizing properties is caused by oxides uniformly distributed in solid solution in the steel which have influenced the solidification of the steel in the ingot and later obstruct the grain growth action. These oxides likewise are starting points for soft spots. The results obtained in heat treatment of all kinds of steels, notably high and medium carbon, are influenced by the presence of oxides in the steel. Failures may be reduced, especially in hardening by carburizing and a microscopical examination of the structures obtained."

Case Hardening

A. H. d'Arcambal, metallurgist Pratt & Whitney Co., Hartford, Conn., in presenting his paper, entitled "Case Hardening," stated that his dominant idea was to promote discussion and experimental work in connection with impact testing in the second part of his discussion. The first part of this paper was a study of the chemical reactions taking place in the cyanide process of case hardening, the results of tests conducted on samples of plain carbon case-hardening steels giving the following information:

1. The cyanide treatment both carburizes and nitrogenizes steels; the absorbed nitrogen producing hardness, the carbon being too low to produce file hardness. Since it is claimed that nitrogen causes greater brittleness in higher carbon steels than in steels of low carbon content, the cyanide bath loses its value in the reheating of carburized specimens or as a heating medium for carbon tool steels.

2. The amount of carbon and nitrogen absorbed depends directly on the time and temperature.

3. Nitrogen and hydrogen become concentrated in the first 0.005 in. layer removed from the outside diameter.

4. Nitrogen penetrates the material throughout the cross section.

5. Nitrogen appears as nitride needles near the breaking off point of the case and in the concentrated area as pearlite.

6. The time at temperature does not increase the depth of case but produces a greater concentration of carbon and nitrogen near the outside surface.

The value of impact testing was enhanced during the war period when it was found advisable to include specifications for impact values for aviation motor parts subject to severe stresses, such as crankshafts and connecting rods, said the author. The quality of steel cannot safely be judged from its impact value alone as its static tensile properties, torsional strength, shearing strength and other physical properties must be considered in order to correctly classify the material. Due to its lower hardness, plain carbon steel will show a higher impact reading than an alloy steel. When heat treatment is applied to the carbon steel the reverse is true. Static tensile properties do not determine the impact value of a steel as the impact test is a dynamic one while usual tensile tests are of a static nature. Actual impact tests on heat treated alloy steel forgings have caused rejections even where the tensile properties came well within the specified limits and severe tests substantiated the impact values. In these cases fractures obtained on the tensile test showed fine grained structures but the impact fractures possessed a fairly coarse grained structure.

The results of izod tests, conducted on plain carbon and alloy case-hardening steels, carburized and double treated, were discussed by the author. All of the alloy steels registered lower impact readings after carburizing and single quenching for case refinement only as compared to the specimens double treated after carburizing. Core fractures on the single treated specimens showed a coarse grained structure as compared with the fine grained structures on the double treated specimens.

Discussion

The discussion of Mr. d'Arcambal's paper brought out the fact that it was the consensus of opinion that impact testing has its limitations and is not fully adapted to working conditions on all grades of materials, and that it is necessary at the present time to treat it as a comparative test. It was evident that the author opened an avenue for much thought and research work in connection with establishing more accurate values in impact testing.

The Three Symposiums

Three symposiums were conducted on various days on hardness testing, research and metallurgical education.

Hardness Testing

One of the most interesting and important of the three symposiums was that on hardness, which was held Friday morning, Oct. 6. It was presided over by Maj. A. E. Bellis, president Bellis Heat Treating Co., New Haven, Conn. The symposium was held under the direction of the hardness testing committee of the National Research Council. Besides a statement of the object of the committee by the chairman, two papers were scheduled, one entitled "Significance of Hardness Tests" by Dr. H. P. Hollnagel, General Electric Co., Schenectady, N. Y., and the other "Hardness and Its Relation to Magnetic Properties" by Prof. R. S. Williams, Oberlin College, Oberlin, Ohio. Only Dr. Hollnagel's paper was presented, following the introductory remarks by Major Bellis.

Dr. Hollnagel's paper was a general discussion of the significance of hardness testing and of the various methods at present in use. He called attention to the great diversity of viewpoints as to the term hardness, and pointed to the sharp difference of opinion between the microscopist and macroscopist. He said there were two classes of hardness, superficial and penetration. Discussing the various methods for determining hardness, he designated them as falling under the classification: Scratch, resistance to wear, re-bound, bending, penetration, deformation and impact. After discussing these somewhat in detail, Dr. Hollnagel was emphatic in the statement that he believed the time element in all of them was one of the most important. He felt that there was not enough agreement in all of these methods of hardness testing and that new specifications were needed and possibly a study of the subject which should result in the perfection of a machine applicable to all conditions. At least he thought that an expression of opinion from the society on this suggestion would be most valuable.

A general running discussion of this paper followed its presentation, participated in by E. E. Thum, James J. Carron, A. L. Davis, A. D. Flinn and others. Various opinions for and against some of the present apparatus were expressed, but the consensus of the opinions did not seem favorable to the possibility of more definite correlation of machines, though a more serious attempt to correlate results was recommended.

Research Symposium

A year ago, at the Indianapolis convention, the directors placed upon the program for the first time a symposium on research. This year the second session on this subject was the concluding one of the convention Friday afternoon, Oct. 6. Four speakers, who are regarded authorities on the subject, contributed valuable papers as follows: "Research for Engineering Societies" by A. D. Flinn, chairman division of engineering, National Research Council, New York; "Government Research" by W. M. Corse, vice chairman division of engineering extension, National Research Council, Washington; "Some Fundamentals of Research" by F. O. Clements, division of research, General Motors Corporation, Dayton, Ohio, and "The Executive and Research" by Dr. John A. Mathews, president Crucible Steel Co. of America, New York. The chairman was Col. A. E. White, University of Michigan.

abstract of these important papers. They will, however, be printed in full later in the *Transactions* of the society. Mr. Corse discussed the various research activities of the Federal Government and the various states, and Mr. Flinn gave a broad résumé of the organization and work of the Engineering Foundation and the National Research Council. He announced that three additional societies had just been admitted to membership in the division of engineering of the National Research Council. They include the American Society for Steel Treating, the American Railway Engineering Association, and the American Institute of Architects.

Dr. Mathews introduced his paper with the statement that "the popular conception of research is a misconception." He pictured the executive as between an upper and nether millstone—the avaricious stockholders and the more avaricious employees, the one demanding more profits and lower costs and the other more money and less production. "How can a man in that position satisfy everyone without the aid of research—not research of the narrower sort from a special laboratory or special group of men, but research in its broadest aspect as affecting every operation, process and product participated in by technicians, foremen and superintendents and not infrequently by alert workmen." Commercial research has, in his opinion, for its principal purpose the increasing of profits. "More and more the executive is being chosen from the ranks of the engineering profession and the difficulty of securing appreciation of research is lessening."

The third symposium was devoted to metallurgical education and was held Tuesday afternoon. The chairman was Prof. S. L. Goodale, University of Pittsburgh.

Failures in Aircraft Parts

A brief but interesting session on failures in aircraft parts was held Wednesday afternoon, Oct. 4, presided over by Arthur W. F. Greene, chief chemist John Illingsworth Steel Co., Philadelphia. At this meeting a paper entitled, "Study of Some Failures in Aircraft Plane and Engine Parts" by J. B. Johnson and Samuel Daniels, was to have been presented but in the absence of the authors was read merely by title. The paper is based on several investigations of breakages, which have occurred under service conditions. The meeting resolved itself into the discussion of four questions of general interest in this field. One was: does macro or microstructure of fatigue failures reveal any data as to the time the failure has been going on? In the opinion of the several persons who discussed this briefly, the general answer was in the negative. The second question was whether the apparent grain size varies with the load applied or the fatigue strength of the metal, and the third question was: does a banded fatigue fracture indicate the interruption in the growth of a crack? The fourth question was: whether it is possible to distinguish between fatigue failure in a ductile metal and a sudden failure in a metal which is brittle? Several speakers, in discussing the last question, believed that a difference in structure would be a basis for distinguishing between the two kinds of failure.

Round Table Discussions

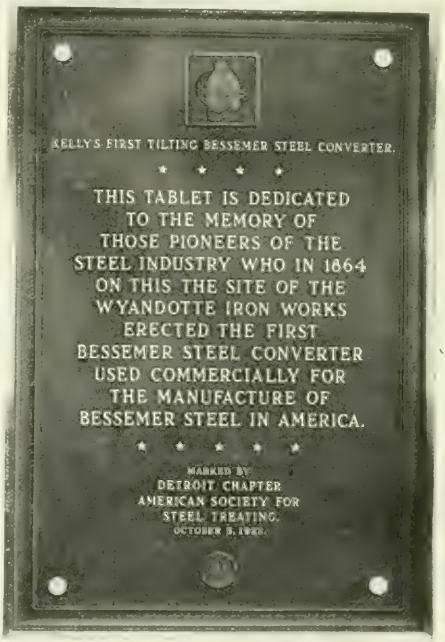
Three different informal sessions were devoted to practical round table discussions on heat treating, held late in the afternoon of the first three days, Oct. 3, 4 and 5.

The practical round table discussion on heat treating held Tuesday afternoon was presided over by H. J. Lawson and was well attended. Mr. Lawson termed the meeting as one of "experience" and urged any of the attending members to offer any problems they had for solution. Practical problems from shop practice were submitted, developing spirited discussion.

A second round table discussion on heat treating was presided over by John J. Halbing, assistant superintendent heat treating, Ingersoll-Rand Co., Phillipsburg, N. J., C. U. Scott, Rock Island, Ill., presented a brief paper on "Using the Critical Point as a Guide in Determining the Hardening Heat," taking the stand that the critical point cannot be depended upon for that purpose because it changes. He held that if it is necessary to start from some point, a point that does not change such as a non-magnetic point should be used. The paper brought out considerable discussion, particularly between Mr. Scott and Mr. Halbing, the latter taking issue with the former's contention.

Memorial Tablet to the First Converter

One of the interesting special features of a historical nature was the dedication at Wyandotte, Mich., of a bronze tablet to the memory of William Kelly, iron master and scientist, who is credited with being the first and the original producer of steel in a pneumatic converter in the United States. The tablet was erected by the Detroit chapter of the American Society for Steel Treating. It has been placed on the outside wall of the public library at Wyandotte, which stands on the site of the Wyandotte Iron Works where in 1864



Kelly's first tilting converter operated. The dedication took place on Thursday afternoon, Oct. 5. The occasion was made a general holiday for the town, and on the speaker's stand were several white-haired citizens of Wyandotte, the last of the workmen who worked in the old mill where Kelly made his steel. Capt. Robert W. Hunt, of Chicago, was one of the speakers, who told of the old days and their failures and discouragements, as well as hopes and successes. Col. A. E. White, director of engineering research, University of Michigan, made the dedicatory address, followed by the unveiling of the tablet. At this point in the program, William C. Kelly, Charleston, W. Va., son of William Kelly, was presented to the audience, and he made a somewhat sensational speech regarding the early history of the process and the relations to it of Sir Henry Bessemer.

The Annual Banquet

The annual banquet was the largest in the history of the society and was attended by 650 to 700 members and guests. It was held Thursday evening in the ball room of the Hotel Statler. The American Drop Forging Institute and the Drop Forge Supply Association united with the steel treaters on this occasion, and at the speaker's table there were seated the officers and directors, past, present and incoming, of both societies, as

well as the principal speakers. William C. Kelly, son of William Kelly of pneumatic converter fame, was present, as was also C. L. Warwick, secretary of the American Society for Testing Materials.

The chairman of the evening was Frank P. Gilligan, retiring president of the American Society for Steel Treating, who introduced Charles T. Bragg, president Michigan Valve & Foundry Co., Detroit, as toastmaster. James Couzens, mayor of Detroit, made a brief introductory speech of welcome, followed by Frank H. Alfred, president Pere Marquette Railway Co., who discussed the present condition of American railroads and strongly condemned the amount of regulation to which they are at present subjected, emphasizing the fact that no private corporation could succeed if limited as to its profits and regulated as to the wages of its employees. A masterly address was delivered by Marion L. Burton, president University of Michigan, who, after telling several anecdotes and drawing several word pictures, discussed the topic, "That Mind of Yours," in which he forcibly presented the mind of man as the most important factor in his success, and consequently in the success of a nation and in the salvation of the world.

At this banquet the secretary of the national society, W. H. Eisenman, presented to the retiring president, F. P. Gilligan, a gold watch and chain. Certificates of founder membership were also bestowed by Col. A. E. White, past president of the steel treaters and member of the board of directors, upon T. E. Barker, superintendent Denver Rock Drill & Mfg. Co., and former vice-president of the American Society for Steel Treating and upon W. B. Woodside, supervisor of mills, Studebaker Corporation, Detroit, and general chairman of the Detroit convention committee. This action was taken because of the activity of these two men, the former in the founding, three years ago, of the small organization in Chicago which resulted in the formation of the American Steel Treaters Society, and the latter in the older organization originating in Detroit.

Next Annual and Sectional Meetings

No definite time was decided upon by the board of directors for the next annual meeting of the steel treaters, but invitations were received from the New York, Boston and Pittsburgh chapters, the argument by the New York representatives being effectively presented by a large delegation.

The next sectional meeting of the steel treaters is to be held in Chicago in February next year, under the auspices of the Chicago chapter and the spring meeting is scheduled for June, 1923, at Bethlehem, Pa., under the leadership of the Lehigh chapter.

A. S. T. M. Committee Meetings

Several important committee meetings of the American Society for Testing Materials were held during the Detroit convention. Some of these meetings were more or less of an experiment as to the expected attendance and had never been attempted before in conjunction with this convention. On Thursday, Oct. 5, there were meetings of five sub-committees, all of which were well attended. The sub-committee on heat treating had an attendance of nearly 60 per cent of its membership. On Friday, Oct. 6, a very successful meeting of committee A1 on steel was held.

Sessions of the Drop Forging Institute

THE first annual convention of the American Drop Forging Institute, held concurrently with the convention of the American Society for Steel Treating, the Drop Forge Supply Association affiliating with the institute, began Oct. 3, with an opening address by President J. Harvey Williams, president J. H. Williams & Co., Brooklyn, N. Y. A "get acquainted" luncheon for drop forgers followed, the annual luncheon meeting of the Drop Forge Supply Association taking place at the same hour.

The afternoon was devoted to a business session at which addresses were made by F. A. Ingalls, vice-president, Ingalls-Shepard Division, Wyman-Gordon Co., Harvey, Ill., on the "Drop Forging Industry," and by Jules Dierckx, Keller Mechanical Engraving Co., Brooklyn, N. Y., on "Suggestions for Institute Research Work." A paper on business trends in the drop forging industry was read by R. P. Dryer, Scovell, Wellington & Co., Cleveland, and another, dealing with the question as to how supply members can co-operate, was read by H. N. Taylor, president N. & G. Taylor Co., Philadelphia.

Urges Individualism in Industrial Relations

A broad view in labor matters, the necessity of preserving the principles of individualism and of avoiding the danger of collectivism, by either employers or labor was urged by Walter Gordon Merritt, New York, organizer and counsel of the League for Industrial Rights, and prosecutor of the Danbury hatters case, in his address at the joint session of the institute and the steel treaters on Oct. 4. The subject of his address was "Some Fundamentals with Respect to the Labor Question" which, in view of the subject of the speaker that followed, Mr. Merritt changed to the "relations of law in combinations and co-operation in the labor problem."

Mr. Merritt cited various cases coming before the courts in the last 20 years, explaining the points at issue and the principles involved. While not wholly approving the Kansas industrial court act, he said that it represented a principle that America would apply when the public interest was at stake. "The time is coming," he said, "when in the production of coal, society will insist that it will not be interfered with by private interest. In matters of great pressing public interest, as in coal and transportation, the public is going to insist that strikes in those fields come to an end."

National organization of labor on the one hand and of capital on the other is to be feared above all, Mr. Merritt said. Anti-trust laws need to be changed to permit co-operation between business men, but they must not be emasculated to put combinations of labor or of employers against other laborers and other employers. "We all believe in co-operation; it is right that business men should co-operate, and also workers, for legitimate purposes. But it must be voluntary. Collectivism must not supersede individualism."

Success in the labor problem will be achieved, it was pointed out, if employers do not abuse the rights upheld by the Supreme Court. "If employers can be trusted with liberty," Mr. Merritt said, "then America will work out the labor problem in a way that will ultimately become a model for all countries. The business men of the nation are on trial," he continued. "If we abuse our trust, mass action has to take the place of freedom."

One of the fundamentals emphasized was permitting employees to have factory representation such as in employee-representation plans, and in this connection Mr. Merritt said he believed in the four C's: Contact, conference, confidence and co-operation.

Sherman Law a Hindrance

Characterizing the Sherman law as a detriment and hindrance to the progress of trade and the welfare of the country, Felix H. Levy, New York, special assistant to the Department of Justice under President Roosevelt, and participator in many proceedings under the Sherman act, pointed out to the members of the societies present that this law should be superseded by modern statutes, by a law framed on broader principles.

The history of the trusts, the enactment of the Sherman law and the various cases involving the law were outlined by the speaker. "The law was enacted for a purpose for which it is not now being put," Mr. Levy said in part, and further, "the law was diverted and spread out by the courts in a way not intended and in a way that has hampered the trade of the country. I urge," the speaker said, "that when plain business

people desire to co-operate to prevent ruinous price cutting and ruinous over-production, they should be able to do so. The Sherman law prohibits them." Trade agreements as sanctioned by many foreign governments were cited, the speaker adding that the trade and commerce of those countries had thrived. He pointed out that no concerted efforts on the part of our merchants had been made to formulate views and give them to the Government and he said that he believed that the people were ready for leadership in this direction.

Discussion followed Mr. Levy's address, in which great interest was shown.

Costs and Technical Matters

J. B. Sehl, second vice-president, Billings & Spencer Co., Hartford, Conn., and chairman of the institute's cost committee, gave an able exposition of the aims and work of his committee, in the business session held Oct. 5. He pointed out that the aim was to work out the proper cost methods applicable to the industry and that a cost system to meet up-to-date requirements must forecast future activities with a reasonable degree of accuracy.

An interesting comparison was read, based on quotations submitted by several members on certain forgings, such as a clevis, steering arms and other parts. Each company quoting had been assigned a number and its identity thereby hidden. It was explained that the quotations were the result of each of the members ideas of figuring net and gross weight, burden, etc. The price of steel was taken by all as f.o.b. Pittsburgh and the item of profit, a variable element, was not included. The tabulation of the quotations submitted revealed marked variations on the same piece. The difference between the lowest and highest bid on the clevis was 421 per cent, on the steering arm 410 per cent, on the front axle 359 per cent, other parts 200 per cent, and the smallest difference between the extremes was 156 per cent. The actual costs could not vary to this extent, it was pointed out, and the extreme variations were ascribed to the lack of uniform cost methods. "This tabulation," Mr. Sehl said, "represents a pretty good picture of what a buyer of drop forgings gets when he asks for quotations, and it does not reflect to the credit of the industry."

The third article of the cost committee had just been distributed and contained a formula for distributing the power charge, the difference in handling die maintenance and the matter of burden centers. A fourth article will be on the preparation of the machine rate system, giving the bookkeeper an idea as to what preparation is necessary to give results usable by the accountants. "We are trying to tell the bookkeeper what he has to have before he can get his estimates on the same basis as others in the industry," said Mr. Sehl. "The object of the committee," Mr. Sehl said in summing up, "is to offer simple and practical methods to be followed by members so that they can be on the safe side."

Active discussion followed Mr. Sehl's address, during which a suggestion was made that education on shapes and sizes of steel was perhaps more fundamental than cost methods. In extension of this idea it was suggested by the same speaker that a correspondence school be started, the commissioners of the institute sending out blue prints of various pieces and asking the size of stock and trim necessary. The members would then send in answers which would be criticised in the light of the best ways.

Ferdinand Barnikol, president Indianapolis Drop Forging Co., and director of the institute, was chairman of the meeting.

Power Plant Costs

Power plant costs in operating steam hammers was taken up in the paper of R. E. Waldron, chief engineer Dominion Forge & Stamping Co., Walkerville, Ontario. Mr. Waldron gave it that actual steam consumption was the best way of figuring the cost and outlined the method used by him. In summarizing, he said that for economical operation the hammer must be in good repair and adjustment and that as high an evaporation rate as possible must be gotten from the boilers. A third factor was to get boilers in operation by using the least amount of fuel possible in steaming them up.

Flow of Metals in Forgings

The "Flow of Metals in Forgings" was a paper read by L. A. Danse, Cadillac Motor Car Co. The paper was that of Harold F. Massey, member of the Iron and Steel Institute and of B. & S. Massey, Ltd., makers of hammers and presses, Manchester, England. The paper had been given by Mr. Massey at the Manchester Association of Engineers, Nov. 12, 1921. In introducing the paper Mr. Danse said that he had himself prepared a paper on the subject, but that Mr. Massey's paper covered it so completely that he abandoned the idea. At the completion of his reading and interpolating talk Mr. Danse showed photographs of forging with which his company has had trouble, pointing out in some how the difficulty was overcome.

A luncheon tendered to the members and guests of the institute by the Drop Forge Supply Association was followed by an executive session for executive members of the institute.

The International Steel Exposition

THE exhibition of heat-treating equipment and processes of heat-treated material by large steel companies and other allied interests was imposing in its scope and impressive in its presentation. In floor space and in material exhibited, it exceeded any previous exhibition. The entire affair occupied about 55,000 sq. ft. of floor space taken by about 100 exhibitors; in Philadelphia in 1920 there were 125 exhibitors but less floor space. Not only the number of steel companies represented but the new equipment and other matters presented were features. A brief general account of some of the exhibits follows.

Machinery Exhibits

The exhibits of forging machinery, machine tools and accessory equipment, while not large in numbers, were a noteworthy center of attraction and several machines are said to have been sold.

The new type F automatic die sinking machine of the Keller Mechanical Engraving Co., Brooklyn, N. Y., which is described in this issue, was shown in operation cutting a crankshaft die. Several dies, loaned by local manufacturers, were shown as they came from the various Keller machines.

The Motch & Merryweather Co., Cleveland, exhibited several machine tools, manufacturers' representatives demonstrating the machines in actual operation. In this exhibit were included the No. 2 full automatic drilling machine of the Avey Drilling Machine Co., and the Baker Brothers No. 121 light, heavy duty boring and drilling machine. Other exhibits in this group were the No. 1 M universal constant-speed drive milling machine, and the No. 1 M universal cutter and tool grinder of the Cincinnati Milling Machine Co.; a No. 18 H gear hobbing machine showing an angular velocity test and a 16-in. high-duty speed-box drive shaper, both being machines of Gould & Eberhardt. A No. 2½ open back inclinable press of the V. & O. Press Co., was in operation making can tops which was completed by a No. 201 thread rolling machine of the same company. Hob and gear control fixtures of the Illinois Tool Co. for use in the inspection department were also in this group. The instruments shown were the company's angular velocity tester for gear hobbing machines, involute curve tester for use in checking up spiral and helical gears, fixture for testing the helical path of hob teeth and another for testing the profile of hob teeth. An interesting fixture was that for testing the angular motion of gears, reproducing by 30 magnifications the inaccuracies in gear teeth. Horton differential chucks were also shown.

Separate exhibits of machine tools included the 32-in. "Dreadnought" motor-driven shaper of the Ohio Machine Tool Co., in operation, and the high-speed universal shaping saw of the Peerless Machine Co., also shown in operation, and with several specimens of work produced. A No. 1 portable hacksaw, a No. 2 saw and a No. 5 automatic high-speed saw were shown by the Armstrong-Blum Mfg. Co., Chicago. This company also exhibited its No. 8 band saw, which is used on structural shapes, bar steel, pipe, etc., cuts at any angle, and is intended to save a great deal of shaping and planing in the tool room. The No. 23 Marvel punch, shear and bender of this company was also exhibited. This machine is for various work on angles, sheets, flat bars, etc., and a number of tools may be set up at one time. The variety of work done was shown by actual specimens.

In forging machinery, the National Machinery Co., Tiffin, Ohio, exhibited a 5-in. heavy pattern machine for a variety of forgings and upsets on round or square stock. Among the features of this machine are the outboard bearing to gripping slide which gives alignment to dies, preventing opening in the front and eliminating flash. The bearings of the heading and grip slides are out of the way of scale and water. The underslung bed is also a feature and also the automatic grip relief intended to prevent damage to the dies if foreign matter should get between them when closing. A large variety of forgings produced by National machines were displayed, and also a large photograph of the company's automatic (bent tap) nut tapper, with specimens of work, and also a photograph of a 1-in. semi-hot rivet heater, with automatic feed.

The Ajax Mfg. Co., Cleveland, Ohio, displayed a working model twin-geared upsetting forging machine and another model of its motor-driven direct gear connected board drop hammer. These models were about 30 in. high. A variety of sample forgings were also shown.

Drop hammer boards for board drop hammers were shown by Charles Kleist & Son, Jamestown, N. Y., the types exhibited being the built-up board, the cut-in board, and the standard board.

High-speed drills and cutting tools were displayed by the American Twist Drill & Tool Co., Detroit, and the Goddard & Goddard Co., Detroit, exhibited its line of "Go and Go" milling cutters, as adapted to automobile work, railroad work and general purpose milling.

Speed transformers of the direct connected, right angle drive and vertical drive types were displayed by William Ganschow Co., Chicago, in conjunction with a large display of gears which included noiseless bakelite timing and rawhide gears.

The Standard Steel & Bearings, Inc., Philadelphia, showed annular ball bearings, both single and double row, and also steel balls in the various stages of manufacture.

An exhibit of interest was the contour measuring projector shown in operation by the Bausch & Lomb Optical Co., Rochester, N. Y., in connection with a large display of various types of metallurgical microscopes, metallographic outfits and microscopes. The contour measuring projector is intended for checking and measuring the contours of gears, screw threads, hobs, gages and special forms. The measurement of the lead of a thread gage from thread to thread or over a number of threads to an accuracy of 0.0001 in. is claimed, and it is checked simultaneously by the root, crest and angle of thread, and the included angle as well as a leaning angle can be measured to within 10 min. of arc. As a thread comparator it is said that 500 screws per hour can be inspected for external pitch and root diameter, shape, smoothness and angle of thread; also width of flat on crest and root. In testing gears slight deviation from the true curature of the tooth can be detected by comparison with a correct master outline. Errors of eccentricity, unequal spacing and lack of proper rolling action can be plainly observed. In addition to the visual inspection photographs may be taken by means of an attachment. Shock absorbing devices for photomicrograph equipment, permitting the taking of photographs under conditions of severe vibration, were also a feature of the company's exhibit.

The American Blower Co., Detroit, exhibited a "man cooling" fan intended to direct a cooling breeze over workmen employed before furnaces, and several sizes of its pressure blower for furnishing furnace blast.

Turbocompressors for supplying air for oil and gas-burning industrial furnaces were exhibited by the Spencer Turbine Co., Hartford, Conn., one of them in operation furnishing the air for the gas-burning furnaces exhibited.

Various types and sizes of air filters for compressors and compressed air lines, turbogenerators, mill motors and sub-stations were displayed by the Midwest Steel & Supply Co., Inc., New York, the American Kreuger & Toll Corporation, New York, also showing air filters in conjunction with transmission steel sections, timber joint plate and Nitrol, a new hardening medium. Methods of agitating solutions with air were exhibited by the J. B. Ford Co., Wyandotte, Mich.

The Pangborn Corporation, Hagerstown, Md., had its EN-1 cabinet sand blast on view, which is used for cleaning of metal where the volume does not warrant a larger machine, or when the pieces are too fragile to be cleaned by automatic machines. It is used for castings, forgings and stampings, and is adapted to removing scale and discoloration from heat-treated tool steels. A small self-container dust arrester, assembled, was also shown, and new shot-proof hoods and aprons of chrome leather for use in connection with metallic abrasive.

Steel Company Exhibits

The exhibit by steel manufacturers was impressive, both because of the number of exhibitors and because of the large displays of both mill products and the finished products made from steel supplied by the exhibitors, all of which attracted a great deal of interest. Probably the outstanding feature of this phase of the exhibit was the display of various products made from alloy steel, showing what progress is being made by alloy steel mills in their efforts to develop fields for their product outside of the automotive industry.

The Central Steel Co., Massillon, Ohio, included in its exhibit of products made from alloy steel, journal box lid springs of chrome-vanadium steel which is said to be the first use of alloy steel in the manufacture of railroad freight cars, a heavy duty shear blade for power shears, an intricate stamping for a tractor tread shoe cold drawn from hot rolled alloy strip steel, a slitter knife for making metal lathe, railroad adzes, nut locks for the rail connections on railroad tracks, and a tennis racket made of 3½ per cent nickel steel tubing.

The Firth-Sterling Steel Co., McKeesport, Pa., had among its exhibits an interesting display of various products made from stainless steel. One of the most interesting features of this exhibit was an automobile on which all the bright parts, such as windshield frame, spotlight reflector, door handles, etc., were made of stainless iron. Other stainless steel products included pump rods, cutlery, golf heads and carpenters' tools.

The Bethlehem Steel Co. had a novel exhibit of a rolled steel wheel for automobile trucks made from a standard I-beam section. This section was made into a wheel by various punching, rolling and bending operations, the section being cut through the center, one section making two wheels. The flange of the I-beam becomes the face of the wheel. The entire wheel, except the cast steel hub, was formed from the structural section.

The United Alloy Steel Corporation, Canton, Ohio, displayed an oil well jar forged from one solid piece of vanadium steel, this being a very difficult forging. This company also showed various products made from alloy steel including track chisels and axes, a rotary oil drilling bit, shock absorbers and shovels.

The Vanadium Alloy Steel Co., Latrobe, Pa., displayed a new alloy steel product, this being a chrome-tungsten die for a hot bolt header.

The Interstate Iron Steel Co., Chicago, displayed complete units of passenger car parts made of chrome-

nickel, chrome-vanadium and chrome-manganese steel.

The Haynes Stellite Co., New York, displayed a new lathe center, the working part of which is of stellite, this being butt welded to a chrome-nickel shank. There was also on display the stellite knives and scraping device for the hot billet scraper, described in THE IRON AGE, April 27, 1922.

An impressive exhibit was that of the Climax Molybdenum Co., New York. It included miniature rolls containing molybdenum and other alloys which are now being used by some mills, instead of plain carbon steel or chilled iron rolls. Some of the results in such mills were displayed. There was also exhibited the steel shovels containing about 0.75 per cent molybdenum, which are claimed to have unusual wearing properties and durability to withstand hard usage, demonstrations of which were made daily. Other uses of molybdenum in various steel alloys were also shown.

The Crucible Steel Co. of America, and the Halcomb Steel Co., Syracause, N. Y., occupied two adjoining booths with a large display of their principal products.

The Heppenstall Forge & Knife Co., Pittsburgh, displayed a large steel truck housing about 8 ft. long, made as a drop forging in one operation. There was also shown two die blocks, one of carbon and the other of alloy steel, which were represented as having been hardened uniformly throughout so that any one face could be used for the impression, as compared with blocks hardened only part way through. Interesting split gear wheels were also exhibited.

The Atlas Steel Corporation, Dunkirk, N. Y., and Charleroi, Pa., displayed a full line of tool and high-speed steels and other miscellaneous products. The Witherow Steel Co., Pittsburgh, besides showing various types of forgings and forging blanks displayed an exhibit entitled "The Evolution of Axle." The Midvale Steel & Ordnance Co., Philadelphia, was represented by a booth used primarily for reception purposes.

Heat-Treating and Other Furnaces

The Westinghouse Electric & Mfg. Co., presented in operating condition one of its new "Hevi-duty" industrial electric furnaces as well as a complete line of smaller electric furnaces with controls in full operation.

The General Electric Co., Schenectady, N. Y., had on exhibition several of its electrical furnaces for heat treating steel, one of which was displayed as lined with calite, the heat resisting alloy.

George J. Hagan Co., Pittsburgh, displayed in its booth photographs of some installations of its electric and other furnances and equipment, as well as complete operating results and general information.

W. S. Rockwell Co., New York, displayed furnace models of its automatic rotating heat-treating furnaces and other general information.

The Hoskins Mfg. Co., Detroit, had on display a complete set of its electric heat-treating furnaces and pyrometers, displaying in particular a furnace equipped with a new type of heating element and automatically controlled by a new type of temperature regulator.

The Chicago Flexible Shaft Co., Chicago, had in operation furnaces controlled by the Selas system.

The Electric Furnace Co., Salem, Ohio, exhibited typical products of the Baily electric furnaces, including anchor chain, draw bar, knuckles, etc.

A cross section of a furnace showing a quick removable heading unit was shown by Holcroft & Co., Detroit. The outstanding feature of this device is that a new unit can be removed quickly, it being claimed that production need never be interrupted more than 30 min. Photographs were displayed of installations of furnaces of the continuous pusher type, continuous rotary hearth, and furnaces for special work. There were also photographs of open-hearth and annealing furnaces, oil and coal-fired. Visits to the company's plant in Detroit were conducted daily by representatives.

The Bellevue Industrial Furnace Co., Detroit, exhibited a high-speed steel furnace with casing cut away, and the same type under actual operation. Refractory linings of various types were shown.

A gas-fired oven furnace for carbon or high-speed steel hardening was displayed by the Surface Combustion Co., Chicago, and also the Volcano furnace for testing the melting point of fire brick and the fusion point of coal ash. The company also had an exhibit of a high pressure gas system, showing the operation of tunnel and impact gas burners.

The Combustion Utilities Corporation, New York, also had a full display of tempering baths, recuperative furnaces, etc.

Pyrometers and other Testing Apparatus

Most of the leading companies producing pyrometers and certain testing equipment were represented in various booths. Among these may be mentioned the Bristol Co., Waterbury, Conn., which had in operating condition a Bristol-Fuller motor-operated valve for air, gas, oil, steam and water connected to a Bellevue high-speed steel hardening furnace; the Brown Instrument Co., Philadelphia, the Taylor Instrument Co., Rochester, N. Y.; the Shore Instrument Mfg. Co., Jamaica, N. Y. and the Leeds & Northrup Co., Philadelphia, in a large booth exhibiting its complete pyrometer equipment. The Wilson-Maeulen Co., New York, had in operation Rockwell direct reading hardness testing machines and the Tinius Olsen Testing Machine Co., Philadelphia, had an interesting display of some of its leading products, including a new extensometer, which has some unusual features. Charles Engelhard, Inc., New York, also displayed its leading products with some recent additions. The Steel City Testing Laboratory, Pittsburgh, displayed a power and hand-operated Brinnell testing machine.

Heat Resisting Alloys

Some of the companies making various heat resisting alloys had elaborate displays.

In THE IRON AGE of Sept. 28, the Electro-Alloys Co., Elyria, Ohio, was represented as displaying samples of tools and tool steels, and as located at Youngtown, Ohio, due to an error. This company, however, displayed a large assortment of its special alloy, known as Thermalloy castings, its principal product.

The Calorizing Co. of Pittsburgh, Pittsburgh, had on display a large assortment of calorized compounds and its new heat resisting alloy calite in various forms as castings.

The General Alloys Co., Chicago, displayed a large variety of its Q-Alloy, also a heat-resisting metal in cast form. A wireless telephone was in working order, by means of which bulletins of leading events were given out.

The Driver-Harris Co., Harrison, N. J., displayed a large assortment of nichrome castings.

In General

American Car & Foundry Co., New York, displayed a new device for heating rods, known as the No. 3 Four Foot Berwick electric rod heater for heating any diameter of rod up to one inch. The company also offered for inspection its electric rivet heaters and other apparatus.

Burners and rivet forges were shown by the Hauck Mfg. Co., Brooklyn, N. Y., the exhibit being made up of portable oil burners, hand torches, oil burners for use on heat-treating furnaces. The company's new venturi type burner for use on open hearth and other furnaces was displayed.

The Liquid Fuel & Engineering Co., exhibited various types of multiple spray fuel oil burners.

A large number of companies displayed various carburizing and other compounds for the use of heat treaters, among whom may be mentioned the American Cyanamide Co., New York; Alfred O. Blaich Co., Detroit; the Case Hardening Service Co., Cleveland; the Dearborn Chemical Co., Chicago; E. F. Houghton & Co., Philadelphia; the Montgomery Chemical Co., Detroit; the Park Chemical Co., Detroit, and the Rodman Chemical Co., Verona, Pa.

Refractory and insulating producers were represented in various booths by the American Refractories Co., Pittsburgh; the American Cork & Insulation Co., Pittsburgh; the Carborundum Co., Niagara Falls, N. Y.; the Celite Products Co., Chicago; the Keystone Re-

fractories Co., N. Y. and the S. Obermayer Co., Chicago.

The American Drop Forging Institute occupied a booth in which was a large assortment of forgings of all kinds, particularly those used in the automobile industry. The product of 15 companies was represented. Prominent among these forgings was a large crankshaft for an aeroplane which was a drop forging, probably 8 ft. long over all and 15 ft. in actual length of metal, and weighing about 300 to 350 lb.

The N. & G. Taylor Co., Philadelphia, also displayed a large assortment of drop forgings.

International Nickel Co., New York, had an attractive booth in which was displayed a wide variety of nickel and nickel alloys, as well as some of the leading products made of nickel steel.

The British American Nickel Corporation, Ltd., also displayed nickel in ingot and other forms, as well as some of the uses to which its product is put.

Booths displaying ferroalloys and similar products were occupied by the Standard Alloys Co., Pittsburgh, and the Vanadian Corporation of America.

The Bureau of Standards, Washington, made its usual large exhibit.

FAIR EXPORT DEMAND

Tin Plate Inquiries from Japan Railroad Buying Continues—Chilean State Railways in Market

NEW YORK, Oct. 10.—Activity in export trade is still largely confined to governmental and semi-governmental buying from Japan. A slight improvement is said to be noticeable in the Shanghai steel market since August, especially in nails, galvanized wire and galvanized sheets. Inquiries from this market are more numerous. Hankow stocks of nails which about a month ago were reported as extremely heavy are now stated to be considerably reduced. No sheet business of any size is coming from Japan at present. The dullness is attributed to stocks of sheets in Japan and also to the low quotations obtainable from British and Continental sellers, the former, it is reported, quoting from 2.75 to 2.80c. per lb., c.i.f. Japanese port on black sheets of No. 28 gage.

Small purchases of rails are being made, the two miles of 92-lb. and 102-lb. girder rails for Osaka municipality having been awarded to the Mitsubishi Shoji Kaisha, 120 Broadway, New York. During the past fortnight inquiry for tin plate has reached fairly sizeable proportions. The latest tin plate tender is from the Nippon Oil Co. and calls for 30,000 base boxes of oil can tin plate, closing Oct. 20. The 5000 boxes of oil can tin plate inquired for by a smaller Japanese oil company was placed with the American branch of the Mitsubishi Skoji Kaisha. Exporters bidding on tin plate to Japan state that others in competition, who submit quotations on Welsh tin plate are able to quote about 50c. per box, c.i.f. Japan, lower than those furnishing the American product.

Among inquiries which have recently appeared from Japan is one from a private railroad interest for 40 tons of steel ties for 20-lb. rails and one from another private source for 13 miles of 60-lb. rails. Besides the 500 tons of bridge material, on which the subsidiary shipbuilding company of a Japanese export house has asked for prices, there is a tender for 350 tons of structural steel for a bridge from the Imperial Government Railways. These railroads have also asked for prices on 9000 tons of couplers, which, although not yet reported awarded, are expected to be divided between two makers, 4500 tons to each.

A continuance of buying by the South Manchuria Railway Co. is evident from the $4,061,910 appropriated by that company for the fiscal year ending March 31, 1923. In addition to further double-tracking of its lines with 100-lb. rails, a roofed-in passenger platform and additional sheeting is contemplated for the station at Mukden. Automatic signals will be installed on the Mukden-Suchiatun line and additional freight locomotives will be built besides finishing 9 locomotives and 20 freight cars under construction.

Among railroad inquiries from other foreign markets is a tender of the Chilean State Railways, 141 Broadway, New York, for a variety of material entering into the construction of locomotives, freight cars and coaches. It includes: Locomotive axles 265, car and coach axles 1239; car and coach springs 1300; locomotive superheaters 17 sets; superheater tubes 853; locomotive water tubes 453; locomotive, tender, freight and coach tires 3861; locomotive boiler plates 38 sets; pressed steel plates for box cars 2500; passenger coach diaphragms 30; steam gages 35 and accessories. Bids close Oct. 20, at the New York office, where specifications are available. The annual rail requirement will probably be issued before the end of the year.

Despite the new tariff, foreign aluminum is still being imported. Since the recent increase of 1c. to 2c. per lb., which the leading American interest is reported to have made, prices of German aluminum are about on a par with the domestic product, so that competition is largely on a basis of quality and delivery. One importer of the German product points out that the production of aluminum in the United States is not equal to the demand and as the American aluminum interest fills up and prices rise in consequence, it will be possible to import more and more of the foreign product. Germany's annual capacity is estimated at close to 130,000 tons of refined aluminum annually, while her production at present is a small percentage of the total.

The Computing-Tabulating-Recording Co., 50 Broad Street, New York, manufacturer of computing machines and a similar line of equipment, has acquired a plant at Villengen, Germany, which will be equipped for complete production of its line for the European trade. Manufactures will include complete machines, parts and repair work.

Reed-Prentice Co. Plans to Sell Plants of Subsidiaries

WORCESTER, MASS., Oct. 10.—The Reed-Prentice Co. is planning to sell the plants of its subsidiaries, the Becker Milling Machine Co., at Hyde Park, Mass., and the Whitcomb-Blaisdell Machine Tool Co. at Worcester, and to concentrate the business in the three other Worcester plants, that of the Prentice Bros. Co. on Cambridge Street, that of the F. E. Reed Co. on Gold Street and the foundry. The Becker Milling Machine Co.'s products will be built in Worcester as soon as the necessary preliminaries have been consummated. A part of the machine equipment of the Becker and Whitcomb-Blaisdell plants will be sold and the remainder moved to the other shops. The recommendation of the directors that such action be taken will be formally acted upon at a meeting of the stockholders called for Oct. 27. The management states that in concentrating manufacturing, the line of machinery will be simplified to a considerable extent by eliminating certain types and this will apply to the milling machines built by the Becker company as well as the lathe, planer and drilling machine departments operated in Worcester.

The first meeting of the Quad-City Foundrymen's Association was held in the Manufacturers Hotel, Moline, Ill., on the evening of Sept. 25. A. E. Hageboeck of Moline was elected president; John Ploehn of Davenport, vice-president, and R. L. Van Alstyne of East Moline, treasurer. Representatives of the gray iron, malleable, steel and brass foundries of the four cities were present. The constitution and bylaws will be drawn up soon and meetings will be held monthly, probably on the fourth Monday of each month

Steel Corporation's Unfilled Orders

The monthly report of the United States Steel Corporation shows 6,691,607 tons of unfilled business on its books as of Sept. 30, or 741,502 tons more than reported on the books Aug. 31. This increase compares with increases of 173,944 tons in August, of 140,630 tons in July, 381,303 tons in June, 157,315 tons in May, 602,765 tons in April and 353,079 tons in March, and with decreases of 100,609 tons in February and 26,736 tons in January. The corporation on Sept. 30, last, had 2,449,929 tons more of unfilled business on its books than it did on Jan. 1, and 2,130,937 tons more than a year ago, and the largest amount for any previous time since February, 1921, when 6,933,867 tons remained unfilled. Following is the unfilled tonnage as reported by months since January, 1920:

	1921	1920
Jan.	4,241,678	7,573,164	6,285,441
Feb.	4,141,069	[illegible]	[illegible]
Mar.	4,494,148	6,284,765	9,892,075
Apr.	5,096,913	5,815,224	10,359,747
May	5,254,228	5,182,487	10,940,167
June	5,635,531	[illegible]	10,978,847
July	5,776,161	4,830,324	11,118,468
Aug.	5,950,105	4,531,926	10,805,008
Sept.	6,691,607	4,560,870	10,374,804
Oct. 31		4,286,829	[illegible]
Nov.		4,250,542	9,021,185
Dec.		4,268,414	8,148,147

The largest total of unfilled orders was on April 30, 1917, when it was 12,183,083 tons. The lowest was on Dec. 31, 1910, at 2,605,747.

Shipbuilding Declining

World shipbuilding is now far below the pre-war level, both in regard to orders placed and to the volume of work actually under way, according to a statement by Lloyd's Register of Shipping. Comparative figures of work under way, expressed in gross tons register, follow:

	Oct. 1, 1922	July 1, 1922	July 1, 1914
United Kingdom.	1,617,045	[illegible]	1,747,000
United States...	150,623	150,623	(a)
Other countries.	934,888	1,165,303	1,199,000
	2,702,556	3,235,430	2,946,000

(a) included under "other countries."

Heavy declines have occurred in tonnage of tankers under construction, those in the United States having fallen since Jan. 1 from 103,000 tons to 26,780 tons Oct. 1, while the world total has dropped from 793,000 tons Jan. 1 to 391,245 tons Oct. 1. The present 150,623 tons under construction in the United States compares with 4,186,000 tons at the peak of wartime building, while the world total, similarly, has fallen from 8,048,000 tons maximum to 2,702,556 tons.

St. Louis Unions Suspended

ST. LOUIS, Oct. 10.—The Building Trades Council has suspended the Carpenters' District Council, composed of 12 local unions, representing about 4200 workers, following refusal of the carpenters to order three men back to work who several weeks ago walked off the job at the new Missouri Pacific Hospital because of a jurisdictional dispute with sheet metal workers. The hospital contractors may now employ non-union carpenters. The carpenters quit work because their demand that metal trim work on windows and doors, being done by sheet metal workers, be turned over to them, was refused.

The Irving National Bank, New York, has prepared a commercial map of the Near East, in which the territorial boundaries are those fixed by the various peace treaties of the Entente Allies with countries in the Austro-Germanic coalition. All the principal steamer routes are set down, with the distances between ports, and all harbors, important commercial centers, railroads, navigable rivers, caravan routes, cable lines, wireless stations and consular offices and agencies are shown. Five insert maps present the character and vegetation of each country, its resources and products, population and rainfall in both winter and summer seasons.

Lake Superior Iron Ore Shipments in September

Shipments of iron ore from Lake Superior in September were 6,801,299 gross tons as compared with 3,913,122 tons in September, 1921. This is an increase of 2,888,177 tons or 73.81 per cent. The season's shipments to Oct. 1, this year, have been 33,111,238 tons as compared with 18,661,194 tons to Oct. 1, 1921, an increase of 14,450,044 tons or 77.43 per cent. The following table gives the September and season shipments by ports and the corresponding figures for 1921 in gross tons:

	September		To Oct. 1	
	1922	1921	1922	1921
Escanaba	820,520	556,158	3,325,[illegible]	1,314,331
Marquette ...	311,758	196,697	1,625,[illegible]	459,802
Ashland	968,712	418,620	4,642,[illegible]	1,847,928
Superior	1,781,670	668,570	8,484,713	4,177,498
Duluth	1,[illegible]	1,503,237	10,183,178	7,975,877
Two Harbors	[illegible]	569,840	4,849,154	2,885,758
Total	6,801,299	3,913,122	33,111,238	18,661,194
Increase	[illegible]		[illegible]	

The Duluth proportion this year to Oct. 1 of 30.76 per cent was considerably less than a year ago when it was 42.74 per cent of the total. The Great Northern dock at Superior is credited with 22.96 per cent of the total shipments this year against 20.63 per cent last year.

Handbook of the Electric Power Club

Seventy-eight manufacturers of electric power apparatus and control equipment are associated and organized to standardize, improve production and increase the distribution of electric products. Sections and committees from these organizations are actively engaged in establishing additional standards. All of these standards are published periodically in this little volume, of which the present edition is of 284 pages, 4 x 6¾ in. It covers electric motors, motor pulleys, generators, transformers, electric tools, mining and industrial locomotives, control equipment, power switchboards and switching equipment. The handbook contains, also, definitions, symbols, general engineering, recommendations and other information needed by users and purchasers of electric power apparatus and control equipment.

The member companies include the largest and best known electrical machinery manufacturers in the United States.

Foreign Commerce Handbook

A "Foreign Commerce Handbook" has been issued by the foreign commerce department of the Chamber of Commerce of the United States, Washington. Within the space of 31 pages this publication condenses a remarkable amount of information as to sources of service in foreign trade. An alphabetical arrangement makes for handy reference. The book contains a list of the topics of national importance that are engaging the attention of the chamber's foreign commerce department committee under the chairmanship of Willis H. Booth, vice-president Guaranty Trust Co., New York.

The Baldwin Locomotive Works during September booked $14,437,147 in new business, as compared with $12,292,342 for August. For the first nine months the total has reached $44,826,758. Third quarter business amounted to $33,002,071, which is nearly three times the business recorded for the first half of the year. It is stated that the plant is operating at about 60 per cent of capacity.

The Western Maryland Railroad has begun work of grading and excavating preparatory to laying a second track east and west of Rockwood, Pa. This will mean that the road will be double-tracked between Dickerson Run, where the road makes connection with the Pittsburgh & Lake Erie Railroad, to Hagerstown, Md., now a single track line.

Car Supply Improves Very Slowly

About 75,000 Tons in the Youngstown District Still Await Shipment—Manufacturers Appeal for Modification of Priority No. 25

YOUNGSTOWN, Oct. 10.—Though some moderation in the stress of car shortage is reported by Mahoning and Shenango Valley industries, transportation problems continue pressing. At the close of last week, fully 75,000 tons of steel products, finished and semi-finished, were piled in this territory, awaiting shipment. The problem of moving this tonnage is requiring the attention of executives as well as traffic departments.

Unless Priority No. 25 is rescinded, steel men believe that mill type gondolas will continue inadequate in number at least until the close of navigation on the Great Lakes, around Dec. 1. Accordingly efforts are being directed toward securing a modification of this ruling, and to increase the number of box cars available for industrial haulage. Under Priority No. 25, shipments other than coal can only be loaded in gondola cars with flat fixed bottoms and with sides 42 in. or less in height, except building materials, which may be loaded in cars of any height moving in direction of the mines, but not beyond.

Valley industries are appealing to the Interstate Commerce Commission to either wholly suspend this ruling, or modify it so as to permit the shipment of mill products in gondolas with sides 48 in. or less high. Such modification would release large numbers of cars, now restricted wholly to coal movement, for the industry.

In appealing to the commission, Valley steel makers point out that continuance of the prevailing conditions will certainly produce additional curtailments, with resultant loss of employment for affected workmen.

Box car shortage is accentuated not only by reason of the diversion of such cars in large numbers to the West for the grain movement, but also for their use in shipping foodstuffs, perishable and otherwise, to the large centers of population in the East. Many box cars, it is contended, are being held up in Eastern freight yards.

While all steel products are affected by the situation, sheets preponderate in the accumulations. Though some inroads have been made into the piled output at the Niles sheet works of the Republic Iron & Steel Co., where 11,000 tons had accumulated, nevertheless the improvement in this respect has been insufficient to increase the operating rate of this department beyond 50 per cent.

Trucking of mill products is on the ascendant in this district, especially for short hauls. For instance, non-integrated sheet rollers and fabricating plants are trucking raw steel from makers' warehouses to their own properties. Likewise, there is still trucking of finished steel to railroad points where cars are available.

Traffic managers anticipate betterment in the freight movement this week through lifting by the Pennsylvania Railroad of the embargo on its lines west of Altoona, which barred shipment of steel commodities. Meanwhile, the carrier has been clearing congestion and putting its lines in this locality in better position to handle the freight traffic. The Baltimore & Ohio, ordinarily a heavy freight carrier, is also improving its service to district industries.

At the beginning of the week, traffic departments estimated that the railroads were moving about all the current output of the mills, preventing for the time being at least further accessions to accumulated material.

The merchant stack at Struthers, Mahoning county, of the Struthers Furnace Co., was unable to resume last week, as scheduled, because of interruptions to coke supply, but was blown in on Monday.

Steel production in the Mahoning Valley continues on an 80 per cent average, while sheet mill output is around 90 per cent. In the Shenango Valley, however, steel shortage has forced temporary suspension of eight sheet units at the Mercer plant and 30 tin mills at the Farrell works of the American Sheet & Tin Plate Co. The plate mill of the Republic Iron & Steel Co. is again rolling, while the A. M. Byers Co. has started the universal plate mill at its Girard plant on skelp rolling, working single turn.

Twenty blast furnaces are pouring in the Mahoning Valley, representing 70 per cent. of capacity. The active furnaces are operating as follows: Republic Iron & Steel Co., 4; Youngstown Sheet & Tube Co., 4; Carnegie Steel Co., 5 at Ohio Works; Brier Hill Steel Co., 3; Sharon Steel Hoop Co., Trumbull-Cliffs Furnace Co., Struthers Furnace Co. and the A. M. Byers Co., one each.

The Republic Iron & Steel Co. will start a fifth furnace in its Haselton battery as soon as traffic conditions sufficiently improve.

Slight Decrease in Activity

DETROIT, Oct. 9.—Despite the fact that the Detroit Employers' Association shows a gain of 5860 in the number of employed, there has been a slight decrease generally in the automobile and subsidiary industries. Detroit business and industrial heads expect to appeal to Governor Groesbeck for a hearing before the legislature enacts a special law fixing the price and providing for the distribution of all fuel within the State. This decision was reached after a conference between the fuel committee of the Detroit Board of Commerce and the local fuel administrator when he reported that there was more bituminous coal in Detroit at present than could be sold. Substantiating this statement, the fuel agent of the Michigan Central R. R. Co. declared that "Bituminous coal now is actually a drug on the market" with about 325 cars a day arriving in Detroit along with 50 cars of anthracite. The Ford Motor Co. has announced that it will sell coke to its employees at $8 per ton and will have 200 tons per day available for this purpose.

Early Improvement Expected by Those at National Capital

WASHINGTON, Oct. 9.—While serious difficulties exist in transportation, it is felt that a breakdown of the railroads will be avoided and that there will be marked improvement in three weeks. Steel interests have been complaining along with others of a lack of cars, with a resulting accumulation of stocks. It has been pointed out that while there still is congestion and embargoes are being declared to certain points, at the same time a number of embargoes have been lifted and congestion relieved. The Interstate Commerce Commission is working out plans which might entail modification of rules and regulations, but it is generally believed it will not be necessary to adopt further drastic action. At the same time, the transportation advisory committee, at a conference last Thursday, with Federal Fuel Distributor C. E. Spens, adopted recommendations for speeding up the movement of coal and it is stated that these plans have yielded favorable results. They call for prompt unloading of all railroad materials, including railroad fuel; discontinuance as far as possible of all maintenance and construction work requiring the use of power and cars, so as to turn this equipment into commercial service; continuance of the campaign to reduce to the minimum locomotives and cars awaiting repairs; the return of foreign coal cars to owners or

connections in the home route with the greatest possible dispatch; the loading of foreign coal cars in the direction of the mines, as permitted under car service order No. 25, should be confined as far as possible to through movement to points on the owners rails. It is also urged that all railroads conduct an active campaign to have all cars loaded to their safe carrying capacity. The railroads are also asked to point out to coal operators that available coal equipment can be increased by the avoidance of sales that require abnormally long distance movement.

Mr. Spens yesterday issued an appeal to coal producers to assist in expediting the movement of coal by loading cars to carrying capacity and by refraining from the loading of coal into cars for which they have no billing. Receivers of coal were asked to unload cars immediately upon arrival. Coal shippers were requested to confine their operations as far as practicable to their normal spheres of distribution in order to reduce the amount of transportation service now required. Consumers were asked, if the coal is available, to confine their purchases to the grade of fuel to which they have been accustomed.

Truscon Steel Co. Makes New Record

September gross sales of the Truscon Steel Co., Youngstown, Ohio, established a new monthly record this year, totaling one and three-quarter millions. The company is receiving from 200 to 250 orders daily for its various products, many of them involving small tonnages. Orders now on its books are of sufficient proportions to permit maintenance of operations at a rate close to normal for the next five months. The company's plant in Japan, supplying that country and other portions of the Orient, is operating at capacity. Its output consists principally of steel products entering into construction and employed for reinforcing purposes.

Owing to the prejudice in China against products manufactured in Japan, all of the company's business booked for China delivery through its offices at Shanghai is delivered from its plants in the United States. President Julius Kahn, who is expected to reach Youngstown within several weeks following a European tour, will probably spend part of the winter months at the Japanese property.

Some of the company's departments at its principal plant in Youngstown are working on 12-hr. shifts and others both day and night. Except for shortage of men and raw materials, an official states production in some lines would be broadened. There is well sustained demand for the company's line of steel building products, pressed metal parts and standard buildings. Considerable tonnage of concrete reinforcing bars is being received in the aggregate, coming from all parts of the country, but the orders chiefly involve lots under 100 tons, many of them ranging less than 25 tons.

Improved Conditions in New England

With the exception of her automobile, New England's industries are beginning to share in the activity and prosperity experienced in other sections of the country. But one of her automobile plants is manufacturing cars; three are in the process of liquidation due to receiverships, while the rest are assembling propositions with only a moderate amount of business on their books.

Gains are being made in other industries. The Crane Co., Bridgeport, Conn., fittings, etc., has added 500 men to its payroll, bringing the total number on the books up to 2000. The Fore River Works, Bethlehem Shipbuilding Corporation, Ltd., Quincy, Mass., has about 5000 on its payroll, an increase of approximately 1500 during the past two months or so. Textile machinery makers are more active than they have been before in months, mostly on foreign orders. Heating appliance makers are running full time, with one exception. The H. B. Smith Co., Westfield, Mass., has been obliged to slow up production, due to the failure of pig iron to arrive.

Makers of hardware are running full and have materially increased working forces during the past three or four months, especially in the Connecticut district. Belting concerns are back on a black ink basis, employing increasing numbers of workmen and running on practically full schedules. The General Electric Co. is practically back on a normal operative basis, and the Westinghouse Electric & Mfg. Co., aside from a slowing up in its radio department, is busier than it has been in months. Bicycle manufacturers are operating about 75 per cent of capacity, and motorcycle even better. The average jobbing foundry is beginning to secure enough forward business to insure operation for several weeks. Machine tool builders, as a whole, are operating about 50 per cent of capacity. Wages in this industry are below the peak of war days, yet 75 per cent above the 1914 average. The outstanding feature of the Massachusetts public employment office report for September was the large increase in the demand for men in the metal trades. This shortage has been so acute in the screw machine products field that some plants have resorted to technical school graduates for labor supplies. There has been a noticeable increase in apprentices in this industry. Drop forgers are busy, especially those in the Springfield, Mass., district, largely on automobile work. Car builders and repairers have sufficient business on their books to keep plants running at present capacity until spring, and in some instances to summer.

More Activity at Springfield, Ohio

SPRINGFIELD, Ohio, Oct. 9.—Production at the plant of the Ohio Steel Foundry Co. was increased to-day. More molders and laborers were added. Besides the heavy orders that are being filled for castings for locomotives, the company is receiving a good run of general business locally and from other cities.

The Kelly-Springfield Motor Truck Co. expects to raise the average production of trucks in October. Last month 50 trucks were turned out. During the past few days the average shipment at the Springfield works of the International Harvester Co. has been about 35 trucks a day. Two good sized shipments will go forward this week, one to England and the other to Australia.

"About 75 per cent of our business during the past week has been drive-aways," said Karl Heinzen, advertising manager of The Westcott Motor Car Company, Saturday. "We are under good production and the outlook is fine."

Open Shop Policy Adopted

The open shop policy was adopted by a group of about forty-five Cleveland manufacturers, mostly in the metal working field, who are members of the East End Manufacturers' Association, at the annual meeting of that association.

W. R. Mitchell, National Acme Co., was elected president, succeeding Sheldon Cary, president the Browning Co. Other officers elected were L. E. Connelly, D. Connelly Boiler Co., vice president; C. C. Robbins, Cleveland Crane & Engineering Co., treasurer; O. F. White, Elyria Iron & Steel Co., secretary; Glenn L. Martin, Glenn L. Martin Co., P. W. Day, International Steel Tie Co., and C. G. Frantz, Apex Electric Mfg. Co., committeemen.

Chicago Building Declines

Permits were issued in Chicago in September for 924 buildings fronting 28,067 ft. and involving a total cost of $12,263,100, as compared with 1048 permits for structures fronting 30,382 ft. and costing $17,919,950 in August, a decrease of 124 permits, 2315 ft. of frontage and $5,656,850. The September totals, however, are practically the same as those for the same month a year ago.

Such a decline, while seasonal, has not everywhere been experienced.

CONTENTS

October 12, 1922

Telling Workers All About Business 917
Employee Representation Has Proved Successful in Periods of Depression and Prosperity at Plant of American Multigraph Co.

New Cold Rolled Strip Steel Plant 920
Finishing Stands Driven Independently of Roughing Stands—Annealing Ovens of Special Design

Strengthening Machine Tool Industry 923
Meeting of Association at Lenox, Mass., Rounded Out Twenty Years of Activity—Now Taking on a Widened Scope

Problems in the Welding of Cast Iron 929
American Welding Society in Chicago Meeting Discussed Requirements of Various Welds, Including Rail Joints

American Society for Steel Treating 931
Technical Papers, Symposiums and Exhibits at Fourth Annual Meeting in Detroit—Drop Forging Institute Holds Joint Meeting

Iron and Steel Exports Again Decrease 950
Drop 8 Per Cent Below July and Are Smaller Than Any Other Month Since February—Japan Buys Less Black Sheets

Iron Ore Imports 922
Foreign Market Notes 922, 951
Trade Associations 926
Leather Belting Business Improving 926, 928
Automatic Die Sinking Machine 927
Less Red Lead in Pipe Joints Demanded 927
Unusual Locomotive 927
Self-Contained Valve Grinder 928
To Safeguard Power Press Tools 928
Copper-Rich Aluminum Alloys 928
Hack Saw Frame with New Handle 928
Copper and Brass in Building Industry 930
Labor Notes 930, 942, 944
Export Market 941
Reed-Prentice to Sell Auxiliary Plants 941
Steel Corporation's Unfilled Orders 942
Shipbuilding Declining 942
Lake Superior Iron Ore Shipments in September 942
Book Notes 942, 976
Car Supply Improves Slowly 943
Plant Activities 943, 971, 972
Editorials 946
Combating Organized Minorities—Stabilizing Machine Tool Building—Progress in Heat Treatment—The Common Labor Shortage—Steel and Iron from Britain
Further Increases in Production 949
Production of Soft Coal 949, 974
September Steel Output 949
THE IRON AGE and Its Readers 949
Fabricated Steel Business 965
Railroad Equipment Buying 965
Conditions in Steel Business 968
Final Proceedings of Lackawanna Purchase 968
British Iron and Steel Market 970
French Pig Iron 971
American Foundries Gain in Number 972
German Iron Market 973
Iron and Industrial Stocks 973
Industrial Finances 973
Plans of New Companies 973, 985
Direct Steel Production 974
Sales of Machinery and Equipment 974
New Trade Publications 975
Trade Changes 985

Iron and Steel Markets 952
Comparison of Prices 953
Prices Finished Iron and Steel, f. o. b. Pittsburgh 966
Non-Ferrous Metal Market 967
Personal Notes 969
Machinery Markets and News of the Works 977
New York Jobbers' Prices 986

ESTABLISHED 1855

THE IRON AGE

EDITORS:

A. I. FINDLEY — MACON — GEORGE SMART

Managing Manager.

Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

U. S. A. — George H. [illegible]

[illegible] 317 West First St. [illegible] Mercantile Library Bldg. Boston: 882 Little [illegible] Street [illegible] 26. Park Building. Boston: 410 Unity Building. Philadelphia: [illegible] Bldg. Pittsburgh: 832 Machesney Bldg. [illegible] 17 Holborn [illegible] E.C. London, England: 88 Chancery Lane, W.C. 2.

Subscription Price, United States and Possessions, Mexico, Cuba, Shanghai, $6.00. Canada $8.00. Foreign $12.00 per year. Single copy 25 cents.

Entered at the Post Office at New York, New York, under the Act of March 3, 1879.

Combating Organized Minorities

It is sometimes said that a republican form of government involves government by organized minorities. With recent experiences in mind, such as the passage by Congress of the American Legion bonus bill, one can hardly feel that as time passes the old saying becomes less appropriate. However, we are growing more disposed to consider how the human mind works. This may be called practical psychology, if one likes, or merely plain common sense. We can recognize that majorities are difficult to organize. The individual is indisposed to join, feeling that the contemplated end ought to be attained without any organized effort, when it represents the will of the majority. Not so with those who recognize themselves to be in a minority. They realize that they must fight to obtain anything. They do not need to look for posts at which the sentinel is asleep, for the majority does not pretend to maintain outposts.

It is high time that strong efforts be made to combat our various organized minorities. There are many substantial nuclei around which working forces can be marshaled to meet these organized minorities. There are, for instance, the Chamber of Commerce of the United States, the National Association of Manufacturers, the American Railway Association, the American Bankers' Association and the engineering societies.

All these groups of men have been attacked more or less. Some of the attacks have been by organized minorities, such as the American Federation of Labor. Other attacks have been sectional, coming chiefly from newspaper editors living in the respective sections. It is not commonly realized how much sectionalism there is in the United States. The result seems to have been to make commercial bodies timid, putting them on the defensive when they should be on the aggressive.

When, for instance, a convention of bankers exhibits a strong sentiment in favor of cancellation of part of the debt owed to the United States Government by foreign governments, the members of the banking fraternity are likely to feel that they are on the defensive, whereas in this particular case there is no organization of even a moderate sized minority that is definitely opposed to them.

We are in great need of a liberal application of the tariff principle in favor of the mass of the people, a wise immigration policy based on sound economics, a labor policy that shall place the comfort and safety of the general public above the rapacious demands of organized groups of workmen, a foreign policy that shall represent the generous nature of the real American people—and many other things.

It is the duty of great bodies of intelligent men to come out and fight valiantly for things that the country needs. They can become the representatives of the great and unorganized majority of the American people. They should be ashamed to fear criticism because they can be called bankers or manufacturers or employers or even engineers. One should not be ashamed of lending money to those who wish to borrow, of manufacturing things the public wishes to buy, of employing those who are seeking jobs, or of designing structures that will benefit the people. In all good causes organizations of these men can appeal to the sound common sense of the American people. Cases really brought to the bar of public opinion are likely to be decided right, but they must really be brought to the bar and argued.

Stabilizing Machine Tool Building

One impression carried away from the meeting of machine tool builders last week was that the organization is well started on the road to larger activity. Aside from the better airing than usual given to trade practices, and the extended conferences which promised to cure the ills, more was heard of the value of the economic studies being directed by the headquarters of the association. If, as is hoped, the manufacturers can be apprised of the approach of conditions calling for a change in the manufacturing policy, we may find a strong group of the industry well prepared to weather the ups and downs of the business cycles.

It takes no imagination to appreciate the value of making for stock in a period of low costs, pro-

vided there is some assurance of an early increase in buying, or, again, of proceeding carefully in times of buying pressure and high costs when unseen cancellation clouds may be ahead. Cyclical changes are of shorter range in time—capable of quicker turns—than is commonly supposed, and it will be highly beneficial for industry in general if so important a factor as the machine tool trade can find the way to reduce the extent of the swings in either direction.

Progress in Heat Treatment

In the great increase in the demand for alloy steels for which it is responsible, the automobile industry has had a corresponding share in the growth and perfecting of the art of heat treatment, seeing that alloy steels are of little value unless properly heat treated. Thus Detroit was an appropriate place for the meetings of steel treaters and drop forgers last week, and the members made much of the opportunities they had to see in some of the country's best equipped plants steel treating operations ranging from case hardening to electric and oil treatment on a large scale.

A very considerable literature on hardening, tempering and annealing of steel existed before the American Society for Steel Treating was organized, but new uses of specially treated steel had brought new problems. An organization was called for to discuss these problems and to put the art on a more scientific basis. A flood of literature resulted, much of it good, some of doubtful value, and all emphasizing the importance and extent of the field. Since late September no less than 30 articles and papers have been published, the electrochemists' and steel treaters' conventions and the technical press all contributing. The uniform merit of these more recent papers makes favorable comparison with the efforts of earlier years, and the managers of the Detroit convention did wisely in concentrating attention on a smaller number of contributions.

Impressive as were last week's exhibits and the record of progress presented at the technical sessions, men who have been most forward in research know that only a beginning has been made. Some important fields still show that scientific heat treatment is sorely needed. Not only is the production of new alloy steels to be expected, but new adaptations of well-known steel products. The application of heat treatment to non-ferrous alloys opens up possibilities little developed as yet, and waiting to be dealt with, either by extending the activities of the American Society for Steel Treating or by a new organization on similar lines.

Discussing present-day tendencies in railroad bridge design, a speaker at a recent session of a British technical society stated that the use of expensive alloys, such as nickel, chrome or manganese steels, for ordinary bridges is not justified at present, since the lightness of the structure is not the governing factor, and that many engineers appear to aim at present at durability rather than lightness. "Stainless steel is more attractive to the majority of bridge engineers. Although its introduction would not be welcomed by purveyors of protective coatings for steel work, yet it would be the most valuable improvement one could at present visualize, provided its strength was at least equal to mild steel and that it had the necessary toughness and malleability." There has been a marked tendency in recent American bridge design to use a low silicon alloy steel which combines lightness with strength, but this steel does not possess non-corrodibility. While a stainless mild steel is not yet commercially available at a low enough price, it is not unreasonable to expect that it will be, and that its strength would leave nothing to be desired. A non-corrodible bridge, requiring no protective coating, would be an achievement of first-class importance.

The Common Labor Shortage

The dwindling of the supply of strong men for common labor in the United States has become a serious matter. The causes of this diminution were pointed out in an editorial in THE IRON AGE of Aug. 10, in which the repeal of the Dillingham 3 per cent law was urged. Everywhere a scarcity is reported, with no relief in sight. The coming of winter will transfer men from outdoor to indoor employment, which will help temporarily, but even for these few months it seems improbable that the supply will equal the demand. While industry has improved throughout the country, it is by no means at a high level, taking it all in all. Therefore employers are wondering what can be done about labor when demand really becomes strong.

The plan of limiting immigration on a percentage basis has not worked out at all well in providing good common labor. In this respect the literacy test has done harm, for an alien must be able to read a few words in his own or any other language in order to be admitted. The superficially educated may come in unchallenged, but the man of thew and sinew, who is content to sell his strength and willingness for common labor, must lay aside his ambition to immigrate, because he has never been taught to read even a little.

The percentage of husky laborers among the immigrants of the past year has been very small. The large industries which have had agents seeking these men among the new arrivals, as steamers docked, discovered this early and found no improvement as time went on. The newcomers were either physically unfit for hard labor, or were unwilling to accept such employment. New and hitherto undreamed of influences have entered the labor situation. For example, everywhere in the country able-bodied men are taking the places of women in the eating places, which are springing up by thousands, not only in the cities and their suburbs, but even in the smallest towns. Foreigners are becoming small merchants, too, and their community stores are doing business in large numbers. These factors alone account for tens of thousands of immigrants who a decade ago quite naturally would have drifted into manufacturing and other industries.

During the business depression and before, as has been often brought out, great numbers of

laborers returned to their native countries. Many had accumulated a competence and never will come back to the United States. Those who let more than six months elapse from the time of their sailing from the United States and then seek to return, must be included in their country's quota of immigrants under the law. The net loss of common labor, charging this element against the new arrivals, leaves a large deficit of muscular males who are willing to do work which requires no training.

The labor shortage has not only been a limiting factor in steel and iron centers, but there is complaint from mining districts. In the copper regions there would be more activity on the present market were there men enough. Every important industrial city has the same story to tell. Few plants are now running more than a single shift. What will they do, their owners ask, when it is necessary to put on a night force? Also, it is asked, how will men be found should a three-shift operation be decided on for iron and steel works?

Naturally, one result will be to put still greater dependence on labor saving equipment; but most plants of large employers of unskilled labor are already on a high plane in respect to the use of mechanical means of doing work.

The Dillingham immigration law has been given sufficient test. It has shown that superb physique counts for nothing as compared with the ability to stumble through a few lines of type. The result is a premium on common labor here. In striving for the remedy it has been suggested that the alien contract labor law be so modified as to admit common laborers, who have been promised work before leaving their home country, subject, perhaps, to federal permit. Then employers, through their agents abroad, could recruit a force of men. Few are hopeful, however, that more than superficial modifications could be procured in the contract labor law at this time, for organized labor is stoutly opposed. Strong presentations of the defects in the practical operation of the present laws are being made in Washington, with the purpose of removing the bars which keep physically strong men from entering the country to serve as common laborers. Continued wage advances for such labor will keep adding to the cost of manufactured articles, and thus increase the spread between the farmer's buying and selling prices, which to-day is a great bar to the coming of prosperity.

A compilation by the Cleveland Trust Co., showing the number of carloads of freight loaded each half year since the beginning of 1919, with estimates for the second half of 1922, indicates that if the estimates are borne out by the facts the present half year will see the greatest six-months' movement in the four years. The table below gives figures in millions of carloads for the several half-year periods:



Steel and Iron from Britain

Some of the reactions of the British iron and steel trades to conditions in the United States are interesting. The new tariff act in particular has caused deep disappointment in Sheffield industries because of the higher rates of duty imposed upon tool steels and cutlery. It will be recalled that a delegation from Sheffield presented the British viewpoint to the Ways and Means Committee when the steel schedules were being whipped into shape, and apparently the British manufacturers expected that their appeal would result in some modification of the schedules covering their particular products.

To quote the London *Engineer*, however: "It would seem that these representations and the opposition of American retailers [!] who foresee the creation of high prices under the big monopolies that will be fostered by the new tariff have alike failed to counter the strong sentiment in America which counts on making the country practically self-contained and self-sufficient industrially."

The *Engineer* points out further that Sheffield manufacturers and others concerned will be ill-advised if they count much upon the new tariff being speedily abandoned. They are advised to equip themselves better to meet the intensified competition of American producers; but a pessimistic note is sounded with regard to the persistent opposition in Sheffield to the application of machinery and methods which would reduce enormously the production costs now prevailing as a result of hand methods.

The feeling of disappointment in the Sheffield district is accented by unlooked for delays in the placing of orders for the two new battle cruisers which Great Britain, under the decision of the Conference on the Limitation of Armaments, is permitted to build. In the past the prosperity of Sheffield has depended in large measure upon the production of war materials, and there has been general unwillingness on the part of manufacturers to equip their plants so as to shift output over to peace purposes. They are now admitting, however, that too much time has been spent in canvassing for a continuation of orders for guns and armor, and too little in adapting their plants for alternative uses. Consequently the immediate prospect for prosperity in Sheffield is none too rosy, whereas plants in the United States and elsewhere, formerly devoted to military materials, have been largely transformed and are already in a fair way to make profits on new lines of products.

Another index to sentiment in the British iron trade is the general disposition to look upon the purchase of Cleveland and Scotch pig iron in the summer months for shipment to the United States to help out in the fuel shortage, as those of "an uncertain customer." That is a correct judgment. The pig iron flurry, like that in British coal, was over sooner than many prophets on this side had looked for. Actual statistics of shipments from Great Britain and of receipts at Atlantic ports in the United States show that the statements given currency in pig iron market reports in August.

putting the sales of British pig iron for consumption in this market at 300,000 tons and upward, were highly exaggerated. It may turn out that much less than half that amount will be brought in on the total movement.

Slight Decrease in Coal Output

WASHINGTON, Oct. 9.—Production of soft coal during the first week of October, according to the Geological Survey, indicates a total of about 9,600,000 tons, marking a slight decrease over the immediately preceding weeks. For three weeks in succession the output had been slowly increasing, reaching 9,776,000 net tons in the week of Sept. 30.

On Monday, Oct. 2, the railroads reported loading 38,088 cars of soft coal, a figure exceeded but once since the close of the strike. On Tuesday, however, loadings dropped to 28,047 cars as against 30,566 on the preceding Tuesday, and the total loaded on the first four days of the week shows a decrease of 2.3 per cent when compared with the week preceding. Final returns are expected to show an output of between 9,500,000 and 9,700,000 tons.

In all the large producing fields of the country demand is active and coal is being offered for shipment up to the limit of transportation. The current rate of output exceeds 1921, but is far below that of other recent years.

There was a slight decrease in the tonnage of bituminous coal handled over Lake Erie piers during the week ended Oct. 1. Dumpings continued at a high rate, however, and the Ore and Coal Exchange reports that the total handled was 1,245,373 net tons against 1,453,684 tons in the week preceding. In comparison with the corresponding week a year ago, this was an increase of 122 per cent. Of the total dumpings, 1,205,433 tons were cargo coal and 38,940 tons were vessel fuel.

During the present season to date 9,693,751 tons of cargo coal has been dumped over the lake piers. Of this quantity 8,702,381 tons was forwarded to regular markets and 991,370 tons was forwarded to destinations not ordinarily taking lake coal.

Preliminary telegraphic reports of dumpings during the first three days of the present week (Oct. 2-7), show a slight increase over the corresponding days of the week before.

Further Increases in Production

Reports from additional industries received by the Department of Commerce, and covering August activities, continue to show widespread increase in production of commodities. In almost every industry there was not only an increase over the previous month, but in most cases August production was the highest in many months, and often the best since the depression at the end of 1920. Moreover, this record was made in the most critical month of the coal and railroad strikes.

Most encouraging is the breadth of the increased activity, which is not confined to a few industries but seems to be general. Factory employment is the highest since the end of 1920, indicating a more even distribution of buying power. Increased demand for manufactured products, after two years of curtailed production and deliveries from stocks on hand, has put industry on a sound basis.

Production, shipments and sales of steel sheets increased, with production at a new high record of 87.2 per cent of capacity. Unsold stocks of sheets declined to the lowest point since December, 1920, but unfilled orders decreased from July, due to greater shipments. Copper production rose above 50,000 net tons for the first time since 1920, and was practically five times the figure for August, 1921. Shipments of locomotives reached 151 in August, the highest in 19 months, while unfilled orders on domestic account totalled 926, the largest since October, 1920.

SEPTEMBER STEEL OUTPUT

Ingot Production Rate About 32,450,300 Tons Per Year—Daily Output 7,000 Tons Larger Than in August

According to the steel ingot statistics, as collected by the American Iron and Steel Institute, the 30 companies which in 1921 made 87.50 per cent of the total, had an output in September of 2,373,779 gross tons. This compares with 2,214,582 tons in August and is an increase of 159,197 tons.

On the assumption that companies reporting are supplying the same percentage of the total as they did last year, the output for the 26 working days of September was about 2,712,890 tons or 104,340 tons per day. The August production on the same basis was about 2,530,900 tons or approximately 97,340 tons per day. The September output was at the rate of about 32,450,300 tons per year; in August it was about 30,273,000 tons; in July about 35,360,000 tons and in June about 36,000,000 tons per year.

The statistics of the American Iron and Steel Institute since January, 1921, follow in gross tons:

Months	Open Hearth	Bessemer	All Other	Total
January, 1921	1,591,281	608,276	3,629	2,203,186
February	1,295,863	450,818	2,796	1,749,477
March	1,175,591	392,983	2,404	1,570,978
April	1,000,653	211,755	2,150	1,213,958
May	1,047,810	216,497	1,543	1,265,850
June	808,286	193,644	1,476	1,003,406
July	689,189	113,312	575	803,376
August	915,334	221,116	1,621	1,138,071
September	908,381	265,152	1,207	1,174,740
Total 9 months	9,432,388	2,673,553	17,401	12,123,042
October	1,269,945	345,837	1,028	1,616,810
November	1,294,371	363,942	1,718	1,660,001
December	1,129,174	296,380	1,539	1,427,093
Total Year	13,125,578	3,679,682	21,686	16,826,946
January, 1922	1,260,809	331,851	822	1,593,482
February	1,395,835	348,357	616	1,745,022
March	1,918,570	451,386	795	2,370,751
April	1,997,465	445,939	1,109	2,444,513
May	2,214,774	494,893	1,474	2,711,141
June	2,143,708	487,851	2,918	2,634,477
July	2,020,572	464,047	2,485	2,487,104
August	1,807,310	404,379	2,893	2,214,582
September	1,911,147	460,127	2,505	2,373,779
Total 9 months	16,670,190	4,034,830	15,617	20,720,841

The September daily estimated output of 104,340 tons compares with 70,020 tons per day in January, with 114,700 tons per day in May and with 113,700 tons per day in July.

The Iron Age and Its Readers

The strong appeal to the public made by the industrial moving picture has been strikingly shown in the case of the Story of Steel, which was prepared by the United States Steel Corporation, as announced in THE IRON AGE of Jan. 21, 1915, and is now being presented in co-operation with the Department of Commerce, Washington, which is represented by M. F. Leopold. Mr. Leopold states that more than 300 requests for the picture have been received in the past seven years and that 75 per cent of those who made the request stated that they had seen the original article regarding the film in THE IRON AGE. These requests came from many parts of the United States and from foreign countries, particularly South America and Mexico. Owing to the limited number of sets the department has for circulation, Mr. Leopold estimates that it will probably require a year to meet the requests already received.

Iron and Steel Exports Again Decrease

Drop 8 Per Cent Below July and Are Smaller Than Any Other Month Since February—Japan Buys Less Black Sheets

WASHINGTON, Oct. 10.—Further contraction in the export market for American iron and steel products was reflected in August, when foreign shipments totaled 145,640 gross tons valued at $13,963,749, as compared with 157,169 tons valued at $14,611,590 in July. For the eight-month period ending with August for the eight months ending with August they aggregated 534,580 tons, while for August, 1921, iron ore imports were only 24,570 tons, and for the eight months ending with August of last year the total was 290,756 tons. Magnesite imports in August amounted to 23,947 tons and for the eight months totaled 87,734 tons.

Imports of Iron and Steel—Gross Tons

	August,		Eight Months Ending August	
	1921	1922	1921	1922
[illegible]	[illegible]	[illegible]	[illegible]	69,093
[illegible]	[illegible]	[illegible]	[illegible]	9,159
[illegible]	[illegible]	[illegible]	18,028	62,332
[illegible]	[illegible]	[illegible]	23,397	48,045
[illegible]	[illegible]	[illegible]	1,744	5,287
Bar iron	179	619	1,185	3,909
Structural steel	41	355	446	1,598
Billets, without alloys	23	2,670	2,738	8,318
All other billets	55	343	1,074	1,331
Steel rails	2,874	726	14,772	21,161
[illegible]	[illegible]	[illegible]	1,871	382
Tin and terne plates	[illegible]	66	308	2,185
[illegible]	[illegible]	[illegible]	[illegible]	1,067
Total	9,708	50,050	75,129	233,867
[illegible]	[illegible]	[illegible]	326,342	272,868

exports aggregated 1,445,914 tons valued at $129,040,199, as against 1,751,533 tons, valued at $268,642,794, for the corresponding period of 1921. The exports for August of this year, however, were practically twice as great as they were in August of last year, when the total reached the extremely low point of 75,827 tons, valued at $12,733,383.

Countries of Consumption

Among the principal destinations of August steel exports of some of the leading products and the quantities taken are the following, in gross tons:

Galvanized Sheets

[illegible]	3,379
[illegible]	1,633
[illegible]	831
[illegible]	602
[illegible]	589

Barbed Wire

[illegible]	[illegible]
Argentina	1,120
[illegible]	[illegible]
West Indies	666
[illegible]	[illegible]
Philippine Islands	482
[illegible]	[illegible]

Black Steel Sheets

[illegible]	1,[illegible]
Japan	905

Tin Plate

Canada	1,441
Japan	731
Brazil	506

Steel Rails

Japan	8,758
Canada	3,143
Philippine Islands	1,267
Cuba	873
Argentina	827
[illegible]	[illegible]
Chile	318

Iron and steel imports, like exports, showed a decline in August, when the total was 50,050 tons, valued at $4,402,607, as compared with 71,971 tons for July. For the eight-month period the total was 233,867 tons, valued at $26,171,427. The decline in imports was reflected in most of the items. The heaviest incoming shipments, as was to be expected, related to ferromanganese and pig iron, the former totaling 15,959 tons and the latter 17,105 tons.

In view of extravagant statements which have been made about heavy pig iron imports, some of them placing the figure at 300,000 tons between April 1 and Sept. 1, it is interesting to observe that their total for the entire eight months up to Sept. 1 was only 62,332 tons. September shipments from Middlesbrough to the United States were 31,118 tons.

Imports of manganese ore in August totaled 62,121 tons as compared with 62,518 tons in July. Total imports of iron ore for August totaled 160,173 tons, and

Exports of Iron and Steel—Gross Tons

	August,		Eight Months Ending August	
	1921	1922	1921	1922
Pig iron	2,419	1,791	17,912	17,564
Ferromanganese	5	76	418	984
Ferrosilicon	[illegible]	28	218	277
Scrap	1,616	3,586	25,814	52,884
Ingots, blooms, billets, sheet bar, skelp	2,447	9,353	6,773	76,421
Iron and steel bars	5,436	13,488	169,423	127,876
Alloy steel bars	[illegible]	246	[illegible]	2,657
Wire rods	351	979	11,314	35,115
Plates, iron and steel	9,388	6,231	293,275	71,687
Sheets, galvanized	2,354	9,690	42,920	83,[illegible]
Sheets, black steel	14,169	6,290	84,628	188,657
Sheets, black iron	456	1,026	10,209	8,[illegible]
Hoops, bands, strip steel	1,386	2,331	14,780	22,457
Tin plate, terne plate, etc.	2,647	4,092	79,909	37,[illegible]
Structural shapes, plain material	[illegible]	22,162	251,662	[illegible]
Structural material, fabricated	[illegible]	7,639	7,937	32,081
Steel rails	4,782	17,658	261,720	202,021
Rail fastenings, switches, frogs, etc.	196	2,266	6,753	24,260
Boiler tubes, welded pipe and fittings	10,917	11,843	301,238	117,851
Cast iron pipe and fittings	2,930	2,095	40,178	17,[illegible]
Plain wire	1,975	8,452	56,764	56,[illegible]
Barbed wire and woven wire fencing	973	7,043	21,346	10,[illegible]
Wire cloth and screening	[illegible]	166	[illegible]	[illegible]
Wire rope and cable	[illegible]	388	[illegible]	2,[illegible]
Wire nails	1,112	2,355	18,407	44,516
All other nails and tacks	226	563	4,057	6,[illegible]
Horseshoes	42	113	405	598
Bolts, nuts, rivets and washers, except track	1,023	1,429	20,[illegible]	11,866
Car wheels and axles	[illegible]	1,051	[illegible]	21,[illegible]
Iron castings	[illegible]	50	[illegible]	[illegible]
Steel castings	[illegible]	183	[illegible]	1,540
Forgings	[illegible]	142	[illegible]	1,635
Machine screws	[illegible]	37	[illegible]	135
Total	[illegible]	145,640	1,751,533	1,445,914

Machinery exports for August, 1922, were valued at $20,257,413, as compared with the July value of $19,830,443; for the eight months ending with August of the current year the total value was $157,487,696, as compared with $329,333,827 for the corresponding period of 1921. The value for August, 1921, was $22,836,383. While the number of machine tools ex-

Number and Value of Machine Tools Exported [illegible]

	July		August	
	Number	Value	Number	Value
Lathes	56	$61,443	88	[illegible]
Boring and drilling machines	65	28,059	94	31,370
Planers, shapers and slotters	26	33,881	25	11,980
Boilers and power presses	18	7,351	10	15,[illegible]
Gear cutters	37	25,791	50	[illegible]
Milling machines	25	27,597	36	27,631
Sawing machines	12	1,015	8	2,147
Pipe and tapping and screw machines	24	16,756	118	13,530
Punching and shearing machines	31	[illegible]	35	6,[illegible]
Power hammers	12	8,973	15	10,531
Bolt and rivet machines	20	1,[illegible]	1	[illegible]
Wood-working machines	2	2,[illegible]	9	1,69[illegible]
Polishing and burnishing machines	1	[illegible]	1	[illegible]
Sharpening and grinding machines	1,[illegible]	1,[illegible]	1,[illegible]	79,[illegible]
Total	1,411	$407,614	1,821	$271,[illegible]

ported in August totaled 1821, as compared with 1411 in July, the value of these tools in August was only $271,390, as compared with $407,614 for July.

Exports, January, 1920, to August, 1922, Inclusive

Gross Tons

	All Iron and Steel	Pig Iron	Semi-finished Material
Calendar year 1919	4 238 867	209 684	258,907
Fiscal year 1920	4,213,782	248,126	288,766
Calendar year 1920	4,961,851	217,958	216,873
January, 1921	547,304	3,710	315
February	302,328	1,307	92
March	230,635	2,320	1,023
April	162,592	1,294	678
May	142,551	2,541	749
June	143,081	1,869	1,106
Fiscal year 1921	4,168,619	129,541	82,549
July	86,823	2,744	363
August	73,827	2,424	1,447
September	95,169	3,078	1,318
October	106,582	1,886	153
November	122,290	1,299	1,869
December	134,415	2,550	250
Calendar year 1921	2,213,042	28,305	10,363
January, 1922	160,920	1,043	4,683
February	133,975	1,430	6,627
March	208,843	2,724	10,002
April	198,830	2,750	9,876
May	230,062	3,897	13,991
June	212,295	1,996	13,178
Fiscal year 1922	1,721,418	28,330	63,127
July	157,169	1,993	10,149
August	145,456	1,791	9,353
Eight months	1,445,914	17,564	76,121

Canada, which passed Japan in July, and regained its usual first position as the leading foreign market for American iron and steel products, retained that rank in August. Japan, however, was the largest export buyer of rails in August, having taken 8758 tons of the 17,658 tons exported. The striking decrease in purchases by Japan of black sheets is reflected in the August figures. They show that only 905 tons of this product, which previously had been going to Japan in greater quantities than to any other country, was shipped to Japan in August. The largest single item of exports in August was plain structural material, the total being 22,162 tons.

MACHINERY EXPORTS
By Value

	August, 1921	August, 1922	Eight Months Ending August, 1921	Eight Months Ending August, 1922
Locomotives	$2,334,737	$1,528,478	$23,956,450	$7,000,192
Other Steam Engines	48,505	42,243	920,746	359,432
Boilers	186,544	118,084	4,239,894	881,749
Accessories and Parts		251,211		606,676
Automobile Engines	60,999	237,013	1,256,919	1,440,999
Other Internal Combustion Engines	88,776	259,616	2,812,525	1,770,452
Accessories and Parts for		222,697		1,759,688
All Other Parts of Engines	432,216		9,524,411	
Gasoline Tractors, except for Farms	7,930	30,249	5,611,804	100,861
Farm Locomotives	242,362		1,447,060	
Other Electric Machinery and Apparatus	2,098,969	425,178	21,912,176	5,860,885
Locomotive Machinery	71,075		1,755,568	
Concrete Mixers	33,973	51,686	485,639	389,987
Road Making Machinery	48,709		692,257	
Elevators and Elevator Machinery	93,479		1,850,441	
Mining and Quarrying Machinery	965,653	1,148,096	6,197,762	2,502,170
Oil Well Machinery	710,915		9,580,268	
Pumps	481,480	534,718	10,198,159	3,836,781
Rolls	51,569	52,963	2,578,556	516,898
Boring and Drilling Machines		31,370		396,098
Planers, Shapers and Slotters		11,980		193,841
Bending and Power Presses		16,061		262,737
Gear Cutters		15,290		78,384
Making Machines		27,631		213,873
Sawing Machines		3,145		31,426
Thread Cutting and Screw Machines		13,530		117,121
Punching and Shearing Machines		6,735		112,865
Power Hammers		1,754		75,305
Riveting Machines		774		155,119
Wire-drawing Machines		1,665		11,366
Polishing and Burnishing Machines		396		10,405
Sharpening and Grinding Machines	61,711	79,356	935,072	519,335
Other Metal Working Machinery and Parts of	818,283	522,232	16,423,647	3,635,030
Textile Machinery	1,176,901	613,619	13,375,229	10,927,720
Sewing Machines	404,156	614,495	5,175,892	4,083,045
Shoe Machinery	109,173	92,419	1,465,749	676,333
Flour-Mill and Gristmill Machinery	28,492	19,946	1,335,266	841,637
Sugar-mill Machinery	587,543	347,725	13,443,535	1,891,615
Paper and Pulp Mill Machinery	153,843		1,994,349	
Sawmill Machinery	65,745	30,816	922,343	372,568
Other Woodworking Machinery	72,372	186,734	2,179,035	922,786
Refrigerating and Ice Making Machinery	49,992	72,709	1,312,143	1,287,129
Air Compressors	210,000	286,000	3,290,643	1,100,000
Typewriters	551,977	729,727	9,241,923	7,536,886
Power Laundry Machinery	40,915	80,577	743,546	430,116
Typesetting Machines	249,951	253,882	2,667,186	2,508,160
Printing Presses	428,571	200,735	6,222,891	2,454,375
Agricultural Machinery and Implements	2,058,399	3,352,657	32,592,374	15,366,014
All Other Machinery and Parts	8,281,508	7,712,481	120,192,559	71,424,008
Total	$22,836,387	$20,257,413	$326,[illegible]27	$157,187,096

Keen Competition for Spanish Locomotive Order

WASHINGTON, Oct. 10.—That European industries are prepared to meet Americans with spirited rivalry in foreign markets was recently demonstrated when bids were opened at Bilbao, Spain, for five 35 and 36-ton locomotives with tenders, for the Matallana-Leon Railway. Altogether 19 locomotive builders competed, only one of whom was Spanish. Eleven German concerns, four Belgian, one British, one Swiss, and one American company submitted tenders, according to Charles H. Cunningham, commercial attache at Madrid, who, in a recent report, gave an analysis of the various quotations.

The Spanish bid was the highest at $32,865, the British being second with $26,782.87. The Swiss company bid $22,536, followed by the American bid, which was $19,953.75. Two German companies bid exactly alike at $14,476.25; in fact, there was a marked similarity in the entire 11 German offers, the maximum having been $15,884.75 and the minimum $14,476.25. While the German bids were low, the coefficients for depreciated currency, plus the gold surcharge, made the acceptance of the German offers an impossibility.

The lowest bid submitted was that of Haine Saint-Pierre, a Belgian company, at $13,098.24. This, however, did not include a superheater, and it is rumored that the order will go to Cockerill, a Belgian manufacturer, who bid $16,492.28.

It is interesting to note that the American company offered the best delivery, four months flat. The Cockerill delivery is nine months. One Belgian concern promised completion of the order in six months and two weeks, but the rest of the builders required from nine months to one year.

As in prices, the Germans showed a community of interest in their delivery offers, all but one calling for nine months.

Esthonians Interested in American Machinery

Consul Albrecht, Peval, reports to the Department of Commerce that machinery and other products obtained from Germany at present are reported as being very frequently of inferior quality. Furthermore, it is stated that no assurances can be obtained as to price or time of delivery with reference to such goods, which generally are received at a much later period and cost considerably more than anticipated, even when allowing for the falling rate of exchange. Under these circumstances Esthonian firms are said to be transferring their orders to Sweden and Great Britain, from which countries they can obtain articles of good quality at a previously fixed price with delivery at a definite time. Indications are, the consul says, that American manufacturers might do business there with the local factories if the latter had fuller information as to their products, prices, terms of sale and delivery, and time required for the latter. No doubt, many manufacturers of machinery and products of this character have representatives in Europe from whom this information could be obtained without the delay attendant upon communication with the United States; but, in general, neither the local factories nor the consul have been informed of the names and addresses thereof.

Examinations for mechanical engineers with the Coast and Geodetic Survey at Washington are announced. Applications on form 1312, to be provided by the Civil Service Commission, Washington, must be filed with that commission on or before Nov. 7. Successful applicants will be employed at $3,000 per year.

Iron and Steel Markets

SOME GAIN IN OUTPUT

Transportation Still the Controlling Factor

Pig Iron Prices Tend Lower and Peaks in Finished Material Are Reduced

The alternation of better and worse conditions on the railroads is still the governing factor in steel production and prices. Output has increased slightly in the past week and some prices are easier. Car troubles are expected to continue for some weeks, but coke is $1 a ton lower, and coal producers are more desirous of selling than are consumers of buying.

In spite of poor movement of finished steel from mills, further piling of product being reported at Pittsburgh, particularly at certain Steel Corporation mills, four more blast furnaces have started up in the Central West—one near Pittsburgh, one at Farrell, Pa., a third at Struthers, Ohio, and a fourth at Cleveland.

Steel ingot production in September was 7 per cent more than in August, while in pig iron the increase was 12 per cent. The September ingot output, at 2,373,000 tons for 30 companies, was almost the same as in March. To-day the rate is considerably higher than the September average, slightly over 70 per cent for the Steel Corporation and the leading independent companies.

The gain of 741,000 tons in the Steel Corporation's unfilled orders last month is close to the Corporation's share in the rail and track supply contracts taken before Oct. 1. As rail rollings will not be heavy before Jan. 1, the rate of demand for other products will largely determine market tendencies in the remaining weeks of the year.

In building steel there is some slackening. Sheets are affected by the coming on of the quiet season at motor car works. But mill arrearages in many directions are so heavy that the present tension may continue, subject to minor variations, for a good many weeks.

More tank work is coming up from time to time, as increased storage is resorted to in view of the low prices of crude oil. A Sinclair company inquiry will require 5000 tons. A Pennsylvania Railroad plate inquiry for first quarter calls for a like tonnage. The 40 coal barges the Carnegie Steel Co. has ordered from the American Bridge Co. will take 6000 tons. In structural steel the Pennsylvania shops at Altoona, 6000 tons, is the chief new contract.

Price variations on the heavy products are not so wide and the tops are not so high. On a New York Central letting 1.95c., Pittsburgh, was low bid on plates, shapes and bars, and the Big Four had a like bid on plates, though some mills were several dollars a ton higher.

There is still no end to car building. The week has added 4750 to the long list and new inquiries foot up 5300.

Merchant furnaces dependent upon beehive coke are finding severe competition from furnaces having their own supply of by-product coke and also from foreign iron. The general tendency of pig iron prices continues downward, particularly in the Pittsburgh district, where basic has declined $2.50 and other grades from 50c. to $1.50. Alabama iron is apparently an exception and quotations on it are from 50c. to $1 higher, but little is sold for delivery outside the State, owing to transportation troubles, and Birmingham stocks increased 40,000 tons last month. Prices on foreign grades are somewhat lower.

September shipments of pig iron from Middlesbrough, England, to the United States were 31,118 tons. All pig iron imports at American ports in the eight months before Sept 1 were 62,332 tons. With full allowance for iron yet to come in, it is evident that the buying of foreign iron by domestic foundries has been overstated.

The scrap market has developed a decided weakness especially at Pittsburgh, Philadelphia and Cleveland.

Small transactions in ferromanganese in which all the $33.60 duty on the 80 per cent product is added to the foreign seller's price, signify little as to the final effect of the new tariff. Steel companies have supplies that will last for months. Imported ore stocks are large and the working of domestic mines is a distant prospect.

Pittsburgh

Basic Pig Iron Drops $2.50—Furnace Coke Prices Easier

PITTSBURGH, Oct. 10.—The steel situation has lost much of its recent buoyancy and if prices are not definitely lower, the explanation is that shipments still are hampered by railroad car shortages and embargoes. Certainly the transportation conditions have not affected production seriously, and the prop to steel prices contained in high fuel and iron costs is slipping. Basic iron lately has been offered at $31, a drop of $2.50, Valley furnace, without takers, and the supposition is that a firm offer of $30 on a round tonnage would find acceptance. Furnace coke prices have eased off fully $1 a ton, with the supply much more plentiful than it has been before in some time. It is no longer difficult to obtain coal and with producers more anxious to sell than buyers are to purchase, prices distinctly favor buyers.

These developments are finding reflection in the demand for steel and some of the prices recently set up

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton	Oct. 10, 1922	Oct. 3, 1922	Sept. 12, 1922	Oct. 11, 1921
No. 2X, Philadelphia‡	$33 11	$33 11	$34 61	$21 84
No. 2, Valley furnace†	*32.50*	33.00	35.00	21.00
No. 2, Southern, Cin'ti†....	**31.55**	31.05	29.05	23.50
No. 2, Birmingham, Ala.†	**27.50**	27.00	25.00	19.00
No. 2 foundry, Chicago**	32.00	32.00	32.00	21.00
Basic, del'd, eastern Pa...	29.50	**29.50**	32.00	20.50
Basic, Valley furnace....	*31.00*	33.50	32.50	19.25
Valley Bess., del. Pitts....	*35.27*	35.77	34.77	21.96
Malleable, Chicago**	32.00	32.00	32.00	21.00
Malleable, Valley	*32.00*	33.50	33.00	20.50
Gray forge, Pittsburgh...	*33.77*	34.27	36.77	21.96
L. S. charcoal, Chicago...	36.15	36.15	36.15	31.50
Ferromanganese, seab'd..	*67.50	*67.50	67.50	60.00

Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill.	$43.00	$43.00	$40.00	$47.00
Bess. billets, Pittsburgh..	40.00	40.00	40.00	29.00
O.-h. billets, Pittsburgh..	40.00	40.00	40.00	29.00
O.-h. sheet bars, P'gh....	40.00	40.00	40.00	30.00
Forging billets, base, P'gh	45.00	45.00	45.00	35.00
O.-h. billets, Phila.....	45.17	45.17	45.17	35.74
Wire rods, Pittsburgh....	45.00	45.00	47.50	41.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh. lb..	2.00	2.00	2.00	1.60
Light rails at mill.....	2.25	2.25	2.00	1.70

Finished Iron and Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Iron bars, Philadelphia...	2.475	2.475	2.575	1.95
Iron bars, Chicago.....	2.50	2.50	2.25	1.75
Steel bars, Pittsburgh....	2.00	2.00	2.00	1.60
Steel bars, Chicago.....	2.10	2.10	2.10	1.75
Steel bars, New York....	2.44	2.44	2.34	1.98
Tank plates, Pittsburgh...	*2.15*	2.25	2.00	1.60
Tank plates, Chicago.....	2.30	2.30	2.30	1.75
Tank plates, New York..	2.49	2.49	2.34	1.98
Beams, Pittsburgh	2.00	2.00	2.00	1.60
Beams, Chicago	2.20	2.20	2.20	1.75
Beams, New York.....	2.44	2.44	2.34	1.98
Steel hoops, Pittsburgh...	2.90	2.90	2.75	2.25

Sheets, Nails and Wire, *Per Lb. to Large Buyers:*	Oct. 10, 1922 Cents	Oct. 3, 1922 Cents	Sept. 12, 1922 Cents	Oct. 11, 1921 Cents
Sheets, black, No. 28, P'gh	3.50	3.50	3.35	3.00
Sheets, galv., No. 28, P'gh	4.50	4.50	4.35	4.00
Sheets, blue an'l'd, 9 & 10	2.60	2.60	2.50	2.25
Wire nails, Pittsburgh...	2.70	2.70	2.60	2.90
Plain wire, Pittsburgh...	2.45	2.45	2.35	2.60
Barbed wire, galv., P'gh	3.35	3.35	3.15	3.55
Tin plate, 100-lb. box, P'gh	$4.75	$4.75	$4.75	$5.25

Old Material, Per Gross Ton:				
Carwheels, Chicago	**$25.00**	$24.50	$23.50	$16.50
Carwheels, Philadelphia..	23.00	23.00	21.00	17.00
Heavy steel scrap, P'gh..	*21.50*	22.00	19.50	14.00
Heavy steel scrap, Phila..	*18.00*	18.50	16.00	12.00
Heavy steel scrap, Ch'go	18.50	18.50	18.50	12.25
No. 1 cast, Pittsburgh....	24.00	24.00	21.50	17.50
No. 1 cast, Philadelphia..	23.00	23.00	21.00	17.00
No. 1 cast, Ch'go (net ton)	21.00	21.00	22.00	13.50
No. 1 RR. wrot., Phila....	23.00	23.00	21.00	16.00
No. 1 RR. wrot. Ch'go (net)	18.25	18.25	18.00	13.00

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt....	*$11.00*	$12.00	$11.00	$3.35
Foundry coke, prompt....	13.00	13.00	12.50	4.50

Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York..	*14.12½*	14.25	14.12½	13.12½
Electrolytic copper, refinery	13.75	13.75	13.75	12.82½
Zinc, St. Louis.....	*6.62½*	6.80	6.37½	4.60
Zinc, New York.....	*6.97½*	7.15	6.72½	5.10
Lead, St. Louis.....	**6.35**	6.30	5.60	4.50
Lead, New York.....	*6.60*	6.65	5.95	4.70
Tin (Straits), New York..	**33.50**	32.87½	32.12½	27.00
Antimony (Aiatic), N. Y.	6.75	6.75	6.25	5.00

•C.i.f.

••The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Oct. 10, 1922, Finished Steel, 2.460c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel

Oct. 3, 1922,	2.474c.
Sept. 12, 1922,	2.412c.
Oct. 11, 1921,	2.236c.
10-year pre-war average,	1.689c.

Composite Price, Oct. 10, 1922, Pig Iron, $30.94 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Oct. 3, 1922,	$32 11
Sept. 12, 1922,	31.52
Oct. 11, 1921,	19.93
10-year pre-war average,	15.72

are little more than quotations as far as sales are concerned. Only retail quantities of plates, shapes and bars now can be sold at 2.25c., Pittsburgh, and it is significant that on the recent inquiry of the New York Central Lines the Carnegie Steel Co. quoted 1.95c., Pittsburgh, on these products. Demand for sheets no longer is so urgent that premiums are readily paid, except possibly on automobile stock, and even on that material the edge is off the market, not only because the automotive industry is coming into its quiet season, but because it is experiencing difficulty in securing supplies of other necessary materials.

It is doubtful whether the advances announced almost two months ago in pipe prices yet are finding much basis in sales, because producers had such heavy obligations at the time at the old prices. Building activities largely accounted for the full order books of pipe manufacturers and already there has been considerable falling off in construction work. Few large structural projects are coming out at present. The Pennsylvania Railroad, however, has let the contract for its new shops at Altoona, Pa., this job involving 6000 tons. It is admitted that the advanced prices recently named on nuts, bolts and rivets are not yet being paid. Premiums on hot-rolled flats are disappearing. Sales of billets, sheet bars and slabs at higher than $40 lately have been few and difficult.

We note no material recessions in steel plant operations in this and nearby districts, despite the fact that at all plants, but notably those of the Steel Corporation, car shortages have forced the further piling of material. The embargo set up by the Pennsylvania Railroad on freight movements west of Altoona has been effective in relieving the congestion on that system, and expires at midnight to-morrow night. This road, however, will continue for the present the embargo against freight from connecting railroads. Lifting of the Pennsylvania Railroad embargo will be helpful to a great many plants in this district. The blowing in of a furnace by the Pittsburgh Steel Co. and one of the Farrell, Pa., fur-

naces, Carnegie Steel Co., brings the total number active in this and nearby districts to 82, six more than were in blast at the peak point around July 1.

Pig Iron.—The market is definitely weaker on practically all grades, this being partly ascribable to the activity of the Cambria Steel Co. as a seller of iron and also to the fact that the coke situation has eased sufficiently to enable Valley producers to meet such competition. The interest which a few weeks ago bought a tonnage of basic iron from a Youngstown steel company at $34, furnace, has offered to sell all or a part of the tonnage at $31, Valley furnace, but has not been successful in interesting users. The Cambria Steel Co. also is quoting this grade at $31 Johnstown, with the freight to Pittsburg the same as that from the Valley, but as reported last week, basic has sold at $30. One sale of 750 tons of basic is noted to a Pittsburgh district steel foundry, the delivered price being below the nominal Valley price, because the iron will be furnished by a furnace with a very low rate to destination. Small tonnages of Valley Bessemer iron have been sold at $34, but now that coke is down in price, some makers in the Valley will take business at $33.50. The range on foundry iron still is wide, because some producers have been able to obtain as high as $34 for small tonnages for early delivery, and are not yet ready to sell for less. We note a sale of 1000 tons of No. 2 foundry at $32.50, Valley furnace, base, and also of a like tonnage at the same price at Johnstown, Pa., the buyer being the Westinghouse Air Brake Co.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.77 per gross ton:

Basic	$31.00
Bessemer	33.50
Gray forge	$32.00 to 33.00
No. 2 foundry	32.50 to 34.00
No. 3 foundry	32.00 to 33.00
Malleable	33.00

Ferroalloys.—Prices have not yet been announced by domestic makers of ferromanganese, but some British material has been sold here at the full price of $101.10 per gross ton, f.o.b. Baltimore, or $105.98, delivered Pittsburgh. Only small lots have thus far been sold, however, because most makers covered pretty freely and got the tonnages in before the duty went on. Spiegeleisen is dull and concessions are being offered on attractive business for deferred delivery. One form of concession is a sliding scale agreement providing for a lower price in the event of a decline in the cost of coke. Limited production, rather than a brisk demand, accounts for a firm market in 50 per cent ferrosilicon.

We quote 78 to 82 per cent British ferromanganese, [illegible] domestic [illegible] producers have not yet announced prices. Average 20 per cent spiegeleisen, $38 to $39 furnace; 16 to 19 per cent, $37 to $38; 50 per cent ferrosilicon, domestic, $65 furnace. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, $50.50; 11 per cent, $53.80; 12 per cent, $57.10; 13 per cent, $61.10; 14 per cent, $64.10; silvery iron, 6 per cent, $39; 7 per cent, $40; 8 per cent, $41.50; 9 per cent, $43.50; 10 per cent, $45.50; 11 per cent, $48.80; 12 per cent, $52.10. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $3.66 per [illegible] ton.

Steel Skelp.—The market holds at 2c. to 2.25c., and this covers the great bulk of the business, though there was one sale recently of 1000 tons of boiler tube skelp on the plate card at a base of 2.25c., the material, including the extras, running up on some sizes to 2.80c.

Wire Products.—The situation shows little change other than that demands in most lines are a little less urgent than they have been. Large jobbers are believed to be well stocked with nails and with the decline in building operations common to this time of the year, purchases are on a more moderate scale. The position of the leading interest with regard to obligations shows no particular improvement, and it is accepting little or no new business. Independents can take on new orders, but on account of the shortage of box cars are not guaranteeing specific delivery. All makers now are giving spring datings on fence orders. Prices are given on page 966.

Iron and Steel Pipe.—Makers of steel pipe still report a brisk and insistent demand for merchant pipe, especially in the butt weld sizes, and considerable difficulty in catching up with their obligations because of the shortage of cars. Activity still is lacking in oil country pipe, and there have been no important lettings of line pipe since that placed with National Tube Co. a few weeks ago, involving about 125,000 tons of 8-in., 10-in. and 12-in. pipe. There is room for improvement in business in wrought iron pipe. Prices are firm on both classes of goods. Discounts are given on page 966.

Billets, Sheet Bars and Slabs.—Production is gaining steadily, but the supply situation remains rather tight owing to the difficulties attendant upon shipments, due to the railroad transportation conditions. Demand is not as urgent as it was recently, probably because non-integrated manufacturers sense an easier situation, with more blast furnaces in operation than before in two years, and this is being reflected in pig iron prices, which show a definitely softer tendency. On billets, sheet bars and slabs, $40 now is regarded as a fair price and for forging steel, the common appraisal is $45. Occasional sales of open hearth sheet bars are being made at $42.50, while forging billets for immediate delivery are scarce and command as much as $50.

We quote 4 x 4-in. soft Bessemer and open-hearth billets, $40; 2 x 2-in. billets, $40 to $42; Bessemer sheet bars, $40; open-hearth sheet bars, $40 to $42.50; slabs, $40; forging billets, ordinary carbons, $45 to $47, all f.o.b. Pittsburgh or Youngstown mills.

Wire Rods.—Independent makers still report sales of small tonnages for quick delivery at $47.50, Pittsburgh, for the base size of soft rods, but this is purely the spot price and regular customers of makers are not called upon to pay more than $45. Rods are relatively in good supply because so many mills are short of wire drawers.

We quote No. 5 common basic or Bessemer rods to domestic consumers, $45 to $47.50; chain rods, $45 to $47.50; screw stock rods, $50 to $52.50; rivet and bolt rods and other rods of that character, $45 to $47.50; high carbon rods, $52 to $57.50, depending on carbon, per gross ton, f.o.b. Pittsburgh or Youngstown.

Sheets.—While there are occasional bookings by independent makers at the Steel Corporation price levels, the more common minimums are 2.50c. base, Pittsburgh, for blue annealed, 3.50c. base for black and 4.50c. base for galvanized, and some business is reported as much as $5 to $6 per ton above these prices. There has been no further recession in the operations of the leading interest, and only a few of the independents, those served exclusively by the Pennsylvania Railroad, have been affected by railroad transportation conditions. Shipments, however, are still suffering from car shortages and it is necessary for most makers to pile up a considerable part of their current production. Prices are given on page 966.

Tin Plate.—This is a quiet season of the year, but at the same time there is a demand sufficient to absorb production, and since tin bars are costly there is not much margin of profit in the finished product at under $4.75 per base box, Pittsburgh. The leading interest is booked fully for the remainder of this year and has turned down some business for December delivery. Indications point to higher prices for first quarter of 1923, but whether it takes place depends largely on developments in the coming month with regard to sheet bar prices.

Cold Finished Steel Bars and Shafting.—This branch of the industry is showing more life and demands are more diversified than was the case recently. Demands from the automotive industry still are good, although lighter than they were a short time ago, in keeping with the tapering activities of that industry, but the loss in this direction has been more than counterbalanced by larger purchases by locomotive builders and gains in the requirements of machine tool and agricultural implement makers. Hot-rolled bars are costly, for it is necessary for cold-finished mills to provide transportation facilities if they are to secure supplies of low-

priced material on order with the Steel Corporation. The market is firm at 2.50c. base, Pittsburgh, for rolled, drawn and turned bars, and at 2.90c. base, f.o.b. mill, for ground shafting in carload lots.

Hot-Rolled Flats.—Premiums over the regular base of 2.90c., Pittsburgh, are much less frequent than they were recently and usually refer to narrow light stock, which is expensive to roll, and consequently undesirable with a number of makers. Mills are well committed against probable production over the remainder of the year, but some independents have room for additional orders. The supply situation has been helped out somewhat by the deterioration in the cotton crop, which has resulted in smaller specifications than expected and released capacity for other products.

Cold-Rolled Strips.—All makers are quoting 4.50c. base at Pittsburgh on new demand, but are still delivering on old orders carrying lower prices.

Boiler Tubes.—Makers are heavily committed and are not eager for new business except at full quotations. The best demand is in steel tubes because of the unusually wide spread between prices of these and iron tubes. Discounts are given on page 966.

Iron and Steel Bars.—Although there are occasional sales of soft steel bars as high as 2.25c., base, Pittsburgh, the going market is from 2c. to 2.15c. and apparently the Steel Corporation will go under 2c. on attractive business since its price on a New York Central inquiry recently was 1.95c., Pittsburgh. Although obliged to provide conveyances to get the material from the mills, buyers are able to obtain some low priced bars and are less disposed to pay above 2c. for fresh supplies. There is no change in iron bars.

We quote steel bars rolled from billets at 2c. to 2.25c.; reinforcing bars, rolled from billets, 2c. to 2.25c. base; rail steel reinforcing bars, 1.90c. to 2c.; refined iron bars, 2.60c. in carloads, f.o.b. mill, Pittsburgh.

Steel Rails.—The local rail-making unit of the Steel Corporation has secured its quota of the recent orders by railroads tributary to Pittsburgh, and the matter now loses interest except as to deliveries. There is a pretty steady demand for light rails at unchanged prices.

We quote 25 to 45-lb. sections, rolled from new steel, 2.25c. base; rolled from old rails, 2c. base; standard rails, $43 per gross ton mill for Bessemer and open-hearth sections.

Structural Material.—Fabricating companies in this district are figuring for the most part against inquiries involving small tonnages. Worthwhile jobs are few and it is noted that such awards of this character recently have been at prices that indicated less than 2c. for plain material. On small lots of plain material 2.15c. and occasionally 2.25c. is being done, but the accepted market in large tonnages is 2c. Prices are given on page 966.

Plates.—The market in this district no longer is quotable above 2.25c., Pittsburgh, and that is the carload lot quotation and will be shaded $2 to $3 per ton on really large lots. The American Bridge Co. has taken an order for 40 coal barges for Carnegie Steel Co. for which about 6000 tons of steel, chiefly plates, will be required. These barges are for delivery over the next year. Prices are given on page 966.

Coke and Coal.—Less is heard these days about car shortages and with the Connellsville operators able to get more men, coke production is gaining and prices are weakening. A number of the men who have remained out because of the refusal of the operators to recognize the union now are seeking work and men also are coming into the Connellsville field from other districts. The Washington Coal & Coke Co., Dawson, Pa., down since April 17, is among those that lately have been able to resume. There is less demand for coke for domestic and heating requirements and more available for blast furnace use. The result is the furnace grade lately has become available as low as $11 and $12. Last week's minimum is this week's maximum. Foundry coke continues to command stiff prices, still being priced anywhere from $13 to $14 per net ton at oven. Coal prices are soft, steam coal now being quotable from $3.25 per net ton at mines, up to $4. By-product coal from $4 to $4.50 and gas coal from $4.50 to $5. It is a buyer's market and top prices usually are obtained only from those not fully informed on market conditions.

Rivets.—Leading manufacturers are on a basis of $3.15 for heavy ship and structural and $3.25 for heavy boiler rivets and 65 per cent off list on small rivets. These prices are based on the prices makers would have to pay for bars and rods if they had to go into the market, and apply to the current shipments only in rare instances. Raw material costs temporarily are high because makers are obliged in many cases to provide conveyances to obtain supplies of steel. Prices and discounts are given on page 966.

Bolts and Nuts.—New prices recently named find little or no basis in sales, because buyers were allowed to enter liberal orders prior to the advance. The advance, however, has had the effect of stimulating specification on old orders. Makers in this district have to haul steel from the mills because of car shortages and this adds considerably to costs. Discounts are given on page 966.

Track Fastenings.—There has been no further change in prices. Current demands for small track spikes are heavy, but bookings in other lines are chiefly for future delivery. Car shortages are forcing most makers to provide means for getting steel from the mills, and this condition makes the steel rather costly, even on tonnages on order at low prices with the mills. Prices are given on page 966.

Old Material.—This market is weaker on heavy melting steel and down about 50c. per ton, but retains its recent strength on specialties, such as railroad knuckles, couplers and wheels, and shows no weakness on blast furnace grades. Youngstown is congested. This has necessitated consignments elsewhere and this market has been a beneficiary. A local steel maker reports a definite offer of 5000 tons of heavy melting steel at $22 delivered, which is considerably less than prices recently named by sellers. It is said that $23 or more recently was paid for high grade steel from the Pennsylvania Railroad by steel companies east of this city. None of the Pittsburgh mills yet has gone that high, and the larger users of scrap here are out of the market. Dealers still are bullish on the situation and look upon the present softness of the market as temporary and likely to be followed by further advances when the mills begin to buy against their winter requirements. The Baltimore & Ohio Railroad will receive bids until noon, Oct. 16, on 12,300 gross tons, and 14 cars of scrap; also on 3000 lb. of high speed steel.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

	Per Gross Ton
Heavy melting steel	$21.50 to $22.00
No. 1 cast, cupola size	24.00 to 25.00
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va.; Franklin and Williamsport, Pa.	22.00 to 22.50
Compressed sheet steel	19.50 to 20.00
Bundled sheet sides and ends	17.00 to 18.00
Railroad knuckles and couplers	24.50 to 25.00
Railroad coil and leaf springs	24.50 to 25.00
Low phosphorus standard bloom and billet ends	25.00 to 26.00
Low phosphorus, plates and other grades	24.00 to 25.00
Railroad malleable	22.00 to 22.50
Iron car axles	34.00 to 35.00
Locomotive axles, steel	27.00 to 28.00
Steel car axles	24.00 to 25.00
Cast iron wheels	25.50 to 26.00
Rolled steel wheels	24.00 to 24.50
Machine shop turnings	16.00 to 16.50
Heavy steel axle turnings	18.50 to 19.00
Short shoveling turnings	18.50 to 19.00
Cast iron borings	19.00 to 19.50
Heavy breakable cast	21.00 to 21.50
Stove plate	19.00 to 19.50
Sheet bar crop ends	24.0u to 25.00
No. 1 railroad wrought	20.00 to 20.50

Chicago

Transportation Troubles Continue Car Buying Still Active

CHICAGO, Oct. 10.—Transportation is the controlling factor in the market. Lack of cars for shipping their products and uncertain deliveries of coal, because of car shortage at the mines, are preventing the mills from making further increases in operations. At the same time, delays in deliveries from the mills are causing buyers to again become perturbed about their supplies with the result that demand for steel for early shipment is again active. Prompt material, however, is increasingly scarce, inasmuch as transportation difficulties are nation-wide and probably more acute in the Eastern centers than here. The car supply situation varies greatly and it is difficult to determine whether or not it is actually on the road to improvement. The steel mills seem to be as severely handicapped as ever, but the merchant blast furnaces during the week have been able to make some gains in shipments. In view of present railroad troubles, it is only logical that the carriers should be active in rehabilitating their properties. Most lines have now covered their rail requirements, and car buying, which has been liberal throughout the year, is still heavy. The Santa Fe alone has placed orders for 5150 cars. Oil companies also are taking renewed interest in storage facilities with the likelihood that a considerable tonnage of steel will be required for tanks.

Steel mill operations remain substantially unchanged. Active merchant iron capacity, however, has been added to by the blowing in of a second Federal furnace. This gain is balanced temporarily at least by the banking of a Milwaukee merchant stack which recently blew in. The local producer of by-product foundry coke now has 160 out of 290 ovens operating. The Milwaukee by-product plant is also now on a 60 per cent basis. With this improvement in production, melters' requirements in this district are being well taken care of and less outside coke is coming in. The price of foundry coke remains unchanged at $15 delivered Chicago switching district.

Pig Iron.—The Thomas stack in Milwaukee has been forced to bank because of unsatisfactory coke resulting from the inability of the coke producer to secure a continuous supply of good coking coal under present transportation conditions. Spot demand for iron still features the market. Inquiries, however, are more numerous and involve larger individual tonnages, indicating that buyers who have delayed purchases now find it necessary to replenish their stocks. Two Wisconsin users want 1500 tons of malleable and 1000 tons of foundry, respectively, for this quarter. An Illinois melter is inquiring for 1000 tons of foundry, a Milwaukee plant for 600 tons of foundry and a railroad 300 tons of foundry for an Indiana shop, all for fourth quarter shipment. Few purchases of first quarter iron have been made, a notable exception being 1000 tons of charcoal bought by a Wisconsin plant. Low phosphorus and silvery are quiet. Prices appear to be unchanged. Southern prices are difficult to determine, but are largely nominal, because of a dearth of sales. One recent sale, however, was closed here at $27.50, base Birmingham.

[illegible] malleable and basic irons are f.o.b. local furnace and [illegible] per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chi-	[illegible]
Northern coke, No. 1, sil. 2.25 to	[illegible]
sil. 1.75 to 2.25	32.00
Southern No. 2	$33.00 to 36.00
Low phos., Valley furnace, sil. 1	[illegible]
Silvery, sil. 8 per cent	46.29

Ferroalloys.—Further sales of ferromanganese have been made at $101.10, seaboard. Foreign spiegeleisen is being offered at from $47 to $48, delivered. An important maker of 50 per cent ferrosilicon has withdrawn from the market, so that its quotation of $65, delivered, is nominal. A small sale has been made at about $76, delivered, but whether this establishes the market is not yet clear.

We quote 80 per cent ferromanganese, $108.66, delivered; 50 per cent ferrosilicon, $65 delivered (nominal); spiegeleisen, 18 to 22 per cent, $47 to $48, delivered.

Plates.—Renewed activity in oil storage tanks and railroad cars will mean additional tonnage on mill books. The Santa Fe alone has just placed orders for 5150 freight cars and there are several sizable tank inquiries in the market, one of the Sinclair Refining Co. calling for about 5000 tons of steel. The low price of crude oil is making it more advantageous to provide storage facilities than to sell the product, as it comes from the ground. Local mills are hampered in making shipments because of lack of cars. One Chicago producer is still in a position to take new business for fairly early delivery. Shipments from Eastern mills are impeded by railroad embargoes and car congestion.

The mill quotation is 2.10c. to 2.34c., Chicago. Jobbers quote 2.90c. for plates out of stock.

Bars.—In the face of a strong demand from railroads, car builders and miscellaneous sources, local quotations of soft steel bars remain unchanged at from 2c. to 2.10c., Chicago. Demand for material for early shipment is again strong, probably for the reason that many buyers are not getting deliveries on their contracts as rapidly as they expected. The transportation situation, in fact, is delaying shipments from all mills. Bar iron is firm, but not in great demand. Hard steel bar prices remain unchanged, one Chicago district maker still quoting 2c., mill. Both Chicago Heights mills are running double turn with bookings that will carry them well through the quarter.

Mill prices are: Mild steel bars, 2c. to 2.34c., Chicago; common bar iron, 2.50c., Chicago; rail steel, 2c. to 2.10c., Chicago mill.

Jobbers quote 2.80c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 3.80c. for rounds and 4.30c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 2.50c. base; hoops, 3.90c.; bands, 3.55c.

Rails and Track Supplies.—The market is quiet, following the heavy orders for rails and fastenings placed at the close of September. Steel tie plates have advanced to $47 a ton, f.o.b. mill.

Standard Bessemer and open-hearth rails, $43; light rails rolled from new steel, 2.15c., f.o.b. makers' mills.

Standard railroad spikes, 2.85c. to 3c., mill; track bolts with square nuts, 3.85c. to 4c., mill; iron tie plates, 2.50c.; steel tie plates, 2.35c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.50c. base and track bolts 4.50c. base.

Wire Products.—Owing to car shortage, production is not so good as it promised to be a week or two ago. Because of these operating difficulties, mills are still behind on shipments and are not actively soliciting new contracts. Specifications are not so heavy as a week ago, but this was to be expected in view of the rush to specify which followed the announcement of advances. However, some sellers do not deny the possibility of a decline in demand during the winter months; such a development would almost be welcomed because it would give the mills an opportunity to catch up. For mill prices see finished iron and steel, f.o.b. Pittsburgh, page 966.

We quote warehouse prices, f.o.b. Chicago: No. 9 and heavier black annealed wire and No. 9 and heavier bright basic wire, $3.20 per 100 lb.; common wire nails, $3.35 per 100 lb.; cement coated nails, $2.75 per keg.

Bolts and Nuts.—Although some makers have followed Eastern manufacturers in announcing advances of 5 to 10 per cent, several important Western producers are still quoting the prices established early last month and they have no immediate intention of adopting the

new discounts. Numerous contracts have been closed for fourth quarter and if specifications are as liberal as during last quarter, bolt and nut plants will operate at close to capacity. The principal present limitation on production is unsatisfactory delivery of raw material from the steel mills. Farm implement makers specified heavily toward the close of third quarter, and while most of them have taken contracts for this quarter, it is probable that their specifications will be much lighter. Despite the gloom pervading Western agricultural districts, it is encouraging to note that not all implement manufacturers are pessimistic, but on the contrary, some of them have sufficient orders on their books or in prospect to justify hopes for a fairly active manufacturing season. The automobile makers continue to place heavy orders for bolts and nuts and whereas for months they followed a hand-to-mouth policy of buying, they are now contracting 60 to 90 days ahead.

Jobbers quote structural rivets, 3.50c.; boiler rivets, 3.60c.; machine bolts up to ⅞ x 4 in., 50 per cent off, larger sizes, 50 off; carriage bolts up to ⅝ x 6 in., 45 off; larger sizes, 45 off; hot pressed nuts, squares and hexagons, tapped, $2.75 off; blank nuts, $2.75 off; coach or lag screws, gimlet points, square heads, 55 per cent off.

Sheets.—With local producers booked through the quarter, some business continues to go to Eastern mills at prices above the minima named below. Deliveries from the East, however, are delayed by transportation difficulties.

Mill quotations are 3.35c. to 3.50c. for No. 28 black, 2.50c. to 2.60c. for No. 10 blue annealed and 4.35c. to 4.50c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote from Chicago stock for delivery annealed, 4.85c. for black and 5.85c. for galvanized.

Reinforcing Bars.—Demand for concrete bars, particularly in small lots from warehouse, shows no abatement. Warehouse prices are unchanged and increasingly firm. Deliveries of bars from the mills are gradually improving despite the handicap of car shortage. While there is much building work as yet unclosed, it is notable that new projects are fewer in certain sections of the West, particularly the purely agricultural districts. Recent awards include:

Mechanical warehouse buildings, Detroit, Mich., 12 buildings, to Concrete Steel Co.

Southside High School building, St. Louis, 500 tons, to Concrete Steel Co.

Power plant, Grand Tower, Ill., 400 tons, to Corrugated Bar Co.

Reservoir for filtration plant, Oklahoma City, Okla., 300 tons, to Corrugated Bar Co.

Shrine temple, Tulsa, Okla., 250 tons, to Paul J. Kalman Co.

Kentucky highway work, 200 tons, to Corrugated Bar Co.

Pending jobs include:

Dormitory for Central Normal School, Mount Pleasant, Mich., 150 tons.

Medical Research Laboratory, University of Illinois, Chicago, 100 tons.

Structural Material.—Fabricating awards for the week are few and the number of new projects has fallen off. Chicago mills, however, are booked through the quarter and into next year and are having difficulty taking care of specifications. Plain material continues to be quoted at 2.10c. to 2.20c., Chicago. Early deliveries against new orders are difficult to obtain owing to current transportation troubles.

The mill quotation on plain material is 2.10c. to 2.34c., Chicago. Jobbers quote 2.90c. for plain material out of warehouse.

Steel Castings.—The recent advances announced in THE IRON AGE of Sept. 28 have been generally adopted by steel castings manufacturers. A large amount of business was closed at the old discounts up to the time the new schedule took effect, but such orders as have come through since that date indicate firmness on the new level. In fact, further advances may be announced within 30 days, although they will probably not be of a sweeping character but confined to certain classes of castings. Car castings, particularly, are regarded as relatively low compared with other types of castings. The explanation for this seems to lie in the fact that whereas the railroads were formerly liberal in accepting car castings, they have gradually made foundries conform to stricter and stricter specifications until now manufacturers believe that prices do not adequately cover the amount of work required on the castings. Steel foundries have excellent bookings; one large interest has 90,000 tons of work ahead.

Cast-Iron Pipe.—The transportation situation in the South shows very little improvement and delays to shipments are not only preventing the delivery of pipe long on order, but are discouraging the placing of new business. Clawson, Mich., has let 268 tons of 6 and 8-in. to the United States Cast Iron Pipe & Foundry Co. The latter company will also furnish 400 tons for Franklin County, Ohio, a contractor's job.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $55.20 to $57.20; 6-in. and above, $51.20 to $53.20; class A and gas pipe, $3 extra.

Warehouse Prices.—Cold-rolled strip steel and flat wire have been advanced $5 a ton, the former to $7.50, base, and the latter to $7.30, base, local warehouse. Although Eastern warehouses recently announced general advances, it now appears that this action will not be followed by local jobbers.

Old Material.—In a quiet and uncertain market prices remain practically stationary. Consumptive buying is largely in small lots for spot delivery and reflects increased caution on the part of users. At the same time, a number of important dealers are refusing to sell in large quantities, and purchases of railroad offerings disclose the fact that some brokers are still speculating on further advances. The continued strength of markets farther east is also making itself felt in this section. A large proportion of a recent railroad list was sold for Eastern delivery, notwithstanding the fact that much of the material was located at points giving Chicago a decided freight advantage. While Eastern markets are encroaching on territory usually tributary to this city, they have not advanced to a point justifying shipments from Chicago itself. The Great Northern offers 1500 tons; the Grand Trunk, Western Lines, 4000 tons, and the Santa Fe, 2000 tons.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton

Iron rails	$25.00 to $25.50
Cast iron car wheels	25.00 to 25.50
Relaying rails	27.50 to 32.50
Rolled or forged steel car wheels	23.50 to 24.00
Rails for rolling	20.50 to 21.00
Steel rails, less than 3 ft	21.50 to 22.00
Heavy melting steel	18.50 to 19.00
Frogs, switches and guards cut apart	18.50 to 19.00
Shoveling steel	18.25 to 18.75
Drop forge flashings	12.50 to 13.00
Hydraulic compressed sheet	15.50 to 16.00
Axle turnings	16.00 to 16.50

Per Net Ton

Iron angles and splice bars	23.00 to 23.50
Steel angle bars	19.00 to 19.50
Iron arch bars and transoms	22.50 to 23.00
Iron car axles	25.50 to 26.00
Steel car axles	19.50 to 20.00
No. 1 busheling	15.50 to 16.00
No. 2 busheling	10.50 to 11.00
Cut forge	17.50 to 18.00
Pipes and flues	12.50 to 13.00
No. 1 railroad wrought	18.25 to 18.75
No. 2 railroad wrought	17.50 to 18.00
Steel knuckles and couplers	20.50 to 21.00
Coil springs	21.50 to 22.00
No. 1 machinery cast	21.00 to 21.50
No. 1 railroad cast	19.50 to 20.00
Low phos. punchings	17.00 to 17.50
Locomotive tires, smooth	18.50 to 19.00
Machine shop turnings	11.00 to 11.50
Cast borings	13.00 to 13.50
Stove plate	17.50 to 18.00
Grate bars	17.50 to 18.00
Brake shoes	17.50 to 18.00
Railroad malleable	22.00 to 22.50
Agricultural malleable	22.00 to 22.50

C. R. Lindgren, 21 Cherry St., Worcester, Mass., has established a heat treating plant. Four furnaces have been installed, one for case hardening, one for high speed steel work, one for handling large work, and the fourth, a small one, for general work. Mr. Lindgren will specialize in contract work.

New York

Large Inquiry for Tin Plate—Pig Iron Inquiry Active—Coke Prices High

NEW YORK, Oct. 10.—Curtailment of coal shipments to the lake regions was of short duration and embargoes were removed last Wednesday. While prices of coal are low, compared with recent quotations, steam coal being quoted at $3.25 to $3.75, coke prices are firm and high, foundry being quoted from $14 to $15, ovens, and foundry grades from $11.75 to $12.25. While furnaces connected with by-product plants are able to operate without excessive cost, furnaces compelled to depend upon beehive coke are at a distinct disadvantage. Drought of the past few weeks has added to the troubles of the coal operators. The high price of coal is attributed largely to labor shortage, due to the strike still prevailing in the Connellsville region and to inadequate car service.

Pig Iron.—The pig iron market is fairly active and inquiries amounting to about 10,000 tons have appeared within the past week, including one of 4000 tons from New England, details of which are not announced; 2000 tons for the American Radiator Co.'s Bayonne plant; 1050 tons for three plants of the Worthington Pump Co.; 1500 tons for William M. Crane, Jersey City; 1200 tons for the New York Central; 375 tons for a New Jersey melter and 300 tons of malleable for a New England buyer. Of the above tonnage the American Radiator Co. has bought 1000 tons of foreign iron and the Worthington Pump Co. has placed an order for 400 tons for its Holyoke plant. The rest of the tonnage is still pending. Both foreign and domestic iron show a tendency toward somewhat easier prices, but no important changes are announced. For Scotch iron the usual quotation is about $30, seaboard. In eastern Pennsylvania the usual quotation is based on $31 for No. 2 plain. Much complaint in regard to car shortage is heard.

We quote delivered in the New York district as follows, but are added to furnace prices $2.27 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$35.27
East. Pa. No. 2X, sil. 2.25 to 2.75	34.27
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	33.27
Buffalo, sil. 1.75 to 2.25	36.91
No. 2 Virginia, sil. 1.75 to 2.25	No sales

Finished Iron and Steel.—Relative quiet still persists. Some views are that the obstacles to transportation have checked buying somewhat, as certainly steel is still being piled up at Pittsburgh district mills. Of the heavy tonnage products steel bars are in chief demand and no inconsiderable portion is constantly going into road construction. For such work one lot of 2500 tons is about to be placed. The concrete bars for the Government hospital at Northampton, Mass., will call for 4000 tons. A fair run of structural work has been put under contract, and the rate of car buying which has obtained for some weeks is sustained. Settlement of a tin plate price is shortly to be expected. The Standard Oil Co. has put out inquiries for 150,000 base boxes, probably for exporting containers. On bids for three barges for the New York Central, the Federal Shipbuilding Co. bid $100,000 for the three, against another New York harbor shipyard's $157,000, and bid $70,000 for two of the barges and $36,000 for one. On the whole, production is at a higher rate than that of the new orders, but deliveries are lagging. Prices remain strong, with plates not uncommonly at 2.25c., Pittsburgh.

[redacted]

plates, 2.44c. to 2.59c.; bar iron, 2.49c. to 2.59c.

Cast-Iron Pipe.—Considering the season, the market is unusually active, not only in private purchasing but from time to time a municipal tender appears. A request for bids on 450 tons of 30-in. water pipe for the City of Boston opens Oct. 11, delivery on this contract being specified for December. Makers report that they are well filled and still somewhat behind on the smaller sizes. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $54.50; 4-in. and 5-in., $59; 3-in., $64.80, with $4 additional for Class A and gas pipe. The soil pipe market is also reported unusually active for this period of the year and prices are holding firm. The car shortage is also affecting shipments in this market. We quote per net ton, delivered New York, discounts of both Southern and Northern makers, as follows: 2 to 6-in. standard, 25 to 30 per cent off list; heavy, 34 and 35 per cent off list.

High Speed Steel.—Since the rapid upward movement in the price of tungsten as a result of the tariff, this market shows considerable unevenness in quotations by various makers. Business is reported as only fair, buying by the automotive industries being largely hand-to-mouth, but producers are attempting to stiffen prices with the result that besides the low quotations that have prevailed in spots for the past year or more, various makers are now quoting 75c. per lb., 80c. per lb. and as high as 85c. per lb. on 18 per cent tungsten, with special brands of some companies selling up to 90c. per lb. A fair estimate of the market, however, is 75c to 80c. per lb.

Ferroalloys.—Sales of ferromanganese are confined to a few carload lots here and there of British alloy on the basis of $67.50, c.i.f. plus a duty of $33.60 per ton on a basis of 80 per cent alloy, together with the freight to the point of consumption. No offerings of domestic alloy are heard of, but a nominal price of $100, furnace, is mentioned. Imports of ferromanganese for August were 15,959 gross tons, making the total for the first eight months of this year 69,093 tons. Demand for spiegeleisen is also light, but there have been a few sales of both foreign and domestic alloy at around $38 to $39, furnace, for the domestic and $39.25 seaboard, for the foreign, including a duty of 75c. Very little is heard of any business in manganese ore or any change in quotations. Importations continue heavy, having been 62,121 tons in August, making the total 272,868 tons to Sept. 1. A light business is reported in 50 per cent ferrosilicon, with the quotation at $65 to $70 freight allowed, for the domestic product. Imported alloy is not quoted since the new tariff became effective. New business is naturally light as many consumers are well covered for this year. Quotations are as follows:

Ferromanganese, domestic, furnace, nominal, per ton	$100.00
Ferromanganese, British, c.i.f., per ton	$67.50
Spiegeleisen, 17 to 19 per cent, furnace	$38.00
Spiegeleisen, 20 per cent, furnace	$38.00 to $39.00
Ferrosilicon, 50 per cent, delivered, per gross ton, carloads	[redacted]
Ferrosilicon, 10 to 15 per cent, delivered, per gross ton	[redacted]
Ferrotungsten, per lb. of contained metal	70c. to 85c.
Ferrochromium, 4 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr., delivered	14c.
Ferrovanadium, per lb. of contained vanadium	[redacted]
Ferrocarbontitanium, 15 to 18 per cent, in carloads, per net ton	$200.00
Ores	
Manganese ore, foreign, per unit, c.i.f.	29c. to 30c.
Tungsten ore, per unit, in 60 per cent concentrates, nominal	$7.00 to $7.50
Chrome ore, basis 48 per cent Cr_2O_3, crude, per ton, Atlantic seaboard	$18.00 to $18.50
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	50c. to 55c.

Warehouse Business.—October is generally stated to have opened with quite as great activity as at any time in September, with structural material still the leading item in sales. Both black and galvanized sheets are fairly firm, but the wide range of quotations continues, one warehouse specializing in sheets offering as low as 4.50c. and 5.50c. per lb., base, on black and galvanized, while most of the others including the leading independent in this district quote up to 4.90c. and 5.90c. per lb. base on black and galvanized. The latter complains that considerable difficulty is being encountered in obtaining shipments and a shortage is beginning to be felt. On the whole, sheet prices are undoubtedly firmer this week. Dealers in wrought iron and steel pipe report unusually good business for this season and a continued shortage of the smaller sizes of steel pipe. Brass and copper warehouses state that business continues fair and prices firm. We quote prices on page 986.

Old Material.—What is considered as a temporary dullness ensued the past week. Prices in Eastern Pennsylvania are reported to be slightly off, with a few mills that have been actively buying recently now out of the market. Parkesburg, Harrisburg and Phoenixville are no longer buying heavy melting steel and the quotation of the Bethlehem Steel Co. and Alan Wood Iron & Steel Co. is still $18 per ton delivered. It is noteworthy that brokers in this district are in many cases paying $18 delivered for heavy melting steel to these points, on speculation. While Lebanon is still buying specification pipe at $17 per ton, Milton, Pa., has reduced its price to $16 per ton and Columbia is out of the market. All dealers and brokers report difficulty in obtaining cars because of the embargo. British scrap is said to have been offered to mills in Eastern Pennsylvania, but the price was too high. At the recent sale of about 6000 gross tons of heavy melting steel, cast iron, low phosphorus steel, burnt iron, turnings and 5,000,000 lb. of copper, bronze and brass at various navy yards, by the Government, some high bids were made. On the 1500 tons of this scrap at the Brooklyn Navy Yard, Brooklyn, the high bids on most of the material were made by Luria Bros. & Co., M. Samuels and Hyman-Michaels Co. The heavy melting steel, stated to be of electric furnace quality, was bid in at $16.20 per ton, f.o.b. Navy yard; $17.05 was the price on the burnt iron offered and $18 per ton was bid on the cast iron. It is reported from Washington that the bids were in confused condition and that it may be necessary to have a reopening.

Buying prices per gross ton, New York, follow:

Heavy melting steel, Yard	$14 00 to $14 50
Steel rails, short lengths, or equivalent	15.00 to 15.50
Rails for rolling	15.75 to 16.25
Relaying rails, nominal	27.00 to 28.00
Steel car axles	17.00 to 18.00
Iron car axles	[illegible]
No. 1 railroad wrought	16.00 to 16.50
Wrought iron track	14.50 to 15.00
Forge fire	11.50 to 12.00
No. 1 yard wrought, long	14.00 to 14.50
Cast borings (clean)	12.50 to 13.00
Machine-shop turnings	11.50 to 12.00
Mixed borings and turnings	11.50 to 12.00
Iron and steel pipe (1 in. diam., not under 2 ft. long)	12.25 to 13.25
Stove plate	14.00 to 14.50
Locomotive grate bars	14.00 to 14.50
Malleable cast (railroad)	13.50 to 14.00
Cast-iron car wheels	14.50 to 15.00

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$20.00 to $21.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	17.50 to 18.00
No. 1 heavy cast, not cupola size	15.00 to 15.50
No. 2 cast (radiators, cast boilers, etc.)	13.50 to 14.00

Foreign Coke Arrives

The Norfolk-Maru, a Japanese vessel, has arrived at New York from England consigned to E. Arthur Tutein, with 5200 tons of British by-product coke and 2500 tons of Middlesbrough pig iron. This is the first foreign coke to arrive in the New York harbor for a number of years. It is selling at about $14, c.i.f., and the pig iron at about $27. This firm recently contracted for 50,000 tons additional pig iron for shipment to this country. Its previous contracts amounted to 100,000 tons, but not all of that tonnage has been shipped.

Buffalo

Car Shortage Causes Piling of Pig Iron by One Company

BUFFALO, Oct. 10.—Conditions are becoming more serious with the placing of embargoes by a number of roads leading out of Buffalo. One interest is obliged to pile its foundry iron because it cannot obtain cars. The Donner Steel Co., which has two furnaces in blast on basic iron, expects to put one to foundry iron within a few days. The Tonawanda furnaces of the Donner Steel Co. are being repaired and put in shape and, if coke is available, one or both of these stacks will be placed in blast. Coke shipments into Buffalo are slow and furnace operation with several interests is threatened because of this condition. For silicon, 1.75 to 2.25, $32 is being quoted by two furnaces and it is stated that this price has not been reduced, but that for any lower silicons $31 would be acceptable. The largest inquiry of the week is one for 1000 tons, the other inquiries ranging from 50 to 500 tons.

We quote f.o.b. per gross ton Buffalo as follows, the higher prices being for early shipment:

No. 1 foundry, 2.75 to 3.25 sil.	$34.00
No. 2X foundry, 2.25 to 2.75 sil.	33.00
No. 2 plain, 1.75 to 2.25 sil.	32.00
Basic	34.00
Malleable	32.00
Lake Superior charcoal	[illegible]

Finished Iron and Steel.—There is no abatement of demand for finished material, but the car situation is compelling makers to place much of their material in stock. Prices of 2c. on bars, 2.15c. on shapes and 2.25c. on plates are practically the uniform quotations of all sellers in this district. The Donner Steel Co. now has full operation in its bar mills, but has not started its plate department. Wire material is in good demand, but a shortage of labor in the wire departments of mills represented here is interfering with free commitment. Cold-rolled material is also in good demand. A new bolt price schedule has been announced by a branch of an independent, and the discounts are now 50 and 10 per cent off list on large machine bolts.

We quote warehouse prices, Buffalo, as follows: Structural shapes, 3.20c.; plates, 3.20c.; soft steel bars, 3.10c.; hoops, 4.10c.; bands, 3.90c.; blue annealed sheets, No. 10 gage, 4.05c.; galvanized steel sheets, No. 28 gage, 5.85c.; black sheets, No. 28, 4.85c.; cold rolled round shafting, 3.95c.

Old Material.—Something of a lull has developed in heavy melting steel and mills very active for several weeks are now inclined to hold off and are not willing to pay more than $19.50 per ton. Transactions between dealers have been made on a higher basis, a sale of 2000 tons at $20.75 having been made last week. Borings and turnings are in good demand and likewise low phosphorus is being sought. The latter is scarce.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$19.50 to $20.50
Low phos., 0.04 and under	21.00 to 22.00
No. 1 railroad wrought	19.00 to 20.00
Car wheels	21.00 to 22.00
Machine-shop turnings	14.50 to 15.50
Cast iron borings	[illegible]
Heavy axle turnings	[illegible]
Grate bars	16.00 to 17.00
No. 1 busheling	[illegible]
Stove plate	17.00 to 18.00
Bundled sheet stampings	14.00 to 15.00
No. 1 machinery cast	21.00 to 22.00
Hydraulic compressed	18.00 to 19.00
Railroad malleable	20.50 to 21.50

Birmingham

Stocks Increase 40,000 Tons Owing to Railroad Congestion—Pig Iron Higher

BIRMINGHAM, ALA., Oct. 10.—Surplus iron on furnace and warrant yards in Alabama on Oct. 1 amounted to 111,816 tons, divided as follows: 90,303 tons foundry iron, 9370 machine cast, 1500 tons warrant, 10,643 tons basic. The total iron on yards in this State Sept. 1 amounted to 72,009 tons, of which 58,349 tons was foundry iron, 4813 machine cast, 1700 warrant and 7147 basic. Prospects are that the surplus will be reduced this month, as hope is expressed that railroad service will improve sufficiently to move out the make and some additional iron.

Pig Iron.—Sales in the Birmingham district, spot business, are being made on a $30 per ton basis, No. 2 foundry. One company during the first two days of the past week sold 1000 tons at that price and the latter part of the week recorded a similar amount. Contract sales for future delivery are on a $28.50 per ton basis. Two furnace interests in the Birmingham district are out of the market entirely and two others are selling cautiously. There is not a very great amount of iron available for the remainder of the year, although all inquiries are receiving attention. The make is at a stronger rate than was noted in September. The improvement in railroad service is not more than sufficient to care for the probable make. This will put a stop to addition to the surplus, which has piled up on the yards in this State to an amount around 100,000 tons. Expectations are that by the end of this month

some moving out of the surplus iron will be possible. All companies in this territory are behind in their deliveries and are anxiously waiting the time when the railroads can handle increased traffic. Three blast furnaces are being gotten in readiness to resume operation next month and all indications are that there will be warrant for active operation wherever possible. The inquiries, which are numerous, are from every direction. Local consumption is showing slight improvement as possibilities take on a better showing for shipment of the various products.

[illegible] furnaces as follows:

Foundry, silicon 1.75 to 2.25	$28.00 to $30.00
Basic	28.00 to 30.00
Charcoal, warm blast	33.00 to 34.00

Cast Iron Pipe.—All high pressure cast iron pipe plants in the South are working steadily in the endeavor to catch up with the business delay. Lettings have been few since the recent advance in pipe prices, but there are orders on hand which call for a steady melt of pig iron and, as far as possible, for a steady shipment of the product. The National Cast Iron Pipe Co. announces that plans have been drawn for an addition to its works so as to install a De Lavaud system of pipe making. The National company obtained a lease on this system from the United States Cast Iron Pipe & Foundry Co.

Coal and Coke.—Coal production in the Birmingham district is around 350,000 to 370,000 tons a week, but is held down to some extent by the railroad car supply. Producers are looking for additional business, bunker coal in particular being offered in quantity. Coke in the Birmingham district enjoys a strong market, quotations ranging between $8.50 to $9.50 for the foundry product. Transportation facilities are around 70 per cent of the coke output. Negotiations have been under way between the mayor of Boston and the Sloss-Sheffield Steel & Wire Co. of this district for a supply of coke amounting to not less than 5000 tons a month to be shipped from the North Birmingham by-product coke ovens via Charleston and then by boat to Boston. This coke is to be distributed through municipal yards to relieve probable distress during the winter.

Scrap Iron and Steel.—The Southern scrap iron and steel market is very strong, prices high and firm. Foundries and other iron melting plants are using more old material now than they did a month or two ago. The advancing prices of pig iron account for this. Heavy melting steel has only a fair market, inasmuch as dealers are asking not less than $5 a ton more than the heaviest consumer in this district is offering for the product. All scrap yards in this territory are well supplied with materials. Turnings and borings especially are holding strong phenomenal advances in the last few weeks. As long as the pig iron market continues strong and active, scrap dealers are confident there will be a good demand for their products.

[illegible] Birmingham district:

[illegible]	$16.00 to $17.00
[illegible]	14.00 to 16.00
[illegible]	18.00 to 20.00
[illegible]	18.00 to 20.00
[illegible]	10.00 to 12.00
[illegible]	9.00 to 12.00
[illegible]	9.00 to 10.00
[illegible]	9.00 to 10.00

Building permits issued in Detroit during the month [illegible] 1509 [illegible] to cost $9,[illegible] $4,514,588, or a [illegible] expenditure of [illegible] new homes upon completion of the projects for which permits were issued last month, comparing with 1476 new homes in August and 739 in September, 1921.

More automobiles were built in the United States in the first eight months of 1922 than in all of 1921, according to *Automotive Industries*, the numbers being 1,671,418 against 1,666,750. The August output of 272,000 pleasure cars and trucks was 12 per cent above the July figure and 53 per cent above that for August, 1921.

Philadelphia

High Price of Coke for Merchant Furnaces—Scrap Prices Decline

PHILADELPHIA, Oct. 10.—Transportation difficulties continue to restrict the movement of inbound raw materials and outbound manufactured products of the iron and steel industry in this district, and have made it impossible to increase operations, which remain at practically the same rate as they have been the past week or two. Deliveries are being delayed in some lines, especially pig iron, and this has had a tendency to strengthen the market, although prices of both domestic and foreign tonnage are unchanged. The high price of coke, which costs $12 to $13.50, is a serious obstacle to merchant blast furnaces dependent on beehive coke, competing with furnaces having by-product coke plants. There are only six merchant stacks out of 24 in the Philadelphia district that are in blast, with no indication that the number will be increased in the immediate future. The fact that the Pennsylvania Railroad will lift the embargo applying west of Altoona at midnight to-morrow has offered encouragement for improved transportation. It is expected that the embargo on connecting lines will be lifted gradually.

Scrap prices on a number of grades are down from 50c. to $1, but some dealers are of the opinion that the softening is only temporary, due to accumulated steel stocks.

The principal demand for pig iron calls for early delivery and a number of steel works interests which have been booking tonnages are behind on shipments and this has increased bookings for foreign iron, though on new business imported tonnage cannot be delivered to this side for six weeks at the earliest, it is stated in the trade.

Pig Iron.—Demand for prompt iron is fair, but domestic furnace interests are able to make only moderate commitments for this delivery and are cautious about accepting bookings for the last quarter owing to transportation difficulties, high fuel prices, and uncertainty as to the future. Melters, on the other hand, are not buying for the first quarter at offerings based on the present prices. Sales of foreign iron have been made in fair volume during the past week, two lots of English foundry tonnage aggregating about 3000 tons. Middlesbrough iron is quoted at $26, French high phosphorus iron at $23 to $24, and Scotch iron at $30 to $31, all c.i.f. for last quarter delivery. It is predicted that a good-sized buying movement of iron will develop within ten days because consumers have absorbed stocks and will be unable to remain out of the market longer. While domestic iron prices remain unchanged, there have been some small lots sold for prompt shipments at higher than prevailing quotations. They include sales of No. 2 plain at $32, furnace, No. 2X at $33.50 furnace, and 500 tons of basic at $30 furnace.

The following quotations are, with the exception of those on low phosphorus iron for delivery at Philadelphia and include freight rates varying from 76 cents to $1.64 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$32.14 to $32.64
East. Pa. No. 2X, 2.25 to 2.75 sil.	33.14 to 33.64
East. Pa. No. 1X	34.14 to 34.64
Virginia No. 2 plain, 1.75 to 2.25 sil.	37.17
Virginia No. 2X, 2.25 to 2.75 sil.	38.17
Basic delivered eastern Pa.	29.50 to [illegible]
Gray forge	31.00 to [illegible]
Malleable	34.00 to 35.00
Standard low phos. [illegible] nace)	38.00 to 40.00
Copper bearing low phos. (f.o.b. furnace)	[illegible]

Coke.—Offerings of blast furnace fuel continue to be made at $12.50 to $13, Connellsville, though it is understood that tonnages have been bought at $12.

Ferromanganese.—The only inquiries for and sales of ferromanganese involve carloads. The price remains at $67.50, seaboard, plus the duty.

Semi-Finished Material.—Demand for semi-finished material is light and prices unchanged with open-hearth rerolling billets quoted at $40 to $42.50, Pittsburgh, and forging billets at $45 to $47.50, Pittsburgh.

Structural Material.—Fabricators report a fair volume of small inquiries and awards of a miscellaneous character. Plain material is quoted at 2.10c. to 2.15c., Pittsburgh.

Bars.—Demand for iron and steel bars is comparatively light. Soft steel bars are quoted at 2c. to 2.25c., Pittsburgh, and bar iron at 2.15c. to 2.25c., Pittsburgh.

Sheets.—Sheet makers report that demand is unchanged, with indication of a slight falling off in business, though it is believed to be due to a temporary lull. Blue annealed sheets continue to be quoted at 2.60c. to 2.75c., black sheets at 3.50c. to 3.75c., and galvanized sheets at 4.50c. to 4.75c. base, Pittsburgh.

Warehouse Business.—Warehouse interests report good demand and sales, and say no difficulty is encountered in getting the recently advanced prices. The demand is of a general character and is attributed to desire for prompt deliveries rather than to transportation difficulties.

Soft steel bars and small shapes 3.05c. to 3.15c.; bars (except bands), 3.025c.; round edge iron, 3.20c.; round edge steel, iron finish, 1½ x ½ in., 3.20c.; round edge steel planished, 4c.; tank steel plates, ¼-in. and heavier, 3.125c.; tank steel plates, 3/16-in., 3.33c.; blue annealed steel sheets, No. 10 gage, 3.85c.; black sheets, No. 28 gage, 4.60c.; galvanized sheets, No. 28 gage, 5.75c.; square twisted and deformed steel bars, 3.15c.; structural shapes, 3.125c.; diamond pattern plates, ¼-in., 4.80c.; 3/16-in., 5c.; spring steel, 4.25c.; round cold-rolled steel, 3.85c.; squares and hexagons, cold-rolled steel, 4.35c.; steel hoops, No. 13 gage and lighter, 4.25c.; steel bands, No. 12 gage to 3/16-in., inclusive, 3.825c.; rails, 3.025c.; tool steel, 8.50c.; Norway iron, 6.50c.

Old Material.—Based on actual sales during the past week, the market for iron and steel scrap has declined from 50c. to $1 on a number of grades, principally those that are not used in large quantities. This is largely due to the fact that consumers have been supplied with their requirements. Some of the leading grades, however, among them No. 1 heavy melting steel, are down 50c. Mixed borings and turnings for blast furnace use, however, have advanced 50c. and now this grade is quoted at $15.50 to $16. The Midvale Steel & Ordnance Co. during the past week bought 16,000 tons of No. 1 heavy melting steel for $20, delivered Johnstown; 1000 tons of high quality railroad steel at $23, several thousand tons of blast furnace turnings at $16, Coatesville, and also for Johnstown at $17, and several thousand tons of bundled sheets at $17, Johnstown. Embargoes have checked shipments of finished steel from mills and it is claimed that this has been an element in the tone of the scrap market, and that it will disappear with freer transportation and greater movement of steel from the mills, permitting greater operations.

We quote for delivery at consuming points in the district as follows:

No. 1 heavy melting steel	$18.00 to $19.00
Scrap rails	18.00 to 19.00
Steel rails for rolling	21.00 to 22.00
No. 1 low phos., heavy 0.04 and under	25.00 to 27.00
Cast iron car wheels	23.00 to 24.00
No. 1 railroad wrought	23.00 to 23.50
No. 1 yard wrought	20.00 to 21.00
No. 1 forge fire	16.00 to 17.00
Bundled sheets (for steel works)	16.00 to 17.00
No. 1 busheling	15.50 to 16.00
Turnings (short shoveling grade for blast furnace use)	16.00 to 17.00
Mixed borings and turnings (for blast furnace use)	15.50 to 16.00
Machine shop turnings (for steel works use)	16.00 to 17.00
Machine-shop turnings (for rolling mill use)	16.00 to 17.00
Heavy axle turnings (or equivalent)	17.00 to 17.50
Cast borings (for steel works and rolling mills)	16.50 to 17.50
Cast borings (for chemical plants)	23.00 to 25.00
No. 1 cast	23.00 to 24.00
Heavy breakable cast (for steel plants)	21.00 to 22.00
Railroad grate bars	17.00 to 17.50
Stove plate (for steel plant use)	16.50 to 17.00
Railroad malleable	15.50 to 16.50
Wrought iron and soft steel pipes and tubes (new specifications)	16.00 to 17.00
Shafting	25.00 to 28.00
Steel axles	30.00 to 31.00

Plates.—While the range of quotations for plates continues to be 2.10c. to 2.50c. base, Pittsburgh, tonnage is freely available at 2.15c. to 2.25c. for fairly early delivery. Demand is fair and comes chiefly from the railroads in connection with car and locomotive work. Shipments of both universal and sheared material are being made in two to three weeks. The Pennsylvania Railroad to-day obtained quotations on 5000 tons of car plates for first quarter delivery.

Bolts, Nuts and Rivets.—Only moderate demand exists for bolts, nuts and rivets, railroads being the principal buyers. Deliveries are being made in six to eight weeks.

Boston

Domestic and Foreign Iron Sales Fall Off —Prices Are Shaded

BOSTON, Oct. 10.—Business in foreign and domestic iron in this territory the past week fell off noticeably, and some shading of prices is reported. Scotch iron, silicon 2.50, is offered at $28 c.i.f. dock, duty paid. Sales for the week, however, include November and December iron at $30.75, $31 and $31.50 dock, duty paid. Continental iron sold in a small way on a basis of $26.75 dock, duty paid. French, equal to No. 2X, is offered for fourth and first quarter at $28 on dock, duty paid, and English fourth quarter at $26.50 to $30.75. These prices in some instances represent a shading, and are so much less than those quoted on domestic iron that sales of the latter are confined to small tonnages for mixture purposes. Sales of domestic included several hundred tons of Buffalo iron with silicons ranging from 1.75 to 3.50, fourth quarter, and 100 tons No. 2 plain, first quarter, at $32, furnace, base. Additional small tonnages of Duluth iron at $32.50, base Buffalo, changed hands. A New Hampshire melter took 100 tons, silicon 1.75 to 2.25, of this iron and is considering two 100 ton lots of foreign in preference to domestic because of the spread in prices. A sale of 500 tons of lake charcoal first quarter at $33 furnace base is noted. Business in eastern Pennsylvania iron is unimportant. Where silicon differentials of $1 exist, there have been modifications in offers by sellers, but this practice is not general. There is due to arrive at Boston this week 3800 tons and at Portland, Me., 3850 tons of Scotch iron, most of which is sold.

We quote delivered prices, on the basis of the latest reported sales, now infrequent, and as follows, having added to furnace prices $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia and $9.60 from Alabama:

East. Penn., sil. 2.25 to 2.75	$35.65 to $37.65
East. Penn., sil. 1.75 to 2.25	34.65 to 36.65
Buffalo, sil. 2.25 to 2.75	37.91 to 38.41
Buffalo, sil. 1.75 to 2.25	36.91 to 37.91
Alabama, sil. 2.25 to 2.75	38.10
Alabama, sil. 1.75 to 2.25	37.60
Virginia, sil. 2.25 to 2.75	38.92
Virginia, sil. 1.75 to 2.25	37.92

Soil Pipe.—Where Pennsylvania and other makers of soil pipe were behind on deliveries a month or so ago, and New England makers were securing premiums for prompt shipments, the situation to-day is different. Stockers of pipe in this territory have received practically all stock on contract, consequently New England makers find small outlet for their product. Prices have dropped 10 per cent, being 33, 10, 10 and 5 per cent discount from list prices, as compared with 33, 10 and 5 per cent a month ago. Fittings are 19, 10, 10 and 5 per cent discount from list prices.

Finished Material.—The activity of bolts and nuts, buying of which has been in anticipation of higher prices, was the outstanding feature of the local finished material market the past week. Railroads were the heaviest buyers, but orders came from practically all users as well as from hardware jobbers. Bars were in fair demand, while other mill products sold in small tonnages. Street railway interests are expected to close this week on sizable rail tonnages. No important structural steel tonnages have been closed recently. The Osgood, Bradley Car Co., Worcester, Mass., has booked an order for 100 electric cars for the United Electric Railways, Providence, R. I., at an average cost of $12,000.

Warehouse Business.—Warehouse sales of iron and steel so far this month have held well. The character of buying has not changed, individual orders being for small lots, while the number of orders received weekly is large. Stocks are in good condition. Structural steel, angles, channels and beams in stock lengths and ¼ in. and heavier plates have been reduced 18½c. per 100 lb., while Norway iron has advanced an additional 10c. per 100 lb. Prices on iron and steel otherwise remain unchanged. Quite a number of price changes, etc.

Jobbers quote: Soft steel bars, $3.25 per 100 lb. base; flats, $3.85; concrete bars, 3.16½c.; structural steel, $3.25 to $3.50; tire steel, $4.50 to $4.85; open-hearth spring steel, $5 to $6.50; crucible spring steel, $12; steel bands, $4.25; hoop steel, $4.75; cold rolled steel, $4 to $4.50; refined iron, $3.25; best refined iron, $4.50; Wayne iron, $5.50; Norway iron, $6.60 to $[illegible]; [illegible]; No. 10 blue annealed sheets, $4.15 per 100 lb. base; No. 28 black sheets, $5.40; No. 28 galvanized sheets, $6.40.

Coke.—New England producers of by-product foundry coke are doing even better than heretofore in the matter of shipments of contract fuel, notwithstanding increased shipping instructions. Because of this fact, the demand for spot coke at $19.50 is practically nil. Both the New England Coal & Coke Co. and the Providence Gas Co. continue to quote contract coke at $16.50 where the local freight does not exceed $3.10. The demand for Connellsville district fuel at $14.50 ovens or $20.05 delivered, for English coke at $14 to $14.50 on cars dock, and for Alabama coke at $16.50, delivered common rate points, therefore has dropped to small proportions. The city of Boston is dickering for a large tonnage of Alabama coke at around $14.50 Boston Navy Yard, which, if purchased, will be sold to household consumers. There is due to arrive at Boston this week 5100 tons of English beehive and by-product coke, and at Portland, Me., 4600 tons. Both cargoes are sold.

Old Material.—The market is less active and soft spots in prices have cropped up. New England melters bought cast freely early in the week. All but one large buyer are out of the market to-day, however. This concern took 2000 to 3000 tons, grade, other than charging box size, not specified, at around $20, delivered. The lowest sellers have done on No. 1 machinery cast the past few days is $22, delivered, a decline of 50c., but strictly textile cast brings $22.50. Jobbing foundries were not much of a factor in cast on this buying movement. Congestion at Youngstown and at Pennsylvania points has checked heavy melting steel buying and taken the edge off prices. The best some firms have done the past day or two is $15.50, shipping point, as against $16 and $16.50, heretofore. As high as $18 shipping point, or $23.50 delivered was paid for chemical borings, $12.50 shipping point for machine shop turnings for rolling mill use, and $12 for mixed borings and turnings, these prices representing advances. Doubt is expressed by the trade in general as to a possibility of a duplication of these prices to-day, however. Sales for the week include a large tonnage of No. 1 yard wrought at $19 delivered New England consuming point, which figures in keeping with $15.50 No. 1 heavy melting steel. Several cars of cotton ties at $9.50 to $10 shipping point, for Pennsylvania consumption, changed hands.

[illegible] delivered consuming points:

No. 1 machinery cast	$22.00 to $22.50
[illegible]	[illegible]
Stove plate	17.50 to 18.00
[illegible]	[illegible]

[illegible] o.b. Boston rate shipping points:

No. 1 heavy melting steel	$15.50 to $16.00
No. 1 railroad wrought	16.50 to 17.00
No. 1 yard wrought	14.50 to 15.00
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
Cast iron borings, chemical	17.00 to 17.50
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]

St. Louis

Very Little All Rail Movement of Pig Iron from Alabama Furnaces

ST. LOUIS, Oct. 10.—A fair amount of business is being done in pig iron for prompt shipment, but melters for the most part take very little interest in their future requirements, nor are makers eager to take on business except for prompt shipment. The market is firm at $32, Chicago, for Northern iron while the price of the Southern make ranges from $27.50 to $30, Birmingham. Sales for the most part were confined to from a carload to 200 tons. The Granite City maker sold several thousand tons of basic, on which the furnaces still are operating, and several thousand tons of foundry iron to East Side melters, with scattering orders amounting to 600 to 900 tons. The Sloss-Sheffield company sold 1000 tons of foundry iron to a general foundry for water and rail shipment. Its price is $30, Birmingham. Because of the rail situation the amount of Southern iron coming through by all rail movement is negligible, and until the congestion is relieved, sales agents feel that it is futile to make any effort to sell for shipment from Birmingham. The foundry business in St. Louis and in Belleville is good. One or two inquiries were received for prices for first quarter and first half delivery, and one buyer was bold enough to ask for prices for third quarter (1923) delivery.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago, $3.28 from Birmingham (rail and water), $5.17 from Birmingham, all rail, and 81 cents average switching charge from Granite City:

Northern foundry, sil. 1.75 to 2.25	$34.16
Northern malleable, sil. 1.75 to 2.25	34.16
Basic	34.16
Southern foundry, sil. 1.75 to 2.25	$32.67 to 35.17

Finished Iron and Steel.—The buying of material by railroads is not so brisk as it has been the previous two weeks but is still fairly active. The only new rail inquiry came from the San Antonio & Aransas Pass Railroad, which wants 5500 tons of rails. The Pennsylvania lines west of Pittsburgh wanted 100,000 tie plates, and the Mobile & Ohio Railroad is in the market for 200 wheels. The Missouri-Kansas-Texas Railway bought 2000 kegs of track bolts and 4500 kegs of spikes from the Illinois Steel Co. The same road bought five boilers from the Babcock & Wilcox Co. and the super-heaters for these boilers from the Superheater Co., being for its shops at Bellmead, Tex. Charcoal iron boiler tubes have advanced five points. The most favored plan for the new Broderick & Bascom Rope Co. building is structural steel, which plans involve 533 tons.

For stock out of warehouse we quote: Soft steel bars, 2.90c. per lb.; iron bars, 2.90c.; structural shapes, 3c.; tank plates, 3c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, cold rolled, one pass, 4.85c.; cold drawn rounds, shafting and screw stock, 3.90c.; structural rivets, 3.60c. per 100 lb.; boiler rivets, 3.70c.; tank rivets, ⅞ in. and smaller, 60 per cent off list; machine bolts, large, 50 and 10 per cent; smaller, 50-10 and 10 per cent; carriage bolts, large, 55-5 per cent; small, 60 and 10 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon blank, $3.50; and tapped, $3.25 off list.

Coke.—The demand for coke continues strong, with prices unchanged. With a more liberal movement of coal to its plant, the Granite City by-product maker has increased its production of coke, and is now more nearly satisfying the needs of customers in its natural territory. Their price is $14 at the ovens. The market on Connellsville coke is $14 at the ovens, and, while the movement is slow, a few cars are being received here.

Old Material.—The first railroad lists of any consequence for three months are before the market this week. If the roads are able to make deliveries promptly, these offerings are expected to have a softening effect on the market. The railroads have been unable until now to spare the labor to pick up the old material. The lists before the market follow: Wabash, 1100 tons; Mobile & Ohio, 800 tons; Pennsylvania, 2300 tons; Missouri-Kansas-Texas, 350 tons; Kansas City Southern,

350 tons, and Terminal Railway Association, 4800 tons. Local dealers are in a position to absorb these offerings. Users of material are busy, but no sales of consequence were made during the week.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards as follows:

	Per Gross Ton	
Old iron rails	$20.50 to	$21.00
Rails for rolling	22.00 to	22.50
Steel rails, less than 3 ft.	22.00 to	22.50
Relaying rails, standard section	26.00 to	29.00
Cast iron car wheels	24.00 to	25.00
No. 1 heavy railroad melting steel	21.00 to	21.50
No. 1 heavy shoveling steel	17.50 to	18.00
Ordinary shoveling steel	17.00 to	17.50
Frogs, switches and guards cut apart	20.00 to	21.00
	Per Net Ton	
Heavy axles and tire turnings	11.50 to	12.00
Steel angle bars	17.00 to	17.50
Iron car axles	26.00 to	26.50
Steel car axles	25.00 to	25.50
Wrought iron bars and transoms	23.00 to	23.50
No. 1 railroad wrought	17.00 to	17.50
No. 2 railroad wrought	17.00 to	17.50
Railroad springs	21.00 to	21.50
Steel couplers and knuckles	21.00 to	21.50
Cast iron borings	11.00 to	11.50
No. 1 busheling	17.00 to	17.50
No. 1 railroad cast	20.00 to	20.50
Railroad malleable	20.25 to	20.75
Machine shop turnings	9.50 to	10.00

Cincinnati

Shipments Moving More Freely from the South —Pig Iron Dull

CINCINNATI, Oct. 10.—Pig iron sales and inquiries during the week have been light. The car situation, especially in the South, has eased up somewhat and iron is moving. This is thought to have contributed to the scarcity of inquiries during the week. Melters who received shipments against contracts were not compelled to resort to fill-in tonnages. Jisco and Milton furnaces are operating on silvery. Inquiries before the trade include that of a Tennessee melter for 500 tons of Southern iron and 1000 tons of malleable for a northern Illinois melter, both of which are for first quarter, 1923. A large pump manufacturer is inquiring for 350 tons for fourth quarter and an Illinois interest is asking for 300 tons of Southern iron. Sales during the week include two 150-ton lots of Southern iron at around $28 and 300 tons of Southern iron, silicon 3.25 to 3.75, to a central Ohio melter. Two hundred tons of high sulphur iron was sold and a sale of 100 tons of Northern iron at a reported price of $33 is noted. Two hundred tons of silvery was taken by a northern Ohio melter.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (No. 1)	$31.77 to 32.27
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	31.77 to 32.27
Ohio silvery (nominal), 8 per cent	33.27 to 34.27
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	34.27 to 36.27
Basic Northern	34.77
Malleable	34.27 to 36.27

Finished Material.—Good demand coupled with the adverse condition of being unable to deliver is the situation in this district, car shortage still greatly hampering operations all around. A shipment from a local warehouse of 30 tons of bar angles to an electrical concern in Indiana, and making up only a part of the total tonnage required, has furnished a concrete example tending to show that large buyers are in the market for quick shipment from whatever source. Some mills are sold up for fourth quarter and it is reported that some business for first quarter is being booked. There is a strong demand for almost all products. Bars are active and prices from 2.10c. to 2.25c. are noted. Automobile sheets are in good demand at $5 and some mills are booked for fourth quarter. On sheets the price range of independent companies is 2.60c. to 2.75c. on blue annealed, 3.50c. to 3.65c. on black and 4.50c. to 4.65c. on galvanized. Orders are being booked at both maximum and minimum prices quoted. There is little new activity in the structural field. A doctors' building, of reinforced concrete, to cost $1,500,000 exclusive of the value of the site, will be erected at Garfield Place in Cincinnati. Bids for the general contract are expected to be out in about four or five weeks, and the requirements in bars to be known shortly thereafter. An inquiry is out for 50 tons of concrete bars for the gymnasium of Ohio University, Athens, Ohio. Three sheet mills at the Ashland plant of the American Rolling Mill Co., Middletown, Ohio, are in operation, as well as all of the sheet mills at the Middletown and Zanesville plants of this company. At the Newport Rolling Mill Co., Newport, Ky., operation is at 75 per cent capacity, or 15 out of 20 mills. Kelly Nail & Iron Co., Ironton, Ohio, has resumed operations in its wire and wire nail departments. The Big Four Railroad bought approximately 3000 tons of tie plates from a Pittsburgh manufacturer.

Warehouse Business.—There has been a big demand for reinforcing bars, the movement of a considerable quantity by one dealer being noted. There has also been a very good demand for hoops and bands as well as for most of the other stock usually carried. Poor shipments from the mills, however, caused in turn by the car shortage, are seriously retarding business.

Cincinnati jobbers quote iron and steel bars 2.95c. base; reinforcing bars, 3.05c. base; hoops 4.05c. base; bands, 3.85c. base; shapes and plates, 3.05c. base; cold-rolled rounds, 3.75c. base; cold-rolled flats, squares and hexagons, 4.25c. base; No. 10 blue annealed sheets, 4c.; No. 28 black sheets, 4.70c.; No. 28 galvanized sheets, 5.75c.; No. 9 annealed wire, $3 per 100 lb.; common wire nails, $3.20 per keg, base.

Tool Steel.—Increased activity is noted in this field. It is reported that an anticipated price advance is causing consumers to cover needs of immediate future, as well as those of the present. Prices range from 70c. per lb. on regular grades of high speed steel to 90c. on special brands of some companies.

Coke.—Activity in coke is better, although car shortage is still a deterring factor. Activity in Connellsville coke is hampered also by operating difficulties, it being said that reservoirs are low and there is a lack of water for quenching. The outstanding activity of the week was the sale of 5000 tons of by-product furnace coke to a northern Ohio interest. Prices are firm on Connellsville furnace coke at $12 and standard foundry grades from $14 to $14.50. New River foundry is $14 to $15 and Wise County foundry coke is quoted at $12 to $14, furnace coke being $11. Pocahontas remains at $11 for furnace and $13 for foundry.

Old Material.—There has been very little activity in this market during the week, the shortage of cars being a contributing cause of the inactivity. Some buying by steel mills has been noted. Prices remain unchanged.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

	Per Gross Ton	
Bundled sheets	$13.00 to	$14.50
Iron rails	17.00 to	18.00
Relaying rails, 50 lb. and up	26.50 to	27.00
Rails for rolling	18.50 to	19.00
Heavy melting steel	17.50 to	18.50
Steel rails for melting	16.00 to	17.00
Car wheels	20.00 to	21.00
	Per Net Ton	
No. 1 railroad wrought	14.50 to	15.00
Cast borings	11.50 to	12.00
Steel turnings	10.50 to	11.00
Railroad cast	18.00 to	19.00
No. 1 machinery	21.00 to	21.50
Burnt scrap	12.00 to	12.50
Iron axles	20.50 to	21.00
Locomotive tires (smooth inside)	14.50 to	15.50
Pipes and flues	9.00 to	9.50

San Francisco

Higher Prices for Pig Iron with Foreign Grades Controlling

SAN FRANCISCO, Oct. 10.—Several considerations have contributed to bring higher prices in pig iron on the Coast, chief of which are the tariff of 75c., higher exchange, lack of steamer space and the 25s. freight rate being charged by various lines operating from Antwerp. The inability of domestic material to offer competition, due to high prices, is also contributing to the advance in foreign iron. The market at present is rather unsettled, and there is a rather wide range in prices named, but it is pretty well agreed that the minimum is around $28. For new contracts prices will

likely be around $30 or somewhat lower, c.i.f. coast ports. During the past fortnight it is estimated that around 1500 tons has been sold for future delivery. This includes English and Continental material. Several thousand tons of iron, contracted for a month or two ago, have arrived recently.

Coke.—There is a moderately good activity along the coast, and about 3000 tons has been sold in the two weeks period. While the prices are not divulged, they are understood to have been favorable. Since domestic coke is too high at present the business was confined to foreign. The foundry and smelter demand is steady, but not conspicuously large. Foreign beehive coke is quoted around $17.50, ex ship, coast ports, and by-product at $15.50.

Cast Iron Pipe.—The market on heavy pipe has been advanced $3 per ton in this district recently, and now 6-in. material is close to $55, delivered, and 4-in., $59. Both private and municipal business is very light at this time, and there is nothing of any note to report. The same holds true of conditions in soil pipe.

Finished Iron and Steel.—While the San Francisco district is not unusually active at the moment, a very good condition is reported in the South, especially in and around Los Angeles. The continued development of the oil fields close by is making for enlarging prosperity. Several very good sized tonnages for mixed materials have been placed of late, including one for 1900 tons of plates, shapes, rivets and accessory materials. The building movement appears to be holding up well, both in the South and in San Francisco, where several good sized structures are being erected. Moreover, apartment-house building is proceeding steadily. Prices on the heavy materials show no very perceptible change from two or three weeks ago. Plates are still quoted at widely varying prices by different interests, the range being from 2.45c. to 3c. delivered, according to mill and delivery. The trade is hesitant about taking on large stocks, apparently waiting for more stability in the market. The aggregate volume of business in sheets is considered satisfactory under present conditions, and prices are about the same as have been prevailing. Buyers are placing part of their fourth quarter contracts on large size machine bolts, which are generally quoted on the 50, 10 and 10 off basis. One small mill is offering lower, but its capacity is limited. The agent for a large interest reports having placed about 20 cars recently.

Old Material.—Prices on scrap are ruling firm, and the trend seems to be upward. The disability of the railroad freight service has been a factor in curtailing the movement of material, and this condition has been supplemented by some little export shipment. Holders have very firm ideas, ranging from $12.50 to $13 per gross ton, delivered at consumers' works, for heavy melting; and from $25 to $27 per net ton on cast iron scrap. Foundry demand at present, however, is not greater than normal, and only a small lot business is being done.

Colorado Fuel & Iron Co. Awarded Reparation

WASHINGTON, Oct. 10.—Examiner Woodrow, in a tentative report to the Interstate Commerce Commission, to-day recommended that the Commission should find that the switching charges assessed on carloads of brick and sand within the switching district of Pueblo, Col., during Federal control were unreasonable to the extent that they exceeded the charge of $6.50 per car and that the Colorado Fuel & Iron Co. should be awarded reparation on all the charges of said shipments in excess of $6.50 per car during this period.

The Chicago Section of the American Welding Society will hold its next monthly meeting on Friday, Nov. 3, 8 p. m., at the rooms of the Western Society of Engineers, Monadnock Block, Chicago. L. M. Zimmer, Linde Air Products Co., Chicago, will discuss Applications of the Oxy-Acetylene Process in the Chicago District.

Cleveland

Temporary Improvement in Car Supply—Pig Iron Shipments Curtailed

CLEVELAND, Oct. 10.—While a few of the mills report a better supply of cars during the past day or two, the improvement is regarded as only temporary. Ohio mills outside of Youngstown apparently are not affected as much by the car shortage as those in the Pittsburgh and Youngstown districts. Owing to the transportation situation, local consumers are suffering from lack of steel, but generally are able to secure cars to move their own product. Car shortage is also curtailing the movement of pig iron. One furnace is shipping practically no iron and another producer is securing cars for moving only 50 per cent of its product. Others are getting a fair car supply. The American Steel & Wire Co. has blown in another Central furnace, now having four in blast, and the Bourne-Fuller Co. expects to get its furnace started in a few days. At present 10 out of 12 furnaces in Cleveland are in blast. The coal movement up the lakes continues heavy. Last week Lake Erie docks shipped 1,100,000 tons of coal. Even with this large lake movement, coal has been arriving at docks somewhat faster than it can be shipped.

Iron Ore.—Nearly 1,000,000 tons of Lake Superior ore was placed on Lake Erie docks during September. On Oct. 1 the amount on docks was 9,028,708 tons as compared with 8,640,101 tons on Sept. 1. However, dock stocks are less than a year ago, the amount on dock Oct. 1 last year being 9,661,365 tons. Receipts at Lake Erie ports during September were 5,230,831 tons and for the season 23,902,450 tons. Shipments from these docks during September were 2,973,902 tons and for the season until Oct. 1 16,103,472 tons. The seamen's strike is having comparatively little effect on the movement of lake boats. Shipments of coal up the lakes continue heavy and there is as much fuel moving as the handling facilities at the upper end of the lakes will permit.

We quote delivered lower lake ports Old range Bessemer, 55 per cent iron, $5.95. Old range non-Bessemer, 51½ per cent iron, $5.20; Mesabi Bessemer, 55 per cent iron, $5.70. Mesabi non-Bessemer, 51½ per cent iron, $5.05.

Finished Material.—There is a fairly heavy demand for steel bars, particularly from the bolt and nut manufacturers, and a fair volume of activity in structural material, but the plate market is very dull. Wire is also in good demand. Some steel bar orders are being taken at 2.25c. for prompt delivery, but where immediate delivery is not required the price range is from 2c. to 2.10c. Structural material is quoted at 2c. to 2.15c. Plate prices are easier to the extent that some of the smaller mills that have been adhering to 2.50c. are now quoting 2.25c. in some cases. Two new inquiries have appeared for plates for oil stills, one for 500 and one for 600 tons. The Big Four Railroad received the following quotations in Cincinnati Oct. 5 on 1400 tons of tank plates and 300 tons of boiler plates, the price unless otherwise noted being f.o.b. Pittsburgh: Otis Steel Co., 2.25c., and the Worth Steel Co., 2.35c. for boiler plates; Midvale Steel & Ordnance Co., 2.20c.; Carnegie Steel Co., 1.95c.; Jones & Laughlin Steel Co., 2.25c.; Inland Steel Co., 2.30c., Indiana Harbor; Illinois Steel Co., 2.195c., Kankakee; Cleveland Steel Co., 2.35c., Cleveland. Activity in the building field has quieted down, but several buildings requiring round lots of material are still pending. An inquiry has appeared for 900 tons of steel for an addition to the Halle Bros. Co. store, Cleveland. Reinforced bars are quiet and hard steel bars are unchanged at 2c. to 2.10c. The Lackawanna Steel Co. has taken 1000 tons of rails for the Clover Leaf Railroad.

Jobbers quote steel bars, 2.91c.; plates and structural shapes, 3.01c.; No. 9 galvanized wire, 3.30c.; No. 9 annealed wire, 2.80c.; No. 28 black sheets, 4.40c.; No. 28 galvanized sheets, 5.40c.; No. 10 blue annealed sheets, 3.70c. to 3.76c.; hoops and bands, 3.71c.; cold-rolled rounds, 3.75c.; flats, squares and hexagons, 4.25c.

(*Continued on page* 968)

FABRICATED STEEL BUSINESS

Drop in Volume of Awards and Especially in New Projects

Among the fabricated steel awards of the past week are the following:

New York Central bridges [illegible] to the McClintic-Marshall Co.

Apartment house, Lexington Avenue and Sixty-ninth Street, 800 tons, to the Paterson Bridge Co.

American Locomotive Co., erecting shop, Schenectady, N. Y., 1000 tons, to an unnamed fabricator.

Corn Exchange Bank, Philadelphia, 800 tons, to an unnamed fabricator.

Erecting and machine shop, Pennsylvania Railroad, Juniata, 5500 tons, to the McClintic-Marshall Co.

West Penn power house, Springdale, Pa., 2500 tons, to an unnamed fabricator.

Power house, Potomac Public Service Corporation, Williamsport, Md., 1500 tons, to an unnamed fabricator.

Bascule bridge, Bridger Avenue, Los Angeles, Cal., Ross Construction Co., San Francisco, general contractor, 2551 tons, to American Bridge Co.

Atlas Tack Co. Building, St. Louis, 375 tons, to Stupp Brothers Bridge & Iron Co.

State of Idaho, bridge over Clearwater River, at Spalding, 267 tons, to unnamed fabricator.

Inland Glass Co. Building, Clearing, Ill., 107 tons, to unnamed fabricator.

Big Four Railroad bridge work, 200 tons, to McClintic-Marshall Co.

Theater, Allston, Mass., 150 tons, to the New England Structural Co.

Copley Theater, Boston, 100 tons, to the New England Structural Co.

Hospital, Waterville, Me., 150 tons, to the New England Structural Co.

Fortieth Street bridge, Philadelphia, 1300 tons, to the New York Shipbuilding Corporation.

Structural Projects Pending

Inquiries for structural steel work now being figured on include the following:

Mt. Vernon Car Mfg. Co., freight car repair shop, Mt. Vernon, Ill., 550 tons.

Broderick & Bascom Rope Co., factory building, St. Louis, 533 tons.

Reorganization of the entire operating and sales force of the Atlas Steel Corporation, a combination of the Atlas Crucible Steel Co., Dunkirk, N. Y., and the Electric Alloy Steel Co., Youngstown, is now being effected. Louis J. Campbell, located at Dunkirk, is in immediate charge of the new company, as chairman of the board of directors. Other officers of the company are: President, Arthur H. Hunter, of Buffalo, former president of the old Atlas company; vice-president, J. H. Roberts, who was assistant to Mr. Campbell in the Electric Alloy Steel company organization; W. D. Myres, secretary and assistant treasurer, and H. G. Nichols, treasurer and assistant secretary.

The John Lauson Mfg. Co., New Holstein, Wis., manufacturer of farm gas engines and tractors, has experienced so much improvement in business that a night shift has been added. A full day shift has been working on a full schedule since May. The principal call is for small gas engines, although tractor demand is increasing steadily.

Stockholders of the Superior Steel Corporation have been notified that there is now in the sinking fund $52,542 for the purchase of the company's first preferred stock and $34,164 for the purchase of the second preferred stock, which will be applied on Oct. 25. Holders of these shares have been invited to present tenders for sale to the corporation at a price not to exceed $115 a share.

RAILROAD EQUIPMENT BUYING

Nearly 5000 Cars Ordered and Fresh Business for More Than 5000

A steady run of car business continues but not in sufficient volume to lessen competition to any extent. The week's items include:

The Santa Fe, which, as reported last week, placed 1000 refrigerator cars and 500 stock cars with the American Car & Foundry Co., has also ordered 500 gondola and 150 caboose cars from the same builder, 1000 refrigerator, 1000 combination furniture and automobile and 500 stock cars from the Pullman Co. and 500 box cars from the Standard Steel Car Co., a grand total of 5150 cars.

The Western Pacific has placed 100 automobile cars with the General American Car Co.

The Nickel Plate has ordered 300 underframes from the Standard Steel Car Co.

The Chicago & Northwestern is inquiring for 800 ore cars.

The Rock Island is inquiring for 50 suburban coaches and is expected to enter the market for 2500 freight cars.

The New York, New Haven & Hartford Railroad recently placed an order with the Westinghouse Electric & Mfg. Co. for five 181-ton electric locomotives.

The Osgood Bradley Car Co., Worcester, has been given a contract for 100 trolley cars for the United Electric Railways Co., Providence, R. I. This is an additional order to one of 50 cars placed some months ago. The Bradley company has business on its books which, it is understood, will keep the plant running full until the middle of 1923.

The Interstate Railway has bought 1000 steel coal cars of the Pressed Steel Car Co.

The Central Railroad of New Jersey has entered the market for 65 passenger cars.

The Pere Marquette is expected to buy 2000 cars.

The Baltimore & Ohio has placed 30 baggage cars with the American Car & Foundry Co.

The steel rail distribution of the Chesapeake & Ohio is as follows: 7500 tons each to the Inland and Illinois steel companies, 4500 tons to the Carnegie Steel Co. and 5000 tons to the Bethlehem Steel Co.

Earnings of Ford Motor Co., Ltd. of Canada

The Ford Motor Co., Ltd., of Canada, Windsor, Ont., had net earnings of $5,006,521 in the fiscal year ended July 31, or equal to 71 per cent on the $7,000,000 stock of the company outstanding. The annual statement sent to shareholders shows $6,147,715 cash on hand July 31, 1922. Investments totaled $3,971,184; accounts receivable, $1,017,192; plant inventory, $4,560,908; goods inventory, $9,806,276. Surplus totaled, $12,537,972; reserves for depreciation and uninsured risks, $4,040,922 and current liabilities, $2,082,551. During the year dividends totaling $2,100,000 were paid. The company produced 45,000 cars and 1,192 tractors, compared with 46,832 cars and 3,062 tractors in the preceding year. Total value of sales amounted to $29,273,254, a reduction of $8,563,219 from the preceding year. The reduction was due mostly, however, to lower selling prices.

The annual report of the Keystone Steel & Wire Co., Peoria, Ill., for the year ending June 30, 1922, shows a profit of $664,677 before deducting interest, taxes and depreciation, and a total of $29,539 transferred to surplus after making necessary adjustments. The company's net sales for the year were $4,357,783 and its operating gain after allowing for bond interest and depreciation was $123,103, or approximately 2½ per cent on its total capital stock of $4,897,800.

The Westinghouse Electric & Mfg. Co. recently opened a service station at Johnstown, Pa., which is housed in a two-story brick building containing about 9000 sq. ft. of floor space. H. R. Larson is manager of the station.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Plates

[illegible]

Structural Material

Beams, channels, etc.....2.00c. to 2.25c.

Iron and Steel Bars

Soft steel bars, base, per lb.....2c. to 2.25c.
Refined iron bars, base, per lb.....2.60c.

Hot-Rolled Flats

Hoops, base, per lb.....2.90c. to 3.25c.
Bands, base, per lb.....2.90c. to 3.25c.
Strips, base, per lb.....2.90c. to 3.25c.
Cotton ties, per bundle of 45 lb.....$1.13

Cold-Finished Steels

Bars and shafting, base, per lb.....2.50c.
Strips, base, per lb.....4.50c.

Wire Products

Nails, base, per keg.....$2.70
Bright plain wire, base, per 100 lb.....2.45
Annealed fence wire, base, per 100 lb.....2.45
Galvanized wire, base, per 100 lb.....2.95
Galvanized barbed, base, per 100 lb.....3.35
Galvanized staples, base, per keg.....3.35
Painted barbed wire, base, per 100 lb.....3.00
Polished staples, base, per keg.....3.00
Cement coated nails, base, per count keg.....2.20
Woven fence, carloads (to jobbers).....70½ per cent off list
Woven fence, carloads (to retailers).....65 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads...50 and 5 per cent off list
Machine bolts, small, cut threads....50 and 10 per cent off list
Machine bolts, larger and longer....50 and 10 per cent off list
Carriage bolts, ⅜ x 6 in.:
Smaller and shorter, rolled threads, [illegible] per cent off list
Cut threads .....50 per cent off list
Longer and larger sizes.....50 per cent off list
[illegible] per cent off list
Plow bolts, Nos. 1, 2 and 3 heads....50 and 10 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.: [illegible] per cent off list
Larger and longer sizes.....45 per cent off list
Hot pressed square or hex. blank nuts...$3.25 to $3.50 off list
Hot pressed nuts, tapped.....3.25 to 3.50 off list
C.p.c. and t. sq. or hex. nuts, blank.....3.25 to 3.50 off list
C.p.c. and t. sq. or hex. nuts, tapped.....3.25 to 3.50 off list
Semi-finished hex. nuts: [illegible] per cent off list
⅜ in. and larger, U. S. S.....70, 10 and 2½ per cent off list
Small sizes, S. A. E.....80 and 5 per cent off list
S. A. E., ⅜ in. and larger.....75 and 5 per cent off list
Stove bolts in packages.....80 and 5 per cent off list
Stove bolts in bulk.....80, 5 and 2½ per cent off list
Tire bolts .....50, 10 and 10 per cent off list

Cap and Set Screws

Milled square and hex. head cap screw.....75 per cent off list
Milled set screws.....75 per cent off list
Upset cap screws.....75 and 10 per cent off list
Upset set screws [illegible] per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb.....$3.15
Large boiler rivets, base, per 100 lb.....3.25
Small rivets [illegible] per cent off list

Track Equipment

Spikes, 9/16 in. and larger, base, per 100 lb....$2.75 to $2.85
Spikes, ½ in. and smaller, base, per 100 lb.....3.50
Spikes, boat and barge, base, per 100 lb.....3.50
Track bolts, base, per 100 lb.....3.85 to 4.50
Tie plates, per 100 lb.....2.35 to 2.50
Angle bars, base, per 100 lb.....2.75

Welded Pipe

Butt Weld

Black	Inches	Galv.
[illegible]	¼ to ⅜ ...+ 7	[illegible]
[illegible]	½	8
[illegible]	¾	11
[illegible]	1	15

Lap Weld

[illegible]	61	1¼	2	20	17
½ to 6	62	2	2½ to 6	22½	19
7 to 8	62	2½	7 to 12	30	17
9 to 12	61	3 to 12			

Butt Weld extra strong, plain ends

[illegible]	47½	31	¼ to ⅜	17	+ 18
½ to ⅜	3	26½	½	25	12
½	49	18½	¾	32	18
¾	64	53⅜	1 to 1½	34	20
1 to 1½	66	5[illegible]			
2 to 3	67	56½			

Lap Weld, extra strong, plain ends

[illegible]	59	43½	2	30	17
2½ to 4	61	32½	2½ to 4	33	21
4½ to 6	62	51½	4½ to 6	32	20
7 to 8	58	1[illegible]	7 to 8	29	13
9 to 12	52	39½	9 to 12	26	8

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 and 2½ per cent.

Boiler Tubes

Lap Welded Steel

1¾ in. [illegible] 2½ to 2¾ in. [illegible]
2 to 2¼ in. [illegible] 3 to 3½ in. [illegible]
2½ to 3 in. [illegible] 4 to 4½ in. [illegible]
3¼ to 12 in. [illegible] 5 to 5½ [illegible]

Charcoal Iron

1½ in. .....+ 7
1¾ to 1⅞ in. 3
2 to 2¼ in. 13
2½ to 3½ in. [illegible]
3¾ to 4½ in. [illegible]

To large buyers of steel tubes a supplementary discount of 5 per cent is allowed.

Standard Commercial Seamless Boiler Tubes

Discounts on cold-drawn tubes in carload lots, f.o.b. Pittsburgh, follow:

1 in. [illegible]
1¼ and 1½ in. [illegible]
1¾ in. 33
2 and 2¼ in. 36
2½ and 2¾ in. 40
3 to 3½ in. [illegible] 44
4 to 4½ in. [illegible] 49
5 in. [illegible] 51

Hot Rolled

3 in. [illegible]

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon steel: [illegible] per cent off list
Carbon 0.30 to 0.40, base.....83 per cent off list
Plus usual differentials and extras for cutting.

Seamless Locomotive and Superheater Tubes

Cents per Ft.		Cents per Ft.	
2-in. O.D. [illegible] gage.	[illegible]	2¼-in. O.D. 10 gage	17¾
2-in. O.D. 11 gage	14	3-in. O.D. 7 gage	33
2-in. O.D. 10 gage	15	1½-in. O.D. 9 gage	13
2¼-in. O.D. 12 gage	15	[illegible]	[illegible]
2¼-in. O.D. 11 gage	16	5½-in. O.D. 9 gage	53

Tin Plate

Standard cokes, per base box..... [illegible]

Terne Plate

(Per package, 200-lb.)

8-lb. coating ..... $9.30 | 25-lb. coating I. C.... $14.25
8-lb. coating I. C. [illegible] | 30-lb. coating I. C.... 15.25
15-lb. coating I. C.... 11.80 | 35-lb. coating I. C.... 16.25
20-lb. coating I. C.... 13.00 | 40-lb. coating I. C.... 17.25

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....2.50c. to 2.85c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.35c. to 3.80c.

Galvanized

No. 28 (base), per lb.....4.35c. to 4.85c.

Tin-Mill Black Plate

No. 28 (base), per lb.....3.35c. to 3.75c.

Manufacturers have pamphlets, which can be had upon application, giving price differentials for gage and extras for length, width, shearing, etc.

Freight Rates

All rail freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, [illegible]

Philadelphia, export	0.235	Cleveland	0.215	St. Louis	$0.43
Baltimore, domestic	0.315	Cleveland, Youngstown	[illegible]	Kansas City (pipe)	0.735
Baltimore, export	0.225	[illegible]	[illegible]	St. Paul	0.595
New York, domestic	0.34	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Cincinnati	0.295	[illegible]	[illegible]
[illegible]	[illegible]	Indianapolis	0.31	Omaha (pipe)	0.765
[illegible]	[illegible]	Chicago	0.34	Denver	1.275
[illegible]	[illegible]	[illegible]	[illegible]	Denver (pipe)	1.215

Pacific Coast	$1.50
Pac. Coast, ship plates	1.20
Birmingham	0.69
[illegible]	[illegible]
Jacksonville, all rail	0.50
Jacksonville, rail and [illegible]	[illegible]
New Orleans	0.[illegible]

[illegible]

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
Oct	Lake	Electro-lytic*	New York	New York	St Louis	New York	St. Louis
4	14.25	13.75	32.75	6.60	6.30	7.10	6.75
5	14.25	13.75	32.80	6.60	6.30	7.05	6.70
6	14.25	13.75	32.87½	6.60	6.25	7.00	6.65
7	14.12½	13.75	....	6.60	6.30	7.00	6.65
9	14.12½	13.75	33.25	6.60	6.35	7.00	6.65
10	14.12½	13.75	33.50	6.60	6.35	6.97½	6.62½

*Refinery quotation.

New York

NEW YORK, Oct. 10.

The markets are quiet and generally devoid of feature. Only a moderate business is reported in copper. The tin market is stronger on a fair turnover. Both the lead and zinc markets are quiet and somewhat easier.

Copper.—New business in electrolytic copper is not heavy for domestic consumption but foreign sales continue large. American consumers are pretty well covered for this year and the industrial congestion has slowed up demand to some extent. Buying is spasmodic, fairly heavy one day and light the next. In export, if one country drops out of the market, another takes its place, so that the volume does not diminish. Prices continue firm at 13.75c., refinery, or 14c., delivered, for the balance of this year. The outstanding fact is that, while the other metals have sharply advanced in recent weeks, copper has remained stationary. Lake copper is slightly easier at 14.12½c. to 14.25c., delivered.

Tin.—Sales of Straits tin in the week covered by this report have amounted to about 800 tons, mostly spot and October delivery, with both consumers and dealers the buyers. On Thursday, Oct. 5, about 300 tons changed hands at 32.75c. to 32.87½c. and on the next day, Oct. 6, fair sales were made at 32.87½c., some business also being done on Saturday at the same price. Yesterday a moderate business was reported at 33.25c., with bids at 33.12½. for any delivery along the line. To-day the market was also moderately active with spot Straits tin quoted at 33.50c., New York. The explanation of the fairly active market on the days referred to is that only two steamers can make October delivery, and therefore a scarcity seems possible. The London market was also strong to-day at £165 2s. 6d. for spot standard, £166 5s. for future standard, and £165 12s. 6d. for spot Straits. Arrivals thus far this month have been 3445 tons, with 7118 tons reported afloat.

Lead.—Somewhat to the surprise of the trade the American Smelting & Refining Co. advanced its price on Oct. 6 to 6.30c., St. Louis, and 6.50c., New York. Just previous to this the market in some sections was easier and 200 tons was sold on Oct. 5 at 6.25c., St. Louis. With the announcement referred to, the market stiffened in the West and has remained fairly strong since then. Some profit-taking lots have slightly eased the market here and there, but on the whole lead is still scarce and there is no large surplus. The outside market is quoted at 6.35c., St. Louis, or 6.60c., New York.

Zinc.—Prices for prime Western have eased considerably and the metal is now quoted at 6.60c. to 6.65c., St. Louis, or 6.95c. to 7c., New York, for early delivery. This reaction is regarded as temporary and is caused by the inability of galvanizers and some other consumers to ship their product. For prompt delivery the metal is still rather scarce, despite the slackening in demand. Prompt delivery, if obtainable, would easily bring 6.65c., St. Louis. High grade zinc is selling as high as 7.75c., delivered.

Antimony.—The market is without feature and Chinese metal in wholesale lots for early delivery is quoted at 6.65c. per lb., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is not officially quoted at present by the leading interest, but the same grade imported from foreign producers is quoted at 20c. to 21c. per lb., New York, duty paid.

Old Metals.—The market is firm but not so active except in white metals which are moving freely. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	13.00
Copper, heavy and wire	13.00
Copper, light and bottoms	11.50
Heavy machine composition	10.00
Brass, heavy	8.25
Brass, light	6.50
No. 1 red brass or composition turnings	9.50
No. 1 yellow rod brass turnings	7.50
Lead, heavy	5.00
Lead, tea	4.00
Zinc	4.25

Chicago

OCT. 10.—The metals are unchanged except for a decline in zinc. Offerings of zinc have been considerable and with buyers few a sharp reaction is looked for. Lead was a drug on the market early last week, but following an advance by the leading producer offerings were suddenly withdrawn and the situation reversed. Fair sales of copper and tin are being made, but buying has not been of a spectacular nature and prices are unchanged. Old metal prices remain the same. We quote, in carload lots, lake copper, 14.50c.; tin, 34c. to 34.50c.; lead, 6.37½c.; spelter, 6.75c.; antimony, 8.50c. in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 11c.; copper bottoms, 9.75c.; red brass, 9c.; yellow brass 7c.; lead pipe, 4.50c.; zinc, 4c.; pewter, No. 1, 20c.; tin foil, 22.50c.; block tin, 26c., all buying prices for less than carload lots.

St. Louis

OCT. 10.—Lead is 15 points higher and zinc 5 points less than last week. We quote: Lead, 6.50c., carlots; zinc, 6.80c. On old material we quote: Light brass, 3.50c.; heavy red brass and light copper, 7c.; heavy yellow brass, 4c.; heavy copper and copper wire, 7.50c.; zinc, 2c.; lead, 3c.; pewter, 15c.; tin foil, 20c.; tea lead, 2c.; aluminum, 9c.

Continuation schools in Wisconsin were attended during the year ended June 30, 1922, by 49,225 pupils, an increase of more than 2000 over the previous year, according to the annual report of the Wisconsin State Board of Vocational Education. The cost of operation was $2,108,902. Attendance in day schools was 24,541, or 12,298 boys and 12,243 girls; in night schools, 24,684, or 11,375 boys and 13,309 girls. The increase is ascribed in part to the operation of the compulsory part-time education law enacted by the Wisconsin Legislature in 1921, requiring that all children up to the age of 18 must take some school work if employed. The Wisconsin continuation school system is considered the largest operated by any state in the Union.

A company selling a refrigerating plant not equipped with safety devices as required by the Wisconsin laws and regulations promulgated by the Industrial Commission is not liable thereunder, as the purchaser and not the seller is considered to be installing the plant, according to an opinion of the state attorney general. The Industrial Commission asked if the company selling the plant, f.o.b. factory, sending an engineer at the purchaser's request and expense to erect and install it, could be prosecuted if the plant was not equipped with the required safety devices. The liability rests upon the purchaser, according to the opinion.

Walter E. Dryer & Sons, Homer, Mich., recently incorporated for $125,000, will manufacture dredges and dredging machinery. Its plans contemplate the extension of the present plant, which is already adequately equipped with heavy machinery. Contract dredging will also be done. The officers are: Walter E. Dryer, president and treasurer; Guy Dryer, vice-president; James H. Dryer, construction engineer; E. W. Dryer, general manager; E. D. Dickinson, secretary.

Cleveland Iron and Steel Market

(Continued from page 964)

Pig Iron.—The market continues very dull with purchases for the most part limited to small lots for immediate needs. Some inquiries have come up for round lots of foundry iron for the first quarter of next year, but furnaces, with one exception, have refused to quote for that delivery. The price tendency is still downward. With foundry iron at $32 in Buffalo and Chicago and at less distant shipping points, or fully $2 per ton lower than in Cleveland, there is a disposition among some producers to get their prices down to more nearly on a level with the prices that are prevailing at other points in the Central Western territory. Sales of foundry iron in car lots were made during the week at $34 and $35 furnace, but sellers admit that they would have to go lower on round lot inquiries, as outside lake furnace iron could be purchased at a Cleveland delivered price of about $34. One lake furnace interest is now quoting foundry iron at $32 to $33, having reduced its maximum price 50c. per ton during the week and has made quotation of $31 to $32 for the first quarter of next year. On basic iron, quotations of $32 have appeared in the Valley district and there are reports that some producers might go to $31.50. Sales of low phosphorus iron in car lots are reported at $37 and $38 as compared with $39 a week ago. Southern iron is unchanged, but consumers are looking for lower prices and are buying only for immediate need. The McKinney Steel Co. has blown in its fourth River furnace in Cleveland and the Hanna Furnace Co. expects to start up its Cherry Valley stack at Leetonia, Ohio, within a few days.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and a $6 rate from Birmingham:

Basic, Valley furnace, nominal	$32.00
Northern No. 2 fdy., sil. 1.75 to 2.25	34.00 to 35.00
Southern fdy., sil. 1.75 to 2.25	34.00 to 36.00
Malleable	34.00 to 35.00
Ohio silvery, sil. 8 per cent	44.52 to 45.52
Standard low phos., Valley furnace	37.00 to 38.00

Semi-Finished Steel.—No sales are reported, but the market is apparently established at $40, Youngstown, for sheet bars, billets and slabs.

Sheets.—Prices generally are firm, although one Valley mill has reduced its price on galvanized sheets in the heavy gages from 4.75c. to 4.50c. Minimum quotations of independent mills are 3.50c. for black, 4.50c. for galvanized, 2.60c. for blue annealed. Warehouse stocks recently offered by independent mills at the prevailing Steel Corporation prices were not in large tonnages. Some of the independent mills have advanced the extra from 25c. to 35c. for single pickling and patent leveling and from 50c. to 70c. for double pickling. Consumers are crowding mills for deliveries on contracts, but new orders are light.

Strip Steel.—A Valley district mill has advanced its prices $5 a ton to 3.50c. on hot-rolled strip steel in narrow gages, but continues to quote the wider gages at 3c.

Warehouse Business.—Local jobbers have advanced prices $3 a ton on cold-rolled steel. Other prices are unchanged.

Coke.—Sales in car lots of foundry coke are reported at $14 to $14.50 for standard Connellsville makes. Very little coke is being offered, but the demand is light.

Bolts, Nuts and Rivets.—Bolt and nut manufacturers are getting a few small current orders at the recent price advance, but most of the consumers have contracts at the old price. Orders on these contracts are heavy. Most rivet manufacturers are under contract, but some sales in small lots are being made at the recent $3 per ton price advance, which applies only to small lots orders.

Old Material.—With a price decline of $1 per ton on heavy melting steel and from 25c. to $1 on several other grades, the turn in the market that many had expected has appeared. Prices at present are soft and indications are that they may go somewhat lower. The easing-up in the price situation is attributed to various causes including limited buying by mills, the softening of pig iron prices and the difficulty in shipping scrap because of the car shortage. The large offerings by the railroads this month also had some effect. The prices which have been prevailing resulted in the offering of considerable scrap by producers, representing accumulations over a few months. As a result of the weakening in prices, more scrap has come on the market, particularly from dealers. Actual sales during the week were very light. There is no demand whatever from local mills for steel making grades.

We quote per gross ton, f.o.b. Cleveland, as follows:

Heavy melting steel	$19.50 to $20.00
Steel rails under 3 ft	21.00 to 22.00
Steel rails, rerolling	24.00 to 25.00
Iron rails	18.00 to 18.50
Iron car axles	26.00 to 27.00
Low phosphorus melting	20.50 to 21.00
Cast borings	14.00 to 15.25
Machine shop turnings	14.50 to 14.75
Mixed borings and short turnings	15.00 to 15.25
Compressed steel	17.50 to 18.00
Railroad wrought	18.00 to 18.50
Railroad malleable	20.00 to 21.00
Light bundled sheet stampings	14.50 to 15.00
Steel axle turnings	16.00 to 16.50
No. 1 cast	21.00 to 21.50
No. 1 busheling	14.25 to 14.50
Drop forge flashings over 10 in.	13.50 to 14.00
Drop forge flashings under 10 in.	14.00 to 14.50
Railroad grate bars	17.00 to 18.00
Stove plate	17.00 to 18.00
Pipes and flue	13.75 to 14.00

President Campbell's Views on Conditions in Steel Business

YOUNGSTOWN, Ohio, Oct. 10.—James A. Campbell, president Youngstown Sheet & Tube Co., predicts a moderate easing in steel demand during the winter, but enough business to permit mills to operate at 60 per cent. He predicts good 1923 business. The Sheet & Tube company is now operating at 75 per cent.

The present price structure is expected to hold fairly well, because of continued high costs. Owing to disappearance of demand from buyers willing to pay premiums, there has lately been some decline in quotations. On some products the mills are sold ahead through the quarter. In the Mahoning and Shenango valleys active iron capacity is at the highest rate in the past two years.

Final Proceedings of Lackawanna Purchase

E. G. Grace, president Bethlehem Steel Corporation, stated Oct. 10 that the meeting of the board of directors held that day was for the purpose of taking final action on formal matters with respect to the Lackawanna purchase. The transaction was completed that afternoon by delivery on the part of the Lackawanna company of all instruments for passing title to all its properties and the delivery on the part of Bethlehem to the Lackawanna company of the Bethlehem stock and cash agreed to be paid therefor.

The Lackawanna company is arranging for the delivery to its stockholders of its pro rata part of the Bethlehem stock and cash upon surrender of the stock of the Lackawanna Steel Co. held by such stockholders. The exchange is to be made at the office of Kean, Taylor & Co., 5 Nassau Street, and it is expected that it will begin about Oct. 27.

All corporate proceedings for the dissolution of the Lackawanna company have been taken and the dissolution papers are being filed.

Chucks and their uses are discussed in a little book published by the Skinner Chuck Co. The favorable reception given to this volume has led to the bringing out of a supplementary booklet of "Questions and Answers." This is intended to cover the questions arising in the minds of people handling chucks and to give correct and helpful answers.

PERSONAL

Charles A. Fitz-Gerald, for 18 years connected with the Sloss-Sheffield Steel & Iron Co., has been appointed sales agent at St. Louis for the western territory. His birthplace and home was Selma, Ala., where he attended the public schools and later the University of Alabama at Tuscaloosa. After several years' service in the transportation and traffic departments of the Southern Railway, he entered the employ of the Sloss-Sheffield Steel & Iron Co., Birmingham, in 1904. In 1911 he was made sales assistant at St. Louis.



CHARLES A. FITZ-GERALD

C. H. Sawyer, formerly Rochester manager of the Syracuse Supply Co. and later connected with its Syracuse office, has taken charge of the Syracuse office of R. D. Clarkson & Co., machine tools, Rochester, N. Y.

A. C. D. Meyjes and R. Fennessy Jones have opened offices at 55 Avenue Chambers, Southampton Row, London, W. C. 1, England, as consulting engineers and agents, under the firm name of Charles Fennessy & Co. Mr. Meyjes is a son of A. C. Meyjes, editor of the *Ironmonger*, London. The new firm plans to represent American as well as British manufacturers of machinery and engineering supplies.

John F. Price, formerly controller of the Brown Hoisting Machinery Co., Cleveland, has been elected vice-president of the George T. Trundle, Jr., Engineering Co., Cleveland, and will be active in the management of the company, serving its clients in the matter of financing, costs and sales.

George A. Mason, formerly manager of sales, wire department, Jones & Laughlin Steel Co., spent a few days renewing old acquaintances in Pittsburgh recently.

E. O. Beardsley of Beardsley & Piper, Chicago, will deliver an address before the Chicago Foundrymen's Club on Saturday evening, Oct. 14, at the City Club, Chicago. He will discuss sand-throwing machines.

Lorenz Maisel, who recently disposed of his interests in the Madison, Wis., Tool & Stamping Works, has become associated with the Allan-Diffenbaugh Wrench & Tool Co., Baraboo, Wis., as factory manager. For 10 years Mr. Maisel was designing engineer and production manager, Burgess Battery Co., Madison.

F. E. Clark, for the past seven years electric furnace expert and secretary of the open hearth committee of the United States Steel Corporation, has resigned to become associated with the Sizer Steel Corporation, Buffalo, as general superintendent.

Charles W. Wilson has resigned as vice-president and general manager of the Willys-Overland Co., Toledo, Ohio, and will return to the Wilson Foundry & Machine Co., Pontiac, Mich., of which he is president.

Sherman A. Harding, who has been Pittsburgh district sales manager, Betts Machine Co., Rochester, N. Y., for the past three years, has been appointed manager of sales in that district for the Consolidated Machine Tool Corporation, of which the Betts Machine Co. became a constituent company in a merger effected a few months ago. Mr. Harding became affiliated with the Bridgeford Machine Tool Works in 1909 and was superintendent of that company when it was merged with the Betts Machine Co., following which he was made general superintendent of the latter company, holding that position for about two years before being made Pittsburgh district sales manager.

F. L. Kennedy, who has been district sales manager in Detroit for the West Penn Steel Co., Brackenridge, Pa., and prior to going to Detroit had been its Chicago district sales manager, has been appointed general sales manager, succeeding George R. Fink who resigned recently.

H. B. Hanley, formerly metallurgical chemist and foundry superintendent, New London Ship & Engine Co., Groton, Conn., is now with Whitehead Brothers Co., New York, Buffalo and Providence. Mr. Hanley will devote his entire time to investigations of foundry raw materials and consulting work.

Charles P. McCrory, general manager, American Steel Co., Ellwood City, Pa., has resigned and becomes president and general manager of the Liberty Steel Wire Products Co., Johnstown, Pa. Mr. McCrory has been in the steel and wire business for over 25 years, having held responsible positions with the Oliver & Roberts Wire Co., the American Steel & Wire Co., and Jones & Laughlin Steel Co. He designed and built the American Steel Co. plant at Ellwood City. The Liberty Steel Wire Products Co. is building a new plant in Johnstown.

Bert N. Greenwood, formerly with the Greenfield Tap & Die Corporation, has joined the sales force of Russell, Holbrook & Henderson, Inc., 30 Church Street, New York, and will be stationed at Bridgeport, Conn.

Breo LaPierre has been appointed district sales manager for New York State with headquarters at Syracuse, for the Central Iron & Steel Co., Harrisburg, Pa. To undertake his new duties, Mr. LaPierre resigned from the sales force of the Buffalo office of the Bethlehem Steel Co. Prior to the taking over of Lackawanna Steel Co. by the Bethlehem company, Mr. LaPierre represented Lackawanna in Central New York for 12 years.

Mark C. Smith, formerly associated with the Westinghouse Electric & Mfg. Co., Cleveland, has been appointed district sales manager, motor department, Ohio Electric & Controller Co., effective Oct. 1. Mr. Smith will be located at 53 West Jackson Boulevard, Chicago. A. J. Reed, until recently general sales manager, Robbins & Myers Co., Springfield, Ohio, also has joined the Ohio Electric & Controller Co. in the capacity of district sales representative of the motor department. His office will be located at 221 North Eleventh Street, Philadelphia.

Fred M. Devlin, president of the Philadelphia Hardware & Malleable Iron Co., at a recent meeting of the Philadelphia Foundrymen's Association, Inc., was appointed president to complete the term of his father, the late Thomas Devlin, who had served as president for the past 15 years and who was a veteran of 67 years in the foundry trade.

W. T. Bennett, 40 Court Street, Boston, has been appointed as New England agent in the sale of pig iron for Witherbee, Sherman & Co. Mr. Bennett was at one time with the Griffin Wheel Co., Chelsea, Mass., and in more recent years was associated with Alley & Page as salesman in New England territory.

Joseph G. Butler, Jr., Youngstown, Ohio, has recently gained possession of a document of peculiar historic significance, the deed to Sulgrave Manor, which was the home of George Washington's ancestors at Northamptonshire, England. Some time ago while traveling in England, Mr. Butler's grandson, William P. Harris, came across the relic by chance and secured it for him. It is especially fitting since the purchaser is director on the board of governors of both American and English branches of the Sulgrave Institution, which exists to foster good will between the English-speaking nations. An interesting coincidence is that Mr. Butler's great-grandfather, Thomas Butler, was a close friend of General Washington.

British Iron and Steel Market

Less American Demand for European Pig Iron—Middlesbrough September Shipments 31,118 Tons to United States—Tin Plate Stronger

(By Cable)

LONDON, ENGLAND, Oct. 10.

Pig iron is firm, with sales being negotiated for December and January delivery. The home demand is increasing and supplies of foundry iron are scarce. American demand is less active.

Hematite demand is broadening. East Coast mixed numbers have been sold to America and further business is anticipated. Stocks have been diminished considerably and prices are firmer.

September pig iron shipments from Middlesbrough amounted to 65,361 tons, of which the United States was the destination to receive 31,118 tons.

Foreign ore is quiet, Bilbao Rubio being nominally 23s. ($5.08) ex-ship Tees.

There is more inquiry for finished steel, especially for export. Japan is inquiring for bridge-building material, and some business is being done. Canada has bought ship plates. Prices are firm, with an upward tendency on increasing costs of raw materials. Billets have been sold to the Pacific Coast at £7 6¼s. ($32.32) f.o.b.

Continental markets generally are quiet. India has bought merchant bars at £7 17½s. (1.55c. per lb.) cost-freight. Merchant bars have been quoted to Japan at £9 (1.78c. per lb.) c.i.f.

American demand for Continental pig iron is decreasing.

Tin plate is steadier, with the works inclined to hold out for higher prices. There is a moderate export business, including small sales to Canada, South America, Mexico and the Continent.

Galvanized sheets are steady, with only a small demand. Japan is purchasing black sheets. Sales have been made also to Roumania and Russia has bought some roofing sheets.

We quote per gross ton, except where otherwise stated, f.o.b maker's works, with American equivalent figured at $4.42 per £1, as follows:

[illegible]		to	$6.20
[illegible]		to	21.00
[illegible]			19.86
[illegible]			18.70
[illegible]			17.88
[illegible]		to	20.11
[illegible]			66.20
[illegible]		to	65.20
[illegible]		to	22.36
[illegible]		to	21.16
Sheet and tin plate bars, [illegible]			22.6[illegible]
[illegible]		to	1.20
			C. per Lb.
[illegible]			1.88 to 1.93
[illegible]			1.88 to 1.93
[illegible]			1.88 to 1.93
[illegible]			1.88 to 1.93
[illegible]			1.88 to 1.93
Galvanized sheets, 24 g. 16	21½	upward	3.18
[illegible]			11.8[illegible]
Cold rolled steel strip, [illegible]			1.50
Cotton ties, Indian specifications			1.00

*Export price.

Continental Prices, All F. O. B. Channel Ports, Delivery as Specified

[illegible]								
[illegible]								
[illegible]								

FRENCH PIG IRON

The Few Companies Apparently Able to Entertain American Business

PARIS, FRANCE, Sept. 23.—The French metallurgical trade has been much interested to hear of the recent important purchases of British pig-iron for American account. A few sales of French pig iron to the United States have taken place but it should be borne in mind that France has an annual capacity of over 10,000,000 tons. French blast-furnaces are generally of a modern type and, although paying a high price for coke (95 frs. now at the Franco-German frontier), they can produce at a low cost. French blast-furnace operators have made marked technical progress and can now offer products of the grade required.

Here follows a summary of the pig iron supply situation:

The Compagnie des Forges de Châtillon-Commentry et Neuves-Maisons (Center and East), the Société des Hauts-Fourneaux de la Chiers (at Longwy), les Petits-Fils de François de Wendel et Cie (at Hayange, Lorraine) and the Société de Commentry, Fourchambault et Decazeville (Center and South) have, as a rule, never any pig iron for sale.

Société des Hauts-Fourneaux, Forges et Aciéries de Pompey (East): Basic pig iron, no production at present; phosphoric pig iron, no available supply.

Société Métallurgique de Knutange (Lorraine): Basic pig iron, no available supply; foundry pig iron, no production.

Société Métallurgique de Senelle-Maubeuge (at Longwy): Basic pig iron, not seller.

The Société des Etablissements Keller et Leleux (which is producing "synthetic" pig iron) has no available supply neither in basic nor in phosphoric foundry pig iron.

The Hauts-Fourneaux de Saulnes (Meurthe-et-Moselle) are making foundry pig iron holding about 1.80 per cent of phosphorus and 0.05 per cent of sulphur, but they have no stock for the present. They have recently been selling for export on the basis of 225 fr. (French currency) f.o.b. Antwerp.

The Réhon (Meurthe-et-Moselle), branch works of the Société Anonyme de la Providence, have just now no available supply of basic pig iron; but the Belgian works at Marchienne-au-Pont belonging to the same company has perhaps some stock.

The Société Lorraine Minière et Métallurgique (Thionville works) is making semi-phosphoric foundry pig iron, but its production is sold out to America until [illegible].

The Société des Aciéries de Longwy recently booked important business, a part for America, so that its output is now sold out until the first days of November. If the United States were still purchasers then, the Société des Aciéries de Longwy would perhaps be able to make an offer.

The Union de Consommateurs de Produits Métallurgiques et Industriels, which is working the famous Hagondange (Lorraine) iron works, has no available foundry pig iron supply; but it can offer for sale basic pig iron of the following grades: Mn, 0.9 to 1.4 per cent; Si, up to 1 per cent; S, up to and including 0.12 per cent; P, 1.7 to 2 per cent. Also iron of Si to 1.3 per cent, and S not over 0.08 per cent; same manganese and phosphorus.

The Société Minière des Terres Rouges, which is working the Audun-le-Tiche works (Lorraine) and whose selling agency is the Comptoir Métallurgique Luxembourgeois, 126 Boulevard Haussmann, Paris (M. Vicaire, manager), is able to supply to America either phosphoric foundry or basic pig iron, and it has in fact sold to the United States lately some thousands of tons, which is low in sulphur. The Comptoir Métallurgique Luxembourgeois is able to deliver pig iron of A and B grades, holding comparatively little phosphorus; but the normal pig iron from Audun-le-Tiche is the P.L. No. 3, now quoted 250 to 260 fr. (French currency) f.o.b. Antwerp, which is equivalent to 285 to 300 fr., c.i.f. Boston, or $22 or $23. French and British branches of large American foundries have been purchasing almost exclusively pig iron of that class.

The Cie des Forges de la Marine et d'Homécourt (East, Center and South), the Société des Hauts-Fourneaux et Forges d'Allevard (South-East), the Forges et Aciéries du Nord et de l'Est, the Usines Métallurgiques de la Basse-Loire and the Forges et Aciéries de Nord et Lorraine (Uckange) have no available supply of basic or foundry pig iron.

The Société Métallurgique d'Aubrives et Villerupt (Ardennes and East) produces phosphoric foundry pig iron having approximately 1.9 to 2.1 per cent of phosphorus and 0.03 to 0.08 per cent of sulphur, but has now no stock.

Changes Among American Steel & Wire Co. Operating Officials

F. E. Gage, for several years assistant superintendent wire works, Donora, Pa., plant, American Steel & Wire Co., and previously attached to the Worcester, Mass., plant of the company, has been appointed superintendent, Farrell, Pa., works, succeeding John Aurelius, who recently retired. L. H. Miller, who has been at the New Haven, Conn., works of the company succeeds Mr. Gage at Donora. Appointment of Charles B. Patt as assistant superintendent, Farrell, Pa., works, in place of the late John McHugh, also is announced. Mr. Patt has been general foreman at Donora, Pa., works and also instructor in the foremen's training school at that plant.

Fogs Delay Lake Navigation

DETROIT, Oct. 10.—Seasonal fogs on the Detroit and St. Clair rivers have seriously hampered navigation during the past 10 days. On Oct. 3 the steel freighters James E. Davidson of the Tomlinson fleet and the Arcturus of the Interlake Steamship Co. were in collision about 12 miles south of Detroit. The Arcturus sank just outside the ship channel, with its decks and upper works above water. It was upward-bound with coal. Efforts are being made to raise it. The Davidson, which was down-bound with ore, was saved by being run onto the channel bank and, after a part of its cargo was lightered, was towed to the Ecorse yard of the Great Lakes Engineering Works for temporary repairs.

On the same day the steamer Adriatic of the Interlake fleet collided with the F. L. Robbins while turning to dock at Port Huron, Mich. Repairs to the Adriatic are being made at the Foundation Co.'s dock.

The Kelley Island Line and Transport Co., new owner of the Rockport Quarry near Alpena, Mich., commissioned the first steel freighter of the Rockport Steamship Co., the John A. Kling, Oct. 4. This vessel, which is 553 feet long, started southward with an 8000-ton limestone cargo for the Lackawanna Steel Co., Buffalo.

Brier Hill Steel Co. Plans

Though financing arrangements have been concluded, the definite program of expansion by the Brier Hill Steel Co., Youngstown, Ohio, has not yet been approved by directors. Certain engineering details remain to be developed, officials explain. It is virtually assured the company will add lapweld tube and strip mills, the new units to be located at Youngstown on a site between the present steel plant and the plate mills at Mosier, near the Trumbull county line.

J. B. Kennedy, chairman of the board of directors, states that $5,000,000 of the $10,000,000 bond issue, disposed of to the Guaranty Co. of New York, a subsidiary of the Guaranty Trust Co., will be used for construction of new mills "which should materially increase the stability of earnings through diversification of products." In addition to this new construction, the company plans to spend $1,000,000 in improving its Thomas sheet mill plant. The remaining proceeds of the issue will be used to supply additional working capital.

The company is now operating at capacity and established a new record for ingot production in September. It has an annual ingot capacity of 720,000 gross tons, and is one of the largest independent sheet producers with yearly capacity of 200,000 net tons.

The Lackawanna Bridge Works Corporation, formerly the Lackawanna Bridge Co., which was purchased by the Lackawanna Steel Co. last fall, has been purchased by the Bethlehem Steel Bridge Corporation and the Bethlehem Steel Co. of New York.

VALLEY DEMAND BRISK

Sheet Rates Not Made on Recent High Quotations of One Company

YOUNGSTOWN, Oct. 10.—Sheets, plates, strip steel and buttweld sizes of standard pipe continue in most active demand and mills are operating as much as transportation difficulties will permit. The Brier Hill Steel Co. has commenced making shipments against the 20,000-ton pig iron contract which it recently signed with a middle interest. One consignment of 2000 tons has gone forward under this order. The Republic Iron & Steel Co. is piling much of the output of its Southern blast furnaces, due to inability of carriers to move the product.

Quotations of 2.75c. on blue annealed, 3.75c. on black and 4.75c. on galvanized sheets, recently announced by a Valley independent, represent the beginning of a trading basis, rather than prices figuring in actual business.

This applies to the great bulk of the tonnage being accepted, though occasional lots carry the maximum quotation. For instance, a Detroit automobile interest paid 3.75c. during the week for 600 tons of black sheets, which it wished to get through promptly.

Much of the current business in sheets carries a price tag of 3.60c. for black and 4.60c. for galvanized, while considerable contract tonnage is moving at the prevailing minimums of 3.50c. and 4.50c. A non-integrated roller which quoted sheets for a time on the basis of $35 sheet bars has withdrawn its lists and substituted advanced quotations.

One of the principal Valley steel makers has virtually withdrawn from the market on all products, and is endeavoring to satisfy the requirements of its regular customers.

No price higher than $40 has yet applied to sales of sheet bars from this district, though makers, limiting sales to 30 days ahead, are talking of some markup, depending on conditions prevailing later in the quarter. Prices ranging from $42.50 to $45 are mentioned. Buyers, seeing the possibility of reduced supplies, are in some instances offering premiums. Producers are well obligated on sheet bars, though surplus tonnages may be uncovered from one interest.

The plate market is marked by special activity, and the chief Valley independent is finding no difficulty in obtaining 2.25c. for most of its tonnage. There is sufficient surplus tonnage available, however, to maintain the independent differential. On one day recently, a Valley interest which has been out of the merchant plate market for an indefinite period, received inquiries aggregating upward of 2000 tons. Tonnages are being placed by builders of tank cars in the Shenango Valley which have been recipients of sizeable contracts.

Coke has moved to a firm minimum of $13 net at the ovens, and much of it is of inferior quality, still further adding to its cost. Scrap is little changed on account of the paucity of offerings, heavy melting ranging from $22.50 to $23 and hydraulically compressed from $20.50 to $21. Coal is somewhat softer, with the spread on by-product grades coming from the Pennsylvania field at $4.25 to $4.50, mine, and steam coal from $3.50 to $4. Low volatile coal for coke ovens is still scarce, because of transportation troubles.

The impression among both sellers and buyers is that pig iron is weakening. This is due in part measure to the offerings throughout this section of standard iron by an Eastern maker, at a price from $30 to $31, at furnace.

AMERICAN FOUNDRIES GAIN

Recent Survey Shows a Total of 6181 in United States and 552 in Canada

Statistics compiled by the *Foundry* show an increase in the number of foundries in the United States and Canada since 1920. In November, 1920, a survey by the same publication showed a total of 6516 foundries in the United States and Canada, while the recent compilation gives a total of 6733, of which 6181 are in the United States and 552 in Canada.

There has been only a slight increase in gray iron foundries—from 4857 to 4966; brass foundries have increased from 3482 to 3542; malleable foundries from 267 to 274, while steel foundries have dropped from 449 to 409. In the United States the total number of foundries is 199 more than in November, 1920.

Pennsylvania, although still in the lead as to number of foundries, has shown a loss of 28 within two years, its total now being 775. Ohio, the second State on the list, has a total of 683, which is a decline of five in the two years. New York remains third, with 593, a gain of 11 in two years. The other leading States are as follows: Illinois, fourth, 523; Michigan, fifth, 423; Wisconsin, sixth, 310; Massachusetts, seventh, 281. Illinois shows the greatest gain, having 39 foundries more than in 1920. Ontario has the greatest number of foundries among the provinces of Canada, a total of 310 as compared with 319 two years ago. Quebec is second with 100, a loss of two in two years. British Columbia has risen to third place with 33 com-

Pennsylvania and Ohio, each with 30 electric steel casting plants, are tied for first place in that classification. This shows a loss for Pennsylvania and a gain for Ohio. California has jumped from fifth to second place by an increase from 11 to 19 electric furnace plants. Illinois and Wisconsin each report 15 shops, while New York has 10.

Chicago is the leading foundry city, with 197, a gain of three; Detroit is second, with 134, a gain of 12; New York is third, having 129, as compared with 125 two years ago; Cleveland is fourth, but has lost six, now having 117, and Philadelphia comes fifth, having 97 as compared with 100 in 1920. There are 52 cities in the United States and Canada which have 15 or more foundries each.

Cambria Steel Co. Replies

WASHINGTON, Oct. 10.—Replying to the brief of railroads asking the Interstate Commerce Commission to vacate its suspension order regarding the substitution of sixth class for commodity rates on steel rails and cross ties from American mills in Maryland, Pennsylvania and West Virginia to Canadian points, the Cambria Steel Co., Johnstown, Pa., has filed an answer with the commission attacking the proposed rates and urging that the suspended tariffs be permanently cancelled. Without considering the general 10 per cent reduction, effective July 1, 1922, it is pointed out that the increase resulting from the rates under suspension would amount in the case of 11 typical Canadian destinations to approximately 26.6 per cent. If the 10 per cent reduction be taken into account, the net increase to these same points, it is stated, will be approximately 13.6 per cent at a time when rates generally throughout the United States and into Canada have been reduced 10 per cent upon the commission's direction.

National Tube Co.'s Gary Plant

Steel construction will be started on the new plant of the National Tube Co. at Gary, Ind., in about 30 days. The first building will be 170x500 ft., and will be used as a construction warehouse during erection. The Mellon-Stuart-Nelson Co., which has the contract for grading the site and putting in the concrete foundations, has the grading work for the structures almost completed. The main mill building will be 1700x2000 ft. To connect the plant with the city of Gary, a 1000-ft. subway is to be constructed under the railroad tracks serving the by-product coke oven plant of the Indiana Steel Co. The subway will carry street car tracks as well as a road for vehicles of all kinds.

GERMAN IRON MARKET

General Business Slowing Down Checked by Higher Freights and Other Costs

BERLIN, GERMANY, Sept. 25.—The railroad rates are to be increased; freight rates by 100 per cent on Oct. 1 and passenger fares by 50 per cent on Oct. 1 and by another 100 per cent on Nov. 1. Together with the increases in cost of production, etc., the higher rates will tend to enhance prices all around and it cannot be expected that German prices will generally stop in their upward move for some time yet. The amount of orders being booked at present is perceptibly decreasing and the number of unemployed is slightly higher than last month. The metal working industry is, however, still fully employed, though orders are less numerous, especially from abroad. In some lines orders are even cancelled. Prices have risen to such an extent that some consumers have abandoned plans for extensions for the present, and even large industrial concerns have halted building programs. Conditions in the iron and steel market show little alterations, as changes in prices have been small during the last fortnight. The demand for semi-finished material is brisk, but the supply of ingots and blooms is wholly insufficient.

Demand for sheets, especially in the thinner grades, is slackening, but this has yet little effect, as it still greatly exceeds the supply. There is a strong demand for bar iron and large amounts were imported from Luxemburg, Lorraine and the Saar districts. Construction works and factories for railroad rolling stock require large amounts, but demand from the building trade is slackening. Jugo-Slavia has given a reparation order for railroad rolling stock to the amount of 51 million gold marks to Germany. The order is distributed among fifty factories and deliveries are to start in five months.

Germany is also to supply as reparation agricultural implements and machinery to the same country instead of cattle, as previously ordered.

The Deutsche Werft A. G. (shipyard), Hamburg, received Swedish orders for 54,000 gross tons last week. All ships are equipped with Diesel motors (system Burmeister-Waen) and two of them of 21,000 tons each are especially adapted for the transport of ore.

IRON AND INDUSTRIAL STOCKS

War News Has Depressing Effect at the Close of the Week

Following a period of unhampered advances during the first half of the week, steel and industrial stocks changed with the color of the war news to erratic fluctuations which prevailed to the closing hour. Yet the week was one of considerable activity. Monday's opening saw sharp advances, among which American Locomotive and Baldwin featured, each striking over a two-point gain. Strength and activity continued until Thursday's cross currents set in, and while steel showed resistance to the trend downward, most issues sold off. Business, though no less active, was peculiarly undecided. While certain specialties were mounting to new high records, heavy selling and declines were occurring in other parts of the list. Traders apparently ignored signs of improvement in industry, heeding instead the rumors from the Near East, which of course caused a certain amount of panicky liquidation. Actually the outlook remains about as before—promising in the domestic situation, but uncertain in its foreign aspects.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

	Low	High		Low	High
Allis-Chalmers	55	58⅜	Inland Steel	48	48
Am. B. S. & F.	78	83¼	Int. Har.	107¼	112½
Am. B.S. & F. pf.	112	112¼	Int. Har. pf.	118⅞	119
American Can.	57¼	66⅝	Lackawanna Stl.	77¼	82
American Can pf.	108⅞	109⅜	Lima Loco.	79	82¼
Am. Car & Fdy.	186	189	Mivale Steel	32¾	35½
Am. Car & F. pf.	122	122	Nat.-Acme	15	15
Am. Locomotive.	123¾	128⅝	Nat. En. & Stm.	61⅞	65¾
Am. Loco. pf.	119	120	Nat. En. & S. pf.	100¾	100
Am. Radiator	122	128½	N. Y. Air Brake	36	40
Am. Steel Fdries.	43⅜	45¼	Nova Scotia Steel	35	35
Am. Stl. Fd. pf.	104⅛	104⅜	Otis Steel	10⅝	12⅛
Baldwin Loco.	133	138½	Otis Steel pf.	54	54
Baldwin Loco. pf.	115	116¾	Pittsburgh Steel	97⅝	98
Bethlehem Steel.	71½	74⅜	Pressed Stl. Car	87	91
Beth. Stl. Cl. B.	71	75⅝	Pressed Stl. pf.	104¼	105
Beth. Stl. 8% pf.	113½	113½	Ry. Steel Spring.	118	123
Brier Hill	17½	17½	Replogle Steel	32⅝	36¼
Br. Em. Steel	11½	11½	Republic	53⅞	59⅜
Br. Em. Stl. 1 pf.	74	74	Republic pf.	86	87½
Br. Em. Stl. 2 pf.	33⅞	34¼	Sloss-Sheff.	49½	50
Cambria Steel	41	41	Steel of Canada.	62	75
Chic. Pneu. Tool.	79¼	83	Superior Steel.	33½	33¾
Colo. Fuel	33½	34	Un. Alloy Steel.	37⅜	37¾
Crucible Steel.	82	86⅞	U. S. Steel	101½	106⅞
Crucible Steel pf.	94	96	U. S. Steel pf.	122	122¾
Deere pf.	73½	74	Vanadium Steel.	44¼	48
Gen. Electric.	177	180	Va. I., C. & Coke	53	54
Gt. No. Ore Cert.	39	40¼	Whouse Air Br.	100	100
Gulf States Steel	85	92½			

Industrial Finances

The General Fireproofing Co., Youngstown, Ohio, has increased its quarterly common dividend rate from 1 to 1½ per cent, payable Oct. 1 to holders of record Sept. 20. The company has approximately 1,500,000 common outstanding. Until 1921 this stock was maintained on a 7 per cent annual basis, when it was reduced to 4 per cent yearly.

The Standard Steel Corporation, 1251 Thirtieth Street, Milwaukee, manufacturer of concrete mixers, water pumping equipment, etc., has filed a voluntary petition in bankruptcy, admitting liabilities of $24,446 and claiming assets of $51,336. The first meeting of creditors will be held Oct. 5.

Holders of Simmons Hardware Co. common stock, under the consolidation plan with the Winchester Co., will receive $3.75 in cash and $2.50 in preferred stock of the new Winchester-Simmons Co. The exchange in securities is being made on the book values of the stocks of the two companies, which in the case of the Simmons figured at $6.25 a share on the 930,000 outstanding common shares. There are also some other assets of uncertain value, which will later go to Simmons shareholders. Officers of the Winchester-Simons Co. include Robert Windsor, senior partner of the Boston and New York banking firm of Kidder, Peabody & Co., chairman of the board, and John E. Otterson, president.

The Bird Machine Co., Walpole, Mass., paper machinery, is to cancel its $100,000 par value 8 per cent preferred stock, and will issue $200,000 new 8 per cent preferred as a 200 per cent stock dividend to holders of the present $100,000 common stock of record Sept. 26.

Pittsburgh Steel Co. reports gross earnings for the year ended June 30, of $15,866,063, against $23,230,028 in the previous year, and net profits of $861,883, as compared with $1,722,527 in the year ended June 30, 1921.

Final steps in the adjudication of the affairs of the Locomobile Co. of America, preliminary to its formal sale to W. E. Durant, were begun last week, by the filing in bankruptcy court at Bridgeport, Conn., of a schedule of assets and liabilities. There are approximately 900 creditors. Assets are estimated at $3,129,200 and liabilities at $5,908,161. The first meeting of the creditors for the appointment of a trustee was also held.

Plans of New Companies

The Hampton Engineering Co., Hampton, N. J., which was recently incorporated with a capital of $100,000, will manufacture refrigerating machinery and equipment, specializing in ammonia fittings and supplies involving the use of the Oxford steel mixture. The incorporators are Herbert and Stephen J. Hargreaves and George A. Bogert, all of Hampton.

The Wolfe & Mann Mfg. Co., 320 Hanover Street, Baltimore, Md., has been incorporated with a capital of $10,000 and will manufacture steel cabinets and pull boxes for electrical work and operate an assembly plant for switchboards. E. L. Wolfe is president and W. J. Mann, Jr., general manager.

The Victor Coal & Gas Saver Co., 81 High Street, Pawtucket, R. I., has filed notice of organization to manufacture fuel economizing devices. It will not manufacture for a time. At present it acts as agent for several coal and gas-saving devices. Ernest R. White heads the company.

A. Gordon & Sons, Inc., 5618 Second Avenue, Brooklyn, was recently incorporated with a capital stock of $30,000, and will handle fabricated steel for general construction purposes. For the time being its materials will be purchased in the open market. The incorporators are R., L., and M. Gordon.

DIRECT STEEL PRODUCTION

Progress Reported by Societe Des Acieries Basset —Levoz Direct Steel Making Process

PARIS, FRANCE, Sept. 15.—The Société des Aciéries Basset, is endeavoring at its Dennemont works, to put the Basset process of direct steel making, which so far has yielded only laboratory results, on a commercial basis.

On June 15, a second furnace with a capacity of five tons each four hours was started at the Dennemont works, where a furnace with a daily output of seventy-five tons of hematite was already in operation. New furnaces, constructed in England, will be erected both in Longwy and at projected works in Mortain, Manche.

The principal difficulty encountered has been the question of a furnace lining, because of the extremely high temperature which is maintained. Although some progress has been realized in improving the lining, it has not so far been made sufficiently practical and it is not yet possible to produce at will exactly the analysis of steel desired. However, M. Basset still declares that he will finally succeed in producing steel at half its present cost.

Toussaint-Levoz has been experimenting at a hydro-electric plant in the Hautes-Pyrénées on a process for making steel direct from ore in an electric furnace. He claims that he can thus obtain, at a cost of about 300 fr. per ton, steel containing 0.98 C, a 1.17 Mn and 0.25 Si, which hardens like high-speed steel and bends like mild steel. He has also obtained, with the same process, iron (of which he made castings) containing: C, 0.14; Si, 0.05; Mn, 0.30; S. 0.01; P, 0.02.

Levoz began his experiments in 1902. They led him to ascertain, so the report goes, the impossibility of obtaining a direct production of iron by treating iron ore in a furnace with siliceous or graphitic lining in the presence of slags which are constantly siliceous. This is sufficient to indicate how wide apart are the experimental paths followed by Basset and Toussaint-Levoz.

Merger Complaint Dismissed

WASHINGTON, Oct. 10.—The Federal Trade Commission last Thursday issued a statement formally announcing the dismissal of its complaint against the Midvale Steel & Ordnance Co., the Republic Iron & Steel Co., and the Inland Steel Co., in which it was alleged that the proposed merger of the companies was an unfair method of competition. In making the announcement the commission said the complaint was dismissed upon the filing with the Commission of a formal statement by attorneys for the three companies that the merger had been abandoned.

High Production of Soft Coal

UNIONTOWN, Pa., Oct. 10.—Production in the Connellsville bituminous region during the week ending Sept. 30 reached the highest point since the labor troubles began to affect the region. Total production was 118,680 tons, an increase of 13,340 tons over the preceding week. This output is within 30,000 tons of the output for the week ending April 1, when the strike developed in the region.

Estimated production of coke was 118,580 tons. The active list of ovens was increased by 570 during the week of which 338 were at furnace and 232 at merchant operations. Of the former, the H. C. Frick Coke Co. contributed 268 and the independent operations 70.

Production of the Frick company is rapidly approaching normal. Independent operations throughout the region are daily increasing their output. The serious handicap now to further increase is shortage of cars and motive power affecting all lines serving the region but is especially pronounced on the Baltimore & Ohio. Continued drought which has affected the entire [illegible] during the week.

The strike in the Connellsville region has ceased to be an important issue.

There has been no great break in ranks of strikers in the region, although quite a few who had joined the union and gone to union fields for work have returned, saying that there are too many miners now in the union fields and that they were unable to get full time employment. Some men are returning to their former places at the plants. Union leaders are making desperate efforts to hold the men in line and to provide housing instead of tents for the cold weather now about due.

The only serious disturbance in the region during the week was two dynamite explosions at the Griffin No. 2 mine of the Provance Coal Co. near Masontown. The cage and fan tipple were damaged.

Auction Sales of Machinery and Shipyard Equipment

Dates for auction sales in November at the Hog Island, Pa., and Sparrows' Point, Md., yards have been announced by the Material Sales Division of the United States Shipping Board Emergency Fleet Corporation. The auction at Hog Island will be conducted by Samuel T. Freeman & Company on Nov. 1, 2 and 3, material to be sold consisting of plant equipment, machine tools, grinders, hydraulic presses, oil furnaces, high speed drills and reamers, ship machinery and equipment, etc. The auction at Sparrows' Point will be held on Nov. 22 and conducted by M. Fox & Sons Co., Baltimore, Md. The material at this location is principally material declared surplus through cancellation of the 13000-ton passenger and cargo ships which were being built by the Bethlehem Shipbuilding Corporation at this location and consists of anchors, chain, boilers, distillers, filters, generator sets, capstans, steering engines, winches, windlasses, pumps of various sizes and types, oil coolers, galvanized tanks, and large quantity of valves and pipe fittings.

Greater Fuel Economies Demanded

Conservation of fuel through improved combustion, power generation and utilization will be stressed at the National Exposition of Power and Mechanical Engineering, Dec. 7 to 13, at the Grand Central Palace, New York. Manufacturers of prime movers and steam generating devices, as well as those interested in fuel burning devices, will have exhibits and experts to take up problems with all interested.

The chairman of the advisory committee is Irving E. Moultrop, Edison Electric Illuminating Co., Boston. Dean Dexter S. Kimball of Sibley College, Cornell University, president American Society of Mechanical Engineers, and Calvin W. Rice, secretary of that society, are also on the committee.

Pere Marquette Rail Order

The Pere Marquette Railway Co. has made the following reservations for its rail requirements for 1923: 4500 tons from the Illinois Steel Co.; a minimum of 4000 tons and a maximum of 4500 tons from the Bethlehem Steel Co.; and a minimum of 3500 tons and a maximum of 4000 tons from the Inland Steel Co.

The Minneapolis, St. Paul & Sault Ste. Marie has contracted for rails for 1923 delivery as follows: 2200 tons from Inland Steel Co., 2000 tons from the Illinois Steel Co. and 1000 tons from the Lackawanna mill of the Bethlehem Steel Co.

Hundred and Thirty-one Ships Building

On Sept. 1 American shipyards were building or under contract to build for private ship-owners 131 steel vessels of 249,394 gross tons, compared with 121 steel vessels of 218,999 gross tons on Aug. 1, 1922. These figures do not include Government ships or ships building or contracted for by the United States Shipping Board.

NEW TRADE PUBLICATIONS

Moving Cathode Plating Apparatus.—United States Galvanizing and Plating Equipment Corporation, 32 Stockton Street, Brooklyn, N. Y. Bulletin No. 100 shows in 12 pages plating equipment for electro-galvanizing with nickel, brass, copper, tin or lead plating. It is claimed for this apparatus that the moving cathode avoids excessive liberation of gases and thus avoids spongy deposits. The bulletin describes the apparatus and its component parts.

Cleaning, Pickling and Similar Automatic Equipment.—United States Galvanizing and Plating Equipment Corporation, 32 Stockton Street, Brooklyn, N. Y. Bulletin No. 105 describes in 12 pages an automatic rotary multiple-drum apparatus for washing, cleaning, rinsing, pickling, bright acid dipping, neutralizing, oiling, oxidizing, drying and otherwise treating small and medium-sized articles in bulk. These include screw machine products, stampings, drawings and forgings, such as knife, fork and spoon blanks, automobile hub caps, lamp sockets, outlet boxes, lock parts, ferrules, bolts, nuts, rivets, etc.

Brown Automatic Control Signalling and Alarm Instruments.—Brown Instrument Co., Philadelphia. Catalog No. 85, of 24 pages, deals with automatic control of temperature and the instruments for maintaining that control. Both recording and indicating pyrometers are shown together with reproductions of charts obtained from the former. Details are given of various parts of the apparatus.

Marks System of Gypsum Roofs.—H. F. Marks Corporation, Empire Building, Pittsburgh. A 16-page catalog. Description is given of pre-cast slabs and roofs poured in place, both made of gypsum. Attention is called to the advantage of gypsum roofs because of their light weight and their insulating value. They are, of course, entirely fireproof. Tables of safe loads are given for both types of construction, with slabs varying from 3 to 3½ in. thick when pre-cast and from 2½ to 4½ in. thick when poured in place. The centering for the latter is composed of steel tees and gypsum board, which remains as part of the roof construction.

Cutting the Cost of Producing Steam.—Detroit Stoker Co., Detroit. A 16-page catalog, 8¼ x 10¾ in., describing single retort under-feed stokers. Attention is directed to decrease in cost of operation as compared with using hand labor, while details of the Detroit stoker and its application are given in considerable extent.

Demand Meters.—General Electric Co., Schenectady, N. Y. Bulletin No. 46108, 8 pages, August, 1922, describes a demand meter used in combination with a watthour meter to indicate maximum demand for electric current.

Automatic Machinery.—Baird Machine Co., Bridgeport, Conn. A 12-page folder dealing with machinery for producing small items in great number. Among the items shown are parts of mouse-traps, metal work for corsets, pin tickets for department store use, hooks and eyes, etc. The machines which produce these products, while not described, are designed and made to order by the company.

Multiwhirl and G-R Vaneflo.—The Griscom-Russell Co., 90 West Street, New York. Bulletin No. 910, in 8 pages, 6 x 9, describes coolers, exchangers and condensers for oil refineries. The coolers are of the multiwhirl type, carrying oil in the shell and water in tubes. The heat exchangers are of both types—multiwhirl and G-R Vaneflo, and are intended for interchanging heat between one liquid and another. The sub-cooling condensers for taking care of gasoline, kerosene or other vapors are of both types.

Lathe With Quick Change Gear Boxes.—John Steptoe Co., Cincinnati. In a 4-page folder, brief description and specifications are given for 14, 16, 18 and 20-in. standard engine lathes, with quick change gear boxes, which can be supplied with beds from 6 to 16 ft. long. Dimensions are given in some detail.

Sterling Transits and Levels.—Warren-Knight Co., 136 North Twelfth Street, Philadelphia. In a 32-page catalog are described several models of transits and levels, together with the working parts through which their accuracy is obtained. Specifications are given for each model, including a statement as to the uses to which it is adapted.

The Minimeter.—Norma Co. of America, Anable Avenue, Long Island City, N. Y. In an 8-page folder is described a precision measuring instrument for obtaining dimensions with an accuracy greater than is possible with ordinary instruments. It is designed primarily for use in quantity production of rollers and balls for bearings, gears, rings, wrist pins, valves, push rods, disks, washers, keys, pins, bushings and other parts small enough to be handled in its mounting. It is also designed for use in the tool room.

Cochrane Heaters, Meters, Separators, Water Softeners, Etc.—H. S. B. W.-Cochrane Corporation, Philadelphia. Publication No. 1080, 210 pages, 6 x 9 in. This is a complete and thoroughly illustrated catalog covering heaters, meters, metering heaters, separators for steam and oil, drainers, multipart valves for back pressure and vacuum service and water softeners, each in a variety of types and styles for different classes of service. Principal dimensions are given of most of the pieces of apparatus, and they are illustrated by both photographic views and diagrams showing connections. Some of the diagrams are worked out in colors to indicate the flow of different liquids and gases.

Chucks.—Callis Co., Clinton, Iowa. Bulletin A, 9 pages, describes and illustrates the quick change Wonder chuck used on spindles of drill presses, lathes, screw machines and other revolving spindle machines, converting them into multiple spindles and allowing change of tools without stopping. It includes formulas for tap shanks and squares. Also Bulletin E, 10 pages, giving price list and specifications on chuck arbors.

Truck Turntable.—Champion Engineering Co., Kenton, Ohio. Pamphlet of 4 pages, 12 x 10 4n., shows the operation of the Champion automatic truck turntable which rotates by the action of the rear wheels, which propel the structure without stopping or shifting gears.

Conveying Equipment.—Cleveland Crane & Engineering Co., Wickliffe, Ohio. Catalog No. 2, 100 pages, exhibiting recent departures in conveyance methods for loads up to two tons weight. It gives comprehensive information by word and picture on the structure, operation and installation of 1200 carriers, hand and electric, cranes and transfer bridges for foundry, warehouse or yard. Diagrams, dimensional drawings, engineering data and various tables and instructions give this book special value as a source of reference both in installing and maintaining this sort of equipment.

Internal Combustion Engines.—Climax Engineering Co., Clinton, Iowa. Bulletin 1001, giving the horsepower characteristics of two types of Climax engine and a considerable collection of photographs of cranes, tractors and various forms of power-driven machinery using the engine for different industrial power purposes.

Grinding and Polishing Machinery and "Pull" Countershafts.—Builders' Iron Foundry, Providence. A 64-page catalog, 6 x 9 in., of belt-driven grinding and polishing machinery, lapping machines, countershafts and belt shifters. Details are given of dimensions and weights.

Preventing Corrosion by Dissolved Oxygen.—Water ordinarily contains oxygen which is set free by heat and will then energetically attack steel piping, etc. In a 16-page pamphlet, the H. S. B. W.-Cochrane Corporation, Philadelphia, has explained a method of removing the oxygen and thus preserving piping and tubing from this form of corrosion.

Leinert Automatic Plate-Valve.—Leinert Valve Co., 122 South Michigan Avenue, Chicago. The folder describes and illustrates plate valves for replacing mechanically operated valves in cylinder heads, blowing tubs, compressors, vacuum pumps, etc.

Bristol's Pyrometers.—Bristol Co., Waterbury, Conn. Pyrometer Catalog No. 1401 is a 68-page booklet detailing various types of indicating and recording pyrometers for use with all types of high temperature apparatus. Specimen charts are given showing the graduations which can be obtained in connection with different instruments, and dimensioned drawings indicate the sizes of the various instruments. Details of wearing parts, such as the fire-ends, are provided, together with numerous pictorial and diagrammatic examples of uses.

Sharpening Stones and Abrasive Specialties.—The Pike Mfg. Co., Pike, N. H. An 80-page booklet, 9 x 6 in., cataloging, illustrating and describing sharpening stones and abrasive specialties and other products of the company, which are listed, with prices, under 47 classifications.

BOOK REVIEWS

"Wave Transmission" is the title of a 56-page pamphlet by Walter Haddon, 132 Salisbury Square, Fleet Street, London, England, dealing with what is called "a sixth and original method" for the transmission of power, the five others being steam, direct mechanical, electric, compressed air and hydraulic. In the new method, wave motions or pulsations are employed, set up in an inclosed column of liquid, usually water. Descriptions and illustrations are given, showing the application of the system, particularly in rock drilling and in riveting. Special ball-and-socket joints in the transmitting pipe allow considerable latitude in the use of the apparatus and in its location. The pulsations, which may be as frequent as 2400 to the minute, as in riveting, are said to travel along the column of liquid at the rate of 4800 ft. per min. Mr. Haddon is chairman of W. H. Dorman & Co., Ltd., Stafford, England, which company manufactures the special apparatus described.

Two useful booklets for the writers of letters have been written by Sherman Perry, correspondence adviser of the American Rolling Mill Co., Middletown, Ohio. They have been copyrighted by the American Rolling Mill Co., but each has been given a price and undoubtedly copies may be obtained by addressing Mr. Perry. One of these, entitled "Mechanics of Correspondence," is addressed specially to the typist, in that it covers such subjects as punctuation, capitalization, syllabication, and the like, together with such specific points as spacing, margins, folding of letters and the actual make-up of letter page. About 40 pages, or half of this booklet, which is priced at 35c., contains the shorthand equivalents of words frequently misspelled. The other booklet, priced at 50c., contains points of value to the dictator as well as the typist. One noteworthy feature is a list of so-called defunct phrases, which are nevertheless commonly found in modern business correspondence, and another feature is an extended treatment of what may be called the psychology of letter-writing. While the booklets were compiled for use by the American Rolling Mill Co., their field of application is of course the business office in general.

Under the title "Training for Foreign Service," No. 27 of the Bulletins for 1921, of the Bureau of Education, Department of the Interior, has been issued at Washington. Glen Levin Swiggett is the compiler. There are 154 pages of valuable material, contributed by specialists, dealing with subjects which should be included in a fully developed major or foreign service training for Government, business, social welfare, etc. The bulletin is designed to assist colleges in planning courses of instruction on training for foreign service, also to enable university men now in business to plan for a systematic reading course. Most of the articles are by professors of economics in American universities or by instructors in charge of special courses designed to fit men for business. One of the most valuable features is the bibliography given by each of the contributors. It will be news to many that 70 colleges and universities in the United States have courses of study in preparation for foreign trade and that the 10 having over 100 students each in these courses reported a total of 2255 such students.

The proceedings of the National Association of Office Managers, which held a conference in Washington, May 18, 19 and 20, have appeared in a pamphlet form for general distribution at $1.50 per copy. The addresses and discussions appear to be given in full and copies may be obtained by addressing the secretary, G. S. Childs, Alexander Hamilton Institute, New York. The president of the association is F. L. Rowland, Gilbert & Barker Mfg. Co., Springfield, Mass., and the first vice-president is G. R. Hulverson, Burroughs Adding Machine Co., Detroit. Among the board of directors are A. A. Keiser, National Cash Register Co., Dayton, Ohio, and H. D. Brown, U. S. Bureau of Efficiency, Washington.

Standards adopted in 1922 by the American Society for Testing Materials are available in a pamphlet of 54 pages, published by the society at 1315 Spruce Street, Philadelphia. The standards include two on non-ferrous metals; brass ingot metals for sand castings and nickel. There are also included the standard definitions of terms relating to paint specifications.

Statistics of the district of New York for the year 1921 are available in a 338-page book, forming part II of the annual report of the Chamber of Commerce of the State of New York, 65 Liberty Street, New York. Nearly a third of the book is given to reviews of various trades for the year, while the remainder is practically altogether tables of exports and imports, production, consumption, financial records and statistics generally valuable in business investigation.

Facts about Cardiff, South Wales, have been presented in a little booklet obtainable from T. W. Dockett Smith, development agent of that city, in the interest of establishing trading between the United States, or any other nation for that matter, and the city of Cardiff.

New Books Received

The Welding Encyclopedia. Compiled and edited by L. B. Mackenzie and H. S. Card of the editorial staff of the *Welding Engineer*, Chicago. Pages 388, 6 x 9 in.; illustrated. Published by Welding Engineer Publishing Co., 608 South Dearborn Street, Chicago.

The Merchants' Association of New York Yea- Book 1922. Pages 334, 7 x 10 in.; illustrated. Published by the Merchants' Association of New York, 233 Broadway, New York.

Condensed Catalogues of Mechanical Equipment with General Classified Directory and Consulting Engineers Directory. Pages 622, 8½ x 11¼ in.; illustrated. Published by the American Society of Mechanical Engineers, 29 West Thirty-ninth Street, New York. Price, $5.

Tested Methods of Non-Ferrous Metallurgical Analysis. By Seymour Pile and Reginald Johnstown. Pages 127, 5 x 7¼, in.; illustrations 10. Published by H. F. & G. Witherby, 326, High Holborn, London, W. C. 1, England. Price, 7s. 6d.

The Bureau of Mines, Its History, Activities and Organization. By Fred Wilbur Powell. Pages 162, 5½ x 8¾ in. Published by D. Appleton & Co., 35 West Thirty-second Street, New York.

The Blast Furnace and the Manufacture of Pig Iron. By Robert Forsythe; completely revised by Carl A. Meissner and J. A. Mohr. Pages 371, 6 x 9 in.; illustrations 74. Published by U. P. C. Book Co., 239 West Thirty-ninth Street, New York. Price, $4.

Knots, Splices and Rope Work. By A. Hyatt Verrill. Pages 144, 4½ x 6½ in.; illustrations 154. Published by the Norman W. Henley Publishing Co., 2 West Forty-fifth Street, New York. Price, $1.

Graphic Charts in Business. By Allan C. Haskell. Pages 250, 6 x 9 in.; illustrated. Published by Codex Book Co., Inc., 119 Broad Street, New York. Price, $4.

American Fuels. Vols. I and II. By Raymond Foss Bacon and William Allen Hamor. Pages 1257, 5¾ x 9 in.; illustrations 383. Published by McGraw-Hill Book Co., Inc., 370 Seventh Avenue, New York. Price, $12.

Machinery Markets and News of the Works

IMPROVEMENT CONTINUES

Increased Business in Almost All Districts, But Largely in Number of Orders

Automotive Industry and Railroads Leading Buyers

Improvement in business is reported from practically all districts, although in some cases it is more of an increase in the number of orders than in their size. Considerable inquiry has developed in some districts since the first of the month. In the Chicago district, some activity is noted among the automotive industries and an advance of 15 and 20 per cent on engine lathes and shapers is reported. From the New England district advances of from 10 to 15 per cent are reported to have been made on tool room lathes, cutter and reamer grinders, plain and universal milling machines, surface grinders, die sinkers, hand millers and pipe cutters. Actual business closed in this district was smaller than last week, but practically all representatives and dealers report transactions in contrast to spotty business heretofore.

Railroads are prominent among buyers in a number of districts. From Cincinnati, the Virginian Railroad is reported inquiring for lathes, planers and shapers and the Atchison, Topeka & Santa Fe has purchased several tools during the week. While no activity among railroads is reported from Cleveland, interest is manifest in the expected list of about a dozen tools to be issued shortly by the Pennsylvania Railroad for its Columbus, Ohio, shops. From Chicago report is made of the closing of an order for a number of electric traveling cranes by the Missouri-Kansas-Texas Railway.

Among the companies active in various districts are the Studebaker Corporation, South Bend, Ind., and the Continental Motors Co., Muskegon, Mich., both of which are still placing orders; the Nash Motor Co., which has a number of tools pending for its Milwaukee plant; the Chevrolet Motor Co., which is extending its facilities for the production of its new air cooled model requiring a large amount of tooling. A list of 12 tools has been sent out by the Spencer Mfg. Co., Spencer, Ohio.

As a rule the tools in the Howitzer plant, Erie, Pa., sold last week by the Philadelphia Salvage Board of the Ordnance Department, brought good prices, both consumers and dealers being among the purchasers. Among the dealers the largest buying was by Albany, New York and Chicago dealers. The machinery consisted of several hundred tools, mostly in first-class condition.

Among crane transactions the large inquiry of the National Tube Co. for its new Gary plant, calling for 41 cranes, is of the greatest interest. Revised bids have been requested and award is expected this week or next. The cranes for the new by-product plant of the Weirton Steel Co. and those for the Clairton plant of the Carnegie Steel Co., also are expected to be placed soon.

New York

NEW YORK, Oct. 9.

WITH the exception of the list of tools from the General Electric Co., which was increased the past week by the addition of between 15 and 20 more tools, there are no large inquiries pending in this market. The Baldwin Locomotive Works has made further purchases on its recent inquiry, but although business generally shows a slight increase, there is no distinct change in the situation. The demand for used tools continues good. Among recent purchases of new tools are to be noted a 90-in. Sellers driving-wheel lathe by the New York Central & Hudson River Railroad and a heavy duty, horizontal boring, drilling and milling machine bought by the Dravo Contracting Co., Pittsburgh.

Inquiry for overhead traveling cranes begins to show a slight improvement, but most of the requests for bids are on cranes of large capacity. There is fair activity in locomotive cranes but not many sales are reported this week. In addition to the two 150-ton cranes, upon which bids are being received by the Brooklyn Edison Co., Brooklyn, N. Y., an inquiry has been issued by Sanderson & Porter, 52 William Street, New York, for a 110-ton, 50-ft. span overhead traveling crane with auxiliary. Another large capacity crane now pending is for the U. G. I. Contracting Co., Philadelphia. It is a 100-ton, 4-motor overhead crane for use at Devon, Conn. The Pennsylvania Railroad, Eastern Region, Philadelphia, is receiving bids on two 12½-ton, 87-ft. span, 3-motor overhead traveling cranes and two 3-ton, 2-motor, single I beam cranes. The Erie Railroad is asking for two 2-ton electric hoists. The inquiry of the E. & F. Fairbanks Co., St. Johnsbury, Vt., for a 5-ton and 10-ton electric traveling crane has not yet been closed. Barnet Weinstein, 53 Boerum Street, Brooklyn, N. Y., purchaser of a 6-ton crane reported in THE IRON AGE last week, is expected to inquire for two or three more cranes of smaller capacities. The American Smelting & Refining Co., New York, is reported about to issue an inquiry.

Among recent purchasers are:

Briggs & Turivas, Chicago, a 20-ton, 50-ft. boom, bucket handling locomotive crane, also equipped with Electric Controller & Mfg. Co. magnet, from the Industrial Works.

W. A. Bechtel, 625 Market Street, San Francisco, Cal., a 25-ton, 40-ft. boom, bucket handling locomotive crane, from the Industrial Works.

United Alloy Steel Corporation, Canton, Ohio, a 25-ton, 50-ft. boom, bucket handling locomotive crane, from the Industrial Works.

Chicago, Milwaukee & St. Paul Railroad, a 15-ton, bucket handling locomotive crane, from the Industrial Works.

Lake Superior & Ishpeming Railway Co., Ishpeming, Mich., a 25-ton, 40-ft. lattice boom with 20-ft. insert and 1-cu. yard. bucket, from the Industrial Works.

Public Service Production Co., Newark, N. J., two 2-ton, 19-ft. 6-in. span, hand power cranes for Hackensack, N. J., from the Chisholm-Moore Mfg. Co.

W. Ames & Co., Jersey City, N. J., a 5-ton, 20-ft. span, motor-driven overhead crane and runway of 330-ft., from the New Jersey Foundry & Machine Co.

Ludwig Baumann & Co., New York, a 1-ton monorail hoist with 350-ft. of monorail, from the New Jersey Foundry & Machine Co.

General Fire Extinguisher Co., Providence, R. I., two 5-ton 3-motor traveling cranes from the Northern Engineering Works.

Center Foundry & Machine Co., Wheeling, W. Va., a

Works.

The J. A. Sexauer Mfg. Co., 523 Eighth Avenue, New York, manufacturer of pipe fittings, plumbing equipment, etc., has plans under way for a new two-story factory, 25 x 100 ft., at 2503 Third Avenue. Foundations will be designed for the construction of four additional stories later.

A vocational department will be installed in the four-story high school to be erected at Bronxville, N. Y., estimated to cost $400,000. Guilbert & Betelle, 546 Broad Street, Newark, are architects.

The Long Island Railroad Co., Pennsylvania Terminal, New York, has preliminary plans in progress for the electrification of its Montauk Division to Babylon, L. I., estimated to cost about $3,500,000, including power equipment, etc.

The American Gas & Electric Co., 30 Church Street, New York, operating electric plants at Scranton, Pa.; Wheeling, W. Va., and other points, has arranged for a bond issue of $7,500,000, a portion of the proceeds to be used for extensions.

A vocational department will be installed in the new high school to be erected at Spring Valley, N. Y., estimated to cost about $250,000. Ernest Sibley, Palisade, N. J., is architect.

Motors, power equipment, controlling devices, conveying machinery, etc., will be installed in the new auxiliary printing plant to be erected by the New York Times Co., Times Square, New York, on Eleventh Avenue, comprising the complete block, Forty-fourth to Forty-fifth Street, recently purchased. An automobile service and repair works also will be built.

The Wolcott Motor Co., 122 State Street, Elmira, N. Y., will install new boiler equipment and auxiliary power apparatus.

The K. & K. Garage, Inc., New York, recently organized, has leased a four-story building, 73 x 100 ft., at 102-6 West 107th Street for a service and repair works. B. S. Katz is one of the heads of the company.

The Long Island Railroad Co., Pennsylvania Terminal, New York, will install traveling cranes, machinery and other equipment in its repair shops at Morris Park, Jamaica, L. I. A former office building at the plant will be remodeled for a car wheel shop. A new steel runway will be installed in the locomotive shop for a 150-ton traveling crane, replacing two 25-ton cranes heretofore used.

The Transit Commission, 49 Lafayette Street, New York, will take bids until Oct. 20 for the construction of new repair shops and an administration building at the yards of the Interborough Rapid Transit Co., near 147th Street.

The American Yellow Taxi Operators, Inc., 119 West 145th Street, New York, has acquired property on Thirty-second Street, between First Avenue and East River, for $100 000, as a site for a one-story automobile service and repair building. Plans will soon be drawn.

In connection with the electrification of the Brazilian Central Railway a distance of about 370 miles, for which contract has been let to the General Electric Co., Schenectady, N. Y., complete electric locomotive and car repair shops will be established, with a number of subsidiary power houses, signal shops, etc. The entire project is estimated to cost $10,000,000. The contracting company will be in complete charge.

The Westinghouse Lamp Co., Watsessing, N. J., has filed plans for the initial unit of its addition on Arlington Avenue, to cost about $67,000. The structure will be connected with the present factory on the opposite site of the street with a tunnel.

A vocational department will be installed in the two-story and basement high school, 104 x 180 ft., at Ocean City, N. J., estimated to cost $250,000. V. B. Smith, Guarantee Trust Building, Atlantic City, N. J., is architect.

The Erie Railroad Co., Jersey City, N. J., will commence the immediate erection of a new one-story lathe shop at its repair works near Provost Street.

The power house at the feed and grist mill of Frederick Bascom, East Millstone, N. J., was destroyed by fire Oct. 2, with entire loss estimated at $55,000. It is planned to rebuild.

Supplementing its new pipe and pipe fitting addition, to cost about $150,000, construction of which has commenced, the M. W. Kellogg Co., 117 Westside Avenue, Jersey City, N. J., will soon break ground for a new one-story pattern shop to cost $26,000.

The Morris & Somerset Electric Co., Morristown, N. J. has been granted permission to issue securities for $40,000 the proceeds to be used for extensions.

The Cyclone Fence Co., 233 Broadway, New York, with plant at Waukegan, Ill., has purchased property, 165 x 400 ft., at 796-808 Frelinghuysen Avenue, Newark, N. J., for a new branch plant. Plans are nearing completion for the first unit, to total about 30,000 sq. ft. Another structure of like size will be built later. J. P. Arthur is president, and Joseph Slomer, vice-president.

The Tiffany Electric Co., 131 Howell Street, Jersey City, N. J., manufacturer of electrical equipment, has filed plans for the erection of a one-story plant addition.

The Common Council, Little Falls, N. J., will build an electrically operated pumping plant in connection with extensions in the municipal sewerage disposal works.

Chicago

CHICAGO, Oct. 9.

NO further railroad buying has been reported, but the Chicago, Burlington & Quincy is expected to take early action on its inquiry. General trade shows slow but steady improvement, and while most orders are for one or two machines, some involve large equipment. The Pawling & Harnischfeger Co., Milwaukee, has bought an 84-in. and 54-in. boring mill. The Orton & Steinbrenner Co., Chicago, with plant at Huntington, Ind., has placed orders for a 42-in. heavy duty Colburn boring mill and a No. 2 Warner & Swasey turret lathe. The Pullman Co. has closed for three punch presses and a squaring shear. Automotive manufacturers are still taking an interest in the market, orders being placed from time to time by the Studebaker Corporation, South Bend, Ind., and the Continental Motors Co., Muskegon, Mich. The Nash Motor Co. may close for a number of tools for its Milwaukee plant during the week. The improved tone of the market is indicated by a betterment in store trade and the occasional receipt of mail orders.

The Reed-Prentice Co. has advanced engine lathes 15 per cent. The American Tool Works has made a light advance in engine lathes and has raised shapers about 20 per cent. It appears that practically all standard lines of engine lathes are now on a higher level.

The Missouri-Kansas-Texas has closed with the Shaw Crane Co. for about $60,000 worth of electric traveling cranes. The Arnold Co., Chicago, has purchased one 10-ton 53-ft. 6-in. span standard 3-motor traveling crane and two 5-ton 50-ft. span bucket cranes from the same builder for the Richmond, Fredericksburg & Potomac Railroad.

The Western Electric Co., Hawthorne, Ill., has secured a permit for the erection of a one-story plant for rolling copper rods and drawing copper wire, to cost $550,000.

Fire recently damaged the machine shop of the Lehon Roofing Co., Forty-fourth Street and South Oakley Avenue, Chicago.

The Northern Pacific will build a large power plant at Brainerd, Minn., to replace the present power house at that point. A scrap reclamation plant will also be constructed.

Directors of the Commonwealth Edison Co., Chicago, have authorized plans for the immediate enlargement of the new Calumet generating station by one-third, and the construction of a new plant on the west side of Chicago which ultimately is expected to be the largest central station in the world. The latter plant will be located on a 67-acre site on the north bank of the drainage canal at Crawford Avenue near Thirty-ninth Street. The two initial units of the plant will cost $9,000,000, exclusive of the ground, and the total investment, when ultimate expansion has been reached, will be in excess of $32,000,000. Construction will begin at once on the third section of the Calumet station, which is situated at 100th Street and the Calumet River. This work will cost $6,000,000, bringing the total cost of the entire station up to $21,000,000.

The Chicago Machine Products Corporation, manufacturer of automobile locks, 14 South Jefferson Street, Chicago, has leased the one-story factory now under construction at 4711-15 West Lake Street. It contains 10,000 sq. ft. of floor space.

The Advance Pattern & Foundry Co., 2734 West Thirty-sixth Place, Chicago, is receiving bids through Kocher & Larson, 6250 South Halsted Street, on remodeling its plant and constructing one and two-story additions, 35 x 146 ft., to cost $50,000.

The Bassick Mfg. Co., manufacturer of automobile accessories, 2638 North Crawford Avenue, Chicago, has had plans

drawn for a one-story factory, 55 x 142 ft., on North Homan Avenue near the Chicago, Milwaukee & St. Paul right of way, to cost $30,000.

Mr. Rubens, 1339 West Lake Street, Chicago, has let a contract for a one-story machine shop, 22 x 100 ft., at 1309 West Lake Street, to cost $5,000.

The Elwood Tractor Co., 1500 Marshall Street, Paris, Ill., recently incorporated with $300,000 capital stock, will manufacture tractors, hitches for various farm implements and road work machines, and possibly some farm implements. The company owns a one-story plant, 75 x 128 ft., with one and one-quarter acres of ground and a railroad side track on one side of the property. A list of the metal-working equipment required has not yet been prepared. A number of machines were acquired with the plant and these the company would like to exchange. Officers are: Horace Link, president; C. D. Ellwood, vice-president, and H. A. Burd, secretary and treasurer.

A vocational department will be installed in the new two-story high school, 75 x 140 ft., to be erected at Holdrege, Neb., for which bids will be received until Oct. 17, estimated to cost $175,000. Davis & Wilson, Security Mutual Building, Lincoln, Neb., are architects.

The Advance Pattern & Foundry Co., 2734 West Thirty-sixth Place, Chicago, is taking bids for a new one and two-story building, 35 x 145 ft., estimated to cost $50,000, including alterations and improvements in the existing works.

The Hanna Ore Mining Co., Fidelity Building, Duluth, Minn., will build a new two-story machine shop, 80 x 106 ft., with oil house, warehouse and other buildings at its Wabigon Mine, estimated to cost $115,000.

The Minnesota Associated Lumber Co., Bemidji, Minn., plans the construction of a new mill, with power house, machine shop and other mechanical departments, estimated to cost $500,000, including machinery.

The Woodruff & Edwards Co., Elgin, Ill., manufacturer of furniture hardware, etc., has awarded contract to Charles E. Gertz & Son, Elgin, for a one-story foundry addition, 50 x 180 ft., estimated to cost $75,000 with machinery.

The Chicago Machine Products Co., Chicago, manufacturer of automobile locking devices, has leased a one-story building now in course of erection at 4711-15 West Lake Street, totaling about 10,000 sq. ft. of floor space, for a new plant. Possession will be taken on Nov. 1.

A vocational department will be installed in the new high school, two stories, 111 x 188 ft., to be erected at Ivanhoe, Minn., estimated to cost $100,000, for which foundations will be laid at once. Herman E. Snock, 1301 Central Avenue, Minneapolis, Minn., is architect.

A complete cold storage and refrigerating plant will be installed in the new creamery to be erected by the Monticello Creamery Association, Monticello, Minn., with electric pumping plant and other mechanical departments, estimated to cost close to $85,000. A. H. Lauterbach is secretary.

Philadelphia

PHILADELPHIA, Oct. 9.

PLANS are under way by the Wilmot Fleming Iron & Steel Co., Philadelphia, recently organized with a capital of $50,000 by Wilmot Fleming, 956 Foulkrod Street, for a new one and two-story plant at Cottman and G Streets. Mr. Fleming has been elected treasurer. Others interested in the company are Paul E. Good, Riverton, N. J., and Joseph K. Carr, Frankford, Philadelphia.

The Peterson Motors Co., Philadelphia, has leased the four-story building, 50 x 160 ft., to be erected at 1229 North Broad Street, estimated to cost about $100,000, for which contract has just been let to the F. W. Mark Construction Co., Commercial Trust Building. A complete service and repair department will be installed.

The A. F. Hendricks Co., 907 Locust Street, Philadelphia, heating and roofing products, has filed plans for a new four-story sheet metal working shop at 245 South Alder Street.

M. J. Hunt's Sons, 251 Richmond Street, Philadelphia, manufacturers of machinery, will install a new 5-ton electric hoist, double-drum type.

M. L. Shoemaker & Co., Inc., Delaware and Vernango Streets, Philadelphia, will soon break ground for a new plant to manufacture fertilizers, estimated to cost $100,000, to replace the portion of its works recently destroyed by fire. New equipment will comprise mixing machinery, conveying equipment, tanks, etc.

The Western Electric Co., Philadelphia, with main plant at Hawthorne, Ill., has awarded contract to Barclay, White & Co., 1713 Sansom Street, for a new five-story building, 910-14 Cherry Street, to cost $150,000.

Hugh F. Munro, Philadelphia, operating a sheet-iron and other metal working-plant at 1737 North Fifth Street, has revised plans in progress for a new plant at 1745-51 Bodine Street. Stuckert & Co., Crozer Building, are architects and engineers.

The Franklin Sugar Refining Co., 125 South Orianna Street, Philadelphia, has acquired the group of buildings of the Spreckels Sugar Refining Co., Delaware Avenue and Reed Street, for $2,500,000 and will use the property for enlargements.

The Victor Talking Machine Co., Camden, N. J., is arranging for an increase in capital from $5,000,000 to $35,500,000, a portion of the proceeds to be used for extensions.

The Board of Education, State House, Trenton, N. J., will commence the immediate erection of a new power house at Clinton Avenue and Perry Street. A refrigerating plant will also be installed.

The Sinclair Consolidated Oil Corporation, 45 Nassau Street, New York, has purchased about 300 acres at Trainer, Pa., for a new oil refinery. Plans have been prepared for the initial buildings, to include power house, machine shop and other mechanical departments, estimated to cost $2,000,000, with machinery. Other units will be built later increasing the expenditure to $5,000,000.

A vocational department will be installed in the new two-story high school to be erected at Pringle, Pa., estimated to cost $85,000. James A. Boyle, Bennett Building, Wilkes-Barre, Pa., is architect.

The Pennsylvania-Edison Co., Easton, Pa., has arranged for a bond issue of $525,000, a portion of the proceeds to be used for extensions. The company is operated by W. S. Barstow & Co., 50 Pine Street, New York. W. S. Barstow is president.

The City Council, Williamsport, Pa., is planning for a bond issue of $1,000,000 for municipal improvements, to include extensions in the electric plant and system.

The York Corrugating Co., Adams Street, and the Western Maryland Railroad, York, Pa., has awarded contract to Hess Brothers, 738 West Princess Street, for a new one-story plant, 184 x 250 ft. C. P. Rice is head.

The Fowler Radiator & Mfg. Co., New Castle, Pa., has plans under way for a one-story addition. A list of equipment will be prepared at an early date. E. L. Brundage is general manager.

A vocational department will be installed in the new senior and junior high school to be erected at Plains,, Pa., estimated to cost $100,000, for which bids on a general contract have been called. Austin L. Reilly, Bennett Building, Wilkes-Barre, Pa., is architect.

The Candlemas Collieries Co., Coal Exchange Building, Wilkes-Barre, Pa., is planning for the installation of electric power equipment, hoisting apparatus, and general mining machinery.

J. Crowe, Hartman Building, York, Pa., architect, has plans under way for a new three-story cold storage and refrigerating plant, 40 x 115 ft., with one-story power house at Chambersburg, Pa. The owner's name will be announced later.

A vocational department will be installed in the new two-story high school now being constructed at Throop, Pa., estimated to cost $175,000. J. J. Howley, Traders' Bank Building, Scranton, Pa., is architect.

Buffalo

BUFFALO, Oct. 9.

HERBY BROTHERS, 610 West Seventh Street, Jamestown, N. Y., manufacturers of automobile truck bodies, etc., have plans under way for a one-story addition. A list of equipment will be arranged at an early date.

The Rome Wire Co., Rome, N. Y., is completing plans for the erection of a two-story branch, 40 x 250 ft., at Niagara Falls, Ont., estimated to cost close to $80,000.

The Live Poultry Transit Co., Broadway, Cheektowaga, Buffalo, has preliminary plans for rebuilding the portion of its car repair shops recently destroyed by fire, with loss estimated at $100,000. A fertilizer factory of the company, also damaged, will be rebuilt.

A vocational department will be installed in the new three-story high school addition, to be erected at Orchard Park, N. Y. Colson & Hudson, Dun Building, Buffalo, are architects.

W. J. Henry, 128 South Street, Auburn, N. Y., and associates, are organizing a company to build and operate a plant on York Street for the manufacture of tools and other products, estimated to cost $100,000, including equipment.

The Buffalo Cold Drawn Steel Co., Buffalo, represented by M. Evans, Marine Trust Building, comprising a recent reorganization of the Cleveland Cold Drawn Steel Co., Cleveland, has plans under way for a new plant, on about 3 acres, lately acquired: It will be equipped for a production of about

35,000 tons a year and is estimated to cost $100,000.

Klepfer Brothers, 1029 Main Street, Buffalo, will commence the erection of a two-story automobile service and repair works, 235 x 570 ft., estimated to cost $150,000, including equipment. A. H. Hopkins, [illegible] architect.

Manual training and vocational departments will be installed in the seven new school buildings to be erected at Buffalo, estimated to cost $500,000 each. The Board of Education will have plans drawn at an early date.

Peter A. Porter, Jr., Marine Bank Building, Buffalo, in conjunction with the James S. Thompson Estate, same address, is formulating plans for the organization of a company to build and operate a hydroelectric power plant at Niagara Falls, with initial installation estimated to cost $4,000,000.

Pittsburgh

A [illegible] week of October in machine tools, but it has been in the number rather than in the size of the orders that business has shown betterment over that of last month. Single tool orders predominate. The Pittsburgh Screw & Bolt Co., bought a 21-in. drill, a 24-in. planer and a Lincoln type milling machine and will buy a surface grinder. Sale of a large knife grinder is reported to one of the Steel Corporation subsidiaries, and a Pittsburgh bolt maker bought a nut tapping machine. Bids still are going in against the list of thirteen tools recently issued by the Carnegie Steel Co., for its Clairton by-product plant, the list containing ten wood-working and three metal-working machines. There are fourteen heavy tools in a list issued by the National Tube Co. for its new tube works in Gary, Ind., and awards are expected in a few weeks.

Interest in the crane market centers around the forty-one to be installed in the new Gary plant of the National Tube Co. The company recently asked for revised bids on these cranes and awards may come late this week or early next week. Cranes, oven pushers and other equipment for the new by-product plant of the Weirton Steel Co., and the addition to the Clairton plant of the Carnegie Steel Co., also are expected to be placed soon. This business will be placed by the Koppers Co., which also has asked for bids on an air operated crane for the Clairton addition.

The H. J. Heinz Co., will place a 2-ton crane shortly and the Pittsburgh Valve Foundry & Construction Co. is about to close on a 5-ton crane. The General Electric Co. has been awarded the drives for the new strip mill of the Otis Steel Co., Cleveland, while the rotary converters and transformers will be furnished by the Allis-Chalmers Mfg. Co. The Carnegie Steel Co. is expected to close shortly for a 10,000-kw. turbo-alternator, with barometric condensers and three turbine gas boosters, also equipped with barometric condensers for its Clairton by-product plant. This business will involve an expenditure of about $500,000. The local office of Manning Maxwell & Moore reports a sale of a 24-in. planer to the Pickands-Mather Co., Cleveland, for its ore mining properties in Minnesota.

The Robertshaw Mfg. Co., Youngwood, Pa., manufacturer of pipe fittings, plumbing equipment, etc., has taken bids for a new machine shop and foundry, each one-story, 110 x 130 ft., and 30 x 65 ft., respectively. The American City Engineering Co., Peoples' Bank Building, Pittsburgh, is engineer.

A vocational department will be installed in the new junior high school to be erected at Corry, Pa., estimated to cost $125,000. William G. Eckles, Lawrence Savings & Trust Building, New Castle, Pa., is architect.

The American Window Glass Co., Farmers' Bank Building, Pittsburgh, has awarded a general contract to the Heyl & Patterson Co., 51 Water Street, for its proposed addition at Jeannette, Pa., estimated to cost $1,500,000, including [illegible]

The West Penn Power Co., West Penn Building, Pittsburgh, is arranging an appropriation of about $15,000,000, for extensions and improvements. It is planned to construct an addition to the generating plant at Springdale, to double the present capacity, estimated to cost $2,000,000. Other power house construction will be carried out.

The Lebbo Gas Coal Co., Lumberport, W. Va., recently organized, will install power equipment, hoisting apparatus, mining machinery, mine cars, etc., on a tract of about 125 acres. S. Clyde Lewis, Grafton, W. Va., heads the company.

The Libbey-Owens Sheet Glass Mfg. Co., Nicholas Building, Toledo, Ohio, has plans for six two-story additions at Charleston, W. Va., each approximating 50 x 250 ft., estimated to cost $300,000, including machinery. The Devore Co., Nicholas Building, Toledo, is engineer.

A vocational department will be installed in the new two-story high school to be erected at Troy, Pa., estimated to cost $100,000. Lawrie & Lappley, Cotterell-Ebner Building, Harrisburg, Pa., are architects.

The Amicon Fruit Co., 81-87 East Naghten Street, Columbus, Ohio, will take bids at once for a new three-story and basement ice and cold storage plant at Williamson, W. Va.

New England

BOSTON, Oct. 9.

THE improvement in machine tool prices was accelerated the past week by additional revisions by manufacturers. Tool room lathes advanced ten per cent, cutter and reamer grinders 12½ per cent; plain and universal milling machines ten to fifteen per cent, surface grinders ten per cent, die sinkers ten per cent, hand millers ten per cent and pipe cutters about ten per cent.

Concurring with the advance in prices is a better demand for metal-working equipment, the majority, however, dealing with single machines. An interesting phase of new prospective business is the strong tendency to present production problems to representatives of machine tool builders. Industry is demanding more specialization in equipment with a view to quantity production at minimum cost. It is due to this that the percentage of increase in new machinery sales is growing faster than in used equipment.

Business closed in this district the past week was smaller in volume than during the previous week, but for the first time in months practically all representatives and dealers report transactions. Heretofore, business has been spotty. A sale of two turret lathes to a Springfield, Mass., manufacturer represents one of the most noteworthy transactions. Another week probably will witness an expansion in bookings, as a large number of sales are on the point of closing.

The Edison Electric Illuminating Co. of Boston will proceed immediately with the construction of a generating station in Weymouth, Mass., the initial capacity of which probably will be two 30,000 kw. units.

The Atlas Body Works, Bridgeport, Conn., automobile bodies, has awarded contract for a one-story, 76 x 90 ft. manufacturing unit.

The plant of the Manning Mfg. Co., Rutland, Vt., dairy machinery, last week was damaged $15,000 by fire. The entire works will not close pending repairs.

Sketches have been made for a proposed $300,000 manufacturing plant contemplated by the Vose & Sons Piano Co., 1010 Massachusetts Ave., Roxbury, Boston. The plant, if erected, will be located at Arsenal and North Beacon Streets, Watertown, Mass.

Bids are in for a one-story, 62 x 112 ft. machine shop to be erected on Prospect Street, Lawrence, Mass., by the Champion International Paper Co.

The Connecticut Metal Treating Co., 207 Knowlton Street, Bridgeport, Conn., whose factory was completely destroyed by fire Oct. 1, will temporarily take over the hardening plant of the Bridgeport Engineering Co., Stratford, until its new plant is completed.

The Lacey Mfg. Co., Union Avenue, Bridgeport, Conn., manufacturer of dies, tools, etc., will break ground at once for the construction of a new one-story addition, to cost close to $25,000.

A vocational department will be installed in the three-story junior high school, 100 x 268 ft., at Worcester, Mass., estimated to cost about $1,000,000, for which ground will be broken at once.

The Albert Griffiths Saw Co., 30 Whittier Street, Roxbury, Mass., will build a new one-story plant, 45 x 90 ft., estimated to cost $25,000.

John Werner, Webster, Mass., has acquired a building on Chase Avenue for a new plant to manufacture carburetor pins and other metal specialties.

A vocational department will be installed in the new three-story high school to be erected at Beverly, Mass., esti-

[illegible] to cost about $700,000, for which bids will be asked at once. Adden & Parker, 177 State Street, Boston, are [illegible]

Dominick & Haff, North Attleboro, Mass., manufacturers of silver and metal hollow ware products, have leased space in the Bigney Building for increased production and will remove to this location.

A vocational department will be installed in the new three-story high school to be erected at East and Second Streets, Pittsfield, Mass., estimated to cost $500,000. An architect to prepare plans will be selected.

The Utilities Power Co., Meredith, N. H., has preliminary plans in progress for a hydroelectric power plant at Ayres Island, near Bristol, N. H., estimated to cost $600,000.

Detroit

DETROIT, Oct. 9.

CONSIDERABLE inquiry has developed since the first of the month and sentiment among machinery representatives is much better. Conditions generally are about on a par with the early months of the last half of the year. Much interest has been shown in connection with the recent announcement of the Chevrolet Motor Co. regarding its extensions which will necessitate a large amount of tooling for the production of its new air cooled model.

One representative reports an advance of fifteen per cent on lathes effective Oct. 9 and this has had the effect of closing orders on recent quotations.

The Monroe Auto Equipment Co., Monroe, Mich., is planning for the construction of a new one-story foundry to cost $25,000. A. F. Meyer is president.

The Maxwell Motor Corporation, Oakland Avenue, Detroit, has awarded a contract to the H. K. Ferguson Co., 6523 Euclid Avenue, Cleveland, for a one-story addition, 80 x 440 ft., estimated to cost $100,000, including equipment.

The Ternstedt Mfg. Co., Artillery and Muster Streets, Detroit, manufacturer of automobile hardware, has filed plans for a new one-story addition on Artillery Street, estimated to cost approximately $235,000, with equipment.

The Michigan Central Railroad Co., Detroit, is considering plans for new car shops with power house at Bay City, Mich. The engineering department is in charge.

Dodge Brothers, Inc., 7900 Joseph Campau Avenue, Detroit, is arranging to build with its own construction department, the proposed addition to its automobile works at Hamtramck, Mich., comprising an eight-story building, 200 x 400 ft., estimated to cost $1,000,000, with machinery.

The Central Paper Co., Muskegon, Mich., is completing plans for a three-story addition, estimated to cost $200,000 with machinery. E. J. Gaddes is secretary.

The Standard Gear Co., 2821 Brooklyn Avenue, Detroit, is considering the installation of new gear-cutting machinery.

Milwaukee

MILWAUKEE, Oct. 9.

MACHINE-TOOL trade is gradually enlarging beyond replacement business which has characterized it for a long time. Local tool plants have received scattering orders for machines for railroad shops, but this business has not yet assumed proportions, although inquiry is steady and active. Automotive industries have been letting down somewhat on equipment needs, but tractor and gas engine shops are better buyers. Sentiment in the tool trade is optimistic and a good fall and winter business is looked for.

The General Motors Corporation, Detroit, which, as already reported, is establishing an additional passenger car factory for the Chevrolet division in the Samson Tractor Co. works at Janesville, Wis., will also place an additional production unit of the Fisher Body Corporation division at this point. Contracts were awarded Oct. 1 for a new building with 96,000 sq. ft. of floor space, to be equipped for body manufacture and to be ready Jan. 1. An additional building will also be erected for the Chevrolet unit to facilitate final assembling of passenger cars. Retooling of existing Samson buildings for car production is going forward.

The D. J. Murray Mfg. Co., Wausau, Wis., founder and machinist, and manufacturer of sawmill machinery, logging equipment, etc., has started work on the erection of a brick and steel addition, 58 x 228 ft., and 48 ft. high, to replace one of the original shops of the group. It will be equipped with a 10-ton electric traveling crane, a large boring mill taking work 12 ft. 6 in. in diameter and 72 in. high; an open-side planer, 16 ft. x 48 in., with reversing motor drive, and a miscellaneous list of other heavy-duty equipment.

The Green Bay, Wis., Board of Vocational Education has engaged Foeller, Schober & Stephenson, local architects, to design the proposed new $250,000 central-continuation school to be erected early in 1923. Plans are expected to be ready for bids about Dec. 1. H. G. Stewart is superintendent.

The Rudolph Jiffy Tool Co., Eau Claire, Wis., has been incorporated with a capital stock of $25,000 to manufacture a line of mechanics' tools, designed by John Rudolph, Brantwood, Wis., and several automotive shop specialties. The incorporators are M. J. and Henry Leinenkugel and J. K. Erity, all of Eau Claire. Space has been leased in an existing building and is being equipped with new and used tools. For the present castings and forgings will be purchased.

The Invincible Metal Furniture Co., Manitowoc, Wis., is remodeling a portion of its plant and adding a one-story building, 25 x 80 ft., to serve as a nickel plating shop, which with equipment will cost about $10,000. Formerly this work was done under contract with outside platers. It manufactures vault doors, safe deposit boxes, fireproof cabinets, furniture, etc.

The Racine, Wis., Board of Vocational Education is taking sealed bids until Oct. 17, for a three-story central continuation school. The estimated cost, including equipment to be purchased later, will be about $375,000. Angus Callender is president, and Eben Burroughs, secretary of the board. The architect is J. Mandor Matson, 533 Baker Block, Racine.

The Allan-Diffenbaugh Wrench & Tool Co., Baraboo, Wis., is installing some additional floor equipment and has added a second shift in nearly all departments to handle increasing orders. Laurence Maisel, formerly of the Madison Tool & Stamping Works, has been engaged as production manager to supervise the expansion program. In the spring it is intended to enlarge the plant. A. C. Allan is president.

The Board of Education, Ironwood, Mich., has taken final action in favor of the construction and equipment of a new high and central continuation school accommodating 1400 students and with cost not to exceed $700,000. An architects' competition will be arranged at once to procure plans.

The Leyse Aluminum Co., Kewaunee, Wis., will erect an addition during the winter, due to the pressure of orders which required the addition of a night crew on Oct. 1. Details are now being prepared.

The Milwaukee Air Power Pump Co., 886 Third Street, Milwaukee, has let the general contract to the Universal Construction Co., 915 Chestnut Street, for its new plant, 130 x 150 ft., at Keefe Avenue and Humboldt Boulevard. It will cost about $100,000 including equipment, for which inquiry is being made. John R. Ball is president and general manager.

The B. C. Chatfield Iron Co., Gladstone, Mich., is completing work on its new gray iron foundry and the installation of the coupola and other equipment. The new shop represents an investment of about $35,000. Joseph Voss has been engaged as production manager.

A. G. Brusewitz, Appleton, Wis., highway commissioner of Outagamie County, is inquiring for a list of metal-working equipment, motors, etc., for the new County garage and service shop, 50 x 150 ft. The total cost will be $50,000.

The Valley Paper Mills, Inc., Neenah, Wis., awarded the general contract to the Appleton Construction Co., Appleton, Wis., for a new paper manufacturing group costing $800,000. The main building will be 80 x 660 ft., with an auxiliary building, 112 x 144 ft. Edward A. Wettengel, Appleton, is architect and engineer. G. W. Burnside is secretary and general manager.

The Kewaunee, Wis., Furniture Co., specializing in laboratory fixtures and equipment, has broken ground for a $50,000 extension and will need some additional equipment for metal, sheet metal and wood-working processes. Present capacity is occupied until April 1, 1923, including a contract involving $50,000 for equipment of the chemical building of the University of Mississippi.

The American Carbonic Machinery Co., Wisconsin Rapids, Wis., has increased its capital stock from $750,000 to $1,000,000, consisting of $900,000 common and $100,000 preferred stock, in preparation for the enlargement of its plant and production of artificial ice machines and cooling systems. Details have not yet been completed.

The plant and property of the defunct Jefferson Rubber Co., Jefferson, Wis., has been sold by the receiver to the National Vacuum Street Sweeper Co., which intends to take occupancy at once and engage in the production of municipal street sanitation equipment. This will require practically the entire retooling of the plant.

The Fairmont Creamery Co., 200 North Broadway, Green Bay, Wis., let the general contract to the L. M. Hansen Co., for a $100,000 plant and cold storage warehouse, 100 x 105 ft., three stories and basement. Inquiry is being made for boilers, engines, ice machine, motors and other equipment.

The Brunet Heating System, Inc., Rice Lake, Wis., incorporated more than a year ago with an authorized capital

of $1,000,000 by E. C. Brunet, Minneapolis, is preparing to [illegible] first unit of its new plant. John L. Dahl is president.

[illegible] kee, has broken ground for a five-story brick, steel [illegible] crete addition, 225 x 420 ft., duplicating the present [illegible] for [illegible] uring open and enclosed automobile bodies is now [illegible] chased. Harold S. Seaman is secretary.

The Board of Education, LaCrosse, Wis., is selecting an architect to design the proposed new junior high and vocational school, for which an appropriation of $250,000 has been made available. Construction work is expected to start shortly after Jan. 1. William Luenining is president of the [illegible]

Ohio

THERE was little change in the Cleveland machine-tool market the past week, although some dealers report a slight gain in single tool orders. Manufacturers of turret lathes note a marked improvement in inquiries for single machines, mostly from the East. No activity is reported in the railroad field but it is understood that the Pennsylvania Railroad shortly will issue a list of about a dozen machines for its Columbus, Ohio, shops. The Spencer Mfg. Co., Spencer, Ohio, has issued a list of a dozen tools, used machinery being preferred.

In Cincinnati machine tool business the past [illegible] been good in both sales and inquiries, activity being confined, however, mostly to single machines with demand from scattered sources. The Virginian Railway is inquiring for lathes, planers and shapers, and the Atchison, Topeka & Santa Fe made purchases during the week. Sales include an all-steel press brake for 13-ft. plate to a company in Canton, Ohio. A sale of six stamping presses to a company operating in Dayton, Ohio, is noted. In used machinery both inquiry and sales are holding up. The issuing of a list for equipment for the new plant of the Fay & Eagan Co., Cincinnati, has been postponed until the structure nears completion.

Considerable interest was taken the past week in the sale of Government machinery at the howitzer plant in Erie, Pa. This machinery, consisting of several hundred tools mostly in first class condition, was sold at auction by the Philadelphia Salvage Board of the Ordnance Department. It is reported that, as a rule, the machines brought very good prices. About half of the equipment was purchased by consumers and the remainder by dealers. Albany, New York and Chicago seem to have been the largest buyers among the dealers. The specific prices given below on some of the machines will indicate the general range of selling prices during the sale: Pratt & Whitney vertical shapers around $1,050; 21-in. 8-ft. bed Leblond heavy duty lathes, $550 to $750; Blanchard vertical surface grinders, $1,550 to $1,875; Ingersoll horizontal milling machine 24-in. x 24-in. x 12-ft., $1,600 to $1,725; Cincinnati planers 36-in. x36-in. x 18-ft. with two heads, $2,150. Milling machines brought about 50 per cent of present prices. Two Cincinnati No. 4 vertical milling machines with single overarm sold at $1,775 each; a No. ½ vertical Milwaukee milling machine at about $850 and a No. 2½ at about $1,150.

The Spencer Mfg. Co., Spencer, Ohio, has sent out the following list:

One 12-in. x 4-ft. engine lathe.
Two hand milling machines.
Three turret lathes.
Three 24-in. upright drilling machines, including one with tapping attachment.
One 24-in. heavy duty drilling machine.
Two 20-in. upright drilling machines.
Two 4-spindle sensitive drilling machines.
Four bench drills.

The Ideal Electric & Mfg. Co., Mansfield, Ohio, is inquiring for a 24-in. shaper and face grinder, milling machine [illegible]

The Adam Axle Co., Findlay, Ohio, will enlarge its plant by the erection of a building, 80 x 200 ft. At present the company is completing a 45 x 75 ft. extension. It is reported that it will install about $50,000 worth of new equipment.

The Commercial Shearing & Stamping Co., Youngstown, Ohio, has been reorganized following the sale of the Carnick interest in the company. It is announced that about $30,000 worth of additional machinery will be purchased. The new officers are W. A. Beecher, president; G. F. Aldercise, vice-president; Nathan Falson, treasurer; Guy Ohl, secretary.

The Anaconda Copper Co. has commenced the erection of its new plant in North Akron, Ohio. The Burger Iron Co., Akron, will erect the steel work.

The Frank Ault Tool & Production Co., Dayton, Ohio, with a capitalization of $20,000, has incorporated, the reorganization being to secure additional working capital to manufacture special machinery.

The Lees-Bradner Co. has acquired a factory, occupying a site 60 x 175 ft. adjoining the rear of its present plant and will equip it for a temporary erecting shop. The company expects to provide larger permanent quarters, but has not yet decided whether to erect a new building on the site just acquired, or to build a new plant on another site which it owns. No definite plans have been made as yet.

Baltimore

BALTIMORE, Oct. 9.

A MUNICIPAL electric power plant will be built by the City Council, Hagerstown, Md., on Antietam Creek, estimated to cost $400,000. It will have an initial capacity of 3000 kw., to be increased to 10,000 kw. later. Millard P. Osburn, Stock Exchange Building, Philadelphia, is consulting engineer.

The Chief of Air Service, United States Army, Washington, will receive bids until Oct. 19 for one adjustable dowel and rod machine, as specified in circular 23-38; until Oct. 17, for 9000 ft. ½-in. copper tubing, 15,000 ft. ⅜-in. copper tubing, and 7500 ft. ¼-in. aluminum tubing, circular 23-31.

Isaac Fass, Inc., Portsmouth, Va., has completed plans for a third unit at its ice-manufacturing plant, 30 x 110 ft., with complete cold storage department, to increase the capacity from 100 to 140 tons per day. The existing units will be electrified in all departments. The expansion is estimated to cost about $100,000.

The Purchasing Agent, Atlanta, Ga., City Hall, will receive bids until Oct. 31 for pumping machinery for the waterworks plant on the Chattahoochee River, consisting of 15 to 30,000,000-gal. centrifugal pumps, and 15,000-000-gal. per day cross-compound pumping engines, with auxiliary equipment. The size and type of pumps will be determined after receiving bids. P. H. Norcross, 1404 Candler Building, is consulting engineer.

The Kelsey Motor Co., 1800 Decatur Street, Richmond, Va., is planning for the installation of machinery at its repair works, including lathe, drill press, bench tools, etc.

The Virginia Railway & Power Co., Richmond, Va., has arranged for a bond issue of $1,250,000, a portion of the proceeds to be used for extensions and improvements.

The American Railway Car Cooling Co., Florence, S. C., has tentative plans for the erection of a local experimental plant to manufacture and develop refrigerating equipment for railroads, with automatic operation. It will cost about $30,000. B. J. Blume is president.

D. C. Elphinstone, 408 Continental Building, Baltimore, machinery dealer, is making inquiries for a 15-ton locomotive crane.

The Bureau of Yards and Docks, Navy Department, Washington, will soon call for bids for the installation of an ice-manufacturing and refrigerating plant at the Pearl Harbor, H. T., navy yard, according to specification 4735.

The Purchasing Agent, Post Office Department, Washington, will receive bids until Oct. 16 for 4000 sets of commutator wire assemblies; until Oct. 13, for five squirrel cage motors, each 1 hp. with five starting rheostats.

The Chesterfield Motor Co., 19 Petersburg Pike, Richmond, Va., will install a new lathe, drill press, bench tools and other equipment at its repair works.

The Hummel-Ross Fiber Corporation, Hopewell, Va., has awarded contract to the Wise Granite & Construction Co., American Bank Building, Richmond, Va., for a new one and two-story plant, with complete machine and beater departments, to cost $100,000, including equipment. The Joseph H. Wallace Co., 5 Beekman Street, New York, is architect and engineer.

The power house and other departments at the planing mill of C. W. Carter, Adel, Ga., were destroyed by fire Sept. 25, with loss estimated at $35,000. It is planned to rebuild.

A vocational department will be installed in the new high school to be erected at Hayesville, N. C., estimated to cost $100,000. Frank B. Simpson, Raleigh, N. C., is architect.

The General Purchasing Officer, Panama Canal, Washington, will receive bids until Oct. 14, for the following equipment: 1000 ft. galvanized iron or steel rope, ¾ in. diameter; 550 ft. phosphor bronze tiller rope; 24 ft. of steel tubing; 150 lb. of bronze rods; 300 lb. of sheet brass; 2000 ft. cast iron soil pipe; machine bolts, stove bolts; 16 brass throttle valves; 10,000 lb. of wire nails, and other miscellaneous material, as set forth in circular 2301.

The R. Mullen Hood Brick Co., Atlanta, Ga., is completing plans for remodeling and enlarging its plant at Rome, Ga., comprising the former works of the Rome Fireproofing Co., lately acquired, estimated to cost $75,000. It will manufacture hollow tile, etc.

The du Pont Motors, Inc., Wilmington, Del., manufacturer of automobiles and parts, has placed its plant at Moore, Pa., on the market and in the future will concentrate operations at Wilmington. Tentative plans are being considered for a new plant at the last noted place.

The Gulf States

BIRMINGHAM, Oct. 9.

THE Mobile & Ohio Railroad Co., Mobile, Ala., operated by the Southern Railway Co., has tentative plans for the establishment of a new mechanical division, to include the construction of additional car and locomotive shops at Tuscaloosa, Ala.

The Tex-McCracken Concrete Pipe Co., 304 Trust Building, El Paso, Tex., has acquired property on Stevens Avenue as a site for a new plant, estimated to cost $75,000. H. E. Johnson is manager.

The Gadsden Pipe Co., Gadsden, Ala., will commence the immediate erection of a new machine shop, 40 x 85 ft.

A vocational department will be installed in the new high school to be erected at Georgetown, Tex., estimated to cost $200,000, for which bids on general contract will be asked at an early date.

The Mercedes Light, Water & Power Co., Mercedes, Tex., has plans under way for an addition to its electric power plant, with the installation of new generating and other machinery.

The Common Council, Valley Mills, Tex., has had plans prepared for a municipal electric light and power plant. Roy S. Pool is city secretary.

The Liberty Mfg. Co., New Orleans, manufacturer of metal electric signs and displays, has acquired property on Carrollton Avenue, for enlargements. New machinery will be installed.

The Crossett Lumber Co., Monroe, La., has plans for a new lumber mill estimated to cost in excess of $300,000, including machinery and power equipment. It is also proposed to build a pulp mill near Monroe, to cost close to $150,000.

The Wichita Falls & Southern Railroad Co., Wichita Falls, Tex., has preliminary plans for a new engine house and machine repair shop. Frank Kell is president and general manager.

The Water and Light Commission, Birmingham, plans extensions and improvements in the municipal electric power plant at North Birmingham, including the installation of new machinery. D. E. McLendon is president of the commission.

A vocational department will be installed in the new two-story high school to be erected at Burkburnett, Tex., estimated to cost $125,000. C. H. Page & Brothers, Austin National Bank Building, Austin, Tex., are architects.

The Wills Storage Battery Mfg. Co., San Marcos, Tex., recently organized, has plans under way for a new plant, 50 x 100 ft. M. B. Wills heads the company.

The El Paso Brick Co., El Paso, Tex., has plans under way for the compelte electrification of its plant, to include the installation of a power house.

A vocational department will be installed in the new high school to be constructed at Brady, Tex.

The Southwestern Portland Cement Co., El Paso, Tex., has concluded negotiations with the Chamber of Commerce, Phoenix, Ariz., for a new plant, estimated to cost $1,000,000. O. J. Binford is secretary and general manager.

The Mansfield Light & Power Co., Mansfield, La., will call for bids at an early date for a new electric generator, Corliss engine, and auxiliary machinery for its power plant. C. E. Hewett is general manager.

The Guadalupe River Navigation Co., Victoria, Tex., will equip a power house in connection with a new sand and gravel plant on the Guadalupe River. Material handling equipment, including hoist, clam shell bucket, etc., will be installed. W. B. DuPre is treasurer and general manager.

The McComb Ice Co., McComb, Miss., has plans under way for a new refrigerating and cold storage plant. New equipment will be installed in the power house. V. G. Connor is superintendent.

The Illinois Central Railroad Co., 135 East Eleventh Place, Chicago, is planning for the installation of mechanical coal-handling equipment at McComb, Miss., estimated to cost $70,000.

The Kaufman Metal Co., Jacksonville, Fla., is making inquiries for cutting torches, for cutting brass and other metals.

The Texas Tinners' Supply Co., Houston, Tex., is making inquiries for machinery to manufacture seamless rubber products; also, for motors and other power equipment.

The Cuero Light & Power Co., Cuero, Tex., has arranged an appropriation of $75,000 for extensions in its electric power plant and system.

A vocational department will be installed in the high school to be constructed at Smithville, Tex., estimated to cost $90,000.

A vocational department will be installed in the high school to be erected at Wortham, Tex., for which a general contract will be let during the present month. It will cost close to $70,000.

The Central South

ST. LOUIS, Oct. 9.

MACHINE tool men from all over the country have been in St. Louis the last 10 days, the attraction being the list put out by the Missouri-Kansas-Texas Railway. The first order of any size went to the Shaw crane works of Manning, Maxwell & Moore, Inc., and was for traveling cranes, one each of 180 tons and 40 tons and two of 15 tons capacity. It is expected that the remainder of the list will be ordered some time this week.

Bids will be taken at once by the Missouri Pacific Railroad Co., St. Louis, for a new one-story steel car repair shop at Kansas City, Mo., 120 x 510 ft. E. A. Hadley is chief engineer.

The Davis Boring Tool Co., 3722 Forest Park Boulevard, St. Louis, has taken title to property at Forest Park Boulevard and Spring Avenue, as a site for a new three-story factory. Plans are being prepared.

The Stout Lumber Co., Thornton, Ark., is preparing plans for rebuilding its planer and veneer mills and power house, recently destroyed by fire with loss of $200,000. The new plant with machinery will cost a like amount.

The Kansas City Southern Railway Co., Kansas City, Mo., has preliminary plans for new car and locomotive shops at Pittsburg, Kan. J. M. Weir is chief engineer.

The Oklahoma Power Co., West Tulsa, Okla., has commenced the erection of an addition to its generating plant, to double the present capacity. The expansion will cost $450,000. The company is a subsidiary of the American Public Service Co.

The Central Power & Light Co., Walnut Ridge, Ark., has plans for extensions and improvements in its generating plant, to include the installation of additional equipment.

The Mead Fiber Co., Kingsport, Tenn., has awarded a general contract to W. A. Allen, Kingsport, for a new two-story and basement mill, 75 x 275 ft., for the manufacture of paper products, estimated to cost $350,000, including machinery.

The Board of City Commissioners, City Hall, Newport, Ky., will receive bids until Nov. 14, for steam and electric deep-well pumping machinery, of 6,000,000-gal. capacity, for installation at the waterworks. George Hornung, Wool-Sack Building, is consulting engineer.

The White Motor Co., Nashville, Tenn., Howard C. Goss, general manager, has tentative plans for new works at Chattanooga, Tenn., to manufacture motor trucks and parts. A site is being selected.

A vocational department will be installed in the new high school to be erected at Marshall, Mo., estimated to cost in excess of $125,000, for which bids on a general contract will be received until Oct. 31.

The Mahan-Kerr Motor Co., Market Street, Knoxville, Tenn., has plans for a new three-story service and repair building, 87 x 100 ft., at Market and Cumberland Streets, estimated to cost $150,000. Barber & McMurray, Burnwell Building, are architects and engineers.

The Pike Light & Power Co., Pikesville, Ky., has arranged for an increase in capital of $200,000, a portion of the proceeds to be used for extensions

The Parker Electric Mills, Inc., Ann Arbor, Mich., has commissioned the Associated Engineering Co., Somerset, Ky., to prepare plans for a hydroelectric generating plant near Somerset for the operation of a new flour mill. The entire plant will cost $700,000, including machinery. George W. Sample, Ann Arbor, is head.

The Abrasive Co., 30 Church Street, New York, manufacturer of grinding wheels, etc., is considering plans for a new reduction plant in the vicinity of Chattanooga, Tenn., utilizing ore from the company mines at Adairsville, Ga. Henry M. Payne is consulting engineer.

F. W. Shaw, Rollo, Mo., is making inquiries for an

electric generator with heavy oil engine and auxiliary operating equipment, for installation in his electric plant at Newburg, Mo.

The Missouri Utilities Co., Mexico, Mo., will make extensions and improvements at its power plant to cost $60,000, including the installation of a new 2000-hp. turbo-generator.

The Common Council, Valley Falls, Kan., has rejected all bids for deep-well pumping machinery for the waterworks, recently received, and will call for new bids at an early date. Black & Veatch, 701 Mutual Building, Kansas City, Mo., are [illegible]

Indiana

INDIANAPOLIS, Oct. 9.

PLANS are in progress by the Rockwood Mfg. Co., English Avenue, Indianapolis, manufacturer of paper pulleys and kindred equipment, for two new one-story machine shops, 100 x 200 ft. and 75 x 100 ft., respectively, estimated to [illegible] works. Motherhead & Fitton, 540 North Meridian Street, are architects.

The Hope Light & Power Co., Hope, Ind., recently organized, is planning the establishment of a local power house and system.

The City Council, Crawfordsville, Ind., has preliminary plans under consideration for a one-story addition to the municipal electric power plant, with the installation of additional equipment, estimated to cost $200,000. H. C. Carroll, Terminal Building, Indianapolis, is engineer.

The Ziegler Mfg. Co., Alexandria, Ind., manufacturer of screw machine products, etc., has commenced the erection of a one-story addition, 60 x 200 ft., estimated to cost [illegible]

A vocational department will be installed in the new Franklin Junior high school, to be erected at Logansport, Ind., estimated to cost $250,000. Bids will be called late in November. Allen & Garriott, Masonic Temple, are architects.

The Consumers' Service Co., Richmond, Ind., is considering plans for a new one-story oil refinery, estimated to cost $200,000 including machinery. A storage department with steel tanks of 100,000-gal. capacity will be installed.

The Logansport Radiator Equipment Co., Logansport, Ind., will build an addition to triple the present capacity. New machinery will be installed. James F. Digan is president.

The Indiana Quarries Co., Bedford, Ind., has awarded contract to the Indiana Bridge Co., Muncie, for a new one-story plant to replace its works recently destroyed by fire. It will cost $400,000, including machinery, power equipment, [illegible]

The Pacific Coast

SAN FRANCISCO, Oct. 3.

THE Haughty-Red Bluff Saw & Machine Works, Red Bluff, Cal., recently organized, has acquired the local plant of the Bessolo Wrench Co., and will convert the works for a manufacturing plant and general machine shop. J. W. Harrington is president, and James Haughty, general [illegible]

The Los Angeles Bureau of Power and Light, Los Angeles, Cal., has plans for a new two-story power house, 45 x 110 ft. The installation will include a 20-ton traveling crane

The High School District, Watsonville, Cal., has authorized the preparation of plans for a one-story machine shop at the high school. Wyckoff & White, Growers' Bank Building, San Jose, Cal., are architects.

The Kroyer Mfg. Co., Los Angeles, manufacturer of farm tractors and parts, is planning the erection of a new five-story factory at Long Beach, Cal., to cost $200,000, including machinery. The company formerly maintained a plant at Stockton, Cal.

A vocational department will be installed in the new two-story high school to be erected at Santa Monica, Cal., estimated to cost $350,000. Allison & Allison, 1405 Hibernian Building, Los Angeles, are architects.

The Western Stove Co., Oakland, Cal., is considering the [illegible] iron works and foundry, estimated to cost about $75,000. The Pomona Chamber of Commerce is interested in the project.

The Steel Tank & Pipe Co., Berkeley, Cal., recently organized, is arranging for a stock issue of $145,000, the proceeds to be used in connection with the establishment [illegible]

The California-Oregon Power Co., 129 Liedesdorff Street, San Francisco, will construct and operate a hydroelectric power plant on the Klamath River, near the northeast State line, with capacity of 120,000 hp. It is estimated to cost $1,000,000.

The Bedell Engineering Co., Los Angeles, manufacturer of machinery and mechanical specialties, has awarded contract to Robertson & Evans, Grant Building, for a new one-story plant, 92 x 130 ft., estimated to cost $25,000.

The Madera Sugar Pine Co., Fresno, Cal., has preliminary plans for rebuilding its plant, recently destroyed by fire with loss estimated at $1,000,000, including machinery, power house, etc. The new mill will cost approximately a like amount. H. F. Horskotte, Merced, Cal., is architect.

The Brooks-Scanlon Lumber Co., Bend, Ore., is planning the erection of an addition to double the present capacity. Electrically operated machinery will be installed, including band-saws, edgers, trimmers and auxiliary equipment.

The Peninsula Lumber Co., Portland, Ore., has tentative plans under way for a new saw mill and lumber plant, estimated to cost $500,000, including machinery.

The Superior Portland Cement Co., Concrete, Wash., has awarded a contract to the Rounds-Clist Co., Walker Building, Seattle, for a new one-story building, 125 x 250 ft., estimated to cost $100,000.

The State Board of Examiners, Helena, Mont., has construction under way on a new four-story engineering building, 77 x 190 ft., and one-story mechanical shop, 120 x 182 ft., at the State University, Bozeman, estimated to cost $300,000. A list of equipment will be arranged.

The West Coast Pulp & Paper Co., Salem, Ore., has acquired property on Tumwater Street, Olympia, Wash., for a new paper and pulp mill. The improvement, including machinery, is estimated to cost $100,000. C. M. Miall is president.

Canada

TORONTO, Oct. 9.

CONDITIONS in this market are showing steady improvement. Machinery sales for September were better than for the corresponding month and dealers state that for some time each succeeding month has been better than the last. In keeping with the boom in industrial building activities, the demand for equipment has also been increasing. While the present call is good, the outlook for the future is still better and inquiries now coming in are from those actually interested in equipment for plants and additions. Small tools continue to move freely and a slight improvement was reported in demand during the week.

Prices are showing an upward tendency, but no general change has been announced.

Plans are being prepared for a machine shop at Ford, Ont., for the Ford Motor Co. of Canada and it is reported that the company will require about $150,000 worth of equipment, including lathes, planers, shapers, milling machines and general tools.

C. Macpherson, Morrison Block, Kincardine, Ont., will build a machine shop for which he is asking for equipment

The Thompson Powder Co., Deseronto, Ont., whose plant was recently destroyed by an explosion with a loss of $35,000, will rebuild immediately and is interested in equipment for a mixing house.

The Artcraft Furniture Co., Goderich, Ont., is in the market for factory equipment.

The Detroit Steam Motors Corporation, Windsor, is building a plant to cost $200,000 and will shortly be in the market for machinery and tools.

The Leggatt & Platt Spring Bed Co., 328 McDougall Avenue, Windsor, Ont., is erecting a factory for which machinery will shortly be purchased.

Smith & Stone, Milton, Ont., are building an addition for the manufacture of electrical supplies. Equipment is about to be purchased.

W. J. Dalgleish, 221 Dundas Street, Galt, Ont., is in the market for a Tabor molding machine squeezer, No. 10, 34 in. between uprights.

J. J. Joubert Cie. Ltd., 975 St. Andre Street, Montreal, is having plans prepared for a boiler house, etc.

The factory owned by the Maloney Electric Co., McDougall Avenue, Windsor, Ont., recently destroyed by fire [illegible] will be required.

The O'Brien Mine, Cobalt, Ont., will rebuild its mill and shaft, recently destroyed by fire with a loss of $250,000.

The Lower Sturgeon Power Co., Sturgeon Falls, Ont., will

erect a power plant to cost about $1,250,000. Wade, Blackwell & Buck, 49 Wall Street, New York, are engineers.

The Seaman Paper Co., Chicago, Ill., will start work immediately on the erection of the first unit of a paper mill at Seaton Lake, B. C., to cost $3,000,000.

The Toronto Hardware Mfg. Co., 402 Dufferin Street, Toronto, will erect a new plant to cost about $60,000.

H. A. Johnson will build an iron foundry and machine shop at Truro, N. S., to cost about $10,000 and will shortly be in the market for equipment.

The Lion Meade Tire Co., Hull, Que., will call for bids at an early date for the erection of a factory to cost about $75,000.

The Wood Hydraulic Hoist & Body Co., 1025 Tecumseh Road, Windsor, Ont., will build an addition to cost $10,000.

The Canadian Pipe Co., Vancouver, B. C., will erect a wood pipe factory at a cost of $35,000 to replace the one recently destroyed by fire. New equipment will be purchased.

W. W. Pearse, business administrator, the Board of Education, College Street, Toronto, is asking bids for boilers, hydraulic ash hoist, etc., for the Bowmore Road School, also for boilers for Jarvis Collegiate.

Trade Changes

A. A. Straub, L. F. Shutterly and C. L. Straub, all formerly identified with the Straub-Atkinson Coal & Coke Co., Pittsburgh, have organized a new company, the A. A. Straub Coal & Coke Co., with offices at 915-916 Union Bank Building, Pittsburgh.

The General Steel Corporation, Detroit, has removed its offices to larger quarters at 1320 Dime Bank Building, that city.

The Cutler-Hammer Mfg. Co., Milwaukee, electric controlling devices, has opened a branch office at 358 Ellicott Square, Buffalo. B. A. Hansen, formerly located in New York, is in charge.

The Rivett Lathe & Grinder Co., Boston, precision bench lathes, internal and radial grinding machines, has changed the address of its Detroit sales office to 6526 Cass Avenue. The office is operated in conjunction with that of the Reed-Prentice Co., Becker Milling Machine Co. and Whitcomb-Blaisdell Machine Tool Co., under the management of T. C. McDonald. E. B. Barber, formerly superintendent of factories, Lafayette Motor Co., has been added to the sales force.

The co-partnership of Benjamin F. Klein and William J. Schoenberger, trading as the United Brass Mfg. Co., 3844 Hamilton Avenue, Cleveland, has been dissolved by mutual consent. The company continues in the manufacture of plumbing brass goods and water works brass goods at the same location, but under the sole ownership of Mr. Klein. Mr. Schoenberger upon withdrawing takes over the gas valve and stove cock department, which will be known as the W. J. Schoenberger Co., Harvard Avenue at 103d Street, Cleveland, manufacturing gas valves and cocks and special fittings for gas appliances.

J. N. Moyer, machinery and supplies, Crozer Building, 1420 Chestnut Street, Philadelphia, has moved into its new quarters at 119 North Third Street, that city, combining its office and showroom.

The Risher Fire Brick Co., 733 Waveland Avenue, Chicago, has established offices and warehouse facilities at Eighteenth and Canal Streets, Chicago.

The International Fuel & Iron Corporation has removed its Philadelphia offices from the Stock Exchange Building to 215 South Broad Street.

The Hartford Tap & Gauge Co., Hartford, Conn., has changed its name to the Hanson Tap & Gauge Co., connecting it more closely with the inventor of the Hanson process which it employs.

The Swope-McCracken Co., Inc., 7720 Gratiot Avenue, Detroit, production manufacturer and machinist, has taken over recently the business of the Hawken Nut & Screw Co. The capital of the former company has been increased accordingly.

The Automatic & Electric Furnaces, Ltd., 281-283 Gray's Inn Road, London, W.C.1, announces its removal to larger works and offices at Elecfurn Works, 173-175 Farringdon Road, London, E.C.1. Demonstration rooms will be provided with furnaces in operation, and laboratory and industrial electric muffles will also be available for trial purposes.

The office and manufacturing divisions of the Lamson Co., mechanical appliances, which were located in Boston and Lowell, Mass., have been consolidated in its new plant at Syracuse, N. Y.

The Brown Hoisting Machinery Co., Cleveland, announces that its conveyor sales are now in charge of E. P. Sawhill, who has had nearly 30 years' engineering and selling experience on this type of equipment. The Brownhoist elevator and conveyor equipment includes a complete line of belt conveyors, chain conveyors, coal crushers, screens, apron conveyors, picking tables, etc.

The Pawling & Harnischfeger Co., Milwaukee, announces the following new agents and territories for its machine tool line: The Cadillac Machinery Co., Detroit, C. L. Campbell, president, has the State of Michigan with the exception of the counties bordering on Lake Michigan and the extreme Northern section of the State. The Cleveland Duplex Machinery Co., Cleveland, G. J. Hawkey, president, has the Northern section of Ohio. The Seifreat-Woodruff Co., with offices at Dayton and Cincinnati, has the lower section of Ohio with counties bordering the Ohio River in the State of Kentucky.

Announcement is made of the change in corporate name of the Wire Goods Co., Worcester, Mass., to the Washburn Co. The Wire Goods Co. was recently reincorporated with capital stock of $1,000,000 and has taken over the business of the Cassady-Fairbanks Co. of Chicago, and the Andrews Wire & Iron Works of Rockford, Ill., together with the Andrews Wire & Iron Works of Canada, Ltd. The American companies will be known as the Wire Goods Co. division, the Cassady-Fairbanks Co. division and the Andrew Wire & Iron Works division. The main office of the company will be at 28 Union Street, Worcester.

Plans of New Companies

The Tait Knob & Dial Co., New York, has been incorporated with a capital of $30,000, to manufacture radio instruments and equipment. Its chief product is a detachable dial and knob. The incorporators are: R. L. Tait, H. Scott and I. B. Canfield. Address M. J. Spalekhaver, 115 Broadway, New York.

The East Pico Sheet Metal Mfg. Co., Los Angeles, Cal., was recently incorporated with a capital of $50,000, to manufacture sheet metal and other metal products, having taken over the business of the East Pico Sheet Metal Works, that city, a business conducted by the incorporators for some years. The company has its own properties for manufacturing which were enlarged recently to meet expansion. The incorporators are: W. J. and C. R. Lauterwasser, and E. V. Hanson. Address C. H. Tribit, Jr., Hollingsworth Building, Los Angeles.

The Scientific Instrument Co., 46 Vesey Street, New York, was recently incorporated with a capital of $25,000, to manufacture precision instruments. The incorporators are: M. Linke, H. M. Vandenhove and F. L. Novak.

The Donnelly Dry Dock Co., 17 Battery Place, New York, has been incorporated with a capital of $250,000, to operate a dry dock and shipbuilding plant. William T. Donnelly, well known in construction circles as a designer of modern floating dry docks, is the chief incorporator. The new company expects to replace many of the older type dry docks during the next two years with this floating type, an example of which is Bethlehem's Sparrows Point Dock. The other incorporators are: N. E. Donnelly and D. W. Barnes.

The H. J. Zinn Cutlery Co., Eighth Avenue and Ninth Street, Altoona, Pa., has been incorporated with a capital of $100,000, to manufacture cutlery products. It specializes in the manufacture of a special electro silver-plated knife, rib enforced, properties have been leased and equipment is being installed. It is in the market for steel products required by its line. The incorporators are: J. H. Bindle, Altoona, Pa.; H. J. Zinn, Kingston, Pa., and W. M. Sellers, secretary-treasurer, Altoona.

The National Motor Products Corporation, New York, has been incorporated with a capital of $500,000, Delaware laws, to manufacture automobile equipment and parts. Mannie Eichner, 1545 Broadway, New York, is corporate representative.

The B. W. & Leo Harris Co., formerly the Manufacturers' Supply Co., 2407 University Avenue, Minneapolis, has been organized as a purchaser and seller of all kinds of merchandise and property, and liquidator of enterprises, including complete plants, businesses, properties, surplus and bankrupt stocks and assets realization of all kinds. B. W. Harris is president; Abraham Harris, vice-president; and Leo B. Harris, secretary and treasurer.

The Brooklyn Screw Machine Products Co., 75 Thirteenth Street, Brooklyn, has been incorporated with a capital of $15,000, to manufacture screw machine specialties and other mechanical products. It uses limited quantities of steel products required for its line; these are purchased in the open market. The incorporators are: E. H. Coller, R. W. Johnson and N. A. Carpenter.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	
Refined iron bars, base price	3.04c.
Swedish bars, base price	7.50c.
Soft steel bars, base price	3.04c.
Hoops, base price	4.39c.
Bands, base price	3.84c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	3.14c.
Channels, angles and tees under 3 in. x ¼ in., base	3.04c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.10c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	3.30c.
Toe-calk, ½ x ⅜ in. and larger	4.15c.
Cold-rolled strip, soft and quarter hard	6.75c. to 7.25c.
Open-hearth spring steel	4.50c. to 7.00c.
Shafting and Screw Stock:	
Rounds	3.90c.
Squares, flats and hex	4.40c.
Standard cast steel, base price	15.00c.
Extra cast steel	18.00c.
Special cast steel	23.00c.

Tank Plates—Steel

¼ in. and heavier	3.14c.

Sheets

Blue Annealed

	Per Lb.
No. 10	4.19c.
No. 12	4.24c.
No. 14	4.29c.
No. 16	4.39c.

Box Annealed—Black

	Soft Steel C. R., One Pass, Per Lb.	Blued Stove Pipe Sheet, Per Lb.
Nos. 18 to 20	4.30c. to 4.70c.	.....
Nos. 22 and 24	4.35c. to 4.75c.	5.00c.
No. 26	4.40c. to 4.80c.	5.05c.
No. 28	4.50c. to 4.90c.	5.15c.
No. 30	4.75c. to 5.15c.	.....

No. 28 and lighter, 36 in. wide, 10c. higher.

Galvanized

	Per Lb.
No. 14	4.60c. to 5.00c.
No. 16	4.75c. to 5.15c.
Nos. 18 and 20	4.90c. to 5.30c.
Nos. 22 and 24	5.05c. to 5.45c.
No. 26	5.20c. to 5.60c.
No. 27	5.35c. to 5.75c.
No. 28	5.50c. to 5.90c.
No. 30	6.00c. to 6.40c.

No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
⅛ in. Butt	—53	—38	⅛ in. Butt	—11	+13
¼ in. Butt	—38	—17	¾ in. Butt	—17	— 1
1-3 in. Butt	—60	—47	1-1½ in. Butt.	—20	— 2
[illegible] Lap	[illegible]	—44	2 in. Lap	—14	+ 2
[illegible] Lap	[illegible]	—30	2½-6 in. Lap.	—18	— 2
9-12 in. Lap	—49	—30	7-12 in. Lap	—10	+ 6

Steel Wire

[illegible] Per Lb.

Bright basic	4.25c.
[illegible]	4.25c.
Galvanized annealed	4.90c.
[illegible]	4.90c.
[illegible]	5.90c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	19¼c. to 20¼c.
High brass wire	20¼c. to 20¾c.
Brass rod	16¾c. to 17¾c.
Brass tube, brazed	26¼c. to 27¼c.
Brass tube, seamless	23 c. to 23½c.
Copper tube, seamless	25¾c. to 26 c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 22¾c. to 23¾c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin Coke—14-20

Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20		Primes	Wasters
		80 lb.	$6.05	$5.80
		90 lb.	6.15	5.90
		100 lb.	6.25	6.00
IC $10.00	$8.50	IC	6.40	6.15
IX 11.50	10.00	IX	7.40	7.15
IXX 13.00	11.25	IXX	8.40	8.15
IXXX 14.25	12.50	XXX	9.40	9.15
IXXXX 16.00	14.00	IXXXX	10.40	10.15

Terne Plates

8-lb. coating, 14 x 20

100 lb.	$7.00
IC	7.25
IX	7.50
Fire door stock	9.00

Tin

Straits, pig	36c.
Bar	43c. to 47c.

Copper

Lake ingot	15¼c.
Electrolytic	15 c.
Casting	14¾c.

Spelter and Sheet Zinc

Western spelter	8½c
Sheet zinc, No. 9 base, casks	9½c. open 10c.

Lead and Solder*

American pig lead	7½c. to 8½c.
Bar lead	9c. to 10c.
Solder, ½ and ½ guaranteed	25½c.
No. 1 solder	24c.
Refined solder	21¼c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	75c
Commercial grade, per lb.	35c.
Grade D, per lb.	25c.

Antimony

Asiatic	8¼c. to 9c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb. 25c. to 27c.

Old Metals

Prices continue firm but business is quiet, except in white metals which are active. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy crucible	12.00
Copper, heavy wire	11.50
Copper, light and bottoms	9.50
Brass, heavy	6.50
Brass, light	5.50
Heavy machine composition	8.50
No. 1 yellow brass turnings	6.75
No. 1 red brass or composition turnings	8.00
Lead, heavy	5.00
Lead, tea	4.00
Zinc	3.75

THE IRON AGE

New York, October 19, 1922

ESTABLISHED 1855

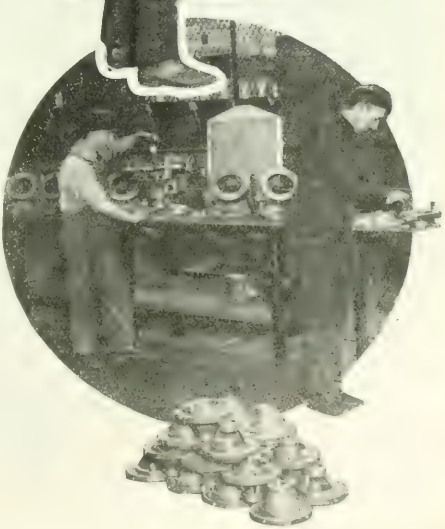
VOL. 110, No. 16

Inspection the Keynote in Axle Plant

Its Economy Shown in Holding Rejections of Finished Axles Below One Per Cent







Above Is a Portion of the Inspection Department; the Man Is Checking the Degrees of Angle on the Steering Knuckle, on a Fixture Designed for That Purpose

At Right the Hardness Test Is Being Made on a Wills King Pin by Means of a Scleroscope

In the Lower View a Cadillac Differential Carrier Is Being Checked for Alinement, with a Test Fixture and a Starrett Dial Indicator, to 0.005 In. Limit

CLOSE inspection of raw material and frequent and rigid inspection of work in process of manufacture are predominating features at the plant of the Eaton axle division of the Standard Parts Co., Cleveland. This inspection with frequent checking of jigs and fixtures has resulted in reducing scrap losses, due to the rejection of defective parts, to not over 1 per cent. It is said that the usual scrap losses in plants of this type run from 2 to 2½ per cent.

In the plant are manufactured front and rear axles for some of the high priced motor cars, the makers of which demand axles of the highest quality. This standard is adhered to in all the output of the Eaton plant, as the management feels that any attempt to produce both high grade and medium quality axles in the same plant, and with the same workmen and equipment, would not prove successful. While high quality is maintained, the plant is nevertheless operated on a fairly large production basis.

The plant management takes into consideration three main factors, to reduce its scrap losses to a minimum. It endeavors (1) to keep its machinery in the best possible condition, (2) frequently checks its jigs and fixtures with blue prints and (3) considers the human element of the utmost importance. During the period of depression, when labor was plentiful, considerable

attention was devoted to building up a force of skilled workmen.

By a careful inspection of raw material, defects when existing are generally found before much work has been expended in machining operations, and thus is avoided later scrapping from this cause. Every piece that goes through the plant is given for inspections. First, the rough piece is inspected, then there is a field inspection during operation, and after the part is finished it is given 100 per cent inspection. Finally there is an inspection of the finished axle after assembling.

Rough malleable castings for the rear axles, such as differential carriers, brake supports, etc., on receipt are given a visual inspection for cracks, blow holes, sand holes and warping. The larger forgings such as I-beams for front axles are first given a rough grinding and polishing, when any defects in forging the steel will show up. Pieces having defects are thrown out and the remainder, with the smaller forged parts, are sent to the heat treating department. After heat treating they are tested for hardness on a Brinell testing machine.

Inspection of all the largest parts is done on special layout benches located in the rough stockroom, the machine shop and the final inspection department. The rough inspection shows whether a casting or forging will clean up properly in machining. If it will not, the part is rejected. Surface gages, indicators, squares, dimension gages and bench centers are used as required for the various inspection work on the rough parts.

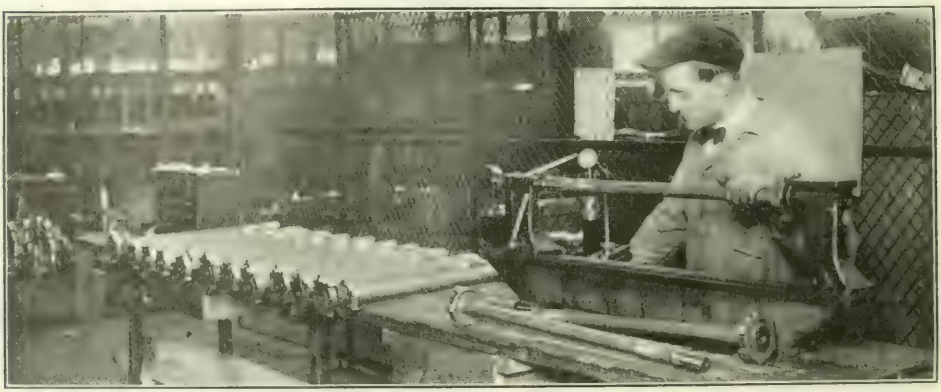
In the machine shop there is an inspection of work at average intervals of 30 minutes. In some cases this may come at longer intervals and in other cases as often as every 15 minutes. This inspection shows whether the work turned out in any operation checks to the specified limits. In case the work approaches either the high or low limits of the specifications in a number of consecutive operations, the jig or fixture is removed and sent to the tool room, where it is checked up with its drawing and repaired if necessary. In designing fixtures simplicity is the aim, a fixture not fully automatic sometimes being regarded as preferable to one that is fully automatic but more intricate.

When final inspection is made, the inspector marks all parts with his individual stamp so that, should a piece not up to the proper limits be passed, responsibility for the error can be properly placed. When an axle is ready to ship it is stamped with a number and a tag signed by the individual inspector is attached. A record is kept of every axle so that, should one be returned or be reported as lacking any part, the responsibility can be placed on the man who made the final inspection.

A daily report is made of the number of parts scrapped. In this report parts rejected are tabulated and the report shows the operation at which the part was rejected, also the department, cause of spoilage and whether the inspection was made after completion. Four copies of this report are made, one going to the factory manager, one to the chief inspector and one to the superintendent, the fourth being for a record file, so that all interested may know the amount of defective work and various details.

Materials purchased finished are inspected the day they are received and, if they do not meet specifications, the manufacturer is immediately informed. By following this plan, the delivery of other parts having similar defects may be avoided and there is less chance for dispute with the manufacturer than where complaint is not made until some time later.

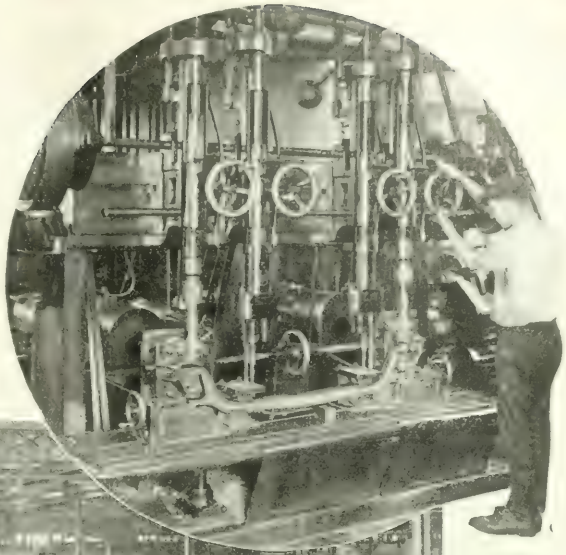
Being probably the latest plant built for the manufacture of automobile axles, the Eaton axle plant is a modern type factory laid out for convenient and economical handling and routing of material. The manufacturing part is a one-story, brick and steel structure of 300 x 450 ft, with sawtooth roof. Across the upper end is a two-track railroad siding which serves both the receiving and shipping departments. Adjoining the receiving department is the rough inspection department with machines for rough grinding, and next to this along one side of the plant is the rough stock storage room. Adjoining this through the center bay is the machine shop, on the other side of which is the inspection department for finished parts and next to this is the finished stock room. This is inclosed with a wire screen so that finished parts cannot get to the stock room before final inspection. Next to the stock room at the outer bay is the final assembly department and at the upper end of the bay the shipping department.



Checking Cadillac Axle Shafts on Bench Center and Indicator, to 0.001 In. Limit

Machine tools in the machine shop are grouped according to operation, each unit complete in itself. Rear axles are machined in the upper end of the plant and front axles and small parts at the lower end. Rough stock passes from the rough stock department directly across to the part of the shop in which it is to be machined and then straight across the stock room to the final assembly department. In the final assembly department the work starts on the rear axle toward the lower end of the shop and moves toward the upper end so that, when the assembly is completed, the axle is close to the shipping department. Generally smaller parts move directly across from the machine shop to the stock room and from there to the

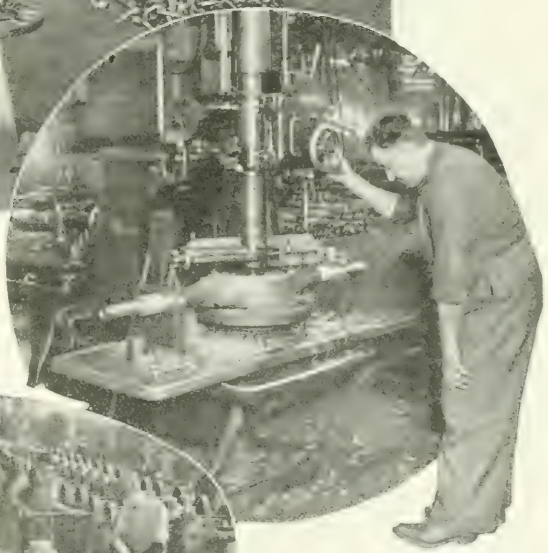
At Right the Machine Is Drilling Spring Seat Holes and King Pin Holes, at One Operation, on a Cadillac I-Beam Front Axle



Below Is Shown the Assembling of Cadillac and Wills Front Axles, the Type of Stand on Which the Axles Are Mounted for Assembly Indicating the Care Taken to Avoid Unnecessary Steps



At Right a Cadillac Rear Housing Is Being Faced on a Machine Designed for This Purpose





At Left Is the Final Assembling Department, Showing Cadillac and Model 1000 Rear Axles Being Assembled on Stands Mounted on Casters

point of assembly. With this arrangement there is virtually no retracing of parts and the amount of handling is reduced to a minimum. The heat treating is done in a separate plant a short distance from the rough stock inspection department.

Handling of parts in process and completed is done largely with elevating platform electric trucks. Special racks on casters are provided for small parts. Danger that parts will become nicked by being thrown on the floor and piled is thus avoided and the use of racks reduces the labor of handling. Work goes through the shop in lots of various sizes. The general policy is to have the machine shop keep 30 days ahead of the assembly department, or carry a month's supply of finished parts in the stock room.

The management keeps a close watch on the proportion of indirect to direct labor. During the readjustment period the drastic steps taken to reduce the overhead cut the office expense over 50 per cent. But no reduction was made in the cost department, as the company wanted to keep this department at a high point of efficiency and with a sufficient force to make quick reports on costs. Practically all employees engaged on production work, except common labor, work on a piece rate basis, involving payment for results produced.

Overheating Aluminum

In a paper read before the Institute of Metals at Swansea on Sept. 21, Dr. Walter Rosenhain and J. W. Grogan described some experiments undertaken to ascertain whether certain forms of treatment in the melting and re-melting of aluminum would bring about in the metal deterioration approximating to the condition generally described as "burnt" aluminum. High grade aluminum was poured at temperatures up to 1000 deg. C. and also at the usual pouring temperature after heating for some hours at 1000 deg. C. The castings so obtained were rolled to sheet form and tested in the annealed state.

No deterioration in the metal could be detected, even when a casting temperature as high as 1000 deg. C. was used. The evidence derived from the tensile tests is tabulated in the paper and has been confirmed by an examination of the small ingots. The appearance of the air surface of these ingots showed no systematic difference corresponding to the increasing casting temperature. The macrostructure was also very similar throughout, except that there was a distinct increase of crystal size with increasing casting temperature.

High-grade aluminum and aluminum containing 0.77 per cent iron and 0.72 per cent silicon were cast to ¾ in. slabs and rolled to a thickness of 0.01 in. This sheet was melted and cast and the whole process repeated ten times. Test pieces cut from sheet 0.05 in. thick from each melt gave figures which indicate no systematic change in the quality of the metal. This is in striking contradiction to the views which have been current in the aluminum industry hitherto.

Dr. C. A. Edwards in the course of the discussion on the paper stated that his own experiments confirmed everything the authors claimed. He thought the difficulties associated with remelting were to a very large extent due to the stirring which was so often too vigorous. If the metal were allowed to stand it was found that not only was the quality better but the amount of dross was less; indeed, he had noticed that on prolonged standing of the molten alloys or pure aluminum the dross was reduced to such an extent that exceedingly little of it was obtained, and its character, so far as it could be judged by ordinary visual examination, was entirely different. The dross, in fact, became like a powder. He considered a high temperature in remelting to be really advantageous because it facilitated the rising and segregation of dross. The chief objection so far as sand castings or chill castings were concerned in connection with the temperature of castings was, he thought, almost entirely due not to any remelting that might have occurred but to the influence of the high temperature of castings upon the slower rate of cooling. He asked the authors if they had evolved any method for satisfactorily estimating oxygen in aluminum.

Dr. A. C. C. Gwyer considered that the authors had proved their point and he said it would be interesting when the work had progressed farther to know exactly what the contamination was due to. Under ordinary circumstances, he said, repeated re-melting caused deterioration in rolling qualities, and it was difficult to see what that was due to owing to the fact that aluminum was such an extraordinarily difficult metal to analyze. His own experience led him to believe that the oxygen content of aluminum must be very small. With regard to casting, he did not consider heating to a high temperature prior to casting to be necessarily bad; it depended entirely upon the rate at which the casting cooled. He knew of cases in which very thin sections for body work had had to be cast in aluminum in this country and in America, and no difficulty at all had been experienced.

Nature of the Dross

J. D. Grogan, who replied to the discussion, said that the author's experience in regard to dross was that in re-melting the sheet the dross was very "metallic" and silvery, and contained a large amount of free metallic aluminum merely entangled, presumably in a mesh of oxide. In the case, however, of the metal deliberately overheated the dross was very hard and sometimes black, although it was not carbon. It was in the form of very fine lamellæ parallel with the surface, and it could be torn apart and divided into sheets. Some of the material when assayed contained apparently over 99 per cent of aluminum. With regard to the question of the determination of oxygen, a large number of methods had been tried without success.

Combustibility of Coke in the Blast Furnace

Further work on the combustibility of coke and relative reactivity with carbon dioxide is being conducted by the Southern experiment station of the U. S. Bureau of Mines, Birmingham-Tuscaloosa, Ala., in cooperation with the Pittsburgh station of the bureau. Two variable properties of coke, its combustibility and rate of oxidation or "solution" in carbon dioxide, are believed to play an important part in its performance in the blast furnace. It has been stated that the ideal coke should come down to the tuyere zone without oxidation by the carbon dioxide in the stack gases (Gruner's ideal working) and should there burn rapidly carbon monoxide. Laboratory scale tests for determining relative combustibility of cokes and their reactivity with carbon dioxide have been developed and a number of by-product and beehive cokes tested. The relation between these values and the physical properties of the coke has been studied. A comparison of laboratory scale test results and results of actual furnace practice is being made.

Study of Electric Furnace Refractories

As it is hoped to develop refractories for electric furnaces, it is desirable to have a method and apparatus for measuring their conductivity at advanced temperatures, states the Federal Bureau of Mines. Moreover, data in regard to the conductivity of existing refractories at temperatures above 1400 deg. C. are meager. It is proposed by the bureau to study the leakage factor through refractories. The method of attack has been worked out and the furnace designed, the material for which is arriving at the bureau's ceramic experiment station at Columbus, Ohio.

New Development in Cupola Construction

The Schuermann Equipment in Germany Involves Pre-Heating the Blast and Shortening the Time of Melting

A NEW development in cupola construction is presented by the Schuermann cupola which is described in the issue of *Die Giesserei*, No. 18 for 1922. The author of the article is E. Hellmund, operating manager of the Werner Iron & Steel Co., Duelken, Germany, where working tests were carried out. The inventor was formerly owner of a foundry at Coswig, and has protected his cupola by German Patent No. 266303. The objects desired are a shortening of the time during which the melting iron is in contact with the glowing coke and more especially the ascending column of gases, and also a preheating of the blast. When first introduced to foundrymen the proposed new cupola attracted very little interest, but it was decided to make a practical test at the Werner plant.

Fig. 1 shows a typical diagram of a Schuermann cupola. The blast enters through the reversing valve a, passes through chamber b of the pre-heater, enters the cupola at c and enters into combustion with the coke. The waste gases pass through the chamber e thereby heating it, then through the reversing valve a and the throttle valve f to the chimney g. As well as through the openings square across the cupola, a part of the blast is at the same time carried through two tuyeres arranged at the sides so as to cover the total space.

As the result of tests which have been carried far enough to be considered conclusive, the amount of coke needed is from 6.5 to 7.5 per cent, depending on the kind of castings to be made. In most cases the iron had to be strongly over-heated for their thin-walled castings, but even then they never used more than 7.5 per cent coke. For the first 15 charges they used 7 per cent and for the following 15 charges 7.50 per cent. They work 48 hours per week, only 5 days in the week; following this the chambers for heating the blast remain cold Saturday and Sunday with no auxiliary fire, only the throttle valve remains always closed. Even then when starting up Monday morning it is not necessary to use for the first charges more than 7 per cent coke. The monthly coke consumption with normal cupola operation used would be as follows:

15 tons × 20 = 300 tons charge with 10.6 per cent coke. This = 31.8 tons. To-day 300 tons × 7.25 per cent = 21.5 tons, showing a saving of 10 tons in the month.

This amounts to 120 tons per year which, with the present price of coke, including freight, cost of unloading, etc., equals a very large amount per year. In addition to the saving of coke the quality is improved due to the lowering of the sulphur by 20 to 30 per cent.

Figs. 2 and 3 show the automatic records of amount and pressure of blast. As may be clearly seen reversals were carried out every 10 min. During the period a reversals were at 3-min. periods in order to burn the coke bed and also heat the two chambers. The period b shows the time of the first charge, while c shows the normal running. In period d the blast was taken off while the slag tap was closed. The final period e shows the blast entering from both sides. The temperature of the waste gases leaving the chimney stack was about 100 to 150 deg. C., which is a proof that the brick work of the chambers was absorbing the greatest part of the heat. The melting ran along without trouble and the reversals prevented a slagging of the tuyeres.

It is hoped to decrease, even more than at present, the amount of blast passing upward through the column of charge, which it is believed will still further reduce the coke consumption, because the carbon of the coke

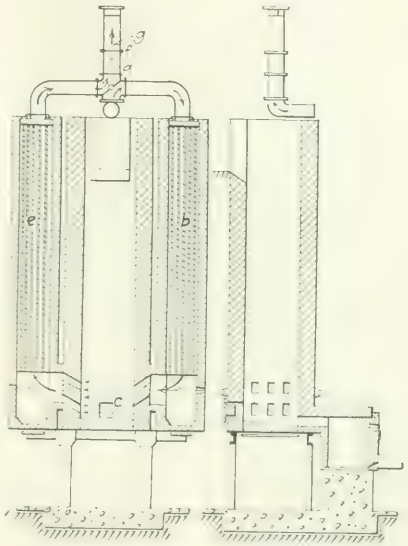


Fig. 1.—Typical Diagram of the German Schuermann Cupola

will not be acted on by the carbon dioxide. Shortly after starting, the gases pass from the heating chamber to the cupola at about 400 deg. C. After two or three reversals the blast temperature reaches about 800 to 900 deg. C.

In order to use the carbon monoxide present in the waste gases, a small amount of blast is introduced in the heating chambers. The results show that for about

Table of Test Results of Cupola Operation with Hot Blast

Coke Charge, Per Cent	Coke Bed, Lb.	Blast: Pressure, in oz	Blast: Amount Cu. Ft. Per Min.	Blast: Deg. C.*	Waste Gas, Deg. C.	Run: Begun	Run: Ended	Charge in Lb.	Sulphur, Per Cent: 1	Sulphur, Per Cent: 2	Sulphur, Per Cent: 3
8.0	1,650	7.5 to 10.0	2,650 to 3,000	400 to 900	100 to 150	3:20	6:30	23,150	....	0.101	0.089
7.0	1,650	8.6 to 11.2	2,650 to 2,900	400 to 900	100 to 150	3:10	6:10	20,390	0.112	0.11	0.075
6.5	1,650	8.0 to 10.8	2,540 to 2,900	400 to 900	Charge 15 had 7 per cent coke	2:50	6:10	22,600	0.120	0.111	0.086
6.5	1,650	8.2 to 10.0	2,650 to 3,000	400 to 900	15,430 lb. cold iron	2:55	6:25	25,350	0.110	0.112	0.080
7.0	1,650	8.6 to 11.2	2,650 to 3,180	400 to 900	.....	2:40	6:00	24,800	0.135	0.14	0.112
6.5	1,650	10.5 to 11.5	2,650 to 3,000	400 to 900	Charge 14 had 7 per cent coke	3:10	6:00	18,200	0.156	....	0.079
6.5	1,650	10.0 to 11.5	2,820 to 3,000	400 to 900	Charge 15 had 7 per cent coke	2:38	6:20	25,900	0.130	0.104	0.083
6.5	1,650	10.0 to 11.5	2,820 to 3,040	400 to 900	.....	3:10	5:55	21,500	0.136	0.076	0.062
6.5	1,650	10.8 to 11.2	2,970 to 3,040	400 to 900	.....	2:55	5:55	25,350	0.134	0.083	0.055
6.5	1,650	10.5 to 10.8	3,000 to 3,180	400 to 900	33 min. stoppage of current	2:50	6:15	25,350	....	....	....

*750 to 1650 deg. Fahr.

3 months the highly heated iron necessary for thin castings has been produced without trouble or other bad effects and with, at the most, a coke charge of 7.5 per cent. At the same time the sulphur of the iron has shown a reduction up to 30 per cent, which results lead to the conclusion that a remarkable improvement has been reached in the cupola melting practice. The writer of the German article believes no such fundamental change in cupola practice has been seen for the last century.

In the table are given the results of a two weeks' test which began with a coke charge of 8 per cent, a coke bed of 1650 lb. with a blast pressure of 7.5 to 10 oz. Higher pressure was not possible with the blow-

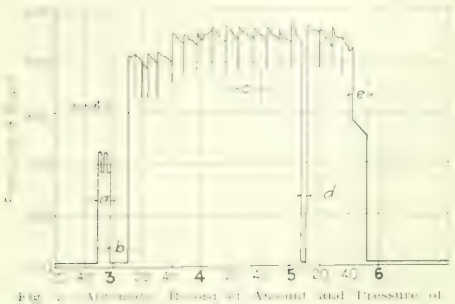


Fig. . Automatic Record of Amount and Pressure of Blast in New German Cupola

ing arrangement available. The amount of blast amounted to 2650 to 3000 cu. ft. per min. The entering blast was from 400 to 900 deg. C., the waste gas temperature 100 to 150 deg. C., the charge 10.5 metric tons. The blast was begun at 3:20 and ended at 6:30, so that the rate of melting was about 3.4 tons per hr. The rate of melting in this case was too small and could not be much increased during the two test weeks. This was because the side tuyeres, mentioned above, were arranged in the brick work of the cupola and could not be changed during this period.

The sulphur content of the molten iron showed, during 5 days with 7 per cent coke, a decrease from 0.14 to 0.11 per cent, which equals about 20 per cent. During the whole test period, with the exception of 4 days when they had 1540 lb. of cold iron which could not be cast, they had uniformly over-heated iron which gave good castings. During the test period they got down to 6.5 per cent coke, and even during the last day had no trouble from cold iron, notwithstanding a 33-min. delay from stoppage of current.

In the table the various sulphur results are shown and on the average the decrease amounts to 20 to 30 per cent. It also must be remembered that they melted with a shaft furnace. In a furnace with a fore-hearth the final sulphur would have been still smaller.

The test period showed the changes necessary to be made. To-day they have a rate of melting of 5¼ tons per hr. and are in the position to possibly increase this through increasing the size of the side tuyeres, but this is not desirable for their practice as they would not be able to cast the extra metal so provided. No disadvantages of the new method of melting have been found up to the present time. The heating chambers are clean and show no effects of the heat, which will probably be seen after a year in operation. It is assumed that the life of these chambers will be at least 5 years. It is also assumed that, with normal working, the cost of the plant for a daily output of 15 tons will be covered by the saving in coke in one year's operation.

This paper was read at a meeting of the German Foundrymen's Association on April 27, at Duesseldorf, and was followed by an active and interesting discussion. The presiding officer, Doctor Werner, said that the new cupola had been brought to the attention of the German Foundrymen's Association during the war but nobody was interested in it, and the inventor made the proposal that the cupola would be available to all the German foundrymen without license, except for covering the heavy costs already incurred for home and foreign patents. Doctor Werner, after investigation, made up his mind to try the cupola in their plant at Duelken, and the paper abstracted above gives the results obtained. It is certain that the final construction of the cupola has not been reached but, as built for the test run, has shown splendid results. The Schuermann company has designed a new construction.

During the discussion one question asked was whether the heating chambers did not need frequent cleaning. The reply was that during the three months' operation this had not been found necessary. In reply to another question it was stated that the cupola had a diameter of 35.4 to 39.4 in. Another speaker pointed out that spark arresters would not be necessary and the three months' operation had shown no danger of explosions. Uncompleted tests showed that the gases leaving the combustion chamber have about 5 per cent CO with 13 to 14 per cent CO_2. Mention was made of the danger of explosions, but it was believed that with suitable doors to guard against explosions this could be avoided.

The heating chambers are constructed of fire brick exactly the same as for the stoves of a blast furnace. Also after each day's run the cupola lining is fixed up, and after the three months' run a complete new lining was put in. Another speaker mentioned he had carefully followed the operations in Duelken and could corroborate the results obtained. One point he wished to make was that with the small amount of coke, only 35 kg., for a charge of 500 kg. very uniform distribution must be used. The dust that collects in the brick work of the heating chambers is easily removed by means of compressed air. He believed this style of cupola would be especially suitable for small Bessemer plants because no sulphur was taken up from the coke

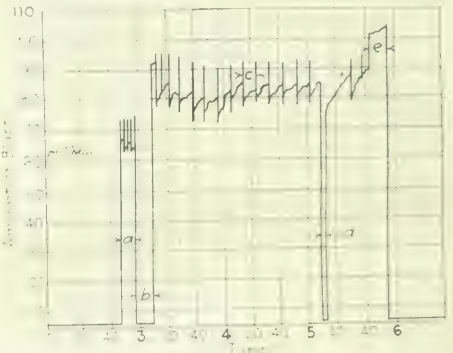


Fig. . Automatic Record of Pressure and Amount of Blast in Schuermann Cupola

and probably large amounts of scrap could be melted. In reply to another question it was stated that the average charge consisted of 50 per cent pig iron and 50 per cent scrap iron castings.—G. B. W.

The importation of scrap from Russia into Germany is on the increase. From July 15 to Aug. 15, over 17,700 tons were sent from Petrograd, including a steamer for breaking up. A further 8000 tons and two old warships are about to be sent. It is expected that the export program of Metallotorg, the company formed to expedite trade between Germany and Russia, which provides for the export of 75,000 tons for the year, will be fully executed.

At the October meeting of the Washington chapter of the American Society for Steel Treating on the evening of Oct. 20, W. J. Newton, research engineer Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., will discuss "The Heat Treatment of Helical Springs."

Gear Makers Hold Notable Meeting

Advanced Recommendations on the Case Hardening of Gears—Gear Noise Elimination Seriously Considered—Buying Gear Blanks by Piece

THE Chicago convention of the American Gear Manufacturers Association was replete with papers, reports and discussion. They bore witness to the unusually active interest of members in the efforts of the society to solve the problems of the industry. Standardization occupied much of the time of the sessions and the progress made by the various committees assigned to this work was encouraging. The measurement of gear noises was the subject of two addresses and caused considerable discussion, with the likelihood that the society will finance some experimental work to that end. The problem of apprenticeship received serious consideration and a revolutionary change in purchasing policy was urged in a paper recounting the experience of a company which now buys gear blanks by the piece instead of by the pound. Wide variations in costs, disclosed by a questionnaire sent to the membership, were cited as indicative of the urgency of uniform accounting methods.

The meeting was held at the Drake Hotel, Chicago, Oct. 9 to 11, inclusive. President F. W. Sinram was in the chair and T. W. Owen was elected secretary to succeed F. D. Hamlin. Mr. Owen will devote his entire time to his duties and has been provided with an office at Cleveland. There were 80 in attendance at the convention, most of them executives of the member companies. Three new companies were admitted to membership and three additional associate members were elected.

Notable Progress in Standardization

The report of the A. G. M. A. sectional committee of the American Engineering Standards Committee, B. F. Waterman, Brown & Sharpe Mfg. Co., chairman, indicated what progress was being made in the adoption of standards affecting the gear industry. Standards for gears and pinions for electric railroad service, gray iron industrial gears, specifications for forged and rolled steel for gears, and specifications for brass and bronze for gears were passed for printing by the committee last spring and will now be submitted to the sponsor societies for their approval as tentative American standards, following which they will be passed on to the main committee. At the last meeting of the sectional committee it was voted to submit for printing the A. G. M. A. standard for composite gearing, its recommended practice for the inspection of gears, its recommended practice for herringbone gears, and its recommended practice for industrial spur gears.

The general standardization committee, B. F. Waterman, chairman, reported the adoption of recommended practice for the adjustment of bevel gears at assembly and a recommendation for backlash in bevel gears, both of which have been printed. These have not yet been submitted to the sectional committee, however, as the sub-committee on bevel gears hopes to have more complete data to offer later. The sub-committee on herringbone gears has reconsidered the recommendations of the sectional committee and adopted them. The only item in the committee's recommendation still unsettled is that on the strength of herringbone gears, but the sectional committee has agreed to the formula offered by the sub-committee for speeds up to 2000 ft. per min., and on this basis will submit the entire recommendation for printing as a proposed standard.

The recommended practice for the inspection of gears, as revised by the sectional committee, has been adopted and submitted to the committee on plain limit gages of the American Society of Mechanical Engineers and as it does not conflict with any tentative procedure of that committee, has been passed for printing in the journal of the A. S. M. E. and has likewise been printed by the A. G. M. A.

The keyway committee made a tentative report at the last convention but has taken no further action, as it is now working with the committee of the A. S. M. E.

The differential committee has been in close touch with the Society of Automotive Engineers since sending out a questionnaire on which its progress report on proposed differential nomenclature was made at the last convention, and will soon have a differential nomenclature acceptable to most anyone.

The tooth form committee has under way an experiment to determine the possibility of a stub-tooth proportion which might enable the present proportions now in general use to be used with it, at the same time obtaining the advantage of a longer tooth which so many think desirable. Stub-tooth proportions are also being studied by foreign engineering bodies, notably Dutch and French.

Later in the meeting H. J. Eberhardt, Newark Gear Cutting Machine Co., Newark, N. J., speaking for the tooth form committee, of which he is chairman, stated that much of the time of the body has been taken up in defining accurately the technical terms used in connection with tooth forms, a task which is rendered difficult by the wide variation in usage. He said the committee is not yet ready to recommend any one tooth form as standard. It is likely, however, that a standard stub-tooth form will soon be recommended, as preliminary tests have proved satisfactory. So far the only feature agreed upon is a 20-deg. pressure angle.

New Standard Bevel Gear Adopted

Of all of the sub-committee reports those on metallurgy and straight and spiral bevel gears commanded the most attention. F. E. McMullen, the Gleason Works, Rochester, N. Y., chairman of the bevel and spiral bevel gear committee, offered for adoption as a standard the system of bevel gear design described in a paper read at the last meeting of the society. In the past spur gear formulas have been used in figuring bevel gears, but as these formulas were worked out for an interchangeable spur gear system which necessarily required some compromise, the possibilities of the involute curve were not so fully utilized as it is felt desirable in bevel gears where interchangeability is not a factor.

The basis of the bevel gear system recommended by the committee is the use of the lowest pressure angle that can be employed without sacrificing strength by introducing excessive under-cut. Experience shows, it is asserted, that bevel gears cut with a lower pressure angle will operate more quietly than those with a higher one, other conditions being equal. The system, which is to apply to generated gears only, provides only three pressure angles (14½, 17½ and 20 deg.) for straight-tooth gears in all ratios having ten or more teeth in the pinion. The 17½-deg. angle need be used for only about 6 per cent of the total number of ratios, but it is considered necessary to carry out the purpose of developing a practical system which will give the quietest form of tooth consistent with strength and wear. For spiral bevel gears one pressure angle, 14½ deg., suffices for all except a few unusual cases, for which a 17½ deg. angle is used. Under the system the gear addendum decreases and the pinion addendum increases as the ratios of the numbers of teeth in the gear and pinion become greater. The report was adopted as a suggested standard for future design of bevel gears. C. B. Hamilton, Jr., Hamilton Gear & Machine Co., Toronto, Ont., recommended that all gears made ac-

cording to this system be stamped with some identification mark, such as a star. This would facilitate the replacement of broken gears in the future because it would indicate to the gear maker that he could duplicate the gears desired by following this standard.

The committee also presented formulas and descriptive terms for calculating the axial thrust loads of spiral bevel gears, which were adopted as recommended practice.

Time Factor in Case Hardening Emphasized

The metallurgical committee, C. B. Hamilton, Jr., chairman, presented a voluminous report covering recommended practice for carburizing and case hardening, and recommended practice for the heat treatment of A. G. M. A. carbon and alloy steels, the latter being covered by graphs. In its instructions covering the selection, test and use of carburizing materials, the committee states that the idea that fast penetration is a mark of merit is a fallacy. Fast penetration is a desirable feature from a cost standpoint, but it is, almost without exception, accompanied by an excessive high carbon surface and its product, free cementite. In order to put the free cementite into solution, the saving made in the time of the carburizing operation is usually lost by the first or high heat of double heat treatment. While the fact does not appear in any publication that steel of a specific analysis has a certain rate for a certain intensity of carbon absorption, there are evidences that lead one to believe that this condition exists. In other words, a certain steel will absorb an eutectic case of a certain depth in a certain length of time, and nothing will decrease this time, without causing the case to become hypereutectic.

The major part of the report dealing with recommended practice for carburizing and case hardening is devoted to detailed instructions as to the selection of carburizing materials, the design and use of carburizing pots, local carburizing, local heating, local quenching, the prevention of adherent scale, and the selection of quenching mediums.

Term Semi-Steel Not Approved

These recommended practices were adopted as a report of the committee, their final adoption by the society being deferred until the next convention to give the membership time to give them careful study. The indorsement of the association was given to the term "high test gray-iron castings" in place of the misnomer "semi-steel," as suggested by the American Society for Testing Materials which is now working out a specification for it.

In outlining the work which will be undertaken by the committee in the future, Mr. Hamilton said that hardness testing and inspection would be the subject of the report for the spring meeting and that a model metallurgical laboratory for the average medium-size gear shop would be exhibited. This laboratory will be equipped largely for the control of materials purchased, he asserted. For the meeting next fall the committee proposes to take up the subjects of furnaces, pyrometry and micrography. Mr. Hamilton was enthusiastic in his expressions regarding the possibilities in the improvement of gears through metallurgical research. He hinted that it might some day prove worth while for the association to employ a consulting metallurgical engineer. He deplored the fact that the committee had not received greater co-operation from the membership and pointed out the excellent results achieved by the American Malleable Castings Association through the centralizing of information regarding the industry and the pooling of metallurgical difficulties.

Inspection, Nomenclature and Other Reports

The inspection committee, F. G. Eppley, Albaugh-Dover Co., Chicago, chairman, presented a report covering methods of inspecting gears, the use of testing machines, etc. The methods outlined were adopted as recommended practice except for a single section relating to hardness tests.

A progress report of the sprocket committee, C. R. Weiss, Link-Belt Co., chairman, indicated that certain minor changes in tooth form would probably be made, and when a formula has been agreed upon by the conferring sub-committees, it will be reported to the various sponsor societies. The changes, however, will not interfere with the use of standard hobs.

Speaking for the differential committee, the chairman, S. O. White, Warner Gear Co., Muncie, Ind., stated that a nomenclature had been worked out in conjunction with the appropriate committee of the Society of Automotive Engineers. It was found necessary to divide differentials into two classes in order to come to an agreement on nomenclature, as the use of the same terms differs widely. Thus far actual standardization of differentials has been attempted on two sizes only. This latter work is still in the formative stage and the committee is not ready to make any recommendations.

The nomenclature committee, F. E. Eberhardt, Newark Gear Cutting Machine Co., chairman, reported that it was gathering nomenclature and symbols in collaboration with the other sub-committees and that it found that there was considerable latitude in the use of terms applying to gears. Through the sectional committee of the American Engineering Standards Committee it is also becoming familiar with nomenclature used abroad. The committee is tabulating this information to make it available for the use of the society.

Problems in Measuring Gear Noise

One feature of the convention which commanded especial interest was an address on the "Standardization of Gear Sounds" by Prof. Daniel L. Rich, dean of the Department of Physics, University of Michigan. He named three methods employed to control sound: (1) Permit the noise and try to absorb it; (2) try to insulate noise and thereby confine it within certain limits; (3) prevent the starting of the noise in the first place. All good architects are familiar with methods of absorbing noise. An audience is probably the best absorbent; other means used are felt on the walls and carpets on the floors.

The successful insulation of noise is a problem as yet unsolved. As applied to gears, sound absorbents have met with slight success. The confinement of the gears in a box serves as a fair insulation when the sound vibrations are slow, but otherwise the box is of little service. The common metals are excellent sound conductors and the frame supporting the gear box acts as a resonator, often deceiving the listener as to the real source of the noise. Hence the third method, *i. e.*, preventing the generation of the noise, is the only feasible one as applied to gears.

Thus far the only way in which gears have been inspected for noise has been by ear. In other words, the matter has been left to the arbitrary judgment of the inspector, a very uncertain and variable factor. There has been no quantitative physical measurement of sounds. Sound indicators thus far devised are usually resonators responding only to one pitch. Obviously they would be of little service in measuring the noise emanating from gears. An indicator for this purpose would have to be non-selective. Perhaps the best indicator of this type is the pressure vane which responds to the air pressure set up by the noise vibrations. This, or possibly some other indicator, might be used to measure gear noises.

The measurement of noises is not so difficult as the interpretation of the measurements. Surroundings have much to do with sounds. In a room, sounds are reflected from wall to wall, from wall to floor, from wall to ceiling, etc., with the consequence that results gotten with an indicator in one room would be different than those which would obtain in another room or out in the open. Objects within a room also serve to reflect the sound vibrations. It is obvious that the room must be bare and likewise the gears must be stripped, for if this were not done it would be impossible to tell whether the gear sounds were attributable to the gears, to the shaft in its bearings, to the gear box or to the supporting frame work.

It is impossible to measure the output of noise in

absolute units; *i. e.*, an increase of 10 per cent in the inclination of an indicator does not mean a 10 per cent increase in noise. It is possible, however, to make relative measurements; *i. e.*, to ascertain whether one gear is noisier than another, and from a commercial standpoint, relative values are often all that is desired. All gears compared, however, must be tested under identical conditions. The measurement will involve not only the use of a machine but a calibrated room. Hence the sound meter will not be portable.

Prof. A. E. White, director department of engineering research, University of Michigan, explained that for the sum of $3,500 to cover only the direct labor and materials required, he was sure that his department could provide equipment to calibrate the noises from simple pairs of gears. Of this amount $1,200 would cover the personal services of Professor Rich over a period of a year; $800, the service of his assistants, and $1,500 the proper sound proof room and apparatus. For an additional sum of $3,500 to be expended also over a period of a year he believed that equipment could be provided to calibrate noises from trains of gears. The proposal brought forth favorable comment and was taken under advisement by the executive committee.

Buying Gear Blanks by Piece, Not By Pound

An old practice of the gear industry was challenged in an address by L. G. Hewins, sales manager Van Dorn & Dutton Co., Cleveland, entitled "Why Buy a Pig in a Poke?" Customers, he pointed out, demand a piece price per gear and his company believes it only right it should buy gear blanks on the same basis. By adopting this policy, it not only took guess-work out of material costs, but has been able, in some cases, actually to save as much as 25 per cent. The plan is especially applicable when castings or hand forgings are used in quantity. Under the old plan, the company had to pay so much a pound, and for the most part let the other fellow decide how much extra the castings should weigh.

Now the incentive of the foundry or forge shop is to work to size. To illustrate, a certain size of forgings bought in lots of 50 formerly averaged 100 lb. each. Under the piece price plan the average weight dropped to 85 lb., actually reducing the cost per piece to $3.40 as against $4 before. A saving of 40c. was also made in turning time, in addition to the saving in preheating costs. It sometimes requires a little more time to predetermine the piece prices, but it gives the company an extra check on its own estimated material costs. A distinct advantage is that it reduces guesswork in figuring on business because it enables one to determine in advance just what each piece will cost him. Some difficulty was encountered at first in inducing foundries and forge shops to quote per piece instead of per pound, but now all work is bought in this manner except malleable castings, and the malleable shops are expected to agree to do so likewise. To assist the shop in quoting, detail prints are supplied and it is permitted to inspect the pattern equipment or to quote on it, if it has not yet been made up.

Question of Costs

The uniform cost accounting committee, J. H. Dunn, R. D. Nuttall Co., Pittsburgh, chairman, reported a small response to questionnaires sent out to the membership. If this be due to fear lest the law be violated, he said that members should disabuse their minds, as the questions asked did not have anything to do with the comparing or fixing of prices, but related solely to costs. Such replies as were received, he stated, showed wide variations in estimated costs. For several designs of industrial gears, a difference of 50 per cent was common and the extreme differences ran up to 100 and 150 per cent. There was nothing uniform about the estimated weights, the time consumed on the same machine in different shops, the material costs, the labor charge, or the overhead. There is a very evident need for a standardization of methods, as well as for uniform cost accounting.

The subject of costs was also touched upon in the report of the commercial standardization committee, E. A. Kebler, Fawcus Machine Co., Pittsburgh, chairman. The importance of a good cost system can be overlooked by no gear manufacturers, whether large or small. A company with a million and a half dollars capital pushed a line, thinking it was its most profitable output, but abandoned it entirely when a proper cost system disclosed the fact that this production for years had been sold at much less than cost. Frequently, small machines bear a greater burden than larger equipment. The committee stated that the scope of its work was limited, as certain commercial practices cannot legally be standardized. A uniform contract form, however, is fully within the law, and is worthy of general adoption.

Variations in Labor Wage Rates

The marked variations in costs were brought out in bold relief by the industrial relations committee report, which was read by the chairman, J. B. Foote, president and treasurer, Foote Brothers Gear & Machine Co., Chicago, who died suddenly the day after the close of the convention. The report, which summarized replies from a questionnaire sent to the membership, disclosed a great variance in the wages of men on the same work in different cities. The wages for boring machine hands ranged all the way from 40 to 80 cents an hour. Other wages varied as follows: lathe hands, 40 to 73 cents; planer hands, 40 to 72 cents an hour; gear cutter hands, 40 to 70 cents an hour.

Mr. Foote's report also devoted considerable attention to the subject of apprenticeship. It pointed out that there is an acute shortage of general all-around mechanics because young men to-day are assigned to specialized tasks, and shops are either too busy to train new men or have given up teaching apprentices for the reason that once they are trained or partly trained they leave for other shops that offer slightly higher wages. A real need for a practicable system of training apprentices exists, however, and coöperation between shops in support of this training was suggested. Similar coöperation to prevent apprentices from jumping their contracts was also emphasized as a necessary part of the plan.

Apprenticeship was discussed even more fully in an address by P. C. Molter, superintendent of the department of industrial education, National Metal Trades Association. Mr. Molter enumerated various plans for training apprentices, among them, training within an individual plant or the pooling of supervision and instruction by a group of employers; training in trade preparatory, trade continuation and trade training schools, supported by federal, state and local funds; and the coöperative plan whereby apprentices alternate in attending schools and in working in shops. Mr. Molter also outlined the plan which has been worked out by his association, under which a curriculum has been provided, rates of pay have been fixed, periodical examinations will be held and certificates will be issued. In fixing the rates of pay the aim has been to discourage the jumping of apprenticeship contracts. In the first year the apprentice receives 33⅓ per cent of the journeymen's wages. The percentage is steadily increased until the last year when a wage of 85 per cent of that of the journeyman is paid. The aim of the certificate is to provide a means of identifying boys who have completed their training and to prevent those who have broken their contracts from obtaining employment as journeymen.

There was considerable discussion of the subject by various members of the society and the consensus of opinion was that there was no way of holding apprentices to their contracts except through moral suasion. A certain number of boys are bound to leave before the completion of their training, and likewise those who do finish may desert the shop of their employer for other plants. E. W. Miller, Fellows Gear Shaper Co., Springfield, Vt., was enthusiastic in his praise of the co-operative plan in force in his city, and pointed out that while apprentices often left for employment in other shops, they frequently came back. George L. Markland, Jr., Philadelphia Gear Works, Philadelphia, added that they not only returned, but

they came back better men because of the broader point of view developed through learning the practices of other shops.

Mr. Molter mentioned two means of holding apprentices until the completion of their training which have been employed successfully by a number of manufacturers. One method is to supply the apprentice with tools as he progresses with his work so that by the time he completes his course he is in the possession of a complete kit. The other is to give the apprentice a bonus when he finishes his training.

Conditions Under New Tariff

S. L. Nicholson, Westinghouse Electric & Mfg. Co., reported for the tariff committee, of which he is chairman. He stated that the new tariff does not affect gear makers directly but gives them a protection of 40 per cent ad valorem under the catch-all clause of the metals section. He thought the ad valorem method would prove satisfactory, particularly because of the flexible feature of the act which permits duties to be lowered or raised on investigation. The tariff is not a high one compared with its predecessors. The Dingley act yielded 25.54 per cent on the import value; the Payne-Aldrich law, 19.34 per cent; the Underwood, 8.3 per cent; and the present tariff, 15.70 per cent. Mr. Nicholson does not believe that the tariff will raise the cost of living. The greatest factor for higher living costs in his opinion lies in our restrictions on immigration which, in effect, constitute a tariff on labor.

A paper by George L. Markland, Jr., on the "Evolution of the Gear," traced the earliest known toothed wheel to 300 B. C. when a metal pinion engaging a metal rack was used to operate a water clock in Egypt. In the middle ages Leonardo da Vinci, the great Italian, 1452-1519, wrote a number of learned treatises on gear teeth. Camus, a Frenchman, 1699-1768, wrote on the teeth of wheels about 1738, showing an excellent grasp of the epicycloidal tooth form. In the English translation published in 1868, the editor, John Isaac Hawkins, predicts that the involute curve will supersede the epicycloidal.

The report of the public policy committee was read by the chairman, H. E. Eberhardt, Newark Gear Cutting Machine Co. Herein was indicated the wide connections of the society in its standardization work. Its coöperative activity brings it into contact with the Society of Automotive Engineers, the United States Bureau of Standards, the American Society of Mechanical Engineers, the American Engineering Standards Committee through the A. G. M. A. sectional committee on the standardization of gears, the British, French, Swiss and German Standards Associations, and the Association in the Netherlands for the Establishment of Standards.

The banquet was addressed by Judge Marcus J. Kavanaugh of the Cook County Superior Court, and Col. John V. Clinnin, also of Chicago. John B. Foote was toastmaster.

The next annual meeting of the association will be held at Cleveland the last Thursday, Friday and Saturday of next April.

MINING CONGRESS MEETS

Many Problems Considered at Cleveland—Carmi A. Thompson Speaks on Iron Ore Industry

Various problems, including taxation, legislation and industrial relations, were discussed at the twenty-fifth annual meeting of the American Mining Congress held in Cleveland, Oct. 9-14. During the closing session the congress adopted a resolution favoring legislation that would prevent strikes. The resolution declared that strikes or lock-outs in essential industries should be impossible, and that laws should be made and enforced by all the power of the Government that could forever strip labor organizations, as well as employers, of the ability to interfere with the production and distribution of the necessities of life.

Another resolution provided for the continuation of the committee on industrial co-operation which was organized at a previous session, and asks that both employees and mine operators be urged to unite in a general movement which would have for its ultimate accomplishment harmonious relations, continuous employment, fair wages and reasonable profits, and the cheapest priced commodities to the consumers, which these conditions will permit.

Another resolution attributed to the restriction of immigration in considerable part the shortage of labor in the metal mines, and authorized a committee to make a study of this matter.

Among the speakers was Carmi A. Thompson, vice-president Tod-Stambaugh Co., Cleveland, Republican candidate for governor of Ohio, who discussed "Some Requirements of the Iron Ore Industry." He declared that iron ore has never enjoyed its fair share of any prosperity that comes to the iron and steel industry from time to time, and referred to the tremendous burden of taxation that the iron ore industry has to bear. He called the iron mining industry a liquidating business for the reason that as soon as a mining company begins to ship ore, it begins to liquidate its assets. He said that the occupational tax imposed on iron ore in Minnesota last year amounts to a tax of 10c. to 12c. per ton on ore.

Mr. Thompson declared that unless relief is found either in the way of higher priced ore, or from some of the tax burden, the underground iron mines cannot longer be operated, and that the great reservoir of cheap ore from the open pit mines will be practically exhausted within the next 10 or 12 years, and then the country would be dependent upon underground ore. That fact would assure a higher price for that commodity.

Among other speakers were W. A. Grieves, Jeffrey Mfg. Co., Columbus, Ohio, chairman of the industrial co-operation division, who spoke on "Industrial Co-operation from a Practical Viewpoint," and Arthur Young, vice-president International Harvester Co., Chicago, who discussed "Some Practical Experiments in Industrial Co-operation."

Richard F. Grant of M. A. Hanna & Co., Cleveland, was toastmaster at the silver anniversary banquet Friday evening.

Sidney J. Jennings, vice-president United States Smelting & Refining Co., New York, was elected president. The directors include William H. Lindsey, vice-president Napier Iron Works, Nashville, Tenn., and W. C. Doering, vice-president Southern Wheel Co., St. Louis.

In connection with the congress, which was held in the Public Hall, there was a large exhibit by manufacturers. This included among other products mine cars and locomotives, conveying and transmission equipment, ball bearings and welding apparatus.

American Malleable Castings Association Meets in Cleveland

Trade and labor conditions were discussed at considerable length at the quarterly meeting of the American Malleable Castings Association held in Cleveland, Oct. 11, this being a joint meeting of the Eastern and Western members of the association. There were about 70 present, representing 50 foundries.

Reports made by members indicated that malleable foundries are now operating at about 75 per cent of normal capacity, or about the same as they have during the past 30 to 60 days. Many of the foundrymen expressed concern over the present labor situation. Their reports indicated a shortage of molders in most sections, but a fair supply of common labor—the reverse of the situation as it appeared a few weeks ago when molders were plentiful but common labor was scarce. The general feeling appeared to be that if foundries get back to normal operations, the labor shortage will

become acute, and that the plants will be unable to get enough men to take care of their orders.

A discussion of the fuel situation brought out statements that some malleable foundries had purchased considerable coal at very high prices, and that this fuel has proved of the poorer quality. This will tend to increase their operating costs.

Reports indicated that most of the orders for malleable castings are now coming from the railroads and the automotive industry. There has been some improvement in the demand for general machinery and industrial castings, but no pickup in orders from the agricultural implement manufacturers. Foundries specializing in castings for car manufacturers are crowded with work. Orders from the railroads for castings for repair work fell off during the shopmen's strike, but the railroads have again commenced to buy to some extent.

Plans for Scrapping 226 Wooden Vessels

WASHINGTON, Oct. 17.—The Western Marine & Salvage Co., with headquarters in Portland, Ore, is contemplating the scrapping of 226 wooden vessels at the plant of the Virginia Shipbuilding Corporation, Alexandria, Va. The Salvage company recently purchased these ships from the Government for $862,000. They were built by the Government at a total cost of $300,000,000. Negotiations are proceeding between the Salvage company and the Trent Amalgam Co., present lessee of the Alexandria plant, for a lease of a part of the property to be used in scrapping these ships.

J. M. Barde, general manager of the salvage company, plans to dismantle 10 ships at a time. To show the magnitude of the undertaking, Mr. Barde has furnished the following figures:

There will be 12 miles of smokestack; 150,000 to 200,000 tons of scrap iron and steel; 5000 tons of brass and copper; 12,000,000 ft. of cable wire; 2500 miles of piping; 162 Ferris type 1400-hp. engines; 64 turbine engines; 226 brass condensers; 452 water tube boilers; 2260 steam pumps; 9000 tons of water tanks; 5000 drill presses, anvils, vises, etc.; 1800 steam winches; 600 tons of rope; 12,000 steam and air gages, and 5500 tons of anchor chain. About 250 men will be employed on each vessel and the work will require 10 years, it is expected.

A large amount of warehouse space will be required for material, which will be held until conditioned and made salable. The hulls will be put in condition and sold for barges. It would cost about $150,000 to build these hulls to-day. They will be sold for $2,500 to $5,000.

The biggest problem ahead of the salvage concern is how to condition the material taken from the ships so as to make it ready for market. The company expects to dispose of most of its salvage in Europe, since, Mr. Barde says, "Americans don't take advantage of bargains when they see them nearly as quickly as the Europeans."

The Trent Amalgam Co. will continue to use a section of the shipyards.

Sales of Government Surplus Material

Final opportunity to purchase surplus material from the United States Shipping Board will be afforded by the auction sales to be held Nov. 1, 2 and 3, at Hog Island, Pa., and Nov. 22, at Sparrows Point, Md., according to Sidney Henry, sales director, Emergency Fleet Corporation. The property to be sold at Hog Island consists of three 160-ton refrigerating plants built by the Shipley Mfg. Co., York, Pa. These are of the carbonic acid type and each unit was designed for a frozen meat steamer of about 320,000 cu. ft. insulating space. Each plant consists of 2 80-ton refrigerating machines driven by a tandem compound steam engine. In one lot there are approximately 40,000 high speed and carbon drills and reamers. There is also a considerable amount of machinery, including turret lathes, flanging presses, forges and furnaces. For further information address J. T. Eason, sales manager United States Shipping Board Emergency Fleet Corporation, Hog Island, Pa.

New England Foundrymen Meet

About 70 members and guests attended the October meeting of the New England Foundrymen's Association, held Wednesday evening, Oct. 11, at the Exchange Club, Boston. H. P. Blumenauer, Arcade Malleable Iron Co., Worcester, Mass., gave an illustrated talk on moving materials, his remarks being based on plant improvements at the Worcester foundry.

Previous to his association with the foundry industry, Mr. Blumenauer represented the Standard Oil Co., New York, in India. Departing from the usual line of discussion of the subject, Mr. Blumenauer compared methods of handling materials in this country and in India. The pictures of India were in natural colors, highly interesting and instructive. One of the most significant of Mr. Blumenauer's remarks related to the improvement in the cost of handling fuel from cars to furnace at Worcester, a reduction being made from 86c. to 4c. plus, per ton; also the great saving in man power in transporting fuel from stock piles to furnace.

The record for handling fuel from cars to furnace, a distance of 1000 ft., was given as 40 tons per min., transportation being by 5-ton trucks. Other subjects discussed were: Truck tractors supplemented gangs of men at fuel storage piles. Portable molding machines, pneumatic annealing-furnace charging equipment, the method of delivery of work from the molding floor to trimming benches, shipping room arrangement which permits repairs on motor trucks while being loaded under cover, sorting and shipping bag holder stands, and the dumping of work from sand blast machines in a way to eliminate extra handling charges.

E. H. Ballard, General Electric Co., president, presided at the meeting of the association. C. B. Conneiley, commissioner Department of Labor and Industry, Harrisburg, Pa., will be the speaker at the November meeting.

Week End Employment of Students in Steel Plant

To assist students working their way through Carnegie Institute of Technology, the Jones & Laughlin Steel Co., Pittsburgh, has arranged to employ students in the steel mills on Friday and Saturday nights or all day Saturday. The shifts are of 10-hr. length. The arrangement is expected, of course, to give to students in the college of engineering some practical as well as theoretical knowledge.

Fluorspar Investigations

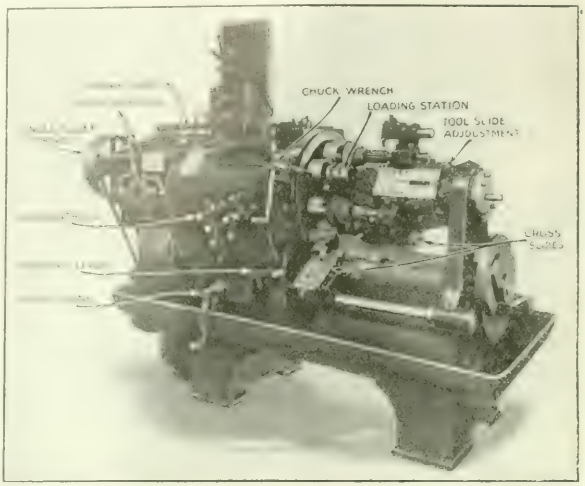
The importance of fluorspar in the steel and ceramic industries is so great, and accurate information on methods of mining, milling, and utilization, and on costs of production and possibilities of future production is so lacking, that it has been considered advisable by the Bureau of Mines to investigate all phases of the fluorspar industry in the United States. At the request of, and in company with several eastern fluorspar producers, examination has been made of the principal fluorspar deposits of the western states. This examination was followed by an intensive study of the producing mines in Illinois and Kentucky. It was found that most of the deposits in the far western states were small and could not be relied on to produce much surplus over the needs of the western states. Costs of production in the Illinois-Kentucky field have increased greatly, owing to the increasing depth of the principal mines, the large amount of water that must be pumped, and the increased costs of labor and supplies. A report on all phases of the fluorspar industry is in preparation.

A voluntary increase of 10 per cent in wages has been granted by the Superior Gas Engine Co., Springfield, Ohio. The employees number about 500 and the wage increase applies to hour men and others on premium work.

New Six Spindle Chucking Machine

The Baird Machine Co., Bridgeport, has placed on the market the machine illustrated, which although of the general type classed as chucking machines, might be termed "an automatic lathe for short pieces." It is for work on castings, forgings and cut-off bar stock requiring a number of operations such as turning, facing, chamfer, form, drill, bore, ream, thread or other regulation lathe work.

Five pieces of work may be operated on at one time, and as many as 21 tools can be used at one time. Five spindles are in an operating position and a sixth in an unloading or loading position. As the finished piece reaches the unloading position the machine automatically stops so that inattention on the part of the operator will not be the cause of a second cycle of operations on the work. The machine can be started immediately and the five work spindles need not be stopped to remove the finished piece or put in a new one. The machine can also be set to run without stopping.



New Chucking Machine for Short Pieces. Five pieces of work are handled at one time and 21 cutting tools may be used. There are 24 spindle speeds and 17 speeds for feed of the cutting tools

The speed of the driving pulley is 800 r.p.m., and the spindle speeds are 28½ to 440 r.p.m., spindle speeds between these limits being obtained by eight possible combinations of the drive gears and three of the spindles, giving a total of 24 speeds. Any spindle may be run at any one of the three speeds. For example, should the combination selected require that one spindle should operate at 20 r.p.m., each of the remaining spindles might be operated at speeds of either 20, 30 or 40 r.p.m.; any spindle at any one of these three speeds. In addition there are 17 speeds for the feed of the cutting tools. Both spindle and tool feed changes are by change gears.

The minimum productive speed with driving pulley at 800 r.p.m. would be one piece in 9 min., the maximum being 2⅔ pieces per min. It is to be noted that the spindle and feed speeds can be arranged to give the greatest productive speed for the work in hand. A hole of small diameter can be bored at a high rate of spindle and cutting speed, and at the same time the outside diameter of the work might be turned at the best speed for that operation.

The machine can be arranged for either belt or motor drive, a 5-hp. motor being required. The tool holders are designed to receive standard forged or inset tools, and tool holders are interchangeable. The features include single pulley drive, all-geared speeds and feeds, automatic control, rapid traverse or reverse, power pump lubrication and power pump for cutting lubricant. The floor space occupied is 93 x 46 in., and the weight approximately 8500 lb.

The causes and effects of fires or explosions, due to the ignition of coal dust from the use of pulverized coal as a fuel at a number of industrial plants have been investigated by L. D. Tracy, coal mining engineer, of the Bureau of Mines. A bulletin on the general subject of coal dust explosion hazards in industrial plants will be issued by the bureau at a later date.

Dolomite for Refractories

If the lime in dolomite can be combined so as to render it nonslaking and at the same time hold up the refractoriness of the material, the abundant deposits of dolomite in the country would be rendered available for extensive use as a basic refractory, according to the Bureau of Mines. Briquettes containing 90 per cent dolomite and varying percentages of iron oxide and clay have been burned by the Bureau of Mines at the ceramic experiment station, Columbus, Ohio. Slaking time tests were run and the results plotted on a triaxial diagram. The slowest slaking mixture was selected for making into bricks, which were burned to a high enough temperature to render the lime inactive. Bricks with a high fusion temperature and high specific gravity, great mechanical strength, and low porosity were the result. The work is being continued, using varying percentages of dolomite to determine the nonslaking areas over the entire field.

Smelting Molybdenum Ore in Washington

A smelter for molybdenum ore is to be erected in Vancouver, Wash., by the United States Molybdenum Metals, Ltd., according to John O. Bender, secretary, of Los Angeles, Cal. A site has been purchased on the Columbia River waterfront and construction of the plant will start about Jan. 1, 1923, Mr. Bender stated. The molybdenum mine owned by this company is one of the five in the world and is located 65 miles from Vancouver at the base of Mount St. Helens. It will be necessary to bring out the ore on pack horses or mules a distance of seven miles, and haul it to Vancouver by truck. It is hoped to send out four tons of concentrates daily, which will mean an output of $1,000,000 per year, the price of molybdenum being around $850 per ton.

Ground Broken for Steel Mill

ST. LOUIS, Oct. 17.—George W. Niedringhaus, president National Enameling & Stamping Co., presided at the ceremonies incident to breaking ground for the new sheet mill to be erected by the company at Granite City, Ill., last Thursday. W. W. Hanlon, plant superintendent, to whom Mr. Niedringhaus gave credit for the idea of the plant, moved the first shovelful of earth. Philip Stremmel, superintendent of the tin mill department, also spoke.

The plant, 300 x 800 ft., will cost $1,225,000. It will contain six sheet mills and one large jobbing mill. It will add 700 employees to the pay roll. It is expected that the plant will be ready for operations by July 1, 1923.

The Underwood Typewriter Co., Hartford, Conn., is on full time. Heretofore the plant operated nine hours per day, five days per week. Five hours each Saturday has been added, making a total of 50 hours per week.

American Factory Methods Regarded Superior to British

A trip was recently made through the eastern part of this country, visiting various manufacturing concerns, by A. T. Davey, secretary of the Institute of Production Engineers, and associate editor of the British technical journal known as *Engineering Production*. The reason for the trip was to compare American production methods with those in use in England. Two of the plants visited by Mr. Davey were the Hendee Mfg. Co., builder of the Indian motorcycle and the Rolls Royce Co. of America, which builds the Rolls Royce car, the latter plant having been somewhat recently established in this country by the British parent company.

The British factory manager, he holds, is not able to figure costs accurately, a matter of prime importance among American manufacturers, owing to lack of production methods and neglect to study scientific management of factories as practiced in this country. He says that in the usual British machine shop there is no definite planning of work nor routing of materials through the shop and that often it is impossible for the management to give definite completion date or to estimate accurately the length of time a job will require to pass through the various machining operations.

British Worker Cannot Compete in Production Volume

Mr. Davey said that while the British worker as an individual is more painstaking and careful in his work than the average American worker, he cannot compete when it comes to turning out volume of product in a short time. Further there is considerably more hand work done in British factories than in similar factories in this country, according to his observation. It appears to be the aim of the average American shop to be so organized that hand work is almost entirely eliminated, work being done in automatic machines or fixtures.

Mr. Davey considers that many British managers look upon scientific management as a mere fetish without actual value in production, not realizing that it is scientific management which has made possible the remarkable production capacity of this country. He believes that when they fully realize in England what scientific production methods will mean, they will undoubtedly adopt them in their British factories.

Industrial Housing Conditions

Mr. Davey finds that working conditions and housing conditions of American workmen are far superior to those prevailing in England. No assistance is given the British worker to make his conditions more comfortable, such as is the practice here. For instance, individual lockers, washrooms, rest rooms, lunch rooms, etc., are practically unknown in England. The use of these helps in this country, he finds, has spurred the American factory worker to greater efforts, the British worker still clinging to the old policy that more production will mean less work to be done. It follows that there is more soldiering going on in British factories because the worker fears lack of employment if he produces rapidly or completes quickly the task on which he is employed.

He says that both in England and on the Continent the working man generally lives in crowded streets with unhealthy and insanitary conditions surrounding him and that his chief amusement is to sit in front of his house and smoke, whereas in this country the working man benefits by latest sanitary conditions, is enabled to have a cottage or a small house with some little ground about it and has means at his disposition for a variety of amusements, in many cases owning an automobile which in England is frequently impossible, even for a foreman.

Mr. Davey feels confident that the work of the Institute of Production Engineers will eventually greatly improve manufacturing conditions and the condition of the working man in England.

Apparatus for Determining Linear Shrinkage and for Bottom-Pouring of Cast Metals and Alloys

In a paper before the Institute of Metals, in Swansea, Sept. 22, F. Johnson and W. G. Jones describe two new forms of apparatus:

(a) For determining the total linear shrinkage of cast metals and alloys;

(b) For producing cast bars by a bottom-pouring method, the molten metal flowing from a specially heated crucible into the mold and the rate of flow being controlled by a lever-operated stopper.

Both forms of apparatus have been used in investigating the shrinkage and hardness of chill-cast copper-zinc alloys. The shrinkage values of these alloys are found to be higher in general than those obtaincd for sand-cast bars by previous investigators. The curve illustrating the relationship of shrinkage to composition confirms most of the features formerly discovered by Turner and Murray, but no minimum at 60 per cent copper is found.

In making the alloys pure electrolytic metals were used, while re-melted castings were excluded. Most of the alloys were poured at a temperature interval of approximately 115 deg. Cent. (239 deg. Fahr.) above their liquidi, and the mold was kept at a constant temperature by means of an outer jacket of water maintained at the boiling point.

The alloys were prepared in a separate coke-fired melting furnace and transferred thence to the bottom-pouring apparatus. The advantages afforded by the use of this apparatus include:

Control of pouring temperature;
Facility for registering temperature of metal;
Absence of delay between attainment of required pouring temperature and release of metal into the mold;
Control of rate of pouring;
Exclusion of dross from stream of metal, thus obviating the necessity for skimming;
Mitigation of "zinc-fume."

The hardness of the bars was determined, both as cast and after annealing. Uniformity was not exhibited by the bars as cast, but was secured by annealing. In the case of the annealed bars, the hardness numbers both by the Brinell and Shore (scleroscope) methods were plotted against composition. The Brinell curve showed an increase of hardness over the range 100 to 88 per cent copper. From 88 to 72 per cent copper the hardness was constant, a slight fall setting in at about 72 per cent copper and persisting to 63 per cent, at which point a rapid increase set in with the appearance of the beta constituent. With the exception of a small dip in the curve between 53 and 50 per cent copper the increase is maintained to 45 per cent copper.

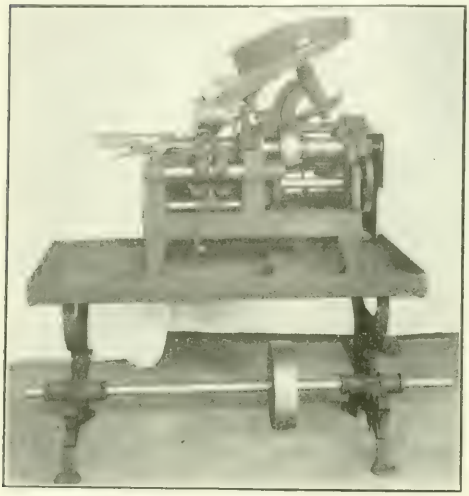
The changes of scleroscopic hardness with composition are of a similar character to those revealed by the Brinell test, but less pronounced, while over the range 60 to 53 per cent copper no increase of hardness is shown, such as that shown by the Brinell test. This would indicate a very slight difference scleroscopically, between the beta and alpha phases. The top faces of the bars as cast are slightly softer than the bottom faces, owing to slower rate of cooling, and although this difference is diminished by annealing, it is not entirely eliminated in every case.

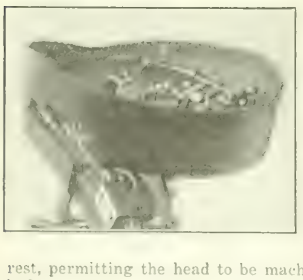
The annealed bars (containing 100 to 57 per cent copper) were cold-rolled, the reduction in thickness being approximately 50 per cent. The hardening capacity of the alpha brasses under cold work increases rapidly with increase of zinc up to a maximum of about 75 per cent copper. The rolled strips after close annealing were again tested for hardness, the results confirming those obtained on the bars as cast and annealed, with the exception that the range of uniform hardness is slightly restricted and the succeeding fall (between 70 and 63 per cent copper) is more pronounced.

New Machine for Shaving Bolts and Screws

A new machine for shaving bolts, cap screws and similar work and equipped with its improved automatic hopper, as shown in the accompanying illustration, has been brought out by the Asa S. Cook Co., Hartford.

The head of the bolt is shaved both over and under simultaneously, assuring a uniform thickness of the head. This is accomplished by the new rocking tool holder shown, which permits of the independent adjustment of each tool, either sideways or at different angles from the center line of the bolt, but working simultaneously. The tool holder is supported on an angle that keeps the tools from dragging on the finished surface on their return strokes. A stop provided for each tool serves to keep the tool in the proper place at all times. The bolt is held in jaws by the end of the shank, and is back-rested by an unusually solid back rest, permitting the head to be machined true with the body.





Machine for Shaving Bolts and Cap Screws. The general arrangement of component members may be seen above and details of the hopper in view at left

Any style of head can be shaved. The capacity of the machine running at 350 r.p.m. and set on blanks not larger than ½ by 4 in., is 18 per min., greater production being obtained on smaller diameters. Starting and stopping is by means of a clutch pulley, and overhead belts are eliminated by placing all shafting underneath the machine.

Hopper for Feeding Bolts

The design of the hopper involves a new idea in feeding bolts and cap screws, unusual speed and efficiency being claimed. Unlike the revolving hopper, the new device functions by means of a stationary groove with a revolving bottom. The groove is made wide enough to accommodate only one bolt at a time, and the hopper itself is built on an angle, forcing surplus bolts to slide back from the top of the groove. The revolving bottom is equipped with steps at regular intervals which catch the heads of the bolts. Agitators, which revolve with the revolving bottom and close to the surface of the stationary disk, stir up the bolts and serve to assure a steady stream of work in single file, disposing of every bolt. The bolts may enter the groove in the chute head first or point first, because as they enter their points drop, and, held by their heads, they continue in this position.

The hopper can be regulated to run at various speeds. On a test of ½ x 2 in. cap screws 105 per min. were fed, emptying the entire hopper to the last bolt at a uniform speed throughout.

Either right or left feed is available, and the hopper can be adapted to any machine requiring a bolt feed hopper. It will take bolts up to 6 in. long, and by changing the chute to suit, various diameters of head may be accommodated.

Detroit Stoker Co. Buys Plant at Monroe, Mich.

The Detroit Stoker Co., Detroit, manufacturer of automatic stokers, has recently disposed of its plant in Detroit and purchased from the Van Blerck Motor Co. its entire manufacturing plant located in Monroe, Mich., where it will continue to manufacture automatic stokers. The general offices, sales and engineering departments will be continued in the General Motors Building, Detroit. All equipment and materials are being moved to Monroe and a large amount of new equipment and machinery is to be installed. The company now manufactures both underfeed forced draft stokers and overfeed natural draft stokers, and due to the increase in business and the necessity for increased facilities, has found it necessary to enlarge its quarters. The new works consists of modern fireproof buildings, including a large machine shop, erecting and assembling shops, as well as separate buildings for heat treating and sheet metal work. The buildings are all one story, and contain 50,000 sq. ft. of floor space. The land comprises nine acres suitably located, with New York Central trackage on the property, and with ample space for future expansion.

Acquire Control of Columbus-McKinnon Chain Co.

Charles M. Wambaugh and associates, all residents of Columbus, Ohio, have purchased the controlling interest in the Columbus-McKinnon Chain Co., as the conclusion of negotiations which have been pending for several months. The general office and financial management of the firm will remain in Columbus.

The controlling stock in the company has been held in Buffalo since the consolidation of the Columbus Chain Co. and the McKinnon Chain Co. Mr. Wambaugh will continue as president and general manager of the combined industries and the men associated with him since the organization of the Columbus Chain Co., 20 years ago, will remain on its board of directors.

The Columbus-McKinnon Chain Co. owns and operates plants in Columbus, Lebanon, Pa., and St. Catherine, Ont. It is one of the largest manufacturers of both electric and fire welded chains in the United States, making all sizes. The company recently installed equipment for the manufacture of automobile tire chains.

Investigation of fire brick in malleable iron furnace bungs has been continued by the Bureau of Mines in order to translate laboratory results for users of clay refractories in malleable iron furnace practice. Different types of fire brick were found to stand 3 to 22 heats. The standard laboratory tests for fire brick did not show this difference, so a thorough study of the relation between the laboratory and service tests were made to assist the manufacturer in the utilization of fire clays for malleable iron furnace brick. The brick giving the heat service had a porosity between 1.9 and 2.3 per cent. Those brick showing the smallest spalling loss stand up best in practice.

Transportation Is Most Important Factor

Trade Paper Editors Review Business Conditions and Say Much Depends Upon Car Supply—How Various Industries Are Affected

At a meeting of the National Conference of Business Paper Editors held at the Hotel Astor, Oct. 12, brief reviews of business conditions in ten basic industries were read by editors of representative trade papers. The following are abstracts of a number of these reviews:

The Railroad Situation

BY SAMUEL O. DUNN
Editor Railway Age

By long odds the most outstanding feature of the present railway situation is the inability of the railroads to move the freight being offered to them. The farmers cannot ship the crops they already have harvested, and the wheat has not all been threshed and the corn is not yet gathered. Every single industry in the country is reporting that its shipments, and many that their production, are being restricted by lack of transportation.

I wish I could assure you that this situation is due to temporary conditions and that it will soon be improved. I cannot do so. The coal strike has created an abnormal demand for the transportation of coal. The railway shop employees' strike has left all the railways somewhat crippled and some badly crippled. These things have made the shortage of transportation greater than it otherwise would have been, and their effects cannot soon be removed.

But the fact is that, although the coal strike and the shop employees' strike have aggravated the present transportation situation, they have not created it. It is mainly due to two series of developments. The first of these is the very large increase within recent months in industrial and commercial activity and, in consequence, in the freight offered to the railways for movement. The second is the long decline which has occurred in the expansion of the railroads. If all the locomotives and cars now owned by the railroads were in normal condition, they could not handle anywhere near all the freight that is being offered to them, and which, in the months ahead, will be offered.

It was long predicted by those who opposed the policy of restrictive railway regulation that in time it would result in making railroad transportation the limiting factor in production and commerce in this country. That prediction, unfortunately for everybody, has now been completely fulfilled. Almost every other condition is favorable to an increase of production and a revival of prosperity such as we had after the panic of 1893, after the panic of 1907 and after the depression of 1914 and 1915. The railroad situation makes impossible for the present any such increases of production and commerce as occurred then.

This limitation upon the country's prosperity and development must be removed. How can this be done? The answer is simple and obvious. The influences which have reduced and almost stopped the expansion of the railroads must be removed. Much the greater part, or all of this reduction of the expansion of the railroads, has been due to the policy of government regulation which has greatly reduced and narrowly restricted the net return earned by them. This reduction and restriction of their net return has driven new capital from them. Unable to raise new capital in relatively as large amounts as in former years they have been unable to develop and increase the capacity of their properties as formerly.

The public long has been told that the railroad problem of this country was ceasing to be one of rates, and was becoming one of lack of transportation. The public, however, has insisted in regarding the problem as chiefly one of rates and in consequence cannot now get, and for a long time will be unable to get, anywhere near enough transportation. It will lose many times more in a short period by this lack of transportation than it has gained in the last ten years by keeping rates on a basis which has almost stopped railroad development.

Do not in this crisis denounce the managements of the railroads. The farmers and business men and the regulating authorities who have done what the farmers and business men have demanded are the people who are responsible. There is no immediate remedy for the present transportation situation. It must be borne as best it can. It can be remedied in time by the adoption of a wiser and fairer policy which will let the railways earn the net returns they require in order to furnish adequate service. There is no other remedy under private ownership, and very few business men wish to take a chance with Government ownership.

Iron and Steel

BY A. I. FINDLEY,
Editor THE IRON AGE

Iron and steel production to-day is largely a function of car supply. Transportation is not yet untangled from the coal and railroad strikes and is not likely to be for some time. The coal strike at its worst brought the industry down below a 50 per cent operation. The recovery was rapid in September and to-day, with all the hamperings of car scarcity, the output rate is something over 70 per cent of capacity. With more than three-fourths of the year gone, we are able to estimate the total production for 1922. It promises to be around 32,000,000 tons of steel ingots as against something over 19,000,000 tons last year. We called 1921 a 40 per cent year. We are safe in putting down 1922 as a 60 to 65 per cent year.

Demand.—The railroads and building have been the main props of the steel industry this year. Up to the second week of October the railroads had bought nearly five times as many cars as in all of 1921, and contracts for locomotives by the hundreds have been coming in in the past three months. Already fully 1,500,000 tons of rails have been bought to be put in track in the first half of 1923. Large structures and new residences have called for much structural steel, gas and water pipe, sanitary equipment and builders' hardware. Automobiles have been built at an unexpected rate, with several months making new records. There are still in dealers' hands agricultural implements manufactured in 1920, but these stocks have nearly disappeared and implement works have made a fair start on the road to better things. Oil tank storage work has helped to make up to the plate mills what they have lacked in orders from shipyards. In those uncounted and common uses of steel, touching the every-day life of the people and altogether representing fully 25 per cent of the total consumption, 1922 has shown a noteworthy gain, as indicated in part in the sheet, tin plate and wire trades.

Prices.—Costs are so high that producers of steel have had little profit in 1922. A number of independent companies have shown balances in red ink for all three quarters of the year. Labor is now 20 per cent higher than in the summer months. The 10 per cent horizontal reduction in freights was admittedly an injustice to iron and steel producers, many railroad men agreeing that rates on coarse freight never should have gone up 40 per cent in 1920. Most burdensome of all has been the high cost of fuel, due to the double

strike. Before the war the steel industry could make a profit on 1¼c. per pound for bars, plates and shapes. To-day's market prices on these products are around 2c., and some mills have all they can do to break even. Due to the coal and railroad strikes, there has been a scarcity market for pig iron and steel products for many weeks. How fast the mills can catch up will depend on how fast the railroads can get their rolling stock in order and master the dislocations due to the priority movement of coal. To-day the composite price of seven main finished steel products is 2.46c. per pound, as against 2.23c. one year ago. Pig iron is quite out of line with steel, having made a rapid ascent due to the widespread blowing out of furnaces that could not get coke. Thirty dollars and ninety-four cents ($30.94), the pig iron composite of Oct. 10, was about 55 per cent above that of October, 1921, as against only 10 per cent advance in finished steel over one year ago.

Outlook.—Steel mills have promise of continuing the present rate of operations—that is, 70 per cent and a little upward, well into the winter. There is no accumulation of steel in the country to speak of, and middlemen's stocks of a good many descriptions of finished product have been broken, in the period of short supply during and following the strikes. There is, of course, surplus capacity in the country, but it will not have the chance to make itself felt because labor supply, fuel supply and car supply will continue to limit the industry. Prices are not likely to change materially in the next four or five months. Pig iron having advanced so much will show more decline than finished material, as the industry works out from its fuel and railroad hamperings. Earnings in the fourth quarter are likely to be the best for the year and the first half of 1923 should show as good a volume of business as today's and a return of moderate profits.

Industrial Chemicals

BY WILLIAMS HAYNES

Editor Drug and Chemical Markets

During the past two years, in spite of the great stress of the period, the industry as a whole has come through soundly. The tremendous over-production of the war period has been curtailed; war prices have been brought back; selling policies have been revised, all with surprisingly little open disturbance. Failures have been comparatively few. Production has been worked out upon a reasonable scale, based upon actual consuming demand. Competition has forced careful scrutiny of manufacturing processes. Second-hand dealers, who throughout the war period were in control of the market, have lost their domination and the more healthy condition of a market in the hands of the actual producers now exists.

Chemical prices, like many other basic commodity prices, have always been set by bargain. There is a marked tendency—although it is not yet more than a tendency—for chemical makers openly to announce their price. Makers of alkalies have been pioneers in this movement, and it is rather significant that within the past two years five great chemical companies—one nearly one hundred years old and the youngest organized more than twenty years ago—have for the first time adopted and are using trademarks. This branding of chemicals, for identification by the consumer, is the first step toward a revision in commodity sales methods that means much to both producers and consumers of the raw materials of industry. It means that there will be less emphasis upon price and greater consideration of the other factors that make up true value. It means better control of prices and less violent price fluctuations. It is a movement that has the vigorous endorsement of the National Association of Purchasing Agents, who recognize that it was in the haggling, bazaar type of market that the age-old saying, "Let the buyer beware," was born. It is a movement that has attracted attention in other basic commodity fields, and as the merchandising of all these raw materials of all the industries lies close to the very root of successful manufacturing, it is a movement full of meaning to us.

Metal Mining Industries

BY J. E. SPURR

Editor Engineering and Mining Journal

The great test of prosperity for the mining industries during the next year will depend upon how far the United States is self-sufficient. Undoubtedly it is a world in itself—undoubtedly it constitutes more of a commercial closed circle than has ever been seen before within single national boundaries. How far will our own consumption take care of our own production of the non-ferrous metals? And in this consideration the present tariff policy of the United States is the chief factor. Since its effect is to raise prices and wages—prices and wages which in many cases have already risen since the passing of the tariff, as if on the touch of an electric button—it is evident that the only theory of the tariff—if there ever was an intelligent theory—is that the domestic consumption is sufficient to take care of production. Certainly the consequent increase in the cost of production cripples our chance to sell cheaply in competition in foreign markets. Then of course there is the universally pointed-out factor that by shutting out foreign goods from our markets we prevent foreign purchases on account of the lack of wherewithal to buy our products. This applies especially to some of the great non-ferrous metal industries. We mine most of the world's metals, producing normally 60 per cent of the copper, 45 per cent of the lead, and so on; and we have had to depend for the prosperity of some of our principal metal industries largely upon the aid of foreign markets directly or indirectly. Possibly our increased consumption may take care of a part of the produced surplus of commodities in the next few years. Only time can tell. In the meantime, however, Germany, normally the greatest consumer of metals after the United States, has lately become a very weak factor as a buyer, on account of the collapse of the mark; and, altogether, our prospects for foreign markets are not too bright. The general European debt or bankruptcy in the several countries, and our own tariff policy, is clogging that outlet for our production.

Marine

BY R. V. SAWHILL

Editor Marine Review, Cleveland

Surface indications do not afford a clear picture of conditions in the marine field. The troublesome liquor issue, the delay in solving the subsidy question, the eager competition for freight business at low rates, the slight amount of ship construction, all point toward a serious and unsatisfactory condition. Every American in the business feels the effects of these issues and has trouble in winning back the optimism of a few years ago.

The liquor issue will probably be settled within a few months, with foreign ships released from the Daugherty interpretation. The subsidy question is up before Congress within a few weeks and the united efforts of practically every branch of the marine field, as well as the support of the Washington administration, will likely bring some modified law into effect. Increasing foreign trade is strengthening freight rates, but world conditions are not improving at the American pace so that to world ship owners profits are not likely to rise.

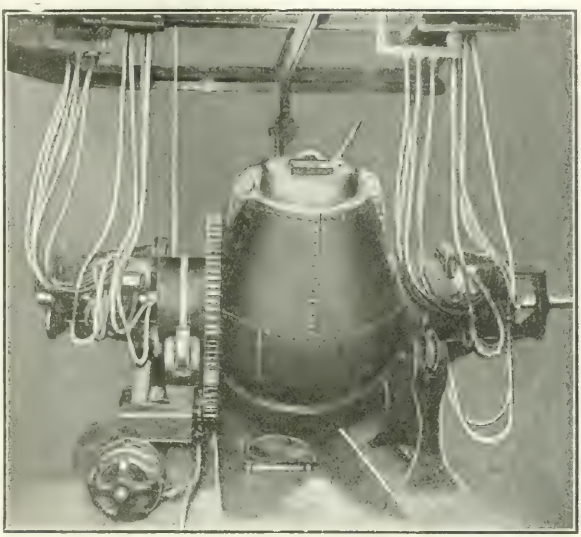
But fundamentally American ship owners and shipbuilders have one solid basis for encouragement. Domestic industry has grown beyond the domestic market and America must seek outlets for her surplus products in foreign countries. This condition has been the economic fact which always has made other nations powers on the ocean. With a physical fleet in her possession, with better trained shipping and shipbuilding organizations than ever before and with foreign trade a necessary part of her industrial life, the United States is certain to regain her strength on the seas despite the interference of minor influences which to-day appear both disturbing and important.

Electric Modification of the Schwartz Non-Ferrous Oil Furnace

The familiar oil burning brass melting furnace, known as the Schwartz furnace has been modified by the Hawley Down Draft Furnace Co., so as to convert it into an electric melting furnace. The new equipment is known as the Hawley electric oscillating furnace. The furnace is designed for melting non-ferrous metals and alloys. Its principal characteristics are as follows:

The heat is generated by an electric arc passing between two horizontal electrodes. This is really the so-called indirect arc type of furnace. The shell of the furnace is the same as that of the original Schwartz oil-burning equipment. The design is such as to permit pouring either into ladles or directly into molds and it can be charged either by hand or mechanical arrangement. Regarding the shape of the cauldron, the following advantages are mentioned: All the metal is melted equidistant from the arc; there is no possibility of the ends bulging, resulting in the electrodes becoming out of the alinement; the cauldron, being absolutely rigid, cannot lose its shape; the use of linings, which are interlocking and which can therefore hold together tighter, is possible.

The furnace is equipped with an automatic oscillating mechanism resulting in a thorough mixing of the charge while melting. The furnace as illustrated is now built in one size only, of 1200 lb. capacity and 150 kva. Two other sizes are being designed, of 600 lb. and 2500 lb. capacity and 75 kva. and 300 kva. respectively. A single phase transformer is furnished with each furnace, together with a motor for oscillating, and automatic and hand control mechanism, together with an integrating watthour meter and other necessary equipment. The lining of the furnace consists of three courses of special refractories. Suitable electrodes and electrode cooling devices are incorporated.



Tariff Data for Electrical Industry

The Tariff Commission has just issued a tariff information survey on the electrical industry. Intended as an aid to scientific tariff legislation, it presents briefly the pertinent facts as to the competitive situation of the industry in the United States and abroad. A brief survey of the whole industry is followed by a separate and more detailed consideration of the more important branches. Power apparatus, incandescent lamps, automobile apparatus, wire and cable, wiring devices, lighting fixtures, batteries, medical apparatus, and miscellaneous supplies are given detailed treatment. Domestic production in 1921 was valued at approximately one billion dollars, of which 10 per cent was exported. Copies of this publication may be procured from the Superintendent of Documents, Government Printing Office, Washington, at 10c. per copy.

Mill Cinder Freight Rates

Mill cinder at one time moved freely from New England and other Eastern points to eastern Pennsylvania steel plants, but of late there has been comparatively little business done, especially where there is a fairly long freight haul, on account of the high freight rate. The price which consumers are willing to pay for mill cinder varies from $3.20 to $3.50 per ton delivered at consumers' works in eastern Pennsylvania and the freight rates from all New England points east of Port Chester, N. Y., is $3.91. Under these circumstances, there is no chance for New England producers of mill cinders to dispose of this product. Dealers have endeavored to get a reduction of freight rate on mill cinder from the New York, New Haven & Hartford Railroad, but without success. The various producers in New England have also had the matter up with the railroad. The road answers that mill cinder is grouped with pig iron and that to reduce the mill cinder rate it would have to reduce the pig iron rate also. As a consequence, mill cinder in New England is now being hauled to the dump or used as ballast on railroads.

Briefs Filed in Rate Case

WASHINGTON, Oct. 17.—The brief of opposing railroads has been filed with the Interstate Commerce Commission regarding the proposed rate of 20c. per 100 lb. from New Orleans and group points to the Houston-Galveston-Beaumont, Texas, group on iron and steel articles. The brief points out that the application is limited to traffic originating beyond and delivered to rail lines at New Orleans and group points by connecting rail lines, by coastwise or ocean vessels and by the Mississippi River, but it will not apply on import traffic. It is, therefore, a proportional rate, at least, as to traffic delivered to the west side lines by the rail carriers, the brief says.

Supporting contentions of the carriers opposed to the 20c. rate, the St. Louis Chamber of Commerce also has filed a brief in which it asks that the proposed tariffs be canceled. The brief of the chamber states that it is sought to secure tonnage from the Birmingham and Pittsburgh districts to the Houston group, but that there was no real desire or hope of securing tonnage from St. Louis under the proposed adjustment because the proportional rate from New Orleans to Houston would not reduce the rate from St. Louis.

The most accurate method of determining the total heating value of a coal sample is by cumbustion in a bomb calorimeter, states the Bureau of Mines in Bulletin 193, just issued. The instrument should be carefully standardized by burning substances of known calorific value, such as the standard samples of cane sugar, napthalene and benzoic acid, that are now being furnished by the Bureau of Standards. The standardization should be conducted under exactly the same conditions and with the same thermometer that is used in the tests. The use of calibrated thermometers is essential. In carefully conducted calorimetric work the probable error should not exceed 0.2 per cent, which corresponds to about 30 B.t.u. in a high-grade coal. This degree of accuracy is higher than the 100 B.t.u. often obtained in the usual methods of sampling.

MACHINE SHOP ECONOMIES

Screw Machines at Brass Cutting Speeds—Other Practices of Eastern Machine Screw Co.

BY L. S. LOVE

W. H. GATES, of the Eastern Machine Screw Co., New Haven, Conn., manufacturer of self opening die heads, threading machines, etc., credits the economies he has worked out in that plant to his early experience in the old Ethan Allen gun plant.

In the Allen plant it was essential to make fixtures do as much of the work as possible, to avoid unnecessary handling, on account of low prices at which the product was sold. This same idea has been carried out in the Eastern plant. One example of this practice is a vise for holding four pieces to be milled at once. The blanks are not uniform and could not be held in multiple with the ordinary solid jaw vise. The vise used has a fixed solid jaw at one end; at the other it has four separate movable jaws held in an adjustable block. The four jaws are individually loosened or tightened by cams. In this manner a group of pieces can be milled at once, each held firmly in place.

A great deal of importance is attached to the treatment of steels in different ways to accomplish particular results. An example is the treatment of steels used for tools in automatic screw machines, permitting them to be run on steel work at speeds ordinarily employed in machining brass. With the special heat treatment for tools, it is possible to hold production jobs practically to tool room limits.

Another example of speed in production is the employment of an internal grinding attachment for small holes, running at speeds up to 120,000 r.p.m. This attachment is operated by an air turbine and runs without vibration.

Standardization and Bridge Design

In a paper before the Franklin Institute, Philadelphia, Ralph Modjeski points out one of the handicaps under which designers and engineers must labor when standardization of products reaches a high level. He said, in part:

"Because of the rapid growth of its railroads and the magnitude of its streams, the United States offers the greatest opportunity of any country for the development of the science and knowledge of bridge building. Unfortunately, we have now entered upon an era of standard specifications, and each engineering society of any size is bent upon compiling its own. Thus an engineer desiring to secure somewhat better material for his structure is met by objections from the manufacturer, who claims that if the standard specifications of such and such a society are good enough, the engineer should be content with them. This automatically arrests any effort on the part of the contractor to produce better material than what is known by him as 'commercial product,' and thus progress in the manufacture of materials of higher grade quality for bridge work is retarded. The material is not improving in quality—it is even deteriorating. Standard specifications are an advantage in many cases, but not in regulating the product of industries which are still almost in their infancy and in process of development."

Panama Canal Traffic

Figures have been given out for the traffic of the Panama Canal during the fiscal year 1922, and during the eight years of operation since the canal was first opened. It is interesting to note that Japan furnished the third largest tonnage of vessels passing through the canal in the latest fiscal year, having 1,044,515 cargo tons compared with 3,329,861 for Great Britain and 4,950,519 for the United States. These three accounted for 85.7 per cent of the total of 10,884,910 tons for the shipping of all nations. On the 8-year basis Norway, which stands fourth in 1922 with 408,268 tons, is a little ahead of Japan, having 4,112,451 tons against 4,047,034 tons for Japan, 21,555,924 tons for Great Britain and 24,030,335 tons for the United States, out of a total of 61,348,406 tons for all shipping.

For 1922, the cargo tonnage decreased from 1921 by more than 6 per cent, this decrease being approximately uniform with regard both to westbound and eastbound traffic. The number of merchant ships using the canal dropped from 2892 in 1921 to 2736 in 1922. The number of warships dropped at the same time from 16 to 14.

Michigan's Fuel Control Law

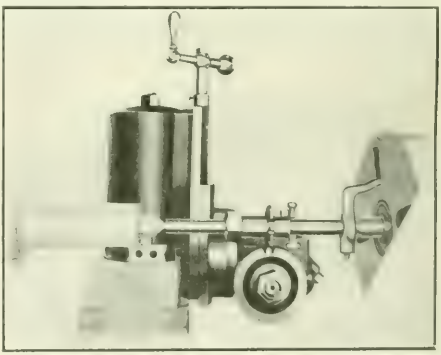
DETROIT, Oct. 16.—Michigan's fuel control law was finally passed by both houses of the Legislature, Friday, Oct. 13. The law becomes effective at once. It embodies the following powers in the office of the fuel administrator:

Supervise, regulate and control the receipt, storage, sale, use, distribution, production and delivery of fuel within the State; fix prices; compel the sale of fuel; ration fuel to dealers and districts; prevent waste; conduct investigations, search properties where fuel is held for sale, and inspect books and documents; require dealers to make reports; license dealers; deputize assistants.

Lathe Attachment for Milling

An attachment for lathes, planers, shapers and drilling machines, known as the Garrett millerette converter, has been placed on the market by the Production Machine Tool Co., Cincinnati.

The device is intended to permit of converting a lathe into a milling machine with a dividing head on which a large range of milling can be done, such as cutting spur and bevel gears, surface milling, angle cutting, spline and keywaying. With the attachment small shops may do many classes of milling machine work on their lathes, and in larger shops it can be used to save set up time on special and single-piece jobs. On the drill press the attachment accurately spaces the holes to be drilled and holds the work. On planers



Attachment for Converting Lathe into Milling Machine with a Dividing Head. It is also adaptable to planers, shapers and drills

and shapers it is used as a dividing head. Three sizes are available, for lathes from 12 to 24-in. swing.

The index head in connection with the change gears provided is quickly set up, as only two gears are used at one time. The index plate is complete, showing the gears to be used and the required number of turns of the index handle to obtain divisions from 2 to 360.

The attachment fits the tool post slot in the top slide of the compound rest of the lathe and is quickly clamped. The lathe supplies the power and carries the cutter on an arbor between centers, furnishing both longitudinal and cross feed. In addition to the movement of the top slide and compound rest on the lathe, the down slide of the attachment is conveniently operated by the handle shown. The device can be set at any angle as both the down slide and index head turn on a swivel.

What Are Real Evils of the Long Shift?

Shorter Hours and Encouragement of Loyalty Urged by One Who Has Worked a Number of Years in the Mills—The Serious Problem of Morale Involved

BY ALDEN D. PERLEY

MANY eminent authorities are to-day thinking of the advisability of the eight-hour day for the continuous processes of the steel mill. Exhaustive reports have been published by such authorities as Bradley Stoughton and Horace B. Drury. I shall try not to encroach upon their field in this article, but merely try to give the viewpoint of one who has spent years at that kind of work. Of the nine years since I left College, I have spent all but the war days inside the mill. At least five of those years have been at double turn shift work, around blast furnaces, coke works and open-hearth furnaces, including most of the heavy jobs as well as most of the highly skilled jobs.

I believe there is no question that 90 per cent of the 12-hour men think they want eight hours, provided they can get ten hours' pay for it. This, however, has little bearing on the question, for it is evident that if the laborer got all he thinks he wants, we would rapidly approach the condition in Russia. Our question is, What are the evils of the long turn, would eight hours benefit the man or his family and what will it cost the public at large in the increased price of steel?

Much has been said about how hard or how easy the work is in the steel mill. The truth is that in nice, cool weather the work is easy for one who is accustomed to it. There is plenty of time for rest to make up for the strenuous pulls. A good man completely recovers between times. As the weather turns hot, the work around an open-hearth furnace becomes an ordeal for the very best men, and becomes harder in all departments.

I believe much more could be done to relieve this heat, especially in the open-hearth, and, of course, it will be done some day. But it still remains true that when it is the hottest and the work is very trying, the man working nights finds it almost impossible to sleep in such a home as he may have.

Despite the hard pull through the summer, however, the hot, heavy work is healthful, and one finds the young fellows holding down the heaviest jobs are in splendid health. It works out, fortunately so, that the young men get the heavy work and the older, more experienced men much lighter work.

Our modern steel mill has grown so large that it has developed some very striking faults of its own. It is often so large that men have a long walk inside the gates. The plant draws men from a great distance around it. Even laborers make a double change of clothes for their work, so that the average 12-hour man in many places is 13½ hours away from home. Allow him one hour for two meals at home and he has 9½ hours left for chores, recreation and sleep. Men given their choice work 14-hour nights and 10-hour days, which proves that the man does not mind the work; what he does want is some time at home occasionally. The 14-hour night allows the average man 8½ hours at home. He eats and goes to bed. Eats and goes to work. This brings in another one of the greatest evils of the 12-hour shift. It is very hard for the man away from home 13½ hours average a day to get proper food. Only the lower classes have any success. I find nearly all the skilled workers have stomach trouble in spite of the exercise they get.

I believe most writers overlook the fact that nearly all the necessary shift men are either semi-skilled or skilled men and not common laborers, and that from the semi-skilled men the skilled men are chosen. These men crave and expect some outside life as well as a home. Can anyone believe that in his 9½ hours free time the workingman finds any time for recreation without assuming he gets some sleep on the job? If we are to countenance sleeping in the mill more provision should be made for it, especially a warm place provided for cold weather. At present such sleep provides more in the way of colds than it does of rest.

If I may digress a little here, one of our greatest problems to-day is to keep up the morale and personnel of the skilled force. The whole trend of big factories is toward decentralization of loyalty and the obliteration of the individual. Men are loyal only to their boss, if to anyone. Each department works only for itself and often even for the destruction of rival departments. The individual becomes nothing, the boss feels he can lose his best man, his most loyal man, without worry to himself. The whole is so strong, the individual so weak, that very little discrimination is shown in picking men, or maintaining good-will. The organization becomes so strong it is top heavy in an emergency. Perhaps the rub comes in a general shortage of labor, or low wages in steel mills alone as compared to other industries or in a general strike. Then one sees what an organization without loyalty is worth and how little we can depend on the serfs of other nations.

In no other place does the American born take so readily to hard work as in the steel mill. There he finds pride as well as sweat in his work. He is more dependable and loyal, and spreads a better feeling, than either the Irish born or the southern European.

The cost of installing three shifts in place of

The Author's Long Service in Steel Plants

THE author of this article, Alden D. Perley, is a graduate of Yale, and with the exception of the service which he rendered as a soldier in war time, he was continuously employed in steel plants for the nine years since his graduation until very recently he resigned to go into business in Pittsburgh. The views which he presents are, therefore, the result of much thoughtful consideration and extended experience.

two has been estimated all the way from nothing to 15 per cent of the cost of the steel. If the additional cost is not over 15 per cent, I believe in three shifts, and trying to pick both bosses and men with more of a spirit of loyalty. Then we can take our furnaces away from the careless type of hunkie—free ourselves from our dependence on the foreigner and make it possible for the American to work through the semi-skilled to skilled jobs. If we do not gain eventually a better type and better loyalty, the company will gain very little from the change, when made.

If we do need eight hours, it is not because the work is too hard, but rather because the time at home is too short, at least for a man giving his whole life to it. Remember, a skilled tradesman cannot change, once he is started. He is always too poor an executive to go up and must fall way back for a job if he cannot retire when he becomes feeble. If we are to consider the work as easy or intermittent, the limiting factor is how long the man has at home and not how long he works. We must make our jobs suitable for the type of man we wish to employ, and to maintain the spirit of good-will which is so essential to continued efficiency.

FERROMANGANESE DRAWBACK

Possibilities of the Steel Export Trade Under the New Tariff

WASHINGTON, Oct. 17.—The high duties carried in the Fordney-McCumber tariff act on manganese ore, ferromanganese and other raw products used by the iron and steel industry have increased interest in the drawback provision of the new measure. This is particularly true of drawbacks in connection with exports of steel in the manufacture of which imported ferromanganese has been used. It is evident that with a duty of 1⅞c. per lb. on ferromanganese, amounting to $33.60 per ton on an 80 per cent content, the drawback becomes an item of importance.

Rebates on Ore and the Alloy

The drawback provision of the Fordney tariff act in all its essential features is similar to that of former tariff laws and provides for a refund to exporters of 99 per cent of the duties paid on imported material used in the manufactured exports. The drawback on each ton of imported ferromanganese used in the exported steel will be $33.26, or 99 per cent of $33.60. Assuming merely for the purpose of calculation that the prewar rate of steel exports continued and that only imported ferromanganese is used in all of this steel, the total annual drawback on the basis of the duty of 1⅞c. would be approximately $700,000. This is arrived at by estimating that one gross ton of steel requires 17 lb. of 80 per cent ferromanganese. In view of the probability that a larger proportion than heretofore of the ferromanganese used at domestic steel works will be made at home under the new tariff, the recoverable duty is likely to be much under the amount stated. Domestic producers of steel for export who make their own ferromanganese would receive as drawback 99 per cent of the duty paid on the ore used in ferromanganese manufacture.

The Tariff Commission has not been approached as yet concerning the drawback that will be allowed on manganese ore and ferromanganese, but the question is being discussed in the trade. There are already large supplies of both in the country, which were delivered before the new tariff law went into effect, and imports since that time have been small. Obviously no drawback will be allowed on present stocks that were imported before the new act became effective because under the Underwood-Simmons act the ore and ferromanganese were on the free list.

Imported Material Must Be Identified

The question has been raised whether a consumer of ferromanganese using both domestic and foreign alloy could secure a drawback on domestic ferromanganese used in exported steel provided a similar quantity of foreign ferromanganese is used as an offset and on this no drawback be claimed.

Section 313, the drawback provision of the Fordney-McCumber act, makes it clear that this cannot be done. The act says:

When the articles exported are manufactured or produced in part from [illegible] merchandise shall so appear in the completed articles that the quantity or measure thereof may be ascertained. • • • The imported merchandise used in the manufacture or production of articles entitled to drawback of customs duties when exported shall, in all cases where drawback of duties paid on such merchandise is claimed, be identified, the quantity of such merchandise used or amount of duties paid thereon shall be ascertained, the facts of the manufacture or production of such articles in the United States and their exportation therefrom shall be determined, and the drawback due thereon shall be paid to the manufacturer, producer, or exporter, the agent of either, or to the person to whom such manufacture, producer, exporter, or agent shall in writing order such drawback paid, under such regulations as the Secretary of the Treasury shall prescribe.

It can be appreciated that the difficulties of segregating imported managanese ore or imported ferromanganese and establishing the fact that it entered into certain designated shipments of steel products which were exported may be such in many cases as to make legal proof impossible or at least too costly to warrant the effort to recover the drawback.

Manganese Duties May Be Changed

It is believed that the iron and steel trades will make an effort to have the duties on manganese ore, ferromanganese, ferrosilicon and other products reduced. Application for reductions can be made under the flexible tariff provision, giving power to the President to make reductions or increases not to exceed 50 per cent of the present duties. Should reductions be granted, naturally the drawbacks allowable would be decreased. The drawbacks obviously are only a small portion of the total duties that the industry will have to pay.

The opinion has been expressed that the flexible tariff provisions will be a dead letter and that they were put in the act largely for political purposes. This is quite misleading, for the contrary is true. President Harding himself asked for adoption of flexible provisions which are so marked a departure in tariff making in the United States. He is showing great interest in these provisions, regarding which the Tariff Commission in the near future will promulgate rules and regulations. There can be no doubt that they will be the liveliest features of the act and will be used extensively for the purpose of making investigations through the commission looking to changes in rates and the plan of valuation where economic conditions demand it. While Congress did not appropriate money, an appropriation will be necessary in connection with the investigations the Tariff Commission will make and that will require the trebling of its force of experts. Assurance has been given from a high source that the funds will be forthcoming when they are needed, without the commission having to draw on its regular appropriation.

Vice-Chairman William S. Culbertson of the Tariff Commission, in an address before the American Mining Congress at Cleveland on Oct. 12, discussed plans of the commission for putting into effect the flexible provisions, giving further proof of the purpose of the Administration to make use of them. He outlined the procedure under the provisions calling for the filing of applications with the commission for a change in rates, proceedings before the commission and investigations that will be made by it as provided for by the order of the President on Oct. 7.

The Annealing of Gray Iron Castings*

Correct Time and Temperatures Determined for Relieving Machine and Casting Strains—Effects on Hardness —Increasing Machinability

THE investigation discussed in this paper was conducted by the Allis-Chalmers Mfg. Co., in order to determine the correct time and temperature for annealing gray iron castings, as well as to determine the effect of annealing and quenching on the physical properties. Each set of test bars was cast from the same 3000-lb. ladle, five transverse bars, 1 x 2 x 26 in., being cast in each flask. When breaking several bars at a given temperature only one bar was taken from any one flask. This was done to average the casting conditions.

Brinell and scleroscope tests were made on a ground surface of transverse bars near the fracture or on a ground surface of the threaded end of the test bar when only tensile bars were broken. The transverse bars were 1 x 2 in. and 24 in. between centers, and were broken on a standard Riehle-type transverse testing machine. The tensile bars were cut from transverse bars after fracture, and were taken longitudinally, and adjacent to the fracture. The tensile bars were made with threaded ends, and were ground to 0.564 in. for a space of 2 in. in the center of bar.

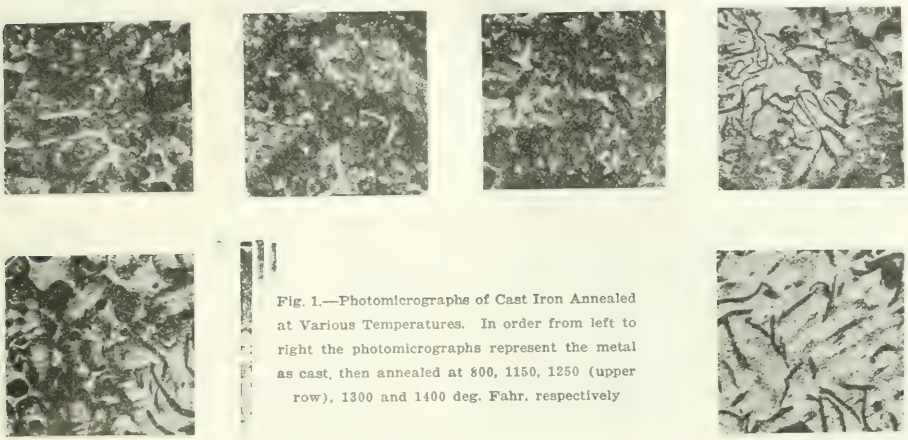


Fig. 1.—Photomicrographs of Cast Iron Annealed at Various Temperatures. In order from left to right the photomicrographs represent the metal as cast, then annealed at 800, 1150, 1250 (upper row), 1300 and 1400 deg. Fahr. respectively

The furnace used for heating was of the semi-muffle oil-fired type and was equipped with a Leeds & Northrup-type potentiometer pyrometer system. For annealing purposes test bars were held at the maximum temperature for one hour, and cooled in the furnace. The combined carbon was determined by color and only used as a check. All specimens for photomicrographs were etched with picric acid.

The results of annealing for one hour on the first set of bars indicate that up to 1150 deg. Fahr. there

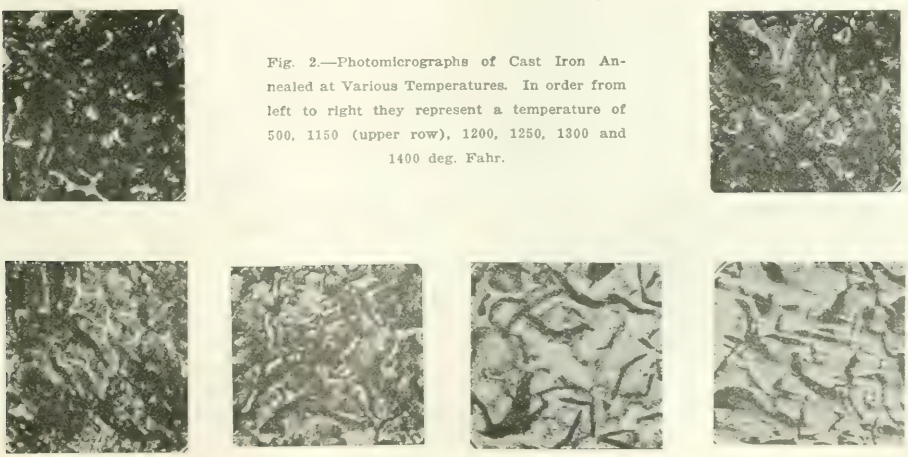


Fig. 2.—Photomicrographs of Cast Iron Annealed at Various Temperatures. In order from left to right they represent a temperature of 500, 1150 (upper row), 1200, 1250, 1300 and 1400 deg. Fahr.

*From a paper, "Annealing Gray Cast Iron," presented at the 1922 convention of the American Foundrymen's Association in Rochester, N. Y., June 26 to 29. The authors, J. F. Harper and R. S. MacPherran, are connected with the Allis-Chalmers Mfg. Co., Milwaukee, Wis.

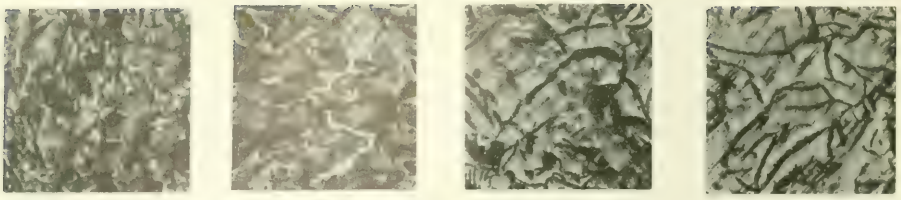
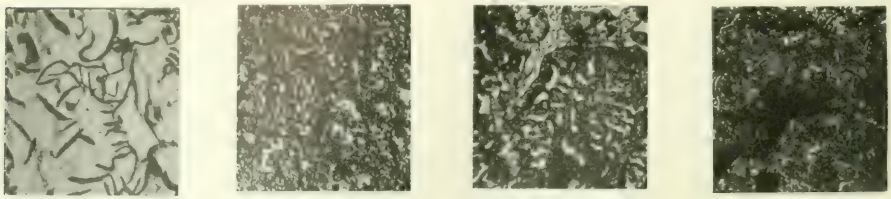


Fig. 3.—Photomicrographs of Cast Iron Annealed at Various Temperatures. In order from left to right they represent a temperature of 500, 1200, 1250, 1300 (upper row), 1400, 1500, 1500 and 1600 (lower row)



has been no loss of strength. Apparently there is a slight drop in the scleroscope hardness, but no change in the Brinell hardness until 1200 deg. Fahr. is passed. These results are confirmed by the change in combined carbon.

Representative photomicrographs were taken from these bars as indicated by group letter, flask number and temperature of annealing, given under each. These are shown in Fig. 1. No decided change had taken place until temperature of 1250 deg. Fahr. was reached. (Bar K-2.) This change is progressive as temperature increases until at 1500 deg. Fahr. it is practically complete. There also appeared to be a tendency of the graphite flakes to enlarge.

The results of annealing for a period of one hour would indicate no loss of strength at 1150 deg. Fahr. nor material decrease in Brinell and scleroscope hardness at this temperature. At 1250 deg. Fahr. there is a slight drop in physical properties, as well as in hardness. These results are again confirmed by a decrease in combined carbon.

Representative micrographs were taken from these bars as above described, and are shown in Fig. 2. There will be noted a very slight change at 1200 deg. Fahr., followed by a decided change at 1300 deg. This is again progressive, and at 1400 deg. is practically complete.

To determine the element of length of time of annealing, the tests were made as shown in Fig. 4. From other data it would appear that the temperature of 1150 deg. Fahr. (for one hour) should not be exceeded when annealing to relieve machine or casting strains. In Fig. 4 is clearly shown the effect of continued annealing at this temperature. It will be noted that there is a material loss of hardness and strength on the longer periods of time at this temperature. The effect of annealing at 1050 deg. Fahr. for various periods of time indicates that this temperature of annealing for reasonable periods does not tend to decrease materially the hardness or strength.

When annealing to increase machinability, only temperatures of from 1450 to 1550 deg. Fahr. will be found satisfactory. In this case, however, the drop in hardness is accompanied by a decided loss of strength.

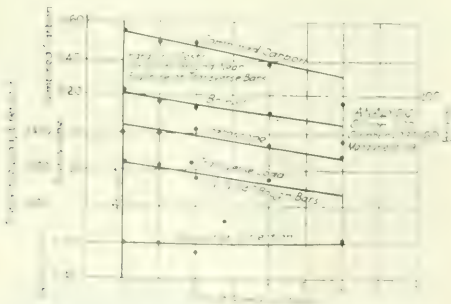


Fig. [illegible] on Properties of

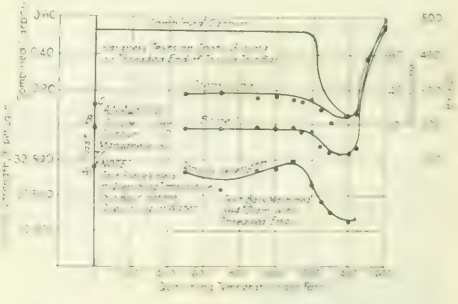


Fig. [illegible] Effect of Quenching Temperatures on Properties of Cast Iron

The following experiments were made on the effect on cast iron of quenching at various temperatures. In the case of bars held at the quenching temperature for one hour before quenching in water, it should be noted that above 1200 deg. Fahr. the Brinell hardness falls off until 1400 deg. Fahr. is reached, above which it rises very rapidly. The fall in scleroscope hardness is less abrupt, but both in decline and increase follows the Brinell test. The tensile strength falls off above 1150 deg. progressively until 1400 deg. is reached. When quenched above this temperature the bars were too hard to machine. The combined carbon begins to diminish at 1200 deg. which change continues progressively until over 1400 deg., when it again rises rapidly.

In Fig. 5 the test bars were cut from broken trans-

verse bars and were quenched in water after holding at quenching temperature one hour. Above 1200 deg. Fahr. the Brinell hardness falls off until 1400 deg. Fahr. is reached. Above which it increases rapidly. The change in scleroscope hardness again follows the Brinell test. The tensile strength begins to show a decrease at 1200 deg. which continues until 1400 deg. is reached. When quenched above this temperature the bars become unmachineable. The combined carbon seems to confirm the above tests.

The photomicrographs in Fig. 3 show a breaking up of the carbides at temperatures above 1200 deg. Fahr. which change is practically complete at 1400 deg. Fahr. When quenched above this temperature the carbon is partly retained in solution with resulting increase in hardness. An interesting comparison is shown between photomicrographs in Fig. 2 and those of Fig. 3.

From the results of these tests it would seem that until the temperature exceeds the critical the rate of cooling has no effect on the physical properties of cast iron.

Bibliography

"The Heat Treatment of Gray Cast Iron at Low Temperatures," by J. E. Hurst, *Engineering*, July 4, 1919.

"The Effects of Seasoning on Gray Iron Castings," by L. M. Sherwin, *Foundry*, October, 1917. Paper presented before American Foundrymen's Association, September, 1917.

"The Elimination of Strains in Iron Castings," by C. J. Wiltshire. Paper presented before American Foundrymen's Association, Sept. 19, 1919.

"Graphitization of White Cast Iron Upon Annealing," by Paul D. Merica and Louis J. Gurevich. Paper presented before American Institute of Mining and Metallurgical Engineers, September, 1919.

"Malleableizing of White Cast Iron," by Arthur Phillips and E. S. Davenport. Paper presented before American Institute of Mining and Metallurgical Engineers, February, 1922.

"Growth of Internal Combustion Engine Cylinders," by J. E. Hurst, *Engineering*, Aug. 4, 1916.

"Applied Metallography to Iron," by J. W. Bolton. *Foundry*, January, 1922.

Talbot and Other Open-Hearth Processes Compared

Original German Investigations of 1914 Continued to Date—Some Former Conclusions Modified

A DETAILED comparison of the Talbot with other open-hearth furnaces, both fixed and tilting, was published in *Stahl und Eisen* early this year. The author is Dr. J. Puppe and the article in several installments is a continuation of the paper published by Schuster* in 1914 (*Stahl und Eisen*, June 4, 11 and 18, 1914), detailing the results obtained from 1912 to that date.

In conjunction with his results on the furnace operations, Doctor Puppe also describes the results obtained with the gas producer and mixer plant at Witkowitz. The furnaces comprise three open-hearth furnaces of 50 to 60 tons capacity, a 65-ton Wellman furnace, and three 200-ton Talbot furnaces, two of the latter having been installed in 1915-16 with certain modifications which the writer describes.

In view of the fact that it would be unsatisfactory to publish some of the tables and omit others, the writer's conclusions regarding the advantages of the Talbot process as compared with the others in use follow:

Dr. Schuster, in the article mentioned, stated that:

1.—"By using a mixer to which heat can be applied, the production of steel in the furnaces supplied by this mixer can be increased by about 30 per cent, with a reduction in the time of operation."

In regard to this, the present writer confirms that the increase of output in steel furnaces running in conjunction with a mixer is from 10 to 20 per cent. This divergence from the opinion of Dr. Schuster is due to the fact that the pig iron worked up during the present period contains 1.7 per cent phosphorus, and that the work done by the mixer is less than during the years 1913-14.

2.—"The quantity of steel produced is, as regards physical and chemical properties, independent of the type of furnace selected." This is entirely confirmed by the experience gained from 1914 to the present time.

3.—"The quantity produced is governed, first, by the pig iron used, and second, by the proportion of scrap to mixer iron or pig, being practically the same in furnaces of different types where these particular conditions remain unaltered." The further experience confirms this statement.

4.—"The Talbot furnace is the most adaptable type for working up pig iron of different composition and as regards varying the amount of scrap added within fairly wide limits." As regards the first part of this statement, viz., that the Talbot furnace is the most suitable for treating pig iron of varying composition, the experience since gained confirms this opinion. The large residue in the bath partially compensates for the fluctuations in chemical composition occurring in the mixer iron, and the high temperature of the residual bath accelerates the oxidation of the admixtures. As regards the second part of the statement, the present writer's experience does not coincide with it, for open-hearth furnaces have been found to be the most adaptable in this particular respect, in that production was the least impaired in this type of furnace with increase in the percentage of added scrap.

5.—"In the Talbot furnace, it is possible to treat pig iron having the lowest to practically the highest phosphorus content without impairing the quality of the steel, the residue with high-phosphorus pig iron being smaller than with other types of furnace." The present writer remarks that the residue when using high phosphorus pig iron in the Talbot furnace is less than in other types, because the phosphorus is more rapidly oxidized in the Talbot furnace. The advantage of the Talbot furnace of treating high phosphorus pig without any detrimental effect on the steel is a quality possessed by any tilting furnace, because the phosphorus-rich slag can be removed by tilting.

6.—"Although the absolute first cost of the Talbot furnace is considerably higher than for tilting furnaces of smaller capacity and fixed open-hearth furnaces, when referred to the ton of steel produced, they work out more favorably for the Talbot." The figures given in the present paper for the production in open-hearth Wellman and Talbot furnaces confirm the above statement.

7.—"The yield of metallic iron from the oxidized materials added (ore and mill scale) is higher in the Talbot than in the other furnaces." The present writer is unable, in the absence of definite figures, to confirm this statement. He expresses the view, however, that the yield of metallic iron from the oxidized added materials may be the same in all three types of furnace, granted the same conditions.

8.—"The slag produced in the Talbot furnace is more valuable than that obtained in other types of furnace, when high-phosphorus pig is used, owing to the concentration of the phosphoric acid. Hence the amount obtained for the sale of the slag is higher." The present writer confirms this statement. The consumption of refractory bricks and dolomite is lowest in the Talbot furnace, as is also the slag formed from the furnace lining. The adhesion of slag in the Talbot furnace is therefore slightly less than in other furnaces, and the phosphoric acid content higher.

9.—"The fuel consumption in the Talbot furnace is lower than in the other furnaces." This fact is con-

*Published practically in full in THE IRON AGE, May 21, 1914. Discussion in THE IRON AGE, Nov. 12, 1914. This abstract is from the *Iron and Coal Trades Review*, Aug. 4, 1922.

firmed by later experience and by the heat balances now published.

10.—"The durability of the refractory lining is much better in the Talbot than it is in the other furnaces; hence the charges for repairs and the total consumption of refractory materials in the furnace operations are lower." Experience confirms this statement.

11.—"The operations of the Talbot furnace are very simple and convenient, due to the ease with which the slag may be removed by tipping the furnace." This advantage over ordinary fixed open-hearth furnaces is possessed by the Wellman as well as by the Talbot furnace.

12.—"The work of the furnacemen is less strenuous with the Talbot than it is with any of the other furnaces; while the Talbot also requires a smaller number of men carrying out the several operations." The above statement is quite correct, due to the elimination of hearth repairs and to the large production of the Talbot furnace. Continuing, the present writer states that the essential advantages of the Talbot process as compared with the other processes carried out at his works, viz., higher daily production, larger number of heats without relining, and lower costs for fuel, refractory bricks, ferromanganese, repairs and wages, are fully confirmed by the figures obtained from 1914 to the present date. All these advantages find expression, of course, in the ratios of costs of production. Doctor Schuster in 1914 placed the ratio as 100 for the Talbot, 105 for the Wellman, and 107 for the fixed furnace. The present writer found these ratios to hold good and even to be exceeded in some years in favor of the Talbot furnace, the ratios in 1915-16 being 100, 110, and 117 respectively.

It is only during the tremendous increases in the cost of pig iron and the drop in the prices of scrap in the last few years that this ratio has come out to the disadvantage of the Talbot furnace. The difference between the prices for scrap and pig iron was so considerable that all the advantages of the Talbot furnace could not keep up with it, and the material from the fixed and tilting furnaces worked out cheaper. It is only recently, since the provision of very large quantities of scrap became possible, that the writer's works have used larger quantities of scrap in the Talbot furnaces, the quantities of charge recently having been about 70 per cent of scrap and 30 per cent of solid pig containing 1.6 per cent phosphorus. Working in this way, they have obtained in the Talbot furnaces, using very light scrap and taking a longer time for charging, about 3.2 to 3.6 heats compared with 2.4 to 2.8 heats in the other types of furnace. The costs of production under these circumstances again show the pronounced superiority of the Talbot over the other furnaces.

The article contains tables referring to: Analyses of producer coal; analyses of producer gas; consumption of coke-oven gas which is used along with producer gas in the furnaces, as well as in the mixers; quantities of material treated in the mixer; charges, outputs and efficiency figures for the mixer; analyses of pig iron, mixer iron and mixer slag; production and life of the three types of furnace used; consumption of refractories; time taken in repairs and re-linings; consumption of dolomite; average analyses for the three types of furnace; analyses of different products; material composing the charges of the different furnaces in the several years under review; production figures for the various furnaces from 1912-13 to 1920; and heat balance for the three types of furnace. Curves are given showing gas and waste-gas temperatures; the combustion of heats in an open-hearth, a Wellman, and a Talbot furnace; and the heat balance for the three types.

MORE ACTIVE CAPACITY

Car Supply Improves in the Valleys, But Accumulations Still Large

YOUNGSTOWN, Oct. 17.—Some easing in the stress of car shortage is reported by traffic officials of Valley steel properties, enabling the shipment of outbound products in a more satisfactory degree. Indicating improvement in the transportation situation is the additional number of blast furnaces being charged. The sheet department at Niles of the Republic Iron & Steel Co., which was reduced to a 50 per cent operating basis for two weeks on account of accumulation of material, has again been restored to normal.

Still, at the week's beginning, it was estimated fully 60,000 tons of products were piled in the two Valleys. Lifting by the Pennsylvania Railroad of embargoes on shipments westbound from Youngstown helped the situation to an appreciable degree, as the road furnishes an important outlet for the district's products. Considerable steel moves west from this territory. Traffic departments report that while transportation shows moderate betterment, there is still much congestion, and the shortage of mill type gondolas and box cars continues a retardant.

Operations, however, are on the ascendant and some interests are producing at a rate close to their normal output. In September, for instance, the 12-unit open-hearth department of the Brier Hill Steel Co. produced 68,197 tons of ingots, establishing a new monthly record. October production is at a rate which may exceed that of September.

Owing to the resumption of blast furnaces at Farrell, Pa., of the Carnegie Steel Co., the number of active stacks in the district has been increased to 29, of 47. The active furnaces represent about 75 per cent of total capacity. Other district stacks will be blown in at an early date.

Indicating the high operating rate of steel departments is the fact that all three Bessemer converters are blowing, while 59 of 66 open-hearth furnaces are charged, including 46 of 51 independent units. Sheet mills are scheduled at a normal rate.

It is unlikely, according to present conditions, that the mechanical puddling plant being constructed at Warren by the Youngstown Steel Co. will be completed before next summer.

The Federal Steel Foundry Co., foot of Reaney Street, Chester, Pa., has resumed production at its open-hearth steel casting plant, following an extended curtailment, and will gradually advance operations until a full working force on full-time is reached. It is expected that this will be within four or five weeks. The Delaware River Steel Co., in the same city, is arranging for the re-opening of its plant, which has been closed since December, 1920; production will resume early in November, and it is planned to give employment to the normal force of 350 men closely following.

The Midwest Castings Co., Middletown, Ohio, resumed operation Oct. 16, after 14 months of inactivity. Orders covering a considerable tonnage have already been booked, and Harry S. Wise, secretary-treasurer, predicts full operation within four or five weeks. H. W. Needham, who has been for many years associated with the Muncie Malleable Foundry Co., Muncie, Ind., will be superintendent, and Moren Whitlinger will act as his assistant and also as metallurgist.

The National Enameling & Stamping Co. has adopted a capacity schedule at its Granite City, Ill., plant for the first time in a number of months. During the summer the plant operated on a considerably curtailed basis.

In connection with the estimation of porosity of blast furnace coke, methods for determining true and apparent specific gravity of coke are being investigated at the Pittsburgh experiment station of the Bureau of Mines. This work is being carried on in co-operation with committee D-6, on coke, American Society for Testing Materials.

MILL TO ROLL MONEL METAL*

Electric Motor Drives for International Nickel Co. Huntington Works

BY F. C. WATSON†

THE Huntington works of the International Nickel Co. are located in close proximity to valuable natural resources, among which are natural gas, fuel oil, and high-grade bituminous coal. In addition, transportation facilities are excellent. Construction was commenced in March, 1921, and operating was started in June, 1922.

The works contain all of the necessary facilities for the conversion of monel metal matte into monel metal sheets, bars, rods and wire rod in various forms, and pig metal, shot and ingot in cast forms; also forgings. The buildings include the calciner, refinery, hammer shop, chipping shop, merchant mill, warehouse and sheet mill. There is also a well-equipped chemical and physical laboratory and general office directly in front of the sheet mill.

Ore from which monel metal is produced is obtained from mines of the company, located near Sudbury, Ontario, and with roasting and smelting at the company's smelter is converted into monel metal matte and shipped to Huntington. The matte is then crushed, ground and roasted in large furnaces in the calciner department, after which it is taken to the refinery to be charged into open-hearth furnaces and is cast into pig for further melting in electric furnaces for the production of ingots.

These ingots are sent to the chipping shop, where the scale and surface are removed by milling machines and any remaining imperfections are removed by pneumatic chipping, after which they pass to the hammer shop, where 5 and 8-ton steam hammers forge them into billets 8½ in. x 5 in. and 8 in. x 8 in. x 5 ft. The billets are again chipped to remove any imperfections and then sent to the merchant mill furnaces and heated for the 24-in. bar mill, from which sheet bars and merchant mill sizes are produced.

Monel metal is an alloy of nickel and copper containing about 67 per cent nickel, 28 per cent of copper and 5 per cent of other elements. This remaining 5 per cent consists partly of iron from the original ore and partly of manganese, silicon and carbon, introduced in the process of refining.

Power is purchased from the Consolidated Light, Heat & Power Co. of Huntington, with a generating capacity of about 20,000 kw. at the local station and an arrangement for purchase of further power from the Virginian Power Co., whose station of 65,000 kw. is located at Cabin Creek, about 65 miles from Huntington. The latter company supply is from a transmission line on steel towers at 44,000 volts, but is designed to deliver power eventually at 88,000 volts.

In addition to the purchased power, there is a small power plant located near the refinery, where waste heat from the open-hearth furnaces is utilized under two 600-hp. Babcock & Wilcox special type Rust boilers, with superheaters. The boilers are equipped to burn natural gas as an auxiliary fuel. Six drums are used on each boiler.

Equipment in the power house consists of two 750-kw., 2200-volt, 3-phase, 60-cycle Westinghouse turbo-generators. The turbines are equipped with LeBlanc condensers, discharging into a cooling pond. The switchboard consists of Westinghouse generator panels, exciter panel, and line panel, with oil circuit breaker so interlocked with the oil circuit breaker in the substation that the latter must be closed before the breaker on the line panel in the power house can be closed. Steam from two 300-hp. boilers in the hammer shop is also available for use in the power house.

Electric Furnaces

In the refinery are two electric furnaces and two open-hearth furnaces. From the latter monel pig is produced for use in the electric furnaces. Both electric furnaces are arranged with a charging floor about 12 ft. above the main floor and all of the 2200-volt transformers and switching equipment is located under this.

There are one 7-ton Heroult furnace and one 3-ton Moore 'Lectromelt furnace. These furnaces have been in successful operation with good results, both having a power factor averaging 0.90. The furnaces are charged with cold metal. The power consumption varies from 642 kwhr. to 714 kwhr. per ton of melter metal.

Mill Motors and Controls

The following mills are equipped with 2200-volt, 3-phase, 60-cycle, wound rotor induction motors:

Mill	Driven by Motor of	R.p.m.	Motor Make
24-in. merchant	1,200 hp.	360	Allis-Chalmers
20-in. merchant	1,000 hp.	450	Allis-Chalmers
14-in. merchant	800 hp.	450	Allis-Chalmers
9-in. wire rod (fin.)	500 hp.	450	Allis-Chalmers
14-in. Belgian (rough)	500 hp.	450	Allis-Chalmers
30-in. sheet (hot)	1,200 hp.	360	Allis-Chalmers
26-in. sheet (cold)	300 hp.	300	Allis-Chalmers
10-in. merchant	500 hp.	865/575	Westinghouse
9-in. wire rod	500 hp.	865/575	Westinghouse

The 24-in. merchant mill has two stands; one three-high stand, with 24 in. x 70 in. rolls, and one two-high stand, with 24½ in. x 24 in. rolls. The mill is equipped with electrically operated stationary and tilting tables, manipulator, bloom shear and hot saw and is used for production of sheet bars, bars and billets of various sizes. The 1200-hp. motor driving this mill is direct connected by flexible coupling to the pinion shaft of a herringbone single reduction gear set, giving a mill speed of 80 r.p.m. On the pinion shaft of the gear set are mounted two fly-wheels, each weighing 10 tons.

The 20-in. merchant mill has five stands; four three-high, and one two-high. This mill will roll rounds 2 in. to 4 in., squares 2 in. to 4 in., flats 4 in. x 1 in. to 8 in. x 2 in. width round and square edges; also billets 2 in. to 4 in. square. The 1000-hp. motor driving this mill is direct connected through flexible coupling to the pinion shaft of a single reduction herringbone gear set. Two 6-ton fly wheels are mounted on the pinion shaft of gear set. The mill has a speed of 60 r.p.m.

The 14-in. merchant mill has four three-high and one two-high stands. This mill runs at 100 r.p.m. and will roll rounds, squares and hexagons 1 in. to 2 in. and flats 2 in. x ¼ in. to 4 in. x 1 in. The 800-hp. motor driving this mill is direct connected through flexible coupling to an 8½-ton flywheel located between the motor and the pinion shaft of a single reduction herringbone gear set.

The 14-in. Belgian roughing mill has two three-high stands and one two-high stand. The 500-hp. motor driving this mill is direct connected through a flexible coupling to an 8-ton flywheel. The shaft of the flywheel is coupled to the pinion shaft of a single reduction herringbone gear set. Speed of mill is 160 r.p.m.

The 10-in. merchant mill has four three-high and one two-high stands, rolling rounds, squares, hexagons and octagons 7/16 in. to 1 in. and flats 1/16 in. x ¾ in. to 1 in. x ¾ in. This mill is driven by a variable speed motor with a 3-ton flywheel interposed between the motor and a single reduction herringbone gear set having a reduction of 5 to 1.

One 9-in. wire rod mill has five three-high stands. The 500-hp. variable speed motor is direct connected through a flexible coupling to the pinion shaft of a single reduction herringbone gear set. The main shaft of the gear set is connected to a single flywheel set whose shaft is connected to the mill. The gear reduction has a ratio of 2.25 to 1.

The 9-in. finishing wire rod mill has four three-high stands, direct connected through flexible coupling to a 500-hp. motor running at 450 r.p.m. The two mills roll 7/32 in. to ⅜ in. rod and are equipped with motor driven reels.

The 30-in. sheet mill with 30 in. x 56 in. rolls has two roughing and two finishing stands. The 1200-hp. motor is connected by flexible coupling to the high speed pinion shaft of a double reduction herringbone gear set, giving the mill a speed of 26 r.p.m. The high speed shaft carries two 10-ton flywheels. The gear set has

*Abstract of a paper presented at the sixteenth annual convention, Association of Iron and Steel Electrical Engineers, Cleveland.

†Electrical superintendent International Nickel Co., Huntington, W. Va.

provision for driving two more roughing and finishing stands at some future time. The roughing stand screw downs are equipped with 40-hp. General Electric, compound wound motors, provided with Cutler-Hammer brakes.

The 26-in cold mill has four stands with rolls 26 in. x 56 in. The 300-hp. motor is connected by flexible coupling to the pinion shaft of a single reduction herringbone gear set. The mill speed is about 29 r.p.m.

All gear sets were furnished by the Mesta Machine Co. and all flexible couplings by the Allis-Chalmers Manufacturing Co. The Westinghouse adjustable speed sets driving two of the mills develop constant horsepower at all speeds between 575 and 865 r.p.m., the synchronous speed being 720 r.p.m. The motors are standard wound rotor induction motors.

PRICE TREND DOWNWARD

Lower Quotations in Coal and Coke in the Valleys—Concessions in Sheets

YOUNGSTOWN, Oct. 17.—Reduction of iron costs may be expected to exert an important influence on steel prices, and in consequence the price situation is characterized as softer. In the Valleys, the market on basic pig iron is now regarded as from $30 to $31. Decline in costs of such raw products as coal and coke is having an appreciable effect on the market. Old material, though still high, will recede, buyers predict, as soon as transportation conditions show greater improvement and the railroads begin to deliver scrap in more normal volume. Wthin the past three weeks congestion and car shortage have interfered with deliveries and offerings, enabling dealers to uphold the market.

Industrial coal prices have perceptibly softened the past two weeks. Because of the jam at lake ports of coal destined for the Northwest, large consignments have been thrown upon the market, and buyers have taken advantage of this situation to cut into prices. Gas coal, purchased in large tonnages for by-product coke oven uses, is obtainable at a $4.50 maximum; run-of-mine coking coal is quoted at $4, while steam coal may be bought at $3.25 to $3.50. These prices represent recessions ranging from 50c. to $1 per ton below the recent nominal market.

Coke Prices Sag

Because of the larger production of coke in both beehive and by-product ovens, prices are sagging, and industrial buyers say that $11 to $11.50 at the ovens is a fair appraisal of the market at this time. Until recently, prices from $12.50 to $13 were being paid, while sizable tonnages were taken at $12. A Valley independent is selling considerable merchant coke and is particularly active in the market at present, because of the margin of profit. It is supplying domestic interests in Illinois, Michigan and Indiana in carload lots, and is also selling an iron maker at Erie, Pa., part of its requirements.

Another independent is supplying its employees with coke at $4.75 per ton delivered. It is explained, however, that this is simply an expedient to aid its workers in obtaining a fuel supply because of the comparatively high prices being charged for retail coal.

Activity is noted in the tin plate market on the part of consumers covered by contracts, who are specifying with more freedom at current quotations. Such buying interests are covering on their requirements in order to benefit from their price arrangements with the mills. Requirements of the oil industry for cans are reflected to a considerable extent in this activity, according to the Trumbull Steel Co. The $4.75 price is being maintained, while preferential customers are enjoying concessions.

Sheet Prices Not So Strong

Sheet makers are well fortified with respect to unfilled commitments, but an unmistakable price weakening is developing. Outside quotations of 3.75c. for black and 4.75c. for galvanized grades are disappearing, even as a trading basis, and are being superseded by prices $3 per ton less. Irregularity of the market and variation in demand are responsible for this weakness. While 3.60c. and 4.60c. are representative of the market position of some interests, others are showing interest in business at $2 per ton less. The bulk of the tonnage going through the rolls was undoubtedly booked at 3.50c. and 4.50c. or less.

A trip through Valley plants indicates that most of them are still impeded by accumulations. Less progress has been made in enlarging the box car supply than in open top equipment, with the result that sheet mills are pretty well clogged. Where the haul is short, trucks are being used, while tops are also being rigged on mill gondolas and the product covered with tarpaulins in transit, to protect it from the elements.

Sheet mills generally have enough business to carry them over the rest of the year, while bookings of two interests will engage their capacity into the first quarter of 1923. The chief independent maker of full finished stock is sold through 1922 and is practically out of the market, 90 per cent of the output being taken by automobile buyers.

Minimum Prices Disappear

Steel bars and plates are weaker. In plates, 2.25c. represents the outside of the market, and is obtainable only because there is active bidding for deliveries on the part of a number of tank car builders. One interest, withdrawn from the market on merchant plates, is placing tonnages with producers in position to meet delivery requirements.

Merchant bars range from 2c. to 2.15c., and the 2.25c. quotation has disappeared. District interests have comfortable backlogs, but are reducing such commitments.

Because of the congested condition of the railroads, scrap is somewhat higher here than in nearby consuming districts. Heavy melting is held at $22, while compressed sheets command $20 to $20.50. One large independent is now producing much of its own scrap, because of its heavy finishing mill production.

Business Men Confer with Ordnance Officials

WASHINGTON, Oct. 17.—With the object of having munition plants of the country repaired for quantity production, without confusion, and to set up a permanent and inexpensive system to meet any emergency that may arise, eight dollar-a-year business men enrolled in the Government service, were in a conference in Washington recently with Army ordnance officials. Those attending this conference on the mobilization of ordnance manufacturing plants consisted of a group of the civilian chiefs of eight ordnance districts into which the country has been divided. Those present at the conference were B. A. Franklin, chief of the Bridgeport, Conn., district; J. C. Jones, chief of the Philadelphia district; Fred J. Robinson, chief of the Detroit district; M. E. Singleton, chief of the St. Louis district; C. L. Harrison, chief of the Cincinnati district; John Ross Delafield, chief of the New York district; E. A. Russell, chief of the Chicago district, and C. H. Tenney, chief of the Boston district.

It is the theory of the Ordnance Department in setting up these districts, each in charge of a civilian chief, all available plants will be under the jurisdiction of the district chief who will be in constant touch with manufacturers and can arrange an agreement with them for the prompt use of the plants in the event of war. Each chief is himself a manufacturer and is experienced in the production of war munitions. To each of them has been assigned an army ordnance officer as secretary to aid in carrying out the program.

Pit Reheating and Soaking Pit Furnaces*

Removal of Waste Gas a Primary Consideration Rarely Achieved—Principles Governing Rational Design

BY W.-E. GROUME-GRJIMAILO

WITH pit reheating furnaces the defect commonly encountered consists in the incorrect taking off of the waste gases. In these furnaces, by reason of the considerable height of the heating chamber, it is absolutely necessary that the waste gases should be drawn off as close as possible to the level

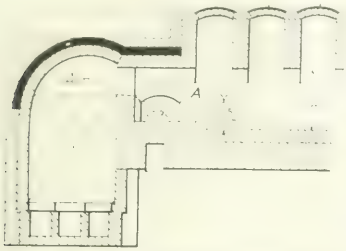


Fig. 1 Shows an Expensive Design of Furnace in Which a Pocket of Stagnant, Chilled Gases Must Collect Below *A*; Reconstruction Did Not Overcome the Trouble

of the hearth of the pit; since, if they are not constructed in this manner, the lower portion of the ingots are plunged into a pocket of stagnant gases and therefore will not be heated uniformly, the tops being much hotter than the bottoms.

Among the designs for these furnaces which have come before the author, there have been none which were completely satisfactory; and in a number of them there were gross violations of the laws governing the removal of the waste gases. Fig. 1, shows the flues

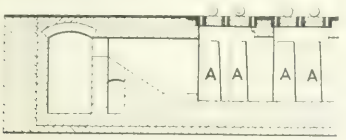


Fig. 2 Is an Example of Poor Design in that the Gases, Taken off at Top, Leave the Ingot Bottoms Cold. Ingots are shown at *A A*

and ports of a pit furnace of "the new Siemens system" of a very expensive design. These pits were supplied with regenerators for the air only, the gas regenerators being omitted. Therefore the products of combustion cannot pass out of the "laboratory" without going through the air regenerators, which are carried up behind a bridge wall to a height of 2 ft. (600 min.) above the hearth of the pits (refer to the point marked *A*).

It is clear that upon the hearth of these pits there will be a pocket of stagnant, chilled gases. Nothing can be done to save this furnace and make it work properly and heat uniformly. Lowering the partition arches between the pits in such a manner that the height h under them was equal to the depth of the layer of gas below the inverted weir, according to the formula of Yesmann, was tried. Reconstructed in this manner the pits worked, but the velocity of the gases within the heating chamber was equal to the normal velocity under the inverted weir; that is to say, with the height $h = 3$ ft. 3⅝ in. (1 meter) (3.28 ft.), the velocity $v = 19$ ft. 8 in. (6 meters) per sec. A velocity as high as this is very unsatisfactory, as the heat from the gases and flame does not have a sufficient amount of time to be transmitted to the ingots, and for this reason the consumption of fuel will be unreasonably high. The best means of reconstructing this pit furnace consists in removing the bridge wall in front of the regenerator so that this port extends down to the hearth of the pits.

Fig. 2 shows a regeneratively fired pit furnace constructed according to the designs of Dalen† at the

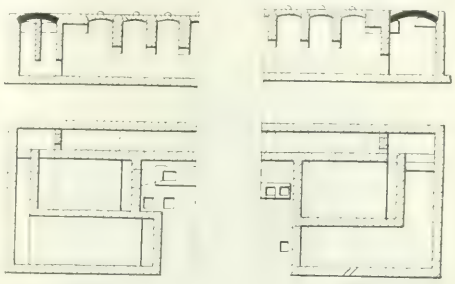


Fig. 3 Fig. 4

Figs. 3 and 4 Are Two Examples of Heads for Mixing the Gas Properly with the Air

Salda works (Oural district of Russia). The waste gases are taken off at the top of the pit. By reason of this the lower portion of the ingots was not in contact with the hot gases. In reality, during the time these pits were in service, the lower portion of the ingots was always heated less than the upper portion. This made it necessary to charge the end pits with the ingots leaning up against the walls (thick end down). To improve the working of the furnace it was found necessary to cut away the sloping portion of the port nearly to the level of the hearth of the furnace.

As the regenerative pit furnace is a very desirable and widely used furnace, the principles governing their rational construction may be stated as follows:

It is desirable that the heating chambers of these pits be operated with a slightly negative pressure, in order that the operatives will not be burned when taking the covers off the pits;

The arches over the regenerator chambers should be as nearly as possible at the level of the covers, as this simplifies the matter of covering the entire furnace with iron plates, forming a working platform;

It is convenient to make the regenerators horizontal and construct them in such a manner that the waste gases enter the upper portion and pass out from the lower portion, to enter the flues leading to the reversing valves;

The port sills should be placed as close as possible to the hearth of the pits. If this construction is employed it will not be necessary to carry the partition walls between the pits down close to the hearth, and the hot gases will have a low velocity through the heating chamber;

The dimensions of the ports should be calculated by means of the formula for the inverted weir, as this

*From "The Flow of Gases in Furnaces," to be published by Wiley & Co.; translated and copyrighted by A. D. Williams, P. O. Box 92, Newark, N. J.

†A well-known German designer of furnaces.

gives the minimum velocity for the flow of the gas and the air through the ports, and accordingly a slow rate of flow for the hot gases through the heating chamber of the pits;

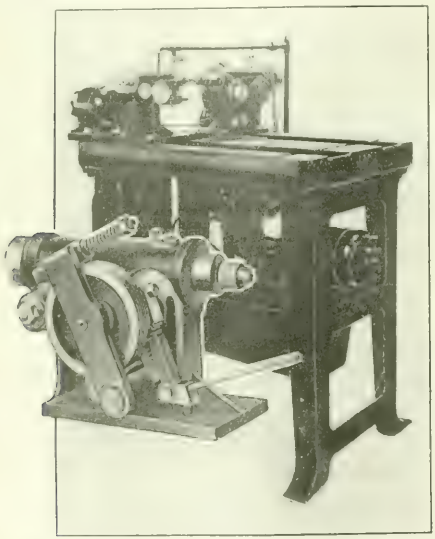
For effecting the mixture of the gas and the air, the heads shown in Figs. 3 and 4 may be employed. The differences between these two constructions are clearly shown in the drawings.

Automatic Drill Head for Small Work

A new automatic drill head, with which special semi-automatic machines such as illustrated may be built, to give large production on small work, has been placed on the market by the Kingsbury Mfg. Co., Keene, N. H.

As an example of its adaptability it is said that to drill six or eight oil holes in a piston simultaneously, the required number of drill heads may be placed in a circle, properly spaced, and a ¼-hp. motor belted to each. Then by connecting all the trip levers to one foot pedal the operator can release all the spindle feeding mechanisms with one motion as soon as the work is in position. The machine shown is equipped with a single spindle unit for cross drilling chuck wrenches, a special fixture with automatically controlled opposed spindle being provided for removing the burr left by the drill. Four of these units may be mounted on the table.

The drill head shown in the insert is the No. 8, with a capacity of No. 60 to ¼-in. drills, and has a self-contained full-automatic feed and control. Although designed for use in a horizontal position, it can be



Machine for Cross Drilling and Burring Chuck Wrenches. An enlarged view of the drill head with self-contained full automatic feed and control is shown in the insert

mounted on an angle or vertically. Each spindle may be driven from an individual motor and obtaining the drive regardless of the position of the head is thereby simplified. With a view to making the head as friction-less and sensitive as possible seven ball bearings are employed, and two provided on the quill feed shaft.

A feature is the pressure feed system, which is claimed to eliminate drill breakage even with very small drills. The automatic sensitive feed is obtained through the combination of a cam with friction gears. The driven gear is mounted on a lever and held in mesh with the friction driving roll or gear by an adjustable compression spring. The cam is cut on the inside of the driven gear and the follower roller is mounted on a gear segment, which meshes with a gear segment clamped to the feed shaft. The compression spring applies pressure to the drill spindle through the cam to the follower; thence through the gear segments to the feed shaft and quill. The cam is revolved by the friction gears and feeds the spindle forward under pressure.

When the forward motion is resisted the follower roller is held momentarily and the rotation of the gears causes the cam to climb on the roller, separating the friction gears and allowing them to slip. As the drill penetrates the work under pressure the follower gives way, bringing the friction gears into tight contact and causing the cam to revolve and again separate the friction gears when further resistance is met. This intermittent motion is not perceptible, it is said, as the action is rapid and smooth.

The cam gives a 1-in. stroke to the spindle with a maximum feed of 0.011 in. per revolution. Special cams can be used with one or two reliefs which will permit of withdrawing the drill during operation, to relieve the chips. For operating indexing and other automatic fixtures a cam may be cut on the outside of the friction wheel or gear.

The diameter of the spindle is 7/16 in., the spindle travel, 3 in. and the spindle adjustment, 2 in. Speeds up to 4000 r.p.m. can be given to the spindle and the maximum speed of the cam is at the rate of 1/115th of the spindle speed. The height to the spindle is 6.75 in., the height overall being 9½ in. and the overall length to nose of chuck in back position, 14 in. The width is 7 in. and the weight of the machine 50 lb. net. Floor stands, lubricating systems and other equipment for use with the machine are available.

Production Features Automotive Meeting

Devoted exclusively to papers and visits of interest to production men, the Oct. 26 and 27 meeting in Detroit of the Society of Automotive Engineers is expected to attract factory managers, superintendents, efficiency men, tool builders and production engineers from the entire automotive industry. The two morning sessions will be held in the General Motors Building, from 9.30 to 1 o'clock, followed in each case by luncheon in the same building. Factory visits will follow. Thursday's visit is to be devoted to the Ford Motor Co., River Rouge plant, and Friday afternoon's to the Dodge Brothers, Packard and Cadillac plants. A dinner Thursday evening will be addressed by A. B. C. Hardy, president Olds Motor Works, and Pierre Dupont, president General Motors Corporation. Harold Emmons will be toastmaster.

Papers so far announced are as follows:

"The Group-Bonus and Its Application," by E. K. Wennerlund
"Cylinders, from the Ore to Finished Part," by P. E. Haglund and I. B. Scofield.
"Tool Allotment and Costs," by F. A. Mance
"New Methods of Processing Splined Shafts," by J. A. Ford.
"Problems Met in the Production of Air-Cooled Engines," by William Dunk.
"Some Experiences from a Production Notebook," by H. J. Crain and J. Brodie.
"Production Errors in Gears," by K. L. Herrmann.
"Selection of Machine Tools," by A. J. Baker.
"Machine Tool Efficiency," by R. K. Mitchell.

Progress in Adoption of A. S. M. E. Boiler Code

The A. S. M. E. boiler code has been adopted by the city of Parkersburg, W. Va., through the passage in that city of a city boiler inspection ordinance providing for the code except that covering the heating boiler section, which is to be taken care of in the city's building code. The code has also been incorporated in the building code of Omaha, Neb., which became effective July 28. The State of Washington, beginning Aug. 1, followed the A. S. M. E. rules in the operations of the safety commission of the State. Active work in the further introduction of the code is promised for 1923, as the legislatures of 25 States will convene next year, according to Charles E. Gorton, chairman of the administrative council of the American Uniform Boiler Law Society.

CONTENTS

October 19, 1922

Inspection the Keynote in Axle Plant 987
Four Separate Inspections Hold Rejections of Finished Axles Below One Per Cent Factory Designed for Straight Line Routing

New Development in Cupola Construction 991
Schuermann Equipment in Germany Involves Pre-Heating the Blast and Shortening Time of Melting

Gear Makers Hold Notable Meeting 993
Advanced Recommendations on Case Hardening of Gears—Gear Noise Elimination—Buying Gear Blanks by Piece

Transportation Is Most Important Factor 1001
Trade Paper Editors Review Business Conditions and Say Much Depends Upon Car Supply—How Various Industries Are Affected

What Are Real Evils of the Long Shift? 1005
Shorter Hours and Encouragement of Loyalty Urged by One Who Has Worked Many Years in Mills—Problem of Morale Involved

Annealing Gray Iron Castings 1007
Correct Time and Temperature Determined for Relieving Machine and Casting Strains—Hardness—Increasing Machinability

Pit Reheating and Soaking Pit Furnaces 1013
Removal of Waste Gas a Primary Consideration Rarely Achieved—Principles Governing Rational Design

Overheating Aluminum 990
Combustibility of Coke in Blast Furnace. 990
Study of Electric Furnace Refractories.. 990
Mining Congress Meets in Cleveland.... 996
Malleable Castings Association Meeting. 996
Plans for Scrapping Wooden Vessels.... 997
Sales of Government Surplus Material... 997
New England Foundrymen Meet..... 997
Fluorspar Investigations 997
Six Spindle Chucking Machine..... 998
Dolomite for Refractories..... 998
Smelting Molybdenum Ore..... 998
American Factory Methods Regarded Superior to British 999
Apparatus for Determining Linear Shrinkage and for Bottom-Pouring of Cast Metals for Alloys..... 999
Machine for Shaving Bolts and Screws.. 1000
Electric Modification of Schwartz Non-Ferrous Oil Furnace..... 1003
Freight Rate Notes..... 1003
Machine Shop Economies..... 1004
Standardization and Bridge Design..... 1004
Panama Canal Traffic..... 1004
Lathe Attachment for Milling..... 1004
Ferromanganese Drawback 1006
Talbot and Other Open-Hearth Processes Compared 1009
Mill to Roll Monel Metal..... 1010
Automatic Drill Head for Small Work... 1014
Automotive Engineers' Detroit Meeting. 1014
Editorials 1016
High Costs and Steel Exports—Distribution of National Income—Steel Supply Now and in 1913—Public Control of Industry.
Correspondence 1019
Steel Lumber for Buildings.
Telescope for Argentina..... 1019
Standardization of Electric Drills..... 1019
Coal and Coke Output..... 1020
Low Side Gondola Cars for Mills..... 1020
German Market Conditions..... 1021
Belgian Market Weaker..... 1022
French Market Firm..... 1022
Japanese Market Quiet..... 1023
Guatemala Iron and Steel Imports..... 1023
Coming Meetings 1037
Pittsburgh Basing Case..... 1038
Fabricated Steel Business..... 1040
Railroad Equipment Buying..... 1040
Decrease in Blindness..... 1040
New Records in Cement Production.... 1041
British Pig Iron and Steel in September.. 1045
Power Plant Activity..... 1051
Industrial Stocks and Finances..... 1054
Trade Changes 1055

Iron and Steel Markets **1024**
Comparison of Prices **1025**
Prices Finished Iron and Steel, f. o. b. Pittsburgh **1039**
Non-Ferrous Metal Market **1041**
Personal Notes **1042**
Obituary Notes **1043**
Machinery Markets and News of the Works **1047**
New York Jobbers' Prices **1056**

ESTABLISHED 1855

THE IRON AGE

EDITORS:

A. I. FINDLEY WILLIAM W. MACON GEORGE SMART

CHARLES S. BAUR *Advertising Manager*

Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

[illegible] Penalty for U. S. A. George H. Griffiths, Secretary

[illegible] Detroit: 317 West Fort St. Cincinnati: Mercantile Library Bldg. Buffalo: 881 Ellicott Square. Washington: 26 Jackson Place N. W. San Francisco: 320 Market St. London, Eng.: 11 Haymarket S.W.I.

BRANCH OFFICES: [illegible] Subscription Price: United States and Possessions, Mexico, Cuba, Shanghai $6.00. Canada $8.50. Foreign $12.00 per year. Single copy 25 cents.

[illegible] 1879, at the Post Office at New York, N.Y., under the Act of March 3, 1879.

High Costs and Steel Exports

It would be a mistake to conclude that the decision of the Consolidated Steel Corporation to go out of business means that American iron and steel manufacturers are to be thought of hereafter as less determined to reach out for a share of the outer world's trade in the products of their industries. The export subsidiary of the United States Steel Corporation is prosecuting as vigorously as ever its plans for the marketing of a portion of its output in other countries. The Bethlehem Steel Co., since its acquisition of the Lackawanna Steel Co., has taken steps to form its own export company, and others of the companies which have been associated in the Consolidated Steel Corporation under the provisions of the Webb Act may be expected to market a portion of their output abroad, probably selling through long established companies engaged in the general export trade.

It has been stated by one of the directors of the Consolidated Steel Corporation that present steel making costs in the United States prevent the company from competing for business in foreign countries; but that statement is to be considered in the light of the situation created by the elimination of Canada as a selling field of the Consolidated company. The acquisition of the Lackawanna Steel Co. by Bethlehem and the desire of the latter to handle Canadian trade from its Buffalo office presented a problem. Naturally the Lackawanna plant had had an important share of the Canadian business of the associated independent companies and the economies of adding Canada to the territory of the Bethlehem office at Buffalo were obvious. For like reasons other independent companies were interested in having a free hand in Mexico and in excepting that territory from the jurisdiction of the Consolidated company. It can be seen that with its Canadian business taken from it, probably more than one-third the total, while the business which remained was in countries across seas in which competition was keenest and unit selling cost highest, the Consolidated company's position quite warranted the statement that "present costs prevent it from competing for business in foreign countries."

The Consolidated Steel Corporation has been the largest and most important of the companies formed under the Webb Act for co-operation by American producers in the marketing of their products in foreign countries. The total ingot capacity of the associated companies was over 12,000,000 tons annually, and for a good many months in 1920 the sales of the Consolidated company ran above the 10 per cent of the represented capacity which it had been decided to devote to foreign trade, regardless of fluctuations in the home demand. An important contribution has been made to the good will created abroad for American steel products, and it is regrettable from more than one point of view that this strong representative of the domestic steel industry, which had been capably seconding the admirable work of the United States Steel Products Co., is to disappear from foreign markets. Its dissolution, along with like developments in connection with other co-operative export enterprises, suggests that the Webb Act has fallen considerably short of justifying the promises made for it and the prodigious effort put forth by business organizations to secure its enactment.

Distribution of National Income

It is notorious that the coal industry is receiving an altogether disproportionate share of the national income. Precise estimates are impossible, but approximations can be made with sufficient closeness to give an accurate general idea of the relation. The total income of the United States was about 33 billion in 1912, 34 billion in 1913, 61 billion in 1918 and 65 billion in 1920, according to the National Bureau of Economic Research for the earlier years and W. R. Ingalls for 1920. Mr. Ingalls sets 1919 at 66 and 1920 at 65½ billion. A fair guess for the rate at which the income is now running seems to be about 55 billion.

For a rough estimate, average prices realized on coal may be taken at $4 for bituminous and $8 for anthracite, which represent an income rate of 2.8 billion a year. This is giving the coal industry the benefit of the doubt. Allowing for expen-

ditures, the value income may be taken conservatively at 2.4 billion. This is 4.4 per cent of the total income as estimated.

There are about 42,000,000 persons in the United States gainfully occupied. About 750,000 of these may be assigned to the coal industry. This is 1.8 per cent of the total. These proportions, 1.8 per cent of the persons and 4.4 per cent of the income, stand in the ratio of 100 to 244.

The proportion is very good for those who receive the coal income and very bad for those who pay it. It is sometimes remarked that industry cannot stand taxes or drains like this. The burden, however, is well distributed, for if we start with 42 million persons receiving 55 billion income and deduct for coal we have 41¼ million receiving 52.6 billion. The first pair of figures makes an average income per person of $1,309.50, the second pair makes an average of $1,275.20. The reduction is only 2.62 per cent.

To increase prices is not to increase the intrinsic value of the national income. If all items were doubled—prices, services, wages, salaries, etc.—the national income would be expressed in twice as many dollars, but no one would receive in goods and services any more than formerly. Yet the operation would be relatively harmless. When, however, some prices and some wages are increased there is a change in distribution whereby some persons are made better off and the remainder are made worse off. The thing can be seen from two opposite viewpoints. When the price of one commodity is too high men have less money with which to buy other things. Also, those who receive the high price have more money with which to compete with the rest of the public in buying the general commodities that are available.

The condition is that certain items are costing too large a part of the national income and there is correspondingly less to spend on other things. The decrease in such expenditures does not attract general attention, but it occurs just the same. The individual has to do without things that formerly he could secure. Often, perhaps, he may not recognize his loss. In shoes or in furniture, for instance, he may appraise what he is receiving, by considering the number of dollars he parts with in a year, not observing that he is making less frequent purchases or is not getting as good quality as he used to get.

A substitute for iron grate bars which has its origin in Canada is another instance of the growing use of alloy steel castings. An inventor across the border is reported to have perfected heat-resisting steel castings which as grate bars in locomotive fire boxes have been in use over two and a half years and are still as good as new. The fact that they are 25 to 40 per cent lighter than ordinary iron bars largely offsets their higher first cost. They are reported to have none of the disadvantages of the iron bar, particularly as to change of shape due to growth. There is a large consumption of locomotive grate bars and it may be that an alloy iron casting may be developed which also will meet the exacting service requirements. Whether it be alloy iron or alloy steel, the development is only another step in the march of alloy progress.

Steel Supply Now and in 1913

The pig iron and steel output of the five leading countries of the world still lags and the totals are still far below those of 1913. Three years and a half have passed since the close of the war and the "world's hunger for steel," of which so much was written, has not yet been sharply felt. A comparison of data for the first half of 1922 with post-war and pre-war years is now possible and yields some interesting conclusions.

In the tables below the production of pig iron and steel is given for 1913, 1920 and 1921 and for the first half of 1922 in tons per month, based largely on the official data of the National Federation of Iron and Steel Manufacturers of Great Britain:

Output of Pig Iron and Steel in Five Countries, Gross Tons Per Month

Pig Iron	1922*	1921	1920	1913
United States	2,067,200	1,390,800	3,077,600	2,584,000
Great Britain	358,200	217,600	669,500	855,000
France	371,100	280,300	281,700	427,000
Belgium	106,900	71,800	92,700	203,300
Germany	†510,000	508,000	464,000	1,373,000
Total per month	3,353,400	2,468,500	4,585,500	5,439,800
Year's output, tons	†40,240,800	29,622,000	55,026,000	65,277,600
Steel				
United States	2,614,100	1,645,300	3,511,000	2,608,000
Great Britain	427,000	302,100	755,600	639,000
France	335,400	254,500	250,200	385,000
Belgium	98,000	65,000	101,300	202,300
Germany	†725,000	725,000	552,000	1,445,000
Total per month	4,199,500	2,991,900	5,170,100	5,279,300
Year's output, tons	†50,394,000	35,902,800	62,041,200	63,351,600

*Six months average January to June. †Estimated on basis of first six months only.

Viewed as a whole two facts stand out: neither in pig iron nor steel will the world's output this year approach that of 1913, nor even that of 1920. The other striking feature is that Germany still ranks second and did in 1921 as well as in 1913. Of significance also is the relatively small amount of pig iron both this year and last as compared with pre-war output. The pig iron industry has by no means recovered to the same extent as steel.

Of unusual interest is the contrast this year between the American steel industry and that of the other countries. In none of the latter has there been any approach to pre-war output, unless Germany be excepted, taking account of her present reduced capacity. There is also the fact that American steel production this year has exceeded that of 1913, which is true of no other country, while pig iron output thus far is at a rate more than 500,000 tons per month less than in 1913. The slow recovery in the British steel industry is also noteworthy.

The present comparative activity in the American industry is in large part the expression of a peace-time demand for steel in compensation for what was pushed aside by the war. Better financial and economic conditions have brought it out. European countries will be a long time picking up any part of the so-called deferred demand for

steel. Events, indeed, have dealt rather hardly with the theory of a vast accumulation of business that was to bring prosperity to the industry in years immediately following the war.

Public Control of Industry

Even if dueling were not sinful, society would not permit men to go out into the street and shoot away at each other. A bystander might get hit. The case would be still stronger if it were apparent that one of the duelists was encouraged by the fact that the endangered bystanders were likely to interfere and try to induce his antagonist to apologize.

Strikes in the United States have reached just such a stage. All the important strikes are really directed against the public. Dust is thrown in the air by saying that it is not right to compel a man to work against his will, while the silent effort is continued to get the public to interfere. It is made to appear that there is only one party to the dispute whom the public can approach for the purpose of bringing about a settlement.

Dueling in the streets is not permitted. If there is an issue between two men means are provided for judgment. Society should not permit dueling in industry. The fond hope has been entertained that relations could be established between employers and employees whereby no issues would arise. In such case there would be no duels, hence no danger of bystanders getting hurt by a duel.

The question, then, is whether the causes of these industrial duels can be removed. If not, the issues must be settled in some other way. The notable fact in the history of strikes in the United States is that issues whose settlement by duel would not greatly injure the public have been largely eliminated, while strikes injurious to the public have thrived. The public is seriously injured by strikes of railroad workers, of coal miners and of artisans in the building trades. High wages in railroading are passed by legal enactment to the public, while in the other two cases the natural laws of trade make the public pay. The so-called "leaders" of the men involved do not conceal the fact that they aim to secure all they can obtain by the means that lie open to them. They do not admit that there is any limitation, and openly or otherwise they refuse to submit to comparisons with wages received by other workers.

By reason of the position openly or covertly taken by the leaders of these groups of men it is made clear that it is futile to attempt to remove grievances or issues. The situation is the same as would obtain with a duel in which one of the contestants was fighting not on account of a grievance, but because he insisted on discharging all the ammunition he chanced to have.

The public should adopt, therefore, a sort of Magna Charta to the effect that it will not tolerate industrial duels that are likely to injure it. In the endless discussion of labor matters the talk has been of means or expedients when there should first be a plain declaration of principle on the part of the public. The moral rights of labor have been defined repeatedly and there is really no question on that score. The rights of the public have not been similarly defined.

The question whether there should be industrial courts should not be entered upon until the public has decided plainly what its rights are and has decided that it is going to insist upon its rights. Then, and not until then, can the question of method be effectively entered upon. Hitherto the discussion has been whether industrial courts would "work." If public opinion were clearly defined means of one sort or another could be found to execute the public will.

The serious effect of the recent strikes and railroad embargoes on the American iron and steel export trade is reflected by the August statistics. The export total of 145,640 tons for that month was the smallest for this year, if we except February, and well under the 1921 average of 181,000 tons per month. September figures may make a still poorer showing. Of equal interest is the fact that American exports are considerably less than the British or German. The average British exports exceeded 250,000 tons per month to October 1 and German exports have been in excess of 200,000 tons per month. In proportion to the present steel output, American exports make probably the smallest showing in finished steel ever recorded.

New Edition of Fordney Tariff Act for Subscribers to The Iron Age

Of the edition of 8500 copies of the metal schedule of the Fordney tariff act printed by THE IRON AGE, less than 100 copies remain undistributed, as the demand has been extraordinary. A new edition is being printed, however, and will be ready for distribution this week to subscribers who ask for the pamphlet.

For handy reference, there has been printed also a limited edition of the Comparison of Tariff Rates published in THE IRON AGE of Sept. 28. This gives the rates on leading iron and steel products in the Fordney act and the two preceding tariff laws.

Simplication in Varieties of File

The United States Government through Secretary Hoover of the Department of Commerce has been urging manufacturers to simplify the variety of their product through the elimination of the items for which there is little demand or for which some more salable item can be substituted. Among the advantages pointed out are a reduction in the number of patterns and sizes, a quicker turnover, smaller stocks, prompter delivery and a better quality product. In response to the request to consider this conservation and simplification movement the Delta File Works curtailed its list of files and recently issued a price list covering all the files needed by 95 per cent of the buyers. The business of the other 5 per cent costs dealers more than it is worth, according to the Delta company.

The list was compiled through analysis of factory sales records extending over a period of years, and was offered to the dealers as a measure of co-operation in order to help them avoid slow sellers and dead stock.

CORRESPONDENCE

Steel Lumber for Buildings

To the Editor: In your issue of Sept. 14 there is a leading article on the above topic which is of no inconsiderable interest. As to fire protection it is always desirable to reduce to the least practicable minimum the quantity of fuel available when fire occurs. And from this point of view the thought emphasized in the article with respect to the use of steel lumber for floor joisting is in order.

From another point of view the emphasis given to fire protection through the use of this material is quite misleading, in my opinion. The fact that steel loses strength very rapidly at relatively low fire temperatures is generally known. The way in which unprotected steel performs under fire conditions is generally known. The article fails to describe effective means of protecting the steel joist assembly from such temperatures when serious occupancy fires occur within premises.

Assuming complete burnouts of contents of one or more floors in the building pictured on page 645, such as occurred, for instance, in the Burlington Office Building fire in Chicago in March of this year, it is not difficult to foresee substantially complete failure of the floor arch above the area in which the burnout occurred, with the possibility of spread of fire through such failure to floors above, until the roof assembly becomes involved.

Records, if any, of the actual performance of floor constructions resembling that described in the article, when subjected to actual and severe fire conditions, would be of interest. If any of these are available in your files or can be furnished by readers of THE IRON AGE, we should appreciate data permitting investigation.

A. R. SMALL,
Vice-president.

Underwriters' Laboratories,
207 East Ohio Street, Chicago,
Oct. 11, 1922.

Warner & Swasey Telescope for Argentina

One of the largest telescopes in the world, a 60-in. reflector, has been completed at the plant of the Warner & Swasey Co., Cleveland, for the Argentine National Observatory. The mechanism for the sidereal drive includes an accurate worm and worm gear, the latter being 9 ft. in diameter. The teeth of this worm gear are very accurately spaced from a master circle divided upon the Warner & Swasey automatic dividing engine. It is operated by a gear box mounted directly underneath, the gears of which were cut on a special machine accurate to one two hundred and sixty-thousandth part of a circle. This machine in turn is dependent for its reliability on the 40-in. dividing engine mentioned, which is exact to nearly a three-millionth part of a circle, believed to be without question the most precise dividing engine in the world. Among the great telescopes designed and constructed by the Warner & Swasey Co., are the 40-in. Yerkes, 36-in. Lick and 26-in. United States Naval refractors, and the 72-in. Canadian and 36-in. Arizona reflectors. While highly important, the designing and constructing of telescopes is, of course, incidental to the manufacture of machine tools by the Warner & Swasey Co.

The Zeigler Mfg. Co., Alexandria, Ind., after increasing equipment over 50 per cent since June 1, is constructing a new building 50 x 200 ft. in plan, one story in height, to add to its facilities. The company makes stampings, plain, formed, drawn and deep drawn, up to ½ in. thick and also screw machine products up to 3 5/16 in. in diameter. Its product goes to the automobile and automobile parts manufacturers and to skate, electric iron, washing machine, tractor, stove, tank, furniture and other industries using stampings or screw machine products.

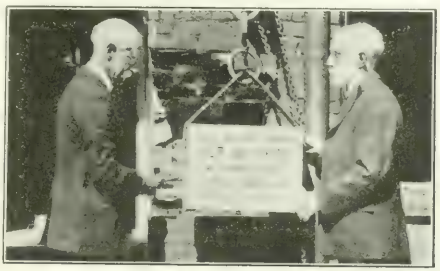
Standardization of Electric Drills

What are believed to be the first standards for portable electric drills were adopted by the Electric Power Club on Aug. 20. They have been printed in bulletin No. 7900, obtainable by writing to S. N. Clarkson, executive secretary, 1017 Olive Street, St. Louis. The rules are the nucleus of a complete group of electric tool standards. What has already been accomplished includes a definition of what constitutes a portable electric drill, test requirements of the motors, performance specifications for drilling, standard sizes of drills and the information which should be given on electric drill name plates.

Electric drills are now widely used, not only for maintenance work, but also very largely as tools of production. The users of electric tools have felt for some time that these devices should be standardized and it was to meet this need that the power club's electric tool section, comprising the representative portable electric tool manufacturers of the country, undertook the work. The electric drill standards will be published in the next edition of the Electric Power Club's handbook covering all electric power apparatus standards.

Celebrate Founding of Disston Saw Business

On Sept. 26, Henry Disston & Sons, Inc., celebrated the 50th anniversary of the first excavation on its present factory site at Tacony, Pa. It was in 1872 that ground was broken for the first of the 68 factory buildings which now stretch over an expanse of 65 acres. In commemoration a corner stone was dedicated to that early beginning of Disston saw, tool and file



manufacture and to the extraordinary record of 54 veteran employees, each of whom has more than a half century of service with that company behind him. Assisting Jacob Disston, Sr., the only surviving son of the founder, in laying the corner stone was William Smith, who 50 years before had assisted the founder in the first breaking of ground.

To promote the growth of the demand for corrugated metal roofing and siding protected with asbestos and asphalt Johns-Manville, Inc., has been appointed joint selling agent by the H. H. Robertson Co. In the future all asbestos protected metal (more recently called Robertson process metal) roofing, siding, accessories and ventilators will be manufactured and shipped from the plant of Robertson company at Ambridge, near Pittsburgh. Hereafter in the manufacture of asbestos protected metal products the Johns-Manville asbestos saturated felts will be used, thus securing the advantages of the experience of Johns-Manville in the manufacture of saturated asbestos felts and the experience of the Robertson company in the fabricating of the finished product.

Standardization of nut, bolt and rivet proportions is to be pushed under the direction of the American Society of Mechanical Engineers, which has taken the unusual step that the committee in charge will be authorized to solicit funds from industries which will be benefited by the work.

COAL AND COKE OUTPUT

Beehive and By-Product Ovens Show Increased Activity

WASHINGTON, Oct. 17.—Production of soft coal for the week of Oct. 9-14, according to the Geological Survey, will show about 9,900,000 tons. During the past five weeks, the output has been at an almost uniform rate, varying little from an average of about 9,780,000 tons. The number of cars loaded on Oct. 9, as reported by the railroads, was 40,906, the largest reported this year. On Tuesday, loadings fell off to 29,239 cars and on Wednesday to 28,671 cars. Since the first of September, coal has been offered for shipment up to the ability of carriers to handle it.

The output of beehive coke continues to increase steadily, the Survey says, and freer movement of coal permitted a partial recovery in the output of by-product coke during September. The present rate of output of beehive coke is declared to be almost double that of the corresponding period of 1921, when the business depression was acute. In comparison with 1920, however, a decrease of 57 per cent is indicated. The accumulative output of beehive coke up to Oct. 7, stood at 4,954,000 tons.

The total production of by-product coke for September was 2,244,000 net tons, an increase over August of 450,000 tons. In spite of the increase, the output was 336,000 tons short of last June, when the maximum for the present year was reached. The by-product ovens operated during September at 63.2 per cent of capacity. Of the 71 plants, 57 were reported active and 14 idle. Production of beehive coke also increased, rising from 539,000 to 606,000 tons. The total production of coke in September was thus, 8,250,000 tons, an increase of 35 per cent over the average for 1921, but a decrease of 34 per cent when compared with 1920.

Although dumpings of soft coal into vessels at Lake Erie piers continued at a high rate, there was a slight decrease in the tonnage handled during the week ended Oct. 8 as compared with the preceding week. The Ore and Coal Exchange reports the total handled during the week ended Oct. 8 as 1,179,298 net tons, as against 1,245,373 tons in the week before. In comparison with the corresponding week of a year ago, this was an increase of 56 per cent. Of the total dumpings 1,142,332 tons were cargo coal and 36,966 tons were vessel fuel.

During the present season to Oct. 8, inclusive, 10,836,083 tons of cargo coal have been dumped into vessels at Lake Erie piers. Of this quantity 9,829,091 tons were forwarded to regular lake markets and 1,006,992 tons were forwarded to Lake Erie destinations not ordinarily taking Lake coal.

More Coke Ovens Going In

UNIONTOWN, PA., Oct. 15.—Car shortage in the region somewhat hampered production in the Connellsville region during the past week, although an increase over the preceding week was shown in output. Production for the week ending Oct. 7 was 126,350 tons, an increase over the preceding week of 7670 tons.

Coke production figures show 11,077 active ovens for the week ending Oct. 7 with a production of 126,350 tons. Revival of production of coke among independents is gaining steadily, the best record during the week being the resumption of three long idle plants in the region. The principal of these was Allison plant of W. J. Rainey, Inc., practically the first in the region affected by the strike on April 1. A total of 469 independent ovens was added to the active list during the week. The H. C. Frick Coke Co. put 201 additional ovens in operation during the week, making the active Frick ovens 7834 or an increase of 1170 more than it had in operation when the strike developed.

TO HELP MILLS

More Low Side Gondola Cars Made Available for Steel Shipments

WASHINGTON, Oct. 17.—The Car Service Division of the American Railway Association has responded to pleas of the iron and steel producers for more transportation to help in moving accumulated stocks in mill yards.

The following order was sent out last Tuesday by the Car Service Division to the railroads:

To increase the car supply for transportation of steel mill products of which there is an accumulated storage at plants, the shipment of which is now needed for construction of all kinds, including freight cars, it is important that the low side or box type of gondola car be immediately withdrawn from other service and assigned to the mill trade.

Railroads not originating steel products and having in their possession this type of car will take necessary action to obtain release of foreign ownership equipment and forward in accordance with car service rules.

No reliable estimate could be made at the office of the Car Service Division as to how many of these low side cars would be released to the steel industry as a result of the order, but it is expected to give a fair degree of relief to the industry in supplying cars for the moving of accumulated stocks.

On last Wednesday, the division sent out a notice that Division Five of the Interstate Commerce Commission has ruled that no objection will be interposed to the movement of mill cinder and mill scale for furnace use, when moving in open top cars under the same conditions as fluxing stone for furnaces. It is hoped that this ruling also will allow mills to move this material more freely. Another ruling of the Interstate Commerce Commission of last week provides that empty coal cars should not be used for the movement of coke, but that special cases might warrant an exception to that rule and that they should be brought to the attention of Division Five of the commission for appropriate action. The purpose of this order is to continue to expedite the movement of coal and to keep coal car equipment exclusively in that service as far as possible.

Reports received by the Car Service Division show that 32,929 fewer freight cars were in need of repairs on Oct. 1 than on July 1 last, when the strike of railway shopmen began. The total number in need of repairs on Oct. 1 was 291,654 or 12.8 per cent of the cars on line. This was a decrease of 12,894 cars compared with the number in need of repairs on Sept. 15, at which time the total was 304,548 or 13.4 per cent. On Oct. 1 last year, 364,372 or 15.8 per cent were in need of repairs.

Of the total number in need of shop work, 230,565 require heavy repairs, while 61,089 require only light repairs. This is a decrease compared with Sept. 15 last of 11,114 in the number requiring heavy repairs, and a decrease of 1750 in the number needing light repairs. Every district reported a decrease in the number of cars in need of repairs on Oct. 1 compared with Sept. 15.

May Make Ferromanganese in Youngstown District

YOUNGSTOWN, Oct. 17.—Since a duty of $33.60 per ton has been imposed on ferromanganese under the new Fordney-McCumber tariff bill, independent interests in this territory have been considering the advisability of manufacturing their own ferromanganese, purchasing the ores on the market. Some point out that such a course might be advisable, in view of the fact that 78 to 82 per cent ferromanganese is now quoted at $101.10 seaboard, by importing interests.

It is explained that the duty on manganese ores is about $10 per ton less under the new tariff than the charge on ferromanganese, thus giving domestic makers an advantage over importers. One of the largest Valley independents consumes from 500 to 700 tons of ferromanganese per month in its steel operations.

The fact that a high temperature is required in a producing furnace is to be considered, however, in connection with domestic production. An expedient which has been considered is the use of smaller, more antiquated furnaces, where the cost of relining would not be so considerable as in the larger, modern stacks.

GERMAN PRICES SKYROCKETING

Advances in Steel Greater Than in Foundry Iron

(*By Cable*)

BERLIN, GERMANY, Oct. 16.—Foundry iron No. 1 is now 38,099 m. (per metric ton, equivalent to $13.55 per gross ton, at 3½ c. per 100 m.). Ingots are 57,640 m. ($20.50); steel bars, 78,700 m. (1.25c. per lb.); thin sheets, 116,970 m. (1.86 c. per lb.).

[This represents an advance in marks since Oct. 2 (see page 880, THE IRON AGE, Oct. 5) of 39 per cent on foundry iron and 68 per cent on each of the other products. The course of prices of these four items during the past few months is shown in the table.]

Date	Exchange per 100 M.	Foundry Iron, Marks per Metric Ton	Foundry Iron, Equivalent per Gross Ton	Steel Ingots, Marks per Metric Ton	Steel Ingots, Equivalent per Gross Ton	Steel Bars, Marks per Metric Ton	Steel Bars, Cents per Pound	Thin Sheets, Marks per Metric Ton	Thin Sheets, Cents per Pound
Oct. 16	3½c.	38,099	$13.55	57,640	$20.50	78,700	1.25	116,970	1.86
Oct. 2	5⅜c.	27,413	11.50	34,370	18.18	46,930	1.144	69,750	1.70
Sept. 18	7c.	26,242	13.67	34,370	24.44	46,930	1.49	69,750	2.22
Sept. 2	7¾c.	24,491	19.28	27,500	21.68	37,020	1.30	41,580	1.46
Aug. 19	8⅜c.	. . . .	.	17,880	15.21	24,050	0.91	.	.
Aug. 8	13¾c.	10,481	14.11	15,670	21.09	21,070	1.266	30,330	1.823
July 4	22c.	7,261	16.23	8,520	19.04	11,470	1.145	16,490	1.645
April 1	33c.	5,549	18.60	7,170	24.04	9,500	1.445	12,770	1.91
Pre-war	$23.82	75½	18.27	$24	19.34	98	1.06	.	.

GERMAN COMBINATIONS

The Rival to the Stinnes Organization—Electric, Metal and Shipping Companies Combine

BERLIN, GERMANY, Oct. 2.—There is great interest at present in corporation transactions, primarily in the gigantic new combination formed by Otto Wolff of Cologne (THE IRON AGE, Oct. 5, page 880), to rival the Electro-Metal Trust which Hugo Stinnes created from the Deutsch-Luxemburg, Gelsenkirchen, Bochum cast-steel and the three Siemens electrical corporations. Properly speaking, Otto Wolff is an iron and steel merchant, not a producer; but he controls producing corporations and also controls 80 per cent of Germany's tinplate production. Wolff lately made a stir by offering to reduce tinplate prices on condition that his customers should pledge themselves not to import from England. With Haniel and Dutch group (Nederlandsche Hoogoven), Wolff controls the big Phoenix corporation, which is the nucleus of the new combination. The Phoenix in turn controls partly or wholly nine corporations, including the important Reiherstieg shipyard of Hamburg, the Dolomitwerke, the Frigga Shipping Co. and a tube company. The Otto Wolff Trading Co. also leads in the Rhenish Steelworks Co., which controls wholly or partly five corporations, chief of which is the Arensbergshe Co. for Mining and Smelting, of Essen. Three-quarters of this company's shares are in the Rhenish Steel Co.'s hands. The Phoenix and Rhenish steel companies, with their fourteen subordinate corporations, constitute the metal wing of the new organization, and play the same rôle as the Deutsch-Luxemburg, Gelsenkirchen and Bochum Steel play in Stinnes' concern.

The electric wing consists of the Dessau Gas Corporation, which controls thirteen important gas and electric light and power companies and also controls the workshops of Max Schorch & Co. of Rheydt in Westphalia. In turn this big electrical group is connected by mutual exchange of shares with the Sachsen Light & Power Co. The Sachsen company, which has a capital of 140,000,000 m., was small before the war; but it has rapidly developed and is now the biggest company of its kind in Saxony. In order to fuse the two wings, it is proposed to make a further exchange of shares between the Phoenix corporation, the Sachsen company, and the Max Schorch company. Through this deal the Sachsen company will acquire a majority control of the Schorch company.

This, however, does not complete the deal. Like the Stinnes Electro-Montan trust it will have big shipping, as well as shipbuilding, connections. Herr Wolff lately surrendered to the Roland Steamship Line his interest in the Argos line. The Roland line is controlled by the North German Lloyd. It is now announced that Otto Wolff will have representation on the control boards (*Aufsichtsraete*) of both the Roland and North German Lloyd. Through this deal the Electro-Metal Trust really becomes an electro-metal-shipping trust; and, through the North German Lloyd's American associations, it becomes an object of interest to Americans. Just as Stinnes uses his new Stinnes line for the foreign trade done by his corporations, so the Wolff organization will use for its foreign trade the shipping of its controlled or associated companies.

The new trust follows the Stinnes example by proclaiming that financially and administratively all the allied concerns will maintain their independence; but as with Stinnes so with the new trust, all threads will lead to the control of Herr Wolff. The news of the combination has created a sensation; and it is predicted that still further unions on similar lines will take place not only in the metal and mechanical but also in very different industries.

Commenting, the Berlin *Boersen Courier* says: "This new event in the concentration movement of German industry signifies a big step forward toward simplification and standardization of production processes; and the importance of the new electro-metal combine is thereby sufficiently proved. The trust guarantees for another great part of our industry that the profits of native labor will go to national economy, and it creates a new strong front against foreign competition."

German Prices More Stable

All German prices are, in a sense, merely functions of the Reichsmark exchange. This has been true of iron and steel prices since 1918; but it has been doubly true since the Eisenwirtschaftsbund three weeks ago decided to fix its prices every ten days according to the dollar exchange. As the mark had a big recovery after touching botton Aug. 27, and as this recovery has on the whole been maintained, the price-rise for pig-iron has for the moment come to an end. Changes of late have been slight. Prices from Oct. 1 are: Hematite, 30,544 m. per metric ton; foundry iron No. 1, 27,413 m.; foundry iron No. III, 27,343 m.; Sieger-land steel-making iron, 29,763 m.; spiegeleisen, 32,483 m.; and ferrosilicon, 34,443 m. None of these exceeds by more than about 200 marks the prices attained on Sept. 1, but they are about double the prices fixed on Aug. 21. The price question has for the moment fallen into the background, but it will again become acute if (as is likely enough) the mark exchange fall is resumed.

Youngstown industries distributed $4,718,589 in wages in September, the largest disbursement in 18 months, reflecting the effects of the wage advance granted to steel workers beginning Sept. 1. It exceeds the August payroll by $303,824 and the September, 1921, distribution by $1,292,587.

BELGIAN MARKET WEAKER

Softness in Semi-Finished Material, But Pig Iron Market Strong—Larger Ore Imports

BRUSSELS, BELGIUM, Oct. 6.—Belgium, whose domestic demand is bearing a much smaller ratio to output than is the case in France, is more sensitive to the influence of foreign events. The difficulties in the Near East, which assumed a critical aspect, were the signal for a slackening at the beginning of this month. Business is now quiet and consumers are only covering their immediate needs. Prices, however, are thus far holding firm.

The recent reduction of railroad rates on French iron ore caused an increase in Belgian ore imports, the prices of which are still advantageous. Quotations at mines are: Briey minette, 14 to 15 fr.; Thionville minette, 11 fr.; siliceous iron ore, Longwy-Nancy, 10 to 13 fr.

France exported to Belgium during the first seven months of 1922, 1,037,235 metric tons of iron ore, against 840,176 metric tons during the same period of 1921.

Foundry Pig Iron.—The pig iron market is firm and rising prices are quoted, but this is believed to be an effect of speculation. Available stocks of foundry iron are restricted. Chill-cast foundry iron No. 3 P. L. is quoted at 245 to 250 fr., delivered, in the home market and 240 to 245 fr. f.o.b. Antwerp. Luxemburg and Lorraine iron is slightly higher.

Semi-Finished Material.—Inquiry for these products exceeds production. Lorraine and Luxemburg mills have returned to the Belgian market, but are quoting slightly higher prices on basic steel. Delivered prices on Belgian and prices f.o.b. Antwerp on Lorraine and Luxemburg material are as follows:

	Fr. Per Metric Ton—	
	Belgium	Luxemburg and Lorraine
Ingots	310 to 315	310 to 320
Blooms	330 to 335	330 to 335
Billets	345 to 355	350 to 360
Sheet billets	370 to 375	370 to 380

France exported to Belgium during the first seven months of 1922, 175,773 tons of semi-finished steel, compared with 195,840 tons for the same period of 1921.

Rolled Products.—Rolled steel products are particularly affected by the weaker tendency of the market. Heavy beams are inactive. Delivered domestic prices and prices for export, f.o.b. Antwerp, on Belgian, Luxemburg and Lorraine material, are as follows, in francs per metric ton:

	Belgian Domestic	Belgian Export	Lorraine and Luxemburg Export
Bars	435 to 440	430 to 435	430 to 435
Heavy beams	400 to 405	385 to 410*	390 to 410*
Light beams	415 to 425		
Angles (according to size)	415 to 440	410 to 435	
Rails	425 to 450		420 to 425
Hoops and strip	650 to 660		650 to 660
Wire	495 to 505	495 to 500	490 to 505
Rods	510 to 520	505 to 515	500 to 520

*Depending upon size.

Iron products are quiet, but seem to be firmer than steel products. Present prices are: No. 2, delivered, 425 to 435 fr.; No. 2, f.o.b. Antwerp, 420 to 435 fr.; No. 3, delivered, 450 to 460 fr.; No. 3, f.o.b. Antwerp, 440 to 460 fr.

Plates and Sheets.—Although the sheet market has not yet receded from its previous firmness, business is much quieter than it was three weeks ago. For export, prices of heavy sheets are most in demand.

Present delivered prices for the domestic market (basic steel) are as follows:

	Fr. Per Metric Ton
3 to 5 mm. and heavier	470 to 530
1½ to 2 mm.	560 to 730
5/10 to 1 mm.	770 to 900

For export, f.o.b. Antwerp, sheets of 3 to 5 mm. and heavier are quoted at 450 to 520 fr. Luxemburg mills are quoting f.o.b. Antwerp 450 to 460 fr. for basic sheets 5 mm. and heavier, and Lorraine mills f.o.b. Antwerp, 490 to 500 fr. for 5 mm. and heavier basic sheets and 575 to 600 fr. for medium sheets.

Steel Castings.—There is keen competition in this line, but some improvement is noticeable and prices are holding better.

August Blast Furnace Operation Shows Increase

In August Belgium had 29 furnaces in blast, against 27 in July and monthly averages of 14 in 1921 and 54 in 1913.

Production of pig iron:

	Tons
August, 1922	154,000
July, 1922	127,000
Monthly average, 1921	73,000
Monthly average, 1913	207,000

FRENCH MARKET FIRM

Coke Supply Obstructs Increased Production—Pig Iron Strong—Semi-Finished Material Quiet But Firm

PARIS, FRANCE, Sept. 28.—The French iron and steel market is firm, with a healthy undertone, and prices are rising slowly. Domestic demand, while not so important as it was in August and in the early part of September, is still quite satisfactory considering the season. In the export field, the appreciation of the pound sterling, the depreciation of the German mark and the aftermath of the strikes in the United States offer exceptional opportunities for foreign trade to France, Belgium and Luxemburg.

Unfortunately, the present coke supply does not permit an increase in pig iron production much beyond the present volume, which is less than one-half of the capacity of the country.

This coke supply is made up as follows (monthly): 427,000 tons of Ruhr coke granted by Commission of Reparations; about 80,000 tons from French collieries; about 40,000 tons from Belgium; 33,000 tons of Ruhr coking slacks on reparations account.

Even though Germany delivered her full complement, it is obvious that this total of about 550,000 tons of coke is far from sufficient for a yearly production capacity which exceeds 10,000,000 tons of pig iron.

France ought to have at her disposal at least 200,000 tons of coke more per month. This can only be Ruhr coke, because there is none other obtainable. The large companies of Lorraine, which are not really rentable unless they be run at full capacity, have now just enough coke to work at half capacity.

Some men, well versed in those questions, have suggested that what France failed to obtain politically might perhaps be obtained more easily by means of a private understanding between French and German iron and coalmasters. Provided the Ruhr producers should admit that the French blast furnaces of the East and in Lorraine have a right to German coke up to the limit of their production, French iron masters would agree, it is suggested, to sell to German transformation works pig iron and semi-finished products at privileged prices, thus re-establishing, to a certain extent, the community of interests which existed before the war between the Lorraine blast furnaces and the Ruhr transformation works.

Germany delivered to France (without Luxemburg), in August, 344,400 tons of reparations coke, or a daily average of 11,100 tons, against 13,774 tons due. In the first fortnight of September, German coke shipments to France showed a marked progress and reached the daily average of 12,950 tons.

The adjusted price of German coke delivered to French blast furnaces through the Société des Cokes de Hauts-Fourneaux has been maintained for October at the same level as in September, 95 fr. per ton, Franco-German frontier; and it is considered, in well-informed circles, as extremely probable that this price will stand until the end of this year. This is considered a very high price, in comparison with the present price of British furnace coke, 27s. delivered at works.

Foundry Iron.—This market is firm and available supplies are scarce. While chill-cast foundry pig iron No. 3 P. L. was averaging 220 fr. for September

delivery, the price for October has been raised to 230 fr.; and it is predicted that 240 fr. will be reached before the end of this year, three times the pre-war price.

For export, French blast furnaces have been selling at 225 fr. (French currency) f.o.b. Antwerp, thus relinquishing, against transportation costs, a part of the export bounty on coke of 20 fr. per ton of coke used in the production of exported pig iron. Some deals have been concluded with North America. One Lorraine concern has sold to that destination the whole of its production of semi-phosphoric foundry iron until the end of this year, and another in the same district several thousands of tons of high grade foundry iron, low in sulphur, at 250 to 260 fr. (French currency) f.o.b. Antwerp, which is equivalent to $22 or $23 c.i.f. American ports.

Hematite Pig Iron.—The French hematite market is in a favorable position and orders are coming in regularly. The passing away of the Comptoir des Fontes Hématites, occurring as it has at the start of a rising movement, has been smoother than was the suppression, at the beginning of last year, of the comptoir de Longwy, which heralded the collapse of foundry iron prices.

Prices of hematite are variable according to districts, and are now oscillating between 250 and 290 fr. per ton at producing works. In the Paris area, the present delivered price is 315 to 325 fr., about the same as the price last quoted by the Comptoir.

Semi-Finished Steel.—Although inland demand is now quieter, order books at works are well filled and delays of delivery vary between two and three months. Prices, which have a rising tendency, average as follows on basic steel at producing works in the East of France or in Lorraine:

	Fr. Per Metric Ton
Ingots	240 to 245
Blooms	270 to 280
Billets	290 to 300
Sheet billets	380 to 390

Beams.—With the building season drawing to a close, orders for beams have become smaller, but mills still have good orders on their books. The Comptoir Sidérurgique, which controls inland sales of beams and rails, will shortly make a decision as to the future price of beams. Some of the associate firms urge the maintenance of the present base price of 475 fr., delivered, which has been ruling since last March, but a majority of members hold that the base price should be raised as the general trend of the market is upward and coke prices are high.

Rails.—The Comptoir Sidérurgique booked an order for about 50,000 tons last month for the upkeep of various French railroads.

Plates and Sheets.—Although orders have somewhat slackened, the tendency of the market is still strong. At its meeting of Sept. 22, the Comptoir des Tôles et Larges Plats, moved by the present state of the market in which foreign inland competition has almost ceased, as well as by the recent rise in price of Belgian sheets and by the high price of coke, determined upon the following increases of its base prices:

	Fr. Per Metric Ton	
	Old Price	New Price
Flats	590	630
Heavy sheets	640	650
Medium sheets	720	750
Light sheets	900	920

Present delays of delivery are about 10 weeks for light sheets, 6 to 8 weeks for medium sheets and 4 to 6 weeks for heavy sheets and flats.

Rolled Merchant Products.—Although the market is firm and rising, prices of rolled merchant products are rather irregular. Quotations vary according to districts, tonnages, composition of orders and times of delivery. For instance, one firm, whose delays of delivery vary between 6 and 18 weeks according to specifications, is selling at 445 fr.; but another, which offers 4 to 6 weeks delivery, is asking as high as 470 fr. Another firm is quoting 450 fr. and 445 fr. for good specifications, but declines to name delivery date, while another firm, which has order books filled for four months ahead, refuses to quote.

Castings.—The previously reported improvement has fully developed, and many foundries are now working at full capacity or are in search of labor, which, especially in the provinces, is scarce. Prices have improved and some foundries have increased quotations by 50 or 100 fr. since July. Orders for malleable pig iron castings from the automobile trade continue satisfactory.

Construction.—After a two year idleness, engineering firms building special machines report that more orders are being received.

JAPANESE MARKET QUIET

Copper Demand Low—Further Declines in Pig Iron Not Expected

SHANGHAI, CHINA, Sept. 20.—As was expected, prices of electrolytic copper in Japan advanced when the import duty was increased, and transactions in copper have tended to decrease. Owing to the decline in price of copper experienced since last year, there arose a tendency to use copper in the manufacturing of furniture, household utensils, and other ways in Japan, but when the prices of copper rose, the demand of copper ware decreased by degrees. In addition, owing to the improvement in price, exports of copper and copper goods shipped to China and the South Seas also decreased. As there is a good deal of imported scrap copper in the market manufacturers are now using it as material for copper ware, and the demand for electrolytic copper has greatly fallen off.

Six hundred workmen employed in the Innoshima branch factory of the Osaka Iron Works have been dismissed owing to the economic slump. The firm still retains service of 1400 men.

Improvement is sighted in the pig iron market in Kobe, although it is still quiet. Hope is entertained by holders that no more price declines will be witnessed. On July 1 the stock of pig iron fell below 200,000 tons, but at the end of last month the market again fell, due to importation of low-priced Indian iron.

Prices are indecisive and weak. No. 1 Kamasihi is quoted at yen 67 ($32.15) per ton against yen 68 at the close of last week. However, operators believe that the bottom has been reached, and state that no more declines are possible.

June's iron output in Japan amounted to 3004 tons, a decrease of 1.5 per cent. Since the entry of Great Britain and the United States into the field of metal importation in Manchuria, these two countries have made rapid encroachments on the trade formerly enjoyed by Japan. During last year, trade statistics indicate that some $6,000,000 worth of metal goods went into Manchuria. In specific items, Great Britain supplied about one half of all brass bars, rods, sheets and the like. Likewise she furnished galvanized iron sheets, lead in bars and tin. Japan is ahead in the copper supply and also has a fair share of aluminum utensils.

United States Furnishes Three-Fourths of Guatemala's Iron and Steel Manufactures

American shipments of manufactures of iron and steel into Guatemala are about the same as they were in 1913, in bulk, but considerably more in dollars, from the increased average price. This condition obtains in spite of a marked decrease in the total imports, as measured by bulk, from more than 7000 metric tons in 1913 to 5237 tons in 1920 and 5705 tons in 1921. The figures in the table show that the United States percentage has increased from 63 in 1913 to 84 in 1920 and fallen to 75 in 1921.

Imports into Guatemala of Iron and Steel Manufactures

	1913		1920		1921	
Source	Metric Tons	Value	Metric Tons	Value	Metric Tons	Value
United States	4,382	$384,094	4,469	$1,029,479	4,263	$872,453
Germany	1,593	181,538	243	79,280	594	225,897
England	780	97,435	425	131,456	755	178,715
Others	247	22,480	100	21,395	92	37,192
Total	7,002	685,547	5,237	1,261,610	5,705	1,289,259

Iron and Steel Markets

AN EASIER MARKET

Car Troubles Continue, But Mill Accumulations No Larger

Downward Trend in Coke and Pig Iron — Prompt Steel at 2 Cents

Prices and supplies of finished steel have been working toward easier conditions in the past week. Accumulations of rolled products at Pittsburgh and Youngstown mills are still large—probably upward of 300,000 tons. But the accumulations are not increasing, and the week has brought eight more blast furnaces into action.

Transportation difficulties promise to continue, but producers and consumers of steel are accepting a 70 per cent output as close to the probable maximum for the remainder of the year. Meanwhile, in contrast with their action during the coal strike, consumers are doing little buying for prompt delivery. The effect of this changed policy has become more marked, making this week the quietest Pittsburgh has had in several months in the matter of new demand.

Fair-sized orders for plates, shapes and bars can now be placed more readily at 2c., Pittsburgh, and some mills will make early deliveries on that basis. Chicago reports that a number of users of steel now prefer to wait for regular deliveries of contract material, even though in so doing they are forced to curtail operations somewhat. This is the case with some car shops, in spite of railroad urging for delivery of new cars.

There are indications that duplicate buying figured to an extent in producing the price peaks of the coal strike months. The amount of such buying will determine in part the course of prices in the next two months.

The fuel situation is steadily more favorable to buyers. Connellsville coke producers are more actively seeking business, and furnace coke has been offered at $9 for delivery over the remainder of the year.

Farm implement makers are still a small figure in the bar market and now look for a quieter manufacturing season than was indicated in the summer months. On the other hand many automobile plants are holding their high rate of production and some are planning increased capacity.

Chicago district sales of steel rails for the first half of 1923 are now put at 650,000 tons and track supplies at 200,000 tons.

In light rails competition has been more marked of late, and as low as 2c., Pittsburgh, has been done in some cases. German light rails have been offered at $36 per gross ton, New York, and at $39, San Francisco.

Awards and inquiries for fabricated steel work continue to call for good amounts of material, but it is a few large rather than many small structures that account for the tonnage. Census figures for September lettings show that business for that month, corresponding to 62 per cent of shop capacity, was not much below that of August, representing 65 per cent.

Sales of 62 locomotives were made in the week and inquiries came out for 41. Cars bought exceeded 2200 and there are fresh inquiries for 1150.

The trend of pig iron prices is still downward and the week has been one of limited sales. At Chicago, prices have receded $1, while at Buffalo resale iron has been bought at $29.50, or $2.50 below recent quotations, and furnaces are selling at $31. At Pittsburgh, basic has declined $1. Recent high quotations on Southern iron, which were largely nominal, have disappeared and little is being sold above $27.50. Throughout the country, consumers of foundry iron are hesitating about placing further orders.

The ability of merchant furnaces to compete with prices at which some steel companies have sold pig iron recently will depend on the extent to which contract coke comes down.

British exports of iron and steel in September amounted to 279,169 tons, compared with 281,954 tons in August and 251,743 tons in July. The United States total in August was 145,640 tons. This country is still inquiring for pig iron in Great Britain and sales are being made covering December and January shipment. British steel prices generally are lower.

THE IRON AGE pig iron composite has fallen to $30.27 per gross ton from $30.94 last week. The price is back now to the level of Sept. 1.

Finished steel has not changed in price, THE IRON AGE composite price remaining at 2.460c. per lb., as last week. This is close to the figure of July, 1921, midway in the long decline from the peak of 1920.

Pittsburgh

Buyers Hesitate and Market Is Quiet—Car Supply Improves Slowly

PITTSBURGH, Oct. 17.—Downward trend of pig iron prices in keeping with an easier fuel situation has tended to intensify the hesitancy recently observed in the demand for finished steel products, and the past week, as far as new business is concerned, has been the quietest the trade has experienced in some time. With most of the steel companies having order books which insure comparatively full operation of capacity over the remainder of the year, pressure to sell is not heavy and there has been no breaking through the recent minimum quotations. Nevertheless, the undertone of the market is weaker as a result of the decline in new commitments and recent maximum quotations on a number of products, notably plates, shapes and bars, have been considerably modified. On really sizable orders of these products, it is doubtful whether the market to-day is above 2c., Pittsburgh, for sales above this figure usually refer to small tonnages or occasional requirements where early delivery is essential.

Prices of above $40, Pittsburgh or Youngstown, for sheet bars, billets and slabs have disappeared, but the fact that some sizable tonnages of sheet bars have been placed at $40 within the week would indicate that not

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton.	Oct. 17, 1922	Oct. 10, 1922	Sept. 19, 1922	Oct. 18, 1921
No. 2X, Philadelphia	$33.14	$33.14	$31.26	$22.40
No. 2, Valley furnace†	32.50	32.50	30.50	21.00
No. 2, Southern, Cin'ti†	31.55	31.55	31.05	23.50
No. 2, Birmingham, Ala.†	27.50	27.50	25.00	19.00
No. 2 foundry, Chicago**	32.00	32.00	32.00	21.00
Basic, del'd, eastern Pa.	29.50	29.50	31.00	20.50
Basic, Valley furnace	31.00	31.00	34.00	19.25
Bessemer, Pittsburgh	35.27	35.27	35.77	21.96
Malleable, Chicago**	31.00	32.00	32.00	21.00
Malleable, Valley	33.00	33.00	34.00	20.50
Gray forge, Pittsburgh	33.77	33.77	37.77	21.96
L. S. charcoal, Chicago	36.15	36.15	36.15	31.50
Ferromanganese, seaboard	*67.50	*67.50	67.50	60.00

Rails, Billets, etc., Per Gross Ton.				
O.-h. rails, heavy, at mill	$43.00	$43.00	$40.00	$47.00
Bess. billets, Pittsburgh	40.00	40.00	40.00	29.00
O.-h. billets, Pittsburgh	40.00	40.00	40.00	29.00
O.-h. sheet bars, P'gh.	40.00	40.00	40.00	30.00
Forging billets, base, P'gh	45.00	45.00	45.00	35.00
O.-h. billets, Phila.	45.17	45.17	45.17	35.74
Wire rods, Pittsburgh	45.00	45.00	47.50	40.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh. lb.	2.00	2.00	2.00	1.60
Light rails at mill	2.00	2.25	2.25	1.75

Finished Iron and Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.475	2.475	2.575	1.95
Iron bars, Chicago	2.50	2.50	2.25	1.75
Steel bars, Pittsburgh	2.00	2.00	2.00	1.50
Steel bars, Chicago	2.10	2.10	2.10	1.75
Steel bars, New York	2.34	2.41	2.34	1.88
Tank plates, Pittsburgh	2.15	2.15	2.25	1.60
Tank plates, Chicago	2.30	2.30	2.30	1.75
Tank plates, New York	2.34	2.49	2.49	1.98
Beams, Pittsburgh	2.00	2.00	2.00	1.60
Beams, Chicago	2.20	2.20	2.20	1.75
Beams, New York	2.34	2.41	2.34	1.88
Steel hoops, Pittsburgh	2.90	2.90	2.75	2.25

Sheets, Nails and Wire, *Per Lb. to Large Buyers*	Oct. 17, 1922 Cents	Oct. 10, 1922 Cents	Sept. 19, 1922 Cents	Oct. 18, 1921 Cents
Sheets, black, No. 28, P'gh	3.50	3.50	3.35	3.00
Sheets, galv. No. 28, P'gh	4.50	4.50	4.35	4.00
Sheets, blue an'l'd, 9 & 10	2.60	2.60	2.50	2.25
Wire nails, Pittsburgh	2.70	2.70	2.60	2.90
Plain wire, Pittsburgh	2.45	2.45	2.35	2.60
Barbed wire, galv., P'gh.	3.35	3.35	3.15	3.75
Tin plate, 100-lb. box, P'gh	$4.75	$4.75	$4.75	$5.00

Old Material, Per Gross Ton.				
Carwheels, Chicago	$25.00	$25.00	$24.50	$17.00
Carwheels, Philadelphia	23.00	23.00	23.00	17.00
Heavy steel scrap, P'gh.	21.50	21.50	21.00	14.00
Heavy steel scrap, Phila.	18.00	18.00	18.00	12.50
Heavy steel scrap, Ch'go.	18.50	18.50	18.00	13.00
No. 1 cast, Pittsburgh	24.00	24.00	24.00	17.50
No. 1 cast, Philadelphia	23.00	23.00	23.00	17.00
No. 1 cast, Ch'go (net ton)	21.00	21.00	21.00	14.50
No. 1 RR wrot, Phila.	22.00	23.00	22.00	16.00
No. 1 RR wrot, Ch'go (net)	17.75	18.25	17.50	12.50

Coke, Connellsville, Per Net Ton at Oven.				
Furnace coke, prompt	$10.00	$11.00	$11.50	$3.75
Foundry coke, prompt	12.00	13.00	12.50	4.50

Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York	14.12½	14.12½	14.12½	13.00
Electrolytic copper, refinery	13.62½	13.75	13.75	12.75
Zinc, St. Louis	6.85	6.62½	6.65	4.65
Zinc, New York	7.20	6.97½	7.00	5.15
Lead, St. Louis	6.35	6.35	5.90	4.50
Lead, New York	6.65	6.60	6.25	4.70
Tin (Straits), New York	34.50	33.50	32.12½	28.00
Antimony (Asiatic), N. Y.	6.75	6.75	6.75	7.00

*C.i.f.
**The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.
The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Oct. 17, 1922, Finished Steel, 2.460c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel

Oct. 10, 1922	2.460c.
Sept. 19, 1922	2.419c.
Oct. 18, 1921	2.221c.
10-year pre-war average	1.689c.

Composite Price, Oct. 17, 1922, Pig Iron, $30.27 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Oct. 10, 1922	$30.94
Sept. 19, 1922	32.54
Oct. 18, 1921	20.03
10-year pre-war average	15.77

less than that price can now be done. Material advances over what are recognized as the minimum prices on sheets no longer are readily obtainable. Despite the fact that makers of tubular goods have caught up fairly well with their orders for oil well pipe and that the demand for this class of material is light on account of the curtailment of oil production, there are intimations of easier prices for these products. The firmest spot in the market at the moment seems to be in hot-rolled flats on which all makers are heavily obligated.

Railroad transportation conditions still are very unsatisfactory, but as a result of modifications of embargoes the movement of material from the mills has improved somewhat and if mill stocks have not declined they are at least no heavier than they were a week ago. The Carnegie Steel Co. since a week ago has put on two additional furnaces at its Farrell, Pa., works, and also started up the steel works at that plant. Steel Corporation subsidiaries dependent upon this plant for billets and sheet bars, however, will be deprived of supplies for a few weeks at least, on account of an accident to the blooming mill engine. Operations of independent steel works in this district range from 65 to 75 per cent of capacity, while in the Youngstown district 90 per cent of the open-hearth furnaces and all of the Bessemer plants are in operation. There has been a further increase in the number of active blast furnaces in this and nearby districts. In addition to the two Carnegie stacks at Farrell, Pa., the Jones & Laughlin Steel Co. has put on its last idle furnace at its Aliquippa works, and the Cherry Valley furnace of the Hanna Furnace Co., Leetonia, Ohio, has gone into blast. The Wheeling Steel Corporation has banked a furnace at Martins Ferry, Ohio. The total number of furnaces in blast in this and nearby districts now is 85 out of a total of 139.

Pig Iron.—The week has been a very quiet one, buyers being impressed with the weaker tendency of prices, as well as a lower market in coke, forecasting still lower

prices for iron, evidently believing that this is a good time to refrain from purchasing. Steel company offerings of basic have forced a further decline in the grade of $1 per ton. We note sales at $30, Johnstown, Pa., and that price now is being named by one merchant interest and a couple of steel companies in the Valley district. It is intimated that less than $30 might be done on some of the iron sold a little more than a month ago by a Valley steel maker, much above the current prices. Not enough business has been done in other grades to establish any change in prices, except on No. 3 foundry, which has been sold as low as $31, Valley furnace, to a Pittsburgh district maker of mine cars. Considerable British iron has been offered in this district lately at around $33, delivered, for all grades, while high phosphorus foundry iron from Luxemburg and Lorraine is being offered at $23.25, c.i.f. Atlantic seaboard. Some of the sanitary ware manufacturers several weeks ago bought some British foundry iron at about $31, delivered, but there has been no recent business.

We [illegible] freight rate for delivery to the Cleveland or Pittsburgh district being $1.77 [illegible]

[illegible]	$30.00
[illegible]	33.50
Gray forge	$31.00 to 32.00
No. 2 foundry	32.50 to 34.00
No. 3 foundry	31.00 to 32.00
Malleable	33.00

Ferroalloys.—Business is of moderate proportions because, as a rule, consumers are well covered against their requirements over the remainder of the year. Domestic producers of ferromanganese have not yet announced prices. This occasions some surprise, but it is stated in explanation that the difference between the duty on manganese ore and ferromanganese is too slight on the present cost of coke for profitable production. There is a feeling that coke prices are coming down, and since every decline of $1 a ton in coke would be equivalent to a drop of $2.50 per ton in ferromanganese, it is desirable to await a more settled market in coke before starting the production of ferromanganese. The demand for the most part is for carload lots, wanted urgently by small consumers and these are being supplied from British material at the full prices of $101.10, duty paid, Atlantic seaboard, for 80 per cent material. Spiegeleisen is dull and easy. Carload lots of 20 per cent material lately have been sold at $38, furnace, as against an asking price of $39 for such lots. Ferrotungsten is finding some sale at 85c. to $1 per lb. contained tungsten, the range being unusually wide because of the variations in impurities. Chrome ore is in brisk demand at $20 per net ton, Atlantic seaboard, for forward delivery and $22 for prompt shipment.

[illegible] British ferromanganese, $67.50 c.i.f. Atlantic seaboard; domestic producers have not yet announced prices. Average 20 per cent spiegeleisen, $38 furnace; 16 to 19 per cent, $37; 50 per cent ferrosilicon, domestic, $65 furnace. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, $50.50; 11 per cent, $53.80; 12 per cent, $57.10; 13 per cent, $61.10; 14 per cent, $64.10; silvery iron, 6 per cent, $39; 7 per cent, $40; 8 per cent, $41.50; 9 per cent, $43.50; 10 per cent, $45.50; 11 per cent, $48.80; 12 per cent, $52.10. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $3.66 per gross ton.

Billets, Sheet Bars and Slabs.—We note sales of sheet bars from Youngstown mills aggregating about 15,000 tons at a flat price of $40. The fact that this business, which was attractive in other ways than its size, failed to develop a lower price indicates that the market is fairly well established at that figure. At the same time, however, there has been a complete disappearance of prices above that level, makers who recently were asking more now being glad to get orders at $40, Pittsburgh or Youngstown. Billets and slabs also are priced at $40, Pittsburgh or Youngstown, but real activity is lacking and it is possible that an attractive order might develop a lower price. Most steel makers have orders sufficient to maintain finishing mill operations at about 70 per cent of capacity over the remainder of the year, but some are not as well situated and have some tonnages of semifinished steel for market. These offerings and the weakness of pig iron are responsible for a disposition on the part of nonintegrated mills to expect lower prices.

We quote 4 x 4-in. soft Bessemer and open-hearth billets, $40; 2 x 2-in. billets, $40; Bessemer sheet bars, $40; open-hearth sheet bars, $40; slabs, $40; forging billets, ordinary carbons, $45 to $47, all f.o.b. Pittsburgh or Youngstown mills.

Wire Rods.—Independent makers still are holding to $47.50 for the base size of common soft rods and are making sales at that figure. We note one sale of 200 tons for delivery in equal quantities in November and December at that price and other sales for early delivery also carry that price. Contract customers, however, are not paying over $45, and some are getting shipments on old orders even below that. The leading interest is not taking new business.

We quote No. 5 common basic or Bessemer rods to domestic consumers, $45 to $47.50; chain rods, $45 to $47.50; screw stock rods, $50 to $52.50; rivet and bolt rods and other rods of that character, $45 to $47.50; high carbon rods, $52 to $57.50, depending on carbon, per gross ton, f.o.b. Pittsburgh or Youngstown.

Wire Products.—Little excitement attends the demand, but in a quiet way business is good and is described by one producer as too good, since its orders over the first half of this month were fully 50 per cent in excess of its normal production. The desire of independent companies seems to be to avoid loading up at to-day's prices. The leading interest still is far behind in its merchant sales and is taking no business it can afford to pass up. Operations of this interest, which were expected to gain as a result of the resumption of the Farrell, Pa., works of the Carnegie Steel Co., have not increased because an accident to the blooming mill engine at that plant means that no billets will be available from those works for from four to six weeks. There has been no change in prices, present levels apparently being satisfactory to buyers, presumably because they are getting some deliveries on old orders carrying lower prices. Prices are given on page 1039.

Steel Rails.—There lately has developed considerable competition among makers for orders of light rails and this has resulted in a price as low as 2c., base, being named on these sections rolled from new steel. Some makers still are quoting 2.25c., but admit considerable trouble in making sales at that price.

We quote 25 to 45-lb. sections, rolled from new steel, 2c. to 2.25c. base; rolled from old rails, 1.90c. to 2c. base; standard rails, $43 per gross ton mill for Bessemer and open-hearth sections.

Iron and Steel Bars.—The situation in soft steel bars is slightly weaker, due probably to the fact that consumers are getting better deliveries on some of their low priced orders, and average costs have fallen so well below 2c. that they are not interested in fresh supplies at much above that level. Small tonnages for early delivery are selling at 2.10c. and occasionally at 2.15c., but the recent maximum of 2.25c. has pretty well disappeared. Iron bars are unchanged.

We quote steel bars rolled from billets at 2c. to 2.15c.; reinforcing bars, rolled from billets, 2c. to 2.15c. base; rail steel reinforcing bars, 1.90c. to 2c.; refined iron bars, 2.60c. in carloads, f.o.b. mill, Pittsburgh.

Plates.—It is getting steadily easier to obtain accommodation at 2.25c., even on small tonnages, and the price must now be regarded not only as maximum, but somewhat extreme against really desirable business. The Sinclair Oil Corporation is taking bids on 10 80,000-barrel tanks for Oklahoma, which will require about 3000 tons of plates. General demand is moderate and usually for small tonnages. Prices are given on page 1039.

Tubular Goods.—Pipe makers in this and nearby districts report a well sustained demand for standard pipe, notably in the butt weld sizes, but only a limited demand for oil country goods. It is reported that there has been a suspension of operations in the Osage field, and in most other oil producing districts the low price of oil is restricting both production and new development. Most makers of steel oil country pipe now are able to make comparatively early delivery against new business, and there are suggestions that quotations are being shaded by those anxious to keep up mill activity. Makers of boiler tubes are heavily

committed and are not anxious for additional business at present prices. Discounts are given on page 1039.

Bolts and Nuts.—There is a good business being done, but it is chiefly in specifications on orders placed at lower prices than now prevail, and current quotations have little basis in sales. Discounts are given on page 1039.

Rivets.—Advanced quotations recently announced by large producers still are more of an asking than of a selling basis. Some makers are down to the old level of $3 base per 100 lbs. for heavy structural and $3.10 for large boiler rivets, and not much business yet has been done above these levels. Prices and discounts are given on page 1039.

Steel Skelp.—Increased supplies of steel are telling on the strength of the market. While boiler tube skelp, which is not desirable business with a good many producers, commands as much as 2.25c., the prevailing market on pipe skelp is 2c. The demand still is fairly active.

Sheets.—Unfilled obligations of makers assure well maintained mill operations over the remainder of the year, but new demands are considerably less urgent than they have been and the explanation probably is to be found in a softer market in sheet bars and a definitely weaker pig iron market. Buyers no longer fear higher prices, as they did when pig iron was up around $34 and sheet bars were priced above $40. Moreover, they have not found it hard to interest some mills in orders without climbing to the extreme prices recently asked. The argument is made that No. 28 gage black sheets cost about 3.60c. to make on $40-sheet bars, but buyers are plainly skeptical and consequently cautious. An accident to the blooming mill engine at Farrell, Pa., works, Carnegie Steel Co., will deprive nearby plants of the American Sheet & Tin Plate Co. of sheet bar supplies expected as a result of the resumption of the former for from four to six weeks. Prices are given on page 1039.

Tin Plate.—It is the quiet season, but at least there is as much business as there ever is at this time of the year and sales are effected without trouble or the necessity of shading prices. The American Sheet & Tin Plate Co. still is silent as to its prices on first quarter and first half of 1923 contracts. An announcement is expected during the first week of November.

Cold-Finished Steel Bars and Shafting.—Business still is good and recent prices are well maintained. Expectations of agricultural implement business over the remainder of the year are slight, but the automotive, railroad equipment and machine tool industries are steady buyers. Most makers here have orders sufficient to keep them busy over the remainder of the year. The carload price on rolled, drawn and turned bars remains at 2.50c., base, Pittsburgh, and on ground shafting 2.90c., f.o.b. mill.

Hot-Rolled Flats.—New business is lighter in most products under this head, but the mills are well booked over the remainder of the year and are not so eager for more business as to be willing to consider lower prices. The market is firm at 2.90c. to 3c., base, Pittsburgh, for broad and narrow stock, where the bookings are heaviest, but rather easy on the intermediate widths.

Cold-Rolled Strips.—The market is holding at 4.50c., base, Pittsburgh, with buyers specifying well against contracts, but not entering new orders with as much freedom as they did a short time ago.

Rail Fastenings.—Railroads tributary to Pittsburgh have generally entered orders against their early 1923 requirements and current demands are moderate. Prices now quoted are generally above those at which business now on makers' books was taken. Prices are given on page 1039.

Coke and Coal.—The market is off another dollar per ton on coke since a week ago, and is not especially strong at the lower level. Blast furnaces running on Connellsville coke lately have been getting more than their requirements, and have been more sparing buyers, this having had the effect of making producers a little more anxious for business. While there have been sales of standard furnace coke as high as $11 per net ton at oven, on both spot and contract sales, the market during the past few days has been at $10 for high grade fuel, while coke which the furnaces use only when forced to has been available from $9.50 down to as low as $8.50. An effort has been made on the part of some furnace interests to line up their requirements for the remainder of the year, but little business of this sort has materialized because producers believe they should have $10, while furnace interests say that $8 is all they should pay in order to meet the competition now existing in pig iron from steel companies. On the present basis of coal, the argument is with the blast furnace interests, because with coking coal at $4 the cost of producing a ton of coke on the basis of one and one-half tons of coal per ton of coke and $1 for conversion, this being high because of reduced operations, the margin for the producer at $8 for the coke would appear to be wide. Producers are, however, figuring on considerable irregularity as to both labor and car supplies for the present. Foundry coke also is down $1 per ton, now being quotable at from $12 to $13 per net ton, ovens. The coal market has been depressed more through a lack of demand than because of large production. Buyers seem to have swung into line generally with Secretary Hoover's suggestions to refrain from buying from stock until the lake requirements were satisfied, and since lake buying lately has been checked by congestions, it has been hard to move the production. Mine run steam coal now is priced anywhere from $3.25 to $3.75, with Panhandle operators asking $4. By-product and gas coal, mine run grade, ranges from $4 to $5, but generally is selling from $4 to $4.50.

Old Material.—The market here for heavy melting steel still is extremely dull and rather soft, as is indicated by the fact that in the face of bids of $22.50, Youngstown, by dealers short on sales at that point, local melters have been offered tonnages at low as $21.50. This, however, is probably as low as any dealer would go except possibly on a distress tonnage or on a consignment which had to be sold quickly to save demurrage charges. The market shows no weakness on special grades such as railroad couplers, knuckles and springs, one Pittsburgh district steel company recently having bought about 15,000 tons of such material and paying $25 per gross ton delivered. On this basis, heavy melting steel should be worth about $23, but there is not a mill in the Pittsburgh area that will pay that much to-day. The leading independent here is out of the market and states that it has enough scrap to last until spring. The Carnegie Steel Co. also remains out of the market. Dealers with yard stocks are looking for these interests to buy against winter needs before long and to be able to obtain the prices they are asking, these being well above the current local market on heavy melting grade. Blast furnace grades are slightly easier.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

Per Gross Ton	
Heavy melting steel	$21.50 to $22.00
No. 1 cast, cupola size	24.00 to 25.00
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va.; Franklin and Williamsport, Pa.	22.00 to 22.50
Compressed sheet steel	19.50 to 20.00
Bundled sheet sides and ends	17.00 to 18.00
Railroad knuckles and couplers	24.50 to 25.00
Railroad coil and leaf springs	24.50 to 25.00
Low phosphorus standard bloom and billet ends	25.00 to 26.00
Low phosphorus, plates and other grades	24.00 to 25.00
Railroad malleable	22.00 to 22.50
Iron car axles	34.00 to 35.00
Locomotive axles, steel	27.00 to 28.00
Steel car axles	24.00 to 25.00
Cast iron wheels	25.00 to 25.50
Rolled steel wheels	24.00 to 24.50
Machine shop turnings	16.00 to 16.50
Heavy steel axle turnings	18.00 to 18.50
Short shoveling turnings	18.00 to 18.50
Cast iron borings	18.50 to 19.00
Heavy breakable cast	21.00 to 21.50
Stove plate	18.50 to 19.00
Sheet bar crop ends	24.00 to 25.00
No. 1 railroad wrought	20.00 to 20.50

Chicago

Selling by Brokers Weakens Pig Iron Market —Production Limited

CHICAGO, Oct. 17.—Transportation continues to limit mill production. Car supply has improved sufficiently to permit producers to dispose of tonnage which had been piled, but no steps have been taken to increase output, as the mills are adhering to a rigid policy of rolling no more than they can ship. While steel output remains unchanged, merchant pig iron production has been increased through the going in of a third Iroquois furnace.

Demand for steel is still of large proportions, and there is no doubt that local mills could operate at capacity if transportation conditions permitted. There is a decreasing disposition on the part of buyers, however, to pay premium prices for prompt steel. In fact, many dependent on local mills prefer to wait for regular deliveries against the contracts, despite the fact that by doing so they are forced to curtail the operations of their plants. Whether Chicago mills will be able to increase production above the present average of 70 per cent is becoming more doubtful as colder weather approaches. Improvement in transportation has been exceedingly slow and such gains as are made are likely to be more than balanced by the decreased efficiency of the railroad which always follows the advent of low temperatures. It seems probable, therefore, that car shortage will prove a limiting factor on industrial activity for several months.

The leading steel interest continues to take business for indefinite delivery, but the foremost independent has not yet opened its books for first quarter. It expects to be ready to take business for that quarter, however, by the first of next month.

Ferroalloys.—The market is quiet and unchanged. A domestic producer of spiegeleisen has reduced its price to $38, Eastern furnace, to meet foreign competition.

We quote 80 per cent ferromanganese, $108.66, delivered; 50 per cent ferrosilicon, $65 delivered (nominal); spiegeleisen, 18 to 22 per cent, $47 to $48, delivered.

Pig Iron.—A steel works stack which makes merchant iron at intervals has sold several thousand tons to brokers, who are offering it at $31, base, furnace, thereby depressing the market a dollar. While this decline has frightened some buyers out of the market, there is still a fair amount of activity, consisting largely of purchases ranging from carloads up to a few hundred tons. In other words, buying is of a hand-to-mouth character, but it is apparent that a considerable number of melters are in immediate need of iron. A recent canvass by a broker which brought out replies from 138 melters in this territory showed that 31 per cent had less than two months' supply of iron on yard and under contract, 60 per cent had less than three months' supply and 77 per cent less than four months' supply. A Wisconsin motor company has closed for 1000 tons of foundry for delivery over the rest of the year. A local jobbing foundry has bought a like tonnage, while a Milwaukee melter has purchased 500 tons of malleable. A Michigan auto manufacturer is inquiring for 1500 tons of 14 to 16 per cent Bessemer ferrosilicon. A railroad car manufacturer and a wire maker have each purchased several thousand tons of basic. Car supply is somewhat better at local furnaces, although still decidedly unsatisfactory. An Iroquois furnace which had been banked for a considerable period has resumed production. Of the 10 merchant stacks represented by the leading Northern merchant, seven are now in blast, namely, three Iroquois, two Federal, one Mayville and the Zenith furnace. Shipments from Southern furnaces are still slow in coming through and new sales of Southern iron are few. However, 100 tons was sold to a melter in this district for delivery over the remainder of the year at $27, base, Birmingham. The market appears to range from $27 to $28, Birmingham. Notwithstanding a recent sale of foreign low phosphorus at a concession, several hundred tons of copper free domestic material has been sold to a melter in Chicago territory at $38, Valley furnace.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$36.15
Northern coke, No. 1, sil. 2.25 to 2.75	32.00
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	31.00
Northern high phos.	31.00
Southern No. 2	$33.00 to 34.00
Malleable, not over 2.25 sil.	31.00
Basic	31.00
Low phos., Valley furnace, sil. 1 to 2 per cent copper free	38.00
Silvery, sil. 8 per cent	46.29

Plates.—Railroad car buying is still the feature of the market. Active inquiries from Western roads total 9500 cars, which, if they are all placed, will bring fully 150,000 tons of steel to local mills. One local producer continues to quote 2.10c., Chicago, on plates for indefinite delivery, while another mill is offering fairly early shipment at 2.30c., Chicago. Buyers are showing a decreasing inclination to pay premium prices to secure deliveries, preferring to curtail operations pending improved shipments from local mills. This seems to explain why the car builders are not running full notwithstanding the fact that they have several months' work ahead and are being pressed by the railroads for deliveries. The Sinclair Oil Co. has withdrawn an inquiry for 10 80,000-barrel oil storage tanks. Under mill quotation, quote 2.10c. to 2.30c.

The mill quotation is 2.10c. to 2.30c., Chicago. Jobbers quote 2.90c. for plates out of stock.

Bars.—Demand for soft steel bars is unabated and comes from practically all sources except the farm implement makers, who expect a dull manufacturing season. Automobile plants, on the other hand, are not only maintaining their high rate of production, but contemplate increasing their capacity. The railroads continue to buy a considerable tonnage of bars, as well as plates and shapes, for car repair work to be done by their own forces. While buying is still in good volume, users show an increased willingness to wait for deliveries from local mills rather than to pay higher prices for prompt shipment. The bulk of new business in soft steel bars appears to be moving at 2c. to 2.10c., Chicago. Inquiry for bar iron is more active than for some time. One Western railroad is in the market for 500 tons and another for 300 tons, and there are numerous smaller tonnages pending. Buying of this product, however, is by no means proportionate to purchases of soft steel. Hard steel bars are still available at 2c., mill. New business is about equal to production, which is on a double turn basis.

Mill prices are: Mild steel bars, 2c. to 2.10c., Chicago; common bar iron, 2.50c., Chicago; rail steel, 2c. to 2.10c., Chicago mill.

Jobbers quote 2.80c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 3.80c. for rounds and 4.30c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 2.50c. base; hoops, 4.15c.; bands, 3.55c.

Rails and Track Supplies.—It now appears that fully 650,000 tons of rails and over 200,000 tons of track supplies were placed with local mills before the recent price advances. The railroads are now fairly well covered for the first half of next year, although they probably still have a considerable quantity of tie plates, bolts and spikes to place. Light rails are in better demand than for a year, due, no doubt, to the resumption of operations at the coal mines. In September, the local mill booked as much tonnage as it could roll, and orders so far this month are equally as heavy.

Standard Bessemer and open-hearth rails, $43; light rails rolled from new steel, 2.15c., f.o.b. makers' mills.

Standard railroad spikes, 2.85c. to 3c., mill; track bolts with square nuts, 3.85c. to 4c., mill; iron tie plates, 2.50c.; steel tie plates, 2.75c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.50c. base and track bolts 4.50c. base.

Wire Products.—Not much progress has been made toward increased production because of the car shortage which is limiting the supply of coal and steel delivered to the mills. The leading interest is booked ahead from eight to 12 weeks and is, therefore, not taking on much new business, although demand is still active. There is a growing feeling in the market that prices have reached the peak, but, on the other hand, no early decline is looked for in view of the probability that transportation will restrict production for many weeks. For mill prices see finished iron and steel, f.o.b. Pittsburgh, page 1039.

We quote warehouse prices, f.o.b. Chicago: No. 9 and heavier black annealed wire and No. 9 and heavier bright basic wire, $3.30 per 100 lb.; common wire nails, $3.45 per 100 lb.; cement coated nails, $2.90 per keg.

Bolts and Nuts.—The bulk of current business is going at the September discounts, although some sellers continue to quote the new prices. Specifications thus far this quarter have been surprisingly good, being fully equal to production, which averages about 75 per cent. Bolt and nut operations would probably be better than that, but for slow deliveries from the steel mills.

Jobbers quote structural rivets, 3.75c.; boiler rivets, 3.85c.; machine bolts up to ⅞ x 4 in., 50 per cent off; larger sizes, 50 off; carriage bolts up to ⅞ x 6 in., 45 off; larger sizes, 45 off; hot pressed nuts, squares and hexagons, tapped, $2.75 off; blank nuts, $2.75 off; coach or lag screws, gimlet points, square heads, 55 per cent off.

Sheets.—Demand for early deliveries is less active, but inquiries for first quarter are commencing to appear in fair volume. The local independent will probably open its books for that quarter the last of this month or early in November.

Mill quotations are 3.35c. to 3.50c. for No. 28 black, 2.50c. to 2.60c. for No. 10 blue annealed and 4.35c. to 4.50c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote f.o.b. Chicago, 4c. for blue annealed, 4.85c. for black and 5.85c. for galvanized.

Reinforcing Bars.—There has been a noticeable decline in new inquiries of size, but sellers report no abatement in orders for small tonnages. Deliveries of steel from the mills are steadily improving. Warehouse prices remain firm at 2.50c. The general contract for the Spavinaw water project, Tulsa, Okla., has been awarded to the Walbridge-Aldinger Co., Detroit. A sub-contract has been let to the Lockjoint Pipe Co., Ampere, N. J., which will purchase the reinforcing bars required, amounting to about 7000 tons. Recent lettings include:

Highway work in Iowa, 350 tons, to Paul J. Kalman Co.

Warehouse, Kohler, Wis., 200 tons, to Concrete Engineering Co.

Sterling Morton High School, Cicero, Ill., 110 tons, to American System of Reinforcing.

Pending work includes:

Knights of Pythias, lodge and office building, South Bend, Ind., 150 tons.

Structural Material.—Activity in the fabricating field is on the decline, both lettings and inquiries being less numerous. The largest structural contract of the week was let to the American Bridge Co. It covers the Wrigley Building Annex, Chicago, and will probably involve about 5000 tons, although the award was made on a pound basis, the plans not having been completed. While local mills are still hampered by car shortage in making shipments, buyers are showing little inclination to pay premiums for deliveries. Most mill business placed in this district is going at 2.10c. to 2.20c., Chicago.

The mill quotation on plain material is 2.10c. to 2.20c., Chicago. Jobbers quote 2.90c. for plain material out of warehouse.

Steel Castings.—Not much new business has been closed since the advanced prices went into effect, but the castings for a considerable number of cars are still to be bought. This holds true of the 5150 cars ordered by the Santa Fe and the 3300 cars placed by the St. Louis & San Francisco. The market is firm, and further advances in some classes of castings, notably car castings, are expected.

Cast Iron Pipe.—The market is unusually quiet. The undiminished uncertainty of the transportation situation is doubtless discouraging the appearance of new inquiries. Chicago has awarded 730 tons of 8 to 12-in. to the United States Cast Iron Pipe & Foundry Co. The Lynchburg Foundry Co. will furnish 90 tons of 30-in. for Detroit. Westmont, Ill., will take bids on 700 tons Oct. 18. Hamilton, Mo., will receive figures to-day on 300 tons.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $55.20 to $57.20; 6-in. and above, $51.20 to $53.20; class A and gas pipe, $3 extra.

Warehouse Prices.—Local jobbers have advanced hoops $5 a ton to $4.15 per 100 lb.; structural and boiler rivets, $2 a ton to $3.75 and $3.85 per 100 lb., respectively; plain wire and wire nails, 10c. per 100 lb. to $3.30 and $3.45, respectively, and cement coated nails, 15c. per keg to $2.90. Special H structural sections have been advanced from $2.90 to $3.15 per 100 lb. Plates, shapes, bars and sheets remain unchanged, and no advances are expected. Business is in good volume, although not so heavy as in recent weeks.

Old Material.—The market is quiet and prices are practically stationary, with both dealers and users marking time. While there are as yet no evidences of weakness, the feeling is growing among buyers and sellers alike that prices have reached the peak. Railroad offerings are still limited, but if present mild weather continues, scrap accumulations by the carriers may assume considerable proportions. Scrap held on speculation is again being offered, no doubt, for the reason that hope for further advances has been abandoned. Some difficulty has been encountered in moving country scrap, however, because of car shortage. Nevertheless, malleable was recently shipped to this market all the way from Roanoke, Va., and scrap of various grades has been offered from points as far west as Nebraska. Consumer buying is limited largely to small lots. Moderate purchases of heavy melting have been made by a leading steel works, but iron mill grades are inactive. The important malleable users appear to be fairly well covered on contract for the remainder of the quarter. Sales to gray iron foundries are confined largely to carload lots. The Rock Island has issued a list of about 1500 tons; the Monon offers 500 tons. The Ordnance Department is taking bids on 750 tons of hydraulic pumps, located at the local Government warehouse, which will be sold as machinery cast.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

	Per Gross Ton	
Iron rails	$25.00 to	$25.50
Cast iron car wheels	25.00 to	25.50
Relaying rails	27.50 to	32.50
Rolled or forged steel car wheels	23.50 to	24.00
Rails for rolling	20.50 to	21.00
Steel rails, less than 3 ft.	22.00 to	22.50
Heavy melting steel	18.50 to	19.00
Progs, switches and guards cut apart	18.50 to	19.00
Shoveling steel	18.25 to	18.75
Drop forge dashings	12.50 to	13.00
Hydraulic compressed sheet	15.50 to	16.00
Axle turnings	16.00 to	16.50
	Per Net Ton	
Iron angles and splice bars	23.00 to	23.50
Steel angle bars	18.50 to	19.00
Iron arch bars and transoms	22.50 to	23.00
Iron car axles	25.50 to	26.00
Steel car axles	20.00 to	20.50
No. 1 busheling	15.50 to	16.00
No. 2 busheling	10.50 to	11.00
Cut forge	17.25 to	17.75
Pipe and flues	12.50 to	13.00
No. 1 railroad wrought	17.75 to	18.25
No. 2 railroad wrought	17.25 to	17.75
Steel knuckles and couplers	21.00 to	21.50
Coil springs	22.00 to	22.50
No. 1 machinery cast	21.00 to	21.50
No. 1 railroad cast	19.50 to	20.00
Low phos. punchings	17.50 to	18.00
Locomotive tires, smooth	18.50 to	19.00
Machine shop turnings	11.00 to	11.50
Cast borings	13.50 to	14.00
Stove plate	17.50 to	18.00
Grate bars	17.50 to	18.00
Brake shoes	17.50 to	18.00
Railroad malleable	22.00 to	22.50
Agricultural malleable	22.00 to	22.50

New York

Large Inquiries for Bars and Wire Mesh—Pig Iron Dull

NEW YORK, Oct. 17.—The week has been one of extreme quiet in pig iron, and of inquiries amounting to about 10,000 tons reported last week, no tonnage of importance has been contracted for. The attitude of buyers is one of waiting, evidently with the expectation of lower prices in harmony with somewhat easier conditions in transportation and lower quotations on coke. Although the market is lacking in firmness, quotations in eastern Pennsylvania remain about the same as last week. It is understood that the new shipment of malleable iron coming from Duluth has been sold. Reports from Buffalo indicate a softening tendency in that market, with prices about $1 lower and some resale iron being disposed of at $29.50. Foreign iron has not been in evidence to any considerable extent during the past few days and quotations on it are unchanged.

We quote delivered in the New York district as follows, having added to furnace prices $2.27 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$35.27
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	34.27
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	33.27
Buffalo, sil. 1.75 to 2.25	35.91
No. 2 Virginia, sil. 1.75 to 2.25	No sales

Ferroalloys.—Business in ferromanganese is confined to carload lots of the British product, which are being sold at the regular quotation of $67.50, c.i.f. New demand is exceedingly light, but specifications on contract, even with the duty in effect, are reported urgent. Nothing is heard of offerings of domestic alloy. Demand for spiegeleisen, both foreign and domestic, is confined to small lots. Quotations for the domestic 20 per cent alloy range from $38 to $39, furnace, and for the foreign $38, duty paid. No activity in manganese ore is reported and quotations are nominal. The 50 per cent ferrosilicon market is also quiet at higher quotations, the domestic alloy being the only one offered. Business in ferrochromium is fair and prices are a little stiffer. Quotations are as follows:

Ferromanganese, domestic, furnace, nominal, per ton	$100.00
Ferromanganese, British, c.i.f., per ton	$67.50
Spiegeleisen, 17 to 19 per cent, furnace	$38.00
Spiegeleisen, 20 per cent, furnace or duty paid	$38.00 to $39.00
Ferrosilicon, 50 per cent, delivered, per gross ton, carloads	$70.00 to $75.00
Ferrosilicon, 14 to 16 per cent, delivered, per gross ton	$40.00 to $45.00
Ferrotungsten, per lb. of contained metal,	70c. to 85c.
Ferrochromium, 4 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr., delivered	12c. to 14c.
Ferrovanadium, per lb. of contained vanadium	$3.50 to $4.00
Ferrocarbontitanium, 15 to 18 per cent, in carloads, per net ton	$200.00
Manganese ore, foreign, per unit, c.i.f.	29c. to 30c.
Tungsten ore, per unit, in 60 per cent concentrates, nominal	$7.50 to $7.75
Chrome ore, basis 48 per cent Cr_2O_3, crude, per ton, Atlantic seaboard	$17.50 to $18.25
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	55c. to 60c.

Cast-Iron Pipe.—Private purchasing is keeping up to an unusual extent, considering the seasonal dullness which generally ensues. Prices are firm and deliveries on 6-in. and smaller sizes are, as a rule, still extended. The tender of the City of Boston for 450 tons of 30-in. pipe, which opened Oct. 11, was awarded to the Warren Foundry & Pipe Co., Philipsburg, N. J. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $54.50; 4-in. and 5-in., $59; 3-in., $64.80, with $4 additional for Class A and gas pipe. The soil pipe market also continues to report unprecedented activity, dealers being active in purchases to fill in on sizes. We quote per net ton, delivered New York, discounts of both Southern and Northern makers as follows: 2 to 6-in. standard, 25 to 30 per cent off list; heavy, 34 and 35 per cent off list.

Warehouse Business.—Demand in practically all lines is reported as unusually good, particularly among warehouses handling structural material. Besides the usual customers, there are evidently a number who, because of the car situation, are unable to receive satisfactory mill delivery. The car shortage is hampering delivery and affecting stocks in consequence. In this respect it is felt that a shortage of black and galvanized sheets may be seen shortly, although at present the wide range of prices that has prevailed for some time still exists. Black and galvanized sheets, No. 28 gage, are still quotable at from 4.50c. to 4.90c. per lb. and 5.50c. and 5.90c. per lb., respectively, with reported sales from time to time at even lower prices. On the whole, however, it is believed that the market is stiffening slowly. Dealers in wrought iron and steel pipe report continued good business and prices firm. Brass and copper warehouses state that business is fair with no change in quotations out of stock since Sept. 28. We quote prices on page 1056.

High-Speed Steel.—The market shows about the usual activity. Much of the present dullness is attributed by producers to the uncertainty prevailing among consumers as to the trend of future business. Quotations are still from 75c. to 80c. per lb. on 18 per cent tungsten high-speed steel, with special brands of some companies ranging up to 90c. per lb.

Finished Iron and Steel.—The present steel price situation has both buyers and sellers guessing as to the future. Sellers say that buyers are apparently satisfied with a 2c. level on plates, shapes and bars, and the trend of the market is toward that level, although all mills have not yet gone that low. Bars are now 2c. to 2.10c., Pittsburgh, the lower price applying on especially desirable specifications, particularly concrete reinforcing bars in large tonnages, but for delivery within two or three weeks it is difficult to buy below 2.10c. The range on structural shapes is also 2c. to 2.10c., Pittsburgh, the lower price being given when delivery requirements are not too exacting or if the tonnage is attractive. Plates are slightly higher, 2.10c. to 2.15c., Pittsburgh, being the level at which most of the business is going. Reports are out that 2c., Pittsburgh, has been quoted by an Eastern mill, but this is not confirmed. A Pittsburgh mill says that it is able to get 2.25c. in the Pittsburgh district, but that competition in the East makes it impossible to get above 2.10c. or 2.15c. The large inquiries for bars are mostly for concrete construction. The Lock Joint Pipe Co. is inquiring for 3500 tons of bars and 2600 tons of wire mesh for a water works plant at Tulsa, Okla. This is the largest inquiry for wire mesh quoted on in this market in a considerable time. About 1500 tons of bars are required for a flour mill at Buffalo for the Pillsbury Flour Mills Co., and various jobs of the New Jersey State Highway Commission require about 1000 tons, some of which has been let. In plates large inquiries are lacking, and there is also a falling off in the number of structural jobs, it being between seasons, too late for fall work and too early for work that is to be begun in the spring. Nevertheless, there are several sizable jobs up for figures, including about 10,000 tons for the new Equitable Building in the Pennsylvania Station zone, New York, on which plans will be issued shortly; 6000 tons for car sheds for the Interborough Rapid Transit Co., and 2500 tons for bridges for the Baltimore & Ohio Railroad. In tin plate there is a fair degree of activity both for export and domestic. In addition to the Standard Oil inquiry for 150,000 base boxes, the Texas Co. is in the market for 50,000 boxes. Consumers who have steel bought are pressing for deliveries, which are delayed, especially from Pittsburgh and Youngstown mills, by the car shortage. The demand for butt weld pipe is particularly active, but lap weld is fairly easy. Wire products are also in demand, nails in particular. A shortage of wire drawers at wire mills is restricting output in some instances to about 60 per cent. The sheet situation appears particularly firm, some mills being sold up for the remainder of the year, and mills in this position are little disposed to consider business at less than 2.75c. for blue annealed, 3.75c. for black and 4.75c. for galvanized, all base Pittsburgh, but it is apparent that these prices are not being paid in every instance. Bar iron is unchanged at 2.15c. to 2.25c.,

Pittsburgh, but it reported that these prices are not as firm as they were a few weeks ago. Export prices continue below domestic prices. A small tonnage of bars for Japan is reported to have been taken by a leading mill at a price which figured back to 1.70c., Pittsburgh.

We quote for mill shipments New York delivery, as follows: For indefinite delivery, soft steel bars, 2.34c.; structural shapes and steel plates, 2.34c. to 2.44c.; for delivery in a number of weeks, soft steel bars and plain structural material, 2.34c. to 2.49c.; steel plates, 2.34c. to 2.59c.; bar iron, 2.49c. to 2.59c.

Coke.—Prices of coke are somewhat lower, and show a wide variation, foundry grades being quoted all the way from $12.75 to $14, and furnace grades from $10 to $11. By-product coke is still quoted at $14, seaboard. There has been a large amount of contracting for by-product coke for distribution in New England, with the usual provision for prices to be determined by the going market at time of delivery. One blast furnace whose owners would like to place it in operation has been unable to obtain from the railroad serving it a promise of regular delivery of coke, although the use of only 50 cars would be needed to meet the requirements.

Old Material.—There is considerably less activity and prices exhibit a slight tendency toward weakness. The railroad embargoes are, as a rule, charged with the present slackening. Brokers are still buying to fill contracts, but new buying by mills is reported at a minimum. Milton and Columbia are out of the market on specification pipe and Lebanon has dropped its offering price from $17 per ton down to $16. Bethlehem is stated to be no longer buying, but shipments are still being made on contracts. With Mahwah, N. J., out of the market on stove plate and $16 per ton being paid for shipment to Harrisburg, which takes a $3.78 freight rate, this item is showing some weakness. A shipment of heavy melting steel to Johnstown is stated to have been made by one dealer at $19 per ton, the freight rate being $4.79, and a broker in New York reports a shipment of steel from a point in New England to Monessen at $21 per ton, delivered. The market on heavy melting steel is still quotable at $14 to $14.50 per ton, but the mills are stated to be increasingly particular as to quality.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$14.00 to $14.50
Steel rails, short lengths, or equivalent	15.00 to 15.50
Rails for rolling	15.75 to 16.25
Relaying rails, nominal	27.00 to 28.00
Steel car axles	17.00 to 18.00
Iron car axles	23.00 to 24.00
No. 1 railroad wrought	16.00 to 16.50
Wrought iron track	14.50 to 15.00
Forge fire	11.50 to 12.00
No. 1 yard wrought, long	14.00 to 14.50
Cast borings (clean)	12.50 to 13.00
Machine-shop turnings	12.25 to 12.75
Mixed borings and turnings	12.25 to 12.75
Iron and steel pipe (1 in. diam., not under 2 ft. long)	12.25 to 13.25
Stove plate	14.00 to 14.50
Locomotive grate bars	14.00 to 14.50
Malleable cast (railroad)	13.50 to 14.00
Cast-iron car wheels	14.50 to 15.00

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$20.00 to $21.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	17.50 to 18.00
No. 1 heavy cast, not cupola size	15.00 to 15.50
No. 2 cast (radiators, cast boilers, etc.)	13.50 to 14.00

The economic importance of safety is to be discussed at the meeting in the Engineering Societies Building, 29 West Thirty-ninth Street, New York, on the evening of Oct. 20 by the American Society of Safety Engineers. An attempt will be made to secure the records of accidents in a given plant ten years ago and to-day, thus to get a comparison as to the number and severity of casualties and the saving in dollars and cents.

Work is being done at Pittsburgh by the U. S. Bureau of Mines on a portable method for determining the dissolved gases in boiler feed water, especially hydrogen. Some boiler feed waters have been found to contain more than 30 per cent hydrogen.

Buffalo

Pig Iron Prices Lower and Demand Limited—Finished Materials Dull

BUFFALO, Oct. 17.—Sales of No. 2 plain pig iron at $31 are more frequent and one furnace announces this figure, although it is not able to take business freely. This furnace has sold 1000 tons made up of various small transactions. Inquiry is livelier, one proposition being considered by two furnaces involves 5000 tons, others ranging from 200 to 500-ton lots, consisting of both malleable and foundry iron. The Donner Steel Co., which has been out of the pig iron field for practically three months, expects to consider foundry iron business soon. Reports of $30.50 being made on No. 2 plain iron by furnaces are not confirmed, but it is understood brokers are selling at $29.50. The Wickwire Steel Co. is relining a stack and expects to blow it in when this work is finished. The basic iron situation is unchanged, no sales having been made that would determine a price other than nominal.

We quote f.o.b. per gross ton Buffalo as follows, the higher prices being for early shipment:

No. 1 foundry, 2.75 to 3.25 sil.	$33.00
No. 2X foundry, 2.25 to 2.75 sil.	32.00
No. 2 plain, 1.75 to 2.25 sil.	31.00
Basic	31.00
Malleable	31.00
Lake Superior charcoal	34.28

Finished Iron and Steel.—Finished material sellers in some quarters are finding a situation where buyers are not as interested in placing orders as they were. It is regarded as indicative of a belief that prices are gradually reaching a more stabilized basis and that no advances are likely at the present time. Prices on bars, shapes and plates are generally firm, 2c. on bars, 2c. to 2.10c. on shapes and 2c. to 2.25c. on plates are virtually the uniform quotations. Sheet business is brisk, but inquiry is somewhat spasmodic; one sheet-maker has sufficient business to warrant full operation when labor is available. A new list of extras on sheet finishes ranging from 5 to 20c. per 100 lb. has been put into effect. No new large structural enterprises have appeared and the general run of projects is for less than 100 tons.

We quote warehouse prices, Buffalo, as follows: Structural shapes, 3.20c.; plates, 3.20c.; soft steel bars, 3.10c.; hoops, 4.10c.; bands, 3.90c.; blue annealed sheets, No. 10 gage, 4.05c.; galvanized steel sheets, No. 28 gage, 5.85c.; black sheets, No. 28, 4.85c.; cold rolled round shafting, 3.95c.

Warehouse Business.—Demand for warehouse products is about evenly distributed, with indications pointing to a good movement of material for the next three or four months. Prices are regarded as stabilized. Haste to clean up, pending structural propositions, is reflected in the increased demand for structural shapes.

Coke.—A price of $14, f.o.b. ovens, is quoted for best grades with a freight rate of $3.28 to Buffalo.

Old Material.—Sales of heavy melting steel have been made at prices ranging from $20.50 to $21, and about 2000 tons has been involved in each transaction. Only one mill is inclined to pay in excess of $20 and something of a lull has developed because dealers are not willing to release material at less than $20.50. Scrap production is limited; railroad embargoes and car shortages seriously affect lists. All dealers have fairly lively demand for turnings and borings, low phosphorus, cast scrap and car wheels. Heavy melting steel, $20 to $21.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$20.00 to $21.00
Low phos., 0.04 and under	21.00 to 22.00
No. 1 railroad wrought	19.00 to 20.00
Car wheels	21.00 to 22.00
Machine-shop turnings	14.50 to 15.50
Cast iron borings	17.50 to 18.00
Heavy axle turnings	17.50 to 18.50
Grate bars	16.00 to 17.00
No. 1 busheling	17.00 to 18.00
Stove plate	17.00 to 18.00
Bundled sheet stampings	14.00 to 15.00
No. 1 machinery cast	21.00 to 22.00
Hydraulic compressed	18.00 to 19.00
Railroad malleable	20.50 to 21.50

Boston

Large Tonnage of Scotch Iron Received — Active Selling of Duluth Iron

BOSTON, Oct. 17.—During the week ending with Saturday last, four steamers with a total of 14,750 tons of Scotch pig iron arrived at this port, the largest amount recorded in any similar period during the present importation movement. There were two 5000 ton lots, one 3800 ton and one 900 ton. A part of the 5000 ton lots will be unloaded at Philadelphia. Credit for the showing made by domestic is largely due to the activity of Duluth iron at $30.50 base, Buffalo, this iron running low in phosphorus and presumably to be mixed with high phosphorus foreign stock. However, sales include several hundred tons of Buffalo iron, fourth and first quarters, at $32, furnace, for No. 2 plain, $33 for No. 2X and $34 for No. 1X; small tonnages of Alabama spot at $38 base, Providence, R. I.; small tonnages of western Pennsylvania at $32.50, furnace, for No. 2X; and small tonnages of eastern Pennsylvania at $31 to $32, furnace base; as well as unimportant tonnages of resale at premiums. Domestic iron quotations appear steadier. Foreign iron is firmer, but no higher. Sales included a small tonnage of spot No. 3 Scotch at $33.50 dock, Boston, and later deliveries at $31 to $32, duty paid. The extreme range on No. 3 Scotch offerings is $28 to $33 on dock. English iron is offered at $28 to $30, and Continental at around $28 on dock, duty paid. The Worthington Pump & Machinery Corporation inquiry for 400 tons each of No. 2 plain, No. 2X and No. 1X and 50 tons high silicon and 50 tons charcoal iron, Holyoke and East Cambridge, Mass., deliveries, has been partly covered, foreign iron being taken. A New Hampshire machinery builder bought 200 tons of foreign iron. Three or four 500-ton lots of iron are expected to close this week, the inquiries being of a private nature, and details lacking.

We quote delivered prices, on the basis of the latest reported sales, now infrequent, and as follows, having added to furnace prices $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia and $9.60 from Alabama:

East. Penn., sil. 2.25 to 2.75	$35.65 to $37.65
East. Penn., sil. 1.75 to 2.25	34.65 to 36.65
Buffalo, sil. 2.25 to 2.75	37.91 to 38.41
Buffalo, sil. 1.75 to 2.25	36.91 to 37.91
Alabama, sil. 2.25 to 2.75	37.60 to 38.10
Alabama, sil. 1.75 to 2.25	37.10 to 37.60
Virginia, sil. 2.25 to 2.75	38.92
Virginia, sil. 1.75 to 2.25	37.92

Finished Material.—A large tonnage of girder rails for 1923 delivery was placed the past week by New England trolley companies, the Boston Elevated Railway Co., the Eastern Massachusetts Street Railway Co., the Worcester Consolidated Street Railway Co., and the Springfield Street Railway Co. being the buyers. The United Electric Railways of Providence, R. I., has not covered its requirements. Aside from rails, the market for finished materials is comparatively quiet, buying being limited to small tonnages in each department. Prices on bars and bolts and nuts hold well, but the range on plates is widening, the spread now being 2c. to 2.25c., Pittsburgh. The Boston Bridge Works, Inc., was awarded 125 tons of structural steel for a baseball cage at Andover, Mass., and the New England Structural Co. 100 tons for a Hyde Park, Boston, engine room extension. Notwithstanding the falling off in structural steel prospects, mill prices remain unchanged. New England steel mills are running full. The Massachusetts plants of the Wickwire-Spencer Steel Corporation are employing more than 3200 workers.

Warehouse Business.—Sales of iron and steel are keeping pace with those for the corresponding period last month. Local stocks are in good condition and prompt deliveries are being made by warehouse interests. Bolts and nuts are more active on talk of an advance in prices. Cut nails have been marked up 10c. per keg, hard steel nails as much, while galvanized nails are 25c. higher. Proof coil, self colored chain has advanced 1c. per lb., placing 3/16-in. stock at 14½c. per lb. Weights are $5 a ton higher, 5 lb. and heavier now being $53 a ton from foundry stocks.

Jobbers quote: Soft steel bars, $3.25 per 100 lb. base; flats, $3.85; concrete bars, 3.16½c.; structural steel, $3.25 to $3.50; tire steel, $4.50 to $4.85; open-hearth spring steel, $5 to $6.50; crucible spring steel, $12; steel bands, $4.25; hoop steel, $4.75; cold rolled steel, $4 to $4.50; refined iron, $3.25; best refined iron, $4.50; Wayne iron, $5.50; Norway iron, $6.60 to $7.10; plates, 3.16½c. to $3.35; No. 10 blue annealed sheets, $4.15 per 100 lb. base; No. 28 black sheets, $5.40; No. 28 galvanized sheets, $6.40.

Coke.—Activity in the foundry coke market the past week centered largely in contracts for the first half of 1923, both the New England Coal & Coke Co., Boston, and the Providence Gas Co., Providence, R. I., having opened their books for such business. The former company is accepting business on a basis of price ruling date of shipment, while the Providence concern is booking orders subject to price ruling on the first of the month prior to shipments. Aggregate tonnage booked runs well up into five figures. The going contract price on foundry coke made by these companies is $16.50, delivered within the $3.10 local freight zone, and the spot price $19.50. Although Connellsville foundry cokes are cheaper, sales in this territory the past week were practically nil. A shipper of Alabama foundry coke has sold 2300 tons to the city of Boston. During the week 4400 tons of English coke arrived at this port, all of which was previously sold.

Old Material.—The withdrawal of additional Pennsylvania buyers from this market has materially slowed up business in heavy melting steel, with resulting softness in prices. Boring and turning values continue to hold well, but those on other materials have an easier tendency in sympathy with heavy melting steel. The best some brokers can offer for heavy melting steel is $14, whereas a week ago they paid better than $15, shipping point. The same firms will pay $2 more for railroad wrought than for heavy melting steel. Reductions by the trade in general, however, are much more modified, but the spread in prices for the moment is wider than usual. Foundries continue an unimportant factor in the machinery cast market, yet a considerable additional tonnage of No. 2 cast has been moved the past week, manufacturers paying $21 delivered a Massachusetts point. No. 1 cast sold in a small way at $22 and $23, delivered. Sales of material for consumption in this territory included round tonnages of No. 1 yard wrought at $19 and $19.50 delivered in Massachusetts.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$22.00 to $23.00
No. 2 machinery cast	20.00 to 21.00
Stove plate	17.50 to 18.00
Railroad malleable	19.00 to 19.50

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$14.00 to $16.00
No. 1 railroad wrought	15.50 to 16.50
No. y yard wrought	13.50 to 14.50
Wrought pipe (1 in. in diam., over 2 ft. long)	12.00 to 12.50
Machine-shop turnings	12.00 to 12.50
Cast iron borings, rolling mill	14.50 to 15.50
Cast iron borings, chemical	17.50 to 18.00
Blast furnace borings and turnings	11.50 to 12.00
Forged scrap and bundled skeleton	11.50 to 12.00
Street car axles	23.00 to 24.00
Street car wheels	18.00 to 18.50
Shafting	18.00 to 19.50
Rails for rolling	16.50 to 17.00

About 60 men at the car repair shops at the plant of the American Car & Foundry Co., Wilmington, Del., declared a strike, Oct. 9, with complaint that the works were being used for "farm out" repairs on freight cars for the Baltimore & Ohio Railroad Co., with lower wage scale than that paid at the railroad car shops for such work. The men ask that the wages be advanced to the basis noted and that employees at the local plant be granted the same working conditions and privileges as received by the railroad shop workers.

Cleveland

Pig Iron Shows Further Recession and Buying Is Still Light

CLEVELAND, Oct. 17—The transportation situation is still very bad in respect to shipments from Pittsburgh and Youngstown mills, apparently showing no improvement over a week ago, but the Pennsylvania Railroad has lifted its embargo on west bound freight from Pittsburgh, which will tend to relieve the situation. Johnstown, Pa., and Buffalo mills are able to keep steel moving fairly well to Ohio points. Two additional blast furnaces in this territory were blown in this week. The Bourne-Fuller Co. started up its Upson stack in Cleveland, and the Cherry Valley furnace of the Hanna Furnace Co., at Leetonia, Ohio, went in blast.

Iron Ore.—The car supply is holding up fairly well for the movement of ore from Lake Erie docks, so that shippers are experiencing little delay. During September some of the ore firms fell behind on shipping schedules and they are endeavoring to catch up with their schedules this month. Consequently, the October movement is expected to be about as heavy as during September, or close to 7,000,000 tons.

We quote delivered lower lake ports Old range Bessemer, 55 per cent iron, $5.95; Old range non-Bessemer, 51½ per cent iron, $5.20; Mesabi Bessemer, 55 per cent iron, $5.70; Mesabi non-Bessemer, 51½ per cent iron, $5.05.

Pig Iron.—Prices have further declined on foundry and malleable iron about 50c. a ton, and some furnaces have made larger reductions to bring their prices more in line with the present market. Buying is light, although sales were heavier during the past week than in the preceding week. One lake furnace is now quoting foundry iron at $31.50 to $32.50 as compared with $32 and $33 of last week and reports sales aggregating 5,000 tons, including an 800-ton lot of malleable iron which was purchased by a northern Ohio consumer at $32. A Cleveland producer is now quoting foundry iron at $33, Valley furnace for Cleveland and outside delivery and sold a 1,000-ton lot for shipment to the Pittsburgh district at that price, which is equivalent to about $32 at furnace. Another local furnace is quoting foundry iron at $33 for outside shipment and $34 for local delivery. However, foundry iron is being freely offered by outside furnaces at $34, delivered Cleveland, and this price can probably be shaded 50c. a ton. Resale foundry iron has appeared in Buffalo at $29.50 and this can be delivered to Valley consumers at $31.02. Another cargo of 5,000-tons of malleable iron is on its way from Duluth to Buffalo for Eastern points. A sales of 400 tons of foundry iron for the first quarter has been made by a lake furnace at $31.50 and a number of other inquiries, including one for 800 tons, are pending. However, these for the most part are regarded as market feelers. Foundries generally are looking for further price reductions and are not inclined to buy except for immediate requirements. No activity is reported in steel making iron. A Valley producer reports the sale of 800 tons of low phosphorus iron at $38 including a 500-ton lot in Chicago. A local foundry during the week purchased 500 tons of foreign low phosphorus iron. Southern iron is easier, some producers who have been quoting $30 for foundry grades having gone back to $28. Southern iron is also being offered at these prices for the first quarter. The foundry iron melt continues heavy and many consumers, including automobile foundries, are crowding furnaces for shipments.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and a $6 rate from Birmingham:

Basic, Valley furnace, nominal	$31.00
Northern No. 2 fdy., sil. 1.75 to 2.25	$33.50 to 34.00
Southern fdy., sil. 1.75 to 2.25	33.50 to 34.00
Malleable	33.50 to 34.00
Ohio silvery, sil. 8 per cent	44.52 to 45.52
Standard low phos., Valley furnace	37.00 to 38.00

Semi-Finished Steel.—Very little inquiry is coming out for semi-finished steel, although a local mill has made small lot sales of sheet bars at $40.

Sheets.—Demand for sheets is light. Black sheets are being offered for prompt shipments at 3.50c., Pittsburgh. The minimum quotation by independent mills on blue annealed sheets is 2.50c. and on galvanized sheets 4.50c., but some mills are quoting $5 a ton higher than the above prices on all grades.

Re-Enforcing Bars.—The demand for re-inforcing bars in small lots continues heavy. Among new inquiries is one for 700 tons for a water works reservoir in Memphis, Tenn. Hard steel bars are firm at 2c. to 2.10c.

Coke.—Foundry coke shows a softer tendency and is now quoted at $13 to $14 for standard Connellsville makes. The market was fairly active during the week in small lot orders.

Bolts, Nuts and Rivets.—A fair volume of business in bolts and nuts is coming from consumers at the new prices, which are firm, and specifications on old contracts are heavy. Local manufacturers are lining stock cars with paper and using these for making shipments because of the scarcity of box cars. Some new business in good sized rivet orders is coming from railroads and from oil tank builders. The market has stiffened. The leading local producer is now quoting 3.15c. for structural and 3.25c. for boiler rivets on all new business.

Old Material.—The scrap market is in an unsettled state in respect to prices. Although there has been a further decline on a few grades, some demand for heavy melting steel for Warren delivery has caused a temporary improvement in the tone of the market. The more common quotations on heavy melting steel range from $21 to $21.50 for Valley shipment, but for selected scrap a dealer has been offered $22.50. The local market is very dull with heavy melting steel scrap around $19 having declined about 50c. a ton. However, a small lot brought $19.75. A wide price spread has also appeared on compressed steel ranging from around $17 Cleveland to $20.50 delivered Youngstown. Most dealers are reported "long" on scrap. Consequently, they are inclined to hold up prices.

We quote per gross ton, f.o.b. Cleveland, as follows:

Heavy melting steel	$18.75 to $19.25
Steel rails under 3 ft.	21.00 to 21.25
Steel rails, rerolling	21.00 to 21.50
Iron rails	18.00 to 18.50
Iron car axles	26.00 to 27.00
Low phosphorus melting	20.00 to 20.50
Cast borings	15.00 to 15.25
Machine shop turnings	14.50 to 14.75
Mixed borings and short turnings	14.75 to 15.00
Compressed steel	16.75 to 17.25
Railroad wrought	18.00 to 18.50
Railroad malleable	20.00 to 21.00
Light bundled sheet stampings	13.75 to 14.00
Steel axle turnings	16.00 to 16.50
No. 1 cast	21.00 to 21.50
No. 1 busheling	14.25 to 14.50
Drop forge flashings over 10 in.	13.50 to 14.00
Drop forge flashings under 10 in.	14.00 to 14.50
Railroad grate bars	17.00 to 18.00
Stove plate	17.00 to 18.00
Pipes and flues	13.75 to 14.00

Finished Material.—The demand for finished iron and steel has fallen off considerably and prices show an easier tendency, bringing the independent mills nearer the Steel Corporation levels. While the 2.25c. price has not entirely disappeared, steel bars are now being freely offered by independent mills at 2c. for early shipment and a Buffalo mill that can make immediate delivery at that price has become a factor in the local market. On plates 2c. to 2.10c. is commonly quoted, although some mills are still holding to 2.25c. Quotations on structural material range from 2c. to 2.10c. Two large orders for oil tanks, each requiring 3000 tons of plates, were placed during the week. One was placed by the Sinclair Oil Co. with the Chicago Bridge & Iron Co. and the other by the Gulf Refining Co. with the Kansas City Structural Co. With present Chicago mill prices on plates, Ohio tank shops buying on a Pittsburgh basis appear unable to compete with western shops buying plates in Chicago for oil tank work in the Southwest. The Peter F. Connelly Co. has been awarded the contract for lap bar pipe for the Cleveland Water Works, requiring 1700 tons of

plates. Lake ship yards are figuring on two new boat inquiries that will require 2600 tons of plates. After a brief lull in the building field, inquiries for structural material have become more active. Building work placed during the week, about to be closed and covered in new inquiries, aggregated about 15,000 tons and in addition bids will be asked for shortly for the Cleveland Public Library, requiring 4000 to 5000 tons of plain material. There is still a fair demand from the automobile field and new inquiries from this source include 900 tons of carbon and alloy spring steel.

Cincinnati

Pig Iron Prices Lower and Sales Light—Coke Quotations Decline

CINCINNATI, Oct. 16.—So far as transactions were concerned, the past week in the pig iron market might well be regarded as featureless. Sales consisted for the most part of carload lots, with an occasional order for 100 to 200 tons being booked. Inquiry also was light, melters in this district apparently having withdrawn from the market. The reason for this is largely due to the fact that iron purchased for third quarter delivery is now coming in, and the need for fill-in tonnages has been satisfied. Slight weakness is perceptible in Northern irons. Chicago, Toledo and Detroit furnaces are reported to be offering iron at $31, furnace, while southern Ohio iron can now be had from practically all sellers at $32. In the South, the situation shows little change, $27 still being the minimum price. It is noted, however, that some furnaces which had been quoting and selling at $30 have revised their ideas somewhat, and $27 to $27.50 may be regarded as the market. One Southern furnace has let it be known that it will book orders for first quarter at to-day's prices, but is not actually soliciting business. The same condition exists in the North, but no reports of first quarter buying have been made. Star silvery furnace at Jackson, is expected to blow in about the last of this month, and the Buena Vista, Va., furnace, has purchased coke, and will start shortly.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$31.05
Southern coke, sil. 2.25 to 2.75 (No. 2 [illegible])	31.[illegible]
[illegible] (Cincinnati), 8 per cent	43.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	34.27
Basic Northern	33.27
Malleable	34.27

Warehouse.—Good business continues, and although deliveries from the mills are still slow, a slight improvement is reported. Consumers, who under normal circumstances, buy directly from the mill, are taking part of their requirements from warehouses. Good demand for reinforcing bars and shafting is noted. Prices are unchanged.

Cincinnati jobbers quote: Iron and steel bars, 2.95c. base; reinforcing bars, 3.05c. base; hoops 4.05c. base; bands, 3.85c. base; shapes and plates, 3.05c. base; cold-rolled rounds, 3.75c. base; cold-rolled flats, squares and hexagons, 4.25c. base; No. 10 blue annealed sheets, 4c.; No. 28 black sheets, 4.70c.; No. 28 galvanized sheets, 5.75c.; No. 9 annealed wire, $3 per 100 lb.; common wire nails, $3.20 per keg, base.

Finished Material.—The market has been featureless during the week. The Big Four fourth-quarter requirements on which bids were opened Oct. 5 have not been officially awarded. Prices are firm, but delivery, not price, seems to be the major consideration on all classes of material. An advance of $5 per ton on cold-rolled flats, making the price 4.50c., instead of 4.25c., was put into effect Oct. 10 by the Steel Corporation subsidiary. Bars are quoted at from 2c. to 2.25c., the higher price being for nearby deliveries which in most cases run from six to eight weeks. Shapes, in light demand, are quoted at from 2c. to 2.15c. On plates the quotation is 2.25c., delivery promises being within four to eight weeks. Car shortage is still affecting the delivery of sheets. Prices are very firm, blue annealed being generally quoted at 2.75c., black at 3.50c., and galvanized at 4.50c. Automobile sheets are in good demand at 5c. Orders are being booked on tin plate for fourth quarter delivery, the current price being 4.75c. per box. It is expected, however, that an advance will shortly be announced. Activity in the coal mining fields is reflected in an increasing demand for light rails and the demand for wire and wire products continues fair, but here also deliveries are a deterrent factor. Few new building projects were figured on during the week, one of the largest being the L. & N. Railroad station at Knoxville, Tenn., involving 250 tons.

Jobbers quote steel bars, 2.91c.; plates and structural shapes, 3.01c.; No. 9 galvanized wire, 3.30c.; No. 9 annealed wire, 2.80c.; No. 28 black sheets, 4.40c.; No. 28 galvanized sheets, 5.40c.; No. 10 blue annealed sheets, 3.70c. to 3.76c.; hoops and bands, 3.71c.; cold-rolled rounds, 3.75c.; flats, squares and hexagons, 4.25c.

Tool Steel.—Buying of tool steel has been very good during the week. A price advance has been made, establishing a range of from 75c. on regular grades of high-speed steel to 90c. on special brands of some companies.

Coke.—There was fair activity in the coke market, with prices showing a softer tendency. We note a sale of 10,000 tons of furnace coke to a Northern furnace, and several of 1000 tons to furnaces now operating. Connellsville foudry coke, standard brands, is quoted at $13 to $13.50; furnace at $10.50 to $12; New River foundry ranges from $13 to $15, and Wise County $12.50 to $13.50. Wise County furnace coke is quoted at $9.50 to $10. By-product foundry coke is quoted at $11 to $12.

Old Material.—The scrap market is inactive, and a softer tone is in evidence, particularly in cast grades. Railroad offerings are fairly heavy, the Norfolk & Western and Louisville & Nashville having heavy lists out. Dealers do not expect much business until these lists are closed. Prices, while tending downward, are quotably unchanged.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

Per Gross Ton	
Bundled sheets	$13.00 to $14.50
Iron rails	17.00 to 18.00
Relaying rails, 50 lb. and up	26.50 to 27.00
Rails for rolling	18.50 to 19.00
Heavy melting steel	17.50 to 18.50
Steel rails for melting	16.00 to 17.00
Car wheels	20.00 to 21.00
Per Net Ton	
No. 1 railroad wrought	14.50 to 15.00
Cast borings	11.50 to 12.00
Steel turnings	10.50 to 11.00
Railroad cast	18.00 to 19.00
No. 1 machinery	21.00 to 21.50
Burnt scrap	12.00 to 12.50
Iron axles	20.50 to 21.00
Locomotive tires (smooth inside)	14.50 to 15.50
Pipes and flues	9.00 to 9.50

St. Louis

Pig Iron Strong—Car Shortage Still Serious—Coke Is Scarce

ST. LOUIS, Oct. 17.—The market for pig iron continues strong, with Southern iron being quoted at $28 to $30, Birmingham, and Northern iron at $32, Chicago. As has been the case for several weeks past, the demand is for small quantities for immediate shipment. Melters buy iron as they need it, and want it shipped right away. Little interest is being shown in orders for the future, in the belief, perhaps, that prices may be lower. The car shortage is still serious, making it difficult to get deliveries on contracts. Melters have been calling on one another to help them out with supplies. Very little iron is coming through by all-rail route from the South, although the water and rail movement of Sloss-Sheffield iron continues regularly. Job and stove foundries are busier than a month ago. Business in stoves has been stimulated by the recent cold weather. Here, too, the car shortage is interfering with shipments. The St. Louis Coke & Chemical Co. continues to work on basic, but will shortly return to foundry iron.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago, $3.28 from Birmingham (rail and water), $5.17 from Birmingham, all rail, and 81 cents average switching charge from Granite City:

Northern foundry, sil. 1.75 to 2.25	$34.16
Northern malleable, sil. 1.75 to 2.25	34.16
Basic	34.16
Southern foundry, sil. 1.75 to 2.25	$33.17 to 35.17

Finished Iron and Steel.—Jobbers report that business is better, and they are looking to the replenishing of stocks, especially in bars, several sales of 50 to 70 tons being made during the week, with inquiries from others. Fabricators are busy, but they report that they have few inquiries, and they are looking for business for December and January. The Missouri Pacific has asked for quotations on 215 tons of reinforcing bars in stock lengths. A railroad bought 2000 charcoal iron boiler tubes. The Missouri-Kansas-Texas Railway bought five boilers for shops at Bellmead, Tex., from the Heine Boiler Co. There is a lull in the demand for sheets. The sale of two carloads of wire nails to a jobber is reported at $2.75, 5c. over the lower quotation, because of ability to guarantee deliveries.

For stock out of warehouse we quote: Soft steel bars, 2.90c. per lb.; iron bars, 2.90c.; structural shapes, 3c.; tank plates, 3c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, cold rolled, one pass, 4.85c.; cold drawn rounds, shafting and screw stock, 3.90c.; structural rivets, 3.60c. per 100 lb.; boiler rivets, 3.70c.; tank rivets, $\frac{7}{8}$ in. and smaller, 55 per cent off list; machine bolts, large, 50 per cent; smaller, 50 per cent; carriage bolts, large, 55-5 per cent; small, 60 and 10 per cent; lag screws, 55 per cent; hot pressed nuts, square or hexagon blank, $2.75; and tapped, $2.75 off list.

Coke.—Coke is still very scarce, with the demand increasing. The Granite City producer is taking business covering the current make to take care of, as far as is possible, the needs of users in this territory. Their price is still $14 at the ovens. Connellsville coke is quoted at $14 to $15 at the ovens.

Old Material.—Railroad offerings listed last week were easily absorbed at top prices. The only additional lists before the trade this week are: Mobile & Ohio, 1900 tons; St. Louis & San Francisco, 2,000 tons, and Northern Pacific, 1100 tons. Receipts generally still are small, and consumption is increasing, having been greater during September than any month in 1922, with the prospects of even greater consumption this month. Users are inclined to hold off buying as long as possible, but it is believed that it is only a question of time when they will be in the market again for heavy supplies. The St. Louis Screw Co. and the Hemlbacher Rolling Mill have increased operations.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton

Iron rails	$21.50 to $22.00
Rails for rolling	22.00 to 22.50
Steel rails, less than 3 ft.	22.00 to 22.50
Relaying rails, standard section	26.00 to 29.00
Cast iron car wheels	24.50 to 25.00
No. 1 heavy railroad melting steel	21.00 to 21.50
No. 1 heavy shoveling steel	17.50 to 18.00
Ordinary shoveling steel	17.00 to 17.50
Frogs, switches and guards cut apart	20.50 to 21.00

Per Net Ton

Heavy axles and tire turnings	11.50 to 12.00
Steel angle bars	17.00 to 17.50
Iron car axles	27.50 to 28.00
Steel car axles	20.50 to 21.00
Wrought iron bars and transoms	23.00 to 23.50
No. 1 railroad wrought	17.50 to 18.00
No. 2 railroad wrought	17.00 to 17.50
Railroad springs	21.00 to 21.50
Steel couplers and knuckles	21.00 to 21.50
Cast iron borings	11.00 to 11.50
No. 1 busheling	14.50 to 15.00
No. 1 railroad cast	20.00 to 20.50
Railroad malleable	20.25 to 20.75
Machine shop turnings	9.50 to 10.00

Detroit Scrap Market

DETROIT, Oct. 16.—The acute car shortage has been reflected in the scrap market along with a slight falling off in the melting schedule in this district. The automotive industry, while still running ahead of predicted production for this time of year, has probably fallen off from 15 to 25 per cent. The following prices are on a gross ton basis f.o.b. cars producers' yards, excepting stove plate, automobile and No. 1 machinery cast, which are quoted on a net ton basis:

Heavy melting steel	$16.00 to $16.50
Shoveling steel	16.00 to 17.00
No. 1 machinery cast	22.00 to 24.00
Cast borings	12.50 to 14.00
Automobile cast scrap	24.00 to 26.00
Stove plate	21.00 to 23.00
Hydraulic compressed	17.00 to 18.00
Car wheels	21.00 to 22.00

Birmingham

Demand for Pig Iron Not So Active and Prices are Declining

BIRMINGHAM, ALA., Oct. 16.—Demand for pig iron in the Birmingham district has decreased to some extent and prices are lower. But little of the probable make of the fourth quarter remains to be disposed of and with the buying that will naturally come in in small bits, there will be no tonnage left over at the close of the year. Quotations of pig iron by those in the market range from $27.50 to $28 for No. 2 foundry, 1.75 to 2.25 per cent silicon. Car supply is still very bad here and iron movements show but little improvement over the past week. The consumption in the home territory continues active though cast iron pipe makers, high pressure pipe, announce their market is easing. The inquiries for 1923 pig iron are still numerous and intimate that foundries and other consumers are not well provided with iron and must add to stocks immediately on the turn of the new year. With but few exceptions, the inquiries are receiving little encouragement, interests here being unwilling to open books as yet for the next year's business. Surplus iron on yards is increasing. Production in this State is also increasing. The decrease in the demand has not interfered with the preparations being made for a still larger production, repairing of furnaces not being interrupted. No change in the plan to blow in three furnaces in November has been made and if the raw material and transportation facilities show the slightest improvement next month, there will be material increase in iron output. The poor transportation facilities were felt in the district hauling the past week, the steady moving of iron ore being disturbed for a few days. Bins at furnaces, however, carry from a week to 10 days' supply on hand and no interruption was noted in the pig iron make. The inquiries for pig iron for next year are coming in from every direction.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon 1.75 to 2.25	$27.50 to $28.00
Basic	27.50 to 28.00
Charcoal, warm blast	33.00 to 34.00

Cast Iron Pipe.—While the lettings for cast iron high pressure pipe have practically become nil in the last few days, there is no slacking to any great extent in the manufacturing plant, as old orders are to be filled to considerable extent. The McWane Cast Iron Pipe Co., Birmingham, has taken an order from the city of Philadelphia for 60,000 ft. of 1¼ in. pre-calked joint cast iron pipe, to be used in a filtration plant now being constructed at Torresdale, Pa. The McWane company is building a new plant in Birmingham the first unit of which will be completed in March or April and will have a daily capacity of 8000 ft. of small sized pipe and give employment to about 150 men. The demand for the small sized cast iron pipe is very strong.

Steel Plants Busy.—All departments of the steel plants in this district are in operation, finishing mills in particular, wire and wire products, rails, sheets, bars, beams, producing steadily, in some instances overtime being gotten in. The transportation delays are also felt by this industry. Rail shipments for export are a little more active and one of the Chickasaw-built boats has docked to take on a cargo of products from this district, including rails, for Japan and China.

Old Material.—The scrap market shows no important change.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Steel rails	$16.00 to $17.00
No. 1 steel	14.00 to 16.00
No. 1 cast	18.00 to 20.00
Car wheels	18.00 to 20.00
Tramcar wheels	17.00 to 19.00
Stove plate	16.00 to 17.00
Cast-iron borings	9.00 to 10.00
Machine shop turnings	9.00 to 10.00

Coal and Coke.—Coal production is off again by reason of the short supply of railroad cars. The weekly output is below 340,000 tons. The coke demand has

taken on a new impetus and spot sales were recorded at $10 per ton for foundry coke. Delivery is a difficult matter with coke, too. Coke production will be increased when the car supply is better, the New Castle Coal & Coke Co. being prepared to resume operations at its beehive ovens just as soon as delivery can be guaranteed.

Philadelphia

Further Declines in Prices of Steel, Pig Iron, Scrap and Coke

PHILADELPHIA, Oct. 18.—The week has brought further declines in prices of plates, shapes and bars, pig iron, scrap and coke, notwithstanding the crucial situation in the Pittsburgh-Youngstown district, where the transportation tie-up is reported to have caused piling up a large tonnage of steel and consequent slowing down of production at some mills. The easier prices on steel are due largely to the action of Eastern mills, which in most instances did not load up their order books heavily at the low prices prevailing before the coal crisis, and which have now worked off a considerable portion of the premium business taken during that emergency. A buyer with a good specification to offer would now have no difficulty in buying plates, shapes and bars for fairly early delivery at 2c., Pittsburgh, and sales have been made within the past few days at this level.

Foundry iron is freely obtainable from Eastern furnaces at $31 for No. 2 plain and $32 for No. 2X, with a few sales having been made as low as $30, base, furnace. Foreign iron also is lower, and a grade practically equivalent to domestic No. 2X is obtainable at $30.75, Philadelphia dock, duty paid. In scrap there have been further declines within the past week.

Larger production has made bituminous coal much easier in price and supply, and this is reflected in lower coke price. Beehive furnace coke has been offered at $9, Connellsville, for standard grade and at $8 for medium sulphur grade. Foundry coke is available at about $1 a ton higher.

While the Pennsylvania Railroad has removed its embargo on west-bound shipments, the embargo on east-bound shipments remains in force, and the permit system is being employed. The lifting of the embargo on the Pennsylvania applies only to material originating on its own lines, which interferes particularly with the movement of scrap from New England points to the Pittsburgh district. The car service orders of the Interstate Commerce Commission further complicate the situation, and the steel trade is hoping that these will soon be suspended, in view of the fact that the soft coal crisis has passed.

Pig Iron.—Confusing elements enter into the present pig iron situation. Although there appears to be no surplus of domestic iron and production costs remain high, prices are slightly weaker. There is a demand for shipments on old orders, but very little inquiry for further requirements. Sellers have been predicting for two weeks a buying movement for November-December and first quarter of next year, which so far has failed to develop. A few sales of foundry iron have been made on the basis of $30 for No. 2 plain, but $31 for No. 2 plain and $32 for No. 2X are the prices which have prevailed on most of the orders booked within the past few days. Foreign foundry iron is offered at lower prices than were quoted a few weeks ago. A grade equivalent to domestic No. 2-X is available at $30, Philadelphia docks, to which is added the duty of 75c. a ton. Receipts of foreign iron at this port in the week ended Oct. 14 were 2214 tons from England, 1500 tons from Scotland, 50 tons from Sweden and 89 tons from Belgium. In the week ended Oct. 7 the receipts were 1975 tons from Belgium, 2000 tons from Scotland and 1000 tons from England. Basic iron is not in demand, but probably could be bought at $28 to $29, Eastern furnace. A sale of 2000 tons a week ago to a New England wire company was at $30, furnace. Gray forge has been offered by a central Pennsylvania furnace at $28, furnace, but a sale of 500 tons was entered by a local sales office a few days ago at $30, furnace. Domestic copper free low phosphorus is not available in the East, but foreign iron of the same grade is offered at $30, Philadelphia docks, duty paid. The outlook is for increased pig iron production in the East within the next month. The Alan Wood Iron & Steel Co. plans to put its No. 3 furnace, which has been out for repairs, in blast about Nov. 15. The Cambria works at Johnstown now has seven active furnaces and there are two operating at the Midvale plant of Coatesville. The long idleness of Virginia furnaces has been broken by the blowing in of the Max Meadows stack of the Virginia Iron, Coal & Coke Co. and the Pulaski Furnace Co. will blow its furnace in as soon as it can be got ready. The Goshen furnace will also probably go in blast shortly. The Virginia Public Service Commission has approved reductions in intrastate freight rates on ore and limestone of about 50 per cent and a tariff has been filed with the Interstate Commerce Commission, effective Nov. 3, reducing the freight rates on coke from the West Virginia fields to Virginia furnaces. The rate from West Virginia to the Roanoke and Clifton Forge group of furnaces on the Norfolk & Western and Chesapeake & Ohio railroads, which was $2.27 per ton, will become $1.70 and the rate to Rusens and Buena Vista, Va., will be reduced to $1.80. These reductions will effect a fairly substantial saving in production costs at Virginia furnaces. Virginia pipe companies have imported French iron at $23, c.i.f. Atlantic port, with a $2.50 freight rate to their plants, rather than pay the prices quoted by Virginia furnaces, which are $32 for No. 2 plain, and $33 for No. 2-X, f.o.b. furnace.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to $1.64 per gross ton:

East Pa. No. 2 plain, 1.75 to 2.25 sil.	$32.14 to $32.64
East. Pa. No. 2X, 2.25 to 2.75 sil.	33.14 to 33.64
East Pa. No. 1X	34.14 to 34.64
Virginia No. 2 plain, 1.75 to 2.25 sil.	37.17
Virginia No. 2X, 2.25 to 2.75 sil.	38.17
Basic delivered eastern Pa.	29.50 to 29.75
Gray forge	31.00 to 32.00
Malleable	34.00 to 35.00
Standard low phos. (f.o.b. furnace)	38.00 to 40.00
Copper bearing low phos. (f.o.b. furnace)	37.00 to 38.00

Ore.—Receipts of Swedish iron ore last week at Philadelphia were 7881 tons. Three tons of manganese ore was received from Germany. In the week preceding 4000 tons of chrome ore from British South Africa was received here.

Coke.—The coke situation has eased perceptibly because of the larger soft coal production. Until to-day $10, Connellsville, was the lowest that had been quoted on furnace coke, but offers were received here of standard coke at $9, Connellsville, while a medium sulphur coke was offered at $8. Foundry coke is obtainable at $1 a ton higher.

Ferroalloys.—One American producer of ferromanganese has named $100, furnace. Importers of British ferromanganese still quote $67.50, Atlantic seaboard, duty to be added. There is very little demand, consumers having covered their needs for some time ahead before the new tariff became effective. Some ferromanganese brought in before the duty went on is being offered for resale at $100, which nets a profit of $32.50 a ton.

Semi-Finished Steel.—Open-hearth rerolling billets are to be had at $40, Pittsburgh, and forging billets at $45 to $47.50, Pittsburgh. Mills are turning down many inquiries for wire rods, which are firm at $45, Pittsburgh.

Plates.—A sudden weakness in plates has developed. Eastern mills are largely responsible for the lowering of quotations, as most of the Pittsburgh-Youngstown mills, excepting the Carnegie Steel Co., continue to quote 2.25c. The bottom of the plate market for some

weeks has been 2.10c., Pittsburgh, and this price has been made principally by one mill, but the working down of their order books has caused three or four other mills to quote 2c., Pittsburgh, on desirable business. At least that number of independent mills are said to have quoted 2c. on 900 tons of plates inquired for by the Philadelphia & Reading Railroad. The Chesapeake & Ohio placed about 2000 tons of car plates at 1.95c. or 2c., Pittsburgh, presumably with a Pittsburgh mill, while the Pennsylvania Railroad, which had inquired for 1000 tons for shipment this year and 5000 tons for first quarter, has covered on about half of this tonnage and is believed not to have paid above 2c., Pittsburgh. One Eastern mill adheres firmly to 2.25c., Pittsburgh, and some small orders were booked within the week at that price. We now quote the market at 2c. to 2.25c., Pittsburgh.

Structural Material.—In line with the weakness in plates, the price of structural steel is now 2c., Pittsburgh, on the bulk of desirable business, whereas 2.10c. had been paid in most instances up to a week or so ago. The market range is now 2c. to 2.10c., as some of the smaller and less desirable orders have not been taken below 2.10c. The latter price also applies where very prompt shipment is required, though most of the mills are now in better shape to make delivery promises. This excepts, of course, the mills in the Pittsburgh district, which are hampered by the car situation.

Bars.—While 2.25c., Pittsburgh, is still being paid in a few instances for bars, this is no longer representative of the market, the prices named by some mills for desirable specifications for early shipment being 2c. to 2.10c., Pittsburgh. The 2c. price is available on nearly all reinforcing bar business. Bar iron is weaker, but mills adhere to formal quotations of 2.15c., Pittsburgh. Buyers report being able to place orders below this figure. The demand for common iron is slow, but refined iron is fairly active. There is a good demand for staybolt and engine bolt iron.

Sheets.—Prices on sheets range from 2.60c. to 2.75c. on blue annealed 3.50c. to 3.75c. on black and 4.50c. to 4.75c. on galvanized, all base Pittsburgh. Most of the mills are pretty well sold up for the remainder of the year and it cannot be said that there is any real weakness in the market despite the spread in quotations.

Light Rails.—A local dealer has been offered German 12-lb. rails at $36 per gross ton, New York, or $39, San Francisco. Domestic mills quote 2c. to 2.25c., Pittsburgh, those making the higher price being able to make shipment from stock.

Wire Products.—The Cambria Steel Co. is practically out of the market on wire nails and plain wire and its price is 5c. per 100 lb. above those quoted by other mills. A shortage of labor at wire mills has caused a firm situation in wire products, and there is no pressure to sell.

Warehouse Business.—Local jobbers quote as follows on steel products for shipment from stock, local delivery:

Soft steel bars and small shapes, 3.025c.; iron bars (except bands), 3.025c.; round edge iron, 3.20c.; round edge steel, iron finish, 1½ x ½ in., 3.20c.; round edge steel planished, 4c.; tank steel plates, ¼-in. and heavier, 3.125c.; tank steel plates, 3/16-in., 3.33c.; blue annealed steel sheets, No. 10 gage, 3.85c.; black sheets, No. 28 gage, 4.60c.; galvanized sheets, No. 28 gage, 5.75c.; square twisted and deformed steel bars, 3.15c.; structural shapes, 3.125c.; diamond pattern plates, ¼-in., 4.80c.; 3/16-in., 5c.; spring steel, 4.25c.; round cold-rolled steel, 3.85c.; squares and hexagons, cold-rolled steel, 4.35c.; steel hoops, No. 13 gage and lighter, 4.25c.; steel bands, No. 12 gage to 3/16-in., inclusive, 3.825c.; rails, 3.025c.; tool steel, 8.50c.; Norway iron, 6.50c.

Old Material.—While some in the trade believe that the weakness in the scrap market noted last week has passed, this is not borne out by this week's price quotations, which in certain instances show still further reductions. The weakness in the market was caused largely by the congestion of finished steel at Pittsburgh and Youngstown mills, which forced curtailment of operations and a shutting off of scrap shipments. In addition the railroad embargoes have made it impossible to ship to some points, with the result that shipments were all routed to a few places. Such mills soon shut off shipments and a good deal of scrap was backed up in the East with few places to which it could be shipped. This caused a somewhat panicky feeling among dealers, who made offers of concessions. While heavy melting steel is not particularly weak, other grades have sagged. No. 1 railroad wrought has been sold at $22, a decline of $1; heavy breakable cast is also lower, and pipe is weak. Shafting is off $2 a ton. Steel axles have sold at $27.50, a decline since the last reported sale of $2.50 a ton. The Pennsylvania Railroad will now accept west bound shipments only and will accept only those which originate on its own lines. This shuts off considerable scrap which ordinarily moves from New England to the Pittsburgh district, and a good deal of this scrap is available for Eastern mills.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$18.00 to $18.50
Scrap rails	18.00 to 18.50
Steel rails for rolling	21.00 to 22.00
No. 1 low phos., heavy 0.04 and under	25.50 to 26.00
Cast iron car wheels	23.00 to 24.00
No. 1 railroad wrought	22.00 to 23.00
No. 1 yard wrought	20.00 to 20.50
No. 1 forge fire	16.00 to 17.00
Bundled sheets (for steel works)	16.00 to 17.00
No. 1 busheling	15.50 to 16.00
Turnings (short shoveling grade for blast furnace use)	16.00 to 17.00
Mixed borings and turnings (for blast furnace use)	15.50 to 16.00
Machine shop turnings (for steel works use)	16.00 to 16.50
Machine-shop turnings (for rolling mill use)	16.00 to 17.00
Heavy axle turnings (or equivalent)	17.00 to 17.50
Cast borings (for steel works and rolling mills)	16.50 to 17.50
Cast borings (for chemical plants)	23.00 to 25.00
No. 1 cast	23.00 to 24.00
Heavy breakable cast (for steel plants)	20.00 to 21.00
Railroad grate bars	17.00 to 17.50
Stove plate (for steel plant use)	17.00 to 17.50
Railroad malleable	15.50 to 16.50
Wrought iron and soft steel pipes and tubes (new specifications)	16.00 to 16.50
Shafting	23.00 to 24.00
Steel axles	27.50 to 29.00

New Extras on Cotter Pins

The American Steel Co., Pittsburgh, has issued a new list of extras on cotter pins, effective Oct. 5. This list is premised on dropping the 90 per cent discount off the old list, also reducing on a few sizes but increasing on most sizes. The additions in fuel, labor and supplies are believed to warrant increased prices.

COMING MEETINGS

October

The National Association of Farm Equipment Manufacturers. Oct. 18 to 20, inclusive. Twenty-ninth annual convention, Congress Hotel, Chicago.

Society of Industrial Engineers. Oct. 18 to 20. McAlpin Hotel, New York. Business manager, George C. Dent, 327 South LaSalle Street, Chicago.

American Iron and Steel Institute. Oct 27. General meeting, Commodore Hotel, New York. H. H. Cook, 40 Rector Street, New York, assistant secretary.

November

National Personnel Association. Nov. 8, 9 and 10. Annual convention, William Penn Hotel, Pittsburgh. W. J. Donald, 20 Vesey Street, New York, managing director.

National Founders' Association. Nov. 22 and 23. Fall meeting, Hotel Astor, New York. J. M. Taylor, 29 South LaSalle Street, Chicago, secretary.

Dr. S. W. Stratton Elected President of Massachussetts Institute of Technology

Dr. Samuel Wesley Stratton, director of the Bureau of Standards of the Department of Commerce at Washington for the last 21 years and a noted physicist, was selected on Oct. 11 to be the next president of Massachusetts Institute of Technology. He will assume his new duties Jan. 1, next. Secretary Hoover has accepted his resignation from the bureau.



DR. S. W. STRATTON

Dr. Stratton was born in Litchfield, Ill., in 1861, and was graduated from the University of Illinois in 1884. For nine years he was professor of physics, mathematics and electrical engineering in the University of Chicago, after having spent seven years in a similar capacity in the University of Illinois. During the Spanish-American war he was commissioned lieutenant in the U. S. Navy. Yale, Cambridge and the University of Pittsburgh awarded him the degree of Doctor of Science. He is a member of the International Commission on Weights and Measures, American Institute of Electrical Engineers, American Society of Mechanical Engineers, American Physical Society, American Philosophical Society, American Association for the Advancement of Society and the National Academy of Sciences.

The resignation of Dr. Stratton will be felt by the steel industry. He contributed to its welfare not only as director of the bureau, but ofttimes through the channel of constructive technical papers presented before societies connected with the industry. On one such occasion he said: "If industrial problems are to be solved correctly, co-operation between such organizations as the American Iron and Steel Institute, the various steel companies and the Bureau of Standards is essential." And to this end two large laboratories erected during the war have been taken over by the bureau.

Dr. Stratton has repeatedly declined attractive offers from various industries. His retirement is attributed to the meager salary attached to his position. Mr. Hoover has endeavored to increase the pay of Government experts, in order to keep them in the Federal service, but Congress would not co-operate and as a consequence these experienced men are returning to industrial fields. In commenting on the retirement of Dr. Stratton, Secretary Hoover said: "The Massachusetts Institute of Technology, an educational institution, finds no difficulty in paying men of Dr. Stratton's caliber three times the salary the Government is able to pay them. Dr. Stratton has repeatedly refused large offers before, but the inability of the scientific men in the Government properly to support themselves and their families under the living conditions in Washington, and to make provision for old age makes it impossible for responsible department heads to secure such men for public service at Government salaries."

Thomas A. Edison has referred to Dr. Stratton as 100 per cent efficient. It is not known who will succeed him as director of the bureau.

Future Prices of Refractories Uncertain

PITTSBURGH, Oct. 16.—Conditions in the refractories market do not change much. While there are orders at present for all the fire clay and silica brick that can be shipped, this does not necessarily imply a big demand, since shipments still are more or less hampered by railroad transportation conditions. It is largely because of the railroad situation that the market is holding firm as to prices. Inability to ship fully means that manufacturers have to lay down the excess production and there is an additional item in the cost sheets through the retention of a full working organization on reduced plant operations. High costs naturally restrain price concessions, especially now with sufficient demand to take care of all the brick which can be shipped.

Nevertheless, there is a rather well-defined belief that present prices cannot hold. It is pointed out that with any betterment in the supply of cars and in the general performances of the railroads, consumers soon would have supplies sufficient to remove much of their present anxiety for shipments. It is also contended that the rise in fire clay and silica brick prices following the settlement of the coal strike did not merely recognize the increase in coal mining costs and the attendant adjustment in wages of brick plant labor, but also included the enhanced value of coal at the time. Coal prices since have come down appreciably from the levels prevailing in early September and another argument put forth in favor of lower prices is that independent steel companies, with but few exceptions, now are finding it rather difficult to sell at prices above those of the Steel Corporation. In other words, independent steel company prices are working lower. The general drift of iron and steel prices is down and this cannot fail to have a bearing on the prices that industry can or will pay for its raw materials.

On Pennsylvania silica brick, $45 per 1000, the general quotation, is not as low as sales are being made. Full application of the new duty to prices of magnesite and magnesite brick is not popular with consumers who feel the advance was too steep in view of the fact that as yet only duty free material is being marketed.

We quote per 1000 f.o.b. works:

Fire Clay	High Duty	Moderate Duty
Pennsylvania	$45.00 to $46.00	$39.00 to $42.00
Ohio	43.00 to 46.00	39.00 to 42.00
Kentucky	43.00 to 46.00	38.00 to 42.00
Illinois	43.00 to 45.00	40.00 to 42.00
Missouri	43.00 to 45.00	38.00 to 42.00
Ground fire clay, per net ton	7.50 to 8.50	
Silica Brick:		
Pennsylvania		45.00
Colorado		53.00
Birmingham		48.00
Ground silica clay, per net ton		10.00
Magnesite Brick:		
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.)		70.00
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)		45.50
Chrome Brick:		
Standard size, per net ton		40.00

To Resume Pittsburgh Basing Case

WASHINGTON, Oct. 17—The Federal Trade Commission will resume taking direct testimony in the Pittsburgh basing case in Washington, beginning Nov. 1, before Examiner J. W. Bennett. It is believed that this proceeding will continue one month. Present indications are that all of this testimony will be taken in Washington, though it might be decided to transfer the hearings to some other point. The names of witnesses and the character of the testimony have not been made known by the commission. After the closing of this testimony, the United States Steel Corporation will then present its testimony, and it is assumed that this will also take a protracted time and will be presented at various points of the country. After the closing of the Steel Corporation testimony, rebuttal evidence will be given by the commission preliminary to arguments, after which the case will be either dismissed or a cease and desist order issued. Should such an order be issued it is confidently believed the Steel Corporation would appeal the case to the courts and carry it through the Supreme Court of the United States if necessary.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Plates

Sheared, tank quality, base, per lb.....2.00c. to 2.25c.

Structural Material

Beams, channels, etc.....2.00c. to 2.10c.

Iron and Steel Bars

Soft steel bars, base, per lb.....2.00c. to 2.15c.
Refined iron bars, base, per lb.....2.60c.

Hot-Rolled Flats

Hoops, base, per lb.....2.90c. to 3.25c.
Bands, base, per lb.....2.90c. to 3.25c.
Strips, base, per lb.....2.90c. to 3.25c.
Cotton ties, per bundle of 45 lb.....$1.13

Cold-Finished Steels

Bars and shafting, base, per lb.....2.50c.
Strips, base, per lb.....4.50c.

Wire Products

Nails, base, per keg.....$2.70
Bright plain wire, base, per 100 lb.....2.45
Annealed fence wire, base, per 100 lb.....2.45
Galvanized wire, base, per 100 lb.....2.95
Galvanized barbed, base, per 100 lb.....3.35
Galvanized staples, base, per keg.....3.35
Painted barbed wire, base, per 100 lb.....3.00
Polished staples, base, per keg.....3.00
Cement coated nails, base, per count keg.....2.20
Woven fence, carloads (to jobbers).....70½ per cent off list
Woven fence, carloads (to retailers).....68 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads...60 and 5 per cent off list
Machine bolts, small, cut threads....50 and 10 per cent off list
Machine bolts, larger and longer....50 and 10 per cent off list
Carriage bolts, ⅜ x 6 in.:
  Smaller and shorter, rolled threads, 50, 10 and 5 per cent off list
  Cut threads.....50 per cent off list
  Longer and larger sizes.....50 per cent off list
Lag bolts.....60 and 5 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads....50 and 10 per cent off list
  Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.:
  Smaller and shorter.....45 per cent off list
  Larger and longer sizes.....45 per cent off list
Hot pressed square or hex. blank nuts...$3.25 to $3.50 off list
Hot pressed nuts, tapped.....3.25 to 3.50 off list
C.p.c. and t. sq. or hex. nuts, blank.....3.25 to 3.50 off list
C.p.c. and t. sq. or hex. nuts, tapped.....3.25 to 3.50 off list
Semi-finished hex. nuts:
  9/16 in. and smaller, U. S. S....75, 10 and 5 per cent off list
  ⅝ in. and larger, U. S. S.....70, 10 and 2½ per cent off list
  Small sizes, S. A. E.....80 and 5 per cent off list
  S. A. E., ⅝ in. and larger.....75 and 5 per cent off list
Stove bolts in packages.....80 and 5 per cent off list
Stove bolts in bulk.....80, 5 and 2½ per cent off list
Tire bolts.....50, 10 and 10 per cent off list

Cap and Set Screws

Milled square and hex. head cap screw.....75 per cent off list
Milled set screws.....75 per cent off list
Upset cap screws.....75 and 10 per cent off list
Upset set screws.....80 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb.....$3.15
Large boiler rivets, base, per 100 lb.....3.25
Small rivets.....65 per cent off list

Track Equipment

Spikes, 9/16 in. and larger, base, per 100 lb....$2.75 to $2.85
Spikes, ½ in. and smaller, base, per 100 lb.....3.50
Spikes, boat and barge, base, per 100 lb.....3.50
Track bolts, base, per 100 lb.....3.85 to 4.50
Tie plates, per 100 lb.....2.35 to 2.50
Angle bars, base, per 100 lb.....2.75

Welded Pipe

Butt Weld

Steel Inches	Steel Black	Steel Galv.	Iron Inches	Iron Black	Iron Galv.
⅛	51½	26	⅛ to ¼	+7	−23
¼ to ⅜	57	31½	½	26	8
½	62	48½	¾	32	17
¾	66	54½	1 to 1½	34	19
1 to 3	68	56½			

Lap Weld

2	61	49½	2	30	17
2½ to 6	65	53½	2½ to 6	32	19
7 to 8	62	49½	7 to 12	30	17
9 to 12	61	48½			

Butt Weld extra strong, plain ends

⅛	47½	31	¼ to ⅜	7	13
¼ to ⅜	52	36½	½	22	17
½	58	48½	¾	32	18
¾	64	53½	1 to 1½	34	20
1 to 1½	66	55½			
2 to 3	67	56½			

Lap Weld, extra strong, plain ends

2	59	48½	2	30	17
2½ to 4	63	52½	2½ to 4	32	21
4½ to 6	62	51½	4½ to 6	32	20
7 to 8	58	47½	7 to 8	28	13
9 to 12	52	39½	9 to 12	20	8

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 and 2½ per cent.

Boiler Tubes

Lap Welded Steel

1¾ in.	21½ to 23½
2 to 2¼ in.	36 to 38
2½ to 3 in.	47 to 49
3¼ to 13 in.	52 to 54

Charcoal Iron

1½ in.	+7
1¾ to 1⅞ in.	3
2 to 2¼ in.	13
2½ to 3 in.	18
3¼ to 4½ in.	20

To large buyers of steel tubes a supplementary discount of 5 per cent is allowed.

Standard Commercial Seamless Boiler Tubes

Discounts on cold-drawn tubes in carload lots, f.o.b. Pittsburgh, follow:

1 in.	57	2½ and 2¾ in.	40
1¼ and 1½ in.	49	3 in.	44
1¾ in.	33	3¼ to 4 in.	48
2 and 2¼ in.	36	4¼ in. and 5 in.	41

Hot Rolled

3 in.	46	3¼ to 4 in.	51

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take prioe of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base.....85 per cent off list
Carbon 0.30 to 0.40, base.....83 per cent off list
Plus usual differentials and extras for cutting.

Seamless Locomotive and Superheater Tubes

	Cents per Ft.		Cents per Ft.
2-in. O.D. 12 gage	13	2¼-in. O.D. 10 gage	17¾
2-in. O.D. 11 gage	14	3-in. O.D. 7 gage	33
2-in. O.D. 10 gage	15	1½-in. O.D. 9 gage	13
2¼-in. O.D. 12 gage	15	5⅝-in. O.D. 9 gage	51
2¼-in. O.D. 11 gage	16	5½-in. O.D. 9 gage	53

Tin Plate

Standard cokes, per base box.....$4.75

Terne Plate

(Per package, 200-lb.)

8-lb. coating	$9.30	25-lb. coating I. C.	$14.25
8-lb. coating I. C.	9.60	30-lb. coating I. C.	16.25
15-lb. coating I. C.	11.80	35-lb. coating I. C.	16.25
20-lb. coating I. C.	13.00	40-lb. coating I. C.	17.25

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....2.50c. to 2.85c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.35c. to 3.80c.

Galvanized

No. 28 (base), per lb.....4.35c. to 4.85c.

Tin-Mill Black Plate

No. 28 (base), per lb.....3.35c. to 3.75c.

Manufacturers have pamphlets, which can be had upon application, giving price differentials for gage and extras for length, width, shearing, etc.

Freight Rates

All rail freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic	$0.325	Buffalo	$0.215	St. Louis	$0.43
Philadelphia, export	0.235	Cleveland	0.215	Kansas City	0.735
Baltimore, domestic	0.315	Cleveland, Youngstown		Kansas City (pipe)	0.705
Baltimore, export	0.225	Comb.	0.19	St. Paul	0.595
New York, domestic	0.34	Detroit	0.295	Omaha	0.735
New York, export	0.255	Cincinnati	0.295	Omaha (pipe)	0.705
Boston, domestic	0.365	Indianapolis	0.31	Denver	1.275
Boston, export	0.255	Chicago	0.34	Denver (pipe)	1.215

Pacific Coast	$1.50
Pac. Coast, ship plates	1.20
Birmingham	0.69
Memphis	0.385
Jacksonville, all rail	0.50
Jacksonville, rail and water	0.415
New Orleans	0.515

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 30c. to 40c.; ship plates, 30c. to 40c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 30c. to 40c.; sheets and tin plates, 50c.; rods, wire rope cable and strands, 75c.; wire fencing, netting and stretcher, 50c.; pipe, not over 8 in. in diameter, 50c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

FABRICATED STEEL BUSINESS

Slight Decline in September—Bureau of Census Has Increased Capacity Figure

WASHINGTON, Oct. 17.—Sales of fabricated structural steel in September reflected a slight decline when compared with August, according to reports made to the Bureau of Census. Sales in September amounted to 61.9 per cent of shop capacity as against 64.9 per cent in August.

Reports received from 137 identical firms from April through September, with a shop capacity of 218,155 tons per month, show the following actual tonnages booked each month and the percentage of shop capacity represented by these bookings:

Month	Tonnage Booked	Per Cent of Capacity*
April	[illegible]	56.0
May	[illegible]	78.0
June	[illegible]	59
July	[illegible]	63.6
August	141,461	64.9
September	[illegible]	61.9

*The inclusion of additional firms this month has made [illegible] the [illegible] capacity reported previously.

Drop in Volume of Awards But Improvement in New Projects

Among the fabricated steel awards of the past week are the following:

Erecting shop of the American Locomotive Co., Schenectady, N. Y., 1000 tons, mentioned last week, will be fabricated and erected by the McClintic-Marshall Co.

Power plant for the West Penn Power Co., Springdale, Pa., 2500 tons, mentioned last week, was awarded to the McClintic-Marshall Co.

Two buildings for the Brooklyn Edison Co., Brooklyn, an employees' building and a switch house, totaling 3000 tons, to the McClintic-Marshall Co.

Fifteenth Regiment Armory, New York, 1700 tons, awarded some time ago to Post & McCord and then held up indefinitely, has been released and work will proceed at once.

Wrigley Building annex, Chicago, approximately 5000 tons, to American Bridge Co.

Mt. Vernon Car Mfg. Co., freight car repair shop, Mt. Vernon, Ill., 550 tons, to McClintic-Marshall Co.

Building for Childs Co., Chicago, 323 tons, to Holmes, Pyott & Co.

Prairie Oil & Gas Co., St. Louis, sixteen pipe line buildings, 708 tons, to Wisconsin Bridge & Iron Co.

Through truss and pony truss spans over Clearwater River, Spalding, Idaho, 266 tons, to Minneapolis Steel & Machinery Co.

Great Northern Railway, 250 pieces of steel plates for ore spouts, Allouez, Wis., 109 tons, to unidentified fabricator.

Gas holder for Conshohocken, Pa., 2500 tons, to Cruse-Kemper Co., Ambler, Pa.

Tileston & Hollingworth, Hyde Park, Boston, engine room addition, 100 tons, to the New England Structural Co.

Baseball cage, Andover, Mass., 125 tons, to the Boston Bridge Works, Inc.

Libby Owens Window Glass Co., Toledo, Ohio, 5500 tons, to the American Bridge Co.

Structural Projects Pending

Inquiries for structural steel works now being figured on include the following:

Equitable Building, Pennsylvania Station zone, New York, 16,000 tons; plans to be issued shortly for figures.

Baltimore & Ohio Railroad, bridges totaling 2500 tons; bids closed Oct. 18.

[illegible] paint [illegible] North River, New York, 400 tons.

Car sheds for the Interborough Rapid Transit Co., New York, 148th Street, New York, 6000 tons; bids being received by the Transit Commission.

Chicago Mill & Lumber Co., Chicago, 400 tons.

Addition to Seneca Hotel, Rochester, N. Y., 500 tons, bids taken.

Chevrolet Motor Car Co., assembly plant at Buffalo, 200 tons.

Ford Motor Co., Detroit, assembly building and engineering laboratory, 4000 tons.

Fremont School, Cleveland, 200 tons.

Pattison Sargent Co., Cleveland, paint factory in Chicago, [illegible] tons.

State [illegible]

RAILROAD EQUIPMENT BUYING

Nearly 2500 Cars Ordered and New Locomotive Lettings and Inquiries

A steady run of car business continues but not in sufficient volume to lessen competition to any extent. The week's items include:

The Chicago, Rock Island & Pacific Railroad has ordered 10 mountain type and 30 Mikado type locomotives from the American Locomotive Co.

The Lehigh Valley Railroad has ordered 15 Mikado locomotives from the American Locomotive Co. in addition to 15 placed with the Baldwin Locomotive Works.

The Minarets & Western Railroad has ordered five Mikado locomotives and the Green Bay & Western Railroad has ordered 2 consolidation type locomotives from the American Locomotive Co.

The Pere Marquette Railroad is inquiring for 22 eight-wheel switching type locomotives.

The Southern Pacific, Texas Lines, is inquiring for nine Pacific type locomotives.

The Central Railroad of New Jersey is in the market for 5 to 10 Mikado type locomotives and expects to inquire for more later.

The Baltimore & Ohio Railroad has ordered 1000 hopper cars from the American Car & Foundry Co., a duplicate of an order recently placed.

The Fruit Growers Express has contracted for 1000 steel underframes with the American Car & Foundry Co.

The New York, Chicago & St. Louis has ordered 300 steel underframes from the Illinois Car Mfg. Co.

The Chicago, Rock Island & Pacific inquiry is for the following types of cars: Box cars, 500; coal cars, 500; automobile cars, 500; flat cars, 250; ballast cars, 250; refrigerator cars, 250; stock cars, 250.

The Ford Motor Co. has ordered 500 50-ton coal cars from the Cambria Steel Co. and an additional 500 has been ordered from another car company.

The Tennessee Coal, Iron & Railroad Co. has ordered from the Chickasaw Shipbuilding Co., also a subsidiary of the United States Steel Corporation, 195 cars of various types.

The Pere Marquette is inquiring for 1500 automobile and 500 hopper cars, or 2000 as mentioned last week.

The Chicago & Northwestern is inquiring for 36 coaches, 10 baggage, 2 buffet and 2 combination cafe and parlor cars.

The Fruit Growers Express has ordered 1000 steel underframes from the General American Car Co.

The Sinclair Refining Co. has placed 10 tank cars with the American Car & Foundry Co.

The Arms Yager Co. has ordered 14 horse cars from the Pullman Co.

The Texas Co. is inquiring for 75 single compartment 6000-gal. and 25 double compartment 6000-gal. tank cars.

The Virginian wants 1000 hopper cars.

The Central of New Jersey is in the market for repairs on 100 passenger cars in addition to its inquiry for 65 new passenger service cars.

The Elgin, Joliet & Eastern is inquiring for repairs on 500 freight cars.

Decrease in Blindness

A statement from the Eye Sight Conservation Council of America announces that in 1920 there were 52,617 blind persons in the United States as against 57,272 in 1910. This is a decrease of from 623 to 498 per million population. This showing, although attributed partly to the result of a change in the method of recording the blind, is taken to indicate beyond question a great improvement due to preventive measures of guarding against infection, and the education of industry as to the importance of eye care and the preventive methods against accidents. If the same ratio existed now that did in 1910, it is estimated that there would be over 13,000,000 people now having vision who would be blind.

That hazards to the eyes of industrial workers are very great and cause a heavy economic loss, and that steps should be taken by employers to save the eyes of the nation's millions of workers was pointed out by G. A. Henry, general director of the Council, in connection with the statement issued.

Industrial heating operations are to be discussed at a meeting of the American Society of Mechanical Engineers at Newark, N. J., by Joseph A. Doyle, W. S. Rockwell Co., New York.

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
Oct.	Lake	Electrolytic*	New York	New York	St. Louis	New York	St. Louis
11	14.12½	13.75	33.75	6.62½	6.35	7.00	6.65
13	14.12½	13.75	34.12½	6.65	6.35	7.05	6.70
14	14.12½	13.75	....	6.65	6.35	7.10	6.75
16	14.12½	13.62½	34.50	6.65	6.35	7.15	6.80
17	14.12½	13.62½	34.50	6.65	6.35	7.20	6.85

*Refinery quotation.

New York

NEW YORK, Oct. 17.

The markets continue quiet and most of them are either firm or higher. No business was done on Thursday, Oct. 12, Columbus Day. The electrolytic copper market is the only one in which there has been any softening. Activity in tin has increased at advancing prices. There has been very little change in the strong position of the lead market, but there has been a marked recovery in zinc.

Copper.—The various rumors which have been current for the last few weeks regarding concessions in electrolytic copper have resulted in offerings by large and small dealers at 13.87½c., delivered, or 13.62½c., refinery, at which some business has been done and at which more metal is available. This is a concession of ¼c. Large producers, however, continue to adhere to the 14c., delivered, price and the market is therefore quotable at 13.87½c. to 14c., delivered, or 13.62½c. to 13.75c., refinery. It is generally admitted that the amount available from dealers is not large, but nevertheless it is sufficient to be a factor in the market. There has been some let-up in foreign demand and also in domestic, due to the confused condition in transportation. Consumers, however, are using copper heavily and their return to the market is inevitable in the near future. Lake copper is practically unchanged at 14.12½c. to 14.25c., delivered.

Tin.—Sales of Straits tin have again been fairly heavy with the largest transactions reported on Wednesday, Oct. 11, totaling from 500 to 600 tons, mostly October delivery, with consumers and dealers the participants. One dealer is reported to have sold 250 tons of this. There were also fair sales of December shipment from the East during the latter part of the week at 33.87½c., and practically every day last week some business was done. The consuming demand referred to has been principally from alloy makers whose stocks are low. Tin plate producers are expected to be the best buyers later. The slow discharge of tin at docks and the difficulty in transporting it because of railroad conditions have been a factor in the market. Yesterday the market was very quiet but firm at 34.50c. for spot Straits tin, but a little easier for November arrivals at 34c. to 34.25c. To-day the market has been quiet with the quotation for spot Straits at 34.50c. New York. About 150 to 200 tons was sold largely on the New York Metal Exchange. This is the first time in many months that Straits tin has sold as high as these figures. The London market has also sharply advanced to £169 7s. 6d. for spot standard, £170 10s. for future standard and £170 7s. 6d. for spot Straits, all about £5 per ton over the prices a week ago. Arrivals thus far this month have been 3513 tons, with 8150 tons reported afloat.

Lead.—The market continues quiet but firm, with little change in prices. Consumption is heavy on contracts but there is no special demand and no great pressure to sell. The position of the market is as strong as ever and sellers for October and November are few. The leading interest continues to quote 6.30c., St. Louis, and 6.50c., New York, while quotations in the outside market are 6.35c., St. Louis, and 6.65c., New York.

Zinc.—The feature of interest has been the publication of statistics for September which showed a reduction in stocks for the month of 2823 tons. Although the September production of 33,134 tons was an increase of 1711 tons over August and also the largest for any month in two years, yet it was smaller than deliveries which were 35,957 tons. Previous to this the market has declined but, on the receipt of this news, it immediately started to advance until to-day it had practically recovered all the losses sustained on the re-action. Prime Western for delivery the rest of the year is quoted to-day at 6.85c., St. Louis, or 7.20c., New York. These quotations are practically the same as the high point in the recent advance late in September. Consuming demand is fairly good and the market has been active recently.

Antimony.—The market is quiet with wholesale lots of Chinese metal for early delivery quoted at 6.75c. to 7c. per lb., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, made by foreign producers is obtainable from importers at 20c. to 21c. per lb., New York, duty paid, but the leading American producer continues its policy of declining to make public the prices at which it is selling its product.

Old Metals.—Business continues fair with a sluggish market. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	13.50
Copper, heavy and wire	12.75
Copper, light and bottoms	11.25
Heavy machine composition	10.50
Brass, heavy	8.25
Brass, light	6.50
No. 1 red brass or composition turnings	9.50
No. 1 yellow rod brass turnings	7.50
Lead, heavy	5.50
Lead, tea	4.00
Zinc	4.25

Chicago

OCT. 17.—Tin and spelter have advanced, while the other metals remain unchanged. The rise in tin was due to world market conditions, rather than to any particular activity to be noted in this territory. Spelter was active early last week, only to decline towards the end of the week and then to recover again. Buying of copper is rather liberal, but the possibilities of securing a concession under the market level appear brighter to-day than a week ago. Lead is quiet. Among the old metals, lead pipe, zinc and most grades of copper have advanced. We quote, in carload lots, lake copper, 14.50c.; tin, 35c. to 36c.; lead, 6.37½c.; spelter, 6.85c.; antimony, 8.50c., in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 11.25c.; copper bottoms, 9.75c.; red brass, 9c.; yellow brass, 7c.; lead pipe, 4.75c.; zinc, 4.25c.; pewter, No. 1, 20c.; tin foil, 22.50c.; block tin, 26c., all buying prices for less than carload lots.

St. Louis

Oct. 17.—Lead for the week was steady and unchanged at 6.35c., carlots, while slab zinc was a little easier, 6.65c., against 6.75c. to 6.80c. last week. On old metals we quote: Light brass, 3.50c.; heavy red brass and light copper, 7c.; heavy yellow brass, 4c.; heavy copper and copper wire, 7.50c.; zinc, 2c.; pewter, 15c.; tin foil, 20c.; tea lead, 2c.; aluminum, 9c.

New Records in Cement Production

Portland cement produced in September, 11,424,000 bbl., while lower than the 11,664,000 bbl. in August and 11,557,000 bbl. in July, was greater than in any other month. The quarter's production, 34,645,000 bbl., was nearly 10 per cent above the highest previous quarter ever recorded. For the first nine months the output was 81,563,000 bbl., comparing with 72,307,000 bbl. in the first nine months of 1921. The year is almost certain to show the largest total ever achieved.

Final figures for production in 1921 are given by the Geological Survey at 98,842,049 bbl., and for 1920, the high record year to date, at 100,023,245 bbl. If 1922 shows the same ratio of gain over 1921 during the last three months as during the first nine months, the year's total will be about 111,000,000 bbl.

PERSONAL

William H. Oliver, manager of sales in Philadelphia since 1915 for the Republic Iron & Steel Co., Youngstown, Ohio, has been appointed manager of sales for this company in New York, effective Nov. 1, succeeding W. A. Phelan, who resigned several months ago to go into business for himself. Mr. Oliver's first connection with the steel business was with the Republic Iron & Steel Co. in New York, in February, 1900. He was sent to Philadelphia a year later and in January, 1915, became manager of sales of that office. Monday, Oct. 16, the pipe jobbers of Philadelphia gave a dinner in Mr. Oliver's honor and presented him a silver set. Mr. Oliver will be succeeded as manager of sales in Philadelphia by Charles S. McKinley, who about a year ago resigned as assistant general sales manager, Republic Iron & Steel Co., in Youngstown, Ohio, to go into the publishing business with his brother in Philadelphia. Mr. McKinley's first association with the company was as a salesman in the Philadelphia office. Later he was made Pittsburgh district sales manager, holding this position for about two years, being transferred to Youngstown Jan. 1, 1919, and made assistant general sales manager.



WILLIAM H. OLIVER

J. L. Mueller, formerly with the American Chain Co., York, Pa., has resigned to become vice-president and secretary in charge of production with the International Chain & Mfg. Co., that city.

W. K. Swigert, Indianapolis, has been appointed production manager of the Fox Motor Car Co., Philadelphia.

G. Morrison Gaither, Jr., who has been connected with the Winchester Repeating Arms Co., New Haven, Conn., for several years, was recently elected vice-president and general manager Baltimore Motor Service Corporation, Baltimore, Md.

W. F. Lusk has become secretary-treasurer and general engineer of the Hendry Machine & Engineering Co., Fort Myers, Fla.

George S. Westerfield has become manager of the southwestern district with the McIntosh & Seymour Corporation and is located in Houston, Tex.

J. M. Meany is now associated with the Lidgerwood Mfg. Co., Portland, Ore., as sales manager.

F. Scarf, managing director Bromford Iron Co., Ltd., West Bromwich, England, arrived in New York last week on the Berengaria. He will visit a number of hoop mills and cold rolled strip plants.

Lee Hillard, of the Chicago office, Bethlehem Steel Co., has been appointed structural sales agent at St. Louis for that company.

E. E. Hoffman, New York, has been appointed plant engineer at the works of the Hendee Mfg. Co., Springfield, Mass., in charge of the engineering division, with direct supervision of tools and tool design, product design, maintenance and inspection.

At a special meeting of the board of directors of the Grant-Lees Gear Co., Cleveland, Oct. 13, Henry A. Tremaine was elected director and president, succeeding as president Richard Ferguson, who was also general manager. Carl W. Blossom was elected a director. Mr. Blossom, who is president of the Automobile Screw Products Co., replaces F. E. Simmons on the board, Mr. Simmons having resigned as vice-president and as director. Mr. Tremaine is treasurer of the Standard Equipment Co. and a director of various companies in Cleveland, including the Peerless Truck & Motor Co. The company manufactures motor car and truck transmissions.

Albert Peter, for many years associated with the Chain Belt Co., Milwaukee, as a designing and production engineer, has resigned, effective Nov. 1, to become associated with the Milwaukee Air Power Pump Co. as chief engineer. The pump company has broken ground for a new works, 130 x 150 ft., on a new site.

R. N. Barnum, vice-president of the Mercer Motors Co., Trenton, N. J., has been elected president, succeeding George B. Smith, resigned. W. A. Smith, heretofore second vice-president, has been elected first vice-president to fill the place of Mr. Barnum. H. D. Fogg, assistant secretary and treasurer, has been advanced to secretary and treasurer.

T. W. Owen was elected permanent secretary of the American Gear Manufacturers' Association at its semi-annual meeting in Chicago last week. When the association recently decided to move its office from Philadelphia to Cleveland and that its growth and scope of activity necessitated a secretary who could devote his entire time to this work, Mr. Owen was chosen for this position and his election was formally approved at the Chicago meeting. He has been connected in a secretarial capacity with the Cleveland office of the Johns-Manville Co. for 10 years. The new offices of the association are at 2443 Prospect Avenue, Cleveland.



T. W. OWEN

F. C. Knight, for the past 10 years with the New England Coal & Coke Co., Boston, has associated himself with Alley & Page, Boston, pig iron, coke, etc.

David L. Eynon, president Pittsburgh Rolls Corporation, Pittsburgh, sailed on Oct. 10 for a two months' European tour during which he will visit the leading steel plants of England, France and Belgium.

N. T. Montague, Norton Co., Worcester, Mass., abrasives and grinding machinery, spoke on Factors Affecting Grinding Wheels Selection before the machine shop section, Providence Engineering Society, Providence, R. I., Tuesday evening, Oct. 10.

D. I. Miller, for several years manager of the Grand River, Ky., plant of J. B. Clow & Sons Co., has been appointed manager of that company's Coshocton, Ohio, plant. F. W. Schwab, who has been manager of both the Coshocton and Newcomerstown, Ohio, plants, will devote his entire time to the latter plant.

Walter S. McKee has resigned as vice-president and director American Manganese Steel Co., and will develop the business of the Inland Engineering Co., 28 East Jackson Boulevard, Chicago, of which he is president.

C. R. Dodge, recently western sales manager Lakewood Engineering Co., Cleveland, has been appointed sales manager of the Northwest Engineering Co., Green Bay, Wis., manufacturer of Northwest crawler cranes, draglines, shovels and similar equipment, with general sales offices at 28 East Jackson Boulevard, Chicago. Mr. Dodge was for several years in charge of the busi-

ness of the Milwaukee Concrete Mixer Co. in the East. Later he organized C. R. Dodge & Co., handling a general line of contractors' equipment, and then for several years was with the Lakewood Engineering Co. as manager of its Philadelphia office, later as field sales manager and finally as western sales manager. W. W. Mutter, vice-president Northwest Engineering Co., who had been in charge of the sales organization, will devote his time to production and special problems.

E. D. Jerome, formerly of the pig iron sales department of Bethlehem Steel Co.'s Boston office, has been appointed sales representative in New England by the Pulaski Iron Co., Real Estate Trust Building, Philadelphia, which will put its furnace in blast shortly, after two years' idleness. Mr. Jerome will have an office at 131 State Street, Boston.

President Julius Kahn of the Truscon Steel Co., Youngstown, Ohio, was the guest of honor at a "welcome-home" dinner given by associates on Oct. 14, following his three months' stay in Europe. Mr. Kahn took occasion to express his views on European conditions, voicing little hope for early revival of trade with continental countries, owing to their currency depreciation. He contends that cancellation of war debts would help in restoring such currencies to normal and thus stimulate trading.

Ray S. Dean has been appointed district manager Manning Maxwell & Moore, Inc., at Chicago. Mr. Dean was born at Sauk Center, Mich., Feb. 25, 1893, and attended the engineering school of the University of Minnesota, being a member of the class of 1906. In January, 1909, he entered the employ of Manning, Maxwell & Moore, and since then has remained with that company.

Jack E. Shibeler, for 10 years with the purchasing department of the Link Belt Co., Indianapolis, and later representing the LaSalle Steel Co. in the Indiana and Ohio territories, has been appointed as Indianapolis district manager of the Betz-Pierce Co., Cleveland, jobbers in iron and steel.

C. C. Upham, chairman of the board of directors of the Diebold Safe & Lock Co., Canton, Ohio, has been elected president of that company to fill the vacancy caused by the recent death of John C. Welty.

Henry L. Thompson, president Bostwick-Braun Co., Toledo, Ohio, and the William Bingham Co., Cleveland, wholesale hardware dealer and jobber in iron and steel, has been elected chairman of the board of directors and chairman of the executive committee of the Willys-Overland Co., Toledo, Ohio.

J. F. Geary, recently superintendent Niagara Radiator Co., North Tonawanda, N. Y., and previously in charge of various plants of the United States Radiator Corporation and the American Radiator Co., is now district manager in western New York, Ontario and northwestern Pennsylvania for the Business Training Corporation, New York, specialist in training courses in production methods for foremen and production executives.

During the first six months of 1922 the mining companies of Melilla, Morocco, exported over 100,000 tons of iron ore, of which a large portion went to Germany. The complete particulars are not yet available, but during the first five months only 17,000 tons were shipped to British ports and 52,430 tons to Rotterdam. In June and July only 8824 tons were shipped to Great Britain. It seems clear, says the London *Iron and Coal Trades Review*, that these exports have considerably affected the sales of iron ore at Bilbao and Santander.

In the Mahoning and Shenango Valleys jobs are more plentiful than men to fill them, say employment managers. Many plants are seeking workers. For common labor from 40 to 55c. per hr. is being paid. The demand for common labor exceeds that for skilled workmen. Shortage of sheet mill workers is being experienced to some extent, and schedules announced by makers at the beginning of a week are seldom maintained throughout the period.

OBITUARY

Frederick E. Anthony

FREDERICK E. ANTHONY, who for many years was in charge of the automatic screw machine tool designing of the Brown & Sharpe Mfg. Co., died on Oct. 8, his 58th birthday, leaving a widow and one son, Clyde. Mr. Anthony was born in East Providence, and at the age of 17 entered Brown & Sharpe's employ as an apprentice. He remained with the company until January, 1890, after which he worked with the Eastman Kodak Co., and with Bugbee & Niles, North Attleboro. In October, 1898, he returned to the employ of the Brown & Sharpe Co., where he remained until the time of his death. A friend of long standing pays him this tribute:

"Mr. Anthony represented the type of trained mechanic which has made so much for the progress of mechanical lines in this country. He was fertile in devising ways and means of doing work, and his sound mechanical judgment and training kept him from various pitfalls that are so apt to embarrass a mechanical genius. Through his advice and experience, many of the details of the automatic screw machines were brought out, and there is hardly a large manufacturing plant in the country making use of this type of machine that is not using some of the plans that Mr. Anthony had worked out. His loyalty to the company was such as showed itself in continually seeking to advance the solution of problems of customers with whom he came in contact. As a companion and shopmate, his untiring courtesy and cheerfulness made him a man who was able to impress himself upon all who came in contact with him as a companion to be cultivated from a sense of pure friendship."

HARRY JACOB FRANK, SR., president of the Frank Foundries Corporation, Davenport, Iowa, died on Oct. 4, following an illness of six months. He was 71 years of age, having been born at Akron, Ohio, on Dec. 28, 1850. Mr. Frank came to Davenport in 1888 and for 10 years was superintendent of the Davenport Machine & Foundry Co. In 1898 he started in business for himself and established the Frank Foundries on West Second Street and Wilkes Avenue. In 1915 a branch foundry was established in Moline under the same firm name.

JOHN B. FOOTE, president and treasurer Foote Bros. Gear & Machine Co., Chicago, died suddenly in that city on Oct. 12. Just two days before Mr. Foote had served as toastmaster at a banquet of the American Gear Manufacturers Association in that city. Mr. Foote was prominent in the activities of that society and was a member of the Executive Committee and chairman of the Industrial Relations Committee. The deceased was born in Chicago in 1865.

GEORGE KOOP, president Columbia Architectural Iron Works, Chicago, died in that city on Oct. 8. Mr. Koop was born in Germany in 1860, coming to America 17 years later. In 1888 he founded the company of which he was president at the time of his death.

SPENCER F. MOORE, chief engineer Collins Co., Collinsville, Conn., died on Oct. 11, in his 36th year. Mr. Moore was born in Schenectady, N. Y., and was graduated from Sheffield Scientific School, Yale University. Later he was associated with the Westinghouse Electric & Machine Co. and the Terry Steam Turbine Co., Hartford, as a mechanical engineer. During the war he was a senior lieutenant and was stationed at the Naval School, Hoboken, N. J.

CHARLES S. GINGRICH, head of the sales department of the Cincinnati Milling Machine Co., Cincinnati, died in that city, Oct. 10, from a complication of diseases, at the age of 48. He had been with the company for about 22 years and was well known throughout the machine tool trade.

EMIL A. FOHT, chief engineer, Miller Saw Trimmer Co., Pittsburgh, died at his home in Sewickley, Pa., after a brief illness of pneumonia. He was born in Erie, Pa., 41 years ago.

British Iron and Steel Market

America Still Buying British Pig Iron — Steel Prices Generally Lower — September Exports, 279,169 Tons

(By Cable)

LONDON, ENGLAND, Oct. 17.

America is inquiring for pig iron and sales are being made covering December and January shipment. The market is firm, with continued scarcity of better grades of Cleveland material.

Hematite is firmer on sustained demand for home and export. Sales have been made to America, but generally these have been of special analysis iron. Bilbao Rubio is nominally 23s. to 23½s. ($5.10 to $5.21) ex-ship Tees.

There is improved demand for finished iron and steel. China and Japan are inquiring for bridge building material and the Indian Government is making substantial purchases of railroad equipment. Prices are firm.

India, China and Japan are buying Continental steel in small lots. Czecho-Slovakian merchant bars are being sold at £9 (1.78c. per lb.) c. i. f. Japan. Belgian merchant bars have been sold at £7 17½s. (1.56c. per lb.) cost and freight to India. Continental pig iron is quiet.

Tin plate is firmer, with more export buying, including substantial quantities for Germany. Welsh tin plate makers have agreed to a minimum selling price of 19¼s. ($4.27) basis, f.o.b. The Welsh association has reduced tin plate bars to £7 ($31.08) delivered.

Galvanized sheets are steady, with moderately small demand. Japan is inquiring for black sheets and some sales have been made. Small sales have been made also to the Continent and India.

Total British exports of iron and steel in September were 279,169 tons. [This compares with 281,954 tons in August and 251,743 tons in July.]

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $4.44 per £1, as follows:

Durham coke, delivered	£1	10½s	to £1	11s.	$6.77 to	$6.88
Cleveland No. 1 foundry	4	17½			21.64	
Cleveland No. 3 foundry	4	12½	to	4 15	20.53 to	21.09
Cleveland No. 4 foundry	4	10			19.98	
Cleveland No. 4 forge	4	5			18.87	
Cleveland basic	4	0			17.76	
East Coast mixed	4	12	to	4 12½	20.42 to	20.53
Ferromanganese	15	0			66.60	
Ferromanganese*	14	10	to	14 15	64.38 to	65.49
Rails, 60 lb. and up	7	5	to	8 0	32.19 to	35.52
Billets		5½	to	8 0	31.63 to	35.52
Sheet and tin plate bars, Welsh	7	0			31.08	
[illegible] base box	0	1	to	0 1 9½	1.22 to	1.27 c. per lb.
Steel [illegible]			to	8 0	1.68 to	1.78
[illegible] steel	11	10	to	12 0	2.28 to	2.38
Boiler		0	to	9 10	1.78 to	1.88
Ship [illegible]			to	8 15	1.63 to	1.72
Boiler			to	8 15	1.63 to	1.72
[illegible]		5	to	9 10	1.78 to	1.88
[illegible]	12	15		upward	3.19	
Black sheets	12	0			2.38	
Steel [illegible]	12	0	to	12 10*	2.38 to	2.38*
[illegible]					1.68	
Cotton ties, Indian specification					2.97	

Continental Prices, All F. O. B. Channel Ports. Delivery as Specified

[illegible]						
[illegible]						
[illegible]						

To Hold Power Exposition in New York

The National Exposition of Power and Mechanical Engineering to be held at the Grand Central Palace in New York from Thursday, Dec. 7 to Dec. 13, closing, however, on the intervening Sunday, is being planned in co-operation with the national societies interested in the economy of fuel and in the production and use of power generated therefrom. The opening of the exposition in the Grand Central Palace will take place on the closing day of the annual meeting of the American Society of Mechanical Engineers, and time has been set aside in the A. S. M. E. program so that members desiring may attend the opening exercises.

The American Society of Refrigerating Engineers is to hold its meeting at the Hotel Astor for three days commencing Dec. 5, and its members, as well as the members of the A. S. M. E., will be admitted to the exposition upon the presentation of their membership cards.

On the advisory committee of the exposition are Irving E. Moultrop, Edison Electric Illuminating Co. of Boston, chairman; Dexter S. Kimball of Cornell University, president American Society of Mechanical Engineers; Alexander G. Christie, chairman power division A. S. M. E.; Fred Felderman, president National Association of Stationary Engineers; Milan R. Bump, president National Electric Light Association; N. A. Carle, vice-president Public Service Production Co. of New Jersey; E. B. Katte, chief engineer electric traction New York Central Railroad; Fred R. Low, editor *Power;* David Moffat Myers, consulting engineer, New York; Calvin W. Rice, secretary American Society of Mechanical Engineers; and the managers, Charles F. Roth and Fred W. Payne, with offices in Grand Central Palace.

To Hold Electric Switch Exhibit at Philadelphia

A congress and exhibit has been planned by the Philadelphia section of the Association of Iron and Steel Electrical Engineers to be held at the Hotel Majestic, Philadelphia, Saturday, Nov. 4. About twenty-five manufacturers of safety switches for 600-volt services and below, including motor starting switches of the across-the-line type only and limit switches for cranes, will exhibit their products at that time. The exhibit will open at 1 p. m. and at 6.30 p. m. a dinner will be served. Following the dinner P. T. Vanderwaart, electrical engineer of the New Jersey Zinc Co., Palmerton, Pa., will deliver a paper on the subject followed by a general discussion.

Fact-Finding Commission Beginning Its Labor

WASHINGTON, Oct. 17.—The fact-finding coal commission recently appointed by President Harding will hold its first meeting at 11 o'clock to-morrow in the office of George Otis Smith, director of the Geological Survey. It is the expectation of the commission to first study Government reports on coal production, costs, etc., which probably will require one month, before beginning a thoroughgoing survey throughout the mining districts of the country. It is believed that John Hays Hammond will be named chairman of the commission. The seven members of the commission are representative of the public, none of them being associated with the coal industry. It will study the industry from production to consumption in more exhaustive detail, it is stated, than has been attempted previously. The results of the investigation are expected to be made the basis for legislation intended to remedy permanently conditions in the industry that have led to frequent strikes, and shortage and high prices of fuel. President Harding and his advisors are said to be convinced that the "fundamental illness" of the coal industry is that it has failed to modernize and this phase of the question is to be given particularly careful study by the commission with a view to placing coal mining on an efficient basis.

It has been stated that neither the commission nor the Government will attempt arbitrarily to prevent strikes but rather an effort will be made to eliminate causes of strikes. Besides Mr. Hammond other members of the commission are: former Vice-president Thomas R. Marshall; Clark Howell, editor Atlanta *Constitution;* George Otis Smith; Dr. Edward T. Devine, Iowa, and Charles P. Neil and Judge Samuel Alschuler, of Illinois.

Brier Hill Steel Co. Plans

Engineers of the Brier Hill Steel Co., Youngstown, are continuing their study of the company's expansion program, and directors have not yet approved any program. In addition to adding lap weld tube mills, the company is likewise considering the construction of butt weld units. The lap weld mills planned will roll pipe from 2 to 12-in. in diameter, though the company has considered units capable of rolling 16-in. pipe. Skelp for these mills will be furnished from the 132-in. plate mill, for the larger sizes, and from a new strip mill, which is to be added, for the smaller sizes.

According to plans now in process, butt weld units may be added to produce wrought iron pipe, absorbing part of the output of the Youngstown Steel Co. at Warren. Interests of the Brier Hill company control the Youngstown Steel Co.

Porter-Cable Machine Co. Buys Another Company

The Porter-Cable Machine Co., Syracuse, N. Y., manufacturer of lathes, has purchased the plant and business of the Syracuse Sander Mfg. Co., Syracuse, and will manufacture the products of the latter company in its own plant, these including disk sanders, oscillating spindle sanders, belt sanders, band saws and wood lathes, all motor driven and designed especially for pattern shops. The building and machinery of the Syracuse Sander Mfg. Co. will be offered for sale.

British Pig Iron and Steel Output for September

LONDON, ENGLAND, Oct. 16 (*By Cable*).—The production of pig iron in Great Britain in September was 430,300 gross tons and that of steel ingots and castings 555,900 tons. These compare with 411,700 tons of pig iron and 520,800 tons of steel ingots and castings in August.

The pig iron and steel output for Great Britain by months so far this year has been as follows in gross tons:

1922	Pig Iron	Steel Ingots and Castings
January	288,000	327,500
February	300,100	418,800
March	389,800	549,400
April	394,300	404,200
May	407,900	462,300
June	369,200	400,200
July	399,100	473,100
August	411,700	520,800
September	430,300	555,900

The September output of pig iron and steel is the largest month of the year. The 1921 pig iron production averaged 217,600 tons per month and the steel output 302,100 tons per month. In 1913 the two figures were 855,000 tons and 639,000 tons per month respectively.

Pulverized coal is to be used in the stoker fired boiler plant at Roanoke of the Norfolk & Western Railroad. The plant comprises six 200 hp. Babcock & Wilcox boilers, each to have one vertical coal burner and five 400-hp. boilers, each to have three vertical pulverized coal burners. Various grades of coal from the Pocahontas field are to be used, especially bone and refuse coal, varying in ash content from 20 to 38 per cent with a calorific value of 10,000 to 11,000 B.t.u. per pound. The equipment will be installed by the Fuller Engineering Co., Allentown, Pa., and will include a Fuller-Lehigh rotary dryer, Fuller-Lehigh pulverizers, and the distribution of the powdered fuel will be by means of the Fuller-Kinyon conveying system over a distance of 250 ft. in 4-in. pipe lines.

PENNSYLVANIA TOOL INQUIRY

Road Asks for Prices on 80 Machines—Buys $225,000 Worth of Cranes

PHILADELPHIA, Oct. 18.—The Pennsylvania Railroad has issued an inquiry calling for prices on about 80 machine tools, aggregating about $300,000 in value, for its new shops at Altoona, Pa., and has placed an order for 16 cranes for the same shops with the Niles-Bement-Pond Co. The crane order, the largest of its kind placed in the East in years, totals upwards of $225,000 and includes two of 250 tons capacity; two 60-ton, two 50-ton, 10 15-ton.

The tool inquiry covers the following machines and it is expected in the local machine-tool trade that purchases will be made within the next few weeks:

One journal turning lathe.
Two 30-in. engine lathes.
Four 24-in. engine lathes.
Nine 16-in. engine lathes.
One 36-in. engine lathe.
One 48-in. engine lathe.
Three No. 5 knee-type milling machines.
One 42-in. coach wheel lathe.
Six 36-in. vertical turret lathes.
Three 42-in. vertical turret lathes.
One 90-in. tire mill.
Two 90-in. driving wheel lathes.
Ten 36 in. x 4 in. wet emery grinders.
Two 36-in. planers.
Two 48-in. planers.
Three Warner & Swasey No. A turret lathes.
Three 5-ft. radial drills.
One 6-ft. radial drill.
[illegible] horizontal turret lathes.
Five 24-in. shapers.
Two 2¼ in. x 26 in. horizontal turret lathes.
One 2-in. pipe machine.
Two 15-in. slotters.
Three 18-in. slotters.
Four 5-in. portable cylinder boring bars.
One crown and staybolt threading and reducing machine, six spindles.
One bolt turning machine, four spindles.
One bolt pointing machine.
One 1½-in. bolt heading machine.

The Pennsylvania Railroad has just placed orders for one 90-in. Sellers driving wheel lathe, one Betts journal turning lathe, one Niles quartering machine, and one 1½-in. semi-automatic bolt threading machine and one 1½-in. roll threading machine, the latter two machines being purchased from Manning, Maxwell & Moore, Inc.

Progress Report on Rock Drill Steel Breakage

WASHINGTON, Oct. 17.—The report relating to the existing status of the practice of heat treatment of drill steels and the extent to which breakage occurs has been completed by engineers serving the Bureau of Mines and the Bureau of Standards. The report will be considered by the executive committee of the advisory board appointed by the American Institute of Mining and Metallurgical Engineers to co-operate with the two bureaus after which it will be made public. Being of a preliminary character the report is to be followed by work for another year on the subject, when special attention will be devoted to the study of breakage in oil well drills.

Request has been made by Benjamin F. Tillson, chairman of the executive committee, for members of the committee to meet on Nov. 17 for discussion of the report just completed and to recommend any changes that may be considered necessary before presentation of the report to the institute on Feb. 20.

It is indicated through field work on the problem, done largely by Francis B. Foley and Charles Y. Clayton, metallurgists with the Bureau of Mines, and by Henry S. Burnholz, a Bureau of Standards metallurgist, that greatly increased efficiency in mining operations may be obtained by distributing more precise knowledge regarding the breakage of drill steel and its heat treatment.

Drill steel handling at 60 mines west of the Mississippi River was studied during April, May and June by the three metallurgists and results of all the work done are summarized in the report to be considered on Nov. 17 by the executive committee. This committee is composed of the following: B. F. Tillson, New Jersey Zinc Co., chairman; W. H. Leonard, Denver Rock Drill Mfg. Co.; Dr. J. A. Mathews, Crucible Steel Co. of America; Van H. Manning, American Petroleum Institute; D. A. Lyon, Bureau of Mines; G. K. Burgess, Bureau of Standards.

American Steel Shipments to South Africa

Total imports into the Union of South Africa, from the United States, amounted in 1913 to $17,851,000, in 1920 to $82,946,000, and in 1921 to $38,931,000. As these figures are respectively 9½, 18 and 16 per cent of the total imports of that country, the American share has been almost doubled in percentage since before the war. Iron and steel and other metal imports and manufactures of metal are covered in an appended table, which has been taken from a report of the United States vice consul at Cape Town. In showing the amounts which the United States and Great Britain, respectively, furnished in 1921 in a large number of mechanical items, and the percentage which the United States figure bore to the whole, the table indicates in some measure the lines along which special efforts to increase sales might bear fruit.

Imports into South Africa of Metal Manufactures
(Expressed in Thousands)

Articles	Total	Great Britain	United States	Per Cent	Others
Agricultural machinery	$6,706	$2,639	$2,584	38	$890§
Aluminum ware	229	90	8	3½	108*
Brass and manufactures	565	304	10	3	187
Clocks and watches	525	89	169	32	234†
Copper and manufactures	162	122	33	20	...
Electrical machin'y, etc.	9,131	5,664	2,935	31	...
Enameled ware	724	349	45	6¼	206*
Hardware and cutlery	10,484	7,210	1,605	15	650*
Iron and steel:					
Bars, bolts, rods	2,172	1,609	54	2½	167§
Chains	205	139	42	20½	...
Beams	581	421	65	11	50§
Hoops	106	48	26	25	...
Pipes and fittings	1,403	1,076	140	10	151*
Wrought iron and steel	1,756	1,191	174	10	301*
Lead and manufactures	108	56	41	39	...
Machinery and parts.					
Air compressors	243	126	95	39½	...
Bands and belting	921	461	430	46½	...
Battery cloth	184	162	18	10	...
Boilers	900	815	40	4½	...
Cranes	428	266	74	17	88§
Elevators	322	300	21	6½	...
Engines	1,148	1,031	104	9	...
Machine tools	1,879	1,434	1,356	72	241*
Mining	6,125	3,478	1,647	27	1,1*
Printing	807	388	298	37	...
Pumps	791	425	184	23	182§
Windmills	572	98	468	82	...
Rails and railroad material	1,096	563	361	33	...
Telegraph and telephone material	290	185	61	21	...
Tin and tinware	435	390	14	3	...
Tramway material	629	341	286	45	...
Vehicles and parts:					
Bicycles	434	391	40	9	...
Carriages	188	...	62	33	76§
Motorcycles	829	328	151	18	...
Motor trucks and cars	4,829	1,113	2,295	58	1,159§
Total of above	$63,474	$37,315	$16,427	26	...

*Germany. †Japan. ‡Switzerland. §Canada. ¶Belgium. ‖Canada, with Belgium sending $112(000) also.

Samuel D. Sleeth, general superintendent foundries, Westinghouse Air Brake Co., Wilmerding, Pa., was the speaker at the regular monthly meeting of the Pittsburg Foundrymen's Association, General Forbes Hotel, Oct. 16. His subject was "Cupola Practice," and he traced in interesting fashion many of his experiences covering a period of more than 50 years, touching on fluxes, mixes, iron and refractories.

An address on machine shop practice will be given by A. L. DeLeeuw, consulting engineer, New York, at the Hotel Winton, Cleveland, on the evening of Oct. 24 before the Cleveland section of the American Society of Mechanical Engineers.

Machinery Markets and News of the Works

MORE RAILROAD INQUIRY

Pennsylvania and Burlington Roads Issue Large Lists of Tools

Railroads, Steel Companies, Automobile and Electrical Machinery Manufacturers Buying

The Pennsylvania Railroad has issued a large list of tools at Philadelphia, calling for bids on shop equipment that will aggregate in value several hundred thousand dollars, and the Chicago, Burlington & Quincy has issued a new list of about 30 items at Chicago covering machines required for its Eola scrap reclamation yard.

Railroad buying promises to increase. The Chicago, Burlington & Quincy has been in the market for some time for a list of tools in addition to the one issued last week, and will probably make large purchases within a few days. The Chicago & Northwestern is expected to issue a list at Chicago shortly.

Steel companies are buying more equipment, cranes in particular. The National Tube Co. has received prices on 14 heavy tools and 41 cranes for its new plant at Gary, Ind.

In the automobile field, the Ford and Dodge companies are the principal buyers. The Ford Motor Co. has closed for seven Bullard Mult-au-matics and the Dodge Motor Co. has bought 10 engine lathes, 12 to 18 in., and two turret lathes from Cleveland. The Nash Motors Co. has bought 11 cylindrical grinding machines for its Milwaukee plant. Detroit automobile manufacturers have bought sparingly of new equipment considering the extent to which they have increased output, but the larger production has been achieved largely by better methods. It is estimated that some companies have increased output about 25 per cent with only a 5 per cent increase in tools.

The General Electric Co., which has been buying for some weeks, has placed additional orders within the past week, its purchases being for Schenectady and Bridgeport plants.

The Hoover Suction Sweeper Co., North Canton, Ohio, has issued an inquiry for about a dozen machines.

New York

NEW YORK, Oct. 17.

A NUMBER of machine-tool manufacturers have put higher prices in effect within the past week, the advances averaging about 10 per cent. This may be the explanation for a slump in buying last week, which dealers and factory representatives believe to be only temporary, as the general trend of trade seems to be toward continued improvement. The General Electric Co., as reported last week, is in the market for additional equipment for its Schenectady works and also has inquiries out for tools for its Bridgeport plant. The Baldwin Locomotive Works has about completed purchases for its plant in Philadelphia. The Pennsylvania Railroad is expected to come into the market shortly for considerable equipment for additions to its shops at Altoona.

Although there is considerable activity in crane sales in other districts, the New York territory continues quiet with a number of satisfactory orders pending. It is expected that the orders for the two 150-ton overhead traveling cranes for the Brooklyn Edison Co., Brooklyn, N. Y., will be placed the latter part of this week. Inquiry for locomotive cranes is active and dealers in used locomotive cranes report fewer available. A noticeable number of orders are appearing for small capacity chain blocks and hoists from dealers, evidently to fill in stock. Hand power crane inquiry is quiet.

Among recent sales are:

The Pennsylvania Railroad, Eastern Region, Philadelphia, has placed an order for 17 electric traveling cranes valued at about $225,000 with the Niles-Bement-Pond Co. They include two 250-ton, two 60-ton, two 25-ton and ten 15-ton electric cranes for the Juniata shops.

Central Railroad of New Jersey, a 150-ton wrecking crane from the Industrial Works.

Union Contracting Co., Falls Creek, Pa., two used 30-ton, 50-ft. boom Ohio locomotive cranes and one 25-ton, 60-ft. boom used Industrial locomotive crane from Philip T. King, 30 Church Street, New York.

American Car & Foundry Co., 165 Broadway, New York, a 15-ton locomotive crane from the Orton & Steinbrenner Co.

Mukden Electric Light Works, Mukden, Shengking, Manchuria, a 30-ton, 39-ft. span overhead traveling crane from the Whiting Foundry Equipment Co., through an exporter.

Consolidated Machine Tool Corporation, 17 East Forty-second Street, New York, has purchased cranes for its Hilles & Jones plant, Wilmington, Del., from an unnamed builder.

Matachewan Power Co., Elk Lake, Ont., a 15-ton electric traveling crane from the Northern Engineering Works.

Vulcan Iron Works, Winnipeg, Canada, a 5-ton, 2-motor crane trolley from the Northern Engineering Works.

Ford, Bacon & Davis, 65 Broadway, New York, who were recently in the market for two 10-ton overhead traveling cranes, have purchased used equipment from Government sources.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until Oct. 24 for 12,300 lb. of brass tubing for voice transmission, schedule 219; and until Oct. 31 for 305 mechanical thermometers, schedule 222, for the Brooklyn Navy Yard.

The Rubel Coal & Ice Corporation, Glenmore Avenue, Ozone Park, Brooklyn, is arranging a list of machinery for its ice-manufacturing plant on Atlantic Avenue, estimated to cost $500,000.

Charles L. Cadle, Superintendent of Public Works, Capitol Building, Albany, N. Y., will receive bids until Nov. 1 for a power plant at Vischer Ferry on the State Barge Canal. Plans and specifications are at the office of the State Engineer, Telephone Building, Albany.

The American Brake Shoe & Foundry Co., 30 Church Street, New York, is reported to have acquired property at Houston, Tex., for a new plant estimated to cost $400,000, including equipment.

The Bureau of Yards and Docks, Navy Department, Washington, will take bids until Nov. 15 for mechanical equipment for the power house to be built in connection with the veterans' hospital, Tupper Lake, N. Y., including side-feed mechanical stokers, feed-water heater, pumping machinery and incinerator plant (boilers will be furnished by the Government), all as set forth in specification 4719. Also at the same time for refrigerating and ice-manufacturing machinery, including compressors, condensors, filters, etc., with can hoist and automatic can dump, specification 4720; and for a 200,000-gal. steel tank and tower, specification 4724.

The United Plumbers' Supply Co., 181 East 108th Street, New York, manufacturer of pipe, plumbing equipment, etc., has filed plans for a two-story factory, 80 x 170 ft., on Exterior Street to cost $75,000.

The Utility Can Co., Long Island City, has leased space in the new building on Van Alst Avenue, near the Queensboro Bridge Plaza, for a manufacturing and distributing plant.

Fire, Oct. 2, destroyed a portion of the plant of the Merchants' Refrigerating Co., Tenth Avenue and Seventeenth Street, New York, with loss estimated at $200,000, including equipment. It will be rebuilt.

Grover A. Whalen, Commissioner of Plant and Structures, New York, is perfecting plans for a trackless trolley system on Staten Island, estimated to cost $4,235,000. Of this amount, $1,235,000 will be used for an electric generating plant, for which a site has been selected. The electrical and mechanical equipment for the cars will cost in excess of $800,000.

In connection with the construction of a railroad from Cochabama to Santa Cruz, Bolivia, for which the Bolivian Government is now calling for tenders, complete repair shops will be built at a number of points along the line, which will be 388 miles, with a 37-mile branch road. The project is estimated to cost in excess of $40,000,000. Information can be had at the office of the Bolivian Exhibit and Information Bureau, 233 Broadway, New York.

Officials of the Radio Corporation of America, Woolworth Building, New York, and the Federal Telegraph Co. of California, San Francisco, have organized the Federal Telegraph Co. of Delaware, capitalized at $9,500,000. The new company will conduct initial operations in China, where a contract has been secured from the Chinese Government for the construction of four high-power wireless plants to cost about $13,000,000, including electric power stations, steel towers, radio apparatus, etc. R. P. Scheerin, president of the Federal company of California, will occupy a similar position with the new organization. The Radio Corporation has purchased the White Oil Building, 64-68 Broad Street, New York, for about $1,000,000, and will establish a central broadcasting and receiving plant at this point.

The Ingersoll-Rand Co., 11 Broadway, New York, manufacturer of mining machinery, etc., has called a special meeting of stockholders on Nov. 1 to vote an increase in the common stock from $15,000,000 to $30,000,000, a portion of the proceeds to be used for expansion.

The Baltic Ice Co., Inc., 87-93 Columbia Street, Brooklyn, has filed plans for extensions and improvements in its two-story ice-manufacturing and refrigerating plant to cost $50,000.

A three-story automobile machine and service works, 75 x 100 ft., to cost $80,000, will be erected at 531-35 West Thirty-sixth Street, New York, by Alfred Revere and Morris Goldenblum, care of Henry J. Nurick, 44 Court Street, Brooklyn, architect.

The Mammoth Oil Co., an interest of the Sinclair Consolidated Oil Corporation, 45 Nassau Street, New York, has disposed of a stock issue of $10,000,000, a portion of the proceeds to be used for the construction of pipe lines, pumping plants, power houses and other structures in the Teapot Dome field, Wyoming, recently leased from the Government under a joint production plan.

The American Smelting & Refining Co., 120 Broadway, New York, has arranged a fund of about $10,000,000 for extensions and improvements in its plants and properties in Colorado, including the installation of new machinery.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until Oct. 24 for one precision bench lathe and attachments, for the naval aircraft station, Lakehurst, N. J.

The Lehigh Valley Railroad Co., Jersey City, N. J., will commence the erection of a new one-story locomotive repair shop at the foot of Chapel Avenue, to cost $25,000.

The Franklin Contracting Co., 20 Washington Place, Newark, has acquired about 37 acres at Edgar, near Perth Amboy, N. J., for a new plant to manufacture road materials.

The Newark Umbrella Frame Co., 359 Ogden Street, Newark, plans the installation of new automatic machine equipment.

The City Commission, Newark, plans the installation of equipment at the power house and refrigerating plant at the new city market, now in course of erection, as follows: Generators and engines, $48,000; boilers and steam piping, $40,000; elevator equipment, $40,000; refrigerating plant, $100,000; equipment for driven wells, $10,000; vacuum ash conveyors, $15,000; incinerators, $10,000; general market equipment, $350,000, and ventilating apparatus, $5,000.

Chicago

CHICAGO, Oct. 16.

PROSPECTIVE railroad business is still the feature of the machine tool market. The Chicago, Burlington & Quincy, which has been at the point of buying against its lists for several weeks, is expected to finally close for this equipment within a few days. The Chicago & Northwestern will probably issue an extensive inquiry in the near future and the Chicago, Rock Island & Pacific, which recently purchased considerable equipment, has issued an inquiry for a carwheel boring machine. The Burlington has issued a new list consisting largely of special machines for its Eola scrap reclamation yard near Aurora, Ill. Sales of local machine tool houses have fallen off since the first of the month, and it is apparent that the general users, outside of the railroads, are taking less interest in the market. Among the few outstanding orders placed recently is a purchase of 11 cylindrical grinding machines for cam and crankshaft work by the Nash Motors Co. for its Milwaukee plant. Additional business is pending for that plant.

The Eola list of the Burlington is as follows:

One 500-lb. upright helve hammer for 4 to 5-in. bar iron.
One vertical power press with capacity of 100 tons.
One combination punch and shear, 36-in. jaw, capacity 1½-in. hole in 1-in. steel plate, to shear plates ⅞-in. thick.
One double head bolt threader, to thread bolts ½ to 1¼ in. in diameter.
One triple head bolt threader, two heads to cut ½ to 1¼ in. in diameter and other head to cut 1⅜ to 2 in.
One bolt shear, capacity ½ to 2 in.
One rapid bolt straightening machine for straightening old bolts ½ to 2 in. in diameter.
One high-speed six-spindle automatic nut tapping machine, capacity ½ to 1⅝ in.
One machine for backing off nuts from old bolts, capacity ½ to 2 in.
One automatic sorting machine for sorting nuts and washers.
Two self-dumping rattlers, 24 x 36 in.
Two double spindle bench dry grinding machines to carry 10 x 1¼-in. wheel.
One automatic rail spike straightener.
One automatic pipe nipple machine.
One dismantling and assembling machine for air, signal and steam hose.
One single head pipe threading machine, from 1 to 1½ in., to rethread air and steam hose nipples.
One automatic angle cock valve grinding machine for grinding angle cocks and cutting out cock valves.
One portabble electric welding outfit.
One portable electric rivet heater, for rivets ⅝ to ¾-in.
One double-door furnace, 12 x 12 x 36 in.
One pneumatic straightening and flanging clamp, capacity to take 120 in. between housings, with vertical adjustment for upper clamping beam of 15 in.
One portable machine for cutting pipe and flues, capacity ½ to 2-in. pipe.
One automatic sheet iron baler.
One automatic washer punch, capacity ½ to 2½ in.
One automatic round bar iron straightening machine with feeding device, capacity ½ to 2-in. round iron.
One coupler stripping machine for removing yokes from couplers.
One sheet straightening roll for straightening sheet iron and steel, 5 ft. between housings, capacity up to 2-in. steel.
One bender for corrugated bars, capacity ⅝ to 1½-in. square bars.
One power baler for baling waste paper, burlap, rope, etc., into 250-lb. bales.
Practically all of the machines are to be motor driven.

The Arnold Co., Chicago, has purchased a locomotive jack from the Whiting Corporation for the Richmond, Fredericksburg & Potomac Railroad. The latter company also has orders for two tumbling barrels for a Chicago plant of the International Harvester Co. and for a 10-ton hand power crane for the Calumet sewage treatment plant of the Kensington sanitary district.

The Chicago Mill & Lumber Co., 111 West Washington Street, is taking bids through Francisco & Jacobus, 29 South LaSalle Street, on a two-story factory, 300 x 400 ft., at North Sangamon and Cornell Streets.

H. P. Hansen of the engineering staff of the Viking Pump Co., Cedar Falls, Iowa, will be the head of the new company which will build a foundry in that city.

The plant of the Illinois Foundry & Machine Co., Belleville, Ill., was recently damaged through the explosion of a cupola.

The American Parts Corporation, manufacturer of automobile radiators and radio specialties, Toluca, Ill., will re-

move its plant to Rochelle. The former Whitcomb factory on the south side of Rochelle is being remodeled.

A two-story building is being erected for the B. F. Downing Chevrolet sales agency at Dixon, Ill. The upper floor will be occupied by a machine and repair shop.

John Stoneberg, formerly superintendent the boiler repair shop of the Chicago, Milwaukee & Gary Railroad at Rockford, Ill., has leased the building and will conduct a private boiler repair shop.

The Andrews Wire & Iron Works, 1802 Preston Street, Rockford, Ill., has preliminary plans for a one-story addition to cost $40,000. Peterson & Johnson, 406 S. A. Bank Building, ar architects.

The Stoll Mfg. Co., Denver, Col., has plans under way for rebuilding its main plant unit, recently destroyed by fire. New equipment will be installed for the manufacture of automobile bodies and accessories.

The United States Reclamation Service, Denver, will receive bids until Dec. 6 for two direct pumping units for the Black Canyon pumping plant, Boise, Idaho, project.

The Air Sales Reduction Co., 342 Madison Avenue, New York, manufacturer of welding equipment, etc., is taking bids for its one-story addition, 50 x 100 ft., at 327 Twenty-fifth Avenue, S.E., Minneapolis, Minn., estimated to cost $35,000.

An ice manufacturing and cold storage plant will be installed in the five-story meat packing plant, 200 x 400 ft., to be constructed by the Mountain States Packing Co., Denver, Col., estimated to cost $2,000,000 with machinery. Charles F. Kamrath is president.

The American Radiator Co., 816-20 South Michigan Avenue, Chicago, will take bids early in November for its one and two-story plant on Minnehaha Street, St. Paul, Minn., for the manufacture of boilers, heaters, etc. It will cover an area 195 x 1000 ft., and is estimated to cost $1,200,000, including machinery. A. R. Stem, St. Paul, is architect.

The Hanford Produce Co., Sioux City, Iowa, has completed plans for a new ice manufacturing and refrigerating plant, 100 x 150 ft., to cost about $100,000 including machinery. A. S. Hanford, Jr., is head.

The Nebraska Gas & Electric Co., Omaha, Neb., will install additional power equipment at its plant at York to double, approximately, the present capacity.

The Producers' & Refiners' Corporation, California Building, Denver, is considering plans for a new oil refinery at Fort Steele, Wyo., estimated to cost $250,000. A simliar refinery is also planned in the vicinity of Omaha.

The Art Lamp Mfg. Co., 6 North Franklin Street, Chicago, manufacturer of electric lamps, etc., is taking bids for a two-story plant at Michigan Avenue and Thirteenth Street, estimated to cost close to $50,000.

New England

BOSTON, Oct. 16.

FEWER machine tools were sold in this section the past week than in the previous week. A fair business was done, however, in moderate priced single new machines and in used equipment. Most of the dealers attribute the slowing up to the holiday, the recent price advances having stimulated rather than stinted buying interest. Industry in New England is increasingly busy, yet extensions and new plants are limited, while new corporations in a large majority of cases have no bearing on metal working machinery. Inquiries for new equipment therefore are confined largely to more or less special production tools. The aggregate number of these under full and semi-negotiation is quite large. Sentiment, generally, is that October will be the best month experienced by many dealers this year, notwithstanding the lack of large lists of tools.

The demand for small tools and machine parts, which fell off last month, shows improvement. With the exception of drills and reamers, prices for small tools and for many materials tend upward. In connection with the better demand for fine tools, the L. S. Starrett Co., Athol, Mass., heretofore on a three day a week schedule, this week went on four days, having materially reduced its accumulation of made up stock. The hack saw department has been on full time and will continue so.

The Ball & Roller Bearing Co., Maple Avenue and Crosby Street, Danbury, Conn., has begun work on a two-story, 50 x 114 ft. addition for the manufacture of grinding machinery. J. Henry Roth is general manager and treasurer.

The New York, New Haven & Hartford Railroad has reopened a portion of its shops at New Haven, Conn., closed since July 1. Work to be done will supplement the work of engine terminals and freight car repairs pending the completion of added facilities at its Cedar Hill yards.

The Boott Mills, Armory Street, Lowell, Mass., has awarded contract for a hydroelectric power plant. It will be one-story, of brick and concrete, and cost about $40,000.

The Blakeslee Forging Co., Plantsville, Conn., drop forging, plans the erection of a two-story, 40x42-ft. foundry addition.

The Bureau of Supplies and Accounts, Navy Department, Washington, will take bids until Oct. 24 for four motors, controllers and spare parts for the Portsmouth, N. H., Navy Yard.

The Brass City Tool Works, 29 Pearl Street, Waterbury, Conn., is taking bids for a two-story and basement addition to cost $45,000. L. S. Kipp, 121 Charles Street, is architect.

The Lake Sunapee Power Co., Rutland, Vt., will soon take bids for a new hydroelectric generating plant to cost about $300,000, including machinery. I. M. Frost is president.

The Merrimac Clay Products Co., 185 Devonshire Street, Boston, will soon commence the erection of a one and two-story-plant, 200 x 600 ft., at Plaistow, N. H., to cost about $225,000 with machinery. Morse & Chase, 25 Washington Square, Haverhill, Mass., are architects.

A three-story automobile service and machine works, 80 x 120 ft., to cost $100,000, will be erected on Harrison Avenue, Springfield, Mass., by G. H. Chaplin, 374 Main Street.

Landers, Frary & Clark, New Britain, Conn., manufacturers of cutlery, etc., will commence the erection of a new six-story addition, to cost approximately $75,000.

The Home Accessories Corporation, Gardner and Tainter Streets, Worcester, Mass., manufacturer of metal bathroom fixtures, etc., has plans for a new two-story factory, 45 x 110 ft., estimated to cost $40,000, on a site lately acquired.

The Auto Truck & Wagon Co., 141 First Street, Cambridge, Mass., is taking bids for a one-story addition, 83 x 100 ft.

Philadelphia

PHILADELPHIA, Oct. 16.

THE Electric Storage Battery Co., Nineteenth and Allegheny Streets, Philadelphia, has purchased about two acres at Belmont Boulevard and Anderson Street, Kansas City, Mo., for the erection of branch works. Plans are being prepared for the first unit, one-story and basement, 160 x 220 ft., and estimated to cost $120,000. A main feature of production will be battery assembling. An electric plant will be installed for factory service, comprising a 50-kw. motor-generator set, with auxiliary machinery. Hans Von Unwerth, Finance Building, Kansas City, is engineer. The company has also awarded contract to Peter Hauck, Cox Building, Rochester, N. Y., for a new branch plant at this point, one-story, 134 x 135 ft.

The Precision Grinding Wheel Co., Inc., Torresdale Avenue, Philadelphia, has filed plans for a one-story addition.

The Philadelphia-Nash Motor Co., 901 North Broad Street, Philadelphia, has leased a five-story building, to be erected at Broad and Thompson Streets, for the establishment of new works, including service and repair departments. Contract for erection was awarded recently to the Turner Concrete Constuction Co., 1713 Sansom Street.

The Reliable Auto Parts Co., 1417 Fairmont Avenue, Philadelphia, has leased property at 1405-7 Race Street, for new works.

The J. Biehl Wagon & Auto Works, 31 South Fifth Street, Reading, Pa., has plans under way for a new two-story plant at West Reading, 85 x 200 ft., for the manufacture of automobile parts, equipment, etc.

The Bradford County Oil & Coal Co., Towanda, Pa., recently organized, is planning for the installation of oil-well pumping machinery, drilling equipment, etc., on local property. Louis A. Poillet and John Conklin head the company.

The Penn Central Light & Power Co., Altoona, Pa., has arranged for a bond issue of $80,000, the proceeds to be used for work in connection with a new power plant at Saxton, Pa.

The Lehigh Coal & Navigation Co., Lansford, Pa., is planning for the construction of a new mechanical coal washery in the vicinity of Tamaqua, Pa., to cost about $50,000.

The Cumberland Valley Light & Power Co., Dillsburg, Pa., has acquired the Dillsburg Light, Heat & Power Co., the Reading Township Power Co., and a number of other public utility companies operating in this section. The properties will be merged and a number of extensions and improvements made. The consolidated company is capitalized at $175,000. Farley Gannett is president.

department to manufacture metal grille work and similar specialties. The regular line of wire goods will be continued.

The Metropolitan Edison Co., Reading, Pa., has arranged for a preferred stock issue of $828,750 a portion of the proceeds to be used for extensions and improvements. E. L. West is president.

The Coopersburg Improvement Co., Coopersburg, Pa., is concluding negotiations for a new granite polishing and finishing plant.

The Elk Run Window Glass Co., Punxsutawney, Pa., is planning to rebuild its tool house and engine department recently destroyed by fire.

The Fleck-Marshall Co., Lancaster, Pa., manufacturer of pipe, plumbing equipment, etc., has acquired the plant of the Rothfuss-Howard Iron Works, East Third Street, Williamsport, Pa., heretofore devoted to the manufacture of machinery and parts. It will be remodeled and occupied by the new owner.

The Pennsylvania Railroad Co., Broad Street Station, Philadelphia, has awarded contract to the McClintic-Marshall Co., Oliver Building, Pittsburgh, for a new locomotive machine and erecting shop at Juniata, Pa., 340 x 685 ft. Two crane runways, 720 ft. long, will be built, one with a span of 104 ft. and the other 90 ft. In the locomotive erecting bays two 250-ton electric traveling cranes will be installed, while the machine bays will be equipped with two 25-ton traveling cranes, and a number of jib cranes, up to 8-tons capacity. Six 15-ton cranes will also be placed in the locomotive department. The plant will have a capacity of 100 locomotives per month, new and old. A. C. Shand is chief engineer.

The Hillside Coal & Iron Co., Pittston, Pa., is planning for the installation of new machinery at its colliery.

The New York Central & Hudson River Railroad Co., New York, is reported to be planning for additions to its locomotive and [illegible] shops at Beech Haven, Pa., estimated to cost $2,000,000, including [illegible].

Pittsburgh

PITTSBURGH, Oct. 16.

BUSINESS in machine tools the past week with regard to sales has been dull. Inquiry is good, but when it comes to closing, the disposition of buyers is to be positive that every source of supply has been sounded as to prices. The market in this district is created to a very large degree by the iron, steel and metal-working industries and while these lines of activity are busy now, there has lately crept into the situation some hesitancy and uncertainty. A large volume of machine tool and equipment business is hanging over the market.

The largest prospective order before the trade is that for the new works of the National Tube Co., Gary, Ind. There are 14 heavy tools in the inquiry and 41 cranes. It is reported that the crane bids have been compiled and sent to New York for approval, following which the papers will be returned to Pittsburgh and orders distributed. Tool awards are not looked for until the cranes have been placed. The Pittsburgh Valve Foundry & Construction Co., Pittsburgh, recently closed for a 5-ton Champion crane. The Pittsburgh & Lake Erie Railroad, C. M. Yohe, purchasing agent, has inquired for a 90-in. wheel lathe. The Pennsylvania Railroad has put out a list of 10 tools, on which bids will close Oct. 19, for its Conway shops at [illegible].

Hubbard & Co., Granite Building, Pittsburgh, manufacturers of shovels, etc., with factory at 6301 Butler Street, have plans for a one-story addition.

The Pittsburgh Meter Co., East Pittsburgh, has purchased about 120,000 sq. ft. in the vicinity of its plant, for $125,000. The site will be used for the erection of a new plant estimated to cost $115,000.

The Argo Lite Appliance Co., 649 Smithfield Street, Pittsburgh, manufacturer of electric lighting equipment, has acquired property at Seventh and Smithfield Streets and will use the buildings for extensions.

The Kinzua Light & Power Co., Kinzua, Pa., is planning the construction of a new power plant. A list of equipment will be prepared.

The Vulcan Refining Co., Coraopolis, Pa., will build a new one-story power house, 56 x 60 ft. E. C. Dilworth, 302 Walsh Building, is consulting engineer.

Ovens, power equipment, conveyors and other equipment will be installed in the new three-story plant to be erected on Forbes Street, Pittsburgh, by the Dusenberry Baking Co., 2138 Tustin Street. Plans are being drawn.

The Equitable Gas Co., 435 Sixth Avenue, Pittsburgh, will build a new one-story machine and repair shop, 50 x 165 ft., with extension 15 x 20 ft.

The Provant Coal Co., Uniontown, Pa., contemplates rebuilding the tipple at its Provant mine destroyed by fire Oct. 7. The fan house and mechanical draft equipment were also destroyed.

The Open-Hearth Fire Brick Co., 1407 Keenan Building, Pittsburgh, is planning for the installation of new machinery at its Freeport plant. H. O. Williams is in charge of purchases.

The Monongahela Power & Railway Co., Fairmont, W. Va., is arranging an appropriation of about $1,000,000 for extensions and improvements in its plants and system.

The Maidsville Coal & Coke Co., Morgantown, W. Va., will build a new tipple at Maidsville. The company was organized recently and is headed by Wilson C. and Guy L. Jamison, both of Morgantown.

The Armstrong Mfg. Co., Huntington, W. Va., manufacturer of hardware and electrical products, will commence the immediate erection of an addition to double the present capacity. The company has recently increased its capital from $300,000 to $500,000.

The Consolidation Coal Co., Watson Building, Fairmont, W. Va., will build a new one-story power house at Coalwood, W. Va., to cost about $90,000.

Baltimore

BALTIMORE, Oct. 16.

PLANS by the Hatfield Resilient Wheel Co., 431 Munsey Building, Baltimore, are nearing completion for a new one-story factory, 50 x 100 ft., at Wells Street and the Baltimore & Ohio Railroad, to cost close to $30,000. S. C. Hatfield is president.

The Bartlett-Hayward Co., Scott and McHenry Streets, Baltimore, manufacturer of gas plant equipment, etc., is considering the erection of a one-story addition, 200 x 262 ft.

The United States Engineer Office, Wilmington, Del., will take bids until Oct. 20 for four electric generator sets, steam-driven, 3½, 5, 7½ and 10-kw. capacity, respectively; also for two 2½-kw. generator sets.

The Construction Quartermaster, United States Army, Norfolk, Va., plans the erection of two new power houses at Fort Storey.

R. E. Campbell, 1000 Taylor Street, Columbia, S. C., is planning the erection of new works to manufacture stoves, heaters and similar products. A company will be organized to operate the plant.

The Southern Power Co., Charlotte, N. C., has plans for a new steam-operated electric power house at Mountain Island, N. C., with initial capacity of 40,000-hp., to be used for emergency service, supplementing its new hydroelectric generating plant in this locality.

The Southern Machinery Co., Quitman, Ga., will build an addition to its foundry and machine shops to double the present capacity. F. C. Underwood is president and general manager.

The American Oil Co., American Building, Baltimore, has acquired a portion of the Smith Shipyard property, Curtis Bay, and has tentative plans for a new oil storage and distributing plant estimated to cost $500,000, including machinery.

The Board of District Commissioners, [illegible] Building, Washington, will receive bids until Oct. 24, Oct. 30 and Nov. 13 for equipment in the new Eastern high school, including motor-generator set, pressure and vacuum pumps, and auxiliary equipment; wood-working shop and art metal department equipment, metal lockers, and print shop equipment. Cuno H. Rudolph, James F. Oyster and Charles Keller are commissioners.

L. F. Hobbs, 113 East Twelfth Street, Norfolk, Va., machinery dealer, is in the market for a locomotive crane, 35 ft. boom, to handle a ¾-yd. capacity bucket.

The du Pont Motors, Inc., Wilmington, Del., manufacturer of high-speed automobiles, is concluding negotiations for property on Vandever Avenue, for local works. The structure will be improved and the plant at Moore, Pa., removed to this location. E. Paul du Pont is head.

The South Carolina Gas & Electric Co., Spartanburg, S. C., recently reorganized, has acquired the plants and property of the South Carolina Light, Power & Railways Co. A fund of $300,000 is being arranged for extensions and improvements.

at Gaston Shoals on the Broad River, enlargements in the steam-operated power plant at Spartanburg, and new power houses. Transmission line extensions will also be made. George B. Tripp is president, and Paul W. Fisher, secretary

W. W. Taylor & Sons, Big Stone Gap, Va., are planning to establish works for the manufacture of brick and tile. Inquiries are being made for machinery.

The Richmond, Fredericksburg & Potomac Railroad, Richmond, Va., is arranging a list of equipment for installation at a new water cooling plant, including tanks, pumps, compressors and auxiliary equipment; also for a new forge and blacksmith shop, with power house. Bids will be called in about

The Common Council, Robbinsville, N. C., plans the erection of a municipal hydroelectric power plant on Wiggins Creek, estimated to cost $100,000.

The Better Brick Co., Cumberland, Md., recently organized, has acquired property at Allegheny Grove, and has plans in progress for a new works to manufacture special brick, roofing tile, and concrete products. Theodore Smith is general manager.

The General Purchasing Officer, Panama Canal, Washington, will take bids until Nov. 2 for equipment for canal zone service, including copper tubing, boiler tubes, bolts, rivets, nails, section cars, storage batteries, valves, tiller rope, galvanized buckets, etc., as set forth in circular 1499.

The Potomac Public Service Co., Hagerstown, Md., is perfecting plans for a new steam-operated electric power plant at Williamsport, Md., estimated to cost $1,500,000.

The American Septic Tank Co., Charlotte, N. C., has plans under way for new works at Spencer, N. C. J. B. Davis is general manager.

The Standard Electric Machinery Co., East Hill Street, Baltimore, machinery dealer, is inquiring for two 3 to 5-kw. engine-generator sets, to operate at 80-lb. steam pressure.

J. Max Chambers, High Point, N. C., is perfecting plans for the establishment of a factory to manufacture automobile equipment and accessories. The Chamber of Commerce is interested in the project.

F. M. Young, Fairfax, S. C., is planning to rebuild his power house, recently damaged by fire with a loss of $25,000. Additional equipment will be installed.

The Winchester Lumber Co., Winchester, Va., will soon commence the erection of a new mill at Gore, Va., estimated to cost $35,000 including equipment. W. B. Corn-

Power Plant Activity

The Fama Co., Paris, France, will build the automatic stokers which will go under six boilers of the central power station of Paris, each of which will develop approximately 2400 hp. with a grate area of 645 sq. ft., giving them what is held to be the largest grate and combustion chamber ever before attempted. The stokers will be of the Riley type, and will be built under license from the Sanford Riley Stoker Co., Worcester, Mass., the Fama people holding the rights to this stoker for France. The underfeed type is held to be well adapted for the use of the low grade French coal.

The Riley company reports much better prospects in the power plant field. The larger public utilities are now able to borrow money at reasonable rates, and a great deal of work is being laid out for execution in the immediate future. Much work which had been held up for a long time is now being released. The Public Service Electric Co., Burlington, N. J., is proceeding toward the construction of its new station, which had been held up for two years. The installation will contain the largest Riley stoker that has been built in this country.

In the industrial field there are many boiler room extensions, about to be undertaken, among them the Viscose Co., Lewiston, Pa., manufacturer of artificial silks, Stephen Sanford & Sons, Inc., Amsterdam, N. Y., carpet manufacturer, Dodge Brothers, Detroit, and Bird & Sons, Inc., Phillipsdale, R. I., manufacturer of special paper products.

The railroads have not come into the market much for power plant equipment, but some of them are now planning for electrification, according to the Riley company. Two have already announced that their policy is to purchase no more steam locomotives. The steel mills are now buying stokers for metallurgical and chemical furnaces, after several years of being out of the market. The demand for small stokers is noticeable, according to the Riley company's experience with the products of its subsidiaries, the Murphy Iron Works and the Underfeed Stoker Co. of America.

Buffalo

THE Watson Mfg. Co., 63 Taylor Street, Jamestown, N. Y., manufacturer of screens, etc., will commence the erection of a four-story addition, estimated to cost $30,000.

The Pierce, Butler & Pierce Mfg. Corporation, Syracuse, N. Y., with plant at Eastwood, manufacturer of boilers, radiators, etc., has disposed of a bond issue of $2,500,000, a portion of the proceeds to be used for extensions and improvements.

The Water Service Commission, Oswego, N. Y., has plans under way for a one-story municipal hydroelectric generating plant on the Oswego River, 50 x 200 ft., to cost $750,000 with machinery. John A. Bensel, 16 East Forty-first Street, New York, is engineer.

A power house will be constructed by the Pillsbury Flour Mills Co., Minneapolis, Minn., in connection with its proposed new mill at Buffalo, estimated to cost $2,000,000. A. C. Loring is president.

The C. F. Davis Machine Co., Rochester, N. Y., has removed its plant to 150 North Water Street where a new factory has been erected for increased capacity.

The Rochester Taxicab Co., New York Central Station, Rochester, N. Y., will build a two-story automobile service and repair works, 90 x 200 ft., on St. Paul Street, to cost $125,000.

A machine shop for parts manufacture and repairs will be installed in the new two-story automobile service building to be erected by Howard H. Masters, Buffalo, at 87 Virginia Place.

Ohio

CLEVELAND machinery houses report a fair volume of single tool orders and several inquiries for single machines in lots up to a half dozen tools. Dodge Brothers, Detroit, purchased 10 lathes in 12 to 18-in. sizes from a local machinery dealer, and two turret lathes from a local manufacturer. The only activity reported in the railroad field is the purchase by the New York Central Railroad of a 54-in. Niles carwheel lathe for its Ashtabula shops. Among inquiries is one from the Hoover Suction Sweeper Co., North Canton, Ohio, for about a dozen machines. The consensus of opinion in the trade is that business this month shows a gain over September.

Reports from the large Michigan automobile manufacturers indicate that they have been able to increase production considerably this year by improving methods rather than with the addition of equipment. Economies in production have been effected by changing tools and fixtures and tool set-ups, etc., and it is claimed that some car builders have been able to increase their output 25 per cent with only a five per cent increase in equipment.

Two price advances are noted. The Le Blond Machine Tool Co. has advanced its lathes about 15 per cent and the Buffalo Forge Co., has marked up its line of drilling machines from five to seven and one-half per cent.

In Cincinnati a fair volume of both sales and inquiries marked the week. The Pennsylvania Railroad has issued a new inquiry from Philadelphia said to cover its needs up to the first of the year, including 18 lathes and a number of radial drills. The General Electric Co. placed orders for milling machines the past week, and the Ford Motor Co. bought seven Bullard Multi-au-matics and a tool grinder through a dealer for its Hamilton, Ohio, plant. A shipment to Japan is noted. Inquiries for used tools are reported to have increased although it is believed that the stock of the better machines of this class is low.

Increase of capitalization from $1,000,000 to $2,000,000 has been made by the Lowe Brothers Co., paint and varnish makers, Dayton, Ohio. New equipment will be needed for a new six-story structure adjoining the present factory, as well as for the floor being added to one of the present buildings.

The Hope Forge & Machine Co., Mt. Vernon, Ohio, is enlarging its plant by the erection of a new building, 60 x 110

ft., to be used as an erecting department, and another structure, 48 x 150 ft., for [illegible] other equipment.

H. J. Walker, formerly of the H. J. Walker Co., Cleveland, has organized the Walker Piston Mfg. Co. and has acquired a factory on East Ninety-third Street for the manufacture of automobile pistons. Considerable machinery has been pur[illegible]

The National Pressed Gear Co., Canton, Ohio, recently incorporated with a capital stock of $250,000, has placed contract for a factory, 50 x 175 ft., on Allen Street, S. E. It will manufacture hot pressed straight and bevel gears under a patented process. A. L. Lewis is president and sales manager; Harry W. McQuaid, vice-president and chief engineer; Ernest Strong, vice-president and superintendent; Harry Nusbaum, secretary, and Frank L. DeCorps, treasurer. The company has opened general offices in the Crane Building, 222 Cleveland Avenue.

The Ohio Crank Shaft Co., Cleveland, manufacturer of automobile crank shafts, is moving into its new plant just completed at 6600 Clement Avenue. This provides 10,000 sq. ft. of floor space, or five times the capacity of the old plant.

The Gabriel Mfg. Co. plans to shortly begin the erection of an addition at 1440 East Fortieth Street, to cost about $35,000.

The Fremont Metal Body Co., Fremont, Ohio, has placed [illegible] 50 x 75 ft.

The plant of the Consolidated Mfg. Co., Fernwood Avenue and Lake Shore tracks, Toledo, Ohio, used during the war for the manufacture of shells, has been purchased by Elmer Gerson, who will remodel the building, which contains 80,000 sq. ft. of floor space, and divide it into about 20 units for small manufacturing plants.

Detroit

DETROIT, Oct. 16.

INQUIRIES on machinery of all types have increased in this market the past week and representatives generally feel that October will show a volume of business from ten to twenty per cent greater than any of the three preceding months.

Installation of a central machine shop and supply department, including a salvage plant for reclaiming and repairing supplies and the construction of a new central power house will be started at once by the Bryant Paper Co., Kalamazoo, Mich., as the first part of its extension program, for which a $5,000,000 bond issue was recently approved. About $1,500,000 will be expended on these two projects. Felix Pagenstecher is president.

The Schwarze Electric Co., Adrian, Mich., is building a brick and steel addition, 50 x 100 ft., to its machine shop.

The American Car & Foundry Co., Detroit, has awarded to the A. J. McLean Co. the general contract for an addition to its plant.

The University of Michigan has under way new construction in excess of $6,000,000, including engineering shops and laboratories to cost $750,000.

Announcement is made that the Ira Lee Suction Cleaner Corporation, Detroit, will remove to a new factory at Royal Oak, Mich.

The former plant of the Harron Motor Co., Wayne, Mich., will be occupied by the Detroit Air Cooled Car Co. for the production of its D-A-C car. A building, 70 x 250 ft., is being equipped. W. J. Doughty is president.

Bids will be taken at once for a new steel testing laboratory at Dearborn, Mich., by the Ford Motor Co., Highland Park, Mich., estimated to cost $100,000. Albert Kahn, 1000 Marquette Building, Detroit, is architect.

The Lansing Pure Ice Co., Lansing, Mich., has plans under way for an addition to double the present capacity. The capital has been increased from $100,000 to $200,000, to provide for the expansion.

The Van Auken Body Co., Pontiac, Mich., has enlargements under way for considerable increase in production. C. M. Van Auken is secretary and treasurer.

The Lansing Bus Co., Lansing, Mich., manufacturer of automobile bodies, has purchased the plant of the Ideal Engine Co. for branch works.

A power house will be constructed at the proposed new three-story plant of the Michigan Canned Food Co., 817 Book Building, Detroit, at Greenville, Mich., estimated to cost $150,000.

In connection with its addition now in course of erection, the Holley Carburetor Co., Vancouver Avenue and the Pere Marquette Railroad, Detroit, will arrange an individual motor drive for practically all equipment. The foundry will be doubled in size and capacity. The extension will cost approximately $60,000.

Indiana

INDIANAPOLIS, Oct. 16.

FOUNDRY and machine shop equipment will be installed by the Super Range Co., Michigan City, Ind., in a local building, for the manufacture of stoves and ranges. R. L. Poe is head.

The Common Council, Broad Ripple, Ind., will soon commence the erection of a municipal electric light and power plant.

The Upland Water Co., Upland, Ind., is planning the construction of an electrically-operated pumping plant in connection with its waterworks system, estimated to cost $50,000.

The Common Council, Hammond, Ind., will commence the erection of a new electrically-operated pumping plant on Columbia Avenue, to cost about $150,000, including machinery.

The Wayne Tank & Pump Co., Canal Street, Fort Wayne, Ind., is preparing for a new one-story works, 50 x 320 ft., estimated to cost $45,000.

The City Sanitary Commission, Indianapolis, has approved plans for the power house to be constructed in connection with the new municipal sewerage disposal plant, to cost with the remaining unit still to be erected, $1,015,000, including machinery. Charles H. Hurd is consulting engineer.

The General Electric Co., Wall Street and Broadway, Fort Wayne, Ind., will erect a new one-story tank shop, 100 x 150 ft., to cost about $30,000.

The Universal Burner Co., Logansport, Ind., is arranging a list of power and other equipment for installation at its plant for the manufacture of fuel-oil burners, comprising motors, steam pumps, air compressors, etc., and shop apparatus.

The United States Encaustic Tile Works, 349 West Sixteenth Street, Indianapolis, will build a two-story addition, 90 x 100 ft., to cost $35,000. S. A. Hastings, company address, is architect.

The Gulf States

BIRMINGHAM, Oct. 16.

PLANS for enlargements are being considered by the Mobile Pulley & Machine Works, Inc., Tennessee Street, Mobile, Ala., including new foundry department for the production of steel castings. A. J. Parsons is president.

The Shirley Machine Co., Eliasville, Tex., is considering the establishment of a branch works at Luling, Tex., for oil well equipment manufacture and repairs.

The Common Council, Lafayette, La., is planning for a bond issue of $144,000, the proceeds to be used for improvements in the municipal electric power plant and waterworks and the installation of additional machinery.

The Houston Terminal Refining Co., Houston, Tex., has plans for an addition to its oil refinery, comprising the former plant of Hoffman & Turnblow. An adjoining site of 25 acres has been secured and a portion will be used for expansion. The company was organized recently with a capital of $500,000. H. M. Duncan and R. R. Kelly are heads.

The Consumers' Ice Co., Amarillo, Tex., will commence the erection of a new ice-manufacturing and refrigerating plant, with initial capacity of 5000 tons.

The National Cast Iron Pipe Co., Tarrant City, Ala., has preliminary plans for an extension to its works. Additional equipment will be installed.

The Crystal Ice & Storage Co., Birmingham, has acquired property for erecting a new ice-manufacturing and refrigerating plant, estimated to cost $90,000 with machinery.

Fire, Oct. 3, destroyed a portion of the No. 3 foundry of the Central Foundry Co., Holt, Ala., with loss estimated at $65,000. Headquarters of the company are at 41 East Forty-second Street, New York.

The Common Council, Fort Myers, Fla., has preliminary plans in progress for a municipal electric light and power house.

The Wichita Motors Co., Wichita Falls, Tex., has perfected plans for the consolidation of manufacturing and assembling operations at its local works. The branch factory at Oklahoma City, Okla., will be discontinued and the equipment transferred to Wichita Falls where enlargements will be made.

The Southwestern Dehydration Co., 409 Andrews Building, Dallas, Tex., recently organized with a capital of $125,000, has inquiries out for equipment for installation in a four-story factory, 75x125 ft., including power and gravity conveyors, boilers and auxiliary equipment, power apparatus, tanks, etc.

The T. W. Smith Lumber Co., Chapman, Ala., is planning to rebuild the portion of its mill recently destroyed by fire with loss of about $75,000.

The Planters & Merchants Mills, 604 Brady Building, San Antonio, Tex., recently formed with a capital of $10,000,000, is preparing plans for a new hydroelectric power house, estimated to cost $100,000, to be used for the operation of a proposed textile mill. J. D. Gilliland is secretary and treasurer.

The Gimmer-Tanner Gravel Co., Columbus, Tex., plans to rebuild its machine and forge shop, recently destroyed by fire.

The Utility Commission, Jacksonville, Fla., has tentative plans for a hydroelectric power house on the St. Marys river in connection with the municipal waterworks. It will cost in excess of $150,000.

The Schlater Light & Ice Co., Schlater, Miss., has tentative plans under way for rebuilding the portion of its plant recently destroyed by fire, with loss estimated at $30,000.

The Consolidated Motor Co., Marianna, Fla., is making inquiries for machine shop equipment, bench tools, etc., for installation at its service works. L. Williams is secretary.

The Central South

ST. LOUIS, Oct. 16.

THE Atlas Tack Co., Fairhaven, Mass., has plans under way for a new one and two-story branch factory, 200 x 500 ft., on the Union Boulevard, St. Louis, estimated to cost $500,000, including equipment. The Widmer Engineering Co., Laclede Gas Building, St. Louis, is engineer.

The McCracken Concrete Pipe Co., Sioux City, Iowa, is considering the erection of a new plant at Cape Girardeau, Mo. J. W. McCracken is president.

The United States Engineer Office, Louisville, will take bids until Oct. 20 for two locomotive type steam air pumps, one single bolt-threading machine, one hack saw machine, one fan blower and four concrete buckets.

The Bell Motor Co., Joplin, Mo., will build a two-story and basement, 50 x 150 ft., service and machine repair works at Fifth and Wall Streets, to cost about $30,000.

The Athletic Mining & Smelting Co., Fort Smith, Ark., has plans under consideration for enlargements and the installation of new retorts, kiln, and other mechanical equipment.

The Shaffer Refining Co., Cushing, Okla., is completing plans for an addition to its oil refinery, estimated to cost $500,000 with machinery.

The Common Council, Pilot Grove, Mo., is planning the construction of a new electrically-operated pumping plant in connection with a new water distributing system, to cost $50,000.

The Cherokee Motor Co., Knoxville, Tenn., will build a three-story addition to its service and repair works, 100 x 150 ft., to cost $75,000 including equipment. Claude S. Reeder is president.

The Department of Public Works, St. Louis, will take bids for the construction of a power, ice and refrigerating plant at the training school at Scott Farm to include boilers, pumps and auxiliary equipment; ice-manufacturing and refrigerating machinery. W. E. Bowen, room 305 City Hall, is engineer.

Denton & Hamilton, Somerset, Ky., are making inquiries for a 16 to 18-in. shaper, new or used.

The Hydro-Electric Co., Oklahoma City, Okla., is perfecting plans for a new hydroelectric power house on the Grand River in the northwestern part of the State. The initial installation will cost in excess of $5,000,000, and ultimate plant more than three times this amount.

The Sinclair Oil Corporation, Carrollton, Mo., will make improvements in the power house at its local plant, to include the installation of new engine and auxiliary equipment.

The Hamilton Machinery Co., 204 Market Street, Chattanooga, Tenn., is in the market for a used 72-in. planer, with 12 to 16-in. bed.

The Merit Veneer & Box Co., Pine Bluff, Ark., recently organized, has leased a local plant to manufacture wire-bound boxes and crates. E. A. Reese and H. F. Buechner, Pine Bluff, head the company.

The William B. Marsh Lumber Co., Elizabethtown, Tenn., will install a boiler, engine and auxiliary power equipment at its power house. Inquiries are being made for the apparatus.

The Wichita Pipe Line Co., Walters, Okla., is planning the construction of a power house at Empire City and an electric pumping plant in the vicinity of Beaver Creek, in connection with a new oil pipe line.

Milwaukee

MILWAUKEE, Oct. 16.

CONDITIONS in the machine-tool trade, from the standpoint of manufacturers, continues to show improvement, which is reflected by a steadily increasing scope of operations. Volume as yet is small, but orders are less spotty. Builders of milling machines still find the automotive industries the best source of business, but buying does not extend beyond urgent needs and rarely does an order cover more than a single machine or from two to three tools. Power farm operating equipment manufacturers are inquiring more freely, lending an aspect of promise for a more active winter and spring demand. In a general way, the iron and steel industries are occupying the best position in more than a year's time. In the orders which have been placed by railroads, local tool shops have shared in a small but encouraging manner. Dealers report more active sales to local metal-working industries and generally throughout Wisconsin, with better prospects than for two years.

The Kohler Co., Kohler, Wis., manufacturer of enameled sanitary ware, farm lighting plants, etc., is asking bids for a four-story addition, 70 x 160 ft., designed by Brust & Philipp, architects, 405 Broadway, Milwaukee. It will be used largely for producing enamels and will be equipped with special crushing, grinding and other equipment. Walter J. Kohler is president.

The Gilson Brothers Co., Fredonia, Wis., has let the general contract for a new gray iron foundry and the remodeling of the present casting shop into an auxiliary building and machine shop addition to the National Construction Co., 490 Virginia Street, Milwaukee. It will cost about $25,000.

The Amherst Electric Co., Amherst, Wis., has been incorporated with a capital stock of $35,000 to erect and operate a commercial light and power plant of the hydroelectric generating type on the Wisconsin River near Mosinee, Wis. The principals are A. G. Kernin, W. H. Knoedler, Charles H. Simpson and Earl A. Boehman, all of Mosinee. Definite plans have not been made public.

The Lerner Metal Specialty Co., Milwaukee, has been organized with $10,000 capital stock to manufacture metal specialties. The principals are represented by Robert A. Hess, attorney, 603 Caswell Block, Milwaukee. A statement will be issued later with respect to plans of the new concern.

The D. J. Murray Mfg. Co., Wausau, Wis., which has let the general contract to the Wisconsin Engineering & Construction Co., local, for a new machine shop, 58 x 228 ft., as reported, is taking bids through E. C. Hall, consulting engineer, 221 Grand Avenue, Milwaukee, for all power and production equipment. The contract for the heating equipment has been let to the American Blower Co.

The Pacific Coast

SAN FRANCISCO, Oct. 10.

A SITE has been obtained by the National Phonograph & Motor Co., Ontario, Cal., for a new plant to manufacture talking-machine motors, spring and electric. T. W. Anderson and W. L. Burt, Ontario, head the company.

The Bureau of Supplies and Accounts, Navy Department, Washington, will take bids until Nov. 7, for 100,000 ft. of aircraft cable for the Mare Island Navy Yard, San Francisco.

Fire, Oct. 1, destroyed a portion of the distributing plant of the Union Oil Co., Los Angeles, at San Pablo Bay, Cal., with loss estimated at $250,000. It will be rebuilt.

Louis Skerl, 298 Eleventh Street, San Francisco, will build a two-story factory on Folsom Street, for heavy sheet-metal working. Plans are being completed.

The San Gorgonio Power Co., Banning, Cal., will commence the construction of two hydroelectric power plants at Big Oaks and Camp Comfort, Whitewater River, to cost about $500,000. A third generating plant will be constructed in the same location later, to cost about $400,000 with machinery.

The United States Light & Heat Corporation, Niagara

Falls, N. Y., has taken title to about two acres on Eighty-ninth Avenue, Oakland, Cal., as a site for a new branch plant to manufacture storage batteries, electric lighting and heating equipment. Plans are being drawn. C. O. Mininger is president and general manager.

The Bungalow Fixture Co., Los Angeles, manufacturer of electric lighting fixtures, has removed to its new plant at 818-20 Flower Street. Additional machinery will be installed to more than double the present capacity.

The Public Service Commission, 207 South Broadway, Los Angeles, will take bids until Oct. 31, for two centrifugal booster pump units and motors, specification 626; also for three centrifugal pumps and motors, specification 627. James P. Vroman is secretary.

The Maricopa Irrigation District, D. H. Smith, secretary, Maricopa, Ariz., will receive bids until Oct. 27 for mechanical equipment for a new irrigation district in Pinal County, including derrick towers, pumps, motors, electric substation machinery and transformers.

The Great Northern Railway Co., Spokane, Wash., will build a new ice-manufacturing and cold storage plant at Chelan, Wash., to cost $450,000, including machinery.

The Water and Electric Board, Eugene, Ore., will install a new unit at its municipal electric power plant at Walterville, including turbine, generator and auxiliary equipment; estimated to cost $120,000. C. A. McClain is chairman.

The West Coast Pulp & Paper Co., Salem, Wash., has acquired property at Tumwater, Wash., and will remodel the structures for the establishment of a new pulp and paper mill. A list of machinery to be installed will be prepared. C. M. Miall is president.

The Snow Mountain Water & Power Co., 216 Pine Street, Ukiah, Cal., has plans in progress for new hydroelectric generating plants on Thatcher and Elk creeks, and the Middle Eel river. The total installation will approximate about 12,000,000-hp. with an estimated cost of $6,000,000.

Canada

TORONTO, Oct. 16.

DEMAND for equipment is being maintained and prospective business appears very good. Inquiries from industrial concerns are coming forward and it is the general opinion of those in the trade that buying activities will be considerably strengthened in the near future. Inquiries coming forward are not alone for equipment for replacement purposes but mostly for new plants and additions. The construction of wood-working factories has been prominent the past three or four months and word is now coming forward regarding extensions to several other plants as well as requirements for equipment. The automotive industry is not buying on as large a scale as formerly, but it is known that several plants are being erected for which equipment has not yet been purchased.

With the exception of the order recently placed by the Canadian National Railways for shop equipment, including about 50 tools, no further orders have developed from the Dominion railroads, although it is understood that considerable equipment is needed for both the Canadian National Railways and the Canadian Pacific Railway. Small tools continue in steady demand and local dealers are experiencing a good market for practically all lines.

Kippen & Co., Montreal, are offering $60,000 of 8 per cent cumulative redeemable preferred stock of the Atlas Brick Co., which operates under the direction of the Interprovincial Brick Co. of Canada, at par with a bonus of 40 per cent of common. The proceeds of this sale will be used to purchase equipment in the company's plant to increase the output to 12,000,000 wire cut face brick per year.

The Windsor Machine & Tool Co., Windsor, Ont., is arranging for the erection of a plant at St. Thomas, Ont., to cost $100,000.

The Home Tractor Co. is preparing for the erection of a manufacturing plant at Tillsonburg, Ont.

The general contract for the erection of an oil refinery at Calgary, Alta., to cost $2,500,000 for the Imperial Oil Co., Ltd., Church Street, Toronto, has been awarded to McDonald Brothers, 518 Ninth Avenue West, Calgary.

The Linde Canadian Refrigeration Co., St. Peter Street, Montreal, is erecting a factory at Lachine, Que., to cost $40,000.

The general contract for the construction of a pumping station and [illegible] has been awarded to the Foundation Co., Ltd., 511 St. Catharine Street, Montreal.

It is reported that the E. F. Phillips Electric Works, de Gaspe Street, Montreal, will start work soon on the erection of a power cable mill as the second unit of its plant at Brockville, Ont. M. J. Miller, 346 Dorchester Street West, Montreal, is architect.

The Middlesex Motors, 781 Dundas Street, London, Ont., is having plans prepared by J. M. Moore & Co., architects, 489 Richmond Street, for a repair shop and automobile show rooms to cost $50,000. Equipment will be purchased.

STEEL AND INDUSTRIAL STOCKS

Week of Ups and Downs Due to Various Causes

So far as steel and industrial stocks are concerned, the market during the past week has been a curious succession of ups and downs, hovering between the stimulus of a better outlook abroad and the anxiety over extra dividends. Nevertheless, the undertone was firm. Till Monday the resistance point of U. S. Steel has been around 106; before the close of the first day it had touched 108¼, and during the week reached the highest point since autumn, 1919. Visions of stock disbursements developed a fever heat which not only sought new high levels but brought a turnover approached at only one other period this year. There was a display of strength in many industrials during the first few days, but then a reaction set in reflecting the crumbling of Standard Oil shares. However, Saturday was an unusually busy day and offered an opportunity for many issues to rise. American Locomotive established a new high at 136¾, also Baldwin at 140⅜. The week's average of 20 industrials was 102.6, or 2.1 above last week.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

	Low	High
Allis-Chalmers	33½	37¾
Allis-Chal. pf.	101½	103
Am. B. S. & Fdy.	82¼	83⅞
American Can	65½	74⅜
American Can pf.	109¾	110⅞
Am. Car & Fdy.	187¾	201
Am. Car & F. pf.	121⅞	121⅞
Am. Locomotive	127¼	136¾
Am. Loco. pf.	120¾	121¼
Am. Radiator	115	129
Am. Steel Fdries.	44⅞	45⅞
Am. Stl. Fd. pf.	104¾	105
Baldwin Loco.	137¼	141⅛
Baldwin Loco pf.	116⅞	116⅞
Bethlehem Steel	74½	76⅛
Beth. Steel Cl. B	74¼	77½
Beth. Stl. 8% pf.	112	112½
Brier Hill	72½	73½
Br. Em. Steel	13	14
Br. Em. Stl. 1 pf.	75¼	75¼
Br. Em. Stl. 2 pf.	36¾	38¼
Chic. Pneu. Tool	82	87½
Colo. Fuel	32	34¼
Crucible Steel	85	89
Crucible Steel pf.	96	97
Deere	71½	73½
Deere pf.	74	75½
Gen. Electric	179¾	188½
Gt. No. Ore Cert.	38¼	40¼
Gulf States Steel	90	94⅞
Inland Steel	47	47½
Int. Har.	108¾	112
Int. Har. pf.	118¾	118¾
Lackawanna Stl.	81	84
Lima Loco.	60½	63
Midvale Steel	33¾	35¾
Nat.-Acme	14⅝	15½
Nat. Enam. & St.	64½	66⅝
Nat. E. & St. pf.	101	101½
N. Y. Air Brake	36	38⅞
Nova Scotia Stl.	37	38½
Otis Steel	11	11¾
Pitts. Steel pf.	96	96⅝
Pressed Steel	89	94
Pressed Steel pf.	104	104
Ry. Steel Spring	122	125¾
Ry. Stl. Spg. pf.	117	117
Replogle Steel	33	35½
Republic	57⅞	61¼
Republic pf.	85⅞	90
Sloss	49½	51⅜
Sloss pf.	77	77
Steel of Canada	62½	70
Superior Steel	34	34
Un. Alloy Steel	37½	38
U. S. Steel	105¼	109⅞
U. S. Steel pf.	121⅞	122⅜
Vanadium Steel	44⅞	47⅝
Va. I., C. & Coke	54	55½
W'house Air Br.	99	100½

Industrial Finances

Stockholders of the Electric Alloy Steel Co., one of the constituents of the Atlas Steel Corporation, are being given the opportunity of participating in the underwriting of $250,000 debenture notes, issued in connection with the recent merger of the Electric Alloy company with the Atlas Crucible Steel Co., Dunkirk, N. Y.

The entire issue of the capital stock of the Precision & Thread Grinder Mfg. Co., formerly held by members of the Hudson Motor Specialties Co., Philadelphia, has been sold to an independent party and the Hudson company is in no way connected with the new management.

The Ohio Steel Castings Co., Cleveland, which some time ago acquired control of the Aetna Steel Casting Co., has increased its capital stock to $100,000. John Thompson is president; C. S. Fenton, vice-president; W. I. Thompson, treasurer; John Elden, secretary, and Harry Gresham, general manager.

The Magna Metal Corporation, Doremus Avenue, Newark, N. J., manufacturer of special metals, has been reorganized, following the termination of a recent receivership, with a capital of $100,000. The plant will be continued in operation.

Orders received by the General Electric Co., for the three months ending Sept. 30, totaled $58,914,620, against $41,608,332 for the same quarter last year. This represents an increase of 42 per cent. Total orders for the first nine months of the year are $176,171,194, compared with $135,256,462 in 1921.

September sales of the New York Air Brake Co. amounted to $817,000, representing the largest volume of business for any month in the history of the company. President C. A. Starbuck reported that all plants of the company are now at capacity. August sales exceeded $700,000.

The General Electric Co. has under consideration the calling of its 6 per cent bonds due in 1940, on the next interest date, Feb. 1, at 105. No financing is contemplated in connection with the retirement of these bonds, the amount outstanding amounting to $5,000,000.

The Wyman Gordon Co., Worcester, Mass., drop forgings, has retired and canceled 500 shares of preferred stock, the purchase being made with sinking fund money. The capital stock thereby is reduced from $3,800,000 to $3,750,000, represented by 7500 shares of first preferred, 13,000 shares of second preferred and 17,000 of common stock, the par value of all three classes being $100.

The Otis Steel Co., in its report for the six months ending June 30, last, shows a net loss of $617,225, after charges. Net operating profit amounted to $243,861, against which there were general expenses of $473,113. Reserves for subsidiary companies and income charges brought the net loss to $617,225.

The Allis-Chalmers Mfg. Co., for the quarter ended June 30, reports net profits of $299,796 after taxes, or the equivalent of 4 cents per share on common stock after preferred dividends. This compares with $278,733 in the preceding quarter. Net profits for the first half of 1922 totaled $578,529, which left a small margin after preferred dividends, as against $1,410,069 for the corresponding period in 1921.

The plant and assets of the Premier Motor Corporation, Indianapolis, bankrupt, will be offered for sale by the receiver, the Fletcher Savings & Trust Co., on Oct. 23.

Edward E. Clark and R. E. Gale have been appointed receivers for the Pan-Motor Co., St. Cloud, Minn., operating a local automobile plant. The liabilities are stated as $506,061, and the assets $2,633,385.

Fred E. Hummell has been appointed receiver for the Elgin Motor Car Corporation, Argo, Ill., following the filing of an involuntary petition in bankruptcy against the company. The liabilities are stated to approximate $1,000,000; the assets have not been determined.

T. L. Hausmann, Cleveland, has been appointed receiver for the Templar Motors Co., with plant on Halstead Avenue, Lakewood, Ohio. The liabilities are said to total $1,400,000, and the aggregate assets close to $3,000,000. The plant has been closed for inventory and is expected to resume under the receivership before the end of the month.

A merger has been consummated by the Ramapo Iron Works, Hilburn and Niagara Falls, N. Y., specializing in the production of railroad track material, and the Ajax Forge Co., Blue Island, Ill., and Superior, Wis., manufacturer of similar equipment, under the name of the Ramapo-Ajax Corporation. The new company will be controlled by the American Brake Shoe & Foundry Co., 30 Church Street, New York. The new company has taken title to the Ajax property for a consideration of about $133,000. A bond issue has been sold, totaling $2,250,000, the proceeds to be used for general operations, extensions, etc.

Report of Hydraulic Steel Co.

The annual report of the Hydraulic Steel Co., Cleveland, for year ending June 30 shows an operating loss for the year of $856,274. The company's welding plant made a profit of $84,113. The Canton sheet steel plant reported a loss of $674,381, the Steelcraft plant a loss of $196,486, and the Hydraulic plant a loss of $69,519. The company some time ago sold its Canton sheet steel plant to the United Alloy Steel Corporation, and it is stated that this sale was made at a loss of $3,000,000, but this sale enabled the company to pay off its bank loans and to establish itself on a sound financial basis. The company's statement says that the business of the Hydraulic and welding plants in July and August of this year averaged nearly $500,000 per month as against an average of less than $300,000 per month the previous year. The earnings were slightly in excess of note interest. The balance sheet shows current assets of $2,781,721 and current liabilities of $883,979. The deficit on June 30, including loss on sale of Canton plant, was $1,212,624. The company reports that it recently closed a deal to take over all the pressed steel business of the Sharon plant of the Savage Arms Corporation, totaling about $1,000,000 per year, upon which the company will realize commencing Jan. 1, 1923.

Trade Changes

The Iron Trade Products Co., Pittsburgh, Philadelphia and New York, supplying raw materials to the steel trade, has organized under Delaware charter the Big Four Fluorspar & Ore Co., which has absorbed Crittenden County, Ky., fluorspar properties, including the Big Four Mine, the Love Mine, Deer Creek Mine and Crittenden Springs Mine. Work is being pushed on the further development of these properties, and it is expected that machinery for milling the ores will be installed in the very near future. The general offices of the new company are in the Farmers' Bank Building, Pittsburgh, in the offices of the Iron Trade Products Co., at which place the following officers are to be found: W. J. Strassburger, president; J. L. Hukill, vice-president; Louis J. Adler, treasurer, and Huntington Downer, secretary. The Iron Trade Products Co. will act as executive sales agent for the Big Four Fluorspar & Ore Co. Mine offices will be maintained at Marion, Ky., where Avery H. Reed as vice-president and general manager will be in charge.

The United Electric Co., Canton, Ohio, stationary and portable electric cleaners, upon the resignation of J. F. Kinder, western manager, announces that in the future it will distribute its products through agencies.

The Senter-Robbins-Fox Corporation, 217 Broadway, New York, announces that it has taken Charles T. Baird, formerly of Baird & McCrory, Inc., into the firm. He is admitted as a special partner to have entire charge of the company's newly organized iron and steel department, effective immediately.

The Metallo Gasket Co., New Brunswick, N. J., announces the establishment of a general sales office at 242 Lafayette Street, New York. P. L. Rhodes, W. A. Gormley, L. A. Ward and W. B. Goering comprise the staff of experts available for consultation at the above address.

The Ziv Steel & Wire Co., 4413 West Kinzie Street, Chicago, high speed steel, has opened a branch office at Detroit in charge of George H. Marvin, 108 East Woodbridge Street. Mr. Marvin represented the Atlas Crucible Steel Co. for a number of years in the same territory.

The Conveyors' Corporation of America, 326 West Madison Street, Chicago, has appointed the George W. Fife Engineering Co., 1403 Merchants Bank Building, Indianapolis, as representative for the sale of American trolley carriers in Indiana.

Anton Lucas has resigned from the Metal & Thermit Corporation, with which he has been connected for twenty-five years, and has organized the Liquid Steel Welding Corporation, 401 West Twenty-third Street, Kansas City, Mo., of which he is general manager. He assisted the inventor, Dr. Hans Goldschmidt, in Germany in the early development of the thermit process of welding and in the production of metal by the alumino thermic process. In 1903 Mr. Lucas was sent to this country to introduce the process and to start the manufacture of products related to the process. The new company will manufacture materials and appliances necessary for welding. The name "Liquid Steel" applies to compounds used in heavy welding, especially in railroad shops, where it plays an important part.

The Bridgeport Motor Co., Inc., manufacturer of reduction gear equipment, marine motors, etc., Bridgeport, Conn., reorganized its business the past week, and elected Henry H. Brautigan president and general manager. Mr. Brautigan has been general manager of the company since its incorporation in 1900, and has now taken over the controlling interests of the Watson-Stillman stock in the concern. R. S. Hanover, until recently of New York, has been made secretary of the new company. No radical changes will be made for the present, but it is expected that the company will expand its plant and business in the near future.

The E. L. Essley Machinery Co., machinery dealer, Chicago, has purchased the plant of the George W. Pyott Co., 1401 West North Avenue, and will use the property as a warehouse for the storage of machine tools. Eventually the premises will be improved with new steel-constructed buildings equipped with electric traveling cranes.

The Federal Machinery Sales Co., Chicago, has been appointed exclusive representative in the Chicago district for the Universal Grinding Machine Co. and the Fitchburg Grinding Machine Co., both of Fitchburg, Mass.

The American Carbonic Machinery Co., Wisconsin Rapids, Wis., has effected a physical merger with the Grand Rapids Foundry Co., the controlling interest in which has been held by the American company for several years. The consolidated concerns take the name of the American Carbonic Machinery Co., which has increased its capital stock to $200,000. Otto R. Roenius is general manager.

Krantz works, Westinghouse Electric & Mfg. Co., located for many years in Brooklyn, has been transferred to Mansfield, Ohio.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	
Refined iron bars, base price	3.04c.
Swedish bars, base price	7.50c.
Soft steel bars, base price	3.04c.
Hoops, base price	4.39c.
Bands, base price	3.84c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	3.14c.
Channels, angles and tees under 3 in. x ¼ in., base	3.04c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.10c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	3.30c.
Toe-calk, ½ x ⅜ in. and larger	4.15c.
Cold-rolled strip, soft and quarter hard	6.75c. to 7.25c.
Open-hearth spring steel	4.50c. to 7.00c.
Shafting and Screw Stock:	
Rounds	3.90c.
Squares, flats and hex	4.40c.
Standard cast steel, base price	15.00c.
Extra cast steel	18.00c.
Special cast steel	23.00c.

Tank Plates—Steel

¼ in. and heavier	3.14c.

Sheets

Blue Annealed

	Per Lb.
No. 10	4.19c.
No. 12	4.24c.
No. 14	4.29c.
No. 16	4.39c.

Box Annealed—Black

	Soft Steel C. R., One Pass, Per Lb.	Blued Stove Pipe Sheet, Per Lb.
Nos. 18 to 20	4.30c. to 4.70c.	.....
Nos. 22 and 24	4.35c. to 4.75c.	5.00c.
No. 26	4.40c. to 4.80c.	5.05c.
No. 28	4.50c. to 4.90c.	5.15c.
No. 30	4.75c. to 5.15c.	.....

No. 28 and lighter, 36 in. wide, 10c. higher.

Galvanized

	Per Lb.
No. 14	4.60c. to 5.00c.
No. 16	4.75c. to 5.15c.
Nos. 18 and 20	4.90c. to 5.30c.
Nos. 22 and 24	5.05c. to 5.45c.
No. 26	5.20c. to 5.60c.
No. 27	5.35c. to 5.75c.
No. 28	5.50c. to 5.90c.
No. 30	6.00c. to 6.40c.

No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel		*Wrought Iron*		
			Black	Galv.
½ in. Butt..	—53	—38	½ in. Butt...	—11	+13
¾ in. Butt..	—58	—45	¾ in. Butt...	—17	— 1
1-3 in. Butt..	—60	—47	1-1½ in. Butt.	—20	— 2
2½-6 in. Lap.	—57	—44	2 in. Lap....	—14	+ 2
7-8 in. Lap..	—53	—30	2½-6 in. Lap.	—18	— 2
9-12 in. Lap..	—49	—30	7-12 in. Lap..	—10	+ 6

Steel Wire

	Per Lb.
Bright basic	4.25c.
Annealed soft	4.25c.
Galvanized annealed	4.90c.
Coppered basic	4.90c.
Tinned soft Bessemer	5.90c.

*Regular extras for [illegible] apply.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	19¼c. to 20¼c.
High brass wire	20¼c. to 20¾c.
Brass rod	16¾c. to 17¾c.
Brass tube, brazed	26¼c. to 27¼c.
Brass tube, seamless	23 c. to 23½c.
Copper tube, seamless	25¾c. to 26 c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 22¾c. to 23¾c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14-20		
	Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20		Primes	Wasters
			80 lb..	$6.05	$5.80
			90 lb..	6.15	5.90
			100 lb..	6.25	6.00
IC..	$10.00	$8.50	IC..	6.40	6.15
IX..	11.50	10.00	IX..	7.40	7.15
IXX..	13.00	11.25	IXX..	8.40	8.15
IXXX..	14.25	12.50	XXX..	9.40	9.15
IXXXX..	16.00	14.00	IXXXX..	10.40	10.15

Terne Plates

8-lb. coating, 14 x 20

100 lb.	$7.00
IC	7.25
IX	7.50
Fire door stock	9.00

Tin

Straits, pig	37c.
Bar	45c. to 50c.

Copper

Lake ingot	15¼c.
Electrolytic	15 c.
Casting	14¾c.

Spelter and Sheet Zinc

Western spelter	8½c
Sheet zinc, No. 9 base, casks	9½c. open 10c.

Lead and Solder*

American pig lead	7½c. to 8½c.
Bar lead	9c. to 10c.
Solder, ½ and ½ guaranteed	25½c.
No. 1 solder	24c.
Refined solder	21¼c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	75c
Commercial grade, per lb.	35c.
Grade D, per lb.	25c.

Antimony

Asiatic	8¼c. to 9c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb. 25c. to 27c.

Old Metals

The market is unchanged and business is fairly active. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy crucible	12.00
Copper, heavy wire	11.50
Copper, light and bottoms	9.50
Brass, heavy	6.50
Brass, light	5.50
Heavy machine composition	8.50
No. 1 yellow brass turnings	6.75
No. 1 red brass or composition turnings	8.00
Lead, heavy	5.00
Lead, tea	4.00
Zinc	3.75

THE IRON AGE

New York, October 26, 1922

ESTABLISHED 1855 VOL. 110, No. 17

From Ore to Nails in Minnesota Plant

Steel Corporation Adds Rod Mill and Wire Plant to Its Duluth Works—Labor-Saving Devices and Safety Measures Are Features

BY GILBERT L. LACHER*

THERE are few American steel works where the making of pig iron from the ore, steel from the iron and finished wire products from the steel are all concentrated under a single management. With the completion of a wire mill in July and a wire rod mill in September, the Minnesota Steel Co., Duluth, Minn., entered that class of plants. The products of the wire mill are sold by the American Steel & Wire Co. and are branded with its trademarks and stencils, but the operation of the mill is entirely under the management of the Minnesota Steel Co. The new plant is a "common products" mill, making nails, fence, barbed wire and galvanized wire exclusively as contrasted with "market wire" mills which make springs, wire hoops, wire rope and strand, insulated wire and cable and various other specialties used largely by manufacturers.

A glance at a map of the United States discloses why Duluth is a logical location for a common products plant. Extending northwest, west and southwest is a great expanse of territory in which agriculture is the principal occupation. Manufacturing centers using special wire goods lie mainly to the south and east of this region and are properly customers of mills making those products. The zone tributary to Duluth is more clearly defined in freight tariffs which give the Minnesota Steel Co. mill an advantage over Chicago district works in the northern peninsula of Michigan, the northwestern half of Wisconsin, in Minnesota, the Dakotas and the territory west and north of those states. The excellent location of the new mill is further emphasized by the fact that Duluth has long been a distributing point for common products.

The new plant which makes Duluth a producing, as well as a distributing, center combines in its construction and equipment the most advanced ideas developed in the various works of the American Steel & Wire Co. The rod mill, which connects with the billet mill of the previously constructed works of the Minnesota Steel Co., is 80 x 400 ft., with a capacity estimated at 400 tons per 24 hr. The wire mill is a separate unit detached from the remainder of the plant, and measures 320 x 1500 ft., covering nearly eight acres. Its production under normal conditions will be 300 tons per 24 hr. and is expected to reach upward of 2400 tons of finished

*THE IRON AGE, Chicago.



Wire Drawers Are Relieved of Lifting by an Electric Hoist Operating on a Monorail Crane

products per week. The entire output will be in low carbon basic steel. Like all other structures of the Minnesota Steel Co., the new buildings are of unusually substantial construction to withstand the rigors of the severe climate. The structural work is of steel, the roof of 3-in. fir with Johns-Manville asbestos roofing, and the walls of cement blocks which were made on the grounds. The blocks are hollow, providing columns of air which serve to keep the dampness and cold out of the buildings.

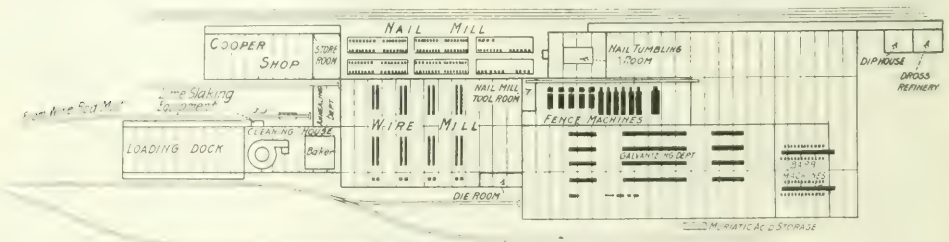
A striking feature of the wire mill is the attention which has been given to labor-saving and safety devices. Particular heed was given to relieve the wire

The drawing room has 168 22-in. blocks and 36 16-in. blocks, arranged in four double rows and driven by eight motors. The motors are placed in pairs and spaced 7 ft. center to center. Three of the double rows comprise 48 22-in. blocks each, or 24 on a side. Each row of 24 blocks is driven by a 225-hp. Allis-Chalmers motor. There are also two rows consisting of 18 16-in. blocks and 12 22-in. blocks each, the 16-in. and 22-in. blocks being bench to bench. These blocks are driven by two 150-hp. Allis-Chalmers motors, as less power is required to run a line of 18 16-in. and 12 22-in. blocks than a solid line of 24 22-in. blocks. Each motor is connected with its line shaft by a flexible coupling and the shaft drives the blocks through bevel gears. A central aisle divides the rows of blocks in half, benches of 12 blocks each being on each side, except in the case of the 16-in. blocks which consist of two benches of 18 blocks below the floor. A shear operated by the same eccentric is used to cut off the end of the rod which cannot be drawn because it has fins. The drawplates used are exceptionally hard high carbon iron castings. Powdered soap is used in the drawplate for the first draft but subsequent drafts are made without additional lubrication.

When finished coils of wire have been drawn, they are lowered on to trucks by the monorail hoist and are then moved by Elwell-Parker storage battery tractor to a Fairbanks registering beam scale. On the bottom of the beam of the scale is type comprising numbers corresponding to the graduations on the beam. When the beam balances, the operator inserts a card, throws a hand press against the type, thereby perforating the card with the weight of the truck load on the scale. The tare weight of the truck is taken at frequent intervals. The cards are filed away with the invoices against shipments to the trade and serve as reliable evidence of the correctness of the weight entered on the invoice. A weighing clerk might easily transpose numbers in writing them down, but there is no chance of this when using the registering beam.

While some wire goes directly to the trade, a considerable portion goes to other departments for further operations, including galvanizing and the making of nails, staples, barbed wire and fencing.

The wire rods from which the wire is drawn are shipped by flat car from the rod mill. The bundles are loaded on trucks so that it is an easy matter to push the trucks from the cars to the loading dock of the wire



Wire and Nail Plant of the Minnesota Steel Co.

back to back. The drawing room contains space for two additional rows of blocks.

The number of blocks operated by a single workman comprises a frame. Usually the number of blocks in the frame is identical with the number of drafts which must be made to produce the wire of the desired gage. Ordinarily the number of drafts is four.

Unusual precautions have been taken to protect the wire drawers from accident. Four means have been provided to stop the rotation of a block. One is the foot pedal ordinarily used by the operator to engage and disengage the clutch driving the block. A hand lever in back of the operator when he is facing the bench may be used to stop the block in case of a snarl which might make it difficult for him to reach the pedal. A third means is a lever located next to the block in a position where it is likely to be struck by the body of the operator in case he is caught by the wire as it is being drawn on to the block. This lever releases a weight which, in dropping, instantly throws the block out of engagement with the clutch. While this weight is down the block cannot be started again by either pedal or hand lever. It is first necessary to pull up a wire rope which draws the weight back to normal position. The fourth method of stopping a block in an emergency is by pushing a button which actuates a circuit breaker on the switchboard, thereby stopping the motor and all the blocks its drives. It will be noted that the stopping of a motor does not shut down all blocks in the drawing room as would be the case in some wire mills, but only two benches of 24 or at the most 30 blocks. Operation can also be resumed by push button.

For each frame of blocks there is a motor-driven roll pointer run by an eccentric on a motor driven shaft mill. Each truck has a capacity for 10 bundles, or an aggregate weight of approximately 3000 lb. The truck was designed and constructed by the Minnesota Steel Co. and is well adapted for handling by storage battery tractor. It is supported by two large wheels in the middle and one small wheel at each end. As a result the truck tips toward the tractor when drawn and away from it when pushed, at no time resting on more than three wheels. Steering is therefore rendered easy whether the truck is pushed or pulled.

The Elwell-Parker tractor is connected with the truck by a triangular coupling devised by the company's own engineers. This coupling has three hooks, one of which is passed through an eye either at the front or back of the tractor, and the other two through eyes on the end of the truck. The tractor, which is an Elwell-Parker type T.C., has a two-wheel drive and a four-wheel steer so that it can make a very sharp turn. The tractor has a number of striking safety features. Operation cannot start until the driver is sitting on the seat. Furthermore, the operating lever must be brought to vertical position before the tractor can be started forward or backward. The importance of this precautionary measure is realized when one considers that the lever might be carelessly or accidentally pushed forward or backward while the tractor is standing still. While it is essential that the driver take his seat before the tractor will start, the mere fact that the lever is in an operating position will not result in a sudden lurch forward or backward. For the charging of the tractor batteries for General Electric motor generator sets driven by 7½-hp. a.c. induction motors have been provided. Each set is served by a control board which prevents the ruining of batteries through overcharging. There are two scales on a board, one graduated up to

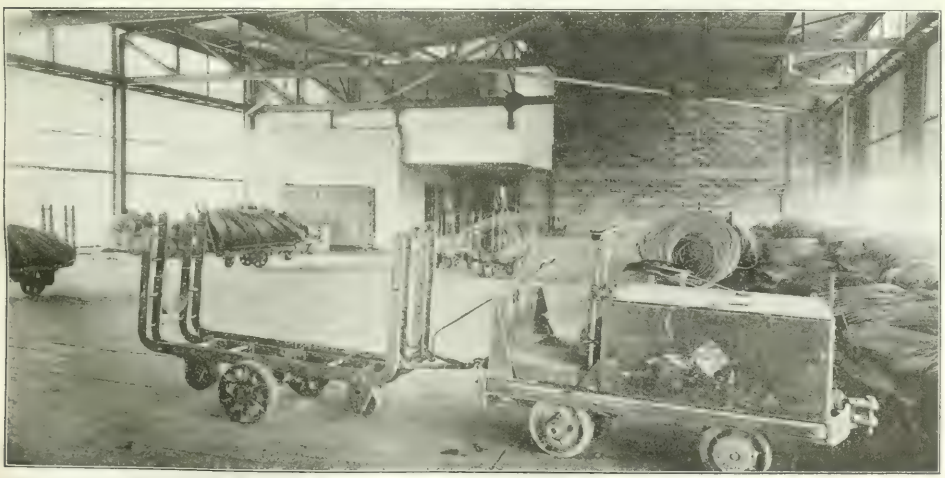


In the Cleaning House Five Acid Tanks and One Water Tank Are Arranged in a Semicircle Around a Jib Crane Which Is Raised and Lowered by Steam and Turned by Motor, Having a Range of the Full 360 Deg. In the foreground are a number of the yokes used to hold the bundles when suspended over the vats

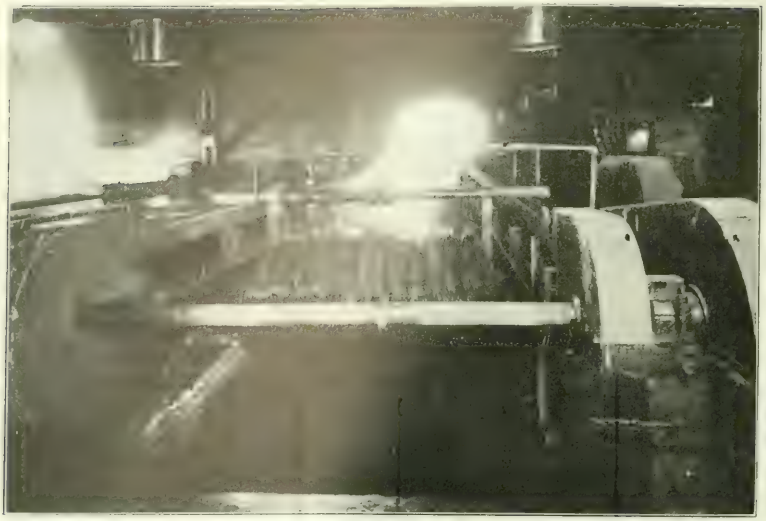
100 amperes and the other up to 75 volts. These are set and when the charging is completed the current is automatically disconnected. Exide storage batteries are used in the tractors.

From the loading dock trucks of rods are passed through a scale house where they are weighed and then brought into the cleaning house. Here five acid tanks and one water tank are arranged in a semi-circle around a jib crane. The crane is raised and lowered by steam and is turned by motor, having a range of the full 360 deg. A yoke suspended from the crane is passed through the rod bundles, whereupon they are hoisted, swung to position over an acid tank and then lowered into the solution. Each end of the top of the yoke rests on the edges of the vat, supporting the rods during the removal of scale. Two yokes of rods may be placed in a tank at one time so that 10 yokes, supporting 30,000 lb. of rods, may be lying in the acid solution simultaneously, there being five tanks.

The agent used to remove the scale is a weak solution of sulphuric acid, the supply of the acid being drawn from two storage tanks just outside of the house, each of which has a capacity of 1,106,000 lb. Before reaching the vats the acid passes from the storage tanks to a measuring tank inside the house which contains approximately a day's supply. The amount of acid introduced into the vats is gaged by five measuring boxes, one for each vat, located at the axis of the jib crane. The amount to be added to each solution is a matter of judgment, depending on the amount of scale on the rods. A sure test of the effectiveness of the solution lies in an inspection of the rods after they are withdrawn from it. If any scale can still be seen the solution is too weak and the rods must be reinserted in the vat. The acid vats are heated by steam which passes into the solution through perforated pipes. Successive additions of acid are made to the solution until the Baumé scale gets too high because of the scale de-



Wire Rods Are Shipped by Flat Car in Truck Loads from the Rod Mill to the Loading Dock of the Wire Plant. Here it is an easy matter to roll the trucks from the cars to the dock. The trucks are hauled throughout the wire plant by tractors. A triangular coupling between the tractor and truck facilitates steering



A Slowing Moving Double Continuous Chain Belt Carries the Yokes Through a Sull Tank, Where the Rods Are Subjected to a Number of Sprays and Mists Which Give the Steel a Thin Uniform Coating of Rust Termed Sull

posited, whereupon the vats are emptied and refilled. To draw off the acid fumes rising from the vats large wooden canopy has been suspended from the ceiling of the house.

After the removal of scale in the acid vats the yokes of rods are placed in a hot water tank where the acid is washed off. The crane then transfers the yokes to a double continuous chain belt, each end of the yoke resting on a belt while the rods are suspended over a long sull tank. The belts are operated by motor and are geared low so that the yokes pass over the tank very slowly. The rods first pass through a vigorous down-spray which gives them a thorough drenching and then through four gentle sprays, termed "mists." Two of the mists strike the rods from above and two from the side, the latter being so situated to reach the inside of the bundles. By the time a yoke has reached the end of the tanks the bundles are covered with a thin uniform coating of brown rust called "sull" which serves as a lubricant when the rods are drawn into wire. At this point a 2-ton Alliance overhead electric traveling crane hoists the yoke and lowers it to a vat, where the rods are immersed in lime for the purpose of neutralizing any remaining acid on the steel and to prevent corrosion. The lime also serves as a lubricant in the subsequent drawing of the wire.



Which Heat the Bakers. The shoveling of the coal into the furnace door requires but a short pass by the fireman

From the lime tank the yoke is transferred to a waiting coil truck standing on depressed concrete tracks leading into a 10-track continuous baking oven with a capacity of 70 trucks. The trucks are pushed into the ovens by double motor-driven chains, dogs from the chains engaging the axles. If an oven track is full, a truckload is automatically pushed out of the discharge end when a fresh truckload is pushed in. The doors at both ends are hung on a slant so that they close by gravity, the entrance doors swinging inward and the discharge doors outward. When the trucks are discharged from the oven they pass by gravity down an incline to the floor of the drawing room.

The bakers are heated to about 300 deg. Fahr., their sole purpose being to dry the rods thoroughly. Heat is supplied by coal-fired furnaces located in the basement. While the furnaces are hand-stoked, the coal never touches the floor because of the ingenious conveying system employed. Coal from both drop-bottom and side-dump coal cars is discharged through a grid into a concrete bin under a railroad siding next to the building. From this storage, coal is transferred to a coal carrier with a capacity of 1000 lb. The carrier is suspended from a monorail system, installed by the Lowden Machinery Co., Fairfield, Iowa, and is easily pushed by hand to a position directly in front of the furnace door to be fed. Here the side of the carrier nearest the furnace is lowered so that the shoveling of the coal from carrier to door requires but a single short pass by the fireman. The carrier was designed by the Minnesota Steel Co.'s own engineers. A carrier furnished by the Lowden company is used for removing ashes, the carrier being passed by monorail from the furnaces to a position under the railroad siding where it is picked up by a continuous bucket elevator, emptied into a waiting railroad car and returned to the monorail.

The furnaces are divided into five units or "houses," one house heating two tracks of the baker above. This arrangement of the furnace and baker into separate units enables the management to operate only part of the oven, if it so desires. Each house is served by a recording Bristol thermometer which registers on a chart the temperature at all times during the course of 24 hr. A blank chart, of course, must be inserted in the thermometer every day.

In a section of the plant next to the baking ovens is a muffled annealing furnace which is used for annealing wire for special purposes, such as wire for the making of staples. Wire must likewise be annealed for fabrication into woven fence and barbed wire. This annealing, as well as the galvanizing of the wire to protect it from rust, is done in another section of the plant connecting with the end of the drawing room opposite that adjacent to the bakers. In this room there

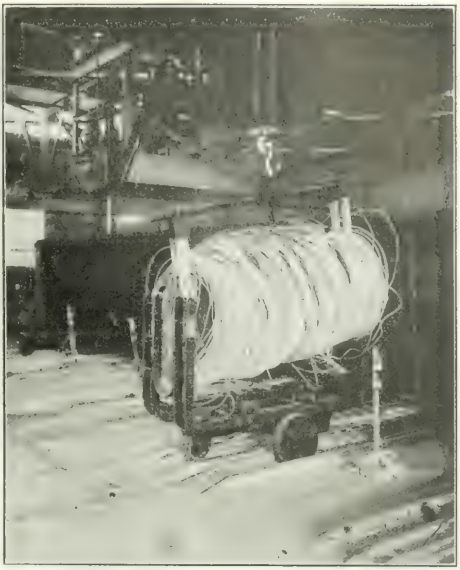
are four separate continuous annealing and galvanizing units arranged parallel to each other. The treatment of the wire consists of passing parallel strands through a lead bath for annealing, then through a tank of muriatic acid to remove the scale, from there through a hot water bath to wash off the acid and through a flux consisting of a neutral solution of hydrochloric acid to insure further the removal of all traces of the acid. From the flux it passes over a hot plate to be thoroughly dried and then into a zinc bath. After it emerges from the spelter tank the wire is wound on take-up frames from which it is removed in bundles by overhead hoist.

The operation of each annealing and galvanizing unit is continuous. The motor-driven take-up frames pull the wire through all steps of the process. The bundles of wire treated in the process are brought from the drawing room into the galvanizing department on trucks from which they are transferred to double reels by Reading overhead electric hoists operating on a monorail built by the Cleveland Electric Tramrail Co. It is to be noted that the bundle-handling equipment is the same as in the drawing room except that in this case a monorail crane is not required. The double reel is a very useful aid to the continuous operation of the galvanizing unit, because it holds two bundles, one above the other. As soon as the bottom bundle has been unreeled, the end of it is spliced on to the top bundle which is then dropped to the bottom of the reel. Another bundle is then placed on the top of the reel so that it will be in readiness for a repetition of the operation just described.

The splicing of wires calls for vigilance on the part of the attending employees. After the wire passes through the spelter bath it is necessary that it be wiped to insure a smooth uniform coating. For this purpose asbestos wipers have been provided. A splice, however, will not pass through a wiper and it is therefore necessary to keep close track of the approach of the splices. Accordingly, at the entering end of the zinc bath trips have been placed which are thrown up by contact with the splices, thereby serving as signals to the operative stationed at the wipers. At such an indication he pulls up the wiper to permit the splice to pass through, at the same time taking the opportunity to insert a new one, as the usefulness of a wiper does not extend beyond a single bundle of wire.

As previously noted, the lead bath is used for annealing. Lead is used as a heating agent because of its adaptability to close control. The bath is held at about 1375 deg. Fahr., the ordinary annealing temperature. A Leeds & Northrup recording pyrometer indicates the temperature of the bath at all times.

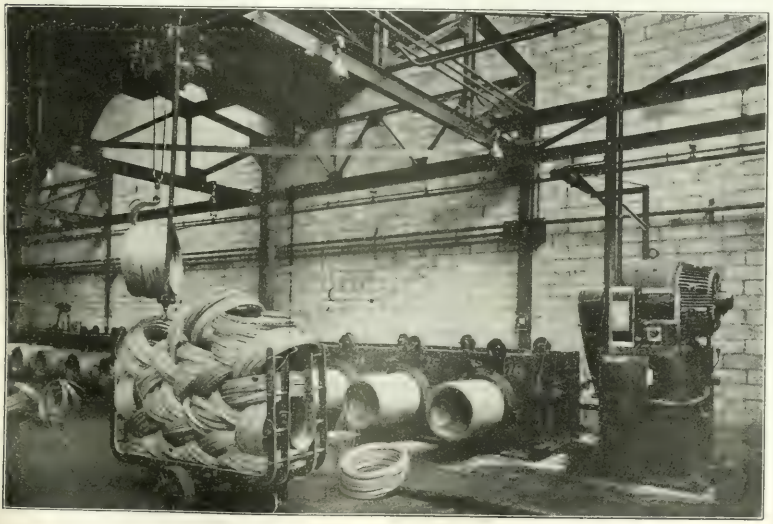
The muriatic acid bath is contained in a concrete tank. As concrete is not impervious to acid, the tank has a lining of vitrified brick which was laid in molten sulphur. The acid vats are entirely inclosed in wooden housings surmounted by hoods through which the fumes are drawn off to the roof of the building.



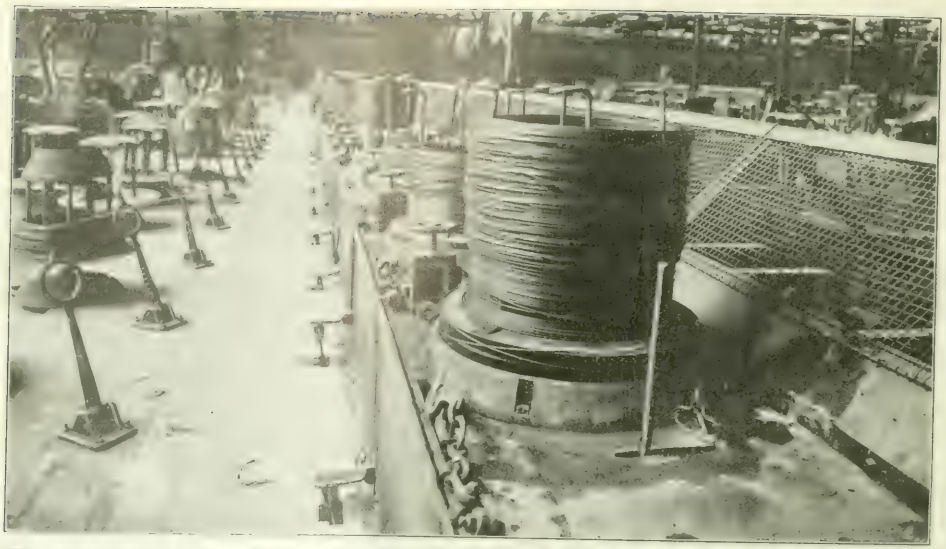
From the Lime Vat the Yokes Are Transferred by Overhead Crane to Trucks, Which Are Delivered by Chain Belt into the Baking Ovens

The temperature of the zinc bath is also controlled by a Leeds & Northrup pyrometer. As the purpose of this bath is merely to galvanize the wire, only sufficient heat is required to keep the spelter molten. The gases rising from the zinc bath are used to heat the hot plate over which the wire passes before entering the spelter. The purpose of the plate is to dry the wire thoroughly before it is immersed in the metal, thereby preventing sputtering and imperfect galvanizing.

As different annealing points are required for different kinds of wire, there is considerable variation in the time required to pass wire through an annealing and galvanizing unit. For the horizontal or line wires of a woven wire fence strength is required, while for the



As Different Annealing Points Are Required for Various Kinds of Wire, the Speed of the Take-Up Frames at the End of Each Galvanizing Unit Is Adjusted by Means of a Variable Speed Motor. The safety lever to be noted above each frame is so situated that it will be struck by the body of the operator should he be accidentally caught by the wire. As the bundles are removed from the frames they are loaded on waiting trucks by an overhead electric hoist operating on a monorail



When the Foot Pedal Is Ordinarily Used to Engage and Disengage the Block, the Hand Lever at the Left Is Employed When There Is a Snarl and It Is Difficult to Reach the Pedal. The lever in upright position next to the block is located where it is likely to be struck by the body of the operator if he be caught by the wire. The block then cannot be started again until a weight is pulled back into position by means of a wire rope the handle of which is shown just to the right of the emergency lever

vertical wires or pickets pliability is necessary. It is obvious that different heat treatment is called for by these two classes of wire. This illustrates the reason why provision had to be made for varying the speed of the take-up blocks which pull the wire through the baths. All of the take-up frames of each galvanizing unit are operated from the same shaft by a variable speed d.c. 25-hp. Westinghouse motor. Each frame is thrown in or out of engagement with the line shaft by a hand clutch. As a precautionary measure a safety lever has been provided for each frame. This lever works in the same direction as the rotation of the frame and is so situated that it will be struck by the body of the operator should he be accidentally caught by the wire. The operation of this lever instantly stops the rotation of the frame.

Each row of frames is served by a monorail and a 500-lb. electric hoist which enables one man to transfer the galvanized wire from the frames to trucks. From here the wire goes to the barbed wire department, the woven wire fence department or to the trade. The barbed wire department is equipped with 50 Universal barbed wire machines, running at the rate of from 250 to 350 barbs per minute, depending on the classes of wire being made. There are forty-six different types of barbed wire and it is the intention of the plant to make all of them. A noteworthy departure from standard practice in this department is the fact that all barbed wire is wound on metal spools made from galvanized wire. These are much superior to wooden spools which often break and cause a tangled jumble. The barbed wire machines are arranged in two groups, each of which is divided by an aisle containing a chain conveyor which carries the completed bundles into the warehouse.

The woven wire fence department contains seven National machines and five American machines, making two brands of fence. The American is a hinge-joint fence in which each stay connecting the longitudinal strands is a separate piece of wire. The national fence is of the continuous picket type, the picket or vertical wire being of one piece. Both types are furnished in 10, 20, 30 and 40 rod rolls and are made in 26, 32, 39, 47 and 55-in. heights. Likewise they are made in different specifications: with No. 9 gage top and bottom and No. 11 gage intermediate wire, with No. 10 top and bottom and No. 12½ intermediate, and with No. 11 top and bottom and No. 14 intermediate. Through the use of different heights and different gages of wire approximately 240 different styles of fence are made. A moving sidewalk conveys the rolls from the machines to the warehouse where, after weighing, they are either stored or loaded directly into box cars.

The nail department is equipped with 145 American crank machines, making from two-penny up to 60-penny nails inclusive, the last size being really a 6-in. spike. From 30 to 40 per cent faster than any other machine, the American machines produce from 150 to 660 nails per minute. This increased speed was made possible by a more sturdy construction, which is able to stand the vibration of more rapid operation. One striking feature of the construction is the base, which is a steel casting, in contrast with the usual base, which is cast iron. There are also two staple machines which make all kinds of fence staples. Both the nail and staple machines were designed and built in United States Steel Corporation shops.

The nail cleaning room is a department of unusual interest. This consists of a main floor and a balcony. As the nails come from the nail machines they are taken by elevator to the balcony where they are deposited in motor-driven tumblers. There are eight 50-keg and five 10-keg tumblers, the latter being used either for small nails or to handle small orders. Approximately two bushels of sawdust are used in each 50-keg tumbler and a proportionate amount in the smaller tumblers. The sawdust is drawn from a large storage bin which is filled from railroad cars below by means of a suction fan.

The nails are oscillated in the tumbling barrel from an hour to an hour and a half, following which the dust and whiskers are drawn off and the nails are discharged into a hopper below. When the hatch at the bottom of the hopper is opened the nails pour out on an incline from which they are raked into kegs. The kegs are fastened in oscillating arms which shake the nails down and cause them to lie flat. To prevent the nails from dropping to the floor, funnels with square shaped tops fitting close to each other and amply large to command the discharge vent in the nail incline at all times during the oscillation, are inserted in the heads of the kegs. The use of shakers has two important advantages, first, it packs the nails flat, thereby conserving the time of the carpenter when drawing nails from the keg and freeing him from the annoyance of pricking points; second, it makes it possible to use a smaller keg, thereby saving freight. The nails are packed in 100-lb. kegs,

which are probably the smallest kegs containing that weight used by any nail manufacturer. The diameter ranges from 9¼ to 11½ in., while the height in all instances is 17 in. All kegs are made in the company's cooper shop which has a capacity of 5000 kegs a day, the kegs being handled from the shop to the nail cleaning room by conveyor. A conveyor also moves the kegs from the shakers to a press where the top hoop is pressed on the keg, to a nailing machine which nails the hoop to the keg, and thence to the warehouse. A covered loading platform extends the whole length of one side of the warehouse. From this platform the kegs are rolled directly into box cars. From 600 to 1000 kegs are loaded into a single car.

Except for the warehouse and the cooper shop, which have flat roofs, the entire wire plant has sawtooth roof construction, thereby insuring the best of light for manufacturing operations. The warehouse, the nail cleaning room and the cooper shop are equipped with automatic sprinklers furnished by the General Fire Extinguisher Co. The "dry system" is used because of the danger of exposed water pipes being frozen by a sudden drop in temperature. Indication posts for the system are on a fire loop on the outside of the building. All fire apparatus is likewise outside, there being a fire hose over each hydrant with hose connected and in a rack for immediate use. The building is heated by hot air. Steam heating coils are suspended from the roof girders and air is blown through them and thence downward through discharge pipes into the room. The steam is supplied from the boiler house of the main works. During warm weather when the steam is disconnected, the system may be used to set up a circulation of air and thereby give the workmen relief from the heat. Each department is supplied with modern wash and toilet rooms which also contain individual lockers for all of the operatives.

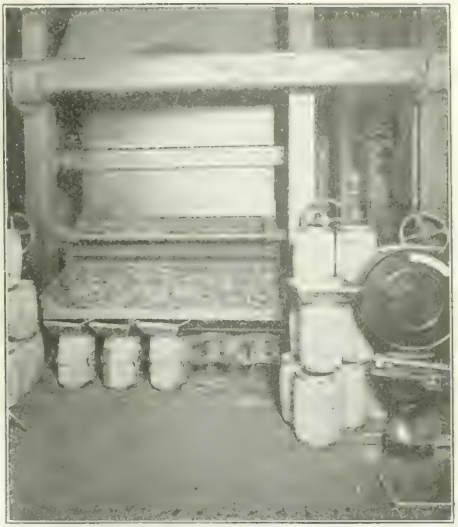
Owing to the fact that the building rests on filled-in land, the floors of most departments are of temporary planking to allow the fill to settle. All machinery, of course, is on permanent foundations, which, however, are independent of the columns of the structure.

The rod supply for the wire plant comes from a two-line continuous type mill, having six 12-in. roughing stands and ten 10-in. finishing stands. A Morgan flying shear trims the billets as they pass from the roughing stands to the finishing stands. The mill rolls 1¾-in. billets down to No. 5 gage rods. The billets are approximately 30 ft. in length and the No. 5 gage bundles contain about 420 ft. of rod, weighing approximately 300 lb. The stands are driven by gear reduction from a 3000-hp. Allis-Chalmers a.c. motor. By rope drive the same motor operates the reels when No. 5 gage rod is being rolled. Coarser rods up to ½ in. in diameter will also be rolled and for this purpose a 100-hp. d.c. variable speed Westinghouse motor has been provided for the operation of the reels. This motor is equipped with an automatic speed controller and an electrical vibrating regulator connected with the main mill motor. This equipment regulates the speed variation of the 100-hp. motor to conform with that of the 300-hp. motor. This mill is the first to be equipped with an auxiliary motor of this kind and it is expected to accelerate the operations of the mill materially when it is changing from No. 5 gage to coarser rods.

The rods are transferred mechanically from the reels to a slide conveyor. The latter consists of a continuous chain belt with hooks on it operating through the middle of a flat incline, the hooks being inserted in the bundles and dragging them to the end of the incline where they are dropped into rod trucks stationed below. The trucks are placed on a transfer which permits an empty truck to be shifted quickly under the conveyor as soon as the previous truck has been loaded. The loaded trucks are wheeled directly on to flat cars which are then switched to the loading dock of the wire plant.

The rod mill is fed by a continuous reheating furnace with a capacity of 194 billets. The furnace is fired by coke oven gas supplied by the company's by-product ovens. There are six stoves in the furnace and each is supplied with gas by two cast iron pipes of 13 in. inside diameter. The air is heated by passing through the stoves under the furnace where it is raised to a temperature of 600 deg. Fahr. The air is furnished by a Sturtevant exhauster.

A 20-ton Morgan crane transfers the billets by magnet from a roller table in the billet mill to a loading dock from which they are discharged into the reheating furnace. The furnace heats from 400 to 425 tons in 24 hr. The rod mill building is commanded by a 25-ton Morgan electric traveling crane.



From a Hopper Located Under Each Tumbling Barrel, Nails Are Discharged onto an Incline from Which They Are Raked into Kegs. The kegs are fastened in oscillating arms, which shake the nails down and cause them to lie flat, thereby enabling the company to use smaller kegs. The square-top funnels in the top of the kegs prevent many nails from dropping to the floor as they are raked into the kegs



Overhead Electric Hoists Operating on Monorails Are Used to Handle the 300-Lb. Bundles in the Annealing and Galvanizing Department. The double reels from which the wire is drawn through the annealing and galvanizing unit facilitate continuous operation. As soon as a bottom bundle has been unreeled, the end of it is spliced onto the top bundle, which is then dropped to the bottom of the reel

Press Safety Guard of Positive Type

A new safety guard for power presses known as the Kartzmark safety guard has been put on the market by the Standard Safety Mfg. Co., New Haven, Conn. The photograph shows a standard type of press with the guard attached, the main part of it being mounted on the side of the press body in place of the usual clutch actuating draw rod. A non-repeat cam is mounted on the press crankshaft which controls hold down for fender bar and housing.

When the operator depresses the treadle the fender bar and housing are brought down so that the fender housing surrounds the die block. If there is any interference, such as the operator's hand or even one finger, preventing the fender's closing entirely to the bolster



Safety Guard for Power Press — When treadle is depressed [illegible] housing surrounds the die block

plate, the latch cannot be withdrawn. This latch is shown at *A*. It is controlled by cam roller bearing shown at *B*. As the housing and fender bar reach the safety point with the fender resting on the bolster, the latch *A* is pulled, the cam on shaft holds it down until the cam has reached its destination, when another cam on shaft shown at *C* strikes the non-repeat lever *D*. This disconnects the treadle at latch *E* and draws the connecting link between the press latch and the guard latch shown at *F* back into position, thus relocking the press. The entire action is automatic, being cam controlled, thus leaving both hands of the operator free to handle work in and out of the machine.

Provision is made for limiting the upper travel of the fender bar and housing and also for adjustment for different heights of dies. This mechanism is also provided with an arrangement to compensate for tilting of the press, arrangement being similar to that usually employed on clutch draw rods.

The positive safety of this device was emphasized at the New Haven Machine Tool Exhibition recently when a blind man operated a press so equipped.

Additional equipment is being installed at the Youngstown plant of the Kalman Steel Co., Chicago, formerly the Paul J. Kalman Co., which will increase its productive capacity about one-third. The company plans to add another unit at Youngstown next spring, 60 x 376 ft.

Increase in Rates Not Justified

WASHINGTON, Oct. 24.—In an opinion made public last Friday, the Interstate Commerce Commission held as not having been justified an increase in the rate on iron and steel products in carloads from Midvale, Utah, in common point territory to destinations in California embraced in groups 3 and 4. The increase proposed was from 75c. to $1.08. It was stated by the carriers involved that steel interests of the San Francisco Bay region had complained that the 75c. rate was too low when compared with their rates to the group 3 and 4 destinations. The increase would have brought the Utah rate to the level of the Minnequa, Col., rate. The commission said it could not approve a parity in rates in which the Utah point had an advantage of about 600 miles in distance and that a spread of 33c. between rates to groups 1 and 2 and groups 3 and 4 seemed unwarranted in view of the fact that group 3 points were on the average only approximately 80 miles more distant.

Decreased Activity of Ohio Foundries

The trade report of the Ohio State Foundrymen's Association for the month of September shows that the actual melt of the foundries reporting decreased from 72 per cent of normal in August to 63 per cent in September. The total stock on hand shows considerable decrease, while the stock received shows also a sharp drop.

The association has established a nonferrous depart-



Press Equipped with Safeguard Being Operated by Blind Man

ment from which reports will be received monthly and later sent out to the nonferrous members.

The convention and the annual meeting of the Foundrymen's Association will be held at Middletown, Ohio, Dec. 7 and 8. Some very interesting and instructive features are being prepared for this convention, details of which will be given later.

The benzol plant in connection with the by-product coke ovens of the St. Louis Coke & Chemical Co., Granite City, Ill., was put in operation recently. Indications are that the Illinois coal being used in the Roberts ovens will have a yield per ton of about 3.5 gal. of light oil, from which the recovery of motor fuel will be 2.85 gal.

Decision Favors Steel Corporation Roads

Interstate Commerce Commission Examiner Finds the Rates for Hauling Minnesota Ore Are Justified—Favors Reduction on Old Range Rates

BY L. W. MOFFETT

WASHINGTON, Oct. 24.—Line-haul freight rates on iron ore from the Gogebic range to Ashland, Wis., and from the Menominee and Marquette ranges to Escanaba, Mich., would be reduced 9c. per ton and from the Marquette range to Marquette, Mich., 4c. to 5c. per ton, while from the Minnesota ranges, the greatest source of supply of Lake Superior ore, they would be left unchanged if the Interstate Commerce Commission accepts recommendations made by Examiner Howard Hosmer. The present charge of 10c. per ton for dock service also would be left unchanged.

The examiner made these recommendations in connection with the well-known case of the Adriatic Mining Co., one of the most elaborately presented matters that has come before the commission in years in a single proceeding. As shown in the accompanying table, the examiner would reduce present line-haul rates from mines to upper docks to 72c. from 81c. from the Gogebic, Menominee and Marquette ranges, except in the case of the docks at Marquette, where he would reduce them from 58c. and 68c. to 54c. and 63c., the former applying from the Marquette range and the latter from the mines at Ishpeming and Negaunee, Mich. The table, however, includes the dock charge.

Many Corporations Complain

Complaints in the case, instituted Dec. 24, 1920, include 87 corporations operating iron mines in the Lake Superior region, identified with the independent steel companies, producing about one-half of the total output of the region. The commission was asked to establish rates which would not exceed the cost of performing the service plus an annual return of 6 per cent of the value of the property devoted to transporting and handling the ore. It also was charged that the present rates are violative of the second and third sections of the Interstate Commerce act because two of the defendants, Duluth, Missabe & Northern and the Duluth & Iron Range railroads, are controlled by the United States Steel Corporation, which, it was alleged, secures what is in effect a rebate. The contention regarding these lines was refuted by the examiner. Upon the publication of the increases in ore rates made by the Michigan lines in February, 1921, a supplemental complaint was filed, assailing those rates. Subsequently the Steel & Tube Co. of America and certain others of the original complainants operating mines in the Gogebic range were permitted to withdraw as complainants and join with the Hayes Mining Co. in filing a petition of intervention, adopting the allegations of the complaint and in addition making the contention that the rate from the Gogebic range to Ashland should be lower than the rates from the other principal ranges to their respective ports.

Charges Against Steel Corporation

Regarding the charges against the Steel Corporation lines, the examiner said the law does not prohibit the owning of a railroad by a shipper by means of stockholding and that the enactment of section 15a recognized the right of a railroad to earn more than 6 per cent because it provided for a recapture of only part of the return in excess of 6 per cent. Concerning the cost of service contention, the examiner said the ore produced by the Steel Corporation could be hauled for less than that of the independents as shown by previous reports of the commission. He made the calculation that under the excess profits tax law and the recapture clause of the Interstate Commerce law, adoption of the theory of rate making proposed by the complainants would leave the two Steel Corporation lines a return of only $5,456,803, which would be $1,984,431 less than the amount contributed by the Steel Corporation to the total excess income of the two carriers. Considering distances, cost of service, and other items, the examiner held that no reduction in rates from the Mesabi ranges, whose output is almost double that of the other ranges combined, was justified. This range is served by the Great Northern, and the two Steel Corporation roads. The report consists of 65 pages devoted to a thoroughgoing discussion of the rate situation in the Lake Superior region, methods of operation, cost, the various grades of ores and the system of handling them, production, etc. To show the relative shipments from the various ranges, the report gives figures by years from 1914 to 1921, inclusive. Taking the greatest year, 1916, when shipments totaled 66,439,000 gross tons, it is shown that

Present, Proposed and Original Rates

The following table shows proposed, present, shippers' suggested rates and those applying at the time of the original complaint, in gross tons, on iron ore from Lake Superior mines to upper docks, including the dock charges, except when otherwise noted:

From	To	Examiner's Proposed Rates	Present	Original at Time of Complaint	*Complainants Asked
Minnesota ranges	Two Harbors, Minn. Duluth, Minn. Superior, Wis. Allouez, Wis.	91c.	91c.	$1	60c.
Gogebic range	Ashland, Wis.	82c.	91c.	85c.	51c.
Menominee and Marquette ranges	Escanaba, Mich.	82c.	91c.	85c.	51c.
Marquette range	Marquette, Mich.	64-73c.	68-78c.	65-75c.	45c.

*Line haul rates.

46,188,000 tons were shipped from the Mesabi, Vermillion and Cuyuna ranges, constituting the Minnesota ranges. Of this latter total, 42,525 tons were shipped from the Mesabi. It is stated that Steel Corporation roads hauled about 42 per cent of the tonnage of dock ore from the lake region in 1920 and 55 per cent in 1921.

Enhanced Operating Costs

"It is urged by complainants that with the return of peace they are entitled to a removal of what they term the war-time, emergency increase in these rates," says the examiner in referring to the Minnesota range situation. "In answer to this contention it is sufficient to point out that the cause for that increase, enhanced operating costs, has been removed only in a small part. While complainants' rates were subjected to a greater increase under general order No. 28 (general increases of June 24, 1918) in comparison with other commodities, that inequality has been entirely wiped out by subsequent re-adjustments. As a result of general increases and reductions since June 24, 1918, the general level of rates in Western territory is 52 per cent higher than it was on the date mentioned, while the net increase in the ore rates from the Minnesota ranges during the

same period has been but 44 per cent. Ore rates shared in the general reduction of July 1, 1922, and the rate then ordered seems to have been fairly proportionate to the decreased costs of operation. Further reductions in operating expenses in the immediate future seem unlikely in view of the present trend of costs of labor, fuel and construction materials."

Regarding rates from the Gogebic, Menominee and Marquette ranges to Ashland and Escanaba, the examiner says that the increase of 10c. per ton in the line-haul to these ports in February, 1921, does not appear from the evidence of the carriers to have been warranted. The 1920 line-haul rate of 80c., reduced 10 per cent, would be 72c., and that amount, it is declared, would seem to be a reasonable maximum for the future. While there has never been a definite relationship between the rate to Ashland-Escanaba and that from the new ranges, it is stated, the difference in transportation conditions is so clearly in favor of the old ranges that their rates may properly be lower.

With respect to the line-haul rates of the lines serving Marquette, it is pointed out, it will be observed that the increase of February, 1921, made those rates 118 per cent higher than they were after the 15 per cent increase in July, 1917. This total increase was declared to have been larger than was made in the same period in any of the other ore rates involved in the case and was excessive in comparison with the increases made on general traffic.

"No sufficient reason for the 5c. increase in the line-haul rates to Marquette appears of record," says the report. "Had that increase not been made, those rates would now be 54c. and 63c. The record indicates that those amounts would be reasonable maxima for the future."

Some iron ore shippers have interpreted the tentative report to be an attempt simply to treat iron ore in the same way in which all other commodities have been treated and to wipe out the effect of all special adjustments. This, it is pointed out, would mean that iron ore would be in a position of having in the Northwest paid a special tax through an excessive increase of 15c. a ton during the war period and beyond, and it is now proposed to put it back into the common bag as if it never had any special consideration either for or against it.

CHAIRMAN SCHWAB CONFIDENT

Sounds Optimistic Note at Meeting of Associated Industries of Massachusetts

The seventh annual meeting of the Associated Industries of Massachusetts was held Tuesday, Oct. 17, and Wednesday, Oct. 18, at the Copley-Plaza and the Westminster hotels, Boston. It was the most succesful affair of its kind ever held by the organization. Col. Charles R. Gow, Charles R. Gow Co., Boston, was re-elected president; Winslow Blanchard, Blanchard Machine Co., Cambridge, treasurer, and George R. Conroy, literary secretary.

A long list of speakers talked on various subjects of interest to the 1600 member industrial concerns, as well as upon national and international affairs. The speakers included Arthur H. Young, manager industrial relations department of the International Harvester Co., Chicago, who talked on experiments in occupational rating and wage setting; Hon. Walker D. Hines, former director general of railroads, New York, who spoke on some phases of the railroad problem and upon industrial conditions abroad; Howard Coonley, president Walworth Mfg. Co., Boston, who talked on the subject of wage adjustments; Harrison E. Howe, editor *Journal of Industrial and Engineering Chemistry*, Washington, who gave an address on commercial phases of modern science; and Harry M. Hope, president Harry M. Hope Engineering Co., Boston, who pointed out how money can be saved in the use of fuel.

Banquet Largely Attended

Charles M. Schwab, chairman of the board, Bethlehem Steel Corporation, was the chief speaker of the evening at the banquet on Tuesday evening, which was attended by 1300, including the wives and daughters of many members. Mr. Schwab touched on many important questions of the day during his informal talk, but the keynote of his message was confidence in the outlook for industry and in the future of these United States.

"With natural resources such as no other nation in the world possesses, this country is destined to become the workshop of the world and to supply the needs and comforts of other peoples," said Mr. Schwab. "If I were younger, I would give up all I have accomplished during my business career of 43 years to begin again in the lowliest capacity, for I am convinced that the development of industry in the United States has only just begun."

At another point he said: "The industries of Massachusetts and of New England are going to be all right even if they have slackened temporarily. I have interests in Boston and elsewhere in New England. They are not paying very well just now, but times are going to be good here before many years. Don't be afraid to risk your dollars in New England industries. You have the highest class of labor in the world here and the old New England tradition is worth something."

In speaking of working conditions of the 150,000 Bethlehem employees, Mr. Schwab said he had always thought of industry as a three-legged stool. There is capital, there is management, and there is labor. "The stool cannot stand unless it has all three legs and the legs must give equal support. Without the good will and the loyalty of the working force a business will soon find itself in the bankruptcy court. The man who has his labor to sell has as good a right to bargain for it as his prospective boss has. I will have no man from Kamchatka come into Bethlehem or Fore River and tell us what to do."

How Disputes Are Handled

Mr. Schwab then explained how disputes and questions pertaining to working conditions are handled at his plants. There is a group of delegates elected on the same basis as the National House, and there are representatives of management, which corresponds to the Senate. This system has taught the workingman how to express freely his views. When, during the recent business depression, it became necessary to cut wages, which was done three different times, the position of the corporation as to profits, losses, etc., was put squarely up to the workmen. The situation was accepted by everybody and Mr. Schwab challenged anybody to find a disgruntled employee.

Mr. Schwab stated his views on the treatment of labor as an offset to some of the things that had been previously said by Prof. G. W. Dyer, Nashville, Tenn., who had maintained that the cost of living had no legitimate connection with wages inasmuch as the scale of wages paid labor was distorted, and the theory being that farm labor's wages were all out of proportion with union wages and that the cost of living to the farmer in this instance had no relation to compensation. A job doesn't mean wages, to Mr. Schwab's way of thinking, but it does mean opportunity.

Many who listened to Mr. Schwab were impressed with the progress made by the steel industry during his association with it. When he started in the game in 1879, the country was producing 1,000,000 tons of steel annually, he said, while to-day it can turn out more than 50,000,000 tons. "During these 43 years in the industry, the angel of good luck seems to have hovered about my life. Yet I have worked as hard and as conscientiously as any man in the United States."

Throughout his remarks, Mr. Schwab injected many interesting stories in connection with the steel industry and his home life. During his stay in Boston, he talked before the student bodies at Harvard University and the Institute of Technology and addressed the members of the Boston Chamber of Commerce.

National Problems at Implement Meeting

Gap Between Farmers' Selling and Buying Prices Widening -Foreign Trade Prospects Poor—Compulsory Arbitration of Industrial Disputes Urged

"THE entire business world must soon come to realize that the price of the products of labor to the American farmer cannot be upon a basis relatively higher than the price that he receives for the products of the soil and enable him to continue to keep our great industrial and transportation systems operating upon a prosperous plane," declared F. R. Todd, vice-president Deere & Co., Moline, Ill., in addressing the twenty-ninth annual convention of the National Association of Farm Equipment Manufacturers, held at Chicago, Oct. 18 to 20. Agricultural implement manufacturers have recognized this interrelationship of prices, but, he added, "not until it is also recognized in other lines of industry, and most of all, in our great mining and transportation fields, can we hope to re-establish the buying power of 50 per cent of our population classed as rural inhabitants, upon a basis which will insure continuous and profitable operation of industry."

Gradual declines in implement prices during the year have brought them to a point approximately 42 per cent above the pre-war level. "Fortunately, during 1922 there has been an upward tendency in prices of farm products, until those prices are now upon a basis approximately 31 per cent above the pre-war level, so that at the close of the season of 1922 the buying power of the farmer, in terms of implements, had been substantially re-established. As a result, while the industry met with very serious declines in volume during the first few months of the year, the later months have shown substantial increases, but as yet the demand has been but little more than 50 per cent of normal and the entire year's business of 1922 but little better, from a tonnage standpoint, than that of 1921.

"The conditions maintaining in the spring of 1922, exhibiting, as they did, a general and continuing tendency for price reduction in materials, which make up about 75 per cent of the total warehouse cost of our implements, gave us courage to believe that we would be able, for the year 1923, to fully re-establish our prices upon the basis of the farmer's buying power and thus return to somewhere near normal condition. . . . Notwithstanding the settlement of the coal and railroad strikes, accumulated orders, shortage of cars and other strike influences have resulted in further market advances. On Sept. 11 material prices were 93.1 per cent above 1914 levels and Oct. 6, 99.9 per cent above. The following table, containing a list of the principal items of materials used in implement construction, and covering the period from Nov. 15, 1921, down approximately to date, shows percentages of increase over 1914, at the various dates indicated, and clearly illustrates the cost problems with which the industry is faced. The prices are in all cases computed f.o.b. Moline:

Price Increases Above 1914 *in Terms of Percentage*

	Nov. 15, 1921	Nov. 28, 1921	Jan. 3, 1922	Mar. 1, 1922	Apr. 22, 1922	May 23, 1922	July 20, 1922	Sept. 11, 1922	Oct. 6, 1922
Hot-rolled bars	44	31	27	19.6	28.3	35.6	38	52.5	56.2
Cold-rolled steel	51	51	45	44	44	50	55.3	77.6	77.6
Bar iron	63	63	63	58.1	69.3	69.3	81.9	122.7	147
Sheet steel (blue annealed)	102	85	85	84.1	94.3	94.3	91.2	98	98
Bolts, nuts and rivets	100	100	93	89.5	121	146	152.6	184.2	184.2
Soft center steel	102	102	102	72.6	72.6	78.4	94.7	94.7	116.2
Solid plow steel	141	141	141	118.2	118.2	118.2	116.2	138.1	160.1
Malleable iron	115	100	100	100	100	100	115.4	123.1	146.1
Pig iron	73	59	52	54.7	65.3	79.4	85.6	142.2	142.2
Coke	171	171	162	160.4	160.4	160.4	165	237.9	237.9
Steam coal	149	149	149	149	149	149	149	265	258.6
Fuel oil	91	91	91	91	91	91	57.1	78.3	78.3
Lumber	80	80	80	80	80	80	90.7	90.7	90.7

"The annual reports of implement companies for the year 1921 have shown very substantial losses," said Mr. Todd. "Economies effected in 1922, reductions in inventories, decreased interest charges, etc., have somewhat improved the 1922 conditions, yet have not enabled implement producers to place their affairs upon a profitable basis. I apprehend that the annual reports for 1922 will show further losses.

"With such a picture of the cost situation as I have painted above, and with the full knowledge that our industry has been operating without profit, management is confronted with a most serious problem in determining the price basis of implements for the coming year. If the ordinary commercial practice were to be followed and the prices of our products properly related to their costs, advances from 10 per cent to 15 per cent should have been made; however, implement manufacturers fully appreciate that the farmer's buying power is so reduced below normal that a radical advance in the price of implements would so materially decrease demand as to necessitate the reduction of factory forces and involve very serious financial loss because of curtailed operation."

Lack of Purchasing Power Blocks Foreign Trade

"We have for the foreign field a line of goods that is both needed and desired, the means of manufacturing them on a sound economic basis, and the organization properly to present them. But when we come to the fourth element, we come to the present trouble—the great and seemingly insurmountable trouble of the customer's financial inability to buy," said George A. Ranney, treasurer International Harvester Co., in discussing the effect of European conditions on foreign trade. "Taking Europe as a whole, the conditions are not favorable for American exports, except in the form of raw materials or foodstuffs, and even as to those commodities Europe's purchasing power is limited."

Railroad Expansion Looked For

"The railroads have been handicapped by adverse conditions in carrying out their program for keeping facilities and equipment up to the needs of the country," said C. H. Markham, president Illinois Central R. R., in discussing "The Transportation Problems of 1922." He said: "They began falling behind several years before the World War, when rates were so low that earnings were depressed and investors were driven to other markets. There was a decided decline in new mileage built and equipment bought. During the ten years ending 1917 the railroads installed an average of 2677 locomotives each year, of which 1696 went to take the places of engines that were sent to the scrap heap. During the last four years, however, they have added an average of only 1772 locomotives a year, or only 76 more than they formerly sent to the scrap heap each year. During these four years the rate at which locomotives have been retired from service dropped to an average of 1073 a year, which means that the railroads, in order to handle the business of the country, had to keep in service locomotives that should be placed on the retired list. The same is true of other kinds of equipment. During the 10 years ending with 1917, the railroads added an average of 120,254 freight cars a year and retired 82,416 a year, while during the last four years they have been able to add an average of only 59,740 a year and retire an average of only 59,258 a year."

Equipment Orders This Year

Mr. Markham showed that the carriers had failed by a wide margin to realize the earnings upon which rates

have been based under the Transportation Act, but added, "the revenues of the railroads will be increased as traffic continues to grow, and the financial reports of the railroads this fall and winter probably will be materially improved. In anticipation of this increase, the market for railway investments has already picked up, and since the first of this year the railroads have been making more extensive investments. During the nine months, Jan. 1 to Sept. 30, this year, the railroads placed orders for 1649 locomotives, which was more than seven times the number during the whole of last year; 112,920 freight cars, which was nearly five times the number ordered during the whole of 1921, and 1437 passenger cars, which was about six times the number ordered in 1921.

"It is to the interest of every man engaged in gainful occupation that the railroads shall be permitted to expand as the business of the country expands. In order to do this they must be allowed to adjust their freight and passenger rates, the rates of pay of their employees and other items of income and outgo so that their net earnings will be sufficient to attract investors to railway securities. . . . I believe that the railroads, because of their fundamental importance to the welfare of all other business, should be operated under the supervision of agencies controlled by the public. The blame for past abuses lies not in regulation itself, but in the fact that regulation has not at all times been intelligently inspired and directed. While removing regulation would correct some abuses, the proper way of insuring railway progress is to educate the public on railway matters so that regulation will be fair and constructive.

Advocates Arbitration of Industrial Disputes

"The losses and social disturbances caused by the strikes of coal miners and railway shopmen during the past summer have focused the attention of many thinking people upon the undesirability of strikes as a means of settling disputes between employers and employees," declared Mr. Markham. "Strikes are civil warfare. When any group of individuals attempts to force the public to accept its demands, without regard to their merit, it is a declaration of war against organized society. . . . The fact that strikes may sometimes be the means of enforcing meritorius demands does not hide their evil aspect.

"There is no peaceful way of settling disputes except by the methods of arbitration. Arbitration is the only way which has respect for the rights of both parties to the dispute and for the rights of the public. Recognizing this fact, we have established courts for the arbitration of the numerous individual controversies which spring from the relations of individual members of the community, and we are seeking to carry out the principle of arbitration in the settlement of international disputes. I submit that the principle must be applied to the settlement of industrial disputes which threaten to jeopardize the rights of the public. . . . The railway shopmen lost their strike because they attempted to jeopardize the interests of the public and overthrow the decisions of the United States Railroad Labor Board, regardless of the merits of their demands. In the end they found it necessary to go back to work and take up their grievances in the manner provided for the settlement of such disputes, of which they could have availed themselves without a resort to force and without creating a national upheaval."

Would Make Railroad Strike a Felony

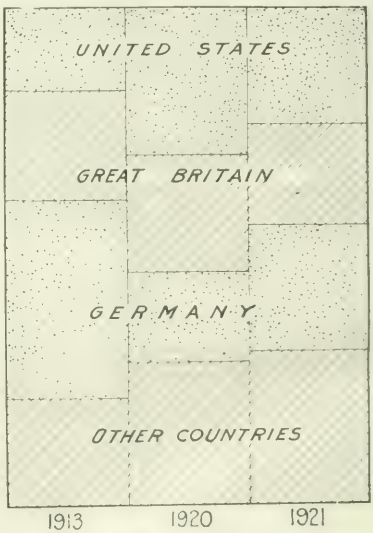
Enactment of a law placing railroad employees in a preferred class, with wages fixed periodically upon a slightly higher basis than those paid in other industries, but predicating the passage of such a measure upon making railroad strikes a felony, was proposed by W. H. Stackhouse, general manager French & Hecht, Davenport, Iowa, in an address on "Industrial Freedom." "Such a measure," he declared, "should effectively protect the country from a repetition of the disastrous strike through which it recently passed and usher in an era of comparative tranquillity in so far as the nation's railroad transportation industry is concerned, especially if employment would at all times be open to men and women of proper qualifications, regardless of their affiliation or non-affiliation with any organization whatever."

At the closing session of the convention, J. B. Bartholomew, president Avery Co., Peoria, Ill., was elected president of the association. F. R. Todd was chosen chairman of the executive committee.

French Imports of Machinery and Tools

Figures of the Department of Commerce show that the United States' participation in French imports of machinery advanced from 16.2 per cent of the total in 1913 to 29.6 per cent in 1920 and fell to 23.25 per cent in 1921. At the same time British machinery received by France advanced from 21.6 per cent of the total in 1913 to 23.1 per cent in 1920, but fell to 19.9 per cent in 1921, and German machinery accounted for 40.1 per cent in 1913, 18.1 per cent in 1920 and 25.3 per cent in 1921. French imports of machinery from smaller countries, notably Belgium, showed a consistent gain, from 22.1 per cent of the total in 1913 to 29.2 per cent in 1920 and 31.55 per cent in 1921. All of this is shown on the chart. The table shows that the United States, third in 1913, became first in 1920 and fell to second place, behind Germany, in 1921.

In tools and metal work a different story is told. The United States share was only 4.3 per cent in 1913, advancing to 15.7 per cent in 1920 and falling to 5.1 per cent in 1921. Meanwhile Great Britain, with less than half as much as Germany in 1913, advanced in 1920 to a commanding lead, only to lose it again to Germany the next year. In 1920 the United States led Germany and occupied second place. All quantities are expressed in metric tons.



Sources in 1913, 1920 and 1921 of French Imports of Machinery, in Tons. The chart shows proportions only

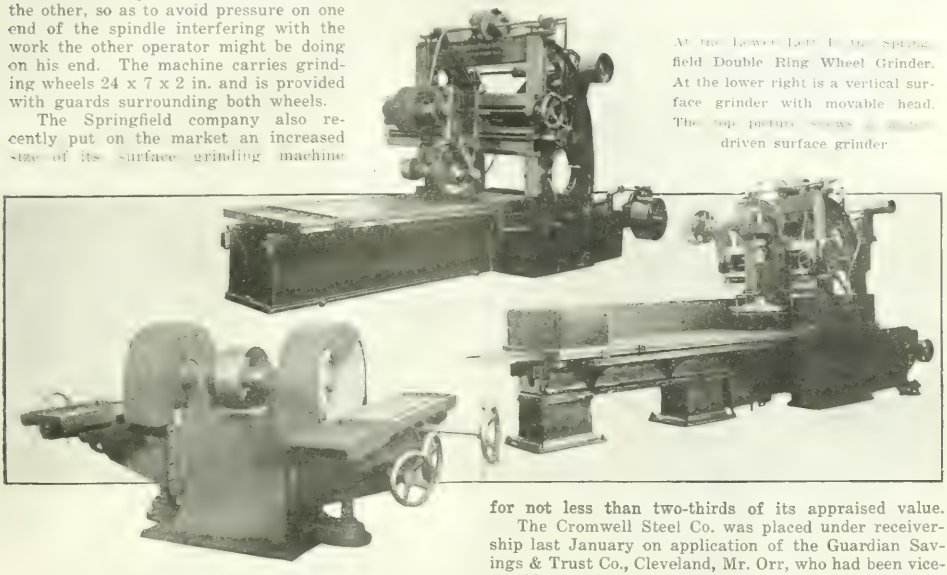
	1913	1920	1921
Machinery			
From United States	[illegible]921	110,007	65,348
From Great Britain	17,738	85,861	55,946
From Germany	88,845	67,278	71,029
From all other	48,935	108,733	88,683
Total imports	221,439	371,879	281,006
Tools and Metal Work			
From United States	[illegible]894	29,556	5,254
From Great Britain	13,027	48,753	13,739
From Germany	28,838	27,098	20,298
From all others	33,400	83,173	63,071
Total imports	78,659	188,580	102,362

For Saving Floor Space in Production Grinding

A double end ring-wheel type of surface grinder was recently put out by the Springfield Mfg. Co., Bridgeport, Conn. The machine was originally developed for use by pump manufacturers for grinding various flat surfaces and was designed to save floor space in that it permits two operators to work on one machine.

This machine has a table traverse capacity of 30-in. with a spindle, 3-in. in diameter, running in bronze bearing. S. K. F. thrust bearings are provided on the inside of each box, these being furnished to absorb the thrust of one operator, working against the other, so as to avoid pressure on one end of the spindle interfering with the work the other operator might be doing on his end. The machine carries grinding wheels 24 x 7 x 2 in. and is provided with guards surrounding both wheels.

The Springfield company also recently put on the market an increased size of its surface grinding machine



At the lower left is the Springfield Double Ring Wheel Grinder. At the lower right is a vertical surface grinder with movable head. The top picture shows a motor-driven surface grinder

of the planer type. This machine has a capacity for grinding 36 in. in width and 8 ft. in length. While this type of machine was originally developed for grinding large dies, the increased size provides a machine capable of handling a large general class of grinding work. This machine is entirely motor-driven, the main motor being mounted on the shelf between the housing. The motor for driving the wheel spindle is mounted directly on the wheel head itself and traverses with it. This machine is the No. 7 surface grinder.

The Springfield company has also developed the vertical surface grinder with movable head into a large size machine for grinding steel flasks and other miscellaneous work, the machine shown having a capacity to grind 42-in. in width by 10-ft. in length and while this type of machine was originally developed for grinding dies of large size, it is now being used for a general class of work, such as, grinding automobile engines, crank cases, oil tanks, and top and bottom of cylinders. This machine is also built with motor drive, the motor mounted on a bracket between the housing and driving both the wheel head and the table.

The Carnegie Steel Co. is considering a resumption at its Bellaire, Ohio works, which has been idle for 19 months. There are two blast furnaces at this plant, while the steel works comprise two 10-ton Bessemer converters, three cupolas and a 250-ton mixer. The annual capacity of the plant is 420,000 tons of ingots, yielding 364,000 tons of sheet and tin plate bars, which go largely to Wheeling district mills of the American Sheet & Tin Plate Co.

The Midwest Steel & Supply Co., Inc., 28 West Forty-fourth Street, New York, has opened an office in Philadelphia, Machinery Exhibit, the Bourse. Layton F. Smith is in charge.

Cromwell Steel Co. Plant and Equipment to Be Sold at Auction

The plant, equipment and real estate of the Cromwell Steel Co., Lorain, Ohio, will be sold at public auction at the Lorain County Court House in Elyria, Nov. 22, at 11 a. m., according to announcement by C. A. Orr, master commissioner in bankruptcy. The plant includes four 90-ton open-hearth furnaces, three soaking pits, one 20-ton hammer, one 30-in. two high two stand reversing bar mill and auxiliary equipment. The plant occupies a 300-acre site. The property has been appraised at $1,650,000 and must, it is stated, be sold for not less than two-thirds of its appraised value.

The Cromwell Steel Co. was placed under receivership last January on application of the Guardian Savings & Trust Co., Cleveland, Mr. Orr, who had been vice-president and general manager, being named receiver. At that time, it was announced that the liabilities of the company included $2,000,000 in bonds on which interest had been defaulted, and about $1,000,000 in notes and accounts.

Shipments to Foreign Countries

SPRINGFIELD, Ohio, Oct. 24.—Foreign orders were recently received by the Springfield works of The International Harvester Co. from Sydney and Brisbane, Australia. These are for speed trucks with the right-hand drive. Shipments to South America are being made by the American Seeding Machine Co. These are going forward at the rate of about three carloads of grain drills per day.

The Thomas Mfg. Co. is getting out mowers with tractor hitch to fill a good sized order from South America. Its last shipment of grain drills to that country was forwarded Oct. 1.

A new car storage shed 90 x 380 ft. is being built for the Apollo Steel Co., Apollo, Pa., adjacent to the newer part of the plant of that company. Steel for this addition will be fabricated and erected by McClintic-Marshall Co., Pittsburgh, and with its completion the company will have storage capacity for 20,000 tons of sheet bars in addition to its present capacity of 10,000 tons. The new shed will be served by a 15-ton overhead traveling crane and will be equipped with a new style of shear built by United Engineering & Foundry Co., Pittsburgh. This shear is a heavy one and of special design and can cut cold at one time two slabs, 12 in. wide, with an aggregate thickness of three inches. The company recently completed the installation of two new galvanizing pots, each capable of taking 48 wide sheets at one time.

Motor Operated Snap Switch for Automatic Applications

A new motor-operated snap switch that can be used on either alternating or direct current, and is applicable wherever the automatic operation of electrical devices is desired, has been perfected by the Westinghouse Electric & Mfg. Co. With mechanisms such as thermostats, pressure gages, time clocks and floats, the switch can be used to regulate electric heaters for heating water, oil or other liquids; the temperature in electric ovens of all kinds; the height of liquids in tanks and a number of other purposes. In a factory this switch is



Motor, Which in Turn Is Actuated by Automatic

especially useful when applied to electrical devices that should be started before the working day, such as forges and pre-heating furnaces.

The motor-operated switch consists of a heavy snap switch with a motor geared to the switch shaft. When the switch-motor circuit is closed, as by a thermostat, the motor throws the snap switch into its other position from that shown, putting the heater or other apparatus, as the case may be, on the line and at the same time opening the circuit of the switch motor. The next operation of the snap switch opens the circuit and so on. The motor is on the circuit for only a short time at each operation and draws 0.4 amp. at, say, 110 volts.

The switch has withstood severe service tests. The contacts and moving parts are mounted on a porcelain base which is fastened in a cast iron base on three bosses. The intermediate gears between the motor and the switch shaft are mounted on the floor of the base casting, and the motor is a unit mounted on the base casting. The switch parts are the standard Westinghouse parts. The motor is of the series type which can be used on alternating or direct currents. The frame and field poles are cast iron, and the bearings are of special self-lubricating material. The cover of the switch is of cast iron lined with the insulating material to prevent any possibility of the grounding of the contacts.

Donner Steel Co. in Alloy Field

The Donner Steel Co., Inc., Buffalo, N. Y., has taken up aggressively the manufacture of alloy steel. It has entered the market to furnish standard grades of alloy steel, such as nickel steels, chrome-nickel and chromium steel and chrome vanadium and molybdenum steel, together with the various combinations of these alloys in both bar and billet form within the company's ranges of sizes.

The manufacture of the alloy steels is under the direct supervision of James A. Buell, formerly of the United Alloy Steel Corporation, Canton, Ohio, who recently joined the Donner organization as general superintendent.

New Chief of Foreign Division

Promotion of Walter L. Miller of Washington to be chief of the Foreign Service Division of the Bureau of Foreign and Domestic Commerce, has been approved by Secretary of Commerce Hoover. The task of promoting the growth of American foreign trade as well as supervising the activities of Government commercial agents in all foreign fields will be under Mr. Miller's direction. Mr. Miller has been assistant chief of the Foreign Service Division and succeeds H. Dotterer, who has been assigned as chief of another division.

Crystallization of Galvanized Malleable Iron Castings

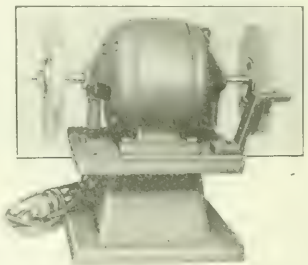
For many years manufacturers of malleable iron have had trouble with the users of castings that are hot-dip galvanized because frequently such castings, though of good quality, after galvanizing have become brittle. The manufacturer was accused of making poor malleable, while in reality the trouble was caused by the hot galvanizing. At the present time most manufacturers of malleable castings, realizing this, will assume no responsibility for the breakage of such castings after being galvanized.

The Eastern Malleable Iron Co., large producer of castings that are galvanized, experienced for many years similar difficulties and tried in many ways to overcome them but were unsuccessful. During the past two years its research department made a special effort in this direction and, after months of study and experimenting, claims to have solved the difficulty.

Not so much difficulty has been experienced by crystallization of tinned malleable iron castings, although this sometimes occurs, and the same method used to overcome the trouble in galvanizing also applies to tinning.

Combination Grinding and Buffing Machine

The Blount Special plain bearing, combination motor grinder and buff, shown in the accompanying illustration, has been added to the line of machine tool equipment manufactured by the J. G. Blount Co,, Everett,



Combination Grinding and Buffing Wheel for Light Work

Mass. It is equipped with a standard Westinghouse ¼-hp., 1800-r.p.m. motor, for alternating or direct current. The equipment includes a 6 x ½-in. standard grinding wheel, medium grit, a tool rest for the right hand side, a 7 x ⅜-in. buff wheel (sewed), and attaching cord with standard plug. The range of uses includes grinding tools, smoothing small castings, grinding lathe tools, and the like.

Canadian Rail Order

TORONTO, Oct. 23.—The Grand Trunk Railway has placed an order with the British Empire Steel Corporation for 25,000 tons of 100-lb. rails for delivery next spring. The rails will be rolled at the Sydney, N. S., plant of the Dominion Steel Corporation, and insure an uninterrupted winter's work for the 3,000 men employed there. Other orders the company has on hand will keep the mill in operation until the first of the year, and the spring delivery feature of the new order will enable the company to wait until the turn of the year before starting rolling on this account.

At the Pittsburgh, Pa., experiment station of the Bureau of Mines heat-treatment experiments, including quenching and annealing, have been conducted on a number of cast non-ferrous alloys including the following: 88:10:2, Cu-Sn-Zn; 85:5:5:5, Cu-Sn-Zn-Pb; 85:4:5:6, Cu-Sn-Zn-Pb; 90:10, Cu-Sn; 90:6:3:1, Cu-Sn-Zn-Pb; 85:15, Cu-Sn; 86:4:6:3:1, Cu-Ni-Sn-Zn-Pb; and 89.9:10:0.1, Cu-Sn-P. The results are being summarized.

CAST IRON PIPE MAKING

Decrease in Value of Products but Increase in Number of Shops

WASHINGTON, Oct. 24.—The Department of Commerce announces that the census reports show a decrease in the value of products of plants engaged primarily in the manufacture of cast-iron pipe during the year 1921 as compared with 1919. In 1921, 69 shops reported products amounting to $43,899,469, as compared with 59 having products valued at $50,235,101 in 1919, a decrease of 12.6 per cent in value of products.

Notwithstanding the decrease in value of products, which was accompanied by decreases in the number of persons employed, in the amount paid during the year for salaries and wages, and in the cost of materials used, there was an increased number of plants, and the tonnage output was greater in 1921 than in 1919. There were 7 new shops reported, and three which were assigned to another industry classification at the previous census reported cast-iron pipe as their chief product in 1921.

Of the 69 reporting in 1921, 25 were located in Alabama; 8 in New Jersey; 7 in Pennsylvania; 6 each in New York and Ohio; 3 each in Tennessee and Virginia; 2 each in Iowa and Massachusetts and 1 each in California, Georgia, Illinois, Indiana, North Carolina, Oregon and Wisconsin. Alabama, the leading state in the industry in 1921, produced 35.2 per cent of the total value of products in that year.

In November, the month of maximum employment, 13,895 wage earners were reported, and in January, the month of minimum employment, 10,183; the minimum representing 73.3 per cent of the maximum. The average number employed during the year was 12,428 in 1921 as compared with 12,625 in 1919. A classification with reference to prevailing hours of labor in the establishments in which employed shows that for 1218, or 9.8 per cent of the total (average) number of wage earners the prevailing hours per week were 44 or less; for 1601, or 12.9 per cent, the hours were 48 per week; for 5639, or 45.4 per cent, 54; and for 3478, or 28 per cent, from 54 to 60.

The returns indicate that the combined output of all establishments was approximately 52.5 per cent of the maximum capacity, based upon a demand requiring full running time. The percentage of output of individual establishments ranged from 5 to 100 per cent of the maximum capacity.

Nickelized Zinc in Ribbon Form

Nickelized zinc in coils or ribbon form is now obainable, the American Nickeloid Co., Peru, Ill., having perfected a process for making this form of nickelized zinc as well as sheets of the same material. The product is intended for manufacturers of metal stampings and novelties. The object of using this form of nickelized zinc, which is given the name of Ribbonoid, is that it requires no plating or refinishing after the stamping. The ribbonoid is furnished in coils of continuous lengths, ranging from 175 to 525 ft. and from ¼ to 12 in. in width.

What Compressed Air Does in Industry

One of the latest motion picture films produced through the collaboration of manufacturers, the Bureau of Foreign and Domestic Commerce and the Bureau of Mines, to show methods of production and the manner in which machinery and apparatus of various sorts are utilized in different fields of activity is one entitled, "The Story of Compressed Air." It is the outcome of the joint efforts of the Department of Commerce, the United States Bureau of Mines and the Compressed Air Society.

To give some idea of the scope, it may be stated there are 121 pictures on three lines. They include the modern foundry which rams molds, sifts sand, removes cores, and cleans, chips and grinds castings by means of air; drilling, reaming, and tapping of metal by pneumatic tools; the air riveter; boiler and condenser tubes being cleaned and packed by compressed air; testing containers for leakage by the use of compressed air, and the cement-gun. Particulars regarding the use of the film will be furnished by the Department of Commerce, the Bureau of Mines, both in Washington, or by the Compressed Air Society, 50 Church Street, New York.

Wire and Spring Plants Busy

The Morgan and National plants of the Wickwire-Spencer Steel Corporation, Worcester, Mass., which were last to feel the revival of business, are now operating full and the company's works in Massachusetts, embracing Worcester, Palmer, Spencer and Clinton, are now on an estimated 90 per cent basis of production as compared with previous high peaks. The National works, formerly the National Mfg. Co., manufactures wire goods and kitchen specialties, and is operating overtime with extra help. The Morgan plant, formerly the Morgan Spring Co., is operating on a night and day basis and is receiving a large percentage of emergency orders requiring delivery by express, many customers having permitted their stocks of springs to get low. The improvement is not only from the automobile and agricultural machinery trades, but from consumers generally. The company is now employing 3400 people in Massachusetts, of whom 2400 are on the payrolls of the Wright, Goddard, National and Morgan works at Worcester.

The work of replacing the fine wire-drawing building at Spencer, Mass., which was burned in August, is proceeding rapidly and it should be ready for occupancy in a fortnight. The structure is 40 by 80 ft., three stories.

September Refractories Statistics

The Refractories Manufacturers' Association has issued its monthly statistical data relative to production, shipments, orders, stocks, etc., of fire clay and silica brick for the month ended Sept. 30. The figures follow:

	Fire Clay		Silica	
Capacity	74,456,394		23,998,333	
Stock Aug. 31	152,183,738	(204)	31,285,797	(130)
Produced, September	46,241,911	(62)	11,295,216	(47)
Shipped, September	49,903,554	(67)	9,962,934	(41)
Stock Sept. 30	148,522,095	(199)	32,618,079	(136)
New orders, September	56,781,987	(76)	11,155,828	(46)
Cancellations	201,569	(0)	27,119	(0)
Net new business	56,580,418	(76)	11,128,709	(46)
Unfilled orders	75,238,631	(101)	18,506,273	(77)

The quantities given are the totals sent in by those who reported and the capacity figure is the combined economical producing capacity of those who sent in figures. The figures in parenthesis are percentages arrived at by dividing the total economical producing monthly capacity into the figures given.

Columbus Stack Resumes

The American Rolling Mill Co., Middletown, on Oct. 23, put its second Columbus furnace in blast. This gives the company three of four stacks in operation, one Ashland furnace being down for repairs. The Middletown plant is running full, eight open-hearth furnaces being on last week, with all sheet mills operating. Transportation conditions cut off the Middletown plant from its coal supply for several weeks, but continuous operations were maintained through the use of oil burning equipment in open-hearth and heating furnaces.

O. E. Guilbert, formerly a director of the Pittsburgh-Des Moines Steel Co., Pittsburgh, is head of the Guilbert Steel Co., which will build a steel fabricating plant on a site on Everett and Railroad Streets, West Side, Pittsburgh. Pittsburgh City Council recently passed an order, which has been signed by the mayor, vacating portions of Everett and Railroad Streets to make room for the plant site. The company expects to start work on the new plant immediately and to put out inquiries for equipment in about a month.

SERIOUS LABOR PROBLEM

Immigration Policy's Effect on Industry—Wholesale Prices Advance

In its review of industrial conditions, the National Industrial Conference Board says:

"The immigration problem is rapidly assuming a position of commanding importance, particularly with reference to industry and employment. The effects of restriction under the per centum immigration law are now making themselves felt and the results give food for very serious thought. Under this law the number of immigrants from any country is fixed at one-third of the pre-war average. In practice an even smaller proportion has actually been admitted. The number of aliens arriving has been greatly reduced and the number of those departing has been much increased. For the twelve months ending June 30 last the number of aliens arriving in the United States totaled 310,000, while the number of aliens departing reached the large total of 200,000.

"The effect on the labor supply of this country, particularly upon the supply of unskilled labor, is likely to be of far-reaching importance, especially so if the number of aliens departing continues in such large volume.

"Not only has net immigration been largely reduced, but the character of the immigrants has changed very definitely. Fewer and fewer skilled workers are arriving; a larger and larger proportion of women and children—non-wage earners—is observed; the national groups from which our industrial workers are drawn actually show a surplus of emigrants, while the non-industrial types show an increase. It is obvious that the mathematical formula which has been applied to the immigration problem has not given satisfactory results.

"Wholesale commodity prices have recently shown renewed strength. The steady upswing of the early part of 1922 continues. Raw materials have been particularly strong and have shown increases averaging about 20 per cent since January. This indicates strong underlying factors which may force a continuous upward trend of wholesale prices in the near future.

"So far and with the exception of coal, these upward tendencies have not made themselves felt in retail prices. The index of the United States Bureau of Labor Statistics has remained almost stationary since June. The index of the National Industrial Conference Board has also registered very little change. On Sept. 15 it stood at 155.6 as compared with 154.5 on Aug. 15, which represents an increase of 1.1 points or seven-tenths of 1 per cent. The July and June figures showed only a very slight decrease. Usually in the course of an upward price movement, retail prices rise more slowly than wholesale prices and in the course of a downward movement retail prices drop more slowly. There is a possibility, therefore, that the upward movement of wholesale prices will be only slowly translated into higher retail prices and that the cost of living will not be seriously affected."

Increased Employment at Milwaukee

MILWAUKEE, WIS., Oct. 23.—Employment in the iron and steel group of Milwaukee industries increased 2.8 per cent between Sept. 1 and Oct. 1, according to official figures of the Industrial Commission of Wisconsin. For the entire state the gain was 1.8 per cent. In Milwaukee the increase is accounted for chiefly by makers of tools, milling machines, steel castings and gears. Employment slackened slightly with business in automotive parts and accessories, which experienced the usual seasonal let-down.

The monthly business and financial review of the largest bank in Milwaukee says: "Returns from 17 large Milwaukee industrial firms indicate that the average rate being paid for common labor at the end of September was approximately the same as on the same date in 1921. The metal trades, however, are paying an average of 4c. per hr. more than a year ago. The average industrial rate being paid for all lines is about 40c. an hr.

"Foundries, machine shops and machine tool makers generally report increased activity during the past month, with prospects for the future brightening," the report says.

More Metal Workers and Higher Wages

Iron and steel plants, according to figures of the Bureau of Labor Statistics, show for September a loss from August of 3106 employees in 126 establishments. This loss of 1.9 per cent was accompanied by a gain of 7.6 per cent in amount of payroll and a corresponding increase in the average pay envelope from $49.07 to $53.74, or 9.5 per cent.

In the automobile industry there was a gain in 97 establishments of ½ per cent in number of employees and a decrease of 5.7 per cent in payroll total. In car building and repairing there was a gain of 15.8 per cent in number of employees in 67 establishments and a gain of 20.6 per cent in amount of payroll.

Compared with a year ago there has been a gain, all told, of 55.1 per cent in number of men employed, and an increase of 72.3 per cent in total payroll. This connotes a gain of 11.1 per cent in contents of the average pay envelope, which has advanced from $53.36 to $59.29.

Wages per half-month per man in automobile plants, which are exceptionally busy, are 22.3 per cent over those prevailing in steel plants. In fact, 162,111 automobile workers received nearly $1,800,000 more in the half month than did 164,731 steel workers.

Compared with August, per capita earnings increased in 21 industries and decreased in 21. Iron and steel led the increases with an advance of 9.6 per cent.

Details are shown in the table.

Period	Number of Establishments	Number of Men	Half-Month Payroll	Average Pay Envelope
Iron and Steel				
Aug., 1922..	126	167,837	$8,235,414	$49.07
Sept., 1922..	126	164,731	8,858,008	53.74
Sept., 1921..	109	107,758	4,122,567	38.26
*Automobiles**				
Aug., 1922..	97	161,356	11,295,841	70.02
Sept., 1922..	97	162,111	10,651,541	65.71
Sept., 1921..	47	103,439	7,040,183	68.06
Car Building and Repairing				
Aug., 1922..	67	46,763	2,554,081	54.62
Sept., 1922..	67	54,148	3,079,649	56.87
Sept., 1921..	53	34,499	1,946,339	56.42
Metal Workers (the three groups above)				
Aug., 1922..	290	375,956	22,085,936	58.74
Sept., 1922..	290	380,990	22,589,198	59.29
Sept., 1921..	209	245,696	13,109,089	53.36

*Payroll figures are reported as "weekly"; they have been made "half-monthly" by multiplying by 2.

Decline in Automobile Production

Figures received by the Department of Commerce through the Bureau of the Census show a marked seasonal decrease in the production of both passenger automobiles and trucks in September. The total production of passenger cars in September was 186,562, compared with 249,225 in August, while truck production in September amounted to only 18,843, as against 24,200 in August. The September production is the lowest since last March, but is considerably above the figures for September, 1921, when the total production was reported as 144,669 passenger cars and 13,648 trucks.

No successor will be elected to fill the vacancy caused by the death of Edgar B. Tyler, vice-president of the Mississippi Valley Structural Steel Co., on Sept. 27. He had been secretary, treasurer and general manager of the Decatur Bridge & Iron Co., of which he was one of the founders, but when that concern and the Christopher & Simpson Iron Co. were merged into the Mississippi Valley Structural Steel Co., Carl R. Dick became secretary; R. B. Wood, general manager, and Earl C. Brown, treasurer; Mr. Tyler being relieved of active duties.

Internal Combustion Engines for Power*

For Steel Plant and Similar Service Both Gas Engines and Diesel Engines Are Favored—Comparison of Costs with Steam Costs

BY D. M. PETTY†

INTERNAL combustion engines which will be considered in this paper are the 4-cylinder, 4-cycle double acting gas engine and the 4, 6 or 8-cylinder, 2-cycle Diesel oil engine. The discussion in general will not go into thermo-dynamic theory to any great extent, but will rather cover a general description of some of the mechanical features as well as the operation of the two types of engines, together with some analysis of first cost and cost of operation.

The Gas Engine

The gas engine which forms the basis for this discussion is rated 4000-kw. output of generator, running at 88.3 r.p.m. The floor space occupied is 68 ft. long and 37 ft. 6 in. wide; two cylinders are in tandem and each tandem pair connected to one end of the crank shaft. The distance between center lines of cylinders is 27 ft. 8 in. The shaft carries a heavy cast steel flywheel made in two parts, the diameter of which is 28 ft. and weight 130 tons. The cylinders are 47 in. diameter. The pistons, of 60-in. stroke, are made of cast steel.

In this particular size the cylinder is usually made in two pieces; however, in this as well as in similar smaller sizes, one-piece cylinders have been found entirely satisfactory. In power cylinders of this size steel rather than cast iron is employed because, in order to maintain the same factor of safety, the wall of the cast iron cylinder must be much thicker than if cast steel be used—of a thickness so great that it cannot transmit the requisite heat per unit of surface. The consequent difference in temperature between inner and outer surfaces of wall induces heat fatigue and consequent cracks when engines are steadily operated at full load. A cast iron cylinder which thus cracks cannot be repaired by welding. A cast steel cylinder seldom cracks and, if it does, can be electrically welded without difficulty. We have steel cylinders that have operated continuously 13 years and are still perfectly good.

The piston rod is 15 in. in diameter and is hollow, making a convenient opening through which the cooling water is carried to the piston. The crank shaft is a one-piece forging and the crank disk and crank pin are cast steel and made in one piece. The crossheads are also cast steel; the inlet and exhaust valves are one-piece forgings. Many of these parts are frequently made of cast iron but in the steel business cast steel is favored, for obvious reasons, and since this engine is built by a steel company, cast iron is replaced by cast steel for a great many parts.

Automatic Control

The speed of this engine is controlled by a spring weighted governor which operates an oil relay. This relay provides ample power for moving the valves, no matter whether they are clean or dirty, and is an important item in the satisfactory operation of any engine used in the generation of power.

An automatic gas pressure regulator located just ahead of the inlet valves maintains a constant gas pressure of 2 in. at the inlet valve. The air mixture is adjustable, but is maintained constant throughout any range of load from zero to maximum unless adjusted by hand, the power output of the engine being governed by throttling the mixture of gas and air rather than by adjusting its richness. The maximum pressure in the cylinder after explosion is 275 lb. per sq. in.

Gas is ignited at the proper time by three spark plugs which operate on the make-and-break principle, 110 volts being used and a current of about 0.75 ampere. This current is limited by the resistance of the winding on an iron core solenoid which gives a long inductive arc, a small incandescent lamp connected in series with the coil serving to indicate the condition of the spark plugs.

An engine such as has just been described can be bought to-day, f.o.b. cars Bethlehem, for $230,000, making the cost of the engine $57.50 per kw. Table I shows the installed cost per kw. of a gas engine power plant made up of three or more 4000-kw. units as described above:

Table I—Installed Cost Per Kw. Capacity of a Gas Engine Power Station in 4000-Kw. Units

	Cost per Kw.
Building, modern construction, brick and steel, tile floors, and crane, including exhaust tunnel and stacks	$7.50 to $15.00
Foundations for engines, including excavation at $15 per cu. yd.	4.50 to 9.00
Engines, including all piping painting ready to run	60.00 to 75.00
Gas cleaning apparatus	6.00 to 8.00
Generators, switchboard, exciters, oil switches for 6600 volts	13.00 to 20.00
Miscellaneous expenses	10.00 to 15.00
Total	$101.00 to $142.00
Average cost per kw.	$122.00

The subject of gas engines should not be passed without calling attention to at least one of the points for future improvements in net operating efficiency, namely, the utilization of the heat contained in the exhaust gases. Reclaiming this energy is somewhat similar to the application of condensers to the steam turbine. This field is merely scratched to-day in a few plants where feed water for boilers is heated in a small way. The water enters the piston rod at about 100 deg. Fahr. and comes out at 130 deg. Fahr., passing to the feed water heater, where it is raised to 170 deg. Fahr. Much greater economies may be obtained by placing a large boiler or water heater so that the exhaust gases may pass through it on its way to the stack.

One great possibility lies in the heating of water which may in turn be circulated in nearby buildings and used for heating purposes. In Germany steam boilers have been used, one showing 2.2 lb. steam for each kwhr. generated by the engine. Large boilers will, of course, produce more steam. It has been conservatively estimated that the total efficiency of the gas engine may be increased easily 30 per cent by the use of exhaust gas boilers. The reason such boilers have not come into more general use is that the efficiency of the gas engine is now high and the cost of coal not sufficiently high to induce the development of this line of apparatus.

In the simplified cross section of a power house made up of such units, attention should be called to the fact that the floor line of the building is somewhat above the ground level, which permits good ventilation in the cellar and provides ample daylight lighting through suitable windows. It should also be noted that the engine floor is served by a crane, whereas the space

*Abstract of a paper presented at the sixteenth annual convention, Association of Iron and Steel Engineers, Cleveland.

†Electrical engineer, Bethlehem Steel Co., South Bethlehem, Pa.

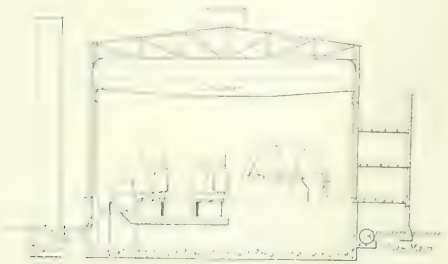
provided for the switchboard and oil switches is in the nature of a leanto on one side of the building.

Operation of Gas Engines

Table II shows the operating cost of a gas engine power plant made up of six 3000-kw. units and one 4000-kw. unit.

In the matter of operating costs, one of the principal items in the past has been the renewal of worn steel parts, such as pistons, cylinders, piston rods, etc. This item has been materially reduced by the careful application of electric welding. Formerly when the grooves of the piston became worn to such an extent as to cause excessive leakage by the piston ring all that could be done was to remachine them and put in oversized rings. This, of course, could not be carried on indefinitely on account of cutting away the metal. To-day the worn places are filled up by electric welding and machined out so that the life of a steel piston is almost infinite. A cast iron piston cannot be thus welded.

At times cracks develop in cylinder walls, especially in the vicinity of the exhaust ports, which formerly



Cross Section of a Modern Gas Engine Station Fitted with Crane Runway and Monitor Roof

would have necessitated the scrapping of the cylinder. To-day these cracks are welded and seldom open up again; in fact, discarded cylinders have been reclaimed by this process to such an extent in one plant that four extra cylinders which were on order have been canceled. It would seem, therefore, that with the proper application of electric welding a gas engine that is built of steel should never wear out and would be replaced only because of obsolescence.

Diesel Oil Engine

The Diesel oil engine which will be used as the basis of this discussion is a 2700-kw., 8-cylinder, 2-cycle, single acting vertical engine operating at 115 r.p.m.

The cylinder is 26 in. in diameter and the engine is built in sections so that it can be supplied as a 4, 6 or 8-cylinder engine and all of the like parts for each cylinder are interchangeable. The pistons are cast steel while the cylinder is cast iron. The Scavenger air inlet valve is in the center of the cylinder head, which has the inherent advantage of cleaning out all of the burnt gases with the exhaust so that the compression stroke has a full supply of fresh air to compress at each revolution. With this construction, the Scavenger air supplied is always somewhat greater in volume than the maximum capacity of the cylinder.

A 6-cylinder engine of this type is now in operation in a ship carrying ore from Chile to Baltimore and New York. The fuel economy, ease of operation and absence of serious failures has considerably exceeded the expectations of the designers, and from all tests which have been carried out the indications are that this type of Diesel oil engine will not only have a wide application in marine service, but will also make a place for itself on land in the generation of power. An 8-cylinder engine such as described above can be bought today, f.o.b. cars Bethlehem, for $260,000.

Operation of Diesel Oil Engines for Power Purposes

While no cost figures are now available taken under operating conditions, tests which have been made bring out forcibly some of the possibilities in the Diesel oil engine. Fuel economy tests on this engine show that under average conditions one kwhr. can be produced with 0.630 lb. of 21 deg. Beaumé fuel oil, which oil contains 19,100 B.t.u. per lb. This is equal to 0.438 of a lb. per brake hp. Since 2545 B.t.u. equal 1 hp., the thermal efficiency at the crank shaft then is:

$$\frac{2545 \times 100}{.438 \quad 19{,}100} = 30.42 \text{ per cent}$$

Assuming the generator efficiency as 93 per cent, the overall efficiency of such a power unit at the switchboard would be: $30.42 \times 0.93 = 28.37$ per cent.

In the matter of speed regulation, an 8-cylinder, 2-cycle Diesel oil engine is superior to the twin tandem compound reciprocating steam engine which would have the same power impulses per revolution, and while we cannot expect it to be equal to that of the steam turbine, it is very close to it. In this connection it is interesting to note that for marine work no flywheel is used in connection with even a 6-cylinder engine and the engine is reversible. Of course, for power generation a flywheel would be used, although much lighter than is the case with a gas engine.

Comparison of Internal Combustion Engines with Steam Engines for Power Station Work

One great weakness of any steam power station is its standby losses. By this is meant in plainest terms the coal that must be burned under the boilers to keep up steam pressure when all of the power generating apparatus is shut down. If it were possible to avoid burning this coal, great savings could be effected in practically all power stations. This particular point has been forcibly brought to attention in the matter of selling power over week-ends and holidays to the power company from whom we normally buy a small percentage of our power.

The operating superintendent of the power company states that it is real economy for him to buy power, provided he did not have to bank his fires, but could burn them entirely out, as under certain conditions it

Table II

	Cost per 100 Kwhr.
Fuel—1,443,288,000 cu. ft. Average B.t.u. value 94 per cu. ft. at 0.0064 per 1000 cu. ft.	$1.58
Labor, including switchboard operators, engineers, oilers, superintendents, etc.	0.31
Repairs, including renewals, tools, miscellaneous supplies and labor in repairs	0.33
Water for cooling oil, waste and boilers, including cooling pond expenses	0.21
Gas cleaning, including water, labor, repairs and power	0.37
Total operating cost	$2.79
Heating feed water with exhaust gases (installed on 4 engines only) credit	0.33
Net operating cost	$2.46

requires almost as much coal to keep his fires banked over a light load period, such as Saturday afternoon, Saturday night, Sunday and Sunday night, as would be burned if he were running a portion of his plant. Therefore, he has seen the wisdom of buying power which is generated in our gas engine power station over such periods. We all feel that each power engineer has a moral obligation to coming generations in the matter of conservation of our fuel reserve. Therefore the power engineer is not only serving his best interests, but also the best interests of future generations, in taking into consideration standby losses.

The annual report of the Boston Elevated Railroad Co. for the year ending Dec. 31, 1921, shows the burning of 2.174 lb. of coal for each kwhr. produced in the various plants for the year 1921. This was bituminous coal having an average heat value for the year of 14,600 B.t.u. per lb. The yearly thermal efficiency of the combined power stations would be:

$$\frac{2545 \times 100}{2.174 \times 14{,}600} = 8.02 \text{ per cent}$$

Assuming a generator efficiency of 95 per cent, the

overall efficiency at the switchboard evidently then would be:

$$8.02 \times 0.95 = 7.62 \text{ per cent}$$

This annual report also shows that this coal cost $7.71 per gross ton. We have then:

$$2.174 \times \frac{\$7.71}{2240} = 0.76\text{c. per kwhr.}$$

which represents the fuel cost per kwhr. in such a station.

It is safe to assume that under full load, in a power station such as those operated by the Boston Elevated Railroad Co., a kwhr. can be generated by burning 1.425 lb. of coal. We then have:

$$1.425 \times \frac{\$7.71}{2240} = 0.499\text{c.},$$

which is the fuel cost per kwhr. under full load conditions on such a system. The difference between 0.76c. and 0.5c. or 0.26c. or 50 per cent of full load cost, represents the increased cost of each kwhr. generated due to the standby losses and the operation of various stations at less than full load.

One great advantage of internal combustion engines, either 4-cycle gas engines or 2-cycle Diesel oil engines, is the fact that when the engine is shut down there is absolutely no standby loss—the gas is shut off or the oil is shut off. In the case of oil, that which might have been burned to make up standby losses remains in the storage tank to be used when power is needed. Therefore, we can with full assurance know that so far as fuel costs are concerned the average economy of our internal combustion engine is also the annual economy of the station made up of such engines.

We may, therefore, derive the annual cost of power when generated by Diesel oil engines as:

$$0.63 \text{ lb. of oil per kwhr.} \times \frac{\$0.05 \text{ the cost per gallon of 21 Beaumé oil}}{7.72 \text{ lb. per gallon of 21 Beaumé oil}} = 0.4018\text{c.},$$

fuel cost per kwhr. generated on Diesel oil engines. These figures show that the Diesel oil engine should be given serious consideration when planning power units to serve for standby power or to serve as peak load absorbers for a gas engine power station.

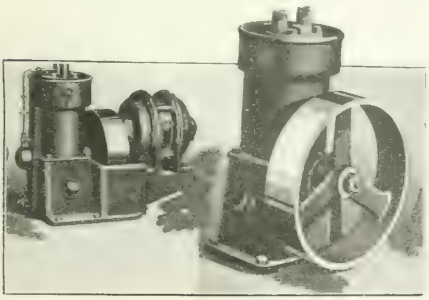
In previous papers on the subject of power generation in steel plants, the writer has pointed out the economy of using gas engines for all loads between 100 per cent and 50 per cent load factor, and suggested that steam turbines either located in a steel plant or in a central station should be used for absorbing the low load factor portion of the steel plant load. It is now evident that a third prime mover should be added to the list for this character of service, namely, the Diesel oil engine.

New Line of Small Air Compressors

The Ingersoll-Rand Co., 11 Broadway, New York, has announced a new line of small vertical belt driven air compressors, known as type Fifteen. In addition to the plain belt drive design each size is built as a self-contained electric motor outfit, driven through pinion and internal gears, or by employing the short belt drive arrangement. The compressing end and electric motor of both gear and short belt drive units are furnished mounted on a common sub-base, so that they in no way depend upon the foundation for correct alinement.

Several noteworthy features of construction have been incorporated, of which the "constant-level" lubrication system is regarded as the most important Others include the constant speed unloader for plain belt drive machines; the centrifugal unloader for start and stop control machines; and the increased size of the water reservoir cooling pot.

The constant-level system of lubrication maintains a constant-level of oil. The base of the compressor forms an oil reservoir. Pet cocks determine the maximum and minimum amount of oil in the reservoir. Above this reservoir and directly underneath the connecting rod is a constant-level pan. Oil is pumped from the reservoir into this constant-level pan through a pump. A projecting stem on the connecting rod dips into the pan and distributes the desired quantity of oil for proper lubrication.



Motor-Driven and Belt-Driven Compressors

The constant speed unloader controls the unloading of the compressor by automatically opening the inlet valve when the receiver pressure rises above that at which the unloader is set to operate. When the receiver pressure has fallen a predetermined amount, the unloader automatically releases the inlet valve and allows the compressor to return to work and thus build up the receiver pressure again.

The centrifugal unloader allows the compressor to start under "no load" such as is essential when automatic start and stop control is used, and permits the electric driving motor to come up to full speed before the load is thrown on automatically. This unloader accomplishes its purpose by holding the inlet valve open until the motor has reached full speed.

Naval Laboratory Delayed

WASHINGTON, Oct. 24.—Work on the buildings constituting the naval experimental laboratory at Bellevue in the District of Columbia has been practically completed and equipment is being installed. But operations, except to a limited extent, cannot begin until Congress has appropriated the necessary funds. The small amount of work that may be started, will be done by special allotments from naval bureaus directly concerned in the development of experiments. Estimates required to conduct the work had been submitted, but were disapproved by the sub-committee of the Senate Committee on Naval Affairs. They will be included in the next budget in the hope of more favorable action. The laboratory was built at a cost of $1,500,000, appropriated by Congress. The idea of its construction grew out of the Naval Consulting Board of 24 leading engineers of the country, which was created shortly before the United States entered the war and of which Thomas A. Edison was chairman. Many inventions and new processes were suggested to the board and the latter urged the establishment of a naval research laboratory.

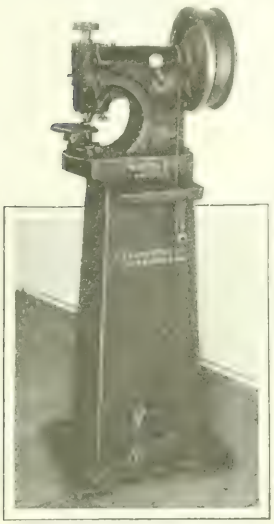
Work in contemplation at the laboratory includes metallurgical problems, and the research proposed will deal largely with these problems as well as those relating to radio. No chemical work of consequence is expected to be done at the laboratory, inasmuch as this is considered to be done better by private interests.

The Rex Typewriter Corporation, Fond du Lac, Wis., which resumed production Oct. 1 following an intermission to perfect new designs, reports foreign orders increasing in a most gratifying manner. Miller, Drake & Co., of London, cabled Oct. 14 asking the monthly shipment be increased from 100 to 150 machines. Pietro Castelli of Brussels has ordered 200 for November shipment.

Machine for Cutting Irregular Shapes

A. C. Campbell, Inc., Waterbury, Conn., has recently placed on the market a so-called nibbling machine. This machine was exhibited at the Machine Tool Exhibition at Yale University and mentioned in the Sept. 28 issue of THE IRON AGE, in which that exhibition was reported.

It will be seen that the machine consists of a C type frame similar to that of the ordinary punching machine. The overarm of this frame carries a rapidly reciprocating punch of small size which operates in a female die in the lower part of the frame. This punch is of special construction, in that a small stop pin at its extreme end governs the amount of feed. The work to be cut may be sheet iron, celluloid or any other material which is not too soft to be properly cut in such a manner and is fed into the machine against the feed pin. As the punch reciprocates small particles of the material are punched out, thereby producing the cut.



At Left—Campbell Nibbling Machine

At Right—Scope of Work Cut by the Nibbling Machine

The material is fed to the machine, or rather guided by the operator, following a design which may be laid out on the work or shown by a template placed on top of the work. The design of the punch and die holders permits easy removal, insertion or adjustment. A point of economy is made in the fact that the punches are made double-ended so that when one end becomes worn it may be reversed and the other end used. Punches are made of special alloy steel, are properly tempered for the work and ground to size.

This machine was designed to take the place of the ordinary type of circle shear which leaves a burr, whereas this machine leaves the material flat. It is also intended for a great variety of work which, in the past, has been produced by drilling consecutive holes along the edge of the layout, later to be filed. The machine will handle material up to and including $\frac{3}{8}$ in. The average cutting speed is 18 in. per minute. Adjustments for different gages of metal can readily be made and the machine is also equipped with a circle cutting attachment to take circles up to 28 in. in diameter.

The machine is adaptable to a large variety of uses, such as making gages or templates, stripper plates, designs in ornamental iron work, etc. Illustration herewith shows a number of designs which can readily be cut on the machine and will give an idea of its scope.

A study of the action of steam on coke, with regard to the reduction in sulphur content of the coke, is being made at the Pittsburgh experiment station of the Bureau of Mines by A. R. Powell, physical organic chemist, and S. H. Thompson, research fellow of the Carnegie Institute of Technology.

The New Home Sewing Machine Co., Orange, Mass., has voluntarily increased wages in the sewing machine departments. The increase varies, according to the nature of the work, but averages approximately 10 per cent.

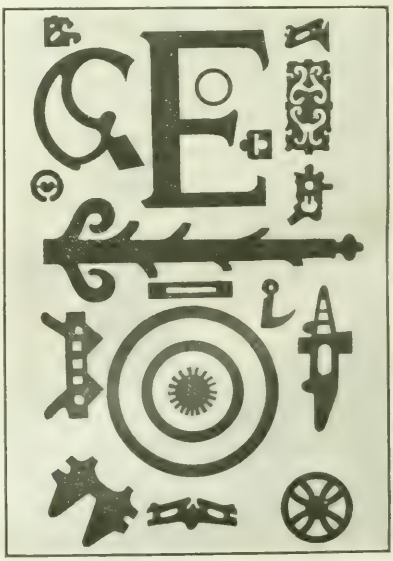
Synthetic Cast Iron on the Pacific Coast

As is well known, pig iron is not produced on the Pacific Coast at the present time in sufficient quantities to meet the demand for iron of such grades as are required for foundry purposes. As a result, foundry iron is costly, due to high freight rates on eastern iron that is brought in and to the high cost of coke suitable for use in the cupola. On the other hand, considerable steel scrap is to be had, and, for that reason, attention has been recently given by the members of the electrometallurgical section of the northwest station of the Bureau of Mines at Seattle, to the problem of determining the best conditions for the production of cast iron by melting scrap steel in the electric furnace. These conditions were established by numerous experiments conducted in a laboratory furnace holding 300 lb. of metal.

Later on these conditions were applied in a local foundry with excellent results. Low-grade miscellaneous steel scrap was melted and carburized in a 3000-lb., direct-arc, 3-phase electric furnace and the resultant metal discharged into the pouring ladle and then into the molds for the miscellaneous gray iron castings which made up the normal output of the foundry. The carbon and silicon content of the product was under control, at all times, and the furnace operator had no difficulty in producing the grade of iron required. Satisfactory castings were made with the normal consumption of power and electrodes.

More Activity in Rolling Mill Equipment

The business of the Morgan Construction Co., Worcester, Mass., has improved to such a degree that it is running at full capacity with a single shift. Contracts for rolling mills that were ordered held up at the beginning of the depression are now being carried forward and several of them have been completed, including a billet mill and a merchant mill for India. A number of American contracts are among those which would have been in operation long ago had it not been for the depression and consequent requests by purchasers to defer deliveries. In addition some rolling mill contracts have been booked in the last few months. The company is filling many orders for wire-making machinery, which accounts in considerable measure for the present activities of the Worcester plant. There are now close to 400 men on the payroll, while early in the year the shops were not at all busy.



FERROMANGANESE SUPPLIES

Output Decreasing Slowly—Importations Heavy—Available Supplies Large—Spiegeleisen Output Light

THE manganese-iron alloy output of American furnaces thus far this year has been as erratic as that of steel, due to the various strikes. The peak in ferromanganese was reached in May despite the coal strike but there has been a gradual falling off since, although the September output of 10,681 tons was considerably higher than that of the first two months of the year. The spiegeleisen production was higher in July and August at the height of the strikes than at any other time this year. The low point was 1230 tons in January, with only 2095 tons in March.

Difficulty in obtaining coke has interfered sharply with the regular merchant producers of ferromanganese and the same cause has had some effect on the output of spiegeleisen. The following table gives the production of ferromanganese and spiegeleisen thus far this year compared with previous years:

Ferromanganese and Spiegeleisen Output of the United States, in Gross Tons

	Ferroman-ganese	Spiegeleisen	Total	Average per Month
April, 1922	14,998	4,211	19,209	.....
May	20,334	4,902	15,432	.....
June	18,273	4,817	23,090	.....
July	18,873	7,176	26,049	.....
August	11,402	7,925	19,327	.....
September	10,681	4,235	14,916	.....
Average per month:				
First quarter	6,951	2,752	....	9,703
Second quarter	17,868	4,643	....	22,511
Third quarter	13,652	6,445	....	20,097
Total, 1921	98,439	56,139	154,578	12,881
Total, 1920	282,681	103,448	386,129	32,177
Total, 1919	179,029	65,391	244,470	20,732
Total, 1918	345,306	249,002	594,308	49,525
Total, 1913	119,495	126,081	245,576	20,464

Judged by the third quarter output of 13,652 tons per month, the present production of ferromanganese and spiegeleisen is considerably heavier than that in 1921, but much below that of 1920.

Available Supplies

The available supplies of ferromanganese thus far this year and previous years, as obtained from an analysis of the output, imports and exports have been as follows:

Ferromanganese Output, Imports and Exports, and Available Supplies in Gross Tons

	Output	Imports	Exports	Available Supplies
April, 1922	14,998	2,380	241	17,137
May	20,334	5,213	41	25,506
June	18,273	13,525	55	31,743
July	18,873	25,841	179	44,535
August	11,402	15,959	76	27,285
Aver. per mo., 1st quarter	6,951	2,063	130	8,874
Aver. per mo., 2d quarter.	17,868	7,039	112	24,795
Average per month, 1921.	8,203	755	57	8,901
Average per month, 1920.	23,557	4,941	288	28,210
Average per month, 1919.	14,923	2,752	255	17,420
Average per month, 1918.	28,775	2,264	298	30,741
Average per month, 1917.	21,486	3,703	*776	25,413
Average per month, 1916.	17,365	7,577	....	.....
Average per month, 1915.	12,021	4,605	....	.....
Average per month, 1913.	9,958	10,672	....	.....
Average per month, 1911.	6,207	6,688	....	12,895
5-year average (1910-14) per month	8,280	8,399	....	....

*First half only.

Due to heavy importations of British ferromanganese, the available supplies have decidedly increased. They ranged from 27,285 tons to 44,535 tons for June, July and August with the monthly average for the second quarter at 24,795 tons.

The feature of the record for recent months has been the large receipts of imported alloy. For June, July and August the average has been 18,441 tons per month or far in excess of the movement in 1913 of 10,672 tons per month when about half of the American consumption came from abroad. The recent importations exceed any previous record and have been due to efforts to anticipate the duty which went into effect Sept. 21.

Manganese Ore Imports

Imports of manganese ore have been increasing almost each month this year, due also to a duty, and in contrast to a decrease in ferromanganese production. In the first quarter of this year these were only 10,609 tons per month but in July and August they had increased to over 62,000 tons per month. Imports thus far this year, compared with other years, have been as follows:

Manganese Ore Imports into the United States in Gross Tons

	Total	Average per Month
April, 1922	25,559	....
May	46,317	....
June	44,329	....
July	62,518	....
August	62,121	....
First quarter	31,828	10,609
Second quarter	116,405	38,801
Total, 1921	401,354	33,446
Total, 1920	606,937	50,578
Total, 1919	332,344	27,779
Total, 1918	491,303	40,942
Total, 1917	629,972	52,498
Total, 1916	576,324	48,027
Total, 1915	320,784	26,732
Total, 1913	345,084	28,858

For the first eight months this year, ore importations have been 34,109 tons per month which compares with 33,446 tons per month in 1921 and over 50,500 tons per month in 1920. In 1913 they were only 28,858 tons per month.

British Supplies of Manganese Ore

Importations of manganese ore into Great Britain have been moderately increasing this year but are far below those of pre-war and war years. The following table gives the record:

British Imports of Manganese Ore

	Total	Average per Month
April, 1922	8,712	....
May	31,518	....
June	18,798	....
July	27,415	....
August	29,644	....
First quarter	21,831	7,277
Second quarter	59,028	19,676
Total, 1921	172,856	14,405
Total, 1920	452,613	37,718
Total, 1919	265,800	22,150
Total, 1918	365,606	30,467
Total, 1917	331,264	27,605
Total, 1916	439,509	36,625
Total, 1915	377,324	31,443
Total, 1914	479,435	39,953
Total, 1913	601,177	50,098

For the first eight months of this year British ore importations have been 17,239 tons per month which is only a little higher than the 1921 movement and considerably under the record of any other year from 1913 to 1920 inclusive.

Supplies and Needs in 1922

Not long after the United States entered the war it was officially estimated that the monthly needs of the steel industry were 28,000 tons of ferromanganese. This was based on the use of 80 per cent alloy and a steel output of about 43,000,000 tons. Assuming the 1922 steel production to be 32,000,000 tons, based on the data to date of the American Iron and Steel Institute and that 74 per cent of this is open-hearth steel with two-fifths of the Bessemer output absorbing spiegeleisen as high carbon steel, the estimated amount of 80 per cent ferromanganese necessary this year at 17 lb. per ton of steel is 217,600 tons. Adding to this the 10,000 tons estimated as usually needed in the iron foundry business, the total 1922 needs become 227,600 tons. That this will actually be less is probable because the total steel production will probably fall below 30,000,000 tons.

To meet this theoretical ferromanganese demand of 227,600 tons, there has already been produced 170,828 tons to Oct. 1 with 49,078 tons imported to Sept. 1, or a total of 219,906 tons. Production for the then remaining months of this year will probably total 30,000 tons and importations will continue heavy, part of the remaining four months at least, so that the theoretical needs of a liberally estimated steel output will be more than amply met, even if importations ceased altogether.

The Ensign-Bickford Co., Simsbury, Conn., has voluntarily increased wages of its several hundred employees 5 per cent. The plant is operating at capacity.

ROLE OF METALLURGIST

Interesting Points Developed at Meeting of Detroit Foundrymen's Association

Harry Rayner, metallurgist for Dodge Bros., Inc., addressed a largely attended meeting of the Detroit Foundrymen's Association Oct. 19 on "The Rôle of the Metallurgist in the Foundry." Mr. Rayner urged the closest possible co-operation with the foundry's sources of raw material supply, suggesting that through the medium of the purchasing department it is possible not only to arrange for the regular supplies of coke, pig iron, sand and other bulk materials of standard grades, but also to secure such materials of unusual analyses as may be occasionally required for particular purposes. He cited particularly the possibility of locating special casts of pig iron, such as high manganese, for which the producer may have no immediate outlet and which can readily be secured, provided the metallurgist is constantly in touch with furnace operations at the plant supplying him, thus largely eliminating the use of more expensive alloys.

Referring to scrap, Mr. Rayner emphasized the absolute necessity of uniformity in the material charged into the cupola, pointing out that much can be done toward this end by a constant and careful inspection of purchased scrap at the point of origin before it is loaded for shipment. If this is not possible, he argued, the foundry will find it more profitable to use only its own return scrap. The metallurgist must have absolute control of the cupola, the charging and melting operations and, with a proper degree of tact, should follow the castings through the machine shop as well. He insisted that the foundry could not be run from the laboratory, but that the metallurgist, to realize the full possibilities of his position, must be in close personal touch daily with all operations from the selection of raw materials through the machining of the castings.

Several interesting points were developed in the discussion which followed Mr. Rayner's paper. Regarding pouring temperatures, it was agreed that the hotter the iron the harder the thin sections will show on the Brinell test. This condition is reversed for heavy sections, and machine shop complaints are most numerous on cylinders cast with dull iron. It was also stated that castings which carry a thin skin of extreme hardness can sometimes be corrected by weathering in storage, as they will rust down to a point where they will machine readily.

The Detroit association also discussed the possibility of co-operating with the engineering department of the University of Michigan in making an exhaustive study of some problems of importance to the foundry industry. Suggestions included the subject of core oils, the chilling of cylinder bores and the securing of a uniform standard of foundry coke.

Meeting of Electric Steel Founders' Research Group

The chief executives and the operating officials of the companies comprising the Electric Steel Founders' Research Group recently held a three-day meeting at Wernersville, Pa., at which exhaustive progress reports were presented on researches being conducted by the organization into annealing, core practice, facing practice, furnace practice, and the elimination of slag from castings. It is stated that there has been gratifying progress in each group investigation and that the improved volume of business in the industry at present affords better opportunity for the prosecution of certain researches than when operations were curtailed during 1921.

The group members report that the standardization of practices has recently been extended to cover methods of chemical analysis.

The group consists of the following companies: Electric Steel Co., Chicago; Fort Pitt Steel Casting Co., McKeesport, Pa.; Lebanon Steel Foundry, Lebanon, Pa.; Michigan Steel Casting Co., Detroit, and Sivyer Steel Casting Co., Milwaukee. The group began active work a little more than two years ago. Details of the working plan adopted by the group were published a short time ago.

Quad City Foundrymen Meet

The second meeting of the Quad City Foundrymen's Association was held in Rock Island, Ill., Oct. 16, with an attendance of 90. Dr. Richard Moldenke, Watchung, N. J., gave an address on general foundry practice. He started in with a brief history of the foundry industry from its inception and followed through up to the present day practice both in this country and in Europe, before and after the world war. He held the attention of the members for an hour and a half, after which time he answered questions up until ten o'clock.

The association had a representative attendance from 27 gray iron, malleable, steel, brass and aluminum foundries. It seems that they had representatives from all departments of their local industries as follows: Managers, 16; general superintendents, 6; foundry foremen and foundry superintendents, 25; foundry engineers, 3; chemists, 5; pattern makers, 1; production managers, accountants and clerks, 6; purchasing agents and welfare men, 8; non-members of the association, 20.

The foundrymen of the section pledged themselves to hold the third Monday in each month open for a monthly meeting. A. E. Hageboeck is president, John Ploehn, vice-president, and R. L. Van Alstyne, secretary and treasurer of the association.

Engineering Research

Much information regarding the division of engineering of the National Research Council is given in a 36-page booklet 6 x 9 in. just issued by the council in co-operation with the Engineering Foundation, 29 West Thirty-ninth Street, New York. Approximately 80 societies are included in the membership of the council, its division of engineering, one of thirteen in all, being located in the Engineering Societies Building to facilitate co-operation with those societies. The division plans programs for projects brought before it and aids in organizing and carrying out the plans. It co-ordinates the work of societies, industries, universities, governmental bureaus and individuals along research lines. Among the fields which have been investigated are those relating to pyrometry, fatigue of metals, steel ingots, highways, molding sands, marine piling, electrical core losses and insulation, heat transmission, hardness of metals, deoxidizing for steel and welding of all varieties.

Iron Mining Discussed

A meeting of the New England Street Railway Club, held Thursday evening, Oct. 19, at the Copley-Plaza Hotel, Boston, attended by about 100, was devoted to a discussion of the mining of iron ore and its conversion into commercial products consumed by street railway companies.

Frank B. Walker, superintendent maintenance of way, Eastern Massachusetts Street Railway Co., read a paper on the mining of iron in the Mesabi iron range. Illustrations accompanied his talk. F. A. Weymouth, sales metallurgist, Bethlehem Steel Corporation, read a paper on modern practice in rolling special steel T and girder rails.

In the analytical work on blast furnace hearth gases, being performed by the U. S. Bureau of Mines, the composition of the gases in the tuyere plane has been determined at two furnaces in the Pittsburgh district. One, a furnace making ferromanganese, showed conditions practically identical with Southern practice on basic or pig iron. The other, making basic iron, showed penetration of oxygen to a further distance than obtained in the Southern furnaces. Arrangements have been made with a blast furnace operation at Youngstown, Ohio, to obtain samples at other planes up the bosh. It is hoped that this work may bring forth some valuable information.

CONTENTS

October 26, 1922

From Ore to Nails in Minnesota Plant 1057
Steel Corporation Adds Rod Mill and Wire Plant to Its Duluth Works—Labor Saving Devices and Safety Measures Are Features

Decision Favors Steel Corporation Roads 1065
Interstate Commerce Commission Examiner Finds the Rates for Hauling Minnesota Ore Are Justified—Favors Reduction on Old Range Rates

National Problems at Implement Meeting 1067
Gap Between Farmers' Selling and Buying Prices Widening—Foreign Trade Prospects Poor—Compulsory Arbitration of Industrial Disputes Urged

Internal Combustion Engines for Power 1073
For Steel Plant and Similar Service Both Gas Engines and Diesel Engines Are Favored—Comparison of Costs with Steam Costs

Study of Economics As a Need in Industry 1086
Value to Management Discussed at Industrial Engineers' Convention—Selecting Employees, Labor Relations, Cost Reducing and Material Handling Among Subjects

Press Safety Guard of Positive Type.... 1064
Increase in Rates Not Justified..... 1064
Decreased Activity of Ohio Foundries... 1064
Chairman Schwab Confident..... 1066
French Imports of Machinery and Tools. 1068
For Saving Floor Space in Production Grinding 1069
Cromwell Steel Co. Plant and Equipment to Be Sold at Auction..... 1069
Shipments to Foreign Countries..... 1069
Motor Operated Snap Switch for Automatic Applications 1070
Donner Steel Co. in Alloy Field..... 1070
Crystallization of Galvanized Malleable Iron Castings 1070
Combination Grinding and Buffing Machine 1070
Canadian Rail Order..... 1070
Cast Iron Pipe Making..... 1071
Nickelized Zinc in Ribbon Form..... 1071
What Compressed Air Does in Industry.. 1071
September Refractories Statistics..... 1071
Serious Labor Problem..... 1072
More Metal Workers and Higher Wages. 1072
Decline in Automobile Production..... 1072
New Line of Small Air Compressors.... 1075
Naval Laboratory Delayed..... 1075
Machine for Cutting Irregular Shapes.. 1076
Synthetic Cast Iron on the Pacific Coast. 1076
More Activity in Rolling Mill Equipment 1076
Ferromanganese Supplies 1077
Role of Metallurgist..... 1078
Meeting of Electric Steel Founders' Research Group 1078
Quad City Foundrymen Meet..... 1078
Engineering Research 1078
Iron Mining Discussed by New England Railway Club 1078
Editorials 1080
Automobile Steel Less Seasonal—Prices and Progress—Manganese and the Tariff—Getting a Full Day's Work—A More Efficient Cupola—Building Costs in England—The Government's Hand in Prices
Business Forecasts 1083
Van Keuren Lapped Steel Surface Plates 1084
Independents Adopt New Pipe Prices... 1084
Universal Saw Bench with Tilting Arbor 1084
Large Coal Output..... 1085
Preparing to Use Iron Ore of Utah... 1085
Limestone Rates Protested..... 1085
Last Sale of Surplus Material..... 1085
French Market Quieter..... 1090
Mechanical Engineers' Annual Meeting in December 1090
Export Market Dull..... 1091
Steel Industry in Soviet Russia..... 1091
Railroad Equipment Buying..... 1106
Fabricated Steel Business..... 1106
J. A. Fay & Egan Co. Buys Plant..... 1107
German Prices Advance Again..... 1109
British Iron and Steel Market..... 1110
Improvement at Lackawanna Plant..... 1110
Book Reviews 1111
New Trade Publications..... 1111
Industrial Finance 1120, 1121

Iron and Steel Markets 1092
Comparison of Prices 1093
Prices Finished Iron and Steel, f. o. b. Pittsburgh..... 1105
Non-Ferrous Metal Market 1107
Personal Notes 1108
Obituary Notes 1109
Machinery Markets and News of the Works..... 1112
New York Jobbers' Prices 1122

ESTABLISHED 1855

THE IRON AGE

EDITORS:

A. I. FINDLEY WILLIAM W. MACON GEORGE SMART

CHARLES S. BAUR, *Advertising Manager*

Member of the Audit Bureau of Circulations and of
Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

[illegible] Publisher in U. S. A. George H. Griffiths, *Secretary*

Detroit: 317 West Fort St. Cincinnati: Mercantile Library Bldg. Buffalo: 881 Ellicott Square. Washington: 26 Jackson Place, N. W. San Francisco: 320 Market St. London, Eng.: 11 Haymarket, S.W.1.

BRANCH OFFICES: Chicago: 1st National Bank Building. Pittsburgh: Park Building. Boston: The Rookery. Philadelphia: 1420-1422 Widener Building. Cleveland: Guardian Building

Subscription Price, United States and Possessions, Mexico Cuba, Shanghai, $6.00; Canada $8.50; Foreign $12.00 per year. Single copy 25 cents

Entered as second class matter June 19, 1879, at the Post Office at New York, New York, under the Act of March 3, 1879.

Automobile Steel Less Seasonal

It is a matter of comment that the demand for steel from the automotive industry this year, for the first time, did not decline materially with the wane of summer. Some manufacturers doing a large business with that industry find specifications for tonnages for the last half of the year are greater than those for the first half, and it is the belief as well as the hope of the steel producers that this important outlet is passing out of the seasonal class. That sales of those forms of steel finding large, if not principal, use in the manufacture of automobiles, trucks and tractors should have increased in recent months is explained in part by the drift of pleasure car design toward the closed or all-the-year-round car, with its larger use of steel. Further, it required no unusual prophetic gift to visualize as far back as early summer the present railroad transportation conditions and the incident increase in the use of motor trucks to get steel from the mill to the consumer.

Those best informed believe the new development in automobile steel to be a permanent one and speak of it as a natural evolution. The automotive industry has reached a point where changes of design from year to year are becoming less important. The degree of standardization that has been attained gives greater latitude in the matter of advance purchases of steel. It also permits the maintenance of motor car production at a higher rate in the period of light demand than was possible when the struggle to get out something new in a pleasure car was almost as intense as the competition for business; indeed, when new design was the chief sales argument. The present capacity for the production of automobile steels is ample, provided the requirements are spread over a reasonable period, but to meet the requirements of a year in six or seven months would require the maintenance of a certain amount of steel making capacity which necessarily would be idle in what have been considered off-season months.

The demands of the automotive industry, though probably less rather than more than 8 per cent of the country's output of steel, have been so insistent at times as to affect the entire structure of steel prices. This was notably the case in the early part of 1920 and to a less degree was felt this year. When their cars were selling well and they were compelled to make close connections with steel works, the automobile manufacturers have not let the price stand in the way. Steel in the ingot moves toward those finishing outlets in which the prices are best, not infrequently at the expense of other requirements. If the mills get the chance to make up the steel when motor car buying is lightest, there will be no pinch in the supply when the call for cars is greatest. That there was not a scarcity of tin plate this year—and the demand for food containers has been extremely large—was due to the fact that the container manufacturers put in their specifications early and had tin plate in abundance when the demand came for cans. The automotive industry does well to take a leaf from the book of the can makers.

Prices and Progress

An important item in the economic alinement of affairs in the past half dozen years is the part that inefficiency plays in the making of commodity prices. If this item be overlooked a misleading conclusion may be reached as to "the business situation" at any given time. Before the war we did not feel, perhaps, that the American people were doing their work and conducting their business altogether efficiently, but in the retrospect, and in the light of much that we have seen lately, we must conclude that these things went on rather well in that period.

That the market price of a commodity rose indicated, as a rule, that there was a particularly heavy demand for it, and the demand was symptomatic of the community having progressed so as to be able to buy more of the goods. There was some debate as to whether rising prices caused prosperity or prosperity caused rising prices, but the argument was conducted chiefly by doctrinaires. The practical business man was not interested, for he felt confident that the two went together, and that seemed enough for him.

The situation now is quite different. In the high prices of the past few years the factor of inefficiency has been important. A very fair and

comprehensive index is the debits to individual accounts at banks outside New York. Taking the volume of debits in 1919 as 100, 1920 stood at 118 and 1921 at 91. Taking the Bureau of Labor's index number of commodities at wholesale and using 1919 as a basis, we have: 1919, 100; 1920, 115; 1921, 73. Inasmuch as a very considerable part of the bank debits represent payment for merchandise, it is evident that a large amount of business was done in 1921. Judged by prices and by the amount of "unemployment" one would rate 1921 as a year in which very little work was done. There were not so many men drawing wages and salaries as in 1920, but those who were being paid were doing more work than they did in 1920.

When Connellsville coke sold above $10 a ton, recently, the high price was no sign that there was prosperity and progress. It was a sign of great inefficiency. Little coke was being made. It has been explained lately that the cost of producing Connellsville coke is high because the operators, besides employing coal miners and coke oven workers, must employ numerous guards. That does not represent efficient production of coke. The pig iron producer should not regard the condition as favorable, even though it enables him to secure a higher price for his pig iron than would be obtainable if coke were being produced at low cost and sold at corresponding prices; nor can the foundryman or steel maker find evidence of "prosperity" in the high price of pig iron. The advancement of the country is measured not by prices nor by the volume of money turnover, but by the commodities and service the people of the country receive.

Manganese and the Tariff

Importations of ferromanganese in recent months have been on a larger scale than ever. Not even in 1913, when British producers furnished about 50 per cent of the total American consumption, were the receipts so large. In June, July and August, importations averaged 18,441 tons per month; in 1913 they were 10,672 tons per month. Steel output in 1913 was about at the rate of to-day. The heavy shipments preceding Sept. 21, as is well known, were due to the effort to anticipate the new duty of 1⅞ cents per pound of contained manganese. It is interesting to note, in connection with the figures bearing on manganese supply given elsewhere, that even with the country's steel production this year more than 60 per cent greater than in 1921, there is already in sight a supply of ferromanganese well in excess of any theoretical need. Production and importations to date exceed the demands of the 32,000,000-ton steel output now indicated even should domestic output and importations cease for the rest of the year.

It will take time, therefore, to demonstrate how much of the new duty British producers of ferromanganese will need to absorb in order to hold a share of the domestic trade; also what part of the "protection" given them by the new tariff domestic producers may need to give up in order to shut out the foreign product. There is also the unsettled question of the extent to which steel companies which for years have been buyers of ferromanganese will become makers of their own supply. Further, in view of the large imports of manganese ores before the new duty of 1 cent per pound of contained manganese went into effect, some time will elapse before domestic producers of such ores, in whose interest the whole manganese tariff schedule was framed primarily, will have the chance to justify or to discredit the large promises made for them to the tariff-framers at Washington.

Getting a Full Day's Work

Much has been written comparing present-day labor efficiency and that to which we were accustomed before the war. Most of the writers have given their own impressions and many of them have shown such bias that their opinions have been discounted accordingly. Only when definite figures have been derived from careful comparative studies are the results likely to be of real value.

One such study, made by the steamship lines of the Southern Pacific Co. in connection with unloading cargoes from three steamers of the company at New Orleans, dealt with fifteen consecutive trips in 1915, five for each steamer, and fifteen consecutive trips, five for each steamer, in the winter of 1919-1920. The figures showed that the tonnage handled per thousand man-hours was more than 39 per cent greater in 1915 than in the later period. The steamers were an identical three in each case; the unloading facilities had not been changed; the character of cargo was the same; the tonnage handled in the fifteen trips in one case was within 1¾ per cent of the total handled in the other fifteen trips. To a large extent, the very men involved in unloading were the same in the one case as in the other. The hours per day were slightly fewer in 1920 than in 1915, so the element of greater fatigue could not be adduced. Hence the falling off must be ascribed almost wholly to the difference in willingness to work between the two periods.

An interesting sidelight on this question of willingness to work, which ties back into the whole problem of labor union domination, now reaches us from England. A joint investigating committee of the Engineering and National Employers' Federation, the Shipbuilding Employers' Federation and the Negotiating Committee of the Trades Unions has issued a report which, due to the composition of the committee, avoids expressing any opinion. Evidence in this report bears out in a striking way the justness of the demand of employers that labor be paid according to its productivity, rather than on the basis of the time put in on a given job.

Riveters engaged in building a warship, and working on time, drove 176 rivets per squad per week. When payment by results was adopted, the number of rivets driven in a week per squad of riveters increased to 722—a gain of no less than 310 per cent.

In another case, when the workers were paid so much per week, the frames of a vessel were set at the rate of 54 pairs in 14 weeks. This works out at slightly less than four pairs of frames set

each week. Under piece work rates, with the same workers, 80 pairs of frames were set in $5\frac{1}{2}$ weeks, or nearly 15 pairs per week. The increase in production per gang per week in this case works out at 277 per cent.

Mechanics fitting watertight sliding shutters took 490 hours when on time work; the same job was done in 150 hours when payment was by result; the gain was 227 per cent.

Not so striking, but still showing more than double the output per thousand man-hours, was the case of two ships built from identically the same plans, one of which, built on time rates, took 2601 hours to complete, while on piece work rates the sister ship, with the same number of men working, was completed in 1151 hours. The gain here was 126 per cent.

None of the above makes pleasant reading for union labor leaders, yet the farmer is not paid according to the number of hours he puts in in his field; the steel worker is to a very large extent on the tonnage basis of payment; salesmen in many lines are paid a commission or some form of bonus, sometimes in addition to a monthly stipend. Such a method of payment by results is not only the fairest that can be devised, when properly safeguarded, but it is the one which, while making satisfactory return to both capital and labor employed, tends to insure the buyer of the product against inordinate prices.

A More Efficient Cupola

That the cupola, generally regarded as an efficient melting medium, is capable of decided improvement is demonstrated in an article in THE IRON AGE of Oct. 19 describing the Schuermann type, a recent German invention. If the claims made as the result of fairly extensive trials can be generally substantiated, this new cupola is well worthy of the attention of American iron foundrymen. In the language of the author of the original German description: "No such fundamental change in cupola practice has been seen for the last century." This statement comes from the foundryman who made the trial tests, not the inventor.

The Schuermann cupola involves the use of a pre-heated blast under pressure, one object sought being a shortening of the time of melting. The test runs showed not only a shorter operating period but low coke consumption. Of equal importance was a reduction in the sulphur content of the iron by 20 to 30 per cent.

The advantage of employing such a device in coping with high cost fuel and high sulphur scrap is manifest. Such conditions obtain in this country to-day and probably in Germany, and the electric furnace has been advocated and used to correct them. But there are many cases where only a cupola is available. In 1908 at the Toronto convention of American foundrymen a somewhat similar suggestion was discussed. It was exemplified in the Baillot cupola, devised by a Belgian engineer, which made a novel use of hot waste gases, provision being made for returning them to the tuyere area. This cupola was described in THE IRON AGE of Nov. 19, 1908. It appears to have acquired no foothold in this country.

Another improvement in foundry melting was described in THE IRON AGE, Aug. 31, in an article dealing with centrifugal iron castings. The Hurst cupola, developed in Great Britain, involves a special mechanical charging device and an oil-fired receiver or fore-hearth which supplies hot metal of regular and uniform composition, a particular essential in the centrifugal casting process.

It is to be noted that increased interest in better cupola performance is shown at the same time that efforts for the improvement of regenerative furnace practice are yielding remarkable results. The past year has seen great strides both in the United States and Great Britain in the increase of open-hearth furnace outputs at steel works through more rapid and more complete combustion. There are not the same possibilities of improvement in the operation of the ancient shaft furnace of the foundry, but it is not unreasonable, in view of the recent developments referred to above, to expect a better approach to theoretical cupola efficiency than the average foundryman has so long been satisfied to attain.

Building Costs in England

There seems to be a difference of opinion as to the status of present building costs in England, and their relation to unemployment. One authority has stated that the present excess above prewar costs is between 60 and 70 per cent. But the National Federation of House Builders places it at 125 per cent and takes the view that any revival in the building trades is bound to lead to a very serious shortage of labor, according to the London *Ironmonger*. This condition would prevent a reduction in the rate of wages. Fear of a shortage of labor reads queerly, in view of the fact that at the end of June the number of unemployed receiving relief or unemployment doles in England and Wales was 1,769,400 workers, or one out of every 21 in the entire population of men, women and children. And on Sept. 18 the number of wholly unemployed persons registered at the exchanges in Great Britain was 1,307,200. From these figures it would seem that any revival in any industry in Great Britain should be exceedingly welcome to all concerned.

The Government's Hand in Prices

The *Engineering and Mining Journal-Press* refers with enthusiasm to a plan it has had in operation since May, under which its market quotations on copper, lead and zinc have been made "as a further precaution and safeguard, with the co-operation of those federal bureaus in Washington which are specially interested in the mining industries"—the Bureau of Mines, the United States Geological Survey and the Bureau of Foreign and Domestic Commerce. Each week the quotations are "fixed by a committee consisting of the market editors of *Engineering and Mining Journal-Press* and the representative of the federal bureaus," who is H. S. Milliken, chief of the division of War Minerals Supply of the Bureau of Mines.

This is certainly a novel Government activity and decidedly a new departure in metal market reporting. The statement that the committee referred to above "fixes" market quotations is probably not to be taken with all the implications of the word. Nevertheless, those whom years of experience in market reporting have confirmed in the notion that their work is rather that of registering accurately prices established by actual sales cannot but ask why a Government representative should be given so important a place in the "fixing" of quotations on important metals. The independence of the men whose reports of market conditions and quotations of prices have become authoritative in great industries is an honorable tradition of business journalism. Why the Government check? And especially why the Government hand, after all the war-time machinery of price-fixing has been done away with and when both at Washington and throughout the country the clear call is being sounded to take and keep the Government out of business?

BUYERS HESITATE

Prices Softening in Youngstown District—Labor Shortage Felt

YOUNGSTOWN, Oct. 24.—Steel prices are softening following substantially reduced costs of coal and coke, affecting pig iron production costs. As shipments are improving, urgency on the part of consumers for material is not so apparent. In sheets, Valley makers are rapidly reducing their unfilled obligations. Some of the smaller, non-integrated interests are not more than a week behind on their running orders. Business is being placed in lots ranging from 100 to 250 and 500 tons.

Basic pig iron has declined to $30 in the Valleys, and little forward business is being done. It is expected that settling of coke prices may establish a $28 iron market for the first quarter of 1923. Steel works interests operating their own blast furnaces are largely consuming their output, with the exception of the Brier Hill Steel Co., which is making shipments regularly against a contract with a middle interest, which involved a purchase by the maker of scrap at a figure above the market at the time.

Semi-Finished Material

Sheet bars, open-hearth and Bessemer, have stabilized at $40 for the final quarter, and price adjustments with interests covered by contract have been made on this basis. Such sheet rollers as the Newton Steel Co., Falcon Steel Co., Falcon Tin Plate Co., Ashtabula Steel Co. and the Mahoning Valley Steel Co. are covered on their semi-finished requirements over the remainder of the year. There is little demand for slabs and billets, which are taking the same quotation as sheet bars. With softer iron prices likely to apply on first quarter business, such interests are looking for a recession in sheet bar prices.

Sheet Conditions Easier

This same feeling is reflected along the line in finished products and particularly in sheets. Any interest in the Valley would take on tonnage to-day on the basis of 3.50c. for No. 28 gage black, with a proportionate differential for galvanized. It is reported that some mills are even willing to shade this price on attractive tonnages, and it is not unlikely that the 3.35c. quotation of the American Sheet & Tin Plate Co. will apply on some tonnages entered by independents over the next month. This is particularly true of mills which are over-supplied with galvanized grades and are anxious to balance their books.

Furthermore, some of the smaller makers, such as the Ashtabula Steel Co., are in position to offer prompt tonnages at the prevailing market, which is weakening the stand of mills that have been holding out for premiums. Further weakening in sheet prices is looked for, in view of the tendencies of the market downward.

Scrap Weakening

Dealers are still endeavoring to bolster the scrap market, which shows, however, unmistakable signs of weakening. Offerings by the railroads are increasing and deliveries are somewhat better. Steel makers are buying warily and are doing nothing to disturb the market in the way of bidding against each other. On heavy melting grades, $22 is representative of the market and $20 to $20.50 on compressed sheet steel.

Shortage of common labor is felt by the more important producers, as production expands, and employment agencies throughout this section are being solicited for workmen.

BUSINESS FORECASTS

Methods of Looking Into Future Considered at Meeting at Harvard University

That a growing number of industries are considering and applying forecasts of business conditions, issued from various institutions, and that the basis of such forecasts in many instances are gradually becoming more fundamental, was demonstrated at a management meeting held Thursday, Oct. 19, in the new lecture hall, Harvard University, Cambridge, Mass. The meeting was initiated by the management section, American Society of Mechanical Engineers, and by the New England section, Taylor Society, and was in conjunction with similar meetings held simultaneously throughout the United States.

An Inside Story

Charles J. Bullock, chairman Harvard University Committee on Economic Research, with the aid of many charts, gave an extremely interesting inside story of how data are collected and applied in forecasting business conditions. The purpose of his address was to convince business interests that such forecasts are founded on carefully compiled statistics, which are corrected as collected, and assembled in groups of relationship. There is no guesswork or haphazard taking for granted, and special stress was put on the fact that the personal attitude of bankers, business interests, etc., are eliminated. Mr. Bullock said:

"We shut ourselves up in our offices with our figures. The results we obtain are nothing more or less than mathematical problems worked out on the corrected statistics covering the period of years beginning with 1903."

Mr. Bullock stated it was hoped statistics extending as far back as the Civil War would shortly be corrected and in such form as to give a basis for further calculation. By the charts presented, the University's economic research department has satisfied itself that cycles and long train movements follow given courses over a period of years. Many of those present at the evening session were of the opinion that earlier records will show no deviation in proven general cycle and train movements.

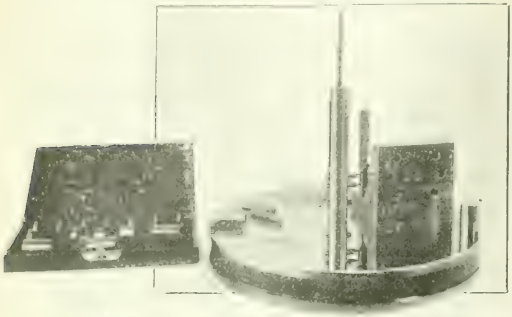
C. H. Jones, president Commonwealth Shoe & Leather Co., Boston, gave a talk on the practical application of cyclical forecasts to manufacturing management. The application in his case was just previous to and since the business depression of 1920. Mr. Jones admitted that some doubt existed in his mind prior to the depression as to the soundness of the Harvard economic research forecasts, but these in time, coupled with the rise in the rediscount rate of the Federal Reserve Bank, strengthened his belief.

Van Keuren Lapped Steel Surface Plates

The Van Keuren Co., Allston, Boston, Mass., has added to its line of measuring tools various sizes of hardened steel lapped precision surface plates. In the accompanying illustration the character of the highly finished lapped surface of the 10-in. diameter surface plate may be noted in the reflections of the tools and work placed on the plate.

The lapped steel surface plates are said to be of a degree of precision in advance of the hand-scraped cast iron surface plates, and to be free from the numerous hills and valleys of hand scraping. They are tested for planeness during manufacture by light waves.

For such work as the inspection of small parts by passing them between a dial gage and a surface plate, for sine bar set-ups and for the many set-ups where



Lapped Steel Surface Plate. The mirror-like surface is ...ent from the reflections of the tools and work

precision gage blocks are used, the lapped precision surfaces are claimed to have many advantages over the common hand-scraped surfaces. Gage blocks may be wrung directly on the lapped steel surface and the hardened steel plate wears indefinitely longer than the usual cast iron. The surface plates are available in 5, 8 and 10-in. diameters, and are furnished with two handles which screw into the edge of the plate. A suitable wooden box is provided to protect the plate.

Independents Adopt New Pipe Prices

YOUNGSTOWN, Oct. 24.—The Youngstown Sheet & Tube Co. and the Republic Iron & Steel Co. have followed the action of the National Tube Co. in advancing pipe prices from $4 to $5 per ton. Makers report a sustained demand for standard merchant pipe in buttweld sizes, and some improvement in the inquiry for the larger sizes. Producers had not benefited from the previous advance to any extent, owing to the fact that their books contained substantial orders booked at lower prices, which they have been working off.

Consequently, pipe prices have not followed the advances in other finished lines, insofar as they have applied to actaal transactions. District mills have been balancing their stocks during the period of car shortage, retarding shipments.

High Operating Rates in the Mahoning Valley

YOUNGSTOWN, Oct. 24.—High operating rates are being maintained by Mahoning Valley iron and steel properties. Of 47 blast furnaces in the Mahoning and Shenango Valleys, 30 are now pouring. Steel making is fully at 90 per cent, with all three Bessemer converters in the Mahoning Valley blowing and 60 to 66 open hearth furnaces charged.

Sheet mills were scheduled at 97 per cent at the beginning of the week, while 15 of 17 tube mills are rolling. The plate mill of the Republic Iron & Steel Co., inactive except for irregular rollings, is in commission. Six of nine independent bar mills are rolling, and all 17 bar units operated by the Carnegie Steel Co.

Due to shortage of men, 20 of the 88 puddling furnaces at the Girard plant of the A. M. Byers Co. are idle. Its bar mill is operating two 8-hr. turns and its plate mill one 8-hr. shift.

Non-integrated sheet rollers are maintaining their usual schedules.

Republic Plans Considered

Meeting in Youngstown last week, directors of the Republic Iron & Steel Co. discussed a program of expansion and rehabilitation at the Youngstown properties. Engineering surveys relating to modernizing the Brown-Bonnell department and the Bessemer plant have been made. Methods of financing the improvements were also discussed. John A. Topping, chairman of the board, presided.

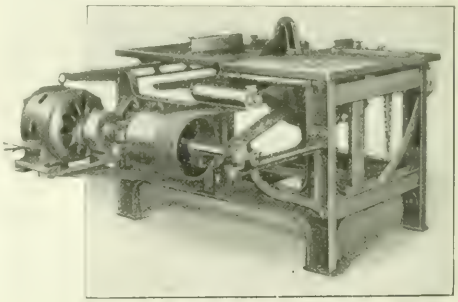
Universal Saw Bench with Tilting Arbor

A universal saw bench with tilting arbor and sliding table, intended to do the work of the usual machine with stationary or movable table and in addition to saw accurately any angle, bevel or miter, or two angles at once, has been placed on the market by the Hooker Mfg. Corporation, St. Johnsbury, Vt.

The machine illustrated is the motor-driven unit and has the miter gage over the saw. The saw is raised and lowered by means of a hand wheel, which adapts the machine for grooving and rabbeting. By means of a hand wheel on the front of the machine, the saw can be changed from perpendicular to any angle up to 45 deg. The frame is constructed rigidly and to permit of access to all parts. The cross girt on the front is offset to permit the operator to work close up to the saw.

The left-hand table is movable sidewise and adjusted to the saw, and being hinged at the back can be raised and tipped. The right-hand table runs on rolls fitted to the track, carrying the work to the saw, and sidewise adjustment permits the use of a dado head. The yoke carrying the saw arbor is guided in a circular groove. It is raised or lowered in dovetailed ways by an elevating screw operated by a handwheel. The yoke can be set at any height or angle and the saw can be raised or lowered when in a tilted position without disturbing its setting.

The saw arbor is of steel, 1 13/16 in. in diameter, the diameter where the saw is mounted being 1 in.



Universal Saw Bench with Tilting Arbor and Sliding Table, Showing Arrangement for Motor Drive and Miter Gage Over Saw

It runs in babbited bearings, grooved for end thrust and all oil holes have dust caps. A ball-thrust bearing, provided between the box next the saw collar and the saw collar itself, is a feature. Ball-bearing boxes can also be provided for the spindle. A 3-hp. 40-deg. motor is used, being mounted as shown. Cut-off gages can be fastened to the table at any angle, one rip gage serving as plain or adjustable to 90 deg. in either direction. A miter gage and plain stop gages are included.

The capacity is for saws of 6 to 10 in. diameter, the latter size cutting stock 6½ in. thick. The speed of the saw arbor is 3600 r.p.m. The floor space occupied is 72 x 58 in., and the weight of the motor-driven machine, 1350 lb. net.

LARGE COAL OUTPUT

Production for Third Week in October Exceeds Ten Million Tons

WASHINGTON, Oct. 24.—Production of bituminous coal in the third week of October, according to complete returns to the Geological Survey, showed an increase to about 10,200,000 tons. The number of cars loaded on Monday, Oct. 16, as reported by the railroads, was 41,201, establishing a new record for this year. The daily average for the first four days of last week was 32,803 cars, while the daily average for the same period for the preceding week was 31,501 cars. The daily average for October last year was 31,045 cars. Production of anthracite coal during the third week of October is estimated at 2,000,000 tons. Transportation remains the limiting factor in the current rate of coal production. Since the first of September no other causes have appreciably restricted the rate of output.

According to reports from the Northwestern Coal Dock Operators' Association the stocks of soft coal at Duluth, Superior, Ashland and Washburn increased from 120,384 net tons on Sept. 1 to 1,034,520 tons on Oct. 1. In comparison with the year preceding, the present reserve appears very small. In 1921 the movement up the lakes was heavy and accumulated on the docks, but in 1922 shipments away from the docks during the period of the miners' strike nearly stripped them of the heavy tonnage carried over from the season before. Practically all the coal on hand represents shipments received during September.

Record Coal Output Predicted

UNIONTOWN, PA., Oct. 22.—Rapid gains in the firing up of new ovens and increased output of coal will set a new record for production for the year when reports are received for this week. This forecast is an apparent certainty because of the production for the week ending Oct. 14 when production in the Connellsville bituminous region as 140,710 tons, only 9000 tons less than the production for the week ending April 1, when the "sympathetic strike" became effective in the Connellsville region. This was an increase, too, of 14,360 tons over the production for the preceding week.

Furnace coke producers in the region are daily adding to their output. During the week just closed, W. J. Railey, Inc., started up four of its six coke making plants in the region, the other two having resumed operations. The Railey company now has 28 per cent of its ovens in blast.

Washington Coal & Coke Co. is preparing to resume its coke production.

There was an improvement in the transportation service during the week on all lines except the Baltimore & Ohio, which is placing less than 20 per cent of car supply to the operations in the Connellsville region. Representations to the Baltimore & Ohio by the new Fayette-Greene Coal Producers' Association brought replies that extraordinary efforts were being made to increase the car placements.

Ovens in blast during the week ending Oct. 14 were 12,330 as compared with 4420 for the same week in 1921.

Coke prices were softer during the week, as was coal.

Preparing to Use Iron Ore of Utah

WASHINGTON, Oct. 23.—Plans for far Western steel interests to manufacture products from native iron ore in that section of the United States are reflected in an authorization just granted by the Interstate Commerce Commission to the Los Angeles & Salt Lake Railroad to construct a branch line. The certificate issued authorizes the carrier to build a branch 32 miles long from a point on the main line near Lund, Utah, to Cedar City, Utah, at a cost of $798,301, exclusive of equipment. This road is to open a tract of 840,000 acres. Around Iron Springs, 22 miles from Lund are iron ore beds which are estimated to contain 400,000,000 tons.

The report of the commission says:

"Two large steel companies contemplate opening mines and shipping ore from this district as soon as the branch line is built. One of these companies proposes to construct blast furnaces for reducing the ore, which will probably be located on Utah Lake. The development of the ore deposits is necessarily contingent upon the construction of the proposed branch. The applicant estimates that initial shipments of iron ore will total 1250 tons a day and that the output will be substantially increased as the district develops."

Limestone Rates Protested

WASHINGTON, Oct. 23.—The Jones & Laughlin Steel Co., Pittsburgh, has filed a brief with the Interstate Commerce Commission, protesting that the proposal of the Baltimore & Ohio Railroad to reduce the rate on limestone from the Martinsburg, W. Va., district to the Mahoning and Shenango valleys from $2.14 to $1.76 per ton without making a corresponding reduction to the Beaver district of Pennsylvania, will unduly prefer the former and prejudice the latter. The brief also states that the proposal of the Western Maryland Railroad to reduce the limestone rates from western Maryland points to Aliquippa, Woodlawn, Beaver Falls, and Ellwood City, Pa., to $1.51 has been justified. The originating points are the Cavetown and Thomasville groups in western Maryland and the present rate is $1.64. The Baltimore & Ohio and the Pennsylvania railroads have filed protests against the establishing of the $1.51 rate, but have made no protest against other proposed rates.

Last Sale of Surplus Material

WASHINGTON, Oct. 24.—The last of the auction sales conducted by the United States Shipping Board, through the Emergency Fleet Corporation, of surplus material, will be held at Sparrows Point, Md., Nov. 22. The auction will be conducted by the M. Fox & Sons Co., Baltimore.

A large quantity of valves, varying in size from 1-in. to 20-in., are to be included in this sale. They were manufactured by Crane & Co. and other manufacturers of standard valves. It is estimated that there are 50 tons of brass valves and 150 tons of the iron valves; many of the iron valves are brass fitted.

There are four Yarrow tube boilers of the Express type, each having a heating surface of approximately 4900 sq. ft. and built for a pressure of 465 lb. per sq. in.

Valley Shipments Increase

YOUNGSTOWN, Oct. 24.—While shortage of mill type gondolas for movement of steel products is still holding back shipments, there has been an appreciable betterment, within the past week, in the supply of box cars for this district. In consequence, the movement of such products as sheets, tin plate and nails, as well as fabricated steel requiring box cars, has been substantially accelerated. Fully 75 per cent of the accumulation in such finished steel materials, which clogged mill aisleways and warehouses, has been moved. This movement has been especially marked to Western points, as box cars have been sent into this territory in large numbers from Eastern centers, and loaded for Western destination. Trainloads of such cars have moved into the Valleys at times, to help relieve the congestion.

The Birmingham plant of the United States Cast Iron Pipe & Foundry Co., is getting into production of 6 to 12 in. pipe with the De Lavaud centrifugal process. Moving pictures of the process will be shown at a meeting of the New England Water Works Association at Boston, Nov. 14.

Study of Economics as a Need in Industry

Value to Management Discussed at Industrial Engineers Convention—Selecting Employees, Labor Relations, Cost Reducing and Material Handling Among Subjects

THE economics of industry, the fundamentals necessary to maintain maximum production with a minimum of effort, waste and cost, formed the major subject of the ninth national convention of the Society of Industrial Engineers, held in New York, Oct. 18, 19 and 20.

The attitude of industrial executives to-day is strikingly similar to that of executives two generations ago toward science and engineering, said Prof. Joseph W. Roe, president of the Society in his address on the relation of economics to industry, given at the opening session. Engineer, chemist and metallurgist are now as necessary a part of all large-scale industry as the accountant. We are at another joining of the ways, he said. To-day, with the increasing scale of production, it is becoming evident that social wastes are no longer tolerable. A knowledge of sound economics and sociology is clearly a help in the reduction of large scale wastes which may be subtle and, though very real, not obvious. Society and industry are so bound together that neither can permanently prosper at the expense of the other, he continued; whatever vitally affects one, affects the other. This means, he said, that industrial leaders in their own interest must consider economics or the social aspects of their business as they learned to include physical and chemical science 50 years ago.

To-day the economist is very much in the field of realities, actually measuring the forces at work in society and their effects, collecting and studying masses of facts covering wide areas and long periods of time, as none but the most exceptional manager could do, Dr. Roe pointed out. He is bound to see some things the manager misses, he continued, and some forces which the manager may "feel" but does not recognize or understand. As an example of these, the advantages and disadvantages of specialization and division of labor, the function of the middleman and of speculation, over-production, and the relation between value and price, were cited. Permanent business success can come only through conformity to sound economic principles, he emphasized.

Instances of how directly economics bears on the work of the industrial executive were given, among these being the consideration as to the economic size of a manufacturing enterprise and the work of the economist in the field of labor relations. In connection with the latter, it was pointed out that economists have made studies covering nominal and real wages in all the major industries and in all countries, back to the Middle Ages, the trend of prices and the history of periodic fluctuations and their causes.

Few executives closely concerned with immediate labor problems realize that many of the acute conditions they have to meet are recurrent, following closely the broad fluctuations of business prosperity, said Professor Roe. As an example of their aid it was pointed out that economic studies show clearly that during every period of rising prices, preceding a boom, labor is aggressive, wages rise, and unions increase in number strength and activity. The boom bursts, he said, and with the depression which follows, there is inevitably a series of defensive strikes, in the main unsuccessful, to retain the high wages of the boom, with a weakening of unionism. Then there has always followed a period of social experiments turning to political nostrums, etc., until with the rise of the next period of prosperity, the round is started all over again. The industrial history of the United States since 1830 was outlined to illustrate the recurrent cycles.

How to Bring Economics into Useful Relationship

More general reading on economics, industrial history and labor relations by industrial executives and labor leaders were among the suggestions offered as definite and practical ways of bringing industry and economics into a close and more useful relationship. More readable books on economic and social subjects were given as a crying need, and the teaching of sound economic standards in colleges and schools, and in general placing them before a much broader public was advocated. More general utilization of the present sources of economic information and statistics and the study of conditions of an industry by its trade association were suggested. The development of a systematic study of the sources, quantities and prices of the material used in industry and means of making this information generally available was also suggested.

The many serious attempts being made to incorporate sound economic principles in the conduct of our business affairs were referred to by J. H. Pardee, president J. G. White Management Corporation, New York, in an address on the part of economics in the formation of a policy of business administration. The policy involved in placing a new product on the market was outlined, it being pointed out that the selling price cannot always be fixed in relation to the cost of production. The rate at which the public will buy "at a price" must be predicted carefully, the speaker said, and the costs of manufacture at this rate accurately determined. Misunderstanding in economic affairs, because of the lack of common units and methods of measurements, was emphasized, and the opportunity of service in placing before business men some rational standards upon which an adequate system of measurement can be founded was pointed out.

In the discussion of these papers E. F. Du Brul, general manager National Machine Tool Builders' Association, Cincinnati, stated that a different attitude toward economics since the recent depression was evident, and cited the registration of nearly 200 in a course lately introduced in a high school in Cincinnati. Mr. Du Brul also pointed out that trade associations generally are getting more and more to study the economic phases and that industrial engineers must reckon with the trade association as a very essential element in the application of economics to industry. An address of welcome was made in the opening session by Dr. Magnus W. Alexander, managing director National Industrial Conference Board, New York.

Study of Economics Gives Perspective

The economic background necessary for a business executive was discussed at an informal dinner meeting of the education group of the society. In defining economics in relation to the manager's position, Dr. Lee Galloway, Ronald Press, New York, chairman of the meeting, said that the object of economic study is the acquirement of a knowledge of laws that concern the general welfare of society. He further said that the managerial interest in this study is to provide a background of economic information whereby business enterprise may be guided and controlled in harmony with the principles conducive to the general welfare. In another place Dr. Galloway declared that "there is perhaps no sadder comment to be made on the attitude of the present-day executive than that while modern economic organization has so arranged and broadened its background as to embrace the nation and the world, the business man of to-day is trying to formulate business policies with a perspective not different from that of the ancient Greeks and Romans."

Prof. Fred D. Fairchild, department of social and political science, Yale University, emphasized the need of economic principles as a basis for practical affairs, saying that how he can grasp more of the great principles of economics and make them serve should be the

first interest of a business man. Economists, on the other hand, he said, should get into closer contact with practical affairs. The growing analyzing by business men of price and other situations was noted by Prof. R. C. McCrea, school of business, Columbia University, who stated that the tendency toward research in recent years will supply business men with a body of generalizations that will give something to the economist himself. A description of the aims and methods of his institution in training administrative engineers was outlined by Prof. E. H. Schell, department of economics, Massachusetts Institute of Technology. Prof. E. J. Kunze, recently of Pennsylvania State College, emphasized the service aim as the real objective of industry, since civilization, he said, is based on industry.

Studying Methods of Expert Worker

The "Relation of Fatigue Elimination to Other Activities" was the subject of a dinner meeting of the committee for the elimination of unnecessary fatigue in industry, Dr. Frank B. Gilbreth, Montclair, N. J., presiding. A new and simple teaching device, designed to eliminate fatigue in the transference of skill or in studying the "one best way to do work," was described and illustrated by Dr. Gilbreth. The device was called the Magster, and consisted of an inexpensive stereoscopic viewer of time and motions on moving picture photographs on paper. It is said to have been used to permit investigators and learners alike to see the "super-experts'" methods in infinite detail in a leisurely manner, permitting of maximum degree of transference of skill from the super-expert without personal contact. The device was offered to the engineering and teaching professions without restriction of patent. Dr. L. I. Harris, department of health, City of New York, Prof. K. Spooner, Polytechnic Institute, London, Dr. Uyeno, Univeristy of Tokio, Miss Nellie Swartz, department of labor, State of New York, and Dr. Stanley Kent, were other speakers at this meeting.

The method used by his company in making a financial budget was outlined by A. J. Lutterbach, controller Palmolive Co., Milwaukee, at the evening meeting, Oct. 18, of which J. Parke Channing, vice-president Miami Copper Co., was chairman. In answer to an objection that budget systems work in normal times but not in depressions, Mr. Lutterbach said that this was true to a certain extent, but pointed out that most of the years were normal. It was also brought out that although in his company the budget was made for the period of a year, in some companies a three months' period might be better.

Stimulating Creativeness in the Worker

The need of a budget for the workman was advocated by R. B. Wolf, consulting engineer, New York, in an address on "The Importance of the Elimination of Waste to the Economic Structure." Among the steps pointed out by Mr. Wolf as tending to strengthening of our economic structure were that we should recognize waste as essentially time which has passed when constructive thinking was absent. To reduce this waste to a minimum we must organize our industries so that the thinking process of the workers is stimulated. To present to the workers facts relating to their past performance, was emphasized as essential, particularly noting what they have accomplished in quantity, quality and economy. The facts of past performance must be presented in a way to enable the workers to see the possibilities of the future. Rewards should be so made as not to stimulate acquisitiveness, on the latter it being said that one of our difficulties is that we have assumed the acquisitive, rather than the creative, as the basic instinct. It is only by so doing, Mr. Wolf said, that the worker can be made to see that accomplishment is the cause, and reward the effect. The giving of productive costs to the workers was stated as one effective means of combatting some of the economic fallacies that have crept into certain radical types of organizations. The cost or economy record was advocated as the most effective means of enabling each individual in the plant to be conscious of his relationship to his fellow workmen and to the plant as a whole.

Sherman Rogers, introduced by the chairman as the "lumber jack orator," addressed the meeting on "Short Cuts to Industrial Sanity." Getting spirit into the worker is, he said, the big job in industry to-day, adding that no workingman will make 100 per cent effort until he understands the rules of the game he is working under. Mr. Rogers' talk, which was forceful and direct, may be summarized in his statement: "Mean what you say when you say it. No employer need worry about his labor if he plays fair. We must reach down into the hearts of men."

Executives and Workmen's Views on Cutting Cost

An afternoon was devoted to "Two Important Economic Factors," the first of which to be considered was "How Can We Reduce Production Costs." J. A. Faust, Waltham Watch Co., Waltham, Mass., discussed the topic from the executive's standpoint. The first consideration influencing costs, he pointed out, lies in the ability of the executive properly to conduct the three phases of his business, financing, production and sales. The fundamentals with which the executive is chiefly concerned in reducing costs, such as the reducing of inventories, decreasing turnover times in manufacture, establishing best production methods, reducing the line of products and compensating labor so as to secure the best returns, were outlined. The sales budget was pointed out as an important possibility in the reduction of expenses, the speaker saying that in this there is an interesting field open for careful study, with ample reward for the effort. That economies in manufacture are possible, due to the savings in work in process, and product made obsolete by changed sales schedules was emphasized as furnishing also the basis for intelligent purchases. A specific instance of the reduction of costs along these lines was outlined.

"If you don't give a worker every chance to use his best skill and pay him accordingly, you should not blame him if costs go up for want of a broadened use of his knowledge," said William Geiger, Keratol Co., Newark, N. J., in presenting the reduction of cost from the worker's viewpoint. That workers should be encouraged to notify foremen when tools are not in condition to do fast work, that unused skill of workers is an extravagance and that a shop with a reputation as a good place to work, which results in minimum of expensive labor turnover, were among the cost reducing factors outlined. The necessity of co-operation was emphasized, which, he said, was a willingness to go 50-50 on work and pay. The piece work plan was commended as easy to understand and practical to use if the operation is repeated. Cutting of piece rates made the worker suspicious and in that condition he cannot be a good co-operator. "Fancy plans" for wage payment did not succeed, he said, with the average worker.

Keeping Workers Contented

The second factor considered at this session was "What Keeps Workers Contented?" A plan in which Charles Cheney, Cheney Brothers, South Manchester, Conn., had faith, was the "credit rating" plan. In this the worker is put into a grade or class in which the base rate has been fixed, there being added to this rate various additional factors representing qualities which tend to render him especially valuable as an employee. These are a record for quality and quantity of production, length of service, record of attendance, versatility, etc.

In concluding the session, the chairman, M. Porosky, engineer, Holtzer-Cabot Electric Co., Boston, said that if companies spent half the money to create good will of the workers as they spend in creating the good will of customers, discussions of these subjects would not be necessary.

Selection of Employees

How to develop a more scientific method of selecting people for jobs was the subject of a sectional meeting of the industrial relations group, Earl B. Morgan, manager of employment and service, Curtis Publishing Co., Philadelphia, being chairman. He prophesied that in ten years we will look back at our methods of to-day and wonder how "we got by with them." Having an elaborate reception hall for customers and sending applicants around to the back door, to be met by a watch-

man or clerk, was incomprehensible. "Before you get to selection," he said, "you must have the stage setting right." That interviewers too frequently take a holier-than-thou attitude and seem to be looking for the 100 per cent man was emphasized as a wrong practice.

Balance of types was brought out as an important consideration in taking on help and in this connection it was pointed out that it is as necessary to analyze the executive who was to handle the new employee, his likes and dislikes as to analyze the job. Committee action, or the combined judgment of the personnel executive and the department heads, was said to be a good thing in the case of applicants for high grade jobs. The discussion also brought out that in the matter of selection too little attention is given to the possibilities of the waiting list; that it is good providing the applicants have confidence that they will be sent for in the event of an opening. To what extent the foreman should be consulted in selecting and firing help was a center of discussion. That the foreman can dismiss from his department but not from the factory was the method of some, and in the matter of selection it was stated that it being a 50-50 proposition the interviewer and the foreman should both be equally responsible. Phrenology and so-called character analysis as a yardstick of selection was suggested but did not meet with general approval.

Economic Aspect of Production

One of the notable addresses of the meeting was that of Ernest F Du Brul, general manager of the National Machine Tool Builders' Association. He discussed the "Economic Aspect of Production." He said in part:

When the engineer speaks of production he has in mind fabrication of physical goods. But, in economics, production means the creation of utility whether of time or place or form and presupposes adequate demand. We hear much of the necessity for increasing production. Naturally, if no goods are produced, we have no goods to supply our wants. Only when goods are plentiful can many wants be supplied; if goods are scarce some wants must go unsatisfied.

The gospel of "production and more production," while absolutely true within certain limits, must be recognized as having those limits. It is true only to the extent that production or fabrication can find a use or a profitable market for the goods. Beyond that point we simply waste effort and capital that should be devoted to producing something else that some one wants strongly enough to pay a profitable price to get it. If we take this word production to mean fabrication, regardless of market conditions, we may simply destroy wealth previously accumulated, and at one time held in the form of liquid assets.

Too many think that mere fabrication creates value. We like to think that, because we have invested our costs in goods. We therefore shall get those costs back at a profit. But we overlook the fact that the price we will get will measure the value to the buyer at the time of sale, not the cost to the producer. If we misjudge how low this value will be at the time we are ready to sell, if we do not rightly forecast the state of demand at that time and do not adjust our supply to meet it, we sell at a loss. Mere fabrication of excess goods, no matter how low the cost, cannot bring salvation unless the goods can be sold at a profit. Continued fabrication at times of glut brings ruin to the fabricator and reduces the total wealth of the community.

Then the question comes, "Who must keep all this going?" The economist designates him the entrepreneur or enterpriser. His distinctive function is to take the responsibility and the risk of all this speculative activity; to employ the auxiliaries, labor, capital, inventor, management. He is the one to render the final decision, to say "go" or "stop"; his to stand [illegible] the profits that the rest of the world envies him too much. The progress of the world in the past has been gained only because some men were willing to risk money in new and untried ventures. As it has always been, it always will be, because human [illegible] existing things. The man who risks is the only one who really initiates, who starts things going and keeps them going till [illegible].

Without him the world would soon go back to barbarism. Yet the world envies the few conspicuous successes to whom its own progress is due. Weighing all his losses against his gains, it is the wonder of the age that men should be [illegible]

own, because demand works back and forth between interdependent industries. Therefore proper forecasting involves the study by an industry of its own conditions and their correlation with the facts of other industries. In this country we have had various destructive projects proposed by big men in business, like the Ford and Edison and Durant schemes of currency and credit. We likewise have had some notable business smash-ups, to the tune of $750,000,000 of liabilities last year. Much more was lost by those who did not smash, but were able to survive the tidal wave of deflation. The biggest and most failures were among manufacturers of various kinds, fabricators of goods. Do these failures not indicate that something is very wrong in the economics these men applied in management? Business gets into such a state because business managers start out on false premises due to incomplete knowledge of economic theory.

There is an oft quoted saying of Emerson's to the effect that, if a man produce a better mouse trap, he would have a path beaten to his door by eager purchasers, even though he lived in the depth of a wood, remote from other men. The unction with which this is so often flung out shows how a fallacious half truth takes root in peoples' minds, if some prominent man first utter it in kindergarten language. But as a business man he never finds paths beaten by buyers to a door where there never has been any advertising done, or any selling effort made. This Emersonian saying utterly neglects the important influence of marketing, with all its intricate problems of publicity, distribution, finance and its manipulation and stimulation of demand.

Because fabrication is not distinguished from production of utility of time and place as well as of form, we hear the cries, "The producer gets too little out of what the user finally pays" and "Labor produces all wealth." This emphasis on fabrication gets men into the bad habit of considering that in fabricating goods they produce value, and just by fabricating or growing something they acquire a right to demand other goods or services in return for theirs.

The usual fabrication man has another impression that many production engineers confirm in his mind, which is, "the more the output of a plant, the lower the cost and the greater the profit." Here he slips again in logic, because often the cost is higher, and even though the cost may be lower, it does not necessarily follow that the profit will be greater in all cases. But then he has another fragment of economics in mind, and retorts, "The lower the price the larger the market, and you enlarge your profit by greater volume." Yet, in fact, at times the market gets smaller when prices are falling and larger when prices are rising.

In the closing discussion, Friday afternoon, Oct. 20, one speaker brought out the value of the work of the industrial engineer by relating in some detail an experience he had had with a plant which in 1919 had found itself short of manufacturing facilities. The management had determined to double the plant, both as to buildings and machinery, in order to take care of a potential demand calling for double the production then being turned out. The industrial engineer who was called in advised the management rather to organize the present plant and equipment on a higher production basis, and to depend upon the unexpanded plant for the extra production. Ultimately this advice was followed. The production was expanded some 25 per cent, after which demand fell off, due to the coming on of the "buyer's strike," and the company had been saved an enormous expenditure for new buildings and plant, which could not have been erected in time for the demand which existed and could not have found employment when the demand fell.

Material Handling Session a Feature

A material handling session, taking for its subject "the application of economics to material handling for the purpose of reducing cost and increasing production," was a feature of the meeting. The shortage of the available human power applicable to industry, the great change in the amount of available male muscle since the war, was brought out by the chairman, R. A. Wentworth, manufacturing manager Barrett Co., New York, who pointed out that in material handling we have a new opportunity, which, he added, the material handling men are grasping.

A talk that was received with great interest was that of M. R. Dennison, superintendent of stores division of the Studebaker Corporation, on the subject of trucks and tractors. He outlined some of the accomplishments at the South Bend works of his company. The seven divisions of the plant and the crane equipment and special hoisting devices were described. Hand

labor, he said, has been eliminated except for short hauls of 2 ft., and close attention to handling of bulk materials, such as pig iron, gave a greater field of economy than others. In the descriptions of how purchased finished materials were handled he said that they had an arrangement with the supplier by which the racks in which the materials are shipped are utilized in receiving and storing the materials. All finished material taken above the first floor is handled by cranes, no elevators being used. The machine shop which is 500 x 520 ft., has an inspection bay in the center, the work moving toward the center and only two hand trucks are employed, conveyors of all types being used. Emphasis was placed on the handling of waste material, which, he pointed out, is one phase of material handling usually overlooked. At the South Bend plant a tunnel equipped with a conveyor receives the borings and turnings which are delivered to trucks. One tractor is devoted to this use, and cranes are used to place the boxes in the cars, not one man touching the waste material. "The real contributing cause of successful operation of this system was layout and planning, not only in material handling, but on all the operations," Mr. Dennison said in conclusion.

Under the title of "Overhead Conveyors" W. C. Hoover, engineer of the B. F. Goodrich Co., Akron, Ohio, outlined the system of conveyors used in making up batches in his company's plant.

A talk on portable elevators or tiering machines was given by M. W. Potts, construction engineer. One installation was a portable elevator having a power hacksaw mounted on it, the hacksaw being elevated to the storage rack and used to cut off lengths from the bar and the bar left on the rack. This arrangement was said to have saved a great deal of handling. The use of portable elevators in handling punch press dies was outlined, and in the motion pictures that followed the handling of dies from storage to the punch presses, and the handling of toteboxes at the plant of the Seng Co., Chicago, were shown. The loading of wire on cars at the works of the Interstate Iron & Steel Co., was also shown, this installation being said to have reduced the time of loading a car from 2½ to 1 hr.

The use of steel belt conveyors was described by Harry Carlson, Sandvik Steel, Inc., New York. The ease of installation, the rust resistant properties of the belt, and simplicity with which material can be discharged at any point along the conveyor without the use of expensive trippers, were among the features outlined. Mr. Carlson's talk was illustrated with lantern slides, which showed actual installation in handling a variety of materials. Details of design brought out that the speed of the steel belt varies from 135 to 300 ft. per min., the average being 200 ft. Inclines vary with the material handled and is from 1 to 4 for a smooth belt which has to be scraped off for unloading. If terminal unloading only is used slats can be attached to the belt and the inclined increased to about 1 in 2.75.

A talk on the design and use of gravity conveyors was given by W. P. Stivey, Philadelphia. Among the points brought out was that if portable gravity conveyors were made too heavy to handle, they will not be used. The necessity of putting the right machine in the right place was emphasized, illustrations of heavy units for light work being given, Mr. Stiver remarking that there are more misfits in this than in any other line of equipment. That most people do not buy gravity conveyors with rollers close enough together and buyers usually do not allow enough grade, were brought out. He also advocated the use of more boosters than usually found. His talk also covered helical chutes, the principle underlying the action of which was explained. Use of various installations of gravity conveyors for use with such chutes were given, and these included installations for round packages with the rollers of cast iron and concave.

In summarizing, Mr. Stiver gave eight principles underlying the successful installations of gravity conveyors. He said that a prospective user of this equipment should know the various types of equipment in use and available for his use and a study of the routing conditions was very necessary. No other job requires more study, he said, adding that to get the best results there should be close co-operation between the manufacturer and the engineer. That the layout for the conveyors should be considered when the buildings are being planned was emphasized, Mr. Stiver stating that they are the first thing that should be designed, the house being built around the handling of material. The making of changes with the same care that is put in the original installation was emphasized, as well as teaching the use of the equipment, especially to the foreman on the job. Regarding the maintenance, he said that a conveyor is usually nobody's pet and everyone's hobby horse, and advocated making some one person responsible for its condition.

Exhibition Features

An exhibit was held in a room close to that in which the main sessions were held, 20 companies showing various products, including material handling equipment.

The Standard Conveyor Co., North St. Paul, Minn., displayed a miniature model of a conveyor system made up of a helical chute, belt and gravity conveyors, inclined-slat conveyor and an automatic straight-lift elevator. These were assembled in one unit, which was in operation showing how boxes are raised and lowered and conveyed in industrial plants. Samples of ball bearings and different sizes of rollers and samples of pneumatic tubes, were also included. Sections of its gravity conveyor, showing patented differential curve and various pneumatic tube carriers were shown by the Lamson Co., Boston, as well as photographs of various installations of its equipment and a moving picture entitled "Multiplying Man Power." A model of an actual installation of steel belt conveyor, with all units 1/20 actual size, and combining inclined and horizontal drive in one unit was shown in operation by Sandvik Steel, Inc., 233 Broadway, New York. Specimens of steel belts were also displayed, one of which had been in use out of doors 3373 hr. and was still in good condition.

The Mercury Mfg. Co., Chicago, had a photographic exhibit, showing views of component parts of tractors and trailers, and actual operation of its trackless trains in various railroad, steamship and manufacturing plants were shown by moving pictures. A model of its portable scoop conveyor was shown in operation by the Portable Machinery Co., Passaic, N. J., photographs of the conveyor in actual use also being shown. A telescoping portable elevator, known as the Little Lifter and operating from a lamp socket, was demonstrated by the Economy Engineering Co., Chicago, and a demonstrating board, showing typical fire alarm, watchmen, and telephone systems in operation, was displayed by the Holtzer-Cabot Electric Co., Boston. Other exhibits of this company included horns, vibrating bells for signal systems, radio headsets, telephone systems and audible calling systems for shop use. A large exhibit was that of the Toledo Scale Co., Toledo, Ohio, scales of various kinds being displayed. A model showing the head mechanism of the heavy capacity scales and a model showing the construction of the platform, lever, and suspension bearing, were features of interest. The exhibit also included automatic counting scales, a long column portable scale, and a short column portable scale arranged to be elevated to different heights. A large photographic exhibit of various installations of the company's weighing and counting equipment was on view.

Industrial systems for tool checks, tool inventories, cost records, perpetual inventories, stock keeping, production control, machine control, and various types of carbon factory forms were shown by the McCaskey Register Co. The Educational Exhibition Co., Providence, displayed models and samples of various types of graphic control, including production, locating supplies, sales, etc. In industrial seating, the C. A. Cook Co., Cambridge, Mass., exhibited adjustable-back spring chairs, and the Royal Metal Mfg. Co., Chicago, its Royal-Chicago factory chair.

The production men of the Society of Automotive Engineers will hold a two days' convention, Oct. 26-27, at the General Motors Building, Detroit. Pierre S. du Pont, president General Motors Corporation, will be the guest of honor.

FRENCH MARKET QUIETER

Prices Still Firm, But Domestic Demands Slacken —Export Market on Sheets Strong

PARIS, Oct. 12.—Although the iron and steel market has lost none of its inner firmness and prices are well maintained, there is undoubtedly, since the beginning of October, a slackening of demand in the domestic market. Among the causes that have brought about this change are the end of the building season and the fact that dealers, having replenished stocks during August and September, are no longer open to new business.

August production of pig iron and steel was as follows:

	Tons
[illegible]	[illegible]
[illegible]	[illegible]

August pig iron output was made up as follows:

	Metric Tons
Pig iron for refining (fonte d'affinage)	20,435
[illegible]	[illegible]
[illegible]	[illegible]
Basic iron	308,807
[illegible]	[illegible]

The steel production for August, 378,073 metric tons of ingot and 18,460 metric tons of castings, was made up as follows:

	Metric Tons
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
Crucible steel	477
[illegible]	[illegible]

From Jan. 1, to Aug. 31, 1922, France produced 3,136,482 metric tons of pig iron and 2,809,703 metric tons of steel.

Iron Ore.—The iron ore market is improving. Hope is entertained that Germany will shortly increase her imports of French ore. Although the minette from Lorraine is a much poorer grade than the Canadian ores recently purchased by Germany, it is much cheaper and Westphalian iron works are accustomed to using it on a large scale. The recent decrease of French ore transportation rates for export is expected to be of assistance. Negotiations opened a few months ago with certain consumers of the Cleveland district in Great Britain for shipment of French Lorraine ore, have just been reopened.

Pig Iron.—The August production, 447,000 metric tons, which might easily be doubled if France disposed of an adequate supply of coke, is sufficient to meet the home requirements, but insufficient to permit France to cut a real figure in export markets. There is practically no stock of foundry pig iron. However, the demand has quieted down, and the quotation of 230 fr. for chill cast foundry iron No. 3 P. L., which was made for October delivery, has not been upheld. The present price is 225 fr. A slackening of the demand for hematite iron is also to be observed. A few orders have been booked for the United States, Switzerland and Italy. Prices vary, according to district, from 280 to [illegible] If this price is compared with that of 320 to 325 fr. f.o.t. Dunkirk quoted for British hematite, it will be seen that the British product is out of competition for the present. Some French hematite has been sold at 310 fr., delivered Havre.

Semi-Finished Steel.—Inquiry has receded, but prices remain firm for basic steel, per metric ton at producing works in the East or in Lorraine, as follows:

	Fr.
Ingots	315
Blooms	325
Billets	330 to 335
Sheet billets	385 to 390

Beams.—The Comptoir Sidérurgique, which controls the domestic sales of beams and rails, booked, in September, orders for beams totaling about 60,000 tons, a record figure for this year. However, it is not probable that at the next meeting of the Comptoir the base price of beams will be raised beyond the present level of 475 fr. For export, the price of beams is 380 to 400 fr. (Belgian currency) f.o.b. Antwerp.

Rails.—The rail market is calm. Practically the only business being done is for light rails (not controlled by the Comptoir) at 400 fr. per ton f.o.b. producers' works, Lorraine. For export, the price of heavy rails is 410 to 420 fr. (Belgian currency) f.o.b. Antwerp.

Sheets.—The situation continues excellent. Foreign competition is almost non-existent from Great Britain, because of the high value of the pound sterling and from Belgium in consequence of a recent price increase. French works not in the Comptoir are quoting prices which closely follow those of the Comptoir. Delays of delivery on light sheets are extending and now average about three months.

Rolled Merchant Iron.—A reduction in demand is noticeable. The present average price is 445 fr. at producers' works. For export, basic shapes from Lorraine are now quoted 380 to 400 fr. (Belgian currency), f.o.b. Antwerp.

Iron Wire.—This product exhibits a rising tendency. The present price is 480 to 490 fr. at producing works in Lorraine.

Castings.—Slackening of orders, which is to be observed in almost all departments, has spread to the castings line. The French State Railways have recently accepted a tender for ten turntables of cast pig-iron, of an aggregate weight of 31 tons, at 622 fr. per ton.

Malleable iron castings continue in a favorable position, through a revival in the automobile trade.

Revision of French Duties Proposed

The proposed revision of the present coefficients on French import duties has been submitted by the French customs authorities to the Minister of Commerce, who instituted an inquiry among metallurgists. The metallurgists have suggested the following modifications:

Phosphoric pig iron: The present coefficient of 2 should be maintained, instead of being reduced to 1.8, as proposed.

Ferromanganese: The present coefficient of 6.3 should not be reduced below 4.

On plain sheets: The following coefficients are suggested: 3 mm. and heavier, 2; 1 to 2 mm., 2.5; 6/10 to 1 mm., 2.6; 4/10 to 6/10 mm., 2.8; less than 4/10, 3.

Mechanical Engineers' Annual Meeting in December

The tentative program lists twenty sessions for the forty-third annual meeting of the American Society of Mechanical Engineers, which will be held in New York Dec. 4 to 7, inclusive. The outstanding feature will be a session to be held Wednesday evening, Dec. 6, with a program presented jointly by the American Economic Association and the management division of the American Society of Mechanical Engineers. Dr. Wesley C. Mitchell of the National Bureau of Economic Research will make an address on the subject, "Making Money and Making Goods," and E. M. Herr, president Westinghouse Electric & Mfg. Co., will talk on the "Human Problem in Industry."

Joint sessions will be held also with the American Society of Refrigerating Engineers, the American Society of Safety Engineers and the Stoker Manufacturers' Association.

Three of the standing committees are contributing to the program as follows: The research committee will have two sessions, one at which five papers relating to researches in progress will be given, and the other at which research work in connection with the new steam tables will be discussed. The standardization committee will present a program relating to the system of preferred numbers, which, it is expected, will be of great value to standardization procedure. At the session on training for the industries, reports will be presented on phases of this work.

The Electric Power Club, the commercial organization of electrical manufacturers, will hold a meeting Oct. 30 to Nov. 2, inclusive, at the Grove Park Inn, Asheville, N. C.

EXPORT MARKET DULL

Japanese Sell American Steel at Less Than Current Prices—German Iron Offered to United States

NEW YORK, Oct. 24.—The general dullness in various foreign markets is attributed by most exporters to varied causes. Japan, which until the past few weeks has been the principal and practically the only export market of any importance for American sellers, has suddenly become quiet as a result of the decline in Government and municipal buying. The financial situation in Japan makes it exceedingly difficult for the small merchant to establish letters of credit and stocks of material in greatest demand are on hand. Also low quotations are being received from European iron and steel producing countries. A peculiar situation exists in the Japanese market on light gage black sheets, 13 to the bundle. Because of the large stocks on hand and the general depression in buying, the same brand of sheets that is now being quoted at about $95 per ton, c.i.f. Japanese port by the American seller is selling at $85 per ton and less, out of stocks carried in Japan.

On steel products generally the exporter to Japan is now meeting a strongly developed competition from the Government steel works, which is stated to have piled about 75,000 tons of its products and, being anxious to reduce this stock, is strongly inclined to shade prices. Buyers of bars are offered European material at £9 6s and as low as £9 per ton, c.i.f. port. European black sheets have also been lower in price and there has been some buying in Continental markets, but this business is reported to have declined, preference evidently being for the American product.

Offerings from Stocks at Low Prices

As an example of the depths to which the Japanese market has declined, the following quotations out of stock in Japan, prevailing about Oct. 1, are noteworthy:

	Yen	Dollars
Mild steel bars, round and square, ½, 5/16, ⅜ and ⅝ in., per ton	116 to 116	[illegible]
Blue annealed sheets, 1/16 in. thick, per ton—		
British	127	61.20
American	154	74.57
Steel plates, ¼ in. and heavier, per ton	100 to 102	48.18 to 49.14
Black sheets, 13 sheets to bundle of 112 lb., per ton—		
British, 62 sen per sheet		69.34
American, 67 sen per sheet		74.87
Wire nails, Tokio assortment, piece keg	11	5.30
Tin plate, 100-lb. box	11	5.30
Wire, galvanized, No. 8, B.W.G., per ton	154	74.57
Wire rod, low carbon, No. 5, B.W.G., per ton	102	49.14

Among recent purchases from Japan, the largest noted is an order for 34,000 boxes of oil can tin plate placed by the Nippon Oil Co. with Mitsui & Co., New York, which awarded the business to the Jones & Laughlin Steel Co. Another smaller order for canning tin plate, about 6000 boxes, has also been placed with an American mill, the purchase being made by the Mitsubishi Shoji Kaisha, 120 Broadway, New York, for its fishing company subsidiary, the "Hokuyo" at Kamchatka. The recent tender of the Imperial Government Railways on more than 9000 tons of couplers, totaling about 66,000 pieces, was divided equally between Frazar & Co. and Okura & Co. of New York. No new rail inquiries from Japan are noted. The Imperial Government Railways has asked for bids on about 500 tons of flat bars.

Despite the present dullness, it is believed that a gradual improvement is under way and that next spring will see at least some renewal of sheet buying. Taking an optimistic view of export business, the United States Department of Commerce says of the Far East: "Conditions in the Orient to-day are better than they have been at any time since 1920. Japan is steadily pulling herself out of the slough of economic despond into which she fell in May, 1920."

In China a widespread apathy to all kinds of buying is evident. Shading quotations, according to exporters doing business in this market, has no apparent effect on the customer. This is generally explained by those in touch with the prevailing situation as due to the uncertain political conditions, which are still practically as unsettled as they were several months ago. Lower quotations from European sellers and a belief that the American market will probably see another recession of prices are also attributed as causes of the present lack of interest in purchasing. There is still some activity reported in wire shorts, which, as a rule are always in demand. One exporter has just shipped 350 tons. Commenting on the Chinese situation, Julius Klein, director of the Bureau of Foreign and Domestic Commerce, says: "Business in China is getting better and the recovery will be aided as the foreign demand for that country's products improves and the strain on Chinese purchasing power, due to the unusual drain of invisible exports experienced during 1921, is relaxed."

The Philippines are also quiet in purchasing, compared with recent activity. One exporter to the Far East is negotiating on about 400 tons of relaying rails for the Philippines, which is about the only inquiry of importance on his books from this source.

Pig Iron Imports Show Improvement

Imports of both iron ore and pig iron are improving, says one large importer. Of iron ore, this interest reports the sale of two cargoes (about 5000 tons to a cargo) of ore to the Dominion Iron & Steel Co. in Canada and two cargoes of ore to two different consumers in the United States. Quotations on North African iron ore are now 11c. per unit, c.i.f. Atlantic port.

A large portion of the pig iron imported recently from the Continent, according to this importer was of French origin. The French market, however, has risen rapidly in the past few weeks and the price is now so high as to make French iron difficult to import. During the past few days German pig iron has appeared and this importer reports some business and prospects for more with iron of German origin. The average analysis of this iron, which can be sold at about $26.75 per ton, c.i.f. New York, or less on large tonnages is: Sil., 1.75 to 2.25 per cent; sul. max., 0.05; mn., 0.40 to 0.90; and phos., 0.40 to 0.90. Although high in phosphorus, it is said to be about on a par with the French product. A consumer of pig iron reports having recently purchased 500 tons of Belgian iron, at a price per ton well below the current market on both domestic and imported iron, and has found the iron of good quality and true to analysis. Manganese ore from the Caucasus is now quoted c.i.f. Atlantic port at 27c. per unit for ordinary and 29c. per unit for washed ore.

Steel Industry in Soviet Russia

According to Soviet official periodicals received by the Department of Commerce, for the accuracy of which the department assumes no responsibility, the production of pig iron in the three principal metallurgical regions of Soviet Russia for the first six months of 1922 was 87,100 gross tons, representing an increase of 51 per cent over the corresponding period of 1921. The year's output in the pre-war year of 1913 was 4,145,000 tons. The three districts also produced, according to the Soviet papers, 9,963,000 poods of open-hearth ingots and 7,646,000 poods of rolled steel.

During the first half of 1921 Ural supplied 69 per cent of all pig iron, while the blast furnaces of the South yielded only 11 per cent and those of the Center 20 per cent. During the corresponding period of 1922 the blast furnaces of the Ural supplied 44 per cent and the South 40 per cent.

At the coming election, Nov. 7, Detroit voters will be asked to decide the proposed bonding of $1,900,000 for additional county buildings and an issue of $5,000,000 of public utility bonds for the purpose of making extensions, additions and betterments to the municipal car service.

Iron and Steel Markets

BETTER STEEL MOVEMENT

Coke and Pig Iron Prices Recede Further

Heavy Finished Steel Products Commonly at 2 Cents—Inquiries for 20,000 Cars

Railroad service is unmistakably better in some iron and steel districts, though little improved in others, but few consumers are suffering from lack of steel, and in nearly all markets prices show irregularity.

There is pressure upon the mills, as heretofore, but it is now chiefly from consumers who want delivery of their low priced contract steel, whereas a few weeks ago a price was paid to make sure of getting the steel.

Pittsburgh is still conspicuous for car troubles, but consumers have adjusted themselves to the use of trucks and other measures for the relief of mill congestion.

The bulk of the new business, particularly in the heavier rolled products, is still coming from the railroads, which while pressing car builders for deliveries, are holding out little hope of better service to steel mills.

Fresh inquiries from seven railroads have added fully 20,000 cars to the lists under negotiation and the year promises already to exceed the average of the preceding ten years by 40 per cent. There are new inquiries for 224 locomotives.

Labor conditions are not uniform. At Pittsburgh the supply of common labor is slightly better, in view of the turning of some men to indoor work for the winter. Reports of further steel mill wage advances are without confirmation. Chicago reports that not only are iron and steel works laborers scarce but the production per man is declining, while at the same time some industries are taking labor away from others by bidding up wages.

The price situation in finished steel is summed up in the statement coming from various market centers that plates, shapes and bars are more generally quoted at 2c., Pittsburgh. Consumers are more pointedly seeking lower prices and some especially competitive business in bars went at 1.95c. The extent to which 2c. has been done on plates is a matter of comment. Car works have had further concessions.

Sheet prices have eased off to the extent that independent mills which lately were about $3 a ton higher are now quoting the Steel Corporation's schedule of 3.35c. for black and 4.35c. for galvanized. Demand has fallen off and a number of sheet mills can now make better delivery promises.

Inability to accumulate coal reserves for the winter causes concern to the mills. The amount now in storage would carry them through but a few days of severe weather and the chances are small of getting together an adequate stock before winter sets in.

Coke has yielded further, going as low as $8 for prompt delivery late last week, but $8.50 to $9 is the range on contract furnace coke for delivery to the end of the year.

The buying of 15,000 tons of basic by an Ohio steel company was the chief transaction of a quiet week in pig iron. At Chicago the market seems to be fairly firm at recent quotations, but in Pittsburgh and the East foundry grades are weak and in line with the decline in coke prices have receded from $1 to $2. Decided softness developed at Buffalo. The tendency in foreign iron is also downward, and there is no difficulty in getting prompt delivery, though there are still complaints of congestion at some railroad centers, especially in the East. Foreign iron is pressing for sale at the Eastern seaboard, German iron being offered at new low prices without sale.

The United States Steel Products Co. has taken a contract for 3000 tons of steel for the Santa Luscia bridge in Uruguay, in competition with British, German, French and Belgian fabricators.

Steel bars are quoted in Berlin at 81,200 m., equivalent to 0.94c. per lb. at current exchange of 2⅜c. per 100 m.

THE IRON AGE pig iron composite has continued its drop from the high price at the end of September, being now $30.02 per gross ton. This compares with $19.97 one year ago and with $42.76 two years ago.

No such peak in prices has been shown in steel as in pig iron, the extreme movement of steel in the last ten weeks being less than 2 per cent of the mean price while in pig iron it has been 10 per cent.

Pittsburgh

Sharp Declines in Pig Iron—Steel Pipe Price Advanced

PITTSBURGH, Oct. 24.—The tendency of finished steel prices still is in the direction of what have hitherto been regarded as minimum levels, this being notably true of the heavy tonnage products, sales of which at more than 2c. have become merely a matter of small tonnages and to meet requirements where immediate delivery is essential. Carload lots of bars still are occasionally being sold as high as 2.25c., Pittsburgh, but where delivery is a matter of three or four weeks and a fair sized tonnage is wanted, the market is 2c. Conditions in plates are much the same, and on shapes there seems to be little or no business at higher than 2c. The Steel Corporation still is considerably behind in its deliveries on these products and unable to take business except for deliveries at its convenience, and on such business as it has recently taken its price is 2c., Pittsburgh. Sales of sheets above the recognized market minimum of prices have become rather difficult in the past week or so. Contrary to the drift of other products is an advance of $4 per ton on all classes of steel pipe, effective Oct. 19, announced by the National Tube Co. and subsequently followed by leading independent makers.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton.	Oct. 24 1922	Oct. 17 1922	Sept. 26, 1922	Oct. 26, 1921
No. 2X, Philadelphia	*$32.11*	$33.11	$31.26	$22.81
No. 2, Valley furnace†	*31.00*	32.50	33.00	21.00
No. 2, Southern, Cin'ti†	*31.05*	31.55	31.05	23.50
No. 2, Birmingham, Ala.†	*27.00*	27.50	27.00	19.00
No. 2 foundry, Chicago*	31.00	31.00	32.00	21.00
Basic, del'd, eastern Pa.	29.50	29.50	29.00	20.50
Basic, Valley furnace	30.00	30.00	34.00	19.00
Valley Bessemer, del. P'gh	*34.77*	35.27	35.77	21.96
Malleable, Chicago*	31.00	31.00	32.00	21.00
Malleable, Valley	*32.00*	32.00	34.00	20.50
Gray forge, Pittsburgh	*32.27*	32.77	34.27	21.96
L. S. charcoal, Chicago	36.15	36.15	36.15	31.50
Ferromanganese, furnace	**100.00**	**67.50	**67.50	**60.00

Rails, Billets, etc., Per Gross Ton.				
O.-h. rails, heavy, at mill	$43.00	$43.00	$40.00	$40.00
Bess. billets, Pittsburgh	40.00	40.00	40.00	29.00
O.-h. billets, Pittsburgh	40.00	40.00	40.00	29.00
O.-h. sheet bars, P'gh	40.00	40.00	40.00	30.00
Forging billets, base, P'gh	45.00	45.00	45.00	35.00
O.-h. billets, Phila.	45.17	45.17	45.17	34.74
Wire rods, Pittsburgh	45.00	45.00	45.00	40.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	2.00	2.00	2.00	1.60
Light rails at mill	2.00	2.00	2.25	1.70

Finished Iron and Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	*2.325*	2.475	2.475	1.95
Iron bars, Chicago	2.50	2.50	2.25	1.75
Steel bars, Pittsburgh	2.00	2.00	2.00	1.50
Steel bars, Chicago	2.10	2.10	2.10	1.75
Steel bars, New York	2.34	2.34	2.44	1.80
Tank plates, Pittsburgh	*2.00*	2.15	2.25	1.60
Tank plates, Chicago	2.30	2.30	2.30	1.75
Tank plates, New York	2.34	2.34	2.49	1.88
Beams, Pittsburgh	2.00	2.00	2.00	1.60
Beams, Chicago	2.20	2.20	2.20	1.75
Beams, New York	2.34	2.34	2.44	1.88
Steel hoops, Pittsburgh	2.90	2.90	2.75	2.25

**C.i.f.

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Sheets, Nails and Wire, *Per Lb. to Large Buyers:*	Oct. 24, 1922 Cents	Oct. 17, 1922 Cents	Sept. 26, 1922 Cents	Oct. 26, 1921 Cents
Sheets, black, No. 28, P'gh	3.50	3.50	3.35	3.00
Sheets, galv., No. 28, P'gh	4.50	4.50	4.35	4.00
Sheets, blue an'l'd, 9 & 10	2.60	2.60	2.50	2.25
Wire nails, Pittsburgh	2.70	2.70	2.70	2.80
Plain wire, Pittsburgh	2.45	2.45	2.45	2.60
Barbed wire, galv., P'gh	3.35	3.35	3.35	3.55
Tin plate, 100-lb. box, P'gh	$4.75	$4.75	$4.75	$5.00

Old Material, Per Gross Ton:				
Carwheels, Chicago	*$25.50*	$25.00	$24.50	$16.50
Carwheels, Philadelphia	*22.50*	23.00	23.00	17.00
Heavy steel scrap, P'gh	*21.00*	21.50	21.50	14.50
Heavy steel scrap, Phila.	*17.50*	18.00	18.00	12.00
Heavy steel scrap, Ch'go	18.50	18.50	18.50	12.00
No. 1 cast, Pittsburgh	24.00	24.00	24.00	17.50
No. 1 cast, Philadelphia	*22.00*	23.00	23.00	17.50
No. 1 cast, Ch'go (net ton)	*20.50*	21.00	21.00	14.00
No. 1 RR. wrot, Phila.	22.00	22.00	22.00	16.00
No. 1 RR. wrot, Ch'go (net)	*17.50*	17.75	17.50	13.00

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	*$8.50*	$10.00	$12.00	$3.25
Foundry coke, prompt	*10.50*	12.00	13.00	4.25

Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York	14.12½	14.12½	14.25	13.00
Electrolytic copper, refinery	13.62½	13.62½	13.75	12.75
Zinc, St. Louis	**7.00**	6.85	6.87½	4.60
Zinc, New York	**7.35**	7.20	7.22½	5.10
Lead, St. Louis	**6.40**	6.35	6.25	4.40
Lead, New York	6.65	6.65	6.50	4.70
Tin (Straits), New York	**35.25**	34.50	32.50	28.50
Antimony (Asiatic), N. Y.	6.75	6.75	6.75	4.85

Composite Price, Oct. 24, 1922, Finished Steel, 2.467c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 85 per cent of the United States output of finished steel

Oct. 17, 1922,	2.460c.
Sept. 26, 1922,	2.433c.
Oct. 25, 1921,	2.177c.
10-year pre-war average,	1.689c.

Composite Price, Oct. 24, 1922, Pig Iron, $30.02 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Oct. 17, 1922,	$30.27
Sept. 26, 1922,	32.54
Oct. 25, 1921,	19.97
10-year pre-war average,	15.72

That maximum prices are disappearing is not hard to understand in view of the weaker tendency of fuel prices, which is finding reflection in pig iron values, and in turn shows in a softer undertone to the market for semi-finished steel. Buyers usually hesitate when prices lean in their favor, and the present is no exception to the rule. Evidently, however, buyers are not looking for prices to decline materially, at least not below the average of the orders they have in with the mills, and they continue to specify steadily. Cancellations are unknown and while the back log of business is not especially well distributed among the various producers, it is believed on the whole to be sufficient to keep capacity engaged at its present rate of more than 70 per cent well over the remainder of this year. Car shortages and railroad transportation conditions still are bothersome, but on the whole no worse than they were recently, and possibly the situation is slightly better, save in the case of pipe, some makers of which still are piling product because of lack of cars.

The labor situation appears to be a trifle easier, due to the fact that a good many men are beginning to seek indoor work for the winter. The coke market has added another $1.50 per ton to the declines recorded in the two preceding weeks. While the scrap market is holding fairly well on the better grades of railroad material, it is not at all strong on ordinary grades, and the decline in pig iron prices has begun to have the effect of making dealers a little more anxious for business.

Pig Iron.—Melters still are in a hesitant mood, because they expect lower prices on account of the decline in coke, and very little business has been done in this market. The market on Valley basic iron appears to have been established for the present at $30, as a result of a sale to a central Ohio steel company of 10,000 tons on that basis by a Cleveland interest, and 5000 by a Valley producer at the same price. Foundry iron from Valley furnaces now is being offered at from $31 to $32 for the base grade, a drop of $1.50 to $2 per ton as compared with the quotations of a week ago, but the new figures are largely an adjustment of the market

to the lower coke prices, and demand being very limited, are not supported by many sales. Valley Bessemer iron is off 50c. per ton, to $33, furnace, but only small sales have been made at this figure and it is probable that a sizable inquiry would bring down the price. Malleable iron is quoted at $32, Valley furnace, but this is an appraisal in keeping with lower fuel costs. The Wheeling Steel Corporation has turned on the blast at its Top Mill furnace in Wheeling. This is the only addition to the list of active furnaces in this and nearby districts in the past week, but repairs to the one remaining idle stack of the Jones & Laughlin Steel Co. are nearing completion, and this furnace is expected to be in blast about the middle of November. There are now 86 out of a total of 139 furnaces in blast in this and nearby districts.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being

Ferroalloys.—Domestic producers of ferromanganese late last week announced they were prepared to take orders on a limited tonnage of 78 to 82 per cent material at $100, furnace. In the case of one producer, this means a delivered price Pittsburgh common rate points of $104.79, while with another, the delivered price will be $104.91. Neither maker is in production and the offerings are of tonnages held in stock. No sales are reported, although the price named is slightly less than the delivered price of British material which at $101.10, Atlantic seaboard, duty paid, would be $105.89, Pittsburgh. Most consumers are well covered against their requirements over the remainder of the year and demands are few and usually for single carloads. Spiegeleisen is slow and easy. We note one sale of 100 tons of 20 per cent material at $38, furnace. Interest in 50 per cent ferrosilicon is very limited and while producers now are quoting $70 to $75, delivered, or its equivalent, when sold f.o.b. furnace, these prices have found little basis in sales. Most users are covered f..r the remainder of the year at much lower prices and are not yet showing much interest in their needs beyond Jan. 1. There are occasional sales of ferrotungsten at 90c. to $1 per lb. contained tungsten, f.o.b. makers' works and of ferrochrome at 12c. to 14c. per lb. contained chromium for 4 to 6 per cent carbon alloy, f.o.b. makers' works.

We quote 80 per cent ferromanganese at $100, furnace, or $104.79 to $104.91 delivered Pittsburgh district for domestic and $67.50 c.i.f. Atlantic seaboard, equal to $105.89, duty paid, delivered, for British. Average 20 per cent spiegeleisen, $38 furnace; 16 to 19 per cent, $37; 50 per cent ferrosilicon, domestic, $70 to $75, delivered. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, $50.50; 11 per cent, $53.80; 12 per cent, $57.10; 13 per cent, $61.10; 14 per cent, $64.10; silvery iron, 6 per cent, $39; 7 per cent, $40; 8 per cent, $41.50; 9 per cent, $43.50; 10 per cent, $45.50; 11 per cent, $48.80; 12 per cent, $52.10. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $3.66 per gross ton.

Wire Rods.—There is a very fair demand and sales still are reported by independent producers at $47.50 for the base size of soft rods. Business from regular customers of these mills is not priced above $45 and deliveries are being made on old orders carrying still lower prices.

to domestic consumers, $45 to $47.50; chain rods, $45 [illegible] bolt rods and other rods of that character, $45 to $47.50; high carbon rods, $52 to $57.50, depending on carbon, per gross ton, f.o.b. Pittsburgh or Youngstown.

Billets, Sheet Bars and Slabs.—Recent big purchases of sheet bars in the Youngstown district, which have been supplemented by an additional purchase of 5000 tons, making a total of 20,000 tons, all for early delivery, temporarily at least have stayed the downward tendency of prices. This business was all at $40, Youngstown, but it is doubtful whether more tonnages now could be sold at that price, Pittsburgh or Youngstown. Producers, who did not share in this business are understood to have available supplies and while asking $40, would consider firm bids of less. The asking price on billets and slabs still is $40, Pittsburgh or Youngstown, but the market is untested. It is reported that 5000 tons of Bessemer billets are being sought for conversion into skelp, but the company mentioned as the probable buyer denies having made the inquiry. Buyers generally are cautious, because of the uncertainty which exists as to first quarter of 1923 price for finished products, while the weaker tendency in pig iron encourages expectations of lower semi-finished steel prices.

We quote 4 x 4-in. soft Bessemer and open-hearth billets, $40; 2 x 2-in. billets, $40; Bessemer sheet bars, $40; open-hearth sheet bars, $40; slabs, $40; forging billets, ordinary carbons, $45 to $47, all f.o.b. Pittsburgh or Youngstown mills.

Wire Products.—A satisfactory business is reported in nails and plain wire, but demands for barbed wire, fence and other essentially agricultural products is very light and the outlook for early improvement is not considered bright. Box cars are scarce, but shipping difficulties are minimized with some companies through the use of open-top cars fitted with temporary roofs or covered with tarpaulins. We note no change in prices, but manufacturers are not permitting unspecified contracts to stay on their books; rather, they are canceling all tonnage not specified by the end of the contract period. Prices are given on page 1105.

Iron and Steel Bars.—The rail market on merchant steel bars and reinforcing bars now is 2c., base Pittsburgh. The leading independent here is on that basis and this is believed to be the price of the Steel Corporation on tonnages for delivery at its convenience. Occasional sales of mild bars are heard of at 2.15c. and 2.25c., but usually there is only a carload involved and delivery must be made very promptly. There has been no change in iron bars.

We quote steel bars rolled from billets at 2c. to 2.15c.; reinforcing bars, rolled from billets, 2c. to 2.15c. base; rail steel reinforcing bars, 1.90c. to 2c.; refined iron bars, 2.60c. in carloads, f.o.b. mill, Pittsburgh.

Plates.—Only on tonnages for very prompt delivery can 2.25c. base, Pittsburgh, now be obtained and sales at that level usually are for one or two carloads. The price for reasonably early deliveries of sizable tonnages is $1 to $2 less, and buyers content to enter orders for shipment at the convenience of the mills are finding accommodation from an increasing number of producers at 2c. Prices are given on page 1105.

Rivets.—Large producers making the full range sizes are quoting heavy rivets at $3.15 base per 100 lb. for structural and $3.25 for boiler rivets, but there are still some makers who have not adopted these prices and are quoting $3 per ton less. Business carrying the higher figure is limited, but makers have a good back log of orders taken prior to the last price advance. Prices and discounts are given on page 1105.

Steel Skelp.—Better deliveries against low-priced orders are keeping down new inquiries and only on small tonnages for very prompt shipment is it possible for makers to obtain more than 2c.

Sheets.—There still is a rather good demand for sheets for prompt delivery and those makers in a position to take on such business have obtained as high as 3.75c. base for black sheets. Ten days' delivery was promised on one piece of business of this sort. There are some independent makers who lack backlogs and who find it impossible to obtain more than 3.50c. As a rule, all makers have enough business booked to insure the present general rate of operation over the remainder of the year, providing there are no developments which might prompt delays in specifications. The market is slightly irregular, but on the whole firm. The leading interest has been able slightly to increase its operations, but its activities still are well below those of the independents. There is much interest in the first quarter of 1923 prices of this interest; indications now are that its prices will be higher, but the extent of the advance will be governed by steel market conditions around the end of the year. Prices are given on page 1105.

Tin Plate.—The market is showing considerable activity for the time of year and with the leading interest committed against probable production for the remainder of the year, much business is going to the inde-

pendent makers. One order for fairly early delivery calling for 175,000 boxes, recently went to an independent maker. A price of $5 per base box, Pittsburgh, for first quarter of 1923, now seems likely and it would occasion no surprise if the "official" quotation was even $5.25. Costs have gone up so much that a price of at least $5 is considered necessary to show a profit. Such tonnages as have been entered for delivery after Jan. 1, carry no fixed price. On business for delivery over the remainder of this year, the market still is $4.75 per base box.

Cold-Finished Steel Bars and Shafting.—Demand is steady and the market holds firm at 2.50c base, Pittsburgh, for carloads. The market on hot-rolled bars has worked into an easier position, supplies being more readily available, while 2c., which recently was minimum, now is a maximum on sizable lots. This development has not yet affected cold-finished bar prices, because makers have enough business to carry them over the remainder of the year and are not actively seeking new business. Ground shafting is unchanged at 2.90c. base, f.o.b. mill, for carloads.

Track Fastenings.—Although large spikes still can be bought at 2.75c. base, Pittsburgh, the most attractive inquiry of the week, that of the Michigan Central, failed to come to this district; a base of 2.85c., Chicago, taking the order. On spikes and other track fastenings, the Pittsburgh base is passing and prices are generally on an f.o.b. mill basis. Prices are given on page 1105.

Hot-Rolled Flats.—Good demand still is noted for hot-rolled strips, but new business in hoops and bands is much lighter than it has been. In the latter products the mills are well sold up on the narrow and wide sizes, but can take business in the intermediate sizes. Prices are given on page 1105.

Cold-Rolled Strips.—Demand holds up well and on new business there is no shading of the regular quotations of 4.50c., base Pittsburgh.

Bolts and Nuts.—Makers here received orders late last month prior to the last price advance. New business since has been very limited, but there has been no shading of prices, because it is still necessary for manufacturers to provide the means of getting steel from the mills, and this makes for higher costs than usual. Discounts given on page 1105 have found little basis in sales.

Fluorspar.—Illinois and Kentucky producers have advanced prices $4 per ton, now quoting washed gravel fluorspar at $20 per ton f.o.b. mines, for material running 80 to 85 per cent calcium fluoride, and not over 5 per cent silica, and $21.50 for material guaranteed to contain 85 per cent calcium fluoride and not over 5 per cent silica. This advance is declared to be necessary on the basis of producing costs, but may be due in part to the tariff since foreign fluorspar is dutiable under the new tariff at $5.60 a ton.

Structural Material.—Fabricating interests are getting many inquiries, but not many orders, except for very small tonnages. There is not much activity in plain material because fabricators have pretty fair stocks or are protected by mill orders. The market does not appear to be quotable above 2c., except for very early shipment, and such demands are not as numerous as they were recently, due to the slowing down of new construction with the approach of winter. Prices are given on page 1105.

Steel Rails.—Demand for light rails is rather limited and competition for business is sharp enough to make sales at 2.25c., base, rather difficult. The market is quotable from 2c. to 2.25c., base, but the latter price is largely a quotation.

We quote 25 to 45-lb. sections, rolled from new steel, 2c. to 2.25c. base; rolled from old rails, 1.90c. to 2c. base, standard rails, $43 per gross ton mill for Bessemer and open-hearth sections.

Iron and Steel Pipe.—The National Tube Co. surprised the trade considerably last Thursday by coming out with new cards making a horizontal increase of $4 per ton in all classes of pipe and in lapwelded boiler tubes. Unlike former advances, there had been no previous intimation that a change was imminent. Independent companies, as was to be expected, promptly followed the advance. It is stated in explanation for the advance that it merely puts the market on the basis of current costs. The advance made by independents on Aug. 15, last, and by the National Tube Co. on Aug. 23, did not profit pipe makers any because they had so much old tonnage, notably in the butt weld sizes, at the time, and then came the wage increase on Sept. 1. Demand for standard pipe still is strong, but oil country goods could do much better. It is stated that while present demands for the latter are moderate, stocks in distributing hands are light and that improvement in the oil situation will find prompt reflection. A resumption in the Osage field is possible before long as private companies in that field are protesting the Government order which led to the suspension. Makers still are piling some tonnage because of car shortages. Wrought iron pipe activity is chiefly on old rather than new business with prices unchanged. Discounts are given on page 1105.

Boiler Tubes.—Action of the National Tube Co. in advancing lap welded tubes $4 per ton, as of Oct. 19, merely met a similar action by several independent makers about three weeks ago. Heavy demand still is reported for tubes, but with steel doing better than iron goods. There has been no change in the latter. Discounts are given on page 1105.

Coke and Coal.—The market on furnace coke has grown decidedly easier since a week ago, standard 48-hr. fuel dropping from $10 per net ton oven, to $8 late last week, while off grade offerings have been as low as $7. This development is the result of production running ahead of consumption, but the decline in prices changed this condition and the market to-day was firm at $8.50 for spot tonnages of standard grade coke, while on tonnages calling for delivery over the remainder of the year the market has been established at $9 by transactions involving the requirements of two stacks or approximately 30,000 tons a month. The market is easier also on foundry coke, but not to the extent it is on furnace grade. The minimum on standard 72-hr. coke is $10.50 per net ton at oven, with some sales still being made at $2 above that level. There has not been much change in the coal market, but activity is lacking and it is more of a buyers' than a sellers' affair. We quote mine run steam coal at $3 to $3.50 per net ton, f.o.b. mines; by-product grade at $3.75 to $4.50, and gas coal at $4 to $4.50 for mine run and $5 for lump.

Old Material.—The market here has grown rather dull since last accounts and while prices are not materially affected by this development, the undertone is hardly as strong as it has been. This, however, is explained largely by offerings by dealers, who as a result of railroad conditions have been forced to reconsign shipments. Dealers and melters have been offered such tonnages of heavy melting steel as low as $21, and on the bases of what could be done this grade is quotable at $21 to $21.50. Supplies of scrap are moderate and this is developed every so often when a mill comes in for a tonnage. Machine shop turnings have sold as high as $17 and do not seem to be available at less than $16.50. There is no weakening in prices of the better grades of railroad steel.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

	Per Gross Ton
Heavy melting steel	$21.00 to $21.50
No. 1 cast, cupola size	24.00 to 25.00
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va.; Franklin and Williamsport, Pa.	22.00 to 22.50
Compressed sheet steel	19.50 to 20.00
Bundled sheet sides and ends	17.00 to 18.00
Railroad knuckles and couplers	24.50 to 25.00
Railroad coil and leaf springs	24.50 to 25.00
Low phosphorus standard bloom and billet ends	25.00 to 26.00
Low phosphorus, plates and other grades	24.00 to 25.00
Railroad malleable	22.00 to 22.50
Iron car axles	30.00 to 32.00
Locomotive axles, steel	27.00 to 28.00
Steel car axles	24.00 to 25.00
Cast iron wheels	25.25 to 25.75
Rolled steel wheels	24.50 to 25.00
Machine shop turnings	16.50 to 17.00
Heavy steel axle turnings	18.00 to 18.50
Short shoveling turnings	18.00 to 18.50
Cast iron borings	18.50 to 19.00
Heavy breakable cast	21.00 to 21.50
Stove plate	17.50 to 18.00
Sheet bar crop ends	24.00 to 25.00
No. 1 railroad wrought	20.00 to 20.50

Chicago

Strong Demand Continues with Railroads Still Leading Factor

CHICAGO, Oct. 24.—On the one hand, steel mill production is limited by inadequate transportation while on the other hand the bulk of new business, particularly in the heavier rolled products, is coming from the railroads. Crippled because of insufficient rolling stock, the carriers are pressing the car builders for deliveries of new cars. The latter, however, are unable to build cars to the limit of their capacity because of slow deliveries from the mills. Neither the car builders nor the mills entertain much hope of increasing operations for several months. The supply of cars available for the shipment of products from steel works is slightly improved, but shortage of cars at the coal mines has reduced receipts of fuel.

The leading interest continues to operate 15 blast furnaces, but has suffered a slight loss in finished steel output, which is now just under 70 per cent. The production of the Inland Steel Co. remains unchanged at between 65 and 70 per cent. Inability to accumulate coal reserves for winter constitutes the principal worry of the mills. The amount in storage now is hardly enough to carry them through a few days of severe weather and with the season rapidly advancing, the chances of piling a sufficient reserve are steadily diminishing. The advent of low temperatures will release a heavy demand for coal for heating purposes, which in view of its imperative nature will make it more difficult for industries to secure their requirements.

Shortage of labor is another factor blocking increased plant operations. Not only are men scarce but the production per man is declining. To make matters worse, some industries are taking labor away from others by bidding up wages.

Although demand appears to have fallen off in other parts of the country, there is no lack of business here, notwithstanding the fact that inquiry for prompt material is less urgent than during and immediately after the twin strikes. Railroad car buying is of large proportions and is expected to continue for several months. The St. Paul and the Rock Island alone are expected to buy a total of 18,000 cars, which will call for fully 100,000 tons of steel, exclusive of the axles and wheels. Other recent inquiries include 3000 cars wanted by the Northern Pacific, 2500 for the Pere Marquette and 3000 for the Louisville & Nashville. The problem of local mills is not to sell but to ship the business on their books and in immediate prospect. They are finding it difficult to satisfy all their customers and are trying to distribute tonnage in such a manner as to permit all plants dependent on them to operate at the best possible rate. The buoyancy of demand is indicated by the fact that the bookings of a prominent producer are fully as heavy as in September, excluding the rail and track supply orders received in that month.

Pig Iron.—The market is quiet and many melters are holding back their inquiries in the hope that prices will again sag. There are no indications of further weakness, however, and prices of Northern iron are firm at the new base of $31, furnace. In fact a number of spot cars have been sold at as high as $32, base, within the past few days. Notwithstanding the resistance of buyers, some fair sized orders are being placed indicating a pressing need for material. A stove manufacturer who had not been in the market for a considerable period is inquiring for 400 tons of foundry to take care of increased business. A Michigan hot air furnace company is in the market for a like tonnage with the probability that it will buy additional iron later. A Wisconsin foundry has closed for 1500 tons of malleable for the rest of the year while a local railroad equipment manufacturer has ordered 1500 tons of foundry for the same delivery and still has a considerable tonnage to buy. Spot demand is good as evidenced by sales covering lots ranging from carloads up to 100 or 200 tons. There is little first quarter buying, among the few sales for that delivery being one of 500 tons of foundry bought by a Michigan user at the ruling price of $31, base, furnace. Deliveries from furnaces are improved as car supply is somewhat better. Shipments from the South are also coming through more freely, although transportation in that section is still far from normal. Prices of Southern iron appear to range from $27 to $28, base, Birmingham. We note several sales of cars on consignment at the $27 base. The Michigan inquiry for 1500 tons of 14 to 16 per cent Bessemer ferrosilicon is not yet closed. Canadian producers are understood to have quoted as low as $45 delivered, or about $5 under the domestic market.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include an average switching charge of 61c per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$36.15
Northern coke, No. 1, sil. 2.25 to 2.75	32.00
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	31.00
Northern high phos.	31.00
Southern No. 2	$33.00 to 34.00
Malleable, not over 2.25 sil.	31.00
Basic	31.00
Low phos., Valley furnace, sil. 1 to 2 per cent copper free	38.00
Silvery, sil. 8 per cent	46.29

Ferroalloys.—Spiegeleisen and ferromanganese are quiet. Ruling prices on 50 per cent ferrosilicon are difficult to ascertain, as a number of important producers are still out of the market. A recent sale at Milwaukee, however, is reported to have been made at about $86 delivered.

We quote 80 per cent ferromanganese, $108.66, delivered; 50 per cent ferrosilicon, $65 delivered (nominal); spiegeleisen, 18 to 22 per cent, $47 to $48, delivered.

Plates.—The market is sustained by railroad car buying which, judging from fresh inquiries, promises to continue for some time. Further business from tank fabricators is also looked for, as several oil companies are known to be quietly negotiating for a considerable number of storage tanks. Prices are firm and no early change is expected in view of the heavy bookings of mills. Producers are more concerned about shipping than selling.

The mill quotation is 2.10c. to 2.30c., Chicago. Jobbers quote 2.90c. for plates out of stock.

Bars.—New business in soft steel bars is fully as large as in September and local mills are experiencing difficulty in meeting the demand. Prices are strong, but no early change is looked for. The leading interest continues to quote 2c., Chicago, for indefinite delivery, while the foremost independent is practically sold up for this quarter at 2.10c., Chicago, and is not yet ready to announce its first quarter price. Demand for bar iron continues to lag, no doubt because it is considerably higher than steel. Even with the price at 2.50c., mills are finding it difficult to break even. One important bar iron plant was shut down indefinitely to-day because of inability to make a profit. Hard steel bar prices are unchanged and mills are well booked ahead.

Mill prices are: Mild steel bars, 2c. to 2.10c., Chicago; common bar iron, 2.50c., Chicago; rail steel, 2c. to 2.10c., Chicago mill.

Jobbers quote 2.80c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 3.80c. for rounds and 4.30c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 2.50c. base; hoops, 4.15c.; bands, 3.55c.

Rails and Track Supplies.—The market is without unusual features. Light rail business is good and small orders for bolts, spikes and tie-plates are being placed.

Standard Bessemer and open-hearth rails, $43; light rails rolled from new steel, 2.15c., f.o.b. makers' mills.

Standard railroad spikes, 2.85c. to 3c., mill; track bolts with square nuts, 3.85c. to 4c., mill; iron tie plates, 2.50c.; steel tie plates, 2.35c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.50c. base and track bolts 4.50c. base.

Wire Products.—Mill operations are no better owing to the continued shortage of steel and fuel, both ascribable to lack of cars. Far behind in its shipments

against present obligations, the leading interest is taking new business sparingly. Demand continues heavy for this season and reports from some of the agricultural districts are more favorable than for some time. The advance in corn has encouraged the farmers in the corn belt. For mill prices, see finished iron and steel, f.o.b. Pittsburgh, page 1105.

We quote warehouse prices, f.o.b. Chicago: No. 9 and heavier black annealed wire and No. 9 and heavier bright basic wire, $3.30 per 100 lb.; common wire nails, $3.45 per 100 lb.; cement coated nails, $2.90 per keg.

Bolts and Nuts.—Some business is being booked at the new discounts, but the September quotations are still being made by important sellers. Specifications are lighter, no doubt because buyers loaded up heavily under their third quarter contracts.

Jobbers quote structural rivets, 3.75c.; boiler rivets, 3.85c.; machine bolts up to ⅞ x 4 in., 50 per cent off; larger sizes, 50 off; carriage bolts up to ⅞ x 6 in., 45 off; larger sizes, 15 off; hot pressed nuts, squares and hexagons, tapped, $2.75 off; blank nuts, $2.75 off; coach or lag screws, gimlet points, square heads, 55 per cent off.

Sheets.—Unfilled obligations of local mills insure operations throughout the rest of the year. There is no pressure to sell at present, but the independent producer will soon entertain inquiries for first quarter. Eastern mills are experiencing little trouble in getting 3.50c. and 4.50c., base Pittsburgh respectively, for black and galvanized.

Mill quotations are 3.35c. to 3.50c. for No. 28 black, 2.50c. to 2.60c. for No. 10 blue annealed and 4.35c. to 4.50c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote f.o.b. Chicago, 4c. for blue annealed, 4.85c. for black and 5.85c. for galvanized.

Reinforcing Bars.—Demand is unusually buoyant in the face of the approach of the winter season, which usually brings with it an appreciable slackening in trade. A considerable number of new projects have come into the market and at the same time demand for small tonnages out of warehouse is unabated. Dealers find mill deliveries somewhat improved but still uncertain. Prices are firm and the quotation for material out of warehouse is unchanged at 2.50c. Recent lettings include:

E. J. Brach & Sons, candy factory, Chicago, 350 tons to Paul J. Kalman Co.

State highway work, Missouri, 200 tons to Concrete Steel Co.

William Hatch School, Oak Park, Ill., 100 tons to Corrugated Bar Co.

Knights of Pythias, lodge and office building, South Bend, Ind., 160 tons to Concrete Steel Co.

Department of Public Works, Chicago, 180 tons to Paul J. Kalman Co.

Rochester Packing Co., packing house, Rochester, N. Y., 400 tons to Corrugated Bar Co.

Fireproof Storage & Warehouse Co. building, Waco, Texas, 200 tons to Paul J. Kalman Co.

Pending work includes:

Grain Elevator, Ft. Worth, Texas, 500 tons, general contract awarded to a San Antonio company.

Elks Lodge, Louisville, Ky., 250 tons, bids on general contract to be taken Oct. 27.

Girls' high school, Louisville, Ky., 200 tons.

St. Francis Convent, Dubuque, Iowa, 350 tons, bids on general contract to be in Oct. 25.

United Butchers Packing Co., packing house, Chicago, 125 tons, bids on general contract taken.

High school, LaPorte, Ind., 150 tons, bids on general contract to be in Oct. 27.

High school, Evansville, Ind., 150 tons.

Chicago Mill & Lumber Co., plant, Chicago, 300 tons.

Vendome Apartments, Milwaukee, 100 tons, to Concrete Engineering Co.

Steel Castings.—The miscellaneous castings for 1000 Chicago & Northwestern cars have been placed at the new discounts. A considerable tonnage of castings for cars recently ordered is still unclosed and in view of large new car inquiries, the outlook of the steel foundry business is good.

Structural Material.—With the approach of the winter season, structural lettings are declining both in size and number. Only three awards are reported this week and the largest involves 400 tons. Fabricators are well booked, however, and will probably be busy until demand revives. Prices of plain material are unchanged. Although less new business is coming to the mills from the fabricators, the tonnage of shapes which is being brought by car builders is large.

The mill quotation on plain material is 2.10c. to 2.20c., Chicago. Jobbers quote 2.90c. for plain material out of warehouse.

Cast Iron Pipe.—Transportation conditions in the South are steadily improving, but with the construction season nearing a close in this territory, municipalities are disposed to postpone action on their requirements in the belief that prices are not likely to advance any further. The National Cast Iron Pipe Co. will supply 300 tons for a Hamilton, Mo., contractor's job. Westmont, Ill., has let 700 tons to a contractor who is not expected to place the pipe for some time. Ferndale, Mich., took bids yesterday on 400 tons of 6-in. Detroit will receive bids Oct. 28 on 100 tons of fittings. Fort Atkinson, Wis., rejected bids on 80 tons.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $55.20 to $57.20; 6-in. and above, $51.20 to $53.20; class A and gas pipe, $3 extra.

Old Material.—Some evidences of weakness are to be noted in the market, ascribable in part to the shutting down of an important bar iron mill. No sustained decline in prices is looked for, however, in view of transportation and labor conditions. Shortage of labor is preventing the collection and sorting of scrap and lack of cars is impeding the delivery of material from seller to user. In view of immigration restrictions, there appears to be no prospect of better labor supply and with cold weather approaching it is doubtful whether better railroad service can be hoped for until next spring. The stability of the present market level seems assured and some observers look for advances in view of the disparity between scrap and pig iron prices. Current buying is of a hand-to-mouth character. At the same time, there is pressure for deliveries against contracts as car scarcity has tended to delay shipments.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

	Per Gross Ton	
Iron rails	$24.50 to	$25.00
Cast iron car wheels	25.50 to	26.00
Relaying rails	27.50 to	32.50
Rolled or forged steel car wheels	23.00 to	23.50
Rails for rolling	20.50 to	21.00
Steel rails, less than 3 ft.	21.50 to	22.00
Heavy melting steel	18.50 to	19.00
Frogs, switches and guards cut apart	18.50 to	19.00
Shoveling steel	18.25 to	18.75
Drop forge flashings	12.50 to	13.00
Hydraulic compressed sheet	16.00 to	16.50
Axle turnings	16.00 to	16.50
	Per Net Ton	
Iron angles and splice bars	23.00 to	23.50
Steel angle bars	18.50 to	19.00
Iron arch bars and transoms	23.00 to	23.50
Iron car axles	26.00 to	26.50
Steel car axles	19.50 to	20.00
No. 1 busheling	15.50 to	16.00
No. 2 busheling	10.00 to	10.50
Cut forge	17.00 to	17.50
Pipe and flues	12.50 to	13.00
No. 1 railroad wrought	17.50 to	18.00
No. 2 railroad wrought	17.00 to	17.50
Steel knuckles and couplers	20.50 to	21.00
Coil springs	22.00 to	22.50
No. 1 machinery cast	20.50 to	21.00
No. 1 railroad cast	19.50 to	20.00
Low phos. punchings	17.50 to	18.00
Locomotive tires, smooth	18.50 to	19.00
Machine shop turnings	11.00 to	11.50
Cast borings	13.50 to	14.00
Stove plate	17.50 to	18.00
Grate bars	17.00 to	17.50
Brake shoes	17.00 to	17.50
Railroad malleable	21.50 to	22.00
Agricultural malleable	21.50 to	22.00

Roland P. Chase, Saginaw, Mich., manufacturer of a new tool truing device, has taken over the plant of the American Stamping & Mfg. Co. at Midland, Mich., and will transfer his business to Midland.

New York

Plates Not Very Firm at 2c—Bar Iron and Pig Iron Lower

NEW YORK, Oct. 24.—Another quiet week has passed with prices showing a tendency downward. On eastern Pennsylvania irons, $30 is the usual quotation for No. 2 plain, but the market is weak at that figure and it is believed that $29 could be done on an attractive tonnage. Reports from Buffalo still show weakness with $29.50 as the usual quotation. Quotations on foreign iron are about as they have been, $30 for Scotch and $27 to $28 on Continental, but no difficulty is experienced in getting prompt delivery. The principal buying of the week was by the Worthington Pump Co. which purchased 1000 tons of domestic and 400 tons of foreign, the latter for its Holyoke plant for delivery over the remainder of the year. The New York Central placed an order for 1200 tons for prompt delivery and other sales aggregated about 2000 tons. Considerable delay in deliveries is still being caused by congestion of railroads, which are concentrating their efforts in carrying coal.

We [illegible] New York [illegible] as follows, having added to furnace prices $2.27 freight [illegible] Buffalo and $5.44 from Virginia:

[illegible]	$34.27
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	33.27
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	32.27
Buffalo, sil. 1.75 to 2.25	34.41
No. 2 Virginia, sil. 1.75 to 2.25	No. sales

Ferroalloys.—Business in ferromanganese is confined to small lots of British ferromanganese for shipment within the next month or two at the prevailing quotation. Only a little domestic alloy is available at about $100, furnace. Very little business is reported in spiegeleisen, quotations for which are unchanged. No business is reported in manganese ore. There have been sales of a few lots of 50 per cent ferrosilicon as high as $70, furnace, and there are also inquiries in the market aggregating 100 to 200 tons. Quotations are as follows:

Ferromanganese, domestic, furnace, nominal, per ton	$100.00
Ferromanganese, British, c.i.f., per ton	$67.50
Spiegeleisen, 17 to 19 per cent, furnace	$38.00
Spiegeleisen, 20 per cent, furnace or duty paid	$38.00 to $39.00
Ferrosilicon, 50 per cent, delivered per gross ton, carloads	$70.00 to $75.00
Ferrotungsten, per lb. of contained metal,	70c. to 85c.
Ferrochromium, 4 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr., delivered	12c. to 14
Ferrovanadium, per lb. of contained vanadium	$7.50 to $8.00
Ferrocarbontitanium, 15 to 18 per cent, in carloads, per net ton	$200.00
Ores	
Manganese ore, foreign, per unit, c.i.f., 29c. to 30c.	
Tungsten ore, per unit, in 60 per cent concentrates, nominal	$7.50 to $7.75
Chrome ore, basis 48 per cent Cr_2O_3, crude, per ton, c.i.f. Atlantic seaboard	$18.00 to $25.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	55c. to 60c.

Cast-Iron Pipe.—Although municipal tenders are no longer appearing, private buying continues strong, unusually so for this season. Prices are firm and are expected to continue unchanged until the first of the year. We quote per net ton, f.o.b. New York, in carload lots as follows: 6-in. and larger, $54.50; 4-in. and 5-in., $59; 3-in., $64.80, with $4 additional for Class A and gas pipe. Soil pipe is quiet, the usual seasonal dullness having set in. We quote per net ton, delivered New York, discounts of both Southern and Northern makers as follows: 2 to 6-in. standard, 25 to 30 per cent off list; heavy, 34 and 35 per cent off list.

Warehouse Business.—Most warehouses report prices firm and business active. Structural material is still in strong demand and dealers in heavy hardware note a good business in bolts, nuts, rivets and similar material. The sheet market, however, despite difficulty being encountered in obtaining shipments from mill, is weak. The range of prices that has prevailed for some time continues; No. 28 gage black sheets, 4.50c. to 4.90c. per lb. and No. 28 gage galvanized, 5.50c. to 5.90c. per lb. Even the low prices are said to be still open to shading by some dealers. Although spring steel prices are still on a 4.50c. per lb. base in this district, a growing shortage of some sizes seems evident from numerous transactions between sellers here, in Boston and in Philadelphia. Some dealers report that they have been unable to place orders with the leading interest on tin plate for earlier than first quarter of next year delivery, and warehouses handling wire and wire products are running low in some cases. The leading interest here has promised a gradual improvement in shipments of orders, but delays are still long. Dealers announce a reduction of discounts from list prices on steel pipe amounting to about $4 per ton. This increase added to a rise in price of about $2 caused by a slight change made Oct. 1, in figuring discounts from list, shows a total advance this month on steel pipe of about $6 per ton. We quote prices on page 1122.

High Speed Steel.—Quietness continues. Some activity is reported in high carbon tool steels. Producers generally quote 18 per cent tungsten high speed steel at 75c. to 80c. per lb., with special brands of some companies ranging up to 90c. per lb.

Finished Iron and Steel.—Nearly all mills are now quoting 2c., Pittsburgh, on desirable lots of plates, shapes and bars. Plates, until recently the strongest of the three products, is now the weakest, and it is only in plates that suggestions of quotations below 2c. are heard. Some of the large buyers, such as railroad companies, oil companies and car builders, say that they are able to buy in large lots for fairly early delivery at 1.90c. to 1.95c., Pittsburgh, though in some instances these prices are given only with shipment at mill convenience. Small lots of plates, shapes and bars have brought prices above 2c. in the past week, but such sales do not involve a large quantity of steel even in the aggregate. The mill position of steel companies rolling plates is the least satisfactory of any steel product. In butt weld pipe, bars, wire products, tin plate and sheets, in the order named, the condition of order books and the present situation as to demand are all that the mills could wish for; in fact, pressure for some of these products is a little too insistent to suit the mills. Rails may also be added to this list, of course, as the total rail tonnage put on the books is probably 1,500,000 to 2,000,000 tons. Several roads which made blanket reservations prior to Oct. 1 have been sending in their specifications within the past two weeks and mills are well provided with rail tonnage for the winter months. Activity in structural steel is at low ebb. In cars there are inquiries for 6500 now pending, with inquiries to be issued within the next week or so for an additional 10,000. Concrete bars are in fairly good demand and the following are some of the larger jobs which have been taken by the Concrete Steel Co. within the past few days: 3500 to 4000 tons for a waterworks at Tulsa, Okla.; 500 tons for a school building in St. Louis; 220 tons for a factory for the Chesbrough Mfg. Co. at Pittsburgh; 100 tons for the Foster Avenue sewer, Brooklyn. Eastern makers of bar iron have reduced quotations to 2.05c., Pittsburgh, for carload lots and to 2.20c. for less than carloads.

We quote for mill shipments, New York delivery as follows: Soft steel bars, structural shapes and steel plates [illegible] bar iron, 2.34c.

Coal and Coke.—Furnace coke is decidedly softer with quotations ranging from $8.25 to $8.50 on standard grades and as low as $6.50 being named for coke which is described as of moderately high sulphur. In foundry coke, the usual quotation is $11, with $12 asked by some sellers. In by-product coke $14, seaboard, is still asked, but it is doubtful whether this quotation can long be maintained in view of the receding prices on beehive oven coke. It is true, however, that users of by-product coke have had the advantage of lower prices than those on beehive coke for several months, and producers of by-product grades are not disposed to hurry in lowering quotations. Steam coal is quoted at $3.25 to $3.50.

Old Material.—The slight recession of the market continues, prices generally still showing weakness. Both the embargoes and the labor shortage being experienced by the mills are pointed to as causes of the

present declining market, but the lack of any large stocks of scrap in yards is held as a good sign that the present decline can only be temporary. No. 1 heavy melting steel is quotable this week at $13.50 to $14, based on $17.50 per ton being paid by Alan Wood Iron & Steel Co. and $18.50 per ton for Johnstown. One seller here points out that for shipment to Buffalo the maximum obtainable is $17 per ton, which with a rail rate of $5.17 figures back to only $11.83 per ton, New York. On railroad steel The Bethlehem Steel Co. is paying $17.50 per ton, which, with a freight rate of $2.65 to Bethlehem, makes the price New York $14.85. A fair range of quotations on railroad steel at present is $14.25 to $14.75 per ton. Both Milton and Columbia are out of the market on specification pipe and Lebanon is paying $16 per ton, which is $12.22 per ton New York. Stove plate is weak, a range of $13.50 to $14.50 per ton about covering present transactions. On stove plate $16.50 has been paid for shipment to Bridgeport.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$13.50 to $14.00
Steel rails, short lengths, or equivalent	14.25 to 14.75
Rails for rolling	15.50 to 16.00
Relaying rails, nominal	27.00 to 28.00
Steel car axles	17.00 to 18.00
Iron car axles	23.00 to 24.00
No. 1 railroad wrought	16.00 to 16.50
Wrought iron track	14.50 to 15.00
Forge fire	11.50 to 12.00
No. 1 yard wrought, long	13.50 to 14.00
Cast borings (clean)	12.50 to 13.00
Machine-shop turnings	12.25 to 12.75
Mixed borings and turnings	12.25 to 12.75
Iron and steel pipe (1 in. diam., not under 2 ft. long)	11.75 to 12.25
Stove plate	13.50 to 14.50
Locomotive grate bars	14.00 to 14.50
Malleable cast (railroad)	13.50 to 14.00
Cast-iron car wheels	14.50 to 15.00

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$20.00 to $21.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	17.50 to 18.00
No. 1 heavy cast, not cupola size	15.00 to 15.50
No. 2 cast (radiators, cast boilers, etc.)	13.50 to 14.00

Buffalo

Weakness in Pig Iron—Car Situation Does Not Improve

BUFFALO, Oct. 24.—Weakness in price is more apparent and demand is even less than the previous week. Two furnaces are quoting $30 for No. 2 plain, but a broker is selling the same grade at $29.50, No. 2 X at $30 and No. 1 X at $30.50. About 3000 tons covers the volume of new business. The Bethlehem Steel Co. operating the Lackawanna plant is a factor in merchant iron. The Hanna Furnace Co., operating two furnaces, is running one on malleable and one on foundry, and the Wickwire Steel Co. is making basic iron only. None of the Buffalo sellers has opened its books for first quarter 1923 business.

We quote f.o.b. per gross ton Buffalo as follows, the higher prices being for early shipment:

No. 1 foundry, 2.75 to 3.25 sil.	$30.50
No. 2X foundry, 2.25 to 2.75 sil.	30.00
No. 2 plain, 1.75 to 2.25 sil.	29.50
Basic	30.00
Malleable	31.00
Lake Superior charcoal	34.28

Warehouse Business.—Softening in mill prices and the critical car situation are probably the reasons for a lull in warehouse demand which developed within a few days.

Finished Iron and Steel.—Advances on pipe prices and stronger demand for tinplate, which are unusual because of this particular season, are the two features of the finished material market this week. Although there are rumors of a weakness in bar prices, there are no admissions of less than 2c., and on some business as high as 2.15c. has been paid. Forward buying is slower and there seems to be more of a tendency to place business covering only immediate needs. Hoops and bands have advanced from 1.75c. to 1.90c. per 100 lb. A price of 2c. on plates is reported made by one seller in the face of considerable competition. Reinforcing bar business for less than 100-ton lots is brisk and weather conditions have not yet affected work requiring this material.

We quote warehouse prices, Buffalo, as follows: Structural shapes, 3.20c.; plates, 3.20c.; soft steel bars, 3.10c.; hoops, 4.10c.; bands, 3.90c.; blue annealed sheets, No. 10 gage, 4.05c.; galvanized steel sheets, No. 28 gage, 5.85c.; black sheets, No. 28, 4.85c.; cold rolled round shafting, 3.95c.

Old Material.—Some sales of small tonnages of heavy melting steel have been made, but the mills which ordinarily purchase in quantities that determine the markets are not interested in paying what the dealers ask for on heavy melting steel. The car situation is worse and is continuing to affect production. Buffalo dealers with orders taken at higher prices for shipment to Youngstown and Pittsburgh find the transportation situation is affecting movement of this material.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$20.00 to $21.00
Low phos., 0.04 and under	21.00 to 22.00
No. 1 railroad wrought	19.00 to 20.00
Car wheels	21.00 to 22.00
Machine-shop turnings	14.50 to 15.50
Cast iron borings	17.50 to 18.00
Heavy axle turnings	17.50 to 18.50
Grate bars	16.00 to 17.00
No. 1 busheling	17.00 to 18.00
Stove plate	17.00 to 18.00
Bundled sheet stampings	14.00 to 15.00
No. 1 machinery cast	21.00 to 22.00
Hydraulic compressed	18.00 to 19.00
Railroad malleable	20.50 to 21.50

Cleveland

Pig Iron Declines—North Central Ohio Steel Plant Buys 15,000 Tons of Basic

CLEVELAND, Oct. 24.—Reports of both pig iron and steel producers indicate an improvement of the transportation situation. More cars are available for handling steel and pig iron at various producing centers than during the past few weeks. The coal movement up the lakes fell off over 100,000 tons last week to 90,900 tons. Many of the lake boats are tied up in the grain trade, and the demands from the Northwest for fuel are less insistent than a few weeks ago. This makes more fuel available for other sections.

Pig Iron.—Prices further declined and the market appears weak at the present levels. Prices on foundry and malleable grades are about $1 per ton lower than a week ago. A north central Ohio steel plant during the week purchased 10,000 tons of basic iron from a Cleveland producer and 5000 tons from a Valley producer at $30. The market generally is quiet. Consumers of foundry iron are looking for further reductions in prices and are buying only for their early requirements. Inquiries for the first quarter of next year have virtually disappeared from the market. Although a number came out, only one sale for that delivery was reported. One lake furnace is now quoting foundry iron at $30.50 to $31 as compared with a maximum of $32.50 a week ago and reports a number of sales aggregating 3500 tons, including one lot of 800 tons to a Northern Ohio foundry. A Valley furnace is now quoting foundry iron at $31. Locally prices have not yet reacted to levels quoted in outlying districts. One producer has held to $33 during the week for foundry iron and reports several sales in lots up to 300 tons for delivery in Cleveland and immediate vicinity at that price. Southern foundry iron is about $1 per ton lower.

Another lot of 500 tons of foreign low phosphorus iron has been sold in this territory. This brought a price equal to slightly less than $37, Valley furnace. We note a sale of 400 tons of Eastern low phosphorus iron at $37.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and a $6 rate from Birmingham:

Basic, Valley furnace	$30.00
Northern No. 2 fdy., sil. 1.75 to 2.25	32.75 to 33.50
Southern fdy., sil. 1.75 to 2.25	33.00 to 33.50
Malleable	32.75 to 33.50
Ohio silvery, sil. 8 per cent	44.52 to 45.52
Standard low phos., Valley furnace	37.00 to 38.00

Iron Ore.—Iron ore interests are naturally considerably disappointed in the report of the examiner of the Interstate Commerce Commission made in Washington Saturday on rail rates from the mines to the upper lake ports. The Lake Superior Iron Ore Association will doubtless take advantage of its right to protest against the findings of the examiner, whose report must be approved by the commission before it becomes effective. [See Washington letter, page 1065.]

We quote delivered [illegible] per gross ton as follows:

[illegible]
[illegible]
[illegible]
[illegible]
51½ per cent iron, $5.05.

Ore Movement.—The iron ore movement during the week has been affected considerably by the car shortage and some ore is going on docks that would otherwise be sent direct to furnaces. The Pennsylvania railroad has declared an embargo against its ore dock at Erie, Pa., for the remainder of the season, and shipments for the East that have heretofore been made to Erie will be made to Ashtabula. Delays of boats at Buffalo in the grain carrying trade have caused a temporary scarcity of vessel tonnage and there has been some wild chartering at a premium over regular rates. Several sales of ore in lots up to 15,000 tons were made during the week to consumers who will need a little more ore and placed their orders in time for delivery before the close of the season of navigation.

Ore on Hand.—Lake Superior ore on hand at furnaces and Lake Erie docks Oct. 1 was over 4,000,000 tons in excess of the amount on the same day a year ago, according to the monthly report prepared by the Lake Superior Iron Ore Association. The amount for October was 41,805,430 tons as compared with 37,746,943 tons on the same date a year ago. On Oct. 1 there was 32,776,722 tons of Lake Superior ore at furnaces as compared with 29,565,935 tons on Sept. 1. Consumption of Lake Superior ore in September was 2,989,545 tons, as compared with 2,589,251 tons in August.

Coke.—Coke prices have further declined. A local consumer reports the purchase of a small lot of Connellsville furnace coke at $8.75 per net ton and later was offered coke at $8.25. Standard Connellsville foundry coke is down to $12 to $13 with some, not regarded as best grade, offered at $11. Plenty of foundry coke is being offered, but little is being shipped because of the car shortage.

Semi-Finished Steel.—Sheet bars, billets and slabs are quoted at $40, Pittsburgh or Youngstown, and while there is no evidence of lower quotations, buyers are inclined to think that this price might be shaded.

Bolts, Nuts and Rivets.—Bolt and nut orders at the new prices are few in number as most consumers had placed contracts before the advance, but specifications on these contracts are heavy, some makers reporting that orders so far this month are equal to the corresponding period in September. New rivet orders are rather light. The leading Cleveland producer is holding at 3.15c for structural and 3.25c for boiler rivets, and is taking some business at these prices in spite of the fact that some makers are reported to be still quoting the old prices, which are $3 per ton lower.

Finished Iron and Steel.—The volume of business is rather light and interest is centered in the price situation. Owing to the tendency to weakness and considerable irregularity as to prices, consumers of steel bars are sounding the market carefully and exerting considerable pressure on mills for lower quotations. Competition of sellers is keen and there are fairly well authenticated reports of a 1.95c. quotation being made by independent producers for round lots of steel bars for early shipment. However, the ruling quotation is 2c. for desirable orders and some business is being booked at 2.10c. Plates are quoted at 2c. to 2.10c. for fairly early deliveries, but local mills and some other independent mills are still holding to 2.25c. This price, however, usually applies to small lots or is for prompt shipment.

Structural material ranges from 2c. to 2.10c., but the lower price is now more common. The volume of business is rather light. Some of the mills are getting in better shape on deliveries and there is not so much insistence on the part of buyers for deliveries on contracts as a few weeks ago. Automobile companies are buying some forging steel and alloy steel for deliveries extending into February. Ohio shops are figuring on an order for tanks for oil cars requiring 2000 tons of plates and an inquiry has come out for 10 stills requiring 500 tons. Business in structural lines is quiet.

Jobbers quote steel bars, 2.94c.; plates and structural shapes, 3.01c.; No. 9 galvanized wire, 3.30c.; No. 9 annealed wire, 2.80c.; No. 28 black sheets, 4.40c.; No. 28 galvanized sheets, 5.40c.; No. 10 blue annealed sheets, 3.70c. to 3.76c.; hoops and bands, 3.71c.; cold-rolled rounds, 3.75c.; flats, squares and hexagons, 4.25c.

Sheets.—Sheet prices have eased up and several independent mills are now quoting the American Sheet & Tin Plate Co.'s schedule of 3.35c. for black and 4.35c. for galvanized. There is no evidence that independent mills are meeting the Steel Corporation on blue annealed sheets, the usual quotations on that grade being 2.60c. to 2.70c. The demand for sheets has fallen off and many of the mills are able to make fairly prompt deliveries.

Reinforcing Bars.—Prices on hard steel bars are easier in sympathy with the soft steel bar market and 2c. is the usual quotation for car lots. The Ohio Public Service Co. has placed an order of 175 tons for a power house in Lorain, Ohio. Inquiries are pending from Louisville for 500 tons for a school building and the Elks Club house.

Old Material.—The weakness that prevailed in the scrap market for about two weeks has evidently disappeared, and the market is firm with virtually no changes in prices during the week. Little buying is reported by the mines, but some small purchases of heavy melting steel have been made for delivery in the Valley district at $21 to $21.25 and dealers report that they are offered $22 for choice material, for shipment to Warren. Compressed steel is quoted at $19.50 to $20 for Valley district shipment. A purchase of 2000 tons of heavy melting steel by a West Virginia consumer is reported at $18 to $18.50, this material to come from nearby towns. The Nickel Plate railroad received bids to-day on miscellaneous lists of about 1500 tons.

We quote per gross ton, f.o.b. Cleveland, as follows:

Heavy melting steel	$18.75 to $19.25
Steel rails under 3 ft.	21.00 to 21.25
Steel rails, rerolling	21.00 to 21.50
Iron rails	18.00 to 18.50
Iron car axles	26.00 to 27.00
Low phosphorus melting	20.00 to 20.50
Cast borings	15.00 to 15.25
Machine shop turnings	14.50 to 14.75
Mixed borings and short turnings	14.75 to 15.00
Compressed steel	17.00 to 17.25
Railroad wrought	18.00 to 18.50
Railroad malleable	20.00 to 21.00
Light bundled sheet stampings	13.75 to 14.00
Steel axle turnings	16.00 to 16.50
No. 1 cast	21.00 to 21.50
No. 1 busheling	12.50 to 13.50
Drop forge flashings over 10 in.	13.50 to 14.00
Drop forge flashings under 10 in.	14.00 to 14.50
Railroad grate bars	17.00 to 18.00
Stove plate	17.00 to 18.00
Pipes and flues	13.75 to 14.00

Boston

Buffalo and Alabama Irons Weaker in Face of Drop in Business

BOSTON, Oct. 24.—Business in pig iron dropped to small proportions the past week, sales probably not exceeding 1,000 tons. Buffalo, Duluth and French iron displayed more life than other kinds. Weakness has developed in Buffalo iron where large tonnages are concerned, offers of No. 2X having been made at $30 furnace or $34.91 delivered, which represents a drop of about $1. One Alabama furnace, at least, is making lower quotations on 1922 and first quarter 1923 shipments, offers of $27.50 furnace or $1.50 less than previously quoted, having been made. Otherwise domestic iron prices show little variation. Eastern Pennsylvania furnaces are coming in slower than anticipated in New England. Sales the past week include Buffalo silicon 3.25 to 3.75, prompt shipment, at $35 furnace, and silicon 2.75 to 3.25 at $34 furnace. Scotch high silicon at $39.41 delivered Boston common rate point, and French silicon 2.50 to 3 at $28 c.i.f. Boston, duty paid, are included in transactions. Scotch iron usually is quoted at $31 and $33 for No. 3 and No. 1, respec-

tively; Continental silicon 2.50 to 3 at around $26.75 to $28 duty paid; and English $27 to $29 duty paid, same grade. During the week ending Oct. 21, 500 tons of pig iron arrived from England and approximately 4234 tons of Continental iron from Antwerp, most of the latter for unloading at New York, a grand total of 4734 tons, contrasted with 14,750 tons during the previous week.

We quote delivered prices, on the basis of the latest reported sales, now infrequent, and as follows, having added to furnace prices $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia and $9.60 from Alabama:

East. Penn., sil. 2.25 to 2.75	$35.65 to $37.65
East. Penn., sil. 1.75 to 2.25	34.65 to 36.65
Buffalo, sil. 2.25 to 2.75	34.91 to 36.41
Buffalo, sil. 1.75 to 2.25	34.91 to 35.91
Alabama, sil. 2.25 to 2.75	37.60
Alabama, sil. 1.75 to 2.25	37.10
Virginia, sil. 2.25 to 2.75	38.92
Virginia, sil. 1.75 to 2.25	37.92

Ferromanganese.—Buying of ferromanganese in small lots is active in this territory. Material running 76 to 80 per cent ground is selling on a pound basis equivalent to $110 to $115 per ton and higher for small lots.

Finished Material.—Round tonnages of bars were placed in this territory the past week, aggregate sales running well up into five figures. Prices are firm notwithstanding reported softness elsewhere. Small tonnages of sheets were placed and business in tool steels showed improvement. Structural steel is quiet. Total sales of finished materials in this territory, however, were somewhat larger than those for the previous week.

Cast Iron Pipe.—The cast iron pipe market is more active than it has been before in some time. Although many inquiries are tentative, prospects are beginning to take definite shape. On Monday next the city of Boston will open bids on 1200 tons of 12-in. and 16-in. high pressure pipe for early spring delivery. The Metropolitan (Massachusetts) District Commission has awarded 500 tons of 30-in. pipe to the Warren Foundry & Pipe Co. The market here for 6-in. pipe and larger is $59.10 delivered common Boston rate points, and for 4-in., $64.10. The usual $4 differential applies to class A and gas pipe.

Warehouse Business.—The movement of iron and steel out of warehouses is just about holding its own, being on a par with that last month, but below August. Stocks are in good condition and prices steady and unchanged. Blacksmiths' supplies are in better demand, especially axles, springs and toe calks, and heavy chain also is selling better. The expected advance in bolts and nuts has not materialized. Shipments of nails into this territory have increased, but are absorbed as fast as they arrive, consequently there is no accumulation of stocks.

Jobbers quote: Soft steel bars, $3.25 per 100 lb. base; flats, $3.85; concrete bars, 3.16½c.; structural steel, $3.25 to $3.50; tire steel, $4.50 to $4.85; open-hearth spring steel, $5 to $6.50; crucible spring steel, $12; steel bands, $4.25; hoop steel, $4.75; cold rolled steel, $4 to $4.50; refined iron, $3.25; best refined iron, $4.50; Wayne iron, $5.50; Norway iron, $6.60 to $7.10; plates, 3.16½c. to $3.35; No. 10 blue annealed sheets, $4.15 per 100 lb. base; No. 28 black sheets, $5.40; No. 28 galvanized sheets, $6.40.

Coke.—Interest in fuel centers in by-product foundry coke for first half contract shipment. The Providence Gas Co. announces it is sold up on such business. Bookings by that and the New England Coal & Coke Co. aggregate 65,000 to 70,000 tons, with the latter company still accepting business. Prices for such coke are either subject to those ruling date of shipment or ruling the first of the month prior to shipment. Both companies have caught up with 1922 contract shipments, the ruling price being $16.50 delivered within the $3.10 freight zone, consequently the $19.50 spot market is largely nominal. Shipments of Alabama foundry coke into this territory have been suspended, temporarily at least. English foundry coke is available at about local fuel prices, but in limited supply due to previous heavy sales to gas companies and other large consumers as well as to retail coal dealers.

Old Material.—New business in old materials has dropped to small proportions, due to congestion at Pennsylvania steel mills, heretofore active buyers in this territory. It is largely limited to heavy melting steel for Pittsburgh district consumers, usually at around $15 to $15.50 on cars shipping point; mixed borings and turnings for a West Virginia account at $12 and $12.50, although $11.75 has been done; and pipe for eastern Pennsylvania consumption, mostly at $11.50, with an occasional car lot at $11.65. Small tonnages of heavy melting steel for eastern Pennsylvania account have been purchased at around $13.50 on car shipping point. Chemical borings have been picked up at $19, shipping point. The scarcity of this material and the willingness of certain consumers to pay premiums is confusing in arriving at a price basis. Here the market apparently is $18 to $19, yet $19.75 on cars, Providence, R. I., has been turned down. Forged scrap at $11.50 on cars, shipping point, several cars of shafting at $19 to $19.50 for New England consumption, and small lots of horseshoes at $15, also for New England account, are included in the week's business. Buying against old contracts continues, but on a modified scale. Machinery cast, stove plate and malleable business is limited, New England melters still being able to supply wants from local or nearby junk yards.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$22.00 to $23.00
No. 2 machinery cast	20.00 to 21.00
Stove plate	17.50 to 18.00
Railroad malleable	19.00 to 19.50

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$13.50 to $15.50
No. 1 railroad wrought	16.00 to 16.50
No. 1 yard wrought	14.00 to 14.50
Wrought pipe (1 in. diam., over 2 ft. long)	11.00 to 11.50
Machine shop turnings	12.00 to 12.50
Cast iron borings, rolling mill	14.00 to 14.50
Cast iron borings, chemical	18.00 to 19.00
Blast furnace borings and turnings	12.00 to 12.50
Forged scrap and bundled skeleton	11.00 to 11.50
Shafting	19.00 to 19.50
Street car axles	23.00 to 24.00
Street car wheels	18.00 to 19.50
Rails for rolling	16.50 to 17.00

Cincinnati

Southern Ohio Pig Iron Prices Decline $1—Market Dull

CINCINNATI, Oct. 24.—The market continues extremely dull, there being practically no inquiry before the trade, and sales to melters in this district consist principally of carload lots. The Louisville & Nashville Railroad will probably close to-day on 775 tons of various grades, and the Buick Motor Car Co. has taken bids on 1500 tons of silvery for last quarter shipment. An Indiana malleable shop is inquiring for 200 tons. The largest sale reported was for 1000 tons of Chicago foundry iron to a Kentucky melter at an unnamed price, although it is reported that it was at least $1 under the market. A Detroit stove manufacturer bought 500 tons of Southern foundry iron at $27, base, Birmingham. Prices on southern Ohio iron are off about $1 a ton, and November and December shipments can now be booked at $31, furnace. In the South the price holds firmly at $27, with 50c. differentials for each 50 points of silicon. Some furnaces are quoting $28 to $28.50 with $1 differentials, but are selling practically all of their production to pipe shops in the South. A few small tonnages of Southern iron are reported to have been sold for first quarter delivery at $27.50. Production of pig iron will be considerably increased in southern Ohio about Nov. 1. Marting furnace has contracted for coke for three months' run on foundry and malleable grades, and Globe and Star silvery furnaces, having purchased coke, expect to blow in about Nov. 10. The Kelly furnace will probably go in on Bessemer. The second Columbus stack of the Amer-

ican Rolling Mill Co. blew in Monday, and No. 2 Ashland is expected to resume, following relining, early in November.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$31.05
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	31.55
[illegible]	
[illegible]	
No. 1	
Basic Northern	32.27
Malleable	33.27

Finished Material.—Orders for finished materials were rather light during the week, being for the most part for carload lots for fill-in purposes. Prices are showing much firmness, although premiums for quick deliveries are no longer being secured. It is true that 2.25c. is still being done on bars and plates, but only in small lots. On orders running 100 tons and over, the usual price is 2.10c. to 2.15c. for four to six weeks' delivery, while for rather indefinite delivery 2c. can be done. Sheet mills report a fair volume of small orders, and deliveries are much better. This is probably due to the fact that most independent mills had not committed their entire tonnage for last quarter. From some mills sheets are now available in three to four weeks. Prices, however, show little change, the range being from 2.60c. to 2.75c. on blue annealed, 3.50c. to 3.65c. on black, and 4.50c. to 4.75c. on galvanized. Independent mills report some pretty fair tin plate specifications during the past week, and fourth quarter business will be fully up to the customary standard. Prices have not been named for next year, but announcements are expected about the first of November. The leading interest has withdrawn from the market on coated tin mill products. The range on structural shapes is 2c. to 2.10c., depending on delivery, with the market showing a little more activity. Nails are in heavy demand, due principally to the fact that shipments from mills are away behind. This condition applies to all wire products, with the exception of fence, the demand for which is light. Steel pipe mills generally have advanced prices $4 per ton, and the situation shows little change, mills being from two to three months behind in deliveries. Light rails are in better demand, with prices of 2c. to 2.25c. being quoted. Some activity has developed in concrete reinforcing bars. Bids will close on Oct. 28 on approximately 500 tons for the Brotherhood of Railway Clerks' office building in Cincinnati. An office building, exclusively for doctors, taking about 700 tons, will be up about Nov. 1. A number of smaller projects, involving an aggregate of 500 tons, are up for bids. The Brown Hotel, Louisville, a 15-story structure, will be up about Nov. 10. This will be a reinforced concrete structure. In the structural field several projects aggregating about 2500 tons will shortly be awarded. Railroad buying of bolts and nuts, spikes, fire box steel, boiler tubes and plates has been fair. The Cincinnati Car Co. has been awarded 100 steel passenger cars by the Chicago Elevated Railroad Co.

Warehouse Business.—Local jobbers report business good. Wire products, in particular, are in demand, there being an actual shortage of nails. Plates and shapes for immediate shipment are also much sought. Prices are very firm, and on plain wire local jobbers have made an advance of $2 per ton, the present quotation being $3.10 per 100 lb.

Cincinnati jobbers quote: Iron and steel bars, 2.95c. base; reinforcing bars, 3.05c. base; hoops, 4.05c. base; bands, 3.85c. base; shapes and plates, 3.05c. base; cold-rolled rounds, 3.75c. base; cold-rolled flats, squares and hexagons, 4.25c. base; No. 10 blue annealed sheets, 4c.; No. 28 black sheets, 4.70c.; No. 28 galvanized sheets, 5.75c.; No. 9 annealed wire, $3.10 per 100 lb.; common wire nails, $3.20 per keg, base.

Coke.—There is fair activity in the coke market, furnace coke in particular being in demand. We note one sale of approximately 18,000 tons, one of 5000, and several of 1000 for last quarter shipments. Prices are easier, particularly on Connellsville which is being offered at $8 on furnace and $10.50 on foundry. Wise [illegible] foundry at $11.50. Pocahontas is quoted at $13 for foundry, and New River foundry as unchanged at $13 to $15. By-product quotations range from $11 to $12, ovens.

Old Material.—Probably in sympathy with the pig iron market, the scrap market is very dull, there being no demand for foundry grades. A little activity is noted in heavy melting steel and blast furnace grades. The L. & N. closed a list of 16,000 tons last week. Prices, if anything, show a softer trend, but in the absence of trading remain as last quoted.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

Per Gross Ton	
Bundled sheets	$13.00 to $14.50
Iron rails	17.00 to 18.00
Relaying rails, 50 lb. and up	26.50 to 27.00
Rails for rolling	18.50 to 19.00
Heavy melting steel	17.50 to 18.50
Steel rails for melting	16.00 to 17.00
Car wheels	20.00 to 21.00
Per Net Ton	
No. 1 railroad wrought	14.50 to 15.00
Cast borings	11.50 to 12.00
Steel turnings	10.50 to 11.00
Railroad cast	18.00 to 19.00
No. 1 machinery	21.00 to 21.50
Burnt scrap	12.00 to 12.50
Iron axles	20.50 to 21.00
Locomotive tires (smooth inside)	14.50 to 15.50
Pipes and flues	9.00 to 9.50

St. Louis

Pig Iron Prices Untested in a Dull Market —Scrap Softer

ST. LOUIS, Oct. 24.

Pig Iron.—The outstanding feature of the pig iron market is the continued indifference of melters to future requirements. No effort of consequence is being made to buy for first or second quarter delivery. Melters are interested only in their immediate needs, and are buying largely in quantities of a carload up to 150 tons. Despite this indifference the furnaces are still quoting on the basis of $32, Chicago, for Northern iron, and $28 to $28.50, Birmingham, for Southern make for future delivery, although some resale iron has been sold on the basis of $31, Chicago. The light buying is what is holding the market at unchanged prices, makers feeling that as long as purchases are made in small lots for immediate shipment there is no need to shade prices. If any considerable tonnage was sought it was believed that a lower price might be made in an effort to land the business. The St. Louis Coke & Chemical Co. reports the sale of 3000 tons of foundry iron to an Ohio melter for prompt shipment and scattering orders aggregating 500 tons. Melters are eager to get shipments of orders already placed. A slightly better all-rail movement from the Birmingham district is reported.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago, $3.28 from Birmingham (rail and water), $5.17 from Birmingham, all rail, and 51 cents average switching charge from Granite City:

Northern foundry, sil. 1.75 to 2.25	$33.16 to $34.16
Northern malleable, sil. 1.75 to 2.25	[illegible]
Basic	33.16 to 34.16
Southern foundry, sil. 1.75 to 2.25	33.17 to 35.17

Finished Iron and Steel.—Jobbers are buying nails, wire and bars, and are needing the material, as is shown by the fact that they are placing their orders where the quickest shipments can be guaranteed. Fabricators report a dearth of inquiries, and there is very little business pending. All are busy now, but they are looking for orders. No railroad inquiries were sent out during the week. The Illinois Highway Commission is in the market for 50 tons of reinforcing bars for highway work.

For stock out of warehouse we quote: Soft steel bars, 2.90c. per lb.; iron bars, 2.90c.; structural shapes, 3c.; tank plates, 3c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, cold rolled, one pass, 4.85c.; cold drawn rounds, shafting and screw stock, 3.90c.; structural rivets, 3.60c. per 100 lb.; boiler rivets, 3.70c.; tank rivets, ⅞ in. and smaller, 55 per cent off list; machine bolts, large, 50 per cent; smaller, 50 per cent; carriage bolts, large, 55-5 per cent; small, 60 and 10 per cent; lag screws, 55 per cent; hot pressed nuts, square or hexagon blank, $2.75; and tapped, $2.75 off list.

Coke.—The demand for coke continues far in excess of the supply. The best grades of Connellsville coke are going at $15 at the ovens, with some of the lesser known grades selling at $13. Terre Haute (Ind.) ovens are offering their coke at $16 ovens. The Granite City producer is still quoting $14, ovens.

Old Material.—The old material market is softer. Especial weakness is shown in rails for rolling, the mills in this district having enough to take care of their requirements for the remainder of the year. Material

sold in May, June and July, which has been tied up on account of the rail strike, is coming in faster than the mills can absorb it. The American Car & Foundry Co. made some purchases of rolling mill grades during the week. Rails for relaying are in good demand in 60 lb. and 80 lb. for lumber mills, coal mines and other industrial plants. The Louisville & Nashville Railroad sold about 15,000 tons, 11,000 going East.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton

Iron rails	$21.00 to $[illegible]
Rails for rolling	20.00 to [illegible]
Steel rails, less than 1 lb.	21.00 to [illegible]
Relaying rails, standard section	26.00 to 29.00
Cast iron car wheels	24.00 to 24.50
Heavy melting steel	17.00 to 17.50
Heavy shoveling steel	16.50 to 17.00
Frogs, switches and guards cut apart	19.50 to 20.00

Per Net Ton

Heavy axles and tire turnings	11.50 to 12.00
Steel angle bars	17.00 to 17.50
Iron car axles	27.00 to 28.00
Steel car axles	20.50 to 21.00
Wrought iron bars and transoms	23.00 to 23.50
No. 1 railroad wrought	17.00 to 17.50
No. 2 railroad wrought	16.25 to 16.75
Railroad springs	21.00 to 21.50
Steel couplers and knuckles	21.00 to 21.50
Cast iron borings	11.00 to 11.50
No. 1 busheling	14.25 to 14.75
No. 1 railroad cast	19.00 to 19.50
No. 1 machinery cast	20.00 to 20.50
Railroad malleable	20.25 to 20.75
Machine shop turnings	9.50 to 10.00

Birmingham

Pig Iron Prices Receding—New Rail Orders—Soil Pipe Reduced

BIRMINGHAM, ALA., Oct. 24.—What the real base of Birmingham iron was at the close of last week was not clear even to the makers. One large producer quotes $27.50 to $28. No maker was asking more than $28.50. Talk of $30 iron has ceased. Talk of $27 iron has entered and it is understood that one producer opened for that price in competitive territory without causing any particular buying. Trading was at a low ebb. The soil pipe people are understood to have given notice that they will not buy at present base, but will run the risk of using all iron on yards and getting along in the near future. There is little or no inquiry for 1923 and it is agreed that the present base will not apply to that delivery in the present psychological state. About Oct. 15, 3000 to 4000 tons was sold to a Southern pipe maker at approximately $28 and one maker is authority for the statement that he sold 1000 tons for the rest of the year in Southern territory on a base of $28.50 early last week. The larger tonnage was for delivery in the first quarter of next year. Three has been no repetition of that size of transaction. A representative of the leading interest was inclined to believe that the market had receded to $27 for really desirable business. The usual transaction last week involved a small tonnage in the South and was at $28 to $28.50. The Sloss-Sheffield Steel & Iron Co. has blown out No. 3 furnace at North Birmingham for minor repairs, which will take several weeks. Four furnaces remain active. Delivery of northern Alabama iron by way of the Tennessee River and Metropolis, thence by the Burlington railroad to Western points, is at the rate of around 10,000 to 12,000 tons a month. The stove and radiator plant melt is at a new maximum and Southern melt at large is giving an excellent account of itself. One furnace interest reports moving its make of pig iron this month so far.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon 1.75 to 2.25	$27.00 to $27.50
Basic	27.50 to 28.00
Charcoal, warm blast	33.00 to 34.00

Finishing Mills.—Full turn at the finishing mills of the Tennessee company for some time seems assured. New rail orders include 30 000 tons for the Atlantic Coast Line, 13,000 for the Nashville, Chattanooga & St. Louis Railway, 15,000 for the Texas & Pacific Railroad and 3000 for the Louisiana Railway & Navigation Co. The Southern railway's order for first half of 1923 includes 30,000 tons of 100-lb. rails and the Southern Pacific has ordered 30,000 tons. The new orders booked by the Chickasaw Shipbuilding & Car Co. include 1000 hopper cars for the Frisco and 200 cars for the Tennessee company. Hoop and band mills are on full turn with some very good export business in sight. The American Steel & Wire Co. and the Gulf States Steel Co. remain on very good turn in finishing mills.

Cast Iron Pipe.—The soil pipe market is dull and prices have dropped from $60 and $65 a ton to $50 and $55. Pressure pipe is firm at $43 and plants have orders sufficient to keep them on full turn for some time to come. The United States Cast Iron Pipe & Foundry Co. is understood to be completing details of price schedule and the like preparatory to placing the De Lavaud pipe on the market.

Coal and Coke.—Alabama coal operators have agreed on a maximum of $3.45 to $6 for domestic coal at mines. Production averages about 345,000 tons a week. Coke is firm at $8.50 to $10. The city of Boston has taken 2300 tons of Sloss-Sheffield Steel & Iron Co.'s coke, which will move by ship out of Charleston.

Old Material.—The scrap market is fairly active and would be more so but for the continued car shortage. The present price schedule is firmly maintained and all materials are moving well. We quote per gross ton f.o.b. Birmingham district yards as follows:

We quote per gross ton f.o.b. Birmingham district yards as follows:

Steel rails	$16.00 to $17.00
No. 1 steel	14.00 to 16.00
No. 1 cast	18.00 to 20.00
Car wheels	18.00 to 20.00
Tramcar wheels	17.00 to 19.00
Stove plate	16.00 to 17.00
Cast-iron borings	9.00 to 10.00
Machine shop turnings	[illegible] to [illegible]

San Francisco

Lack of Freight Space and Advance in Freight Rates Factors in Pig Iron Market

SAN FRANCISCO, Oct. 18.—The difficulty of securing adequate freight space on steamers calling at English and Continental ports is having a tendency to limit new business in foreign pig iron on the Pacific Coast. Water freights, moreover, have been raised recently, which is reflected in higher prices, a condition aggravated by the new duty, which has resulted in buyers adopting a conservative attitude, and covering their immediate needs only. It appears that there is a disposition to await lower prices on domestic material and a decline in water rates. At present, even at higher levels, foreign iron undersells domestic very considerably, making competition impossible. During the past two weeks, about 1000 tons of mixed English and Continental pig iron has been sold at about $30 to about $33, ex-ship, coast ports, the latter figure applying to high-grade iron and that which is sold on liberal terms. The acute shortage of open cars on the Pacific slope, due to lack of westbound movement, is having a disconcerting effect on deliveries of both pig iron and coke.

Cast Iron Pipe.—The pipe trade at this time is not very active, especially on heavy water pipe. Both private and municipal business is unusually light. Some prospects, however, are in sight, one sizable tonnage of 24-in. from Los Angeles coming up soon, and one from Lakeport of about 1000 tons, which has been delayed owing to some defection in the bond issue.

Old Material.—Firmness prevails in the scrap market, and stocks of desirable materials are rather hard to find. Japanese buyers who were looking around a short time ago did not accumulate very much. Current prices are ruling practically unchanged at from $12.50 to about $13 for heavy melting, delivered at buyer's plant, and from $25 to around $27 for cast iron scrap. Business is no more than routine.

Philadelphia

Pig Iron and Scrap Weaker—Finished Steel at Last Week's Levels

PHILADELPHIA, Oct. 24.—There has been no change in steel prices within the past week, except that plates, shapes and bars are more generally quoted at 2c., Pittsburgh. Pig iron is about $1 a ton lower for foundry grades, with indications that Eastern furnaces might go even lower on desirable tonnages to compete with the prices quoted on imported iron. Some scrap prices are also slightly lower than a week ago.

Shipments of steel from the Pittsburgh district to Eastern consumers are delayed by shortage of cars and the workings of the permit system now in force on the Pennsylvania Railroad, but Eastern mills are having little trouble. Apparently steel consumers are not suffering from lack of steel. Most of the pressure for deliveries comes from those having low-priced contracts. A large jobber reports that its "rush shipment" orders have fallen off in the past week or two, indicating that users of steel are fairly well supplied by the mills in spite of transportation handicaps.

Pig Iron.—With coke prices declining, with several furnaces in the East and Virginia ready to blow in soon, and with imported iron coming to Atlantic ports so freely as fairly to flood the market with offerings, it is not surprising that the past week should have brought further softening in pig iron prices. Foundry iron is off at least $1 a ton from last week's published quotations, making the present market $30, furnace, for No. 2 plain and $31, furnace, for No. 2X. There are indications that buyers of 500 tons or more for delivery over the remainder of this year would be able to cover as low as $29, furnace, for No. 2 plain. A week ago the lowest-priced offerings were made by steel companies, but since then merchant furnaces have also reduced their prices to $30, base. One or two steel companies find it as profitable to sell iron at an average price of $30 as to sell plates, shapes or bars at $40 per net ton, Pittsburgh. The Alan Wood Iron & Steel Co. has opened its books for first quarter pig iron contracts, quoting $31 for No. 2 plain and $32 for No. 2X, f.o.b. furnace. Buyers seem little interested in future requirements at the moment, and practically all of the current business, which is small in volume, is for prompt shipment. The decline in price of blast furnace coke is encouraging two or more operators of Eastern furnaces to put their stacks in blast and announcement of their decision is expected this week. One of these furnaces has 30,000 tons of unfilled orders on its books. An Eastern steel company is in the market for 10,000 to 15,000 tons of basic for November shipment and an Eastern subsidiary of the Steel Corporation has been anxious to buy basic if immediate delivery could be promised, as its regular supply from furnaces in the Pittsburgh district has been delayed by car shortage. None of this business had been closed up to to-day, and it seemed likely that furnaces would quote around $29 or $30, furnace, basic being slightly stronger than foundry iron, as there has been little competition in basic from foreign furnaces. A sale of upward of 1000 tons of basic was made last week at $30, furnace. Foreign foundry iron is offered at prices ranging from $27 to $30, c.i.f. Philadelphia, while imported low phosphorus iron, copper free, is now available at about $28, c.i.f. Philadelphia.

[illegible] Philadelphia and include freight rates varying from [illegible]

Virginia No. 2X, 2.25 to 2.75 sil. 38.17

Ferroalloys.—While domestic makers of ferromanganese have had little or no opportunity to quote prices within the past few weeks, $100 per ton, furnace, would be quoted on inquiries. Foreign spiegeleisen is competing with domestic spiegeleisen at $38 for either foreign or domestic, but little business is to be had.

Semi-Finished Steel.—Despite the decline in some finished steel prices, semi-finished steel remains high and firm. Open-hearth re-rolling billets are still quoted at $40 and forging billets at $45, Pittsburgh.

Plates.—A week ago, 2c., Pittsburgh, had been quoted by a few mills on some inquiries, but since then this price has become generally recognized as the market level, and with one or two exceptions all of the plate mills are now quoting 2c., Pittsburgh, on desirable lots of tank steel. For firebox or boiler steel some mills quote slightly higher. The Philadelphia & Reading business, about 900 tons, was divided between two mills which quoted 2c.

Bars.—While little new business in steel bars is coming to the mills their order books are in fairly good condition, independent mills having, as a rule, at least five or six weeks rollings ahead. To compete with steel bars makers of bar iron have reduced prices on that product and are now quoting 2c., Pittsburgh.

Wire Products.—The shortage of wire products is illustrated by the fact that one mill which is quoting $1 a ton above its competitors is having no difficulty in getting all of the business it cares to take.

Warehouse Business.—There is a fair demand upon jobbers for steel out of stock. Prices are unchanged and for local delivery

Coke.—A contract for furnace coke for delivery over the remainder of the year at $8, Connellsville, was under negotiation to-day and may be closed before the end of the week. This is a decline of $1 a ton within the week. Foundry coke is obtainable at $9 per ton, Connellsville. The coke situation is decidedly easier and the pig iron trade is predicting a decline to about $6 a ton.

Old Material.—The outstanding transaction of the week was the purchase of 10,000 or 12,000 tons of heavy breakable cast scrap and car wheels by an Eastern subsidiary of the Steel Corporation, which ran short of pig iron because of the car shortage, its supplies being shipped from the Pittsburgh district. For car wheels $23.50 per ton was paid. On cast the first price paid was $23, but this was dropped by degrees as purchases were made until the last buying was done at $20.50. The present market level for heavy breakable cast scrap, therefore, is slightly higher than a week ago as dealers in covering on their orders are paying at least $21, delivered. Railroad grate bars and stove plate are slightly stronger also, but otherwise the scrap market is weak and there are several declines in prices. No. 1 heavy melting steel is obtainable at $17.50 to $18, delivered at Eastern steel plants. No. 1 cast scrap for foundries is off $1 a ton.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$17.50 to $18.00
Scrap rails	17.50 to 18.00
Steel rails for rolling	21.00 to 22.00
No. 1 low phos., heavy 0.04 and under	25.50 to 26.00
Cast iron car wheels	22.50 to 23.50
No. 1 railroad wrought	22.00 to 23.00
No. 1 yard wrought	19.00 to 20.00
No. 1 forge fire	16.00 to 16.50
Bundled sheets (for steel works)	16.00 to 16.50
No. 1 busheling	15.50 to 16.00
Turnings (short shoveling grade for blast furnace use)	16.00 to 16.50
Mixed borings and turnings (for blast furnace use)	15.50 to 16.00
Machine shop turnings (for steel works use)	15.50 to 16.00
Machine-shop turnings (for rolling mill use)	15.00 to 16.00
Heavy axle turnings (or equivalent)	17.00 to 17.50
Cast borings (for steel works and rolling mills)	16.50 to 17.50
Cast borings (for chemical plants)	22.00 to 23.00
No. 1 cast	22.00 to 23.00
Heavy breakable cast (for steel plants)	21.00 to 22.00
Railroad grate bars	17.50 to 18.00
Stove plate (for steel plant use)	17.50 to 18.00
Railroad malleable	15.50 to 16.50
Wrought iron and soft steel pipes and tubes (new specifications)	15.50 to 16.00
Shafting	29.00 to 30.00
Steel axles	27.50 to 29.00

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Plates

Sheared, tank quality, base, per lb.....2.00c. to 2.25c.

Structural Material

Beams, channels, etc.....2.00c. to 2.10c.

Iron and Steel Bars

Soft steel bars, base, per lb.....2.00c. to 2.15c.
Refined iron bars, base, per lb.....2.60c.

Hot-Rolled Flats

Hoops, base, per lb.....2.90c. to 3.25c.
Bands, base, per lb.....2.90c. to 3.25c.
Strips, base, per lb.....2.90c. to 3.25c.
Cotton ties, per bundle of 45 lb.....$1.13

Cold-Finished Steels

Bars and shafting, base, per lb.....2.50c.
Strips, base, per lb.....4.50c.

Wire Products

Nails, base, per keg.....$2.70
Bright plain wire, base, per 100 lb.....2.45
Annealed fence wire, base, per 100 lb.....2.45
Galvanized wire, base, per 100 lb.....2.95
Galvanized barbed, base, per 100 lb.....3.35
Galvanized staples, base, per keg.....3.35
Painted barbed wire, base, per 100 lb.....3.00
Polished staples, base, per keg.....3.00
Cement coated nails, base, per count keg.....2.20
Woven fence, carloads (to jobbers).....70½ per cent off list
Woven fence, carloads (to retailers).....68 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads...60 and 5 per cent off list
Machine bolts, small, cut threads....50 and 10 per cent off list
Machine bolts, larger and longer....50 and 10 per cent off list
Carriage bolts, ⅜ x 6 in.:
Smaller and shorter, rolled threads, 50, 10 and 5 per cent off list
Cut threads.....50 per cent off list
Longer and larger sizes.....50 per cent off list
Lag bolts.....60 and 5 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads....50 and 10 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.:
Smaller and shorter.....45 per cent off list
Larger and longer sizes.....45 per cent off list
Hot pressed square or hex. blank nuts...$3.25 to $3.50 off list
Hot pressed nuts, tapped..... 3.25 to 3.50 off list
C.p.c. and t. sq. or hex. nuts, blank..... 3.25 to 3.50 off list
C.p.c. and t. sq. or hex. nuts, tapped..... 3.25 to 3.50 off list
Semi-finished hex. nuts:
9/16 in. and smaller, U. S. S....75, 10 and 5 per cent off list
⅝ in. and larger, U. S. S.....70, 10 and 2½ per cent off list
Small sizes, S. A. E.....80 and 5 per cent off list
S. A. E., ⅝ in. and larger.....75 and 5 per cent off list
Stove bolts in packages.....80 and 5 per cent off list
Stove bolts in bulk.....80, 5 and 2½ per cent off list
Tire bolts.....50, 10 and 10 per cent off list

Cap and Set Screws

Milled square and hex. head cap screw.....75 per cent off list
Milled set screws.....75 per cent off list
Upset cap screws.....75 and 10 per cent off list
Upset set screws.....80 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb.....$3.15
Large boiler rivets, base, per 100 lb..... 3.25
Small rivets.....65 per cent off list

Track Equipment

Spikes, 9/16 in. and larger, base, per 100 lb....$2.75 to $2.85
Spikes, ½ in. and smaller, base, per 100 lb..... 3.50
Spikes, boat and barge, base, per 100 lb..... 3.50
Track bolts, base, per 100 lb..... 3.85 to 4.50
Tie plates, per 100 lb..... 2.35 to 2.50
Angle bars, base, per 100 lb..... 2.75

Welded Pipe

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	49	23½	⅛ to ¼	+ 7	−22
¼ to ⅜	56	29½	⅜	26	8
½	60	46½	½	32	17
¾	64	52½	¾	32	19
1 to 3	66	54½	1 to 1½	34	19

Lap Weld

2	59	47½	2	29	15
2½ to 6	63	51½	2½ to 6	32½	19
7 to 8	60	47½	7 to 12	30	17
9 to 12	59	46½			

Butt Weld extra strong, plain ends

⅛	45	28½	⅛ to ⅜	+15	−18
¼ to ⅜	51	34½	½	25	13
½	57	46½	¾	32	18
¾	62	51½	1 to 1½	34	20
1 to 1½	64	53½			
2 to 3	65	54½			

Lap Weld, extra strong, plain ends

2	57	46½	2	30	17
2½ to 4	61	50½	2½ to 4	33	21
4½ to 8	60	49½	4½ to 6	32	20
7 to 8	58	48½	7 to 8	25	13
9 to 12	50	37	9 to 12	20	8

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 and 2½ per cent.

Boiler Tubes

Lap Welded Steel

1¾ in.	21½
2 to 2¼ in.	36
2½ to 3 in.	47
3¼ to 13 in.	52

Charcoal Iron

1½ in.	+ 7
1¾ to 1¾ in.	3
2 to 2¼ in.	.13
2½ to 3 in.	18
3¼ to 4½ in.	20

To large buyers of steel tubes a supplementary discount of 5 per cent is allowed.

Standard Commercial Seamless Boiler Tubes

Discounts on cold-drawn tubes in carload lots, f.o.b. Pittsburgh, follow:

1 in.	57	2½ and 2¾ in.	40
1¼ and 1½ in.	49	3 in.	44
1¾ in.	33	3½ to 4 in.	49
2 and 2¼ in.	36	4¼ in. and 5 in.	41

Hot Rolled

3 in.	46	3½ to 4 in.	51

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take prioe of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base.....85 per cent off list
Carbon 0.30 to 0.40, base.....83 per cent off list
Plus usual differentials and extras for cutting.

Seamless Locomotive and Superheater Tubes

	Cents per Ft.		Cents per Ft.
2-in. O.D. 12 gage	.13	2¼-in. O.D. 10 gage	.17¾
2-in. O.D. 11 gage	.14	3-in. O.D. 7 gage	.33
2-in. O.D. 10 gage	.15	1½-in. O.D. 9 gage	.13
2¼-in. O.D. 12 gage	.15	5⅝-in. O.D. 9 gage	.51
2¼-in. O.D. 11 gage	.16	5½-in. O.D. 9 gage	.53

Tin Plate

Standard cokes, per base box.....$4.75

Terne Plate

(Per package, 200-lb.)

8-lb. coating	$9.30	25-lb. coating I. C.	$14.25
8-lb. coating I. C.	9.60	30-lb. coating I. C.	15.25
15-lb. coating I. C.	11.80	35-lb. coating I. C.	16.25
20-lb. coating I. C.	13.00	40-lb. coating I. C.	17.25

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....2.50c. to 2.85c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.35c. to 3.80c.

Galvanized

No. 28 (base), per lb.....4.35c. to 4.85o.

Tin-Mill Black Plate

No. 28 (base), per lb.....3.35c. to 3.75c.

Manufacturers have pamphlets, which can be had upon application, giving price differentials for gage and extras for length, width, shearing, etc.

Freight Rates

All rail freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic	$0.325	Buffalo	$0.265	St. Louis	$0.43
Philadelphia, export	0.235	Cleveland	0.215	Kansas City	0.735
Baltimore, domestic	0.315	Cleveland, Youngstown		Kansas City (pipe)	0.705
Baltimore, export	0.225	Comb.	0.19	St. Paul	0.595
New York, domestic	0.34	Detroit	0.295	Omaha	0.735
New York, export	0.255	Cincinnati	0.295	Omaha (pipe)	0.705
Boston, domestic	0.365	Indianapolis	0.31	Denver	1.275
Boston, export	0.255	Chicago	0.34	Denver (pipe)	1.215

Pacific Coast	$1.50	Pac. Coast, ship plates	1.20
Birmingham	0.69	Memphis	0.385
Jacksonville, all rail	0.50	Jacksonville, rail and water	0.415
New Orleans	0.515		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 30c. to 40c.; ship plates, 30c. to 40c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 30c. to 40c.; sheets and tin plates, 50c.; rods, wire rope cable and strands, 75c.; wire fencing, netting and stretcher, 50c.; pipe, not over 8 in. in diameter, 50c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

RAILROAD EQUIPMENT BUYING

Fresh Inquiries Call for More Than 20,000 Freight Cars and 225 Locomotives

Fresh inquiries indicate all of 20,000 freight cars added to the railroad equipment now under negotiation and also 225 locomotives. With 125,000 cars already purchased this year, the week's developments look promising. Some of the items are as follows:

The Chicago, Milwaukee & St. Paul is inquiring for 2000 [illegible]

[illegible] is in the market for [illegible]

The Northern Pacific is asking for figures on 3000 box cars.

The Pere Marquette, which is inquiring for 1500 automobile and 500 hopper cars, as announced last week, is also in the market for 500 gondola cars.

The Louisville & Nashville is inquiring for 2000 hopper and [illegible] box cars.

The Detroit, Toledo & Ironton has placed 500 steel hopper cars of 55 tons capacity with the Cambria Steel Co. and a like number with the Standard Steel Car Co., substantially as mentioned last week, the Ford Motor Co. being the buyer.

The Hocking Valley is inquiring for repairs on 1000 freight cars.

The American Short Line wants 50 gondola and 200 stock cars.

The Chicago, Milwaukee & St. Paul is inquiring for 100 Mikado type locomotives.

The Northern Pacific is in the market for 20 Mikado type, 20 Pacific type, 15 switch and 4 Mallet engines.

The Grand Trunk is inquiring for 7 eight-wheel switch engines.

The Chicago, St. Paul, Minneapolis & Omaha is in the market for 15 switch engines.

The Denver & Rio Grande is inquiring for 10 mountain type locomotives.

The Western Maryland has revived an inquiry for 10 consolidation type engines.

The Seaboard Air Line has placed orders for one locomotive each with the three locomotive builders. The latter are to work out the design of the type desired with their own engineering staffs and the builder which produces a locomotive most satisfactory to the railroad will be favored with an order for 22 additional engines of the same type.

The Virginian Railroad is in the market for 500 120-ton coal cars.

On bids opened by the Chicago & North Western on 800 ore cars, the Pullman Co. was low.

The Pennsylvania Equipment Co., Crozer Building, 1420 Chestnut Street, Philadelphia, is in the market for a number of 8000 and 6000-gal. tank cars for rental during the months of November, December and January, for the transportation of molasses, and it also desires to lease 100 tank cars for one year from Feb. 1, 1923, to be used for fuel oil. It is also in the market to purchase about 200 second-hand 100,000-lb. capacity flat bottom steel gondola cars, and one consolidation type locomotive weighing 100 tons.

The Chicago Elevated Railroads have purchased 100 new passenger cars from the Cincinnati Car Co.

FABRICATED STEEL BUSINESS

Fair Amount of Contracting But Slowing Up in Fresh Inquiries

Among the fabricated steel awards of the past week are the following:

New York Edison Co. building, Fifty-second Street, New York, 300 tons, to Hay Foundry & Iron Works.

Two apartment houses in New York, totaling 1000 tons, to A. E. Norton, Inc.

School building in Long Island City, 200 tons, to National Bridge Works.

Definite confirmation is now had of the letting of an apartment building on Park Avenue, 5000 tons, to Post & McCord, the American Bridge Co. furnishing the fabricated steel.

Metropolitan Life Insurance Co., model tenements in Queens, 800 tons, to R. Voras, Brooklyn.

The Bethlehem Steel Bridge Corporation was low bidder on car sheds for the Transit Commission on East 148th Street, New York, the tonnage being 3300 instead of 6000, as first announced.

The McClintic-Marshall Co. was low bidder on bridges for the Baltimore & Ohio Railroad, totaling 2500 tons.

American Steel & Wire Co. warehouse, Denver, Col., 587 tons, wood construction substituted.

Corn Products Refining Company, Plant Building, Argo, Ill., 400 tons, to Vierling Steel Works.

Patterson & Sargent Co. building, Chicago, 227 tons, to Brooks Co., Cleveland.

High School, Cedar Rapids, Iowa, 122 tons, to Rock Island Bridge & Iron Co.

Bridges and bridge repairs, Baltimore & Ohio Railroad, 2500 tons, to McClintic-Marshall Co.

Buckeye Commercial Savings Bank, Findlay, Ohio, 200 tons.

[illegible] for Great Northern Railway Co., F. A. Bushnell, St. Paul, purchasing agent.

Structural Projects Pending

Inquiries for structural steel work now being figured on include the following:

[illegible] tons.

Power house in Indiana to be erected by Stone & Webster, 2200 tons.

Missouri Pacific, one 80-ft. and two 60-ft. deck plate [illegible]

High school, Evansville, Ind., 250 tons, bids close Oct. 25.

Elks' Temple, Louisville, Ky., approximately 800 tons, bids close Nov. 1.

Mengel Body Co., Louisville, Ky., 200 tons, private plans.

Gymnasium, Ohio University, Athens, Ohio, 200 tons, bids in.

Louisville & Nashville freight station, Knoxville, Tenn., 250 tons, bids close Oct. 25.

Motor Company Additions

The Chevrolet Motor Co., Flint, Mich., and the Fisher Body Co. Corporation, Detroit, subsidiaries of the General Motors Corporation, have announced further expansion plans. The Samson Tractor Co.'s plant at Janesville, Wis., will be dismantled and remodeled for the Chevrolet and Fisher interests. Two large additions have been started, one providing 96,000 sq. ft. of floor space to be utilized by the Fisher Body Corporation, while the other new building will be used for assembling Chevrolet cars. The two new buildings will be ready for occupancy Jan. 1.

New Lukens Warehouse

The Lukens Steel Co., Coatesville, Pa., has acquired property at New Orleans, La., comprising a portion of the former shipyard of the Foundation Co., on the industrial canal, as a site for the erection of a new branch warehouse. The initial plant will consist of a four-unit structure, 75 x 250 ft., estimated to cost about $300,000, including equipment. At a later date, it is proposed to construct a fabricating plant at this location to replace the plant the company now operates at New Orleans.

Government Scrap Sold at Toledo

At the Government sale of scrap metals held at Toledo, Ohio, Oct. 23, 13,000 tons of shell forgings was sold at $20.89, Toledo, to Hickman, Williams & Co.; 2,000 tons of trench mortar forgings were sold to Samuels & Co., Brooklyn, at $16.77 and 7,000 tons of finished shell casings with copper bonds attached were sold at $23.06.

No bids were received for the plant and equipment of the Barney & Smith Car Co., offered at receiver's sale at Dayton, Ohio, Oct. 17. Negotiations are being carried on between the bondholders' committee and several large car manufacturing companies for the sale of the property, and it is expected that a deal will be completed within the next two or three weeks.

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery

Oct.	Copper, New York Lake	Copper, New York Electrolytic*	Straits Tin New York	Lead New York	Lead St. Louis	Zinc New York	Zinc St. Louis
18.....	14.12½	13.62½	35.00	6.65	6.30	7.17½	6.82½
19.....	14.12½	13.62½	34.85	6.65	6.30	7.20	6.85
20.....	14.00	13.50	34.95	6.65	6.30	7.20	6.85
21.....	14.00	13.50	....	6.65	6.30	7.20	6.85
23.....	14.12½	13.62½	35.25	6.65	6.35	7.30	6.95
24.....	14.12½	13.62½	35.2	6.65	6.40	7.35	7.00

*Refinery quotation

New York

NEW YORK, Oct. 24.

None of the markets is very active. In some the price tendency is higher and in others steady. Demand for electrolytic copper is fairly good and the market is steady after a slight reaction. Prices of both tin and zinc have advanced sharply on fairly good sales, but there is practically no change in the lead market.

Copper.—There have been persistent reports that electrolytic copper has been sold as low as 13.75c., delivered, in the past week, and a canvass of the market shows that some sales were made at this level the latter part of last week, but that at present practically no metal is available at less than 13.87½c., delivered, or 13.62½c., refinery. This represents the present market and metal at these prices is available from dealers and some small producers, but most of the large producers are either out of the market or not quoting less than 14c., delivered. Lake copper is generally quoted from 14c. to 14.25c., delivered. General demand is fair.

Tin.—Prices of Straits tin have advanced quite sharply in the past week on a fairly large turnover. As a result there has been considerable selling for profit, particularly by dealers, and there has been some buying in this market by London houses. The largest sales were made on Thursday, Oct. 20, when the total amounted to over 500 tons, part of this being bought by consumers and part by London houses, at a range of 34.62½c. to 35c. On that day metal for future shipment from the East was easy at 34.62½c. On both Friday and Saturday, Oct. 20 and 21, there was fair activity with dealers the principal buyers. On the New York Metal Exchange there were more transactions during the week than for some time. Yesterday and to-day the market has been very quiet with the quotation for spot Straits to-day at 35.25c., New York. The London market has continued to advance until to-day spot standard was quoted at £174 7s. 6d., future standard at £175 2s. 6d. and spot Straits at £175 10s., all about £5 per ton higher than a week ago. This is the principal cause of the advance in the New York market to a price higher than in many weeks. The extent of the advance here, however, in proportion to that in London, has been retarded partly because of a sharp decline in exchange. Arrivals thus far this month have been 5541 tons, with 7810 tons reported afloat.

Lead.—The lead market continues firm and steady, but fairly dull. Price changes are insignificant. Consumption is heavy, but there continues to be no spectacular demand and no pressure by producers to sell. The situation is a little stronger at St. Louis, where the outside market is now quoted at 6.40c., St. Louis. Quotations at New York are unchanged at 6.50c. for the leading interest and 6.65c. for the independents.

Zinc.—Prices for prime Western have advanced sharply until they have reached the highest levels for the year. Prime Western for early delivery is quoted at 7c. to 7.05c., St. Louis, or 7.35c. to 7.40c., New York, and sales have been made at the lower level. The market has advanced almost daily on moderate sales and demand from both galvanizers and brass makers is reported good. Besides the reduction in stocks and the difficulty in increasing production, due to the scarcity of labor, the sharp rise in the London market has been a factor in the advance. It is the general opinion that the British will have to come into the American market in the very near future for some of their supply of zinc.

Antimony.—Wholesale lots of Chinese metal for early delivery are quoted at 6.75c. per lb., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, made by foreign producers, is quoted by importers at 20c. to 21c. per lb., New York, duty paid, but public quotations of the leading American producer continue to be unobtainable.

Old Metals.—The market is quiet and trading is limited. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	13.37½
Copper, heavy and wire	12.50
Copper, light and bottoms	11.25
Heavy machine composition	10.50
Brass, heavy	8.25
Brass, light	6.50
No. 1 red brass or composition turnings	9.50
No. 1 yellow rod brass turnings	7.50
Lead, heavy	5.50
Lead, tea	4.00
Zinc	4.25

Chicago

Oct. 24.—Copper has declined, while tin and spelter have advanced. Tin has advanced through speculation. London purchases of tin in New York last week averaged 1000 tons a day. This unusual development is ascribable to an effort to run up the market. Copper has weakened following reports that a large producer had sold a considerable tonnage at a concession in price. Demand for zinc and lead is alternately good and bad, but the net result is a firm market. Some of the old metal grades have advanced in sympathy with new material. We quote, in carload lots, lake copper, 14.37½c.; tin, 36c. to 37c.; lead, 6.37½c.; spelter, 7c.; antimony, 8.50c., in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 11.50c.; copper bottoms, 9.75c.; red brass, 9c.; yellow brass, 7c.; lead pipe, 4.87½c.; zinc, 4.50c.; pewter, No. 1, 23c.; tin foil, 24c.; block tin, 29c., all buying prices for less than carload lots.

St. Louis

Oct. 24.—Lead for the week was firm at 6.35c., car lots, while slab zinc was firmer, up 15 points, at 6.80c. On old metals we quote: Light brass, 3.50c.; heavy red brass and light copper, 7c.; heavy yellow brass, 4c.; heavy copper and copper wire, 7.50c.; zinc, 2c.; pewter, 15c.; tin foil, 20c.; tea lead, 2c. and aluminum, 9c.

J. A. Fay & Egan Co. Buys Plant

The J. A. Fay & Egan Co., woodworking machinery manufacturer, Cincinnati, has purchased the plant of the Trailmobile Co. in the Oakley district, and will occupy it about Jan. 1. The Fay & Egan Co. had completed plans for a new factory in the Bond Hill section, but the completion of the deal for the Trailmobile plant will enable the company to move from its present plant, which has been sold to a warehousing syndicate, almost at once. The new plant will give the company 150,000 sq. ft. of floor space, against 200,000 at present occupied, but its modern construction will enable the company to utilize the smaller floor space to much better advantage. The Trailmobile plant was completed in 1919, and is one of the most modern industrial plants in the Middle West.

To Make Hoffmann Bearings in United States

The Norma Co. of America has acquired the American patents and business of the Hoffmann Mfg. Co., Chelmsford, Essex, England, maker of roller, ball and thrust bearings. The line of Norma precision ball bearings will now be supplemented with Hoffmann bearings. The Norma company, Anable Avenue, Long Island City, N. Y., will erect a new plant for the manufacture of Hoffmann products in America. Meantime they are being imported by the Norma company.

PERSONAL

John Calder, consulting engineer, Lexington, Mass., who has devoted the past three years to organizing and managing the industrial relations of Swift & Co. in its various plants in the United States and Canada, as central office from Chicago, will return to his practice in organization, management and industrial counsel on Nov. 1. Mr. Calder has been appointed industrial adviser to Swift & Co.

Joseph K. Larkin, president J. K. Larkin & Co., Inc., 253 Broadway, New York, recently celebrated the 30th anniversary of his connection with the iron and steel industry. In 1901 Mr. Larkin organized the firm of J. K. Larkin & Co., which, under his direction, has steadily grown, until it now ranks among the leading distributors of iron and steel products in the country. Mr. Larkin long has been a student of the metallurgy of iron and steel. He also attended New York Law School.



JOSEPH K. LARKIN

Several changes in the car works organization of the Pullman Co. were made necessary by the resignation of J. B. Weaver as vice-president. Peter Parke, chief engineer, while retaining that title, has been transferred to the economy and improvement department, where his duties will involve research and experimental work with regard to modern methods and machinery. E. W. Test, formerly of the Michigan City plant of the company, has taken over Mr. Parke's former duties with the title of general mechanical engineer. P. L. Randall becomes acting superintendent of car service, and J. K. Tully, who has been a special inspector in yard service, becomes assistant superintendent of yards.

Joseph B. Weaver has resigned as vice-president of the Pullman Co., an office which he has held since 1919. Previously he was vice-president and general manager of the Harlan & Hollingsworth plant of the Bethlehem Shipbuilding Co., Wilmington, Del., having gone to Wilmington from the Newport News Shipbuilding & Dry Dock Co., where he had been superintendent of hull construction. Mr. Weaver is a graduate of Cornell, class of 1902.

G. A. Richardson, advertising manager, Pittsburgh, of the Midvale Steel & Ordnance Co., showed that company's film, "The Process of Manufacturing Steel," before the students of Washington University and also the Associated Engineering Clubs at St. Louis. He left that city for Texas, where the film will be shown at Marshall, Dallas, Forth Worth, Waco and San Antonio.

W. H. Phillippi, vice-president Lackawanna Bridge Works Corporation, a subsidiary of the Lackawanna Steel Co., and one of the properties recently taken over by the Bethlehem Steel Corporation, has resigned.

T. W. Harris, general foreman at the blast furnace of the St. Louis Coke & Chemical Co., Granite City, Ill., sailed from New York this week to become connected with the blast furnace staff of the India Iron & Steel Co. at Asansol, Bengal, India. He expects to arrive in India in time for the blowing in of the first 500-ton furnace, which has been under construction in the past year.

George D. Cameron has tendered his resignation, effective Jan. 1., as manager of the coal department of Pickands, Mather & Co., Cleveland, which he has held for a [illegible]

Alfred D. Flinn has been elected director of the Engineering Foundation. This is the organization brought into being some years ago through the initial donation of a large sum of money by Ambrose Swasey for fostering organized industrial research on a nation-wide scale. Mr. Flinn, who is also secretary of the United Engineering Society, the organization which holds the Engineering Societies Building in New York, has retired as chairman of the engineering division of the National Research Council in order to accept the new appointment, but he will continue as secretary of the United Engineering Society, thus providing that the foundation will continue intimate relations with the so-called founder engineering societies.

Joseph E. Moore, for about 15 years identified with the New York office of the Bethlehem Steel Co., has been appointed structural steel sales agent of the company at Detroit, with headquarters in the Penobscot Building. The establishment in Detroit of a structural steel office marks a departure for the Bethlehem company.

O. R. Paine, who has been assistant to L. R. Stewart, manager of the structural sales department of Bethlehem Steel Co.'s Philadelphia office, has been appointed to have charge of the structural sales of the company's Baltimore office, Continental Building.

Edward T. Peterson, formerly with the Treadwell Engineering Co., Easton, Pa., has been appointed chief engineer of the Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.

Horace C. Barker, formerly industrial engineer, Toledo Scale Co., Toledo, Ohio, has been appointed general manager for the General Radio Equipment Mfg. Co., Chicago.

Oliver Stubbs, who represented the Institution of British Foundrymen at the meeting in Rochester of the American Foundrymen's Association, has been elected senior vice-president of the institution as a step to provide for his re-election as president of the organization. He served as president last year and traveled 30,000 miles on institution work, a feat which he stated he was not prepared to do again, though willing to accept the office a second time and serve foundry interests in other ways.

Warren F. Fraser, president, has resumed the general management of the Warren F. Fraser Co., Westboro, Mass., automatic cylindrical grinders, metal products, etc. Sydney Player, formerly vice-president and general manager, and Joseph N. Bethel, formerly vice-president and sales manager, have formed a selling partnership under the firm name of the Bethel-Player Co., and will continue to sell the products of the Warren Fraser Co.

Frederick D. Dimmick, 501 Franklin Bank Building, Philadelphia, in addition to his own territory, has been appointed exclusive sales agent of the Sloss-Sheffield Steel & Iron Co., Birmingham, Ala., in the New York district.

Jay L. Hench, formerly district sales manager of the Lackawanna Steel Co. at Chicago, has been appointed manager of sales, Hillside Fluor Spar Mines, Chicago, and is also to be vice-president and a member of the board of directors.

A. D. Fishel has been appointed Cleveland representative of the Mahr Mfg. Co., with offices at 1202 Illuminating Building, Cleveland.

Louis W. Byrne, formerly with Burton Griffiths & Co., Ltd., New York, has been appointed sales manager of Wilmarth & Morman Co., Grand Rapids, Mich., manufacturer of grinding machines, effective Nov. 1.

Homer D. Williams, president Carnegie Steel Co., has been appointed member of the Pittsburgh Board of Public Education. The appointment is for six years. Mr. Williams also is a member of the State Council of Education and a trustee of the University of Pittsburgh and the Carnegie Institute of Technology.

George Furman, until recently plant manager of the Chicago works, Niagara Radiator & Boiler Co., and formerly associated with Henry E. Pridmore, Chicago, has joined the sales force of Beardsley & Piper, Chicago, manufacturer of sand slinging machines.

R. H. Becker, formerly connected with the machine tool building and sales department of Joseph T. Ryerson & Son, is now with the Milwaukee Machinery Co., 93 West Water Street, Milwaukee. He will have charge of machine tool sales in part of the Milwaukee and in southern Wisconsin.

Kent Harrison, who for the past three years has been in charge of open hearth operations with the American Rolling Mill Co., Ashland, Ky., has resigned to become superintendent of open hearth operations of the Donner Steel Co., Buffalo, effective Nov. 1. He was trained in the mills of the Illinois Steel Co., and has done some good work both as operator and steel maker.

P. C. Idell, who has been connected with the engineering and sales department of the Babcock & Wilcox Co., 85 Liberty Street, New York, for 23 years, has been appointed manager of its New England office at 49 Federal Street, Boston.

D. K. Swartwout and Herman H. Lind have resigned as president and vice-president respectively of the Ohio Body & Blower Co., Cleveland. M. A. Middleton, Boston, has been elected president to succeed Mr. Swartwout.

OBITUARY

William B. Rhodes, director S. Severance Mfg. Co., Pittsburgh, who at one time was identified with the Pennsylvania Tube Works, founded by his father, Joshua Rhodes, now the Pennsylvania Works, National Tube Co., died Oct. 20, at the home of his sister, Mrs. H. N. Van Voorhis, Sewickley Heights, Pa. He was 59 years old.

Louis P. Lincoln, superintendent of the beam-fitting department of the Homestead works, Carnegie Steel Co., fell dead while at work on the afternoon of Oct. 20. He was born Aug. 8, 1866, in Laurelton, Pa. and attended Dickinson College. During the past 10 years he had been burgess of Munhall, Pa.

James A. King, one of the organizers of the King Bridge Co., and for many years president of that company, died Oct. 19. He retired from active business several years ago, and had been an invalid for a number of years. Norman C. King, a son, is secretary-treasurer of the company.

L. A. Burrell, Cincinnati representative of the Sharon Steel Hoop Co., died at his residence in that city on Oct. 17. He was born in Bellefonte, Pa., and was at one time a member of the State Legislature. He was 66 years old, and is survived by his wife and two daughters.

John C. Kroner, president LaCrosse Steel Roofing & Corrugating Co., and of the Fred Kroner Hardware Co., LaCrosse, Wis., died suddenly on Oct. 18, in Atlantic City, N. J., while attending the national wholesale hardware convention. He was widely known as manufacturer and jobber of hardware and sheet metal goods. Mr. Kroner was 57 years of age and a native of LaCrosse.

Charles A. Brayton, president Standard Car Wheel Co., Cleveland, died suddenly on Oct. 15, having succumbed to heart trouble during the night. He was 47 years of age and had been connected with the company 20 years, becoming president after the death of his father who also had held that position. He was graduated from Yale University in 1899.

GERMAN PRICES ADVANCE AGAIN

Foundry Iron and Steel Figures Up 3 to 5 Per Cent in Week

(By Radiogram)

Berlin, Germany, Oct. 23.—Foundry iron No. 1 has been raised from 38,099 m. (last week) to 40,176 m. per metric ton. (This represents $9.70 per gross ton, at 2⅜c. per 100 m.) Similar advances have been made in steel ingots, 59,470 m. ($14.35) in place of 57,640 m.; steel bars, 81,200 m. (0.94c. per lb.) in place of 78,700 m.; thin sheets, 25 gage, now 120,680 m. (1.40c. per lb.) in place of 116,970 m.

[In all of these cases the world price, expressed in dollars (or cents) is much lower than last week, due to the drop in exchange from 3½c. to 2⅜c. per 100 m. As shown on page 1021, Oct. 19, the translated prices a week ago were: foundry iron, $13.55; ingots, $20.50; bars, 1.25c. per lb., and sheets, 1.86c. per lb. The table on that page gives figures for these four products, covering the principal changes of the past seven months.]

Wheeling District Steel Plant Operations Increase

Wheeling, W. Va., Oct. 23.—Operations in local plants show some increase. The Laughlin plant, American Sheet & Tin Plate Co., Martins Ferry, has 20 of the 23 mills working. Three additional tin mills have gone on at the Creek plant of Whitaker-Glessner Co. The top furnace, Wheeling Steel & Iron Co. has gone into blast. Operating schedules for the week follows:

Wheeling Steel Corporation

Wheeling Steel & Iron Co.: Benwood plant 67 per cent; Belmont plant, 65 per cent; Top mill furnace, operating; Yorkville plant, 50 per cent.

Whitaker-Glessner Co.: Wheeling mills, 100 per cent; Martins Ferry mills, 80 per cent; Beech Bottom plant, 100 per cent; Wheeling Can department, 75 per cent; Portsmouth plant, 85 per cent.

LaBelle Iron Works: Steubenville plant, 75 per cent; Wheeling plant, 95 per cent.

United States Steel Corporation

National Tube Co.: Riverside plant, Benwood, idle.

American Sheet & Tin Plate Co.: Laughlin plant, Martins Ferry, 87 per cent; LaBelle plant, Wheeling, idle; Aetna-Standard, Bridgeport, Ohio, idle.

Carnegie Steel Co.: Bellaire plant, idle; Mingo Junction, two of four blast furnaces in blast and sheet bar mills running full.

Persistent Reports of Wage Advances Nov. 1 Not Credited in Pittsburgh

Pittsburgh, Oct. 23.—A further increase in steel mill wages, to become effective Nov. 1, is common gossip here, but actual confirmation that any on the companies will make an increase is not to be obtained. Reports have reached here from the East to the effect that independent companies would advance wages of common labor 10 per cent, but investigation among the leading companies brings forth the statement that no action yet has been taken. It is admitted, however, that common labor wage scales here are unattractive by comparison with those paid in other industries and that there is still a marked shortage of this class of help.

Provision for Open Top Cars

Washington, Oct. 24.—Effective yesterday, by an amendment to service order No. 25, made public last Wednesday, the Interstate Commerce Commission made provision for the supply and distribution of open-top cars suitable for the loading and carrying of coal to wagon mines and it also added foundry sand and materials for car and locomotive construction or repair to the list of commodities which may be loaded in open-top cars in the direction of, but not beyond, the mine or mines to which the open-top cars are destined for coal loading. The addition of these products will help the iron and steel, foundry and lumber trades particularly.

British Iron and Steel Market

America Still Inquiring for Pig Iron—Tin Plate Price Agreement Signed by 93 Per Cent of the Makers

(By Cable)

LONDON, ENGLAND, Oct. 24.

While there is still a moderate American demand for pig iron, other export buying is slow, owing to high prices. Fuel is still advancing and increased production of pig iron at present is unlikely. America is buying on the East Coast and Welsh hematite makers' stocks are now practically cleared. Prices are firmer.

Finished iron and steel generally is quiet, with quotations unaltered. The Indian Government is inquiring for 92 locomotives.

There is fair demand for Continental iron and steel, owing to the depreciation of money exchanges, but the works generally are firm and are not keen to reduce prices. Continental merchant bars are offered at £6 16s. (1.35c. per lb.) f.o.b.; sheet bars at £6 7½s. to £6 10s. (1.26c. to 1.29c. per lb.) c.i.f. Wales. German billets are quoted at £5 10s. ($24.42) f.o.b.

Tin plate demand is affected by the price agreement, but some business is being done at the new figures. There is good inquiry from Scandinavia, Australia, Canada and India, but Japan is quiet. Ninety-three per cent of the tin plate makers have agreed to maintain the minimum price. Welsh tin plate bar makers will sell bars at £7 ($31.08) delivered to these tin plate works, but charge £7 7½s. ($32.75) to tin plate works outside the agreement.

There is improved demand for galvanized sheets. Prices are firmer on dearer spelter. Small business is being done with South Africa, South America, Australia, China and the Straits Settlements.

Black sheet makers have fixed minimum prices for Japanese specifications. Good business is passing at the old prices and a moderate amount of inquiry continues.

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $4.44 per £1, as follows:

Furnace coke, delivered	£1 11s			$6 88	
Cleveland No. 1 foundry	4 17½			21 64	
Cleveland No. 2 foundry	4 15½	to 4 16s		20 53 to $21 09	
Cleveland No. 4 foundry	4 10			19.98	
Cleveland No. 4 forge	4 5			18 87	
Cleveland basic	4 0			17 76	
East Coast mixed	4 12½	to 4 15		20 53 to 21.09	
Foundry coke	17 0			66 60	
Ferromanganese*	11 10	to 14 15		64 38 to 65 49	
Rails, 60 lb. and up	7 5	to 8 0		32.19 to 35.52	
Billets	5 5½	to 5 6		24 63 to 25 52	
Sheet and tin plate bars,					
Welsh	7 0	to 7 7½		31 08 to 32 75	
Tin plates, basic box	1 0½	to 1 0 19/28		4 27 to 4 30	
				C. per Lb.	
Angle bars	8 10	to 9 0		1 68 to 1 78	
Beams	11 10	to 12 0		2 28 to 2 38	
Tees	9 0	to 9 10		1 78 to 1 88	
Channels		to 8 15		1 63 to 1 73	
Beams		to 8 15		1 63 to 1 73	
Rounds and squares		to 9 10		1 78 to 1 88	
Galvanized sheets, No. 4		to 16 10		3 22 to 3 27	
Galvanized sheets, No. 28					
gage, delivered	15	to		2 78 to 2 97	
Black sheets, No. 28	14	to 14 10*		2 18 to 2 28*	
Cotton ties, Indian specifi-				4 58	
				2 9-	

Continental Prices, All f. o. b. Channel Ports. Delivery as Specified

				$18 [illegible] to $19 42
				[illegible]
				19 98
				[illegible]
				[illegible]
				[illegible]
				[illegible]
				[illegible]
Wire nails (keg basis)				[illegible]
				[illegible]
				[illegible]
				[illegible]
				[illegible]

Tees:				
Belgium	£8 5s.			1.63c.
Merchant bars:				
Belgium, Jan., Feb.	7 0	to £7 5s.		1.39 to 1.44c.
Luxemburg, Jan.	7 0	to 7 2½		1.39 to 1.41
France, Jan., Feb., Mar.	7 0	to 7 7½		1.39 to 1.46
Germany, Jan., Feb., Mar.	7 0	upward		1.39
Joists (beams):				
France, Dec.	6 8	to 6 10		1.27 to 1.29
Belgium, Dec.	6 8	to 6 10		1.27 to 1.29
Luxemburg, Dec.	6 8	to 6 10		1.27 to 1.29
Channels:				
Belgium	7 10	to 7 12½		1.49 to 1.51
⅜-in. plates:				
Germany, Dec., Jan.	7 5	to 7 7½		1.41 to 1.46
Belgium, Dec.	7 7½	to 7 10		1.46 to 1.49
Luxemburg, Dec.	7 5	to 7 7½		1.44 to 1.46
France, not offered.				
½-in. plates:				
Germany	9 0			1.78
No. 8 gage wire:				
Belgium	14 10⅝			2.88

Preliminary Improvements at Lackawanna Plant

BUFFALO, Oct. 24.—Razing of old frame structures and the erection of steel and brick buildings, installation of sanitary facilities for the convenience of the men, and the improvement of railroad facilities essential to a better movement of freight both incoming and outgoing, are the first steps taken by the Bethlehem Steel Corporation in its process of improving the Lackawanna Steel plant recently acquired. Work has already been started and preliminary steps were inspected by President E. G. Grace and Vice-president Quincy Bent. Mr. Grace made his first official visit to the plant since it was taken over by the Bethlehem interests.

Water transportation for the movement of steel products and pig iron will be developed by the Bethlehem organization at Lackawanna. One of the first observations by Mr. Grace at the plant was that this facility had not been developed in proportion to the opportunities offered by reason of the natural advantages offered through lake and river connections.

The full program of improvements at the Lackawanna plant calls for the spending of over $15,000,000. The changes will be mainly in departments other than the rail mill. The new construction will include some additions to both blast furnace and coking plants. The company expects to be a continuing factor in the merchant pig iron market.

Detroit Scrap Declines

DETROIT, Oct. 24.—While there has been no decided decrease in the melting schedules of the Detroit and Michigan foundries, the scrap market has shown a slight decline on almost all materials. Producers have been forced to pile all grades of scrap which ordinarily would be moved to melting points, and car shortage is more acute than ever. The following prices are on a gross ton basis f.o.b. cars producers' yards, excepting stove plate, automobile and No. 1 machinery scrap, which are quoted on a net ton basis:

Heavy melting steel	$16.00 to $16.50
Shoveling steel	16.00 to 17.00
No. 1 machinery cast	21.00 to 23.50
Cast borings	12.50 to 14.00
Automobile cast scrap	23.00 to 25.00
Stove plate	21.00 to 23.00
Hydraulic compressed	17.00 to 18.00
Car wheels	21.00 to 22.00

The Dodge scrap for November delivery, consisting of approximately 4000 tons of turnings, flashings, borings and hydraulic compressed, will be awarded the latter part of the month on a competitive basis.

Asking for Prices for Next Year

YOUNGSTOWN, O., Oct. 24—Steel buyers are beginning to ask the mills for prices to apply in the first quarter of next year. Makers are largely withholding quotations, but one interest says it expects to open its books about Dec. 1. Talk of a $37.50 sheet bar price for the first quarter is heard.

Though accumulated output due to car shortage is being cleared, one independent still has 7,000 tons of sheets piled.

BOOK REVIEWS

Health and Efficiency. By Thomas Darlington, M. D. Pages 262, 5¾ x 8¾ in. Published by Wynkoop, Hallenbeck, Crawford Co., New York. Price, $1.50.

Dr. Darlington is well known to the steel trade for his unstinted service as secretary of the welfare committee of the American Iron and Steel Institute. He has done much to give "welfare" work a better name in industry and to put it on a basis more enduring than mere sentiment or even self-interest could give it. All this because he brought to his industrial work a ripe experience in the practice of medicine and in the administration of laws safeguarding the public health.

In writing the book Dr. Darlington says that he aimed to give the reasons for the principles of physiology and to show their application to the human machine in every-day working and living conditions. He meant it as a contribution to the great conservation movement that must follow the war's riot of expenditure of time, money and lives. In all his effort in behalf of workers in iron and steel the author has stressed attention to the common details of care of the body and the necessity for periodic physical examinations. The surprise to physicians who have made many physical examinations of workmen of ordinary intelligence and education is not so much, he tells us, to find the large percentage of physical defects, but to find so few of those examined who had the faintest idea of having defects, or who were aware of their impaired physical condition.

In simple style and with no trace of professional pedantry in matter or manner, the results of Dr. Darlington's long experience are set down, and running through his whole counsel is the spirit of helpfulness and of optimism. The chapter headings are often single words, as Air, Food, Sleep, Exercise, Sunshine and Clothing. Getting Tired is the subject of an important chapter, recalling Dr. Darlington's iron and steel works addresses on fatigue. There are chapters also on Baths and Bathing, Drinking Water, Care of the Mouth and Teeth, and How to Avoid Disease of the Lungs. What is said and the manner of saying it indicate that back of the practitioner is one who would be known as a friend of man, one who would make a full appraisal of the value of faith, a well-ordered life and a right mental attitude in their relation to health and therapy. The book should have a widespread reading both among employers and employees.

The Journal of the Institute of Metals, Vol. XXVII, edited by G. Shaw Scott, Institute of Metals, 36 Victoria Street, London, S. W. 1, England, covers practical problems relating to the corrosion, protection and season cracking of condenser tubes, failure of aluminum alloys, recrystallization of cupro-nickel and other metals. The first 300 pages of the book are given over to these subjects. The volume concludes with an abstracts section containing several hundred concise summaries of metallurgical papers that have been published in all parts of the world. The list of names of papers abstracted covers 11 pages. The book may be obtained from Institute of Metals at the address given. The price is 31s. 6d. net.

NEW TRADE PUBLICATIONS

Steel Conveyors.—Sandvik Steel, Inc., 233 Broadway, New York. Catalog No. 18, 26 pages. Information is given on the application of the steel belt in conveying problems, also as to its efficiency and economy. Illustrations are supplemented with fractional views of various units in the construction.

Electric Railroads.—Bulletin No. 44016, General Electric Co., Schenectady, N. Y. The progress of steam railroad electrification is traced on numerous systems in Asia, Europe, and North and South America, telling of physical and mechanical problems encountered in modernizing private and public roads. Freely illustrated, showing various types of motors and dynamo rooms. Size, 20 pages, 10 x 12-in.

Boilers.—E. Keeler Co., Williamsport, Pa. Condensed bulletin giving detailed description and illustrations of the three types of Keeler boilers. It includes a comprehensive table of dimensions of all important sizes together with setting plans. Size, 20 pages, 6 x 9-in.

Power Tools.—Chicago Pneumatic Tool Co., 6 East Forty-fourth Street, New York. Special publication No. 686, illustrates and describes power operated tools, showing novel methods in their use.

Grinders and Buffs.—J. G. Blount Co., Everett, Mass. Small booklet describes and illustrates its line of ball-bearing motor grinders and motor buffs.

Digest of Patent Laws of the World.—Mida's Trade Mark and Patent Bureau, Ellsworth Building, Chicago. Bulletin No. 106 gives in four pages a brief digest of the patent laws of the world, showing the duration of life of the patent, the proper applicant, the limitation on filing, the tax period and the requirement as to working of patent. The digest covers 100 countries and colonies.

Pinion Rods and Cold Drawn Shapes.—A. B. & J. Rothbone, Palmer, Mass. In a 20-page catalog, 6 x 9 in., are illustrated some dozens of irregular shapes made in aluminum, brass, phosphor and tobin bronze, German silver, etc., for a great variety of purposes. These are used in watches and clocks, typewriters, adding, calculating, multigraphing and motion picture machines, carbureters, magnetos and small motors, cameras, telegraph instruments, telephones, vacuum cleaners, locks, dental apparatus, firearms and a great variety of other machines and instruments.

All in a Day's Work.—Osborn Mfg. Co., Cleveland. In a 16-page pamphlet, featuring molding machines, are shown various types of castings made and patterns for use with molding machines. Data are given of the Osborn roll-over jolt molding machine, various dimensions, weights and figures for capacity being tabulated.

Ballard-Sprague Construction Service.—Ballard-Sprague & Co., 200 Fifth Avenue, New York. A 20-page pamphlet, 6 x 9, devoted to specialized construction service in boiler settings and chimneys, together with special work in the line of bridge pier foundations and concrete buildings. The pamphlet describes the building of radial brick chimneys, and shows, among other things, reinforced concrete acid towers. Tables are given showing the sizes of chimneys fitted to various boiler powers and giving the maximum intensity of chimney draft for various chimney heights and gas temperatures.

Alloy Steels.—The Central Steel Co., Massillon, Ohio. Booklet of 44 pages, giving a brief story of the evolution of the alloy steel industry. Lists many parts for which alloy steels are used, and calls attention to the various qualities that have led to the adoption of certain alloy steels for specified products. Numerous charts are included giving chemical and physical characteristics of many most generally used alloy steels. Specifications are also given of some of the special alloy steels made by this company.

Chilled Iron Wire Drawing Dies and Hard Iron Castings.—McFarland Foundry & Machinery Co., Trenton, N. J. A 4-page circular devoted to dies for wire drawing, varying from those with 1 hole to those with 16 holes, the range is 26 sizes, going as small as No. 25 B. & S. gage and weighing from 4 oz. to 37 lb. Special shapes also are made in hard cast iron in a variety of patterns.

Combustion Device.—Crown Fuel Saver Co., Richmond, Ind., Earl F. Whitaker, agent, 30 Church Street, New York. Illustrated circular describing a device for introducing supplementary air for combustion immediately above the fuel bed of coal-burning furnaces.

Tile.—The Carborundum Co., 50 Church Street, New York. Catalog, describing and illustrating various conditions under which anti-slip tile may be used to give a lasting resistance on walking surfaces, indoors and out. A specification guide for placing or repairing tile floors is included. Size, 22 pages, 9 x 5 in.

Machinery Markets and News of the Works

RAILROADS STILL INQUIRE

Chicago & Northwestern Issues List of 19 Tools

Other Purchases Small, But a Fair Volume of Machine-Tool Business Is in Prospect

Railroad business continues to dominate the machine-tool situation. The Pennsylvania Railroad, Central Region, has inquired for 10 tools. A large list from the same road for its Columbus, Ohio, shops has been expected at Cleveland, but it is stated that it probably will not be issued until the first of the year. No action has yet been taken on the 80 tools inquired for by the Eastern division of the road.

At Chicago the Chicago & Northwestern Railroad has issued an inquiry for 19 tools, which is regarded as a forerunner of a larger list. The St. Louis-Southwestern has an inquiry out for a half dozen machines and the Santa Fe has added a few tools to its recent purchases. The Rock Island has bought one tool within the past week and is in the market for two others.

At Pittsburgh the Pittsburgh & Lake Erie Railroad is inquiring for seven tools. The Missouri-Kansas-Texas Railroad has placed a few orders with Cincinnati builders. Included in the recent orders of the Baldwin Locomotive Works, Philadelphia, were 10 planers, which will be furnished by a Cincinnati machine-tool company. The Ramapo Iron Works, Hillburn, N. Y., is reported to have bought 12 planers.

In the East the principal buying of the past week has been done by the General Electric Co., Schenectady, N. Y., which is rounding out tool purchases begun several weeks ago.

Among prospective buyers of machinery, mostly woodworking, is the Mengel Body Co., Louisville, Ky., which is expected to buy a complete line of machines for a body-building plant.

A few price advances have taken place within the past week notably one of 15 per cent by a leading manufacturer of drilling machines.

New York

NEW YORK, Oct. 24.

EACH week brings a slight improvement in machine-tool buying in the Eastern district, but the volume still falls far short of being satisfactory. Aside from the General Electric Co. there are few companies in the East that are buying on a liberal scale. The General Electric Co.'s purchases have been spread out over several weeks, further orders having been placed within the past week. The Crucible Steel Co. of America, which is doing locomotive repair work at its Harrison, N. J., works has bought a 96-in., 600-ton wheel press and a 90-in. driving wheel lathe. The New York Central Railroad has bought a 100-ton bushing press and the Atlantic Coast Line has bought a 43-in. rod miller. These items cover the more important buying of the week.

The Transit Commission, New York, will build large shops on E. 148th Street, New York, for the Interborough Rapid Transit Co., which the latter will equip, most of the machinery having been purchased some time ago, but a few odds and ends will probably be required when the new shops are completed.

Quietness rules in sales of cranes and new inquiries, with the exception of locomotive cranes, inquiry for which is reported to be active. Fewer used locomotive cranes are said to be in evidence. Several of the large capacity overhead crane orders are still pending but are expected to close shortly. Among these is the inquiry of the Phoenix Utility Co., New York, which has been current for several weeks, and one from the Central Railroad of New Jersey, calling for a 25-ton, 4-motor crane for Perth Amboy. Fay, Spofford & Thorndyke, Boston, consulting engineers, who are handling a contract

at 10 a. m., Nov. 14, on a 5-ton, single I beam, hand power crane for use by the Navy Department at Tenjo, Cal.

two 10-ton electric traveling cranes from the Shaw Electric Crane Co.

Pennsylvania Railroad, a 25-ton, 58-ft. span, gantry crane with 10-ton auxiliary for Indianapolis, from the Champion Engineering Co.

Imperial Government Railways, Japan, two 20-ton, 40-ft. boom, crane pile-drivers through an exporter in New York, from the Industrial Works. This makes a total of six crane pile-drivers purchased recently by this railroad.

New York Central & Hudson River Railroad, three used Orton & Steinbrenner locomotive cranes from the General Equipment Co., New York.

American Smelting & Refining Co., New York, a 30-ton, used Orton & Steinbrenner locomotive crane from the Lord Construction Co., Weehawken, N. J., for use at Maurer, N. J.

Raymond Concrete Pile Co., New York, a 30-ton locomotive crane for use at St. Louis, from the McMyler-Interstate Co.

Gaynor & Rosenbloom, Brooklyn, N. Y., a 5-ton, 30-ft. span hand power crane from an unnamed builder.

Durant Motors Co., New York, seven pneumatic hoists for the Elizabeth assembling plant, Elizabeth, N. J.

Berry Iron & Steel Co., St. Joseph, Mo., a 5-ton, 58-ft. span, 3-motor overhead traveling crane from the Bedford Foundry & Machine Co., through the Miles Machinery Co., Saginaw, Mich.

The Unit Ventilation Co., College Point, L. I., manufacturer of ventilating equipment, is taking bids for a one-story addition to its plant on Second Avenue, 50 x 100 ft., estimated to cost $30,000. Paul H. MacNeil, 154 Nassau Street, New York, is architect.

The C. M. Sorensen Co., 177 East Eighty-seventh Street, New York, manufacturer of electric air compressors, parts, etc., has plans nearing completion for the construction of a three-story factory, 40 x 75 ft., on Radde Stand Hunter Avenue, Long Island City, to cost $60,000.

The S.O.S. Welding Corporation, 235 Sixth Street, Brooklyn, will install a traveling crane and other equipment at its plant.

Power equipment, conveying apparatus, disposal machinery and other mechanical equipment will be installed in the two-story incinerating plant, 70 x 100 ft., to be erected by the Bureau of Street Cleaning, Borough of Queens, Huntington, L. I., estimated to cost $200,000, for which bids will be asked around Nov. 15. Joseph P. Powers, Rockaway Beach, L. I., is architect.

The American Locomotive Co., 30 Church Street, New York, has awarded a contract to the McClintic-Marshall Co., Oliver Building, Pittsburgh, for a new one-story erecting shop

Lathes, milling machines, drill presses, screw machines and other machine tools, electrical equipment, etc., will be offered for sale by the Air Service Bureau, War Department, Washington, at the air service depot, Long Island City, N. Y., on Nov. 14.

Motors, controlling devices and other electric power and mechanical equipment, conveying machinery, etc., will be installed in the new six-story printing and publishing plant, 83 x 110 ft., to be erected by the Brooklyn Daily Eagle, Eagle Building, Brooklyn.

The Robbins & Myers Co., 30 Church Street, New York, manufacturer of fans, motors, etc., with plant at Springfield, Ohio, has issued bonds for $3,000,000, a portion of the proceeds to be used for extensions, additional working capital, etc.

A complete automobile machine and repair works will be installed in a portion of the new six-story industrial building to be constructed by the Queens Subway Loft Building Corporation, Long Island City, at Hunters Point and Skillman Avenues, for which site, 440 x 520 ft., has been acquired. The shop will be equipped primarily for motor truck service. The industrial building will aggregate more than 500,000 sq. ft., and will be leased to outside interests. It is estimated to cost in excess of $600,000, including power house and other mechanical branches.

The State Hospital Commission, room 1046, 25 Broadway, New York, will receive bids until Oct. 31 for the construction and installation of an electric lighting plant at the Brooklyn State Hospital, Creedmoor, Queens, L. I., in connection with the erection of other buildings. Plans and specifications at the office of L. F. Pilcher, Capitol Building, Albany, N. Y.

The W. H. Hughes Co., 507 West Thirty-fifth Street, New York, manufacturer of lacquers, enamels, etc., has acquired the entire building at 164 Coit Street, Irvington, N. J., heretofore held by the Pierce, Butler & Pierce Mfg. Co., New York, for a new plant. Immediate possession will be taken.

The Public Service Production Co., Public Service Terminal, Newark, a subsidiary of the Public Service Corporation, operating electric and railway utilities, is concluding negotiations for the purchase of the recently completed plant of the Day-Elder Motors Corporation at Clinton Avenue and Twenty-first Street, Irvington, for $350,000. The structure is four-stories, 75 x 250 ft., and will be equipped for miscellaneous operating service; the first floor will be used for a complete machine and repair shop to handle about 500 motor trucks and cars operated by the company. It is proposed to equip the top floor as a testing laboratory. The Day-Elder company has abandoned plans to use the building for motor truck manufacture, as initially projected, and will continue operations at its present works on Coit Street.

The Crane Co., 84 Mechanic Street, Newark, manufacturer of valves, steam specialties, etc., with headquarters at 836 South Michigan Avenue, Chicago, has leased a one-story building to be constructed on Tremont Street, Jersey City, to cost about $50,000, for a new branch.

The Zenith Mfg. Co., 23 Marshall Street, Newark, formerly known as the Zenith Tool Co., has purchased a new two-story factory, 50 x 150 ft., at 290 Chestnut Street, and will concentrate operations at this point for the manufacture of talking machine parts and equipment. The company recently acquired the Cirota Talking Machine Co., High Street, to merge with its present organization.

The Gilby Wire Co., 690 Summer Avenue, Newark, N. J., manufacturer of fine brass wire, etc., has leased property at 108 Adams Street, totaling about 8000 sq. ft. for a new plant.

Burrell G. White, Munsey Building, Baltimore, manufacturer of refrigerating equipment, has leased the one-story building at 238-40 Astor Street, Newark, comprising about 6000 sq. ft. of floor space, for the establishment of a new plant.

The Torsion Test Piston Ring Co., Roselle, N. J., has leased property at 112 Adams Street, Newark, N. J., for a new branch plant.

W. A. Fouchy, 15 Broad Street, New York, is inquiring for a used vertical boring mill, capacity between 60 in. and 84 in. between centers.

F. H. Crawford, 299 Broadway, New York, is inquiring for the following used machines: No. 0, No. 1 or No. 2 bulldozer, Williams-White or equivalent; several No. 6 and No. 57 Toledo or Bliss presses; double-end shear, preferably with slitting shear blade at one end and long bar shear blade at other end, capacity for ⅜ in. high carbon plate 36 in. wide; 25-ton hydraulic wheel press; 8-in. pipe machine.

Catalogs Wanted

S. N. Mistri & Co., engineers, contractors and manufacturers' agents, 139 Daripur, Rupapari Pole, Ahmedabad, India, request American manufacturers to send catalogs, pamphlets, etc., of engineering products and automobiles.

Chicago

[illegible]

UNEXPECTED delays have resulted in further postponement of the closing of the Burlington lists. The Chicago and Northwestern has issued an inquiry comprising 19 items which is regarded as the forerunner of an extensive list. The St. Louis-Southwestern is inquiring for a 42-in. boring mill, a 36-in. horizontal boring mill, a 6-in. centering machine, two emery stands and a cutter and reamer grinder, all motor driven. The Santa Fe has entered the market for a 20-in. upright drill press and an improved Yankee belt-driven single end dry drill grinder with point thinning attachment, style J. B. point, and an inquiry has been received here from the Norfolk & Western for two 8-ft. plain radial drills. The Rock Island has placed an order for a 24-in. crank planer, but is still in the market for a carwheel boring machine and a bulldozer. Local machine tool houses find general trade less active and believe that if October sales totaled prove to be as large as those of September, it will be because of railroad orders rather than business from miscellaneous users.

No further price changes have been announced outside of a general adjustment by the Canedy-Otto Mfg. Co., Chicago Heights, which puts its radial drills up about five per cent and decreases upright drills approximately the same percentage.

The Chicago & Northwestern list is as follows:

Two 18-in. engine lathes, 4 ft. between centers.
Two 20-in engine lathes, 6 ft. between centers.
Two 30-in. crank planers.
One 42-in. drill press.
Three power hack saws, Marvel No. 4, or equivalent.
One 15-in. drill press.
Three double dry grinding emery wheel stands with 2 x 18-in. wheels and 1¾-in. arbors.
One spot welding machine, equal to No. 254 Thompson Welder Co. machine to weld No. 22 to No. 3 B. & S. gage iron and steel.
One large quick work power hammer with set of dies.
One centering machine to center 3-in. stock.
Two hollow hexagon turret lathes, Warner & Swasey No. 2-A universal, or equivalent.
All of these machines are to be quoted including motors.

The Stephens-Adamson Mfg. Co., Aurora, Ill., is inquiring for a gear hobber to cut gears up to 1½ d.p. and to 72-in. p.d., a small friction saw for cutting steel bars and shapes, a combination punch and coping machine, a 1½-in. capacity heavy duty hand screw machine, a 2-in. capacity heavy duty screw machine and one horizontal boring machine, capacity of 10-in. bore, length 60 in., with 24-in. space from table to center when former is in lowered position, with side adjustment to be equipped with boring bars and out-bored bearing.

The National Supply Co., Toledo, Ohio, is inquiring for a 42-in. or a 52-in. vertical boring mill with one head.

The Chicago, Rock Island & Pacific has placed a 200-ton transfer table with the Whiting Corporation.

The Shepard Electric Crane & Hoist Co. recently booked the following orders: A 2-ton electric hoist and back-geared motor for the Mississippi Valley Structural Steel Co., St. Louis; a 2-motor 5-ton hoist for the Chesapeake & Ohio, Peru, Ind., shop; a 1-ton hoist for the Ford Motor Co., Detroit, two 2-ton hoists for the Jeffrey Mfg. Co., Columbus, Ohio, and a 1-ton hoist for the Central Malleable Castings Co., Chicago.

The Raymond Brothers Impact Pulverizer Co., 1319 North Branch Street, Chicago, has purchased a tract, 200 x 250 ft., adjoining its plant, which will be used for expansion.

The Chicago Steel & Wire Co. is receiving bids through L. G. Hallberg & Co., 116 South Michigan Avenue, Chicago, on a one-story addition, 30 x 112 ft., at West 103rd Street and Hoyne Avenue, to cost $15,000.

The Imperial Box Co., Inc., 1506 Carroll Avenue, Chicago, will have constructed by Holton, Seelye & Co., a one-story addition, 70 x 115 ft., to cost $27,000.

The International Harvester Co., 606 South Michigan Avenue, Chicago, will build a one-story plant, 120 x 180 ft., at 2600 West Thirty-first Boulevard, to cost $60,000.

The Mercury Mfg. Co., manufacturer of storage battery trucks and automobile trucks, 4118 South Halsted Street, Chicago, has let contract for a one-story addition, 60 x 100 ft., to cost $12,000.

Huguelet Brothers, 908 Gary Street, Chicago, have had

[illegible] 50 x 150 ft., to cost $[illegible]

The Innes Shocker Co. has started the erection of the first unit of a plant at Bettendorf, Iowa, for the manufacture of grain shockers. It will be 60 x 140 ft.

The machine shop of the Automatic Gravel Products Co., Muscatine, Iowa, a building 20 x 40 ft., was recently destroyed by fire with an estimated loss of $15,000.

The General Die Casting & Machine Co., 2533 North Ashland Avenue, Chicago, recently incorporated, has taken over the business of the General Die Casting Co. of the same address. An addition to the plant is under way to provide increased facilities for production and to take care of larger business.

The Sinclair Refining Co., 111 West Washington Street, Chicago, will soon take bids for a new mill, 70 x 116 ft., at Olmstead, Ill., estimated to cost $75,000. The installation will include pulverizing, sorting, conveying and other machinery.

A refrigerating and cold storage plant will be installed in the five-story meat-packing plant to be erected by the Mountain States Packing Co., Union Stock Yards, Denver, Col., to be 200 x 400 ft., and estimated to cost about $2,000,000. All machinery will be electrically operated.

The Northern Pacific Railroad Co., Fifth and Jackson Streets, St. Paul, Minn., will build an addition to its locomotive repair shops at Jamestown, N. D., including engine house, shops, etc., estimated to cost $150,000.

C. W. Lamphere, Gilmore, Iowa, is preparing for the erection of a new one-story and basement ice-manufacturing plant, 70 x 100 ft., estimated to cost $50,000, including equipment. A similar plant is also contemplated in the vicinity of Clarion, Iowa.

The Central Power Co., Grand Island, Neb., will commence work on a new steam-operated, electric generating plant, with initial capacity of about 5000 kw. estimated to cost approximately $750,000.

The Kohrs Packing Co., 1343 West Second Street, Davenport, Iowa, will erect a two-story ice and refrigerating plant, 64 x 75 ft., estimated to cost $60,000.

The Middle West Utilities Co., 72 West Adams Street, Chicago, will commence the construction of a new steam-operated electric power plant on the Mississippi River, near Grand Tower, Ill., to have an initial capacity of 25,000 kw., estimated to cost $5,000,000. Later, additions will be made bringing the cost to more than $10,000,000.

The Common Council, Spencer, Iowa, has authorized the completion of plans for a one-story municipal electric power plant to cost $25,000. W. C. Barton, 1221 Forty-third Street, Des Moines, is architect.

The Sioux City Gas & Electric Co., Sioux City, Iowa, has disposed of a bond issue of $3,500,000, a portion of the proceeds to be used for extensions in electric power plants and system.

Rudow Brothers, Morris, Ill., have commenced the erection of a two-story shop, 60 x 84 ft., for machine and welding work. It will cost about $22,000.

Philadelphia

PHILADELPHIA, Oct. 23.

THE George B. Clopp Iron Works, 3717 Filbert Street, Philadelphia, has awarded contract to Barclay White & Co., 1713 Sansom Street, for a new five-story plant at 910-14 Cherry Street, to cost $100,000

The Harrisburg Pipe & Pipe Bending Co., Harrisburg, Pa., is in the market for a No. 6, or larger, Becker vertical milling machine, suitable for die sinking.

A one-story power house will be constructed at the plant of the Mifflin Chemical Co., Delaware and Mifflin Avenues, Philadelphia.

Hugh F. Munro, 1737 North Fifth Street, Philadelphia, operating a sheet-metal working plant, is said to be arranging a list of equipment for installation at his proposed two-story and basement plant, 50 x 60 ft., at 1745-51 Bodine Street.

The plant and property of the Wright Roller Bearing Co., Twentieth Street and Indiana Avenue, Philadelphia, including a two-story factory, 61 x 270 ft., machine tools, power equipment, etc., will be sold on Nov. 9, by the receivers, Harry W. Champion and W. B. Stratton.

The Nash Motor Co., 901 North Broad Street, Philadelphia, has awarded contract to the Turner Construction Co., 1713 Sansom Street, for a five-story and basement automobile service and repair building, 75 x 160 ft., estimated to cost $[illegible]

The Department of Public Safety, 1328 Race Street, Philadelphia, is planning for the [illegible] electrically operated.

A. B. Stem, R. Van Horn and F. W. Woodcock, care of James Collins Jones, Bullitt Building, Philadelphia, representative, have organized a number of light and power companies to operate in various townships. Electric power plants and systems will be installed. Application for a State charter will be made on Nov. 20.

Fire, Oct. 20, destroyed a portion of the paper mill of the Jeperson Newsprint Co., South Union Street, Lambertville, N. J., with loss estimated at $300,000, including machinery. The plant was formerly held by the Perseverance Paper Co., and has recently been acquired, remodeled and reopened by the Jeperson Co. It is planned to rebuild. Henry Weeks is general manager.

Motors, conveying equipment and general machinery, valued at close to $75,000, at the plant of J. Eavenson & Sons, Inc., Penn Street and the Delaware River, Camden, N. J., manufacturer of soap products, were destroyed by fire, Oct. 20. The entire loss is estimated at $200,000. It is planned to rebuild.

The Hillside Coal & Iron Co., Pittston, Pa., has plans in progress for a new coal breaker at its Butler Colliery, estimated to cost close to $100,000, including machinery.

Ovens, electric power equipment, conveying machinery and other mechanical equipment will be installed in the new eight-story plant, 150 x 250 ft., to be erected at Glenwood Avenue and Broad Street, Philadelphia, by the National Biscuit Co., New York. A. G. Zimmerman, 85 Ninth Avenue, New York, is architect.

The Pressweld Products Co., Ellwood City, Pa., recently organized, has acquired the local plant of the Pennsylvania Iron & Steel Products Co., for the manufacture of iron and steel specialties. A portion of the equipment has also been taken over.

The Williamsport Wire Rope Co., Williamsport, Pa., has completed plans for a one-story addition, 80 x 140 ft., to cost $14,000, exclusive of equipment.

The Pennsylvania Power & Light Co., Allentown, Pa., will enlarge its electric generating plant at Hauto, Pa., with installation to include a 20,000 kw. generator and auxiliary machinery. Details are being arranged for taking over the property of the Lycoming-Edison Co., Williamsport, Pa., and affiliated interests about Nov. 16. Extensions are planned in the latter works.

The Advance Rumley Co., Laporte, Ind., manufacturer of agricultural implements and equipment, has plans nearing completion for new branch assembling and distributing works on South Cameron Street, Harrisburg, Pa., to be 100 x 150 ft., and estimated to cost $100,000, including equipment. F. G. Fahnestock, Jr., Harrisburg, is architect.

The International Chain & Mfg. Co., York, Pa., has been organized under State laws and has acquired the plant of the Victoria Chain Co. George J. Campbell is president, and Richard L. Hunt, treasurer.

The Fleck-Marshall Co., Lancaster, Pa., manufacturer of pipe, plumbing equipment, etc., has tentative plans for a two-story foundry and machine shop at the plant of the Rothfuss-Howard Iron Works, Williamsport, Pa., lately acquired for a branch factory. The company is affiliated with the Fleck Brothers Co., 50 North Fifth Street, Philadelphia, manufacturer of similar equipment. John G. Fleck is president.

A power house will be constructed by the Stauffer Chemical Co., 624 California Street, San Francisco, Cal., in connection with its proposed new Eastern plant at Chester, Pa., where site of 10 acres has recently been secured, estimated to cost $500,000.

Fire, Oct. 18, destroyed a portion of the foundry of the Extension Radiator Works, Huntingdon, Pa., with loss estimated at $25,000. It is planned to rebuild. The plant is operated by the Pierce, Butler & Pierce Mfg. Corporation, Syracuse, N. Y.

The Pioneer Grinding & Machine Co., Allentown, Pa., has been organized to take over and operate the general machine works at 844 North Seventh Street, heretofore conducted under the name of Dugan & Young. The new company plans expansion. It will be headed by John C. Young, a member of the former organization, and Henry J. Wallis, who has acquired the Dugan interest.

Fire, Oct. 13, destroyed the repair shops and yard property of the Central Railroad of New Jersey at Ashley Plane, near Wilkes-Barre, Pa., with loss estimated at $200,000, including equipment.

The Pennsylvania Railroad Co., Broad Street Station, Philadelphia, has plans in progress for the electrification of its system from Altoona to Johnstown, Pa., to include the construction of a main generating plant, with a number of smaller electric power houses. The entire project is estimated to cost in excess of $12,000,000. A. C. Shand is chief engineer.

The Ellwood Steel Co., Ellwood City, Pa., has acquired the local plant formerly occupied by the Sharon Pressed

Steel Co. Improvements will be made and equipment installed for the manufacture of a general line of steel products.

The Board of Mercer County Freeholders, Trenton, N. J., will take bids until Oct. 31, for 75,000 pounds of machinery, cable, sheaves and other equipment, to be used in connection with the erection of a new steel, lift-span, wire-rope type, viaduct over the Delaware & Raritan Canal, and Pennsylvania Railroad, Olden Avenue. Charles H. Reichert is director, department of bridges. Plans and specifications at the office of the County Engineer, Trenton Court House, and at J. A. L. Waddell, 35 Nassau Street, New York, engineer.

Henry A. Hitner's Sons Co., 4501 Richmond Street, Philadelphia, is in the market for two used air compressors, belt driven; capacity 500 cu. ft. each, 100 lb. steam pressure or better; 220 or 440 volt, two-phase.

G. William, 828 North Hancock Street, Philadelphia, is inquiring for small Landis pipe threading machines, used but in good condition; also lots of galvanized electrical conduit.

Catalogs Wanted

The Ideal Dust Conveyor Co., Williamsport, Pa., desires catalogs, price lists, etc., on pipe strapping, galvanized steel sheets, ash can handles, hinges, door latches.

New England

BOSTON, Oct 23

SALES were spotty the past week, a majority of machine tool houses, notably manufacturers' representatives, reporting no business of importance, while a few did fairly well on one, two and three tool lots. The largest individual transaction the past week involved three new engine lathes, the heaviest 20 in., a used plain grinding machine, a used drill press and six small used bench tools to a Greater Boston concern. A two-spindle high speed drill press and a hack saw, purchased by the Massachusetts Institute of Technology, is representative of the average importance of new tool business. Two or three school lists are out but are unimportant. The largest live prospect is a woolen goods manufacturer, who has issued a moderately large machine shop list and is expected to close shortly. In this case tools are specified, thus competition is eliminated. Several prospects heretofore considered active have either been abandoned or put over into the first quarter of 1923. The purchase of a new 32-in. shaper and an 18-in. lathe by the Portland Terminal Co., Portland, Me., represents the last business up with New England carrier interests.

The recent advance in new tool prices so far has failed to stimulate buying to any degree. On the other hand, it has made for a somewhat larger inquiry for used equipment and going business is chiefly in this field. Used machine tool houses, for the first time in months, are buying quite freely for stock. One Boston house is negotiating for a large amount of equipment and is expected to shortly make an announcement regarding this.

Crane prospects have dwindled to one 5-ton or one 10-ton crane wanted by a Vermont scale manufacturer.

The International Paper Box Machinery Co., Nashua, N. H., wants a used planer type slab milling machine to take 30 in. between housings, with a 12 ft. to 14 ft. table. The machine must have two vertical spindles and a side head, if possible.

The Superintendent of Lighthouses, Portland, Me., is in the market for two oil compressor units for operating fog signals.

The Lever Brothers Co., 176 Broadway, Cambridge, Mass., is considering the erection of a turbine building. No date has been set for bids to close.

Large drop hammers and miscellaneous other shop and foundry equipment will be sold at public auction by the trustees in bankruptcy of the Harley Co., Page Boulevard, Springfield, Mass.

Work has been started on the foundations and superstructure for the first two units, 160 x 360 ft. of the new Boston Elevated Railway Co. machine shops at Everett, Mass.

Plans have been filed by the Spartan Saw Works, Springfield, Mass., for a factory to be erected at a cost of $14,000.

The S. A. Woods Machine Co., 17-19 Damrell Street, Boston, will build a one-story addition.

The Edison Electric Illuminating Co., 70 State Street, Boston, is arranging for a stock issue of $5,406,700, a portion of the proceeds to be used for new power plant construction, extensions, etc.

The Universal Gold Process Co., Providence, recently organized, has established a plant at 336 Douglas Avenue, for electroplating and other mechanical service. Charles W. Osberg and Arthur T. Shoren head the company.

The H. B. Ives Co., New Haven, Conn., manufacturer of hardware products, has awarded a contract to Sullivan & McKeon, New Haven, for a four-story addition, with one-story wing extension, 30 x 80 ft.

The DuBarry Mfg. Co., Middlefield, Conn., manufacturer of metal specialties, has acquired the plant and business of the National Hair Pin Co., Hartford, Conn., and will remove the business to Middlefield. The latter plant will be enlarged.

The J. J. Walsh Co., 1540 Columbus Avenue, Roxbury, Boston, manufacturer of automobile bodies, is taking bids for two-story addition, 50 x 100 ft., estimated to cost close to $30,000. S. J. Rantin, 1117 Columbus Avenue, is architect.

John W. Leahy, Danbury, Conn., is in the market for a ⅞ Cleveland model B and a 1½ Cleveland model B automatic screw machines, used.

Baltimore

BALTIMORE, Oct 23

THE Terminal Refrigerator & Warehouse Co., Washington, affiliated with the Washington Market Co., Seventh Street and Pennsylvania Avenue, will take bids until Nov. 1 for a new eight-story refrigerating and cold storage plant near the Pennsylvania Railroad. A. P. Clark, 816 Fourteenth Street, N. W., is architect.

The Protector Non-Skid Chain Co., 1301 West Baltimore Street, Baltimore, recently organized, has arranged with the Maryland Metal Products Co., Hagerstown, Md., to carry out initial production at its plant. Later it is proposed to build a plant exclusively for company manufacture. Oscar M. Peters is president and general manager.

The American Ice Co., Calvert Building, Baltimore, will build a one-story plant, 59 x 107 ft., at Regester and Gough Streets, to cost about $60,000. Plans have been completed.

The Cumberland Edison Power Co., Cumberland, Md., recently organized by Thomas B. Finan, Cumberland, and associates, has acquired the plants and properties of the Edison Electric Illuminating Co., and the Cumberland Electric Railway Co.; the first noted operates two power plants. The new owner will merge the companies and plans for extensions and improvements.

The Bureau of Supplies & Accounts, Navy Department, Washington, will take bids for the following equipment for the Mare Island Navy Yard, San Francisco: Until Nov. 7, for 1190 adjustable pipe wrenches, schedule 233; until Nov. 14, for one I-beam crane, schedule 239; until Oct. 31, for one universal milling machine, schedule 241; until Nov. 7, for one crank shaper, schedule 252; one engine lathe, schedule 253, and one electric oven and soldering pot, schedule 235.

The Lambert-Hudson Motors Co., 1212 Connecticut Avenue, N. W., Washington, local representative for the Hudson automobile, has awarded a contract to Parsons & Human, 816 Twenty-second and M Streets, for a new service and repair building to cost $160,000.

The Trent-Amalgam Co., Alexandria, Va., has leased the local plant of the Virginia Shipbuilding Co., and will take immediate possession. A subsidiary company is being organized under the name of the Western Marine & Salvage Co., to operate a shipyard on a portion of the property. The other part will be used for a plant for the manufacture of fuel from slack coal and fuel oil. Machinery will be installed.

The Trexler Co., Bellevue Court Building, Philadelphia, manufacturer of air lock valves, transmission locks and other automotive accessories, has acquired the plant of the Artillery Fuse Co., South Wilmington, Del., on 27-acre site. The company will establish a new plant. E. G. Flannery is vice-president.

J. W. Simpson, Roanoke, Va., and associates, have acquired mica properties in Patrick County, Va., and plan the erection of a new pulverizing mill and power house estimated to cost $60,000.

The Wilson-Hock Co., City Point, Va., machinery dealer, is making inquiries for one direct-connected engine generator set, from 50 to 75 kw.

The Southern Power Co., Charlotte, N. C., has authorized plans for a new steam-operated electric power plant at Eno, N. C., with capacity of 25,000 kw., supplementing a similar station to be built at Mountain Island, N. C. The Eno plant is estimated to cost close to $1,000,000.

Washington, will take bids until Nov. 1 for the installation of a new refrigerating plant at the navy yard, Annapolis, Md.

The Potomac Public Service Co., Hagerstown, Md., has decided to double the capacity of its plant on the Potomac River, near Williamsport, Md., and will revise plans. It is estimated to cost in excess of $2,000,000, with machinery.

The Wheeling Corrugating Co., 801 McDonough Street, Richmond, Va., will build a two-story addition estimated to cost $17,000.

The Fiber Board Container Co., Richmond, Va., manufacturer of fiber products, has plans for rebuilding the portion of its works recently destroyed by fire with loss of $100,000, including machinery. The new plant will cost approximately a like amount.

The Seaboard Brass & Copper Co., Baltimore, recently organized with a capital of $100,000 to manufacture brass products, etc., has leased a portion of the building at the southeast corner of Gay and Water Streets. Brook H. Rollin is president.

The Consolidated Gas, Electric Light & Power Co., Lexington Building, Baltimore, will build a new one-story power house, 57 x 70 ft., at 700-24 West Pratt Street.

The Bartlett Hayward Co., Scott and McHenry Streets, Baltimore, manufacturer of gas plant apparatus, etc., has awarded contract to the Whiting Turner Construction Co., 427 East Lombard Street, for a one-story foundry, 200 x 260 ft.

The Sandy Run Electric Co., Mooresboro, N. C., recently organized, plans for the installation of an electric power house for service at Latimore, Ellenboro and vicinity. Leslie Hamrick, Latimore, is secretary and treasurer.

The Purchasing Agent, Post Office Department, Washington, will take bids until Nov. 1 for 2500 boxes of lock washers.

R. C. Hearne, White Hall, S. C., has inquiries out for a high-speed planing machine.

The Denton Mfg. Co., Denton, N. C., is in the market for a hydraulic press.

Hoffman Brothers, Fort Wayne, Ind., have tentative plans under consideration for a new hardwood mill with power house in the vicinity of Columbia, S. C. F. E. Hoffman is head.

The Standard Electric Machinery Co., 7 East Hill Street, Baltimore, is inquiring for a used air compressor, 3500 to 4000 ft., 50 lb., with 25-cycle synchronous motor.

Buffalo

BUFFALO, Oct. 23.

A CALL for bids has been issued by the Chevrolet Motor Co., 3044 West Grand Boulevard, Detroit, for the erection of the first unit of its new assembling plant at Buffalo, two-stories, 335 x 900 ft. Albert Kahn, 1000 Marquette Building, Detroit is architect.

The Stabryte Steel Co., Inc., 8 Lord Street, Buffalo, is arranging for the installation of machinery in a local building to manufacture hardware and cutlery products. H. E. Bredemeir is head.

The Binghamton Light, Heat & Power Corporation, Washington Street, Binghamton, N. Y., has completed plans for a two-story addition to its power house at Willow Point, N. Y., to cost about $75,000.

The Fanning Co., Inc., Perry, N. Y., will commence the erection of a new ice-manufacturing plant, with initial capacity of about 1800 tons.

A. C. Fisher, Springville, N. Y., has plans in progress for the erection of a one-story machine shop, 50 x 100 ft.

The Porter-Cable Machine Co., Syracuse, N. Y., is arranging for expansion to provide for the removal of the local plant of the Syracuse Sander Mfg. Co., to the main works on East Water Street. The last noted company was recently acquired and the production of its line of grinding equipment will be continued.

The Empire Drawn Steel Co., 1133 Marine Bank Building, Buffalo, has plans nearing completion for the erection of a one-story building, 70 x 400 ft., to cost approximately $90,000. Harding & Crea, White Building, are architects.

William J. Teere, Buffalo, operating a forge shop at 1087 [illegible] to convert the works into an electric welding shop. New equipment will be installed.

The Automatic Gear Co., 712 Erie County Bank Building, Buffalo, has plans under way for the installation of equipment in its [illegible] F. E. Hoffman is head.

Roger J. Sweet, Buffalo, has acquired property at 1189 Niagara [illegible] for the [illegible] of an engineering service and machine [illegible] and welding.

Pittsburgh

PITTSBURGH, Oct. 23.

THE local trade is expectant. It has been quoting against a number of inquiries lately, including two moderate-sized railroad lists, and believes that the coming week will see the placing of orders. Actual machine tool business of the past week has been of rather slim proportions, both in volume and value, but with the railroads showing a real interest in the market, sentiment is decidedly cheerful about the immediate future.

Power equipment business has been moderate lately, but prospective business is good. The Carnegie Steel Co. has not yet closed for the power requirements in connection with the extension of its Clairton by-product plant. There are reports that the Cheat River power development in West Virginia, started a few years ago and then abandoned, may be revived before long.

The Pennsylvania Railroad, Central Region, took bids up to last Friday on the following list:

One 18-in. x 10-ft. lathe.
One 36-in. x 18-ft. lathe.
One 24-in. x 16-ft. lathe.
One 18-in. x 12-ft. lathe.
One 42-in. x 19-ft. engine lathe.
One 90-in. driving wheel lathe.
Two 28-in. shapers.
Two flue welders.

With the exception of one lathe for its Blairsville shops, these tools are for the Conway shops, Freedom, Pa.

The Pittsburgh & Lake Erie Railroad recently put out the following list:

One 24-in. engine lathe.
One 36-in. engine lathe.
One 14-in. shaper.
One 28-in. shaper.
One 25-in. drill press.
One 90-in. driving wheel lathe.
One axle lathe.

The Guibert Steel Co., Diamond Bank Building, Pittsburgh, which is to build a steel fabricating plant on the west side of Pittsburgh, is a prospective buyer of punches and shears. It has already asked for bids on a 5-ton crane. The tool inquiry for the new Gary works, National Tube Co., is regarded as one against which action is likely at an early date. The Jones & Laughlin Steel Co., Pittsburgh, recently closed for three Shaw cranes, two of 5 tons and the other of 15 tons capacity, for installation at its South Side Pittsburgh works. One of the 5-ton cranes is equipped with a revolving spreader bar, which turns the trolley. The Pittsburgh & Lake Erie Railroad has closed for two Shaw overhead cranes, one of 7½ tons and the other of 10 tons capacity; the latter is a special type crane. Interest remains active in the 41 cranes soon to be placed by the National Tube Co. for its Gary works.

M. K. Frank, Frick Building, Pittsburgh, has recently equipped a plant at Carnegie, Pa., for the manufacture of pitt wagons for coal mines and sand plants.

The Neely Nut & Bolt Co., 26 South Twenty-Second Street, Pittsburgh, is taking bids for a one-story addition to its bolt works, 120 x 150 ft., estimated to cost $30,000.

The Central Refractory Co., Newark, Ohio, has acquired the plant of the Center Brick & Clay Co., Orviston, Pa., and firebrick manufacturing plant at Snow Shoe, Pa., with large fire clay deposits in Clinton County. The new owner plans for extensions and improvements.

The Hazel-Atlas Glass Co., Wheeling, W. Va., will build a new three-story machine shop, 45 x 80 ft., at its branch works, Washington, Pa., estimated to cost $50,000.

The Electric Alloy Steel Co., Charleroi, Pa., is planning for the installation of additional electric equipment, including a 500-kw. generator, two other generators of approximately like size, 800 and 500 hp. motors, controlling devices and auxiliary apparatus.

Power equipment, ovens, conveying machinery, etc., will be installed in the new baking plant to be erected in the vicinity of Ridge Avenue and Marburg Street, Pittsburgh, by the Ward Baking Co., New York, estimated to cost $1,500,000. Pittsburgh offices are at 3100 Liberty Avenue. George S. Ward is president.

The Oil City Boiler Works, Seneca Street, Oil City, Pa., has awarded contract to L. O. Boquin, Oil City, for a one-story addition, 60 x 75 ft.

Hubbard & Co., Granite Building, Pittsburgh, manufacturers of shovels, have plans for the removal of their plant at Aliquippa, Pa., to the main works on Butler Street, Pittsburgh, where an addition will soon be built. The Aliquippa plant is now closed on account of a strike.

The De Roth Steel Truck & Car Wheel Co., 611 Keystone Building, Pittsburgh, will install a number of traveling cranes at its new plant at Osgood, Pa., varying from 2 to 10 tons in capacity.

The Seneca Oil Works, South Carver Street, Warren, Pa., is planning the erection of an addition to cost $65,000.

The Highland View Mfg. Co., Marwood, Pa., manufacturer of metal specialties, is said to be arranging a list of tools for its addition, now in course of construction.

Cincinnati

CINCINNATI, Oct. 23.

RAILROADS and equipment companies have been the chief buyers in the machine tool market so far this month. A local company reports that up to date this month its orders from the railroads run well over $100,000, and with one under negotiation, which is expected to be placed this week, will more than double that amount. The Rock Island and Missouri-Kansas-Texas both placed orders in this market last week, and the latter is expected to close on the remainder of its requirements this week. Another Western road has practically concluded negotiations for a large number of tools, but formal orders have not been issued. The Baldwin Locomotive Works has placed an order in this district for 10 planers, and the Ramapo Iron Works is reported to have closed for 12. Lathe manufacturers report a very pronounced improvement in business, coming from all sections of the country and from all industries. One purchase was by an Eastern manufacturer of gear cutting machines, which included several heavy tools. The Mengel Body Co., Louisville, Ky., will shortly be in the market for complete equipment for a body building plant.

Prices are showing much strength. Practically all machinery manufacturers have advanced quotations from 5 to 15 per cent within the past month. The Avey Drilling Machine Co., Cincinnati, last week announced an advance of 15 per cent.

The crane market is fairly active, and prices are stiffening. One builder in this district is reported to have raised his prices approximately 20 per cent.

The Worthington Pump & Machinery Corporation was low bidder on pumping equipment for the Western Hills pumping station, Cincinnati. It will have a daily capacity of 8,000,000 gal. Work on the installation will commence shortly.

The Mengel Body Co., Louisville, Ky., has been organized and will be incorporated under the laws of New Jersey, to manufacture automobile and truck bodies. The Mengel Co., Louisville, box manufacturer, will be the principal stockholder. The company is preparing to erect a plant containing 200,000 sq. ft. of floor space and work will probably start this week. It will be located at Fourth and G Streets, occupying 30 acres, and will have direct railroad connections with both the Southern and Louisville & Nashville railroads. Complete equipment for the production of bodies will be installed. Contracts have been signed to deliver 30,000 bodies during 1923, and employment will be given to 500 people. The output of the plant for five years, estimated at $20,000,000, has also been contracted for. Plans for the new company were agreed upon by W. C. Durant, Detroit automobile manufacturer; R. Frank Munroe, Ludington, Mich., and William L. Hoge and Arthur D. Allen of the Mengel Co. Mr. Allen will be president of the new company, Mr. Hoge and Mr. Monroe vice-presidents.

The Fairfield Engineering Co., Lancaster, Ohio, has taken temporary quarters in the Alton Foundry Works, following the fire in its plant several weeks ago. Plans for the rebuilding are now being considered, but nothing definite has been announced. The company manufactures coal-loading machinery.

Improvements are now being made at the plant of the Advance Foundry Co., Dayton, Ohio, which will enlarge the molding and coremaking departments. Buildings and new equipment are being provided for both of these departments to take care of increased volume of business.

Cleveland

CLEVELAND, Oct. 23.

MACHINERY dealers report a fair volume of business from manufacturers of automobile parts. One parts manufacturer in Cleveland during the week placed six lapping machines for lapping piston pins and four automatic grinders were purchased by two others. Business as a whole, however, was dull, but some local dealers report that October sales are considerably ahead of the corresponding period during September. The trade has been looking for a good sized list from the Pennsylvania Lines, West, for the Columbus, Ohio, shops, but has been advised that an appropriation for this equipment has not yet been made and that the list will not be sent out before the first of the year.

Manufacturers of automatic screw machinery report an improvement in orders as compared with September, but sales are mostly in single machines. Gear cutting and grinding machinery is moving fairly well.

The Ohio Injector Co., Wadsworth, is inquiring for two drilling machines and a milling machine and is expected to purchase other equipment. The Van Dorn Iron Works Co. the past week purchased a multiple spindle drilling machine and the American Steel & Wire Co. a single spindle machine. The latter is inquiring for a cold saw.

The Brown Hoisting Machinery Co., Cleveland, has taken an order for a 10-ton coal and ore bridge for the Coal Trading Association, Rotterdam, Holland. This will be a duplicate of an ore bridge recently built by the Cleveland company for the same interest in Rotterdam.

The Baker R & L Co., Cleveland, plans the erection of a factory extension at an expenditure of $10,000.

The Miami Foundry Co., Miamisburgh, Ohio, has just completed an extension 60 x 144 ft.

The Buckeye Casting Co., Lima, Ohio, plans the erection of two foundry buildings at an estimated cost of $75,000.

The Ohio Public Service Co., has commenced the erection, at Lorain, Ohio, of a three-story building, 60 x 280 ft., for power plant purposes.

The Republic Structural Iron Works, 1290 East Fifty-third Street, Cleveland, is in the market for a used Toledo press No. 35P.

Catalogs Wanted

The Enterprise Mfg. Co., Akron, Ohio, will soon be in the market for sand blasting equipment and desires catalogs and prices for such equipment suitable for the manufacture of small brass, nickel silver, aluminum and steel parts.

The Central South

ST. LOUIS, Oct. 23.

PLANS are nearing completion for a one-story addition, 100 x 150 ft., for the Rabe Pipe & Foundry Co., North St. Elmo, Chattanooga, Tenn. R. R. Rabe is president.

The American Sash & Door Co., Sixteenth and Dellefontaine Streets, Kansas City, Mo., has preliminary plans in progress for a one-story addition, 100 x 300 ft.

The Appalachian Marble Co., P. O. Box 837, Knoxville, Tenn., is planning for the installation of electric pumping machinery.

The Means-Haskins Coal Co., Montago, Ky., is planning for the construction of a new coal tipple at its properties.

The United States Engineer Office, Custom House, St. Louis, will take bids until Oct. 30, for three drum tandem hoisting engines, as specified in circular 54-27.

The Louisville & Nashville Railroad Co., Louisville, plans the construction of a new engine house and car repair shops at Leewood, Tenn., estimated to cost $250,000, including machinery. W. H. Courtenay, Louisville, is chief engineer.

The Taylor Mfg. Co., Morristown, Tenn., is in the market for machinery for a wood-working plant, including planer, band saw, jointer, line shaft pulleys, motors, etc. W. H. Taylor, Morristown, is president.

The United Railways Co., St. Louis, has completed plans for a power house at Eighth and Franklin Avenues. A. T. Perkins, company headquarters, Thirty-ninth Street and Park Avenue, is general manager.

The Wood & Lane Co., 915 Olive Street, St. Louis, is in the market for an engine-generator set, from 250 to 500 kw.; also, for a motor-generator set, about 150 kw.

The Churchill Compress Co., Dyersburg, Tenn., has tentative plans for rebuilding its cotton compress plant, destroyed by fire Oct. 11 with loss estimated at $500,000, including machinery.

The McGregor Battery Engineering Co,. 681 Marshall Avenue, Memphis, Tenn., has completed plans for a new one-story factory, 30 x 105 ft., at 679 Monroe Avenue. Estes W. Maun, 618 Madison Avenue, is architect. J. M. McGregor is president.

The Common Council, Piggot, Ark., has tentative plans for a municipal hydroelectric generating plant.

The Tavern Rock & Sand Co., Klondike, Mo., is planning the construction of a new power house to replace that recently destroyed by fire.

The Cumberland & Manchester Railroad Co., Barboursville, Ky., has completed plans for a new one-story forge shop.

C. F. Lewis, 713 Ohio Street, Wichita, Kan., is making inquiries for machine shop equipment, including emery wheel, bench and hand tools, welding equipment, etc.

The Mountain Grove Creamery, Ice & Electric Co., Springfield, Mo., is planning to rebuild the portion of its power plant destroyed by fire Oct. 11, with loss of $100,000.

The Liquid Steel Welding Co., Kansas City, Mo., recently organized, will establish a plant at 101 West Twenty-third Street for the manufacture of welding equipment. Anton Lucas, previously connected with the Metal & Thermit Corporation, New York, heads the company.

The Kentucky Utilities Co., Jackson, Ky., has completed plans for a new one-story and basement power plant. Homer Gillem is general manager.

A. J. Slonecker, Trenton, Mo., is organizing a local company to establish a plant for the manufacture of jack screws.

The Missouri Pacific Railroad Co., St. Louis, has awarded contract to Jerome A. Moss, Chicago, for a new one-story plant, 120 x 510 ft., to include engine house, car repair and construction shops, at Kansas City, Mo.

The Nedringhaus Metalware Corporation, Goodfellow and Natural Bridge Avenues, St. Louis, in the the market for two used presses for blanking and light forming; beds about 36 in. x 72 in. between bousings.

The Beall Sales Co., 943 Syndicate Trust Building, St. Louis, is inquiring for a used Hess file grinding machine and other file-making machinery.

The Gulf States

BIRMINGHAM, Oct. 23.

A MACHINE shop will be erected by the P. H. Palmer Co., Jacksonville, Fla., recently organized. P. H. Palmer is president, and Charles Atkins, vice-president.

The Southwestern Gas & Electric Co., Shreveport, La., has arranged for a bond issue of $2,500,000, a portion of the proceeds to be used for extensions in power plants and system. Bruce M. Brown is president.

Fire, Oct. 18, destroyed a portion of the plant of the Lafayette Sugar Refining Co., New Orleans, at Lafayette, La., with loss estimated at $300,000, including machinery, power house, etc. It is planned to rebuild.

The Standard Electric Works, 17 Bibb Street, Montgomery, Ala., has plans for a new factory for electric motor construction, rebuilding and repair, etc.

The Dallas Power & Light Co., Dallas, Tex., has acquired property totaling more than three acres as a site for its new electric generating plant, estimated to cost $2,180,000. Joseph H. Gill is assistant general manager.

The Monroe Sand & Gravel Co., Monroe, La., recently organized, is arranging a list of equipment for installation at its properties, including steam shovel, industrial locomotive, etc. T. E. Stephenson heads the company.

The Southern Paper Co., Moss Point, Miss., has plans for extensions, including main paper and pulp mill, and power house. It is expected to increase the capacity to close to 100 tons per day. E. H. Mayo is general manager.

The Foley Light & Power Co., Foley, Ala., has completed plans for a new power house, estimated to cost $50,000.

Fire, Oct. 14, destroyed a portion of the plant of the S. J. Stewart Electric Motor Co., 527-31 St. Joseph Street, New Orleans, with loss estimated at close to $75,000, including equipment and stock.

The New Orleans Railway & Light Co., New Orleans, has plans under way for two new power houses, with an addition to the present generating plant. The work is estimated to cost in excess of $150,000. Dwight P. Robinson & Co., 125 East Forty-sixth Street, New York, are engineers. Frank Hunt is superintendent.

The Peninsular Ice & Cold Storage Co., Daytona Beach, Fla., recently organized with a capital of $200,000, is contemplating the erection of a new ice-manufacturing and cold storage plant to cost $100,000, including machinery. Guy G. Bailey is president.

The Magnolia Petroleum Co., Dallas, Tex., has plans under way for a new oil storage and distributing plant at Oilton, Tex., to include the installation of steel tanks, pumping machinery, etc., estimated to cost $200,000. Headquarters and main plant for the Webb-Zapata oil field will be established at this point.

The Citizen's Ice Co., Athens, Tex., is planning to rebuild the portion of its ice-manufacturing plant destroyed by fire, Oct. 13, with loss estimated at $65,000, including equipment. The company is headed by F. N. and S. A. Drane.

The Common Council, Valley Mills, Tex., has plans under way for the installation of a municipal electric light and powerhouse. Bids will be asked at an early date. Roy S. Pool is secretary.

The St. Louis, Brownsville & Mexico Railroad Co., Brownsville, Tex., has acquired about 30 acres for the construction of new locomotive and car shops, etc. The present plant at Victoria, Tex., wil be removed to the new location and considerably enlarged.

The Consolidated Motor Co., Marianna, Fla., is inquiring for machine shop equipment for installation in a local building. L. Williams is secretary.

The Common Council, Utica, Miss., will take bids until Nov. 9 for equipment for a municipal electric plant, including oil-operated engine, two electric alternators, switchboard, pumping machinery, etc. Swanson-McGraw, Inc., 705 United Fruit Building, New Orleans, is engineer. R. F. Cook is mayor.

The Forest Products Co., Ltd., Montgomery, Ala., machinery dealers, is inquiring for a band saw, 36-40 in., used, in good condition, and other wood-working machinery.

The Moore Dry Kiln Co., Jacksonville, Fla., is in the market for a used 2-in. Landis pipe threading and cutting machine with four-style chaser head, motor driven preferred.

Milwaukee

MILWAUKEE, Oct. 23.

RAILROADS are becoming more of a factor in the volume of local machine tool business, although with respect to the milling machine industry, requirements from this source are relatively very small. Automotive shops remain the principal source of demand, with the gas engine trade as considered apart from passenger and commercial vehicles a factor of increasing importance. Leather and textile machinery makers continue to buy moderately. The Nash Motors Co. so far has placed only a part of the needs for the extension of its four-cylinder car works in Milwaukee, and in November and December will be in the market for the supplementary equipment of the new LaFayette car plant, now under construction in Milwaukee. Machine shops are busier than at any time since spring, but their needs as yet are limited, as available capacity is still in excess of needs and tools are being bought principally for replacement. General inquiry is more active and the trade is confident of a steady enlargement of business through the winter.

The Acme Brass & Metal Works, Waupaca, Wis., recently incorporated with $75,000 capital stock, has purchased the property of the Jorgenson Mfg. Co. of Waupaca, consisting of a brass foundry and machine shop, from the receiver. Operations were resumed Oct. 16 on a limited initial scale, the plant having been idle since bankruptcy proceedings were instituted in April. The Acme company will specialize, as the Jorgenson interests did, in automotive equipment specialties, principally gas engine priming devices, but will broaden the general scope of the business into general brass and bronze castings, raw and machined. For the present it will not make any material additions to the shop equipment. J. M. Brown, Appleton, Wis., is president of the Acme company; Lewis Larson, Waupaca, vice-president; E. M. Nelson, secretary; C. J. Pommer, treasurer. S. K. Wood, sales manager.

The Vulcan Last Co., Portsmouth, Ohio, has started the work of reconstructing its mill and factory at Crandon, Wis., which was almost totally destroyed by fire early in September, with a loss of $675,000. The Crandon plant furnishes the semi-finished material for shoe lasts for three large last plants operated by the Portsmouth concern. Plans for the new works call for a complete finishing plant as soon as

the present construction is completed about Dec. 1 or 15, and later a similar unit in Milwaukee. J. C. Knott is general manager at Crandon.

The Borden Condensed Milk Co., New York, has decided to equip a factory for manufacturing containers in connection with its plant at New London, Wis. It is to have a daily capacity of 150,000 metal cans.

The Rauschenberger Tire Co., Akron, Ohio, has purchased five acres along the Chicago & Northwestern main line tracks in the town of Granville, just north of Milwaukee, and intends to erect a three-story plant, 175 x 300 ft., employing about 250. Plans have been completed and contracts will be let about Oct. 30.

The Appleton Motor Truck Co., organized at Appleton, Wis., with $50,000 capital stock, has acquired the factory group of the defunct Reliance Motor Truck Co., Appleton, and besides resuming the production of motor trucks and truck axles, will enter the farm implement field with a number of new designs of planting machines. This will require some retooling and installation of new equipment, the purchase of which will be made early in 1923. Officers of the new corporation are: President, A. G. Brusewitz; vice-president, John Heenan; secretary, William Geenen; treasurer, Matthew Rossmeisel.

The Capitol Plating & Machine Co., Madison, Wis., is installing some additional equipment for quantity production of windshield spotlights and other illumination specialties.

The Excel Mfg. Co., 3402 South Pierce Street, Milwaukee, closes bids Oct. 24 on a two-story brick and concrete addition, ell-shaped, 60 x 180 and 30 x 180 ft. for wood-working processes. The extension will cost about $50,000. R. E. Oberst is architect.

The F. J. Greene Engineering Works, 1028 Douglas Avenue, Racine, Wis., has placed the contract for a three-story addition, 53 x 103 ft., with the Nelson Construction Co., local. With equipment, now being purchased, the enlargement will cost about $50,000. The architects are Edmund B. Funston & Co., Racine.

The Althouse-Wheeler Co., Waupun, Wis., is completing the renovation and partial retooling of its plant at 11-19 East Main Street, which was badly damaged by fire last spring. It manufactures steel towers, windmills, tanks, etc., and also conducts a gray iron foundry. Operations are being resumed with a force of 50. E. D. Doney is president, and H. O. Thompson, works manager.

The Kohler Co., Kohler, Sheboygan County, Wis., has let the general contract to Paul Riesen's Sons Co., 1018 Humboldt Avenue, Milwaukee, for a four-story addition, 70 x 160 ft., to be equipped for grinding and preparing enamels for sanitary goods department. The Riesen company has sublet the reinforcing bars, amounting to 190 tons, to the Concrete Engineering Co. The architects are Brust & Philipp, 405 Broadway, Milwaukee.

The Corona Pen Co., Janesville, Wis., has started the operation of its new factory in the Bicknell Building on North Academy Street. Additional floor space has been contracted for and will be equipped for larger production immediately. S. V. Corona, formerly identified with typewriter manufacturing interests, is president and general manager.

The Pacific Coast

SAN FRANCISCO, Oct. 17.

CONTRACT has been awarded to the Austin Co., Pacific Electric Building, for a new one-story foundry, 56 x 152 ft., for the Kay-Brunner Steel Casting Co., Los Angeles.

The Southern California Edison Co., Los Angeles, has arranged for a bond issue of $10,000,000, a portion of the proceeds to be used for power plant and system extensions.

The Shell Oil Co. of California, 343 Sansome Street, San Francisco, has plans under way for a new refinery on 5-acre site at Wilmington, Los Angeles harbor, estimated to cost $1,000,000, including extensions to local storage and distributing plants.

Fire, Oct. 9, destroyed a portion of the refinery and storage works of the Richfield Oil Co., Twenty-fourth street and Santa Fe Avenue, Los Angeles, with loss estimated at $200,000, including machinery. It is planned to rebuild.

The Yuba Development Co., Hobart Building, San Francisco, will soon make inquiries for an electric traveling crane, about 20-tons capacity.

The People's Ice Co., Fresno, Cal., will commence the erection of a two-story addition to its plant, 100 x 150 ft., at Woodward Street and Anna Avenue, to cost $100,000, including machinery.

The Amalgamated Talc Co., Los Angeles, is having plans drawn for a new one-story mill, 40 x 160 ft., on East First Street. The installation will include milling machinery, pulverizing equipment, power apparatus, etc. A. Godfrey Bailey, 410 Junior Orpheum Building, is architect.

The Puget Sound Power & Light Co., Seattle, Wash., has arranged for a bond issue of $1,300,000, a portion of the proceeds to be used for extensions. Frederick S. Pratt is chairman of the board of directors.

The Progressive Sales Co., Tacoma, Wash., has plans under way for a new plant to manufacture automobile springs, shock absorbers and kindred equipment. It will cost about $35,000. J. E. Drain is president.

The Common Council, Canby, Ore., has authorized the preparation of plans for a municipal electric light and power plant, estimated to cost $50,000.

The Sandpoint Lumber & Pole Co., Sandpoint, Idaho, has plans under way for the construction of a new branch mill at Troy, Mont., with daily capacity of 60,000 ft., estimated to cost $150,000. A power house will be built. H. C. Culver, Spokane, Wash., is president.

The Discovery Bay Logging Co., Port Townsend, Wash., has tentative plans for the rebuilding of its plant, with power house, machine shop and other buildings, destroyed by fire recently with loss estimated at $350,000, including machinery.

Indiana

INDIANAPOLIS, Oct. 23.

THE Baltimore & Ohio Railroad Co., South Wells and West Harrison Streets, Chicago, has preliminary plans for a number of one and two-story additions at its car and locomotive repair works, Garrett, Ind., estimated to cost $500,000, including equipment.

The Blackford Window Glass Co., Vincennes, Ind., recently reorganized with a capital of $1,000,000, has plans in progress for new works on a 6-acre site, lately acquired, estimated to cost $300,000, including machinery, power house, etc. Frank Bastin is president.

Fire, Oct. 17, destroyed a portion of the car shops of the Monon Railroad, Lafayette, Ind., with loss estimated at $50,000.

Cline & Hicks, Lebanon, Ind., are having plans prepared for a new one-story machine shop, 60 x 100 ft., with two other mechanical shops adjoining, 40 x 60 ft. and 40 x 40 ft., estimated to cost $40,000.

The Common Council, Auburn, Ind., is completing plans for an addition to the municipal electric light and power plant to cost $60,000. E. E. Weinland is engineer.

The Wabash Valley Electric Co., Terre Haute, Ind., has plans under way for a hydroelectric power house on the Wabash River, Sugar Creek Township, estimated to cost $3,000,000, including transmission system.

Fire, Oct. 14, destroyed a portion of the oil storage and distributing plant of the National Refining Co., Lafayette, Ind., with loss estimated at $100,000, including machinery. It is planned to rebuild.

The Vigo Mining Co., Rose Dispatch Building, Terre Haute, Ind., will take bids early in November for the construction of a power plant at its mine No. 29, Sullivan County, to cost $75,000. The Shourds-Stoner Co., 510 Tribune Building, Terre Haute, is architect and engineer.

Homer A. Woods, 19-29 South Street, Indianapolis, manufacturer of metal and electric specialties for automobile service, will erect a new four-story plant, 60 x 200 ft., estimated to cost $200,000. The machinery installation will cost in excess of $60,000.

The plant and property of the Spacke Machine & Tool Co., Madison Avenue and Merrill Street, Indianapolis, and branch plant at Charles Street and the Belt Railway, used for the manufacture of axles, etc., will be offered for sale by the receiver, Charles O. Roemler, on Oct. 30.

Canada

TORONTO, Oct. 23.

BUSINESS in machinery and machine tools is gradually extending beyond the replacement stage, which has been the main feature of this market for some time. Industrial concerns are now calling for equipment for new plants and additions, as well as for bettering operating conditions. Inquiries for various lines are numerous and while large lists are still few there is a steady increase in the number of buyers. It is generally known that the Canadian railroads are badly in need of new rolling stock, in fact the Grand Trunk recently sent out an inquiry for some 7000 freight cars. Equipment for car building shops is coming into

[illegible] reported. The demand for wood working [illegible] equipment continues to head the list. A slight improvement is reported in the call for small tools and sales so far this month are better than for the corresponding period last month.

Prices [illegible] changes have been announced.

The Standard Shingle Co., Hereward Road, Vancouver, B. C., will erect a shingle mill and is interested in equipment.

The sawmill owned by the J. D. Buckley Estate, Nordin, N. B., was destroyed by fire with a loss of $150,000.

The Peninsular Cord Tire & Rubber Co., 45 St. John Street South, Hamilton, Ont., is preparing to erect a plant at Hanover, Ont.

The Windsor Machine & Tool Co., Windsor, Ont., is making arrangements for the erection of a manufacturing plant at St. Thomas, Ont., to cost $100,000.

Equipment is now being installed in the addition recently completed to the machine shop of the Springer Lock Mfg. Co., Belleville, Ont., including one Brown & Sharpe universal milling machine with vertical milling attachment; a die engraving machine, shaper, large punch press, a battery of three screw machines, two dozen bench vises and a miscellaneous lot of power-driven bench tools.

The Canadian Locomotive Co., Ltd., Kingston, Ont., has taken on 105 men in the last few days for locomotive repair work. William Casey, general manager, states that the Canadian railroads are inquiring for locomotives and there is every prospect that orders will be placed at an early date.

Pittsburgh Steel Co. Earnings

The comparative income account of the Pittsburgh Steel Co. for the year ended June 30, last, as disclosed by its annual pamphlet report, follows:

	1922	1921	Decrease
Net earnings after deducting all charges for operations and idle plant expenses, including maintenance and repairs	$902,300	$3,817,030	$2,914,730
Interest and income from investments	199,988	338,870	38,883
Miscellaneous revenue	115,804	108,600	*7,204
Balance of reserve of 1920 set up to cover depreciation in price of Liberty Bonds, not now required	19,001	69,729	50,728
Appreciation of Liberty Bonds to par value, June 30, 1922	360,068		*360,068
Adjustment for reserve for federal taxes	270,427		*270,427
Adjustment of Pittsburgh Steel Ore Co. assets	39,565		*39,565
Total earnings	$1,907,152	$4,234,228	$2,327,077
Less:			
Reserve for depreciation of plants	$800,697	$884,825	$84,128
Reserve for depletion of mine properties	65,633	101,065	35,431
Reserve for income and profits tax		143,182	143,182
Interest on unmatured installments of purchase price of Alicia properties	75,625	103,125	27,500
Loss on sale of Liberty Bonds		60,362	60,362
Loss on sale of capital assets, Rowe mine		123,824	123,824
Loss on sale of capital assets, Chicago warehouse property	38,250		*38,250
Reduction of inventory values	65,063	1,095,320	1,030,257
	$1,045,268	$2,511,701	$1,466,433
Net income for the year	$861,883	$1,722,527	$860,644
Dividends on preferred stock	$735,000	$735,000	.....
Dividends on common stock	560,000	840,000	280,000
	$1,295,000	$1,575,000	$280,000
Surplus for the year	†$433,117	$147,527	$580,644

*Increase.
†Deficit.

For the nine months ended Sept. 30, the Otis Elevator Co. reports a net income of $1,790,482, after charges and federal taxes, which amounts to $10.52 per share on the common stock after allowing for preferred dividends. This compares with $11.62 per share in the same period of 1921.

The Virginia Iron, Coal & Coke Co., Roanoke, Va., reports net earnings for the first nine months ended Sept. 30, of $288,799. Third quarter earnings were $273,886, as compared with a net loss in the first quarter of $81,048, and net [illegible] in the second quarter of $95,961.

STEEL AND INDUSTRIAL STOCKS

U. S. Steel Strikes a New High—Future Trend by No Means Certain

Irregularity characterized steel and industrial stocks last week, the dominant factor in movements still clinging to the series of expected dividends. There was considerable profit taking and some short selling. Violent fluctuations set in Tuesday, carrying in their wake a steady stream of liquidation, but alternating with this came downward movements against which pivotal stocks like Baldwin and Steel common withheld. The fundamental soundness of the market was reflected in the ability of American Can to reach the highest level ever attained, and of U. S. Steel common to reach another new high at 111½. Some bullish talk attached to American Can, whose advances have been linked with the rise in Continental Can. These two with National Enameling are brought forward as a group which may follow an upward trend. Industrial prospects are good, the average of 20 stocks dropping but slightly. The immediate future of the market is still in a maze. Various conjectures of an unusual market are now discounted in favor of a general concurrence that no buying wave is in progress, such as occurred early in 1907 and late in 1919.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

	Low	High		Low	High
Allis-Chalm.	47¾	52⅝	Gulf St. Steel pf.	98	98
Allis-Chalm. pf.	94	99½	Int. Har	109	112¼
Am. B. S. & Fdry.	79	80	Int. Har. pf.	118½	118½
Am. B. S. & F. pf.	112½	113	Lackawanna Steel	82	85
American Can	70⅝	76¼	Lima Loco.	59⅛	61½
American Can pf.	110½	111	Midvale Steel	33½	35
Am. Car & Fdry.	189	195	Nat.-Acme	14¾	15¼
Am. Car & F. pf.	121⅞	123	Nat. E. & Stm.	66	68½
Am. Locomotive	131	136½	Nat. E. & Stm. pf.	100¾	103
Am. Locomot'e pf.	121	121¼	N. Y. Air Brake	38	40½
Am. Radiator	119⅞	122	Otis Steel	10¾	11
Am. Steel Fdries.	43½	45¾	Pittsburgh Stl. pf.	94½	94¼
Am. Steel Fdr. pf.	105	106⅛	Pressed Stl. Car	89	92
Baldwin Loco.	137½	142⅝	Ry. Steel Spring	121	123⅝
Baldwin Loco. pf.	117	118	Ry. Stl. Spring pf.	117	117
Bethlehem Steel	72½	76¼	Replogle Steel	31¾	34⅝
Beth. Stl. "A"	73½	78½	Republic	54¼	61¼
Beth. Stl. pf.	117⅞	118	Republic pf.	85½	88½
Br. Em. Steel	13	14	Sloss	48⅞	50⅞
Br. Em. S. 1st pf.	74½	74½	Steel of Canada	66¾	69½
Br. Em. S. 2d pf.	32½	35	Superior Steel	32¾	33
Cambria Steel	41	41	Un. Alloy Steel	37	38
Chic. Pneu. Tool	84	87	U. S. Pipe & Fdry.	31½	34
Colorado Fuel	31	33½	U. S. Pipe & F. pf.	70¾	70¾
Crucible Steel	83½	90½	U. S. Steel	107½	111½
Crucible Steel pf.	95	96	U. S. Steel pf.	122	122½
Deere pf.	72½	73	Vanadium Steel	43	47
Gen. Electric (8)	182½	189	Va. I. C. & Coke	55½	58
Gt. No. Ore Cert.	33½	39½	Wlhouse Air Br.	99	99
Gulf States Steel	88⅝	94¼			

Empire Steel Corporation Reorganization

The much talked of and always more or less intangible British Empire Steel Corporation reorganization and financial deal which has maintained an unusual interest in the corporation and its securities since last spring was stated to be "off" when President Roy Wolvin, subsequent to a meeting of the board of directors held in Montreal, Que., Oct. 18, issued a statement to the effect that he had been unable so far to make the proposition sufficiently attractive to the financial houses with which he had been negotiating.

Following the meeting of the board of directors, however, it was pointed out that Roy Wolvin was about to leave for New York for the purpose of arranging other plans for the financing of the corporation. It is rumored that a New York financial house submitted an offer about a fortnight ago, when the option on the financing lapsed to float bonds to the extent of approximately $5,000,000.

Republic Iron & Steel Co. Deficit

That the coal and railroad labor troubles materially increased steel mill production costs is reflected in the quarterly earnings statement of the Republic Iron & Steel Co. for the period ending Sept. 30. The income account shows operating profits of $395,756, which after allowances of $252,338 for depreciation and renewals, $49,886 for exhaustion of minerals, $232,228 for bond interest, left a deficit of $138,676. This showing contrasted with that made in the second quarter is less favorable, but a comparison with the income account for the third quarter of 1921 shows a decided improvement in the affairs of the company to-day.

For instance, in the quarter ending Sept. 30, last year, instead of an operating profit, there was a deficit of more than $1,000,000, and after ordinary charges and the payment of $427,500 in preferred dividends, a deficit of more than

$1,800,000. For the first nine months of 1922 a total deficit of $764,376 is shown, whereas last year for the same period there was a deficit of practically $4,000,000.

Unfilled business on the books of the company as of Sept. 30 last amounted to 199,431 tons of finished and semi-finished products, contrasted with 196,886 tons on June 30, last, and 69,577 tons on Sept. 30, last year.

Industrial Finance

The Grant Motor Car Corporation, Cleveland, was placed in receivership Oct. 20 on complaint of the Durston Gear Corporation, Syracuse, N. Y., which declared that a receiver was needed to preserve the assets of the company. Federal Judge D. C. Westenhaver appointed Joseph C. Hostetler, attorney, receiver. The company has $4,285,000 in outstanding stock. Its debts are placed at $1,478,000 and include $167,000 in open accounts, $232,000 due to merchandise creditors, $638,000 in notes and mortgages held by banks and $500,000 owed to holders of long term notes.

Owing to the fact that the Canadian railways were not in the market for new cars to any extent, the National Steel Car Corporation, Hamilton, Ont., in the fiscal year ended June 30, 1922, showed a new loss of $79,733.52 before providing for depreciation on buildings, machinery and equipment and interest on mortgage bonds and borrowed money. This compares with net profits of $422,674, in the preceding fiscal year. The capital and surplus as at July 1, 1921, was $2,820,324. From this sum was deducted $7,247 for depreciation, $107,653 interest on bonds and $46,516 interest on borrowed money, which together with an appropriation to cover the operating losses, made total dueductions of $306,373, and left a balance at June 30, 1922, of $2,513,950. Approximately $80,000 was expended during the year in betterments to plant and equipment

Plans of New Companies

John T. Hill, formerly president of R. C. Hoffman & Co., Inc., announces the formation of John T. Hill & Co., 1318 Continental Building, Baltimore, and will deal in relaying rails, scrap, track material of all kinds, sheets, iron and steel bars, reinforcing material, structural shapes, etc., and will also serve as consulting engineers, specializing in inspection and valuations.

The American Fuel Power Co., Inc., 78 Main Street, Buffalo, has been incorporated with a capital of $500,000, to manufacture electric and other power machinery. Its properties and equipment are adequate for the present. Certain parts of its work will be done by contract. The incorporators are: A. Stover, Jr., J. M. Aitken and S. J. Renthcler. John C. Mefts is president.

The Hayes Brass Foundry, 132 Richmond Avenue, Syracuse, N. Y., which was recently incorporated, has a fully equipped foundry for turning out limited quantities of castings, etc. C. H. Hayes heads the company.

The Seneca Foundry Co., Waterloo, N. Y., has been incorporated with a capital of $25,000, and will manufacture iron and steel castings. The incorporators are: J. F. Madia and C. Cannull. W. S. O'Brien, Geneva, N. Y., represents the company.

The Solter Co., Philadelphia, has filed articles of incorporation to manufacture metal products. However, no manufacturing will be done, the company acting for the present merely as selling agent. Illoway & Felix, Room 509, 213 South Bread Street, Philadelphia, represents the company.

The Empire Drawn Steel Corporation, Marine Trust Building, Buffalo, recently incorporated with a capitalization of $750,000, 8 per cent preferred and 30,000 shares of no par common stock, to equip and operate a cold-drawn steel plant, has placed specifications for buildings with Harding & Crea, Buffalo. F. W. Allan, president and F. R. Kew, works manager, are handling the purchase of draw benches, straightening, cut-off and pointing machines, etc. The main building will be 70 x 450 ft., capable of supporting a five-ton crane, and together with a number of additions will enable the company to turn out 36,000 tons of cold-drawn steel annually.

The Chattanooga Plating & Smelting Works, 20½ West Ninth Street, Chattanooga, Tenn., which was recently incorporated, is considering bids on its new construction program, a part of which is to be taken care of by its immediate working forces.

The Gray Hub Co., 642-46 Catherine Street, Detroit, has been incorporated with a capital of $30,000, and will manufacture automobile parts, principally hubs, pistons, etc. R. B. Gray and Guy Swartz, both of whom served several years with the Timken Axle Co., Detroit, are connected with the new company, which had been organized as a partnership for nearly a year.

The Spotz Mfg. Co., 100 Broadway, New York, and its foreign complement, the C. A. Spotz Co., Inc., were recently incorporated under Connecticut laws to manufacture machinery and mechanical equipment. The American firm has a capital stock of $100,000. The chief product will be a new design of weighing scale adapted to an entirely new mechanical principle. Patents are held for the chief foreign countries and have been applied for in the United States. Operations will not begin immediately since the officers are completing a program of demonstration from the A. H. Emery laboratories at Glenbrook, Conn. The company expects that at first it will have its castings and parts let out to contract, using the Glenbrook plant for assembling. However, if demonstration tests prove to be as successful as expected, the company will erect its own building and install equipment for making the parts. Harry M. Rice is president; C. A. Spotz is vice-president and chief engineer; A. H. Emery, Jr., secretary and Carlton Pratt, treasurer.

The Gerace Willow Stripper & Accessories Co., 3519 St. Clair Avenue, Detroit, has been incorporated with a capital of $25,000, to manufacture willow-stripping and willow-manufacturing machinery. In the event of booking large contracts, the manufacture of parts will be done by contract and assembling will be done at the present location. Grant Clary is secretary.

The A. E. Stevens Co., Inc., Portland, Me., has been incorporated with a capital of $50,000, to take over the business of A. E. Stevens & Co. in the manufacture of gears, wagon parts, etc. The latter company was a partnership, the reorganization coming as a result of the death of one of the partners, Samuel A. Stevens. Paul R. Stevens is president of the new company.

The Rebstock Co., 1439-43 North Nineteenth Street, St. Louis, has been incorporated with a capital of $12,000, and has purchased complete equipment to engage in the manufacture of conveying machinery, including gravity roller, bottle, bucket, chain and power apron conveyors, and chutes, hoists and conveyor supplies. A. J. Rebstock is president; C. A. Kohl, vice-president; W. M. Wolters, secretary, and A. J. F. Wolters, assistant secretary.

L. J. Krom, metallurgical engineer, has established an office at 50 Church Street, New York, for the purpose of carrying on a consulting, metallurgical and engineering practice which will be devoted to the production and consumption of metals and alloys. Mr. Krom is an expert in the nonferrous lines.

The Sun Recharger Co., 4344 Cottage Grove Avenue, Chicago, was recently incorporated to manufacture magnetos. The steel cabinets used in making up the recharger unit are manufactured by the Metzger Co., Chicago. Other parts used are principally standard electrical units. The incorporators are John T. Jenkins, H. B. Floyd and H. W. Hoppe.

The Square Deal Mfg. Co., South Side Market Street Bridge, Wilmington, Del., has been incorporated with a capital of $25,000, and is manufacturing heavy duty internal combustion marine engines; it also designs and builds special machinery and does general machine work and pattern work. Charles O. Robertson heads the company.

The Acme Mfg. Co., 116 Market Street, Newark, N. J., was recently incorporated to manufacture brackets and other metal goods. Its work is being done on a contract basis at present, but preparations are under way to do its own manufacturing.

The Connecticut Electric Instrument Co., 54 Church Street, Hartford, Conn., has filed notice of organization to manufacture electrical instruments, having taken over the radio appparatus business of the Hartman Mfg. Co., that city. It is in the market for a limited amount of equipment. About Jan. 1, it is expected, the company will lease properties and install light machine and bench equipment. At that time it will require some raw and semi-finished material.

The Joyce Mfg. Co., 2970-3000 Jefferson Avenue, Detroit, has been incorporated with a capital of $500,000 to manufacture automobile equipment and accessories. It has leased a factory formerly occupied by the Fisher Body Co. and is installing equipment. The company plans to be ready for operation in about 30 days. Frank H. Joyce is president.

The Seaboard Foundries, Inc., 602 Driggs Avenue, Brooklyn, has been incorporated with capital of $110,000 to manufacture iron, steel and other castings. It is disposing of properties now held in Brooklyn and is developing plans to govern future operations on a larger scale. The incorporators are H. W. Eldred, J. C. Garrett and R. J. West.

The Natlay Chain Corporation, New York, has been incorporated with a capital of $100,000 to manufacture steel chains and other mechanical products. Its chief product will be a patented chain which is said to possess unusual merits. Actual operation will not start immediately. B. M. Bancroft and W. Hutchinson are the incorporators. The company is represented by Henry Amerman, 233 Broadway, New York.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	
Refined iron bars, base price	3.04c.
Swedish bars, base price	7.50c.
Soft steel bars, base price	3.04c.
Hoops, base price	4.39c.
Bands, base price	3.84c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	3.14c.
Channels, angles and tees under 3 in. x ¼ in., base	3.04c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.10c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	3.30c.
Toe-calk, ½ x ⅝ in. and larger	4.15c.
Cold-rolled strip, soft and quarter hard	6.75c. to 7.25c.
Open-hearth spring steel	4.50c. to 7.00c.
Shafting and Screw Stock:	
Rounds	3.90c.
Squares, flats and hex	4.40c.
Standard cast steel, base price	15.00c.
Extra cast steel	18.00c.
Special cast steel	23.00c.

Tank Plates—Steel

¼ in. and heavier	3.14c.

Sheets

Blue Annealed

	Per Lb.
No. 10	4.19c.
No. 12	4.24c.
No. 14	4.29c.
No. 16	4.39c.

Box Annealed—Black

	Soft Steel C. R., One Pass, Per Lb.	Blued Stove Pipe Sheet, Per Lb.
Nos. 18 to 20	4.30c. to 4.70c.	.....
Nos. 22 and 24	4.35c. to 4.75c.	5.00c.
No. 26	4.40c. to 4.80c.	5.05c.
No. 28	4.50c. to 4.90c.	5.15c.
No. 30	4.75c. to 5.15c.	.....

No. 28 and lighter, 36 in. wide, 10c. higher.

Galvanized

	Per Lb
No. 14	4.60c. to 5.00c.
No. 16	4.75c. to 5.15c.
Nos. 18 and 20	4.90c. to 5.30c.
Nos. 22 and 24	5.05c. to 5.45c.
No. 26	5.20c. to 5.60c.
No. 27	5.35c. to 5.75c.
No. 28	5.50c. to 5.90c.
No. 30	6.00c. to 6.40c.

No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
½ in. Butt	50	—42	½ in. Butt	—11	+13
¾ in. Butt	55	—44	¾ in. Butt	—17	— 1
1-3 in. Butt	[illegible]	[illegible]	1-1½ in. Butt	—20	— 2
[illegible]	[illegible]	[illegible]	[illegible]	—14	+ 2
7-8 in. Lap	—50	—26	2½-6 in. Lap	—18	— 2
[illegible]	[illegible]	[illegible]	7-12 in. Lap	—10	+ 6

Steel Wire

Base [illegible] No. 9 Gage and Coarser — Per Lb

Bright basic	4.25c. to 4.50c.
Annealed soft	4.25c. to 4.50c.
Galvanized annealed	4.90c. to 5.15c.
Coppered basic	4.90c. to 5.15c.
Tinned soft Bessemer	5.90c. to 6.15c.

•Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	19¼c. to 20¼c.
High brass wire	20¼c. to 20¾c.
Brass rod	16¾c. to 17¾c.
Brass tube, brazed	26¼c. to 27¼c.
Brass tube, seamless	23 c. to 23½c.
Copper tube, seamless	25¾c. to 26 c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 22¾c. to 23¾c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin — Coke—14-20

Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	Primes	Wasters
		80 lb.	$6.05 $5.80
		90 lb.	6.15 5.90
		100 lb.	6.25 6.00
IC..$10.00	$8.50	IC..	6.40 6.15
IX.. 11.50	10.00	IX..	7.40 7.15
IXX.. 13.00	11.25	IXX..	8.40 8.15
IXXX.. 14.25	12.50	XXX..	9.40 9.15
IXXXX.. 16.00	14.00	IXXXX..	10.40 10.15

Terne Plates

8-lb. coating, 14 x 20

100 lb.	$7.00
IC	7.25
IX	7.50
Fire door stock	9.00

Tin

Straits, pig	38c.
Bar	45c. to 50c.

Copper

Lake ingot	15¼c.
Electrolytic	15 c.
Casting	14¾c.

Spelter and Sheet Zinc

Western spelter	8¾c.
Sheet zinc, No. 9 base, casks	9¾c. open 10¼c

Lead and Solder•

American pig lead	7¾c. to 8½c.
Bar lead	9c. to 10c.
Solder, ½ and ½ guaranteed	26½c.
No. 1 solder	25c.
Refined solder	22¼c.

•Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	75c
Commercial grade, per lb.	35c.
Grade D, per lb.	25c.

Antimony

Asiatic	8¼c. to 9c

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb. 25c. to 27c.

Old Metals

There has been a tendency to shade prices a little this week. Business has been quiet. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy crucible	12.00
Copper, heavy wire	11.50
Copper, light and bottoms	9.50
Brass, heavy	6.50
Brass, light	5.50
Heavy machine composition	8.50
No. 1 yellow brass turnings	6.50
No. 1 red brass or composition turnings	8.00
Lead, heavy	5.00
Lead, tea	4.00
Zinc	3.75

THE IRON AGE

New York, November 2, 1922

ESTABLISHED 1855 VOL. 110, No. 18

Future Buying of Railroad Rolling Stock

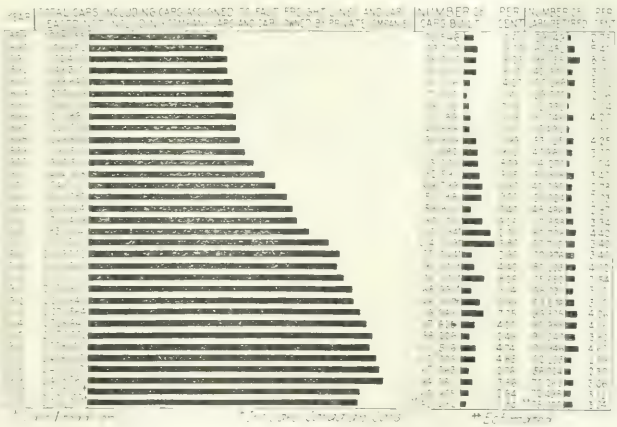
Purchases for 1922, Though Fairly Large, Have Not Come Up to Estimated Requirements of the Carriers

ALTHOUGH the steel companies, locomotive and car builders, and to a certain extent the manufacturers of machinery, have this year felt the stimulus of railroad buying of freight cars and locomotives, together with the large volume of repair work that has been done, the total of such railroad buying has not come up to the expectations of those who have studied railroad rolling stock requirements in the light of statistics covering the past 20 years. This leads to their conclusion that if the railroads are to restore their rolling stock to its normal condition, buying of cars and locomotives will continue throughout the next year or two, at least, on a fairly large scale.

Figures compiled from official sources show that up to Oct. 1 there had been ordered this year a total of 125,000 freight cars and *Railway Age* estimates the number of locomotives ordered up to Oct. 21 at 1848.

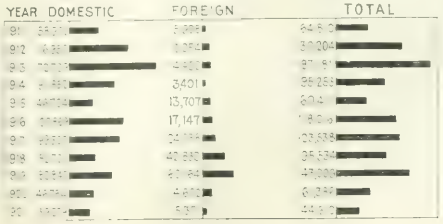
While 1922 will rank as a fairly good year in railroad buying of rolling stock it does not compare with some of the good years before the war. In 1916, for example, there were 170,054 cars and 2910 locomotives ordered; in 1912, another good year, railroads ordered 234,758 cars and 4515 locomotives. Going back still further there were even higher records in 1905 and 1906, the two banner years of two decades in railroad buying. In 1905 the railroads of the country ordered 341,315 cars and 6265 locomotives; in 1906 they ordered 310,315 cars and 5642 locomotives.

Thus it will be seen that in years when the railroads were not handling nearly so heavy a traffic movement as now exists there was considerably larger buying of rolling stock. In 1905 the railroads carried 186,463,109,510 ton miles of freight with a total of 1,731,409 cars, while in 1920, a heavy traffic year, they moved 413,698,749,000 ton miles with 2,322,122 cars (this total applying to Class I roads only). The average carrying capacity has increased, however, during that period several tons per car.



The Chart Immediately Above Shows the Number of Freight Cars in Use in the United States Each Year from 1889

The Chart Immediately Below Shows the Freight Cars Delivered Annually, 1911 to 1921



An analysis of car and locomotive purchases for a ten-year prewar period, from 1902 to 1911, inclusive, shows an average annual purchase of 177,025 cars and 3704 locomotives. The subsequent decade, which includes the war years, during which there was comparatively little railroad buying, shows an average per year of 106,469 cars and 2151 locomotives bought. It will thus be seen at a glance that in the ten years ended Dec. 31, 1921, the railroads had not replenished their rolling stock at more than 60 per cent of the average buying in the preceding ten-year period.

Theoretically, the railroads of the United States are supposed to be actually short several

hundred thousand cars of what past experience has proved presumably to be their requirements. Whether more efficient handling of traffic and the gradual increasing in car capacity will permit the railroads to operate efficiently during years of large freight movement with a fewer number of cars than statistics indicate to be necessary is still to be fully determined, but the present traffic situation points clearly to a shortage of cars. The carrying capacity of cars has been increased somewhat and the pulling power of locomotives is now considerably larger.

Those who have based their estimates of probable railroad buying of rolling stock during the next few years on statistics kept for the past 20 years or more argue that 200,000 cars a year should be built to keep railroad rolling stock in normal condition, taking care of cars retired and providing for normal growth in the volume of traffic to be moved. On account of the present actual shortage of cars, it is further argued that the railroads should buy fully 250,000 cars during the next year to place themselves in good condition.

As each car requires an average of about 10 tons of steel (the range being from about 6 tons for box cars to 17 tons for heavy steel cars) railroad purchasing of 250,000 cars during 1923 would mean a demand for approximately 2,500,000 tons of steel. Locomotive purchases over a period of 20 years have averaged close to 3000 per year, requiring a total, roughly, of 250,000 tons of steel. These figures on possible steel requirements do not include the large number of car and locomotive accessories, which involve considerable foundry and machine-shop work, but which do not run into exceptionally large tonnages.

The actual condition of railroad rolling stock at the present time becomes more readily understood when the 1921 figures on purchases are taken into consideration. In that year only 239 locomotives and 23,346 cars were ordered, which brings down the average for 1921 and 1922 to such a low figure as to give a ready explanation of the present so-called "car shortage."

Figures on freight car purchases for 1922 are not complete, however, without reference to the contracts let for car repairs. Orders booked by car companies up to Oct. 15, this not including work done in the railroad companies' own shops, total 93,000 cars. As each car repaired probably requires at least 5 tons of steel, this activity accounts for close to 500,000 tons additional steel orders going to the mills this year. In all of 1921 the car companies repaired only 48,782 cars, which shows quite a gain for repair work this year.

Another factor of interest to the steel trade is that a larger percentage of the cars ordered in the past few years has been all-steel or part steel construction, while the average capacity of each car has grown steadily, from 28 tons in 1902 to over 45 in late years. As the movement of such heavy commodities as coal, coke, ore, pig iron, scrap and steel products has increased very heavily in the past ten years, the need for cars of larger capacity built of steel is readily explained.

The accompanying table, compiled from figures obtained from official sources, shows the volume of car and locomotive buying in this country since 1900.

Year	Number	Number
1911	2,850	133,117
1921	239	23,346

No estimate of probable purchases of railroad rolling stock within the next few years can properly be reached without due consideration of the figures showing the growth of traffic. Even in 1921, which was a year of general industrial depression, the railroads carried 309,443,050,000 ton miles of freight, only slightly over 100,000,000,000 ton-miles short of that carried in 1920, which was the heaviest traffic year on record, exceeding even the war years of 1917 and 1918. The figures showing the increase in traffic since 1900 follow:

Year	Ton-Mileage	Ton-Miles Per Car Per Day
1900	141,596,551,161	284
1905	186,463,109,510	295
1910	255,016,910,451	327
1915	276,830,302,723	320
1916	365,771,824,741	424
1917	394,465,400,493	449
1918	405,379,284,206	457
1919	364,293,063,017	405
1920	413,698,749,000	487
1921	309,443,050,000	366

Reed-Prentice Co.'s Plans for Becker and Whitcomb-Blaisdell Companies

The stockholders of the Reed-Prentice Co., Worcester, Mass., have ratified the recommendation of the board of directors to purchase the business of the Becker Milling Machine Co., Hyde Park, Mass., and the Whitcomb-Blaisdell Machine Tool Co., Worcester, including good will, trade names, patents, etc., and certain machinery and equipment, raw materials and the entire inventories of finished machinery and cutters, and such portions of semi-manufactured products as the new owners consider worth moving. The Becker and Whitcomb-Blaisdell plants will be sold and the business concentrated in the Reed-Prentice plants in Worcester.

In a statement by the Reed-Prentice Co. it is brought out that "in combining the business in a few plants it is proposed to simplify the lines in an important way, retaining only those which seem the most desirable from the standpoint of the machine tool market. The Becker line will be reduced to some extent, but the standard models will be retained, of course. So, too, will other lines be curtailed, including engine lathes, upright and radial drilling machines and planers."

The statement further says: "While the contemplated consolidation would be considered a fundamentally sound business proposition under normal conditions, the board of directors believes it is especially advisable at this itme in view of the abnormal conditions with which the machine tool industry is now confronted. For two years or more the machine tool industry has been practically stagnant. Owing to the lack of orders the company's losses have been extremely heavy and there is every prospect of continued losses from operations unless additional business can be secured. In the judgment of the board of directors the plan offers an opportunity to the company to secure additional business in lines which are consistent with and supplementary to the company's present lines."

The three companies have had a joint operation of various departments for two years or more, announcement being made in THE IRON AGE of July 8, 1920, that their sales, purchasing, accounting and executive departmnts had been combined and that various selling agencies throughout the country had been displaced by direct factory branches.

American marine engines recovered from wooden hulls originally built for service against Germany are now to be shipped to Germany and installed in steel hulls built there, according to a statement from a salvage company in Portland, Ore., which is "scrapping" the wooden ships. There are 162 triple-expansion engines, of 1400 hp. each, involved in the proposed deal which would provide the rapidly growing German fleet of freight ships with motive power at less cost and in less time than would be needed to build new engines.

Optimism Prevails at Institute Meeting

Members Look Forward to Period of Prosperity, but Do Not Ignore Unfavorable Factors—Large Attendance and Notable Addresses

OUTSTANDING features of the twenty-second general meeting of the American Iron and Steel Institute, held at the Hotel Commodore, New York, last Friday, were the opening address of the president, Judge Gary, who expressed the hope that another conference would be held at Washington for a discussion of the financial, commercial and industrial questions and advocated greater publicity in the affairs of business companies and labor unions; the presentation of papers of great excellence; the dinner speech of Rear Admiral Carl T. Vogelgesang, who made a vigorous argument for a strong Navy; the address of Dwight W. Morrow, New York attorney, and the delightful informal remarks of Charles M. Schwab, in which he poked fun at Judge Gary as a farmer and told why he wanted to live 20 years longer. An amplifier installed in the banquet hall enabled all of the banqueters to hear the speeches distinctly.

The attendance of 1350, while 200 short of the record made in November, 1921, when Marshal Foch was the guest of honor, was considered excellent for a time when there was no extraordinary attraction.

The drift of sentiment as expressed in the lobbies was optimistic, although it is of course recognized there are still some disturbing features of present conditions. Further recessions are expected in pig iron prices and possibly in finished materials.

At the meeting of the directors of the Institute, Willis F. McCook, president Pittsburgh Steel Co., was elected a director to fill the vacancy caused by the resignation of George F. Downs, formerly president Lackawanna Steel Co.

The 12-Hour Day

In his preliminary remarks before beginning his formal address at the opening morning session, Judge Gary said that the committee appointed to investigate the 12-hr. day was not ready to report. "I very much regret that this is true," he said. "I wish to urge all interested to furnish the special committee and sub-committees at the earliest possible moment any information that would be of value on this important subject. Many have neglected to do so. We have been urged to act in regard to this matter by the President of the United States, who has been fair and reasonable, and in fairness to him, who is carrying such heavy burdens, we ought to help in every way in our power."

Papers Presented

An exceedingly varied range of subjects was covered by the nine papers on the technical program. The principal activities of the industry from coal to electric furnaces were discussed, only the blast furnace having no place on the program this year. Abstracts of some of the papers follow, and those not included here will be published in later issues of THE IRON AGE.

Absent Members Honored

In opening the post-prandial program in the evening, Judge Gary spoke with much feeling of Joseph G. Butler, Jr., of Youngstown, and Willis L. King of Pittsburgh, vice-president Jones & Laughlin Steel Co.

"I am extremely sorry," said Judge Gary, "that Uncle Joe is not with us to-night. He is still ill, but in fine spirits, and we trust that he will live for many years. Another good friend, Willis King, has been in poor health for several months, but is improving rapidly. We earnestly hope that both of these men will be restored to health, and, as a slight tribute to them, I ask that you all rise and stand for a moment." This request was complied with.

The Navy and the Steel Industry

After referring briefly to the fact that Friday was the birthday of Theodore Roosevelt, and therefore Navy Day, Judge Gary introduced Rear Admiral Carl T. Vogelgesang, commandant of the Brooklyn Navy Yard. He spoke of the Navy as the foster parent of the steel business and the backbone of industry and the life of the nation. He said that the recent conference for limitation of armament at Washington had the effect of weakening that backbone to some extent and had proved a stimulus for fanatical pacifists, who are a positive danger to the country. He said that so long as there is a desire to make progress implanted in the heart of man there will be competition, and that in seeking the goal of ambition a national sacrifice is sometimes necessary, for war is the ultimate expression of economic strife. The nation must be productive and progressive. In order to be progressive, it must export about 20 per cent of its products which it cannot use itself. For this reason this country is on the threshold of economic strife. The Navy is the bulwark of defense and is necessary unless we are to sink into decay. To have a cheap Navy is to cause unjustifiable waste. If we are to have any Navy, it must be the best. The Navy has been maintained by about 8 per cent of the Federal budget. This expenditure is not only a provision for insurance, but has done more for science and commerce than any other branch of the Government.

Building the New Navy

The admiral told how in 1882 the building of the new Navy was started when Congress voted to construct four cruisers from domestic steel and of how manufacturers protested that the steel could not be made in this country. Wrought iron was used almost entirely, while the little steel used came from England. These manufacturers hesitated to invest in the large plants necessary, but the steel plants were built, steel men learned how to make good steel, and in a short time the price of steel plates was reduced from 8½c. to 4½c. per lb. Then steel began to supplant all other materials. Andrew Carnegie gave credit to the Navy for being an influence in improving steel manufacture.

The speaker told of researches that had been made for which the Navy had paid, whereby the deleterious effect of sulphur in steel was shown. He spoke of how the Navy had contributed to progress in the electric field—in propelling ships by electricity, in developing radio plants and in other important fields. He also spoke of the contributions of the Navy in personnel service and of the splendid work that is done in machine shops of naval ves-

sels. He referred to the protection given by the Navy to trade and to American citizens in foreign lands. In closing, he made a strong plea for a big Navy of 100 per cent efficiency and declared that the small appropriations made by recent sessions of Congress had interfered with efficient operation. He vigorously denounced "political opportunists and misguided pacifists," who in his opinion are interfering with the progress of the nation.

Mr. Morrow on Modern Progress

Dwight W. Morrow, an attorney of the firm of J. P. Morgan & Co., New York, held the closest attention of the audience as he discussed developments in the progress of the world. He said he was not certain that in future years, when we get a better perspective on the advance of the past 20 years, the World War, great as it was, will overshadow what he considered to be one of the greatest achievements in all history—quantity production. With clear vision and an impressive array of facts and figures, he described how this quantity production affects the lives of the people. Taking sugar as an example, he told how 200 years ago only 1500 tons were used in England in a year, while in the United States last year 4,500,000 tons were consumed. This he said was only one example of how quantity production has contributed to the comfort and enjoyment of millions of people. He spoke also of the tremendous fluctuations in business in the early days and of the frightful loss of life due to famine and disease, which in recent years has been checked to a large extent. He looked forward to the time when the capitalist-laborer would be the owner of industry. He said that one of the greatest things Judge Gary had accomplished was to increase the number of employees who were also stockholders.

Charles M. Schwab was the last speaker of the evening, and, as usual, delighted the audience. He said that since he last attended a meeting of the Institute he had passed his sixtieth birthday and had now been in the business longer than any other member—43 years. He said that the most highly valued dividends were not those that came in money, but in the friendship of members of the Institute, and for those friendships he would not exchange all that came to him in the way of material success. He wanted to live 20 years more to continue to enjoy those friendships and all the good things of life. He said that he had never built a plant which had been big enough to meet the requirements of the time of prosperity.

President Gary Makes Plea for Publicity

Says Business and Labor Unions Should Be Treated Alike—Places Blame for Interference with Prosperous Conditions

IN opening his address, Judge Gary said that his remarks would relate to economics and would be spoken from the standpoint of the public interest. He said that in consideration of all economic questions, every one should endeavor to determine the final effect upon the people as a whole. Personal or private gain or advancement or political advantage must be subordinated to the general public good. He expressed the opinion that labor, constituting 85 per cent of the cost of production, is not as a rule paid more than is proper, owing to the high cost of living. He deprecated the tendency to believe that everything objectionable can be overcome by the adoption, amendment or repeal of laws. He said that a combination calculated to control business or production either as to quantities or prices, by the employers or by the employees, interferes with the natural course of business and results in hardships upon all who are outside of the combination, who may be termed the consumers.

Referring to demands made upon the Chief Executive of the country, Judge Gary said that "the patience, perseverance, wisdom, ability and honesty of a President like the one now administering the affairs of this country" are required. "We should strive to hold up his hands; we should pray for him and not find fault or condemn," said Judge Gary. "He is doing better, much better, than any one who unjustly criticizes him would do if in his place."

A strong plea was made for publicity, saying its practical results and its necessities in all departments of economic life without discrimination or exception have not been given due consideration. The full exposure to the people of business methods and management on the part of public and private institutions and organizations will, he said, create and firmly establish a powerful, effective and satisfactory public sentiment, which, on the average and for the long run, will be more potential than penal statutes. Judge Gary expressed the opinion that investigations by legislative committees sometimes have been of great benefit and have resulted in correcting existing evils, but more frequently they are harmful because unfair, politically partisan and managed without regard to rules which govern legal procedure. He added: "The committees are often made up largely of lawyers, some of whom are inclined to deal in personalities, are vindictive and arbitrary, and as the witness or other person subject to investigation is not usually permitted to have a lawyer to represent and protect him, great injustice is likely to result."

Referring to the recent industrial conflict, Judge Gary commended the national administration and added: "There is nothing to be said at this time against labor organizations or their leaders; certainly there is or should be no personal animosity. But to permit any group, and this representing only a minority in its branch of industry, to be exempted from publicity is an injustice and a wrong to the general public."

Judge Gary talked emphatically in regard to the great debt owing by certain foreign nations to the United States, saying that to cancel these debts or any part of them would be forced charity, which is never agreeable to the donor, and, as a rule, equally disagreeable to a self-respecting person or nation. He expressed the hope that there will soon be held in Washington another peace conference for the full and frank discussion of all unsettled financial, commercial and industrial questions in which our people are interested, directly or indirectly, to be participated in by able, open-minded, well-disposed representatives from the different nations, such as those who appeared at the recent limitation of armament conference.

Business Conditions

In conclusion Judge Gary spoke of business conditions, saying:

"There are no obstacles to continued prosperity in the iron and steel business of the United States except such as may arise from interference with the natural course of supply and demand. There is a great abundance of high quality iron ore; steam, gas and coking coal; limestone and other raw products, all within easy reach; also furnaces, mills and shops of the highest grades, railroads and ships for transportation, every variety of experts of pronounced ability, organizations and systems equal to any in the world; and the demand

for every kind and character of steel is far in excess of capacity to produce. Steel is needed immediately for buildings and other structures, for railroads, for farms, for pipe lines, for canning, for equipment of every kind, for guns, tools and implements of thousands of varieties, for wire, ranging from the finest watch springs and piano springs to the largest cables, for cars, automobiles, aeroplanes and other vehicles for transportation of property and persons, and many other purposes.

"Order books are well filled, finished steel, aggregating many thousand tons, is stored at the producing mills, ready for shipment, and this notwithstanding the recent labor troubles at the mines and in transportation circles. Unfortunately there has been an interference with the mining and delivery of coal and with the transportation of finished iron and steel, and there is an insufficient supply of labor.

Who Are Blamable?

"If the natural course of business had not been interrupted, we would now be enjoying success and prosperity in our industry greater than ever before, so far as volume is concerned. Who is blamable? The answer is: Any one who by word or deed has interrupted or hindered the operation of the natural law of supply and demand; or has interfered with the full, free and unlimited right to work, to operate and to produce.

"All that is necessary to prosperity in the United States is the legitimate utilization of our stupendous resources. We can produce here everything to supply to our inhabitants their necessities and their comforts; also luxuries and even delicacies. We can produce without limit, fuel, food, clothing and shelter; everything to make us comfortable and happy, and then have left much for other countries whenever they are in need. We would sell for cash or work or on credit; or when distress is occasioned by calamity, furnish supplies without consideration except a continuance of friendly and Christain response. We are no better than the people of other nations; and we are no worse.

"The fault for lack of continual prosperity in a measure may be laid at our own doors. If so, then let us to the best of our ability overcome our faults and consistently adopt and practice reasonable and constructive policies.

Too Many Tinkers

"Fault in many places no doubt exists. There are too many tinkers, too few experts. Many individuals, by reason of political position or other limited success, assume to know a good deal about matters, particularly economic, concerning which they have little information, derived either from study or experience, and these generally talk the loudest and longest on these subjects. Others from a desire to control or create antagonisms or to derive personal profit, attempt to interfere with the natural and reasonable course of business, sometimes resorting to force and brutality. We must keep our own houses clean, search our own hearts, remain true and loyal and above reproach, and then openly proclaim the truth at proper times and places.

"Just at this time it is generally recognized there is a shortage of labor, although now and generally there are considerable numbers of idle men who do not ask for or desire steady work. For various reasons many workmen have returned to their homes in foreign countries. Business here was dull, and besides, these men on account of very large wage rates had accumulated money and believed themselves to be independent. The shortage in labor, however, has come principally as the result of the percentage immigration laws which have limited the number of workmen who would now come to this country if not prevented by the laws referred to. After some experience these laws are now believed by large numbers to be unreasonable. Ostensibly, at least, they were aimed at the sudden and large increases in the foreigners who were locating here, many of them entertaining views hostile to the ideas of our Government. These laws ought to be promptly changed. The restrictions upon immigration should be directed to the question of quality rather than numbers of foreigners coming to this country. Measures for limiting the number of immigrants to those who are clearly shown to be healthy, morally, politically and physically, ought to be clear, strict and enforceable; but the number allowed to come here should be equal to the necessities of our industries. The administration of the law could be under the control of a competent and impartial governmental commission or department, to be managed for the benefit of the general public and not for the protection of any special class or the exploitation of any impractical or injurious theory. This is one of the most important questions now being debated throughout the United States.

Will Soon Get Back

"In spite of the difficulties which have confronted industry and appreciably frightened investors, the manufacturers of steel are now producing, on the average, about 75 per cent of their estimated capacity. This is more than double the total capacity 20 years ago. We are making a better quality of steel, are increasing diversification of shapes for additional uses; and in many ways we are extending capacity and effecting economies, although selling prices have not kept pace with larger costs. We shall soon get back to a basis of business that will yield fair profits, if permitted to proceed without unreasonable interference.

"As to general business conditions, in addition to what has already been said, great significance should be given to the publications concerning the enormous savings bank balances. These show conclusively a disposition to economize, whatever may be the reasons. Economy and saving are fundamental to thrift and prosperity.

"In this greatest, richest, most admirable country, there should be the continuance of prosperity without prolonged depressions. The iron and steel industry can be a decided influence toward progress and stabilization."

The Electric Furnace in Refining Iron and Steel

Present Status and Reasons for World-Wide Expansion—Rôle of Clean Steel—Flexibility of the Process

BY JOHN A. MATHEWS*

IT seems to have been generally overlooked by the steel trade that this year, 1922, marks the ter-centenary of iron making in the Western Hemisphere. In 1622, the first iron was made at Falling Creek, Va., and in the same year the plant was destroyed and the workmen massacred by the Indians. It is a far cry from charcoal hearths and forges to the consideration of the electric furnace—the latest development in steel making processes.

The rapidity with which electric furnaces have been installed within the last decade all over the world calls for some analysis as to cause. After 10 to 12 years of invention and pioneering there were about 125 furnaces in the world in 1912. At this time, Germany led with nearly one-third of the total number. To-day, as nearly as may be estimated, there are 1000 furnaces, 388 of them being in the United States according to THE IRON AGE figures for Jan. 1, 1922. Accurate sta-

*President, Ohmite Steel Co. of America, New York. This is an abstract.

(*Continued on page* 1130)



DR. H. F. BAIN



DR. J. A. MATHEWS



E. F. ENTWISLE



G. H. JONES

Authors of Papers Read at the Meeting of the American Iron and Steel Institute

H. FOSTER BAIN, director Bureau of Mines, Washington, author of the paper on "Modern Methods of Mining Coal," has had extensive experience in mining operations, for after graduating from Moore's Hill College, Indiana, and taking graduate work at Johns Hopkins University, he became associated with the Iowa Geological Survey, and leaving the Survey in 1900, went to Colorado, where he spent two years in Cripple Creek, managing a mining property. Later he was connected with the United States Geological Survey, the Illinois Geological Survey, was editor of *Mining and Scientific Press*, San Francisco, editor of *Mining Magazine*, London, and engaged in exploration work in South Africa. When the United States entered the war, Dr. Bain returned to the United States and became assistant director of the U. S. Bureau of Mines, giving particular attention to the speeding up of mineral production. At the signing of the armistice, Dr. Bain went to the Far East in exploration work for American interests. He returned to the United States, and on Jan. 1, 1921, was made assistant director and acting director of the U. S. Bureau of Mines. He was confirmed as director by the Senate in May, 1921.

DR. JOHN A. MATHEWS, president Crucible Steel Co. of America and author of the paper on the "Present Status of the Electric Furnace in Refining Iron and Steel," was born May 20, 1872, at Washington, Pa. He received degrees from Washington and Jefferson College, Columbia University, and attended the Royal School of Mines, London University, London. After serving for a time as instructor in chemistry at Columbia University, he became a metallurgist at the Sanderson works of the Crucible Steel Co. of America. He was made assistant manager two years later, remaining there until 1908, when he became operating manager of the Halcomb Steel Co., Syracuse, N. Y. He later became general manager and in 1915 president of the company, and at the same time was made president and general manager of the Syracuse Crucible Steel Co. He was elected a director and first vice-president of the Crucible Steel Co. of America, and was transferred December, 1919, to Pittsburgh, holding that position until November, 1920, when he was elected president of the company, which position he now holds. He was the first recipient of the Carnegie gold medal for research from the Iron and Steel Institute (Great Britain) in 1902.

E. F. ENTWISLE, whose paper was on the "Economic Importance of the Power Plant in the Steel Industry," graduated from Cornell University in 1906. During 1906 and 1907 he was on power plant construction work for Ford, Bacon & Davis of New York, at Nashville, Tenn. In the fall of 1907 he went to the Duquesne plant of the Carnegie Steel Co., working successively in the master mechanic's department, steam engineering department, and again in the mechanical department in charge of the installation of six Snow gas engines. After their installation he was placed in charge of their operation and also the operation of all steam power, blowing and water supply equipment. In 1914 he became mechanical engineer for the Maryland plant of the Pennsylvania Steel Co., and in 1916, upon the active acquisition of that company by the Bethlehem Steel Co., he was made mechanical engineer of the Steelton plant. During the latter half of 1917 he was appointed general superintendent of the Donaghmore division, comprising Bethlehem's blast furnace and ore concentration operations at Lebanon, and in 1918 he was again moved to the Steelton plant as assistant general manager, which position he now holds.

W. P. CHANDLER, JR., who read a paper on "Heating Furnaces for Blooms, Slabs and Billets," was born in Wilmington, Del., in 1889, and after attending the public Schools of that city and the Penn Charter School of Philadelphia, entered Cornell University in 1906, graduating in 1910 with the degree of mechanical engineer. He then entered the employ of the Carnegie Steel Co. at Clairton, Pa. After doing various work in the rolling mills and inspection department, he went into the steam engineering department and was steam engineer from 1914 to 1917. The following year he had charge of the boiler house for the Cleveland Furnace Co., Cleveland, leaving there to become assistant fuel and experimental engineer for the Carnegie Steel Co., at Duquesne, Pa. In August, 1922, he was promoted to become fuel and experimental engineer at that works.

G. H. JONES, president Hillside Fluorspar Mines, Chicago, who presented a paper on "Fluorspar and Its Uses," has been identified with the iron and steel business for 50 years, more than half of which was with the Inland Steel Co. Mr. Jones was one of the organizers of the Inland Company in 1893, and its remarkable progress was due in no small measure to his efforts. He resigned his position as first vice-president and general manager of the Inland Steel Co. on Jan. 1, 1922, and has since devoted his attention to the Hillside Fluorspar Mines, Chicago, whose mines are at Rosiclaire, Ill. He was born in England, Jan. 25, 1856, came to this country in 1871 and for 22 years was associated with Hall, Kimbark & Co., wholesale iron and steel merchants, Chicago.



W. P. CHANDLER, JR.



G. R. McDERMOTT



C. L. KINNEY, JR.



H. H. STOEK

C. L. KINNEY, JR., who with G. R. McDermott presented a paper on "The Thermal Efficiency of the Open-Hearth Furnace," was born at Wareham, Mass., Aug. 4, 1876. He graduated from Massachusetts Institute of Technology, class of 1899, and was chemist for the Tremont Nail Co., Shickle Harrison & Howard Co., and Illinois Steel Co., South Works, 1899-1901. He was employed in the open-hearth department of the Illinois Steel Co., South Works, in various foreman positions and as assistant superintendent from 1902 to 1911, and has been superintendent of open-hearth plant No. 1 of the same works since 1911.

G. R. McDERMOTT, assistant engineer Illinois Steel Co., South Chicago, who was associated with C. L. Kinney, Jr., in presenting a paper on "The Thermal Efficiency of the Open-Hearth Furnace," was born in Glasgow, Scotland. He received his degree as mechanical engineer from Sibley College, Cornell University, class of 1905. Upon graduating, he became associated with the General Electric Co., Schenectady, N. Y., in its steam turbine engineering department. He returned to Cornell University two years later for post graduate work, also acting as assistant professor of thermodynamics as applied to heat-power engineering for a year and a half. Next he entered the employ of Westinghouse, Church, Kerr & Co., (now W. P. Robinson & Co.) and the New England Engineering Co. as superintendent of construction. In 1913, he accepted a position in the engineering department of the Illinois Steel Co.; appointed steam engineer in 1917, promoted to his present position in 1920. Mr. McDermott presented a paper before the 1921 convention of the Association of Iron and Steel Electrical Engineers entitled "Utilization of Waste Heat for Steam Generation." He is a member of the American Society of Mechanical Engineers and the Association of Iron and Steel Electrical Engineers.

R. C. HELM, author of the paper on "The Use of Liquid Fuel in Metallurgical Furnaces," received his technical education at the Pennsylvania State College, graduating in 1913. He took a position in the chemical laboratory of the Pennsylvania Steel Co., Steelton, Pa., for a short time. In the latter part of 1913 he accepted a position in the physical laboratory of the American Steel & Wire Co. as a laboratory assistant and was engaged in the study of various problems relating to the manufacture of both steel and copper wires, becoming later first assistant in the same laboratory. For the past four years he has been in charge of the Worcester district physical laboratory of the American Steel & Wire Co.

HENRY T. CHANDLER, author of the paper on the "Steel Requirements of the Automotive Industry," was one of the younger men who made valuable contributions to the meeting. He was born in 1890. He spent two years at the University of California, three years at the Massachusetts Institute of Technology, one year at the Sorbonne in Paris and one and one-half years at the Polytechnic Institute in Zurich, Switzerland, specializing in physics, chemistry and mathematics. He was for five years with the Ford Motor Co. in its research laboratory, and has been employed by C. H. Wills & Co. as metallurgist for the past two years.

HARRY HARKNESS STOEK, professor in mining engineering at the University of Illinois, who read a paper on "The Storage of Bituminous Coal" was born in Washington, on Jan. 16, 1866 and was graduated from Lehigh University in 1887. In the following year, he was awarded a degree in mining engineering by that institution and in the same year was appointed assistant engineer with the Susquehanna Coal Co., Wilkes-Barre, Pa. Later he became instructor in mining, metallurgy and geology at Lehigh University. In 1893 he was appointed assistant professor in mining at Pennsylvania State College. For two years he was editor of *Mine and Minerals*, Scranton, Pa., being named as head of the department of mining engineering at the University of Illinois in 1909, a position which he still holds. Mr. Stoek is secretary of the Illinois Mine Rescue Commission, and a member of the Illinois Mining Investigation Commission, American Institute of Mining Engineers, Institute of Mining Engineers of Great Britain, Lake Superior Mining Institute, Western Society of Engineers and ex-president of the Coal Mining Institute of America. Among his writings are found: "The Anthracite Coal Field," "Economic History of Anthracite," "Education of Mine Employees" and "The Storage of Coal." Mr. Stoek's home is at 1203 West Illinois Street, Urbana, Ill.

JOHN V. FREEMAN who appeared with Prof. H. H. Stoek, of the University of Illinois in presenting the paper of "Storage of Bituminous Coal" was born at St. Ignace, Mich., in 1885, graduated from Ashland, Wis., High School and Chicago School of Assaying, later specializing in industrial organic chemistry at the University of Chicago. For three years, he was chief chemist of Lake Superior Iron & Chemical Co., now the Charcoal Iron Co. of America, at its Ashland plant. He became chemist to the coal and coke committee of the United States Steel Corporation in 1908, which position he has since held, working on the technical features of all coal and coke problems coming before that body, especially on questions regarding the by-products of coking coal and coal treatment processes. He is also a member of the Corporation's chemical committee compiling standard methods.

Under an order of the Wayne Circuit Court of Michigan, the receiver offered for sale Oct. 31 the Detroit Structural Steel Co.'s plant at Newburn Avenue and Six Mile Road, Detroit. The plant is only a few years old and was fully equipped for the fabrication of structural steel.

(*Continued from page 1127*)

tistics have been extremely difficult to secure during late years, but according to Dr. Richard Amberg* there are 65 furnaces in Germany engaged in the manufacture of ingots, with a yearly productive capacity of 430,000 tons and an unknown number of furnaces making steel castings with a capacity estimated at 300,000 tons per annum. I think we may estimate the total number of electric furnaces in Germany as about 100 to 110.

Reasons for Expansion

The reasons for the world-wide expansion of electric steel making are three:

1—Cheapening of wholesale power rates, due to hydroelectric and improved steam plant developments. Thus it is now commercial to use electricity for melting, whereas the original promoters of arc furnaces felt that their use would be of necessity confined to refining of metal premelted by the older processes.

2—The extreme flexibility and adaptability of electric furnaces to a wide range of uses. It has been shown by experience that they may be successfully used for melting cold charges or refining liquid charges, for making ingots or castings, and for melting ferroalloys. They may be used alone, or in conjunction with the Bessemer or open-hearth, or both. They may be operated acid or basic. They may be used in conjunction with the blast furnace or cupola for making gray iron, malleable and semi-steel castings. For foundry use particularly, the small units are advantageous for making frequent small heats of steel or iron castings.

The most popular size of electric furnace in this country is of 6 gross tons capacity, but furnaces from ½ to 40 tons capacity have proved equally successful. In furnaces of 6 tons, or a little larger, hand charging is general, but in the larger sizes either mechanical charging of cold materials or the use of hot metal charges is usual. Duplexing of open-hearth steel is practiced in many of the larger units, while triplexing is done at the great installation at the Illinois Steel Co., as described at the institute a few years ago by T. W. Robinson.†

All of the manifold methods of operation are possible with the use of arc furnaces, which are by far the most frequently used, here and abroad. Of the different types of arc furnaces in the United States nearly one-half are of the Heroult type and considerably more than one-half of the productive capacity is represented by them.

The electric furnace has small possibilities in this country for the manufacture of pig iron from the ore, but during the war period several furnaces were used to make so-called synthetic pig iron from turnings and borings and other light scrap, in the United States, Canada and France. In Sweden, Norway and Italy, where metallurgical fuel is very dear and electricity is cheap, electric smelting of ores is an established industry. The world's production for 1921 is placed at 377,900 tons, and most of you will recall that the year 1921 was not a good year for high records.

3—Quality of products. A new process to succeed must be cheaper in operation or produce a better quality. The cost of electric steel is rarely lower than open-hearth and never lower than Bessemer and therefore its success is presumably due to its producing a generally superior product. Of course there are especially favored localities or peculiar market conditions which warrant the installation of small electric furnaces where open-hearth and Bessemer installations would be out of the question. In the same localities and markets electric furnaces do operate successfully alongside of large tonnage plants and under such conditions quality must be the principal reason for success rather than low cost.

It is quite obvious that this country has not installed 1,500,000 tons of productive electric capacity to compete with the present crucible capacity of one-tenth that volume. In an address several years ago I said: "It is seldom that a process is discovered that cannot be improved upon. Crucible steel is an exception to this rule. This earliest process makes the best steel and has never been surpassed." The superior lasting qualities of German guns were often ascribed to the use of molybdenum, zirconium, uranium or other strange alloys, but my own idea is that the use of clean, well-melted crucible or electric steel is a more probable explanation. Crucible steel was employed for many submarine crankshafts, and apparently the Germans recognize that when fabricating and machining costs are far in excess of material cost, and where dependability is a vital necessity, it is a poor policy to save at the spigot and let out at the bunghole. Quality depends upon the selection of raw materials, the process of melting and subsequent care in forging and heat treating. The electric furnace provides a reducing atmosphere in which sulphur is readily removed and with it goes one of the generally recognized inclusions, manganese sulphide, and the same condition serves to eliminate oxides.

Importance of Clean Steel

The electric furnace, therefore, is a potential source of clean steel which is more highly appreciated than formerly, and the electric product is opportune to meet the new and exacting requirements for ordnance, automobiles and airplanes, and other devices in which alternating stresses are very severe. The importance of clean steel has been observed in the course of extensive investigations of the fatigue of metals under the direction of Prof. H. F. Moore. It is not too much to expect that the higher the elastic or proportional limit resulting from heat treatment, the more serious would become defects such as non-metallic inclusions and seams in parts made from inferior steel. Dr. McCance confirms this in stating that fatigue failure under repeated stress is a progressive failure, starting in all cases in some defect or irregularity either of internal structure or external surface.

By way of illustrating the freedom from inclusions in electric steel I might mention the result of actual count of hairlines, due to inclusions, in the ground surface of steel to the same chemical specification—a chrome-nickel steel for aeroplane crankshafts. As the result of tests on several heats of this steel by the basic, and acid open-hearth and basic electric process, the average count ran in the ratio of 8 to 4 to 1, and the hairlines in the electric steel were much shorter than in the steel of open-hearth manufacture. Another illustration from my own experience may be convincing. In one of the races at the Indianapolis Speedway a few years ago, about one-half of the cars starting did not finish because of failure of vital parts. The following year nine or ten cars, which I knew contained our electric furnace product in their important parts, all finished the race without mishap, and included the winning car. A practical demonstration of this kind is more eloquent than columns of figures of laboratory tests.

The recent paper by W. J. Priestley* outlines the splendid results of electric furnace ordnance steels made at Charleston, W. Va., in the largest furnaces in the United States. He shows that the results are due to clean steel and freedom from oxides, sulphur and phosphorus. These results show that large units, with proper handling, can produce very high quality steel, and we see no reason, now that larger electrodes can be made of dependable quality, why a 60 or 80 ton furnace cannot be expected to give relatively as satisfactory results. The electric steel rail is still a desired possibility. The increased demands made upon materials of construction call for new methods for meeting those demands. As I stated here six years ago, the electric furnace was opportunely invented to meet a new demand rather than to replace an old process.

It would be mere repetition to restate here the various types of furnaces, such as arc, induction, radiation, etc. They have been described in books and technical magazines and we need only observe in passing

Hellos, vol. 28, p. 169, for April, 1922.

Institute, 1918, p. 115.

*Effect of Sulphur and Oxides in Ordnance Steel. Metallurgical Engineers, vol. LXVII, p. 317 (1922).

that there have been no new principles of heating employed since the first few years—with the possible exception of Dr. Northrup's high frequency induction furnace, which has not thus far been successfully employed in units of commercial size in the steel industry.

Mechanical and Electrical Refinements

Of mechanical and electrical refinements there have been many, all in the nature of improvements in regulation and economy. Among these may be mentioned two of American origin, J. A. Seede's automatic electrode regulator, and E. T. Moore's peak-load regulator. The principle of dual, or rather multiple, voltages was embodied in our original installation in 1906, but its metallurgical significance was not so apparent as it was later when we installed a process employing a 220 volt arc and with considerable difficulty succeeded in persuading the inventor that provision for a lower voltage for use during the refining period must be provided. The desirability of relatively high voltage for melting and low voltage for refining is now generally recognized. Many improvements have been made as the shortcomings of the earlier furnaces appeared, such as well-fitting doors, water-cooled arches, better electrodes and holders and economizers to cut down oxidation and waste of the electrode. In my own experience I have seen electrode costs per ton of product as high as $8 gradually decline to 35c. This was in a furnace refining molten charges.

The electric furnace is also a recognized factor in melting non-ferrous alloys, such as brass and Monel metal, as well as special alloys such as nichrome, "rezistal" "stellite," stainless steel, manganese steel and high-speed steels, besides an endless variety of the simpler alloy and carbon steels from the mildest to the hardest tempers.

Versatility of the Electric Furnace

As stated earlier in this paper, its astonishing flexibility—versatility, we might call it—has attracted the attention of the metallurgical world in almost every branch of smelting, melting, refining, heating and even baking metals. To those of us who have watched its growth from the start, it seemed very slow in achieving the recognition we felt must inevitably come to it, but at last our early confidence has been confirmed in every steel-making country, because its products have fulfilled almost every expectation in every field wherein it has been thoroughly tried. The present success is due not only to the original inventors of the basic processes, but also to the active co-operation of the great manufacturers of electrical equipment, furnace designers and builders, makers of refractories and electrodes and a group of earnest metallurgists in many individual plants who have studied every detail of operation.

When users acquire a full appreciation of what clean sound steel means in terms of national efficiency, safety and economy we shall see more rapid growth than has as yet been seen. Its usefulness to engineering and industry has just begun.

Design of a Proposed 100-Ton Open-Hearth Furnace*

Thermal Efficiency and Heat Balance of a Furnace of 1912 and One of 1922

BY C. L. KINNEY, JR., AND G. R. McDERMOTT†

AT the outset the authors suggested that the American Iron and Steel Institute appoint a committee to prepare and sanction some standard method of determining the thermal efficiency and heat balance of the open-hearth furnace, and they further suggested that those members who manage such plants pledge themselves to use in investigations the standard method authorized by the committee. They regard the method used by Fred Clements in his paper on this subject, which appears in the Journal of the Iron and Steel Institute (London), 1922, (THE IRON AGE, July 13) as the most simple and practical of any extant, and in their presentation very largely followed his plan.

Their paper covered an investigation to determine the present efficiency and heat balance of a typical open-hearth furnace as operated at the works of the Illinois Steel Co. and to show what improvements have been made and wherein the losses shown may be minimized. With this in mind they showed a design of a 100-ton furnace in which are embodied certain improvements.

The proposed 100-ton furnace has been provided with insulated checker chamber walls only, but no increase of combustion chamber efficiency has been assumed. We are satisfied to show that the heat conserved by this insulation is of advantage in our waste heat boiler only. It may be asked why the checker chamber roofs are not so insulated, thus further conserving heat. To this question we will reply by saying that the peak temperature in these chambers is at present not far below the softening temperature of fire-brick and it is felt that any great increase would involve chamber roof collapse.

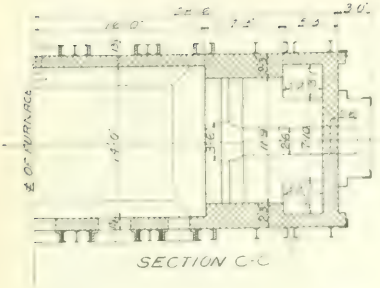
The checker work shown in the drawing of the 1922 and 100-ton furnaces was designed to give the greatest possible inlet area (number of top openings per square foot of horizontal area) and the maximum square feet of exposed surface per cubic foot of checker brick, but also, in its individual flue area of 36 sq. in., gives a velocity high enough for a very excellent rate of heat transfer without premature clogging and consequent suspension of efficient operation.

With checkers as shown in the furnace of 1912 and burning Universal mine run roal (which has an average proximate analysis as follows: volatile, 35 per cent; fixed carbon, 45 per cent; ash, 8 per cent; moisture, 12 per cent; B.t.u., 11,445), the average amount of coal per ton of ingots produced was 750 lb., and over an equally long period during 1914, using the improved checker work and the same coal, the pounds per ton of ingots was reduced to 684, a decrease of 8.8 per cent. Had we been using, during the periods named, what may be termed a standard gas producer coal of high fixed carbon, low ash and moisture content. having a heat value of 13,400 B.t.u., our coal per ton of ingots would have been for the 1912 period, 600 lb. and for the 1914 period, 548 lb., this last figure representing actual results. It should be unnecessary to mention the desirability of the proper arrangement and size of flues under the checker work, and we have attempted to minimize short-circuiting by progressive increase in area from bridge-wall to valve flue, at the same time keeping ample area in all parts in order to take care of deposited oxides. Ample insulated flue area, between regenerative chamber and valves and boiler, has also been provided.

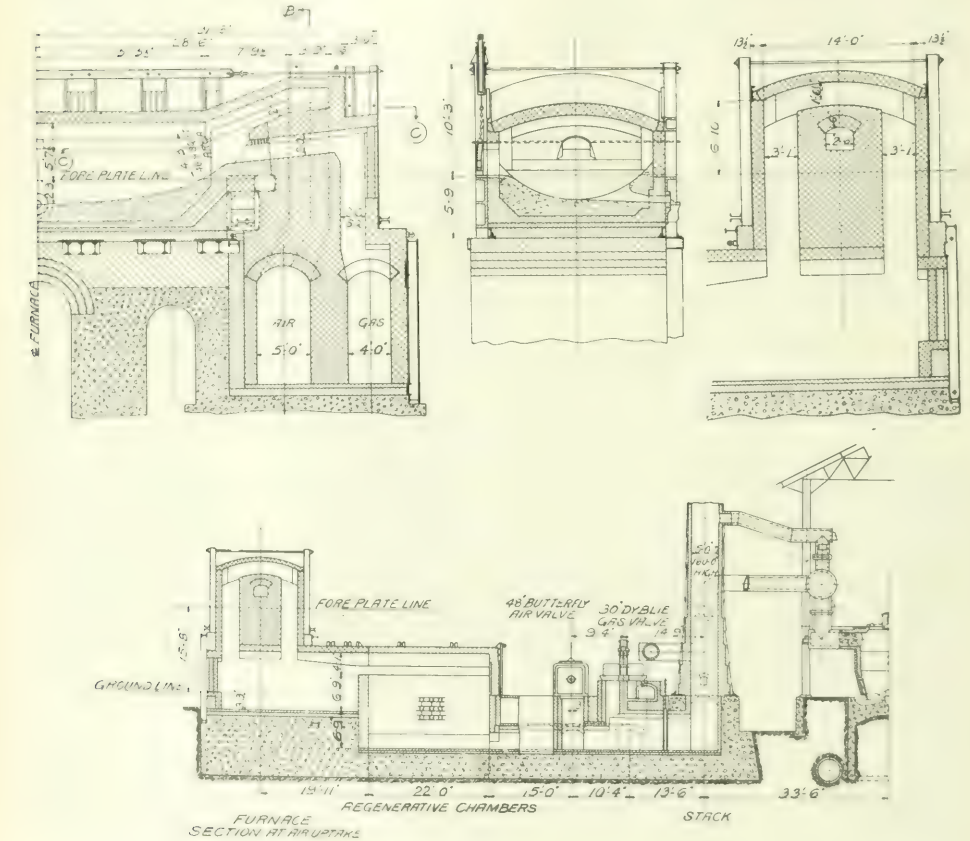
Today it is not unusual to find furnaces, the face of whose gas ports are too far advanced into the melting chamber and the bottoms of the ports not high enough above the bath level. The antithesis of such a condition prevails where gas ports are set too far back, thus causing a very high temperature flame to play upon and pass over the end banks. With this condition these banks will soften and cut instead of building out and trouble will be encountered in the

*Abstract of paper read before the American Iron and Steel Institute, New York, Oct. 27.

†Superintendent No. 1 open-hearth department and assistant chief engineer, respectively, South Chicago Works, Illinois Steel Co., South Chicago, Ill.



Required 750 Lb. of Coal of 11,445 B.t.u. Calorific Value to Produce 1 Ton of Ingots. This, measured by 14,000 B.t.u. coal, is 600 lb. By an improvement in the checker work such as indicated in the 1922 type of furnace, the coal consumption was 684 lb. and 548 lb., for the two kinds of coal, respectively

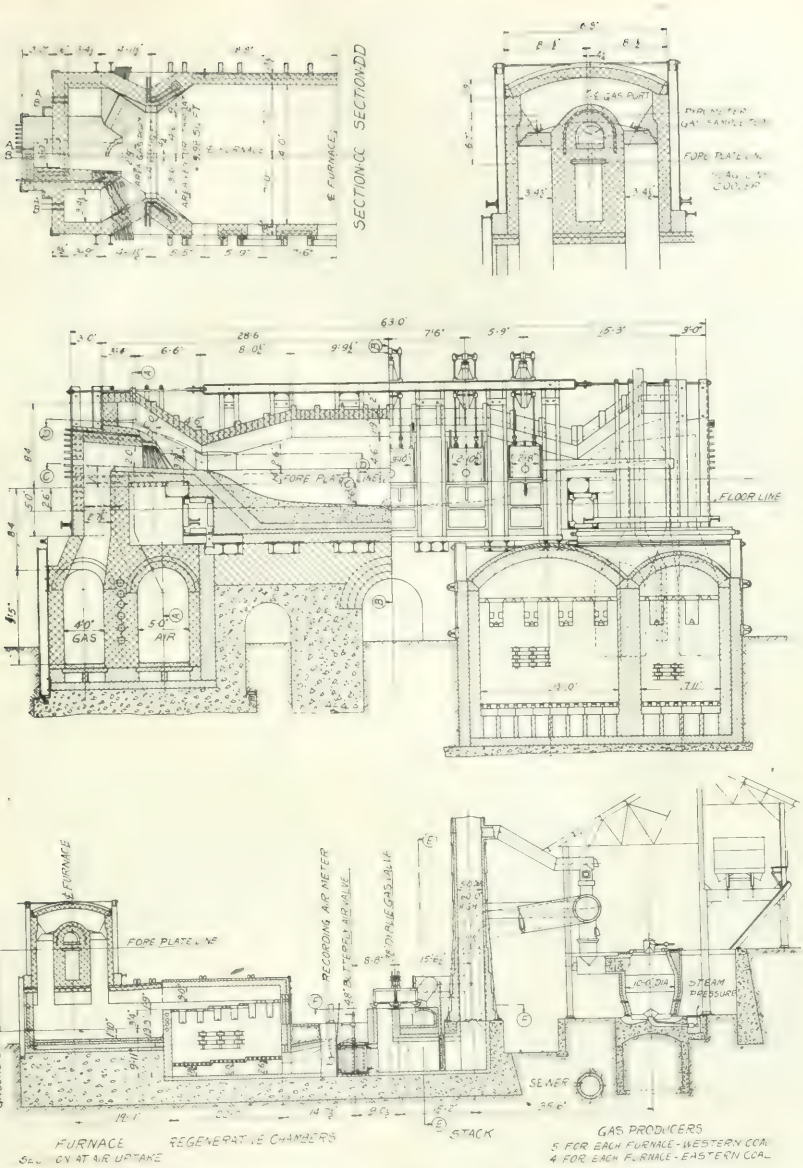


form of delays in repairing them, and in the loss of heats.

Reference to the port end of 1912 type of furnace will show that, while a preliminary combustion zone existed, there was a decided lack of contact area between incoming gas and air. A cross section of the combustion chamber at the gas port mouth shows that only the upper portion of the gaseous column is in contact with the air column. The 1922 design shows how this area of contact has been increased by the admission of air on the sides of the gas port. The proposed 100-ton furnace exhibits another arrangement in this respect, in that the fuel column is divided and by means of the damper the air is forced into a still more intimate contact.

Referring again to the 1912 type, it will be noted that, after leaving the zone referred to, the area of greatest confinement was 43 sq. ft., and the continuity of direction and compactness of the fuel column was largely a matter of velocities and confinement in the zone immediately adjacent to the gas port mouth.

To maintain the proper direction and compactness of the fuel column under the 1922 condition of preliminary combustion, it was necessary to prevent velocity dispersion, by decreasing the area of confinement to 20 sq. ft., which is practically the amount indicated by the increased volume of the gases, due to their temperature increase between the face of the entering port and the point of greatest confinement. Not only does this decrease in area (23 sq. ft.) result in a regular compact fuel column, but by increasing the intimacy of the mixture of gas and air an improvement in combustion is attained. Such reduction in area does not, as might be supposed, affect the efficient removal of the products of combustion from the melting chamber.



The 1922 Type of Open-Hearth Furnace, Besides the Improved Checker Work, Shows Improved Port and Melting Chamber Design, Reducing the Coal Consumption per Ton of Ingots to 596 Lb. and 477 Lb. for the 11,445 and 14,000 B.t.u. Coals, Respectively

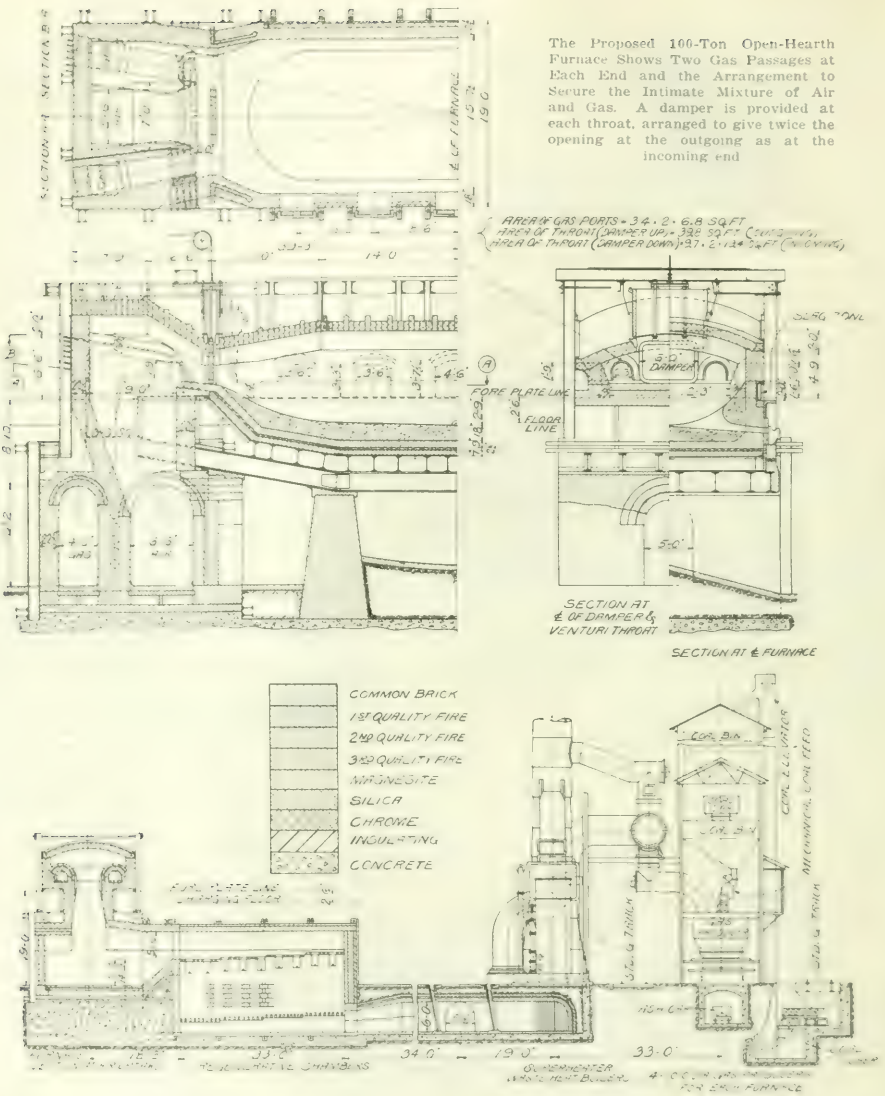
The 100-ton furnace not only increases intimacy of mixture for the necessary combustion, and the confinement of area necessary for efficient control of the flame, but in addition provides an outlet area capable of handling a greater input energy.

The furnace drawing shows the air-cooling system for the division walls between slag pockets and checker chambers. This is connected to a fan which supplies air to the furnace. This arrangement increases circulation and renders cooling more efficient and adds sensible heat to the incoming air.

The 100-ton furnace shows a substitution of the damper type valve for the rotating water-cooled type and while there is no question of the superiority of the former due to its easier flow lines, there is also much less heat loss in the cooling-water and the absence of water vapor carried into the furnace from the exposed water of the seal. It should be emphasized that a valve of this type, used on the air flues, eliminates the short-circuiting of a larger or smaller portion of the incoming air to the stack flue, which in the butterfly type comes from faulty sealing of the valve tongue and entails losses more serious than commonly supposed.

The sensible heat in the gases after passing through the regenerators of an open-hearth furnace represent 30 to 50 per cent of the heat available in the fuel as fired. The absorption of the heat content of these gases is largely obtained by convection which necessitates the travel of the gases at high velocity over the heating surface of the boiler.

By referring to 100-ton furnace drawings it will be noted that a fire-tube type of boiler and economizer



The Proposed 100-Ton Open-Hearth Furnace Shows Two Gas Passages at Each End and the Arrangement to Secure the Intimate Mixture of Air and Gas. A damper is provided at each throat, arranged to give twice the opening at the outgoing as at the incoming end

is shown. Both the boiler and economizer are constructed with 3-in. diameter flues. The reduction of space required, lower first cost, less draft loss, elimination of air leakage due to infiltration, and ease of maintaining a clean surface on the gas side of the heating surface for equal evaporation led to the adoption and installation of the fire-tube type of waste heat boiler at South Chicago in 1915 and in 1917.

The heating surface of the boiler and economizer constructed with 3-in. flues is 6250 and 2200 sq. ft. respectively, while the number of square feet of heating surface of the boiler constructed with 2-in. flues and an economizer having 3-in. flues is 3100 and 2200, respectively. The latter installation would consume more fan power on account of the greater friction loss through the 2-in. flues as compared with the 3-in. flues. The cost of this power would be offset by the difference in first cost of the installation and interest on the investment.

The furnace equipped with a waste heat boiler utilizes as useful work 35.9 per cent of the energy in the coal fired at the producers, as compared to 16.1 per cent with the furnace not so equipped. This difference would be further increased by the installation of an economizer.

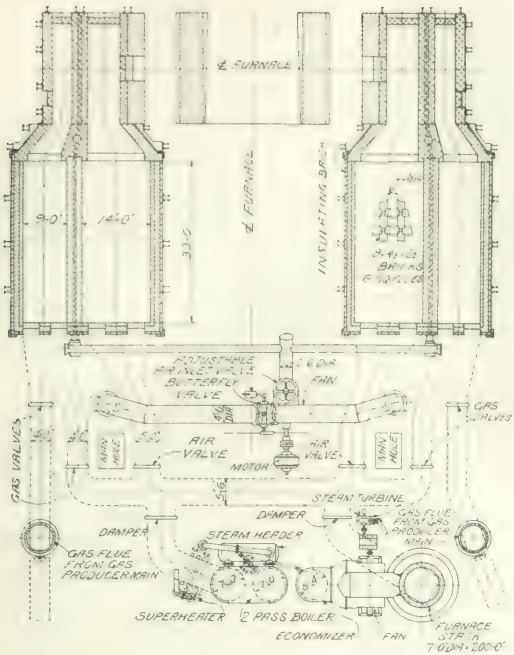
The authors took observations of three successive heats of No. 24 furnace at the No. 2 plant of the South Works of the Illinois Steel Co.

The heat balance shows a total heat input of 531 million B.t.u. in the coal fired in the gas producers, of which 493 million B.t.u. was delivered to the furnace gas valve, no allowance being made for the tarry vapor content of the gas. Of this 531 million B.t.u., the principal losses are given in the accompanying table.

Principal Heat Losses [illegible]

	Million B.t.u.	Loss in Per cent of Coal Fired
Carbon monoxide in waste gas sampled at port ends	53.5	10.01
Heat radiated from [illegible]	[illegible]	7.2
Heat [illegible]	[illegible]	13.[illegible]
Heat [illegible]	[illegible]	2.0
Heat in waste gas to boiler	270.00	51.0

The heat in useful work in the steel produced



The apparent loss in the form of unburned carbon monoxide is in part recovered by secondary combustion in the checker chamber and largely appears as additional heat in the waste gases utilized by the boiler. This large loss of the furnace is uneconomical from the standpoint of furnace efficiency, and may be corrected in a large measure by improving melting chamber combustion.

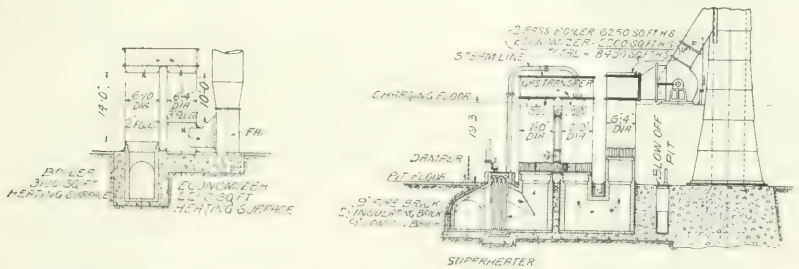
Some 38.8 million B.t.u. are lost by radiation from checker chambers, slag pockets and uptakes, and we would expect in the 100-ton furnace to prevent a portion of this by insulation of the checker chamber walls.

The gases leaving the waste heat boiler can be further utilized by means of a feed water economizer to the extent of approximately 8 per cent additional steam generation, as demonstrated by a recent installation at these works.

To further an increase of efficiency we propose to install a fan or other mechanical means of delivering air, which is automatically controlled supply air for effective combustion. The automatic control feature will supply air in proportion to the fuel consumed. This air control will operate in combination with an automatic control for the removal of the waste gases which must maintain a balanced draft in the melting chamber.

The port construction of the proposed furnace as shown is purely theoretical, the soundness of the design and expected results to be proved by actual construction and operation.

An accompanying table gives a comparison of the important dimensions of the three types of furnaces discussed; and as a matter of additional interest the authors show the same data for the 100-ton furnace designed by Fred Clements, Rotherham, England. (Shown in THE IRON AGE of July 13, page 75.)



The Proposed Open-Hearth Furnace Installation Comprehends Using Forced and Induced Draft Fans in Connection with a Waste Heat Boiler and Arrangement to Supply Air in Proportion to the Fuel Consumed. Division walls between slag pocket and checker chamber are air-cooled, being connected with supply fan A one or two pass boiler is indicated, the latter type with both superheater and economizer

amounted to 85.29 million B.t.u. or 16.1 per cent of the B.t.u. contained in the coal fired. The net heat recovered by the waste heat boiler, after deducting the heat in the steam used for blowing the five gas producers was 87 million B.t.u. or 16.4 per cent of the B.t.u. in the coal.

Dimensions of Open-Hearth Furnaces Compared

	1912 Type	1922 Type	Authors' 100-Ton	Clements' 100-Ton
Distance between gas port faces, ft.	39	43	54	48
Width between front and back walls, ft.	13.25	13.25	15.75	16
Length of hearth, ft.	32	32	42	38
Hearth area per ton of ingots, sq. ft.	5.73	5.73	6.75	6.08
Area of gas port, sq. ft.	4.7	4.7	6.8	8
Area of air port, sq. ft.	24.5	28	42	78
Area of mixing throat, incoming, sq. ft.	46.9	20	19.4	abt. 19
Area of mixing throat, outgoing, sq. ft.	46.9	20	19.4	abt. 19
Length between mixing throats, ft.	36.9	37.3	50	37

Managers in 10 basic industries are enlarging their work-forces to keep production abreast of the growing demand developing with the general quickening of business, according to reports made to the Department of Labor at Washington. The percentage of increase in a few industries is as follows: car building and repairing, 15.8 per cent; shipbuilding, 4.7; automobile manufacturing, 5; electrical goods and machinery, 2.2. There has been a decline in the numbers employed in farm implement production, but this is attributable to the usual seasonal slacking in demand.

The University of Michigan has announced that its new engineering shops and laboratories, which will be ready for the opening of the U. of M. in the fall of 1923, will cost approximately $750,000. There will be a foundry under the direction of the metallurgical department, a pulp and paper laboratory, motor fuels and petroleum laboratory, paint and varnish laboratory, asphalt, tar and cement laboratory.

Steel Requirements of the Automotive Industry

Classified as to Various Parts—Tests for Mechanical Properties—Importance of Heat Treatment—Alloy Steels for Certain Parts

BY HENRY CHANDLER*

PRIMARILY, the physical properties of automotive steels determine which of those steels are best adapted and most essential to the automotive industry. Speaking generally, the mechanical characteristics of materials determine, first, the thing we are able to make, and second, the methods we are to employ in making it.

The more highly specialized an industry becomes in its development, the greater is that industry's dependence upon the properties of the metals peculiar to it. Our first thoughts in the development of a mechanical idea are governed by and limited to the materials then available. Later, competition and a fuller understanding of our actual needs result in the discovery of materials still more suitable. For instance, in the early pioneer days of the motor car industry, crankshafts were made from billets intended for rails, gears from tool steel, cylinders from iron suitable for stoves and, similarly, all other parts were made of the only materials then available.

To-day we rely upon specialized automotive steels for our major parts. The automotive manufacturer is now buying physical properties. The chemical specifications, from which steels are actually purchased, are not of importance in themselves but only for the physical characteristics which they define. It is the mechanical characteristics of the steels that are of prime importance to the manufacturer, both in the design of his product and in the mechanical methods he is to employ in manufacturing it. These are the two factors that determine his commercial success.

The adoption of a steel for commercial purposes is predicted upon two general questions; first, "How will this steel adapt itself to the necessary manufacturing processes?" and second, "Will the part, when made of this steel, withstand the forces, such as wear, breakage, etc., that operate for its destruction?" The answer to these questions is obtained through a survey of the mechanical characteristics of the metal. This two-fold importance of the physical properties suggests a natural division of the various parts of motor cars.

Steels Suited to Fabrication

Our first group will contain all those automotive parts which are made from steels in which the physical properties, that control the processes of fabrication, are of first importance. This group includes most of our sheet metal parts, low stressed bolts, nuts and other screw machine products, as well as miscellaneous forgings, hardware and stampings. The requirements are easily and quickly ascertained. Actual use becomes the best criterion and we are able to define our steels in terms of how they must behave in the shop.

Steels for Service Conditions

The second group contains those special automotive parts which are made from steels in which the physical properties demanded by service conditions are unusual and of first importance. Steels for such parts, due to the peculiar conditions of service to which they are subjected, must have individual physical properties developed to an unusual degree. Valves, ball bearings, magnets, armatures, hardened keys and the like are all typical of this class.

For example, in valves, strength, hardness and toughness must be maintained at high temperatures and the metal must withstand the corrosive and erosive effects of the products of combustion. To meet these particular requirements, many special steels have been developed, such as high-tungsten, silicon-chromium, cobalt-chromium and others, each with its own peculiar advantages for this service, and each with its own distinct engineering following. Also the electrical properties now attained in armature and magnet steels are evidence of the specialized nature of these parts.

Naturally this group requires special analyses. The manufacture of these parts or of the steels suitable for them can be commercially undertaken only after a thorough understanding of the complex problems involved.

Steel for Major Automotive Parts

The third group contains most of our major steel parts. The front axle and its various component units; our power train from piston pin, through connecting rods, crankshaft, transmission, universal joint, to the rear axles; springs; heavy duty gears; and, in general, all parts subjected to live loads of a high order are included in this division.

These parts are uniquely automotive parts, that is, the forces of wear, fatigue and breakage to which they are subjected; the processes by which they are fabricated and the economic factors which limit their cost are peculiar to and characteristic of the automotive industry alone. The steels for these particular parts may, therefore, be truly called "automotive steels." Their development into the many standard grades of alloy steels has been coincident with and in a large measure responsible for the development of the motor car. Parts in this group, in operation, are subjected to much punishment.

Tests to Determine Mechanical Properties

The automotive manufacturer relies upon two types of test: First, that of actual use itself, and second, comparatively simple and rapid laboratory tests, whose indications he has learned to correlate with the results of actual use.

The test of actual use, while undoubtedly our final criterion, nevertheless has serious disadvantages. It is generally slow and its results are difficult to express in terms usable in steel specifications. Laboratory tests, whose results may be numerically expressed, have been devised to furnish us with information as to the likely behavior of the metal in service.

It is not yet easy to say which and how many of the various physical properties, which metals possess, are of direct importance in the construction of these automotive parts. The conditions under which a motor car must operate are unusual. Dynamic tests, designed to isolate and measure the physical properties which determine the behavior of steel under these conditions, have been suggested. Of the many properties easily measured, the automotive manufacturer depends chiefly upon those obtained by the following tests:

First, the tensile test.
Second, the Brinell and scleroscope hardness tests.
Third, an impact test (in this country generally the Izod).
Fourth, thermal and metallographic investigation.

These tests, while not conclusive, nevertheless, when properly interpreted and supplemented by close observation of actual service, sufficiently define our steels for commercial purposes. [The author here discusses each of these methods of testing and what they mean.]

Effects of Heat Treatment

Steels for the parts now under discussion are invariably used in the heat treated state. The behavior of the steel under thermal treatment also bears a relation to its dynamic characteristics.

When a piece of steel is heated beyond its critical

point, it undergoes a chemical and physical transformation. If thereafter it be slowly cooled, this transformation reverses itself and the material returns to its normal state. However, when the steel is quenched, the physical and chemical changes which took place during the heating have now no opportunity to reverse and the material, when cool, is consequently in a state of unstable equilibrium. This degree of instability is measured by the temperature to which we can subsequently reheat or "draw" the steel after quenching and still maintain our requisite strength. In other words, the higher the drawing temperature that the steel can withstand, the greater is its molecular stability and the greater is its resistance to any subsequent molecular change, whether the latter be produced mechanically or otherwise.

Other factors being equal, the steel with the highest drawing temperature will be the most satisfactory for those automotive parts that require resistance to "fatigue."

But here again caution must be exercised lest our conclusions carry us beyond a logical point, because the metallographical size, nature and distribution of the constituents of the steel are also factors to be reckoned with.

We have indicated in the preceding paragraphs that the merit of a steel for motor car use was closely related to the results of the tension test; and that this relationship might be expressed by the proportion:

$$\frac{\text{Mean Breaking Strength} \times \text{Elongation}}{\text{K} - \text{Reduction in Area}}$$

It is perfectly obvious that such a simple proportion as the above can in no way be an exact statement of the really complex relation which exists between the phenomena occurring in the tensile test and the exceedingly complex combinations of properties required for our various parts. Nevertheless, since this test so greatly influences the automotive manufacturer in his choice of steels, we are justified in considering what further information it can supply us with.

The physical properties of our steels are direct functions of the drawing temperature. Thus the elastic limit, elongation and reduction in area may all be varied over wide limits by heat treatment. It therefore follows that our merit number, as previously computed, will also change in value according to changes in the drawing temperature and will in a given steel reach a maximum at some definite temperature.

For example, a hardened but not drawn bar of high carbon steel may show an elastic limit of say 175,000 lb. per sq. in. Nevertheless, it can be readily seen by breaking the bar with a hand hammer that this strength is of little use for the parts under discussion. Due to the slight elongation and reduction in area possessed by the bar, these factors in our equation will be small and our merit number will be very low, in spite of the relatively high elastic limit. If we now reheat or draw the bar, we find that although of less strength as measured by elastic limit, it will easily withstand our efforts with the hand hammer. A further increase in temperature still further increases the amount of energy which must be expended before breakage occurs, until a maximum point is reached where the decrease in tensile strength and elastic limit is not compensated for by the corresponding increase in elongation and reduction in area. Further elevation of the drawing temperature beyond this point results in a decrease in merit until the critical point is reached, with its accompanying fundamental changes in qualities. This drawing temperature at which maximum merit occurs is different in different types of steel and is fairly independent of the carbon content. This consideration is important in comparing the suitability of the various steels for different uses and in defining our practice in allotting a particular analysis of any given type of steel to a particular part.

Thus we find that the steels in which this temperature of maximum merit is naturally low are used exclusively in the condition resulting from low drawing temperatures. This is the case with silico-nickel steels which are widely used for hard light armor plate.

Our most widely used spring steel is of an analysis which develops the necessary spring requirements of strength, etc., at a drawing temperature but 60 deg. removed from the temperature of maximum merit for that steel.

It is common practice in the manufacture of large carbon steel forgings to meet the elastic limit requirements in so far as possible by carbon additions and thus maintain a high drawing temperature. Since there is, then, a definite drawing temperature, at which the dynamic properties required in automotive steels are developed to their maximum, for each particular steel analysis, there is, consequently, a corresponding definite elastic limit at which the particular steel may best be used.

Most of our major automotive parts require, owing to the limitations imposed by design, minimum strengths of a relatively high order. Also the successful operation of these parts, under the difficult service conditions, presupposes the development of the merit index to a high degree.

Alloy Steels for Certain Parts

Carbon steels may develop under suitable heat treatment elastic limits which are sufficient for most of these parts, but their use is promptly excluded where the requirements exceed 80,000 lb. per sq. in., and even for requirements under this figure the merit index is of a lower order than is desired.

Accordingly, our automotive alloy steels have been developed, which not only will show higher elastic limits than those obtained in carbon steels, but also for any given elastic limit, demanded by design, will exhibit resistance to fatigue, vibration, shock and wear, far greater than that of any carbon steel.

This development has been coincident with and in a large measure responsible for the development of the automotive industry.

The commercial factors, as defined by the adaptability of these materials to the various mill processes of manufacture and the subsequent operations of fabrication, such as machineability and general adaptability to shop conditions, have in a like manner been improved until it may now be fairly said that through the use of alloy steels, the automotive manufacturer can build a better product at a cheaper price.

Liquid Fuel in Metallurgical Furnaces

Handling and Burning Tar and Fuel Oil—Use in the Open-Hearth and in Heat Treating Wire

BY R. C. HELM*

TAR and fuel oil are the most common of the liquid fuels which are economically available for use in metallurgical furnaces and this paper has, therefore, been confined to their use only.

The use of oil as a fuel in furnaces for metallurgical purposes dates back a good many years, and the demand for it is constantly increasing. Originally, the oil was used in its crude form without the removal of any of the more volatile hydrocarbons. Naturally, the low flash point of such oils made them unsafe to handle. Moreover, the development of wider uses for these lighter oils demanded their extraction from the crude. The removal of these lighter hydrocarbons raised the

*Director Worcester Research Laboratory of the American Steel and Wire Co., Worcester, Mass. This

flash point of the residue considerably, giving a resultant product which could be used with more safety. A large proportion of the oil now used as fuel is obtained as a residue in this manner.

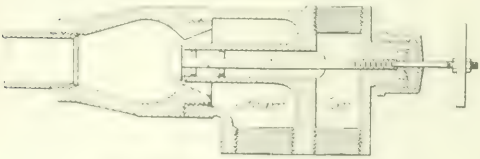
The calorific value of the fuel oils in common use varies from about 141,800 to 152,400 B.t.u. per gal. with corresponding density as measured by the Beaumé hydrometer of 30 to 12 deg. at a temperature of 60 deg. Fahr. As oil is purchased by the gallon, the heavier but more viscous fuel oils, therefore, have the higher ther-



mal values. The thermal value of the oil, however, does not necessarily indicate its adaptability for furnace use, as other features such as the content of impurities and size of furnace installation must be taken into consideration in deciding whether the heavy and more viscous oils should be used in preference to the lighter and more fluid oils.

The introduction of the by-product coke plant increased the available amount of coal tar to such an extent as to result in making coal tar available as a liquid fuel for use in metallurgical furnaces. In addition to tar, the by-product coke plant also furnished a supply of gas for the same purpose. The usual proximity of the by-product coke oven plant to the open-hearth plant supplies a very good opportunity of utilizing both coke oven gas and tar as open-hearth fuel to the economic benefit of both plants.

As the production of tar goes hand in hand with the production of gas, the natural development of the use of both these fuels has resulted in the practice of



using them in combination as fuel for the open-hearth furnace. The use of coal tar only has also been advantageously developed. As tar can be burned more advantageously where high temperatures are required, its use in steel plants has been chiefly confined to open-hearth practice.

Tar has a thermal capacity of about 155,000 to 162,000 B.t.u. per gal. Coke oven gas as used is debenzolated and has a thermal capacity averaging 540 B.t.u. per cu. ft.

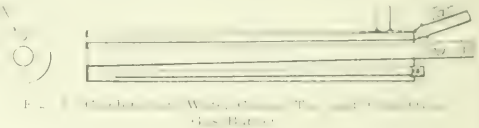
Many types of furnaces for metallurgical use have been equipped for use of liquid fuels. As far as the supply of air for combustion with liquid fuel is concerned, these types may be classified into three groups: (1) non-preheating furnaces in which the air is admitted to the combustion chamber at atmospheric temperatures; (2) regenerative furnaces operating on the reversing principle in which the air is preheated in a checker chamber before entering the combustion chamber, the checker chamber deriving its heat from the waste gases; and (3) recuperative furnaces in which the air for cumbustion is preheated by passing through a set of flues which alternate with flues through which the hot waste gases flow in a counter direction or at right angles to the direction of flow of the air.

Liquid Fuels in Open-Hearth Furnaces

The price of fuel oils in localities where large tonnages of open-hearth steels are produced is usually so high as to prohibit its use in competition with producer gas. The supply of by-product coke oven coal tar, however, ranging in quantity with different kinds of coal from approximately five to thirteen gal. per ton of coal used, is available in sufficient quantities and at prices which make its use economically attractive, as far as the supply lasts, for use either alone or in combination with coke oven gas in open-hearth furnaces. Where the open-hearth practice has been developed for the use of tar alone or in combination with coke oven gas with consequent closing down of the gas producers, fuel oil may be substituted for tar to permit continuous furnace operations if the regular supply of coal tar is interrupted for short periods of time. As the equipment necessary for using tar is similar to that used for oil, such a change may be quickly accomplished.

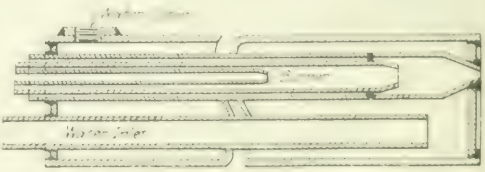
[The installations for handling liquid fuels are discussed by the author here.]

As tar is more difficult to atomize than even the



heavier fuel oils, the type of burner used is worthy of considerable attention. The most common type of burner used for atomizing tar is illustrated in Fig. 1, where the tar is introduced through a central nozzle with the steam chamber entirely surrounding it. With burners of this type, various alterations of design have been tried with the idea of increasing the efficiency of atomization by inserting a valve spindle through the tar supply pipe, and attaching a ball or cone to the spindle at the fuel orifice. The ball or cone diverts the tar directly into the path of the steam, giving better opportunity for atomization. Another modification of this burner may be obtained by plugging the end of the nozzle and drilling holes at various points throughout its circumference through which the liquid fuel is forced into the path of the steam.

Fig. 2 illustrates a burner, designed and patented by Mr. Krause of the South Chicago plant of the Illinois Steel Co., intended primarily for increasing the efficiency of atomization when burning tar. Its construction lends itself readily, however, to the application of atomizing fuel oils with great efficiency. It is quite simple in design, but very effective in atomizing tar.



The tar supply passes through the central part of the valve to the button at the end of the valve stem, where it is sprayed in fan shape into the path of the steam. Small projections from the valve stem to the wall of the valve prevent vibrations. The steam chamber is conicled in the direction of the tar outlet so that maximum velocity is obtained at the area of contact between the tar and oil. The atomization of the tar accomplished in this burner proves very effectual as judged by combustion conditions within the furnace. The

burner also has the advantage of being quickly cleaned by screwing the valve stem in or out if clogging occurs at the tar orifice.

The steam pressure on the line supplying steam for atomization varies from 50 to 125 lb. per sq. in., dependent on furnaces and burner construction. Likewise, the amount of steam per gallon of oil atomized varies from about 3 to 6 lb. Dry steam is essential for good atomization, steam separators being used where necessary at advantageous positions on the line to obtain this condition. While the amount of steam seems relatively small, it is an item which should not be neglected in determining the type of burner to be used. Compressed air has not proved satisfactory for the atomization of tar. As fuel oils can be atomized with compressed air, however, tests have been conducted at an open-hearth plant using fuel oil only to determine whether steam or compressed air was cheaper. Such tests showed a net saving of seven per cent in the amount of fuel oil consumed in favor of compressed air, using a type of burner found to give consistently good results in furnace operation.

With the temperature conditions existing on the ends of an open-hearth furnace, it is necessary to provide some means of preventing the burner from being destroyed. This may be accomplished by providing mechanical means of swinging the burner out of the furnace when not in use; by placing the burner within a water jacket; or by building a tunnel, which may or may not be water jacketed into the end of the furnace. As the majority of open-hearth furnaces on which liquid fuels are now used were designed primarily for the use of producer gas, there is commonly not sufficient space between furnaces to permit of the use of swinging burners.

In cases where tar is to be used in combination with coke oven gas and the introduction of both fuels has been found to give the best results when admitted into the end of the furnace, the gas burner and tar burner are combined in the same water jacket as illustrated in Fig. 3. Coke oven gas, due to being very light, is always introduced under the tar or oil, the heavier liquid fuel acting as a blanket to keep the lighter gas from rising and burning at the roof of the furnace with consequent short life of the furnace roof. The objection to using a burner of this type is that the tar and steam both must pass through a long atomizing chamber surrounded with water. The cooling effect of the water tends toward both condensation of the steam and the liquifaction of the tar. The shape of the gas tip used with the combination coke oven gas and tar burners is either round or flattened. As the details of furnace construction vary, it will be necessary to determine by experiment whether the coke oven gas will give better results with either the round or flattened nozzle.

With furnaces designed for introducing tar alone at the ends of the furnace, a water jacketed burner similar to that illustrated in Fig. 4 may be used. This type of burner does not possess the objectionable feature of bringing the burner chamber in direct contact with the cooling water. A similarly designed water jacket may also be used in connection with the combination tar and coke oven gas burner.

The location of the burner in the furnace for either tar or fuel oil is of great importance, and in practice differs as to the height above and angle which it makes with the bath line and the length introduced into the furnace. It should be placed so that luminosity is obtained as soon as the fuel reaches the furnace hearth. In connection with this, it is important that the burner be so placed and the port ends so constructed that proper direction of atomized fuel and air for combustion will give the most efficient melting down and prevent melting of the roof. As different types of burners vary in the thoroughness of atomization, the type of burner used will have some bearing on its location.

The use of a satisfactory quality of liquid fuel alone requires little or no changes in open-hearth practice. It has been used with furnaces up to 200 tons capacity. The quantity of fuel consumed per ton of ingots produced will, however, vary according to the open-hearth practice used at different localities. Furnaces operating with a combination coal tar and coke oven gas practice use variable percentages of each dependent on local conditions. Commonly, however, about 50 per cent of the heat required is derived from each source. Some plants have experienced a reduction of 10 to 15 per cent in the time of heats under similar conditions and a reduction in furnace repairs, as compared with furnaces operating with producer gas. Where waste heat boilers are installed, the less volume of gases from liquid fuel burning, as compared with furnaces operating with producer gas, results in a less amount of heat available for use in the boilers. Application of liquid fuel to heat treatment of wire products is discussed by the author at this point.

Conclusions

Liquid fuels when available at satisfactory prices may be adapted to a large variety of furnaces used in conducting metallurgical operations. The relatively small initial expenditure required for its application and the ease of manipulation of furnace temperatures make the use of liquid fuels quite attractive. Success in using this type of fuel depends on furnace design, proper methods for its distribution to the furnace, and on burners which will thoroughly atomize the fuel. In the future development of the use of liquid fuel for metallurgical furnaces, there are at least two important principles to consider in an effort to obtain further economy. One of these is the adoption of the principle of mechanical injection now used quite extensively with boilers, and the other, the use of the recuperative principle wherever it can properly be applied in the construction of furnaces which now obtain their air for combustion at atmospheric temperatures.

RAIL MAKERS WIN

Interstate Commerce Commission Sustains Protest as to Canadian Shipments

WASHINGTON, Oct. 31.—Producers of steel rails and cross ties in Maryland, Pennsylvania and West Virginia, have been victorious in their protest against the proposal of American and Canadian railroads to make sharp increases on those products when shipped from their mills to points in eastern Canada. In a decision made Oct. 26 and handed down last Saturday, the Interstate Commerce Commission found that the proposed increases were not justified and ordered on or before Nov. 27, the cancellation of suspended schedules carrying the higher rates, which had been filed to become effective July 1 and July 12, 1922. It was proposed by the carriers to cancel their joint commodity rates on steel rails and cross ties in carloads and to apply what really would be rates slightly less than sixth class. The railroads proposed to apply the class basis for 2000 pounds (net ton) to the gross ton, or 2240 pounds.

The protest against the operation of the schedules was made by the Cambria Steel Co., the Carnegie Steel Co., the Lorain Steel Co., the United States Steel Products Co., and the National Tube Co., also appeared at the hearing to protest against the schedules going into effect and they were suspended until Nov. 28. Among the contentions made in the protest was that the long existence of the commodity rates applying on rails from the points of origin to the points of destination raised a presumption that the existing rates are reasonable. The protestants were also apprehensive that the application of the proposed rates from Johnstown, and Bessemer, Pa., would make it impossible for them to compete with Canadian rail producers. It was further maintained that it would place them at unfair advantage with steel rail mills in England.

The principal producing points involved in the proceeding were Bessemer, Johnstown, and Steelton, Pa., and Sparrows Point, Md.

Spiral Bevel Gear Testing Machine

A gear tester for spiral bevel gears, and for tests covering the bearing on the teeth, quiet running, and the center distance at which they run with the best bearing and the least noise, has been placed on the market by the Davenport Machine Tool Co., Inc., Rochester.

The construction of the machine may be noted from the accompanying illustration. Both headstocks holding the gears have large bearing surfaces on the bed and a deep dovetail slot with a taper gib the entire length of the slide. Provision is made for clamping the headstock to the bed by means of bolts passing through the headstock into blocks and T-slots in the bed. These bolts are placed very close to the bearing with the intention of making the headstock and the bed practi-



Spiral Bevel Gear Testing Machine. The crown gear is mounted on the stationary headstock and the pinion or gear on right-hand headstock. The three valves shown at the front are used for clamping work in the spindle, moving the slide, and clamping the headstock

cally one piece during the test. Little adjustment is usually necessary on the left-hand headstock, on which the crown gear is mounted, and it is clamped down by a lever attached to one of the hold-down bolts with an adjustable connection to the second bolt to assure equal tightening of both at the same time.

The right-hand headstock is moved quite a distance each time a pinion or gear is changed for testing and it is quickly operated by means of air pressure. A cylinder mounted on the back side of the machine moves the slide a fixed distance, and after the slide has been drawn back and the pinion changed, a new pinion is brought into mesh with the crown gear in exactly the same position at which the previous one was tested, or to any other position desired. This mechanism is controlled by a hand wheel with a graduated dial, which is located underneath the right-hand headstock. Being moved many times a day, provision has been made for clamping the right-hand headstock by means of an air cylinder. There is also an air chuck fitted to the machine for quickly clamping the pinions.

The three valves shown at the front of the machine are used for clamping the work in the spindle; moving the slide so that the pinion and gear mesh, and clamping the headstock. Reversing the handles unclamps the headstock, moves the slide back and releases the pinion.

Both spindles are equipped with large ball bearings on each end. An arrangement for keeping the oil in the bearings at a constant height has been included. A 3-hp. motor is employed and is mounted in the base. It is controlled by a switch, which permits the spindles to be driven in either direction. The air cylinder exhaust, which is piped to the brake band on the crown gear headstock, cools the brake. If preferred, however, water may be circulated to the brake for that purpose.

The capacity of the machine is sufficient to cover the range of all sizes of spiral bevel gears used in motor cars. The floor space occupied is about 4 ft. square and the weight about 1500 lb. net.

Baltimore Plant Burns—Plans to Resume Operations Quickly Made

The Baltimore plant of the Porcelain Enamel & Mfg. Co., Eighth and O'Donnell streets, Baltimore, Md., was almost totally destroyed by fire shortly before seven o'clock on the morning of Oct. 23, the estimated loss being upward of $300,000. The plant adjoins a property of the Standard Oil Co., employers of which laid 15 lines of hose and succeeded in saving a small portion of the enameling plant, as well as protecting the oil company's property.

Heinrich Turk, president of the Porcelain Enamel & Mfg. Co., is in Europe. News of the fire was cabled to him by his brother, Karl Turk, vice-president, and he replied that he would return at once.

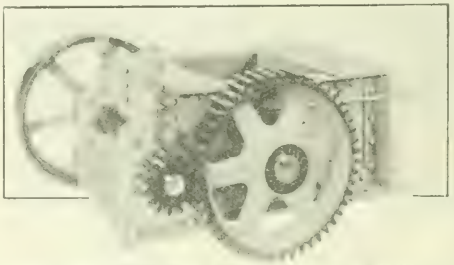
Within a few hours after the fire, plans were under way for the erection of a temporary structure on the site of the buildings destroyed to permit operations that would enable the company's other two plants to carry on their work without interruption. Other enameling companies in Baltimore proffered their assistance to the company. The latter was enjoying one of the best months in its history, and at the time of the fire night forces were working in some departments. The company is the owner of the Pemco enameling process and manufactures enamels bearing the same name.

Improves Single Roll Coal Crusher

An improved single roll coal crusher having a frame fabricated from slab steel plates, a steel shear pin safety device and powerful relief springs, as protection against heavy tramp iron, has been added to the line of the Pennsylvania Crusher Co., Philadelphia. This equipment is for preparing coal for pulverizing, gas making and for stoking.

The new machine is available in the 18 by 18 in. and the 18 by 24 in. sizes, one of the units being shown in the illustration. The steel side plates are 1 in. thick and are connected by nine steel cross members, all heavily hot riveted into a rigid box frame. Bronze-bushed bearings are shouldered into the side plates so that the bearing bolts are not subjected to shear.

The flywheel pulley, which drives the roll through cut back gearing, is provided with a shear pin safety



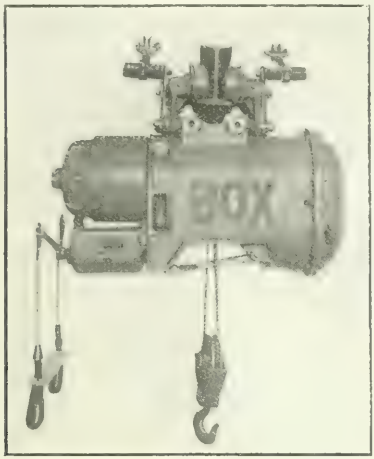
Single Roll Coal Crusher with Pin Shear Safety Device. A steel shear pin safety device and powerful relief springs for protection against tramp iron are features

device, mounting a steel bolt in hardened bushings, intended to assure full protection of the crusher parts against tramp iron. The breaker plate is a massive casting of charcoal iron, deeply chilled on the crushing surface. It is hinged on the frame at the upper end, and suspended at the lower end by relief springs. The breaker plate tip, which takes most of the wear, is a reversible and renewable casting of manganese steel. The segmental roll is cast from charcoal iron, deeply chilled, or from chrome steel. Lubrication is by large grease cups.

NEW SMALL ELECTRIC HOIST

Automatic Lubrication—Interchangeable Trolley and Hook Suspension Simplicity a Feature

The Load Lifter, an electric hoist 11 in. wide and 28 in. long, shown in the accompanying illustration, has been brought out by Alfred Box & Co., Inc., Philadelphia. It is built in one frame only and rated to lift 1000 lb. on a two-part line at 20 ft. per min., or 500 lb. on a single-part line at 40 ft. per min. The rope drum



The Hoist May Be Hung Either Parallel with or at Right Angles to the I-Beam. Interchangeable hook suspension and automatic lubrication are features

of the standard machine will accommodate approximately 80 ft. of rope.

Although small in size the new machine is said to retain the standard construction details of the company's heavier equipment and to be for hard, continuous service. It is further said to have been designed with a view to making the machine so simple and requiring so little expert attention that it could be used safely by anyone.

Automatic lubrication from one point and by a combination of the splash and forced-feed system is a feature. One filling is adequate for about six months. The mechanism is entirely inclosed, all parts operating in oil-tight dust-proof cases, the motor and controller being also inclosed.

The trolleys are adjustable to run on standard I-beams from 5 to 9 in. The hoist frame is arranged to permit mounting of the trolleys so that the hoist will hang either parallel with, or at right angles to, the I-beam. Changing from one to the other is conveniently accomplished by means of a wrench only. The hoist is arranged also for hook suspension, this change being made also without employing any tool than a wrench.

The controller is of special design. It is of the drum type, has non-arcing fingers and is insulated with Bakelite. The cover is hinged to facilitate opening for inspection, and a "water shed" is provided over the feed force. To facilitate wiring a terminal block is built in the controller.

All bearings are equipped with Hyatt flexible roller bearings, except in the motor bearing, and an SKF flexible self-alining ball bearing is used in the motor. Bearings are permanently alined, being integral with the hoist frame. The latter is a heavy one-piece casting.

Gears are of forged steel and heat treated. Stub-tooth spur gears are employed, and shafts are of manganese steel. The hoist is equipped with a multiple-disk roller ratchet load brake, and a band brake on the motor shaft. Stud or tap bolts are not used on the machine. All bolts are fitted through bolts with lock washers.

Cost of Living Reduced

Monthly figures of the Bureau of Labor statistics show a slight reduction in the wholesale prices of all commodities in September as compared with August, the index figure being 153 in place of 155, both being referred to 100 as the average for 1913. The figure is, however, 2 per cent above the 150 recorded in June.

Metals and metal products showed an increase during the month, going from 126 to 134. Building materials, advancing from 172 to 180, while showing the same numerical gain had a lower percentage gain. There were slight increases in farm products, cloths and clothing, chemicals and drugs and the miscellaneous items. All of these, however, were more than offset by the 10 per cent reduction in fuel and lighting. Metals and metal products stand now at 34 per cent above the 1913 average. The other seven specific groups of materials stand at an average of 68 per cent above their 1913 figure, or just twice as far removed from the pre-war prices as metals.

Our table shows the figures for the two most recent months and for September, 1921. It also shows the peak figure of 1920 and the present status of net liquidation, from the peak, of the excess of the peak prices over the average of 1913.

Index Numbers of Wholesale Prices, by Groups of Commodities

(1913 equals 100)

	1920 Peak	1921 Sept.	1922 Aug.	1922 Sept.	Liquidation, Per Cent
Farm products	247	124	131	133	77.5
Food, etc.	248	142	138	138	74.3
Cloths and clothing	346	178	181	183	66.3
Fuel and lighting	281	181	271	244	20.4
Metals and metal products	203	116	126	134	67.0
Building materials	300	156	172	180	60.0
Chemicals and drugs	213	131	122	124	78.8
House-furnishings goods	275	179	173	173	58.3
Miscellaneous	208	118	115	116	85.2
All commodities	247	141	155	153	63.9

Figures of the National Industrial Conference Board, based on the budget of the average wage earning family, show a slight upward turn in September, the cost of living being placed at 55.6 per cent above July, 1914, in place of 54.5 per cent excess in August. Both may be compared with 104.5 per cent excess in July, 1920, which was the peak month. Food is the lowest item in the workman's budget, being now 40 per cent above the pre-war figure. Shelter is 65 per cent up; clothing 55 per cent; fuel and light 87 per cent and sundries 72 per cent.

No drop in prices to the pre-war level may be expected within the next ten years, according to the Harvard Economic Service, the chairman of which has stated:

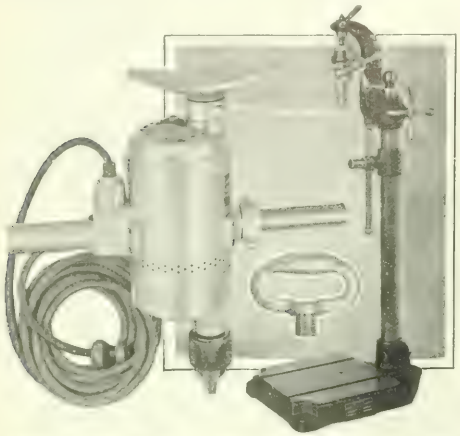
"The plausible inference that prices must return to a pre-war normal has been drawn from the fact that prices have reverted to their former levels after previous periods of currency inflation. The committee, however, cannot find that the governing conditions exist to-day which brought about those lower price levels in the past. If we are prepared to accept, as apparently we must, the present price level as substantially that around which fluctuations of the business cycle must play during the coming decade, we can contribute powerfully to financial stability throughout the world."

The Standard Tank Car Co. will repair 92 locomotive boilers for the Erie Railroad and will furnish 500 underframes for the Atlantic Coast Line Railway.

Portable Electric Drill Convertible Into Bench Drill

The illustration shows the Way portable electric drill built by A. F. Way Co., Inc., Hartford, Conn., which was mentioned briefly in THE IRON AGE as one of the exhibits in Mason Laboratory, Yale University, Sept. 21-23. As indicated, the portable electric machine is convertible into a bench type drilling machine.

The motor employed in this drill is built for the company by the General Electric Co. It is of the universal type and can be operated from the ordinary electric



Portable Electric Drill and Stand to Convert It into Bench Drill with Screw Feed

lamp socket. The bearings of the motor are sealed against oil leakage so that each oiling will last for months. The motor and all working parts are inclosed in aluminum housing, with provision made for cooling. Gears are heat treated and their studs run in bronze bearings at each end. Ball bearings are used only for spindle end thrust.

The breast plate and spade handle can be used as desired. The auxiliary handle bracket may be removed to make close up drilling possible. The electric cable is attached to the machine in a manner to make it impossible to pull it out. In fact, it will support considerably more than the weight of the machine itself. It is claimed that the machine can be taken apart and reassembled in about 15 min. and that it is impossible to assemble it incorrectly.

The use of the drilling stand converts the machine into a bench drill with a screw feed. This screw feed can also be used on the machine without the stand.

Negotiations for Columbia Steel Co.

Negotiations are under way for the sale of the Columbia Steel Co., Elyria, Ohio, which operates a long established cold-rolled strip steel plant, to a group of investors including a number of Pittsburgh men. A new company has been organized under the same name, but will have an Ohio charter, and this will take over the plant, provided the sale is effected. It is expected that the deal will be closed within the next few days.

In the new organization C. E. Lozier, vice-president and general manager of the present company, will be chairman of the board of directors. Officers will include H. M. Naugle, president; K. R. Jenson, secretary and treasurer, and A. J. Townsend, vice-president in charge of operations. Mr. Naugle and Mr. Townsend recently severed their connections with the Central Steel Co., Massillon, Ohio, to become associated with the new Columbia company. Mr. Naugle was third vice-president of the Central Steel Co., in charge of the National Pressed Steel division, and Mr. Townsend was manager of methods and standards. Mr. Jenson has also been associated with the same company. The board of directors will be composed of the officers named and several Pittsburgh and Elyria business men.

The financing of the company provides for an issue of $750,000 7 per cent sinking fund gold bonds, $750,000 of 7 per cent cumulative preferred stock, of which $500,000 is to be issued and 30,000 shares of no par common stock. The financial part of the transaction is being handled by J. H. Holmes & Co., investment bankers, Pittsburgh.

Wages of Puddlers and Finishers Advanced

Puddlers will be paid $10.12 per ton in November and December as a result of the bi-monthly examination of sales sheets Oct. 27 at Youngstown between representatives of the Western Bar Iron Association and the Amalgamated Association of Iron, Steel & Tin Workers. This is an advance of $1.19, from $8.93 paid in September and October.

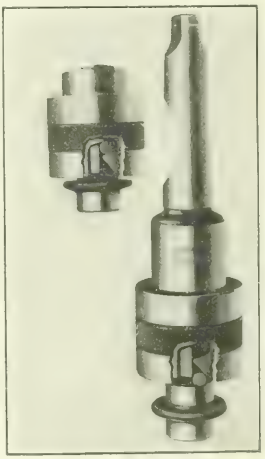
Average price of bar iron shipped during the 60 days ending Oct. 20 was disclosed at 1.95c. per lb., an increase of five points from the average revealed two months before of 1.70c.

Finishers receive an increase in tonnage rates of 12 per cent on the base, or an actual advance of 13 1/3 per cent on the September-October rates. They will be paid 44½ per cent above base under the new rates, as compared with 33½ per cent above base during the past two months.

With some interests subscribing to the Amalgamated Association agreement, shipments declined during the period covered by the settlement, compared with the previous two-month period. Herbert Reese of Pittsburgh, vice-president of the Amalgamated, acted for employees, assisted by a committee, while James H. Nutt, secretary of the Western Bar Iron Association, represented employers. Mr. Nutt estimates that 25,000 workers are directly and indirectly affected by the settlement.

New Quick-Change Drill Chuck

An improved Wizard quick-change drill chuck, constructed as shown in the illustration, has been placed on the market by the McCrosky Tool Corporation, Meadville, Pa. Unusual ease of operation is a feature emphasized.



Drill Chuck Broken Away to Show Mechanism of Driving Member. The insert shows collet locked in place and the full view, the collet entering

The chuck is made up of only two main parts, a driving body with a Morse taper shank to fit the drill press spindle and a slotted collar to hold the collet up in the driving body. The collar is straight and uniform, and is hardened all over. In the improved chuck the bayonet locking slots in the collar, that admit the driving lugs of the collet, are designed to permit inserting or releasing the collet with one hand, without slowing or stopping the machine.

To insert a tool the operator needs only to push the collet into the revolving chuck; the positive automatic latch locks it instantly. A slight pressure of the thumb and forefinger on the knurled collar of the chuck releases the collet and permits it to drop into the operator's hand. The improved chuck will take all styles and sizes of the company's wizard collets.

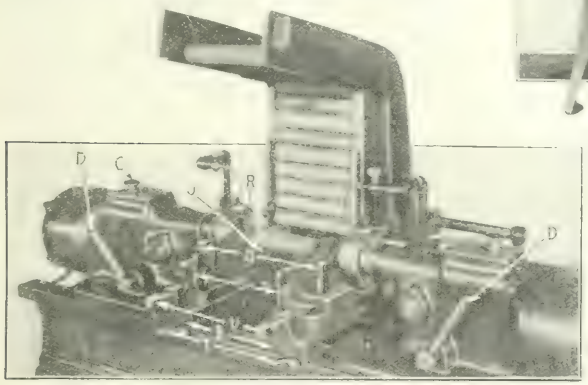
AUTOMATIC CENTERING

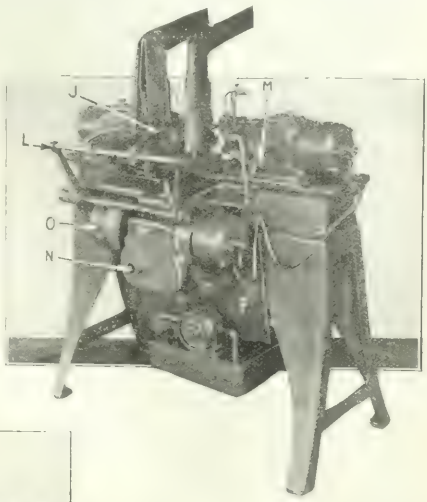
Large Production Machine Centers Both Ends in One Operation—Automatic Drill Feed—Other Features

An automatic centering machine having two heads which center the work at both ends in one operation and having also an automatic drill feed mechanism operated in conjunction with a magazine, has been brought out by the Pratt & Whitney Co., Hartford. Clamping of the work is also done mechanically.

The new machine shown in the accompanying illustrations is intended for use in large production work. In operating, after the set-up, it is only necessary to keep the magazine supplied with work and take away the finished pieces. Work is removed from the magazine by transfer slides, placed in the vise, clamped, centered and then released into the work box, independent of attention from the operator. The capacity is for work of ¼ to 1½ in. in diameter, and 2½ to 18 in. in length, centering both ends. The floor space occupied is 4½ ft. by 2½ ft., and the weight, with complete equipment, 1020 lb. net.

The automatic feed of the drill heads is operated by the same cam that operates the transfer slides shown at O in the illustration. The small motor at the right drives the cam, and change gears permit adjusting the drilling time to suit the nature of the work. The drills are automatically withdrawn twice during the centering operation, which permits clearing them of chips and allowing oil to enter the drilled hole.





Automatic Machine for Large Production Centering. The detail view at left shows the location of magazine, vise and other details. The rear view, above, shows cam for operating magazine and automatic feed of drill heads, location of work box, pump, and other parts

Each spindle has a maximum feed movement of ⅞ in. which may be reduced to 7/16 in., with any variation between. The machine may be run through its cycle of operations by hand to check the set-up, a crank handle fitting the shaft at N, being provided for the purpose.

To hold the drilling depth to a desired dimension, adjustable stops are mounted as shown at R in the detail illustration; these bear against the ends of the work to limit the forward movement of the spindles. Where it is required to have the center holes the same distance apart, regardless of variations in the length of work, the stops are positioned to engage lugs on the drill heads, this holding the spindles to a pre-determined forward movement. The drills are driven by individual motors mounted in the head as shown, and geared to provide speeds of 1200 or 1800 r.p.m. The motor drive is made up of three ¼-hp., 1700-r.p.m., constant-speed, alternating or direct-current units.

The changing of gears or locking the spindle for removing the drills is conveniently accomplished by turning the knobs shown at C. The magazine and work supports are mounted on the head castings, the heads merely being moved along the bed to accommodate various lengths of work. The sides of the magazines are slotted and are conveniently adjusted for various diameters of work.

A feature is the self-adjusting vise, shown at B in the detail view. The work is supported by V-jaws, which are provided with adjusting screws, U, that permit setting the jaws to the desired diameter, the automatic compensating arrangement shown at S taking care of minor variations in the diameter of the work. The work is clamped in the V jaws by transfer plates on the slides, shown at J, which remain in contact during the drilling. Adjustments of the V jaws permit drilling of holes out of center on one or both ends, and facing or chamfering tools may be used in place of drills if desired. The different transfer plates for the various diameters of work are conveniently put in place, four sets of the plates covering the range of the machine.

Oil is supplied to the drills from a geared pump. The tank is located beneath the bed and oil drains into it from all parts of the machine, including the work box. The work box, F, is taken off for cleaning and removing the finished work. Work pieces are ejected directly into the box. The box may be removed while the machine is running, a deflector hinged on the bed then being latched in position to catch the work.

Reparation in Pig Iron Case

WASHINGTON, Oct. 31.—The eighth proposed report in the pig iron of Sloss-Sheffield Steel & Iron Co., et al. was made last week when Examiner Warren H. Wagner recommended that the Interstate Commerce Commission make awards of reparation to certain complainants on account of shipments of pig iron from Chattanooga, Tenn., to Ohio River crossings and destinations in Central Freight Association territory. The greatest sum recommended as reparation was $32,353, which it was said should be paid to the Roane Iron Co. by the Cincinnati, New Orleans & Texas Pacific because of unreasonable rates charged.

The Hummel Steel Foundry Co., Conshohocken, Pa., which was recently incorporated to engage in the manufacture of electric steel castings, has acquired the foundry formerly operated by the Conshohocken Steel Foundry Co., Conshohocken.

Brass Casting and Machining Plant

Equipment and Arrangement of a Foundry in Cleveland—Method of Ventilating Melting Room

THE ventilation of a melting room in a brass foundry has commonly been a trying problem, especially to carry away the fumes resulting from the melting process. This has been met in the new plant of Sterling Brass Co., Cleveland, manufacturer of plumbers brass goods, by natural draft ventilation. Fresh air inlets admit outside air into the furnace room at the floor back of the furnaces and the smoke and fumes from the furnaces pass upward through the top of the building.

Besides the method of ventilation, the plant is interesting in terms of the layout of the various departments. Routing of material to effect economic production, and good lighting facilities, so that artificial light is not needed in the foundry room even on dark days, are among the features.

The plant approaches in plan the form of a letter L and is 197 ft. long and 145 ft. wide in its maximum dimensions. The accompanying floor plan shows the arrangement of the departments and the routing of material. The raw material or scrap receiving room is located at one corner and adjoining this is the furnace room. The foundry proper is 42 ft. 6 in. x 99 ft., having space for 16 molders, and adjoins the furnace room on one side and the machine shop on the opposite side. Adjoining the foundry room at the lower end are the core room and pattern vault. At one end of the machine shop is the tool room and machine shop stock room. Above the machine shop is a second floor, occupied by the plating and polishing department.

A tramrail track equipped with a hand operated conveyer makes a complete circuit of the plant, starting at the outside entrance of the receiving room and extending in a straight line through that room and the furnace room, and making a right angle turn from the furnace room through the center of the foundry, and then through the machine shop, terminating at the shipping door at the side of the finished stock and shipping department that adjoins the lower end of the machine shop. This monorail is used for carrying material to the furnaces, crucibles of molten metal from the furnaces to the foundry door, and rough castings from the foundry to the machine shop. The tramrail was supplied by the Cleveland Crane & Engineering Co.

In the outer wall of the melting room, back of the furnaces at the floor line, are three cold air doors, 24 x 36 in. Outside air enters these doors, is carried around the furnaces and upward, and passes through openings provided by top hung sash under the roof. This being of the inverted monitor type, aids in turning the air currents through the side wall outlets. The sash are in two continuous sections, 4 ft. wide on each side of the melting room and are mechanically operated from the floor. The cold air openings are covered over with mesh on the outside and are further protected with ¾-in. rods on 4-in. centers and on the inside have doors of steel plate construction. The melting room is 23 ft. high to the top of the brick work.

The melting room is equipped with two open flame and two crucible furnaces of the Monarch type, each of 500 lb. capacity. The furnaces are fired with fuel oil which is used also for firing the core oven and for heating the entire plant. The steam heating boiler in the basement is provided with automatic oil regulation. This equipment is used as being economical in that no attendant is required for the heating plant. The oil supply is kept in a 20,000-gal. fuel oil tank located underground outside the building, and is carried to the furnace room in a trench in which the electric conduits are also located. The oil for the furnaces is forced into two 60-gal. auxiliary tanks in the furnace room and from this is delivered to the furnaces at 60 lb. pressure through an oil line directly beneath the furnaces. By having the auxiliary tanks partly filled with air, an air cushion assures a flow of the oil to the furnaces with a relatively even pressure. Cores are baked in a 6-drawer oven built by the Foundry Equipment Co.

At the end of the foundry room adjoining the machine shop, the castings are cut, cleaned, polished and ground. The rough product is finished and assembled on the first floor. Product that requires more than rough finishing is carried up a specially designed elevator to the plating and polishing rooms on the second floor. This elevator amounts to a ½-ton Sprague electric hoist which operates an elevating platform in a cage connecting the two floors. It is so arranged that when the operator standing on the floor lets go of the control rope, the elevator stops. The parts are handled from one floor to another on 30 x 36-in. hand trucks, having wooden 6-tier platforms. The same trucks are used for carrying finished product to the shipping door.

The plant is of mill type construction with brick walls. The furnace room is of fireproof construction, of reinforced concrete, with a concrete roof. Wood block floors are used throughout on the first floor. The foundry roof also has an inverted monitor. All windows have steel sash and the foundry has continuous window sections of factory ribbed glass. The entire plant is equipped with a sprinkler system.

The plant was designed by and built under the supervision of Allen Sogg, architect and engineer, Hippodrome Building, Cleveland.

An official announcement is expected to be made soon by the Westinghouse Electric & Mfg. Co., that it has purchased the Sharon, Pa., plant of the Savage Arms Corporation, the purchase including the Sharon Improvement Co., the land and housing company of the Savage Corporation in Sharon. The plant property covers approximately 15 acres, containing a 3-story office building, machine shops for both light and heavy work, and a power plant. It is served by the Pennsylvania, Erie and the New York Central railroads. The Westinghouse company has not yet announced its intentions with regard to the acquired property.

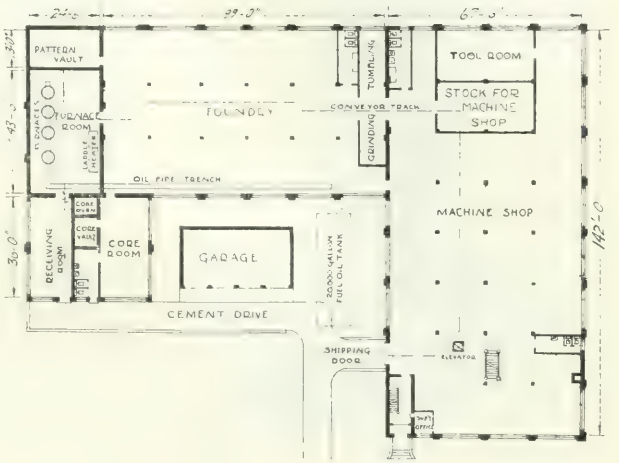
The Minnesota & Ontario Paper Co., International Falls, Minn., has decided to equip each of its 12 326-hp. horizontal return tubular boilers with Westinghouse stokers. The equipment consists of three retorts per boiler with double-dumping ash grates of the new model type. Each two stokers are driven by a Westinghouse vertical reciprocating steam engine. The coal used in this industrial power house is Youghiogheny screenings fired at about 12,000 B.t.u. per lb. An approximate analysis of the coal is fixed carbon 55 per cent; volatile matter 30 per cent; moisture 3 per cent; ash 12 per cent and sulphur 1 per cent.

The Standard Tank Car Co., Sharon, Pa., has received an order from the Erie Railroad for 92 locomotive boilers and for 500 underframes from the Atlantic Coast Line Railroad, reports President John Stevenson, Jr. The plant is working three 8-hr. shifts. It is now filling an order for 150 tank cars from a Southwestern oil interest, and has orders on its books approximating $7,000,000 in value.



Ventilation of the Melting Room of the Sterling Brass Co. (Above) Has Been Solved by Having Fresh Air Inlets in the Wall Back of the Furnaces, Providing a Free Circulation of Air, Which Carries the Fumes from the Furnaces to the Top of the Building and Out Through Side Windows. As the cold air is admitted near the floor, it spreads over the floor and then, on becoming heated, rises to the exits

At Right Is the General Layout of the Plant. A monorail system extends from the raw material receiving room through the melting, foundry and machine departments to the shipping platform



Below Is Shown the Foundry Floor, with the Monorail Running Though the Center. Its method of suspension is of interest



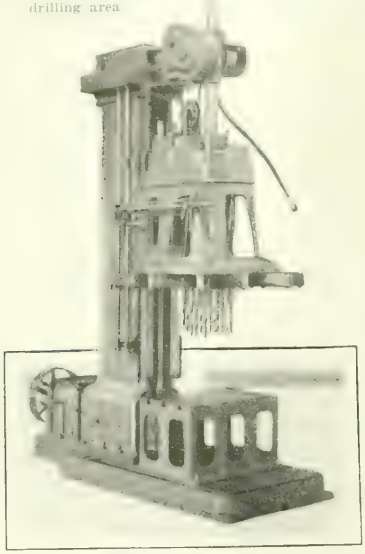
New Multiple Drilling Machine

A high-speed multiple drill, known as the No. 2A, the design of which is founded on the idea of a center-feed type of machine that will apply the feed pressure over the center of the drilling area, has been brought out by the Baush Machine Tool Co., Springfield, Mass.

It is intended in this design to hold a true alignment of spindles, prevent the head from springing under the drilling pressure and to prevent cramping of the head on the ways. In preventing the springing of the head, the friction between the drills and the bushings is largely eliminated. This, in turn, does away with the severe pressure of the drills and connecting spindles, and greatly reduces the strain on the feed mechanism.

The capacity of the machine illustrated is, in cast iron, twelve 1-in. drills or equivalent. There are four

New Baush Multiple Drilling Machine. Feed is by means of a heavy ram directly above center of drilling area



optional methods of drives; by three-speed cone pulley, three-speed change gear box, either belt or motor driven, and by direct connected variable speed motor. The main drive comes through the base directly to the head gears, an arrangement tending to eliminate vibration. Fifteen to 20 hp. are required for operation.

Feed is by means of a heavy ram directly above the center of the drilling area. The ram is moved by a pinion which is connected through the change-feed gear box directly to the main drive of the machine. There are three changes of speed, and for each of these there are three changes of feed, which vary from 0.0018 to 0.023 in. per revolution of the spindle. Other feeds can be provided. Except for counterboring, the head is operated by hand only in emergency and for adjusting tools for height or alignment in gigs. The pilot wheel is disconnected when not in use.

Round and rectangular heads of various sizes can be provided. The patented spindle arm in use on the company's other drills has been retained; these permit liberal vertical adjustment of the spindles and a center distance to be obtained equal to the diameter of the spindles themselves. An automatic safety counterweight catch is provided which prevents falling of the counterweight if the cable breaks.

Ease of operation is emphasized. Quick approach and return of the head is operated by friction clutches in the feed gear box, the head being quickly lowered or raised by the manipulation of a conveniently placed lever. The head can come down at fast speed until the drill comes in contact with the work, no care being necessary to prevent damage, as when the drills strike the work the friction clutch immediately slips. The power feed is then thrown in and when drilling is finished the head automatically returns at fast speed and stops at the starting position. This feature is built integrally in all machines of this model.

The machine can be built for tapping in addition to drilling, in which case back gears on the head are used for reducing the spindle speed. In operating, the taps are brought down into the work by means of the quick approach. Further downward movement of the head is then controlled by the lead of the taps in the work, and at a certain point the rotation of the taps is automatically reversed. After the taps have cleared themselves from the work, the operator engages the quick return and the head travels up to the starting position and stops, the spindles being automatically reversed ready for the next operation.

A counterboring attachment for spot facing and similar operations is also available. In this the head is advanced slowly and with great power by hand, being accomplished by means of a lever and gears. Back gears in the head for reducing the spindle speed may be used in this connection.

Roller bearings are used for shafts and ball thrust bearings where required. Driving gears are of steel. A hole is provided in the back of the column for adding or removing small weights to nicely adjust the balance of the head. An oil pump and tubing is furnished as required. The floor space occupied is 3 ft. x 8 ft. 10 in., the height with feed ram in extreme position is 12 ft. 3 in. and 10 ft. 8 in. with feed ram down. The distance of the spindles to bed is 45 in. and 20 in., maximum and minimum, and that of the face of the post to center of head is 20 in.

Ferryboat Youngstown Launched

In the presence of a group of Youngstown steel men, the Youngstown, flagship of the Erie ferry fleet in New York harbor, and reputed largest ferryboat in the harbor, was launched Oct. 26. Miss Marie Campbell, daughter of President James A. Campbell of the Youngstown Sheet & Tube Co., christened the boat. It is scheduled for active service by Jan. 15 next. The new Erie flagship will carry 3000 passengers and 40 vehicles. It is 210 ft. long and 45 ft. wide, double deck. The Youngstown delegation traveled to New York as the guests of W. A. Baldwin, manager of the Ohio Region, located at Youngstown. James A. Campbell, Thomas J. Bray, James H. Grose, Fred Tod, James B. Kennedy, Julius Kahn, C. H. Booth, Robert Bentley, W. H. Foster, G. F. Alderdice, Lloyd Booth, E. L. Clark and Paul Hubbard were among those from Youngstown steel companies who witnessed the launching.

A New Stinnes Tube Plant

The new Stinnes tube works, concerning which various reports have come to the United States from Germany, will consist of six units of which it is planned to have the first ready this year. The plant is built with a view to mass production, especially of the larger sized tubes. It is being erected alongside the private railroad line of the Bochumer Verein für Bergbau und Gussstahlfabrikatien A. G., which is Stinnes-controlled, and the location is between Bochum and Essen, convenient to the iron and steel works of the Bochumer Verein. The Mannesmann system will be employed in the new mills. The rate of construction of the plant as originally laid out will depend on the general industrial development in Germany, and also on the amount of capital the company has available for extensions. There has been some talk of increasing the share capital of the Bochumer Verein.

The Board of Estimates at Saginaw, Mich., has approved an $800,000 bond issue for the construction of a consolidated pumping station for the city.

Automobile Production Problems

Machine Tool Selection and Performance and Wage Payment Methods Among Topics Discussed at Meeting Last Week in Detroit

THE first national production meeting of the Society of Automotive Engineers, with an attendance of 300, was held Thursday and Friday, Oct. 26 and 27, at Detroit. The first session was called to order in the general auditorium of the General Motors Building, on Thursday morning. By way of introduction, L. C. Hill, of the society's staff, spoke of the meeting as the culmination of efforts to have the production men get together to discuss "shop problems."

E. Karl Wennerlund, of the General Motors Corporation, presented a paper describing "The Group-Bonus and its Application." The system was evolved in the General Motors plants and was fostered by the desire to eliminate the complicated factory cost systems attending the premium, piece-work and flat wage methods. Mr. Wennerlund enumerated the faults of the individual wage incentive systems, citing the large amount of clerical work involved and traced the various steps from piece work through the coupon or job ticket system to the group bonus plan. This method is especially adapted to progressive manufacturing where the product moves in a line or lines. The three major operations in automobile work are machine work, turning and bench work. Groups working on each operation do the same work and the group is rewarded with a 20 per cent bonus for 100 per cent efficiency, which is the actual number of hours on any one job divided by the total standard hours. Standard hours have been established by taking the average elapsed time on any one operation over a long period. Summarizing:

> The group plan is primarily applicable to repetitive work arranged in progressive production lines of sequence operations, but it is also applicable to non-progressive operations where the individual interest can be centered on definite results per man-hour of labor. Like any other wage-incentive plan, it has for its main objective the speeding-up of the production rate per employee; that is, intensive production.
>
> It is being used because it simplifies the factory detail where a high rate of production is desired on repetitive work, and where a wage incentive is employed as the means of obtaining intensive production. Its application has gained favor among factory executives, because it speeds-up production as compared with the individual plan on the same work, ties up less material in process and minimizes clerical detail in the factory.
>
> To have a group plan remain in successful operation over an indefinite period, it is necessary to maintain the interest of the individual worker in the group effort. It must be simple for computation of individual earnings, flexible so as to meet changing factory conditions and easily understood by each group member.

Ford Practice in Using Furnace Metal in Castings

A paper prepared by P. E. Hagland and I. B. Scofield, of the Ford Motor Co., was presented by Mr. Hagland and told an interesting story of the production of Ford cylinder blocks from ore to the finished product. Aided by slides, the facilities of the Ford company were shown, starting with the ore docks and following through the blast furnace, foundry and machine shop. By diagrams Mr. Hagland emphasized the dominant idea in all Ford manufacturing units of progressive manufacturing by mechanical conveyor systems. The author said there had been many erroneous statements made as to their method of using hot metal direct from the blast furnace and stated that the percentage used was 30 per cent by weight of the total melt. The cupola charges contain approximately the same sulphur, phosphorus and manganese content as the blast furnace metal, and any differentiating necessary to give a constant silicon content is done by varying the weights of the metal direct from the blast furnace, but as an average they were using approximately 30 per cent of the direct furnace iron in their mixture.

Reducing Cost of Perishable Tools and Supplies

A paper prepared by F. A. Mance, of the Studebaker Corporation, Detroit, entitled "The Control of Operating Tool and Supply Cost" was the third feature of the session. The author outlined a system that has been in practice for four years in the Studebaker factories, which covered a control over expenditures for perishable tools and operating supplies, by alloting the amounts to be used by each department for every operation in accordance with the number of cars built. The methods of procedure were given for instituting such a system and for charging off the costs of tools used in one department when the tools are "salvaged" from other departments. This system after four years' trial by the Studebaker Corporation has shown a reduction in the cost of perishable tools of approximately 71 per cent; admitting, of course, that some of this reduction was due to decrease in the cost of the tools.

J. A. Ford, Studebaker Corporation, presented a paper outlining "A New Method of Processing Spline Shafts," devised as a result of a series of experiments. The process eliminates the difficulties incident to the finishing of the splined and body portions of a spline shaft, such as is used in transmission gearing, by grinding with a formed wheel after the shaft has been hardened. The accuracy of the finished shaft was the primary consideration and three other groups of important considerations are stated, as well as four specific difficulties that were expected to appear upon departure from former practice. Illustrations were presented to show the tools used, and the method of using them was commented upon step by step. The shaft can be straightened to within 0.005 in. per foot of being out of parallel with the true axis of the shaft, after the shaft has been hardened, and it is then re-centered true with the spline portion.

Thursday afternoon was spent in a tour of the Ford River Rouge plant and in the evening over 500 members and visiting guests attended a dinner at the Hotel Statler at which Pierre S. du Pont, president General Motors Corporation, was the guest of honor.

The Friday morning session, presided over by H. W. Alden, was introduced by a paper on "Problems Met in the Production of Air Cooled Engines," contributed by William Drink, H. H. Franklin Mfg. Co., Syracuse, N. Y., maker of the Franklin automobile.

Some interesting production troubles in the Packard factory and how most of them were solved by accidental discoveries of the seat of trouble was disclosed in a paper entitled "Experience from a Production Note Book" prepared by H. J. Crain and J. Brodie of the Packard Motor Car Co.

Gear Troubles Discussed

K. L. Hermann, Studebaker Corporation, presented an interesting treatise on "Production Errors in Gears." Summarizing:

> The different gear noises are classified under the names of knock, rattle, growl, hum and sing, and these are discussed at some length, examples of defects that cause noise being given and a device for checking tooth spacing being illustrated and described. An instrument for analyzing toothforms that produce these different noises is illustrated and described.
>
> Causes of the errors in gears may be in the hardening process, in the cutting machines or in the cutters. A hobbing machine is used as an example and its possibilities for error

are commented upon. Tooth-forms are illustrated and treated briefly, and the hardening of gears and the grinding of gear-tooth forms are given similar attention.

The discussion was in general one of compliment to Mr. Hermann for his thorough research work in developing methods of checking errors correctly. The consensus of opinion was that the automobile industry as a whole was receiving great benefits from such individual experimental work. Mr. Hermann expressed a hope that his offering would be a spur to further efforts along this line.

A. J. Baker, Overland Co., in his paper on "Selection of Machine Tools," urged production men to be certain of their needs before making radical changes in their methods of manufacturing. Citing cases of special equipment being installed where standard machines would have served the purpose at much less cost, R. K. Mitchell's paper on "Machine Tool Efficiency" dove-tailed into Mr. Baker's statements. The author expressed the opinion that where new equipment is necessary, in most cases there are standard machines on the market to fill the need. He urged a closer study of the possibilities of standard machines on the part of the prospective purchaser.

The meeting closed Friday afternoon with tours of inspection to the Dodge, Packard and Cadillac factories. There is no doubt that the production men of the S. A. E. will have an annual meeting and that hereafter the production section will be a prominent factor in the general S. A. E. meetings.

NEW BOX CAR ORDER

Effect on Iron and Steel Shipments Not Expected to Be Very Important

WASHINGTON, Oct. 31—Shipments of the more highly finished steel products such as sheets and tin plate are affected more than other steel products by the order of the car service division of the American Railway Association that railroads operating east of Chicago, Peoria and St. Louis, return at once all box cars now on their lines which are owned by carriers in the Northwestern, Central Western and Southwestern districts. The car service division says the order is the most drastic it ever issued and was promulgated for the purpose of aiding in the movement of the tremendous business which is now being offered to the railroads in the West, and to meet the demands of agricultural interests and other shippers for greater transportation facilities. In 1920, orders were issued for the movement of trains of empty freight cars to Western points. That order resulted, however, in many cars being dispatched westward, which were wholly unsuited for the needs of shippers in the West. The order issued on Wednesday of last week limits the movement to those cars belonging to Western railroads, as such cars are particularly adapted to the needs of shippers in that part of the country.

The box car equipment being used by the iron and steel industry is chiefly for the purpose of shipping highly finished products. The order is not expected to have a widespread effect in the trade. The effect, however, will be reflected to some extent not only in certain restrictions in movements directly from the mills. It has been pointed out that there will be a reflection indirectly also. This is due to the fact that consumers of products moving in box cars from the mills even more extensively use box cars in shipping their finished products. With the supply of their rolling stock curtailed, it has been stated, they might be compelled to have shipments from mills deferred. While automobile cars are exempted in that part of the order discontinuing use of box cars for local loading in the territory surrounding Grand Rapids, Detroit, Toledo, Youngstown, Pittsburgh, and Wheeling, as well as of territory east of those points, it is provided that automobile cars must be moved, loaded or empty, in the direction of automobile loading territory. This, it is declared, will make the order less applicable to the sheet industry than it would be if it were not for the exemption as to automobile cars. Shortly after the order was issued, the Car Service Commission says that it was advised that one of the large Eastern railroads began making up two trains of empty cars for movement to the West in compliance with the order. Demand for freight cars in excess of the available current supply amounted to 156,309 on Oct. 15. This was an increase of 15,057 over the total on Oct. 8.

Shortage of Box Cars

The shortage in box cars amounted to 77,111 cars, an increase of 6048 within a week. The shortage in coal cars totaled 44,984 or an increase of 4485 within the same period. A shortage of 18,919 was reported for stock cars, which was an increase of 1442 since Oct. 8, while there was an increase within the same period of 2840 in the shortage of refrigerator cars which brought the total to 7631 cars. At the same time, 4275 surplus cars of all descriptions and in good repair were reported scattered throughout the country, 1225 less than on Oct. 8. Of that number 1588 were surplus coal cars, a decrease of 1436 within a week.

More Freight Loaded

Loading of revenue freight amounted to 983,470 cars during the week which ended on Oct. 14, according to reports just received from the carriers by the car service division of the American Railway Association. This was an increase of 15,301 cars over the week before. It also was an increase of 72,941 cars over the corresponding week last year, but a decrease of 35,069 cars under the corresponding week in 1920 when loadings were the greatest in the history of American railroads. Except for the Northwestern, every district showed an increase over the week before in the total loading of all commodities, while all except the Pocahontas showed an increase compared with the corresponding week last year. Coke loadings for the week totaled 10,208 cars, a gain of 328 over the previous week. This was an increase of 3909 cars from the same week one year ago, but a decrease of 5570 under the same week in 1920. Ore loadings atotaled 46,362 cars, 1077 under the week before, 26,542 above the same week last year and 30,067 below the same week two years ago.

Plate Mill for Scotland

Stewarts & Lloyds Co., Ltd., Mossend, near Glasgow, Scotland, has placed a contract with Mackintosh-Hemphill Co., Pittsburgh, for a 2-high reversing universal plate mill, with all auxiliary equipment. This mill will roll universal plates from 8-in. to 50 in. wide, or sheared plates up to 84 in. The horizontal rolls for the mill are 34 in. in diameter. On account of high costs and freight charges, the mill will be designed in Pittsburgh and built in England from the Mackintosh-Hemphill designs.

Mackintosh-Hemphill Co. now is working on the 40-in. blooming and the 24-in. sheet bar mills, the order for which, with all auxiliary equipment, was placed a few weeks ago by the Otis Steel Co., Cleveland.

Tin Plate Plant Resumes

YOUNGSTOWN, Oct. 31.—The most important change this week in operating schedules of Mahoning Valley iron and steel plants is in the resumption of the Liberty tin plate works at Leavittsburg of the Trumbull Steel Co., following a protracted idleness. This property would have started sooner, except for lack of steel. The Trumbull company is now operating at a rate close to normal in all departments.

The 132-in. plate mill of the Brier Hill Steel Co. is operating only half of the week. Otherwise schedules are unchanged in blast furnaces, open-hearth furnaces. Bessemer departments, sheet, tin plate and tube mills.

CONTENTS

November 2, 1922

Future Buying of Railroad Rolling Stock 1123
Purchases for 1922, Though Fairly Large, Have Not Come Up to Estimated Requirements of Carriers

Optimism Prevails at Meeting of Iron and Steel Institute 1125
President Gary Makes Plea for Publicity
Electric Furnace in Refining Iron and Steel
Authors of Papers Read at Meeting
Design of a Proposed 100-Ton Open-Hearth Furnace
Steel Requirements of the Automotive Industry
Liquid Fuel in Metallurgical Furnaces

Brass Casting and Machining Plant 1144
Equipment and Arrangement of a Foundry in Cleveland—Ventilating Melting Room

Automobile Production Problems 1147
Machine Tool Selection and Performance and Wage Payment Methods Discussed at Detroit Meeting

Iron and Steel Exports Again Decrease 1154
Drop 3½ Per Cent Below August and Are Smaller Than Any Month Since February—Fourth Successive Monthly Reduction

Of 277 Months 116 Were Without Accident 1156
Unusual Safety Record Made in Competition by Worcester Plants—A 22 Per Cent Gain This Year

Preparing for Investigations Under Tariff 1159
Commission Announces Methods of Procedure Under Flexible Provisions—Large Appropriations Necessary

Reed-Prentice Co.'s Plans 1124
Spiral Bevel Gear Testing Machine 1140
Single Roll Coal Crusher 1140
New Small Electric Hoist 1141
Cost of Living Reduced 1141
Portable Electric Drill 1142
Puddlers' and Finishers' Wages Advanced 1142
Quick-Change Drill Chuck 1142
Automatic Centering Machine 1143
Multiple Drilling Machine 1146
New Stinnes' Tube Plant 1146
New Box Car Order 1148
Plate Mill for Scotland 1148
Editorials 1150
One Gage of Future Demand—A Real Manganese Ore Survey—Two Institute Speeches—Facing the Labor Issue.
Motor Driven Chain Hoist 1153
Steel Corporation Earnings 1153
Machinery to Be Sold by Government 1153
Regulations for China Trade Act 1155
Anthracite Production Increases 1155
Progress in Management 1158
Japanese Copper Improves 1160
Shanghai Market Depressed 1160
Shop Safety Enforced by Drama 1160
Manganese Appraisal 1161
Exports Continue Quiet 1161
New Iron and Steel Code 1161
Fabricated Steel Business 1176
Railroad Equipment Buying 1176
Brown Coal Briquettes for Gas 1176
Improvement in Connellsville Region 1177
Oxygen in Blast Furnaces 1179
Labor Shortage in Pennsylvania 1179
Personnel Association to Hold Convention 1181
Foundrymen's Convention Next Year 1181
Rate Increase Approved by Commission 1182
Sheet Sales Statistics 1182
Labor Notes 1182
Automobile and Truck Production 1182
Ryerson Anniversary 1183
What Are Wire Rods? 1184
Shading Brick Prices 1184
Steel and Industrial Stocks 1185
Plans of New Companies 1185
Trade Changes 1186
New Trade Publications 1186

Iron and Steel Markets 1162
Comparison of Prices 1163
Prices Finished Iron and Steel, f. o. b. Pittsburgh 1175
Non-Ferrous Metal Market 1177
Personal Notes 1178
Obituary Notes 1178
Machinery Markets and News of the Works 1187
New York Jobbers' Prices 1196

ESTABLISHED 1855

THE IRON AGE

EDITORS:

A. I. [illegible] WILLIAM MACON GEORGE SMART

CHARLES S. BAUR, *Advertising Manager*

Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

[illegible] PRINTED IN U. S. A. George H. Griffiths, *Secretary*

[illegible] 239 West 39th Street, New York. Detroit: 317 West Fort St. Cincinnati: Mercantile Library Bldg. Buffalo: 881 Ellicott Square. Washington: 26 Jackson Place N. W. San Francisco: 320 Market St. London, Eng.: 11 Haymarket, S.W.1.

BRANCH OFFICES: [illegible] Pittsburgh: [illegible] Philadelphia: [illegible] Chicago: Guardian Building

Subscription Price: United States and Possessions, Mexico, Cuba, Shanghai, $6.00; Canada, $8.50; Foreign $12.00 per year. Single copy 25 cents.

Entered [illegible] Dec. 18, 1879, at the Post Office at New York, New York, under the Act of March 3, 1879

One Gage of Future Demand

Assuming that the state of activity of a number of large steel consumers will be sooner or later that of all other such industries, a gage may be taken of the steel demand of the near future. The immediate past in building and construction work, in automobile manufacture, in railroad purchases and in farmer buying is known. These four broad classifications may be regarded as absorbing one-half of all the steel made.

Activities in the building and automobile fields have been at so high a rate that one can hardly count on a further expansion. He is likely instead to be satisfied with an approach to what has obtained in the past several months. The steady flow of railroad business this year may keep up, as it should, considering the admittedly great needs; even if steel buying for railroads is not at the current rate, it will probably be larger than those close to railroad financial problems believe possible. The farmer as a steel consumer will be a factor in the months just ahead, for the reason that he has been absent from the market for all of a year and one-half and must buy for much the same reasons that the railroads have had to buy. No great volume of steel seems likely to go to the farmer because the purchasing power of his crops is still out of line and has not been greatly helped by the recent betterment in his prices and the movement of farm products.

On the whole, the indications in respect to the industries taking close to one-half of the country's steel are for a smaller rather than a larger demand than has marked recent months, and if the remainder of the steel business moves in unison with the groups mentioned, then we shall do well if we maintain the present scale of business for the next five months. Beyond that, the factors of uncertainty increase, seeing that April 1 brings us face to face with another coal strike with all its possibilities of unsettlement, and with little of the chance for fuel accumulation of which industry availed itself in the first quarter of 1922.

For the first time, China's imports of American copper were given separately in the July statistics and now that the August figures have been published, China's takings of our copper are shown to have been 20,000 net tons in the first eight months of the year. This is 1000 tons more than was taken in the same period by Japan, large customer as that country has been known to be. Heretofore the direct shipments to China have been included under the head of "other countries," and there was also a considerable sale to China of American copper that had been imported by Japan. Japan's new tariff on copper has naturally cut off importations to that country for reshipment to China. The statistics show another interesting fact: The total of refined copper exports has been lately at the highest rate since the war. At an average of 28,950 tons per month up to Sept. 1 this year's movement has far exceeded the rate in 1919, 1920 or 1921. And Germany still maintains the lead among buyers at over one-third of the total, despite the sensational fall in the mark. Yet in spite of growing consumption abroad and at home, there has been no such change in the relation of supply and demand as to give a real upturn to the copper market. As with steel, the day of any substantial profit is still deferred.

A Real Manganese Ore Survey

It has been quite evident from the attitude of the steel industry toward the duties on manganese that this feature of the new tariff act would soon be brought to the attention of the Tariff Commission with a view to its revision. Opportunely the War Department just now is making its inquiry as to the country's resources in minerals of particular strategic value in times of war. Thus the question comes up afresh as to the available tonnage of high-grade manganese ore in the United States.

The possibilities of manganese mining in this country were put before the framers of the Fordney tariff act in a very different light from that in which the domestic users of ferromanganese long have viewed them. Members of the Ways and Means Committee apparently were led to believe that in view of the amount of manganese ore produced at home in one year in response to the war time demand and to a price range of $250 to

$450 in 1917 and 1918, we have a potential industry which could be stimulated by proper protection. We have already expressed the view that as the amount of high-grade manganese ore in the United States is small, our resources of that sort ought to be kept in reserve against the day, should it ever come, when war conditions on the high seas would make it difficult or even impossible to import manganese from our usual sources of supply. That view was reinforced by the conservative estimates made by the U. S. Geological Survey, whose means for obtaining reliable data are of the best. On the other hand, were the enormously higher estimates of native manganese ores (unsupported by impartial authority) put before the tariff makers by the American Mining Congress. These estimates seem to have carried the day.

Elsewhere in this issue is a statement from the joint committee of the American Institute of Mining and Metallurgical Engineers and the Mining and Metallurgical Society of America, which has set out to supply the War Department with entirely fresh data concerning the manganese reserves in the United States. The committee is composed of fair and able men. It asks the help of all who have information concerning deposits of manganese ores and of manganiferous iron ores. The latter are of considerable extent, as is well known, but they cannot be made the basis of a domestic ferromanganese industry, Congress to the contrary notwithstanding.

What is needed now is such an impartial survey of the whole question as shall become the basis of a new canvass of the tariff on manganese ore and ferromanganese. The inquiry should have the fullest co-operation of all interested in knowing the exact facts concerning manganese ores in the United States and the policy of taxing American steel consumers for their development.

Two Institute Speeches

Two noteworthy addresses were made last Friday evening at the banquet of the American Iron and Steel Institute by Admiral Vogelgesang and Attorney Dwight W. Morrow. The admiral spoke with much force and with careful selection of words in making a plea for a strong navy, and no one in the steel industry will dispute his claim that the Navy has been a powerful influence in improving the quality of steel and in hastening the substitution of steel for wrought iron. Certainly the Navy has played no small part in the development of the steel industry. It was unfortunate, however, that the admiral, in his zeal for a strong Navy, spoke rather slightingly of the Washington conference for limitation of armament, giving the impression that its influence has been mischievous in encouraging "fanatical pacifists." It was also unfortunate that the admiral described war as a necessary accompaniment of progress. This is not in keeping with the advanced thought of to-day and many in the steel industry will not concur in it. They will rather agree with what Secretary Hughes said at Boston Monday night in regard to the conference:

> This was far more than a limitation of naval armament; it was the rescue of the world from despair. And however serious the difficulties that vex us at the moment and may continue to vex us for some time to come, the work of the Washington Conference, with the assurance of the sincerity of the desire for peace, lights the pathway of hope for a world that is weary of war.

That kind of a conference does not weaken the "backbone of the nation" or breed "fanatical pacifists," as contended by the admiral.

One of the brightest chapters in the history of the great war is the record made by the steel industry in furnishing all sorts of equipment for the Allies before the United States entered the war, and of giving almost its entire output to the United States and the Allies after the United States became an active participant. There is not a particle of evidence that the leaders of the industry did anything to start the war, or to keep up warfare for the sake of the money they would make out of it.

A bright picture was that painted by Mr. Morrow, who, with clear vision, showed how manufacturers had contributed to the comfort and happiness of mankind. When one hears of quantity production, he is likely to think of driving work, hot plants and grimy faces, but Mr. Morrow brought the view that quantity production has made life more comfortable for millions of people. In the way of illustration, he spoke of sugar, whose production and use with modern methods of refining have increased immensely in the past two hundred years; but, as Mr. Schwab afterwards remarked, steel might have been taken as an illustration, and Mr. Morrow did refer to the great service of steel manufacturers in making useful products. Quantity production becomes a great thing, not only for the increased volume of product it has brought into use, but because of the world-wide distribution and the service to humanity. There is more of the admirable in business than is generally conceived and sometimes one looking upon it from the outside can see the admirable more distinctly and picture it in a more fascinating way than one intimately connected with it. This was the achievement of Mr. Morrow and such preachments as his will always be welcome in meetings of the institute or similar gatherings of manufacturers.

Facing the Labor Issue

With the growing use of applied psychology, there is more common recognition of the fact that men do not always think straight, that sometimes they parade as the product of purely logical thought conclusions that really are reached partly by emotional processes. There is confusion in many subjects of vital public importance by the introduction of emotional factors and by the suppression for emotional reasons of plain facts.

In the trite remarks that the interests of "capital and labor" are identical and that capital and labor should co-operate with each other instead of occupying an antagonistic attitude there is suppression of the plain fact that the interests of buyer and seller in some respects are necessarily antagonistic. In other respects they are

necessarily mutual. The wish being father to the thought, the attempt is made to show that employer and employee should get along together as well as do buyers and sellers of that which is produced. The cases are not identical, and right thinking, unconfused by emotion, would not make them appear so.

As between buyer and seller there are certain things of mutual advantage. The producer wishes to produce good goods, and the consumer wishes him to do so. The producer desires that the consumer thrive, so that the market may be preserved and increase. The consumer desires that the producer thrive, so that his source of supply may continue. The existence and success of each party is essential to the existence and success of the other. Naturally there is co-operation. The producer studies the needs of the consumer and endeavors to meet them. Frequently he anticipates them. The consumer endeavors to use the materials that can be produced with the greatest facility and when he can he will aid the producer to manufacture more economically.

On the other hand, the buying and selling operation involves also a diversity of interests. Whatever the parties may say, each desires to strike the best bargain possible, as to price, quantity and quality. These desires are restrained only by considerations of self-interest.

Between employer and employee there is an opposition of interest that is precisely similar in character, with a restraint also by considerations of self-interest. The degree of restraint is determined by the intelligence and morals of the parties involved.

These facts should be recognized squarely instead of being glossed over. The opposition of interest between employer and employee makes more difficulty than the opposition between seller and buyer in the purchase and sale of commodities, because in the purchase and sale of service the quantity and quality cannot be so accurately defined as in the case of commodities. With a commodity the price is but one factor. Other factors are quantity and quality. Where would be the much paraded harmony between commodity seller and buyer if the quantity of goods to be delivered for a certain sum of money were not precisely fixed in the bargain but were left to the will of the shipper, checked by the whim of an inspector at the buyer's plant, or if quality should vary according to the general state of the market at the time of delivery? If buyers and sellers of commodities had to transact business on as loose terms as often obtain between employers and employees there would be endless trouble and confusion. The labor issue should be faced with candid recognition of the actual fact that in certain respects there is no mutuality of interest.

Altoona & Logan Valley Electric Railway Co., Altoona, Pa., will build an addition 60 ft. x 70 ft. to its power plant to house a new generator, which will double the company's present capacity.

John B. Smiley, president Poldi Steel Corporation of America, 120 Broadway, New York, has sailed for Europe and will be abroad until January.

RAILROAD BUYING

President Campbell Says It Is an Important Contributor to Prosperity

YOUNGSTOWN, Oct. 31.—Steel prospect is hopeful, in opinion of President James A. Campbell of the Youngstown Sheet & Tube Co., who states that railroad requirements are supplying a large part of the mills' current backlog. He voices the opinion that buying will not be in such volume as to force prices to higher levels and that costs will not permit them to recede. A stabilization around current levels is regarded therefore as likely.

"I think we'll have all the business the railroads can handle," he states. "In their present condition, the carriers could not move 100 per cent. production of our industries. Export business is so reduced because of disorganized conditions in Europe that we are not likely to operate full for some time."

Sheet prices, he points out, are declining to the level of the American Sheet & Tin Plate Co. "With nearly the full capacity of the country's sheet mills engaged, it is not surprising to see a recession in prices. The demand for sheets is still firm, but many companies believe they have to work to capacity, and this is the reason they are taking business at lower levels to fill their rolling schedules."

October shipments from the Sheet & Tube company properties were heavy, he adds.

An important customer of another Valley independent has made inquiries as to prices to apply on first quarter, 1923 business.

Car Supply Still Short

YOUNGSTOWN, Oct. 31.—Industry is still confronted by inadequacy of car supply, but executives look for improvement in this respect upon the close of navigation late in November. They expect that large numbers of open top cars, now diverted to the coal traffic, will be released for industrial freight. The Valley is receiving a larger supply of box cars, especially from the Pennsylvania Railroad. Many such cars are being routed from Eastern centers westward and are being loaded with tin plate and sheets.

Mills with desirable railroad connections have been able to make substantial inroads into piled tonnages of steel requiring box cars. One plant at Niles, tapped by only one road, has been an exception, however. While 4000 tons of an accumulated output have been moved this month, in addition to current production, the plant still has over 6000 tons piled, awaiting shipment.

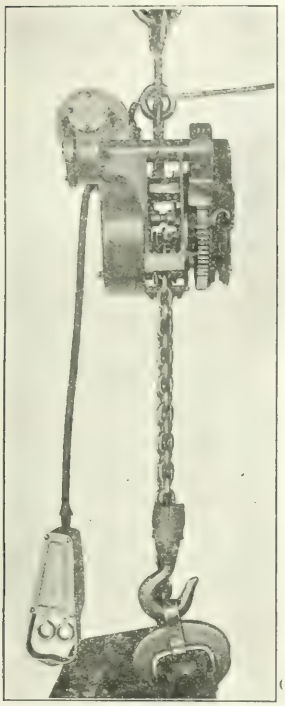
Many bad order cars are being used, and one mill states that nine of every ten cars it has received the past month, in box cars, have been "bad order." In many cases it has been necessary, with such equipment, to wrap the material shipped, such as sheets, in tar paper. Where the buyer desired early shipment, open top cars have been occasionally used, with a temporary covering rigged up.

Rates on Limestone and Coal Not Unreasonable

WASHINGTON, Oct. 31.—Dismissing the complaint of the Minnesota Steel Co. vs. Director General and Duluth, Missabe & Northern Railroad, the Interstate Commerce Commission in a decision last Saturday held that the rates of $7.50 per car plus 20c. per net ton on limestone and $7.50 per car plus 15c. per net ton on coal from the dock to Steelton, Minn., on shipments between June 25, 1918, and Nov. 15, 1918, during Federal control, were not unreasonable. The rates mentioned represent increases effective June 25, 1918. The complainant protested against the increases and on Nov. 15, 1918, a rate of $9.50 per car, which it was claimed would have been a reasonable rate on the shipments concerned, was established, applicable on coal or limestone.

New Motor-Driven Chain Hoist

An electrically operated material-handling device, known as the motorbloc, intended to serve in the field between that of the standard chain hoist and the traveling electric hoist, has been placed on the market by the Motorbloc Corporation, Summerdale, Philadelphia. It is readily portable and arranged to take current from the nearest electric circuit. Control is by means of the pendant shown in the accompanying illustration of the device. The machine is made up of a spur-geared chain hoist of steel construction, having a heavy-duty motor of special design and reduction gearing. A slip friction clutch is provided which is applied by means of a malleable iron supporting bracket. Care is said to have been used in avoiding stresses of the hoisting mechanism beyond the loads and speeds for which it is proportioned for hand operation. Ruggedness to withstand overloads and the abuse to which equipment of this character is frequently subjected is a feature also emphasized.



Current for the Portable Motor-Driven Chain Hoist Is Taken from the Nearest Electrical Circuit and Control Is by the Pendant Shown

The armature shaft and worm are carried in ball bearings and means provided for automatic lubrication. The pendant controller is self-contained and may be conveniently used by the fingers of one hand, thus leaving the other hand free to guide the load and permitting one man to lift and place the load. Operation is safeguarded by the use of the ring-oiled slip friction clutch, which is designed to prevent damage to the hoist parts and chain from over running, at the same time protecting the motor from overload, without the use of an electric limit switch.

For places where current is not available, or in the event of failure of electric power, the hand chain can be conveniently applied, and the hoist operated as an ordinary block. The electrifying unit can be applied to standard chain hoists already in service. The 1-ton size complete weighs 148 lb.

During the eight months ending with Aug. 31, last, shipments by the Atlas Tack Corporation, Fairhaven, Mass., in tonnage, showed an increase of 71 per cent as compared with those for the corresponding period last year. Due to the downward readjustment of prices, sales, in dollars and cents, show an increase of but 37½ per cent.

The Lake Torpedo Co., Bridgeport, Conn., plant has completed a twenty-year submarine construction plan for the Government, and the number of employees reduced from 2000 to a mere handful, retained to keep equipment and plants in good condition. Just when activities will resume is problematical.

STEEL CORPORATION EARNINGS

Little Change Compared with Second Quarter—September's Poor Showing

The report of the United States Steel Corporation for the third quarter of 1922 shows little change in net earnings as compared with the second quarter. In the second quarter, the net earnings were $27,286,945, and in the third, $27,468,339. September made the poorest showing of any month since February of this year, its earnings being $7,019,590, while the earnings for August were $10,615,085. The deficit after the paying of dividends was $1,339,602, which compares with $1,462,345 for the preceding quarter. The usual quarterly dividends of 1¾ per cent on the preferred and 1¼ per cent on the common stocks were declared.

The earnings for the first three quarters of 1922 and the preceding three years were as follows:

Quarters	1922	1921	1920	1919
First.....	$19,339,985	$32,286,722	$42,089,019	$33,513,384
Second....	27,286,945	21,892,016	43,155,705	34,331,301
Third.....	27,468,339	18,918,058	48,051,540	40,177,232
Fourth...	.....	19,612,033	43,877,862	35,791,302
Net earnings each year		$92,708,827	$177,174,126	$143,813,219

Earnings for Third Quarter

	Earnings Before Charging Interest on the Subsidiary Companies' Bonds Outstanding	Less: Interest on the Subsidiary Companies' Bonds Outstanding	Balance of Earnings
July, 1922...	$10,544,674	$711,010	$9,833,664
Aug., 1922...	11,324,059	708,974	10,615,085
Sept., 1922...	7,727,721	708,131	7,019,590
	$29,596,454	$2,128,115	

Net earnings		$27,468,339
Less, charges and allowances for depreciation and sinking funds		11,170,945
Net income		$16,297,394
Deduct: Interest for the quarter on U. S. Steel Corporation bonds....	$4,778,296	
Premium on bonds redeemed.....	200,000	4,978,296
Balance		$11,319,098
Dividends on stocks of the United States Steel Corporation, viz.:		
Preferred, 1¾ per cent.....	$6,304,919	
Common, 1¼ per cent.....	6,353,781	12,658,700
Deficit		$1,339,602

Machinery to Be Sold by Government

The catalog just issued by the Emergency Fleet Corporation contains 1486 different lots of material which will be offered for sale, Nov. 1, 2 and 3 at Hog Island. Among machinery supplies are noted a large quantity of wrenches in every conceivable size and type. There are many rivet sets, punches and blacksmith tools. A number of steam pumps are included, among which are 19-20-in. suction by 20-in. discharge; Kingsford Foundry & Machine Co. centrifugal pumps direct connected to 11 x 9 steam engine. These pumps are designed for a circulating pump for 8000 sq. ft. condensers. Among items of shop machinery offered are feed water heaters, small vertical steam engines, four Wheland 10-in. x 10-in. windlasses, three 8¼-in. x 10-in. Hyde windlasses, and other auxiliaries and deck equipment; a Stenton-Ross horizontal woodworking planer, having 48-in. blade, General Electric spot welder, electric reaming machine, Lysholm plate punch table, a gas-driven portable wood saw table, a heavy duty hydraulic punch and Pangborn sand blast outfit, as well as a number of electric motors of various horse power, all A. C. 3 phase, 60 cycle, 440 volts. There is a considerable quantity of plumbing material, such as is used in industrial plants and consisting of white enamel porcelain lined gang wash troughs and washroom fittings.

Application for further information should be made to J. T. Eason, sales manager, United States Shipping Board Emergency Fleet Corporation, Hog Island, Pa.

Iron and Steel Exports Again Decrease

Drop 3½ Per Cent Below August and Are Smaller Than Any Other Month Since February—Fourth Successive Monthly Reduction

WASHINGTON, Oct. 31.—Continuing its decline, which set in in June, the export movement of iron and steel products in September aggregated only 140,455 gross tons valued at $14,380,851, as compared with 145,640 tons in August, valued at $13,963,749. There was, therefore, an increase in value for September of $417,102 over August, but a decrease of over 5000 tons. Exports of machinery for September also showed a slight decline, being valued at $19,160,208 as compared with $20,257,413 in August and with $19,689,318 in September, 1921.

Compilation of import figures has been delayed owing to the change from the Underwood-Simmons to the Fordney-McCumber tariff act, the latter going into effect Sept. 21. The Customs Division of the Treasury and the Bureau of Foreign and Domestic Commerce, Department of Commerce, are completing reports of all shipments up to Sept. 21, under the old tariff act, and will make the report cover this period of the month only; while the first imports under the new classification included in the new tariff law will embrace the period from Sept. 21, when it became effective, to the end of October. It is expected that the import figures for the first three weeks of September will be available in a day or so.

Iron and steel exports for the nine months ending with September totaled 1,586,369 tons valued at $143,408,506, as compared with 1,846,824 tons valued at $281,536,789 for the corresponding period of last year. The shipments for September exceeded by approximately 45,000 tons those of the same month of last year, when they amounted to 95,169 tons valued at $12,893,995. The shipments for September of this year, however, were only 50 per cent as great as the British iron

Nine Months Ending September

	1921		1921	1922
[illegible]	2,889	[illegible]	20,801	22,767
[illegible]	186	[illegible]	[illegible]	1,054
Ferrosilicon	[illegible]	[illegible]	[illegible]	366
[illegible]	[illegible]	[illegible]	27,201	55,303
Ingots, blooms, billets, [illegible]	1,318	[illegible]	[illegible]	83,231
Iron and steel bars	4,270	10,881	[illegible]	138,757
Alloy steel bars*	[illegible]	379	[illegible]	3,406
[illegible]	[illegible]	1,401	11,975	36,516
Plates, iron and steel	10,068	11,616	303,360	83,303
[illegible]	2,628	5,697	45,569	88,699
[illegible]	16,560	9,231	101,185	197,888
[illegible]	[illegible]	930	[illegible]	[illegible]
[illegible]	1,013	2,502	[illegible]	24,959
Tin plate, terne plate, etc.	4,724	6,357	[illegible]	59,902
Structural material, fabricated	11,531	10,898	266,008	96,696
[illegible]	770	3,054	8,707	35,135
[illegible]	20,442	18,451	282,162	220,472
Rail fastenings, switches, frogs, etc.	211	[illegible]	6,965	26,983
[illegible]	9,019	[illegible]	310,057	138,053
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	19,621
[illegible]	[illegible]	[illegible]	[illegible]	91,412
[illegible] wire fencing	[illegible]	[illegible]	[illegible]	56,511
[illegible]	[illegible]	203	[illegible]	1,145
Wire rope and cable*	[illegible]	458	[illegible]	3,147
[illegible]	[illegible]	2,320	19,205	16,806
All other nails and tacks	[illegible]	659	4,401	6,642
[illegible]	[illegible]	133	[illegible]	731
Bolts, nuts, rivets and washers, except track	[illegible]	1,404	[illegible]	13,270
Car wheels and axles†	[illegible]	1,126	[illegible]	12,630
[illegible]	[illegible]	661	[illegible]	7,541
[illegible]	[illegible]	[illegible]	[illegible]	1,713
[illegible]	[illegible]	94	[illegible]	[illegible]
[illegible]	[illegible]	10	[illegible]	[illegible]
Total	95,169	140,455	1,846,824	1,586,369

*Not reported separately, prior to January, 1922.
†Previous to January, 1922, reported by value only.

[illegible] Machinery Items Increased in September

	November, 1921		September, 1922	
	Number	Value	Number	Value
Boring and drilling machines	[illegible]	$52,963	67	$54,874
[illegible]	[illegible]	31,370	[illegible]	40,628
[illegible]	[illegible]	11,980	[illegible]	15,758
[illegible]	[illegible]	16,061	[illegible]	11,085
[illegible]	[illegible]	15,290	[illegible]	14,667
[illegible]	[illegible]	27,631	[illegible]	29,662
[illegible]	[illegible]	3,145	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	22,924
[illegible]	17	6,735	[illegible]	7,171
[illegible]	[illegible]	10,534	[illegible]	20,886
[illegible]	[illegible]	734	[illegible]	3,897
Wire-drawing machines	9	1,665	[illegible]	81
Polishing and burnishing machines	[illegible]	[illegible]	[illegible]	[illegible]
Sharpening and grinding machines	[illegible]	79,356	1,081	[illegible]
Total	[illegible]	[illegible]	[illegible]	[illegible]

Countries of Consumption

Following are the principal destinations of some of the leading steel products exported during September:

Galvanized Sheets

	Gross Tons
Canada	2,433
Philippine Islands	873
Cuba	848

Steel Rails

	Gross Tons
Japan	5,115
Dutch E. Indies	3,024
Colombia	2,195
Argentina	1,548

Galvanized Wire

United Kingdom	1,016
Brazil	852
Argentina	654

Barbed Wire

Brazil	2,119

Black Steel Sheets

Japan	4,661
Canada	4,197

Tin Plate

Japan	2,029
Canada	2,015
Brazil	511

Wire Nails

United Kingdom	944
Mexico	175

Exports, January, 1920, to August, 1922, Inclusive

	Gross Tons		
	All Iron and Steel	Pig Iron	Semi-finished Material
*Average, 1912 to 1914	2,406,218	221,582	145,720
*Average, 1915 to 1918	5,295,333	438,462	1,468,026
Calendar year 1919	4,239,837	309,682	258,907
Fiscal year 1920	4,212,732	248,126	288,766
Calendar year 1920	4,961,851	217,958	216,873
January, 1921	547,394	3,710	315
February	393,328	1,307	92
March	230,635	2,320	1,023
April	162,592	1,234	878
May	142,551	2,541	749
June	119,081	1,689	1,106
Fiscal year 1921	4,168,619	129,541	82,549
July	86,523	2,744	363
August	75,827	2,424	2,447
September	95,169	3,078	1,318
October	106,582	2,830	153
November	122,290	1,299	1,869
December	134,415	2,550	250
Calendar year 1921	2,213,042	28,305	10,363
January, 1922	160,920	1,043	4,683
February	133,975	1,430	6,627
March	208,813	2,724	10,002
April	198,830	2,750	9,376
May	230,062	3,897	13,091
June	212,295	1,996	13,178
Fiscal year 1922	1,721,418	28,330	63,127
July	157,169	1,943	10,142
August	145,640	1,791	9,353
September	140,455	5,203	6,810
Nine months	1,586,369	22,767	83,231

*Calendar years

and steel exports for September, which amounted to practically 280,000 tons.

The largest items of American steel exports in September included boiler tubes, welded pipe and fittings, the foreign shipments of which amounted to 20,202 tons. Ranking second were steel rails. Of the 18,451 tons of rail exports, 5115 tons went to Japan, which country revived somewhat its purchases of steel products in September. Of the 9231 tons of black sheets exported that month, Japan took 4661 tons.

Striking changes have taken place in the character of outgo of steel products during the past year. Black sheets in September were only 9231 tons, compared with 16,560 tons last year. But during the nine months, this year's figure of 197,888 tons was nearly double last year's 101,185 tons. And, in spite of a drop in the total nine months' exports of 14.1 per cent, the amount of scrap sent abroad more than doubled, the tonnage of semi-finished material this year is more than ten times last year's total, wire rods more than trebled, galvanized sheets were almost twice as much as last year and wire, including fencing, provided more than twice last year's tonnage, while wire nails were also more than doubled.

Included in the exports of machinery in September were 1448 machine tools valued at $284,407 as compared with 1821 tools valued at $271,390 exported in August. Other metal working machinery and their parts to the value of $596,508 were exported in September. The largest single item of machinery exports in September was agricultural implements, $2,381,364, while second place was held by typewriters, whose value was $985,996. For the nine months, this year's total figure of $176,640,215 is barely more than half the 1921 figure of $349,043,145.

MACHINERY EXPORTS
By Value

	September 1921	September 1922	Nine Months Ending September, 1921	Nine Months Ending September, 1922
Locomotives	$1 190 050	$217,587	$25,449,500	$7,217,779
Other Steam Engines	29 102	82,649	1,320,717	1,783,882
Boilers	80,960	168,054	4,320,854	850,803
Accessories and Parts		105,066		4,587,895
Automobile Engines	133,229	205,378	1,390,148	4,215,477
Other Internal Combustion Engines	157,845	362,939	2,970,370	187,666
Accessories and Parts for		266,424		2,020,127
All Other Parts of Engines	698,438		10,222,849	
Tractors, except Agricultural	22,261	3,475	5,644,065	205,855
Electric Locomotives	59,817		1,500,877	
Other Electric Machinery and Apparatus	1,544,876	417,394	23,137,052	6,366,554
Pneumatic Machinery	288,000		2,044,264	
Gasoline Mixers	25,182	62,329	510,802	452,261
Road Making Machinery	78,108		765,365	
Elevators and Elevator Machinery	122,066		1,772,407	
Mining and Quarrying Machinery	385,778	297,291	6,583,540	2,799,878
Oil Well Machinery	398,619		9,978,887	
Pumps	492,065	615,687	10,690,224	4,441,110
Lathes	65,093	54,874	2,643,649	571,772
Boring and Drilling Machines		40,628		436,726
Planers, Shapers and Slotters		15,758		209,539
Bending and Power Presses		11,085		273,787
Gear Cutters		14,667		91,835
Milling Machines		29,662		243,535
Sawing Machines		5,041		36,431
Thread Cutting and Screw Machines		22,924		140,045
Punching and Shearing Machines		7,171		120,036
Power Hammers		20,886		70,099
Rolling Machines		3,897		55,046
Wiredrawing Machines		81		11,447
Polishing and Burnishing Machines		1,265		11,620
Sharpening and Grinding Machines	95,889	56,468	1,000,958	575,803
Other Metal Working Machinery and Parts of	495,207	596,508	13,864,640	4,236,917
Textile Machinery	1,484,026	640,008	14,859,255	11,567,728
Sewing Machines	588,395	641,069	5,764,197	4,724,114
Shoe Machinery	70,895	74,349	1,536,644	750,882
Flour-Mill and Gristmill Machinery	90,596	28,920	1,005,812	870,557
Sugar-Mill Machinery	992,275	548,132	11,145,508	2,139,747
Paper and Pulp Mill Machinery	287,666	657,684	2,282,015	1,941,056
Sawmill Machinery	11,005	99,124	956,948	471,692
Other Woodworking Machinery	111,244	113,965	2,290,279	1,036,751
Refrigerating and Ice Making Machinery	103,646	119,692	1,415,789	1,406,821
Air Compressors	140,486	126,340	3,431,129	1,593,239
Typewriters	518,269	985,996	9,760,192	8,358,424
Power Laundry Machinery	43,667	66,063	787,213	497,170
Typesetting Machines	150,772	260,591	2,817,958	2,764,295
Printing Presses	292,232	173,152	6,515,123	2,627,527
Agricultural Machinery and Implements	1,182,454	2,381,364	34,774,828	17,747,440
All Other Machinery and Parts	7,329,865	8,558,571	120,225,774	72,900,847
Total	$19,689,318	$19,160,208	$349,043,145	$176,640,215

Regulations for Carrying Out China Trade Act

WASHINGTON, Oct. 31.—Secretary of Commerce Hoover yesterday issued regulations for carrying out the provisions of the China trade act, approved by the President Sept. 19, which is considered to be one of the most important measures from the standpoint of foreign trade promotion that has been enacted by Congress in years. To obtain the benefits of the act, firms must be organized as District of Columbia organizations with the specific purpose of trading in China.

Owing to special provisions by Great Britain, France and Japan for firms and corporations operating in China, American establishments in the China trade have been suffering under a heavy handicap which is removed by the China trade act. It provides for exemption from Federal income taxation of stock in corporations directly engaged in commerce in China, held by Chinese or American stockholders resident in China, provided the amount of money so exempted is distributed annually as a special dividend to such stockholders. The act, it is explained in a statement from the Department of Commerce, places American trade in China for the first time on an equality with that of Great Britain, France and Japan.

Acting Commercial Attache Frank Rhea, Peking, has been designated by Secretary Hoover as registrar under the terms of the act, and F. R. Eldridge, chief of the Far Eastern division of the Department of Commerce, as assistant registrar. Application for registration should be addressed to the Assistant Registrar, China Trade Act, Department of Commerce, Washington.

The regulations issued by Mr. Hoover relate to applications for certificates of incorporation, registration fees, certificate of property value, certificate of amendment of articles of incorporation or authorization for dissolution or extension, annual reports, inspection of accounts and appeals from decisions of the registrar.

A tabulation from supposedly reliable sources in Shanghai has been received by the department showing the number of foreign firms doing business in China for the period 1914-1921, inclusive. For the latter year the total was 9511 firms, with 240,769, of which 412 were American firms with 8230 persons. Japanese firms greatly predominate, having had 6141 firms with 144,434 persons. Russia was second, with 1613 firms and 68,250 persons, and Great Britain third with 703 firms and 9298 persons.

Production of Anthracite Increases

WASHINGTON, Oct. 31.—Production of about 10,400,000 net tons of soft and 2,100,000 net tons of anthracite coal in the fourth week of October is indicated by preliminary returns to the Geological Survey. The revised estimates for the third week show 10,365,000 tons of bituminous and 2,003,000 tons of anthracite. A slight increase in the total coal raised is thus shown for the fourth week, as compared with the previous week, but the increase is practically entirely in the output of anthracite.

The number of cars of bituminous coal loaded on Monday, Oct. 16, as reported by the railroads, was 43,243, a new high record for the year. On Tuesday loadings declined to 30,724 cars, and by Thursday loadings declined to 28,987 cars. Full returns on loadings for the week are expected to show a total of 190,000 cars and indicate a production of 10,400,000 tons.

The gain in the rate of production during the past two weeks reflects some improvement in the transportation situation which, however, remains the principal factor limiting output. Rate of output is approaching adequacy but does not yet assure sufficient coal to meet current needs, the requirement movement up to the lakes, and to provide the desired consumer's stocks.

Of 277 Months 116 Were Without Accident

Unusual Safety Record Made in Competition by Worcester Plants Employing 20,000 Persons—A 22 Per Cent Gain This Year

BY JOHN NELSON

The Worcester County Safety Council, which has headquarters in Worcester, Mass., and is affiliated with the National Safety Council, has been conducting since Jan. 1 a contest between member firms, representing about 20,000 employees, the unit goal of which is the month without a lost-time accident. The council embraces a wide variety of industry, in which metal and machinery predominate.

Each month an honor roll—a list of firms having perfect scores—is posted at the meeting of the council and given to the newspapers of the city. The successful competitor is credited not only with the one month without an accident, but also with the number of successive perfect months. In the nine months several plants have had seven or eight months in a row.

The Perfect Score Months of Competing Firms in the Worcester County Safety Council's Competition Between Its Members

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.
Arcade Malleable Iron Co.			X			X	X		X
American Steel & Wire Co.:									
Central Works	X	X	X	X				X	
South Works								X	
Baldwin Chain & Mfg. Co.	X				X	X	X		
Boston Pressed Metal Co.			X		X				
Curtis & Marble Mach. Co.	X	X	X			X	X		X
Fitchburg Gas & Elec. Co.							X	X	X
Graton & Knight Mfg. Co.			X		X				
Hobbs Mfg. Co.		X	X	X	X	X	X	X	X
Jones, Eaton & Fales	X	X			X				X
S. Slater & Sons			X		X				
United States Envelope Co.:									
W. H. Hill Div.					X		X		
Logan Drinking Cup			X	X	X	X	X	X	X
Logan, Swift & Brigham				X	X	X			
Whitcomb Div.			X	X	X	X	X	X	X
Walden-Worcester, Inc.		X	X		X		X		
Whittall Mills							X	X	X
Wickwire-Spencer Steel Corporation:									
Clinton Works		X	X		X	X			
Goddard Works									
Morgan Works		X					X		X
National Works	X	X	X	X	X	X	X		X
Palmer Works		X	X		X	X			X
Spencer Works	X				X	X		X	X
Wright Works		X	X		X				
Wire Goods Co.	X						X	X	
Worcester Electric Light Co.					X	X			
Worcester Gas Light Co.								X	
Worcester Stamped Metal Co.	X	X	X			X	X	X	X
M. S. Wright Co.		X	X		X	X	X	X	
Wyman-Gordon Co.	X	X							
Total	9	13	16	6	18	14	15	12	13

The combined operation of the thirty-three firms which have submitted their figures during the contest gives 277 working months, and of these 116 were without accident—over forty per cent. These figures, however, should not be taken without explanation. The great majority of perfect scores were made by firms relatively small or of moderate size, so that were the clean-score months reduced to the number of employees represented, the results would appear in a different light. But just as they stand they are impressive.

The competition is unique among "sporting propositions," as it has come to be accepted by officials of the contesting firms. Nothing quite of the sort had ever been attempted, so far as its originators know. He wins who makes life and limb the safer for his workers. Wherever in sports the name of an industrial concern is involved, whether it be in base ball or football, basket ball or bowling, the desire to win and the pride of winning are felt even to the oldest and most sedate member of the board of directors. In this Worcester plan the winning points of the game are the acts of prevention which save from injury men and women, boys and girls. These are the touchdowns and the home runs.

The results achieved have been direct and cumulative. The council's records of the same firms, employing at the time upward of 20,000 people, in the last four months of 1919, when business was at its full tide, show that the average number of lost time accidents per 100 employees was 0.525 in September, 1.00 in October, 0.440 in November and 0.60 in December.

Compare these figures with those of the last five months under this plan of competitive stimulus, after it had attained its momentum, when manufacturing business had started on the way toward normalcy and some of the works had returned to a full normal. The number of accidents per 100 employees was 0.25 in May, 0.294 in June, 0.279 in July, 0.274 in August and 0.27 in September.

The one month in common between 1919 and 1922 in these figures, September, shows the contrast of 0.525 and 0.270, which means that the number of accidents was cut nearly in two. The comparison is a fair one, for though works were probably running with more people in 1919, business is now in a state of tension which naturally accompanies the beginning of prosperous times, following a sharp depression, for shop executives and workers alike feel the constant prod of the sales department to get out goods which customers had deferred buying until the last minute and demanded on the instant. Consequently the fact, generally accepted, that with a rush of business accident hazard increases applies this year as well as in 1919.

Fewer Accidents by 22 Per Cent

The actual improvement wrought since the first of the year as shown in the figures is by no means small. The average lost-time accidents per 100 employees for the first four months of this year was 0.35; for the last five months of the competition it was 0.273. This is a decrease of 22 per cent. Any system that will prevent 22 out of every 100 accidents that otherwise might be expected is well worth while. And this is a comparison between one period and another of the operation of the plan. It simply means cumulative results, and not by any means the total results. The comparison in this respect is fairer with the record of 1919. The Worcester plan has proved to those who are included in its operation that it is a powerful stimulus to the working of safety systems in mills and factories.

Record of Lost-Time Accidents Under the Plan of Competition Conducted by the Worcester County Safety Council

	No. Firms Reporting	No. Employees	No. Lost-Time Accidents	No. Per 100 Employees
January	27	18,748	85	.453
February	29	19,522	59	.302
March	34	20,396	68	.330
April	32	17,431	65	.320
May	33	18,002	45	.250
June	33	18,368	54	.294
July	25	15,520	43	.279
August	31	18,606	51	.274
September	33	19,656	53	.270
	277		523	

It is well known that under ordinary conditions safety work has periods of lagging. Men lose interest. Superintendents and foremen are busy people, and quite naturally, under the stress of management, are prone to shunt what at the moment seems to them an unessential for the essential, which is production. This must be maintained on an economical, efficient basis. When the leaders let down in accident prevention work

the whole shop lets down with them. Safety engineers, giving constant attention to prevention measures, have difficulty in securing co-operation. Finally something happens, usually a serious accident which can be traced directly to neglect or carelessness and we have another stimulus which brings accident prevention to a high level point again.

The stimulus of the competition plan is continuous. Without it the rate of lost-time accidents per 100 employees would now be returning toward the 1919 level. Instead, it is improving, in spite of the increase in employment and in intensity of production.

The reason is the psychological effect of a sporting event. The sporting instinct is inherently an American trait. Owners and managers are watching the score board in Worcester. When a man's own firm name appears in the honor list, he is glad. When it is absent he wants to be shown why it is absent, and men appear on the carpet at his office and are asked pertinent questions. The word goes forth into the mill that "the old man" says this or that, meaning that accidents must not be permitted. Lagging ceases. Safety devices are inspected and rules strictly enforced. It is literally a fact that when a man is injured nowadays in these Worcester county plants he is no longer wholly an object of pity and commiseration. The feeling is that he has gone and spoiled the record. The safety engineers are having the time of their lives, for they have never had such wholehearted co-operation. The people higher up are demanding that the firm's name go on the honor roll, not one month but every month. Naturally the plan is not particularly popular with some superintendents and foremen.

Contrast with Old-Time Record

The day was, not so very many years ago, when managements of works whose processes compelled hazardous occupation—for instance, wire mills—figured on so many fatalities a year, and so many maimings and so many cases of serious septic poisoning and so on. These sinister factors had to be reckoned, reduced to dollars and cents, as a production cost. Many employers of labor still active in business shudder as they recall what happened among their own employees, which would have been prevented had scientific safety methods been developed a decade or two sooner. In those old days a table such as that herewith printed detailing the perfect month honor roll would have been naked indeed.

Take, for example, the South works of the American Steel & Wire Co., operating a steel mill, blooming, rod and wire mills, drawing and treating wire, and having an elaborate industrial railroad—altogether an ideal breeding place of hazards. In the old days the mention of a perfect month without an accident would have been regarded as a grim jest. A perfect week would have been something to boast about. Accident prevention was confined then to the most glaring hazards in this plant, as in practically every other like it in that day.

In 1922 its 2950 workmen went through the long month of August without one lost time accident, and in the other eight months the works accident record was extremely low. So, too, it was at the North works, at the Norton Co., Crompton & Knowles Loom Works and other great establishments.

The smaller Central works of the American Steel & Wire Co. have almost as remarkable a record, in spite of the fact that it has but 250 employees. During five of the nine months it had no lost time accident. The big Wright works of the Wickwire-Spencer Steel Corporation had three clean months, and the Palmer works, also a large establishment, had five. The Worcester Stamped Metal Co., which conducts an industry always regarded as hazardous, had seven months and the Boston Pressed Metal Co. two months. The Graton & Knight Mfg. Co., manufacturer of leather belting, operated its Worcester factory with 1300 men two months without a lost-time accident. The Baldwin Chain & Mfg. Co., had four months; the Hobbs Mfg. Co., which makes paper box machinery and also operates presses, had eight months in a row. The table will show others with most creditable records.

The weak spot in the system of competition, and one which it is proposed to rectify, is that too great a handicap is imposed upon the large concerns. The employer of 1500 men and more cannot hope for the same perfect results in a month as an employer of 200 men. Therefore it is believed to be more fair if some unit were established, as for example 500 men. The employer of less than that number, to score perfect, must have no lost-time accident whatsoever. The employer of 500 to 1000 men could have one accident and still be perfect, the employer of 1000 to 1500 two accidents, and so on.

The method adopted in the collecting of the data of the various industrial plants represented in the competition safeguards each firm against too wide a divulgence of its intimate affairs, such as the number of people it employs and the number and nature of accidents. No member of the Safety Council sees the reports, since they go to a neutral party, Gleason H. MacCullough of the department of mechanical engineering of the Worcester Polytechnic Institute, who is pledged to regard the information as strictly confidential. He has reduced the names to numerals in his tabulations, and occasionally changes the numbering, that information may not be gleaned by deduction.

May Abolish Tax Exemptions

WASHINGTON, Oct. 31.—It was indicated to-day in high sources that Congress may be asked at the next regular session to do away with tax exemption of securities. To do so, it was stated, might require a constitutional amendment which would possibly make the undertaking difficult. It is the belief of the Administration that growing investment in state and municipal securities which are tax exempt is working to the detriment of the Federal Government and is checking investment in industrial and other securities and enterprises.

Reports that the Treasury is considering new taxes are not given credence. The Administration is known to be reluctant to fix any new taxes and would not do so except in the case of necessity. It is stated there is no present necessity, and that on the contrary the Bureau Budget has pared expenditures to a point where it is expected the total deficit will be wiped out within a reasonable time.

New Link-Belt General Catalog

The Link-Belt Co., Chicago, Philadelphia and Indianapolis, has issued a new general catalog No. 400, of 832 pages, cloth bound, obtainable from any Link-Belt branch office. It includes not only the complete Link-Belt line but also the products of the H. W. Caldwell & Son Co. plant. The following is a brief summary of the subjects included in the catalog: Link-Belt chains and wheels, power transmission machinery, bearings, hangers, gears, pulleys, etc.; elevator boots and buckets; screw conveyor equipment, apron and belt conveyors; boiler plant equipment, coal tipple equipment, coal storage, pockets, towers, etc.; car loaders and unloaders, locomotive and crawler type cranes, grab buckets, electric hoists, overhead cranes, telpherage, car pullers, revolving screens, sand separators, etc.; lime handling equipment, foundry conveyors and sand revivifiers.

The elimination of waste in industry will be a theme for discussion Nov. 22, at the sixth annual New York State Industrial Conference to be held at the Hotel Lafayette, Buffalo, Nov. 21 to 23. L. W. Wallace, executive secretary, Federated American Engineering Societies, will deliver the opening address at the waste session, his topic being "Wasteful Industrial Habits." H. F. Simmons of the General Electric Co., Schenectady, will speak on "How to Prevent Waste of Materials."

PROGRESS IN MANAGEMENT

Knowledge Now Basis of Judgment Changes of Attitude—College Courses and Management Societies Increase

That management has definitely progressed along certain main lines in the last 10 years, was a dictum of a paper on "Ten Years Progress in Management," by L. P. Alford, vice-president American Society of Mechanical Engineers. The paper has been read at several branch meetings of the Society. One of these was a joint gathering of the New York groups of the Society, and of the Society of Industrial Engineers and the Taylor Society, held Oct. 17, in New York. The similar meetings, for example, were held at Meriden, Conn., and Plainfield, N. J.

The information on the changes which have taken place since the committee report on the state of industrial management were presented to the American Society of Mechanical Engineers in 1912, were obtained by letters and interviews. Quoting from one of the letters and emphasizing it as a well balanced judgment of the situation, it was stated that in the first place good management is more insistent to-day on knowledge as a basis of judgment, rather than the old judgment based on personal observation. Management is more and more demanding costs, a knowledge of inventories, monthly profit and loss statements, statistics and records.

In the second place, management is now undergoing a definite metamorphosis in industrial relations, and managers are waking up to the fact that they owe more to their employees than mere wages, and that whistle blow and hustle are not all there is to factory operation. It was further said that it is this belief and the spirit developing, rather than the volume of action up to date, which is a matter of very definite progress in the past ten years of management.

Ten opinions were cited and from these and other facts a group of factors marking progress were deduced, the factors being arranged in three groups.

The first group of factors concerns changes in mental attitude. The controversy as to whether management is a science or an art has subsided and the attitude of opposition and mistrust toward management has disappeared. An appreciation of the problems of management has grown among those responsible for the carrying on of industry and acceptance of the principles of management has broadened among engineers, executives in industries and educators.

The second group of factors of progress takes up the application of management methods and it is pointed out that the engineering or scientific method has extended in industrial cost accounting. Among the developments are uniform cost accounting systems, those of 64 manufacturers' associations being emphasized. The theory and method of determining and applying standard costs and of determining losses, the forecasting of sales leading to long-term production schedules, and the budgeting of future expenditures were mentioned. Appreciation of the possibilities and advantages of standardization, simplification and elimination of waste during the last two years were also included in this group. The demand for knowledge, facts as a basis for judgment, has grown insistent in all good management. This has led, among other developments, to a widespread use of specification and graphics as a means of recording and communicating management knowledge.

The third group of factors marking the progress of management concerns especially significant developments, which, after being stated, are subject to explanation and comment. Management activities have broadened far beyond the installation of those mechanisms which are usually associated with the Taylor system. Some eight or 10 of the leading American engineering schools have established courses in management since 1912. Appreciation of the importance of the human factor in industry and attempts at its study from a fact basis were emphasized as the most striking management developments. Management engineers have declared that the service motive must prevail in industry and that all questions concerning human relationships must be considered in a spirit devoid of arbitrariness or autocratic feeling.

Accepted Management Mechanisms

Information as to the use of management mechanisms was secured, the question indicating the line of inquiry being "What, if any, mechanisms of management do you consider as generally accepted in principle and in practice?" The conclusion arrived at was that certain mechanisms of management have made decided headway in acceptance both in principle and practice, and from an assay of four industries, the importance of application yields two groups. In the first group are balance of stores, incentive wage plan, purchase control, selection and placement, and in the second group, cost control, idle-time analysis, planning and time study. It was emphasized that in the installation of such mechanisms a significant change is becoming evident. In the early days the mechanisms concerned the physical means of production and they were originated by the executives and were ordered into the shops. At a later date the value of methods which concerned the worker was appreciated. Training was the first to have any widespread trial. But the attitude was still the developing of a mechanism from the top downward.

Within the decade under review, it was pointed out that another attitude has been adopted in a few instances. It seeks to make the foremen and even the workers consciously parties to the development of the plans before they are put into effect. It endeavors to arouse interest, to inspire to achievement, to release creative energy. Its effect is to install methods and mechanisms from the bottom upward with celerity and improvement in personnel relations.

The rise of works councils in American industries is commented on, several hundred having been established during the past decade. Their development, it is pointed out, has been in response to a desire on the part of the workers for a means of expressing their beliefs and wishes in regard to matters arising in employment, and on the part of the management for means of communicating with their employees and gaining and holding their confidence and good will. The movement emphasizes the fact that the development of the relationships of employer and employed is a responsibility of the management.

Dayton Furnaces Being Rebuilt

The Cumberland Coal & Iron Co., 149 Broadway, New York, of which Arthur M. Wickwire, a lawyer, is president, is rebuilding the two Dayton blast furnaces at Dayton, Tenn., which the company recently acquired from the Dayton Coal, Iron & Railway Co., and expects to put them in blast some time in the spring. The Dayton furnaces, which were formerly owned by English interests, have been out of blast since 1913, when the owners suffered financial reverses. The furnaces have been in charge of a receiver and were recently bought by the Cumberland Coal & Iron Co. at a receiver's sale.

The furnaces will be relined and skip hoists will be built. Other needed repairs will be made to fit the stacks for operation on a more economical basis. In addition to the furnaces, the Cumberland Coal & Iron Co. has acquired ore and coal lands, bee hive coke ovens and limestone quarries, the plant being self-contained in every particular.

During its former operation the furnace property turned out a high grade of iron, which found a market in Tennessee, Kentucky, southern Ohio and Indiana, and some went as far as the Chicago district.

Domestic sales of oak leather belting for September amounted to 475,380 lb., valued at $797,213, a reduction of nearly 20 per cent from the 590,618 lb. and $967,433 value in August. For September, 1921, the figures were 311,709 lb. and $525,230.

Preparing for Investigations Under Tariff

Commission Announces Methods of Procedure Under Flexible Provisions—Large Appropriations for Expenses Necessary

BY L. W. MOFFETT

WASHINGTON, Oct. 31—Issuance by the United States Tariff Commission last Thursday of rules of procedure, under the flexible and other provisions of the Fordney-McCumber tariff act, has set in motion the machinery for tariff-making that is distinctly new in the annals of United States history. Evidently, however, it will be some time before the commission can get fully under way in the discharge of its enlarged responsibilities. While reorganization of the commission and enlargement of its forces are proceeding, its funds, as previously pointed out, are extremely limited. As a matter of fact, at present the commission has only its ordinary appropriations to work on, although Congress greatly increased the powers of the commission which Chairman Burgess has said will require trebling of its forces of experts. Assurance has been given to the commission that it will be granted funds to carry on its work and it is understood that the Bureau of the Budget has tentatively set aside $350,000 for this purpose. This sum is considered by many who have studied the situation to be entirely inadequate. As it happens it represents approximately the cost of each of the investigations made by the Taft tariff board regarding the wool and cotton industries.

The provisions of the Fordney-McCumber act, will, if carried out properly, involve investigations of many industries from time to time. Despite this handicap, however, it is believed that public sentiment is so strongly in favor of the new provisions of the Fordney-McCumber tariff act, because they at least mean a partial removal of tariff from politics, that sooner or later the commission will be more amply provided with funds to conduct its work. The country undoubtedly will watch with interest the effect of the operation of the rules of procedure covering the three provisions of the act to which they apply.

Power Conferred on President

The first of these, as pointed out by Vice-Chairman William S. Culbertson of the commission before the American Manufacturers' Export Association in New York last Thursday, is section 315, which permits the President to increase or decrease by not more than 50 per cent in tariff rates after an investigation by the commission that shows such a change is necessary to equalize "the difference in costs of production in the United States and the principal competing country." He may also change the classification of articles and in the case of those taking ad valorem duties, he may accomplish this by substituting American for foreign valuation. But in doing this, he is not permitted to increase the ad valorem rate. An increase, of course, is accomplished by changing from foreign to American valuation.

The second of the new provisions is carried in section 316 and assumes the character of a supplement to tariff rates. It is designed to protect American industry against unfair methods and unfair acts in the importation of goods. The section provides that additional duties may be levied against any importations by individuals engaged in unfair price cutting, full-line forcing, commercial bribery, or any other type of unfair competition. When the unfair competition is extreme in its nature, offenders may be prohibited from importing into the United States.

The third new provision, section 317, is intended to aid American industry by protecting American export trade and this section, according to Mr. Culbertson, is of greater significance to the export trade. This section brings to a definite head a settled policy on tariff negotiations and gives the President power to impose additional duties or even prohibition upon the whole or a part of the imports, into the United States from any foreign country which denies to American foreign trade treatment equal to that accorded to the trade of any foreign country. It further provides protection against preferential export taxes by permitting the President to penalize imports into the United States of the products of any industry in a foreign country which benefits by preferential export taxes granted by a third country.

Rules of Procedure

Concerning the rules of procedure issued by the commission last week, Mr. Culbertson said: "They set forth how applications for investigations shall be made and under what conditions and in what manner the commission will conduct formal investigations upon which the President may change the tariff law. Anyone can apply for an investigation. The application need not be in any special form, but it must be in writing and signed by or on behalf of the applicant. It must also recite the relief sought and the reasons therefor. Obviously, the mere filing of an application does not obligate us to proceed formally. We shall not order an investigation unless the application or a preliminary investigation discloses to our satisfaction that there are good and sufficient reasons for doing so under the law.

"We can order a formal investigation upon our own initiative as well as upon application and we are not confined to the issues presented in an application; we may broaden, narrow, or modify the issues to be determined.

"When we finally decide to proceed formally with an investigation, we shall issue and publish a notice of its nature and scope. Any person who then can show to our satisfaction an interest in the subject matter of the investigation may enter his appearance in person or by a representative. He will be notified of public hearings and afforded opportunity to offer such testimony as we may deem necessary for a full presentation of the facts. Our hearings will usually be open to the public. Evidence submitted will be subject to verification from the books and records of the parties in interest. In conjunction with hearings, we shall conduct field investigations both in the United States and in foreign countries.

"In the case of formal investigations, our procedure will be judicial in character. Our rules provide for the attendance and examination of witnesses, the production of documentary evidence, the issuance of subpoenas, and the taking of depositions. The commissioner or investigator in charge of any investigation will summarize the hearings and the information obtained by field investigation and will prepare a report. Parties of record will be permitted, before they file their briefs, to examine this report, as well as the record, except such portions as relate to trade secrets and processes.

"Final hearings will, of course, be before the commission. Parties of record may file briefs and in some cases present oral arguments. Our findings will be in writing, and will be transmitted with the record to the President for his action."

Reasons for New Methods

Reasons for new methods in tariff-making were explained as follows: "A number of causes have led to this new departure in tariff-making, which in fact is merely the logical outcome of a long struggle on the

(*Concluded on page* 1181)

JAPANESE COPPER IMPROVES

Demand Beginning to Exceed Supply — High Prices of Domestic Product Damaging to Japanese Manufacturers

TOKIO, JAPAN, Oct. 4.—The statistical position of copper has been improving, the consumption steadily outstripping the supply. In spite of this encouraging condition, the price remained the same last week, mainly due to lack of confidence in the market. This lack of confidence is attributed to the intrigue of brokers who are attempting to create disturbances. A calm market is fatal to their interests because there are no waves of buying. So they are trying, it is rumored, to create unrest among consumers, who are doubtful as to what they should do and have been hesitant for some time. The policy of price regulation may also be partly responsible for this inactive state of the market.

Such is the situation at the moment, but judging from the general point of view it may be safe to conclude that the tendency is upward, because whatever artificial measures are resorted to by the brokers, the fundamental fact that consumption is going ahead of supply cannot fail to make itself felt in the end. There has been no change during the present week in the figure of stock on the market, which was 9000 tons at the end of last week.

Hitherto quotations have been based on the imported price of American electrolytic copper as a standard, but quotations have lately declined from 46 yen to 43.50 yen, "quite ignoring the import price of the American product and the increase of the import duty by 7 yen per 100 kin," as a Japanese paper states. Among the copper merchants, keen competition is now prevailing, while copper goods have declined in price extraordinarily. Competition on copper electric wire is serious and merchants are quoting prices that are less than cost. The cutting off of a supply of cheap copper from abroad led, directly the duty was increased to higher prices. It was predicted at the time that this was likely to be a fatal blow to the various promising copper consuming industries of Japan.

In electrolytic copper, in spite of inactivity and dullness, stocks have gradually decreased, and with the season of increased demand beginning the market has been more or less strengthened, although quotations remain the same. The Osaka arsenal is reported to require 500 tons of electrolytic copper. In the Tokio market, quotations stand at 44.70 yen to 44.80 yen per 100 kin for large lots and 45 yen for small lots, while in the Osaka market, quotations are 44 yen for large lots and 44.30 yen for small lots.

Shanghai Market Depressed

SHANGHAI, CHINA, Oct. 4—The condition of the iron, steel and metal markets in Shanghai has not yet definitely altered. There are a few changes in prices, but it is doubtful whether they will have any effect in the way of stimulating buyers.

The paralyzing influence of the complicated political situation in China is beginning to be realized. The whole metal market in Shanghai is depressed. Very little cargo moving out of this port into the interior and goods are stagnating. There is no improvement in sight.

There has been some business in Belgian merchant bars at £9 7s. 6d. c.i.f. Shanghai, and a little inquiry for galvanized sheets, but black sheets are dull.

Japan continues to buy rails in the New York market, a large portion of which is Japanese Government business. Manila, P. I., has been buying heavily during the past few weeks of wire nails, bars and galvanized sheets, a large portion of this business going to New York for execution, although there has been some export from Shanghai to Manila.

White House States Position as to Judge Gary's Suggestion

WASHINGTON, Oct. 31.—This Government will give no consideration to an international conference on the debt question until the economic problem involved is worked out by experts, it was stated to-day at the White House in response to a query as to the view of the Administration regarding the suggestion made last week by Judge Gary of the Steel Corporation, before the American Iron and Steel Institute for the holding of an international financial conference in Washington. It was declared at the White House, however, that this Government is willing to participate in an economic conference looking to the betterment of the old world situation.

It was pointed that the Administration does not hold to the opinion often expressed, especially from European sources, that cancellation is the only solution of the debt problem. Opposition to debt cancellation expressed by Judge Gary is the same attitude as that of the Administration. While no definite plan of solving the matter of collecting the debts has been worked out, negotiations are under way, it was daclared, in the firm belief that a solution will be found. Meanwhile it was emphasized the Administration will cling strenuously to the conviction that the debts constitute National obligations that should be met.

Shop Safety Enforced by Drama

The safety organization of the Wickwire-Spencer Steel Corporation taught lessons in safety in a new way in a drama given at the Goddard Works at Worcester, Mass., recently, in the presence of 225 officers, superintendents and foremen of the corporation's various Massachusetts plants. The play was written by Winthrop G. Hall of the general manager's office, and Vernon C. King, the company's safety engineer. The performance was highly personal in its characters, for among them were President T. Harry Wickwire, Jr., General Manager John Wheeldon, Assistant General Manager E. C. Bowers, and Stanley Wheeldon and T. H. Wickwire, 3d, sons of the president and general manager. These parts were impersonated by members of the organization, who were made up for the purpose, and other parts were taken by the men themselves, and still others, notably of foremen, had fictitious names, that the rub might be somewhat lightened.

The plot centered upon poorly attended, uninteresting foremen's meetings, and a serious accident in which the sons of the president and general manager were seriously hurt, all because of lack of attention to the safety system. Officials of the company find that the performance has had a salutary effect in stimulating active co-operation in the enforcement of accident prevention rules.

Dr. George Otis Smith Resigns from Geological Survey

WASHINGTON, Oct. 31.—The resignation of Dr. George Otis Smith as director of the Geological Survey has been accepted by President Harding. The resignation was necessary in order that Dr. Smith could continue to serve as a member of the Fact Finding Coal Commission. It is the hope of the Administration that the Department of Interior can arrange for the return of Dr. Smith as director of the Geological Survey after he has completed his work on the commission.

It was also pointed out that Judge Alschuler is not qualified to serve formally as a member of the commission because he is a member of the United States Circuit Court of Appeals and is merely acting formally in connection with the commission. It is also the hope in his case that Congress will pass legislation making it possible for Judge Alschuler to be qualified as member of the commission.

A MANGANESE APPRAISAL

The Country's Resources to Be Investigated by Engineers

It was to be expected that an early move would be made to secure a revision of the manganese ore and ferromanganese duties in the Fordney tariff act. No action in that direction has been taken as yet by steel manufacturers, most if not all of whom were opposed to a high duty on manganese. However, an inquiry has been set on foot to have an impartial determination of the manganese resources of the United States. This has come about through no initiative of manufacturers, but as part of the War Department's inquiry into the extent of the country's resources in minerals particularly required for the carrying on of war.

The attention of all readers of THE IRON AGE who may be able to supply information concerning manganese ores is especially directed to the following statement by a committee that is charged with the manganese inquiry. The statement fully explains the constitution and purpose of the committee, which is composed of C. M. Weld, chairman; D. F. Hewett, Bradley Stoughton and John A. Mathews:

"The Secretary of War has asked the president of the American Institute of Mining and Metallurgical Engineers to supply him with a statement concerning the nation's resources of certain strategic minerals and their availability in the event of war. This inquiry has been referred to a general committee on industrial preparedness, which has joined hands with the Committee on Foreign and Domestic Mining Policy of the Mining and Metallurgical Society of America in the appointment of joint sub-committees to collect essential data and submit reports on the various metals. The undersigned have been asked to take up the subject of manganese.

"It is the purpose of this manganese committee to attempt a careful survey of our domestic manganese resources and to study these resources in their relation to both peace and war needs.

"The value of the results of this investigation will necessarily depend upon the quantity, accuracy and degree of detail of the data that can be obtained. It is desired, therefore, to make use of every available source of information. Many manganese deposits throughout the country have been examined by engineers and geologists since 1917 and many reports have been printed. There must be many additional reports in the hands of engineers, of mining companies and of owners which might be made available to the committee. The committee will be glad to consider summaries of estimated reserves for districts, but particularly wishes detailed reports on separate mines or deposits with maps (if possible), records of shipments (if any), representative analyses, prospecting records, etc.

"All those sending in such reports and other pertinent information will assist in performing an important public service. Material submitted to the committee will be treated as confidential if it is so requested and after examination will be returned. If original material can not be sent, the committee will be glad to furnish blanks indicating the more essential details which are desired. Send material or write at once to C. M. Weld, 2 Rector Street, New York."

EXPORTS CONTINUE QUIET

Noteworthy Inquiry from Japan for Gas Pipe—Low Prices by British Sellers—Foreign Pig Iron

NEW YORK, Oct. 28.—Quietness continues in exports with the exception of a few inquiries which have recently appeared from Japanese sources. The Chinese market is unchanged. Among the current inquiries now being bid upon by American exporters to Japan, the largest is probably the gas pipe inquiry from the Tokio Gas Co., which calls for 1,219,000 ft. of black gas pipe, ¾ to 1½ in. While this order may be placed in the United States, it is noteworthy that at least one Japanese export and import house with a branch in New York has, within the past month or two purchased about 1000 tons of various sizes of black gas pipe, which are being carried in stock in Japan. Much of this stock was purchased on a slightly lower pipe market than the present, being shipped on about a 69 per cent discount from list, c.i.f. Japanese port, and a lower quotation might be made for immediate delivery of this stock material than could be obtained on current bids from American sellers, which would probably not be better than 66 per cent off list.

As a further example of the lower quotations obtainable by the Japanese on British and Continental material, a tender for between 1500 and 1600 tons of ship construction material, ship plates, boiler tubes, shapes, bars, etc., from a Japanese shipyard has been placed with British sellers at $6 to $7 per ton less than the American delivered price. The ship plates were awarded on a price of £10 per ton and the shapes at £9 18s. per ton, c.i.f. Japan. No further buying by the Imperial Government Railways is noted, with the exception of an order placed recently with a large Japanese house for six power-drive pipe cutting and threading machines manufactured by the Toledo Pipe Threading Machine Co., Toledo, Ohio. Current inquiries from privately owned railroads include a request for bids on 14 miles of 25-lb. rails and the prospect of the early issuance of a tender covering eight miles of 75-lb. rails. No purchases of light gage black sheets are noted.

The recent report of one pig iron importing interest in New York that German iron is being offered for export to the United States at as low as $26.75 per ton is considerably discounted by other importers of foreign iron and representatives of German mills in New York. It is generally pointed out that Germany is least able to export pig iron of any of her raw materials and doubt is expressed that Governmental permission could be obtained for foreign sale of German iron in any quantity at this time. In the meantime fair activity in Scotch iron is reported by importers. One importer in New York, who has been bringing in small tonnages of Scotch iron for some time is now offering an iron of guaranteed analysis, which shows: Sil., 2.75; sul., 0.025; mang., 1.05; phos., 0.3, at a duty paid price of $28.75 per ton, New York. This importer states that he could book numerous orders if immediate delivery were possible. The ocean freight on shipments from United Kingdom ports to Boston has declined from 17s. to 15s., the current rate, which is the same as the rate to New York and Philadelphia.

New Iron and Steel Code

An iron and steel code, which can be used in combination or in conjunction with any other five letter code, has been compiled and will be ready for distribution Dec. 10, by the C. Bensinger Co., 15 Whitehall Street, New York. The code contains specifications for bars, structural material, rails, tin plate, sheets, wire, scrap, etc., complying with the standards of European, Eastern and Spanish speaking countries.

Announcement has been made of the organization of a new Auto Body Co. to operate in connection with the motor plants of the Durant Motor companies. H. Jay Hayes of Detroit is president of the new company and Victor Preston of Grand Rapids is to be engineer.

Administrative and executive offices of the Youngstown Steel Co., Youngstown, Ohio, which is building a mechanical pudding plant at Warren, Ohio, will be moved Nov. 1 to the plant site. Heretofore they have been maintained in the Realty Trust Building, Youngstown.

Iron and Steel Markets

45,000 CARS PENDING

Demand Apart from Railroads Less Active

Car Supply Still a Limiting Factor—Pig Iron and Scrap Prices Lower

The steel market, particularly on the major products, plates, shapes and bars, is coming into a quieter time. Consumption is maintained in most directions, but buyers wait to see that prices, which have been working easier, are entirely freed from the inflating effects of the coal strike and of car troubles. Generally they find that apart from some Steel Corporation subsidiaries the steel companies are lightly booked beyond December.

Car supply, however, is still an uncertain factor. Production has increased slightly in the past week, but in some districts, notably Pittsburgh, box cars have been scarcer again, retarding the movement of certain finished products from the mills. The steady fall in coke prices is taken as the key to the immediate future, particularly of pig iron.

At Chicago car buying not only keeps up but promises to be greater. This week's report shows a total of over 45,000 freight cars and 700 passenger cars in pending inquiries—probably the largest number of cars ever in the market at one time. The steel required is more than 450,000 tons, all of which would be for 1923 delivery, in view of present business on the books of both car builders and mills.

The Steel Corporation's heavy bookings during the coal strike period and the inroads on its operations made by the railroad shopmen's strike are indicated by its recent buying of nearly 100,000 tons of ingots and sheet bars, the ingots going to its pipe subsidiary. On a part of the sheet bars $40, Youngstown, was paid. The possibility of further purchases is a factor in the sheet-bar market, in which in the past week a $39 quotation at Youngstown has appeared.

Steel Corporation earnings, which fell off noticeably in September, show the culminating effect of the double strike. With independent steel companies September output was larger than that of August and at all plants October production showed a gain over September.

In the past week the Illinois Steel Co. has increased its steel output to 73 per cent of capacity. The Steel Corporation and the industry as a whole are now close to a 75 per cent operation.

Coke has declined to $7.50 at ovens, or but little more than half the peak price reached just before the coal strike, and on coke under the Connellsville standard as low as $6.50 is reported.

With the exception of 12,000 tons of basic sold to an eastern Pennsylvania consumer at $28.50 to $29, delivered, no large transactions in pig iron have been reported and the downward trend of prices is still marked. In the South, there has been a decline of $2 and further weakness has developed in important centers, especially Philadelphia, Cleveland and Pittsburgh. Quotations on foreign irons are declining in harmony with those for domestic grades. Little further buying abroad for shipment to this country is to be expected, as considerable foreign iron, some of it already on this side, is still the property of importers and brokers. Philadelphia receipts of foreign iron have been 21,000 tons in the past fortnight.

In finished steel the fractional variations from a 2c. basis for plates, shapes and bars are being more closely observed for indications of the trend. At Cleveland, attractive business in reinforcing bars has brought out a concession of $1 per ton to 1.95c., but 2c. is usually paid for bars.

Plate mills, as for some time, have lighter bookings than are common in other lines. Oil tank work has held up well, with 7000 tons pending and 1500 tons placed this week.

While the recent movement of sheet prices has been toward those of the Steel Corporation, an advance by the latter is a possible development of the near future.

While automobile output is declining, the decline is surprisingly small. Manufacturers are buying little steel at present, particularly alloy steel. For medium priced cars there are orders that will keep many plants running full for the next two months.

The scrap market gives signs of realizing by holders of considerable stocks. At Pittsburgh an independent steel company has bought 60,000 tons of heavy melting steel at about $21, Pittsburgh. This represents a decline of nearly $2 from the high point of a few weeks ago.

THE IRON AGE pig iron composite, through a further decline in foundry iron, is $3 a ton below the high price at the end of September, being now $29.52. This compares with $19.97 one year ago.

The composite price for finished steel has also dropped, being 2.466c. per lb. It compares with 2.163c. a year ago and 3.724c. two years ago.

Pittsburgh

Premiums on Finished Materials Disappear—Pig Iron Very Dull

PITTSBURGH, Oct. 31.—The fact that steel mills now are reaching backlog orders carrying considerably lower prices than those now current and that they are delivering against these orders is telling on the structure of prices. While occasional sales of bars still are heard of as high as 2.10c. base, Pittsburgh, and occasionally sales of small tonnages of plates are made at above 2c., Pittsburgh, few consumers are suffering sufficiently for supplies to be willing to pay even 2c., and that level now may be regarded as the top of the market. The heavy tonnage products are the weakest in the market because so many consumers are comfortably fixed with supplies priced well below to-day's levels. In other lines, there is a disposition on the part of buyers to wait on shipments against old and low priced contracts rather than seek new tonnages, and while prices only in a few instances have declined materially, there has been a virtual disappearance of delivery premiums because of the less urgent demand. The entire list of prices is threatened by the weakness in plates, shapes and bars, which in time must necessarily mean the diversion of steel away from them into those products where there

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton.	Oct. 31, 1922	Oct. 24, 1922	Oct. 3, 1922	Nov. 1, 1921
No. 2X, Philadelphia	*$31.11*	$33.14	$33.14	$22.84
No. 2, Valley furnace†	*30.00*	31.00	33.00	21.00
No. 2, Southern, Cincinnati	*29.06*	31.06	31.06	23.50
No. 2, Birmingham, Ala.†	*25.00*	27.00	27.00	19.00
No. 2 foundry, Chicago*	31.00	31.00	32.00	21.00
Basic, del'd, eastern Pa.	28.50	29.50	29.50	20.50
Basic, Valley furnace	30.00	30.00	33.50	19.00
Valley Bess., del. Pitts.	34.77	34.77	35.77	21.96
Malleable, Chicago*	31.00	31.00	32.00	21.00
Malleable, Valley	32.00	32.00	33.50	20.50
Gray forge, Pittsburgh	*31.27*	32.27	34.27	21.96
L. S. charcoal, Chicago	36.15	36.15	36.15	31.50
Ferromanganese, furnace	100.00	100.00	**67.50	**60.00

Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$40.00
Bess. billets, Pittsburgh	40.00	40.00	40.00	29.00
O.-h. billets, Pittsburgh	40.00	40.00	40.00	29.00
O.-h. sheet bars, P'gh	*39.00*	40.00	40.00	30.00
Forging billets, base, P'gh	45.00	45.00	45.00	35.00
O.-h. billets, Phila.	45.17	45.17	45.17	34.74
Wire rods, Pittsburgh	45.00	45.00	45.00	40.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	2.00	2.00	2.00	1.60
Light rails at mill	2.00	2.00	2.25	1.65

Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.325	2.325	2.475	1.95
Iron bars, Chicago	2.50	2.50	2.50	1.75
Steel bars, Pittsburgh	2.00	2.00	2.00	1.50
Steel bars, Chicago	2.10	2.10	2.10	1.75
Steel bars, New York	2.34	2.34	2.44	1.80
Tank plates, Pittsburgh	2.00	2.00	2.25	1.60
Tank plates, Chicago	2.30	2.30	2.30	1.75
Tank plates, New York	2.34	2.34	2.49	1.88
Beams, Pittsburgh	2.00	2.00	2.00	1.60
Beams, Chicago	2.20	2.20	2.20	1.75
Beams, New York	2.34	2.34	2.44	1.88
Steel hoops, Pittsburgh	2.90	2.90	2.90	2.25

**C.i.f.

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Sheets, Nails and Wire,	Oct. 31 1922	Oct. 24, 1922	Oct. 3, 1922	Nov. 1, 1921
Per Lb to Large Buyers.	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh	*3.35*	3.50	3.50	2.90
Sheets, galv., No. 28, P'gh	4.50	4.50	4.50	3.90
Sheets, blue an'l'd, 9 & 10	2.60	2.60	2.60	2.25
Wire nails, Pittsburgh	2.70	2.70	2.70	2.90
Plain wire, Pittsburgh	2.45	2.45	2.45	2.60
Barbed wire, galv., P'gh	3.35	3.35	3.35	3.5
Tin plate, 100-lb. box, f.o.b. P'gh	$4.75	$4.75	$4.75	$4.75

Old Material, Per Gross Ton:				
Carwheels, Chicago	$25.50	$25.50	$24.50	$16.50
Carwheels, Philadelphia	*21.00*	22.50	23.00	17.50
Heavy steel scrap, P'gh	21.00	21.00	22.00	14.50
Heavy steel scrap, Phila.	*17.00*	17.50	18.50	12.00
Heavy steel scrap, Ch'go	*18.00*	18.50	18.50	12.00
No. 1 cast, Pittsburgh	24.00	24.00	24.00	17.50
No. 1 cast, Philadelphia	22.00	22.00	23.00	17.50
No. 1 cast, Ch'go (net ton)	20.50	20.50	21.00	13.75
No. 1 RR. wrot, Phila.	*21.00*	22.00	23.00	16.00
No. 1 RR. wrot, Ch'go (net)	*17.00*	17.50	18.25	12.50

Coke, Connellsville,				
Per Net Ton at Oven:				
Furnace coke, prompt	$7.50	$8.50	$12.00	$3.10
Foundry coke, prompt	*10.00*	10.50	13.00	4.2

Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	14.12½	14.12½	14.25	13.12½
Electrolytic copper, refinery	13.62½	13.62½	13.75	12.75
Zinc, St. Louis	**7.10**	7.00	6.80	4.55
Zinc, New York	**7.45**	7.35	7.15	5.00
Lead, St. Louis	**6.50**	6.40	6.30	4.40
Lead, New York	**6.80**	6.65	6.65	4.70
Tin (Straits), New York	**37.00**	35.25	32.87½	28.00
Antimony (Asiatic), N. Y.	*6.70*	6.75	6.75	4.75

Composite Price, Oct. 31, 1922, Finished Steel, 2.446c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel

Oct. 24, 1922,	2.467c.
Oct. 3, 1922,	2.474c.
Nov. 1, 1921,	2.163c.
10-year pre-war average,	1.689c.

Composite Price, Oct. 31, 1922, Pig Iron, $29.52 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Oct. 24, 1922,	$30.02
Oct. 3, 1922,	32.11
Nov. 1, 1921,	19.97
10-year pre-war average,	15.72

is some demand and on which relatively better prices can be obtained.

The fact that there has been a recurrence of a shortage of cars, particularly of the box type, has again placed restrictions upon the movement of finished materials away from the mills, but it is without effect as a market factor because there has been no particular let down in steel production and buyers have the assurance that the supplies exist, even though full deliveries are not possible at the present time. Buyers also are in a hesitant mood because they see that the one big factor in the advance in prices, the high cost of fuel, is rapidly vanishing. Coke is down to $7.50 per net ton at oven for beehive furnace grade or only slightly more than half the peak price reached prior to the settlement of the coal strike.

As to efficiency, labor still leaves much to be desired, but it is a fact the shortage is not as acute in a number of Pittsburgh district plants as it was a few weeks ago. More men are seeking work in the steel mills as the winter approaches.

There has been no special change in pig iron prices since a week ago, except that silveries have been reduced $2. The market is untested and lower prices seem likely with the appearance of a real inquiry. The scrap market has been featured by the purchase of approximately 60,000 tons of heavy melting steel at $21, Pittsburgh, by an independent steel company which for some time has been out of the market. The transaction represents a decline in the price of $2 per ton from the high point of a few weeks ago, but is likely to peg the market at that level, since some dealers sold short.

Pig Iron.—Business has been dull almost to the point of utter stagnation, melters being inclined to defer purchases until the actual needs exist, and with deliveries on old contracts at much lower prices than prevail to-day on a heavier scale than they were recently, needs are not so great as they have been. We reduce the price of foundry iron $1 a ton to $31, Valley furnace, for the base grade. Some iron of this grade, taking a rather high freight to point of consumption, has sold as low as $30, Valley furnace, in competition with iron offering from other fields having a more favorable freight rate. In this district $31, Valley furnace, and $32, Johnstown, Pa., has been done on small lots of No. 2 foundry. Hardly enough has been done in other

grades to establish any change in prices. An Allegheny Valley sheet maker is a possible buyer of 5000 tons of basic iron in the next few weeks, and it is expected that this business will establish the real basis of that grade of iron, which is merely nominal at the current quotation of $33, Valley, or Johnstown, Pa. W. P. Synder & Co. make the average price of Bessemer iron from Valley furnaces for the month of October at $33.50, and for basic $30, as compared with $33.50 and $32.93, respectively, for September.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.77 per gross ton:

[illegible]
No. 2 foundry..... 30.00 to 31.00
[illegible]

Ferroalloys.—Demand here is light for all ferroalloys and quotations find almost no basis in sales. The price of $100, furnace, recently announced on 80 per cent ferromanganese by domestic producers still is merely a quotation, and the price of British material being somewhat higher than that for the domestic offerings, it naturally does not find much appeal. Activity is unlikely until consumers have reduced their stocks. Interest in spiegeleisen and 50 per cent ferrosilicon is almost nil. Attractive orders for the former can be placed at less than quotations.

We quote 80 per cent ferromanganese at $100, furnace, or $104.79 to $104.91 delivered Pittsburgh district for domestic and $67.50 c.i.f. Atlantic seaboard, equal to $105.89, duty paid, delivered, for British. Average 20 per cent spiegeleisen, $38 furnace; 16 to 19 per cent, $37; 50 per cent ferrosilicon, domestic, $70 to $75, delivered. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, $48.50; 11 per cent, $51.80; 12 per cent, $55.10; 13 per cent, $59.10; 14 per cent, $62.10; silvery iron, 6 per cent, $37; 7 per cent, $38; 8 per cent, $39.50; 9 per cent, $43.50; 10 per cent, $43.50; 11 per cent, $46.80; 12 per cent, $50.10. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $3.66 per gross ton.

Wire Rods.—The leading interest is not much of a factor in the current market for the reason that it is considerably behind in its deliveries on old orders and is taking no new business. Its price is $45 for the base size of soft rods to those customers it feels obligated to accommodate. Independents are looking out for regular customers at $45, but are still obtaining $47.50 for small tonnages for early delivery. Screw stock rods are slow, because users find coiled bars cheaper.

We quote No. 5 common basic or Bessemer rods to domestic consumers, $45 to $47.50; chain rods, $45 to $47.50; screw stock rods, $50 to $52.50; rivet and bolt rods and other rods of that character, $45 to $47.50; high carbon rods, $52 to $57.50, depending on carbon, per gross ton, f.o.b. Pittsburgh or Youngstown.

Billets, Sheet Bars and Slabs.—The market has a distinctly softer tone and it is probable that the next transactions of consequence will be at lower prices than have lately prevailed. Steel Corporation purchases, amounting to approximately 100,000 tons of ingots, sheet bars, billets and slabs, stayed the decline in prices, but with that company now showing little interest and with a number of producers having excess tonnages for sale, lower prices seem immediately ahead. While sheet bars have not yet sold at less than $40, Pittsburgh or Youngstown, there are bona fide offers of tonnages at $39, and sales of billets lately have been so difficult at $40 as to lead to the belief that less could be done. Small lots of forging steel now are obtainable at $45 and while some mills ask more, it is doubtful if more can now be obtained. Car shortages and a scarcity of labor are interfering with the outward movement of finished material but are not affecting the production of steel.

[illegible]
nary carbons, $45, all f.o.b. Pittsburgh or Youngstown mills.

Wire Products.—The sold up condition of the leading interest makes for heavier demands upon the independent manufacturers than otherwise might be the case. Little activity is observed in barbed wire or in fence, but other wire products, notably nails, are in demand for delivery over the remainder of this year. Jobbers' stocks are good in some places, but light in others; the explanation is found in an uneven supply of cars, or irregular shipping conditions on the railroads in the different parts of the country. We note no shading of quotations. Prices are given on page 1175.

Iron and Steel Bars.—The market on soft steel bars has pretty definitely settled to a flat price of 2c. base, Pittsburgh, and it is currently reported that in the Cleveland district a price equivalent to 1.95c., Pittsburgh, has been named by some mills having a freight advantage to that point. The full range of prices on known business, however, still is 2c. to 2.10c., base, Pittsburgh, as there have been sales of carload lots for early delivery at the higher figure. We make no change in iron bars, but makers note the lighter demand that there was recently.

We quote steel bars rolled from billets at 2c. to 2.10c.; reinforcing bars, rolled from billets, 2c. to 2.10c. base; rail steel reinforcing bars, 1.90c. to 2c.; refined iron bars, 2.60c. in carloads, f.o.b. mill, Pittsburgh.

Plates.—Sales of sizable tonnages at more than 2c, now are almost out of the question. Where a variety of sizes and gages is demanded and early delivery is essential, premiums are obtainable but not so readily as they could be a few weeks ago. Buyers are getting too much low priced tonnage to be seriously interested in the market at present prices, especially as new jobs involving the use of plates no longer are numerous. Prices are given on page 1175.

Rivets.—Agricultural implement manufacturers are providing little or no business for rivet makers, but other consuming industries are reported to be specifying steadily against contracts. There is still a range of prices here, some makers quoting large rivets at $3 and $3.10, base, and small rivets at 65 and 5 per cent off list or $3 a ton below the prices of the larger producers. Current shipments carry prices which average well below the quotations given on page 1175.

Steel Skelp.—Any real scarcity of this product that existed has been pretty well relieved and no difficulty now attends placing orders at 2c. for either grooved or sheared pipe skelp. Occasional sales of boiler tube skelp for quick shipment command a slight premium.

Sheets.—The market appears to be definitely weaker on black sheets, but is holding up well on other finishes. Some of the independent makers who did not accumulate a very big backlog of black sheets, lately have found it necessary to go as low as 3.35c., base, to get orders. That is the Steel Corporation base on black sheets, but it has not lately been accepting business at this or any other price for delivery this year. The going prices on galvanized sheets are 4.50c. to 4.60c., base, and there are still sales of blue annealed sheets as high as 2.75c., base. Shipping conditions with the mills in all parts of this and nearby districts are bad on account of car shortages, which promise to be worse instead of better in the immediate future, since an order of the American Railway Association, dated Oct. 26, having the authority of the Interstate Commerce Commission, directs the immediate return West of box cars of Western roads now on Eastern lines. The order says that cars going West from Pittsburgh, Youngstown and Wheeling may be loaded for points West of Chicago, Peoria and St. Louis, but not to points east of those centers. The use of Western cars for shipments East is prohibited. The Republic Iron & Steel Co. has been forced to shut down eight mills of its Niles, Ohio, sheet plant because of the car shortages, but operations of independents generally are above 80 per cent. The leading interest has further increased its operations and now is operating more than 60 per cent of its sheet mills. Prices are given on page 1175.

Tin Plate.—Makers are besieged with inquiries for tonnages for delivery over the remainder of the year, but are not accepting many because they set the price at $4.75 per base box, Pittsburgh, and that, it is claimed, is below costs. Assuming full operations and a price of about $35 for sheet bars, makers could sell at the current price and not lose money. But it is figured that the labor supply will not permit anywhere nearly full operations for some time and a drop to $35 for sheet bars is not believed to be immediately ahead. Under the circumstances, it is no surprise that

the prediction is common that the first quarter of 1923 price will be at least $5 per base box. The leading interest has all the business it can handle for the remainder of the year and is out of the market.

Cold-Finished Steel Bars and Shafting.—We make no change in prices, the market showing no important deviation on new business from 2.50c., base, Pittsburgh, for carload lots of drawn, rolled or turned bars, while 2.90c. base, f.o.b. mill for carloads still is observed on ground shafting. Makers still have considerable business on their books carrying lower prices and buyers are specifying on such orders to a larger extent than they are buying. New demands are largely for piecing out or for sizes that are wanted in a hurry.

Track Fastenings.—There is no change in the general situation. New buying is on a moderate scale, but the railroads are specifying steadily and as the makers have good-sized bookings, they are not at present so eager for additional orders as to consider lower prices. Little of the business now on the books is at present quotations. Prices are given on page 1175.

Hot-Rolled Flats.—On wide strips for immediate delivery, the common base is 3c., Pittsburgh, but on hoops and bands, the going price is 2.90c. and that price is not easily obtained since most users have good-sized orders in with the mills at lower prices and are inclined to wait on deliveries rather than make new purchases. Prices are given on page 1175.

Cold-Rolled Strips.—While the demand is good for the time of year and in view of the lighter operations of the automotive industry, the urgency of buyers for supplies is less than it was recently and there is more of a disposition to wait delivery on old and lower-priced orders than to make new purchases. Prices are given on page 1175.

Bolts and Nuts.—Buyers are specifying fairly well against orders placed prior to the last advance in prices. New business is light and quotations do not indicate much basis in sales. Discounts are given on page 1175.

Structural Material.—The market is soft. The regular quotation is 2c., Pittsburgh, and occasionally a small tonnage for very prompt delivery commands a little more, but fabricating interests now are getting deliveries against contracted tonnages placed much below to-day's prices, and these supplies generally are sufficient to take care of current structural business, which for the most part is for small tonnages. The existence of this low priced steel is reflected in very low business against structural inquiries. It is said that bids based upon plain material at more than 1.70c. do not stand much chance of fetching awards. The trade looks for a good spring business in housing and commercial construction, but it is figured that another year or two must elapse before the country catches up with war time expansion of industrial building. Plain material prices are given on page 1175.

Steel Rails.—A strong effort is observed to maintain a price of 2.25c., base, for light rails rolled from new steel, but it is not especially successful and such business as has been done at that price has been for moderate lots out of stock. On strictly mill business the market appears quotable from 2c. to 2.15c., base, while these sections rolled from old rails are priced at 2c., base.

We quote 25 to 45-lb. sections, rolled from new steel, 2c. to 2.25c. base; rolled from old rails, 1.90c. to 2c. base; standard rails, $43 per gross ton mill for Bessemer and open-hearth sections.

Iron and Steel Pipe.—While demand for a number of finished products admittedly is slower, this is not the case with pipe. Standard pipe still is in strong demand and interest in oil country goods and line pipe is said to be increasing. It is thought, however, that the activity is partly due to the fact that distributors are specifying in excess of their real needs to secure advantage of the prices in effect prior to Oct. 19. Few makers had caught up with old standard pipe obligations at lower prices when the last advance was announced. Plant operations are high, but car shortages limit shipments and a good deal of the current production is being piled. Wrought iron pipe is in fair demand, but specifications on old business exceed new orders. A. M. Byers Co. have made an advance of one point or $2 a ton on less than carload lots of wrought iron pipe. The spread between carload and less carload discounts now is a matter of nine to 13 points. Discounts are given on page 1175.

Boiler Tubes.—Demand still is reported to be heavy and makers still are behind several weeks on their orders. The advance in welded boiler tubes by the National Tube Co. was accompanied by a similar advance in commercial seamless tubes, while locomotive and superheater tubes were advanced ¾c. to 2c. per ft. Independent makers of seamless tubes have adopted the new schedule which, however, does not change the discount on mechanical tubing. Discounts are given on page 1175.

Coal and Coke.—A further decline of $1.50 per ton ton has been registered in the price of beehive oven furnace coke since a week ago, because an increase in production has not been accompanied by a like gain in consumption and sellers have been more numerous than buyers. The current market is quotable from $7.50 to $8.50 per net ton at oven, with the bulk of the recent business at $7.50 to $8, and some contracts for the remainder of the year have been made at the latter price. The market also is easier on foundry grades, but the decline is much less than that in furnace grade because the labor situation has not yet cleared up sufficiently in the Connellsville district to permit many of the oven operators to grade up the 72-hr. fuel. The market is quotable at $10 to $11 per net ton, oven, or 50c. to $1 below the prices of a week ago. The coal market is slightly firmer than it has been because of the difficulty of securing sufficient cars. The trouble in western Pennsylvania is not that there are any fewer cars but that the available supply has to be distributed over a greater number of operations than ordinarily is the case. If prices come down, a good many of the mines now working will be forced to quit and this would insure larger placements for the mines which can operate profitably at lower prices. We quote steam coal mine run grade at from $3.25 to $3.50 per net ton at mines; by-product coal at $3.50 to $4; and gas coal at $4.25 to $4.50 for mine run, and $5 to $5.50 for lump.

Old Material.—An independent steel maker, out of the market for several weeks, came in late last week and has taken in all close to 60,000 tons of heavy melting steel at $21, Pittsburgh. This business establishes the market here on that grade at that price, a concession of from 50c. to $1 per ton below what dealers hitherto have been asking for heavy melting steel delivered Pittsburgh. The sale probably will stay the downward tendency of prices recently observed, but it seems doubtful whether it will bring about an advance for the reason that it fixes a limit that will be paid for Pittsburgh delivery on this grade. There is some surprise that a price this low was done in view of the fact that lately a relatively better price has been obtainable in Youngstown and Canton. Sellers in some cases, however, own much of what they sold and the railroad lists are fairly heavy this month, the Pennsylvania Railroad offering about 35,000 net tons off its Eastern and Central regions.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

Per Gross Ton	
Heavy melting steel	$21.00
No. 1 cast, cupola size	24.00 to 25.00
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va.; Franklin and Williamsport, Pa.	22.00 to 22.50
Compressed sheet steel	19.50 to 20.00
Bundled sheet sides and ends	17.00 to 17.50
Railroad knuckles and couplers	24.50 to 25.00
Railroad coil and leaf springs	24.50 to 25.00
Low phosphorus standard bloom and billet ends	25.00 to 26.00
Low phosphorus, plates and other grades	24.00 to 25.00
Railroad malleable	22.00 to 22.50
Iron car axles	30.00 to 32.00
Locomotive axles, steel	27.00 to 28.00
Steel car axles	24.00 to 25.00
Cast iron wheels	25.25 to 25.75
Rolled steel wheels	24.50 to 25.00
Machine shop turnings	16.50 to 17.00
Heavy steel axle turnings	18.00 to 18.50
Short shoveling turnings	18.00 to 18.50
Cast iron borings	18.50 to 19.00
Heavy breakable cast	20.00 to 20.50
Stove plate	17.50 to 18.00
Sheet bar crop ends	24.00 to 25.00
No. 1 railroad wrought	20.00 to 20.50

Chicago

Increased Buying by Railroads Other Demand Not So Active

CHICAGO, Oct. 31.—All indications point to increased buying by the railroads, but demand from other sources is less active. The disposition of the average buyer is to await developments evidently on the theory that prices will not go any higher and may, in fact, decline. The position of the mills, however, is strong and the placing of additional car steel will give them an even larger backlog. Pending inquiries, principally from Western roads, call for over 45,000 freight cars and nearly 700 passenger cars, probably the largest number of cars ever in the market at one time. Fully 450,000 tons of steel is involved, all of which will have to be placed for 1923 delivery, in view of present business on the books of both car builders and mills.

Local mill prices are unchanged. The leading interest continues to quote 2c., Chicago, on soft steel bars and 2.10c., Chicago, on structural shapes and plates. While it is taking orders with specification attached for delivery at convenience, it is accepting no contracts. The foremost independent is asking 2.10c., 2.20c. and 2.30c., Chicago, for bars, shapes and plates respectively, but has little remaining tonnages open for this year and has not yet opened its books for first quarter. For a prominent interest sales and specifications last week were slightly heavier than the average for the past three months.

Demand from the automotive industry is showing unusual buoyancy. In past years, purchases of material by automobile plants have dropped sharply with the passing of the summer season, but this has not been true this fall. While it is undeniable that automobile production is declining, the decline is surprisingly small, particularly for certain manufacturers. The leading maker of low priced cars produced 925,325 during the first nine months of this year and expects to make a total of 1,300,000 for the full year.

The transportation situation has improved sufficiently to permit an increase in iron and steel production. The Illinois Steel Co. has added a furnace at South Works, giving it a total of 16 active stacks out of its 29, and at the same time has increased its steel output to 73 per cent of ingot capacity. The Wisconsin Steel Co. has put in a second blast furnace. One Bay View furnace at Milwaukee, which has recently banked, has resumed operation. Production at the Inland Steel Co. is unchanged with all three blast furnaces in and steel output at 65 to 70 per cent of capacity. The question uppermost in the minds of producers is whether these gains can be held after the arrival of severe weather. No plants have been able to set aside fuel reserves, and as the railroads are now having difficulty in delivering the local requirements of the steel industry, which average from 450 to 500 cars a day, there seems to be little hope of their bringing in the necessary supply when they are crippled by winter conditions.

Pig Iron.—Extreme caution characterizes the attitude of buyers. There is little inquiry for first quarter and purchases for the remainder of the year are few. Spot iron alone is in demand and even it is not moving as fast as heretofore. Prices of Northern iron still seem well established at $31 base furnace, although some re-sale material has appeared of late. Apparently some melters who bought at bottom prices now desire to sell to realize the profit. On the other hand, a considerable proportion of users have little stock on hand and are pressing the furnaces for deliveries against previous orders. It is for this reason and also because foundries appear to be generally busy that sellers regard the potential demand as good. Among the few sales which have been made for first quarter shipment is one of 600 tons of foundry to a Michigan melter. A northern Illinois agricultural implement maker has closed for 300 tons of foundry for prompt shipment. An Indiana melter is in the market for 1500 tons of foundry for the rest of the year, and a local railroad equipment manufacturer wants 500 tons of foundry for the same delivery. Transportation difficulties still impede sales of Southern iron in this territory. A number of carload lots, however, have been sold here at $25 and $27 base Birmingham, respectively, and a sale of re-sale material for Milwaukee delivery was made at a still lower figure. Silvery has dropped $2 a ton, while Bessemer ferrosilicon is very weak owing to Canadian competition. A Michigan automobile maker has closed for 1500 tons of 14 to 16 per cent at approximately $44.50, delivered. Foreign competition has again been felt in the low phosphorous market. A sale of 100 tons of this material with a slight trace of copper has been made at approximately $38 delivered, Chicago.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include an average switching charge of 61c per ton. Other prices are for iron delivered at consumers' yards, or when so indicated f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$36 15
Northern coke, No. 1, sil. 2.25 to 2.75	32 00
Northern coke, foundry No. 2 sil. 1.75 to 2.25	31.00
Northern high phos.	31.00
Southern No. 2	$31.00 to 33.00
Malleable, not over 2.25 sil.	31.00
Basic	31.00
Low phos., Valley furnace, sil. 1 to 2 per cent copper free	38.00
Silvery, sil. 8 per cent	44.29

Ferroalloys.—Spiegeleisen is slightly weaker, being available at $47 delivered. Ferromanganese is quiet, but two recent carload sales were made at the full price.

We quote 80 per cent ferromanganese, $108.66, delivered; 50 per cent ferrosilicon, $65 delivered (nominal); spiegeleisen, 18 to 22 per cent $47, delivered.

Plates.—Pending inquiries call for 45,263 freight cars and 689 passenger cars, principally for western roads. This is believed to be the largest number of cars which has ever been in the market at one time. Fully 450,000 tons of steel is involved which, in due time, will be booked by the mills. In contrast with the large prospective demand for plates from carbuilders, inquiry from other sources is less active. The leading interest continues to take orders with specifications attached for delivery at convenience, but is accepting no contracts. The foremost independent is still in a position to take limited tonnages at 2.30c., Chicago, for late December delivery, but has not opened its books for first quarter.

The mill quotation is 2.10c. to 2.30c., Chicago. Jobbers quote 2.90c. for plates out of stock.

Bars.—Carbuilders and railroads are still conspicuous as buyers of mild steel bars. Demand from the automotive industry is also holding up surprisingly well. There has been no material decline in buying with the passing of the summer season as was the case in past years. New business from other sources is lighter. The condition of the farm implement manufacturers is still discouraging, but the few changes in operation which have been reported are in the direction of improvement. Demand for bar iron is still of small volume. The principal effect of the closing down of one important mill was to increase the share of remaining producers in the tonnage which is being placed. Prices remain unchanged. Hard steel bar mills are booking considerable tonnage well distributed among farm implement makers, bedstead manufacturers, fence post makers and reinforced concrete builders. New demand is not so heavy, but producers have comfortable backlogs. The ruling quotation is 2c., mill.

Mill prices are: Mild steel bars, 2c. to 2.10c., Chicago; common bar iron 2.50c., Chicago; rail steel, 2c., Chicago mill.

Jobbers quote 2.80c. for steel bars out of warehouse. The warehouse quotation on cold rolled steel bars and shafting is 3.80c. for rounds and 4.30c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 2.50c. base; hoops, 4.15c.; bands, 3.55c.

Wire Products.—Mill operations show no improvement and in other respects the market situation is unchanged. Jobbers and other users are still pressing

for deliveries, indicating that material is passing rapidly into consumption and that no stocks have been accumulated. For mill prices see finished iron and steel, f.o.b. Pittsburgh, page 1175.

We quote warehouse prices f.o.b. Chicago: No. 9 and heavier black annealed wire and No. 9 and heavier bright basic wire, $3.30 per 100 lb.; common wire nails, $3.45 per 100 lb.; cement coated nails, $2.90 per keg.

Rails and Track Supplies.—Current orders for track supplies are small, as to be expected after the heavy buying of a month ago. Demand for light rails has fallen off sharply.

Standard Bessemer and open-hearth rails, $43; light rails rolled from new steel, 2.15c., f.o.b. makers' mills.

Standard railroad spikes, 2.85c. to 3c., mill; track bolts with square nuts, 3.85c. to 4c., mill; iron tie plates, 2.50c.; steel tie plates, 2.35c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 350c. base and track bolts 4.50c. base.

Bolts and Nuts.—Specifications are lighter, although most bolt and nut plants have enough business now on their books to insure good operations for some time to come. While a few automobile manufacturers continue to maintain high rates of production, the output of cars generally is declining and purchases of bolts and nuts are being reduced accordingly. The September discounts are still being quoted by important sellers and it is doubtful whether any business of consequence is being placed at higher prices.

Jobbers quote structural rivets, 3.75c.; boiler rivets, 3.85c.; machine bolts up to ⅞ x 4 in., 50 per cent off; larger sizes, 50 off; carriage bolts up to ⅞ x 6 in., 45 off; larger sizes, 45 off; hot pressed nuts, squares and hexagons, tapped, $2.75 off; blank nuts, $2.75 off; coach or lag screws, gimlet points, square heads, 55 per cent off.

Sheets.—With deliveries from local mills steadily improving, buyers are showing less interest in premium material and it is doubtful whether any tonnage of consequence is now being placed at more than what have been heretofore the minimum prices, namely 2.50c., base Pittsburgh, for blue annealed, 3.35c. for black and 4.35c. for galvanized.

Mill quotations are 3.35c. for No. 28 black, 2.50c. for No. 10 blue annealed and 4.35c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote f.o.b. Chicago, 4c. for blue annealed, 4.85c. for black and 5.85c. for galvanized.

Reinforcing Bars.—Lettings of concrete bars have been fairly numerous of late and have involved good-sized individual tonnages, but new projects are noticeably fewer and competition for pending business has grown keener. While the warehouse price of 2.50c. is holding firmly for small tonnages, attractive projects are bringing out concessions. Recent awards include:

Judson Hotel building, Chicago, 200 tons, to Barton Spiderweb Co.

Northern Bank Note Co. building, Chicago, 250 tons, to Truscon Steel Co.

Sheridan Beach Hotel building, Chicago, 250 tons, to Truscon Steel Co.

High school building, St. Paul, Minn., 400 tons, to Cowin & Co., St. Paul.

Waterworks, Memphis, Tenn., 450 tons, to Truscon Steel Co.; 250 tons to Laclede Steel Co.

United States Aeronautical Service, building, Broadview, near Chicago, 100 tons, to Barton Spiderweb Co.

Pending projects include:

Illinois State Highway Commission, letting of general contract, 100 miles of roads with bridges, Oct. 31, 1200 tons.

Central Mfg. District, plant building, Chicago, E. W. Sproul Co., Chicago, general contractor, 1000 tons.

Hayes Hotel, building, Chicago, general contract to Charles D. Johnson, Chicago, 200 tons.

Hotel for LeRue Poppenfus, Chicago, 400 tons.

First Avenue Bridge, Sterling, Ill., 240 tons.

Veterans' Hospital, Camp Sherman, Chillicothe, Ohio, 800 to 1000 tons of billet stock.

Railway Brotherhood Building, Cincinnati, 440 tons.

Steel Castings.—Car builders continue to place the miscellaneous castings for cars recently booked. For 3500 Santa Fe cars 2000 tons of castings have been placed. With much business pending and in prospect, steel foundries look for a busy winter.

Structural Material.—Fabricating awards are more numerous than a week ago and one of them, the Chicago Allerton House, calls for 2400 tons. On the whole, however, the trend is downward in construction work, new contracts being fewer and smaller. Most shops have enough work on the books to carry them through the winter. Prices of plain material remain unchanged.

The mill quotation on plain material is 2.10c. to 2.20c., Chicago. Jobbers quote 2.90c. for plain material out of warehouse.

Cast Iron Pipe.—Although shipments from pipe shops continue to improve, new demand is light. Pleasant Ridge, Mich., is taking bids on 400 tons of 10 and 12-in., while Warren, Ohio, receives tenders today on 225 tons of 6 and 8-in. Nokomis, Ill., opens bids Nov. 2 on 160 tons of 8 and 6-in. While orders from municipalities are few, private buying is improved, one good sized purchase being reported.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $55.20 to $57.20; 6-in. and above, $51.20 to $53.20; class A and gas pipe, $3 extra.

Old Material.—The market is generally softer and various grades have declined from 50c. to $1 a ton. Shipments from the railroads are much improved, better than they have been for months, and new railroad offerings are more liberal. With deliveries of scrap improved, users are showing less concern about their future supplies and most of the larger buyers are now out of the market. This is particularly true of the steel works which have contracted for heavy tonnages and are now awaiting shipments. Iron mill grades are still dull because of low production of bar iron. Buying of cast and malleable grades is confined largely to the small foundries. The appearance of lower prices has caused many holders of scrap to release material in the hope of liquidating before the market drops further. While this has tended to increase the current available supply of scrap, there is little expectation among either sellers or users of a sustained downswing in prices. Railroad lists include the Pennsylvania, Northwestern Region, 3000 tons; the Pennsylvania, Southwestern Region, 3500 tons, and the Burlington, 2500 tons.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$24.50 to $25.00
Cast iron car wheels	25.50 to 26.00
Relaying rails	27.50 to 32.50
Rolled or forged steel car wheels	22.50 to 23.00
Rails for rolling	19.50 to 20.00
Steel rails, less than 3 ft.	21.00 to 21.50
Heavy melting steel	18.00 to 18.50
Frogs, switches and guards cut apart	18.00 to 18.50
Shoveling steel	17.75 to 18.25
Drop forge flashings	12.00 to 12.50
Hydraulic compressed sheet	15.50 to 16.00
Axle turnings	15.50 to 16.00
Per Net Ton	
Iron angles and splice bars	23.00 to 23.50
Steel angle bars	18.00 to 18.50
Iron arch bars and transoms	22.50 to 23.00
Iron car axles	26.00 to 26.50
Steel car axles	19.00 to 19.50
No. 1 busheling	15.00 to 15.50
No. 2 busheling	10.00 to 10.50
Cut forge	16.00 to 16.50
Pipe and flues	12.00 to 12.50
No. 1 railroad wrought	17.00 to 17.50
No. 2 railroad wrought	16.00 to 16.50
Steel knuckles and couplers	20.00 to 20.50
Coil springs	21.50 to 22.00
No. 1 machinery cast	20.50 to 21.00
No. 1 railroad cast	19.50 to 20.00
Low phos. punchings	17.50 to 18.00
Locomotive tires, smooth	18.00 to 18.50
Machine shop turnings	11.00 to 11.50
Cast borings	13.50 to 14.00
Stove plate	17.50 to 18.00
Grate bars	17.00 to 17.50
Brake shoes	17.00 to 17.50
Railroad malleable	21.50 to 22.00
Agricultural malleable	21.50 to 22.00

Reorganization of the John R. Squire Co., Youngstown, Ohio, a sheet metal interest, has been effected since its purchase by the Dalzell Bros. Co., engaged in heavy sheet metal work, roofing and heating and ventilating installations. The two companies will continue as separate entities. The John R. Squire Co. will devote its activities largely to warm air furnace installations. The concerns jointly employ 150 men.

New York

Good Demand for Concrete Bars—Pig Iron Dull—Coke Prices Lower

NEW YORK, Oct. 31.—It is plain that buyers are convinced that prices of pig iron will not be higher in the near future and they see some reason for believing that there will be further recessions. Hence, buying is very light and is confined to limited tonnages for prompt delivery. That buyers would not come into the market for any considerable tonnages if prices were sharply reduced is shown by the slowness in which some resale iron is being placed. Current reports indicate that $28 has been done in Buffalo on resale iron, but $29.50 continues to be the usual furnace quotation, while in eastern Pennsylvania $30 is regarded as the base, but it is conceded that a lower price would be named on an attractive tonnage. Contracting by importers for foreign iron seems to have come to an end and arrivals of foreign iron in the United States are decreasing. Foreign quotations are fairly firm at about $29.50 for Scotch and $27 to $28 for Continental, with larger concessions than heretofore on high phosphorus iron. Furnaces still report much difficulty in making deliveries, owing to numerous embargoes declared by the railroads.

We quote delivered in the New York district as follows, having added to furnace prices $2.27 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$34.27
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	33.27
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	32.27
Buffalo, sil. 1.75 to 2.25	34.41
No. 2 Virginia, sil. 1.75 to 2.25	No sales

Ferroalloys.—Demand for ferromanganese is confined to a few carload lots for early delivery, and this is being met by British producers almost entirely at the regular quotation at $67.50, c.i.f. With the exception of a few lots the domestic alloy is not in evidence, but on future business it is understood that such producers are quoting $100, furnace. The spiegeleisen market is very quiet, with demand confined to carload lots at prevailing quotations. Specifications on contracts for 50 per cent ferrosilicon continue very heavy and some consumers have entered the market for carload lots for early delivery at as high as $75, delivered. Quotations are as follows:

Ferromanganese, domestic, furnace, nominal, per ton	$100.00
Ferromanganese, British, c.i.f., per ton	$67.50
Spiegeleisen, 17 to 19 per cent, furnace	$38.00
Spiegeleisen, 20 per cent, furnace or duty paid	$38.00 to $39.00
Ferrosilicon, 50 per cent, delivered, per gross ton, carload	$75.00
Ferrotungsten, per lb. of contained metal	70c. to 85c.
Ferrochromium, 4 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr., delivered	12c. to 14c.
Ferrovanadium, per lb. of contained vanadium	$3.50 to $4.00
Ferrocarbontitanium, 15 to 18 per cent, in carloads, per net ton	$200.00
Ores	
Manganese ore, foreign, per unit, c.i.f.	29c. to 30c.
Tungsten ore, per unit, in 60 per cent concentrates, nominal	$7.50 to $7.75
Chrome ore, basis 48 per cent Cr_2O_3, crude, per ton, c.i.f. Atlantic seaboard	$18.00 to $25.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	55c. to 60c.

Cast-Iron Pipe.—Private purchasing still shows considerable strength, particularly for the season, makers continuing booked up to the end of the year. Municipal tenders still appear at intervals. The latest, calling for 450 tons of 16-in. and 12-in. high pressure water pipe for the city of Boston, closed Oct. 30. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger $54.50; 4-in. and 5-in., $59; 3-in., $64.80, with $4 additional for Class A and gas pipe. The soil pipe market is unchanged. We quote per net ton, delivered New York, discounts of both Southern and Northern makers, as follows: 2 to 6-in. standard, 25 to 30 per cent off list; heavy, 34 and 35 per cent off list.

Warehouse Business.—The market continues active and October is believed to have been quite as satisfactory a month as September. Prices generally are unchanged. Sheets still show weakness, despite the fact that some warehouses complain that they meet with difficulty in obtaining shipments from mills. While the prevailing quotations are 4.50c. to 4.90c. per lb. on No. 28-gage black and 5.50c. to 5.90c. per lb. on No. 28-gage galvanized, some shading is reported. A few dealers are said to be willing to concede 5c. to 10c. per 100 lb. on any order larger than ordinary. Dealers handling tire steel report a distinct shortage, evidenced by the number of orders being received by them from other dealers outside of this district to fill in on sizes. This condition is also true of spring steel, in which transactions are numerous between dealers to fill in sizes for their stock. Warehouses handling wrought iron and steel pipe report business still active and attribute the present activity partly to the building construction that is being carried on late into the fall. Wrought iron pipe is dull in comparison to the activity in steel, and dealers point to the fact that the price on wrought iron pipe is about 100 per cent higher than the quotations for steel pipe. Brass and copper warehouses report no change since Sept. 28. Business continues fair. We quote prices on page 1196.

High Speed Steel.—The market is dull and prices continue unchanged. Producers generally quote from 75c. to 80c. per lb. on 18 per cent tungsten high speed steel, with special brands of some companies ranging up to 95c. per lb.

Finished Iron and Steel.—There has been a gradual let-up in steel buying in recent weeks, the past week having brought out a smaller volume of business than those just preceding it. Sellers do not wholly attribute the slump in demand to the easier price situation, but the fact remains that except for specific jobs which have been planned to go ahead at this time buyers of steel are covering their requirements only in a small way and are not anticipating their needs for more than two or three weeks at a time. The general explanation for the present light volume of buying is that consumers covered pretty well for fourth quarter are depending on shipments on their contracts, which are now coming through quite freely considering the transportation embargoes. Plates, shapes and bars are generally quoted at 2c., Pittsburgh, but on plates this price is admittedly not strong, and on large tonnages of car plates or oil tank steel, for example, it is intimated that one or two mills would be willing to quote 1.95c., Pittsburgh, and some buyers report that they have already received such quotations for fairly prompt shipment. Reports of sales of concrete reinforcing bars at 1.95c., Pittsburgh, are unconfirmed. Shapes appear to be fairly firm at 2c. The premium prices on sheets have almost entirely disappeared, and it is possible to buy for early delivery at the prices named by the American Sheet & Tin Plate Co. A large order for wire mesh, about 2600 tons, for the Tulsa water works, has been placed with the American Steel & Wire Co. Demand for structural steel is falling off, but three pending jobs call for a total of about 6000 tons. Up to Sept. 30 about 110,000 tons of steel had been required for buildings erected or under construction in the metropolitan district, this not including bridges, subway or elevated work. There is a fairly good demand for concrete reinforcing bars. The following are some of the jobs now being figured on:

Walker Hotel, Washington, D. C., 1000 tons.
Terminal Refrigerating Warehouse Co., Washington, D. C., 800 tons.
Chevrolet Motor Car Co. plant at Buffalo, 1000 tons.
Collingwood school, Cleveland, 500 tons.

Other jobs, including one of 8000 tons, make up a further total of upward of 10,000 tons. The following bar contracts have been awarded:

Transportation Building, Washington, D. C., 480 tons, to Rosslyn Steel & Supply Co.
Road work in Missouri, 200 tons, to Concrete Steel Co.
Pillsbury flour mills, Buffalo, 1000 tons, to Corrugated Bar Co.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, structural shapes and steel plates, 2.34c.; bar iron, 2.34c.

Coal and Coke.—The coke market continues to soften and furnace grades can now be had from $7.75 to $8.25 for even small lots, while considerably lower prices are

named on coke of moderately high sulphur. In foundry grades usual quotations range from $10 to $12, but one important company has closed contracts with its consumers of Virginia foundry coke at $8 for first half of 1923. On by-product coke, long quoted at $14, seaboard, quotations are now being made on the delivered basis of $14.91, delivered Newark and Jersey City points. This represents a substantial reduction for most consumers.

Old Material.—The general weakness continues. Bethlehem has suspended purchasing and because of congestion at the Alan Wood Iron & Steel Co. works some shippers are delaying shipment on contracts. Heavy melting steel is still quotable at $13.50 to $14 per ton, although most of the transactions are evidently nearer to the low price than the high. Specification pipe is extremely quiet, Lebanon no longer buying, even at $15. The stove plate market is also dull, a Harrisburg mill only showing interest in purchasing at its own figure and a Phoenixville mill paying $16.50 delivered, which with a $3.53 freight rate figures back to $13.22 per ton, New York. Machine shop turnings and mixed borings and turnings are weaker and can not be quoted at better than $11 to $12. One broker reports shipments to Johnstown at $15.25, which would amount to $10.46 per ton New York. Other transactions, such as $15.50 Bethlehem, however, are reported, which justify the higher quotation.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$13.50 to $14.00
Steel rails, short lengths, or equivalent	14.25 to 14.75
Rails for rolling	16.50 to 17.50
Relaying rails, nominal	27.00 to 28.00
Steel car axles	No market
Iron car axles	23.00 to 24.00
No. 1 railroad wrought	16.00 to 16.50
Wrought iron track	14.50 to 15.00
Forge fire	11.00 to 11.50
No. 1 yard wrought, long	13.50 to 14.00
Cast borings (clean)	12.50 to 13.00
Machine-shop turnings	11.00 to 12.00
Mixed borings and turnings	11.00 to 12.00
Iron and steel pipe (1 in. diam., not under 2 ft. long)	11.00 to 11.50
Stove plate	13.25 to 13.75
Locomotive grate bars	14.00 to 14.50
Malleable cast (railroad)	13.50 to 14.00
Cast-iron car wheels	14.50 to 15.00

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$20.00 to $21.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	17.50 to 18.00
No. 1 heavy cast, not cupola size	15.00 to 15.50
No. 2 cast (radiators, cast boilers, etc.)	13.50 to 14.00

Cleveland

Ore Association Will Protest—Pig Iron Prices Show Further Declines

CLEVELAND, Oct. 31.—The Lake Superior Iron Ore Association will file exceptions to the recent report of the examiner of the Interstate Commerce Commission, who recommended that the line haul rates from the Minnesota mines to the upper lake ports be unchanged, but favored a slight reduction on rates from the old range mines to Ashland, Escanaba and Marquette. The association has until Nov. 9 to file exceptions to the report. A meeting of the rate committee of the association and attorneys for various mining interests was held here Monday to map out plans for attacking the examiner's findings. After the filing of the bill of exceptions the Interstate Commerce Commission will set a date for final argument and both the ore shippers and railroads will be heard orally.

Car Supply Improves.—The transportation situation shows further improvement. Reports from Youngstown indicate that mills there are now getting a fair car supply so that they are able to ship practically all their product. Shipments to this territory from the Pittsburgh district are better, although they have not improved to the extent that they have from Youngstown. Consumers in this territory now appear to be getting steel as fast as they need it.

Iron Ore.—The ore movement is still being delayed somewhat by the car shortage. As very little dock space is available, boats are being held at lake ports until cars can be had. As many boats have been diverted to the grain trade wild vessel capacity for ore can probably not be secured except at an advance over the regular rates, but there is little demand for wild tonnage. Most shippers are well up on their schedules and several will be virtually through with their shipments for the season by Nov. 15.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $5.95; Old range non-Bessemer, 51½ per cent iron, $5.20; Mesabi Bessemer, 55 per cent iron, $5.70; Mesabi non-Bessemer, 51½ per cent iron, $5.05.

Pig Iron.—The market is dull and weak. Foundry and malleable grades have settled down to virtually a $30 base price in northern Ohio, this price being quoted both by Valley and Lake furnaces. Prices have offered little resistance to pressure and have declined in spite of the fact that no round lot inquiry has come out to test the market. The largest sale reported at a delivery point where competition was keen because of the geographical position, was a 500-ton lot purchased by a Mansfield implement manufacturer, and it is understood that the highest quotation on this inquiry was $31. One Cleveland producer has reduced its price on foundry iron for Cleveland delivery $1.50 per ton to $32 delivered, bringing its price slightly above the price at which iron can be shipped in from outside producing points. Another Cleveland interest has not yet met the price situation and is quoting foundry iron at $32 for outside shipment and $33.50 for local delivery. Foundries are looking for further price reductions and as a rule are buying only for their immediate requirements. However, some additional inquiry has come out for the first quarter of next year, and a lake furnace reports a sale of 1000 tons foundry iron for that delivery. This same producer made sales aggregating several thousand tons during the week. Southern iron has settled down to a $27 base with no demand. Ohio silvery iron has been reduced to $39.50 for 8 per cent silicon. This is a $2 reduction from the schedule price and $3 lower than some of the producers have been quoting recently for early shipment.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland and for local iron includes a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and a $6 rate from Birmingham:

Basic, Valley furnace	$30.00
Northern No. 2 fdy., sil. 1.75 to 2.25	$31.75 to 32.00
Southern fdy., sil. 1.75 to 2.25	31.00 to 33.00
Malleable	31.75 to 32.00
Ohio silvery, sil. 8 per cent	44.52 to 45.52
Standard low phos., Valley furnace	37.00 to 38.00

Semi-Finished Steel.—A local producer reports sales of several lots of sheet bars, billets and slabs aggregating about 10,000 tons at $40. However, because of the decline in pig iron, somewhat lower prices are looked for.

Finished Material.—The market as a whole is rather dull, although there is considerable activity in steel bars and orders include some large lots. Prices are inclined to softness, but in this respect practically no change developed during the week. While sales of steel bars are reported at 1.95c. for attractive orders, the bulk of the business seems to have been taken at 2c. Plates are generally quoted at 2c. to 2.10c., with some of the smaller mills still making sales at 2.25c., which is now the maximum quotation for quick shipment. Structural material is commonly quoted at 2c. New demand for plates for oil tank work has appeared. The Mexican Petroleum Co. is inquiring for tanks that will require 7000 tons of plates. The Gulf Refining Co. has placed eight tanks, requiring 1200 tons, with the Riter-Conley Co., and Utah Mfg. Co. has placed a tank order requiring 300 tons with the Kansas City Structural Co. An automobile rim manufacturer in this territory has placed 2000 tons of rim steel for early shipment. Automobile manufacturers are buying little steel at present, this being particularly true of alloy steels. However, reports indicate that manufacturers of medium priced cars have sufficient orders to keep their plants at a maximum capacity for the next two or three months.

Jobbers quote steel bars, 2.91c.; plates and structural shapes, 3.01c.; No. 9 galvanized wire, 3.30c.; No. 9 annealed wire, 2.80c.; No. 28 black sheets, 4.40c.; No. 28 galvanized sheets, 5.40c.; No. 10 blue annealed sheets, 3.70c. to 3.76c.; hoops and bands, 3.71c.; cold-rolled rounds, 3.75c.; flats, squares and hexagons, 4.25c.

Sheets.—The softening of the sheet market noted last week has become more pronounced. Black sheets are commonly quoted by independent mills at the American Sheet & Tin Plate Co., price of 3.35c. Galvanized sheets are firmer than black, although some mills are quoting these at 4.35c. Blue annealed sheets appear firm at 2.60c. for the heavier and 2.75c. for the lighter gages.

High Speed Steel.—The market is not active. The more common quotation for small lots of 18 per cent tungsten high speed steel is 75c. per lb. and has a range from 60c. for round lots up to 90c. for certain brands.

Hot-Rolled Strip Steel.—The demand continues good with prices firm at 2.90c. for the wider sizes and 3.25c. for the narrow sizes.

Reinforcing Bars.—Attractive business has brought out a concession of $1 a ton on reinforcing bars to 1.95c., but the general quotation for car lot orders is still 2c. The demand continues fairly active.

Bolts, Nuts and Rivets.—Bolt and nut manufacturers are getting a heavy volume of specifications on contracts at the September prices and are booking some small lots of miscellaneous business at the new price. They report an improvement in steel shipments, but are complaining of the scarcity of some lines of labor. Little new business in rivets is coming out, but orders on old contracts are heavy. Prices are firm at the recent advance.

Coke.—Prices on foundry coke have further declined to from $10 to $11 for standard Connellsville makes and consumers are buying only in car lots for immediate requirements. Foundry coke is still high as compared to furnace coke which seems plentiful at $8.

Old Material.—The market is dull and the price situation is uncertain. Although there is no particular sign of weakness, dealers seem to be unable to form an opinion as to whether the prices will remain at present levels or decline. There is virtually no buying by consumers and little trading among dealers as these are fairly well covered on outstanding contracts. Sales are reported in small lots of choice heavy melting steel at $22 to dealers for Warren and Youngstown deliveries, but this price appears higher than the current market. Specialties such as couplers, knuckles, etc., are firm, sales for these being reported at prices equivalent to $24, Youngstown. The Big Four Railroad received quotations Tuesday on a blank scrap list. There is virtually no change in prices with the exception of a decline of 75c. per ton on flashings.

We quote per gross ton, f.o.b. Cleveland, as follows:

Heavy melting steel	$18.75 to $19.00
Steel rails under 3 ft	21.00 to 21.25
Steel rails for rolling	21.00 to 21.50
Iron rails	18.00 to 18.50
Iron car axles	26.00 to 27.00
Low phosphorus melting	20.00 to 20.50
Cast borings	15.00 to 15.25
Machine shop turnings	14.50 to 14.75
Mixed borings and short turnings	14.75 to 15.00
Compressed steel	17.00 to 17.25
Railroad wrought	18.00 to 18.50
Railroad malleable	20.00 to 21.00
Light bundled sheet stampings	13.75 to 14.00
Steel axle turnings	16.00 to 16.50
No. 1 cast	21.00 to 21.50
No. 1 busheling	12.50 to 13.50
Drop forge flashings over 10 in.	12.75 to 13.25
Drop forge flashings under 10 in.	12.50 to 13.50
Railroad grate bars	17.00 to 18.00
Stove plate	17.00 to 18.00
Low sulphur plate	13.75 to 14.00

Buffalo

Sales and Inquiry for Pig Iron Light, with Lower Prices Expected

BUFFALO, Oct. 30.—Though there is no further manifestation of price softening, there is a feeling in this market that there will be a further decline in the month of November. Sales and inquiries are extremely light and while $29.50 is the usual quotation on No. 2 plain, the general impression is that a livelier demand would bring price concessions from those interests having iron available. On several sales of off grade iron, a price of $28 has been made. The 50c. differential is in effect, but one furnace is trying to get a dollar differential without success. There is very little commitment for first quarter, and the general run of inquiry is for small tonnages. A 5000-ton inquiry previously referred to in THE IRON AGE has not been placed with a Buffalo seller. None of the local sellers sees a brisker movement in the near future, notwithstanding their surveys of consumers show that practically all are working with as small stocks of iron on hand as is absolutely essential to continued operation. Shipping difficulties are worse, if such a situation is possible, but a prospective improvement is seen in the fact that water transportation will soon be concluded in this section, and cars now used in connection with water traffic will be available.

We quote f.o.b. per gross ton Buffalo as follows, the higher prices being for early shipment:

No. 1 foundry, 2.75 to 3.25 sil.	$30.50
No. 2X foundry, 2.25 to 2.75 sil.	30.00
No. 2 plain, 1.75 to 2.25 sil.	29.50
Basic	29.00
Malleable	31.00
Lake Superior charcoal	36.28

Finished Iron and Steel.—Demand for bars, shapes and plates is not as strong as it was some time ago. Inquiry is steady, however, and is mostly concerned with carload lots. There is a livelier call for wire products and tin plate; on the latter, new prices are expected this week and all the regular buyers are interested and awaiting this schedule. Bar prices have not dropped below 2 cents, and this has been done by a few of the sellers only where delivery concessions were taken into consideration. Shapes range from 2c. to 2.10c., and plates at 2.15c., while 2.15c. on bars could be obtained for quick delivery. Two of the leading Buffalo factors on plates are virtually in a situation where they will no longer be able to consider plate business. One is a local maker and the other a branch of an independent. In the case of the local interest their plate mill has been down for some months, and there is no likelihood of it being put into operation very soon; the other is finding it more profitable to roll sheet bars. Sheets are in good demand and prices are firm at 3.50c. for black and 4.50c. for galvanized. The car situation is discouraging; relief noted a few days ago has disappeared, and the situation is generally on the same level as has existed right along. Structural work on jobs involving less than 100 tons are brisk, but nothing greater than 100 tons has appeared or is immediately in prospect.

We quote warehouse prices, Buffalo, as follows: Structural shapes, 3.20c.; plates, 3.20c.; soft steel bars, 3.10c.; hoops, 4.10c.; bands, 3.50c.; blue annealed sheets, No. 10 gage, 4.05c.; galvanized steel sheets, No. 28 gage, 5.85c.; black sheets, No. 28, 4.85c.; cold rolled round shafting, 3.95c.

Warehouse Business.—Structural shapes are more in demand than any other warehouse product, and while the general volume on all lines is good, there is a noticeable decrease in the size of tonnages buyers ask for. Prices are firm and an expected softening of prices is now regarded as improbable, because of the several wage increases by mills. Bars and bands are in fair demand, but sheets are slow.

Coke.—The range of coke prices, f.o.b. Connellsville, is $9.50 to $11 for best foundry grades. Demand has diminished within a few days.

Old Material.—Mills will not pay in excess of $19.50 for heavy melting steel, and dealers have declined to meet this situation. Some of the buyers who paid $20 a few weeks ago have taken a stand at $19, and in consequence of the difference, there is a decided lull in transactions. The demand for turnings and borings has fallen off and most of the consumers are well supplied for the present. Demand for low phosphorus and railroad malleable is good, but the supply is scarce. Other lines of old material are quiet.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$20.00 to $21.00
Low phos., 0.04 and under	24.00 to 25.00
No. 1 railroad wrought	19.00 to 20.00
Car wheels	21.00 to 22.00
Machine-shop turnings	14.50 to 15.00
Cast iron borings	17.50 to 18.00
Heavy axle turnings	17.50 to 18.50
Grate bars	16.00 to 17.00
No. 1 busheling	17.00 to 18.00
Stove plate	17.00 to 18.00
Bundled sheet stampings	14.00 to 15.00
No. 1 machinery cast	21.00 to 22.00
Hydraulic compressed	18.00 to 19.00
Railroad malleable	20.50 to 21.50

Boston

Competition Between Domestic and Foreign Iron Is Growing Keener

BOSTON, Oct. 31.—More pig iron business passed through local firms the past week, but buying is far from active. Aggregate October sales in this territory are large, however, mostly foreign iron. Some heretofore active foreign iron interests are practically cleaned up on offerings and plan to withdraw from the market. Selling interest at the moment centers largely in a Massachusetts textile machinery maker's inquiry for 500 to 1000 tons each of silicon 1.75 to 2.25 and silicon 5.00 to 6.00, domestic or foreign iron, late 1922 or early 1923 delivery. Lower offerings on foreign iron have been made on this business. Continental iron, silicon 2.50 plus, is offered at $27 to $28 duty paid on dock, and English on the same basis, while similar Scotch, heretofore held at $31 to $33, is now available at $30 and less, plus duty. The softness of foreign iron prices is due to concessions made by domestic furnaces. An inquiry the past week for 500 tons No. 1X, 1922 delivery, by a local textile machinery maker for a Maine subsidiary, brought out offers of less than $35 delivered from two Northern furnaces, which figures under $30, furnace, based on regular differentials. All Alabama furnaces operating in New England are now on a $27.50 furnace base. Virginia furnaces so far have maintained prices. It is evident, however, that competition between domestic and foreign irons is growing keener.

Receipts of foreign iron for the week ending Oct. 28 amounted to 3500 tons of Scotch, part of which is consigned to Philadelphia and will be unloaded at that port. During the previous week 4734 tons arrived at Boston, and in the week before that 14,750 tons.

We quote delivered prices, on the basis of the latest reported sales, now infrequent, and as follows, having added to furnace prices $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia and $9.60 from Alabama:

East. Penn., sil. 2.25 to 2.75	$34.15 to $36.15
East. Penn., sil. 1.75 to 2.25	33.65 to 35.65
Buffalo, sil. 2.25 to 2.75	34.91 to 36.41
Buffalo, sil. 1.75 to 2.25	34.91 to 35.91
Alabama, sil. 2.25 to 2.75	37.60
Alabama, sil. 1.75 to 2.25	37.10
Virginia, sil. 2.25 to 2.75	38.92
Virginia, sil. 1.75 to 2.25	37.92

Warehouse Business.—Soft steel and refined iron bars have been reduced 18½c. per 100 lb., and structural shapes as much, but iron and steel warehouse prices otherwise remain unchanged. Lower prices are based on increased stocks and the elimination of mill extras. Warehouse extras are generally charged. The movement of iron and steel out of stock is slightly larger. Bolts and nuts are in normal demand. Three local concerns are carrying large stocks, but others have comparatively little material on hand. Rumors of an impending advance in warehouse prices are freely circulated. Jobbers have announced new season prices on wire goods. Black and galvanized wire cloths are slightly lower than last season, bronze a little higher, and pearl unchanged, while netting values show little variation.

Jobbers quote: Soft steel bars, $3.065 per 100 lb. base; flats, $3.85; concrete bars, 3.16½c.; structural steel, $3.065 to $3.50; tire steel, $4.50 to $4.85; open-hearth spring steel, $5 to $6.50; crucible spring steel, $12; steel bands, $4.25; hoop steel, $4.75; cold rolled steel, $4 to $4.50; refined iron, $3.065; best refined iron, $4.50; Wayne iron, $5.50; Norway iron, $6.60 to $7.10; plates, 3.16½c. to $3.35; No. 10 blue annealed sheets, $4.15 per 100 lb. base; No. 28 black sheets, $5.40; No. 28 galvanized sheets, $6.40.

Finished Material.—Local mill representatives continue to report a fair business in bars, plates, sheets and miscellaneous small products. Individual orders, however, call for small tonnages, but the number of orders booked is increasing. Bids are asked on 700 tons of structural steel for a local police station, bringing the total amount under negotiation in this territory up to approximately 10,000 tons. The Boston Bridge Works, Inc., is awarded 150 tons for a Cambridge, Mass., bakery. The Boston Elevated Co. has awarded a contract for 30 new type one-man cars to the Laconia Car Co., Boston. The city of Pittsfield has purchased three 10-ton tractors, two of the Best and the third of the Holt type.

Coke.—The flurry of first-half 1923 by-product coke buying has subsided, most of the foundry trade having contracted. Both the New England Coal & Coke Co. and the Providence Gas Co. are maintaining operating schedules and are up to date on 1922 contract shipments. The demand for spot foundry coke therefore is limited to a stray car now and then. Both companies continue to quote by-product fuel at $16.50 delivered within the $3.10 freight zone. The undertone of the market, nevertheless, is unsettled due to the fact that Connellsville by-product coke is now down to a basis where it can compete with New England product. The uncertainty of the car situation is the one disturbing factor in the Connellsville coke market.

Old Material.—A further shrinkage in demand for old material has made for uncertainty as to values. The market, however, is not as soft as it appears on the surface. For instance, dealers who paid $14 and $14.50 on cars shipping point for heavy melting steel a fortnight or so ago, have dropped their price to $13, but admit they can buy little material. The lack of actual transactions at $13 would make reports of actual weakness appear unfounded. Purchase of No. 1 yard wrought the past week for eastern Pennsylvania mills at $18.50 delivered, brings the f.o.b. Boston price down to around $14, which indicates no weakness in this material. Inquiries for several hundred tons of cast iron chemical borings remain in the market with bids ranging from $19 on cars shipping point up, unchanged from last week. A central Massachusetts textile machinery maker is offering 200 tons of these borings and has turned down $19. Other borings and turnings prices remain as heretofore where actual transactions take place. Dealers have paid 90c. a 100 lb. for machinery cast on cars shipping point the past two or three days, which certainly indicates no weakening in such material. The most important old material interests in this territory look upon the present quietness as temporary and due to the transportation situation. Confidence is expressed that buying will shortly resume with prices as high or higher than heretofore.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$22.00 to $23.00
No. 2 machinery cast	20.00 to 21.00
Stove plate	17.50 to 18.00
Railroad malleable	19.00 to 19.50

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$13.50 to $15.50
No. 1 railroad wrought	16.00 to 16.50
No. 1 yard wrought	14.00 to 14.50
Wrought pipe (1 in. diam., over 2 ft. long)	11.00 to 11.50
Machine shop turnings	12.00 to 12.50
Cast iron borings, rolling mill	14.00 to 14.50
Cast iron borings, chemical	18.00 to 19.00
Blast furnace borings and turnings	12.00 to 12.50
Forged scrap and bundled skeleton	11.00 to 11.50
Shafting	19.00 to 19.50
Street car axles	23.00 to 24.00
Street car wheels	18.00 to 19.50
Rails for rolling	16.50 to 17.00

Cincinnati

Southern Iron Declines $2—Silveries Reduced by Jackson County Makers

CINCINNATI, Oct. 31.—There is little activity in the Cincinnati iron market, buyers apparently keeping out of the market until long delayed shipments start to roll in, and in the meantime helping one another out by borrowing and buying small lots. As a result, the market is showing a softer tone, and Southern iron is off $2 from the previous low, it being available at $25, base Birmingham, to-day. Silveries, with little activity, have been reduced voluntarily by Jackson County makers $2 a ton, the new schedule calling for $39.50 for 8 per cent. On foundry grades, there is little appreciable change in the southern Ohio district as regards prices, though plans are under way to blow in a number of furnaces on foundry iron, of which there is practically none on furnace yards. Reports are heard of further

recessions on iron by lake front furnaces, it being reported that a northern Ohio melter had closed for 500 tons at $29.50, furnace. A Detroit melter bought 700 tons of Chicago iron at $29.50, furnace. Another Detroit melter bought 700 tons of Chicago iron at $30, furnace, and a Michigan automobile manufacturer closed on 1500 tons of electrolytic ferrosilicon, 14 to 16 per cent, at a reported price of $45, delivered, the order going to a Canadian producer. The Louisville & Nashville Railroad bought 775 tons of Southern, of which 700 was reported to have been placed at less than $26.50, base, and 75 tons of special iron at $28, base. The only inquiry of consequence comes from an Indiana stove manufacturer, who asks for 500 tons of Southern. A Chicago district melter is in the market for 500 to 1000 tons of foundry. Two of the smaller furnaces in the Ironton district have bought coke, and will likely blow in about Nov. 15. This will make 10 of 17 furnaces in southern Ohio active.

Based on freight rates of $1 from Birmingham and $2.27 from Ironton, we quote f.o.b. Cincinnati:

Southern, [illegible]	[illegible] to $31.05
Southern coke, sil. 2.25 to 2.75	
[illegible]	[illegible] to 31.55
Ohio silvery (nominal), 8 per cent	41.77
Southern Ohio coke, sil. 1.75 to [illegible]	32.27
[illegible] No. 2	32.27
[illegible] Northern	32.27
Malleable	32.27

Tool Steel.—While the demand for tool steel has fallen off somewhat during the past two weeks, sales are still considered fair. Indications are that increasing manufacturing operations, particularly in machinery building plants, will show a big improvement, and as stocks of tool steel are not being carried, this will mean better business for mills. Prices are strong, at from 75c. per lb. for 18 per cent tungsten high speed steel, to 95c. for special brands of some companies.

Finished Material.—The demand for finished materials showed improvement during the past week, though orders are still being placed in small lots. Shipments from mills are showing a slight improvement, and deliveries on last quarter contracts are taking care of the major portion of the needs of consumers. A better demand for sheets is reported, and plates are still fairly active. On bars and shapes, however, the demand has slowed up, and 2c. is now the common quotation, the outside price of 2.25c. having entirely disappeared. The going price on plates, for the small orders being booked, is 2.15c., though on anything like an attractive order 2c. to 2.10c. can be easily done. There is a brisk demand for wire nails, but on other wire products little interest is being shown. Tin plate orders have been fairly numerous for this season of the year, and some inquiries have been received for first half of next year, on which it is reported that a price of $5 per base box has been quoted by a manufacturer. Fair activity in the structural field is reported, the largest letting reported being a railroad bridge by the Lake Erie & Western Railroad at Lima, Ohio, 600 tons. The Chevrolet Motor Co. is taking bids on a new plant in Norwood, for which approximately 1200 tons of steel will be required. The Third National Bank, Dayton, Ohio, is having plans prepared for an office building involving an expenditure of approximately $1,500,000.

Reinforcing Bars.—There is a fair demand for reinforcing bars, and a number of awards involving a fair tonnage have been reported. Recent lettings include:

Tri-State Hotel, Memphis, Tenn., 700 tons, general contract awarded to [illegible]

[illegible] Sisters of Mercy Academy, Cincinnati, 150 tons, to Bourne-Fuller Co. Newton Tea & Spice Co.'s plant, Cincinnati, 100 tons, to Bourne-Fuller Co.

Pending business includes:

High School for Girls, Louisville, Ky., 150 tons, bids in. Elks' temple, Louisville, Ky., 150 tons, bids closed Nov. 1. [illegible] Cincinnati, 500 tons, bids closed Oct. 28.

Coke.—There is a fair demand for foundry coke, and several furnaces bought a supply for a two to three month operation last week. Included in these were Marting and Kelly furnaces at Ironton. The Ironton by-product ovens will be in operation this week. Prices are easier, in some districts, Pocahontas foundry now being quoted at $11, and the Ashland producer having reduced foundry prices to $11 for November contracts. In other districts, prices are the same as last week.

Warehouse Business.—Local jobbers report a brisk demand for reinforcing bars, structural shapes, small angles, and sheets. Wire nails are also in good demand, and stocks are running low. Prices show no change.

Cincinnati jobbers quote: Iron and steel bars, 2.95c. base; reinforcing bars, 3.05c. base; hoops, 4.05c. base; bands, 3.85c. base; shapes and plates, 3.05c. base; cold-rolled rounds, 3.75c. base; cold-rolled flats, squares and hexagons, 4.25c. base; No. 10 blue annealed sheets, 4c.; No. 28 black sheets, 4.70c.; No. 28 galvanized sheets, 5.75c.; No. 9 annealed wire, $3.10 per 100 lb.; common wire nails, $3.20 per keg, base.

Old Material.—Several important sales of steel grades are reported for shipments to other districts, the delivered prices ranging from $21.50 to $22.50 on heavy melting steel. As a general thing, however, the market is rather quiet, dealers not being desirous of pushing sales in this market, as they have a feeling that higher prices will be seen shortly. Only fair buying of foundry grades is reported, with prices showing little change from last week.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

Per Gross Ton	
Bundled sheets	$13.00 to $14.50
Iron rails	17.00 to 18.00
Relaying rails, 50 lb. and up	26.50 to 27.00
Rails for rolling	18.50 to 19.00
Heavy melting steel	17.50 to 18.50
Steel rails for melting	16.00 to 17.00
Car wheels	20.00 to 21.00
Per Net Ton	
No. 1 railroad wrought	14.50 to 15.00
Cast borings	11.50 to 12.00
Steel turnings	10.50 to 11.00
Railroad cast	18.00 to 19.00
No. 1 machinery	21.00 to 21.50
Burnt scrap	12.00 to 12.50
Iron axles	20.50 to 21.00
Locomotive tires (smooth inside)	14.50 to 15.50
Pipes and flues	9.00 to 9.50

St. Louis

Pig Iron Prices Lower, One Seller Going as Low as $25, Birmingham

ST. LOUIS, Oct. 31.—The pig iron market is easier. The St. Louis Coke & Chemical Co. is now quoting $31.50 to $32 at the Granite City furnace, to meet which price Chicago district makers are quoting on the basis of $30, Chicago, although they are quoting $31, Chicago, for that territory. The prevailing quotation on Southern iron is at $27.50, Birmingham, the price being maintained by all of the makers in that district, with the exception of one, which has quoted $25, Birmingham. The latter, a furnace of small capacity, has just resumed operations after having been out of blast for months and, unlike other makers, has no order file. The low price has had no effect yet on the price of other makers in that field. Melters in this district are playing a waiting game. Very little business was placed for fourth quarter delivery and virtually none for first quarter. The melt is on the increase, especially among the stove furnaces, and it is only a question of time when they must get into the market again. No inquiries are before the market. So long as melters are showing no disposition to buy, there can be no real test of the market. Such orders as are being placed are mostly for carloads for quick shipment, and there is not so much of this kind of business. The Granite City maker sold 1500 tons of foundry iron to a Western melter, and 1000 tons to an East Side melter.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago, $3.28 from Birmingham (rail and water), $5.17 from Birmingham, all rail, and 81 cents average switching charge from Granite City:

Northern foundry, sil. 1.75 to 2.25	$32.16
Northern malleable, sil. 1.75 to 2.25	32.16
Basic	32.16
Southern foundry, sil. 1.75 to 2.25	$30.17 to 32.17

Finished Iron and Steel.—Fabricators report that there is a slight increase in small jobs, but there still is a dearth of inquiries requiring any considerable tonnage. Fabricators in the district are well booked up with orders for the remainder of the year, but they are looking for business for beyond that period. They placed a few small orders with steel mills during the week. Jobbers are not buying very much, although one jobber is said to have placed shipping instructions covering a large tonnage of merchantable bars ordered some time ago. Railroad inquiries from railroads centering

in St. Louis are very light. The Louisville & Nashville Railroad is in the market for tanks involving about 2000 tons of tank plates, and the Texas Electric Railway at Dallas wants 55 axles. There also is an inquiry for 100 tons of galvanized wire.

For stock out of warehouse we quote: Soft steel bars, 2.90c. per lb.; iron bars, 2.90c.; structural shapes, 3c.; tank plates, 3c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, cold rolled, one pass, 4.50c.; cold drawn rounds, shafting and screw stock, 3.90c.; structural rivets, 3.60c. per 100 lb.; boiler rivets, 3.70c.; tank rivets, ⅞ in. and smaller, 55 per cent off list; machine bolts, large, 50 per cent; smaller, 50 per cent; carriage bolts, large, 55-5 per cent; small, 60 and 10 per cent; lag screws, 55 per cent; hot pressed nuts, square or hexagon blank, $2.75; and tapped, $2.75 off list.

Coke.—The coke market may be easier in the East, but producers in this district are holding firm. The Granite City by-product producer reports an improved coal supply and oven operations are at 100 per cent capacity, but it has so many orders that they are not influenced by the easy situation elsewhere. The Terre Haute ovens are also holding firm at $16 ovens for foundry coke and $11 to $12 for domestic coke. Connellsville brands are lower.

Old Material.—The market for old material is easier. As is usual following a decline in the market, country dealers are offering their supplies. The railroads are not moving much old material and but one list is before the market, the Southwestern region of the Pennsylvania, their list being 3700 tons. Users of old material are very busy and dealers feel that they shortly will be in the market again for supplies. While inquiries for relaying rails are not so numerous as they have been, still there is a good business in this item from industrial interests.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

	Per Gross Ton	
Iron rails	$21.00	to $21.50
Rails for rolling	20.00	to 20.50
Steel rails, less than 3 ft.	21.50	to 22.00
Relaying rails, standard section	26.00	to 29.00
Cast iron car wheels	23.00	to 23.50
Heavy melting steel	17.00	to 17.50
Heavy shoveling steel	16.00	to 16.50
Frogs, switches and guards cut apart	17.00	to 17.50
	Per Net Ton	
Heavy axles and tire turnings	11.50	to 12.00
Steel angle bars	17.00	to 17.50
Iron car axles	27.50	to 28.00
Steel car axles	20.50	to 21.00
Wrought iron bars and transoms	23.00	to 23.50
No. 1 railroad wrought	16.00	to 16.50
No. 2 railroad wrought	15.00	to 15.50
Railroad springs	20.00	to 20.50
Steel couplers and knuckles	21.00	to 21.50
Cast iron borings	11.00	to 11.50
No. 1 busheling	14.25	to 14.75
No. 1 railroad cast	19.00	to 19.50
No. 1 machinery cast	20.00	to 20.50
Railroad malleable	20.25	to 20.75
Machine shop turnings	9.50	to 10.00

Birmingham

Pig Iron Shows Declining Prices in an Extremely Dull Market

BIRMINGHAM, ALA., Oct. 31.—One of the dullest weeks on record in the Birmingham iron market was that ending last Saturday. Not a single order involving real tonnage was booked so far as came to the surface. The largest deal heard of is reported from Detroit, where a stove maker is understood to have booked 500 tons at $27, Birmingham base. One company is openly offering pig iron at $25, and it became generally known to-day that one other maker is reported as having already marked down to that base. Other makers have the matter in hand to-day. The company which first named $25 operates one stack at Holt, Ala. All indications point to its lead being generally followed. Sales at higher base have been neglected for two weeks, with soil and pressure pipe makers protesting against high prices. The latest sale at $28.50 involved 500 tons for this year and was made the Saturday before last. Anything like that has not been repeated. The deadlock between pipe makers and iron makers was pronounced and open at close of the week. Soil pipe is dull, some plants slowing down and makers will not buy at present levels if they have to go to the new year, they openly declare. Large pressure pipe makers have good business on books, but they are afraid of higher priced iron and say they will not think of buying at the present base. If this state exists until inventory season, there seems small prospect of much iron buying before the end of the year. Southern melt of all kinds continues large.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon 1.75 to 2.25	$25.00 to $27.00
Basic	27.50
Charcoal, warm blast	33.00

Finishing Mills.—Southern wire drawing mills report fully as good business as during the past two months with warehouse stocks moving out fairly well and a good run of new business all around. Much business for Southern delivery was diverted to Southern mills from Northern on account of car shortage. The Tennessee company continues double turn at all finishing mills. The week's exports included 3351 tons of rails for Yokohama and 400 tons of rails, 437 tons of sulphate of ammonia and 300 tons of angle bars for Kobe. Gadsden and Birmingham wire drawing mills moved 900 tons of nails and wire to Pacific Coast points.

Sanitary Pipe.—Soil pipe is very dull and some plants are slowing down. The base remains at $50 and $55 with few offers at that. Jobbers are out of the market. Pressure pipe is going better, Southern municipalities continuing improvement work during the winter. Memphis has taken 500 tons from the United States Cast Iron Pipe & Foundry Co. The base is $43.

Old Material.—The scrap market holds its own at present prices, the tonnage going at the high figures being about the same as that going at the lower owing to activity in small plants. Steel scrap has not been so active following recent good buying.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Steel rails	$16.00	to $17.00
No. 1 steel	14.00	to 16.00
No. 1 cast	18.00	to 20.00
Car wheels	18.00	to 20.00
Tramcar wheels	17.00	to 19.00
Stove plate	16.00	to 17.00
Cast-iron borings	9.00	to 10.00
Machine shop turnings	9.00	to 10.00

Philadelphia

Falling Off of Demand Now More Apparent —All Prices Easier

PHILADELPHIA, Oct. 31.—A more marked falling off in the demand for pig iron, steel and old material, together with further weakening of prices, leaves both buyers and sellers in a quandary as to what the nearby future has in store. Buyers are exercising great caution and, as is usual in a market situation like the present, are unwilling to commit themselves for more than urgent requirements when each week brings slightly lower quotations. In steel the position of the mills is fairly satisfactory for the remainder of the year, excepting plates, which are not in demand, and plate orders on the books do not represent, as a rule, more than two or three weeks' rollings. In pig iron the situation is decidedly unsatisfactory from the standpoint of the operators, as there is very little business and prices show no stability. One effect of the weak pig iron market may be to defer the blowing in of some furnaces which were to start operations as soon as coke prices got down to a moderate basis.

There has been very little business of an important character during the week, except in basic pig iron, one Eastern steel company taking 12,000 tons for November shipment at prices $1 a ton lower than its last large purchase about a month or so ago. Some old material prices are lower and there is very little buying.

Complaints are heard of delays in getting cars and shipments once started take longer than they should, due to congestion at various junction points. Railroad embargoes add to the transportation confusion. However, there is little or no distress among consumers in

[illegible] appear to be nearing a peak [illegible] normal requirements.

Pig Iron.—The only important pig iron transaction of the week was the purchase to-day of 12,000 tons of basic by an Eastern steel company at prices ranging from $28.50 to $29, delivered, this being $1 a ton lower than was paid by this company on its last large purchase about a month ago. The business was divided among at least three furnaces. In foundry iron also, there is pronounced weakness, and domestic grades are quoted $1 a ton below last week's published prices. No. 2 plain in large lots is to be had at $29, furnace, and No. 2X at $30, while for smaller lots $30 and $31, furnaces, for these two grades are asked. Foreign iron keeps pace with domestic iron in the decline of prices. English iron equivalent to No. 2 plain and No. 2X is to be had at $27.75 and $28.75, Philadelphia, duty paid, and some No. 3 Scotch iron, which local importers are anxious to move promptly from docks, is to be had at $29.50 to $30, Philadelphia, duty paid. Two eastern Pennsylvania and one Virginia furnace are now definitely scheduled to go into blast in November. The Alan Wood Iron & Steel Co. will probably put its No. 3 stack in blast Nov. 15. The Robesonia furnace will go in about the same time and will make both foundry and low phosphorus iron. The Pulaski Iron Co. has decided to put its furnace in operation on Nov. 10. Low Moor will probably go in as soon as a coke supply can be assured. No definite plans have been made yet for blowing in a Warwick furnace. Imports of foreign iron at Philadelphia in the past two weeks total more than 21,000 tons. In the week ended Oct. 21, the total was 9044 tons, all from England, while in the week ended Oct. 28 the total was 12,020 tons divided as follows: Scotland, 2750 tons; France, 5036 tons; England, 2250 tons; Belgium, 1984 tons.

The following quotations are, with the exception [illegible] Philadelphia and include freight rates varying from 76 cents to $1.64 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$30.14 to $31.14
East. Pa. No. 2X, 2.25 to 2.75 sil.	31.14 to 32.14
East. Pa. No. 1X	32.14 to 33.14
Virginia No. 2 plain, 1.75 to 2.25 sil.	37.17
Virginia No. 2X, 2.25 to 2.75 sil.	38.17
Basic delivered eastern Pa.	28.50 to 29.00
Gray forge	31.00 to 32.00
[illegible]	32.00 to 33.00
[illegible] nace)	38.00 to 40.00
Copper bearing low phos. (f.o.b. furnace)	37.00 to 38.00

Ore.—Receipts of iron ore from Sweden at Philadelphia during the two weeks ended Oct. 28 were 13,145 tons. In addition 500 tons of iron ore was received from Germany and 3083 tons of manganese ore from various sources. From British South Africa, 4500 tons of chrome ore was received.

Ferroalloys.—A few small sales of domestic ferromanganese at $100, furnace, have established that price. British ferromanganese continues unchanged at $67.50, seaboard, duty for account of buyer. Spiegeleisen, either imported or domestic, is to be had at $38, docks or furnace, as the case may be.

Semi-Finished Steel.—The American Locomotive Co. has ordered 1100 tons of special quality forging billets from an Eastern mill. Prices remain unchanged, $40 for re-rolling quality and $45 for forging quality, Pittsburgh base.

Plates.—Some Eastern plate mills have not more than two or three weeks' rollings ahead and are pressing the market for business without any marked results. Except for a few specific jobs, as, for example, two gas holders involving a total of about 5000 tons, for which steel was recently bought, there has been very little business of an important character in this market in the past two weeks. One mill which had been holding for 2.25c., Pittsburgh, is now quoting 2c., Pittsburgh, on desirable lots. It remains, however, that on small lots some mills are still getting above 2c., but on the other hand quotations of 1.95c., Pittsburgh, have appeared on desirable tonnages of tank steel. We now quote the plate market at 1.95c. to 2c., Pittsburgh, for large lots and at 2.10c. for small lots.

Structural Steel.—There has been a gradual falling off in demand for structural shapes during recent weeks, due to the let-up in building work, but some of the mills have a fair quantity of business ahead. A viaduct over Olney Avenue, in Trenton, N. J., will require a few thousand tons of shapes and reinforcing bars. Plain material is quoted at 2c., Pittsburgh.

Bars.—One important producer of steel bars has 60 days' work ahead, but is not booking much new business. Merchant steel bars are firm at 2c., Pittsburgh, but it is intimated that large lots of concrete reinforcing bars are to be had at 1.95c., Pittsburgh. Bar iron is quoted at 2c., Pittsburgh, with demand almost nil.

Sheets.—The premium prices recently obtainable on sheets have almost disappeared and quotations now range from 2.60c. to 2.75c. on blue annealed; 3.35c. to 3.50c. on black and 4.35c. to 4.50c. on galvanized, all base Pittsburgh. Some mills are offering November shipments at these prices.

Rivets.—An Eastern maker of rivets has put in effect an advance in prices on small lots, its present quotations being 3c. for structural rivets in large lots and 3.15c. in small lots and 3.10c. for boiler rivets in large lots and 3.25c. in small lots, f.o.b. Pittsburgh. There has also been an advance on small rivets in small lots, the discount now being 65 per cent off list, while on large lots 65 and 5 per cent off is granted.

Warehouse Business.—The following prices are effective for steel products out of stock for delivery within the limits of Philadelphia.

Soft steel bars and small shapes, 3.025c.; iron bars (except bands), 3.025c.; round edge iron, 3.20c.; round edge steel, iron finish, 1½ x ½ in., 3.20c.; round edge steel planished, 4c.; tank steel plates, ¼-in. and heavier, 3.125c.; tank steel plates, 3/16-in., 3.33c.; blue annealed steel sheets, No. 10 gage, 3.85c.; black sheets, No. 28 gage, 4.60c.; galvanized sheets, No. 28 gage, 5.75c.; square twisted and deformed steel bars, 3.15c.; structural shapes, 3.125c.; diamond pattern plates, ¼-in., 4.80c.; 3/16-in., 5c.; spring No. 13 gage and lighter, 4.25c.; steel bands, No. 12 and hexagons, cold-rolled steel, 4.35c.; steel hoops, gage to 3/16-in., inclusive, 3.825c.; rails, 3.025c.; tool steel, 4.25c.; round cold-rolled steel, 3.85c.; squares steel, 8.50c.; Norway iron, 6.50c.

Coke.—A further easing in coke prices is noted. On furnace coke $7.50 has been quoted on best grades from Connellsville and $6.50, Connellsville, has been quoted on an inferior grade of furnace coke from another district. Foundry coke is about $1 a ton higher.

Old Material.—Purchase of 50,000 tons of heavy melting steel by a Pittsburgh steel company at $21, Pittsburgh, has had no appreciable effect on the Eastern situation, though most of this steel will be shipped from the East. An Eastern mill has bought 300 tons of scrap rail at $17, delivered, which is a decline of 50c. a ton within a week. The highest being paid is $17.50, which dealers are offering on contracts made a few weeks ago at $18. Several grades of scrap are lower in price, notably low phosphorus melting steel, car wheels, No. 1 railroad wrought, bundled sheets for steel works, blast furnace turnings, cast borings and pipe.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$17.00 to $17.50
Scrap rails	17.00 to 17.50
Steel rails for rolling	21.00 to 22.00
No. 1 low phos., heavy 0.04 and under	24.00 to 25.00
Cast iron car wheels	21.00 to 22.00
No. 1 railroad wrought	21.00 to 22.00
No. 1 yard wrought	19.00 to 20.00
No. 1 forge fire	16.00 to 16.50
Bundled sheets (for steel works)	15.50 to 16.00
No. 1 busheling	15.50 to 16.00
Turnings (short shoveling grade for blast furnace use)	15.50 to 16.00
Mixed borings and turnings (for blast furnace use)	15.50 to 16.00
Machine shop turnings (for steel works use)	15.50 to 16.00
Machine shop turnings (for rolling mill use)	15.50 to 16.00
Heavy axle turnings (or equivalent)	16.00 to 17.00
Cast borings (for steel works and rolling mills)	16.00 to 16.50
Cast borings (for chemical plants)	21.00 to 23.00
No. 1 cast	22.00 to 23.00
Heavy breakable cast (for steel plants)	21.00 to 22.00
Railroad grate bars	17.50 to 18.00
Stove plate (for steel plant use)	17.50 to 18.00
Railroad malleable	15.50 to 16.50
Wrought iron and soft steel pipes and tubes (new specifications)	15.00 to 16.00
Shafting	22.00 to 23.00
Steel axles	27.50 to 28.00

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Plates

Sheared, tank quality, base, per lb.....2.00c. to 2.25c.

Structural Material

Beams, channels, etc.....2.00c. to 2.10c.

Iron and Steel Bars

Soft steel bars, base, per lb.....2.00c. to 2.10c.
Refined iron bars, base, per lb.....2.60c.

Hot-Rolled Flats

Hoops, base, per lb.....2.90c. to 3.00c.
Bands, base, per lb.....2.90c. to 3.00c.
Strips, base, per lb.....2.90c. to 3.00c.
Cotton ties, per bundle of 45 lb.....$1.14

Cold-Finished Steels

Bars and shafting, base, per lb.....2.50c.
Strips, base, per lb.....4.50c.

Wire Products

Nails, base, per keg.....$2.70
Bright plain wire, base, per 100 lb.....2.45
Annealed fence wire, base, per 100 lb.....2.45
Galvanized wire, base, per 100 lb.....2.95
Galvanized barbed, base, per 100 lb.....3.35
Galvanized staples, base, per keg.....3.35
Painted barbed wire, base, per 100 lb.....3.00
Polished staples, base, per keg.....3.00
Cement coated nails, base, per count keg.....2.20
Woven fence, carloads (to jobbers).....70½ per cent off list
Woven fence, carloads (to retailers).....68 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads...60 and 5 per cent off list
Machine bolts, small, cut threads....50 and 10 per cent off list
Machine bolts, larger and longer....50 and 10 per cent off list
Carriage bolts, ⅜ x 6 in.:
Smaller and shorter, rolled threads,
50, 10 and 5 per cent off list
Cut threads.....50 per cent off list
Longer and larger sizes.....50 per cent off list
Lag bolts.....60 and 5 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads....50 and 10 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.:
Smaller and shorter.....45 per cent off list
Larger and longer sizes.....45 per cent off list
Hot pressed square or hex. blank nuts...$3.25 to $3.50 off list
Hot pressed nuts, tapped.....3.25 to 3.50 off list
C.p.c. and t. sq. or hex. nuts, blank.....3.25 to 3.50 off list
C.p.c. and t. sq. or hex. nuts, tapped.....3.25 to 3.50 off list
Semi-finished hex. nuts:
9/16 in. and smaller, U. S. S....75, 10 and 5 per cent off list
⅝ in. and larger, U. S. S....70, 10 and 2½ per cent off list
Small sizes, S. A. E.....80 and 5 per cent off list
S. A. E., ⅝ in. and larger.....75 and 5 per cent off list
Stove bolts in packages.....80 and 5 per cent off list
Stove bolts in bulk.....80, 5 and 2½ per cent off list
Tire bolts.....50, 10 and 10 per cent off list

Cap and Set Screws

Milled square and hex. head cap screw.....75 per cent off list
Milled set screws.....75 per cent off list
Upset cap screws.....75 and 10 per cent off list
Upset set screws.....80 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb.....$3.15
Large boiler rivets, base, per 100 lb.....3.25
Small rivets.....65 per cent off list

Track Equipment

Spikes, 9/16 in. and larger, base, per 100 lb....$2.75 to $2.85
Spikes, ½ in. and smaller, base, per 100 lb.....3.50
Spikes, boat and barge, base, per 100 lb.....3.50
Track bolts, base, per 100 lb.....3.85 to 4.50
Tie plates, per 100 lb.....2.35 to 2.50
Angle bars, base, per 100 lb.....2.75

Welded Pipe

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
¼	49	23½	¼ to ⅜	+ 7	+33
¼ to ⅜	55	29½	½	26	8
½	60	46½	¾	32	17
¾	62	52½	1 to 1½	34	19
1 to 3	66	54½			

Lap Weld

2	59	47½	2	29	15
2½ to 6	62	51½	2½ to 6	32½	19
7 to 8	60	47½	7 to 12	30	17
9 to 12	59	46½			

Butt Weld extra strong, plain ends

¼	45	28½	¼ to ⅜	+ 17	+ 48
¼ to ⅜	51	34½	½	25	13
½	55	40½	¾	32	18
¾	62	51½	1 to 1½	34	20
1 to 1½	64	53½			
2 to 3	65	54½			

Lap Weld, extra strong, plain ends

2	57	46½	2	30	17
2½ to 4	61	50½	2½ to 4	33	21
4½ to 6	60	49½	4½ to 6	32	20
7 to 8	56	45½	7 to 8	25	13
9 to 12	50	37½	9 to 12	20	8

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 and 2½ per cent.

Boiler Tubes

Lap Welded Steel		*Charcoal Iron*	
1¾ in.	21½	1½ in.	+ 7
2 to 2¼ in.	36	1¾ to 1⅞ in.	3
2½ to 3 in.	47	2 to 2¾ in.	13
3¼ to 13 in.	52	2½ to 3 in.	18
		3¼ to 4½ in.	20

To large buyers of steel tubes a supplementary discount of 5 per cent is allowed.

Standard Commercial Seamless Boiler Tubes

Discounts on cold-drawn tubes in carload lots, f.o.b. Pittsburgh, follow:

1 in.	55	2½ and 2¾ in.	38
1¼ and 1½ in.	47	3 in.	42
1¾ in.	31	3½ to 4 in.	47
2 and 2¼ in.	34	4½ in. and 5 in.	39

Hot Rolled

3 in.	44	3¼ to 4 in.	49

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base.....85 per cent off list
Carbon 0.30 to 0.40, base.....83 per cent off list
Plus usual differentials and extras for cutting.

Seamless Locomotive and Superheater Tubes

Cents per Ft.		Cents per Ft.	
2-in. O.D. 12 gage	14	2¼-in. O.D. 10 gage	19
2-in. O.D. 11 gage	15	3-in. O.D. 7 gage	34
2-in. O.D. 10 gage	16	1½-in. O.D. 9 gage	13¾
2¼-in. O.D. 12 gage	16	5¾-in. O.D. 9 gage	53
2¼-in. O.D. 11 gage	17	5½-in. O.D. 9 gage	55

Tin Plate

Standard cokes, per base box.....$4.75

Terne Plate

(Per package, 200-lb.)

8-lb. coating	$9.30	25-lb. coating I. C.	$14.25
8-lb. coating I. C.	9.60	30-lb. coating I. C.	15.25
15-lb. coating I. C.	11.80	35-lb. coating I. C.	16.25
20-lb. coating I. C.	13.00	40-lb. coating I. C.	17.25

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....2.50c. to 2.75c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.35c. to 3.50c.
Regular auto body sheets, base, per lb.....4.75c. to 5.00c.

Galvanized

No. 28 (base), per lb.....4.35c. to 4.60c.

Tin-Mill Black Plate

No. 28 (base), per lb.....3.35c. to 3.50c.

Manufacturers have pamphlets, which can be had upon application, giving price differentials for gage and extras for length, width, shearing, etc.

Freight Rates

All rail freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic	$0.325	Buffalo	$0.265	St. Louis	$0.43
Philadelphia, export	0.235	Cleveland	0.215	Kansas City	0.735
Baltimore, domestic	0.315	Cleveland, Youngstown		Kansas City (pipe)	0.705
Baltimore, export	0.225	Comb.	0.19	St. Paul	0.595
New York, domestic	0.34	Detroit	0.295	Omaha	0.735
New York, export	0.255	Cincinnati	0.295	Omaha (pipe)	0.705
Boston, domestic	0.365	Indianapolis	0.31	Denver	1.275
Boston, export	0.255	Chicago	0.34	Denver (pipe)	1.215

Pacific Coast	$1.50	Pac. Coast, ship plates	1.20
Birmingham	0.69	Memphis	0.385
Jacksonville, all rail	0.50	Jacksonville, rail and water	0.415
New Orleans	0.515		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 30c. to 40c.; ship plates, 30c. to 40c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 30c. to 40c.; sheets and tin plates, 50c.; rods, wire rope cable and strands, 75c.; wire fencing, netting and stretcher, 50c.; pipe, not over 8 in. in diameter, 50c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

FABRICATED STEEL BUSINESS

Fresh Inquiries Double the Tonnage of Awards of the Week

Among the fabricated steel awards of the past week are the following:

Three buildings for the Sirup Products Co., Yonkers, N. Y., 300 tons, to Bancroft & Jones.

Beach Channel bridge, Borough of Queens, New York, 370 tons, to Bethlehem Steel Bridge Corporation.

Bridge construction for the Baltimore & Ohio Railroad, 2500 tons, to McClintic-Marshall Co., as indicated last week.

Transit Commission car shops on East 148th Street, New York, to be used by Interborough Rapid Transit Co., 3300 tons, to Bethlehem Steel Bridge Corporation, as indicated last week.

Apartment building at Lexington Avenue and Ninety-third Street, New York, 600 tons, to Hinkle Iron Works.

Building for *Brooklyn Daily Eagle*, Brooklyn, 200 tons, to Hedden Iron Construction Co.

Allerton House, Chicago, 2450 tons, to Bethlehem Steel Bridge Corporation.

Broderick & Bascom Rope Co., building, St. Louis, 633 tons, to St. Louis Structural Steel Co.

Chicago Mill & Lumber Co., plant, Chicago, 400 tons, to Kenwood Bridge Co.

Burnham Boiler Co., foundry, Lancaster, Pa., 600 tons, to Lancaster Steel & Foundry Co.

Masonic Temple, Butte, Mont., 340 tons, to Minneapolis Steel & Machinery Co.

Tama County, Iowa, bridges, 175 tons, to Clinton Bridge Works.

Missouri Pacific Railroad, one 80-ft. and two 60-ft. deck plate girder spans, 118 tons, to Virginia Bridge & Iron Co.

Highway bridge over Lake Erie & Western tracks, Lima, Ohio, 600 tons, to American Bridge Co.

Highway bridge, Hamilton County, Ohio, 100 tons, to a Cincinnati fabricator.

Machine shop building, Neely Nut & Bolt Co., Pittsburgh, 250 tons, to McClintic-Marshall Co.

Addition to Tuller Hotel, Detroit, 700 tons, to Riverside Bridge Co.

Addition to Seneca Hotel, Rochester, N. Y., 750 tons, to Genessee Bridge Co., low bidder for steel delivered, and A. E. Norton, Inc., New York, low bidder for steel delivered and erected.

Structural Projects Pending

Inquiries for structural steel work now being figured on include the following:

Mecca Temple, Shriners, Sixth Avenue, between Fifty-fifth and Fifty-sixth Streets, New York, 2500 tons.

Salaam Temple, Shriners, Newark, 1000 to 1500 tons.

Subway construction in Borough of Queens, New York, 2700 tons; bids received.

Carpenter Building, Grand Avenue and Sixth Street, Milwaukee, 1250 tons.

Addition to Peoples Trust & Savings Bank, Chicago, 700 tons.

Producers & Refiners Corporation, ten 55,000-bbl. oil storage tanks for Fort Steele, near Rawlings, Wyo., 3000 tons.

Plant for Chevrolet Motor Co., Cincinnati, approximately 1200 tons, bids close Nov. 7.

Horses and props, Dam 32, Ohio River, 450 tons, proposals received until Nov. 20 by U. S. Engineers' Office, Huntington, W. Va.

City pumping station, Cleveland, 1500 tons.

Longfellow School, Cleveland, 150 tons.

General Tire & Rubber Co., Akron, plant addition, 160

Two Box Car Orders

WASHINGTON, Oct. 31.—The order of the car service division of the American Railway Association made public yesterday, which instructs railroads in the Northwest, Central Western and Southwestern districts to return at once box cars which are now on their lines but which belong to Eastern roads, follows the one issued earlier in the week by the railroads situated east of Chicago and Peoria, Ill., and St. Louis, which were instructed to send west immediately all box cars to Western roads in order to enable Western agricultural States to meet the box car shortage.

RAILROAD EQUIPMENT BUYING

Fresh Inquiries Call for About 10,000 Freight Cars—93 Locomotives Bought

Fresh inquiries add about 9600 freight cars to the railroad equipment now under negotiation. Some 1350 cars and 93 locomotives have been ordered. Some of the items are as follows:

The Illinois Central Railroad has ordered 85 Mikado locomotives from the Lima Locomotive Co.

The Maine Central Railroad has ordered 8 ten-wheel switching engines from the Lima Locomotive Co.

The Northern Pacific has canceled its inquiry for 15 switch engines but is still in the market for 49 locomotives of other types.

The Soo line has placed 500 box and 250 gondola cars with the Pullman Co. and 500 box cars with the American Car & Foundry Co.

The Denver & Rio Grande is inquiring for 800 gondola cars and 1000 stock cars.

The Great Northern is in the market for 5900 cars of various types.

The St. Louis Southwestern is inquiring for 500 box, 500 automobile and 200 ballast cars.

The Rock Island has let repairs on 5 dining cars to the Pullman Co.

The inquiry of the Chicago, Milwaukee & St. Paul Railroad, mentioned last week, has been increased to 7000 50-ton composite gondolas and 3000 40-ton box cars.

The Cotton Belt Railroad is inquiring for 500 box cars and 200 gondolas.

The Lehigh & New England Railroad had ordered 100 composite gondolas from the Magor Car Corporation.

The Norfolk & Western Railroad has placed an order for four double-cab electric locomotives similar to, but of greater capacity, than those now on the Elkhorn grade electrification. The new locomotives will be equipped for operation over the alternating current installation and will be of the jack shaft and side rod type of locomotive weighing approximately 382 tons.

The Pennsylvania Equipment Co. is in the market for a second-hand Mogul engine of 65 tons weight and two cafe-observation cars.

The Lion Oil & Refining Co., Kansas City, Mo., is in the market for 9 oil tanks of 2000 and 10,000 bbl. capacity, 6 1000-bbl. stills and other equipment for its refinery at Pearson, Ark.

Brown Coal Briquettes for Producer Gas

WASHINGTON, Oct. 31.—Returning recently from a trip of three months in European countries to study the lignite industry in connection with an investigation authorized by Congress, O. P. Hood, chief mechanical engineer of the Bureau of Mines, made some observations to THE IRON AGE which are of interest to the iron and steel industry.

"I found where producer gas was used," said Mr. Hood, "that it is entirely possible to use brown coal briquettes. Even with an admixture with some raw brown coal I found a great deal of fuel of this sort used for that purpose, particularly in Germany.

"It is interesting for Americans to note that briquettes are readily accepted in the family of fuels, while we think of them as something special or extraordinary, or in the nature of experiment. The increase in the price of fuel will no doubt bring us to the same condition where briquettes of fine coal or even of special fuels will be more readily accepted as standard fuel. One finds English block briquettes widely distributed and in use, especially on European railroads.

"Our boiler room and fuel practice in its best expression is just as good as anything I observed in Europe, but it seemed to me that good firing and attention to good combustion was more universally practiced, especially in the smaller plants than with us. European firemen will get good results from a fuel that our firemen would reject as impossible."

Countries visited by Mr. Hood included England, Belgium, Germany, Czecho-Slovakia, Switzerland, Italy and France.

Shenango works (tin plate), American Sheet & Tin Plate Co., New Castle, Pa., is running full.

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
Oct.	Lake	Electrolytic*	New York	New York	St. Louis	New York	St. Louis
25.....	14.12½	13.62½	35.75	6.75	6.45	7.35	7.00
26.....	14.12½	13.50	35.95	6.80	6.50	7.45	7.10
27.....	14.12½	13.50	36.87½	6.80	6.50	7.45	7.10
28.....	14.12½	13.50	....	6.80	6.50	7.45	7.10
30.....	14.12½	13.62½	37.37½	6.80	6.50	7.45	7.10
31.....	14.12½	13.62½	37.00	6.80	6.50	7.45	7.10

*Refinery quotation.

New York

NEW YORK, Oct. 31.

Buying of the metals is not active. With the exception of copper prices have advanced. The electrolytic copper market is quiet. Prices of tin have reached the highest level of the year and quotations of lead and zinc have advanced during the week.

Copper.—Because of the fact that electrolytic copper has been available from one or two sources at 13.75c., delivered, the market has turned quiet and inactive, due to a natural cautiousness on the part of consumers. The actual amount of metal available at the above price is small relatively, and, if the demand were large, it could not be satisfied at less than 13.87½c., delivered, and some sellers will not sell below 14c., delivered. The situation is somewhat mixed, but the broad market may be quoted at 13.62½c., refinery, or 13.87½c., delivered, for deliveries extending into the first of the year. Lake copper is quoted at 14c. to 14.25c., delivered.

Copper Averages.—The average price of Lake copper for the month of October, based on daily quotations in THE IRON AGE, was 14.14c. The average price of electrolytic copper was 13.65½c., refinery, or 13.90½c., delivered.

Tin.—Sharp advances in the price of Straits tin, to the highest levels of the year, have again been recorded, due largely to the highly speculative London market. In the last week the British market has advanced nearly £10 per ton, so that to-day spot standard was quoted at £184, future standard at £184 10s. and spot Straits at £185 7s. 6d. Despite the character of the market abroad buyers here are not panicky. It is the opinion of some that consuming demand will diminish in the near future rather than increase. The quiet market early last week, noted in this report a week ago, continued until last Thursday when sales of about 300 tons were made, mostly nearby delivery, at 35.87½c. to 36c., with dealers the heaviest buyers. The New York market to-day has been dull and weak, with spot Straits tin quoted at 37c., New York. A report in the trade yesterday to the effect that an American option had been obtained on the government stocks of tin in the Far East created considerable of a flurry, but an analysis of the entire situation and denials by several American interests who might be able to obtain this option rendered the rumor as unworthy of serious consideration. Arrivals thus far this month have been 7201 tons, with 7325 tons reported afloat. Estimates in the trade are to the effect that deliveries into consumption for October will total about 5100 tons.

Lead.—The market is fairly firm and very little metal is available for November delivery. The situation is as tight as it has been at any time. The leading interest has not yet changed its quotations which still stand at 6.30c., St. Louis, and 6.50c., New York, but the outside market is very much stronger at 6.50c., St. Louis, and 6.80c., New York. For delivery at Eastern points business has been done in small lots at 6.82½c., New York, for early delivery.

Zinc.—Prices have again advanced, largely due to the statistical situation, and prime Western for early delivery is now quoted at 7.10c., St. Louis, or 7.45c., New York, the highest prices of the year. New business is light, but the situation regarding exports is brighter and some sellers report business already done for export to England where the metal is reported to be scarcer than on this side.

Antimony.—Wholesale lots of Chinese metal for early delivery are quoted at 6.70c., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, made by foreign producers is obtainable from foreign importers at 20c. to 21c. per lb., duty paid, but the leading American producer has not yet made public the basis on which it is doing business.

Old Metals.—Red metals are quiet but white metals continue active. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	13.375
Copper, heavy and wire	12.50
Copper, light and bottoms	11.25
Heavy machine composition	10.50
Brass, heavy	8.25
Brass, light	6.50
No. 1 red brass or composition turnings	9.50
No. 1 yellow rod brass turnings	7.50
Lead, heavy	5.50
Lead, tea	4.00
Zinc	4.25

Chicago

OCT. 31.—Tin, lead and spelter have again advanced, although in this territory business in three metals has been rather light. Old grades of zinc and tin have advanced in sympathy with the new metals. We quote, in carload lots, lake copper, 14.37½c.; tin, 38c. to 39c.; lead, 6.62½c.; spelter, 7.25c.; antimony, 8.50c., in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 11.50c.; copper bottoms, 9.75c.; red brass, 9c.; yellow brass, 7c.; lead pipe, 4.87½c.; zinc, 4.75c.; pewter, No. 1, 23c.; tin foil, 26c.; block tin, 30c., all buying prices for less than carload lots.

St. Louis

OCT. 31.—Lead for the week was higher at 6.40c. to 6.45c., car lots, while slab zinc was up 20 points at 7c. to 7.05c. On old metals we quote: Light brass, 3.50c.; heavy red brass and light copper, 7c.; heavy yellow brass, 4c.; heavy copper and copper wire, 7.50c.; zinc, 2c.; pewter, 15c.; tin foil, 20c.; tea lead, 2c., and aluminum, 9c.

Continued Improvement in the Connellsville Region

UNIONTOWN, PA., Oct. 29.—Output in the Connellsville bituminous region lacked, for the week ending Oct. 21, only 3000 tons of reaching the pre-strike production. A gain of 6000 tons over the preceding week was made. Total production was 146,720 tons.

Four plants added 559 ovens to the active list during the week. The principal retarding influence in the regional production is a shortage of cars. No improvement has been made on the Baltimore & Ohio and during the week the Pennsylvania placements were below the average for the past several weeks. For instance, the combined movement of coal and coke loads over the Pennsylvania Railroad during the week was 7779 cars, a loss of 1200 cars from the previous week. Plants added to the active list during the week were Washington Coal & Coke Co., No. 2 plant; Century plant of the Century Coke Co., and Garwood and Peerless plants. The H. C. Frick Coke Co. added 170 more ovens to its active list. Ovens in operation in the region now are 12,889, as compared to 4860 for the same week of last year.

The strike situation has ceased to be a factor in the output of the region. Strikers are preparing for the winter. In some instances wooden shacks are being built. In one small shack in the region it is reported that 35 families are housed in one great room.

The Paige Motor Car Co. has acquired the plant formerly occupied by the Hinkley Motors Corporation on West Fort Street at Twenty-fourth Street, Detroit, giving the Paige Company four plant units. The Hinkley Motors Corporation has moved to its new plant in Ecorse, Mich.

PERSONAL

Charles F. Morse, corporation attorney, Chicago, has been elected president Dodge Sales & Engineering Co., Mishawaka, Ind. William W. Dodge, who holds a controlling interest in the company, has been elected vice-president. Among officers who have resigned are Melville W. Mix, president; W. B. Hosford, vice-president; Charles Endlich, treasurer; W. L. Chandler, assistant treasurer, and Harry Bell, foundry superintendent.

John A. Camm, president Western Iron Stores Co., Milwaukee, was tendered a formal dinner on Oct. 23, by the officers and department executives of the Kearney & Trecker Corporation, Milwaukee, from which he retired as sales manager on Aug. 1.

B. F. Phillopon, president Climax Molybdenum Co., 61 Broadway, New York, sailed on the Majestic on Oct. 29 for France where he will spend four or five weeks on business.

Frank W. Wirfs, until recently sales manager of the Power Equipment Co., Minneapolis, Minn., has joined the sales force of the Chicago Belting Co., Chicago. He will be located in Minneapolis covering contiguous territory where he has a considerable acquaintance among mill supply buyers. After leaving the University of Washington, he conducted mills of his own at Canby and Dayton, Ore. Later he was salesman for A. H. Averil & Co., Portland, Ore., jobbers of mill and threshing machinery. Then he spent five years as marine engineer with the Merchant Marine, joining the Power Equipment Co. as sales manager at the close of the war.

At a recent meeting of the directors of Foster, Merriam & Co., manufacturers of hardware, Meriden, Conn., Reginald W. Millard, president, and John A. Ross, treasurer, resigned their positions to take effect immediately. The directors have elected Howard E. Boardman, New York as the new president. Mr. Boardman has been a director for some time. Nelson C. Johnson, secretary of the company, has been chosen treasurer to succeed Mr. Ross, at the same time retaining his duties as secretary. Albert W. Savage was elected member of the board to fill a vacancy.

C. C. Strout, formerly connected with the Victor Saw Works as western sales manager, and with the Safety Wrench & Appliance Co. as general sales manager, has been appointed vice-president in charge of sales of the Alvord Reamer & Tool Co., Millersburg, Pa.

John T. Hill, formerly president of R. C. Hoffman & Co., Inc., has organized John T. Hill & Co., Inc., rails, sheets, bars and shapes, 1318 Continental Building, Baltimore, Md.

Guy W. Donahue has resigned as president and general sales manager of the Victor Saw Works, Inc., Middletown, N. Y., to organize the Dolman Mfg. Co., Inc., in conjunction with two former associates: William F. Pollock, formerly general manager, and Chester C. Jackman, formerly factory manager of the Victor Saw Works. The new company which is located at Springfield, Mass., will engage in the manufacture of tools.

Glenn W. Norris, formerly in the Pittsburgh district office, Youngstown Sheet & Tube Co., and subsequently a member of the sales force, Liberty Steel Products Co., Cleveland, and the Iron Trade Products Co., Pittsburgh, has become affiliated with W. C. Runyon & Co., First National Bank Building, Pittsburgh, as salesman. The firm is sales agent of the Struthers Furnace Co., Struthers, Ohio, and also does a coal and coke business.

Roy A. MacDonald, formerly attached to the Pittsburgh district sales office, General Refractories Co., has been placed in charge of the recently created Cleveland district of that company, with offices at 1126 Leader-News building, Cleveland. Mr. MacDonald, after leaving Penn State College, spent about eight years as a construction engineer at blast furnace and steel works plants in the Pittsburgh and Youngstown districts. He was associated with the Harbison-Walker Refractories Co., Pittsburgh, for a few years, leaving that company to join the General Refractories Co. at its formation in 1911. George A. Forbes, formerly with the Pennsylvania Fire Brick Co., will be associated with Mr. MacDonald.

H. B. Bole resigned as first vice-president of the Hydraulic Steel Co., Cleveland, at the annual meeting on Oct. 27. He will remain as a member of the board of directors.

L. W. Fischer, Chicago, secretary National Metal Trades Association, spoke on the Landis award in the building industry of Chicago at the first fall meeting of the Executives' Club, Worcester, Mass., held Friday evening, Oct. 27.

Benjamin G. Lammé, chief engineer Westinghouse Electric & Mfg. Co., has been awarded the Joseph Sullivant medal of Ohio State University, in recognition of his engineering achievements. Mr. Lammé is a graduate of the Ohio institution. He is the first to receive the Sullivant medal, which is awarded only once in five years to a graduate of the university for outstanding accomplishments in his chosen work.

G. Ernest Wells, director Edgar Allen & Co., Ltd., Sheffield, England, is in the United States visiting the Western and Eastern offices of the Edgar Allen Steel Co., Inc., 86 John Street, New York.

F. P. Hammes has succeeded to the position of production manager D. J. Ryan Foundry Co., Ecorse, Mich. The position was held previously by the late James F. Flynn.

W. R. Marvin has succeeded L. E. Woodsend as general manager, Valley Foundry & Machine Works, Inc., 710-732 H Street, Fresno, Calif.

H. J. Stambaugh, formerly vice-president and general manager Trussed Concrete Steel Co. of Canada, Ltd., Walkerville, Ont., has been appointed general sales manager of the Burlington Steel Co., Ltd., Hamilton, Ont.

W. W. Lukens, former president of the Alan Wood Iron & Steel Co., Philadelphia, has returned from an extended stay in Europe.

George C. Davies, vice-president Pilling & Co., pig iron merchants, Philadelphia, has returned from a stay of two months in England.

Richard Knight, New York office of the McClintic-Marshall Co., has returned from a sojourn of five weeks in England.

OBITUARY

CHARLES E. GLOVER, an active and prominent Connecticut manufacturer, died on Oct. 25 in New Britain, following a long illness. He was in his 75th year. Mr. Glover was perhaps best known as president of the Corbin Screw Corporation, being the executive head of that company from 1902 until March, 1921, when he resigned. During his business life Mr. Glover was a director of the American Hardware Corporation, president of the Skinner Chuck Co., president of the H. R. Walker Co.; president of the D. C. Judd Co.; and served as a director of the New Britain National Bank, North & Judd Co., Aetna Nut Co., and the New Britain General Hospital. A native of Nottingham, England, where he was born June 16, 1847, he was brought to Connecticut as a child. During the Civil War, he worked in his father's machine shop, and at the age of 20 secured employment with the National Screw Co. Nine years later, Mr. Glover became associated with the P. & F. Corbin Co., New Britain, his first duty being to supervise the installation of screw making machinery in the company's new plant. In 1902, when the P. & F. Corbin Co. consolidated with Russel & Erwin to form the American Hardware Corporation, Mr. Glover was made president of the Corbin Screw Corporation.

CHESTER R. BAIRD, formerly of the Baird Furnace Co., operating in the Hocking Valley in Ohio, died at

St. Vincent's Hospital, New York, on Oct. 17, aged 56. Some 30 years ago he was a member of the firm of Chamberlain, Turney & Baird, Columbus, Ohio. Later he engaged in the iron business in Philadelphia and for the past 15 years resided in New York. He was president of a company manufacturing motion picture machines.

A. J. BEATON, of the Beaton & Cadwell Mfg. Co., manufacturer of metal goods, air valves, and plumbing goods, New Britain, Conn., died on Oct. 21, at Norwood, Mass., aged 74.

WILLIAM BLAKE WOOD, president Gifford-Wood Co., Hudson, N. Y., died on Oct. 28 at the Albany City Hospital, after a two-weeks illness. Mr. Wood was born in Arlington, Mass., July 15, 1869. He became a member of the firm of William T. Wood & Co., Arlington, upon the death of his father Cyrus Wood, in 1896, and continued as a partner with William E. Wood, and later became a member of the Gifford-Wood Co. incorporated in 1905. He moved with his family to Hudson in 1911 and succeeded Malcolm Gifford as president upon the latter's death in 1919.

RICHARD T. PULLEN, 73 years old, former president of the Herring-Hall-Marvin Safe Co., Hamilton, Ohio, died in New York on Oct. 27. At the time of his death he was president of the Remington-Sherman Safe Co., New York.

PPILLIP C. WALSH, JR., president Walsh Sons & Co., iron and steel merchants, Newark, N. J., died at his home, in that city, on Oct. 28. Mr. Walsh spent a lifetime in the iron and steel business and was held in high regard. He was connected with several business corporations and was at one time president of the Waste Trade Dealers' Association. A son, Philip C. Walsh, 3rd, is general manager of the National Steel Rolling Co., New York.

WARREN KELLY, president O. S. Kelly Co., piano plate manufacturer, Springfield, Ohio, died at his home last Tuesday morning after an illness of several months. He was born in Springfield 71 years ago. Mr. Kelly's father, the late Oliver S. Kelly, was at one time mayor of Springfield and a prominent manufacturer for many years.

JOHN BERGOYNE FOOTE, president and treasurer of Foote Brothers Gear & Machine Co., Chicago, whose sudden death on Oct. 12 was announced in this column on Oct. 19, was an inventor of numerous automatic machines for making cams and a pioneer in inventions pertaining to the light weight type of farm tractor. He began at the age of 14 as a die setter for the Chicago Stamping Co. From 1893 to 1904 he was a partner with D. O. James in the firm of James & Foote, manufacturers of cut gears. In 1904 a disastrous fire wiped out all but the goodwill of the concern and then he organized the Foote Brothers Gear & Machine Co. He was a director of the Barton spider web reinforced concrete system; president and director Illinois Tractor Co.; treasurer American Tractor Association; director of American Gear Manufacturers' Association and member Society of Automotive Engineers. His brother, Bradford Foote, will continue the business of the Foote company.

Detroit Scrap Firm

DETROIT, Oct. 31,—Detroit producers report that they are able to ship a large proportion on their scrap commitments due to the fact that in most cases they are receiving some cars on incoming materials which can be loaded out. The market, while below the high point of the year, has a tendency to firmness. The following prices are on a gross ton basis, f.o.b. cars producers' yards, excepting stove plate, automobile and No. 1 machinery cast, which are quoted on a net ton basis:

Heavy melting steel	$16.00 to $17.00
Shoveling steel	16.00 to 17.00
No. 1 machinery cast	21.00 to 23.00
Cast borings	13.00 to 14.00
Automobile cast scrap	23.00 to 25.00
Stove plate	21.00 to 23.00
Hydraulic compressed	16.50 to 17.50
Car wheels	21.00 to 22.00

Use of Oxygen in Blast Furnace and Metallurgical Operations

Use of oxygen in connection with the enrichment of the blast in the blast furnace and in practically all phases of pyro-metallurgical work will furnish the key to success in the further development of such metallurgical operations, according to Dr. F. G. Cottrell, formerly director and now consulting metallurgist of the U. S. Bureau of Mines, who first directed the bureau's attention to this subject. Through this enrichment process, it is hoped to increase the efficiency of metallurgical operation with a resultant production of metals at lower cost and possibly the use of lower grade ores.

The Bureau of Mines now has outlined plans for two studies which will be carried on simultaneously. The first will cover the present-day processes for the production of oxygen, in order to determine the feasibility of attempting to produce oxygen, or oxygenated air, in such amounts and at such a cost as to permit of its use in metallurgical operations. The second study will be devoted to the feasibility of using oxygen, or oxygenated air, in metallurgical operations.

Because of his interest in this investigation, M. H. Roberts, vice-president Franklin Railway Supply Co., was asked to select an advisory committee to work with the Bureau of Mines and to act as chairman of this committee. The committee will consist of Dr. F. G. Cottrell, director Fixed Nitrogen Research Laboratory; Prof. W. L. DeBaufre, chairman mechanical engineering department of the University of Nebraska; Dr. D. A. Lyon, chief metallurgist Bureau of Mines; Dr. R. B. Moore, chief chemist Bureau of Mines; Dr. R. C. Tolman, professor of physical chemistry and mathematical physics, California Institute of Technology; J. W. Davis, mechanical engineer Bureau of Mines; F. W. Davis, metallurgist Bureau of Mines; Frank Hodson, president of the Electric Furnace Construction Co., Philadelphia, and P. H. Royster, assistant metallurgist Bureau of Mines.

Previous to the war, some work was done in Belgium on the enrichment of the blast with oxygen in connection with the smelting of iron ores in the blast furnace. In the United States the late J. E. Johnson, Jr., was interested in the possible use of oxygen in metallurgical operations and carried on some experimental work along these lines previous to his death.

Common Labor Shortage in Pennsylvania Less Acute

The semi-monthly report of the Pennsylvania State Department of Labor and Industry discloses that as of Oct. 15, there were 10,000 fewer unemployed than on Oct. 1. The total number of unemployed on Oct. 15, is estimated to have been 40,680, exclusive of those on strike. This is regarded as an unusually favorable situation in view of the fact that normally there is a floating army of 50,000 workmen, either unable to find work or unwilling to accept employment. While a shortage of men in both skilled and unskilled positions in some lines is reported, the supply of the latter is becoming more plentiful. Many farmers have released summer help and the completion of several large contract projects has helped to relieve the acute shortage of common labor.

A 60,000-kw. power plant is to be built by the Edison Electric Illuminating Co., of Boston, and the construction and engineering of the work has been put in the hands of Stone & Webster, Inc., Boston, under the supervision of I. E. Moultrop of the Edison company. The plans contemplate an ultimate capacity for the station of 300,000 kw. The plant will be built on the Fore River at Weymouth, with arrangements for bringing coal by water through a ship channel. The preliminary plans call for an initial installation of two 30,000-kw. turbine units.

British Iron and Steel Market

American Inquiry for Pig Iron Stagnant—Large American Structural Inquiry—Continental Market Weaker

(By Cable)

LONDON, ENGLAND, Oct. 31.

Fresh American demand for pig iron is practically stagnant, but substantial quantities are still due for shipment and in consequence makers are but slightly perturbed, owing to the limited output and more buying for the home account. Hematite is firm with scarcity of prompt shipments. Makers are well booked.

Foreign ore is quiet with best Bilbao Rubio nominally at 23s. and North African ore selling at 21s., both ex-ship tees.

Finished iron and steel quotations are generally unchanged, but when business is offered competition is keen. General demand is broadening. The United States is inquiring for 20,000 tons of structural steel and the Colonial governments are placing substantial rail and bridge building contracts. The Clyde output in October was six vessels, a total of 54,570 tons. The Ebbw Vale dispute is ended and colliers have resumed work, but steel works are expected to remain idle the remainder of the year.

The Continental market is weaker, on exchanges; however, a fair business is being done. Germany has sold some good parcels of rails to Japan and minor tonnages of rails to India and the United States. Czecho-Slovakian open-hearth merchant bars have been sold at £6 19s., f.o.b., and Czecho-Slovakian beams at £7 2s. 6d., c.i.f. India. There is a good demand for wire nails, but supplies are scarce.

Tin plates are firmer. On speculative purchases on minimum basis, makers generally are asking more money. There is an improved export demand for tin plate, inquiries appearing from Canada, but no business is reported.

There is an improved demand for galvanized sheets, and the market is firmer on dear spelter. Japan continues to purchase good quantities of black sheets and Welsh works are generally booked until the end of the year. Prices are higher.

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $4.46 per £1, as follows:

Durham coke, delivered	£1	11s.		$6.91
Cleveland No. 1 foundry	4	17½		21.74
[illegible]	4	[illegible]	to £4 18s.	20.63 to $21.18
[illegible]	4	10		20.07
[illegible]	4			18.955
[illegible]	4			17.84
[illegible]	4	[illegible]	to £4 15s.	20.63 to 21.18
[illegible]	3	10		66.90
[illegible]*	4	10	to £4 15s.	20.07 to 21.18
Rails, 60 lb. and up	7	5	to 8 0	32.33 to 35.68
[illegible]	7	[illegible]	to 8 0	31.77 to 35.68
Sheet and tin plate bars, [illegible]	7	[illegible]	to 7 7½	31.22 to 32.89
[illegible]	4	[illegible]	to 4 17½	4.29 to 4.35
				C. per Lb.
[illegible]	1	10	to 2 0	1.69 to 1.79
Boiler plates	11	10	to 12 0	2.29 to 2.39
Tees	9	0	to 9 10	1.79 to 1.89
[illegible]	1	[illegible]	to 1 15	1.64 to 1.74
[illegible]	1	[illegible]	to 1 15	1.64 to 1.74
[illegible]	1	[illegible]	to 1 15	1.64 to 1.89
Galvanized sheets, 24 g.	16	10	to 17 0	3.28 to 3.38
Black sheets, Japanese [illegible]	1	[illegible]	to 1 15*	1.64 to 1.74*
Cold rolled steel strip, [illegible]	[illegible]			[illegible]
Cotton ties, Indian speci- [illegible]	[illegible]			[illegible]

*Export price.

Continental Prices, All F. O. B. Channel Ports, Delivery as Specified

No. 3 foundry pig iron:						
Belgium, Jan.	£4	2½s.	to £4	5s.	$18.39 to	$18.95
Luxemburg, Jan.	4	2½	to 4	5	18.39 to	18.95
France, Jan.	4	2½	to 4	5	18.39 to	18.95
Billets:						
France, Jan.	5	7½			23.97	
Luxemburg, Jan.	5	7½			23.97	
Lorraine, Jan.	5	7½			23.97	
Wire nails (keg basis):						
Germany	0	14½			3.23	
Belgium	0	20½			4.57	
Wire rods, 5 mm. (0.2 in.):						
Belgium	7	5	to 10	7½	32.33 to	46.27
Angles:					C. per Lb.	
Belgium, Sept.	7	7½			1.46	
Tees:						
Belgium	8	5			1.64	
Merchant bars:						
Belgium, Jan.	6	17½	to 7	0	1.39 to	1.44
Luxemburg, Jan.	7	0	to 7	2½	1.39 to	1.41
France, Jan.	7	0	to 7	2½	1.39 to	1.46
Germany, Dec., Jan.	6	0	to 6	5	1.39	
Joists (beams):						
France, Dec.	6	8	to 6	10	1.27 to	1.29
Belgium, Dec.	6	8	to 6	10	1.27 to	1.29
Luxemb'g, Dec., Jan.	6	5	to 6	10	1.24 to	1.29
Channels:						
Belgium	7	10	to 7	12½	1.49 to	1.51
⅜-in. plates:						
Germany, Dec., Jan.	6	10	to 6	12½	1.44 to	1.31
Belgium, Dec.	6	15	to 7	0	1.46 to	1.39
Luxemburg, Dec.	6	15	to 7	0	1.44 to	1.39
France, not offered.						
⅛-in. plates:						
Germany	9	0			1.79	
No. 8 gage wire:						
Belgium	14	10⅝			2.89	

Fuel for Blast Furnaces Higher—Price for Tin Plate Bars Agreed on—A Steel Company Liquidates

LONDON, ENGLAND, Oct. 19—The pig iron market has continued firm with a moderate amount of general demand; supplies of the better grade are becoming scarce and Cleveland makers now require a month for delivery of substantial quantities. America has made a few fresh purchases but no great volume is involved. Quite large shipments are, however, still to be made to the United States and Canada, which will keep makers occupied for the rest of the year. Prices are undoubtedly high but there is as yet little hope for a general increase of output, as fuel prices are rising rapidly. Hematite has also shown a much firmer tendency on some revival of demand, for home consumers showed inclination to purchase this material while it was cheaper than foundry iron, but now the two grades have come into line and sellers quote both No. 3 G.M.B. and East Coast mixed numbers at about 92s 6d.

The position of finished iron and steel does not show much change though here and there there are signs of marked improvement. There are a few decent orders about, but the total is not large. Apart from these, however, Colonial governments have been placing some very substantial contracts for railroad material and home railroads are beginning to show more life. The London & North Western Railway Co. has just placed orders for 30 locomotives, at a cost of £15,000 each. It is hoped that the tin plate trade will revive now that some amicable agreement has been arrived at. Provided that tin plate makers are willing to maintain a minimum selling price of 19s 3d basis I. C. f.o.b., the Bar Makers Association agree to supply tin plate bars at £7. These arrangements have been agreed to by 93 per cent of the tin plate works, and a six months trial is to be given.

The Sheffield Steel Products Co. has gone into liquidation, Sir William B. Peat, of W. B. Peat & Co., being made receiver and manager on behalf of the debenture holders. An official circular issued by the company, gives reasons for this step, which, it is said, is due to the fact that the company has been suffering from lack of working capital and, now being advised of the commencement of proceedings by a number of creditors and with the difficulty of finding funds for the necessary raw material and wages, the directors themselves have suggested this course. The circular continues that the announcement does not indicate that the business will be closed, but that it will be carried on by the receiver and manager.

Preparing for Investigations Under Tariff

(*Concluded from page* 1159)

part of Congress with an overwhelmingly complicated and difficult task. The instability resulting from rapidly changing economic conditions, not only in the United States but in foreign countries whose currencies are depreciated, the growing complexity of American industrial life, and the increasing burden on Congress of general tariff revisions, have led Congress at last to turn over to the President, with the co-operation of the Tariff Commission, the adjustment of individual tariff rates in accordance with a definite rule. Congress has saved the constitutional point by laying down the principle which is to guide the President in adjusting tariff rates, and has then provided a judicial method for finding the facts and for the application to them of the rule laid down.

"Another factor contributing to its enactment was a desire for greater stability in tariff-making. Surely if there is one thing more than another that business desires and the world needs to-day it is stability. And is it not more than likely that these provisions will lead to greater stability? What could be more disturbing to business than the long drawn out tariff controversy through which we have just passed? For a year and a half Congress has been working on the tariff and business has been held in suspense. Business men most of all should be interested in this new procedure which affords them adequate opportunity at all times to be heard and to have individual rates modified to meet changing conditions without the serious upheaval which always comes with a general tariff revision. When economic conditions require the change of a tariff rate, it is not necessary under this new system to await a general revision of the tariff in order to obtain relief."

Personnel Association to Hold First National Convention

Immigration, psychological tests, motion pictures, pension plans for workers, employment and labor turnover, shop training and the relation of industry to both the engineering and the public school, will be discussed at the first annual convention of the National Personnel Association in a three-day national forum, to be held at the William Penn Hotel, Pittsburgh, Nov. 8, 9 and 10.

"The Immigrant's Point of View," will be the subject of an address by Michael Pupin, professor of electro-mechanics, Columbia University, New York. Magnus W. Alexander, managing director, National Industrial Conference Board, will speak on our immigration policy and its social and economic effects. Training immigrant workers will be treated in an address by George F. Quimby, industrial service secretary, Associated Industries of Massachusetts.

Psychological tests will be discussed by Dr. E. K. Strong, Jr., director of the Bureau of educational research, Carnegie Institute of Technology, Pittsburgh. Motion pictures will be the general topic of a round-table discussion at which the speakers will be H. M. Jefferson, manager of the personnel development department, Federal Reserve Bank of New York, and Rowland Rogers, lecturer at Columbia University and vice-president of the Picture Service Corporation.

Pensions for workers will be outlined by E. S. Ching, supervisor of industrial relations, United States Rubber Co., Dean R. L. Sackett of the Pennsylvania State College, being also among the speakers at the shop session. Developing men for executive positions will be the subject of an address by R. C. Dooley, manager of personnel and training, Standard Oil Co. of N. J.

Speakers at a session on health education will include Dr. R. F. Quimby, service manager, Hood Rubber Co., Dr. E. S. MacSweeney, medical director, New York Telephone Co., and Dr. F. L. Rector, National Industrial Conference Board.

Trade apprenticeship will be the topic of Paul E. Wakefield, director of the Duquesne Works, Carnegie Steel Co. A session on foremen training will be addressed by D. J. MacDonald of the Ohio State University and H. H. Tukey, supervisor of foremen's conferences, New York Employing Printers' Association.

Other sessions include one on employment and labor turnover and another on industrial and public school relations. The latter session will include addresses by C. S. Coler, manager of the educational department, Westinghouse Electric & Mfg. Co., R. L. Cooley, superintendent of Continuation Schools, Milwaukee, and Dr. Clifford B. Connelley, commissioner of labor, Pennsylvania.

Next Foundrymen's Convention at Cleveland —International Exhibit at Paris

The 1923 convention and exhibition of the American Foundrymen's Association will be held in Cleveland. This decision was reached following a recent meeting of the directors of the association at Chicago, a mail ballot of the directorate being canvassed on Oct. 23. Saturday, April 28, will be opening day for the exhibits and Monday, April 30, will be opening day for the annual convention. The closing day will be Thursday, May 3. It is proposed that Saturday, April 25, be Cleveland day for the inspection of exhibits.

Of special interest is the action taken on an invitation received from the Association Technique de Fonderies of France, asking the American Foundrymen's Association to join with the foundrymen's associations of France, England and Belgium in an exhibit in Paris in the first fortnight of September, 1923. The invitation was accepted and referred to a committee to decide to what extent the association will take an active part in the proposed international meeting. The chairman of the committee is H. Cole Estep, London, England, and Stanley G. Flagg, Jr., Philadelphia, is vice-chairman. The other members are L. L. Anthes, Toronto, Canada; G. H. Clamer, Philadelphia, and A. O. Backert and Franklin G. Smith, Cleveland.

Metal Working and Machinery Leaders Helping Red Cross

The Annual Roll Call of the American Red Cross for registration of the membership for 1923 will begin on Armistice Day, Nov. 11, and close on Thanksgiving Day, Nov. 30. The ground work for this stupendous task of re-enrolling the membership throughout the world has been laid in a plan for the first complete and comprehensive system of registration of the Red Cross membership in all its 3300 active chapters at home and abroad.

In New York a strong committee of men identified with metals and machinery trades is active in behalf of the Red Cross. A. B. Schultze, secretary New Jersey Zinc Co., is chairman of a committee among whose members are: W. L. Lasky, of the American Can Co.; C. V. Day, American Brass & Copper Co.; E. F. Caldwell, 36 West Fifteenth Street; A. W. Dodd, American Zinc, Lead & Smelting Co.; A. H. Sloane, Copper and Brass Research Bureau and M. W. Ferguson, Hayden, Stone & Co.

P. W. Brotherhood, of Manning, Maxwell & Moore, and W. W. Nichols, of the Allis-Chalmers Co., with Marshall Prentiss, of Prentiss & Co., will get the Red Cross appeal before executives and employees in boiler, engine and machinery groups, while F. C. Sauer, of the Symington Co., will handle the Roll Call for railroad supply houses. W. Y. Churchill, of the Vandyck Churchill Co., and Mr. Pratt, of Babcock & Wilcox, are active in the engine and machinery group.

Papers announcing the merger of the General Refractories Co., of which Governor Sproul is president, with the Pennsylvania Fire Brick Co. and the Hayes Run Fire Brick Co., with a capital of $18,000,000 were filed in the Pennsylvania State department recently.

DECREASED DEMAND

Less Activity in Sheets and Some Other Products at Youngstown

YOUNGSTOWN, Oct. 31.—While steel demand is weaker in spots, it is by no means of inconsequential proportions. One of the important Valley makers of steel bars reports it is booked until Jan. 1, 1923. Producers of sheet bars have comfortable unfilled tonnages, though material for fairly prompt delivery is obtainable. Pipe demand, especially in the larger sizes, has picked up appreciably within the past month and inquiry is brisker.

The principal weakness has been in the sheet market, though enough business has come through to enable manufacturers to maintain a high operating rate. One interest reports the receipt during the week of several inquiries, each involving 1000-ton lots, and a number for 400 tons and over. Another maker, temporarily overbalanced on black business, states that buyers in the South are seeking to expedite deliveries of galvanized roofing products.

A recent careful survey of the market by Valley interests revealed a price range on blue annealed sheets of from 2.55c. to 2.75c., with considerable business being placed at 2.65c., as a fair average. Black sheets have settled for the time being to a 3.50c. base, though the stability of this figure is questioned in some quarters. Galvanized is purchasable at 4.50c.

Some of the smaller outlying mills have been quoting from $2 to $3 per ton below these figures on attractive tonnages in order to fill gaps in their rolling schedules. It is also reported that one of the larger makers has dipped below these prices to prevent gaps in its rollings.

One of the important Valley interests is keeping a close check on prices in sheet bars and sheets, and has asked its customers to notify it of any quotations below the market. The inference is that it will meet a competitive situation, where such actually exists.

Interest in the trade is likewise focused on prices to apply in the first quarter of 1923. Reports of quotations sent in by customers are being checked.

It is the prediction of one conservative interest that sheet bars will settle to a $37.50 base in the next quarter, with a possible spread up to the present market of $40. Youngstown mills have sold substantial tonnages at this figure for delivery over the final quarter of 1922, but a weakness is apparent, due to the decline in pig iron quotations. Sheet mills buying their steel requirements are already indicating that sheet bar prices should be shaded.

Standard basic iron is on a $30 base in this district, though a number of sales are reported at $29.50.

Proposed Increase of Rates Approved by Commission

WASHINGTON, Oct. 31.—The Interstate Commerce Commission in a report last week relating to proposed increases in rates on iron and steel products from Ohio and Mississippi River crossings to the Southeast found justified the proposed increases on articles rated as special iron in Southern classification from Ohio River points, St. Louis, and points taking the same rates to points in Carolina territory, Augusta, Ga., south Atlantic ports and points taking the same rates to the extent the increases do no exceed the existing rates to Virginia cities from the same points. The commission said that to the extent the proposed increased rates exceed those to the Virginia destinations and from the same points of origin they have not been justified. The commission pointed out that this revision is not intended to be permanent and that different conclusions may be reached as a result of its present investigation into Southeastern rates, and that its findings should not be understood as requiring a reduction in present rates.

The schedule under suspension were the object of protest by manufacturers and jobbers at Ohio River points and St. Louis. It was stated by the commission that the particular grievance of the protestants lay in the fact that no increases were proposed from Pittsburgh and Birmingham, where their two chief competitors are located, or from Atlanta.

An order for cancellation of the suspended schedules by Nov. 25 was entered by the commission which authorized the publication by that date on five days' notice of new ones in conformity with its findings.

Sheet Sales Increasing

Sheet statistics for September as compiled by the National Association of Sheet and Tin Plate Manufacturers, for the Bureau of Census, Department of Commerce, disclose a gain in sales of 13,368 tons, as compared with August, and of 45,300 tons as against the July sales. Production last month was 25,798 tons less than in August, but 23,500 tons greater than in July. Shipments in September were 25,173 tons less than in the previous month, but exceeded those of July by 8646 tons. Unfilled orders show a decline for the third consecutive month, while unshipped orders moved up in September for the third consecutive time. Unsold stocks, which declined in July and August, increased last month.

The figures for September compared with those of the two preceding months as follows:

	September, Net Tons	August, Net Tons	July, Net Tons
Sales	188,863	175,495	143,563
Production	202,906	228,398	179,100
Shipments	190,027	215,200	181,381
Unfilled orders	378,574	379,249	409,885
Unshipped orders	102,198	96,058	82,053
Unsold stocks	21,241	19,184	19,586

Employment Gains at Milwaukee

Reports from 48 metal-working shops in Milwaukee, Wis., assembled by the National Metal Trades Association, show a total of 15,352 employed in August and 15,491 in September, an increase of 139 employees. The average number of hours worked per week per man was 51.1 in both months. A comparison of 36 shops for the months of September, 1921 and 1922, showed an increase of 2955 employees in the present year or 22.1 per cent. September, 1922, also showed a gain of 9.4 hours worked per man per week. The total number of man hours for these shops in that month was 2,755,262, as against 4,212,392 in March, 1920, when the high point in production was reached.

Automobile and Truck Production

Figures of the Department of Commerce place the September production of automobiles at 186,562 cars and 18,843 trucks, this being the sixth successive month showing a total production of more than 200,000 cars per month. Figures for the year to date, month by month, are given in the table:

1922	Passenger Cars	Trucks	Total
January	81,693	9,416	91,109
February	109,171	13,195	122,366
March	152,959	19,761	172,720
April	197,216	22,342	219,558
May	232,431	23,788	256,219
June	263,027	25,984	289,011
July	224,057	21,357	245,414
August	249,225	24,200	273,425
September	186,562	18,843	205,405
Nine months	1,696,341	178,886	1,875,227

The Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has leased for 20 years a 5-story building in the Minneapolis industrial district, which will be utilized as a combined sales, service and warehouse center to serve the territory known as the Twin City area. The building is one of a group erected by the Northwestern Terminal Co., Minneapolis. Norman Stewart is manager of the Minneapolis office, and J. D. Whitaker is service superintendent. The Westinghouse Lamp Co. also will be located in the new building, with H. C. Aurens in charge of its interests in the Minneapolis district.

EIGHTY YEARS IN BUSINESS

Joseph T. Ryerson & Son Celebrating Establishment of Firm in 1842

Shortly after the Duke of York ousted the Dutch magistrate and granted Jersey to Lord Berkeley, George Ryerson and a syndicate purchased 6000 acres of land in the northern part of the colony. In 1695 he began to develop this tract for agricultural purposes, later discovering and developing iron ore beds.

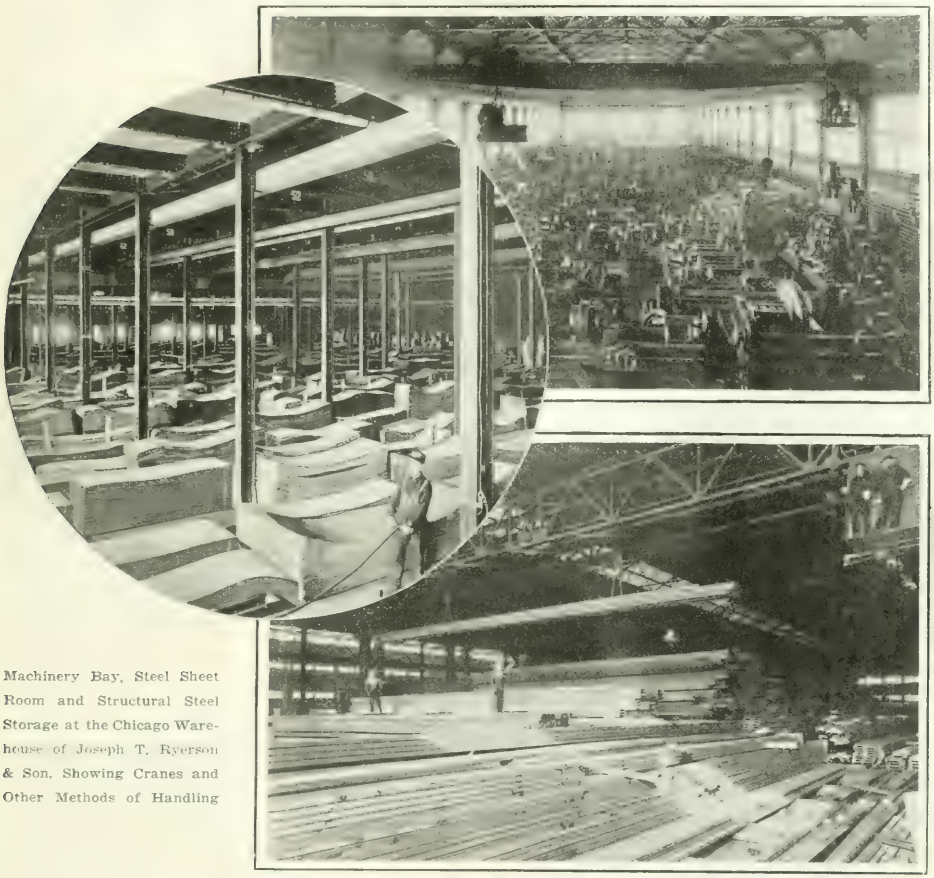
In the next generation Marten Ryerson, a son, further developed iron production, and quite an amount of pig iron was made as early as 1740. The colonists were using much iron and were coming to depend upon home industry to a greater extent. This was the period of the French and Indian wars and arms and ammunition were needed. About 8000 tons of ore were taken out of the Iron Hill mine, one of the group operated at this time.

The old furnace at Wynokie is still standing and in exceptionally good condition, still bearing the Ryerson inscription. The ore was melted in it by placing alternate layers of coal or charcoal and of ore until the outfit was full. The fire was then started and kept going by means of a forced draft from immense bellows operated by a small waterfall.

Later the Ringwood and Wynokie mines played an important part in the Revolutionary War, supplying the Colonial army with great quantities of munitions material and equipment. Hanging framed at Washington's headquarters at Newburgh is a bill from Ringwood to Capt. Thomas Machin and John Nicoll for clips, links and bolts furnished to the Government. The bill amounts to £5,000 English and is dated 1777.

Part of the chain which was stretched across the Hudson at West Point to prevent the British from coming up the river was forged at Ringwood, the other part being made at the Sterling Iron Works nearby. A piece of this chain is now among the exhibits of the Chicago Historical Society.

About 1790 Marten's son Thomas started business in Philadelphia as a wholesale dealer in finished iron and steel products. Joseph, the son of Thomas, continued the business until 1842, when he removed to Chicago, arriving there Nov. 1, just 80 years ago, where he found a town of some 6000 people.



Machinery Bay, Steel Sheet Room and Structural Steel Storage at the Chicago Warehouse of Joseph T. Ryerson & Son, Showing Cranes and Other Methods of Handling

With the receipt of a stock of iron from the East, the store was opened for business. This was the beginning of the present firm of Joseph T. Ryerson & Son. Chicago was then, perhaps even more than now, the gateway of the West. The gold rush of '49 brought many newcomers. The population steadily increased and the steel business flourished. In ten years Mr. Ryerson moved three times, each time into larger quarters. The business grew and prospered until Oct. 9, 1871, when the Chicago fire reduced the building to ashes and the stock to a conglomerate heap of molten metal. The burned store was rebuilt during the winter.

Joseph T. Ryerson died March 9, 1883, and his son, Edward L. Ryerson, succeeded him at the head of the business. To facilitate the administration of the rapidly growing concern, the firm was incorporated in 1888. The business weathered successive panic periods

and grew to such an extent that in January, 1892, it was necessary to add two stories to the three-story building erected ten years earlier. Additional property was purchased later and a five-story addition erected on each side of the main building. In 1908, to get still more room, property was purchased farther from the center of the city and nearer the heart of the industrial district. Here were erected the first buildings of the present Chicago plant, which now occupies a ground area of over 19 acres.

When Edward L. Ryerson retired from the presidency in 1912 and became chairman of the board of directors, Clyde M. Carr, for many years active in sales and administrative work, became president. The executive committee includes five vice-presidents—Joseph T. Ryerson, Donald M. Ryerson, Edward L. Ryerson, Jr., George Moody and E. L. Hartig.

In 1914 the company purchased the plant of the W. G. Hagar Iron Co., doubled its capacity and began to serve the great southwest territory direct from St. Louis. In 1915 the New York plant was built, making the third link in the chain. In 1917, when war was declared with Germany, the Detroit plant, just completed, was offered to the Government. As the War Department did not need it then, a large stock of steel was laid in and the plant began to serve its territory. The warehouse of the Ferguson Steel & Iron Co. at Buffalo was purchased in 1919. This has been enlarged by the addition of a modern sheet and bolt warehouse. The five plants now cover 40 acres and have a combined floor space of nearly 1,500,000 sq. ft.

In THE IRON AGE of Oct. 25, 1917, page 983, is reported the celebration of the 75th anniversary of this firm.

WHAT ARE WIRE RODS?

Decision as to Freight Rate Involves Definition of Steel Products

WASHINGTON, Oct. 31.—Involving terms descriptive of steel products, the Interstate Commerce Commission in a decision handed down last Saturday in connection with the complaint of the Lancaster Steel Products Co., Lancaster, Pa., against the Director General, et al., held that fifth class carload rates on wire rods from Canton and Youngstown, Ohio, and the Pittsburgh district to Lancaster and on steel wire and band steel from Lancaster to Harrison, N. J., and eastern destinations were inapplicable and unreasonable and reparation was ordered paid. Applicable commodity rates, it was found, were not unreasonable or otherwise unlawful.

The complaint involved shipments of wire rods, in coils, since Dec. 1, 1916, from Canton and Youngstown and the Pittsburgh district to Lancaster of wire, in coils, between Jan. 1 and Dec. 31, 1919, and from Lancaster to Harrison; and of band steel, in coils and bundles, during the last four months of 1919 and since July 15, 1920, from Lancaster to points in New England, New York and New Jersey. Shipments which moved prior to Dec. 16, 1916, were barred by limitation and were not considered in the decision.

It was contended by the complainant that its inbound material comes within the tariff description relating to bolt, nail, rivet and wire rods in coils and was entitled to the commodity rate. The defendants contended that the complainant's material is not wire rods but "bar steel in coils," for which no commodity rate or special classification is provided. The commission said the evidence was that the material was "wire rods" and is so known to the steel trade generally and that commodity rates were and are applicable.

Evidence also supported the contention of the complainant, the decision said, that its shipments of steel wire from Lancaster to Harrison came within the steel wire classification taking commodity rates. On band steel Lancaster commodity rates were published and were applied except for the last four months of 1919 and since July 15, 1920, during which former period the railroads applied fifth class rates, contending the article was "not otherwise specified." Upon the discontinuance of that classification on Dec. 31, 1919, commodity rates were again applied until July 15, 1920, when the carriers by supplement to their tariffs provided for "strip steel not otherwise indexed by name, c.l., fifth class." Since then class rates have been exacted upon the theory that the article was strip steel. The carriers claimed that this commodity is not band steel, the commission said, but give no sufficient reason why it should not be so regarded. It declared that the shipments were and are entitled to the application of the commodity rates contemporaneously maintained on band steel.

SHADING BRICK PRICES

Buyers Object to Paying Advance on Magnesite Grade Attributed to Tariff

PITTSBURGH, Oct. 30.—Aside from the fact that there is some shading of the quotation on magnesite brick, it is impossible to chronicle any special change in refractories prices. With the passage of Fordney tariff, carrying a duty of $11.50 per net ton on dead-burned imported magnesite, the price of that material was increased by that amount and magnesite brick, which prior to Sept. 21, were priced at $60, immediately were marked up to $75. Buyers have objected to paying the advance and lately some sales have been made as low as $70. Some steel makers who hitherto have bought magnesite brick for open-hearth use, have been substituting chrome brick, which, though heavier than magnesite and consequently carrying a higher per brick freight charge, are relatively cheap. It is figured that with chrome brick at $50 per net ton, magnesite brick should sell at not more than $65, if the lighter weight of the latter is to be a successful sales argument in competition with chrome brick.

It is said that observance of quotations on fire clay and silica brick is more general than it was recently. But there is still much uncertainty that present prices can be maintained. The Steel Corporation subsidiaries are understood to have placed orders for their requirements over the present quarter and to be specifying steadily against these orders. Independent steel companies, however, are merely buying close to actual needs and are protesting strongly against paying the prices demanded. Makers, however, claim that present costs prohibit any price reductions right now. Plant operations no longer are suffering much from railroad transportation conditions. Shipping conditions notably are better with Kentucky and Illinois producers.

We quote per 1000 f.o.b. works:

Fire Clay	High Duty	Moderate Duty
Pennsylvania	$43.00 to $46.00	$39.00 to $42.00
Ohio	43.00 to 46.00	39.00 to 42.00
Kentucky	43.00 to 46.00	38.00 to 42.00
Illinois	43.00 to 46.00	40.00 to 42.00
Missouri	43.00 to 45.00	38.00 to 42.00
Ground fire clay, per net ton		7.50 to 8.50
Silica Brick:		
Pennsylvania		45.00
Chicago		53.00
Birmingham		48.00
Ground silica clay, per net ton		9.00 to 10.00
Magnesite Brick:		
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.)		70.00 to 75.00
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)		43.50
Chrome Brick:		
Standard size, per net ton		50.00

Fire on Oct. 25 destroyed two pattern shops and some of the smaller buildings of the Monessen Foundry & Machine Co., Monessen, Pa.

STEEL AND INDUSTRIAL STOCKS

General Downward Trend with Uncertainty at Close of the Week

Despite a situation in industry the country over which purports to be the best since the spring of 1920, steel and industrial stocks crumpled under violent reactions and joined in the general downward trend. Persistent pressure was exerted against industrial leaders, causing a break to new lows. Although it broke with the rest, Steel common was supported by the optimistic tone of Judge Gary's address. Conflicting opinions were reflected in continued irregularities. At Tuesday's close it was evident, however, that the advance had been halted and that only technical recoveries would follow until some special development intervened. With the mid-week slump Baldwin, American Locomotive, Crucible and Republic broke from two to four points. A spell of uncertainty prevailed in the closing hour, Friday's sharp advance not being regarded as even a hint that the reaction was past. Almost without exception the advice from brokers was to sell industrials and buy railroad stocks, the implication being—whether true or not—that rail stocks are selling far out of line with the former. Industrial prospects, while not brilliant, are reasonably promising.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

	Low	High		Low	High
Allis-Chalm.	14½	19	Harbisen Wal. pf.	115	117
Allis-Chalm. pf....	96	96	Int. Har.	105¾	109
Am. B. S. & Fdry.	75¼	77¾	Int. Har. pf.	118½	118¾
Am. B. S. & F. pf.	111½	111½	Lackawanna Steel.	80½	82¾
American Can....	71½	73½	Lima Loco.	57¾	61⅝
American Can pf..	110	111½	Midvale Steel....	32¼	34⅞
Am. Car & Fdry..	188½	189	Nat.-Acme	12⅝	14
Am. Car & F. pf..	123½	124	Nat E. & Stm....	66	68½
Am. Locomotive..	126⅞	133	N. Y. Air Brake..	35½	38⅝
Am. Locomot'e pf.	121	121½	Otis Steel.....	9⅞	10⅝
Am. Radiator.....	117	120	Pittsburgh Stl. pf.	94	95
Am. Steel Fdries..	42¾	43⅝	Pressed Stl. Car..	86	89
Baldwin Loco.....	132½	141	Ry. Steel Spring..	117	122
Baldwin Loco. pf.	117	117½	Ry. Stl. Spring pf.	117	120
Bethlehem Steel..	70⅜	72	Replogle Steel....	28	32⅛
Beth. Stl. Cl. B...	71⅜	74¼	Republic	48¾	56¼
Beth. Stl. 8% pf.	111⅝	112	Republic pf.....	83½	85½
Brier Hill.....	16½	17	Sloss	45½	46¾
Br. Em. Steel....	11	13	Sloss pf.....	77	77
Br. Em. S. 2d pf..	31	31½	Steel of Canada..	61½	66½
Cambria Steel....	41	41	Superior Steel....	31	32
Chic. Pneu. Tool..	82	84⅜	Un. Alloy Steel...	35½	36¼
Colorado Fuel.....	29	31	U. S. Pipe.....	28⅜	32
Crucible Steel.....	77½	85⅝	U. S. Pipe pf.....	69⅝	70½
Crucible Steel pf..	94⅜	94⅞	U. S. Steel.....	105¼	109
Deepe pf.	73½	77½	U. S. Steel pf.....	121	122½
General Electric...	176	183	Vanadium Steel...	40½	43½
Gt. No. Ore Cert.	33⅞	35¾	Va. I. C. & Coke..	58	59½
Gulf States Steel.	84	89½	Wh'ouse Air Br..	96	100
Gulf St. Stl. 1st pf.	100				

Bethlehem Finances

The Bethlehem Steel Corporation has declared the regular quarterly dividends of 1¼ per cent on both classes of common stock, and 1¾ per cent on the new 7 per cent cumulative preferred stock. At the same meeting which was held last Thursday, Alvin Untermeyer, Moses Taylor, H. G. Dalton and Oliver Jennings, the last three of whom represent the Lackawanna interests, were elected directors, succeeding E. V. R. Thayer, J. E. Mathews, J. H. Ward and Allan A. Ryan. President Grace said that although the third quarter earnings were insufficient to cover dividend requirements, they were substantially greater than either of the two previous quarters for the year. Operations are at about 80 per cent, the highest for the year.

Industrial Finances

Utah Steel Corporation, Salt Lake City, which in September, 1921, listed its total assets as $2,070,898, of which $1,704,403 was fixed assets and balance cash, accounts receivable and inventories, is in the hands of a receiver.

Net operating income of the Gulf States Steel Co. for the three months ended Sept. 30 are $340,287, equivalent after taxes, depreciation and preferred dividends to about $1.90 per share on common stock. This compares with $1.70 in the preceding quarter and 40 cents per share in the first quarter. This gain obtained notwithstanding wage advances during the last period and the handicap of car shortage part of the time.

The American Can Co. has announced that it will purchase a limited amount of its 5 per cent 15-year debenture bonds maturing in 1928 at 99½ and accrued interest if said bonds are presented at the First National Bank, New York.

A new corporation is to be formed by interests allied with the Iron Products Corporation, and in which that company will have a large interest. The new corporation proposes to take over a part of the Iron Products Corporation's business, which consists of radiators and self-feeding smoke-consuming stoves and furnaces, thereby relieving the parent company of subsidiary interests, enabling it to devote its entire time to pig iron and pipe.

The consolidated report of the American Smelting & Refining Co. and the American Smelters Securities Co. for the six months period ended June 30, shows that net earnings of operating properties increased $3,675,776 over the same period in 1921. Total net income increased $3,524,918, and the income account on June 30 showed a surplus of $1,825,923 against a deficit of $1,101,831 on June 30, 1921. In presenting the report, President Guggenheim predicted increased earnings for the latter half of 1922.

Plans of New Companies

The Major Oil-Tite Piston Ring Co., Asbury Park, N. J., has been incorporated with a capital of $150,000, and will engage in the manufacture of piston rings and kindred mechanical products. It will also conduct a repair shop. The company is receiving bids from manufacturing companies on piston rings in lots of 10,000. This will take care of immediate needs. It is also in the market for automatic machinery for manufacturing its own product. Plans for a manufacturing location are still undecided, but preference is given to Newark and New York. C. Wesley Major is secretary.

The Protector Non-Skid Chain Co., 1301-03 West Baltimore Street, Baltimore, Md., which was recently organized to manufacture chains, has let contracts for immediate manufacture to the Maryland Metal Products Corporation, Hagerstown, Md., but has plans under way for the equipment of a plant next year. At that time, it will be in the market for equipment used in the manufacture of pressed steel parts. Its chains will be made from a series of rectangular pressed steel links with a four-sided flange which prevents side skid as well as forward and backward. O. M. Peters heads the company.

The Steadylite Motion Picture Corporation, New York, has been incorporated with a capital of $1,000,000, to manufacture motion picture machines and parts. Plans for manufacture are still in embryo, further developments awaiting the results of experimentation. The incorporators are: J. Bramwell, A. P. Anderson and L. C. Gunn. Davis, Wagner, Heater & Holton, 34 Nassau Street, New York, are the corporate representatives.

The Bunker Mfg. Corporation, 1110-12 Woodland Avenue, Kansas City, Mo., has been incorporated with a capital of $150,000, to manufacture tire chains. All manufacturing will be done in its own fully equipped plant which is already producing. The directors and officers of the company are: C. A. Bunker, president; C. M. Kryder, vice-president; F. T. Shepard, secretary; L. R. Van Houton, treasurer, and K. E Kryder, sales manager.

The Blackburn Steel Co., Jersey Avenue and Central Railroad of New Jersey, Jersey City, N. J., has filed notice of organization to operate a structural steel and iron works. A plant has been leased and fabricating work is being done to the extent of about 800 tons per month. It specializes in derricks. Richard H. Blackburn, 92 Oak Street, Jersey City, heads the company.

The Prudential Automobile Service Corporation, Fifty-seventh Street and Broadway, New York, has been incorporated with a capital of $100,000, to manufacture automobile parts and operate a general machine repair works. Its manufacturing for the present is being done by contract. The incorporators are: H. E. Rampton and L. Billig.

The Harvey Mfg. Corporation, New York, has been incorporated with a capital of $20,000, to manufacture metal products. The company is still in the process of organization. Morris Friedberg, 116 Nassau Street, New York, is corporate representative.

The Electric Cord Adjuster Corporation, 103 East 125th Street, New York, which was recently incorporated to manufacture electrical equipment, is in the market for black steel spring wire and tubing. A. F. Brown is manager.

The Apex Tool & Stamping Corporation, 4830 Southern Parkway, Louisville, Ky., was recently organized to manufacture tools, stamped metal goods, etc. Some equipment has been purchased and the company expects to be in full operation within a month. It has pending several contracts for stampings, which together with tool and die manufacturing will constitute the activities of the company. Address, Lee F. Hukill, secretary-treasurer, 611 South Fortieth Street, Louisville.

The Triplex Mfg. Co., 62 Highland Avenue, Somerville, Mass., has filed notice of organization to manufacture sash. At present it is considering bids on its manufacturing which will be done by contract until spring, when it will look for

[illegible] equipped for this line of work. At first [illegible] equipment will be added as is required for the special processes involved. At the present time the company is in the market for corrosion-resisting metal strips and glass. L. O. Card is president; M. F. Camera, vice-president; W. I. Harrison, treasurer, and A. W. Sweetman, secretary.

The Keifer Electrical Supply Co., Peoria, Ill., has been incorporated with a capital of $30,000, to manufacture electrical equipment and supplies, but does not purpose to do any manufacturing, at least for the time being. It will act as distributer.

The Meriden Novelty Co., Meriden, Conn., has been incorporated with a capital of $25,000 to manufacture metal specialties. At present it is renting factory space in that city. Address, F. E. Bemis, 74 Wilcox Avenue, Meriden.

The Titeflex Metal Hose Co., Badger Avenue and Runyon Street, Newark, N. J., has been incorporated with a capitalization of 5,000 shares of no-par stock, to manufacture metal reinforced hose. This company succeeds to the Titeflex Metal Hose Corporation, a New York company, having almost the same personnel. It will manufacture all-metal hose, and full and semi-interlocked tubing. C. W. Fletcher heads the company, and he with W. K. Herbst and R. H. Stone are the incorporators.

The Burdick-Atkinson Corporation, 33 Scott Street, Hamburg, N. Y., which was recently incorporated, will engage in the manufacture of steel wire springs. John S. Burdick, formerly vice-president and general manager of the Buffalo Body Corporation, is president; Frederic R. Atkinson, vice-president and works manager; F. R. Brown, treasurer, and H. Burdick, secretary.

The Gasoscope Co. of America, St. Louis, has been incorporated with a capital of $500,000, to manufacture gas measuring devices and other mechanical equipment. It has a fully equipped plant and is already producing. Address, John E. Bishop, care of the Corporation Trust Co. of America, DuPont Building, Wilmington, Del.

The Swimall Mfg. Co., 508 South Dearborn Street, Chicago, was recently incorporated with a capital of $25,000 and will manufacture its own products, chief of which are safety devices. It is in the market for machinery. William Kennedy is sales manager.

The Wichita Fender Brace Co., Wichita Falls, Tex., was recently incorporated with a capital of $10,000 and will manufacture braces and sheet metal specialties. The company has constructed a building and installed necessary equipment for present operations. J. C. Mytinger is president.

Trade Changes

The Western Iron Stores Co., Milwaukee, Wis., has been appointed sole representative in Wisconsin for the Barber-Colman Co., Rockford, Ill., manufacturer of gear hobbing machines, milling and gear cutters, and hob grinding machines. The company has also been appointed Wisconsin distributer for the line of transmission machinery and equipment manufactured by the Dodge Sales & Engineering Co., Mishawaka, Ind. The quarters of the Western Iron Stores Co. are being remodeled and the work will be completed on Nov. 25, when a formal opening will be held and a complete line of mill supplies, mechanics' tools, metal and woodworking machines will be displayed.

John W. Gamble, president Standard Chemical Mfg. Co., and vice-president First National Bank, Omaha, Neb., has purchased the American Machinery & Supply Co., Omaha, of which he will be president and treasurer. Thomas McSchane will be vice-president and general manager and Benjamin J. Harrison secretary.

The Peerless sheet metal Works, Inc., 637 First Avenue, New York, has been incorporated with a capital of $15,000, to manufacture sheet metal and other metal products. It is still in the process of organization. The incorporators are: I. L. Gaffein and M. Heyert.

The Bertelsen & Petersen Engineering Co., East Boston, ship and stationary repairs, discontinued business under this name Nov. 1. Officials and a large percentage of the working forces have become associated with the Atlantic Works Corporation, which has purchased a part of the former company's real estate, floating dry dock and other equipment. With these added facilities, the Atlantic Works Corporation can repair vessels up to and including 10,000 tons. Under the combination Fred McQuesten is president; Jens Bertelsen, vice-president; Alfred E. Cox, treasurer and general manager; Edward P. Robinson, agent; Paul J. Bertelsen, works manager; Joseph M. Robinson, purchasing agent; George S. Webster, superintendent; Ralph C. Christensen, outside superintendent, and Carl G. Hedblom, assistant superintendent.

Columbia Steel & Shafting Co., Pittsburgh, announces that Edgar T. Ward Sons Co. has been made its exclusive distributing agents in those centers where the Ward company maintains warehouses. These are located in Boston, Newark, N. J., Brooklyn, Philadelphia and Chicago. The Columbia Steel & Shafting Co. maintains its own warehouses in Detroit and Cleveland.

C. S. Norris and A. J. Lewis have organized the Esther Coal Co., with offices at 416 State Building, Pittsburgh. The company will do a brokerage and agency business in coal and coke.

The Valley Foundry & Machine Works, Inc., 710-32 H Street, Fresno, Cal., announces that W. R. Marvin has succeeded L. E. Woodsend as general manager.

The C. F. Bulotti Machinery Co., 67 Main Street, San Francisco, has been appointed agent in California territory for the Whiting Corporation, cranes, foundry equipment and railroad specialties, Harvey, Ill., to succeed the Eccles & Smith Co., San Francisco.

Such executive and administrative offices of the Youngstown Steel Co. as are directly connected with the erection of the new mechanical puddling plant at Warren, Ohio, will be removed to the plant offices at North Mahoning Avenue, Warren, the address of which is R. F. D. 3, Warren, Ohio, effective Nov. 1. Those of the personnel who will remove to Warren at this time are T. M. Phillips, H. Z. Bixler, E. S. Harrar, L. J. Wilson, W. E. Schmidt and J. P. Suter.

The Alvord Reamer & Tool Co., Millersburg, Pa., announces the appointment of C. C. Strout in the capacity of vice-president in charge of sales. He was formerly connected with the Victor Saw Works as western sales manager, and with the Safety Wrench & Appliance Co. as general sales manager. This company has formed a service department in connection with its engineering division to function in supplying consulting service in connection with special tool equipment. A. M. Lindsley will have charge of the new department.

The Morris Tool Co., Inc., 808 Lincoln Place, Brooklyn, tools and tool holders, has removed its offices to 30 Church Street, New York.

The Ohio Electric & Controller Co., 5900 Maurice Avenue, Cleveland, announces the opening of a district sales office at 53 West Jackson Boulevard, Chicago.

The Arion Steel Co., after Oct. 26, will have its offices and warehouse located at 123 Oliver Street, Boston, carrying a complete line of steel.

The Precision & Thread Grinder Mfg. Co., 1 South Twenty-first Street, Philadelphia, recently acquired by A. T. Doud, announces the appointment of William H. Frick as chief engineer in charge of development and service departments. Mr. Frick, who is a grinder expert, was previously connected with Budd Wheel Co. as equipment engineer, with the Landis Tool Co. as master mechanic, and in a similar capacity with the Cleveland Automatic Co., Gisholt Machine Co., Diehl Mfg. Co., and the Hero Mfg. Co. D. F. Bruce (formerly with the Remington Arms Co. and J. E. Lonergan), was appointed superintendent in charge of production. He was formerly superintendent with McCambridge Co. The Precision & Thread Grinder Co. is preparing field and construction service, including time and production records, on precision and thread grinding.

New Trade Publications

Steel Lockers.—Richard W. Jefferis Co., Camden, N. J. Folder No. 330 describes and illustrates in color pressed steel lockers, single and in sets, including specifications.

Wood Preservation.—Century Wood Preserving Co., Century Building, Pittsburgh. Catalog No. 24, 24 pages, 12 x 10 in., outlining various processes used to combat deterioration of ties and timbers. Special sections show the action of destructive agents, prescribing treatment and explaining control and measurement of preservatives. Cubical contents of round poles and contents of crossties appear in tabular form.

Service and Its Value in Dollars and Sense.—Combustion Engineering Corporation, 43 Broad Street, New York. This is a little 16-page pamphlet from the standpoint of the stoker manufacturer, in which business ethics with regard to the sale and installation of stokers receive careful attention. An attempt is made to work out a satisfactory method for providing a definite amount of service to the purchaser wih a minimum number of visits.

The Coxe Stoker.—Combustion Engineering Corporation, 43 Broad Street, New York. A 24-page pamphlet, 8½ by 11 in., dealing with a chain grate stoker designed particularly for operating on Western and mid-Western bituminous coals. A number of test reports with corresponding curves are included. The pamphlet shows several installation views as well as sketches indicating application of the stoker to various types of water-tube boilers.

Machinery Markets and News of the Works

BUYING IMPROVING SLOWLY

Volume of Machine-Tool Business Still Somewhat Disappointing

Western Railroads Place Fairly Large Orders and More Are to Come Soon

Machine-tool trade is still disappointing as to volume, but each week brings some encouraging signs. Railroad purchases are still to the fore, but business in some other lines, notably companies in or affiliated with the automobile industry, shows promise.

The Chicago, Burlington & Quincy Railroad has bought the shapers, engine lathes, bending rolls and punches and shears on its general list, and will probably place further orders soon. The Chicago, Rock Island & Pacific has added several upright drills and portable lathes to its recent purchases and the Missouri-Kansas-Texas Railway has bought quite heavily at St. Louis. It is expected that the Pennsylvania Lines East will close this week at Philadelphia on the 80 tools recently inquired for. A supplemental inquiry covers a number of bushing and wheel presses. The orders of the Missouri-Kansas-Texas totaled several hundred thousand dollars, one company's orders amounting to close to $200,000. The Southern Railway is inquiring for four tools.

In the East railroad buying is scattered and not large in volume. The New York Central has bought a car wheel lathe and the Grand Trunk a 6-ft. radial drill. At Pittsburgh a large volume of business is pending, particularly in cranes, it being estimated that prospective orders total about $1,000,000. In addition to the inquiry of the National Tube Co. for 41 cranes, about 25 others are being figured on.

Among industrial companies, purchasers of machine-tool equipment include the Cincinnati Hy-Speed Machine Co., Cincinnati, which has bought six machines, and the Republic Brass Co., Cleveland, which has ordered five screw machines. The Helsey Wheel Co., Detroit, is a prospect for machine tools for manufacturing motors for the Gray automobile. The Neely Nut & Bolt Co., Pittsburgh, has inquired for eight tools.

Some further price advances are noted this week.

New York

NEW YORK, Oct. 30.

EXCEPT for a few purchases by railroads, the past week has brought no marked activity in the local machine-tool market. The New York Central has bought a car wheel lathe and a New York company has sold a 6-ft. radial drill to the Grand Trunk and a 250-lb. steam hammer to the St. Louis, Rocky Mountain & Pacific. A large number of machine tools, mostly of the smaller types, will be thrown on the market shortly, an auction sale of the entire stock of the former Wright-Martin aircraft plant at Long Island City having been ordered for Nov. 14. Included in the equipment are considerable numbers of turret screw machines, drilling machines, lathes, etc.

Quietness continues in the crane market, although there are a fair number of inquiries current for both locomotive and electric overhead cranes. The hand-power crane market is dull. Prices on both overhead and locomotive cranes exhibit an advancing tendency. Some manufacturers of chain blocks and hand-power cranes have made slight percentages of increase and one locomotive crane builder is said to be on the point of increasing quotations. A pending order, which is expected to be closed this week is from the Hummell-Ross Fibre Corporation, which has been receiving bids on a 5-ton, single I beam hand-power crane and a 10-ton, 39-ft. 6-in. span hand-power crane through J. H. Wallace & Co., 5 Beekman Street, New York, consulting engineers. The Armstrong Cork Co., Lancaster, Pa., which is building an addition to its plant has recently purchased cranes. The inquiry of Sanderson & Porter, New York, for a 100-ton overhead traveling crane may be closed this week.

Among recent purchases are:

Phoenix Utility Co., 71 Broadway, New York, a 60-ton, 4-motor, overhead traveling crane from the Whiting Corporation.

Lockjoint Pipe Co., Ampere, N. J., four 25-ton and two 10-ton locomotive cranes for handling buckets from the American Hoist & Derrick Co.

West Virginia Pulp & Paper Co., 200 Fifth Avenue, New York, a 20-ton, 50-ft. boom locomotive crane for use at its Piedmont, W. Va., plant, from the Industrial Works.

Brooklyn Foundry Co., Boulevard and Orchard Streets, Astoria, L. I., a 2-ton, 22-ft. span, 3-motor overhead traveling crane from the Columbia Hoist & Machine Co.

Mackintosh-Hemphill Co., Pittsburgh, a 50-ton, 60-ft. span crane with 10-ton auxiliary and a 5-ton, 30-ft. span overhead traveling crane from the Niles-Bement-Pond Co.

The Curran Motor Car Co., 61 State Street, Albany, N. Y., will soon take bids for a one-story assembling plant, 60 x 100 ft., in the North Albany section, estimated to cost $50,000. A. L. Delahanty, 17 Steuben Street, is architect.

The New York Telephone Co., 15 Dey Street, New York, has filed plans for a two-story service building and machine repair shop, 155 x 202 ft., at White Plains Avenue and Penfield Street, for company automobiles and trucks, to cost $200,000, including equipment. McKenzie, Voorhies & Gmelin, 342 Madison Avenue, are architects.

Officials of the W. N. Best Co., 11 Broadway, New York, have organized the W. N. Best Engineering Corporation under Delaware laws, with capital of $100,000, to manufacture oil burning equipment, tar burners and kindred apparatus. The company is headed by A. H. Best, Carl E. Zihold and Charles A. Beach.

The Cantor Corporation, care of Frank S. Parker, 44 Court Street, Brooklyn, consulting engineer, will build a two-story garage and machine shop, 150 x 200 ft., at Park Avenue and 164th Street, to cost about $150,000.

The Estate of S. Weinstein, 100 Richardson Street, Brooklyn, manufacturer of doors, sash, etc., has purchased property at Meserole Avenue and Calyer Street, Greenpoint section, for $70,000, as a site for a new plant, including machine shop and power house, estimated to cost approximately $500,000. Machinery for the most part will be electrically operated. It is purposed to have the plant ready for service early in the spring.

The Fulton Metal Co., 296-8 Fourth Avenue, Brooklyn, is taking bids for a one-story addition at Fourth Avenue and First Street, 80 x 90 ft., to cost $17,000.

The Silver Mfg. Co., 90 West Street, New York, manufacturer of machine tools, wood-working machinery, etc., with plant and headquarters at Salem, Ohio, has disposed of

Silver is treasurer.

The National Railways of Mexico, Government Administration, 233 Broadway, New York, are planning for the electrification of the Tampico-San Luis Potosi Division, about 275 miles, to include power plants, electric shops and other mechanical and electrical structures. G. L. Trevino, Monterey, Mex., is electrical engineer in charge.

The Studebaker Corporation of America, South Bend, Ind., will make improvements at its New York headquarters and parts department, Broadway and West Seventieth Street, to cost about $46,000.

The Bliss Waterproof Concrete Block Co., 34 Union Hall Street, Jamaica, L. I., has plans for a new one-story factory, 100 x 200 ft., at Carroll and Foley Streets, to cost about $50,000.

The Pan-American Petroleum & Transport Co., 120 Broadway, New York, has plans in progress for a new oil refinery at Los Angeles Harbor, near Wilmington, estimated to cost $500,000 with machinery. Plans are being perfected for taking over the Mexican Petroleum Co., same address, a subsidiary, and merging with the parent organization. Edward L. Doheny is head of both companies.

Weinberg Brothers, 167 Central Avenue, Albany, N. Y., have had plans prepared for a one-story machine and repair shop at 152 Sherman Street, and will soon break ground. Peter J. Pagano, 61 Maiden Lane, Albany, is architect.

Officials of the Iron Products Corporation, 41 East Forty-second Street, New York, are forming a subsidiary organization for the manufacture of radiators, stoves and furnaces. Extensive operations are planned, including plant establishment in different sections. The present branch of the parent organization devoted to this line of production will be taken over by the new company.

Officials of the Timken Roller Bearing Co., 230 West Fifty-sixth Street, New York, with plant and headquarters at Canton, Ohio, have organized the Timken Roller Bearing Service & Sales Co., to establish and operate repair and service plants in various cities. H. H. Timken is head.

The American Smelting & Refining Co., 120 Broadway, New York, is perfecting arrangements for a bond issue of about $5,000,000, a portion of the proceeds to be used for extensions and improvements, including additional machinery installation, at its plants in Colorado and Mexico.

The Eastern Tool & Mfg. Co., Bloomfield Avenue, Bloomfield, N. J., has taken bids for a two-story addition, estimated to cost $45,000.

Motors, controllers, mechanical conveyors and other equipment will be installed in the printing plant to be erected by the Paterson Industrial Development Co., 5 Colt Street, Paterson, N. J., to cost about $400,000. Walter Kidde & Co., 140 Cedar Street, New York, are engineers.

S. Kukielski, 431 Montgomery Street, Jersey City, N. J., manufacturer of wagon parts, automobile bodies, etc., has had plans prepared for a new two-story works at 415-21 Montgomery Street, to cost $53,000. C. O'Brien, care of owner, is architect.

The Empire State Ice Co., Weehawken, N. J., is taking bids for a new one and two-story ice-manufacturing plant, 65 x 200 ft.

The Salem Glass Co., Salem, N. J., is planning to rebuild the portion of its works destroyed by fire Oct. 16, with loss of $200,000, including equipment.

The Davis Automobile Co., South Pearl Street, Bridgeton, N. J., has commissioned Walter Custer, 75 East Commerce Street, architect, to prepare plans for a one and two-story service and machine repair works, 75 x 75 ft. John H. Davis is head.

The J. S. Mundy Hoisting Engine Co., 696 Frelinghuysen Avenue, Newark, has tentative plans for an addition to its main shop, to include the installation of new equipment. Other extensions will also be made to double, approximately, the present production. Work will commence in 1923.

The Public Service Electric Corporation, Public Service Terminal, Newark, will commence the erection of a three-story steel and concrete addition, 142 x 325 ft., to its power plant at Point-No-Point, estimated to cost $1,000,000.

The Department of Streets and Public Improvements, City Hall, Newark, is receiving bids for a two-story addition to the municipal automobile service and repair works at Franklin Street and Broom Alley, to cost $175,000.

The William H. Nicolls Co., 2-10 College Place, Brooklyn, is inquiring for a used 96-in. vertical boring mill.

New England

BOSTON, Oct. 31.

THE machine tool market is more active in spots with the demand for new equipment again featuring business. October, with several local concerns, at least, will prove one of the few months this year where red figures do not appear on books. Going business as a rule is still confined to one, two or three tools, but lists, although small, are developing.

A paper mill has a list of nine tools, against which two will be bought now and the remainder later. A Massachusetts machinery builder is about to close on a round number, possibly a dozen milling machines, and three or four lists calling for various sized presses have made their appearance. Some lists out, however, do not hold much promise. For instance, a Connecticut shipyard is asking for prices on several large machines, but in this case the inquiry is believed to be for inventory purposes. A New Britain inquiry for 200 polishing stands and attachments holds little promise.

Sales the past week include six presses to a Rhode Island concern; a $2,600 milling machine to a Connecticut interest; two 24-in. shapers to a Springfield, Mass., district manufacturer, and a miscellaneous lot of upright drills, grinders, saws, shapers and lathes, in addition to used planers, lathes, pressers and shapers to textile and other machinery makers, etc. The Atlas Tack Co., Fairhaven, Mass., recently bought tack making equipment for its proposed new St. Louis plant. There is a possibility of much of the company's Cleveland plant equipment being moved to St. Louis, and the Cleveland plant given up. Small fine tools, machine tool parts, files, hacksaws, drills and reamers are moving in larger volume.

Nut and bolt machinery makers, effective Nov. 1, advanced prices approximately 10 per cent. Cranes are on the point of advancing; builders have notified prospective customers that outstanding quotations hold only for a limited period. Although nothing official has been given out, it is indicated an advance in prices for all sizes and kinds of motors will be put into effect in the near future. Leading makers of leather belting have gone up approximately 10 per cent on list quotations. Manufacturers of saws have advanced prices 10 per cent on everything but hacksaws.

Bids were taken last week on a two-story 50 x 170 ft. manufacturing unit at Providence, R. I., contemplated by the Crompton & Knowles Loom Works, 93 Grand Street, Worcester, Mass.

The Brooks Skinner Co., Inc., Quincy, Mass., portable garages, has awarded contract for a one-story, 100 x 242 ft. plant, to cost about $50,000.

Fletcher-Thompson, Inc., 1089 Broad Street, Bridgeport, Conn., are the architects for a two-story, $250,000 manufacturing plant to be erected by the Thompson Machine Co., Belleville, N. J., contract for which has been let.

The New Haven Malleable Iron Co., New Haven, Conn., has bought about five acres of land on Middletown Avenue, adjoining its plant, for future expansion.

George M. Thompson, West Newton, Mass., formerly vice-president and general manager Wickwire-Spencer Steel Corporation, Worcester, Mass., is equipping a small steel rolling mill on Mildred Avenue, Dorchester, Boston, consisting of a one-story, 60 x 115 ft. building and two one-story storage units, 25 x 35 ft., and 50 x 150 ft. Brainerd, Leeds & Kellogg, Boston, are the architects.

The Tileston & Hollingsworth Co., 892 River Street, Hyde Park, Mass., manufacturer of paper products, has awarded contract to the Aberthaw Construction Co., 27 School Street, for a one-story addition to its machine department to cost $30,000. George F. Hardy, 309 Broadway, New York, is engineer.

The Suburban Gas & Electric Co., Winthrop, Mass., is arranging for a stock issue of $417,000, a portion of the proceeds to be used for extensions and improvements.

The New Haven Sherardizing Co., Hartford, Conn., manufacturer of iron specialties, mandrels, etc., is concluding nego-

tiations with the Chamber of Commerce, Akron, Ohio, for the removal of its plant to that city. An existing building, totaling about 7000 sq. ft. will be taken over.

Dominick Bertoldi, care of George A. Cornet, 10 Central Avenue, Lynn, Mass., architect has plans in progress for a one-story machine shop, 40 x 130 ft., on Wilson Square, Peabody, Mass.

The Hersey Mfg. Co., 314 West Second Street, Boston, manufacturer of special machinery, will commence the erection of a two-story factory on E Street, to cost approximately $30,000.

The Vermont Hydro-Electric Corporation, Pittsford, Vt., will make extensions and improvements in its power plant at Cervers Falls, to include the installation of a 1250-kw. generator, water wheel, and auxiliary machinery.

The Parker Wire Goods Co., 18 Grafton Street, Worcester, Mass., is clearing a site at Washington and Lamartine Streets, heretofore occupied by the Star Foundry, for a new one-story plant totaling about 30,000 sq. ft. of floor space. The present works will be removed to the new location. Edward D. Priest is head.

The Seymour Mfg. Co., Seymour, Conn., is in the market for 10 mill trucks, approximate dimensions 27 in. high and 40 in. wide, length 10 to 12 ft.

Philadelphia

PHILADELPHIA, Oct. 30.

HUMPHREYS & CO., Front and Tusculum Streets, Philadelphia, operating a structural iron and steel works, have awarded a contract to E. E. Hollenback, Inc., 1804 Brandywine Street, for a new plant, two-stories, 60 x 118 ft., to cost $27,000.

The Edward G. Budd Mfg. Co., Hunting Park Avenue and Twenty-fifth Street, Philadelphia, manufacturer of steel automobile bodies, has filed plans for two one-story additions. Other structures will be erected later, for which plans are being prepared by the Ballinger Co., Twelfth and Chestnut Streets, architect and engineer. The company is arranging for an increase in capital from $8,750,000 to $14,498,300, a portion of the proceeds to be used for enlargements.

P. Randolph, Poplar and Forty-first Streets, Philadelphia, is asking bids for a two-story, reinforced concrete, 50 x 100 ft., garage and machine shop at Mascher and Wyoming Streets, to cost $100,000. Neubauer & Supowitz, 929 Chestnut Street, are architects.

A machine and repair shop will be installed on the third floor of the new three-story building to be erected by the United Auto Sales Co., Philadelphia, local representative for the Studebaker automobile, on property adjoining the present structure.

Property of the Nelson Blower & Furnace Co., Boston, acquired by the Marlin-Rockwell Corporation, Philadelphia, to satisfy a claim, including lathes, milling machines, screw machines, grinders, etc., will be sold on Nov. 16, at plant site, 4825 Reno Street, West Philadelphia.

The Eberhard Watch Corporation of America, Trenton, N. J., recently incorporated with a capital of $300,000, has acquired 100 building lots in the Woodside Park district as a site for a new watch movement and case manufacturing plant. It will consist of eight individual units, with administration building, power house and other mechanical departments, and will cost close to $200,000. It will give employment to 500 operatives. George F. Eberhard, formerly manager at the local plant of the Ingersoll Watch Co., heads the new organization, which is represented by Marvin L. Spaulding, 147 East State Street.

The Victor Talking Machine Co., Camden, N. J., has tentative plans under consideration for extensions and improvements. The company has arranged for an increase in capital from $5,500,000 to $35,500,000, and will use a portion of the proceeds for expansion.

The Blue Mountain Electric Co., Bethel, Pa., has acquired the Yost mill property at Lickdale, Pa. as a site for a new electric generating plant. It will cost in excess of $125,000.

The Merchant & Evans Co., 2035 Washington Avenue, Philadelphia, manufacturer of metal roofing, and the Globe Automatic Sprinkler Co., same address, associated, have preliminary plans for a new one-story factory on Fountain Avenue, Lancaster, Pa., 75 x 150 ft. Powell Evans is president.

The Lower Milford-Lehigh Power Co., the Dunham-Busks Power Co., both of Easton, Pa., and the Washington-Berks Power Co. and Hereford-Berks Power Co., both of Reading, Pa., affiliated, recently organized, have plans under way for the installation of power plants and systems in their respective districts. The companies are closely associated with the Metropolitan Edison Co., Reading.

The Tamaqua Mfg. Co., East Broad Street, Tamaqua, Pa., manufacturer of mining machinery and parts, has plans for enlargements to double, approximately, the present capacity.

The Central Abattoir Co., Chestnut Street, Reading, Pa., will commence the erection of a new three-story packing plant, with refrigerating and cold storage department, estimated to cost $185,000, including machinery.

W. T. Merrick, Wellsboro, Pa., and associates, are planning for a new power plant at Blossburg, Pa., for local light and power service, estimated to cost $30,000.

The General Refractories Co., Oliver Building, Pittsburgh, has acquired the plants and businesses of the Hayes Run Fire Brick Co., Orviston, Pa., and the Pennsylvania Fire Brick Co., Beech Creek, Pa. The properties will be consolidated with others lately purchased in this same section and continued in operation. The purchasing company has arranged to operate with a capital of $18,000,000.

Fire, Oct. 25, destroyed a portion of the plant of the Monessen Foundry & Machine Co., Monessen, Pa., with loss estimated at $200,000, including equipment.

E. F. James & Sons, Edwardsville, Pa., operating the LeGrand Drill Works, manufacturers of mechanical equipment, have plans nearing completion for new works.

The Adelphia Mfg. & Plating Co., Orthodox and Belgrade Streets, Philadelphia, is planning for the installation of additional equipment.

Motors, controllers, conveying machinery and other equipment will be installed in the new printing plant of the "Pottsville Daily Republican," Pottsville, Pa., for which property has been purchased. It is estimated to cost $500,000. J. H. Zerbey heads the company.

A power house, mechanical conveyors and hoppers, and other operating machinery will be installed in the municipal incinerating plant to be erected by the Department of Public Safety, Harrisburg, Pa., estimated to cost $85,000. S. F. Hassler is commissioner.

The Confederated Home Abattoir Co., Bethlehem, Pa., has acquired a local site for a new packing house, with refrigerating and cold storage plant, estimated to cost $100,000.

Richard J. Boyer, head of the R. J. Boyer Printing Co., Lebanon, Pa., has organized a new company to build and operate a plant for the manufacture of disk wheels, special rims and other steel automotive products. Machinery will be ordered at once. Mr. Boyer will be president of the company; L. Raymond Reigert, vice-president, and Frank P. Hammar, secretary and treasurer.

Baltimore

BALTIMORE, Oct. 30.

PLANS have been completed by the Baltimore Steel Co., Eastern Avenue and Eden Street, Baltimore, for two one-story additions to cost $40,000. Plans are also being considered for a new one-story steel fabricating extension, to cost $50,000, on site recently purchased. Gilbert A. Wehr is president.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until Nov. 14 for one 150-ton steam hydraulic forging press, with spare parts, for the naval station at Bellevue, D. C., schedule 257; until Nov. 21 for 3750 ft. galvanized steel pipe for Mare Island, San Francisco, schedule 260.

Fire, Oct. 23, destroyed the plant of the Porcelain Enamel & Mfg. Co., O'Donnell and Eighth Streets, Baltimore, manufacturer of porcelain-making machinery, etc., with loss estimated at close to $400,000, including buildings and equipment. It is planned to rebuild.

The Jamison Cold Storage Door Co., Hagerstown, Md., manufacturer of cold storage and refrigerating equipment, is planning an addition, to include a galvanizing works.

R. E. Piper, 1522 West Broad Street, Richmond, Va., manufacturer of roofing, cornices and other metal products, plans the installation of a new power shearing machine and other equipment.

George W. Taylor & Co., Haddington Building, Norfolk, Va., have plans in progress for extensions and improvements in their ice-manufacturing plant, to cost $100,000, including equipment. Ophuls & Hill, 112 West Forty-second Street, New York, are engineers.

The Purchasing Agent, Post Office Department, Washington, will receive bids until Nov. 6 for two arbor presses, each of approximately 5 tons pressure, and until Nov. 8 for 3000 No. 14 steel wire belt hooks.

The Rodrain Electro-Metallurgical Co., Salisbury, N. C., is planning for a new three-story reduction plant near Lexington, N. C., to cost about $500,000, including machinery. A

power house and machine shop will be built. J. L. Mittenhuter is in charge.

The Andrews-Harris Boiler & Machine Co., Petersburg, Va., will install a boring machine and other equipment.

The Reus Brothers Co., 146 West Mount Royal Avenue, Baltimore, manufacturer of piston rings, etc., has awarded contract to the Charles L. Stockhausen Co., Water Street, for a one-story addition, 59 x 83 ft., to cost approximately $25,000.

The Standard Electric Machinery Co., 7 East Hill Street, Baltimore, machinery dealer, has inquiries out for 7-10 hp. motors and 300-600 kw. turbo-generator sets, with switchboard, surface condenser and auxiliary equipment.

An electrically operated pumping plant will be installed in connection with a new waterworks system at Williamsport, Md., for which bonds for $100,000 are being arranged. The City Council is in charge.

J. A. Harvey, Kinston, N. C., is arranging for the organization of a company to construct and operate an ice-manufacturing and cold storage plant at Wauchula, Fla., for which tentative plans are under way.

The Richmond, Fredericksburg & Potomac Railroad Co., Richmond, Va., has acquired about 30 acres at Acca as a site for new locomotive and car shops.

The Norfolk & Western Railway Co., Norfolk, Va., will electrify its coal terminal at Lambert's Point, Piers 2 and 3, with 120-ton coal dumpers and other mechanical equipment.

The Wortendyke Mfg. Co., foot of Thirteenth Street, Richmond, Va., manufacturer of paper products, has authorized plans for a new three-story factory, to cost $200,000, with machinery. Carneal & Johnson, Chamber of Commerce Building, are architects.

R. P. Johnson, Wytheville, Va., machinery dealer, is making inquiries for a 20 hp., oil-operated engine, portable or stationary.

The People's Motor Co., West Tabb Street, Petersburg, Va., will install bench tools in its repair works, also a lathe.

The Chief of Air Service, United States Army, Washington, will take bids until Nov. 6 for 10 motor-driven gasoline pumps, circular 23-54.

The Purchasing Agent, Post Office Department, Washington, will take bids until Nov. 12 for two automatic riveting hammers.

Beckerley & Trusler, 306 Stewart Building, Baltimore, machinery dealers, are making inquiries for two horizontal return tubular boilers, 150 hp.; 26-36 in. band saw and bench joiner.

The Board of Awards, office of the City Register, Baltimore, will receive bids until Nov. 8 for 400 boiler tubes for the Highway Engineer Department.

The Norfolk & Western Railway Co., Norfolk, Va., will build an electrically-operated pumping plant on the Bluestone River, near Graham, Va.

The Auto Service Co., 1504 West Broad Street, Richmond, Va., plans the installation of a drill press, emery grinder and other equipment at its repair department. W. H. Wyatt is head.

The Lynchburg Foundry Co., Lynchburg, Va., will rebuild the portion of its pattern shops recently destroyed by fire. An official estimate of loss has not been announced.

The Crystal Ice Co., Elizabeth City, N. C., has commissioned Ophuls & Hill, 112 West Forty-second Street, New York, to prepare plans for a one-story addition to its ice-manufacturing plant, with improvements in present building, to cost $100,000.

Buffalo

BUFFALO, Oct. 30.

THE M. D. Knowlton Co., manufacturer of paper box machinery, plans to erect a 100 x 137 ft. one-story brick and steel addition to its works on Elizabeth Street, Rochester, N. Y.

The Palmyra Pump & Accessories Co., Palmyra, N. Y., recently organized for the establishment of a factory for the manufacture of patented automobile equipment and devices. An affiliated factory at Rochester, N. Y., will be removed here.

The Empire Gas & Electric Co., Auburn, N. Y., has arranged for a bond issue of $1,100,000, a portion of the proceeds to be used for extensions and improvements in plants and system.

A lathe, combination saw, cutoff saw, band saw, bench tools, electric motors and other equipment will be installed in the two-story wood-working mechanical shop to be erected at 23 Poplar Avenue, Buffalo, by William P. Hoffman.

The Binghamton Foundry & Machine Co., Binghamton, N. Y., recently organized with a capital of $250,000, will take over and consolidate the plants of the McGill & Holford Mfg. Co., manufacturer of textile machinery, and Shapley & Wells, 118 Washington Street, manufacturer of boilers and machinery, both of the same city. Plans are under way for expansion. F. L. Dennis and R. S. Cooper head the new company.

The Powertown Tire Corporation, 253 East Avenue, Rochester, N. Y., is taking bids for a four-story service building at 217-19 East Avenue, 40 x 60 ft., to cost $45,000. Hutchinson & Strutz, Cutler Building, are architects.

The Steinmetz Electric Motor Car Corporation, Kate Avenue and the Western Maryland Railway, Baltimore, is considering plans for a new plant at Syracuse, N. Y., to manufacture electrically-operated motor trucks. Dr. Charles P. Steinmetz, chief engineer General Electric Co., Schenectady, N. Y., heads the company. K. E. Turner is assistant general manager.

The Madison Tire & Rubber Co., Buffalo, is arranging for a bond issue of $750,000, a portion of the proceeds to be used for extensions and improvements.

The C. D. Reynolds Co., Alfred, N. Y., has tentative plans for rebuilding its refrigerating and cold storage plant, destroyed by fire Oct. 25 with loss estimated at $80,000. Fred Reynolds is head.

Officials of the Northern New York Utilities, Inc., Watertown, N. Y., have organized the Power Corporation of New York, with capital of $1,000,000 and 300,000 shares of stock, no par value, to operate hydroelectric power plants for industrial service. Water power property of the St. Regis Paper Co. and the Hanna Paper Corporation, St. Regis Falls, N. Y., and vicinity has been acquired, as well as a site on the Racquette River, where a hydroelectric plant of 60,000 hp. is contemplated. John N. Carlisle, president Northern New York Utilities, Inc., will act in the same capacity for the new company.

Pittsburgh

PITTSBURGH, Oct. 30.

THE local machine tool trade is figuring on the greatest amount of business it has had at one time in more than two years. This, rather than the amount being placed, is the encouraging feature of the situation. Among the important prospective business are the 14 heavy tools for the new plant of the National Tube Co., Gary, Ind.; the lists recently put out by the Pennsylvania Railroad for its Juniata and Conway shops and that of the Pittsburgh & Lake Erie Railroad. Another list before the trade is one of eight tools for the Neely Nut & Bolt Co., Pittsburgh, and calls for a lathe, shaper, miller, drill press, grinder, hacksaw, an arbor press and a portable grinder. Single tool inquiries still are numerous. The trade as a whole looks upon much of the prospective business as very likely to close before the end of the year.

In cranes and other heavy equipment the story is the same as that in the lighter lines. The local offices of power equipment manufacturers, while reporting actual business to be slow, state that prospective orders exceeding $1,000,000 in value are being figured on. Pending crane business also is heavy. Exclusive of the 41 cranes for the new Gary tube mills of the National Tube Co., there are what are regarded as live inquiries for about 25 overhead cranes, at least 10 jib cranes and a number of hoists. Preliminary quotations for estimating purposes are also going out every day. The National Tube Co. is expected to buy its cranes soon. There has been a report that the order had been placed and that an Ohio and a Michigan builder had divided the award. Confirmation, however, is lacking.

A steel maker outside the Pittsburgh district is in the market for three 10-ton mill type cranes. The Koppers Co. has not yet placed the 5-ton and 10-ton air-operated overhead cranes for the by-product plant addition to the Clairton plant of the Carnegie Steel Co., nor for a 10-ton hand-power crane for the by-product plant of the Weirton Steel Co., Weirton, W. Va. A 50-ton power house crane for the Jones & Laughlin Steel Co. still is pending, while the Pennsylvania Railroad, in addition to the tools it has taken bids on for its Conway shops, Freedom, Pa., has inquired for a 10-ton 3-motor overhead crane, a 2-motor hoist and 10 jib cranes for those shops. The Neely Nut & Bolt Co. wants a 5-ton, 60-ft. span crane.

In crane and heavy equipment orders the Mackintosh-

Hemphill Co., Pittsburgh, recently closed for a 50-ton Niles crane with 5-ton auxiliary hoist, for its Garrison plant, this being a duplicate of a crane already at that plant; the DuRoth Steel Car & Truck Co., Osgood, Pa., has bought one 10-ton 3-motor crane, one 5-ton, one-motor crane and one 2-ton, one-motor crane from the Barber Foster Co., Cleveland; the J. E. Moss Iron Works, Wheeling, W. Va., has bought a used 10-ton Northern crane of 57-ft. 2-in. span from stock at the Hog Island shipyard, and Wellman-Seaver-Morgan Co., Cleveland, has taken orders for four oven pushers for the addition to the Clairton by-product plant and one for the by-product plant of the Weirton Steel Co., together with much other oven equipment.

The Standard Underground Cable Co., Westinghouse Building, Pittsburgh, is taking bids for an addition to its plant at Sixteenth and Pike Streets. The W. G. Wilkins Co., Westinghouse Building, is engineer.

The Gulf Oil Corporation, Frick Annex, Pittsburgh, has disposed of a bond issue of $35,000,000, a portion of the proceeds to be used for extensions and improvements.

The Maniscalco New Power System Co., M. & M. Bank Building, Sharon, Pa., is arranging for the installation of machinery in a local building to manufacture a special type electric motors and parts.

The West Penn Power Co., West Penn Building, Pittsburgh, has plans in progress for a new power house at State Line, Pa., to connect with the system of the Monongahela Power & Railway Co., Riversville, W. Va., lately acquired. Plans are nearing completion for a new 80,000 hp. electric plant at Charleroi, Pa.

The Fairmont & Cleveland Coal Co., Fairmont, W. Va., has issued bonds for $350,000, a portion of the proceeds to be used for mining plant extensions of the Chesapeake and other properties, including the installation of power and mechanical equipment.

The National Forge & Tool Co., Irvine, Pa., is planning for the installation of a new heavy type drill press and other equipment.

The Greenview Coal Co., Greenview, W. Va., recently organized, will install electrical equipment, hoisting machinery, mine cars, etc., at its local properties. E. G. Watkins is president and general manager in charge.

John S. Scully, Jr., Winchester, Va., will equip an electric light and power plant in connection with a summer resort enterprise at Capon Springs, W. Va.

The Interstate Oxygen Co., Forty-fourth Street, Wheeling, W. Va., has awarded contract to H. L. Searight, Wheeling, for a new one-story plant, 100 x 150 ft., for the manufacture of commercial oxygen, etc., estimated to cost $55,000.

The Pittsburgh & Lake Erie Railroad Co., South Smithfield Street, Pittsburgh, will install a 10-ton crane, lathes, drill press and other tools at its shops. C. M. Yohe is purchasing agent.

Detroit

DETROIT, Oct. 30.

A MUNICIPAL hydroelectric power plant estimated to cost $150,000, with machinery, is under consideration by the Common Council, St. Johns, Mich.

A one-story power house, 40 x 75 ft., will be built in connection with the new four-story hospital of the Holland Hospital Association, Holland, Mich., estimated to cost $250,000. Robinson & Campau, 715 Michigan Trust Building, Grand Rapids, Mich., are architects.

The Consumers' Power Co., Grand Rapids, Mich., has arranged for a bond issue of $14,000,000, a portion of the proceeds to be used for extensions and improvements. George E. Hardy is vice-president.

Durant Motors, New York, has awarded contract to the H. G. Christman Co., Detroit, for the construction of an additional unit to the building program in Flint, Mich. The new structures are to be utilized to double the production of the Star car, and will be a duplicate of the plant being erected for the manufacture of the Flint Six, having a floor space of 516,000 sq. ft. May 1, 1923, is the date set for completion, and the Durant enterprises in Flint will then employ at least 8000 men.

The American Steam Pump Co., Battle Creek, Mich., will erect a one-story addition, 50 x 60 ft., to cost $20,000.

The Commonwealth Power, Railway & Light Co. of New York has purchased the White Lake Power Co. at Montague, Mich., and will further develop the facilities of this company.

The H. G. Christman Co., Detroit, has been awarded contract for building a new distributing station for electric current produced by Lansing's new municipal power plant. The cost is given as $32,000.

The Common Council, North Muskegon, Mich., has rejected bids received for an electrically-operated pumping plant at the waterworks, and will call for new bids. Hoad, Decker, Shoecroft & Drury, 303 South State Street, Ann Arbor, Mich., are engineers.

Lindwall & Lindstrom, Iron River, Mich., operating an automobile machine and repair shop, are planning for the installation of additional equipment, including drill press, bench tools, etc.

The Rickenbacker Motor Co., 4815 Cabot Avenue, Detroit, has preliminary plans in progress for a one-story addition. F. J. Winter, 2331 Dime Bank Building, is architect.

The Whirlwind Vaporizer Corporation, Detroit, has been organized under State laws, to manufacture vaporizers for Ford automobiles. The incorporators are C. W. and W. M. Grover and H. M. Gaffney, 125 Hill Avenue, Detroit.

The International Seal & Lock Co., Hastings, Mich., is in the market for a heating, lighting and power unit.

Chicago

CHICAGO, Oct. 30.

THE Chicago, Burlington & Quincy has bought the shapers, engine lathes, bending rolls and punches and shears on its general list, and is expected to continue to place orders during the current week. The Chicago, Rock Island & Pacific has added to its recent purchases, having ordered several upright drill presses and portable lathes. Word comes from St. Louis that the Missouri-Kansas-Texas has placed orders for the major portion of its large list. The Boyne City, Gaylord & Alpena Railroad has ordered a 24-in. engine lathe for its shop at Boyne City, Mich. Machine tool business from general sources has fallen off materially, but railroad orders will probably bring October total sales up to a figure which compares favorably with the record for any previous month this year.

The Chicago Mill & Lumber Co., Chicago, has ordered a 5-ton electric overhead traveling crane from the Shaw Crane Co.

The Universal Body Corporation, 230 East Ohio Street, Chicago, recently incorporated with $50,000 capital stock, has leased 24,000 sq. ft. of factory space in a building at Pershing Road and South State Street and will manufacture automobile bodies of the closed type. It is probable that production will be limited to taxicab bodies until early next spring. All of the work will be done in the company's plant and not by contract. Additional metal-working and woodworking machinery, as well as special body equipment, is expected to be purchased within the next three months. The officers are J. L. Geier, president; W. H. Heggem, secretary and H. L. Schroeder, treasurer.

The X-L Refrigerating Co., Inc., 1834 West Fifty-ninth Street, Chicago, is receiving bids on a one-story factory, 125 x 132 ft., at the northwest corner West Fifty-ninth and Aberdeen Streets, to cost $60,000. A. G. Lund, 453 West Sixty-third Street is architect.

Rawson & Eisenberg, 5 North LaSalle Street, Chicago, will complete plans about Nov. 1, and receive bids on a three-story factory, 100 x 125 ft., with metal window frames and probably a freight elevator, for manufacturing bed springs.

The Badeker Mfg. Co., manufacturer of metal gaskets, 212 North Sheldon Street, Chicago, has let contract for a one-story factory, 50 x 180 ft., at 4612-14 Park Avenue.

A. E. Ficar is having constructed by Holton, Seelye & Co., 140 South Dearborn Street, Chicago, a one and two-story automobile paint shop, 50 x 163 ft., at 2532 Indiana Avenue, to cost $120,000.

The International Harvester Co., 606 South Michigan Avenue, Chicago, will construct a one-story foundry, 40 x 213 ft., between the south branch of the Chicago River and the Pennsylvania Railroad tracks, to cost $55,000.

A. Fulton, 7400 South Ada Street, Chicago, has let contract for a two-story brick ice plant, 175 x 175 ft., at 1313-27 West Seventy-fourth Street, to cost $50,000.

The Casper Iron Foundry, a recently organized company, is constructing a one-story foundry, 30 x 60 ft., on East C Street, near McKinley Street, Casper, Wyo. Among those interested are Dan Ader, an experienced molder, formerly of Chicago, Ray J. Holloran, and R. D. Crane, for seven years a still man at the Standard Oil Co. refinery at Casper. These men have formed a partnership.

The new power plant of the Public Service Co. of Northern

Illinois, now under construction at Waukegan, Ill., will be [illegible]

The Dubuque Electric Co., Dubuque, Iowa, is constructing an addition to its power plant at the foot of Sixth Street, comprising a boiler house addition, 58 x 63 ft., a skip hoist coal handling system and a reinforced concrete stack, 248 ft. high.

The Central Power Co. is breaking ground for a new steam generating station on a 20-acre site just west and north of the new Burlington Bridge, east of Scotts Bluff, Neb. The station will develop 5000 kw., and will cost approximately $750,000.

The Mayor and City Council, Marshall, Ill., will receive bids on improvements to the light and power plant until Nov. 9. The new facilities will include a new power house, two a. c. generators directed to uniflow engines, switchboard, two boilers, piping, chimney, moving and resetting one fire-tube boiler, etc.

Fire recently destroyed the molding room of the York Foundry & Engine Co., York, Neb. It will be repaired at once.

The Mid-City Foundry Corporation, recently incorporated with $15,000 capital stock, has leased the plant of Henry E. Pridmore, manufacturer of molding machines, at 1901 South Rockwell Street, Chicago. It will be operated as a foundry for the manufacture of medium and heavy grey iron castings. The officers, all of whom are practical foundrymen with years of experience as molders and core makers, are as follows: Carl J. Berg, president; Julius Drofka, vice-president; Lennart Dahlberg, treasurer; and Frank Cederwall, secretary.

The Hassinger Gravimeter Corporation, care Bruckner & Ingraham, 616 Reaper Block, Chicago, recently incorporated with $200,000 capital stock, will manufacture an instrument for the accurate and instantaneous determination of the specific gravities of solids and liquids at any given temperature. It is designed especially for determining the solid content of milk, fat, sugar, proteins, ash; cheese-making properties; the solid content of oils, acids, chemicals, etc., and will be adaptable for use in determining the composition of ice cream, condensed milk, sugar, cement, asphalt, and other solids. The company has not yet begun manufacturing on a commercial scale, but contemplates leasing a plant for this purpose. It expects to have a plant of its own within a year. The officers are Adolph T. Hassinger, president; George Jay Kepp, vice-president; Jesse E. Meyer, secretary-treasurer.

The Ackermite Co. of America, 80 West Washington Street, Chicago, recently incorporated, has been operating a factory in Chicago for the manufacture of bearing metal for some time, and has concluded arrangements for a much larger plant. The equipment for the new factory has been purchased. Officers are Walter H. Eckert, president; A. H. Ackerman, vice-president; Frank G. Jones, secretary.

The Northern Machinery Co., Minneapolis, Minn., is inquiring for a used No. 22 New Britain automatic.

The Patent Scaffolding Co. of Illinois, 506 South Canal Street, Chicago, has purchased just west of Southport Avenue, fronting 275 ft. on Center Street, and partly improved with a one-story building. It will make some additional improvements and will occupy the property.

The Raymith Mfg. Co., manufacturer of electrical switch boxes, 3707 Ogden Avenue, Chicago, has leased a one-story building, 50 x 125 ft., at 1943-45 Carroll Avenue for five years.

The Tyree Auto Radiator Co., 814 West Thirty-third Street, Chicago, has leased the first floor, 100 x 100 ft., of the building at 1500-02 West Fifteenth Street, for a term of years.

The Bassick Mfg. Co., manufacturer of automobile accessories, 2638 North Crawford Avenue, Chicago, is having plans prepared for a one-story mill-constructed factory, 55 x 142 ft., at North Homan Avenue, near the Chicago, Milwaukee & St. Paul right-of-way. The estimated cost is $30,000.

At a special city election at Fort Morgan, Colo, Oct. 18, it was voted to issue water bonds for $125,000, to provide a new power plant.

The Lu Mi Nus Signs, Inc., 1400 South Michigan Avenue, Chicago, has purchased a one-story factory on Wentworth Avenue, north of Twenty-eighth Place.

The Victory Ice & Ice Cream Co., South Keeler Avenue and Sixteenth Street, Chicago, is taking bids for a new two-story ice-manufacturing plant, 200 x 200 ft., estimated to cost $100,000. E. E. McClellan, 7441 Cottage Grove Avenue, is architect.

The Chicago, Rock Island & Pacific Railroad Co., 139 West Van Buren Street, Chicago, has plans nearing completion for a one-story addition to the machine shop, 36 x 250 ft., at Cedar Rapids, Iowa, to cost $25,000. A. T. Hawk, company address, is architect.

The Common Council, Shelbyville, Ill., has arranged a bond issue of $100,000 for a municipal electric power plant, 45 x 100 ft., and system, with installation to include two 500 kw. generators, two 200 hp. boilers and auxiliary machinery. W. A. Fuller, 1971 Railway Exchange Building, St. Louis, is engineer.

The County Commissioners, City Hall, Minneapolis, Minn., are having plans completed for a new power house at Glen Lake, to cost about $200,000, with machinery. Sund & Dunham, 514 Essex Building, Minneapolis, are architects.

Fire, Oct. 17, destroyed the three-story works of the Knudsen Auto Co., 202 Superior Street, Duluth, Minn., including machinery and tools, with loss approximately $75,000. H. B. Knudsen is head.

The City Council, Fairmont, Minn., has tentative plans under way for the installation of a municipal water softening plant, for which a fund of about $60,000 will be arranged. Jones & Curtis, Fairmont, are engineers.

The Minneapolis Steel & Machinery Co., Minneapolis, Minn., has plans in progress for enlargements, to include several shops primarily for locomotive repair work. Additional equipment will be installed.

The Eagle Ottawa Leather Co., Grand Haven, Mich., will install additional power equipment at its plant, including mechanical stokers, pumps, feed-water regulators and other apparatus. Cahill & Douglas, 217 West Water Street, Milwaukee, are engineers.

The Rockford Malleable Iron Works, Rockford, Ill., has foundations in progress for a one-story annealing plant, 90 x 120 ft., to cost about $40,000. George C. Forbes is secretary and treasurer.

Cleveland

CLEVELAND, Oct. 30.

LOCAL manufacturing houses are getting a fair volume of scattered orders, almost entirely for single machines. Some automobile manufacturers are buying small lots or single machines for replacement purposes, and there is a moderate volume of buying by automobile parts manufacturers, whose orders are generally for small machines. The most important prospect in the automotive industry is the Kelsey Wheel Co., Detroit, which is reported to be in the market for equipment for manufacturing motors for the Gray car. Screw machine manufacturers are booking numerous small orders. During the week the Republic Brass Co., Cleveland, purchased five screw machines from a local manufacturer.

Railroad business is dragging and no sales are reported from that source. The volume of inquiries seems to have improved, and a few inquiries for large machines are pending. Machine tools business as a whole during October was in the same volume as in September.

The only price change reported is a 10 per cent advance by the Porter-Cable Co. on its line of tool room lathes, effective Nov. 1.

The Lampson & Sessions Co., Cleveland bolt, nut and rivet manufacturer, will enlarge its Kent plant by the erection of a single story building, providing 35,000 sq. ft. of floor space. This is the former plant of the Falls Rivet Co., which was acquired by the Lampson & Sessions Co. last June. Some bolt making and other machinery will probably be required, but the company advises that it will make no purchases before spring.

The Denby Wire & Iron Co., 5119 Euclid Avenue, Cleveland, will erect a one-story manufacturing plant, 40 x 105 ft., at 3005 East Eighty-first Street. It manufactures wire railings, bank fixtures, grills, etc.

It is reported from Lima, Ohio, that the Chamber of Commerce of that city has closed negotiations with the Pittsburgh Engineering Co., Jeannette, Pa., to remove its plant to Lima.

The Stull-Boylston Co. will erect a three-story factory in Lima, Ohio, for the manufacture of pencils and pens. The plant now located at Addelboro, Mass., will be moved to Lima as soon as the new building is completed; and the

executive offices now located at Fremont, Ohio, will also be moved to Lima.

It is announced that the Herbrandt Co., Fremont, Ohio, will erect a branch plant for the manufacture of wrenches.

The American Steel Foundry, Alliance, Ohio, is inquiring for a 4000 lb. steam forging hammer. A double stand hammer with extra heavy anvil for heavy duty is specified.

The General Tire and Rubber Co., Akron, Ohio, will enlarge its plant by the erection of three three-story buildings, 60 x 100 ft., 40 x 180 ft., and 36 x 100 ft., respectively.

The Sunray Stove Co., Delaware, Ohio, will enlarge its plant by the erection of a brick factory, 60 x 100 ft.

Milwaukee

MILWAUKEE, Oct. 30.

OCTOBER sales of machine tools are reported by most builders in this market as exceeding the volume in any month this year, although a few shops, such as milling machine makers, find that April and May still stand out as high lights in this year's sales to the automotive industries. Railroad business continues to make gains. Although nothing definite has been made public, it is reported that the Chicago, Milwaukee & St. Paul intends to make some fair-sized purchases for the West Milwaukee locomotive and car repair shops. This business probably will be placed through the general offices in Chicago. The Federal Rubber Co., Cudahy, Wis., is buying a miscellaneous list of tools, and already has bought a Niles-Bement-Pond boring mill and several other items. The Allis-Chalmers Mfg. Co. is buying some new equipment from time to time, but no large list is in immediate prospect. The Seaman Body Corporation is buying wood and metal-working machinery for a $350,000 factory extension.

The S. Miller Cold Storage Co., Rhinelander, Wis., is inquiring for power plant and refrigerating equipment for a three-story warehouse, 44 x 116 ft., the general contract for the erection of which was let Oct. 25 to Krasin Brothers, architects and builders, 151 South Central Avenue, Marshfield, Wis. The investment will be about $75,000 in all.

The Chippewa Valley Auto Co., Chippewa Falls, Wis., has placed the general contract with Tschopp, Durch & Canastral, local contractors, for a $75,000 garage, sales and service building at West Grand Avenue and Bay Street. It will be four stories, 100 x 110 ft. The machine shop will occupy about 7500 sq. ft. Equipment is now being purchased. Fred A. Bigler is president and general manager.

The August C. Beck Co., 1-30 East Street, Milwaukee, manufacturer of shipping cases, cigar boxes, etc., has started work on the reconstruction of the main mill and factory damaged by fire early in October. New wood-working equipment and some power plant machinery are being purchased. The architect is Henry G. Lotter, 427 Milwaukee Street. Ernest E. Fair is secretary and manager of the Beck company.

The Allan-Diffenbaugh Wrench & Tool Co., Baraboo, Wis., has authorized an issue of $25,000 additional stock for the purchase of a miscellaneous list of equipment for the production of wrenches, mechanics' tools, etc. The present capacity is fully occupied past Jan. 1. Lorenz Maisel is works manager.

The Madison Pattern Works, 2019 Winnebago Street, Madison, Wis., has let contracts for a one-story brick and concrete addition, 50 x 85 ft., to cost about $17,000 with additional equipment now being purchased.

The United States Engineer Office, Federal Building, Milwaukee, is taking sealed bids until Nov. 27 for furnishing one dipper dredge complete with hull and house. No estimate of the price is given.

Heilprin & Co., Madison, Wis., wholesale fruit, vegetable and grocery dealers, have purchased a site at North Bedford and West Mifflin Streets for a new cold storage warehouse estimated to cost $85,000. Work will begin Jan. 1, when possession of the property will be given the new owners. The warehouse at West Main Street and the Illinois Central tracks also will be rebuilt and enlarged at a cost of $25,000 next spring.

The John Wilging Co., 1612 Teutonia Avenue, Milwaukee, will build a two-story factory, 80 x 120 ft., of brick and concrete, for the manufacture of fine millwork, interior fixtures and hardwood specialties, at Thirty-third and Burleigh Streets.

The Mayville, Wis., Board of Education has commissioned Parkinson & Dockendorff, architects, LaCrosse, Wis., to design a new high school and manual training building, two stories, 112 x 274 ft., with separate heat and power plant; estimated cost, $245,000 complete. Contracts will be let about Jan. 1. Alvin Draeger is secretary of the board.

Indiana

INDIANAPOLIS, Oct. 30.

THE Tokheim Oil Tank & Pump Co., Fort Wayne, Ind., manufacturer of gasoline pumping and storage systems, has completed plans for a one-story plant on Wabash Avenue, 150 x 350 ft., estimated to cost $100,000, including machinery.

The Citizens' Heat, Light & Power Co., Winchester, Ind., will make extensions in its plant and system, including power houses at Modoc and Losantville, Ind., estimated to cost $125,000 with equipment.

The Indestructible Wheel Co., Lebanon, Ind., manufacturer of automobile wheels, will take bids at once for a new two-story plant, 100 x 160 ft., for wire wheel production, estimated to cost $65,000.

The United Public Service Corporation, Rochester, Ind., has acquired the power plant and system of the Logansport Utilities Co., Logansport, Ind. Extensions and improvements will be made, and additional equipment installed, to cost about $150,000.

The Cudahy Packing Co., 111 West Monroe Street, Chicago, has plans in progress for an addition to its refrigerator car manufacturing plant at East Chicago, Ind., to cost about $75,000. Other departments will be extended to provide for a production of 750 refrigerator cars during the next twelve months.

The Common Council, Merom, Ind., has tentative plans under way for the installation of a municipal electric plant and system.

The Valparaiso Lighting Co., Valparaiso, Ind., will acquire the plant and property of the Monterey Light & Power Co., Hebron. Extensions and improvements will be made, including the installation of additional equipment.

The Merchants' Heat & Light Co., Indianapolis, will issue bonds for $267,000 and stock for $87,000, a portion of the proceeds to be used for extensions.

The Standard Oil Co. of Indiana, Indianapolis, will install new power equipment at its plant at Whiting, Ind., including boilers, stokers, etc.

Cincinnati

CINCINNATI, Oct. 30.

RAILROAD business again was a big factor in the local machine tool market last week. One manufacturer reports orders amounting to approximately $60,000, the greater part coming from the Burlington. The Rock Island also bought a number of tools. The Missouri-Kansas-Texas has made further purchases, and, in addition to a number of miscellaneous machines booked locally, is reported to have placed its lathe requirements with a St. Louis district manufacturer. The Cincinnati Hy-Speed Machine Co., drilling machine manufacturer, bought six tools, involving an expenditure of approximately $20,000, a local dealer getting the order.

Reports generally showed a falling off in industrial purchases for the early part of the month, but the amount of railroad business placed makes the month one of the best with many manufacturers since 1920. In the last few days a number of orders for one and two machines have been booked and similar inquiries coming out have greatly encouraged the trade.

While reports are heard of low prices being quoted, these are traced to old quotations made before the general advance in prices in September, and in practically all cases quotations made on the old prices have been withdrawn and the new lists are being firmly adhered to.

The Cincinnati Galvanizing Co., Cincinnati, through the Schott Brothers Realty Co., has purchased land from the Procter & Gamble Co., at Spring Grove Avenue and Chickering Street, and is having plans prepared for a new factory. George M. Schott is president.

The main shops of the Tennessee Central Railway, Nash-

ville, Tenn., were practically destroyed by fire Oct. 27, with loss estimated at $400,000. Five locomotives, 50 box cars and a large quantity of valuable machinery were also destroyed.

The plant of the Lexington Battery Mfg. Co., Lexington, Ky., was destroyed by fire Oct. 13, causing a loss of $75,000. It will be rebuilt.

The Chevrolet Motor Co., Detroit, is taking bids on a plant 300 x 600 ft., to be erected in Norwood, Ohio, and a similar adjoining building will be erected by the Fisher Body Corporation. While the purpose of the new structures has not been definitely announced, it is reported that they will be used for assembling the new air-cooled car soon to be put on the market by the General Motors Corporation. Bids for the buildings will close Nov. 7. The cost, with equipment, is estimated at $3,000,000.

A movement is on foot to consolidate the Monroe Motor Co., Indianapolis, with a Louisville, Ky., manufacturing plant, the purpose being the moving of the Monroe company's business to Louisville. Should the consolidation go through, plans provide for an output of 30 cars a day, giving employment to 400 men.

The Belden Brick Co., Somerset, Ohio, is making additions which will increase the capacity 25 per cent. Further extensions are contemplated during the winter. G. A. Brand is superintendent.

The Ohio Power Co. has appropriated $387,000 for improvements in and around Lancaster, including the building of a new sub-station and construction of high voltage lines from Lancaster to Logan, the latter involving an expenditure of $200,000.

The Fabricated Steel Products Co., Leetonia, Ohio, is in the market for a used cupola fan, 30 or 36 in., belt driven.

The Gulf States

BIRMINGHAM, Oct. 30.

DWIGHT P. ROBINSON & CO., INC., New York, has been awarded contract for the erection of a cement mill at Birmingham for the Lehigh Portland Cement Co., Allentown, Pa. It will have a capacity of 1,000,000 bbl. a year.

The Galveston, Harrisburg & San Antonio Railroad Co., Houston, Tex., operated by the Southern Pacific Railroad Co., has plans for a new repair plant at El Paso, Tex., including a one-story locomotive erecting shop to cost $250,000; addition to present engine house and shop, $50,000; storehouse and other buildings, $50,000. J. W. Harshaw is division engineer.

The New Orleans Public Service, Inc., New Orleans, is disposing of a bond issue of $12,000,000, a portion of the proceeds to be used for electric plant extensions and improvements. A. L. Kempster is vice-president and general manager.

The State Board of Regents, University of Texas, Austin, has plans nearing completion for a new power house at Galveston, Tex., in connection with a proposed medical college, with total estimated cost of $400,000. The Herbert M. Green Co., North Texas Building, Dallas, Tex., is architect.

The city of Miami, Fla., Frank H. Wharton, general city manager, will take bids until Nov. 7 for centrifugal and other pumping machinery, motors and miscellaneous equipment for the municipal water plant. Charles W. Murray is director of public service.

Dowling Brothers, Odessa, Fla., are planning to rebuild their lumber mill, recently destroyed by fire with a loss of $250,000, including power house, machine shop and other buildings.

The Terminal Oil and Refining Co., Texas City, Tex., has plans nearing completion for an addition to its local refinery and oil-topping works, to more than double the present capacity. C. E. Robertson is general superintendent.

The Common Council, Raymondville, Tex., has plans in progress for a new municipal electric light and power plant.

The Imperial Oil & Gasoline Products Co., Sterlington, La., is planning for extensions and improvements to cost $150,000, including machinery.

The Common Council, Franklin, La., has plans in preparation for a new unit at the municipal light and power plant.

The Robbins & Fletcher Co., Eldorado, Tex., is planning for a new local ice-manufacturing and refrigerating plant. A list of machinery will be arranged.

The Gonzales Cement Works, Gonzales, Tex., has plans in progress for a new two-story plant, 50 x 90 ft., with adjoining one-story structure, 40 x 50 ft. A. O. Neumann heads the company.

The Rosedale Compress Co., Rosedale, Miss., plans to rebuild the portion of its plant recently destroyed by fire with loss estimated at close to $40,000.

Bonds for $25,000 have been approved at Tulia, Tex., for extensions and improvements at the municipal electric plant.

The General American Tank Car Corporation, 111 West Monroe Street, Chicago, has acquired about 300 acres near New Orleans as a site for a new plant to manufacture and repair steel railroad cars. Plans will be prepared at once. A power house will be constructed.

The Common Council, Canton, Tex., has tentative plans under way for a municipal electric light and power plant.

The Colorado, Columbus & Mexican Railroad Co., Columbus, N. M., recently organized, will construct car and locomotive repair shops on site to be selected, in connection with the proposed new line from Columbus to Farmington, N. M., and branch road to El Paso, Tex. Application has been made to issue bonds for $20,000,000 and stock for $5,000,000 for the project.

William L. Papham, Apalachicola, Fla., is organizing a company to build and operate an ice-manufacturing plant, with electrically-operated refrigerating department.

The Kilby Pipe Co., Anniston, Ala., recently organized, has preliminary plans in progress for a new foundry to manufacture cast iron pipe. A department will be established for the manufacture of fittings and other castings. E. M. Kilby heads the company.

The Central South

ST. LOUIS, Oct. 30.

ALL of the list of machine tools on which prices were asked by the Missouri-Kansas-Texas Railway have been purchased. It is understood that most of the equipment went to Manning, Maxwell & Moore. Aside from this, there is more activity in the market for machine tools.

The United States Public Service Co., St. Louis, is disposing of a bond issue of $1,100,000, a portion of the proceeds to be used for extensions and improvements in plants and system. H. Wurdack is president.

The Midwest Piping & Supply Co., 1452 South Second Street, St. Louis, is taking bids for a one-story and basement addition, 120 x 135 ft., to cost $35,000. Klipstein & Rathman, Chemical Building, are architects.

The Springfield Ice & Refrigerating Co., Springfield, Mo., has plans in progress for an addition, with improvements in present building, to cost $55,000. Ophuls & Hill, 112 West Forty-second Street, New York, are engineers. A. F. Johnson is general manager.

A power house will be installed at the new North Side high school on Natural Bridge Avenue, St. Louis, for which plans are being prepared, to include two 350-hp. boilers, stokers, pumping machinery, mechanical fans, etc. R. M. Milligan, 506 Board of Education Building, is architect.

Fire, Oct. 20, destroyed the planing mill at the plant of the Blackfoot Lumber Co., Stamps, Okla., with loss estimated at $60,000, including machinery. It is planned to rebuild.

The Arkansas Light & Power Co., Arkadelphia, Ark., is planning for a new power house at Smackover, Ark., for local light and power supply, to cost $30,000.

The Sinclair Consolidated Oil Corporation, 45 Nassau Street, New York, has extension and improvement work under way at its refinery at Coffeyville, Kan., to develop a capacity of 5000 bbl. per day. Construction is also in progress on a second unit at the refinery at East Chicago, Ind., to have a daily capacity of about 10,000 bbl. Plans are under consideration for another unit at Houston, Tex.

The Board of Commissioners, Artesian Water Department, Memphis, Tenn., will take bids until Nov. 24 for equipment for installation at a new waterworks plant, including two 100-kw. direct-connected unaflow engine-generator sets and switchboard; coal and ash-handling system; three low-head centrifugal pumps, direct-connected to reaction water turbines. A traveling crane will also be installed. Fuller & McClintock, 421 Produce Exchange Building, Kansas City, Mo., with branch office at 170 Broadway, New York, are engineers.

The New State Ice Co., Oklahoma City, Okla., has plans in progress for a new electrically-operated ice-manufacturing plant, with 6000-ton cold storage building adjoining. The present works will be remodeled and improved. Total cost is estimated at close to $290,000, including machinery. Ophuls & Hill, 114 West Forty-second Street, New York, are engineers. Carl S. Glitsch is vice-president.

The Carthage Spoke Co., Carthage, Tenn., plans for an addition to its factory, including improvements in present works. New machinery will be installed. The capital has been increased from $50,000 to $100,000.

The Knoxville Power & Light Co., Knoxville, Tenn., has

arranged a fund of $430,000, for power plant and system extensions and improvements. C. H. Harvey is president.

The Duncan Machinery Co., Knoxville, Tenn., machinery dealer, has inquiries out for a complete steam power plant, with engine, generator, etc., with capacity not less than 200 hp.; also, for a used portable truck loader, operated with a gasoline engine, in good condition.

The Louisville & Nashville Railroad Co., Louisville, is considering plans for the removal of its car construction and repair shops from Earlington, Ky., to a new site at Atkinson Junction, Ky., where the capacity will be increased. W. H. Courtenay is chief engineer.

The West St. Louis Water & Light Co., Clayton, Mo., plans for extensions and improvements in power house and system, including the installation of additional equipment to cost about $250,000.

The Empire Refineries, Inc., Ponca City, Okla., will make further additions and improvements in its oil refinery, to cost in excess of $1,000,000 with equipment. This is in addition to approximately $2,000,000 which has been expended in recent months.

The Illinois Central Railroad Co., 135 East Eleventh Place, Chicago, has tentative plans under way for extensions in its shops at Paducah, Ky. Improvements will also be made in the present works. E. L. Thompson is chief engineer.

The Oklahoma Fabric & Rubber Co., recently organized with a capital of $2,500,000, has plans in progress for new works in the vicinity of Muskogee, Okla., estimated to cost $1,000,000, including machinery. Officials of the Allentown Tire & Rubber Co., Allentown, Pa., are identified with the new company. The Chamber of Commerce, Muskogee, is interested in the project. A. C. Leathers, general manager of the parent organization, will act in the same capacity for the new company.

G. E. Osborn, 433 Wabash Avenue, Wichita, Kan., is arranging a list of machine tools and other equipment for installation at his proposed machine shop for parts manufacture and general repairs.

The Pacific Coast

SAN FRANCISCO, Oct. 24.

PLANS are nearing completion for a one-story foundry, 36 x 75 ft., at 1901-3 Santa Fe Avenue, for the Atlas Brass Foundry Co., Los Angeles. V. P. Gilbert, 431 Citizens' National Bank Building, is architect.

The United Engine & Machine Co., Fresno, Cal., has been organized with a capital of $250,000 to take over and merge the Fresno Pattern Works, 2137 Cherry Avenue, and the Sulprizio Machine Works, 507 Broadway. Plans are in progress for new works, to include a one-story foundry, 100 x 150 ft.; one-story machine shop, 100 x 150 ft.; one-story forge shop, 50 x 75 ft., and one-story pattern shop, 50 x 75 ft. The new company will specialize in the manufacture of piston rings, valves, general castings, etc. G. J. Dolan, Jr., and D. Sulprizio head the organization.

The Western States Gas & Electric Co., Stockton, Cal., has arranged for a note issue of $5,000,000, a portion of the proceeds to be used for extensions and improvements.

The Southern California Edison Co., Los Angeles, has plans in progress for a machine and electrical repair shop, 170 x 270 ft., to be erected in connection with a group of warehouses, 200 x 600 ft., 100 x 400 ft. and 100 x 100 ft., at Alhambra, Cal. Material-handling machinery will be installed in the last noted. The project will cost about $750,000.

Four electric booster plants and a main electrically operated pumping plant will be constructed by the West Stanislaus Irrigation District, Crows Landing, Cal., in connection with a new irrigation project to cost $600,000. E. N. Bryan, Forum Building, Sacramento, Cal., is engineer.

The Imperial Ice & Development Co., Calexico, Cal., will lay foundations at once for an addition to its ice-manufacturing plant with capacity of 10,000 tons. An addition to the cold storage plant at Brawley, Cal., with capacity of 3500 tons will also be built.

The Utah Power & Light Co., Salt Lake City, Utah, will construct and operate a hydroelectric generating plant in the vicinity of Soda, on the Bear River. Plans are under way for two units, each with capacity of 10,500 hp.

The Ventura Associated Oil Co., Los Angeles, has tentative plans under consideration for a new oil refinery in the vicinity of Wilmington, Los Angeles Harbor. A storage and distributing plant will also be built.

The Municipal Power Department, Los Angeles, has arranged for a bond issue of $1,149,000, known as the Los Angeles City Electric Plant, a portion of the proceeds to be used for extensions and improvements. E. F. Scattergood is chief engineer.

The Washington Auto Body & Wheel Co., 911 Eleventh Avenue, Seattle, has preliminary plans under way for a one-story addition. Lewis Williams heads the company.

The City Council, Logan, Utah, has made application for permission to construct and operate a municipal hydroelectric power plant on the Logan River, near the State Dam. The initial capacity will approximate 1000 hp.

The Washington Iron Works, Seattle, is completing plans for a new one-story foundry, 130 x 660 ft., at 1500 Sixth Avenue, estimated to cost $100,000. Several electric traveling cranes will be installed. Richard Ellis is company engineer in charge.

The Beaver Portland Cement Co., Portland, Ore., is said to have preliminary plans under way for a new plant in the vicinity of Grants Pass, Ore., estimated to cost $600,000. Plans are also in progress for the development of cement rock deposits in Josephine County, to include the construction of a 3-mile railroad and tramway system. The latter work will cost about $500,000.

Canada

TORONTO, Oct. 30.

IMPROVEMENT in industrial activities is being reflected in a stronger demand for machinery and general plant equipment. Additional announcements regarding new construction are also having their effect on the machinery market and inquiries are being sent out more freely than at any time this year. Demand includes practically all lines, but is more pronounced in woodworking equipment.

The automotive industry is not buying as freely as a month or two ago, but inquiries are out for equipment for two or three plants now under construction. The call on replacement account continues to hold and good business is being done in one or two machines to various buyers. Small tools are still moving freely and orders are said to be of a larger volume than a month or so ago.

J. Read, care the Bridge River Power Co., 602 Hastings Street West, Vancouver, B. C., is interested in prices of equipment for a pulp and paper mill.

The Brantford Arena Co., Brantford, Ont., will erect a plant and is interested in ice making machinery.

The Humberstone Shoe Co., Ltd., Humberstone, Ont., is in the market for two 4-in. gearless sole cutting machines; one 5-hp. electric motor; one clicking machine and other equipment. H. H. Knoll is purchasing agent.

The Moffat Stove Co., Ltd., Denison Avenue, Weston, Ont., will build a two-story addition, 60 x 100 ft., to cost $60,000, and will shortly be in the market for equipment for a porcelain enameling department. F. W. Moffat is interested.

The Parlor Furniture Mfg. Co., Victoria Street, Pointe aux Trembles, Que., whose plant was recently destroyed by fire, will rebuild without delay and is interested in woodworking equipment. G. Langelier is interested.

The Cameron Motor Co., Cleveland, Ont., is contemplating the erection of a plant at Niagara Falls, Ont.

The D. W. Robert Mfg. Co., Lockport, N. Y., is asking bids for a one-story factory, 40 x 80 ft., to be erected at Niagara Falls, Ont., for the manufacture of knives, etc., for paper cutting.

The Fisher Motor Co., Ltd., Orillia, Ont., has completed its new plant and operations have commenced. It is three stories, 75 x 200 ft., and is equipped for the manufacture of die castings, sheet metal stampings, fountain equipment, ball arm radiator caps, etc.

The London Shipping Containers, Ltd., London, Ont., will erect a factory for the manufacture of cartons.

The Dominion Steel Corporation, Sydney, N. S., will install additional equipment in its wire mill with the intention of doubling the present capacity. The installation will include a galvanizing frame which will enable the company to turn out 120 tons of fence material per day, instead of 60 tons as at present. Work will start immediately and the plant is expected to be in operation by February.

Leston & Burnell, 172 Alexander Street, Vancouver, B. C., will rebuild factory and machine shop at a cost of $40,000, recently destroyed by fire, and are interested in prices and information regarding equipment.

The Northern Aluminum Co., 158 Sterling Road, Toronto, is proceeding with the erection of a plate mill to cost $200,000.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	
Refined iron bars, base price	3.04c.
Swedish bars, base price	7.50c.
Soft steel bars, base price	3.04c.
Hoops, base price	4.39c.
Bands, base price	3.84c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	3.14c.
Channels, angles and tees under 3 in. x ¼ in., base	3.04c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.10c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	3.30c.
Toe-calk, ½ x ⅜ in. and larger	4.15c.
Cold-rolled strip, soft and quarter hard	6.75c. to 7.25c.
Open-hearth spring steel	4.50c. to 7.00c.
Shafting and Screw Stock:	
Rounds	3.90c.
Squares, flats and hex	4.40c.
Standard cast steel, base price	15.00c.
Extra cast steel	18.00c.
Special cast steel	23.00c.

Tank Plates—Steel

¼ in. and heavier	3.14c.

Sheets

Blue Annealed

	Per Lb.
No. 10	4.19c.
No. 12	4.24c.
No. 14	4.29c.
No. 16	4.39c.

Box Annealed—Black

	Soft Steel C. R., One Pass, Per Lb.	Blued Stove Pipe Sheet, Per Lb.
Nos. 18 to 20	4.30c. to 4.70c.	.....
Nos. 22 and 24	4.35c. to 4.75c.	5.00c.
No. 26	4.40c. to 4.80c.	5.05c.
No. 28	4.50c. to 4.90c.	5.15c.
No. 30	4.75c. to 5.15c.	.....

No. 28 and lighter, 36 in. wide, 10c. higher.

Galvanized

	Per Lb.
No. 14	4.60c. to 5.00c.
No. 16	4.75c. to 5.15c.
Nos. 18 and 20	4.90c. to 5.30c.
Nos. 22 and 24	5.05c. to 5.45c.
No. 26	5.20c. to 5.60c.
No. 27	5.35c. to 5.75c.
No. 28	5.50c. to 5.90c.
No. 30	6.00c. to 6.40c.

No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
⅛ in. Butt	—50	—42	⅛ in. Butt	—11	+13
¼ in. Butt	—55	—44	¼ in. Butt	—17	— 1
1-3 in. Butt	—57	—44	1-1½ in. Butt	—20	— 2
2½-6 in. Lap	—54	—41	2 in. Lap	—14	+ 2
7-8 in. Lap	—50	—26	2½-6 in. Lap	—18	— 2
9-12 in. Lap	—46	—25	7-12 in. Lap	—10	+ 6

Steel Wire

	Per Lb.
Bright basic	4.50c. to 4.75c.
Annealed soft	4.50c. to 4.75c.
Galvanized annealed	5.15c. to 5.40c.
Coppered basic	5.15c. to 5.40c.
Tinned soft Bessemer	6.15c. to 6.40c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	19¼c. to 20¼c.
High brass wire	20¼c. to 20¾c.
Brass rod	16¾c. to 17¾c.
Brass tube, brazed	26¼c. to 27¼c.
Brass tube, seamless	23 c. to 23½c.
Copper tube, seamless	25¾c. to 26 c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 22¾c. to 23¾c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14-20		
	Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	Primes	Wasters
			80 lb.	$6.05 $5.80
			90 lb.	6.15 5.90
			100 lb.	6.25 6.00
IC	$10.00	$8.50	IC	6.40 6.15
IX	11.50	10.00	IX	7.40 7.15
IXX	13.00	11.25	IXX	8.40 8.15
IXXX	14.25	12.50	XXX	9.40 9.15
IXXXX	16.00	14.00	IXXXX	10.40 10.15

Terne Plates

8-lb. coating, 14 x 20

100 lb.	$7.00
IC	7.25
IX	7.50
Fire door stock	9.00

Tin

Straits pig	39c.
Bar	45c. to 50c.

Copper

Lake ingot	15¼c.
Electrolytic	15 c.
Casting	14¾c.

Spelter and Sheet Zinc

Western spelter	8¾c.
Sheet zinc, No. 9 base, casks	10c. open 10½c.

Lead and Solder*

American pig lead	7¾c. to 8½c.
Bar lead	9c. to 10c.
Solder, ½ and ½ guaranteed	26½c.
No. 1 solder	25c.
Refined solder	22¼c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	75c
Commercial grade, per lb.	35c.
Grade D, per lb.	25c.

Antimony

Asiatic	8¾c. to 9c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb. 25c. to 27c.

Old Metals

Business is quiet with the exception of white metals, which are active. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy crucible	12.00
Copper, heavy wire	11.50
Copper, light and bottoms	9.50
Brass, heavy	6.50
Brass, light	5.50
Heavy machine composition	8.50
No. 1 yellow brass turnings	6.50
No. 1 red brass or composition turnings	8.00
Lead, heavy	5.00
Lead, tea	4.00
Zinc	3.75

THE IRON AGE

New York, November 9, 1922

ESTABLISHED 1855 VOL. 110, No. 19

Some Foundry Troubles and Their Remedy

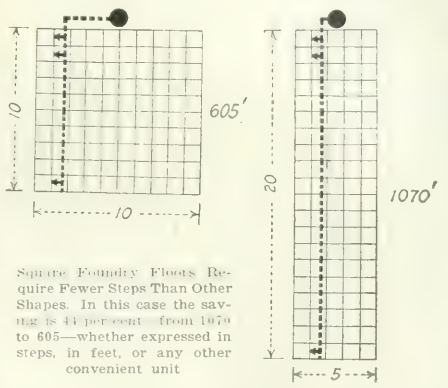
Handling 16 Tons to Make One 230-Lb. Bathtub—Layout of Foundry Floors to Minimize Steps of Molders

BY HENRY M. LANE

MOST foundrymen think that their business is always full of trouble, but that just now they have more than their share, and I am inclined to think they are right. The aftermath of the war left us with a labor shortage. The result is that many of our foundries, and particularly foundries of the snap molding class or light work class, are short of help and must remain short of help when judged by the pre-war basis. The answer is to be found to the problem "how can we get out more castings with less men, and still pay high wages?" We have been facing this problem ever since there was a foundry industry in the United States, and we will face it again and solve it.

As has been stated many times before, the production of castings involves three things: metal, material and man-hours. To produce one ton of ordinary gray iron castings takes about 2040 lb. of metal purchased, and in some cases more. I happen to have available the material sheet for a large foundry producing a line of castings varying all the way from relatively small to those weighing several tons. For producing castings this list shows some forty-odd separate items purchased, including various grades of metal, fire brick, fire clay, different grades of sand, fluxes, core compounds, facing, core binders, core sand, etc. Working this out into pounds of everything necessary to produce one ton of castings, averaged over a period of years, amounted to 3105.84 lb. In other words, over ½ lb. of other material was purchased, and used up, for every pound of castings produced in this shop. The coke purchases for core ovens, foundry and all, showed that they got about 4.6 lb. of castings per pound of coke. The above quantities do not include flask lumber or other similar supplies involved in equipment.

By digging this far into the thing it did not look as though there was very much chance for cutting down the man-hours, and they appeared to be the only thing on which we could make our saving. The next question was what are the man-hours for? Before proceeding to a study of the material handling involved in making 100 lb. of casting, it might be well to consider the shape of floors used by men. We all know that the center of a circle is on an average closer to every point within the circle than the center of any other inclosing form of equal area, but foundry floors are generally rectangular.



Square Foundry Floors Require Fewer Steps Than Other Shapes. In this case the saving is 44 per cent—from 1070 to 605—whether expressed in steps, in feet, or any other convenient unit

If we imagine a square floor with a molder in the center at one side of it, and 100 molds set on this floor, each mold in a square, and being set tight together, and we then figure the distance traveled by the man in units of mold width, which would amount to the same thing as if the molds were all 1 foot square, and we also figured that the man walks along the front of his row, and then down the row, which gives a little more traveling in the case of a square floor than it would in the case of a rectangular floor, we have the following figures:

With 100 molds set down ten on a side, the total amount of traveling to set the molds down is 605 ft., and the same amount for bringing them back. If we now take a floor 5 ft. wide and 20 ft. long, and follow the same rule, we find that our man must travel 1070 ft., which approaches twice the amount he had to travel in the other case. In other words, we find that a square floor is more economical from a carrying standpoint than a long, narrow one. Foundrymen have a tendency to crowd their men close together, and give them long, narrow floors in order to save gangway space, but when we come to the design of continuous foundries we find that the nearer square we can make the man's working floor the greater output we can get from him. This little point is worthy of study. In many cases, by the addition of a few gangways the output of a plant may be considerably increased.

Other handling problems which involve the carrying of materials over a given area can be analyzed in the same way.

Table I shows the necessary handlings to produce a 100-lb. automobile casting, and very little explanation is necessary. For instance: pig iron must be lifted from the car and piled in the yard, which necessitates two handlings at this point. Later it has to be taken from the pile to the scales, off at the scales to the platform, then into the cupola, and then handled in the molten state to the mold, making four handlings. Following this same reasoning it is easy to check over the list and to see that to produce this automobile casting and get it out of the shop with the least possible handling, we had the equivalent of lifting 100 lb. over 55 times, or more than 55 lb. had to be handled to every pound turned out. Also, when we consider that it was generally lifted two or three feet each time, the number of foot pounds involved will readily be appreciated.

Table I.—Handlings Involved in Making a [illegible] Lb. Automobile Casting

	Lb.
Handling 105 lb. of iron from car and piling in yard, 2 handlings	210
Handling coke and trimming back into bin, 11 lb., 3 handlings	[illegible]
Shoveling limestone into bins	4
Shoveling molding sand into bin and trimming back, 30 lb., 1½ handlings	45
Shoveling core sand into bin and trimming back, 80 lb., 1½ handlings	120
Handling iron from pile in yard to scales, off scales into cupola, and carrying molten iron to flask, 130 lb., 4 handlings	520
Handling coke from bin to cupola or core ovens, 11 lb., 3 handlings	33
From the drop we have 2 lb. to be handled twice	4
4 lb. of limestone had to be handled 4 times, including drop	16
Of the incoming molding sand 20 lb. went straight to the heap or one handling, and 10 lb. had to be handled 4 times because it was made into facing sand, and then delivered to the molder. This makes 20 lb. plus 40 lb.	60
The sand heap required for one mold contained 300 lb. of sand, and this required three cut-overs with the shovel for tempering, plus shoveling into the mold, 300 lb., 4 handlings	1,200
The 90-lb. flask onto the machine	90
floor	390
Carrying the flask from the machine to the	
The cope was set down on edge on the floor and had to be closed subsequently	190
80 lb. of cores to be set into the mold	80
In the making of the 80 lb. of cores it required three handlings of the core sand to get it from the bin into the boxes	240
Handling the cores and core plates from the bench to the rack and off the rack represents	240
Handling the core plates and driers back to the core makers	40
During inspection, pasting and delivery of the cores involved 4 handlings of 80 lb.	320
Piling the flask back from the floor	90
Casting gates and cores and lifting off the floor	210
Handling casting at knockout	210
Handling sand from knockout to the dump, 2 handlings of 90 lb.	180
Handling sprue from knockout to the yard, 2 handlings of 30 lb.	60
Handling castings to tumbling barrels and out to the sand blast, in and out through inspection, 2 handlings; through chipping, 2 handlings, and onto a truck for shipping and off the truck into the freight car involves a total of 10 handlings at 100 lb.	1,000
Total amount lifted to produce 100-lb. of casting	5,568½

The abrasive industry is expected to show a substantial increase in business during the next few months, according to the Abrasive Company, Philadelphia. Orders are coming in from the automobile industry, and from the railroads, which are now repairing cars and locomotives. Many of the abrasive plants are working overtime.

The Abrasive Company, Philadelphia, reports that after an extended period of comparative inactivity it is now operating on a 90 per cent basis. Actual betterment was first noticed during March and since that time there has been a most gratifying increase each month until the 90 per cent production figure has been reached. Indications point to further betterment and in consequence the Abrasive company is making a number of plant changes to more adequately handle increased business.

This is really a very low figure. In the case of one concern where a similar study was made it showed 240 lb. to be lifted and set down again to produce a pound of casting. In the case of the automobile casting, owing to the loss in melting, grinding, chipping, etc., we had to use 105 lb. of iron to make 100 lb. of casting; about 30 lb. of molding sand, 80 lb. of core sand, 4 lb. of lime stone, 11 lb. of coke for use in the cupola and core ovens. For pouring the castings it was necessary to melt, including the return, 130 lb. of iron, the flask required 300 lb. of molding sand, and the flask weighed 90 lb., the various cores which entered into the job required 40 lb. of core plates and core driers.

There are certain other lines of work in which larger flasks are handled by cranes. To illustrate a typical case of this kind we show in Table II the molding of a 230-lb. bath tub in which we have 137 lb. handled or, including the enameling and shipping to the store room, 145 lb. handled, for every pound produced.

In this case we have used the minimum amount of handlings possible to produce the tub. In practice there are many more handlings generally involved. The tub weighs 230 lb. net, and takes 300 lb. of iron to pour it, the flask weighs 2700 lb. and contains 1800 lb. of sand. Operations for making one bath tub are detailed in the table.

Our chance for reduction of cost in modern American practice lies almost wholly in this handling end. It is rare that we can make much of a saving in the metal, and we can make only minor savings in the auxiliary material, but our big savings must come from the labor end. We may accomplish something by a better arrangement of departments and working space so as to reduce foot pounds of energy necessary to turn out the product and thus decrease the man-hours expended, or we could substitute mechanical handling for some of the manual work. In the case of the bath tub flask, all of the heavy lifts are naturally made with a crane and the sand is cut over with a sand cutter, or with mechanical equipment, but it still involves the handling problem, and the question is to get this handling problem down to the lowest cost for a given output.

It is in this field that the foundry engineer finds his opportunity to help American foundrymen reduce the cost of their castings. It is true that everyone connected with the foundry will to some extent act as foundry engineer if he devotes his time to this problem. A mistake, however, which is frequently made is to call in the manufacturer of some certain type of equipment, and tell him to see what he can do for you. Many manufacturers are very careful when called in in this way, but others show a tendency to sell the foundrymen as much of their equipment as they can, whether it is the best for the job or not.

It is undoubtedly true that American foundries must in the next few years see a greater concentration and specialization of product, and a greater tendency to substitute mechanical means for manual labor.

Table II.—Handling Involved in Making a 230-Lb. Bath Tub

	Lb.
Loading 240 lb. of iron in the yard, 2 handlings	480
45 lb. of coke in the yard, 1½ handlings	67½
12 lb. of limestone in the yard	12
50 lb. of molding sand in the yard, 1½ handlings	75
300 lb. of iron to the scales, onto the charging platform, into the cupola, and in molten state to mold, total of 4 handlings	1,200
45 lb. of coke, 3 handlings	135
6 lb. of drop, 2 handlings	12
12 lb. of limestone, 4 handlings, including drop	48
50 lb. of sand, 2 handlings	100
Molding and subsequent operations:	
1800 lb. of sand, 4 handlings during tempering and placing in flask	7,200
2700 lb. of flask onto the machine	2,700
Sand and flask to the closing operation	4,500
Sand and flask to pouring	4,500
The same plus iron to the shakeout	4,800
The flask returned to the molding floor	2,700
The iron in casting to trucks	300
Sprues to the yard	70
Off truck at scratch department, back on truck, off at gate grinding and back on, off at sand blast and back on, at the enameling department 4 handlings, onto the truck and off at the stock room, which makes not less than 11 handlings or	2,530
50 lb. of sand to the dump, 2 handlings	100
Total to produce 230 lb. of casting	31,529½

Steels for Automobile Construction

Standardized Steel Specifications of the German Automotive Industry—What the Various Symbols and Designations Signify

BY BENNO R. DIERFELD

TO-DAY'S production of steels for automotive vehicles is a clear technological process, and the methods for testing their quality are simple and may be performed easily. However, the great number of kinds of steel existing not only renders difficult the selection of steel suitable for a certain purpose, but also has the great economic drawback that the manufacturer or dealer is compelled to keep in stock a great variety of steels for products of similar kind. Furthermore, it is possible for only a few factories continuously to

TABLE I.—SUMMARY OF AUTOMOTIVE STEELS

CONSTRUCTION STEELS:	Unrefined Steel, Case-hardening Steel, up to 0.15 Carbon, per cent, about				Semi-Refined Case-hardening Steel, 0.16 to 0.25 Carbon, per cent, about				Refined Steel, Not for Case-hardening, 0.26 to 0.45 Carbon, per cent, about				Highly Refined Spring Steel, Natural State, 0.5 to 0.7 Carbon, per cent, about			
	Symbol	Tensile Lb. per Sq. In.		Elongation %	Symbol	Tensile Lb. per Sq. In.		Elongation %	Symbol	Tensile Lb. per Sq. In.		Elongation %	Symbol	Tensile Lb. per Sq. In.		Elongation %
Unalloyed:																
Construction Steel, Mn up to 0.8%; Si up to 0.3%, Cr up to 0.5%	11a	71,100		25	12a	85,300		20	13a	114,000		15	14a	128,000		10
Basic open-hearth steel, S and P up to 0.05%	11b	57,000		25	12b	71,100		20	13b	99,500		15	14b	114,000		10
Commercial quality steel	11c	57,000		20	12c	71,100		15	13c	99,500		10	14c	114,000		7
Low Alloy Steels:																
Manganese steel, Mn over 1%	21m	64,000		30	22m	85,300		25	23m	99,500		20	24m	128,000		12
Manganese-Silicon steel, Mn over 1%; Si over 0.5%	21m,s	....		....	22m/s	92,400		18	23m/s	121,000		12	24m/s	....		....
Manganese-Silicon steel, C 0.5%; Mn 1.1%, Si 0.3 to 1.6%	....	....		....	....	....		....	23m/s	99,500		15	....	....		....
Chromium Silicon steel, Cr over 1%; Si over 0.5%	21c/s	....		....	22c/s	92,400	*§	20	23c/s	121,000	†	15	24c/s	142,200	**	12
Chromium Silicon Steel, Cr over 1%; Si over 0.5%, case-hardened	....	....		....	22c/s	128,000	*	10	23c/s	142,200	†	12	24c/s	206,000	**‡	9
Vanadium Steel, Va over 0.5%	21v	....		....	22v	92,400	§	20	23v	121,000		15	24v	....		....
Vanadium Steel, Va over 0.5% case-hardened	....	....		....	22v	128,000		10	23v	142,200		12	....	....		....
Alloy Steels:																
Nickel Steel, Ni over 4%	31a	64,000	Δ	35	32a	85,300	α γ	30	33a	99,500	β	25	....	....		....
Nickel Steel, Ni over 4% case-hardened	31a	92,400	Δ	25	32a	121,000	α	15	33a	114,000	β	22	....	....		....
Nickel Steel, Ni about 3%	31b	64,000	Δ	30	32b	85,300	α ε	25	33b	99,500	β	22	....	....		....
Nickel Steel, Ni about 3% case-hardened	31b	92,400	Δ	20	32b	121,000	α	12	33b	114,000	β	20	....	....		....
Nickel Steel, Ni under 2% (about 1.5%)	31c	64,000	Δ	25	32c	85,300	α λ	22	33c	99,500	β	20	....	....		....
Nickel Steel, Ni under 2% (about 1.5%), case-hardened	31c	92,400	Δ	15	32c	121,000	α	10	33c	114,000	β	15	....	....		....
Nickel-chromium Steel, Ni about 3.5%; Cr about 1.5%	41a	85,300	Δ	20	42a	99,500	α μ	20	43a	114,000	β	22	....	....		....
Nickel-chromium Steel, Ni about 3.5%; Cr about 1.5%; case-hardened	41a	121,000	Δ	12	42a	170,600	α	8	43a	142,200	βη	12	....	....		....
Nickel-chromium Steel, Ni about 1.5%; Cr about 0.8%	41b	78,200	Δ	20	42b	92,400	α ν	18	43b	106,600	β	16	....	....		....
Nickel-chromium Steel, Ni about 1.5%; Cr about 0.8%; case-hardened	41b	114,000	Δ	12	42b	142,200	α	8	43b	128,000	β	10	....	....		....
Nickel-tungsten Steel, Ni about 3%; Wo about 1.5%	....	....		....	52	92,400	θ ν	20	53	121,000	φ	15	....	....		....
Nickel-tungsten Steel, Ni about 3%; Wo about 1.5%; case-hardened	....	....		....	52	149,300	θ	8	53	156,400	φ	10	....	....		....
Chromium Steel, Cr 1.5% or over	61	71,100		20	62	85,300	∥ π	18	63	106,600	⊙	15	64	....		....
Chromium Steel, Cr 1.5% or over; case-hardened	61	92,400		10	62	128,000	∥	8	63	128,000	⊙	8	64	....		....
High Alloy Steels																
Nickel Steel, Ni 36%	71a	....		....	72a	....		....	73a	....		....	....	....		....
Nickel Steel, Ni 30%	71b	....		....	....	....		....	....	....		....	....	....		....
Nickel Steel, Ni 25%	71c	....		....	72c	....		....	....	....		....	....	....		....
Manganese Steel, Mn 5 to 6	....	....		....	82	....		....	....	....		....	....	....		....

TOOL STEELS:	Soft Carbon, per cent, about 0.6	Harder Carbon, per cent, about 0.7	Tough-hard Carbon, per cent, about 0.9	Medium-hard Carbon, per cent, about 1.1	Hard Carbon, per cent, about 1.25	Very Hard Carbon, per cent, about 1.45	Special Steels Carbon, per cent, about 1.6	Special Steels Carbon, per cent, about 2.2
Unalloyed:								
Simple tool steel	101	102	103	104	105	106		
Weld Steel	111		113		115			
Alloy Steels:								
Steel with chromium and tungsten			123	124		126		
Manganese Steel			....	134			....	....
Chromium Steel, Cr over 2%			....		145a		147a	
Chromium Steel, Cr under 2%			....		145b			
Tungsten Steel			....	....	....	156	....	....
High Alloy Steels:								
Chromium Steel, Cr 12%			....	....	....	....	....	168
High-speed, tungsten steel, Wo over 13.5%	171		....	....	....	....	....	....
High-speed, tungsten steel, Wo 10 to 13.5%	172		....	....	....	....	....	....
High-speed, chromium steel, Cr not over 18%	173		....	....	....	....	....	....
High-speed, cobalt steel	181		....	....	....	....	....	....
High-speed, war quality, with tungsten, molybdenum and chromium	191		....	....	....	....	....	....

*C, 0.25%; Mn, 0.85%; Cr, 1.2%; Si, 0.55%.
†C, 0.4%; Mn, 0.85%; Cr, 1.25%; Si, 0.55%.
** C, 0.55%; Mn, 0.8%; Cr, 1.5%; Si, 0.8%.
‡ At about 650 deg. Cent. (1200 deg. Fahr.).
§ When refined, 106,600 lb. per sq. in. and 15% elongation.
γ When refined, 99,500 lb. per sq. in. and 22% elongation.
γ When annealed, 78,200 lb. per sq. in. and 25% elongation.
ε When refined, 99,500 lb. per sq. in. and 20% elongation.
λ When refined, 99,500 lb. per sq. in. and 15% elongation.
μ When refined, 128,000 lb. per sq. in. and 12% elongation.
ν When refined, 121,000 lb. per sq. in. and 12% elongation.
π When refined, 106,600 lb. per sq. in. and 10% elongation.

ΔC, 0.15%; Mn, 0.3%.
αC, 0.25%; Mn, 0.4%.
β C, 0.45%; Mn, 0.6%.
θ C, 0.25%; Mn, 0.6%.
φ C, 0.45%; Mn, 0.5%.
∥ Cr, 1.5%; Mn, 0.3%.
Λ Cr, 2%; Mn, 0.4%.
⊙ Cr, 2%; Mn, 0.6%.
η Refined.

make comparative tests of the different kinds or products of steel, on account of the high laboratory costs.

Therefore, both the designer and the manager of the factory are obliged to continue using the kinds of steel already known to them, because they could not well take the risk of introducing a competitor's steel said to be equivalent to the sort formerly used, or even better. Of course, the full utilization of favorable orders was hardly possible with the old system, especially if the steel works suddenly stopped delivery on account of strikes, etc., and a rational storing of stock was difficult.

TABLE II.—COLORS AND STRIPES AND DESIGNATING MARKS

Per Cent of Carbon	Character	Color	Non-alloyed Steel: Class "a" Case-hardening Steel	Non-alloyed Steel: Class "b" Open-hearth Steel	Non-alloyed Steel: Class "c" ‡	Low-alloy Steel (d): Manganese Steel	Low-alloy Steel (d): Manganese Silicon Steel	Low-alloy Steel (d): Chromium-Silicon Steel	Vanadium Steel
[illegible]	[illegible]	White	11a†	11b**	.....	21m	21m/s	21c/s	21v
0.16 to 0.25	Semi-refined universal	Blue	12a†	12b**	.....	22m	22m/s	22c/s	22v
[illegible]	[illegible]	[illegible]*	13a†	13b**	.....	23m	23m/s	23c/s	23v
0.36 to 0.45	Refined oil-hardening (not for case-hardening)	Red	13a†	13b**	.....	23m	23m/s	23c/s	23v
0.50 to 0.60	Highly refined spring steel	Yellow	14a†	14b**	.....	24m	24m/s	24c/s	24v

*With narrow white stripe running lengthwise, indicating that the steel is already refined. †Has [illegible] **Same color, half width only. ‡No color marking.
d Basic color and lavender, both running lengthwise.

All these facts led peremptorily to a standarization of steel, and the German pioneers in this direction are Frank Popp, director, and Walter Pessl, head laboratory engineer, of the Bayerische Motoren-Werke (abbreviated hereafter as B. M. W.) in Munich. This company was well known during the war by the B. M. W. airplane engines and in peace time by the B. M. W. engines for cars, trucks and motorcycles. The standardization system, introduced by these two engineers in their Munich works three years ago, has proved out very well and now forms not only the foundation for the steel specifications of the Verein deutscher Motorfahrzeugindustrieller (German Society of Automotive Manufacturers), to be described later on, but also for that of other countries like Switzerland, Belgium, Sweden, etc. In pursuance of the new system, it is a serious fault to classify the steels for the automotive vehicles according to the purpose they are used for; the right way is a classification according to the properties of the steels. As the properties of steel depend in the first place on the percentage of carbon, and in the second place on the degree of alloy, the standardization has to follow these two directions.

By laying out the carbon contents as abscissæ and the alloys with other metals, like nickel, chromium, manganese, silicon, etc., as ordinates, generally every point of this system of co-ordinates will correspond to a steel of quite distinct chemical composition and strength properties. These principal properties can be changed extensively only by a heat treatment (annealing, hardening, forging, etc.). However, as the kind of heat treatment depends upon the carbon contents, it is sufficient to subdivide the carbon contents into intervals, within which the properties may be assumed to be practically limited to "above" and "below" and "technically uniform." Thus the steel works has the necessary full scope in the producing process and is allowed a sufficient tolerance. Leaving out of account the degree of alloy, the construction steels for automotive vehicles may be classified into four principal groups, according to their carbon contents, in the following manner:

1—Steel of about 0.05 to 0.15 per cent carbon, as unrefined case hardening steel, for general purposes.

2—Steel of about 0.16 to 0.25 per cent carbon, as refined and case hardening steel for universal uses.

3—Steel of about 0.26 to 0.45 per cent carbon, as pure refined steel, with a further classification of 0.26 to 0.35 per cent carbon for hardening in water and of 0.36 to 0.45 per cent carbon for hardening in oil.

4—Steel of about 0.50 to 0.60 or 0.70 per cent carbon, as highly refined spring steel.

TABLE III.—B. M. W. SPECIFICATIONS
(Strength figures translated

Per Cent Carbon		0.05 to 0.15				0.16 to 0.25				
Character		Case-hardening Steel				Semi-refined Universal Case-hardening Steel				
	Condition	Class	Elastic Limit	Tensile Strength	Elongation % Minimum	Notching Toughness	Class	Elastic Limit	Tensile Strength	Elongation % Minimum	Notching Toughness
Construction Steel	1. Annealed		32,700	52,600-	30	11,400		39,800	66,800	25	10,000
	2. Natural hardness	11a	42,650	64,000	25	11,400	12a	49,800	78,200	20	10,000
	3. Refined		.....	.....	.....	.....		.....	.....	.....	.....
	4. Hardened		57,000	85,300	20	11,400		64,000	99,500	13	10,000
Basic open-hearth steel	1. Annealed		32,700	52,600	25	8,530		39,800	66,800	20	7,110
	2. Natural hardness	11b	42,650	64,000	20	8,530	12b	49,800	78,200	15	7,110
	3. Refined		.....	.....	.....	.....		.....	.....	.....	.....
	4. Hardened		57,000	85,300	15	8,530		64,000	99,500	10	7,110
Commercial Quality	1. Annealed		28,500	49,800	20	5,700		35,550	61,200	15	.....
	2. Natural hardness	11c	35,550	57,000	15	5,700	12c	49,800	78,200	10	.....
	3. Refined		.....	.....	.....	.....		.....	.....	.....	.....
	4. Hardened		49,800	71,100	15	5,700		57,000	92,400	7	.....
Explanation of Figures 1, 2, 3, 4	1. Annealed at about		*930 deg. Celsius; cool slowly					†900 deg. Celsius; cool slowly			
	2. Natural hardness		No heat treatment					No heat treatment			
	3. Refined		.....					Quench at about **850 deg. Celsius in oil or water; Reheat to §630 deg. Celsius			
	4. Hardened at about		*930 deg. Celsius, in water					†900 deg. Celsius, in water or oil			
Tolerance			4,265 lb. per sq. in.					4,265 lb. per sq. in.			

*1706 deg. Fahr. †1652 deg. Fahr. **1562 deg. Fahr. ‡1166 deg. Fahr. §1472 deg. Fahr.

TABLE IV.—SPECIFICATIONS FOR NON-ALLOY STEELS, ADOPTED
(All values of strength have been

Class		10				11			
C% Carbon		0 0 to 0.10				0 10 to 0 20			
		Case-hardening Soft Steel				Case-hardening Steel (not refined)			
	Condition	Elastic Limit	Tensile Strength	Elongation in % Minimum Value	Notching Toughness Minimum Value	Elastic Limit	Tensile Strength	Elongation in % Minimum Value	Notching Toughness Minimum Value
	1. Annealed	32,700	45,500	38	21,330	35,550	59,700	27	11,400
	2. Sufficiently hard for rolling	35,550	49,800	34	17,000	45,500	71,100	23	10,000
	3. Refined								
	4. Hardened	49,800	71,100	25	11,220	64,000	93,800	15	8,530
	1	32,700	45,500	32	17,000	45,550	59,700	22	8,530
	2. Hard for rolling	35,550	49,800	28	12,800	45,500	71,100	18	7,110
	3. Refined								
	4. Hardened	49,800	71,100	19	10,000	64,000	93,800	10	5,700
	Miscellaneous class for untested minor material. Without prescription of quality								
Explanation of Figures 1, 2, 3, 4	1. Annealed at about	*950 deg. Celsius; cool slowly				†920 deg. Celsius; cool slowly			
	2. Hard for rolling								Without special
	3. Refined								
	[illegible]	*950 deg. Celsius in water				†920 deg. Celsius in water			
Tolerance		±4,265 lb. per sq. in.				±4,265 lb. per sq. in.			
	[illegible]	**1166 deg. Fahr. ‡1166 deg. Fahr. §1514 deg. Fahr.				§§1472 deg. Fahr.			

TO DISTINGUISH STEELS OF VARYING CHARACTERISTICS

Over	Nickel Steel Under		Nickel-Chromium Steel		Nickel Steel	Chromium Steel	Nickel Steel		Manganese Steel
4[illegible]	[illegible]	2	1[illegible]	1	[illegible]	over 1.5 %	36 %	30 %	25 %	5 to 9 %
3[illegible]a	3[illegible]b	3[illegible]c	4[illegible]a	4[illegible]b	5a	6a	71a	71b	71c	81
3[illegible]a	3[illegible]b	3[illegible]c	4[illegible]a	4[illegible]b	5a	6a	72a	72b	72c	82
3[illegible]a	3[illegible]b	3[illegible]c	4[illegible]a	4[illegible]b	5a	6a	73a	73b	73c	83
3[illegible]a	3[illegible]b	3[illegible]c	4[illegible]a	4[illegible]b	5a	6a	73a	73b	73c	83
3[illegible]a	3[illegible]b	3[illegible]c	4[illegible]a	4[illegible]b	5a	6a	74a	74b	74c	84

aBasic color and stripe, except eight-per-cent steel, which is green and red, both running lengthwise.
bBasic color and stripe, both running lengthwise.
cWith narrow yellow stripe running lengthwise through the green band, indicating that the steel is already hardened.

These four principal groups of carbon steel are furthermore to be distinguished in their mechanical (strength) properties according to their quality, depending upon the process of production. The first quality is the construction steel (class *a*). The second quality is the standard basic Siemens-Martin or open-hearth steel (class *b*). The third quality is the commercial steel, with the least strength (class *c*).

FOR STEEL WITHOUT ALLOYS
into Lb. per Sq. In.)

Class	Refined Steel (Not for Case-hardening) 0.26 to 0.35 Elastic Limit	Tensile Strength	Elongation Minimum	Notching Toughness	Class	Highly Refined Spring Steel 0.50 to 0.60 Elastic Limit	Tensile Strength	Elongation % Minimum	Notching Toughness
	46,900	82,500	18	. .		59,700	99,500	15	....
13a	. . . .	. . . .	. . . .	. . . .	14a	7[illegible],100	128,000	10	. . .
	71,100	106,600	15	5,700 to 7,110		142,200	185,000	6	. . .
	99,500	128,000	10			59,700	99,500	12	. .
	46,900	82,500	15						
13b	. . . .	. . . .	. . . .	. . . .	14b	92,400	128,000	8	.
	71,100	106,600	10	4,265 to 5,700					
	99,500	128,000	7			128,000	170,600	4	.
	42,650	71,100	15			52,600	92,400	12	.
13c	. . . .	. . . .	. . . .	. . . .	14c	78,200	114,000	8	.
	56,800	99,500	10	2,840 to 4,265					
	85,300	114,000	7	. . . . .		114,000	142,200	8	
	**850 deg. Celsius; cool slowly No heat treatment					§800 deg. Celsius No heat treatment			
	Quench at about **850 deg. Celsius, in oil or water; Reheat to †630 deg. Celsius					Quench at about §800 deg. Celsius in oil; Reheat to †630 deg. Celsius			
	**850 deg. Celsius, in water or oil 7,110 lb. per sq. in.					§800 deg. Celsius, in oil 11,400 lb. per sq. in.			

The four principal groups are characterized in the accompanying tables by the "units" figure of a number of two figures, thus:

The figure 1 means an average carbon content of 0.1 per cent.

The figure 2 means an average carbon content of 0.2 per cent.

The figure 3 means an average carbon content of 0.3 per cent.

BY THE GERMAN SOCIETY OF AUTOMOTIVE MANUFACTURERS
translated into Lb. per Sq. In.)

12 0.20 to 0.35 Semi-refined Steel				13 0.35 to 0.50 Refined Steel (not for case-hardening)				15 0.50 to 0.70 Highly Refined Steel			
Elastic Limit	Tensile Strength	Elongation in % Minimum Value	Notching Toughness Minimum Value	Elastic Limit	Tensile Strength	Elongation in % Minimum Value	Notching Toughness Minimum Value	Elastic Limit	Tensile Strength	Elongation in % Minimum Value	Notching Toughness Minimum Value
42,650	71,100	20	11,400	49,800	85,300	16	8,530	71,100	114,000	14	5,700
54,000	82,500	16	10,000	64,000	99,500	12	7,110	99,500	142,000	10	4,265
71,100	99,500	15	14,220	92,400	120,900	15	11,400	128,000	156,500	8	8,530
85,300	114,000	10	7,110	120,900	156,500	7	4,265	156,500	199,000	5	2,840
42,650	71,100	16	8,530	49,800	85,300	13	7,110	71,100	114,000	12	4,265
54,000	82,500	12	7,110	64,000	99,500	9	5,700	99,500	142,000	8	2,840
71,100	99,500	11	10,000	92,400	120,900	12	8,530	128,000	156,500	6	5,700
85,300	114,000	7	4,265	120,900	156,500	5	2,840 to 4,265	156,500	199,000	3	1,420 to 2,840
**880 deg. Celsius; cool slowly heat treatment				§840 deg. Celsius; cool slowly				§§800 deg. Celsius; cool slowly			
Quench at about **880 deg. Celsius in oil or water, reheat to †630 deg. Celsius				Quench at about §840 deg. Celsius in oil or water, reheat to †630 deg. Celsius				Quench at about **880 deg. Celsius in oil or water, reheat to †630 deg. Celsius			
**880 deg. Celsius in oil or water †7,110 lb. per sq. in.				§840 deg. Celsius in oil †7,110 lb. per sq. in.				§§800 deg. Celsius in oil †11,400 lb. per sq. in.			

The figure 4 means an average carbon content of 0.5 per cent.

This manner of characterizing makes it comparatively easy to keep in mind the single principal groups with the corresponding carbon contents.

The "tens" figure of the number of two figures represents the degree of alloy in the following manner:

For non-alloy steel, the cardinal number 10; for low alloy steel, the cardinal number 20; for nickel-alloy steel, the cardinal number 30; for nickel-chromium-alloy steel, the cardinal number 40; for nickel-tungsten-alloy steel, the cardinal number 50; for higher chromium-alloy steel (more than 1.5 per cent), the cardinal number 60; for high alloy steel, the cardinal numbers 70 and 80.

In accordance with this, Table I was arranged. The practical application of Table I is as follows: Of new steel coming to hand in the factory, in the first place the carbon content is determined and, according to this percentage, the definite annealing and hardening temperatures are prescribed. In this manner figures are obtained that are produced under the same conditions as those in Table I and, therefore, may be compared with them. When the classification has been done, the corresponding steel is painted lengthwise with a distinct color; Table II shows the different colors used for automotive steels with reference to the specification of Table I. It may be added that the specification in Table I, covering tool steels, represents only a preliminary work that may be changed later in some particulars.

Table I forms the main specification, comprising all kinds of steels. But for practical use an enlargement and addition of some new items seemed to be valuable. Walter Pessl, head of the steel section of the German Society of Automotive Manufacturers, has carried out this enlargement for the non-alloy steels of Table I, and Table III represents the new specification, covering only non-alloy steels. As a basis, an average chemical composition was taken, as follows: Manganese, not over 0.8 per cent; silicon, not over 0.3 per cent; phosphorus, not over 0.05 per cent; sulphur, not over 0.05 per cent. The strength figures of the steel as delivered were supplemented by the strength figures for the steel in the annealed and hardened states.

In addition to the usual statement of the tensile strength, the elastic limit and the notching toughness (strength in

[illegible] per square centimeter for bar of 10 x 10 millimeters section and round notching) has been added, because these data are far more valuable for the designer than the tensile strength only. Of course, it was necessary, too, to standardize the terms "annealing, hardening and refining," because different temperatures of annealing, hardening and refining result in correspondingly different strength properties. These terms were fixed as follows:

Class 11—(non-refined case hardening steel):

Annealing: at about 930 deg. Celsius (1706 deg. Fahr.); cool slowly.

Hardening: at about 930 deg. Celsius; quench in water.

Class 12—(universal case hardening steel):

Annealing: at about 900 deg. Celsius (1652 deg. Fahr.); cool slowly.

Refining: at about 900 deg. Celsius; quench in oil or water and reheat to about 630 deg. Celsius (1166 deg. Fahr.).

Hardening: at about 900 deg. Celsius in water or oil.

Class 13—(refined steel):

Annealing: at about 850 deg. Celsius (1562 deg. Fahr.); cool slowly.

Refining: about 850 deg. Celsius; quench in oil or water and reheat to about 630 deg. Celsius.

Hardening: at about 850 deg. Celsius in water or oil.

Class 14—(highly refined steel):

Annealing: at about 800 deg. Celsius (1472 deg. Fahr.); cool slowly.

Refining: at about 800 deg. Celsius; quench in oil and reheat at 630 deg. Celsius.

Hardening: at about 800 deg. Celsius in oil.

According to the prescription, the steels were treated corresponding to their carbon contents, the strength values were determined and somewhat modified, so that the separate sub-groups of a class may be distinguished sufficiently from each other by different values of the elastic limit, tensile strength and elongation. This small modification was chosen in such a manner that, between the sub-groups *a* and *b* in Table I, only the elongation among the principal features appears changed (with constant elastic limit and tensile strength); while between the sub-groups *b* and *c*, with constant elongation, the elastic limit and tensile strength are changing. Thus the material of the sub-group *a*, that is used in the first place for bevel gears, crankshafts and other highly stressed parts of the motor car, is distinguished definitely from the material of the sub-groups *b* and *c*.

Perhaps an addition to Table III, covering the strength figures at right angles to the fibers of a bar, may be valuable, because all strength figures there given relate only to a direction parallel to the bar fiber; and a further addition covering material that is re-forged. This addition will be necessary, because in bevel wheels and spur gears, that are not re-forged, but made of the solid piece, the teeth mostly are inclined at 45 deg. to the fiber or are perpendicular to it.

The alloy steel specification in Table I is to be enlarged and completed in the same manner as for Table III for non-alloy steels. But this work requires considerable time and labor and has not yet been finished.

As previously mentioned, the German Society of Automotive Manufacturers has adopted the steel specification tables of the Bayerische Motoren-Werke (B. M. W.), described above, as the foundation for the steel specification recommended by the society to its members.

Table IV shows this specification, for non-alloy steels, that is similar to Table III of the B. M. W.; only it has five groups of carbon contents and two classes of quality, *a* and *b*, while the third class *c* represents a miscellaneous class for minor material. The prescrip-

TABLE V—SWISS STEEL SPECIFICATION FOR NON-ALLOY STEELS
(All values of strength have been translated into Lb. per Sq. In.)

Symbol	Chemical Composition — C	Mn	P	S	Condition	Mechanical Properties — Elastic Limit	Tensile Strength	Elongation in 10 / 1.54	Elongation in 1.54	Notching Toughness — Test Bar 20	Notching Toughness — Test Bar 10	Remarks
	Not over	Not over	Max.	Max.								
C00	0	10	1	6	Annealed	25,600	42,650 to 45,500	30	40	.....	.....	Very soft
C0	5 to 15	40 to 70	1	6	Annealed	31,300	54,000 to 62,500	22	27			Soft
C1	5 to 15	40 to 70	1	6	Annealed	31,300	54,000 to 62,500	24	30	28,450		
C1a	5 to 15	40 to 70	1	6	Annealed	31,300	54,000 to 62,500	25	30	37,080		For case-hardening
					Case-hardened and hardened in water	42,650	64,000 to 78,100	18	22	28,450		
C2a	15 to 25	40 to 60	7	6	Annealed	37,000	62,500 to 71,100	20	24	.....	.....	Medium Soft
C2	15 to 25	40 to 60	4	3	Annealed	37,000	62,500 to 71,100	22	26	25,600		
C2a	15 to 20	50 to 70	2	2	Annealed	39,890	62,500 to 71,100	22	28	34,100		For case-hardening
					Case-hardened and hardened in water	57,000	99,500 to 128,000	8	10	21,330	.....	
C3a	25 to 40	50 to 70	7	6	Annealed	42,650	71,100 to 85,300	16	20	.....	.....	Medium hard
C3	25 to 40	50 to 70	4	3	Annealed	42,650	71,100 to 85,300	20	25	30,000		
					Refined	57,000	85,300 to 99,500	18	20	22,730		
					Refined	71,100	99,500 to 114,000	14	16	17,000		
					Refined	85,300	114,000 to 128,000	10	12	11,400	.....	
					Refined	99,500	128,000 to 142,200	8	10	7,110	.....	
C4a	40 to 50	50 to 70	7	6	Annealed	48,350	85,300 to 99,500	12	15	.....	.....	Hard
C4	40 to 50	50 to 70	4	3	Annealed	48,350	85,300 to 99,500	14	18	14,220	.....	
					Refined	71,100	99,500 to 114,000	12	15	14,220		
					Refined	85,300	114,000 to 128,000	10	12	11,100		
C5a	50 to 60	60 to 80	7	6	Annealed	57,000	99,500 to 114,000	8	10	.....	.....	Very hard
C5	50 to 60	60 to 80	4	3	Annealed	57,000	99,500 to 114,000	12	14	10,000	.....	
					Refined	71,100	99,500 to 114,000	14	16	14,220	.....	
					Refined	85,300	114,000 to 128,000	10	12	8,530	.....	

Every steel is marked by a symbol which contains the alloy components of the corresponding steel (if alloy steel at all) expressed by the international designations of the chemical elements. In the symbol these designations are arranged in the following order: Carbon = *C*, nickel = *Ni*, chromium = *Cr*, manganese = *Mn*, silicon = *Si*, vanadium = *V*, tungsten (wolfram) = *W*, molybdenum = *Mo*. After each designation of the alloy component stands its percentage figure multiplied by 10; for instance, *Cr* 10 means 1 per cent of chromium. If the percentage of the alloy component is less than 0.1, and the figure of percentage consequently smaller than the figure 1, then it will be expressed by a fraction.

The designation *C* for carbon is used only for the carbon steels, but not for the alloy steels; however, the percentage figure of carbon remains, and begins the symbol of each alloy steel. For example: a carbon steel with an average of 0.2 per cent carbon is marked

tions for annealing, hardening and refining are somewhat modified, too.

The Automotive Manufacturers' Association of Switzerland, also, has used the table of the B. M. W. as the foundation for its steel specification. Table V shows the Swiss specification for non-alloy steels, which has been adopted by Belgium and Sweden, too. Like the former tables, it refers neither to the production process nor to the application purpose of the steel, but is based only on its chemical composition and mechanical properties.

with C2. A chromium-nickel steel with an average of 0.1 per cent carbon, 4 per cent nickel and 0.8 per cent chromium is marked with 1 *Ni* 40 *Cr* 8. The letter *n* (normal purity) set behind the symbol means an admissible maximum percentage of 0.07 per cent phosphorus and 0.06 per cent sulphur. If neither letter *n* nor *s* stands behind the symbol, then the percentage of phosphorus may not exceed 0.04 per cent, nor that of sulphur 0.03 per cent. The letter *s* (superior purity), set behind the symbol, means an admissible maximum phosphorus (and sulphur) percentage of 0.02 per cent each.

The Swiss specification table contains data covering the following mechanical properties: the minimum values of the elastic limit in kilograms per square millimeter, the minimum and maximum values of tensile strength in kilograms per square millimeter, the minimum values of elongation for measuring length $l = 10\,d$ or $11.3\,\sqrt{F}$ and $l = 5\,d$ or $5.65\,\sqrt{F}$, expressed in percentage of the original measuring length, in which F means the original section of the test bar. Finally, the minimum values of the notching strength in kilograms per square centimeter. The test bars have the following dimensions:

Test bar 20: $L = 160$ mm. (6.3 in.); $b = 20$ mm. (0.79 in.); $t =$ notching depth $= 5$ mm. (0.2 in.); $r = 2$ mm. (0.08 in.); $l = 120$ mm. (4.7 in.).

Test bar 10: $L = 80$ mm. (3.15 in.); $b = 10$ mm. (0.394 in.); $t = 2.5$ mm. (0.1 in.); $r = 1$ mm. (0.039 in.); $l = 70$ mm. (2.76 in.).

The notch of the test bar shall be perpendicular to the direction of fibers.

Other Swiss tables for alloy steels are to be prepared, but this work is being done in close conformity with the specifications of the B. M. W. German Table I, above.

OXYGEN IN METALLURGY

Rôle of Air, Rich in Oxygen, in the Blast Furnace, Bessemer and Open-Hearth Processes

At a joint session of the Faraday Society and the British Cold Storage and Ice Association recently, Cosmo Johns, of Sheffield, made an interesting contribution on the use of oxygen in metallurgical processes.

He said that most of the useful metals in present-day practice are extracted from their ores and refined for industrial use by processes which involve the use of atmospheric air for the combustion of carbonaceous matter, silicon, phosphorus or sulphur, to provide the heat required. These processes have become standardized to a large extent, and are based on the assumption of the invariableness of the oxygen content of the atmosphere.

Obviously the oxygen enrichment of the air used would alter the conditions under which those metallurgical processes which depend on oxidation of some fuel for the heat required are carried out, and though it is difficult to predict what would actually be the effect of such altered conditions, yet enough is known to enable us to say that revolutionary changes in metallurgical practice would result. The processes now employed, and the types of plant used, are the result of gradual evolution of industrial practice. Our knowledge of the reactions that occur are imperfect and almost entirely restricted to our knowledge of what occurs when ordinary air is used. But though it may be difficult to predict the actual changes in practice that would result, it is comparatively easy to review the possibilities. It is important to note, however, that what is contemplated is not the use of pure oxygen, but the availability of a mixture with 30 to 40 per cent of oxygen, or even less.

In the Blast Furnace

The modern blast furnace plant would obviously undergo a startling change in its design and arrangement when it had no longer to handle the present huge volumes of dust-laden heated combustible gases to effect difficult heat exchanges with the incoming air to secure fuel economy. The hot blast stoves would probably disappear, or be much reduced in size. The furnace itself would be reduced in height, and the whole plant, when the changes had been completed, would bear but little resemblance to the equipment found necessary to-day for the production of pig iron.

In the Bessemer Converter

The Bessemer converter, whether acid or basic, has been evolved on the assumption of an invariable oxygen content of the air blown in. Given the possibility of varying and controlling the oxygen ratio in the air employed, we should find the character of the process completely changed. In the acid process the order in which carbon and silicon are removed depends on the temperature. In the basic process it is almost certain that by controlling the temperature it would be possible to oxidize the phosphorus before all the carbon had been removed, and thus the injurious after-blow would be avoided. This temperature control could be effected if the oxygen content of the air blown in could be varied.

In the Open-Hearth Furnace

The regenerative open-hearth furnace is costly, complicated, and inefficient from the thermal standpoint. If oxygen-enriched air could be employed for the production of the fuel gas, and for its subsequent combustion in the hearth of the furnace, it would be possible to effect a startling and beneficial alteration in the plant. The uni-flow furnace would become a possibility, and there would be a very desirable simplification in the design of the furnace. A neutral or oxidizing flame would be at the command of the operator, while the melting and refining operations would be accelerated. The waste gas of the furnace would be much richer in CO_2, and, with added oxygen, rich air would be ideal for blowing into the gas producer, thus enabling a fuel gas rich in CO to be supplied to the furnace.

Pure Oxygen Not Needed

It is important to note that it is not pure oxygen that is required. It would be amply sufficient if the oxygen content could be varied between the range of 20 and 40 per cent. What is required is not pure oxygen in steel flasks, but enriched air in hundreds of tons.

Owing to the slight difference in density of oxygen and nitrogen it would appear that centrifugal methods for their separation are not very hopeful. Can any refrigerating system be devised which will give oxygen enriched at a commercial price? Any such refrigerating system should be able to use, as the source of the energy it requires, the sensible or potential heat of the products of the metallurgical process where it is employed, if carbon be the fuel used in the process. If a suitable cycle can be discovered for effecting the partial separation of the two mixed gases, for complete separation is not required, then a vast field is available for the use of oxygen-enriched air in metallurgical operations.

[In THE IRON AGE, Nov. 2, p, 1179, there is a brief article along the same lines which discusses the new investigations which the U. S. Bureau of Mines is inaugurating with a view to securing cheaper oxygen and to ascertaining the practicability of its use in metallurgy.]

The Pittsburgh Steel Co. reports sales to the value of $5,381,130 in the three months ended Sept. 30, which, after setting aside the sum estimated to meet income and profits taxes, resulted in a net loss of $9,687. In the same period last year, sales of $3,428,790 brought the company a net profit after allowance for taxes of $13,921.

Accidents at beehive ovens are referred to as follows by the U. S. Bureau of Mines. On the basis of production the fatal and non-fatal accident rate was 61.3 per million tons of output in 1921, as against 51.0 in 1920, 72.2 in 1919, and 71.3 in 1918. The 1921 beehive output was smaller than for any year since 1885.

Reincarnation of a Firearms Business

Resumption on a Production Basis, Within a Few Months, of the Marlin Establishment—Good-Will of Former Employees a Factor

BY L. S. LOVE

THE Marlin arms business was founded at New Haven, Conn., in 1870 by John M. Marlin, who had been trained in the manufacture of firearms in the Colt plant at Hartford. At the time the Marlin company was organized the entire capital was $400. This company at first manufactured pistols, revolvers and later the famous Ballard target rifles. In 1880 the first model Marlin repeating rifle was placed on the market and all other models were then dropped from production, which was centered on the manufacture of repeating arms. Later the side ejecting firearm was developed by this company.

In 1915 the business was sold to other interests, later known as the Marlin Rockwell Corporation. With the plant in New Haven as its foundation, this corporation undertook the manufacture of machine guns during the war. At the time the United States entered the war there were about 1300 machine guns of four varieties owned by the War Department. At that time the Marlin organization, making machine guns for the Allies, had a capacity of about 200 per day. This capacity was increased to about 1000 machine guns per day at the time of the armistice.

When the war was ended the Marlin firearms business was not immediately resumed, principally on account of high production costs. Accordingly the plant was closed and all tools, jigs, fixtures, etc., were packed away in storage.

Owing to labor conditions it was deemed inadvisable to resume operations until August, 1921, when a new company known as the Marlin Firearms Corporation was formed. In the meantime, the Marlin organization had dispersed, many of the men entering other lines of business.

The new company was started by two men only, one of them the former sales manager of the old Marlin business. The corporation acquired the plant, patents, good-will, tools, fixtures, gages, machinery, etc., of both the Marlin firearms business and the Hopkins & Allen arms business, of Norwich, Conn.

The first step was to arrange for Marlin organization foremen to return to the Marlin plant. Practically all of these men had worked in the plant for years, ranging in service from 15 to 38 years, and they were glad of the opportunity to return to their old positions. The services of some of these men were highly valuable, as a number of them had supervised the packing away of the tools and gages. They were all at once put to work assorting and cataloging the tools for convenient handling. At the same time the engineering department was at work improving the design of some models.

As soon as possible after the commencement of operations, the tool, die and gage department was set up and a force of tool makers put to work, making tools for redesigned models, repairing old tools which needed it and replacing those which had been lost or mislaid.

The next step was to set up the manufacturing department. As the original Marlin plant grew, the various departments were laid out, as is usually the case, wherever space was available. In the resumption of operations the reorganization of all departments permitted the grouping together of those parts of the work of manufacture which were closely associated and the routing of the work through the plant so that the parts in process at no time double back upon their trail, thus permitting the most economical manufacturing layout. Loyalty of former salesmen was also exhibited in that the new corporation was able to recall many former representatives to its service.

The remarkable strides made in getting production into working order is no doubt largely attributable to the systematized method of routing materials through the shop and checking each piece and each operation.

Each job is originated in the production or planning office, a different colored card being used to indicate different models. The card is perforated in the middle, the upper half showing production order number, the piece number, machine operation number, etc. The lower half is a move ticket for the piece to the next operation, this part of the ticket showing the number of pieces delivered to machine, number lost, number spoiled and number passed by inspector. These cards when issued by the production department go to the shop which is to perform the operation, where the foreman inserts the number of the machine on which it is to be handled and places the card in a rack provided for the purpose. This rack consists of two parts bearing the numbers of machines in the department; the inactive part of the rack shows jobs waiting for machines and the active part of the rack shows jobs in process. When there is no work for any particular machine, a green card is inserted in the rack opposite the number of that machine. A blue ticket in the rack opposite any machine number indicates that the machine is to be set up and tooled for a special rush job and held, regardless of any other job waiting for the machine. Operators' production tickets, which are used in conjunction with the operation ticket, are carried in the racks bearing the operators' clock numbers.

When the job is completed the lower half of the card goes to the next department to notify that foreman that the work is coming through to his department. The work is handled in counting trays to facilitate checking of finished pieces. After the move ticket has been checked by the next department, it is returned to be clipped to the operation half of the ticket and forwarded to the production office and accounting department.

A similarly designed ticket is used for stores requisition. This ticket is printed in red ink and is used by the assembly department. A special delivery ticket, also printed in red, is used for making up shortages of parts required by the assembly department.

All work moving from one department to another must be signed by the foreman of the department receiving the goods. Parts returned to stores must be signed for by the storekeeper. The use of these cards permits a complete record to be kept in the production or planning office of all work as it proceeds through the shop. Note is made at the time a job starts, when it moves to the next department, etc., so that at all times the production office knows accurately the status of work in the shop.

When a job is nearing completion on one operation, notice is sent to the tool crib to prepare tools, fixtures, etc., for the next operation, so that any loss of time due to waiting for tools is avoided.

Key cards are used to maintain a constant check



1—Perforated card issued for each operation.
2—Time card used in conjunction with operation card.
3—Time card for repair and other non-productive work.
4—Card used for rush or replacement jobs.
5—Time card for piece work.
6—Card used by assembly department to draw parts from stores.
7—Detailed record of parts in stock.
7a—Reverse side of No. 7.
8—Record of partly assembled parts.
9—Final assembly record.

on finished parts in stock. These cards cover both units and what are known as secondary units which are composed of single units already assembled, before going to the final assembly. The usual process of soft and hard assembly is practiced in this shop.

In the short time that the new organization has been working, production has been boosted to the point where it is almost keeping step with orders as they come in, although the shop is still several thousand guns behind actual orders.

Briquets of Flue Dust

The principle of briquetting as a means of flue dust disposal has been adopted by the M. A. Hanna Furnace Co., and a plant installed at its Buffalo operation has been accepted by that company. The officials of the Hanna company are expected shortly to make similar installations at their other blast furnaces.

The keynote of the new plant is its automatic and simple operation. Hitherto, rotary presses have been considered impossible from the point of view of briquetting ores and flue dust, largely because the pressures realized were insufficient to make coherent and strong briquetes. Such briquetting plants as have been installed in the country have used either the drop presses followed by tunnel furnace treatment, or a powerful toggle press followed by a period of seasoning. The products were large briquets, costly to manufacture and costly to handle. The new briquet, as turned out at Buffalo, is pillow shaped, small—weighing 5 oz. Passing directly from the press to a seasoning belt it is ready at the end of an hour's travel for fairly rough handling.

The cost, both for plant installation and for briquet manufacture, is relatively small. The briquets are in easily reducible form and are not magnetic.

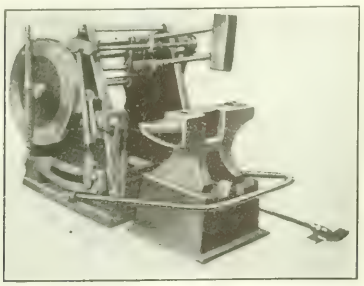
The Frazier-Sheal Co., Cleveland, engineers and constructors, have removed their offices from the Illuminating Building, to the B. F. Keith Building, Euclid and East Seventeenth Street.

The Otis Steel Co., Cleveland, has placed an order with the M. W. Kellogg Co., Jersey City, for six brick stacks for its new open-hearth plant.

General Utility Blacksmith's Hammer

A general utility blacksmith's hammer designed to work upon an ordinary anvil and intended as a one-man tool, dispensing with the services of strikers, has been placed on the market by the Blacker Engineering Co., Inc., Grand Central Terminal, New York. Special tools or dies need not be employed.

The general construction of the hammer may be noted from the accompanying illustration. It is rated to work 2½ in. and larger material, and only 1 hp. is required for operation. The blow struck is said to be about four times as heavy as that of a man striking,



General Utility Blacksmith's Hammer Intended to Eliminate Necessity of Striker. The hammer has lateral movement and stroke is adjustable

and the machine attains the rate of as much as 140 blows per min. Because of the parallel arms the work is struck with a straight blow, which is pointed out as an advantage to the blacksmith who works alone with his ordinary tools and without clamps, swages, etc.

The lateral traverse motion of the hammer is a feature. It permits quickly traveling the head along the face of the anvil to any point, and bringing it over the holes for swaging, punching, heading or similar work. The motion is controlled by the winged foot lever shown at the right of the anvil, and can be operated without stopping the hammer. Light or heavy blows may be struck as desired, the weight of the blow varying according to the amount of depression of the foot treadle extending around the anvil. The usual distance between the face of the head and the anvil is 8½ in. The stroke is quickly adjustable to suit the work in hand.

Anvil and block of special design, having a planed base and a stand with adjusting screw as shown, can be provided. The adjustment permits bringing the anvil backward or forward as required. The pulleys are 15 in. in diameter, 2¾ in. face. The motor is set in the frame of the machine, and geared direct, making a self-contained unit. The weight of the hammer alone is 1300 lb., the special anvil 560 lb. and the weight of the stand 336 lb. The machine was originally brought out in England a few years ago, and within the last few years in France, also.

Drop in Manufacture of Horseshoes

Figures of the Census Bureau show a considerable falling off between 1919 and 1921 in the manufacture of horseshoes. The number of establishments decreased from 20 to 12. The number of persons engaged dropped from 919 to 306, and of wage earners from 744 to 207. The value of the products fell from $3,367,001 to $1,931,812, or 42.6 per cent. Connecticut produced in its three establishments, 54.1 per cent of the total value of 1921 products.

The United States Civil Service Commission will receive applications until Dec. 5 to fill positions of mechanical inspector at the Naval Station, Pearl Harbor, Hawaii. The pay offered is $7.20 a day with an additional allowance of 96 cents a day while employed at the station. A degree in mechanical or electrical engineering and at least three years of certain specified experience are required.

Tool Grinder for Single-Phase Current

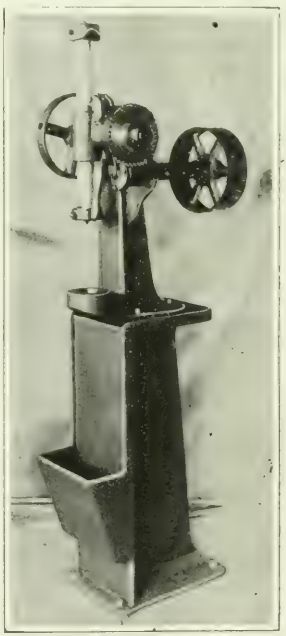
A model No. 75 electric-driven tool grinder, similar to the No. 76 which was described in THE IRON AGE of June 22, has been brought out by Forbes & Myers, Worcester, Mass. The new model is designed for single-phase current and the motor has all the windings on the back side. The 6-in. grinding wheels are mounted on the motor shaft and the front of the grinding wheels can be worn away before they are even with the front of the motor. Other details are the same as in the model previously described. The machine can be equipped with cord and plug for operation from an ordinary lamp socket.

Vertical Broaching Press for Small Work

The power bench broach press shown in the accompanying illustration has been placed on the market by the American Broach & Machine Co., Ann Arbor, Mich., to meet a demand for a small vertical machine for broaching round holes, squares, hexagons and small keyways. It will take work up to 6 in. in diameter.

The maximum stroke is 14 in. and the pressure developed approximately 2 tons. The table is bored 2½ in. in diameter central with the ram. The driving pulley is 10 in. in diameter, 3 in. face and the power is transmitted through the steel worm and bronze worm gear shown. The machine is fitted with an automatic stop and the movement of the ram is controlled by a positive jaw clutch, which is of steel and hardened. The return movement of the ram is by means of a counterweight.

The press can be operated as a hand machine, the



Vertical Press for Broaching Round Holes, Squares, Hexagons and Small Keyways

hand wheel at the left being equipped with hollow spokes, as shown, to receive a leverage bar. The oil receptacle mounted on the pedestal may be connected with an oil pump when required. The distance from the top of the work table to the floor is 36 in. The machine weighs approximately 350 lb.

Improvements recently completed at the Blandburg, Pa., plant, Harbison-Walker Refractories Co., Pittsburgh, have brought the daily capacity of that plant from 40,000 to 60,000 9-in. equivalent fire clay brick.

Bases of Modern Blast Furnace Practice*

Methods of Producing the Highest Combination of Quality, Economy and Quantity—Uniformity in Raw Materials—Lines of Furnaces

BY A. K. REESE

THERE are many factors entering into this subject, each of which is more or less dependent upon the others. They may be divided under four major headings, which may be called the prime factors in modern blast furnace practice. That practice is distinctly the result of evolutionary progress, the modern phase dating from 1894, when James Gayley introduced the low bosh at Braddock, Pa., up to the present era of large hearth diameter and steep bosh angle.

There are three principal objects in all blast furnace practice, ranking in importance in the following order —quality, economy and quantity. The first is essential; the second is commercially of great importance; the third is highly desirable, particularly in its bearing upon the second. No. 1 may be obtained independently of the other two. No. 2 may be obtained, to a degree, independently of No. 3. No. 3 is, to a degree, subject to Nos. 1 and 2. In all blast furnaces one of these objects has been the limiting factor in the attainment of the others. The object sought through the application of so-called modern practice may be described thus:

Consistent with quality, to produce the greatest possible economical quantity and, as any material increase in quantity has a direct and favorable bearing upon economy, this description of the object of modern blast furnace practice may be condensed to—*the attainment of the greatest possible quantity consistent with quality.*

The degree to which this object has been attained in certain localities, in comparatively recent years, resulting in normal economical outputs of from 400 tons to 600 tons per 24 hr., is well known, and demonstrates the great commercial advantage to be obtained by the adoption of the principles and methods by which it has been attained, in those other localities which up to the present have not yet fully adopted them.

There may be, and doubtless are, some makers who are still of opinion that with their particular materials the principles and methods of so-called modern blast furnace practice are not applicable. It is the author's firm conviction that those principles and methods are adaptable to any iron-bearing materials workable in a blast furnace, subject, of course, to suitable fuel and flux being obtainable within even a wide degree of quality, and subject, likewise, to a minimum degree of variation in that quality for any individual operation. He feels convinced that their adoption will lead to so great an advantage as to constitute almost a revolution in the pig iron industry in those localities where they have not hitherto been applied.

The four prime factors above referred to are:

I. Preparation of Materials.
II. Furnace Design.
III. Auxiliary Equipment.†
IV. Method of Operation.

I.—Preparation of Materials

That the mechanical and physical conditions of the materials charged into a blast furnace have a most important bearing upon its successful and satisfactory operation, affecting both its operative conditions and the economy of the results obtained, is a fact which no furnace operator is likely to dispute; but while it is true of any furnace, it is particularly true in its bearing upon the operation of the modern blast furnace. One essential condition of satisfactory operation is that there shall be as nearly as possible uniformity of chemical reactions, and of physical movement of the materials, throughout the whole cross-section in every zone of the furnace.

Two elements required to obtain this in theoretic perfection are perfect uniformity in the size and density of the materials charged and a sufficient blast volume to produce the condition of a plenum throughout the whole furnace interior. While it is impracticable to obtain for furnace use materials of perfectly uniform size and density in each of the three classes of materials used in pig iron smelting—fuel, flux and ore —it is practicable to approximate that condition by use of proper means for their preparation.

It is obvious that the feature which most directly bears upon the essential condition above mentioned is that of distribution and, in order to obtain as nearly as practicable uniformity of distribution, such preparation as will give as nearly as practicable uniformity of size must be resorted to. Uniformity of size only is not, however, sufficient; for example, uniformly large size, while giving uniformity of distribution, would be detrimental to economical operation. The preparation of materials must be in the direction of uniformity small size.

Fuel (Coke)

While this principle is much more important in its application to the ore and flux than to the fuel, it also applies to the latter. As rapidity of action is largely dependent upon rapidity of combustion of the fuel, it is desirable that the fuel should be charged in lumps of not excessive size, and preferably should not exceed 4 to 6 in. This assumes coke of proper physical condition. The physical quality and chemical purity of coke for blast furnace use are of the greatest importance. It should be strong but of not great density, and as low as possible in ash and sulphur. Nothing more greatly interferes with the regular and economical operation of a blast furnace than soft, friable or high ash coke, as everyone connected with the industry has experienced during late years under the conditions existing during, and for some time after, the late war. The disadvantage of high sulphur in the coke need not be emphasized.

Coke as charged into the furnace should be thoroughly screened to free it from smalls, commonly known as breeze, and should be of sufficient strength to prevent the excessive formation of smalls in the furnace, through the crushing effect of the burden. The strength should not, however, be of the kind which is produced by great density, which destroys the cellular structure. A dense coke burns slowly and is, therefore, inimical to rapid combustion, which is necessary for fast driving; whereas cellular structure permits the heat and the agents of combustion to penetrate readily to the interior of the lumps, thus facilitating combustion.

On the other hand, a very open cellular structure produced at the expense of strength is equally to be avoided, as tending to produce smalls through its lack of resistance to crushing by the weight it has to bear and abrasion by its movement in the furnace. Such a fuel is also subject to excessive waste in the upper regions of the furnace before it reaches the zone of its usefulness, owing to the greatly increased reaction upon it of the CO_2 in the gases—$CO_2 + C = 2CO$. It is, therefore, of the greatest importance, in modern

*Abstract of paper before the (British) Iron and Steel Institute.

†This section has been omitted, in this abstract. It involves consideration of the power plant, blast heating plant, raw material supply plant and output disposal plant.

blast furnace practice, that coke makers should give the greatest possible attention to the production of a coke combining these two essential features—strength and porosity.

It is the carbon which does the work in the furnace, and every decrease in the percentage of ash increases the available carbon and tends in other ways toward a higher degree of efficiency. In addition to the higher fuel value of low ash coke, it is lighter in weight, requires less limestone for fluxing the ash, and a lower amount of the fuel charged is required for forming and melting the slag produced from the coke ash. It is estimated that the formation and melting of blast furnace slag requires approximately 25 per cent of its weight in fuel; therefore, for every 100 lb. of slag produced from coke ash, 25 lb. of fuel is lost so far as the smelting of iron ore—the primary object of the blast furnace process—is concerned.

Iron Ore

From the standpoint of preparation, the iron ore is the most important of all the materials charged into the blast furnace, owing to the extremes in mechanical condition, from fines to large lumps, in which most iron ores are received from the mines, and the great variety of physical characteristics in different ores. The operation of the furnace is much more usually affected, for good or ill, by the mechanical condition of the iron ore than that of either fuel or flux. It is, therefore, of prime importance that this condition should receive careful attention and whatever steps are necessary should be taken, in the way of preparation, to convert it as nearly as practicable to such condition as will insure the most beneficial effect upon furnace operation.

Two principal features are affected directly by the condition of the iron ore, both bearing upon the rate of production and upon economy. These are reducibility and distribution. The degree of reducibility of an iron ore depends primarily upon its density, a characteristic in itself not readily altered, except with dense ores containing high percentages of protoxide of iron (magnetite), the reducibility of which may be increased by subjecting them to a roasting process in an oxidizing atmosphere, thus converting the protoxide to peroxide of iron.

Rough Ores

But the rate of reduction in the furnace may be materially increased for any particular ore containing lumps, whatever its degree of density, by increasing the surface area exposed to the action of the reducing agents. The obvious method of attaining this increase in surface area is by breaking the lumps into smaller pieces. The extent to which this operation may be carried is limited by the cost of breaking the ore, a commercial consideration, and the tendency of any particular ore to produce an excessive proportion of fines in the breaking. The latter tendency, however, really does not exist to any considerable extent in ores whose condition allows of their being broken at all, for whatever smalls may be produced in the breaking are usually of sufficient size not to be classed as fines, and may therefore be safely charged into the furnace with the larger products of the breaking operation.

Increase in the rate of reduction obtained by thus increasing the surface area exposed to the agents of reduction in the furnace has, in addition to the higher possible rate of production, a very important effect upon economy of production. Of the two principal reducing agents in the blast furnace process, carbonic oxide and solid carbon, it is generally accepted that reduction of iron oxide by carbonic oxide, in the upper zones, is a much more economical reaction than the reduction of iron oxide by solid carbon in the lower zones. It is, therefore, highly desirable that the whole or the greatest possible portion of the iron oxide should be reduced by carbonic oxide gas, and that this reduction should be completed before any lumps of iron oxide have reached the zone where conditions permit, in excess, the uneconomical reaction between them and solid carbon.

It is obvious that the surest way of attaining this is so to increase the possible rate of reduction of the ore by increasing its surface area that the maximum reduction may be effected by the carbonic oxide gas in the upper zones of the furnace. If this precaution of increasing the surface area by breaking the lumps of ore before charging into the furnace is neglected, the larger unbroken lumps will escape thorough reduction by carbonic oxide gas, with consequent waste of fuel, particularly if any attempt be made, by rapid driving, to increase materially the rate of production. To obtain a high rate of production, with economy and quality, it is therefore necessary to prepare the ores in the manner described.

The degree to which it is commercially practicable to crush an ore depends upon its density. Experience has indicated that all ores should be crushed to sizes not exceeding such as will pass through a 3-in. or 4-in. ring, although ores of great density may be advantageously crushed to even smaller sizes. The standard of 3 or 4 in., while seemingly rather small for ores of a high degree of reducibility—the so-called "soft" ores—is not determined wholly from the standpoint of degree of reducibility, but also by its bearing upon distribution.

Distribution of ore in a blast furnace is of the highest importance in its relation to regularity of operation, this in turn affecting most vitally the economy, quality and output. This question has been referred to above in a general way in connection with uniformity of action in the furnace but, important as that is as regards all the materials, solid and gaseous, entering into furnace operation, the distribution of the ore is the most important consideration in regard to the solid materials.

In considering this question it is necessary to keep in mind the great essential—*equality of action throughout the whole of every cross section of the furnace interior.* Except for the fact that the operations are taking place in a vertical shaft of circular cross section, this result would be obtained, theoretically, only with materials of exact uniformity in size and density, but the fact just mentioned introduces a feature which interferes with this theoretical requirement. It is well known that the gases have a natural tendency to ascend next to the walls, and would do so to the neglect of the interior if the furnace were filled with materials of exact uniformity in size and density.

It is necessary, therefore, in order to secure approximate equality of action, to have a somewhat greater resistance to the passage of the gases in the materials nearest the walls than in the interior. It is to this condition that the ordinary bell and hopper charging apparatus owes its satisfactory use, discharging the materials as it does in such a way that a greater proportion of the smaller particles remains next to the walls, thus providing the greater resistance to the ascending gases required there. That this distribution by bell and hopper charging may give the desired result, the relation of the diameter of the bell to the diameter of the furnace throat at the stock line is of material importance, as likewise that the falling materials shall first strike the materials in the furnace, when nearly full, at about 18 in. from the walls. The former relation is usually a bell diameter 4 to 5 ft. less than the throat diameter at the stock line. The bell angle is usually 40 to 45 deg., and in some cases 50 deg.

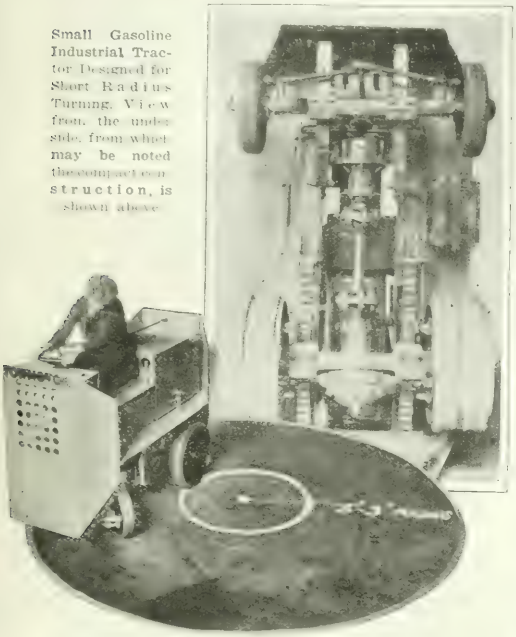
This method of charging results in the surface of the material in the furnace assuming the shape of an inverted cone with its base about 18 in. from the walls, from which point they slope away slightly to the surface of the walls. The smallest particles lie on the base of the cone, and between it and the walls, together with a portion of the smaller lumps and rubble. The inner slope from the base to the apex of the cone consists of pieces of gradually increasing size, with practically only the largest lumps at and near the apex. This description does not, of course, apply to an ore mixture consisting of all fines, or of lumps of uniform size, conditions which seldom exist in blast furnace practice, but it does apply to the usual run of ores.

It is obvious that the greater the difference between the largest and the smallest pieces, in other words, the

(*Continued on page* 1253)

Smaller Tractor Offered by Towmotor Co.

A model C gasoline industrial tractor having a wheel base of 40 in., a turning radius of 5¼ ft., overall, and 40 in. wide overall has been placed on the market by the Towmotor Co., Cleveland. The draw bar pull is rated at 1150 lb. but is said to be capable of considerable increase by weighting the chassis to utilize reserve torque of the motor. The speed is 1 to 8 mi. per hr., and may be controlled by governor. The



Small Gasoline Industrial Tractor Designed for Short Radius Turning. View from the underside, from which may be noted the compact construction, is shown above

short turning radius and the construction from the underside may be seen in the illustrations.

The motor is a four cylinder, four cycle, 3 x 4½ S.A.E. rating 14.44 hp., capable of delivering 23 brake horsepower at 2000 r.p.m. It is said to be particularly suited to heavy-duty pulling on account of high torque and flexibility. Auto-lite battery type ignition is employed, and the starter has the Auto-lite, 6-volt, starting motor with automatic Bendix type mechanism. The battery is a 6 volt, 104 ampere hour truck type, rubber insulated Willard storage battery of special construction, mounted under the frame. The carburetor is 1 in. in size with dash choke control for easy starting. A 6-gal. gasoline tank furnishes gravity feed to the carburetor and is accessibly located in front of the driver.

The frame is pressed steel of special section, 9½ in. deep by 13½ in. wide. A Borg & Beck type 10-in. single plate heavy duty clutch is employed and the propeller shaft is equipped with fabric joints between the transmission and rear axle. The transmission is of special constant-mesh selective type in unit with the motor, and has one speed forward and one reverse. The front axle is of the Elliott truck type. The rear axle is a special adaptation of the Torbensen internal gear type of drive and is said to be highly efficient for both low speed and breakaway pulls, and light duty. The reduction ratio is 8 to 1, full floating type. Timken bearings are used. The truck type sliding-block steering column is incorporated, steering connection being to the front wheels only. Cast steel disk wheels with Timken bearings are used and tires are of solid rubber, pressed on front and rear. The front tire is 16 x 3½ in. single, and the rear 22 x 3½ in. dual. Internal expanding type brakes are used at rear wheels, and are controlled by foot pedal.

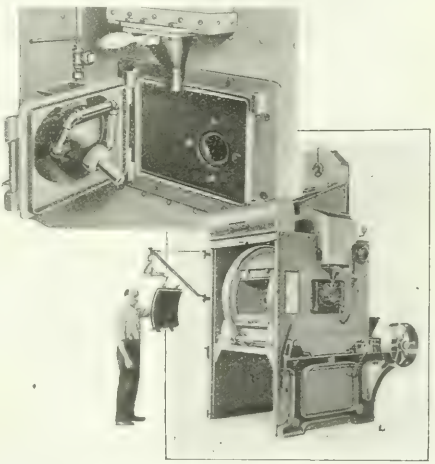
Semi-elliptic chrome vanadium steel springs are provided front and rear and are bushed and equipped with pressure lubricators and ground bolts. Bumpers are of ⅜-in. steel plate, front and rear, and run full width of the chassis, integral with the frame, giving protection to vital parts and for pushing operations. The couplings provided front and rear are adjustable for height. Cooling is by the thermosyphon system. The weight of the tractor is 2900 lb., and by way of comparison it may be mentioned that the weight of the previous type, the model B., is 3975 lb.

Improved Barrel Sand Blast

A new sand blast barrel designed to decrease operating cost by increasing the efficiency of the blasting action and by increasing the durability of the equipment itself has been placed on the market by the Pangborn Corporation, Hagerstown, Md.

Cleaning capacity, in sand blasting, is largely governed by the distance of the nozzle from, and its angle to, the work. Accordingly, in the new machine the nozzles are made adjustable both horizontally and vertically to secure the most effective position to accommodate the various classes of work, with the changing sizes of the individual pieces and the corresponding "ride" within the barrel drum. A mechanical separator intended to assure efficient and constant separation of the abrasive for re-use is included. This is obtained by a ribbed roller driving against a shaft, protected by heavy rubber tubing. The tubing takes the entire wear and is conveniently and inexpensively replaced.

Durability is a feature emphasized. The barrel drum is reinforced at the door opening with plates and angles, inside and out. Steel tires are pinned to the head castings, and the driving on manganese steel rollers with front rollers idle and equipped with



Improved Barrel Sand Blast. The nozzles, shown in insert, are adjustable to give most effective position for blasting various classes and sizes of work

roller bearings, is intended to provide smooth, even traction with minimum wear. The driving sprockets are of steel and, with the chain, run in a bath of oil. The clutch is simple in design and positive in action.

Two sizes of the machine, 30 x 40 in. and 50 x 40 in., are available, these sizes being intended for small work and also for work as large as feasible for barrel cleaning.

Permits were issued in St. Louis last month for the construction of 785 new buildings of an estimated cost of $2,683,245 and for alterations on 578 buildings at an estimated cost of $274,038, the total for the month being $2,957,283, as compared with $1,557,173 in October, 1921, a gain of $1,400,110.

BRITISH FOREIGN TRADE

September Steel Exports Increase—Imports Third Largest of the Year

The September official data on British foreign trade in steel and iron show that the total exports were 289,344 gross tons. This is an increase of 7390 tons over August. The September exports make the average for the first nine months 273,715 tons per month. Exports of scrap are included. To Oct. 1, this year, total exports have been 2,463,440 tons against 1,163,560 tons for the same nine months in 1921.

The September imports were 83,186 tons, those in January having been 100,178 tons. The average for the first nine months of this year is now 75,804 tons per month. These data also include scrap. The following table shows comparative data:

British Steel Exports and Imports, Gross Tons

	Exports	Imports
July, 1922	251,743	55,893
August	281,954	84,003
September	289,344	83,186
Aver. per month, first quarter, 1922	267,047	82,536
Aver. per month, second quarter, 1922	274,830	67,785
Aver. per month, third quarter, 1922	274,347	74,360
Aver. per month, 1921	144,885	152,734
Aver. per month, 1920	274,881	128,685
Aver. per month, 1919	188,519	51,301
Aver. per month, 1913	420,757	195,264

The following table covers the principal exports:

Principal British Exports, Gross Tons

	Average per Month		September	
	1913	1921	1921	1922
Pig iron	78,771	8,602	5,108	69,950
Steel rails	11,876	14,698	20,090	16,375
Steel plates	11,162	10,675	6,016	6,402
Galvanized sheets	63,506	17,635	21,670	35,047
Steel bars	20,921	8,927	9,805	18,122
Tin plates	41,208	18,875	19,792	35,258
Black plates	5,679	1,178	1,256	2,770
Steel sheets	....	....	3,729	13,870
Total exports, first 9 months, 1922				2,463,440
Total exports, first 9 months, 1921				1,163,560

The most marked recovery in the September exports this year over those in September, 1921, has been in pig iron, galvanized sheets, steel bars, steel sheets and tin plates.

Pig iron imports in September were 11,665 tons compared with a monthly average in 1921 of 55,564 tons.

Iron ore imports in September were 299,387 tons which compares with a monthly average in 1921 of 157,298 tons.

Manganese ore imports in September were 49,437 tons. Last year they were 14,405 tons per month and in 1913 they were over 50,000 tons per month.

Analyzing Sand Physically

Frank W. Brooks, chief engineer William Swindell & Bros., Pittsburgh, will be the speaker at the next meeting of the Chicago Foundrymen's Club, which will be held at the City Club, Chicago, at 7 p. m., Nov. 11. His subject will be Multiple Melting of Steel and Gray Iron in the Foundry. At the December meeting of the club, a collection of about 100 samples of molding sand physically analyzed by Eugene W. Smith, Crane Co., Chicago, will be shown. The process, originated by Mr. Smith, consists of placing sand and water in a bottle and shaking the mixture on a vibrating machine. The effect is to separate the silica and the bond, clearly indicating the proportion of each in the sand. The process will be fully explained by Mr. Smith at that meeting.

Midvale's Increase

In its report last week the Midvale Steel & Ordnance Co. showed an improvement of $700,000 during the third quarter as compared with the three months ended June 30. Net earnings for the quarter, after taxes, totaled $1,076,921, as compared with $354,374 in the previous quarter, and $688,238 for the corresponding period a year ago. After interest and depreciation there was a deficit of $760,864 as against $1,435,111 in the preceding three months, and $1,249,136 for the same period of 1921. For the nine months ended Sept. 30, last, net earnings were $1,817,265 as compared with $1,796,229 in 1921. After allowing for all deductions, there was a deficit of $3,348,802 for the period as compared with a deficit of $3,933,931 in 1921 and with a balance of $10,314,574 in 1920. The increase over the preceding quarters may possibly be ascribed to the fact that the company did not suffer so severely from car shortage as did many companies.

Reparation Awarded Pittsburgh Steel Co.

WASHINGTON, Nov. 7.—A decision handed down last Saturday by the Interstate Commerce Commission in relation to a complaint of the Pittsburgh Steel Co., gave recognition to the propriety of selling the shipments involved on the basis of f.o.b., Pittsburgh, which takes on increased interest in view of proceedings before the Federal Trade Commission concerning the Pittsburgh base plan. The commission held as unreasonable and made an award of reparation to the complainant in connection with its complaint against the Director General, et al., as to a rate of 25.5c, fifth class, on a carload of nails and a mixed carload of nails, wire and staples, from Monessen, Pa., to Weston, W. Va., imposed on shipments made in July, 1919. Contemporaneously there was a rate of 19.5c from points in the Pittsburgh district on the Baltimore & Ohio to Weston other than Monessen, a local point on the Pittsburgh & Lake Erie, the former being the delivering carrier to Weston. Previous to Nov. 1, 1918, the 19.5c rate also applied from Monessen. It was restored Oct. 27, 1919.

The Director General alone defended the case and opposed payment of reparation. The commission held that inasmuch as the freight was sold on the basis of f.o.b. Pittsburgh, the complainant's customer deducted the excess of 25.5c over 19.5c from the invoice price and that therefore the complainant was entitled to reparation.

Bethlehem Purchases Dry Dock Company

The Bethlehem Shipbuilding Corporation, Ltd., has purchased the Simpson's Patent Dry Dock Co., Jeffries Point, East Boston, with a view to making it an integral part of the Bethlehem shipbuilding system. Under the direction of S. W. Wakeman, general manager Fore River Works, Bethlehem Shipbuilding Corporation, Ltd., the new property will be turned to active use at once.

The Simpson dock was built in 1856, and the repair department started in June, 1919. The unit buildings are of concrete and brick construction, and include a power plant, pumping plant, property department, plate department, carpenter shop, marine shop and three dry docks. At present 150 are employed. The normal operating force is approximately 330. For the present, at least, there will be no change in the personnel. The purchase will give the Fore River Works, Quincy, Mass., additional repair facilities in Boston harbor, and will eliminate the towing of some of its repair work to Quincy Point and back again to Boston harbor.

Buildings of Structural Steel

In a 72-page booklet, 9¼ x 6 in., issued by McClintic-Marshall Co., Pittsburgh, are represented pictorially more than 60 buildings, mainly industrial, which have been put up by the company. Among these are open-hearth and mill buildings for the Republic Iron & Steel Co., Weirton Steel Co., Inland Steel Co., Mansfield Sheet & Tin Plate Co., Tata Iron & Steel Co. of India, Ashtabula Steel Co., and a number of others, besides all of the massive lock gates of the Panama Canal, involving 55,000 tons of steel. Buildings for Westinghouse, General Motors, Norfolk Navy Yard, Chicago Union Station and other structures are shown.

Witherbee, Sherman & Co., Port Henry, N. Y., have placed their entire piping installation, necessary for the new 500-ton blast furnace which is now in process of erection, with B. Floersheim & Co., Pittsburgh, Pa. B. Floersheim & Co. are closely affiliated with the Crane Co., Chicago, and all the latter's products will be used as a standard. Delivery of material will begin in about three to four weeks and will be completed within three months.

Auxiliary Problems in Steel Making

Contributions on Heating Furnaces, Power Plants, Fluorspar and Coal Read Before American Iron and Steel Institute

IN THE IRON AGE last week were published abstracts of four of the papers presented at the twenty-second meeting of the American Iron and Steel Institute in New York, Oct. 27. They covered the electric furnace, steels for automobiles, open-hearth furnace design and liquid fuel in metallurgical furnaces. Portions of the remaining papers in the program, covering heating furnaces, power plants, fluorspar and coal, follow:

Heating Furnaces for Blooms, Slabs and Billets

Results of Tests Show Greater Efficiency of the Continuous Recuperative Type Than in the Regenerative Furnace

BY W. P. CHANDLER, JR.*

THERE are two main types of furnaces in use for heating blooms, slabs and billets, the continuous and the non-continuous. The latter is similar in construction to the open-hearth furnace; the direction of the gas flame across the hearth is periodically reversed and the furnace is usually equipped with regenerative checker chambers for preheating the air used for combustion. The blooms or slabs which this type of furnace usually heats are charged on the hearth of the furnace and remain in the one place until hot enough to roll.

As the continuous furnace is not reversed, the flame always travels in one direction, while the steel, usually in the form of billets, passes through the furnace in the opposite direction. Cold billets enter the furnace at the coolest point and are pushed forward to the point of maximum temperature, where they are discharged to the rolls. In the continuous furnace the billets lie tight together on the skids, forming a large steel plate on the floor of the furnace. Only the top of the billet is exposed, so that all the heat required to bring the steel to rolling temperature must be absorbed by this surface. In the non-continuous furnace there is an open space between blooms, so that three sides are available for directly absorbing the heat from the products of combustion or roof, while the fourth side, resting on the heated hearth of the furnace, absorbs from it a large amount of heat.

The dimensions of the non-continuous furnace do not affect directly the time of heating, but in the continuous furnace, with the rolling mill handling a given number of bars per hour, the length of the furnace fixes the time of heating. With everything else the same, the time of heating in a continuous furnace varies as the square of the thickness of the billet, so that a 5-in.

*Fuel and experimental engineer, Carnegie Steel Co., Duquesne, Pa. Abstract of a paper read before the American Iron and Steel Institute, at New York, Oct. 27.

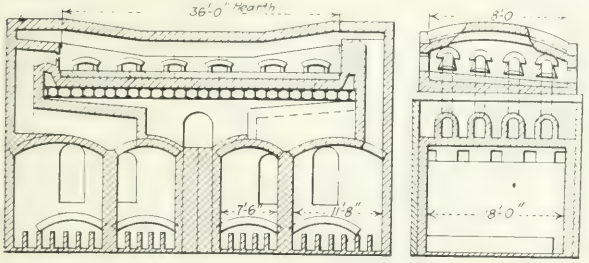


Fig. 1. Non-Continuous (Reversing) Regenerative Heating Furnace — Longitudinal and Transverse Sections. This type is most common for large blooms, which lie stationary while being heated
(At left)

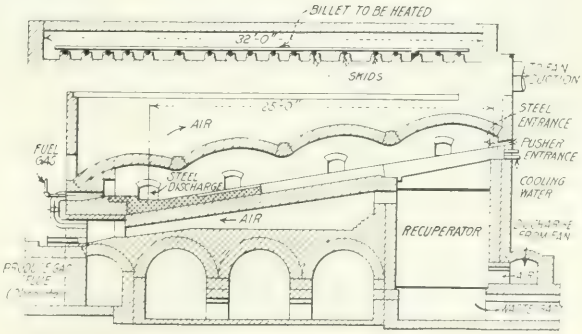


Fig. 2. Continuous Recuperative Furnace, with Side Charging and Discharging Doors Through Which the Billets Are Passed Longitudinally. At top is a cross-section of this furnace, showing how the billet rests upon the numerous skids in its passage sidewise through the heating chamber
(At right)

square billet requires four times as long as a 2½-in. square billet. This means that for the larger sizes of billets long furnaces are needed to give the capacity required by the rolling mill. For blooms and slabs the general practice so far has been to use non-continuous furnaces, but for 5 x 5-in. billets and smaller the continuous furnace proves very satisfactory.

Certain of the alloy and spring steels, if heated too rapidly, tend to crack, so that care must be used in bringing such billets up to rolling temperature. The continuous furnace fits this class of steel admirably, since the billet enters a relatively cool part of the furnace and is gradually heated to the temperature required for rolling.

Non-Continuous Regenerative Furnace

A non-continuous regenerative furnace is shown in Fig. 1. The hearth, which is 18 ft. wide by 36 ft. long, has a silica bottom, made by fusing sand in thin layers until the proper thickness is reached. A slight slope toward the rear of the furnace allows the slag which forms to drain through spouts into slag pots. The steel is charged and drawn through doors in the front by a charging machine. Four ports at each end of the furnace admit gas with part of the air for combustion. The remaining air for combustion enters through a wide port opening between the roof and the top of the gas ports.

Two regenerative checker chambers are provided at each end of the furnace, as the producer gas used was preheated, as well as the air for combustion. The checker chambers are connected to the stack by flues containing valves and dampers, so arranged that the direction of the flow of the hot products of combustion across the hearth may be periodically reversed.

Results of Tests

On tests of this furnace the heat absorbed by the steel was found from the weight of steel heated, the temperatures of the steel on entering and leaving the furnace and the [illegible], which was taken as 0.166. The weight of steel was obtained from the number and weight of blooms entering the furnace. The heat supplied to the furnace was determined from the heat value of the fuel gas, as calculated from the chemical analysis, and the number of cubic feet of gas burned, reduced to standard condition of 62 deg. Fahr. and 30 in. of mercury pressure.

Losses were calculated according to usual engineering practice, the loss due to radiation being taken as the difference between the heat supplied in the gas and the sum of heat absorbed by the steel and all losses except radiation.

The efficiency of the furnace as shown is the ratio of the heat absorbed by the steel to the heat delivered in the gas. The efficiency of the regenerator was calculated by assuming that all the heat in the gases entering the regenerator was available for absorption by the air. The difference between the heat content of the gases entering and leaving the regenerator was assumed as the heat absorbed by the air. The efficiency shown is the ratio of the heat absorbed by the air to the sensible heat of gases entering the regenerator.

From the tabulated results it will be seen that the efficiencies varied from 36 to 41 per cent. With the highest efficiency the following conditions prevailed: the lowest rate of heating steel, the lowest gas consumption, the lowest radiation and the lowest stack loss, while the reverse conditions prevailed on the test having the lowest efficiency. The greater rate of heating is accompanied with greater furnace temperature and corresponding greater heat losses.

Table II [illegible] Tests on Reheating Furnaces

Test No.	[illegible]	[illegible]	300	Continuous Brick Recuperator 410	400	420	Continuous Cast Iron Recuperator 420	410	430
[illegible]			[illegible]	3¼x3¼	3¼x3¼	2½x2½	2x2	2½x2½	2½x2½
					2½x2½				
Weight of billet, lb.	500	1,120	1,300	1,100	1,100	650	420	650	650
			1,700		650				
Number of billets heated	178	142	177	345	361	532	917	693	672
Steel heated per hr., lb.	36,486	32,905	40,743	54,214	45,637	49,400	55,020	65,952	60,014
Temperature, heated steel, Fahr	2,076	2,047	2,118	2,087	2,179	2,164	2,056	2,058	1,994
Gas burned per ton of steel, cu. ft.	3,790	3,522	4,095	2,347	2,425	2,598	3,000	2,485	2,637
Flame temperature, deg. Fahr.	2,563	2,511	2,676	2,600	2,622	2,570	2,430	2,406	2,408
Stack temperature, deg. Fahr.	839	868	936	552	563	565	716	629	655
Efficiency of furnace, per cent.	38.70	40.91	36.47	62.18	63.07	58.29	47.30	57.41	52.52
Recuperative efficiency, per cent	59.75	58.67	57.30	22.09	26.06	20.25	19.00	23.02	14.20
Radiation loss, per cent	34.60	32.56	32.52	16.48	14.54	20.84	20.74	13.18	16.06
Loss to stack, per cent	22.39	22.08	26.18	17.56	18.13	16.85	26.24	24.72	26.09
Other losses, per cent	4.31	4.45	4.83	3.78	4.26	4.02	5.72	4.69	5.33

Table III [illegible] Efficiencies obtained

Furnace	Run No. 1	Run No. 2	Run No. 3	Average	Type of Furnace
No. 2 Mill	62.18	63.07	58.29	61.18	Continuous recuperative
No. 5 Mill	38.70	40.91	[illegible]	[illegible]	Non-continuous regenerative
No. 6 Mill	47.30	57.41	[illegible]	[illegible]	Continuous recuperative

Table III.—Temperatures of Gases Leaving Furnace Chamber

Non-continuous regenerative	2001 deg. Fahr.
Continuous recuperative	1192 deg. Fahr.

Table IV—Drop in Air Pressure Through Recuperators, in Inches of Water

Furnace No.	Type of Recuperator	Run No. 1	Run No. 2	Run No. 3	Average
2	Brick	2.11	2.40	1.55	2.02
6	Cast iron	1.18	1.38	1.41	1.32

Continuous Recuperative Furnace

A continuous billet heating furnace equipped with a recuperator for preheating the air for combustion is shown in Fig. 2. The billets enter through a side door in the upper end of the furnace, passing into the furnace on rollers, are pushed forward on the skids by a set of arms which operate through the rear end wall and are discharged through a small door in the side wall at the other end of the furnace by a pusher bar

Table V.—Efficiency as Affected by Billet Size

Furnace No.	Test No.	Billet Size in Inches	Per Cent Radiation Loss	Per Cent Efficiency
2	1	3½ x 3½	16.48	62.18
2	2	3¼ x 3¼ and 2½ x 2½	14.54	63.07
2	3	2½ x 2½	20.84	58.29
6	1	2 x 2	20.74	47.30
6	2	2½ x 2½	13.18	57.41
6	3	2½ x 2½	16.06	52.52

driven by pinch rolls. The discharge door is in line with the first pass of the roughing rolls, so that the billet enters the rolls before being completely discharged from the furnace.

This design is possible where only one furnace supplies a mill. If two or more furnaces are used the billets usually fall from the hearth, through the end of the furnace, upon the rollers of the transfer table. This requires an opening in the end of the furnace, extending the full width. While the opening is partially closed by swinging doors, bars or pipes, it allows a large amount of cold air to pass into the combustion chamber at the point where the billets are being heated to their highest temperature.

The roof consists of four arches thrown in the direction of travel of the steel. The skewbacks for these arches are supported by a water-cooled system of pipes hung by straps from steel beams which rest on the side walls of the furnace. The side walls extend 3 ft. above the arch. Steel trays filled with sand are placed over the beams, forming an air space over the roof.

Water-cooled skids are used to bridge the opening into the recuperator chamber, but no water-cooling occurs beyond the point where the fire brick floor of the furnace commences. Cast iron skids support the billets to within 3 ft. of the discharge door, where a magnesite brick bottom, built flush with the tops of the skids, covers the floor of the hearth. The cast iron skids without water-cooling give excellent service. Fifteen burners are provided across the end of the furnace.

While the furnace shown has a recuperator of vertical cast iron pipes supported by plates, another furnace, also, was tested, having a brick recuperator. The recuperator has received a great deal of attention abroad and a number of special form tiles have been developed with which it is constructed. In one type, where the recuperator chamber is located below the furnace, the air for combustion passes upward, by natural draft, through vertical rectangular flues, while the waste gases entering at the top travel through horizontal flues and make two passes across the outside of the air-carrying tile. Great care has been used to prevent leakage from the air passageways into the waste gas flues and the tile has been designed as thin as is consistent with the necessary strength.

Results of Tests on Recuperative Furnaces

Continuous recuperative furnaces are more efficient than regenerative furnaces, as shown in Table II. This higher efficiency is due to the method of operation of the continuous furnace, in which the cold steel enters the furnace at one end and progresses slowly to the other end, at which time it has become hot enough to roll. The gases traveling in the opposite direction—from the hot to the cold end—are cooled by the steel and therefore leave the furnace chamber at a much lower temperature than the gases of the regenerative furnace. In the latter furnace all parts of the hearth are maintained at the same temperature. The principal heat losses of heating furnaces are the stack losses and radiation, as shown at the bottom of Table I.

Table II clearly shows why the use of regenerative furnaces should be limited to those places where it is impossible to apply the continuous recuperative furnace, for less than half of the heat in the gas enters the steel in the non-continuous regenerative type. The regenerative furnace does not lend itself to insulation to prevent radiation, because the temperature over the entire chamber is the same and usually so intense that if insulation were applied the limit of the refractories would be reached and the furnace destroyed. The continuous recuperative furnace, on the other hand, does lend itself to insulation to prevent radiation, because this furnace is comparatively cool and most of the radiating areas can be insulated.

The two continuous furnaces tested had different recuperators. Table IV gives the losses in air pressure through the two types.

The greater drop in air pressure through the brick recuperator is due mainly to the sharp turns around the ends of the baffles placed in the recuperator. The cast iron recuperator also has a distinct advantage over the brick recuperator in that its passages can be made with surfaces smooth enough and of such shape that the drop in air pressure through it will be less than can be secured in brick recuperators, where the passages in most cases must be made of rectangular cross section and have rough surfaces. Cast iron is also much better for conducting heat than fire brick.

In both series of tests on continuous recuperative furnaces the efficiencies were highest when the largest size billets were handled. Table V gives the size of billets, radiation loss and efficiency for the series of tests on the two recuperative furnaces.

It will be noted that the series on the smallest size billets had the largest radiation loss. This may be due to improper operation or design. The smaller size billets heat more quickly and are at rolling temperature before arriving at the discharging end. This causes a higher average temperature of steel, roof and side walls inside of the furnace, resulting in greater radiation loss.

Conclusions and Recommendations

From the results shown, the development of heating furnaces should be along the lines of continuous recuperative furnaces unless some special reason makes it necessary to use another type. The recommended type as now built is superior to other types, and can be made even more efficient by development. Recommendations for improvement follow:

A.—The roof should be placed at such a height above the steel that the gases may wipe both surfaces and yet not encounter too much resistance to their flow. A flat roof eliminates the necessity of water-cooling arch supports. Some method of longitudinal corrugation may be advisable, to increase the surface for absorbing heat from the products of combustion. This would make available more heat for radiation from roof to steel and increase the rate of heat transfer.

B.—The slope of the hearth of the continuous furnace from the charging end to the discharging end should be not too great. This applies especially to long furnaces to handle large billets. The use of a basic lining for reversing furnaces would give a supply of basic cinder. This can be used in open-hearth furnaces to replace lump ore.

C.—Solid cast iron skids should be installed on the floor of the furnace, to eliminate the heat lost in cooling water and to simplify construction.

D.—A series of burners should be installed across the width of the furnace, to secure a uniform temperature. The burners should be equipped with valves for independent control of both fuel gas and air for combustion.

E.—Each furnace should be equipped with means whereby the gas and air pressures on the burners may be automatically maintained constant, and with an integrating and recording device which will accurately measure the amount of gas used.

F.—The pusher for advancing the steel along the skids should give a uniform motion that can be regulated very closely, both in regard to distance and speed.

G.—The use of a roof recuperator should be limited to that section of the roof in which the refractory property of the brick will not permit it to be insulated.

H.—The side discharge is superior to the dropping end discharge, from a fuel standpoint. It eliminates loss of heat due to the exposure of a poorly insulated surface to radiation from the hottest zone of the furnace, as it is impossible properly to insulate the swinging door on account of its construction and the abuse it receives. The side discharge admits less cold air to the furnace chamber and a side charging mechanism prevents to a large extent the leakage of air into the furnace.

I.—The use of metal in recuperator construction has certain advantages over brick. It has a greater heat transfer rate and is not so susceptible to cracking, with consequent air leakage. The possibility of a design with the use of pipes or tubes similar to watertube boilers looks attractive. The recuperator should be constructed so that it offers the least resistance to the flow of air and gas, consistent with good heat transfer. It

should be located where it is easily accessible for inspection and repair. Placing it above the furnace instead of under ground should be carefully considered. A better distribution of the waste gases, both through the furnace and in the recuperator, would be possible than is the case where the entrance to the recuperator is directly below the steel to be heated, since the gases must pass over the ends of the billets. Additional insulation would be required, but no drainage water could collect in the bottom of the chamber or flues.

J.—Insulation should be used to prevent radiation, as far as possible, without reaching the refractory limit of the fire brick and yet remain under the point where first cost would overbalance economy.

K.—Water-cooled parts should be avoided wherever possible, because they are hard to keep in repair and dissipate an appreciable amount of the total heat of the gas; their elimination reduces the cost of supplying cooling water.

L.—Several installations of waste-heat boilers have been made in connection with heating furnaces. However, the development of the recuperator holds such possibilities that furnace efficiencies comparable to good boiler practice should be obtained. Future development, however, may show that in some cases of non-continuous regenerative furnaces the waste-heat boiler may have a field.

Discussion

Prof. W. Trinks, Carnegie Institute of Technology, Pittsburgh, stated that the size of billets is not the deciding factor in the choice between continuous recuperative furnaces and non-continuous or reversing regenerative furnaces. He cited instances where a continuous furnace is in use in Pittsburgh for heating blooms 9 x 9 in. in section; another one in Philadelphia is used for heating ingots 17 in. square, while two other mills in Pennsylvania use these furnaces for heating ingots of 22 in. and 24 in. respectively. On the other hand, he knew of no cases where skelp is heated in a continuous furnace. He pointed out that one important element in the choice of furnace is the question of continuity of operation in the mill. Any mill running on small orders and subject, consequently, to frequent roll changes, or any mill in which much trouble is experienced, causing shutdowns for one reason or another, is a poor proposition for the use of a continuous furnace. He also stated that the usual purpose in the use of a continuous furnace is not so much a question of fuel saving as of labor saving.

Much leakage of air in and beyond the recuperator is charged by Professor Trinks against the use of the recuperative continuous furnace. In a test of one of the furnaces involved in the present paper, such leakage was found to amount to 30 per cent of all the air passing through the recuperator, with the result that only 400 deg. rise in temperature of air was obtained in place of 600 deg. expected. In another similar furnace, air leakage amounting to 65 per cent was found, with correspondingly reduced efficiency in the recuperator. He laid particular stress on the fact that any mill trouble or variation in sections cuts down furnace efficiency very heavily.

W. D. Chapman, president Chapman Engineering Co., New York, advocated a much greater amount of pre-heating in the recuperator, pointing out that a rise of 400 deg. produces a saving of 10 per cent in fuel, whereas a rise of 1300 deg. results in saving 30 per cent of the fuel. These are theoretical figures. Practically, however, the savings work out even greater than this in both cases, because of the fact that with highly pre-heated air not so much excess air is required in consuming the fuel. He also advocated the use of a design of furnace which would pass the gases both above and below the steel to be heated, instead of merely above. This would result in more rapid heat transfer between the gases and the steel and in every way conserve efficiency.

Mr. Chapman referred to a test he had made with an English recuperative furnace using a high temperature of air, in which the consumption of coal per gross ton of steel was 174 lb. In this case, ingots were being heated which measured 14 x 16 in. at one end and 16 x 18 in. at the other and which were only 5 ft. 2 in. long. Two 8-hour shifts were employed, with 4-hr. idle periods between shifts. Each recuperator tile used in this furnace measured about 12 in. high, 5 in. thick and 8 in. deep. Each tile had four vertical passages, so small that there could be no core of air in the center which would not receive heat. In this particular case the passages were 1⅝ x 2⅝ in. in section. The waste gases, passing on the outside of these tiles horizontally, serve to heat the vertically moving air within the small passages.

Power Plants in the Steel Industry

Their Economic Importance—How Power Costs Compare with Ingot Cost and with Payroll

BY E. F. ENTWISLE*

DURING recent years tremendous development has been made in the size, reliability and control of electrical apparatus for steel plant service and in the generation and transmission of the power required for its operation. Its almost innumerable applications have been so general in character and large in total that in many cases the development of the plant's own power supply has not kept pace either in economy or size with the peak power demand, so that electric current frequently must be purchased to take care of these maximum load periods.

The true cost of power is not generally fully appreciated, total power cost being defined as the cost of producing or purchasing all the energy for generating steam, electricity and blast furnace blowing. In such a cost, waste heat must be accorded a value commensurate with the value of the fuel that would have to replace it if the waste heat were not available. While it is true that the value placed on such waste heat is returned as a credit to the cost of the producing department, its real value must be set down as an item of power expense in order to appreciate fully how large an item power actually is in production costs and for a proper realization of the importance of its economic use.

The data submitted, taken from the cost records of three of the Bethlehem steel plants, cover the period from Jan. 1, 1920, to Aug. 1, 1922. This period is fairly representative of modern practice, 1920 being a year of good production, but with many wartime prices and practices still continuing, 1921 being a year of low production and best possible economy, and 1922 being a period of increasing production, with a continuance of improvement in the economies of 1921.

The table shows the ratio of the cost of total power generation to the costs of some of the principal and more familiar items entering into production costs. From these figures have been eliminated all the effects of such pig iron and coke as were manufactured for shipment to outside customers, so that the data applies generally to any steel plant the operation of which extends from coke ovens to finished steel products. In

*Assistant general manager, Steelton plant, Bethlehem Steel Co., Steelton, Pa. This is an abstract of a paper read before the American Iron and Steel Institute, at New York, Oct. 27.

the first set of figures, blast furnace and coke oven gas and waste heat are charged to costs at full value. In the second block, all charges for such waste heat products have been eliminated, and all power purchased

	Including Value of By-Product Gas and Waste Heat		Not Including Any Value for By-Product Gas and Waste Heat and with Total Power Consumption Figured at Plant Producing Cost	
	A	B	A	B
Ratio of total power cost:				
1. To delivered cost of all coal for coking	0.82	0.60	0.60	0.28
2. To delivered cost of all gas, coal and oil	1.67	0.64	1.22	0.30
3. To delivered cost of all ore	0.65	0.60	0.48	0.28
4. To delivered cost of all limestone	5.35	2.40	3.90	1.10
5. To delivered cost of all alloys	2.45	2.16	1.80	1.00
6. To delivered cost of all refractories	2.70	2.98	2.00	1.40
7. To total ingot cost	0.138	0.142	0.101	0.065
8. To total plant pay roll	0.255	0.230	0.187	0.106
9. To sales value of all finished products	0.071	0.080	0.052	0.037
10. Horse power hours consumed per ton of shipments	286	242	286	242
11. Kilowatt hours (including equivalent of blast furnace blowing) consumed per ton of shipments	256	516	256	516
12. Per cent of blast furnaces blown by gas engines	100	100	100	100
13. Per cent of Item 10 generated by waste products	39	68	39	68
14. Per cent of Item 11 generated by blast furnace gas	78	72	....	....

is assumed to have cost the same as the power generated at the plant.

Relation Between Power and Other Costs

Any single cost item that, stripped of all credits, reaches the proportion of nearly one-fifth of the total plant payroll, or 5½ per cent of the total sales value of all manufactured products, or twice the cost of all refractories, commands attention. How to reduce it, and the extent to which it can be reduced, constitute the real economic question. Every plant is a problem in itself, and no definite formula can be laid down that is applicable to all. But comparatively few plants are in a position where their total power costs cannot be reduced and at the same time show a good return on the expenditures required to make the reduction.

In general there are three points of attack on the problem, after the cost analysis has been made: first, on the prime movers of mill and auxiliary drives; second, on the electric generating and blast furnace blowing plants; and third, on the steam plants.

Keeping these three general points in mind, it is interesting to return to the tabulated figures, particularly items 7 to 14, inclusive, as they illustrate to some extent the possibilities referred to.

A is the average of plants in which power requirements are about evenly divided between steam and electricity; *B* is a plant which is primarily motor driven. While the nature of the products from plant *B* requires nearly twice the quantity of power per ton as the products from *A*, *B*'s power bill per ton is scarcely greater than *A*'s, due to its more extensive recovery of power, proportionally, from its by-product gas and waste heat, and in spite of the fact that 28 per cent of its total electric power must be purchased at a unit cost of about four times its own generating cost, all of its own power being generated by gas engines. Plants *A* purchase 14 per cent of their electric power consumption. Improvements now under way at *B* will eliminate this excess burden, and a truer comparison of the accomplishment possible may be seen in the second block of figures, in which gas and waste heat charges have been eliminated and the power now being purchased figured at plant producing costs.

Further reductions in this plant's power costs may be made through the replacement of its existing boiler plants. It is safe to say that this plant, or any one similar in equipment and power requirements, can reduce its total power bill, eliminating all charges for by-product gas and waste heat, to about 5½ per cent of its total ingot cost.

Fluorspar and Its Uses

Its Rôle in the Open-Hearth Furnace—Other Uses—Production, Importations and Prices

BY G. H. JONES*

FLUORSPAR, a comparatively unknown non-metallic mineral of moderate cost, widely distributed geologically, but of commercial value only in a few places in the world, is of essential and economic importance to steel makers from the fact that 80 to 85 per cent of the world's production is used in basic open-hearth and electric furnaces as a flux and detergent, and there is no known substitute. Its consumption runs evenly with the production of basic open-hearth steel ingots, and its production increases or decreases as the steel business is good or bad.

The demand for steel making is for a washed gravel, sized ¾-in. and under, of 85 per cent and over in calcium fluoride and not to exceed 5 per cent in silica, and free from sulphides, lead and zinc, the shipper being penalized according to an agreed percentage, varying with different buyers, for a lower calcium fluoride or a higher silica content than the percentages here given. A properly equipped mine has its own laboratory and watches the analyses as they are made from the mill feed, mill run and car loadings, and is therefore in a position to guarantee to the user the analysis specified.

Necessity for Specifications

I suggest the necessity for buyers to adopt standard specifications for fluorspar and that this be taken up with the American Society for Testing Materials, in order to determine what analysis is best for steel makers and other users, presenting penalties for inferior quality, and a bonus for superior ones, as in the case of iron ore.

The open-hearth melter would then know exactly what he had to work with. It is a common assumption that the melter throws in so much spar whether high or low in calcium fluoride or silica, but that is not the case as he uses only enough to bring about the reaction required, and in that way readily determines the grade employed.

Rôle of Fluorspar in the Open-Hearth Furnace

From the heads of the operating departments of a large steel company, I have been given the following information:

The elimination of phosphorus and sulphur depends almost entirely upon the limestone, so in order to take

*President Hillside Fluorspar Mines, Chicago. This is an abstract.

care of the phosphorus and sulphur it is necessary at all times to have a highly basic fluid slag. Phosphorus is reduced at a low temperature while sulphur is reduced at a high temperature. In fact, most of the sulphur is reduced after the heat has been melted and the slag made fluid and the bath raised to higher temperature.

The limestone slag, immediately after the heat is melted, lies like a blanket upon the bath and to insure proper oxidizing conditions it is necessary to thin up the slag, and render it more fluid so that the metallic contents of the bath will come into more intimate contact with the oxidizing slag. It is the universal practice in this country to use fluorspar for this purpose. Fluorspar acts as a neutral reagent and does not affect the basicity of the slag. The increased fluidity not only allows for quicker elimination of impurities in the metal but allows the transference of heat from the fuel to the bath of metal in much quicker time.

Twenty years or more ago it was the general practice in most of the steel plants of this country to add fluorspar just before the furnace was ready for tapping. During later years, however, it has become the more general practice to add the fluorspar in the early stages of the working of the heat, not only to allow the slag time enough to function properly with regard to impurities in the metal, but to eliminate sulphur at higher temperature and to allow the furnaceman more opportunity to quickly raise the temperature of the bath in case it is necessary to tap the heat a little early.

In some steel making districts, particularly in the East, pig iron is apt to be high in phosphorus and low in manganese and it is the general practice where scrap is plentiful and cheap, to charge as little pig iron as possible. Iron of this character requires a high lime charge, due to the fact that the small pig iron charge with consequent decreased amount of silicon and manganese does not tend to create a fluid slag; therefore, large additions of fluorspar are necessary. High manganese pig iron increases the fluidity of the slag and, therefore, decreases the amount of fluorspar necessary for thinning out the slag. A low silica content in fluorspar is most desirable as a high silica content means additional limestone. The latter item is not desirable from a tonnage standpoint because a high limestone charge adds to the time of heat in the furnace with the subsequent reduction of tonnage.

The general practice in this country would indicate the average consumption of from 8 to 10 lb. of fluorspar per ton of steel. This depends upon the character of pig iron, scrap, etc., used in the various districts. The use of alumina as a substitute for fluorspar is being advocated in some quarters but to date has not been proved up commercially.

No bad effects of the spar on the walls or roof of the open-hearth furnace have been known and it has been found as time goes on that open-hearth superintendents are increasing the amount of fluorspar used per ton of steel melted.

Dr. H. M. Howe in "The Metallurgy of Steel" (1890) in summing up fluorspar says it appears to favor dephosphorization:

> 1. By liquefying the slag and enabling it to assimilate the lime present, part of which might otherwise remain unmolten and inert and thus rendering the slag effectively basic to it.
>
> 2. Probably by volatilizing silicon from the metal, thus diminishing the formation of silica and thereby increasing the basicity of the slag.
>
> 3. In certain cases, for example, when the conditions are not strongly oxidizing, by volatilizing phosphorus as fluoride.

Dr. Richard Moldenke at the New York Institute meeting, Feb. 19, 1922, claimed that basic hearth electric furnaces should be used in every new installation. To desulphurize rapidly and well, lime and fluorspar must be used in combination to form an active slag on the molten metal.

THE IRON AGE, April 6, 1922, under the heading of "Fluorspar in the Open-Hearth" reviewed editorially an article from a German source previously printed in THE IRON AGE of March 23, 1922, to which I refer you.

Outside of the steel industry many uses, and growing ones, are found for fluorspar. The glass, ceramic and enameling trades, including enameled tile and brick, are the next largest users, and use the highest grade hand picked and ground spar. Then come perhaps the electrolytical smelting of lead and antimony and other nonferrous and ferrous smelters. It is also commencing to regain the standing it once had among foundries, the demand from which is expected to steadily increase, as the benefits derived include the reduction of the coke necessary on account of the reduction of the number of pounds of fluxing material used. Cleaner castings are obtained on account of more fluid metal and greater freedom from slag, and stronger castings for the same reason. Less iron is lost in the slag and the slag is more liquid. Less work is required in cleaning and repairing the cupola and taking care of the dump, by reason of the liquid slag causing the cupola to clean itself more readily, and that this class of slag is brittle and hence breaks up more readily in cleaning away the dump. Fluorspar is also the main component part of many special foundry fluxes.

Benedict Crowell in the *Engineering and Mining Journal*, Jan. 21, 1922, made the statement which follows: It is not generally realized that the known fluorspar deposits of this country are very limited in extent. War stimulation failed to develop a single new ore body of consequence, that I know of. The increased supply in 1917 and 1918 came from the exhaustion of reserves at the principal mines, depletion of all old and newly located shallow deposits, working over old dumps, and salvaging the low grade ore left in the old workings of abandoned mines. Prices of $35 to $60 per ton justified extreme activity.

Production and Prices

Production of fluorspar in the United States was first reported in 1883. Years of normal production are:

	Tons
1883	4,000
1892	12,250
1900	18,150
1905	57,385
1910	89,427
1915	136,941
1920	186,778

The largest shipments, due to previous war demands, were 263,817 tons in 1918 to which add 12,572 tons imported in that year. In 1921 shipments dropped to 34,960 tons due to large stocks and depression in the steel business.

English production has averaged for the last eight years about 50,000 tons annually. Exact German production reports are not available, but indicate about 8000 tons annually, and should show much larger for 1921 and 1922.

The highest average prices realized for fluorspar at mines including shipments made on old low-price contracts were:

1918	$20.72 per ton
1919	25.49 per ton
1920	25.26 per ton

Basic open-hearth steel production at 5-yr. intervals shows:

	Tons
1900	2,745,491
1905	7,815,728
1910	15,292,329
1915	22,788,526
1920	31,467,123

As indicating the consumption of flourspar for these years gravel fluorspar was produced in the United States as follows:

	Tons
1910	32,013
1915	114,151
1920	194,786

No records were kept of importations when fluorspar was on the free list, prior to August, 1909, but for subsequent years imports were as follows:

	Tons
1910	*42,488
1915	7,167
1920	24,612

*Largest on record.

Of the 1920 imports England furnished 17,096 tons, Canada, 7086 tons, chiefly from British Columbia, and Germany, 407 tons.

Fluorspar was on the free list until August, 1909, when a duty of $3 per ton went into effect. This was reduced to $1.50 per ton, October, 1913. The present duty of $5.60 per ton is in the new tariff of September, 1922.

A rough estimate shows consumption as follows:

	Per Cent
Steel ingots and castings	80 to 85
Glass and enameling	7½ to 10
Hydrofluoric acid	5 to 6
Foundries	1 to 2
Miscellaneous	2

[Geological and mining features are discussed in the concluding portion of the paper.]

Coal and the Steel Industry

Practicability and Methods of Storing Bituminous Coal—Modern Methods of Mining

TWO papers on the coal industry were presented, covering certain phases bearing on the steel industry.

One was entitled, "The Storage of Bituminous Coal," by H. H. Stoek, professor mining engineering, University of Illinois, Urbana, Ill., and J. V. Freeman, director, Coal and Coke Research Laboratory, United States Steel Corp., Joliet, Ill. The authors discussed the practicability and disadvantages of coal storage and the physical and chemical changes in stored coal. The requirements of an ideal storage plant were outlined together with a classification of the common methods of storing. According to the authors, the iron and steel industry consumes about one-fifth of the bituminous coal produced in the United States, or about 100,000,000 tons per year. As large consumers of water, gas and electricity, steel companies are directly interested in public utilities.

The other paper, "Modern Methods of Mining Coal," was by H. Foster Bain, director Bureau of Mines, Washington. An interesting moving picture of some phases of present day mining was a distinct addition to the author's presentation. The author's summary and conclusions are as follows:

In bituminous mining there has been a decided improvement in the development of methods during the past 25 yrs. Changes in labor supply and the increasing cost of coal require a more general adoption of better methods.

The application of engineering knowledge has been of great advantage in securing a high recovery of coal, increase in safety and decrease in cost.

Concentration of work and supervision especially are in the interest of greater safety and of coal recovery.

More extensive introduction of machinery underground is to be anticipated, but it will be necessary to change mining methods in order to realize the full economy of the machinery.

Irregular working is one of the most serious handicaps to be met in improvement of practice and can only be expected to be eliminated in part.

From the standpoint of economy of operation, high recovery of coal, and the control of conditions that affect safety, the close adherence to a well-thought-out plan adapted to the local conditions is a first obligation on operators and managers.

In many localities much coal is being lost beyond the possibility of future recovery and the time may come when the States will levy a tax penalty on coal that is unnecessarily left in mined-out areas.

STEEL IN SOUTH AFRICA

Union Steel Corporation Installing New Open-Hearth Furnace and Rail Rolling Mill

Steel production in South Africa is making considerable progress, according to a report to the Department of Commerce from Trade Commissioner Stevenson, though not as much as had been expected.

The Union Steel Corporation (of South Africa), Limited, Mr. Stevenson says, is by far the most important factor in the industry, its 1921 production being 14,434 tons of a value of £361,468. The greater part of the output, or 11,573 tons, consisted of open-hearth steel made from scrap materials, while 2861 tons were made in a 3½-ton Heroult electric furnace. A new 22-in. mill is being installed to roll heavier sections of angles, channels, girders and similar products from 20 to 30 lb. per foot, and rails up to 60 lb. per yard. A new 25-ton Siemens open-hearth furnace has been erected and when in full working order the capacity of the works will be 30,000 tons a year. The Union Steel Corporation has already supplied a large part of the reinforcing steel contract for the Government grain elevators, and has rolled a few rails which have been purchased by the South African Railways for trial purposes.

The Dunswart Iron & Steel Works, Limited, turned out 5355 tons of iron, valued at £123,165 in 1921. A new 3-roll high 18-in. cogging mill is in the course of erection. It is intended later to manufacture steel castings up to 7 tons.

The Witwatersrand Co-operative Smelting Works, Limited, has erected a new plant at Driehoek, to which the old equipment is being transferred. The capacity of the new plant will be 4500 tons per annum. The 1921 output was 1296 tons of shoes and dies, worth £25,900, as against 1201 tons in 1920, valued at £24,020.

The South African Iron & Steel Corporation, Limited, at Pretoria, was able to operate only during the first four months of 1921, the output being 1148 tons of pig iron, valued at £11,480, which was slightly below the 1920 figures. The Newcastle Iron & Steel Works, Limited, during the year completed its plant, which includes one blast furnace of a daily capacity of 175 tons, two Cowper stoves, two blowing machines, and brick-making machinery. Both of these companies, which were formed to exploit local ores, are unable to operate, due to lack of capital. The only plants operating on any commercial scale utilize scrap.

It would appear, Mr. Stevenson concludes, that the local industry has not as a whole made the progress that was anticipated, even allowing for the depression period. Whether the new iron and steel industry encouragement act will prove sufficiently attractive to interest capital is open to some question.

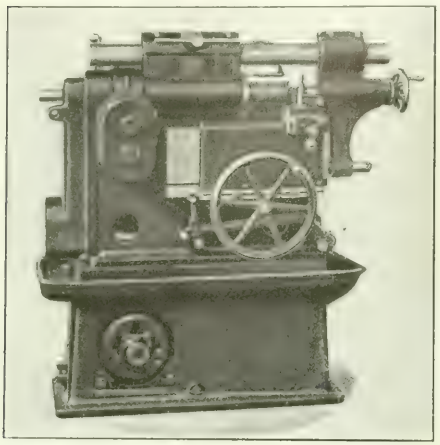
The Western Screw Products Co., St. Louis, whose plant was recently destroyed by fire, has secured new properties located at Main and St. George streets, that city. Its new plant is being equipped with modern machinery, some of which is still en route. If the present plans are consummated, production will begin about Nov. 15. The range of capacity will be enlarged to produce screw machine work up to and including 2¾ in. diameter.

Of all the typewriters imported into Australia, about 95 per cent are of American manufacture, according to Trade Commissioner Sanger of the Department of Commerce.

Stub Lathe for Piston Turning

The Sundstrand stub lathe, shown in the accompanying illustration, has been added to the line of manufacturing lathes of the Rockford Tool Co., Rockford, Ill. Although designed primarily as a piston turning machine, many other jobs, such as turning automobile wheel hubs, gears, steering knuckles, pulleys, bushings, etc., may be handled with equal advantage. One operator can operate two machines, and on some work, three machines.

The swing over the carriage is 8 in. and the maximum capacity between centers, 12 in. The carriage ways and headstock are in one casting to assure rigidity under heavy cuts. The spindle is unusually large and runs in phosphor bronze taper bearings lubricated with wick feed from an oil reservoir supplied through sight



Stub Lathe for Turning Pistons, Pulleys, Gears and Other Pieces. One man can operate two machines and, on some work, three machines

feed oil cups. Take-up for both bearings is by means of a single nut at the rear of the spindles. The spindle is driven by a heavy bronze wheel and worm provided with ball-bearing thrust and geared to 3 to 1 reductions. Six spindle speeds, 40 to 145 r.p.m. are provided. Provision is made for mounting an air cylinder and a quick acting draw back.

The feed is driven from the spindle by a chain and pick-off gears at the headstock end, six feeds, from 0.020 in. to 0.090 in. per revolution of the spindle being available. The feed arrangement to the carriage and rear tool is simple, being driven by worm through a large worm wheel. The worm is submerged in oil, and to engage the feed is lifted into the worm wheel by a handle at the front of the machine. The worm wheel is keyed on the pinion shaft that drives the carriage, no gearing being required in the apron. A 15½ in. hand wheel is on the pinion or worm wheel shaft.

The tripping mechanism consists of a dog on the carriage which trips the feed lever and automatically disengages the worm from the worm wheel. This is said to provide a reliable and accurate knockout, and especially dependable when working to shoulders or facing to close diameters. The carriage is 18 in. long with full length bearing surface on an 8-in. face at the front of the bed and a 4-in. angular surface on top. An angular gib is provided at the bottom of the carriage to take up wear. The front tool slide is equipped with stop screws for tool adjustment and several tools can be clamped on the slide at one setting. A rear tool having a 4-in. in-and-out travel and ample sideway adjustment is provided.

The tailstock is heavy and is clamped to the overhanging arm and supported by a stud protruding from the bed. A large diameter screw with a lead of 1½ in. to each revolution of the tailstock handwheel is provided. The spindle has a longitudinal adjustment of 5 in., and its bearing is split the full length and held in position by screws which may be adjusted to the wear of the spindle. The overhanging arm is 3½ in. in diameter and arranged so that tools can be clamped on for doing several operations. Adjustment is easily made by means of a rack and pinion, a rack being cut on the overhanging arm.

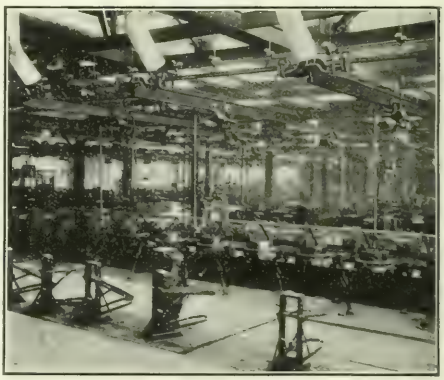
A 5-hp. 1800 r.p.m. motor is employed, being fastened on a pivoted frame or plate inside of the bed. A friction clutch pulley at the rear is mounted on roller bearings and the starting handle is conveniently located. The oil pump is driven from the main drive friction pulley, the tank for cutting coolant being located in the bed, below the chip pan. The floor space occupied by the lathe is 33½ x 46½ in., and the net weight, with motor, is 3000 lb.

Tramrail Cranes in Use at Wire Mill

An installation of 57 tramrail cranes and 80 carriers with electric hoists, said to be the most complete installation of its kind in the country, has been placed in use recently at the plant of a Western wire mill. The equipment is used for removing the coils of wire from the blocks on which the wire is wound after drawing. There is said to be more than a mile of track used in connection with this system.

The accompanying illustration shows the arrangement of the wire draw-blocks and the tram rail system overhead. There are several of these hoist equipped cranes on the same runway over the coiling reels, and as the hoist has a transverse movement on the crane girder the load may be moved both longitudinally and transversely.

A rigid arm extends from the crane to within 4 ft. of the floor and at the bottom of this arm are two push buttons that control the hoist. With this control the crane operator controls the up and down movement of the hoist with the push buttons, and with the same hand propels the crane in any direction, using the other hand to steady and guide the load. The cranes are equipped with a double row of ball bearings on every wheel and



Tramrail Cranes with Hoists for Handling Coils of Wire from Draw Blocks

run on high carbon steel rails, which is intended to facilitate operation.

The crane, tramrail and hoist equipment was built by the Cleveland Crane & Engineering Co., Wickliffe, Ohio.

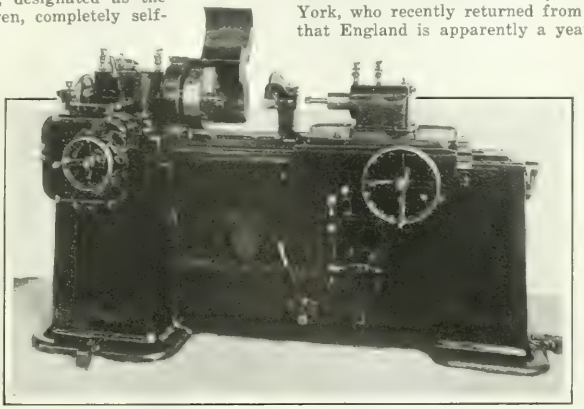
A joint meeting of the Cincinnati section of the American Society of Mechanical Engineers, the Society of Industrial Engineers and the Taylor Society was held in Cincinnati Oct. 24 and 25. The principal speakers at the sessions were E. A. Muller, vice-president King Machine Tool Co., Cincinnati, C. U. Carpenter, Dayton, Ohio, and H. J. Plogstedt, Fifth-Third National Bank, Cincinnati.

NEW INTERNAL GRINDER

Automatic Unit Eliminates Hand Plugging—Gaging Mechanism and Other Features Outlined

The Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., has developed the machine illustrated for the internal grinding of various automobile and machine parts automatically, entirely eliminating hand plugging by the operator. An outstanding intention of this design is to provide equipment that practically will eliminate the skill required of operators at present, and also to provide a machine which will grind a hole to the finish size with the minimum of waste.

The new machine, designated as the No. 12, is motor-driven, completely self-contained, and is equipped with push button control. Six work spindle speeds have been provided, and are selected by turning the hand wheel on top of the workhead to any of the six indicated positions. The spindle is of large diameter and runs in large adjustable bronze bearings. Ball bearings are provided on the power transmission line to the spindle. Among other features it may be mentioned that the workhead is mounted in a circular bearing on a cross slide which permits the grinding of tapers to an included angle of 30 deg. Quick and accurate indexing has been provided. The collet chucks are operated by draw bar and hand wheel.



Automatic Internal Grinder for Various Automobile and Machine Parts. Automatic gaging, eliminating hand plugging, is a feature. The chuck has a holding capacity of ¼ to 10¾ in., and is of special design

An automatic gaging mechanism has been incorporated for the purpose of eliminating hand plugging. After the operator chucks the piece and starts the feed, the machine will grind to the finished size, automatically trip the carriage which returns to the rest position. This device has been designed to allow for wheel wear. The initial cost of the bar gages used is said to be less than half the cost of plug gages, and the life of the gages prolonged as they revolve at work speed and the finishing gage enters the work at once.

The wheel carriage is of an unusually heavy and unique construction, having large bearing surfaces on the ways of the bed and being guided by Vees on both sides. The carriage is reciprocated hydraulically. The motor for driving the wheel spindle is mounted directly beneath the wheel carriage and reciprocates with it. Bearing surfaces are protected from abrasive material.

The grinding wheel spindles are mounted on ball bearings in the wheel head, which are tapered on the outside and mounted in a corresponding taper in the wheelhead housing, being fastened in place by a lock nut. This mounting is intended to permit of easy attachment and removal. Coolant is forced through the center of the spindle to the work by a centrifugal pump, and means for automatically cutting off the water when the wheel leaves the work and also for turning on the water as the wheel enters the work have been provided.

Feeding of the work against the wheel takes place at the end of the stroke. Two separate series of feeds have been provided for, ten roughing and five finishing. Both feeds are controlled by use of two gages, a roughing gage and a finishing gage. When the roughing gage enters the work the roughing speed is automatically cut out. The finished speed automatically engages until the finishing gage enters the work when the trip on the carriage automatically operates, returning the carriage to its rest position.

A special gear scroll chuck having a holding capacity of ¼ to 10¾ in., designed by the Cushman Chuck Co., Hartford, is part of the standard equipment. It is of water-tight construction, and all operating parts are protected against grit; the body is filled with grease. The body is of steel, all working parts are hardened. The total swing over the ways is 13 in., the size of the holes ground is ¾ to 10 in., and the depth ground, 9 in. The maximum travel of the wheel carriage is 20 in. The floor space required is 7 ft. x 4 ft. 2 in. The weight is 4400 lb. net.

England Looks to 1923 as Approach to Normal

Richard Knight, manager of the foreign department of the McClintic-Marshall Co., 50 Church Street, New York, who recently returned from a trip abroad, says that England is apparently a year behind the United States in a return to normal conditions. To-day British business is looking forward to 1923 as a year of more nearly normal conditions, much as American business regarded 1922. It is generally conceded, he says, that the beginning of 1923 will probably see a reduction of labor costs.

The labor situation in England is not satisfactory, and the unemployment payments by the Government, known as "doles," in many instances fail to operate as intended. When a worker is able to obtain work for two days a week, which is sufficient to remove him from the Government's unemployed payroll, he finds that he can obtain more money from the Government than he can by working part time.

Mr. Knight said that British costs are in practically all cases higher than the American prices, in some instances, such as on plates and shapes, at the time he was in England, the base prices, f.o.b. works, were equivalent to the f.o.b. Pittsburgh price in the United States. At the various plants he visited the dearth of automatic machinery and labor-saving devices, says Mr. Knight, were noticeable. He spoke particularly of one concern which was cutting out the corner on steel plates, a result that would have been obtained in one operation in an American plant. After cutting the square corner, some time was spent in machining.

Southern Sheet Steel Co. Plans

BIRMINGHAM, ALA., Nov. 6.—There is no definite statement forthcoming as to progress made in financing the Southern Sheet Steel Co., Chattanooga, which plans a $1,500,000 sheet steel mill. It is understood that citizens of Chattanooga are to be asked to raise $250,000, that an outside firm in Cleveland will underwrite $250,000, the rest to be secured at large. W. J. Lynch is vice-president and general manager.

The Alloy Electric Steel Casting Co., Warren, Ohio, expects to have its new plant in operation early in the year. The company will make alloy steel castings using both the open-hearth and electric furnaces. The main building will be 118 x 280 ft. and will include the melting department, molding floor, cleaning room and core room. A 15-ton open-hearth furnace will be installed. The company has a capital stock of $450,000. H. L. Coxey is president; Herman Vogt, vice-president; A. F. Rauck, secretary, and O. R. Grimmesy, treasurer.

INDUSTRIAL HEATING

Some Unusual Pronouncements at an Engineering Meeting at Newark, N. J.

Joseph A. Doyle, vice-president W. S. Rockwell Co., New York, addressed 100 members of the Metropolitan section of the American Society of Mechanical Engineers at the Downtown Club, Newark, Oct. 31, on industrial heating operations. The talk was illustrated with lantern slides.

Mr. Doyle enunciated a number of novel ideas, at variance with the usually accepted notions, regarding the use of B.t.u. comparisons of fuels, etc. He emphasized the fact that we should aim to utilize not only the energy value of a fuel, as expressed in B.t.u., but also and more particularly the commodity value, which involves not only the energy but also the value of position and of particular utility for the work to be done. As a specific instance of this he stated that, although a bituminous coal might cost only 17c. per million B.t.u., where electric energy would cost nearly $6 for the same amount of heat energy, there were occasions where the electricity must be the choice because it would be necessary that the atmosphere produced by the consumption of the bituminous coal or other fuel be kept rigidly away from the product to be heated.

Except for the comparison of fuels of thoroughly similar characteristics, such as two kinds of coal or two kinds of relatively similar gases, etc., the speaker regarded the B.t.u. method of comparison as archaic and on a wholly unsound basis. As soon as a difference occurs in chemical formation of a fuel, there is a corresponding difference in economic value, which is the final basis for logical comparison. The same remarks were made with regard to the use of the heat balance, except as it might be employed between fuels of similar nature.

It was pointed out that much unnecessary worry is expended upon loss of fuel through poor combustion; while, as a matter of fact, there is far greater loss of fuel through waste of heat. Consequently, the latter is the point which should be made the target of attack. Another common sense point of view enunciated was that fuels alone should not be compared, but that rather the comparison should be between one fuel and the apparatus for its burning and another fuel and its apparatus. Even this is not carrying the matter quite far enough, for beyond the apparatus must be considered the object to be treated and the method in which it is handled while in the apparatus. In other words, the economic problem should be the goal of our effort, rather than the mere technology of combustion. The quality and cost of the ultimate product or service are the two deciding factors.

Another point made by Mr. Doyle was the fact that the time element, in its true relation to the economic aspect of the problem, is usually carefully excluded. In this is involved properly a study not only of the mass of the steel to be heated, but also of the exposed surface of that steel which can receive the heat imparted by the fuel, and again the loading of the furnace as an index to the rapidity and uniformity with which the steel can be heated. Thus the question is not merely one of temperature but is much more complex.

By-product coke ovens manufacturing coke and the various coal derivatives are regarded by Mr. Doyle as an economic fallacy, except where coke is definitely sought. He argued for the installation of a group of industries close alongside, so that a by-product plant might be used in conjunction with a gas plant distributing to domestic and industrial customers and a chemical plant for utilizing many of the by-products of the coke plant. Only by such an intimate inter-relation of utilities, he stated, can the by-product plant be made into a really useful member of society.

Meetings of Mechanical Engineers

Among meetings of local sections of the American Society of Mechanical Engineers scheduled in November are the following:

Nov. 13. Chicago, J. D. Cunningham, 2210 Diversey Boulevard, Chicago, secretary. Illustrated address at Engineers' Club on "Autogenous Welding as Applied to Unfired Pressure Vessels" by Harry Sloan, president of American Society of Refrigerating Engineers.

Nov. 14. Metropolitan section, secretary, A. E. Allen, Westinghouse Electric & Mfg. Co., 165 Broadway, New York. Address at Engineering Societies Building on "United States Shipping Board Tests of Scotch Marine Boilers" by Carl Jefferson of the United States Shipping Board.

Nov. 15. Plainfield section, secretary, R. H. Rausch, Niles, Bement, Pond Co., Plainfield. Address at Park Hotel on "A New Development in Internal Combustion Engines" by S. W. O'Neil, chief engineer Ingersoll Rand Co.

Nov. 17. Baltimore section, secretary, Prof. J. C. Smallwood, Johns Hopkins University, Baltimore. Address at Engineers' Club on "Recent Developments in Power Plant Practice" by Prof. A. G. Christie, Johns Hopkins University.

Nov. 21. Cleveland section, secretary, E. E. Blundell, Cleveland Automatic Machine Co., 2269 Ashland Road, Cleveland. Joint meeting with the American Society of Steel Treating and the American Institute of Mining and Metallurgical Engineers at Hotel Winton. Address on "Alloy Tool Steels" by Dr. John A. Mathews, president Crucible Steel Co. of America.

Nov. 21. Providence section, secretary, W. A. Kennedy, General Fire Extinguisher Co., Providence. Joint meeting with the Providence Engineering Society in Providence Engineering Society's rooms. Address on "The Engineer and the Home" by Mrs. Frank B. Gilbreth, Mont-

Nov. 23. Boston section, secretary, C. R. Main, 200 Devonshire Street, Boston. Affiliated Technical Societies of Boston at Lorimer Hall, Tremont Temple. Subject: "Aviation—Present State of the Art, with Special Reference to the Development of Boston as an Air Port." Addresses: "Heavier Than Air Development," by Prof. [illegible]

Corporation, Washington.

Nov. 23. Cincinnati section, secretary, Prof. J. T. Faig, Ohio Mechanics' Institute, Cincinnati. Address on "Die Casting" by Charles Pack.

Nov. 23. Bridgeport branch, secretary, A. E. Keating, American Tube & Stamping Co., 471 Hancock Avenue, Bridgeport. Address at Stratfield Hotel on "Individualism versus Socialism" by E. W. Carpenter, president E. F. Houghton Co.

Nov. 28. Atlanta section, secretary, E. A. Brooks, 702 Candler Building, Atlanta. Address at Town Hall, Chamber of Commerce, on "Diesel and Semi-Diesel Engines versus Small Steam Engines in Power Stations Up to 500 Kw." by R. H. Cunningham, southern representative of Ingersoll Rand Co., Birmingham. Discussion by R. B. Hall, Ames Iron Works, and W. H. Davidson of Fulton Iron Works.

Michigan Steel Corporation Will Build Sheet Mill

The Michigan Steel Corporation has been organized to build a sheet mill plant in the vicinity of Detroit, to specialize in the manufacture of high-grade automobile body and fender sheets. It is incorporated under the laws of New Jersey. It has opened temporary offices in the First National Bank Building, Detroit. The officers of the company are as follows: Frederick B. Lovejoy, Wheelock, Lovejoy & Co., New York, chairman of the board; George R. Fink, formerly with the West Penn Steel Co., Brackenridge, Pa., president and treasurer; Frank H. Jones, Worthington Pump & Machinery Co., New York, vice-president; Herbert M. Steele, formerly with the Newton Steel Co., Newton Falls, Ohio, vice-president. Further announcement of more definite plans will be made within the next week or ten days.

Miners' Wages Advanced

The Oliver Iron Mining Co., United States Steel subsidiary, has announced wage adjustments upwards for all employees retroactive to Oct. 1. The increase averages 20 per cent and affects over 12,000 workers. This is in line with advances by other subsidiaries.

CONTENTS

November 9, 1922

Some Foundry Troubles and Their Remedy 1197
Handling 16 Tons to Make One 230-Lb. Bathtub—Layout of Foundry Floors to Minimize Steps of Molders

Steels for Automobile Construction 1199
Standardized Steel Specifications of the German Automobile Industry—Symbols and Designations

Reincarnation of a Firearms Business 1204
Resumption of a Production Basis of the Marlin Establishment—Good-Will of Former Employees a Factor

Bases of Modern Blast Furnace Practice 1207
Methods of Producing Highest Combination of Quality, Economy and Quantity—Raw Materials—Lines of Furnaces

Auxiliary Problems in Steel Making 1211
Contributions on Heating Furnaces, Power Plants, Fluospar and Coal Read Before Institute

Judge Gary Defends Pittsburgh Basing Plan 1228
Says Chaos Would Result if There Were No System of Figuring Prices—Hearing Continued

Pig Iron Production in October 1232
Daily Output 17,301 Tons More Than in September—Gain of 26 Active Furnaces

Oxygen in Metallurgy 1203
Briquets of Flue Dust 1205
General Utility Blacksmith's Hammer 1206
Drop in Manufacture of Horseshoes 1206
Tool Grinders for Single-Phase Current 1206
Vertical Broaching Press for Small Work 1206
Tractor Offered by Towmotor Co. 1209
Improved Barrel Sand Blast 1209
British Foreign Trade 1210
Analyzing Sand Physically 1210
Reparation Awarded Pittsburgh Steel Co. 1210
Bethlehem Purchases Dry Dock Company 1210
Steel in South Africa 1217
Stub Lathe for Piston Turning 1218
Tramrail Cranes at Wire Mill 1218
New Internal Grinder 1219
England Looks to 1923 1219
Industrial Heating 1220
Meetings of Mechanical Engineers 1220
New Sheet Mill 1220
Miners' Wages Advanced 1220
Editorials 1222
Living Wages—Steel Institute Leadership—Oxygen in Steel Metallurgical British Steel in Shipbuilding—The Country as a Business Enterprise.
Correspondence 1224
Friendliness as a Factor in Extending Export Trade—Burning Mine Culm and Waste.
German Prices Jump Higher 1225
Coming Meetings 1225
Imports Records 1226
Distribution of Iron and Steel Exports 1226
To Make Test Runs on Synthetic Pig Iron 1226
Forty-Three Years' Experience as Buyer 1227
Lake Superior Ore Shipments 1231
Elements of Industrial Heating 1231
Blast Furnace Notes 1237
Swedish Production 1248
Plant Operations 1248
Large Brier Hill Production 1249
Hungarian Iron Trade 1251
Railroad Equipment Buying 1252
Fabricated Steel Business 1252
Egyptians to Learn American Methods 1254
1921 Manufacture of Tin Plate 1254
Japanese Stocks Still Large 1255
Canadian Conditions 1255
Youngstown as Industrial Center 1255
Advancing German Prices 1256
New England Plant Activities 1256
Trade Association Decision 1257
Expansion Plans of Ford Motor Co. 1257
Increase in Employment in Steel Industry 1257
Program of National Founders' Meeting 1257
Plans of New Companies 1258
Trade Changes 1258
Steel and Industrial Stocks 1267

Iron and Steel Markets 1234
Comparison of Prices 1235
Prices Finished Iron and Steel, f. o. b. Pittsburgh 1247
Non-Ferrous Metal Market 1249
Personal Notes 1250
Obituary Notes 1251
Machinery Markets and News of the Works 1259
New York Jobbers' Prices 1268

ESTABLISHED 1855

THE IRON AGE

EDITORS:

A. I. FINDLEY WILLIAM W. MACON GEORGE SMART

CHARLES S. BAUR, *Advertising Manager*

Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

[illegible] George H. Griffiths, *Secretary*

[illegible]

Vice-Pres. A. C. Pearson, *Treas.* F. J. Frank, *Secy.*

BRANCH OFFICES: Chicago: Otis Building. Pittsburgh: [illegible] 1420-1422 Widener Building. Cleveland: Guardian Building. Detroit: 317 West Fort St. Cincinnati: Mercantile Library Bldg. Buffalo: 881 Ellicott Square. Washington: 26 Jackson Place, N. W. San Francisco: 320 Market St. London, Eng.: 11 Haymarket, S.W.1.

Subscription Price: United States and Possessions, Mexico, Cuba, Shanghai, $6.00; Canada, $8.50; Foreign, $12.00 per year. Single copy 25 cents.

[illegible] at the Post Office at New York, New York, under the Act of March 3, 1879.

Living Wages

The Railroad Labor Board, in its decision in the maintenance of way case (Decision No. 1267, dated Oct. 21, 1922), made a definite statement of its attitude to "the living wage" that has been urged repeatedly upon the board. It distinguishes between "a living wage," which it asserts it has granted in all cases, and "the living wage" which has been defined by its proponents before the board as follows: "A wage which will support a family of five in health and reasonable comfort, such family being assumed to consist of a husband and wife and three dependent children under 16 years of age."

The supporting opinion of the board points out that according to the 1920 census there was an average of 4.4 persons per family, not five, and that dependent children under 16 years of age average 1.4 to a family, not three, also that for each family there are 1.36 male workers, not one.

The opinion considers the full demand made by the employees' representatives in this case, the one they claimed the board should endeavor to work up to, and shows that on the basis of 1921 revenue the carriers would have a deficit of $2,241,639,518, while the temporary demand, proposed as a sort of stepping stone, would give them a deficit of $378,078,125.

This matter of "the living wage" may also be considered from the broader viewpoint of the entire country. We have not adopted a principle that railroad employees, all things considered, should be better paid than other workers. Wages represent in essence a distribution of the production of the country. One receives wages in order that he may purchase his share of the goods and services that are available. As mentioned in THE IRON AGE of Oct. 19, in a discussion of the proportion received by the coal industry, the national income may be assumed to be running at about 55 billion dollars, while there are about 42,000,000 persons gainfully occupied. A fair distribution according to experience, likely to encourage creative intelligence and promote progress, is 70 to 75 per cent for wages and salaries and 25 to 30 per cent for capital and management, or, with 55 billion total, say 40 billion for wages and salaries and 15 billion for capital and management.

What has been called "the living wage" is above $2,500, but taking that figure, to give it uniformly to all those gainfully employed would be to make a payroll of 105 billion dollars. The money would be given and received for the purpose of being spent. It would be impossible to buy the goods and service represented, because they do not exist. There would be merely disturbance and confusion.

If workers are to receive more, if their standard of living is to be advanced, and all will agree that it is desirable it should be, the prescription is obviously not to juggle with dollars but to make more goods and services available so that existing incomes will buy more. That is to be accomplished by harder and more efficient work being done. Whenever and wherever a question comes up for settlement that involves efficiency, the settlement should be in favor of efficiency. When the public generally comes to realize that advancing wages and salaries from 40 billions to 100 billions will not enable the recipients to buy two and one-half times as much as the 40 billions have been buying, there will be a saner attitude toward this matter of "the living wage."

Yet another use for chromium has been developed, it is reported from Sheffield, England. According to the London *Ironmonger* a new method of electroplating by the deposition of chromium on various metals has been perfected. For some years experiments have been under way in Germany and in England to find a plating solution from which chromium could be deposited electrolytically. If the Sheffield claims are well founded this new process is likely to be of considerable importance industrially and to modify present electroplating processes. It is evident that because chromium is a very hard metal, harder than any of those now used for plating, its successful deposition on steel may mean a cheaper stainless product or one less difficult to make and fabricate than stainless steel itself, at least in such forms as cutlery and ornamental objects. The success of the new process would add one more to a long

list of uses which have conferred an unusual distinction upon chromium.

Steel Institute Leadership

The recent New York meeting of the American Iron and Steel Institute brought out in strong light that part of its work which has to do with the production of a literature of iron and steel works practice in the United States. More than once the comment has been made that the industry has been fortunate in Judge Gary's long-continued relation to the institute as "dean of the faculty." Judge Gary and his associated directors in the institute have the final word in making available the results of the excellent work on important metallurgical problems that are engaging their technical staffs. The engineering societies, on the other hand, have a relatively small number of the leaders of the industry in their membership, and in the past the consent of executives has not been always so easy to get, for the publication of results of research, as the conditional consent of operating men directly connected with the work.

Most of the nine papers read at this last meeting of the institute bore on problems immediately exercising iron and steel manufacturers. The steel industry had been through the greatest coal strike in its history. Modern methods of mining coal and storage of bituminous coal—the latter question thrust to the front by proposals for curing the seasonal stagnation in coal mining—were treated by highly competent men. Fuel economies have been studied as never before, in view of high transportation cost and the high price of coal, jointly due to profiteering by miners and operators. Hence the papers on liquid fuel in steel making, heating furnace performance in semi-finished steel, economic operation of steel works power plants, and thermal efficiency of the open-hearth furnace. This last paper may be called the American response, with its design for a proposed 100-ton open-hearth furnace, to the paper before the Iron and Steel Institute (London) last May, with which the author gave a design, also for a 100-ton furnace, based on the best British practice.

The status of the electric furnace in iron and steel refining, the steel requirements of the automotive industry, and the position of fluorspar mining in the United States were treated in papers which heaped up the measure of the most notable of iron and steel convention programs outside of an international meeting.

In its beginnings ten years ago the American Iron and Steel Institute seemed to justify the prophecies that it would concern itself with the commercial rather than the technical side of the industry. Thus there were papers on contract obligations, export trade, cost standardization. But such discussions are heard no more. The institute has found a place, and occupied it as no other organization has done, as a producer of the most detailed and practically valuable literature extant of latter-day methods in the production of iron and steel.

It may surprise some observers to learn that Luxemburg is now more of a factor in the output of steel in Europe than was the case before the war. Under the economic control of Germany in 1913 that little country produced steel at the rate of 109,000 tons per month. In recent months the output has expanded until for June, July and August it averaged 125,400 tons. This exceeds the record of Belgium for the same period; for the first eight months the excess in favor of Belgium is very slight. The United States is the only other country that is now exceeding its 1913 rate of steel production. Before the war the Luxemberg iron and steel industry was swallowed up by Germany and operated for the greatest benefit of the German industry, particularly for its pig iron production. To-day, unhampered, it is practically on a footing with Belgium.

Oxygen in Steel Metallurgy

We may not have long to wait for a commercial test of the value of oxygen-enriched air in metallurgical operations. Announcement was made in THE IRON AGE last week that the Bureau of Mines plans for two lines of investigation of such an enrichment process, to learn whether it will increase the efficiency of smelting operations with the resultant production of metals at a lower cost and, perhaps, permit the use of lower grade ores. The blast furnace is to be one object of study.

Cosmo Johns of Sheffield, England, recently discussed the same subject, his remarks appearing in abstract in another column. He says it is not pure oxygen that is required but an enrichment of the air to between 20 and 40 per cent of oxygen; "not pure oxygen in steel flasks but enriched air in hundreds of tons." Under such conditions he believes the modern blast furnace would undergo a startling change; that hot blast stoves would probably disappear; that the Bessemer converter would be rendered more efficient and the character of the process changed; that the low thermal efficiency of the open-hearth might be improved, and that it even might be worth while to make producer gas richer in carbon monoxide.

The realization of these radical changes has been predicted before. The drawback has been the production of oxygen at a low enough cost. One object of the new research by the Bureau of Mines is to devise a way to produce highly oxygenated air more economically. The original contentions of Dr. F. G. Cottrell and the late J. E. Johnson, Jr., may yet be realized.

British Steel in Shipbuilding

It is not generally realized to what extent the demand for steel for shipbuilding purposes controls the output of British steel plates and shapes. Disregarding such abnormal conditions as have obtained in the last two years, the records of several previous years, back as far as 1913, show 20 per cent or more of the total British output of steel used in the making of shipbuilding materials. In 1913 it is estimated that 1,854,700 tons of steel was required for this purpose. This figure was exceeded in 1920, when, it is estimated, 1,963,700 tons of ingots and castings went into shipbuilding material.

Figures for other years are given in a compara-

tive table, which shows the great slump in steel demand for shipbuilding during the first two years of the war and the heavy increase in the years which followed. The table shows also that in 1921, during the period of light production of steel in Great Britain on account of strikes, more than 40 per cent of what was actually produced was used for

Steel Consumed in British Shipbuilding

Year.	Vessels Launched Gross Register Tons.	Steel Ingots Required. Gross Tons.	British Output of Steel Ingots and Castings. Gross Tons.	Proportion Used in Shipbuild'g. Per Cent.
1913.....	1,824,000	1,555,200	7,895,358	19.7
1914.....	1,684,000	1,616,600	7,835,113	20.6
1915.....	651,000	625,000	8,550,015	7.3
1916.....	608,000	583,600	8,991,729	6.5
1917.....	1,163,000	1,116,500	9,716,514	11.4
1918.....	1,384,000	1,328,600	9,539,439	13.9
1919.....	1,620,000	1,555,200	7,394,000	19.7
1920.....	2,056,000	1,973,700	9,067,800	21.7
1921.....	1,538,000	1,476,500	3,625,800	40.7
1922*....	500,000	480,000	2,612,200	18.0

*First six months, estimate.

shipbuilding purposes. The general average, over the period of 9½ years, was 16.7 per cent. The figures, from a report of the United States assistant trade commissioner in London, deal with merchant shipping only.

Comparative figures for the United States show far lower proportions of the steel output used for shipbuilding. Even with the tremendous American construction of merchant ships in 1918, 1919 and 1920—construction which, in each of those three years, was greater than any other nation ever made in any year and in one of them (1919) greater than any other nation ever made in two years—only 7.6 per cent of the American steel output was devoted to shipbuilding. The one year 1919 showed 11.3 per cent, the highest proportion in the history of steel ship construction in the United States.

The Country as a Business Enterprise

The greatest thing that was destroyed in Russia was the business organization. Plants can be built or rebuilt, raw materials can be secured, workmen can be found or trained, provided there is adequate organization; but without organization nothing can be done. At the time of the armistice the United States had plants, workmen and materials, but our greatest asset was our organization.

We are not now using our organization to advantage. Between some departments there is lack of co-operation, between others there is hostility if not actual strife. In view of the conditions in which civilization at this time has elected to live, it is right, it is not sordid, to consider this country as a business enterprise.

Looking upon the country as a business enterprise, we have these conditions: A part of the organization is complaining that there is not enough labor to do our work. A part of the organization refuses to allow others to be employed to work for us, by our importing the goods they make. A part insists that the debts due the organization, partly by foreign governments to this Government, partly by foreign individuals to our traders and bankers, be paid eventually and be subject to interest meanwhile. A part insists that we must not accept, against interest or principal, the only thing that can be offered, which is goods.

It is not necessary for the present argument to take sides in that debate. Let the matter of the principal be ignored and only the annual interest be considered. As indicated in what THE IRON AGE has said on this subject, the total due us, public and private, is not far from 20 billion dollars. The annual interest would be nearer a billion than a half billion. Movement of securities, American or foreign, has been suggested, but such a process could not be kept up to meet interest requirements indefinitely. By the same token, remission of interest for a time would represent merely a postponement of settlement.

It is not necessary that at this present time any man or group of men decide how these divergent pulls should be harmonized—the complaint of labor scarcity, the unwillingness to import the products of labor, and the insistence that debts be paid when the only payment that can be offered is refused. We are not so quick as we once were to say that if anything is wrong the thing to do is to "pass a law." Our experiences in the war and since have taught us that that process can be overdone, and we are rather more willing to let time and events work out our troubles than take our chances with more legislation.

We have had reason to believe, moreover, that legislative expedients for correcting what is awry in our great business enterprise do not always represent the will of the majority. In a number of respects we have control by organized minorities, seeking individual ends either through selfishness or lack of broad knowledge. We do not now realize as we should how many of these organized minorities there are. The American Federation of Labor is readily identified as one. The agricultural bloc is another. There are many well organized propaganda agencies at work throughout the country and of these the Socialist minority is perhaps the most active. And why omit Congress itself? It is not in touch with the real business of the country, and has grown particularly out of touch by the long sessions of these recent years.

CORRESPONDENCE

Friendliness as a Factor in Extending Export Trade

To the Editor: It has been said that American manufacturers in many instances have not appreciated the factor of personal friendship in their foreign trade. Henry H. Morse, chief of the Specialties Division of the Department of Commerce has said that the relationship between the seller and the buyer in our overseas business has passed from the realm of strict business to that of friendly business.

Business nowadays is conducted on a basis very different from that of 20 years ago, even of 10 years ago, and the evolution is still going on. A letter file of 1900 tells the story of the change most strikingly. Business letters used to be cold; the colder the letter, apparently, the better it was considered by its writer. Friendships, of course, counts for a great deal. It does not often get orders in itself alone. But it puts the seller on a footing with the buyer, where he is much more apt to get the business than his competitor who has failed to acquire this relationship.

American manufacturers who occasionally visit among their trade abroad, whether in Europe or South

America or the Far East, have learned this in relation to foreign customers. The interchange of courtesies often brings a complete change in the atmosphere of correspondence. There is a friendly note in it. Each is glad to help the other. For example, a first hand source of information to which a business house feels free to turn, perhaps as to business conditions or as to the standing of a prospective customer, may be worth a great deal. Then, too, it is no small asset to have friendly words spoken for the firm in another country where there may exist that indefinable something which separates business men of different nations.

But such business friendships must come naturally. At the same time one must appreciate the need of taking thought. In this connection a paragraph of Mr. Morse's article in *Commerce Reports* gives food for reflection:

> People are human wherever we find them. They like us or they dislike us, and usually they are ready to like us if we give them the least encouragement. This can be done by expression of friendship in a letter, or by sending a cablegram at the time of a catastrophe, or at a time of good fortune. Before the United States went into the war many export managers got much closer to their Italian customers by cabling congratulations when military victories were reported. The same thing has been done by sending cablegrams of inquiry regarding a customer's safety at the time of an earthquake or a tidal wave. In a less spectacular way an interest may be shown by referring, after a considerable lapse of time, to personal items that have crept into a customer's letter. So simple a thing as a postal card mailed from some resort where an export manager is spending a week's vacation is enjoyed by a customer in a foreign land. Inexpensive souvenirs, the sending of a non-business letter by someone not connected in a business way with the manufacturer, tend to draw the seller and the buyer closer together. As in all matters of etiquette, reason must rule, but where attentions of this kind are shown graciously, where they are genuine, the results are gratifying and permanent.

To attempt deliberately to establish such a contact with customers as a business policy would require more than a common amount of business and social tact in order to achieve results. That sort of thing must develop out of actual good fellowship. But the easiest of all things is to compel a friendly wording of letters throughout an organization. An export manager—as for that, any manager—would not be wasting the time devoted to looking over carefully the letters which go out from his subordinates and eliminating such mannerisms as sometimes creep in, perhaps even to touch the customer on the raw. JOHN NELSON.

Worcester, Mass., Nov. 1, 1922.

Burning Mine Culm and Waste

To the Editor: I am much interested in the article in THE IRON AGE of Aug. 24, page 467, entitled "Burning Mine Wastes" and giving description of a test from ash and low volatile fuel in pulverized form in a French boiler plant.

Your attention should be called to the fact that similar fuel has been burned in pulverized form quite extensively in this country for the last two or three years, using practically dust and culm mine dirt, etc., from anthracite coal. The largest equipment, which is supplied by six Fuller pulverizing screen mills, is for twelve 500 and 600-hp. boilers of the water-tube type operating a 10,000-kw. electric power station. It has been in successful operation over a year and a half and the owners are so well satisfied that they contemplate building another similar plant in a different locality which will also use the same class of fuel. The efficiency of boiler and furnace of 80 per cent and over is maintained regularly, from the B.t.u. in the coal as fired, when developing 150 to 200 of boiler rating.

The details given in your article are not altogether consistent and the statements are rather misleading unless they are clarified to such an extent as to make them more definite. For instance, in the fourth paragraph, you state that average evaporation per pound of fuel is 7.38 lb. of steam, which corresponds to an overall efficiency of 82 per cent boiler and furnace. Figuring backward, based on the B.t.u. in the coal of 10,728 per lb., 82 per cent boiler and furnace efficiency would give an evaporation of 9.06 lb. from and at 212 deg. Fahr. On the other hand, if the evaporation you give as 7.38 lb. of steam is from and at 212 deg. Fahr., this would mean only 66 per cent boiler and furnace efficiency. As the feed water temperature during the test and the boiler pressure are not given, it is difficult to interpret correctly the figures given.

If the statements could be elaborated to bring out the actual facts of the operating conditions, it would add to the value of the information given.

FREDK. A. SCHEFFLER.

Manager Power Department, Fuller Engineering Co.
New York, Sept. 19, 1922.

GERMAN PRICES JUMP HIGHER

Advance Faster Than the Mark Falls—Wolff Trust Dealing with Moscow

(By Cablegram)

BERLIN, GERMANY, Nov. 6.—Inflow of orders for steel is unchecked, but shortage of working capital locally hampers production. Only the sheet market is dull. Foundry iron No. 1 is now 83,994 m. per metric ton ($14.40 per gross ton at 1 11/16c. per 100 m.). Ingots are 96,700 m. ($16.58); bars, 132,000 m. (1.01c. per lb.); thin sheets, 196,000 m. (1.50c. per lb.).

Otto Wolff trust has signed the Moscow agreement creating a metal trading corporation in which the Soviet State is a partner. The trust undertakes to grant wares credit to the extent of £750,000 ($3,345,000) and a further £500,000 ($2,230,000) loan to the Russian State.

[The prices quoted above may be compared with those of mid-October given on page 1256. They replace 40,176 m. ($9.70) for foundry iron on Oct. 23; 59,470 m. ($14.35) for ingots; 81,200 m. (0.94c. per lb.) for steel bars, and 120,680 m. (1.40c. per lb.) for thin sheets. Attention is directed, further, to the table on page 1021, Oct. 19, showing the principal changes in these four products since April 1.]

The Gregg Pump Co., Kansas City, Mo., is moving to Kalamazoo, Mich., and has leased with privilege to purchase a building, owned by Fred J. Crockett, of the Star Brass Works. The structure contains about 12,500 sq. ft. of floor space and is being entirely overhauled to house the new industry. Walter S. Gregg, president of the concern, expects to be running by Dec. 1 and will employ at the outset from 30 to 40 men.

COMING MEETINGS

November

National Personnel Association. Nov. 8, 9 and 10. Annual convention, William Penn Hotel, Pittsburgh. W. J. Donald, 20 Vesey Street, New York, managing director.

Machine Tool Section of the National Supply and Machinery Dealers' Association. Nov. 21. Fall meeting, William Penn Hotel, Pittsburgh. Thomas A. Fernley, 505 Arch Street, Philadelphia, secretary.

National Founders' Association. Nov. 22 and 23. Fall meeting, Hotel Astor, New York. J. M. Taylor, 29 South LaSalle Street, Chicago, secretary.

December

American Society of Mechanical Engineers. Dec. 4 to 8, inclusive. Annual meeting, Engineering Societies Building, 29 West Thirty-ninth Street, New York. Calvin W. Rice, secretary.

National Exposition of Power and Mechanical Engineering. Dec. 7 to 13, inclusive. Grand Central Palace.

IMPORTS GREATEST IN 30 YEARS

More Than 76,000 Tons of Iron and Steel, Including 46,839 Tons of Pig Iron

WASHINGTON, Nov. 7.—The rush to get imports into American ports before the Fordney-McCumber tariff act went into effect at midnight, Sept. 21, is plainly reflected in the official figures. They show that from Sept. 1 to Sept. 21, inclusive, imports of iron and steel products reached the comparatively large volume of 76,393 gross tons, valued at $4,835,887, as compared with only 12,825 tons valued at $2,127,895 for the entire month of September 1921. The figures presented for September this year cover only the period up to Sept. 21, because that marks the end of the Underwood-Simmons tariff law. The next figures on imports will cover the remaining period in September, together with imports for October.

As was to be expected, the most interesting import figures in September related to pig iron and ferromanganese. Imports of pig iron totaled 46,839 tons while imports of ferromanganese totaled 10,718 tons for the three-week period. For the nine months ending Sept. 21 imports aggregated 301,987 tons, valued at $30,566,739. Of these imports, 109,171 tons consisted of pig iron and 72,011 tons consisted of ferromanganese. The greatest import movement of pig iron in September was from Scotland, the shipments from that country being 19,600 tons. With Belgium and England ranking second and third, respectively, pig iron tonnages from these countries, in the order named, were 12,448 and 11,471 tons. Imports of ferromanganese from England in September amounted to 10,301 tons out of the total movement of 10,718 tons.

The imports of iron and steel in September were the largest in over 30 years, were greatly in excess of 50 per cent of the export movement and represented an increase of about 52 per cent over the imports in August, which totaled 50,050 tons.

Manganese ore imports likewise showed a sharp increase and totaled 46,869 tons, valued at $347,916, the movement of this ore being 30 tons in excess of the pig iron movement in September. Imports of iron ore in September totaled 127,838 tons.

Imports of Iron and Steel in Gross Tons

	September		Nine Months Ending September	
	1921	1922*	1921	1922
Ferromanganese	804	10,718	6,605	72,011
Ferrosilicon	633	3,015	5,853	12,774
Pig iron	2,100	46,839	20,527	109,171
Scrap	114	12,221	28,916	69,085
Steel bars	252	657	1,955	5,798
Bar iron	190	371	1,375	4,280
Structural steel	6	289	550	1,784
Billets, without alloys	2	248	3,021	8,554
All other billets	10	375	1,138	1,705
Steel rails	2,850	705	17,622	21,866
Sheet and plates	4	42	1,804	425
Tin and terne plates	5	75	313	2,233
Wire rods	10	235	562	1,302
Total	12,825	76,393	88,388	301,987
Manufactures and scrap	16,102	16,869	366,744	327,537

*To Sept. 21 only.

Imports of Iron Ore by Countries in Gross Tons

	Nine Months Ending	
	*September, 1922	*September, 1922
Spain	11,739	39,936
Sweden	33,856	219,808
Canada	346	1,754
Cuba	22,000	210,520
Other countries	59,897	190,400
Total	127,838	662,418

*To Sept. 21 only.

Imports of Ferromanganese and Pig Iron in September, 1922, up to and Including Sept. 21, and Principal Sources for Nine Months to Sept. 21.

Pig Iron

	September 1922—		Nine Months,
	Gross Tons	Value	Gross Tons
Belgium	12,448	$225,550	32,037
France	2,100	41,755	4,369
Sweden	29	989	308
England	11,471	291,222	29,185
Scotland	19,600	385,790	29,617
[illegible]	1,191	[illegible]	3,197
[illegible]	[illegible]	[illegible]	1,516
	46,839	$979,350	

[illegible]

	Gross Tons	Value	Gross Tons
Germany	300	$17,958	575
Norway	25	1,483	25
[illegible]	[illegible]	[illegible]	[illegible]
Canada	90	6,096	90
	10,718	$604,603	

Distribution of Iron and Steel Exports

Canada, taking 41,417 tons, or nearly 30 per cent of the total September exports of iron and steel from the United States, had a long lead over Japan, which stood second, with 22,328 tons. Specific destinations for 122,698 tons, shown in the table, show that 75,920 tons, or 62 per cent, went to the Western Hemisphere (19,676 tons to South America) and 46,778 tons to the Eastern Hemisphere (35,403 tons to Asia).

The following are the chief countries of destinations of September steel exports, stated in gross tons:

Canada	41,417	India	2,909
Japan	22,328	Australia	2,403
Cuba	7,656	Colombia	2,303
Mexico	6,193	Philippine Islands	2,224
Brazil	6,133	Peru	1,562
China	5,689	Rumania	1,463
United Kingdom	4,306	Venezuela	1,304
Chile	4,229	Hong Kong	1,074
Argentina	4,145	British South Africa	979
Chosen (Korea)	3,403	Panama	978

To Make Test Runs on Synthetic Pig Iron

The Hartford Electric Light Co. has arranged to operate the plant of the Connecticut Electric Steel Co., Inc., Hartford, for a test run on synthetic pig iron. This process consists in converting steel scrap into gray iron by increasing the carbon content and at the same time refining the iron by the elimination of impurities, so that a very high quality of pig iron is produced. The Connecticut Electric Steel Co. produced all of the pig iron used in its foundry in this manner during the war.

The object of this test is to determine the commercial possibilities of the process under local conditions. On account of the high freight rate which must be paid by purchasers of pig iron and also the large quantities of suitable steel scrap available in Hartford and vicinity, it is thought that it will be possible to produce pig iron of analysis superior to the blast furnace product at a price to compete with the delivered cost of blast furnace pig.

Arrangements have been made with several local foundries to send molds to the steel plant into which the molten refined iron will be poured direct, without first casting into pigs and remelting. This will enable these foundries to determine the value of the electric furnace process as a means of producing special high quality iron for particular purposes.

During this test run practically all grades of pig iron will be made, for with the electric furnace process it is possible to vary the percentage of carbon, silicon, manganese, phosphorus and sulphur almost at will and to produce pig iron of the usual foundry grades.

In connection with this test the Hartford Electric Light Co. is anxious to co-operate with any foundries that have any problems requiring a special analysis of pig iron.

A special crane, built by the Industrial Works, Bay City, Mich., for the Virginia Railway, is probably the largest machine of its type in the world. It is known as a type Z and its capacity with outriggers extended is 400,000 lb. at a radius of 17½ ft. Without the use of jack beams, the main hoist will lift 85,000 lb., while the auxiliary hoist will lift 60,000 lb. at a radius of 24 ft.

Robert C. Sweatt, Ltd., Vancouver, B. C., is in the market for one set of Traylor crushing rolls, or equivalent, 36 x 16 in., feed 1½ in. to crush to ⅜ in. maximum.

Forty-Three Years' Experience as a Buyer of Iron and Steel



A. W. GLESSNER

A. W. GLESSNER, Chicago, tells of changes in methods which have come in recent years, numerous changes in character of products.

OVER 43 years a buyer of iron and steel, Arthur W. Glessner, Chicago, has an experience paralleled by few men in American business. His first purchase dates back to May 12, 1879, when he was in the employ of N. Hawkins & Co., Chicago, manufacturer of elevator buckets used for handling grain, sand and other materials. Since that time, many changes have taken place in the iron and steel industry, and the names of numerous producers and sellers, familiar in past decades, are now mere memories; yet, singularly enough, the company with which Mr. Glessner placed his first order was Joseph T. Ryerson & Son.

At the time of his initiation into the purchasing profession, Mr. Glessner was a stripling of 18, fresh from Elizabeth, a hamlet near Galena, Ill., where he was born on April 30, 1861. To-day after 43 years, he is the largest buyer of light sheets in Chicago and the West and at the same time is one of the leading manufacturers of hot air furnaces and stove and furnace sheet metal supplies in the United States. His connection with the Hawkins company lasted only a year and a half, after which he became a member of the partnership of Thornburgh & Glessner, its successor. In 1886, he participated in the organization of the Excelsior Steel Furnace Co., of which he became secretary. Four years later, in 1890, he bought out his associates and ever since that time has been president.

When asked what change in the iron and steel industry he regarded as the most important from the point of view of a purchasing agent, he replied:

"Without a doubt the most revolutionary change was in the terms of sale. For years the buyer was given almost unlimited time in which to liquidate his accounts. When the United States Steel Corporation was formed, however, it inaugurated a policy of selling at 30 days net with two per cent off for cash in 10 days, and as a result of this step the iron and steel business is to-day on a cash basis. Another important development, almost co-incident with the change in terms of sale, was the placing of mill business on a strict carload basis. It was formerly the common practice of mills to solicit small orders, pool them into a carload shipment, and consign the car to one of the group of buyers, who after unloading his portion of the lading, would permit the remainder to be distributed among the other customers. This practice, though strongly entrenched, was abandoned, with the consequence that the acceptance of less than carload business for mill shipment is now the exception."

In discussing the numerous changes which have taken place in the character of the products rolled by the mills, Mr. Glessner pointed out that his purchases of iron antedated those of steel. His first order called for galvanized iron sheets. Iron sheets have been long since largely supplanted by steel sheets; yet such terms as "sheet iron" and "galvanized iron," harking back to the old days, are still used by the sheet metal trade in referring to present-day steel products. Because of his large consumption of sheets, Mr. Glessner has been a close student of the quality of mill products and has the distinction of introducing into this country the production of a special grade of sheets previously made only in Europe. For years he had noted that there was a loss of from five to ten per cent in wasters in making stove and furnace pipe elbows out of black sheets. He was therefore much interested when, upon a visit to Germany some 16 years ago, he was shown a one-pass sheet of such ductility that it insured the elimination of this loss. Upon his return to the United States, he induced a leading steel manufacturer to make a similar grade of sheets and to this day it is known as "Glessner special" in recognition of what he did to introduce it in this country. This sheet has an even blue color in contrast with the almost iridescent appearance of the ordinary black sheet. Practically all American sheet mills now roll such sheets under various trade names.

Mr. Glessner has the habits of mind of a purchasing agent and when asked his views regarding the reported impending mergers of independent steel makers, he replied:

"As a buyer, I naturally prefer many competing mills, as it gives one a wider market in which to trade. Drawing upon my experience as a manufacturer, however, I can see that the consolidations will result in economies in production which cannot fail to accrue to the benefit of users."

Car Service at Youngstown Shows Improvement

YOUNGSTOWN, Nov. 7.—Aside from curtailment this week at the Niles sheet plant of the Republic Iron & Steel Co., schedules of Mahoning Valley iron and steel properties are moving forward with little change. The Republic company was compelled to reduce the number of active sheet mills at Niles from 16 to 8, because of congestion produced by heavy accumulation. This reduction in production will enable the railroads to clear away part of the accumulated output, after which the plant will again resume on a normal basis.

A branch line is now being built to connect this plant with the Baltimore & Ohio Railroad, and it will then have rail service from two trunk line carriers.

In other respects, car supply for Valley industries has materially improved the past month. The Youngstown Sheet & Tube Co. has virtually no accumulation, and President James A. Campbell states that while transportation is not yet normal, it shows material betterment. Motive equipment is still inadequate. Large numbers of new cars are being built and many are being repaired, so that the car supply is being improved in this respect. Many new cars will be delivered to the railroads and to private owners between now and the end of the year, states Mr. Campbell.

Judge Elbert H. Gary was awarded the Louis Livingston Seaman Medal by the Safety Institute of America at a luncheon given by Arthur Williams, president of the institute, at the Bankers' Club in New York, on Nov. 2, in Judge Gary's honor. The medal was awarded in recognition of conspicuous achievement in the conservation of human life in his capacity as leader of the recent New York safety week campaign.

Judge Gary Defends Pittsburgh Basing Plan

Tells Examiner of Federal Trade Commission That Chaos Would Result if There Were No System of Figuring Prices—Hearing Continued at Washington

BY L. W. MOFFETT

WASHINGTON, Nov. 6—With the utmost frankness, Chairman Elbert H. Gary appeared here to-day and testified in connection with the Pittsburgh base hearing before Examiner J. W. Bennett, the commission's attorneys being K. E. Steinhauer and G. S. Burr. Representing counsel for the Steel Corporation are C. A. Severance and W. W. Corlett. Accompanying Judge Gary were controller W. J. Filbert and F. R. Sites, secretary to Mr. Gary.

The direct examination of Judge Gary was conducted by Mr. Steinhauer. The line of his questions indicated that he is seeking to show that the Steel Corporation dominates the steel market and makes its prices and uses the Pittsburgh base as a device to this end. The testimony of Judge Gary was clear and was pointed, holding that the suggestion of its powers is without justification. In substance, the contention of Judge Gary was that the Pittsburgh base can operate only when there is an equality as between supply and demand or the latter is greater than the former, and that when business is poor it is merely theoretical.

Attorney Steinhauer asked Judge Gary the reason the Federal Trade Commission had difficulty in getting certain information from the steel trade.

Sharp Competition

"You must remember the members of the iron and steel industry have very sharp competition all the time and they do not furnish to each other the details of the business required, as they might affect competition," replied Judge Gary. "You have no trouble I think or the governmental departments have no trouble to get figures which express the total of any feature of business. But they might have difficulty in getting figures which might be of benefit to one competitor to the prejudice of another competitor. The Federal Trade Commission, I think as a rule, has been able to secure without hindrance and with a good deal of aid the figures which are pertinent and which are withheld from general circulation among the iron and steel people. Of course I do not know exactly what you refer to now and perhaps it would not make any difference if I did know. I think the Federal Trade Commission as a rule has commended the Steel Corporation particularly because of the information which it has furnished from time to time. I know during the war members of the Federal Trade Commission, members of the War Industries Board and other Government departments expressed satisfaction at what we had done in furnishing figures for Government purposes."

Information Delayed

Mr. Steinhauer then said the commission has been unable to get certain information from the Carnegie Steel Co., and wanted to know why submission of the information had been delayed.

"Well, I would criticize any man, or any officer, or any corporation for unreasonably delaying to give consideration to a small request," replied Judge Gary. "I can't answer your question, as I do not know just what was involved, but it is a fact that the Steel Corporation reserves the right to pass on these questions of policy. Sometimes the subsidiary company may not know how far reaching the inquiry may be and it may be our fault. I remember only a very short time ago a question reached me for final decision concerning the furnishing of data and the decision was not in favor of furnishing it. So there has been some doubt. Now when the company furnishes for general distribution information as to how much of any product is furnished in a particular State or location it is giving a competitor a knowledge of decided advantage to him. I do not believe there is any complaint that the Steel Corporation is not pretty liberal in giving access to its works, to Americans and foreigners alike. In fact, I think we are very reasonable in that respect, but there are times that we may have been slow or doubtful. I presume this might be admitted. Anyhow, we try to carry on our business in a business-like way."

Speaking of the alleged ability of the Carnegie Steel Co., before organization of the Steel Corporation, to compete in the Chicago district because of the use of the Pittsburgh base, Mr. Steinhauer asked how it could do it.

"Any company could go into any district and sell what surplus it had provided it could meet the market," the witness answered. "There is always the question of supply and demand and the cost of producing and delivering."

Competition in Early Days

Expanding this thought Judge Gary continued: "In those early days the Carnegie Steel Co. had a decided advantage from the other days and it would sell often at whatever price it could get in competition with another company, with a view to driving the other company out of business. It was a method of the old regime. It is impossible to say what a large or very prosperous company will not do to keep its mills filled."

He said that steel companies sometimes did and sometimes they did not charge the Pittsburgh base in the old days, as always has been and is now the case.

"This Pittsburgh basis existed for the purpose of establishing a quotation price, fixing a quotation price," Judge Gary explained. "It was adhered to or not, depending upon whether the law of supply and demand justified it and that depended upon whether business was good or poor, upon whether there was enough steel manufactured in the western district to supply the trade. Trading in steel is like the trading in anything else. The seller of steel and the buyer of steel have to make bids and contracts depending upon what the general market is and they both like some place for fixing the price. Otherwise there would be chaos. Take for instance the price of wheat, quoted on a Chicago basis."

Some Misunderstanding

Judge Gary said he thought that there has been some misunderstanding as to what the Pittsburgh base means in practice. He referred to producing capacity and said it changes in various places. The cost of production has changed in a great many places, it was pointed out, and a great many circumstances have changed. All the time, it was said, the question settles down to what price the seller is willing to sell at if he has anything to sell, and what the buyer is willing to buy at if he wants to buy.

"That is a general statement, but nevertheless it is a fundamental statement as I understand it," was added.

"Generally have you quoted prices on the Pittsburgh basis?" asked Mr. Steinhauer.

"I would say generally as I understand it we have quoted prices on a Pittsburgh base and perhaps more than the average steel company we have sold on a Pittsburgh base," was the reply, "but when business is dull the Steel Corporation has absorbed part of the freight, to a greater or less extent, to secure business, and I believe that at least many of the competitors have absorbed a greater part."

Judge Gary was asked if any discrimination was

made in price by the Steel Corporation as between consumers of its products.

"I would say that between customers there is not any discrimination except depending upon quantities," he replied. "But I believe in the practice that in all these lines the Steel Corporation to a substantial extent reduces its prices, or at least absorbs part of the freight in order to get the business after it has found that it was necessary. Now I must admit, however, in making that statement that I am not sufficiently familiar with that business in detail, to be positive just what the practice is. I know what our general practice is. I know there are times when a very large contract has been offered and some reductions of prices have been made. I think that has been justifiable."

Maintaining Pittsburgh Base

Mr. Steinhauer wanted to know the ability of the steel trade to maintain the Pittsburgh base plan.

In times of stress, Judge Gary said, the law of supply and demand will not permit the use of the Pittsburgh base, except as a basis for quotations for the buyer and for the seller to go by. He expressed the opinion that the Pittsburgh base prior to 1895 came more from speech in the trade rather than any actual practice. He pointed out that it is the effort of the Steel Corporation to stabilize prices as far as it can so that they shall be neither too high nor too low. He said he knew that there were times when they were too high and the Steel Corporation sold below its competitors. As business became dull, he said, speaking of a period after the war, competitors sold below the cost of production, and speaking of 1921 he said the Steel Corporation was forced to reduce prices to the low point to meet competition and to reduce wages. He also recited the fact that Steel Corporation prices were held down through 1919 and 1920 below those of competitors. Mr. Steinhauer wanted to know if in that instance and in 1921 the independents or the Steel Corporation were following the law of supply and demand. Judge Gary said the independents followed it, but could not reach it. He concluded that there were times when the seller took advantage of location of its plant, but when compared with what the purchaser does when the demand exceeds the supply, it is nothing to speak of."

Not Guilty of Wrong Doing

"I deny," said Judge Gary, emphatically, "that our corporation uses the Pittsburgh base or any other rule of trade unconscionably and with a view to seeking advantage over our customers which is not fair and right. I do not think that, if that had been our policy, we would have been allowed by the Supreme Court to live and we ought not to have."

Mr. Steinhauer, adverting once more to the law of supply and demand, attempted to show that the Carnegie Steel Co. in 1921 was able to sell steel in the Chicago district at $7.60 more, based on the freight rate of 38c. per lb. on plates, shapes and bars over the Pittsburgh price, despite the fact that the industry was depressed and Gary plants operating at low capacity.

Judge Gary said there were a number of things that might enter into such a situation and while he denied knowledge of the matter, said such things as maintenance of heavier operations of the Carnegie Steel Co. would mean a lower cost, that the law of supply and demand is subject to temporary interruptions and its operations delayed until the real market is found. Then he gave the following definition of this law:

"The law of supply and demand includes the ability of and willingness of one to sell at a certain price and the ability and willingness of another to buy at that price. Of course, if a producer has a larger quantity than he can sell, the supply is large and his willingness to sell increased. If the proposed purchaser is anxious to buy and use a very large quantity for immediate delivery, of course he is willing to buy at a greater price. It is a meeting of minds. If for any reason one is compelled to act and is not left free, then to a corresponding extent the law of supply is temporarily suspended or modified."

Duluth and Chicago Plants

Judge Gary said that the steel industry would not have established plants at Duluth, Minn., Chicago and other places had it not been for the Pittsburgh base. He pointed out that the producers knew that they could get the Pittsburgh price plus the freight differential for their product in normal times when the demand is as great as the supply. He stated, therefore, that if it had not been for the Pittsburgh base, consumers would have had to pay the Pittsburgh plus price anyhow. Moreover, he stated that on the average the district consumers in Chicago pay no more on the whole than those in Pittsburgh. Stressing the point that the Steel Corporation bends its energies toward the stabilization of the steel industry when it can, Judge Gary said that conditions in that industry have improved since the incorporation of the Steel Corporation because it has had a stabilizing influence.

Previously Judge Gary, in reply to a question by Mr. Steinhauer, said that 85 to 90 per cent of the cost of production in the steel industry from the raw to the finished products is in labor. He declared that wages cannot be reduced, owing to the high cost of living. The value of property of the Steel Corporation was placed at $2,250,000,000. He stated that it is not making any great profits but that conditions are improving and adjusting themselves. He expressed the belief that the Pittsburgh base is an element of stability for all concerned, including both the producers and the consumers.

Mr. Steinhauer tried to get the witness to state the relation between the cost of production at the Gary and the Pittsburgh mills. Judge Gary said that this depended upon a number of conditions which are changeable. The Gary mills, he said, were new about 10 years ago and he believed at the time costs were reasonable and fair and in some lines lower than in Pittsburgh. All things being equal, however, he said that he believed Pittsburgh could at least take care of itself to-day and possibly produce at a lower cost than Gary. This answer was surrounded by a number of conditions such as markets, equipments, capacity of operations, etc.

Judge Gary was excused at 3.30 o'clock so that he could return to his home and will be recalled for further direct examination on Wednesday, Nov. 15. It is understood that testimony will be given to-morrow by John A. Penton, president Penton Publishing Co., Cleveland, publisher of the *Iron Trade Review*. Among other witnesses called for this week is William G. Gray of the American Iron and Steel Institute, who is scheduled to appear Friday. It is the purpose of the Commission to conclude the taking of direct testimony some day next week, after which the Steel Corporation will present its side of the proceedings.

Mr. Findley's Testimony

A. I. Findley, editor of THE IRON AGE, the first witness called at the present proceeding, testified on Wednesday, Nov. 1. He was questioned by Attorney Steinhauer on behalf of the Federal Trade Commission as to the reliability of quotations carried in THE IRON AGE. Mr. Findley pointed out that iron and steel contracts are based on quotations carried in THE IRON AGE and Attorney Severance made the observation that THE IRON AGE is highly regarded in the trade. The manner of gathering market and other news, its accuracy and the method of arriving at the quotations given in THE IRON AGE were explained by Mr. Findley, it being made clear that market information is gathered and prepared by a staff specially trained in the work, and that the sources of such information are both buyers and sellers. Attorney Steinhauer submitted in evidence statements from prominent steel men as to the standing of THE IRON AGE in the trade and its acceptance as an authority. The attorney for the commission also put into the record an elaborate compilation of articles from THE

IRON AGE since 1873, when the Pittsburgh Base was said to have been established. The material consisted of various news articles as well as editorial comment. Apparently it was incorporated in the record to show price trends, trade practices and market developments.

Conditions in Sheet and Tin Plate Trade

On the following day, Thursday, the witness was J. I. Andrews, general manager of sales, American Sheet & Tin Plate Co., Pittsburgh. The evidence brought out by the questions of Mr. Steinhauer dealt almost exclusively with matters that now are well known trade history. The commission had asked for correspondence and other official records of the American Sheet & Tin Plate Co. and without raising any issue as to the authority of the commission to obtain this material, it was freely offered by Mr. Andrews. His evidence consisted of description of conditions in the sheet and tin plate industry, particularly during and since the war. Mr. Steinhauer asked and was told regarding prices, production, contracts, etc., some of the information being based on the records in the files of the company. Where he was called upon to do so, Mr. Andrews elaborated on subjects that were brought up. When asked about the differences in the prices of the American Sheet & Tin Plate Co., and those of independent producers during 1919 and 1920, Mr. Andrews pointed out that the American Sheet & Tin Plate Co. adhered to the schedule of prices adopted in March, 1919, which had been prepared by a committee of the American Iron and Steel Institute, with the idea of continuing fixed prices that had been instituted during the war upon the initiative of the Government. The Government, however, not desiring to continue the policy of price fixing, the trade itself adopted the schedule referred to. But as demand increased and the market became strong, independent producers' prices were advanced, while the Steel Corporation subsidiaries continued maintaining the schedule of prices that had been drawn up by the Iron and Steel Institute committee. Mr. Andrews referred to 1921 as being probably the most acutely competitive year in the history of the sheet and tin plate industries. Asked to explain certain correspondence between his office and salesmen of his company regarding prices, Mr. Andrews said that never in 25 years had he heard so much misinformation as during the first nine months of 1921.

The Irregular Market of 1921

"I insisted," said Mr. Andrews, "that our own people should present facts only and that they should run down these reports whenever possible. I was trying to stabilize our own salesmen more than anything else." He said that he knew that competitors were selling below the American Sheet & Tin Plate Co. and judged they were underselling it during a part of the year mentioned by a maximum of $5 per ton, this being particularly true, it was pointed out, from April to November. Prices, Mr. Andrews said, were on a Pittsburgh basis. Mr. Steinhauer asked Mr. Andrews how the Pittsburgh district railroad rates had been fixed. Mr. Andrews replied that he did not think they had been "fixed" in any way, except by the railroads themselves. Inquiry was made of Mr. Andrews as to the relative production of sheets in Ohio and Pennsylvania. Mr. Andrews replied that without looking up the records he could not say positively which State produced the greater tonnage. "Why, then," inquired Mr. Steinhauer, "should there be a Pittsburgh basing point on sheets and not such a basing in Ohio?"

"I will answer that question by asking another," replied Mr. Andrews. "If there should be an Ohio basing point, where in Ohio would it be?"

Attorney Steinhauer asked Mr. Andrews about proposed changes of the American Sheet & Tin Plate Co. relating to differentials and extras. Mr. Andrews replied that they applied largely to pickled sheets and finishes that cost more now than they did when the present differentials and extras were established. He said he was sure that some of the changes made by the American Sheet & Tin Plate Co. would not be the same as those of its competitors. Activities of the National Association of Sheet and Tin Plate Manufacturers were taken up by Mr. Steinhauer, and Mr. Andrews pointed out that the American Sheet & Tin Plate Co. is not a member of the association, but is familiar with its statistical studies and other undertakings, such as those relating to the improvement of practice of manufacture.

Sheet Bars from Gary to Pittsburgh

Speaking of the exceptional activity of the steel industry in 1920, Mr. Andrews said that for the first and only time in history the American Sheet & Tin Plate Co. was unable to get sheet bars from its sister company, the Carnegie Steel Co., in the Pittsburgh district, and had to obtain them from the Gary, Ind., plant of the Illinois Steel Co. He said that the American Sheet & Tin Plate Co. had to bear the excess freight on the sheet bars; that is, the difference between the freight paid on shipments from the Carnegie plant in the Pittsburgh district and the freight paid on shipments from Gary. He said that on an average the excess was $4 per ton. Adverting to present-day conditions, Mr. Andrews said that the Elwood, Ind., plant of the American Sheet & Tin Plate Co. is obtaining sheet bars from the Duluth, Minn., plant of the Steel Corporation. This extraordinary movement of semi-finished material is due, he pointed out, to the shortage of coal at the Gary plant from which sheet bars for Elwood ordinarily are obtained. The freight rate from Duluth is $6.03 per gross ton, while from Gary it is $2.53. Mr. Andrews was cross-examined by Attorney Corlett, who had the witness develop more fully some of the points brought out by Mr. Steinhauer.

The Sheet and Tin Plate Association

Testimony was given Friday by Charles O. Hadly, general manager of sales, Alan Wood Iron & Steel Co., Philadelphia, and President W. S. Horner of the National Association of Sheet and Tin Plate Manufacturers. Their evidence related largely to the activities of the association. Official association records were presented by Mr. Horner at the request of the commission. Mr. Hadly, whose company is a member of the association, submitted records from the company files. The testimony, like that of Mr. Andrews, was almost entirely devoted to conditions in the trade, which are well known and which were currently published. Attorney Corlett objected to certain portions of the testimony as being irrelevant, but these were admitted by the examiner with the understanding that the attorney for the commission should connect the evidence with the issue involved in the case. Correspondence of the Alan Wood Iron & Steel Co., sent and received, was read, and its significance inquired into by the commission attorney. Attorney Severance asked Mr. Hadly if there was any collusion as to prices of sheets among members of the association. Mr. Hadly replied that there was none.

Mr. Horner said that his association operated as a clearing house for the exchange of trade information. Its membership is composed of manufacturers who represent from 60 to 65 per cent of the sheet steel production. It was stated that the American Sheet & Tin Plate Co., which is not a member of the association, produces about 30 per cent of the sheet output.

Chicago Building Increases

Permits were issued in Chicago in October for 1103 buildings fronting 34,794 ft. and costing $14,996,150, as compared with 924 permits fronting 28,067 ft. and costing $12,263,100, issued in September. The October record also exceeded that of October, 1921, when 876 permits were issued covering 26,481 ft. of frontage and involving a cost of $10,457,250.

The Double Drive Truck Co., formerly located in Chicago, has moved to Benton Harbor, Mich., having purchased the Mandel plant. Machinery and tools are being installed and production is expected to be under way in a few weeks. This company manufactures the 1½ and 3-ton Pulmor trucks.

WOULD CHECK DECLINE

Sellers in Youngstown District Firmer in Making Quotations

YOUNGSTOWN, Nov. 7.—Efforts of major Valley industrial interests to stem the downward tide of steel prices are being noted. Feeling prevails among district interests that there is a heavy unsatisfied demand for their products which is being held in abeyance through expectation of lower prices. Coal prices, too, are showing higher tendencies, and quotations to industrial buyers are up 25c to 50c per ton for coking grades. Steel makers attribute this condition partly to car shortage and to heavy industrial demand. Coal storage has been on a much smaller scale this year than previously and most interests will enter the winter with very little coal accumulation.

In this territory, there is no evidence as yet of concessions under $40 for sheet bars, billets or slabs. Makers, in fact, are well sold ahead in sheet bars for delivery over rest of the quarter. There is a disposition, however, to believe that the price will recede for the first quarter of 1923, and will possibly settle to a $37.50 basis.

Sheet Demand Spotty

Sheet demand is characterized by several of the leading makers as somewhat spotty. Prices for black grades have definitely settled to the 3.35c quotation of the American Sheet & Tin Plate Co., and no Valley mill would likely refuse business at this figure. Galvanized grades, likewise, are definitely weaker, and while 4.50c is still applying on some tonnages, business has been accepted at 4.35c.

The smaller makers, who were among the first to cut under the 3.50c price on black sheets, have apparently forced the larger interests to mark down their quotations in order to protect themselves. As a result, the galvanized price, which remained firm at 4.50c for a time even after black sheets had declined to 3.35c has been definitely weakened.

Furthermore, there have been gaps in rolling schedules of Valley interests which they were anxious to fill. Most of the sheet tonnage accumulation in this territory has been moved, but one interest which has 7500 tons piled, has reduced production temporarily to permit the railroads to make some inroads into this piled output.

It is the belief in influential independent quarters in this district that sheet prices will enter the first quarter of next year at the current level of the leading interest.

The Tin Plate Price

The principal Valley maker of tin plate is just now considering the price to be named on next quarter tonnage, and there is a strong undercurrent that the quotation will be moved up to $5 per base box. What the independents will do in this respect, though, depends in large measure upon the attitude of American Sheet & Tin Plate Co. From now until the close of the year, it is expected that the more important tin plate consumers will sign contracts covering their requirements for the first six months of 1923. They are already freely inquiring about prices.

The independents are now receiving a considerable volume of business for this season of the year, owing to the fact that they are in better position than the leading interest to meet delivery requirements. Prices on tonnages now going through the rolls range from $4.60 to $4.75, the larger buyers as usual receiving preferential treatment. A Valley independent declares that the margin of profit on tin plate at the current range has been inadequate, and an advance is justified on this account, predicting it will be sustained by demand. In fact, this maker contends that prices would have been marked up sooner had it not been for the action of a Pittsburgh independent in accepting a large volume of business at $4.60. He points out that a reduction of $2.50 per ton in sheet bars would mean only 10c per box on tin plate, and that this amount would be more than offset by higher labor charges.

In the strip market, automotive demands continue to lead, with the Ford Motor Co. the heaviest buyer. Fabricators, pressed and stamped metal interests are likewise substantial purchasers of strip. The leading Valley producer is quoting hot-rolled at 2.95c to 3.15c, the lighter gages commanding the higher prices. Cold-rolled finishes are firm at a 3.50c. base. One Valley interest is establishing new production records in its strip department. Strip steel is replacing castings for many operations and sheets to some extent.

Plate makers here state that the Bethlehem Steel Co., which recently cut its plate price to 2c, has advanced it $2 per ton, to 2.10c, Pittsburgh. Early deliveries on merchant steel bars likewise command better than 2c, though large tonnages were booked at the lower figure.

Basic pig iron is now quotable in the Valleys at $29 to $30, with foundry at $31 for No. 2 grade. Prices in the iron market are definitely weaker due to larger production and reduced coke prices. Furnace coke is now obtainable at $7.50, and Valley buyers look for further concessions.

Lake Superior Iron Ore Shipments in October

Shipments of iron ore from Lake Superior in October were 6,081,386 gross tons as compared with 3,233,081 tons in October, 1921. This is an increase of 2,848,305 tons or 88.10 per cent. The season's shipments to Nov. 1, this year, have been 39,192,624 tons as against 21,894,275 tons to Nov. 1, 1921, an increase of 17,298,349 tons or 79.01 per cent. The following table gives the October and season shipments by ports and the corresponding figures for 1921, in gross tons:

	October		To Nov. 1	
	1921	1922	1921	1922
Escanaba	405,554	795,801	1,719,885	4,121,426
Marquette	259,491	231,661	719,293	1,857,564
Ashland	335,180	800,494	2,183,108	5,442,839
Superior	655,915	1,793,270	4,833,413	10,277,983
Duluth	1,188,926	1,730,870	9,164,803	11,914,348
Two Harbors	388,015	729,290	3,273,773	5,578,464
Total	3,233,081	6,081,386	21,894,275	39,192,624
Increase		2,848,305		17,298,349

The Duluth proportion this year to Nov. 1 of 30.40 per cent was considerably less than a year ago when it was 41.86 per cent of the total. The Great Northern dock at Superior is credited with 23.37 per cent of the total shipments this year against 20.12 per cent last year.

Elements of Industrial Heating

In a 44-page booklet 8½ x 11 in. the W. S. Rockwell Co., 50 Church Street, New York, has made a notable compilation of the factors entering into industrial heating. The factors cover the quality and cost of products subjected to the action of heat in the process of manufacture and the selection and use of equipment and fuels necessary to produce better results at a lower cost. Among the illustrations are scores of furnace sections for work of all kinds, including heating, annealing, heat treating, automatic conveyor furnaces, muffle and pot furnaces, melting and regenerative furnaces, etc. Curves are given comparing various fuels as to efficiency and cost and diagrams show the character and distribution of losses from various types of equipment.

Oglebay, Norton & Co., Cleveland, are erecting about 75 dwelling houses at Ramsey, Mich., for use of employees at its Eureka mine. This firm is also planning a large housing program at Hurley, Wis., where it operates the Montreal mine. A new shaft is being built at this mine and when completed additional houses will be needed for the miners. According to present plans, about 75 houses will be erected at this mine during the coming year.

The Tod foundry at Youngstown of the United Engineering & Foundry Co., Pittsburgh, has resumed after being idle since May, 1918.

OCTOBER IRON OUTPUT

Gain Last Month 17,301 Tons Per Day as Compared with September

Thirty-two Furnaces Blown In and Only Three Blown Out or Banked

The pronounced improvement in the fuel situation has been reflected in a very sharp upturn in the country's pig iron output for October. It is necessary to go back to December, 1920, to find a month which exceeds the record made in October for the blast furnaces of the country. Not only was the total production of pig iron last month the largest since December, 1920, but the number of furnaces active on Nov. 1 was the greatest since Dec. 1, 1920. There were 32 furnaces blown in during October and only three blown out, or a net gain of 29. The increase also in daily output of 17,301 tons over September was more than 25 per cent.

Production of coke and anthracite pig iron for the 31 days in October amounted to 2,637,844 gross tons, or 85,092 tons per day as compared with 2,033,720 tons, or 67,791 tons in September, a 30-day month. This represents a gain of 604,124 tons over October.

The total number of furnaces in blast on Nov. 1 was 218 as compared with 189 on Oct. 1, with 144 on Sept. 1, with 172 on Aug. 1 and with only 29 on Aug. 1, 1921, the low point in the depression last year. It is the first time this year that over 200 furnaces were in blast the first of the month. On Dec. 1, 1920, the number of furnaces in blast was 252. The capacity of the 218 furnaces in blast on Nov. 1 is estimated at 87,935 tons per day, as compared with 77,005 tons per day for the 189 furnaces in blast on Oct. 1.

The manganese-iron alloy output for October was 21,478 tons, of which only 9193 tons was ferromanganese.

Daily Rate of Production

The daily rate of production of coke and anthracite pig iron by months, from October, 1921, is as follows:

Daily Rate of Pig Iron Production by Months—Gross Tons

	Steel Works	Merchant	Total
October, 1921	33,356	6,850	40,215
November	37,960	9,223	47,183
December	41,173	12,023	53,196
January, 1922	42,139	10,933	53,063
February	46,827	11,387	58,214
March	53,547	12,128	65,675
April	56,930	12,140	69,070
May	60,619	13,790	74,409
June	62,354	16,167	78,701
July	62,295	15,297	77,592
August	44,672	12,914	58,586
September	53,856	13,935	67,791
October	66,060	19,032	85,092

The figures for daily average production, beginning with January, 1916, are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since Jan. 1, 1916—Gross Tons

	1916	1917	1918	1919	1920	1921	1922
Jan.	107,716	101,643	77,709	106,225	77,291	77,945	53,063
Feb.	106,456	94,473	82,835	105,006	102,720	69,187	58,214
Mar.	107,667	104,882	103,648	99,685	108,900	51,468	65,675
Apr.	107,592	111,165	109,607	82,607	91,327	39,768	69,070
May	108,422	110,238	111,175	68,002	96,312	39,394	74,409
June	107,053	109,002	110,793	70,495	101,451	35,494	78,701
July	104,017	107,820	110,354	78,340	98,931	37,889	77,592
Aug.	103,346	104,772	109,341	88,496	101,529	30,780	58,586
Sept.	106,745	104,465	113,942	82,932	104,310	32,850	67,791
Oct.	113,189	106,550	112,482	60,115	106,212	40,215	85,092
Nov.	110,394	106,859	111,807	79,745	97,830	47,183	
Dec.	101,847	91,867	91,196	84,344	87,252	53,196	

Production of Steel Companies—Gross Tons

Between [illegible] furnaces of the United States Steel Corporation and the various independent steel companies, as well as from merchant furnaces producing ferromanganese and spiegeleisen, show the following totals of steel making iron, month by month, together with ferromanganese and spiegeleisen. These last, while stated separately, are also included in the columns of "total production:"

Production of Steel Companies—Gross Tons

	Total			Ferromanganese		
				1920	1921	1922
[illegible]	1,932,159	1,306,045				8,574
[illegible]	1,625,695	1,311,170		28,038	29,013	8,840
[illegible]				35,275	41,294	13,695
[illegible]	2,015,621	1,707,302		27,628	24,310	19,209
June		883,312	1,876,033	33,407	9,232	20,334
[illegible]						990
[illegible]				36,789	5,524	26,049
[illegible]				26,985	3,878	19,327
Sept.	815,692	1,615,696		39,546	3,289	14,916
[illegible]	1,034,312	2,047,873		34,786	3,902	21,478
Dec.				32,644		

Output by Districts

The accompanying table gives the production of all coke and anthracite furnaces for October and the three months preceding:

Pig Iron Production by Districts. Gross Tons

	Oct. (31 days)	Sept. (30 days)	August (31 days)	July (31 days)
New York	148,419	115,635	80,322	145,831
New Jersey	13,134	10,736	11,604	10,475
Lehigh Valley	63,635	55,711	46,254	58,068
Schuylkill Valley	66,232	41,646	35,286	54,675
Lower Susquehanna and Lebanon Valleys	32,374	25,440	20,679	26,698
Pittsburgh district	610,281	502,804	432,178	493,963
Shenango Valley	92,728	63,841	58,812	99,335
Western Penna.	116,508	68,140	62,659	81,927
Maryland, Virginia and Kentucky	54,856	44,136	41,324	58,506
Wheeling district	72,770	43,366	57,752	65,753
Mahoning Valley	302,434	218,363	130,555	233,813
Central and Northern Ohio	290,185	184,914	191,880	261,084
Southern Ohio	28,248	17,909	15,305	29,517
Illinois and Indiana	416,073	346,380	342,363	472,371
Mich., Minn., Mo., Wis. and Colo.	98,608	67,656	67,265	101,656
Alabama	210,994	204,802	204,389	195,929
Tennessee	20,365	22,241	17,543	15,764
Total	2,637,844	2,033,720	1,816,170	2,405,365

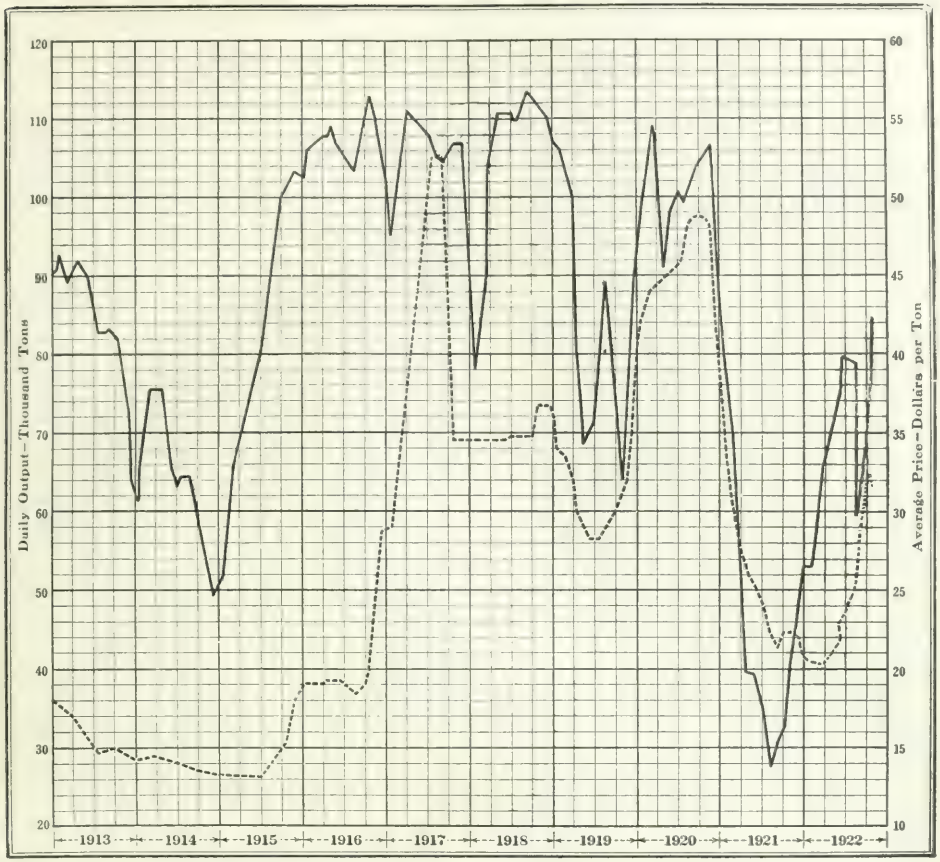
Capacities in Blast Nov. 1

The following table shows the number of furnaces in blast Nov. 1 in the different districts and their capacity, also the number and daily capacity in gross tons of furnaces in blast Oct. 1:

Coke and Anthracite Furnaces in Blast

Location of Furnaces	Total Stacks	Nov. 1 — In Blast	Nov. 1 — Capacity per Day	Oct. 1 — In Blast	Oct. 1 — Capacity per Day
New York:					
Buffalo	22	12	4,800	12	5,300
Other New York	4	0	....	0	....
New Jersey	4	1	420	1	360
Pennsylvania:					
Lehigh Valley	18	5	1,900	5	2,000
Spiegeleisen	2	1	150	1	140
Schuylkill Valley	15	6	2,130	6	2,400
Lower Susquehanna	10	3	1,090	2	900
Lebanon Valley	6	1	130	1	120
Ferromanganese	2	0	....	0	....
Pittsburgh District	55	42	19,500	40	20,000
Ferromanganese and Spiegel	4	2	390	2	275
Shenango Valley	19	9	3,500	5	2,400
Western Penna.	26	10	4,050	9	3,600
Maryland	3	4	1,530	3	1,400
Ferromanganese	1	1	75	0	....
Wheeling District	15	5	2,430	4	1,450
Ohio:					
Mahoning Valley	28	21	9,830	17	6,800
Central and Northern	26	22	9,360	16	6,400
Southern	16	4	930	3	1,300
Illinois and Indiana	42	28	14,340	24	12,000
Mich., Wis. and Minn.	12	9	3,085	7	2,450
Colorado and Missouri	6	1	430	1	350
The South:					
Virginia	16	1	365	0	....
Kentucky	7	1	260	1	250
Alabama	40	21	6,500	21	6,300
Ferromanganese	1	1	70	1	70
Tenn., Ga. and Texas	16	7	670	7	740
Total	418	218	87,935	189	77,005

Among the furnaces blown in during October were the following: C furnace of the Bethlehem Steel Co. in the Lehigh Valley; A furnace of the Bethlehem Steel Co. in the lower Susquehanna Valley; No. 5 Aliquippa furnace of the Jones & Laughlin Steel Co., and one furnace of the Pittsburgh Steel Co. in the Pittsburgh district; No. 4 Shenango furnace and the three Farrell furnaces of the Carnegie Steel Co. in the Shenango Valley; one furnace of the Cambria Steel Co. in western Pennsylvania; the Max Meadows furnace of the Virginia Iron, Coal & Coke Co. in Virginia; B and C furnaces of the Bethlehem Steel Co. in Maryland; the Martin's Ferry furnace of the Wheeling Steel & Iron Co. in the Wheeling district; two furnaces of the Youngstown Sheet & Tube Co., the Anna furnace of the



The Full Line Represents the Daily Production of Pig Iron and the Dotted Line Is the Average of the Price Per Ton of No. 2 Southern Pig Iron at Cincinnati, Local No. 2 Iron at Chicago and No. 2X Iron at Philadelphia

Struthers Furnace Co. and the Cherry Valley furnace in the Mahoning Valley; one Central furnace of the American Steel & Wire Co., two furnaces of the Columbus works of the American Rolling Mill Co., one furnace of the National Tube Co., one River furnace and the Upson furnace in central and northern Ohio; the Jisco furnace of the Jackson Iron & Steel Co. in southern Ohio; one Calumet, one Federal, one Iroquois and one South Chicago furnace in the Chicago district; B furnace of the Ford Motor Co. in Michigan, No. 2 furnace of the Minnesota Steel Co. in Minnesota and two furnaces of the Woodward Iron Co. in Alabama.

Among the furnaces blown out or banked during October were the following: D furnace of the Bethlehem Steel Co. in the Lehigh Valley; No. 3 North Birmingham furnace of the Sloss-Sheffield Steel & Iron Co. and No. 2 Bessemer furnace of the Tennessee Coal, Iron & Railroad Co. in Alabama.

Diagram of Pig Iron Production and Prices

The fluctuations in pig iron production from 1913 to the present time are shown in the accompanying chart. The figures represented by the heavy lines are those of daily average production by months of coke and anthracite iron. The dotted curve on the chart represents monthly average prices of Southern No. 2 foundry pig iron at Cincinnati, local No. 2 foundry iron at furnaces in Chicago, and No. 2X at Philadelphia. They are based on the weekly quotations of THE IRON AGE.

Production of Coke and Anthracite Pig Iron in the United States by Months, Beginning Jan. 1, 1918—Gross Tons

	1918	1919	1920	1921	1922
Jan. ...	2,411,768	3,302,260	3,015,181	2,416,292	1,644,951
Feb. ...	2,319,299	2,940,168	2,978,879	1,937,257	1,629,991
Mar. ...	3,213,091	3,090,243	3,375,907	1,595,522	2,035,920
Apr. ...	3,288,211	2,478,218	2,739,797	1,193,041	2,072,114
May ...	3,446,412	2,108,056	2,985,682	1,221,221	2,306,679
June ...	3,323,791	2,114,863	3,043,540	1,064,833	2,361,028
½ year	18,002,572	16,033,808	18,138,986	9,428,166	12,050,683
July ...	3,420,988	2,428,541	3,067,043	864,555	2,405,365
Aug. ...	3,389,585	2,743,388	3,147,402	954,193	1,816,170
Sept. ...	3,418,270	2,487,965	3,129,323	985,529	2,033,720
Oct. ...	3,486,941	1,863,558	3,292,597	1,246,676	2,637,844
10 mos..	31,718,356	25,557,260	30,775,351	13,479,430	20,943,782
Nov.	3,354,071	2,392,350	2,934,903	1,415,481	.....
Dec. ...	3,433,617	2,633,268	2,703,855	1,649,086	.....
Ttl. yr.	*38,506,047	30,582,878	36,414,114	16,543,686	.....

*These totals do not include charcoal pig iron. The 1921 production of this iron was 94,730 tons.

Iron and Steel Markets

LARGE GAIN IN PIG IRON

Output 25 Per Cent More in October Than in September

Both Steel Works and Merchant Furnaces Have Greatest Increase in Months—Car Supply Better

Pig iron production in October gives a good gage of the rapid picking up of the industry after the coal strike. There was a gain of 25 per cent over the September rate and more blast furnaces are active to-day than at any time since December, 1920.

In the 31 days of October the country produced 2,637,844 tons of pig iron, or 85,092 tons a day, against 2,033,720 tons in September, or 67,791 tons a day. The steel companies increased their output 12,200 tons a day over the September rate and the merchant furnaces gained 5100 tons a day, the largest increase for them in many months.

The Steel Corporation made a net gain of 6 in active furnaces last month, the independent steel companies a gain of 14, and the merchant furnaces a gain of 9—a total of 29. On Nov. 1 the capacity of the 218 furnaces in blast was 87,935 tons a day, against 77,005 tons a day for 189 furnaces on Oct. 1.

Apparently the increase in steel output has corresponded to that in pig iron and the steel companies are operating this week at fully 75 per cent of capacity. With the rate of pig iron production to-day close to 32,000,000 tons a year, steel ingot production is probably not far from 38,000,000 tons a year.

The effect of this increased output on prices, of both pig iron and finished steel, is being watched closely by both buyers and sellers. In particular, attention is being directed to the Steel Corporation's decision, looked for this week, on sheet and tin plate prices for the first quarter of 1923. There has been an expectation of some advance above $4.75 per base box for tin plate and above 3.35c. for No. 28 black sheets. This week the effect of the decline to $38 for sheet bars is having consideration. Plans of can makers for the first half of 1923 will call for large shipments of tin plates.

Car supply for the movement of material away from mills is better on the whole, and the movement of coal to the lakes is likely to taper off in the next three weeks, further improving the car situation.

Distributers of standard steel pipe continue to urge deliveries and a good deal of construction taking large quantities of butt welded pipe is still in progress.

Bolt and nut manufacturers have been buying bars in the past week, and there is inquiry from motor car works for forging and spring steel bars for first quarter. Some bar business has come also from agricultural works, due to implement sales in the South.

Of 3300 new cars ordered, the Louisville & Nashville bought 3100.

Six sizable fabricated steel projects have added 12,000 tons to pending lists, and awards of the week amount to fully 16,000 tons. At Chicago building permits for October exceeded those for September.

Recent price concessions have not stimulated buying in the pig iron market and even the $25 price on Alabama iron has resulted in few sales. The trend is still downward and among the reductions of the week are $1 on foundry grades and 50 cents on Bessemer in the Pittsburgh district; $1 on malleable, foundry and basic at Chicago, and from $1 to $2 on silveries following the recent reduction of $2. The market is dull and weak at Cleveland and Cincinnati.

Some standard Connellsville coke sold at $7 in the past week, but blast furnace resumptions are lifting the free coke from the market and $7.50 is nearer to-day's market.

The rush to get iron and steel imports into the country before the new tariff act went into effect, rolled up 76,393 tons in 21 days of September—greater than the figure for any calendar month since the late 'eighties. Pig iron accounted for 61 per cent of the total, scrap for 16 per cent, ferromanganese for 14 per cent and ferrosilicon for nearly 5 per cent, leaving only 4 per cent for all other items.

THE IRON AGE pig iron composite has again fallen, being now $28.86, compared with $32.54 at the end of September. One year ago it was under $20.

Finished steel remains at 2.446c. per lb., THE IRON AGE composite having kept between 2.4c. and 2.5c. for nearly three months. Early last March the low point of the post-war period was reached, at 1.998c. per lb.

Pittsburgh

Keen Interest in Prices of Sheets and Tin Plate for First Quarter

PITTSBURGH, Nov. 6.—Continued weakness in pig iron prices, which has begun to filter through to the semi-finished steel market, increases expectations of lower finished steel prices, and makes for an even quieter market than previously has been noted.

Steel manufacturers are inclined to ignore the decline in pig iron as a reason for reductions in prices on the ground that steel at its peak levels did not fully reflect the advance in either pig iron or semi-finished steel, and that such benefits as have been derived from the freight rate reductions made last July and the settlement of the coal strike with the attendant decrease in the price of fuel have been more than counterbalanced by the wage advance of 20 per cent as of Sept. 1. It is claimed in well informed quarters that not over 10 per cent of the steel which has left the mills in the past three or four months has brought the top prices reached in that period. Attention also is being directed, as a reason why prices should not de-

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Nov. 7, 1922	Oct. 31, 1922	Oct. 10, 1922	Nov. 8, 1921
No. 2X, Philadelphia	$31.14	$31.14	$33.14	$22.84
No. 2, Valley furnace*	*29.00*	30.00	32.50	21.00
No. 2, Southern, Cin'ti†	29.05	29.05	31.55	23.50
No. 2, Birmingham, Ala.†	25.00	25.00	27.50	19.00
No. 2 foundry, Chicago*	*29.00*	31.00	32.00	21.00
Basic, del'd, eastern Pa.	*28.14*	28.50	29.50	20.50
Basic, Valley furnace	*29.00*	30.00	31.00	19.00
Valley Bessemer, del. P'gh	*34.27*	34.77	35.27	21.96
Malleable, Chicago*	*30.00*	31.00	32.00	21.00
Malleable, Valley	*30.00*	32.00	32.00	20.50
Gray forge, Pittsburgh	*30.77*	31.27	33.77	21.96
L. S. charcoal, Chicago	36.15	36.15	36.15	31.50
Ferromanganese, furnace	100.00	100.00	67.50**	60.00**

Rails, Billets, etc., Per Gross Ton				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$40.00
Bess. billets, Pittsburgh	*38.00*	40.00	40.00	29.00
O.-h. billets, Pittsburgh	*38.00*	40.00	40.00	29.00
O.-h. sheet bars, P'gh	*38.00*	39.00	40.00	30.00
Forging billets, base, P'gh	45.00	45.00	45.00	35.00
O.-h. billets, Phila.	45.17	45.17	45.17	34.74
Wire rods, Pittsburgh	45.00	45.00	45.00	40.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	2.00	2.00	2.00	1.60
Light rails at mill	2.00	2.00	2.25	....

Finished Iron and Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.325	2.325	2.475	1.95
Iron bars, Chicago	2.50	2.50	2.50	1.75
Steel bars, Pittsburgh	2.00	2.00	2.00	1.50
Steel bars, Chicago	2.10	2.10	2.10	1.75
Steel bars, New York	2.34	2.34	2.44	1.80
Tank plates, Pittsburgh	2.00	2.00	2.15	1.50
Tank plates, Chicago	2.30	2.30	2.30	1.75
Tank plates, New York	2.34	2.34	2.49	1.88
Beams, Pittsburgh	2.00	2.00	2.00	1.50
Beams, Chicago	2.20	2.20	2.20	1.75
Beams, New York	2.34	2.34	2.44	1.88
Steel hoops, Pittsburgh	2.90	2.90	2.90	2.25

Sheets, Nails and Wire, *Per Lb. to Large Buyers:*	Nov. 7, 1922 Cents	Oct. 31, 1922 Cents	Oct. 10, 1922 Cents	Nov. 8, 1921 Cents
Sheets, black, No. 28, P'gh	3.35	3.35	3.50	2.90
Sheets, galv., No. 28, P'gh	4.50	4.50	4.50	3.90
Sheets, blue an'l'd, 9 & 10	2.60	2.60	2.60	2.25
Wire nails, Pittsburgh	2.70	2.70	2.70	2.90
Plain wire, Pittsburgh	2.45	2.45	2.45	2.60
Barbed wire, galv., P'gh.	3.35	3.35	3.35	3.55
Tin plate, 100-lb. box, P'gh	$4.75	$4.75	$4.75	$4.75

Old Material, Per Gross Ton:				
Carwheels, Chicago	*$25.00*	$25.50	$25.00	$16.00
Carwheels, Philadelphia	21.00	21.00	23.00	17.50
Heavy steel scrap, P'gh	*20.50*	21.00	21.50	14.50
Heavy steel scrap, Phila.	*16.50*	17.00	18.00	12.00
Heavy steel scrap, Ch'go	*17.75*	18.00	18.50	12.00
No. 1 cast, Pittsburgh	*23.50*	24.00	24.00	17.50
No. 1 cast, Philadelphia	22.00	22.00	23.00	17.50
No. 1 cast, Ch'go (net ton)	20.50	20.50	21.00	13.75
No. 1 RR. wrot, Phila.	*19.00*	21.00	23.00	16.50
No. 1 RR. wrot Ch'go (net)	*16.50*	17.00	18.25	12.50

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$7.50	$7.50	$11.00	$3.00
Foundry coke, prompt	*9.00*	10.00	13.00	4.25

Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York	14.12½	14.12½	14.12½	13.25
Electrolytic copper, refinery	13.62½	13.62½	13.75	12.75
Zinc, St. Louis	7.10	7.10	6.62½	4.75
Zinc, New York	7.45	7.45	6.97½	5.25
Lead, St. Louis	**6.85**	6.50	6.35	4.40
Lead, New York	**7.15**	6.80	6.60	4.70
Tin (Straits), New York	**38.00**	37.00	33.50	28.62½
Antimony (Asiatic), N. Y.	*6.60*	6.70	6.75	4.75

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
**C.i.f.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.
The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Nov. 6, 1922, Finished Steel, 2.446c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

Oct. 31, 1922,	2.446c.
Oct. 10, 1922,	2.460c.
Nov. 8, 1921,	2.135c.
10-year pre-war average,	1.689c.

These products constitute 88 per cent of the United States output of finished steel

Composite Price, Nov. 6, 1922, Pig Iron, $28.86 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Oct. 31, 1922.	$29.52
Oct. 10, 1922,	30.94
Nov. 8, 1921,	19.97
10-year pre-war average,	15.72

cline, to the earnings statements of the steel companies for the third quarter, all of which have shown losses. Whether the argument of costs will be sufficient to sustain prices, however, is something for the future to disclose. If precedent counts for anything, costs will not have a great deal of bearing upon the market the course of which will be determined largely by how badly the mills need business. Outside of the Steel Corporation, it is doubtful whether there are many companies which are so heavily obligated that they will not be seeking additional business before the end of the year.

The car supply for the movement of material away from the mills on the whole is better, and with the movement of coal to the lakes likely to taper off considerably in about two or three weeks, the outlook is for further improvement in the situation. Makers of pipe still complain of their inability to secure a sufficient number of cars. Demand still is exceedingly strong. A good demand also is noted for nails and most other wire products, but this also is explained by an uneven distribution due to car shortages. In other directions, buyers are falling back on contracted tonnages and evidently are receiving ample supplies in view of the fact that strictly new business is extremely light. Announcement of first quarter of 1923 prices on those products which are sold over definite periods is awaited with unusual interest. Announcement with regard to sheet and tin plate prices by the American Sheet & Tinplate Co. is expected later this week, and there is a good deal of guessing as to what will be done. The more common expectation is that advances will be made in both sheets and tin plate, but now that sheet bar prices have begun to work down, there is some doubt that any change at all will be made.

Steel works operations in this and nearby districts are holding up well, averaging better than 75 per cent, and there have been a couple of additions to the active list of blast furnaces. The Carnegie Steel Co. has lighted its Neville furnace and now has 40 furnaces making iron, the largest number in blast at any one time this year. The Cambria Steel Co. has put on a furnace at Johnstown, Pa., and now has seven of 11 furnaces in blast. Out of a total of 139 furnaces in this and nearby districts, 88 are active, 12 more than were blowing at the previous high point at the end of

last June, and 38 more than were active at the low point at the end of August.

Pig Iron.—Deflation of prices continues, the past week having brought a further decline of $1 per ton in basic and foundry grades, and 50c. per ton in Bessemer. The market on basic and foundry iron now is quotable at $29, Valley Furnace, and as producers are more anxious to sell than buyers are to take hold, and prices do not yet fully reflect the decline in coke costs, it is probable that the next sales will be at even lower prices. A sanitary ware manufacturer recently was able to secure 1000 tons of No. 2 foundry iron at $29, Valley furnace, for immediate delivery, and we note sales of basic iron aggregating about 2000 tons at $29, Valley furnace. Gray forge iron also has been sold at $29, Valley furnace. Only small lots of Bessemer have been sold from Valley furnaces and these have been at $33. A sale of 1000 tons of this grade, however, is noted at $32, Johnstown, and it is probable that as Valley makers now are offering tonnages at $32.50, they would meet the Johnstown price on a sizable order. We note a few sales of low phosphorus copper-free iron at $37.50, Valley.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.77 per gross ton:

Basic	$29.00
Bessemer	33.00
Gray forge	29.00
No. 2 foundry	29.00 to 30.00
No. 3 foundry	28.00
Malleable	29.00
Low phosphorus copper free	37.00 to 38.00

Ferroalloys.—The trade here is experiencing very quiet times, for while steel works operations are at a rate to indicate heavy consumption, most users have ample stocks for this year's requirements and are doing almost no new buying. Such sales as are being made are small and provide no real idea as to prices that will prevail when contracting starts up again. The market may be described as firm, but is entirely nominal at present. Ferrotungsten is held a little more firmly and 95c per lb. contained tungsten, f.o.b makers' works, now appears to be minimum.

We quote 50 per cent ferromanganese at $100, furnace, or $104.79 to $104.91 delivered Pittsburgh district for domestic and $67.50 c.i.f. Atlantic seaboard, equal to $105.89, duty paid, delivered, for British. Average 20 per cent spiegeleisen, $38 furnace; 16 to 19 per cent, $37; 50 per cent ferrosilicon, domestic, $70 to $75, delivered. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, $48.50; 11 per cent, $51.80; 12 per cent, $55.10; 13 per cent, $59.10; 14 per cent, $62.10; silvery iron, 6 per cent, $37; 7 per cent, $38; 8 per cent, $39.50; 9 per cent, $41.50; 10 per cent, $43.50; 11 per cent, $46.80; 12 per cent, $50.10. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $3.66 per gross ton.

Wire Rods.—We make no change in prices this week, because the demand is sufficient to absorb the supply and buyers have not objected to paying as much as $47.50 for small tonnages for prompt shipment. The market still is good in wire products, but other products of wire rods are beginning to slow down, this being notably so of bolts while bars are supplanting screw stock rods because they are much cheaper. Buyers figure that rods prices cannot hold up in face of the weakness in billets.

We quote No. 5 [illegible] to domestic consumers, $45 to $47.50; chain rods, $45 to $47.50; screw stock rods, $50 to $52.50; rivet and bolt rods and other rods of that character, $45 to $47.50; high carbon rods, $52 to $57.50, depending on carbon, per gross ton, f.o.b. Pittsburgh or Youngstown.

Billets, Sheet Bars and Slabs.—The market is dull and weak. The Steel Corporation has made no further purchases and nonintegrated steel makers are waiting on lower prices on the claim that they cannot operate profitably at to-day's prices of finished steel unless able to buy semi-finished material under current prices. It is more profitable for the self-contained producers to sell semi-finished than finished steel and with most makers having a surplus of the former, pressure to sell is increasing. Only an appraisal of prices is possible in the absence of definite sales, but taking into consideration the light demand, the greater desire for business and the recent declines in pig iron and scrap, $38, Pittsburgh or Youngstown, about measures the market on sheet bars, billets and slabs. It is reported that 8000 tons of billets, the surplus tonnage of a Pittsburgh district company, recently was sold at $37, Pittsburgh, while sheet bars have been offered at $39 without takers.

We quote 4 x 4-in. soft Bessemer and open-hearth billets, $38; 2 x 2-in billets, $39; Bessemer sheet bars, $38; open-hearth sheet bars, $38; slabs, $38; forging billets, ordinary carbons, $43 to $45, all f.o.b. Pittsburgh or Youngstown mills.

Wire Products.—Activity still is lacking in the purely agricultural products, but demand holds good in other directions, notably in nails and spring wire and because of the rather poor peformance of labor, not to mention its scarcity, makers are not cutting down their obligations with much rapidity and consequently are not free sellers. Poor transportation conditions also make it hard for manufacturers to satisfy their customers. The situation is strong now, but any change for the better in labor and transportation conditions would quickly be felt. Prices are given on page 1247.

Iron and Steel Bars.—New business is small by comparison with that of a few weeks ago, due largely to the fact that shipments against old and low-priced orders are meeting the needs of buyers. The market is holding fairly well on steel bars at 2c., base, Pittsburgh, but the explanation is that most makers have fairly good order books and, as there are no cancellations, there is not much pressure to sell. Makers seeking new tonnages, however, find it hard to get 2c. except on moderate-sized lots for early delivery. Iron bars hold at 2.60c. base, Pittsburgh for refined iron.

We quote steel bars rolled from billets at 2c.; reinforcing bars, rolled from billets, 2c. base; rail steel reinforcing bars, 1.90c. to 2c.; refined iron bars, 2.60c. in carloads, f.o.b. mill, Pittsburgh.

Plates.—Strictly new inquiries usually are for small tonnages and are not especially numerous. Too many producers now are willing to take on business at 2c. for sales to be easily made at above that figure. Prices are given on page 1247.

Iron and Steel Pipe.—Distributors of standard pipe still are urging deliveries, and makers are having considerable trouble in meeting these demands because of the scarcity of cars. A good deal of construction, which takes large quantities of butt welded pipe still is in progress, and as distributors for some time past have been able to cover only a portion of their orders, the urge for deliveries is not hard to understand. There is a fair demand for line pipe, usually for small tonnages, for extensions of repairs to existing lines, but oil well goods still are in moderate demand. Discounts are given on page 1247.

Boiler Tubes.—Demand still is reported as heavy with makers hampered in meeting their obligations, chiefly because of the lack of sufficient transportation facilities. There is no change in prices. Discounts are given on page 1247.

Steel Skelp.—Supplies are quite ample for wants and the market is barely steady at 2c, for either grooved or sheared material. Deliveries against low-priced orders now are sufficient to meet the requirements of consumers.

Sheets.—The American Sheet & Tin Plate Co. has made a further slight gain in mill operations and since it has not been taking on any new business for several weeks, it is in a fair way of getting rid of most of its obligations by the end of the year. Its carry over into next year will be chiefly in full finished stock. Independent mill operations are on a slightly smaller scale than recently because old orders are pretty well out of the way and new business is light since buyers are waiting on an announcement as to prices for the first quarter of next year. Outside of automobile sheets, there is not the demand for early delivery there was recently, and this development has pretty well canceled the delivery premiums on prices. Not over 3.50c. base now is obtainable on black sheets, while 4.60c. base appears to be top on galvanized sheets. Prices are given on page 1247.

Tin Plate.—The market is quieter, not because of any lack of interest on the part of container manufacturers, but because makers generally are sold up on this year's production and are not prepared to take on first quarter tonnages until the leading interest has announced its price. The cost argument favors an ad-

vance to at least $5 per base box, Pittsburgh, as the official quotation, but with steel prices weakening, the matter of an advance is rendered somewhat doubtful.

Cold-Finished Steel Bars and Shafting.—There is no evidence that less than 2.50c., base, Pittsburgh, is being done on new sales, but it is also a fact that not much business is being done at that price, since deliveries on old orders, carrying lower prices, are satisfying most of the requirements of consumers. Specifications from the automotive industry are good for the time of year and locomotive builders are taking out steel steadily. Business with the agricultural implement manufacturers still is light, although it is said there is some looking round for tonnages for delivery late this year. Ground shafting is unchanged at 2.90c., base, f.o.b. mill for carloads, on new business.

Hot-Rolled Flats.—Premium prices for early deliveries have largely disappeared as consumers are more comfortably supplied as a result of better deliveries on old orders and their requirements are not as urgent as they were a short time ago. The market now is not quotable on hoops, bands or strips at above 2.90c., base, Pittsburgh. Cotton tie specifications fell considerably below early estimates because of the deterioration in the cotton crop, but makers did not produce fully and the carryover probably will be nil. Shipments practically have been completed for this season. Prices are given on page 1247.

Bolts and Nuts.—Demand has begun to taper off, because requirements are lighter in keeping with the time of year, while consumers are less apprehensive about future requirements with the steel situation showing unmistakably easier tendencies. It is said that third quarter prices have been quoted by some makers to obtain specifications on fourth quarter contracts. Discounts given on page 1247 find little basis in actual sales.

Track Fastenings.—Makers in this district are well supplied with business, most of it taken at below current quotations, and report that specifications are coming in without much prompting. New business, however, is light and prices given on page 1247 to a large extent are merely quotations.

Cold-Rolled Strips.—Buyers are specifying freely against contracts and as deliveries are heavier, strictly new business is on a smaller scale than recently. Most makers are well committed over the remainder of the year and are not shading the established base of 4.50c., Pittsburgh, on new business.

Structural Material.—This market is no longer quotable at above 2c., and sales at that level are not especially numerous, because structural projects are seasonably few and fabricating shops are getting fairly liberal shipments against old orders carrying lower prices. Since bids against structural jobs, to be successful, must be below 2c. for plain material, there is not much incentive for fabricating interests to stock up heavily at to-day's prices. Plain material prices are given on page 1247.

Steel Rails.—The market on light rails rolled from new steel, no longer is quotable above 2.15c., base, as that is said to be the Steel Corporation price and is being met by other makers. Intermittent producers of light sections still find it necessary to go as low as 2c., base., to secure orders and that price also is being asked by those rolling them from old standard sections.

We quote 25 to 15-lb. sections, rolled from new steel, 2c. to 2.15c. base; rolled from old rails, 1.90c. to 2c. base; standard rails, $43 per gross ton mill for Bessemer and open-hearth sections.

Coke and Coal.—Standard furnace coke for spot delivery has been as low as $7 per net ton, oven, since a week ago, but a good deal of the free coke has passed off the market as a result of recent blast furnace resumption, and the market to-day is not quotable below $7.50 on low sulphur fuel. A few sales have been done in the past day or two at $7.75. Coke of a quality which was used during the recent pinch in the supply is available from $7 down to $6.50. Foundry coke has weakened in the past week, now being quotable generally from $9 to $10, although one or two makers still are asking $10.50. The coal market retains its recent firmness due to the fact that the car supply is insufficient for all the mines now in operation. This means that a good many mines in this part of the country cannot operate anywhere nearly full and costs are high. We make no material change in prices, steam coal mine run grade being quotable at $3.25 to $3.50, by-product from $3.75 to $4.25, and gas coal, from $4.25 to $4.75 for mine run and $5 to $5.50 for lump.

Old Material.—Recent purchases of heavy melting steel by an independent steel maker here, now estimated to have been more than 70,000 tons, have not imparted the strength to the market they were expected to, because sellers did not go short or more than half the quantity and covering of sales has been helped by the fact that no other Pittsburgh steel maker has entered the market for supplies. There is no sign that the Carnegie Steel Co., contemplates purchases and other important melters here are out of the market at least for the present. A Pittsburgh district sheet plant, which has been a ready outlet for the better grades of railroad steel, no longer is taking on tonnages and the price of knuckles, couplers and springs at that plant, which recently was up to $25, now is not over $22. High prices were paid against the Pennsylvania Railroad scrap, but chiefly by dealers with short contracts in Canton and Massillon, Ohio. The general drift of prices is lower in keeping with pig iron and steel prices, and as is usually true of a declining market, dealers are rather anxious to sell.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

	Per Gross Ton
Heavy melting steel	$20.50 to $21.00
No. 1 cast, cupola size	23.50 to 24.00
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., Franklin and Williamsport, Pa.	22.00 to 22.50
Compressed sheet steel	19.50 to 20.00
Bundled sheet sides and ends	17.00 to 17.50
Railroad knuckles and couplers	23.00 to 23.50
Railroad coil and leaf springs	23.00 to 23.50
Low phosphorus standard bloom and billet ends	24.00 to 25.00
Low phosphorus, plates and other grades	23.00 to 24.00
Railroad malleable	21.00 to 21.50
Iron car axles	28.00 to 30.00
Locomotive axles, steel	23.00 to 24.00
Steel car axles	23.00 to 23.50
Cast iron wheels	23.50 to 24.00
Rolled steel wheels	23.00 to 23.50
Machine shop turnings	16.50 to 17.00
Heavy steel axle turnings	18.00 to 18.50
Short shoveling turnings	18.00 to 18.50
Cast iron borings	18.00 to 18.50
Heavy breakable cast	19.00 to 19.50
Stove plate	17.00 to 17.50
Sheet bar crop ends	24.00 to 25.00
No. 1 railroad wrought	20.00 to 20.50

Record Building Construction

Figures compiled by F. W. Dodge Co. for the 27 Northeastern States (about three-fourths the total construction of the United States) show that the amount of building contracts in September was $271,493,000. This is 11 per cent more than for September, 1921, and is the highest recorded September total. All building construction operations for the first nine months of the year amount to $2,634,365,000, this being greater than the total for any full calendar year previous to 1922. The nine months' figure is 51 per cent higher than the first nine months last year.

Industrial buildings started during the month aggregated $26,384,000; residential buildings, $101,428,000, accounted for 37 per cent of the month's total; public works and utilities amounted to $50,379,000; business buildings to $45,907,000 and educational build.ngs to $21,213,000. Contemplated new work reported during the month aggregated $330,801,000.

The Victor Engineering Co., Bullitt Building, 101 South Fourth Street, Philadelphia, has been incorporated with a capital of 20,000 shares of no par stock. Its immediate business will be confined to the manufacture and installation of steam boiler accessories, including ash conveyors and ejectors, grate bars, stokers, etc. Part of the work will be done by contract. N. S. Keith is treasurer.

New York

Lethargy Among Buyers of Pig Iron and Finished Materials—Little Change in Prices

NEW YORK, Nov. 6—The buying for delivery this year seems to be nearly ended, and there is very little interest in the market for the first quarter of next year. The most important inquiries pending are 2500 tons for an air brake company for December-January delivery, and 1000 tons for the Crane Co. for prompt delivery. Prices show little change. In eastern Pennsylvania the usual quotations range from $29 to $30 furnace, and at Buffalo $28 to $28.50 is the range. Low Moor furnace, Low Moor, Va., was blown in Nov. 6, after having been out of blast for a year and a half. There has been so little activity in Virginia iron that prices are uncertain, but it is conceded that the $32, base, named by the leading Virginia company some time ago, cannot be maintained. On foreign irons the usual quotation on Scotch is $29 to $29.50, while $27 to $28 is quoted on Continental grades. Foreign irons still have the advantage at seaboard and nearby points in competition with domestic irons, but the latter are preferred by most melters.

We quote delivered in the New York district as follows, having added to furnace prices $2.27 freight from eastern Pennsylvania, $4.91 from Buffalo and $7.11 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to [illegible]	$32.27 to $34.27
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	32.27 to 33.27
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	31.27 to 32.27
Buffalo, sil. 1.75 to 2.25	34.41
No. 2 Virginia, sil. 1.75 to 2.25	No sales

Ferroalloys.—Demand for ferromanganese continues light. There have been sales of small lots from both domestic and foreign sellers at prevailing quotations. Official data show that total imports for the year up to Sept. 21, when the tariff went into effect, had been 72,011 tons. Sales of spiegeleisen, both foreign and domestic, are also confined to small lots at prevailing quotations. No activity is reported in manganese ore, but importations continue heavy at over 62,000 tons in the first three weeks of September. The 50 per cent ferrosilicon market is reported higher, sales having been made at $75 to $80, delivered, but demand is light. Quotations are as follows:

Ferromanganese, domestic, furnace, nominal, per ton	$100.00
Ferromanganese, British, c.i.f., per ton	$67.50
Spiegeleisen, 17 to 19 per cent, furnace	$38.00
Spiegeleisen, 20 per cent, furnace or duty paid	$38.00 to $39.00
Ferrosilicon, 50 per cent, delivered, per gross ton, carloads	$75.00 to $80.00
Ferrotungsten, per lb. of contained metal,	85c. to 95c.
Ferrochromium, 4 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr., delivered	12c. to 14c.
Ferrovanadium, per lb. of contained vanadium	$3.50 to $4.00
Ferrocarbontitanium, 15 to 18 per cent, in carloads, per net ton	$200.00

Ores

Manganese ore, foreign, per unit, c.i.f.	29c. to 30c.
Tungsten ore, per unit, in 60 per cent concentrates, nominal	$7.50 to $8.00
Chrome ore, basis 48 per cent Cr_2O_3, crude, per ton, c.i.f. Atlantic seaboard	$18.00 to $25.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	55c. to 60c.

Cast-Iron Pipe.—Private buying continues good considering the season. No new municipal tenders are expected before the beginning of the year. It is felt that in view of the declining market on pig iron and coke and the prospect of a reduction of prices on cast-iron pipe as a result, some municipal tenders that might otherwise appear in December may be delayed. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger $54.50; 4-in. and 5-in., $59; 3-in., $64.80, with $4 additional for Class A and gas pipe. The soil pipe market continues active and discounts from list are unchanged, although the quotations of Southern makers have developed weakness. Poor shipments caused by the railroad embargoes have interfered with profitable purchasing by Northern buyers at these lower prices. We quote per net ton, delivered New York, discounts of both Southern and Northern makers, as follows: 2 to 6-in. standard, 25 to 30 per cent off list; heavy, 34 and 35 per cent off list.

Warehouse Business.—November has evidently opened as a better month than October with most warehouses in this district. Bars and shapes are undoubtedly the most active items carried in stock, but warehouses handling black and galvanized sheets report considerable improvement in demand this month over October business. A tendency seems evident for prices on both black and galvanized to settle to about a 4.50c. and 5.50c. per lb. basis for large lots, although a number of the warehouses are still quoting 4.90c. and 5.90c. per lb. for No. 28 gage black and galvanized, respectively. One warehouse which has been endeavoring for the past few weeks to maintain a middle price of 4.75c. and 5.75c. per lb. has dropped to the 4.50c. and 5.50c. per lb. base price, and one of the factors in sheets in this district is continuing to quote this price with 4.75c. and 5.75c. per lb. base on small lots. Wrought iron and steel pipe is active, but no price changes are expected. There is still a slight shortage of the smaller sizes of steel pipe. We quote prices on page 1268.

High Speed Steel.—Producers report an improvement in both high speed and high carbon tool steel sales, but prices of 18 per cent tungsten high speed steel continue unchanged at 75c. to 80c. per lb., with special brands of some companies ranging up to 90c. per lb.

Finished Iron and Steel.—Views of sellers are that production will continue for some months at the present rate and that prices of the heavy tonnage products will remain at the 2c Pittsburgh level with an occasional break of $1 or $2 per ton in the case of some large offering which a mill may especially desire to fit into its rolling schedule. Consumers are getting better deliveries and are showing no concern about future protection. Apparently they fear no advance in price or difficulty of securing material next year in the face of claims of protracted labor and car shortage. The bottom has dropped out of the export market, seeing that the world is not buying heavily and that Europe can satisfy the needs at prices sometimes $12 and $14 below what is asked for the American product. Any losses taken to-day in sales on foreign account must be charged against the business of, say, a decade. A round tonnage of fabricated steel work was put under contract in the week, but new projects, as is natural at this season, are conspicuous for their fewness. Not much new was learned of concrete reinforcing work. The Turner Construction Co. reported among recent contracts the Joseph J. Greenberg Building, Philadelphia; Brooklyn Daily Eagle; Reid Ice Cream Co., New York; H. B. Hardenburg & Co., Linden, N. J.; Evening Star, Washington, and American Can Co., Brooklyn, N. Y. For the 800 tons of bars for the Terminal Refrigerating Warehouse Co., Washington, the Consolidated Engineering Co., Baltimore, was low bidder. One of the large insurance companies has decided to finance a new lot of low rental apartment houses, but the projects are not yet before the steel trade. Reports also are that the financing of further railroad purchases is looked on with favor in financial circles.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, structural shapes and steel plates, 2.34c.; bar iron, 2.34c.

Coke.—Foundry grades are quoted at $9 to $10, Connellsville ovens, and furnace at $7.25 to $8. By-product coke is quoted at $14.84 to $14.91, delivered, Newark and Jersey City points.

Old Material.—The market is quiet and prices generally are weak. Buying for delivery to Bethlehem of heavy melting steel and some mixed borings and turnings continues. Heavy melting steel is unchanged this week at $13.50 to $14 per ton, while mixed borings and turnings, based upon $15 per ton being paid delivered Bethlehem, are quotable at $11.75 to $12.25 per ton. Both lebanon and Columbia mills are out of the market on specification pipe, but a Milton mill is pay-

ing $14.50 per ton delivered. On the whole the market is not active, although prices on some items are fairly strong.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$13.50 to $14.00
Steel rails, short lengths, or equivalent	14.25 to 14.75
Rails for rolling	16.50 to 17.50
Relaying rails, nominal	27.00 to 28.00
Steel car axles	No market
Iron car axles	26.00 to 27.00
No. 1 railroad wrought	16.00 to 16.50
Wrought iron track	14.50 to 15.00
Forge fire	11.00 to 11.50
No. 1 yard wrought, long	13.50 to 14.00
Cast borings (clean)	12.50 to 13.00
Machine-shop turnings	11.75 to 12.25
Mixed borings and turnings	11.75 to 12.25
Iron and steel pipe (1 in. diam., not under 2 ft. long)	10.75 to 11.25
Stove plate	13.00 to 13.50
Locomotive grate bars	14.00 to 14.50
Malleable cast (railroad)	13.50 to 14.00
Cast-iron car wheels	15.50 to 16.00

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$20.00 to $21.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	17.50 to 18.00
No. 1 heavy cast, not cupola size	15.00 to 15.50
No. 2 cast (radiators, cast boilers, etc.)	13.50 to 14.00

Cleveland

Pig Iron Dull and Weak—Bolt and Nut Makers Buy Bars

CLEVELAND, Nov. 6—The pig iron market continues dull and weak. The more common quotation by lake and Valley furnaces on foundry iron is $30 for shipment to outside consuming points, but there are reports that as low as $29 has been quoted. For local delivery one Cleveland interest has reduced its price on foundry iron 50c. a ton to $31. The largest inquiry reported is from the American Radiator Co., 2000 tons of foundry iron for early shipment to its Detroit plant. This will probably be placed with a Detroit furnace. With a declining market, there is little buying except for immediate requirements. Considerable inquiry has come out which has not resulted in sales. There is no activity in steel making grades, but there are reports that basic iron is being offered at $29 by some Valley makers. On Southern foundry iron the $25 price has become fairly general, but this has not stimulated buying, as consumers are looking for further concession. Low phosphorus iron is weak owing to foreign competition. We note the sale of a 200-ton lot at $37 by a Valley producer. The McKinney Steel Co. will blow in its Scottdale furnace, Scottdale, Pa., within a few days.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron includes a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and a $6 rate from Birmingham:

Basic, Valley furnace	$29.00 to $30.00
Northern No. 2 fdy., sil. 1.75 to 2.25	31.50
Southern fdy., sil. 1.75 to 2.25	31.00
Malleable	31.50
Ohio silvery, sil. 8 per cent	42.52
Standard low phos., Valley furnace	37.00

Iron Ore.—Ore shipments for the season, up to Nov. 1 were 39,192,624 gross tons, indicating a total movement for the year of approximately 42,000,000 tons. October shipments were 6,081,386 tons as compared with 6,801,299 tons during September. The movement until Nov. 1 was 17,298,349 greater than during the same period last year. The total movement for 1921 was 22,300,726 tons. Several of the shippers will lay up their boats Nov. 15 and the movement will be very light after that date.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $5.95; Old range non-Bessemer, 51½ per cent iron, $5.20; Mesabi Bessemer, 55 per cent iron, $5.70; Mesabi non-Bessemer, 51½ per cent iron, $5.05.

Semi-Finished Steel.—While there are indications of weakness and reports of lower quotations, a local producer during the week sold 2000 tons of billets at $40. However, delivery was a factor of this sale, immediate shipment being specified. Inquiry is light.

Finished Material.—Considerable business in steel bars was booked during the week, the bolt and nut makers being the largest buyers. Some buying was also done by the implement manufacturers. While the market on the whole is quiet, some of the independent mills report that their orders are keeping up with production. Manufacturers of automobile parts are inquiring for forging and spring steel bars for the first quarter, but the delivery terms are not agreeable to the mills, which want to take the business subject to their ability to make shipment. Little change is noted in the price situation, but there are indications that the 1.95c. price that has been quoted on steel bars by at least two independent mills has been withdrawn. Round lot orders for steel bars were placed during the week at 2c., which is the commonly quoted price. On plates 2c. is the general quotation, but some mills are making small lot sales at 2.25c. Two new inquiries have come from oil interests for plates, one for 1100 tons for refinery work and the other for 600 tons for 20 stills. Structural material is commonly quoted at 2c. The seasonal slump has appeared in the demand for structural steel for building work. One large local job, a store building for the Halle Brothers Co., for which bids were received, has been held up indefinitely because of the high cost of building. The sale of a 2000-ton lot of wire rods is reported at $49 and carload sales at $50. The demand for light rails, which has been active, is quieter. These are quoted at 2.10c. to 2.25c., the latter price being for quick shipment from stock.

Jobbers quote steel bars, 2.91c.; plates and structural shapes, 3.01c.; No. 9 galvanized wire, 3.30c.; No. 9 annealed wire, 2.80c.; No. 28 black sheets, 4.15c. to 4.40c.; No. 28 galvanized sheets, 5c. to 5.40c.; No. 10 blue annealed sheets, 3.70c. to 3.76c.; hoops and bands, 3.71c.; cold-rolled rounds, 3.75c.; flats, squares and hexagons, 4.25c.

Sheets.—The new demand is light and some mills are running low on orders and are eager to take on tonnage. The 3.35c. price for black and 4.35c. for galvanized sheets have become more general with independent mills. Blue annealed sheets are firm at 2.60c. to 2.75c.

Warehouse Business.—Some weakness has developed in warehouse prices on black and galvanized sheets. Quotations by jobbers of 4.15c. for black and 5c. for galvanized sheets are reported.

Bolts, Nuts and Rivets.—Specifications on contracts for bolts, nuts and rivets are holding up well and prices are firm, but new buying is light.

Coke.—Coke prices still show a downward tendency. Standard Connellsville foundry coke is now quoted at $9.50 to $10. Buying is very limited.

Old Material.—The market is dull and unsettled with a tendency towards weakness. A few days ago dealers were paying $22 for heavy melting steel for shipment to Valley district mills but that price brought out a great deal of material and the market for Valley delivery has settled down to about $21.50 at which some sales to dealers have been made. Locally the same grade is being offered to consumers at $20.50. Recent railroad offerings appear to have brought good prices, the most of the material evidently having been sold to consumers. A local dealer offered $23.50 for couplers, knuckles and other specialties on the New York Central list for Alliance, Ohio, delivery, but that bid did not take the material. Cast scrap is weak in sympathy with the pig iron market.

We quote per gross ton, f.o.b. Cleveland, as follows:

Heavy melting steel	$19.00 to $19.50
Steel rails under 3 ft.	21.00 to 21.25
Steel rails for rolling	21.00 to 21.50
Iron rails	18.00 to 18.50
Iron car axles	26.00 to 27.00
Low phosphorus melting	20.00 to 20.50
Cast borings	15.00 to 15.25
Machine shop turnings	14.50 to 14.75
Mixed borings and short turnings	14.75 to 15.00
Compressed steel	17.00 to 17.25
Railroad wrought	18.00 to 18.50
Railroad malleable	20.00 to 21.00
Light bundled sheet stampings	13.75 to 14.00
Steel axle turnings	16.00 to 16.50
No. 1 cast	21.00 to 21.50
No. 1 busheling	12.50 to 13.50
Drop forge flashings over 10 in.	12.75 to 13.25
Drop forge flashings under 10 in.	12.50 to 13.50
Railroad grate bars	17.00 to 18.00
Stove plate	17.00 to 18.00
Pipes and flues	13.75 to 14.00

Boston

Domestic Furnaces Handicapped by Embargoes and Prices Are Steadier

BOSTON, Nov. 6.—The pig iron market appears to have been almost at a standstill the past week. A textile machinery maker in the market for 500 to 1000 tons each of low and high silicon iron is reported to have covered requirements, but details are lacking. Otherwise sales have been largely in car lots of resale, Buffalo and foreign iron, while, aside from an inquiry for 500 tons high silicon, no prospective business of importance has developed. One western Pennsylvania furnace, with a Buffalo freight rate, has met the Buffalo $30 furnace base price. Otherwise, the price situation appears steadier, due to a tightening up in the transportation situation insofar as it bears on shipments into New England and to the fact that all but a very small percentage of the New England foundries have sufficient material on hand or on order to carry up to or through Jan. 1. Fresh embargoes have been placed by railroads serving eastern Pennsylvania furnaces, as well as by the New York, New Haven & Hartford Railroad. The uncertainty of deliveries thus created has checked further concessions by furnaces in that district. Deliveries from the Buffalo district can be made by the New York Central system, but by other routes are uncertain. Alabama shipments have slowed up, more on account of car supply than otherwise. With domestic furnaces handicapped, there is less disposition to make concessions on foreign iron.

We quote delivered prices, on the basis of the latest reported sales, now infrequent, and as follows, having added to furnace prices $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia and $9.60 from Alabama:

East. Penn., sil. 2.25 to 2.75	$34.15 to $36.15
East. Penn., sil. 1.75 to 2.25	33.65 to 35.65
Buffalo, sil. 2.25 to 2.75	34.91 to 36.41
Buffalo, sil. 1.75 to 2.25	34.91 to 35.91
Alabama, sil. 2.25 to 2.75	37.60
Alabama, sil. 1.75 to 2.25	37.10
Virginia, sil. 2.25 to 2.75	38.92
Virginia, sil. 1.75 to 2.25	37.92

Coke.—New England producers of by-product foundry coke have reduced their price 50c. a ton to $16 delivered within the $3.10 freight rate zone, the first reduction to be announced since February, 1922. The $16.50 price had been in effect since Aug. 1. No spot price is named, that being left open to negotiation. The New England Coal & Coke Co. is on the point of closing its books for first half, 1923, contract fuel. The Providence Gas Co. closed its books shortly after they were opened Oct. 15. Both producers report that never before in their history has as large a tonnage been booked in any corresponding period. Shipments on last half contracts are up to the minute, and indications are that practically every pound so booked will be taken in by consumers. While some trouble has been experienced, the car supply is normal to-day. The New England Coal & Coke Co. is operating all of its 400 Otto-Hoffman ovens for the first time in many months. In addition, coking operations have been speeded up to a point where production is 100 per cent plus, if comparison is made with records of former years.

Warehouse Business.—Aside from some slowing up in the demand for bolts and nuts the volume of business passing through warehouses in this territory is holding its own. Prices for bolts and nuts are strong, notwithstanding the falling off in demand, with indications of an advance prior to Nov. 15. Stocks of iron and steel are in good condition, thereby facilitating prompt deliveries. Sheets are doing a little better than in the last part of October, and the aggregate tonnage of structural steel moving is increasing. Sheet lead has been marked up ½c. a pound and zinc ¼c.

base; flats, $3.85; concrete bars, 3.16½c.; structural

iron, $4.50; Wayne iron, $5.50; Norway iron, $6.60 to $7.10; plates, 3.16½c. to $3.35; No. 10 blue an-

Cast Iron Pipe.—An order for 500 tons of 12-in. and 625 tons of 16-in. pipe placed with R. D. Wood & Co., Philadelphia by the city of Boston, represents the only important transaction in this territory the past week. The Philadelphia firm's price was $53.63 a ton, which compares with open market quotations heretofore of $59.10 on 6-in. and larger delivered common Boston rate points, and $64.10 on 4 in. Various cities and towns, as well as jobbing interests, are sounding out the market. Indications are spring business will be placed earlier than usual.

Finished Materials.—Stone & Webster have awarded 2500 tons structural steel to the McClintic-Marshall Co. for a power house at Terre Haute, Ind. No other round tonnages of this material were placed in this territory since last reports. Mill representatives report a decided slump in new buying of bars, sheets, plates and structural shapes. Users, as well as jobbers, are believed to have enough stock on hand to carry them over to the new year, and presumably have decided to await price developments. Bars are offered at less than 2c. f.o.b. Pittsburgh, six weeks' delivery.

Old Material.—The market for certain old materials has slipped off in the absence of buying, but for others, notably railroad malleable, railroad and yard wrought, shafting and axles, holds steady. Declines average 50c. a ton on those materials used outside New England. Early in the week several cars of mixed borings and turnings were purchased at $11.95 on cars shipping point, and as much was paid for steel turnings, but the best offer to-day is $11. This decline, and that on chemical borings, amounting to $1 to $1.50 a ton, represent the two weakest spots in the list. Prices on machinery cast are nominally down 50c. a ton from $23 delivered, yet owners are still demanding 90c. a 100 lb. on cars, which figures out $20.16 a gross ton. With an average freight of $2.50, the delivered price is more than $22.50. In this, as well as in other cases, it is difficult to determine a real market in the absence of actual transactions.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$22.00 to $22.50
No. 2 machinery cast	20.00 to 20.50
Stove plate	17.00 to 17.50
Railroad malleable	20.50 to 21.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$13.50 to $14.50
No. 1 railroad wrought	16.00 to 16.50
No. 1 yard wrought	14.00 to 14.50
Wrought pipe (1 in. diam., over 2 ft. long)	10.50 to 11.00
Machine shop turnings	11.50 to 12.00
Cast iron borings, rolling mill	13.50 to 14.00
Cast iron borings, chemical	17.00 to 17.50
Blast furnace borings and turnings	10.50 to 11.00
Forged scrap and bundled skeleton	10.50 to 11.00
Shafting	19.00 to 19.50
Street car axles	23.00 to 24.00
Street car wheels	17.50 to 18.00
Rails for rolling	15.50 to 16.00

Birmingham

Buying at New Base of $25 Encourages Blast Furnace Operators

BIRMINGHAM, ALA., Nov. 6.—Four to six thousand tons of pig iron was sold on a base of $25, Birmingham, by the interest opening at that base just before the close of October. Two lots of 500 tons each were taken by a large consumer and 2000 to 3000 tons were taken by one very large consumer and close buyer. That two close and heavy buyers participated in the purchasing was received with good grace by some of the makers who feared the reduced price would simply encourage demand for a still lower base. No other makers admitted following the lead of the company quoting $25 and none of those holding for $27 and $27.50 claimed to be doing any but small business for rush delivery. The general quotation by other makers at the end of last week was $27.50 and some sales were made at a base of $28, but this tonnage was negligible. Makers generally contended that it was not at all necessary to hurry the game and say they do not propose to cut

prices with no business offering. However, the prompt taking of 4000 to 6000 tons by big buyers seems to have rather offset that theory. The Woodward Iron Co. blew in its only idle stack last week and now all five are active, one on basic for Western steel makers. One maker decreased stocks by 3000 tons during October.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon 1.75 to 2.25	$25.00 to $27.00
Basic	25.00 to 27.00
Charcoal, warm blast	32.00 to 33.00

Finishing Mills.—Practically all finishing steel mills remain on full to near full turn. The Tennessee company went to 10,000 tons of rails at Ensley this week. Its tie-plate mill has become one of its busiest and structural steel has been active for two months. Cuban points took 1000 tons of rails out of Mobile last week. The Southern Pacific's total rail order for 1923 delivery placed with the Tennessee company now amounts to 73,500 tons.

Cast Iron Pipe.—Pressure pipe makers receive a fair tonnage of new orders. The American Cast Iron Pipe Co. has booked 700 tons for Westmont, Ill., and the United States Cast Iron Pipe & Foundry Co. 730 tons for Chicago. Soil pipe is very weak, the jobbers being out of the market. Very little new business is reported at the new base of $50 to $55.

Old Material.—Large buyers of steel scrap have not been in the market recently. Small consumers of both steel and cast are paying the quoted prices.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Steel rails	$16.00 to $17.00
No. 1 steel	14.00 to 16.00
No. 1 cast	18.00 to 20.00
Car wheels	18.00 to 20.00
Tramcar wheels	17.00 to 19.00
Stove plate	16.00 to 17.00
Cast-iron borings	9.00 to 10.00
Machine shop turnings	9.00 to 10.00

Buffalo

Pig Iron Very Weak—Good Demand for Some Finished Products

BUFFALO, Nov. 6.—Both sales and inquiry are slower than in many weeks and while none of the sellers makes announcement of sales at $28 base, there is no question that the predicted weakening has occurred. There is hardly a sale recorded of greater than 100 tons, but there is little doubt among buyers or sellers that $28 or possibly $27.50 would be made on any transaction of 500 tons or greater. There is a decided slowing up of interest from New England in Buffalo iron and, of course, the importation of foreign iron is the reason thereof. Furnaces generally find that heating appliance manufacturers are the only consumers especially interested. No improvement in shipping conditions is apparent, there is no awakening of interest in first quarter business, but furnaces expect that any tendency toward firmness now would bring out considerable interest in 1923 placement. The Wickwire Steel Co. expects to blow in a furnace within a couple of weeks and the one stack now in blast is alternated between basic and foundry iron weekly.

We quote f.o.b. per gross ton Buffalo as follows, the higher prices being for early shipment:

No. 1 foundry, 2.75 to 3.25 sil.	$29.50
No. 2X foundry, 2.25 to 2.75 sil.	29.00
No. 2 plain, 1.75 to 2.25 sil.	28.50
Basic	29.00
Malleable	29.00
Lake Superior charcoal	36.28

Finished Iron and Steel.—A lively demand in certain finished products is not extended to bar, shape and plate business as a general proposition. For example, wire and pipe demand is extraordinary, while bar, shape and plate inquiries are moderate. There is no weakening of prices in bars, shapes or plates, and the range of 2c. to 2.15c. is practically observed by all factors with the higher figure governing on immediate or near immediate de'ivery. Rolling schedules enter into the price consideration on bar transactions. One mill working on a three to four week's delivery schedule is quoting 2c. on extended delivery on large tonnages, but asks 2.15c. on carload lots. Structural business is good, mostly for small sizes. Plate demand is not very active, and delivery is a four to six week proposition. New prices on tin plate have not yet appeared, though expected daily. The first quarter demand is slow. Sheets are firm. A local sheet maker has not opened its books for first quarter business. Inquiry is much brighter in sheets than kindred lines; one from the Middle West this week being for 1000 tons. The transportation situation is generally described as not much better. A contract for 1500 tons of reinforcing bars for a flour mill for Pillsbury Flour Mills Co., Buffalo, has been awarded to Corrugated Bar Co., Buffalo.

We quote warehouse prices, Buffalo, as follows: Structural shapes, 3.20c.; plates, 3.20c.; soft steel bars, 3.10c.; hoops, 4.10c.; bands, 3.90c.; blue annealed sheets, No. 10 gage, 4.05c.; galvanized steel sheets, No. 28 gage, 5.50c.; black sheets, No. 28, 4.85c.; cold rolled round shafting, 3.95c.

Warehouse.—Structural shapes are more actively sought than any other warehouse product and, it is expected that this demand will keep up until weather conditions force a suspension of construction work.

Old Material.—Several mills are buying, and there is no immediate softening of prices expected. Sales are for small lots, and dealers are trying to get more for heavy melting steel than in recent weeks. The range now is from $19.25 to $20. All other products are in fair demand, but the car situation continues to retard easier movement. The New York Central list, closed last week, brought $22.50 for heavy melting steel at Cleveland with all other prices about on the line as last month.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$20.00 to $21.00
Low phos., 0.04 and under	21.00 to 22.00
No. 1 railroad wrought	19.00 to 20.00
Car wheels	21.00 to 22.00
Machine-shop turnings	14.50 to 15.50
Cast iron borings	17.50 to 18.00
Heavy axle turnings	17.50 to 18.50
Grate bars	16.00 to 17.00
No. 1 busheling	17.00 to 18.00
Stove plate	17.00 to 18.00
Bundled sheet stampings	14.00 to 15.00
No. 1 machinery cast	21.00 to 22.00
Hydraulic compressed	18.00 to 19.00
Railroad malleable	20.50 to 21.50

St. Louis

Reduction in Price of Alabama Iron Fails to Develop Orders

ST. LOUIS, Nov. 7.—The quotation of one Southern maker of $25, Birmingham, had the effect of weakening the market for Southern iron and causing other concerns to lower prices, but it did not create any business for anybody, including the concern that made the deep cut. No other concern is quoting that low a figure. A Sheffie'd maker, which had been quoting $30, made a quotation of $27.50 when proffered some business, but did not get the order. The market may be said to be at $25 to $27, Birmingham, although there is not enough business being offered to afford a real test. The price of Northern iron is still at $31, Chicago, or $30, if sold in this territory to compete with the make of the St. Louis Coke & Chemical Co., Granite City, Ill., which is still quoting $31.50 to $32, f.o.b. furnace. The only sale of consequence was of 400 tons of malleable to a northern Illinois melter by the Granite City furnace, which is now making foundry iron. A few sales of a carload up to 100 tons were made. Melters are indifferent to first quarter requirements, and are playing a waiting game, buying only from hand to mouth and borrowing and trading lots among themselves. The melt is increasing and business is good, so that makers feel that it is only a question of time when they will be compelled to buy iron or close down their plants.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago, $2.28 from Birmingham (rail and water), $5.17 from Birmingham, all rail, and 81 cents average switching charge from Granite City:

Northern foundry, sil. 1.75 to 2.25	$32.16
Northern malleable, sil. 1.75 to 2.25	32.16
Basic	32.16
Southern foundry, sil. 1.75 to 2.25	$30.17 to 32.17

Coke.—The market for coke is holding firm, with an active demand. The Granite City by-product concern has been operating at 100 per cent capacity since Oct. 1, and is still comfortably sold on its entire output for the next 30 or 60 days. Their price is $14 at the oven. The best Connellsville coke is selling at $12, ovens. Some Southern coke is being sold in here at prices to compete with the local by-product producers.

Finished Iron and Steel.—Fabricators of structural steel in Oklahoma, Missouri and Kansas are ordering material for stock, although the increase in business seems to be for rather small jobs. Jobbers are showing more interest in bars, although the volume of business placed is not large. The volume of railroad business being placed now is very light, a carload here and there, and there are no new inquiries of consequence.

For stock out of warehouse we quote: Soft steel [illegible] sheets, 4.10c.; No. 28 black sheets, cold rolled, one pass, 4.85c.; cold drawn rounds, shafting and screw stock, 3.90c.; structural rivets, 3.60c. per 100 lb.; boiler rivets, 3.70c.; tank rivets, ½ in. and smaller, [illegible] smaller, 50 per cent; carriage bolts, large, 55-5 per cent; small, 60 and 10 per cent; lag screws, 55 per cent; hot pressed nuts, square or hexagon blank, $2.75; and tapped, $2.75 off list.

Old Material.—The market for old material as a whole is quiet. The weakest item is rails for rolling, which are $1.50 lower. Some other items are off from 25c. to $1. Consumers are not buying, and the market seems to have settled down to a basis of trading among brokers. The only railroad lists were issued by the Terminal Railway Association and the Frisco, and these were for small tonnages.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

	Per Gross Ton	
Iron rails	$20.50	to $21.00
Rails for rolling	18.50	to 19.00
Steel rails, less than 3 ft.	21.50	to 22.00
Relaying rails, standard section	26.00	to 29.00
Cast iron car wheels	23.00	to 23.50
Heavy melting steel	17.00	to 17.50
Heavy shoveling steel	16.00	to 16.50
Frogs, switches and guards cut apart	17.00	to 17.50
	Per Net Ton	
Heavy axles and tire turnings	11.50	to 12.00
Steel angle bars	17.00	to 17.50
Iron car axles	27.00	to 27.50
Steel car axles	20.00	to 20.50
Wrought iron bars and transoms	22.50	to 23.00
No. 1 railroad wrought	15.75	to 16.25
No. 2 railroad wrought	15.00	to 15.50
Railroad springs	20.00	to 20.50
Steel couplers and knuckles	21.00	to 21.50
Cast iron borings	11.00	to 11.50
No. 1 busheling	13.75	to 14.25
No. 1 railroad cast	19.00	to 19.50
No. 1 machinery cast	20.00	to 20.50
Railroad malleable	19.50	to 20.00
Machine shop turnings	9.50	to 10.00

Philadelphia

Apathy of Buyers Makes for a Very Dull Market With Prices Sagging

PHILADELPHIA, Nov. 7.—The tone of the iron and steel market is dull and weak, with buyers taking very little interest. There is general weakness in prices, but few actual changes from last week's quotations, except in scrap, some grades being from 50c. to $2 a ton lower.

Pig Iron.—While there has been a little more inquiry for foundry iron in the past week, the inquiries are mostly for carload or 100-ton lots for prompt shipment, and in the aggregate these tonnages are only a fraction of the iron that is available. At least two Eastern furnaces are piling iron rather than to sell at to-day's prices, which remain at $29 to $30, furnace, for No. 2 plain; $30 to $31, furnace, for No. 2X and $31 to $32, furnace, for No. 1X. Stocks at Eastern furnaces are slowly increasing and in addition the imports of foreign iron are heavier at this port than at any time since the movement began. Last week's receipts were slightly more than 13,000 tons, coming from the following countries: Belgium, 1002 tons; Germany, 1016 tons; Nova Scotia, 1805 tons; Scotland, 2989 tons; France, 1000 tons; England, 5281 tons. While the buying of foreign iron by dealers and importers has practically stopped, the imports are likely to continue at a fairly good rate for the next two or three months. Most of the pig iron contracts made with melters were covered by confirmed letters of credit which will insure fulfillment regardless of the trend of the domestic iron market. Final prices agreed upon between an Eastern steel company and five furnace companies in the basic iron transaction reported last week were lower than the prices reported in our issue of Nov. 2. The steel company took altogether about 16,000 tons of iron and the delivered prices ranged from $28.14 to $28.26. In one instance this meant a price at furnace of $26.50 per ton. All of this iron is to be shipped in November. The slump in pig iron and steel buying has caused the Alan Wood Iron & Steel Co. to postpone the blowing in of its No. 3 furnace until about Jan. 1. It was scheduled to go in this month. Coke has been bought for a Warwick furnace, which will probably go in blast about Nov. 15. The Pulaski furnace at Pulaski, Va., is to be blown in on Wednesday. The Sheridan furnace of the Lavino Furnace Co., which has been making foundry iron, will go back on ferromanganese this week. Malleable pig iron is now offered by two or three makers at prices ranging from $30 to $31, furnace, and gray forge is obtainable at $28.50 to $30, furnace.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to $1.64 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$30.14	to $31.14
East. Pa. No. 2X, 2.25 to 2.75 sil.	31.14	to 32.14
East. Pa. No. 1X	32.14	to 33.14
Virginia No. 2 plain, 1.75 to 2.25 sil.		37.17
Virginia No. 2X, 2.25 to 2.75 sil.		38.17
Basic delivered eastern Pa.	28.14	to 28.26
Gray forge	29.64	to 31.14
Malleable	31.14	to 32.14
Standard low phos. (f.o.b. furnace)	38.00	to 40.00
Copper bearing low phos. (f.o.b. furnace)	37.00	to 38.00

Ore.—Foreign iron ore continues to come in freely, last week's receipts including 14,800 tons from French Africa and 5652 tons from Sweden. Recent imports of chrome ore have been quite large, most of this going to the refractories industry. Last week's receipts were 1500 tons.

Coke.—Blast furnace coke is now obtainable from $7 to $7.50, Connellsville, and foundry coke at $8.50 to $9.50, depending upon quality. There have been a few sales of spot furnace coke to Eastern furnaces.

Ferroalloys.—The British price is without change at $67.50, c.i.f. Atlantic port, and domestic makers continue to quote $100, furnace, on ferromanganese.

Semi-Finished Steel.—There has been no change in quotations on billets, $40, Pittsburgh, for rerolling quality and $45 for forging quality being the usual prices.

Plates.—At the low rate at which orders are being booked, some of the Eastern plate mills will run out of business before the end of the year. Some are much closer than that to the end of their schedules. There is very little buying of plates. The mills see no use in making price concessions on the few orders that are obtainable, hence 2c., Pittsburgh, is generally quoted on specification steel. On ordinary tank steel in large lots it is not questioned that some mills would quote 1.95c., Pittsburgh. An Eastern shipbuilding company is getting prices on 1900 tons for car ferries and floats.

Structural Material.—Very little new structural steel work has come up in this district in the past two or three weeks and the mills are now busy principally in shipping steel for buildings that are under way. Plain material is fairly firm at 2c., Pittsburgh.

Bars.—Soft steel bars are generally quoted at 2c., Pittsburgh, and the only deviation from that price is on certain large tonnages of concrete reinforcing bars, which have been shaded $1 a ton. Bar iron is weak at 2c., Pittsburgh, some shading of this price having been reported.

Sheets.—Despite the expectation that the American Sheet & Tin Plate Co. may advance its prices on sheets, the market shows no particular strength and independent mills are now nearly all willing to sell at the present prices of the leading interest, namely 2.60c. for blue annealed, 3.35c. for black and 4.35c. for galvanized. If there is any strength it is in galvanized sheets, for which some mills are able to get 4.50c.

Warehouse Business.—Philadelphia jobbers have adopted a new plan of quoting prices. One set of prices will rule hereafter for Philadelphia, another for Chester and Wilmington and still another for other points. The prices quoted for local delivery are as follows:

Soft steel bars and small shapes, 3.025c.; iron bars (except bands), 3.025c.; round edge iron, 3.20c.; round edge steel, iron finish, 1½ x ½ in., 3.20c.; round edge steel planished, 4c.; tank steel plates, ¼-in. and heavier, 3.125c.; tank steel plates, 3/16-in., 3.33c.; blue annealed steel sheets, No. 10 gage, 3.85c.; black sheets, No. 28 gage, 4.60c.; galvanized sheets, No. 28 gage, 5.75c.; square twisted and deformed steel bars, 3.15c.; structural shapes, 3.125c.; diamond pattern plates, ¼-in., 4.80c.; 3/16-in., 5c.; spring No. 13 gage and lighter, 4.25c.; steel bands, No. 12 and hexagons, cold-rolled steel, 4.35c.; steel hoops, gage to 3/16-in., inclusive, 3.825c.; rails, 3.025c.; tool steel, 4.25c.; round cold-rolled steel, 3.85c.; squares steel, 8.50c.; Norway iron, 6.50c.

Old Material.—The scrap market continues to show marked weakness. Lower prices are registered whenever sales take place, but many of the current sales are due to forced shipments and give the market a weaker tone than is perhaps justified by other conditions. For example, one sale of 500 tons of No. 1 railroad wrought was made at $18, delivered, but it is doubtful whether this low figure represents the market generally and this grade probably is quotable at $19 to $20. A steel company bought 300 tons of structural crop ends at $16.39, delivered, the lowest price reached on high grade melting steel since September. No. 1 forge fire has been sold at $15.50, bundled sheets at $15, pipe at $14.50 and shafting at $21.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$16.50 to $17.50
Scrap rails	16.50 to 17.50
Steel rails for rolling	20.50 to 21.00
No. 1 low phos., heavy 0.04 and under	24.00 to 25.00
Cast iron car wheels	21.00 to 22.00
No. 1 railroad wrought	19.00 to 20.00
No. 1 yard wrought	19.00 to 20.00
No. 1 forge fire	15.50 to 16.00
Bundled sheets (for steel works)	15.00 to 16.00
No. 1 busheling	15.50 to 16.00
Turnings (short shoveling grade for blast furnace use)	15.50 to 16.00
Mixed borings and turnings (for blast furnace use)	15.50 to 16.00
Machine shop turnings (for steel works use)	15.50 to 16.00
Machine shop turnings (for rolling mill use)	15.50 to 16.00
Heavy axle turnings (or equivalent)	16.00 to 17.00
Cast borings (for steel works and rolling mills)	16.00 to 16.50
Cast borings (for chemical plants)	22.00 to 23.00
No. 1 cast	22.00 to 23.00
Heavy breakable cast (for steel plants)	20.00 to 21.00
Railroad grate bars	17.00 to 17.50
Stove plate (for steel plant use)	17.00 to 17.50
Railroad malleable	15.50 to 16.50
Wrought iron and soft steel pipes and tubes (new specifications)	14.50 to 15.00
Shafting	21.00 to 22.00
Steel axles	27.50 to 28.00

Detroit Scrap Market

DETROIT, Nov. 6.—The prices on all scrap material remained approximately the same as quoted a week ago. The Dodge awards for November delivery developed the fact that there were fewer manufacturers and furnaces bidding on this tonnage but a corresponding increase in the number of dealers. The following prices are on a gross ton basis, f.o.b. cars producers' yards, excepting stove plate, automobile and No. 1 machinery cast, which are quoted on a net ton basis:

Heavy melting steel	$16.00 to $17.00
Shoveling steel	16.00 to 17.00
No. 1 machinery cast	21.00 to 23.00
Cast borings	13.00 to 14.00
Automobile cast scrap	23.00 to 25.00
Stove plate	21.00 to 23.00
Hydraulic compressed	16.50 to 17.50
Car wheels	21.00 to 22.00

Chicago

Pig Iron Prices Decline $1 — Unexpected Activity in Building

CHICAGO, Nov. 6—Production continues to improve, although steel works have been unable to accumulate coal reserves. The Illinois Steel Co. has added a blast furnace at Gary, so that it now has 17 active stacks out of its 29. It has also increased its steel output to 74 per cent of ingot capacity. The Wisconsin Steel Co., which blew in a second blast furnace last week, is now rolling steel at the rate of 80 per cent of capacity. The operations of the Inland Steel Co. remained unchanged. Transportation is considerably improved, although coking coal is not coming into this district in the volume desired. This is probably due in large measure to the concentration on shipments to Lake Erie ports for movement by water to the Northwest. With a continuance of good weather, it is hoped that it would be possible to satisfy Northwestern needs before another month has passed, and that shipments in greater quantity will then move to this district.

The lack of fuel is hardly more serious than the scarcity of labor. It is believed, however, that the arrival of cold weather will cause many men to seek inside work.

In finished steel products, there is little change in prices, but pig iron is weak with a minimum of buying.

Pig Iron.—Buying is very light and prices are weak. Current demand is confined to spot iron, and there is a notable lack of interest in first quarter requirements. The decline in inquiry cannot be attributed to a falling off in industrial activity, as melters appear to be as busy as at any time this year. Neither do they have heavy stocks, as they are pressing for deliveries against contracts. Apparently they are remaining out of the market in the belief that prices will decline. Their apathy has, in fact, brought out some price shading, sales having been made at various base prices all the way from $31, furnace, down to $30. Sizable sales have been exceptional, among them a few thousand tons of local off basic. The sharp decline in Southern iron has developed little buying, notwithstanding marked improvement in shipments from the South. Addition sellers are quoting $25 base, Birmingham, but we note one sale of 300 tons at $26. Silvery is soft and has been offered at from $2 to $3 under the new prices announced last week. No sales are reported, however. Despite foreign competition, several hundred tons of domestic low phosphorous have again been sold to a Chicago district buyer at $38, Valley furnace. A Michigan melter has put out a tentative inquiry for 1000 to 1500 tons of Southern foundry, 2.25 to 2.75 per cent silicon, for first quarter.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$36.15
Northern coke, No. 1, sil. 2.25 to 2.75	$31.00 to 32.00
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	30.00 to 31.00
Northern high phos	30.00 to 31.00
Southern No. 2	31.00 to 32.00
Malleable, not over 2.25 sil.	30.00 to 31.00
Basic	30.00 to 31.00
Low phos., Valley furnace, sil. 1 to 2 per cent copper free	38.00
Silvery, sil. 8 per cent	44.29

Ferroalloys.—Outside of a few carload sales, ferromanganese is quiet and unchanged as to price. Spiegeleisen is now available at as low as $46.05, delivered.

We quote 80 per cent ferromanganese, $108.66, delivered; 50 per cent ferrosilicon, $65 delivered (nominal); spiegelsein, 18 to 22 per cent, $46.05 to $47, delivered.

Bars.—Demand for soft steel bars is still of satisfactory volume, although not so brisk as some weeks ago. The agricultural implement makers, who were believed to have covered their requirements, are now

coming in for some additional tonnage. This unexpected development is accounted for by implement sales in the South. Instead of curtailing their operations, farm equipment manufacturers look forward to a slight improvement over the output which they have been able to maintain thus far this year. The railroads, the car builders, the automobile industry and reinforcing bar sellers continue to seek tonnage. Bar iron remains quiet with prices unchanged. Demand for hard steel bars is not so heavy as a month ago, but prices remain firm.

Mill prices are: Mild steel bars, 2c. to 2.10c., Chicago; common bar iron, 2.50c., Chicago; rail steel, 2c., Chicago mill.

Jobbers quote 2.80c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 3.80c. for rounds and 4.30c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 2.50c. base; hoops, 4.15c.; bands, 3.55c.

Plates.—Car builders, tank fabricators and railroads are still active buyers of plates, as well as shapes and bars. Fully 500,000 tons of steel will be required by cars now on inquiry. Two oil storage tank inquiries involve a total of 12,000 tons of plates.

The mill quotation is 2.10c. to 2.30c., Chicago. Jobbers quote 2.90c. for plates out of stock.

Wire Products.—Specifications are heavier than for some weeks, and while they are confined largely to nails and plain wire, some excellent business in barbed wire has also come in, notwithstanding the fact that the season for fence building is practically over. Slightly more favorable reports are heard from the agricultural sections, particularly from the South. The plants of the leading interest have been unable to increase operations materially, those mills now running being on a 60 per cent basis. It seems probable that production will continue to fall short of demand for some time. For mill prices, see finished iron and steel, f.o.b. Pittsburgh, page 1247.

We quote warehouse prices f.o.b. Chicago: No. 9 and heavier black annealed wire and No. 9 and heavier bright basic wire, $3.30 per 100 lb.; common wire nails, $3.45 per 100 lb.; cement coated nails, $2.90 per keg.

Rails and Track Supplies.—Aside from small orders for track supplies, the market is without features.

Standard Bessemer and open-hearth rails, $43; light rails rolled from new steel, 2.15c., f.o.b. makers' mills.

Standard railroad spikes, 2.85c. to 3c., mill; track bolts with square nuts, 3.85c. to 4c., mill; iron tie plates, 2.50c.; steel tie plates, 2.35c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.50c. base and track bolts 4.50c. base.

Bolts and Nuts.—New business continues lighter than in September, but this is not surprising in view of the heavy specifications placed during that month. Bolt and nut plants are operating at a good rate and are getting improved deliveries of steel from the mills. Orders from the automobile industry continue to decline, in view of reduced operations of all plants except those making the cheaper cars. It is to be noted, however, that the falling off in automobile production is less than is generally the case at this season. Further evidences of a desire to contract for a considerable period ahead instead of buying for 30 to 60 days' requirements have appeared. The Nash Motor Co. is now in the market for nuts for 20,000 cars, or roughly its requirements during the first half of next year. There is better feeling among the farm implement makers and some fair-sized specifications for bolts and rivets have been received from them. Farm machinery orders from the South are reported to be much improved. The September discounts on bolts and nuts still rule in this market.

[redacted]

Sheets.—The local independent has not yet opened its books for first quarter, but it expects to find it necessary to allocate its tonnage in view of numerous requests for space received from customers. Eastern mills have taken some new business in this territory at the prices quoted below.

Mill quotations are 3.35c. for No. 28 black, 2.50c. for No. 10 blue annealed and 4.35c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote f.o.b. Chicago, 4c. for blue annealed, 4.85c. for black and 5.85c. for galvanized.

Reinforcing Bars.—Shading of prices is growing commoner as trade slackens and sellers become more concerned about building up a winter backlog. Business for shipment from warehouse is being taken at all the way from 2.20c. to 2.50c., while good-sized tonnages for delivery from mill are being placed at from 2c. to 2.10c., Chicago. Recent lettings include:

Sinclair Refining Co., plant additions, East Chicago, Ind., 500 tons, and at Houston, Tex., 500 tons, a total of 1000 tons to Truscon Steel Co.

Bryant Paper Co., paper mill, Kalamazoo, Mich., 200 tons to Truscon Steel Co.

Chicago Mill & Lumber Co., plant, Chicago, 400 tons to Kalman Steel Co.

Research Laboratory, University of Illinois, Chicago, 100 tons to Olney J. Dean & Co.

Penitentiary building, Pendleton, Ind., 150 tons to Concrete Steel Co.

Cedar Rapids, Iowa, high school building, 100 tons to Kalman Steel Co.

School, Sharon, Pa., 150 tons to Kalman Steel Co.

Bridge, Hillman, Mich., 100 tons to Kalman Steel Co.

Calumet power station, Commonwealth Edison Co., Chicago, 100 tons to Kalman Steel Co.

Pending business includes:

Spoor apartment hotel, Chicago, 500 tons.

Steel Castings.—The miscellaneous castings for fully 38,000 cars recently ordered have not yet been placed, and there is also considerable castings work for locomotives pending. Steel foundries therefore expect to maintain their present favorable operations. There is now less talk of further advances in car castings, although, if labor costs continue to go up, such action may prove necessary.

Structural Material.—Building activity is showing unexpected buoyancy for this season. Permits issued in this city in October exceeded those for September. New fabricating inquiries involve a total of 25,000 tons of steel, the individual jobs ranging from a few hundred tons up to 6000 tons.

The mill quotation on plain material is 2.10c. to 2.20c., Chicago. Jobbers quote 2.90c. for plain material out of warehouse.

Cast-Iron Pipe.—Transportation conditions are steadily improving, but interest in the market continues to lag and it is probable that prospective buyers regard the weakness of Southern pig iron as a cue to postpone their purchases of pipe. Nokomis, Ill., has rejected bids on 160 tons. Ferndale, Mich., has awarded 400 tons to James B. Clow & Sons. Marlin, Tex., have let 560 tons of 6-in. to the National Cast Iron Pipe Co. A private inquiry is pending for 150 tons of 6-in. for a subdivision extension.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $55.20 to $57.20; 6-in. and above, $51.20 to $53.20; class A and gas pipe, $3 extra.

Warehouse Prices.—Local jobbers in iron and steel have made no changes in prices and apparently none is in prospect. Business is in good volume and is steadily expanding, coming from a greater diversity of users. Notable among buyers are manufacturers of products used in building construction, particularly in interior equipment. The effects of railroad car buying are also felt in warehouse orders.

Old Material.—Weakness is more pronounced and prices of most grades of scrap continue to decline. Various factors contributing to this condition include the lack of buying by the large users, the indefinite shutdown of one bar iron mill and an embargo on shipments to another until Nov. 20, liberal offerings by holders of scrap who desire to liquidate before the market sinks lower, better shipments from the railroads as well as from country dealers and a weaker tone in the pig iron market. An uncertain element which may materially affect the future course of prices is the weather. The unusually mild temperatures which have prevailed up to this time have facilitated the collection and prepara-

tion of scrap and a continuance of favorable weather would greatly augment the supply of materials available. While consumer buying is at a low ebb, the current melt of scrap shows no decline and in some directions is increasing. Railroad lists include the Great Northern, 1000 tons, and the Chicago & Eastern Illinois, 600 tons.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

	Per Gross Ton	
Iron rails	$23.50 to	$24.00
Cast iron car wheels	25.00 to	25.50
Relaying rails, 56 and 60 lb.	26.00 to	27.00
Relaying rails, 60 lb. and heavier	32.00 to	35.00
Rolled or forged steel car wheels	22.50 to	23.00
Rails for rolling	19.00 to	19.50
Steel rails, less than 3 ft.	20.50 to	21.00
Heavy melting steel	17.75 to	18.25
Frogs, switches and guards cut apart	17.75 to	18.25
Shoveling steel	17.50 to	18.00
Drop forge flashings	12.00 to	12.50
Hydraulic compressed sheet	15.00 to	15.50
Axle turnings	15.50 to	16.00
Per Net Ton		
Iron angles and splice bars	22.50 to	23.00
Steel angle bars	17.50 to	18.00
Iron arch bars and transoms	22.00 to	22.50
Iron car axles	24.50 to	25.00
Steel car axles	19.00 to	19.50
No. 1 busheling	14.50 to	15.00
No. 2 busheling	10.00 to	10.50
Cut forge	15.50 to	16.00
Pipe and flues	11.50 to	12.00
No. 1 railroad wrought	16.50 to	17.00
No. 2 railroad wrought	15.50 to	16.00
Steel knuckles and couplers	19.50 to	20.00
Coil springs	21.50 to	22.00
No. 1 machinery cast	20.50 to	21.00
No. 1 railroad cast	19.00 to	19.50
Low phos. punchings	17.50 to	18.00
Locomotive tires, smooth	17.50 to	18.00
Machine shop turnings	10.50 to	11.00
Cast borings	13.00 to	13.50
Stove plate	17.00 to	17.50
Grate bars	16.50 to	17.00
Brake shoes	16.50 to	17.00
Railroad malleable	21.00 to	21.50
Agricultural malleable	21.00 to	21.50

Cincinnati

Southern Ohio Pig Iron Declines $1—Moderate Sales of Alabama Grades

CINCINNATI, Nov. 6—While the market generally is quiet, more interest was shown last week than in the previous one, and several fair-sized sales are noted. The price situation generally speaking is weaker, and southern Ohio iron is down $1 on a number of small sales. The Southern market remains at $25, Birmingham, with more furnaces quoting this figure. Included in sales was one of 3000 tons of Southern iron to a pipe maker with plants in different parts of the country at $25 base. A Virginia pipe company is reported to have purchased 1000 tons of Virginia iron at slightly under $30, furnace. A central Ohio malleable shop bought 800 tons, divided between a lake furnace and a southern Ohio maker, at $30, furnace. We also note a sale of 500 tons of high sulphur iron to a northern Ohio melter at slightly less than quoted for the base grade. An inquiry for 100 tons from a car manufacturing plant is the only one of consequence being figured on, melters apparently being determined to stay out of the market until absolutely forced to buy to keep running. Shipments from Tennessee furnaces are very good, but from the Birmingham district little improvement is apparent.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$29.05 to $31.05
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	29.55
Ohio silvery (nominal), 8 per cent	41.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	32.27
Basic Northern	31.27
Malleable	32.27

Finished Material.—The demand for finished materials has tapered off somewhat in this district, and occasional orders for small tonnages represent the activity in the market. With prices showing some weakness, buyers apparently are content to await further developments, and in the meantime shipments on contracts are taking care of present demands. Tank and boiler manufacturers in the Southern districts are showing interest in first quarter plate business, and it is expected that some fair orders will be placed within the next two or three weeks. The sheet market is showing considerable activity compared with other finished products, and prices are being pretty well maintained. While 3.40c. and 4.40c. for black and galvanized sheets have been quoted, most of the orders being placed are at 3.50c. and 4.50c., and in some cases galvanized sheets are being booked at 4.60c. Automobile body sheets continue to be in good demand at 5c. and blue annealed are quoted at 2.50c. to 2.75c., the majority of the orders being taken at 2.60c. There is only occasional demand for wire fence, carload orders being the limit. On nails, however, much activity is reported, due principally to the fact that mills have not been shipping on contracts. On bars, shapes and plates, 2c. is the going price, although on undesirable specifications 2.10c. to 2.15c. is quoted. In the structural field, no new projects have appeared, and the awards have been light.

Reinforcing Bars.—Prices on reinforcing bars have slumped off to about 2c. mill, with engineering services included. The demand is fairly heavy. Recent awards include:

Doctors' Office Building, Cincinnati, 800 tons, to Pollak Steel Co.
Office building for Railway Clerks' Brotherhood, Cincinnati, 500 tons, to Bourne-Fuller Co.
High school, Louisville, Ky., 150 tons, general contract to C. A. Koerner Co.

Warehouse Business.—Local jobbers report a big demand for concrete bars, small shapes, and wire nails. Bolts and nuts are also moving better. Prices, while having a softening tendency, are holding at previous levels.

Cincinnati jobbers quote: Iron and steel bars, 2.95c. base; reinforcing bars, 3.05c. base; hoops, 4.05c. base; bands, 3.85c. base; shapes and plates, 3.05c. base; cold-rolled rounds, 3.75c. base; cold-rolled flats, squares and hexagons, 4.25c. base; No. 10 blue annealed sheets, 4c.; No. 28 black sheets, 4.70c.; No. 28 galvanized sheets, 5.75c.; No. 9 annealed wire, $3.10 per 100 lb.; common wire nails, $3.20 per keg, base.

Coke.—Further reductions are noted in coke prices, with a fair demand for foundry fuel being maintained. Connellsville furnace coke is quoted at $8 to $8.50, and foundry $8.50 to $10; Wise County furnace can be had at $8 and foundry at $10. No change is noted in New River foundry or by-product fuels, but Pocahontas foundry is down 50c. to $10.50.

Old Material.—Local dealers report little activity in the scrap market. The Government sold 6500 tons of shell forgings, copper bands attached, stored in Columbus, at $20.52, and these in turn have been turned over by the buyer at a higher figure. The market generally is weaker, and prices on all grades are at least 50c. a ton lower.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

	Per Gross Ton	
Bundled sheets	$12.50 to	$14.00
Iron rails	16.50 to	17.50
Relaying rails, 50 lb. and up	26.00 to	26.50
Rails for rolling	18.00 to	18.50
Heavy melting steel	17.00 to	18.00
Steel rails for melting	15.50 to	16.50
Car wheels	19.50 to	20.50
Per Net Ton		
No. 1 railroad wrought	14.00 to	14.50
Cast borings	11.00 to	11.50
Steel turnings	10.00 to	10.50
Railroad cast	17.50 to	18.50
No. 1 machinery	20.50 to	21.00
Burnt scrap	11.50 to	12.00
Iron axles	20.00 to	20.50
Locomotive tires (smooth inside)	14.00 to	15.00
Pipes and flues	8.50 to	9.00

San Francisco

SAN FRANCISCO, Oct. 31.—It can hardly be said that the steel market of the Pacific Coast is particularly active at the moment. The building industry provides the greatest and steadiest activity, as it has for several months past, all parts of the State showing a good expansion in this respect. Individual jobs, for the most part, are moderate in size, but the aggregate tonnage is very considerable. One of the most conspicuous new projects in the San Francisco region is the proposed 17-story P. G. & E. building to be located on lower Market Street. It is estimated that around 1800 tons of reinforcing bars will be involved. Several hundred tons have been contracted for a State building in Sacramento, and both Fresno and Modesto are planning good-sized structures. A new bank for Salt Lake will require

a sizable tonnage. The price of bars has shown an upward tendency of late, and at present mills are quoting $2.95 for concrete reinforcing and $2.70 for merchant bars, f.o.b. cars, San Francisco. Among the recent awards is 2500 tons to the American Bridge Co. for the Los Angeles bascule bridge, and 300 tons of structural steel to the Pacific Rolling Mill Co. for a Los Angeles railroad. The heavy materials have not displayed any great price changes during the past two weeks. Plates are still the most unsettled, being quoted from 2.45c. to 2.75c., or even higher, according to mill. The tonnage on the market has been moderate, but not unusually large. Sheets are holding to their levels pretty well. Specialty lines are moving consistently at good prices.

Coke.—A moderately good business is reported for the fortnight period, but again, as in the case of pig iron, the placing of new orders is greatly handicapped by shortage of steamer space, and lack of English offerings, due, it appears, to the foreign ovens being practically sold up for higher quality coke which will stand the handling in transit. Prices, accordingly, are firm, but do not show any particular variation from the levels quoted two weeks ago. A few buyers in this market have been purchasing small quantities of domestic material for prompt shipment, but prices are not yet very attractive.

Canadian Scrap Market Revives

TORONTO, Nov. 5.—The demand for iron and steel scrap materials is just beginning to show improvement after a period of stagnation that has held the market in its grip for about two years. Steel plants and foundries are entering the market both for spot delivery and for delivery later on in the year. Mills are buying heavy melting steel and turnings in larger tonnages than has been the case for some months. Foundries in their turn are placing orders for large tonnages of No. 1 machinery cast and despite the fact that dealers are offering around $18 per net ton Toronto for this commodity, there is very little coming out and in the majority of cases scrap yards are very short of machinery cast. Other lines of scrap are also showing signs of improvement and it is the opinion of local dealers that business will be making rapid strides toward the normal stage before the beginning of the new year.

President Warner Is Optimistic

President Jonathan Warner of the Trumbull Steel Co., Warren, Ohio, voices the belief that the steel industry is about to experience a period of prosperity with more regular employment and larger wages for everyone. "We are gradually overcoming all post-war difficulties and getting back to enduring prosperity. The last quarter of the year will be the best one," he states.

The Trumbull company is establishing new production records in its strip mill department.

Scrap Rate Decision

WASHINGTON, Nov. 7.—The Interstate Commerce Commission has dismissed the complaint of Louis Cohen & Son vs. New York Central et al., the opinion holding the rate on scrap iron, $6.30 per ton in carloads, from Newberry Junction, Pa., to Holyoke, Mass., in November 1920 and February 1921 was not unreasonable or unduly prejudicial.

A number of steel and foundry companies with property within the city limits of Pittsburgh are confronted by a stiff advance in tax valuations as a result of the recommendations of the Pittsburgh Board of Assessors. The board has been appraising industrial land values for taxing purposes over the entire city and has made increases over the former taxing valuations of anywhere from 50 to 125 per cent. This means higher taxes even if there is no change in rate of assessment and in some quarters it is believed the rate also will go up.

Improving Coal Situation

WASHINGTON, Nov. 4.—Industrial users of coal are beginning to accumulate some reserves, and the general steam coal situation may now be regarded as fairly satisfactory, according to Federal Fuel Distributor, C. E. Spens. In the greater part of the country, supplies of domestic bituminous coal are fairly well assured, states Mr. Spens, although in some sections available supplies would quickly vanish in the event of severe weather conditions and consequent retardation of transportation. For the past few weeks the average spot price for all grades of bituminous coal has steadily declined, while production figures have mounted.

The Northwest territory, for instance, served largely by lake transportation will need for all purposes approximately 4,000,000 additional tons before the close of navigation, in addition to all rail movement from Illinois, Indiana, etc., to care for its requirements until April 1. Barring unexpected difficulties, with dumpings at Lake Erie ports averaging at least 1,000,000 tons per week, it is anticipated that these requirements will be accomplished.

In Illinois the available supply on hand is low, due largely to the fact that a very considerable proportion of the coal mined within the State and adjoining territories has been, and is, moving all rail to the Northwest to supplement the Lake allotment from eastern fields. It is important that far distant communities be served at this time, nearby communities can, of course, be taken care of with little delay.

In the matter of prices of bituminous coals, the following figures will give an idea of the present trend. For the week ended Sept. 23, the average spot price of all grades of coal was $5.06 per ton.

For the week ended Sept. 30	$4.89	per ton
For the week ended Oct. 7	4.60	per ton
For the week ended Oct. 14	4.45	per ton
For the week ended Oct. 21	4.26	per ton

During the past few weeks the above average prices have been "held up" by the comparatively higher prices received for domestic coals, the margin between "run-of-mine" and "lump" coals having in some instances been abnormally large. The results of recent conferences, and pending conferences, with coal operators in the various districts, in the matter of maximum f.o.b. mine prices, particularly on prepared sizes of coal for household use, will undoubtedly soon be reflected in these average market prices.

The necessary distribution of coals is dependent principally upon two factors at the present time: climatic conditions and transportation. The latter factor is to a large extent dependent upon the former, although it should also be remembered in this connection that the transportation lines of this country have not yet fully recovered from the ravages of the recent railway strike, and that in addition, the offerings of tonnage of all character are almost at the peak in the history of the carriers.

Blast Furnace Notes

The Ford Motor Co. blew in its second or B furnace for the first time on Oct. 11.

For the first time in many months a furnace is operating in Virginia. The Virginia Iron, Coal & Coke Co. blew in its Max Meadows furnace on Oct. 9.

Of the 32 blast furnaces blown in during October, the independent steel companies had 16; the Steel Corporation 7 and merchant producers 9. Of the 3 furnaces blown out or banked, 2 were operated by independent steel companies and one by the Steel Corporation.

The Bureau of Supplies and Accounts, Navy Department, Washington, will take bids until Dec. 12, for a quantity of steel wire nails for eastern and western navy yards, schedule 273; also, until Nov. 21, for 3750 ft. of galvanized steel pipe for the Mare Island Navy Yard, San Francisco.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Plates

Sheared, tank quality, base, per lb.....2.00c.

Structural Material

Beams, channels, etc.....2.00c.

Iron and Steel Bars

Soft steel bars, base, per lb.....2.00c.
Refined iron bars, base, per lb.....2.60c.

Hot-Rolled Flats

Hoops, base, per lb.....2.90c. to 3.00c.
Bands, base, per lb.....2.90c. to 3.00c.
Strips, base, per lb.....2.90c. to 3.00c.
Cotton ties, per bundle of 45 lb.....$1.14

Cold-Finished Steels

Bars and shafting, base, per lb.....2.50c.
Strips, base, per lb.....4.50c.

Wire Products

Nails, base, per keg.....$2.70
Bright plain wire, base, per 100 lb.....2.45
Annealed fence wire, base, per 100 lb.....2.45
Spring wire, base, per 100 lb.....3.25c. to 3.75c.
Galvanized wire, base, per 100 lb.....2.95
Galvanized barbed, base, per 100 lb.....3.35
Galvanized staples, base, per keg.....3.35
Painted barbed wire, base, per 100 lb.....3.00
Polished staples, base, per keg.....3.00
Cement coated nails, base, per count keg.....2.20
Woven fence, carloads (to jobbers).....70½ per cent off list
Woven fence, carloads (to retailers).....68 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads...60 and 5 per cent off list
Machine bolts, small, cut threads....50 and 10 per cent off list
Machine bolts, larger and longer....50 and 10 per cent off list
Carriage bolts, ⅜ x 6 in.:
Smaller and shorter, rolled threads, 50, 10 and 5 per cent off list
Cut threads.....50 per cent off list
Longer and larger sizes.....50 per cent off list
Lag bolts.....60 and 5 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads....50 and 10 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.:
Smaller and shorter.....45 per cent off list
Larger and longer sizes.....45 per cent off list
Hot pressed square or hex. blank nuts...$3.25 to $3.50 off list
Hot pressed nuts, tapped.....3.25 to 3.50 off list
C.p.c. and t. sq. or hex. nuts, blank.....3.25 to 3.50 off list
C.p.c. and t. sq. or hex. nuts, tapped.....3.25 to 3.50 off list
Semi-finished hex. nuts:
9/16 in. and smaller, U. S. S....75, 10 and 5 per cent off list
⅝ in. and larger, U. S. S.....70, 10 and 2½ per cent off list
Small sizes, S. A. E.....80 and 5 per cent off list
S. A. E., ⅜ in. and larger.....75 and 5 per cent off list
Stove bolts in packages.....80 and 5 per cent off list
Stove bolts in bulk.....80, 5 and 2½ per cent off list
Tire bolts.....50, 10 and 10 per cent off list

Cap and Set Screws

Milled square and hex. head cap screw.....75 per cent off list
Milled set screws.....75 per cent off list
Upset cap screws.....75 and 10 per cent off list
Upset set screws.....80 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb.....$3.15
Large boiler rivets, base, per 100 lb.....3.25
Small rivets.....65 per cent off list

Track Equipment

Spikes, 9/16 in. and larger, base, per 100 lb....$2.75 to $2.85
Spikes, ½ in. and smaller, base, per 100 lb.....3.50
Spikes, boat and barge, base, per 100 lb.....3.50
Track bolts, base, per 100 lb.....3.85 to 4.50
Tie plates, per 100 lb.....2.35
Angle bars, base, per 100 lb.....2.75

Welded Pipe

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
¼	49	23½	⅛ to ⅜	+7	+33
⅛ to ⅜	55	29½	½	26	8
½	60	46½	¾	32	17
¾	64	52½	1 to 1½	34	19
1 to 3	66	54½			

Lap Weld

2	59	47½	2	29	15
2½ to 6	63	51½	2½ to 6	32½	19
7 to 8	60	47½	7 to 12	30	17
9 to 12	59	46½			

Butt Weld extra strong, plain ends

⅛	45	28½	¼ to ⅜	+15	+48
¼ to ⅜	51	34½	½	25	13
½	57	46½	¾	32	18
¾	62	51½	1 to 1½	34	20
1 to 1½	64	53½			
2 to 3	65	54½			

Lap Weld, extra strong, plain ends

2	57	46½	2	30	17
2½ to 4	61	50½	2½ to 4	33	21
4½ to 6	60	49½	4½ to 6	32	20
7 to 8	56	43½	7 to 8	25	13
9 to 12	50	37	9 to 12	20	8

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 and 2½ per cent.

Boiler Tubes

Lap Welded Steel		Charcoal Iron	
1¾ in.	21½	1½ in.	+7
2 to 2¼ in.	36	1¾ to 1⅞ in.	3
2½ to 3 in.	47	2 to 2¼ in.	13
3¼ to 13 in.	52	2½ to 3 in.	18
		3¼ to 4½ in.	20

To large buyers of steel tubes a supplementary discount of 5 per cent is allowed.

Standard Commercial Seamless Boiler Tubes

Discounts on cold-drawn tubes in carload lots, f.o.b. Pittsburgh, follow:

1 in.	55	2½ and 2¾ in.	38
1¼ and 1½ in.	47	3 in.	42
1¾ in.	31	3¼ to 4 in.	47
2 and 2¼ in.	34	4¼ in. and 5 in.	39

Hot Rolled

3 in.	44	3¼ to 4 in.	49

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base.....85 per cent off list
Carbon 0.30 to 0.40, base.....83 per cent off list
Plus usual differentials and extras for cutting.

Seamless Locomotive and Superheater Tubes

Cents per Ft.		Cents per Ft.	
2-in. O.D. 12 gage	14	2¼-in. O.D. 10 gage	19
2-in. O.D. 11 gage	15	3-in. O.D. 7 gage	34
2-in. O.D. 10 gage	16	1½-in. O.D. 9 gage	13¾
2¼-in. O.D. 12 gage	16	5⅜-in. O.D. 9 gage	53
2¼-in. O.D. 11 gage	17	5½-in. O.D. 9 gage	55

Tin Plate

Standard cokes, per base box.....$4.75

Terne Plate

(Per package, 200-lb.)

8-lb. coating	$9.30	25-lb. coating I. C.	$14.25
8-lb. coating I. C.	9.60	30-lb. coating I. C.	15.25
15-lb. coating I. C.	11.80	35-lb. coating I. C.	16.25
20-lb. coating I. C.	13.00	40-lb. coating I. C.	17.25

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....2.50c. to 2.75c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.35c. to 3.50c.
Regular auto body sheets, base, per lb.....4.75c. to 5.00c.

Galvanized

No. 28 (base), per lb.....4.35c. to 4.60c.

Tin-Mill Black Plate

No. 28 (base), per lb.....3.35c. to 3.50c.

Manufacturers have pamphlets, which can be had upon application, giving price differentials for gage and extras for length, width, shearing, etc.

Freight Rates

All rail freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic	$0.325	Buffalo	$0.265	St. Louis	$0.43
Philadelphia, export	0.235	Cleveland	0.215	Kansas City	0.735
Baltimore, domestic	0.315	Cleveland, Youngstown		Kansas City (pipe)	0.705
Baltimore, export	0.225	Comb.	0.19	St. Paul	0.595
New York, domestic	0.34	Detroit	0.295	Omaha	0.735
New York, export	0.255	Cincinnati	0.295	Omaha (pipe)	0.705
Boston, domestic	0.365	Indianapolis	0.31	Denver	1.275
Boston, export	0.255	Chicago	0.34	Denver (pipe)	1.215
				Pacific Coast	$1.50
				Pac. Coast, ship plates	1.20
				Birmingham	0.69
				Memphis	0.385
				Jacksonville, all rail	0.50
				Jacksonville, rail and water	0.415
				New Orleans	0.515

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 36c. to 40c.; ship plates, 36c. to 40c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 30c. to 40c.; sheets and tin plates, 50c.; rods, wire rope cable and strands, 75c.; wire fencing, netting and stretcher, 50c.; pipe, not over 8 in. in diameter, 50c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

FRENCH MARKET QUIETER

Export Demand Offsets Lighter Domestic Business—Prices Generally Unchanged

PARIS, Oct. 26.—Although French ironworks are, on the whole, kept busy on old orders, there has undoubtedly been a decline in the home demand since the beginning of this month. Raw and semi-finished materials, however, continue active, owing to the export demand; but rolled merchant products are rather neglected, with weakening prices.

Both the continued appreciation of the pound sterling and depreciation of the mark are favorably influencing French exports.

Iron Ore.—France produced in August 1,938,000 tons of iron ore, with stocks at the end of that month amounting to 3,198,000 tons, as against 3,237,000 tons at the end of July. In 1913 the corresponding average monthly production (Alsace-Lorraine included) was 3,582,000 tons.

France exported in August 599,732 tons of iron ore and during the first eight months of 1922 5,590,769 tons.

Coke.—Germany delivered to France and Luxemburg 179,000 tons of coke during the first ten days of October and 183,300 tons during the last ten days of September, of which 72 per cent went to France and 28 per cent to Luxemburg.

Foundry Pig Iron.—The blowing-in of several blast furnaces is reported, notably a third furnace at the Hauts-Fourneaux de Saulnes, Meurthe-et-Moselle, which are producing a grade of pig-iron in considerable demand.

The market for foundry iron is steady. Available supplies are scarce and, although domestic orders are restricted, some good business is being done for export, especially to the United States, Belgium, Italy and Great Britain. The average present selling price of chill-cast foundry pig iron No. 3 P. L., is about 225 fr. at producing works in Lorraine; but numerous orders are reported at prices up to 235 to 240 fr. For export, the price now quoted is 255 to 260 fr., f.o.b. Antwerp (Belgian currency). Hematite pig iron is now firm and demand is improving. Present prices are as follows, delivered:

	Francs
[illegible]	320 to 325
Paris district	290 to 310
Eastern area	300 to 310
[illegible]	*270 to 300

*F.o.b. works.

Imported British East Coast hematite is now offered at 325 fr., c.i.f. French northern ports. Spiegeleisen is now selling at producing works in the east of France at 350 fr. for 10 to 12 per cent mn., and 405 to 430 fr. for 12 to 18 per cent mn.

Semi-Finished Material.—The inland demand is rather inactive, but as the works have orders ahead for the next ten or twelve weeks, and there is also a good export business, notably with Great Britain, prices are firmly held and exhibit a tendency to rise. The following prices are now being quoted per metric ton on basic steel (about 20 fr. additional for open-hearth material) by some Lorraine works:

	Domestic, f.o.b. Works	Export,* f.o.b. Antwerp
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
Sheet billets	345 to 355	375 to 380

Beams.—The Comptoir Sidérurgique which controls inland sales of beams and heavy rails decided, at its meeting of October 19, to leave its base price of 475 fr. on beams unchanged at least until its next assembly in November. For export, beams are quoted at 380 to 390 fr. (Belgian currency) f.o.b. Antwerp, which is equal to about 360 fr. (French currency) f.o.b. producing works.

Rails.—Rail mills are still busy on old orders. The Comptoir Sidérurgique is quoting on the home market the base prices of 525 fr. for heavy rails and 450 fr. for sleepers. Rails of less than 14 kg. are being offered by Lorraine at 400 to 410 fr. for shorn and 440 to 450 fr. for machined rails. For export, heavy rails are quoted at 420 to 425 fr. f.o.b. Antwerp, and rails under 14 kg. (shorn) at 400 to 410 fr. (Belgian currency).

Sheets and Plates.—Contrary to expectations, the Comptoir des Tôles et Larges Plats, at its meeting of Oct. 20 resolved to leave its base prices unchanged. The following delivered quotations per metric ton steel prevail:

	Francs
Flats	610
Heavy sheets	650
Medium sheets	730
Light sheets	930

For export, f.o.b. Antwerp, the following prices (Belgian currency) are being quoted: Open-hearth sheets, 5 mm. and heavier, 520 to 530 fr.; Flats, 470 to 480 fr.

Rolled Merchant Iron.—This market is the most affected by the slacking of orders. Prices have receded and average now about 440 fr. at Lorraine producing works. The export price f.o.b. Antwerp (Belgian currency) is now 425 to 430 fr.

Castings.—Castings are now quieter, except in the stove branch.

The French Higher Railway Board resolved, Oct. 19, that the general revision of the whole schedule of railroad rates, which is to be proceeded with at once, must keep within a maximum limit of three times the prewar transportation costs. At the same time, it fixed May 1, 1923, as the latest date by which the revision shall be completed.

Swedish Iron and Steel Production

The number of blast furnaces and open-hearth furnaces in Sweden shows little alteration in comparison with last year. The production of pig iron has gone back from 383,200 metric tons during the first six months of 1913 to 120,900 tons in the same period this year; that of blooms and bars from 77,700 to 14,200 tons; that of Bessemer steel from 55,600 to 19,900 tons, and that of open-hearth steel from 218,200 to 101,300 tons. The last three, however, show an improvement over last year's figures. The following table gives the iron and steel production in the first half year and in the first seven months of 1922 and 1921 in metric tons:

	First Six Months		January-July, Inclusive	
	1922	1921	1922	1921
Pig iron	120,900	206,200	140,100	225,600
Blooms and bars	14,200	11,900	17,200	13,800
Bessemer steel	19,900	12,000	24,100	15,400
Open-hearth steel	101,300	85,800	123,400	96,500
Crucible and electric steel	6,100	7,200	7,200	8,100
Rolled material	90,600	54,200	110,600	63,600

Plant Operations

The New Process Steel Co., Noblesville, Ind., has commenced operations at the first unit of its new local plant, recently completed, for the production of small T-rails, steel billets and structural steel specialties. Three other plant units are in course of erection and these will be placed to service as soon as completed. It is expected to give employment to more than 200 workers within 60 days. Clarence Taylor is secretary and James Hundley general manager.

The Pennsylvania Railroad has placed its Sunbury, Pa., shops on a full time basis, seven-day week, day and night, and will maintain this schedule for an indefinite period. Production is devoted to repairs on locomotives and cars.

The Victor Talking Machine Co., Camden, N. J., has adopted a capacity production schedule, with large working force.

The American Bridge Co., has all furnaces in blast at its Pencoyd Works, Manayunk, Philadelphia, with full time working schedule.

The United States Cast Iron Pipe & Foundry Co., Burlington, N. J., has adopted a full capacity operating basis, with regular working force.

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, Lake	Copper, Electrolytic*	Straits Tin, New York	Lead, New York	Lead, St. Louis	Zinc, New York	Zinc, St. Louis
Nov.							
1.....	14.12½	13.62½	36.20	6.80	6.45	7.45	7.10
2.....	14.00	13.50	36.45	7.00	6.62½	7.42½	7.07½
3.....	14.00	13.50	37.30	7.12½	6.80	7.42½	7.07½
4.....	14.12½	13.62½	37.75	7.15	6.85	7.42½	7.07½
6.....	14.12½	13.62½	38.00	7.15	6.85	7.45	7.10

*Refinery quotation.

New York

NEW YORK, Nov. 6.

None of the markets is active except tin. Only a fair demand for copper prevails at unchanged prices. The tin market has been fairly active and prices have advanced. There has been a sharp advance in lead but the zinc market is practically unchanged.

Copper.—Consumers are still conservative and buying of copper is light. The market price depends upon the seller, with electrolytic available from one or two sources part of the week at 13.50c., refinery; most sellers, however, adhere to 13.62½c., refinery. It is believed that at present very little metal is now available at the lower price and we quote the general market for electrolytic copper at 13.62½c., refinery, or 13.87½c., delivered. Lake copper is selling at 14c. to 14.21½c., delivered.

Tin.—The feature of the market has been the sale of large quantities of Straits tin during the week, amounting to close to 1600 to 1700 tons at advancing prices. One explanation is the continued rapid advance in London, but it is generally recognized that American consumers have not covered their requirements beyond December, particularly the tin plate makers. It is also estimated that consumption and production of tin are about equal. The largest sales were made on Thursday, Nov. 2, with 500 tons, mostly features, changing hands at between 36.25c. to 36.75c. Saturday was also an active day with 400 to 500 tons sold, mostly metal on steamers afloat, at 37.62½c. to 37.87½c. Spot Straits tin is quoted to-day at 38c., New York, the highest price of the year, and the London market was also about £3 per ton higher than a week ago at £187 7s. 6d. for spot standard, £187 15s. for future standard and £188 15s. for spot Straits. Deliveries into consumption in October were considerably larger than estimated at 5603 tons, with 2859 tons in stock and landing on Oct. 31. Imports for the first 10 months have been 41,715 tons, as compared with 18,143 tons to Nov. 1, 1921.

Lead.—The feature of the market has been the advances made by the leading interest. On Nov. 1 the American Smelting & Refining Co. advanced its price from 6.50c. to 6.75c., New York, and on the following day, Nov. 2, from 6.75c. to 7c., New York, or $10 per ton in two days which is the largest advance made in a long period. The outside market continues to be at a premium over the prices of the leading interest at 6.85c., St. Louis, or 7.15c., New York. Lead continues scarce with prompt metal hard to get and November lead available only to favored customers. So far as can be learned books are not yet opened for December.

Zinc.—The principal item of interest in this market has been the sale of about 7000 tons for export to England. While this is not a large amount it is of considerable importance relatively because of low stocks in this country. Domestic demand, however, is not heavy. Prime Western for early delivery is quoted at 7.10c., St. Louis, or 7.45c., New York.

Antimony.—Chinese metal for early delivery in wholesale lots is quoted at 6.60c., New York, duty paid.

Aluminum.—The leading producer in this country has not yet made public its quotations, but virgin metal, 98 to 99 per cent pure, is available from foreign producers at around 21c. per lb., duty paid.

Old Metals.—With the exception of white metals the market is featureless, scrap copper and brass being very dull, while lead is quite active. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	13.25
Copper, heavy and wire	12.50
Copper, light and bottoms	11.25
Heavy machine composition	10.50
Brass, heavy	8.25
Brass, light	6.50
No. 1 red brass or composition turnings	9.50
No. 1 yellow rod brass turnings	7.50
Lead, heavy	6.25
Lead, tea	4.75
Zinc	4.75

Chicago

Nov. 7.—Copper and zinc have declined while lead has advanced. Copper is exceedingly quiet with users showing no interest in anything but their immediate requirements. Zinc buying has fallen off because the extra material which galvanizers ordered to protect themselves against transportation uncertainties, is now being delivered. Lead has gone up largely because of two advances by the leading producer. Buyers experience some difficulty in obtaining their lead requirements, but the scarcity is regarded as artificial rather than real. Tin consumers remain consistently out of the market, trading being confined to dealers. Ordinarily futures would be bought on an advance, but such is not now the case. Among the old metals lead pipe alone has advanced. We quote, in carload lots, lake copper, 14.25c.; tin, 38c. to 39c.; lead, 6.85c.; spelter, 7.15c.; antimony, 8.50c., in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 11.50c.; copper bottoms, 9.75c.; red brass, 9c.; yellow brass, 7c.; lead pipe, 5c.; zinc, 4.75c.; pewter, No. 1, 23c.; tin foil, 26c.; block tin, 30c., all buying prices for less than carload lots.

St. Louis

Nov. 7.—Lead was strong and up 35 to 40 points for the week at 6.75c. to 6.80c., carlots, due to the advance of the leading interest. Slab zinc was up 5 points at 7.05c. to 7.10c. On old metals we quote: Light brass, 3.50c.; heavy red brass and light copper, 7c.; heavy yellow brass, 4c.; heavy copper and copper wire, 7.50c.; zinc, 2c.; pewter, 15c.; tin foil, 20c., tea lead, 2c. and aluminum, 9c.

Large Production of Brier Hill Steel Co. Plants

In producing 79,026 tons of ingots in October, it is believed the Brier Hill Steel Co., Youngstown, Ohio, has established a record for a 12-unit open-hearth department. The October production compares with 68,197 tons of ingots produced in September by this plant. The company's blooming mill had a total rolling tonnage in October of 74,990 tons, and 64,960 tons in September, its next best month.

During the last month but 11 of the 12 furnaces were ordinarily charged, one usually being down for relining or repairs, and the record is therefore all the more significant. Average daily production was 2550 tons, or 220 tons per furnace. Rated capacity of the units is 200 tons per day.

The company's blast furnace department also set up a new production record, in turning out 44,157 tons of pig iron, comparing with its previous best mark of 43,257 tons. The Brier Hill company operates three blast furnaces. Its Grace stack supplied 16,323 tons of iron in October, its previous high production being 16,274 tons. Its Jeannette furnace poured 17,900 tons of iron, as against its best previous mark of 17,326 tons.

A demonstration of leather belting is to be given at the Hotel Pennsylvania, New York, Nov. 16, 17 and 18, by the Leather Belting Exchange.

PERSONAL

Willis L. King, vice-president Jones & Laughlin Steel Co., Pittsburgh, is back at his desk again after an absence of several weeks due to illness, which also prevented his attendance at the recent meeting of the American Iron and Steel Institute, of which he is a vice-president. Mr. King on July 12 last rounded out 53 years in the iron and steel industry, all of which have been with the Jones & Laughlin Steel Co.

George L. Bitting, sales manager Eaton Axle Co., since its organization, took over on Nov. 1 the sales managership of the Standard Welding Co., Cleveland. Both companies are divisions of the Standard Parts Co., that city. Mr. Bitting's new appointment is in line with the aggressive sales policy recently instituted by the Standard Parts Co. for its tubing and rim plant of which the tubing capacity alone is 50,000,000 ft. annually.



GEORGE L. BITTING

P. T. Hill succeeds his former chief as sales manager of the Eaton Axle Co. Mr. Hill has also been with the Axle company since its organization and previous to that was connected with the Torbensen Axle Co.

William Le Compte has been appointed sales manager in charge of New York territory of Jenkins Bros., 80 White Street, New York. He has been in the sales organization of the company for 25 years.

Earl M. Hayes, who for the last five years has been general manager of the Hunter & Havens Iron & Steel Co., has been appointed general manager of steel sales with the American Tube & Stamping Co., Bridgeport, Conn. His first connection in the steel trade was with the Republic Iron & Steel Co. in 1907.

C. V. Dodge, formerly in charge of steel casting sales for the United Engineering & Foundry Co., Pittsburgh, has been promoted to assistant manager in charge of roll and steel sales. He began his career with the company in 1904 as shipping clerk at the steel foundry in Vandergrift, Pa., and was later made foreman of the chipping shop at this plant. In 1916, he was given charge of steel casting sales.

Herbert F. Perkins, vice-president International Harvester Co., Chicago, in charge of all manufacturing and raw materials operations, has been assigned to assist the president in the administration and general management of the company's affairs and to be acting president in the latter's absence. Mr. Perkins retains charge of raw material properties. Cyrus H. McCormick, Jr., works manager in charge of the Chicago tractor works and the works at Milwaukee, Akron and Springfield, Ohio, has been elected vice-president in charge of all manufacturing plants in this country, Canada and Europe. George A. Ranney, secretary and treasurer, has been elected vice-president and treasurer. W. M. Gale, assistant treasurer, was elected secretary and E. A. Johnston, manager experimental department, was appointed to a new office as director of engineering.

D. M. Pitcock, formerly superintendent of the Massillon Rolling Mill Co., Massillon, Ohio, has accepted a position as general superintendent of the Universal Steel Co., Bridgeville, Pa.

F. M. Gibson, formerly sales representative of the Consolidated Steel Corporation in Japan, recently arrived in New York. He expects to return to Japan about Jan. 1.

Harry J. Reefe, formerly manager of the order department, Independent Pneumatic Tool Co., 600 West Jackson Boulevard, Chicago, has been appointed purchasing agent, succeeding Thomas J. Keegan, resigned.

William McGonigal, for the past two years manager of sales with the Philadelphia Steel Warehouse Co., has resigned and is now connected with the specialty department, J. G. Brill Co., which handles the selling of products not connected with cars and trucks. Mr. McGonigal started in the steel business with the Cambria-Midvale Steel Co., with which he remained 15 years, resigning to become assistant manager of sales with the Camden Forge Co.

D. K. Hutchcraft, formerly vice-president of the Indiana Air Pump Co., Indianapolis, and a prominent authority on air lift pumping, has been appointed district manager of the branch office at Tulsa, Okla., recently established by the Chicago Pneumatic Tool Co., Chicago Pneumatic Building, New York.

P. D. Brown, formerly manager of the Baltimore branch of the Crucible Steel Co., has been appointed district sales manager in southern territory of the Polidi Steel Corporation of America, with headquarters at Baltimore.

J. J. Stoddard has been appointed general manager of the Lakeside Forge Co., Erie, Pa., manufacturer of drop forged wrenches and forgings. Since the first of the year he has held the position of sales manager.

George Hoeffle has been elected president and general manager of the Ferguson Furnace Co., Toledo. He has been vice-president and Eastern sales manager of that company since 1907 with headquarters in New York.

A. H. Hunter of Buffalo, has resigned as president of the Atlas Steel Corporation, Dunkirk, N. Y., a consolidation of the Atlas Crucible Steel Co. of Dunkirk and the Electric Alloy Steel Co., Youngstown, Ohio. Mr. Hunter was formerly president of the Atlas Crucible company. The position will remain vacant and the duties of president will be performed by L. J. Campbell, chairman of the board in immediate charge of the company. Mr. Campbell was previously president of the Electric Alloy company.

President James A. Farrell, of the United States Steel Corporation, arrived in New York Nov. 3 from a six weeks' European trip.

G. C. Tinsley of Youngstown, Ohio, has accepted a position with the David J. Joseph Co., dealer in pig iron and scrap metals, to head a newly organized sheet and plate department. Mr. Tinsley will be located at Cincinnati. He was formerly in charge of the Commercial Shearing & Stamping Co., Youngstown, and lately has been engaged in jobbing sheets and plate ends.

Fred A. Worthey, assistant secretary of the Standard Tank Car Co., Sharon, Pa., has been promoted to assistant general manager under C. E. Neudorfer, general manager.

A. L. Seaman has organized A. L. Seaman & Co., 549 West Washington Boulevard, Chicago, to engage in the sale of iron and steel mill products. The company has been appointed exclusive representative in Chicago territory of the American Tube & Stamping Co., Bridgeport, Conn., manufacturer of hot and cold rolled strip steel, and will handle a number of other lines. Mr. Seaman was first identified with the steel business in 1904, as a special representative in the sale of flat wire and special wires for John A. Roebling's Sons Co. In 1916 he participated in the organization of E. P. Bartlett & Co., Chicago, jobbers of iron and steel, and manufacturers' representatives. He has recently sold his interest in that company to form the organization bearing his own name.

H. F. Moore, professor at the University of Illinois, will address the tri-city chapter, American Society for Steel Treating on Nov. 23. His subject will be the Fatigue of Metals. The October meeting was held at the rooms of the Davenport Chamber of Commerce, Davenport, Iowa, on Oct. 26.

William P. Moore, who until recently was district sales manager at Harrisburg, Pa., for the Central Iron & Steel Co. of that city, has joined the sales organization of the Alan Wood Iron & Steel Co., Widener Building, Philadelphia, and will handle sales of plates.

Frank Samuel, Harrison Building, Philadelphia, sales agent in the United States for one brand of British ferromanganese, has returned from a six weeks' stay in England.

John Duncan, president Illinois Co., St. Louis, and formerly president of the Wheeling Steel & Iron Co., has been elected a director of the National Enameling & Stamping Co.

OBITUARY

ALLEN HOFFER, well known in the pig iron trade of the Cleveland and eastern Pennsylvania districts, died of pneumonia on Sunday at Douglasville, Pa., at the home of his father-in-law, James P. Roe of the Reading Iron Co., Reading, Pa., following an illness of one week. Mr. Hoffer was connected with the ore sales department of the Cleveland-Cliffs Iron Co., Cleveland, and resided in that city. He was also a director of the Trumbull-Cliffs Iron Co. He began work in the pig iron trade at the Warwick furnaces, Pottsville, Pa., when a young man and later was superintendent of blast furnaces at the Worth Brothers' steel plant at Coatesville, Pa., before the sale of that property to the Midvale Steel & Ordnance Co. Mr. Hoffer attended the meeting of the American Iron and Steel Institute in New York on Oct. 27, and the following day attended the Yale-Army football game at New Haven, Conn., where he contracted a severe cold which developed into pneumonia. Mr. Hoffer was 37 years old. He leaves a wife and two children.

GEORGE KNAPP HOBLITZELLE, 55 years old, vice-president and treasurer of the Commonwealth Steel Co., St. Louis, died at his home in that city Nov. 5. Mr. Hoblitzelle was born in St. Louis and was educated at a manual training school which then was part of Washington University. After leaving school he became connected with the Shickle, Harrison & Howard Iron Co., of which he later was made secretary. When that concern was purchased by the American Steel Foundries, he remained with the latter for a year when he, with Clarence H. Howard and H. M. Pflager purchased the Commonwealth Steel Co. in 1904. Mr. Hoblitzelle then was made vice-president and treasurer. He is survived by his wife, a daughter of John Harrison, president of the Shickle, Harrison & Howard Iron Co. A son, Harrison, is assistant treasurer of the Commonwealth Steel Co.

DRUID A. WALTON, president C. J. Walton & Son, boiler manufacturers, Louisville, Ky., hanged himself at his office on Monday afternoon, Oct. 30. The act was attributed to failing health and business depression. Mr. Walton was born in Louisville in 1864 and attended Stevens Institute of Technology from which he was graduated with high honors. He immediately became associated with the business of the late Charles J. Walton, his father, following whose death he became president 12 years ago. Mr. Walton was a member of the American Society of Mechanical Engineers.

JAMES FRANCIS FLYNN, production manager and one of the directors of the D. J. Ryan Foundry Co., Ecorse, Mich., died suddenly from pneumonia on Oct. 16, in his 39th year. Mr. Flynn was formerly associated with the Erie Railroad, later going into business for himself. His relations with the Ryan company date from its inception as successor to the Ecorse Foundry & Machine Co.

HERBERT T. GRANTHAM, vice-president and chief engineer of the Belmont Iron Works, Philadelphia, structural steel fabricator, dropped dead on the golf links of the Philadelphia Country Club on Sunday, death being due to apoplexy. Mr. Grantham was about 54 years old and had been connected with the Belmont Iron Works for 24 years. He leaves a wife and son. The funeral was held from the family residence, 178 Green Street, Germantown, Tuesday afternoon.

CHARLES J. TAGLIABUE, president C. J. Tagliabue Co., manufacturer of thermometers, Brooklyn, died suddenly Nov. 2 from heart trouble. Mr. Tagliabue was born in New York 70 years ago.

HUNGARIAN IRON TRADE

Stinnes an Active Factor in Supplying Balkan Markets

(*Special Correspondence*)

BERLIN, GERMANY, Oct. 20.—The Hungarian iron industry is strenuously working to secure the necessary raw material from other countries, and to develop its own resources. German interests are active and the new manganese deposits which have been discovered in the Vesprimer Komitat are to be exploited with the aid of the German Bank. These deposits are of special interest to the German steel industry, because it is depending for its manganese on imports. Through the peace of Trianon, Hungary lost 319 factories with 30,772 workmen and a production worth 243.7 million gold kronen, which is 47 per cent of the factories and 37.4 per cent of the value of production in its pre-war territory. Of the 359 factories which remain within present-day Hungary, 7 are producing rolled iron and steel, 9 iron and steel castings, 93 hardware, 17 wire and wire goods, 3 iron cooking utensils, 8 iron furniture, and 227 machinery. These plants employed 67,876 workmen and had a production of the value of 406.8 million gold kronen.

The importance of the Hungarian engineering industry, especially in regard to exports to the Balkans, has also been realized by Hugo Stinnes, who is pushing his organization in southeastern Europe with a view to creating a market for his Austrian Alpine Montan Gesellschaft and other works. Only recently the Jugo-Slawische Montanhütten-Syndicat A. G. was founded under his auspices in Agram by the Alpine with a capital of 3 million Jugo-Slavian kronen. Now he has made a contract with the Hungarian Liptak works, in which he acquired large interests. These works are to be enlarged and modernized, and the organization is being extended especially in the Balkan countries. The capital of the company is being increased from 100 to 180 million Hungarian kronen.

The Hungarian foreign trade was comparatively inactive during the first six months of the present year, imports being 1,390,000 metric tons valued at 35,400 million kronen, and exports 590,000 tons, valued at 27,600 million kronen. The iron exports alone amounted to over 20,000 tons, an important item being bar iron. Exports of machinery are constantly increasing, amounting to 13,600 tons, of which 5400 tons was agricultural machinery, during the first half of 1922.

Advance in Puddlers' Wages

The Reading Iron Co., Reading, Pa., announced a 10 per cent wage increase for puddlers, the rate per ton being advanced from $8 to $8.80. There will be no change in the common labor rate at this time.

The Westinghouse Electric & Mfg. Co., East Pittsburgh, has started the construction of the first of four units to comprise a combination distributing warehouse, repair shop and factory on West Pershing Road and Leavitt Street, Chicago.

H. J. N. Voltman, designing engineer with the W. S. Rockwell Co., New York, will address the American Society for Steel Treating at the rooms of the Providence Engineering Society, Friday, Nov. 10, on "The Turning Out of Heat-Treated Products."

FABRICATED STEEL BUSINESS

Awards Call for a Round Tonnage But Few New Projects Appear

Among the fabricated steel awards of the past week are the following:

New York Times annex, 2700 tons, to Levering & Garrigues Co. (1200 tons to be erected before the end of the year.)

Chevrolet Motor Co., Buffalo, N. Y., 200 tons, at Buffalo, to J. W. Ferguson Co., Paterson, N. J.

H. & J. Burke, Ltd., warehouse, Brooklyn, 200 tons, to Levering & Garrigues Co.

Coal pier for Virginia Railway, Sewell's Point, Norfolk, Va., 5800 tons to the Bethlehem Steel Bridge Corporation.

Transmission towers for the Virginia Railway & Power Co., 500 tons, to Milliken Brothers Mfg. Co.

Empire State Ice Co., Weehawken, N. J., 300 tons, to the Comunipaw Structural Steel Co.

Flatbush telephone exchange, 1000 tons, to the Hedden Iron Construction Co.

Six-story garage, West Fifty-fourth Street, 500 tons, to the Hinkle Iron Co.

Addition, Seneca Hotel, Rochester, N. Y., 750 tons, to the Genessee Bridge Co.

Allerton House, Chicago, 3000 tons (reported 2450 tons last week), to the Bethlehem Bridge Corporation.

Elk River Coal & Lumber Co., six bridges for Buffalo Creek & Gawley Railroad, to Phoenix Bridge Co.

Factory building for Ideal Electric & Mfg. Co., Mansfield, Ohio, 100 tons to the Austin Co.

South High School, Pittsburgh, 400 tons, Kelly Construction Co., Philadelphia, low bidder.

Warehouse, American Rolling Mills Co., Ashland, Ky., 100 tons, to McClintic-Marshall Co.

Freight station, Knoxville, Tenn., for Louisville & Nashville Railroad, 250 tons, to H. K. Ferguson Co.

San Antonio & Aransas Pass Railroad, Brazos River Bridge, near Wallis, Tex., 768 tons, to Virginia Bridge & Iron Co.

Luick Ice Cream Co., Milwaukee, 300 tons, to Milwaukee Bridge Co.

Peoples Trust & Savings Bank Building, Chicago, 700 tons, to A. Bolters Sons Co.

Structural Projects Pending

Inquiries for structural steel work now being figured on include the following:

Power house in Indiana for Stone & Webster, Inc., 2200 tons.

Lion Oil & Refining Co., Kansas City, Mo., for delivery at Pearson, Ark., nine tanks of 2000 to 10,000-bbl. capacity and six 1000-bbl. stills.

Parcels post building, Cleveland, 500 tons.

Plant for Mengel Body Co., Louisville, Ky., 500 tons, Joseph & Joseph, architects.

Third Unit Calumet Power Station, Commonwealth Edison Co., Chicago, 3000 to 3500 tons.

National Biscuit Co., New Building, Philadelphia, 3500 tons.

To Discuss Machine Tool Distribution

The fall meeting of the Machine Tool Section of the National Supply and Machinery Dealers' Association will be held at the William Penn Hotel, Pittsburgh, Tuesday, Nov. 21, at 10 o'clock in the morning. The program will focus particularly on machine tool distribution through representation by dealer agents, such as those houses comprised within the membership of the Association.

L. H. Swind, Swind Machinery Co., Philadelphia, is chairman of the section, and Thomas A. Fernley, with general offices at 505 Arch Street, Philadelphia, is secretary-treasurer. The executive committee comprises Henry Prentiss, Henry Prentiss & Co., Inc., New York; H. G. Mitchell, Harron, Rickard & McCone, San Francisco; J. W. Wright, Colcord-Wright Machinery & Supply Co., St. Louis, and George H. Cherrington, Brown & Zortman Machinery Co., Pittsburgh.

RAILROAD EQUIPMENT BUYING

Fresh Inquiries for About 500 Cars But 3300 Put Under Contract

Some 3300 cars have been put under contract but only 450, including passenger type equipment, have been added to business under negotiation. In financial circles further consideration is being given to arrangements for financing further railroad equipment requirements. Some of the week's items are as follows:

The Rock Island is inquiring for 50 suburban coaches.

The Mississippi Central wants 100 to 200 flat cars.

The Kingan Refrigerator Co. is inquiring for 100 refrigerator cars.

The Pacific Electric Co. is inquiring for 50 interurban coaches.

The Santa Fe wants 10 dining cars.

The Union Pacific has let 100 tank cars to the American Car & Foundry Co.

The Live Poultry Transportation Co. will build 100 chicken cars in its own shops.

The Chesapeake & Ohio Railroad has placed orders with the American Locomotive Co., New York, for two mountain type locomotives for passenger service, price, $61,200 each, and six Pacific type locomotives for passenger service, price, $56,550 each, all to be built at the Richmond works, delivery, April, 1923.

The Louisville & Nashville has placed 2100 hopper cars with the American Car & Foundry Co., and 1000 box cars equally with the Chickasaw Shipbuilding & Car Co. and the Mt. Vernon Car & Mfg. Co.

Complaint as to Steel Plate Rates Dismissed

WASHINGTON, Nov. 7.—In a decision handed down last Saturday the Interstate Commerce Commission dismissed the complaint of the Gulf Refining Co. of Louisiana, holding that the rates of 69c. and 89c. per 100 lb., on steel plates and tank material, knocked down, from Leetsdale, Pa., to Dubberly and Mansfield, La., assessed on 33 carloads to Dubberly and 11 carloads to Mansfield, between Dec. 30, 1919, and March 8, 1920, were not unreasonable or unduly prejudicial. The decision embraced another complaint of the Gulf Refining Co. regarding a similar traffic movement. It had alleged that the rates were unreasonable and unduly prejudicial to the extent that they exceeded 63c. and 83c. said to have been the contemporaneous rates on iron plates from the same point of origin to the same destinations. These rates, it was stated, would have been applicable but for the elimination through oversight of a commodity differential of 19c. as between both iron and steel plates from the Pittsburgh district to points in Texas from the Western classification when the consolidated classification was published.

Charges on Pipe Unreasonable

WASHINGTON, Nov. 7.—A finding of illegality and unreasonableness has been made by the Interstate Commerce Commission in the complaint of the Indiahoma Refining Co. vs. Director-General, et al., as to the charges collected on three carloads of wrought-iron and cast-iron pipe, pipe fittings, and connections from Drumright, Quay and Shamrock, Okla., to Ranger, Tex., in November and December, 1918. The commission found the charges were made on rates not applicable to the shipments moved. Class rates upward of 71c. were collected while there existed a commodity rate of 44c. from Muskogee and other points in Oklahoma in the same general territory as the points of origin involved in this complaint, to the same destinations. The commission found the charges illegal and unreasonable to the extent they exceeded 44c. from Quay, 51.5c. from Shamrock and 52c. from Drumright and ordered reparation.

Foundries at Wrightsville, Pa., comprising the Riverside Foundry Co., the Wrightsville Hardware Co. and the Susquehanna Casting Co., have advanced the wages of employees 10 per cent, effective Nov. 1.

Bases of Modern Blast Furnace Practice

(*Continued from page* 1208)

larger the lumps, the greater the sorting action above described and, conversely, the smaller the maximum size of the lumps the less the degree of segregation. It is therefore further obvious that, to avoid excessive segregation, the preparation of the ore by crushing the lumps to smaller, say rubble, size is necessary. This prevents excessive segregation in two ways: first, being smaller, they have less tendency to roll down the sides of the inverted cone to the apex and, secondly, the broken pieces have usually sharp and jagged edges and have, therefore, a greater tendency to lodge nearer where they fall, and the movement of the materials to the center is more likely to be en masse, carrying a certain amount of smalls with it. It is thus that preparation by crushing materially improves distribution by preventing excessive segregation, which is a condition directly inimical to the application of modern blast furnace practice.

In the distribution existing when the usual run of ores and limestone are charged "as received" there is a core or column in the center of the furnace, consisting almost entirely of the largest lumps, the area of the cross section of this core varying with the size and proportion of lumps to rubble and fines. Between this core and the walls is an annular ring consisting of a mixture of rubble and smalls, in which the proportion of rubble to smalls gradually decreases until, next to the walls, there are practically only smalls and fines.

As previously pointed out, an essential to regular and economical descent of the materials is perfect uniformity of action of the ascending gases upon the whole of every cross-section of the material in the furnace and, while this is an ideal condition which may be impossible of full attainment in actual practice, the nearest possible approach to it is of the greatest importance. There can be little approach to such a condition if the ascending gases are forced, under pressure, through a mass of materials distributed as just described. Very little, if any, of the gases will find contact with the closely packed fine materials close to the walls, and the greater proportion will pass up through the more open structure in the center, the core of large lumps, and a proportion only through the annular ring of rubble and smalls. The result of this unequal distribution of the ascending gases is the faster descent of the largest lumps in the center, and a gradually slower descent of the outlying materials. Such a descending movement of the materials of the various sizes is exactly contrary to what is most desirable. Those which descend most rapidly, owing to their slower rate of reducibility should descend most slowly, and those which descend most slowly, owing to their high rate of reducibility should descend most rapidly.

Maximum economy and output are impossible under such conditions for, apart from the question of irregularity of movement which almost always results from them, it is necessary to provide an excess of fuel to insure the complete reduction of the more rapidly descending lumps before they enter the melting zone, and the rate of driving is limited by their slower rate of reducibility. Any attempt at really fast driving under these conditions so reduces the ratio of ore to fuel which can be carried that not only is the output not increased, but the fuel consumption is greatly increased, with the added danger of the production of low grade iron through unreduced ore entering the furnace hearth from over driving, or irregular descent of the materials.

Under the conditions existing in a furnace charged in the manner under consideration there is always a strong tendency toward irregularity of movement, or none at all, in the material nearest the walls, with a gradual building up on the walls. This building up continues until portions either become permanently stationary, forming scaffolds, or masses break away and are precipitated toward the center and into the actively descending materials and rapidly ascending gases, constituting the well known slip.

This procedure is more or less frequent and more or less severe, from the small slip, causing temporary production of off grade iron, to the heavy slip or explosion, which either blows off the furnace top, or fills the tuyeres with slag, chills the hearth, "gobbs up" the furnace and puts it out of commission for days, an evil too well known among those interested to require emphasis. But to whatever degree it occurs it seriously interferes with the regularity essential to best results. The disadvantages from the accumulated effects of these conditions are avoided, and even then not always satisfactorily, only by periodical partial clearance of the furnace walls by the use, temporarily, of considerably reduced burdens or, which is the same thing, by charging extra fuel, at the expense of both economy and output. These evils can be avoided only by the proper preparation of lumpy ores by crushing.

Fine Ores

The disturbing effects upon furnace operations of the use of any considerable proportion of very fine ores —exaggerating the conditions described under distribution—are well known. Although in modern practice furnace design and method of operation have considerably reduced these effects, such ores are still sufficiently objectionable in this respect to make advisable some treatment to change their character as fines. In this case the process of preparation is the reverse of that for lumpy ores, that is, instead of reducing, it is desirable to increase their size, in order to remove their clogging effect in the furnace and to prevent their being carried out in excessive quantities by the escaping gases into the gas flues.

Various processes have been introduced for this purpose, such as briquetting, nodulising and sintering, each of which yields a satisfactory product for use in the furnace. Sintering, the more recent process, has grown rapidly in favor, owing to its lower production costs and the large range of materials which may be treated by it, including blast furnace flue dust. The recovery of this dust alone in some cases warrants the installation of the process, particularly as, in addition to the iron ore recovered, the dust usually carries such an excess of fuel over what is required for its own treatment that a considerable proportion of other fine ore, without fuel, may be mixed and sintered with it. By these processes, and particularly sintering, many ores which in their natural state are unsuitable for use in the furnace, either owing to their mechanical condition or high sulphur content, or both, may be rendered suitable.

The Flux (Limestone or Dolomite)

Of the solid materials the flux, being easily acted upon by the heat and chemical reactions, and usually forming a small proportion of the mixture, is of less importance in connection with the question of preparation of materials. It is of sufficient importance, however, to receive consideration, as its mechanical condition has a definite bearing both upon distribution and rapidity of action in their bearing on economy. Although the effect is less in degree, it is the same in principle as in the case of the ore, and for similar reasons the flux should be broken to as nearly as practicable uniform size. In practice it has been found sufficient to break it to sizes not exceeding 4 or 6 in., or such as would pass through a 4-in. or 6-in. ring, although there is no disadvantage in breaking it to even smaller sizes. The author has had personal experience with large blast furnaces using oyster shells alone as flux over a considerable period, with perfectly satisfactory results, except that there was added to the waste gases a further objectionable feature to their usual asphyxiating qualities, their bad odor.

Blast

The only remaining raw material essentially used in blast furnace operation is the air which supplies the oxygen necessary for the combustion of the fuel. There is little to be said with regard to the blast under the heading of preparation of materials, that is, in its bearing upon modern furnace practice as distinguished from practice which is not "modern," except that the usual custom in the latter is to take the air as we find

it, although not always in all its purity. Too little attention is usually paid to this point.

Natural air in its purest state has its detrimental constituents, but as a rule little attempt is made to draw the supply for the blowing engines even as pure as it occurs. The proximity of boilers and free exhaust auxiliary machinery, and various sources of evaporation, too often charge the air near blast engine houses with quantities of moisture much in excess of that in natural air "in its purest state." In modern practice practically all exhaust steam is condensed, and a large proportion of the auxiliary machinery is electrically driven. There is therefore little, if any, opportunity for extraneous moisture to enter the blast engines with natural air. This is a feature of considerable importance, and has an appreciable bearing upon the economy of modern practice.

Although, in view of its lack of more general adoption, it has no direct bearing upon the subject of this paper, there is a treatment to which natural air may be subjected for its improvement for furnace purposes, which comes logically under the heading of preparation of materials. This is the question of dry blast or, to be more exact, the treatment of natural air for reducing its hygroscopic moisture to a uniform and low content —a treatment first introduced and practically demonstrated by James Gayley in 1904.

There has been a great deal of discussion and even contention (mainly theoretical) as to the merits of this process. At the time of its introduction it caused a great stir in iron producing centers, and during the following years a considerable number of plants were installed for its use, in the United States more particularly, and in Europe. Some of these installations are still used continuously, and some intermittently, in the United States; that is, they are used in the summer months when the moisture content of the air is high, and discontinued in the winter months when the moisture is naturally low. In other cases their use has been entirely discontinued.

There is, however, practically unanimous agreement among those who have used "dry blast" that its use does improve blast furnace results, although opinions differ as to the degree of the economy. The author has had an opportunity during the past eighteen months of discussing this matter with representative American furnace operators, particularly as to the reasons why the process has not been more generally adopted and its use continued more generally where plants have been installed. The explanation given is that the benefits obtainable from dry blast have been superseded by the great advance in blast furnace results brought about in recent years by improvements in furnace design, and the altered practice following those improvements. In other words, it has been possible to obtain in other ways advantages equal to those derivable from dry blast under the older practice. I believe that attitude to be a mistaken one and that, if every advantage which can be derived from dry blast is provided for, further improved results are obtainable in addition to those already had by the means above referred to.

There is one important feature in connection with the use of dry blast which seems to have been missed by those who have used and abandoned it, either partially or wholly, a feature which, in all probability, explains the attitude adopted toward it in the United States in conjunction with later American practice, and possibly elsewhere. This is the important factor of blast temperature. It is probably general experience (although there may be isolated cases to the contrary) that with natural air there is an upper limit to the temperature of blast which can be used with satisfactory and smooth working for any particular furnace. Any considerable increase beyond this limit causes "stickiness," "hanging" and irregular movement of the materials in the furnace. American blast furnacemen say that this is the case even with furnaces of the latest design, and a particular case was cited at one of the most modern plants in America, where very high temperatures of blast were tried, with results as above mentioned. The blast temperatures generally used range from 1150 to 1250 deg. Fahr., while with clean gas and modern stove design (and sufficient stove capacity) temperatures as high as 1500 to 1600 deg. Fahr. are obtainable.

Were it possible to make satisfactory use of this additional heat in the blast the economical advantage which could be derived need hardly be emphasized and any practicable means which would render this possible would confer a very important boon upon the iron producing industry. The author's experience is that such a means is available in dry blast, and that it is this further advantage of dry blast added to those which are already conceded it which would, if taken advantage of, settle the doubts of those who are still undecided, and convert those who have already condemned it.

(To be concluded)

Egyptians to Learn American Manufacturing Methods

WASHINGTON, Nov. 4.—Ten Egyptian students, graduates of the engineering and polytechnic schools of Egypt, sent to America by the Khedive's government to learn American manufacturing methods, arrived last week in Washington and have been placed by the Department of Commerce in automobile and other factories where they will for two years work as actual employees, with the purpose of carrying back to the land of the pyramids the industrial and technical knowledge and skill of the Americans.

Their coming was inspired and arranged by Lester Maynard, American Consul at Alexandria, who carried on the negotiations with the Egyptian government. The Egyptian government pays all the expenses of the mission.

The railroad and telephone students were placed by the division of transportation and communications of the department, the marine engineer and the student of Diesel and internal combustion engines by the division of industrial machinery, and the six prospective automobile engineers by the automotive division.

1921 Manufacture of Tin Plate

Figures of the Census Bureau show a considerable falling off between 1919 and 1921 in the activity of the plants making tin plate and terne plate. The figures for 1921 are based upon returns from 32 establishments (exclusive of retinning plants) with products valued at $99,128,800. This was a decrease of 45.5 per cent from the value of the 1919 product. Part of this decrease, however, is due to a lower price per lb., for the decrease in tonnage of output was only 31.4 per cent for tin plate and 30 per cent for terne plate. The unit value per lb. was given as 6.94c. in 1919 and 5.53c. in 1921. The table shows details of the report.

	1921	1919	Per Cent of Decrease
Total value of products ...	$99,128,800	$181,789,200	45.5
Tin plate:			
Pounds	1,638,373,000	2,388,867,000	31.4
Value	$90,531,000	$165,846,100	45.4
Coke:			
Pounds	1,605,958,000	2,352,317,000	31.7
Value	$88,263,200	$162,762,100	45.8
Charcoal:			
Pounds	32,415,000	36,550,000	11.3
Value	$2,267,800	$3,084,000	26.5
Terne plate:			
Pounds	87,108,000	124,920,000	30.0
Value	$5,650,500	$8,296,600	31.9
Other sheets (long terne):			
Pounds	9,864,800	50,860,000	80.6
Value	$580,100	$3,054,900	81.0
All other products, including plates redipped, scrap and retinned, and custom work and repairing	$2,366,965	$4,591,600	48.5

Fusibility of ash from coals of the United States is the subject of one of the new publications of the Bureau of Mines, being bulletin 209, by W. A. Selvig and A. C. Fielder. A limited number of this publication is available and requests should be made to the Director of the Bureau of Mines, Washington.

JAPANESE STOCKS STILL LARGE

Stocks Decline But Still Heavy—Rail Inquiry Coming—New England Interest in Foreign Iron

NEW YORK, Nov. 7.—Dullness continues in export with the Japanese market quiet both in governmental and private purchasing. A few small inquiries are reported from South American sources. Not only are prices low in Japan for sales of material out of stock, but stocks are estimated at as high as 170,000 tons of all kinds of material, exclusive of the Government Steel works stock, stated to total 70,000 tons. Large as this figure is, it represents a considerable decline from the estimated total of 350,000 tons held at the high point of the depression. At present, the stock on hand of light gage black sheets is estimated by the representative of one large steel exporting interest in this country at about 50,000 tons. The estimated consumption per month of this material in Japan is 6000 to 7000 tons. This representative, who recently arrived in New York, states that the docks and storage facilities at the ports in Japan are now quite normal in appearance, compared with the congestion that prevailed for many months. A fair resumption of black sheet buying in the spring is rather generally looked forward to by most companies dealing with Japan. At present, buying in European markets is largely in plates, shapes, bars and sheets, upon which quotations considerably below the American price are obtained.

While low prices have been received from European sellers of iron and steel by the Japanese, there is some dissatisfaction over the delayed deliveries which have ensued in many cases. A notable instance is that of the South Manchuria Railway Co., which, prior to its latest rail purchase, placed in the United States, awarded tonnage to a German mill. Although the order was placed early this year, it is stated that the rails have not yet been received. It is reported that the Imperial Government Railways is about to issue another rail tender, which will probably total about 5000 tons. An inquiry for structural material now current from a Japanese source calls for 4000 tons.

With the general tone of the export market quiet, some export houses are again interesting themselves in attempting to import European material, which it is claimed can be profitably done in some instances. The great obstacle to successful imports, however, are the delayed deliveries. Although foreign pig-iron is said to be obtainable for November and December delivery, on finished products, British and Continental mills are quoting nothing earlier than first quarter of next year. A slightly increased interest is noted in foreign foundry iron among New England foundries. One importer, who has been bringing in small lots from time to time, reports inquiries on his books totaling 2500 tons, but in the large majority of cases a price not to exceed $27 per ton duty paid on Scotch foundry iron, seems to be expected. At the present British market this is $1.50 to $2 per ton too low a basis on which to do business.

CANADIAN CONDITIONS

Steady Improvement Noted, But Pig Iron Production Still Light

TORONTO, Nov. 6.—The steady improvement in industrial activities that has made its appearance since the settlement of the coal strike in the United States has had a stimulating effect on the demand for practically all lines of iron and steel commodities. Both steel plants and foundries throughout Ontario and Quebec are operating on a more active scale than was possible six months ago and the outlook for the future is much more promising than in the earlier months of the year. In such lines as bars and sheets, mills are booked up for about six weeks and there is little or none of these commodities available for spot delivery from Canadian producers. A shortage of cars for transportation purposes is having a detrimental effect on operations in some quarters as shipment of raw materials to plants is being held up as a consequence. As a result of the difficulty in securing raw materials, the Baldwin Canadian Steel Corporation, Toronto, Ont., closed down its plant about eight weeks ago and as to when operations will be resumed is a matter of conjecture.

Pig Iron Market

The situation which developed in the Canadian pig iron market during the coal strike and transportation difficulties is now showing considerable improvement. Producers, however, are still operating only in a limited way and at the present time only one concern is carrying on a progressive sales campaign in foundry and malleable iron. Shipments of English and Scotch iron are making their appearance in the Ontario market in fairly large tonnages and consequently no shortage of iron is expected. Out of a total of 20 furnaces in Canada, only four are in operation at the present time. Of these one is being operated by the Algoma Steel Corporation, Sault Ste. Marie, Ont., on foundry; one by the Steel Co. of Canada, Hamilton, Ont., on basic and two by the Dominion Steel Corporation, Sydney, N. S., one on basic and one on foundry. Melters are showing but little concern regarding iron for future use and the greater part of the present activity is that regarding the demand on spot account, which ranges from 100 to 200 tons to a customer. During the past three weeks, Canadian producers reduced pig iron prices $3 per ton, and melters are expecting still greater reductions before the end of the year. Pig iron prices are now holding as follows: No. 1 and malleable, $36.30; No. 2, $35.30, Toronto, Ont. Montreal prices are: No. 1 and malleable, $38.70 and No. 2, $37.70. British iron, namely, Carron and Summerlee, are quoted at $33 to $35 per ton, dock, Montreal.

Finished Materials

Local mill representatives report active demand for various lines of iron and steel. The brisk activities that have prevailed in the building trades have had a good effect on the demand for shapes, beams and reinforcing bars, and together with requirements of 3000 tons of reinforcing bars for the Welland Canal, have resulted in a strong movement in these commodities for some time past. The Toronto mill price on shapes is strong at 2.40c. Plates are moving freely and inquiries are making their appearance from shipbuilders and repair yards as well as from boiler and tank makers who are reporting active operations at the present time. Plates are quoted at 2.30c., Toronto. The demand for bars has been strong throughout the past two or three months and as up to a very short time ago only limited shipments were arriving from American producers, Canadian mills were closing a very considerable portion of the bars required for consumption in the Dominion. To-day both jobbers and large consumers are entering the market for bars for spot and future delivery, but mills have little to offer inside of six weeks' time. Bars are quoted at 2.60c., Toronto. A good demand exists for black and galvanized sheets, and the mills at Hamilton are said to be operating at full time in order to keep up with the business on their books. No. 28 gage black sheets are quoted at 3.35c., and 28 gage galvanized at 4.60c., Toronto.

Youngstown as an Industrial Center

In a 40-page booklet, 8 x 11 in., the Diversified Industries Committee of the Youngstown Chamber of Commerce invites industries to locate in Youngstown. Attention is centered upon the industrial phases of Youngstown's development, without reference to historical facts. About 250 different lines of manufacture are listed as being comprised within Youngstown's group and illustrations are given of a large and diversified group of these industries.

It is of interest to note that the booklet gives the 1920 pig iron production of the Youngstown district, from 53 blast furnaces, as 5,617,057 tons. This may be compared with 8,034,000 tons, also in 1920, from the entire United Kingdom of Great Britain.

ADVANCING GERMAN PRICES

Large Company Earnings Fictitious Domestic Demand Strong But Foreign Buying Decreases

BERLIN, GERMANY, Oct. 19.—The great rise in iron and steel prices which took place in August almost ceased in September, through a temporary improvement in mark exchange; but in October it was renewed, owing to the dollars having passed the 3000 mark limit. This affected all metals. The minerals-group index of the *Frankfurter Zeitung* showed for August a rise from 18,355 to 42,648, and in September a movement from 42,648 to 54,905. The new increases this month are moderate. Pig iron prices are as follows, in marks per metric ton:

	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
Foundry iron, No. 1	35,173	32,696
Foundry iron, No. 3	35,103	32,626
Siegerland steel-iron	33,499	31,497
[illegible]	[illegible]	[illegible]

Steel Syndicate prices per metric ton on semi-finished and finished steels are as follows:

	Oct. 18	Oct. 11
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
Slabs	76,360	68,190
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
Wire rods	87,210	84,520
Sheets:		
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]

Steel Prices Relatively High

These rates vary from about 700 fold upward above pre-war rates; and therefore correspond to the external currency depreciation; but they are considerably higher than they would be based upon the internal currency depreciation. In other words, domestic steel prices are relatively dearer than domestic prices of most other commodities. The cost of foreign ore, and of coal, on which there is a tax of 40 per cent, sufficiently explains the disparity.

The iron and steel markets are still extraordinarily active. Privy Councillor Kloeckner, the head of the Lorraine company, says that while shortage of working capital threatens trouble, the general outlook is promising: "Foreign countries," he says, "still show willingness to buy, the overseas demand is great, England always appears among the givers of orders, and in general we have more work than we can do."

The last official labor report shows an increase from 6 to 7 per thousand in unemployed and on this ground the *Labor Gazette* prophesies a bad winter, but such unfavorable prophecies are made every fall. The *Frankfurter Zeitung* reports that the worst fears were held concerning the Frankfurt Fair, which was largely a metal and machinery exposition, but that the fears proved entirely baseless. Exhibitors and buyers appeared in large numbers.

The steel industry, however, is wholly under the influence of the currency crisis. Shortage of capital is great, and there is general uncertainty. Such uncertainty always prevails as long as the mark exchange is violently moving, and disappears during the intervening periods of relative stability. The shortage of coal and coke continues. Recent imports of English coal averaged 1,100,000 tons a month, costing over 11,000,000,000 paper marks monthly. No real loss is caused, as the foreign coal is used exclusively in industry, and is therefore an instrument for producing much more valuable goods. In September home coal rose by 2592 m. per metric ton to 4105 m. and a new heavy increase is due.

Importing to Export in Manufactured Condition

The domestic demand for heavy iron and steel, semi-finished materials, and finished metal products is unabated, but latest reports show that while foreign inquiries still come in abundantly, there is a slight decline in the volume of orders actually booked. Some metal concerns have been accepting foreign orders at prices that were too low. The increasing imports of heavy iron and steel are a cause of complaint in the trade press; but here again a relatively cheap material, which under present conditions foreigners cannot convert into finished products without loss, is so converted by Germany, and this is wholly to the national advantage.

In August, the last month reported, Germany imported 24,989 tons of pig iron, and exported only 6851 tons; and from January to August inclusive imports of pig iron totaled 173,042 tons and exports only 105,749 tons. Imports of ferroalloys exceed the exports; the imports of scrap from January to August were 381,856 tons against exports of 27,719 tons; and the imports of bars, girders and hoops were 446,121 tons against exports of 330,652 tons. Against this, Germany in the same eight months exported 27,665 tons of tools against 488 tons imports; 308,145 tons of machines against 7151 tons; 221,798 tons of ties, rails, etc., against 68,057 tons imported; 25,596 tons of farm machinery against 837 tons imported, and 27,009 tons of domestic iron and steel articles against 3285 tons imported. These figures tend to show that the apprehension that the Versailles Treaty would compel Germany to do Europe's roughest and worst-paid work (producing coal, pig iron, etc.) are unfounded, and that the policy proclaimed two years ago by Hugo Stinnes, when he established the Rhine Elbe Union, has become a fact. This policy was to keep at home metal and other raw materials, and to import if necessary more raw materials, in order that the output of high-priced finished products might be increased.

The Stahlwerk Becker is reported to be negotiating with a Luxemburg-Belgian-French group for the transfer of a large, if not a majority, interest to the group. The Phoenix company has decided to increase its capital from 275,000,000 to 300,000,000 marks. Increased profits and higher dividends are reported by nearly all steel companies, dividends ranging from 20 to 100 per cent, but the increases are fictitious, being gained in ever more depreciated marks. When allowance is made in some cases for considerable increases of capital, the gold dividends are much lower than the dividends of the preceding year.

This is the general course of Germany's steel industry. If a company's output is as high as before the war the paper mark profits should theoretically be several hundred fold higher than in 1914, the mark being internally depreciated about 500 fold. The real increases, however, are much smaller. The reason for this is that the main burden of taxation falls on the capitalist. The industrial worker, having always lived at near the existence minimum, cannot have his real wage materially reduced. From the national standpoint, this is a great advantage. Employment is provided if a great industrial concern only just pays its way or reaps small profits; while the ruined stockholders and bondholders are driven, as the *Frankfurter Zeitung* points out, into the ranks of the producers, and the result of the process is to increase the national wealth.

New England Plant Activities

About 125 union molders at the Saco Lowell Shops, Biddeford, Me., are on strike for a 20 per cent increase in wages. Less than 50 non-union men have remained at work. The strikers had been getting $5.20 per day.

The Pratt & Whitney Mfg. Co., Hartford, Conn., machinery and machine tools, has increased its running time to 50 hours per week. The company is employing about 1000 skilled workers or approximately 200 more than a year ago.

Cutlery and hardware manufacturers of New Britain, Conn., are running various departments overtime in an effort to keep up with incoming orders.

The most active foundries in New England to-day are those engaged on stove castings. A Taunton, Mass., stove maker is 5000 gas stoves behind orders, while a Watertown, Mass., concern is melting more iron than ever before in its history.

"FISHING EXPEDITIONS"

Court Decision May Make Federal Trade Commission More Cautious

WASHINGTON, Nov. 7.—Representatives of various trade associations in Washington believe that the recent decision of Judge Manton of the United States District Court of the southern district of New York, in which he condemned "fishing expeditions" will have a salutary effect upon the methods of the Federal Trade Commission in conducting its investigation and price inquiries. It has been the custom of the commission agent to pry into private files of corporations and individuals for the purpose of finding out whether they contained any evidence upon which charges of law violations could be based. Nothing, it is declared, was safe from the agents of the Government in their search for data. It is expected in some sources that the latest decision in the case of the Federal Trade Commission against the Lorillard company will restrain officials of the commission and make them modify their practice.

The Lorillard case is held to be an example of the methods used by the commission and an instance where it grossly exceeded its authority. According to the evidence in this case, the commission demanded all correspondence to and from the jobber customers of the Lorillard company for a period of a full year without any charge or complaint having been made against the company. The Manton decision revives interest in the fourth amendment to the Constitution, which makes the right of the people secure against unreasonable searches and seizures. It is significant to note that Judge Manton in his decision, said: "It is now well established that a corporation is entitled to invoke the guarantee of the fourth amendment against unreasonable searches and seizures in as full measure as would a person or partnership."

It is believed that certain members of the commission will insist that an appeal be taken to the United States Supreme Court to define the authority of the commission. As the matter now stands, the District Court has ruled that the Federal Trade Commission lacks lawful authority to go through the private papers of corporations or persons on "fishing expeditions," but that it may demand access to specified papers or records, for the purpose of securing specific evidence relating to a particular complaint, or other specific purpose authorized by law.

Expansion Plans of Ford Motor Co. of Canada

The Ford Motor Co. of Canada has definitely entered upon its expansion project announced some time ago, when the company was reported to have acquired extensive real estate holdings adjoining the present site of its plant at Ford City, Ont.

According to Walter R. Campbell, vice-president and treasurer of the company, the project includes the erection of docks and storage facilities on the river front, a power plant and machine shop which will, when completed, enable the Canadian Ford company to increase its output 60 to 100 per cent.

The power plant and pumping station will be large enough to supply the entire manufacturing plant with power and water for many years to come. All electrical wiring and piping for water, gas and heat for the various buildings will be carried through tunnels.

The first development will be the large machine shop to be erected on the 50 acre plot between the Grand Trunk right-of-way and the Essex terminal. The building will be one story, steel, 578 x 1080 ft. long. With this additional space the company will be able to increase its production more than 60 per cent.

On Oct. 25 an order for 2800 direct current motors was placed. Vice-president Campbell estimates that by May 1, 1923, the new machine shop will be ready to enter upon the new production schedule which has been set at 75,000 cars for the year. Under present conditions, the output for the fiscal year ending July 31 has been 45,000 and for the calendar year about 50,000 cars.

Increase in Employment in Steel Industry

WASHINGTON, Nov. 7.—The iron and steel industry showed a larger increase in the number of employees in October than any other industry, according to the report of the United States Employment Service, Department of Labor. The report records an increase in 12 of the 14 major industrial groups, representing 1428 concerns. On Oct. 31 these industries had 52,868 more employees on their payrolls than those carried on Sept. 30. Iron and steel revealed an increase of 19,348, according to the report. Increases in other industries, included railroad repair shop, 6700; stone, clay and glass, 1509; chemicals and allied product, 2946; vehicles for land transportation, 8272; lumber and its manufacture, 752; metal and metal products, other than iron and steel, 2444; miscellaneous industries, 4478; paper and printing, 912; leather and its finished products, 899; textiles and their products, 4223; food and kindred products, 1370. Decreases were shown in tobacco and liquor and beverages, employment in the former industry declining 1255, while in the case of liquor and beverages the increases were reported to be only six.

The report says "the iron and steel industry is rapidly recovering everywhere, although a car and labor shortage seems to be holding operations and employment to a 75 per cent production."

Program of National Founders' Meeting

The program of the annual meeting of the National Founders' Association, to be held at the Hotel Astor, New York, Nov. 22 and 23, is as follows:

Wednesday Morning Session:

Reports of President William H. Barr, Commissioner A. E. McClintock and Secretary J. M. Taylor.

Report of new membership committee, H. J. Boggis, chairman.

"The Proposal to Destroy the Judicial Power" by James A. Emery, counsel National Founders' Association.

Wednesday Afternoon Session:

"The Physician in Industry" by Dr. J. J. Moorhead, New York.

"The Open Shop" by John E. Edgerton, president National Association of Manufacturers.

"The Railroad Situation" by L. F. Loree, president Delaware & Hudson Railroad.

Dinner, Wednesday Evening:

Address by Samuel Harden Church, president Carnegie Institute.

Thursday Morning Session:

"Improved Foundry Practice" by D. R. Wilson, vice-president Wilson Foundry & Machine Co.

"Apprenticeship" by William M. Taylor, Chandler & Taylor Co.

Reports of committees and election of officers.

Mahoning Valley Scrap Market

YOUNGSTOWN, Nov. 7.—There has been an appreciable decline in buying of old metals by Valley steel plants. Most of them are producing larger tonnages of scrap in the various processes of rolling down ingots into finished products, while several have large accumulations in their yards which they prefer to work off to some extent before entering the market on any extensive scale.

Heavy melting scrap is purchasable at $21, while compressed sheets are quotable around $20.

Extensive scrap piles in the yards of steel makers indicate that some of the leading interests are well fortified in this respect. One company has a large tonnage of old rails ready for melting as its needs require.

Plans of New Companies

The Chicago Auto Parts Co., 3732-6 South Wallace Street, Chicago, was recently incorporated to manufacture automobile equipment, but will not do any manufacturing for a time. It has leased buildings and will handle under contract a line of replacement fenders manufactured by the Fostoria Pressed Steel Co., Fostoria, Ohio. It plans to handle any product of importance in the automotive sheet metal line, including headlamps, running board enclosures, splash shields, radiator shells, etc.

The Newark Screen Corporation, Brooklyn, was recently incorporated with a capital of $10,000 to manufacture screens and other wire products. T. F. Twyford, 44 Beaver Street, New York, is corporate representative.

John T. Hill & Co., Inc., 1318 Continental Building, Baltimore, Md., has been organized recently by John T. Hill, formerly president of R. C. Hoffman & Co., Inc., and is receiving inquiries for relaying rails, scrap, track material, black and galvanized sheets, reinforcing material and bars. The firm will also act as consulting engineers.

The Paul Mfg. Co., 5243 Western Avenue, Detroit, has been incorporated with a capital of $30,000, to operate a general machine works and to manufacture machinery. Its immediate activities will be confined practically to the manufacture of washing machines, since it has purchased the business of the James Washing Machine Co. The present locations is only temporary. Plans are already under way for a modern factory of 100,000 sq. ft. capacity which will be completed some time next spring. The officers of the company are: Richard R. Paul, president; Lorin R. Runkle, vice-president; Raymond M. Merline, secretary and treasurer.

The Martin Demountable Rim Co., Flint, Mich., has been incorporated with a capital of $100,000, to manufacture metal rims for automobile wheels. The incorporators are: Walter S. Martin, Wage H. Horn, and Andrew W. Begin, 1325 Avenue B, Flint.

The Met-All Mfg. Co., Detroit, has been organized to take over the business of the Tube Products Co., 2699 Guoin Street, Detroit, and was recently incorporated with a capital of $500,000. Its products will include steel tubing and metal ladders. The officers of the company are: C. S. Jacobs, president; F. L. Jacobs, treasurer; and C. R. Robinson, secretary.

The Universal Body Corporation, 230 East Ohio Street, Chicago, has been incorporated with a capital of $50,000 to manufacture automobile bodies and parts. Under the present plans manufacturing will be confined to bodies of the closed type. Within the next three months wood-working and metal-working machinery will probably be needed. There are still some contracts to be awarded for body equipment. In addition to its plant at Thirty-ninth Street and State Streets, the company has leased a building of 24,000 sq. ft. J. L. Geier is president and W. H. Heggem is secretary.

The Paragon Disk Wheel Co., 254 Hawthorne Avenue, Portland, Ore., has been incorporated with a capital of $100,000 to manufacture metal wheels for automotive service. During the last two years the company manufactured Paragon steel disk wheels under the name Wilkinson Brothers. The incorporators are: Thomas Wilkinson, general manager; William Wilkinson and George N. Schell, all of Portland.

The Hillman-Ayres Mfg. Co., P. O. Box No. 2, Kansas City, Mo., has been organized to manufacture machine tools and other machinery, but for the present will confine its activities to Kewanee-Laclede oil business for hot air furnaces, power boilers, forging and annealing furnaces, etc. The company is headed by J. P. and A. A. Hillman and W. B. Laughlin, all of Kansas City.

The Houghton Mfg. Co., Chicago, was recently incorporated and will manufacture tire pumps and other automotive accessories. Initial operations have been started on a limited scale. H. T. Houghton is president and treasurer.

The National Motor Castings Co., South Haven, Mich., has been incorporated with a capital of $250,000 to manufacture iron, steel and other metal castings. The company does a general foundry business, but specializes in motor castings. Its present capacity is about 1300 tons per month. This company was formerly chartered in Delaware. R. B. Campbell is president and he, with F. H. Gallagher and G. H. Wisting, all of South Haven, are the incorporators.

The Sterling Cutlery Corporation, 20 Hamilton Street, Paterson, N. J., which was recently incorporated, will manu-

Trade Changes

The Ellwood Steel Corporation, Ellwood City, Pa., has changed its name to the Ellwood City Nail Co., this name being more definitive of the company's activities, which are chiefly in the production of wire nails. The company, which was incorporated earlier in the year under Pennsylvania laws with a capital of $5,000, recently increased the capital to $250,000. Officers of the company are: President, George E. Blythe; vice-president, John E. Tyler; secretary, Ira E. Bixler; treasurer, August Miller; directors, J. A. Gelbach, J. W. Offutt and Walter Scott.

The Consolidated Tool Works, Inc., 296 Broadway, New York, has made the following recent additions to its sales force: William H. Thompson, formerly with the Union Hardware Co., Torrington, Conn., is representative in New York City; Howard A. Postley, formerly with the Knickerbocker Mfg. Co., Belleville, N. J., is representative in New England territory; William L. Rubin, formerly with the Jacobs Scale Co., New York, will cover Pennsylvania, New York, Maryland, District of Columbia, and parts of West Virginia and Ohio, and Charles Alburtus, formerly with the American Safety Razor Co., Brooklyn, N. Y., will act as representative in New Jersey.

The Dominion Asbestos & Rubber Corporation has removed its offices from 154 Nassau Street to 1780 Broadway, New York. It has recently added to its line the Dominion brake block for use on heavy hoisting apparatus.

The Boston office of the Carnegie Steel Co. has been moved from the second floor, 200 Devonshire St., to the seventh floor.

C. M. Lovsted & Co., malleable and steel car castings, frogs and switches, has removed its offices and warehouse at Seattle, Wash., from 316 to 2212-16 First Avenue South.

Frederick Franz, who for the past four years has been chief engineer of the Terminal Engineering Co., manufacturer of trucks designed for combined indoor and other service for railroads, shipping and industrial plants, has established an engineering office at 27 Warren St., New York, for the purpose of solving special problems of engineering relating to labor saving machinery.

The Firth-Sterling Steel Co., 310-14 Hudson St., New York, announces the addition to its line of Globe polished drill rods drawn by the Globe Wire Co., Sharpsburg, Pa. These rods are made from steel produced by the Firth-Sterling company. Complete stocks are now carried in its New York, Boston and Philadelphia warehouses.

The Cleveland office of the Independent Pneumatic Tool Co., 600 West Jackson Boulevard, Chicago, has been removed to 1204-5 Citizens Building.

The Angle Steel Stool Co., Otsego, Mich., has removed to a recently completed factory at Plainwell, Mich., where increased facilities will be provided. C. E. Pipp is president and general manager.

A reorganization of the sales and operating forces of the Atlas Steel Corporation, Dunkirk, N. Y., is being effected. Louis J. Campbell, formerly president of the Electric Alloy Steel Co., is to be chairman of the board, and Arthur H. Hunter, formerly president Atlas Crucible Steel Co., will be president.

Joseph Beal & Co., 465 Atlantic Avenue, Boston, have been made representative agents for the South Bend Lathe Works, South Bend, Ind., in a large section of eastern New England.

John S. Burdick, formerly vice-president and general manager Buffalo Body Corporation, has incorporated a company to be known as the Burdick-Atkinson Corporation, 33 Scott Street, Hamburg, N. Y.

The Edward G. Budd Mfg. Co., sheet metal worker, Philadelphia, is preparing for an authorized increase of capital in the near future, the purpose of which is to take care of plant expansions. It has purchased the Shoch Building, which it has occupied for some time; also the property of the Simmons Co. from which it will derive 150,000 sq. ft. of additional floor space. A contract has been awarded for the completion of the Simmons building.

The Southern Dry Dock & Shipbuilding Co., Orange, Tex., has arranged for a change of name to the Orange Car & Steel Co. Operations in the future will be concentrated on steel railroad car construction and repairs.

After Federal Judge Cooper signed the order last week confirming the sale of the Syracuse plant of the Willys Corporation to W. C. Durant, it was learned that this property will be turned over to the T. W. Warner Corporation, Toledo, Ohio.

Machinery Markets and News of the Works

SLOWLY IMPROVING

National Tube Company's Award the Leading Activity

Buying from Miscellaneous Sources Better—Railroad and Automotive Purchases Fall Off

A slight improvement is noted generally, but more especially in the cities in the central section. Steady increase is reported from Cincinnati, where the early October rate of buying is expected to be maintained if not increased during the present month; planers seem to have been particularly active during the week. In Chicago business from miscellaneous sources has been better, several fair sized purchases being noted. Cleveland reports improvement with business from scattered sources predominating, and turret lathe manufacturers booking orders for small machines from the brass industry. Very little expansion of sales is reported from New England, although prospective purchasers are more numerous. New York reports a dearth of inquiry and sales. Used machinery in some districts is not in competition with new tools to the extent that formerly prevailed.

The outstanding activity of the week was the award of 41 cranes for its new works at Gary, Ind., and 12 heavy machine tools by the National Tube Co. It is estimated that the complete order involved an expenditure of more than $500,000. A large list is being figured on for equipment to go direct to the Gary plant.

In the automotive field the trade is looking for considerable business from the Durant interest for its new plant at Flint, Mich. The actual requirements have not as yet been revealed. Except for the placing of a few single machines automobile manufacturers have not been in the market.

Railroad buying has fallen off. The Chicago & Northwestern has bought five machines against its list and a purchase of two machines by the New York Central is noted. The Missouri-Kansas-Texas placed three planers and is buying other equipment. Purchases on the list E-1566 of the Pittsburgh & Lake Erie are expected within two weeks. The Chicago, Burlington & Quincy is expected to close the remainder of its list soon.

Recent inquiries include the Lombard Governor Co., Ashland, Mass., for a tool room lathe, boring mill and some miscellaneous equipment. The General Electric Co. at Lynn, has issued a small list and has inquired for presses and other equipment for its Pittsfield and Bridgeport plants.

Several new crane inquiries are noted.

New York

NEW YORK, Nov. 7.

THERE has been a dearth of machine-tool inquiry and sales in the past week. Eastern machine-tool companies find that orders are coming more freely from Chicago, Cleveland and other cities in the central section of the country than from the East. While buying in the New York territory has shown a steady increase in the past few months, the volume of business done in October showing a gain over that of September, there is still a great deal of room for improvement. The Baldwin Locomotive Works has bought a Niles planer, 130 x 84 in. x 20 ft.

A few new inquiries for overhead traveling cranes are current and a number of old ones are still pending. Slight activity is noted in the hand power crane field and in sales to dealers of chain blocks. Sellers of locomotive cranes report a fair number of inquiries, but few purchases in this district. Among recent inquiries for electric traveling cranes is one from the General Electric Co., calling for bids on a 60-ton, 60-ft. span, 4-motor overhead traveling crane for Pittsfield, Mass. The crane is to be installed to replace two 30-ton overhead cranes. The inquiry of the U. G. I. Contracting Co., Philadelphia, for a 100-ton overhead traveling crane, which has been pending for some time, has been revised and now calls for a 50-ton, 52-ft. span, 4-motor, overhead traveling crane. Barnet Weinstein, 53 Boerum Street, Brooklyn, N. Y., is reported to be in the market for a small hand-power crane. Russell, Burdsall & Ward, Portchester, N. Y., are receiving bids on monorail hoists.

Among recent purchasers are:

Sanderson & Porter, 52 William Street, New York, consulting engineers, a 110-ton electric traveling crane from the Cleveland Crane & Engineering Co.

American Abrasive Metals Co., 50 Church Street, New York, a 3-ton, 45-ft. span, 3-motor overhead traveling crane from the Shepard Electric Crane & Hoist Co.

McGowan & Arnott, Brooklyn, N. Y., a 5-ton, 26-ft. span, 3-motor, overhead traveling crane from the Shepard Electric Crane & Hoist Co.

Duquesne Slag Products Co., Diamond Bank Building, Pittsburgh, a 20-ton, 50-ft. boom locomotive crane and a 15-ton, rebuilt Industrial locomotive crane from the Industrial Works.

Dwight P. Robinson, Inc., 61 Broadway, New York, a 40-ton, 80-ft. lattice boom, with 20-ft. and 10-ft. removable sections, for use in Alabama, from the Industrial Works.

New York Central & Hudson River Railroad, New York, a 5-ton electric hoist from the Shepard Electric Crane & Hoist Co.

Lisenby Mfg. Co., Fresno, Cal., a 1-ton, 37-ft. span, 3-motor, overhead traveling crane from the Shepard Electric Crane & Hoist Co.

Edward L. Soule, San Francisco, Cal., a 5-ton, cage control, mono-rail hoist from the Shepard Electric Crane & Hoist Co.

Chattanooga Stamping & Enameling Co., Chattanooga, Tenn., a 1-ton, 27-ft. span, overhead traveling crane, from the Shepard Electric Crane & Hoist Co.

American Agricultural Chemical Co., 2 Rector Street, New York, a 3-ton electric hoist for Everett, Mass., from an unnamed manufacturer.

Philip T. King, 30 Church Street, New York, dealer, has purchased a 30-ton Browning, two 20-ton Brownhoist and one 15-ton Industrial locomotive cranes, used, from the Pusey & Jones Shipbuilding Co., Gloucester City, N. J.

Rome Mfg. Co., Rome, N. Y., a 35-ton, 35-ft. span, 5-motor, double trolley, overhead traveling crane from the Niles-Bement-Pond Co.

The American Can Co., 120 Broadway, New York, has plans for a new four-story factory at Boston and Hudson Streets, Baltimore, 90 x 160 ft., to cost approximately $350,000, including machinery. C. J. Preis, company address, is engineer.

The National Biscuit Co., Tenth Avenue and Fifteenth Street, New York, will commence the erection of a three-story service building and repair works, 20 x 70 ft., at 407-11 West Sixteenth Street, for company automobiles and trucks, estimated to cost $60,000.

The Bureau of Supplies and Accounts, Navy Department, Washington, will take bids until Nov. 21 for 90 oil coolers for the Brooklyn Navy Yard.

The Standard Gas Light Co., 130 East Fifteenth Street, New York, will erect a new service building and machine repair works, 98 x 200 ft., for automobiles and trucks, at 405-15 East Thirty-second Street, to cost $65,000.

The Erie Railroad Co., 50 Church Street, New York, has arranged for the consolidation of its four operating districts into three divisions, abolishing that at Hornell, N. Y. With the exception of the repair shops at Meadville, Pa., and Marion, Ohio, all locomotive and car shops will be under direct company supervision and no outside contracts will be operative.

The Miller Rubber Co., 256 West Fifty-fifth Street, New York, manufacturer of tires and tubes, will commence the erection of an addition to its plant at Akron, Ohio, 70 x 105 ft., estimated to cost $25,000.

A power house will be erected in connection with the new hospital on Mamaroneck Avenue, White Plains, N. Y., planned by the New York Orthopedic Hospital, Third Avenue and Twenty-third Street, New York, estimated to cost approximately $500,000.

The Gardner Hygienic Ice Co., 915 Cypress Avenue, Brooklyn, is taking bids for a one-story service building and machine repair shop, 100 x 100 ft., estimated to cost $50,000. Louis Berger & Co., 1652 Myrtle Avenue, Brooklyn, are architects.

The Superintendent of Lighthouses, Staten Island, will receive bids until Nov. 20 for 180 acetylene cylinders, 88 ft., [illegible] and one extra motor-generator.

A power house [illegible] refrigerating plant will be installed in the proposed terminal market to be constructed by the Department of Plant and Structures, Municipal Building, New York, at the 145th Street bridge, between 161st Street and the Harlem River, to cost in excess of $5,000,000.

The New York Central Railroad Co., 466 Lexington Avenue, New York, C. S. White, purchasing agent, room 344, will receive bids until Nov. 16 for electric motors and controllers, as set forth in circular inquiry No. 32, 1922.

The Transit Commission, 49 Lafayette Street, New York, has foundations in progress for a third addition to the car repair shops of the Interborough Rapid Transit Co., Lenox Avenue and 147th Street, estimated to cost $500,000.

A complete power plant, including electrical department, ice and refrigerating plants, will be installed in the new hospital to be erected by the Beth Israel Hospital, 70 Jefferson Street, New York, estimated to cost $3,000,000. Louis A. Abramson, 46 West Forty-sixth Street, is architect.

The Falls Rivet Co., 261 Broadway, New York, will build a one-story addition to its plant at Kent, Ohio, 165 x 210 ft., estimated to cost $50,000.

A new one-story pumping plant will be built on Willow Avenue, Clifton, S. I., by the New York & Richmond Gas Co., Bay Street, Stapleton, S. I.

The International Petroleum Co., 120 Broadway, New York, has initial work in progress on a new refinery at the mouth of the Magdalena River, Peru, to have a daily capacity of 25,000 bbl.

The Plaza Metal Bed Co., 5 La Grange Street, Brooklyn, will make improvements and extensions in its three-story plant for general increase in manufacture.

The Standard Oil Co. of New Jersey, 26 Broadway, New York, will arrange a fund from its recent 400 per cent stock dividend allotment for extensions and improvements in refineries in different parts of the country, storage and distributing plants, etc.

The George H. Stern Lumber Co., 545 East Seventy-first Street, New York, will build a power house in connection with its new plant on property lately acquired on Sixty-ninth Street, estimated to cost $100,000. Plans are being prepared by William H. Gompert, 117 Madison Avenue.

The McNab & Harlin Mfg. Co., 110 William Street, New York, manufacturer of iron, steel and brass pipe, etc., with plant at Paterson, N. J., has disposed of a bond issue of $750,000, a portion of the proceeds to be used for extensions.

A power house will be installed in the new six-story and basement building, 50 x 80 ft., to be erected at 652-60 Bergen Avenue, Jersey City, N. J., by the local Y. M. C. A., 76 Montgomery Street, Jersey City, N. J., [illegible] 1819 Broadway, New York, is architect.

Robinson & Co., Frenchtown, N. J., manufacturer of metal [illegible] Belvidere, N. J., for a new plant.

The Thomson Machine Co., Belleville, N. J., manufacturer of bakers' machinery and parts, will dispose of its factory on Main Street, to concentrate operations at its new plant on Cortland Street, now in course of erection, approximating 40,000 sq. ft. Considerable additional equipment will be installed.

The New Jersey Power & Light Co., Dover, N. J., has acquired the plant and property of the Hackettstown Electric Light Co., Hackettstown, N. J., and will take possession Jan. 1. Extensions and improvements are planned, including the merging with the system of the new owner.

New pumping machinery, power equipment, etc., will be installed at the waterworks plant of the Maple Shade Water Co., Maple Shade, N. J., in connection with enlargements and improvements, to cost $50,000.

William Benke, Newark, manufacturer of automobile bodies, has purchased the one-story building, 85 x 100 ft., at 343-49 Elizabeth Avenue, for a new plant.

Ovens, power equipment, conveying machinery and other electrical and mechanical equipment will be installed in the one and two-story plant to be erected on Abingdon Avenue, Newark, N. J., by Dugan Brothers, 287 Broadway, Brooklyn, to be 150 x 167 ft. and 50 x 167 ft., respectively, estimated to cost $200,000. Marshall N. Shoemaker, 15 Central Avenue, Newark, is architect.

The Orenstein Trunk Co., 338 Central Avenue, Newark, has leased the second floor of the building at Plane and Hackett Streets for a new manufacturing plant. Employment will be given to about 250.

C. W. Curtiss, Newark, formerly general manager Splitdorf Electrical Co., 98 Warren Street, and Carl T. Mason, previously chief engineer of the same company, have organized the Metropolitan Radio Corporation to operate a plant at 67-71 Goble Street, for the manufacture of receiving sets, head phones, jacks and other wireless apparatus. Mr. Curtiss will be president and Mr. Mason chief engineer.

Catalogs covering equipment for diamond mining, cutting and finishing are wanted by Antonio Parra, Venezuela Trading Co., 251 Broadway, New York.

New England

BOSTON, Nov. 6.

SALES of machine tools in this district the past week showed little if any expansion, yet prospective business has increased and the general outlook perhaps is more encouraging. The purchase of eight cam milling machines by a Massachusetts manufacturer constitutes the largest individual sale of new equipment. Other transactions include a 20-in. x 10-ft. lathe and a power saw, a 30-in. x 8-ft. planer, large cutting machine, disk grinder, a 20-in. used drill, 12-in. x 5-ft. tool room lathe, three used Porter-Cable lathes, an automatic screw slotter, saw and filing equipment, three special automatic machines for squaring the ends of taps, and miscellaneous new and used tools.

The Lombard Governor Co., Ashland, Mass., is in the market for a tool room lathe, boring mill and miscellaneous equipment; the General Electric Co., Lynn, has issued a small list of individual tools, but the actual purchase may be put over until 1923. It also has inquiries out for presses and other equipment for its Pittsfield and Bridgeport plants. In addition there are several new sizable inquiries of a private nature which eliminates competition, details of which are lacking. Although nothing definite has transpired, most of the New England railroads are making up their 1923 budgets, and indications strongly point to larger equipment purchases than heretofore. Several leading manufacturing interests have definitely decided to hold over until 1923 purchases of machinery.

Sales of hangers are heavier than in several months, and small chain hoists are in better demand. Vises are more active, while bookings of drills and other small tools and repair parts are holding their own. Makers of gasoline gages, automobile timers and numerous other small appliances are buying die castings on a larger scale than in any previous month this year.

The Bellevue Monumental Works, Lawrence, Mass., has awarded contract for a one and two-story shop, 40 x 53 ft., on Manchester Street.

The J. J. Walsh Co., 1540 Columbus Avenue, Roxbury, Boston, truck bodies, has awarded a contract for the erection of a one-story, 72 x 122 ft. manufacturing unit on Columbus Avenue and Center Street.

The Stanley Works, New Britain, Conn., builders' hardware, etc., has purchased about one and one-half acres of adjoining land, together with buildings and railroad sidings, for future expansion. For light manufacturing purposes it has rented two floors in a New Britain Machine Co. unit.

The Underwood Typewriter Co., Hartford, Conn., has purchased from the Johns-Pratt Co. that city, property on Capitol Avenue consisting of six main manufacturing units, containing about 92,000 sq. ft. floor space, a boiler plant and engine room. The price was approximately $125,000. The company will utilize this additional space for manufacturing purposes as soon as the present equipment has been removed and new machinery installed.

The Union Hardware Co., Torrington, Conn., has preliminary plans for an addition and later it is proposed to build a three-story factory on Mignon Avenue, in the vicinity of the present office building.

The Eastern Massachusetts Electric Co., 201 Devonshire Street, Boston, has petitioned the Department of Public Utilities for permission to issue capital stock for $110,000, and bonds for $75,000, a portion of the proceeds to be used for extensions and improvements.

Rolls-Royce of America, Inc., Springfield, Mass., has disposed of a bond issue of $2,000,000, a portion of the proceeds to be used for extensions.

A power house and electrical department will be installed in the new office building to be erected by the Aetna Life Insurance Co., 650 Main Street, Hartford, Conn., estimated to cost $3,000,000. James G. Rogers, 367 Lexington Avenue, New York, is architect.

The National Collapsible Tube Co., 362 Carpenter Street, Providence, R. I., has completed plans for a one-story addition.

M. Strauss, Boston, operating a sheet metal works at 53 Merrimac Street, is planning for the installation of automatic shears, punch, and other equipment. Used machinery in good condition will be considered.

The Bethlehem Shipbuilding Corporation, Boston, operating the Fore River shipyard, has acquired the Simpson Patent Dry Docks, Jefferies Point, East Boston, consisting of three dry docks, plate shop, machine shop, power house and other buildings. Immediate operations are proposed. The plant will be known as the Simpson Works of the company. S. Wylie Wakeman, general manager at Fore River, will act in the same capacity here.

The Macrodi Fibre Co., Carnation Street, Woonsocket, R. I., has awarded contract to F. Pelletier, Woonsocket, for a new one-story factory, 60 x 150 ft., estimated to cost $45,000.

Pittsburgh

PITTSBURGH, Nov. 6.

THE past week has been featured by the closing of much machine tool and equipment business which has been pending for some time. Outstanding among the awards are the 41 cranes by the National Tube Co. for its new works at Gary, Ind., and 12 heavy tools, eventually for that plant, but which will be shipped to its Lorain, Ohio, works for the manufacture of special equipment for the Gary plant. The crane business, as intimated in THE IRON AGE of Nov. 2, was divided between a Michigan and an Ohio builder.

It is estimated that the complete crane and tool order involved the expenditure of more than $500,000. This order is merely an initial one and a large list to go direct to Gary is being figured on. The Union Railroad, the Steel Corporation interplant rail system in the Pittsburgh district, has closed for a 600-ton wheel press which will be furnished by the Chambersburg Engineering Co., Chambersburg, Pa. The latter also will furnish two board drop hammers for Hubbard & Co., Pittsburgh. The Pennsylvania Railroad and the Pittsburgh & Lake Erie Railroad lists still are pending, but action is expected soon.

The Shaw Electric Crane Co., Muskegon, Mich., will furnish 28 four-hook cranes of the following capacities and spans to the National Tube Co.: Four 10-ton, 84-ft. span; four 10-ton, 52-ft. span; eight 10-ton, 60-ft. span; one 20-ton, 60-ft. span; seven 10-ton, 106-ft. span; four 10-ton, 76-ft. span. The Alliance Machine Co., Alliance, Ohio, was awarded 13 standard cranes of the following capacities and spans by the same company: One 10-ton, 84-ft. span; one 10-ton, 5-ton auxiliary, 84-ft. span; one 10-ton, 61-ft. span; two 15-ton, 5-ton auxiliary, 61-ft. span; three 5-ton, 32-ft. span; one 10-ton, 5-ton auxiliary, 37-ft. span; two 10-ton, 37-ft. span; one 5-ton, 37-ft. span; one 20-ton, 84-ft. span.

The tool award of the National Tube Co. was one 72-in. x 77-in. x 22 ft. open side Cincinnati planer; one 36-in. x 36-in. x 14-ft. open side Gray planer; one 48-in. x 48-in. x 20-ft. open side Gray planer; one 6-ft. American radial drill; one Cincinnati universal milling machine; one 42-in. Bullard vertical boring mill; one Niles-Bement-Pond horizontal boring machine; two-18-in. x 10-ft. American lathes; one 24-in. x 14 ft. Greaves & Klusman lathe; one 24-in. Springfield lathe; one 26-in. open side Coulter crank-shaper.

The week's sales of cranes included one 50-ton overhead for the South Side Pittsburgh works, Jones & Laughlin Steel Co., to the Morgan Engineering Co., Alliance, Ohio; one 15-ton, 42-ft. span, 20-ft. lift, hand-power crane for the Yorkville, Ohio, works, Wheeling Steel Corporation, placed with the Whiting Corporation, Harvey, Ill., and two 2-ton 33-ft. span cranes for the H. J. Heinz Co., Pittsburgh, to the Northern Engineering Works, Detroit. The Cutler Steel Co., Pittsburgh, with a plant at New Cumberland, W. Va., is in the market for a 10-ton crane.

The Beaver County Light Co., 435 Sixth Avenue, Pittsburgh, has plans under way for a new power house at New Brighton, Pa., to cost $35,000. H. L. Fullerton, 5444 Kincaid Street, is engineer.

The Raymilton Oil Refining Co., Raymilton, Pa., has purchased a site at Mercer, Pa., for a new refinery. The present plant will be removed to the new location, and the capacity increased.

The Board of Public Works, Wheeling, W. Va., has commissioned J. N. Chester, Union Building, Pittsburgh, engineer, to prepare plans for a new power house, electrically-operated pumping plant, intake and filtration plant at the municipal waterworks, to cost about $1,000,000, including five steel tanks, 1,000,000-gal. capacity, total.

The Federal Enameling & Stamping Co., McKees Rocks, Pa., will soon take bids for a three-story addition on Thompson Avenue. Frank Frimmer, 1133 Charles Street, is engineer. C. E. Chriatian is in charge.

The Harbison-Walker Refractories Co., Oliver Building, Pittsburgh, has arranged a program for extensions and improvements at its Blandburg, Pa., plants to cost approximately $1,000,000.

The Guilbert Steel Co., Diamond Bank Building, Pittsburgh, now being organized under State laws to make application for a charter on Nov. 14, has tentative plans for a one-story plant, 55 x 200 ft., in the West Park district, to cost approximately $100,000, including equipment. It will manufacture general steel products, with works to include a fabricating department. O. E. Guilbert and R. G. Stewart head the company, which is represented by John Rebman, Jr., 43 St. Nicholas Building.

The National Metal Molding Co., Fulton Building, Pittsburgh, has completed plans for a one-story addition to its plant at Ambridge, Pa., 100 x 100 ft.

The Superior Auto Accessories Co., 1342 Forbes Street, Pittsburgh, has leased a site at Baum Boulevard and Woodworth Street, for a new one-story plant.

The Pennsylvania Silverware Co., Kane, Pa., recently organized, has acquired the local plant and business of the Oneida Fountain Supply Co. Production will be continued in this line, with the addition of metal and silverware specialties. Increased capital has been arranged for expansion. F. C. Westfall, former official of the Oneida company, will be president and general manager of the new organization; W. W. Browning is general superintendent.

The Standard Steel Spring Co., Coraopolis, Pa., has awarded contract to the Pittsburgh Bridge & Iron Works, Pittsburgh, for a one-story addition, 65 x 140 ft.

The Board of Works, Pittsburgh, will build a power house in connection with the proposed new hospital at the Leech Farms to cost $180,000. J. P. Brennan, Municipal Building, Northside, is architect.

The Belgrade Glass Co., Buckhannon, W. Va., is planning to rebuild its machine shop and other departments destroyed by fire Oct. 29, with loss estimated at $35,000.

The Alley Glass Co., Shinnston, W. Va., has tentative plans under consideration for a new plant, including power house, machine shop and other departments, estimated to cost $250,000, including equipment. L. E. Alley is president.

The United States Engineer Office, Huntington, W. Va., is planning for a new power house at Dam 30, Ohio River, to cost $35,000.

The Huntington Iron Works, Huntington, W. Va., operating a structural steel fabricating plant, has plans under consideration for an addition to double, approximately, the present capacity.

The Mercer Refining Co., Franklin, Pa., is said to be planning the installation of new transmission, conveying and other machinery at its refinery. W. C. Hastings is treasurer.

Philadelphia

PHILADELPHIA, Nov. 6.

A ONE-STORY power house will be built by the Wilmot Fleming Iron & Steel Co., 956 Foulkrod Street, Philadelphia, at its new plant to be located at Cottman and G Streets. Wilmot Fleming is treasurer.

The American Ice Co., Sixth and Arch Streets, Philadelphia, is taking bids until Nov. 13 for a new plant at Duncannon and Mascher Streets, estimated to cost $60,000.

Handling machinery, producers, boilers and other equipment will be installed by the United Gas Improvement Co., Broad and Arch Streets, Philadelphia, in an addition to the Philadelphia Gas Works, Station B, Richmond and Tioga Streets, estimated to cost approximately $1,000,000. The company will also build an addition to its plant at Delaware and Buckius Streets.

The Bureau of Supplies and Accounts, Navy Department, Washington, D. C., will take bids until Nov. 21, for 350 wheels for landing gears, for use at the Philadelphia Navy Yard, schedule 281.

A power house, ice and refrigerating plant will be installed in the new factory of the Breyer Ice Cream Co., Ninth and Cumberland Streets, Philadelphia, on a two acre site just acquired on Forty-third Street. It is estimated to cost $500,000 with machinery.

The Scott Paper Co., Foot of Market Street, Philadelphia, has disposed of a preferred stock issue of $642,700, a portion of the proceeds to be used in connection with extensions to its plant at Chester, Pa.

The John B. Stetson Co., Columbia Avenue and Fifth Street, Philadelphia, will build a one-story machine and repair shop, 75 x 125 ft., in connection with new buildings at its hat factory. J. O. Potts, Montgomery Avenue and Fifth Streets, is architect.

John H. Shriner, Philadelphia, will install a refrigerating and cold storage plant in the five-story building at 8 North Front Street, recently acquired.

The Foreign Trade Bureau of the Philadelphia Commercial Museum, Thirty-fourth Street, has received an inquiry from a company at Zawiercie, Poland, for cement manufacturing machinery for installation in a local plant, to include a main rotating furnace with capacity of 40,000 metric tons per year, cooling equipment, etc. Full information available upon request.

The Philadelphia & Reading Railroad Co., Reading Terminal, Philadelphia, has preliminary plans for inlargements in its engine house and repair shops at Newberry Junction, Pa.

The Franklin Institute, 15 South Seventh Street, Philadelphia, has had plans prepared for a new four-story electrical laboratory building, 55 x 110 ft., at Nineteenth and Cherry Streets, estimated to cost approximately $250,000, including equipment.

Motors, controllers and other electrical and mechanical power equipment will be installed in the new eight-story addition to the plant of the Ketterlinus Lithographic Mfg. Co., Fourth and Arch Streets, Philadelphia, for which bids are being asked. The Ballinger Co., Twelfth and Chestnut Streets, is architect.

Henry Hugh, Lime and Chester Streets, Lancaster, Pa., has preliminary plans for a one-story machine and repair shop at Rockland and Pennsylvania Streets, 25 x 50 ft. Guy Linville, 509 South Lime Street, is architect.

The Lycoming Motors Corporation, Williamsport, Pa., has perfected a new automobile motor and will make enlargements in its plant to develop an output of about 125 motors per day. The present working force of 700 will be increased.

The Altoona & Logan Valley Electric Railway Co., Altoona, Pa., has plans in preparation for an addition to its power house. The installation will include a generator, condensing engine, surface condenser and auxiliary equipment. The F. D. Hain Co., 203 Coleridge Avenue, Llyswen, Altoona, is engineer.

Fire, Oct. 29, destroyed a portion of the plant of the Gaylord & Butler Pipe Co., Pine Brook, Scranton, Pa., manufacturer of heating equipment, etc., with loss estimated at $40,000. It is planned to rebuild.

Motors, controllers, transmission machinery and other equipment will be installed in the new two-story printing [illegible] New Castle, Pa., estimated to cost $80,000.

The Harrisburg Mfg. & Boiler Co., Nineteenth and Naudain Streets, Harrisburg, Pa., has acquired property at Bolton and Brookwood Streets for expansion.

[illegible] from the Steinmetz Estate for a new plant to manufacture [illegible] recently with a capital of $75,000, with John H. Lloyd, Lebanon, Pa., president, and W. W. Mish, Annville, treasurer.

The Girard Model Works, Inc., Girard, Pa., is planning for the installation of equipment to manufacture small springs, wire specialties, etc. S. L. Connell is head.

A. F. Teel, Wind Gap, Pa., has plans in progress for a slate mill to cost $50,000, with grinding, cutting, finishing and other machinery.

Chicago

CHICAGO, Nov. 6.

THE Chicago & Northwestern has started buying against its list, thus far having closed for two crank planers, an 18-in. lathe, an upright drill, and a shear. The New York Central Lines have bought a 42-in. boring mill and a 5-ft. radial drill from a local dealer. The Chicago, Burlington & Quincy has not made any further purchases, but is expected to close the remainder of its general list soon. Except for occasional purchases of one or two machines, buying by automobile manufacturers has ceased. The Studebaker Corporation, South Bend, Ind., has purchased two additional "Simplimatic" turret lathes, while the Nash Motors Co., Kenosha, Wis., has closed for a lapping machine and a drill press.

Business from miscellaneous sources is somewhat better, several fair-sized purchases having been reported. The Apollo Player Piano Co., De Kalb, Ill., has placed orders for a No. 3 universal milling machine, a 16-in. crank shaper, universal cutter and reamer grinder, and a 20-in. drill press. The Mantle Lamp Co. of America, Chicago, has purchased an 18-in. engine lathe and a 16-in. shaper. The Crescent Steel Furnace Co., a new company located in Cherry Street on Goose Island, Chicago, has purchased a tool room outfit, consisting of a shaper, milling machine, engine lathe, drill press and planer. No further price changes are reported.

The Wisconsin Steel Works, South Chicago, has ordered a 15-ton three-motor skullcracker crane with magnet drum and 85-ft. 9-in. span from the Morgan Engineering Co. The Shepard Electric Crane & Hoist Co. has recently taken the following orders: A 2-ton hoist, the Wisconsin River Paper & Pulp Co., Neenah, Wis.; 4-ton hoist, the Grafton Foundry Co., Grafton, Wis.; 1-ton hoist, the Illinois Steel Bridge Co., Jacksonville, Ill.; a 1¼-ton hoist, the Lake Erie & Western Railroad; two 1-ton hoists, the Nash Motors Co., Kenosha, Wis.; a 1-ton hoist with 2¼-hp. back-geared motor, the Studebaker Corporation, South Bend, Ind.; a ½-ton hoist, Doerman & Roehrer, Cincinnati; a ½-ton hoist, the Steinman & Meyer Furniture Co., Cincinnati, and three 1½-ton ice plant cranes, the Vilter Mfg. Co., Milwaukee.

Manton & Smith have purchased the one-story steel constructed factory at 3333-49 West Grand Avenue, Chicago, and will occupy it for the manufacture of ornamental and architectural iron and bronze work. The building, which is 150 x 216 ft., will undergo extensive alterations. The partners, James S. Manton and Edward Smith were formerly connected with the Winslow Brothers Co., Chicago. They have the contract for all of the ornamental iron and bronze work for the London Guarantee & Accident Co., Building, Chicago, now under construction, and have just completed a similar contract for the Chicago Juvenile Court building.

The Houghton Mfg. Co., 115 South Clinton Street, Chicago, recently incorporated with $10,000 capital stock, will manufacture automobile tire pumps and a number of Ford accessories not yet determined. The company has leased 2000 sq. ft. of floor space at the above address and has purchased its initial equipment. Officers are H. P. Houghton, president and treasurer, and Rudolph Probandt, secretary.

The Kokomo Steel & Wire Co., Kokomo, Ind., has started the construction of a new building, 90 x 425 ft., to house its galvanizing department, estimated cost $50,000.

The Fort Wayne Foundry & Machine Co., Fort Wayne, Ind., will build an addition, 36 x 85 ft., to be used as an assembling room.

The Andrews Wire & Iron Works, Rockford, Ill., will erect two additions which will double the size of its plant. The estimated cost, exclusive of heating, lighting and plumbing, is $20,000.

The Roos Co., Harrison and Circle Avenues, Forest Park, Ill., manufacturer of cabinets, is taking bids for a one and

two-story addition, 150 x 425 ft., to cost about $200,000, including machinery. Holabird & Roche, 104 South Michigan Avenue, Chicago, are architects.

The Union Pacific Railroad Co., Omaha, Neb., has tentative plans for an addition to its locomotive repair shops and engine house at Columbus, Neb.

The Commanding Officer, Rock Island Arsenal, Rock Island, Ill., will take bids until Nov. 17 for 160 steering clutch springs, 50 drag link springs, 50 draw bar springs, 320 roller frame springs, and 10 support springs, circular 416-A; also, for 130 brass oil pressure gages, circular 414-A; and until Nov. 15, for 420 master clutch friction disks, 220 intake heater gaskets, and 320 cylinder head gaskets, circular 413-A.

Voightmann & Co., 445 West Erie Street, Chicago, manufacturers of metal windows, etc., have preliminary plans under way for a new one-story and basement addition. Mundie & Jensen, 39 South La Salle Street, are architects.

The Interstate and Foreign Trade Department, Chicago Association of Commerce, 10 South La Salle Street, Chicago, reports an inquiry from a company in New Orleans, for a quantity of low pressure crude oil burners, rotary or turbine type, No. 1591; also, from a company at Oakland, Cal., for 5000 drop forge wrenches, No. 1668. Full information on request at the office noted.

The International Harvester Co., of America, 606 South Michigan Avenue, Chicago, has plans for a one-story motor service and repair shop at Clybourn and Diversey Avenues, estimated to cost $65,000.

The Elgin Stove & Oven Co., 14 Chicago Street, Elgin, Ill., has awarded a contract to L. Balkin, 538 South Clark Street, Chicago, for a three-story addition at State and Schiller Streets, to cost $100,000, including machinery.

The Board of Directors, Memorial Hospital, Harvey, Ill., has completed plans for a new one-story power house. Chatten & Hammond, 64 East Van Buren Street, Chicago, are architects.

The Continental Gas & Electric Corporation, Omaha, Neb., has acquired the plants and propertics of the Union Power & Light Co., operating in Nebraska, Iowa and South Dakota. Plans are under way for extensions and improvements. Rufus E. Lee is president.

The Carter-Mayhew Mfg. Co., Fifth Avenue, South, Minneapolis, Minn., manufacturer of iron and steel products, has plans under way for a new one-story foundry, 60 x 100 ft., estimated to cost $25,000.

Fire, Oct. 29, destroyed a portion of the plant of the Columbus Auto Co., Columbus, Neb., manufacturer of automobile parts, etc., with loss estimated at $50,000. It is planned to rebuild.

The Common Council, Carroll, Iowa, will install two electrically-operated pumping plants in connection with a new sewerage system.

The City Council, Muscatine, Iowa, has commissioned Arthur L. Mullergren. Kansas City, Mo., engineer, to prepare plans for a municipal electric light and power plant to cost approximately $350,000, with machinery.

The plant of the Fremont Mfg. Co., Fremont, Neb., occupied by the Sure Hatch Incubator Co., and the Crystal Refrigerator Co., subsidiary organizations, was almost completely destroyed by fire Oct. 23, with loss estimated at $200,000, including buildings and machinery. It is planned to rebuild.

The White Lake Co-Operative Creamery Association, White Lake, S. D., will build a machine shop in connection with its proposed new plant. J. L. Jensen is secretary and manager.

Buffalo

BUFFALO, Nov. 6.

CONTRACT has been awarded by the Continental Heater Co., Otter Street, Dunkirk, N. Y., for a one-story addition, 65 x 220 ft., estimated to cost $25,000.

The Onondaga Litholite Co., 102 Beech Street, Syracuse, N. Y., manufacturer of composition stone products, has plans in progress for a one-story addition, 40 x 600 ft., for cutting, finishing and other work, to cost about $50,000. The Watson Engineering Co., 4614 Prospect Avenue, Cleveland, is engineer.

The Power Corporation of New York, Watertown, N. Y., recently organized by officials of the Northern New York Utilities, Inc., of the same place, is disposing of a bond issue of $5,000,000, the proceeds to be used for the acquisition and construction of new power plants. John N. Carlisle is president of both companies.

The American Can Co., 120 Broadway, New York, plans for a new four-story building on Parce Avenue, Fairport, N. Y., 75 x 175 ft., to cost $45,000.

The Ontario Knife Co., Empire Street, Franklinville, N. Y., is considering the erection of an addition, size and details still to be determined.

E. H. Norton and associates, Brockport, N. Y., have acquired the local plant and business of the Decker Mfg. Co., manufacturer of power spraying equipment. Extensions are contemplated. Mr. Norton was previously connected with the company.

The Norwich Gas & Electric Co., Norwich, N. Y., plans for the construction of a new power line and other extensions to cost approximately $30,000.

H. H. Masters, 87 Virginia Place, Buffalo, is arranging for the installation of additional machine shop equipment.

A power house and refrigerating plant will be installed in the proposed new county home to be erected by the Erie County Board of Supervisors, City Hall, Buffalo, at Alden, N. Y. Kidd & Kidd, 234 Delaware Avenue, Buffalo, are architects.

The Adirondack Power & Light Corporation, Glens Falls, N. Y., has acquired the Glens Falls Gas & Electric Light Corporation, Consolidated Light & Power Co., Whitehall, N. Y., and the Ballston Spa Light & Power Co., Ballston Spa, N. Y. The properties will be consolidated and extensions and improvements made.

Cincinnati

CINCINNATI, Nov. 6.

BUSINESS in machine tools is showing a steady improvement, and while railroad buying, which formed the biggest part of the volume during October has fallen off, orders from industrial concerns are pretty well filling the gap, and the early October rate of buying bids fair to be maintained, if not increased the present month. Planers are particularly in demand, one manufacturer in this district having booked orders for 10 the past week, and another a single order for six.

The Missouri-Kansas-Texas Railway also placed an order for three planers and is buying other equipment. A railroad equipment manufacturer closed for six planers of a special design. An Eastern railroad bought two heavy duty lathes in the local market, and a Dayton foundry placed an order for three used Bullard automatics. The J. H. Day Co., Cincinnati, bought two radial drills and the Chicago Mill & Lumber Co. is also reported to have bought a number of tools for a new plant in Chicago. The National Cash Register Co., Dayton, was a buyer in a small way.

No action has been taken on the latest list of four machines issued by the Southern Railroad, although on a previous inquiry one machine has been purchased. Local manufacturers are working on the Pittsburgh & Lake Erie Railroad list E-1566, and it is expected that purchases will be made within two weeks. Orders for scattered machines from industrial and automotive sources continue to be booked by local manufacturers, and taken as a whole, the future of the industry is brighter than it has been for at least two years.

The National Elevator Co., Indianapolis, has purchased property along the Big Four tracks, and is having plans prepared for the erection of a grain elevator to cost with equipment about $75,000.

Core making and molding equipment will be installed in the addition being erected to the plant of the Advance Foundry Co., Dayton, Ohio. The extra space will enable the company to increase its capacity 50 per cent.

The Tucker Boiler Works Co., Newark, Ohio, will engage in the manufacture of large tanks for the gas and oil trade and is planning an addition to its present works on Indiana Street. It will also engage extensively in the welding business. William Tucker is president.

The buildings and equipment of the Rapid Rim Co., Huntington, Ind., has been sold at receiver's sale to W. H. Collins and associates of Chicago and Fort Wayne, Ind., who will finish the buildings and install equipment for the manufacture of enamel ware.

The old car shops of the Chicago & Eastern Illinois Railroad at Brazil, Ind., including the round house and engine house, abandoned when the machinery and equipment were moved to Evansville, have been taken over by Hammond & Jeffers, operating at Kansas City and Indianapolis. The shops are to be used on car repair work for the Cincinnati, Indianapolis & Western and other railroads.

Cleveland

CLEVELAND, Nov. 6.

LOCAL machine tool business shows improvement. While no round lot purchases are reported, dealers are getting a very satisfactory volume of orders which are usually for single machines, although some are for two or three tools. Buying is from widely scattered sources, and is mostly for replacements. October sales of some dealers showed a fair gain over any of the few preceding months. The demand for new machinery is better than for used tools. Turret lathe manufacturers are getting quite a few orders for small machines from the brass industry. No railroad purchases are reported.

In the automotive field the trade is looking for considerable business from the Durant interests for equipping a new plant at Flint, Mich., for making the Star car, but so far machine tool manufacturers have been unable to secure any definite information as to the requirements of this plant. An inquiry has come out for about 10 used machines, mostly presses and shears for the Detroit service department of an automobile spring company. The Horsburgh & Scott Co., Cleveland, has purchased a 12 x 48-in. Pratt & Whitney thread milling machine.

No further price changes are reported but intimations are coming from some machine tool builders that they will probably advance prices shortly.

Some slowing down in the automotive industry is indicated by curtailment this month in operations by foundries having large orders for motor castings. The employment of labor in the various Cleveland industries increased 2 per cent during October, according to the monthly report of the Chamber of Commerce that is compiled from reports made by 100 plants having 500 or more employees. Iron and steel and metal-working plants outside of the automotive field showed a gain of 5.90 per cent in the number of employees on Oct. 31, as compared with Sept. 30. Automobile and allied plants reported a falling off of 5.10 per cent in employment.

The National Screw & Tack Co., Cleveland, is having plans prepared for a five-story addition to relieve some of the congestion that now exists in the various departments.

The Lippitt Textile & Machine Co., Cleveland, has been incorporated with a capital stock of $80,000 by E. Lippitt and others and will engage in the manufacture of knitting machines. The company has leased the plant of the Cleveland Underwear Co.

The McCorkle Screen Products Co., Akron, Ohio, in which H. L. McCorkle and others are interested, will erect a plant for the manufacture of window and door screens, weather strips and other products.

The Towmotor Co., Cleveland, reports the recent receipt of four repeat orders, one from the United Alloy Steel Corporation, Canton, Ohio; one from Herbrandt Co., Fremont, Ohio, and an order for two machines from Ball Brothers, making a fleet of eight operated by the latter concern.

The Henle Co., Cleveland, has been incorporated and has established a plant at 1838 Central Avenue for the manufacture of advertising signs. Edward J. Henle is president.

The Ideal Electric & Mfg. Co., Mansfield, Ohio, has placed a contract with the Austin Co., Cleveland, for an additional factory building, 100 x 325 ft., with a 20-ton crane aisle 50 ft. wide and two machine shop aisles 25 ft. wide.

Detroit

DETROIT, Nov. 6.

THE Michigan Central Railroad Co., Detroit, has taken bids on a general contract for a new one-story car repair shop, 30 x 200 ft., at Niles, Mich., and will soon lay foundations.

The Common Council, Portland, Mich., is arranging for the installation of new equipment at the municipal power plant, to cost close to $15,000.

The Whitehead & Kales Co., River Rouge, Mich, operating a structural steel works, plans the installation of a new angle shear, punch and other equipment.

The Witters Motor Co., 147 Weston Street, S. E., Grand Rapids, Mich., has awarded contract to L. P. Oltman, 110 Pearl Street, N. W., for a new two-story service and repair building, 100 x 110 ft., to cost $25,000, exclusive of equipment.

The Ford Motor Co., Highland Park, Mich., has had plans drawn for a two-story gas producer plant, 60 x 150 ft., at its proposed glass factory at Flat Rock, Mich., estimated to cost $100,000. The entire plant will represent an investment of close to $1,000,000. Albert Kahn, 1000 Marquette Building, Detroit, is architect.

The Detroit Edison Co., Detroit, is arranging for a bond issue of $15,000,000, a portion of the proceeds to be used for extensions and improvements.

The Kalamazoo Stationery Co., Kalamazoo, Mich., has tentative plans for additions to the paper mill at Taylorville, Mich., recently acquired, to double the present capacity. Equipment will be installed for 500 employees.

The Bryant Paper Co., Kalamazoo, Mich., will commence the erection of a new one-story power plant, 60 x 100 ft., to cost approximately $100,000, including equipment.

The Kawneer Mfg. Co., Niles, Mich., manufacturer of metal store fronts, will erect an addition to its plant in the near future. The new building will be 60 x 260 ft., three stories, of brick and steel.

Baltimore

BALTIMORE, Nov. 6.

JOHN S. METCALF & CO., 108 South La Salle Street, Chicago, engineers, have been engaged by the Baltimore & Ohio Railroad Co., Baltimore, to prepare plans for new grain elevators at Locust Point to replace those destroyed by fire last July with loss of $1,000,000. Bids for machinery will be called within 90 days, to include power equipment, belt conveyors, mechanical draft apparatus, cleaning and drying equipment, etc. The plant is estimated to cost $3,000,000.

The Purchasing Agent, Post Office Department, Washington, will take bids until Nov. 15 for 2200 boxes of lock washers; also until Nov. 17, for 200 truck casters with iron wheels.

The Quartermaster, United States Army, Washington, will receive bids until Nov. 10 for one 10-hp. motor, 220-volt, single phase, 60-cycle, circular 235.

The Battey Machinery Co., Rome, Ga., is in the market for an automatic gear cutter, used, good condition.

The Common Council, Davidson, N. C., has plans in progress for a municipal electric light and power plant, for which bonds for $60,000 were voted recently, including waterworks improvements.

The Dunlevi Lumber Co., Inc., Savannah, Ga., recently organized to consolidate the company of the same name and the Southern Lumber Co., both of Allenhurst, Ga., has plans under consideration for new mills, with power house and machine shop, to increase the capacity to 50,000,000 ft. per year. E. V. Dunlevi is president.

The Thompson Auto Repair Co., 509 West Marshall Street, Richmond, Va., plans for the installation of a lathe and other machine shop equipment.

G. W. Morse & Sons, Forest Hill, Md., are planning for the purchase of a boring machine for boring heavy wood posts.

The United States Engineer Office, Norfolk, Va., will take bids until Dec. 4 for two power houses at Fort Story, Cape Henry, Va., as per specifications on file.

The Georgia Talc Co., Asheville, N. C., has inquiries out for motors, transformers and other equipment.

The General Purchasing Officer, Panama Canal, Washington, will take bids until Nov. 22 for the following equipment for the canal zone: Machine bolts, steel rivets, steel rope, high-tension insulators, electric motor transformer, copper wire, fuses and renewals, padlocks, steel filing cabinets, etc., all as set forth in circular 1500.

The Shenandoah Valley Co-Operative Milk Producers' Association, Strasburg, Va., has plans under way for a new power house and ice and refrigerating plant in connection with its new distributing works. J. L. Barr, 224 St. Paul Street, Baltimore, is consulting engineer.

D. C. Elphinstone, 408 Continental Building, Baltimore, machinery dealer, is making inquiries for one electrically operated crane, 75 ft. boom, with capacity for handling a 2-yd. clamshell bucket.

The Butters-Camp Mfg. Co., Atlanta, Ga., manufacturer of automobile locks and locking devices, has preliminary plans for a new factory for a large increase in capacity.

Officials of the Potomac Public Service Co., Hagerstown, Md., have organized the Williamsport Power Co., Williamsport, Md., to build and operate a local steam-operated power plant to cost about $1,500,000. It will have an initial capacity of 18,000 kw., which later will be increased to 40,000 kw.

The Night & Day Service Co., 900 West Broad Street, Richmond, Va., is planning for the installation of a drill press, lathe and other equipment. C. B. Hatch is head.

The Atlantic Ice & Coal Corporation, Athens, Ga., has completed plans for a new cold storage and refrigerating plant to cost $60,000.

The Terminal Bus Line Co., Asheville, N. C., will install a complete machine and repair shop in its new three-story terminal, estimated to cost in excess of $80,000.

The Chief Signal Officer, United States Army, Washington, will receive bids until Nov. 18 for 120 pliers, 500 machine screws, 500 spiral springs, 500 brass washers, 500 crank handles, 500 crank pivots, 100 connectors, 200 ft. of lead sleeving, 600 terminal strips, etc., circular 11229—A-4-C. P.; until Nov. 20 for switchboard supplies, including wire, connecting blocks, terminals, induction coils, etc., circular 12873—1 C. P.

The Columbus Electric & Power Co., Columbus, Ga., is arranging an appropriation of $250,000 for hydroelectric power plants and transmission lines. R. M. Harding is general manager.

The Studebaker Automobile Agency, Washington, has awarded contract to the Wardman Construction Co., Washington, for a four-story factory branch and service building, 60 x 100 ft., on Fourteenth Street, N.W., to cost $75,000.

The General Ice Delivery, Inc., 117 Campbell Avenue Roanoke, Va., has plans in progress for a two-story service and machine repair works, 25 x 104 ft. Eubank & Caldwell, Boxley Building, are architects.

The Pacific Coast

SAN FRANCISCO, Oct. 31.

BIDS will be taken at once by the Goodrich Rubber Co., 401 Mission Street, San Francisco, for its new plant on West Second Street, six stories, 65 x 160 ft., estimated to cost approximately $150,000. H. C. Baumann, 251 Kearny Street, is architect.

The Union Pacific Railroad Co., Engineering Department, Omaha, Neb., has plans in progress for shop buildings in the vicinity of the Belvedere Gardens, Los Angeles, to cost in excess of $80,000.

The Madera Sugar Pine Co., Madera, Cal., has completed plans for a new saw mill, power house and tramway system, estimated to cost $80,000. Work will soon be commenced.

The United States Molybdenum Metals, Ltd., 16 Natoma Street, San Francisco, operating in the St. Helens mining district, near Spirit Lake, Wash., has purchased the former shipyards of the Standifer Shipbuilding Co., Vancouver, Wash., as a site for a new metal reduction plant, including power house, machine shop and other structures.

Beers & Bennett, Vancouver, Wash., are considering plans for a new mill on the Nehalem River, near St. Helens, Ore., to be equipped for a capacity of 20,000 ft. per day. A power house will also be erected.

The Great Western Meter Co., Emeryville, Cal., has awarded contract to H. P. Nelson, 1947 Blake Street, Berkeley, Cal., for a new one and two-story plant, estimated to cost $30,000.

Charles A. Criss, Anaheim, Cal., has had plans prepared for three new buildings for the manufacture of cement, brick and kindred products, estimated to cost $35,000.

The Yamhill Electric Co., Newberg, Ore., has acquired the municipal power plants at Sheridan, Amity and Willamina, Ore. Extensions and improvements will be made, including the installation of additional equipment, and the properties merged.

The National Motor Bearing Co., San Francisco, has leased the building at 1609 Pine Street for a new plant to manufacture die-cast metal and bronze back motor bearings and kindred automotive equipment. A. S. and L. A. Johnson head the company.

The Black Package Co., 1025 Van Ness Avenue, Fresno, Cal., will install an ice and refrigerating plant in its new two-story building, for which plans are being prepared, estimated to cost approximately $150,000.

The Gulf States

BIRMINGHAM, Nov. 6.

THE Oil Belt Power Co., Eastland, Tex., has plans under way for an addition to its electric generating plant to double the present capacity. The installation is estimated to cost in excess of $200,000. J. E. Lewis is vice-president and general manager.

The McIntosh Utilities Co., McIntosh, Fla., recently organized, has completed plans for a new ice-manufacturing and cold storage plant to cost $50,000. N. A. Russell is secretary and treasurer.

The Houston Lighting & Power Co., Houston, Tex., has arranged for an increase in capital from $3,000,000 to $4,500,000, a portion of the proceeds to be used for extensions.

An ice-manufacturing and refrigerating plant will be installed in the two-story municipal market, 150 x 200 ft., to be erected at Third Avenue and Twenty-third Street, Birmingham, by the City Council, estimated to cost $200,000.

The Rodriquez Spring Wheel Co., 602 Third Street, Baton Rouge, La., recently organized, is perfecting plans for a new factory to manufacture spring wheels for automobiles and trucks, estimated to cost $50,000. A. J. Rodriquez is president.

The Bastrop Pulp & Paper Co., Bastrop, La., has arranged for a bond issue of $650,000, a portion of the proceeds to be used for extensions and improvements.

The Griswold Oil & Refining Co., Henrietta, Tex., has acquired the local refinery of the Beacon Oil Co. and plans for extensions and improvements. A pipe line with pumping plants will be constructed.

The Stickle Lumber Corporation, Maple Avenue, Dallas, Tex., has plans for a new mill, 100 x 200 ft., with power house, 60 x 60 ft., estimated to cost $80,000. R. O. Jameson, American National Bank Building, is consulting engineer.

The Common Council, Birmingham, is planning for extensions in the municipal electric power plant at North Birmingham, including the installation of additional equipment. William L. Harrison is chairman of the Board of Public Utilities.

The United States Gasoline Corporation, Texas City, Tex., has acquired about 75 acres as a site for a new refinery. The initial unit will be equipped for a daily capacity of 100,000 gal. and is estimated to cost $250,000. Three additional units will be built later.

The Ashbrook Veneer Co., Lumberton, Miss., recently organized, will establish a local mill and will install rotary cutters, motors, transmission equipment, etc. C. B. Ashbrook heads the company.

The Swiftsure Petroleum Co., Texas City, Tex., will make extensions in its storage and distributing plant, including the installation of two steel storage tanks, each with capacity of 55,000 bbl.

The St. Petersburg Welding & Machine Co., St. Petersburg, Fla., is perfecting plans for the establishment of a machine shop. It was organized recently with T. D. Orr as president, and A. M. Galaher, treasurer.

Fire, Oct. 22, destroyed a portion of the plant of the Dallas Paper Co., Law Street, Dallas, Tex., with loss estimated at $60,000, including equipment.

The Spinks Ice & Mfg. Co., Shubuta, Miss., is planning for the installation of a new electric power plant, to be operated as an auxiliary of its hydroelectric generating station. T. M. Spinks is head.

E. W. Parker, Curry Building, Tampa, Fla., is arranging for the purchase of a steam shovel for grading operations.

The County Commissioners, Fort Pierce, Fla., has completed plans for a two-story service and repair shop, 60 x 120 ft., for County automobiles and trucks.

The Common Council, Plaquimine, La., is arranging for the sale of a bond issue of $150,000, the proceeds to be used for the installation of a municipal electric power plant.

W. A. Hoffman and E. E. Burleigh, Daytona, Fla., are organizing a company to construct and operate a plant for the manufacture of sash, doors, etc. A site, 155 x 380 ft., has been selected and plans are being drawn. Most of the machinery will be electrically operated. Mr. Hoffman will be president of the company.

The Louisiana Sand & Gravel Co., Monroe, La., is making inquiries for a 200-hp. boiler, marine type, with auxiliary equipment. T. E. Stephenson is president.

Milwaukee

MILWAUKEE, Nov. 6.

CURRENT sales of machine tools remain limited largely to single items, but trade is slowly overcoming its spotty characteristics. Inquiry is coming from a greater variety of sources and some classes of tools are in broader demand than in two years. The numerous vocational or continuation schools erected by Wisconsin municipalities have also reached the stage where purchases of equipment are being made. Public garage and repair shop tools are moving actively and absorbing considerable used equipment, although new machinery is also being purchased. Less complaint is being heard concerning the pressure of used machinery stocks in competition with new equipment. Production of milling machines has been increased further.

The Gurney Refrigeration Co., Fond du Lac, Wis., manufacturer of refrigerators, will start work [illegible] on a three-story addition, 60 x 150 ft., and extensions of the engine room and boiler house, the work to cost approximately $100,000. F. J. Stepinski, local architect, is in charge. A miscellaneous list of machinery, largely for wood and sheet metal working processes, will be required.

The Ogren Motor Car Co., 692-698 National Avenue, Milwaukee, manufacturer of passenger automobiles, has increased its authorized capitalization from $500,000 to $1,000,000 to finance the enlargement of the factory, purchase of additional equipment, and generally accommodate the growth of the business. Details of the program have not yet been made public. Fred G. Smith, 115 Grand Avenue, is president and general manager.

The Common Council, Sheboygan, Wis., has appropriated $50,000 to the local Board of Vocational Education to buy machinery and other equipment for the vocational institute division of the new Sheboygan high school, now being completed. The list of requirements is now being compiled.

The Wisconsin Sheet Metal Works, 636 Twelfth Street, Milwaukee, has purchased the real estate and buildings at 2928 Lisbon Avenue, which will be remodeled and re-equipped to provide an increase of 150 to 200 per cent of the capacity of the present works.

The Brown County Motors Corporation, 445 South Jackson Street, Green Bay, Wis., has let the general contract to the H. J. Selmer Co., local, for a brick and steel sales and service building, 50 x 150 ft., part two stories and basement, estimated to cost $32,000. Joseph Piaskowski is president.

The Combination Door Co., Fond du Lac, Wis., has engaged B. E. Mehner, local architect, to design a new three-story factory and warehouse, 50 x 174 ft., of brick and concrete, with steel sash, costing about $60,000 with woodworking and other machinery. L. J. Schmidt is president.

The A. F. Geisinger Mfg. Co., Milwaukee, has been organized with $25,000 capital stock by Arthur F. Geisinger, 1007 Twenty-second Street; Albert J. Holzhauer and Daniel Fisher to engage in the production of machinery and mechanical equipment. A statement detailing plans for a factory will be issued shortly.

The Prentiss-Wabers Co., Wisconsin Rapids, Wis., manufacturer of hot air heating units for tourists and sportsmen, has plans for a two-story brick and concrete extension, 34 x 110 ft., to contain the enameling, assembling and testing floors and shipping room. The capital stock is being increased from $60,000 to $100,000 for construction and equipment investment. T. A. Taylor is president and general manager.

The Prairie du Chien, Wis., Tool Co., manufacturer of wrenches, tools and automotive specialties, has increased its capital stock from $50,000 to $100,000 to provide for additions, purchase of new equipment and generally accommodate the expansion of the business.

The Racine Pure Milk Co., Racine, Wis., has engaged Cahill & Douglas, consulting engineers, 217 West Water Street, Milwaukee, to design and contract for the erection and equipment of a new boiler house, 30 x 50-ft., with a 125-ft. stack.

The Durant Motor Sales Co., Wausau, Wis., will build a two-story brick sales and service building, 60 x 80 ft., designed by Oppenhamer & Obel, architects, Wausau and Green Bay, Wis. It will cost about $25,000 complete. Max L. Tisch, 208 Washington Street, is proprietor.

The Perrigo Foundry & Machine Co., Beloit, Wis., has been incorporated with a capital stock of $150,000 to manufacture iron, steel and other metal products. It succeeds to the business established by William S. Perrigo, 808 Emerson Street, and J. E. Halverson, who have been engaged in the foundry and machine shop business in Beloit for many years.

The Janesville-Caloric Co., Janesville, Wis., has been organized by Walter McGill and M. A. Hudson of Chicago, and F. M. Coyle, Janesville, to take over the local factory of the Stafford-Caloric Co., effective Nov. 1. The new owners will until Jan. 1 continue the manufacture of folding chairs for the Stafford company of Chicago, and meanwhile remodel and retool parts of the factory for the production of electric fireless cookers, with a daily capacity of 400 to 500. M. A. Hudson is vice-president in charge of production, and F. M. Coyle, present general superintendent, will continue in this capacity.

The Michigan State Board of Industrial Education has let the general contract to the Albinson Construction Co., Minneapolis, Minn., for a training school at Marquette, Mich., to cost $178,772. Other contracts and the equipment will make the total cost approximately $275,000.

The Stratford, Wis., Light & Power Co., has applied for permission to issue $15,000 in new securities to build a substation and erect a light and power transmission line for local service. Current is purchased from the Wisconsin Valley Electric Co., Wausau, Wis.

The Wisconsin Cylinder Foundry Co., Racine, Wis., has increased its capitalization from $50,000 to $75,000 and will employ the new issue to enlarge production. It specializes in gas engine cylinder castings.

The F. & G. Auto Parts Co., Stevens Point, Wis., started work Nov. 1 on a one-story brick addition, 35 x 102 ft.

The Drummond, Wis., Board of Education let the general contract for a new $125,000 high school and manual training institute to N. F. Weaver, Owen, Wis.

Indiana

INDIANAPOLIS, Nov. 6.

W. H. COLLINS, South Bend, Ind., and J. B. White and C. E. Hadsell, both of Fort Wayne, Ind., have acquired the plant of the Rapid Rim Co., Huntington, Ind., at public sale for $75,000. The new owners will take immediate possession and will organize a company to manufacture enamel ware products.

The Noblesville Heat, Light & Power Co., Noblesville, Ind., will commence the installation of machinery in its hydroelectric power plant on the White River, estimated to cost $150,000.

The Fort Wayne Corrugated Paper Co., Murray and Barr Streets, Fort Wayne, Ind., has commissioned Mills, Rhines, Bellman & Nordhoff, 1234 Ohio Building, Toledo, Ohio, to prepare plans for a one and two-story branch plant at Hartford City, Ind., estimated to cost $70,000.

The Board of Sanitary Commissioners, City Hall, Indianapolis, has advanced the date for the receipt of bids for machinery for the municipal sewerage disposal plant to Nov. 14. The installation will include a power plant with prime movers, coal-handling equipment, pumping machinery, feed-water heaters, etc.

Hammond & Jeffers, Indianapolis, contractors, with branch at Kansas City, Mo., have leased the old car shops of the Chicago & Eastern Illinois Railroad Co., Brazil, Ind., for the establishment of a general car repair works. Plans are being completed for remodeling the buildings and for extensions, with the installation of additional equipment. Contract for car and locomotive repairs has been secured from the Cincinnati, Indianapolis & Western Railroad Co.

The Fort Wayne Foundry & Machine Co., Fort Wayne, Ind., manufacturer of architectural and other iron products, has tentative plans for an addition estimated to cost $65,000.

The Indiana Power Co., Indianapolis, has secured permission to issue bonds for $250,000, a portion of the proceeds to be used for extensions.

Motor-driven pumping machinery will be installed in the new pumping plant at the municipal works, Mishawaka, Ind., estimated to cost $50,000, for which plans are being prepared by Burns & McDonnell, 402 Interstate Building, Kansas City, Mo. The Board of Public Works is in charge.

The Central South

ST. LOUIS, Nov. 6.

PLANS are under way by the Grace Sign & Mfg. Co., 425 South Main Street, St. Louis, manufacturer of metallic signs, etc., for a new two-story and basement factory, 130 x 160 ft., estimated to cost $100,000, including equipment. Paul R. Grace is president.

The Missouri-Pacific Railroad Co., St. Louis, is completing plans for new machine repair shops at Wichita, Kan., estimated to cost $80,000. John R. Nagel is chief engineer.

The North Missouri Power Co., Brookfield, Mo., formerly known as the Brookfield Electric Light Co., has plans under way for extensions and improvements to cost $150,000. New boilers, superheaters, stoker grates and electrical equipment will be installed.

The White Oak Corporation, Knoxville, Tenn., is making inquiries for a marine-type boiler, about 500 hp., with auxiliary equipment.

The Kansas Electric Power Co., Leavenworth, Kan., is disposing of a bond issue of $1,000,000, a portion of the proceeds to be used for extensions and improvements.

W. N. McIlvain, city clerk, Phillipsburg, Kan., will receive bids until Nov. 20 for a water filtration plant, including four centrifugal pumps, gasoline engine, valves, sluice gates, etc. Black & Veatch Mutual Building, Kansas City, Mo., are engineers.

The Lion Oil & Refining Co., Kansas City, Mo., has completed plans for an addition to its refinery at El Dorado, Ark., with installation to include stills, pressure valves, tanks, refinery machinery and auxiliary equipment, estimated to cost close to $100,000. Victor H. Smith is vice-president.

The Western Union Telegraph Co., 195 Broadway, New York, has plans nearing completion for a new general car building and repair plant at Chattanooga, Tenn., estimated

to cost $250,000, including machinery. It will adjoin the existing plant of the company for railroad motor car repairs.

The Mississippi River Commission, First and Second Districts, Memphis, Tenn., will take bids until Dec. 2 for machinery for a hydraulic grader, including turbines, boiler feed pumps, general pumping machinery, feed-water heater, electric light plant, etc., as per specifications on file; also under another contract, for boilers for the grader.

The Styles Mfg. Co., Bolivar, Mo., has tentative plans under consideration for the establishment of a new plant in a neighboring district and the removal of its present works. The company specializes in the manufacture of gravel loaders and other loading machinery.

The Board of Public Improvements, City Hall, St. Louis, is considering plans for a new municipal electric power plant, estimated to cost $1,000,000, including machinery.

Motors, controllers, transmission machinery and other equipment will be installed in the new printing plant to be erected by the Gibbs-Inman Co., Louisville, estimated to cost $110,000.

The Duncan Machinery Co., Knoxville, Tenn., machinery dealer, is making inquiries for a line of wood-working machinery, suitable for hardwood, rough and finished production.

The Kansas City Southern Railway Co., Kansas City, Mo., is said to be arranging a fund of about $1,000,000 for its new shops at Pittsburg, Kan., for which preliminary plans are in progress. W. G. Morgan is division engineer in charge.

The Dixie Spinning Mill Co., Volunteer Life Building, Chattanooga, Tenn., will build a power house in connection with its new cotton mill, estimated to cost $500,000. Roberts & Co., Red Cross Building, Atlanta, Ga., are engineers.

The Tennessee Central Railway Co., Nashville, Tenn., is planning to rebuild its car and locomotive shops, destroyed by fire Oct. 27, with loss approximating $400,000, including buildings, equipment and rolling stock. Pending the completion, the company is perfecting arrangements to use a portion of the plant of the William J. Oliver Mfg. Co.

The Board of Directors, Consolidated School District No. 3, Faucett, Mo., will build an electric light and power plant in connection with an addition to the local school.

O. L. Wright, Maysville, Mo., and associates, Maysville, Mo., have plans under way for enlargements in the electric power plant, recently acquired, to include the installation of electrical equipment, engines, pumps, etc.

The Biltwell Factories, Inc., Wichita, Kan., is planning for the installation of machine tools and wood-working machinery at its plant, 1414 South Washington Avenue. C. W. Rogers is one of the heads of the company.

The Pipe & Foundry Co., Thirty-second Street and Westside Avenue, Chattanooga, Tenn., will lay foundations at once for a one-story foundry addition, 150 x 200 ft., estimated to cost $45,000. John Parks & Co., Hamilton National Bank Building, are architects.

The Edgerton Milling Co., Edgerton, Mo., is planning for the installation of new power equipment, including boiler apparatus, feed-water heater, pumps, etc.

The Common Council, Milan, Mo., has plans in progress for the erection of a municipal electric power plant, with initial capacity of about 300 hp. and will soon call for equipment.

The Common Council, Cement, Okla., has arranged a bond issue of $33,000 for extensions in the municipal electric light and power plant, including additional equipment.

Canada

TORONTO, Nov. 6.

THE general tone of the machine-tool market continues to show improvement, with the railroads taking more interest than formerly. Industrial concerns are buying more freely, both for replacement and new works, and as a result dealers' and manufacturers' orders are well up to expectations. The increased industrial activities are also having a stimulating effect on the demand for small tools. Prices continue firm and unchanged.

In addition to the order recently placed for the St. Malo shops at Quebec and the Moncton, N. B., shops, the Canadian National Railways have just ordered the following equipment for shops in western Canada: One 36-in. Bertram heavy vertical drilling machine; one 51-in. Bertram vertical standard boring and turning mill; one Pond type rebuilt engine lathe; four Canada Machinery Corporation lathes, 24 x 44 in.; one Alfred Herbert No. 4 capstan turret lathe; one Hammett radius link grinder; two Southwark hydraulic spring testing machines, capacity 35 tons; one model E power driven pipe bending machine; one Underwood portable crank pin turning machine; three pipe cutting and threading machines; one Kearney & Trecker No. 3 universal milling machine.

H. Johnson, Truro, N. S., will build a machine shop and foundry and is interested in prices for equipment.

The Ford Motor Co. of Canada, 672 Dupont Street, Toronto, is preparing to erect a manufacturing plant on Danforth Avenue to cost approximately $500,000.

The Powell River Pulp & Paper Co., Powell River, B. C., is arranging for the erection of a pulp and paper plant and is receiving prices on general equipment, etc.

The sawmill and manufacturing plant owned by the E. T. Nesbitt Co., 74 Tenth Avenue, Limoilou, Quebec, was destroyed by fire Oct. 31, with a loss to building and equipment amounting to $75,000.

The Sydenham Brick & Tile Co., Wallaceburg, Ont., is contemplating removing its plant to a new location, suitably provided with railroad sidings, and will also install additional equipment, including driers, conveying machinery, etc.

The Red Wing Quarry Co., Ltd., North Bay, Ont., has secured 8 acres and will proceed with the erection of a plant for preparing building material. It is estimated that about $50,000 worth of new equipment will be required. The company has a capital stock of $500,000 and the officers include Arthur T. Stone, president; J. H. Bremer, secretary treasurer; Homer Stockdale, general manager, all of whom reside in North Bay.

The False Creek Lumber Co., 6th Avenue West, Vancouver, B. C., is having plans prepared for the erection of a lumber mill to cost $150,000.

A. D. Snider & Son, Carter-Cotton Building, Vancouver, B. C., have the general contract for a machine shop costing $10,000 for the Burrard Iron Works, Alexander Street, Vancouver.

The City Council, Paisley, Ont., is having plans prepared for the construction of a power development plant on Little Saugeen River.

The Nova Scotia Steel & Coal Co., Ltd., Sydney Mines, N. S., will build a pumping plant at a cost of $85,000. Mr. Purves is engineer.

Plans are being prepared for a sewage disposal plant at Sandwich, Ont., to cost $150,000. McColl & Patterson, Gas Building, are engineers.

STEEL AND INDUSTRIAL STOCKS

Active Trading Follows Losses in the Early Part of the Week

Though considerable losses were felt in steel and industrial stocks during the early part of last week, good recoveries and active trading marked the close. The business revival foreshadowed many weeks ago in the light of steel activities is clearly evident. At the outset reactionary movements and, for a time, ragged prices appeared as forebodings of a break. On Thursday, however, this anxiety was dispelled by a sharp rally which continued through Friday, though some profit taking and further bear selling slightly dampened the action. The improving sentiment brought fresh demands. Disappointment over the report of the U. S. Steel Corporation caused only a flurry; then its normal status was resumed. The average of 20 industrial stocks was 99.2, against 98.7 over last week.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

	Low	High
Allis-Chalm.	42¾	46
Allis-Chalm. pf.	95	96
Am. B. S. & F.	73	76
Am. B. S. & F. pf.	110	110
American Can	68⅜	76½
American Can pf.	109⅜	110½
Am. Car & Fdry.	179¼	187
Am. C. & F. pf.	124	125¾
Am. Locomotive.	122¼	129
Am. Loco. pf.	121	121½
Am. Radiator	111½	118
Am. Steel Fdries	41½	45⅝
Am. Stl. F. pf.	104½	107
Baldwin Loco.	127	134
Baldwin Loco. pf.	117	118
Bethlehem Steel.	68	70
Beth. Stl. Cl. B.	66⅛	72
Beth. Steel 8% pf.	111	112
Brier Hill	16¾	16¼
Br. Em. Steel	11¼	11¼
Br. Em. S. 1st pf	74	74
Br. E. S. 2d pf.	30½	31½
Cambria Steel	41	41
Chic. Pneu. Tool	75	84¾
Colorado Fuel	28⅜	30¼
Crucible Steel	73	79¼
Crucible Steel pf.	93½	95
Deere, pf	72	74
Gen. Electric	174	180
Gt. No. Ore Cert.	32¼	34¾
Gulf States Steel	85½	92¾
Harbison Walker.	115	115
Int. Har.	103½	107
Int. Har. pf.	118¼	118½
Lack. Steel	78½	82¼
Lima Loco.	58	61⅜
Lima Loco. pf.	122½	123
Midvale Steel	29⅝	32⅜
Nat.-Acme	13¼	13¾
Nat. Em. & Stm.	62	38½
N. Y. Air Brake	32½	34⅜
Nova Scotia Steel	32	32
Otis Steel	9⅛	10⅜
Otis Steel pf.	53	53
Pressed Steel Car	80¼	85¾
Pressed Steel pf.	99⅞	102
Ry. Steel Spring.	114	118
Ry. Stl. Spg. pf.	116	119
Replogle Steel	26¼	29¼
Republic	47⅛	51⅛
Republic pf.	80¾	85½
Sloss	42	45
Steel of Canada	60	63
Superior Steel	30½	33
Trans.-Williams.	32½	33¼
Un. Alloy Steel.	34	35¾
U. S. Pipe & Fdy	27½	30
U. S. Pipe & F. pf	69	70½
U. S. Steel	103¼	107⅞
U. S. Steel pf.	119¾	122⅛
Vanadium Steel	35¾	41¼
Va. I. C. & Coke	59	59¼
Whouse Air Br.	95	96

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	
Refined iron bars, base price	3.04c.
Swedish bars, base price	7.50c.
Soft steel bars, base price	3.04c.
Hoops, base price	4.39c.
Bands, base price	3.84c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	3.14c.
Channels, angles and tees under 3 in. x ¼ in., base	3.04c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.10c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	3.30c.
Toe-calk, ½ x ⅜ in. and larger	4.15c.
Cold-rolled strip, soft and quarter hard	6.75c. to 7.25c.
Open-hearth spring steel	4.50c. to 7.00c.
Shafting and Screw Stock:	
Rounds	3.90c.
Squares, flats and hex	4.40c.
Standard cast steel, base price	15.00c.
Extra cast steel	18.00c.
Special cast steel	23.00c.

Tank Plates—Steel

¼ in. and heavier	3.14c.

Sheets

Blue Annealed

	Per Lb.
No. 10	4.19c.
No. 12	4.24c.
No. 14	4.29c.
No. 16	4.39c.

Box Annealed—Black

	Soft Steel C. R., One Pass, Per Lb.	Blued Stove Pipe Sheet, Per Lb.
Nos. 18 to 20	4.30c. to 4.70c.	.....
Nos. 22 and 24	4.35c. to 4.75c.	5.00c.
No. 26	4.40c. to 4.80c.	5.05c.
No. 28	4.50c. to 4.90c.	5.15c.
No. 30	4.75c. to 5.15c.	.....

No. 28 and lighter, 36 in. wide, 10c. higher.

Galvanized

	Per Lb.
No. 14	4.60c. to 5.00c.
No. 16	4.75c. to 5.15c.
Nos. 18 and 20	4.90c. to 5.30c.
Nos. 22 and 24	5.05c. to 5.45c.
No. 26	5.20c. to 5.60c.
No. 27	5.35c. to 5.75c.
No. 28	5.50c. to 5.90c.
No. 30	6.00c. to 6.40c.

No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel		*Wrought Iron*	
	Black	Galv.	Black	Galv.
⅛ in. Butt	—50	—42	⅛ in. Butt	—11	+13
¼ in. Butt	—55	—44	¼ in. Butt	—17	— 1
1-3 in. Butt	—57	—44	1-1½ in. Butt.	—20	— 2
2½-6 in. Lap.	—54	—41	2 in. Lap	—14	+ 2
7-8 in. Lap.	—50	—26	2½-6 in. Lap.	—18	— 2
9-12 in. Lap.	—46	—25	7-12 in. Lap.	—10	+ 6

Steel Wire

	Per Lb.
Bright [illegible]	4.75c. to 5.00c.
Annealed [illegible]	4.75c. to 5.00c.
Galvanized annealed	5.40c. to 5.65c.
Coppered basic	5.40c. to 5.65c.
Tinned soft Bessemer	6.40c. to 6.65c.

*Regular extras for [illegible] gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	19¼c. to 20¼c.
High brass wire	20¼c. to 20¾c.
Brass rod	16¾c. to 17¾c.
Brass tube, brazed	26¼c. to 27¼c.
Brass tube, seamless	23 c. to 23½c.
Copper tube, seamless	25¾c. to 26 c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 22¾c. to 23¾c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14-20		
	Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	Primes	Wasters
			80 lb.	$6.05	$5.80
			90 lb.	6.15	5.90
			100 lb.	6.25	6.00
IC	$10.00	$8.50	IC	6.40	6.15
IX	11.50	10.00	IX	7.40	7.15
IXX	13.00	11.25	IXX	8.40	8.15
IXXX	14.25	12.50	XXX	9.40	9.15
IXXXX	16.00	14.00	IXXXX	10.40	10.15

Terne Plates

8-lb. coating, 14 x 20

100 lb.	$7.00
IC	7.25
IX	7.50
Fire door stock	9.00

Tin

Straits pig	39c.
Bar	45c. to 50c.

Copper

Lake ingot	15¼c.
Electrolytic	15 c.
Casting	14¾c.

Spelter and Sheet Zinc

Western spelter	8¾c.
Sheet zinc, No. 9 base, casks	10¼c. open 10¾c.

Lead and Solder*

American pig lead	8c. to 8¼c.
Bar lead	9c. to 10c.
Solder, ½ and ½ guaranteed	27½c.
No. 1 solder	26c.
Refined solder	23¼c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	75c
Commercial grade, per lb	35c.
Grade D, per lb	25c.

Antimony

Asiatic	8¼c. to 9c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb. 25c. to 27c.

Old Metals

White metals are active, particularly lead, but scrap copper and brass are very dull. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy crucible	12.00
Copper, heavy wire	11.50
Copper, light and bottoms	9.50
Brass, heavy	6.50
Brass, light	5.50
Heavy machine composition	8.50
No. 1 yellow brass turnings	6.50
No. 1 red brass or composition turnings	8.00
Lead, heavy	5.75
Lead, tea	4.25
Zinc	4.25

THE IRON AGE

New York, November 16, 1922

ESTABLISHED 1855 VOL. 110, No. 20

Handling Material in Automotive Plant

System at Studebaker Plant—Tractors Effect Large Savings —Machine Shop Layout and Handling of Scrap Are Features

ECONOMY in handling material was the general subject of a practical talk by M. R. Dennison, of the Studebaker Corporation, South Bend, Ind., at the material handling meeting at the convention of the Society of Industrial Engineers, held in New York Oct. 18, 19 and 20. For several years, said Mr. Dennison, overhead expense has received probably more attention than any other single item contributing to cost. Entering into the question, and more so of late, has been the problem of economy in the movement of material. Some economies in that line accomplished at the South Bend plant of his company are given in what follows.

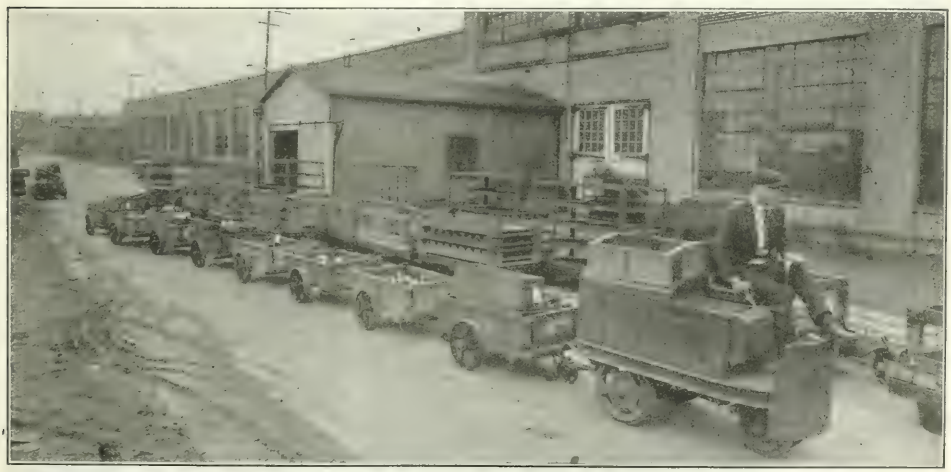
Divisions of Plant Outlined

The plant is laid out in seven divisions, all under the direction of a production manager. These are the gray iron foundry; tool, die and maintenance; power; machining and assembling; stamping; forging; and the stores division. Each of the first six has within it a separate stores department under the direction of a general storekeeper. One transportation department, one receiving department, and one scrap department, serve all divisions.

The rough stock and work in process in the stamping and forging divisions is handled entirely by overhead cab-cranes, running the full length of the building and operating transversely as well as longitudinally. Depressed tracks lead into steel yards and sheet metal stores for receiving of material. Special hoisting devices are used in connection with the handling of sheet metal. Hand labor is eliminated, with the exception of short moves of a few feet. Steel baskets and large wooden boxes, which in emergency can be moved by a lift truck, are used for transferring forgings in process, but are, in 98 per cent of the cases, lifted and moved by crane. Stampings in process are handled on four-wheeled, heavy duty trailer trucks.

It was found that close attention to the handling of bulk material, such as bar steel or sheet metal, gave a greater chance for quick economy than the handling of other stock. Gray iron castings are made at the Studebaker foundry about one mile from the main plant, and are transported by freight car between the foundry and main plant divisions. Castings are placed in large box trucks at the foundry, part numbers and quantity being shown on a tag on each truck, and trucks are then loaded in tiers in freight cars. The tag eliminates recount, and the truck one handling at the main plant. In emergency, castings are hauled on wagons from the foundry by gasoline tractors.

The tractors are favored for long hauls on rough pavements, for two reasons: initial cost and higher speed. Large castings are put in freight cars and not in trucks, and the movement is handled, wherever possible, so that cars are delivered to the spur track adja-



The Tractor-Hauled Train Runs on a Schedule Through the Departments. It is required to make a right angle turn through a 6½-ft. doorway, sometimes with 50 cars in the train

cent to the machine shop and unloaded directly from car to machining department.

Two four-story buildings, 520 x 520 ft., are utilized by the department and storerooms for assembling motor, axle and other units. Each building has two wings, with crane bay in the center, covered by glass; in each crane bay two 5-ton overhead electric cranes operate. A depressed track runs into each building in the crane bay, and extends the full length of the building. A driveway is also maintained through the crane bay for trucks and pickups. The material, upon receipt, is checked for count, weight, etc., and at once is transferred to some sort of truck on wheels. The keeping of material on wheels, particularly in the receiving department, is emphasized. On each side of the crane bay are projecting balconies for landing of loads by the crane.

Different types of trucks are provided. Large dock trucks are used for sending many boxes of small items to the storerooms at one trip. Trucks with a special rack are provided for many items where the finish demands protection. By an arrangement with some suppliers the rack in which they ship material is utilized in receiving, checking and sorting. Care is exercised by the receiving department to load material so that all material on the same truck is to be stored about in the same locality, and all in the same storeroom. The material is then transported by automatic lift truck a short distance to the receiving inspection, where each lot of material, as loaded by the receiving room, is kept together except for rejections. After inspection, the automatic lift truck delivers back to the receiving dock and the overhead crane carries the truck from there to the nearest projecting balcony to the point of storage. The hooker-on, from the ground, signals the particular balcony by electric horn, while the load is in the air, so no time will be lost in landing the load.

Savings in Handling Material to Assembly Line

The layout was made with a view of making it necessary for every piece of material to pass through these storerooms before going to assembly lines or stands. All material consigned to points above the first floor and going from the first floor is handled by crane. Upon receipt of the material by the storeroom, it is taken to the proper bin and there unloaded. The handling of material to the assembly line is one of the phases which has resulted in a large saving. Banks of material have been laid out for each assembly floor so the foreman will have just enough to maintain production. After the banks have been established, deliveries are made daily in exact sets, on a basis of finished car production.

The stock is stored adjacent to the assembling operations where used. Sets are assembled each afternoon by the stores men and placed on steel benches just over which is a wicket window opening to the assembly department. By simply putting up the wicket at the proper time, the stock is available to the assembler. Back orders are maintained where the supply of material in the stores is not sufficient to put out a full day's supply.

All material down to the smallest cotter pin is handled on the basis of sets. When the producer is short, one of two things must be done; he must produce a defective piece, properly tagged by an inspector, or his foreman must give the storeroom a requisition for what he wants, the valuation of the goods he gets on this basis being charged against his department as an expense. Since his expense is budgeted and he is only allowed to spend so many cents per car on each ten-day period, he is usually quite able to account for the goods.

All scrap and salvage is disposed of within the storerooms. This is done to replace it with good stock, and get a good record on the disposal of the scrap. In many of the assembling operations, the work is done on a continuous moving conveyor, in which event, the stock is put up in single sets and moves along with the assembly. The final car assembly is on this basis. All parts for the car, with the exception of axles, frames, motors, and body, are assembled on the racks in the storeroom, which has a complete floor in this case, located over the final assembly department. This assembling of parts on the rack is done as the rack moves on a power driven conveyor past the point of storage. The rack, when filled, is carried by crane to the final line conveyor, which comes up into the storeroom on the second floor and then carries the rack back down at an angle of 45 deg. When material is put up in single sets, as in this case, all nuts and washers are assembled to bolts and sent to the assembler in this manner to prevent his reaching first for the bolt, then for the washer, and then for the nut.

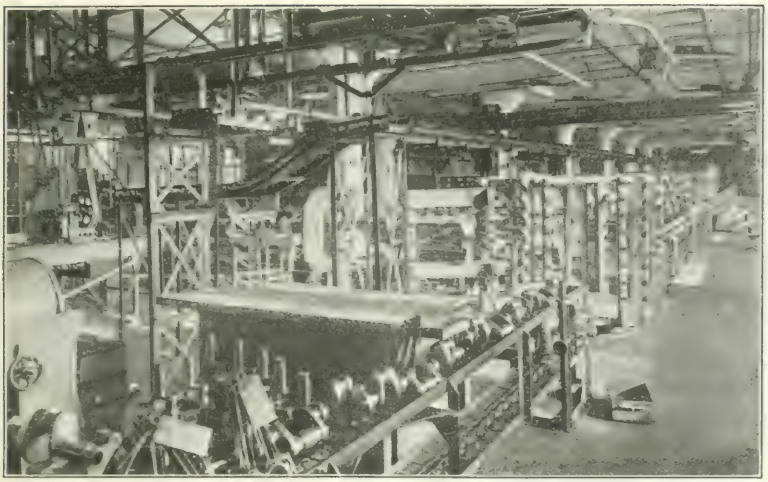
The finished unit assemblies, as motors, axles, etc., are handled to the final assembly storerooms by tractor in train loads on a scheduled basis. This is the only operation in the plant where parts are handled by the tractor from one floor to another on elevators. Specially designed racks to suit the need, assembled on standard 3 x 6 ft. trailer trucks, are used for transporting these units.

Tractors and Box Trucks Handle Rough Parts

All forgings, gray iron and malleable castings, stampings, aluminum castings, and for a considerable number of parts, bar steel and tubing, are handled in what are called rough stores. This material, on a basis of 200 finished automobiles per day, is handled by three electric tractors, which on their routes also handle finished machined parts to stock. There are about 3000 box trucks of three types, and 400 flat four-wheeled trailer trucks of one type only, that are used for storing material as well as for transportation. The transportation of this material is all on the ground floor. The stock is loaded in specific types of trucks on the receiv-



One of the Features Is the Large Num- Ready for Transpor-



Some of the Overhead Chain Conveyors Are Equipped with Hooks on Which Work Is Hung. Belt conveyors of all types are found, some with deflectors for delivering the work to the proper point for the next operation

ing dock when received. Specific amounts of all material is placed in each truck and tag is then placed on truck showing part number and quantity. The box truck used is made on the same principle, size only being the variation.

As stated, there are three sizes, the first being 40 in. long and 26 in. wide, with sides 11 in. high; the second 60 in. long and 26 in. wide, with sides 18½ in. high; the third, 48 in. long and 34 in. wide, with sides 26 in. high. The same part and the same quantity always are stored in rough stores, or as it may be called, semi-finished stores, in the same type of truck. Two wheels and an axle are used on each truck. A clevis with pin is attached to the tender of the rear end and a cast steel leg for support is used on the front under which a third wheel can be inserted with a fulcrum movement, thereby putting the truck on wheels and ready to roll. This third wheel is used in two types, one having a long handle for hand operation, and the other having a short tongue for trailing purposes. The trucks are balanced so it is unnecessary to insert the third wheel for short pulls of a few feet.

After delivery of material to rough stores from the forge shop, stamping division, receiving room, etc., the truck is placed in a designated spot. The design of the truck permits lifting by crane and piling one on the other. Small cranes are installed in each bay in the rough stores for lifting the truck to the proper pile, and for lifting down and conveying to the nearest aisle for making up of trainloads to go to the machine shop. Some 800 to 1000 of these box trucks are employed, filled with material in rough stores. Certain large pieces are, of course, handled by hand and piled on receipt from the receiving department.

The question has been raised of carrying these trucks in stores, equipped with wheels, axles, clevises, and front legs. It has been found that the hardware involved will not begin to offset the additional expense required for hoists, the higher cost of the chassis, etc.

Tractor Operation Means Large Savings

Tractor operation has accomplished a tremendous saving in non-productive labor and has also worked in admirably with the system of maintaining small banks of material in each department operating, for the reason it works on a scheduled basis entirely, and tends to keep the flow of material constant. The trains of material are made up entirely in the different clearing stations and rough stores. The trucks are lifted from their piles in rough stores, for instance, and placed in proper order in the making-up aisle, ticketed for transfer, third wheels are inserted, and trucks coupled together by the rough-stores men. The operation is on the principle of a railroad.

The equipment is all numbered. In comes the tractor with the driver alone. The driver carries a supply of third wheels in a box on top the battery compartment, and drops the same number as are picked up on trucks. He immediately hitches up to the train after dropping from his load such trucks as are consigned to rough stores. He then proceeds on his route, which is exactly laid out, his time of arrival and departure from each stopping point being carefully planned. He rings a time card at each stopping point on a time clock, which, by its print, shows where he was. These cards are turned in to the dispatcher's office at night so delays may be noted. These delays seldom occur, as it is a matter of pride on the part of the driver to be "on time." The men in the stores and clearing houses also expect him on time, and it is to their interest to have the train ready for him to prevent delays, as his instructions are to report by telephone to the dispatcher whenever he is held up. The schedules are arranged so the tractor is kept moving all the time.

The train now proceeds to the machine shop. Material is delivered daily to the machine shop in sets with the exception of small pieces, a large supply of which can be placed in one truck.

Only Two Truckers in Machine Shop

The machine shop is a 500 x 520 ft. building of one-story, saw-toothed construction. An inspection bay walled and screened in, 49 ft. wide, runs through the exact center. All raw material is delivered to the proper one of the two aisles. The tractor is not allowed to get out of this end aisle. The trucks are cut out in the end aisle at the end of the row of machines in which the parts are manufactured. Two hand truckers are provided, one on each side of the inspection bay. Their duty is to assist the driver in cutting out trucks at proper points and pulling work to the first operation. These two men also pull back empty trucks and assist in coupling to the next train that comes through. The work is handled automatically from the first operation to the inspection bay. No trucks containing material are allowed past the first operation.

Many automatic devices are used. Overhead chain conveyors, from which baskets of work can be suspended, are utilized to advantage. Other conveyors with hooks on which the piece can hang are used. Belt conveyors of all types are found on many of which deflectors have been placed, so that when one man is performing operation one and three men are on operation two, the work is deflected automatically to the proper man on operation two. Cast iron tables with high sides are provided for many of the operators, in which the work is placed from the preceding operation by hand, when the machines are close, or in many cases by an inclined steel chute, and in others by gravity conveyors. It is insisted that very small amounts of material in process be carried. This has been accomplished mainly by the automatic equipment which



When the Train Reaches a Station, Loaded Trailers Are Detached and Those Ready for Hauling Are Coupled to the Train, the Tractor Operator Acting as the Train Crew. If a given trailer is detained beyond allowed time, its contents are dumped on the floor and it is put into the train for active service

allows and in reality forces rapid dispatch from one operator to another.

Upon receipt of finished material in the inspection bay it is placed, if OK'd, in the proper receptacle and arranged in proper place in the train being made up. The tractors, after delivering rough stock, proceed with empty trucks to the inspection bay and, dropping the empty trucks, pick up the train ready. It now goes to the two crane bays in the assembly buildings previously described, where the proper trucks are cut out and handled to the balconies by crane.

Many special boxes and racks in conjunction with trucks are used in carrying finished material from the machine shop to the finished stock. They are all capable of being included anywhere in the train, however. Gears and ground work are carried in special boxes which are inserted and fit into the regulation box truck.

System Prevents Lack of Empty Trucks

For a time, there was a severe want of empty trucks. Numbering them helped a good deal. Also, the tractor drivers are all provided with a printed tag, which they hang on any loaded truck standing anywhere for 48 hr. This is a notification to the foreman of the department where the truck is located that he must get this truck moving within 24 hr., or the truck will be dumped and put in service, and the foreman must then get along as best he can. The banks are maintained so no material in process can be held for more than 72 hr. without operations being performed. The transportation department has absolute authority over all trucks, no matter where they are.

After leaving the assembly buildings, the train proceeds to the stamping division, then to the carbonizing department and forge shop, and then through to the rough stores where the operation starts once more. This route is one mile long, and is covered in 30 min.

A charging department equipped with sufficient stands to handle all tractors at one time is maintained adjacent to the dispatcher's office. The tractors are, of course, all put on the charging stand at the noon hour. No trouble is experienced because of lack of power if the tractor is charged at noon.

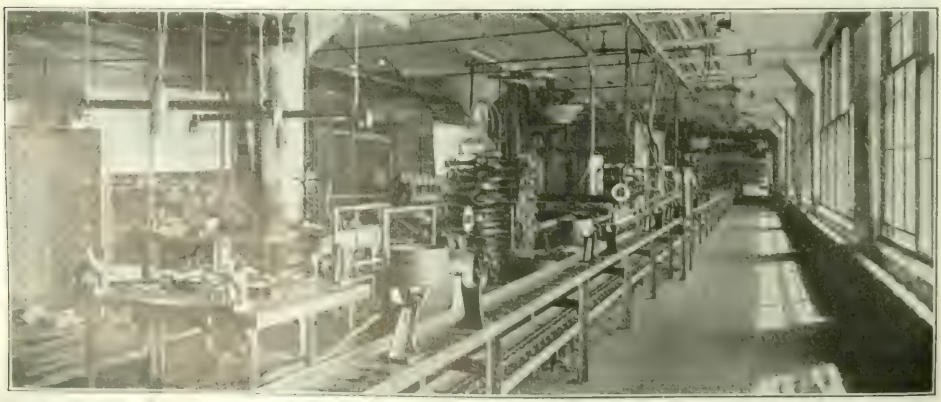
Loads are heavy and the tractor is pulling a load practically all the time. Repairing of the tractors is done at night. No spare tractors are maintained. The repair expense was not watched carefully until recently. Without any check, this item amounted to $1 per tractor per day. It now amounts to 75c. per day per tractor, and will drop to 50c. per day per tractor, or less.

Other Tractors Used For Handling Other Material

In addition to the three tractors described and the one on unit assemblies, five others are used.

One is for handling enamel, oils and greases, and another for handling dies to and from stamping and forging divisions to die room, and also carrying completed work from press room to inspection bay.

A third is for handling scrap, another for pulling large wagon trailers into buildings after same have been dropped outside by our gas tractors. Also handling hoods to the final car shipping department, and the fifth is on miscellaneous work of all kinds. All except



The Full Use of Mechanical Conveying Is Not Indicated in This View. Cast-iron tables are commonly provided at [illegible] and the [illegible] is also provided to keep down the amount of material in process of manufacture

the last run on schedules with no variation in the kind of work they handle outside the layout.

Equipment used with tractors must be designed to track as perfectly as possible. A train of 50 box trucks will pass through a 6½-ft. door at a right angle turn. In fact, every trainload of material from the machine shop must pass through a door of this size at right angles. The design of the box trucks calls for 18-in. semi-steel wheels of Studebaker manufacture, with 3-in. face at each end of a 1⅛-in. steel axle, cold rolled. Steel rollers are used for roller bearings. For 4-wheeled trailers, a 3 x 6 ft. truck is used equipped with a spring rigging, which runs the entire length of the trailer, and takes the strain of starting and stopping and pulling the load from the framework. The platform is 14 in. high on all trailers so they will pull in a train with box trucks. With a few exceptions the equipment on trucks is standard, holding to the three sizes on box trucks and the one type on four-wheeled trailers.

Truck Repairs Department Maintained

A complete repair department for box trucks and trailer trucks is maintained. Trucks are inspected and oiled by one man who travels continually. As he finds a truck needing repair, it is tagged with a large tag reading "repair," and pulled to the nearest tractor route, where it is picked up by the tractor. A system of putting a small spot of paint on the rear end of the truck is used as it is oiled. All trucks are oiled once a month, red for October, blue for November, white for December, etc. This enables us to check this important item at a glance.

Scrap Tunnel For Machine Shop

A phase of material handling that has still been overlooked by many industries is the matter of waste material. The original installation cost money but has paid for itself, the company believes, many times. For instance: directly under the inspection bay and running the full distance of 500 ft. across the machine shop building, the same width as the inspection bay above, is a so-called scrap tunnel. All turnings, borings, etc., are deposited on conveyors leading directly down into 3 x 6 ft. steel tanks on four-wheeled trucks in the tunnel. The machine shop is as clean as any other part of the plant.

One tractor is used by the scrap department, in pulling these trucks out, and also gathering scrap from certain departments in other buildings. Loads are pulled up a 10 per cent grade from this tunnel outside the building, and from there taken to the scrap department located at one end of the plant in the forge shop building. Again the overhead cranes serve to lift the steel tanks off the truck itself, dumping the material into the bins located at each side of a depressed track and above it. These bins are equipped with steel chutes extending out over the gondola cars on the track. The material, by operating the chute, is loaded very easily.

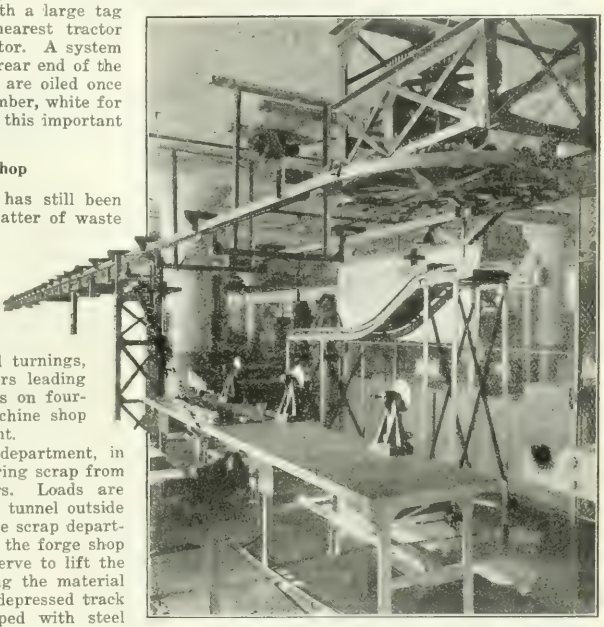
The sheet metal trimmings are thrown on a 48-in. wide belt which runs the full length of the press room by the side of one row of presses, by the operator where possible, and where this is not possible, the scrap is accumulated in steel tanks on 3 x 6 ft. trucks and dumped on the belt by hand truckers. This belt conveys the steel to a pit located at one end of the building where it is baled. The bales are then handled by magnet from the pit to gondola cars.

In handling flashings, etc., in the forge shop, hand labor plays practically no part at all. Paper is baled on the receiving docks. Also gondola cars are spotted on depressed tracks wherein all scrap wood is broken up and piled and rubbish is accumulated. These items are separated as they are placed in car. At night cars are pulled out to the scrap department and replaced by empty cars. An incinerator for disposal of rubbish is operated by the scrap department, and the car is thus spotted next to the incinerator. Rubbish is unloaded from one side for burning and wood is unloaded on the other into wagons for sale to employees. Sweepings and rubbish from floors above the ground floor are carried to the end of the buildings and thrown down a steel chute, leading down into a high sided wagon placed under the chute on a drive through the building. Once a day these wagons are replaced by empties, and the load is pulled to the incinerator by a gasoline tractor.

Buyers in Youngstown District Show More Interest in Requirements After Jan. 1

YOUNGSTOWN, Nov. 14.—In the independent steel trade in this territory, interest centers about prices to apply on first quarter, 1923 tonnage. Consumers are showing more activity with respect to next quarter bookings, especially in the automotive field. Surveys by several Valley sheet and strip makers of the prospects for automobile building next year are very encouraging and indicate a heavy overhanging demand from this source.

In the meantime, enough sheet business is being booked and released to warrant 80 per cent operation of capacity. Business is by no means as well sustained in this branch as in such other finished lines as tubes, strips and tin plate.



Overhead Chain Conveyors Provide for Delivering Baskets for Work from Place to Place

The suspension of a Valley sheet mill plant recently was attributed both to lack of box car supply and insufficiency of orders. Sheets have settled to a basis of 3.35c. for No. 28 gage black and 4.35c. for the base gage of galvanized, and are readily obtainable at these prices for fairly prompt delivery. Prices on blue annealed tonnages range from 2.50c. to 2.65c., the 2.75c. maximum having virtually disappeared.

Southern buyers are seeking roofing products. A number of producers are endeavoring to uphold the 4.50c. base price on galvanized grades, because of high spelter costs, but are experiencing difficulty owing to the competitive condition of the market.

Sheet bars are softening and prices below the $40 base, which has prevailed on the bulk of the last quarter tonnage moved from this district, have been quoted on recent inquiries. In this connection, prices down to $38 are noted. Most of the current sheet bar tonnage involves releases against existing contracts.

BUSINESS IMPROVING

Loading of Revenue Freight Shows Increased Activity in Many Lines

WASHINGTON, Nov. 14.—While reports received from the carriers by the Car Service Division of the American Railway Association show that demand for freight cars on American railroads in excess of the current supply amounted to 179,239 on Oct. 30, a record shortage and an increase of 12,890 cars over the total on Oct. 23, it is also shown that loading of revenue freight during the week which ended on Oct. 28, amounted to 1,014,480 cars, the largest number of cars loaded with revenue freight during any one week in the history of the railroads, except for the week of Oct. 15, which exceeded this total by only 4059 cars. The acute shortage applies especially to the agricultural sections of the Northwest.

In brief the reports show stimulated business in almost all lines. They reflect an increased shortage in various types of rolling stock, but at the same time show that a greater number of locomotives and cars have been put into service, some being new and others being repaired equipment.

Loadings for the week of Oct. 28, this year was an increase of 10,721 cars over the week before, and an increase of 63,096 cars over the corresponding week last year. It also was an increase of 33,238 cars, or 3.4 per cent, above the corresponding week in 1920 when the total was 1,008,818 cars. A new record in the number of cars loaded with merchandise and miscellaneous freight, which includes manufactured products, was also made during the week. The total for the week was 602,018 cars. This exceeded by 5626 the total for the preceding week which had marked the peak, and was the fifth time in almost successive weeks this year that a new record for this class of commodities had been made. The total for the week was an increase of 26,225 cars over the corresponding week last year, and an increase of 58,122 cars over the corresponding week in 1920.

BY-PRODUCT COKE

October Output Makes New Record—Beehive Tonnage Also Large

WASHINGTON, Nov. 14.—October witnessed an output of by-product coke larger than the monthly average for any preceding year, according to the Geological Survey. The total production was 2,806,000 tons, an increase of 563,000 tons or 25 per cent over August, and of 226,000 tons, or 9 per cent over last June, the highest preceding month of the present year. The ovens operated during October at 76.5 per cent capacity. Of the 71 plants reporting, 59 were active and 12 idle. The production of beehive coke also increased during October and reached 878,000 tons, an increase of 74 per cent over the monthly average for 1921, but a decrease of 15 per cent compared with 1920. The output of beehive coke, however, decreased 8 per cent in the week ended Nov. 4, as compared with the preceding week. From reports of cars of coke loaded, by the principal railroads, the total production during that week is estimated at 217,000 tons, against 237,000 tons in the week before. The record production of 2,806,000 tons of by-product coke in October, 1922, compares with a monthly average of 2,565,000 tons in 1920, the record year.

The quantity of coal consumed in the manufacture of coke during October was approximately 5,416,000 tons, of which 4,032,000 tons was used in by-product ovens and 1,384,000 in beehive ovens. These figures indicate that the present consumption of coal for coke manufacture is about two-thirds greater than during the period of extreme depression in 1921, and about 8 per cent less than in the active year 1920.

Active demand for household fuel has largely absorbed the heavy stocks of unsold coke, which had accumulated at by-product coke works last spring. Statements furnished by 19 by-product coke operators supplying gas to the municipalities under contract show a decrease of 73 per cent from March 1 to Oct. 1, 1922. As the stocks of surplus coke at such plants on March 1 were slightly over 1,000,000 tons, it appears that the October stocks were about 270,000 tons. The 19 companies heard from by the Geological Survey up to the day of publication had 236,796 tons on Oct. 1.

According to the Ore and Coal Exchange, the total [illegible] coal handled at Lake Erie piers during the week ended Nov. 7 [illegible] compared with 1,026,388 tons in the week preceding.

Preliminary returns on coal loaded at the mines in the week ended Nov. 11 indicate a total production of 12,600,000 net tons, of which about 10,700,000 tons was bituminous coal and 1,900,000 tons was anthracite. Revised estimates for the week ended Nov. 4 show 10,617,000 tons of bituminous and 1,839,000 tons of anthracite. Thus a slight increase in the total coal raised is shown for the present week as compared with the week before. The rate of output of soft coal is now higher than in 1918 and 1921, and of course much higher than in 1919, when at the correspondng period the great strike of that year had begun; but the present rate is lower than at the same season in 1920.

Mahoning Valley Operations

YOUNGSTOWN, Nov. 14.—Production schedules of Mahoning Valley iron and steel properties show little fluctuation from week to week. The eight-mill sheet plant of the Falcon Steel Co. at Niles, idle the past week, is again under power. Because of accumulated output, the Republic Iron & Steel Co. is continuing for another week its sheet plant at Niles on a 50 per cent production basis.

In the Youngstown district, 30 of 47 blast furnaces are pouring, but preparations are being made to blow in two additional stacks in the Shenango Valley. Of 51 independent open-hearth furnaces in the Mahoning Valley, 44 are charged, while all three Bessemer converters are blowing.

Pipe and tin plate mills are operating at a high rate close to normal. This week's schedules provided for the operation of 16 of the Valley's 17 tube mills, the Republic Iron & Steel Co. operating all six of its tube units.

Crucible Steel Shows Loss

In its recent report the Crucible Steel Co. of America shows a loss from operations of $2,165,768, for the year ended Aug. 31, the most unprofitable in a decade. This compares with a profit of $5,547,246, after interest charges in the preceding fiscal year. After dividends the deficit reached $6,459,335, against a surplus of $298,303 in the year ended Aug. 31, 1921. Since the first quarter of the last fiscal year, however, there has been a steady increase in earnings.

Automobile Manufacturers Not So Active

DETROIT, Nov. 14.—Automobile manufacturers have reduced their schedules in many instances. This is to be expected with the inventory period so close at hand and this season of the year is always one of low production. The Rickenbacker, Paige, Gray and Maxwell companies have practically closed down. The Chevrolet and Overland plants are operating on reduced schedules.

A new steel pier will be constructed at Sewell's Point, Norfolk, Va., by the Virginian Railway Co. The pier will be 1073 ft. long, 86 ft. wide and 74½ ft. high and is to be equipped with modern coal dumping machinery of about 6000 tons per hour capacity.

New Combination By-Product Coke Oven*

Modified Method of Operation Involving Use of Waste Gas Dilution, to Render Coking Temperature Nearly Uniform Throughout Mass of Coke

BY JOSEPH BECKER†

AS is usual in American industrial practices, the natural tendency in building coke ovens has been to attain a maximum capacity per unit oven while simultaneously producing a good quality of coke. Therefore the development in America has been a gradual increase in the size of ovens. The use of high grade silica brick throughout the structure has reduced considerably the time required for coking, as compared with the use of clay brick. But beyond the increase of capacity, due to the use of silica in the building of long and high ovens, there was necessary an improvement in design, to make it possible to build long and high ovens with proper heat distribution over the considerably increased coking areas. This problem was difficult.

Blast furnace practice showed that coke made from high volatile coals should be pushed at relatively low temperatures. But when pushing coke made at low temperatures any uneven heating conditions in the ovens becomes much more pronounced and visible than when pushing hot coke. Furthermore, the heating system of ovens of large capacities has to allow passage of larger volumes of gas (such as waste products of combustion) through their flues. This calls for proportionately larger areas to convey such gases, in order to prevent great pressure drops throughout the heating system, which would seriously interfere with proper operation.

With individual regeneration and flame heating in the flues good coke is produced in Koppers ovens of the capacity commonly in use to-day. While heating from the bottom up to the horizontal flue is practically uniform, yet the region of the horizontal flue lags behind in coking. Fig. 1 shows a typical progression of temperature readings taken by inserting thermocouples through the pusher side door 4 ft. into the coal charge; one was located 2 ft. above the oven floor, one just below the horizontal flue and another at about the center line of that flue. The figures are an average of a great number of readings and exhibit in general the conditions as they exist in practically all Koppers coke ovens which are heated reasonably well and operated to capacity.

This indicates that the influence of the horizontal flue is quite appreciable and the amount of coke in the upper region of the ovens, affected by its location, is a considerable percentage of the total coke made. This condition is tolerable, particularly when the ovens are pushed without waiting until the upper part is thor-

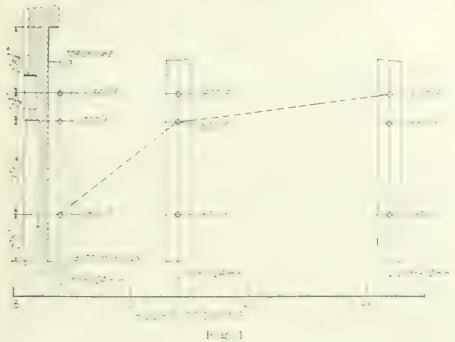


Fig. 1

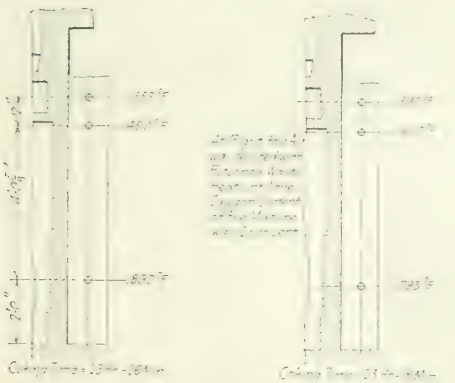


Fig. 2

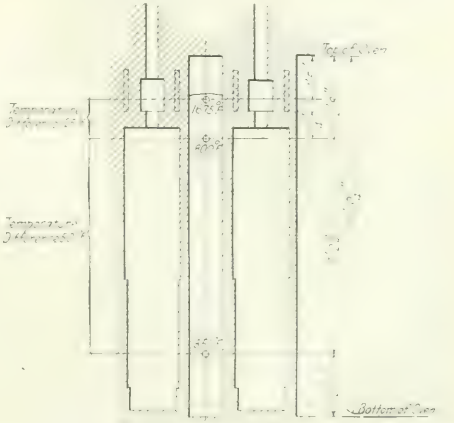


Fig. 3

Fig. 1. Heat-Progression Chart, Old Type of Koppers Oven with Coke Oven Gas Heating, Showing the Time Needed to Bring the Three Points of Temperature Measurement Successively to 1800 Deg. Fahr.

Fig. 2. Heat-Progression Chart, Showing Effect of Diluting the Air with Returned Waste Heat Gases. This test was on ovens of the Seaboard By-Product Coke Co., using coke-oven gas for heating

Fig. 3. Heat-Progression Chart, New Type of Koppers Oven, Showing Relative Uniformity in Temperature Distribution Due, in Part, to Absence of Interference from the Horizontal Flue and, in Part, to the Dilution of the Air Supply by the Use of Waste Gas

*From a paper read at Buffalo before the Eastern States Blast Furnace and Coke Oven Association.

†Consulting engineer Koppers Co., Pittsburgh.

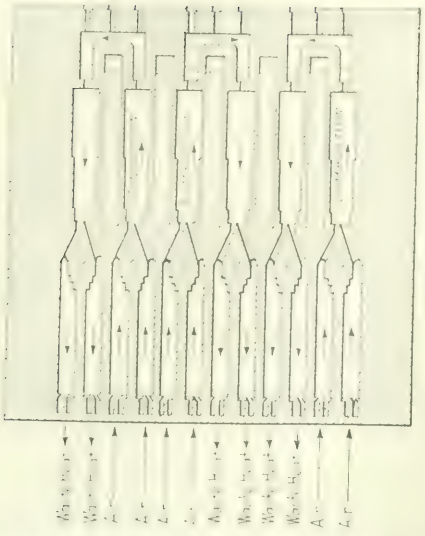


Fig. 4. Section of New Type Koppers By-Product Coke Ovens as Installed at Chicago, Showing Flow of Air and Gases When Using Coke Oven Gas Heating

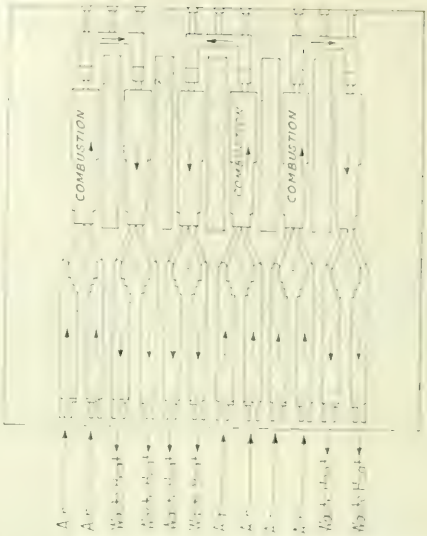


Fig. 5. Skeleton Section of New Type Koppers Ovens Showing Reversal of Gases as Compared with the Condition of Fig. 4; Coke Oven Gas Heating

oughly coked, and such coking operations with these ovens have given good blast furnace results. These ovens have an average capacity of about 18 to 19 net tons of coal per 24 hr.

Investigation of the heat progression in the coking charge in an oven designed for 17 hr. operation, but operated between 23 and 24 hr., was made at the Seaboard By-Product Coke Co.'s plant by inserting thermocouples in the coal charge in the same way as above. The test disclosed that on that coking time the lower part of the oven coked decidedly faster than the upper part. When the lower part of the coke reached a temperature of 1890 deg. Fahr. the part just below the horizontal flue had a temperature of only 1450 deg. Fahr. These temperature differences could, of course, be expected because, when operating on a longer coking time, the quantity of gas per flue becomes correspondingly less and combustion is relatively quicker, thus causing a quicker progression of the coking in the lower part as compared with the upper part of the oven.

In 1914 Dr. Koppers proposed, as a means of evening out temperatures within the heating system of coke ovens, the addition of waste gases to the air required, in order to retard the combustion of gases in the heating flues. Because of the reduced content of oxygen in the mixture of waste gases and air, and thus a lengthened flame, this resulted in an improved heat distribution and temperature progression within the coal charge. This process was tried out at Seaboard and Fig. 2 shows at the right the result of the addition of waste gas until the mixture of waste gas and air contained 12 per cent oxygen. The waste was gas taken from the stack by means of a fan and blown into the air boxes on the regenerators, while the air was drawn in according to the regular practice. The bottom temperature was reduced thus to 1793 deg. Fahr., while the temperature just below the horizontal flue was increased to 1607 deg. Fahr., simultaneously increasing the temperature in the coke near the region of the horizontal flue to 1590 deg. Fahr. And it was shown that when the fan was taken off the temperatures went back to the original figures.

This test proves that the return of waste gases in ovens which have unequal heating conditions from bottom to top will greatly help the distribution of heat progression in the coking charge. It is a good cure for ovens which suffer from hot bottoms, as it causes a condition in the heating flues similar to that existing when using blast furnace or producer gas, both of which are excellent fuels for heating the ovens because they have a slower combustion speed and distribute the heat more uniformly.

Most coke ovens and blast furnace operators believe that, especially with high volatile coals, better coke can be made in narrow ovens. In making the oven narrower, the coking capacity per 24 hr. is necessarily reduced unless a considerable multiplication of the operations be resorted to. One could compensate for this by building higher and longer ovens and thus increasing the tonnage per oven per 24 hr. This would mean that the horizontal flue, with the type of oven as mentioned before, would have to be enlarged and thus occupy a larger space in the coking region, thereby retarding the coking of a proportionately larger amount of coal in that region. And when equipping ovens so that they can be heated in the future with producer or blast furnace gas, which is unquestionably the proper construction, this flue must be enlarged still further to carry the additional amount of inerts present in such low B.t.u. gases.

It was apparent, therefore, that the oven as it stood should not be increased in capacity without changing the design to eliminate the effect of the horizontal flue on heating conditions and thus on the quality of coke produced. Also, with increased capacities a relatively smaller horizontal flue would require an exaggerated closing of the discharge openings of the vertical flues, to such an extent that the drop of pressure through the reduced openings would become too high for the best draft conditions throughout the oven structure. It is, of course, evident that an oven can be successful in operation, production and length of life only if the draft in the heating flue system be kept at the minimum.

It might be thought best to design ovens without horizontal flues. Such ovens usually operate in such a manner that adjacent vertical flues serve alternately as up-burning flame flues and down-going waste gas flues, and vice versa. And an oven in which all adjacent heating flues, or at least a large group of them, serve at the same time in their entirety as up-burning flame flues or in their entirety as down-going waste heat flues is not subject to the danger of different draft conditions between adjoining flues. In this case, the up-burning flame can under no condition be affected by adjoining down-flow flues in case there should be any leakage in the brickwork separating such flues, a condition which otherwise can easily occur, especially as the ovens become older.

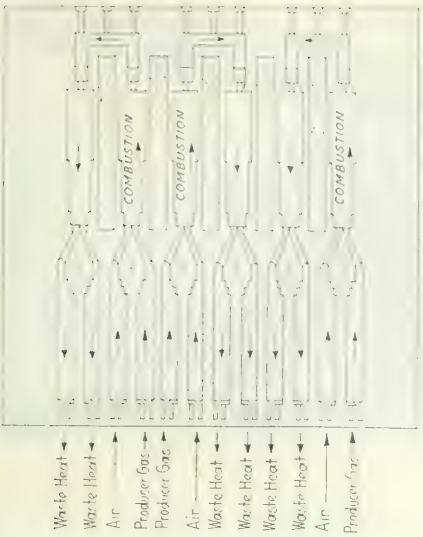


Fig. 6. Skeleton Section of New Type Koppers Ovens with Flow of Gases When Using Producer Gas for Heating

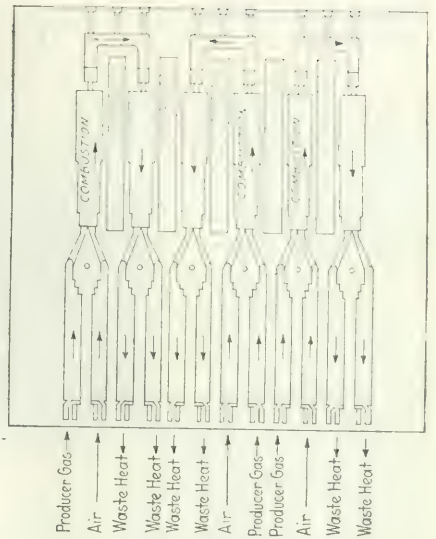


Fig. 7. Reversal of Flow of Producer Gas from Condition Shown in Fig. 6; New Type Koppers Ovens

Furthermore, the arrangement of the gas supply flues in an oven in which the gas is burned up in one flue and down the next adjoining one is usually such that this gas supply flue is paralleled by an up-going regenerator on the one side and a down-going regenerator on the other side. This arrangement greatly increases the difficulty of keeping the gas supply flues tight. Also in up and down-flow flued ovens there will always be a counter current between waste gas and gas in regenerators, as well as between adjacent flues. None of these dangers of leakage between adjoining flues exists in ovens with paralleled flow and it is, therefore, best to retain a horizontal flue, because it insures simplicity in design and the greatest safety in operation of the ovens. Also, it makes the system readily adaptable for the use of blast furnace and producer gas, without the objectionable counter currents.

Rapid Coking in New Ovens

These leading principles in oven construction have been tried out by the Koppers Co. in a battery of five ovens at the plant of the Chicago By-Product Coke Co. at Chicago. The ovens were put into operation Feb. 1 last and have since operated continuously on great varieties of coals at coking times between 10 and 12 hr. The new oven has a length of 37 ft. between doors, a chamber height of 11 ft. 8 in. and an average width of 14 in., the taper between coke side and pusher side being 1½ in. Cast iron jambs are used at the ends of the ovens.

One side of the new design oven is heated in its entirety—that is, gas burns simultaneously on the coke side and on the pusher side; the products of combustion then join in the respective horizontal flues and pass through the crossover flues, one of which is on the coke side and the other on the pusher side. Thence the products of combustion enter the respective horizontal flues of the adjacent heating wall and pass downward throughout the entire wall into the respective regenerators. Now the cross sectional area of a horizontal flue when operating in this way can be considerably reduced as compared with the horizontal flue in ovens of the former design. This allows us to locate the horizontal flue higher than was previously possible and furthermore permits the use of heavy walls between the horizontal flue and the coal chamber. Sufficient space is thus provided to use insulating material if necessary to prevent overheating of the gas space in the oven chamber. The insulation of the crossover flues at Chicago has been found entirely satisfactory and effective.

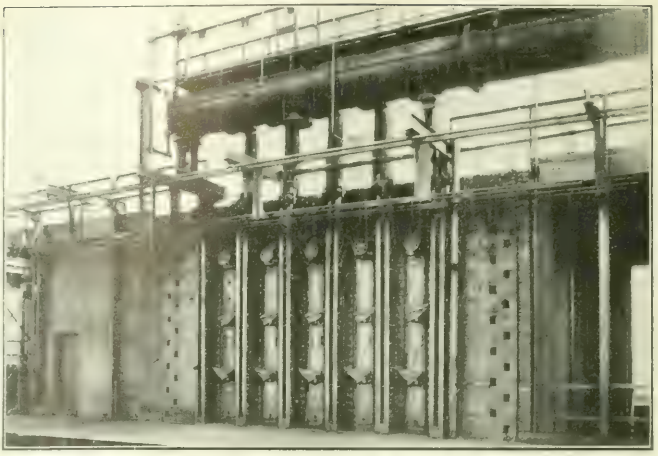
One most important point in this new design is the fact that the height of the flame flues has been considerably increased; these now extend as far up toward the top of the coal charge as is necessary for uniform heating of the entire charge. Thus the interference of the horizontal flue with the flame flue heating has been eliminated. Of course the number of crossover flues could be increased beyond two, preferably to five, the crossovers passing through the available spaces between charging holes. The size of the horizontal flue would thus be still more reduced, without causing an additional pressure drop.

For ovens of 12 ft. height and of a length similar to the Chicago oven, it has been demonstrated that only two crossovers are required to permit a size of horizontal flue that does not interfere with flame flue combustion and a flue which is consistent with good strong wall construction. However, there is little reason why ovens should not be increased further in height and length, and it might then be preferable, in order not to increase the size of the horizontal flue, to build three or five crossovers. With this new design the size of an oven has become independent of areas required for the former horizontal flue, which interfered with the perfect operation of the ovens, especially when they were of great capacity, and it is important to retain the advantageous functions of horizontal flues.

As an entire side of the coke oven chamber serves either for up-flow combustion or down-flow products of combustion, any leakage between individual flues becomes of little consequence, because all the gases flow either up or down and each flue is operating under the same pressure conditions. Since there is absolutely no counter flow in any of the heating flues, this undoubtedly constitutes the safest construction for flame heated coke ovens. Also, the regenerators reverse longitudinally with the battery instead of crosswise as in the former design. The usual longitudinal taper of a coke oven requires that larger amounts of fuel gas be used on the coke side than on the pusher side. In the type of oven formerly built, products of combustion from the coke side of the oven chamber exchange their heat with the air, or air and gas, going up to the narrow pusher side. Since gases are required in smaller volume for the latter side, the efficiency of the heat exchange varies with reversals, as is shown by fluctuations in the stack flue temperature. In this new construction the in-going gases for each half of the oven are regenerated with the products of combustion from that half, and it is thus possible to maintain a lower

uniform stack temperature, which is the nearest practicable approach to the theoretical.

When air flows upward in two regenerators the gas supply flue located in the supporting wall separating them is operating also for up-flow combustion, while the adjoining heating wall operates for discharge of waste gases and consequently the gas supply flue located in that particular regenerator wall is not in operation. In other words, there are hardly any pressure differences between up-flowing regenerators and gas supply flues and consequently the leakage of the gas distributing flue will be reduced to a minimum.



Pusher Side of New By-Product Coke Ovens at Chicago

When producer gas or blast furnace gas of low heating value is used for heating the ovens it must be pre-heated by passing through separate regenerating chambers on its way to the heating walls, in order to obtain the desired temperature and to operate economically. In the new design of oven the arrangement of regenerators and flow of gases prevents at any time a counter flow between incoming fuel gas and out-going products of combustion in adjacent regenerator chambers, for they are always separated by a regenerator containing in-going air. Should there be a slight leakage into the waste gas regenerator chambers, it would result in loss of air only, while it would be impossible to lose producer or blast furnace gas.

The Chicago battery of new design ovens was operated on 11 hr. coking time for several months with producer gas having a heating value purposely varied between 85 and 125 B.t.u. It was there demonstrated that the oven, when heated with this producer gas, gave most satisfactory results as to heat distribution and fuel consumption. There was no leakage of producer gas into waste gas, because producer gas and air were flowing in parallel and a counter-flow existed only between air and waste gas.

It has been demonstrated that on the Chicago ovens the arrangement of adjustable ports (Fig. 8) in that construction is correct for both conditions, that is, when using straight coke oven gas or producer gas. The same small temperature difference between top and bottom was observed when using coke oven gas as with producer gas.

Tests for determining the progression of coking at different elevations in the oven chamber were made, as before, on these ovens and the results obtained were most gratifying. (Fig. 3.) The absence of the interference of the horizontal flue, together with the unique design of adjustable air ports, gave such a distribution of heat that the entire mass from top to bottom and from end to end was finished at the same time, the difference in temperature usually not exceeding 100 deg. Fahr.

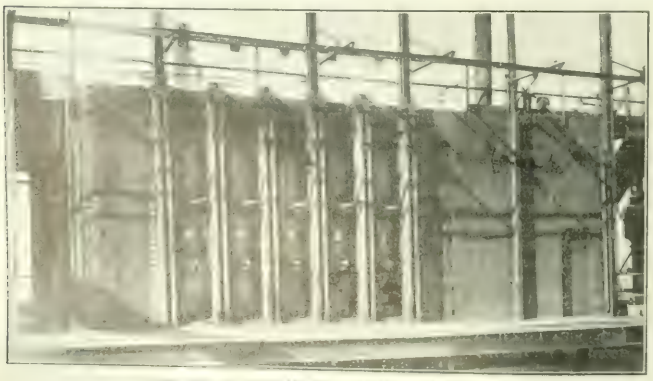
Coke produced from these new type ovens was decidedly more uniform than that produced from the older ovens. The large pieces of coke originating near the horizontal flue region of the older oven were entirely absent in the new oven and the coke from the bottom part of the new oven was just as large as that from any other part of the oven.

Shatter tests and combustion tests, made on coke out of different elevations of the new ovens, have shown that the combustibility of the coke from the lower part of the ovens is the same as that taken from the upper part. And the shatter tests of coke from the upper part of the oven are virtually the same as from the lower part. This indicates that, besides uniform size of coke produced, the characteristics of the coke from different parts of the oven show great uniformity. In making coke of 11 hr. in this new design of oven, the temperature of the flue walls did not exceed the maximum of 2550 deg. Fahr. and the fuel consumption in coking Pittsburgh coals was equivalent to 1050 B.t.u. per pound of coal.

The advantages claimed for this new oven include:

1. Greatest simplicity of design.
2. Perfect distribution of heat in such a way that the coking within the coal charge progresses uniformly at all places, thus preventing any over and under coking.
3. Increased capacity per oven unit.
4. Lowest fuel gas consumption.
5. Maximum strength of oven walls.
6. Lowest pressure differentials throughout the entire oven system.
7. Complete absence of counter-flow between flame flues and gas supply flues and gas regenerators.

All of these improvements should guarantee long life to the oven structure and a continuous supply of most uniform coke at the lowest fuel consumption and operating expense. The low draft conditions existing in these ovens are of great importance because it insures their long life. It is well known that high draft



conditions in ovens always result in early oven repairs and loss of products.

As the foregoing shows that coal can be coked in the most uniform manner, the only matter to be decided upon in individual cases would be the width of oven proper for certain coals to produce the best blast furnace coke in respect to size and its combustible properties; furthermore, at what temperatures or in what length of time coals should be coked to produce the coke that gives the best blast furnace results. From all observations made so far it seems to be correct for straight high volatile coals to build the ovens as narrow as is practicable, because this produces a coke of less fingery structure and cross fracture than when made in wider ovens.

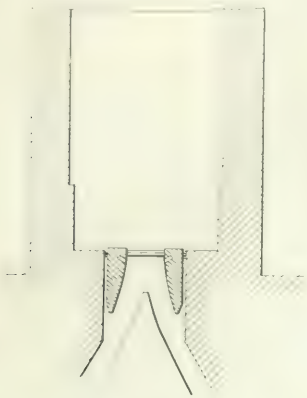


Fig. 8.—Section of Adjustable Air Port as Used in New Type of Koppers By-Product Coke Ovens

Reasons for Narrow Ovens

There is usually a variation in the coke, starting with the wall side and ending at the center of the oven. This variation is greater in coke from wide ovens than in coke made in narrow ovens. In making tests of a piece of coke, and taking samples from the inner end of the coke, the middle and the outer end of the coke, it has been observed that the specific gravity and porosity of the coke changes from center to end, and that in wide ovens the cauliflower and dense end penetrates to a greater depth than in narrow ovens. But in the coke made in the Chicago ovens a much more uniform porosity was practically maintained from one end to the other of a piece of coke.

Coked in narrow ovens, coals give a higher yield of tar than when coked in wide ovens, indicating that the smaller yield of tar must have been accompanied by formation of additional gas and residue of carbon which is deposited on the cell walls of the coke. However, carbon coke made from tars is very refractory and combustion tests on it when subjected to a temperature corresponding to that of coking operation (about 1800 deg. Fahr.) showed its combustibility to be less than that of ordinary coke. This would again indicate that a given coal, when coked under conditions which yield the maximum in tar, would produce a coke of greater combustibility than when coked under conditions where the tar yield is relatively low. For these reasons it is advisable to build as narrow ovens as are practicable and consistent with economical operation. Since the time for coking is shorter in narrower ovens, the coke is exposed for a shorter time to the detrimental effect of high temperatures, which again insures maximum combustibility of the coke; a quality which lately has been emphasized as being most important.

A NEW CUPOLA LINING*

German Liner Rings as a Substitute for Brick

The use of ganister for lining up converters, instead of building them out with fire brick is as old as the Bessemer process itself, and finds a counterpart in cupola melting practice in the placing of slabs of mica-schist where brick would ordinarily be used in patching up the melting zone region of this furnace. This ganister is a crushed highly silicious rock to which about 2 per cent of lime has been added for a binding material, the mass wetted down, rammed in place, dried and then burned at a very high temperature. The lining thus becomes a solid mass which can be readily patched up and is good for a long campaign before requiring replacement in its entirety.

Of late, the use of loose refractory materials rammed into place for furnace linings in the crucible process has found a place in this country, but a direct application to the cupola—to replace the fire brick and blocks now employed—would seem new to us here. References to this matter have appeared from time to time in the foundry literature of Germany, and advertisements of suitable materials in loose form, for ramming up the cupola lining appear regularly, the largest concern delivering about 10,000 tons a month to the foundry trade.

In *Die Giesserei*, the journal of the organization which corresponds to the national founders' association of Germany, an article was recently published on this subject by a foundry engineer named Kark Grocholl of Breslau, who advocates the use of his patented adjustable liner rings in place of the usual block patterns which may be either solid or split, and which are moved upward in the cupola as ramming up the lining proceeds.

Grocholl states that the cost of fire brick is 30 times as high as this new refractory material, which doubtless is a silica sand mixed with a little lime or clay, or both. The results obtained have proved so good that the near future may see the discarding of all brick and blocks now used. In his foundry, he rams up the lining from the bottom to the charging door with this loose material, and finishes up the top of the cupola with a hollow cast iron circular cupola block. No fire brick or blocks are used at all, and the experience of four years of this practice has shown it highly economical. Patching is done after every heat, and a relining is not necessary within two or more years. Even then much of the lining is left intact. Particular attention is called to the fact that common labor only is necessary for lining up the cupola, no skilled craftsmen being used.

The article in question gives illustrations of the several kinds of cupola interiors current in German melting practice. These are omitted here as only one of them—the straight, uniform-diameter lining can be recommended. Grocholl is undoubtedly right in preferring an adjustable liner ring of steel to the wooden solid or split pattern block that must be unwieldly within the cupola, and when jarred loose and upward do some damage to the freshly made lining.

The subject is recommended to the attention of the refractories trade, and the production of a suitable refractory loose material which will have minimum change in volume under the high temperatures of the cupola melting zone, which will stand abrasion well, and only flux sufficiently to resist disintegration, should be possible of production. The disagreeably high item of new brick brought to the cupola daily in some foundries will then be much reduced and a substantial cut in the annual cost for this charge effected.

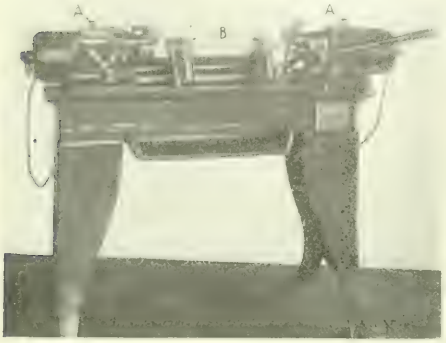
*Abstracted from the German by Dr. Richard Moldenke, Watchung, N. J.

The National Metal Trades Association will hold its twenty-fifth annual convention April 18 and 19, 1923, at Hotel Astor, New York.

New Duplex Hand Centering Machine

A duplex hand centering machine for use in shops having a variety of work requiring quick adjustment to various sizes within the capacity of the machine has been placed on the market by the Pratt & Whitney Co., Hartford. The machine is shown in the accompanying illustration. The self centering vise, shown at B, will take diameters up to and including 2 in., and permit centering both ends of work in lengths from 3 to 18 in. The V supports are adjustable and take diameters of 4 in. and less, and accommodate work of any length. For work over 5 ft. long an outboard support is required.

Two opposed drill heads for centering both ends of the work in one operation are provided, although the machine is also available, equipped with one head for long work. The left-hand head is adjustable for various



Duplex Hand Centering Machine. Both ends of the work are centered in one operation. The left hand head is adjustable for various lengths and can be removed entirely for long work

lengths of work, and can be removed for occasional long work. Both heads are operated together by the hand lever shown at the right. The drills are advanced by the hand feed lever, with the right hand, until they come in contact with both ends of the work, which is placed loosely between the jaws of the vise. When contact is made both jaws of the vise are tightened at the same time by the lever, with the left hand. The work is then ready for centering.

The drill spindles are mounted in sliding bronze sleeves, provided with ball thrust bearings and are driven from a ¼-hp. constant speed motor, geared to provide two changes of drill speed, 1200 or 1800 r.p.m. Changing gears or locking the spindles for the removal of drills is by means of the knobs shown at A in the illustration. To hold the drilling depth to a given dimension, adjustable stops are provided. For cases where the center holes must be of the same distance apart regardless of minor variations in the length of work, adjustable stops are positioned to engage lugs on the drill heads, thus holding the spindles to a predetermined forward movement. Two quick-acting, self-centering vises, shown at B, are adjustable along the bed and operated simultaneously by a single lever.

After being centered the work is deposited in a removable tote box at the rear of the machine. Oil drains from this box into the tank and is conveyed to the drills by a plunger pump which is connected to, and works with, the hand-feed lever. Oil is thus supplied to the drills while cutting, without attention from the operator. The floor space occupied by the machine is 2½ x 4½ ft., and weight with complete equipment 600 lb. net.

The City Commissioner of Public Service, Martin Travieso, San Juan, Porto Rico, will take bids until Dec. 1, for 20,020 tons of cast iron pipe, and for 250 tons of special castings, as per specifications on file at the office noted.

American Foundry Practice as Regarded by British Foundryman

In May last, F. J. Cook, past president of the Institution of British Foundrymen, paid a visit to the United States in connection with the holding of the annual foundrymen's convention. On Oct. 28 he gave some impressions of the visit at the opening meeting of the Staffordshire Iron and Steel Institute, of which body he is vice-president.

Mr. Cook paid a generous tribute to his American hosts for the courteous way in which they received him and placed information at his disposal. He was astonished at the huge size of the plants which he visited, and the production was equally a matter of wonder to him. He considered that the Americans were particularly successful in malleable casting and could show something far surpassing achievement in Great Britain, and in this case they produced the quality as well as the quantity. In some cases the output was twice as much per man as in the English foundry.

In regard to quality, the patterns were exceptionally well turned, and considering the huge output the skin of the casting was wonderfully clean. That applied, however, to repetition work.

When they came to floor molding Mr. Cook considered that the American standard was far below the English standard in regard to quality, and he said that a great deal of the work he saw turned out would not be accepted in Great Britain. The annealing was done on mass lines very different from the careful method employed in England. The time taken to turn out a casting was rather longer than in England, chiefly because in America they annealed at a much lower temperature.

In conclusion, Mr. Cook advised anyone engaged in iron and steel production not to miss an opportunity of inspecting American plants and he assured his hearers that they might depend upon being received with the greatest possible hospitality.

Program of Taylor Society Meeting

The Taylor Society will hold its annual business meeting in New York, Nov. 22, 23 and 24, at the Engineering Societies Building, 29 West Thirty-ninth Street. The first session will be a dinner meeting, largely for the transaction of business of the society. The general, so-called public sessions will occur on Thursday and Friday, for which the following program has been announced:

Nov. 23, 9.30 a. m.—Organization and Management of a Medium-sized Plant: emphasis on manufacturing organization and management. By Percy S. Brown, works manager, Corona Typewriter Co., Groton, N. Y.

Nov. 23, 2.30 p. m.—Statistical Compilation: some of its uses as a function of scientific management; description of a statistical department, its organization, equipment and product, and the use of the latter in managerial control. By Harry B. Horwitz, planning department; Harry A. Wembridge, statistical division, and Herman J. Hutkin, methods division, Joseph & Feiss Co., Cleveland.

Nov. 23, 8 p. m.—Shaping Management to Meet Developing Industrial Conditions. By H. S. Person, managing director Taylor Society, New York.

Nov. 24, 9.30 a. m.—Master Budgets of Sales and Production: Case 1—Hood Rubber Co., by W. W. Duncan, Hood Rubber Co., Watertown, Mass. Case 2—Dennison Mfg. Co., by Ernest E. Brooks, Dennison Mfg. Co., Framingham, Mass.

Nov. 24, 2.30 p. m.—Reduction of Waste Through Research Studies in the Operating Departments of Retail Stores: a summary of results of recent studies made by the Retail Research Association. By Philip J. Reilly, associate director Retail Research Association, New York.

Nov. 24, 8 p. m.—Symposium: Supervision of Personnel; trend following the shock of the depression.

The Rosedale Foundry & Machine Co., Pittsburgh, recently completed and shipped the gates, valves and operating mechanism for a large gate tower for a hydro-electric power development of the Ujigawa Electric Co. of Japan. The inner valve is 12 ft. in diameter and the outer valve 16 ft. 6 in. The gate tower is designed to control the discharge of 6400 cu. ft. of water per second.

Judging Combustion from Gas Analyses*

Gaseous Fuels—Blast Furnace; Coke Oven and Producer —Show Under Analysis Most Discordant Results— How to Use the Figures

BY A. G. WITTING†

FOR metallurgical purposes three gaseous fuels are used: blast furnace gas, coke oven gas and producer gas. Their heat value and the efficiency of their combustion are judged from analyses and from the heat balance indicated by them; heat balance meaning the heat delivered to and usefully absorbed at the place of combustion, or the difference between the heat developed in the combustion plus the sensible heat in the gas and the air (if preheated) minus the sensible heat carried away by the waste gases.

A complete heat balance involves so many factors that to a large extent it depends on guess work or arbitrary assumptions—its value is consequently questionable. To make up such a heat balance, for example, for a hot blast stove gas burner, it is necessary to obtain not less than nineteen items of information, each requiring a series of observations taken during the same time. Such a feat has never been really accomplished. But, on the other hand, the efficiency of the combustion itself, the more or less correct manner in which the fuel and its air supply are handled by the operator, can be judged exactly from an analysis of the gas and an analysis of the products of combustion, provided both samples are taken simultaneously, not the one immediately after the other.

Table I—Table of Chemical Reactions in Combustion

One Cu. Ft.	Requires in Cu. Ft.		Produces in Cu. Ft.			B.t.u. Developed per Cu. Ft.	
	Oxygen	Air	CO_2	H_2O	N_2	High Value	Low Value
C_2H_4	3.0	14.286	2.0	2.0	11.286	1,591	1,491
CO	0.5	2.381	1.0	..	1.881	324	324
H_2	0.5	2.381	..	1.0	1.881	328	278
CH_4	2.0	9.524	1.0	2.0	7.524	1,012	912
C_2H_6	7.5	35.715	6.0	3.0	28.215	3,810	3,494
C_3H_8	2.5	11.905	2.0	1.0	9.405	....	1,437
$C_{10}H_8$	12.0	57.144	10.0	4.0	45.144	....	6,070
H_2S	1.5	7.143	1.0 (SO_2)	1.0	5.643	....	....

It is clear that the highest efficiency is developed when all combustibles in the gas and all oxygen in the air are consumed, leaving in the waste gases nothing but CO_2, N_2 and H_2O. This 100 per cent reaction is in practical operation not attainable. The fuel burnt either with an oxidizing flame, with a surplus of air, indicated by the presence of oxygen in the waste gas analysis, or with a reducing flame, the air supply being below requirements, so that combustibles are carried away with the waste gases and appear in their analyses. It also happens sometimes that both oxygen and combustible gases at the same time occur in the waste gases.

In the latter two cases a direct comparison between the two analyses is not possible, and the composition of the waste gases cannot be calculated directly from the gas analysis. Under these conditions it has been customary to figure the waste gases produced, on the assumption that all the carbon in the original gas is found in the waste gas, the volume of the latter comparing with the volume of the former as the CO_2 that would have been produced by complete combustion compares with the CO_2 in the waste gas analysis plus the CO_2 that would have been produced by the unburnt combustibles.

Now, very often in metallurgical operations the waste gases contain CO_2 not derived from the fuel. When this occurs there exists no published method by which the combustion process can be calculated. It is the purpose of this paper to set forth a series of simple formulas which will assist in solving such problems.

To determine the efficiency of a burner or a furnace operation we obtain two gas samples, the waste gas sample being collected at a point where danger from outside influence, air leakage for example, is as far as possible eliminated. If the analysis of the waste gas shows no combustibles present, the chances are that oxygen is found. The question then naturally is: How much surplus air has been admitted? It will be necessary first to calculate the requirements and results of a theoretically perfect combustion. Having thus obtained the volume of the products of combustion, neglecting the condensible moisture, then the amount of air present in the waste gases, as indicated by a certain percentage of oxygen and the total volume of waste gases, is obtained by means of the following formula:

$$A = \frac{Pa}{21-a}\ ;\ W = \frac{21P}{21-a}$$

Where A = amount of surplus air.
P = products of complete combustion (minus moisture).
W = total amount of waste gas = $A + P$.
a = percentage of oxygen in waste gas.

Calculation of Total Volume of Waste Gases from Complete Combustion with Surplus Air

Contents	Cu. Ft.	Cu. Ft. O_2 for Combustion	Waste Gases CO_2	Waste Gases H_2O	Waste Gases N_2	B.t.u. per Cu. Ft.
CO_2	12.4	...	12.4	..	...	
CO	26.2	13.1	26.2	..	...	84.89
CH_4	0.2	0.4	0.2	0.4	...	2.02
H_2	3.0	1.5	...	3.0	...	9.84
N_2	58.2	...	...	..	58.2	....
Total	100.0	15.0	38.8	3.4	58.2	96.75
Nitrogen in air		56.43	..	..	56.43	
Grand total		71.43	38.8	3.4	114.63	

We find accordingly that 100 cu. ft. of gas of the given composition requires 71.43 cu. ft. of air and produces a total of 156.83 cu. ft. of waste gases, of which 153.43 cu. ft. are non-condensible and will show in the analysis, which must contain

CO_2 38.80 cu. ft. = 25.288% (= 25.3%)
N_2 114.63 cu. ft. = 74.712% (= 74.7%)
153.43 cu. ft. = 100.000%

If oxygen is present in the analysis, the following formulas will give the total amount of waste gases and the amount of surplus air, the products of complete combustion being calculated as above.

$$A = \frac{Pa}{21-a}\ ;\ W = P\,\frac{21}{21-a}\ ;$$

Where A = amount of surplus air.
P = products of complete combustion.
W = total amount of waste gas.
a = percentage of oxygen in waste gas.

Example: The gas used in the previous example has produced a waste gas of the following analysis:

CO_2 — 23.1%
O_2 — 1.8%
N_2 — 75.1%

$$W = 153.43\,\frac{21}{21-1.8} = 167.814 \text{ cu. ft.}$$

(*Continued on page* 1332)

*Abstract of a paper presented at the sixteenth annual convention, Association of Iron & Steel Electrical Engineers, Cleveland.

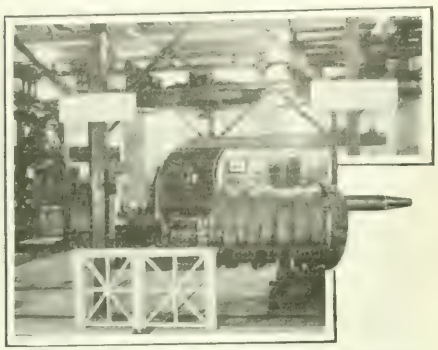
†Assistant Chief Engineer, Illinois Steel Company, Gary, Ind.

Device for Handling Coils of Rods

A device for use with its electric tramrail system and designed to handle coils of rod in rod wire and wire mills, has been brought out by the Cleveland Crane & Engineering Co., Wickliffe, Ohio. Among its uses is the handling of coils to and from gondola cars.

The rod conveyor is a straight round steel hook about 8 ft. long, suspended from the carrier, as shown in the illustration, and equipped with two electric hoists, one at each end. The hook has a capacity of 1 ton of coils.

A number of coils can be conveyed from the rod mill to the warehouse and piled, one row on top of another, the hook depositing its load and leaving the coils on end, or in the position they are conveyed. In removing coils from the warehouse the hook is run into a pile, the hook hoisted and the coils conveyed to cars or wherever they may be needed.



Conveyor for Handling Coils of Rods as Exhibited at Cleveland Meeting of the Iron and Steel Electrical Engineers

Only one man, operating the carrier, is required for the work. It is claimed that the one operator can handle more rods in a day than several gangs of men handling the coils in the usual way of piling them by hand, one on top of another, on flat trucks, hauling them to the warehouse with a tractor and again handling them, this time from the trucks to piles on the warehouse floor.

Metal Lath and Tin Can Manufacturers to Consider Standardizing

WASHINGTON, Nov. 14.—The iron and steel industry is manifesting interest in two forthcoming conferences that are to be held in Washington with the Division of Simplified Practice, Department of Commerce, which have been called by Secretary Herbert Hoover, at the request of interested producers. On Dec. 12, a final conference is to be held and recommendations from the Associated Metal Lath Manufacturers, Chicago, submitted regarding plans for reducing the list of recognized weights. During the week of Jan. 15, there will be a preliminary conference with manufacturers, distributors and users of food containers of all kinds, among them being tin cans. This conference also has in mind a plan for dimensional simplification.

The final conference regarding metal laths is expected to be attended by about 100, including producers, distributors and users. It is stated that there are about 60 manufacturers and at present they produce between 80 and 100 different sizes and weights of metal lath. It is believed that this number can be reduced to 12. The Associated Metal Lath Manufacturers is making a survey and will submit figures as to total production, sizes and weights during the last three years. It is expected that the recommendations made will result in one member from each of the interests, producers, distributors, and users, being appointed and that they will prepare a joint agreement to be published by the Department of Commerce, which will give the conference its full support. This will be done through the division of which William A. Durgin is chief. The conference of the week of Jan. 15 will be attended by producers, distributors and users of the various classes of food containers. An effort will be made to reduce the number of different shapes and sizes of tin and other food containers. It is understood to be the plan to give more standard shape to tin containers, and that the standards decided upon will have an effect on specifications for tin plate, both as to form and thickness of the rolled product.

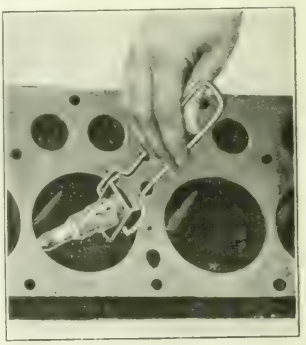
At the same time the Bureau of Standards is working with the American Can Co., to determine the thickness of tin containers. The bureau's investigation covers the question of thickness, strength and durability.

Inside Micrometer for Gaging Cylinder

A self-alining and centering inside micrometer gage, intended primarily for gaging automobile cylinders as illustrated, has been placed on the market by the L. O. Beard Tool Co., Lancaster, Pa.

The gage is made up of an alining base, a handle and a micrometer, three sizes of which are available. By holding the base against the cylinder wall and turning the knurled spindle until it touches the opposite wall, a direct reading in 0.001 in. is obtained. One revolution of the spindle indicates 0.050 in. advance of the screw; the barrel is graduated in 0.001 in. Figures provided on the spindle are for a check on the reading; if 25 on the spindle is in line with zero on the barrel, it will be found that 25 on the barrel is in line with zero on the spindle, giving the same reading in two places.

The body of the micrometer is a sliding fit in the bushing of the alining base to permit of adjustment for various size holes. This also permits the base to slide forward on the body of the micrometer so that it can be tilted to remove the micrometer from the cylinder. The spindle of the micrometer is locked by a clamping screw having a brass plug between the thread of the spindle and the clamping screw. Both ends of the micrometer and the parallel edges of the alining base are hardened and ground.



Self-Aliming and Centering Inside Micrometer Gage for Gaging Cylinders. The thimble is graduated in 0.001 in.

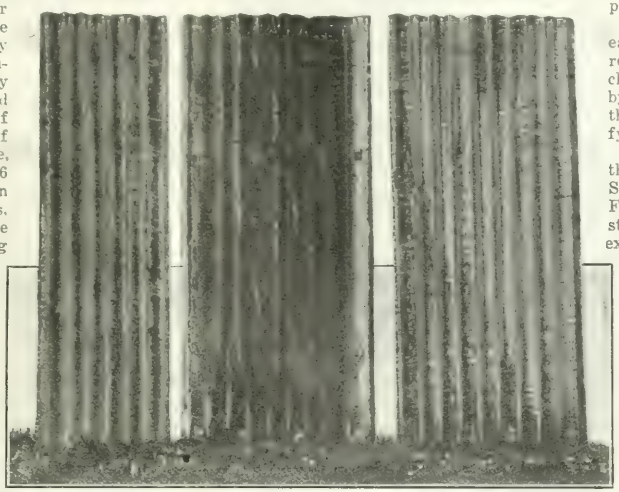
Motion picture shows will form one of the features of the National Exposition of Power and Mechanical Engineering at Grand Central Palace, New York, Dec. 7 to Dec. 13, inclusive. These include the following: A close-up of stoker combustion, vertical transportation, Cottrell electrical precipitator in action, story of coal, story of petroleum, story of sulphur, story of ingot iron, story of asbestos, rock drilling, story of abrasives, story of heavy excavating machinery, story of natural gas, oxygen, story of an electric meter, story of a watch, story of an automobile, story of steel, manufacture of cast iron pipe, water power and electric transportation.

The machine, blacksmith and tin shops of the Tennessee Central Railroad at Nashville, Tenn., recently destroyed by fire with an estimated loss of $80,000, will be replaced immediately, together with the machinery destroyed.

GALVANIZING AT FAULT?

Modern Method of Coating Criticised—A Producer Makes Answer

In the October number of *Mining and Metallurgy*, the official publication of the American Institute of Mining and Metallurgical Engineers, New York, is an article entitled "What is the Matter with Modern Galvanizing?" by J. A. Singmaster and G. F. Halfacre of the New Jersey Zinc. Co. The authors say that they have examined about 50 samples of galvanized sheets of recent manufacture, obtained from 36 manufacturers in the United States, and find that the weight of coating on these sheets varies from 0.62 to 1.9 oz. per sq. ft., with but five of the samples in excess of 1½ oz. per sq. ft. They contrast these weights with the minimum weight of 2 oz. per sq. ft. of sheet required by the majority of buyers of sheet under specification, and then ask: "Is it any wonder that galvanized iron, which, according to Webster, is 'iron coated with zinc to protect it from rust,' fails prematurely and brings all galvanizing into disrepute?"



Ingot Iron Exposed to the Atmosphere at Pittsburgh for 42 Months. 1.60-oz. coating

Copper-Bearing Steel Exposed to the Atmosphere at Pittsburgh for 42 Months. 1.77-oz. coating

Ingot Iron Exposed to the Atmosphere at Pittsburgh for 42 Months. 1.75-oz. coating

The authors add that the situation as regards wire is worse, also that the roofing industry has been driven in self-defense to stringent specifications on the weight of coating of the nails used to fasten its products.

In conclusion, the article says: "We believe it is to the mutual interests of the iron and zinc industries to co-operate in measures for the return of galvanizing to the heavy coated work and the re-establishment of the reputation of this material, rather than to surrender the field to substitute materials which in many cases contain neither metal."

THE IRON AGE has brought the criticism referred to above to the attention of a number of manufacturers of galvanized sheets with the suggestion that they comment upon it if so disposed. Responses have been received from a few of them. Among the letters is the following from the research department of the American Rolling Mill Co., Middletown, Ohio, written by J. A. Aupperle:

Durability of Coating in Relation to the Character of Base Metal

"The American Rolling Mill Co. realized many years ago that the durability of iron and steel depended very largely upon the galvanized coating, and it has been our endeavor to put the maximum weight of galvanized coating on iron sheets which the product will permit. On sheets which require forming and stamping, the galvanized coating rarely gets below 1 oz. per sq. ft., while on culvert material we have always used a minimum coating of 2 oz. per sq. ft. on all pure iron.

"We have found that a pure base metal influences the purity of the zinc coating, and from the hundreds of analyses which we have made we have found the percentage of iron to be considerably less in the coating on commercial pure iron than in the same weight coating on commercial steel.

"We have done considerable research work on galvanized coatings, and have tested such material under all sorts of conditions. We have recently tested galvanized coatings subjected to a saturated solution of alum, at room temperature, and have found that the galvanized coating on copper-bearing steel or copper-bearing iron is attacked five times as fast as the galvanized coating on pure iron. These tests were made by using different grades of material, each grade, however, containing as nearly a 2-oz. coating as it was possible to secure.

"An alum test is easy to make and the results are very conclusive. Alum is used by many cities for the purpose of purifying city water.

"We believe that the article by J. A. Singmaster and G. F. Halfacre overstates the conditions existing in the manufacture of galvanized sheets. It is not a fact that manufacturers reduce expenses by skimping in the amount of zinc used in their finished product. The tight-coat sheets containing the light weight coating have been developed to meet severe drawing and forming operations. We have found that the more impure the coating, the thinner such coating must be in order to stand severe forming; on the other hand, we have found that pure iron which carries a pure coating can carry a heavier coating and still stand severe forming operations.

"The authors have directed attention to the life of the modern galvanized gutter or leader pipes. The authors do not say what they observed when such products are examined. It is a fact, however, that galvanized gutter or leader pipes, made from pure iron, are giving good service under many different kinds of atmospheric conditions in this and foreign countries.

"We would welcome any law which would require branding of galvanized products with the weight of zinc coating, as for many years we have followed this practice on some of our products.

"We concur in the opinion of the authors that the weight and purity of zinc coating are important factors in galvanizing on which the durability of the sheet depends. The accompanying photograph emphasizes this point very clearly. Two sheets of pure iron and one of copper-bearing steel were exposed to the atmosphere at Pittsburgh for 42 months. The copper-bearing steel carried more coating than the pure iron.

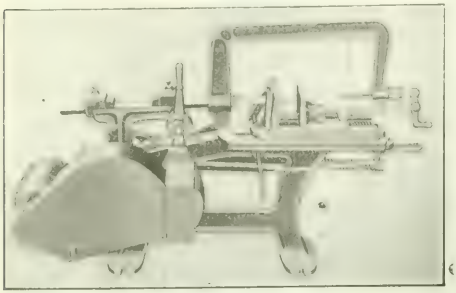
"The copper-bearing sheet was covered with red rust while the coating on the two sheets of pure iron was but slightly attacked. The greater durability of these sheets containing a galvanized coating is realized when we compare the life of these galvanized sheets with the same material ungalvanized. Uncoated pure iron, 22 gage, when tested by the American Society for Testing Material at Pittsburgh, lasted about 22 months, while the galvanized coating was but slightly attacked after almost twice as long exposure.

"The galvanized sheets were 26 gage, while the uncoated sheets tested by the American Society for Testing Materials were 22 gage or 67 per cent heavier than these galvanized sheets. These tests prove conclusively that a pure coating is more durable than the impure zinc coating on steel."

New Portable Motor-Driven Hacksaw

A No. 2 Marvel portable draw-cut hacksaw, motor driven, has been added to the line of the Armstrong-Blum Mfg. Co., 335 North Francisco Avenue, Chicago. Large capacity and nominal cost are features emphasized. The capacity is 6 x 6 in. on long stroke and 8 x 8 in. on short stroke, the size of blade being from 12 to 17 in.

The motor is attached to the rear of the machine as shown in the illustration, where dirt and saw chips cannot get into it. It is connected to the driving crankshaft by a silent chain, sprockets and intermediate cut



Portable Hacksaw Machine Driven by Motor Drawing Current from Any Lighting Circuit.

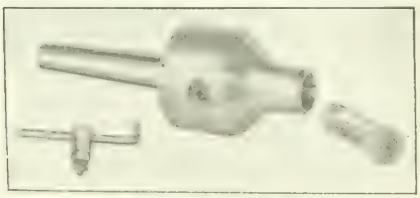
gears, these parts being entirely inclosed in the cast housing shown, and run in oil.

When the machine is equipped with a motor for operating on a lighting circuit the switch is wired to a plug receptacle, attached to the top of the switch box, so that the machine can be connected with any lamp socket by means of an extension lamp cord. The machine may be taken anywhere in the shop on a small platform truck and connected to the nearest lighting fixture. When a cut is completed the saw frame trips the starting handle and automatically opens the switch and stops the motor.

Spring Chuck for Holding Small Rods

A spring chuck or spring collet holder constructed as shown in the illustration and intended for holding small rods, straight-shank drills, milling cutters, etc., has been placed on the market by the Rockford Milling Machine Co., Rockford, Ill.

The collet is held securely in place by a worm wheel threaded on the inside to fit the threads on the end of the collet. A noteworthy advantage is the small spindle nose which permits bringing the work very close to the chuck. When used to hold drills or milling cutters, the shank is gripped over almost its entire length. This tends to increase the rigidity and assure against crys-



tallizing which frequently causes the loss of cutters or drills where they have only a short grip.

The chuck is of alloy steel, hardened and ground, and has a shank to fit a standard taper spindle. There are no projecting parts. To draw in the collet, the worm is turned to the right by means of the key wrench shown; this draws the collet against the taper seat, closing the nose centrally with side strains. Turning to the left forces the collet out. It has a hole through the entire length, the diameter being as large as the small end of the taper will permit.

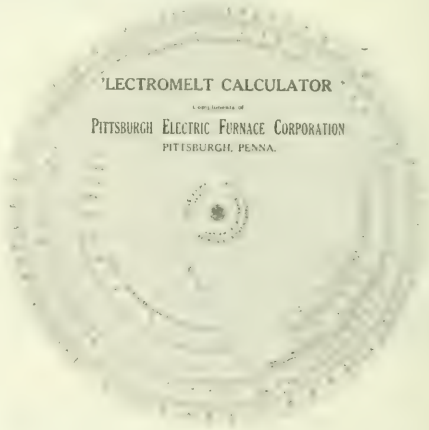
The chuck may be used in lathes also, and placed in the spindle for holding stock or collet, it is said to grip rigidly and not to require a draw in attachment. Three sizes are available for Nos. 9, 10 and 11 B & S taper. The diameters of the threaded ends are ½, ⅝ and ¾ in. respectively, and taking a round collet of from zero to 1 in.

Why Enameled Ware Cracks

The Bureau of Standards finds that enameled ware cracks because enamel does not "fit" the iron. When the rate of expansion is the same for the enamel as it is for the iron then they will stay together through any amount of heating and cooling, but if they have different rates of expansion they are likely to separate. The rate of expansion of the enamel depends upon its composition, and may thus be adjusted quite accurately to that of the iron. The bureau expects shortly to publish a paper dealing with this subject and advising manufacturers of enameled ware what composition will give the best "fit."

Device for Calculating Alloy Additions

An ingenious device for quickly calculating the additions of various alloys necessary to add to certain steels has been perfected by the Pittsburgh Electric



Furnace Corporation, Pittsburgh. It is called the 'Lectromelt Calculator. It is a circular slide rule, consisting of three celluloid disks, intended to aid the furnace superintendent and melter not only in figuring mixtures, but in enabling him to allow for ordinary percentages of loss in the absorption of the alloy in melting Complete instructions as to how it should be used are printed on the reverse side. Rapidity and accuracy are pointed to as serving useful purpose in the steel and metal industries.

A list of alloys, including brasses, bronzes, tin and lead base alloys, has been prepared in pamphlet form by the American Society for Testing Materials, for sale at $1 per copy. The list has been prepared by Dr. William Campbell of the society's committee on nonferrous metals and alloys. The alloys, 1550 in number, are arranged in groups. A copy may be obtained by applying to the society at 1315 Spruce Street, Philadelphia.

NEW GAS-MAKING PRINCIPLE

Deschamps Method Involving Pulsating Rather Than a Continuous Supply of Air

BY JOSEPH F. SHADGEN

The gas producer industry has been conservative in late years. The various makes differ mostly in mechanical details of construction, such as absence or presence of mechanical pokers or equalizers, stationary or rotating shaft-shells, design and movement of grate. All these parts have been developed with the main object of breaking up the coal strata, to relocate the coal mass and to plow up the fuel and ash layers.

By avoiding the formation of channels in the fuel bed, along which the air would travel in preference through the piled-up mass, the chemical reactions which take place are facilitated. The gas desired is a mixture of oxide of carbon and hydrogen and the presence of carbon dioxide is manifest proof that ideal conditions are not existing. The numerous analyses of every-day gas show an average CO_2 content varying from 3 to 6 per cent and a mean of 5 per cent is usually accepted as good practice. This seems to indicate that efficient conditions of gasification are not attained especially in view of the fact that the active gases of the composition (CO and H_2) make up about 35 per cent of the volume.

The present practice is to supply the gas producers with air and steam under a positive pressure flow, either by means of a fan or an injector. These devices are used separately or jointly for the sake of continuity of operation. The steam jet with ejection type nozzles tends to supply too large a quantity of steam in proportion to the air. This is detrimental because hydrogen is obtained in too large quantities as compared with the carbon monoxide. There is the risk of running cold with the operating complication of heavy fires and pasty slags. Therefore, positive pressure blowers with proportioning devices for the steam are gaining in favor to permit exact regulation and control by the operating crew.

Remarkable is the fact that in all present designs the air steam flow is continuous, and centrifugal fans are the usual machines, giving a constant supply at uniform pressure.

Jules Deschamps, a French gas producer engineer, who published some twenty years ago the first comprehensive book on these problems, has developed lately, after years of investigation, a new process of operating the gas producers. In substance, the Deschamps process consists in supplying the reacting gases (air and steam) not in a continuous way, but in pulsations of precalculated frequency and amplitude. The periodically varying flow of the gases can be obtained by the simplest means without operating complications.

The new process can be clearly illustrated by an example: Assume a gas produced, designed to run at 1½ in. constant pressure, given a continuous supply of air and steam. Instead of uniform conditions, fluctuations are produced. For instance, dry air is blown at 1¼ in. pressure for one second; and a rich air steam mixture of 1¾ in. pressure for one second; or dry air is blown at 1¼ in. pressure for one second; rich air steam at 2 in. for one second; and nothing for ½ second or any other combination of the three possibilities. In the fuel bed will successfully exist different pressures, that of the air determined by the fan, that of the air steam mixture and that of the generated gas alone.

Practically these fluctuations are realized by periodic opening and closing of valves or gates. These differences in pressure force the air and steam constantly to change the paths through the fuel. A uniform stream of the gases, on the other hand, will follow the lines of least resistance, through the channels, and a great portion of the fuel is not active in the reactions. Mechanical devices never reach the heart of the coal mass.

The varying pressures of the steam or air supplied in the Deschamps invention will create different velocities of flow through the combustible, the periodic changes will provoke cross currents, eddies, lateral movements. In other words, an equilibrium never exists, and constanty new surfaces are reached by the reacting gases and the evacuation of the formed products of reaction is greatly facilitated. The flexibility and mobility of the steam and air permit reaching the full area of the solid mass by the proper choice of the frequency and force of the pulsation with due regard to the velocities of the reactions that take place. The practical result of the vibrating supply of gases to the gas producers will be the non-existence of channels, and will be reflected by an inevitable decrease in the carbon dioxide content of the resultant gas.

IMPROVEMENT IN BELGIUM

Prices Are Firm Generally — Quotations of Lorraine Mills Check Upward Movement— Export Business Good

BRUSSELS, BELGIUM, Nov. 3.—The Belgian iron and steel market is beginning to show improvement. Business has become more active and a more optimistic view is taken of the situation. Unfortunately, while favoring Belgian exports, the rise of the pound sterling is causing some hesitancy, both on the part of consumers and on the part of producers, the latter not knowing how much the prices of raw products will increase. On the whole, prices are firm and show a rising tendency.

In the export market there is better inquiry from India and South America, and some important orders have been taken by Belgian firms in China. One of these is for the construction of a port at Macao and another for the construction and equipment of a railway line near Pekin (180 million Belgian francs).

Coke.—The price of German reparation coke was increased Nov. 1 to 78.50 fr. at Belgo-German frontier, a rise of 12 fr. per ton. Germany delivered to Belgium, from Oct. 1 to Oct. 20, 31,051 tons of metallurgical coke and 76,767 tons of coking slacks (at 58.50 fr. per ton, Belgo-German frontier). The price of Belgian coke has increased 11 fr. from Oct. 15.

Pig Iron.—Available supplies are scarce and partly because of the increase in coke, prices of pig iron are rising. There is only one Belgian firm which is in a position to accept orders for foundry iron, and in the hope of obtaining a better price it has so far refrained from committing itself over November. Lorraine and Luxemburg producers are adopting much the same tactics, but are quoting lower prices for desirable orders. Some orders for basic pig iron have been booked for export. Chill-cast foundry iron, No. 3 P.L., is being quoted nominally at 265 to 270 fr. for domestic delivery or f.o.b. Antwerp, for export on iron from Belgian, Luxemburg or Lorraine producers. Ordinary basic iron is 245 to 250 fr. delivered.

Semi-Finished Material.—Prices continued upward until they were checked by offers from Lorraine works at lower prices. Quotations are firm, but vary according to the volume of orders previously booked by the various works.

Present prices on basic material are as follows, per metric ton:

	Belgium, Delivered, or f.o.b. Antwerp, Fr.	Luxemburg, f.o.b. Antwerp, Fr.	Lorraine and Saar, f.o.b. Antwerp, Fr.
Ingots	305 to 310	315 to 320	305 to 310
Blooms	320 to 330	335 to 345	320 to 325
Billets	340 to 350	355 to 365	355 to 360
Sheet billets	355 to 360	365 to 375	370 to 380
Supplement for open-hearth steel	25 to 30	20 to 30	20 to 30

Rolled Products.—Iron products are quiet but steady, and prices, although discussed by purchasers, are firmly held. Because of the high cost of fuel and scrap, present quotations are not particularly advantageous to producers. A really better tendency is noticeable in rolled steel products, with a material rise in prices. Inquiry is satisfactory, especially on shapes. Large works are filled with orders until January or February. There is also good inquiry for bars at about 430 fr. f.o.b Ant-

werp. Heavy beams are neglected because of German competition. Rods and wire are firm. Spring steel is in good demand at 700 to 750 fr. per metric ton.

	Belgium, Domestic, Delivered	Belgium, Export, f.o.b. Antwerp	Luxemburg	Lorraine
Bar	430-440	425-430	420-425	430-440
Beams	385-415	380-400	.....	380-400
Angle	400-425	395-425	.....	.....
Rail	470-475	.....	420-425	.....
Plate	520-535	520-525	500-510	520-530
Hoop*	650-675	630-650	625-635	625-675
Wire	500-510	500-510	500-510	515-520

*Belgian cold rolled steel hoops are quoted at 950-1000 fr. for delivery in Belgium.

Plates and Sheets.—Business is more active and prices are more easily held. Heavy sheets alone are an exception, because of German competition.

	Belgian Sheets— Domestic, Delivered, Fr.	Export, f.o.b. Antwerp, Fr.
3 mm. and over	450 to 465	.....
3 mm. to 2 mm.	500 to 550	*420 to 510
1.5 mm. to 1 mm.	600 to 775	.....
0.8 mm. to 0.3 mm.	820 to 900	.....
Fine lines	440 to 450	420 to 430

*3 mm. and heavier.

Luxemburg mills are quoting 5 mm. and heavier sheets of basic steel for export at 450 to 460 fr. per metric ton, f.o.b. Antwerp, and flat bars at 440 to 450 fr. per metric ton, f.o.b. Antwerp. Quotations of Lorraine mills are 470 to 490 fr. per metric ton on basic steel sheets, 5 mm. and heavier and 560 to 580 fr. per metric ton on medium sheets.

Increase of Three Furnaces in September

Some 32 furnaces were in blast in Belgium in September, producing 163,120 tons of pig iron, as against 29 in August having produced 154,000 tons.

Many Machine Tools at Government Sale

More than 450 lots of material, the majority of which were machine tools, were sold at a public auction of surplus supplies at the Long Island Air Reserve Depot, United States Aeronautical Engine Plant, Long Island City, N. Y., Nov. 14. The plant at which the sale took place was formerly operated for the government by the Wright-Martin Aircraft Corporation.

The material had been on display for a week and the registered buyers numbered more than 120. Dealers took the largest quantity although users of equipment were in evidence. It may be expected perhaps that most of the machinery will be placed on the market again. Unserviceable tools had been weeded out and all items offered were said to be from 85 to 100 per cent complete. Buyers were not confined to the New York district, and at least one buyer from Chicago was on hand. All sales were f.o.b. the place of sale, and were to be shipped within 30 days.

Interest was shown in turret lathes, but the machines for the most part brought low prices. In Jones & Lamson machines, six 3 x 36-in. were bought for $400 each, one of the same size at $440, two at $360 each, and another at $350. Five other machines of that company went at $400 each and four at $360 each. On the 2¼ x 24-in. size, nine J. & L. machines were taken at $425 each and one at $330. Another lot of 13 of the J. & L. 2¼ x 24-in. lathes were sold for $215 each. Fifteen Gisholt 6½ x 24-in. machines with two motors were taken at $370 each and two of the same size at $825 each. Two 3½ x 21-in. machines of the same company, with two motors, brought $650 each and another of that size, $300. A Potter & Johnson, No. 3, with motor, was taken at $165 and six Foster machines, friction geared heads, at $350 each. A Fitchburg "Lo Swing" lathe, 3½ x 84-in., with motor, went for $175 and three, 3½ x 60-in., at $160 each.

In screw machines eleven Gridley automatics, 4¼-in. with two motors, were taken at $310 each, two of the same size going at $355 each. Another lot of five Gridley, 4¼-in., with two motors brought $180 each, and two 3¼-in. machines of that make went for the same price each. Three 4-spindle, 1¼-in. Gridley, with motor were sold for $550 each.

Twelve Acme No. 55, 4 spindle automatics at $200 each was a feature, two No. 56 machines of the same make bringing $400 each and seven No. 52's, $310 each. Two Brown & Sharpe No. 0 went for $700 each and a No. 2 Garvin, with motor, at $175.

Seven Porter & Cable lathes, 9 x 38 in., sold for $135 each; six at $130 and five of the same size at $65. Three Blount 13 x 10-in. speed lathes went for $125, a Pratt & Whitney 24-in. x 8-ft. engine lathe for $100, and a Lodge & Shipley 16-in. x 8-ft. lathe for $650.

Drill presses offered were for the most part multiple spindle machines. A Baush 16-spindle, No. 1 went for $350, and a lot made up of two Baush No. 3 and a No. 4 and a Natco No. 30 was sold for $4,000. Foote-Burt machines included a No. 4, 6-spindle, at $450 and one of the same size at $400. A No. 2, 4-spindle machine went at $280 and a No. 25, 5-spindle at $250. Two Pratt & Whitney No. 12's, 16 spindles, brought $350, and three No. 1½ horizontal, 2-spindle, $75 each, another machine of the same size going for $225.

A Natco multiple spindle, type 14, was taken at $600 and a No. 30 at $825. Four No. 14 Natco, multiple spindle, brought $500 each. Among other sales were a Detroit No. 2, five spindle automatic drill at $200; a No. D2, Minster, 24-in. machine at $400 and two Leland-Gifford 24-in., four spindle machines at $225 each. A four spindle, 12-in. Allen brought $250. In radials, four Barnes No. 3 brought $650. Two 3-ft. American radial drills were sold at $925 and one at $825.

Several milling machines were offered. Five plain Le Blonde, type 3M were sold at $500 each, a 3H universal machine of the same company going for $825 and another for $675. A No. 4 plain Le Blonde sold for $525. In vertical machines, a Becker model A brought $375; a model SB, $310; a model C, with motor, $525; a model ACS, two spindle, $375; a No. 6, $500; a No. 48, $365; two No. 4B, $285 each, and four No. 6, $700 for the lot. A Cincinnati No. 2 vertical machine brought $775. Two Ingersoll 24 x 60 x 16 ft. machines with motor brought $1000 each, and two 30 x 24 x 10 ft. were sold for $3,300. A Briggs machine, Type A, of Gooley & Edlund Co., was sold for $140, six type B machines being sold for $140 each, and two type A for $205. Three Garvin duplex No. 2 sold for $200 each, and five No. 1½ for $35 each. Among others were a Pratt & Whitney No. 4 spline miller at $125, a Cincinnati Lincoln, type 28, at $380; a Pollock, model A, four spindle, at $125, and two Pratt & Whitney machines for $625.

In grinders, four Bryant chucking machines, No. 18, brought $240 each, and another $500. Two Pratt & Whitney vertical surface machines, 12 x 36 in., were taken at $800 each, two 14 in. machines going at $400 and $500. A Landis No. 1½ internal grinder was sold for $70, a Gardner disk No. 14 for $210, and a Gardner double disk, No. 8, for $200. Two Diamond No. 3, surface grinders sold for $1,200, and a Landis No. 2 universal for $450. In tool grinders a Springfield 18-in. machine, brought $210, and a Blount No. 2, 10-in., $20. A 24-in. Ingersoll cutter grinder sold for $45, and two more for $31 each.

Interest was shown in gear cutters. Four 6-in. Gleason bevel-gear machines were taken for $680. A Gould & Eberhardt 20-in. machine was taken at $450 and a Newark No. 2B at $125. A Brown & Sharpe No. 13 went for $300 and a "Pfanter" 36-in. machine with motor was taken at $550. In gear hobbers, two Barber & Coleman No. 3 machines went at $525 each, a Gould & Eberhardt machine at $750 and a Schuchardt & Schutte No. 2 at $365.

A few broaching machines, several Liberty die-casting machines, tapping machines and threading machines were also offered. In material handling machinery two Sprague electric hoists, ½-ton capacity, were sold and an electric truck of the Lansing Co. A quantity of electrical apparatus including motors and parts was also taken. Plug, thread and other type gages were offered and taken at very low prices. Hardware, radiators, airplane engines, pulleys, pipe fittings, sheet brass, paints and a quantity of other miscellaneous material was also among the offerings.

Tracing the History of Pittsburgh Basing

Colonel Bope Tells of the Origin of the Custom—J. Leonard Replogle, Wm. H. Donner and Others Give Testimony—Judge Gary Recalled

WASHINGTON, Nov. 14.—With Chairman Elbert H. Gary of the United States Steel Corporation recalled to give further direct testimony to-morrow, and Chairman Charles M. Schwab of the Bethlehem Steel Corporation called to testify the latter part of the week, perhaps on Friday, the closing days of direct testimony by the Federal Trade Commission in the hearing in the Pittsburgh base case are to be marked by the appearance of these two notable men of the iron and steel industry. It is expected that the testimony of each of them will occupy at least one day.

The hearing in Washington has embraced a wide range of subjects injected by Attorney Steinhauer for the commission, the most of which has been objected to by counsel for the Steel Corporation. Examiner J. B. Bennett has ruled that it will be necessary for Mr. Steinhauer to connect the various issues raised with the direct charge of the commission in its complaint against the Steel Corporation, that the Pittsburgh base is an unfair method of competition. Mr. Steinhauer has repeatedly said that he would connect the subjects brought up with the main issue.

The hearing was enlivened to-day during the testimony of President William H. Donner of the Donner Steel Co., Buffalo, who was on the stand practically the entire day. Mr. Donner, who it was evident made every effort to testify clearly and frankly, had responded to a question by Mr. Steinhauer as to how the law of supply and demand operated when the company was able to sell steel East or West on a Pittsburgh base. Mr. Donner, who supported the Pittsburgh base and said quotations are made on the law of supply and demand, was explaining different market conditions, intending to reply to the question by Mr. Steinhauer. He told of conditions when quotations were made on the Pittsburgh plus basis as well as when it was necessary to absorb freight differentials. The latter he called the Pittsburgh minus quotation. Examiner Bennett, who seemingly was irritated, volunteered the remark that the reply of Mr. Donner was evasive.

Mr. Severance, counsel for the Steel Corporation, taking sharp issue with the statement of the examiner, arose to his feet and declared that the latter had insulted the witness. Then followed a few hot words exchanged by the examiner and Mr. Severance, after which the testimony was resumed.

Mr. Donner's Testimony

Mr. Donner explained his association with the steel industry over a long period and was asked by Mr. Steinhauer as to the purchase by the Pennsylvania Railroad of the Pennsylvania Steel Co., Mr. Donner having been chairman of the latter in its early days. Mr. Donner said that having been neither a director nor stockholder of the Pennsylvania Railroad, he could not tell why it assumed controlling interest. Speaking of the organization by Mr. Donner of the National Tin Plate Co., Monessen, Pa., Mr. Steinhauer had Mr. Donner tell of how more than two decades ago tin plate was sold on the basis of the price at Swansea, Wales, plus freight to destination when there was small production in the United States and competition with Welsh makers existed. The method of buying steel at a tin plate plant at Anderson, Ind., which was on the Pittsburgh base, also was described and for a period, it was pointed out, tin plate was sold at a delivered price. But to-day it is sold f.o.b. Pittsburgh. The Pittsburgh base method of quotation was said by Mr. Donner to be due to Pittsburgh being the center of production and as a means of providing a convenient form of quotation.

Preceding Mr. Donner, exhibits showing contracts over a term of years for plates, shapes and bars, together with quotations on these products based on THE IRON AGE figures, were explained by H. E. White, of the commission, former traffic manager of the Minneapolis Steel & Machinery Co. He also occupied the stand all day yesterday, when he submitted various data. The other witness of this morning was Miss Eleanor Shenehan, of the commission, who submitted a compilation of prices during the period from 1912 to 1921 on soft steel bars and basic pig iron at Chicago and Pittsburgh, the figures being based on THE IRON AGE quotations. The purpose of the exhibits of both those of Mr. White and Miss Shenehan apparently was to show discrimination in prices.

Colonel Bope on Pool Days

Testimony given on Tuesday, Nov. 7, by Col. H. P. Bope, formerly first vice-president and general manager of sales of the Carnegie Steel Co., took a wide range. It really constituted an outline of the history of the iron and steel trade in the United States. Colonel Bope was associated with Carnegie Bros. & Co. as far back as 1879 and in his recital he showed a remarkable memory for details.

It was not easy to see why the attorney for the commission inquired at such great length into so many matters extraneous to the Pittsburgh base. Colonel Bope, however, proved equal to the occasion and almost without exception was able to make detailed replies to the questions asked. His testimony dealt with the old pools of the industry, especially the beam pool, meetings of associations to discuss trade conditions, division of the country into zones, fixing of various basing points, developments in processes of manufacture, the fixing of differentials, extras, etc.

Pittsburgh Base Back in 1873

The Pittsburgh base was supported by Colonel Bope because of its stabilizing influence on the market. He said it was established in 1873 and was due to the panic in that year. Speaking of the beam pool in the old days, when Andrew Carnegie was a dominating figure in the fast-developing steel industry, Colonel Bope spoke of the manner in which the country was parceled into zones. Prices, he said, were made to cover the entire country so that all mills were on an equality. Zone prices were established soon after the erection of the first skeleton steel structure, the Home Life Building in Chicago in 1884, and were intended to make it possible for all fabricators to enter business on an equality. The zone prices, it was stated, represented an f.o.b., Pittsburgh basis plus an average rate to each zone. The zone system continued until the number of structural plants increased and inequalities sprang up. Colonel Bope said he hardly thought it fair to call the Carnegie method of competition ruthless. He said that Mr. Carnegie wanted to keep the mills going and favored membership in the associations of the old days.

Pittsburgh, Colonel Bope said, was made the basing point, because it was the greatest producing center. He told Attorney Steinhauer, in reply to a question, that it was necessary to fix a base in order to maintain stability. He recited different attempts made to deviate from the Pittsburgh base and spoke particularly of the efforts to do this in February, 1909, when the market was extremely dull and it was decided to reduce prices and to dissolve all relations with pools. This policy was determined upon after it was felt that customers had been protected and their stocks liquidated. Prices of bars, it was declared, dropped to 1.10c. and even to 1c. per lb. and the manufacturers began quoting f.o.b.

mills. Chaos resulted. There was a revival of business, Colonel Bope said, by May 1 and steel manufacturers without concerted agreement or understanding again began quoting on the Pittsburgh basis. He said he thought the mills returned to their plan not only to stabilize conditions but also to make money out of the increment of freight rates.

Mr. Steinhauer read an article from THE IRON AGE, quoting from an address made by Colonel Bope on Jan. 25, 1911, before the Pittsburgh Realty Club, dealing with competition in the steel trade, and he was asked by Attorney Steinhauer if THE IRON AGE is considered an authentic journal in the steel trade. Colonel Bope replied that it is, and while he could not recall making the particular speech referred to, he said that the article was full of truth and he had no doubt that he made the speech. Judging from the character of THE IRON AGE, he did not think that it would publish anything that was not all right.

Value of Basing Point to Consumer

Chairman John A. Topping of the Republic Iron & Steel Co. was examined at considerable length by Attorney Steinhauer. His evidence was largely of the same character as that of Judge Gary as to the reasons for the Pittsburgh base and how it has operated. Mr. Topping said that steel, like any other commodity, is sold under competitive conditions determined by the law of supply and demand, no matter what the steel or where it is made. He spoke of the Pittsburgh base as being a convenience, "a spot to shoot at," and a method of quotation, but that it does not in any way fix the price. He said the prices were fixed by competition and that supply and demand regulated the quotation. Buying and selling, he pointed out, depend upon the necessity of the seller to sell or the necessity of the buyer to buy. Pittsburgh had been made the basing point, because of its dominant position as a producing center. He took the position that the Pittsburgh-plus plan is of more advantage to the consumer than it is to the seller.

Mr. Steinhauer asked Mr. Topping which State, Pennsylvania or Ohio, produced the greater tonnage of sheets. Mr. Topping said he thought that more sheets are produced in Ohio than in Pennsylvania. Mr. Steinhauer, repeating a question he had previously asked, wanted to know why, then, the base was not in Ohio. Mr. Topping stated that the Pittsburgh base has been established as an outgrowth of conditions in the trade and he reiterated it is a convenience for purposes of making quotations. He added that there can be a half-dozen bases, or quotations can be made f.o.b. mills, but in any case it will not make any difference in prices. Mr. Steinhauer asked Mr. Topping at some length regarding the difference in the costs of manufacturing Bessemer and open-hearth steel. Mr. Topping replied that the costs fluctuated and that it would not be possible to make any general statement. Asked as to the relative output, he estimated that two-thirds of the production is open-hearth steel and one-third Bessemer steel, while 10 years ago a reverse situation existed. He ascribed the development of open-hearth production to the growing scarcity of Bessemer ore and to the feasibility of using scrap in making open-hearth steel as well as to the fact that the latter is more homogeneous and therefore of a better quality than Bessemer steel.

Mr. Topping was followed by President Lloyd Booth of the Falcon Steel Co., Niles, Ohio. He explained that his company is a member of the National Association of Sheet and Tin Plate Manufacturers and he described the relation of his company to that association, and also some of the activities of the latter in gathering and issuing statistics.

Mr. Replogle on War-Time Chicago Basing

J. Leonard Replogle, president Replogle Steel Co., Wharton, N. J., in the course of his testimony last Thursday, described the Pittsburgh base as an evolution of trade practice of many years. It was due to the enormous production in the Pittsburgh district and had become a standard of quotation. One of its purposes is to give consumers a basis to figure costs of their raw material. Also, it was pointed out, it is of great value to manufacturing users of steel; without it an enormous amount of competition would be eliminated, his reference being particularly to non-integrated producers who now get the benefit of freight differentials. When the question of differentials and extras was taken up by Mr. Steinhauer, the witness said that he favors uniform extras. If there is to be price cutting it should apply to base figures and not to extras. Otherwise, it was said, manufacturers could resort to cutting of prices by lowering those on extras and leaving the bases unchanged.

Mr. Steinhauer asked Mr. Replogle why the latter as director of steel supply of the War Industries Board fixed a Chicago base on plates, shapes and bars. Mr. Replogle replied that it was an arbitrary action taken without process of law and through the co-operation of steel manufacturers. He pointed out that when the Chicago base was fixed steel plates were selling as high probably as 14c. per lb., and this quotation was reduced to 3.25c. with corresponding cuts on other steel products. The War Industries Board, he said, was placing enormous tonnages for projectile steel in the Chicago district, and this was said to be the real reason for fixing the base at that point. Most manufacturers, he said, had sufficiently low costs and made no particular objection. Later the Railroad Administration placed big car orders in the Chicago district calling for large amounts of plates, shapes and bars. The Chicago mills became loaded up to a point where they could not take any more steel and it was necessary to place additional business in the Pittsburgh district. It was then felt to be unfair to some Chicago makers, especially those with non-integrated plants, to continue the Chicago base and a return to the Pittsburgh base was made. Some of the Chicago district producers said they were threatened with bankruptcy and that it would be necessary for them to have the advantage of the freight differentials. Also it was felt to be unfair to the Pittsburgh mills to make them pay the differential.

Accuracy of The Iron Age

The Chicago base applied from September, 1917, to July, 1918. Mr. Replogle was asked as to whether he was correctly quoted in THE IRON AGE of June 27, 1918, which credited him with saying that "the Government has probably saved between $10,000,000 and $15,000,000 as the result of Chicago basing." Mr. Replogle replied that he did not remember making the statement, but said that he possibly did. Asked as to how THE IRON AGE is regarded in the steel trade, he said it is regarded very highly and as authentic. He said that it is as accurate as it is possible to be in any trade publication and that his observation was based on a reading of THE IRON AGE for 20 years.

Attorney Severance of the Steel Corporation had Mr. Replogle describe his activities as vice-president and general manager of sales of the Cambria Steel Co., Johnstown, Pa., which position he resigned in 1914. He told Mr. Severance that he figured prices on most products on the Pittsburgh base, but that different prices were quoted according to competitive conditions. This would have been so, the witness said, regardless of whether quotations were on a Chicago or mill or other basis. Mr. Steinhauer asked the witness what would be the result if the Lackawanna Steel Co., Buffalo; the Midvale Steel & Ordnance Co., Coatesville, Pa.; the Carnegie Steel Co., Pittsburgh, and the Illinois Steel Co., Gary, Ind., desired a certain piece of business in Chicago and were prohibited from using the Pittsburgh base and quoted the same price on a mill base. Mr. Replogle said that quite naturally all competition with the Illinois Steel Co., in such a case, would be eliminated. The effect of such a practice would be, he said, to localize the market.

The $28 Rail Price a Mistake

The witness told Mr. Steinhauer that he never knew the time when base prices were strictly observed. There are many ways to cut prices, he said, such as the cutting of extras or the buying back of scrap. Prices never were uniform and he himself had "sliced" prices to get business where competition was keen. The most nearly uniform prices he knew of were the old quota-

tions of $28 and $30, mill, on Bessemer and open-hearth rails. He thought the mills made a mistake in holding to these prices, because they did not yield profits. He said that many sales of steel products are based on THE IRON AGE quotations. It was declared that prices on extras are often cut either to "fool" customers or competitors.

Mr. Replogle was followed by G. H. Charls, vice-president and general manager of the United Alloy Steel Corporation, Canton, Ohio. Mr. Charls submitted in evidence correspondence from his files as to conditions and prices prevailing in the sheet market.

Pipe and Rail Prices

H. E. White, statistician for the commission, formerly traffic manager of the Minnesota Steel & Machinery Co., Minneapolis, Minn., on Friday put into records the tables of freight rates. Other witnesses on that day were C. L. Lingo, traffic manager of the Inland Steel Co., Chicago; Edward Worcester, formerly vice-president in charge of sales of the National Tube Co., Pittsburgh; George H. Jones, president Hillside Fluorspar Mines, Chicago, and formerly first vice-president of the Inland Steel Co., and William G. Gray of the American Iron and Steel Institute. Mr. Lingo testified as to freight rates and the territory served by the Inland Steel Co., pointing out that it shipped a very small amount of material east. Mr. Worcester testified that prior to 1900 there was a free delivery of pipe in the Pittsburgh district within certain zones. Outside of those zones, he said that different rates were charged. It was stated that the listed discount method of selling pipe f.o.b. Pittsburgh was started in 1900 and that all pipe, so far as the witness could remember, ever since that time, has been sold on the Pittsburgh basis. He stated that the reason is that Pittsburgh is the largest and cheapest pipe-producing center. Mr. Jones testified as to market conditions when he was with the Inland Steel Co. and the territory it served. Asked as to how the market price is established on rails, he said it had been done by sales by the leading producer, the price of which was followed by others, there being only a small number of manufacturers of steel rails. He said this method did not apply to other steel products. Mr. Gray submitted for the record statistics of the American Iron and Steel Institute, including its report of 1921, told how the figures are gathered and testified as to the accuracy of material carried in THE IRON AGE and other industrial papers.

The Steel Corporation's Case

The commission probably will end its direct testimony next week. The Steel Corporation expects to begin the presentation of its side of the case about the middle or the latter part of January in Chicago. The proceedings may be confined to that city or may be continued in New York. It is expected to call from 100 to 200 witnesses. Their testimony is expected to be much briefer than evidence called for by the Federal Trade Commission.

It is not possible to say when the present hearing will come to an end. The hearings will be followed by the submission of a tentative report by the examiner to the commission. Next will be arguments before the commission, after which it will pass upon the question of dismissing the case or issuing a cease and desist order. In the event the latter is issued, the case undoubtedly will be taken to the courts by the Steel Corporation and through the Supreme Court of the United States, if necessary.

Tonnage Rates in Sheet Mills Advanced

YOUNGSTOWN, Nov. 14.—Tonnage rates paid workers in sheet mills subscribing to the sliding scale wage agreement of the Amalgamated Association of Iron, Steel and Tin Workers will advance 4½ per cent of the base rate for the November-December period, as a result of the bi-monthly examination of sales sheets Nov. 13.

The examination disclosed an average price on Nos. 26, 27 and 28 gage black sheets shipped during the 60 days ending Oct. 20 of 3.20c. per lb., as compared with 3.05c. two months before, an advance of three points. The July examination, covering shipments for the 60-day period ending June 20, revealed an average price of 2.90c. per lb.

Under the new rate, affected employees will be paid 31½ per cent above base.

The 3.20c. average compares with a postwar low price of 2.75c., covering the September-October period in 1921.

The average price on tin plate was unchanged at $4.65 per base box, where it has remained for the last three bi-monthly periods, and tonnage rates therefore continue without change. Tin mill workers are paid a rate 23 per cent above base.

M. F. Tighe of Pittsburgh headed the committee of the Amalgamated association, representing the workers, while James H. Nutt of Youngstown acted for the employers through the Western Sheet and Tin Plate Manufacturers Association.

Atlas Steel Corporation Improvements

Plant improvements and extensions which will involve the expenditure of approximately $250,000 were authorized Nov. 13 by the executive committee of the Atlas Steel Corporation, meeting at Youngstown. The Atlas Steel Corporation is a consolidation of the Atlas Crucible Steel Co. and the Electric Alloy Steel Co., and maintains headquarters at Dunkirk, N. Y.

The principal items in the improvement program are the installation of a new 20-in. blooming mill at the Dunkirk property, and electric drives for the 10-in. rolling mill at Charleroi, Pa. Changes and alterations on furnaces and rolling mills will be made at both plants to effect operating economies and reduce costs.

L. J. Campbell, chairman of the board of directors, states that demand for tool and die steels is well sustained and that orders now on the company's books will engage capacity into the new year. While buying by automotive interests is less active, there is considerable inquiry from this source with respect to next year's prices.

Increased Buying Evident

In its mid-monthly report on business conditions, the Department of Commerce notes that current wholesale distribution is far in excess of its position last year. Increased employment and higher wages are credited with the enlarged demand. While manufacturing activity declined somewhat in September, much of this was purely seasonal re-action.

Copper production in September is given as 95,665,000 lb., declining from 100,835,000 lb. in August. Exports of copper declined slightly. Imports of tin fell from 8,219,000 lb. to 7,379,000 lb. Steel barrel production fell from 41.2 per cent of capacity to 37 per cent. Freight car orders during September are placed at 10,350, while unfilled orders for locomotives are given as 1,463. Shipments of locomotives during the month were 119, compared with 151 in August and 106 in September of 1921.

Otis Steel Quarterly Report

The Otis Steel Co. reports manufacturing profits of $297,716, for the quarter ended Sept. 30, and operating profit after charges of $69,273. After interest and other accounts, the report shows a deficit of $88,246. Operating loss, after taxes, for the nine months ended Sept. 30 are $159,979.

Manning, Maxwell & Moore, Inc., will re-open its Cleveland office, which was closed a few months ago, probably in the Leader-News Building. Norman Allerdice is Pittsburgh-Cleveland district manager of sales.

NO IMPORTS OF STEEL BARS

Customs Regulations as to Values, Exchange and Other Items Thus Far Prohibitive

The Fordney-McCumber tariff act has been in effect long enough to give some idea of the possibilities of finished steel importations, under conditions such as have obtained for some time in European and domestic markets. Importers have tried recently to figure out how bars and some other products could be brought over and sold at a profit along the Atlantic seaboard, but the workings of the tariff law, plus the fluctuations of exchange, are such that importations have not been found practicable.

For example, Belgian steel bars at this time are quoted at about 450 fr. per 1000 kilos, f.o.b. Antwerp. Adding about 55 fr. for freight, this would mean a price, c.i.f. American Atlantic ports, of 505 fr., or, on the basis of 15 fr. to the dollar, something over $33 per metric ton. Without the duty this would mean a price at New York just above 1.50c. per lb.

The duty is figured, under the new tariff bill, on the basis of the home consumption price in the country of origin, and when the price of rolled steel is between 1.50c. and 2c. per lb., or its equivalent in foreign currency, the tariff amounts to 0.50c. per lb. Below 1.50c. the tariff is 0.30c. per lb. The 0.50c. duty would bring the total price of Belgian or other foreign steel bars to such a level that competition from foreign steel works is not likely, especially in consideration of the difficulties of clearance through the customs under the new tariff act. The foreign market price, to be used as a dutiable basis, must be proved if it is less than the consular invoice value, and the rate of exchange is that fixed by the Treasury Department. Both price and exchange rates are those on the date of the actual sailing of the vessel, and this may put the dutiable cost either above or below the price paid. The importer's original calculation of duty he is to pay is seldom exactly right and it is practically impossible to calculate it in advance. In addition to the above, such items as transmission taxes and foreign export duties, where any exist—and these are subject to levy under the tariff act—are to be added to the calculations.

The marking of goods with the country of origin, if not done properly and in accordance with the act, will cause an additional assessment of 10 per cent and the possibility of a penalty.

JAPAN TO BUY MORE RAILS

Government and South Manchuria Railways Inquire—European Prices Low—Railroad Electrification Tender

NEW YORK, Nov. 14.—Although merchant buying from Japan continues at a low ebb, Government tenders and the inquiries of large consumers continue to appear. American quality and deliveries are factors but some exporters to Japan claim that German products have proved satisfactory and as German and Belgian iron and steel is quoted c.i.f. Japanese port, as $10 to $15 per ton lower than the American product, there is a tendency to purchase European material. As a notable example of these lower prices, on a recent Government tender for 250 tons of galvanized telegraph wire, the German bid was 29 yen ($14.06) per ton less than the American c.i.f. price.

Among the current inquiries of size is the tender of the Imperial Government Railways for 5000 tons of 60-lb. rails, which closes Nov. 15, and an inquiry from the South Manchuria Railway Co. for 90 miles of 100-lb. rails, which totals 15,085 tons. It is stated by a large Japanese export and import branch in New York, which is submitting bids on the tender of the Imperial Government Railways, that for the first time this tender for rails has stated that quotations on rails of German origin would be acceptable. In addition to other tenders from the Japanese Government, manufacturers of electrical equipment are submitting bids on furnishing material for the electrification of the Japanese railroads. There is an inquiry current from Japan for 400 tons of wire rods. An inquiry recently appeared for a small tonnage of light gage black sheets, but the price expected, which was not to exceed $93 per ton, c.i.f. Japan, was considered by exporters as too low on which to transact profitable business.

Importation of foreign pig iron continues, but few of the sales reported are to Eastern consumers. The best business in foreign iron is said by importers to be in shipments to Pacific Coast consumers, although there are still some tonnages of foundry iron being disposed of in the New England district. The German pig iron that was recently offered by one large importer in New York, at $26.75 per ton, c.i.f. New York, was only a limited quantity. It was the surplus available from the production of the furnaces of several German mills and a special permit for its exportation, it is stated, was obtained from the German Government.

Business from South American markets continues fair, but is largely confined to small orders. A few inquiries of small size are being figured on from the Dutch East Indies. The Chinese market shows no change for the better.

Air-Steam Mixtures in Steam Engines

In Bulletin No. 131 of the Engineering Experiment Station, University of Illinois, will be found details of tests in mixing air with steam for the production of power on a low expenditure of fuel. The booklet covers 96 pages, with a large number of diagrams and tables, and gives much detail of methods of test and of the results obtained. The curves illustrating the results are in accordance with observations of other experimenters, so far as the gain in economy is concerned. They show that the maximum economy occurs in mixtures containing about 30 per cent steam. The maximum gain is more pronounced when cold air is used rather than preheated air. This gain becomes still greater with decreasing load. The gain at the maximum load carried, with an initial temperature of 410 degrees, is 5 per cent, but with cold air this becomes 15 per cent. At three-quarters load and with cold air the gain is about 24 per cent.

The term sandblast is to be dropped by the W. W. Sly Mfg. Co., Cleveland, which holds that it is not an accurate description to-day of equipment employing abrasives, as in cleaning with a blast of air. Emphasis is placed on the fact that there is an increase in the adoption of metal abrasives, such as shot, grit and iron crush, and, for certain purposes, of such materials as coke-breeze and pumice. The point is that properly designed blast equipment will handle any abrasive the user decides is best adopted to give the finish or result required. For this reason and with the desire to make its product distinctive, the blast equipment manufactured by the company will hereafter bear the name Slyblast.

Analyses of Kentucky coals, is the subject of technical paper No. 308, containing the results of chemical analyses and heating-value determinations of several hundred Kentucky coals, published by the U. S. Bureau of Mines. This is the second of a series of technical papers issued by the bureau dealing with the characteristics of the coals of the various States. Technical Paper 269, relating to Iowa coals, was published some months ago. The paper may be obtained from the Superintendent of Documents, Washington, at a price of 10 cents per copy.

CONTENTS

November 16, 1922

Handling Material in Automotive Plant 1269

System at Studebaker Plant—Tractors Effect Large Savings—Machine Shop Layout and Handling of Scrap

New Combination By-Product Coke Oven 1275

Method Involving Use of Waste Gas Dilution to Render Coking Temperature Nearly Uniform Throughout Mass

Judging Combustion from Gas Analyses 1281

Gaseous Fuels—Blast Furnace, Coke Oven and Producer—Show Under Analysis Most Discordant Results

Tracing the History of Pittsburgh Basing 1287

Colonel Bope Tells of Origin of Custom—J. Leonard Replogle, W. H. Donner and Others Give Testimony—Judge Gary Recalled

Freight Car Loadings 1274
By-Product Coke Output 1274
Plant Operations 1274, 1289, 1318
New Cupola Lining 1279
Duplex Hand Centering Machine 1280
American Foundry Practice 1280
Program of Taylor Society Meeting 1280
Device for Handling Coils of Rods 1282
Standardizing Metal Lath and Tin Cans 1282
Inside Micrometer for Gaging Cylinder 1282
Galvanizing at Fault? 1283
Portable Motor-Driven Hacksaw 1284
Spring Chuck for Holding Small Rods 1284
Why Enameled Ware Cracks 1284
Device for Calculating Alloy Additions 1284
New Gas Making Principle 1285
Belgian Market 1285
Auction Sale of Machinery 1286
Tonnage Sheet Mill Rates Advanced 1289
Increased Buying Evident 1289
No Imports of Steel Bars 1290
Japan to Buy More Rails 1290
Air Steam Mixtures in Steam Engines 1290
Editorials 1292
No Danger from Depression—Imports of Pig Iron—Revising the Country's Future Needs—The New Factor in Salesmanship — Creditors' Committee Salvage.
Japanese Market 1295
Situation in China 1295
Applications of Gas Welding 1299
Railroad Equipment Buying 1310
Fabricated Steel Business 1310
International Chamber of Commerce Meeting in Rome 1311
British Market 1314
National Personnel Association Meeting 1315
Activities of Malleable Castings Association 1315
Electrochemists' Spring Meeting 1316
Industrial Conference at Buffalo 1316
New York Steel Treaters 1316
German Trade with Russia 1317
British October Output 1317
Canadian September Output 1317
British Empire Steel Corporation 1317
Five-Foot Book Shelf of Foreign Trade 1317
Shippers Denied Relief 1318
New Type Great Lakes Freighter 1318
Rate Reduction 1318
October Steel Output 1319
Steel Corporation's Unfilled Orders 1319
New Tubing Process 1319
Refractories Market 1320
Properties of Pure Iron Alloys 1320
Tariff Reductions 1320
Steel and Industrial Stocks 1330
Plans of New Companies 1331
Trade Changes 1331

Iron and Steel Markets 1296
Comparison of Prices 1297
Prices Finished Iron and Steel, f. o. b. Pittsburgh 1309
Non-Ferrous Metal Market 1311
Personal Notes 1312
Obituary Notes 1313
Machinery Markets and News of the Works 1321
New York Jobbers' Prices 1334

ESTABLISHED 1855

THE IRON AGE

EDITORS:

WILLIAM W. MACON GEORGE SMART

CHARLES S. BAUR, *Advertising Manager*

Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

Entered at the Post Office at New York, N. Y., under the Act of March 3, 1879.

No Danger from Depression

During the war there were many predictions that a panic and a prolonged industrial depression would eventually follow. Throughout the whole industrial life of the United States there have been recurrent panics and depressions. If such occurrences are inevitable, the four years that have elapsed since the armistice have brought us so much nearer. There can be a panic without much depression following and there can be a mild industrial depression not preceded by a panic. We have had little occurrences of this sort since the armistice, and the present reference is, of course, to a development of the major order.

These things are not a necessity in human life, but are produced by certain conditions. A survey of present alinements indicates that we now stand in no danger of a panic and industrial depression of the major order in the discernible future. The prime cause of such a disorder, requiring a thorough cleansing of the system, is the conversion of too much liquid capital into fixed capital, unable for a time to make earnings. We did have, during the war, a large amount of such conversion, but it seems fair to assume that if this were to produce trouble the trouble would have come before this, for buying power in the past four years has been smaller, presumably, than it will be in the next four. Foreign countries are expected to recover, while in the United States the high prices have made the real buying power smaller than appeared from a glance at alleged earnings.

There have been very large expenditures for the erection of dwelling houses, and these expenditures continue. It may be claimed, perhaps, that the expenditures are too great, that the builders are not receiving their money's worth. That view is open to question; but even so, a paper loss in such investments is not productive of business unsettlement, as would be a loss in the construction of factories that cost too much or factories the product of which cannot be sold.

There have been large expenditures for automobiles, and economists who have merely glanced at the figures showing the number of automobiles produced have expressed alarm. They have not observed, perhaps, that demand has been running rapidly to the lighter, lower priced and more cheaply operated cars, whereby the total weight of automobiles produced has increased but little if at all. It is inconceivable that large numbers of those who have bought automobiles in recent years will be seized with panic. They knew, much better than the buyers of ten years ago, what they were getting and what it would cost to retain and operate their purchases.

We have not had an over-development of railroads or of public service facilities generally. Rather, there is complaint that we do not have enough. As for over-development, the most common remark made for more than a year is that we have over-development in coal mining, but no one will fear that a panic is coming from that quarter.

The economic ills of the day are not those that produce panics or industrial depressions. Those most often referred to are inadequate transportation facilities, shortage of labor, insufficient profits in farming and lack of a broad foreign market. Such things do not produce panics and industrial depressions. Nor do we even have the swollen inventories that produced the disturbance of late 1920. At the most we may expect, some time in the future, a period in which men will be less eager to spend money and in which, therefore, jobs will be more treasured and men will grow more willing to work hard. This last is what men should do, and conditions that make men do what they should are not to be regarded as representing a national misfortune.

Imports of Pig Iron

Further data on the much-discussed movement of foreign pig iron into the United States are now available and will produce surprise in view of some claims made in the trade. The fact is that the volume from Great Britain has not been so large as claimed, while the amount credited to Belgium much exceeds the common estimate. The total pig iron imports for the year to Sept. 21, when the new tariff became effective, were 100,227 gross tons. Of this, 58,801 tons came from Great Britain, 29,617 tons being Scotch iron. Belgium sent 32,037 tons, or nearly one-third of the total. Germany and France are credited with only 1516 tons and 4369 tons respectively. The movement of British ferromanganese has really exceeded that of pig iron, the greater part of the

72,011 tons of ferromanganese imported to Sept. 21 having been British alloy. Commenting on this movement, the London *Iron and Coal Trades Review* recently said that in 1913 "we exported to the United States just over 100,000 tons of pig iron [including ferroalloys], and to Sept. 30 this year we have exceeded that tonnage by about 47,000 tons." This year's movement will probably establish a record, in pig iron at least, though the proportion of spiegeleisen will also be large.

Revising the Country's Future Needs

If immigration should never again approach the flood movements of the years before the world war, we may have to revise our views of the rate of growth of American industry. Aside from the restrictions of the 3 per cent immigration law, which, of course, may be modified or abrogated, countries other than the United States may prove increasingly attractive to the emigrant from Europe. Pecuniary advantage or social opportunity, or both, may make an appeal stronger than that which this country so long has made. All of the 3 per cent quotas were not exhausted in the last fiscal year (particularly when the emigration, which is not recognized by the law, is considered), and it is from many of those nations whose percentages were not exhausted that the highly desirable immigrants formerly came.

Production in this country has been mounting. There has been not only the factor of increasing population but also that of increasing per capita consumption. Broadly ascribed to the influence of advancing civilization, we have the record of production growing from year to year in response to greater and greater consumption by the individual. In pig iron, for example, 478 lb. per annum per person was the rate of consumption in 1900; in 1910 it was about 612 lb., and in 1920, 763 lb.

The population of the United States increased 21 per cent from 1900 to 1910, while the corresponding increase in the pig iron consumption rate was 28 per cent. The increase in population in the 1910-1920 decade was 15 per cent and the increase in pig iron consumption rate was 25 per cent.

Whatever the population increase, the per capita consumption will undoubtedly increase, but the absorption will not keep up the old rate of acceleration if there is a marked check to the rate of growth in population. The product of the population and iron consumption rates is an index to the total consumption. It was accordingly ($1.21 \times 1.28 = 1.55$) 55 per cent greater in 1910 than in 1900. Similarly the total consumption of 1920 was ($1.15 \times 1.25 = 1.44$) 44 per cent greater than that of 1910. If the rate of population increase should decline, it follows that the curve of yearly production would show some departure from the sharp upward trend it has taken for years.

Colonization movements from Europe to Canada and to portions of South America are to be expected and to an extent the United States will profit by them. Every such step in developing the resources of neighboring countries on the north and south will mean ultimate increase in the call for our products from Canada and Latin America. But the completion of that circle has too many contingencies and belongs too much to the distant prospect. What is of present concern is the effect on the rate of American manufacturing development of a continued policy of barring useful and willing workers from industries which are undermanned to-day. And this at a time when demand calls but 70 to 80 per cent of producing capacity into action.

The New Factor in Salesmanship

In the last decade a new and important influence has entered into the art of selling in the metal and machinery trades. The every-day business and social life of men has been subjected to various influences which have aroused what has always existed, but without the impulse to bring it to the surface—a latent mechanical and scientific bent. The motor boat, the airplane, experience with the implements of war, and, chief of all, the automobile, have brought men into intimate contact with mechanics and the materials of construction; naturally enough, the knowledge gained, which in very many cases is far from superficial, has been carried into business.

The subject is not a new one. The idea has been long recognized, and by not a few firms, especially the larger ones, has been applied successfully in their selling methods. But in many other cases the new influence either is not fully appreciated or else efforts to take advantage of it have failed. It has been hard to get managing owners, particularly some who govern the selling end, to depart from traditional ways. Buyers are heard to complain that salesmen who call on them know too little of the mechanical principles and construction of the machinery they sell, or of the composition of the metals they handle. They are unable to respond to the new inquisitiveness. The importance of the change is recognized abroad. An article in a recent issue of London *Engineering* by a sales manager tells of this realization in England. He writes, in part:

> The tenet that commercial acumen and a sound engineering training are incompatible is now advanced with less dogmatism than it formerly was by those who would accept the exception only as a proof of the rule. "Let your engineer be an engineer," they said, "but for the commercial or sales side keep him out of it; he will only do harm."
>
> The customer, usually without the widespread knowledge of the present mechanical age, in engineering matters preferred to deal with someone with whom he had more points in common—the product of the commercial school of training. One, moreover, who did not talk over his head on matters of which he was reluctant to acknowledge ignorance. A desire to choose our own vantage ground in negotiations is innate in most of us, and to the customer the discussion on the output of the machine, the space occupied, the first cost, running costs, delivery date and terms of payment were (and still are, of course) vital matters which he could intelligently and advantageously discuss with complete freedom from the cross currents of actual and detailed construction of the machine likely to be discussed at length by the engineer.
>
> Conditions have changed rapidly during the last generation. Nowadays, for instance, ignorance in connection with the standard elementary mechanism of motor cars is even among laymen sufficient to mark one as an "outsider," and it is, if anything, looked upon with as much intolerance as is an ignorance of golf. The motor car is mentioned because probably more than all other influences combined it has been instrumental in inculcating an appreciation of mechanisms in the minds of the larger portion of that section of the community to whom the engineering salesman can look for his potential customers.
>
> The continued increase in the development and application of machinery in all branches of industry; its wonderful capacity for increasing, regularizing and standardizing production, the educating and enlightening effect of the preponderating mass of engineering appliances and inventions of warfare used in the late world war—all these have had their effect in arousing the mechanical instinct which lies dormant in many of our countrymen.

The solution of the problem of the new condi-

tions lies, of course, in the methods of training salesmen, and in the United States the beginning of this work was made years ago, though for a time perhaps in exceptional cases. Formerly salesmen were taken almost exclusively from the offices. Their training was not at all from the mechanical side, but from the commercial side. If questions of mechanism were involved, they referred them to the mechanical departments at the home plant. Not many of them could operate a machine. In the case of metals the salesmen knew more of the uses of their products than of the principles underlying their manufacture. But it should be said for the steel salesmen, and the salesmen in composition metals, that their products in the old days were well standardized. They had not arrived at the era of the alloys, with their revolutionary effect on various consuming industries, notably on motor car manufacture.

Nowadays the salesman is getting part of his training in the works. Young men are coming forward who are well able to meet the questionings of the most insistent buyer. The mechanical age, as the British writer calls it, is developing a school of salesmanship to meet its demands. Firms which do not recognize this need will soon be the exception.

Creditors' Committee Salvage

Scores of American industrial companies are doing business to-day, and at a profit, which under other-day methods would have been pushed into bankruptcy in the slump which brought on the late period of depression. They were saved to continue a career of productivity by resorting to the device of the creditors' committee, which, because of its beneficent results in so large a number of cases has come to be considered by banking and other interests as an established institution.

A generation ago each State was a law unto itself in the matter of insolvencies, and a failure very often spelled ruin for the business involved and very little salvage for creditors. Then came the Bankruptcy Act, which centralized power in the Federal courts and did away with some of the evils of conflicting State laws, though bringing in others scarcely less serious. Finally, originating with the large banks, came the creditors' committee, which in the past few years has become widespread in its operation.

When the depression of 1920 fell upon the country many business houses were caught with an appalling inventory, a flood of cancellations, large outstanding indebtedness and inability to collect on bills receivable. The Federal Reserve Bank and its member banks and the trust companies immediately assumed a paternal attitude, partly because it served their individual interests to do so, partly for the general well-being of the business community. Debtor firms were not pushed too hard. They were given time to find out just where they stood.

Many were able to arrange matters and put their affairs in the way of adjustment. Others faced an army of creditors, including the banks, and could find no way out of their predicament. One by one they passed into the hands of creditors' committees which assumed full charge. In most instances there was no publicity.

More or less drastic action followed, all depending upon conditions as they were found. Overhead was attacked, executive salaries cut, inventory charged off, waste hunted for and eliminated, sales and purchasing systems bettered, cost keeping and production put on a more efficient basis. In some cases the knife cut deep, for there was much that needed the knife, due to the wasteful methods that came along with a feverishly active market and forced production.

Creditors co-operated willingly, as a rule, and where they were recalcitrant, pressure was brought to bear, sometimes by the banks, which usually had a representative on the committee. In almost every case the end justified the means, bank men and credit experts say. Firm after firm could be named whose stock two years ago would not have brought a dollar in the market, but is now paying dividends or is on the road to dividends. The stockholders now include creditors who accepted stock in part payment of their accounts. Credit with some firms is better than it ever was, strange as this may seem. The plunging spirit has been removed.

Some firms had to go under. Their business had too unstable a foundation and their creditors were forced to let them pass into the bankruptcy courts or a receivership to wind up their affairs. But the percentage of these has been very small, as the records of bankruptcy courts in the industrial States will prove. The creditors' committee as physician and surgeon has succeeded beyond all other agencies in lowering the rate of business mortality.

An answer to the fears expressed lately that the country is plunging into another era of inflation is to-day's relations between loans and deposits in banks. Whereas loans were 22 per cent and more above deposits in 1920, and 16 per cent above them in 1918, 1919 and 1921, they are only 5 to 6 per cent in excess for August, September and October of this year. While loans have been mounting rapidly since early this year, and while in total they have been exceeded only in 1920 and in the early part of 1921, deposits also have been rising and, according to the returns of 720 member banks of the Federal banking reserve system outside of New York, they are 10 per cent higher than in 1920.

British steel manufacturers are sending a remarkably large share of their production of finished steel out of the country. The contrast with 1920 is marked. In that year, of a finished steel production of 6,831,600 gross tons only 38 per cent was exported. In 1921 the exports were 54 per cent. In the first eight months of this year, however, out of a total finished steel output of 2,595,000 tons, about 61 per cent was exported. The figures are their own comment on the shrunken proportions of the British home demand, with output only two-thirds what it was in 1920.

The Lloyd Forge Co., Lebanon, Pa., has been granted a tract of land in Annville, Pa., on which it will erect a modern structure to manufacture drop-forged products. John H. Lloyd, secretary and general manager, is now manufacturing turnbuckles on a small scale, but has found it necessary to expand in order to fill orders. The company has been incorporated with a capital stock of $75,000. Work on the building will be started soon. It is to be built of structural steel, 72 x 150 ft.

JAPANESE PRICES IMPROVE

Despite Heavy Stocks Prices Rise—Copper Market Still Depressed—Sheets and Tin Plate Better

TOKIO, JAPAN, Oct. 18.—The Osaka Arsenal has made a contract for the purchase of 500 tons of electrolytic copper at 42.1488 yen from the Amano Shoten. As the quantity is not very large, it is not thought that the transaction will have any influnce in lowering the general trend of the copper market, but as transactions in copper have almost ceased, it will probably encourage dealers.

Since the increase in the duty on copper six months have elapsed, but the market continues depressed. Many unfavorable factors exist to prevent its improvement. One of the important factors in this depression is probably the large speculative imports of foreign copper brought in before the duty was increased. The monthly output of electrolytic copper in Japan is estimated at 4500 tons, while the average monthly consumption is about 5000 tons. It is said that lately copper consumption has decreased to less than the monthly production. Japanese merchants are expecting the usual autumnal improvement, but thus far demand is still light and quotations stand at 44.20 yen to 44.30 yen.

Nail Market Depressed

The French nail market continues depressed because of the large stock on hand, as well as the lack of activity in building operations. Quotations stand at 10.30 to 10.50 yen per keg. A further decline in the market is expected. There are no negotiations for the import of French nails due to the fact that English goods stand at 12 to 13 yen, and that the total arrival of French nails for the first half of this year amounted to 423,000 kegs, representing more than 60 per cent of Japan's total yearly consumption.

Heavy Stocks on Hand

In normal years the demand for iron and steel at this season shows a great increase, but as a result of the financial depression and the general inactivity in trade and industry, the iron and steel market is declining. In addition, the market is considerably affected by the increased arrivals of iron and steel from Belgium and Germany. According to investigations made by the Yawata Iron Foundry, the stock of materials remaining in the bonded warehouses and other warehouses in the six large cities of Tokio, Yokohama, Kyoto, Nagoya, Osaka and Kobe amounts to 150,000 tons, while the large wholesale merchants have 30,000 tons in stock. As compared with the corresponding period of last year, this is an increase of 50 per cent. On the other hand, demand for iron and steel has decreased about 50 per cent. The increase in stock is due to the large arrivals of foreign material, about 20 per cent of which are British, 40 per cent German and 40 per cent Belgian.

The price of German and Belgian material is 100 yen per ton and British 105 yen, which is 24 or 25 yen lower than material of Japanese origin. Under such circumstances, prevention of the import of foreign material is impossible. Of late the price of steel has shown an improvement of 10 sen per kamme, but this is considered as only a temporary rise. The stock owned by the Yawata Iron Foundry amounts to 75,000 tons at present.

Wire Rods and Sheets Improve

Up to a week ago wire rods were quoted at 110 yen, but there was no eagerness to buy. After the turn of the week quotations improved to 113 yen or 114 yen, with sellers reluctant to dispose of stocks. At present the price of wire rods is slightly higher than the price of nails. This is due to the fact that the manufacturers are no longer able to keep heavy stocks of wire rods because of the financial situation and buy only as much as they can consume. Stocks of sheets have also decreased. Lately small merchants have liquidated their stocks at a loss, the stocks being in the main purchased by the large merchants. Accompanying the reaction on the rice market, the market has been improved and quotations tend upward. Black sheets, 13 to the bundle, are quoted at 73 sen per sheet. A few months ago 12-lb. rails were quoted at about 2300 yen per mile, and this price has continued firm. American rails stand at 2550 yen per mile, and German at 2500 yen, which is an improvement of 200 to 300 yen.

Tin Plate Price Rises

From the beginning of May this year the tin plate market rapidly declined and quotations dropped to 19 yen per box. At the beginning of August stocks of tin plate had increased by 10,000 boxes, but the demand having increased the market shows some signs of improvement. Quotations stand at 20.30 yen for spot delivery, while Welsh tin plate is quoted at 21 yen for forward delivery. Demand for tin plate is most active in October under normal conditions and some further improvement is awaited. Should quotations rise very high, bankers holding tin plate as security will undoubtedly dispose of it. Therefore no sensational improvement is expected.

White Metals Weak

White metals have been strongly maintained on the ground that prices abroad are rising and that stocks in this country are small, but in spite of these factors, lead and tin have fallen substantially.

Growing uncertainty in the Japanese business world has induced consumers to refrain from buying, and holders who have hoped for good fall business are discouraged. Business is declining daily, small lot purchases in the lead pipe market being the only active feature.

Australian lead has been quoted at 17 yen per picul, but is now offered freely at 16.50 yen per picul. Lead from the United States and Canada is below 16 yen. Straits tin has declined to 104 yen per picul, which represents a drop of 1 yen compared with the first of this week. Zinc has fallen off 50 yen per picul, 99 per cent being quoted at 21 yen per picul, while 98 per cent is quoted at 20.50 yen per picul.

Situation in China

SHANGHAI, CHINA, Oct. 8—Business in almost all lines throughout the week has been at a standstill. Reports from iron and steel merchants in Shanghai indicate an unsatisfactory state of affairs. Although orders are being received from the interior markets, they are for small lots. It is believed likely, however, that demand will broaden within the next two months.

Hope is expressed that as soon as the country settles down to its new form of government, there will be increased demand. It had been anticipated that metal business would revive this month, and there would be an increased demand for many of the lines now held in large stocks in Shanghai.

During the past week there has been a slightly better tone in wire nails and galvanized sheets. The demand is chiefly for prompt parcels out of stock. In tin plate the Shanghai market is extremely quiet, undoubtedly caused by the heavy arrivals during the past six months. These stocks are being depleted steadily, and there is no doubt that within the next month or so, both China and Japan will be in the English and American markets for tin plate.

It is reported that 5000 tons of grooved rails, included in the inquiry issued several months ago by the Peking Tramways Co. has been awarded to a French mill.

"Story of Steel" Shown in Washington

WASHINGTON, Nov. 14.—The initial showing in Washington of the moving picture "The Story of Steel" was presented this morning at the Department of Commerce before officials of the department, local representatives of the Steel Corporation, which prepared the picture, and others. The picture is being shown in the United States and foreign countries by the department in co-operation with the Steel Corporation and the film is about to be shipped to Rio de Janeiro to be shown at the Brazilian Centennial.

Iron and Steel Markets

OUTPUT AT HIGH POINT

The Year's Peak Both in Pig Iron and Steel

Finished Steel Prices for 1923 Still Undefined —Heavy Railroad and Building Demand

With blast furnace and steel works operations at the highest rate of the year, some districts showing further slight increases in the past week, the finished steel market has developed no new tendency either in demand or prices. In view of the decline in pig iron and some late weakening in semi-finished steel, consumers of rolled products have been looking for price concessions. Sellers, however, in spite of the fact that independent mills in several lines of production are booked less than two months ahead, are not forcing the issue.

At Chicago the heavy railroad demand, the large car orders yet to come, and excellent building prospects are emphasized in this week's report. At Pittsburgh traffic conditions are worse in view of a fresh embargo on Pennsylvania lines, effective Nov. 13; meanwhile the market has been quieter. In eastern Pennsylvania, where heavy products, especially plates, are the leaders, the trade has simply drifted.

No announcement has been made of the Steel Corporation sheet and tin plate prices for the first quarter of 1923. The increase in costs in the past six months is a factor, also the possibility of further purchases of sheet bars by the Steel Corporation. Both sheet and tin plate mills have been operated on a larger scale in the past two weeks, 75 per cent of capacity being reached by important producers.

The continued addition of blast furnaces to the active list, in spite of the handicap of car shortages, particularly of box cars for the lighter mill products, complicates the outlook. There is little fear that the outlet from mills will be dammed to the point of checking pig iron or ingot production.

For the entire steel industry, the operation this week is estimated at 75 to 80 per cent. In view of shipping difficulties and the small margins of stock on which some consumers are working, the absence of shutdowns for lack of material is a matter of comment.

Trucks are still a large factor in the relief of congestion at Pittsburgh mills. River transport of coal has helped greatly, also the barge shipments of finished products from Pittsburgh to Ohio and Mississippi River points.

Some 25,000 tons of new fabricated steel work appeared in the week, and awards, while for jobs averaging 520 tons, were numerous enough to bring the total to that of each of the two weeks preceding, when the average of contracts let was 835 tons.

Building trade operations throughout the country still rank with railroad buying as a main feeder of the steel mills.

With orders for 2850 cars and for 67 locomotives and additions to the inquiry lists of 6700 to 8200 cars, and of 42 locomotives, railroad equipment buying shows no cessation.

Bids close this week on 5000 tons of 60-lb. rails for the Imperial Government Railways of Japan, and the South Manchuria Railway Co., a consistent buyer in the past two years, is inquiring for 15,000 tons of 100-lb. rails.

Importers have been figuring on bringing in Belgian bars, but while the price is attractive, at 1.30c., Antwerp, or less, against 2.35c. for American bars at New York, the attempt has been given up in view of complications over values, exchange and possible penalties.

The rapid decline in the price of Southern pig iron continues and $23 is now quoted, a decline of $2 within a week and $4.50 within a month. In the North, weakness has been most pronounced in Pittsburgh and northern Ohio, where a decline of $1 on most grades has been recorded. The largest sale reported was 5000 tons of basic to a Canton, Ohio, company. While some furnaces which recently blew in are piling iron, a number of others are slated to resume at early dates. Stocks of pig iron at Birmingham decreased 8900 tons last month, the total Nov. 1 being 102,900 tons. The movement of foreign iron to this country has slackened and seems to have entered on its last stage.

British shipments of pig iron in October were 129,959 tons, of which 92,153 tons, or 71 per cent, went to the United States. The month's total of iron and steel exports, the year's highest, was 347,128 tons. British tin plate has advanced (minimum basis) from 19¼s. to 19½s. ($4.29 to $4.35).

Pig iron continues its decline. THE IRON AGE composite for pig iron is now $28.02, compared with $28.86 last week and $30.27 a month ago. One year ago it was $19.81.

Finished steel remains at 2.446c. per lb., compared with 2.460c. a month ago and 2.113c. a year ago.

Pittsburgh

Steel Manufacturers Resist Efforts of Buyers to Obtain Lower Prices

PITTSBURGH, Nov. 14.—Steel manufacturers thus far have been fairly successful in resisting efforts to weaken prices, but the pressure of buyers is increasing. They are using as a lever the weakness of pig iron, which has declined on an average of about $1 per ton, and gives signs of going still lower, while several additions to the list of active furnaces are immediately ahead.

Steel buyers are comfortably supplied or covered over the remainder of the year and as they are plainly waiting on lower prices which producers are loath to make, business of the past week has been exceedingly quiet. Semi-finished steel has weakened with pig iron and we note offerings of sheet bars at $38, without takers, while it is reported that a Cleveland producer within the past few days has sold a round tonnage to a Cleveland sheet maker at $38, mill. We note sales of basic iron at $28, Valley furnace. Foundry iron also has sold as low as $28, Valley furnace. A week ago $29 was minimum on both grades.

Steel plant and blast furnace operations in this and nearby districts show a tendency to increase, despite the fact that there is a very common complaint of a

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton	Nov. 14, 1922	Nov. 7, 1922	Oct. 17, 1922	Nov. 15, 1921
No. 2X, Philadelphia‡	$31.14	$31.14	$33.14	$22.84
No. 2, Valley furnace†	29.00	29.00	32.50	20.50
No. 2, Southern, Cin'ti†	29.05	29.05	31.55	22.50
No. 2, Birmingham, Ala.†	25.00	25.00	27.50	18.00
No. 2 foundry, Chicago*	30.00	30.00	31.00	21.00
Basic, del'd, eastern Pa.	28.14	28.14	29.50	20.50
Basic, Valley furnace	29.00	29.00	30.00	19.00
Valley Bessemer, del. P'gh	34.27	34.27	35.27	21.96
Malleable, Chicago*	30.00	30.00	31.00	21.00
Malleable, Valley	29.00	30.00	33.00	20.00
Gray forge, Pittsburgh	29.77	30.77	32.77	21.96
L. S. charcoal, Chicago	36.15	36.15	36.15	31.50
Ferromanganese, furnace	100.00	100.00	67.50**	60.00**

Rails, Billets, etc., Per Gross Ton				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$40.00
Bess. billets, Pittsburgh	38.00	38.00	40.00	29.00
O.-h. billets, Pittsburgh	38.00	38.00	40.00	29.00
O.-h. sheet bars, P'gh	38.00	38.00	40.00	30.00
Forging billets, base, P'gh	45.00	45.00	45.00	35.00
O.-h. billets, Philadelphia	45.17	45.17	45.17	34.74
Wire rods, Pittsburgh	45.00	45.00	45.00	40.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	2.00	2.00	2.00	1.60
Light rails at mill	2.00	2.00	2.00	1.55

Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.325	2.325	2.475	1.95
Iron bars, Chicago	2.50	2.50	2.50	1.65
Steel bars, Pittsburgh	2.00	2.00	2.00	1.50
Steel bars, Chicago	2.10	2.10	2.10	1.75
Steel bars, New York	2.34	2.34	2.34	1.80
Tank plates, Pittsburgh	2.00	2.00	2.15	1.50
Tank plates, Chicago	2.30	2.30	2.30	1.75
Tank plates, New York	2.34	2.34	2.34	1.88
Beams, Pittsburgh	2.00	2.00	2.00	1.50
Beams, Chicago	2.20	2.20	2.20	1.75
Beams, New York	2.34	2.34	2.34	1.88
Steel hoops, Pittsburgh	2.90	2.90	2.90	2.25

**C.i.f.

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire,	Nov. 14, 1922	Nov. 7, 1922	Oct. 17, 1922	Nov. 15, 1921
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh	3.35	3.35	3.50	2.75
Sheets, galv., No. 28, P'gh	4.50	4.50	4.50	3.75
Sheets, blue an'l'd, 9 & 10	2.60	2.60	2.60	2.25
Wire nails, Pittsburgh	2.70	2.70	2.70	2.90
Plain wire, Pittsburgh	2.45	2.45	2.45	2.60
Barbed wire, galv., P'gh	3.35	3.35	3.35	3.55
Tin plate, 100-lb. box, P'gh	$4.75	$4.75	$4.75	$4.75

Old Material, Per Gross Ton:				
Carwheels, Chicago	$25.00	$25.00	$25.00	$17.00
Carwheels, Philadelphia	21.00	21.00	23.00	17.00
Heavy steel scrap, P'gh	20.50	20.50	21.50	14.50
Heavy steel scrap, Phila.	16.50	16.50	18.00	12.00
Heavy steel scrap, Ch'go.	17.50	17.75	18.50	12.00
No. 1 cast, Pittsburgh	23.50	23.50	24.00	17.50
No. 1 cast, Phila	22.00	22.00	23.00	17.50
No. 1 cast, Ch'go (net ton)	20.50	20.50	21.00	13.75
No. 1 RR. wrot, Phila	19.00	19.00	22.00	16.50
No. 1 RR. wrot, Ch'go (net)	16.00	16.50	17.75	12.50

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$7.00	$7.50	$10.00	$3.00
Foundry coke, prompt	8.50	9.00	12.00	4.25

Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	14.12½	14.12½	14.12½	13.25
Electrolytic copper, refin'y	13.62½	13.62½	13.62½	13.00
Zinc, St. Louis	7.25	7.10	6.85	4.72½
Zinc, New York	7.60	7.45	7.20	5.22½
Lead, St. Louis	6.90	6.85	6.35	4.35
Lead, New York	7.25	7.15	6.65	4.70
Tin (Straits), New York	36.87½	38.00	34.50	28.50
Antimony (Asiatic), N. Y.	6.60	6.60	6.75	4.65

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Nov. 14, 1922, Finished Steel, 2.446c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel

Nov. 6, 1922,	2.446c.
Oct. 17, 1922,	2.460c.
Nov. 15, 1921,	2.113c.
10-year pre-war average,	1.689c.

Composite Price, Nov. 14, 1922, Pig Iron, $28.02 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Nov. 6, 1922,	$28.86
Oct. 17, 1922,	30.27
Nov. 15, 1921,	19.81
10-year pre-war average,	15.72

shortage of cars, notably of the box type, for the movement of finished materials from the mills, and effective at midnight, Nov. 13, the Pennsylvania Railroad reimposed a very tight embargo on West-bound freight, from Cresson, Pa., west on the Eastern region and on all Western shipments in its Central Region. This railroad has never rescinded the embargo on freight from connecting lines which it established late in September. The action of the Pennsylvania Railroad will work a considerable hardship on those Pittsburgh district steel companies entirely local to its lines. One Pittsburgh district steel maker has at least 100 carloads of sheets which cannot now be moved except by special permit, and obtaining permits is extremely difficult. Railroad conditions are imposing a good deal of a burden on the affected steel companies since payments are contingent upon deliveries. Although transportation conditions leave much to be desired at the moment, there is at least one bright spot in the situation, in that insurance on lake cargoes expires to-morrow and already the movement of coal to the lakes is dwindling and there is promise of the early release of many coal cars for steel shipments. Ingot production in this and nearby districts averages at least 75 per cent of capacity, while the additions to the list of active blast furnaces will bring the total to 91, an increase of 41 from the low point of late August.

First quarter prices on sheets and tin plate are yet to be announced. Of the products sold on a quarterly basis only the prices on strips have been named. Makers of the latter product are continuing for first quarter of 1923 the present price schedule.

Pig Iron.—The market has shown very little life in the past week, but on such business as has been done lower prices have been established. Melters are interested only in their actual requirements and as yet are evidencing little concern about their needs over the first quarter and first half of next year. The tendency to let stocks run down to a minimum before buying is marked, and although few, if any, of the merchant producers are benefitting fully from the decline in coke prices, it is observed that there is not much resistance to the pressure of buyers for lower prices. Individual sales in few instances have exceeded 250 tons. There has been only one inquiry of any considerable size, this being from the United Alloy Steel

Co., Canton, Ohio, which bought 5000 tons of basic for delivery between now and the end of the year. The most recent business in gray forge iron was at $29, Valley furnace, but with No. 2 foundry available and selling at $28, the market on the former grade hardly is quotable above that price. Almost nothing has been done in Bessemer iron in the past week, and the quotation of $32, Valley furnace, is merely what producers would be willing to sell for. The market on malleable iron also is poorly defined because of an absence of business. The furnace of the Clinton Iron & Steel Co., Pittsburgh, which was blown out in December, 1920, will go into blast to-morrow, and the one idle furnace of the Jones & Laughlin Steel Co. will be blown in late this week. The furnace of McKinney Steel Co., Scottdale, Pa., will be lighted soon and the Claire furnace, Sharpsville, Pa., will go in next week. Fannie furnace of the Hanna Furnace Co., West Middlesex, Pa., is expected to go into blast soon.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.77 per gross ton:

Basic	$28.00
Bessemer	32.00
Gray forge	28.00
No. 2 foundry	$28.00 to 29.00
No. 3 foundry	28.00
Malleable	29.00 to 30.00
Low phosphorus, copper free	37.00 to 37.50

Ferroalloys.—The market is very dull with sales confined to single carloads and with a well-defined disposition among consumers to use up every pound of material in stock before buying. The possibility of a reduction in the manganese and ferromanganese duties by the application of the elastic provisions of the tariff law is a factor in the demand for ferromanganese. There is no change in quotations, except that German 76 to 80 per cent material now is being offered at $67, c.i.f. Atlantic seaboard, for first quarter of 1923 delivery, the duty being $31.92 on 76 per cent material and $33.60 on that of 80 per cent manganese content. Almost nothing is being done in spiegeleisen and present prices are untested. It is believed $35 furnace could be done on a round tonnage of 20 per cent material. Interest locally in other ferroalloys is light. Quotations on 50 per cent ferrosilicon are higher by $5 per ton, but no sales are reported here at the new figures. Bessemer ferrosilicon and silveries are nominal in price with no business being done. Makers of ferrophosphorus now are quoting $95, furnace, for 20 per cent and $124 for 23 to 25 per cent.

We quote 80 per cent ferromanganese at $100, furnace, or $104.79 to $104.91 delivered Pittsburgh district for domestic; $67.50 c.i.f. Atlantic seaboard, equal to $105.89, duty paid, delivered, for British; and $67 c.i.f. Atlantic seaboard for German 76 to 80 per cent. Average 20 per cent spiegeleisen, $38 furnace; 16 to 19 per cent, $37; 50 per cent ferrosilicon, domestic, $75 to $80, delivered. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, $48.50; 11 per cent, $51.80; 12 per cent, $55.10; 13 per cent, $59.10; 14 per cent, $62.10; silvery iron, 6 per cent, $37; 7 per cent, $38; 8 per cent, $39.50; 9 per cent, $41.50; 10 per cent, $43.50; 11 per cent, $46.80; 12 per cent, $50.10. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $3.66 per gross ton.

Steel Skelp.—Supplies are ample for all demands and the market is barely steady at 2c. for either grooved or sheared material. The situation is weakened by the fact that plate mill bookings are small with most companies and this means more skelp making capacity. Car shortages are hindering deliveries, but not to a serious extent.

Wire Products.—Manufacturers in this district are having a good general business without making much effort to get it, since they are well filled and are hampered in reducing their obligations by a shortage of wire drawers and of box cars. Only enough cars of this kind are available to move current production and some makers have found it necessary to supplement box car supplies by open top cars with temporary roofs to prevent additions to mill accumulations. Shipping conditions probably play an important part in the fact that demand is so good at this time of the year. There is no change in prices, nor signs of an immediate change. Prices are given on page 1309.

Iron and Steel Pipe.—The story this week is a repetition of that of the past few weeks. A large and urgent demand continues for standard pipe in the butt weld sizes, with makers able to ship only a part of what is wanted on account of car shortages and insufficient labor supplies and no material indent being made on unfilled tonnages. Some line pipe and oil country pipe business is filtering in, but it is not sufficient to engage capacity very far ahead and lacks urgency. Mills are just about averaging to ship current production, but are making no inroads on accumulated stocks. Demand for wrought iron pipe is steady rather than active. Discounts are given on page 1309.

Wire Rods.—Makers appear to have little tonnage available for delivery over the remainder of the year, and prices are unaffected as yet by the weaker tendency in prices of other forms of semi-finished steel. The spot market remains at a base of $45 to $47.50 for soft rods, but the latter price is not being shaded on tonnages for early delivery.

We quote No. 5 common basic or Bessemer rods to domestic consumers, $45 to $47.50; chain rods, $45 to $47.50; screw stock rods, $50 to $52.50; rivet and bolt rods and other rods of that character, $45 to $47.50; high carbon rods, $52 to $57.50, depending on carbon, per gross ton, f.o.b. Pittsburgh or Youngstown.

Billets, Sheet Bars and Slabs.—Demand is very light and prices are merely nominal. Finishing mills appear well covered against their requirements over the remainder of the year and demands for finished material being light, deliveries on contracted tonnages are sufficient. Sheet makers are awaiting an announcement by the American Sheet & Tin Plate Co. as to first quarter of 1923 prices and these prices will have much bearing on what non-integrated mills can pay for sheet bars, since the sheet prices of the leading interest are likely to be those of other producers. There is little business upon which to base billet, sheet bar and slab prices, but $37.50 to $38, Pittsburgh or Youngstown, is regarded as a fair appraisal of to-day's possibilities. Sheet bars have been offered at $38 without takers.

We quote 4 x 4-in. soft Bessemer and open-hearth billets, $37.50 to $38; 2 x 2-in. billets, $39; Bessemer sheet bars, $37.50 to $38; open-hearth sheet bars, $37.50 to $38; slabs, $38; forging billets, ordinary carbons, $43 to $45, all f.o.b. Pittsburgh or Youngstown mills.

Sheets.—There has been no announcement relative to first quarter of 1923 prices by the American Sheet & Tin Plate Co. and the expectation now is that it will not be made until late this week or early next week. Judged by what can be done now and taking into consideration that sheet bars have been offered at $38 without takers, it would not be surprising if current prices were continued. Most independent companies are back to 3.35c. base for black sheets and some will go to 4.35c. base for galvanized, but as a general rule 4.50c. is minimum on the latter. On blue annealed 2.75c. has about disappeared, 2.60c. measures the general maximum. Shortage of cars is materially restricting shipments this week, but has not affected mill operation much. The leading interest now is running more than 70 per cent of its sheet mills. Prices are given on page 1309.

Tin Plate.—Interest centers around the price for first quarter and first half of 1923, to be named by the American Sheet & Tin Plate Co. Indications now are that the price will be $5 per base box, Pittsburgh. On the basis of the increase in the prices of sheets bars and pig tin and in wages, since the present price of tin plate was set up a year ago, the market should advance at least 75c. a box. The actual increase in costs, however, is much less than is indicated by the advance in raw materials and labor and for a figuring basis $4.50 is a much fairer price level than $4.75, since little production until the last quarter commanded the latter price. A fair estimate of the increase in costs, not including the increased replacement price of pig tin, is about 50c. and this added to $4.50, would mean $5. Considerable business is being entered for first quarter shipment, subject to a price to be announced later.

Cold-Finished Steel Bars and Shafting.—The market is unchanged at 2.50c. base, Pittsburgh, with a fairly good business in progress. Doubt about the main-

tenance of the present base of 2c. on hot-rolled bars is discouraging to purchases of cold-finished bars very far ahead at to-day's base. Buyers, however, are taking all steel due them on old contracts. Ground shafting is unchanged at 2.90c. base, f.o.b. mill, for carloads.

Hot-Rolled Flats.—Independent makers, representing a considerable tonnage, have announced a continuance of the present base of 2.90c., Pittsburgh, for the first quarter of 1923. The market does not reflect the easier steel and fuel situation, partly because it is claimed there is only a slight margin of profit at this level and also because another wage increase is expected. On current business the market is 2.90c. base, on the wider sizes, but some makers still ask 3c. base on hoop sizes where early delivery is required. Prices are given on page 1309.

Cold-Rolled Strips.—Price for first quarter of 1923 of 4.50c., base Pittsburgh, has been announced by a number of independent makers. This is the same price as now prevails. Specifications against contracts are good, but new business is moderate, buyers being inclined to wait a while before placing 1923 orders.

Bolts and Nuts.—Consumers and distributors are specifying fairly well, but are less urgent in their demands than recently, presumably because shipments are better and the steel supply situation is easier. Quoted discounts are unchanged; they are given on page 1309.

Track Fastenings.—Standard railroad spikes hardly are quotable longer at above $2.75 base, per 100-lb., as it has been found that more is not obtainable owing to increased competition among makers for orders. The largest inquiry now up is for 13,000 kegs for the New York Central Lines. There has been no change in prices of other track equipment. Prices are given on page 1309.

Boiler Tubes.—Demand holds strong, notably on lap welded steel tubes, on which the leading interest is understood to be sold ahead for 90 days or more. Car shortages are holding up shipments, but more important is that labor is not sufficiently plenty to permit an increase in production. Discounts are given on page 1309.

Steel Rails.—The market has settled pretty well to 2c. base, mill, for light sections rolled from new steel, although 2.15c. still is asked by some makers on shipments from stock. Demand is not particularly brisk, as a number of important users are well covered against their requirements for the remainder of the year and deliveries are better on old orders.

We quote 25 to 45-lb. sections, rolled from new steel, 2c. to 2.15c. base; rolled from old rails, 1.90c. to 2c. base; standard rails, $43 per gross ton mill for Bessemer and open-hearth sections.

Iron and Steel Bars.—Buyers are not very eager to enter new business at 2c., base, Pittsburgh, for soft steel bars, but leading makers here are sufficiently obligated that they are not willing to consider less, at least not for early delivery. Makers of iron bars are still holding to 2.60c., base, for refined iron, but sales at that level are few and small.

We quote steel bars rolled from billets at 2c.; reinforcing bars, rolled from billets, 2c. base; rail steel reinforcing bars, 1.90c. to 2c.; refined iron bars, 2.60c. in carloads, f.o.b. mill, Pittsburgh.

Structural Material.—The mills are not yet inclined to consider less than 2c. for plain material, but not much business is being done, as that price is well above what fabricators can figure on against structural projects and be successful in getting awards. Structural inquiries are somewhat more numerous than they have been, but for the most part involve only small tonnages. Plain material prices are given on page 1309.

Plates.—Buyers are exerting considerable pressure to break the current price of 2c., base, Pittsburgh. The efforts so far have been unsuccessful, but this possibly may be due to the fact that the tonnages offered have not been particularly large. There is much idle plate capacity in this and nearby districts because it cannot be operated profitably at prevailing quotations. Prices are given on page 1309.

Rivets.—New business is slower because buyers are expecting lower prices. Makers turning out the full range of sizes are quoting $3.15, base, per 100 lb. for large structural rivets and $3.25, base, for large boiler rivets, but some still are quoting $3 per ton less. Prices and discounts are given on page 1309.

Coal and Coke.—There has been a further drop of 50c. per ton in the price of coke since a week ago, spot furnace grade now being quotable from $7 to $7.50 per net ton oven for standard grade and from $8.50 to $9 for standard foundry fuel. The bulk of recent business in furnace coke has been $7, while coke running a little high in sulphur, which the furnaces were using and paying high prices for a short time ago, is available at $6.50. The market is suffering from the fact that production is increasing faster than consumption and the passing of lake business in coal with the approach of the end of the lake shipping season is weakening the coal market to a point where the sale of this product as coke is more profitable. There has not been much change in steam coal, which still is quotable from $3.25 to $3.50 per net ton, mine. For mine run grade on mine run gas and by-product coal, however, $4 now is the common quotation, with ¾-in. gas coal readily available at $5, a drop of about 50c. per ton since a week ago.

Old Material.—There is no special change in the situation. The only demand for the steel works grades comes from dealers who went short on a part of the tonnage sold to a large independent steel maker about two weeks ago. With no buying from melters worth noting, covering of short sales entails no boosting of the price. Indeed, unless there is fresh consumptive buying, it is hard to figure how present prices can hold, since the weakness of pig iron makes melters less willing to pay current prices for scrap, and places where the greatest demand recently existed now appear well filled up. The market is very quiet here and prices are little changed from those of a week ago.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

	Per Gross Ton	
Heavy melting steel	$20.50 to	$21.00
No. 1 cast, cupola size	23.50 to	24.00
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va.; and Franklin, Pa.	22.00 to	22.50
Compressed sheet steel	19.50 to	20.00
Bundled sheet sides and ends	17.50 to	18.00
Railroad knuckles and couplers	23.00 to	23.50
Railroad coil and leaf springs	23.00 to	23.50
Low phosphorus standard bloom and billet ends	24.00 to	25.00
Low phosphorus, plates and other grades	23.00 to	24.00
Railroad malleable	21.00 to	21.50
Iron car axles	28.00 to	30.00
Locomotive axles, steel	23.00 to	24.00
Steel car axles	23.00 to	23.50
Cast iron wheels	23.50 to	24.00
Rolled steel wheels	23.00 to	23.50
Machine shop turnings	17.00 to	17.50
Heavy steel axle turnings	18.00 to	18.50
Short shoveling turnings	18.00 to	18.50
Cast iron borings	18.00 to	18.50
Heavy breakable cast	19.00 to	19.50
Stove plate	17.00 to	17.50
Sheet bar crop ends	24.00 to	25.00
No. 1 railroad wrought	20.00 to	20.50

Applications of Gas Welding Discussed

The efficiency of acetylene gas welded joints in pipe used for the transmission of manufactured gas through high pressure lines was brought out in a paper by G. O. Carter, Linde Air Products Co., in a meeting of the Metropolitan section of the American Welding Society, held in New York, Nov. 13. The growth and possibilities of high pressure distribution of gas were outlined. A point of discussion was the feasibility of using testing pressures greatly in excess of actual working pressure. Successful gas and electric welded joints on steam lines, the pressures being up to 150 lb., were cited.

"Production Welding in the Sheet Metal Shops" was the subject of a short paper by J. W. Owens, welding aid, U. S. Navy Yard, Norfolk, Va. The production of various thin sheet metal parts by gas welding was illustrated, the rate of output of various pieces being given.

Discussion brought out the need for adequate ventilation while welding, especially in confined places. Getting rid of fumes and protecting the health of welders was pointed out as a vital matter, worthy of research and wide discussion.

Chicago

Mills Can Take Little Tonnage for This Year—Production Gains

CHICAGO, Nov. 14.—The tonnage booked thus far in November by a leading mill is somewhat heavier than during the same period in October. The new business being placed, however, is for forward delivery, inquiry for early shipment being less active as the time for inventory taking approaches. At the same time, little or no new tonnage can be taken by local mills for delivery this year, excepting small lots of certain sizes which will fit into existing rolling schedules. While one important producer continues to accept orders for indefinite delivery, which really means shipment next year, another prominent mill has not yet opened its books for first quarter, except on rails and track supplies, contracts for which were received some time ago. The latter bookings will employ about 40 per cent of its capacity, and judging from numerous requests for protection received from customers, the remaining output will have to be allocated. Prices on plates, shapes, soft steel bars and sheets remain unchanged, but in view of the diminishing margin of profit for some producers and actual losses for others, a general advance in steel prices is not regarded as altogether remote.

Concurrent with the aforementioned increase in bookings, production has gained. The Illinois Steel Co. has added two blast furnaces at South Chicago and has blown out one at Joliet for relining, giving it a net gain of one, making a total of 18 active stacks out of its 27 steel works stacks. At Milwaukee it has put the blast on one of its two small merchant stacks, but this furnace will remain in operation only long enough to discharge unfilled merchant iron contracts. The company's steel output has increased to 79 per cent of capacity. The operations of the Inland Steel Co. remain unchanged.

The three factors, coal, fuel and labor, still worry local producers. Coal deliveries have improved sufficiently to permit material increases in operation, but not enough to allow the accumulation of winter reserves. The supply of cars at the mills for the shipment of finished products is also better, but not yet normal. One producer recently found it necessary to load rails in stock cars. A shortage of common labor is still to be noted, although the situation is less acute than a week or two ago owing to the fact that many outdoor workers are now seeking indoor employment.

Ferroalloys.—The market is quiet and devoid of features. With no sales for a considerable period and no producers quoting, it is impossible to say what 50 per cent ferrosilicon is worth.

We quote 80 per cent ferromanganese, $108.66, delivered; 50 per cent ferrosilicon, $65, delivered (nominal); spiegeleisen, 18 to 22 per cent, $46.05 to $47, delivered.

Pig Iron.—In an apathetic market, prices of Northern iron have undergone further changes. Current demand is principally for spot iron and sales continue to be made at all the way from $31 to $33, base, furnace. Little business has been placed for first quarter and there are few inquiries for that delivery. Among the few current is one for 1000 tons of Southern foundry ranging from 1.75 to 5 per cent silicon content put out by a sewing machine manufacturer. A local melter is inquiring for 400 tons of foundry, Northern or Southern, for first quarter. Another current inquiry from a Chicago buyer calls for 300 to 500 tons of 15 per cent Bessemer ferrosilicon for December and January or first quarter shipment. The most important recent transaction was the purchase by a Michigan melter of 500 tons of Southern and a like tonnage of Northern foundry for November and December delivery. It is notable that outside iron is getting into this territory to a greater extent than for a considerable time. Southern iron has been sold at as low as $24, base, Birmingham, while St. Louis iron is now quoted at $33, base, furnace. A most unusual development was the sale of 600 tons of No. 2 Valley foundry to an Indianapolis user at $30.15 delivered. A few carload sales of silvery have been made at $3 below what has been heretofore the ruling market.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$36.1
Northern coke, No. 1, sil. 2.25 to 2.75	$31.00 to 32.00
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	30.00 to 31.00
Northern high phos.	30.00 to 31.00
Southern No. 2	30.00 to 31.00
Malleable, not over 2.25 sil.	30.00 to 31.00
Basic	30.00 to 31.00
Low phos., Valley furnace, sil. 1 to 2 per cent copper free	38.00
Silvery, sil. 8 per cent	41.29 to 44.29

Plates.—Pending inquiries for cars aggregate 60,000 of which fully 40,000 are from Western roads. A number of lines want deliveries in the first quarter, but in view of the present heavy commitments of the mills, it would appear that the steel cannot be obtained to build them that soon. The Kansas City Structural Steel Co. has booked an order for Western oil storage tanks involving 5000 tons of plates. The leading mill continues to quote 2.10c. on tank plates for indefinite delivery. The foremost independent whose price is still 2.30c., Chicago, is booked practically full for this quarter and has not opened its books for first quarter.

The mill quotation is 2.10c. to 2.30c., Chicago. Jobbers quote 2.90c. for plates out of stock.

Cast Iron Pipe.—The market is quiet and prices are somewhat weaker in sympathy with pig iron. The market on 6-in. and over ranges from $43 to $44, Birmingham.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $55.20 to $56.20; 6-in. and above, $51.20 to $52.20, class A and gas pipe, $3 extra.

Bars.—With the approach of inventory taking, demand for soft steel bars for early delivery is less active. At the same time, mills have little or no tonnage left to sell for this quarter. One important interest continues to take business at 2c., Chicago, for indefinite shipment, which really means delivery next year. Another mill, which is quoting 2.10c., Chicago, has not yet opened its books for first quarter, but in view of numerous requests for tonnage from customers, believes that its output will have to be allocated. Bar iron is firm at 2.50c., Chicago, and demand is somewhat improved, although not sufficiently to enable mills to accumulate a backlog. Hard steel bar mills continue to book a fair amount of business and are holding firmly to 2c., f.o.b. mill.

Mill prices are: Mild steel bars, 2c. to 2.10c., Chicago; common bar iron, 2.50c., Chicago; rail steel, 2c., Chicago mill.

Jobbers quote 2.80c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 3.80c. for rounds and 4.30c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 2.50c. base; hoops, 4.15c.; bands, 3.55c.

Rails and Track Supplies.—Although the next important buying movement in track supplies is not expected before February or March, a surprising tonnage of bolts, spikes and tie plates was booked by local mills last week. Light rail demand has revived and orders for the week are the heaviest this year. An interesting development in connection with standard sections is the receipt of specifications for heavier rails from Western lines. Heretofore a few Eastern roads have been the principal users of heavy sections, but two Northwestern lines have made 130 lb. A. R. E. A. rails their standard on curves and parts of the road subject to heavy traffic. One of these lines has specified for 4000 tons of this section against its 1923 contract. A Southwestern road is laying 110 lb. A. R. E. A. sections on a large portion of its system and has specified for 30,000 tons against its contracts.

Standard Bessemer and open-hearth rails, $43; light rails rolled from new steel, 2.15c., f.o.b. makers' mills.

Standard railroad spikes, 2.85c. to 3c. mill; track bolts with square nuts, 3.50c. to 3.75c. mill; iron tie plates, 2.50c.; steel tie plates, 2.35c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.50c. base and track bolts, 4.50c. base.

Wire Products.—The leading interest has been unable to increase its operations above a 60 per cent rate for the mills which are running, with the result that the gap between production and demand is still wide. There are no stocks in the hands of the jobbers and shipments from mills pass almost directly into the hands of ultimate users. Demand for wire products is good in practically all territories except the Northwest, where crops were short. Prices are unchanged. As is customary at this season, spring terms are out on wire fencing, but not on other products. Demand for wire rods is good and prices range from $47.50 to $50, Pittsburgh. For mill prices on wire products, see finished iron and steel, f.o.b. Pittsburgh,, page 1309.

We quote warehouse prices f.o.b. Chicago: No. 9 and heavier basis annealed wire and No. 9 and heavier bright basic wire, $3.30 per 100 lb.; common wire nails, $3.45 per 100 lb.; cement coated nails, $3.50 per keg.

Bolts and Nuts.—Specifications are coming in satisfactory volume and bolt and nut makers look forward to a busy first quarter. The automobile industry is active and conditions in agricultural districts are not nearly so bad as they have been painted except in the Northwest. The September discounts still rule in this market.

Jobbers quote structural rivets, 3.75c.; boiler rivets, 3.85c.; machine bolts up to ⅞ x 4 in., 50 per cent off; larger sizes,, 50 off; carriage bolts up to ⅞ x 6 in., 45 off; larger sizes, 45 off; hot pressed nuts, squares and hexagons, tapped, $2.75 off; blank nuts, $2.75 off; coach or lag screws, gimlet points, square heads, 55 per cent off.

Sheets.—Demand for sheets for early shipment is less active, but this is to be expected as consumers prepare to take their inventories. Local mills are booked through the quarter and are unable to take on any additional tonnage except occasional gages which will fit into existing rolling schedules. The independent mill has not yet announced its first quarter prices, but in view of pressure from customers, expects that it will prove necessary to allocate its output for the three months period. Outside mills are no longer obtaining premiums on business taken in this territory.

Mill quotations are 3.35c. for No. 28 black, 2.50c. for No. 10 blue annealed and 4.35c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote f.o.b. Chicago, 4c. for blue annealed, 4.85c. for black and 5.85c. for galvanized.

Reinforcing Bars.—Although lettings fell off during the week, there is considerable pending business and several attractive new projects are coming up for bids. The building industry promises to be active throughout the winter, but prices of reinforcing bars are weak. The nominal quotation is of 2.50c. local warehouse, but 2.25c. would appear to be closer to the actual market in view of numerous recent concessions. Awards include:

Library Bureau building, Chicago, 200 tons, to Kalman Steel Co.

Charles E. Mitchell residence, Tuxedo Park, near New York, 100 tons, to Kalman Steel Co.

Chicago & North Western grade separation work, near Milwaukee, Wis., 100 tons, to Kalman Steel Co.

Atherton High School, Louisville, Ky., 175 tons, to Corrugated Bar Co.

Pending business includes:

Sewage disposal plant, Indianapolis, 1250 tons, bids on general contract to be taken Nov. 14.

Primalt Products Co. building, Chicago, 200 tons, bids on general contract to be closed Nov. 13.

Printing building for Tony Rubovitz, Chicago, 200 tons.

Greenwood School, St. Paul, Minn., 200 tons.

Structural Material.—Fabricating awards are more numerous than for several weeks and the amount of pending business continues to expand. In this city, $50,000,000 worth of work in large buildings alone is being figured on and it is believed that most, if not all, of the structures will go ahead. Prices on plain material remain unchanged.

The mill quotation on plain material is 2.10c. to 2.20c., Chicago. Jobbers quote 2.90c. for plain material out of warehouse.

Steel Castings.—The market is spotty with Western foundries well booked while plants in some sections of the East are not so well situated. This is accounted for by the fact that most recently railroad car lettings have been by Western roads. Some rolling mill business is pending in the Pittsburgh district, however, and this may serve to balance the situation. No changes in discount are looked for outside of the advance of a few specific items which are now out of adjustment, such as striking castings and center fillers for freight cars.

Old Material.—The market is still weak, although price declines are less general than a week ago. Except for a purchase of about 15,000 tons of heavy melting by a steel mill, consumer buying has been light. Demand for iron mill grades is slack because of the idleness of one mill and curtailed operations of others. Foundries are withholding purchases of cast scrap because they expect further declines in sympathy with pig iron. Malleable users covered their needs for the rest of the year some time ago and prices have been sustained by the purchases of brokers to fill their contracts. Railroad offerings include the Northern Pacific, 1500 tons, and the Chicago Great Western, 1000 tons.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$23.00 to $23.50
Cast iron car wheels	25.00 to 25.50
Relaying rails, 56 and 60 lb.	26.00 to 27.00
Relaying rails, 65-lb. and heavier	32.00 to 35.00
Rolled or forged steel car wheels	22.00 to 22.50
Rails for rolling	18.50 to 19.00
Steel rails, less than 3 ft.	20.50 to 21.00
Heavy melting steel	17.50 to 18.00
Frogs, switches and guards cut apart	17.50 to 18.00
Shoveling steel	17.25 to 17.75
Drop forge flashings	12.00 to 12.50
Hydraulic compressed sheet	15.00 to 15.50
Axle turnings	15.50 to 16.00
Per Net Ton	
Iron angles and splice bars	22.00 to 22.50
Steel angle bars	17.50 to 18.00
Iron arch bars and transoms	22.00 to 22.50
Iron car axles	24.50 to 25.00
Steel car axles	18.50 to 19.00
No. 1 busheling	14.50 to 15.00
No. 2 busheling	10.00 to 10.50
Cut forge	15.50 to 16.00
Pipe and flues	11.50 to 12.00
No. 1 railroad wrought	16.00 to 16.50
No. 2 railroad wrought	15.50 to 16.00
Steel knuckles and couplers	19.50 to 20.00
Coil springs	21.00 to 21.50
No. 1 machinery cast	20.50 to 21.00
No. 1 railroad cast	19.00 to 19.50
Low phos. punchings	17.50 to 18.00
Locomotive tires, smooth	17.50 to 18.00
Machine shop turnings	10.50 to 11.00
Cast borings	13.00 to 13.50
Stove plates	16.50 to 17.00
Grate bars	16.00 to 16.50
Brake shoes	16.50 to 17.00
Railroad malleable	21.00 to 21.50
Agricultural malleable	21.00 to 21.50

The Brier Hill Steel Co., Youngstown, Ohio, expects to occupy its new six-story general office building next March, and largely abandon its offices in the Stambaugh Building. The office structure is being erected on West Federal Street, Youngstown, opposite the company's open-hearth department. Concentration of offices at the plant in one building is expected to prove beneficial from the standpoints of economy and efficiency.

The Blackwood Electric Steel Corporation, Parkersburg, W. Va., has been organized to build a plant for the manufacture of alloy steel castings. The company will build a foundry 250 x 140 ft. and it is the intention to install an electric melting furnace. Officers have been elected as follows: President and general manager, F. S. Blackwood, president of the Farrell-Cheek Foundry Co., Sandusky, Ohio; vice-president and sales manager, P. T. Thomas, Pittsburgh, Pa.; secretary and treasurer, E. D. Kibley, Parkersburg.

Two steel stocking trestles, with a capacity of approximately 300,000 tons of ore, are under construction at the Athens mine of the Cleveland Cliffs Iron Co., near Negaunee, Mich. The Worden-Allen Co. of Milwaukee has the contract for the steel.

A committee on leather belting is to be organized by the American Society for Testing Materials to cover standards for leather belting for power transmission.

New York

Finished Material Demand Notably Light—Plate Mills in Need of Orders

NEW YORK, Nov. 14—The New York Air Brake Co. has bought 2500 tons of domestic iron for December-January delivery and the Crane Co., Bridgeport, 1000 tons of foreign iron for prompt delivery. Other sales have been for small tonnages and the total for the week is not large. Buyers continue to cover only for early requirements and are awaiting a further decline in prices. Reports from the South indicate sharp reductions on southern iron. In eastern Pennsylvania, $29 still seems to be the minimum, but there is a strong feeling that a lower price would be named on any considerable tonnage. At Buffalo $28 is the usual quotation. Virginia prices are still undetermined. In foreign iron, quotations are from $29 to $29.50 on Scotch and $27 to $28 on Continental grades and there is very little activity. Inquiries for domestic iron include several lots of from 500 to 700 tons of malleable.

We quote delivered in the New York district as follows, having added to furnace prices $2.27 freight [illegible] Pennsylvania, $4.91 from Buffalo and [illegible] Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$33.27 to $34.27
East. Pa. No. 2 X fdy., sil. 2.25 to 2.75	32.27 to 33.27
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	31.27 to 32.27
Buffalo, sil. 1.75 to 2.25	32.91
No. 2 Virginia, sil. 1.75 to 2.25	No sales

Ferroalloys.—Demand for ferromanganese is confined to small lots, mostly British alloy, at regular quotations. Sales of spiegeleisen have also been light, made up partly of the domestic and partly of the foreign product. There has been a fair demand for 50 per cent ferrosilicon, amounting to 200 to 300 tons, prices ranging from $75 to $80, delivered. Should the market continue to advance, it may be possible for sales of the imported alloy to be resumed. Contracts for 1923 have not yet been negotiated. Quotations are as follows:

Ferromanganese, domestic, furnace, nominal per ton	$100.00
Ferromanganese, British, c.i.f., per ton	$67.50
Spiegeleisen, 17 to 19 per cent furnace	$38.00
Spiegeleisen, 20 per cent, furnace or duty paid	$38.00 to $39.00
Ferrosilicon, 50 per cent, delivered, per gross ton, carloads	$75.00 to $80.00
Ferrotungsten, per lb. of contained metal,	85c. to 95c.
Ferrochromium, 4 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr., delivered	12c. to 14c.
Ferrovanadium, per lb. of contained vanadium	$3.50 to $4.00
Ferrocarbontitanium, 15 to 18 per cent, in carloads, per net ton	$200.00

Ores

Manganese ore, foreign, per unit, c.i.f.	29c. to 30c.
Tungsten ore, per unit, in 60 per cent concentrates, nominal	$7.50 to $8.00
Chrome ore, basis 48 per cent Cr_2O_3, crude, per ton, c.i.f. Atlantic seaboard	$18.00 to $25.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS$_2$, New York	55c. to 60c.

Cast-Iron Pipe.—Private purchasing continues active, but municipal inquiries for delivery this year have about ceased. A few feelers on price are reported to have come out on pipe for delivery in the spring, but the tendency is evidently to delay until after the first of the year in anticipation of lower prices, as a result of lower pig iron quotations. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $54.50; 4-in. and 5-in., $59; 3-in., $64.80, with $4 additional for Class A and gas pipe. Business in soil pipe is good, but makers here have found it necessary to increase discounts from list in order to meet the competition of lower prices quoted by southern makers, who have been quoting 55 per cent off list Birmingham base. Considerable difficulty in obtaining permits for shipments because of the railroad embargoes, is reported. The new discounts being offered on pipe in this district from both southern and northern makers, delivered New York, are as follows: 2 to 6-in. standard 33 to 35¾ per cent off list; heavy, 43 to 45¾ per cent off list.

Warehouse Business.—Judging by transactions of the first part of this month, most warehouses in this district will find November business better than October sales. October, however, was with most dealers, not as prosperous a month as September. Warehouses still encounter difficulty in obtaining shipments from mills because of the embargoes and report their stocks low in some sizes of certain materials. Sales of structural steel are still a large item. The sheet market is appreciably weaker. Although the greater number of warehouses in this district are officially quoting 4.90c. and 5.90c. per lb. base on black and galvanized sheets respectively, the current price justified by sales is undoubtedly 4.50c. and 5.50c. per lb. base and even this quotation is stated to have been shaded on satisfactory orders. Good business is reported in brass and copper. Sellers of wrought iron and steel pipe continue to report unusual activity in sales of steel pipe. This is partly attributed to the extension of home building into the winter season in order to gain the exemption on taxes allowed for 10 years by the city on all homes, the foundations of which are in before April 1, 1923. We quote prices on page 1334.

High Speed Steel.—The market is quiet and quotations continue unchanged at 75c. to 80c. per lb. on 18 per cent tungsten high speed steel with special brands of some companies ranging up to 90c. per lb.

Finished Iron and Steel.—Not in a considerable time has the demand for steel been so light. In plates there is practically no business and some of the mills have only a few weeks' work ahead. The mill position on other products is much better. In bars, wire products, tubular goods, tin plate and sheets, there is a good volume of orders on the books and the mills are not seriously concerned over present lack of demand. Conditions are getting easier for the consumer except as to deliveries, which are still delayed because of railroad congestion and lack of cars. Several companies which own cars are using them to haul steel from Pittsburgh and other districts to points of consumption. One contracting firm in New York recently bought 25 bad-order cars, rebuilt them and is now using the equipment for hauling fabricated steel to jobs on which it is engaged in New York. Prices on plates, shapes and bars are unchanged. On the ordinary run of orders the ruling price is 2c., Pittsburgh, on all three products, but it is possible to shade this on especially desirable tonnages. The fact is that few such concessions are being made by the mills because of the lack of attractive business. Structural steel is the only commodity in which there has been renewed activity. Inquiries and orders during the past week show somewhat of a gain over preceding weeks. Bar iron is quoted at 2c., Pittsburgh, by Eastern mills but this price would be shaded on attractive lots. The Truscon Steel Co. has been awarded 1200 tons of reinforcing bars for the new plant of the Chevrolet Motor Car Co. at Buffalo.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, structural shapes and steel plates, 2.34c.; bar iron, 2.34c.

Coke.—By-product coke is now quoted at $14.84 to $14.91, delivered, Newark and Jersey City points, a reduction of $2 since last week. Connellsville grades are quoted at $8.50 to $9.50 and furnace grades from $7 to $8. Activity of copper smelters has developed a quotation as low as $5.75 to $5.85 on coke analyzing 1.50 per cent sulphur.

Old Material.—The weakness that has been evident for some time is developing into a distinct downward tendency in prices. Dealers and brokers are not inclined to make purchases at any price unless orders are in hand. What little activity is evident is largely in No. 1 heavy melting steel and railroad steel. Jones & Laughlin Steel Co. is receiving shipments for which dealers are paying $20 per ton delivered Pittsburgh, which with a freight rate of $5.17 would tend to establish a buying price of $14.83 per ton, New York, on heavy melting steel. On the other hand, the Bethlehem Steel Co. specifies railroad steel and dealers are paying only $16.50 per ton, delivered Bethlehem, on this quality, which with the $2.65 freight rate established a buying price New York of $13.95 on railroad steel. However, the price being paid for shipment to the Jones & Laughlin Steel Co. is about the high point of this market, for a Weirton mill, taking the same rate, is paying only $18.50 per ton, delivered. A fair estimate of the market on heavy melting steel is $13 to $14 per

ton and on railroad steel $14.25 to $14.75 per ton. A Milton, Pa., mill is still offering $14.50 per ton for specification pipe, which with a $3.80 freight rate, figures back to $10.70 per ton as a buying price New York. A fair estimate of this market is $10.50 to $11, with the tendency toward weakness.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$13.00 to $14.00
Steel rails, short length, or equivalent	14.25 to 14.75
Rails for rolling	16.00 to 16.50
Relaying rails, nominal	21.00 to 22.00
Steel car axles	No market
Iron car axles	26.00 to 27.00
No. 1 railroad wrought	15.50 to 16.00
Wrought iron track	14.25 to 14.75
Forge fire	11.00 to 11.50
No. 1 yard wrought, long	13.50 to 14.00
Cast borings (clean)	12.50 to 13.00
Machine-shop turnings	11.75 to 12.25
Mixed borings and turnings	11.75 to 12.25
Iron and steel pipe (1 in. diam., not under 2 ft. long)	10.50 to 11.00
Stove plate	13.00 to 13.50
Locomotive grate bars	14.00 to 14.50
Malleable cast (railroad)	13.50 to 14.00
Cast-iron car wheels	16.00 to 17.00

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$20.00 to $21.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	17.50 to 18.00
No. 1 heavy cast, not cupola size	15.00 to 15.50
No. 2 cast (radiators, cast boilers, etc.)	13.50 to 14.00

Boston

Domestic Furnaces Cut Prices, But Foreign Pig Iron Sellers Get the Business

BOSTON, Nov. 14.—Further concessions by eastern Pennsylvania and Buffalo furnaces the past week failed to attract many buyers. Sales of Alabama iron were more than the combined sales of Buffalo and eastern Pennsylvania, and included one lot of 1000 tons of silicon 3.25 to 3.75. Sales of foreign iron totaled approximately 6000 tons, mostly Continental, and included one 2000-ton lot and two 500-ton lots, all French, being silicon 2.50 to 3.00 at around $28 c.i.f., Boston, duty paid. Sales of all kinds of iron amounted to about 9000 tons, the largest for any similar period in more than a month. Included are 200 tons of Northern malleable at $28, Buffalo base, bought by a New Hampshire maker of machinery. The market for Virginia iron is lifeless inasmuch as eastern Pennsylvania iron can be landed in New England at more than $4 less than Virginia, while the differential on Buffalo is more than $3 and on foreign iron about $8, and even Alabama irons are cheaper when laid down in New England. Cuts made by eastern Pennsylvania and Buffalo furnaces the past week brought prices about $2 nearer those quoted on iron landed here on foreign, but there remains an average differential of about $4 in favor of foreign. Most of the foreign iron sold since last reports went to Connecticut melters. Contrary to earlier reports, the Crompton & Knowles Loom Works, Worcester, Mass., has not covered its requirements and is said to have offers of foreign iron at around $26 on dock, plus duty. A Massachusetts textile machinery maker is in the market for 500 tons No. 1X iron.

We quote delivered prices, on the basis of the latest reported sales, now infrequent, and as follows, having added to furnace prices $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia and $9.60 from Alabama:

Eastern Penn., sil. 2.25 to 2.75	$32.15 to $34.65
Eastern Penn., sil. 1.75 to 2.25	31.65 to 33.65
Buffalo, sil. 2.25 to 2.75	33.41 to 35.41
Buffalo, sil. 1.75 to 2.25	32.91 to 34.91
Virginia, sil. 2.25 to 2.75	33.92
Virginia, sil. 1.75 to 2.25	37.92
Alabama, sil. 2.25 to 2.75	35.10
Alabama, sil. 1.75 to 2.25	34.60

Iron Imports.—During the week ending Nov. 11 no foreign iron was received at this port, whereas in the previous week 3350 tons of Scotch, 4260 tons of Belgian and 4200 tons of English, a grand total of 11,810 tons was received. At least one cargo is due this week, approximately 4000 tons of Scotch iron.

Coke.—Although the Connellsville foundry coke market has weakened noticeably since Nov. 1, New England producers of by-product fuel have not changed their price since then, both quoting on a basis of $16 delivered within the $3.10 freight zone, or approximately $2.50 a ton above the Connellsville market. New England coke producers, however, have an advantage over Connellsville inasmuch as they can guarantee delivery, while the Connellsville cannot. Approximately 4000 tons of English foundry coke was unloaded at this port the past week, all of which is sold to interests other than foundry.

Warehouse Business.—Little of the unusual is transpiring in warehouse business anywhere in New England. Warehouse outgo is holding its own, running well above tonnages moved a year ago, yet slightly behind records established two and three months back. Stocks are ample for immediate requirements, but inasmuch as shipments from mills have slowed up materially the past ten days, apprehension is felt in some quarters regarding supplies next month. Individual orders placed with warehouses are small, but the real strength of the situation lies in the volume of aggregate orders passing. Prices are reported as very steady all down the line.

Jobbers quote: Soft steel bars, $3.065 per 100 lb. base; flats, $3.85; concrete bars, 3.16½c.; structural steel, $3.065 to $3.50; tire steel, $4.50 to $4.85; open-hearth spring steel, $5 to $6.50; crucible spring steel, $12; steel bands, $4.25; hoop steel, $4.75; cold rolled steel, $4 to $4.50; refined iron, $3.065; best refined iron, $4.50; Wayne iron, $5.50; Norway iron, $6.60 to $7.10; plates, 3.16½c. to $3.35; No. 10 blue annealed sheets, $4.15 per 100 lb. base; No. 28 black sheets, $5.40; No. 28 galvanized sheets, $6.40.

Finished Material.—Bars, plates and sheets are in limited demand, with the undertone of prices possibly steadier, the tendency to shade being less noticeable. Structural steel sales are limited at the moment, 150 tons awarded by the George A. Fuller Co., Boston, to the Ornamental Iron Co., Boston, for a Northampton, Mass., hospital represents the largest award locally since last reports. Approximately 7700 tons is expected to close within ten days, however, and additional tonnages are in the making. The Maine Central Railroad has placed orders for seven baggage cars with the Osgood Bradley Car Co., Worcester, Mass., a Standard Steel Car Co., subsidiary, and for 460 miscellaneous freight cars, with the Keith Car & Mfg. Co., Sagamore, Mass., another subsidiary. In addition this carrier has ordered 50 gondola cars and eight 10-wheeled type locomotives from concerns outside New England. The Boston & Albany Railroad is in the market for miscellaneous locomotive equipment, and the Boston Elevated Railway Co. for two large ash hoppers.

Old Material.—New business in old material was at a standstill the past week, and buying against old contracts was limited to comparatively few hundreds tons of miscellaneous scrap. A limited tonnage of heavy melting steel, for shipment to the Pittsburgh district, was taken at $14 f.o.b. shipping point, or $1 better than was paid the previous week. Mixed borings and turnings changed hands at $12 shipping point, this price representing an advance of $1. Small tonnages of machine shop turnings and malleable, included in the business of the week, cost buyers last week's full top prices. Based on these few transactions, it appears the market in general is firmer, notwithstanding the lack of sizable tonnage moving. Cast iron borings, for chemical purposes, apparently are the one weak spot in the market. Several car lots early in the week were taken at $18 shipping point, but during the past few days buyers have dropped their bids $1. The Watertown, Mass., Arsenal has sold 2000 tons of scrap material in three lots to Perry, Buxton & Doane Co., Boston, and Gordon, Goose & Gerber Co. and J. Lipsitz Co., Chelsea, Mass.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$22.00 to $22.50
No. 2 machinery cast	20.00 to 20.50
Stove plate	17.00 to 17.50
Railroad malleable	20.50 to 21.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$13.50 to $14.50
No. 1 railroad wrought	16.00 to 16.50
No. 1 yard wrought	14.00 to 14.50
Wrought pipe (1 in. diam., over 2 ft. long)	11.00 to 12.00
Machine shop turnings	11.50 to 12.00
Cast iron borings, rolling mill	13.50 to 14.00
Cast iron borings, chemical	17.00 to 18.00
Blast furnace borings and turnings	11.00 to 12.00
Forged scrap and bundled skeleton	10.50 to 11.00
Shafting	19.00 to 19.50
Street car axles	23.00 to 24.00
Street car wheels	17.50 to 18.00
Rails for rolling	15.50 to 16.00

Cincinnati

Sales of Southern Pig Iron Made at $23 — Market Dull and Weak

CINCINNATI, Nov. 14.—The pig iron market is dull and weak, and buying continues chiefly for carload lots for prompt shipment. On these orders, prices show little change, but a round tonnage can be purchased at much lower than recent prices. It is reported that a Michigan melter bought 500 tons of Southern resale iron for November and December shipment on a basis of $24, Birmingham, and one furnace has sold 1000 tons at $23 for this year and is quoting $24 for first quarter. On Northern irons, while $30 appears to be the market, shading of this price is reported, and a sale of a small tonnage at 50c. under this figure was made by an Ohio stack. An Indiana melter bought 200 tons of malleable last week at $30, southern Ohio furnace, and an Indianapolis car manufacturer bought 200 tons of foundry at $30, Chicago. These were the outstanding sales in the local market. Several inquiries for 200 to 300 tons are current, and an Illinois melter is asking for 1000 tons. A northern Ohio steel maker has an inquiry out for 5000 to 10,000 tons of basic, and is reported to have been quoted at least $2 under last week's market. Another inquiry for 1000 tons of basic from the same district is current. Foundry iron at $28, Valley furnace, has been offered in this territory. Production in southern Ohio will be materially increased this week, as one Marting furnace blew in on Sunday, and Hanging Rock furnace will go in this week.

Delivered freight rates to Cincinnati from Birmingham and $2.27 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$27.05 to $28.05
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	27.55 to 28.55
Ohio silvery (nominal), 8 per cent	41.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	31.77 to 32.27
Basic Northern	31.27
Malleable	32.27

Finished Materials.—The market is marking time, and only small orders for immediate shipment are being placed. Buyers are showing interest in their first quarter requirements, however, and much sheet business is offering for that delivery, but as prices have not been named, orders are not being booked except where buyers are asking that the orders be entered at the prices to be announced. Some shading of sheet prices by small mills is reported, 3.30c. and 4.30c. having been named on black and galvanized respectively, but the greater number of the orders booked were at a range of 3.35c. to 3.50c. and 4.35c. to 4.60c. On bars, shapes and plates, 2c. is now the recognized market for desirable specifications. The only order of consequence reported during the week was one from a manufacturer of road building machinery, who placed 400 tons. Implement manufacturers are buying in a small way, but the tonnage from this source does not approach the total booked for third quarter. A fair demand for hoops and bands is noted, and 2.90c. is now the common quotation. Plain and galvanized wire is more in demand, but fence is inactive. Wire nails may be said to be very active, this being in a large measure due, however, to the poor shipments from mills. There is little activity in the structural field, no new inquiries having appeared during the week.

Tool Steel.—While some of the bigger manufacturers anticipated their requirements before the recent advance, others continue to buy only from hand to mouth, and the market is showing a fair activity. Prices are strong, at 75c. to 95c. for 18 per cent tungsten high speed steel.

Reinforcing Bars.—There is a fair demand for reinforcing bars, and a number of new buildings now ready for figuring will aggregate a fair tonnage. Prices are reported to be showing weakness, but most of the orders placed are at 2c., mill. An addition to the plant of the Kemper-Thomas Co., Norwood, plans for which are about completed, will require about 300 tons.

Warehouse Business.—Jobbers report orders continuing in heavy volume, and stocks are showing the effects of the big demand of the past few months. Prices are firm, and due to the scarcity, it is expected that plain wire and nails will show an advance in the next few days. Prices on the heavier products are unchanged.

Cincinnati jobbers quote: Iron and steel bars, 2.95c. base; reinforcing bars, 3.05c. base; hoops, 4.05c. base; bands, 3.85c. base; shapes and plates, 3.05c. base; cold-rolled rounds, 3.75c. base; cold-rolled flats, squares and hexagons, 4.25c. base; No. 10 blue annealed sheets, 4c.; No. 28 black sheets, 4.70c.; No. 28 galvanized sheets, 5.75c.; No. 9 annealed wire, $3.10 per 100 lb.; common wire nails, $3.20 per keg, base.

Coke.—There is only a fair demand for foundry coke, and prices continue to slip, the market to-day being 50c. lower than last week in practically all districts. It is reported that some West Virginia ovens are contemplating shutting down Dec. 1 if prices continue to drop, as operations are unprofitable at to-day's costs. We quote Connellsville furnace coke $7 to $7.50, foundry at $8.50 to $9.50, New River foundry $13 to $15, Wise County furnace $7.50 to $8, and foundry $9.50 to $10; by-product foundry coke at $11, Connellsville basis. We note one sale of 6000 tons of furnace coke per month for three months to a southern Ohio stack.

Old Material.—Local dealers report increasing activity in the scrap market, wrought iron, cast and heavy melting steel being in fair demand in this district and for shipment to Southern points. Despite this activity, prices continue to decline, and some items are again marked down 50c., including rails for rolling, heavy melting steel, car wheels, and railroad cast. A fair demand for locomotive tires is reported, and prices have been advanced $1 in order to secure supplies.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

Per Gross Ton	
Bundled sheets	$12.50 to $14.00
Iron rails	16.50 to 17.50
Relaying rails, 50 lb. and up	26.00 to 26.50
Rails for rolling	17.50 to 18.00
Heavy melting steel	16.50 to 17.50
Steel rails for melting	15.50 to 16.50
Car wheels	19.00 to 20.00
Per Net Ton	
No. 1 railroad wrought	14.00 to 14.50
Cast borings	11.00 to 11.50
Steel turnings	10.00 to 10.50
Railroad cast	17.00 to 18.00
No. 1 machinery	20.50 to 21.00
Burnt scrap	11.50 to 12.00
Iron axles	20.00 to 20.50
Locomotive tires (smooth inside)	14.00 to 15.00
Pipes and flues	8.50 to 9.00

Buffalo

Pig Iron Steel Weak, with Quotations Somewhat Lower

BUFFALO, Nov. 14.—Continued weakness in prices of pig iron is revealed through quotations by several sellers of $28 for No. 2 plain. Such concessions, however, have not served to bring out any buying, although all users, with the exception of heating interests, have only small quantities of iron on hand. One seller expects a lively December. A leading radiator interest is expected to place its first quarter business within a few days, but no information as to the requirements is now available. With the exception of one inquiry for 1000 tons, there is nothing to arouse any unusual interest, the average being for a carload lot to 100 tons. Increased furnace operation by one maker will not have an immediate effect on sales because the product will be sufficient only to meet its own needs and business now on the books. An inquiry for 4000 tons was recently declined by this furnace for the same reasons. Thirty dollars has been done on a small tonnage of silicon greater than 3.25. Some unusual inquiry has come from outside the district, but it is meaningless insofar as Buffalo meeting the competition.

We quote f.o.b. per gross ton Buffalo as follows, the higher prices being for early shipment:

No. 1 foundry, 2.75 to 3.25 sil.	$29.00
No. 2X foundry, 2.25 to 2.75 sil.	28.50
No. 2 plain, 1.75 to 2.25 sil.	28.00
Basic	28.50
Malleable	28.50
Lake Superior charcoal	36.28

Finished Iron and Steel.—Demand for both finished and semi-finished material does not undergo any decided change from week to week. There is no question

that material in consumers' stockrooms is at a low ebb, but that fact has not produced any buying movement and the general impression is that the reluctance on the part of consumers is due to a belief that prices will weaken soon. There is absolutely no disposition toward forward buying; everything is scheduled for as close to immediate delivery as possible. Premiums on delivery advantages are not as general as heretofore. Quotations of 2c. on bars, shapes and plates have been more uniform, but nothing under 2c. has been reported. Sheets are quiet, but prices are firm. Pipe demand is very brisk and all wire products are especially brisk. One wire manufacturer has sold up through the next 60 days on all grades.

We quote warehouse prices Buffalo, as follows: Structural shapes, 3.20c.; plates, 3.20c.; soft steel bars, 3.10c.; hoops, 4.10c.; bands, 3.90c.; blue annealed sheets, No. 10 gage, 4.05c.; galvanized steel sheets, No. 28 gage, 5.85c.; black sheets, No. 28, 4.85c.; cold rolled round shafting, 3.95c.

Warehouse.—The fact that mills are in better shape to meet deliveries is beginning to have effect on warehouse demand, particularly Eastern demand. Although there has been no great falling off in the volume of business, the usual seasonal quietness is expected shortly. There are no price changes, and none is expected in the near future, but when they do come it is believed the revision will be downward.

Old Material.—There is a lively demand for railroad malleable, low phosphorus, and machinery cast scrap, and few dealers are unable to obtain the material to fill this call. The movement of heavy melting steel is rather sluggish; mills are only partially interested, and will not pay more than $19.50 to $20, while dealers who are filling old contracts on a $21 basis.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$20.00 to $21.00
Low phos., 0.04 and under	21.00 to 22.00
No. 1 railroad wrought	19.00 to 20.00
Car wheels	21.00 to 22.00
Machine-shop turnings	14.50 to 15.50
Cast iron borings	17.50 to 18.00
Heavy axle turnings	17.50 to 18.50
Grate bars	16.00 to 17.00
No. 1 busheling	17.00 to 18.00
Stove plate	17.00 to 18.00
Bundled sheet stampings	14.00 to 15.00
No. 1 machinery cast	21.00 to 22.00
Hydraulic compressed	18.00 to 19.00
Railroad malleable	20.50 to 21.50

St. Louis

The $25 Quotation on Alabama Iron Common —Few Sales Reported

ST. LOUIS, Nov. 14.—All of the makers of pig iron in the Birmingham district, with the exception of one, were quoting $25, Birmingham, for Southern iron at the end of the week. The one exception quoted $27.50, but it was understood that it would have accepted any tonnage that might be offered at the lower figure. The cut to $25 produced no business to speak of. A few inquiries regarded as feelers were issued, the largest for 300 tons, but melters generally continue to play a waiting game. The melt is increasing, and business is keeping up, but melters seem unconcerned as to their first quarter requirements, orders for which are very much later than normal. Lower prices are what the melters seem to be holding out for. The market for Northern iron is on the basis of $30, Chicago, to compete with the make of the St. Louis Coke & Chemical Co., Granite City, which is still quoting $31.50 to $32, f.o.b. furnace. Interest in Northern iron is no keener than in the Southern make, melters playing the same waiting game.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago, $3.28 from Birmingham (rail and water), $5.17 from Birmingham, all rail, and 81 cents average switching charge from Granite City:

Northern foundry, sil. 1.75 to 2.25	$32.16
Northern malleable, sil. 1.75 to 2.25	32.16
Basic	32.16
Southern foundry, sil. 1.75 to 2.25	30.17

Finished Iron and Steel.—An important transaction of the week was the sale of 4000 kegs, involving 200 tons, of wire nails to a St. Louis jobber. Fabricators are doing more business on smaller jobs, and are buying material. A Tulsa, Okla., fabricator bought 150 tons of beams and 25 tons of plates in this market. A Kansas City fabricator is in the market for 1000 tons of ¼-in. or heavier tank plates. The Louisville & Nashville Railroad is in the market for 2000 tons of tank plates, which is the only railroad inquiry of consequence. The Texas Construction Co. is in the market for 200 tons of 70-lb. rails, and a St. Louis industrial concern wants 100 16-in. wheels.

For stock out of warehouse we quote: Soft steel bars, 2.90c. per lb.; iron bars, 2.90c.; structural shapes, 3c.; tank plates, 3c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, cold rolled, one pass, 4.85c.; cold drawn rounds, shafting and screw stock, 3.90c.; structural rivets, 3.60c. per 100 lb.; boiler rivets, 3.70c.; tank rivets, ⅞ in. and smaller, 55 per cent off list; machine bolts, large, 50 per cent; smaller, 50 per cent; carriage bolts, large, 55-5 per cent; small, 60 and 10 per cent; lag screws, 55 per cent; hot pressed nuts, square or hexagon blank, $2.75; and tapped, $2.75 off list.

Coke.—The demand for coke is holding up. The St. Louis Coke & Chemical Co., which has been operating at 100 per cent capacity since Oct. 1, is well sold up through November and beyond, but has been taking a few orders for metallurgical coke at $12 to $14 at the furnace. Domestic coke is in good demand.

Old Material.—The market for old material continues soft. No new buying is reported, and the mills seem to be satisfied with their requirements for the rest of the year. The only items which appear to be in demand are couplers, knuckles and wheels, and these are scarce. The Missouri Pacific Railroad and the St. Louis Southwestern Railroad were the only lines to issue lists, which were for small tonnages.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Iron rails	$20.50 to $21.00
Rails for rolling	17.50 to 18.00
Steel rails, less than 3 ft.	21.50 to 22.00
Relaying rails, standard section	26.00 to 29.00
Cast iron car wheels	23.00 to 23.50
Heavy melting steel	16.00 to 16.50
Heavy shoveling steel	15.50 to 16.00
Frogs, switches and guards cut apart	17.00 to 17.50
Per Net Ton	
Heavy axles and tire turnings	11.50 to 12.00
Steel angle bars	17.00 to 17.50
Iron car axles	27.00 to 27.50
Steel car axles	20.00 to 20.50
Wrought iron bars and transoms	21.75 to 22.25
No. 1 railroad wrought	15.75 to 16.25
No. 2 railroad wrought	15.00 to 15.50
Railroad springs	20.00 to 20.50
Steel couplers and knuckles	20.00 to 20.50
Cast iron borings	11.00 to 11.50
No. 1 busheling	13.50 to 14.00
No. 1 railroad cast	19.00 to 19.50
No. 1 machinery cast	20.00 to 20.50
Railroad malleable	18.50 to 19.00
Machine shop turnings	9.50 to 10.00

Birmingham

Market Has Slipped to $23 Base for Delivery This Year

BIRMINGHAM, ALA., Nov. 14.—The Birmingham iron market has weakened again in price. While no maker admits his own offer of iron under $25 several admit that sales have been made at $24. One maker has heard of iron offered in the district at $23 for the rest of the year and $24 for next year. When taken together, consumers are offering $23 and one reputable consumer says he has offers from two makers under $25. There seems no doubt of the market having slipped to $23 for this year. The feature of the week was the unexpected showing of a decrease in yard stocks. Furnace accumulations on Oct. 1 and Nov. 1 were as follows: Foundry, 90,000 and 82,000; machine cast, 9300 and 9400; warrants, 1500 and 1300; basic, 10,600 and 9800; total, 111,800 and 102,900. The decrease followed better car service. The largest individual foundry holdings are 30,000 tons and the next 16,000 tons. The small amount of basic is due to large operations at steel mills. Charcoal iron is in good demand and the Shelby Iron Co. is disposing of product as made.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon 1.75 to 2.25	$23.00 to $24.00
Basic	25.00
Charcoal, warm blast	32.00

Finishing Mills.—The Tennessee company will continue double turn in finishing mills this week with the rail mill on schedule of 10,000 tons. Independent steel mills are on or near full turn. The Virginia Bridge & Iron Co. has taken 700 tons for a bridge at Wallis, Tex., 700 tons for the Phoenix Portland Cement Co.'s new mill at Birmingham, 400 tons for the Freeport Sulphur Co.'s plant at Freeport, Tex., and 200 tons of fabricated steel for the Alabama Dry Docks & Shipbuilding Co. at Mobile. The Ingalls Iron Works has taken 200 tons for the new Lehigh Cement Co.'s mill at Birmingham, a like amount for the Redemptorist school at New Orleans and 600 tons for the Louisville & Nashville freight house at Knoxville.

Cast Iron Pipe.—Pressure pipe makers are gratified over improved deliveries and greater plant production. The National Cast Iron Pipe Co. booked 750 tons for Marlin, Tex. The base remains at $43. Soil pipe continues listless with plants gradually working to the end of the order string. The base is $50 to $55, a reduction of $10 from the high point of several weeks ago.

Old Material.—Like pig iron, old material has become rather listless so far as new business is concerned, although shipments on orders are on the rush list. Prices rule with comparative firmness.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Steel rails	$16.00 to $17.00
No. 1 steel	14.00 to 16.00
No. 1 cast	18.00 to 20.00
Car wheels	18.00 to 20.00
Tramcar wheels	17.00 to 19.00
Stove plate	16.00 to 17.00
Cast-iron borings	9.00 to 10.00
Machine shop turnings	9.00 to 10.00

Cleveland

Canton Company Buys Basic—Some Concessions in Finished Lines

CLEVELAND, Nov. 14.—The Interstate Commerce Commission has set Dec. 14 as the date for the oral arguments in the ore rate case involving the railroad rates to upper lake ports. An extension until Nov. 20 has been allowed the Lake Superior Iron Ore Association in which to file exceptions to the recent report of the commission's examiner.

Semi-Finished Steel.—Several sales of billets, sheet bars and slabs aggregating 8000 to 10,000 tons were made by a local producer during the week, at $38. Some of the business was taken on a Valley basis and the remainder f.o.b. mill. The market is not firm and there are reports of a $37.50 quotation. A small lot sale of forging billets was made at $48.

Iron Ore.—On Nov. 1 there was 9,586,234 gross tons of Lake Superior ore on Lake Erie docks as compared with 9,672,077 tons on the same date a year ago and as compared with 9,028,708 tons on Oct. 1. Receipts at Lake Erie docks during October were 4,632,542 tons and for the season until Nov. 1 28,542,052 tons. Shipments from these docks during October were 2,928,293 tons and for the season to Nov. 1 19,032,476 tons. Receipts for the season up to Nov. 1 other than Lake Erie ports were 9,413,180 tons and at lake front furnaces at Lake Erie ports 7,674,711 tons. Many of the lake boats are making their last trip for ore and shipments will be nearly over this week, although some shippers will continue to move ore until the end of the month.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $5.95; Old range non-[illegible]

Pig Iron.—Interest during the week centered in an inquiry from a Canton, Ohio, consumer for 5000 tons of basic iron which was placed at a price not made known. Otherwise the market is almost at a standstill. With a declining market consumers are still refraining from buying iron for next year and although January is now less than seven weeks away, virtually no iron has been sold for delivery during the first quarter. Consumers argue that high priced coke forced pig iron up, and they figure that both coke and pig iron will continue to decline, and that it will be to their advantage to defer buying as long as possible. One local producer has booked a small tonnage of foundry iron for the first quarter subject to price prevailing at the time of shipment. Consumers are allowing their stocks to run low. Sales of foundry iron during the week were limited to a few small lots for early requirements. With the present large production some furnaces are running short on shipping orders and unless the demand quickly improves they will commence piling iron. The market continues weak, although there have been no sales of sufficient size to test prices. Prices have settled down to $29 Valley furnace for foundry iron, and the Lake furnace quotation ranges from $29 to $30. For Cleveland delivery a small lot of foundry iron was sold by a local producer at $30.50 at furnace, or a decline of 50c. during the week. A few small lots of Southern iron were sold at $25. Ohio silvery iron is weak, prices apparently being affected by the competition of the electrolytic furnaces. Some Jackson County producers seem willing to consider a price of $6 above foundry iron or $4.50 below the present $39.50 schedule on silvery. Low phosphorous iron is unchanged at $37. We note the sale of 200 tons at that price. Some consumers who bought foreign low phosphorous iron are not getting the deliveries expected and have been forced to buy domestic iron.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron includes a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and a $6 rate from Birmingham:

Basic, Valley furnace	$28.50 to $29.00
Northern No. 2 fdy., sil. 1.75 to 2.25	30.75 to 31.00
Southern fdy., sil. 1.75 to 2.25	29.00 to 31.00
Malleable	31.00
Ohio silvery, nominal, sil. 8 per cent	42.50
Standard low phos., Valley furnace	37.00

Finished Material.—The demand for finished iron and steel continues fairly good, the most activity being in steel bars. Anticipating a heavy demand for cars next year, the automobile industry is buying considerable material for this season of the year. The present demand from this source is mostly for bars and spring steel. A Michigan automobile company, during the week, placed 1000 tons of bars. The independent mill price on steel bars now appears firm at 2c. A break below the common 2c. plate price to 1.95c. has been made by one or more independent mills. Prices up to 2.25c. are still being named, but few sales above 2c. are being made. There is a good demand for small lots of plates and considerable oil tank work is being figured on. The demand for structural material in the building field has fallen off, but there is a fair call for structural sections from car builders and for various miscellaneous work. Structural material is quoted at 2c. We note the sale of 300 tons of standard rails at the new price. The car shortage appears to have become more serious in respect to shipments from the Pittsburgh district.

Jobbers quote steel bars, 2.91c.; plates and structural shapes, 3.01c.; No. 9 galvanized wire, 3.30c.; No. 9 annealed wire, 2.80c.; No. 28 black sheets, 4.15c. to 4.40c.; No. 28 galvanized sheets, 5c. to 5.40c.; No. 10 blue annealed sheets, 3.70c. to 3.76c.; hoops and bands, 3.71c.; cold-rolled rounds, 3.75c.; flats, squares and hexagons, 4.25c.

Strip Steel.—Keen competition has brought out a 2.75c. price for hot-rolled strip steel for early shipment. Some mills are adhering to 2.90c. The latter price is being quoted for the first quarter delivery.

Sheets.—Demand is not active and part of the independent mills are in need of orders. In some cases consumers over-bought in the rising market and now find themselves with excess stocks. There appears no change in the price situation. Some independent mills are quoting black sheets at 3.35c. and galvanized at 4.35c. and some are adhering to $3 a ton higher prices. Blue annealed sheets appear firm at 2.60c. to 2.75c. Demand for automobile body sheets continues good. Some car builders are placing orders for December shipments which virtually means for first quarter requirements.

Reinforcing Bars.—Demand has fallen off with the approach of the winter season and there has been some cancellation of stock orders on which mills were slow

in making deliveries. However, a large amount of new work is in prospect. John Gill & Son have taken foundation work for the Cleveland Public Library requiring 130 tons and 200 tons for a warehouse of the Cleveland Board of Education has been placed with the Bourne-Fuller Co. Hard steel re-inforcing bars now appear firm at 2c.

Coke.—Foundry coke is weak, being freely offered at from $9 to $9.50 per ton for standard Connellsville makes. Sales are light, being limited to consumers' early requirements.

Bolts, Nuts and Rivets.—Following a lull in buying, demand has improved. Some business is coming from the automobile companies for immediate shipment. No inquiry has as yet come out for first quarter contracts and some makers are willing to book orders for that delivery at present prices, which are firm. Rivet specifications are good. Buying is light and small lot orders that are being booked are at regular prices.

Old Material.—The market continues dull. While prices are not particularly firm, there is no decided evidence of weakness. Very little buying is reported by mills and there is little activity between dealers, as they seem well cleaned up on old orders. The trade expects a more active buying on the part of the mills during the next week or two. Heavy melting steel scrap for Youngstown district delivery is unchanged at $21.50. Mixed borings and short turnings have advanced 50c. a ton and cast scrap is 50c. lower.

We quote per gross ton, f.o.b. Cleveland, as follows:

Heavy melting steel	$19.00 to $19.50
Steel rails under 3 ft.	21.00 to 21.25
Steel rails for rolling	21.00 to 21.50
Iron rails	18.00 to 18.50
Iron car axles	26.00 to 27.00
Low phosphorus melting	20.00 to 20.50
Cast borings	15.00 to 15.25
Machine shop turnings	14.50 to 14.75
Mixed borings and short turnings	15.25 to 15.50
Compressed steel	17.00 to 17.25
Railroad wrought	18.00 to 18.50
Railroad malleable	20.00 to 21.00
Light bundled sheet stampings	13.75 to 14.00
Steel axle turnings	16.00 to 16.50
No. 1 cast	20.50 to 21.00
No. 1 busheling	12.50 to 13.50
Drop forge flashings over 10 in.	12.75 to 13.25
Drop forge flashings under 10 in.	12.50 to 13.50
Railroad grate bars	17.00 to 18.00
Stove plate	17.00 to 18.00
Pipes and flues	13.75 to 14.00

Detroit Scrap Market

DETROIT, Nov. 14.—While considerable tonnage of scrap materials have been bought during the past week, the market, generally, has shown a declining tendency. There is no doubt that the pig iron situation is reacting on the scrap market. Melters admit they are supplementing their low stocks of pig to delay purchasing their first quarter requirements as long as possible. In some instances, mills and furnaces have purchased scrap to insure their car supply, the material to be piled for future consumption. Stove plate recorded the greatest decline, showing a price $4 under quotations of a week ago, due to the stocks on yards and decrease in melt in the Chicago district. The following prices are on a gross ton basis, f.o.b. cars producers' yards, excepting stove plate, automobile and No. 1 machinery cast, which are quoted on a net ton basis:

Heavy melting steel	$15.50 to $16 50
Shoveling steel	15.50 to 16.50
No. 1 machinery cast	20.00 to 22.00
Cast borings	12.50 to 13.50
Automobile cast scrap	22.00 to 24.00
Stove plate	17.00 to 19.00
Hydraulic compressed	16.00 to 17.00
Car wheels	21.00 to 22.00

What engineering can do to cut the cost of handling materials between producer and consumer is to be the general subject in the forthcoming year of the meetings to be conducted by the material building division of the American Society of Mechanical Engineers. In the past year the keynote has been the matter of ports and terminals, but for the coming year less-than-carload and package material handling will get the major attention, such as store-door delivery systems, package and less-than-carload freight handling, junction terminals, transfer points, etc.

Philadelphia

Traffic Problems Becoming Uppermost in a Quiet Iron and Steel Market

PHILADELPHIA, Nov. 14.—Transportation problems are becoming uppermost in a quiet pig iron and steel market. Railroad embargoes are causing mills and furnaces considerable difficulty in getting shipments through to their customers. While the situation is a great deal worse in the district west of Altoona, there are some sections of the East in which the traffic congestion is serious. New England is more seriously affected than any Eastern district, nearly every road in that section having embargoes in effect which make it a trying problem to ship material into those States.

Steel companies having their own coal mines were threatened last week with a partial cutting off of use of their own cars when an order was issued that only 40 per cent of the privately owned cars would be placed at coal mines for loading. This order was speedily rescinded, however.

Orders for steel products this month are smaller in the aggregate than those of October. Pig iron business has fallen away almost to nothing, but the furnaces are looking forward to a buying movement some time before the end of the year, as practically no iron has been bought for first quarter shipment. Scrap is weak and sales are at a minimum.

Pig Iron.—The end of the movement of foreign pig iron to the United States seems to be in sight. It is probable that the first of the year will see most of the iron which has been contracted for landed on this side of the Atlantic. Last week's receipts at the port of Philadelphia were 9000 tons, 6000 from Scotland and 3000 from England, a reduction of about 4000 tons from the week preceding. The domestic iron market presents no new features except the determination of a number of furnace operators to put their furnaces in blast despite the weakness of prices and lack of demand. Four Virginia furnaces, Max Meadows, Pulaski, Low Moor and Buena Vista are now in blast, the last named having blown in on Monday. In eastern Pennsylvania one Warwick furnace went in blast on Saturday, Robesonia will go in on Nov. 20 and the Delaware River furnace is ready for lighting and will probably go in as soon as the fuel situation has been ironed out. Several furnaces are piling iron at to-day's high costs in the expectation that a market will be found for the iron before the winter is over. The furnace trade recognizes the weakness of the present situation, but is risking over-production on the theory that winter's cold and snow will so seriously complicate the transportation situation that they will dispose of their iron without a loss. Not all sellers subscribe to this view, however, some believing that iron prices will seek a lower level with the keener competition resulting from increasing production. Buyers are not taking a long-range view of the market and are content to buy for immediate needs only. Some of the foreign iron which is coming in is being sold for spot shipment to take the place of domestic iron which has not been delivered because of transportation tie-ups and lack of cars. Basic pig iron is weak and it is expected that pending inquiries for 6000 and 2000 tons from two Eastern steel makers will bring out slightly lower prices than were developed by a recent purchase of 16,000 tons by another steel company.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to $1.64 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$30.14 to $31.14
East. Pa. No. 2X, 2.25 to 2.75 sil.	31.14 to 32.14
East. Pa. No. 1X	32.14 to 33.14
Virginia No. 2 plain, 1.75 to 2.25 sil.	37.17
Virginia No. 2X, 2.25 to 2.75 sil.	38.17
Basic delivered eastern Pa.	28.14 to 28.26
Gray forge	29.64 to 31.14
Malleable	31.14 to 32.14
Standard low phos. (f.o.b. furnace)	38.00 to 40.00
Copper bearing low phos. (f.o.b. furnace)	35.00

Ore.—Receipts of foreign ore last week totaled 8441 tons, all from Sweden.

Ferroalloys.—A few sales of carload lots of ferromanganese have been made by a domestic producer at $100, furnace. The Lavino Furnace Co. has put its Sheridan furnace back on ferromanganese. It has been making foundry pig iron for some weeks.

Coke.—Blast furnace coke is available at $6.50 to $7.50 per ton, Connellsville, while foundry coke is quoted from $8 to $9.

Plates.—A plate manufacturer reports that the past few days has brought inquiries for several thousand tons of plates, but the situation generally shows no improvement. A leading producer has taken off four open-hearth furnaces because of reduced rolling schedules. For ordinary lots the customary price is 2c., Pittsburgh, but large lots of tank steel are to be had at 1.95c., Pittsburgh.

Structural Material.—Work on one large structural steel job in Philadelphia has been suspended because of lack of steel for erection. Transportation delays are the root of the trouble. Demand for structural shapes has shown a falling off this month, but this is to be expected at this season. The Eastern Steel Co. contemplates starting its structural mills again shortly. Plain material is generally quoted at 2c., Pittsburgh.

Bars.—While current demand for steel bars is not up to October bookings, the mills have a substantial volume of business on their books and there is very little disposition to shade 2c., Pittsburgh, except on desirable lots of concrete reinforcing bars, on which 1.95c., Pittsburgh, has been done. Bar iron is weak at 2c., Pittsburgh, with some makers willing to shade that figure for desirable orders.

Sheets.—Blue annealed sheets are firmer than either black or galvanized. The latter two grades are generally obtainable from independent mills at the American Sheet & Tin Plate Co.'s prices of 3.35c. and 4.35c., Pittsburgh, respectively, but blue annealed is not below 2.60c. for early shipment and more frequently 2.75c. is quoted and paid.

Warehouse Business.—Prices on steel out of stock are unchanged and for Philadelphia delivery are as follows:

Soft steel bars and small shapes, 3.025c.; iron bars (except bands), 3.025c.; round edge iron, 3.20c.; round edge steel, iron finish, 1½ x ½ in., 3.20c.; round edge steel planished, 4c.; tank steel plates, ¼-in. and heavier, 3.125c.; tank steel plates, ⅜-in., 3.33c.; blue annealed steel sheets, No. 10 gage, 3.85c.; black sheets, No. 28 gage, 4.60c.; galvanized sheets, No. 28 gage, 5.75c.; square twisted and deformed steel bars, 3.15c.; structural shapes, 3.125c.; diamond pattern plates, ¼-in., 4.80c.; ⅜-in., 5c.; spring steel, 4.25c.; round cold-rolled steel, 3.85c.; squares and hexagons, cold-rolled steel, 4.35c.; steel hoops, No. 13 gage and lighter, 4.25c.; steel bands, No. 12 gage to ⅜-in., inclusive, 3.825c.; rails, 3.025c.; tool steel, 8.50c.; Norway iron, 6.50c.

Old Material.—Weakness in the scrap market continues, but prices on some grades have reached a point at which brokers and dealers would consider it a great risk to sell for forward delivery. Current sales are mostly of small lots and do not indicate what consumers might be obliged to pay for a tonnage.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$16.50 to $17.50
[illegible]	16.50 to 17.50
Steel rails for rolling	20.00 to 20.50
No. 1 low phos., heavy 0.04 and under	24.00 to 25.00
Cast iron car wheels	21.00 to 22.00
No. 1 railroad wrought	19.00 to 20.00
[illegible]	17.00 to 18.00
No. 1 forge fire	15.50 to 16.00
Bundled sheets (for steel works)	14.50 to 15.50
[illegible]	14.50 to 15.50
Turnings (short shoveling grade for blast furnace use)	15.00 to 15.50
Mixed borings and turnings (for [illegible])	[illegible]
Machine shop turnings (for steel [illegible])	[illegible]
Machine shop turnings (for rolling mill use)	15.00 to 15.50
[illegible] lent)	15.50 to 16.50
Cast borings (for blast furnace and rolling mills)	16.00 to 16.50
Cast borings (for chemical plants)	22.00 to 23.00
Heavy breakable cast (for steel [illegible])	[illegible]
[illegible]	[illegible]
Stove plate (for steel plant use)	17.00 to 17.50
Railroad malleable	15.50 to 16.50
[illegible]	[illegible]
Shafting	21.00 to 22.00
[illegible]	[illegible]

San Francisco

Limited Steamer Space for Pig Iron—Foreign Produce Excludes Domestic

SAN FRANCISCO, Nov. 8.—The past two or three weeks have been rather quiet in the pig iron market along the Coast, although a moderate amount of tonnage has been placed, perhaps something under 1000 tons. One of the difficulties ruling at present is the limited steamer space offering from European points, and the rates charged also are conducive to the curtailment of business. Current prices on foreign iron range from about $33 to $35, depending on quality, duty paid, ex-ship, Coast ports. There is, however, a liberal offering of high phosphorus pig iron in this and the Los Angeles markets, and it is reported that some trading has been done at figures from about $28 to $29, ex-ship. Trading in domestic pig iron is negligible, on account of the relatively higher prices and delivery charges still prevailing over foreign irons.

Coke.—Freight conditions are not such as to stimulate buying in European coke, with the result that only a moderate tonnage has been sold for future shipment. The market has shown an upward tendency recently, prices on best grades being quoted from $18.50 to $19, ex-ship, Coast ports. Outside of the regular demand by users in this territory, activity is not very pronounced. Domestic coke is dull, although some inquiries have been made of late, but costs are too high to offer competition with foreign.

Cast Iron Pipe.—The Coast market has been without notable feature during the past fortnight, but it appears that conditions are tending toward improvement. Several good tonnages are in the market, including one for 3300 tons, opening Nov. 10, in Los Angeles. This is a municipal job and involves sizes from 4 to 6-in. pipe. In the territory adjacent to Los Angeles there are some 1500 tons coming up soon, and about 500 tons will be offering in the San Francisco district. Regular extension work is involved. Private business remains quiet. The price is steady and without conspicuous change at $54, delivered, on 6-in. Conditions in the soil pipe market are good, although buyers seem to be holding off somewhat for lower prices.

Finished Iron and Steel.—Conditions have been unusually quiet in this district of late, there being little more than the regular business, and buying of jobbers. Building materials hold up steadily, due to the continued activity in construction work throughout the State. Prices on bars are quoted at $2.95 for reinforcing and $2.70 for merchant, f.o.b. cars, San Francisco. One of the most notable jobs now in sight is that for a building in Los Angeles requiring 800 tons of steel. In the heavy materials, plates appear to be the most active, with the price somewhat easier. Certain of the large independents are naming $2.60, against $2.65, delivered, a short time ago. Sheets are unchanged and without special feature. Probably the largest tonnage in the market at present is that for 3400 tons of plates, now being figured on, for oil field work in the Los Angeles section. Deliveries of the various materials are improving, which is tending to settle the market generally.

Old Material.—An upward tendency is manifest, especially in heavy melting steel, which now is quoted close to $14 per gross ton, delivered at consumers' works. Cast iron scrap is held at about $26 per net ton, delivered. The scarcity of materials is the main reason for the firm condition prevailing, since foundry demand is not particularly urgent. The volume of business consummated recently has not been noteworthy.

The Pennsylvania Railroad has undertaken improvements and extensions at its Enola yard near Harrisburg, Pa., to cost $900,000. The work includes the erection of a new steel freight car repair shop, 100 x 620 ft. This company also proposes the installation of extensive waterfront facilities near Norfolk, Va., the improvement including the construction of a freight warehouse and a complete rail-water terminal, the total involving an expenditure of approximately $3,000,000.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Plates

Sheared, tank quality, base, per lb.....2.00c.

Structural Material

Beams, channels, etc.....2.00c.

Iron and Steel Bars

Soft steel bars, base, per lb.....2.00c.
Refined iron bars, base, per lb.....2.60c.

Hot-Rolled Flats

Hoops, base, per lb.....2.90c. to 3.00c.
Bands, base, per lb.....2.90c. to 3.00c.
Strips, base, per lb.....2.90c. to 3.00c.
Cotton ties, per bundle of 45 lb.....$1.14

Cold-Finished Steels

Bars and shafting, base, per lb.....2.50c.
Strips, base, per lb.....4.50c.

Wire Products

Nails, base, per keg.....$2.70
Bright plain wire, base, per 100 lb.....2.45
Annealed fence wire, base, per 100 lb.....2.45
Spring wire, base, per 100 lb.....3.25 to 3.35
Galvanized wire, base, per 100 lb.....2.95
Galvanized barbed, base, per 100 lb.....3.35
Galvanized staples, base, per keg.....3.35
Painted barbed wire, base, per 100 lb.....3.00
Polished staples, base, per keg.....3.00
Cement coated nails, base, per count keg.....2.20
Woven fence, carloads (to jobbers).....70½ per cent off list
Woven fence, carloads (to retailers).....68 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads...60 and 5 per cent off list
Machine bolts, small, cut threads....50 and 10 per cent off list
Machine bolts, larger and longer....50 and 10 per cent off list
Carriage bolts, ⅜ x 6 in.:
Smaller and shorter, rolled threads, 50, 10 and 5 per cent off list
Cut threads.....50 per cent off list
Longer and larger sizes.....50 per cent off list
Lag bolts.....60 and 5 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads....50 and 10 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.:
Smaller and shorter.....45 per cent off list
Larger and longer sizes.....45 per cent off list
Hot pressed square or hex. blank nuts...$3.25 to $3.50 off list
Hot pressed nuts, tapped.....3.25 to 3.50 off list
C.p.c. and t. sq. or hex. nuts, blank.....3.25 to 3.50 off list
C.p.c. and t. sq., or hex. nuts, tapped.....3.25 to 3.50 off list
Semi-finished hex. nuts:
9/16 in. and smaller, U. S. S....75, 10 and 5 per cent off list
⅝ in. and larger, U. S. S.....70, 10 and 2½ per cent off list
Small sizes, S. A. E.....80 and 5 per cent off list
S. A. E., ⅝ in. and larger.....75 and 5 per cent off list
Stove bolts in packages.....80 and 5 per cent off list
Stove bolts in bulk.....80, 5 and 2½ per cent off list
Tire bolts.....50, 10 and 10 per cent off list

Cap and Set Screws

Milled square and hex. head cap screws....75 per cent off list
Milled set screws.....75 per cent off list
Upset cap screws.....75 and 10 per cent off list
Upset set screws.....80 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb.....$3.15
Large boiler rivets, base, per 100 lb.....3.25
Small rivets.....65 per cent off list

Track Equipment

Spikes, 9/16 in. and larger, base, per 100 lb.....$2.75
Spikes, ½ in. and smaller, base, per 100 lb....3.50
Spikes, boat and barge, base, per 100 lb.....3.50
Track bolts, base, per 100 lb.....$3.85 to 4.50
Tie plates, per 100 lb.....2.35
Angle bars, base, per 100 lb.....2.75

Welded Pipe

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	49	23½	¼ to ⅜	+ 7	−33
¼ to ⅜	55	29½	½	26	8
½	60	40½	¾	32	17
¾	64	52½	1 to 1½	34	19
1 to 2	66	54½			

Lap Weld

2	59	47½	2½	32½	17
2½ to 6	63	51½	3 to 4½	34½	21
7 to 8	60	47½	7 to 12	30	17
9 to 12	59	46½			

Butt Weld, extra strong, plain ends

⅛	45	28½	¼ to ⅜	12	18
¼ to ⅜	51	34½	½	25	12
½	54	46½	¾	28	18
¾	62	51½	1 to 1½	34	20
1 to 1½	64	53½			
2 to 3	65	54½			

Lap Weld, extra strong, plain ends

2	57	46½	2½	32	17
2½ to 4	61	50½	2½ to 4	34	21
4½ to 6	60	49½	4½ to 6	32	20
7 to 8	56	43½	7 to 8	24	13
9 to 12	50	37½	9 to 12	20	8

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 and 2½ per cent.

Boiler Tubes

Lap Welded Steel

1¾ in.	21½
2 to 2½ in.	36
2½ to 3 in.	47
3¼ to 13 in.	52

Charcoal Iron

1¼ in.	7
1¾ to 1¾ in.	3
2 to 2¼ in.	13
2½ to 3 in.	18
3¼ to 4½ in.	20

To large buyers of steel tubes a supplementary discount of 5 per cent is allowed.

Standard Commercial Seamless Boiler Tubes

Discounts on cold-drawn tubes in carload lots, f.o.b. Pittsburgh, follow:

1 in.	55	2½ and 2¾ in.	38
1¼ and 1½ in.	47	3 in.	42
1¾ in.	31	3½ to 4 in.	42
2 and 2¼ in.	34	4¼ in. and 5 in.	39

Hot Rolled

3 in.	44	3½ to 4 in.	49

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base.....85 per cent off list
Carbon 0.30 to 0.40, base.....83 per cent off list
Plus usual differentials and extras for cutting.

Seamless Locomotive and Superheater Tubes

Cents per Ft.		Cents per Ft.	
2-in. O.D. 12 gage	14	2¼-in. O.D. 10 gage	19
2-in. O.D. 11 gage	15	3-in. O.D. 7 gage	34
2-in. O.D. 10 gage	16	1½-in. O.D. 9 gage	13¾
2¼-in. O.D. 12 gage	16	5⅝-in. O.D. 9 gage	53
2¼-in. O.D. 11 gage	17	5½-in. O.D. 9 gage	55

Tin Plate

Standard cokes, per base box.....$4.75

Terne Plate

(Per package, 200-lb.)

8-lb. coating	$9.30	25-lb. coating I. C.	$14.25
8-lb. coating I. C.	9.60	30-lb. coating I. C.	16.25
15-lb. coating I. C.	11.80	35-lb. coating I. C.	16.25
20-lb. coating I. C.	13.00	40-lb. coating I. C.	17.25

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....2.50c. to 2.60c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.35c. to 3.50c.
Regular auto body sheets, base, per lb.....4.75c. to 5.00c.

Galvanized

No. 28 (base), per lb.....4.35c. to 4.50c.

Tin-Mill Black Plate

No. 28 (base), per lb.....3.35c. to 3.50c.

Manufacturers have pamphlets, which can be had upon application, giving price differentials for gage and extras for length, width, shearing, etc.

Freight Rates

All rail freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic	$0.325	Buffalo	$0.265	St. Louis	$0.43
Philadelphia, export	0.235	Cleveland	0.215	Kansas City	0.735
Baltimore, domestic	0.315	Cleveland, Youngstown		Kansas City (pipe)	0.705
Baltimore, export	0.225	Comb.	0.19	St. Paul	0.595
New York, domestic	0.34	Detroit	0.295	Omaha	0.735
New York, export	0.255	Cincinnati	0.295	Omaha (pipe)	0.705
Boston, domestic	0.365	Indianapolis	0.31	Denver	1.275
Boston, export	0.255	Chicago	0.34	Denver (pipe)	1.215

Pacific Coast	$1.50	Pac. Coast, ship plates	1.20
Birmingham	0.69	Memphis	0.385
Jacksonville, all rail	0.50	Jacksonville, rail and water	0.415
New Orleans	0.515		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 30c. to 40c.; ship plates, 30c. to 40c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 30c. to 40c.; sheets and tin plates, 50c.; rods, wire rope cable and strands, 75c.; wire fencing, netting and stretcher, 50c.; pipe, not over 8 in. in diameter, 50c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

FABRICATED STEEL BUSINESS

Awards Call for a Round Tonnage and Numerous New Sizable Projects Appear

Among the fabricated steel awards of the past week are the following:

Creedmore (New York State), hospital at Jamaica, N. Y., 1500 tons, to McClintic-Marshall Co.

Apartment building on East Seventy-fifth Street, near Lexington Avenue, New York, 400 tons, to Hay Foundry & Iron Works.

Factory building for George Storm Co. in the Bronx, New York, 200 tons, to Levering & Garrigues Co.

Apartment building on West Sixty-first Street, New York, 400 tons, to A. E. Norton, Inc.

New York Central pier, North River and Forty-sixth Street, New York, 400 tons, to Lehigh Structural Steel Co.

Naval Academy grandstand at Annapolis, Md., 300 tons, to Chesapeake Iron Works.

Government building at Yorktown, Va., 200 tons, to Penn Bridge Co.

Philadelphia & Reading bridge, 125 tons, to McClintic-Marshall Co.

Tanks for Mexican Petroleum Co., 1000 tons, mostly plates, to American Bridge Co.

Third unit, Calumet power station, Commonwealth Edison Co., Chicago, 3500 tons, to McClintic-Marshall Co.

Texas Co., improvements in Oklahoma and Texas, 1300 tons, to Mississippi Valley Structural Steel Co.

Hotel building, Reno, Nev., 450 tons, to Pacific Rolling Mills Co.

Freight house for Gulf, Colorado & Santa Fe Railway, Dallas, Tex., 357 tons, to unidentified fabricator.

Kaw Boiler Works extension, Kansas City, Kan., 288 tons, work to be done by company's own forces.

Transit shed berth 190, City of Los Angeles, Cal., 200 tons, to Austin Co.

Union Terminal Station, Phoenix, Ariz., 178 tons, to unidentified fabricator.

Northern Pacific, repairs to a Mississippi River bridge, 127 tons, to Minneapolis Steel & Machinery Co.

Washington County, Iowa, a 320-ft. deck truss bridge, 124 tons, to Iowa Bridge Co.

St. Louis-San Francisco Railroad, repair parts for bridges, 118 tons, to unidentified fabricator.

Sugar Pine Lumber Co., refuse burner, Fresno, Cal., 102 tons, to unnamed fabricator.

Rock Island Lines, two 60-ft. deck plate girder spans, 100 tons.

Pennsylvania Cement Co., Portland Point, N. Y., addition, 300 tons, to the Kellogg Structural Steel Co., Buffalo.

Eastman Kodak Co., Rochester, N. Y., 200 tons, to Jones & Laughlin Steel Co.

High school, Sharon, Pa., 150 tons, to Kalman Construction Co., Youngstown, Ohio.

Shrine Temple, Memphis, Tenn., 350 tons, general contract to Kaucher & Hodges, steel reported placed with Virginia Bridge & Iron Co.

Cleveland water works pumping station, 1500 tons, Forest City Steel & Iron Co., low bidder.

General Tire & Rubber Co., Akron, Ohio, factory building, 150 tons, to Burger Iron Works.

Structural Projects Pending

Inquiries for structural steel work now being figured on include the following:

Tunnel construction for subways, 1500 tons, Board of Estimate of New York City asking bids.

Public school at Trenton, N. J., 300 tons.

Virginian Railroad, 500 tons, for work at Norfolk, Va.

Life Insurance Co. of Virginia, Richmond, Va., 1500 tons.

Apartment building, Park Avenue and Eighty-seventh Street, New York, 1000 tons.

New York Telephone Co., building on East Ninety-seventh Street, New York, 2400 tons, bids in.

Apartment building at Broadway and Ninety-fifth Street, New York, 400 tons.

South Brooklyn Savings Bank, Brooklyn, 400 tons.

Y. M. C. A. building, Jersey City, N. J., 500 tons.

New Roosevelt Hotel, Madison Avenue, New York, for which the Thompson-Starrett Co. has the general contract, 5000 tons, bids soon to be asked.

Loft building, Thirty-fourth Street, near Seventh Avenue, New York, 400 tons.

Store building for Revillon Freres, Fifth Avenue, New York, 1000 tons.

Apartment building for Dwight P. Robinson & Co., Lexington Avenue, New York, 2000 tons.

Kansas City Southern, extension to erecting shop, Pittsburgh, Kan., 540 tons.

Oak Park Trust & Savings Bank, building, Oak Park, Ill., 250 tons.

Public Library, Cleveland, foundations, 400 tons of sheet piling.

Union League Club, building, Chicago, 3000 tons, plans to be completed about Jan. 1.

Brown Hotel, Louisville, Ky., 2000 tons, plans not completed.

Gymnasium, Fairmount School, Cleveland, 100 tons.

Six steel barges for Mississippi River Commission, 900 tons, estimated, bids being taken.

RAILROAD EQUIPMENT BUYING

Fresh Inquiries for Upward of 7500 Cars and Purchases of 2850 Cars and 67 Locomotives

Purchases of 2850 cars, an addition of 6700 to 8200 cars to the list under more or less active negotiation, and inquiries for 42 locomotives and sales of 67 mark the past week in the buying of railroad equipment. Some of the principal items are the following:

The Rock Island lines have placed 500 box cars with the Western Steel Car & Foundry Co. and 500 gondola cars with the American Car & Foundry Co. and will now receive figures on 250 flat, 500 refrigerator and 250 ballast cars.

The Pere Marquette has asked for revised prices on 2500 cars.

The Union Pacific contemplates the purchase of 5000 refrigerator cars for the Pacific Fruit Express.

The Union Tank Car Co. is inquiring for 500 to 2000 [illegible].

The General American Tank Car Corporation is building 1000 tank cars for its own use.

The Chicago & Northwestern has awarded 800 ore cars to the Pullman Co. and 40 coaches and 10 baggage cars to the American Car & Foundry Co.

The Detroit, Toledo & Ironton is in the market for 500 [illegible].

The New York Central Lines are inquiring for 35 coaches, [illegible].

The Grand Trunk is inquiring for 10 Santa Fe and 10 [illegible].

The Duluth & Iron Range placed 3 Mikado type engines with the [illegible].

The Baltimore & Ohio ordered 5 Mikado type engines from the Baldwin Locomotive Works.

The Oliver Iron Mining Co. contemplates buying 10 switch [illegible].

The Sugar Land Lumber Co. placed 2 switch engines with the American Locomotive Co.

The Georgia Railway is inquiring for 5 Mikado type locomotives.

The Richmond, Fredericksburg & Potomac is in the market for 2 engines.

The Central Railroad of New Jersey is inquiring for 5 Pacific type engines and has ordered 10 Mikado locomotives from the American Locomotive Co.

The Seaboard Air Line has ordered 1 four-wheel switching locomotive, 1 Mikado type locomotive, 1 six-wheel switching locomotive and 2 consolidation type locomotives from the American Locomotive Co.

The General Electric Co. has ordered 10 electric type locomotives for the Mexican Railway Co., Ltd., from the American Locomotive Co.

The Western Pacific has ordered 6 Mikado type locomotives from the American Locomotive Co.

The Pere Marquette Railroad has ordered 20 eight-wheel switching locomotives from the American Locomotive Co.

The Montour Railway Co. has ordered 4 Mikado type locomotives from the American Locomotive Co.

The Villa Non-Atocha Railroad of Chile and the Villa Non-Atocha Railroad of the Argentine have each ordered one Mikado type locomotive from the American Locomotive Co.

The Canadian National Railways' plans are gradually taking shape for the construction of 3000 freight cars and 700 refrigerator cars, and orders for 2000 freight cars are expected from the Canadian Pacific Railway.

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
Nov.	Lake	Electrolytic*	New York	New York	St. Louis	New York	St. Louis
8.....	14.12½	13.62½	36.87½	7.15	6.85	7.47½	7.12½
9.....	14.12½	13.62½	37.37½	7.15	6.85	7.55	7.20
10.....	14.12½	13.62½	37.37½	7.15	6.85	7.60	7.25
11.....	14.12½	13.62½	.....	7.20	6.90	7.60	7.25
13.....	14.12½	13.62½	37.12½	7.25	6.90	7.60	7.25
14.....	14.12½	13.62½	36.87½	7.25	6.90	7.60	7.25

*Refinery quotation.

New York

NEW YORK, Nov. 14.

Most of the markets are fairly active and strong. A firmer tone prevails in the copper market. There has been further buying of tin at slightly lower prices. The lead and zinc markets continue to advance.

Copper.—All evidences point to the elimination of the low price for electrolytic copper which has been a disturbing factor in the market for several weeks. It is generally conceded that for early delivery it cannot be obtained at less than 13.62½c., refinery, or 13.87½c., delivered, which we quote as the market. Some producers are asking 14c., delivered, but with little success. Export business recently has been very good and domestic consumers are also more interested with the result that sales have been heavier. All indications, including the statistical position, point to a firmer market. Lake copper is quoted at 14c. to 14.25c., delivered.

Tin.—The Straits tin market has been spotty with dull days interspersed with active days. The largest business of the week was done on Wednesday, Nov. 8, when about 500 tons changed hands at prices ranging from 36.75c. to 37c. Consumers in the Pittsburgh district were the heaviest buyers at the lowest price, with dealers taking some of the business. The metal sold was mostly ex-steamer at dock or afloat. About 150 tons of November-December metal was sold on the following day. The London market has declined sharply from the recent high levels with spot standard quoted to-day at £180, future standards at £180 15s. and spot Straits at £181 12s. 6d., all about £7 per ton below prices prevailing a week ago. In a dull market here to-day spot Straits tin was quoted at 36.87½c., New York. Arrivals thus far this month have been 1135 tons, with 9590 tons reported afloat.

Lead.—The situation is still as tight as at any time and the metal is very scarce for November, and supplies none too large for December, bookings for the latter month now being made. In the week the outside market has advanced to 6.90c., St. Louis, or 7.25c., New York, but the quotations of the leading interest remain unchanged at 6.80c., St. Louis, or 7c., New York.

Zinc.—Prices for prime Western zinc have again advanced to the highest levels of the year at 7.30c., St. Louis, or 7.65c., New York. Several factors are the cause of this. Domestic buying is fairly good, both by galvanizers and brass makers, but more important are the sales to Great Britain, which now approximate 11,000 tons. The statistical position is also a factor, shipments having been very heavy in October and stocks having been further reduced. The first of the year surplus stocks of zinc were about 64,000 tons which have been reduced now to around 18,000 tons.

Antimony.—The market is dull and Chinese metal for early delivery is quoted at 6.80c., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, made by foreign producers, is available from importers at about 21c. per lb., New York, duty paid. The leading producer is understood to have advanced its price 1c. per lb., bu it still refrains from making public its selling price.

Old Metals.—The market is firmer and business more active. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	13.375
Copper, heavy and wire	12.50
Copper, light and bottoms	11.25
Heavy machine composition	10.25
Brass, heavy	8.25
Brass, light	6.50
No. 1 red brass or composition turnings	9.50
No. 1 yellow rod brass turnings	7.75
Lead, heavy	6.25
Lead, tea	4.75
Zinc	4.75

Chicago

Nov. 14.—Copper, lead and zinc have advanced. Offerings of zinc and lead are limited and it is asserted that stocks are low. Consumer buying, however, is not heavy. In tin, speculation is still the rule with trading confined largely to dealers. Antimony is exceedingly quiet. Old metal prices are unchanged. We quote, in carload lots, lake copper, 14.37½c.; tin, 38c. to 39c.; lead, 7.05c.; spelter, 7.40c.; antimony, 8.50c., in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 11.50c.; copper bottoms, 9.75c.; red brass, 9c.; yellow brass, 7c.; lead pipe, 5c.; zinc, 4.75c.; pewter, No. 1, 23c.; tin foil, 26c.; block tin, 30c., all buying prices for less than carload lots.

St. Louis

Nov. 13.—Both lead and zinc continue to advance. We quote carlots, lead 6.90c.; slab zinc, 7.20c. to 7.25c. On old metals we quote: Light brass, 3.50c.; heavy red brass and light copper, 7c.; heavy yellow brass, 4c.; heavy copper and copper wire, 7.50c.; zinc, 2c.; pewter, 15c.; tin foil, 20c.; tea lead, 2c., and aluminum, 9c.

Rome Meeting of International Chamber of Commerce

Among those who have booked for participation in the meeting at Rome, Italy, March 19-26, 1923, of the International Chamber of Commerce are the following: Capt. George P. Blow, chairman of the board, Western Clock Co., LaSalle Ill.; A. J. Brosseau, president International Motor Co., New York; William Butterworth, president Deere & Co., Moline, Ill.; A. B. Farquhar, president A. B. Farquhar Co., Ltd., York, Pa.; Frank L. Fay, Greenville Steel Car Co., Greenville, Pa.; John M. Glenn, secretary Illinois Manufacturers' Association, Chicago; Clarence H. Howard, president Commonwealth Steel Co., St. Louis; Edward N. Hurley, president Hurley Machine Co., Chicago; R. P. Lamont, president American Steel Foundries, Chicago; Adolph Mueller, president H. Mueller Mfg. Co., Decatur, Ill.; Augustus L. Searle, Globe Elevator Co., Minneapolis; Alvan T. Simonds, president Simonds Mfg. Co., Fitchburg, Mass.

The American delegation to the Rome meeting is scheduled to leave New York on the Caronia, Feb. 10, 1923. Besides a cruise of the Mediterranean, with arrangements to go to Egypt and Palestine, the tour includes a trip through Italy after the meeting and then to principal cities in Switzerland, Germany, Belgium, ending up in a number of days in Paris and London, and leaving Southampton on April 28 to arrive in New York on May 5. Lacey C. Zapf, secretary of the American section of the International Chamber, Mills Building, Washington, is in charge.

In THE IRON AGE of Nov. 2, page 1192, it was stated that the Mid-City Foundry Corporation had leased the plant of Henry E. Pridmore, Inc., Chicago, manufacturer of molding machines. It should have been explained in that connection that while the Mid-City company has leased a foundry at Nineteenth and South Rockwell Streets, Chicago, its operations do not interfere with those of the Pridmore company in any respect.

PERSONAL

E. G. Buckwell retired Nov. 1 from active connection with the Cleveland Twist Drill Co., Cleveland, with which he has been associated since 1899. He has been sales manager of the company 23 years and also secretary since 1904. He will retain his interests in the company. W. E. Caldwell, who has been connected with the Twist Drill company since 1901, and has been assistant sales manager since 1916, has succeeded Mr. Buckwell as sales manager. Harry Jenson, who has been associated with the company many years and formerly represented it in Philadelphia territory, has been appointed assistant sales manager. George Kast, the treasurer, has been made secretary-treasurer, taking on the additional work of the secretary's office previously handled by Mr. Buckwell. Before his connection with the Cleveland Twist Drill Co., Mr. Buckwell was a member of the retail hardware firm of McClung, Buffet & Buckwell, Knoxville, Tenn. Previous to this business association, he was a hardware traveling salesman for Sargent & Co. During the early years of his connection with the Cleveland Twist Drill Co., he spent considerable time on the road and had a wide acquaintance among hardware jobbers and mill supply houses.



E. G. BUCKWELL

Robert G. Berrington has been appointed Philadelphia district sales agent of the Cleveland Twist Drill Co., succeeding Harry Jenson, who has become assistant sales manager. Mr. Berrington has been connected with the sales department of the company for 13 years, representing its interests in the Central States and Canada, but resigned two years ago to act as sales agent for a line of machine tools in the Cleveland territory.

Charles E. Beeson, who on Nov. 1 was elected a vice-president of the Pittsburgh Steel Co., has been identified with that company since its organization in 1901, having been its first secretary and holding that office until about two years ago. For the past three years, Mr. Beeson has been a director and a member of the executive committee. He was graduated from Sheffield Scientific School, Yale University, and for four years following his graduation conducted the general store of his father in Uniontown, Pa., which had been in the family for 114 years. He sold out this business in 1896 and became associated with the late Wallace H. Rowe in the Consolidated Steel & Wire Co., later absorbed by the American Steel & Wire Co. of Illinois, and went along with Mr. Rowe in the organization of the Pittsburgh Steel Co.



CHARLES E. BEESON

Frank Kilmer, treasurer Wickwire-Spencer Steel Corporation, New York and Worcester, Mass., has resigned. Owing to the establishment of the corporation's headquarters at New York, it would have been necessary for Mr. Kilmer to leave Worcester, which he preferred not to do. He will spend the winter in Florida.

J. F. Hulse, formerly connected with the Consolidated Steel Corporation and the Trumbull Steel Co., has been assigned to the New York sales office of the latter at 3846 Grand Central Terminal, New York.

W. C. Reitz has been elected a director of the Pittsburgh Steel Co., taking the place of the late William A. Nash, New York. Mr. Reitz is secretary and treasurer of the Pittsburgh Steel Products Co., an associated interest of the Pittsburgh Steel Co.

E. E. Maher has been appointed district sales manager of the Standard Turbine Corporation, Wellsville, N. Y., with offices at 2237 Insurance Exchange Building, Chicago. The Chicago office will handle business for the greater part of Indiana, Illinois and Iowa. The Standard Turbine Corporation is incorporated under the laws of New York, and manufactures steam turbines exclusively. J. Y. Dahlstrand, formerly associated in engineering capacities with the Allis-Chalmers Mfg. Co., Westinghouse Electric & Mfg. Co. and Kerr Turbine Co., is chief engineer and manager.

David T. Buffington, whose appointment as manager of sales in the Chicago district for the Illinois Steel Co., and special sales agent in the same territory for the Carnegie Steel Co., was recently announced, is a native of Covington, Ky. He attended Kentucky Wesleyan College, Millersburg, Ky., and before entering the steel business conducted a stock farm in Kentucky for several years. He has been in the general sales department of the Illinois Steel Co. at Chicago for 20 years, soliciting the trade of fabricators, carbuilders and others, paying particular attention to the carbuilders. As manager of sales in the Chicago district of that company and special sales agent for the Carnegie Steel Co., he continues to have his headquarters at Chicago.



DAVID T. BUFFINGTON

Allan L. Cowperthwaite, foreman of the Goddard Works, Wickwire-Spencer Steel Corporation, Worcester, Mass., will become superintendent of the wire works to be erected at Dorchester, Boston, by George M. Thompson, formerly vice-president and general manager Wickwire-Spencer Steel Corporation. Other officials are expected to go with Mr. Thompson when his new plant is ready for operation.

A. M. Kreuger, who has been connected with the American Hoist & Derrick Co., St. Paul, Minn., American Engineering Co., Philadelphia, and more recently in selling for Maris Brothers, Philadelphia, has been appointed to the New York district sales office of the Pawling & Harnischfeger Co., 50 Church Street. Another recent appointment to the sales force in New York is John J. Kennedy, recently with the Westinghouse Electric & Mfg. Co., and prior to that associated with the General Ordnance Co., New York, in charge of foreign sales, and the Chile Exploration Co., Chuquicamata, Chile. S. I. Roth continues as New York district manager. W. J. Henry, at one time construction engineer with Westinghouse, Church, Kerr, Inc., and more recently highway engineer for the New York State Department of Highways, has been appointed to the Philadelphia office of the company, which is in charge of T. E. Gallagher.

F. S. Blackwood has resigned as manager of the Farrell-Cheek Steel Foundry Co., Sandusky, Ohio, effective Jan. 1, to become president and general manager of the Blackwood Electric Steel Corporation, Parkersburg, W. Va.

C. H. Gale, superintendent of foundries, Pressed Steel Car Co., McKees Rocks, Pa., will retire from active business after nearly 50 years in foundry work. Mr. Gale has been with the Pressed Steel Car Co. for 18 years, and previously had been associated with the International Harvester Co., having worked in its foundries at Chicago, Hamilton, Ontario, and Springfield, Ohio, while his first connection with the industry was with the Detroit Malleable Iron Co. He has been an active figure in foundry circles and has contributed a number of papers at conventions of foundrymen. Mr. Gale plans to spend the coming winter in Florida and to devote much of his time to travel.

William H. Blount, superintendent Sleeper & Hartley, Inc., Worcester, Mass., wire drawing machinery, has resigned for the purpose of devoting his entire attention to the affairs of the Arey & Blount Electric Co., recently organized to manufacture electric flashlights.

Ogden R. Adams, Rochester, N. Y., for the past 18 months associated with the Seneca Falls Mfg. Co., Inc., in the capacity of president and general manager, has severed his connection with that company and will devote his entire time to business interests in Rochester, Buffalo and Syracuse.

A. J. Lindemann, president A. J. Lindemann & Hoverson Co., Milwaukee, manufacturer of stoves and ranges, has returned from a three-months' business and pleasure tour of the British Isles and the Continent.

R. M. Young takes over the Philadelphia territory of the Lancaster Steel Products Corporation, with offices in the Franklin Trust Building. Mr. Young's territory will include New Jersey up to and including Trenton; Pennsylvania, excepting the northwestern portion; Maryland, Delaware and West Virginia. Mr. Young comes to his new post from a large mechanical specialty company for which he was assistant manager in the Philadelphia district.

W. H. Bruening, for the past four years factory manager of the Kellogg Mfg. Co., Rochester, N. Y., has resigned to become a partner in the Vogt Tool Works, 46 Stone Street, Rochester. He has had considerable experience as executive in industrial plants, having been connected with the Cadillac Motor Car Co., for several years, previous to 1906 when he came to Rochester as factory engineer with the General Railway Signal Co. In 1912 he resigned to become factory superintendent of the North East Electric Co., joining the Kellogg company in 1918.

John K. Boll, for many years sales manager, Page Steel & Wire Co., has resigned to accept an important position with the Wheeling Steel Products Co., which will sell the output of the new rod and wire mills of the Whitaker Glessner Co., now nearing completion at Portsmouth, Ohio. Mr. Boll will assume his new duties Nov. 16.

F. F. Rohrer, assistant to manager in the power and railroad departments, Westinghouse Electric & Mfg. Co., has been appointed general contract manager of the company. Mr. Rohrer will have general supervision of all contract and order work. He was born in Harrisburg, Pa., April 22, 1876, and entered the employ of the Westinghouse company as a student in 1896. During the World War, Mr. Rohrer was a member of the committee of the War Industries Board appointed to conserve the production of turbine-generating equipment for Government needs.

Walter H. Woods has been appointed sales engineer in the Detroit territory of the motor bearing division, Hyatt Roller Bearing Co.

W. H. Warren, formerly general manager of the Brier Hill Steel Co., Youngstown, Ohio, has been appointed general superintendent of the Trumbull Steel Co., Warren, Ohio, in full charge of all operations.

W. W. Sayers, who for many years has represented the Link-Belt Co., 910 South Michigan Avenue, Chicago, in the home territory, and later took charge of the locomotive crane department, has been promoted to chief engineer of the company's Philadelphia works and Eastern operations. His future headquarters will be at the Philadelphia office.

William G. Stowell, formerly production manager, Coffield Washer Co., Dayton, Ohio, has been appointed vice-president. Other changes of personnel in the company are as follows: Edward P. Becker, who formerly held sales positions with the Electric Appliance Co., Pittsburgh, and the Chicago Washing Machine Co., Chicago, becomes sales manager. Harry W. Hoskinson, formerly superintendent of machine works, has been promoted to factory production manager.

William H. Warren, formerly general manager of Brier Hill Steel Co., Youngstown, and previously with the Gary Works of the United States Steel Corporation, has been appointed general manager of the Trumbull Steel Co., Warren, Ohio.

Charles M. Schwab and Eugene Grace, chairman and president Bethlehem Steel Co., were the guests of honor of Samuel Mather, honorary chairman of the Cleveland Community Fund, at the Union Club in that city Monday, and addressed officers and teamworkers of the community fund. Tuesday evening the two Bethlehem officers addressed the Cleveland Bankers' Association.

OBITUARY

J. E. SNYDER, vice-president Hess-Snyder Co., Massillon, Ohio, manufacturer of stoves and heating furnaces, died recently, aged 77 years.

THOMAS JOHNSTON, pioneer maker of refractories, organizer of the Apollo Fire Brick Co., in which the late Andrew Carnegie and his brother, Thomas, were interested, died at his home in Apollo, Pa., on Nov. 6. Mr. Johnston was later associated with the Climax Fire Brick Co., Climax, Pa., and in 1903 organized the Apollo Silica Brick Co. He was 91 years old.

W. D. NORTON, president Norton Broadway Machinery Co., Cincinnati, dealer in new and second-hand machinery, died on Nov. 7 at Magnetic Springs, Ohio, where he had been undergoing treatment for a nervous ailment.

THOMAS S. PATTERSON, veteran employee McKeesport, Pa., Works, National Tube Co., died at his home in that city Nov. 13. He was born in Jedburgh, Scotland, 77 years ago, and came to this country in 1870, settling in Boston and entering the employ of the National Tube Co., that year. He went to McKeesport when the company located there in 1872 and had charge of the machine shop for 37 years. His nephew, P. C. Patterson, is chief engineer National Tube Co.

EDWARD B. ALSOP, active several years ago in the steel and metal trades in Pittsburgh, died at his home in Washington, D. C., Nov. 12. He retired from active business about 20 years ago, but previously had been identified with C. G. Hussey & Co., copper products; The Hussey-Binns Shovel Co., and the Hussey-Howe Steel Co., which was absorbed by the Crucible Steel Co. of America. Mr. Alsop was born in Philadelphia in 1835, but went to Pittsburgh as a young man and made his home in that city until 15 years ago.

PORTER MCMILLEN, for many years identified with the pig iron industry, died at his home in Detroit on Tuesday, Oct. 31. Mr. McMillen was born near Wellston, Ohio, and was 58 years of age. For several years, beginning in 1886, he was superintendent of the Wellston Iron & Steel Co. and later became connected with the Detroit Furnace Co. as general manager from 1906 to 1908. When this company was taken over by the Detroit Iron & Steel Co., Mr. McMillen was retained in an executive capacity until the plant was dismantled in 1919.

British Iron and Steel Market

American Buying of Pig Iron Almost Over—Tin Plate Stronger—Continental Market Weaker, Due to Exchange Demoralization

(By Cable)

LONDON, ENGLAND, Nov. 14.

Pig iron is easier, owing to cheaper fuel and a cessation of substantial American buying, but America is still purchasing moderate parcels of special grades for shipment up to March. Home demand is improving and consumers are placing forward contracts, realizing that a price decrease is now improbable. Two more Cleveland furnaces were started up last week.

Hematite is steady on the expansion of home business and a fair export demand. Prompt iron is still scarce. Makers are well sold out, as America made fresh purchases last week.

Foreign ore is weaker. Bilbao Rubio is 21¾s. to 22s. ($4.85 to $4.91) compared with 22½s. to 22¾s. ($5.02 to $5.08) last week, both ex-ship Tees.

Steel prices are unaltered and the general position is unchanged, though there has been improved inquiry for finished iron and steel. But the works are still in want of orders. While there are practically no price decreases, makers are granting concessions on extras, owing to the keen rivalry to secure business.

Orders for more boats are being placed by the Orient Line; Vickers is already building one 20,000-ton ship for the line. South Africa has been buying mining stores. The Indian bids were too low and Australia is quiet.

Continental material is a difficult proposition, owing to exchange fluctuations. Merchants' and works' prices show great variations. Sheet bars are being sold at £5 5s. ($23.42) c.i.f. United Kingdom and billets at £5 to £5 5s. ($22.30 to $23.42) f.o.b. Merchant bars are selling at £5 17½s. (1.17c. per lb.) f.o.b. India and China have made small purchases of merchant bars, but overseas customers generally are getting nervous [at the instability of prices].

Tin plate makers have advanced the minimum basis selling price by 3d. to 19½s. ($4.35) f.o.b. until February. The market is firm but general business is quieter on less merchant buying. There have been continued speculative dealings and export sales have improved, Canada having inquired for large quantities. Large oil plate inquiries, running into 250,000 boxes, have been placed already, in part, in Wales, at 19½s. basis f.o.b. for January to March delivery. Tin plate bars (sheet bar) have been advanced to £7 10s. ($33.45) delivered in January to March, with 7½s. ($1.67) rebate.

Galvanized sheets are firm on increased sales and higher costs, some works being off the market, and January shipment the earliest offering. South America is the best buyer, while last week the Far East was buying substantial quantities.

Japan specification black sheets have been sold for February and March shipment at £15 10s. (3.09c. per lb.) f.o.b. The works are well booked up, and cannot offer earlier shipment except for the thicker gages. Other markets are quiet.

October exports of pig iron of all kinds amounted to 129,959 tons, of which the United States took 92,153 tons (71 per cent). The total exports of iron and steel aggregated 347,128 tons.

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $4.46 per £1, as follows:

Durham coke, delivered	£1	9½s.	to	£1	10½s.	$6.58	to	$6.80
Cleveland No. 1 foundry	4	17½				21.74		
Cleveland No. 3 foundry	4	12½				20.63		
Cleveland No. 4 foundry	4	10				20.07		
Cleveland No. 4 forge	4	5				18.96		
Cleveland basic	4	0				17.84		
East Coast mixed	4	13½				20.85		
Ferromanganese	15	0				66.90		
Ferromanganese*	14	10	to	14	15	61.87	to	65.79
Rails, 60 lb. and up	7	5	to	8	0	32.54	to	35.68
Billets	6	15	to	7	0	30.19	to	31.22
Sheet and tin plate bars, Welsh	7	0	to	7	7½	31.22	to	32.89
Tin plates, base box	0	19½	to	0	19¾	4.35	to	4.41
						C. per Lb.		
Ship plates	8	10	to	9	0	1.69	to	1.79
Boiler plates	11	10	to	12	0	2.29	to	2.39
Tees	9	0	to	9	10	1.79	to	1.89
Channels	8	5	to	8	15	1.64	to	1.74
Beams	8	5	to	8	15	1.64	to	1.74
Round bars, ¾ to 3 in.	9	0	to	9	10	1.79	to	1.89
Galvanized sheets, 24 g.	17	7½	to	17	10	3.46	to	3.48
Black sheets, 24 gage	11	15				2.34		
Black sheets, Japanese specifications	15	5				3.04		
Steel hoops	11	0	&	11	10*	2.19	&	2.29*
Cold rolled steel strip, 20 g.	23	2½				4.61		
Cotton ties, Indian specifications	15	0				2.99		

*Export price.

Continental Prices, All F. O. B. Channel Ports, Delivery as Specified

No. 3 foundry pig iron:								
Belgium, Jan.	£4	0s.				$17.84		
Luxemburg, Jan.	4	0				17.84		
France, Jan.	4	0				17.84		
Billets:								
France, Jan.	5	0	to	£5	2s.	22.30	to	$22.75
Luxemburg, Jan.	5	0	to	5	2	22.30	to	22.75
Lorraine, Jan.	5	0	to	5	2	22.30	to	22.75
Wire nails (keg basis):								
Germany	0	14½				3.23		
Belgium	0	20½				4.57		
Wire rods, 5 mm. (0.2 in.):								
Belgium	7	5	to	10	7½	32.34	to	46.27
						C. per Lb.		
Angles:								
Belgium, Sept.	7	7½				1.47		
Tees:								
Belgium	8	5				1.64		
Merchant bars:								
Belgium, Feb., Mar.	6	10	to	6	12½	1.29	to	1.32
Luxemburg, Jan.	7	0	to	7	2½	1.39	to	1.42
France, Jan.	7	0	to	7	2½	1.39	to	1.42
Germany, Dec., Jan.	6	0	to	6	5	1.19	to	1.24
Joists (beams):								
France, Jan.	6	0	to	6	2½	1.19	to	1.22
Belgium, Jan.	5	15	to	6	0	1.15	to	1.19
Luxemburg, Jan.	6	0	to	6	2½	1.19	to	1.22
Channels:								
Belgium	7	10	to	7	12½	1.49	to	1.52
⅜-in. plates:								
Germany, Dec., Jan.	6	10	to	6	12½	1.29	to	1.32
Belgium, Jan.	6	12½				1.32		
Luxemburg, Jan.	6	12½	to	6	15	1.32	to	1.34
France, Jan.	6	12½	to	6	15	1.32	to	1.34
No. 8 gage wire:								
Belgium	14	10s.				2.89		

Fuel Advancing—American Pig Iron Demand Less—Tin Plate and Galvanized Sheet Demand Good

LONDON, ENGLAND, Nov. 3.—The pig iron market has been somewhat quieter. We hear less of demand from America, which has apparently ceased—that is to say, so far as the better grades of foundry iron are concerned, but makers are not in any way perturbed by this, as they will be busy for the rest of the year, and even into early next year, on current contracts for shipment across the Atlantic. Fuel prices will continue to rise.

In finished iron and steel there is not much of an encouraging nature. The demand in general still leaves a tremendous amount of room for improvement. Consumers naturally are kicking against the prices ruling but, while costs are advancing, it is of course invidious to expect the steel makers to sell at still further losses.

A good deal of business has been moving in tinplates since makers agreed to fix a minimum selling price of 19s. 3d. I. C. f.o.b. Wales, and with tin prices moving upward of late, it looks as if tinplates will go higher. In the galvanized sheet trade business is improving, though the bulk of the orders taken are still far from the normal size, but the aggregate amount being booked by makers is quite satisfactory and some works are now sold out for the rest of the year.

SHOP LABOR PROBLEMS

Topics Discussed at Meeting of National Personnel Association at Pittsburgh

The human factor in industry and commerce was the dominant topic of the first annual convention of the National Personnel Association, held in Pittsburgh, Nov. 8, 9 and 10, which brought together a gathering of 400 men and women, enthusiasts in the study, understanding and dissemination of the principles, policies and methods of creating and maintaining human relations between those who employ and those who are employed. The association is new in name only, for it has taken over and combined the activities of the National Association of Corporation Training and the Industrial Relations Association of America, which inaugurated the work, now to assume a broader scope, nine or ten years ago.

Censure for Immigration Law

Immigrations laws came in for severe censure, particularly by J. M. Larkin, assistant to the president, Bethlehem Steel Corporation, who spoke at the general session on the afternoon of Nov. 9, when the general subject was "Our Immigration Policy and Its Social and Economic Effects." Mr. Larkin said that the shortage of laborers, especially in the Eastern states, was entirely due to the restrictions of the existing immigrations laws. He gave figures to support the contention that the lack of unskilled workmen was making impossible the normal readjustment of industrial production. Mr. Larkin was for letting down the bars, but with the proviso that immigrants be examined as to their desirability in their native land before embarkation. There also was condemnation of the law at the round table discussion on "Training Immigrant Workers," on the morning of Nov. 8. One speaker declared the country would be a tranquil place if there was the same observance of all laws as there is of the "3 per cent quota" restriction on immigration.

Training Immigrant Workmen

Round tables on the subject of training attracted rather large groups and were productive of much discussion. In the training of immigrant workmen, it was stressed that the teaching of English to the foreigner was important in that work was done better when the workman understood what he was told and thereby became more valuable, both to himself and his employer.

Training of the workman from abroad was fundamentally a public school function, but that in this effort industry should co-operate. Shop schools were helpful to making citizens out of the immigrant workmen, one speaker stating that out of a class of 700 or 800 conducted by the Ryan Car Co., Chicago, 189 took out citizenship papers. Americanization efforts were criticized in that in not a few cases too much of the money allotted for such work went to the directors and too little to the teachers.

Another round table that was highly interesting was that on "Shop Training," on the morning of Nov. 9, at which Dean R. L. Sackett, Pennsylvania State College, presided, and discussion was led by Stanley Zweible, Nordyke & Marmon Co., Indianapolis. Mr. Zweible said his company trained its men on regular production, and it had attained a fairly high rate of efficiency from those in training, with less loss than if the shop school was conducted as a separate unit and the product wasted. The men were taught simple blueprint reading and mathematics only when necessary. There was an admission that the production of boys who were not "shop wise" frequently exceeded that of the trained men. This was viewed as dangerous practice by one speaker, but controverted by another, who contended that it was good management to allow the boys to do all they were able to do.

A question as to whether the objective of shop training should be for specialists or all-round mechanics developed that railroad shops required the latter type, while large scale work called for specialists. It was also brought out that if the effort were directed at turning out all-round men, there could not fail to be a good crop of specialists. The place for training was the shop and the need of capable teachers was stressed.

Teachers for Apprentices

On the subject of "Trade Apprenticeship Progress," speakers urged the need of the proper point of view of teachers. The school should be in the industry and not industry in the school. The best teachers were those trained in industry having the point of view of industry. It was suggested that funds made available by Smith-Hughes law be sought for in training industry school teachers. Apprenticeship should not be thought of in terms of time service, since this puts the nimble-witted boy at a disadvantage and moreover makes the apprenticeship unattractive, since to the average boy the dollar of to-day looms bigger than the dollars of to-morrow. State apprenticeship laws did not strike a popular chord, chiefly because of the fear of politics in their administration.

Other subjects discussed included: Psychological Tests; Employment and Labor Turnover; Economics for Employees; Health Education; Pension Plans; Job Analysis; Developing Men for Executive Positions; Personnel Problems of Small Offices; Foremen Training and Employee Publication.

ENLARGING ACTIVITIES

American Malleable Castings Association Will Enter New Fields

The American Malleable Castings Association has enlarged its field of activity for the benefit of its members and of the malleable foundry industry by the appointment of a shop practice committee which will investigate various subjects connected with the manufacture of malleable castings with a view of determining and reporting what are the best shop practices. The activities of the research committee of the association are largely along metallurgical lines. The shop practice committee, which will be a sub-committee of a research committee, will consider the more practical shop problems. H. D. Hunter, Dayton Malleable Iron Co., Dayton, Ohio, chairman of the research committee, will also act as chairman of the shop practice committee.

The shop practice committee which consists of 15 members has grouped the various subjects under eight general headings. The headings have sub-divisions covering various phases of that particular subject. The groups adopted and the sub-divisions were as follows: 1. Annealing: a, annealing practice; b, annealing ovens; c, scaled castings. 2. Casting Defects: a, shrinks; b, hard iron cracks; c, slag inclusions; d, pattern design; e, welding. 3. Sand: a, molding sand; b, core sand; c, binders; d, core oils. 4. Refractories: a, firebrick and other furnace and oven refractories. 5. Framed Castings. 6. Oil Burning: a, melting; b, annealing; c, other applications. 7. Finishing Castings: a, cleaning; b, grinding. 8. Galvanizing.

Selected for Study

It was decided that at the start five of the eight general subjects should be selected for study and that the remaining three together with others that might be suggested later should not be taken up until some progress has been made on the five subjects assigned. The three subjects which will not be taken up until later as decided by vote as being of lesser importance are finishing castings, oil burning and galvanizing.

Each subject is to be handled by a sub-committee of three members of the committee of 15. In appointing these sub-committees the association has aimed to place at their heads men who have made a special study of the subjects assigned to that particular sub-committee. The association members agreed to co-operate to their fullest extent in supplying the sub-committee with

the results of any research work they have made, or with any other information that would be of assistance to the committee.

It was decided that in the majority of cases the members of the committees could keep in touch with each other by correspondence and that actual meetings would not be necessary except at such times as sufficient data had been compiled to warrant a meeting in order to discuss the information obtained and embody it in either a preliminary report or in a final report to the committee. The shop practice committee has recommended to the research committee that the shop practice committee as a whole hold quarterly meetings to review the work of the various sub-committees and that these meetings be held at the same time and place as the regular quarterly meetings of the association. The shop practice committee also recommended that the research committee consider the advisability of collecting data for members relative to the importance of principal supplies that are used per ton of castings produced. These data are to include such items as coal per ton of iron melted, coal per ton of iron annealed, firebrick per ton of iron melted, sand per ton of iron produced and information as to the consumption of other major supplies that have a definite bearing on the cost of castings.

In line with the work just started by the association, a report of the galvanizing of malleable castings is being prepared by W. R. Bean, Eastern Malleable Iron Co., which will be presented shortly to the research committee. This report will contain results of research work started long before the appointment of the shop practice committee.

Plant Safety Work

The association has also recently appointed a plant safety committee which will investigate all accidents of a more serious nature in malleable foundries and will issue reports giving details of each accident and suggesting means for preventing similar accidents. This committee consists of Donald E. Willard, Decatur Malleable Iron Co., Chicago; Otto J. Fehling, National Malleable Castings Co., Chicago., and E. Mannweiler, Eastern Malleable Iron Co., Naugatuck, Conn. This committee has prepared its first report covering three accidents in foundry grinding departments. A study of these accidents brought out the following suggestions that are embodied in the committee's first report:

Revolving Shafts: It is imperative that the revolving end of the shafts be covered so that men working on adjacent wheels or otherwise near the ends of the shafts will not become entangled and seriously injured.

Guards: Emery wheel guards must necessarily be constructed of sufficiently heavy material to restrain the flying parts of broken wheels and in addition to this the guards must be so securely fastened to prevent their revolving in case of the wheel fragment becoming jammed.

Balance: A wheel should be balanced when originally used and tested for balance occasionally, as it is worn down.

Work Rest: The rest should be placed as close as possible to the wheel to prevent parts being caught between the rest and the wheel.

Storage: Emery wheels should be stored in dry places and should be supported on end in the racks. Straight-sided shellac and rubber-bonded wheels of ¼ in. or less in thickness shall be laid flat on a straight surface to prevent warpage.

Inspection: Wheels, before being placed in service, should be inspected for cracks. This can be done by tapping gently with a light instrument, and if they sound cracked, they should not be used. All new wheels should be run for at least one minute at full speed.

A cold wheel should be warmed up gradually before the work is applied with great force, as the sudden heating of the wheel very often causes it to crack.

Spring Meeting of American Electrochemists

The forty-third semi-annual meeting of the American Electrochemical Society will be held in New York, Hotel Commodore, May 3 to 5, 1923.

The principal attraction of the technical program will be a whole day session on the general topic: "The Production and Application of the Rarer Metals." The arrangements for this session are in charge of Dr. F. M. Becket, Electrometallurgical Corporation, New York. There will be papers on vanadium, tungsten, cobalt, molybdenum, zirconium, cerium, uranium, tantalum, calcium, magnesium, and others. Among the speakers will be: H. N. McCoy, president Carnotite Reduction Co., Chicago; H. W. Gillett, Bureau of Mines, Ithaca, N. Y.; B. D. Saklatwalla, Vanadium Corporation of America, Pittsburgh; F. E. Carter, Baker Platinum Works, Newark, N. J. (paper on platinum); H. S. Cooper (paper on zirconium metal); J. A. Holladay, Electrometallurgical Corporation (paper on analyses); M. A. Hunter, Rensselaer Polytechnic Institute, Troy, N. Y. (two papers, one on titanium); Mr. Clancy (paper on alloys as catalyzers); Mr. Cutter of the Climax Molybdenum Co.; Russel Lowe, Bario Metal Corporation (paper on bario metal); Colin G. Fink, secretary of the society (paper on tungsten); C. E. Minor, Aravaipo Leasing Co., Klondyke, Graham Co., Ariz.; W. R. Whitney, Director of Research Laboratories, General Electric Co., Schenectady, N. Y.

Another session will be devoted to a discussion of "Electrode Potentials," headed by Dr. Wm. G. Horsch, Chile Exploration Co., New York.

Industrial Conference at Buffalo

What is known as the Sixth Annual Industrial Conference of the State of New York, will be held at Buffalo, Nov. 21, 22 and 23, at the Lafayette Hotel. The meeting has been called by Henry D. Sayer, industrial commissioner, and the industrial board of the State and a committee representing industries of the State. The central theme is to be "The Elimination of Waste in Industry." The program includes:

"Forward Steps in Industry," by W. D. Baldwin, chairman of the board of directors, Otis Elevator Co., on Tuesday evening, Nov. 21.

"Wasteful Industrial Habits," by L. W. Wallace, secretary of the Federated American Engineering Societies, Washington; and "How to Prevent Waste of Materials," by M. F. Simmons, General Electric Co., Schenectady, N. Y., on the morning of Nov. 22. Sidney Detmers, vice-president Republic Metal Ware Co., Buffalo, will preside at this session.

"Waste Prevented by Accounting Systems," by W. R. Basset, president, Miller, Franklin & Basset Co., New York, on the afternoon of Nov. 22.

"Education for Industrial Leadership," by Arthur E. Morgan, president Antioch College, Yellow Springs, Ohio, on the evening of Nov. 22. At this session Dexter S. Kimball, dean of the College of Engineering, Cornell University, will preside.

"Brains and Muscles," by H. C. Blagbrough, manager industrial relations, H. H. Franklin Mfg. Co., Syracuse, N. Y., on the morning of Nov. 23.

"How Industrial Accidents Are Being Prevented," by Arthur H. Young, manager of industrial relations department, International Harvester Co., Chicago, on the afternoon of Nov. 23.

Among the members of the general conference committee are M. O. Clement, Massey-Harris Harvester Co., Batavia, N. Y.; Frank M. Ward, Otis Elevator Co., Yonkers, N. Y., and Clarence L. York, General Electric Co., Schenectady, N. Y.

New York Steel Treaters

At the November meeting of the New York Chapter of the American Society for Steel Treating, held at the Machinery Club, Wednesday evening, Nov. 15, L. H. Fry of the Standard Steel Works, Burnham, Pa., was the principal speaker. He discussed "Press and Hammer Forging of Steel" with the aid of lantern slides. Three national officers of the organization were also present: T. D. Lynch, president; W. S. Bidle, second vice-president, and W. H. Eisenman, secretary. A dinner at the club preceded the session.

Germany Financing Russian Business

BERLIN, GERMANY, Oct. 24.—A development which deserves close observation is the growth of the Russian automobile transport service which the co-operative societies are making great efforts to enlarge. Though the service on the existing railroads is improving, it is unequal to requirements and the automobile is beginning to play an important part in the general transport of the country. The number of cars and tractors on service is constantly increasing, and interested German quarters are paying special attention to the requirements of the Russian market, which promises to be of importance to the German automobile industry.

Negotiations which are conducted at present indicate that the Russian electric industry is also reviving. The improvement in the general economic condition in the country has also increased the demand for electrical appliances and machinery. The Russian electrotrust includes all the factories in this industry, but it is realized that they can be brought up to a fair standard of efficiency only with the help of the more developed American and German electric industries, and negotiations in this direction are being conducted with representafives of German concerns. The A. E. G. has already started work, and a contract between the Siemens-Schuckert concern and the Russia Electrotrust has just been ratified.

Trade with Russia is largely a matter of credit, and the Germans have always made large concessions in this respect. A large number of German-Russian companies have been formed lately and the Russian Government generally holds 50 per cent of the shares. The Bank of Beneckendorff, which is connected with the well-known Russian industrialist Putilow, has increased its capital to 300,000,000 marks and is also devoting itself to Russian re-construction works. An industrial and commercial company which intends to foster trade relations with the Ukraine has also been founded.

British Pig Iron and Steel Output for October

LONDON, ENGLAND, Nov. 13 (*By Cable*).—The production of pig iron in Great Britain in October was 481,500 gross tons and that of steel ingots and castings 565,200 tons. These compare with 430,300 tons of pig iron and 555,900 tons of steel ingots and castings in September.

The pig iron and steel output for Great Britain by months so far this year has been as follows in gross tons:

1922	Pig Iron	Steel Ingots and Castings
January	288,000	327,500
February	300,100	418,800
March	389,800	549,400
April	394,300	404,200
May	407,900	462,300
June	369,200	400,200
July	399,100	473,100
August	411,700	520,800
September	430,300	555,900
October	481,500	565,200
Total	3,871,900	4,722,400

The October output of pig iron and steel is the largest for any month of the year. The 1921 pig iron production averaged 217,600 tons per month and the steel output 302,100 tons per month. In 1913 the two figures were 855,000 tons and 639,000 tons per month respectively.

Canadian Iron and Steel Outputs in September

The effect of the coal shortage and transportation difficulties is shown in the fact that the Canadian production of pig iron in September declined 7.92 per cent from the output of August, according to the Dominion Bureau of Statistics. The output in September was 24,974 gross tons as compared with 27,123 tons in August. A comparison of the first 9 months of 1922, with that of the corresponding period last year shows a decrease from 457,157 tons to 275,989 tons or 39.6 per cent.

During September the production of steel in Canada showed a falling off of 23,373 tons when compared with the output for the month of August. In the month under review 35,787 tons were produced as compared with 59,160 tons in August. The output for the first 9 months of 1921 was 477,588 tons as compared with 334,835 tons for the present year.

Rail Order Placed With British Empire Steel Corporation

The Grand Trunk Railway of Canada has placed an order for 25,000 tons of steel rails with the British Empire Steel Corporation, Sydney, N. S., according to a report to the Department of Commerce from Consul General Gunsaulus, Halifax. This order, with others on hand, is said to insure the continuous operation of the Sydney works, employing 3000 men all winter.

It is also announced that the output of the wire mill at Sydney, operated by the British Empire Steel Corporation, will be doubled by the installation of $50,000 worth of new equipment, work on which has already begun.

British Empire Steel Corporation Activities

Following his return to Montreal after an inspection of the company's property in Cape Breton, Roy M. Wolvin, president of the British Empire Steel Corporation, announced that the company is again operating profitably and is employing over 23,000 men practically at full time. Mr. Wolvin adds that the unrest is disappearing and that labor is more efficient. The No. 8 blast furnace at Sydney, N. S., has been rebuilt since it was last operated and has recently been blown. This furnace shows increased daily output due to changes made in the design of the furnace. A larger output is also obtained from the No. 1 blast furnace. The No. 1 open-hearth furnace in October produced the largest output of any month since commencing operations. The company is now loading the last cargo of steel products to reach the head of the lakes this season before the close of navigation. Unfilled orders on the company's books are much greater than at the corresponding date last year.

Five-Foot Book Shelf of Foreign Trade

The completion of a "Selected Bibliography of Foreign Trade, 1922," in which are listed the leading authorities on various aspects of international commerce, is announced by the National Foreign Trade Council of India House, Hanover Square, New York, and copies may be obtained from the secretary, O. K. Davis. This five foot book-shelf of foreign trade contains fifty titles dealing with training for foreign trade, the history and geography of foreign trade, the practical admipistration of an export business, and with all phases of ocean transportation. Should this selected bibliography prove of value, the National Foreign Trade Council plans to republish it annually with such changes and additions as further investigation and the publication of new books may necessitate.

Malleable Castings Outlook Favorable

At the monthly meeting of the Western section of the American Malleable Castings Association held in Chicago, Nov. 8-9, the 25 members present expressed an optimistic feeling over the outlook of the malleable iron industry for the first half of next year. Malleable foundries are now operating at about 83 per cent of normal or 56 per cent of the maximum capacity. The average operation during the past five years is used as the normal capacity in figuring the percentages.

The Racer Disk Wheel Co., Wooster, Ohio, has purchased the Wooster plant of the Kelly-Springfield Tire Co. and plans to engage in the manufacture of tire tubes.

RELIEF DENIED

Iron and Steel Shippers Associated with Others in Transcontinental Controversy

WASHINGTON, Nov. 14.—Iron and steel producers in the Pittsburgh and Eastern sections of the country who supported the contention of transcontinental railroads in the fourth-section applications to establish to the Pacific terminals lower rates than are in effect to and from intermediate points on traffic east of the Rocky Mountains share with the carriers the defeat they sustained by a decision of the Interstate Commerce Commission announced last Saturday. It denied relief on iron and steel shipments along with most of the other commodities affected. The only relief was on shipments on certain grains and groceries moving from Pacific terminals East or from Southern points West to Pacific terminals. The proposed rates were grounded on the low rates by steamship lines between the Atlantic and Gulf ports and the Pacific ports.

The rate proposed from all points, from the Atlantic seaboard to the Pacific terminals, on iron and steel approximated the rate from Pittsburgh to the Pacific Coast by way of Baltimore, rail and water, plus a few cents to represent the superiority of the rail service. It was not intended to meet the competitive situation at the North Atlantic ports as the port-to-port water rate was so low as to make that impossible. The blanketing of points of origin, it was hoped, would induce the movement of traffic from the Middle West and afford the carriers the same kind of traffic, with the same gross revenues for the shorter haul, as they would receive for the longer haul from the points farther East. It was pointed out, however, that while on traffic to the Pacific Coast it was proposed to keep the Middle West on a parity with the seaboard territory, the latter would be required to pay more than the Middle West on traffic to intermountain territory. For instance, the rates on structural steel to both the terminals and intermountain territory at the time of the hearing were $1.175 from Colorado common points, $1.255 from the Missouri River, $1.42 from the Mississippi River, $1.50 from Chicago, $1.585 from Cincinnati, $1.665 from Pittsburgh and $1.835 from the Atlantic seaboard. Also on iron and steel there are insurance rates ranging from about 0.5c. to 2c. per 100 lb. The proposed blanket rate from all points of origin to the Pacific Coast terminals, except from Colorado common-points territory, was $1 per 100 lb. on bars, bands, hoops, bolts, nuts, structural steel, rails and fastenings, boiler flues, unbent tubing, ties, plates, sheets, No. 11 gage and heavier, wrought pipe, horseshoes and locomotive axles. From Colorado points it was proposed to reduce the rate to 77c. from $1.175. The present rate from points East of the Buffalo and Pittsburgh district, as far as the Atlantic seaboard is $1.835; from the Pittsburgh-Buffalo territory it is $1.665; from the Detroit-Cincinnati territory it is $1.585; from Chicago territory it is $1.50; from Mississippi River territory it is $1.42; from Missouri River territory it is $1.25.

Broadly, the denial of relief, dissented from by some of the commissioners, was based upon the conclusion that the rates proposed did not meet the requirement of the rule laid upon the commission in the amended fourth section saying that "in exercising the authority conferred upon it in this proviso (authorizing relief in special cases) the commission shall not permit the establishment of any charge to or from the more distant point that is not 'reasonably compensatory' for the service performed," a difference of opinion developing as to the meaning of "reasonably compensatory."

New Type of Great Lakes Freighter

An innovation in water transportation facilities will be made in the construction of two freight boats to be used as cargo carriers on the Great Lakes in the summer and in the Gulf Coast trade in the winter. While in the past small boats built for the lake trade have been sold for use in the coastwise trade, no general attempt appears to have been made to build boats that could be used on lakes in the summer and on the ocean in the winter when lake navigation is suspended.

The boats will be 262 ft. long, or of Welland Canal size, and will have a breadth and draft that will permit them to be taken through the New York Barge Canal. Another feature of the vessels is that they will be electrically operated with a combination Diesel engine and electrical drive. They will be the first lake boats to be electrically propelled except the Fordonian, which was originally equipped with a Diesel engine drive but recently changed over to a combination Diesel engine and electrical drive.

The boats will be twin screw driven. Each will be equipped with two 250 kw. generators which will drive 250 hp. motors. Each motor will be direct connected to the propeller shaft of one of the twin screws. All the auxiliary equipment will operate electrically and electricity will also be used both in heating and for cooking. Contracts for the generators and motors have been placed with the General Electric Co., but the orders for the boats have not yet been placed. They will be built for the Minnesota & Atlantic Transportation Co.

Michigan Manufacturers Hampered

DETROIT, Nov. 15.—Michigan manufacturers and shippers generally are suffering from the drastic rulings of the Interstate Commerce Commission on box cars and open top equipment. Specifically, the order expediting box cars to the West, Northwest and Southwest empty, is jeopardizing the future operation of many plants, while the ruling on gondolas, limiting their usage to those with sides under 42 in. in height, has limited the shipment of raw materials to a point where manufacturers in many instances are operating on a weekly basis. The Michigan Utilities Commission is working in conjunction with the Michigan railroads and the shippers to secure a modification of these orders. Throughout this whole situation of car shortage, the Michigan railroads have been free from embargoes as far as local conditions apply.

The Detroit Employers' Association reports a total of 175,000 employed as of Thursday, Nov. 8, these figures being approximately 8000 below early July figures when the employment reached the high point of the year.

Reduced Local Rate Authorized

WASHINGTON, Nov. 14.—Effective Dec. 11, the Interstate Commerce Commission, in a decision made public last Saturday, authorized the establishing of a reduced local rate of 38c. per 100-lb. on iron and steel articles in carloads from New Orleans and group points to Houston, Galveston, Beaumont and Orange, Tex., and points taking the same rates. At the same time it ordered canceled tariff schedules proposing a proportional rate of 20c. per 100 lb. from and to the same points for application on traffic from and beyond New Orleans. All descriptions of iron and steel products are involved in the tariffs. The 38c. local rate is the same as the one in effect on June 24, 1918, just previous to the general rate advance of 25 per cent. On the majority of the products, the present local rate is 57.5c. In connection with the proposed 20c. proportional rate, it was held that it would afford Birmingham, Ala., a through all-rail rate out of proportion to the other rates, both rail and rail-and-water.

The largest casting so far turned out in South Africa, weighing 50,000 lb., was recently made at Salt River Works. The operation proved a complete success, and when the casting was dug up it was found to be without a flaw. It is intended for an anvil block for a 3-ton hammer. The Salt River Works claim that they can now make any casting, either in iron or bronze, that may be required in South Africa.

OCTOBER STEEL OUTPUT

Ingot Production Rate About 39,267,000 Tons Per Year—Daily Output 20 Per Cent Higher

According to the steel ingot statistics, as collected by the American Iron and Steel Institute, the 30 companies which in 1921 made 87.50 per cent of the total, had an output in October of 2,872,415 gross tons. This compares with 2,373,779 tons in September and is an increase of 498,636 tons.

On the assumption that companies reporting are supplying the same percentage of the total as they did last year, the output for the 26 working days of October was about 3,282,760 tons or 126,260 tons per day. The September production on the same basis was about 2,712,890 tons or approximately 104,340 tons per day. The October output was at the rate of about 39,267,000 tons per year; in September it was about 32,450,300 tons; in August it was about 30,273,000 tons; in July about 35,360,000 tons and in June about 36,000,000 tons per year.

The statistics of the American Iron and Steel Institute since January, 1921, follow in gross tons:

Monthly Production of Steel Ingots by 30 Companies Which Produced about 87.50 Per Cent of the Steel Ingot Production in 1921

Months	Open-Hearth	Bessemer	All Other	Total
January, 1921	1,591,281	608,276	3,629	2,203,186
February	1,295,563	450,818	2,796	1,749,477
March	1,175,591	392,983	2,404	1,570,978
April	1,000,053	211,755	2,150	1,213,958
May	1,047,810	216,497	1,543	1,265,850
June	808,286	193,644	1,476	1,003,406
July	689,489	113,312	575	803,376
August	915,334	221,116	1,621	1,138,071
September	908,381	265,152	1,207	1,174,740
October	1,269,945	345,837	1,028	1,616,810
Total—10 months.	10,702,033	3,019,390	18,429	13,739,852
November	1,294,371	363,912	1,718	1,660,001
December	1,129,174	296,380	1,539	1,427,093
Total—Whole yr.	13,125,578	3,679,682	21,686	16,826,946
January, 1922	1,260,809	331,851	822	1,593,482
February	1,395,835	348,571	616	1,745,022
March	1,918,570	451,386	795	2,370,751
April	1,997,465	445,939	1,109	2,444,513
May	2,214,774	494,893	1,474	2,711,141
June	2,143,708	487,851	2,918	2,634,477
July	2,020,572	464,047	2,485	2,487,104
August	1,807,310	404,379	2,893	2,214,582
September	1,911,147	460,127	2,605	2,373,779
October	2,352,207	518,010	2,198	2,872,415
Total—10 months.	19,022,397	4,407,054	17,815	23,447,266

The October daily estimated output of 126,260 tons compares with 70,020 tons per day in January, with 114,700 tons per day in May and with 113,700 tons per day in July.

Another Furnace Blown In in Virginia

After idleness approximating 20 months and representing the only long period of complete shut-down during 50 years of existence, the Low Moor Iron Co., of Virginia, blew in furnace "A," one of its three stacks, on Nov. 6. It has a production capacity of 250 tons foundry iron per day.

The Low Moor company owns and operates extensive Virginia ore deposits, limestone quarries, coal mines and coke ovens, and is self-contained in its necessary raw material requirements. The company is the oldest pig iron producer in Virginia.

Bundy Tubing Co.'s New Process

The Bundy Tubing Co., Detroit, has been incorporated with a capitalization of $50,000 to manufacture mechanical tubing. Harry W. Bundy, president of the company, has developed a new type of tube and process of manufacturing, both tube and method being covered by patents. The tube is made of copper, brass or steel from a single strip of metal, which, after being tinned in the strip, is rolled in a machine into two complete circles, making a tube with a multiple or two-ply wall. It is then sweated in a die, sized, cooled and cut off, progressively, in the same machine. The tube produced has a uniform wall thickness, is readily bent into shapes, cannot leak or spring and has practically no seam. It can be used wherever small tubes of light gage are employed. The process includes a new method of upsetting, replacing the flaring method for making standard S. A. E. joints. This upset is used in the same way as the flare, with the same fittings and makes a joint that has the advantage of additional metal at the joint rather than the thinning effect of the flare method. The factory is located at 4845 Bellevue Avenue, Detroit, where three additional machines are being installed to give a producing capacity of 12,000 lb. per day. Offices of the company are maintained at 842 Book Building, Detroit, with the following officers: H. W. Bundy, president; C. E. Freese, vice-president; F. G. Morhous, secretary; O. C. Schimmel, treasurer; M. A. Bundy, assistant secretary and treasurer.

Metropolitan Steel Co. Organized

The Metropolitan Steel Co., Cincinnati, has been incorporated with a capitalization of 2500 shares cumulative 8 per cent preferred stock, par value $100, and 10,000 shares of common stock of no par value, for the purpose of owning and operating a steel plant. The company proposes to specialize with its first mill in the manufacture of cold-rolled steel, hoops and bands. James I. Stephenson, of the Cincinnati Iron & Steel Co., is president of the Metropolitan, and associated with him are Robert S. Stewart, of the Stewart Iron Works, S. E. Anning, and Paul W. Weber, of the Sharon Steel Hoop Co.

Steel Corporation's Unfilled Orders

The monthly report of the United States Steel Corporation shows 6,902,287 tons of unfilled business on its books as of Oct. 31, or 210,680 tons more than reported for Sept. 30. This increase is the eighth consecutive one reported this year, and shows the corporation has more unfilled business on its books than at any previous period since February, 1921, when unfilled orders amounted to 6,933,867 tons. In September the unfilled tonnage increased 741,502 tons; in August, 173,944 tons; in July, 140,630 tons; in June, 381,303 tons; in May, 157,315 tons; in April, 602,765 tons; in March, 353,079 tons; while in February and January it decreased 100,609 tons and 26,736 tons, respectively. Contrasted with a year ago the corporation has 2,615,458 tons more of unfilled business. Following is the unfilled tonnage as reported by months since January, 1920:

	1922	1921	1920
Jan. 31	4,241,678	7,573,164	9,285,441
Feb. 28	4,141,069	6,933,867	9,502,081
Mar. 31	4,494,148	6,284,765	9,892,075
Apr. 30	5,096,913	5,845,224	10,359,747
May 31	5,254,228	5,482,487	10,940,465
June 30	5,635,531	5,117,868	10,978,817
July 31	5,776,161	4,830,324	11,118,468
Aug. 31	5,950,105	4,531,926	10,805,028
Sept. 30	6,691,607	4,560,670	10,374,804
Oct. 31	6,902,287	4,286,829	9,836,852
Nov. 30	.....	4,250,542	9,021,481
Dec. 31	.....	4,268,414	8,148,122

The largest total of unfilled orders was on April 30, 1917, when it was 12,183,083 tons. The lowest was on Dec. 31, 1910, at 2,605,747.

Toledo Company Sold

Controlling interest in the Toledo Machine & Tool Co., Toledo, Ohio, has been purchased by Harry E. Collin, Gardner Building, that city. The deal involves 30,000 shares of stock at an unrevealed price. The company manufactures machine tools, dies, presses and special machinery and employs about 1400 men. Two years ago it erected a foundry on a newly acquired 80-acre site. Henry J. Hinde has been president of the company since its organization. The new controlling ownership, it is believed, forecasts expansion of the industry.

Work is in progress of getting the Riverside works, National Tube Co., Benwood, W. Va., ready for operation. The plant is expected to start up Nov. 20. It has been idle for 19 months.

REFRACTORIES ARE QUIETER

Silica Brick Lower in Chicago and Trend Is Down on Magnesite

PITTSBURGH, Nov. 13. Chicago district makers of silica brick have reduced quotations $3 and now are on a base of $50 per 1000 at works. So far there has been no change by Pennsylvania and Birmingham district producers, but it is a fact that some Pennsylvania makers have been taking business as low as $43 and a quotation as low as $40 has been reported. Manufacturers representing the major portion of fire clay brick production still are adhering to the prices set up around Oct. 1 but it is admitted that orders are not flowing at all freely at these figures. Instead of being the prevailing price for magnesite brick, $75 per net ton at works has become both a maximum and an extreme figure and, as far as sales are concerned, finds no support. Too many producers of this kind of brick are willing to take orders at $70, for those asking more to get business. The real market is $70 and even that price is rather unattractive, since chrome brick can be substituted, and at present prices the latter are much cheaper than magnesite brick. An effort is being made to get prices of chrome brick down, and it may be successful since imported chrome ore is duty free and a good deal of the increase in producing costs as embraced by fuel prices, has been eliminated in the past three or four weeks.

While it is possible that there will be no general decline in prices in the next few weeks, the market gives plain signs that it is as high as it is going to be. Business in general is slower than it has been, especially from the iron and steel industry, and with transportation conditions better in most districts and shipments going forward with greater freedom, demands for supplies for prompt delivery are much fewer than they were a few weeks ago. Complaint is heard of a shortage of labor in the brick yards, due to the fact that the men can make as much money working a few days a week in the coal mines, as they can in a full week in the yards. But it is noted that the industry as a whole is operating at a fairly high rate of 65 per cent and that the labor shortage is not creating any scarcity of refractories.

We quote per 1000 f.o.b. works:

	High Duty	Moderate Duty
Fire Clay:		
Pennsylvania	$43.00 to $46.00	$39.00 to $42.00
Ohio	43.00 to 46.00	39.00 to 42.00
Kentucky	43.00 to 46.00	38.00 to 42.00
Illinois	43.00 to 45.00	40.00 to 42.00
Missouri	43.00 to 45.00	38.00 to 42.00
Ground fire clay, per net ton	7.50 to 8.50	
Silica Brick:		
Pennsylvania	43.00 to 45.00	
Chicago		50.00
Birmingham		48.00
Ground silica clay, per net ton	9.00 to 10.00	
Magnesite Brick:		
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.)		70.00
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)		43.50
Chrome Brick:		
Standard size, per net ton		50.00

Preparation and Properties of Pure Iron Alloys

Scientific Paper No. 453 of the Bureau of Standards, entitled the "Preparation and Properties of Pure Iron Alloys," deals with fundamental principles involved in the manufacture of steel products. In this investigation iron of practically 100 per cent purity was prepared by an electrical method similar to the method of silver plating in which the metal is deposited from a solution by the passage of an electric current. This iron was then melted in a vacuum to exclude the effects of gases which would be taken up from the air if melted in contact with it. The heating was done electrically and the containing crucibles were made of chemically pure magnesium oxide. Extensive series of alloys were made by re-melting this iron in this same manner and adding carbon and manganese. Compositions were varied by small amounts so as to include the entire range of compositions found in ordinary steels. Specimens from these ingots were tested and results compared so as to bring out the effects of each element.

TARIFF REDUCTIONS

Great Britain and Spain Reach Agreement Which May Extend to United States

WASHINGTON, Nov. 14.—Sharp reductions in tariff duties on numerous iron and steel products and machinery and machine tools shipped into Spain, are provided in a commercial treaty ratified between Great Britain and Spain, according to a cablegram received by the Department of Commerce, from Commercial Attache Charles H. Cunningham, Madrid. Great Britain has agreed to admit free of duty from Spain for three years, the term of the treaty, Spanish mineral ore, along with other products, and Spain has agreed to a minimum importation of 750,000 tons of pit coal at a duty of 4 pesetas per ton instead of the regular second-column duty of 7.50 pesetas. This replaces a proposed general reduction in the import duty on British coke.

It is understood that the reductions in the Spanish duties are to be extended also to similar products from other countries having a most-favored-nation status with Spain, including the United States.

Reductions of 5 to 10 per cent below the second column are to apply to unpolished iron and steel bars, except round rods less than 10 millimeters in diameter, iron and steel railway joints and crossings, iron and steel tubes except those coated with copper, copper alloys, or other metal, bolts and screws up to 11 millimeters thick and nuts and washers; machine tools for working metals weighing more than 10,000 kilos. Reductions to 15 per cent below the second column include cables, unpolished copper tubes or pipes of more than 10 millimeters in diameter and the same polished including tubes or pipes of 60 millimeters and more, unpolished bronze or brass tubes or pipes, land and marine steam engines weighing more than 500 and up to 50,000 kilos. Reductions of 10 to 20 per cent below the second column include automobiles of a value of more than 40,000 pesetas. Reductions of more than 20 per cent below the second column include fine steel, containing tungsten, vanadium, with a certain density, most wire and its manufactures, types of internal combustion engines, steam boilers and generators, machine tools for working metals weighing more than 4000 kilos, land and marine steam engines weighing up to 500 kilos and weighing more than 50,000 kilos, steam locomotives and tank locomotives and machinery not specified.

Soft Coal Output Increased

UNIONTOWN, PA., Nov. 11.—Production in the Connellsville bituminous region now exceeds that of the last week in March, immediately preceding the inauguration of the "sympathetic" strike of the non-union workers in the region. The strike has long ceased to be a factor in the situation in this region and the principal handicap now is a shortage in transportation facilities affecting all of the railroads serving the district. Efforts toward relieving this situation are in progress.

Production in the region during the week was 164,320 tons, an increase of 4560 tons over the preceding week.

A number of companies increased their production of coke during the week.

E. J. McDonnell, sales manager, open-hearth combustion system division, Blaw-Knox Co., Pittsburgh, will address the Pittsburgh Foundrymen's Association at its regular monthly meeting at the General Forbes Hotel, Wednesday evening, Nov. 22. His subject will be "Improvements in Open-Hearth Furnace Operation." The talk will have particular reference to port construction as embodied in the McKune and Egler furnaces.

Machinery Markets and News of the Works

ANOTHER RAILROAD LIST

Chicago, Milwaukee & St. Paul Inquires for 23 Machine Tools

Buying in Some Markets Has Shown a Slight Falling Off During the Past Week

The Chicago, Milwaukee & St. Paul Railroad has added to the already important railroad business pending at Chicago an inquiry for 23 machine tools, many of them of large type. The Chicago, Burlington & Quincy has placed no further orders against its recent large inquiry. The extensive inquiry of the Pennsylvania Lines East, issued a few weeks ago, has not been acted upon, but the Philadelphia machine-tool trade is expecting that orders will be placed this week. Much of the current railroad business consists of orders for single machines from scattered lines. The Chicago & Northwestern has closed on the remainder of its recent small list. The Chesapeake & Ohio will probably close soon on a recent list.

In Chicago and Cleveland, the demand for machine tools represents a fair degree of activity, but other leading markets, notably New York, Boston, Philadelphia and Cincinnati are somewhat quiet and sales have shown a slight falling off in these centers within the past week.

Industrial companies are coming into the market in greater numbers and it is expected this business will supplement railroad buying to a degree that will place the machine-tool industry on a better plane early in 1923. Inquiries from agricultural implement manufacturers in the Chicago market have been encouraging because of the fact that this industry has been exceedingly quiet for the past two years.

Ohio is a fairly good field for prospective machine-tool business. The Dayton Engineering Laboratories (Delco), Dayton, Ohio, is expected to buy a list of equipment shortly for buildings now being erected. The Ohio Injector Co., Wadsworth, Ohio, has been buying tools for a plant extension. Three companies in Toledo, the Electric Auto Lite Corporation, the Chevrolet Motor Car Co. and the Toledo Automatic Brush Machine Co., have all bought tools recently.

In the East the principal buyer is the General Electric Co., which has purchased several tools for its Philadelphia plant. The Tebo Yacht Basin Co., Brooklyn, has added to its shipyard shop equipment. The Baldwin Locomotive Works, Philadelphia, has bought two triple-head locomotive frame slotters.

The American Rolling Mill Co., Middletown, Ohio, will shortly buy sheet and jobbing mills and a galvanizing plant for its Ashland works.

New York

NEW YORK, Nov. 14.

THERE is not enough business in the New York territory to awaken enthusiasm among sellers. It is true that each month of the year has brought a slight improvement over the preceding month, October sales in some offices being the best of any month within two years, but this does not mean that the volume of sales is anywhere near what is reckoned as normal. Within the past week there have been few sales of importance. The Tebo Yacht Basin Co., Brooklyn, bought several machines; the Baldwin Locomotive Works, Philadelphia, bought two triple-head locomotive frame slotters and the General Electric Co. bought several tools for its Philadelphia plant; aside from these the week's buying was confined largely to single machines.

Auction sales of used machine tools which take place this month will throw many tools in good condition on the market. Hundreds of tools are included in the list offered for sale to-day (Nov. 14) at the Wright-Martin aircraft plant at Long Island City, while a sale at the plant of the Hartford Auto Parts Corporation, Hartford, Conn., on Nov. 23 will put 200 machines up for disposal.

Few new inquiries for cranes have appeared in the past week and a number calling for cranes of large capacity are still pending. The market in small capacity and hand power cranes is not active. Fair demand for locomotive cranes is noted. The sales of four of various capacities for use outside of this district, is noted this week. A builder of crawl tread cranes in the Middle West reports the sale of a total of 23 cranes in September, the biggest month's business in the history of the company and 11 crawl tread cranes in October. Only a few of these totals were sold to companies for use in the New York district. When properly approved, the Department of Docks, city of New York, will issue a call for bids on furnishing elevators, an electric power substation, railroad tracks, gravity chutes for cargo and cargo booms to be installed at the Stapleton improvement, Stapleton, S. I. At a later date bids will be requested by the department on elevators, chutes and baggage conveyors for West Forty-fourth Street, New York.

Among recent purchases are:

Gulf & Ship Island Railroad, Birmingham, a 5-ton, 72-ft. span, 3-motor overhead traveling crane from the Niles-Bement-Pond Co.

Georgia Marble Co., Tate, Ga., a 7½-ton, 75-ft. span overhead traveling crane from the Shepard Electric Crane & Hoist Co.

Otis Steel Co., Cleveland, Ohio, a 30-ton, 50-ft. boom, bucket handling locomotive crane with 25-ft. insert to make 75-ft. boom and a 30-ton, 50-ft. boom locomotive crane with bucket from the Industrial Works.

Hummell-Ross Fibre Co., Hopewell, Va., a 5-ton, 14-ft. span and a 10-ton, 39-ft., 6-in. span, hand power crane from the Reading Chain & Block Corporation, through Arthur Appleton, 29 Broadway, New York.

Atlantic Utilities Corporation, Rio, N. Y., a 10-ton, 20-ft. 10-in. span, hand power crane from the Reading Chain & Block Corporation, through Arthur Appleton, 29 Broadway, New York.

Michigan Brass & Copper Co., Detroit, Mich., a 7½-ton, 75-ft. span, 3-motor overhead traveling crane from the Northern Engineering Works.

American Flexible Bolt Co., Pittsburgh, three 1-ton jib cranes from the Northern Engineering Works.

H. J. Heinz Co., Pittsburgh, two 2-ton, 23-ft. span, 3-motor, overhead traveling cranes from the Northern Engineering Works.

The Atlas Iron Works, Inc., 993 Washington Avenue, New York, has awarded contract to the La Sala Construc-

tion Co., Rochambeau Avenue, for a new one-story plant, 60 x 100 ft. and 20 x 30 ft., on 139th Street.

[illegible] cars will be installed in the new building to be erected by the New York *Times*, Times Square, New York, on Eleventh Avenue, 200 x 225 ft. Ludlow & Peabody, 101 Park Avenue, are architects. A. H. Sulzberger is in charge.

The Albany Garage Co., Howard and Williams Streets, Albany, N. Y., has preliminary plans in progress for a seven-story service building, garage and machine repair works at Beaver, Williams and Howard Streets. Chauncey D. Hawkes is general manager.

The Rubel Coal & Ice Corporation, 197 Glenmore Avenue, Brooklyn, will soon take bids on separate contracts for a new one-story ice-manufacturing plant, 100 x 100 ft., at Cortelyou and Dahill Roads, to cost $200,000 with machinery. Edward M. Adelsohn, 1778 Pitkin Avenue, is architect.

The Camaguey Sugar Co., New York, care of George H. Houston, president, 60 Broadway, operating three sugar mills with railroad system on 26,000 acres in Cuba, is disposing of a bond issue of $6,000,000, a portion of the proceeds to be used for extensions and improvements.

The Chile Copper Co., 120 Broadway, New York, will make extensions and improvements in its plant at Chuquicamata, Chile, including the installation of additional equipment.

The Babcock & Wilcox Co., 85 Liberty Street, New York, manufacturer of watertube boilers, with plants at Bayonne, N. J., and Barberton, Ohio, is arranging for an increase in capital fom $15,000,000 to $25,000,000, a portion of the proceeds to be used for extensions.

A manual training department and laboratory will be installed in the three-story high school to be erected at Freeport, L. I., for which bids will be called at once. William Adams, 15 West Thirty-eighth Street, New York, is architect. It will cost $600,000.

The Mexican Railway Co., Ltd., Mexico City, Mex., has awarded a general contract to the International General Electric Co., 120 Broadway, New York, for work in connection with the electrification of its line from Orizaba to Esperanza, about 30 miles, to include power equipment, locomotives, feeder and transmission lines, fittings, repair shop equipment, etc., estimated to cost $2,000,000. Other portions of the system will be electrified later.

The Solomon Independent Ice Co., New York, has acquired property, 100 x 150 ft., at the south corner of East Fifth Street and the East River, as a site for a new ice-manufacturing and refrigerating plant, with capacity of 500 tons per day. Plans will be drawn at once. Abraham Solomon is president.

The Unit Ventilation Co., College Point, L. I., has awarded a contract to the Robert Grange Co., 527 Fifth Avenue, New York, for a one-story addition, 50 x 100 ft., to cost $30,000.

The New York Central Railroad Co., 466 Lexington Avenue, New York, has made inquiries for a 90,000-lb. motor-driven press brake. C. S. White is purchasing agent.

The Yale & Towne Mfg. Co., 9 East Fortieth Street, New York, with plant at Stamford, Conn., has called a special meeting of stockholders on Nov. 17, to arrange an increase in capital from $5,000,000 to $10,000,000, a portion of the proceeds to be used for extensions.

The American Can Co., 120 Broadway, New York, has awarded contract to the Turner Construction Co., 244 Madison Avenue, for additions and improvements in its plant on Adams Street, Brooklyn.

The Supro Building Products Corporation, 315 Vanderbilt Avenue, Brooklyn, metal lath and other metal building specialties, has purchased the building at Meadow Street and Nelson Avenue, Degnon Terminal, Long Island City, 169 x 265 ft., for a new general operating and distributing plant.

The Singer Mfg. Co., 149 Broadway, New York, with main plant at Elizabeth, N. J., has called a special meeting of stockholders, Dec. 6, to arrange for an increase in capital from $90,000,000 to $120,000,000, a portion of the proceeds to be used for extensions. The company is operating nine factories in different parts of the United States.

The Walker Vehicle Co., Long Island City, manufacturer of commercial automobiles, with headquarters at Chicago, has leased a new three-story, reinforced-concrete building, 100 x 115 ft., to be erected at Ely Avenue and Thirteenth Street, Long Island City, by the Neivel Realty Corporation, for a period of 10 years, for the establishment of a general service and repair plant for the Eastern district.

[illegible] Charles E. Gorton High School to be erected at Palisade Avenue and Shonnard Place, Yonkers, N. Y., for which bids on a general contract will be received until Nov. 24.

The Bethlehem Shipbuilding Corporation will develop different lines of iron and steel products at its Moore shipyard, Elizabeth, N. J., and has contracted for the manufacture of 18 hydraulic filter presses for the Standard Oil Co. of New Jersey, to cost approximately $300,000.

The Orange Screen Co., Valley Street, Maplewood, N. J., has awarded contract to E. M. Waldron & Co., 84 South Sixth Street, Newark, for an addition, two-stories and basement, to cost $50,000.

A manual training department will be installed in the new high school to be erected at Bogota, N. J., estimated to cost $200,000. C. V. R. Bofert, 167 Main Street, Hackensack, N. J., is architect.

The Ransome Concrete Machinery Co., Dunellen, N. J., will commence the erection of a one-story addition, totaling about 10,000 sq. ft., increasing the present works area by one-third.

The Maple Shade Water Co., Maple Shade, N. J., recently acquired by new interests, has plans in progress for extensions and improvements in the waterworks to cost $50,000, including the installation of new duplex pumping machinery and auxiliary equipment.

A vocational department will be installed in the two-story and basement high school to be erected at Linden, N. J., estimated to cost $350,000, for which bids on a general contract are being taken. H. B. Brady, 333 North Broad Street, Elizabeth, N. J., is architect.

A vocational department will be installed in the proposed new high school at Irvington, N. J., estimated to cost $500,000. Preliminary plans are in preparation.

New England

BOSTON, Nov. 13

SALES of machine tools in this district the past week showed a falling off. Business was confined largely to used equipment. The largest sale was five automatic screw machines to a Cambridge manufacturer. Other sales include lathes, upright and sensitive drills, milling machines, automatic screw machines, punch presses and miscellaneous used tools to Boston and manufacturing interests throughout New England. Sales of new machinery have been few and far between and mostly of low-priced tools. The sale of a disk grinder costing $800 to $900 to a Lawrence, Mass., concern, which has been under consideration for a year and a half, illustrates the slowness of small manufacturers in covering requirements. The Bangor & Aroostook Railroad is expected to close on a carwheel boring machine within the next 10 days, and the Boston & Albany on a single machine. The slowing up of business the past week is reported as due in part to the fact that prospective customers have been looking over equipment offered for sale by automobile manufacturers outside of New England.

While actual orders fell off, prospective business increased, although new inquiries, almost without exception, involve single machines. A central Massachusetts firm is inquiring for a 6-in. pipe machine, a New Hampshire mill for a used lathe, a Boston firm for gear-cutting machinery; while an upright drill, a punch, a press, a planer, a milling machine, or a cutting off saw is wanted, the amount of money involved in each case not being important. In the aggregate, however, there is a considerable volume of business in the making which gives indication of closing next month or early in 1923. Broaching machines are among the very few that are not selling in this district. On the other hand, the demand for broaches is increasing.

The Fore River Works, Bethlehem Shipbuilding Corporation, Ltd., Quincy, Mass., has obtained a contract from the New York, New Haven & Hartford Railroad for the reconditioning of locomotives, and one shop has been turned over for this work. The railroad company will furnish a certain number of shop men and mechanical equipment required. The initial order is small and more in the nature of an experiment on the part of both the railroad and the Fore River Works. Should the work prove satisfactory, it is expected that additional business will be forthcoming, and in that event it probably will be necessary for the Fore River Works to purchase additional equipment. The Quincy plant, with a comparatively small outlay, can be adapted to locomotive work on a large scale without seriously disrupting shipbuilding and repair work.

The Standard Steel & Bearings Co., Inc., Plainville, Conn., contemplates the erection of an addition. It is preparing to transfer the mechanical equipment of its Philadelphia plant to Plainville and abandon the former unit. An additional 1000 employees will be taken on at the Plainville plant.

Arthur H. Parker, founder and formerly president and general manager Parker Wire Goods Co., Worcester, has organized the Parker Metal Goods Co., with a capital of $50,000, to make a general line of wire hardware, special wire goods and metal stampings. The company will begin production as soon as manufacturing space can be obtained. Mr. Parker is president and treasurer of the new company. Associated with him are George H. Mirick and J. M. Lindsay.

The Reed & Prince Mfg. Co., Worcester, Mass., screws, bolts and rivets, has awarded contract for a two-story, 60 x 400 ft. mill unit, and a one-story, 90 x 120 ft. annealing unit, the aggregate cost approximating $150,000. Construction of the two units will begin as soon as present buildings on the site are razed.

A permit has been granted the Factor Motor Trucks, Inc., Springfield, Mass, to erect a plant costing about $35,000 at 296 Pecousic Boulevard. Adolf A. Geisel is president and general manager.

The Chelsea Clock Co., Chelsea, Mass., has purchased an acre adjoining its plant, to provide for future expansion. The company now has about 1000 ft. frontage.

The Moore Drop Forging Co., Springfield, Mass., will erect a machine shop, 35 x 93 ft., near its forge shop. Clintock & Craig, Springfield, are the architects.

An auction sale of machine tools at the plant of the Hartford Auto Parts Corporation, Hartford, Conn., will be held on Thursday, Nov. 23, by Herbert A. Segal, auctioneer, 156 Market Street, Newark. About 200 machines will be placed on sale, including screw-cutting lathes, automatic screw machines, turret lathes, milling machines, shapers, gear cutters, broaching machines, drills, cutting saws, planers, etc. Electrical equipment will be included.

The Connecticut Foundry Co., Rocky Hill, Conn., has awarded contract to C. P. Waterman, Inc., 43 Farmington Avenue, Hartford, Conn., for a two-story addition, brick and concrete, 30 x 70 ft.

The General Electric Co., Schenectady, N. Y., has awarded contract to the Austin Co., Philadelphia, for a one-story addition to its Pittsfield, Mass., works, 100 x 515 ft., to cost approximately $150,000.

The Blake Electric & Power Co., Bangor, Me., recently organized, has concluded negotiations for the purchase of the plant and property of the Maine Electric Light & Power Co., of the same place. Extensions and improvements will be made. Frank R. Blake is president.

The Lawrence Machine Co., Lawrence, Mass., manufacturer of centrifugal pumps, etc., has removed from Island Street to a new building at 341 Market Street, South Lawrence, where additional equipment will be provided for increased production.

The Charles H. Phillips Chemical Co., Stamford, Conn., will build a new two-story machine shop, box manufacturing plant and power house.

The New Bedford Boiler & Machine Co., 42 Front Street, New Bedford, Mass., has work under way on a new two-story building at Water and Commercial Streets, 60 x 165 ft., to cost $75,000.

The States Co., Hartford, Conn., manufacturer of electrical products, has removed its winding department to 73 Francis Avenue, where branch works will be conducted. The space available at the main works through this change will be equipped for increased production.

The Scovill Mfg. Co., Waterbury, Conn., manufacturer of brass, bronze and other metal products, has arranged for an increase in capital from $5,000,000 to $15,000,000, a portion of the proceeds to be used for extensions.

The Arey & Blount Electric Co., Worcester, Mass., recently organized, has acquired property for a new plant to manufacture electrical specialties, flashers, etc. William H. Blount, formerly superintendent of Sleeper & Hartley, Inc., Worcester, heads the company.

The Boston & Albany Railroad Co., South Station, Boston, will take bids until Nov. 24 for three blow torches; three blow torch cleaners; three pump levers; two brass tank valves; two tank valve wells (tank steel); two perforated copper stainers, and other mechanical equipment. F. A. Ryer, Room 237, address noted, is purchasing agent.

The United States Tire & Rubber Co., 560 Commonwealth Avenue, Boston, has leased a new building, 84 x 135 ft., to be erected at 660 Charles River Road, for a new plant, estimated to cost $100,000. Burtis Brown, 88 Broad Street, is engineer.

A vocational department will be installed in the new junior high school to be erected at Norwich, Conn., estimated to cost $200,000. William T. Towner, 152 West Forty-second Street, New York, is architect.

The Great Northern Paper Co., Madison, Me., has arranged for an increase in capital from $8,300,000 to $25,000,000, a portion of the proceeds to be used for extensions. A branch mill is operated at Millinocket, Me.

Philadelphia

PHILADELPHIA, Nov. 13.

A NEW four-story building, 38 x 160 ft., to be erected at 1415 North Broad Street, has been leased by the Edward Wilkie Motors Co., 917 North Broad Street, Philadelphia, for a new service and repair plant.

The L. H. Gilmer Co., Keystone and Cottman Streets, Philadelphia, will commence the erection of addition to its mechanical belting plant, including a power house, to cost $75,000.

The Board of Education, Philadelphia, has preliminary plans in progress for a new three-story trade and vocational school, 150 x 171 ft., at Spring Garden and Brandywine Streets.

The National Electrotype Co., 621 Commerce Street, Philadelphia, has leased space in the factory at 811-21 Cherry Street, totaling about 5,000 sq. ft., for a new plant.

The Foreign Trade Bureau of the Philadelphia Commercial Museum, Thirty-fourth Street, has received an inquiry from a company at Alexandria, Egypt, for cottonseed oil mill machinery, with capacity of 35 to 40 tons per 24 hr. Foundries are requested to communicate direct with the correspondent. Full information available upon request.

The Sun Co., Finance Building, Philadelphia, has preliminary plans in progress for an addition to its refinery at Marcus Hook, Pa. The capacity will be increased about 10 per cent.

The Sweeten Automobile Co., Juniper and Cherry Streets, Philadelphia, has leased property at 114 North Juniper Street, for extensions in its service and repair works.

The Paper Manufacturers' Co., Inc., 526 Cherry Street, Philadelphia, has awarded contract to the J. S. Rogers Co., Drexel Building, for a six-story plant, 127 x 180 ft., at Fifth and Willow Streets, to cost $500,000, including machinery.

The Sobel Multiplying & Book-Keeping Machine Co., 880 North Forty-eighth Street, Philadelphia, is making inquiries for a used shaper, in good condition.

The Neel-Cadillac Co., 142 North Broad Street, Philadelphia, has had plans completed for the erection of a new service and repair building at Ninth and Federal Streets, Camden, N. J.

Motors, controllers and other electrical and mechanical power equipment will be installed in the two-story printing plant to be erected by the Chilton Co., Forty-ninth and Market Streets, Philadelphia, to cost about $190,000. The Ballinger Co., Twelfth and Chestnut Streets, is architect.

John Nuttall, Fifth and Montgomery Streets, Philadelphia, machinery dealer, has purchased the machinery at the plant of the Wilcox & White Co., Meriden, Conn., bankrupt, manufacturer of mechanical piano players, for $64,000, inventoried, it is stated, at more than $200,000.

The Union Petroleum Co., Widener Building, Philadelphia, will build an addition to its refinery at Marcus Hook, Pa., estimated to cost $500,000 with equipment. W. W. Mellen, at plant site, is in charge.

A machine shop, sheet-metal shop and other manual training departments will be installed in the new three-story high school to be erected on State Street, Trenton, N. J., estimated to cost approximately $900,000. Bids will be asked early in January. J. Osborne Hunt, 219 East Hanover Street, is architect.

Pumping machinery, power equipment, conveying apparatus and other mechanical equipment will be installed in the new sewerage disposal plant at Trenton, N. J. estimated to cost $1,250,000. Plans are expected to be ready in December and bids will be asked at that time. The George A. Johnson Co., 150 Nassau Street, New York, is consulting engineer.

A manual training department will be installed in the high school to be erected at Palmerton, Pa., estimated to cost approximately $150,000.

The Eastern Foundry Co., Boyertown, Pa., has construction in progress on a one and two-story addition, 98 x 150 ft., for cast iron pipe production. E. M. Rhoads is president.

Fire, Nov. 7, destroyed a portion of the plant of the Mineral Products Co., East Newport, Pa., manufacturer of roofing products, with loss estimated at $25,000 including equipment. John R. Morgan heads the company.

The National Radiator Co., New Castle, Pa., will soon break ground for a one-story foundry addition, 30 x 365 ft., to be ready for occupancy early next spring. It will provide a total foundry area of 135 x 365 ft.

A vocational department will be installed in the two-story senior and junior high school to be erected at Norristown, Pa., estimated to cost $250,000. Oliver R. Parry, Builders' Exchange Building, Philadelphia, is architect.

E. F. Woodhead, Swarthmore, Pa., has organized a company to manufacture paper products. The plant of the Norristown Coal & Ice Co., Norristown, Pa., has been acquired, and will be remodeled.

Bids will be taken at once for a two-story vocational school, 70 x 86 ft., at Mill City, Pa. J. H. Davey, Coal Exchange Building, Scranton, Pa., is architect.

The Lebanon Machine Screw Co., Lebanon, Pa., recently organized, will build a new one-story factory at East Lebanon, for which plans have been completed. J. Warren Light and Carlton Bell, both of Lebanon, head the company.

The Harrisburg Pipe & Pipe Bending Co., Harrisburg, Pa., has purchased the plant of the Harrisburg Bar Mill for expansion. It will be maintained in operation and improvements made. E. C. Frey is treasurer and general manager.

A manual training department will be installed in the high school to be erected at Mount Union, Pa., estimated to cost $144,000.

Baltimore

BALTIMORE, Nov. 13.

THE American Can Co., Maryland Trust Building, Baltimore, with headquarters at 120 Broadway, New York, has awarded contract to the Ferro Concrete Construction Co., Cincinnati, for its four-story plant, 90 x 160 ft., at Boston and Hudson Streets, to cost $350,000 with machinery.

The Hammond Oil Products Co., Wilmington, Del., recently organized, is arranging for the erection of a new plant in the vicinity of Church and Fourteenth Streets, Brandywine.

The Purchasing Agent, Post Office Department, Washington, will receive bids until Nov. 20 for 10 stationary air compressors, 9 to 10 cu. ft. capacity, with 110 and 120-volt motors, and one 60-gal. tank; also for one shaft-driven tenoning machine; and, on Nov. 22, for one motor-driven hydraulic tire press, 300 tons capacity.

The Carolina-Tennessee Power Co., Murphy, N. C., is planning for the construction of two new hydroelectric power plants on the Hiwassee River, near Asheville, N. C., each with initial capacity of about 30,000 hp. E. B. Norwell is secretary.

The corps of engineers, United States Army, Washington, will soon call for bids for one locomotive crane.

The Lambert Auto Co., Maryland and Mount Royal Avenues, Baltimore, local representative for the Hudson and Essex automobiles, has acquired the three-story plant of the Howell Motor Co., 913 Bolton Street, 100 x 120 ft., for $110,000. It will be used as a machine works and service plant.

A vocational department will be installed in the new three-story and basement high school, 165 x 220 ft., at Newport News, Va., estimated to cost $300,000. Charles M. Robinson, Times-Dispatch Building, Richmond, Va., is architect.

The Board of Awards, City Hall, Baltimore, will take bids until Nov. 22 for one centrifugal oil purifier for the Water Department.

Suggs Brothers, Tarboro, N. C., are planning the erection of a one-story machine shop at Carthage, N. C., for general parts manufacture and repairs.

The Chief of Air Service, War Department, Washington, will take bids until Nov. 27 for 75 valve assemblies and 3-way valves; also for 50 aneroid altimeters.

The Newberry Stock Co., Newberry, S. C., is planning the erection of a new ice-manufacturing, cold storage and refrigerating plant at Camp Sevier, estimated to cost $100,000, including equipment. T. E. Keitt, address noted, is in charge.

Fire, Nov. 4, destroyed a portion of the main plant, 200 x 300 ft., of the Fisheries Products Co., Money Point, near Norfolk, Va., manufacturer of fertilizer products, with loss estimated at $300,000, including machinery. It is planned to rebuild.

The Federal Tin Co., 11 East Barre Street, Baltimore, manufacturer of tin cans, etc., will use the property recently acquired in the vicinity of its plant, totaling about 45,000 sq. ft. of floor area, for extensions and will install machinery to cost approximately $40,000.

The American Machinery Equipment Co., Providence Road, Charlotte, N. C., machinery dealer, has inquiries out for power equipment, steam specialties and boilers.

The General Purchasing Officer, Panama Canal, Washington, will receive bids until Nov. 20 for the following equipment for the canal zone: Tackle blocks, galvanized pipe, wire finishing nails, copper sheathing nails, boiler-feed pumps, rubber gaskets, rubber packing, and miscellaneous apparatus, as set forth in circular 1502.

The Director of Public Works, Norfolk, Va., will receive bids until Nov. 27 for one horizontal, cross compound, crank and flywheel, condensing pumping engine, double opposed type, 12,000,000 gal. capacity. Dabney H. Maury, 1445 Monadnock Block, Chicago, is consulting engineer.

The Wilson-Hock Co., City Point, Va., machinery dealer, has inquiries out for power equipment, including high pressure boilers, transformers and engines; also for narrow gage flat cars for industrial service.

The W. C. Bradley Co., Columbus, Ga., manuacturer of fertilizer products, has purchased the plant of the F. S. Royster Co., devoted to similar production. Extensions and improvements will be made, including the installation of additional equipment. The plant of the Bradley company was destroyed recently by fire.

D. W. Sykes, Smithfield, Va., is planning for the installation of an automatically-operated refrigerating plant at his meat-packing works. Inquiries are being made for the machinery.

The Broadfoot Iron Works, Wilmington, N. C., has commenced the erection of a new one-story plant, 50 x 250 ft., primarily for boiler and plate work, including a department for repairs and general machine operations. A forge shop will also be established and a 50-ft. electric traveling crane installed. The expansion will cost about $200,000 with equipment. W. G. Broadfoot is president.

The Virginia Railway & Power Co., Petersburg, Va., is arranging an extension program for the coming year, to include an addition to the Locks power plant to double the present capacity, substation and line extensions and other improvements, estimated to cost $250,000 with machinery. John E. Harwell is general manager.

The Common Council, Whiteville, N. C., is planning for the installation of a municipal electric power plant and waterworks system.

The Big Bend Power Co., Scottsville, Va., has preliminary plans in progress for six individual hydroelectric power plants on the James River, with initial station to develop a capacity of 30,000 hp. A new transmission system will be built. The project is estimated to cost $3,000,000. The Ambler Engineering Co., Richmond, Va., is engineer.

A manual training department will be installed in the new boys' high school on Broyles Street, Anderson, S. C. It will be 70 x 180 ft., and is estimated to cost $100,000. W. P. Wright is secretary of the local Board of School Trustees.

R. P. Johnson, Wytheville, Va., is planning for the installation of new crushing and grinding machinery at a local quarry. The prospective purchaser operates a new and used machinery business.

Pittsburgh

PITTSBURGH, Nov. 13.

BUSINESS in machinery and equipment has declined somewhat the past week, but the trade is inclined to regard the slackening merely as a lull before activity. Inquiries still are numerous and much business is pending, which it is confidently believed will close soon. Action is expected shortly against the Pittsburgh & Lake Erie and the Pennsylvania Railroad tool lists, and this week will probably bring awards of a number of cranes which have been before the trade for some time. The Cutler Steel Co., New Cumberland, W. Va., which will make acid-resisting steel castings and wants a 10-ton crane, will buy soon, it is believed. An award of a 5-ton crane by the Guibert Steel Co., Pittsburgh, and the cranes for the by-product oven construction by the Koppers Co. in Clairton, W. Va., and Weirton, W. Va., also is believed to be near at hand. New crane inquiries include a 3-ton and a 5-ton for the Pittsburgh Screw & Bolt Co., Pittsburgh, and a 10-ton crane for the Blaw-Knox Co., Pittsburgh.

The Alliance Machine Co. has taken the order for a 2000-lb. revolving floor type charging and drawing machine for the Edgewater Steel Co., Edgewater, Pa. The L. A. Green Rail & Machinery Co. has taken two 10-ton, 50-ft. span cranes for the Pittsburgh Foundry & Machine Co., Pittsburgh. The General Electric Co. will furnish a 10,000-kw. turbo-alternator unit and three turbo-driven gas boosters for the Clairton by-product plant of the Carnegie Steel Co.

The Mack International Truck Co., 5911 Center Avenue,

Pittsburgh, will commence the erection of a one-story service and repair works, 120 x 275 ft., at Liberty and Gross Streets, to cost about $65,000. It operates plants at Plainfield, N. J., and Allentown, Pa.

A vocational department will be installed in the new high school to be erected at Freeport, Pa., estimated to cost $200,000, for which plans are being prepared.

The United States Radiator Corporation, Corry, Pa., will break ground at once for a foundry addition, to give employment to about 100 men.

The F. J. Kress Box Co., 3930 Liberty Avenue, Pittsburgh, has taken bids on a general contract for a three-story addition, 70 x 155 ft., estimated to cost $45,000. Thomas Pringle, Pittsburgh Life Building, is architect.

The Englert Mfg. Co., 2131 Carson Street, Pittsburgh, manufacturer of electric batteries, has awarded a contract to the Duquesne Construction Co., Bessemer Building, for a new plant on property recently acquired at Jane and South Twenty-fifth Streets.

The Fleischmann Co., 508 West North Street, Pittsburgh, will build a one-story automobile service and repair works in connection with its new plant on the Northside, estimated to cost $90,000.

A manual-training department will be installed in the two-story and basement high school to be erected on Duss Avenue, Ambridge, Pa., for which plans are being prepared by W. Ward Williams, 309 Fourth Avenue, Pittsburgh.

The Apollo Steel Co., Apollo, Pa., will install two 15-ton traveling cranes at its plant.

The Huntington Coal & Mining Co., Huntington, W. Va., will build a new electric power plant for service at its mines in Wayne and Kanawha counties, W. Va., and in Floyd County, Ky. A tipple also will be constructed at its Harkins mine and machinery installed at other properties. An appropriation of $265,000 has been arranged for expansion. J. M. Hall is secretary and treasurer.

The Huntington Iron Works, Huntington, W. Va., will install a traveling crane in its proposed new steel fabricating plant addition. J. J. Reich is in charge.

A vocational department will be installed in the new high school to be erected at Wayne, Pa., bids for which are being received until Nov. 27. Holmbee & Pogue, Clarksburg, W. Va., are architects. Fisher F. Seaggs, secretary of the Board of Education, is in charge.

The Allegheny Plate Glass Co., Glassmere, Pa., has awarded a contract to the Mawhinney Construction Co., 603 McCause Building, Pittsburgh, for a new one-story plant, 50 x 500 ft., estimated to cost $100,000, including machinery.

Buffalo

BUFFALO, Nov. 13.

PLANS are being completed by the Buffalo Steel Car Co., East Walden Avenue, Buffalo, for a new one-story power house, 25 x 100 ft. Plumer & Mann, 700 Main Street, are architects.

The Robertson-Cataract Electric Co., Mohawk Street and Elmwood Avenue, Buffalo, operating the Robertson Electric Construction Co., manufacturer of switchboards and electrical products, is disposing of a preferred stock issue of $180,000, a portion of the proceeds to be used for extensions.

The Depew & Lancaster Light, Power & Conduit Co., Lancaster, N. Y., is disposing of a bond issue, the proceeds to be used for extensions to power plants and system, and the installation of additional machinery.

The Board of Education, Jamestown, N. Y., is taking bids until Jan. 10 for a three-story junior high school, 150 x 180 ft., on Buffalo Street, with power house. It will include a vocational department and laboratory. Guilbert & Betelle, 541 Broad Street, Newark, N. J., are architects.

The Rochester Taxicab Co., Rochester, N. Y., has awarded contract to Peter G. Hauck, 503 Cox Building, for a two-story service and repair building, 90 x 200 ft., to cost approximately $125,000.

The plant and property of the Aluminum Ware Mfg. Co., East Clinton Street and Madison Avenue, Elmira, N. Y., including machinery, tools, etc., will be sold on Dec. 5 by the receivers, Francis G. Caffey, David J. Fox and William H. Mandeville.

Power equipment, pumping machinery, etc., will be installed in the proposed sewerage plant to be constructed by the Board of Trade, Blasdell, N. Y., estimated to cost in excess of $200,000.

The United States Radiator Works, Buffalo, has leased a three-story building at 16-18 Glenwood Avenue for the establishment of a plant to manufacture and repair automobile radiators, fenders, bodies, etc. W. H. Smith and Isaac Brockman head the company.

The New York Gas & Electric Corporation, Ithaca, N. Y., operating five power plants and system, is disposing of a bond issue of $650,000, a portion of the proceeds to be used for extensions and improvements. S. J. Magee is president.

A power house addition and one-story machine shop will be erected at the plant of the Firth Carpet Co., Auburn, N. Y., in connection with general mill extensions to cost approximately $140,000. Lockwood, Greene & Co., 101 Park Avenue, New York, are engineers. Headquarters of the company are at Firthcliffe, N. Y.

The Walcott & Campbell Spinning Co., New York Mills, near Utica, N. Y., will make extensions and improvements in the power house at its textile plant to cost $50,000. The C. B. Roberts Engineering Co., 19 Milk Street, Boston, is engineer.

Charles Sudrow, 1099 Genesee Street, Buffalo, is planning for the construction of a one-story works at Genesee and Peterson Streets to manufacture automobile and motor truck bodies.

The Angola Tire & Rubber Co., 270 North Division Street, Buffalo, is arranging a list of equipment for installation at its power house.

D. H. Burrell & Co., Inc., Ann and Albany Streets, Little Falls, N. Y., manufacturer of dairy machinery and parts, has awarded contract to Thompson & Binger, Inc., 280 Madison Avenue, New York, for a new five-story addition, estimated to cost $100,000.

Detroit

DETROIT, Nov. 13.

REPORTS from machine tool representatives indicate that November will show the greatest volume of business of any month during the year. This applies to actual orders placed as well as inquiries. One representative reports a record day for its local office, having received six inquiries from different sources. Orders placed cover automatic lathes and special machines for delivery in from eight to ten weeks. Production schedules in the automobile industry are planned to exceed the high point of the present year.

The Bohn Foundry Co., Detroit, is having preliminary plans prepared by Christian W. Brandt covering a one-story addition, 170 x 200 ft. and a two-story building, 37 x 100 ft., to be erected on Hart Avenue.

The Garman Mfg. Co., 1938 Franklin Street, Detroit, has been incorporated with a capital of $25,000 to manufacture drag links and tie rods. Some additional equipment will be bought. Officers of the company are H. B. Garman, president; L. R. Garman, secretary-treasurer, and Henry Wyatt, vice-president.

The Riverside Machine Co., Hamburg Street, Jackson, Mich., has awarded a contract to the Austin Co., Chicago, for a one-story addition, 88 x 110 ft., to cost $30,000. A portion of the structure will be used as a forge shop.

The Briggs Mfg. Co., Leuschner Avenue and the Grand Trunk Railroad, Detroit, has work in progress on a new one-story power plant, 80 x 85 ft., at its automobile body works.

The Ford Motor Co., Highland Park, Mich., will take bids at once for a one-story and basement addition on Brush Street, 100 x 237 ft. Albert Kahn, 1000 Marquette Building, Detroit, is architect.

The Lake Independence Lumber Co., Bay City, Mich., affiliated with the Brunswick-Balke-Collender Co., 629 Wabash Avenue, Chicago, manufacturer of talking machines, refrigerators, etc., has arranged for a bond issue of $1,000,000, a portion of the proceeds to be used for extensions. J. E. Orr is treasurer.

The Double Drive Truck Co., 4826 West Kinzie Street, Chicago, manufacturer of motor trucks, is completing the removal of its plant to Benton Harbor, Mich., where property was recently acquired. Additional equipment will be installed for increased output.

The Central Paper Co., Muskegon, Mich., is taking bids for a three-story addition on Lake Street. It has disposed of a bond issue of $1,100,000, a portion of the proceeds to be used for extensions. H. Jones is secretary.

The Joyce Mfg. Co., 2970 Jefferson Avenue, Detroit, recently organized with a capital of $500,000, has leased a building for the establishment of a plant to manufacture automobile equipment. Frank H. Joyce is president.

The Ira Lee Mfg. Co., Royal Oak, Mich., manufacturer of vacuum cleaners, has plans nearing completion for a new one-story factory, 60 x 120 ft., to cost about $60,000. F. D. Madison, Howarth Building, is architect.

The Diamond Spring Bumper & Mfg. Co., Wyandotte,

Mich., has been incorporated with a capital of $50,000 to manufacture spring bumpers for automobiles. It expects to locate in Wyandotte, and will be in the market for new equipment. Officers of the company are E. W. Stieler, president; E. R. Jones, vice-president; G. J. Bigler, secretary-treasurer.

The New Detroit Heater Co., 3907 Grand River Avenue, Detroit, has been incorporated with a capital of $10,000 to manufacture water heaters and other metal products. Officers of the company are P. F. Kehoe, president; J. A. MacDonald, vice-president; Norman L. Upper, secretary-treasurer.

The Peninsular Power Co., Madison, Wis., is completing plans for a hydroelectric generating plant at Loretto, Mich., with initial capacity of 1000 kw., estimated to cost $150,000. Mead & Seaston, Journal Building, Madison, are engineers.

Chicago

CHICAGO, Nov. 13.

THE Chicago & Northwestern has closed for the remainder of its small list, but the Chicago, Burlington & Quincy has placed no further orders against its large inquiry. The latest development in the railroad field is the appearance of a list from the Chicago, Milwaukee & St. Paul. It includes 23 items, some of them large machines. Store trade has fallen off, but by vigorous solicitation local machinery houses find that they are able to unearth considerable miscellaneous business, consisting principally of orders for one or two machines. One of the most encouraging recent developments lies in the receipt of a number of scattered orders for single tools from independent farm implement manufacturers. The agricultural machinery industry has been exceedingly quiet for two years and it is hoped that these orders forecast a revival which will carry with it considerable machine tool buying. It is reported that the South, where business conditions are materially improved, has been a liberal purchaser of implements of late.

The Chicago, Milwaukee & St. Paul list follows:

One extra heavy double pinion-drive heavy-duty vertical boring and turning mill to take 62-in. under tool holders, spindle travel 42 in., arranged for variable speed motor drive.

Two 30-in. full swing, side carriage turret lathes, 9-in. hole through spindle, equipped with four-jaw extra heavy universal chuck, with complete set of chucking and bar tools, arranged for motor drive.

One 2¼-in. x 6-in. cone drive flat turret lathe with four tool holders.

Two 86-in. heavy cabinet base, automatic guide bar grinders, sectional wheel, equipped with "T" slot carriage two speeds, 32-in. steel chuck and sectional wheel, arranged for motor drive.

One 36-in. heavy duty draw cut shaper arranged for motor drive.

One motor-driven 90-in. locomotive journal turning, quartering and pin turning machine.

One second hand 15-ton 30-ft. span electric traveling crane.

One motor-driven 1½-in. wedge grip bolt and rivet header.

One 24-in. x 10-ft. engine lathe arranged for belt drive.

One 18-in. x 8-ft. heavy duty geared head engine lathe, arranged for belt drive.

One 2½-in. x 26-in., rigid turret, cone drive flat turret lathe with four tool holders.

One 44-in. heavy duty motor-driven driving box boring mill.

One 54-in. vertical adjustable rotary milling machine.

One 36-in. motor-driven heavy duty draw cut pillar shaper.

One 18-in. x 8-ft. heavy duty geared head engine lathe.

One 48-in. x 12-ft. horizontal milling machine.

One electric flue welder.

One 60-in. high duty, single pulley drive universal radial drill.

One 1100-lb. single frame guided ram steam hammer.

One 28-in. heavy duty back-geared crank shaper arranged for single pulley drive.

One 36-in. x 18-ft. heavy duty triple back geared instantaneous change gear engine lathe.

The Pennsylvania Railroad System has ordered a 25-ton motor gantry crane for its Detroit yard from the Whiting Corporation. The latter company will also furnish a 36 x 54-in. water cinder mill for the Kewanee Boiler Co., Kewanee, Ill., and a No. 6 cupola for the William E. Dee Co., Harvey, Ill.

The trustees of the Central Manufacturing District, Chicago, have undertaken to construct a combination warehouse, repair shop and factory for the Westinghouse Electric & Mfg. Co. in four units, to cost $2,500,000. The plant will be located on West Pershing Road and Leavitt Street, Chicago. Work has commenced on the first unit. Industrial switchboards and panels will be manufactured.

The Central Manufacturing District of Chicago will erect a factory and warehouse, 142 x 350 ft., and 100 x 284 ft., for the Evans Fibre Box Co., at 3301 West Forty-seventh Place, Chicago. It will be completed early in January and will cost $200,000, including the site.

The Ford Motor Co., Detroit, Mich., will start immediately on the construction of a branch assembling plant at 180th Street and Torrence Avenue, Hegewisch, Ill. It will be 500 x 1400 ft. of reinforced concrete.

The Davis Phonograph Co., Chicago, has purchased a three-story factory building, 120 x 125 ft., at 314-324 West Forty-third Street, giving in part payment its present two-story plant, 58 x 120 ft., at the southeast corner of Sixty-first and May Streets.

The C. J. Sykes Mfg. Co., manufacturer of talking machine parts, automobile accessories, dies, tools, etc., 2132 Lawrence Avenue, Chicago, has purchased the southwest corner of Maplewood and Shubert Streets, 100 x 125 ft., improved with a two-story and basement plant, 60 x 125 ft.

The Golden Rule Cutlery Co., 212 Sheldon Street, Chicago, has let contract for alterations to its three and four-story factory to cost $20,000.

The Star Wood Turning Co. is receiving bids on alterations and a two-story brick addition, 40 x 50 ft., to its factory at 2267 Clybourn Avenue, Chicago, to cost $30,000.

E. Edelmann & Co., manufacturers of automobile specialties, 469 East Ohio Street, Chicago, have let contracts for a three-story factory, 125 x 150 ft., at the southwest intersection of Logan Boulevard, Holly Sreet and Schubert Avenue, to cost $250,000.

The Chicago Steel & Wire Co., 10,000 Torrence Avenue, South Chicago, has let contract for a one-story addition, 30 x 112 ft., to cost $9,000.

The Chicago Nut Co., 2513 West Cullerton Street, Chicago, has let a contract for a three-story factory, 36 x 119 ft., at the same address, to cost $40,000.

The Speeder Machinery Corporation, manufacturer of ditch diggers, Leon, Iowa, has increased its capital stock from $50,000 to $200,000 and will move its plant to Fairfield.

The Federal Stamping Co., Holland, Mich., will erect a new factory to contain 60,000 sq. ft. of floor space.

The LaPorte Brass & Aluminum Foundry Co., LaPorte, Ind., recently started operations. The foundry will confine itself to the manufacture of small brass and aluminum castings.

The Linwood Stone & Cement Co., Davenport, Iowa, has increased its capital stock from $300,000 to $2,000,000, and will erect a new cement plant to cost $1,500,000.

The Great Western Stove Co., Leavenworth, Kan., has let contract for remodeling its foundry building. It will cover an area 65 x 165 ft.

The Northeastern Iowa Power Co. has broken ground for a new power station at Independence, Iowa.

Edward Sabatini and R. Bateson will open a machine shop in the Con Keppie Building, Second Avenue, next to the Municipal Court building, Hibbing, Minn.

The Volator Co., Inc., 600 North Michigan Avenue, Chicago, recently organized with $100,000 capital stock, will manufacture the Volco line of automobile bumpers. The company expects to lease a plant, and its purchases of metal-working machines will be confined principally to drill presses and grinders. The officers are Bert Hannah, president; Lewis H. Scurlock, vice-president and general manager, and L. Byron Nash, secretary and treasurer.

The Corduan Die & Machinery Co., 413-419 North Carpenter Street, Chicago, recently incorporated with $25,000 capital stock, has bought the machinery of the Chicago Die & Machine Works and the Westerman Bakers Machinery Co., and will manufacture dies, tools, special machinery and stampings, the Maxstadt improved American copper joints and the Westerman bakery machinery. The officers are G. F. Corduan, president; Charles Schacht, vice-president; and William L. T. Kuechel, secretary.

The Carter Mahew Co., manufacturer of special grain cleaning machinery, Fifth Avenue South and Sixth Street, Minneapolis, Minn., is constructing a one-story factory, 80 x

180 ft., at Nineteenth Avenue Northeast and Jefferson Street, to cost $70,000.

The foundry department of the Plains Iron Works, Denver, Col., was recently destroyed by fire.

The City Council, Kewanee, Ill., has issued bonds for $125,000 to cover the cost of a municipal electric light and power plant.

The Grand Building Corporation, 3345-69 West Grand Avenue, Chicago, has let contract for a one-story foundry, 83 x 87 ft., to cost $10,000.

The Sloan Valve Co., 4300 West Lake Street, Chicago, has let contract for a one story factory, 84 x 148 ft., to cost $35,000.

The Chicago Mill Castings Co., 120th Street and Racine Avenue, Chicago, will build a one-story plant, 61 x 105 ft., at 1225 West 120th Street, to cost $7,500. A. J. Bennett, 1416 South Dearborn Street, is architect.

The Paepcke, Leicht Lumber Co., 111 West Washington Street, Chicago, has let contract for a two-story plant, 206 x 315 ft., in the rear of 949-53 Elston Avenue, to cost $350 000.

The Peru Foundry Co., Peru, Ind., has purchased additional land for expansion.

The Central Indiana Power Co., a merger of the Wabash Valley Electric Co., the Merchants Light & Power Co. and the Brewer interests, has plans under way for a 10,000-hp. power house on the Wabash River, 12 miles south of Terre Haute. Property, including a coal mine, has been purchased. The cost of the project will be $7,000 000.

Fire, Nov. 4, destroyed a portion of the plant of the Colfax Pressed Brick Co., Clay Street, Denver, Col., with loss estimated at $30,000 including equipment. It is planned to rebuild.

A vocational department will be installed in the new senior and junior high school, two-stories, 75 x 140 ft., to be erected at Holdrege, Neb., estimated to cost $200,000. Davis & Wilson, 515 Security Mutual Building, Lincoln, Neb., are architects.

The Cole Storage Battery Co., 2437 Indiana Avenue, Chicago, is taking bids for a one-story top addition at its plant, 45 x 109 ft. Halperin & Braun, 19 South La Salle Street, are architects.

The Interstate and Foreign Trade Department, Chicago Association of Commerce, 10 South La Salle Street, Chicago, is in receipt of an inquiry from Monterey, Mex., for metal furniture, No. 1674. Full information on request.

The Quartermaster Department, Chicago General Intermediate Depot, 1819 West Pershing Road, Chicago, is taking bids until Nov. 21 for furnishing cold chisels, files, spark wrenches, hub wrenches, double-end wrenches, engineers' wrenches, dies, reamers, taps and kindred specialties, as specified in Circular 23-59.

The H. Mueller Mfg. Co., 512 West Cerro Gordo Street, Decatur, Ill., manufacturer of brass goods, is considering the erection of a one-story and basement addition, 60 x 95 ft.

The La Rue Mining Co., Nashwauk, Minn., is planning to rebuild its machine and forge shop, destroyed by fire Nov. 2 with loss of $25,000.

A vocational department will be installed in the new high school to be erected at Edwardsville, Ill., estimated to cost $300,000. M. Kane, Bohm Building, is architect.

The Red Wing Sewer Pipe Co., Red Wing, Minn., is considering tentative plans for rebuilding the portion of its plant destroyed by fire Nov. 1, with loss estimated at $150,000 including machinery. The company specializes in the manufacture of vitrified pipe.

A manual training department will be installed in the high school to be erected at New Prague, Minn., estimated to cost $200,000. Toltz, King & Day, 1410 Pioneer Building, St. Paul, Minn., are architects.

Cleveland

CLEVELAND, Nov. 13.

LOCAL machine tool dealers are doing a good volume of business in single machines and in lots of two or three tools, which is well distributed among various industries in northern Ohio. Some plants are buying piece-meal, one or two machines at a time, extending their purchases over a considerable period, but if their requirements were combined in complete lists, they would include a fair amount of equipment. Business shows less evidence of dragging than recently and the demand is tending toward the better types of new machines.

The Ohio Injector Co., Wadsworth, Ohio, is still buying some equipment for its extension. In Toledo some machinery is being purchased by the Electric Auto Lite Corporation, also the Toledo plant of the Chevrolet Motor Car Co., and the Toledo Automatic Brush Machine Co. for a new plant. H. D. Beech Co., Coshocton, Ohio, has purchased a 36-in. planer. The Union Chain & Mfg. Co., which is moving its plant from Seville to Sandusky, is inquiring for a punch press with capacity to punch a 1½-in. hole in 1-in. steel. A Cleveland dealer during the week booked one order from a manufacturing plant for four manufacturing lathes.

The Wellman-Seaver-Morgan Co., Cleveland, has received an order from the Koppers Co., Pittsburgh, for five coke pushers and five quenching cars. Four of each are to go to the Clairton plant of the Carnegie Steel Co. and the fifth to the Weirton Iron & Steel Co. It has also taken an order for two 8-ft. gas producers for the Newton Steel Co., Newton Falls, Ohio.

The Electric Auto Lite Co., Toledo, is enlarging its Fostoria, Ohio, plant by rebuilding the plant formerly occupied by the Allen Motor Co.

The Ohio Trent Coal & Amalgam Co., Toledo, will erect a plant for the manufacture of fuel made from pulverized low grade coal and fuel and refuse oils. The process requires the use of crushers, conveyors, etc.

The Cleveland Waterproof Paper Co. has acquired a factory site on Berea Road and will build a plant for the manufacture of waterproof and mothproof paper.

The Toledo Automatic Brush Machine Co., Toledo, was recently organized to manufacture bristle brushes and machines for manufacturing brushes. It is affiliated with the Kent-Owens Machine Co. and has an office at 716 Nicholas Building. George P. Greenhalgt is president; J. R. Cowell, vice-president and general manager, and J. T. Robinson, Jr., secretary and treasurer.

The Garford Mfg. Co., Newcomerstown, Ohio, was recently organized and has established a plant for the manufacture of brass valves and for doing jobbing machine shop work.

Milwaukee

MILWAUKEE, Nov. 13.

MACHINE-TOOL trade is proceeding along fairly active lines, with scattering orders for single machines or two to three tools. Some moderate purchases are being made by automotive industries, although not much more volume is expected from these sources until after Jan. 1. Buying by railroad and railroad supply shops is only fair, and less business has come to local machinery manufacturers than had been expected. On the other hand, this is believed to portend more active purchasing in the future. General industrial activity in Milwaukee and Wisconsin, especially as it relates to iron, steel and machinery operations, is increasing steadily. The larger shops apparently have sufficient capacity to handle current business, but a good many small institutions are building extensions and buying a few small lots of machine tools, in which used equipment continues to figure prominently.

John M. Nash, Milwaukee, manufacturer of special machinery, tools, and mechanical specialties, has plans by Leenhouts & Guthrie, local architects, for a one-story addition, 90 x 123 ft., and a second story addition, 40 x 90 ft., to the present shop at 840-848 Thirtieth Street. The investment will be about $35,000. Equipment is now being purchased.

The Marinette, Wis., Boiler Works has started work on a brick and concrete addition, 40 x 50 ft., for general repair work, including overhauling of switching and yard engines for local divisions of several railroads and private logging roads of local lumber manufacturers.

The J. L. Austin Mfg. Co., Milwaukee, manufacturer of tool grinders and other mechanical specialties, has selected Menomonee Falls, Wis., eleven miles northwest of Milwaukee, as the location of permanent works. Since organization two years ago it has occupied leased quarters at 419-423 Van Buren Street. Construction of a new shop estimated to cost $50,000 will be started about Dec. 1, but details have not matured. Officers are: President, J. L. Austin, formerly with Luther Grinder Mfg. Co., Milwaukee; vice-president, William Bennett; secretary and treasurer, C. A. Reuter, formerly with T. L. Smith Co., Milwaukee; general superintendent, A. Waecker, formerly with the Chain Belt Co., Milwaukee.

The Gurney Refrigerator Co., Fond du Lac, Wis., let the

general contract to the Hutter Construction Co., Fond du Lac and Beaver Dam, Wis., for the erection of a three-story [illegible] 100 ft., and a new engine house and boiler room, 30 x 50 ft., estimated to cost $75,000, including new wood and metal-working machinery, power plant equipment, etc. E. G. Vail is president and general manager.

The Carlson Brothers Sheet Metal Co., Superior, Wis., is contemplating the erection of an addition to handle its increasing business in ventilating system installations. Details have not been announced. The company has booked orders valued at $150,000 in the past month for systems in new schools at Altoona, Pa., Houghton, Mich., Marquette, Mich., Ottumwa, Iowa, and several other cities.

The Harley-Davidson Motor Co., Milwaukee, manufacturer of motorcycles and bicycles, which is completing an additional story on one of the largest production buildings of its works at Thirty-eighth and Chestnut Streets, has engaged the Federal Engineering Co., 444 Milwaukee Street, to design an additional story, 80 x 125 ft., for another shop. Tool requirements, while not formulated, will be small and of a miscellaneous character. William Davidson is general works manager.

The Aluminum Specialty Co., Manitowoc, Wis., has broken ground for a three-story brick and concrete manufacturing and storage addition, 52 x 148 ft., at Seventeenth and Vollmar Streets, estimated to cost $45,000.

The Madison, Wis., Pattern Works, 2015 Winnebago Street, let the contract to Chase & Son, local builders, for a $20,000 addition, 40 x 65 ft., part two stories and basement, and is buying some additional equipment.

The All-American Steel Casket Co., St. Paul, Minn., has started work on the first unit of its permanent works at Nichols, near Appleton, Wis. It will be 50 x 160 ft., one story and will employ transformer current. Edwards A. Walter, St. Paul, is general contractor.

The Milwaukee Motor Products, Inc., 760 Thirtieth Street, Milwaukee, contemplates further extensions of its work, devoted largely to the production of ignition timers for Ford cars and other automobile engines. The capital stock is being increased from $250,000 to $350,000. Plans are to be prepared at once.

The General Refractories Co., Ableman, Wis., has been incorporated in Wisconsin with a capital stock of $120,000 to quarry and mine materials and manufacture fire brick, etc. A large tract of refractory clay and silica has been developed in the heart of the extensive granite and rock deposits surrounding the village of Ableman. The incorporators are W. L. Spraul, B. E. Sloan and J. A. Spraul.

The Western Screw & Specialty Co., Racine, Wis., will build a $20,000 shop addition, the general contract for which has been let to the L. V. Construction Co., 1120 Sixth Street, Racine.

Cincinnati

CINCINNATI, Nov. 13.

WHILE local manufacturers report a slight falling off in orders last week, this is ascribed to seasonal dullness, which each year is noticeable about Nov. 1. No big buying was reported, but bookings for single machines from widely scattered points indicate a general resumption of manufacturing on a larger scale than during the past two years. Some manufacturers report orders booked for the month of October were second only in volume to September, which was the biggest month in two years. All indications point to fair business, and if local manufacturers close even 50 per cent of business now under negotiation the next few months will show a very decided improvement even over the last three or four.

There are no new lists of consequence before the trade, although it is expected that the Dayton Engineering Laboratories (Delco), Dayton, Ohio, will shortly issue a list for new buildings now being erected. The American Rolling Mill Co., Middletown, Ohio, will buy complete equipment for new sheet and jobbing mills and a galvanizing plant to be erected at its Ashland works. The Chesapeake and Ohio Railroad is expected to close its list issued recently. Local dealers report fair activity in both new and used tools, but purchases are confined mostly to small machines for rounding out equipment.

[illegible]

competent mechanics, and that this condition is not local is indicated by reports from other manufacturing centers. Higher wages are looming in the industry, and it is expected that further advances in machine tool prices will be made to take care of increased costs of manufacturing.

The automobile tag shop and planing mill departments of the Ohio penitentiary were destroyed by fire Nov. 7, with loss of $75,000. The shops will probably be rebuilt as soon as the Legislature meets and passes an appropriation.

The Louisville, Ky., Board of Education will erect an addition to the du Pont manual training high school, bids closing Nov. 24. New equipment, including machine tools, will be installed.

The Standard Piston Ring Co., Wichita, Kan., has been organized as a subsidiary of the Bridgeport Machine Co., Marietta, Ohio, for the manufacture of piston rings. It is capitalized at $100,000 and is headed by J. A. Woods, president of the Bridgeport company.

The Williams Co., London, Ohio, manufacturer of steel wool, is erecting an addition to its plant which will enable it to practically double the capacity.

The Allied Belting Co., Greenville, Ohio, will shortly commence the erection of an addition to double its capacity. Considerable new equipment will be installed. The company is contemplating the installation of looms and other machinery for the weaving of duck which goes into its belts from raw cotton.

The Fauntleroy Motor Car Co., Cincinnati, has been incorporated with a capitalization of $100,000 and contemplates the erection of a garage and service station costing $50,000, including repair equipment. T. J. Fauntleroy is president.

Fire, caused by spontaneous combustion, damaged the plant of the Fairbanks Piano Plate Co., Springfield, Ohio, Nov. 13 to the amount of $45,000. M. L. Milligan is president and treasurer of the company.

The Gulf States

BIRMINGHAM, Nov. 13.

FOUNDATIONS for the new plant of the Birmingham Stove & Range Co., Birmingham, Ala., are being completed. It is expected to have the structure ready for machinery early in the coming year.

The Common Council, McLean, Tex., has completed plans for a new municipal electric light and power plant to cost $30,000.

The Columbia Oil Co., McComb, Miss., recently organized by E. E. Williams, McComb, and associates, has preliminary plans in progress for a refinery in the vicinity of Columbia, Tenn.

The A. P. Mitchell Automobile Co., Fort Worth, Tex., has plans under way for a new two-story service and repair building, 100 x 200 ft., on Calhoun Street, to cost about $75,000.

The Roper-Strauss-Ferst Co., Birmingham, is planning for the purchase of conveyor belting, pulleys and other transmission equipment.

The Texarkana Water Corporation, Texarkana, Tex., is planning for extensions and improvements, to include the installation of electrically-operated pumping machinery and other equipment, estimated to cost $150,000.

The Alco Coal Co., Alco, Ala., is arranging for the installation of motors and other electrical equipment at its properties. Fleetwood Rice is general manager in charge.

The Houston Lighting & Power Co., Houston, Tex., has selected a site on the ship channel and has tentative plans for a new electric generating plant. The company recently increased its capital from $3,000,000 to $4,500,000 for expansion.

The Public Utilities Commission, Jacksonville, Fla., has plans under way for extensions and improvements in the municipal electric power plant and system to cost $500,000, to include the installation of a 12,500-kw. generator and auxiliary machinery. Frank H. Owen is commissioner in charge.

The Gonzales Cement Works, Gonzales, Tex., is arranging a list of equipment for installation at its new plant, including oil engines, motors, elevators, pressing equipment, mechanical handling apparatus, etc. A. O. Neumann is head.

Charles Earl Currie & Co., Ashland, Ala., machinery dealers, have inquiries out for a grinding mill for handling mica, rotary drying equipment and kindred apparatus.

A manual-training department will be installed in the new junior high school to be erected at San Antonio, Tex., estimated to cost $175,000. Phelps & Dewees, Gunter Building, are architects.

The Acme Flooring Co., Hattiesburg, Miss., recently organized, has plans under way for a new mill for the production of hardwood flooring, estimated to cost $60,000. Hugh S. Currie, New Orleans, is secretary and treasurer.

The Shippers' Compress Co., Houston, Tex., is planning for extensions and improvements in the former plant of the Nelma-Kehoe Compress & Warehouse Co., Houston ship channel, recently acquired, to include the installation of additional machinery. Kenneth E. Womack is secretary.

A vocational department will be installed in the new high school to be erected at Commerce, Tex., to cost $125,000. C. E. Barglebaugh, 301 Masten Street, Dallas, Tex., is architect.

William L. Popham, Apalchicola, Fla., is planning for a new ice-manufacturing and refrigerating works in connection with a new canning factory, estimated to cost $150,000 with machinery.

The North Biloxi Improvement Association, North Biloxi, Miss., is making inquiries for sugar mill machinery and operating equipment; also for tractors and kindred equipment. J. D. Hagaman is president.

Ryan & Knight, Miami, Fla., have completed plans for a three-story automobile service and repair works, estimated to cost $70,000.

The Texas Central Power Co., Yorktown, Tex., has foundations in progress for a new power house, estimated to cost $25,000.

The Godard Lumber Co., Wetumpka, Ala., has perfected plans for a new planing mill. Later it is expected to build a new hardwood and veneer mill estimated to cost $50,000. The company's plant was recently destroyed by fire. J. F. Godard and E. A. Newton head the company.

The Common Council, Celina, Tex., is arranging for a bond issue of $50,000, the proceeds to be used for a municipal electric light and power plant. J. E. Ousley is mayor in charge.

The Central South

ST. LOUIS, Nov. 13.

THE Carey Salt Co., Hutchinson, Kan., has completed plans for a new two-story ice and cold storage plant, 100 x 150 ft., estimated to cost $150,000, including machinery. George E. Wells, St. Louis, is engineer.

The Styles Mfg. Co., Bolivar, Mo., manufacturer of loading machinery, has plans nearing completion for the initial building of its new plant, to be 46 x 107 ft. Harry T. West is president and general manager.

A manual-training department will be installed in the new high school to be erected at Highland, Kan., estimated to cost close to $90,000, for which work will commence at once. C. W. Squires, Emporia, Kan., is architect.

The Louisville Gas & Electric Co., Louisville, Ky., has arranged for a bond issue of $18,805,000, a portion of the proceeds to be used for extensions and improvements.

The Texas & Pacific Coal & Oil Co., Pauls Valley, Okla., care of the local Chamber of Commerce, is arranging plans, in conjunction with the latter organization, for a refinery in the Roberson oil-fields district.

The Elkhorn Gas Coal Co., Bluefield, W. Va., is planning for the electrification of its properties at Smalley, Ky. F. W. Gesling, Ashland, Ky., is consulting engineer. H. W. Crockett is secretary.

A manual-training department will be installed in the three-story high school to be erected at Kirksville, Mo., estimated to cost $190,000. Irwin Dunbar, Kirksville, is architect.

The Apt Co., Hillsboro, Mo., is planning the erection of a factory to manufacture railroad equipment, including interlocking spikes, tie plates, etc. W. E. Apt is president.

The Common Council, Smackover, Ark., has concluded arrangements with the Arkansas Light & Power Co. for the construction of a local electric power plant to cost $30,000. W. D. Terry will be manager.

The Western Screw Products Co., St. Louis, is arranging for the early operation of a new plant at Main and St. George Streets to replace its works recently destroyed by fire. New machinery will be installed.

John Robertson, 1435 North Pattie Avenue, Wichita, Kan., will install machinery in a local building for boiler repair work, tank manufacture, etc.

The City Council, Fulton, Mo., is taking bids until Nov. 22 for a one-story municipal electric light and power plant, estimated to cost $35,000. Hugo K. Graf, Chemical Building, St. Louis, is architect.

The Osborn Paper Co., Tenth and Moffett Streets, Joplin, Mo., has awarded contract to W. R. Garrison, Forty-fourth Street and Penn Avenue, for a new one-story and basement building, 70 x 125 ft. S. D. Osborn is president.

A one-story power house will be erected at the new plant of the Welch Grape Juice Co., Westfield, N. Y., at Springdale, Ark., estimated to cost approximately $300,000.

The Haynes-Langenberg Mfg. Co., 4042 Forest Park Boulevard, St. Louis, manufacturer of gas furnace-burners, furnaces, etc., will commence the erection of a new three-story plant, 150 x 200 ft., on site lately acquired. Equipment from the present factory will be removed to the new location and additional machinery installed to provide for about 50 per cent increase in capacity. The company has disposed of its present plant to the United Shoe Machinery Corporation, Boston.

The Common Council, Wanette, Okla., is planning for the installation of electrically-operated pumping machinery and other equipment at the municipal power and water plant. V. V. Long & Co., 1300 Colcord Building, Oklahoma City, are engineers.

The Lexington Battery Co., Lexington, Ky., is planning to rebuild the portion of its factory recently destroyed by fire with loss estimated at $75,000, including equipment.

The Stryker Kot-N-Wood Products Co., Memphis, Tenn., is completing plans for a new factory at 1040 Oakland Avenue, to cost $65,000, for the manufacture of building specialties.

The Pure Oil Co., the Roxanna Oil Co. and the Prairie Oil & Gas Co., all of Tulsa, Okla., are planning to rebuild the portion of their refineries recently destroyed by a tornado, with loss estimated at $500,000 including equipment.

A one-story power house will be erected at the new two-story school at Leavenworth, Kan., estimated to cost $130,000, for which bids are being received until Nov. 21. C. A. Smith, 602 Finance Building, Kansas City, Mo., is architect.

The Paducah Ice Co., Paducah, Ky., has completed plans for the construction of two new units at its ice-manufacturing plant, estimated to cost $70,000.

A manual-training department will be installed in the new high school to be erected at Miami, Okla. Preliminary plans and estimates are being made.

Indiana

INDIANAPOLIS, Nov. 13.

THE Weidely Motors Co., Georgia and Shelby Streets, Indianapolis, manufacturer of automobile engines, has plans for enlargements for the manufacture of six-cylinder motors. The present works have a capacity of about 1000 motors of this type per month, practically all contracted for by the Auburn Automobile Co., Auburn, Ind. Bonds for $700,000 have recently been issued for general operations and expansion. George A. Weidely is vice-president.

Dad's Factories, 238 South Meridian Street, Indianapolis, manufacturer of electric lanterns, automobile equipment, etc., have awarded contract to the Thompson & Binger Co., 709 Indiana Pythian Building, for a four-story and basement addition, 60 x 200 ft., to cost $200,000, including equipment. Homer A. Woods is general manager.

The Board of Park Commissioners, Muncie, Ind., will call for new bids for the construction of a municipal pumping plant in the Heekin Park section. Former bids have been rejected.

The Board of Works, Lafayette, Ind., will install new motors, transformers and other electrical equipment at the municipal water plant. A contract for furnishing electric power has been made with the Northern Indiana Gas & Electric Co.

Fire, Oct. 31, destroyed a portion of the foundry of the J. A. Dalton Co., Warsaw, Ind., with loss estimated at $15,000. It is planned to rebuild at once.

The Goodwin Brothers Auto Co., New Castle, Ind., will build a new two-story and basement service and repair works, 85 x 130 ft., on Race Street. J. C. Goodwin is head.

The Evansville Enameling Co., Fulton Street, Evansville, Ind., has taken bids on a general contract for a one-story addition to cost approximately $55,000, including equipment.

The Hoosier Desk Co., Jasper, Ind., has plans in progress for a three-story and basement addition, 60 x 200 ft. Clifford Shopbell & Co., Furniture Building, Evansville, Ind., are architects.

The Wadley Co., 335-45 West North Street, Indianapolis, will commence the construction of a two-story cold storage and refrigerating plant at Pana, Ill., 82 x 130 ft., estimated to cost $100,000. Thomas A. Winterrowd, 332 American Central Life Building, Indianapolis, is architect.

The addition to the plant of the Indestructible Wheel Co., Lebanon, Ind., will be used for the manufacture of disk wheels, which it has been making for the past 14 years.

The Pacific Coast

SAN FRANCISCO, Nov. 7.

CONSTRUCTION will begin on a new one-story plant, estimated to cost $25,000, for the Lisenby Mfg. Co., Angus Street, Fresno, Cal., manufacturer of color printing presses.

The Ford Motor Co., 2060 East Seventh Street, Los Angeles, has preliminary plans in progress for a one and two-story addition to its assembling plant, 150 x 350 ft. John and Donald B. Parkinson, 420 Title Insurance Building, are architects.

The Santa Fe Railway Co., Kerckhoff Building, Los Angeles, has completed plans for a new cold storage plant at Bakersfield, Cal., 82 x 340 ft. The engineering department is in charge.

The Gill Battery Co. of California, Oakland, Cal., is planning the construction of a new two-story factory, estimated to cost $250,000 with machinery. M. R. Standish is head.

The Central California Ice Co., Fresno, Cal., has plans in progress for a new ice manufacturing plant at South M and Ventura Streets, Dinuba, Cal., with initial capacity of about 30 tons per day.

The Arizona Ice & Cold Storage Co., Tucson, Ariz., will break ground at once for a new ice manufacturing and cold storage plant to cost about $125,000. The machinery installation is estimated to cost approximately $175,000.

The Fresno Paper Co., Fresno, Cal., has preliminary plans under way for a new mill, estimated to cost $70,000. A box board factory will also be erected.

The Bungalow Fixture Co., 818 Flower Street, Los Angeles, manufacturer of electric lighting fixtures, is planning for the installation of additional machinery to double, approximately, the present capacity.

The Pacific Car & Foundry Co., Sixtieth and Oregon Streets, Portland, Ore., will commence the erection of a one-story addition to cost $18,000.

The Alaska-Gastineau Mining Co., Thane, near Juneau, Alaska, is planning to rebuild its power house No. 1, on Salmon Creek, partially destroyed by fire Oct. 30, with loss estimated at $50,000 including machinery.

The Union Ice Co., San Diego, Cal., has acquired property on Cleveland Street, Oceanside, Cal., as a site for an ice manufacturing and cold storage plant, estimated to cost $75,000. A. L. Bird, is manager.

The Northwestern Electric Co., Portland, Ore., has plans in progress for an addition to its electric generating plant at the foot of Lincoln Street, to cost approximately $500,000 including machinery. L. T. Merwin is vice-president and general manager.

Canada

TORONTO, Nov. 14.

STEADY improvement continues in the demand for machinery and tools in this market. Mill supplies are moving more freely than at any time in the past six months. There have been more orders placed for new machinery the past two or three weeks than for some time and conditions point to still further improvement. Sales in paper mill equipment and wood-working lines have been very active of late and a considerable amount of prospective business is still in sight. Equipment for car and railroad shops is in better demand and dealers and manufacturers expect to close some good orders for this class of equipment before the end of the year. Railroads are coming into the market for cars and orders are pending for considerable repair work.

An upward tendency in prices is reported and a number of manufacturers have announced advances during the week. The advance applies not only to supplies but to machinery as well and ranges from 10 to 15 per cent. Despite the fact that manufacturers have advanced quotations it is stated that some dealers are shading prices when a

[illegible] 20-in. water tool type and the other a 14-in. heavy type to the Imperial Oil Co., for its plant at Calgary, Alta.

The Smart Turner Machine Co., Hamilton, Ont., reports the following [illegible] pumps, several small triplex power pumps, No. 4 belt driven centrifugal [illegible] pump, two 8 x 10 x 12 simplex vacuum pumps, an automatic feed pump and receiver equipment with motor driven centrigual pump and two motor driven centrifugal circulating pumps and a 5½ x 6 triplex power pump.

The Canadian Side Car Co., 65 York Street, Hamilton, Ont., is in the market for a 200 to 250-ton hydraulic press, Canadian Rand type preferred.

The Night Hawk Peninsula Mine, South Porcupine, Ont., is assembling machinery for its new mill. The concrete superstructure has been completed and further construction work is under way. Equipment will be installed next spring.

D. M. Fraser of the Corman Engineering Co., Toronto, announces that his company has purchased the plant and equipment of the Chapman Double Ball Bearing Co., Sorauren Avenue, Toronto. The Corman Engineering Co. has taken over the entire line of manufacture of the Chapman company which will be added to its regular products. The new owners will move into the Sorauren Avenue plant at an early date.

It is reported that the Asbestos Corporation of Canada, Asbestos, Que., will spend $500,000 on additions and new equipment.

The Red Wing Quarry Co., Ltd., North Bay, Ont., will build a stone crushing plant and will require equipment. Homer Stockdale is general manager.

Kilgour Brothers, 21 Wellington Street West, Toronto, dealers in paper bags, etc., are having plans prepared by D. C. Cotton, architect, 54 Adelaide Street East, Toronto, for a factory at Windsor Mills, Que., to cost $100,000.

C. Northey, 825 Dufferin Avenue, London, Ont., has the general contract for a factory for the London Shipping Containers, Ltd., to cost $50,000.

The Montreal Metal Co., 31 St. Nicholas Street, Montreal, will erect a foundry to cost $8,000.

The Phillips Mfg. Co., Oshawa, Ont., will build an extension to its plant and install additional equipment. It manufactures windshields and other automobile accessories, picture molding and frames.

Additions and improvements will be made to the plant of the General Motors Corporation, Oshawa, Ont., including the installation of extra equipment in the power plant.

STEEL AND INDUSTRIAL STOCKS

Little Effect of Election Is Shown in Wall Street Activities

Whatever slight shock was sustained by steel and industrial stocks during the past week as a result of election disturbances was so well shunted as to reflect only negligible changes. This bears strong evidence that markets no longer subscribe to the fallacy that any party can create prosperity. It was another week of hesitancy. Trading was largely attributable to professional effort. An outburst of strength came at mid-week in response to promising reports which placed current steel output at 75 per cent. Yet over the entire week the body of stocks lost ground. Steel common gathered sufficient strength on the post-election reports to reach 109½, with high scale buying, and Baldwin reached 132⅝. Then came the changing mood which depressed most issues. It is probable that American Can and Continental Can will declare good-sized dividends before long. The average of 20 industrial stocks remains at 99.24.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

	Low	High
Allis-Chalm.	41½	44¾
Allis-Chalm. pf.	94	96
Am. B. S. & F.	114½	120½
Am. B. S. & F. pf.	111	111
American Can	103¾	105¼
American Can pf.	110½	112
Am. Car & Fdry.	180½	188
Am. Car & F. pf.	126	126½
Am. Locomotive	123¼	129¾
Am. Loco pf.	121	121¼
Am. Radiator	114⅜	117¼
Am. Stl. Fdries.	43	45½
Am. Steel F. pf.	104½	104½
Baldwin Loco.	127	134½
Baldwin Loco. pf.	117	117
Bethlehem Steel	65	71½
Beth. Steel Cl. B	65½	72¾
Beth. Stl. 8% pf.	112	112½
Brier Hill	39¾	41½
Br. Em. Steel	10	11½
Br. E. Steel 2d pf	29¾	31½
Cambria Steel	41	41
Chic. Pneu. Tool	79½	85¾
Colo. Fuel	28½	30¾
Crex. Steel	74	80½
Cruc. Steel pf.	94¼	94½
Deere pf.	73½	74
Gen. Electric	177	181¼
Gt. No. Ore Cert.	34¼	35½
Gulf States Steel	82	91¾
Gulf S. Steel pf.	100	100
Inland Steel	44½	45
Int. Har.	104½	107
Lackawanna Stl.	80¾	82
Lima Loco.	57½	66¾
Midvale Steel	31	32¾
Nat.-Acme	13	13¾
Nat. Enam. & St.	65	68¼
Nat. E. & S. pf.	99	100¼
N. Y. Air Brake	33	34½
Otis Steel	9	10
Pitts. Steel pf.	95	95
Pressed Steel Car	82	85
Pressed Steel pf.	101¼	102½
Ry. Steel Spring.	114	118
Replogle Steel	36¾	39¼
Republic	41	43
Republic pf.	82½	85
Sloss	42	46
Sloss pf.	78	78
Steel of Canada.	62¼	63¼
Un. Alloy Steel.	34	36½
U. S. Pipe	28	32½
U. S. Pipe pf.	69¾	69¾
U. S. Steel	109	110¾
U. S. Steel pf.	120½	121½
Vanadium Steel	36¾	38¼
Va. I., C. & Coke	57	58
Whouse Air Br.	98	99

Plans of New Companies

The Richards Train Control Corporation, 714 Continental Building, Baltimore, has been incorporated under Maryland laws with a capital stock of $2,000,000. This company is a reorganization of the Richards-Ford Train Control Co., incorporated in 1917. Its principal business will be the manufacture and installation of automatic train control devices, which for the present will be built by contract. Plans contemplate building about Jan. 1, at which time equipment will be purchased. Harry W. Richards is president.

The Automatic Accelerator Co., 1205-7 Harrison Avenue, Cincinnati, was recently incorporated, with a capital of $25,000, to manufacture automotive equipment. Some parts will be manufactured by contract. Factory equipment will be removed from the present plant at Kendallville, Ind., to the address above, and full operations will be started about Dec. 1. M. Wetstein is president.

The General Die-Casting & Machine Co., 2533 North Ashland Avenue, Chicago, has been incorporated with a capital of $25,000, to manufacture die castings and mechanical equipment. It has acquired the property of the General Die Casting Co., to which additions will be made. The present equipment will be increased later. Thomas D. Hogan is president; A. E. Croft vice-president, and Edward Friedlander secretary-treasurer.

Members of the Kokomo Brass Works, Kokomo, Ind., have taken over the plant of the Malleable Iron Co., that city, and have been incorporated with a capital of $550,000, to manufacture iron and steel products. Production will be increased as soon as possible, present plans looking to immediate expansion in annealing and melting capacity. The incorporators are: J. W. Johnson, Charles T. Byrne and George Kingston, all of Kokomo.

The W. H. Robinson Co., Real Estate Trust Building, Philadelphia, was recently organized to manufacture metal products. It is in the market for steel and tin plate. William H. Robinson is general manager.

The Bolandi Beading Machines Corporation, 250 West 106th Street, New York, has been incorporated with a capital of $300,000, to manufacture special machinery and parts. Plans provide for the erection of buildings in the near future. The company will have about 600 machines manufactured by contract. Raphael Bolandi is the chief incorporator.

The Columbia River Door Co., Kalama, Wash., was recently organized with a capital stock of $50,000, to engage in the manufacture of doors, sash and kindred products. J. F. Stone, Kalama, is corporate representative.

The Orange Car & Steel Co., Orange, Tex., has been organized to take over the business of the Southern Dry Dock & Shipbuilding Co., that city. The capital stock, completely subscribed for, is $200,000. Car building and repairing comprise the chief lines of operation. S. M. White is president, H. J. L. Stark and F. H. Farwell are vice-presidents, and T. F. Coyle is treasurer.

The Norwalk Iron Works Co., South Norwalk, Conn., builder of air and gas compressors and refrigerating machinery, announces the opening of a Chicago office at 627 West Washington Boulevard. L. R. Bremser, who for 13 years was associated with the Gardner Governor Co., will be in charge.

The Oklahoma Fabric & Rubber Co., Muskogee, Okla., is in no way identified with the Allen Tire & Rubber Co., Allentown, Pa. Among the organizers of the former appear the names of two ex-officials of the Allen Co., but they have had no connection with that concern since September.

The Alvord Reamer & Tool Co., Millersburg, Pa., announces the appointment of Paul A. Cuenot as mechanical representative to furnish special tool service to customers. Mr. Cuenot was formerly connected with the American Locomotive Co. and the Pennsylvania Steel Co.

The Mount Vernon Machine Works, Inc., Mount Vernon, Wash., was recently incorporated and will engage in a general machine shop business. Its present properties are sufficient but plans are under way to erect a building in the spring. At that time it will be in the market for equipment. E. O. Ellingson is president; W. E. Gerry, vice-president, and W. H. Utter, secretary-treasurer.

The Maximotor Co., Muskegon, Mich., has been organized with an authorized capital of $500,000 preferred and 10,000 shares no par value common stock to manufacture small gas engines. Ground has already been broken for the first unit of the plant, a building 350 x 80 ft. The officers are: President, Frank E. McKee; vice-president, Lee L. Turner; secretary, Thomas H. Hume; treasurer, I. A. Wyant; plant manager, George D. Branston, all of Muskegon.

The Skelton Shovel Co., Inc., Dunkirk, N. Y., was recently incorporated, with a capital stock of $300,000. It will engage in the manufacture of shovels for the present, but other lines may be added later. A new plant is being erected on Lake Road, Dunkirk. This company, although separately incorporated, will be the American subsidiary of the Canadian Shovel & Tool Co., Ltd., Hamilton, Ont. The officers of the company are: John C. McCarty, president; Frederick Skelton, vice-president, and Walter E. Skelton, secretary and treasurer.

The American Developing Machine Corporation, 50 East Forty-second Street, New York, has been incorporated with a capital of $1,250,000, to manufacture machinery and parts. The chief item of manufacture for the present will be a developing machine upon which $250,000 has been spent in experimentation. Plans provide for the building of a plant, preferably on a New York site, some time in the near future. The incorporators are: H. H. Meyers, H. N. Trimble and E. F. Murphy.

The C. J. Tool Service Corporation, Pelham, N. Y., has been incorporated with a capital of $10,000, to manufacture tools and other mechanical equipment. Raw materials will be purchased in the open market. The incorporators are: E. W. Burdick and B. G. Smith, both of Pelham.

The American Lamp-O-Phone Corporation, 442 East 148th Street, New York, has been incorporated with a capital stock of $50,000, to manufacture machines and parts. It has taken over a business already established, but is planning to expand into larger quarters immediately. The company purchases quantities of tin, zinc and metal strips in the open market. The incorporators are: F. Riera, H. H. Stevens and M. H. Elvidge.

Firm Changes

Charles H. Lucas, 108 Alder Street, Waltham, Mass., for the past 15 years engaged in the manufacture of tools, dies and gages, has retired. He is succeeded by the Dunbrack Tool & Die Co., a Massachusetts corporation capitalized at $20,000, of which W. H. Dunbrack is president and N. K. Dunbrack treasurer. The new firm will manufacture jigs, fixtures, cutters, gages, sub-presses and open dies, in addition to experimental instrument work, but will specialize in dial gages. The management has under consideration plant extensions. The officers of the new company for the past 15 years held executive positions with the Keystone Watch Case Co.

The Coppus Engineering & Equipment Co. and the New England Brass Foundry Co., Worcester, Mass., are to consolidate under the name of the Coppus Engineering Corporation, capitalized for $500,000. The foundry will be operated as a department of the new company. New interests have come into the combination. The board of directors will consist of Frans H. C. Coppus, J. Verner Critchley, Frank A. Drury, Linwood M. Erskine, George A. Gaskill, Jerome R. George and William D. Luey. Mr. Critchley will represent Worcester banking interests on the board.

The Reliance Gage Column Co., Cleveland, announces that its Cleveland clutch business has been sold to the Western Engineering & Mfg. Co., Chicago, which has been incorporated as a subsidiary of the Western Valve Bag Co. to take over the manufacture and marketing of this clutch. Increased demand in its steam specialty line, together with the developing of its new method float, caused the Reliance company to dispose of its clutch business.

The name of the Westfield Machine Co., Westfield, Mass., screw machine products, has been changed to The Westwyre Co. Thomas T. Lofie is president and treasurer.

The official title of the Newburyport Metal Stamping Co., Newburyport, Mass., has been changed to the Parkman-Farnsworth Lamp Co. William G. Fisher is president and Norman Russell treasurer.

Paul J. Kalman Co., Inc., with executive offices in Chicago, announces the change of its corporate name to the Kalman Steel Co. Warehouses for reinforcing bars have been opened for active operation at Youngstown, Ohio, and in New York. It has established an Eastern sales office at 110 East Forty-second Street, New York.

The Anker Engineering Co., Widener Building, Philadelphia, has taken over the agency of the Exeter Machine Works, Inc., West Pittston, Pa., in Philadelphia territory.

The Florandin Equipment Co., 110 West Fortieth Street, New York, which is New York representative of the Conveyors' Corporation of America, Chicago, is now also representing the Perfection Grate & Supply Co., Springfield, Mass., manufacturer of hand stokers and soot cleaners.

The Pyrene Mfg. Co., 520 Belmont Avenue, Newark, N. J., has moved to this address from its previous location, 17 East Forty-ninth Street, New York. Its new property provides 100,000 sq. ft. of floor space.

Judging Combustion from Gas Analyses

(*Continued from page* 1281)

$$A \quad \frac{153.43 \times 1.8}{21 - 1.8} \quad \begin{matrix} O \\ N \end{matrix} \quad \begin{matrix} 3.021 \\ 11.363 \end{matrix}$$

$CO_2 = 23.1\% = 38.765$ cu. ft.
$O_2 = 1.8\% = 3.021$ cu. ft.
$N_2 = 75.1\% = 126.028$ cu. ft. $114.665 + 11.363$
$100.0\% = 167.814$ cu. ft.

The slight discrepancy — CO_2 38.765 against 38.80 and N_2 (from combustion) 114.665 against 114.63 — depends on the fact that only one decimal is given in the analysis, permitting an error of 0.05 per cent.

The Case of Producer Gas

Producer gas is made from coal partly through direct gasification of the fixed carbon by the blast (a mixture of air and steam) and partly through distillation of the volatile matter. In addition, secondary reactions of varying nature take place, stabilizing the hydro-carbons in the volatile matter into gases permanent in heat. These processes may be considered either as a series of pyrogenetic reactions, whereby the hydro-carbons, at the high temperature prevailing, are condensed into higher compounds and free carbon, or cracked up into more simple non-condensible compounds and free hydrogen; or else as direct reactions between the hydro-carbons and the distillation products (particularly CO_2 and H_2O and, of course, oxygen if, due to a thin fuel bed or channels in it, the oxygen has not all been absorbed in the gasification zone), forming CO and H_2. A true understanding of these reactions is of highest importance in the correct operation of a producer and they offer a wide field of study.

In considering the influence of these secondary reactions on the composition of the gas, we might assume three possibilities:

1. That only the first kind of reactions takes place, viz.: that all the tarry vapors enter the gas as stable hydro-carbons.

2. That only the second kind of reactions takes place, viz.: that all the tarry vapors are broken up and converted into permanent non-condensable gases, so that the gas analysis represents 100 per cent of the gas produced.

3. That both kinds of reactions occur simultaneously, the preponderance of the one or the other depending on operating conditions, but with the result that the gas always contains some condensable hydro-carbons and the gas analysis consequently does not represent all the gas.

Table II.—Gas Produced from One Pound of Coal

	Cu. Ft. Fixed Gas	Cu. Ft. Tar Vapors	Cu. Ft. Water Vapor	Total Cu. Ft.	B.t.u. per Cu. Ft.	Total B.t.u.
Case No. 1: All tar vapors destroyed	66.3			103.7		7,822
Case No. 2: All tar vapors preserved	66.3	6.8	30.6	103.7	122.1	8,190
Case No. 3: 50 per cent tar vapors preserved	66.3	3.4	30.6	100.3	111.0	8,156

It being generally conceded that the gas receives its luminosity from the hydro-carbons and that this luminosity is of highest importance, at least in open-hearth practice, it follows that the quality of the gas is improved to the degree in which the first kind of reactions dominates.

Hard to Judge from Analysis

Very often a gas with a fine looking analysis is defunct in hydro-carbons. In other words, it is impossible to tell from the gas analysis whether the hydro-carbons in the tarry vapors have been preserved or destroyed.

To prove this statement I have set forth below a series of detailed calculations based on the analyses of coal and producer gas which I quoted before. From these calculations the very same analysis can be obtained, whether all the hydro-carbons have been destroyed and converted into fixed gas, whether they are all preserved but stabilized or whether part of them are destroyed and part preserved. The gas produced from one pound of coal, according to the one or the other condition, might have identically the same analysis, but its physical properties are decidedly different, as Table II will show.

Not only is the total heat value obtained from one pound of coal considerably lessened as the tar vapors are cracked up and fixed but, what is much more important, the actual heat value per cubic foot, when the moisture is considered, is in reality not 118 B.t.u., but might be as high as 127.7 B.t.u. or as low as 103.7 B.t.u. And to this must be added the heat transfer capacity and the radiating power of the gas, which depend entirely on the tarry vapors preserved or, more correctly, on the amount of condensed hydro-carbons contained in the gas.

Condensable Hydro-Carbons in Producer Gas

This coal can be assumed to produce gas in all three different ways: Case No. 1, case No. 2 and case No. 3, above. The coal, converted into gas, will accordingly contain per lb.:

Table III

	Case 1 Lb.	Case 2 Lb.	Case 3 Lb.
Carbon	0.66536	0.57106	0.61821
Hydrogen	0.03934	0.03312	0.03623
Oxygen	0.03393	0.03393	0.03393
Nitrogen	0.01357	0.01357	0.01357
Total	0.75220	0.65168	0.70194

Assuming that in either case the gas produced has the same analysis, and that 100 cu. ft. of gas contain by weight the constituents given in Table IV, and that the air performing the gasification has been inducted into the producer by means of steam blast (0.4 lb. steam per lb. of Western coal), then from one lb. of coal will be produced:

Case, No. 1, $\frac{66.536}{1.00379} = 66.285$ cu. ft. fixed gas.

Case, No. 2, $\frac{57.106}{1.00379} = 56.890$ cu. ft. fixed gas.

Case No. 3, $\frac{61.821}{1.00379} = 61.588$ cu. ft. fixed gas.

These gases, all with the same analysis, will contain by weight the amounts of elements shown in Table V, derived either from the coal or the blast.

Table IV

Gas Contents	Cu. Ft	Total Weight	Weight of 100 Cu. Ft. Gas — Carbon	Hydrogen	Oxygen	Nitrogen
CO_2	9.0	0.93280	0.25440		0.67840	
C_2H_4	0.4	0.02954	0.02532	0.00422		
CO	26.3	1.49712	0.64162		0.85550	
H_2	8.1	0.04295		0.04295		
CH_4	2.6	0.10993	0.08245	0.02748		
N_2	60.6	1.47046				1.47046
	100.0	1.08280	1.00379	0.07465	1.53390	1.47046

Table V.—Case No. 1

	Total	From Coal	From Blast
C_2	0.66536	0.66536	
H_2	0.04948	0.03934	0.01014
O	1.01674	0.03393	0.98281
N	2.96323	0.01357	2.94966
	4.69481	0.75220	3.94261

From Steam: $H = 0.01014$, $O = 0.08112$, Steam 0.09126

From Air: $O_2 = 0.98169 = 23.412\%$, $N_2 = 2.94966 = 76.588\%$, Air = 3.93135

Assuming the composition of air by weight to be 23.3 per cent oxygen and 76.7 per cent nitrogen, and remembering that, as the basis for calculations, an average has been taken of a large number of gas analyses with all but the first decimal omitted, it follows that in either of the three cases a gas of the given analysis could have been produced, as its contents, not derived from the coal or from steam, hold the true proportions of air.

No doubt most combustion engineers have some-

times been puzzled by the apparently anomalous fact that a gas having a good analysis burnt with a thin flame lacking "body," while another furnace had a sharp, quick-working flame, although the gas analyzed lower. The data presented here ought to explain satisfactorily such puzzles and substantiate my claim that the analysis of the gas offers no indication as to what degree the tar vapors remain in the gas. It might be possible, although highly improbable, that the gas production has followed the lines of Case No. 1, with all the vapors reduced to fixed gas. Again it might be possible, although just as improbable, that all the tarry vapors, according to Case No. 2, remain as hydro-carbons in the gas. Neither is there anything to warrant

Table VI.—Case No. 2

	Total	From Coal	From Blast
C	0.57106	0.57106	
H	0.04247	0.04247	
O_2	0.87264	0.03321	0.83871
N_2	2.54326	0.01357	2.52969
	4.02943	0.65168	3.37775

From Steam		From Air	
H_2 = 0.00935		0.83871	
O_2 = 0.07480		0.07480	
Steam	0.08415	O_2 = 0.76391 = 23.194%	
		N_2 = 2.52969 = 76.806%	
		Air = 3.29360	

the assumption that the gasification takes place exactly according to Case No. 3, on a fifty-fifty basis. It might be 75 per cent or more either way. But so long as any assumption has to be made, this condition might just as well be accepted because, as shown in the following, it offers some simple figures to be used in the calculations, and is close enough so that the results of the calculations need not be misleading.

The question naturally presents itself: If the quality of the gas depends chiefly on the presence of hydrocarbons, and the gas analysis cannot tell anything about it, and consequently is not a dependable indicator of the quality, what is then the use of a gas analysis? But gas analyses are nevertheless very useful, so long as they are used with discrimination. They are, to begin with, indispensable in any calculations concerning combustion. They will, furthermore, give a good relative comparison of the operation of the individual producers in a plant where the producers are of the same type and operate on the same kind of coal. Besides, it is possible by means of gas analyses, if taken in a certain way, to determine the real quality of the gas, viz: whether the majority of the hydro-carbons are destroyed or remain in the volatile.

In conclusion I want to call attention to another fact which often is overlooked; the necessity for waste gas analyses when the problem concerns the combustion in an open-hearth furnace, the question being whether the ratio between the gas and the air is correct or whether the combustion is performed in a satisfactory manner. When problems of this nature, involving the combustion in the furnace proper, are to be solved by means of gas analyses, it will absolutely not do to collect the waste gas sample in the flue between the reversing valves and the stack, because there always is a leakage of air into the downtakes and checker chambers and because there might be a short circuit in the gas reversing valve, introducing combustibles into the waste gas. The sample must be taken as close to the furnace proper as possible—in the ports or downtakes.

But due to the construction of the furnace, where the air and gas currents are introduced one above the other on more or less parallel lines and removed in a similar way, a perfect mixture is seldom obtained. A certain amount of gas will sweep closely over the bath; a certain amount sweeps along the roof; between them is a separating blanket of waste gases. The result is that combustibles will show up in a waste gas sample collected from the gas downtake, while a simultaneously collected sample from the air-downtake shows free oxygen, indicating surplus air. Under normal operation, when the ratio between gas and air is close, this condition is more the rule than an exception.

If only one sample is taken, either from the air or the gas downtake, the result must be erroneous; unless one sample from each of the downtakes is taken, simultaneously with a fuel gas sample (the sampling time of course in all three cases being inside a reversal or not more than 10 to 15 minutes) it is useless to attempt any calculations. It is naturally pre-supposed that the ratio in which the waste gases divide between the gas and air ports has been established by observations. This ratio is probably different in every furnace.

Calculations have been made, using a ratio of 45 per cent going through the gas ports and 55 per cent through the air ports, figures obtained from measurement. These calculations show that the total amount of waste gases produced was 232.118 cu. ft., that the surplus of air was 10.4 per cent, while the useful air amounted to 96.4 per cent of the air necessary for complete combustion. The ratio of heat development will figure out 95.85 per cent. If we had contented ourselves with one waste gas analysis, we would have obtained, if we had taken our sample in the air port, 249.374 cu. ft. waste gases (or 7.4 per cent more than actually was produced) as a result of complete combustion with a surplus of air as high as 27.2 per cent; while, if the sample had been secured from the gas port, the result would have shown 214.018 cu. ft. waste gases (or only 92.2 per cent of the actual amount) with only 91.5 per cent of the possible heat developed, because only 92.7 per cent of the necessary air was present.

It may seem inconsistent first to point out the mistake often committed, by introducing assumptions in the calculations, and then try to prove my argument against ordinary producer gas analyses by means of an assumed quantity of tarry vapors existing in the gas. But my object was to show the great importance of the tar vapors—not to produce a heat balance. In the problems of combustion with which most of the time we have to deal, the question is not about the actual volumes nor of the total heating value, but simply whether the combustion is going on in an efficient way, and whether the proportion of gas and air is satisfactory.

Table VII.—Case No. 3

	Total	From Coal	From Blast
C	0.61821	0.61821	
H_2	0.04588	0.04588	
O_2	0.94169	0.03359	0.91076
N_2	2.75325	0.01357	2.73968
	4.36213	0.70194	3.66019

From Steam		From Air	
H_2 = 0.00975		0.91076	
O_2 = 0.07800		0.07800	
Steam	0.08775	O_2 = 0.83276 = 23.311%	
		N_2 = 2.73968 = 76.689%	
		Air = 3.57244	

Calculations carried out according to my method, and based on waste gas analyses collected at the gas port as well as at the air port simultaneously, with a fuel gas sample will, under these circumstances, give a sufficiently close result, even though the presence of tar vapors and water vapors is neglected; particularly as the analyses are presented with only one decimal and it is perfectly satisfactory to compute the figures, on which the judgment is based, with one decimal only.

It has been the purpose of this paper to call your attention to the fact that guesswork can be eliminated from the solution of ordinary combustion problems by means of waste gas analyses, and to present a method that will extend the possibility of their application, as it will establish the relations between a fuel gas and the waste gases, even when the combustion is incomplete and part of the CO_2 is derived from the metal bath. I have confined myself to gaseous fuels, but the formulas can easily be modified to apply to liquid fuels as well, provided the assumption is made that they, during a certain stage of the combustion process, are gasified and dissociated into their elements. This assumption is of course in reality wrong, but as a purely theoretical chemical proposition it is permissible, as the final result of the calculations will be the same.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	
Refined iron bars, base price	3.04c.
Swedish bars, base price	7.50c.
Soft steel bars, base price	3.04c.
Hoops, base price	4.39c.
Bands, base price	3.84c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	3.14c.
Channels, angles and tees under 3 in. x ¼ in., base	3.04c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.10c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	3.30c.
Toe-calk, ½ x ⅜ in. and larger	4.15c.
Cold-rolled strip, soft and quarter hard	6.75c. to 7.25c.
Open-hearth spring steel	4.50c. to 7.00c.
Shafting and Screw Stock:	
Rounds	3.90c.
Squares, flats and hex	4.40c.
Standard cast steel, base price	15.00c.
Extra cast steel	18.00c.
Special cast steel	23.00c.

Tank Plates—Steel

¼ in. and heavier	3.14c.

Sheets

Blue Annealed

	Per Lb.
No. 10	4.19c.
No. 12	4.24c.
No. 14	4.29c.
No. 16	4.39c.

Box Annealed—Black

	Soft Steel C. R., One Pass, Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.30c. to 4.70c.	.....
Nos. 22 and 24	4.35c. to 4.75c.	5.00c.
No. 26	4.40c. to 4.80c.	5.05c.
No. 28	4.50c. to 4.90c.	5.15c.
No. 30	4.75c. to 5.15c.	.....

No. 28 and lighter, 36 in. wide, 10c. higher.

Galvanized

	Per Lb.
No. 14	4.60c. to 5.00c.
No. 16	4.75c. to 5.15c.
Nos. 18 and 20	4.90c. to 5.30c.
Nos. 22 and 24	5.05c. to 5.45c.
No. 26	5.20c. to 5.60c.
No. 27	5.35c. to 5.75c.
No. 28	5.50c. to 5.90c.
No. 30	6.00c. to 6.40c.

No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
½ in. Butt	—50	—42	½ in. Butt	—11	+13
¾ in. Butt	—55	—44	¾ in. Butt	—17	— 1
1-3 in. Butt	—57	—44	1-1½ in. Butt	—20	— 2
[illegible]	[illegible]	—41	2 in. Lap	—14	+ 2
⅞ in. Lap	—50	—26	2½-6 in. Lap	—18	— 2
9-12 in. Lap	—46	—25	7-12 in. Lap	—10	+ 6

Steel Wire

	Per Lb.
Bright basic	4.75c.* to 5.00c.
Annealed soft	4.75c. to 5.00c.
Galvanized annealed	5.40c. to 5.65c.
Coppered basic	5.40c. to 5.65c.
Tinned soft Bessemer	6.40c. to 6.65c.

*Regular extras for lighter sizes.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	19½c. to 20½c.
High brass wire	20 c. to 21 c.
Brass rod	17 c. to 18 c.
Brass tube, brazed	26⅜c. to 27⅜c.
Brass tube, seamless	23 c. to 23½c.
Copper tube, seamless	25¾c. to 26 c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 22c. to 23c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14-20		
	Grade "AAA" Charcoal 11x20	Grade "A" Charcoal 14x20	Primes	Wasters
			80 lb...	$6.05	$5.80
			90 lb...	6.15	5.90
			100 lb...	6.25	6.00
IC..	$10.00	$8.50	IC..	6.40	6.15
IX..	11.50	10.00	IX..	7.40	7.15
IXX..	13.00	11.25	IXX..	8.40	8.15
IXXX..	14.25	12.50	IXXX..	9.40	9.15
IXXXX..	16.00	14.00	IXXXX	10.40	10.15

Terne Plates

8-lb coating, 14 x 20

100 lb.	$7.00
IC	7.25
IX	7.50
Fire door stock	9.00

Tin

Straits pig	40c.
Bar	45c. to 50c.

Copper

Lake ingot	15¼c.
Electrolytic	15 c.
Casting	14¾c.

Spelter and Sheet Zinc

Western spelter	8¾c.
Sheet zinc, No. 9 base, casks	10¼c. open 10¾c.

Lead and Solder*

American pig lead	8c. to 8¾c.
Bar lead	9c. to 10c.
Solder, ½ and ½ guaranteed	27½c.
No. 1 solder	26c.
Refined solder	23¼c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	75c.
Commercial grade, per lb.	35c.
Grade D, per lb.	25c.

Antimony

Asiatic	8¼c. to 9c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb. 25c. to 27c.

Old Metals

The market is more active and values slightly higher. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy crucible	12.00
Copper, heavy wire	11.50
Copper, light and bottoms	9.50
Brass, heavy	6.50
Brass, light	5.50
Heavy machine composition	8.50
No. 1 yellow brass turnings	6.75
No. 1 red brass or composition turnings	8.00
Lead, heavy	5.75
Lead, tea	4.50
Zinc	4.25

THE IRON AGE

New York, November 23, 1922

ESTABLISHED 1855 VOL. 110, No. 21

Standard Machines Increase Production

Savings Effected in Use of Fixtures Rather Than in Special Machines—Case of Quintupled Production

BY L. S. LOVE

CONSI[illegible]crease in production can ve[illegible] be secured through the development of fixtures to be fitted to machines already in use in the machine shop, or through the purchase of standard types of machines to be fitted with special fixtures, or in many cases without any special fixtures at all, but simply with the use [illegible]ercial machines with standard tools fitted [illegible]n.

This is exemplified in the changes which have been made in the production plant layout at the Gray & Davis Division of the American Bosch Magneto Co., since the latter company took over the Gray & Davis plant at Cambridge, Mass. In this particular plant starting and lighting motors and generators for motor cars are manufactured. These motors and generators consist of shells or frames in which are mounted four poles and the usual form of laminated rotor with requisite connections.

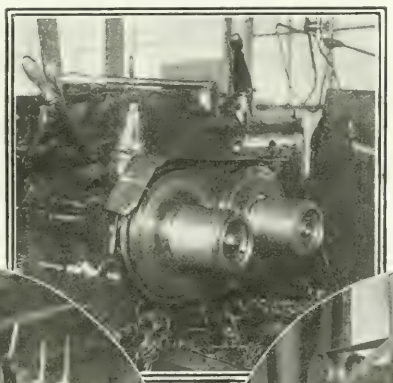
There are two sizes of shells used in the present product, 4 in. in diameter and 5 in. These shells are drawn to shape from flat stock. The former method of drawing did not produce shells of sufficient accuracy to be used without boring. This operation, as well as opening of the closed end and chamfering the inside edge on that end was handled, on both sizes, in a single spindle automatic screw machine; the turning, beveling and shouldering operations being done in turret lathes.

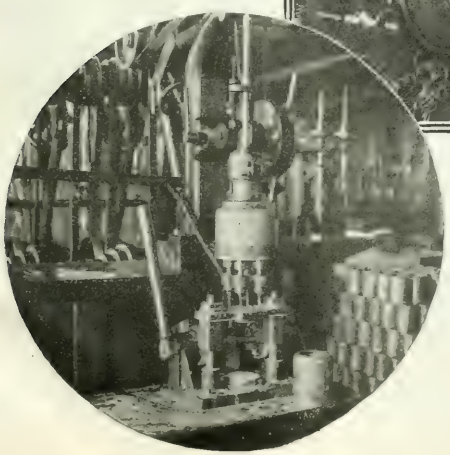
The present manner of production is the same

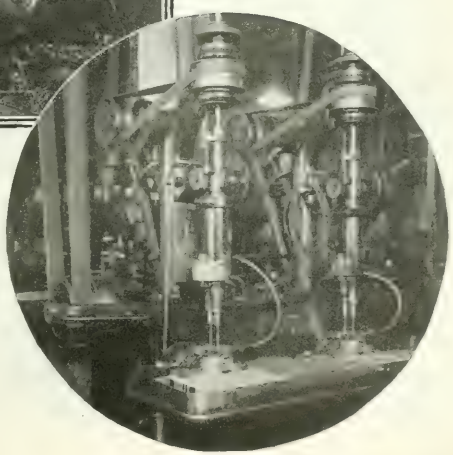
A 2-Spindle Turret Lathe Saves Two Chuckings of the Shell or Frame of an Automobile Starting and Lighting Motor (as Shown in the Top Illustration) in Turning, Shouldering and Boring the Shells

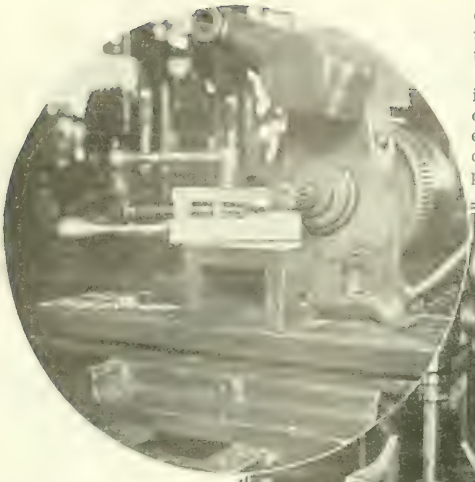
A Simple Quick Acting Fixture and Drill Guide for Drilling the Holes in the End Plates of the Motor Is Shown in the Lower Left Picture

In the Lower Right Is Shown the Method of Drilling Pole Pieces, to Be Fixed, of Course, on the Interior of the Motor Shell. The method increased output five times

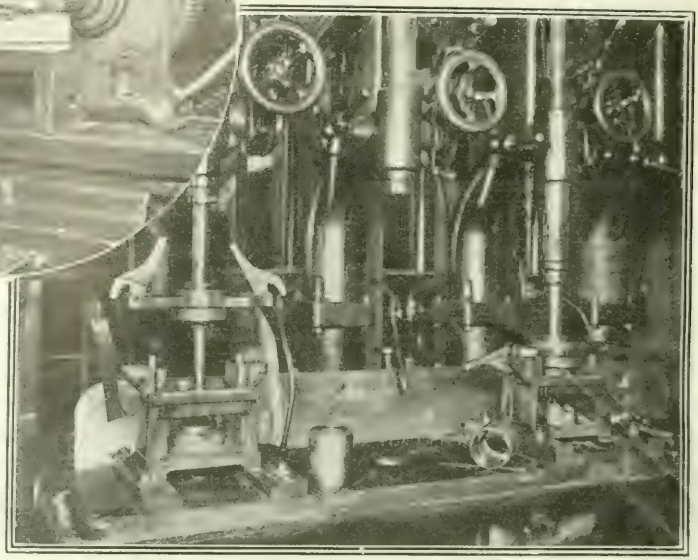








To Give the Rounded Corners of the Pole Pieces, the Device Shown in the Circle Is Employed. The milling cutter requires no lubrication



Pole Pieces Are Bored in Position in a 2-Spindle Drill Press. This operation makes them concentric with the end holes in the shell and thus maintains a uniform air gap between the rotor and the poles

on the 4-in. shells, except that the boring operation is eliminated, the opening up of the closed end being the operation now on the automatic screw machine. The boring operation is no longer required, as the drawing dies are held to closer limits, thereby producing shells of sufficient accuracy without that machining operation. In handling the 5-in. shells it has been found more economical to place the work in a standard type of two-spindle turret lathe. This machine is equipped with standard forms of tools having stellite bits, which are doing all machining operations of opening, chamfering, turning, shouldering and beveling in one chucking at the rate of 225 per day, which is a saving of 20 per cent from the old method. The expanding mandrels on which the work is mounted are controlled by air. This mounting is shown in one of the illustrations.

After the shells are turned in the manner just described, they are moved to the next machining operation. This is drilling holes through the sides for attaching the pole pieces and brush holders. There are three holes in a straight line parallel with the axis of the shell, each line of holes being drilled radially and spaced 90 deg. apart. The work is handled in a two-spindle power-feed drill press of the high-speed type. Each spindle carries a multiple drill head carrying three twist drills in a line. Shells are mounted on fixtures consisting of a horizontal expanding mandrel, which can be rotated and locked in the four positions required for spacing around the shell. Drill guide bushings are carried in a plate extending over the mandrel. The method of handling is for the operator to place the work in one fixture and engage the feed. He then mounts a piece in the other fixture and engages the feed there, during which interval the first piece has been drilled, the feed disengaged and the spindle returned to rest. He rotates the fixture to next position and proceeds as described.

The next operation is also one of drilling and is likewise handled in a two-spindle high-speed type of machine with power feed. Here each spindle is equipped with a multiple spindle head having four drills in a circle for drilling holes to attach end plates. The type of fixture used under each of these spindles consists of a heavy base in which are mounted two vertical guide posts. On these posts slides the top clamping plate, which serves not only to hold the work, but also carries drill guide bushings. The work is mounted on a plug in the base plate, which enters the open end of the shell. There are two dowel pins at the rear which enter two of the pole piece holes previously drilled, thus registering it in relation to these holes. The top clamping plate also carries a pilot plug which enters the shell at the top. It is thus registered from three points—both ends and the side. The top plate of this fixture is lowered by means of a lever actuating a shaft on which are carried two gears. These latter mesh with racks attached to the rear of the top plate bearings which ride on the guide posts, as illustrated in another of the reproduced photographs. The tapping of these four holes for attaching the end plate is done in a similar manner in a machine equipped, of course, with a tapping attachment.

Alligator Shear Leaves Insignificant Burr

Pole pieces are delivered to the shop in bars of mill lengths drawn to shape. These must be cut to the individual length required. The former method was to bundle four or five bars together and cut then in a hack saw. This work is now being done one bar at a time in an alligator shear about twenty times as fast as the old method, and the shear cuts this stock with practically square ends. In addition to the saving of time, there is a considerable item of saving in floor space.

Copper segments for commutators are likewise sheared from formed bars, instead of being sawed as formerly. This method produces 11,000 per day

as against a former production of 1000 per day per saw. This operation is handled in an ordinary punching press.

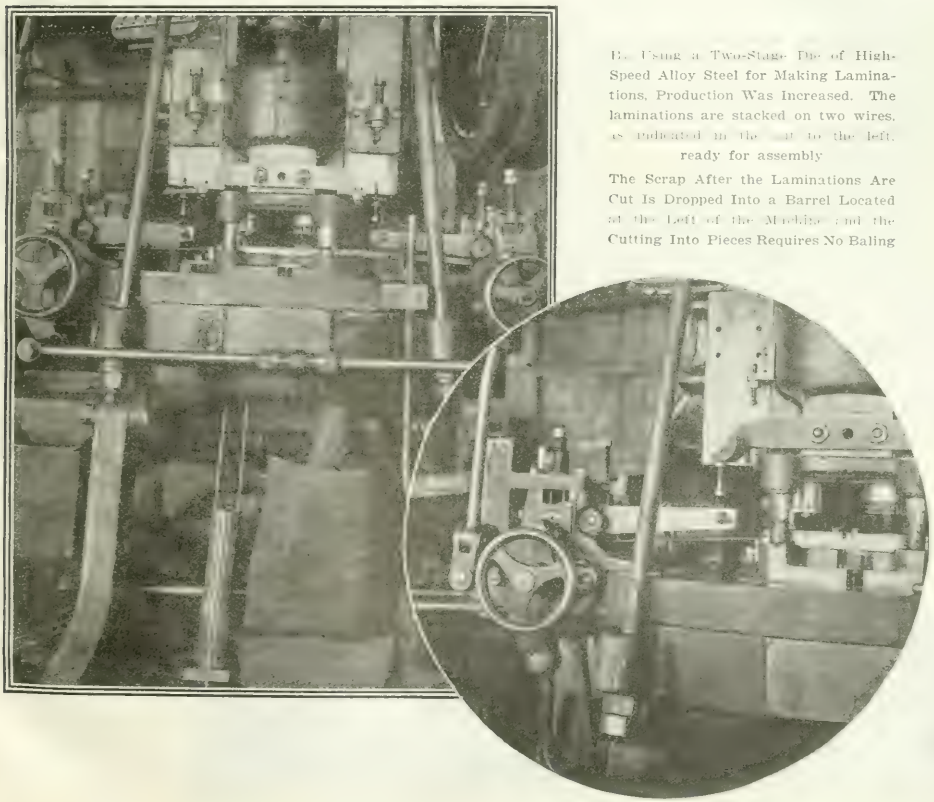
Each pole piece has two holes drilled in it for attachment to the shell. These were formerly handled in a single spindle machine, with hand feed, one hole at a time. The output was 1000 per day. The present method utilizes a two-spindle high-speed drill press with automatic feed. Table is equipped with two fixtures, one under each spindle as shown in an accompanying illustration. There is a two-spindle head carried in each spindle of the machine. Operator inserts a piece in one fixture and engages the feed, then proceeds to the other fixture and inserts work there, engaging the feed. He then returns to the first spindle which has drilled the holes in the first piece, disengaged the feed and returned to neutral position. This method permits practically continuous operation with a production of 5000 drilled pieces per day.

Another operation required on the pole pieces is rounding the corners to prevent abrasion of insulation on the pole winding. This work was formerly done by holding the pieces against a grinding wheel. At present the pieces are mounted in a fixture on an ordinary knee type milling machine, in the spindle of which is a shell end milling cutter. The fixture swivels at a point which produces the desired radius at the corner, as the pole piece is swung in front of the tool. Work is ejected by the operator's hand pushing against a spring plunger, as illustrated. Some 500 pieces with four corners rounded are turned out daily without the use of any cutting compound, the cutter keeping cool by running in the air for a period greater than the actual cutting time.

The pole pieces are next assembled in the shell and are carried to a boring operation, that they may be concentric with the end holes of the shell. This work is handled in a two-spindle power-feed drill press, of the plain bearing type, on the table of which are two fixtures, both handled by one operator. As indicated in one of the illustrations, the base plate of the fixture carries a pilot which registers one end hole, the top plate when clamped down registering the other end hole on a pilot plug carried there. The top plate and the lower plate both carry bushings to pilot the boring bar.

Seats for bearings, laminated cores, etc., are turned on the rotor shafts. These are made from bar stock and were formerly produced on single spindle automatic screw machines. The present method employs practically the same kind of tool set-up, except that the work is handled in a four-spindle automatic machine, increasing the production three times from the same floor space.

A special form of three-jaw chuck, also illustrated, has been designed for use on turret lathes. The jaws on this chuck are levers pivoted in the body and have hooked ends. They rock in to grip the work. They are actuated by a tapered plug which enters the body of the chuck at the rear and pushes out on the jaws behind their pivots, thus closing them in at the front. Starter gear housings are held for turning and boring in this chuck with a saving of 35 per cent over time required with the old standard chuck. The machine in which this operation is performed is provided with air to



By Using a Two-Stage Die of High-Speed Alloy Steel for Making Laminations, Production Was Increased. The laminations are stacked on two wires, as indicated in the rack to the left, ready for assembly

The Scrap After the Laminations Are Cut Is Dropped Into a Barrel Located at the Left of the Machine and the Cutting Into Pieces Requires No Baling



By Using This Chuck 35 Per Cent in Time Was Saved in Turning Starter Gear Housings

operate the chuck. One end of the housing is inserted in the open face of the chuck as far as the flange on the housing. The jaws of the chuck then rock, in gripping the piece and drawing it firmly back against the chuck face. thus holding the bore square with the flange.

This type of chuck is used on several other operations, in some cases being lever operated instead of air operated. One operation is the facing on both sides of the motor end plate flange. This chuck, while similarly constructed, grips internally. Two turning tools, set the proper distance apart, are carried in the front tool post on the cross slide of the turret lathe and fed in to rough the flange parallel. Two tools carried in the rear tool post are then fed in to finish face the flange parallel and to the proper thickness.

Standard Tool Gives Better Production Than Special

Starter pinion teeth are chamfered to facilitate engagement with the starter gear. This work was formerly handled in a tooth-rounding machine at the rate of 200 per day. The present method employs an ordinary hand-milling machine on which is counted a hand-operated fixture. This fixture is provided with a spring latch pin for proper indexing of the gear and has increased the output to 100 per hour.

The stampings which make up the laminated rotor core were formerly stamped out in a press with a single operation die fed by hand. Per day 20,000 pieces were punched. The company is now producing 45,000 pieces per day by using roller feed and a two-stage die made of high-speed alloy. The first part of the die cuts out the winding slots and punches the hole through which the shaft passes. The second position in the die blanks the lamination out of the strip and drops it through the die and press bed to a stacking frame. This frame consists essentially of two upright rods set into a heavy base. The rods extend up into the die and catch the laminations as they come through, thus stacking them ready for use.

Since developing this type of die and stacking frame, a further indirect saving of labor has been effected in handling the scrap. Formerly it came out in strips and was bundled. A new roller feed has been built with a shearing attachment, which, acting with the press operation, cuts the strip scrap into small pieces and drops them into a conveniently placed barrel.

Rotor shafts before receiving the core laminations are knurled in a special machine, similar in appearance to an ordinary beading machine, except for the rolls. These are cut for knurls. The two lower rolls are 3 in. in diameter and are cylindrical. The top roll is 5 in. in diameter and is flatted on one side to permit of convenient insertion of the shaft, one revolution of the top roll cutting the knurl.

A hand-operated forming machine is used for forming rotor windings. Flat wire is drawn from the reel into the forming machine. By the operation of a locking pin and lever the wire is folded back, thus forming the two legs of the winding. It is then gripped on both legs and formed by the movement of a second lever. A third lever sets the ends and cuts off. This operation is handled at rate of 6000 to 7000 per day per man. The company has just worked out a machine for producing 2000 per hour. This machine will be installed shortly.

The field coils or windings which surround the pole pieces are wound in an old turret lathe from which all parts but the bed and head have been stripped. Wire which is cut to proper length is fed to a slot in the special chuck carried on the spindle of the lathe. This chuck is a sort of mandrel formed to correspond to the shape of the pole piece. As the lathe spindle revolves, the wire is held against the mandrel by a roller rest supported by a spring. The coils are then wrapped in insulating material and passed through a press operation to form them to the contour of the motor shell.

Another special machine which this company has developed winds 1600 turns on relay shunt coils. While this machine is not radically different in appearance from standard commercial winding machines, it has been possible nevertheless to produce with it about 50 per cent more work.

During the past few months the Dominion Iron & Steel Co., Sydney, N. S., has been importing Algerian iron ore from Northern Africa. This when mixed with the Wabana ore, is said to produce a grade of foundry iron which far surpasses that previously made by the company from Wabana ore alone.



Rotor Windings Are Formed in a Hand Machine

How Bethlehem Became Armament Maker

Reminiscences Covering the Introduction of Bessemer Steel, the Activities of Ericsson, Holley and Fritz and the Passing of the Builder of the Monitor

BY H. F. J. PORTER

IN 1842 Robert L. Stevens, of Hoboken, N. J., began the construction of a floating battery, which when finished he offered to sell to the Government; but the Navy Board appointed to inspect it made an unfavorable report upon it and it was not accepted. Robert L. Stevens died in 1859 and his brother, Edwin A., decided to reconstruct it. In 1862, discouraged because Capt. Ericsson at the DeLamater Iron Works, New York, outdistanced him with the Monitor, he sent to Europe Alexander L. Holley, a very capable civil engineer in his employ on the Camden & Amboy Railroad, (in which his family's fortune was invested and of which he was president), to study the foreign navies, shipyards and armament forges in the hope of obtaining some new ideas to apply to his rejected battery.

Country's First Bessemer Plant

While in England Holley seized the opportunity to investigate the Bessemer process of making steel, then recently developed, and on his return, after reporting to Mr. Stevens on the ordnance situation, he visited Captain Ericsson, who he knew would be interested in learning about his trip, as he was then engaged in conjunction with his "Battery Associates," John F. Winslow and John A. Griswold, iron manufacturers of Troy, N. Y., in building monitors of various sizes for the Government at the DeLamater Iron Works and in a number of other shipyards about the country. Incidentally Holley told him what he had learned about the Bessemer process and Winslow and Griswold at once sent him back to England to secure the exclusive rights for its adoption in this country.

On Holley's return he formed the partnership of Winslow, Griswold and Holley, and in 1864 built the first Bessemer steel plant in this country in connection with the Albany Iron Works at Troy, N. Y., under the name of the Bessemer Steel Co.

Shortly before this there had been established at Wyandotte, Mich., an experimental plant of a similar character under the patents of William Kelly, of Eddyville, Ky., and of Robert Mushet, of England, the American rights to whose patents had been secured in this country.

The Bessemer process and the Kelly process interests soon locked horns in the courts but finally concluded to settle their differences by combining under the name of the Pneumatic Steel Association. The plant at Wyandotte was discontinued and Capt. Robert W. Hunt, who had charge of it later, became superintendent of the works at Troy. They then began the introduction of the Bessemer process of making steel in the representative iron rolling mills of the country, most of which were in western Pennsylvania, Ohio and Illinois, where the necessary raw materials for the product, iron ore, limestone and coking coal, were located. Mr. Holley acted as engineer of installation.

Up to this time railroad building had been slow owing to the high price of wrought iron rails and transportation about the country was largely by stages and river boats. Manufacturing was carried on by water power, and even when the steam engine became commercialized, industrial towns were still located on the rivers, lakes and the coast because of the lack of land transportation facilities. The Bessemer process, however, substituted the cheap steel rail, and immediately there came about an era of railroad building which carried the factory site to the raw material, and industrial towns sprang up all over the country.

It has been said that the Bessemer process did more for civilization than all previous inventions of man put together. Holley deserves much of the credit for this advance. He made trips abroad annually, exchanging between European and American Bessemer plants experiences and improvements in practice, many of which were of his own devising.

Early Warship Work at DeLamater Plant

In 1868 when Edwin A. Stevens died, he left a million dollars to the State of New Jersey to complete his floating battery. In 1869 Theodore F. Randolph, a prominent business man in New Jersey, president of the Morris & Essex Railroad and interested in coal and iron mining in Pennsylvania, had been elected Governor of the State and he appointed my father, Gen. Fitz John Porter, who had become associated with him after the Civil War and lived on adjoining property in Morristown, and Gen. George B. McClellan and William Shippen, who was connected by marriage with the Stevens family, as commissioners to reconstruct the Stevens' battery. They selected Isaac Newton, U. S. N., retired, who had been first assistant engineer on the Monitor during her career, to superintend the work, which was contracted for by the DeLamater Iron Works.

In connection with his mining associations, my father had come in contact with Asa Packer, at Mauch Chunk, Pa., who built the Lehigh Valley Railroad and in 1865 founded Lehigh University at South Bethlehem, Pa. He had placed in charge of it Capt. Henry Coppee, then professor of English literature at the University of Pennsylvania. Professor Coppee and my father had been classmates at West Point and had gone through the Mexican War together, and several of his faculty were West Point men. When it came time for me to attend college in 1874 and I decided to study engineering, it was quite natural for my father to select Lehigh University as the technical school for me which he knew most about and of which there were very few in existence and all quite young.

In that same year Alexander Holley installed the Bessemer process at the Bethlehem Iron Works at South Bethlehem, and in October, one month after I went there, the first "blow" was made and the town went to see it. Governor Randolph's eldest son, a boyhood friend of mine, went to South Bethlehem at the same time I did and entered the iron works to obtain an idea of the iron and steel industry before joining his father in his coal, iron and affiliated interests. He and D. A. Tompkins, chief draftsman of the works, roomed together near me and I visited them there and at the works frequently during my college course and so obtained some familiarity with shop practices.

It was during those visits that I met and got to know more or less intimately Mr. Holley and John Fritz, superintendent and engineer of the plant. They used to talk about the inadequate protection of this country from the attacks of foreign navies, which were growing stronger every year, and Holley told Fritz of Captain Ericsson's work and of his own visits to the foreign ordnance forges. He brought Fritz and Ericsson together at the DeLamater Iron Works, where much of the machinery for the Bessemer plants was constructed.

Mr. Holley wanted Mr. Fritz to install a type of blowing engine designed by George H. Reynolds, chief engineer of the DeLamater Iron Works, and he took Mr. Fritz there to see it, but Mr. Fritz preferred engines of his own design and I saw them built and erected and chose one of them as the subject of my graduating thesis at Lehigh University in 1878.

It was customary in those days for a boy after graduating as an engineer to complete his preparatory

education by spending four years getting practical experience in some iron works, and both Mr. Fritz and Mr. Holley suggested my going to the DeLamater Iron Works, which was the largest works of its kind in the country and where a greater variety of work was performed than elsewhere.

Beginning of Society of Mechanical Engineers

My father, who had become acquainted with Mr. DeLamater and Captain Ericsson, and the DeLamater Iron Works through his connection with the rebuilding of the Stevens battery, approved of the suggestion, and I went there in the summer of 1878 and spent four years in the shops, beginning in the pattern office and ending in the drafting room. Looking upon this experience as a post-graduate course I considered the DeLamater Iron Works as my Alter-Alma Mater. There I used to see Mr. Holley on his occasional visits to Mr. DeLamater, and on one of these visits he came to my drafting board, which was just outside of Mr. DeLamater's office, and expressed his interest in learning that I was in charge of that part of the drafting department which had in hand the development of ice machinery, which was then new in this country, having been introduced here by Raoul Pictet in the French section of the Centennial Exhibition in Philadelphia in 1876 and taken up afterward by Mr. DeLamater.

Mr. Holley told me of the then forming American Society of Mechanical Engineers, of which he was the founder and suggested my joining it and presenting a paper before it on the ice machine. I accepted the suggestion and joined the society at its first meeting in November, 1880, and at the following spring meeting in Hartford, Conn., I read a paper before it on the experimental ice machine plant at the DeLamater Works. Mr. Holley attended this meeting and presided at the banquet held during one of the evenings.

While in the shops at the DeLamater Works, I took part in the construction of the "Destroyer," a semi-submersible torpedo boat designed by Captain Ericsson to supersede the Monitor type of war vessel and built at his and Mr. DeLamater's expense. On its trial trip, I met Lieutenant William H. Jaques, a naval officer in the Bureau of Ordnance, who wrote a monograph on it entitled "Ericsson's Destroyer and Submarine Gun" which was published by G. P. Putnam's Sons as No. xxx in their series "Questions of the Day."

The Semi-submersible Torpedo Boat

This vessel the owners offered to sell to the Government and the latter appointed a board of three naval officers with Capt. T. O. Selfridge at its head to inspect it. It was sent to the Brooklyn Navy Yard and submitted to a series of tests resulting in a favorable report and recommendation that it be purchased and several more ordered built.

The novelty of the design deterred the Government from taking immediate action regarding it, just as they had acted in the case of the Monitor, but the activity of foreign nations in increasing their navies caused the appointment of another board entitled the Naval Advisory Board, composed of fourteen army and navy officers, to recommend a comprehensive plan of procedure regarding the development of a new navy. The president of this board was Admiral John Rogers, who had commanded the monitor Dictator built at the DeLamater Works.

The introduction of Bessemer steel in the principal rolling mills of the country naturally caused this board, among other recommendations, to propose that the new navy should be constructed of steel and naturally to confer with Captain Ericsson and Mr. Holley in the course of the study. The recommendation resulted in the appointment of the "gun foundry board" composed of three army and three navy officers with Commodore Edward Simpson, chairman, and Lieutenant Jaques, previously mentioned, secretary.

Armor Plate and Guns at Bethlehem

Both Captain Ericsson and Mr. Holley recommended that before making their report, they take the same trip to Europe which Mr. Holley had made and visit the armor plate and gun forges of England and on the continent. This recommendation they adopted and on their return home, Lieutenant Jaques had with him options on the licenses from Whitworth in England and Schneider in France for the exclusive use in this country of their processes for making armor plate and guns. These were offered to Mr. DeLamater, but he said he was too old to consider them and contemplating retirement rather than engaging in new ventures. Mr. Holley had died while the board was away and Captain Ericsson recommended that they visit Mr. Fritz at Bethlehem as the best man to take up the project.

Mr. Fritz had already realized that he could not compete with the other Bessemer plants in the West, which were more favorably located as regards the raw materials of the product. From his knowledge of the manufacture of ordnance obtained from Holley and Ericsson, he saw also that by a change to the latter character of product he could sell a small amount of it in the shape of guns and armor plate for hundreds of dollars per ton instead of a large amount in the shape of rails for tens of dollars per ton. He had already placed the matter before his board of directors, explaining that by this change the distance of the plant from the raw material would not be so serious a matter. So when the gun foundry board came to see him and Lieutenant Jaques showed him the options on the licenses to use the foreign processes of manufacturing ordnance, he induced the board of directors to take up the matter with the Government at Washington. Receiving favorable consideration there, Mr. Fritz and Lieutenant Jaques went abroad and closed the contracts with Whitworth and Schneider, while simultaneous arrangements were made with the Government here for sufficient orders to guarantee the construction of the works. The works were completed in 1887 and Lieutenant Jaques left the navy and joined the staff of the company.

Mr. DeLamater and Captain Ericsson died in 1889 and the DeLamater Iron Works went out of existence the following year. The site was bought by New York, the buildings razed, the west side marginal way was cut through and modern piers for ocean vessels were built there. The Bethlehem plant already in full operation thus became the logical successor of the DeLamater Works.

While I was a student at Lehigh University 1874-78, the Centennial Exhibition took place in Philadelphia. Armed with letters of introduction to some of the officials, I visited the exhibition under very favorable circumstances. A letter to Lieutenant Lewis W. Robinson, U. S. N., in charge of machinery hall, from the prominent Philadelphia engineer Coleman Sellers, whom I knew well through college friendship with his youngest son, gave me especially favorable opportunity to study the exhibits there, which Lieutenant Robinson took occasion to go out of his way to show me.

Armor Plate and Commercial Forgings Exhibited at Chicago

In 1891 I was appointed first assistant mechanical engineer at the World's Columbian Exposition in Chicago and took part in it during the construction period under D. H. Burnham, the Chicago architect, then director of works. The chief of the machinery department was my old acquaintance of the Centennial Exhibition, Lieutenant Robinson, who when the construction of the exposition was approaching completion invited me to become assistant chief in charge of machinery hall. So I was able to assist Mr. Fritz and the Bethlehem Iron Co. in securing adequate space for their exhibit of armor plate, guns and large commercial forgings.

After the exposition, I decided to open an office in Chicago and the Bethlehem Iron Co. made me Western representative to handle commercial work.

At this time there was formed in Chicago the Technical Club, composed of engineers and others affiliated with that profession. Capt. Robert W. Hunt, who, as has been stated, was in charge of the Bessemer Steel Co.'s plant at Troy, N. Y., and had later established an international bureau for testing rails and materials of construction, became president of the club. Charles E. Billin (now secretary of the Philadelphia Engineers' Club) became secretary and I became treasurer. This club later developed into the present Chicago Engi-

neers' Club, one of the largest social organizations of the profession in the West.

During the 90's a great development of electricity in the lighting and street railroad fields took place and huge power plants with their large steam engines were made possible only by the great forging presses of the Bethlehem Iron Co. When the Spanish war came on, as the company in accordance with the contract with the Government had to devote its whole energy to the production of ordnance to the exclusion of commercial work, I was called to the works at South Bethlehem and there I was able to renew my association with Mr. Fritz and Lieutenant Jaques.

Historical Landmarks Established

After the DeLamater Works closed down, many of the men who worked there, anxious to maintain their old associations formed an organization called the "Associated Veterans of the DeLamater Iron Works." This still exists, meeting annually at a banquet. During the past four years this organization has had several meetings memorializing the work of Captain Ericsson and Mr. DeLamater in which quite a large number of other organizations civic, historical, technical, etc., have taken part. I have been chairman of the committee in charge of these meetings and at the last one, on March 9, the sixtieth anniversary of the battle between the Monitor and the Merrimac, I had the satisfaction of having the site of the DeLamater Iron Works, Twelfth to Fourteenth Streets and Tenth Avenue to the North River, New York, named DeLamater Square and a bronze tablet recounting the accomplishments performed there placed on the Cunard pier, which now occupies the space where the center of the old works was. I was thus instrumental in perpetuating the name of my Alter-Alma Mater in the locality where it was rapidly fading from memory.

This committee is now arranging to place a historical collection of the DeLamater-Bethlehem memorabilia in the Smithsonian Institution at Washington as the nucleus of a national engineering museum in which every engineer in the country should be interested.

We are told that a tree once marked retains the evidence, though a hundred years of growth may have overlaid it. We cannot foretell the future of the stately oak of American engineering planted during the middle of the nineteenth century on the threshold of a development which has placed this country in the forefront of all the others, but no time will come when the historian stripping off the bark and penetrating the rings of many generations will not find at the heart the names which were carved there by Captain John Ericsson, Alexander L. Holley, Lieutenant William H. Jaques and John Fritz.

WHY WAGES WERE RAISED

An Answer from the Experience of New England Brass Mills

It will be recalled that some criticism was made of the 20 per cent advance in wages at steel works that became effective Oct. 1. It seemed to be the view in some quarters that the steel producers made the position of manufacturers in other lines more difficult, and needlessly so. The fact was, as has been pointed out by THE IRON AGE, that the steel manufacturers, in view of the relation of supply and demand, in the market for common labor, had no option in respect to the advance. It was really made by conditions over which they had no control. The article below, reproduced from the *Chase Diamond*, the publication of the Chase Companies, Inc., Waterbury, Conn., shows exactly the same situation in the brass industries that compelled the action on the wages of steel workers:

"Two months ago there was an increase in wages in the Chase Metal Works, the Chase Rolling Mills, and the Waterbury Mfg. Co., and various guesses have been made as to why wages went up.

"There has been no general demand for higher pay, there has been no talk of strikes. There is little radicalism or bolshevism in Waterbury, and although there never was, and probably never will be, a time when every one feels that he is earning as much money as he would like, still men were not so discontented or restless.

"Why, then, did wages go up?

"Had the companies made so much money that they felt that they ought to divide some of the profit among their employees?

"Was another golden age of higher wages and prosperity about to come?

"Were profits large and business so plentiful that wages were raised as a kind of bonus?

"No; none of these reasons was correct. Wages went up for two reasons:

"1. There was a shortage of unskilled labor.

"2. Living costs were slowly rising.

"The brass business has been in hard times. Last year one brass company lost a million and a half dollars, another lost nearly a million dollars, and another about three-quarters of a million, and other brass mills and factories have suffered in the same way. Business has been "bad" for nearly two years. People did not buy brass and the factories were almost idle. Thousands of men were out of work and the millions of dollars invested in brass and machinery stood idle. Taxes and overhead charges piled up and every month showed large losses on the ledgers.

"Then slowly, like a sick man after a long illness, business began to get back its strength. The factories began to hire more men to take care of their increased business, but the demand for men found little response. The long lines of unemployed that besieged the mills for work last winter had disappeared. Many had gone to other cities, many had returned to Europe. Strict immigration laws were in force and the supply of immigrants had dwindled to a thin stream. The building boom had come with a rush and many were on new construction work and repairing the roads.

"Men for heavy unskilled labor were scarce.

"There was also another reason for the increase in wages. Living costs began to climb. The coal strike will be paid for by every man in the country this next winter, and the railroad workers' strike has cost the country millions and millions of dollars, every dollar of which will sooner or later be paid for by the public.

"There is, however, one side of the recent raise which has not been talked about, but which is easily seen to be true. That is, that the companies which have raised the pay of their employees at this time will suffer large losses from doing so.

"Contracts have been taken to insure steady regular business for our mills and factory, and these contracts have been taken at old costs. A piece of brass, for instance, may cost 20c. per lb. to make, on which we may be sure of a fair profit. Add to this price the increased cost of this raise in wages, and the profit is eaten up, and the article sold at a loss.

"Our customers who have already placed their orders may congratulate themselves, our men may appreciate that what is our loss is their gain, but we ourselves know that unless this raise is repaid by more effort and productive labor, it means a large expense and loss to our companies."

"Daylight the Natural Illuminant" is the title of a book of 48 pages published by the Skybryte Co., Cleveland. From the premise that the intensities of artificial light in use in most factories are too low for the workman to do his best, the author argues that by providing adequate glass areas and by keeping the glass clean, natural lighting will have a chance to save workers as assets instead of making them liabilities. He contends that daylight can easily provide the desired intensities and that with proper maintenance of glass, much higher intensities can be obtained than are commonly found in factories. The book will be sent on application to the publisher, 347 Bangor Building, Cleveland.

Continuous Annealing Furnaces for Sheets

Car-Type Furnaces with Daily Capacity of 125 Tons Each at Ashtabula Steel Plant—Pulverized Coal Used as Fuel

CONTINUOUS annealing furnaces for box annealing form the predominating feature of the new sheet mill plant of the Ashtabula Steel Co., Ashtabula, Ohio, this being the first installation of furnaces of that type for box annealing. Departing from the usual practice of having a separate annealing department with a battery of standard type annealing furnaces, usually located in another building at some distance from the mill department, the box annealing is done in two large underfired car-type continuous furnaces that, built as a pair, are located in the center bay of the plant, just below the sheet mills and adjoining the pickling, galvanizing and finishing departments. These furnaces have a capacity for box annealing the entire product of the eight-sheet-mill plant, or approximately 250 tons per day.

Various economies in production are claimed for these furnaces, particularly in handling. After the sheets leave the rolls the handling is confined to a comparatively limited area in the lower end of the plant. Another advantage claimed is that with the continuous furnaces the plant is always able to turn out without delay orders calling for quick delivery. With the elimination of a separate building for an annealing department, the entire production department is confined to the one main building 624 ft. long and 166 ft. wide.

Powdered coal is used exclusively for fuel throughout the plant, for the sheet and pair and annealing furnaces, for firing the boilers and also for the galvanizing pots. While powdered coal has been used for some time in sheet mills having separate sheet and pair furnaces, it is stated that this is the first plant in which this fuel is used for firing combination furnaces. Both the annealing furnaces and the coal pulverizing plant were furnished by the Fuller Engineering Co.

The annealing furnaces are 96 ft. long and, together, 23 ft. 5 in. wide outside the brick work. Each furnace is 6 ft. 3 in. wide between the bridge walls and 10 ft. 3 in. in height. Each is divided into two sections by a door in the center, providing two chambers of equal size, an annealing chamber on the charging side and a cooling chamber at the discharging end. Each furnace has a capacity for six annealing boxes, three in the annealing side and three in the cooling side.

All annealing pot covers are of steel plate and the bottoms of cast iron. The pots are conveyed in and out of the furnaces on cars 16 ft. long and 6 ft. wide built by the Easton Car Co. Each car has six wheels, each wheel being mounted on a short shaft with two bearings so that, in case of warping, all the wheels will remain on the track. The annealing box bottoms when on the cars are 2 ft. 6 in. above the floor.

Cars are charged into the furnace by means of two pulleys and a cable, the latter attached to an overhead crane. As a car is pushed into the heating chamber it shoves the six cars already in the furnace forward a car length, bringing the last car outside at the discharge end. A car is charged into the furnace every 4 hr., so that with a furnace capacity of six cars the material stays in the furnaces 24 hr., one-half of this time being in the cooling chamber. The usual car charge is about 20 tons. The end doors of the furnaces, and the center door dividing the heating and cooling chambers, are of cast iron and are operated simultaneously by a 15-hp. motor connected to a line shaft.

After the annealing pot is removed from the car, at the discharge end of the furnaces, the crane picks up the car, the bottom always remaining on it, and carries it back to the front end of the furnace. When necessary the cars can be lifted with their loads. For convenience in handling they are provided with movable lifting beams, which, when not in use, are pushed in under the car platform out of the way. Only one spare car is required in the operation of the two furnaces.

Extending the length of the cooling chamber on each side are six 6-in. pipes with a 2½-in. corebuster inside, through which air for cooling is circulated, blast being supplied by a Buffalo Forge Co. blower located at the side of the furnace. Air passes from the blower to a header and from this to the cooling pipes and, after passing through the pipes, is discharged through the roof.

The plant is divided into three bays, the two outside bays being 50 ft. wide and the center bay 66 ft. A liberal amount of floor space is provided for all departments and the building is of good height, being 44 ft. 9 in. high at the sides and 66 ft. in the center, to the peak of the monitor roof. In the north bay are located the squaring shears, the finishing department and warehouse and shipping department. A depressed loading track runs the length of this bay along the outer wall. In the center bay are the sheet mills and annealing furnaces. The south bay is occupied by the bar shear, sheet and pair furnaces and pickling and galvanizing departments. The north bay is served by a 5-ton crane, the center bay by a 30-ton crane with 10-ton auxiliary and the south bay by two 10-ton cranes, all supplied by the Cleveland Crane & Engineering Co.

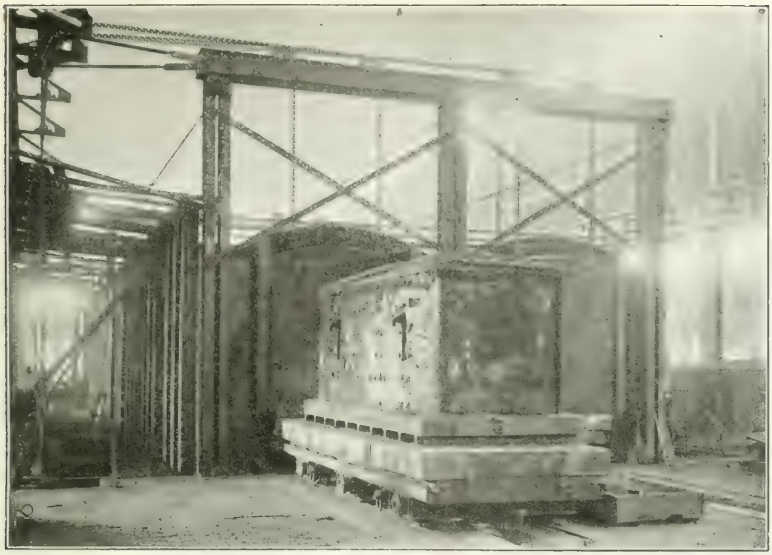
Mill equipment includes five roughing and eight finishing stands. The two largest finishing mills have individual roughing stands and the other six finishing mills have a roughing stand for a set of two finishing stands. The mills have 38-in., 42-in. and 46-in. rolls, all the rolls being 28-in. in diameter. Chilled rolls are used in the finishing mills. The mills were built by the Hyde Park Foundry & Machine Co. There are six 156-in. resquaring shears and four doublers, one for each two finishing mills, all of the same make.

Sheet bars which are stored in the upper end of the plant, are sheared on a bar shear built by the United Engineering & Foundry Co. This shear is served with a motor driven roller type approach table. After shearing, a crane in the south bay delivers the bars back of the furnaces. There are eight combination sheet and bar furnaces, one for each finishing mill. These are of the Fuller type with chambers 5 ft. 6 in. and 6 ft. wide and 25 ft. long. Bars are charged by hand into the pair furnaces from each side.

Equipment in the pickling, galvanizing and finishing departments includes two plunger type pickling machines with tanks 6 ft. deep and 13 ft. long, a drying machine, two galvanizing pots supplied by the United Engineering & Foundry Co., four roller levelers and a Streine corrugating machine.

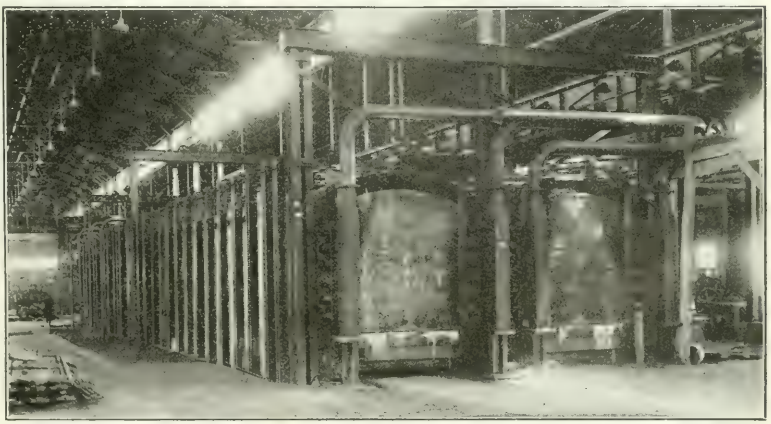
The powdered coal plant is located at the side of the mill building. Coal delivered in hopper cars is dumped into a receiving header, from which it is conveyed to a crusher which reduces it to a size which will permit it to go through a 1-in. mesh screen. It is then elevated into a magnetic separator and is discharged into a 25-ton bin located at the feed end of a rotary drier, into which it is mechanically fed. After being dried until the moisture content is reduced to 1 per cent or less, it is elevated to two dry coal bins, one of 15 tons and the other of 8 tons capacity. From the bins it is fed into two pulverizers each having a capacity of 4 tons per hour. In these it is ground to a fineness that will permit 80 per cent to pass through a 200 mesh screen. From the pulverizers a Fuller-Kinyon pump delivers the fuel to two 7-ton weighing bins. After being weighed it passes by gravity to another pump

(*Concluded on page* 1362)



Annealing Plant of the Ashtabula Steel Co.

Two Continuous Annealing Furnaces of the Car Type, in Place of the Battery of Furnaces Commonly Found in a Sheet Mill. The car shown, with annealing box and bottom, is ready to be charged into the furnace



Discharge End of the Twin Annealing Furnaces, Showing Air Supply Lines Carried Over the Top and Extending Down Each Side of Each Furnace. The air is circulated on each side of the cooling chamber in the "lower" half of the furnaces



Hoppers, at Left, Which Supply Powdered Coal to the Sheet Furnaces and at Right, the Feed Lines Leading into the Backs of the Furnaces. The sheet bars, shown piled up, are delivered at the furnace backs by an overhead crane

Angular Wheel-Truing Device

An angular wheel-truing device as illustrated, for use with its surface grinding machines, has been brought out by the Wilmarth & Morman Co., Grand Rapids, Mich. It is intended for use in shops that salvage and reclaim worn out milling machine cutters, reamers and drills, and also in shops specializing in cast Stellite cutters and tools.

With this device, the wheel can be formed to correspond to the outline to be ground. In the illustration the wheel-truing device is shown in position for



The Wheel Can Be [illegible] Without Disturbing the Set-Up of Work

dressing the wheel face parallel with the table. The diamond is fed to the wheel by means of the knurled knob at the top, which the crank is employed to feed the diamond across the face of the wheel. A graduated dial is provided for setting the device at the angle desired. The diamond-carrying member is tilted to either side for dressing the wheel face at an angle.

The chief advantage of the built-in wheel-truing device is that the wheel can be dressed properly without disturbing the set-up of the work. Time is said to be saved because of its adaptability and the facility of operation.

Merger of Press Manufacturers Reported

Newspapers at Toledo, Ohio, and elsewhere have published reports that the purchase of a controlling interest in the Toledo Machine & Tool Co., manufacturer of presses at Toledo, as reported in THE IRON AGE last week, is for the purpose of bringing about a consolidation of four or five of the leading press manufacturers in Ohio and Michigan. It is understood that a new corporation to be known as the Consolidated Machine Tool Co., will be formed with headquarters in Brooklyn, N. Y.

Nearly 60,000 Miles of Pipe in Oil Lines

A report of the Interstate Commerce Commission shows that in 1921 there were 55,260 miles of pipe line operated in interstate commerce by 33 companies. The total investment was put at $652,138,894. Extensive additions have been made to the system in the present year, and the American Petroleum Institute, New York, estimates that the 1922 report will show more than 60,000 miles of interstate line.

In addition to the main trunk lines, which are usually of 8-in. steel pipe and carry the oil from the producing fields to terminals located on the Atlantic and Gulf coasts and at the large listributing centers inland, there are thousands of miles of smaller so-called gathering lines. It is through these lines, which are from 2 to 6 in. in diameter, that the oil is collected from the wells and gathered in storage tanks for shipment to distant points.

Decarburization of Ferrochromium by Hydrogen

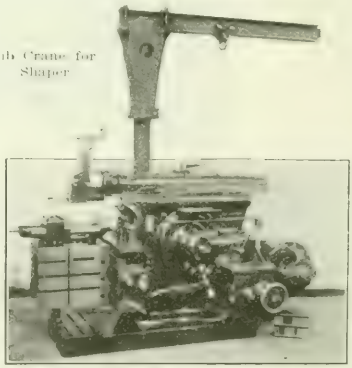
In order to produce rustless iron it is necessary that carbon-free iron and chromium be available. The usual forms of chromium, commercial grades of ferrochromium, contain comparatively large amounts of carbon. The discovery of rustless iron has thus made it very important to be able to treat ferrochromium by some process which will remove the carbon. Among the methods proposed is that of heating ferrochromium in contact with hydrogen.

Through experiments conducted by the Bureau of Standards, it has been found that ferrochromium heated in hydrogen loses carbon slowly at temperatures below the melting point of the alloy. When hydrogen is bubbled through molten ferrochromium, the loss in carbon is very rapid. It may be possible to prepare low carbon ferrochromium by blowing hydrogen gas through molten ferrochromium in a converter of the type used in the manufacture of Bessemer steel. This work is described in Scientific Paper No. 448.

Shaper Equipped with Jib Crane

To facilitate the handling of heavy work on its larger shaping machines, Gould & Eberhardt, Newark, N. J., have brought out the jib crane arranged as shown in the accompanying illustration. The equipment illustrated is the 32-in. direct motor drive machine having a jib crane of 1000 lb. capacity for loading and unloading work out of the vise. The crane is located opposite the operating side of the machine and may be revolved completely around it to handle work on all sides.

The boom is of single I-beam section and will take 1000 lb. at the extreme end. The mast is of heavy



Jib Crane for Shaper

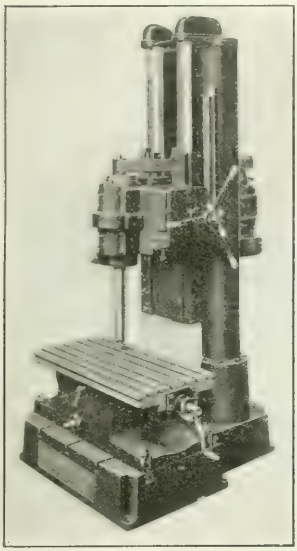
wrought steel pipe which is clamped to the shaper frame in two positions. The upper pintle is of steel and is held in a cup attached to the mast. It is provided with a ball and socket type bearing, intended to assure proper alinement of the boom at all times and permit revolving the crane by the application of a slight pressure.

The W. & B. Douglas Co., Middletown, Conn., pump manufacturer, has been purchased by the Premier Mfg. Co., Sandy Hook, Conn., which recently took over the Standard Metal Work Corporation, Thompsonville, Conn., automobile accessories, etc. Each of the subsidiary plants will be expanded within the next few months, if present plans carry.

Vertical-Spindle Type Cylinder Grinder

A cylinder-grinder having the wheel mounted on a vertical spindle as shown in the accompanying illustration, has been placed on the market by the Hy-Way Service Co., South Bend, Ind. One advantage of the vertical spindle arrangement is that the driving mechanism is above the grinding wheel so that abrasive dust drops through the cylinders and does not settle on the bearings and running parts. A canvas curtain is used to protect the vertical way on which the head slides.

The longitudinal table slide has sufficient movement in each direction from the center to permit of grinding three cylinders each way without uncovering the ways of the slide, which is intended to protect the ways from abrasive dust. In setting up a cylinder the bed on which the worktable is mounted is set in approximately the correct position to locate the work under the grinding wheel, the final adjustment being made by means of a cross slide controlled by a screw and crank.



Vertical Spindle Cylinder Grinder

A 2-hp. motor mounted at the back of the head serves to drive the grinding spindle, transmit the planetary motion to the spindle unit and feed the head down into the cylinder being ground and return it. It may be noted from the illustration that the motor is provided with a double end drive. The top belt is of fabric and drives the grinding spindle direct, and correct speeds for various sizes of wheels used are obtained through changing the pulleys on the motor and the spindle. The direct drive arrangement is intended to eliminate transmission losses and to permit of ample power from a 2-hp. motor.

The spindle is mounted in a sleeve which in turn is eccentrically located within another sleeve, the rotation of which gives planetary motion to the spindle. The outer sleeve has a ring bevel gear to which power is transmitted for rotating the wheel unit, independently of the rotation of the grinding spindle. The two sleeves in which the grinding spindle are mounted are arranged so that by making suitable adjustments, the eccentricity of the grinding spindle in relation to the entire spindle unit may be varied from zero to 1⅛ in. A graduated dial is provided to indicate the amount of eccentricity for a given setting. The range is ample for all commercial sizes of automotive cylinders where grinding wheels of suitable size are employed, without the necessity of changing pulleys.

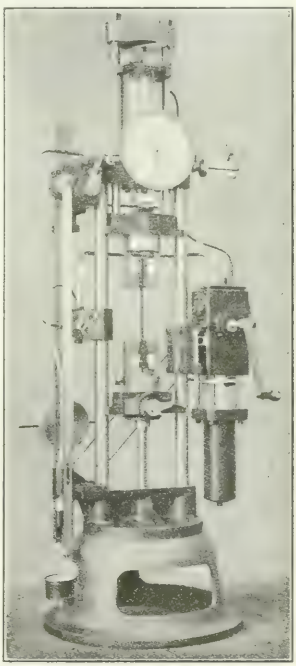
Power for the planetary movement of the grinding head is taken from a spiral pinion at the lower end of the motor through gears to the ring bevel gear on the spindle. By means of a hand lever, operating a clutch, speeds of either 40 or 60 revolutions for the planetary movement may be selected. Twelve rates of feed, from 0.007 to 0.375 in. per revolution of the grinding spindle are available, these changes being through gearing. The head is fed up and down on the column of the machine by means of racks and pinions, and the capstan wheel shown at the right is used in raising and lowering the head by hand.

The wheel spindle provided grinds holes 2¾ in. and larger, the speeds being 5000 to 7000 r.p.m. The grinding wheels are from 2½ to 5 in. in diameter. The range of feed of the head is 1½ to 10 in. per min. and the vertical travel of the head, 28 in. The equipment includes a truing diamond and holder. The floor space occupied is 37 x 42 in.; the height is 7 ft. overall; and the weight, with universal table and motor, is about 4000 lb.

New Tensile Testing Machine for Bars, Strips and Wire

A new tensile machine, built on the principle of the hydraulic press, has recently been put on the market. A feature is the wide range of adjustment which it permits as regards its sensitiveness and maximum capacity. Two coaxial rams are provided, and when both rams are in action, the machine can exert a maximum pull of 20,000 lb., while the maximum capacity with only the inner ram working amounts to 2000 lb.

The load is measured, as in all Amsler tensile testing machines, by a pendulum dynamometer, the most accurate method known for measuring the force exerted by testing machines. This pendulum deviates from its vertical position when pressure is applied, acting like a lever, but no knife edges, which are always subject to deterioration through shocks, excessive stresses, vibrations, etc., are employed. By adjusting the effective length of the pendulum rod, the sensitiveness of the dynamometer can be changed, and the 20,000 lb. machine can be converted in a minute into one with a maximum capacity of either 10,000 lb., 4000 lb., 2000 lb., 1000 lb., 400 lb. or 200 lb. Whatever the particular range chosen may be, the entire load indicating dial and the entire width of the load-extension recording apparatus will then be available for the maximum capacity for which the machine had been set. The selective feature of this machine is especially advantageous and important in testing strips and wires of different gage.



New Testing Machine for Bars, Strips and Wire

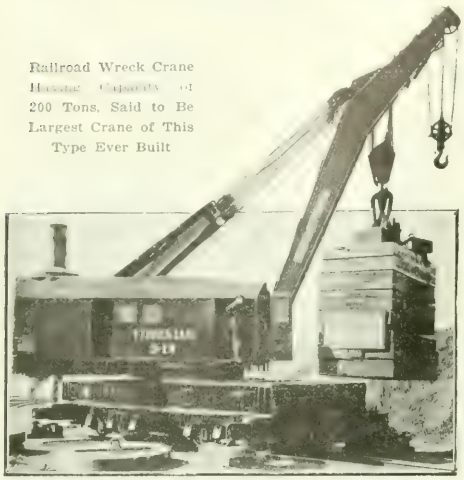
The machine as shown is of compact construction and self contained, mounted on a base 27 in. in diameter, not requiring any special foundation; it can be conveniently operated by hand. It is manufactured by the Amsler works of Switzerland, represented in this country by Herman A. Holz, testing engineer, 17 Madison Avenue, New York.

The Sessions Foundry Co., Bristol, Conn. has advanced wages of day and piece workers 10 per cent. More than 300 workmen will benefit from the increase. Labor is scarce throughout Connecticut, especially in the Hartford County district, with the general tendency of wages upward.

Industrial Works Builds 200-Ton Crane

What is said to be the largest railroad wreck crane ever built has been furnished the Virginian Railway Co., by the Industrial Works, Bay City, Mich. It has a capacity on the main hoist of 400,000 lb. at a 17½ ft. radius, with all outriggers; 200,000 lb. at the same radius with end outriggers only; and 85,000 lb. without outriggers, The capacities on the auxiliary hoist are 90,000 lb. at 24 to 30 ft. radius, with end outriggers only, and 60,000 lb. at 24 ft. without outriggers.

The crane is mounted on special-six-wheel trucks and



Railroad Wreck Crane Having Capacity of 200 Tons, Said to Be Largest Crane of This Type Ever Built

has a maximum axle load in running order of 64,000 lb. The car has a total wheel base of 26 ft. 2 in. and is 34 ft. long, the crane being 15 ft. 9 in. high at its highest point and 10½ ft. at its widest. The engines are 12 x 12 in. and steam is supplied by a 65 in., 160 lb. A. S. M. E. boiler. A Westinghouse air pump is provided and clasp brakes on each of the 12 wheels, the brakes being operated either by the engineer on the crane or by the engineer of the locomotive which may be hauling the crane in a train. Clutches are air operated. In running order the crane weighs 356,500 lb.

In building the crane the main problem of design was to keep within railroad clearances and the maximum allowable axle load, on account of bridges, of 65,000 lb., and still obtain the 200 ton capacity required by the unusually heavy rolling stock and motive power in use on the Virginian railroad.

The largest wrecking cranes in the world are said to have been built in the United States, and prior to the crane under consideration the largest equipment of this character was a 160 ton unit, having a maximum capacity of 320,000 lb. with all outriggers.

Carbonized Lignite Fuel

The vertical carbonizing oven, constructed at Grand Forks, N. D., in the course of a co-operative investigation by the University of North Dakota and the United States Bureau of Mines looking toward the commercial utilization of the northwestern lignites, has recently been operated under the supervision of W. W. Odell, fuel engineer, of the Bureau of Mines in the manufacture of lignite char on a commercial scale. Results were very satisfactory, and valuable information on the production of lignite char without the recovery of by-products was obtained. The cost of producing this char was reduced considerably below the cost of operation in the carbonizing oven used in 1921. A satisfactory grade of char was produced. Grates for the utilization of this char in the ordinary magazine feed house heating stove and for a house-heating boiler have been made at Pittsburgh and sent to North Dakota for distribution to domestic consumers.

October Sheet Shipments Show Substantial Gain

The October statistical report of the National Association of Sheet and Tin Plate Manufacturers, for the Bureau of Census, Department of Commerce, is based on a greater number of mills than previous reports of this kind. The total number of hot mills in the United States now is given as 658, having a capacity for October of approximately 385,000 net tons and the percentage of the capacity to which the October figures are related is about 68.9 per cent. Former reports detailed 641 hot mills with a capacity of approximately 365,000 net tons and the percentage of the capacity to which the figures related was 67 per cent.

	October, Net Tons	September, Net Tons	August, Net Tons
Sales	208,916	188,863	175,495
Production	243,746	202,600	228,398
Shipments	223,874	190,027	215,200
Unfilled orders	376,394	378,574	379,249
Unshipped orders	108,291	102,198	96,058
Unsold stocks	20,069	21,241	19,194

Molding Sand Investigation

The Bureau of Standards is conducting a series of tests to discover a sand with 100 per cent permeability. The advantage of finding a perfectly permeable sand or one which approximates perfect permeability is obvious. Having a standard sand with a known permeability, the suitability of every molding sand could be expressed in percentage of a sand found to be 100 per cent permeable. To accomplish this result, several sands have been investigated. One commercial grade of sand, which is a very pure silica sand of a fairly uniform degree of fineness, has been found on a number of tests, both dry and with as high as 4 per cent of moisture to be 100 per cent permeable. Further tests are being made to determine its colloidal matter or any other substances which might affect its permeability.

A. M. Castle & Co. May Decide to Build Freight Cars

A. M. Castle & Co., iron and steel jobber, Chicago, is considering engaging in the manufacture of freight cars. William B. Simpson, president of the company, has purchased property at 6601-33 West Grand Avenue from the receiver of the Ursus Motor Co. and may erect buildings to cost $750,000 to $1,000,000 for freight car construction. No definite decision has yet been reached, however, and it is possible that a separate company will be formed for the new undertaking. Heretofore the company has built freight car underframes and furnished supplies for railroad car makers.

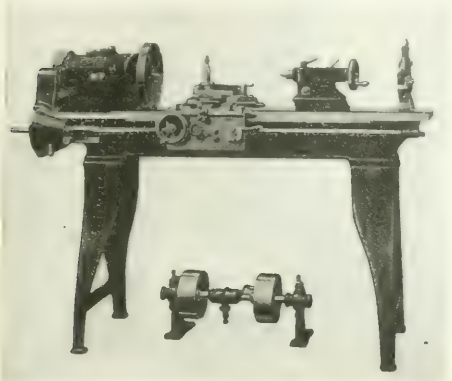
Pennsylvania Railroad Lifts Eastbound Embargo Temporarily

PITTSBURGH, Nov. 20.—Effective at midnight, Nov. 19, the Pennsylvania Railroad has suspended for the first three days of this week the embargo it set up Nov. 13, at midnight, as far as eastbound freight is concerned, and it is reported will suspend the embargo on westbound shipments for the last three days of the week. The benefit to the steel industry, it is believed, will be slight. While all restrictions as to the acceptance of freight by this road for the East, even as from connecting lines, are lifted, the modification makes no provision for the movement of freight already in transit; indeed, the new order specifically states that the freight accepted during these three days must be on bills of lading dated Nov. 20, 21 and 22. The steel trade is skeptical as to results, because it is feared that the lack of cars will have more bearing on the movement of goods than the apparent desire of the railroad to help prevent further additions to mill stocks.

Adds Smaller Engine Lathes to Line

Screw cutting engine lathes of 10, 12 and 14 in. size have been added to the line of the Oliver Machinery Co., Grand Rapids, Mich. The actual swing is said to be 11, 13 and 15 in. respectively. Each size is equipped with either cone pulley or all steel geared headstock, straight or gap bed, bench or floor legs, with or without oil pan, either with countershaft for belt drive or with self-contained motor drive.

The 12 in. geared head single-pulley driven engine lathe is illustrated. The headstock is of the inclosed box-type fitted with all steel gears running in an oil bath. Six spindle speeds are secured by means of two convenient levers at the front. One lever operates a positive-jawed steel clutch engaging either the back gears or the direct drive. The other lever shifts the three engaging gears which provides three spindle speeds direct drive, and three speeds through the back gears. The driving pulley of the geared headstock is



Geared Head 12-In. Screw Cutting Engine Lathe. A number of variations and attachments are available

fitted with a friction clutch operated by a shifting bar extended the length of the lathe. The headstock spindle is of high-carbon steel and is hollow. All headstocks are equipped with a positive-tooth feed reversing clutch, by means of which both the longitudinal and the cross feed and the direction of the lead screw may be reversed without engaging or disengaging gears, stopping the lathe, shifting belts or reversing the spindle rotation. This feature is intended to simplify the cutting of threads and decrease the time of operation.

The tailstock is of the offset type with screw set over for taper turning, graduated in 1/16 in. The spindle is graduated in 1/16 in. to permit accurate and rapid production when drilling to depth. The tail center is self ejecting.

The back of the carriage is machined and tapped ready to receive the taper attachment. The swiveling bar is graduated in inches and is adjusted by a screw and bronze swiveling nut for turning all tapers up to 4½ in. a foot. Settings and adjustments are made from the front of the machine. The carriage is wide and heavy and has a long bearing upon the bed on the Vees and is gibbed to the bed both in front and rear. It has a positive lock to prevent longitudinal motion while cross cutting. The carriage is drilled and tapped to receive taper attachment and follow rest and has T slots both at front and rear for attaching jigs and fixtures or special tools. Cross slide is accurately gibbed and is actuated by a large diameter square thread screw which receives power through a friction clutch. The cross slide screw has a 3-in. diameter hand wheel dial graduated in one thousandths of an inch. The compound rest has unusually large bearing surface. The base is circular and graduated in degrees permitting accurate setting. The screw has square threads, fitted with a large dial wheel graduated in 0.001 in.

The apron is screwed and doweled to the carriage. The apron gearing is arranged so that the operator may readily shift from thread cutting to the use of either the longitudinal or the cross feed without shifting of gears. The difference in the lead between chasing threads and that desired in feeding is provided by the use of a worm and worm gear in the apron. A friction knob operates either the cross or the longitudinal power feed. The feed lever has three positions; in the first it engages the power longitudinal feed; in the second it is neutral and permits the engaging of the lead screw; and in the third position it engages the power cross feed. The thread cutting lever operates the two halves of the lead screw nut which it can close about the lead screw only when the feed lever is in the neutral position. The lead screw nut is of phosphor bronze and threaded from the solid.

For motor driving the cone head lathes, a friction countershaft, supported on a swinging arm directly back of the headstock, is provided. The swinging arm and the motor are carried by a bracket bolted to the leg, and swivels about a bearing near the motor. It is adjusted to and from the headstock by means of a screw and hand-wheel operated from the front. A second adjustment regulates the motor vertically to take up stretch of motor belt. For motor driving the geared head lathes, two methods of self-contained motor drives are offered, the motor-on-head type and the motor-on-leg type.

The lead screw is milled with five pitch acme threads of sufficient accuracy for tool room precision. It is splined so that the power cross and longitudinal feeds are operated by a long key acting in the spline and the threads of the lead screw are used only when chasing threads. The selective change gear mechanism consists of mounting all of the gears of the change-gear set slidably on the end of the lead screw and supporting the weight, housing and guard of the gears by means of a slide bar and bracket attached to the bed. A full quick-change gear box is available if required.

Several variations and attachments are available. These include a universal milling attachment, follow rest, gap bed, extra bed length, turret on carriage or bed, draw-in attachments, metric transposing gears and others.

Italian Steel Works Reorganized

Reorganization of the Ansaldo Steel Works is being effected by the formation of a new company, bearing the same name, having a capital of 200,000,000 lire divided into 1,000,000 shares of 200 lire, says Consul Leon Dominion, Rome, in a report to the Department of Commerce. According to press notices, the Banca Nazionale di Credito has subscribed for 1250 shares, and the Gio, Ansaldo Co. for 998,750 shares. The new company has taken over the principal plants of its predecessor, among which are the Sampierdarena machine shops and locomotive works, Sestri Ponente dockyards, Borzon yards, Fegiano railroad car works, Campi cannon foundry, Delta steel works at Cornigliano Ligure, Campi electrical works, Multedo iron foundry, Cornigliano steel works and bronze and aluminum plants.

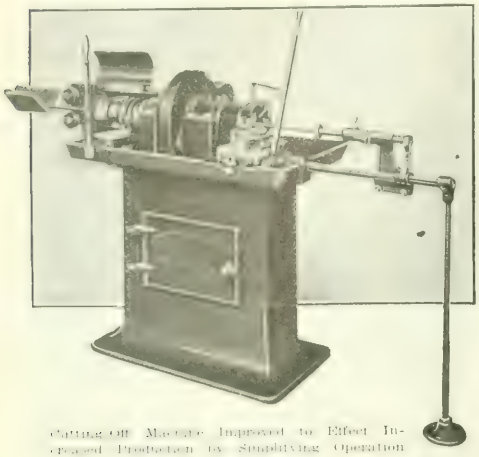
The purchase price of these establishments is stated to be 28,405,800 lire, and payment has been made to the old Ansaldo Co. by means of 142,029 shares of the new company. The new company furthermore assumes liabilities amounting to 40,261,339 lire on bonds issued for the account of the plants it has taken over and which are guaranteed by mortgages. About 45,000,000 lire in bonds remains in the hands of the old company.

The executive committee of the American Society for Testing Materials has voted to hold the 1923 annual meeting at Atlantic City in the latter half of June. Two periods for the meeting are tentatively under consideration. One is June 25 to 29, and the other is immediately following the meeting in Atlantic City of the American Railway Association, which is usually held from Thursday to Wednesday about the middle of June.

Improves Cutting-off Machine

The cutting-off machines of the Modern Machine Tool Co., Jackson, Mich., designed for cutting pipe, tubing and bar stock have been improved to save several motions on the part of the operator, and permit thereby of greater production.

The changes in construction include a double live roller feed as illustrated for feeding the stock through the spindle, this being for the Nos. 2 and 3 machines. An automatic stop for gaging the length of the cut-off piece has been added to all sizes. This is of the same design as formerly, but is operated from the tool block. A plate, which is adjustable to permit setting the tool for various sizes of stock, is attached to the right-hand side of the tool block. This is arranged with a lug to



Cutting-off Machine Improved to Effect Increased Production by Simplifying Operation

catch and rock the rocker block, shown in the illustration, between the tool block and the frame. As the tool block is moved out to remove tool from the cut, in the last ⅛ in. of the movement the lug catches the rocker shaft and through the lever and cam rotates the stock stop, throwing it out 3/16 in. When the tool block is fed in to start the cut, a spring brings the stop back clear of the work. This arrangement is provided so that the stop will not wear and the work can drop away from the tool. A stop pin is provided to indicate when the tool is clear of the work.

The double live roller feed is driven through worm and gears from the cone pulley shaft as the machine is slowed up for large stock; it also slows up the feed. The rolls run continuously. They are trunnioned and connected with the collet-control lever shaft, and the in-movement of the collet lever opens the collet and brings the rolls simultaneously up to the stock. Further pressure on the collet lever feeds the stock through the spindle against the stock stop. The back movement of the lever throws the rolls clear of the stock and closes the collet. The collet control lever has been placed in a vertical position and has a toggle action intended to eliminate much of the friction of the previous design; the lever also operates more easily.

With the new machine the operator places his left hand on the collet control lever and pulls, which opens the collet and feeds the stock through the spindle up to the stop. He then pushes the lever to close the collet, and places his right hand on the tool-feed lever and when the collet is closed, feeds the tool into the work. The motion is then reversed. The operator does not remove his hands from these levers.

Compared with the previous design the new machine saves three or more motions and one step, on every piece cut off. On a production of 150 to 200 pieces per hour of large work or 500 to 600 of small work, it is obvious that the new equipment effects considerable savings.

Tariff Commission Gives Results of Its Investigation

WASHINGTON, Nov. 21.—Finding that preferential rates do exist, the United States Tariff Commission has issued a report entitled "Preferential Transportation Rates" which is the result of an investigation conducted by the commission to ascertain to what extent, if any, preferential rates affect the country's customs tariff when such rates as applied from the various ports to interior points in the United States, on imported commodities, are lower than those applicable on like domestic tariffs from the same ports to the same interior point. The report also deals with the extent to which the export rates from interior points in the country of export are lower to the foreign port on traffic destined to the United States than applied to similar domestic rates.

The report says that the principal ports in this country from which such rates apply are the South Atlantic, Gulf, and Pacific ports, and Portland, Me., the latter when routed by way of the Grand Trunk System. Similar preferential rates are also applied from various Canadian ports on traffic imported through those ports destined to points in the United States.

The conclusions reached by the commission are, that, while it is evident that preferential transportation rates do exist, the carriers have established such rates primarily for the purpose of equalizing the commercial advantage of the rival ports of the alternative routes over which the foreign trade is carried, rather than an attempt to offset in whole or in part the duties imposed by the customs tariff. As an illustration, the pivotal or basic port in most instances on traffic to the Central West appears to be New York, from which port the imports and domestic rates are generally the same. From other ports the rates are ordinarily established with relation to the rates from New York. In certain countries the export rates in some instances are lower than the domestic rates, the apparent object being to favor the export trade of that country. The commission's report also shows the result of its investigation of the export rates in this country, the import rates in foreign countries and the ocean rates as applied to traffic moving from and to foreign countries.

Aluminum Line Level

The aluminum line level illustrated, known as the No. 108, has been placed on the market by the L. S. Starrett Co., Athol, Mass.

Weighing but ½ oz., it eliminates sag in the line. It is 3 in. in length, and is made from ⅜ in. hexagonal stock so that it may be used effectively as a surface



Aluminum Line Level. It is 3 in. long and of ⅜-in. hexagon stock

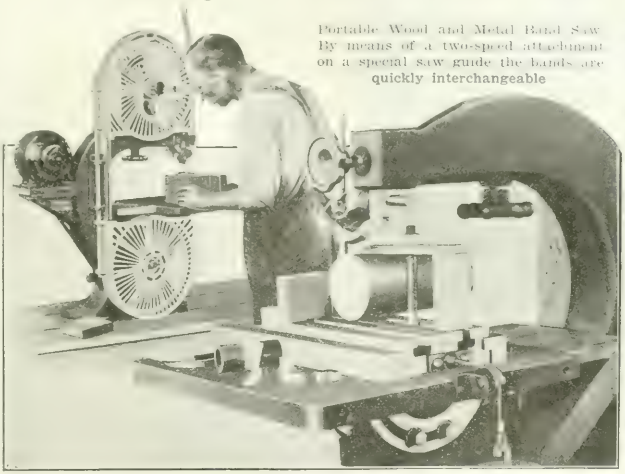
level. The level may be conveniently carried in the pocket. A luminous level glass with a yellowish fluid is used for the vial. The slots on the protruding pieces are constructed so that the part of the slot which comes in contact with the line is true in relation to the level. The design of the slots is said to prevent the level from dropping off the line when in use.

The special apparatus which has been developed at the Bureau of Standards, for testing the corrosion of steels by alternate immersion and exposure to the air is now perfected so that as soon as the different specimens have been properly heat treated, polished, measured, and weighted, the actual immersion tests can be started. A few preliminary tests which have been carried out indicate that the results will be obtained much more quickly by the method of repeated immersions than by simple immersion.

Wood and Metal Portable Band Saw

The Racine Tool & Machine Co., Racine, Wis., has put on the market the portable band saw illustrated, designed to cut either wood or metal. By means of a two-speed attachment and a special saw guide the wood and metal bands may be quickly interchanged. Combination spring-temper blades for cutting either soft metal or wood at high speed may also be used.

The machine is suitable for pattern work, sprue cutting, shaping jobs of various kinds in iron or steel, aluminum and brass cutting, fibre and hard rubber cutting in curves or squares, and for other purposes. Ball bearings have been provided for the band saw wheels to eliminate vibration. The bearings are contained in independent housings, a patented feature, suspended at three points, at both ends, which facilitates the accurate alinement of the wheels in manufacture. To secure accurate alinement of the blade a sensitive hand screw is provided for tilting the upper wheel. Tension on the blade is also controlled by a hand screw operating against a spring in such a way as to obtain a uniform and cushioned tension. The spring also serves as a safety device, as chips and blocks which accidentally fall between the band and the wheel will pass around the wheel without breaking the saw blade.



Portable Wood and Metal Band Saw. By means of a two-speed attachment on a special saw guide the bands are quickly interchangeable

The wheels are cast aluminum, reducing the weight and promoting the portability of the machine. The table is 15 x 15-in., tilts to any angle up to 45 deg. and operates on a substantial quick-acting saddle. The saw guide may be quickly adjusted to the desired position, being mounted on a square steel post. A two-speed attachment permits of quick speed change by merely shifting a lever. The machine is driven by a standard electric motor, from any light socket or power circuit, the motor being bolted directly to a platform on the frame as shown. For flexibility the machine is driven from the motor by belt. The wheel guards are of aluminum and are hinged.

Without attachments the machine is adapted to cutting wood and soft metals. With two-speed transmission the speed may be reduced to the proper ratio for cutting steel. Sheet steel and flats up to ¼ in. may be cut without clamping in a vise. With two speed transmission and gravity feed vise the machine will cut bar stock, rounds, flats and shapes up to 3 in. in thickness.

New Record in Portland Cement

October production of portland cement, according to the United States Geological Survey, amounted to 12,287,000 bbl., the highest month's production in the history of the industry. This exceeds the figure for August, the previous high record, by 5½ per cent and brings the total for ten months to 93,850,000 bbl., comparing with the total for twelve months last year of 98,293,000 bbl., and for the twelve months of 1920, the record year to date, of a little under 101,000,000 bbl. With construction going ahead full tilt, November will probably add enough to the total to make the eleven months aggregate production greater than that of any full year previously recorded.

Shipments for October, at 12,854,000 bbl., were the fourth largest of the year, being exceeded by June, July and August and being slightly in excess of May and September. The August figure was 14,361,000 bbl. Shipments have so far exceeded production during the greater portion of the year that stocks have been reduced from 14,470,000 bbl. May 1 to 4,157,000 bbl. at the end of October.

Arc Regulation in Electric Furnaces

In any furnace where two or more electrodes are used, one of the main problems in operation is the proper regulation of the electrodes. There are now available on the market a number of automatic control systems which, when functioning properly, give excellent regulation and an even, well - balanced load. These automatic regulators are expensive, however, and for small furnaces are often cumbersome and impractical, so that a large proportion of the furnaces are and probably will continue to be hand-operated. The principal objects of regulation are to maintain correct power input, and to prevent both surges and large fluctuations in the power. In furnaces depending on hand control, the operator regulates the power by observing ammeters or wattmeters placed within his line of vision from the controls, and moving the electrodes up or down accordingly. On the whole the prevention of fluctuations is done more out of consideration for the power plant than for the furnace itself. However, there is another phase of regulation, not so often mentioned, which is of greater importance to the melter in the proper operation of the furnace, namely, keeping equal arcs on the various electrodes. Details of experiments regarding arc regulation in electric furnaces and pilot light control are contained in Serial 2411, by C. E. Sims, electrometallurgist, which may be obtained from the Bureau of Mines, Washington, D. C.

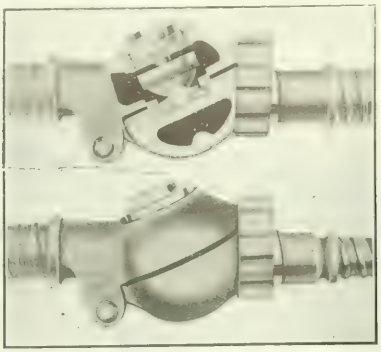
Workers in Shop Crafts Disagree

Following the official announcement by the Fore River Works, Bethlehem Shipbuilding Corporation, Ltd., Quincy, Mass., of its intention to do locomotive repair work for the New York, New Haven & Hartford Railroad, various shop crafts employed at that plant, through a committee, have notified the management the men are opposed to working on locomotives of a railroad where a strike exists. Sentiment among the union workers is mixed, however, a large percentage of them taking no ground against such work in view of the fact that striking New Haven shopmen took positions at the Fore River Works which rightfully belonged to union men. With sentiment among the workers split, there is little danger of the company's locomotive plans being upset.

The Alabama By-Products Co., Birmingham, Ala., proposes to build a 12-in. gas main four and a half miles long into the East Birmingham territory where there are many important manufacturing plants such as the National Cast Iron Pipe Co., which it already serves with gas. Among other plants proposing to use the gas is the Stockham Pipe & Fittings Co.

Automatic Air Hose Coupling

An air hose coupling which is in effect a valve and coupling combined, and which among other features is intended to take the place of the globe valve in the pipe line and thereby save the purchase of globe valves has been placed on the market by the Robinson Machine Co., Muskegon, Mich. In using the coupling air tools may be changed at the work without walking to and from the pipe lines to turn off the air. Kinking and bursting of hose in lengthening or shortening hose lines or in removing tools is eliminated. The pressure is thus always at the end of the hose line, and can be shut for



Automatic Air Hose Coupling. For changing tools the pressure is shut off simply by disconnecting the coupling

changing tools simply by disconnecting the coupling. This feature saves time and also air.

The coupling is shown in the illustration. It is available either for pipe or hose connections and made interchangeable in ½ and ¾-in. sizes. It is said to be positively air tight and can be taken apart with the pressure on as conveniently as with the pressure off. Durability is also a feature and it is claimed that the coupling cannot be blown out of hose lines. Positive grip hose clamps are part of the regular equipment. There is no corroding or sticking and oil has no effect on the coupling as the valve gasket is of oil-proof material. All parts are cleaned when the connection is made which eliminates clogging from scale and dirt.

The coupling is made in two halves. The half containing the automatic check valve is designed so that the pressure of the air in the line comes on top of the valve to assure tight and instant valve action. The valve is made up of a brass stem with a special leather disk-valve facing which may be replaced without special tools. The valve stem is centered by a reamed hole in the valve cap. Two projections with a cross bar extend beyond the face of the valve seat, and these serve to protect the seat when the valve half is being dragged along the floor, as at the end of a hose. The cross bar also forms a pivot for hooking the hose-shank half when making the connection.

Two small projections extending beyond the valve face on the hose-shank half serve to push the valve open when the connection is being made, admitting the pressure to that section of the line. This part is recessed to receive a specially treated gasket, which is cemented permanently in place. These gaskets are said to have held up from six months to one year under severe operating tests.

The two halves are quickly locked together by the eccentric clamping ring shown. Hose shank halves are equipped with "positive-grip" hose clamps which make them ready for attachment to air lines and eliminate the trouble caused by couplings blowing out of the hose lines.

Freyn, Brassert & Co., Chicago, have recently contracted for installation of patented bacon waste heat boilers at the Bettendorf Co., Bettendorf, Iowa, and at the plant of the Carpenter Steel Co., Reading, Pa.

Exhibitors at New York Power Show

A list of exhibitors who will exhibit at the National Exposition of Power and Mechanical Engineering at the Grand Central Palace, New York, Dec. 7 to 13, includes the following:

Allen-Sherman-Hoff Co.
American Arch Co.
American Refractories Co.
American Steam Gage & Valve Co.
Ashton Valve Co.
Bailey Meter Co.
Beaumont, R. H., Co.
Bernitz Furnace Appliance Co.
Bethlehem Shipbuilding Corporation
Bishop & Babcock
Boig & Hill
Bowser, S. F., & Co.
Burhorn, Edwin, Co.
Carling Turbine Blower Co.
Carlyle-Johnson Machine Co.
Cash, A. W., Co.
Celite Products Co.
Cochrane Corporation, H. S. B. W.,
Combustion Engineering Corporation
Connelly, D., Boiler Co.
Connery & Co., Inc.
Coppus Engineering & Equipment Co.
Craig Damper Regulator Co.
Crane Co.
Davidson, M. T., Co.
Dearborn Chemical Co.
DeLaval Separator Co.
DeLaval Steam Turbine Co.
Detrick, M. H., Co.
d'Este, Julian, Co.
Diamond Power Specialty Co.
Drake Non-Clinkering Furnace Block Co.
Edward Valve Mfg. Co.
Ellison, Lewis C.
Erdman Forced Draft Burner Co.
Falls Engine Stop Co.
Flinn & Emerich
Foster Engineering Co.
Foxboro Co.
Frederick Iron & Steel Co.
Furnace Engineering Co.
Gibby Engineering Co.
Gillis-Geoghegan, Inc.
Graver Corporation
Green Engineering Co.
Griscom-Russell Co.
Harris, Burt
Hays, J. W., Co., Inc.
Hill Clutch Co.
Huber-Hand Stoker Co.
Hunt, C. W., Inc.
Huyette, Paul B., Co.
International Filter Co.
International Combustion Engineering Corporation
Jenkins Brothers
Kelly Valve Co.
Keasbey & Mattison
Kieley & Mueller
King Refractories Co.
Kingsbury Machine Works
Ladd, George T., Co.
Lead Lined Iron Pipe Co.
Leather Belting Exchange
Leddell Metals Co.
Liptak Fire Brick Arch Co.
London Steam Turbine Co.
Lopulco Systems
Lunkenheimer Co.
McLeod & Henry
Mack Engineering & Supply Co.
Manning, Maxwell & Moore
Martin-Morse Corporation
Merritt, L. R., & Co.
Midwest Engine & Supply Co.
Mineral Oil Paint Co.
Murphy Iron Works
Nash Engineering Co.
Olsson Corporation
Otis Elevator Co.
Philadelphia Gear Works
Pittsburgh Testing Laboratory
Pittsburgh Valve Foundry & Construction Co.
Power Specialty Co.
Pratt & Cady Co.
Pyramid Iron Products Corporation
Quigley Furnace Specialties Co.
Racine Machine Tool Co.
Rahmann, George, & Co.
Reading Steel Casting Co.
Reliance Gage Column Co.
Republic Flow Meters Co.
Roto Co.
Ruggles-Klingeman Mfg. Co.
S. C. Regulator Mfg. Co.
Sanford-Riley Stoker Co.
Scovill Mfg. Co.
Schaeffer & Budenberg Mfg. Co.
Smith & Serrell
Spence, Paulsen Co.
Stewart-Sayer Co.
Superheater Co.
Tagliabue, C. J., Mfg. Co.
Templeton Mfg. Co.
Tidewater Oil Sales Corporation.
Tracy Steam Purifier Co.
Uehling Instrument Co.
Underfeed Stoker Co. of America
Underfeed Stoker Co. of Canada
U. S. Cast Iron Pipe & Foundry Co.
Vibration Specialty Co.
Vincent Gilsen Engineering Co.
Walworth Mfg. Co.
Watts Regulator Co.
Wheeler, C. H., Mfg. Co.
Wheeler Condenser & Engineering Co.
Yarnall-Waring Co.

At the recent hearing of the Southeastern rate case, in Cincinnati, before Interstate Commerce Commissioner Eastman, R. R. Robinson, representing the United Alloy Steel Co., Canton, Ohio, testified that while Canton steel industries were on a par with Youngstown, Pittsburgh and other steel producing centers, which enjoy one rate charge into Southern territory, Canton concerns were forced to pay the combination rate now in effect, thereby practically eliminating the Canton manufacturers as competitors in Southern territory. Youngstown and Pittsburgh industries had enjoyed the one rate charge for 20 years, and he asked that the Canton producers be placed on the same basis as their competitors.

RAIL PROSPECTS IN JAPAN

Little General Demand Dullness in Copper and Other Markets

TOKIO, JAPAN, Oct. 26.—The steel market is looking brighter as extension projects are being planned on railroads throughout the country. Rails, especially 60 lb. sections, are in good demand, and dealers having disposed of heavy stocks are contemplating re-ordering from American mills. The decline in demand for construction materials because of prohibitory prices has resulted in this sudden energy in railroad construction.

Steel rails, however, present the only bright spot in the market, other prices suffering from a lack of demand. Although shipyards are slightly busier than during the early part of the year, they are heavily stocked with plates and other materials. Round bars are in fair demand, and are quoted at about 4.60 yen per kwamme (5.72c. per lb). Sheets stand at 7 yen (8.48c. per lb.) and plates are offered at 4.20 yen per kwamme (5.08c. per lb.). Sixty pound rails are quoted at 15,000 yen ($77.10 per ton) per mile and 12-lb. rails stand at 2500 yen ($64.24 per ton).

The total consumption of zinc sheets in this country amounts to about 1500 tons a year, used for packing tea and matches. Lately the export of matches, for which about 70 per cent of the zinc is consumed, has been inactive, and the demand for material from this quarter shows a great decrease. For this reason, speculative imports of goods have been terminated and goods which were quoted at 19.50 yen last spring show an improvement to 25 yen for spot delivery and about 26 yen for forward delivery.

Copper in Japanese Hands

Before the customs duty on electrolytic copper was increased last spring, copper merchants imported a large quantity of American copper. After the duty was increased, the arrival of copper practically ceased, with the result that the shortage of supply of Japanese copper was made up from these imported stocks or with scrap copper. According to the latest investigation, stocks of foreign copper remaining in the Kobe and Osaka markets have decreased to 350 tons. For a long time the home market had been governed by the quotation of imported copper, but it is believed that the Japanese copper producers, having made it unprofitable to import copper, will resume their influence over the domestic market.

The tenders for the purchase of electrolytic copper amounting to 400 tons were opened at the Tokio Arsenal, Oct. 13. The tender was in four parts. The offers per 100 kin were as follows: Sumitomo, 43.848 yen (16.10c. per lb.); Kuhara, 44.13 yen (16.20c. per lb.); Fujita, 44.15 yen (16.21c. per lb.); Mitsui, 44.19 yen (16.22c. per lb.); Mitsubishi, 44.38 yen (16.29c. per lb.); Furukawa, 44.53 yen (16.35c. per lb.); Okura, 47.07 yen (17.28c. per lb.); Samuel, 47.94 yen (17.60c. per lb.). The offer made by the Sumitomo Copper Co., the lowest, being much higher than the estimate of the Arsenal, the tender was repeated, when most of the bidders renounced their right of bidding, but Sumitomo and Mitsui went in for it, the former bidding 43.752 yen (16.07c. per lb.) and the latter 43.734 yen (16.06c. per lb.). The offer being still higher than the estimate of the Arsenal, no business was concluded. The Government might exercise its right of importing the copper duty free.

Tin plate is weaker, despite the fact that imports have fallen off recently. Prices are again declining, after stiffening slightly during the first few days of the month. Consumers are making but few inquiries. Added to the slack demand, there is a report that steel mills in India have become interested in the Japanese market, and are expecting to offer tin and iron products on the local market soon. Some business is already being done in Kobe and Osaka.

FRENCH IRON AND STEEL

Little Pig Iron Available—Active Exports of Semi-Finished Material

PARIS, FRANCE, Nov. 9.—Although slow on inland orders, the market is rather active for export. Unfortunately, low prices have still to be accepted for foreign business. The recent political difficulties in the Near East unfavorably affected the market, which is still watching anxiously what may happen in Turkey. Prices for inland orders are generally firm, except on semi-finished and rolled merchant products, which are weak. Pig iron production increased from 419,000 tons in July to 447,000 tons in August and 462,000 tons in September. On Oct. 1, the number of French furnaces in blast was 103, out of a total of 221, as follows:

District	Number in Blast	Total Furnaces
Lorraine	41	68
Meurthe-et-Moselle	40	84
Northern area	4	*20
Other districts	18	49

*Most of these destroyed during war and now being reconstructed.

A few blast furnaces in the Northern area are about to be relighted, and coke for them will be supplied from the reconstructed batteries of the Lens Coal Mining Co., which will begin in December to ship 10,000 tons of coke per month. So far, producers have had no difficulty, with the assistance of good export business, in finding an outlet for their increased production, but export business is low-priced.

The Reparations Commission has decided to ask Germany for a monthly supply of 569,000 tons of coke for France, 74 per cent and Luxemburg 26 per cent from Nov. 1 until Jan. 31, 1923. Luxemburg would be entitled per month to 148,000 tons and France to 421,000 tons. For the first nine months of 1922, Germany shipped to France 3,131,000 tons of coke, against 3,513,000 tons due. The tonnage of coke asked for by the Reparations Commission, which is the same as that in force from Aug. 1 to Oct. 31, is just sufficient to operate the blast furnaces which are now in commission, without permitting any further development.

Iron Ore.—The ore market is improving but slowly and prices are unchanged. Although Germany has recently increased her imports of French minette, her purchases of that ore, mined within proximity of Rhenish-Westphalia and extensively used by German blast furnaces for many years, ought to be much more considerable than they are now. Negotiations with a view to exporting Lorraine ore to the Cleveland district of Great Britain have not yet been concluded, but as satisfactory results were obtained from the samples sent, it may be that sooner or later regular shipments will be made. The recent difficulties which arose in the United States over the transportation of iron ore from the lakes to consuming centers suggested to French producers that it would perhaps be feasible to ship French ore to American furnaces situated close to the coast. This would probably have been comparatively easy at the time the United States shipped coal to France, and Lorraine iron ore might then have furnished a satisfactory return freight. Unfortunately, the situation has now changed and French ports have little to offer in the way of cargo boats returning to the United States. The Briey ores, which hold only 35 per cent of iron, in a dry state, and 40 per cent in exceptional cases, are really too poor to bear the cost of transatlantic transportation. However, France is producing other iron ores, in Normandy and Brittany, for instance, of a higher grade than the Lorraine ores, which could perhaps be exported to the United States.

Foundry Iron.—Available supplies of foundry iron are restricted and hardly any tonnage is to be had for November delivery. For December delivery, chill-cast foundry iron No. 3 P. L. is being dealt in at an average price of 235 to 245 fr. but fine qualities are currently sold at 250 fr. The export price, f.o.b. Antwerp (Belgian currency) is 255 to 260 fr. per metric ton.

Hematite Pig Iron.—The appreciation of phosphoric pig iron and the high value of the sterling—which is, of course, shutting out completely British competition—have considerably improved the market of French hematite. Present prices at furnaces: In the North, 300 to 320 fr. in the Center, 280 to 290 fr. in the East and South, 290 to 310 fr.

Semi-Finished Steel.—France produced in September 407,000 tons of steel (399,000 tons of ingots and 7400 tons of castings), as against 397,000 tons in August and 390,000 tons in July. Semi-finished products are selling with difficulty on the inland market, but they are active for export. Great Britain is taking some supplies in France, and Germany is purchasing large tonnages of French billets. Some orders from Germany for open-hearth steel, besides her customary orders for basic, are also reported. Present export prices, f.o.b. Antwerp, are about as follows, in Belgian currency:

	Francs
[illegible]	[illegible]
Blooms	320 to 325
[illegible]	[illegible]
Sheet billets	375 to 380

These prices are for basic steel 20 fr. more for open-hearth steel.

Beams.—Orders for beams have shrunk considerably, as is, of course, quite normal at this time of the year. However, mills are now booked up for at least three months ahead. The export price, f.o.b. Antwerp (Belgian currency), is 380 to 390 fr.

Rails.—The large order in rails for the consortium of French railways, which has been in suspense for a long time, has not yet been allocated but a solution reserving the whole of the order to French makers is now in view. We may say that the base price of 500 fr., corresponding to a price of coke of 95 fr. at the Franco-German frontier and sliding with it, had been mentioned for this order a few days ago. The following export prices are now quoted, in Belgian currency, f.o.b. Antwerp: Heavy rails, 420 to 425 fr., and light rails, 400 to 410 fr.

Plates and Sheets.—The volume of orders booked in October by the Comptoir des Tôles is slightly exceeding that of September, which was over 40,000 tons. Nevertheless, the tendency is quieter and, although mills are well provided for with orders for some time to come, there cannot be any question now of an increase of basic prices. French shipbuilding yards have recently increased their orders for plates. Export prices, f.o.b. Antwerp, (Belgian currency) are:

	Basic Fr.	Open-Hearth Fr.
Sheets of 5 mm. and over...	470 to 480	520 to 530
Flat bars	450 to 460	470 to 480

Rolled Merchant Products.—The inquiry for rolled merchant products continues to decrease except for export. Substantial orders from Germany are to be specially mentioned. At any rate, order books are not now as full as they used to be and there are many works which accept for eight to ten weeks delivery, while in September four or five months delivery was common. The average selling price in Meurthe-et-Moselle and Lorraine remains at 440 fr., which is about 30 fr. below the parity of the present price of pig iron (240 to 250 fr.). The base prices of rolled merchant products in other districts are: Saar, 430 to 440 fr.; North of France, 470 to 480 fr.; West of France, 500 to 520 fr. Export price, f.o.b. Antwerp, (Belgian currency): 425 to 430 fr.

Hoop and strip iron is selling at 550 to 560 fr. in the Saar district and 600 to 620 fr. in Lorraine.

Rolling Stock.—The French State Railways have just ordered 450 two-axle passenger cars.

MORE CARS NEEDED

Modification of Open Top Order Brings Some Relief Lake Season Near End

YOUNGSTOWN, Nov. 21.—District industrial interests are still feeling the pinch of car shortage, which is holding up outbound shipments of finished products. Car supply, however, is improving and will show further betterment now that the Interstate Commerce Commission has modified Service Order No. 25, restricting movement of open top cars to insure priority to coal shipments. The new order permits more freedom in use of cars south of the Ohio and Potomac. The entire cancellation of this order would permit the steel plants to ship their products in all directions with more freedom, but it would also enable them to build up coal stocks. Major interests in the Mahoning Valley have been able to create little coal reserve against winter needs because of diversion to the Northwest via the Great Lakes.

Termination of the lake season, now at hand, not only insures the release of thousands of cars heretofore restricted to coal movement, but the release of a large output of bituminous coal for industrial uses. It is customary for the steel plants to have ample coal reserves on hand at this time of the year, to protect themselves against possible interruptions to shipments because of weather conditions. But this year what stocks have been accumulated are much smaller than usual.

Mild weather conditions throughout the Middle West to date have been in favor of the industries as well as the railroads. Transportation has been much more efficient than if the railroads were hampered by freezing weather.

Traffic conditions now are much improved as compared with October. The Republic Iron & Steel Co. is again operating its Niles sheet plant on a normal basis, following a two weeks' production at 50 per cent to enable the railroads to clear accumulated output. Because of transportation difficulties and substantial stocks on hand, the Trumbull Steel Co. was forced to suspend its No. 2 strip mill four days last week. Inadequate car supply is also reflected in operations of the metal lath department of the Youngstown Pressed Steel Co. at Warren.

For a time, curtailment of operations by the two large independent pipe makers in the Mahoning Valley was threatened because of lack of cars. Special measures were taken to bolster car supply, however, and this expedient is no longer necessary.

The peak of the fall freight movement is past, but shipments, both inbound and outbound, will continue heavy for the next four weeks. Ore consignments are declining and will soon largely cease. Heavier coal movement will partially offset this loss.

Meanwhile, railroads are pushing repairs to cars and locomotives long neglected during the prolonged shopmen's strike. This work is being rushed and shops throughout this territory are being operated by day and night shifts. There has been an appreciable improvement the past month in the condition of locomotive equipment. Railroad operating officials point out that a late and mild winter would prove highly beneficial to them, and permit the carriers to place rolling stock in readiness for normal transportation next spring.

This week the Pennsylvania Railroad is enforcing an embargo against shipments on its Eastern and Panhandle divisions, restricting freight movement in these directions.

Meanwhile independents are maintaining operations at 80 per cent. This week iron output is increased by the resumption of Claire blast furnace of E. W. Mudge & Co. in the Shenango Valley, increasing the number of active furnaces in the two Valleys to 31 out of 47.

The explosion of a pot of tar in a warehouse at the plant of French & Hecht, Springfield, Ohio, manufacturers of metal wheels, caused a fire Nov. 20 which damaged the plant to the extent of $8,000.

Following official notice of a six-day week being established at Navy Yards, effective Dec. 1, orders were received at the Charlestown Navy Yard, Boston, to reduce operating forces.

Bases of Modern Blast Furnace Practice*

Elements of the Design Which Go to Make Up the Lines of the Furnace—Influence of the Low Bosh

BY A. K. REESE

II.—Furnace Design

THIS refers not to the structural detail of the furnace as a whole, but to that portion only in which the metallurgical operations take place; that is, the furnace proper, the interior space, the design of which is technically known as the "lines of the furnace." The terms usually used to describe the lines of a blast furnace divide it into a number of sections—the hearth or crucible, which is cylindrical; the bosh, an inverted truncated cone; the shaft, an upright truncated cone; and the throat—in modern furnaces usually cylindrical—extending from the top of the shaft to the top of the furnace.

The principal dimensions of these sections consist of heights, diameters, the acute angle of the bosh wall to the horizontal, and the batter of the shaft wall to the vertical. Each of these dimensions has an important bearing upon all the others, and their relation to each other is of first importance as a factor in modern furnace practice; for, although they may vary somewhat in their relations, the variations are limited to conform to certain principles, the height of the furnace and hearth diameter being the dimensions which control all the others.

Under this heading the author proposes to outline and discuss these principles, and to enunciate as a general law the principle that *the output capacity of a blast furnace (with any particular set of raw materials) is in proportion to the effective bosh area.* The nucleus of this law is the word *effective* for, as will be shown, the maximum effective bosh area is dependent upon the various factors which constitute the principles of modern blast furnace practice.

Modern development has established the following essentials: a shaft batter of 1 in 13.5 to 15, the low bosh, the large hearth diameter, and the step bosh angle—all of which are, of course, comparative terms in their relation to similar features in the older designs.

Fig. 1 shows two furnaces, A and B, of pre-modern lines (extreme cases have been chosen in order to emphasize the principles under discussion), and Fig. 2 two furnaces, C and D, of modern lines. Present tendency is further to increase the hearth diameter, and a furnace is now in successful operation with a hearth diameter of 20 ft. 9 in., but in this direction it is sufficient for the present purpose to avoid the extremes.

Throat and Stack

The upper section of the furnace or throat, usually cylindrical in shape, extends to from 20 to 25 ft. below the furnace top, or 12 to 17 ft. below the stock line, the highest point to which the furnace may be filled. The adoption of the cylindrical throat is primarily to obtain the desired batter to the shaft walls, although it also has a bearing upon regularity of distribution, by presenting to the charged materials an area of the same dimensions for the varying positions of the materials in the throat due to their constant movement. The latter point, however, is not of great importance in the modern furnace plant, as the charging appliances are usually, or should be, of ample capacity to keep the furnace fully charged at the highest rate of driving.

Within the distance to which the cylindrical throat extends, the condition of the materials is such that there is no tendency for them to adhere to the walls or to hang through jamming or arching, as they are in a "dry" condition, both as to moisture and pastiness, and their expansion through increase in temperature is not yet sufficient to require increased space for their accommodation so as to avoid the danger of restricting free movement. Below this point, however, temperature increase becomes much more rapid and reactions much more intense. In this alteration in condition and temperature, which is progressive as the materials descend, more space accommodation is required for free movement, more particularly because to expansion is added the semi-pasty and pasty condition, and the increased density of the mass through the increasing load bearing down upon it from the increasing weight of superimposed materials.

It is also probable that the question of carbon deposition enters into the necessity for greater space accommodation, as the materials descend into the hotter and more active regions of the furnace: hence the necessity for the expanding batter to the shaft walls. It would also seem obvious that the more rapid the descent of the materials into and through these zones (faster driving), the greater must be the increase in space accommodation. In the older furnace designs, with slower driving, shaft batters as low as 1 in 26, and possibly less, were in use. In modern practice it has been found necessary to increase this batter to 1 in 14, or thereabouts. The principles involved in this feature of modern furnace design are of greatest importance and probably explain, in part at least, why many furnace managers have failed in their attempts to apply fast driving to furnaces with lower shaft batter.

To revert for a moment to throat diameter, there are in this feature several opposing conditions to consider. The lower the velocity of the gases as they leave the furnace top, the lower the loss from flue dust carried over with them. The largest possible throat diameter is, therefore, desirable for this reason. On the other hand, the extent to which this feature may be provided for is limited by the question of distribution, both of the materials charged into the top and the ascending gases, as regards the most uniform action of the latter over the whole cross section of the former. The throat diameter is also limited by the required shaft batter and the bosh diameter and height. Sacrifices must, therefore, be made in one direction or the other and, as the question of losses by flue dust is largely affected by regularity of stock movement, features tending to the latter should have first consideration. Throat diameters are, therefore, restricted in modern furnaces of 85 to 95 ft. in height to from 15 to 17 ft., the controlling factors being the other dimensions such as hearth diameter, bosh diameter and height.

The Low Bosh

The low bosh was the direct outcome of attempts to increase furnace outputs by increasing the volume of blast blown per minute. These attempts with the old high bosh furnaces resulted in seriously increased furnace irregularities, the reason for which became apparent from the study of the altered conditions brought about in the furnace through the more rapid driving, and the troubles experienced. With the much more rapidly descending materials it was found necessary that the contracting part of the furnace, that is, the top of the bosh, should begin below the upper limit of the zone of fusion, to prevent the pasty materials just above that zone from entering the contracting area, where they would be subjected to a squeezing action as a result of the resistance of the bosh walls and the weight of the superimposed materials, with the conse-

*Abstract of paper read before the (British) Iron and Steel Institute; concluded from page 1254, Nov. 9.

quent tendency to pack and cause hanging and the formation of scaffolds on the upper bosh walls.

Continued lowering of the top of the bosh followed therefore continued attempts at faster rates of driving for larger outputs, until in modern practice a bosh height, or 85 to 95 ft. furnaces, of 10 to 12 ft. above the top of the crucible, has been adopted, as compared with as much as 30 ft. in the old design. While it is true that no one would build a furnace with a 30-ft.

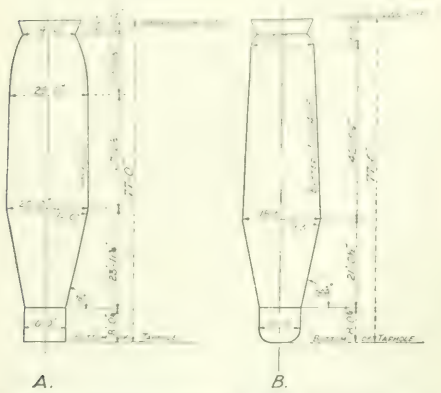


Fig. 1 Shows Pre-Modern Lines in Two Blast Furnaces of Differing Sectional Contours

high bosh to-day, there are furnaces in operation of recent design with boshes 16 to 18 ft. or even higher. Any attempt to drive such furnaces rapidly is sure to result in increased irregularity and consequent failure. The basis of this principle—the low bosh—is, therefore, that the furnace must be so designed, as regards bosh height, that the expanding portion or shaft shall continue to a point slightly below the beginning of the melting zone, so that no pasty materials shall enter the contracting portion at the top of the bosh.

In practice most modern furnaces are designed with a cylindrical section from 5 to 8 ft. in height between the lower limit of the expanding shaft and the upper limit of the contracting bosh. This section has no justification from the standpoint of any principles involved in its adoption, except that it fills up with brickwork the angular space at the junction of the bosh and shaft, which to a degree may be considered "dead space," and renders less abrupt the transition from the expanding shaft to the contracting bosh, but is rather the result of necessity in order to obtain the desired relation between other features such as shaft batter, throat diameter and bosh diameter and height.

The bosh diameters, for what may be called full-sized blast furnaces, that is, from 85 to 95 ft. high, are usually from 20 to 23 ft., with a bosh angle of about 80 deg., while in pre-modern designs this angle was anything from 68 deg. or less to 74 deg. The latter feature is the result of the progressive increase in hearth diameters, and these two features, the steep bosh angle and the large hearth, are concomitant, and their evolution the result of efforts to overcome irregularities through the failure of earlier designs (with the flatter bosh and smaller hearth diameter) to bring into operation the maximum effective bosh area, which is, of course, the full bosh area.

The Hearth or Crucible

In modern full-sized furnaces hearth diameters are normally from 16 to 18 ft., although, as already mentioned, in one instance this dimension has reached 20 ft. 9 in. But it remains to be seen whether hearths of this extreme size are likely to be generally adopted. In the process of evolutionary experiment it is often necessary to overreach the maximum in order to ascertain what it really is.

The hearth diameter of a blast furnace would seem, at first sight, to be the determining factor for its output capacity. It is the starting point in the design and, with the bosh angle and bosh height now generally adopted in modern design, practically determines the bosh diameter. But in the sense that the hearth diameter, together with the low bosh and steep bosh angle, are merely means for making effective the maximum bosh area, it is not really the determining factor, which is the bosh diameter. The hearth, or more properly the crucible, is the receptacle for receiving and storing from cast to cast the molten materials, while the bosh area is the active area in which the molten materials are produced as such, and the proportion of that area which is in active operation is the determining factor as to the quantity of molten materials available for collection in the crucible.

In all previous references to the various dimensions of the modern blast furnace and the principles which have led to their adoption it is assumed that in the operation of the furnace the volume of blast is in keeping with the size of the furnace, and is such as will provide the operating conditions upon which those principles are based. In modern practice the volume of blast blown is normally from 40,000 to 50,000 cu. ft.

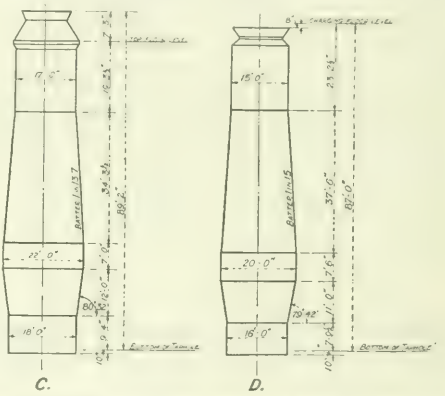


Fig. 2 Shows Two Furnace Sections of Modern Lines, with Larger Hearth and More Rapid Batter of Shaft Than Was Formerly Thought Desirable. In both cases there is a short parallel-sided or cylindrical section between bosh and shaft, and a cylindrical throat surmounts the shaft

of free air per min., from engines capable of delivering these volumes against resistances up to 25 or 30 lb. per sq. in., to provide ample reserve power for conditions causing abnormally high pressures. Normal working pressures are usually between 15 and 20 lb.

Effective Bosh Area

This term, used several times in the foregoing, while a new one in blast furnace nomenclature, has a meaning of the first importance in blast furnace operations. A general law has been enunciated that "the output capacity of a blast furnace, with any particular set of raw materials, is in proportion to its *effective* bosh area." Before discussing this proposition it is necessary to define:

1. What is the "effective bosh area?" and to consider
2. What are the factors which control or determine the effective bosh area?
3. What bearing have these factors (through their determination of the effective bosh area) upon the output capacity of the furnace?

1. The effective bosh area is that portion of the full horizontal bosh area at its maximum diameter which is in normal activity under the conditions of operation of the furnace.

2. The factors which control or determine the effective bosh area are the condition of the materials charged, the furnace lines and the volume of blast blown per minute in relation to the size of the furnace.

3. The bearing these factors have upon the output capacity of the furnace is that they determine the area of activity in the melting zone.

The whole trend of evolution in blast furnace practice has been in attempts to devise means of increasing output capacity consistent, of course, with quality and economy. The degree to which these attempts have been successful in modern practice has been due to the influence the factors in that practice have had in increasing the ratio of effective bosh area to the maximum or designed bosh area of the furnace or, to put it in simple terms, *to keeping the walls clean.* It is therefore conversely true that the effective bosh area of blast furnaces, where the factors upon which modern practice is based have not been adopted, or which are not operated in conformity with its principles, is less than the maximum or designed bosh area.

As has been described, the direct tendency of lack of such preparation is toward restriction of active area in the furnace. The tendency of the high bosh and the low stack batter is shown to be toward restriction of active area in the furnace. Equally the tendency of the small hearth and flat bosh angle is toward restriction of effective bosh area, owing to the removal of the area at and adjacent to the top of the bosh near the walls too far horizontally from the upward moving gases, with the consequent tendency for accumulation of torpid or stationary materials in that area.

For a furnace of given size, insufficient blast volume to insure equal activity throughout the whole cross section at every altitude tends to produce inactive areas, owing to the impossibility of providing perfect uniformity of materials. The greater this lack of uniformity the greater this tendency. The under blowing of a furnace is one of the most fruitful causes of reduction of effective bosh area, with outputs far below maximum output capacity.

A furnace tends to adjust its active areas to the volume of blast supplied to it. This tendency is in strong evidence where furnaces which have been blown for a considerable period with comparatively small blast volume have been suddenly and too quickly supplied with a considerably increased volume. Operators who have made this experiment will doubtless recall the difficulties they have experienced through irregular working. The author knows of cases where, although the furnace size was quite suitable to the increased blast volume, the attempt has been abandoned through the conclusion that conditions were not suitable to faster driving, whereas a little persistence would probably have overcome the difficulties met with by the walls gradually clearing, and the furnace thus adjusting itself to the larger blast volume.

It is true that many furnaces in operation to-day are not adaptable to modern practice in its fullest sense. One or more of the necessary factors are lacking and, as the author has attempted to show, each of these factors is so dependent upon the others that they must all be present for its full application. Among them, however, preparation of materials, if adopted alone, would provide conditions which would render possible the partial application of others, with decided improvement in results, and tend to remove many of the difficulties now experienced.

IV.—Method of Operation

A paper of this nature would not be complete without some reference to an essential difference in the method of operation by which the improvements in results, made possible by the adoption of the factors already discussed, are obtained, and the method of operation still prevalent in many localities where modern practice has not been adopted. In modern practice the nearest possible approach to uniformity in all controllable factors is a first principle, to obtain the nearest possible approach to uniformity of action within the furnace.

Reference has been made to the importance of this question of uniformity in various connections, *including uniformity or regularity of blast volume, irrespective of furnace pressure or resistance.* In the older practice, still prevalent in many localities, the volume of blast is varied with the furnace resistance, that is, the varying conditions within the furnace are permitted to cause lack of uniformity or irregularity in the volume of blast delivered to the furnace. This method, being contrary to the principle of uniformity of all controllable factors, is totally inapplicable to modern practice. Blowing by constant volume, irrespective of furnace resistance, is the method of operation essentially employed in modern blast furnace practice.

The actual volume of blast per minute, the number, size and length of projection of the tuyeres inside the crucible walls, the weight of coke per round of charge, the rotation of coke, ore and flux in the charge, the degree of bosh wall cooling, etc., are all operating conditions determinable, for any particular furnace and set of materials, within certain limits by experience only.

Exceptions Filed in Lake Superior Ore Rate Case

WASHINGTON, Nov. 21.—Twenty-three fundamental exceptions to the recent tentative report of Examiner Howard Hosmer of the Interstate Commerce Commission regarding proposed rates on ore from Lake Superior mines to the docks are made in a brief filed last week for the Adriatic Mining Co., et al., by Jean Paul Muller, attorney for the complainants. In the course of the brief, it is declared that the proposed rate of 82c. to Escanaba and Ashland should be according to the computation of the examiner himself, 77c., made up of a line haul rate of 72c. and a dock charge of 5c.

The brief says that the examiner, in declaring that no sufficient reason for the 5c. increase of 1921 in the line haul rate to Marquette appears on records, admits that 10c. per ton has been unlawfully collected on Ashland and Escanaba traffic and 5c. per ton on Marquette traffic. Therefore, it is said, the complainants are entitled to a reparation of at least 10c. on Ashland and Escanaba ore shipments and 5c. on Marquette ore shipments moving after Feb. 21, 1921. The brief adds:

"Furthermore, . . . complainants believe that the examiner has erred in permitting the Old Range carriers to retain 5c. of the arbitrary 1921 increases by the device of separate consideration of the dock charge, condemned in the Newport case."

Chamber of Commerce Southern Tour

A tour of six leading cities in Texas and Louisiana is being made by the officers and members of the board of directors of the Chamber of Commerce of the United States. The occasion is the final 1922 meeting of the board, which will be held in Galveston, on Nov. 23 and 24. The cities included in the tour, which started Nov. 19 at St. Louis, are Dallas, Fort Worth, San Antonio, Houston, Galveston and New Orleans.

The board of directors consists of upward of fifty members named to represent the various parts of the country and the different business interests. Among these are: Homer L. Ferguson, president Newport News Shipbuilding & Dry Dock Co., Newport News, Va.; William Butterworth, president Deere & Co., Moline, Ill.; A. B. Farquhar, president A. B. Farquhar Co., Ltd., York, Pa.; L. S. Gillette, president Plymouth Investment Co., Minneapolis, Minn.; Harry A. Black, president Black Hardware Co., Galveston, Tex.; Max W. Babb, vice-president Allis-Chalmers Mfg. Co., Milwaukee; George P. Blow, chairman of board Western Clock Co., LaSalle, Ill.; A. J. Brosseau, president International Motors Co., Allentown, Pa.; Frederick C. Richmond, president F. C. Richmond Machinery Co., Salt Lake City, Utah; Alvan T. Simonds, president Simonds Mfg. Co., Fitchburg, Mass.

Sales of oak leather belting for October are reported at 499,943 lb. valued at $861,902, or an average of $1.72 per lb. This represents returns from about 60 per cent of the industry. The figures show a moderate gain from September and a heavy gain from a year ago. The figures for September were 475,380 lb. and $797,213, or an average of $1.68 per lb., while in October, 1921, the figures were 299,867 lb. and $501,379, an average of $1.67 per lb.

Discuss Waste at Industrial Conference

Wasteful industrial habits, the loss of production caused by ill health, physical defects and industrial accidents were among the topics discussed by L. W. Wallace, executive secretary, Federated American Engineering Societies, in an opening address of the sixth annual New York State Industrial Conference, held in Buffalo, Nov. 21, 22 and 23.

Serious time-labor loss because of defective vision and the fatigue produced thereby was pointed out. "It is estimated," Mr. Wallace said, "that 25,000,000 workers have vision which requires correction. A large rubber company and a typewriter company found that 20 per cent of their inspectors were unable to see sufficiently well to locate defects."

The twelve-hour day and the seven-day week were classed as wasteful industrial habits by Mr. Wallace, who cited the findings of the committee on work-periods in continuous industry of the Federated American Engineering Societies and the observations and experiences of John D. Rockefeller, Jr.

Mr. Wallace held management responsible for conditions which slowed down production and produced increased cost, hardships and labor unrest. Cancellation of orders and the return of goods he characterized as vicious practices hindering stabilization. He commended Mr. Hoover's plan for an authoritative national information agency to aid managers of industry and commerce. High labor turnover he called another indictment of management. He advocated systematic and permanent study of the unemployment problem, ascribing to intermittent employment great waste. Both management and labor, he charged, were guilty at times of criminal restriction of production, individually and collectively.

R. H. Sweetser Addresses Cincinnati Engineers

Ralph H. Sweetser, vice-president of the American Rolling Mill Co., Columbus, Ohio, was the principal speaker before a joint meeting of the Cincinnati Section of the American Society for Steel Treating and the Engineers' Club Nov. 16. Mr. Sweetser described the making of pig iron from the raw materials to the finished product.

At the meeting, George W. Galbraith, E. A. Muller, F. W. Willey, O. F. Sheppard, F. C. Broeman and Julian A. Pollak were nominated as candidates for directors of the Engineers' Club for the three year term. Resolutions of condolence on the death of Charles S. Gingrich, sales engineer of the Cincinnati Milling Machine Co., and a prominent member of the club, were adopted.

Conference of Indiana Foundrymen

The conference of Indiana foundrymen to be held under the direction of the department of practical mechanics of the engineering extension service of Purdue University, on Nov. 23 and 24, at Lafayette, Ind., provides for sessions on the morning, afternoon and evening of Nov. 23, a session on the morning of Nov. 24 and an inspection of the taking of a gray iron heat by the students in foundry practice in their regular work. The purpose of the conference is to bring the foundrymen of Indiana together for the betterment of foundry interests. Among the addresses scheduled are the following:

"Foundry Conditions in Indiana," by R. E. Wendt, Lafayette, instructor in foundry practice; "Layout and Design of a Modern Foundry," by F. D. Chase, F. D. Chase, Inc., Chicago; "The Manufacture of Pig Iron," by H. B. Northrup, Diamond Chain & Mfg. Co., Indianapolis; "The Manufacture of Malleable Iron," by N. W. Waterbury, Link-Belt Co., Indianapolis; "Team Work in Your Industry," by A. J. Tuscany, secretary Ohio State Foundrymen's Association, Cleveland, with a discussion led by A. J. Rumely, La Porte Foundry & Furnace Co., La Porte, Ind.; "Warpage in Iron," by J. F. Keller, iron and steel specialist, Lafayette; "Metallurgy in the Foundry," by J. H. Hopp, C. C. Kawin Co., Chicago; "Why Research Pays," by H. C. Peffer, School of Chemical Engineering, Lafayette; "Foundry Costs," by E. T. Runge, E. T. Runge Cost Co., Cleveland.

Meeting of Ohio State Foundrymen's Association

Plans have been completed for the convention and annual meeting of the Ohio State Foundrymen's Association at Middletown, Ohio, Dec. 7 and 8. The headquarters will be at the Hotel Manchester, where luncheon will be served at 11 a. m. Dec. 7. This will be followed by a business session. At 7 p. m. there will be an informal banquet followed by an entertainment. The morning of Dec. 8 will be spent in inspecting the plant of the American Rolling Mill Co., where the foundrymen will be entertained at luncheon. During the afternoon, they will be taken on an automobile trip to Cincinnati, where they will be entertained by Cincinnati foundrymen.

New Officers of New York Electrochemists

At the meeting of the New York section of the American Electrochemical Society, at the Chemists' Club, New York, Nov. 17, Dr. E. P. Mathewson gave an illustrated talk on mining and living conditions in Burma as he encountered them during his recent visit there. Dr. Mathewson outlined briefly the various metallurgical steps involved in the treatment of complex sulphide ores. These ores contain not only silver and lead, but also zinc and copper. C. H. Davis, of the American Brass Co., described his improved method of spectrum analysis. Traces of impurities in copper, brass, zinc and German silver can be detected in very short order, using a few milligrams of the material.

At the conclusion of the technical program, election of officers of the section took place. Dr. H. C. Cooper, 38 Clinton Street, White Plains, N. Y., was elected chairman; Dr. James Kendall, of Columbia University, vice-chairman; Paul DeV. Manning, 2 Rector Street, New York, secretary. The next meeting of the section will be held on the evening of Feb. 9, at the Chemists' Club.

Ohio Foundry Operations

Operations of Ohio foundries fell out slightly during October, having declined to 61.4 per cent of normal on Oct. 31, as compared with 63 per cent on Sept. 30, according to the monthly report of the Ohio State Foundrymen's Association. This decline is attributed partially to the seasonal slowing up of the automobile industry which has affected some foundries. Pig iron stocks on hand increased during October from 75 to 84 per cent, and stocks received increased from 35 to 47 per cent. The association finds that the softening of pig iron prices has resulted in the tendency on the part of buyers of castings to withhold the placing of contracts because they expect lower prices on castings. Operations of non-ferrous foundries show considerable improvement, having increased from 65 per cent of normal during September to 74 per cent during October.

Foundry Meeting at Milwaukee

The Wisconsin Foundrymen's Association has arranged with the Bethlehem Steel Co. to have its foundry expert, Mr. Kreulen, address the association in open meeting, at the Hotel Pfister, Milwaukee, on Nov. 28. The latter part of the evening will be devoted to a general discussion of foundry problems. Admission cards can be obtained gratis from the secretary, J. L. Wurm, 283 Clinton Street, Milwaukee. William J. Grede is president.

Co-ordination of the country's transportation facilities, including railroads, water routes and highways, will be a prominent part of the program of the Southern Commercial Congress in convention this week at Chicago.

Effect of Manganese on Carbon Steels

Their Structure As Affected by Varying Percentages—Manganese As a Strengthening Factor in Low and Medium Steels

BY HENRY S. RAWDON* AND FREDERICK SILLERS, JR.*

ALTHOUGH the influence of manganese as a "hardening element" of steel, in addition to its action as a deoxidizing and as a "desulphurizing agent, is well understood by metallurgists, it is doubtful whether its behavior in this respect is fully appreciated by designing engineers and users of steel in general. In a previous publication of the Bureau of Standards[1], the preparation of a series of iron-carbon-manganese alloys has been described, together with their utilization for the determination of the specific effect of carbon and of manganese upon the mechanical properties of such alloys.

The scope of the present article is restricted to a discussion of the structural effects resulting from variations in the manganese content and is based upon a study of the alloys prepared in the former investigation. These alloys were of a very high degree of purity. The materials used in their preparation were electrodeposited iron, manganese of 98.75 per cent purity and an iron-carbon alloy (4.5 per cent carbon) prepared from Acheson graphite and some of the electrodeposited iron. Crucibles of fused magnesia, prepared especially for this investigation, were used for containing the alloys during the melting which was carried out in vacuo. The following figures show the maximum impurities in any of the finished alloys: Sulphur, 0.008; silicon, 0.008; nickel, copper, and cobalt (combined) 0.014 per cent.

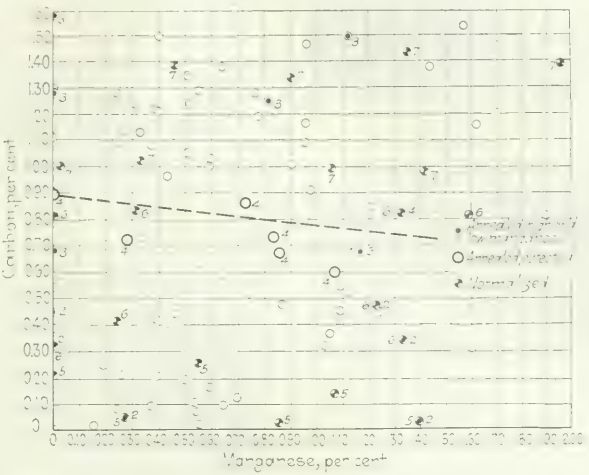


Fig. 1.—The Alloys Available for Examination Grouped According to the Respective Carbon and Manganese Contents

The conclusions reached by Neville and Cain, as a result of their investigation of the series of iron-carbon-manganese alloys prepared from pure materials, concerning the effect of residual manganese upon the tensile properties and hardness may be summarized as follows:

> The effects of carbon and of manganese are mutually dependent upon each other; the presence of carbon augments the influence of manganese, and vice versa. The ultimate tensile strength of the alloys was found to increase by an amount varying from 90 to 250 lb. per sq. in. for each addition of 0.01 per cent manganese, the lower rate of increase being for the alloys of low carbon content. The proportional limit was found to be affected in much the same way as the ultimate tensile strength by variations in the manganese, whereas the ductility was only slightly affected. The average increase in the Brinell hardness number for each 0.01 per cent addition of manganese is 0.5, though for low carbon alloys it is somewhat less than this value.

As illustrative of the effects of manganese upon the mechanical properties of commercial carbon steels in the normalized state, the values in Table 1 given by Aitchison[2], may be cited.

The general effect of manganese upon the structure, and hence the properties, of carbon steels has been well expressed by Howe[3] as follows:

> Its effect on the mechanical properties of the steel seems to me in the last analysis due primarily to its retarding action on the transformations and on the coalescence of the microconstituents into progressively coarser masses. . . . The retarding effect on the structural changes shows itself by leading in general (in carbon steels) to finer structure, finer ferrite masses, finer network structure, and finer pearlite; indeed, probably often to the replacement of lamellar pearlite with sorbite. This greater fineness leads to better quality in general and to a higher elastic limit in particular, though, of course, with a corresponding sacrifice in ductility. The great value of manganese for this purpose has not begun to receive the attention it deserves.

Table 1.—Effect of Manganese on Physical Properties of Steel

Carbon, Per Cent	Manganese, Per Cent	Yield Point, Lb. per Sq. In.	Maximum Tensile Strength, Lb. per Sq. In.	Elongation, Per Cent
0.21	0.05	38,100	56,000	42.0
0.25	0.85	56,000	60,500	30.0
0.38	0.08	44,800	67,200	35.0
0.36	0.58	58,300	78,400	28.0
0.37	0.82	60,500	96,300	25.0
0.49	0.09	49,300	80,600	27.0
0.47	0.70	65,000	94,100	26.0
0.50	0.80	67,200	112,000	20.0

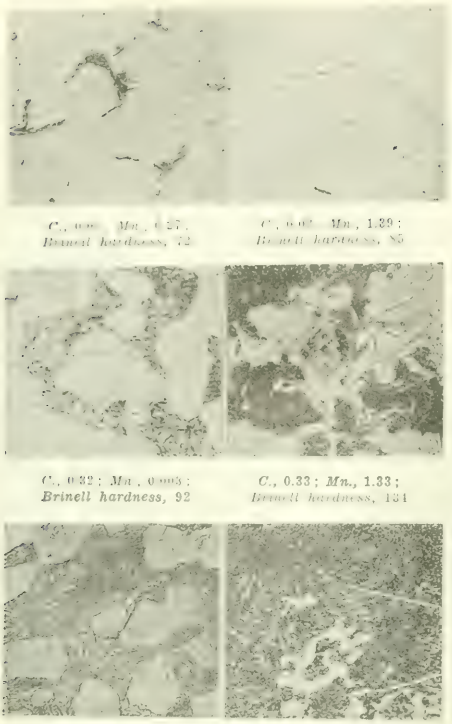
The series of iron-carbon-manganese alloys available offered an excellent opportunity for studying the structural changes in carbon steels which result from manganese, a study which on account of the dearth of information along this line in the technical literature, is very desirable. Although the alloys belong to the ternary system, the most convenient and practical way to treat them so far as their relation to steel is con-

*Physicist and laboratory assistant, respectively, Bureau of Standards, Washington. Published by permission of the director of the Bureau of Standards.

[1] R. P. Neville and J. R. Cain: "The Preparation and Properties of Pure Iron Alloys; I, The Effect of Carbon and Manganese on the Mechanical Properties of Pure Iron. Bureau of Standards Scientific Paper, forthcoming, 1922. The paper contains a rather complete bibliography on the effect of manganese on carbon steels.

[2] L. Aitchison, "Engineering Steels," p. 143, D. Van Nostrand Co. (1922).

[3] H. M. Howe: Topical Discussion on the Rôle of the General Alloying Elements in the Alloy Steels. The Rôle of Manganese; A. S. T. M. *Proceedings*, vol. 17, p. 5, 1917.



C., 0.32; *Mn.*, 0.005; *Brinell hardness*, 92 — *C.*, 0.33; *Mn.*, 1.33; *Brinell hardness*, 154

C., 0.45; *Mn.*, *trace*; *Brinell hardness*, 105 — *C.*, 0.46; *Mn.*, 1.23; *Brinell hardness*, 164

Fig. 2.—Microstructure of Annealed Alloys of Similar Carbon Content with Low and with High Manganese. Note the pronounced difference in the character of the pearlite which results from an increase in the manganese content. Reduced about one-fourth from an original of 500 dia.

cerned, is to regard them as belonging to the binary or iron-carbon series, with manganese as an extraneous or added element. This is the general method used in the following discussion.

The Materials Used

Composition: In Fig. 1 are indicated the alloys available for examination, grouped according to the respective carbon and manganese contents. One hundred and two (102) alloys with carbon varying from 0 to 1.6 per cent and manganese 0 to 2.0 per cent were used. Although the structures of all of the specimens shown were examined, photomicrographs of only a few have been reproduced as types in the following discussion. Such specimens have been suitably indicated in Fig. 1 and the carbon and manganese content given on the respective micrographs in the different figures. The results of the complete chemical analysis of all the specimens are given in the reference cited in note 1.

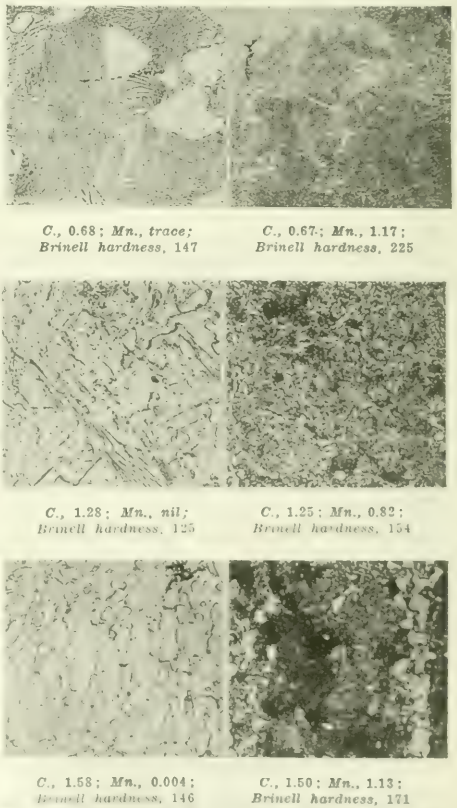
Treatment: In the previous investigation, all of the specimens were heat treated before being tested. This treatment varied somewhat according to the composition of the alloy, the aim being to develop the highest tensile properties in the normalized condition. On account of the relatively small size of the ingots, approximately 8 x 1½ in., the reduction during the mechanical working of the metal was not sufficient to remove entirely the "ingot structure." Hence a preliminary annealing was given all of the specimens after being cut from the rolled plate in order to minimize any possible ingotism remaining. The bars were heated for two hours at the annealing temperature, which was varied according to carbon content, as follows: Carbon, 0 to 0.09 per cent, 940 deg. C.; 0.10 to 0.29 per cent cent, 900 deg. C.; 0.30 per cent, 840 deg. C., after which they were allowed to cool in the furnace.

In carrying out the normalizing treatment which followed the preliminary annealing, allowance was made for the differences in both carbon and manganese contents. The treatments are summarized in Table 2.

Table 2.—Normalizing Treatment
(20 min. at required temperature, followed by air-cooling)

Carbon, Per Cent	Temperature, Deg. C., According to Manganese Content: Manganese, 0 to 0.79 Per Cent	Manganese, 0.80 to 1.50 Per Cent
0.00–0.09	940	915
0.10–0.19	915	885
0.20–0.29	885	860
0.30–0.44	845	830
0.45–0.59	815	800
0.60–0.74	785	785
0.75–1.50	770	770

In addition to examining all the specimens in the normalized condition, many of them were re-examined after a second or supplementary annealing. Small pieces approximately 15 g. in mass, cut from the ends of broken tension specimens were packed in an iron container (section of 3-in. pipe) covered with amorphous silica containing a small amount of charcoal and heated to a temperature of approximately 750 deg. C. (745 to 765 deg.). After a sojourn of one hour at this temperature the container and specimens were allowed to cool rather slowly within the furnace, one hour being required for the temperature to drop from 750 to 600 deg. C. In this examination, since all of the specimens had received identical treatments, the effect of the manganese upon the structure was much more evident and permitted closer comparison than in the same samples after the normalizing treatment.

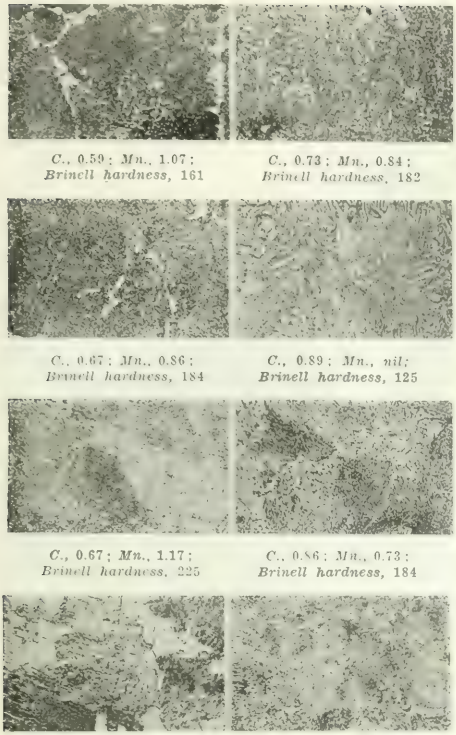


C., 0.68; *Mn.*, *trace*; *Brinell hardness*, 147 — *C.*, 0.67; *Mn.*, 1.17; *Brinell hardness*, 225

C., 1.28; *Mn.*, *nil*; *Brinell hardness*, 125 — *C.*, 1.25; *Mn.*, 0.82; *Brinell hardness*, 154

C., 1.58; *Mn.*, 0.004; *Brinell hardness*, 146 — *C.*, 1.50; *Mn.*, 1.13; *Brinell hardness*, 171

Fig. 3.—Microstructure of Annealed Alloys Showing the Changes Resulting from Variations in the Manganese Content in Specimens of Similar Carbon Content. Reduced about one-fourth from an original of 500 dia.



C., 0.59; *Mn.*, 1.07; *Brinell hardness*, 161 — *C.*, 0.73; *Mn.*, 0.84; *Brinell hardness*, 182

C., 0.67; *Mn.*, 0.86; *Brinell hardness*, 184 — *C.*, 0.89; *Mn.*, nil; *Brinell hardness*, 125

C., 0.67; *Mn.*, 1.17; *Brinell hardness*, 225 — *C.*, 0.86; *Mn.*, 0.73; *Brinell hardness*, 184

C., 0.72; *Mn.*, 0.28; *Brinell hardness*, 127 — *C.*, 0.82; *Mn.*, 1.33; *Brinell hardness*, 184

Fig. 4.—Microstructure of Annealed Alloys of Approximately Eutectoid Composition Showing the Changes Resulting from Variations in Manganese Content. See Fig. 1 for the location of eutectoid line. Reduced about one-fourth from an original of 500 dia.

Structural Feature from Variations in Mangenese

Annealed Alloys: In Figs. 2 and 3 are shown the structures of a series of alloys of progressively increasing carbon contents, each one of which occurred in combination with a low and a high manganese content (See Fig. 1). The characteristic influence of the manganese in the steel which resulted in the pearlite being in a fine grained sorbitic state rather than in the coarser lamellar condition is very evident in these micrographs. The general appearance of the alloys of high manganese content is similar to that which would result in the companion, that is, the low-manganese, alloy if it were cooled at a much more rapid rate than was used here.

The results obtained with the annealed alloys indicated that manganese has very little if any effect upon the grain size of the annealed material. This conclusion is not in entire agreement with that reached by Howe[8], that manganese decreases the size of the austenite crystals and therefore the size of ferrite network in the annealed steel resulting from them. However, as will be shown later, steels of high manganese content when cooled at a more rapid rate, for example in normalizing, often are of a much finer grain structure than steels of similar carbon content but lower in manganese. This is the condition which obtains more frequently in commercial steels than that shown by the slowly cooled alloys in Figs. 2 and 3, and hence, may account for the conclusion reached by Howe concerning the effect of manganese upon grain size.

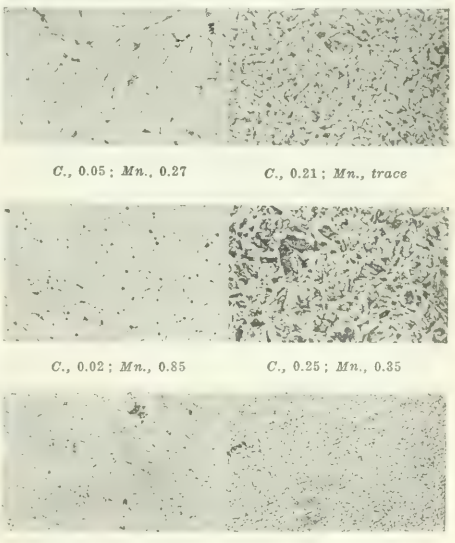
As an indication of the effect of manganese upon the mechanical properties of the alloys in the annealed state, the Brinell hardness was determined, a "micro-Brinell" set, which employs a 1/16 in. diameter (1.58 mm.) ball and a 15 kg. load, being used. The results are summarized in Table 3, and the hardness has also been indicated on the micrographs of these alloys.

Table 3.—Effect of Manganese on the Brinell Hardness of the Annealed Alloys

Carbon, Per Cent	Manganese, Per Cent	Brinell Hardness Number
0.05	0.27	72
0.02	1.39	85
0.32	0.003	92
0.33	1.33	134
0.45	Trace	105
0.46	1.23	164
0.68	Trace	147
0.67	1.17	225
0.67	0.86	184
0.59	1.07	161
0.72	0.28	127
0.86	0.73	184
0.82	1.33	184
0.89	Nil	125
0.73	0.84	182
1.28	Nil	125
1.25	0.82	154
1.58	0.004	146
1.50	1.13	171

Change in Eutectoid Ratio: In addition to the difference in the character of the pearlite resulting from the presence of manganese another noticeable structural change is the decrease in the amount of precipitated proeutectoid ferrite in all of the alloys containing manganese. This condition implies a change in the eutectoid ratio, the "pearlite point" being gradually shifted to the left, that is, to lower carbon percentages, by the addition of manganese. Further substantiating evidence of this is afforded by the fact that free cementite may be detected in alloys containing considerable manganese but with a carbon content somewhat below the eutectoid composition of the simple iron-carbon alloys (Fig. 4).

By the examination of a series of annealed specimens of approximate eutectoid composition the location of the apparent eutectoid line was determined and has been indicated in Fig. 1. Fig. 4 shows the microstructure of the series of eutectoid alloys examined after annealing. The presence of free ferrite or cementite is



C., 0.05; *Mn.*, 0.27 — *C.*, 0.21; *Mn.*, trace

C., 0.02; *Mn.*, 0.85 — *C.*, 0.25; *Mn.*, 0.35

C., 0.02; *Mn.*, 1.39 — *C.*, 0.13; *Mn.*, 1.07

Fig. 5.—Microstructural Changes Produced by Variations of the Manganese Content of Normalized Alloys of Low Carbon Content. Note the decrease in grain size with increasing manganese. Reduced about one-fourth from an original of 100 dia.

[8] See Note 3, also H. M. Howe, "Life History of Network and Ferrite Grains in Carbon Steel," A. S. T. M. Proc., 11, p. 365, 1911.

the criterion used in reaching a decision as to upon which side of the line the alloy should be placed. By this means the dotted line shown in Fig. 1 was located. This indicates that one per cent of added manganese lowers the eutectoid ratio to approximately 0.78 per cent carbon.

The line as drawn represents the structural conditions which obtain under ordinary circumstances. The exact or theoretical location of the line is a matter of considerable uncertainty since the degree of annealing would have to be varied to suit the variations in manganese content of each of the different alloys.

Normalized Specimens: From the numerous specimens examined in the normalized condition, a few typical samples of the various grades according to carbon content, were selected, micrographs of which have been given in Figs. 5, 6 and 7. In addition to the characteristic effect of manganese upon the nature of the pearlite, which was even more evident here than it was in the annealed specimens, these micrographs indicate that the grain size of hypoeutectoid steels when cooled fairly rapidly, that is, normalized, is apparently considerably less in those of high manganese content than in similar ones lower in manganese. The ferrite masses in the steels of high manganese content are much smaller and the continuity of the pearlite grains is broken up much more effectively than in the similar steels of lower manganese content.

In the high carbon steels, an increase in manganese content leads to formation of cementite in excess of that which normally occurs in simple carbon steels of the same carbon content. Instead of the well defined plates, in which form cementite often appears in high carbon steels, manganese causes this constituent to occur in very much smaller masses or granules. In some of the specimens prominent well-defined streaks of cementite were found. It is believed, however, that this structural feature was a result of the small-scale production used in the preparation of these alloys and that it may not be a characteristic effect of manganese in general.

Discussion

The effect of manganese in lowering the critical or the transformation temperatures of steel is well known. The magnitude of this effect upon the Ar_1 transformation in iron-carbon alloys (4 per cent carbon or above) has been stated by Wust[6] to be 20 to 25 deg. C. for each per cent of manganese added provided the total amount is not in excess of 5 per cent. The more recent investigation by Matsushita[7] of low carbon steels (approximately 0.21 per cent carbon) indicates the lowering of the Ar_1 temperature for each per cent of added manganese, up to a total of 9.8 per cent of this element, to be slightly less than 20 deg.

The structural changes in the character of the pearlite of the alloys previously described can, in large measure, be accounted for by the effect of this element upon the transformation temperatures. However, the fact that all elements which lower the Ar_1 transformations in steel do not produce the same change in structure of the annealed pearlite indicates that the result is dependent to some extent upon other factors. This characteristic effect of manganese has been well stated by Howe (see note 5) as follows: "Sluggishness from lowering the birth-temperature of ferrite and pearlite reinforces sluggishness due directly to the presence of manganese."

Manganese and iron are completely isomorphous and hence form a continuous series of solid solutions. In the ternary iron-carbon-manganese alloys of low carbon content it is probable then that at least part of the manganese exists in solid solution in the ferrite. Manganese also reacts with carbon to form a carbide corresponding to cementite so that in the alloys of higher carbon content it may be expected that the manganese exists in the form of carbide. Whether a double carbide of iron and manganese or a mixture of the simple carbides of the two elements exists is still an open question.

Although each of these two factors, the solution of manganese in ferrite and the presence of a special carbide of this element, undoubtedly has an effect upon the mechanical properties of the steel, it appears very probable that the structural effect resulting from the presence of manganese is of much greater importance in this respect.

An indication of the magnitude of the effect resulting from the solution of manganese in ferrite is given by the very low-carbon alloys in Table 3. It will be noted that the increase in hardness produced by manganese in this case was very much less than in those in which

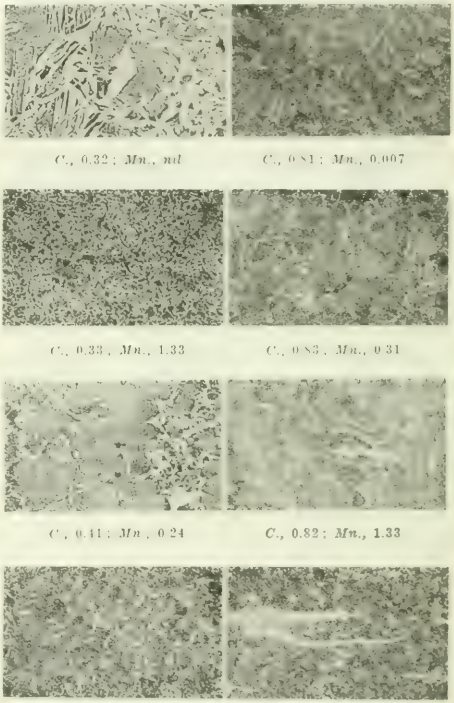


Fig. 6.—Microstructural Changes Produced by Variations in the Manganese Content of Normalized Alloys of Medium and of Eutectoid Carbon Content. Note the change in grain size of the medium carbon alloys. Reduced about one-fourth from an original of 100 dia.

more carbon was present and hence a greater structural difference existed between the low and high manganese alloys.

Concerning the effect of manganese upon the grain size of steel, conflicting statements have appeared in the technical literature. Howe (see note 3) attributed much of the beneficial effect of manganese in low carbon steels to a decrease in the grain size resulting from the presence of this element. Hoyt[8] states that no marked difference in ferrite grain size results from the presence of manganese in steel. The results obtained in this investigation indicate that the rate at which the steel is cooled is a very important factor in this respect. In the annealed alloys of high and low manganese content no noticeable difference in grain-size could be detected. However, in the same or similar alloys which had been given a normalizing treatment and hence cooled much more rapidly the difference in grain size was very marked, the grain-size being very much less

[8] S. L. Hoyt: "Metallography; Part II, The Metals and Common Alloys," 1921, p. 340.

in those containing the higher percentages of manganese. The marked difference in Brinell hardness observed in the high and low manganese alloys after annealing indicates, however, that any increase in the mechanical properties as a result of the decreased grain size in the materials of relatively high manganese content is in addition to the effects which are induced directly by the presence of manganese.

Another effect of manganese in steels is the shift in the eutectoid ratio toward the left of the diagram, that is, to a lower percentage of carbon. An addition of 1 per cent of manganese in the iron-carbon alloys examined, lowered the eutectoid ratio to approximately 0.78 per cent carbon. This change is considerably greater than the value quoted by Hoyt (see note 8), a lowering to 0.75 per cent carbon for 2 per cent manganese being given by him. The very fine grained or sorbitic character of the pearlite in alloys containing considerable manganese together with the ready tendency toward spheroidization of the lamellar pearlite of manganese-free alloys renders the location of the eutectoid line a matter of considerable uncertainty. By cooling the manganese alloys from the annealing temperature at a very much slower rate than the one employed, this line might be located somewhat more accurately. However, the position given in the diagram (Fig. 1) represents very closely the conditions which obtain in commercial practice.

One other practical effect of manganese in steel as indicated by the foregoing micrographs is the decrease in spheroidization of the cementite. The large amount of cementite remaining in the sorbitic condition in the high carbon alloys containing considerable manganese is a very conspicuous feature of the structure as compared with similar low-manganese alloys which received the same treatment.

The value of manganese as a strengthening element in carbon steels, particularly in those of low-carbon content, has been emphasized by prominent metallurgists, for example Howe, and to some extent such steels are now used commercially, especially abroad. While the results of structural examination alone, such as this article describes, will not permit of any definite recommendation in this respect, it is very evident from the results described above that by the use of higher manganese contents than are usually employed, a structural condition may be obtained in low and medium carbon steels which is very much more desirable than that which obtains in a similar steel but of lower manganese content after having received an identical treatment. The results strongly support the recommendations which have been made at different times concerning the advantages to be gained by using higher manganese in such steels.

Summary

1. The investigation, which is part of the general study of the iron-carbon-manganese alloys which is being conducted by the Bureau of Standards, consisted of a study of the microstructure of a comprehensive series of these alloys. One hundred and two alloys with the carbon varying from 0 to 1.60 per cent and manganese 0 to 2 per cent were used.

2. The effect of manganese as observed in annealed alloys, is to confer upon the pearlite a very fine grained or sorbitic structure, even after slow cooling. The relative amount of pearlite present is considerably greater in the alloys of high manganese content than in corresponding ones low in this element. A pronounced increase in Brinell hardness of the annealed alloys accompanies the change in structure produced by the addition of manganese.

3. The addition of manganese causes a shift in the eutectoid ratio toward lower carbon content. One per cent of manganese lowers it to approximately 0.78 per cent carbon.

4. In the normalized alloys, a pronounced decrease in grain size was found in those of higher manganese contents, in addition to the structural effects mentioned above. In the annealed specimens no noticeable difference in grain size was detected for high and low manganese content in alloys of any given carbon content.

5. The well known effect of manganese in lowering the transformation temperatures of the materials will account in part for the observed structural changes. It appears also that manganese renders steel more "sluggish" and less responsive to structural changes than many of the other elements which produce a similar lowering of the critical temperatures.

6. While the results of the structural examination will not warrant any definite conclusions concerning the use of manganese as a strengthening element in steel, the results obtained strongly support previous recommendations which have been made by different metallurgists concerning the advantages to be gained from the use of higher manganese, particularly in low and medium carbon steels.

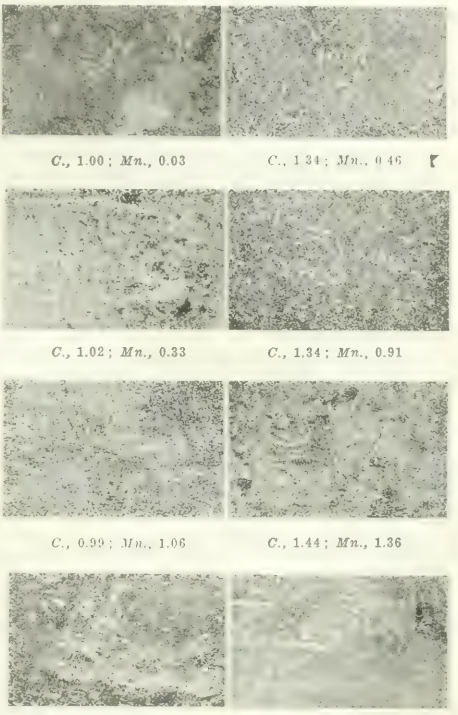


Fig. 7.—Microstructural Changes in Normalized High Carbon Alloys Resulting from Variations in the Manganese Content. Note the gradual increase in amount and change in character of the cementite. Reduced about one-fourth from an original of 100 dia.

Purchasing Agency Will Move from Washington to Chicago

WASHINGTON, Nov. 21.—Announcement has been made by J. W. Cain, manager of purchases, American Short Line Railroad Association, that its consolidated purchasing agency will be removed, effective Dec. 1, from Washington to 616-618 Railway Exchange, Chicago. The reason assigned is that business now being handled by the agency has increased to such proportions that it has been found necessary to be more centrally located, both geographically and industrially. The association also is completing plans for a finance corporation through which gasoline passenger motor cars may be acquired by member lines and others under a lease purchase contract. It is believed that this will be a great help to a large number of railroad companies, which have found difficulty in financing the purchase of motor equipment on this basis.

FAVORS SHIP SUBSIDY

Mr. Schwab Speaks Earnestly in Support of Upbuilding the Merchant Marine

WASHINGTON, Nov. 21.—Before he took the stand last Friday morning to testify in the Pittsburgh base case, Chairman Charles M. Schwab of the Bethlehem Steel Corporation was, as is always the case when occasion permits it, surrounded by newspaper correspondents. He was in his usual happy mood and talked to the newspaper men freely about current topics. In the course of his remarks, he took occasion to strongly support ship subsidy legislation. He said that he could not understand why the farmers objected to it, because it is as important to them as it is to the manufacturing interests on the seaboard. He said that it is necessary that this country build up its own merchant fleet and that to do so a subsidy is required. Mr. Schwab pointed out that foreign countries have built up their merchant fleets on this basis and that it is essential for the United States to do likewise.

It was declared by Mr. Schwab that immediate passage of the ship subsidy bill would give a strong impetus to American business. Deploring the lack of American vessels that existed until their construction was forced by the war, Mr. Schwab said that the Bethlehem corporation was compelled to give contracts abroad to foreign ships to carry iron ore, because there were no American ships available.

"It is not possible for us to compete with the commerce of the world on the same footing," he said, "unless we get our shipping on the same basis as theirs. We are the workshop of the world. We are the foodshop of the world. And it is nothing less than absurd not to help our own ships in getting a fair share of the world's commerce. The margin between good business and bad business is only a few per cent. Exports can furnish this margin, and a strong and resourceful merchant marine would make a tremendous difference in the aspect of American business."

Mr. Schwab said that although business conditions in the United States and throughout the world are unsettled, there is no obligation on the part of the United States to call any world economic conference. He expressed firm belief in the principles laid down by the founders of this country in opposition to entangling alliances with foreign countries. Pointing out that this nation has vast natural resources, which should be turned into gold, Mr. Schwab said that while he believed the United States should adopt a helpful attitude toward other nations, he did not believe that it should be held responsible for world conditions.

Lackawanna Building Plans

BUFFALO, Nov. 20.—Charles M. Schwab, chairman Bethlehem Steel Corporation and President E. G. Grace, inspected the Lackawanna mills last Tuesday. Mr. Schwab stated that in line with the expenditure of $15,000,000 at Lackawanna, would be included the erection of more than 1000 dwellings for the workers. He expressed confidence in the future of the Lackawanna properties.

Specifications for Safes Considered

WASHINGTON, Nov. 21.—The tentative draft of the standard specifications for fireproof safes to be furnished to the Government was discussed at a meeting at the Bureau of Standards last Friday with representatives of safe manufacturers. The preparation of these specifications is in charge of a committee of the Federal Specifications Board, Bureau of the Budget, which prepares tentative specifications and then invites manufacturers' representatives to express their opinion. After careful consideration of all points of view these specifications are adopted and are then mandatory on all Government departments.

Fireproof safes, by these specifications, are divided into four classes, depending on the severity of the fire they will be expected to withstand. The meeting was taken up with a discussion of the requirements of the four types of safes and with various details of construction.

All manufacturers will be invited to submit bids on the basis of these specifications and the successful competitor will be awarded the contract for all Government purchases of safes of that type for one year only. Tentative specifications will be revised and copies of the plans sent to manufacturers for their criticism.

Increasing Output of Coal

WASHINGTON, Nov. 21.—Returns on carloadings at mines for the week Nov. 13-18 indicate 13,200,000 net tons of coal were produced, according to the Geological Survey. Of this quantity 11,100,000 tons was soft coal and 2,100,000 was anthracite.

The estimated cumulative production of bituminous coal this year to Nov. 11, inclusive, stands at 332,668,000 tons, which is 21,541,000 tons, or 6 per cent less than in the corresponding period of 1921; 137,385,000 tons, or 29 per cent less than in 1920; 77,734,000 tons, or 19 per cent less than in 1919; 177,534,000 tons, or 35 per cent less than in 1918, and 143,856,000 tons, or 30 per cent less than in 1917.

The cumulative output of beehive coke during 1922 to Nov. 11 stood at 6,051,000 net tons. In the corresponding period of the four years preceding it was as follows: 1921, 4,715,000; 1920, 18,462,000; 1919, 16,974,000; 1918, 27,106,000.

Continuous Annealing Furnaces for Sheets

(*Concluded from page* 1342)

which distributes the coal to steel bins near the point of consumption.

Fuel is fed to the furnaces by small screw feeders direct connected to motors, the coal being delivered into the air blast in the proper proportion. Each sheet and pair furnace has a separate 4-ton steel fuel bin located back of it along the side wall of the building. The fuel is carried underground in 3-in. feed pipes from the bins to the furnaces. Each combination furnace has one burner located at the back of the furnace. The annealing furnaces are supplied from a 20-ton fuel bin located at the side of the furnaces. Eight 1½-in. and 3-in. supply lines lead from the bin to the furnaces, each furnace having four combustion chambers beneath the floor, with one burner in each chamber.

The sheet mills are driven by a 1600-hp. 28 in. x 36 in. twin duplex condensing and reversing Uniflow engine built by the Nordberg Mfg. Co. and located between the mill stands. A 5 to 1 herringbone reduction gear supplied by the Falk Co. reduces the speed from 150 to 30 r.p.m., at which the rolls are driven. The fly wheel is 13 ft. in diameter and 28 in. wide and, with the main shaft, weighs 50 tons. The main gear is 16 ft. in diameter. A 750-hp. Uniflow engine drives a 350-kw. alternating current General Electric generator that supplies current for operating the powdered coal plant and blowers. A 175-hp. Crocker-Wheeler direct current generator furnishes electricity for the cranes and for the motors that operate the screw feeders that deliver fuel to the furnaces and a 60-kw. generator that supplies current for lighting. Steam is supplied by two 450-hp. water tube boilers built by the Union Iron Works.

The plant is located on a 50-acre site on the main line of the New York Central Railroad, assuring good shipping facilities. It has a capacity of 5000 to 6000 tons per month in black and galvanized sheets in 12 to 30 gages, and in widths to 40 in.

The Ashtabula Steel Co. was organized in 1920 by the Chamber of Commerce of that city, and its plant was placed in operation late the past summer. Robert Lock is president. Other officers include, H. M. Kunkle, treasurer; W. J. Kunkel, assistant treasurer; T. J. Rennick, secretary and Severn P. Ker, Jr., general manager of sales.

Layout for Electric Tool Steel Plant

Efficient Arrangement of Buildings and Equipment, Particularly the Melting Department—Storage of Scrap and Ferroalloys

BY MERLE W. CARUTHERS*

THE manufacture of tool steels in the electric furnace is receiving added impetus and, by the use of proper forethought in the laying out of the melting department and storage facilities, it is possible to surpass the highest efficiency previously obtained.

Of course, it is not possible to furnish any set rules that can be universally followed, but an attempt is made in the following article to present a layout that combines the good points found in a number of installations.

Steel Scrap Storage

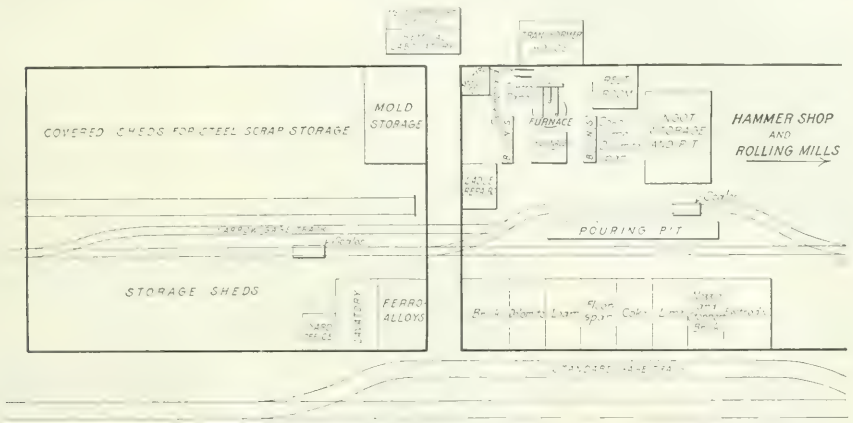
The question of storage for melting scrap is obviously an important one. It is the condition of the scrap, with regard to corrosion when charged into the furnace, which determines the amount of refining of the bath necessary, the quality of the steel produced and the life obtained from the furnace refractories. These factors, of course, govern the cost of the finished bar and their control minimize factory cost.

It is an established fact that the analysis of any tool steel does not definitely guarantee that the steel will be suited for the purpose intended even if the chemical composition required by the purchaser has been met. Quality starts farther back than the ladle tests or the check analyses taken from the finished bar by the purchaser. The selection and storage of the raw materials which go to make up the charge are important steps in the production of quality tool steel.

Covered sheds should be used for the storage of steel scrap. Excessively rusty steel not only fails to yield a proper percentage of its weight when melted, but forms a bath that is very high in oxides. These oxides should be reduced to insure the making of a sound steel in any case and, when present in large quantities, the time and materials necessary to bring about proper refinement are immoderate and consequently cause a higher priced steel without an accompanying enhancement in quality.

On the contrary, the quality is decreased by using a great quantity of highly oxidized scrap, for no matter what precautions are taken to "tap" under a high reducing atmosphere, it is practically impossible to obtain a steel free from gases and the use of rusty scrap necessarily increases the danger of getting a finished product that is not thoroughly deoxidized.

The extra precautions taken to make a fine quality steel from rusty scrap also consume extra time which could be used for increased tonnage if unrusted scrap that had been stored under covered sheds were used. Consider the amount of ice and snow which will cling to scrap when exposed to the winter seasons with the impending danger of explosions resulting from its use and the fact that large steel mills working on a quantity production basis still consider it prudent to cover their stores of melting scrap. The feasibility of having covered sheds for steel scrap storage will be more fully realized.



Suggested Plan Which Represents an Ideal One for an Electric Tool Steel Plant

The life of the furnace refractories is shortened by an appreciable amount when the charge in the furnace consists of highly oxidized material, the increased volume of oxides making the ordinary scouring action on the lining and roof even more severe and hence the furnace is repaired more often. This, of course, means increased cost of repairs and consequent loss of time.

The position of standard and narrow gage tracks, as shown in the illustration, has been selected to permit the unloading of the incoming scrap and the loading of the charge for the furnace to be performed by the same crane and, if necessary, without even placing the scrap in storage. This last feature is sometimes advisable when it is desirable to mix heavy and light scrap for the charge without having the crane cover too much distance in doing so. It is convenient to have the track scales for weighing charges situated in the scrap shed so that cars or bogies, when on the scales, may be served by the crane and the exact weight desired can be furnished without having to make any "shifts."

Mold Storage

A portion of the shed which is used for steel scrap storage may also be used for the storing of new molds and sizes not in use. In the first place, the handling

*Engineer, Westinghouse Electric & Mfg. Co., East Pittsburgh.

of them by the crane means that any desired number can be obtained on a short notice, whereas, if it is necessary to move them by laborers using skids and bars, the time required to get out the same number as by the crane would obviously be greatly increased. Also, the molds would be kept free from rust by being stored under a covered shed. When split molds are used, it is good practice to coat the inside surface with pitch or some other suitable protective coatings. The coatings are burned off when the molds are used for the first time and the molds have thus been preserved and the surface prevented from becoming pitted by rust.

Melting Platform

The illustration shows the arrangement of the furnace or furnaces, melter's office, bins and rest room which make for an efficient operation of the furnace. The question of rest room should not be overlooked, as there are times when the furnace men, and particularly the pit men and ladlemen, can rest for a while, and if a room is provided near their place of work it will be more attractive than to crawl off into some hiding place where they may be hard to find when needed. This, of course, applies generally to men working at night.

The installation of shower baths in the rest room affords a pleasure and comfort to the majority of men working in the melting department and their cost would be justified by the benefits derived through better health of the employees. One of the large steel mills in the Pittsburgh district installed four showers in one of their open-hearth departments, employing approximately 200 men, and they are used to capacity with a waiting line at every change of shifts. It is probably impossible to determine just how much good is derived from them, but it is safe to assume that better health is enjoyed by the men who use them regularly.

The melter's office should be built close to the furnace and should be so constructed as to permit of the accommodation of as few persons as necessary. An error made in the amount of additions to be made would, no doubt, mean a "lost heat."

The storage bins for fire brick, dolomite, loam, fluorspar, coke breeze, lime, nozzle and stopper brick and electrodes should be built so that a standard gage car could be unloaded directly into them. It is well to have them under the same roof as the furnace so that material can be transported from them to the furnace without great difficulty and without being exposed to inclement weather.

It will also be noted that materials such as fire and silica brick, electrodes and nozzle and stopper brick, that absorb frost readily, are stored where they are protected in some degree from exposure to the elements. Electrodes and electrode joints should receive special consideration along this line as excessive electrode breakage will result from using those which have become frosted. They should also be stored where no rain can beat in on them as moisture is almost as injurious as frost with regard to breakage.

Furnace Pit

The pit in front of the furnace should be so constructed that ample room is given for the receiving of a ladle larger than the rated furnace capacity. A heat is, at all times, liable to be lost in the pit and the larger the pit the more readily can any scrap be removed from it. The walls and bottom should be reinforced with concrete and a liberal radius should be allowed where the side intersects the bottom. This precaution is taken to add to the ease with which steel, which has entered the pit in a liquid state, can be removed after solidification. For this same reason it is good practice to cover the bottom of the pit with a layer of loam about 2 in. thick.

It is desirable, when possible, to have the melting platform, furnace with control panels, bins, etc., elevated about 10 ft. above the pouring platform, but the expense of such an arrangement is sometimes considered inadvisable. In case the melting and pouring platforms are on two separate levels, it is obviously unnecessary to have a pit, as the ladle for receiving the heat can rest upon its trunnions, supported by standards placed on both sides of the ladle for this purpose.

Ferroalloy Storage

The cost of ferroalloys and the ease with which some of them can be mistaken for each other makes it expedient that they be kept in bins in a general storage room made especially for them. This will also have a psychological effect upon men held responsible for getting the alloys to the furnace, as the more orderly the condition of the storage house the more care will be taken in keeping them in separate piles about the furnace.

The writer recently visited a steel mill using ferromanganese and ferrochromium and noticed a pile containing approximately 1½ tons of what looked at a distance to be either ferromanganese or ferrochromium. Upon making inquiry it developed that an inexperienced laborer had mixed 1100 lb. of ferromanganese with a pile of ferrochromium and the resultant mixture was of no use because of the fact that no heats were made at that plant using those amounts of manganese and chromium in combination.

This is an example of carelessness that is not uncommon around a steel mill and, although the amounts involved in this case are larger than are required in an electric furnace tool steel mill, it still remains a fact that setting the right example for some workmen in maintaining orderly looking storage houses has a decidedly lasting and desired effect upon the men taking materials from them.

The making of quality steels by the electric furnace process necessitates the running of preliminary analysis on such elements as carbon, manganese, chromium, etc., and the holding of the heat in the furnace until the results of the laboratory have been received. When the laboratory is near to the furnace, much time can be saved.

Ingot Storage

Ingot storage facilities should be arranged so that it is possible to bury ingots hot in a pit if desired or to store them cold in piles. Heat numbers should be stamped or marked legibly on each ingot and the ingots should be piled in such a way as to have their identity outward and easily obtained.

General Remarks

Tests which are being made from day to day to determine the physical properties of different grades of tool steels show that one company's steel may be of higher quality than another's, although they have, in all probability, bought their alloys according to the same specification, used the same grade of scrap, melted to the same chemical composition, and cogged their ingots at the same rate of reduction and at the same temperature. The difference is due to the fact that the first company has learned that quality must be injected at every stage of manufacture, while the second company, overlooking this fact, has only met the chemical requirements.

We are slowly realizing that hit or miss methods have no place in present day steel manufacture and also that the physical requirements of any tool steel are far more important than the chemical composition. It remains for some standard testing apparatus to be designed that will reveal the true requirements of tool steel and, until that time comes, our greatest safeguard against poor quality is by using steels that have been made by up-to-date manufacturers using up-to-date methods and equipments, and controlled by up-to-date supervision and design.

Clarksburg, W. Va., plant, Weirton Steel Co., Weirton, W. Va., which for several weeks has been operating at two-thirds of capacity, went on a full time and capacity basis Nov. 20.

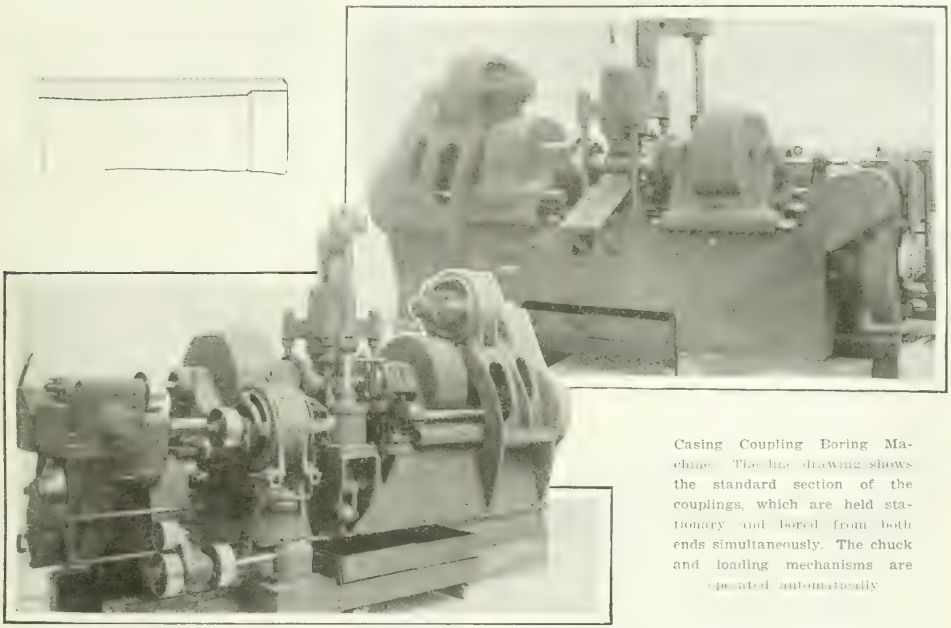
Scottdale furnace, McKinney Steel Co., Scottdale, Pa., was blown in Nov. 17, after having been down since the latter part of 1920.

COUPLING BORING MACHINE

Bores Ends of Casing Coupling Simultaneously Hopper Feed-Chuck and Loading Mechanism Automatic

A machine of the horizontal type, as shown in the accompanying illustration, designed for boring casing couplings, has been brought out by the Bullard Machine Tool Co., Bridgeport. The capacity is for work 6¼ to 12½ in., a change in chuck jaws and tool heads being required for each size.

The coupling is held stationary in a pneumatically operated universal two-jaw chuck located in the center of the bed. It is bored from both ends simultaneously, the tool heads on the boring spindles being designed to hold single-point tools for the taper bore as well as tools for the recess at each end. Tools for machining the coupling to length and turning the radius of chamfer



Casing Coupling Boring Machine. The line drawing shows the standard section of the couplings, which are held stationary and bored from both ends simultaneously. The chuck and loading mechanisms are operated automatically

on each end are also mounted in these heads. The spindles revolve in opposite directions and are mounted in heads at the ends of the bed, and driven from a common motor. The boring spindle heads are fed, as units, by barrel cams mounted on a common shaft within the bed.

Couplings are delivered to the chuck by a chute or hopper and, when finished, are ejected from the chuck into a receptacle provided. The chuck and the loading mechanism are operated automatically, and in conjunction with the feeding movement of the spindles by means of an adjustable timing mechanism mounted on the feed camshaft. The path of the taper boring tools is controlled by a form bar within each boring spindle, these bars being removable for changing. Tool heads may be quickly removed from the spindle ends. The tools, mounted in the tool heads, are ¾ in. square section and are independently adjustable and removable.

In operating the machine the taper form bars in the boring spindles are advanced to the operating position and the tool heads rapidly advanced to the point where the cut begins. The feed mechanism is engaged and the heads are advanced at predetermined rate of feed. One head, slightly in advance of the other, finishes its cut to the center of the coupling and then recedes to make room for the opposite head which feeds slightly beyond the center of the coupling, thus forming a finished junction of the two tapers at the center of the coupling. During the latter stages of the tapering cut, the recess in each end of the coupling is bored and the coupling is faced to length and chamfered or rounded on the outside diameter at each end. Upon completion of the cutting, the heads are rapidly returned to the initial position, the chuck is opened and the finished work ejected. All operations then automatically repeat.

The machine is driven by an adjustable-speed 10 to 25 hp. motor, mounted on top of the machine. A 5 hp. constant-speed motor at the opposite end is used for the circulating pump for the cutting lubricant, and for the rapid power traverse motion of the tool heads. Magnetic remote control for starting and stopping can be provided for the main driving motor. The connection between the main drive motor and driving shaft is by gearing.

The feed mechanism includes provision within certain limits, by means of change gears, for change of the rate of feed per revolution of the boring spindles. The forward movement of the boring heads is divided into two phases, the rapid advance to the point of cut where cut begins; and feed movement at predetermined rate. At the end of the cutting stroke the heads are returned rapidly to the initial position. The change from rapid advance to feed movement is by the location of a dog, adjustable for various coupling lengths.

Features of construction include alloy steel, heat-treated gears and feed cams of steel. Spindle and shaft bearings are bronze bushed and large ball bearing is provided for spindle thrust. Special attention has been given to lubrication. The tool heads form self-contained reservoirs, within which the driving gears revolve, carrying the oil to ducts that lead to the main spindle bearings. The feed cams are immersed in individual reservoirs. Special provision is made to prevent the entrance of cutting lubricant into the machine or its working parts. The cutting lubrication system includes a steel pan at the base into which the lubricant and chips are returned. A chip receptacle is provided.

The boring spindles are 8 in. in diameter and their speeds range from 10 to 40 r.p.m. The total movement of each tool head is 9½ in. Feeds may be selectively set within limits of 0.025 in. to 0.075 in. per revolution. Change gears are included for three rates of feed for each head. The weight of the machine, not including motor, is approximately 24,000 lb. and the actual projected floor space, in operation, is 12 by 5 ft.

Judge Gary and Mr. Schwab Give Testimony

Defend Pittsburgh Base as Convenient Method of Quotation —Pools, Dinners and Previous Investigations Again Reviewed

BY L. W. MOFFETT

WASHINGTON, Nov. 18.—In the Federal Trade Commission hearing of the Pittsburgh base case, Chairman Charles M. Schwab of the Bethlehem Steel Corporation was on the stand a little more than one hour Friday morning, and was examined by Attorney Steinhauer of the commission. His testimony, however, was extremely general in character. Often, he was unable to recall details of matters brought to his attention and frequently was non-committal. As explained by Mr. Schwab himself, many of the details which related to practices in the steel trade when he was associated with the United States Steel Corporation as president, or in days previous to the organization of the Steel Corporation, when he was associated with Andrew Carnegie, had escaped his memory. As to detailed selling methods of the Bethlehem company, he said he was not familiar. The great majority of the questions put to him related to old pools, the manner of fixing steel rail prices, etc.

Mr. Schwab told Mr. Steinhauer that he had no definite occupation, that he is nominally chairman of the Bethlehem Steel Corporation, but practically a retired steel man. The description, however, striking the good-sized number of spectators as being humorous, really was intended to be serious, although stated by Mr. Schwab in his characteristically good-natured way. It did reveal the fact that he is not actively associated with the operating and selling conditions in the trade.

Pools Not Always Successful

Mr. Steinhauer asked Mr. Schwab if a buyer of steel at the Sparrows Point, Md., plant of the Bethlehem Steel Corporation would have to pay the Pittsburgh base price. Mr. Schwab replied that he assumed the price would be quoted on the Pittsburgh base, but explained that he has not been buying and selling for years and therefore could not make a definite reply. But he did take occasion to state as had been stated by Judge Gary and other witnesses that the Pittsburgh base does not mean price fixing but it is a convenient method of quotations. Mr. Steinhauer read from testimony given by Mr. Schwab in connection with the Government's dissolution suit against the United States Steel Corporation and attempted to refresh the memory of Mr. Schwab on details of his testimony, but Mr. Schwab said that he could not recall precisely what he had said so long ago. Asked by Mr. Steinhauer as to whether the pools of the old days were always successful, as price combinations, Mr. Schwab replied that they were not and said that the idea was to get fair prices but at the same time to prevent prices that were too low. He said that the pools did not prevent cutting of prices but that they endeavored to do so. He expressed the opinion, however, that the pools stabilized prices fairly well. He also humorously volunteered the remark that he had been the originator of most of the plate pools.

Judge Gary's Testimony

In many respects the testimony of Judge Gary when he reappeared on the stand last Wednesday was like that he had given the previous week. Attorney Steinhauer's questions were often mere repetitions of questions he had asked before and many of them also were either based on hypothetical conditions or assumed matters that are so fundamental that they really answered themselves. Judge Gary, however, maintaining good humor and patience, again testified frankly and fully. Attorney Steinhauer particularly questioned Judge Gary as to his statements regarding the law of supply and demand controlling the market and the fact that the Pittsburgh base plan is beneficial to consumers as well as to producers.

Judge Gary was asked about testimony that when operations were down to 25 to 30 per cent of capacity in sheets for the American Sheet & Tin Plate Co., Pittsburgh, how it was able to maintain the Pittsburgh base in accordance with the law of supply and demand.

Judge Gary said he was not familiar with the precise condition in the sheet industry, but said the Steel Corporation was trying to steady prices generally by preventing them from going to ruinous levels. He said that temporarily conditions might have gone contrary to the law of supply and demand but that it would be necessary for him to know the full circumstances before explaining the situation. He stated that some competitors had put prices down below the cost and cut wages. He said that he was free to admit that the Steel Corporation has tried at times to act in such a way as to disregard the law of supply and demand in order to keep prices on a fair and reasonable level.

"We do not believe," said Judge Gary, "in raising prices to an unconscionable basis or in selling at ruinous prices. In such cases sometimes the law of supply and demand is temporarily suspended. But sooner or later the law of supply and demand controls." He said that some corporations, like the Steel Corporation, will hold prices down notwithstanding the fact that they can get higher prices. It is a question of ethics, Judge Gary observed, but, he repeated, sooner or later the law of supply and demand will bring the market to its equilibrium because neither the seller nor buyer is smart enough to prevent it.

More Conscience in Business

"Besides," he added, "if I may say so, I think there is a growing conscience in business to-day."

Dwelling further on the ultimate control of prices by the law of supply and demand, Judge Gary cited an example to support his statement.

"If," he said, "a new business starts up in a locality and becomes successful and another plant is started up in another place, the first plant dominates the price situation. That covers all principal lines of business. As I have said before, I think Philadelphia was the first steel basing point, but Pittsburgh soon became the principal point for the manufacture of iron and steel and became the basing point." Other plants starting in other localities, it was pointed out, then based their quotations on Pittsburgh. A new plant, Judge Gary said, could not compete with Pittsburgh with its established plants and fine organizations. Chicago plants, he said, could not do it, when they were started, but were glad to develop in that district and by charging the Pittsburgh price plus the freight were able to live. In the course of time, it was stated, Chicago became more prosperous and users in that district naturally wanted to get steel as cheaply as they could. The consumers who caused the present complaint to be issued by the commission, Judge Gary said, claimed that steel could be made in the Chicago district as cheaply as in Pittsburgh. Improved plants at Gary, Ind., it was stated, brought about two things: First additional plants, like the Inland Steel Co., the Interstate Steel Co., and others, and, secondly, competition, which was exactly what Chicago needed and that, it was said, was where the Pittsburgh base came in. At times, it was declared, the base was almost entirely eliminated and Chicago basing was built up. Duluth, it was stated, came along and objected to the Pittsburgh base and wanted a steel plant of its own. Judge Gary said the

Steel Corporation established a plant there, and that it has not been very profitable, but it has been possible to supply part of the demand. Others, it was said, couldn't afford to go into Duluth.

New Plants Encouraged

The question of prices and bases, it was stated by Judge Gary, always depends on circumstances. The Pittsburgh base, it was explained, operates more especially as to localities, encourages new plants, and is a criterion for buyers who purchase raw and semi-finished steel and convert and sell it on that base. He said that there are involved in the whole question not only purchasers and sellers in particular lines but other lines that use basing points, a fact which he stated to the commission when the complaint was under contemplation.

It was declared that the kind of discrimination that those asking for the complaint wanted is the kind that favors them

"Let them come into the steel business," added Judge Gary, "and they would immediately become a convert of the Pittsburgh base. You cannot change the natural course of trade for very long."

In replying to another question, Judge Gary said that he conceded as a witness that if there is any combination that is arbitrary and contrary to the Sherman law and causes prices to be fixed that are illegal and unconscionable, it ought not to be allowed to exist, but it was insisted that Pittsburgh basing is not the result of a combination. It was declared that it grew up naturally, was maintained naturally, and has largely disappeared because of the law of supply and demand.

"I do not believe," he said, "in large corporations taking unreasonable advantage of consumers and taking more than should be paid."

He recalled the fact that he maintained when the proceeding was commenced, he was in favor of an investigation but that it is a big and broad question affecting manufacturers, consumers and various territories of the United States and that consequently all interests and localities should have been made parties as interveners to the case.

"If we thought the law of supply and demand governed the situation," Attorney Steinhauer interjected when that question again was under discussion, "we certainly would recommend dismissal of the complaint."

When Attorney Steinhauer intimated that mills in the Chicago district were shut down in 1921 in order to sell steel from Pittsburgh and obtain the freight differential in supplying the Chicago demand, Judge Gary wanted to know of Mr. Steinhauer how long he thought it would be, if such a policy were adopted, before "we would starve to death." At another point Judge Gary told Mr. Steinhauer that if he knew as much about the purchaser as he does about the manufacturer Mr. Steinhauer would be "surprised at his (the purchaser's) cupidity." Judge Gary said, however, that the purchaser cannot be blamed; that it is human nature to get as much as possible, although he added that "conditions are cooling and we are getting on a new platform."

Examiner Bennett asked Judge Gary if cost does not govern prices. Judge Gary said that was true only in part.

"Don't you put too much of a soft pedal on cost?" inquired the examiner.

"It is a question of reasonableness of profits," replied Judge Gary. "Assuming that the profits of the Steel Corporation were limited to 4 per cent, that would drive the smaller producers out of business and create a monopoly." In this connection, Judge Gary took occasion to say that if it were possible to get the right kind of a Government commission, he, speaking for himself, would favor controlled maximum prices, but, he said, to get an intelligent, disinterested commission without prejudices is more than can be done at the present time.

"When will the Pittsburgh plus no longer obtain in Chicago under the law of supply and demand, as defined by you?" asked Mr. Steinhauer.

"When competition in Chicago is such that producers there will have to sell the same as Pittsburgh producers do," replied Judge Gary.

"When will the law of supply and demand in Chicago operate to bring about that condition?" inquired Mr. Steinhauer.

"That depends on profits, the course of business developments in the West and prices the buyers are willing to pay or at which producers are willing to sell." Judge Gary said that there is nothing to prevent manufacturers or middlemen in Chicago or anywhere else from going to Pittsburgh and getting advantage of the Pittsburgh base.

"I think that Chicago will be a base some time," Judge Gary remarked. "It is nearly that now in practice. But," he said, humorously, "I think it will be a long time before Duluth will be a base."

Replying to question by Mr. Steinhauer as to whether he meant the steel products on which the Chicago base would apply were plates, shapes, and bars, Judge Gary replied that it would be more particularly those commodities.

Pools and Dinners

Attorney Steinhauer attempted to go into a long drawn out history of pools in the steel industry, with which Judge Gary had nothing to do, but from which, he explained, he ordered the withdrawal of all Steel Corporation subsidiaries, when he became associated with the corporation, and learned of their participation in the pools. Mr. Steinhauer then attempted to take up the matter of the Gary dinners. Judge Gary said that since the beginning of the Stanley congressional hearings, the Steel Corporation had been careful to avoid all practices criticized by Government departments, much less the courts. Judge Gary said that the Gary dinners as a matter of fact amounted to only five in number and were held in 1907 and 1908, as a result of the panic of the former year. Judge Gary said that the dinners had accomplished their purpose. Their purpose, he said, was to urge the steel men to keep their heads and to prevent precipitate selling by customers of inventories. Incidentally Judge Gary took occasion to say that in the dissolution suit brought by the Government against the Steel Corporation, the judges of the Court of Appeals unanimously upheld the legality of the Gary dinners.

Taking another turn in his examination, Mr. Steinhauer attempted to show a discrimination in the prices quoted to railroads and fabricators. Apparently with this purpose in view Mr. Steinhauer asked Judge Gary about prices of steel rails. Judge Gary replied that for a great many years there was a price of $28, f.o.b. mill, which was established about 1898. Judge Gary said the price really was made by agreement between the late A. J. Cassatt for the railroads and himself. Judge Gary said he believed that the price of $28 had been maintained for a great many years because "we refused to sell at higher prices." But it was stated that higher prices were really justified.

Defends Privately Owned Railroad Cars

WASHINGTON, Nov. 21.—Defense of privately owned railroad cars was made during the hearing last Wednesday in the assigned car case before Commissioner Aitchison of the Interstate Commerce Commission by President C. H. Markham of the Illinois Central Railroad. The hearing, which relates to rules for distribution of coal cars, developed the fact that the carriers as a rule favored a continuance of the signed car rule, while the operators, generally speaking, were opposed to it. Mr. Markham testified in favor of a continuance of the rule on the ground that it was in favor of the public interest that railroads should be assured a steady and uniform supply of fuel, which he contended could be procured only by the use of the assigned car for railroad fuel.

In defending the privately owned freight cars, Mr. Markham pionted out that they relieve the railroads of the necessity of finding the capital to supply the equipment to serve the consumers who furnish the cars.

The United States Steel Corporation, he said, on cross examination, furnishes cars for its fuel and the Illinois Central hauls them in train loads, not because it desires to favor the Steel Corporation but because handling in train loads was the most economical way.

BOOK REVIEW

The Labor Injunction—An Exposition of Government by Judicial Conscience and Its Menace. By John P. Frey, editor of the *International Molders' Journal*, Cincinnati. Paper, [illegible] pp.

John P. Frey has assembled in this book his objections to the use of injunctions in labor disputes, heretofore published in a series of articles in the "International Labor News Service." To these objections he has appended numerous declarations by the American Federation of Labor, condemning the use of the injunction in labor disputes, a copy of a model anti-injunction bill drafted and approved by the American Federation of Labor, and copies of a number of injunctions heretofore issued by the courts and some decisions by appellate courts vacating injunctions. Only one opinion sustaining an injunction is included. This would seem at first a trivial matter; but the text of the book itself confirms the suspicion that Mr. Frey prepared himself for his task by reading the opinions in cases in which injunctions were refused or vacated and then in reading the injunctions in cases where they issued, without reading the opinions which gave the reasons for their issuance.

Mr. Frey points out that American equity courts derived their original authority from the Anglo-Saxon system of jurisprudence, but that they have departed from the modern English authorities. The English courts are forbidden by legislation to issue injunctions in industrial disputes, and the author wholly overlooks the fact that our modern equity courts derive their authority from our constitutions and that they issue injunctions to protect rights guaranteed by those constitutions.

It is said that equity will exert its powers only to protect property rights. Mr. Frey stresses this point. He cries out, "Business is not property!" "Labor is not property!" But the right to do business and the right to labor are property. They are the only forms of property which, unhappily, many thousands of people have. Mr. Frey does not argue directly that the law should forsake the protection of these rights.

The author dwells upon the point that a storekeeper has no property right in his customers or an employer in his employees. He fails to discuss in any way the recognized right in the good will of a business and in the right to be unmolested in access to the markets for the sale of one's products and for the purchase of labor, and the right of those who have labor to sell in unmolested access to the opportunities of employment. Should the law fail to protect these rights? Mr. Frey does not say. Yet these are the rights the law seeks to protect by the issuance of injunction in industrial disputes.

Complaining that injunction decrees prohibit innocent acts which are protected by the constitution, the author calls attention to injunctions prohibiting unions from expending money for the relief of their members and prohibiting strikers from stating that a strike exists. It is an ancient rule of conspiracy that no act, however innocent in itself, is lawful when it becomes a step in an unlawful plot. This is the basis upon which acts otherwise lawful are prohibited. Mr. Frey does not pause to contest the merit of this doctrine.

Objection is made that the injunction is used to prohibit the commission of crimes, with a view to the destruction of the right of trial by jury. This, we think, is a misconception. Injunctions issue to prohibit unlawful acts for the protection of civil rights. The fact that the threatened acts may also be punishable as crime does not concern a court of equity.

Mr. Frey devotes a chapter to the contention that the law is not applied to employers and employees with even handed justice, but that what is held unlawful for employees to do is held lawful for employers to do. In view of the cases restraining combinations of employers from even discussing prices or exchanging information as to prices, from buying shares of stock in competing concerns and from breaching agreements with trade unions, and in view of the cases in the Supreme Court of the United States and elsewhere restraining boycotts by merchants, it is difficult to understand how Mr. Frey permitted himself to indulge in this libel upon the American judiciary.

He complains particularly that the courts have forbidden workmen to associate in a trade union while permitting employers to organize. His complaint is entirely without foundation. The opinions of some States have held that a strike to enforce a closed shop is unlawful because the benefit to employees from a closed shop is not justified by such an interference with the employer's business; but this does not mean that workmen who desire to join a union may not do so, and that if they do not care to work with men who are not members of a union they do not have to. By the same token, employers who do not care to employ union men may refuse to do so. So far, however, as the question of combination is concerned, the law is much more lenient with employees than with employers. Combinations of business men may be in themselves, at least so far as they may affect the price of commodities, unlawful conspiracies and they may be dissolved under the anti-monopoly statutes. But labor unions, in most States, are exempt from these statutes and there is no instance in which a combination of labor has ever been ordered dissolved.

In criticizing injunction orders on the ground that they are vague and beyond the understanding of the average striker, so that he abandons all his rights lest he infringe an order which he does not understand, Mr. Frey makes a criticism that in some instances must be true. His criticism of punishment for contempt without a jury trial is an old story. He states, inadvertently, that a judge may impose any punishment he wishes by way of fine or imprisonment. This is not the case certainly in a majority of the States, where punishment for contempt is limited by statute. The ancient law of equity courts regarding punishment for contempts has been upheld by the legislatures and the constitutions of our States and an examination of the records will show that the courts lean over backward in their care to avoid a judgment of contempt when there may be any shadow of doubt concerning the facts.

It is deeply to be regretted that Mr. Frey, since he has given so much time to the subject, did not give more time to it and did not answer the fundamental question at the bottom of this whole matter: viz., Shall the right to do business and the right to labor go unprotected, by the only adequate means for their protection, against assault by powerful combinations? But though he has overlooked this question, the matter of the reform of our courts of equity is one which he owns to be a question of law. Whatever correction may be needed, he justly leaves to the proper authority. He says: "The abuses which have emanated from American equity courts will eventually be corrected by law, and the trades union movement, because it is an American organization, loyal to American institutions and ideals, will continue to seek a remedy through legislation."

MURRAY T. QUIGG

New Books Received

Chemical Engineering Catalog, 1922. Pages 1187, 9 x 11½ in.; illustrated. Published by Chemical Catalog Co., Inc., 19 West Fortieth Street, New York.

Why Manufacturers Lose Money. By Robert Grimshaw. Pages 176, 5 x 7½ in. Published by D. Van Nostrand Co., 8 Warren Street, New York. Price, $2.

The Mineral Industry During 1921. Pages 903, 6 x 9 in.; illustrated. Published by McGraw-Hill Book Co., Inc., 370 Seventh Avenue, New York. Price, $10.

American Society for Testing Materials Tentative Standards, 1922. Pages 774, 6 x 9 in.; illustrated. Published by American Society for Testing Materials, 1315 Spruce Street, Philadelphia. Price, $7.

Steel, The Diary of a Furnace Worker. By Charles Rumford Walker. Pages 157, 5¾ x 8 in. Published by Atlantic Monthly Press, Boston. Price, $1.75.

Manchuria, Land of Opportunities. Pages 113, 6 x 9 in.; illustrated. Published by the South Manchuria Railway, New York.

CONTENTS

November 23, 1922

Standard Machines Increase Production 1335
Savings Effected in Use of Fixtures Rather Than in Special Machines—Case of Quintupled Production

How Bethlehem Became Armament Maker 1339
Reminiscences Covering the Introduction of Bessemer Steel, the Activities of Ericsson, Holley and Fritz, etc.

Continuous Annealing Furnaces for Sheets 1342
Car-Type Furnaces with Daily Capacity of 125 Tons Each at Ashtabula Steel Plant—Pulverized Coal Used as Fuel

Bases of Modern Blast Furnace Practice 1353
Elements of the Design Which Go to Make Up the Lines of the Furnace—Influence of the Low Bosh

Effect of Manganese on Carbon Steels 1357
Their Structure As Affected by Varying Percentages—Manganese As a Strengthening Factor in Low and Medium Steels

Layout for Electric Tool Steel Plant 1363
Efficient Arrangement of Buildings and Equipment, Particularly the Melting Department—Storage of Scrap and Ferroalloys

Judge Gary and Mr. Schwab Give Testimony 1366
Defend Pittsburgh Base as Convenient Method of Quotation—Pools, Dinners and Previous Investigations Again Reviewed

Why Wages Were Raised 1341
Angular Wheel-Truing Device 1344
Nearly 60,000 Miles of Pipe in Oil Lines 1344
Decarburization of Ferrochromium by Hydrogen 1344
Shaper Equipped with Jib Crane 1344
Vertical-Spindle Type Cylinder Grinder 1345
New Tensile Testing Machine 1345
Industrial Works Builds 200-Ton Locomotive Crane 1346
Carbonized Lignite Fuel 1346
October Sheet Shipments 1346
Molding Sand Investigation 1346
Adds Smaller Engine Lathes to Line 1347
Italian Steel Works Reorganized 1347
Improves Cutting-off Machine 1348
Tariff Commission Investigation 1348
Aluminum Line Level 1348
Wood and Metal Portable Band Saw 1349
Record in Portland Cement 1349
Arc Regulation in Electric Furnaces 1349
Automatic Air Hose Coupling 1350
Exhibitors at New York Power Show 1350
Rail Prospects in Japan 1351
French Iron and Steel 1351
Lake Superior Ore Rate Case 1355
New York Industrial Conference 1356
Conference of Indiana Foundrymen 1356
Ohio State Foundrymen Meet 1356
New York Electrochemists Meet 1356
Foundry Meeting at Milwaukee 1356
Plant Operations 1356
Lackawanna Building Plans 1362
Specifications for Safes 1362
Favors Ship Subsidy 1362, 1377
Coupling Boring Machine 1365
Defends Privately Owned Railroad Cars 1367
Book Review 1368
New Books Received 1368
Editorials 1370
The Course of Steel Prices—Making Common Labor Jobs Fewer—Hourly Output a Constant—Fluctuations in Steel Production—Less Pig Iron for Steel
Opposed to Ore-Carrying Railroads Consolidating 1372
Piece Work Plan Satisfactory 1373
British Iron and Steel Market 1373
Investigation of Unions Suggested 1374
Cost of Living Higher 1374
Pittsburgh Base Hearing 1375
Shell Steel Sold 1375
Japan Still Buys Rails 1376
Syndicate Takes Over Sweet's Steel Co 1376
Larger Use of Open Top Cars 1377
Courses in Industrial Geography 1377
German Prices Higher 1377
More Money for Federal Trade Commission 1377
Fabricated Steel Business 1392
Railroad Equipment Buying 1392
More Metal Workers and Higher Wages 1393
Industrial Finances 1405, 1406
Steel and Industrial Stocks 1406
Plans of New Companies 1407
Trade Changes 1407

Iron and Steel Markets 1378
Comparison of Prices 1379
Prices Finished Iron and Steel, f. o. b. Pittsburgh 1391
Non-Ferrous Metal Market 1393
Personal Notes 1394
Obituary Notes 1395
Machinery Markets and News of the Works 1396
New York Jobbers' Prices 1408

ESTABLISHED 1855

THE IRON AGE

EDITORS:

A. I. FINDLEY WILLIAM W. MACON GEORGE SMART

C. S. BAUR, *General Advertising Manager*

Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

E. J. Frank, *President* Entered in U. S. A. George H. Griffiths, *Secretary*

Owned by the United Publishers Corporation, 243 West 39th Street, New York. H. M. Swetland, *Pres.*, Charles G. Phillips, *Vice-Pres.* A. C. Pearson, *Treas.* F. J. Frank, *Secy.*

BRANCH OFFICES: Chicago, Otis Building; Pittsburgh: Park Building; Boston, 419 Ideal Building; Philadelphia: 1420-1422 Widener Building, Cleveland, Guardian Building. Detroit: 317 West Fort St., Cincinnati: Mercantile Library Bldg. Buffalo: 881 Ellicott Square. Washington: 26 Jackson Place, N. W. San Francisco: 320 Market St. London, Eng.: 11 Haymarket, S.W.1.

Subscription Price: United States and Possessions, Mexico, Cuba, $6.00. Canada, $8.50; Foreign, $12.00 per year. Single copy 25 cents.

Entered as second class matter, June 18, 1879, at the Post Office at New York, New York, under the Act of March 3, 1879.

The Course of Steel Prices

Chairman Gary of the Steel Corporation said at the Federal Trade Commission hearing on Pittsburgh price basing that the corporation had not been making money in recent times. No one connected with the manufacture of steel since depression fell upon the industry in the fall of 1920 has been without reminders, many and unpleasant reminders, of the unprofitableness of the business. If, as Judge Gary estimated when testifying before the Lockwood Committee in New York last June, the Steel Corporation has $3 a ton advantage in costs over the large independent companies, it follows that when the Steel Corporation is not making money, its competitors are falling considerably short of making money. The statements of most of the independent companies which have been published in the past 18 months or more have been a disheartening iteration of deficits. One large company, whose statement for the first three quarters of the year came out recently, showed a deficit for the nine months of $3,348,000, and in the corresponding period of 1921 its deficit was $3,934,000. Red ink balances have been the rule. Dividends on common stocks, apart from the Steel Corporation, have been suspended, and even in cases where paper surpluses exist dividends on preferred stocks have been suspended because conditions demanded the conservation of all liquid resources.

As was pointed out repeatedly in 1921, when occasionally an ill-informed but assertive writer on phases of the readjustment in labor and commodities called for a heroic reduction of steel prices, the steel industry had stood a more complete deflation than any other save agriculture. While it was admitted that costs do not make market prices, the fact that many steel companies had gone below their costs was emphasized as a reason for expecting some producers to choose idleness rather than a continuance of operations which only piled up losses.

History repeated itself when late last February some mills, in the effort to create a backlog, took on business on a 1.30-cent to 1.35-cent basis for heavy products, these prices being the lowest reached since the slump of 1915, just before the war demand for American steel began to show itself. It is, in part, to the very considerable tonnages put on the books at these low prices last spring that the steel industry owes its large scale of operations in recent weeks, after the months of scarcity and premium prices due to the long-drawn-out coal strike.

Now that the question of steel prices is up again—that is, prices for the first quarter of 1923—it is not out of place to refer to what the industry has gone through in the past two years, for the light that thus may be thrown on the course of the market just ahead. It is still true that costs do not make market prices and that there is still a considerable variance in the costs of different producers of steel. But the one experience that is common to all producers—and the Steel Corporation has had no exemption—is that of a very definite and in some cases pronounced increase in costs since the weeks just before the coal strike, in which the market dipped to the lowest point since early 1915. Between the advances in labor and fuel that have come since the low-priced tonnages of February and March went on their books some companies have been literally ground between the upper and the nether millstones.

It will be said again, and it will be true, that supply and demand will be the arbiter in the present test of buyer and seller strength. On that basis reasons can be found for the prevalence, in the early months of 1923, of finished-steel prices not materially different from those prevailing today. The country has no stocks, and between labor scarcity and car scarcity the mills are not likely to increase the present rate of output. On the other hand, in spite of continued losses by some producers, and very narrow margins for the most favored, the advances in prices that have been agitated in some quarters may be still further delayed.

An interesting application of a rather unusual alloy steel has come to light. In an address before the New York chapter of the American Society for Steel Treating, last week, a representative of one of the largest American companies producing steel castings and forgings for locomotive parts stated that his company is rapidly expanding

its use of manganese-vanadium steel in forgings in place of plain carbon steel. The steel contains about 0.90 per cent manganese and 0.20 per cent vanadium. It has excellent physical properties, is superior to the plain carbon steel lower in manganese that was formerly used, and is especially responsive to the heat treatment necessary for the parts into which it goes. A similar steel, higher in manganese but without the vanadium, made a record during the war because of its unusual properties. Containing 1.25 to 1.50 per cent manganese, it must be regarded as an alloy steel. It is still in use, but its possibilities are not yet fully appreciated, though investigations of its behavior are actively in progress. With part of the manganese replaced by vanadium, this new alloy steel is an illustration of the many combinations possible and of the tendency of simple alloy steels to replace plain carbon steels.

Making Common Labor Jobs Fewer

It is often remarked that the so-called "labor leaders," the officials of unions of skilled workmen, are unintelligent when they oppose immigration. The argument is that most work involves the employment of both skilled and unskilled men, and a good supply of "common" labor is likely to encourage industrial undertakings, and thus more work will be provided for the skilled men.

It is not well to underrate the capacity of an opponent, whether in debate or other activity. If, from their side of the case, the labor leaders had been making a mistake, their attention has been called to the mistake so repeatedly that it is reasonable to suppose that they would have changed their view by this time. It is better to recognize the fact that in a number of cases they have support, in actual developments, for their attitude. There is, for instance, the fact that not so many years ago hod carriers were essentially drawn from the ranks of common labor. To-day in most communities the hod carriers are organized. They have a union, a scale and the familiar restrictions as to what they will not do. Again, the employment of helpers to machinists, boiler makers and many other craftsmen is the regular thing, when formerly such help as might be requisite was furnished by common labor. Possibly there is not much boasting about these achievements, but the facts may as well be recognized.

Those who desire better conditions should work for improvement rather than indulge in academic presentations. One essential thing is for the majority to organize to combat the organized minorities that oppose immigration. Majorities count only when they are organized.

Another thing to do is to face the condition and make up for scarcity of common labor by the introduction of labor saving devices. To such improvement there is no end. There is never a time when a builder or manufacturer can feel that he has done all that can be done, has made all the progress there is to be made in this direction.

The preference of men for "easy jobs" is no transient phenomenon. It is a natural preference and as a matter of plain fact its exercise has been greatly facilitated by the progress of the mechanical arts. It requires much less skill than formerly to be a regular carpenter. The most difficult work is done by machinery and the architect supplies much more information than he once did. Corresponding changes have occurred in most of the crafts. The difference between the common labor job and the skilled labor job has become much less in point of skill and at the same time has become greater in point of muscular effort required. The condition is not really inconceivable of its costing more money to induce a man to navigate a wheelbarrow than to handle hatchet or saw, to carry pig iron than to watch a lathe. All of which suggests that more attention needs to be paid to improvements that look toward reduction in the use of so-called "common labor."

Hourly Output a Constant

When the movement toward shorter hours in industrial plants was taking form many persons held that a reduced time schedule would result in increased production per hour. Under such circumstances, it was argued, men would accomplish as much, say, in nine hours as they had in ten, excepting as the factor of machinery entered into the calculation. Experience in the United States has demonstrated no such result among workers who are paid by the hour. With the piece worker the desire for personal profit caused some gain, but not by any means what was predicted.

Years ago, in the very beginning of the reduction in working hours, when men had been laboring from "sun-up to sunset," the shorter day did materially increase efficiency. The period of daily physical effort was so long that men lagged in the later hours of the day. Therefore, when ten hours had become the standard working day, theorists, not recognizing the real reason of the former improvement, argued that a still higher efficiency per hour would follow further decrease in schedules. In most cases they were mistaken. Production per hour remained a constant.

A British committee has been making a survey in connection with a decrease from a 54-hour to a 47-hour week. It has found that in Great Britain the drop in output has been directly in proportion to the time, a result directly opposed to the theory of many economists over there. They have been disappointed exactly as American economists were disappointed with the reduction of hours in American mills and factories. The findings caused some concern in considering competition from other countries, and investigators of the committee began to delve into the experiences of competing nations of the Continent. The *Engineer*, in analyzing the situation in Europe as a whole, deduces as a law, "The average output per hour per worker is a constant," the truth of which was long ago recognized in this country.

The Belgian Minister of Labor is quoted as stating that the evidence in his possession showed a greater decrease in output in the case of the time workers than in the case of the piece workers, but in all cases output per hour had diminished. In Belgium working hours had been cut from 55 or 60 to 48. Apparently, from the minister's statement, the per cent of reduced produc-

tion was greater than the per cent of reduction in hours.

The Dutch Permanent Secretary of Labor reported as a special case that "when the hours in textile works were reduced from 11 to 10 the result was an increase in output per hour, but the further reduction from 10 to 8 hours had not had the same result." In Germany the British committee found output had been reduced in proportion to the reduction in hours from 54 to 48.

"Thus," says the *Engineer*, "the theory of those who held that because men work fewer hours they would get less tired and stale and therefore would produce as much as they did in longer hours, is exploded with its fellow theory that the efficiency before breakfast was very low. Probably each nation has for itself a nearly fixed rate of output per hour."

Fluctuations in Steel Production

One method of making apparent the wide fluctuations there have been of late in steel production is to compare the successive six-months periods April to September and October to March respectively. The periods are not dissimilar in length, one having 183 days and the other 182. Comparison can be made by taking the monthly ingot production of the thirty companies which make monthly returns to the American Iron and Steel Institute. Such a comparison does not bring out the extreme of the fluctuation, since the thirty companies made 84.2 per cent of the industry's total in 1920 and 87.5 per cent in 1921. That is, the companies not reporting monthly had a wider fluctuation than those reporting, since 1921 was a year of lighter production than 1920.

The institute totals are given below, and for convenience in comparison each total is given an index number or relative, the base or 100 being the average half-yearly output in the two years, 1920 and 1921. The base may be considered representative of average consumption in the two years, it being reasonable to assume that after the iron and steel strike and coal strike of late 1919 stocks of steel were low, while after the drastic liquidation of 1921 stocks were also low.

Steel Ingot Production by 30 Companies

Six months ended	Gross Tons	Relative
September, 1920	17,304,960	135
March, 1921	13,518,658	105
September, 1921	6,599,401	51
March, 1922	10,413,159	81
September, 1922	14,865,596	116

These are certainly wide variations. The general industrial activity of the country did not show such swings. The term "consumption" will be defined according to the individual viewpoint. The steel producer is apt to define it as including distribution by jobbers, placement in construction work and fabrication by sheet metal shops, machine shops, agricultural implement works, tool makers, etc. The steel has been consumed if it no longer lies in the hands of the steel mill's customer in the form in which it was shipped. If, however, there are unusual stocks of implements, tools, hardware, machinery, etc., in the hands of manufacturers or distributers the steel is not really consumed. It is not yet performing the function for which it was destined. Early in 1921 there were large stocks of such manufactures of steel.

As a general policy it is no doubt desirable that stocks of commodities should be carried somewhere, to absorb to an extent variations in consumption and unavoidable variations in production. In steel, however, there have been not a few indications that stocks accumulate when consumption is heavy and are drawn upon when consumption is light. To deny that any such practice has obtained would be to say that the actual ultimate consumption of steel has had wider variations than the fluctuations in production shown above. That is improbable, to say the least. Reference is made, of course, to the putting of steel into use, not to the activity of shops that manufacture steel wares for employment.

For the rate of production in October of this year the relative would be 134, almost equal to the highest relative in the table given above, that for the six months, April to September inclusive, 1920. Steel production in November has been substantially at the October rate. Accordingly, the rate of steel ingot production since Oct. 1 has been 15 per cent greater than the rate in the six months preceding Oct. 1. That is a fact that is worthy of careful consideration.

Opposed to Ore Carrying Railroads Consolidating

WASHINGTON, Nov. 21—Opposition of consolidation of the Duluth, Missabe & Northern and the Duluth & Iron Range railroads, owned by the United States Steel Corporation, with the Great Northern was expressed before the Interstate Commerce Commission in connection with its hearing regarding consolidation of carriers into certain units. The opposition relating to the Steel Corporation carriers was made through W. A. McGonagle, vice-president of the Duluth, Missabe & Northern, and F. E. House, president of the Duluth & Iron Range.

It was declared that these two carriers are used purely for carrying iron ore, they compete with the Great Northern, that the consolidation would not increase the strength of the latter and that it would reduce competition.

Youngstown Sheet & Tube Co. Records

YOUNGSTOWN, Nov. 21.—Operating an average of 11.2 open-hearth furnaces in October, out of 12, the Youngstown Sheet & Tube Co. established a new monthly steel production record, turning out 75,008 tons. During the last half of the month production was at the rate of 85,000 tons monthly.

The blast furnace department also set a new record for this company for four stacks in producing 73,000 tons of iron. Several tube mills also broke records.

Contracts for heating furnaces are reported by F. J. Ryan & Co., Wesley Building, Philadelphia, as follows: Davis Brothers, Philadelphia, six bolt stock furnaces (oil fired), a special oil fired furnace and two oil fired rod heating furnaces; Gleason Works, Rochester, N. Y., automatic two stage control high speed tool treating furnace; U. S. Cast Iron Pipe & Foundry Co., Birmingham, duplicate annealing unit for centrifugal pipe casting machine; American Steel Foundries, Chester, Pa., oil burning equipment for 45-ft. pit annealer; Perfection Spring Co., Cleveland, rebuilding of oil fired spring treating furnace; Pusey & Jones Co., Wilmington, Del., oil burning equipment for 50-ft. angle furnace; Milton Mfg. Co., Milton, Pa., 30-ft. automatic rod heating furnace, and Mathieson Alkali Works, Saltville, Pa., high speed tool treating furnace.

PIECE WORK PLAN

Highly Satisfactory Results Obtained in Plant of Packard Motor Car Co.

DETROIT, Nov. 20.—J. H. Marks, industrial engineer of the Packard Motor Car Co., discussed "An Outline of Group Labor Incentive and Its Application to a Foundry" before the meeting of the Detroit Foundrymen's Association held Nov. 16 at the headquarters of the Employers' Association. Starting with the observation that, in 75 to 80 per cent of the years, industrial conditions necessitate some form of wage incentive beyond the workmen's mere desire for employment, the speaker outlined and sketched the merits and shortcomings of the piece work plan, the payment of premiums for excess and similar methods of stimulating efficiency.

The plan followed in various departments of the Packard factory for several months has shown remarkable results, in that the number of employees has dropped from above 6000 to 4000 or less with a steady increase in production. It is based on the proportion of efficiency actually achieved to a pre-determined standard. If this standard is set at 80 per cent, as is the case in certain departments, a bonus of 1 per cent is paid all productive labor in that department, this including the foreman, for each per cent of increased efficiency. The gain to the company comes through reduction in overhead and through steadier, better regulated production. In each department a bonus board each day tabulates the excess percentage of the previous day as well as the average of the pay-period to date.

In setting the standard of efficiency, a study of "lost time" was found of vital importance and, the speaker said, would reveal some surprising conditions in any manufacturing plant. The adoption of this plan has resulted in a steady decrease in the total time-hours, with an increase in production and a reduction in the cost of castings. As only the good castings acceptable to the next department are counted, this method of course eliminates payment for bad castings.

It has reduced the labor turn-over to a marked degree; the shirker is influenced by his associates either to speed up or quit, and workmen of ability are brought in by the older employees wherever vacancies occur. The Packard factories employ only American citizens. In the foundries, the men work in four groups—aluminum, brass, core-room and gray-iron, in the last of which well over 100 men are employed.

British Iron and Steel Market

Standard Oil Buys 150,000 Boxes Tin Plate in Wales—Expect 20,000 Tons Rails to Go to Continent

(By Cable)

LONDON, ENGLAND, Nov. 21.

Pig iron is steady. Home demand is expanding but export buying of foundry iron is generally poor. America is still purchasing special grades of Cleveland foundry iron. Hematite is firm. Some works are full for the remainder of the year. There is renewed American demand and fair parcels have been sold, while inquiries continue for regular monthly shipments through the whole of next year. Home demand is fair.

Foreign ore is easier. Bilbao Rubio is held at 21¾s. to 22s. ($4.87 to $4.93), ex-ship Tees.

Steel position is generally unaltered.

Continental markets are affected by exchange fluctuations, but good business is being done in rails for the Far East. The South Manchurian Railroad is inquiring for 20,000 tons of rails and it is expected that the order will go to the Continent. Continental pig iron is dearer on advanced franc quotations.

Semi-finished steel (Continental) is weak. Belgian billets have been sold at £4 17½s. ($21.84) f.o.b., December shipment.

Tin plate is firm. Some works are asking up to 20s. ($4.48), basis, f.o.b. January and onward, but second-hand sellers place it at 19½s. ($4.37), basis, f.o.b. Canada is inquiring for large quantities, and part has been placed, at 19½s. basis, f.o.b., for spring shipment. The Standard Oil Co. has placed 150,000 boxes in Wales; the final destination is uncertain.

Galvanized sheets are quieter. The works are booked up to January. For delivery further forward, prices could be shaded.

Japan is still buying moderate quantities of black sheets. Other markets are quiet.

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $4.48 per £1, as follows:

Durham coke, delivered	£1	9s.	to £1 10s.	$6.50 to $6.72
Cleveland No. 1 foundry	4	17½		21.84
Cleveland No. 3 foundry	4	12½		20.72
Cleveland No. 4 foundry	4	10		20.16
Cleveland No. 4 forge	4	5		19.04
Cleveland basic	4	0		17.92
East Coast mixed	4	13½		20.95
Ferromanganese	£15	0s.		$67.20
Ferromanganese*	14	10	to £14 15s	64.96 to $66.08
Rails, 60 lb. and up	7	5	to 8 0	32.48 to 35.84
Billets	6	15	to 7 0	30.24 to 31.36
Sheet and tin plate bars, Welsh	7	0	to 7 7½	31.36 to 33.04
Tin plates, base box	0	19½	to 0 19¾	4.37 to 4.42
				C. per Lb.
Ship plates	8	10	to 9 0	1.70 to 1.80
Boiler plates	11	10	to 12 0	2.30 to 2.40
Tees	9	0	to 9 10	1.80 to 1.90
Channels	8	5	to 8 15	1.65 to 1.75
Beams	8	5	to 8 15	1.65 to 1.75
Round bars, ¾ to 3 in.	9	0	to 9 10	1.80 to 1.90
Galvanized sheets, 24 g.	17	5	to 17 10	3.45 to 3.50
Black sheets, 24 gage	11	15		2.35
Black sheets, Japanese specifications	15	5		3.05
Steel hoops	11	0	& 11 10*	2.20 & 2.30*
Cold rolled steel strip, 20 g.	23	2½		4.63
Cotton ties, Indian specifications	15	0		3.00

*Export price.

Continental Prices, All F. O. B. Channel Ports, Delivery as Specified

No. 3 foundry pig iron:				
Belgium, Jan.	£4	2½s.		$18.48
Luxemburg, Jan.	4	2½		18.48
France, Jan.	4	2½		18.48
Billets:				
France, Jan.	4	17½	to £5 0s.	20.84 to $22.40
Luxemburg, Jan.	4	17½	to 5 0	20.84 to 22.40
Lorraine, Jan.	4	17½	to 5 0	20.84 to 22.40
Wire nails (keg basis):				
Germany	0	14½		3.25
Belgium	0	20½		4.59
Wire rods, 5 mm. (0.2 in.):				
Belgium	7	5	to 10 7½	32.48 to 46.48
				C. per Lb.
Angles:				
Belgium, Sept.	7	7½		1.48
Tees:				
Belgium	8	5		1.65
Merchant bars:				
Belgium, Feb., Mar.	6	10	to 6 12½	1.30 to 1.33
Luxemb'g, Jan., Feb.	6	10	to 7 0	1.30 to 1.40
France, Jan.	7	0	to 7 2½	1.40 to 1.43
Germany, Dec., Jan.	6	0	to 6 5	1.20 to 1.25
Joists (beams):				
France, Jan.	6	0	to 6 2½	1.20 to 1.23
Belgium, Jan.	5	15	to 6 0	1.15 to 1.20
Luxemburg, Jan.	5	10	to 5 15	1.10 to 1.15
Channels:				
Belgium	7	10	to 7 12½	1.50 to 1.53
½-in. plates:				
Germany, Dec., Jan.	6	10		1.30
Belgium, Jan.	6	10		1.30
Luxemburg, Jan.	6	10		1.30
France, Jan.	6	10		1.30
No. 8 gage wire:				
Belgium	14	10⅝		2.91

A competitive examination for architectural draftsman is announced by the United States Civil Service Commission and for further information application should be made to the commission at Washington, asking for form 1312. A vacancy at the public works department of the Naval station at Guam is to be filled from this examination.

INVESTIGATE THE UNIONS

Demand Emphasized by President Barr at Meeting of National Founders' Association

At the opening session of the annual meeting on Wednesday at the Hotel Astor, New York, of the National Founders' Association, President William H. Barr devoted himself at some length to the propriety of Congress's determining "what value, if any, the trade unions are to the public." In calling for an unbiased investigation, he asked:

What [illegible] beneficiaries of unionism, and show by comparison the average financial standing of the union worker in a given district as compared with the free American plan worker.

Why are all union controlled commodities more expensive, and to what extent has restriction of output contributed to the increased cost of living?

Congress might also determine what rules of efficiency, if any, govern membership in the trade union.

Why is the training of apprentices limited, and the resulting trade education of our American boys stifled?

How are strike votes taken, and what is the average percentage of the membership voting? Who counts the votes, and where?

What is the total income of the international unions in America for the last year? How is it spent? What percentage goes for salaries of officers and agitators, and what percentage actually returns in the form of benefits to the members?

Why is one man permitted to determine why 50 or 100,000 mechanics willing to work under fair conditions may not do so?

Why are the public utility unions directed by a few men permitted with startling regularity to secure a strangle hold on the prosperity and comfort of our people?

Why is the incorporation of unions and correlative financial responsibility not made compulsory?

Why is it that when the railroad brotherhoods elected that the word "violence" be included in a given contract, that "assault and battery" is not regarded by them as a form of violence? Why is it that the murder of 60 men by union members and sympathizers in the State of Illinois evokes no voice of protest, and no question as to why the murders were committed? Why should the unions not clearly define their opposition to every form of public police protection? Why are union members required under oath to place their union sympathies above their obligations as citizens?

Use of Union Money

How many of our citizens understand that the total union income per annum is approximately $100,000,000? How many know that in 1921 the bituminous miners alone collected $17,000,000 in dues, most of it provided for them by the operators through the check-off system? Has that big $100,000,000 fund been used to promote the prosperity of the union or any other workers? to restore the industrial normality of the country? to stimulate the betterment of working conditions? or has it been used to promote the personal interests and advancement of union leaders and their associates?

The failure of unionism is not so much in its forgotten principles, but in its practice; not wholly in its inspiration, but in its leadership; not altogether in the protective policy it enunciates, but in the destructive policy it follows. There should be only expressions of sympathy for the men who have sold themselves into unionism for the benefit of that protection which is so completely lacking. We commisserate with those members who permit subordination of all that is fine in human instincts to the will of men who are not fit to lead.

If confirmation of this statement is needed, note well the attacks on the Supreme Court of the United States; the attempts to change and limit its power by constitutional amendment; the effort to control Congress and the State legislatures; the imposition of certain restrictive legislation on all except the unions, and the partial success of the unions in absolving themselves from certain laws.

Duty of Employers

President Barr discussed the questions of immigration and labor shortage, the duty of employers, the meaning of the open shop and the relation of good citizenship and politics. "The modern employer," he said, "who takes the point of view that his workers are chattels is not entitled to inclusion in the association of intelligent employers; nor has he a place in any community of good citizenship. It is true that, today, there are few unintelligent employers who seek to exploit their workers; but these should be eliminated, and thereby would be destroyed the antagonism which still exists, to some degree, in the public mind against employers generally.

"There can be no set rule for prescribing the duties of an employer, but, above all, he must recognize that the treatment of employees should inspire that desire for individual accomplishment, that pride in the job, which the labor unions have almost completely destroyed.

"There is no definite solution of the labor problem, for human desire will always reach out for changed, if not always improved, conditions, as it is the natural desire of every man to make his path through life, and that of his family, apparently easier.

"Therefore, we should so regulate our conduct toward our workers that we will furnish an object lesson in common honesty and in good citizenship. The man who treats his workers properly will receive a fair day's work for a fair day's pay; he will be better understood as their friend, and will at once make a sharp contrast with the union labor agitator who never is a real friend of any but himself."

COST OF LIVING HIGHER

All Items But Fuel Higher Than in September

Wholesale prices in October averaged nearly 1 per cent higher than in September, according to the information gathered by the Bureau of Labor Statistics, and 8.5 per cent higher than in October of last year. Similarly, the average retail price of food is reported 2 per cent higher in October than in September, but it is 6 per cent lower than it was a year ago. And the National Industrial Conference Board reports the cost of living, based on the wage earner's budget, as 1 per cent higher in October than in September, but 4 per cent lower than in October, 1921.

Metals and metal products, as a group, advanced ¾ per cent during the month, and reached a point 16.4 per cent higher than a year ago—this, in spite of recent recessions in pig iron. But THE IRON AGE composite price for pig iron, at mid-October, was 51 per cent higher than a year ago, and the composite for finished steel was 11 per cent higher than in 1921.

Metals stand liquidated 66 per cent of the 1920 peak price excess over 1913—that is, 66 per cent of that excess has been wiped out. This liquidation, a year ago, had reached 84.5 per cent, a portion of which has since been lost by price advances in nearly all items. All commodities have been liquidated 65 per cent, on the basis of the October figures; a year ago, it was 71.5 per cent.

Index Numbers of Wholesale Prices, by Groups of Commodities

(1913 equals 100)

	1920 Peak	1921 Oct.	1922 Sept.	1922 Oct.	Advance in One Year, Per Cent
Farm products	247	124	133	138	11.4
Food, etc.	248	140	128	140	0
Cloths and clothing	346	180	183	188	4.4
Fuels and lighting	281	189	244	226	19.6
Metals and metal products	203	116	134	135	16.4
Building materials	300	159	180	183	15.1
Chemicals and drugs	213	131	124	124	—5.3
House furnishing goods	277	180	178	176	—2.2
Miscellaneous	208	118	116	120	1.7
All commodities	247	142	153	154	8.5

President James A. Farrell of the United States Steel Corporation, it has been announced at Georgetown University, Washington, will direct the financial affairs of the Georgetown Endowment Association in its nation-wide campaign to raise a $5,000,000 building and extension fund.

Fire at the plant of the Fairbanks Piano Plate Co., Springfield, Ohio, Nov. 13, damaged a part of the plant to the extent of $45,000.

PITTSBURGH BASE HEARING

Taking of Direct Testimony Ended Steel Corporation Will Now Have Its Turn

WASHINGTON, Nov. 22.—Begun in Milwaukee on Jan. 30 of the present year, the taking of direct testimony by the Federal Trade Commission in the Pittsburgh base hearing was concluded here this morning with the testimony of President Alva C. Dinkey of the Midvale Steel & Ordnance Co. Examiner John W. Bennett, who is presiding at the hearings, has arranged tentatively with counsel for the United States Steel Corporation, the respondent, to resume hearings in Chicago on Jan. 22, for the taking of direct testimony for the Steel Corporation. There is no possible way of indicating when the case will be finally disposed of by the commission before which it has been in one form or another since 1919. It is conceivable that the personnel of the commission will have changed considerably before the conclusion of the case is reached.

The principal witness called and examined by the commission since it started its hearings in Washington on Nov. 1 was Chairman Elbert H. Gary of the Steel Corporation. His testimony occupied one day week before last and a day and one-half last week, when it consumed all of Wednesday and the morning of Thursday.

Mr. Dinkey's Testimony

Mr. Dinkey was asked by Attorney Burr for the commission as to the manner of the Carnegie Steel Co., of which Mr. Dinkey was formerly president, in quoting prices on steel as far back as 1904.

Mr. Dinkey replied that it was so long ago that he does not remember. He was then asked what his attitude toward the Pittsburgh plus plan is if it is used by all steel companies to stipulate given prices and then to which is added a charge based on the freight from Pittsburgh to destination.

"If such a practice were in vogue to quote on shipments all over the United States, then, of course, I would like to see it done away with," replied Mr. Dinkey, "but I do not think it is in vogue."

Invoices showing shipments of steel by the Cambria Steel Co., Johnstown, Pa., were brought along by Mr. Dinkey at the request of the commission and submitted in the records. They showed that shipments are based on variable practices, governed by market conditions, sometimes carrying delivered quotations, which on occasions worked back to the Pittsburgh base quotation while on other occasions they did not. The witness said all works of the Midvale company followed the same policy.

A Matter of Conjecture

Asked as to whether he thought the Pittsburgh base method of quoting stabilized prices, Mr. Dinkey described the reason for the Pittsburgh base as conjecture. By that, he said, he meant that no one knows the precise reason because the practice has come about through evolution and that it is not possible to know the reason for something that "just grew."

"Anything that keeps on base as against many bases," continued Mr. Dinkey, "I think tends to stabilize prices. But my thinking it does not make it so. Another system of prices might be much more stable."

President MacMurray's Testimony

The hearing on Monday was confined to testimony given in the afternoon by James E. MacMurray, president of the Acme Steel Goods Co., Chicago, maker of cold-rolled strip steel and buyer of steel billets, and H. E. White, statistician of the commission, who put in additional figures on freight rates and contracts for steel of various kinds. Mr. MacMurray told Attorney K. E. Steinhauer for the commission that he sold a large proportion of his product in the East and also a great deal in Europe and the Straits Settlements. He named various steel concerns from which he purchased billets, among those being the Donner Steel Co., Buffalo, and the Illinois Steel Co., Gary, Ind.

"How do the Donner steel prices compare with those contemporaneously quoted by Pittsburgh manufacturers?" asked Mr. Steinhauer. "Sometimes they are the same, sometimes they are higher, and sometimes they are less," replied Mr. MacMurray.

"How do the prices of the Illinois Steel Co. compare with prices contemporaneously quoted by Pittsburgh manufacturers?" asked Mr. Steinhauer.

"Most of the time they are the same as the reported Pittsburgh prices," Mr. MacMurray responded.

"Were they at any time lower?" inquired Mr. Steinhauer.

"Oh, yes," replied Mr. MacMurray.

The witness said that he thought the Illinois Steel Co. prices were a little higher, probably $1 per ton, than the quoted Pittsburgh prices, the first of the present year. Ordinarily, he said, his company bought billets at a certain price at the mill of the Illinois Steel Co. and not at the Pittsburgh price plus freight. He also submitted in evidence orders for steel plates with the Donner Steel Co. where the latter absorbed freight.

(Further details of the hearing in Washington will be found on page 1366.)

SHELL STEEL SOLD

About 19,000 Tons Sold at Auction by Government Salvage Board

At a recent public auction of steel shells, brass cartridge cases, shell forgings, hand grenades and similar scrap, held by the Philadelphia District Salvage Board in its New York office, Room 808 Army Building, 39 Whitehall Street, New York, about 13,950 gross tons of steel shells with copper turning bands, lead disks and brass base covers; about 482 gross tons of Stokes' motor shells; about 1830 gross tons of shell forgings; about 480 tons of brass cartridge cases; about 860 gross tons of hand grenades, and about 1516 gross tons of trench mortar shells were sold.

David Kaufman, Elizabeth, N. J., was high bidder on about 4176 gross tons, about 332 gross tons, about 390 gross tons and about 912 gross tons of steel shells in lots, all at the reserve depot, Hammonton, N. J. David Kaufman also was high bidder on about 336 tons of steel shells at the reserve depot, New Cumberland, Pa., and 749 tons of steel shells at Middletown, Pa., as well as 3177 gross tons of British shells at Raritan Arsenal, Metuchen, N. J., and 276 gross tons at the Woodbury depot, Westville, N. J.

The Manhattan Machinery Co., New York, was high bidder on 344 gross tons of steel shells at the ordnance depot, Hammonton, N. J., 139 gross tons, one ton and 10 tons of steel shells, and 23 tons of hand grenades, all at the ordnance reserve depot, Charleston, S. C.

The New Haven Iron & Metal Co., New Haven, Conn., bid in 1248 gross tons of steel shells and about 150 gross tons hand grenades both at Hammonton, N. J., and about 300 gross tons of hand grenades at Penniman depot, Penniman, Va., about 60 gross tons of steel shells at Delaware depot, Pedricktown, N. J., and about 60 gross tons steel shells at Raritan Arsenal, Metuchen, N. J.

Hyman-Michaels Co., Pittsburgh, bid high on about 541 gross tons of steel shells at the reserve depot, Penniman, Va., and about 1312 gross tons of howitzer shells at Penniman, Va., and about 357 gross tons of shell forgings and about 1518 gross tons of steel howitzer shells at general reserve depot, Schenectady, N. Y. Also this company was high bidder on about 1473 gross tons of shell forgings and about 399 gross tons of steel shells both at Pedricktown, N. J.

Hurwitz Brothers, Syracuse, N. Y., were high bidders on about 23 gross tons of steel shells at the general reserve depot, Schenectady, N. Y.

H. Jaffe, New York, was high bidder on about 596 gross tons of steel shells at the reserve depot, Seven Pines, Va., and about 207 gross tons of steel shells at New Cumberland, Pa. H. Jaffe also bid in about 263 gross tons of brass cartridge cases at Schenectady, N. Y., about one gross ton at Curtis Bay, Baltimore, Md., and about 183 gross tons at Middletown, Pa.

JAPAN STILL BUYS RAILS

Inquiry from Corea Calls for 6000 Tons—Sheet Business Goes to Europe—Aluminum Imports Slack

NEW YORK, Nov. 21.—The export market is generally dull, although there is some business appearing in small orders from South American markets and a few inquiries are being handled from the Philippine Islands. The Chinese market shows no prospect of immediate change for the better. Merchant buying from Japan is still practically at a standstill, although there have been some inquiries and the sale is reported by one Japanese import and export house in New York of a tonnage of medium weight black sheets. Although there are heavy stocks of black sheets still being held in stock in Japan, they are largely of No. 30 gage and lighter. Numerous orders for black sheets of light and medium gage are evidently still being placed in the United Kingdom and in European markets. While sheets of this origin are admittedly not of the exact standard desired by the Japanese buyers, a tendency to improve the product is reported as evident among British sheet mills. That there is still a fair tonnage of black sheets being purchased by Japanese importers in Europe is evidenced by the recent report that two of the largest Japanese export companies have within the past few weeks placed orders in London for between 6000 and 8000 tons of black sheets, close annealed. There is some interest from Japan in purchases of structural steel, but most of the inquiries which appear are of Governmental origin. One large Japanese export house in New York has recently booked an order for 170 tons of beams and channels.

The recent tender of the imperial Government Railways for 5000 tons of 60-lb. rails and 250 tons of splice bars, upon which it was stated bids on furnishing German material would be acceptable, has been awarded to a German mill at a price said to have been about $8 per ton under the American c.i.f. quotation. The order was placed on a March-April delivery basis, against the offer of the American mills of December delivery. In addition to the tender of the South Manchuria Railway Co., asking for 15,085 tons of 100-lb. rails, a separate tender closing Nov. 20 was issued about a week ago by the purchasing office of the Corean lines of this railroad, calling for 40 miles of 100-lb. rails (6285 tons). Bids on the larger tonnage will not be opened until Nov. 30. Of interest in connection with the tenders for furnishing electrical equipment for the Japanese railroads, now under consideration by American manufacturers, is the fact that of 42 electric locomotives now in operation in Japan, 36 are of British manufacture, four of American origin and two German. Buying for electrification of the railroads in Japan is expected to continue for the next four years.

Imports of German ingot aluminum are at present at a low ebb, both because of high prices prevailing in Germany and difficulty in obtaining it. German sheets, however, may be imported at about ½c per lb. under the prevailing American market. French and Swiss ingot aluminum, with the American market probably at about 22c per lb., are said to be possible of import at 15½c per lb., which, plus 5c per lb. duty, brings the price up to 20½c per lb.

NEXT QUARTER PRICES

Valley Sheet Mills Expect Present Quotations to Continue Into 1923

YOUNGSTOWN, Nov. 21.—With basic pig iron settling to $28, and lower quotations in sight for the first quarter of 1923, the trade's interest continues to be focused on steel prices which will apply in the next quarter. Already strip makers have announced their intention of carrying forward current quotations into the next quarterly period. It is the expectation in sheet mill circles that the prevailing minimums of 3.35c. on black and 4.35c. on galvanized, base gages, will represent the market on first quarter, 1923, tonnage.

The principal independent strip producer in this territory is booking tonnage for early next year delivery on the basis of 4.50c. for cold-rolled finishes, and 2.95c. to 3.15c. for hot-rolled flats. The narrower widths take the higher quotation. Strip demand continues firm among finished products, and is especially influenced by the heavy requirements of automobile builders.

In fact, independents anticipate that steel requirements of the automobile industry next year will be on a broader scale than at any time heretofore. Current requirements for full finished sheets, for instance, are in excess of mill capacity. Some of the more important automobile interests are pressing for next year's needs and are anxious to close contracts protecting their raw material supplies.

Automobile sheet seconds are scarce and difficult to obtain. The major motor car makers are mapping enlarged manufacturing programs for next year, say Valley steel interests. This will involve sustained requirements not only for highly finished sheets, but for ordinary grades, as well as for strips and merchant bars.

While new business in finishing lines, as well as in pig iron, sheet bars, billets and slabs, is slackening, due to approach of the inventory period, nevertheless, mills are maintaining operations on releases under existing contracts. Buyers are also holding back because of price unsettlement and uncertainties.

Black sheet business is spotty, largely reflecting immediate needs of consumers, and announcement of definite 1923 prices, for first quarter, will help to clarify the situation. While announcement of prices to apply will release some tonnage now held back, mills do not anticipate any large influx of orders. At present business is confined to 200 to 400-ton lots mostly, though some 1000-ton orders are being placed.

Sheet bars are selling down to $37, with comparatively little new business. The principal makers in this district are well covered over the next few weeks, and non-integrated interests report they have no difficulty in satisfying their needs.

Pipe is one of the strong spots in the finished market, and producers will enter the new year in strong position, especially in the buttweld sizes. There is much uncompleted construction throughout the country, which is sustaining buttweld needs. Oil and line pipe demand, while not so heavy as two weeks ago, nevertheless is still firm.

Buying of scrap metals shows little life and heavy melting is readily obtainable at $21. Compressed sheet steel is quotable at $20.

Syndicate Takes Over Sweet's Steel Co.

The Sweet's Steel Co., Williamsport, Pa., recorded a deed of trust on Nov. 17, securing an issue of $400,000 of first mortgage 6 per cent bonds, marking the completion of a $1,500,000 transaction. The deed of trust runs in favor of the First National Bank, Williamsport, and it is understood that the entire bond issue has been underwritten by local banks. Last September a syndicate headed by Joseph Kaye, Emporium, and D. F. Swartz, Williamsport, was granted an option on the estate of R. L. Ahles, formerly president, to purchase 90 per cent of the Sweet company's stock, and this option has been exercised. James B. Bailey, Philadelphia, president, Pine Iron Works Co., Pottstown, Pa., is a member of the syndicate whose officers will probably be: Joseph Kaye, chairman; John M. Young, president; Allen P. Perley, vice-president; Daniel F. Swartz, treasurer, and C. L. Peaslee, secretary.

Ohio interests, headed by L. A. Griffith, United Machine & Mfg. Co., Canton, Ohio, have acquired controlling interest in the James A. Brady Foundry Co., Chicago. Mr. Griffith will be president of the new organization.

PRESIDENT DETERMINED

Tone of Message Indicates White House Will Fight for Merchant Marine Bill

WASHINGTON, Nov. 21.—Realizing that it faces vigorous opposition, particularly in the Senate, President Harding's message to-day urging passage of the Administration ship subsidy bill was marked by an unusually strong tone. It had an air of defiance and even belligerency. The President showed such a determination to fight for the legislation as he possibly has not shown regarding any previous legislation since he has been President.

While the rules of the House are such that it likely will be possible to pass the bill on Nov. 29, such rules are not applicable to the Senate, where a bitter and possibly prolonged contest over the bill is expected, the outcome of which is problematical.

The President's message was clear and it convincingly explained the need of maintaining a privately owned merchant marine, both as a matter of national defense and of development of the foreign commerce of the United States. One of the points stressed by the President was that the legislation would reduce greatly the present high costs to the Government in maintaining ships under Government ownership and operation. He also appealed to the "farm bloc" apparently when he pointed out the value of a merchant marine to the agricultural interests.

Passage of the legislation before the present Congress expires, March 4, is considered to be extremely important because of the numerous radical members who will be in Congress after that time as the result of the recent elections.

Larger Use of Open Top Cars

WASHINGTON, Nov. 21.—Iron and steel interests are among those who will benefit by the order of the Interstate Commerce Commission which removes the preference that has been given to coal in the supply and movement of open top cars to and from points south of the Ohio and Potomac rivers. The order, issued in the form of amendment No. 2 to service order No. 25 became effective yesterday and applies to all railroads south of the Ohio and Potomac rivers except the Baltimore & Ohio. The condition of the latter carrier is still far from normal. The order amended five paragraphs of car service order No. 25.

The amendment means that the Southern lines will be in a position to supply open top cars, regardless of their height, to shippers of other products as well as coal and will not be required to maintain other conditions which had prevailed since Sept. 19, in order to expedite shipments of coal. It is provided, however, that any special priority which has been set up within the Southeastern territory under provisions of the Federal fuel distribution plan must be fulfilled.

Courses in Industrial Geography

Clark University, Worcester, Mass., is to establish correspondence courses in connection with its School of Geography. This will include courses for persons engaged in industry, and special mention is made in the prospectus of persons engaged in the handling of products of the mines, and those holding responsible positions in manufacturing enterprises, such as iron and steel plants, and in commercial firms, such as exporting and importing companies. Supplementary courses will give to these same classes of students more advanced instruction in specialized subjects, such as the geography of the iron and steel industry. President Wallace W. Atwood is the head of the School of Geography, but immediately in charge of the home study courses, as they will be called, will be Douglas C. Ridgley, recently of the Illinois State Normal University.

GERMAN PRICES UP 60 PER CENT

Advance Much Faster Than Mark Falls—Steel Rises More Than Iron

(By Radiogram)

BERLIN, GERMANY, Nov. 20.—Foundry iron No. 1 is now 110,173 m. per metric ton ($18.19 per gross ton, at 1⅝c. per 100 m.); ingots are 161,600 m. ($26.68); bars, 219,200 m. (1.62c. per lb.); thin sheets, 332,000 m. (2.45c. per lb.).

[These prices may be compared with those of Nov. 6, quoted on page 1225, Nov. 9. At that time foundry iron was 83,994 m. ($14.40, at 1⅛c. per 100 m.); ingots, 96,700 m. ($16.58); bars, 132,000 m. (1.01c. per lb.); thin sheets, 196,000 m. (1.50c. per lb.). The advance in two weeks, expressed in marks, has been 31 per cent in pig iron, 67 per cent in ingots, 66 per cent in bars and 69 per cent in sheets.

Since July 4, foundry iron, in marks, has advanced 15-fold, from 7261 m.; ingots have gone up 19-fold, from 8520 m.; bars, 19-fold, from 11,470 m.; sheets, 20-fold, from 16,490 m. In dollars, foundry iron has advanced 12 per cent, from $16.23; ingots, 40 per cent, from $19.04; bars, 41.5 per cent, from 1.145c. per lb.; sheets, 49 per cent, from 1.645c. per lb.]

Labor Conditions in the Valley Improve

YOUNGSTOWN, Nov. 21.—Operating and earning position of independent iron and steel interests in the Mahoning Valley is on a satisfactory basis for the fourth quarter. Labor supply is plentiful, due to the influx of men to the steel properties from outside employment. This applies particularly to unskilled labor. "We now have all the unskilled steel mill labor we need for full operations," states an independent executive. "Men who have been employed on outside work have been coming to the plants rapidly of late."

In view of this situation, it has been unnecessary for Valley employers to pay bonuses to secure men. For this same reason a wage advance, predicted in some quarters for Dec. 1, is declared unlikely by the independents. However, they say that they would follow the action of the Steel Corporation in any such procedure. Steel prices do not justify such a move at this time, which independent leaders believe would be inadvisable.

They point out that while some of the principal independents are now on an earning basis, they have passed through a period of depleted earnings and that most companies have sustained severe losses.

More Money for Federal Trade Commission

WASHINGTON, Nov. 21.—The Budget Bureau has approved an appropriation of $955,000 for the Federal Trade Commission for the fiscal year ending June 30, 1924. This is an increase of $55,000 over its appropriation for the present fiscal year and is $45,000 less than the amount the commission asked for, which was $1,000,000. The commission, it is stated, will employ additional attorneys and economists. There has been considerable interest as to how the commission would fare with the Bureau of the Budget. Unless Congress disapproves the action of the Bureau of the Budget, it may be assumed, however, it not only will be permitted to continue activities along its present lines but will be permitted to broaden and increase them.

The Westinghouse Electric & Manufacturing Co., Pittsburgh, plans to start operations in its newly acquired plant at Sharon, Pa., purchased from the Savage Arms Corporation, the first of next year. It will start one department at a time and production will be gradually increased, depending on the overflow from the company's plant at East Pittsburgh.

Iron and Steel Markets

TESTING OUT PRICES

Present Levels Likely in Sheets and Tin Plates

Heavy Consumption of Finished Steel—Pig Iron Lower with Large Buyers Inquiring

With operations well sustained at the high rate recently reached, which is but little under 80 per cent, consumption of steel keeps close step with production. New buying is still slack in view of the uncertainties as to prices for the first quarter of 1923.

The week's developments point to the continuance of the 3.35c. basis for black sheets and of $4.75 per base box for tin plate, though no announcement has been made by the Steel Corporation at this writing.

The testing out of the 2c. price for plates, shapes and bars shows that supply and demand are just now nearer an equilibrium in finished steel than in pig iron. Some mills have gone $1 to $2 a ton below the 2c. level, car material in particular showing concessions.

Some weakness has developed in hoops, bands and hot-rolled strip steel, as indicated by sales at 2.75c. as against 2.90c. recently. Wire and tubular products show more activity and more firmness than other lines.

Mills still have overdue deliveries of considerable volume and are counting on operating at the present rate well into the first quarter, barring winter blockades. Car shortages continue, but mills in the Pittsburgh and nearby districts, where congestion has been greatest, have not been obliged to add to their piled-up product.

The river barge shipments of finished steel from Carnegie Steel Co. mills, started this week, are expected to grow in importance.

The inquiries of the railroads have added from 175 to 225 locomotives and nearly 7000 cars to the pending lists. Actual purchases include 50 locomotives but not much over 500 cars.

Activity in fabricated steel work is still of unusual promise, involving awards of 21,000 tons in sizable projects and new inquiries of 37,000 tons. Three-fourths of the latter are covered by the Philadelphia-Camden bridge, a Missouri River bridge at St. Charles and a public service power station at Chicago. Bureau of Census figures for bookings in October were 122,000 tons, or 15 per cent less than the average of the last four months.

Automobile companies are still liberal buyers of steel bars, though deliveries on some of this business will not be made until late in the first quarter. Demand has sprung up also in the implement trade for steel bars and steel specialties.

Pig iron markets continue weak and declines of $1 to $2 on foundry and basic grades are noted in important Northern centers. But it is significant that large melters are quietly sounding the market and the buying of considerable tonnages at no distant date would not be surprising. The Pennsylvania Railroad has bought from 6000 to 8000 tons of foundry iron and the Steel Corporation has closed in the East for 6000 tons of basic for its Pencoyd plant. This last purchase is due to car shortage, preventing delivery of pig iron from Steel Corporation furnaces in the Pittsburgh district.

Ups and downs in blast furnace coke are being registered week by week and are keeping buyers on the alert. After selling as low as $6.50 late last week, standard beehive coke has strengthened to $7.25 and a contract for 23,000 tons, delivery to the end of the year, was put through at $7.50.

The coal market has been weakened by the closing of lake navigation and the lack of demand from other directions. Run of mine steam has been sold at $2.75 to $3.25.

Germany got the 5250 tons rails placed last week by the Imperial GovernmentRailways of Japan, at about $8 per ton less than the American bid. For the first time since the war it was given out by Japan that German bids would be entertained. This week 7000 tons of 100-lb. rails will be bought for Corea by the South Manchuria Railway Co. British mills expect the 21,370 tons of rails pending for Manchuria to go to the Continent.

The Standard Oil Co. has bought 150,000 boxes of tin plate in Wales for use in its foreign trade. At low prices Welsh mills have regained from the United States all their tin plate trade on Canada's Pacific Coast.

American inquiries have reached Great Britain for "hematite" iron on regular monthly shipments through the whole of 1923.

For the fourth successive week THE IRON AGE composite price for finished steel is at 2.446c. per lb.; this compares with 2.099c. one year ago and 3.581c. two years ago.

For the eighth successive week THE IRON AGE pig iron composite price has fallen, being now $27.61 per gross ton, compared with $32.54 at the end of September. One year ago it was $19.64; two years ago, $37.63 per ton.

Pittsburgh

Steel Prices Show Little Change—Pig Iron Market Is Weak

PITTSBURGH, Nov. 21.—Steel prices in the main are holding fairly well in this market, but the explanation is to be found in the fact that few mills as yet have felt the need of orders badly enough to meet the ideas of buyers as to value. Buyers plainly are uninterested in plates at 2c. Pittsburgh, although one important interest has turned down business carrying that figure. There is no question that well below the equivalent of 2c. Pittsburgh has been done by some makers. The situation as to prices of bars and shapes also is uncertain.

Independent sheet makers have found it necessary to go back to the Steel Corporation levels to get new orders for all finishes except automobile grades. Definite weakness has lately developed in hot-rolled flats, sales of which have been made as low as 2.75c. base Pittsburgh, or $3 per ton below the current price which most makers had adopted for first quarter contracts. There is no weakening in wire products nor in tubular goods, these lines showing activity which is largely lacking in almost all other finished products.

The pig iron market remains weak, although within

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton.	Nov. 21, 1922	Nov. 14, 1922	Oct. 17, 1922	Nov. 22, 1921
No. 2X, Philadelphia	*$30.11*	$31.11	$33.11	$22.84
No. 2, Valley furnace†	*27.50*	28.00	32.50	20.50
No. 2, Southern, Cin'tif..	27.05	27.05	31.55	22.50
No. 2, Birmingham, Ala.†	23.00	23.00	27.50	18.00
No. 2 foundry, Chicago*..	30.00	30.00	31.00	20.00
Basic, del'd, eastern Pa..	*27.50*	28.14	29.50	21.00
Basic, Valley furnace....	*27.50*	28.00	30.00	19.00
Valley Bessemer, del. P'gh	*33.37*	33.77	35.27	21.96
Malleable, Chicago*.....	30.00	30.00	31.00	20.00
Malleable, Valley	29.00	29.00	33.00	20.00
Gray forge, Pittsburgh...	*28.77*	29.77	32.77	21.46
L. S. charcoal, Chicago...	36.15	36.15	36.15	31.50
Ferromanganese, furnace.	100.00	100.00	67.50**	60.00**

Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill.	$43.00	$43.00	$43.00	$40.00
Bess. billets, Pittsburgh..	38.00	38.00	40.00	29.00
O.-h. billets, Pittsburgh..	38.00	38.00	40.00	29.00
O.-h. sheet bars, P'gh....	38.00	38.00	40.00	30.00
Forging billets, base, P'gh	45.00	45.00	45.00	32.00
O.-h. billets, Phila	*$43.17*	45.17	45.17	34.34
Wire rods, Pittsburgh....	45.00	45.00	45.00	40.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb..	2.00	2.00	2.00	1.60
Light rails at mill.....	2.00	2.00	2.00	1.55

Finished Iron and Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Iron bars, Philadelphia...	*2.275*	2.325	2.475	1.95
Iron bars, Chicago.....	2.50	2.50	2.50	1.65
Steel bars, Pittsburgh....	2.00	2.00	2.00	1.50
Steel bars, Chicago.....	2.10	2.10	2.10	1.60
Steel bars, New York....	2.34	2.34	2.34	1.80
Tank plates, Pittsburgh..	2.00	2.00	2.15	1.50
Tank plates, Chicago....	2.30	2.30	2.30	1.60
Tank plates, New York...	2.34	2.34	2.34	1.88
Beams, Pittsburgh	2.00	2.00	2.00	1.50
Beams, Chicago	2.20	2.20	2.20	1.60
Beams, New York.....	2.34	2.34	2.34	1.88
Steel hoops, Pittsburgh...	2.75	2.90	2.90	2.00

**C.i.f.

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.

†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire, *Per Lb. to Large Buyers:*	Nov. 21, 1922 Cents	Nov. 14, 1922 Cents	Oct. 17, 1922 Cents	Nov. 22, 1921 Cents
Sheets, black, No. 28, P'gh	3.35	3.35	3.50	2.75
Sheets, galv., No. 28, P'gh	*4.35*	4.50	4.50	3.75
Sheets, blue ann'l'd, 9 & 10	*2.50*	2.60	2.60	2.25
Wire nails, Pittsburgh...	2.70	2.70	2.70	2.75
Plain wire, Pittsburgh...	2.45	2.45	2.45	2.50
Barbed wire, galv., P'gh..	3.35	3.35	3.35	3.75
Tin plate, 100-lb. box, P'gh	$4.75	$4.75	$4.75	$4.75

Old Material, Per Gross Ton:				
Carwheels, Chicago	*$24.50*	$25.00	$25.00	$17.00
Carwheels, Philadelphia..	*20.00*	21.00	23.00	17.00
Heavy steel scrap, P'gh..	20.50	20.50	21.50	14.00
Heavy steel scrap, Phila..	*16.00*	16.50	18.00	12.00
Heavy steel scrap, Ch'go..	*17.00*	17.50	18.50	12.25
No. 1 cast, Pittsburgh....	*23.00*	23.50	24.00	16.50
No. 1 cast, Phila.....	*20.00*	22.00	23.00	17.50
No. 1 cast, Ch'go (net ton)	20.50	20.50	21.00	13.25
No. 1 RR. wrot, Phila....	19.00	19.00	22.00	15.50
No. 1 RR. wrot, Ch'go (net)	*15.50*	16.00	17.75	12.00

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt....	*$7.25*	$7.00	$10.00	$3.00
Foundry coke, prompt....	*8.00*	8.50	12.00	4.00

Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York..	14.12½	14.12½	14.12½	13.50
Electrolytic copper, refinery	13.62½	13.62½	13.62½	13.25
Zinc, St. Louis.....	*7.20*	7.25	6.85	4.65
Zinc, New York.....	*7.55*	7.60	7.20	5.15
Lead, St. Louis.....	6.90	6.90	6.35	4.35
Lead, New York.....	7.25	7.25	6.65	4.70
Tin (Straits), New York..	*36.50*	36.87½	34.50	29.62½
Antimony (Asiatic), N. Y.	*6.50*	6.60	6.75	4.50

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Nov. 21, 1922, Finished Steel, 2.446c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

Nov. 14, 1922,	2.446c.
Oct. 24, 1922,	2.467c.
Nov. 22, 1921,	2.099c.
10-year pre-war average,	1.689c.

These products constitute 88 per cent of the United States output of finished steel

Composite Price, Nov. 21, 1922, Pig Iron, $27.61 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Nov. 14, 1922,	$28.86
Oct. 24, 1922,	30.02
Nov. 22, 1921,	19.64
10-year pre-war average,	15.72

the past few days some producers have shown more resistance to the downward tendency than they had previously. These producers are finding that their costs are practically even with selling prices; hence, their firmer stand with regard to prices. The market is at least 50c. per ton lower than a week ago and the decline runs to $1 a ton in some grades.

The coke market, after showing considerable weakness over the latter part of last week, turned strong to-day and advanced about 50c. per ton, due to rather big demands and some irregularity in car placements. This change is regarded as merely temporary unless there is some bad weather immediately ahead, and the fact that the demand for coal has dwindled sharply with the ending of the lake shipping season means that coal will be cheap enough to prevent permanent strength in coke.

The scrap market is extremely dull, but prices do not yield much, chiefly because dealers are figuring on the entrance of Carnegie Steel Co. into the market.

Transportation conditions are showing no appreciable change, although the Pennsylvania Railroad suspended its embargo on eastbound freight for the first three days of this week, and it is rumored that it will accept westbound freight during the last three days of the week. Car shortages continue, but on the whole it is doubtful whether any of the mills in this or nearby districts have been obliged to pile any more production. An interesting development in connection with transportation is that the Carnegie Steel Co. this week will inaugurate down river barge shipments of finished products. Neither rail conditions nor the insufficient supply of labor seems to be affecting blast furnace and steel plant operations. The Jones & Laughlin Steel Co. has all 12 of its blast furnaces in operation and is producing ingots at between 75 and 80 per cent of capacity. Other independents are doing almost as well and the blast furnace record for this week shows 92 out of 139 furnaces in blast, this including the new Claire Furnace at Sharpsville, Pa., which will be lighted Nov. 23, and the Scottdale, Pa., furnace of the McKinney Steel Co.

Pig Iron.—Such sales of Valley basic iron as have been made in this district in the past week have been at $28, including one lot of 2000 tons, and another of 500 tons. This price, however, is maximum and as there have been sales as low as $27, the market appears to be quotable at from $27 to $28. This grade is not above $27 at points which can compete with Valley furnaces, and it is hardly likely that more than this price now can be obtained. Merchant producers of foundry iron all are quoting $27.50 for the base grade at Valley furnace and most of the local sales of the week have been at from $27.50 to $28. The Westinghouse Electric &

Mfg. Co., however, recently closed for approximately 1000 tons of foundry iron for its Cleveland plant and it is reported did not go as high as the equivalent of $27, Valley furnace, for the iron. A producer having the same freight rate into Pittsburgh as Valley furnace, has offered No. 2 foundry at $27. There is not enough Bessemer iron on sale or wanted to establish prices. The one Valley interest which has any of this grade for sale is quoting $31.50, but iron of this grade can be bought at $31, Johnstown. Very little has been done on low phosphorus iron here lately and the price is nominal at $37, Valley furnace, for copper free.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.77 per gross ton:

No. 2 foundry	27.50 to 28.00
Low phosphorus, copper free	37.00 to 37.50

Ferroalloys.—The price of $100 furnace for 80 per cent domestic ferromanganese has found more basis in sales in the past week than before since it was announced. A Pittsburgh district steel company a few days ago closed for 2000 tons for immediate delivery at that figure. Several carload sales also have been made at that price which has been quoted on other inquiries, aggregating close to 1000 tons. The explanation for this development is found in the fact that the Turkish disturbance has practically shut off shipments of Caucasian ore and unrest is curtailing Indian production and shipments. Brazilian mines have been doing little during the past few months. British ferromanganese makers are said to lack enough ore to meet their sales and there is a possibility of higher British prices. British makers are meeting the American price, now quoting $100 f.o.b. Atlantic seaboard, duty paid. This represents a cut of $1.10 a ton from the former price of $67.50 c.i.f. seaboard, for 80 per cent material. There is little interest in other ferroalloys. An effort is being made to line up 1923 contracts for 50 per cent ferrosilicon at $82.50, delivered, but so far without much success. Current demands for this material are few and small and the common quotation is $75, delivered. Spiegeleisen is dull and weak. Domestic makers are quoting $38, furnace, for 20 per cent, but would take less on desirable tonnages, $35 being mentioned as a possibility on a large lot for delivery over a period. Domestic material hardly would command more than $41 delivered here since that is about the delivered price on imported spiegeleisen, duty paid. Bessemer ferrosilicon and silvery iron have been reduced $2 a ton.

We quote 80 per cent ferromanganese at $100, furnace, or $104.79 delivered Pittsburgh district for either domestic or British, and 76 to 80 per cent German at $67 c.i.f. Atlantic seaboard. Average 20 per cent spiegeleisen, $38, furnace; 16 to 19 per cent, $37 or domestic; 20 per cent foreign, $37 f.o.b. Atlantic seaboard, duty paid; 50 per cent ferrosilicon, domestic, $75, delivered, for spot delivery, $82.50 for 1923 shipment. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, $46.50; 11 per cent, $49.80; 12 per cent, $53.10; 13 per cent, $57.10; 14 per cent, $60.10; silvery iron, 6 per cent, $35; 7 per cent, $36; 8 per cent, $37.50; 9 per cent, $39.50; 10 per cent, $41.50; 11 per cent, $44.80; 12 per cent, $48.10. The present freight rate from Jackson and New Straitsville into the Pittsburgh district is $3.66 per gross ton.

Steel Skelp.—Makers still are quoting 2c. on sheared and grooved skelp, but sales are neither numerous nor large. Non-integrated pipe makers are not suffering much for supplies in spite of the fact that railroad conditions impede deliveries.

Wire Products.—Business still is coming along in good volume without much sales effort on the part of manufacturers. Since the leading interest still is heavily committed and is taking no new business, the distribution of orders is better than otherwise would be the case. The Steel Corporation wire-making subsidiary, however, is gaining steadily in plant operations and should be able before long to modify its sales policy. Car shortages and a lack of sufficient number of wire drawers combine to prevent normally full performance either as regard production or deliveries. Prices are unchanged. They are given on page 1391

Iron and Steel Pipe.—The report still is that there is no let-up in the demand for standard pipe, particularly in the butt welded sizes. Car and labor shortages are preventing full performance against orders and few makers will accept new business for delivery in less than 60 days. As a general proposition, current shipments are about equal to current production, but no appreciable inroads are being made upon unshipped tonnages. The National Tube Co. will ship about 1500 tons of pipe by barge from its local mills, as part of a general down river shipment to be started this week by the Carnegie Steel Co. This is an experiment by the Steel Corporation. There is a fair demand for oil country and line pipe, but the mills are not heavily committed on these lines and reasonably early delivery is promised by most makers. Activity in wrought iron pipe also is chiefly in the butt welded sizes. Discounts are given on page 1391.

Wire Rods.—The market has lost none of its recent strength, chiefly because offerings are scant and none too plenty for the demand. The regular market is quotable from $45 to $47.50 for the base size of soft rods, but mills in a position to produce and to deliver promptly have obtained as much as $50 on a few small lots.

We quote No. 5 common basic or Bessemer rods to domestic consumers, $45 to $47.50; chain rods, $45 to $47.50; screw stock rods, $50 to $52.50; rivet and bolt rods and other rods of that character, $45 to $47.50; high carbon rods, $52 to $57.50, depending on carbon, per gross ton, f.o.b. Pittsburgh or Youngstown.

Billets, Sheet, Bars and Slabs.—Activity is lacking and prices are rather poorly defined. While occasional sales of billets and sheet bars, usually representing a pressing need, are being made at above $38, that seems the more common price on most inquiries now current. We note one sale of 5000 tons of sheet bars at $38, delivered, to a mill having a freight rate of about 50c. per ton from originating plant. Finished materials are not readily salable at to-day's quotations and non-integrated mills claim to be unable to pay $38 for billets and sheet bars and get out whole at below today's sheet and bar prices. Railroad conditions do not appear to be affecting steel works operations.

We quote 4 x 4-in. soft Bessemer and open-hearth billets, $37.50 to $38; 2 x 2-in. billets, $39; Bessemer sheet bars, $37.50 to $38; open-hearth sheet bars, $37.50 to $38; slabs, $38; forging billets, ordinary carbons, $43 to $45, all f.o.b. Pittsburgh or Youngstown mills.

Sheets.—It is expected that the American Sheet & Tin Plate Co. will continue its present prices for the first quarter of 1923, these being 3.35c., base, for black, 4.35c. base for galvanized and 2.50c. base for blue annealed. The independent market already is back to those levels, for the failure of the leading interest to name prices up to this time has been taken by buyers to mean there would be no change and they have held back orders. Independent mills, having only small backlogs, have found that to get new orders to take the place of completed ones it has not been possible to get more than the old American Sheet & Tin Plate Co. quotations. A little business in galvanized sheets has been done at 4.50c., but the prevailing price now is 4.35c. and similarly, sales of blue annealed sheets at above 2.50c., base, are the exception rather than the rule. On ordinary black sheets, 3.35c. is the going price and early shipments are promised at that figure by independent makers. On automobile body stock, the market is not quotable below 5c., base, for No. 22 gage. The leading interest will have little tonnage of this class for sale over the first quarter of the year and is not taking on new business. Mill operations are holding up well and the leading interest actually has made a slight gain. Prices are given on page 1391.

Tin Plate.—It is now believed that when the American Sheet & Tin Plate Co. announces its price for first quarter and half of 1923 shipments, it will not be over $5 per base box, Pittsburgh, and there is a possibility that it will not be that high, since a large order for delivery this year is understood to have been taken by an independent mill at $4.75. Not long after the present base was set up a year ago, price concessions appeared and very little production tonnage actually went on makers' books at much above $4.50 during the first half of this year. A price that is likely to hold will be named by the leading interest. General business is quiet, pending an announcement of prices.

Cold-Finished Steel Bars and Shafting.—Demands, though moderate in size, are well diversified, but the fact that hot-rolled bars have not yet gone below 2c. base is a prime influence in keeping up the price of cold-finished bars at 2.50c. base for carloads. Some of the automobile makers who recently suspended shipments have given releasing orders. Ground shafting is unchanged at 2.90c. base f.o.b. mill for carloads.

Hot-Rolled Flats.—While some makers report specifications against fourth quarter contracts to have increased and that there has been a fair amount of first quarter business, it is evident that this is not a general condition, for several sales lately at 2.75c., base, Pittsburgh, indicate that other makers need orders. The general asking price still is 2.90c. base, but a little "shopping" will uncover 2.75c. on both wide and narrow stock, though the tendency to shade at the moment is not pronounced in the latter. We now quote strips, hoops and bands at 2.75c. to 2.90c. The cotton tie season is over. Prices are given on page 1391.

Cold-Rolled Strips.—Buyers are specifying fairly well on fourth quarter contracts, but are moving slowly as to their future needs in the belief that they stand to lose nothing by waiting and may possibly gain by the weakness which lately has cropped out in hot-rolled strips. Makers still are holding generally to 4.50c. base, Pittsburgh, and as yet there have been no important deviations from that price.

Bolts, Nuts and Rivets.—Quoted prices show no particular change, but as the bulk of the orders on makers' books is at lower figures and specifications against these orders are not as heavy as they might be, there is reason to suppose that concessions could be had on attractive new orders. Steel prices are slightly weaker except in the case of rods, and while railroad conditions mean higher delivered costs than otherwise would be the case, there still remains a very fair margin for producers at less than quoted prices. Present indications are that first quarter of 1923 prices soon to be named will be about the same as those now quoted. Discounts are given on page 1391.

Track Fastenings.—We make no change in prices, the market being firm, not so much because of big demands, but because manufacturers are well supplied with orders and not yet anxious enough for additional bookings to be willing to shade prices. It must be stated, however, that quoted prices do not rule on many of the current deliveries. Steel is easier in price, but local plants still have to haul much of their requirements because of railroad transportation conditions. Prices are given on page 1391.

Boiler Tubes.—Makers are generally sold up against production over the remainder of the year and, it is probable, will be obliged to carry some business over into next year because of the difficulty experienced in getting full production on account of labor shortages. Prices on all classes of tubes are firm. Discounts are given on page 1391.

Steel Rails.—The Carnegie Steel Co. has a comfortable backing of orders for light rails and is not accepting orders for more prompt delivery than six to eight weeks. Most of the demands are for earlier delivery than that and that company, consequently, is not getting much of the current business. Its last price was 2.25c., base, and that price also is being named by an independent rail maker. As low as 2c., base, has been done, however, and 2.15c. constitutes the current maximum on new steel rails. Light sections rolled from old standard rails are held at 2c., base, but this is somewhat extreme on sales.

We quote 25 to 45-lb. sections, rolled from new steel, 2c. to 2.15c. base; rolled from old rails, 1.90c. to 2c. base; standard rails, $43 per gross ton mill for Bessemer and open-hearth sections.

Iron and Steel Bars.—Small lots of merchant steel bars are being sold at 2c. base Pittsburgh, but there are no big demands at this price, as buyers are convinced that they will do better by waiting. We make no change in iron bars.

We quote steel bars rolled from billets at 2c.; reinforcing bars, rolled from billets, 2c. base; rail steel reinforcing bars, 1.90c. to 2c.; refined iron bars, 2.60c. in carloads, f.o.b. mill, Pittsburgh.

Structural Material.—The largest structural project which has come up in the past week involves 6500 tons for the new Fortieth Street bridge over the Allegheny River, Pittsburgh. There are only three bidders, the McClintic-Marshall Co. being low at 5.28c. for 3600 tons of arches and spans and 4.22c. for 2800 tons of girder plate approaches. The American Bridge Co. bid 5.94c. and 4.88c., respectively, and the Fort Pitt Bridge Works 7.39c. and 4.77c. Work on this bridge will not be started until the spring of 1924. Structural shops are getting a fair run of inquiries, but most of them are for small jobs and the plain material market does not show very much activity. Most mills are quoting 2c., Pittsburgh, but do not find this price attractive to buyers. Prices are given on page 1391.

Plates.—Sales are not especially numerous and are usually for small tonnages, giving away some of the freight advantage by naming this price f.o.b. mill. Some makers who have recently sought tonnages have found 1.90c. as high as buyers are willing to go. About 1500 tons of plates will be wanted for 10 barges, bids on which have recently been asked by the Government at Rock Island, Ill. Prices are given on page 1391.

Rivets.—The market is not especially brisk either as regards specifications on contracts or new business. There is not much pressure to sell owing to the difficulties attendant upon deliveries of steel incident to the railroad situation. At the same time, $3.15 base per 100-lb. for large structural and ship rivets and $3.25 base for large boiler rivets are not readily obtained, especially as some makers still are quoting $3 per ton less. Prices and discounts are given on page 1391.

Coke and Coal.—After selling as low as $6.75 per net ton at ovens, late last week, the market here for a standard beehive oven furnace coke has strengthened and to-day $7.25 per net ton at oven was minimum, and a number of sales were noted at $7.50. Resumptions by blast furnaces using Connellsville coke have been fairly numerous lately and the available supply has been further reduced by irregular car supplies. A number of negotiations are in progress for first quarter tonnages, but buyers and sellers, at the moment, are apart on prices. We note one contract to run from Nov. 15 to Dec. 31, involving 23,000 tons at $7.50 at ovens. Foundry coke has declined to a normal alignment with furnace grade, now being quotable at $8 to $8.50 at oven. The coal market has been weakened by the closing of lake navigation and lack of demand from other consuming sources. We now quote mine run steam coal at $2.75 to $3.25 and mine run by-product and gas coal at from $3.50 to $4.

Old Material.—Loosening up in the Pennsylvania Railroad embargo is helping the delivery of scrap and has seemingly nipped a budding demand for tonnages for quick delivery. Under the modification of the embargo, the Pennsylvania Railroad will take shipments East on the first three days of this week. Some demand for heavy melting steel for delivery in 10 days at $21, was noted prior to this order, but the market now is dull and prices no more than steady on the steel works grades. Cast scrap is weaker in sympathy with pig iron.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows

	Per Gross Ton
Heavy melting steel	$20.50 to $21.00
No. 1 cast, cupola size	23.00 to 23.50
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md., Huntington, W. Va., and Franklin, Pa.	21.50 to 22.00
Compressed sheet steel	19.50 to 20.00
Bundled sheet sides and ends	17.50 to 18.00
Railroad knuckles and couplers	22.50 to 23.00
Railroad coil and leaf springs	22.50 to 23.00
Low phosphorus standard bloom and billet ends	24.00 to 25.00
Low phosphorus, plates and other grades	23.00 to 24.00
Railroad malleable	21.00 to 21.50
Iron car axles	28.00 to 30.00
Locomotive axles, steel	23.00 to 24.00
Steel car axles	23.00 to 23.50
Cast iron wheels	23.50 to 24.00
Rolled steel wheels	22.50 to 23.00
Machine shop turnings	17.00
Heavy steel axle turnings	18.00 to 18.50
Short shoveling turnings	18.00 to 18.50
Cast iron borings	18.00 to 18.50
Heavy breakable cast	19.00 to 19.50
Stove plate	17.00 to 17.50
Sheet bar crop ends	24.00 to 24.50
No. 1 railroad wrought	20.00 to 20.50

Chicago

Finished Steel Prices Generally Firm—Railroad Car Buying Continues

CHICAGO, Nov. 21.—The week's bookings of a leading producer showed a slight gain over the average of the past few months. However, excluding specifications against a number of rail contracts which were included in this total, there was actually a small recession in strictly new tonnage, but not sufficient to be regarded as having any significance. Consumption of steel, a more dependable gage than bookings, shows no diminution. On the contrary, it would be even greater if producers could furnish the material. Firmness characterizes practically all finished steel prices and this is not surprising in view of the heavy bookings of mills. One producer is committed well into next quarter and another is now taking orders for shipment during that period at its previous prices. About 40 per cent of its capacity is already committed by rail and track supply contracts and the remaining tonnage available will be allocated among customers.

Railroad car buying still looms large as a factor in this market. The Chicago, Milwaukee & St. Paul has let tentative orders subject to the approval of the board of directors for 2000 box cars and 3000 gondola cars. Local mill protections on pending car inquiries aggregate 360,000 tons of steel, not counting 148,000 axles. In looking ahead the trade still regards it probable that the Pennsylvania and the New York Central lines will enter the market for 30,000 cars each.

An oil storage tank inquiry calls for 12,000 tons, and in addition to present mill protections covering 30,000 tons for building work in Chicago and vicinity, 67,000 tons additional is in immediate prospect.

Mill operations show another gain, the Inland Steel Co. having increased its steel production to 75 per cent of capacity. The Illinois Steel Co., which showed a gain in operations a week ago, has made no further additions to its active capacity. With local steel output on a 75 to 80 per cent basis, mills have recovered the ground lost during the twin strikes. Owing to transportation conditions, however, they have not yet been able to build up winter fuel reserves and the advent of severe weather might seriously affect their operations.

Ferroalloys.—Weakness is indicated by recent sales of both ferromanganese and spiegeleisen. Several hundred tons of ferromanganese were sold to a Chicago user at approximately $105, delivered. This material, however, was on cars and had to be moved to prevent the accumulation of demurrage charges. It appears that 80 per cent material is rather generally quoted at $2 under the former market of $67.50, tidewater, plus the duty. A local sale of 1100 tons of foreign spiegeleisen of 27 to 28 per cent manganese content, calling for delivery over the next four months, was closed at about $47, delivered. Eighteen to 22 per cent material is freely available at from $44.05, delivered, for large tonnages, to $46.05, delivered, for carloads. While there have been no sales to establish a market, 50 per cent ferrosilicon is quoted at from $75 to $80, delivered.

[illegible] to $47.05, delivered.

Pig Iron.—Buying remains extraordinarily light, being limited to purchases of prompt iron. Melters generally are holding back their orders in anticipation of further price recessions. Local iron for prompt shipment has receded to a maximum of $30, base furnace, but the market on iron for forward delivery remains unlisted because of lack of sales. The dearth of buying cannot be attributed to reduced consumption. On the contrary, users are pushing the furnaces for deliveries against contracts, which would indicate that the melt in this territory is being maintained and that stocks on foundry yards are low. It would appear that in some instances stocks are reaching the point of exhaustion. A large Michigan automotive plant, in fact, has put out an inquiry for 18,000 tons of various grades for prompt shipment. While it cannot be denied that the market is weak, some observers are of the opinion that buyers may overplay their hands. There has been practically no first quarter buying and this must develop before the first of the year. There is also the danger that the advent of severe weather will cripple production, as furnaces have not yet been able to accumulate winter fuel reserves. Inquiries before the trade include 500 tons of foundry wanted by a Wisconsin melter for first quarter and 150 tons of low phosphorus wanted by a local plant for December shipment. Another local buyer is inquiring for 500 to 1000 tons of low phosphorus for delivery to an Eastern plant over the next three months. Little Southern iron has been sold, but $23 base Birmingham seems to be the minimum going price. After a period of instability, silvery has become established at $37.50, f.o.b. Jackson, for 8 per cent.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$36.15
Northern coke, No. 1, sil. 2.25 to 2.75	$31.00
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	30.00
Northern high phos.	30.00
Southern No. 2	$29.00 to 30.00
Malleable, not over 2.25 sil.	30.00
Basic	30.00
Low phos., Valley furnace, sil. 1 to 2 per cent copper free	38.00
Silvery, sil. 8 per cent	42.29

Plates.—Of the railroad cars on inquiry which are covered by protections from local mills, those still unplaced number 38,500 and involve 360,000 tons of plates, shapes and bars, as well as 148,000 axles. An outer lake drive to be constructed in Grant Park, Chicago, will require 15,000 tons of plates, bars and shapes. Pending protections on oil storage tanks call for 10,000 tons of plates. The leading independent is now accepting business for first quarter shipment at 2.30c., Chicago mill, while the largest producer continues to book orders for indefinite delivery at 2.10c., Chicago. Occasional orders for early delivery are placed with Eastern mills at 2c., Pittsburgh.

The mill quotation is 2.10c. to 2.30c., Chicago. Jobbers quote 2.90c. for plates out of stock.

Cast Iron Pipe.—The pipe for a new sewage disposal plant at Indianapolis, amounting to 500 tons, will be furnished by the United States Cast Iron Pipe & Foundry Co. No other lettings are reported and no new tonnage is in immediate prospect; in fact, sales are so few that prices have almost become nominal. Pipe makers are well booked, however, and are not pressing for additional tonnage.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $55.20 to $56.20; 6-in. and above, $51.20 to $52.20, class A and gas pipe, $7 extra.

Rails and Track Supplies.—Demand for bolts, spikes and tie plates is somewhat more active, but is confined to rather small lots. Current inquiries for bolts and spikes range from 500 to 1000 kegs. Prices are firm and unchanged.

Standard Bessemer and open hearth rails, $43 light rails rolled from new steel, 2.15c., f.o.b. makers' mills.

Standard railroad spikes, 2.85c. to 3c. mill; track bolts with square nuts, 3.85c. to 4c., mill; iron tie plates, 2.50c.; steel tie plates, 2.35c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.50c. base and track bolts, 4.50c. base.

Bars.—Demand for soft steel bars is still active, particularly for forward delivery. Prices of local mills remain unchanged, but the leading independent has opened its books for first quarter and expects that its available tonnage will be quickly absorbed by customers. No contracts will be accepted, but sales will be confined to orders with specifications attached. The automotive industry continues to require a large tonnage of bars. In fact, the production of an automobile plant in this vicinity in November promises to break all previous monthly records. Implement makers, although they entertain no hope of an early return

to normal operations, are encouraged by a very active demand for farm equipment from the South. New business in bar iron is not even heavy enough to employ the capacity of mills still in operation. The market remains firm, however, at 2.50c., Chicago mill. Hard steel bar makers are maintaining their previous rates of operation, but have not been able to build up a satisfactory backlog. Prices are unchanged at 2c., mill.

Mill prices are: Mild steel bars, 2c. to 2.10c., Chicago; common bar iron, 2.50c., Chicago; rail steel, 2c., Chicago mill.

Jobbers quote 2.80c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 3.80c. for rounds and 4.30c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 2.25c. base; hoops, 4.15c.; bands, 3.55c.

Wire Products.—There has been a slight falling off in specifications, but it is not yet clear whether this is merely a temporary dip in demand or whether a quieter period is at hand, such as usually develops towards the close of the year. Several factors would argue for a sustained demand throughout the winter. It is to be noted that the leading interest has not yet succeeded in increasing its operations in proportion to the gains of producers of heavier products and that jobbers and manufacturing consumers have been unable to accumulate stocks. Continuance of open weather has prolonged the demand for nails in a large portion of the West and North and the South continues to be a heavy buyer of various forms of wire products. For mill prices, see finished iron and steel, f.o.b. Pittsburgh, page 1391.

We quote warehouse prices f.o.b. Chicago: No. 9 and heavier black annealed wire and No. 9 and heavier bright basic wire, $3.30 per 100 lb.; common wire nails, $3.45 per 100 lb.; cement coated nails, $2.90 per keg.

Bolts and Nuts.—Specifications are lighter, evidently reflecting a desire of users to keep their stocks down prior to taking inventory. No weakness in prices is to be noted, however, as sellers still have fair backlogs and look forward to a heavy demand with the turn of the year, basing their view on the undiminishing consumption of bolts and nuts. Among important users, the automobile industry is, in fact, running ahead of its previous production for this season. The September discounts still rule in this market.

Jobbers quote structural rivets, 3.75c.; boiler rivets, 3.85c.; machine bolts up to ⅞ x 4 in., 50 per cent off; larger sizes, 50 off; carriage bolts up to ¾ x 6 in., 45 off; larger sizes, 45 off; hot pressed nuts, squares and hexagons, tapped, $2.75 off; blank nuts, $2.75 off; coach or lag screws, gimlet points, square heads, 55 per cent off.

Sheets.—The local independent is now accepting orders for first quarter at unchanged prices. It is not taking contracts, however, as it wishes to confine its new bookings to actual specifications. Eastern mills continue to book fair tonnages for early delivery in this market at the same prices.

Mill quotations are 3.35c. for No. 28 black, 2.50c. for No. 10 blue annealed and 4.35c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote f.o.b. Chicago, 4c. for blue annealed, 4.85c. for black and 5.85c. for galvanized.

Reinforcing Bars.—Lettings are numerous and the amount of business pending continues to increase, pointing to sustained building activity throughout the winter. One seller handled more business through his local warehouse in October than during any previous month on record and reports from other dealers are of a similar nature. Notwithstanding the unusual demand for reinforcing bars and the firmness of mill prices, warehouse quotations are still soft, most business being closed at about 2.25c. Recent awards include:

LeRue Popperfuss Hotel, Chicago, 500 tons, to Barton Spiderweb System Co.

Plant for Westinghouse Electric & Mfg. Co., Central Mfg. District, Chicago, 400 tons, to Kalman Steel Co.

Hayes Hotel building, Chicago, 220 tons, to Truscon Steel Co.

Warden Apartment Hotel, Fort Dodge, Iowa, 125 tons, to Truscon Steel Co.

Northern State Normal School building, Marquette, Mich., 200 tons, to Kalman Steel Co.

Overton Hygienic Mfg. Co. plant, Chicago, 100 tons, to Kalman Steel Co.

Bridge, Lansing, Mich., 200 tons, to Kalman Steel Co.

Illinois State road work, 125 tons, to Truscon Steel Co.

High school building, Superior, Wis., 100 tons, to Concrete Steel Co.

Greenwood School building, St. Paul, Minn., 250 tons, to Concrete Steel Co.

Grammar school building, St. Louis, Mo., 155 tons, to Concrete Steel Co.

Pending business includes:

State road work, near Faribault, Minn., 1500 tons.

U. S. Veterans' Hospital buildings, Knoxville, Iowa, 500 tons.

U. S. Veterans' Hospital, Chillicothe, Ohio, 500 tons, George A. Fuller Co. low bidder on general contract.

High school building, Evanston, Ill., 300 tons, bids on general contract to be in Dec. 7.

International Harvester Co., Chicago, warehouse at Cleveland, 400 tons.

Sewage disposal plant, Indianapolis, 1250 tons, general contract awarded to L. W. Hancock Co., Louisville, Ky.

Two public school buildings, Minneapolis, 1000 tons.

Third unit, Calumet power station, Commonwealth Edison Co., Chicago, 700 tons.

Roy E. Warner Co. garage, Louisville, Ky., 100 tons.

Hammond Hotel & Improvement Co., hotel, Hammond, Ind., 160 tons.

Structural Material.—New building work in Chicago and vicinity involves a total of 30,000 tons of steel and additional projects expected to go ahead within the next two months will account for 67,000 tons more. Prominent among pending jobs are a Missouri River bridge at St. Charles, Mo., requiring 10,000 tons, and the West Side power station of the Commonwealth Edison Co., Chicago, 8000 tons. While plain material prices remain unchanged, the Inland Steel Co. is now accepting orders for first quarter shipment.

The mill quotation on plain material is 2.10c. to 2.20c., Chicago. Jobbers quote 2.90c. for plain material out of warehouses.

Old Material.—Consumer buying is at a minimum and prices of a large number of grades have again dropped 50c. or more a ton. Buyers appear to have sufficient material on hand or on order to take care of their early requirements and they are not disposed to add to their stocks until inventory taking has been completed. While dealers have liquidated most of their holdings of prepared scrap, car repair shops are placing on the market a growing tonnage of unprepared material and increasing amounts of sorted scrap are coming from the industrial shops and the railroads. No general shortage of scrap is looked for, and unless another buying movement starts soon, further price recessions appear inevitable. Railroad offerings include the Wabash and the Grand Trunk Western lines, 3000 tons each; the Rock Island, 4000 tons, and the New York Central, a blank list.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$22.50 to $23.00
Cast iron car wheels	24.50 to 25.00
Relaying rails, 56 and 60 lb.	26.00 to 27.00
Relaying rails, 65-lb. and heavier	32.00 to 35.00
Rolled or forged steel car wheels	22.00 to 22.50
Rails for rolling	18.00 to 18.50
Steel rails, less than 3 ft.	19.00 to 19.50
Heavy melting steel	17.00 to 17.50
Frogs, switches and guards cut apart	17.00 to 17.50
Shoveling steel	16.50 to 17.00
Drop forge flashings	12.00 to 12.50
Hydraulic compressed sheet	14.50 to 15.00
Axle turnings	15.00 to 15.50
Per Net Ton	
Iron angles and splice bars	21.50 to 22.00
Steel angle bars	17.00 to 17.50
Iron arch bars and transoms	21.00 to 21.50
Iron car axles	24.50 to 25.00
Steel car axles	18.50 to 19.00
No. 1 busheling	14.00 to 14.50
No. 2 busheling	9.50 to 10.00
Cut forge	15.00 to 15.50
Pipe and flues	11.00 to 11.50
No. 1 railroad wrought	15.50 to 16.00
No. 2 railroad wrought	15.00 to 15.50
Steel knuckles and couplers	19.50 to 20.00
Coil springs	21.00 to 21.50
No. 1 machinery cast	20.50 to 21.00
No. 1 railroad cast	19.00 to 19.50
Low phos. punchings	17.50 to 18.00
Locomotive tires, smooth	16.50 to 17.00
Machine shop turnings	9.50 to 10.00
Cast borings	13.00 to 13.50
Stove plates	16.50 to 17.00
Grate bars	16.00 to 16.50
Brake shoes	16.50 to 17.00
Railroad malleable	20.50 to 21.00
Agricultural malleable	20.50 to 21.00

New York

Suggestions of Resale Steel—Advanced Quotations for First Quarter— Quiet Buying of Pig Iron

NEW YORK, Nov. 21.—On the surface the pig iron market is dull, but important buyers are moving in a very quiet way, either to sound the market or place orders. One important melter of foundry iron has divided a considerable tonnage for early delivery between two sellers, but unusual pains have been taken to prevent details from becoming public. This buyer is said to have acted in the belief that it was important to obtain delivery early on account of the danger that heavy snows might add greatly to present embarrassments of the railroads. A Steel Corporation subsidiary has been a buyer of basic for an Eastern plant. Inquiries for malleable, noted last week, have resulted in orders being placed for at least a part of the tonnage. Further evidences of weakness have appeared, especially in Buffalo, where the $27 base can be shaded. In eastern Pennsylvania $29 is usually quoted, but it is understood that at least one seller will take orders at $28. In foreign irons, Continental grades continue to be quoted at $27 to $28, but Scotch is lower and can be had at $28.50, seaboard.

We quote delivered in the New York district as follows, having added to furnace prices $2.27 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$33.27
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	32.27
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	31.27
Buffalo, sil. 1.75 to 2.25	31.91
No. 2 Virginia, sil. 1.75 to 2.25	No sales

Ferroalloys.—British 80 per cent ferromanganese is now quoted at $100 f.o.b. Atlantic seaboard, which practically means duty paid, instead of $67.50, c.i.f., the former quotation. American producers are quoting $100, furnace, and have taken some business. Sales of the British alloy in the last week have totaled about 2000 tons and inquiries before the market amount to about 1000 tons, one of which involves at least 500 tons. The market is more active than it has been in some little time. One large American producer will soon produce ferromanganese in the furnace which has lately been making pig iron. The spiegeleisen market is quiet with sales confined to a few small lots at $37 to $38, furnace, for the domestic product. A fairly good business has been done in 50 per cent ferrosilicon for delivery this year by steel producers needing more than they have contracted for and the market is strong at $80 to $85, delivered, with sales made on this basis. Imported 50 per cent ferrosilicon can be obtained at about $85, delivered. The ferrochromium market is moderately active at slightly firmer levels. Quotations are as follows:

Ferromanganese, domestic, furnace, nominal per ton	$100.00
Ferromanganese, British, 80 per cent, f.o.b. Atlantic port	$100.00
Spiegeleisen, 17 to 19 per cent, furnace	$36.00
Spiegeleisen, 20 per cent, furnace or duty paid	$37.00 to $38.00
Ferrosilicon, 50 per cent, delivered, per gross ton, carloads	$80.00 to $85.00
Ferrotungsten, per lb. of contained metal	90c. to 95c.
Ferrochromium, 4 to 8 per cent carbon, 60 [illegible] per lb. c.l. delivery	13c. to 14c.
Ferrovanadium, per lb. of contained vana- [illegible]	$1.00
Ferrocarbontitanium, 15 to 18 per cent, in carloads, per net ton	$200.00
Manganese ore, foreign, per unit, c.i.f. 29c. to 30c.	
Tungsten ore, per unit, in 60 per cent concentrates, nominal	$7.50 to $8.50
Chrome ore, basis 48 per cent Cr_2O_3, crude, per ton, c.i.f. Atlantic seaboard	$18.00 to $25.00
Molybdenum ore, 85 per cent concentrates, [illegible]	

Finished Iron and Steel.—What weakness there is in steel prices is regarded as the outcome of the heavier shipments which the mills are now making on old orders, some booked at several dollars per ton below current figures. A portion of this steel is finding its way into construction jobs at prices which would not be profitable if the current prices were paid. The suggestion is that in some cases receipts are beyond current needs and resales have been made. The mills are holding with a deal of resistance to 2c., Pittsburgh, on shapes and bars, but plates are weak, and on any desirable tonnages less than 2c. has been quoted. One special lot of about 1000 tons has been sold at 1.85c., Pittsburgh. On less than 200 tons an important buyer was able to shade the 2c. price by $1 or $2 a ton. Bars for concrete work have also been sold below 2c., Pittsburgh, but this may have been resale material. While consumers generally are not suffering from shortage of steel, the transportation congestion is causing some difficulties. Jobbers' stocks are running low. There have been urgent demands for shipment of some forms of steel, particularly butt weld pipe and wire products. Notwithstanding present weakness in prices, there are intimations that mills will try to put into effect higher prices for first quarter. Whether conditions of supply and demand will sustain higher prices is yet to be determined, but it is interesting that a mill which was asked to quote on concrete reinforcing bars for first quarter named 2.10c., Pittsburgh, as its minimum. Independent sheet and tin plate companies are still waiting for the expected announcement of the Steel Corporation on prices for first quarter. A $2 advance on blue annealed sheets, $3 on black and galvanized and $5 on tin plate have been predicted, but the Steel Corporation has not officially indicated what its sheet and tin plate prices will be. The Carnegie Steel Co. has announced an advance of 10c. per 100 lb. on axles, and the general price is 2.75c., against 2.60c., recently obtaining. An inquiry for 1500 tons of black plate and 20,000 boxes of tin plate from the National Enameling & Stamping Co. is in the market. The American Locomotive Co. has bought 1300 tons of forging billets and 200 tons of plates. In concrete bars there is only fair activity, many projects having been postponed until the new year. The Truscon Steel Co., Detroit, will furnish 900 tons for the new Star automobile plant at Flint, Mich. The Concrete Steel Co. will furnish 120 tons for the South Side High School, Pittsburgh, and 210 tons for the Greenwood School, St. Paul, Minn. Dietrich Brothers, Baltimore, have been awarded an order for 1150 tons for the warehouse of the Terminal Refrigeration Co., Washington.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, structural shapes and steel plates, 2.34c.; bar iron, 2.34c.

Cast-Iron Pipe.—Makers of water pipe report good business from private buyers and some interest in prices of pipe to be shipped next year. Much difficulty is being encountered in obtaining permits for shipment because of the car shortage. Makers at present are chiefly interested in the prospective tender of the City of San Juan, Porto Rico, for about 20,000 tons of cast-iron pipe. This is about the only municipal purchase evident. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $54.50; 4-in. and 5-in., $59; 3-in., $64.80, with $4 additional for Class A and gas pipe. The soil pipe market is also unusually active for this season and makers report difficulty in obtaining sufficient cars to make shipments, although they are obtaining raw materials without much delay. We quote discounts of both Southern and Northern makers, delivered New York, as follows: 2 to 6-in. standard 33 to 35¾ per cent off list; heavy, 43 to 45¾ per cent off list.

Warehouse Business.—The market continues active with structural material still in good demand. In fact, most materials entering into building construction are still strong, despite the lateness of the season. Steel pipe has strengthened until there is little or no inclination to shade prices. Quotations on wire are firm and show an upward tendency. No change is reported in prices of brass and copper products out of stock and business in this line is good. Sheet prices have about settled to a basis of 4.50c. and 5.50c. per lb., base, on black and galvanized sheets respectively, although many warehouses officially quoting 4.90c. and 5.90c. per lb. base on black and galvanized claim to be still transacting business on these prices. On large lots better than the 4.50c. and 5.50c. per lb. are said to have been made. Warehouses report difficulty in obtaining shipments from mills and in making shipments to consumers because of the railroad embargoes and car shortage. We quote prices on page 1408.

High Speed Steel.—A slight improvement is evident and prices are firm at 75c. per lb. for 18 per cent

tungsten high speed steel with special brands of some companies ranging up to 90c. per lb.

Coke.—The coke market seems to be a trifle stronger. Connellsville grades are quoted at $8 to $8.50 and foundry and furnace at $6.75 to $7, but the market is firmer than it was a week ago. By-product coke is quoted at $14.84 to $14.91, delivered to Newark and Jersey City points.

Old Material.—Quietness continues, the Jones & Laughlin Steel Co. and the Bethlehem Steel Co. being about the only buyers active. No change is expected from the present dullness until dealers have cleared their books of shipments they are now making. Shipments are being made with considerable difficulty because of the embargoes on the railroads and the manifest shortage of cars even on roads which have no embargo in effect. According to shippers in this district conditions are not improving. For shipment to Bethlehem $16 per ton is being paid on railroad steel or equivalent and rejections are noted when material is not up to a high standard. No. 1 heavy melting steel is still going to the Jones & Laughlin Steel Co. at $20 per ton. Specification pipe is quotable at $10.50 to $11 per ton, based upon $14.50 being paid for shipment to a Lebanon mill. Stove plate still exhibits some activity in shipments to Harrisburg and to West Mahwah, N. J. From $13 to $14 per ton is a fair range of prices being paid in this market. Both machine shop turnings and mixed borings and turnings are weak at $11 to $11.50 per ton.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$13.00 to $14.00
Steel rails, short lengths, or equivalent	14.25 to 14.75
Rails for rolling	16.00 to 16.50
Relaying rails, nominal	21.00 to 22.00
Steel car axles	No market
Iron car axles	26.00 to 27.00
No. 1 railroad wrought	15.50 to 16.00
Wrought iron track	14.25 to 14.75
Forge fire	11.00 to 11.50
No. 1 yard wrought, long	13.50 to 14.00
Cast borings (clean)	12.50 to 13.00
Machine-shop turnings	11.00 to 11.50
Mixed borings and turnings	11.00 to 11.50
Iron and steel pipe (1 in. diam., not under 2 ft. long)	10.50 to 11.00
Stove plate	13.00 to 13.50
Locomotive grate bars	14.00 to 14.50
Malleable cast (railroad)	13.50 to 14.00
Cast-iron car wheels	16.50 to 17.50

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	19.00 to 20.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	17.00 to 17.50
No. 1 heavy cast, not cupola size	15.00 to 15.50
No. 2 cast (radiators, cast boilers, etc.)	13.50 to 14.00

Boston

Competition Keener as Business Falls Off—Transportation Outlook Bad

BOSTON, Nov. 21.—With every New England railroad embargoed by connecting lines and with the carriers in this territory placing embargoes against each other, the question of delivery of pig iron is fast supplementing that of price. Already connecting lines have failed to honor permits to load cars at Northern and Pennsylvania as well as Southern furnaces. With the carriers in New England clogged with loaded freight cars, there is a possibility of snow and ice demoralizing the transportation situation. Purchases of pig iron the past week showed a falling off. Competition between domestic and foreign irons is increasing with Buffalo and Alabama more aggressive than other domestic furnaces. Alabama is competing with certain grades of foreign iron, and Buffalo with regular analysis. Alabama is offered at $23, furnace base; Buffalo at $27; Scotch, silicon 2.50 to 3.00, at $28.50, duty paid on dock; English at $26.50, and Continental at $26. Eastern Pennsylvania No. 2X is available at $29, which brings the base price down to approximately $28, furnace. The purchase of 500 tons each of foreign high and low silicon and 300 tons of Buffalo by a Massachusetts textile machinery maker, and 500 tons foreign low phosphorus and about as much domestic malleable by a Rhode Island melter, and 1000 tons of foreign iron, analysis corresponding with our No. 2 plain by a Massachusetts heater maker, constitute the largest transactions. Other sales were in 100 ton lots and smaller with domestic furnaces getting the lion's share. Northern malleable is $1 lower at $27.

We quote delivered prices on the basis of the latest reported sales, now infrequent, and as follows, having added to furnace prices $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia and $9.60 from Alabama:

Eastern Penn., sil. 2.25 to 2.75	$32.15 to	$34.65
Eastern Penn., sil. 1.75 to 2.25	31.65 to	33.65
Buffalo, sil. 2.25 to 2.75	32.41 to	33.41
Buffalo, sil. 1.75 to 2.25	31.91 to	32.91
Virginia, sil. 2.25 to 2.75		38.92
Virginia, sil. 1.75 to 2.25		37.92
Alabama, sil. 2.25 to 2.75		35.10
Alabama, sil. 1.75 to 2.25		34.60

Cast Iron Pipe.—The city of Springfield, Mass., this week will award 2550 lengths of 6- to 12-in. pipe and a small tonnage of miscellaneous other sizes. Boston will purchase a small tonnage of 14-in. pipe. Boston will receive bids until Dec. 1, on 90 tons of 6 in., 575 tons of 8 in., 50 tons of 10 in., 1550 tons of 12 in., 300 tons of 16 in., 550 tons of 36 in. and 200 tons of special pipe, a total of 3315 tons. No change in cast iron prices is reported.

Iron Imports.—During the week ending Nov. 18 receipts of iron at this port amounted to 5000 tons, consisting of 4500 tons of Middlesboro and 500 tons of Scotch. During the previous week no iron was received.

Warehouse Business.—The situation has not materially changed. Business in practically all kinds of iron and steel holds up well, with prices steady and unchanged. Bolts and nuts show a little more life than heretofore, and there is more being done in blacksmith supplies, especially horseshoes. Large rivets sell slowly, while small iron are scarce and in big demand, premiums being the rule in jobbing circles. The wire nails situation apparently is as acute as ever, all distributors having large numbers of back orders, and the cut nail position is not much better. Washers are not selling in proportion with bolts and nuts.

Jobbers quote: Soft steel bars, $3.065 per 100 lb. base; flats, $3.85; concrete bars, 3.16½c.; structural steel, $3.065 to $3.50; tire steel, $4.50 to $4.85; open-hearth spring steel, $5 to $6.50; crucible spring steel, $12; steel bands, $4.25; hoop steel, $4.75; cold rolled steel, $4 to $4.50; refined iron, $3.065; best refined iron, $4.50; Wayne iron, $5.50; Norway iron, $6.60 to $7.10; plates, 3.16½c. to $3.35; No. 10 blue annealed sheets, $4.15 per 100 lb. base; No. 28 black sheets, $5.40; No. 28 galvanized sheets, $6.40.

Coke.—An additional large tonnage of foundry coke for first half delivery has been taken by one New England by-product interest, at price ruling date of shipment. Both producers in this territory continue to quote on a basis of $16 delivered within the $3.10 freight zone. Their percentage of shipments to jobbing foundries is much smaller than to manufacturing interests, heater, stove and textile machinery makers being the largest consumers of fuel. Local shipments have slowed up somewhat, and because of the general transportation situation less Connellsville coke is offered here than heretofore. The fuel situation therefore appears tighter. Another lot of approximately 4000 tons of foreign coke arrived at this port the past week.

Old Material.—Old material prices are easier, the market falling under its own weight rather than to any pressure to sell scrap. A further contraction in both old and new business the past week is noted. Sales included a limited tonnage of heavy melting steel at $13.50 and $14; blast furnace borings and turnings at $11, as against $11.50 and $12 the previous week; and chemical borings at $17, down $1, with offerings larger than they have been in months. Machine shop turnings have declined 50c. and forged scrap and bundled skeleton $1, without much interest shown by dealers.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$22.00 to $22.50
No. 2 machinery cast	20.00 to 20.50
Stove plate	17.00 to 17.50
Railroad malleable	20.50 to 21.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$13.50 to $14.50
No. 1 railroad wrought	16.00 to 16.50
No. 1 yard wrought	14.00 to 14.50
Wrought pipe (1 in. diam., over 2 ft. long)	11.00 to 11.50
Machine shop turnings	11.00 to 11.50
Cast iron borings, rolling mill	12.50 to 13.00
Cast iron borings, chemical	16.00 to 17.00
Blast furnace borings and turnings	11.00 to 11.50
Forged scrap and bundled skeleton	9.50 to 10.00
Shafting	19.00 to 19.50
Street car axles	23.00 to 24.00
Street car wheels	17.50 to 18.00
Rails for rolling	15.50 to 16.00

Cincinnati

Buying Movement Expected Soon Prices of Silveries Reduced

CINCINNATI, Nov. 21,—The general opinion in the pig iron trade is that a buying movement is near, and that within a week or two first quarter business will be in full swing. It is certainly a fact that very little interest has been shown in first quarter iron and sales to date for this delivery have been negligible. Some tentative inquiries have appeared, but usually end in the purchase of a carload or two for immediate shipment. Buyers are very shy of contracting very far ahead, and what orders are being placed are for prompt shipment. That stocks are low is evidenced by the requests being received to hurry and trace shipments now on the way. An inquiry from a Michigan melter for 18,000 tons for immediate shipment created a stir, while another Michigan melter is inquiring for 1000 tons of foundry for first quarter. Two malleable inquiries, more or less tentative, call for 3000 tons for first quarter. Sales include two 1000-ton lots of Southern iron at $23 and $25, Birmingham, respectively. On 300 tons of Southern Ohio Iron $30 was done, but on another inquiry for 200, $29 failed to take the order. It is reported that some Northern furnaces are willing to book first quarter business at $28, or $1 under to-day's market, but the attitude of Southern producers is the other way around. They will sell for December shipment at $23, base, but for first quarter are asking $24, and we note sales of 700 and 1000 tons to melters in other districts at this price. Silvery makers have reduced their schedule by $2 a ton, although it is said that some sales had been made at $3 below the old price. Basic is in little demand, but a number of small inquiries for Bessemer are current, and the price is firm at $32, Ironton.

Based on freight rates of $4.65 from Birmingham and $2.27 from Ironton, we quote f.b. Cincinnati:

Northern coke, sil. 1.75 to 2.25 (No. 2)	$27.05 to $28.05
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	27.55 to 28.55
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	31.27
Basic	30.77
Malleable	31.27

Finished Materials.—Orders placed are mostly for small lots, but there have been a number of these, and the aggregate tonnage is about equal to the total of last month. Bars and plates are showing fair activity, but shapes seem to be neglected. Sheets are in good demand; in fact, are as much sought after as has been the case for many weeks. An independent mill is reported to be willing to book business for first quarter at 2.60c. for blue annealed, 3.35c. for black and 4.35c. for galvanized, and is soliciting orders from large buyers at these figures. This is the only instance where prices for first quarter have been made. There is a fair demand for nails, but wire fence is extremely quiet. Pipe is showing continued activity, with deliveries not improved, for the transportation situation seems to be getting worse in this district, as a number of the roads have embargoed all shipments from certain points and this is said to be likely to happen from time to time during the next few weeks. A fair demand for light rails is reported from mining districts, with prices running around 2c., but little activity is noted in track fastenings, as roads have pretty well covered for this year's needs, at least, and some of them for the first half of next year. There is little activity in the structural field, although a number of small pending projects will take a considerable tonnage of reinforcing bars, made up largely of 50 to 75 tons each. Bids were taken recently on a portion of the sewage disposal plant for Indianapolis, for which 1200 tons of bars will be required. L. W. Hancock, Louisville, Ky., was low bidder on the general contract. The H. C. Godman Co., shoe manufacturer, Columbus, has plans prepared for the second unit of its new factory group, and bids will be asked shortly. This will be a concrete structure, requiring approximately 300 tons of bars. Competitive plans are to be asked for the War Memorial building at Indianapolis, and a coming project will be a number of buildings for the Stutz Motor Car Co. of America.

Warehouse Business.—A local jobber reports receipt of an order for approximately 200 tons of small angles from a West Virginia fabricator, and another for 70 tons from a district manufacturer. In both cases immediate delivery was required, so mill shipment could not be considered. Jobbers report a good demand for reinforcing bars and small angles, with prices holding very firm. On nails, $3.25 per keg, base, is becoming more common, as the demand exceeds the available supply. The demand for roofing sheets has been pretty well satisfied, though a few orders are still being placed by sheet metal contractors. Cold-rolled products are in fair demand.

Cincinnati jobbers quote: Iron and steel bars, 2.95c. base; reinforcing bars, 3.05c. base; hoops, 4.05c. base; bands, 3.85c. base; shapes and plates, 3.05c. base; cold-rolled rounds, 3.75c. base; cold-rolled flats, squares and hexagons, 4.25c. base; No. 10 blue annealed sheets, 4c.; No. 28 black sheets, 4.70c.; No. 28 galvanized sheets, 5.75c.; No. 9 annealed wire, $3.10 per 100 lb.; common wire nails, $3.20 per keg, base.

Tool Steel.—It now develops that the month of September was the best by far since 1920 with a number of manufacturers of tool steel, some of them having booked orders reminiscent of the early months of that year. The market last week showed fair activity, a number of small orders bringing the aggregate placed to a fair total. The price situation shows little change, and for 18 per cent tungsten high speed steel the price range is 75c. to 95c. per lb.

Coke.—There is little activity in the coke market, comparatively speaking, though we note one sale of 1000 tons for prompt shipment. An inquiry for 500 tons of foundry coke for first quarter is current, though most of the business is confined to one and two carloads. Prices are undergoing further readjustments. Connellsville foundry coke is unchanged at $8.50 to $9.50, but furnace has declined 50c. to $6.50. New River foundry has dropped $3 to $12, and Wise County foundry and furnace grades are off 50c. to $7 and $8.50 respectively. No coke is available from the Pocahontas field, and by-product is unchanged at $11, Connellsville.

Old Material.—The scrap market is spotty. Some of the steel mills in the district have been buying in small tonnages, particularly heavy melting steel and borings and turnings. On the latter, prices are stronger owing to the slightly increased demand and prices have been advanced $1. Old car wheels have been marked down 50c. Cast scrap, in only fair demand, is rather scarce and as a result prices are fairly firm.

We quote dealers' buying prices, f.b. cars Cincinnati:

Per Gross Ton	
Bundled sheets	$13.50 to $14.00
Iron rails	16.50 to 17.00
Relaying rails, 50 lb. and up	26.00 to 26.50
Rails for rolling	17.50 to 18.00
Heavy melting steel	16.50 to 17.50
Steel rails for melting	15.50 to 16.50
Car wheels	19.50 to 20.00
Per Net Ton	
No. 1 railroad wrought	11.00 to 11.50
Cast borings	11.50 to 12.00
Steel turnings	11.00 to 11.50
Railroad cast	17.00 to 18.00
No. 1 machinery	20.50 to 21.00
Burnt scrap	11.50 to 12.00
Iron axles	20.00 to 20.50
Locomotive tires (smooth inside)	14.00 to 15.00
Pipes and flues	10.50 to 11.00

Buffalo

Competition with Foreign Pig Iron Results in Lower Quotation

BUFFALO, Nov. 20.—Further weakness in price occurred the latter days of the week in the pig iron market when, to meet competition of foreign iron at New England points, No. 2 plain was quoted by a Buffalo seller at $26.50, No. 2X at $27 and No. 1 foundry at $28. All sellers are striving to maintain the one dollar spread. The charcoal iron price is firm and several transactions have been made lately at a price of $36.28, Buffalo. Malleable is firm at $28, and basis—if demand warranted—would be quoted at $27.75. An inquiry for 3000 tons of foundry iron by an Eastern buyer was considered by two Buffalo sellers, but information was not obtainable as to whether domestic or foreign iron filled the order. The same purchaser will be in the market for a like tonnage shortly. While there is a lively run of small tonnage orders, it has been found that Eastern consumers are disposed to hold

off until after Dec. 1—expecting to see a more stabilized market. A few first quarter contracts have been made, but the general attitude is one of waiting. The Wickwire Steel Company expects to have another furnace in blast early in December.

We quote f.o.b. per gross ton Buffalo as follows, the higher price being for early shipment:

No. 1 foundry, 2.75 to 3.25 sil	$28.00
No. 2X foundry, 2.25 to 2.75 sil	27.50
No. 2 plain, 1.75 to 2.25 sil	27.00
Basic	27.50
Malleable	28.00
Lake Superior charcoal	36.28

Finished Iron and Steel.—Wire products and cold-finished material represent lines of steel products in greatest demand. Bars, shapes and plates are inclined to be quiet and premiums for delivery on bars seem to have disappeared; the quotation of 2c. is general. Non-announcement of tin plate prices has interfered with free commitment in this product and as soon as new prices are known it is expected a large volume of tonnage will be booked. Deliveries on tubular products and on wire are delayed and some of this material is sold four months ahead. There is no expectation that buying in any line will exceed actual needs until after Jan. 1; inventories already being considered because of the tax situation. The range of sheet prices is: Black, 3.35c. to 3.50c. and galvanized 4.35c. to 4.50c.—but the tendency is toward the lower figure. The 3.35c. and 4.35c. base is quoted by the Steel Corporation and a few independents. As a general proposition, deliveries are in better shape than in several weeks except in the instances mentioned above. The leading wire manufacturer finds strong pressure for delivery, with no tonnages available until January.

We quote warehouse prices, Buffalo, as follows: Structural shapes, 3.20c.; plates, 3.20c.; soft steel bars, 3.10c.; hoops, 4.10c.; bands, 3.90c.; blue annealed sheets, No. 10 gage, 4.05c.; galvanized steel sheets, No. 28 gage, 5.85c.; black sheets, No. 28, 4.85c.; cold rolled round shafting, 3.95c.

Coke.—Demand is very good with buyers interested at $8.50 per ton for good grades.

Old Material.—Consumers are not active and the general tone of the market is sluggish. None of the large buyers is interested and the general quietness is expected to remain in effect until the first of the year. Dealers are still filling old contracts at higher prices than prevail at this time and will not sell heavy melting steel at less than $20. Consumers might take small tonnages at $19 or $19.50, but that is the absolute high limit. No sales of heavy melting steel at less than $19.50 are known. Scrap production is light.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$19.00 to $20.00
Low phos., 0.04 and under	21.00 to 22.00
No. 1 railroad wrought	19.00 to 20.00
Car wheels	21.00 to 22.00
Machine-shop turnings	14.50 to 15.50
Cast iron borings	17.50 to 18.00
Heavy axle turnings	17.50 to 18.50
Grate bars	16.00 to 17.00
No. 1 busheling	17.00 to 18.00
Stove plate	17.00 to 18.00
Bundled sheet stampings	14.00 to 15.00
No. 1 machinery cast	21.00 to 22.00
Hydraulic compressed	18.00 to 19.00
Railroad malleable	20.50 to 21.50

St. Louis

Resale Iron Disposed of at $22 While Most Sellers Are Quoting $23

ST. LOUIS, Nov. 21.—It is difficult to say just what is the market on Southern pig iron, because of the wide range of prices. One lot of resale iron has been offered as low as $22, f.o.b. Birmingham. Most of the makers are quoting $23, one large concern is quoting $25, and still another, $27.50. The only sale of consequence was of a round tonnage to a stove plant at $23, but the reduction from last week's market of $25 failed to produce any other buying. Melters of both Southern and Northern iron, the price of which is unchanged, continue to play a waiting game, and the volume of business placed for first quarter delivery is almost nothing compared to what should have been placed at this period in the fourth quarter. Very little buying was done for fourth quarter delivery. And yet melters in the district in all lines have been doing a big business. Makers of Northern iron seem to be holding out against the melters' pressure for lower prices better than the Southern interests, as Northern iron is still being quoted on the basis of $30, Chicago, to compete with the price of $31 to $32 made by the St. Louis Coke & Chemical Co. A real test of the market will come when melters will look more to the future than their present policy of borrowing from their neighbors or buying a carload now and then. Plans are now being made to blow in the blast furnace of the Mississippi Valley Iron Co. about Jan. 1. It has a capacity of between 400 and 500 tons per day. It has been down for two years.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago, $3.28 from Birmingham (rail and water, $5.17 from Birmingham, all rail, and 81 cents average switching charge from Granite City:

Northern foundry, sil. 1.75 to 2.25	32.16
Northern malleable, sil. 1.75 to 2.25	32.16
Basic	32.16
Southern foundry, 1.75 to 2.25	28.17

Finished Iron and Steel.—The three largest fabricators of steel in the St. Louis district had orders on their books on Nov. 1 for about 14,000 tons of structural steel, about four months' work ahead. The same fabricators contracted for a total of about 3800 tons during October, and shipped approximately 3500 tons during last month. Inquiries have been received here for from 350 to 400 tons of reinforcing bars for the M. Rich & Bros. Co. building at Atlanta, Ga. One jobber bought two cars of wire nails during the week, and shipment was made within six days. Buyers of this material are insistent upon immediate shipment. Spring requirements for field fencing are beginning to be placed now, one concern ordering about 25,000 rods. Railroads are buying hardly anything. Inquiries sent out last week did not amount to more than two carloads.

For stock out of warehouse we quote: Soft steel bars, 2.90c. per lb.; iron bars, 2.90c.; structural shapes, 3c.; tank plates, 3c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, cold rolled, one pass, 4.85c.; cold drawn rounds, shafting and screw stock, 3.90c.; structural rivets, 3.85c. per 100 lb.; boiler rivets, 3.95c.; tank rivets, ⅞ in. and smaller, 55 per cent off list; machine bolts, large, 50 per cent; smaller, 50 per cent; carriage bolts, large, 45 per cent; small, 45 per cent; lag screws, 55 per cent; hot pressed nuts, square or hexagon blank, $2.75; and tapped, $2.75 off list.

Coke.—The Granite City by-product producer is very much behind on shipments, and reports that the demand is keeping up. It is operating at 100 per cent capacity, and has business booked up for about 60 days. Connellsville coke is still weak.

Old Material.—Buying of old material by consumers is light. They are inclined to wait until after the inventory period before taking on any more material, and the dealers are taking the same attitude. Users of old material are all busy, and it is expected that they will be in the market for heavy tonnages right after the first of the year. Prices are 25c. to 50c. lower on some items. There is a good demand for relaying rails from coal mines and other industrial concerns, heavy rails being mostly wanted. The biggest railroad list closing this week is that of the Wabash for about 3000 tons, of which 1000 tons is of scrap rails. The St. Louis Southwestern Railway has a list amounting to 600 tons and the Missouri-Kansas-Texas Railway, one of 800 to 900 tons.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Iron rails	$20.00 to $20.50
Rails for rolling	17.00 to 17.50
Steel rails, less than 3 ft.	21.50 to 22.00
Relaying rails, standard section	26.00 to 29.00
Cast iron car wheels	23.00 to 23.50
Heavy melting steel	16.00 to 16.50
Heavy shoveling steel	15.50 to 16.00
Frogs, switches and guards cut apart	16.50 to 17.00
Per Net Ton	
Heavy axles and tire turnings	11.50 to 12.00
Steel angle bars	17.00 to 17.50
Iron car axles	27.00 to 27.50
Steel car axles	20.00 to 20.50
Wrought iron bars and transoms	21.50 to 22.00
No. 1 railroad wrought	15.50 to 16.00
No. 2 railroad wrought	15.00 to 15.50
Railroad springs	20.00 to 20.50
Steel couplers and knuckles	20.00 to 20.50
Cast iron borings	11.00 to 11.50
No. 1 busheling	13.00 to 13.50
No. 1 railroad cast	19.00 to 19.50
No. 1 machinery cast	20.00 to 20.50
Railroad malleable	18.00 to 18.50
Machine shop turnings	9.50 to 10.00

Cleveland

Pig Iron Prices Still Receding—Moderate Buying of Finished Products

CLEVELAND, Nov. 21.—Prices of pig iron have further declined from $1 to $2 a ton and the market still shows a downward tendency with little resistance to efforts of buyers to depress prices. The market shows more activity than for some time in the volume of inquiry, but some of the inquiries are regarded only as market feelers. The blowing in of one or more additional furnaces with few orders on their books is also tending to bring down prices. In the Valley district, foundry iron is no longer quoted above $28, and this price is not being maintained. Low quotations were brought out on an inquiry from the Westinghouse Electric & Mfg. Co. for 900 tons of foundry iron for its Cleveland plant for immediate shipment and this business is understood to have gone to a Valley furnace at under $27. Locally small lot sales of foundry iron have been made by Cleveland producers at $29 to $30, but sellers find these prices too high to take on much business. For outside shipment local furnaces are asking $28. No new basic inquiries have come out and sellers' views of the market range from $26.50 to $27.50. On a recent inquiry from an Ohio steel maker, a Cleveland producer quoted equivalent to $27.25, Valley, on a round lot of basic iron, but this price did not take the order. The purchase of 5000 tons of basic iron by the Central Steel Co. is confirmed, but the report of another 5000-ton sale to the same consumer by a Cleveland producer has proved unfounded. One large consumer has attempted to buy foundry iron around $27.50, Detroit. New inquiries include one from the American Radiator Co. for 1000 tons for Detroit and 1000 tons for Springfield, Ohio, and another from the American Car & Foundry Co. for 3000 tons for Detroit, all for immediate shipment. An Eastern pipe foundry is inquiring for 10,000 to 15,000 tons for first half. Southern iron is weak with a price range of from $23 to $25. The sanitary interest whose purchase of 1000 tons at $23 was reported last week later bought 1000 tons additional for November shipment at a $25 base. The latter order was for iron running 2.25 to 2.75 per cent in silicon for which the contract price was $25.50. A few small lot sales are reported at $24. Jackson county furnaces have made another $2 a ton reduction on silvery iron, which is weak at the new price.

Quotations below, except on basic and low phosphorous iron, are delivered Cleveland, and for local iron includes a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and a $6 rate from Birmingham.

Basic, Valley furnace	$27.50
Northern No. 2 fdy., sil. 1.75 to [illegible]	[illegible] to $29.50
Southern fdy., sil. 1.75 to 2.25	29.00 to 31.00
Malleable	29.50 to 30.00
Ohio silvery, nominal, sil. 8 per [illegible]	[illegible]
Standard low phos., Valley furnace	[illegible]

Iron Ore.—The ore shipping season will be practically wound up this week. Independent ore firms will move very few more cargoes and the Pittsburgh Steamship Co. will send out no boats for ore cargoes after Tuesday. Shipments for the month will be about 3,000,000 tons, making a season movement of about 42,000,000 tons, as recently estimated. Lake Superior ore on hand at furnaces and Lake Erie docks Nov. 1 was 44,181,124 gross tons as compared with 39,071,003 tons on the same date a year ago. The amount at furnaces Nov. 1 was 34,594,890 tons as compared with 32,776,722 tons on Oct. 1. The consumption of lake ore during October was 4,012,007 tons as compared with 2,989,545 tons during September.

We quote delivered lower lake ports: Old range [illegible]

Finished Iron and Steel.—New business is coming out only in moderate volume, but mills are getting small orders for steel bars, plates and structural material. Automobile companies are still buying material, particularly steel bars, in rather liberal quantities, and deliveries on some of the orders now being placed will not be made until late in first quarter. Some demand for steel bars and steel specialties has sprung up from the agricultural implement manufacturers. Prices are holding fairly well around recent levels. However, shading to 1.95c. by independent mills on steel bars in evidence a few weeks ago has again appeared on moderate sized lots for prompt shipment. Plates seem to be holding well at 2c., although there are reports that the 1.95c. price reported last week is being made in a few cases. On the other hand, small lot sales are still being made up to 2.25c. Plate deliveries have become easier. Structural material is unchanged at 2c. In structural lines, two local contracts that have been pending for some time, one for the Collinwood School and the other for a Jewish temple were placed during the week, and several new inquiries came out.

Jobbers quote steel bars, 2.91c.; plates and structural shapes, 3.01c.; No. 9 galvanized wire, 3.30c.; No. 9 annealed wire, 2.80c.; No. 28 black sheets, 4.15c. to 4.40c.; No. 28 galvanized sheets, 5c. to 5.40c.; No. 10 blue annealed sheets, 3.70c. to 3.76c.; hoops and bands, 3.71c.; cold-rolled rounds, 3.75c.; flats, squares and hexagons, 4.25c.

Semi-Finished Steel.—Prices on sheet bars, slabs and billets range from $37.50 to $38. The sale of 5000 tons of sheet bars to a Cleveland consumer at $37.50, Cleveland, or $38, delivered, is reported. A local producer sold 2000 tons of 2 x 2-in. billets during the week at $38, and several small lots of sheet bars and slabs at the same price.

Bolts, Nuts and Rivets.—Some new demand for bolts and nuts is coming from automobile companies and additional buying is being done by some of the railroad equipment builders. Prices are firm. Rivet manufacturers are getting some good orders for lots up to 300 tons from car builders. Manufacturers' prices appear firm, but there are reports of some shading on small lots by jobbers.

Old Material.—A Cleveland consumer has purchased 2000 tons of mixed borings and short turnings at $16.50 and this activity has caused this grade and cast borings to advance 50c. a ton. On the other hand, heavy melting steel scrap, owing to an absence of demand, is 50c. a ton weaker. The market continues very dull. Dealers have very few unfilled orders and consequently are buying very little material. Some of the mills are expected to come into the market within the next week or two. Activity in the railroad equipment field has stimulated the demand for low phosphorous melting scrap and sales of this grade are reported at $23, delivery Alliance, Ohio.

We quote per gross ton, f.o.b. Cleveland, as follows:

Heavy melting steel	$18.50 to $19.00
Steel rails under 3 ft	20.00 to 20.50
Steel rails for rolling	20.00 to 20.50
Iron rails	18.00 to 18.50
Iron car axles	25.00 to 26.00
Low phosphorus melting	20.50 to 21.00
Cast borings	15.75 to 16.00
Machine shop turnings	14.50 to 14.75
Mixed borings and short turnings	15.50 to 16.00
Compressed steel	17.00 to 17.25
Railroad wrought	18.00 to 18.50
Railroad malleable	20.00
Light bundled sheet stampings	13.75 to 14.00
Steel axle turnings	16.00 to 16.50
No. 1 cast	20.50 to 21.00
No. 1 busheling	12.50 to 13.50
Drop forge flashings over 10 in.	12.75 to 13.25
Drop forge flashings under 10 in.	12.50 to 13.50
Railroad grate bars	17.00 to 18.00
Stove plate	17.00 to 18.00
Pipes and flues	13.00 to 13.75

Reinforcing Bars.—The demand for reinforcing bars continues active and the price appears firm at 2c. The George A. Fuller Co. has taken a general contract for buildings at Camp Sherman, Ohio, requiring 500 tons. The Bourne-Fuller Co. has taken 130 tons for the foundation for the Cleveland Public Library. The Pennsylvania Railroad has taken bids for grade crossing work in Cleveland requiring 120 tons, and A. Bentley & Sons, Toledo, have taken the general contract for the Orlando Hotel, Jacksonville, Fla., requiring 250 tons.

Sheets.—The only change in the sheet situation is an easing up in prices on blue annealed sheets. On these a minimum quotation of 2.60c. has been held by independent mills, but some of these mills are now quoting 2.50c. Quotations of 3.35c. for black sheets and 4.35c. for galvanized sheets are being made by many of the independent mills.

Coke.—Prices have further declined to $1 a ton on Connellsville foundry coke, which is now quoted at $8 to $8.50 for standard makes. Sales are limited to car lots.

Birmingham

Reports of Round Tonnages Placed—Large Consumers Sound Market

BIRMINGHAM, ALA., Nov. 21.—Some of the larger consumers have at least sounded the market, while in one iron office it was reported that there was confidential information to the effect that something like 40,000 tons of iron had been purchased at from $23 to $24. It was thought that these reported transactions would come to the surface this week. They could not be authenticated last week. One maker claims to have booked 1000 tons of low-grade iron at $24. Strictly local consumers offering $23 were turned down, but the tonnage involved was not enough to attract special consideration. Makers admit that iron has been sold in competitive territory at $23 and concede that the large buyers will probably enter the market on that base. At the same time, the pipe makers are very close to 1923 without providing for their first quarter requirements and they seem more inclined to trade than before. Statistically Southern iron will be strong at the end of the month.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon 1.75 to 2.25	$23.00 to $24.00
Basic	23.00 to 24.00
Charcoal, warm blast	32.00

Finishing Mills.—Wire drawing mills are twelve weeks behind in nail deliveries with other products on much the same basis. The Tennessee company's practically 100 per cent schedule is continued this week with rail mill again on a turn of 10,000 tons. A vessel is waiting at Mobile for 6000 tons of rails and other products for Japan and China. Structural and welded steel are fairly active for this time of the year.

Cast Iron Pipe.—There is very little new pressure pipe business, but shops are making deliveries in much better form, while the unfilled tonnage is still considerable. The base remains at $43. The soil pipe trade is still dull, with base of $50 to $55 not attracting the brokers. Unfilled tonnage is reaching a low point.

Old Material.—The scrap market has felt the reaction in the iron market, but yard men have been slow to mark down. In fact, they have not done so and small consumers usually pay the full quoted price, while larger ones are for the present out of the market.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Steel rails	$16.00 to $17.00
No. 1 steel	14.00 to 16.00
No. 1 cast	18.00 to 20.00
Car wheels	18.00 to 20.00
Tramcar wheels	17.00 to 19.00
Stove plate	16.00 to 17.00
Cast-iron borings	9.00 to 10.00
Machine shop turnings	9.00 to 10.00

The Carnegie Steel Co. is preparing No. 1 blast furnace in the Ohio works group for lighting. It is the only idle stack of six in the complement. Heavy operations of Carnegie company properties in the Mahoning and Shenango Valleys are responsible for the contemplated resumption. This will increase the number of active furnaces in the Mahoning and Shenango Valleys to 32, of the total 47 in the valleys.

Philadelphia

Further Weakness in Pig Iron and Scrap Prices With Light Buying

PHILADELPHIA, Nov. 21.—A further recession of $1 a ton in prices of foundry pig iron, a decline of nearly that amount in basic iron and general weakness in all grades of scrap stand out as the principal market factors of the week. Finished steel products hold their own to some extent, mills showing a disposition to resist a general level for plates, shapes and bars below 2c., Pittsburgh, though occasional sales at 1.90c. and 1.95c. are on record. Light buying of all products, due to year-end watchfulness of inventories and uncertainty over the trend of prices, is reported by producers, but there have been a few noteworthy sales of pig iron.

Pig Iron.—Sales of foundry and basic pig iron within the week record further weakness. Foundry iron has sold at as low as $28, furnace, for No. 2 plain, and at $29, furnace, for No. 2X, but up to to-day only one or two furnaces had made this reduction, and others reported sales at various figures ranging from $28.50 to $29.50 for No. 2 plain and from $29.50 to $30.50 on No. 2X. Quotations on No. 1X are quite uniformly, $1 a ton above No. 2X prices. Basic iron is quite generally obtainable at $26 to $26.50, furnace, and two sales within the week totaling 8000 tons or more were made at about this level. Sales of foreign iron are keeping pace with domestic sales and prices of foreign iron continue to go down, keeping just a shade under domestic irons of corresponding analyses. Receipts of foreign iron at the port of Philadelphia in the week ended Nov. 18 totaled 8149 tons, of which 4620 tons were from England; 1250 tons from France, and 2279 tons from Scotland, making a total of about 60,000 tons of iron received at Philadelphia from abroad since Oct. 1. The most interesting pig iron transaction of the week was the purchase by the Eastern structural steel subsidiary of the Steel Corporation of 6000 tons of basic. Though this plant is usually supplied by the furnaces of the corporation at Pittsburgh, the present car shortage made it seem advisable to cover for its nearby requirements in the East. Further purchases are considered probable. A steel company bought 2000 tons of basic. Both sales developed prices of about $27.50, delivered. The Pennsylvania Railroad has been the largest recent buyer of foundry iron, its purchases from two furnaces for the remainder of this year and first quarter totaling 6000 tons or more. A part of the Pennsylvania's purchase was classified as basic iron, but it presumably is to be used for foundry purposes. Of outstanding importance as affecting the immediate future course of pig iron prices is the fact that many of the furnaces now in blast are piling iron. In one instance, at least, this is due to the belief of the furnace owners that present weakness in prices is a passing phase, and that higher prices will be obtained within the next 60 days. This expectation is largely based on the assumption that colder weather with snow and ice will so seriously hamper the railroads as to create at least a temporary iron shortage. The total sales of four furnaces in Virginia now in blast are negligible compared with the tonnage being made, and practically all of this iron is going on the banks. There is no call for gray forge iron, but quotations would be at about $28 per ton, furnace, while malleable iron is obtainable at $30 to $31, furnace.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to $1.64 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$29.14 to $30.64
East. Pa. No. 2X, 2.25 to 2.75 sil.	30.14 to 31.64
East. Pa. No. 1X	31.14 to 32.64
Virginia No. 2 plain, 1.75 to 2.25 sil.	37.17
Virginia No. 2X, 2.25 to 2.75 sil.	38.17
Basic delivered eastern Pa.	27.50 to 28.00
Gray forge	29.14 to 30.14
Malleable	31.14 to 32.14
Standard low phos. (f.o.b. furnace)	38.00 to 40.00
Copper bearing low phos. (f.o.b. furnace)	35.00

Ore.—Receipts of foreign iron ore at this port totaled 4833 tons, all from French Africa.

Ferroalloys.—Representatives of British makers of ferromanganese are now quoting $100, seaboard, duty paid. Domestic makers continue to quote $100, furnace.

Coke.—Furnace coke is quoted from $6.50 to $7, Connellsville, and foundry coke $8 to $9, according to quality.

Semi-Finished Steel.—Not all of the Eastern mills have met the quotation of $38, Pittsburgh, which has been made by Pittsburgh mills on re-rolling billets. Forging billets are relatively firmer, and scarcely any of the Eastern mills are disposed at present to go lower than $45, while sales within the past week have been made at $47.50, Pittsburgh. Screw stock rods have been sold at $50, Pittsburgh, with full extras and wire rods at $50, Pittsburgh.

Plates.—From the mill viewpoint, the plate situation continues very unsatisfactory. Some of the mills are adhering firmly to a minimum of 2c., Pittsburgh, but admit that they are losing business because of lower quotations. It is not so difficult to obtain 2c. on specification plates as on ordinary tank quality, which, according to reports, is being quoted at 1.90c. to 1.95c., Pittsburgh. With Eastern mills ranging from 25 to 50 per cent operation and hungry for orders, a continuance of the 2c. level by any of the mills might appear untenable were it not for a feeling on the part of some companies that they would rather reduce operations still further than to continue piling up a loss with every sale. Regardless of whether it is possible for steel companies to make a profit on 2c. steel, it is held that it certainly can not be done with the low rate of operations which the plate mills have been held to in recent months. Some of the plate mills at the Cambria plant of Midvale Steel & Ordnance Co. are idle because of insufficiency of steel for all departments. The Cambria plant is operating at 90 per cent of capacity. About 1000 tons of plates has been ordered from an Eastern mill for 15 marine boilers for Great Lakes vessels. Locomotive work promises more plate buying. The Chicago, Milwaukee & St. Paul has ordered 50 locomotives from Baldwin Locomotive Works, with 50 more to be placed, and current inquiries total 175 engines.

Warehouse Business.—Quotations of jobbers for steel out of warehouse for local delivery are as follows:

Soft steel bars and small shapes, 3.025c.; iron bars (except bands), 3.025c.; round edge iron, 3.20c.; beveled edge sheet iron, firm, 1½ x ½ in., 3.20c.; round edge steel planished, 4c.; tank steel plates, ¼-in. and heavier, 3.125c.; tank steel plates, ⅜-in., 3.33c.; blue annealed steel sheets, No. 10 gage, 3.85c.; black sheets, No. 28 gage, 4.60c.; galvanized sheets, No. 28 gage, 5.75c.; square twisted and deformed steel bars, 3.15c.; structural shapes, 3.125c.; diamond pattern plates, ¼-in., 4.80c.; ⅜-in., 5c.; spring steel, 4.25c.; round cold-rolled steel, 3.85c.; squares and hexagons, cold-rolled steel, 4.35c.; steel hoops, No. 13 gage and lighter, 4.25c.; steel bands, No. 12 gage to ⅜-in., inclusive, 3.825c.; rails, 3.025c.; tool steel, 8.50c.; Norway iron, 6.50c.

Structural Steel.—While new buying of strucural shapes is not large, mills are shipping freely on contracts, and many fabricators who bought material months ago at prices several dollars a ton lower than now prevailing are finding their wants fully supplied by the mills. Some of this business was placed prior to the coal crisis and shipment was delayed for months. Delivery of fabricated material on local construction jobs is held up. Delay in construction of the Museum of Art, Philadelphia, due to lack of the steel, has been the subject of much newspaper comment in the past week. Plain material is quoted at 2c., Pittsburgh, but it appears that this price has been shaded at least $1 a ton in some instances.

Bars.—Merchant steel bars are firm at 2c., Pittsburgh, and the mills have a comfortable amount of business on their books. In concrete reinforcing bars, there have been some concessions, usually $1 to $2 a ton. Bar iron is weak and current sales of a carload or more are usually at not more than 1.95c., Pittsburgh, though 2c. is the nominal asking price. Dietrich Brothers, Baltimore, have 1150 tons of bars to place for a building in Washington.

Sheets.—More mills are coming to the level of prices quoted by the American Sheet & Tin Plate Co., namely 2.60c. on blue annealed, 3.35c. on black and 4.35c. on galvanized. No official information has come out regarding the expected advance on sheets by the leading interest covering first quarter contracts, and there is a growing conviction that there will be no change in prices.

Old Material.—During the past week there have been price recessions on nearly every grade of scrap. A steel company bought a small tonnage last week at $16.50, delivered, but to-day would not offer more than $16. A larger independent has an open price of $16, delivered. All grades of cast scrap are lower. Steel axles are quoted at $22, delivered, by a large dealer, which is more than $5 a ton lower than the last reported sale several weeks ago.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$16.00 to	$16.50
Scrap rails	16.00 to	16.50
Steel rails for rolling	19.50 to	20.00
No. 1 low phos., heavy 0.04 and under	22.00 to	23.00
Cast iron car wheels	20.00 to	21.00
No. 1 railroad wrought	19.00 to	20.00
No. 1 yard wrought	17.00 to	17.50
No. 1 forge fire	15.00 to	15.50
Bundled sheets (for steel works)	14.50 to	15.00
No. 1 busheling	14.50 to	15.00
Turnings (short shoveling grade for blast furnace use)		15.00
Mixed borings and turnings (for blast furnace use)		15.00
Machine shop turnings (for steel works use)	15.00 to	15.50
Machine shop turnings (for rolling mill use)	15.00 to	15.50
Heavy axle turnings (or equivalent)	15.50 to	16.00
Cast borings (for steel works and rolling mills)	16.00 to	16.50
Cast borings (for chemical plants)	22.00 to	23.00
No. 1 cast	20.00 to	21.00
Heavy breakable cast (for steel plants)	19.50 to	20.00
Railroad grate bars	16.50 to	17.00
Stove plate (for steel plant use)	16.50 to	17.00
Railroad malleable	15.50 to	16.50
Wrought iron and soft steel pipes and tubes (new specifications)	14.00 to	14.50
Shafting	21.00 to	22.00
Steel axles		22.00

Research Group Meets

PITTSBURGH, Nov. 21.—The technical division of the Electric Steel Founders' research group is meeting today and to-morrow at the William Penn Hotel here, with R. A. Bull, research director, presiding. The meeting is one of those held monthly to receive and discuss reports of the technical problem and research investigations of the group. Five companies are embraced by the organization and all are represented at the meeting, the Fort Pitt Steel Casting Co., McKeesport, Pa., by C. S. Koch; the Electric Steel Co., Chicago, by W. J. Nugent; the Michigan Steel Casting Co., Detroit, by H. A. Neel; the Sivyer Steel Casting Co., Milwaukee, by R. J. Doty, and the Lebanon Steel Foundry, Lebanon, Pa., by T. S. Quinn.

Will Ship Cars to Poland

WASHINGTON, Nov. 21.—The United States Shipping Board has entered into a contract with Paul Klopstock for the movement of about 3600 American-made flat cars from Norfolk to Danzig. These cars were purchased by Poland from the War Department and their movement will extend over a period from December, 1922, to July, 1923. The steamers operated by Moore & McCormack East Baltic Lines and by C. H. Sprague & Son will probably be used to handle this movement for the Board.

Duquesne Pattern Plant Damaged

PITTSBURGH, Nov. 21.—Fire on the evening of Nov. 20 damaged the upper floors of a four-story pattern storage building of the Duquesne Foundry Co., Coraopolis, Pa., and also the pattern shop. Two old buildings were destroyed. The company will not be obliged to suspend operations as a result of the fire.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Plates

Sheared, tank quality, base, per lb. ..... 2.00c.

Structural Material

Beams, channels, etc. ..... 2.00c.

Iron and Steel Bars

Soft steel bars, base, per lb. ..... 2.00c.
Refined iron bars, base, per lb. ..... 2.60c.

Hot-Rolled Flats

Hoops, base, per lb. ..... 2.75c. to 2.90c.
Bands, base, per lb. ..... 2.75c. to 2.90c.
Strips, base, per lb. ..... 2.75c. to 2.90c.

Cold-Finished Steels

Bars and shafting, base, per lb. ..... 2.50c.
Strips, base, per lb. ..... 4.50c.

Wire Products

Nails, base, per keg $2.70
Bright plain wire, base, per 100 lb. 2.45
Annealed fence wire, base, per 100 lb. 2.45
Spring wire, base, per 100 lb. ..... 3.25 to 3.35
Galvanized wire, base, per 100 lb. 2.95
Galvanized barbed, base, per 100 lb. 3.35
Galvanized staples, base, per keg 3.35
Painted barbed wire, base, per 100 lb. 3.00
Polished staples, base, per keg 3.00
Cement coated nails, base, per count keg 2.20
Woven fence, carloads (to jobbers) ..... 70½ per cent off list
Woven fence, carloads (to retailers) ..... 68 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads ... 60 and 5 per cent off list
Machine bolts, small, cut threads ... 50 and 10 per cent off list
Machine bolts, larger and longer ... 50 and 10 per cent off list
Carriage bolts, ⅜ x 6 in.:
Smaller and shorter, rolled threads, 50, 10 and 5 per cent off list
Cut threads ..... 50 per cent off list
Longer and larger sizes ..... 50 per cent off list
Lag bolts ..... 60 and 5 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads ... 50 and 10 per cent off list
Other style heads ..... 20 per cent extra
Machine bolts, c.p.c. and t. nuts, ¾ x 4 in.:
Smaller and shorter ..... 45 per cent off list
Larger and longer sizes ..... 45 per cent off list
Hot pressed square or hex. blank nuts ... $3.25 to $3.50 off list
Hot pressed nuts, tapped ..... 3.25 to 3.50 off list
C.p.c. and t. sq. or hex. nuts, blank ..... 3.25 to 3.50 off list
C.p.c. and t. sq. or hex. nuts, tapped ..... 3.25 to 3.50 off list
Semi-finished hex. nuts:
9/16 in. and smaller, U. S. S. ... 75, 10 and 5 per cent off list
⅝ in. and larger, U. S. S. ... 70, 10 and 2½ per cent off list
Small sizes, S. A. E. ..... 80 and 5 per cent off list
S. A. E., ⅝ in. and larger ..... 75 and 5 per cent off list
Stove bolts in packages ..... 80 and 5 per cent off list
Stove bolts in bulk ..... 80, 5 and 2½ per cent off list
Tire bolts ..... 50, 10 and 10 per cent off list

Cap and Set Screws

Milled square and hex. head cap screws ... 75 per cent off list
Milled set screws ..... 75 per cent off list
Upset cap screws ..... 75 and 10 per cent off list
Upset set screws ..... 80 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb., $3.00 to $3.15
Large boiler rivets, base, per 100 lb. ..... 3.10 to 3.25
Small rivets ..... 65 and 5 to 65 per cent off list

Track Equipment

Spikes, 9/16 in. and larger, base, per 100 lb. $2.75
Spikes, ½ in. and smaller, base, per 100 lb. 3.50
Spikes, boat and barge, base, per 100 lb. 3.50
Track bolts, base, per 100 lb. ..... $3.85 to 4.50
Tie plates, per 100 lb. 2.35
Angle bars, base, per 100 lb. 2.75

Welded Pipe

Steel	Butt Weld		Butt Weld		Iron	Butt Weld		Butt Weld	
Inches	Black	Galv.	Inches	Black	Galv.	Inches	Black	Galv.	Inches	Black	Galv.
⅛	49	23½	2	59	47½	⅛ to ¼	+ 7	+33	2	29	15
¼ to ⅜	55	29½	2½ to 6	63	51½	½	26	8	2½ to 6	32½	19
½	60	46½	7 to 8	60	47½	¾	32	17	7 to 12	30	17
¾	64	52½	9 to 12	59	46½	1 to 1½	34	19			
1 to 3	66	54½									

Lap Weld

2	59	47½	2	29	15
2½ to 6	63	51½	2½ to 6	32½	19
7 to 8	60	47½	7 to 12	30	17
9 to 12	59	46½			

Butt Weld, extra strong, plain ends

⅛	45	28½	¼ to ⅜	+ 15	+48
¼ to ⅜	51	34½	½	25	13
½	57	46½	¾	32	18
¾	62	51½	1 to 1½	34	20
1 to 1½	64	53½			
2 to 3	65	54½			

Lap Weld, extra strong, plain ends

2	57	46½	2	30	17
2½ to 4	61	50½	2½ to 4	33	21
4½ to 6	60	49½	4½ to 6	32	20
7 to 8	56	43½	7 to 8	25	13
9 to 12	50	37½	9 to 12	20	8

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 and 2½ per cent.

Boiler Tubes

Lap Welded Steel		Charcoal Iron	
1¾ in.	21½	1½ in.	+ 7
2 to 2¼ in.	36	1¾ to 1⅞ in.	3
2½ to 3 in.	47	2 to 2¼ in.	13
3½ to 13 in.	52	2½ to 3 in.	18
		3¼ to 4½ in.	20

To large buyers of steel tubes a supplementary discount of 5 per cent is allowed.

Standard Commercial Seamless Boiler Tubes

Discounts on cold-drawn tubes in carload lots, f.o.b. Pittsburgh, follow:

1 in.	55	2½ and 2¾ in.	38
1¼ and 1½ in.	47	3 in.	42
1¾ in.	31	3½ to 4 in.	47
2 and 2¼ in.	34	4½ in. and 5 in.	39

Hot Rolled

3 in.	44	3¼ to 4 in.	49

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base ..... 85 per cent off list
Carbon 0.30 to 0.40, base ..... 83 per cent off list
Plus usual differentials and extras for cutting.

Seamless Locomotive and Superheater Tubes

	Cents per Ft.		Cents per Ft.
2-in. O.D. 12 gage	14	2¼-in. O.D. 10 gage	19
2-in. O.D. 11 gage	15	3-in. O.D. 7 gage	34
2-in. O.D. 10 gage	16	1½-in. O.D. 9 gage	13¾
2¼-in. O.D. 12 gage	16	5⅜-in. O.D. 9 gage	53
2¼-in. O.D. 11 gage	17	5½-in. O.D. 9 gage	55

Tin Plate

Standard cokes, per base box $4.75

Terne Plate

(Per package, 200-lb.)

8-lb. coating	$9.30	25-lb. coating I. C.	$14.25
8-lb. coating I. C.	9.60	30-lb. coating I. C.	15.25
15-lb. coating I. C.	11.80	35-lb. coating I. C.	16.25
20-lb. coating I. C.	13.00	40-lb. coating I. C.	17.25

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb. ..... 2.50c. to 2.60c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb. ..... 3.35c. to 3.50c.
Regular auto body sheets, base (22 gage), per lb. ..... 5.00c.

Galvanized

No. 28 (base), per lb. ..... 4.35c. to 4.50c.

Tin-Mill Black Plate

No. 28 (base), per lb. ..... 3.35c. to 3.50c.

Manufacturers have pamphlets, which can be had upon application, giving price differentials for gage and extras for length, width, shearing, etc.

Freight Rates

All rail freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic	$0.325	Buffalo	$0.265	St. Louis	$0.43
Philadelphia, export	0.225	Cleveland	0.215	Kansas City	0.735
Baltimore, domestic	0.315	Cleveland, Youngstown Comb.	0.19	Kansas City (pipe)	0.705
Baltimore, export	0.225	Detroit	0.295	St. Paul	0.595
New York, domestic	0.34	Cincinnati	0.295	Omaha	0.735
New York, export	0.255	Indianapolis	0.31	Omaha (pipe)	0.705
Boston, domestic	0.365	Chicago	0.34	Denver	1.275
Boston, export	0.255			Denver (pipe)	1.215

Pacific Coast	$1.50
Pac. Coast, ship plates	1.20
Birmingham	0.69
Memphis	0.385
Jacksonville, all rail	0.50
Jacksonville, rail and water	0.415
New Orleans	0.515

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 30c. to 40c.; ship plates, 30c. to 40c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 30c. to 40c.; sheets and tin plates, 50c.; rods, wire rope cable and strands, 75c.; wire fencing, netting and stretcher, 50c.; pipe, not over 8 in. in diameter, 50c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

FABRICATED STEEL BUSINESS

Further Decline in Structural Sales

WASHINGTON, Nov. 20.—A marked seasonal decline in the sales of fabricated structural steel in October is announced by the Department of Commerce from reports made to the Bureau of the Census. October sales amounted to 54.9 per cent of shop capacity, compared with 61.6 per cent in September.

Reports received from 140 identical firms from April through October, with a shop capacity of 221,790 tons per month, show actual tonnages booked each month as given in the subjoined table together with the percentage of shop capacity represented by these bookings. A revision of these capacities in accordance with a uniform standard is now being undertaken by the Bureau of the Census but the results are not yet complete.

	Tonnage Booked	Per Cent of Capacity*
April	151,336	68.3
May	137,950	62.2
June	153,278	69.1
July	141,907	64.0
August	145,140	64.7
September	136,587	61.6
October	†121,763	54.9

*The inclusion of additional firms this month has made slight revisions in the per cent of capacity reported previously.

†October sales prorated for one firm which failed to report and represented about 1 per cent of the total.

Awards Call for a Round Tonnage and Numerous New Sizable Projects Appear

Among the fabricated steel awards of the past week are the following:

War memorial building, Baltimore, 500 tons, to unnamed [illegible]

Foundry building for Bartlett, Hayward Co., Baltimore, 700 tons, to American Bridge Co.

Power house at Terre Haute, Ind., 2200 tons, to McClintic-Marshall Co. Stone & Webster general contractors.

National Biscuit Co. building, Philadelphia, 3500 tons, to American Bridge Co.

Apartment house on West Sixty-fourth Street, New York, 300 tons, to Hay Foundry & Iron Works.

Extension, Kansas City Southern Railway shops, Pittsburgh, Kan., 540 tons, to Kansas City Structural Steel Co.

Missouri Portland Cement Co., kiln building and new raw building, Prospect Hill, Mo., 295 tons, to Mississippi Valley Structural Steel Co.

Missouri Pacific Railway, machine shop addition, St. Louis, 201 tons, to Mississippi Valley Structural Steel Co.

Johns-Manville, Inc., garage, Waukegan, Ill., 140 tons, to American Bridge Co.

St. Louis-San Francisco Railway, material for reinforcing bridges, 118 tons, reported last week, to American Bridge Co.

Glen Lake Sanatorium, Oak Terrace, Minn., 106 tons, to Crown Iron Works.

South Pittsburgh high school annex, 400 tons, to Jones & Laughlin Steel Co.

Addition to Eagles Club, Pittsburgh, North Side, 100 tons, to Jones & Laughlin Steel Co.

Fortieth Street bridge, Pittsburgh, 6500 tons, McClintic-Marshall Co. low bidder.

Oak Park, Ill., Trust & Savings Bank Building, 252 tons, to unidentified fabricator.

Stills for Standard Oil Co., 150 plates for Casper, Wyo., and 10 plates for Sugar Creek, 700 tons, to Midvale Steel & Ordnance Co.

Grand Tower, Ill., power station, Middle West Power Co., 1085 tons, to unidentified fabricator.

Ohio Pumping Machine Co., Akron, factory building, 215 tons, to the Massillon Bridge & Structural Co.

Collinwood High School, 1250 tons, to King Bridge Co.

[illegible] Structural

Structural Projects Pending

Inquiries for structural steel work now being figured on include the following:

Southern Railway, bridge, 200 tons.

Towers for Delaware River bridge connecting Philadelphia and Camden, N. J., 9100 tons.

Chesapeake & Ohio Railroad, bridge, 400 tons.

Bridge over Missouri River, St. Charles, Mo., 10,000 tons

West [illegible] [illegible] Chicago

Addition to Kaufmann's department store, Pittsburgh, 200 tons.

Masonic Temple, Muncie, Ind., 600 tons, bids close Nov. 22.

Rich Brothers, department store, Atlanta, Ga., 1880 tons.

Tanks, Casper, Wyo., for Standard Oil Co. of Indiana, 12,000 tons.

Board of Commissioners, Port of New Orleans, 450 tons for Seventh Street shed and 260 tons for grain elevator sacking plant.

Owens Bottle & Machine Co., Toledo, factory building, 275 tons.

Michigan Steel Corporation, Detroit, sheet mill, 1250 tons.

National Screw & Tack Co., Cleveland, factory building, 700 tons.

Pennsylvania grade crossing work, Cleveland, 1500 tons, bids taken.

J. W. Clement Co., Buffalo, building, 250 tons.

RAILROAD EQUIPMENT BUYING

Inquiries for Nearly 7,000 More Cars But Substantially No Purchases

Fresh inquiries for 6650 freight cars, some more offerings of car repair business and the purchase of 50 locomotives by the St. Paul are outstanding features of the week's developments in railroad equipment buying. The items include the following:

The Baltimore & Ohio Railroad is inquiring for 2000 55-ton hopper cars and 1000 70-ton gondolas. It has placed 500 box cars with the Hamilton Car Co., Newark, Ohio.

The Chicago, Milwaukee & St. Paul Railroad has placed an order with Baldwin Locomotive Works for 50 locomotives, and will probably order 50 more soon.

The Chicago, Burlington & Quincy Railroad is in the market for 85 locomotives.

The Baltimore & Ohio is inquiring for 75 locomotives.

The Lehigh Valley Railroad is in the market for 15 locomotives.

The Pere Marquette is expected to close for 1500 box and 500 hopper cars this week.

The Northern Pacific also expected to place orders for 3000 box cars this week.

The Spokane & International is inquiring for 50 flat cars.

The Monon is in market for repairs on 500 gondola cars.

The Detroit, Toledo & Ironton is inquiring for repairs on 500 gondola cars.

The Ford Motor Co. is in market for steel underframes for 500 40-ton box cars.

The Elgin, Joliet & Eastern placed repairs on 500 gondola cars with James G. Heggie & Sons.

The Pittsburgh, Shawmut & Northern is inquiring for 200 stock cars.

The Pennsylvania Tank Car Co. is in the market for 300 tank cars.

The United States Fuel Co. is inquiring for 300 steel narrow-gage mine cars.

The El Paso & Southwestern has ordered 4 passenger cars from the Pullman Co.

The Atlanta & West Point is inquiring for 150 hopper cars and 2 baggage cars.

The Brooklyn Rapid Transit is in the market for 50 passenger bodies and 100 passenger car trucks.

The Long Island is inquiring for 40 motor cars and 20 trailers, 10 steam passenger cars and 20 trailers and 2 baggage and mail cars.

The Central of New Jersey has increased its order with American Car & Foundry from 20 to 45 steel coaches.

Wheeling District Steel Plant Operations

WHEELING, W. Va., Nov. 20.—While this week's schedule of steel plant operations in this district shows recessions here and there, the general tendency is toward a higher rate. The Weirton Steel Co., with plants in Weirton and Clarksburg, W. Va., and Steubenville, Ohio, went on a 100 per cent basis this morning, when its Clarksburg plant, which has been running at two-thirds capacity, went on full. A large order for tin plate for shipment to Alaska, deliveries to be completed by the end of the year, is understood to have been taken by this company and to have necessitated full operation of its tin plate units.

Operations of the Laughlin plant of the American Sheet & Tin Plate Co., Martins Ferry, Ohio, have been increased from 65 per cent to 87 per cent, with 20 of the 23 hot mills there being on.

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
Nov.	Lake	Electrolytic*	New York	New York	St. Louis	New York	St. Louis
15.....	14.12½	13.62½	37.12½	7.25	6.90	7.65	7.30
16.....	14.12½	13.62½	36.50	7.25	6.90	7.65	7.30
17.....	14.00	13.62½	36.50	7.25	6.90	7.65	7.30
18.....	14.00	13.62½	....	7.25	6.90	7.60	7.25
20.....	14.00	13.62½	36.75	7.25	6.90	7.55	7.20
21.....	14.12½	13.62½	36.50	7.25	6.90	7.55	7.20

*Refinery quotation.

New York

NEW YORK, Nov. 21.

Demand is light in all the markets. The copper market is firm but dull. Buying of tin is moderate at lower prices. The lead market is unchanged. A slight reaction in the zinc market has set in.

Copper.—Statistics concerning the copper market are closely guarded, but sufficient is now known to make the statement that shipments in October to domestic consumers exceeded by far any month of the year, and those to foreign consumers were equal to the year's previous high mark. Up to within the last day or two domestic buying had been fairly good and so had foreign sales, but the market has now turned quiet. Quotations are firm at 13.62½c., refinery, or 13.87½c., delivered, with Lake copper selling at 14c. to 14.12½c., delivered.

Tin.—Sales of Straits tin in this market during the week totaled 800 to 1000 tons at prices close to 36.50c. to 36.75c. On Nov. 15 about 300 to 350 tons of spot metal and metal afloat was sold, practically to one consumer, at 37.12½c. On Nov. 16 from 300 to 500 tons is estimated to have changed hands, with dealers the largest buyers and importers the sellers. On Nov. 17 150 to 200 tons of December-January shipment was sold mostly to one dealer. Since then and including to-day the market has been dull and featureless. Spot Straits tin is quoted to-day in New York at 36.50c. and the London quotations were about £2 per ton lower than a week ago at £178 for spot standard, £178 15s. for future standard, and £179 15s. for spot Straits. There is a wide difference of opinion in the trade as to the extent to which consumers are covered for their future requirements. The recent speculation in the London market is attributed largely to the fact that one operator believes these requirements are not covered much beyond December. The fact, however, that the quantity of metal reported afloat is so large, at 9335 tons, should be taken into account, particularly if most of this metal represents sales on contracts. Arrivals thus far this month have been 3670 tons.

Lead.—Conditions in this market are practically unchanged both as to supplies and quotations. November lead is unobtainable and sales for December shipments have been made at 7.25c., New York, by independents. The St. Louis outside market is slightly stronger at 6.90c. to 6.95c. The quotation of the leading interest remains unchanged at 6.80c., St. Louis, or 7c., New York.

Zinc.—A moderate reaction has appeared in this market and prime Western zinc is now quoted at 7.20c., St. Louis, and 7.55c., New York, or about 10 points below the levels a week ago. Domestic buying has nearly ceased and offerings for export have not been accepted as freely as they have been made. The appearance of a slight reaction is not regarded with alarm, but is accepted as a healthy sign.

Antimony.—The market is unchanged and featureless with Chinese metal in wholesale lots for early delivery quoted at 6.50c., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 pure, made by foreign producers, is quoted by importers in wholesale lots for early delivery, at 21c. to 22c. per lb., New York, duty paid. The price at which the leading interest is taking orders is still withheld.

Old Metals.—The market continues firm and business is fairly active. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	13.50
Copper, heavy and wire	12.50
Copper, light and bottoms	11.25
Heavy machine composition	10.25
Brass, heavy	8.25
Brass, light	6.50
No. 1 red brass or composition turnings	9.50
No. 1 yellow rod brass turnings	7.75
Lead, heavy	6.25
Lead, tea	5.00
Zinc	5.00

Chicago

Nov. 21.—Tin, lead and spelter have declined, while copper and antimony remain unchanged. The recession in lead and spelter is taken to indicate that these metals have passed the crest of the recent upward movement. Demand is not at all brisk for either metal and, but for the fact that stocks are said to be low, a sustained decline would be expected. Buying of copper has been fair, but this metal is not likely to advance because supplies of both new and second-hand material are large. We quote, in carload lots, lake copper, 14.37½c.; tin, 37.50c. to 38c.; lead, 6.95c.; spelter, 7.30c.; antimony, 8.50c., in less than carload lots. On old metals we quote copper wire crucible shapes and copper clips, 11.50c.; copper bottoms, 9.75c; red brass, 9c.; yellow brass, 7c.; lead pipe, 5.25c.; zinc, 4.75c.; pewter, No. 1, 23c.; tin foil, 26c.; block tin, 30c., all buying prices for less than carload lots.

More Metal Workers and Higher Wages

Iron and steel plants, according to figures of the Bureau of Labor Statistics, show for October a gain from September of 7717 employees in 140 establishments. This gain of 4.6 per cent was accompanied by a gain of 9.8 per cent in amount of payroll and a corresponding increase in the average pay envelope from $53.48 to $56.15, or 5 per cent.

In the automobile industry there was a loss in 118 establishments of 5.9 per cent in number of employees, but a gain of 0.9 per cent in payroll total, and 7.3 per cent in average pay envelopes. In car building and repairing there was a gain of 13.7 per cent in number of employees in 73 establishments and a gain of 13.8 per cent in amount of payroll.

Compared with a year ago there has been a gain in 216 establishments which reported at both times of 24.2 per cent in number of men employed, and an increase of 45.7 per cent in total payroll. This connotes a gain of 11.7 per cent in contents of the average pay envelope, which has advanced from $53.21 to $62.42.

Wages per half-month per man in automobile plants which are exceptionally busy, are 24.3 per cent over those prevailing in steel plants. In fact, 171,892 automobile workers received over $2,000,000 more in the half month than did 176,387 steel workers.

Compared with September, average per capita earnings increased in 29 industries and decreased in 14.

Details are shown in the table.

Period	Number of Establishments	Number of Men	Half-Month Payroll	Average Pay Envelope
Iron and Steel				
Sept., 1922...	140	168,670	$9,019,313	$53.48
Oct., 1922...	140	176,387	9,903,466	56.15
Oct., 1921...	112	114,267	4,714,553	41.26
*Automobiles**				
Sept., 1922...	118	182,726	11,881,688	65.03
Oct., 1922...	118	171,892	11,992,082	69.77
Oct., 1921...	48	100,974	6,444,111	63.80
Car Building and Repairing				
Sept., 1922...	73	66,810	3,754,348	56.20
Oct., 1922...	73	75,932	4,271,514	56.25
Oct., 1921...	56	40,050	2,423,397	60.51
Metal Workers (the three groups above)				
Sept., 1922...	331	418,206	24,655,349	58.96
Oct., 1922...	331	424,211	26,167,062	61.68
Oct., 1921...	216	255,291	13,582,061	53.21

*Payroll figures are reported as "weekly"; they have been made "half-monthly" by multiplying by 2 1/6.

PERSONAL

Paul M. Lincoln, after nearly 30 years of practical engineering experience, has accepted the position as director of the school of electrical engineering of the College of Engineering, Cornell University, to succeed Prof. Alexander Gray, deceased. Mr. Lincoln graduated from Ohio State University in 1892, and after being connected for a time with the Short Electric Co., Cleveland, went to Pittsburgh to take up work with the Westinghouse Electric & Mfg. Co., in December, 1892. After about two and one-half years with that company he became electrical superintendent of the Niagara Falls Power Co., Niagara Falls, N. Y. This was at the time of the beginning of the modern phase in the water power development of Niagara Falls, for which the Westinghouse company had built the generators and other electrical equipment. The seven years, 1895 to 1902, which Mr. Lincoln spent as electrical superintendent of the Niagara plant, were among the most interesting and profitable of his life. In 1902 he returned to the Westinghouse company in an engineering capacity and remained with the company until 1909, when he became connected with the Lincoln Electric Co., Cleveland, remaining with that company until a few days ago, when he took up his new duties at Cornell. From 1911 to 1915 Mr. Lincoln was head of the electrical school of the University of Pittsburgh, while still carrying on his work with the Westinghouse Electric & Mfg. Co. He was for many years active in the affairs of the American Institute of Electrical Engineers, of which he was president in 1914 and 1915. He has also been an active worker for the interests of his alma mater, and is a past president of the Ohio State University Association, a national organization.



PAUL M. LINCOLN

Frederick G. Hughes, vice-president New Departure Mfg. Co., Bristol, Conn., has been elected president of the Bristol Chamber of Commerce.

A. Skidmore, for many years with the Ayer-O'Connell Mfg. Co., Meriden, Conn., has been chosen superintendent of the new plant at Bridgeport, Conn., of the recently organized Manufacturers' Polishing & Platers' Supply Co.

M. W. Hall, chief mechanical engineer, South Side works, Jones & Laughlin Steel Co., Pittsburgh, has resigned and has been succeeded by C. G. Bigelow, formerly with the American Sheet & Tin Plate Co.

Stephen Badlam has been appointed works manager of the Superior Steel Corporation, Pittsburgh, the plant of which is at Carnegie, Pa., succeeding James Warren, who resigned recently to become works manager of the LaLance & Grosjean Mfg. Co., Woodhaven, L. I. For the past year Mr. Badlam has been engaged as an engineer, specializing in rolling mill equipment in Philadelphia, but previously for 12 years has been in the operating department of the Pennsylvania Steel Co.; served as assistant chief engineer, Pittsburgh Crucible Steel Co., during the building of its plant at Midland, Pa., and later was chief engineer, Pittsburgh Seamless Tube Co., Beaver Falls, Pa. In the World War he was major of infantry on the General Staff, First Army, and was overseas for two years. Following the war he was sales engineer with the Philadelphia Roll & Machine Co. He is a graduate of the Massachusetts Institute of Technology.

R. L. Beers, recently appointed chief engineer of the Detroit Stoker Co., was graduated from Syracuse University in mechanical engineering, with the class of 1912. Four years ago he was appointed testing engineer of the Underfeed Stoker Co. of America and was later promoted to the position of assistant chief engineer.

C. A. Crusoe, who has been director of purchases of the Fisher Body Co., Cleveland, has been transferred to Detroit, where he has become supervisor of purchases for the General Motors Division of the company. His office is in the General Motors Building.

Edward C. Wilson, formerly connected with the U. S. Light & Heat Corporation and the Vapor Car Heating Co., with offices at Chicago, has been appointed western sales manager of the Ohio Locomotive Crane Co., Bucyrus, Ohio, with offices in the Railway Exchange Building, Chicago.

J. J. Eichenberger, who has been freight agent Pennsylvania Railroad, with headquarters at the Allegheny freight terminal, Pittsburgh, N. S., has resigned that position to become traffic manager of the Pittsburgh Crucible Co., Pittsburgh.

Allan Fraser, New York, resigned Nov. 1 as general sales manager of the Wickwire-Spencer Steel Corporation and will leave shortly for San Francisco, where he will be sales representative for that corporation on the Pacific Coast. Arrangements have been completed which will permit him to establish selling connections with other representative manufacturers of iron and steel products, hardware and kindred lines. Mr. Fraser will have a sales force and warehouse facilities, both in San Francisco and Los Angeles. For 25 years he was identified with the American Steel & Wire Co. and developed its extensive business in the territories under his supervision. He received his training in the office of James A. Farrell, now president of the United States Steel Corporation, and through years of work for the American Steel & Wire Co., the Wickwire Steel Co. and its successor, the Wickwire-Spencer Steel Corporation. On a recent trip across the continent Mr. Fraser made an exhaustive study of trade conditions and requirements west of the Rockies.



ALLAN FRASER

Harry W. Coffin, vice-president and general manager Alabama Co., Birmingham, Ala., retired effective Nov. 15. John W. Porter, vice-president and sales manager, who has been with the Alabama Co. for 14 years, will assume Mr. Coffin's duties in addition to his own.

R. W. Valls, vice-president and consulting engineer, Champion Engineering Co., Kenton, Ohio, which he was instrumental in organizing from the old Champion Iron Co., has resigned.

Fred C. Severin, for many years with the Niles-Bement-Pond Co., and more recently with the Betts Machine Co., Rochester, N. Y., now a part of the Consolidated Machine Tool Corporation, and B. H. Tripp, for many years with the Chicago Pneumatic Tool Co., have formed a partnership for the purpose of buying and selling used machine tools. They have taken an office at 25 Church Street, New York.

Burton E. Carpenter has been appointed sales representative of the Garvin Machine Co., New York, in the territory embracing eastern Pennsylvania, Maryland, Delaware and southern New Jersey.

N. J. Higinbotham has resigned as New York district sales manager of the Wheeling Steel Products Co. to become president of the Fred Adee Corporation, 5 Cliff Street, New York, an old plumbing and steam supply house. He is succeeded by Charles E. Scofield,

who has been connected with the Wheeling Steel Corporation for about 20 years. Percy W. Abbott, district sales manager, Wheeling Corrugated Co., succeeds Mr. Scofield.

P. E. Miller, for 13 years manager of the Bryden Horse Shoe Works, Catasauqua, Pa., has resigned to accept a position with the Tredegar Iron Co., Richmond, Va.

Stanley B. Wentz, formerly with the Lindsay Chaplet & Mfg. Co., has resigned to become general manager of the Pennsylvania Foundry Supply Co., Liberty Building, Philadelphia.

Fay Ingalls, secretary Niles-Bement-Pond Co., 111 Broadway, New York, has resigned, due to the pressure of personal affairs since the death of his brother. He has been succeeded by C. S. Guthrie, formerly of the Pond Works.

William F. Anklan, who has been elected president of the Hall Lamp Co., Detroit and Kenosha, Wis., began service 20 years ago as a bookkeeper in the general offices of the Badger Brass Mfg. Co., Kenosha. When the industry became a part of the Hall Lamp Co., Mr. Anklan was transferred to the general offices in Detroit as office manager. Shortly afterward he was elected secretary-treasurer and made assistant to President J. F. Hartz, whom he now succeeds upon the elevation of Mr. Hartz to the chairmanship of the board.

James R. Anderson, assistant general manager of the Kenosha, Wis., branch of the American Brass Co., division of the Anaconda Copper Co., has tendered his resignation, effective Jan. 1.

Robert Liston, who has been in the sales department of the Inland Steel Co., Chicago, since 1914, has been transferred to the company's St. Louis office as assistant to Frank R. Meyer, Jr., district sales manager. Mr. Liston was with the Griffin Wheel Co., Kansas City, before going with Inland Steel Co. The territory covered by the St. Louis office includes southern Missouri, southern Illinois, southern Indiana, northern Louisiana and all of Kentucky, Tennessee, Arkansas and Oklahoma.

W. W. Heylmun, formerly chief chemist of the St. Louis Coke & Chemical Co., Granite City., Ill., has been made blast furnace superintendent succeeding T. W. Harris, who resigned recently to become connected with the Tata Iron & Steel Co. in India.

Joseph G. Shryock, designing engineer, Belmont Iron Works, Philadelphia, has been appointed chief engineer of that company. After being graduated in civil engineering from Pennsylvania Military College in 1900, he became associated with the bridge and construction department of the Pencoyd plant, American Bridge Co. In 1903 he accepted a position in the engineering department of the Virginia Bridge & Iron Works, Roanoke, Va., remaining there until 1904, when he returned to Philadelphia to become connected with the Belmont Iron Works. Two years later he was appointed designing engineer, which position he held until his recent change.

R. Klinkenburg, of the executive committee of the Union Dortmund works in Germany; F. Burgers, blast furnace superintendent at Gelsenkirchen, Westphalia; G. Knepper and H. Olfe, mining engineers; W. Martini, chief engineer at Union Dortmund, and G. Opderbeck, chief engineer at Gelsenkirchen, compose a party of representatives of Stinnes iron and steel interests who are visiting various iron and steel and coke oven plants in the United States. From Granite City, Ill., where they visited the coke oven and blast furnace plants of the St. Louis Coke & Chemical Co. the party left last week for Birmingham, Ala.

Harry J. Cogswell, formerly associated with the Ajax Forge Co., Chicago, has recently joined the organization of the Valley Forge Steel & Tool Co., Chicago, as general sales manager.

Reorganization plans having failed, the property of the Union Motor Truck Co., Bay City, Mich., will be sold at bankruptcy sale Dec. 12.

OBITUARY

WALTER M. SPAULDING, Worcester, Mass., chairman of the Graton & Knight Mfg. Co., and for many years president and managing head of the business, died in Worcester, on Nov. 16, aged 76 years. In 1869 he entered the employ of Graton & Knight, manufacturers of leather belting, and in 1872 was made a director and secretary. He was general manager when in 1909, on the death of Joseph A. Knight, he was elected president. Within the past year he retired from the presidency because of ill health.

FREDERICK W. GARDNER, chairman of the board of directors, Bucks Stove & Range Co., St. Louis, died at Beverley Hills, Cal., on Nov. 11. Mr. Gardner was at one time manager of the Western branch for the Michigan Stove Co., Detroit.

C. HENRY HUTCHINS, for many years president of Crompton & Knowles Loom Works, Worcester, Mass., died at his home in Shrewsbury, Mass., on Nov. 14, aged 75 years. He entered upon a manufacturing career as a young man, first for himself, then with L. J. Knowles & Bros., loom builders. On the death of Francis B. Knowles he became president, and continued as such in the larger business which came with the consolidation with the Crompton Loom Works. Mr. Hutchins retired from business in 1917. He was president of the United States Envelope Co. from the time of its organization.

FRANK W. BUFFUM, president, Buffum Tool Co., Louisiana, Mo., died recently in St. John's Hospital, St. Louis, from pneumonia. He was 63 years old. Mr. Buffum formerly was president of the Buffum Telephone Co. and for four years was Highway Commissioner of Missouri, serving under Governor Major. His father, the late Col. G. A. Buffum, founded the LaCrosse Lumber Co. of Louisiana. A brother, Col. Charles G. Buffum, is president of that company and of the Bank of Louisiana.

HENRY HIRSCH, 57, vice-president, American Cutlery Co., 111 Fifth Avenue, New York, died suddenly last Wednesday morning at the Hotel Claridge. Mr. Hirsch had been in apparent good health up to the time of his death which was attributed to heart failure.

GEORGE F. SMITH, Southington, Conn, died at his home there on Sunday evening, Nov. 12, in his 92nd year. Mr. Smith was at one time vice-president of H. D. Smith & Co., Plantsville, Conn., manufacturers of forgings, but for the past 20 years had led a retired life.

RAYMOND H. STILES, assistant manager, Jenkins Brothers, Boston, manufacturers of valves, died at his home in Wollaston, Mass., on Nov. 12, following an illness of three months. Mr. Stiles was born in Brockton, Mass., about 40 years ago and became associated with the Jenkins company at the age of 20.

JOHN DOWLING, veteran furnace manager, died at Oakland, Cal., last week, aged 70 years. He had been furnace manager for many years with the Tennessee Co., Bessemer, Ala., and for the past 10 years had been furnace manager with the Chattanooga Iron & Coal Co. One of his sons, John Dowling, Jr., is furnace manager for the Gulf States Steel Co., Alabama City. Mr. Dowling had gone west on account of impaired health.

The manufacture and sale of the Loy & Nawrath line of power brakes, shears and kindred products has been taken over by the Birmingham Iron Foundry, Derby, Conn. This business, formerly conducted by the Loy & Nawrath Co. of Newark, N. J., will be handled by the Loy & Nawrath Division of the Birmingham Iron Foundry and all correspondence and business will be centered at the Derby office. Increased facilities are provided by the new arrangement.

Machinery Markets and News of the Works

BUSINESS TAPERING OFF

Orders for Machine Tools Show a Decline in Some Markets

Disposition of Certain Prospective Buyers to Postpone Purchases Is Noted

Excepting Cleveland and Detroit, which continue to enjoy a fairly satisfactory machine-tool trade, due largely to purchases by the automobile industry, the past week has shown a tapering off in orders in some of the leading selling centers. There is noted a disposition on the part of many buyers to postpone purchases, probably until the new year.

Among the principal buyers in the automotive field are the Electric Auto Lite Corporation, Toledo, Ohio, which has purchased 13 machines, and the Nash Motors Co., Kenosha, Wis., and the Rickenbacker Motor Co., Detroit, which have each purchased a half dozen turret lathes.

The month has brought considerable improvement in the demand for automatic screw machines and turret lathes.

Chicago reports a cessation in railroad buying, and also that while inquiries are fairly numerous, there has been a decline in orders booked. Pittsburgh likewise reports lessened activity, with indications of postponement of many purchases until the new year. The transportation congestion and the resultant accumulation of steel at steel mills have a tendency to prevent steel companies from buying new equipment of any kind.

The Pennsylvania Railroad has begun placing orders against its recent list which numbered about 80 tools.

In the East there is little change. Demand continues at a fair rate, but buyers are interested principally in used tools. One large machinery house reports that the bulk of its sales is in used tools. The American Locomotive Co. has purchased seven or eight tools for its plant at Richmond, Va., and is expected to issue a list soon for its Schenectady works. The New York Central has bought a radial drill and two lathes; the Norfolk & Western two right line radial drills, and the Southern Pacific an axle lathe. The Spicer Mfg. Corporation, South Plainfield, N. J., has bought a few tools.

The H. H. Franklin Co., Syracuse, N. Y., has informed some in the machine-tool trade that it has postponed construction of a new factory for manufacture of four-cylinder cars.

The Cleveland Board of Education has taken bids on about 20 metal and woodworking tools.

New York

NEW YORK, Nov. 21.

DEMAND for used tools is keeping up at a fairly good rate, but new tools are lagging behind. Some dealers who handle used tools as well as new lines are doing almost a normal business, as compared with pre-war records, but the bulk of their orders is for second-hand machines. There are very few inquiries and a good deal of the current business must be developed as there is very little spontaneous demand. The American Locomotive Co. has purchased seven or eight tools for its Richmond, Va., plant and is expected to issue a list shortly for its Schenectady works. The Spicer Mfg. Corporation, South Plainfield, N. J., has bought a few tools. Other purchases include a radial drill and two lathes by the New York Central Railroad; two 8-ft. right line radial drills by the Norfolk & Western; an axle lathe by the Southern Pacific, and six 600-lb. steam hammers to a coal company.

Few new inquiries in either overhead or locomotive cranes are in evidence. Sales of hand power cranes are also slack. Construction of new shops by the Board of Trustees of the Boston Elevated Railroad, 108 Massachusetts Avenue, Boston, may result shortly in inquiry for cranes. Although the Pennsylvania Railroad, Eastern Region, Philadelphia, has not yet closed for the two 12½-ton electric cranes inquired for a short time ago, a new inquiry has been issued calling for prices on a 3-ton, 33-ft. span, 4-motor, overhead traveling crane, also for Altoona, and the railroad is understood [illegible] electric crane.

[illegible] two [illegible] from the Shaw Electric Crane Co., for Anaconda, Mont.

New York, New Haven & Hartford Railroad, a 10-ton, monorail hoist from the Shepard Electric Crane & Hoist Co.

United Fruit Co., 17 Battery Place, New York, two 3-ton, 3-motor electric cranes from the Niles-Bement-Pond Co.

Ben Hur Erection Co., a 25-ton locomotive crane to be equipped with 65-ft. boom, for use in St. Louis, from the Industrial Works.

Louisville & Nashville Railroad, Louisville, Ky., a No. 3 pile driver from the Industrial Works.

Southern Pacific Co., 165 Broadway, New York, a 40-ton, 70-ft. boom, locomotive crane for use in California, from the Industrial Works.

The Boston & Maine Railroad, Boston, is reported to have purchased three locomotive cranes from the Browning Co.

Bartlett Hayward Co., Baltimore, Md., has purchased five electric traveling cranes for its foundry from the Chesapeake Iron Works.

Thomson Machine Co., Belleville, N. J., has purchased a small hand power crane from an unnamed builder.

The Empire Tinware Co., 33 South Fifth Street, Brooklyn, is taking bids for a four-story addition, 100 x 125 ft., estimated to cost $35,000. Improvements will also be made in the present factory. William I. Hohauser, 116 West Thirty-ninth Street, New York, is architect and engineer.

The British-American Metals Co., Inc., 200 Broadway, New York, has awarded contract to the Levering & Garrigues Co., 552 West Twenty-third Street, for a one-story brick and steel addition to its plant on South Second Street, Plainfield, N. J., 40 x 150 ft., to cost $25,000. N. A. Staples is vice-president in charge.

Edward M. Adelsohn, 1778 Pitkin Avenue, Brooklyn, architect, has plans under way for a two-story automobile service and repair building, 130 x 190 ft., on Kingston Avenue, estimated to cost $200,000. The owner's name will be announced at an early date.

The National Biscuit Co., 85 Ninth Avenue, New York, has plans nearing completion for a three-story automobile repair and service building at 407 West Sixteenth Street, estimated to cost $70,000. J. R. Terrance, company address, is architect and engineer.

The Callahan Zinc-Lead Co., 61 Broadway, New York, has preliminary plans for extensions in the plant of its subsidiary, the Galena Mining Co., operating in the Coeur

d'Alene district, Idaho, to include new milling machinery and other mechanical equipment.

The Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y., has plans under way for an addition. George Mertz, company address, is engineer.

Power equipment, ice and refrigerating machinery, conveying apparatus, etc., will be installed in the new three-story plant, 145 x 200 ft., to be erected at 9-19 West 141st Street, New York, by the Reid Ice Cream Co., 524 Waverly Avenue, estimated to cost approximately $250,000, with machinery.

Olney & Warrin, 295 Lafayette Street, New York, machinery, have inquiries out for a 14 x 30 steam engine, Corliss type.

The C. Dentermann & Son Ice Co., White Plains, N. Y., has plans in progress for a one-story addition to its plant, 50 x 120 ft., estimated to cost $65,000. Louis Block, 501 Fifth Avenue, New York, is consulting engineer. Leroy Rader is superintendent.

Motors, controllers, power equipment and other mechanical apparatus will be installed in the new five-story printing plant to be erected by the Edward Langer Printing Co., Inc., Jamaica, L. I. To provide for the expansion, the company has arranged for a bond issue of $1,350,000.

The Bureau of Yards and Docks, Navy Department, Washington, will readvertise for bids for the proposed veterans' hospital and mechanical buildings at Tupper Lake, N. Y., for which revised plans are in preparation. Part IV of the specifications calls for electric equipment, including transformers, panel boards, fixtures, conduits, ducts and wiring; and Part V, return tubular boilers, feed-water heater, steel storage tank, feed-water and vacuum pumps, combined twin pump and receiver, and other mechanical equipment. Drawings and specifications will be available before the close of the month.

The Huntoon Ice Co., 631 Hudson Street, New York, has purchased property, 92 x 100 ft., on West Nineteenth Street, near Tenth Avenue, as a site for a new ice-manufacturing plant.

The Sewer and Water Board, Saranac Lake, N. Y., will receive bids until Nov. 27 for two 3,000,000-gal. horizontal double-acting duplex plunger type pumps, with chain drive equipment for each pump. John L. Collins is consulting engineer for the board.

A manual training department will be installed in the two-story and basement high school, 100 x 105 ft., with wing, 54 x 105 ft., to be erected at Ocean City, N. J., estimated to cost $250,000. Plans are being prepared by V. B. Smith, Guarantee Trust Building, Atlantic City, architect.

The Lime & Stone Products Co., Hamburg, N. J., will electrify its properties in this district, and will install motors and other equipment. Power will be furnished by the New Jersey Power & Light Co., Dover.

The Water Board, Burlington, N. J., will install additional pumping machinery at the municipal waterworks. G. A. Allison, Burlington, is engineer.

Jay Hayes and Victor Preston, officials of the Hayes-Ionia Co., Grand Rapids, Mich., manufacturer of automobile bodies, are organizing a company to occupy a portion of the plant of the Durant Motor Car Co., Elizabeth, N. J., for the manufacture of bodies for Durant automobiles. It will be operated as a separate company, apart from the Hayes-Ionia organization.

A vocational department will be installed in the proposed new Central high school to be erected at South Orange, N. J., under joint agreement by town and township officials, for which a fund of about $500,000 will be provided.

The Public Service Electric Co., Public Service Terminal, Newark, has received permission to issue stock for $2,250,000, the proceeds to be used for extensions and equipment.

Plans are under way for the construction of a new ice and refrigerating plant at South River, N. J., 50 x 400 ft., estimated to cost close to $70,000. M. Hammerschlag, secretary of the local Chamber of Commerce, represents the owner.

The American Welding Co., Carbondale, Pa., plans to build near New York, in the spring of 1923, a brass foundry, an iron foundry and a machine shop, for the manufacture on a quantity basis of a new heavy tractor. L. A. Belding, 30 Church Street, New York, has charge of the work.

The Hart & Hegeman Co., Hartford, Conn., manufacturer of junction boxes, clamps, etc., has purchased the plant of the Hartford Auto Parts Co. at Hartford, the consideration being $200,000. The Hartford Auto Parts Co. will continue to occupy a part of the premises as a tenant. On Nov. 23 the Hartford Auto Parts Co. will sell at auction a large part of its machine-tool equipment, but will withhold from sale about 350 tools of various types.

New England

BOSTON, Nov. 20.

THE volume of machine tool business the past week showed healthy expansion, with more individual firms participating. Used machinery, however, holds the center of the stage, sales of new equipment having dropped to small proportions, although the purchase of 16 new ring turning lathes to a Massachusetts textile machinery maker is noteworthy. Aside from this sale, and an inquiry for three to six high speed drills from a local boiler maker, an advance of 10 per cent on a New England make of lathes and of about 5 per cent on miscellaneous small machinery by a Hartford manufacturer, the new tool market presents little interest.

On the other hand, a Massachusetts manufacturer has purchased more than a dozen used and some new individual tools, as well as jigs and fixtures, with more to follow; eight semi-automatic Pratt & Whitney machines and an 8-in. Heald rotary grinder with magnetic chuck went to a Rhode Island manufacturer; a grinder, two lathes, two drills, screw machine and a milling machine to another Rhode Island interest; a No. 1½B milling machine to a Massachusetts textile machinery maker; a new 24-in. x 8-ft. South Bend lathe and a used No. 2 Kempsmith milling machine to a South Boston firm; a 24-in. planer to a Nashua, N. H., concern; a 4-ft. radial drill to a Boston house; a 2¼-in. Gridley automatic, four manufacturing type Cincinnati millers, V & O presses and miscellaneous shop and production equipment to users in practically every New England State.

The Stanley Works, New Britain, Conn., hardware, which recently added to its holdings by acquiring property from the W. L. Damo Coal Co., has purchased from the New Britain Machine Co. property at 77 to 87 Elm Street, which will be developed for the manufacture of rules and levels.

Fire last week did considerable damage to various units of the Hunt-Spiller Mfg. Corporation, South Boston, gun castings. The greatest damage was sustained in the pattern storage unit.

James Macnaughtan is president and Andrew Hogdon treasurer of the Gordon Machine Co., 40 State Street, Boston, recently incorporated under Massachusetts laws with a capital of $300,000 to manufacture machinery for packing either free flowing material or single objects into small cartons or paper bags.

The Lander Welding Co., 41 Chester Street, Malden, Mass., will erect a one-story, 40 x 50 ft. manufacturing building.

Fire last week destroyed the car and repair shops of the Bangor & Aroostook Railroad, Houlton, Me., at an estimated loss of $100,000. The company will rebuild.

A manual training department will be included in the new $205,000 high school to be erected by the town of Fairfield, Conn., bonds for which were voted this week. O. C. S. Ziroli, 211 State Street, Bridgeport, is the architect.

The Connecticut Brass Co., Waterbury, Conn., has plans prepared for a new castings factory on Watertown Avenue.

The Holmes Special Tool Co., 38 Canal Street, New Haven, Conn., has awarded contract for a one-story 40 x 65-ft. brick and steel addition.

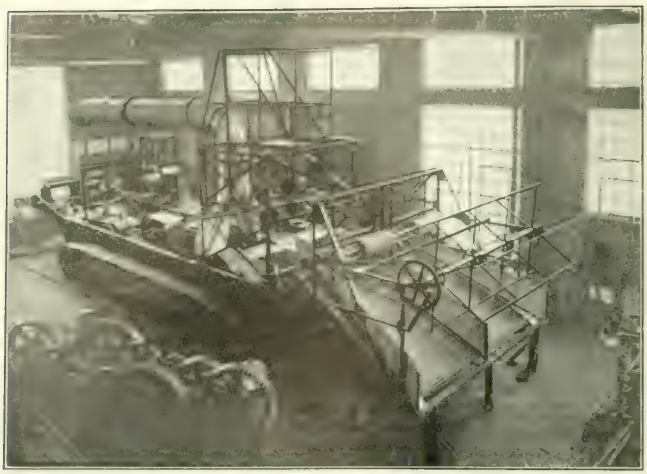
The Locomobile Co. of America, Inc., Bridgeport, Conn., has awarded contract to the Levering & Garrigues Co., New York, for a one-story 60 x 180-ft. addition to its machine shop and a one-story 40 x 200-ft. brick and steel building, besides alterations to buildings. Lockwood, Greene & Co., 101 Park Avenue, New York, are the engineers.

The Kinney Mfg. Co., 3541 Washington Street, Boston, manufacturer of pumps, compressors, etc., will build a one-story addition as a testing department.

The Parks & Woolson Machine Co., Springfield, Vt., has work under way on a new three-story and basement, brick and reinforced concrete plant, 40 x 70 ft.

The New England Steel Casting Co., 100 School Street, Springfield, Mass., will hold in abeyance the rebuilding of its one-story foundry at East Longmeadow, Mass., destroyed by fire some time ago. The structure, as designed, will be 70 x 125 ft., estimated to cost $50,000. Morris W. Maloney, 145 Chestnut Street, Springfield, is architect.

The Liberty Marble Co., 80 Granite Street, South Boston, has completed plans for a new one and two-story grinding, finishing and polishing works, 80 x 122 ft., at 42 Dillingham Street, Dorchester, Mass., to cost $30,000.



THIS land and sea boat, propelled by a pair of stern paddle wheels when it is afloat and by a pair of caterpillars or apron wheels when it is in shallow water near the shore, was built by the Norbom Engineering Co., Darby, Pa., for the Grass Fibre Pulp & Paper Corporation, Leesburg, Fla., for harvesting saw grass for use in the manufacture of paper pulp. The machine reaps the grass, cuts it into approximately 3-in. lengths inside the boat and then blows it through an overhead delivery pipe into a cargo carrier. It is built to deliver 30 to 40 tons of grass per hour. The body of the machine is a flat bottom boat, 45 ft. long, 10 ft wide and 5 ft high The extreme length is 60 ft. 8 in. The machinery is driven by a Wisconsin gasoline motor, while for propulsion a Continental motor is used.

The New Haven Sherardizing Co., Hartford, Conn., has leased property at 917 Sweitzer Street, Akron, Ohio, for its proposed plant, totaling about 9000 sq. ft. of floor space. The local plant will be removed to the new location and it is expected to commence production early in Jan.

The S. Lowe & Sons Co., Fairfield, Conn., manufacturer of builders' hardware, etc., has awarded contract to Thomas Lanese, 198 Calhoun Street, Bridgeport, Conn., for a two-story addition, 45 x 80 ft.

The City Council, Springfield, Mass., has preliminary plans under way for a new technical high school, with vocational departments, adjoining a present school on State Street, estimated to cost approximately $800,000. E. C. and G. C. Gardner, 33 Lyman Street, are architects.

The Gloucester Electric Co., Gloucester, Mass., will issue additional capital stock for $102,620, a portion of the proceeds to be used for extensions and improvements.

The William H. Field Co., 39 Washington Street, North, Boston, woodworking machinery, has construction in progress on a one-story building, 60 x 250 ft., on Dorchester Avenue, South Boston.

The Connecticut Co., Church Street, New Haven, Conn., operating electric power utilities, is considering the construction of an addition to its power plant to cost $150,000.

Handschumacher & Co., 25 John Street, Boston, meat packers, are arranging for the installation of a cold storage and refrigerating plant in their new factory at 16 North Street.

The Phillips Insulated Wire Co., Pawtucket, R. I., will build a new one-story power house, 28 x 65 ft., estimated to cost $25,000.

The Crompton & Knowles Loom Works, Inc., Worcester, Mass., has awarded contract for a one-story addition to its Providence plant, 50 x 170 ft., with basement. The main floor will be equipped as an erection shop.

The Texas Co., 17 Battery Place, New York, is reported to have purchased the shipyard of the Emergency Fleet Corporation at Bath, Me., and will use the site for storage and distributing works.

The Common Council, Warren, Mass., is planning for the installation of new pumping machinery, in connection with extensions and improvements in the municipal waterworks.

The Warren & Irrgang Co., 238 Dwight Street, Springfield, Mass., manufacturer of factory trucks, trailers, etc., has acquired a building at Chicopee, Mass., where it will remove its works for increased production.

Philadelphia

PHILADELPHIA, Nov. 20.

([illegible] Abrasive Co., Tacony and Freley Streets, Philadelphia, for a one-story addition.

The Pennsylvania Sugar Co., Delaware Avenue, Philadelphia, has plans in preparation for a new group of buildings at its local refinery.

The Foreign Trade Bureau of the Philadelphia Commercial Museum, Thirty-fourth Street, has received an inquiry from a company at Caracas, Venezuela, for machinery for manufacturing pressed metal ceilings, moldings, tiles, etc., also for equipment for the production of paperboard and composition materials. An inquiry has also been received from Winterthur, Switzerland, requesting information on American manufacturers of air compressors and ice-making machinery. Full information available upon request.

The American Insulation Co., Roberts and Stokley Streets, Philadelphia, manufacturer of asbestos products, has awarded contract to the William Steele & Sons Co., 1600 Arch Street, for a new building to cost $25,000.

The General Paper Products Co., 3430 Lancaster Avenue, Philadelphia, manufacturer of paper and metal containers, plans for the installation of new metal-working equipment and paper container machinery, dies, etc.

The Pennsylvania Independent Oil Co., Inc., Philadelphia, care of J. H. Sherman & Co., Bulletin Building, is disposing of capital stock amounting to $440,000, the proceeds to be used for extensions and improvements in plants and system. James P. Culbertson is president.

F. H. Caven, director of Public Works, City Hall, Philadelphia, will receive bids until Nov. 29 for air lifts and other equipment to be installed in the Northeast sewerage treatment plant, estimated to cost $50,000. C. A. Allen, City Hall, is engineer. The Bureau of Water, C. E. Davis in charge, has inquiries out for one 500-hp. uniflow engine, to operate under a steam pressure of 170 lb.

The Frank H. Stewart Electric Co., 37 North Seventh Street, Philadelphia, electrical equipment, has work under way on a four-story and basement addition to its six-story works.

The Buick Motor Co., Flint, Mich., a division of the General Motors Corporation, is in negotiation with the Chamber of Commerce, Trenton, Secretary Lochner, relative to the establishment of a factory branch. Several sites are being considered.

The City Council, Gloucester City, N. J., has approved of a bond issue of $80,000, to be used in connection with the equipment installation at the new municipal pumping plant, the total cost of which will aggregate $260,000.

The Littlefield Ice & Coal Co., Hammonton, N. J., will commence the erection of a new ice-manufacturing and cold storage plant to cost $55,000.

The City School Board, West King Street, York, Pa., will soon call for bids for a three-story and basement industrial high school, 230 x 245 ft. Plans are being completed by Hamme & Witman, City Bank Building.

The East Penn Electric Co., Pottsville, Pa., has arranged for a preferred stock issue of $1,110,000, a portion of the proceeds to be used for power plant extension, etc. Work has been commenced on a new generating plant with initial capacity of 33,000 hp., and designed for an ultimate output of 330,000 hp. C. A. Hall is president.

The Livingood Mfg. Corporation, Lebanon, Pa., has leased the local Laudermilch Building for the establishment of a new plant to manufacture collapsible stoves, metal camping equipment, etc.

The Scranton Lace Co., Glenn Street, Scranton, Pa., is planning for the erection of a new power house at its textile mill to cost about $65,000.

Fire, Nov. 11, destroyed a portion of the plant of the Standard Wire Co., New Castle, Pa., with loss estimated at $35,000. It is planned to rebuild.

The Confederated Home Abbatoirs Co., Bethlehem, Pa., has been formed under State laws to construct and operate a packing plant, refrigerating and cold storage plant on site recently acquired. Plans have been drawn. Victor B. Boyer, 242 North Eleventh Street, Allentown, Pa., is treasurer in charge.

Bids have been rejected for the erection of the proposed high school at Bridgeport, Pa., and revised plans will be drawn. New bids will be asked after Jan. 1. A vocational department will be installed. The Building Committee of the Bridgeport School Board is in charge.

The Monessen Foundry & Machine Co., Monessen, Pa., has tentative plans for rebuilding the portion of its plant recently destroyed by fire, with loss estimated at $200,000, with machinery.

Motors, controllers, power and other equipment will be installed in the three-story printing plant, 80 x 100 ft., to be erected at Slatington, Pa. It will cost about $50,000, exclusive of machinery, which is esimated at $150,000. John A. Brush, Slatington, is in charge, and will be head of the operating company.

The Nanticoke Garage Co., Nanticoke, Pa., will soon take bids for a three-story service and repair building, 50 x 100 ft., witht wing extension, to cost $65,000. G. T. Price, Miller Building, Scranton, Pa., is architect.

The Kurtz Brothers Furniture Co., Bethlehem, Pa., manufacturer of hotel and school equipment, has plans under consideration for rebuilding its plant at Avenue B and West Union Street, destroyed by fire Nov. 15 with loss estimated at $750,000, including machinery. John, Charles and Herman Kurtz head the company.

The Watsontown Door & Sash Co., Watsontown, Pa., has tentative plans under consideration for a new generating plant for factory and municipal service to cost $300,000, including machinery.

Fire, Nov. 14, destroyed a portion of the plant of the Fuller-Lehigh Co., Fullerton, Pa., manufacturer of machinery, iron and steel castings, etc., with loss estimated at $30,000. It is planned to rebuild.

The Jointless Fire Brick Co., 1130 Clay Street, Chicago, has preliminary plans in progress for a new fire brick and refractory plant on New York Avenue, Trenton, N. J., one-story, 70 x 250 ft., to cost approximately $75,000.

The Hummel Steel Foundry Co., Pottstown, Pa., has been formed under State laws to operate a plant for the manufacture of steel and semi-steel castings. A building has been acquired and operations will commence at an early date. George W. Corbett, 63 High Street, is treasurer.

Baltimore

BALTIMORE, Nov. 20.

THE American Oil Co., American Building, Baltimore, has taken over the shipyard of the Henry Smith Shipbuilding Co., Curtis Bay, for about $90,000. Plans are in progress for a new oil storage and distributing plant, with barrel and box factory, pumping plant and power house, estimated to cost approximately $500,000, including a concrete pier. Louis Blaustein is president.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until Dec. 12 for 20 portable electric drills and nine electric grinders, for the Mare Island Navy Yard, San Francisco, schedule 295; until Dec. 5, for miscellaneous rubber pump valves, schedule 299.

Pihl & Miller, Wabash Building, Pittsburgh, contractors, have received contract for a new plant at Ridgeway, W. Va., to manufacture automobiles, and will break ground for the initial unit before the close of the month. The plant is estimated to cost in excess of $1,000,000, including machinery. A site of more than 2000 acres has been acquired and a company, capitalized at $10,000,000, is being organized to build and operate the plant. The names of the principals and details of the project are temporarily withheld.

D. C. Elphinstone, 408 Continental Building, Baltimore, machinery dealer, is inquiring for a 15-ton electric bridge crane, 50-ft. span; also for two 2½-yd. clam shell buckets.

The Chief of Engineers, United States Army, Munitions Building, Washington, will take bids until Dec. 6 for one steam locomotive crane, 36-in. gage, as per specifications on file, advertisement No. 95.

An electric power plant, steam-operated, ice-manufacturing plant with daily capacity of 225 tons, and five-story cold storage and refrigerating plant, will be constructed by the White Provision Co., Atlanta, Ga., in connection with a new packing plant on the Howell Mill Road. It is estimated to cost $350,000 with equipment. W. H. White is president.

The Tide Water Power Co., Wilmington, N. C., operating electric light and power properties in this section and at St. Petersburg and Clearwater, Fla., has arranged for a bond issue of $3,000,000, a portion of the proceeds to be used for extensions and improvements.

The Carter Production Works, 210 South Water Street, Wilmington, N. C., machinery dealer, is making inquiries for a wheel press, about 76-in. diameter, 250 to 300 tons.

The City Council, Elizabeth City, N. C., has arranged a bond issue of $550,000 for the installation of a municipal electric light and power plant and extensions in the waterworks.

Harry Evans, St. Michaels, Md., is planning for the erection of a one-story machine ship, to replace his works recently destroyed by fire.

The Standard Ice & Fuel Co., Charlotte, N. C., will commence the erection of an addition to its ice-manufacturing plant, with capacity of about 40 tons per day. All equipment will be electrically operated.

The Chief of Air Service, United States Army, Washington, will receive bids until Dec. 1 for one automatic motor-driven air compressor; until Nov. 27 for 25 single-pole, single-throw toggle switches, 25 navigation light signal switches and 100 flare push-button switches; and until Nov. 28 for 100 wind cones, 24-in.

The Atlantic Ice & Coal Corporation, Pratt Street, Atlanta, Ga., has awarded contract to the Barge-Thompson Construction Co., Atlanta, for a two-story service and repair building for company trucks, estimated to cost $50,000.

The Newport News & Hampton Railway, Gas & Electric Co., Newport News, Va., has arranged for a common stock issue, to net in excess of $100,000, a portion of the proceeds to be used for extensions. J. N. Shannahan is president.

The Wheeling Corrugating Co., Wheeling, W. Va., a subsidiary of the Whitaker-Glessner Co., is said to be planning for an addition to its plant at Richmond, Va.

The Westinghouse Electric & Mfg. Co., Pittsburgh, has leased a five-story building, 100 x 150 ft., to be erected at Jones Avenue and Marietta Street, Atlanta, Ga., by the Massell Realty Co., estimated to cost $300,000, for a new factory branch for Southern territory.

The Dorchester Fertilizer & Lime Co., Cambridge, Md., is planning for the installation of a complete grinding mill and auxiliary equipment, with capacity of about 60 tons per day. Lloyd Webster is president.

The Street Cleaning Department, Baltimore, has received an appropriation from the Board of Estimate for the coming fiscal year of $10,000 for supplies and repairs to motor trucks, and $10,000 for supplies and repairs to horse-drawn trucks and carts; also $25,000 for the purchase of additional motor trucks. Edward P. Callahan is deputy commissioner of street cleaning.

A manual training department will be installed in the two-story and basement high school to be erected at Concord, N. C., estimated to cost $150,000. C. G. Sayre, Anderson, S. C., is architect.

Following the rejection of a proposal for light and power service from the Potomac Public Service Co., the Board of Street Commissioners, Hagerstown, Md., has authorized preparation of plans for the proposed municipal electric power plant, estimated to cost $300,000.

The Wilson-Hock Co., City Point, Va., machinery dealer, has inquiries out for 30 to 35 hp. motors, equipped with pulleys and starting apparatus; also for split pulleys, 18-in. and 4-in. diameter.

Charles J. Britt, Wilmington, S. C., is organizing a company to establish and operate a local plant for the manufacture of traction engines and tractors. Operations will commence at an early date.

Maxwell Weinstein, Baltimore, manufacturer of toys, has acquired the plant and equipment of the International Wood & Paper Products Co., Calverton Road and Lexington Street, at a receiver's sale, for $50,000. It will be remodeled by the new owner for occupancy.

The Warren Power Co., Front Royal, Va., has purchased a hydroelectric power plant at Morgans Ford, Va. It will be extended and improved, and merged with the system of the company.

J. E. Kerr, 1106 Citizens & Southern Bank Building, Atlanta, Ga., is in the market for a 40-hp boiler and 30-hp. engine and auxiliary equipment.

Swift & Co., Waycross, Ga., are planning for the installation of a new refrigerating plant at their local meat-packing works. E. P. Thompson is local manager.

The J. M. Morse Lumber Co., Cogdell, Ga., is planning for the installation of new boring and turning machinery at its wood-working plant.

Pittsburgh

PITTSBURGH, Nov. 20.

LITTLE activity is noted in machine tools in this territory. Sales for the most part are of individual tools and are hardly numerous enough to be satisfactory, while it is rather discouraging to note that pending railroad lists are not showing signs of early letting. It is getting late in the year for the placing of business, and with inventory taking close at hand, some in the trade expect much business, against which quotations have gone in, to go over into the new year. Apparently, too, the weakness which has crept into the iron and steel market in the past three or four weeks is not without effect upon the attitude buyers now take toward the market, and while such price announcements coming out are advances, there is some doubt among buyers that they will lose much by waiting.

As far as steel company purchases are concerned, it may be said that the inability of railroads to take care of the steel freight offered has resulted in much piling of material, with the consequent tying up of considerable capital. Industry in Pittsburgh is not rolling up profits, because prices at which the output of the steel plants and foundries now is moving, in but few instances, are commensurate with producing costs. A local railroad which recently bought a 24-in. and a 30-in. lathe took used tools, because of prices. The Pittsburgh & Lake Erie Railroad has inquired for a 42-in. boring mill with side head and a 24-in shaper.

The Boye & Emmes Machine Tool Co., Cincinnati, this week notified its agents of an advance of 12½ to 15 per cent. in its entire line. Other lathe manufacturers are expected to advance prices also, but as yet have not acted.

Pending business in cranes remains heavy but actual orders are few. The Carnegie Steel Co. is likely to place the order for a couple of ladle cranes for its Duquesne works this week and it is believed the cranes to be placed by the Koppers Co. for the extension to the Carnegie Steel Co. by-product plant at Clairton also will be let this week. The Gulbert Steel Co., Pittsburgh, has bought a 5-ton crane from the Barber, Foster Co., Cleveland. Local engineering companies are busy on a large number of projects and are calling for quotations for estimating purposes. It is now reported that the Michigan Steel Corporation, First National Bank Building, Detroit, is to build a steel works in addition to a sheet mill. The Crucible Steel Co. of America is asking bids on drives for a 10-in. and a 16-in. mill, which it plans to move from one of its Syracuse, N. Y., plants to Midland, Pa.

A vocational department will be installed in the new high school to be erected at Woodlawn, Pa., estimated to cost $500,000. Carlisle & Sharrer, Jenkins Arcade, Pittsburgh, are architects.

Hubbard & Co., 6301 Butler Street, Pitsburgh, manufacturers of bolts, nuts, rivets, etc., have filed plans for a new one-story building to cost $20,000.

The Patterson Township Light Co., Pittsburgh, has been formed under State laws to install and operate a power house and system in a section of Patterson Township. C. J. Braun, Jr., 435 Sixth Avenue, is treasurer.

The Metal & Thermit Corporation, 120 Broadway, New York, manufacturer of welding apparatus, etc., is taking bids for a new two-story plant on Fayette Street, Pittsburgh, 40 x 100 ft.

The J. G. Dickson Co., 241 South Main Street, Pittsburgh, manufacturer of sheet metal products, has acquired a building in the Northside district for a branch factory.

The Brown Coal Co., Uniontown, Pa., is planning for the erection of a tipple at its recently acquired coal properties in the Bear Mountain district, Barbour County, W. Va. The plant, with machinery, is estimated to cost $75,000.

The Evans Lead Co., recently organized as a subsidiary of the Ohio Alloy Co., Fostoria, Ohio, with a capital of $1,000,000, has plans in progress for a new plant at South Charleston, W. Va., where 15 acres has been purchased. It will consist of two main units, four-stories and one-story, each 50 x 180 ft., for the manufacture of lead products, and is estimated to cost $100,000. S. M. Evans is president of both organizations.

The Blackwood Electric Steel Foundry Co., Sandusky, Ohio, has tentative plans for a branch plant at Parkersburg, W. Va., to manufacture small steel castings.

The City Council, Wheeling, W. Va., C. H. Dowler, city manager, will receive bids until Dec. 12 for two engine-driven, low service centrifugal pumps; one turbine-driven, high service centrifugal pump; three 350-hp. boilers, with stokers and auxiliary equipment; also, for three low service and three high service centrifugal pumping engines, motor driven, in units of 10, 15 and 20 million gal.

A manual training department will be installed in the new junior high school, two stories, 150 x 156 ft., to be erected at Oil City, Pa. B. L. Bailey, Chambers Building, is architect.

Griffith, Rodes & Co., Charleston, W. Va., operating a sheet-metal plant, are planning for the installation of additional equipment.

The E. E. White Coal Co., Glen White, W. Va., will commence the erection of a steel tipple, to cost in excess of $50,000.

The Simmons Co., 824 River Street, Pittsburgh, manufacturer of metal beds and springs, is asking bids until Dec. 9 for a two-story and basement factory branch and assembling works on East River Avenue, 180 x 195 ft., estimated to cost approximately $150,000.

Buffalo

BUFFALO, Nov. 20.

THE plant of the Batavia Rubber Co., Batavia, N. Y., has been purchased at a receiver's sale by the Fred Stearns Co., 1832 Broadway, and the Taylor, Armitage & Eagle Co., 120 Broadway, both of New York, for about $110,000. The new owners propose to form a joint company and operate the plant for the manufacture of automobile tires and other rubber products.

The Rochester Packing Co., 900 Maple Street, Rochester, N. Y., is planning for the installation of additional refrigerating and cold storage plant equipment.

The T. W. Warner Corporation, Toledo, Ohio, manufacturer of gears, has preliminary plans for enlargements in the plant of the New Process Gear Corporation, Syracuse, N. Y., lately acquired in conjunction with W. C. Durant, head of the Durant Motors, Inc., 1819 Broadway, New York. The entire works, comprising more than nine acres of floor space on completion of expansion, will be used for gear production for the Durant and Star automobiles. T. W. Warner heads the company.

The Niagara, Lockport & Ontario Power Co., Niagara Falls, N. Y., is negotiating for the purchase of power plants at Elmira and Binghamton, N. Y., to be extended and improved, and merged with the company's system. Plans are being perfected for an extension of high-tension power service to these cities. The company has recently acquired power plants at Jamestown, Salamanca and Bradford, N. Y., and Meadville, Pa.

The Acheson Graphite Co., Buffalo Avenue, Niagara Falls, N. Y., manufacturer of electrodes, electrical specialties, etc., is planning for the erection of a one-story addition.

The United States Gypsum Co., 205 West Monroe Street, Chicago, has taken title to prōperty at Oakfield, N. Y., comprising about 1000 acres of gypsum lands, and is said to be planning the erection of a new plant for the manufacture of blocks and other gypsum products.

A manual training department will be installed in the new three-story high school, 134 x 194 ft., to be erected at Hamburg, N. Y., estimated to cost $200,000, for which plans are being prepared by Frank Spangenberg, 250 Delaware Avenue, Buffalo, architect.

The Gray Machine & Parts Corporation, Batavia, N. Y., manufacturer of wrenches, automotive equipment, etc., contemplates the construction of a large addition.

E. L. Phillips & Co., 50 Church Street, New York, engineers, and George W. Olmstead, Ludlow, Pa., have negotiations under way for the purchase of the Hornell Electric Co., Hornell, N. Y. Extensions and improvements will be made in the plant and system. The Phillips company now controls the Nassau Light & Power Co. and the Long Island Power Co., New York.

The American Kardex Co., Main Street, Tonawanda, N. Y., manufacturer of office filing equipment, etc., is considering plans for a two-story addition, to cost $65,000.

The Jamestown Panel Co., Steele Street, Jamestown,

N. Y., will build a two-story addition. A list of equipment will soon be arranged.

The Crane Co., 836 South Michigan Avenue, Chicago, plans the erection of a new building at Church and Fourth Streets, Buffalo, for its local factory branch, estimated to cost $100,000.

The C. D. Reynolds Co., Alfred, N. Y., has plans for rebuilding its refrigerating and cold storage plant, recently destroyed by fire. New equipment will be installed.

Chicago

CHICAGO, Nov. 20.

NO further railroad buying has developed. The Chicago, Burlington & Quincy delays closing against its general list, and the Chicago, Milwaukee & St. Paul has just received figures on its inquiry issued two weeks ago. Inquiries for machine tools from miscellaneous sources are numerous, but there appears to be a growing disposition to postpone purchases until after the first of the year. This is reflected in a decline in the bookings of local dealers. There has also been a notable lack in sizable individual orders. Among the few reported was a purchase of seven turret lathes of various sizes by the Nash Motors Co., to be divided between its Milwaukee and Kenosha plants.

There are few changes in prices. The Rhodes Mfg. Co., Hartford, Conn., has advanced small shapers and slotters 20 per cent.

The Inland Steel Co. has ordered a 5-ton overhead traveling crane for its Chicago Heights plant from the Whiting Corporation.

The Ryan Car Co., with shops at Hegewisch, Ill., for the repair of freight cars, has leased the Elsdon car shops of the Grand Trunk at Fifty-first Street and Park Avenue, Chicago. The latter has been named the Elsdon Works of the Ryan Car Co., and will be used exclusively on repair work.

Voightman & Co., manufacturers of metal windows, 445-59 West Erie Street, Chicago, have purchased 65,000 sq. ft. at the northwest corner of Schubert and Keeler Avenues and are erecting a one-story plant to cost $125,000.

The Advance Window Frame Co., care Madison & Ibson Mfg. Co., manufacturer of sash and doors, 1818 West Austin Avenue, Chicago, is having plans prepared by Godfrey E. Larson, 4932 North St. Louis Avenue, for a one-story factory, 125 x 125 ft., at the southwest corner of West Division Street and Kildare Avenue, to cost $45,000.

The Ryan Car Co., Hegeswisch, Ill., has let a contract for an addition to cost $13,500.

The Mid-City Wire Frame Co., Inc., 1622 Fulton Street, Chicago, recently incorporated with $25,000 capital stock, will manufacture wire lamp shade frames, wire goods to order, wire dish drainers and wire canning racks. It has leased 24,000 sq. ft. at the address given and is in the market for the latest type of forming presses, welding machines and soldering outfits. Officers are Guy Dincognito, president; Michael Dincognito, vice-president, and Paul Dincognito, secretary-treasurer.

The Advance Wheel Mfg. Co., 125-127 West Illinois Street, Chicago, recently incorporated with $10,000 capital stock, manufactures polishing wheels for the jobbing trade only. Officers are James J. Manderscheid, president and general manager; P. Manderscheid, vice-president; Ralph J. Garvey, treasurer, and F. Garvey, secretary.

The National Electric Humidifier Co., 4311-13 East Ravenswood Avenue, Chicago, recently incorporated with $50,000 capital stock, manufactures tobacco humidifiers and kindred products. At present it is doing assembling work only, most of the parts being outside, but in due time expects to build or lease a plant for complete manufacturing operations. Officers are F. S. Stafford, president; F. Schaub, secretary-treasurer.

The National Copper & Steel Tank Works, 1275 Wade Street, Chicago, has purchased a newly constructed one-story factory, 75 x 125 ft., at 455-61 North Artesian Avenue.

The Duncan Foundry & Machine Works, Alton, Ill., is constructing an addition, 60 x 240 ft.

The Midland Iron Works, manufacturer of oil well tools, Billings, Mont., has started the construction of a branch plant, 30 x 60 ft., at Shelby and will equip it with a large steam hammer, a 26-in. x 18-ft. oil country lathe, engine lathes, drill presses, shapers, etc.

The Andrews Wire Works, Rockford, Ill., has let contract for an addition, 80 x 120 ft., to cost $20,000 exclusive of fixtures and machinery.

The Automatic Hot Machine Co., 726 Michigan Avenue, Chicago, recently incorporated with $75,000 capital stock, is a merchandising organization and will not engage in the manufacturing business. It will act as agent in the Chicago territory for the Scott-Newcomb oil burning heat machine manufactured by the Home Appliance Corporation, St. Louis.

The Western Engineering & Mfg. Co., 360 East Grand Avenue, Chicago, recently incorporated with $50,000 capital stock, is a subsidiary of the Western Valve Bag Co., and was organized to take over the manufacture of automatic bag-filling and other machinery heretofore manufactured by the latter company. The new organization will also manufacture the Cleveland friction clutch, formerly made by the Reliance Gauge Column Co., Cleveland.

The Chicago, Aurora & Elgin Railroad Co., Aurora, Ill., will make extensions in its power plant at Batavia, Ill., to cost $50,000. Additional equipment will be installed.

The Board of Directors, Olaf's College, Northfield, Minn., is revising plans for a new one-story power house to cost $50,000. John D. Small, 127 North Dearborn Street, Chicago, is mechanical engineer.

The Producers & Refiners' Corporation, California Building, Denver, Colo., has acquired property at Greensville, Wyo., for a new refinery. It will have an initial capacity of 10,000 bbl. per day, which will be more than doubled later. A pipe line 55 miles long will be constructed from the Ferris oil field to the new plant.

The Sioux City Gas & Electric Co., Sioux City, Iowa, has disposed of a bond issue of $3,500,000, a portion of the proceeds to be used for extensions and improvements. L. L. Kellogg is president.

A manual-training department will be installed in the new high school at De Witt, Iowa, estimated to cost $125,000.

The R. Hardesty Mfg. Co., Denver, Colo., manufacturer of power and irrigation equipment, has plans for the erection of new works, estimated to cost $200,000, including machinery. To carry out the project the company has disposed of a stock issue of $250,000.

The Linwood Stone & Cement Co., Kahl Building, Davenport, Iowa, has tentative plans for a new cement mill with daily capacity of 2000 bbl., estimated to cost $1,200,000.

Detroit

DETROIT, Nov. 20.

THE Ford Motor Co., Detroit, has awarded contract to the American Steel Co., Woodward Street, for a one-story assembling plant, 500 x 1400 ft., on property recently purchased at 180th Street and Torrence Avenue, Chicago. The new works will be equipped for a capacity of 450 assembled cars per day, and will be increased by the erection of additional stories later.

The Board of Education, Hancock, Mich., has plans in progress for a three-story high school, 80 x 335 ft., to cost $275,000, with vocational department to include a machine shop, forge shop, sheet-metal and wood-working shops, automobile and electrical shops. G. L. Lockhart, 1353 University Avenue, St. Paul, Minn., is architect.

Fire, Nov. 14, destroyed a large portion of the plant of the Monroe Body Co., Ludington, Mich., with loss estimated at $150,000, including machinery. It is planned to rebuild.

The Paige-Detroit Motor Car Co., Detroit, has taken over the former plant of the Hinkley Motors Corporation, West Fort Street, and will use the structure exclusively for assembling.

The Kalamazoo Paper Box Co., Kalamazoo, Mich., is perfecting plans for a three-story addition, totaling about 15,000 sq. ft. of floor area, estimated to cost approximately $200,000, including machinery.

The Chevrolet Motor Co., General Motors Building, Detroit, has plans nearing completion for a one-story works at Toledo, Ohio, 90 x 450 ft., for the manufacture of gears and transmission equipment; one-story heat-treating shop, 100 x 120 ft., and one-story power house, 60 x 90 ft. Albert Kahn, 1000 Marquette Building, Detroit, is architect.

The J. W. Murray Mfg. Co., 1975 Clay Street, Detroit, manufacturer of automobile fenders, etc., has awarded contract to J. H. G. Steffine, 3729 Cass Street, for a one-story addition.

The Ferndale Auto Parts Co., Ferndale, Mich., has been incorporated with a capital of $20,000 to manufacture automobile parts and other automotive equipment. The incorporators are Valentine S. Oberkoetter, Ferndale, and Albert C. Ratz, 4911 Wabash Avenue, St. Louis, Mo.

The Phillips Body Co., a subsidiary of the Fisher Body Co., General Motors Building, Detroit, has plans for new works at Ravenna, Ohio, to include the remodeling of an existing structure and the erection of a one-story addition, 40 x 100 ft., estimated to cost $45,000. The Carter-Richards Co., 923 Illuminating Building, Cleveland, is architect.

The Advance Specialty Co., Grand Rapids, Mich., has been organized under State laws to manufacture automotive products and mechanical specialties. The incorporators are Ralph O. Tucker, Laurence W. Smith and Irvin A. Kroft, 2 Tyler Court, Grand Rapids.

The Charles W. Marsh Co., Muskegon, Mich., manufacturer of leather packings and gaskets, is enlarging its plant by the construction of a building of 23,400 sq. ft. This will practically triple the company's productive capacity.

Indiana

INDIANAPOLIS, Nov. 20.

THE Northern Indiana Power Co., Kokomo, Ind., has been organized under State laws, with a capital of $3,500,000, to acquire and merge a number of electric power companies in this district. Application has been made for permission to purchase the companies operating at Kokomo, Rochester, Noblesville, Logansport, Sheridan and Roann, valued at $8,000,000, and for which bonds will be issued. Extensions and improvements will be made in the plants, including the installation of additional machinery. George J. Marott, president of the Indiana Railways & Light Co., Kokomo, heads the new organization.

The Tokheim Oil Tank & Pump Co., Wabash Avenue, Fort Wayne, Ind., has awarded contract to Wrigand & Son, Fort Wayne, for a one-story addition to cost $100,000, with equipment. C. O. Griffin is secretary.

The Puritan Bed Spring Co., 902 Kentucky Avenue, Indianapolis, manufacturer of wire springs, plans to immediately rebuild its enameling department, destroyed by fire Nov. 8.

The Machinery Clearing House, Indianapolis, has inquiries out for a 100-kw. generator, exciter, switchboard and auxiliary operating equipment. S. P. Grey is general manager.

The Period Cabinet Mfg. Co., Eighth Street, New Albany, Ind., has tentative plans in progress for a new two-story and basement addition, 100 x 200 ft., to cost $25,000, exclusive of machinery.

The Calumet Electric Co., Gary, Ind., has acquired the Wanatah-Lacrosse Electric Co., operating in the eastern section of Laporte County. The system will be merged with that of the purchasing company and extensions and improvements made in plants. Charles W. Chase heads the company.

Stockholders of the Home Brewing Co., Cruse and Daly Streets, Indianapolis, are considering a proposition to remodel the plant for a large ice-making and cold storage works, including the installation of new equipment. Newton Todd, 415 Lemcke Building, recent purchaser of the plant, is at the head of the project.

A complete ice-manufacturing and refrigerating plant will be installed in the proposed city market building, Indianapolis, estimated to cost $1,000,000. The site of the present market and Tomlinson Hall will be used. The City Council is in charge.

The Indiana Furniture Co., 316 West Indiana Street, Evansville, Ind., will install machinery at its plant to cost $20,000, in connection with the remodeling of a warehouse for manufacturing works.

Cleveland

CLEVELAND, Nov. 20.

LOCAL machine tool builders report an increase in sales and inquiries. Orders are mostly small, usually ranging from one to three machines, and come from scattered sources, although the activity is more pronounced in the automobile trade. Among lines that have improved considerably this month are automatic screw machines and turret lathes. Cleveland machinery houses continue to do a fair volume of business in single tools.

Orders placed during the week include one from the Standard Oil Co. for a lathe, milling machine, automatic screw machine, and a shaper, and another order booked involving about a half dozen machines. The Cleveland Board of Education has [illegible] machines for the John Adams School.

The Electric Auto Lite Corporation, Toledo, Ohio, has purchased 13 machines, seven grinding machines and six automatic screw machines from a local dealer. Two good orders for turret lathes, each for six or seven machines, were placed with a Cleveland builder during the week, one by the Nash Motors Co., Kenosha, Wis., and another by the Rickenbacker Motor Co., Detroit.

A Central Western turret lathe manufacturer has made new price adjustments, representing advances from a small amount up to 12½ per cent. Some machine tool builders still find that production costs are advancing, labor being the principal item that is increasing. However, they expect that the cost of castings will show some increase Jan. 1 compared with the prices for which they were able to contract in the last half of this year.

The H. H. Franklin Co., Syracuse, N. Y., has advised a Cleveland machinery manufacturer that it has postponed the erection of its plant for the manufacture of four-cylinder air-cooled motor cars.

The Ohio Pumping Machinery Co., Akron, Ohio, has taken bids for a new plant.

The American National Co., Toledo, Ohio, manufacturer of metal wheels, toy vehicles, etc., has purchased a site adjoining its plant and will build an addition estimated to cost $250,000. It will be seven stories, 100 x 300 ft., of steel and concrete.

The Fairfield Engineering Co., formerly operating a plant at Lancaster, Ohio, which was burned recently, has secured a new location in Marion, Ohio, where it will shortly begin the erection of new works, consisting of a main factory building, 50 x 80 ft., and a warehouse. The company manufactures conveying machinery. It will be reorganized and will have a capital stock of $150,000, of which $100,000 will be in common stock and $50,000 in preferred. Henry B. Walker is president.

The Hadfield-Penfield Steel Corporation, Bucyrus, Ohio, has completed an addition, 35 x 112 ft., to be used as a flask floor for small manganese steel castings, and has under construction a molding room, 75 x 80 ft.

The International Harvester Co., Chicago, plans the erection of a ten-story warehouse and service station on East Fifty-fifth Street, Cleveland, at an estimated cost of $300,000.

Milwaukee

MILWAUKEE, Nov. 20.

SALES of machine tools the past week were about equal to the average of the last three or four weeks, while inquiry was well sustained. The intermission of production by many passenger automobile concerns has developed inquiry on new and replacement needs of floor equipment which will be placed between now and spring. Railroad buying, so far as this market is concerned, is of limited volume. Local industries are fair buyers of miscellaneous equipment, but no large lots are in evidence. The Milwaukee Rolling Mill Co. is inquiring for some additional equipment for an extension of its main sheet mill. The Harley-Davidson Motor Co. is in the market for equipment for a new heat-treating building. Structural shops are getting some scattering business, which is divided principally into small jobs for industrial and commercial extensions, public garage construction, etc.

Fairbanks, Morse & Co., Chicago, is transferring the pump department of its Eclipse works in Beloit, Wis., to the branch works in Three Rivers, Mich., to make practically all of the Beloit plant available for the production of farm gas engines and combinations for agricultural purposes. The changes will require considerable retooling, which will be effected gradually. A large gray iron shop has been erected and equipped at Beloit during the past two years. W. C. Heath is general manager of the Eclipse works.

The Wisconsin Gray Iron Foundry Co., Milwaukee, has started work on additions to and alterations in its shop at Thirty-ninth Avenue and Burnham Street, to provide an increase of about 50 per cent in capacity. New melting, core making and cleaning room equipment has been purchased. E. T. Brennan is works manager.

The new building to be erected for the Harley-Davidson Motor Co., Milwaukee, by the Federal Engineering Co., 444 Milwaukee Street, local, as noted in THE IRON AGE of Nov. 16, will be equipped as a heat treating department. It will be 80 x 145 ft., one story, of brick and steel, and is estimated to cost $45,000, including equipment, which is to be purchased at once. William Davidson is general works manager.

The Milwaukee-Western Fuel Co., 120 Wisconsin Street, Milwaukee, has let the general contract to Klug & Smith, 30 Mack Block, local, for a two-story brick and concrete building, 120 x 138 ft., at Clinton and South Pierce Streets, to be equipped as a general machine, repair and service shop. It will cost about $80,000. A list of miscellaneous tool equipment, fixtures, etc., will be purchased. William F. Ardern is vice-president and general superintendent.

Thompson Brothers, Peshtigo, Wis., manufacturers of boats and canoes, are erecting a three-story addition, 96 x 160 ft., to be used largely for the production of hulls and equipment for power launches, a new department being established. The plant will contain more than 60,000 sq. ft. when the improvement is completed. Additional metal and wood-working equipment is being purchased.

Forest H. Hines, who retired recently from the Stevens Lumber Co., Rhinelander, Wis., has purchased five acres at Crandon, Wis., and will build a sawmill and a planing mill next spring at a cost of $50,000.

The F. Rassmann Mfg. Co., Beaver Dam, Wis., manufacturer of steel barn equipment and stable fixtures, is adding some new equipment for the production of malleable disk wheels for automobiles, and a line of children's coaster wagons.

The Wisconsin Cylinder Grinding Co., Milwaukee, has been incorporated with $15,000 capital stock by Herman Kiekow, Jr., who owns and operates a machine shop at 326 Sixteenth Avenue, which will be enlarged and re-equipped especially for gas engine repairs requiring tool operations

The Standard & Specialty Porcelain Works, Inc., Sun Prairie, Wis., have been organized with $20,000 capital stock by E. A. Chase, A. F. Fuhrmann and O. E. Weisensel, all of Sun Prairie, to manufacture enameled goods. The new concern has taken over the plant of a defunct spark plug manufacturing concern and for the present will need little new equipment.

The Spring City Auto Co., Waukesha, Wis., has let the general contract to the Federal Bridge & Structural Co., local, for a brick and steel addition, 65 x 190 ft., for a service and repair works. Equipment has not yet been purchased. Peter and Ben Wolf are the proprietors.

The American Carbonic Machinery Co., Wisconsin Rapids, Wis., is erecting a brick and steel addition, 60 x 175 ft., to be equipped with electric welding devices, heating ovens, bending machines, etc., for the production of coils and tanks for its artificial ice machines. The improvements will cost about $75,000. Otto E. Roenius is general manager.

The Valley Paper Mills, Inc., Neenah, Wis., has let the general contract for a new pulp and paper plant estimated to cost, with equipment, approximately $800,000, to the Appleton, Wis., Construction Co. Work on the foundations was started Nov. 10. F. F. Wettengel, Appleton, is architect. G. W. Burnside is secretary and general manager.

The Phoenix Light Co., 525 Market Street, Milwaukee, manufacturer of electric light fixtures, portable lamps, etc., contemplates enlargement of its works and has issued $125,000 in preferred stock to finance the program, which will be undertaken shortly after Jan. 1. Details are not yet available. Joseph Sable is president.

The Wisconsin Ice & Coal Co., 216 West Water Street, Milwaukee, a dealer in coal and natural ice, has decided to enter the artificial ice production field and will build a two-story plant, 114 x 120 ft., at Thirty-first and Galena Streets, estimated to cost $75,000. Ice and refrigerating machinery probably will be purchased from local manufacturers. Luhr & Friedl, 154 West Randolph Street, Chicago, are in charge as architects and engineers. John H. Kopmeier is president of the ice company.

The Aluminum Specialty Co., Manitowoc, Wis., has contracted with William F. Mielke, local builder, for a three-story plant and warehouse addition, 32 x 150 ft., to be ready for equipment about Jan. 1. The building and machinery will represent an investment of about $50,000.

The Giljack Auto Truck Body Co., Jackson, Wis., is a new $25,000 corporation organized by W. J. Gilbert, E. A. Prahl and P. J. Hayes to engage in the manufacture of special body equipment for commercial motor vehicles.

The Aug. C. Beck Co., Sixth and East Streets, Milwaukee, manufacturer of wooden boxes, hardwood flooring, etc., let the general contract to H. Schmitt & Son, Inc., 430 Farwell Avenue, for a two-story brick and mill wood-working factory, 145 x 200 ft., to replace the main building destroyed by fire recently. Practically a full complement of production machinery and some new engine and boiler house equipment is being purchased.

The Automobile Gasoline Gauge Mfg. Co., Eau Claire, Wis., has been incorporated with a capital stock of $20,000 by C. E. Knobloch, E. A. Kuehl and V. X. Stiets, who have leased an existing building and will manufacture metering and measuring devices.

Cincinnati

CINCINNATI, Nov. 20.

THE machine tool trade is quieter than it has been in many weeks, and although a few orders for single machines are being booked, lack of heavy purchases, recently made by railroads and industrial companies, makes the market dull by comparison. Some manufacturers are of the opinion that recent price advances, which had the effect of bringing to a head a great number of deals which had been hanging fire for some time, may have had some effect on the situation, in that it practically cleaned up all the lists of tools required, but the more general opinion seems to be that, with the rapid approach of the inventory period, buyers are content to wait until next year's appropriations have been made up. There are, however, a number of good prospects out, and it is expected that action on the Pennsylvania list will be taken before the end of the week. This is expected to be the biggest purchase of the year, as it is said that in addition to the tools already inquired for, a number of additional machines for various shops will be bought.

The Board of Education, Columbus, Ohio, will open bids Dec. 11 at its offices in the Ohio National Bank Building, on two 12-in. speed lathes and three 30-in. band saws and equipment. Proposals must be submitted on an f.o.b. Columbus basis, and must be accompanied by a certified check equal to 20 per cent of the amount of the bid. Bids may be made separately or on all equipment.

The Stutz Motor Car Co. of America, Indianapolis, which recently passed into the control of Charles M. Schwab and associates, has purchased the property of the Empire Motor Co., Indianapolis, and will erect a number of additional buildings for the production of a new six-cylinder car. The present plant of the company will be devoted exclusively to the production of four-cylinder cars.

The Union Traction Co. of Indiana has completed plans for an addition to its central power plant at Anderson, Ind., which will provide sufficient power to operate its 460 miles of electric car lines throughout the State. New power generating equipment will be installed.

The Gulf States

BIRMINGHAM, Nov. 20.

A SPECIAL meeting of stockholders has been called by the Magnolia Petroleum Co., Galveston, Tex., for Dec. 2 to increase the capital from $120,000,000 to $180,000,000, a portion of the proceeds to be used for extensions and improvements. W. C. Proctor is treasurer.

The Peninsular Ice & Cold Storage Co., Grandview Avenue, Daytona, Fla., is arranging for a new ice-manufacturing and refrigerating plant.

G. L. Jones, Marble Falls, Tex., operating the local electric light and power plant, recently acquired from M. H. Reed, has plans in progress for extensions and improvements, including the installation of additional equipment.

The Brown Mfg. Co., Houston, Tex., manufacturer of screens and kindred wire equipment, has arranged for the establishment of a branch factory at San Antonio, Tex.

The Oak Cliff-Nash Co., Oak Cliff, Dallas, Tex., recently organized to represent the Nash automobile, has arranged for the erection of a new service and repair works at Tenth and Marsalis Streets. Prior to completion and the installation of equipment, the company will be temporarily located at 126 Marsalis Street. D. D. McLarty heads the company.

The plant of the Liberty Oil Refining Co., Cisco, Tex., has been acquired by new interests, headed by L. H. Christman. Plans for extensions and improvements are being prepared, including the installation of additional equipment to increase the capacity to 3000 bbl. per day. The work is estimated to cost $50,000.

The Chamber of Commerce, Florence, Ala., is perfecting plans for a hydroelectric power plant on Cypress Creek, for local light and power service. It is proposed to organize a company to operate the property.

A manual training department will be installed in the proposed junior high school buildings to be erected at Hubbard and Tenth Streets, Jacksonville, Fla., for which bids are being received on a general contract until Dec. 9. The cost is estimated at $300,000. Greeley & Benjamin, office of the school board, are architects.

The Santa Fe Railroad Co., 80 East Jackson Boulevard,

Chicago, has arranged for the immediate erection of its proposed new boiler and locomotive shops at Albuquerque, N. M., designed to be the largest shops of their kind on the system. The plant will cost in excess of $200,000, with machinery.

The Catron Mfg. Co., Bonham, Tex., manufacturer of visible pumps and similar equipment, has leased the Steger Building, South Center Street. The present works will be removed to this location and considerably increased with the installation of additional machinery.

Fire, Nov. 12, destroyed a portion of the oil storage and distributing plant of the Gulf Pipe Line Co., Humble, Tex., a subsidiary of the Gulf Production Co with loss estimated at about $500,000, including tanks, machinery, stock, etc. It is planned to rebuild.

The Goddard Lumber Co., Wetumpka, Ala., is planning the erection of a new mill at Washington Park, Ala., to replace its local plant, recently destroyed by fire with loss of $75,000. The local site will be discontinued.

A manual training department will be installed in the proposed new high school to be erected at Canyon, Tex., estimated to cost $100,000. E. F. Rittenbury, Amarillo, Tex., is architect.

The Marion County Ice Co., Ocala, Fla., is planning for the installation of new electrical and mechanical equipment, including generator, engine, etc., and will soon have inquiries out for the machinery.

A complete mechanical repair shop will be installed in the new two-story works, 40 x 60 ft., to be erected at Evergreen and Young Streets, Dallas, Tex., by the Safety Tire Repair Co., 517 South Ervay Street. W. E. English is head.

The Deeson Compress Co., Deeson, near Rosedale, Miss., has tentative plans for rebuilding its plant, destroyed by fire Nov. 14, with loss estimated at $150,000, including equipment.

The West Texas Utilities Co., Stamford, Tex., has plans under way for extensions and improvements in the local power plant and system, operated in the name of the American Public Service Co., estimated to cost approximately $50,000.

New pumping machinery and other power equipment will be installed at the waterworks, Elgin, Tex., by the Common Council, in connection with extensions and improvements to cost $40,000.

The Attalla Motor Co., Attalla, Ala., will install a complete machine shop and mechanical repair department in its new building, 50 x 125 ft., now in course of erection on Fourth Avenue.

A vocational department will be installed in the proposed new high school to be erected at Galveston, Tex., estimated to cost $500,000. De Witt & Lemmon, Dallas, Tex., are architects.

Electrically-operated pumping machinery and other mechanical equipment will be installed at the waterworks, Panhandle, Tex., in connection with enlargements in the plant, estimated to cost $54,000.

Plans are nearing completion for rebuilding the power plant at the Chickasaw County Agricultural High School, Buena Vista, Tex., recently destroyed by fire

The Pacific Coast

SAN FRANCISCO, Nov. 14.

THE Martin Products Co., Oakland, Cal., manufacturer of automobile equipment, metal stampings, etc., has leased property in Emeryville for a new plant. Immediate possession will be taken and equipment installed. O. G. Meyers is president and C. W. Martin, vice-president.

The Shell Oil Co., San Francisco, has awarded contract to the William A. Heitman Construction Co., Merritt Building, Los Angeles, for a new refinery at Wilmington, Los Angeles harbor. It will include a power plant, machine shop [illegible] with machinery.

[illegible] a local ice [illegible] on Walnut Avenue, estimated to cost $50,000.

The Teetor Adding Machine Co., 502 Pacific Finance Building, Los Angeles, has awarded contract to Hamm & Grant, Ferguson Building, for its one and two-story plant at Pomona, Cal., 100x300 ft., and 35x100 ft., respectively.

[illegible] Corporation, Fresno, Cal., has disposed of bonds to an amount of $140,820, a portion of the [illegible]

The Banner Refining Co., Kohl Building, San Francisco, [illegible]

The Western Stove Co., Oakland, Cal., is negotiating [illegible]

Pomona, Cal., for a site for a new plant estimated to cost $75,000. J. J. Vaughn is head.

L. E. Chastain and D. A. New, Van Nuys, Cal., have purchased property, 200x255 ft., at Bessemer Street and Cedros Avenue, for a new ice-manufacturing and refrigerating plant. A company will be formed headed by the parties noted, and plans prepared at once.

The Veneer Products Co., Seventeenth and Dock Streets, Spokane, Wash., will make extensions in its power plant and mill. The latter will be increased from 50 to 250 tons in capacity. The expansion is esimated to cost $200,000.

The Central South

ST. LOUIS, Nov. 20.

THE Electric Storage Battery Co., 1619 Walnut Street, Kansas City, Mo., with headquarters at Philadelphia, has awarded a contract to the Fogel Construction Co., Reliance Building, for the first unit of its local plant, one-story and basement, 160 x 220 ft., estimated to cost $120,000. Hans Von Unwerth, Finance Building, Kansas City, is engineer.

The Common Council, Fredericktown, Mo., is arranging for the installation of additional equipment at the municipal power plant, to cost about $25,000.

The Coleman Lamp Co., 220 North St. Francis Street, Wichita, Kan., has awarded contract to John M. Denny, 1450 North Lawrence Street, for a one-story addition for the manufacture of stoves. H. W. Strong is general manager.

The Cincinnati, Newport & Covington Railway Co., Newport, Ky., a subsidiary of the Columbia Gas & Electric Co., Cincinnati, operating electric power utilities, is disposing of a bond issue of $4,000,000, a portion of the proceeds to be used for extensions and improvements.

The United Railways Co., Thirty-ninth Street and Park Avenue, St. Louis, will construct by day labor its new one-story power plant at Union Avenue and Maple Street, to cost in excess of $75,000.

Fire, Nov. 9, destroyed the plant of the Continental Machinery Co., Chattanooga, Tenn., with loss estimated at $200,000, including machinery. It is planned to rebuild.

The Common Council, Poplar Bluff, Mo., is planning for the installation of additional machinery at the municipal electric power plant, to cost about $20,000.

The Galvin Electric Mfg. Co., St. Louis, manufacturer of small motors, radio equipment, etc., has acquired a building at 3320 South Broadway, with considerably increased floor space, and will remove to this location at an early date. Additional equipment will be installed. J. F. Galvin is president.

The White Co., 2001 Grand Avenue, Kansas City, Mo., manufacturer of automobile trucks, with headquarters at Cleveland, has awarded contract to the George M. Bliss Construction Co., 510 Lathrop Building, for a two-story and basement service and repair building at Twenty-ninth and Walnut Streets, 100 x 250 ft., estimated to cost $100,000.

The Merit Veneer & Box Co., Pine Bluff, Ark., recently organized, has acquired a building for the establishment of its proposed plant. Equipment will be purchased at once. H. F. Buechner is secretary and treasurer.

H. S. Hoefflin, 1516 North Waco Avenue, Wichita, Kan., operating a general woodworking plant, is planning for the installation of motors, belting, shafting and other equipment. H. S. Hoefflin heads the company.

The Louisiana & Arkansas Railway Co., Stamps, Ark., has awarded contract to Herman & McCain, Little Rock, Ark., for a new one-story locomotive repair shop, estimated to cost $150,000. Harrington, Howard & Ash, Orear-Leslie Building, Kansas City, Mo., are architects.

The Missouri-Kansas-Texas Railway Co., St. Louis, will soon commence the erection of additions to its grain elevator at Kansas City, Mo., estimated to cost $2,000,000. The machinery installation will approximate $800,000, including motors and power equipment, conveying machinery, etc.

The Light Development Co., St. Louis, Railway Exchange Building, has preliminary plans under way for a new electric generating plant on the Mississippi River, with initial capacity of 20,000 kw., estimated to cost $1,750,000.

The Common Council, Wetumka, Okla., has authorized plans for extensions and improvements in the municipal electric plant and system, including the installation of additional equipment. Plans and estimates of cost will be made by V. V. Long & Co., 1300 Colcord Building, Oklahoma City, Okla., and bonds voted.

The plants and properties of the Memphis Gas & Electric Co., Memphis, Tenn., have been acquired at a receiver's sale by new interests, headed by H. C. Abell, 120 Broadway, New York, banker, for $10,000,000. The company will be reorganized under the name of the Memphis Power & Light Co.

The new owners have agreed to expend $2,000,000 within 18 months in extensions and improvements.

A manual training department will be installed in the new two-story and basement high school to be erected at Pleasant Hill, Mo., estimated to cost $125,000. W. H. Sayler & Co., 306 Mutual Building, Kansas City, Mo., are architects.

The National Forge Co., 1572 Cherokee Road, Louisville, will commence the erection of a one-story foundry, 60 x 120 ft., at 2920 Garland Avenue. Whitfield Clark is president.

The Kansas City Bolt & Nut Co., Winchester Avenue, Kansas City, Mo., has disposed of a common stock issue of $400,000, a portion of the proceeds to be used for extensions.

The Gager Lime & Mfg. Co., Chattanooga, Tenn., is planning for the installation of additional equipment, including disk crusher, stone washer of 200 tons capacity, operating equipment and other mechanical apparatus. M. P. Kennedy is secretary.

A vocational department will be installed in the new two-story and basement high school, 70 x 130 ft., to be erected at Morristown, Tenn., estimated to cost $180,000, for which bids will soon be asked. C. T. Jones, 1102 James Building, Chattanooga, Tenn., is architect.

J. B. Greenway, Roanoke, Va., is organizing a company to establish and operate a plant at Columbia, Tenn., for the manufacture of automobile tires and tubes and other rubber products.

The Aeromotor Co., 1215 West Eighth Street, Kansas City, Mo., recently organized with a capital of $350,000 to manufacture windmills and kindred machinery, has awarded contract to Fred Crites, 2136 Belleview Avenue, for the initial building of its proposed plant at Ninth and Hickory Streets, one-story and basement, 118 x 120 ft. Henry Thompson is one of the heads of the company.

The City Light & Traction Co., Sedalia, Mo., has plans for a new power house to cost about $350,000.

Canada

TORONTO, Nov. 20.

BUSINESS in machine tools still shows improvement, and while railroads are buying only in a small way, industrial concerns are entering the market for a wide variety of equipment. Inquiries leading to sales are numerous and it is the opinion that November sales will be well up to the mark reached during October. Equipment for iron and steel-working plants is in stronger demand, but wood-working tools and machinery continue to head the list of requirements. Small tools are also more active.

Increased prices which recently went into effect continue to hold, but in some localities shading is still resorted to by some dealers.

The Levis County Railway, Levis, Que., is in the market for a 32-in. lathe, screw jack car hoist, shaper, vertical drill, double-end emery grinder, combination circular saw, planer, band saw and small lathe. E. E. Weyman is manager.

The J. Buckley Estate, Nordin, B. C., will rebuild a sawmill recently destroyed by fire, and is in the market for equipment.

The Standard Shingle Co., Vancouver, B. C., will erect a mill and is asking information regarding equipment.

The producer house of the Sun Brick Co., Don Valley, Todmorden, Toronto, was destroyed by fire with a loss of $10,000. It will be rebuilt immediately.

The plant of the Electroplax Co., Mount Dennis, Ont., manufacturer of electrical insulation equipment, etc., was destroyed by fire with a loss of $100,000. The bulk of the damage was to the machinery and contents of the plant.

The British Columbia Electric Co., Vancouver, B. C., in addition to improvements to its power plant on the Stave River, is planning the construction of a new power house further down the river, to cost $10,000,000. It is estimated that the new plant will develop 100,000 hp.

Stetson-Cutler & Co., St. John, N. B., will rebuild a planing mill recently destroyed by fire and are interested in equipment.

The National Brake Co., Ellicott Building, Buffalo, N. Y., is preparing to erect a branch plant at Bridgeburg, Ont.

Eucher Caron & Son, 158 Chamberlain Street, Hull, Que., have the general contract for the erection of a plant in the Wrightville district, to cost $55,000, for the Lion Meade Tire Co., Hull.

Preliminary plans are being prepared for a dam and power house, to cost $700,000, at Drummondville, Que., for the Southern Canada Power Co., 20 St. Nicholas Street, Montreal. J. H. Trimmingham is chief engineer.

Logan Township, Ont., will install an electric power plant and distributing system. L. G. Rock, Brodhagen, Ont., is clerk.

The Standard Steel Co., Welland, Ont., is contemplating establishing a plant in Quebec for the manufacture and fabrication of steel for bridge and general construction purposes. It is stated that it will operate under the name of Le Construction Cie, Ltd., and will begin work on a plant about two miles from the city next spring. Between 40 and 50 men will be employed at the start.

The H. Mueller Mfg. Co., Ltd., Sarnia, Ont., manufacturer of plumbers' supplies, etc., will install considerable new equipment to increase its output.

The National Cash Register Co. of Canada, Ltd., Toronto, has purchased a four-story building at the corner of Bloor and Dufferin Streets, which will be equipped and used as a manufacturing plant. It has also secured adjoining land for additions.

The Dominion Insulator & Mfg. Co., a branch of the Ohio Brass Co., Mansfield, Ohio, has started work on the erection of a plant at Niagara Falls, Ont., which is expected to be completed by the first of the year. The company will manufacture high-tension porcelain insulators, trolley material, rail bonds for electric railroads and mines, electric car equipment, etc.

The Cling Cutlery Corporation of Canada, Ltd., has taken over the building formerly owned by the Fulton Motor Co., Welland, Ont., and will convert it into a plant for the production of cutlery, etc.

The Canadian Advance Car Mover Co., Welland, Ont., recently incorporated with a capital stock of $40,000 for the manufacture of railroad car movers, safety car wrenches, car door rollers, tools, etc., contemplates establishing a local plant. The provisional directors include Richard and Walter Miller, both of Appleton, Wis.; Henry J. Adian, Niagara Falls, N. Y., and Richard D. Spencer, Welland, Ont.

Plans have been prepared for the erection of a plant at Welland, Ont., for the Welland Packing Co., Ltd. It will be three stories, 70 x 96 ft., of concrete and steel. The building will cost $50,000 and machinery and equipment $25,000. The directors include Frank Ahman, president, Welland, Ont.; George A. Reist, vice-president, Kitchener, Ont.; Nicholas Verves, secretary, Welland.

The Sully Brass Foundry, Ltd., Toronto, is equipping a new brass foundry at 2388 Dundas Street West, for the production of brass, bronze and aluminum castings.

The Beaver Laundry Machinery Co., Ltd., Toronto, is occupying temporary quarters at 80 Perth Avenue, but later intends to erect a new plant. The company is capitalized at $50,000. W. G. Fraser, president of the Beaver Soap Co., is president, and H. L. Howard is resident manager.

W. D. Beath & Son, 394 Symington Avenue, Toronto, engineers, are building a two-story boiler room, 60 x 152 ft. in connection with their plant.

James Stewart, president Maple Leaf Flour Mills and of the James Stewart Grain Co., will erect a terminal elevator at Port Arthur, Ont., to have a capacity of 1,500,000 bushels and cost $850,000. Construction will be started during the winter.

Crucible Steel Showing Profit

Chairman Horace S. Wilkinson of the Crucible Steel Co. of America told the stockholders at the annual meeting that the company is now operating at a profit. Mr. Wilkinson said in part:

"The month of October shows the largest increase in orders over the preceding month that we have had at any time since the depression began, and we take pleasure in stating that it is our belief that the tide has turned, and that in the near future we will be able to make a substantial profit. The item of stock subscription mentioned in your annual report has been paid and the $5,000,000 has been deposited to the credit of the company. The bills payable have been paid and the company now has no outstanding current liabilities except the usual monthly bills which are for the material used in each current month's business. We look forward with great confidence."

The directors of the company were re-elected.

The Osgood Co., Marion, Ohio, manufacturer of steam shovels, has established a district sales office at 30 Church Street, New York, M. E. Pullen in charge. All business formerly handled by M. E. Davis will be handled through this office.

The foundry formerly owned by the Timken-Detroit Axle Co., 100 Clark Avenue, Detroit, has been purchased by the Dayton Malleable Iron Co., Dayton, Ohio.

The present address of the Robinson Adjustable Center Co., manufacturer of centers with adjustable high speed steel points, is 9552 Quincy Avenue, Detroit. It is moving into its new factory at 31 Woodbridge Street.

STEEL AND INDUSTRIAL STOCKS

Sentiment Shows Improvement Following Pessimism a Few Days Before

In contrast to the pessimism prevalent in the early part of last week when wild rumors were abroad, the sentiment insofar as steel and industrial stocks were concerned brightened up at the close, even in spite of the irregularity. In the wake of Monday's numerous declines came a severe reaction and the heaviest selling for months, bringing drops of from one to five points. Impressive gains were made at midweek in Steel, Republic, Baldwin and American Car. What turned the tide none could tell, but the abrupt upward reaction from earlier declines may be remembered as an instance where stocks did not move at all in accord with tangible events, but rather in line with confused guesses and vague apprehensions. Trading lagged toward the end, transactions dividing about equally between strength in stocks like Baldwin and Continental Can, and weakness in such issues as Replogle.

	Low	High
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
Am. B. S. & Fdy.	70½	73
Am. B.S. & F. pf.	110	110
American Can...	68¼	72⅞
[illegible]	[illegible]	[illegible]
Am. Car & Fdry.	175	180¾
Am. Car & F. pf.	124	124
American Loco..	120	124
[illegible]	[illegible]	[illegible]
Am. Radiator...	112	116
[illegible]	[illegible]	[illegible]
Am. Stl. Fd. pf..	104½	105½
Baldwin Loco...	121¼	126⅝
Bald. Loco. pf..	116½	118
Bethlehem Steel.	63	67
Beth. Steel Cl. B	63⅞	68⅝
Beth. Stl. 8% pf.	111	111
Brier Hill.....	15	15½
Br. Em. Steel...	9	9¼
Br. Em. Stl. 1 pf.	67¼	69
Br. Em. Stl. 2 pf.	27½	29¼
Cambria Steel...	41	41
Chic. Pneu. Tool	78½	80¾
Colo. Fuel.....	26	28⅝
Crucible Steel...	61	75¼
Crucible Stl. pf..	92	94⅝
Deere pf.	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
Gen. Electric...	172	177
Gt. No. Ore Cert.	10½	11⅛
Gulf States Steel	69	83⅜
Inland Steel.....	44	44

	Low	High
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
Lackawanna Stl.	75½	79¾
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
Nat.-Acme	9½	12½
Nat. En. & Stm.	62	64¼
Nat. E. & St. pf.	100½	102
[illegible]	[illegible]	[illegible]
Nova Scotia Stl.	30	36
[illegible]	[illegible]	[illegible]
Otis Steel pf....	45	51
P'burgh Stl. pf..	92	92
Pressed Stl. Car	78	83¼
Pressed Steel pf.	100	101
Ry. Steel Spring.	109	114
Ry. Stl. Spg. pf.	120	120
Replogle Steel...	21¾	26¼
Republic	46	47⅞
Republic pf.....	80	82
Sloss	39¼	42½
Steel of Canada.	59¾	61
Superior Steel...	27	30½
Transue-Williams	32½	33
Un. Alloy Steel..	36	36
U. S. Pipe.....	25	28½
U. S. Pipe pf....	85	87½
U. S. Steel.....	102¾	106¼
U. S. Steel pf...	120½	121⅝
Vanadium Steel.	34	36¾
Va. I., C. & Coke	57	57
Wh'ouse Air Br.	95	98

Industrial Finances

The Moore Drop Forging Co. has changed its authorized common stock from 50,000 shares of $5 par to 1655 shares of $100 par, authorized common then to be increased to 20,000 shares of $100 par. The balance sheet of Oct. 2, showed a surplus of $2,183,502.

The Standard Sanitary Mfg. Co., Pittsburgh, has declared a stock dividend of 40 per cent on its common stock, in addition to the regular quarterly cash dividend of 2 per cent and an extra of 2 per cent.

The American Steel Foundries has declared a stock dividend of 18 per cent, equivalent to $6 per share on outstanding common stock, payable Dec. 30 to stock of record Dec. 9. The company reports a surplus for the first nine months of $2,317,357 after charges and Federal taxes. Its net earnings were $3,157,463.

The real estate, buildings and equipment of the Pfau Mfg. Co., Norwood, Ohio, plumbing supply manufacturers, will be sold at public auction on Nov. 22.

The Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich., has sold to the Continental & Commercial Trust Co., Chicago, an issue of $850,000 first mortgage serial 6½ per cent gold bonds. The money will be used to redeem an issue of the company's first mortgage serial 7 per cent gold bond issue.

For the nine months ending with September earnings of the Timken Roller Bearing Co. amounted to $6,339,000, after [illegible] were larger than those for September, and the showing so far this month is on a par with October.

The Apperson Brothers Automobile Co. has sold $700,000 10-year 7 per cent first mortgage bonds to New York and Chicago bankers. These bonds are a direct obligation and constitute the only funded indebtedness. Money derived from the sale of these bonds will enable the company to place on the market a popular-priced car, of which it is proposed to manufacture approximately 4000 the first year in addition to 2500 eight-cylinder cars.

An issue of $2,000,000 15-year 7 per cent sinking fund bonds has been sold by the Rolls-Royce Co. of America, Springfield, Mass. Funds derived from their sale will be used to refund higher interest-bearing obligations and as working capital. The bonds are dated Sept. 1 last and carry a sinking fund provision dated 1924.

Bankers have purchased $750,000 McNab & Harlin Mfg. Co. 20-year 7 per cent first mortgage sinking fund bonds, thereby providing additional working capital for the company, which produces iron, semi-steel, steel and brass pipes and fittings.

The Central Vermont Railway has sold $754,000 6 per cent equipment trust notes, series E, dated May 1 last and maturing Nov. 1, 1922, to 1927, at the rate of $49,000 semi-annually, and Nov. 1, 1927, to May 1, 1930, at the rate of $44,000 semi-annually. Money derived from the sale of these notes will be used to pay in part for 500 30-ton steel underframe rebuilt box cars and 200 50-ton all-steel hopper rebuilt coal cars purchased from the American Car & Foundry Co. at a cost of $1,107,571.

The board of directors of the Reynolds Spring Co., Jackson, Mich., has declared a dividend of 1¾ per cent on preferred A and B stock, payable Jan. 1, 1923, to stockholders of record Dec. 18, 1922.

In the report of the Carbon Steel Co., Pittsburgh, for the fiscal year ended Sept. 30, an operating loss for the year of $366,135 is shown, after taxes, insurance, depreciation, etc. No dividends were declared. The total reduction made on the surplus account was $542,023.

The Remington Typewriter Co., Bridgeport, Conn., has paid off during the past year all of its $1,650,000 bank loans, and in addition has paid $90,000 for agencies in Germany. The sale of the company's products, both in this country and abroad, is steadily expanding.

The LaSalle Iron Works, 3110 LaSalle Street, St. Louis, with assets of $31,760 and liabilities of $10,560, has increased its capital stock from $10,000 to $30,000, of which $11,200 is paid. The additional capital is to be used for enlarging its plant and installing new equipment.

A voluntary petition in bankruptcy was filed in the Federal Court of Cleveland by the Holmes Automobile Co., Canton, Ohio. The company was organized several years ago to manufacture air-cooled motor cars. Its liabilities are placed at $1,293,415 and assets at $1,136,548.

The Republic Tool & Mfg. Co., having plants in Cleveland and Detroit, has been placed in the hands of Elliot E. Sterns as receiver, who was appointed in that capacity by the Federal Court. The company was formed in 1919 as the consolidation of the Cleveland Power Transmission Co., Diamond Stamping Works, Clyde C. Lowe Co. of Cleveland, and the Detroit Reamer & Tool Co., Detroit. The company has been in the hands of a creditors' committee and its Cleveland plant at 1946 East Fifty-fifth Street was sold recently to the American Stamping Co.

The Royal Machine & Foundry Co., Oshkosh, Wis., has filed a voluntary petition in bankruptcy, scheduling liabilities at $26,321 and claiming assets of $62,770. W. C. Jennerjahn is president. The first meeting of creditors was held on Nov. 17.

The Steelcraft Corporation of America, Cleveland, with plants at Long Island City and Lititz, Pa., manufacturer of metal safes, filing equipment, etc., is disposing of a bond issue of $600,000, a portion of the proceeds to be used for extensions and improvements. B. H. Sinks is president.

The Packard Motor Car Co., in its annual report for the fiscal year ended Aug. 31, shows net profits amounting to $2,115,828 on factory sales of $38,000,000. Surplus as of the same date stood at $17,004,438, giving the common stock a book value of $24.31 per share.

A special meeting of the stockholders of the Sterling Steel Foundry Co., Braddock, Pa., will be held Dec. 28 to consider an increase in the capitalization of the company from $1,000,000 to $2,000,000.

The Pittsburgh Steel Co. has declared the regular quarterly dividend of its preferred stock of 1¾ per cent, payable Dec. 1.

The Hampden Grinding Wheel Co., Springfield, Mass., proposes to increase its capitalization by issuing 1,000 preferred shares, at $100 par, 350 shares of the new stock to be used for the cancellation of indebtedness. Willard P. Leshure is president.

The Storms Drop Forging Co., Springfield, Mass., has made a change in its capitalization. The outstanding 12,000 shares of common stock, par $25, were first changed to 12,000 shares of no par value, and then the number outstanding reduced to 3,000 shares. Frank F. Storms is president and Frank O. Wells, Greenfield, Mass., treasurer.

The Bee Machine Co., Lynn, Mass., dealing in various kinds of machinery and machine tools, has been incorporated under Massachusetts laws, with Vincent W. Burke president and Frank S. Belliveau treasurer.

Plans of New Companies

The Diamond Automotive Co., 302 McDougal Street, Brooklyn, has been incorporated with a capital of $100,000, to manufacture automotive equipment and parts. It has taken over the property formerly belonging to the Peerless Radio Co. and has installed a part of the machinery required, but is still in the market for the rest. Chief among its products will be door handles and steel braces, the latter requiring quantities of cold rolled strip. Production in any considerable quantity will probably be delayed for a time awaiting repairs and installations. The incorporators are W. Robertson, L. Schroeter and W. J. Power. After operations are under way, the company plans to manufacture a general line of automotive accessories.

Edward F. Maher, Inc., 522 Fifth Avenue, N. Y., has been incorporated with a capital stock of $25,000, to manufacture iron and steel products. Immediate plans provide for a warehouse to handle a complete line of iron and steel products, particularly sheets and strips. If the company fails to secure property which it is now attempting to lease, it will build its own warehouse. Edward F. Maher, who has been 15 years in the steel business, during the last six of which he has been connected with the Wheeling Metal & Mfg. Co., Wheeling, W. Va., is head of the firm.

The Miller-Harmon Corporation, New York, has been incorporated with a capital stock of $50,000, to manufacture machinery and parts. It is uncertain as to its plans for the future but manufacturing will most likely be let out to contract. The incorporators are: L. Weinberg, P. Deschere and G. Herrmana. S. L. Samuels, 60 Broadway, New York, is corporate representative.

The Star Wire Diamond Die Corporation, 111 Delancey Avenue, New York, was recently incorporated with a capital stock of $30,000, to manufacture dies and other mechanical products. Manufacturing will be delayed for some time while the organization is being completed. H. Mestel heads the company.

The Mid-States Rubber Co., Evansville, Ind., which was recently incorporated, will rent buildings and install machinery as soon as possible. If adequate space cannot be obtained the company will build a plant of its own. Address J. S. Hopkins, secretary, Never Split Seat Co., Evansville, Ind.

The Fay Mfg. & Supply Co., Inc., 238-40 West Fifty-third Street, New York, which was recently incorporated, is engaged in large quantity production of automatic screw machine products and handles anything in this line from $\frac{1}{8}$ to 2 in. in diameter. The company has a fully equipped modern shop. L. S. Liberman is treasurer, and he with H. C. Lewis and J. E. Lief are the incorporators.

The Pohlig Mfg. Co., Stewart Avenue and Harrison Place, Brooklyn, N. Y., has been incorporated with a capital of $500,000, to manufacture automobile fenders and other sheet metal products. Nothing definite has been decided as yet regarding the future plans of the company. The incorporators are: H. P. Griffin, S. C. Whitbeck and W. S. Tienken.

Abraham Isaac, dealer in scrap iron, Elizabeth, N. J., has opened an office at Apartado 267, Santiago, Cuba, under the name, American Salvage Products Corporation. Nicholas Colas will be in charge, working through the home office, 126 Broad Street, Elizabeth. Mr. Isaac on his return from a month's trip in Cuba reported that he found business conditions good.

The Service X-Ray Co., 222 Market Street, Newark, N. J., has been incorporated with a capital stock of $25,000 to manufacture x-ray machinery and parts. This company has been operating as a registered company for about 18 months and acts as a sales agent only. No manufacturing will be done unless it is in the remote future. Harry F. Ernest is president.

The Union Plane Co., New Britain, Conn., has been incorporated with a capital of $50,000 to manufacture planes, tools and hardware. It has acquired the business of the Union Mfg. Co., whose lines it will follow. The company is represented by H. H. Wheeler, 28 Forest Street, New Britain, Conn.

The Arundel-Shope Brick Co., Baltimore, Md., recently incorporated, has erected a plant which is now in operation. The company will manufacture concrete face brick. Richard A. Fishlinger is secretary-treasurer.

The Kilby Frog & Switch Co., Birmingham, Ala., was recently organized to take over a plant already in operation. The company will manufacture railroad crossings, frogs, switches and manganese track work. W. W. Stringfellow is president; E. M. and T. E. Kilby, vice-presidents, and H. W. Bostick, secretary.

The Sloan Bros. Co., 1302 Peoples Bank Building, Pittsburgh, has applied for a Pennsylvania charter to engage in the manufacture of power plant equipment and steam specialties. No immediate construction is being contemplated. P. M. Sloan is the chief incorporator.

The Gettman Motor Co., Union and Beale Avenues, Altoona, Pa., was recently organized to manufacture automotive equipment, but will do no manufacturing for the present. The company will act as agent for the Ford Motor Co. W. P. Gettman heads the company.

The Katchen-Shaw Iron Works, Newark, N. J., a newly formed corporation, has purchased land on Lyons Avenue, that city, and will erect a structural steel shop. Saul Shaw, the company's chief engineer, with offices at 298 Eighteenth Avenue, Newark, is preparing the plans, which provide a shop 80 x 140 ft. and a material yard.

The Caton Pipe & Fittings Co., Detroit, has been incorporated with a capital stock of $20,000 to manufacture pipe and engineering products, but no manufacturing will be done for the present. The company will operate chiefly as jobber of steel supplies. The incorporators are Louis N. Beers and Joseph R. Lee, Detroit, and Ross R. Caton, 331 Glengarry Avenue, Windsor, Ont.

R. P. Sweeny, Greenville, S. C., has organized to manufacture suction cleaners for use in industrial plants. Arrangements for manufacturing are completed. No building is contemplated at this time. R. P. Sweeny heads the company.

The Fresh Water Pump Co., Spartanburg, S. C., has been incorporated with a capital of $20,000 to manufacture pumping machinery, but for the present the company will act merely as selling agent. W. D. Burnett is president and treasurer, and L. S. Burnett, secretary.

The Rayner Auto Safe Lock Co., Louisville, Ky., has been organized to manufacture locking devices. Nothing definite has been decided as yet regarding plans for manufacturing. B. O. Keanny, 906 Inter-Southern Building, Louisville, Ky., is secretary.

The Heat Treated Parts Co., Third and Chestnut Streets, Harrisburg, Pa., has been incorporated with a capital stock of $350,000 to manufacture metal products. It has erected a plant and expects to start operation in January. Edward R. Sponsler is president; J. Herbert Freeland, secretary, and E. Curzon Fager, treasurer.

The P-D Auto Parts, Inc., 679 Colony Street, Meriden, Conn., was recently incorporated to act as distributor of valves, pistons, springs, axle shafts, etc. Charles J. Peterson is president.

Trade Changes

The Lamson Co., Inc., tubes, carriers and conveyors, has moved from 100 Boylston Street, Boston, to a new building at Syracuse, N. Y. Its plant, which was formerly located at Lowell, Mass., has also been removed to the new address.

The Herberts Machinery & Supply Co., Third and San Pedro Streets, Los Angeles, Cal., has been appointed exclusive representative of the Diamant Tool & Mfg. Co., Inc., Newark, N. J., to promote the sale of Diamant standard punch and die sets in California, Arizona and Nevada.

The United Shoe Machinery Corporation, Boston, has purchased the plant of the Haynes-Langenberg Mfg. Co., St. Louis, and will establish a branch factory there.

The Haynes-Langenberg Mfg. Co., St. Louis, manufacturer of steel furnaces, has purchased a tract of 22 acres on North Kingshighway, opposite Penrose Park, and will erect a new factory. The property has a frontage of approximately 1200 ft. on Kingshighway, and runs 850 ft. east to Euclid Avenue, extending to Bircher Street. The company will erect a three-story building, 150 x 200 ft., giving about twice the floor space available in the building now occupied at 4045-57 Forest Park Boulevard.

The Victor Tool Co., Waynesboro, Pa., has made the following changes in personnel: Edward T. Oliver has been appointed representative in Northern Ohio and will have his headquarters at 2031 Lincoln Avenue, Lakewood, Cleveland, and the J. F. Buhr Machine Tool Co., 7762 Dubois Street, Detroit, has been appointed representative in Eastern Michigan.

Ford S. Clark, formerly Chicago district representative of the Ralston Steel Car Co., has opened an office at 20 East Jackson Boulevard, Chicago, for the sale of railroad supplies.

The Witherow Steel Co., Pittsburgh, has opened a branch office in the General Motors Building, Detroit, in charge of J. S. Langston, district manager, assisted by L. A. Daines.

The E. S. Stacy Supply Co., 41-43 Taylor Street, Springfield, Mass., has been appointed agent for the South Bend Lathe Works, South Bend, Ind., in Hampden, Hampshire and Franklin counties.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	
Refined iron bars, base price	3.04c.
Swedish bars, base price	7.50c.
Soft steel bars, base price	3.04c.
Hoops, base price	4.39c.
Bands, base price	3.84c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	3.14c.
Channels, angles and tees under 3 in. x ¼ in., base	3.04c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.10c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	3.30c.
Toe-calk, ½ x ⅝ in. and larger	4.15c.
Cold-rolled strip, soft and quarter hard	6.75c. to 7.25c.
Open-hearth spring steel	4.00c. to 6.00c.
Shafting and Screw Stock:	
Rounds	3.90c.
Squares, flats and hex	4.40c.
Standard cast steel, base price	15.00c.
Extra cast steel	18.00c.
Special cast steel	23.00c.

Tank Plates—Steel

¼ in. and heavier	3.14c.

Sheets

Blue Annealed

	Per Lb.
No. 10	4.19c.
No. 12	4.24c.
No. 14	4.29c.
No. 16	4.39c.

Box Annealed—Black

	Soft Steel C. R., One Pass, Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.30c. to 4.70c.	.....
Nos. 22 and 24	4.35c. to 4.75c.	5.00c.
No. 26	4.40c. to 4.80c.	5.05c.
No. 28	4.50c. to 4.90c.	5.15c.
No. 30	4.75c. to 5.15c.	.....

No. 28 and lighter, 36 in. wide, 10c. higher.

Galvanized

	Per Lb.
No. 14	4.60c. to 5.00c.
No. 16	4.75c. to 5.15c.
Nos. 18 and 20	4.90c. to 5.30c.
Nos. 22 and 24	5.05c. to 5.45c.
No. 26	5.20c. to 5.60c.
No. 27	5.35c. to 5.75c.
No. 28	5.50c. to 5.90c.
No. 30	6.00c. to 6.40c.

No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel			*Wrought Iron*		
	Black	Galv.		Black	Galv.
½ in. Butt	—50	—42	½ in. Butt	—11	+13
¾ in. Butt	—55	—44	¾ in. Butt	—17	— 1
1-3 in. Butt	—57	—44	1-1½ in. Butt	—20	— 2
2½-6 in. Lap	—54	—41	2 in. Lap	—14	+ 2
⅞ in. Lap	—50	—26	2½-6 in. Lap	—18	— 2
9-12 in. Lap	—46	—25	7-12 in. Lap	—10	+ 6

Steel Wire

Base Prices* on No. 9 Gage and Coarser, Per Lb.

Bright basic	4.75c. to 5.00c.
Annealed soft	4.75c. to 5.00c.
Galvanized annealed	5.40c. to 5.65c.
Coppered basic	5.40c. to 5.65c.
Tinned soft Bessemer	6.40c. to 6.65c.

*Regular extras for lighter gage

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	19½c. to 20½c.
High brass wire	20 c. to 21 c.
Brass rod	17 c. to 18 c.
Brass tube, brazed	26⅜c. to 27⅜c.
Brass tube, seamless	23 c. to 23½c.
Copper tube, seamless	25¾c. to 26 c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 22c. to 23c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14-20		
	Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	Primes	Wasters
			80 lb.	$6.05 $5.80
			90 lb.	6.15 5.90
			100 lb.	6.25 6.00
IC	$10.00	$8.50	IC	6.40 6.15
IX	11.50	10.00	IX	7.40 7.15
IXX	13.00	11.25	IXX	8.40 8.15
IXXX	14.25	12.50	IXXX	9.40 9.15
IXXXX	16.00	14.00	IXXXX	10.40 10.15

Terne Plates

8-lb. coating, 14 x 20

100 lb.	$7.00
IC	7.25
IX	7.50
Fire door stock	9.00

Tin

Straits pig	40c.
Bar	45c. to 50c.

Copper

Lake ingot	15⅛c.
Electrolytic	15 c.
Casting	14¾c.

Spelter and Sheet Zinc

Western spelter	8¾c.
Sheet zinc, No. 9 base, casks	10¼c. open 10¾c.

Lead and Solder*

American pig lead	8c. to 8¾c.
Bar lead	9c. to 10c.
Solder, ½ and ½ guaranteed	27½c.
No. 1 solder	26c.
Refined solder	23¼c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	75c.
Commercial grade, per lb.	35c.
Grade D, per lb.	25c.

Antimony

Asiatic	8c. to 8¾c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb. 25c. to 27c.

Old Metals

The market is more active and values slightly higher. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy crucible	12.00
Copper, heavy wire	11.50
Copper, light and bottoms	9.50
Brass, heavy	6.50
Brass, light	5.50
Heavy machine composition	8.75
No. 1 yellow brass turnings	7.00
No. 1 red brass or composition turnings	8.00
Lead, heavy	5.75
Lead, tea	4.50
Zinc	4.50

THE IRON AGE

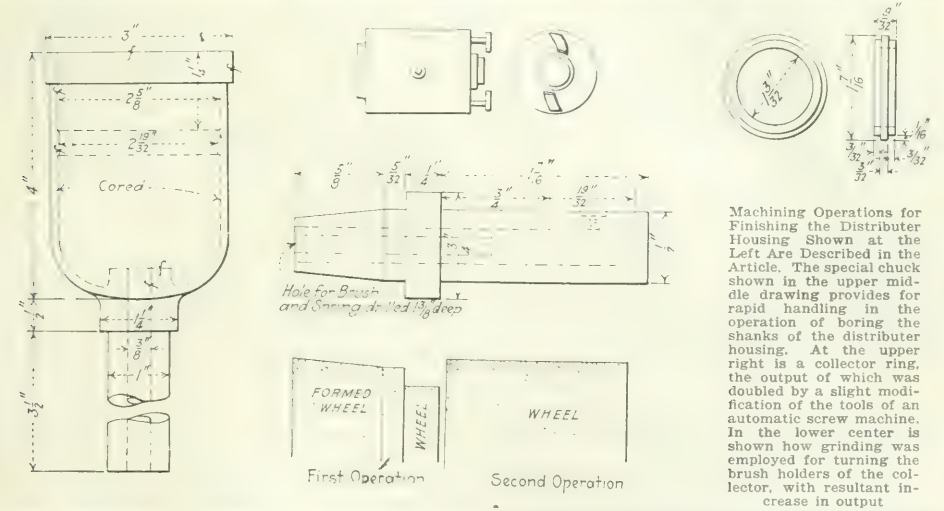
New York, November 30, 1922

ESTABLISHED 1855 VOL. 110, No. 22

Savings Effected by Combining Operations

Two Chuckings More Economical Than One—Output from Automatic Screw Machine Doubled—Different Forms and Diameters of Grinding Wheels on One Spindle

THE combination of operations formerly requiring separate positions in turret lathes; the combining of operations, or practice of multiple tooling in the various stations, in automatic screw machines; what is known as "straight-in" grinding, with the use of one wide face wheel, or several wheels of different diameters, to grind several diameters at once; all these are becoming more and more common. Some good examples of this practice have been developed in the plant of the American Bosch Magneto Co., Springfield, Mass., which manufactures magnetos, distributers and other motor car ignition products.



Machining Operations for Finishing the Distributer Housing Shown at the Left Are Described in the Article. The special chuck shown in the upper middle drawing provides for rapid handling in the operation of boring the shanks of the distributer housing. At the upper right is a collector ring, the output of which was doubled by a slight modification of the tools of an automatic screw machine. In the lower center is shown how grinding was employed for turning the brush holders of the collector, with resultant increase in output

Six Hole Turret Used for Seven Position Operation

In machining distributer housings, it has found that two chucking operations on this particular piece are more economical than one. The casting was formerly chucked on the outside with the shank extending through the spindle of the turret lathe, and all operations, except turning the shank, were performed in that setting.

With the present method, the casting is chucked on the outside, the stop for setting its position in the chuck being a sleeve mounted on the bar which carries the tools for the first operation, thereby utilizing that side of the turret for a two position operation. This sleeve is set forward or drawn back by means of a barrel-cam action, hand operated. After the sleeve has been used as location stop for the work, the chuck is tightened, the stop withdrawn, and the first machining operation is performed without revolving the turret. This first operation is facing of the internal boss and turning a groove which becomes the chamfer for the hole drilled through the shank later from the other end.

The second operation is clearing the scale from the boss and surrounding portion of the housing. This is accomplished by a special tool which somewhat resembles a combination rose mill and hollow mill, each of its cutting edges having a contour best described as shaped like a hoof. Subsequent operations in this chucking are boring two diameters, facing and turning the flange.

In the second set up, the piece is handled in a turret lathe with a special chuck. This consists of a shell containing the operating mechanism and bearing a pilot plug for registering the casting from the finished bore. The chuck has two dogs or clamps which are cam actuated, the cam being operated by a key similar to

that used for the ordinary lathe chuck. These dogs are thrown in against the sides of the casting, then drawn back, so that the casting is forced against the face of the pilot plug and securely held. Operations are centering, drilling, boring, and rough and finish reaming. After this operation the work is passed to a plug gage for both diameters to check for concentricity.

Duplex Tool Set-up

The shank is turned and semi-finished in the next operation. The work is chucked from the bore and the shank is hollow milled on both diameters with one tool. The cross slide carries a turning tool to skim off any eccentricity left by the hollow mill and to turn fillets. The next tool in the turret is a turning tool for semi-finish, and the third is a facing tool. The other three holes of the turret are used for a duplicate set of tools, so that when once set up, the machine can run for double the work before tools require grinding and adjustment. The shank is finished by dry grinding. It is held on a roller grip mandrel in a plain grinder carrying a wide face carbofied wheel. The hole in the shank is finished by burnish broaching in an air operated arbor press.

The tool set-ups for the operations described, in common with all tools in use, are tested in the development department on actual castings before being released to the shop.

An interesting method in handling this distributer is in use in the assembly department. The shells or housings are placed in racks or carriers holding ten in a row. These carriers slide in tracks along a conveyor bench from station to station, where various parts are assembled in them at the different stations.

Double Output on Automatic Screw Machine

A four spindle 1½-in. automatic screw machine is in use turning out collector rings, on which the brushes in the magneto ride. The tooling purchased from the manufacturer with the machine turned out one ring at a time. The Bosch company has changed the tooling so that the machine is now delivering two complete rings instead of one on each revolution of the spindle turret.

The material is brass tubing. At the bottom station, at the front of the machine, two rings are formed by the cross slide while the turret tool rough bores. At the upper station, front of the machine, the turret tools finish bore and break the corners of the first ring. At the third station, top rear of the machine, the cross slide cuts off the first ring and breaks the corner on the second; the turret then chamfers the bore of the second in this same position. At the fourth station, lower rear of the machine, the cross slide cuts off the second ring, and stock is fed for the next cycle. These collector rings are then set into a molded insulating material, which is formed like a sheave, having the brass ring at the bottom of the groove. In this groove the brush holder, described below, is placed, with the brush riding on the brass collector ring, as the latter revolves.

Brush holders are made of hard rubber composition with a brass insert of rectangular section having a projection which is finished on the surface in a grinding operation. This insert is drilled in other operations to receive the brush and spring and is also drilled, counterbored and tapped for a terminal.

In the first grinding operation a formed wheel is used corresponding in contour with the tapered nose and straight portion of the brush holder and this in conjunction with a straight face wheel of smaller diameter corresponding with the width of the collar, thus to reduce the tapered end and collar at the same time. In the second operation a wide face wheel is used to reduce the long straight portion of the brush holder. It is in this operation that the brass insert mentioned above is finished. This method of grinding has reduced time 50 per cent below the old method of turning, and also produces a better finish for the brush holder.

Seventy Per Cent Saved in Milling Hexagons

The Bosch Company is making spark plug shells, the design of which requires that they be made from round stock. This job was transferred to the Springfield plant from the Gray & Davis division at Cambridge. The method of milling the hexagons on these shells was in a fixture designed to hold six for a gang straddle milling operation. Due to misalinement in the fixture, it was found that only five shells could be handled at a time. The redesigned fixture in use at present is 15 in. in diameter and holds 18 of the shells.

They are held in place by means of small mandrels inserted through them. These in turn are tightened by binder screws in the face of the fixture. There are six of these binding screws, each effective on three of the mandrels. The fixture is manually indexed to three stations, completing the hexagon, as the milling cutters pass through the work at each station. While the actual time consumed is greater than with the old fixture, the saving, with an operator running one machine is about 42 per cent, milling time being about 7½ min. Total time is less than 10 min. floor to floor, per load. This production can be doubled when the operator is running two machines. The machine in use is a manufacturing milling machine with automatic quick return to the table.

Westinghouse Company in Minneapolis Industrial District

The leasing by the Westinghouse Electric & Mfg. Co. of a six-story building in the Minneapolis industrial district, to serve as a combined sales, service and warehouse center, bring into relief the story of this industrial district plan. The proposition was explained to 250 business men of Minneapolis, who immediately subscribed the sum of $1,000,000 to carry out the plan. Two hundred and fifty acres of ground were purchased on the eastern side of the city, 3 miles from the main business district. There existed in Minneapolis a belt line operated by the Minneapolis Transfer Co., which connected with all of the nine railroads entering the city. This belt line was operated in such a manner that the railroads did not make switching charges to each other to and from their respective lines. Thus the plan provided a means of distribution for less than carload lots and called for the establishment of warehouses in this district by jobbers and Eastern manufacturers.

A joint express office, freight station and telegraph office was provided at a convenient point, connected to the warehouses by a remarkable tunnel system. The less than carload lots are delivered to the freight station, where the material is loaded upon trucks drawn by an electric tractor. In the same manner shipping is facilitated. Shipments of less than carload lots are loaded on the trucks and the transfer companies call for them with the tractor, which carries the goods to the freight station. A feature of the district is a restricted type of the character of the buildings. It is estimated that three to four million dollars has been expended in the development of the industrial district with no immediate outlook for dividends. The business men of Minneapolis appear to have invested the money for the betterment of Minneapolis.

A new type of multi-stage centrifugal pump has been developed by the De Laval Steam Turbine Co., in which the advantages of the double suction impeller are retained. This is made possible by the use of a specially formed casing which provides individual volumes for each impeller. One of these pumps is to be shown at the National Power Show to be held in New York in the week beginning Dec. 7.

The Bridgeport Manufacturers' Association, Bridgeport, Conn., has elected the following officers for the ensuing year: George M. Eames, president; T. Rice Davis and Sumner Simpson, vice-presidents, and R. G. Farrell, treasurer.

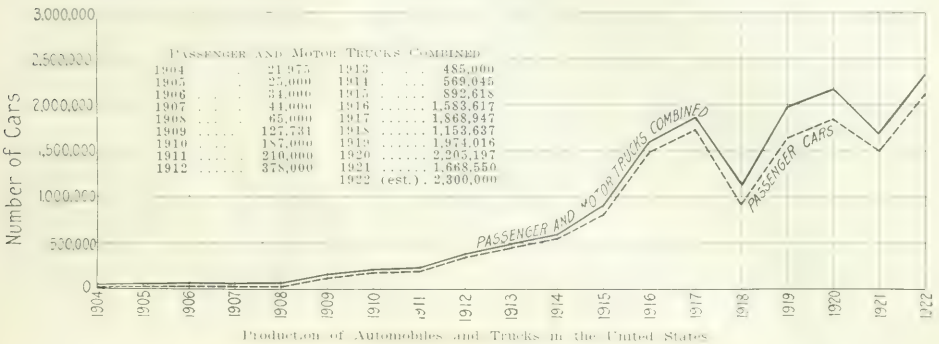
Has Automobile Production Reached Peak?

Indications That 1922 Output Will Probably Break All Records, Including That of 1920—Building of New Plants Indicates Confidence

BY C. E. WRIGHT

THOSE prophets who have for several years been predicting that automobile production had about reached its peak will be doomed to another disappointment this year when the final production figures are compiled. Up to Oct. 1 the nine-months production showed a total of close to 1,900,000 passenger cars and trucks. Estimating the production for the last quarter of the year at 400,000, which is considered conservative, the total would be 2,300,000, as compared with the former record-breaking year, 1920, when 2,205,000 cars and trucks were manufactured.

During the current year the automobile industry will approximate a total business of $4,000,000,000, represented as follows: Cars, $2,000,000,000; trucks, $300,000,000; tires, $800,000,000; accessories, $600,000,000; parts, $400,000,000. There are undoubtedly some duplications in these figures, but in the main they represent the enormous proportions of the motor-vehicle industry.



PASSENGER AND MOTOR TRUCKS COMBINED

1904	21,975	1913	485,000
1905	25,000	1914	569,045
1906	34,000	1915	892,618
1907	44,000	1916	1,583,617
1908	65,000	1917	1,868,947
1909	127,731	1918	1,153,637
1910	187,000	1919	1,974,016
1911	210,000	1920	2,205,197
1912	378,000	1921	1,668,550
		1922 (est.)	2,300,000

Production of Automobiles and Trucks in the United States

When an automobile manufacturer predicted at a banquet a decade or so ago that there would eventually be 5,000,000 cars owned in the United States, he was rated as an extreme optimist. To-day there are approximately 10,500,000 motor vehicles registered in the country, or one automobile for every 10 persons. California has one motor vehicle to every 5.16 persons.

The question has often been asked, when will the saturation point in automobile ownership be reached? Obviously there must be some point at which the absorption of automobiles will stop, but the increasing output each year, excepting 1918 and 1921, furnishes no indication that the peak of production and absorption has yet been reached. In 1918 the automobile industry was crippled by inability to obtain sufficient steel because of war needs; in 1921 it was crippled by the generally impoverished condition of the country due to business and agricultural depression.

Expect Continued Increase

During times that were at all favorable the automobile industry has made a gain each year over the preceding year, and the building of new plants now under way indicates the confidence of automobile manufacturers that the country will go on buying cars at an increasing rate for some years to come.

Economy in production methods, enabling manufacturers to sell cars at lower prices, has of course opened up a wider market for the automobile. At one time it was, for example, a luxury on the farm; to-day it is almost a necessity. Yet there are millions of farmers who do not own automobiles.

The importance of the automobile trade to the manufacturers of steel and other metals is indicated by the fact that this year automobiles themselves took fully 4 per cent of the steel the country produced; 16 per cent of the copper; 20 per cent of the zinc and 25 per cent of the aluminum.

Automotive Industries is authority for the statement that the industry has been centralizing more and more in the hands of large groups since the formation of one of the large groups in 1911. The result is that to-day 10 companies produce 75 per cent of the motor vehicles. Two concerns, the Ford Motor Co. and the General Motors Corporation, produce approximately 60 per cent of the automobiles.

Increasing Demand for Closed Cars

Another trend emphasized by the same publication is the increased demand for closed cars, which is of importance to the steel industry because of the increasing use of steel for car bodies. Twenty per cent of the Ford cars are now of the closed type; 25 per cent of the Dodge output; 50 per cent of the Cadillac and 52 per cent of the Hudson.

The ordinary observer of motor car congestion in the large cities is entitled to feel, perhaps, that the limit has about been reached as to the number of such vehicles that can be accommodated. New York State, for example, has close to 800,000 registered automobiles. The automobile statistician naturally looks now to gains in those States which have not adopted the automobile as readily as other States. Florida, for example, made a gain of 33 per cent in one year in the number of automobiles registered. This year some of the Southern States have made surprising gains in the purchase of automobiles. The great farming States of the Mississippi Valley and the West still present large possibilities for automobile absorption, especially in view of the fact that the prices of so many cars are now within the reach of hundreds of thousands who could not afford to buy them at the higher prices prevailing since the war.

The sale of cars in some sections of the country has been held in check to a degree by the lack of sufficient service stations and good roadways. These things are now being remedied and the automobile industry looks to considerable gains in the sale of cars in sections which have not kept pace with the records of other States. For example, California, Iowa, South Dakota, Nebraska, Kansas, Colorado, Oregon and North Dakota all rank under seven persons for each motor vehicle, while some of the more populous States have relatively

a fewer number of cars. Pennsylvania has one car for each 12.6 inhabitants; New York one to 13.3 persons; Massachusetts, one to 10.7 persons.

The National Automobile Chamber of Commerce estimates that the production of cars in 1923 will equal and possibly exceed that of 1922. New manufacturing plants are in course of construction which will swell the output if the demand for the cars exists.

New Plants Being Built

One of the most ambitious programs is that of W. C. Durant, former head of the General Motors Corporation. In Flint, Mich., Mr. Durant's interests are building a plant for the Flint Motor Car Co., costing $1,500,000, and at Lansing, Mich., the same interests are building new plants for the Star and Durant cars, which will give capacity for an output of 300 cars daily of the former and 150 daily of the latter. A plant for a Durant car is also being built at Flint, to have a capacity of 8000 cars a month.

The Chevrolet Motor Car Co., a subsidiary of the General Motors Corporation, is also engaged upon a large building program, including a new assembly plant of considerable size at Buffalo; another at Cincinnati and a third at Janesville, Wis. The last mentioned plant will be in conjunction with a new factory being erected by the Fisher Body Corporation, which will turn out from 100 to 150 closed car bodies per day.

The Fisher Body Corporation is expending its facilities in co-operation with the Chevrolet Motor Co. to give the latter bodies for a daily production of 2000 cars in 1923. The Fisher-Chevrolet plant in Flint will have a capacity of 400 to 500 car bodies daily. A Fisher plant at Flint will also be built for Buick cars. The Fisher company will also have body plants at Pontiac, Mich., St. Louis, Buffalo, Cincinnati, Oakland, Cal., and Janesville, Wis., all in co-operation with the Chevrolet company.

Work is under way on a plant for the Lafayette Motor Car Corporation, Indianapolis, adjoining the plant of the Nash Motors Co. at Milwaukee. It will cost $500,000 for the initial units and additional units to be built next year will bring the total cost to $1,000,000.

Detroit Plants Enlarging

Dodge Brothers, Detroit, have started work on a large body and assembly plant. The Hupp Motor Car Co. will build a new manufacturing plant that will give it 50 per cent increased capacity. The Ford Motor Co. is contemplating the building of assembly plants at Jacksonville, Fla., and at Minneapolis, in the United States, and at Tampico, Mexico. The Canadian plant capacity will be doubled by 1923 through additional factory buildings, and the Manchester and Cork plants in the British Isles are being extended.

The Lincoln Motor Co., Detroit, now controlled by Henry Ford, is building a one-story addition, 1600 ft. long, which will increase its production.

The Columbia Motors Co., with the addition of the Saxon plant at Detroit, is in a position to triple its former production.

C. H. Wills & Co., Marysville, Mich., manufacturers of the Wills Sainte Claire, are extending their manufacturing space.

The Gray Motor Co. has started erection of an additional assembly building in Detroit, which will give it capacity there for 200 cars daily: in addition assembly plants at Oakland, Cal., and Albany, N. Y., planned for operation before the season of 1923, will give a production capacity of about 100 cars daily at each plant.

The Detroit Air Cooled Car Co. has purchased an assembly plant at Wayne, Mich., and will begin production in December.

The Commander Motor Corporation, 49 Wall Street, New York, has acquired a plant in Chicago and will later take over a plant in Milwaukee with 40,000 sq. ft. to manufacture a $5,000 car.

The Anderson Motor Co., Rock Hill, S. C., announced recently that plans to expand have been approved.

In addition to this expansion of automobile building plants, plans have been announced by several makers of parts and accessories for larger capacity to take care of 1923 business.

STEEL IN THE ARMY

Secretary of War Weeks Tells of Constructive Activities in Industry

Speaking on the subject "I Didn't Know," Secretary of War Weeks recently delivered an address before the Boston Chamber of Commerce, and in an extremely interesting manner described the many constructive activities of the Army. Dealing with its relation to the steel industry, interchangeable manufacture and the Taylor Scientific Management system, the Secretary of War said:

"Do you know that the Army started our steel industry, guided it through its early development, and, in co-operation with the Navy Department, stimulated it throughout its expansion to the present gigantic proportions? . . . The dominating influences in building up steel have been the provision of markets, the increasing adaptation in employment, and the specifications for design. The Army was the original market for steel products—offered an even greater field for the use of steel—and led the entire industry in specifications for design. High grade steel, as we know it to-day, dates from the Civil War when the Army called for superior quality in gun metal. In 1880 the requirements for high carbon steel in making guns were fully 50 per cent more severe than were the general industrial specifications. The Ordnance Department introduced alloy steels in the manufacture of Army material, and prescribed the use of nickel steel at a time when there were very few commercial uses for nickel steel in the entire country and when only two or three commercial concerns were capable of its manufacture. In 1875, the Board of Investigation at the Watertown Arsenal established a program of investigation and built an emery testing machine that was the largest in the world. This machine is still in daily use and was only recently superseded in its rank as the largest in the world. The work of Watertown Arsenal was truly pioneer work in this country, and it has a tremendous influence in stimulating similar investigations on the part of technical schools and colleges. Until the creation of the Bureau of Standards, the Arsenal was recognized leader in metallurgical study and it is even to-day doing very original work which must have a noteworthy effect in the future."

Extensions to Ashland Plant

The directors of the American Rolling Mill Co., at a meeting in Middletown Nov. 20, decided to go ahead with the extension to the Ashland works, and evolved a plan of financing the improvement which will be publicly announced as soon as a statement can be prepared for submission to shareholders. President Verity reported to the meeting that the company's plant had been running at full capacity all summer, and a very satisfactory showing had been made.

Frank W. Brooks, chief engineer William Swindell & Bros., Pittsburgh, recently addressed the Chicago Foundrymen's Club at the City Club, Chicago. His subject was the Multiple Melting of Steel. With the aid of lantern slides he described a multiple electric furnace installation. Two electric furnaces are mounted on a turntable and when one is pouring the other is melting. The advantage of the scheme lies in the fact that the same electrodes and electrode lifting apparatus may be used for both furnaces and inasmuch as one furnace is connected with the current practically at all times, the load is fairly constant. Economies lie in labor, equipment and current rates.

Founders Urge Change in Immigration Law

National Association Says Present Act Is Working an Injury to Nation—Annual Convention in New York Has Interesting Program

DECLARING that the present immigration act is "working an injury to the nation, without any compensating advantages to our citizenship," the National Founders' Association, at its twenty-sixth annual convention, held Nov. 22 and 23 at the Hotel Astor, New York, resolved to petition the President and Congress so to amend the act as to enlarge the American labor supply.

"Unless this is done," said the resolution, "the economic conditions indicate that the inability to carry on the great body of preliminary operations in forest, factory, farm and general construction is likely to lessen steadily the demand for skilled craftsmen and increase constantly all of the underlying costs of production and transportation."



WILLIAM H. BARR

The subject of immigration was discussed in the annual address of the president, William H. Barr of Buffalo, whose address in part was reported in last week's issue of THE IRON AGE, page 1374, and also from the floor of the convention, it being indicated as the sentiment of members that a serious labor shortage will restrict the country's prosperity unless a greater supply of common labor becomes available soon.

The full text of the resolution follows:

WHEREAS, the present immigration act was frankly conceived and enacted to meet post war conditions, which no longer exist, and establishes a purely abritrary restriction without basis of experience,

AND WHEREAS, the record of its operation shows that it is now working an injury to the nation, without any compensating advantages to our citizenship, therefore:

BE IT RESOLVED, that it is the sense of the National Founders' Association, in convention assembled, that the Congress should replace our present negative and unscientific handling of the alien, with a definite policy of immigration.

We suggest as the fundamental principle of such policy the historic recommendation of Madison to the first Congress: "To welcome every person of good fame who really means to incorporate himself into our society," to reject all who will not be "a real addition to the welfare and strength of the United States."

Our National policy ought to distinguish the requirements for admission from those for naturalization. We believe admission should be denied to the chronic diseased, the criminal, the defective, those likely to become public charges, all who oppose any form of government and any who would effect political change by force, or are incapable of citizenship. We believe effective tests to this end should be applied to the alien so far as practicable, where his passport is visèd, or at the port of embarkation, and ought not to wait upon his arrival at our ports of entry.

We believe the Federal Government should assert the right and assume the responsibility of controlling and supervising the distribution of the immigrant. The requisite direction may be had, and accurate information of the national economic needs and opportunities obtained through systematic official and private cooperation, State and Federal. It is due the immigrant that he be fairly informed of employment opportunities in agriculture and industry that the needs of the nation may be definitely and intelligently met. Through the same agencies the process of naturalization may be practically stimulated and aided.

We believe a working knowledge of our language and a practical understanding of our form of government ought to be a prerequisite to naturalization, and the bestowal of citizenship should be accompanied by formalities that emphasize its privileges and responsibilities.

When the qualification for citizenship has been established, naturalization should be regulated exclusively through federal action.

We urge upon the Congress the immediate need for action, that while protecting the quality of our citizenship, enlarges our labor supply. Unless this is done, the economic conditions indicate that the inability to carry on the great body of preliminary operations in forest, factory, farm and general construction, is likely to lessen steadily the demand for skilled craftsmen, and increase constantly all the underlying costs of production and transportation.

William H. Barr Re-elected President

The election of officers resulted in the unanimous selection of William H. Barr of Buffalo to succeed himself as president. For vice-president the association selected Charles L. Taylor, Taylor & Fenn Co., Hartford, Conn.; secretary, J. M. Taylor, Chicago (re-elected); treasurer, Chicago Trust Co. O. P. Briggs of Minneapolis, Minn., was unanimously chosen to continue as an honorary member of the Administrative Council, and the usual district committees were elected.

Commissioner McClintock's Report

A. E. McClintock, commissioner of the association, read his annual report, which in the main dealt with labor matters within the foundry industry. He dwelt particularly on the scarcity of skilled molders. His report in part follows:

"During the past year, the Administrative Council authorized that support be given to nine members, located in six towns, and from which 222 molders were on strike. At four of the shops, the strikes are now inactive and conditions normal. While the other five are still requiring aid from the association, in every instance will these strikes be combated to a successful conclusion and an unconditional victory.

"It is interesting to record that seven of the nine shops above mentioned are devoted to the manufacture of heavy and complicated castings, and for many years have been closed union shops. These are now being definitely added to the open shop list.

Condition of International Molders' Union

"The receipts and disbursements of the national treasury of the molders' union for the twelve months ending Sept. 30, 1922, are as follows:

Income		$559,350
Disbursements:		
Strike benefits	$194,100	
Management and other expenses	246,150	
		440,250
		$119,100

Average paid membership for year, 29,000, as compared to 61,000 two years ago.

"As the pendulum of business swings upward from depression, the foundry industry is again confronted with a shortage of skilled molders. Due to present immigration laws, and the unprecedented shortage of unskilled labor, this is a serious situation, and one which in all likelihood will become much more acute before there is improvement.

"With the foundry industry operating at about an average of two-thirds capacity, the great majority of shops have already re-employed all of their former molders still available, and the problem is where to obtain additional men as needed. Unless the signs fail, trade will continue to improve, demand for molders increase, wages will be bid up first by individual shops, and then by towns, and large numbers of workmen will

be constantly idle, migrating from place to place, seeking a higher bidder.

"It has been my observation that the foundryman most emphatic in his condemnation when unable to readily obtain a full quota of molders will more often than otherwise be found to be doing little or nothing in the educating of boys or men in the molding trade in his own shop.

"While the subject of apprentices has been discussed in this report year after year for many years past, it is my conviction that the time has arrived when prompt and vigorous action should be taken and a greater effort than ever before be made to arouse foundrymen generally to a realization that unless there is a very large increase in apprentices, every foundry will suffer.

Predicts More Molders' Strikes

"The scramble to obtain molders has now started, and the professional agitator is again at work telling the men that higher wages for less work are offered elsewhere. It does not require much vision to appreciate that we are very shortly approaching a time when from little cause, or no cause, molders' strikes will be frequent. As one of our distinguished railroad executives recenty said, labor is now "professionally organized," and very largely in control of professional leaders. It is to the advantage of these leaders to foment strikes.

"To those familiar with the industry, the fact is apparent that the foundry business is not attracting to itself men of sufficient caliber, or who are big enough to become superintendents and foremen.

"To-day nearly all foundry executives are promoted from the sand heap. Many lack education and executive ability, and are not sufficiently progressive to utilize to the fullest extent such mechanical devices as have been perfected, and as a consequence the foundry business does not progress in keeping with other lines.

Engineers Become Foundrymen

"Some time ago, the association began showing moving pictures at various engineering schools, and after each exhibition the students were given a talk, trying to induce them to see the possibilities in following the foundry business. At first no impression was made, but this year quite a number of graduate engineers got in touch with us, stating that they had decided to make the foundry their life's work, and wanting to know how they could get positions that would enable them to do so.

"In conversation with these young men, we found certain conditions that will have to be met in order to induce them to go into the foundry business. First, let me say, they are a splendid type, not afraid of hard work, dirt, or the drudgery incident to foundry operations. They all feel, however. that the time has come when they must be self-supporting, and as a consequence the starting salary must be sufficient to enable them to do this.

"The boys are perfectly willing to spend about a year in molding, or doing any other kind of work which may be given them. They all feel, however, that at the end of a year they ought to be given some minor executive position, as they do not expect to train their hands sufficiently to enable them to become mechanics, and they feel that they can master the principles involved inside of a year.

Starting Salaries

"In investigating further, we found that concerns in other lines are sending men to the universities to hire these young men, offering them from $100 to $150 per month as starting salary. They then train them in a short training course to their particular line of work, and put them on in such capacities as charge of testing apparatus, assistant foremen, and positions of an executive nature throughout their plants. From there on, the boy's progress depends entirely on his merit.

"It would seem as though the money that any firm might spend in developing these young men would be well invested.

"If any number of our members would signify a willingness to hire these young men and develop them along the lines here suggested, the association could easily become a clearing house and keep in touch with the universities and get such men as elected to go into the foundry business in touch with the different firms. This plan would cost the association very little, and might be a means of injecting some high-grade men into the business, where the need is becoming daily more apparent.

"The secret of production is enthusiasm and loyalty on the part of the workmen. Experience has demonstrated that the best way to get these elements into an organization is through the foreman. As the employer's representative in daily contact with the workmen, he has an opportunity to play an important part in industrial leadership. The development of foremen and making sure that they are properly informed, is of great importance in maintaining industrial peace.

"The recent railroad and coal strikes have done much to educate the public in industrial controversies. Slowly the general public is coming to realize that it is they who pay the bill. Shorter workday, opposition to production increasing machinery and appliances, restrictions on output, are all paid for by the consumer. The open shop, with freedom of opportunity, is better understood than ever before. Truth and right thinking will ultimately prevail, but not without further ignorant opposition and conflict.

Pioneer in Open-Shop Movement

"This association is a pioneer in the open-shop movement in America. For a quarter of a century you have been banded together by the firm conviction that the principles of the open shop are right in theory and right in practice. No organization of business men has ever backed their conviction with more time, energy or money. Time after time professional labor agitators have decreed that from then on all should wear the union yoke, but this association has stood steadfast. We hold to the idea that men should be rewarded according to production, and not according to time. We maintain that a man has a right to bargain individually just as he has to elect to bargain collectively; that he has as great a right to have a bargain made with him as to have one made for him; and that the Constitution of the United States still protects him as fully in his right not to strike as it does in the right to strike.

"These things are fundamental, and there is need that they be repeated over and over again, until they are as commonplace among the men in the shops as they are now with the employers.

"Our labor problems are largely due to the fact that industrial leadership has passed from the employer to the professional agitators, whose economics are unsound and false. The employer realizes this condition, and the task before him is to again assume the leadership of his men. The workman must have driven home to him the fact that the standard of living is based on production and consumption, and not as the labor agitator would have him believe—on less production and more pay.

One Way to Prosperity

"Increased individual production is the road to plenty, prosperity, and a higher standard of living for a people or a nation, and there is no other way. No man need apologize for speaking the truth. In demonstrating to his workmen that unionism is based on a philosophy which is false and untrue, and followed to its ultimate conclusion leads nowhere, the employer is doing the kindest of service to his fellow-man. The employer knows these things, but the workmen have been led to base their thinking on a foundation which is false, and not made of facts. While the task is large, it is not an impossible one. It is my strong belief that herein lies the way to improvement in industrial relations.

"As has been stated many times before, the success of an open shop depends on making it a better place to work than a union shop. A shop where there is opportunity for large production, and where pay is measured according to output and not according to time con-

sumed, will continue to triumph. As in the past, so it will be in the future, that greater and greater reward shall come to him who lessens the cost of service."

The report of the secretary, J. M. Taylor, covered the financial condition of the association and dealt with various matters of association routine business.

Overriding the Supreme Court

James A. Emery, Washington, general counsel of the association, delivered an inspiring address on "The Proposal to Destroy the Judicial Power," in which he discussed the agitation in some quarters to give Congress power to override the decisions of the United States Supreme Court. He argued strongly against such action. He said that this would destroy the judicial power of the highest court and make every great question which comes before that tribunal for adjudication one of politics rather than law. He pointed to the ease with which the public mind can at times be swayed, sometimes in the right direction, but often in a wrong direction, and said this would give an instability in government which would endanger the principles upon which the republic is builded. He went into the history of the Constitution and the creation of the Supreme Court, and held that there is nothing in history to show that the framers of the Constitution ever intended that the power of Congress should supersede that of the Supreme Court.

H. J. Boggis, chairman committee on new membership, reported that despite rather unfavorable industrial conditions, the membership of the association continues favorable, with encouraging prospects for next year.

Achievements and Problems of the Foundry

D. R. Wilson, vice-president Wilson Foundry & Machine Co., Pontiac, Mich., in collaboration with Henry M. Lane, foundry engineer, Detroit, presented an illustrated address on the company's foundry and its methods. About 80 lantern slides were thrown on the screen showing the equipment and the foundry practice which have made this plant one of the most efficient in the United States. President Barr, in commenting on the presentation afterward, said that the Wilson foundry was the last word in efficiency and that probably not more than eight or ten foundries in the entire country even approach it in general excellence. It was decided to print the entire address, with photographic illustrations, in a pamphlet to be gotten out by the association.

William M. Taylor, Chandler & Taylor Co., Indianapolis, discussed the apprenticeship question and called attention to the questionnaires recently sent out by the New York State Department of Education, seeking information as to the advisability of enacting a State law governing apprenticeship training. Mr. Taylor said that in some places vocational education is falling down and that efforts will have to be made to keep up the right kind of training or skilled molders will become almost extinct. They are becoming fewer in number each year and no adequate means has yet been found to bring in new men and properly train them. The New York State proposal is to appoint an advisory committee composed of employers and employees to establish standards of apprenticeship training, and Mr. Taylor questioned as to whether this is a desirable proceeding.

In the discussion which followed Henry M. Lane, Detroit, told of work he had done years ago in writing a course of instruction in foundry practice for one of the large correspondence schools. He said that this course was by no means perfect, but up to that time it was the only serious effort that had been made to teach foundry workers the principles of their craft. He believed that the National Founders' Association could undertake successfully a program of correspondence instruction, and it was decided by the members to empower the president to appoint a committee to go into the whole subject thoroughly and recommend action.

President Loree and Others on Vital Questions

L. F. LOREE, president Delaware & Hudson Railroad Co., described the railroad situation, giving in brief the history of the relations of the railroads to their employees during the war and up to the present time. He told of the many concessions that had been made to the railway employees during the war by the various Government officials and boards, and particularly of the policy of the Labor Board and of the efforts to readjust wages that have been made this year. He described in a very interesting way the method of taking strike votes, which he declared to be farcical. He said that when the votes are handed in by the employees, each man writes his name on his ballot, and the labor officials are thus enabled to know how every man votes. The rule is that the men vote 98 to 2 in favor of strike.

Referring to the shopmen's strike, Mr. Loree said that he was greatly surprised that so many men quit work. The percentage in the case of his own railroad was about 80, although the men had no grievance. To-day the railroad has 110 per cent of the force employed at the time of the strike. This is due in part to the fact that more business is being done, and also to the fact that many of the new men are not as efficient as the old ones and more are required to do the same work. He said that locomotive equipment will not be in first-class condition prior to next July. Locomotives as a rule are overhauled once a year. Last July 18.5 per cent were in bad condition, and in October 24.7 per cent.

President Loree expressed the opinion that there is still danger of trouble among the railroads that did not settle the strike on the right basis. The companies which adhered to the right principles, and particularly those that have organized company unions, are not exposed to danger. The men are contented and glad to continue under present conditions of employment. He expressed the conviction that many union men are praying for deliverance from the unions and are glad to go into an organization which is fairly conducted. He described in detail the organization of the union of the Delaware & Hudson Railroad.

In conclusion, President Loree spoke of recent elections, saying that they afforded the latest evidence of the tendency of people in this country to swing suddenly from one side to another, because they did not know what they were voting for. He said that this country cannot tolerate a secret, oathbound, hooded organization, but he paid a tribute to the Fascisti of Italy, saying that we should take off our hats to the men of Italy who were willing to go out, not in secret, but openly and courageously, to serve their country. If we could have such a spirit in this country and enough men willing to serve in that way, our troubles would be over.

The Human Machine

"The Physician in Industry" was the subject of an address by J. J. Moorhead, M.D., chairman Conference Board of Physicians in Industry, New York. He rendered distinguished service in war time, and is just as deeply interested in serving his fellow men in times of peace. He made a strong plea for giving at least as much thought and attention to the human body as to the machines which the men operate. He said that machines are built to certain specifications, and that men should be required to conform to certain specifications as to physical condition. Men afflicted with any disease that is communicable should be prevented from associating with others, partly for the sake of their associates, and partly for their own sake. He said that very often men who have various diseases in their incipiency can be cured with proper attention, if the life extension principles are followed.

Dr. Moorhead gave very interesting statistics pub-

lished in the report of the Surgeon-General of the Army as to the results of physical examination of the 4,000,000 men who were enrolled by the United States for the great war. He said that 47 per cent of all those examined had physical defects. The largest percentage of defective men was 64, that of the men examined from Rhode Island, while Kansas led all the States, having only 35 per cent of defectives. He attributed the splendid showing of Kansas largely to the fact that the people of that State are natives and spend much time in the open air and the population is not congested, while in Rhode Island a larger percentage is foreign born, and the State is more thickly populated. In cities of the country, the defectives were 51 per cent, and in rural communities 44 per cent.

More Altruism Demanded

John E. Edgerton, president National Association of Manufacturers, spoke with great earnestness on the open shop. He said that while there is a lack of appreciation on the part of manufacturers of the importance of the open shop, the greatest trouble is that there is not enough courage. Owing to a lack of individual effort, the necessity of organized effort is imperative.

Mr. Edgerton urged that manufacturers bolster up their courage and get a new vision. While he had been rather downcast in regard to the results of the recent election, he knew that if the election resulted in greater activity of those who are opposed to dangerous tendencies in our national life, it would turn out to be a blessing. He said that there are two classes of manufacturers who are impeding progress: Those who are too quick to compromise, and those who have narrow vision and look to self rather than to the welfare of others.

Mr. Edgerton told in some detail how he encourages personal contact between the management and the men in his own plant, and he vigorously urged that employers make more effort to know their men. He believed that if manufacturers would show more interest in the welfare of their men, they would obtain greater loyalty from those whom they employ. He said that he was conducting a closed non-union plant. While he did not deny the right of men to organize, he did not feel compelled to recognize organized labor. He had been fortunate in getting all the non-union labor that he required, and he believed that if men could be excluded from a plant on account of being physically diseased, they should also be excluded for mental or moral diseases. If an employee is not loyal to his employer, he certainly ought to be excluded.

In conclusion, Mr. Edgerton remarked that he would like to see one more association added to those already in existence—a National Obligation Association. He said that there is too much talk about rights and too little about obligations. He had hoped that when the boys returned from France, after offering their all to their country, they would show an unselfish disposition and would continue to practise giving rather than getting. He was disappointed in the disposition which had been shown by the soldiers to get as much as possible from the Government. He believed that manufacturers should lead in encouraging loyalty to country, in insisting upon obligations being carried out and in more unselfish service being rendered.

President Church Condemns False Principles

Praises Business and Political Leaders Who Have Contributed to the Greatness of the Country and Happiness of the People

AT the convention dinner, Wednesday evening, there was only one speaker, Col. Samuel Harden Church, president Carnegie Institute, Pittsburgh, who delivered a scholarly address on "Authority in a Democracy." Before becoming connected with Carnegie Institute, Colonel Church was for many years in the railroad business, holding highly responsible positions with the Pennsylvania System. He was enthusiastically greeted, received close attention and was heartily applauded at the conclusion.

"Authority in a democracy must rest in the sound leadership of the people, and without capable and talented leadership there can be neither prosperity nor happiness for the nation," said Colonel Church. "If we could all only understand the meaning of leadership, and of the authority that goes with it, we could reach the solution of our troubles much more quickly. I remember, when I was a boy, hearing Henry Ward Beecher deliver a lecture in Pittsburgh, and only one sentence of that address has remained in my mind. It was this: 'Whenever you hear a man proclaiming that he is as good as the next man, always turn around and see who the next man is!' I have always thought that the safeguard of our democracy was embedded in that maxim. Our forefathers established a representative form of government for this country based upon their belief that the people would choose superior men to be their leaders. Yet, in our political life, we are constantly met with the spectacle of the man who has failed in every undertaking in civil affairs, but who says 'send me' to the offices of highest responsibility in the public service. In all other human undertakings the masterful man is a pre-requisite to the success of the enterprise. We have a great population in Pittsburgh, but we could never have had our steel mills there without Carnegie and his associates to behold the vision and take the risk. America could never have had the stabilizing institution of the Steel Corporation without Morgan to organize it and Gary to manage its ripening years. We could never have had the railroad system, which is the wonder of the world, without Vanderbilt and Garrett and Edgar Thomson and Cassatt to build it over barren mountains, and across surging rivers, and through the savage wilderness when only their faith in their country rescued such an investment from madness. We could never have assuaged the hunger of our people, occupying a vast continent, without the McCormicks and the Studebakers to harvest the mighty crops with their wonder-working machines. And we could never have worked out the problem of food distribution for our enormous territory without the aid of the meat packers who have been good servants of the nation there at Chicago.

Selecting Real Leaders

"These great constructive achievements are due to leadership and the authority that comes from leadership, and if our people would use the same care in choosing our public servants that they do in selecting the real builders of the country, the return to happiness would be more quickly accomplished. The doctrine that one man is as good as another in all the affairs of life was sadly shaken by those pregnant statistics which were assembled when we called 4,000,000 men into the army to stop Germany's conspiracy to murder the world. The men were graded from A to F according to their intellectual stamina; A and B representing superior men, C and D ordinary men, and E and F inferior men. If we apply the results of these striking tests in their average bearings to the nation, we can get a working theory of the mental capacity of our whole people. If, for convenience, we call the total population 100,000,000, we find that 50,000,000 of our people have the mentality of children of 12 years, and that 35,000,000 more have the mentality of 14 years, while 10,000,000 are of high intelligence, and the remaining 5,000,000 possess the natural ability and genius, and are capable of acquiring the

superior training necessary to fit them for great leadership.

"I know of one railroad company which made a secret but thorough canvass of 1500 clerks in order to find one man among them who possessed the qualifications—intelligence, tact, order, discipline and personality—to fit him to be an assistant secretary. I have within the past few weeks seen a list of 15 colleges and universities, some of them among the greatest in the country, which are looking for presidents, yet some of them permit one, two or three years to elapse without making a choice because the exceptional man cannot be found, or if found is not available. I know of two industrial establishments in Pittsburgh, both fabricating the same things, and each capitalized for not less than $5,000,000. One of them is efficiently officered with a capable man on every part of the work, and has been successful from the start. The other, with a newer and better plant, but without an efficient organization, has never made a dollar of profit.

After Cleveland Came Demagogues

"In our political history we are illustrious only where we have had great leaders. In that brilliant group at the time of the Revolution there is abundant evidence that Washington was the one man indispensable to success. In the Civil War it was Lincoln whose patience and faith, trying out one man after another, finally guided the armies to victory. When Cleveland came he interposed his strong will against the unthinking passion of the crowd, and saved the country from an overturn. After Cleveland there came an epoch of demagogues, under showy and clever leadership, preaching that duly elected public servants were to be pulled down from their lawful seats upon the caprice of the crowd, and that judicial decisions based upon the fundamental law of the land should be annulled by public clamor. Our people were insidiously impressed with the belief that success in life was criminal, that great fortunes were great thefts, that the foundations of business should be undermined, not because business was dishonest, but because it was big. Out of that false and meretricious philosophy there came a train of disasters which paralyzed the railroads, unsettled the stability of business, destroyed the credit of our industries, halted our national progress, and transformed capital from a creative and courageous servant of the nation into a timid and shrinking object which takes fright whenever new enterprises are proposed.

Troubles After Other Wars

"The pursuit of happiness is the main object of human progress, yet we are told that the people are not happy. But we find our hope for better things in reading the history of all great wars, for we shall see that from the time of Cæsar, every war has been followed by an overturn of constituted authority, an attack upon property through confiscatory taxation, and an unflinching demand of the home-coming army upon the purse of the nation. In Cromwell's time after the Civil Wars in England had ended, there arose an organization known as the Levellers who attempted to distribute all the wealth of the nation on an equal per capita basis, and to reduce the social state of the people of England to the condition of the most wretched and ignorant person in the land. Cromwell encountered that organization in the field and disposed of it in a practical fashion. In France 150 years later the mob started upon a similar undertaking, and Carlyle tells us that a young major of artillery named Napoleon Bonaparte met the French Revolution in the streets of Paris and put an end to it with a whiff of grapeshot.

Two Adventurers Fail

"In our time the two adventurers who have brought humanity to its dregs in Russia are reaching the logitermination of their experiment. It was a repetition of the movement of the Levellers of Cromwell's time, and of the fanatics who aimed at greater madness in Revolutionary France. But it has failed miserably and with misery to all the vast millions who were subjected to it, and it has shown the world once more that men who lead humanity downward instead of upward must inevitably attract into their retinue those four horsemen whose appalling ride brings war, famine, pestilence, and death unto all the nations. We are being called upon to support the people of Russia from starvation. It is a merciful task, but every dollar we spend in that way preserves Bolshevism from its final fall.

Italy's Change for the Better

"And now, humanity has once more turned on the upward march. There in Italy we see a palpable and dramatic change for the better. There were many signs of decadence in Italy. The Government-owned railroads were the worst the world has ever seen. Other public utilities were wastefully administered. Public credit was declining. Integrity was melting under a loose system. Voices were crying out for the confiscation of property. Labor was trying to seize all. And then there came through the gates of Rome a black-shirted man, without sword or gun in his hand, who told the ministry that Government means life and honor and property and happiness, and that he is going to give Italy such a government. And with a purpose like that in his heart, no man dared to stop him, and in one hour he became the master of an empire, his leadership to endure as long as his heart and his integrity remain sound.

America's Imperative Task

"And in this great work of restoring authority in a disordered world America has her imperative task. We have not lost faith in our leaders, but we must give them faith and more faith. We must come once more to the recognition of exceptional men, and give weight to the authority of their knowledge and experience. We must call them back into the doing of mighty tasks, and permit them freely to reap the rewards of their courage and genius. We must refrain from our national passion of trying to make the world virtuous by acts of parliament, and repeal a thousand laws which hamstring our civilization. We must realize that only by the upbuilding of character can a nation be made righteous.

Encouragement in Better Men

"And when we view the troubled world we must compassionately enter her councils and take part with her in the discussion of her enormous difficulties. We should give what aid we can in the restoration of her normal way of life. And there is another thing we should consider. The other nations owe us great sums of money, a portion of which was given to them for their own national purposes, and is thus a legitimate obligation which should be paid. But another portion of these sums was advanced to enable them to keep up the fight while we were tardily preparing to take our place on the battle front. It is a question of conscience whether some part of this debt ought not to be remitted—not for the enlargement of foreign armies and navies, not for the attainment of dangerous national aspirations—but it may well be committed to men like President Harding and those two great secretaries, Mr. Hughes and Mr. Mellon, whether the time has not come when America, through an act of superlative statesmanship, cannot employ a part of these vexatious funds in the purchase of an enduring international peace."

George K. Elliott, chief metallurgist of the Lunkenheimer Co., Cincinnati, was the principal speaker before the November dinner and meeting of the Cincinnati Association of Purchasing Agents held Nov. 21. His subject was "Non-ferrous Metals and Their Alloys." Plans were completed at this meeting for the December meeting, which would be for entertainment purposes exclusively, and some novel features are being prepared.

Dayton Steel Foundry Co., Dayton, Ohio, has just purchased a 3-ton Moore rapid lectromelt furnace for its steel foundry.

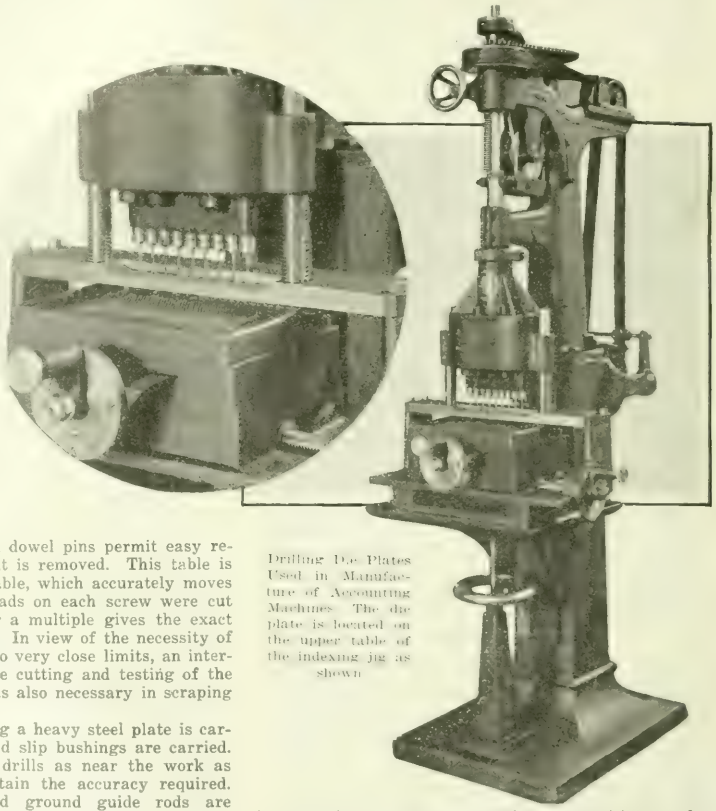
Time Saved in Accurate Drilling Job

One of the important operations in the manufacture of accounting machines is the making of the die plates used in punching the cards. Close accuracy is necessary because in the multiple printing each punch must accurately enter each die. Further, the cards must be accurately punched in order to register properly in the electric tabulating machine.

The die plates are of tool steel varying in thickness from ⅛ to ⅜ in. The plate shown in the illustration is 3⅞ in. by 8¾ in. overall, and has 45 holes the long way and 12 rows across. In machining, the question of cutting down time for drilling and the matter of accuracy were the important considerations. The tolerance between the two extreme holes was plus and minus 0.002 in., any two adjacent holes not to vary more than 0.0005 in. The holes being too close to drill adjacent ones, the plan finally worked out was to have each of the nine spindles drilling every fifth hole, five operations completing each row. The plates are now finished in 22 min. from floor to floor, as against the previous time of 3 to 4 hr.

The drilling machine used was a standard unit of the Hoefer Mfg. Co., Freeport, Ill., a detail view of which is shown in the accompanying illustration. The die plate is located on the upper table of the indexing jig, which has an oil basin for cutting compound. Accurately located dowel pins permit easy replacement of the plate if it is removed. This table is mounted on a compound table, which accurately moves at right angles. The threads on each screw were cut so that either one turn or a multiple gives the exact distance to be moved over. In view of the necessity of holding the finished work to very close limits, an interesting problem arose in the cutting and testing of the lead screw. Great care was also necessary in scraping in the sliding members.

Across the top of the jig a heavy steel plate is carried, in which the liner and slip bushings are carried. These serve to guide the drills as near the work as possible in order to maintain the accuracy required. Two heavy hardened and ground guide rods are mounted on the plate and serve to keep the head and jig in alinement at all times. The head itself is counterbalanced in the column of the machine, and springs are added to assist. The head is of sturdy construction, and is mounted on the company's regular high-speed ball bearing machine, with automatic cam feed and return. Indexing the jig and replacing the drilled parts is practically the only attention necessary on the part of the operator.



Drilling Die Plates Used in Manufacture of Accounting Machines. The die plate is located on the upper table of the indexing jig as shown

---

Of the titanium alloys, only four are in commercial use: Ferrocarbon-titanium, ferrotitanium, cuprotitanium and manganotitanium. Ferrocarbon-titanium and carbon-free ferrotitanium are employed as deoxidizers and denitrogenizers in steel practice. Cuprotitanium and manganotitanium are used as deoxidizers in brass and bronze practice. Information regarding these four alloys is contained in Serial 2406, "Titanium," by R. J. Anderson, metallurgist, which may be obtained by addressing the Bureau of Mines, Washington, D. C.

Production on 1920 Levels

In its survey of October business conditions, the Department of Commerce points to the large increase in production of basic commodities. The output of pig iron and steel ingots, the consumption of cotton and silk and the output of cement, all exceeded in October any previous month since 1920. Cotton consumption at 533,950 bales was the highest for any month since June, 1920. Exports of raw cotton, 798,664 bales, have been exceeded only once since January, 1920. Silk consumption at 42,621 bales makes a new high record.

Floor area contracted for in new buildings showed an increase over September, instead of the usual decline. Both industrial and residential buildings shared in this increase. This may be due in part to the heavy fire losses of both September and October, which were far above normal; being more than $40,000,000 each month. Cement production at 12,287,000 bbl. formed a new high record.

Production of steel sheets advanced from 80.4 per cent of capacity to 91.8 per cent, both being far above the 53.8 per cent of October, 1921. Shipments of locomotives increased heavily, going from 119 to 145. Six locomotives in September and twelve in October were for foreign account. Freight cars advanced from 10,350 to 12,700.

Work of modernizing and rehabilitating the Thomas sheet mill plant at Niles of the Brier Hill Steel Co., Youngstown, will commence at an early date. Some of the equipment has already been ordered. The company's engineering department is working on the changes to be made to the 132-in. plate mill, so as to permit it to roll a wider range of gages. The changes will largely affect the rolls and housings. It is estimated this work will involve an outlay of approximately $200,000.

A Call for Better Chilled Cast Iron Wheels

The Problem Presented by Failures in Service Is Not in the Difficulty of Making Wheels, But in Existing Replacement Practice

BY P. H. GRIFFIN*

CONDITIONS that have existed for a number of years in the manufacture and use of chilled car wheels have prevented the production of wheels equal to increasing service demands of heavier freight equipment and have led to deterioration during the period in which the wheel load and strain have continually increased.

There are about 25,000,000 car wheels in service and over 90 per cent are chilled wheels, the use of which is general in freight car service.

The result of the conditions referred to is shown by a report submitted by the test engineer of a leading railroad at a recent annual meeting of the American Society for Testing Materials as referred to in an editorial in THE IRON AGE of June 30, 1921. Details of the discussion at this meeting were given also in the same issue. The editorial comment was as follows:

> The vital rôle played by the cast-iron wheel in the country's commerce and the need for chemical and other specifications to insure better wheels were emphasized anew at the annual meeting of the testing engineers at Asbury Park last week. In six years losses on railroads from accidents have increased over 200 per cent, or from $33,000,000 in 1913 to $106,000,000 in 1919, due in large measure to poor cast-iron car wheels. * * * The matter was brought to a focus at the annual convention and was easily the most vital subject of the steel and iron sessions. * * *

In the discussion of the report as published in the same issue the author stated that 42 wrecks on the lines of his company in 1920 were caused by broken wheels, all but a few being wheels under foreign cars (cars of other lines passing in interchange traffic).

The loss due to such accidents falls entirely on the line on which they happen, although it had no voice in the selection of the wheels that failed.

Accidents of a certain class are more or less inevitable because they are due to causes that cannot always be controlled, but accidents due to broken wheels are not of this kind. On certain lines operating large mileage under conditions hereafter stated there has been absolute freedom from accidents due to broken wheels.

Not a Manufacturing Problem

The problem of better chilled wheels does not lie in the difficulty of making them, but in the conditions established by the practice carried on in this country under which such wheels are made and used. It is not a case of neglect on the part of practical railroad officials and wheel makers, but of a situation that so far has been beyond their control because no individual road or wheel maker has the power to make the necessary change.

The greater part of all freight traffic is carried in cars that pass from line to line from originating point to destination. Wheel renewals are made by the line, a car happens to be on when replacement is necessary and are governed by certain rules known as Master Car Builders' rules which fix the price of the new wheel and the value that must be deducted for the worn out wheel removed. The net charge so fixed for a standard 33-in. chilled wheel weighing 750 lb. is about $7.50.

As the old wheel is so taken in part payment for the new one used, it is likewise used in payment to wheel makers for new wheels ordered. Wheel makers must recast the old wheels into new ones, and published reports of wheel making practice indicate the use of about 80 per cent of old wheels in making new ones. Sulphur and other impurities (the former from coke used in remelting) increase with each recasting.

The whole situation is the result of practice established years ago that has been continued because of the difficulty of changing it.

In recent years the load and strain on car wheels in freight service has practically doubled through general use of cars of 50 tons or greater capacity, and such increase is sure to continue.

Quality of Chilled Wheels

The chilled wheel has been made and can be made of quality that will fully meet these conditions, but under present practice it is evident that it has not been. This has caused the general impression that it has reached the limit of endurance and quality, but nothing can be further from the fact, as shown by many published records of service of wheels properly made of proper material.

It is not only a matter of the quality of the wheels themselves but of the mechanical conditions under which they are used. They are delivered by the maker and put in service by the user with no mechanical preparation except to bore hubs for axles. That is, the wheels are used in the rough as they are received, although more or less out of round, out of balance and uniform diameter. In this condition they must carry a maximum load that under heavy freight cars amounts to about 10 tons per wheel or 20 tons per axle.

It is not necessary to comment on the service results that follow. The loss of power required is evident, as well as the effect of the resulting shatter and strain on equipment, roadway and structures.

The whole situation and its results constitute one of the most vital and important problems of railroad operation in this country. The subject has been more or less discussed for years by associations of wheel makers and railroad officials in charge of practical operation, but the discussions have related to minor details and not to the fundamental conditions stated. Specifications and tests have been used as formulated by railroad associations, but they cover one or two wheels out of each hundred and wheels not accepted go into other use.

These conditions are not stated critically but to make clear the cause of the deterioration in chilled wheels and the means and method that must be adopted to stop it. It is simply a case of a situation that has gone beyond the bounds of present practice and that calls for improvement that will meet present conditions.

What Should Be Done

The things that can be done to bring improvement may be briefly stated as to the most important ones:

The return of wheels removed from service to wheel makers, with no selection of those that failed to give proper results, can be discontinued and wheels that are plainly of poor quality can be used for other purposes. They will make excellent brake shoes and in that service will pass out of existence. There are other uses as well and no loss to speak of will result to the railroads.

All wheels should be properly finished mechanically before use. There is no difficulty about doing the work with apparatus long available and the cost is low. Some years ago it was done extensively.

These two points can only be solved by the railroads.

The quality of every wheel made can be thoroughly established by the maker in the process of manufacture by simple tests at the various stages. Under the present price restriction, established by M. C. B. price limits, this has not been done. Such practice has been published in all details as well as the fact that hundreds of thousands of wheels so made have been used in the heaviest service with no breakage.

But the makers must receive a price that will provide

*President Griffin Chilled Steel & Iron Co.

for such manufacturing practice and heretofore they have not had it. The increase over the present M. C. B. price will not be great and it is entirely practicable to decide that point by proper investigation.

But in the past when such matters have been discussed the wheel makers have found that more expensive practice was called for when explained, with no increase in the M. C. B. price to cover the cost, and that has made present producers slow to accept the higher costs.

The general situation that confronts practical railroad officials has been equally difficult. They do not determine the prices to be paid for materials and at most can only submit specifications for what is required. The fact as to car wheels for freight service that has had most to do with present price conditions is that by far the greatest use of wheels is for renewals under foreign cars that are merely passing over the lines in transit. The M. C. B. price limits the charge that can be made, as stated, and it is not necessary to point out that $7.50 plus a like weight of scrap wheels does not admit of production of 33-in. standard wheels that weigh 750 lb. without the use of the scrap wheels, regardless of quality.

There is nothing complicated about the creation of better conditions except the securing of action to that end. If a few leading lines started action, others would be sure to follow and there is one reason why it must be taken sooner or later.

The total production of chilled wheels, covering over 90 per cent of all wheels used, does not exceed 5,000,000 per year. At the M. C. B. price the total cost is $37,500,000.

If the total cost of all accidents in 1919 was $106,000,000, with chilled wheel failures a leading item, it is evident that the annual cost of such failures must approach the total cost of all such wheels used both for new car construction and for all renewals.

PECULIARITIES OF BUYERS

Self-Sufficiency of the Egoist and Futility of the Rubber Stamp Type

BY JOHN J. RALPH

AS the human element can never be neglected, it is always necessary to make allowance for individual peculiarities when studying a selling situation. The times of stress showed these up beautifully. Every type of man re-acted to them in a different way, but there were a few types which stood out clearly.

The quality of enthusiasm and loyalty was present in practically all men. This quality is ordinarily rated high and sought for. The stress showed that practically all men have unlimited reserves which have not been tapped.

The Egoist

He is the man who, because he is he, is confident of the impossibility of his making error in judgment or calculation. Time after time this may be disproved, but there is the stock reply: "You cannot make omelettes without cracking eggs."

Having gone through a problem, there was no other solution possible than his, for HE had worked it out. There was no possibility of error having been made, particularly within the sphere of his technical knowledge, and opposition could have but one meaning—personal animus. For that there was but one cure—removal of the opposition; for only in that way could the path of progress be smoothed.

This is the man who gave verbal orders for machinery, who performed his calculations on scraps of paper and confidently assured us that detailed planning work was unnecessary, for he had already gone over the problem and it was solved.

With No Sense of Proportion

He spent the same amount of time on an order for $25 worth of supplies as he did on the purchase of 100 machines at $1,000 each, and demanded the same kind of formality for each requisition. He was as quick to give attention to the order for hinges for the alley door as he was to the requisition for a broken gear for the broken-down machine.

He was the man who was as insistent on immediate delivery of material, when he already had four months' supply on hand, as he was for the material that had to come by motor truck because operations could not proceed without it.

With a factory full of idle machines he was as insistent on the delivery of the final shipment in accordance with contract, when some other plant could use them immediately, as he was in pressing for the machine someone had forgotten to order, that should have been installed a month before.

A Lack of Sense of Value

This is the man who can see the value in anything up to, say, $1,000 and insists on the most meticulous care in investigating such a proposition. When the amount soars into the upper thousands, however, he cannot realize that here also he is talking of money and that each dollar is entitled to as much consideration as when the purchase is for $25 only.

Such is the man who views the murder of one man with horror, but reads of the deaths of thousands in battle with equanimity. It is a peculiar phenomenon. Most of us know the executive who can be approached with fear and trembling when a few small tools are needed, but who listens readily to the proposal to install a machine costing thousands upon thousands of dollars.

We also have with us the man of wealth who, on the same day, buys a motor car at $7,000 and begrudges himself a decent pocket knife at $1.50. There seems to be a total inability to grasp the mental concept of many dollars consisting of a series of single dollars. One of the tests of mental development is the number to which the individual can count. Perhaps this is simply another phase of the phenomenon of lack of a sense of proportion.

There must also be counted in the delusion of grandeur. The feeling that one has just signed a contract for a quarter of a million can never be usual to the ordinary man. The transaction has a glamor that often prevents the close intimate study the smaller transactions get.

The Rubber Stamp

Feeling the urgent necessity of the purchasing, knowing that he is employed more as a matter of form than for his purchasing ability, the quite different rubber stamp type of man permits laxities in system which leave him entirely up in the air. He is continually receiving bills of lading for material he never knew had been ordered. He is continually called on to expedite goods he was assured had been ordered and delivery promised.

He has not even self respect enough to throw up his job when his province is cut into by every "Tom, Dick and Harry" in the organization. To be sure, responsibility is not his, for he and the organization can but reproduce the lack of ability and knowledge of those in authority.

Automobile Production Still Heavy

Figures of the Department of Commerce show a production in October of 217,098 passenger cars and 21,416 trucks, a total of 238,514. This exceeds September by about 15 per cent under each heading, due in part to the closing of the Ford plants in September. The figures compare with 134,734 cars and 12,813 trucks in October, 1921.

For the first ten months of the year, production of passenger cars has reached 1,914,000 while trucks have exceeded 200,000. October is the seventh successive month with a total production of more than 200,000 vehicles.

Easier Conditions on the Railroads

Open Top Cars Released for Coke Shipments—Loading of Revenue Freight the Heaviest in History of American Railroads

WASHINGTON, Nov. 28.—Easier transportation conditions are reflected by recent developments. Following the order of the Interstate Commerce Commission of week before last, releasing open top equipment on all lines south of Ohio and Potomac Rivers, except the Baltimore & Ohio, to all classes of shippers, regardless of the height of the car, the commission last Thursday announced an amendment to car service order No. 25, effective last Saturday midnight, releasing open top equipment with sides 48 in. or less for shipments of all character of coke. The office of the Federal Fuel Distributor will be closed on Jan. 1. Federal Fuel Distributor Spens had prepared to relinquish his duties on Dec. 1, but will continue until New Year's at the request of President Harding. The president, while realizing that danger of a famine in the bituminous coal situation has passed, desires that every precaution be taken against any serious shortage arising through too miscellaneous distribution and it is also understood that he feels the anthracite situation still requires careful supervision. The lake shipping season is virtually at an end, which means that coal shipments which heretofore have been going to the Northwest, can now be diverted to industrial and other consumers in greater quantities in other sections of the country. In addition to these indications of improved transportation conditions, coal production is at a high point and there is a growing supply of cars and locomotives due to those that have been repaired and put into service and the delivery of new cars and locomotives.

Feeling of Relief

While it is recognized that cold weather, with its hampering influence on transportation, is at hand, there is a feeling of general relief over developments. The order of the commission releasing open top equipment up to 48 in. for the coke trade, will release several thousand cars and allow blast furnaces to build up reserves. Heretofore shipments of coke for industrial purposes have been confined to regular coke racks and any cars that might be provided that did not have sides exceeding 42 in. in height.

Other Regulations Removed

Another evidence that the coal situation is easier was the action of the Federal Fuel Distributor last Friday in revoking regulations, effective Dec. 1, requiring bituminous coal operators to furnish the Federal Fuel Distributor with daily statements as to coal loadings, prices obtained for coal and destinations to which coal is shipped. These regulations were promulgated on Sept. 27 and 28 and Oct. 4, and required that daily reports of coal shipments in the territory east of the Mississippi River be transmitted to the 15 naval officers acting as district representatives of the Federal Fuel Distributor. Operators in trans-Mississippi territory were required to make their reports directly to the Federal Fuel Distributor except in the case of operators in Iowa, Montana and North Dakota.

Rolling Stock Installed

Reports received by the car service division of the American Railway Association show that new railroad owned equipment installed and on order by the railroads, up to Nov. 1, 1922, made an increase of 47,802 cars over 1921. Locomotives installed from Jan. 1 to Nov. 1, 1922, totaled 866; those on order Nov. 1 amounted to 1232. This represented a total of 2098 installed and on order as against 1382 installed in 1921.

Freight cars installed from Jan. 1 to Nov. 1, 1922, totaled 54,774, the principal type of equipment being box cars, 19,352 and coal cars, 26,812. Cars on order Nov. 1 totaled 62,464, of which 30,844 were box cars and 22,571 were coal cars. The total installed and on order therefore, up to Nov. 1, was 117,238, as compared with 48,737, installed in 1921, during which year the total cars ordered and installed was 69,436.

Rapid Repairing

The railroads repaired and turned out of their shops during the period from Oct. 15 to Nov. 1, 1922, the largest number of locomotives for any semi-monthly period in approximately the last two years. During that semi-monthly period 13,490 locomotives were repaired. This also exceeded by 2086 the number turned out of the shops from Oct. 1 to Oct. 15 last. Locomotives in need of repair on Nov. 1 totaled 18,366, or 28.5 per cent of the number on line. This was a decrease of 865 since Oct. 15, at which time 19,231, or 29.8 per cent were in need of repairs. Of the total number on Nov. 1, last, 15,101 were in need of repairs requiring more than 24 hours. This was a decrease since Oct. 15 of 834 locomotives in the number needing heavy repairs. The remaining 3265 represented locomotives in need of light repairs, which was a decrease of 31 within the same period. Reports filed by the carriers show that on Nov. 1 the railroads had 46,096 serviceable locomotives, an increase of 909 over the number on Oct. 15.

On Nov. 15 the shortage of cars totaled 158,236 as compared with 174,498 on Nov. 8. The shortage of box cars was 82,523, of coal cars, 42,827 and of coke cars 270. The surplus on Nov. 15 was 4945 cars, of which 669 were box and 2086 were coal cars.

Heavy Loading

The car service division, in its report last Thursday, said that loading of revenue freight continues to be the heaviest in the history of American railroads.

For the week which ended on Nov. 11 loading totaled 953,909 cars, which is an increase of 198,132 cars compared with the corresponding week last year, and an increase of 26,323 cars compared with the corresponding week in 1920. The total, however, was a decrease of 40,918 cars compared with the preceding week due to election day and the observance of armistice day throughout the country, both of which took place during the week of Nov. 11. Coal loading totaled 188,312 cars. While this was a decrease of 5765 cars below the week before, it was an increase of 33,462 cars above the same week last year, but a decrease of 34,562 under the same week in 1920. Coke loading totaled 12,273 cars, 632 above the week before. Compared with the same week last year, this was an increase of 5896 cars, but a decrease of 2837 cars compared with the same week two years ago. Ore loading totaled 39,383 cars, which was a decrease of 7663 cars below the week before. Compared with the same week last year, however, this was an increase of 30,648, but a decrease of 10,300 under 1920.

Shipments by the Greenfield Tap & Die Corporation, Greenfield, Mass. during October were 66 per cent greater than those for the same month last year, while the comparative gain for the first ten months of the year was 24 per cent.

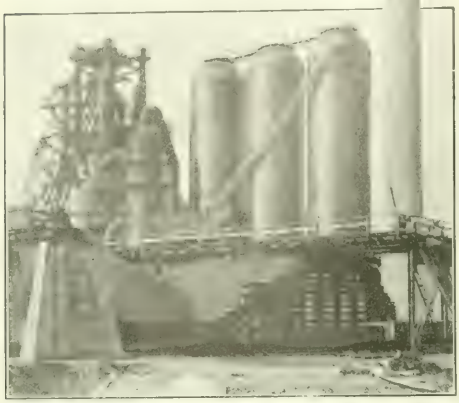
The labor barometer of the Employers' Association of Detroit shows a net increase of 3045 men for the week ending Nov. 14. The total working force of the 79 firms reporting is now 178,778.

NEW CLAIRE FURNACE

Example of Modern Standard Blast Furnace Practice, But Unusual Methods of Disposing of Slag

BY GEORGE F. TEGAN*

ANOTHER hand-filled blast furnace has passed. The Claire furnace, Sharpsville, Pa., owned by Reliance Coke & Furnace Co., Pittsburgh, built in 1888, is no more. In its stead stands a new furnace, modern in every respect, which was blown in Nov. 23. It has a rated capacity of 500 tons of iron daily and it will produce this tonnage at no greater labor cost than the old stack, which turned out half that quantity. The new furnace is the successor of one of the first pig-iron making units built in the Shenango Valley, an iron furnace, known as Mt. Hickory, constructed a few years after the conclusion of the Civil War by Scott & Pierce. Later a second furnace of the same type was built and both were operated until 1887, when they were torn down to make room for the first Claire furnace.



The New Furnace Is Served by Three Stoves

It is interesting to compare these furnaces with the later ones. They were 45 ft. high with a hearth 6 ft. in diameter and a bosh of 10 ft. in diameter. They were open-top stacks, hand-filled and served by an elevator which moved up and down by water balance. Only hard Lake Superior ores were available in those days; the blast was 2½ lb. to 5 lb. pressure and pyrometers not then being known, the temperature of the iron was largely guess work. The common method was to hold a piece of lead pipe against a tuyere cap and count until the pipe melted, the heat being gaged by the count. These furnaces each produced about 175 tons of pig iron a week.

The first Claire furnace was a long step forward in blast furnace construction by comparison with the Mt. Hickory stacks and was able in a day and a half to make as much pig iron as the two old stacks cast in a week. It had a stack 75 ft. high and a diameter at the hearth of 11 ft. and at the bosh of 15 ft. 6 in. Four stoves arranged in a square furnished the hot blast. A hand-filled furnace, and possible to run profitably in recent years only during periods of high prices, it was only natural that it should in time give place to one capable of economical operation. The cost of making iron in the new furnace may run high, but this will be due to the prices of raw materials rather than to furnace performance.

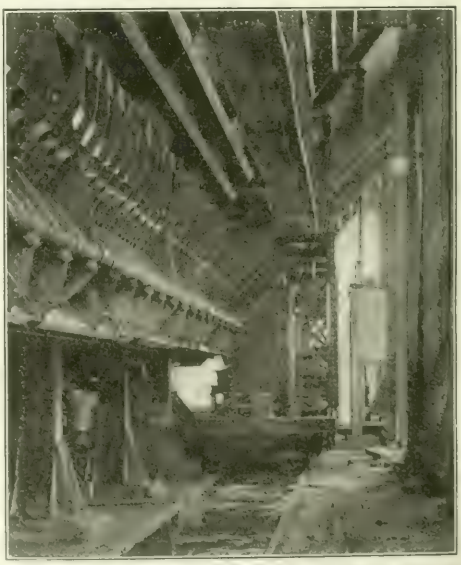
The latest Claire furnace is a thoroughly modern unit and yet in its construction there has been no important deviation from what to-day is regarded as "standard practice" in blast furnace building. In other words, the company has put up a furnace which, while embodying most of the modern contrivances, appliances and designs, does not contain any innovations. No claim is made that the furnace differs essentially from those which have been built in the past few years.

The stack is 87 ft. high with a diameter at the hearth of 16 ft. 3 in., and at the bosh of 20 ft. The bosh is built at an agle of 80 deg., the idea of this steep pitch being that the yield of iron will be increased by the fact that the metal will drop faster and with less resistance than with walls pitched at a slighter degree. In the old furnace the bosh was pitched at 75 deg. The stoves, three in number, are 100 ft. high, 22 ft. in diameter, of the two-pass side combustion type, built in a row. The chimney for carrying off the stove gases is of concrete, lined to its full height with radial fire brick. The chimney rears 200 ft. from the foundation level and is 7 ft. inside diameter at the top. Checker work in the stoves is 4½ in. square with 3-in. walls. The old stoves had large checkers with brick of varying sizes, the four stoves containing less heating surface than one of the new ones.

The furnace is served by a double-track cantilever skip bridge, the feature of which is that its weight is upon its own foundations rather than upon the stack. Wood bins for coke, ore and stone have been replaced by steel ones. Coke breeze is carried by a steam jet ash conveyor from a hopper under the screens to a bin located above the railroad track. The same track serves the dust catcher. Flue dust is stored and will be sintered later.

The furnace has a Brassert gas washer in connection with which is a gas drier. There are four uptakes, from which branch the downcomers, the latter converging into a single one going into the dust catcher. The furnace has the regular double-bell top, operated by the skip operator who also operates the coke bin gates. The stack is of heavy construction, the shell being of 1-in. steel plate.

To take care of the greater power demands of the new furnace, the company has installed two new boilers of 500 hp. each and 150-kw. motor generator set. The storage yard contains space for 100,000 tons of ore. This yard and the bins are served by a 3-track steel trustle, two tracks running over the bins and the



The Bins Are of Heavy Steel Construction. The view is of the ore bins

*[illegible]



The Stack Has a Hearth Diameter of 16 ft. 3 in. and a Bosh Angle of 80 Deg.

other over the storage yard. The company now employs locomotive cranes for loading the bins from the storage pile, but for this purpose other arrangements will be made in the future. The new furnace having been built where the old stack stood, it has not been necessary to construct a new cast house. The old one, equipped with a single-strand casting machine, will be used.

Disposal of the slag is one activity in which the company departed from the beaten paths. The slag is granulated in the usual fashion of playing a stream of water upon it as it leaves the runners going into the pit.

It then is received into a hopper on the suction pipes of low-speed centrifugal pumps, and conveyed as a sludge under the Shenango River in 8-in. pipe lines to a storage space back of a hill opposite the plant property, a distance of 1500 ft. This means of slag disposal will be watched with much interest because the more common practice of other furnace operators in the district is to "waste" the slag or to give it to the slag-crushing plants. There is considerable expense to the method employed by the Reliance Coke & Furnace Co., but it is not as costly as the charge of 69c. a ton now imposed by the railroads for "wasting" the slag.

The company has built a new pump house of concrete, equipped with two 6,000,000-gal. steam turbine-driven centrifugal pumps. The water passes through three screens, bar, mesh and perforated plate, before being used. The building contains a water chamber 5 ft. below the normal level of the river for the suction pipes, partitioned off, so that one section can be cleaned while the other is in use. Freyn, Brassert & Co., Chicago, handled the engineering details of the new construction.

Farm Implement Outlook Improved

That advances in the prices of farm products may close up much of the gap between what the farmer gets for what he sells and what he pays for what he buys was pointed out in addresses at the meeting of the Tractor and Thresher Department of the National Association of Farm Equipment Manufacturers held in Chicago Nov. 16 and 17.

"The year which is just closing will write some more red ink history into many of our balance sheets," said F. R. Todd, vice-president, Deere & Co., Moline, Ill., in an address on the Outlook for the Farm Equipment Industry. "The year 1923 seems to hold better things in prospect. A month ago I felt that while 1923 would be a much more favorable year than either of the two that have gone before, it was not likely to be a profitable one. The developments of the last 30 days, particularly in the increasing prices of farm products, have to my mind improved the outlook, and I think there are now possibilities that the year 1923 may cover the turning point when red ink figures in our balance sheets will give place to black. I am quite sure that this will be the case if farm products will advance so as to cover any increase in implement prices that may be made necessary by our growing costs.

"The figures of Sept. 1, indicated that the prices of farm products were approximately 31 per cent above the pre-war level. Price advances during the month of September carried this level to 33 per cent above 1914. While the figures are not yet available for October, farm products generally went steadily up during that month, and it is probable that the present level is from 34 to 35 per cent above pre-war. If all of the farmers' purchases in the farm equipment line were taken into consideration at the present level of prices, the result would probably show a little, if any, in excess of 35 per cent above pre-war. This means that in terms of implements the farmer's purchasing power has been substantially re-established."

Will Sell Gun Plant

WASHINGTON, Nov. 28.—The office of the Director of Sales, War Department, announces that the Symington gun plant, Seventy-fourth Street and Ashland Avenue, Chicago, will be auctioned on the premises at 2:30 p. m., Dec. 2. The plant covers 47.4 acres and has a forge shop, cooling room, machine shop, a power building and two other steel structures. The equipment among other things includes seven 10-ton Chesapeake cranes; four 25-ton Chesapeake cranes; four 10-ton Shepard cranes; three 20-ton Milwaukee cranes; and one five-ton Shepard crane.

The working force at the Government armory at Springfield, Mass., has been reduced to 290, and presumably will remain on that basis until June 30, next, at least. The pre-war peace-time was about 600. The metal working departments have been transferred from the Hill to the Watershops plant, leaving the woodworking, heat treating, case hardening, cleaning, repairing and assembling departments at the Hill shops.

The relining of a hot blast stove of the Norton Iron Works at Ashland, Ky., and the installation of a pig casting machine at the Belfont Iron Works Co., Ironton, Ohio, are among added blast furnace plant construction work, both of these improvements to be done by Freyn, Brassert & Co., Chicago.

Bag Holder Saves Labor

Many manufacturers of fittings, sprinkler heads and other small metal products, ship in bags rather than boxes. In counting parts, as they are thrown into the bags, one laborer handles the parts and counts them, and generally it has been found necessary for another laborer to hold the bag open to receive them, even when weighing is depended on for getting a count.



The Stand Holds the Bag Open While Being Filled

To save the time of one of these laborers on this work, the Malleable Iron Fittings Co., Branford, Conn., developed for its own use and has now put on the market a bag holding stand. This consists essentially of two semi-circular castings of different sizes, connected by three standards.

In each of the two castings are three renewable pins for holding the bag upright and open, so that material can be readily dropped into it. It will be noted that the device will accommodate different sizes of bags. Small bags are held with one end of the stand up and larger bags with the other end up.

National Foreign Trade Council Organizes Trade Adviser Service

The organization of a trade adviser service to act throughout the year as a medium for the interchange of experience on foreign trade problems is announced by the National Foreign Trade Council, India House, New York. "This service," says O. K. Davis, secretary of the council, "is intended to provide foreign traders with a confidential answer to those intimate, personal, or unusual problems which cannot be handled in a satisfactory manner through existing governmental or private agencies. It will be of very practical assistance to foreign traders in improving the technique of export organization, sales methods, foreign advertising, commercial credits, traffic management and other similar practical matters.

"More than a hundred leading foreign trade executives from all parts of the United States, and many lines of industry have agreed to co-operate in this work, and to draw upon their own successful experience to help other foreign traders solve their problems.

"The trade adviser service of the foreign trade council will enable the manufacturer entering the export field to obtain invaluable advice from those of more mature experience. It will also provide the experienced manufacture with an opportunity to check up his policies and methods with those of others equally or perhaps even more experienced in the same field. This advisory service is rendered without obligation to the inquirer and without remuneration to the adviser, solely with the bigger and broader point in view of assisting in the development of American foreign trade.

"To secure the benefits of this service, the inquirer should submit his problem in writing to the trade adviser secretary of the National Foreign Trade Council, 1 Hanover Square, New York, giving sufficient details and background to enable the advisers to visualize the problem in full. The inquiry will then be considered from all angles, and the reply will contain a digest of the advice of some of the best brains in American foreign trade."

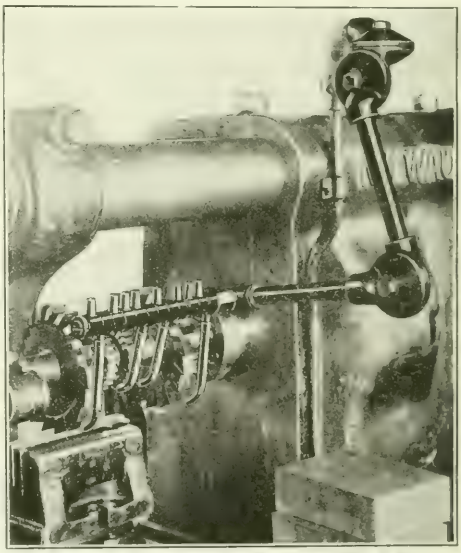
The general chairman of the trade adviser service is E. P. Thomas, president United States Steel Products Co. A. E. Ashburner, American Multigraph Sales Co., is vice-chairman, and C. J. Warren, Remington Typewriter Co., executive chairman.

Multi-Production Lubricator Attachment

A multi-production lubricator for distributing tool and work cooling compound to tools and cutters on screw machines, milling and other machines has been placed on the market by the Borgeson Tool & Machine Co., Inc., Syracuse, N. Y. It is intended to permit of increasing production and reduced tool and cutter expense by providing adequate cooling lubrication.

The accompanying illustration shows the device as attached to a milling machine. It is made up of a threaded attachment plug and slotted distributing tube upon which the nozzles are mounted. The nozzles are held in a firm position on the distributing tube by spring tension, and each nozzle may be adjusted readily to the open or closed position without changing the others.

The distributing tube has elongated slots cut in the side, which register with the holes in the nozzles when in the open or feeding position. The length of the slots permits a wide range of adjustment in the open position. The attachment plug is threaded to standard pipe sizes, those for use on Jones & Lamson machines being threaded with the special thread required.



Multi-Production Lubricator in Use on a Milling Machine. The nozzles are held in position on the distributing tube by spring tension

The spouts fit the taper on the distributing nozzle, and may be adjusted to any angle for directing the flow of cooling compound to the exact cutting edge of the tool. Various lengths of spouts, to suit requirements, are available. The swivel joints are made either single or double, permitting the distributers to be located readily in any position. They have large ground friction surfaces, and are said not to leak or jar from position when in use.

The West Penn Power Co. has ordered two 30,000 kw. turbine generators with surface condensers for its Springdale, Pa., plant from the Westinghouse Electric & Mfg. Co. The new units are 3-phase, 60-cycle, 12,000 volt, single cylinder, to operate with 300-lb. steam pressure at turbine, 250 deg. superheat, and 29-in. vacuum. Each generator will be served by a 55,000 sq. ft. condenser, equipped with two 35,000 g.p.m. circulators, driven by 300 hp. C. W. motors; two full capacity condensate pumps, a LeBlanc air pump and air ejectors.

Problems of the Machine Tool Industry*

Some Grow Out of the Relations of Dealers and Manufacturers —What Is Sold Is Production, Not Pounds of Cast Iron—Cost Does Not Make Value

BY ERNEST F. DU BRUL†

AN essential fact of economic society is that each producer must hunt his demand to make his living. The machine tool builder is no exception to this rule, and his success depends on the kind of sales outlets he has for his goods. No matter how good a machine he makes, it will not sell itself. He must bring it to the attention of prospective users. Advertising at best can only attract attention and perhaps arouse the interest of a prospective purchaser; but the sales of machine tools must be made in the end by personal contact.

Years ago most machine sales were made through dealers; but in the last few years some builders that were large enough to undertake the problem of direct selling have taken over the more concentrated territory for their own direct sales organization. Such changes do not come about as a result of mere caprice or notion, so it is well for both the manufacturer and the dealer to consider carefully the reasons for this change.

Machines are not built to be sold to dealers, and the economic process is not complete until they reach the users' hands. For the greater number of machine tool builders the dealer is still the point of contact with the real market, the users. Both being mutual participants, it is the duty of both the machine tool builder and the dealer to study the selling problems of the industry so as to perform their respective economic functions with the greatest efficiency.

Co-operation of Dealer and Manufacturer

If a manufacturer does not give the dealer the co-operation that the circumstances fairly demand, the dealer will seek to represent a manufacturer who can and will give him the proper co-operation. If the dealer is responsible for some vital deficiency, the manufacturer, for his own self-preservation, must find another dealer or join with a group of manufacturers properly to reach the market that the dealer is neglecting, or start his own direct selling force. On the basis of those fundamentals it is well to have both elements, dealers and manufacturers, carefully consider their joint and several interests to bring out any defects of the present system and to take appropriate steps to remedy them. The Machine Tool Builders' Association at its last convention recommended to the board of directors that a committee be appointed to co-operate with a similar committee from the dealers' association in all matters of mutual interest. I am very glad to bring that message to this organization.

If there are any manufacturers or dealers who feel that the other's interests are antagonistic to them those men are short-sighted. Such men do not realize that each one has a function to perform in seeking out machine tool demand. The manufacturer, of course must produce machinery of quality, up-to-date in design, otherwise he cannot hope to compete with the more efficient machine. Efficiency of a machine means efficiency for the purpose for which it is to be devoted In many cases a machine that will do rough work in rather slow time is efficient for its purpose, although in other cases the requirements are for a machine of very rapid and accurate productive capacity.

Sales Problems Never So Important

In a spirit of analysis of the conditions governing the machine tool business, the recent convention of the Builders' Association had round table discussions that dealt with many things. The vital function of sales naturally received much attention. Never before have sales problems been so important, because as the aftermath of the war the machine tool industry is in a very deplorable state. The hard wallops of the worst depression ever known have started an amount of thinking that must lead to results. If the dealers are to do a proportionate amount of work along the line of their interest they too will use the brains the Lord gave them to work out some of these selling problems.

If men do not think clearly to work out safe and sane policies, their businesses will not produce the amount of income that they can have out of their efforts. Perhaps their businesses will go under the sheriff's red flag and they will lose their investment and some of their creditors' money besides.

Machine tool builders' ideas of the law of supply and demand have been entirely too vague and hazy Most men have the general impression that the lower the price, the wider a market becomes in all cases But this is not true in all cases and at all times. It is mostly true only as to goods that go to an ultimate consumer. Even in automobiles, although a reduction of $50 or 16⅔ per cent might increase the Ford demand 25 per cent, a reduction of $50 in the Rolls-Royce price would make no appreciable difference. Perhaps a reduction of 16⅔ per cent of the Rolls-Royce price would not increase the demand for the Rolls-Royce over 5 per cent.

What Makes Machine Tool Demand

To jump to the conclusion that the law of supply and demand affects machine tools in the same way that it does the Ford automobile has been absolutely fatal to some machine tool companies. The machine tool has no demand of itself. Its demand is of the nature described as a secondary or derived demand. Its demand depends on the demand for the commodities which the machine tool produces. When that demand is satisfied there is absolutely no demand for machine tools at any price.

*An address before the National Supply and Machinery Dealers' Association, Pittsburgh, Nov. 21, 1922.

†General manager National Machine Tool Builders' Association.

GREATER specialization of machines and greater necessity of selling production efficiency forecast the coming of the sales engineer in the machine tool industry. The metal-working industry may be dangerously subject to abuses of credit, because men who start shops may be very good mechanics but very poor risks as business men. In innumerable cases very fine mechanics were so wanting in business capacity that they simply destroyed capital. It is not the business of either builders of machine tools or dealers to finance customers that bankers cannot afford to carry.

You all know that a shop full of idle machinery with no prospect of using additional machinery is a very poor hunting ground for orders. No price short of a free gift would induce the owner of such a shop to clutter himself up with machine tools that he cannot use. Eventually the same condition comes to the automobile owner. He has a saturation point as an individual.

Demand for machine tools is of three kinds. One kind is due to wear-out and that is a very limited demand, indeed, because physically machine tools do not wear out very fast. The second demand is due to obsolescence, caused by the improvement of machine tool design and construction, whereby a given machine tool will produce more work with the same muscle power of attendance, the same space, supervision, and other overhead. The third class is expansion demand, due to the development of new industries or the expansion of old ones with the growth of the country. But whatever the motive that leads a buyer to invest in a machine tool, he does not invest unless and until he needs the tool.

It is very important for the machine tool industry and all its participants to realize that fact, because on that fact must be based a price policy that will produce a satisfactory return on the industry's investment of time, brains and capital. That return must be sufficient to keep the industry going or society will find itself without machine tools until the industry will yield a satisfactory return to its participants.

Cost Does Not Determine Value

Another economic principle that all participants in this industry must recognize is that cost does not produce value. The Socialist soap-box orator says that labor produces wealth; the manufacturer or merchant says that he marks up goods because they cost him more. But he hates to mark them down because they cost him less. Business men and salesmen say they ought to get more for their work because of the effort that they put out and the pain and anguish of putting it out. All say these things because they think that it is cost that produces value, whether that cost be a money cost or an effort cost.

As a matter of fact, cost has nothing whatever to do with the production of value. The maker or distributer of goods has nothing to say about value; it is the user of the goods who attaches value to the goods. It is the business of the fabricator or merchant to produce goods to which the buyer will attach a value in excess of the cost of production, and to get his cost as much below that valuation as he can.

It is also his business to know how high a value the user will put on the goods and how near to that value his competitor will allow him to make his asking price. Patent protection gives him a limited monopoly for a given length of time, and enables his price to equal the buyer's value, if he is salesman enough to get it. There are points below which he cannot go without losing his capital. There are other points below which he should not go, because his investment could be more productive in other lines. There are other points above which he cannot go, because to do so invites additional competition to come in and whittle down his return to a point that is not in conformity with the returns of other lines of business.

The machine tool builder has other limits to a high range of price. It is impossible for him to gouge the user, for two reasons: First, even though he has a tight patent monopoly he cannot get any buyer to pay more than a machine is worth as a profit-making asset. Second, if he has no patent and even though all competitors knew very accurately the maximum price that the user could afford to pay and still earn a profit, by the use of the machine, if that point is very much above the point that measures the cost and trouble of making the machine, the user could go ahead and make a machine for himself in his own shop. So to sell him, the price must be below this point of disutility.

The Working Price Range

Within such ranges of price the machine tool industry must work. It simply cannot go above and it loses its investment through bankruptcy if it goes below.

That economic fact has a direct bearing on the selling problem. Every one of you has met the buyer who thinks he knows all about how little or how much a machine tool should cost and who sagely weighs his notion of cost against the price, and calls the machine tool builder a robber. But we notice that wiseacres who believe in that folly and try to run a machine tool shop on that basis do not stay in it very long. Most of the men using that argument do not believe their own bunk, but they are smart enough to make the machine tool crowd swallow it. As a matter of fact, the selling forces of the machine tool industry have not been good enough salesmen to refuse to be led astray on the question of cost of machine tools. On that account they have let themselves be jockeyed out of profits that the economics of the market would fairly and decently afford them.

Basing prices on cost does not work both ways as a fair argument would, because the buyer feels no divine call to pay the machine tool builder more than the machine is worth because the machine cost a lot of money. If salesmen were trained to ridicule that argument as it should be ridiculed whenever it is brought up by a buyer, the buyer would soon recognize that he was making a fool of himself in trying it on. The fact that it has been taken seriously only shows how low is the level of salesmanship in the machine tool industry that allows such a false argument to gain currency and to be effective.

THE dealer would do better not to deceive himself as to the actual worth of old machines and work to educate users to scrap them. In other cases the dealer has taken an old machine in at a very low price and then sold it at a price above its real worth. . . . If he does not work to improve methods of production through his activities, he is falling down on his job, and he need not be surprised if the manufacturer takes his job away from him.

Cost Factors Overlooked

The machine tool buyer using that argument does not figure in his own estimate of cost a lot of factors that actually enter into cost. For that matter the machine tool builder himself has not figured those elements or the buyers could not so easily have gotten away with the argument. A shoe manufacturer does not figure the cost per pair of shoes based on the overhead of a given week during high production divided by the number of shoes produced that week and base his price accordingly. If he did he would find that the supposed profit gained during the active season would all be paid out and more besides to carry his organization over until the next active season.

The shoe salesman knows better than to let his customer argue and jockey about a price based on that nonsense. In principle the same thing must apply to the machine tool industry, except that instead of figuring overhead by the week or by seasonal periods of activity during a year, the machine tool builder and the dealer must figure on a cycle of longer duration. Machine tool cycles are as short as two years from bottom to bottom and have hardly ever been longer than four years from bottom to bottom. It seems that in some cycles the period of inactivity was as long as three years.

If the machine tool industry does not collect this cost of necessary idleness from its customers during the period of activity, both builders and dealers surely must go out through the bankruptcy court during the period of inactivity. Only those who get enough to

carry on are able to survive. Those who do not get enough sink, because they don't know their business.

Another element of machine tool cost is due to these long periods of inactivity. The industry is always faced with the necessity and the cost of re-building its labor force when its own demand comes on. This demand always comes on quite a while after the customers' shops are quite active, and the activity of the customers cleans up the labor market. When the machine tool builder can go into the labor market, he has to train new men or break up the organization of his customers by bidding his old men away from them at a greatly advanced wage that he must pay to overcome their preference to work in a steadier industry. This costs the machine tool industry a lot of money, and if that cost is not gotten back from the customers, our industry does not get a proper return on its capital.

A Paradox in Machinists' Wages

Another thing, the machine tool builder necessarily requires a more general and more skilled class of mechanics to build machine tools than is required to fabricate articles of mass production. The market price of automobiles is high enough to allow the automobile maker to pay high wages to unskilled labor to work on the specialized machines furnished him by the machine tool builder. Yet in many cases he pretends to expect the machine tool builder to sell his machines so low that this industry could not make the machines unless its skilled mechanics took lower wages than the automobile builder pays his unskilled laborers.

Some machine tools have been sold at a price so low that their high productivity saved enough in labor cost in four months to pay for the machine tool. In such cases the buyer was able to secure a 300 per cent a year investment, due to the selling incompetence of the supplier; yet the buyer "yammered" just as loudly about that machine tool being high priced as he did about any other. In the particular case a price six times as much would have given the buyer a 50 per cent per year investment, and such investments are rather difficult to find except when made in machine tools.

THE market price of automobiles is high enough to allow the automobile maker to pay high wages to unskilled labor to work on the specialized machines furnished him by the machine tool builder. Yet in many cases he pretends to expect the machine tool builder to sell his machine so low that this industry could not make the machines unless its skilled mechanics took lower wages than the automobile builder pays his unskilled laborers.

Selling Production Not Pounds

We surely need to raise the level of the business capacity of executives who permit sales departments to set a price that will return 300 per cent a year profit to the purchaser of the machine. The whole industry must learn to sell *production* and not so many pounds of cast iron and steel. The manufacturers must learn to figure all the elements of cost so that ignorant competitors and buyers will not be deceived. All of us must make buyers consider productivity rather than weight in relation to price. Only when dickering for a price do they think of weight. Once they get the machine they don't care a hoot about weight. They don't really buy weight, they buy production.

Too many so-called salemen alibi their incompetence with complaints about price. The industry will not gain the respect of its customers unless it asks prices that will be remunerative to both manufacturers and dealers, and enable both of these to engage and hold men that are able to sell machines on their merits.

Has Salesmanship Suffered?

At our last convention, heart-to-heart discussion showed a widespread feeling that something is seriously wrong with the selling end of the industry, and the discussions brought out a number of points. During the war the great demand led some good salesmen to start machine tool agencies of their own. The war gave other employment to some other good salesmen. The vacancies were not filled by the same class of men, but by a class who were not practical men like the older salesmen were. In re-building their forces the dealers took the easiest way; they did not train a new set of men of the same caliber as those that had left them. The result was a deterioration in the quality of the salesmen. These inferior salesmen did not know the machines they were handling. If they ran into any trivial trouble they took the easiest way, which was to yell for factory help.

Cases reported by the factory men were of machines belted to run the wrong way, or a grinding machine spindle sticking because the user was ignorant enough to use heavy oil instead of a light oil. Another typical case was that of a machine that must have a 5-hp. motor. After it was installed it did not operate well. The salesman was told the machine was unsatisfactory and wired the manufacturer to send a man. When this man got to the job he discovered that a whole department was being run with a 5-hp. motor, and of course his machine slowed down. He then requested that a 5-hp. motor be supplied to operate his machine, which was installed after two or three weeks' delay. He was called for again because the user could not get a response from the machine. Further investigation showed that a 2-in. belt had been put to connect the motor to the countershaft, whereas the blue print sent specifically stated that a 5-in. belt was required. When the 5-in. belt was put on the machine worked without any difficulty.

That was a combination of inefficiency in both the user of the machine and the salesman, but it was the machine tool builder who paid the expense of straightening it out. Frequently factory men are called to straighten out people who fail to oil machines and take proper care of them. Frequently belts slip and machines fail to deliver the necessary power and salesmen have not sufficient judgment even to recommend the tightening of the belt.

What Dealer Service Should Be

Now the cure for this sort of trouble lies in the hands of the dealer. Certainly a salesman who knew what any salesman ought to know about the goods he sells would not have asked the factory to go to the expense of sending a man to find out such trivial conditions. It is the dealer who hires the salesmen he pays and he certainly should hire men that have sufficient elementary mechanical knowledge to look after such minor troubles on any machine. Unless the dealer does have such men he is not giving competent representation to the factory's product.

If the factory is to be always called on for help to sell the prospect, and to service him, the manufacturer will easily be led to decide that since his own force must do most of the real engineering service of selling, demonstrating, trouble-shooting, and so on, he might just as well carry the accounts himself and let his men dig up the prospects as well. Some large organizations have gone to selling direct, other concerns have combined into a group that jointly employs direct representatives for the group. These steps were taken because of dissatisfaction with the quality of representation in real selling.

To get at the worth of the service of merely carrying accounts, add to the counter rate for money the small amount necessary to safely take care of losses and you get a very fair measure of what that service is worth. Eliminate that from the commission and stare straight in the face the cost the well-established manufacturer would have of digging up prospects that come only through the dealers' efforts. Where the

COST has nothing whatever to do with the production of value. The maker or distributer has nothing to say about value; it is the user who attaches value to the goods. It is the business of the fabricator or merchant to produce goods to which the buyer will attach a value in excess of the cost of production, and to get his cost as much below that valuation as he can.

manufacturers' service men have to be out on the territory anyhow, they dig up many prospects right in the shop, that the order taker never could find.

Some other developments make it very necessary for both the dealer and manufacturer to weigh the real value of real sales engineering. Greater specialization of machines and greater necessity of selling production efficiency forecast the coming of the sales engineer in the machine tool industry. Selling a 50 per cent investment instead of a 300 per cent a year investment would give quite a handsome margin out of which to pay for the highest type of sales engineering service.

Putting Specialists on the Road

Again there is the question of a dealer handling many lines of machines. It is humanly impossible for a salesman to be sufficiently competent to do all the sales engineering required on all these lines. Is it real service to the user to give a mere order taker a certain territory, out of which to dig up prospects for all kinds of machines? In the end will it not produce better results all round by having men specialize on a few machines and cover the whole territory? That is the problem for the dealer to figure out. Some manufacturers have figured it out quite the opposite to the present practice. As a consequence they have put their own specialists on the road, either individually or as groups. Their success will lead other manufacturers to seriously consider the adoption of the same policy.

Naturally it is a task to gather and hold together a lot of high grade salesmen; the higher their grade the more ambitious they will be to go into business for themselves. To retain them one must give them a fair split not only in the way of salary and commissions, but allow them to become partners or stockholders. This is another problem that must be solved both by the manufacturer and the dealer, each for himself.

I am very sure that machine tool builders have neglected their own rights in the way of patents. The man best protected with patents can draw better men and maintain a better organization which will benefit more users.

Shaving Commissions

In addition to the salesman questions, there are other matters of administration policy that are controlled by the owners of the dealers' establishments. A dealer is in law not an employee of the manufacturer and legally is free, if he has bought a machine, to do what he wills with it, to make whatever price he wills, to make whatever terms he wills, to throw in whatever attachments he wills. On the other hand, economically the dealer is a channel through which the product is distributed from the manufacturer to the ultimate user. The manufacturer who sells through his own employees makes his price and lays down his own policy and the employee must abide by it.

In competition it is what the ultimate user eventually pays for a machine tool that must and will govern the manufacturer's policy. If the dealer gives up a part of his commission to get an order away from a competitor he need not be surprised if this is taken to show that his commission is too high. The same if the dealer gives unusual terms of credit, or throws in a lot of attachments or accessories. He thereby proclaims that his margin is too great and invites a cut in commissions, or the establishment of direct selling outlets to meet the competitor at the point of delivery, the user.

Granting unwarranted terms, cutting commissions or throwing in attachments is often due to childish ignorance of the dealers' cost of doing business. But whatever their cause some very unpleasant results are sure to follow, due to human nature. The market effect is just the same in the way of demoralization and cut-throat competition, whether the abuse arises from a dealer or from a manufacturer's own employee.

The Factor of Good Will

The customer will not pay the same price for an XYZ hat as he will for a Dunlap hat, no matter if they are of exactly the same quality. He will pay a premium for the Dunlap hat over an unknown hat, merely as a personal insurance, because he is not an expert on hats. Therefore, the XYZ Co. must be content with a smaller price than the Dunlap Co. can get in the open market. The XYZ hat even at the lower price may require a bigger sales effort to sell it at a lower price than does the Dunlap.

Both dealers and manufacturers should recognize th strength of a good will factor and what it means in price. Suppose a Dunlap agent were to complain that Dunlap hats were too high priced because Truly Warner sold a $3 hat. He would very likely be told that his job was to sell Dunlap hats, that Dunlap did not expect to sell all the hats in the world but only a good share of the high priced hats, and he should not try to persuade a $3 customer to buy a Dunlap.

Another question that has come up is the matter of terms on machine tools. Looked at strictly from the best financial practice, if a buyer cannot secure the funds with which to pay for machine tools in 30 days it is not the business of the seller of machine tools, either direct seller or dealer, to finance his capital requirements. Why take a partnership interest to that extent, even for a counter rate of bank interest, and perhaps be satisfied with having no security for the account. That is bad business, fundamentally bad. Good business dictates that men finance their fixed asset requirements with their own capital or by funded debts which are amply secured, or take in partners to carry the risk and share in the profits.

Credit Abuses

It is not out of place here to say that the banking fraternity are beginning to question why there should have been so many failures among the manufacturers of metal products in the last few years. They have been greater than in any other class of manufacturers in number, liabilities and proportion. These men got more credit than they knew how to use, and when they failed they not only lost their own money, but some of their creditors' money as well. The man who gives more credit than a debtor is fairly entitled to and thereby leads him to destruction, does society just as much damage as though he had set fire to that debtor's plant and burnt up those values. Every man should have as much credit as he can safely and sanely use, but neither bankers nor merchandise creditors should extend credit that makes a man's business unsafe.

The metal working industry may be dangerously subject to abuses of credit because men who start shops may be very good as mechanics but very poor risks as business men. In innumerable cases, very fine mechanics were so wanting in business capacity that they simply destroyed capital. It is not the business of either builders or dealers in machine tools to finance customers that bankers cannot afford to carry. If one does it he starts a bad practice whose effects are sure to be felt all through the industry.

Physical and Economic Life of a Machine

It is too often lost sight of that the economic life of a machine may be quite different from its physical life. In the shops of this country are many machines that cost more to operate than a new machine would

cost. Some of them are in machine tool shops. They waste their owner's substance because selesmen have not known how to sell a better product of the newer type. Both manufacturers and dealers have overemphasized the physical life of the machine and underemphasized its economic life. Dealers have allowed, on old machines in trade, far more than their real value. Then they have worked hard to pass the lemon on to some other customer instead of sending it to the cupola.

There are places where an old machine is a perfectly logical thing to install, but old machines have often been sold where a new one or a better one could and should have been installed, just because the dealer allowed too much on the old one in a trade. The dealer would do better not to deceive himself as to the actual worth of old machines, and work to educate users to scrap them. In other cases the dealer has taken an old machine in at a very low price and then sold it at a price above its real worth. In such cases a dealer is not performing his economic function in an economic manner. If he does not work to improve methods of production through his activities, he is falling down on his job, and he need not be surprised if the manufacturer takes that job away from him.

Then there is the question of repairs on old machines. It is doubtful if machine tool builders get paid for the trouble and expense and direct cost of getting the repair to the customer. It takes the time of a high priced engineer to dig out old drawings, and get out the proper pattern. Getting a special casting, putting that repair through the shop at a single piece, stopping production on modern and profitable product; all cost more than machine tool builders figure they do. If they figured these costs against the job they would refuse to furnish many a repair that they have furnished. Here again the selling function of the dealer comes in. Instead of encouraging men to uneconomically repair obsolete machines they should analyze the user's situation and in many cases they would sell a new machine instead of bothering with a small repair.

Grinding Machine Problems

Each separate type of machine has a crop of troubles that are peculiarly its own. Letters from

THE machine tool has no demand of itself. Its demand depends on the demand for the commodities which the machine tool produces. When that is satisfied, there is absolutely no demand for machine tools at any price.

manufacturers of grinding machines cite specific grinding machine troubles. These manufacturers say things like this:

The grinding machine requires specialists to sell. Dealers' salesmen who have no direct knowledge and are not experts on grinding machines made it necessary for us to send our own experts into the field, who actually did the selling. This developed to such a point that we found we had a force in the field sufficient to carry on the selling program. The agents merely did clerical work, and collected the accounts, so that our next step was to do this work ourselves, which we did for very much less money, and got more sales for the money spent. We could not expect the agents to send every one of their salesmen to us to be made into grinding machine experts, and as long as we had to provide the expert service and the sales were made by the experts we took the next logical step and have never regretted it.

HELPLESSNESS OF SALESMEN

Another one writes:

In the matter of grinding machines the salesmen seem to be absolutely helpless. If any little thing is complained of by the purchasers they cannot get to the nearest telegraph office or telephone quick enough to notify the manufacturer

DURING the war the great demand led some good salesmen to start machine tool agencies of their own. The war gave other employment to some other good salesmen. The vacancies were not filled by the same class of men, but by a class who were not practical men, as the older salesmen were. The result was a deterioration in the quality of the salesmen.

that it is absolutely necessary to send a service man immediately. This means that even simple mechanical things that anybody dealing with any machine should be competent to look after are being neglected by the salesmen due to their incompetence. If the salesmen are to continue to be of this class, additional selling combinations of manufacturers may be looked for.

Another one suggests:

Instead of wasting traveling expense running around among customers during a few weeks in the hot season when there is no purchasing anyway, this money could be far more profitably spent by sending the salesmen to a few manufacturers each year. In a short time this would build up a strong practical selling organization. The manufacturers are only too glad to instruct salesmen in the selling points of their machines and to caution them with respect to the more frequent annoyances experienced after the machines get into the hands of the customer. This system would tend to keep up the salesmen's interest in their work. They would become more enthusiastic boosters for that manufacturer instead of always falling in with the viewpoint of the purchaser. This is not based on hearsay or imagination; 26 years of contact as a salesman with manufacturers, dealers, and customers, entitle the writer to speak with authority on that subject.

Another letter says:

While not all of our dealers have shown a disposition to call on us unduly, some of them have, and we think that the others have acquired a good working knowledge of our product because we have called to their attention any unnecessary trips that we have taken because of complaints that they transmitted to us.

ON GRINDING WHEELS

Another one writes:

Manufacturers of grinding machines send the machine out equipped with a cutting tool in the shape of an emery wheel. You never get cutters with a milling machine, nor cutting tools with a lathe or planer, you equip it yourself with the right tool for the kind of material and sort of cuts you will take on that machine. Yet a large percentage of the users of grinders try to get the same wheel to do all different kinds of work, whether on gray iron castings, carbon steel, or high speed steel. This is a matter that dealers and salesmen should fully appreciate and manufacturers should cease to send out grinding wheels with grinding machines.

Another remark is:

The grinding machine is a precision machine of the finest type and of relatively high spindle speed. When the machine is tested out on the factory floor the spindle bearings are adjusted when the bearing head of the machine is quite warm. I have seen the take-up on the bearings adjusted when cast iron housings were so hot that it was uncomfortable to lay the hand on it. To do a nice piece of work demanding extreme accuracy you cannot put your work on the table, throw over the belt, and start in on the work. You must run the head in until there is a uniformity of heat change in the bearings. Only after warming up will the machine do a nice piece of grinding. We send out our machines with the bearings tight but too often we find that the users of the machines, noticing a slight belt slippage, immediately loosen up the spindle and then get a lot of "chatter" for which they condemn the machine and call for a factory representative. These men have often had to go many miles merely to advise the operator of the machine to warm up his machine before running, or to use a lighter grade of oil in his spindle, or some little thing of that sort.

Another one says:

The dealers must endeavor to impress on their salesmen that they must become acquainted with the grinding machine, not be a stranger to it, and particularly not be afraid of it.

As it is now they call for factory representatives simply because there is a grinding machine giving a little trouble, rather than a lathe or drill that might give as much trouble as the grinder and be corrected with as little mechanical ability.

Mutual Interest of Makers and Dealers

In closing I desire to express the thanks of our organization for the opportunity here presented to lay before the dealers these problems of mutual interest. Some very incorrect impressions have been current to the effect that interests of machine tool builders and dealers are necessarily opposed one to the other. That is not only an incorrect impression but an unfortunate one, because both of these elements are part of the machine tool industry. Only by frank co-operation on a plane of self-respect and the Golden Rule applicable not only as between dealers and dealers, and as between manufacturer and manufacturer, but as between dealer and manufacturer and customer as well, can the industry fully and profitably function as it should. Misrepresentation of motives of either dealer or manufacturer can do the industry nothing but harm. Questions affecting the industry as a whole should be considered in the light of intelligent appraisal rather than from a blind prejudice.

I have endeavored to set before you some facts, and to point out the effects of certain causes that have operated in the past to the detriment of the whole industry, in the hope of bettering the function of distribution in which you are engaged.

The High-Cost Factor in the Scrap Trade

Transportation and Labor Responsible for Large Increases
Why the Consumer Must Pay So Much More To-day
If He Draws from Distant Sources

BY W. VERNON PHILLIPS*

IT is common to say that "Scrap is worth what it will bring"; also that "Scrap has no intrinsic value" and is entirely the creature of supply and demand. This is true to an extent, but the position has been changed considerably in the last few years.

It is still true that during a depression scrap is only "worth what it will bring" at its point of origin or "worth all that it will bring" during a period of activity; but the new element of high costs has affected the delivered cost of scrap in perhaps greater proportion than any other commodity. Roughly speaking, labor and freights have practically doubled.

A typical illustration will be the cost of delivering New England scrap to the Pittsburgh district, typical because the bulk of this scrap goes to that district, and because Pittsburgh is absolutely dependent on outside scrap; and with so many avenues cut off by other consumers this market is greatly influenced, if not made, by the cost of New England scrap.

In 1914 the average cost of loading and delivering scrap to New England yards was $1.50 per ton; its preparation and conditioning in the yard, $2.50 per ton; freight to Pittsburgh, $3 per ton. Adding $1.50 per ton profit for the yard, the dealer and broker interested in the movement gave a total of $8.50. In 1922 these costs are: loading and delivery to the yard, $2.50; conditioning, $4; freight to Pittsburgh, $5.53, and assuming the same profits the total is $13.53. Assuming the producer or owner was willing to sell at $5 per ton, this represents a cost of $13.50 delivered in 1914 and of $18.53 in 1922.

It is true that a large percentage of scrap is shipped directly to the consumer without passing through a yard, thus saving some of this cost; but excepting in a very dull market the price is established by the yard costs, and during times of depression the scrap in the yards must be stored until a profit can be secured. Thus scrap has an actual cost in the above instance of $13.53, delivered, plus the price paid for the raw material, which is the only part dependent upon supply and demand.

The buyer of scrap has only two facts to go on. First, is the intrinsic value, which is its ratio of metallic production and cost of melting to pig iron; second, is the actual cost of preparation and delivery above illustrated.

A third element, supply, reduces everything to guesswork. There is no known means of ascertaining either the production or supply of scrap. Following a depression there is a good supply of steel scrap but a poor production of manufactured scrap. There is always an apparent shortage on a rising market and an apparent over-supply on a declining market. This was very clearly illustrated to the writer during the war when we were only securing the scrap available from day to day. It had reached a point where we had decided to commandeer. On Nov. 10, 1918, there was no scrap available, while on Nov. 11 (Armistice Day) with a positive decline in prices in prospect, a month's supply, or 1,000,000 tons of scrap, was for sale. As a matter of fact there was not one pound more available than on the day before.

Theoretically the buyer should place himself in the center of a circle. At minimum prices he will get the scrap on his doorstep. As his needs increase, the circle will widen and extend until it reaches to a point where a surplus of scrap is encountered. But as the circle widens, the scrap within the circle which has not been sold or is being produced will benefit in price to the extent of the increased freights from the farthest point. Neither the dealer nor the broker is profiting by the high prices, two-thirds of the increase being garnered by the railroads and the remainder by labor.

Take the present market as an instance. A month ago no one could figure out how there would be sufficient steel scrap to satisfy the mills' needs. To-day the supply is apparently more than sufficient. As a matter of fact, the supply to-day is greatly reduced. The yards everywhere have been liquidating their storage piles; the large Government surplus materials have disappeared; the railroads, due to labor scarcity and car shortage, are collecting less and less scrap, whereas the mills are probably consuming more rather than less.

The two points to be emphasized are: First, that prepared delivered scrap to-day has a much higher cost than in pre-war days, due to labor and freights; second, that a declining market does not necessarily mean that a larger supply of scrap exists; it usually means the reverse.

The scrap dealer works on short turns of approximately thirty days, whereas the mill should work on the longer swings of at least three months, and should never subject itself to the danger of being caught in one of the shorter movements.

The above does not take into account at all the question of embargoes, car shortages, and other difficulties which are so serious to-day. As a result, a considerable tonnage of scrap has been sold but cannot be shipped. This will come into the mills later, but not on the market. In the meantime, the mills may have to reach out farther and farther to points from which they are not embargoed, to get their needs, thus widening the circle and increasing the price to the extent of the additional freights, which represent such a large part of the cost

*Perry, Buxton, Doane Co., Philadelphia.

Shaping Management to New Conditions

Predicted Long Term Buyers' Market—Requires Adjustment of Policies—Other Topics Discussed at Taylor Society Meeting

THAT for a decade consumers' demand is likely to remain so hesitant and uncertain as to be out of proportion to our great capacity as a nation to produce, and that, in view of a buyers' market continuing for most of this period, management should have more concern over future policy were views expressed by Dr. H. S. Person, managing director of the Taylor Society in an address on "Shaping Your Management to Meet Industrial Conditions," given at the annual meeting of the society held in New York, Nov. 22, 23 and 24.

Sessions were devoted to a variety of subjects, including the organization and management of a medium-sized plant, the supervision of personnel, master budgets of sales and production, and some of the uses of statistical compilation as a function of scientific management. The addresses and papers were for the most part received enthusiastically, and a feature of the sessions was the time allowed for discussion and questions.

The background and argument of Dr. Person's address may be summarized as follows: Weak industrial enterprises have succumbed to the shock of the recent depression; others have just pulled through and are still in a precarious condition; others believe that, because they seem to have pulled through safely, there is a clear way ahead. It is the argument of the address that the way ahead is not likely to prove as clear as many believe, especially for those establishments which will continue to be managed in the conventional manner. Dr. Person outlined what the tendency is, what industrial conditions will probably result, and what kind of management will be required to meet them.

The particular phase of the policy problem considered is presented in the question: "How must executives shape their managements to meet developing industrial conditions?" The question was pointed out as not to be understood as asking what new principles of management must be discovered and formulated, it being added that we have principles enough at our command, many more than have been generally recognized and utilized, to meet any conceivable conditions.

Developing Industrial Conditions Reviewed

In taking up developing industrial conditions, Dr. Person stated that a first glance is reassuring, "for the revival due to follow the acute depression of 1921 is obviously already under way. This is indicated in all the reports of fundamental lines of activity. We even already hear talk of a 1923 boom on the part of ultra-optimistic business men.

"But a second, less superficial consideration of conditions causes us to hesitate to join those who believe 'it is all over except the shouting.' May not the evidence of revival be only the evidence of a rebound from the extreme depression, and may not the present rate of acceleration be only temporary, to be replaced by a rate more moderate? May not the projection of a curve into the future on the assumption of a continuance of the present rate of revival be a dangerous basis on which to establish managerial policy for the future? The more thoughtful and cautious fear so.

"When there is eliminated the activity to supply seasonal and terminable demand, and particularly the intensive activity to supply the abnormal demand for fundamental necessities to which the exigencies of war denied satisfaction, for instance, construction and its allied industries, when there is observed the fact that consumers' demand for a wide range of commodities and services is continuing to be cautious, there is not left a sufficient amount of evidence to warrant a projection of the curve of industrial activity into the future at its present gratifying slope."

"During the past decade, as a result of the study of earlier cyclic movements, we have learned that certain economic phenomena, such as the quantity of money and credit, have a definite relation to industrial activity," said Dr. Person, in a third analysis which included more fundamental conditions. He pointed out that in general industrial activity increases in intensity with an upward price movement, is stagnant when there is a downward price movement, and is hesitant and uncertain in the early years of a new stable price level. "The ideal condition," he stated, "is a fairly stable price level, but when a condition of stable price level suddenly confronts an industrial generation accustomed to a consistent upward price movement over a long period, the new condition of stability, because different from the accustomed, is upsetting to the individual, either as demander or producer. It takes a considerable period, measured not in months but in years, for him to learn just what he can safely do, both in purchasing and in producing."

The work done in recent years in the analysis of fundamental industrial conditions and tendencies, which have given a basis for policy determination more substantial than anything previously available, was commented on. The success of these investigators in making some accurate measurements of basic elements which determine price conditions for a number of years was pointed out, and the safest judgment to accept was stated to be "that, in the words of the Harvard Committee on Economic Research, 'the present price level is substantially that around which the fluctuations of the business cycle must play' for the next ten years."

Assuming that forecast to be correct, the effect of a new price-level was said to be that we are for a number of years going to continue to be conservative as purchasers and also as producers. "As producers, he said, "we are going to wait for demand, and as demanders we are going to wait until we have adjusted our purchases to the new relation between our incomes and the cost of living. It is true that wages are settling to a new high level, but there still remains a large number of consumers whose incomes are not readjusted so easily and quickly, whose incomes are and will for some time continue to be adjusted rather to the old price level." That it does not take a very large bloc of maladjusted consumers to keep the market unsteady and uncertain was emphasized.

Demand Will Be Less Than Productive Capacity

The conclusion to be drawn was pointed out to be that consumer demand is likely to remain so hesitant and uncertain as to be out of proportion to our capacity to produce. Calling attention to the great capacity of American industry, the question was put, "If our productive capacity is so great, and if it can be made greater simply by eliminating sheer idleness (waste), and if consumer demand is fairly certain to be hesitant for the coming decade, have you or have you not a really critical management problem confronting you?"

"We all appreciate," said Dr. Person, in a fourth analysis of present industrial tendencies, "that we are now in at least a temporary buyers' market. I am suggesting that we are on the trail to a dominant buyers' market and that we are possibly already on the great divide." He reviewed in brief the industrial history of the United States to show that we have been brought up in a sellers' market.

"Consumers' demand," he pointed out, "has kept ahead of and pulled along producers' capacity to satisfy the demand." The evolutionary tendency toward a buyers' market was outlined and in connection with the shock to the industrial system caused by the war it was stated that it "seems to have hastened evolutionary

tendencies, which would have developed more gradually and with only relatively minor depressions, and to have thrown us suddenly upon a buyers' market which will last for some time and may be the beginning of a dominant buyers' market."

Management on a Buyers' Market Different

In discussing what a buyers' market means, Dr. Person said in part: "It means, for competitive industries, a strife for the consumers' dollar which makes so-called competition on a sellers' market seem but a children's game. There never was a time," he emphasized, "when management should have more concern over future policy, and over the quality of its future management. Now that you appear to be face to face with a buyers' market and the necessity of developing real management, if you are to be successful in a most intense competition, if your competitor, instead of yourself, is to be the one to disappear in some readjustment of productive capacity to consumer demand, it is expedient for you to inquire into the nature of that real management."

Tremendous production capacity with a conservative, hesitant market continuing for a considerable period was given as the practical elements of the problem. This, it was said, will mean intense competition to find the individual consumers and to sell them, and in that competition selling price and cost of production will be critical factors. "The hesitant market will tend to force selling price down, while higher prices of certain elements entering into cost will tend to keep that figure up. Wages," he said, "have settled at a new high level, and the strength of organized labor and new immigration policy seem sufficient to hold them there during such a period as will determine the success or failure of competing enterprises. It should be observed also that many of the basic materials of industry are closely controlled, and that material costs are likely to remain high. Therefore, the management will be faced by high prime costs in the face of great pressure to reduce the selling price of fabricated products.

The Way Out

"The way out for the successful competitor," said Dr. Person, "seems to be to develop an inclusive system of management which will more than compensate for high prime costs by cost savings eleswhere, thereby effecting lower factory costs and making possible lower selling prices." In the first place that management will give more attention to long-run tendencies in the industrial environment. Major executives will give more thought to policy and general plans and not become too much absorbed in operating details, he said. They will have in their organizations a unit to study and interpret industrial statistics.

Secondly, management will provide for a more accurate judgment of the market with respect to the demand for the commodities it has to offer, competitors' ability to supply the demand and what share of the market it can have reasonable expectations of securing. Managers will learn that they cannot afford to misjudge demand, either with respect to what it wants, how much it wants or what share of it competitors will permit a particular enterprise to provide. Excessive inventories are fatal on a buyers' market, he said, but management will avoid it by means of some unit in the organization which will make continuous and precise analysis of the market and provide the data for master plans and schedules. Management will set up in writing, on basis of data from market research, definite master plans, budgets and schedules of operations for a considerable period ahead, these being supported by definite and interdependent detail plans and schedules for the major operating departments, selling, production and financing, respectively. These will be standards of performance, goals to strive for.

Selling operations will have to be conducted with more skill than ever before, and in connection with detail changes likely to follow the development of the new merchandising it was asked: "Is it not probable that there will be less of that advertising whose object is to create new wants in satisfaction of which consumers would spend surplus dollars, and more of that advertising whose object is to convince concerning the quality of staple merchandise offered in competition for the limited supply of dollars?"

Good Production Methods Important

Turning to better production methods as a feature of the new management, Dr. Person said that the production problem is far from solved. "It is true," he said, "though we have a body of production management principles at our command which if utilized would eliminate waste, reduce costs and permit cost and price reductions to an astonishing extent. But it is equally true," he emphasized, "that they are not generally utilized, and the educational task of bringing about their utilization in a plant is as difficult as developing market analysis and improved selling methods. The more severe the competition, the more important become good production methods. The superior management of the next decade will develop the production department to a high degree of precision, in accordance with principles and methods already formulated and available. Strong manufacturers will be able to take their profits by eliminating waste."

In the field of personnel relations Dr. Person said that management will win the co-operation of all the personnel of the enterprise, not as a matter of humanitarianism, but as a matter of technical necessity. "Without such co-operation all other provisions for excellence of management are unpaired. The entire personnel of an institution, from major executive to the latest recruit, should be a co-operating group of individualities." A spirit of co-operation, an atmosphere of live interest in the best management principles and practice, an *esprit de corps* of search for wiser policies and better methods, and individualities which have not lost the power of creation within co-operation, was stated to be the greatest asset of an organization.

The utilization of a new type of executive was pointed out in conclusion, as a special aspect of the new management. "The long sellers' market has developed highly one particular type of executive, the forceful, acquisitive, go-getter type which drives straight to results regardless of methods and cost," he said. And in another part, "Managers have come to realize that an organization must be balanced by the inclusion of the thinking, investigating, planning type of executive." The latter type, he said, will play a decidedly important part in the future.

Discussion

W. R. Mattson, Babson Statistical Organization, Wellesley Hills, Mass., in his discussion of the subject, expressed agreement for the most part with Dr. Person, and said that if the policies outlined were followed business men generally would get farther than by following the policies of ten years ago. Morris L. Cooke, Philadelphia, in his discussion of the subject, brought out the necessity of improved railroad service, saying that if one cannot move the goods manufactured at low cost they might just as well not be manufactured. "It seems generally admitted," he said, "that the future of railroading seems dark and unless someone can get in and get emphasis away from valuation and the financial side to the operating side, something is bound to happen." Richard A. Feiss, Cleveland, president of the society, emphasized the necessity of better quality production, the giving of better value. Large scale production and consequent lower unit cost in the light of bringing goods within reach of many that could not now afford them, creating new demand, was stated as the problem of management during the condition of a buyers' market. R. A. Wentworth, chairman of the management section of the American Society of Mechanical Engineers, presided.

Manufacturing Control at Corona Typewriter Plant

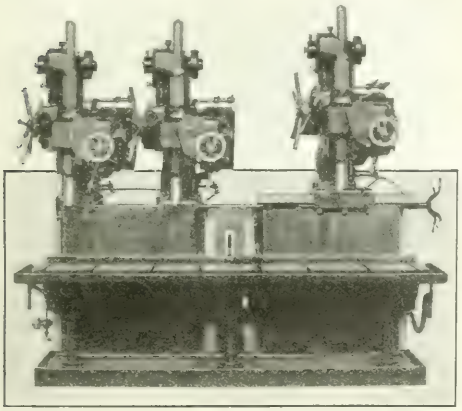
A paper on the "Organization and Management of a Medium-Sized Plant," by Percy S. Brown, works manager, Corona Typewriter Co., Groton, N. Y., was received with interest. The system of organization and methods of manufacturing control of the Corona com-

(*Continued on page* 1469)

Gang Drills with Adjustable Head

Special gang drills with longitudinal movement provided for one of the heads, as shown in the accompanying illustrations, have been developed at the Colburn Machine Tool Plant of the Consolidated Machine Tool Corporation of America.

The machine in the left-hand illustration has a four-spindle column and the regular four-spindle table. The two left-hand heads are permanently placed on the column and have a fixed center distance. The third head is mounted on a plate having finished ways, as shown, the plate being attached to the column. The head has an adjustment of 27 in. and is moved by means of a screw and capstan handle. The head may be clamped securely in any position. The center distance between the second and the adjustable spindle is 27 in. minimum, and 54 in. maximum. Between the extreme left-hand head and the adjustable head the distance is 54 and 81 in., minimum and maximum, respec-



tively. Thus the total range between spindle centers is 27 to 81 in.

A machine can also be arranged with the same column and table, but having only two heads and instead of having the finished ways extending only half the length of the column, they can be lengthened and extended under the second spindle.

The second illustration shows a machine with a fourth head mounted on the ways, making a regular four-spindle unit with 27 in. center distance between spindles. In this arrangement the right-hand head may be removed and the third head adjusted so that the combination of the first and third or second and third heads can be used if desired. The machine illustrated is a Colburn No. 4 drill press, but the No. 2, a smaller size, or the No. 6, a larger size, can be arranged in a similar manner.

The rated swing of the No. 4 machine is 24 in., the distance between the center of spindle and face of column being 12 in. Each spindle has a drilling capacity of 2 in. in solid steel, and the spindles are double-splined to equalize the strain. Driving and feed gears are mounted inside of each head and run in oil, the gears being of chrome-nickel steel, hardened and heat treated. Shafts are of large diameter and mounted on ball bearings. Automatic trip is provided. The supporting brackets under the center and ends of the table are a feature. The column and table are heavily ribbed and the latter has a three-point bearing in the column.

On Nov. 22 the blast furnace at Warren, Ohio, of the Trumbull-Cliffs Furnace Co. turned out 867 tons of hot metal, establishing a new per diem record, and comparing with its previous high production of 811 tons. The stack has a rated capacity of 600 tons daily. Its production this month has been at the rate of 750 tons daily, or a monthly production of 22,500 tons.

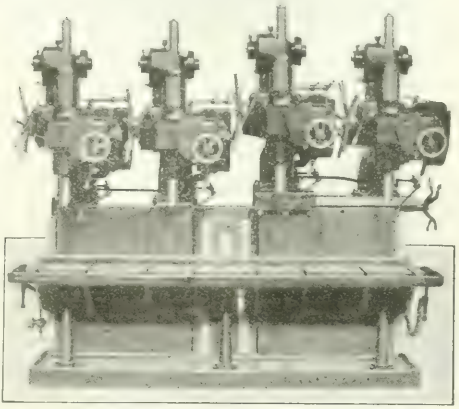
Blackwood Electric Steel Corporation Officials Named

Announcement has been made of some of those who are to guide the destinies of the Blackwood Electric Steel Corporation, recently organized and which now has under construction, in Parkersburg, W. Va., a modern foundry capable of producing 300 tons of electric steel castings and alloy steels a month.

Alexander Blackwood, president of the new organization, at present is general manager, Farrell-Cheek Steel Foundry Co., Sandusky, Ohio, but will sever that connection on or before Jan. 1. He is a pioneer in the manufacture of small steel castings and many of the methods and standards which he developed are to-day common practice.

B. D. Thomas, who is to be vice-president and sales manager of the new company, at present is general sales manager, Acme Steel Co., Glassmore, Pa. He is to retire from that connection as of Feb. 1, next. Mr. Thomas started with the American Car & Foundry Co., in St. Louis, at the age of 14 years and had much practical experience in the foundry, shop and sales departments of that company. During the world war he was commissioned a lieutenant and later a captain

Special Gang Drill with Right-Hand Spindle Having Longitudinal Adjustment Is Shown at Left. In the arrangement shown below the right-hand head may be removed and third head adjusted in combination with the other two



in the Ordnance Department, and was in charge of the Pittsburgh district inspection division of shell manufacture.

Edgar M. Lewis, who is to join the Blackwood organization in an executive capacity, now is affiliated with the J. S. McCormick Co., Pittsburgh, foundry supplies, and previously has been with the Hill & Griffith Co., Cincinnati, and the E. J. Woodison Co., Detroit. He will assume his new duties Jan. 1.

Reed-Prentice Readjustment

The Reed-Prentice Co. announces a readjustment of capital, under which the corporation will issue one new common share of no par value for each of the 7,500 shares of existing common of $100 par value. There will also be authorized 8,500 additional no par common shares, making the total authorized capital consist of 16,000 common shares and 12,000 shares of preferred of $100 par value. One share of common is to be issued for the good will, use of trade names, patents, drawings, patterns, fixtures, tools and gages of the Becker and Whitcomb-Blaisdell companies, and 2299 shares for the semi-manufactured inventory, of a book value of $25,500. Also, 5525 shares of common are to be sold to the Becker Milling Machine Co. for cash at $50 a share, with the right to subscribe on or before May 1, 1923.

THREE NEW GAGES

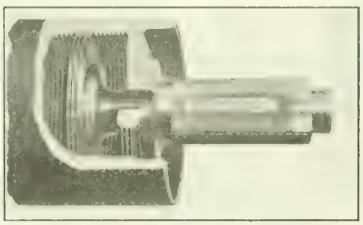
Pipe Gage, Pin Gage, and Gage for Steel Wheels Offered by Pratt & Whitney Co.

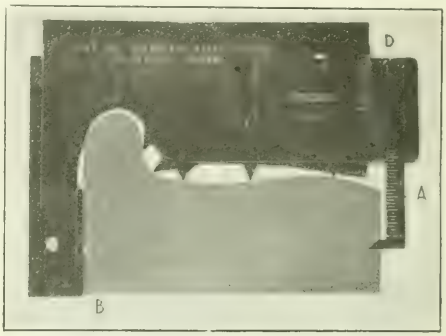
Three new gages, shown in the accompanying illustrations, one of which is an adjustable limit pin gage for internal measurements, have been added to the line of the Pratt & Whitney Co., Hartford.

The adjustable limit pin gage is emphasized as new in principle and design and it combines a Go and No Go internal gage in a single unit. Two spherical-ended hardened steel pins are carried in a cast iron frame, as shown in the illustration, the frame being similar to that of the company's Trusform gages and intended to combine strength with lightness and to resist tendency to distortion or warping.

One pin is adjusted to any size within its range by means of opposed set screws which lock the pin firmly in position when tightened. The opposite pin works between two stops, one of which is adjustable to give limits from 0.001 to 0.025. This pin is moved by the thumb and finger inward to the Go position and outward to the adjustable stop for the No Go size. Adjustments may be sealed, and testing the setting or changing it to compensate for wear is simple. Four removable brass disks provide ample space for working.







The Adjustable Limit Pin Gage for Internal Measurements Is Shown at the Upper Left. The gage for measuring the taper of female pipe threads is shown below it

The A. R. A. Railway Gage Shown Above Is Used for Measuring Steel Wheels to Restore Contour. It gives a direct reading of the amount of service metal

Gage for Measuring Female Pipe Thread Taper

Another new gage offered is for measuring the taper of female pipe threads, the construction and application of which may be noted from the illustration.

The gage is marked one division equals 0.002 in., which signifies that one division on the handle of the gage represents a variation of 0.002 in pitch diameter in a length of 2 in., this length being the distance covered by the gage. In use the inner plug is first screwed down into the thread by hand followed by the outer gage, both parts being set hand tight.

If the taper is correct the witness line on the inner gage will come opposite the zero line on the graduations on the outer gage. Variation from the true taper is read directly on the scale. These gages are made up to order and slight variations from the specifications may be had.

A. R. A. Railway Gage

For measuring steel wheels to restore contour, the A. R. A. Railway gage illustrated has been developed. This gives a direct reading of the amount of service metal on a steel or steel-tired wheel as the basis for billing foreign roads for wheel replacements according to Interchange Rules. It tells whether or not a worn wheel is worth turning to restore standard contour, and the amount of service metal which will remain after turning. This measurement can be made either before or after turning. The gage can be set to the wheel in a dark place and taken to the light for reading, thus avoiding errors and guess work.

The witness groove, limit of wear groove, is checked to assure that it is of the right diameter, which is 29½ in. for a 33 in. wheel. The contour is taken at several points so that the point of maximum wear may be found.

The application of the gage to a worn tread is shown in the illustration. The pointer A is swung to the right and the gage placed over the wheel with face B and point C in contact. The part A is then swung to engage limit of wear groove, the four sliding pointers pushed down to the wheel and the gage removed.

There is a scale on the back of the sliding front plate, under the pointer C, which gives the depth of cut necessary at junction of fillet and tread to restore standard contour. The same information may be read at D. The amount of service metal is read at A.

October Refractories' Statistics

Fire clay and silica brick statistics, compiled by the Refractories Manufacturers' Association for distribution among its membership and to the Depatment of Commerce, for the month of October, have been issued. The quantities given are the totals sent in by those who reported and the capacity figure is the combined economical producing capacity of those who sent in figures. The figures in parentheses are percentages arrived at by dividing the total economical monthly producing capacity into the figures given. October figures in 9-in. equivalents, compare with those of September, as follows:

	October		September	
Capacity	[illegible]		[illegible]	
Stock, Sept. 30	145,050,275	(197)	•142,186,418	(194)
Production	53,535,843	(71)	46,241,914	(62)
Shipments	46,127,408	(75)	40,963,344	(66)
Stock, Oct. 31	144,930,710	(193)	†148,522,095	(199)
New orders	49,174,113	(66)	46,781,985	(63)
Cancellations	2,756,922	(4)	201,469	(0)
Net new business	46,717,815	(62)	46,580,118	(63)
Unfilled orders	67,480,023	(90)	75,238,631	(101)

	October		September	
Capacity	23,891,666		23,998,333	
Stock Sept. 30	32,471,079	(136)	•31,285,797	(130)
Production	[illegible]	[illegible]	[illegible]	[illegible]
Shipments	[illegible]	[illegible]	[illegible]	[illegible]
Stock Oct. 31	34,760,255	(145)	†32,618,079	(136)
New orders	[illegible]	[illegible]	[illegible]	[illegible]
Cancellations	[illegible]	[illegible]	47,119	(0)
Net new business	[illegible]	[illegible]	[illegible]	[illegible]
Unfilled orders	[illegible]	[illegible]	[illegible]	[illegible]

•Aug. 31. †Sept. 30.

Use of Standard Machine Tools Favored

Special-Purpose Versus Standard Tools for Automotive Work —Standard Tools with Special Tooling— Simplicity in Fixture Design

A GENERAL criticism in disfavor of the prevailing policy of making large expenditures for special equipment when standard equipment might well serve the purpose, and also a plea for the reduction of the too-large investment carried under fixtures and permanent tools, was made by R. K. Mitchell, Maxwell Motor Co., Inc., in a paper on "Standard vs. Special Machine Tools for Automotive Production." The paper was read at the production meeting of the Society of Automotive Engineers, held in Detroit, Oct. 26 and 27, and an abstract of it follows.

There was a time when the automotive manufacturer found it necessary to build special machines for performing certain operations and making special parts.

The policy was to design special fixtures and machine tools to meet the special conditions. But often when the original intention is only to design a special fixture, the ultimate result is a fixture or machine tool that requires special driving and feed mechanisms. Then comes the question of whether to design special drives and feeds for some machine that is already in the plant, and this is the critical point in the argument between special tools and standard equipment. In many instances the only machine tool that will accommodate the special heads is one designed and built purposely to meet this one particular difficulty; so, we arrive at the stage we have so much desired to avoid which is the design and fabrication of special machine tools.

Average Draftsman Cannot Design Special Tools

In the ordinary routine followed when building special machine tools, we are confronted with numerous obstacles. The first is that the average draftsman in tool-designing departments has had neither the engineering nor the production experience essential to the proper designing of special machine tools. His lack of knowledge as to proper stresses, correct bearings, loads and the details to be employed, together with lack of foresight in considering the interchangeability of parts, ease of replacement and the use, so far as possible, of standard parts, is reflected in the enormous first cost of the majority of special machine tools that are built under private supervision. The actual construction is performed usually in the tool room by high-priced labor, working an excessive amount of overtime, and the machine, finally completed, has yet to meet its first test. Few special machines have been devised and built that did not demand undue expense and delay in production, not to mention the necessity of many changes before they begin to function as intended.

A special machine tool in production requires a skilled or special operator, at least until those interested have become familiar with its care and operation. If the operator should be absent, loss of time and production must result before another man can be broken in.

Repair parts for special machine tools are costly items. Not infrequently patterns are broken, mislaid or left at the foundry and, when the casting is finally secured, it means day-and-night work in the tool room with additional expense and delay. But perhaps the foregoing will be accepted as constituting problems that will arise in any trade or line.

Designs of Automotive Parts Change Constantly

The most forceful argument against special machine tools at present is the unstable design and development of automotive parts. When a designer produces a special machine tool to accommodate a certain part, he has no guarantee as to the life of that part and, I venture to say, the average life of the majority of automotive parts, without change in design, is less than 6 months. Change in the design of a part makes about obsolete a special machine tool. At best, it demands such changes in construction, at a further prohibitive outlay, that the machine usually finds its way to the obsolete or salvage department long before its intended usefulness has been realized.

Advantages in Using Standard Equipment

Machine-tool builders have stocked the market with a large variety of simplified, standard machinery that can be adapted to special operations and parts with slight extra expense. The standard machine tool is much cheaper than a special machine and being built on a quantity production basis, and designing and engineering charges are distributed over a greater number of units. The standard machine tool is available for prompt delivery. It has had a thorough trial in practical work before being placed on the market, and is out of the experimental stage. Reputable manufacturers of standard machinery build their machine tools so that the parts are interchangeable and, in case of service requirements, they are prepared to furnish any part promptly from stock. Consider for a moment the money that is tied up in special machinery patterns, extra castings and the like. With a standard machine tool in production in any large shop, if an operator is called from his machine other men just as familiar with the operation of the machine as the man who is absent are always available and capable of continuing production without loss of time.

Sometimes it is advisable to have special features on machine tools, such as a special number of spindles possibly set at different angles on a milling machine. It has been proven that a standard make of milling machine can be equipped with a suitable special head to take care of special work. If the special part made by the special head is ever changed or made obsolete, the manufacturer need not scrap the entire machine, but only the special tooling. The standard machine tool with the special tooling can be secured in much less time and with far less expense than the special machine tool. In the case of the standard machine tool, if the special part only is scrapped, the machine itself is adaptable for any other operation of a similar nature. These advantages are true also with lathes, grinders and many other standard machine tools.

Special Fixture Design Should Be Improved

There is ample room for improvement in the design of special fixtures. Too little attention is paid to the needs of manufacturers of standard parts whose product, if properly investigated, will be found to contain unlimited possibilities for incorporation in the design of special jigs and fixtures. In a recent issue of a weekly periodical there was a full page spread, advertising the merits and possibilities of standard bushings. Although many companies like that place their engineering staffs and experience in their particular line at our disposal, still we do not pay enough attention to their claims and the merits of their products to consider them when designing our own pet tools and equipment.

As far as possible, when designing fixtures and tools, we should take advantage of all that the trade offers, and attempt to simplify our creations. The frequent use of the three fundamentals of jig and fixture work, the clamp, the V-block and the angle plate, is to be recommended.

As an instance I may cite the case of a large drum-type fixture recently designed, built and installed on a

machine. The cost was about $2,500, including special drive gears and the like that were constantly breaking, delaying production and running up a continuous repair bill on this job. The annoyance and continuous expense demanded immediate action and the whole fixture was replaced with two small angle-plate fixtures on which V-blocks to oppose each other were fastened. One side was loaded while the part on the other side of the fixture was being milled. These two fixtures cost about $70 and actually increased production beyond that of the more elaborate and expensive fixture.

I believe that the tool designer is so prone to become intent on the design and construction of the fixture that he temporarily loses sight of the fact that the fixture or tool is not the ultimate issue, but only the means to an end.

MECHANICAL ENGINEERS

Main Features of Program of Annual Meeting in New York, Dec. 4 to 7

The tentative program of the annual meeting of the American Society of Mechanical Engineers, to be held in New York, Dec. 4 to 7 inclusive, in the Engineering Societies Building, 29 West Thirty-ninth Street, is as outlined below. Besides the sessions listed, there will be sessions on the power test codes, on the morning of Dec. 5; a session on steam tables on the afternoon of Dec. 5; a railroad session on the morning of Dec. 6; a standardization session on the morning of Dec. 7, and an ordnance session, an aeronautic session and a forest products session, all on the afternoon of Dec. 7. The meeting opens with a joint session in the afternoon on Dec. 4 with the American Society of Refrigerating Engineers. There will be a public hearing on the boiler code that afternoon, and in the evening Dexter S. Kimball, dean of the Colleges of Engineering, Cornell University, will deliver the presidential address before the society. On both morning and afternoon of Tuesday, Wednesday and Thursday are three or four simultaneous discussions and the following is a part of the program.

Management Session, Morning of Dec. 5

Ten Years' Progress in Management, L. P. Alford, editor *Management Engineering*, New York.

Installation of Management Methods, Wallace Clark, industrial engineer, New York.

Progress reports of committees on:

Measurement of Managerial Ability, A. L. DeLeeuw, chairman.

Standardization of Terminology, F. E. Town, chairman.

Standardization of Graphics, J. J. Swan, chairman.

Machine Shop Session, Morning of Dec. 5

Gearing for Planers, F. E. Cardullo, chief engineer G. A. Gray Co., Cincinnati.

Testing Involute Spur Gears, M. Estabrook, Niles-Bement-Pond Co., New York.

Application of Oilgear Variable-Speed Hydraulic Drive to Machine Tools and Manufacturing Processes, Walter Ferris, consulting engineer Bucyrus Co., South Milwaukee.

Spherical Gears, C. H. Logue.

Power Required for Removing Metal, F. A. Parsons, chief engineer Kempsmith Mfg. Co., Milwaukee.

Session on Training for the Industries, Afternoon of Dec. 5

Joint reports on:

Extension and Correspondence Schools, J. A. Moyer, Boston.

Schools for Apprentices and Shop Training, R. L. Sackett, State College, Pa.

Industrial Education as Represented in Schools, C. R. Richards.

Research Session, Afternoon of Dec. 5

Effect of Pulsations on Fluid Flow, H. Judd and D. B. Pheley.

New Method of Determining the Effect of Speed upon the Strength of Gear Teeth, Wilfred Lewis; president Tabor Mfg. Co., Philadelphia.

Torsion of Crankshafts, Dr. S. Timoshenko.

Orifice Coefficients for Various Sizes of Pipes, J. M. Spitzglass, Republic Flow Meters Co., Chicago.

Effects of Large Sudden Steam Discharges on Boilers—Report of Research Sub-Committee on Sudden Initial Pop Lift of Safety Valves.

[illegible] Session, Afternoon of Dec.

Refining and Rolling Mill for Monel Metal, W. L. Wotherspoon, consulting engineer, International Nickel Co., New York.

Dry Vacuum Pump Tests, Methods and Results, E. W. Noyes and H. V. Stevenson.

Diesel Engine Clutch [illegible] Submarine U-117, William H. Nicholson.

General Session, Morning of Dec. 6

Radial Elongation and Rotational Stresses in Cylindrical-Shaped Rotors of Uniform Diameter, C. M. Laffoon.

Design of Flywheels for Motor-Driven Impulse Machines, C. O. Rhys, United Shoe Machinery Corporation, Beverly, Mass.

Stress Distribution in Electric-Railway Motor Pinions as Determined by the Photo-Elastic Method, Paul Heymans and A. L. Kimball, Jr.

Fuels Session, Joint Session with Stoker Manufacturers' Association, Morning of Dec. 6

Symposium on Stokers.

Development and Use of the Modern Chain Grate, T. A. Marsh, chief engineer Green Engineering Co., East Chicago, Ind.

Overfeed Stokers of the Inclined Type, G. I. Bouton, chief engineer Murphy Iron Works, Detroit.

Design and Operation of Underfeed Stokers, H. F. Lawrence, American Engineering Co., Philadelphia.

Chronological History of Stoker Development to the Present Day, A. H. Blackburn, chief engineer Under-Feed Stoker Co. of America, Detroit.

Power Session, Morning of Dec. 7

The Commercial Economy of High Pressure and High Superheats in the Central Station, G. A. Orrok, consulting engineer, New York, and W. S. Morrison, New York Edison Co., New York.

Feed Water Heating for High Thermal Efficiency, L. Helander, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Tests of Stirling Boiler of Detroit Edison Co.'s Connors Creek Station, P. W. Thompson, Detroit Edison Co., Detroit.

Elasticity of Pipe Bends, Sabin Crocker, Detroit Edison Co., and S. S. Sanford.

Transmission of Superheated Steam, B. N. Broido, New York

Safety Engineering Session, Morning of Dec. 7

(Under the auspices of American Society of Safety Engineers, with A. S. M. E. Committee on Safety Codes co-operating)

Safety Codes, M. G. Lloyd.

Safety Engineering in Connection with the Compression of Gases, Dr. A. D. Risteen.

Safety Code for Grinding Wheels, G. E. Sanford, General Electric Co., Lynn, Mass.

Wage Increases Slower

The latest monthly statement by the National Industrial Conference Board, 10 East Thirty-ninth Street, New York, summarizing wage changes reported during the past month shows that the upward trend of wages still continues, though at a slower rate than in the preceding two months.

The following table shows the movement of wage changes in the past six months:

Date	Reductions	Increases	Total Changes
May 15–June 15	23	26	49
June 15–July 15	25	21	46
July 15–Aug. 15	7	8	15
Aug. 15–Sept. 15	4	119	123
Sept. 15–Oct. 15	4	65	69
Oct. 15–Nov. 15	1	36	37

Labor shortage continues to stand out as the dominant reason for wage increases. It is especially a factor in the mining and building industries. Revival of activity in industries previously idle or operating on a curtailed basis, as in the case of the mining industry in Minnesota, is also a factor.

Most of the changes were voluntary on the part of the company, and the changes affecting the largest number of workers took place on the railroads and in mining.

The Glauber Brass & Mfg. Co., 7706 Platt Avenue, Cleveland, is planning to remodel its plant and make some extensions at an estimated cost of $50,000.

CONTENTS

November 30, 1922

Savings Effected by Combining Operations 1409
Two Chuckings More Economical Than One—Output from Automatic Screw Machine Doubled—Different Grinding Wheels on One Spindle

Has Automobile Production Reached Peak? 1411
Indication That 1922 Output Will Break All Records, Including That of 1920—Building of New Plants Indicates Confidence

Founders Urge Immigration Law Be Changed 1413
National Association Says Present Act Is Working Injury to Nation—Annual Convention in New York

Call for Better Chilled Cast Iron Wheels 1419
Problem Presented by Failures in Service Is Not in the Difficulty of Making Wheels, But in Existing Replacement Practice

Problems of the Machine Tool Industry 1425
Some Grow Out of Relations of Dealers and Manufacturers—What Is Sold Is Production, Not Pounds of Cast Iron—Cost Does Not Make Value

The High-Cost Factor in the Scrap Trade 1430
Transportation and Labor Responsible for Large Increases—Why the Consumer Must Pay So Much More To-day If He Draws from Distant Sources

Shaping Management to New Conditions 1431
Predicted Long Term Buyers' Market—Requires Adjustment of Policies—Topics Discussed at Taylor Society Meeting

Use of Standard Machine Tools Favored 1435
Special-Purpose Versus Standard Tools for Automotive Work—Standard Tools with Special Tooling—Simplicity in Fixture Design

Bethlehem Steel Co. Acquires Midvale 1443
Merger of Two Leading Independents Will Give Purchaser 7,600,000 Tons Ingot Capacity or About 15 Per Cent of Country's Total

New Era in Structural Steel Industry 1445
American Institute of Steel Construction Planning to Create New Uses, to Establish Authoritative Design Data and to Harmonize Building Codes

Steel in the Army 1412
Time Saved in Drilling Job 1418
Production in 1920 Levels 1418
Peculiarities of Buyers 1420
Automobile Production in October 1420
Easier Conditions on Railroads 1421
New Claire Furnace 1422
Farm Implement Outlook 1423
Bag Holder Saves Labor 1424
National Foreign Trade Council Organizes Trade Adviser Service 1424
Multi-Production Lubricator Attachment 1424
Gang Drills with Adjustable Head 1433
Three New Gages 1434
October Refractories Statistics 1434
Mechanical Engineers' Program 1436
Wage Changes 1436

Editorials 1438
Sheet and Tin Plate Prices—Progressive Foundrymen—A Refractory Survey—Associations Made Liable—Less Pig Iron for Steel—Turns in the Railroad Situation.
Ford Steel Plant and Rolling Mills 1441
Plant Activities 1441, 1449
Japanese Market 1442
Federal Trade Commission's Attitude 1444
Precision Eccentric Boring Head 1446
Machine Tool Discussion 1447
Export Market 1448
Railroad Equipment Buying 1462
Fabricated Steel Business 1462
Meeting of Iron and Steel Jobbers 1470
Materials of Engineering 1470
Science of Human Effort 1470
Oil Well Casing Threads Standards 1471
Meeting of Quad City Foundrymen 1471
Refractory Research 1471

Iron and Steel Markets 1450
Comparison of Prices 1451
Prices Finished Iron and Steel, f. o. b. Pittsburgh 1463
Non-Ferrous Metal Market 1465
Personal Notes 1466
Obituary Notes 1467
Machinery Markets and News of the Works 1473
New York Jobbers' Prices 1482

ESTABLISHED 1855

THE IRON AGE

EDITORS:

A. I. FINLEY WILLIAM W. MACON GEORGE SMART

C. S. BAUR, *General Advertising Manager*

Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

[illegible] Printed in U. S. A. George H. Griffiths, *Secretary*

[illegible] Detroit: 317 West First St. Cincinnati: Mercantile Library Bldg. Buffalo: 881 Ellicott Square. Washington: 26 Jackson Place, N. W. San Francisco: 320 Market St. London, Eng.: 11 Haymarket, S.W.1.

BRANCH OFFICES—Chicago: Otis Building. Pittsburgh: 1420-1422 Widener Building. Cleveland: Guardian Building.

Subscription Price: United States and Possessions, Mexico, Cuba $6.00. Canada $8.00. Foreign, $12.00 per year. Single copy 25 cents.

Entered [illegible] 1879, at the Post Office at New York, New York, under the Act of March 3, 1879.

Sheet and Tin Plate Prices

The reaffirmation of its former sheet and tin plate prices by the United States Steel Corporation last week caused much less surprise than would have been the case if the announcement had been made a month earlier, but still it has caused some. At one time the opinion was quite general in the trade that advances would be made in both products, but more recently the feeling has changed.

Some of the reasons given in the trade in favor of advances in these commodities were logical and forceful, while others were not. One argument put forth deserves particular attention, that being that the current market price of sheet bars, then $40, Pittsburgh or Youngstown, not merely justified but actually necessitated advances, in the price of tin plate to rule during the first half of next year and in the price of sheets to rule during the first quarter. The tacit assumption was that since sheets and tin plates are made from sheet bars, the market price of the "raw material" is necessarily a governing factor. In ordinary affairs this is, of course, a perfectly logical basis. In this case it is not, for the reason that the important market commodities are sheets and tin plates, not sheet bars. Substantially all the sheets and tin plates made are sold in the market, while only a small proportion of the sheet bars made are sold in the market. In both sheets and tin plates by far the major portion of the output is from mills that make their steel themselves.

The familiar market development is for sheets or tin plates to advance or decline and for sheet bars to follow. An advance in sheet bars may peg an advance previously made in the finished product, but it does not originate an advance. A special case, of course, is presented when either sheets or tin plates change in price without the other product changing, but wide divergences of such a sort have been rare. Technically, the advance in the sheet market since the first of the year has not been matched by an advance in tin plate, but practically there has been substantial harmony, for the open price on tin plate was being cut rather deeply early in the year.

In these troublous and uncertain times the steel market cannot be made exactly as it ought to be made for the best interests, in the long run, of all concerned. It would be well if we could have at this time a practical carrying out of the doctrine preached by Judge Gary years before the war, that "stable prices make stable demand." It was a new doctrine then, and it is needed even more now than it was at that time.

For the common good all parties in interest should strive to have prices in the iron and steel industry less fluctuating. Especially should it be considered in bad form to assume it right and proper that if one material is at an unreasonable price the extra should be carried through the successive stages of manufacture. This may be necessary at times, but the condition should be regarded as distinctly regrettable. If, merely to illustrate, coke is unnaturally high, and too high relative to pig iron, the philosophy of the trade should be that it is better for the common good that coke should go down than that pig iron should go up. We shall never reach normalcy over any other course.

Progressive Foundrymen

Several features of the convention of the National Founders' Association held in New York last week deserve special mention because of their constructive value. It is easy to criticize unfavorably and to tear down, but it is not always so easy to make helpful suggestions and to follow them by effective supporting work. It is the fashion to rail at Congress and condemn its shortcomings, but the critics seldom point the way for improvement.

Immigration is one subject the discussion of which has included much criticism of Congress for passing the "percentage bill." It is generally recognized that although the act may have been justified as a post-war measure, conditions have changed and its modification becomes imperative. The question is, How shall it be modified? The resolutions adopted by the founders' convention, published in full elsewhere, do not attempt to define exactly the kind of measure that should be passed, but they do lay down some fundamental principles which should be regarded. The resolutions are planted squarely on Madisonian principles, which declare that the ports of the United

States should be open to receive all who will contribute to its welfare and be a real addition to its population. As to how these principles should be applied, the resolutions offer excellent suggestions. The authors clearly had in mind the welfare of the men and women who come to this country, as well as the interests of those who are now citizens of the United States. The plan of determining as far as possible, at the foreign home of the would-be immigrant, whether he is worthy to be admitted to the United States certainly ought to be adopted, and the suggestion that the immigrants should be informed as to conditions in the New World is also sound. Whether the Government could supervise the distribution of immigrants, however, is open to some doubt.

The action of the convention looking to the preparation of an up-to-date course of study on foundry practice is a progressive step. As pointed out by Mr. Lane, in his presentation of the subject, great changes have taken place in foundry practice within a few years. When the best course of instruction now in existence was written the molding machine was in its infancy, and many other changes in equipment and practice have taken place. The task of bringing the old course up to date and making it conform to requirements of different classes of people is not an easy one, but the National Founders' Association has been progressing as the number of its members having valuable experience has increased and its ablest men can be depended upon to carry this important undertaking to success. It is encouraging to note, as reported by Commissioner McClintock, that progress is being made in getting a larger number of educated men interested in the work of the foundry.

This country has been rather surfeited with investigations by Congress and by State legislatures, but the light of publicity seldom has turned on the labor unions. When, in a New York State investigation, a prominent labor leader was put on the stand, his confessions of the weaknesses of labor unions were no less interesting than his insistence that nothing be done about them. They are important as indicating to some extent what might be expected from a thorough inquiry. Labor leaders are happy to see other folks investigated. Why not submit to a little of it themselves? The suggestion of President Barr deserves consideration.

A Refractory Survey

An industrial survey of unusual interest is about to be made by the Refractories Manufacturers' Association to obtain complete information regarding the furnaces in which refractory materials are used. An elaborate blank has been prepared in which 25 questions are asked relating to type of furnace, product of furnace, fuel, kinds of refractories used and similar points; temperature and combustion, particularly combustion conditions; abrasion, calling for description and final results; slag action and other features.

In the past few years it has been found that owing to rapidly changing conditions in many industries the demand for brick of widely differing characteristics has increased, and there is reason for believing that often the refractories used were not those best adapted for the purpose. Studies of furnace conditions frequently have shown the cause of the trouble, and the association believes that the thorough investigation which it has now planned will greatly help both manufacturers and users of refractories, eliminating waste and reducing costs. The investigation is one which will involve time, much labor and patience and it is worthy of the support of all manufacturers who are users of refractories.

Associations Made Liable

That voluntary associations, including labor unions, are financially liable for their acts and in that respect are on the same basis as corporations and individuals, was established by the voters of a State in referendum for the first time at the recent election in Massachusetts. The majority was small, but it is believed this was due to the coupling of the question on the ballot with two others against which great majorities were polled. One of the two would have meant much stricter enforcement of prohibition had the vote been yes; the other would have established a state motion picture censorship. So the word was passed around systematically to "vote no on everything," which many unthinking voters did. Yet, with a very heavy vote, the majority was favorable to the establishment of the liability in the courts of voluntary associations. The expression of opinion was most emphatic.

Other States already had similar laws, among them the industrial States of New York and Connecticut. But their statutes were enacted by their legislatures. The Massachusetts Legislature for the first time in its history was favorable to such an act as was proposed. Labor fought the bill strongly and persistently. It passed the legislature of 1921, and then the referendum was invoked. Consequently there was plenty of time for a campaign of education, and the opponents of the measure conducted a vigorous campaign. Their efforts, however, reacted against them. The voters, men and women, saw the words "fair play" written into the proposed law, and cast their ballots accordingly.

The law is a just one. Labor union men agree that if any such statute had to go on the books this is as good a one as could be framed. While it provides that any voluntary association composed of five or more members can sue and be sued in its common name, "the separate real or personal estate of any individual member shall not be subject to attachment or execution in any suit against such association." The member is placed in much the same position as that of the stockholder of an ordinary corporation. The company may be sued, but, under ordinary circumstances, he cannot be made a party to the suit.

In the famous Danbury hat cases, which went to the full bench of the United States Supreme Court, all property, real or personal, that could be found as belonging to any member was attached. The promoters of the Massachusetts bill, following the example of other States, recognized that a

law which would permit of such wholesale actions would be as unfair in the one direction as the absence of any law would be in the other direction. They wished only to establish an equitable distribution of legal responsibility. As it turned out, it is well that the labor leaders invoked the referendum and placed the matter before the people as a whole, to receive their stamp of approval or disapproval. The vote cast at this election was one of the largest in the history of Massachusetts. The result of the referendum may be regarded as final, and its influence in extending the application of the principle still further is by no means inconsiderable.

Less Pig Iron for Steel

Because of accumulating evidence that less pig iron per ton of steel is being used in steel making, the question is often asked whether the change is permanent. Because of fuel and other conditions the rate of pig iron production in the United States this year has been much less than that of steel. It is to be noted, however, that while the spread between the pig iron and steel output is large, it is only a little larger than it was in 1920; in other words, the unfavorable economic conditions this year have only slightly accentuated a trend which has existed since the war.

There is, however, a marked tendency the world over to make less and less pig iron in proportion to steel. This appears from an analysis of the pig iron and steel outputs of the leading countries in the last three years compared with that of 1913. The countries represented in this analysis are the United States, United Kingdom, Canada, France, Belgium, Germany and Luxemburg. The figures used are those published by the National Federation of Iron and Steel Manufacturers of Great Britain.

In 1913 the pig iron production of the seven countries was 68,800,800 gross tons and the steel ingot output was 65,703,600 tons, or a difference in favor of pig iron of 3,097,200 tons. The corresponding data for the same countries for 1920, 1921 and the first eight months of 1922, put in the form of a table, are as follows:

Pig Iron and Steel Output of Seven Countries in Gross Tons

	1920	1921	1922*
Steel ingots	63,733,200	37,317,600	35,171,200
Pig iron	56,720,400	31,192,800	28,500,000
Difference	7,012,800	6,124,800	6,671,200

*Eight months, with Germany estimated.

It thus appears that the spread between the steel and pig iron outputs of the leading producing countries has increased from 7,012,800 tons in 1920 to a yearly rate of 10,006,800 tons in the first eight months of 1922. This wide spread this year is in contrast with a balance on the other side in 1913, when the pig iron total was 3,097,200 tons more than that of steel ingots. In other words, the seven countries which in 1913 were producing 258,100 tons *more* pig iron than steel per month, are now making 833,900 tons per month *less* pig iron than steel.

Among the causes of this marked change, the increased use of scrap in steelmaking is chief. The abundance of scrap from the war has been a factor in Europe, and in the United States less pig iron in steelmaking is recognized practice. Imports of scrap into Germany to September this year have been over 47,700 tons per month, exceeding all records. The larger production of basic open-hearth steel in Great Britain in recent years, involving the use of more scrap, is well known. Another factor to be considered is the decline in the percentage of foundry iron production. Foundry activity has been relatively less, both at home and abroad. Busy foundries mean new industrial enterprises and extensions of those existing, calling for all forms of equipment. The world has not been building new factories since the war.

Important changes are going on. It has been found possible to use less and less pig iron in steel works practice, without the sacrifice of quality. The movement is a broad one and is worthy of careful study. If the tendency continues it means the conservation of iron ore reserves and the postponement of the day of scarcity in good ores of which something too much was commonly predicted a few years ago.

Turns in the Railroad Situation

The congressional elections went against the railroads. Three members of the Senate Committee on Interstate Commerce were defeated for re-election and in all two minority and three majority party Senators who voted for the transportation act failed of re-election. At the same time all the senatorial candidates in the West and Central West who attacked the railroads were elected, prominent among these being Mr. La Follette.

The reaction of the stock market was prompt. In 16 days Northern Pacific had declined 10 points, Baltimore & Ohio, Chesapeake & Ohio, Rock Island, Great Northern, New York Central and New Haven 8 points or more, and Union Pacific, St. Louis & San Francisco, Chicago, Milwaukee & St. Paul and Reading more than 5 points, while Pennsylvania, just put back on a 6 per cent basis, declined from 48⅛ to 46⅛.

The transportation act is not doing so much to rehabilitate the railroads and put them where they belong for the best interests of the country as was expected. But judging by what the successful candidates for the Senate and House said against the railroads and against the act in their campaigns, and judging by the loss of friends it sustained by the election there is a prospect of the act being eventually amended in manner adverse to the railroads.

The attitude of men serving in Congress may be different from what is indicated by campaign utterances. There is an opportunity for these men to become better posted and more serious minded. The untrue statements made in the campaign indicate gross lack either of honesty or of information.

It is a curious fact, in the light of many things that are said about the railroads and about the transportation act, that of all the broad national subjects that come up for consideration there is

scarcely another on which such complete and precise information is available. The facts are gathered and can be had upon request.

In particularly useful form is a statement just compiled by the Bureau of Railway Economics, giving various details of Class I roads as a whole from the fiscal year 1911 through the calendar year 1921, showing investment and income account, employees and their compensation, freight ton-mileage and passenger mileage, traffic averages, equipment in service, and train, car and locomotive miles.

The figures of investment in road and equipment as shown below are drawn from the statement just mentioned. As of interest in this connection, we have computed the amount per mile of line. The return on the stated investment is also shown:

Class I Railroads

	Investment	Per Mile	Return Per Cent
1911*	$14,246,167,475	$66,200	5.08
1912*	14,632,497,022	67,100	4.84
1913*	15,284,763,489	68,500	5.15
1914*	15,842,127,273	70,400	4.17
1915*	16,257,146,632	71,100	4.20
1916*	16,688,440,056	72,300	5.90
1916†	16,884,440,038	73,000	6.16
1917†	17,762,152,127	76,400	5.26
1918†	18,213,629,613	78,100	3.51
1919†	18,529,749,653	79,300	2.46
1920†	19,061,239,186	81,100	0.09
1921†	19,496,000,000‡	83,300	3.08

*Fiscal year. †Calendar year. ‡Partly estimated.

The railroad baiters have said often in the past year that the transportation act "guarantees" the railroads a 6 per cent return. It does not. One thing it does do is to limit them to a disbursement of 6 per cent if by any possible chance they should make more. Last year they secured only half the amount mentioned.

It is true that the actual value of the railroads is not known. At great expense a valuation is now being made, and this quite possibly may show more than the railroads claim in their present accounts. The important point is that in any event the accounts cannot be much out. What makes a 3 per cent return by railroad figures would be only 4 per cent return if the value is 25 per cent below the railroad accounts, and it cannot possibly be so much below. It easily may be above.

Ford Steel Plant and Rolling Mills

The Ford Motor Co., Detroit, which for two years has produced its own pig iron at its River Rouge plant, is planning, as announced previously, for the erection of a steel plant containing a number of electric furnaces, two of them of large size. Several rolling mills are planned also, and the Morgan Construction Co., Worcester, Mass., which will act as engineer for this part of the installation, has received an order for the first of these mills. Much of the construction is too heavy to be made in New England, but all of the designing and a portion of the work will be executed in the Morgan company's shops in Worcester.

Further reports of the use of roller bearings in steel mills show that the Bethlehem Steel Co. is equipping 115 charging cars with Hyatt bearings, the Wisconsin Steel Co. is similarly equipping 75 charging cars and 65 ingot cars, the Youngstown Sheet & Tube Co., 270 ingot cars, and the Tennessee Coal, Iron & Railroad Co., at the Fairfield plant, is equipping the mill tables on the 11-in. merchant bar with the same type bearing.

Youngstown Foundry & Machine Co. May Sell Its Properties

A proposal to sell their properties will be considered by shareholders of the Youngstown Foundry & Machine Co., Youngstown, Ohio, at a special meeting Dec. 23. Myron I. Arms, II, president of the Aetna Foundry & Machine Co., Warren, Ohio, and formerly treasurer of the Republic Rubber Corporation, Youngstown, is negotiating for the company's plants.

Last spring negotiations were conducted between these two interests, but failed because of inability to agree upon valuations. It is understood this difficulty has now been removed and that the owners of the Youngstown Foundry & Machine Co. are willing to sell their interests for a much lower price than they asked in the spring.

Financial arrangements are being conducted by the Aetna company, which is planning a bond issue to finance the purchase. If effected, the combination will have a capitalization approaching $1,000,000. The Youngstown Foundry & Machine Co. operates two plants in Youngstown producing general mill equipment. Its capitalization is $250,000, but its properties are worth considerably more, it is claimed.

At Warren, the Aetna company operates a somewhat smaller plant, producing castings, mill machinery, pickling and galvanizing equipment. W. J. Wallis is president of the Youngstown Foundry & Machine Co.; F. A. Williams is vice-president and B. G. Parker is general manager.

National Tube Co. Will Start Riverside Works Soon

WHEELING, W. VA., Nov. 27.—Beyond the warming up of one of the blast furnaces of the National Tube Co. at Benwood, W. Va., preparatory to blowing it in late this week, there will be no material change in iron and steel plant activities in this district this week. With the starting of the National Tube Co. stack, it will be only a matter of a short time before the steel works and pipe furnaces start up. Wheeling Steel Corporation units are averaging about 75 per cent capacity operations, while the Weirton Steel Co., Weirton, W. Va., still is running practically full. Of the other Steel Corporation plants in the district, the Bellaire, Ohio works, Carnegie Steel Co., still is down, while the Mingo, Ohio works has two blast furnaces on out of four and is in full operation on steel works and sheet bar mills. The American Sheet & Tin Plate Co. is running practically full at its Aetna-Standard works, Bridgeport, Ohio and Laughlin plant, Martins Ferry, Ohio, but its LaBelle plant in this city is idle.

Plant of Cromwell Steel Co. Sold

The plant of the Cromwell Steel Co., Elyria, Ohio, which was offered for sale Nov. 22 under receivership proceedings, was purchased by W. E. Guerin, vice-president of the Guardian Savings & Trust Co., Cleveland, for $1,100,000, or approximately two-thirds of the appraised value, which was $1,600,000. Mr. Guerin, as purchaser, represented the trustee of the bondholders and the bondholders' committee. The bonded indebtedness of the company is $2,000,000. A new company has been organized under the name of the Midland Seamless Tube & Steel Co., having a small capital stock which will act as a holding company until a new organization can be effected. Steps are now being taken to form a permanent organization and to provide the necessary financing. C. A. Orr, formerly vice-president and general manager of the company, has been in charge of the property since last January, when he was appointed receiver. He will assist the bondholders in the reorganization.

The Cromwell plant has four open-hearth furnaces, a 30-in. bar mill and a 20-ton steam hammer, the latter being provided for breaking down ingots, taking the place of a blooming mill. When the plant was in operation, the company specialized on bars for making seamless steel tubing.

JAPANESE PRICES WEAKER

Copper Weakens as Consumers Turn to Aluminum —All Stocks Increase—Tin Plate Better

TOKIO, JAPAN, Nov. 2.—Price cutting in an effort to draw consumers back into the trade features the weakening copper market. But little buying is done, and holders are overloaded with surplus stock.

Domestic smelters are not bothered with competition from America, as the new tariff puts American copper out of reach. It is quoted in Yokohama now at about 47.50 yen per picul. Domestic smelters offer electrolytic copper at from 44 to 46 yen. The lack of buying is attributed to the fact that wire manufacturers are replacing copper with aluminum, as cheaper and just as durable. In November, the Tokio city tramway is to buy 500 tons of copper, and the price to be offered is attracting keen attention.

Sales of iron and steel from stocks of the Yawata Iron Foundry are reported not sufficient to prevent further accumulations. It is calculated that by the end of November the stock of steel at the Yawata works will have increased to 90,000 tons and pig iron to 150,000 or 160,000 tons. Rail orders are said to be favorable, and the foundry has orders from the South Manchuria Railway Co. for 3000 tons and from Formosa for 1000 tons, all 60-lb. sections.

The tin plate market continues brisk and stocks are decreasing gradually. The stock on the Osaka and Kobe markets is reported to be about 25,000 boxes. Welsh 170-lb. boxes are quoted at 21 yen for spot delivery, an improvement of 20 sen. Prices of tin plate ruling in the London and Japanese markets are about the same at present.

Stocks of French nails in the Kwansai district amount to 100,000 drums, and those in the Kwanto district are estimated at 50,000 drums. A large portion of the stock was bought at about 12 yen. On the foreign market German nails are quoted at 13 yen and American nails at 12.50 yen. Depressed by the business slump, quotations on French nails stand at 10.70 to 10.80 yen, while Japanese goods are now as low as 11 yen. However, there has been some demand for these of late and the monthly disposition of stock amounts to 30,000 drums. In addition, most of the wholesale merchants have suspended the import of goods and no additional supplies are to arrive until next spring. Under these circumstances, the market, it is thought, will show an upward tendency. At present iron rods for the manufacture of French nails are purchasable at 117 to 120 yen and it is more profitable to manufacture French nails with this material than to import goods from the foreign market. It is expected that imports of French nails will therefore cease.

On the wire market, galvanized wire remains firm, No. 8 being quoted at 9.50 yen and Nos. 10 and 11 at 10.50 yen. The home market has been deeply depressed by the slump and negotiations for the imports of goods have ceased. However, arrivals of goods during July and August were large, and the quantity was estimated as sufficient to meet the demand for 18 months. Such being the case, quotations are weak. No. 8 plain wire is quoted at 9 yen, and Nos. 10 and 11 at 9.50 or 9.60 yen. Compared with the quotations ruling during July and August, this is a drop of 1 yen.

Bethlehem Steel Export Corporation

The officers of the Bethlehem Steel Export Corporation, which will handle the export business of the Bethlehem Steel Corporation, are the following: E. G. Grace, president; Frank Purnell, vice-president; R. E. McMath, secretary. Mr. Purnell has been vice-president of the Consolidated Steel Corporation, which recently ceased selling and is now liquidating its affairs. The offices of the Bethlehem Steel Export Corporation are on the fifteenth floor of the Cunard Building, New York.

Canadian Scrap Market

TORONTO, Nov. 27.—The demand for iron and steel scrap is at a minimum with consumers showing little interest with regard to scrap either for spot consumption or for future delivery. In the majority of cases dealers' yards are well stocked with old material in most lines, but stove plate and machinery cast are scarce. Local dealers do not look for any noticeable change in conditions until after the turn of the year, but the majority are optimistic when mentioning possible conditions for 1923. At the present time consumers are of the opinion that prevailing prices are too high and consequently they are remaining out of the market or are buying only on a hand to mouth basis with the expectation that an adjustment of prices will be forthcoming in the early future.

We quote Toronto dealers' buying prices:

Gross Tons	
Heavy melting steel	$11.00
Steel axles	16.00
Axles, wrought iron	16.00
Car wheels, iron	16.00
Rails	11.00
No. 1 wrought scrap	11.00
Boiler plate	8.00
Steel turnings	7.00
Machine shop turnings	7.00
Heavy axle turnings	6.00
Wrought pipe	6.00
Flashings	6.00
No. 2 busheling scrap	5.00
Hydraulic compressed sheets	5.00
Cast borings	5.00
Bundled sheet scrap	4.00
Plate and shape shearings	7.00

Net Tons	
No. 1 machinery cast	18.00
Stove plate	14.00
Standard car wheels	15.00
Malleable scrap	11.00

Scrap Weak at Detroit

DETROIT, Nov. 27, 1922.—The pre-inventory period is showing its effect on scrap production, the tonnages offered for December delivery being considerably smaller than the November lettings. Interest is being shown in the offering of one of the largest producers, consisting of approximately 2500 gross tons of turnings, borings, flashings and hydraulic compressed. Prices in general have had a tendency to weakness.

The following prices are on a gross ton basis, f.o.b. cars producers' yards, excepting stove plate, automobile and No. 1 machinery cast, which are quoted on a net ton basis:

Heavy melting steel	$14.50 to $15.50
Shoveling steel	15.00 to 16.00
No. 1 machinery cast	19.00 to 21.00
Cast borings	12.00 to 13.00
Automobile cast scrap	21.00 to 23.00
Stove plate	16.50 to 18.00
Hydraulic compressed	15.50 to 16.50

Late Youngstown News

YOUNGSTOWN, Nov. 28.—The Youngstown Sheet & Tube Co. is preparing to blow in one of the two blast furnaces at its plant in Hubbard, Trumbull County. This will increase the number of its active stacks to five of its six.

In trade circles, a sale of 1000 tons of basic pig iron is reported at $27.50.

Sharp curtailment in sheet mill operations is predicted for December, owing to the irregular condition of the market.

One small blast furnace of an independent steel maker will be blown out within the next two weeks.

The foundry and pattern shop of the Velte Foundry & Machine Co., Mars, Pa., were almost entirely destroyed by fire on the night of Nov. 23. Damage, covered by insurance, is estimated at $40,000.

Bethlehem Steel Co. Acquires Midvale

Merger of Two Leading Independents Will Give the Purchaser 7,600,000 Tons Ingot Capacity or About 15 Per Cent of the Country's Total

PRESIDENT EUGENE G. GRACE of the Bethlehem Steel Co. announced Friday, Nov. 24, the purchase by Methlehem of the Midvale Steel & Ordnance Co., subject to ratification by stockholders. Rumors of such a merger had appeared from time to time but actual negotiations, it is now stated, had been carried on only within the past month.

Bethlehem will take over all of the properties of the Midvale Steel & Ordnance Co. excepting the Nicetown, Pa., plant, which was the original Midvale works. A separate company will be organized to operate this plant, as was the plan when the Midvale-Republic-Inland merger was under discussion some months ago, and the stock in this company will be distributed among the present stockholders of the Midvale Steel & Ordnance Co.

The acquisition of the Midvale properties will give the Bethlehem Steel Co. a total ingot producing capacity of 7,600,000 tons annually, or about 15 per cent of the country's total. It will rank second to the United States Steel Corporation, which has a rated capacity of about 22,700,000 tons annually. Taken together, the Steel Corporation and Bethlehem Steel Co. will have 60 per cent of the total ingot capacity of the United States.

Of its present ingot capacity, Bethlehem acquired 1,840,000 tons in its recent purchase of Lackawanna Steel Co. This added to the 3,217,000 tons it already had gave it a total of 5,057,000 tons. Midvale's rated capacity, exclusive of the Nicetown plant, is about 2,700,000 tons annually.

President Grace's statement of Nov. 24 was as follows:

"The board of directors of Bethlehem Steel Corporation at a special meeting held this afternoon authorized contracts for the purchase of the plants and other assets of Midvale Steel & Ordnance Co. and of Cambria Steel Co., excepting the ordnance plant and other business located at Nicetown, Pa., and assets appurtenant thereto.

Payment in Bethlehem Common Stock

"In payment for the properties to be acquired Bethlehem Steel Corporation, besides providing for the assumption of the bonds and other indebtedness of the Midvale and Cambria companies (excepting current liabilities appurtenant to the operations of the Nicetown plant), will issue about $97,650,000, par value, of the Bethlehem common stock, of which $95,000,000, par value, will go to the Midvale company for distribution on dissolution to its stockholders, and the balance to the holders of the stock of Cambria not held by Midvale. As a result of these purchases the stockholders of the Midvale company will receive for each two shares of $50, par value, of the Midvale company stock, $95, par value, of the Bethlehem common stock, together with a pro rata share of the stock of the new corporation to which the Nicetown plant and the assets appurtenant thereto are to be transferred.

"The board of directors of Bethlehem Steel Corporation has authorized these additional acquisitions in pursuance of its policy of building up a complete line of steel products which it has followed ever since Mr. Schwab and his associates became interested in Bethlehem.

"Through the acquisition of the properties of the Midvale and Cambria companies, Bethlehem will acquire plants at Coatesville and Johnstown, Pa., and Wilmington, Del., and important developed iron ore properties in Michigan and Minnesota, as well as developed coal properties in Pennsylvania. The ability to distribute and mix the Midvale coal and ores with Bethlehem's present coal and ore supplies will be of much advantage to both sets of properties in that operating costs can be reduced.

New Products for Bethlehem

"The acquisition of the Midvale and Cambria properties will give to Bethlehem important lines of steel products which it does not now manufacture, such as wire rods, wire and wire products, steel freight and mine cars, steel wheels, boiler tubes, agricultural implement parts, etc.; in fact, it will place Bethlehem in position to produce all the so-called commercial steel products with the exception of pipe and seamless tubes. For these Bethlehem is planning to build plants at one of its existing properties.

"Bethlehem's present annual ingot capacity of 4,890,000 tons will be increased to 7,600,000 tons by the Midvale-Cambria purchase.

"These acquisitions will constitute an advantageous development of Bethlehem geographically, in that they will supplement its present plants by a large steel plant with low-cost production, located at Johnstown, Pa., from which an economical distribution of its products can be made into the important Central West industrial field, which Bethlehem cannot now advantageously serve.

"No increase in the aggregate indebtedness is necessary or contemplated for this transaction. With the additional common stock to be issued for the properties to be purchased and with the 8 per cent preferred stock converted into the new 7 per cent cumulative preferred stock, the approximate capitalization of Bethlehem Steel Corporation will be:

	$213,500,000 funded debt
	62,000,000 7 per cent preferred stock
about	180,250,000 common stock

Investment of $465,500,000

"The combined investment in property and plant, less depreciation and depletion, will be about $465,500,000 and the aggregate net quick assets will be about $133,700,000.

"The stockholders' meeting and the other proceedings will require sixty to ninety days before the transaction can be concluded. In the meantime, the Bethlehem management will be acquainting themselves with operating conditions at the Midvale and Cambria properties so as to facilitate the taking over of the active management when the transaction shall have been ratified by the stockholders of the respective companies."

A Midvale Statement

W. E. Corey, chairman of the board of directors of the Midvale Steel & Ordnance Co., issued a statement to the stockholders of that corporation in which he told of the approval of the sale by the boards of directors of the Midvale Steel & Ordnance Co. and the Cambria Steel Co. After giving the terms as stated by Mr. Grace, his statement continues:

"The officers and directors of the Midvale Steel & Ordnance Co. have for a long time been convinced that a larger steel tonnage, a wider diversity and a better distribution of products than their corporation enjoys is essential, to effect the savings in manufacturing, selling and administrative costs, and the economies in mining ore, coal and limestone, necessary to secure the best results in the steel business. The sale to Bethlehem has been arranged with these things in view.

Stockholders' meetings will be called to approve the transaction."

Midvale Organization and Properties

The Midvale Steel & Ordnance Co. was organized Oct. 5, 1915, by interests which acquired the Midvale Steel Co., Nicetown, Pa., and the plant of the Worth Brothers Co. at Coatesville, Pa. In February, 1916, the Midvale Steel & Ordnance Co. bought the properties of the Cambria Steel Co., Johnstown, Pa., and the two have since been operated as one company, though the Cambria Steel Co. has retained its corporate identity, due to the fact that a number of its stockholders did not exchange their stock holdings for stock of the Midvale company.

Officers of the Midvale Steel & Ordnance Co. are: William E. Corey, chairman of the board; A. C. Dinkey, president; W. B. Dickson, vice-president and treasurer; A. A. Corey, Jr., vice-president in charge of operations; John C. Neale, vice-president in charge of sales; Robert Brewster, secretary; Marshall Lapham, controller.

The Cambria plant, which is the company's largest unit, has 11 blast furnaces with a total annual capacity of 1,700,000 tons, steel foundry, car axle department, steel car building shop, bar mills, wire mills, rail, plate and structural mills and a wheel plant. Its Gautier works, where its bar mills are located, turns out a variety of bar mill products, including special sections for automobile rims, steel window sash and crescent bars. The wheel plant is also one of the most important units of its kind in the country and has capacity for 300,000 wheels per year. Its wire mills have capacity for 120,000 tons annually of wire rods; 95,000 tons of wire; 40,000 tons of galvanized wire; 12,700 tons of barbed wire; 30,000 tons of wire fencing; 900,000 kegs of wire nails.

There are also at Johnstown 612 by-product coke ovens, annual capacity, 1,360,000 net tons of coke, with 60 more under construction and 60 more planned. These ovens are served by coal mines in Cambria County, with estimated annual capacity of 2,400,000 tons.

At Coatesville, Pa., the Midvale company has three blast furnaces, with a rated capacity of 450,000 tons annually; plate mills and charcoal iron fires for boiler tubes. The plate mills have a capacity of 310,000 tons annually. About 25,000 tons of boiler tubes can be produced annually.

The iron ore properties of the Midvale company are an important asset. It owns the Penn Iron Mining Co., Menominee range, Lake Superior, with about 2,500,000 tons; one-fifth Hanna Ore Mining Co., and 15 per cent Hoyt Mining Co., Mesabi range, 6,000,000 tons; one-seventh of the Scranton mine, Mesabi range, and one-seventh of Plymouth, Gogebic range, about 5,000,000 tons; one-fourth of Bennett mine, Mesabi range, 5,000,000 tons; one-half of Mahoning mine, Mesabi range, 50,000,000 tons; one-fourth interest in Zenith mine, Vermillion range, 2,000,000 tons; total, about 70,500,000 tons. There is also a one-third interest in the Mesabi Iron Co., with its large deposits of magnetite on the Eastern Mesabi and its sintering plant at Babbitt, Minn. The company has some 300,000,000 tons of ore in the Buena Vista group on the northeast coast of Cuba—these ores being like those of the Bethlehem mines (Mayari) in the same district. At Sterlington, N. Y., near the New Jersey State line, its Ramapo Ore Co. has a considerable deposit.

One of the interesting developments of the Bethlehem-Midvale consolidation will be the handling of sales. The acquisition of Lackawanna Steel Co. brought no change in the policy of Bethlehem in maintaining its general sales organization at Bethlehem, Pa. The general sales offices of the Midvale Steel & Ordnance Co. are in Philadelphia. The Midvale company, as indicated above, produces a number of products which the Bethlehem company has never made. Its Cambria works has enjoyed a large trade in the Detroit automobile district, particularly in the furnishing of spring steel, bars and special sections; it has also had a large agricultural machinery trade. No announcement has been made regarding executive and sales officials of the Midvale Steel & Ordnance Co. who will continue under the Bethlehem regime.

Federal Trade Commission's Attitude

WASHINGTON, Nov. 28.—The Federal Trade Commission has under advisement the plan of the proposed acquisition of the Midvale Steel & Ordnance Co. exclusive of its Nicetown, Pa., plant, by the Bethlehem Steel Corporation. It is expected that the commission will decide on its course in the near future. The plan was laid before the commission by Attorney Paul Cravath, counsel for the steel interests, and is understood to be a detailed outline of the proposed merger as it will be submitted to the interested stockholders. President Grace of the Bethlehem Steel Corporation is quoted to the effect that the proposed plan has been approved by Attorney-General Daugherty.

It is recalled that the Department of Justice gave approval to the proposed Midvale-Republic-Inland merger and of the Lackawanna purchase by Bethlehem, pointing out that such consolidations would not violate the Sherman, Clayton, or Webb-Pomerene acts. The Federal Trade Commission at the same time issued complaints against both the proposed mergers, alleging unfair methods in violation of the provisions of section 5 of the Federal Trade Commission act. This resulted in the abandonment of the proposed Midvale-Republic-Inland merger. The complaint in this case consequently was dismissed. The Bethlehem-Lackawanna merger, however, has been consummated and the commission now is preparing its case for a hearing before an examiner on this matter. A similar course will be adopted by the commission, in case it issues a complaint in the Bethlehem-Midvale transaction.

The Bethlehem and Lackawanna companies, after the complaints were issued against them, filed answers denying the charges. After the testimony is taken by the examiner in this proceeding, he will make a tentative report to the Federal Trade Commission and counsel will then be at liberty to file exceptions. Arguments will follow before the commission and a decision will be given. In the event a cease and desist order is issued, the commission, if the order were not obeyed, would apply to the Circuit Court of Appeals for an order of enforcement, while the steel company could appeal to the Circuit Court of Appeals to modify or set aside such an order. The notices to stockholders and the other procedure involved in the Midvale acquisition will delay the closing of the purchase, in any event, until some time in February.

Proposed Merger in Central West

The latest report as to possible merging of steel companies seems to be well founded as far as two Chicago companies are concerned, but it is definitely stated by one of the interested companies that the Bethlehem Steel Corporation is not connected with the proposed merger, which will be in the nature of purchase of property. The inclusion later of a prominent steel company in the Central West east of Chicago seems probable.

American Manganese Mfg. Co. Receivership

The American Manganese Mfg. Co., Bullitt Building, Philadelphia, Edward E. Marshall, president, one of the largest producers of ferromanganese in the United States, having a total annual capacity of 150,000 tons, has applied for receivership in United States District Court No. 4, Philadelphia. David Halstead will probably be appointed by the Court as receiver.

The company owns two blast furnaces at Dunbar, Pa., which have been idle since the beginning of the coal strike last April. It was incorporated in Pennsylvania on Dec. 31, 1913, with capital stock of $6,000,000 common and $6,000,000 6 per cent cumulative preferred, and has a bonded indebtedness, according to its last report, of $1,287,633. Among its assets is a half interest in a Semet-Solvay coke plant at Dunbar, having 110 by-product and 225 bee-hive ovens. The company also owns the capital stock of the Cuyuna-Duluth Iron Co. and the Cuyuna-Mille Lacs Iron Co. which operate iron and manganese ore mines on the Cuyuna Range, Minnesota.

New Era in Structural Steel Industry

American Institute of Steel Construction Planning to Create New Uses, to Establish Authoritative Design Data and to Harmonize Building Codes

MORE than half the membership of the American Institute of Steel Construction, this being the new name of the National Steel Fabricators Association, was represented at the annual meeting held at the William Penn Hotel, Pittsburgh, Nov. 23, and the gathering not only was productive of the adoption of a name for the organization more definitive and comprehensive of its aims and activities than the old one, but also of a very constructive program worked out since a year ago by the board of directors and the managing director, L. H. Miller, formerly of the Cleveland district office of the Bethlehem Steel Corporation.

The organization seems to have found itself since a year ago and a marked feeling of optimism pervaded the meeting as to its future. John L. Kimbrough, Indiana Bridge Co., Muncie, Ind., president of the association, presided, and in his introductory remarks commented upon the great change in sentiment of this year's gathering in contrast with that of a year ago, when the industry was depressed and optimism was conspicuous by its absence. Mr. Miller in his remarks stressed heavily the need of standardization of building codes and handbooks of structural steel. He detailed the history of the compilation of hand books and pointed out that some of them now in use were made up 35 years ago. He also pointed out the possibility of the greater use of structural steel in residences, claiming that a 7-in. 10-lb. channel was not only cheaper by 22 per cent than 2 x 2-in. wood joists, but that the use of steel would obviate the necessity of laying two courses of brick on the exterior wall of a residence.

Mr. Miller said in part:

"The most obvious condition connected with the structural steel industry is that there has been a constantly decreasing demand for its use since the first records were started in 1912 by the Bridge Builders and Structural Society. These records indicate a total decrease in the nine years from 1912 to 1921 of about 55 per cent. Materials which have supplanted structural steel have increased about 1000 per cent in that time, due to intensive effort in exploitation. This has happened in face of the fact that there has never been produced or marketed a material for construction or any other purpose, as uniform in quality as structural steel is to-day. Inside its elastic limit it acts with a mathematical accuracy that is unknown in any other construction material. It cannot possibly be injured by stresses within its elastic limit, and this point is never approached in construction work. Medium open hearth structural steel has an elastic limit in the neighborhood of 40,000 lb. per sq. in. and a slight increase in the silicon content raises this point to about 45,000 lb. per sq. in.

Need of Authority on Use of Structural Steel

"In spite of the extensive individual distributed knowledge regarding structural steel, there has never been established a recognized authority on its use, and until such an authority is created and given power, the numerous troubles that beset the industry can be approached only in a clandestine way. No two building codes in the country are the same, and unless there is a means soon established to co-ordinate the various movements now operating to revise these codes, it will be but a short time before we will have much greater divergence in building codes than now exists.

"The fact that there is now no recognized authority needs no extensive discussion; and the fact that it does not exist is itself sufficient to convince all of us that one should be developed. If we can accept the necessity of an authority on structural steel, it next becomes necessary to determine where such an authority should be located. It is true that the catalogs of the various mills are the source of information regarding steel to-day but these are extensively reprints of catalogs appearing 35 years ago; and it is the extensive distribution of these catalogs or handbooks that is one of the greatest difficulties in creating a uniformly recognized authority. These books were devised to exploit the sale of the product of the various mills, whose interest in the subject is confined principally to the making and rolling of steel shapes, and not to the conditions under which they are used in construction. In fact when a mill or an engineering firm wants the services of a man qualified to design or discuss the uses of structural steel, they recruit him from the fabricating industry.

"It should be remembered that the mills do not sell their product to the public in the form in which it is rolled, but the material passes through another industry before reaching its ultimate destination. It is the fabricating industry which is the bridge between the rolling mills and the public, over which bridge all structural steel tonnage must pass. The fabricating industry is in constant contact with the engineering and architectural professions, with building commissioners and the ultimate purchasers of structural steel. It is, therefore, apparent that the authority should be located where the talent and the means of exploiting its increased use exists, which gives us a clear title.

"The most striking thing connected with the past of the steel industry is the fact that such rapid strides have been made in the metallurgical processes, in the rolling improvements, in the knowledge regarding design, in methods of fabrication, and erection, and in inspection; but against all these there was the failure to provide an authority that would permit exploiting the full economy of steel. If only one mill handbook now existed, it might be used as a basis of creating an authority, but so many make it difficult to obtain coordination. An effort originating among the mills to confine their data to one source would in itself be very difficult to effect, and might bring forth suspicion not only among themselves but with the public, as to the motives involved. On our part we frankly admit that we want to increase the demand for steel by bringing about conditions that permit its economical use. To make ourselves the recognized authority we must do something that will be accepted and welcomed as constructive by the mills, the engineering profession, the architects, the building commissioners and the purchasers of steel.

Committee to Recommend Stresses and Formulas

"We are now working on the selection of a committee of the most eminent talent we can find and will ask them to recommend a proper unit stress and column formula for steel construction. Based upon their recommendations, we will publish a set of loading tables for all the sections rolled by the various mills. One of the serious objections to the present mill handbook is that it has encouraged the handbook engineer. By omitting the use of the word "safe" and stating that our tabulated loads produce the stress conditions recommended by the committee, we will make empirical handbook engineering more difficult than at present. For instance, if our committee recommends a unit stress of 20,000 lb. for beams in bending, our tables will state that the uniformly distributed load produces a stress of 20,000 lb. in the extreme fiber of the beam instead of stating as present books do, that the tables give the safe loads. Under present conditions the word

"safe" is relative and does not mean the same in different cities.

"In addition, our tables should show the maximum strength of the web to resist buckling, and also the maximum strength of the web to resist shear. These items are omitted from many tables, but are often of utmost importance in design. We will ask the mills to adopt our standards in their books. We then can go before the engineers, architects, building commissioners and the public with concrete evidence that the mills who originated our present practices have accepted our standards as authority. I have not found a single person or interest who has not expressed unqualified approval of this and there are several large cities ready to recommend our standards as their building code as soon as they are established. Our work will not end when we have established uniform code regulations, as there is yet much work to be done in bringing the matter of steel construction more prominently into the college courses. Then there is the question of fireproofing which can be better approached when we have once been recognized as a power.

More Structural Steel in Residences

"Along with this is the matter of development of new fields for the use of steel, such as in residence construction. You perhaps think that this is a matter far in the future but in a few figures I will reveal that under present conditions steel is cheaper than wood. A 7-in. 10-lb. channel is stronger than two wood joists 2 x 12-in. and at present mill prices for both the steel cost is 22 per cent less, in addition to saving two brick courses on the exterior wall of a residence. Labor must be added to the cost of both elements and under present conditions labor is about 65 per cent of a residence against 35 per cent in material. These figures are obtained from a reliable architect, whose work is largely in residence construction. Properly exploited, this field offers an opportunity for greater tonnage and profit than now exists in all other fields.

"These prospective changes will enable us to exploit an increased demand for steel which in ten years should be many hundred per cent above that of last year, without considering the new sections which the mills will soon produce, enabling us to go into many new fields. It is not extravagant to state that I believe that we are to-day launching a new era in the structural steel industry, and all we need is patience and support to guarantee success.

Basis of Calculating Building Weights

"Another point which a leading architect has called to my attention as a subject which we could correct very promptly is that of how the calculated weight of a steel contract should be determined, *i. e.*, should the calculated weight include in addition to the weight of the main members, such items as the total weight of the rivets used, and in the case of gusset plates, should it include the weight of the corners of the plate clipped off to make a presentable appearance. What weight should be included for the first coat of shop paint, and what for the second, if specified? This architect pointed out that fabricators purchase their material based on catalog weights from the mills, and we should determine whether or not structural steel should be sold on catalog weights as purchased, or on scale weights. He pointed out that these questions were a bone of constant contention in almost every steel contract, and that the architectural profession would welcome a standard ruling from an association such as ours, which could be pointed to as the recognized authority saving them from a constant discussion on this subject. In his opinion, it is a matter of indifference to the architectural profession just what this ruling should be, but it is of utmost importance that he should establish something that they could refer to as basic.

"There is also another very important field in which our association can be of enormous value, in bringing about uniform practice in tank construction. While this industry is not carried on in all cases as a part of the fabricating industry, it so completely overlaps in many cases that we should be in a position to contribute very valuable assistance. As the industry now stands, unit stresses vary all the way from 12,000 to 25,000 lb. per sq. in., making it impossible for the bidder to tell whether he is in competition with unit stresses or his competitor's fabricating costs. There is also a possibility that in many cases the liquid contained has a very wide range in specific gravity, making the resultant stresses dependent upon the specific gravity used by the designer. Then again, there is the question of rivet spacing and whether or not the rivets are driven hot or cold. It is a very large subject and one which we should take up in our work."

Mr. Lane, of the Bureau of the Census, Department of Commerce, addressed the meeting, telling of the efforts of the Government to secure structural awards, and the methods employed and urged that those not reporting their awards should do so. At the luncheon, W. A. Durgin, chief of the division of simplified practice, Department of Commerce, urged the necessity of cooperation between the association and the Department of Commerce.

Officers and Directors

William Wood, Mississippi Structural Steel Co., Decatur, Ill.; C. A. Schneider, General Iron Works, Cincinnati; A. J. Dyer, Nashville Bridge Co., Nashville, Tenn.; George E. Klingelhofer, Pittsburgh Bridge & Iron Works, Pittsburgh, and C. W. Russel, Russel Wheel & Foundry Co., Detroit, were elected directors to serve for three years, Messrs. Wood and Schneider being re-elected. The board of directors later organized by re-electing John L. Kimbrough, president, and William Wood, vice-president and treasurer.

Large Expenditures Planned by Michigan Public Utilities

The Michigan Committee on Public Utility Information at Ann Arbor reports that approximately $10,000,000 will be expended by public utility corporations of Michigan for extension and expansion work now under way or planned for 1923. The rapidly mounting requirements of industries, municipalities and domestic consumers have necessitated this increase in power facilities. The Detroit Edison Co., has a program of expansion for 1923 which involves an expenditure of $5,000,000 for service extensions, new power plants, and sub-stations. This covers the preliminary work on the huge new power unit in the lower Detroit River, near Trenton, which will duplicate the Delray and Conner's Creek plants in Detroit; completion of the first section of the power plant at Marysville, the first of which was placed in service several weeks ago and which will add 66,000 electrical hp. to the Edison company's present capacity of 418,000 hp.; electrification of Harsem's and Russell's Island and the St. Clair Flats; erection of four new sub-stations and general extension of its service in the 3400 square miles of territory in southeastern Michigan now served by the company.

Will Develop Electric Power in the Ohio Valley

Early start on the development of electric power facilities in the Ohio Valley, involving an initial outlay of upwards of $10,000,000, is promised by R. P. Stevens and associates, who have just acquired control of the electric railway, power and light systems in the Mahoning and Shenango Valleys. It is the plan to build a large electric power station to supply the growing industrial requirements in the Ohio Valley and the Youngstown district.

Mr. Stevens, of New York, John T. Harrington of Youngstown, a director of the Trumbull Steel Co., Warren, and others have purchased a controlling interest in the Republic Railway & Light Co., the Pennsylvania-Ohio Electric Co. and the Pennsylvania-Ohio Power & Light Co.

Jonathan Warner, president of the Trumbull Steel Co., and W. H. Foster, president of the General Fireproofing Co., have been elected to the board of directors of the Pennsylvania-Ohio Electric Co.

Machine-Tool Dealers Discuss Problems

Business Prospects, Selling of Second-Hand Tools, Commissions, and Other Subjects Considered at Meeting in Pittsburgh

MACHINE-TOOL dealers who are members of the machine-tool section of the National Supply and Machinery Dealers' Association met at the William Penn Hotel, Pittsburgh, on Nov. 21, for their annual meeting and considered many of the problems concerning the selling of new and used tools. The section has 136 members, of whom 32 are located west of Chicago, 17 in the New England States, 22 in the district of Illinois, Missouri, Indiana and Michigan, and 65 in the district of New York, New Jersey, Pennsylvania and Ohio.

L. H. Swind, president L. H. Swind Machinery Co., Philadelphia, chairman of the section, in his opening address said:

"At our fall meeting of last year your chairman laid particular stress on the necessity of closely drawing the lines of economy in order to promote a healthful condition in our industry and to meet the rising business tide that was surely but slowly in the making. Special mention was also made that we had to look to the railroads for the initiative in the prospective resumption of business.

"We are again gathered here to-day to discuss what the near future may hold in store and what seems best to promote the welfare of our industry, as well as that of our association. An attempt to forecast the future—when considering the existing conditions—beyond a period of a few months is quite questionable. There is a pronounced manifestation of uncertainty.

"The dealer handling new machine tools exclusively has experienced many difficulties in the marketing of his lines, owing to the large quantities of rebuilt, so-called rebuilt, used, Government owned, and surplus machine tools and those available at public sales and enforced liquidations.

"Many instances have been recorded where the dealer created a demand later satisfied by attractive prices available from the aforesaid supply. His extreme effort plus the attendant expense were for naught. Confronted with this abnormal condition, coupled with the practice of some builder in offering his own products in rebuilt form, greater intensity was directed to this branch of selling, with the result that the buyer became equally as intensive in securing this character of equipment in preference to new. From present indications it looks as if the particular branch of activity will continue for some little time.

"Let us hope for a speedy liquidation at prices within reasonable bounds, as this result would greatly assist the stabilization of the industry.

Terms of Payment

"Reference was recently made to the selling of machine tools on a basis of long-time payment. It is suggested that our members vigorously oppose such movement and at the same time instruct their credit department to avoid the pitfalls of compromise that invariably follow any deviation from the customary terms of 30 days net as the prevailing margin is insufficient to countenance any other course that makes for additional expense channels. Attention is again called to the merit of the trade acceptance as it affords an opportunity of cost reduction attendant in slow payments and trade abuses. Experience has shown that it is carefully regarded by the acceptor and its stimulating effect in the receivables becomes apparent to the user.

Dealers' Problems

"Are dealers' costs too high, or is his compensation inadequate? During the war period the increasing volume and attendant low cost of doing business made his road one of prosperity and comparative ease. This is reflected in the years 1919-20—in that commercial failure—manufacturing, wholesaling and retailing—was less than any time during the preceding period of about 36 years.

"Our secretary has recently tabulated figures covering dealers' costs and the average indicates the necessity of giving this question most serious consideration. Houses dealing exclusively in machine tools are affected severely, as aside from their high costs the used market further intensifies the situation in that the necessary volume is not obtainable.

Salesmanship

"The large surplus of used and rebuilt machines demands a higher standard of salesmanship in those having to do with the selling of the improved type of machine tools. The past two years injected the price germ into quite a large number of buyers with the result that investment values have suffered materially.

"The so-called bargains available in rebuilt and used machines might prove less attractive if they would but tabulate the subsequent cost of repairs, additions, adaptability of the purchase to their shop conditions, and last but not least, the valuable service obtainable in the purchase of new machines with the many cost reducing features embodied.

"In face of these conditions, the salesman should better prepare himself by careful study of the more recent machine tool engineering development of the respective makes handled by his firm in order to counteract the bad effect of the price germ on the idustrial market."

Co-operation With Machine-Tool Builders

Thomas A. Fernley, Philadelphia, secretary of the association, reported in part as follows:

"Your organization has closely co-operated with the National Machine Builders' Association, and it is expected that a continuation of this co-operation will be helpful in many directions in the interest of a higher standard of business methods and of better distributing conditions.

"Many of our members have, during the past year, done considerable business in rebuilt, second-hand and surplus machine tools, and while many had not previously dealt in other than new tools, it has been found desirable to develop this medium of trading as a means of absorbing the accumulation of the war period and of maintaining a good volume of business.

"Inquiry by the association concerning the cost of doing business in machine tool distribution has shown a continuing high expense despite efforts made to reduce these expenses.

"The handling of other than new goods by some of the members has been in an effort to distribute the overhead expense over a larger volume of sales and thus to meet the situation.

"The subject of what is a proper commission for machine-tool dealers has been heard of from members during the year, and it is planned to have a discussion on the subject at this time.

"One indirect feature of the work of the association which has been of decided benefit, has been that of a better handling of cases where divisions of commissions have been suggested and members have told your association that their friendly relations with other dealers have led to some satisfactory adjustment which, under previous conditions, could hardly have been reached."

Ernest F. Du Brul, general manager of the National Machine Tool Builders' Association, addressed the association. His address is reported on page 1425 of this issue.

EXPORTS GENERALLY DULL

Japanese Rail Purchases Still Factor — United States Leads in Supplying Japan

NEW YORK, Nov. 28.—Export business is increasingly quiet. One exporter dealing with Chinese markets and the Far East, except Japan, states that he has not handled an order from China for the past month, the total of his present business being small shipments for stocks carried in the Philippines. At present this exporter is sending to Philippine warehouses about $125,000 worth of sheets, nails, wire, etc. Another company, however, which engages in an export and import business with China, reports fair imports of material from China into the United States and mentions a fair number of current iron and steel inquiries. A large part of the business developing, however, is evidently being placed in Germany, German sellers making a strong effort to sell into China and sometimes engaging in keen competition among themselves for particularly desirable orders. This was evidenced not long ago in the bids for electrical installations in the city of Ningpo, China, totaling about $500,000. The American bid was considerably too high, but the Allgemeine Elektricitäts Gesellschaft and the Siemens-Schuckert Co. in Germany were strong competitors for the contract and cut their quotations to a low level. This exporter points out that on a recent inquiry for about two miles of light rails, he was able to quote a price about one-third lower than the current American domestic market, having available a tonnage of re-rolled rails. Low as the price was, it was too high to obtain the business.

IMPORTATION INTO JAPAN

	September			Total								Kwan-	August	Total for First 9
	Kobe	Osaka	Yokohama	Sept.	United States	Great Britain	Germ'y	Belgium	British India	Australia	China	tung Prov.	Imports	Months
Copper	...	...	...	...	...	...	...	...	...	...	...	...	101	19,497
[illegible]	14	...	100	26	...	...	...	...	...	...	10	...	138	1,995
[illegible]	3.7	...	1,013	1,027	973	2	...	...	1,404	2,264	26	...	494	30,533
[illegible]	555	61	656	1,884	610	...	21	...	...	871	...	...	4,135	32,452
Pig iron...	14,130	1,987	1,721	17,838	1,115	957	...	...	11,552	...	1,639	2,268	8,148	122,953
Plates	8,250	538	8,527	17,315	11,262	5,589	170	289	...	...	...	...	41,977	478,255
Rail	8,125	1,080	15,256	24,467	20,580	192	3,592	97	...	...	...	...	18,585	128,789
[illegible]	[illegible]	[illegible]	} 7,240	15,458	4,356	2,559	4,805	2,511	...	...	812	9	19,662	196,022
[illegible]	[illegible]	[illegible]			...	...	...	...	...	...	...	...	...	...
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	331	...	483	...	...	...	...	...	1,221	42,100
Tin plate...	918	188	1,212	2,318	1,703	599	...	...	...	...	...	16	2,989	47,968

Japanese Purchases of Rails Still Heavy

The Japanese market, as far as merchant buying is concerned, is unimproved, but purchases of rails continue on a fairly large scale. The recent tender of the Corean lines of the South Manchuria Railway Co., for 40 miles of 100-lb. rails (6285 tons), bids on which were opened Nov. 20, was awarded to the Mitsubishi Shoji Kaisha and placed with an American interest at about $43, c.i.f. per gross ton. The Imperial Government Railways, which recently placed 5000 tons of rails in Germany, on Nov. 24 closed on another tender for 3800 tons of 75-lb. rails. In addition to this business there have been some small orders for locomotive boiler tubes placed in the United States through Japanese houses by the South Manchuria Railway Co. and other Japanese railroads.

American Material Strong in Japan's Imports

Despite reports that Japanese buyers are exhibiting a strong tendency to turn from the United States to Great Britain and the Continent because of the considerably lower prices obtainable in these markets, a current report of imports into Japan by countries, made up unofficially by a large Japanese import and export house, shows the balance of business for the first nine months of this year and for September, heavy on the side of the United States. The heaviest shipments in September, for example, were of rails, a total of 24,467 tons being imported through the ports of Kobe, Osaka and Yokohama, of which 20,580 tons were from the United States, the second largest shipper being Germany with only 3592 tons to her credit. While these figures on rail imports for the first nine months of this year show a total of 128,789 tons, it must be considered that this total does not show shipments made for the South Manchuria Railway Co., which buys c.i.f. Dairen, Manchuria, or a number of small tenders that have been placed in the United States by the Formosan Government. The figures given under "Kwantung Province," although they represent shipments from a foreign market into Japan proper, in reality represent the production of two large works, owned, operated and controlled by Japanese and Japanese capital. The 11,552 tons of pig iron shown as imported from British India is Tata iron and is interesting when compared with the total iron imports from the United States, Great Britain, China, Kwantung Province and other producing centers.

Although this table shows figures strongly favoring the United States, a Japanese exporter in New York points out that they represent only the shipments that have arrived in Japan and that judging by reports of recent purchasing in European markets, the statistics for the final quarter and the first month or two of 1923 may show a considerable difference in the tendency of Japan's trade.

Continental Iron Still Competitive

An importer of pig iron, who has been dealing almost exclusively in shipments of Scotch foundry iron reports the market for imported iron dull, because of the gradual decline of the domestic price, which has brought the American product practically to the same price level as the British product. This importer states that he recently quoted $28 per ton, duty paid, on a tonnage of high silicon iron, the phosphorus in which was 0.60 to 1 per cent.

An interest that handles imports of European pig iron almost exclusively reports business still fair, although a large part of the present sales is for shipment to Pacific Coast consumers, where there is still a good margin of price difference between the foreign and domestic product. This interest still reports sales to foundries in the New England district, but it is worthy of note that it has been offering a limited quantity of German iron lately at $25 per ton, c.i.f. Atlantic port. The iron analyzes from 2.25 to 3.25 per cent silicon, with the manganese and phosphorus at about 0.60 per cent. None of it has yet arrived but the first shipment has been promised for December delivery, shipment to be made in November.

Foreign Iron Ore Active

The foreign iron ore market is fairly active. An importer of North African iron ore reports the sale in the past two weeks of a total of 35,000 tons. The greater part of this tonnage, however, was for shipment to a Canadian interest. This seller quotes the current price at about 10½c. per unit, c.i.f. port. Sales of Caucasian manganese ore are few and the market dull. The price is unchanged at about 27c. per unit for ordinary and 29c. for unit for washed ore. An agent for the Caucasian mines has recently booked one order for 5000 tons.

LARGE FURNACE OUTPUT

More Valley Stacks in Operation Than for 28 Months—Slight Slackening in Sheets

YOUNGSTOWN, Nov. 28.—In the sheet division of the steel industry, operations in the Mahoning Valley show less strength and sustaining influences are lacking. Some interests have sizable gaps in their rolling schedules and are depending upon business booked from day to day to round out their operations.

Both the Republic Iron & Steel Co. and the Falcon Steel Co. are operating their sheet mill departments this week on a 50 per cent basis. Of the 109 units in the Mahoning Valley, 92 were scheduled Monday. Bar mill production also shows moderation, and the Republic company has one less unit active this week than last.

Blast furnace production, on the other hand, is at the highest point in the past 28 months, with 32 of 47 stacks in the Mahoning and Shenango Valleys pouring. During the past week, No. 1 blast furnace in the Ohio Works group at Youngstown of the Carnegie Steel Co. resumed. All of the six stacks in this complement are now active.

Strip, skelp, pipe and tinplate production continues with little diminution. Of the 17 tube mills in the Mahoning Valley, operated by the Youngstown Sheet & Tube Co. and the Republic company, 16 are rolling.

There are two less open hearth furnaces charged this week than last in the Mahoning Valley, the independents melting from 42, as compared with 44 the previous week. All four Bessemer converters in the district are blowing.

Properties of subsidiaries of the United States Steel Corporation, in the two Valleys are maintaining a high production rate, with exception of the Farrell, Pa., Works of the American Steel & Wire Co., which is scheduled to go down Wednesday evening for inventory. The Youngstown, New Castle and Farrell properties of the Carnegie Steel Co. are operating at normal, as are the plants of the American Sheet & Tin Plate Co. at Mercer, Shenango, Farrell and New Castle. At the Farrell plant, only two of 30 tin mills were idle during the forepart of the week.

Despite the seasonal slackening in demand for reinforcing materials and steel building construction products, district fabricators are maintaining their plants at a good rate. The Truscon Steel Co., for instance, is operating at about 90 per cent and the General Fireproofing Co. at 85 per cent.

Railroad and tank car builders are busy and in some cases are increasing their forces. More adequate labor supply has enabled the A. M. Byers Co., Pittsburgh, to enlarge the operations at its Girard plant. This week it has 76 of 88 puddle furnaces fired.

Michigan Steel Corporation Buys Site for Plant

DETROIT, Nov. 27.—George R. Fink, president Michigan Steel Corporation, First National Bank Bldg., has announced that the new company has secured an attractive site of 35 acres on the Ecorse River in the western industrial section of the city. Plans have been completed for the erection of a six mill sheet plant with an approximate production of 3000 tons monthly to start with and 400 employees.

Contracts were placed this week for the structural steel for the buildings and every effort will be made to have them completed within four months, with the idea of having the plant in operation by the middle of next summer. Other contracts have been let for cranes and electrical equipment and within the next week contracts covering the rolling mill equipment will be placed.

The officers of the company are: Frederick B. Lovejoy, Wheelock, Lovejoy & Co., New York, chairman of the board; George R. Fink, formerly with the West Penn Steel Co., Brackenridge, Pa., president and treasurer; Frank H. Jones, Worthington Pump & Machinery Co., New York, vice-president; Herbert M. Steele, formerly with the Newton Steel Co., Newton Falls, Ohio, vice-president.

VALLEY SHEET MARKET

Price Announcement Does Not Develop Large Volume of Orders

YOUNGSTOWN, Nov. 28.—Independent interests are booking sheet and tinplate tonnages for first quarter delivery, next year, on the same basis as the quotations of the leading interest, namely 2.50c for blue annealed sheets, 3.35c for black and 4.35c for galvanized, all base gages, and $4.75 for tinplate. Maintenance of the sheet prices was generally expected, but it was hoped in independent tinplate circles that the next quarter price would be marked up to at least $5. Doubt had been expressed in some quarters, though, whether the volume of business was such as to warrant such an increase.

Independents point out that the tinplate price just recently announced is to apply, according to present calculations, only to the first three months of next year. Ordinarily it is the custom in this branch of the industry to enter into contracts for six months ahead. What price will apply after the first quarter of next year is of course largely a matter of speculation.

Independent tin plate makers have considerable business on their books accepted as low as $4.60, and they have been contending that costs justified an advance. While they are less heavily obligated than the leading interest, nevertheless their position with respect to unfilled tonnage is comfortable, and new business is coming through in a satisfactory way.

In the common grades of sheets, much is to be desired, insofar as makers are concerned. Demand has tapered the past two weeks, attributed in part to price unsettlements and to the approaching inventory period. Announcement of next quarter prices failed to bring to the mills the volume of business which had been hoped for. Some makers have already reduced their production.

Non-integrated sheet and tinplate rollers are of course much interested in the sheet bar price which is to apply for next quarter. Sheet bars are selling down to $37, and makers compelled to buy such raw material contend that current finished steel prices do not warrant a sheet bar quotation above $35. It is expected in some quarters that the price for next quarter will sag to this figure, which compares with a $40 quotation earlier in the fourth quarter of this year.

Reed-Prentice Co. Concentrating Work

The Reed-Prentice Co., Worcester, Mass., is proceeding rapidly in concentrating the business of the Becker Milling Machine Co. of Hyde Park and the Whitcomb-Blaisdell Machine Tool Co., in the company's shops, known respectively as the Reed and Prentice plants, from their former owners, the F. E. Reed Co. and the Prentice Bros. Co. Such machinery of the Becker plant as was considered desirable in rounding out the equipment has been shipped to Worcester and together with some of the tools from the Whitcomb-Blaisdell shops, has been set up. The remainder of the equipment of the plants now abandoned will be sold, together with the real estate, for the benefit of the shareholders of the Becker company, the purchase by the Reed-Prentice Co. not including these.

A score or more of Becker employees have moved to Worcester to enter into the new service. They include Scott F. Taylor, superintendent, who has been made superintendent of the Reed plant; A. S. Morse, who will have charge of sales for the small tool department; L. D. Farmer, mechanical engineer; Charles Brown, production engineer, and L. S. Cook, correspondence clerk.

The Worcester business is being reorganized, so that the Reed plant will be devoted to the manufacture of small tools and the smaller machine parts, while the Prentice works will do the setting up and the manufacture of heavy parts.

The Becker line of milling machines will be simplified by the elimination of certain types, and so will the line of the Whitcomb-Blaisdell Co., in its lathes and planers. The elimination will extend through the Reed-Prentice types.

Iron and Steel Markets

HIGH MILL OPERATIONS

Working Out of Fuel and Railroad Hamperings

Price Situation on Heavy Products Not Yet Fully Developed for Early 1923

The high rate of steel works and rolling mill operations has kept up for another week and the industry is exceeding the predictions of early October in the rate at which it is working up accumulated orders.

The formal naming of previous prices on sheets and tin plates as the Steel Corporation's basis for the first half of 1923, while a disappointment to some independent producers, is taken by buyers in these and other lines to be predicated on a fair balance between supply and demand in the months just ahead, with production well above the 1922 average.

Of immediate moment is the basis on which steel companies not so well booked ahead as the Steel Corporation will take business as a backlog for 1923 operations. Some of these companies have booked sparingly of material for steel cars, on which there have been concessions, and it is yet to be seen whether enough business will develop in other lines to give them a satisfactory operation.

There is no great variation in current prices for plates, shapes and bars, but just enough to make consumers cautious until the situation is more fully developed as to first-quarter business.

Wire and tubular products show more firmness than other lines. In the former the leading producer has not been able to exceed a 60 per.cent operation. In plates, shapes and bars $1 per ton below the 2c. level and in some cases $2, is reported, but the fixing of the contract basis for the first quarter of 1923 is still in abeyance.

Poor performance by the Pennsylvania Railroad at Pittsburgh is still a factor, but generally shipments in that district are equal to production, and some mills have moved a part of their accumulated product. The subsidence of recent unfounded reports of impending wage increases accompanies an easier situation as to common labor supply.

In connection with the announcement of the $4.75 price for tin plate, plans of buyers indicate a continuance of the heavy consumption by canning companies, with indications that on the Pacific Coast there will be an increase in 1923.

While $38 has been considered the sheet bar market price, $37 at Central Western steel works has been named. Some sheet mills which buy their bars are limiting their sales to this year.

Oil storage tanks account for about one-half of the fabricated steel awards of 25,000 tons for the week and new work calls for 12,000 tons. At Toledo, Ohio, a shipyard has taken a lake boat requiring 3000 tons of plates.

Besides 9000 more freight cars bought at Chicago, new inquiries have appeared for 1250 cars.

Buyers of pig iron are showing much more interest in the market, but there still is hesitancy about placing orders, especially for delivery after Jan. 1. Marked weakness continues. In the Buffalo district, quotations are very low, especially on higher silicon irons. The aggressive attitude of Buffalo furnaces has been felt in other sections, where in competitive business prices have been marked down sharply. At Chicago the decline is from $1 to $2 and in eastern Pennsylvania $1, while in Pittsburgh prices on foundry and Bessemer grades have receded 50c. and on basic $1. In the South, with the market at $23, resale iron is going at $22.

The shrinkage in export business is more pronounced. The recent Corean order for 6300 tons came to the United States at a delivered price of $43, which is the present mill price on domestic business. The contracts for 3800 and 5000 tons for the Imperial Government Railways of Japan, taken by Germany, went at $34 to $35, c.i.f. Japan.

England is credited with getting a Standard Oil contract for 150,000 boxes of tin plate at the equivalent of $4.25 per box, though it is indicated that the United States could have had the order at $4.50.

San Juan, Porto Rico, is about to buy 20,000 tons of 30-in. cast iron water pipe. Bids will be opened Dec. 1.

A slight drop, the first in four weeks, brings THE IRON AGE composite price for finished steel to 2.439c. per lb., putting it on the plane reached at the end of September, in the rise due to the coal and railroad strikes. Early in March the figure was just under 2c.

For the ninth successive week the pig iron composite price has fallen, and is now $26.77, compared with $27.61 last week and with $32.54 at the end of September. In July, just before the recent rise, the figure stood at $23.61, while last February, at $18.02, it registered the lowest point since the fall of 1916.

Pittsburgh

Some Light on Steel Prices—Pig Iron Quotations Decline

PITTSBURGH, Nov. 28.—The steel prices situation has been only partially clarified by the announcement of the American Sheet & Tin Plate Co. as of last Thursday, continuing the present prices for the first half of 1923. Independent plate makers plainly are disappointed that an advance of at least $5 per ton was not made by the leading interest. Ultimately, however, it is believed they will fall in line with the Steel Corporation price, since failure to do so would put their customers at disadvantage with those served by the Corporation. There is a possibility that Corporation sheet prices will not long remain as minimums, since it is well established that independent producers, lacking sizable order books, may find it necessary to cut to secure rolling schedules. Indeed it is reported that a northern Ohio independent already is seeking business at 3.25c. base for black sheets. The Steel Corporation has not yet definitely committed itself as to its first quarter prices on the heavy tonnage products and the uncertainty as to prices for that period makes buyers extremely cautious and prices on current busi-

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton.	Nov. 28, 1922	Nov. 21, 1922	Oct. 31, 1922	Nov. 29, 1921
No. 1X, Philadelphia	*$29.14*	$30.14	$31.14	$22.34
No. 2 Valley furnace	*29.00*	*30.00*	30.00	20.50
No. 2, Southern, Cin'ti	27.05	27.05	29.05	22.50
No. 2 Birmingham, Ala.	23.00	23.00	25.00	18.00
No. 2 foundry, Chicago*	*29.00*	30.00	31.00	20.00
Basic, del'd, eastern Pa.	27.50	27.50	28.50	21.00
Basic, Valley furnace	*26.00*	27.50	30.00	19.00
Valley Bessemer, del. P'gh	*28.77*	33.27	*34.77*	21.96
Malleable, Chicago*	*29.00*	30.00	31.00	20.00
Malleable, Valley	*28.00*	29.00	32.00	20.00
Gray forge, Pittsburgh	*28.27*	28.77	31.27	21.46
L. S. charcoal, Chicago	36.15	36.15	36.15	31.50
Ferromanganese, furnace	100.00	100.00	100.00	60.00

Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$40.00
Bess. billets, Pittsburgh	*37.00*	38.00	40.00	29.00
O.-h. billets, Pittsburgh	*37.00*	38.00	40.00	29.00
O.-h. sheet bars, P'gh	*37.00*	38.00	39.00	30.00
Forging billets, base, P'gh	45.00	45.00	45.00	32.00
O.-h. billets, Phila.	43.17	43.17	45.17	34.74
Wire rods, Pittsburgh	45.00	45.00	45.00	40.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	2.00	2.00	2.00	1.50
Light rails at mill	2.00	2.00	2.00	1.55

Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.275	2.275	2.325	1.95
Iron bars, Chicago	2.50	2.50	2.50	1.65
Steel bars, Pittsburgh	2.00	2.00	2.00	1.50
Steel bars, Chicago	2.10	2.10	2.10	1.60
Steel bars, New York	2.34	2.34	2.34	1.80
Tank plates, Pittsburgh	*1.95*	2.00	2.00	1.50
Tank plates, Chicago	2.30	2.30	2.30	1.80
Tank plates, New York	2.34	2.34	2.34	1.88
Beams, Pittsburgh	2.00	2.00	2.00	1.50
Beams, Chicago	2.20	2.20	2.20	1.60
Beams, New York	2.34	2.34	2.34	1.88
Steel hoops, Pittsburgh	2.75	2.75	2.90	2.00

Sheets, Nails and Wire,	Nov. 28, 1922	Nov. 21, 1922	Oct. 31, 1922	Nov. 29, 1921
Per Lb. to Large Buyers	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh	3.35	3.35	3.35	3.00
Sheets, galv., No. 28, P'gh	4.35	4.35	4.50	4.00
Sheets, blue an'l'd, 9 & 10	2.50	2.50	2.60	2.25
Wire nails, Pittsburgh	2.70	2.70	2.70	2.75
Plain wire, Pittsburgh	2.45	2.45	2.45	2.50
Barbed wire, galv., P'gh	3.35	3.35	3.35	3.40
Tin plate, 100-lb. box, P'gh	$4.75	$4.75	$4.75	$4.75

Old Material, Per Gross Ton:				
Carwheels, Chicago	*$24.00*	$24.50	$25.50	$16.50
Carwheels, Philadelphia	20.00	20.00	21.00	17.00
Heavy steel scrap, P'gh	20.50	20.50	21.00	14.00
Heavy steel scrap, Phila.	16.00	16.00	17.00	11.50
Heavy steel scrap, Ch'go	17.00	17.00	18.00	12.00
No. 1 cast, Pittsburgh	*22.50*	23.00	24.00	16.50
No. 1 cast, Philadelphia	20.00	20.00	22.00	17.50
No. 1 cast, Ch'go (net ton)	*19.50*	20.50	20.50	13.00
No 1 RR wrot. Phila.	19.00	19.00	21.00	15.50
No. 1 RR wrot. Ch'go (net)	*15.25*	15.50	17.00	11.50

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	*$7.00*	$7.25	$7.50	$2.75
Foundry coke, prompt	8.00	8.00	10.00	4.00

Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	14.12½	14.12½	14.12½	13.50
Electrolytic copper, refinery	13.62½	13.62½	13.62½	13.37½
Zinc, St. Louis	*7.03½*	7.20	7.10	4.65
Zinc, New York	*7.37½*	7.55	7.45	5.15
Lead, St. Louis	**6.95**	6.90	6.50	4.35
Lead, New York	**7.30**	7.25	6.80	4.70
Tin (Straits), New York	*36.37½*	36.50	37.00	29.87½
Antimony (Asiatic), N. Y.	6.50	6.50	6.70	4.50

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Nov. 28, 1922, Finished Steel, 2.439c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel

Nov. 21, 1922,	2.446c.
Oct. 31, 1922,	2.446c.
Nov. 29, 1921,	2.135c.
10-year pre-war average,	1.689c.

Composite Price, Nov. 28, 1922, Pig Iron, $26.77 Per Gross Ton

Based on average of basic and foundry irons, the basis being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Nov. 21, 1922,	$27.61
Oct. 31, 1922,	29.52
Nov. 29, 1921,	19.56
10-year pre-war average,	15.72

ness are irregular. Although the common quotation on plates, shapes and bars is 2c., it is admitted that business has been lost at this figure. Sales of hot-rolled flats, more especially in the heavy gages, still are being made at 2.75c. base, or $3 a ton below the established quotation, and the market is not as firm as it was recently on several of the war products. Recent top prices on rivets have disappeared and concessions are appearing in spikes and track bolts. As a matter of fact, among the finished products real strength is apparent only in wire products and tubular goods. Demand for the former is so heavy that it would occasion no great surprise if an advance were made before long, the claim being made that at present levels they are out of line with other finished products.

The decline in pig iron prices still is unchecked in spite of the fact that merchant producers assert that on the basis of costs the market should be higher. We note a further decline of 50c. a ton in foundry and Bessemer iron and of $1 a ton in basic iron.

Semi-finished steel is softer in price in keeping with the weakness in pig iron, and the fact that the tendency of scrap prices is lower. The common quotation on billets, sheet bars and slabs is $38, Pittsburgh or Youngstown, but sheet bars have been offered at $37, and sales are reported to have taken place at even less than that. The price idea of most sheet makers for first quarter contracts is about $35.

Fuel prices are no more than steady. In spite of rather poor performance on the part of the Pennsylvania Railroad, steel shipments are at least equal to production and we note no appreciable decline in plant operations in this and nearby districts.

Subsidence of talk of a wage increase rather suggests that the labor situation is somewhat easier than it has been. The Carnegie Steel Co. and the Cambria Steel Co. each has put on a furnace in the past week, and these with the resumptions by the Reliance Coke & Furnace Co., Sharpsville, Pa.; and the McKinney Steel Co., Scottdale, Pa., bring the total number of active furnaces to 94 out of 139.

Pig Iron.—Still lower prices have been reached in the past week on all grades, and since the declines have been established on comparatively small sales there is a possibility that two or three good sized pending tonnages may produce even lower figures. In some directions there is some resistance to the downward tendency of prices, but evidently these interests have not succeeded in stemming the tide. We note sales of foundry iron amounting to 2000 tons to one Pittsburgh district consumer for December delivery at $27, Valley furnace, for No. 2 grade, a decline of 50c. per ton

as compared with last week's price, and on small tonnages producers lately do not seem to have been able to obtain more. We note a sale of 1000 tons of standard basic to a Valley interest at $27, but quite as much tonnage has been moved at $26.50, making the market quotable at $26.50 to $27. It is doubtful whether the latter price now could be obtained since buyers have fixed $26 as their buying price limit. Valley Bessemer iron is held at $31 by the one producer in the Valley district having any tonnage for sale, but this price is altogether untested and will probably work into a more proper alinement with basic grade when there is an inquiry of any considerable size. Bessemer has been sold at $29, Johnstown, and since the freight rate into Pittsburgh is the same from Johnstown as from the Valley, it is hard to see how Valley iron can long command such a premium.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.77 per gross ton:

Bessemer	[illegible]
Gray forge	26.50 to 27.00
[illegible]	[illegible]
[illegible]	[illegible]
Malleable	[illegible]
Low phosphorus, copper free	37.00 to 37.50

Ferroalloys.—Sales of ferromanganese in this district in the past week or ten days, including a couple of round tonnages, have amounted to close to 4000 tons, all at $100 seaboard, for 80 per cent, or $104.79 delivered, Pittsburgh. The business includes about 1000 tons of British material brought in by a domestic producer. Talk of higher prices does not impress local consumers, who believe that sellers, notably of imported material, are running out of orders and are talking advances with an idea of stimulating buying. Little activity is observed in other ferroalloys. Domestic producers are quoting 50 per cent ferrosilicon at $80 to $85 delivered, but we note no sales at these prices in this district. Spiegeleisen is dull with quoted prices unchanged, but likely to be shaded on attractive inquiries.

We quote 80 per cent ferromanganese at $100, furnace, or $104.79 delivered Pittsburgh district for either domestic or British, and 76 to 80 per cent German at $67 c.i.f. Atlantic seaboard. Average 20 per cent spiegeleisen, $38, furnace; 16 to 19 per cent, $37 or domestic; 20 per cent foreign, $37 f.o.b. Atlantic seaboard, duty paid; 50 per cent ferrosilicon, domestic, $80 to $85, delivered. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, $46.50; 11 per cent, $49.80; 12 per cent, $53.10; 13 per cent, $57.10; 14 per cent, $60.10; silvery iron, 6 per cent, $35; 7 per cent, $36; 8 per cent, $37.50; 9 per cent, $39.50; 10 per cent, $41.50; 11 per cent, $44.80; 12 per cent, $48.10. The present freight rate from Jackson and New Straitsville into the Pittsburgh district is $3.66 per gross ton.

Steel Skelp.—The quoted price still is 2c. for either grooved or sheared pipe skelp, but demand is moderate and the market is not free of the influence of a weaker tendency in plate prices. The bulk of the current movement is on contracts at less than to-day's price.

Wire Products.—Makers in this district are not able to increase production materially, because of a continued shortage of labor, notably wire drawers, and the supply situation with distributors and manufacturing consumers still is tight. Demand is brisk and the problem of the mills is in supplying it. Nails are particularly wanted, but other lines are only slightly less active. An easier price situation can come only through a lighter demand or an increase in production. Prices are given on page 1463.

Iron and Steel Pipe.—Makers of steel pipe report no let-up in the demand for standard pipe and that interest in oil country and line pipe is expanding, with a number of sales of the latter running in some cases up to 40 miles, being noted. Manufacturers say that car supplies are slightly better, due to the release of a good many open top cars, hitherto devoted to the lake coal trade, but that as yet they are not able to ship much more than current production. Distributors and consumers of standard pipe still are far short of their requirements and it is said that oil country jobbers are going along with light stocks. Makers of wrought iron pipe still have fairly heavy obligations, but can make earlier deliveries on standard pipe than those making steel pipe. There is no suggestion of any immediate change in prices. Discounts are given on page 1463.

Wire Rods.—Quotation of $50 against a few small inquiries by a local maker has not brought the orders and it is doubtful if that price can be done on ordinary soft rods. Sales at $50 are believed to refer to screw stock rods and, applying the usual extra of $5 for that grade, would work back to $45 for ordinary rods. We regard the market as firm, but not quotably changed from the recent range of $45 to $47.50 for No. 5 soft rods.

We quote No. 5 common basic or Bessemer rods to domestic consumers, $45 to $47.50; chain rods, $45 to $47.50; screw stock rods, $50 to $52.50; rivet and bolt rods and other rods of that character, $45 to $47.50; high carbon rods, $52 to $57.50, depending on carbon, per gross ton, f.o.b. Pittsburgh or Youngstown.

Billets, Sheet Bars and Slabs.—The market on these forms is not quotable above $38, Pittsburgh, or Youngstown, and there are definite offers of as low as $37. Demand is slow and nonintegrated sheet and tin plate manufacturers assert they can not pay $38 and get out profitably at the present prices of the finished materials. This, in particular, is the case with tin plate producers. It is believed that the Steel Corporation sheet bar price for first quarter will not be above $35, in view of the fact that its sheet and tin plate making subsidiary is naming current prices on first quarter sheet orders and first quarter and first half tin plate business. There are occasional sales of forging steel up to $50, but the more common figure is $45, and observance of the usual differential of $5 above soft billets would produce a price of $43.

We quote 4 x 4-in. soft Bessemer and open-hearth billets, $37 to $38; 2 x 2-in. billets, $37 to $38; Bessemer sheet bars, $37 to $38; open-hearth sheet bars, $37 to $38; slabs, $37 to $38; forging billets, ordinary carbons, $43 to $45, all f.o.b. Pittsburgh or Youngstown mills.

Sheets.—Announcement by the American Sheet & Tin Plate Co., last Thursday continuing its present bases of 3.35c. for black, 4.35c. for galvanized, 4.70c. for No. 22 gage automobile body stock, 2.50c. for blue annealed and 3.35c. for tin mill black sheets, for first half of 1923 business, was about in line with expectations, since independent prices had receded to those levels previously except for automobile body stock. Independents still are at 5c. base, for automobile body sheets, but otherwise they have gone along with the Corporation prices for first quarter of 1923 deliveries. But there is considerable doubt, since few of them have very sizable order books, that they will be able to accumulate them except by shading prices. It should be helpful to independent business that the Corporation sheet-making subsidiary has little tonnage available for delivery before the middle of next March on new orders, having bookings, which it figures will engage capacity at least over the first two months of 1923. Mill operations remain high, averaging more than 80 per cent for the entire industry, including the leading interest which has more capacity on to-day than before in several weeks. Prices are given on page 1463.

Tin Plate.—Much disappointment is noted among independent tin plate manufacturers over the action of the American Sheet & Tin Plate Co., in coming out last Thursday with a price of $4.75 per base box, Pittsburgh, for the first quarter to jobbers and for the first half to manufacturers. They had expected a price of at least $5 and while they probably will adopt the Steel Corporation price, they are slow to announce acceptance. It is believed that the Corporation took cognizance of the lower fuel and pig iron prices, forecasting lower steel prices, in deciding to continue the present quotation. It also is thought to have been influenced by a desire to establish the market at a price that would be maintained. When $4.75 per base box was announced a year ago, hardly 48 hours had elapsed before there were price concessions and before the decline was checked the price receded to $4.35 per base box.

Cold-Finished Steel Bars and Shafting.—Specifications are coming along well against contracts but brand new orders with most makers are of moderate propor-

tions. It is reported, however, that a couple of orders of considerable size are under negotiation at Detroit. Makers generally are holding firmly to 2.50c. base Pittsburgh for carloads, and some are talking advances for first quarter business on the ground that the present price is based upon hot-rolled bars averaging about 1.75c. base, and it is not believed that the first quarter price on hot-rolled bars will be below 1.90c. Ground shafting is unchanged at 2.90c. base, f.o.b. mill for carloads.

Steel Rails.—Occasional sales of light rails are reported at 2.15c., base, but the tonnages moving at that figure are rather small, because these rails rolled from new steel are available as low as 2c. and the higher figure applies usually on shipments out of stock. Light sections rolled from old rails are held at 2c., base, mill, but there is considerable waving of extras, which results in a lower price than when the extras are insisted upon. The extras on light rails are 4½c. per 100 lb. for 16 to 20-lb. sections and 9c. per 100 lb. ton on 12-lb. sections for carloads; for less than carloads, 25 tons, down to five tons, 15c. per 100 lb. extra, for five tons or less 25c. per 100 lb. extra; all dead lengths 4½c. per 100 lb. extra; cut to length, shorter than 20 ft. down to 12 ft., 9c. per 100 lb. extra, 12 ft. and under 22½c. per 100 lb. extra.

We quote 25 to 45-lb. sections, rolled from new steel, 2c. to 2.15c. base; rolled from old rails, 1.90c. to 2c. base; standard rails, $43 per gross ton mill for Bessemer and open-hearth sections.

Hot-Rolled Flats.—It is the claim of makers of strips here that 2.75c. is the base on only a small part of the current bookings for either prompt or first quarter delivery, and that this price refers more to heavy gage bands and not on the lighter material. Strips, however, are subject to competition from bands and annealed sheets in some districts and this competition has resulted in sales of strips in affected districts at 2.75c. Prices are given on page 1463.

Cold-Rolled Strips.—No important deviations from the established base of 4.50c., Pittsburgh, are observed. Business is reported to be good.

Bolts and Nuts.—Demand is seasonably light and while the railroads are specifying fairly well, the approach of inventory time is causing some buyers to reduce or suspend shipping instructions. The steel supply situation is easier with most makers, and as current quotations are being based on higher prices than the material now coming from the mills, there is some uncertainty about the maintenance of quoted prices. Discounts are given on page 1463.

Rivets.—Recent prices of $3.15 base for large structural and ship rivets, $3.25 for large boiler rivets and 65 per cent off list for small rivets have disappeared. No considerable business was done at these prices. Discounts are given on page 1463.

Iron and Steel Bars.—Efforts to line up first quarter tonnages of steel bars at 2c. base, Pittsburgh, have not met with much success so far, because buyers are unconvinced they will not do better by waiting. The present Steel Corporation price is 2c., and it is believed it would name that as the first quarter price if satisfied that it would be observed by the independents. On the other hand, there are reports that the Steel Corporation is negotiating with makers of cold-finished steel bars and other large users at 1.90c base, and independents advance that as a reason why business as 2c. is not better. On current business, which is of moderate proportions, 2c. is the going price, but orders also have been lost at that price, presumably to mills giving away part of their freight advantage. Local makers of iron bars still are holding at 2.60c. base for refined iron.

We quote steel bars rolled from billets at 2c.; reinforcing bars, rolled from billets, 2c. base; rail steel reinforcing bars, 1.90c. to 2c.; refined iron bars, 2.60c. in carloads, f.o.b. mill, Pittsburgh.

Structural Material—Shipments against old contracts are sufficient to meet the current needs of fabricating shops and new business is light. Few big structural projects are up and there is also a claim that business cannot be obtained at prices based on 2c. for plain material. Such structural awards as are being let are on those which will go ahead immediately and the shops which can promise the best delivery are getting the business. Plain material prices are given on page 1463.

Plates.—The market is exceedingly dull and competition for orders is so much sharper than in other products that 2c., Pittsburgh, is becoming merely an asking price. Mills outside Pittsburgh have sold at 1.95c., Pittsburgh and some have taken orders at a price equivalent to 1.90c., Pittsburgh. Prices are given on page 1463.

Coke and Coal.—Supply of furnace coke is running along pretty even with demand and we note no material change in prices. As one good sized tonnage of spot coke has been sold at $7 per net ton at oven, and $7.50 continues to be done, the range is $7 to $7.50 as against $7.25 to $7.50 last week. Connellsville operators are talking $7.75 to $8 for December contracts, but buyers are not interested at above $7.50. Foundry grades hold generally at $8 to $8.50, but there has been some business as low as $7.75, with $8 the prevailing figure. The coal market is dull and easy with mine run steam coal quotable from $2.50 to $3.25 net ton at mines, and mine run by-product and gas coal from $3 to $4.

Boiler Tubes.—Leading makers of steel tubes have obligations that will keep them busy over the next three months and are not promising delivery before February on new orders. On iron tubes, mill commitments also are large and early deliveries hard to obtain. Prices are very firm. Discounts are given on page 1463.

Track Fastenings.—Prices are sustained chiefly by reason of the fact that producers have fairly full order books, and are not very anxious at the minute for additional business. Current demands are moderate. Prices are given on page 1463.

Old Material.—The trend of prices in this market is downward due to the fact that other steel-making centers competing with this market for supplies are pretty well filled up, and this is about the only outlet for current offerings. One of the Corporation subsidiaries late last week bought 10,000 tons of heavy melting steel at $21.50 and there was a sale of 5000 tons to a Pittsburgh district independent at $21. Both of these buyers since have withdrawn from the market and with other melters in the district not buying, it is doubtful if $21 now could be obtained. We regard the market on heavy melting grades as still quotable at $20.50 to $21. Railroad melting steel is weaker by 50c. per ton and on turnings and the blast furnace grades dealers have had to take substantial cuts in order to make sales. The Baltimore & Ohio Railroad will receive bids until noon Dec. 4, on 21 carloads and 15,025 gross tons of scrap, also on 3000 lb. of high speed steel scrap.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

	Per Gross Ton
Heavy melting steel	$20.50 to $21.00
No. 1 cast, cupola size	22.50 to 23.00
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va.; and Franklin, Pa.	21.50 to 22.00
Compressed sheet steel	19.50 to 20.00
Bundled sheet sides and ends	17.50 to 18.00
Railroad knuckles and couplers	22.00 to 22.50
Railroad coil and leaf springs	22.00 to 22.50
Low phosphorus standard bloom and billet ends	24.00 to 25.00
Low phosphorus, plates and other grades	23.00 to 24.00
Railroad malleable	21.00 to 21.50
Iron car axles	28.00 to 29.00
Locomotive axles, steel	23.00 to 24.00
Steel car axles	22.50 to 23.00
Cast iron wheels	23.00 to 23.50
Rolled steel wheels	22.00 to 22.50
Machine shop turnings	16.00 to 16.50
Heavy steel axle turnings	17.50 to 18.00
Short shoveling turnings	17.50 to 18.00
Cast iron borings	17.50 to 18.00
Heavy breakable cast	19.00 to 19.50
Stove plate	17.00 to 17.50
Sheet bar crop ends	24.00 to 24.50
No. 1 railroad wrought	20.00 to 20.50

Chicago

Railroad Car Orders Call for 90,000 Tons of Steel—Pig Iron Prices Decline

CHICAGO, Nov. 28.—Owing to the heavy tonnage business which continues to come to local mills, the seasonal slackening in buying which generally precedes inventory taking is not being felt. Orders placed by the St. Paul, the Northern Pacific and the Pere Marquette total 9000 cars which will call for approximately 90,000 tons of plates, shapes and bars. Contracts for 40 tanks awarded by the Standard Oil Co. involve 12,000 tons of plates. Considerable additional tank business is pending and car building is expected to continue in view of the inadequacy of the present equipment on the rails. Although locally the scarcity of open top cars is no longer so acute, the shortage of box cars for grain loading is pronounced throughout the West. Building is abnormally active for this season, as indicated by current fabricating awards and inquiries and especially by an unprecedented demand for reinforcing bars. The buoyancy of the automobile industry is also a matter of comment.

Increased mill operations have resulted in heavier shipments to users, although some manufacturers of shafting, bolts, nuts and rivets are still dissatisfied with deliveries, and purchasers of semi-finished steel complain that they cannot get all the material they need.

Steel prices are unchanged, but some buyers regard the failure of quotations to be advanced for first quarter as an indication that the tide has turned and that the advantage in the market will no longer be with the seller. This view, however, does not seem to be verified by the local mill situation. Chicago producers have large commitments in rails and track supplies for delivery during the first half of 1923 and a heavy tonnage in plates, shapes and bars ordered by car builders will overlap into first quarter. There is also a large tonnage from miscellaneous customers booked for indefinite shipment which will be carried over into next year.

What has been said of steel does not apply to pig iron. Merchant furnaces have booked very little for first quarter and prices of both Northern and Southern iron are weak.

Local mill operations are unchanged, but inability to accumulate adequate coal reserves is still cause for concern. Merchant blast furnaces appear to be better fortified as to fuel than the steel works furnaces.

Ferroalloys.—Sales of 250 tons of spiegeleisen have been made at $46.05 delivered. Ferromanganese is quiet and the general quotation is $100 seaboard.

We quote 80 per cent ferromanganese, $107.56, [illegible] f.o.b. furnace; 50 per cent, [illegible] final, delivered; spiegeleisen, 18 to 22 per cent, $46.05 to $47.55 [illegible].

Pig Iron.—Prices continue to weaken, and while the level of the market is not clearly defined, local iron for prompt shipment appears to command $29, base, furnace. The few purchases which have been made for forward delivery indicate that lower prices are being made on first quarter iron. A price of $28 dollars base Chicago furnace would seem to represent the first quarter market; in fact, even this figure has been shaded in a few instances. Southern iron also is soft and recent sales have been made in this territory at $22, base, Birmingham. Some of this material, if not all, was resale iron. Recent first quarter purchases include 200 tons of Northern and 200 tons of Southern foundry bought by a Wisconsin company, 1000 tons of Southern ordered by a Belvidere, Ill., manufacturer, and 700 tons, divided between Southern and Northern, contracted for by a Joliet consumer. Among current inquiries is one from a Chicago melter for 500 tons of foundry for December shipment. Domestic copper free low phosphorus has dropped to $37, Valley furnace, but foreign material is offered at $37.50 to $38 delivered. The differential for Northern No. 1 foundry above the base price is now 50c. while $1.50 above base is charged for material running 2.75 to 3.25 per cent in silicon.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include an average switching charge of 61c. [illegible] other prices are for iron delivered at consumers' yards at which no freight is involved. Iron from furnaces other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$[illegible]
Northern coke, No. 1, sil. 2.25 to 2.75, first quarter	[illegible]
Northern coke, No. 1, sil. 2.25 to 2.75, prompt delivery	29.50
Northern coke, foundry No. 2, sil. 1.75 to 2.25, first quarter	28.00
Northern coke, foundry No. 2, sil. 1.75 to 2.25, prompt	29.00
Malleable, not over 2.25 sil., prompt	29.00
Malleable, not over 2.25 sil., first quarter	28.00
Basic, prompt	29.00
Basic, first quarter	28.00
High phosphorus, prompt	29.00
High phosphorus, first quarter	28.00
Southern, No. 2	$28.01 to 29.01
Low phos., Valley furnace, sil. 1 to 2 per cent copper free	37.00
Silvery, sil. 8 per cent	42.29

Plates.—The final placing of large freight car orders by the Chicago, Milwaukee & St. Paul has added considerable tonnage to local mill books. Oil storage tank construction is also an important source of business. Local producers will furnish 12,000 tons of plates for tanks to be built at Casper, Wyo., for the Standard Oil Co. Projections are pending on 16,000 tons of tankage which will probably be placed this week and an inquiry from the Jenkins Petroleum Process Co. for 25 55,000-barrel tanks in the Eldorado field involves 5500 tons.

The mill quotation is 2.10c. to 2.30c., Chicago. Jobbers quote 2.90c. for plates out of stock.

Cast Iron Pipe.—Chicago takes bids Nov. 29 on 1550 tons of 6-, 8- and 12-in. Mount Prospect, Ill., takes figures to-day on 400 tons of the same sizes. The market remains sluggish with prices untested. Large private buyers who were in the habit of placing orders at this season to insure early delivery for spring work are postponing action on their needs. Present bookings will carry pipe shops through the end of the year and in some cases a number of weeks beyond.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $55.20 to $56.20; 6-in. and above, $51.20 to $52.20; class A and gas pipe, $3 extra.

Rails and Track Supplies.—The Louisville, Henderson & St. Louis is inquiring for 1000 tons while another Western road is in the market for 10,000 tons of standard section rails. These are the first inquiries of importance to appear since the advance in prices. Specifications for both rails and track supplies are liberal while new orders for the latter are surprisingly numerous. Demand for light rails is not particularly active.

Standard Bessemer and open-hearth rails, $43; light rails rolled from new steel, 2.15c., f.o.b. makers' mills.

Standard railroad spikes, 2.85c. to 3c. mill; track bolts with square nuts, 3.85c. to 4c., mill; iron tie plates, 2.50c.; steel tie plates, 2.35c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.50c. base and track bolts, 4.50c. base.

Bars.—Demand for soft steel bars shows little change as the end of the year approaches. Users are buying freely for 1923 delivery and at the same time continue to buy small tonnages for prompt shipment. In fact, an Eastern mill last week booked a total of 2000 tons, largely in carload lots for December delivery, the price being 2c., base Pittsburgh. The demand for deformed bars for reinforcing work is unprecedented for this season. Local mill prices remain unchanged. Bar iron is firm at 2.50c., mill, but new business is still rather light. The East Chicago mill of the Republic Iron & Steel Co., which has been idle for several weeks, will resume operation next week. Hard steel bar mills find their backlogs diminishing notwithstanding a fair demand from bedstead makers, fence post manufacturers and reinforcing bar sellers. Prices, however, remain unchanged at 2c., mill.

Mill prices are: Mild steel bars, 2c. to 2.10c., Chicago; common bar iron, 2.50c., Chicago; rail steel, 2c., Chicago mill.

Jobbers quote 2.80c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 3.80c. for rounds and 4.30c. for [illegible] squares and hexagons.

Jobbers quote hard and medium deformed steel [illegible] base, [illegible]

Wire Products.—In some products, such as large head roofing nails, a seasonal let-up in demand is to be noted, but the tonnage involved is too small to affect the general situation. The leading producer has been unable to increase its operations above 60 per cent of capacity and still finds it impossible to satisfy customers on deliveries. With rare exceptions there are no accumulated stocks in the hands of the mills or the jobbers. The recent announcement of spring terms on woven fencing has brought out considerable business both from jobbers who are anticipating their spring needs and from Southern points where, of course, there are no seasonal limitations on fence construction. Wire rods are in excellent demand, particularly from wire specialty manufacturers. For mill prices see finished iron and steel, f.o.b. Pittsburgh, page 1463.

We quote warehouse prices f.o.b. Chicago: No. 9 and heavier black annealed wire and No. 9 and heavier bright basic wire, $3.30 per 100 lb.; common wire nails, $3.45 per 100 lb.; cement coated nails, $2.90 per keg.

Bolts and Nuts.—Specifications are light and buyers generally appear to be staying out of the market in the hope that sellers will weaken. However, the September discounts are still firmly adhered to in this section.

Jobbers quote structural rivets, 3.75c.; boiler rivets, 3.85c.; machine bolts up to ⅞ x 4 in., 50 per cent off; larger sizes, 50 off; carriage bolts up to ⅝ x 6 in., 45 off; larger sizes, 45 off; hot pressed nuts, squares and hexagons, tapped, $2.75 off; blank nuts, $2.75 off; coach or lag screws, gimlet points, square heads, 55 per cent off.

Sheets.—The action of the leading producer in taking first quarter business at unchanged prices has had a stabilizing effect on the market and buying for both prompt and forward delivery is proceeding with apparently no hesitation on the part of the buyer. The local independent is allocating its first quarter output among customers.

Mill quotations are 3.35c. for No. 28 black, 2.50c. for No. 10 blue annealed and 4.35c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of $4c. per 100 lb.
Jobbers quote f.o.b. Chicago, 4c. for blue annealed, 4.85c. for black and 5.85c. for galvanized.

Reinforcing Bars.—Both building and road construction are showing unusual buoyancy for this time of the year. In Missouri a total of 800 tons for state road work has been let and 2000 tons additional is about to be figured. In St. Louis County, Minn., a total of 1500 tons is pending. Notwithstanding the amount of work which continues to come up for figures, warehouse prices are still very weak. While sellers are attempting to hold the market to 2.25c. local warehouse, there have been numerous concessions below that price, in extreme cases as much as 20 and 25c. per 100 lb. Recent awards include:

St. Francis Convent, Dubuque, Iowa, 350 tons, to Concrete Steel Co.

M. Rich & Brothers, department store, Atlanta, Ga., 760 tons, to Concrete Steel Co.

Missouri State road work, 600 tons to Concrete Steel Co., and 200 tons to Corrugated Bar Co.

Chevrolet Motor Co., building, Norwood, Ohio, 600 tons to Kalman Steel Co.

Public Service Co. building, Dayton, Ohio, 300 tons to Kalman Steel Co.

Kansas State road work, 100 tons to Corrugated Bar Co.

Chicago Trust Co. building, Chicago, 100 tons to Kalman Steel Co.

Sanitarium, Oak Terrace, Minn., 100 tons to Corrugated Bar Co.

High school, Laporte, Ind., 150 tons to Concrete Steel Co.

Danville, Ill., Electric Light & Power Co., power plant, 100 tons to Concrete Steel Co.

Two grammar schools, St. Louis, Mo., 155 tons to Concrete Steel Co.

Pending work includes:

State of Missouri, 200 miles of road work 2000 tons, bids on general contract to be taken Dec. 2.

St. Louis County, Minn., 50 miles of road work, 1500 tons, general contract to Butler Bros., St. Paul.

Ford Motor Co. assembly plant, South Chicago, 175 tons.

Jefferson School, Minneapolis, 530 tons, Kalman Steel Co., low bidder.

Southeast High School, Minneapolis, 625 tons, Kalman Steel Co. low bidder.

Third unit, Calumet power station, Commonwealth Edison Co., Chicago, 700 tons, George A. Fuller Co., general contractor.

Structural Material.—Building activity continues unusually active for this season. Figures are asked on a power station at Joliet, Ill., for the Public Service Co. of northern Illinois, involving 2300 tons. The Mississippi Valley Structural Steel Co. has the contract for 1685 tons for a power station at Grand Tower, Ill., to be built for the Middle West Power Co. An inquiry from an oil company for buildings in Louisiana involves 6000 tons of light structural shapes. Mills are well booked ahead and plain material prices are unchanged.

The mill quotation on plain material is 2.10c. to 2.20c., Chicago. Jobbers quote 2.90c. for plain material out of warehouses.

Old Material.—An unusually large quantity of railroad material has been offered on the market, further strengthening the position of consumers who have been withholding their purchases in anticipation of still lower prices. The Illinois Central takes bids to-day on 17,000 tons. This material has not all been prepared, but represents what will be shipped as accumulated at the road's Burnside shops, Chicago, in December and January. Other lists include the Burlington, 4500 tons; the Pennsylvania, Southwestern Region, 5000 tons; the Pennsylvania, Northwestern Region, 2500 tons and the Monon, 500 tons. In the East the Pennsylvania system is offering 31,000 tons. Consumptive demand is at a low ebb and current activity is confined almost wholly to purchases by dealers to cover short sales. Prices have again receded on a number of grades, but the full effects of the large railroad offerings have not yet been felt.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

	Per Gross Ton	
Iron rails	$22.50 to	$23.00
Cast iron car wheels	24.00 to	24.50
Relaying rails, 56 and 60 lb.	26.00 to	27.00
Relaying rails, 65 lb. and heavier	32.00 to	35.00
Rolled or forged steel car wheels	22.00 to	22.50
Rails for rolling	18.00 to	18.50
Steel rails, less than 3 ft.	18.50 to	19.00
Heavy melting steel	17.00 to	17.50
Frogs, switches and guards cut apart	17.00 to	17.50
Shoveling steel	16.50 to	17.00
Drop forge flashings	12.00 to	12.50
Hydraulic compressed sheet	14.00 to	14.50
Axle turnings	15.00 to	15.50
Per Net Ton		
Iron angles and splice bars	21.00 to	21.50
Steel angle bars	16.50 to	17.00
Iron arch bars and transoms	21.00 to	21.50
Iron car axles	24.50 to	25.00
Steel car axles	17.75 to	18.25
No. 1 busheling	14.00 to	14.50
No. 2 busheling	9.50 to	10.00
Cut forge	15.00 to	15.50
Pipe and flues	11.00 to	11.50
No. 1 railroad wrought	15.25 to	15.75
No. 2 railroad wrought	15.00 to	15.50
Steel knuckles and couplers	19.50 to	20.00
Coil springs	21.00 to	21.50
No. 1 machinery cast	19.50 to	20.00
No. 1 railroad cast	18.50 to	19.00
Low phos. punchings	17.00 to	17.50
Locomotive tires, smooth	16.00 to	16.50
Machine shop turnings	9.50 to	10.00
Cast borings	13.00 to	13.50
Stove plates	16.00 to	16.50
Grate bars	16.00 to	16.50
Brake shoes	16.00 to	16.50
Railroad malleable	20.00 to	20.50
Agricultural malleable	20.00 to	20.50

J. Verner Critchley has been made managing director of the Coppus Engineering Corporation, Worcester, Mass., recently organized to take over the business of the Coppus Engineering & Equipment Co. and the New England Brass & Foundry Co. Mr. Critchley is the managing head of Walden-Worcester, Inc., manufacturer of wrenches, and was the founder of the Critchley Machine Screw Co. He will devote a part of his time to reorganizing the Coppus business, which is the manufacture of blowers, pumps and castings. Frans H. C. Coppus is the president of the new corporation, Harry R. McIntosh treasurer, and Linwood H. Erskine secretary. The directors are: Mr. Critchley, Mr. Coppus, Mr. Erskine, and Jerome R. George, vice-president of the Morgan Construction Co.; Frank A. Drury, William D. Luey and George A. Gaskill. The company has an authorized capital stock of $500,000 preferred and 10,000 common shares of no par value. All of the common and $80,000 of the preferred stock has been issued.

New York

Pig Iron Buyers More Interested, But Weakness Continues

NEW YORK, Nov. 28.—Evidence of increasing interest of melters of pig iron is more positive than it was last week, but accompanying signs which are encouraging to the sellers are developments of extreme weakness, particularly in the Buffalo market, where usual differentials are being disregarded and high silicon irons are being sold for very little more than No. 2 plain. The lowest quotation on iron analyzing 1.75 to 2.25 silicon seems to be $26, but No. 2X has sold for $26 and No. 1X at $27 or possibly less. In eastern Pennsylvania, the market has also slipped, but not so decidedly as in Buffalo, the eastern Pennsylvania base being $27. The leading Virginia interest is quoting on a basis of $28 for No. 2 plain, but sales are not large, and buyers claim to be able to shade this price. Foreign irons are somewhat lower and $27, duty paid, can now be done on Continental grades, while Scotch can be had at $28, duty paid. Very little foreign iron is being sold. One agency last week sold 5000 tons made up mostly of small tonnages, the largest being 500 tons. This was almost entirely domestic iron. The principal inquiries pending are one for 2000 to 3000 tons for first quarter from a New Jersey melter and 500 tons for the same delivery from another melter, both being for foundry iron, and 1000 tons of malleable for this month's delivery. Although $23, Birmingham, is the usual quotation on Southern iron, a sale of several hundred tons was made on the basis of $25.

We quote delivered at the New York district as follows, having added to furnace prices $2.27 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$33.27
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	32.27
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	29.27
Buffalo, sil. 1.75 to 2.25	30.91
No. 2X Virginia, sil. 2.25 to 2.75	34.44
No. 2 Virginia, sil. 1.75 to 2.25	33.44

Ferroalloys.—Buying of ferromanganese in this market is confined to small lots at regular quotations, with some of the business taken by domestic producers. Sales of spiegeleisen are light at prevailing quotations. No business is reported in manganese ore. The 50 per cent ferrosilicon market is moderately active at unchanged quotations and negotiations on contracts for 1923 are progressing. Quotations are as follows:

Ferromanganese, domestic, furnace, nominal per ton	$100.00
Ferromanganese, British, 80 per cent, f.o.b. Atlantic port	$100.00
Spiegeleisen, 17 to 19 per cent, furnace	$36.00
Spiegeleisen, 20 per cent, furnace or duty paid	$37.00 to $38.00
Ferrosilicon, 50 per cent, delivered, per gross ton, carloads	$80.00 to $85.00
Ferrotungsten, per lb. of contained metal,	90c. to 95c.
Ferrochromium, 4 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr., delivered	13c. to 14c.
Ferrovanadium, per lb. of contained vanadium	$3.50 to $4.00
Ferrocarbontitanium, 15 to 18 per cent, in carloads, per net ton	$200.00
Ores	
Manganese ore, foreign, per unit, c.i.f.	29c. to 30c.
Tungsten ore, per unit, in 60 per cent concentrates, nominal	$7.50 to $8.50
Chrome ore, basis 48 per cent Cr_2O_3, crude, per ton, c.i.f. Atlantic seaboard	$18.00 to $25.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	55c. to 60c.

Cast Iron Pipe.—Buyers are beginning to feel out the market on prices for shipment next year. The car shortage is still an obstacle to the satisfactory shipment of orders. Bids will be opened Dec. 1, on the 20,000 tons of cast iron pipe, the majority of which is 30-in., for the City of San Juan, Porto Rico. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger $54.50; 4-in. and 5-in., $59; 3-in., $64.80, with $4 additional for Class A and gas pipe. The soil pipe market continues active and prices unchanged. We quote discounts of both Southern and Northern makers, delivered New York, as follows: 2- to 6-in. standard 33 to 35 per cent off list; heavy, 43 to 45 per cent off list.

Warehouse Business.—Business shows a slight slackening, generally attributed to the approaching end of the year. On the whole, however, November has been a better month with most warehouses than October, although not as large a month as September. Good business is particularly reported by those warehouses which carry structural material in stock. Both bars and shapes are strong, but plates are rather weak. Sheets are unchanged, a fair number of transactions being reported at prices which range from 4.50c. and 5.50c. per lb. base on black and galvanized, respectively, up to as high as 4.90c. and 5.90c. per lb. base, the latter the established quotation of many of the warehouses in this district. Business among brass and copper warehouses is fair and prices, except on copper wire, are unchanged. We quote prices on page 1482.

High Speed Steel.—The market is unchanged and producers are still quoting 75c. to 80c. per lb. on 18 per cent tungsten high speed steel, with special brands of some companies ranging up to 90c. per lb.

Finished Iron and Steel.—Buying of finished steel products continues on a moderate scale, the demand for bars being fairly good and a number of new projects requiring structural steel have given that product a fair degree of activity. In platees there is very little being done and plate prices are weak, but no lower than in recent weeks, when it has been possible to shade 2c., Pittsburgh, by $1 to $2 a ton on desirable orders. Jobbers' stocks are low in some lines and they are pressing for deliveries, particularly in wire products and butt weld pipe. In the main all buyers are pursuing a careful policy, not desiring to carry any more stock than is necessary into the approaching inventory period. The Standard Oil Co. has placed 150,000 boxes of tin plate in England at a price said to correspond to $4.25 per base box.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, structural shapes and steel plates, 2.34c.; bar iron, 2.34c.

Coke.—Recent quotations are being maintained and Connellsville grades are quoted $8 to $8.50 for foundry and $6.50 to $6.75, furnace. By-product is still quoted at $14.84 to $14.91, delivered Newark and Jersey City points.

Old Material.—Weakness continues. In addition to the mills that have been active in purchasing heavy melting steel, either No. 1 or of railroad quality, the Alan Wood Iron & Steel Co. has entered the market in the past week and $16 per ton Philadelphia is being paid for heavy melting steel on this order. The Bethlehem Steel Co., is still accepting railroad steel and is stated to be extremely rigid on inspection. Dealers are offering $16 Bethlehem. Buying continues for shipment to the Jones & Laughlin Steel Co. and also for mills at Donora and Monessen. No. 1 heavy melting steel is scarcely quotable at better than $12.50 to $13.50 per ton and a fair range for railroad quality is $14.25 to $14.75. Specification pipe is weaker, a Lebanon buyer having reduced its price from $14.50 to $14 per ton.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$12.50 to $13.50
Steel rails, short lengths, or equivalent	14.25 to 14.75
Rails for rolling	16.00 to 16.50
Relaying rails, nominal	21.00 to 22.00
Steel car axles	No market
Iron car axles	25.00 to 26.00
No. 1 railroad wrought	15.50 to 16.00
Wrought iron track	14.25 to 14.75
Forge fire	11.00 to 11.50
No. 1 yard wrought, long	13.50 to 14.00
Cast borings (clean)	12.50 to 13.00
Machine-shop turnings	11.00 to 11.50
Mixed borings and turnings	11.00 to 11.50
Iron and steel pipe (1 in. diam., not under 2 ft. long)	10.00 to 10.50
Stove plate	13.00 to 13.50
Locomotive grate bars	14.00 to 14.50
Malleable cast (railroad)	13.50 to 14.00
Cast-iron car wheels	16.50 to 17.50

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	19.00 to 20.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	17.00 to 17.50
No. 1 heavy cast, not cupola size	15.00 to 15.50
No. 2 cast (radiators, cast boilers, etc.)	13.50 to 14.00

Boston

Fresh Weakness Develops in Northern Iron—German Iron Sold

BOSTON, Nov. 28.—The continued weakness of Northern iron is the outstanding feature of the market. During the early part of the past week, Buffalo iron, silicon 2.25 to 2.75 and silicon 2.75 to 3.25, sold in 100 ton lots and larger at $27, furnace, or $31.91 delivered. Subsequently round tonnages sold at $26.50 and $26 for silicon 2.25 to 2.75, and at the close of the week was offered at less than $26, furnace, the extreme slump during a period of seven days approximating $2 a ton. Buyers consequently show little interest in eastern Pennsylvania, Virginia or Alabama irons, prices for which, in view of developments, are purely nominal. To compete with New York State iron, eastern Pennsylvania will have to sell at around $26.25, furnace, Virginia around $24, and Alabama around $20. German iron has become a factor in this market, two 1000-ton lots of silicon 2.50 plus and a smaller tonnage being reported as sold at $27, f.o.b. dock here, duty paid, which brings the delivered price up to around $29 to $29.50. Continental iron, low phosphorus, is offered at less than $27 on dock, duty paid, but better analysis iron, as well as Scotch and English, remain as heretofore. A small tonnage of Scotch sold at $31.66 delivered, duty paid, that price representing a loss of more than $1 a ton to the shipper. Local importers are experiencing difficulty in securing cars to make shipments. The aggregate tonnage of iron sold in the New England territory the past week amounted to but a few thousand tons.

We quote delivered prices on the basis of the latest reported sales, now infrequent, and as follows, having added to furnace prices $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia and $9.60 from Alabama:

Eastern Penn., sil. 2.25 to 2.75	$32.15 to	$34.65
Eastern Penn., sil. 1.75 to 2.25	31.65 to	33.65
Buffalo, sil. 2.25 to 2.75	29.91 to	30.91
Buffalo, sil. 1.75 to 2.25	29.91 to	30.91
Virginia, sil. 2.25 to 2.75		38.92
Virginia, sil. 1.75 to 2.25		37.92
Alabama, sil. 2.25 to 2.75		35.10
Alabama, sil. 1.75 to 2.25		34.60

Iron Imports.—Receipts of foreign iron for week ending Nov. 25 amounted to 3832 tons, contrasted with 5000 tons for the previous week. Of the 3832 tons, 1322 were Belgian and 2510 Scotch.

Coke.—The coke situation remains unchanged. Both New England producers are quoting on a basis of $16 delivered within a $3.10 freight rate zone for contract fuel, or $1.95 to $2.45 above prices at which 72-hour Connellsville foundry coke is offered. A readjustment of local coke prices is intimated on or about Dec. 1. New England producers are doing fairly well in the matter of deliveries, but the outlook is less encouraging due to further restrictions having been put on the largest producer in the matter of car supply. Foundries, fearing a shortage of cars during the next two months, are increasing specifications, which is a factor in slowing up deliveries in general. A steamer calling at this port with pig iron last week had several thousand tons of English coke consigned to Los Angeles interests. After discharging here, the steamer will discharge at another Atlantic port and then proceed to California.

Warehouse Business.—Nothing of special interest transpired during the past week. The movement of iron and steel out of stock holds up remarkably well for this time of the year, and the trade will enter the final month of 1922 in a comfortable financial and stocks position. Individual orders booked by warehouses involve small tonnages. The strength of the market is found in the large number of orders booked. The market for bolts and nuts continues firm, with an advance in prices pending. Stocks of heavy chain are broken and delays in transportation from the manufacturers are holding up business.

Jobbers quote: Soft steel bars, $3.065 per 100 lb. base; flats, $3.85; concrete bars, 3.16½c.; structural steel, $3.065 to $3.50; tire steel, $4.50 to $4.85; open-hearth spring steel, $5 to $6.50; crucible spring steel, $12; steel bands, $4.25; hoop steel, $4.75; cold rolled steel, $4 to $4.50; refined iron, $3.065; best refined iron, $4.50; Wayne iron, $5.50; Norway iron, $6.60 to $7.10; plates, 3.16½c. to $3.35; No. 10 blue annealed sheets, $4.15 per 100 lb. base; No. 28 black sheets, $5.40; No. 28 galvanized sheets, $6.40.

Old Material.—A further shrinkage in the volume of old material business in this territory is noted. With a majority of the dealers, business has been practically at a standsill the past week, and in the absence of actual transactions prices had no opportunity to change. The undertone of the market in general appears steadier than a week ago, however. Railroad embargoes are holding up shipments out of New England and some business previously booked for delivery on or before Dec. 1 will be lost. The Millers Falls branch, Connecticut Valley Street Railway, 10 miles in length, has been sold to a Greenfield, Mass., junk dealer to be dismantled.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$22.00 to $22.50
No. 2 machinery cast	20.00 to 20.50
Stove plate	17.00 to 17.50
Railroad malleable	20.50 to 21.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$13.50 to $14.50
No. 1 railroad wrought	16.00 to 16.50
No. 1 yard wrought	14.00 to 14.50
Wrought pipe (1 in. diam., over 2 ft. long)	11.00 to 11.50
Machine shop turnings	11.00 to 11.50
Cast iron borings, rolling mill	12.50 to 13.00
Cast iron borings, chemical	16.00 to 17.00
Blast furnace borings and turnings	11.00 to 11.50
Forged scrap and bundled skeleton	9.50 to 10.00
Shafting	19.00 to 19.50
Street car axles	23.00 to 24.00
Street car wheels	17.50 to 18.00
Rails for rolling	15.50 to 16.00

Cincinnati

Sale of 50,000 Tons of Southern Iron Reported—Northern Market Weaker

CINCINNATI, Nov. 28.—Indications point to a beginning of the long delayed buying movement, as during the week several sales of round tonnage lots were reported. A cast iron pipe maker is reported to have placed orders for approximately 50,000 tons of Southern iron for first half shipment at a price not made public, and confirmation of the purchase has been received from at least one furnace sharing in the business. The Southern market is showing a stronger front, and $23, Birmingham, appears to be the absolute minimum on such business as is being placed. A Cincinnati melter bought 1600 tons for first quarter and a radiator company bought 1000 tons at this figure for its Southern plant. A Kentucky sanitary manufacturer placed 2000 tons at the same price. Several other smaller sales of Southern iron are reported. In the North, the market shows further weakness, and while $27 is heard, $28, furnace, is about the lowest price having any basis in sales. As high as $29 was done early in the week, but tonnages are lacking to afford a test of the market. We note a sale of 2000 tons to a radiator company, at an unnamed price, and 400 tons of malleable at $28.50, southern Ohio. A Louisville melter bought 1000 tons of Northern iron for prompt shipment at $28, Chicago, and a Mid-Western melter 500 tons of low phosphorus. Inquiries include 3000 to 4000 tons of foundry for first quarter, and 1000 tons of foundry and malleable for the same shipment. A pump manufacturer wants 300 tons and a central Ohio melter a similar amount. A local melter is in the market for 100 tons of Bessemer. The inquiry reported last week for 18,000 tons has not been closed, and a Michigan melter who inquired for 1000 tons bought 100 for prompt shipment.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$27.05
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	27.55
Ohio silvery (nominal), 8 per cent	39.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	29.27
Basic Northern	29.27
Malleable	30.27

Finished Material.—Some surprise was expressed among consumers of sheets that the American Sheet & Tin Plate Co. should continue, for first quarter, prices now in effect on sheets and tin plate. An advance of at least $3 a ton on sheets and $5 a ton on tin plate was looked for. It is reported that the leading interest will have little tonnage of sheets available

for first quarter, but that orders will be accepted for January shipment on tin plate. Independent companies are quoting the Steel Corporation prices, but are not making them for full quarter, orders being accepted only for January shipment. The market generally is rather quiet, although a few fair-sized orders for December shipment were placed last week. On bars, shapes and plates, the demand shows every indication of improvement, the number of orders placed last week showing a fair increase over the previous week. Two cents is the going price on lots offering, although on attractive tonnages 1.95c. has been quoted on bars and plates. Small angles in fair demand, but on the heavier structural shapes little interest is being shown. Some fair nail inquiries are before the trade, but mills appear to be more concerned with shipping on old contracts than adding to their troubles by taking on new business. Prices of wire products are holding firm. Light rails are in fair demand from mining districts, and prices are steady. Pipe orders are good but mills generally are three to four months behind on deliveries. There is little activity in reinforcing bars, the only new projects to come up being inquiries from a construction company for 1,000 tons for stock purposes and an extension to the United Brotherhood office building in Dayton, Ohio, which will require about 500 tons. This structure will also take about 150 tons of steel shapes for a 7-story tower to be erected on top of the building. Bids on this project will close Nov. 14. The bars required for the Norwood plant of the Chevrolet Motor Co., about 400 tons, will be supplied by Paul J. Kalman Co., Chicago. The structural steel, 450 tons, will be fabricated by the Jones & Laughlin Steel Co. Two hundred and fifty tons of bars for an academy for the Sisters of Mercy at Cincinnati, will be supplied by the Bourne-Fuller Co. The steel for the Masonic Temple at Muncie, Ind., 900 tons, is reported awarded to the Indiana Bridge Co. The Big Four Railroad will take bids Dec. 4 on its first quarter requirements of frogs and switches.

Warehouse Business.—Local jobbers report an exceptional demand for reinforcing bars and light structural shapes, from contractors who are rushing building projects before the cold weather sets in. There is also a good demand for wire products such as nails and plain wire, but fence is moving slowly. Prices are holding up strongly.

Cincinnati jobbers quote: Iron and steel bars, 2.95c. base; reinforcing bars, 2.95c. base; hoops 4.05c. base; bands, 3.85c. base; shapes and plates, 3.05c. base; cold-rolled rounds, 3.75c. base; cold-rolled flats, squares and hexagons, 4.25c. base; No. 10 blue annealed sheets, 4c.; No. 28 black sheets, 4.70c.; No. 28 galvanized sheets, 5.75c.; No. 9 annealed wire, $3.10 per 100 lb.; common wire nails, $3.20 per keg, base.

Tool Steel.—Some fair orders for high speed and carbon steels were placed last week at prices ranging from 75c. to 95c. per lb. for 18 per cent tungsten high speed steel.

Coke.—Fair activity is reported in the coke market, with prices unchanged from last week. Car shortage is reported from West Virginia producing centers. We note one sale of 1000 tons for December shipment, and an inquiry for 1000 tons for January. Foundry coke is more active than furnace, and there is also a good inquiry for domestic.

Old Material.—The Southern scrap market is showing fair activity, but in the Cincinnati district not much interest is being shown, outside of small tonnages of cast for immediate shipment. Prices are soft.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

Cast borings	11.50 to 12.00
Steel turnings	[illegible]
Railroad cast	17.00 to 18.00
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
Locomotive tires (smooth inside)	14.00 to 15.00
[illegible]	[illegible]

Birmingham

Indications of Heavy Buying of Pig Iron—Very Large Production

BIRMINGHAM, ALA., Nov. 27.—There are strong indications that there will be early heavy trading in pig iron. Several large consumers were sounding the market, these including pipe makers who had been leaders in the price deadlock. Several lots of 200 to 500 tons were sold in strictly Southern territory on a base of $24, but the several lots of 1000 tons booked in the Middle West were on a base of $23 and that was the price asked by Birmingham makers in the East. One maker was tentatively offered 6000 tons on a base of $23 with some provisos attached and the deal was under consideration at the close of the week. Numbers of small lots sold at $24 and a few at $25, but it was no longer contended that the market was above $23 for real business. The Southern melt is at a high rate and makers have no hesitancy in maintaining the present producing rate, which is highest of the year. The Tennessee company, in fact, is at highest iron-producing point in its history with seven stacks on basic and two on foundry, the active stacks including the largest and rebuilt ones. No. 1 furnace at Ensley resumed this week after a month off for repairs. The car service has so improved as to insure rapid outgo of yard stocks and improvement in the statistical position. Indications point to the shortest holidays on record in numbers of iron-consuming plants, especially those making stoves, furnaces and radiators, which are at 100 per cent and then behind in deliveries.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon 1.75 to 2.25	$23.00
Basic	23.00
Charcoal, warm blast	32.00

Cast Iron Pipe.—Both pipe markets are quiet, but the pressure pipe makers have more unfilled tonnage than the soil pipe makers. The latter feel assured of a big business early in the year. The pressure pipe base is $43 and that of soil pipe is $50 to $55.

Finishing Mills.—Southern finishing mills are without exception close to 100 per cent. The Tennessee company is pressed for production of iron sufficient to satisfy its ingot mill and the ingot mill is pressed to satisfy the finishing mills. There is not a lagging plant in the list and most are on double turn with the rail mill regularly producing 10,000 tons a week. The Conners Steel Co. is operating both hoop and band mills. The Gulf States Steel Co. and the American Steel & Wire Co. have unfilled tonnage carrying them well into the first quarter of the year. The best December on record is reported by wire mill salesmen.

Coal and Coke.—Coal production is averaging 345,000 tons a week, which is above normal for this time of the year, but the lion's share of the production is by the furnace companies. The coke production is at a high point, but all is cared for at $7.50 to $8.50 a ton. The Alabama By-Products Co. will fire its 25 new Koppers ovens this week and start work on a 4½ mile gas main to carry its gas to a number of large factories in East Birmingham. The Stockham Pipe & Fittings Co. will be among the first to tie on.

Old Material.—The scrap market is uneventful, the large consumers holding off until inventory period. Prices are fairly well maintained for a moderate run of business in cast materials.

We quote per gross ton f.o.b. Birmingham, district yards as follows:

Steel rails	$16.00 to $17.00
No. 1 steel	14.00 to 15.00
No. 1 cast	18.00 to 20.00
Car wheels	18.00 to 20.00
Tramcar wheels	17.00 to 19.00
Stove plate	16.00 to 17.00
Cast-iron borings	9.00 to 10.00
Machine shop turnings	9.00 to 10.00

The Providence Engineering Society will establish itself formally on Dec. 1 at new quarters at 44 Washington Street, Providence, where there are a lecture room accommodating 250, a secretary's room, a library and a lounge. James A. Hall, of Brown University, is president.

Cleveland

Buying of Pig Iron for First Quarter Is Light — Ore Shipments Nearly Ended

CLEVELAND, Nov. 28.—About a half dozen of cargoes of ore will be shipped from the upper lake ports early this week, and one cargo is scheduled for shipment from Escanaba, Friday. It is expected that this will be the only cargo shipped during December. Some of the upper lake docks are through for the season, and reports from these docks indicate that the November shipments will be about 3,300,000 tons, making the total movement for the season about 42,500,000 tons.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $5.95; Old range non-Bessemer, 51½ per cent iron, $5.20; Mesabi Bessemer, 55 per cent iron, $5.70; Mesabi non-Bessemer, 51½ per cent iron, $5.05.

Pig Iron.—Buying of foundry and malleable iron for the first quarter of next year started in a very limited way during the week. One lake furnace booked a number of orders mostly in foundry iron for that delivery aggregating about 5000 tons at $28. Another lake furnace sold something over 2000 tons for the first quarter subject to prices prevailing at time of shipment. Other first quarter inquiries pending aggregate 3000 tons. The demand for iron for early shipment is very light, although a few sales are reported in lots up to 200 tons. Shipping orders on contracts have fallen off and with limited sales some producers have commenced to pile iron. There is not much evidence of further weakening of prices during the week, although the inquiries that came out were not of sufficient size to test prices. The common lake furnace quotation on foundry iron is now $28, although one lake furnace has made small lot sales on a $27.50 basis. In the Valley district, $27.50 appears to be the more general quotation, although Valley foundry iron can probably be bought at $27. For Cleveland delivery one local producer has reduced its price 50c. a ton to $29 at furnace and another is now quoting on a $27.50 Valley basis, which means about a similar reduction. Outside of this territory, a few round lot sales are reported on inquiries that were noted a week ago. The American Radiator Co. has purchased 3000 tons of foundry iron, 1000 tons each for its Detroit, Springfield, Ohio, and Titusville, Pa., plants, and the American Car & Foundry Co. is understood to have purchased 3000 tons for its Detroit plant. Southern iron is now being offered at $23 for the first quarter as well as for early shipment. Some small lot orders are being booked for early delivery, but consumers are not buying for next year. The basic market is inactive, the only inquiry being from a Pittsburgh consumer for 750 tons.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron includes a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and a $6 rate from Birmingham.

Basic, Valley furnace	$27.50
Northern No. 2 fdy., sil. 1.75 to 2.25	$28.75 to 29.50
Southern fdy., sil. 1.75 to 2.25	29.00 to 30.00
Malleable	28.75 to 29.50
Ohio silvery, nominal, sil. 8 per cent	40.52
Standard low phos., Valley furnace	37.00

Reinforcing Bars.—A good volume of inquiry for reinforcing bars in small lots continues to come out. The Concrete Steel Co. has taken 150 tons for a building for the American Can Co., Indianapolis. Hard steel reinforcing bars are unchanged at 2c.

Tool Steel.—The demand is slow, with virtually no change in the price situation. High speed tool steel running 18 per cent in tungsten is generally quoted at 80c. to 90c. per lb. for small lots, although 90c. is asked for certain brands, while for round lots 60c. or lower will be quoted.

Bolts, Nuts and Rivets.—Some bolt and nut manufacturers are quoting present prices for the first quarter delivery. Inquiries have appeared for that delivery, but no sales are reported. With the present trend in the steel market, manufacturers feel that the cost of raw material during the first quarter will be at least as low as at present. New business is light. Demand for rivets is also light, but makers are getting good specifications on contracts. Rivet prices do not appear as firm as they have been. While the leading local producer is holding to 3.15c. for structural and 3.25c. for boiler rivets, these prices are being shaded $2 to $3 a ton.

Semi-Finished Steel.—No sales were made on the local market during the week. Prices on sheet bars, billets and slabs remain nominally at $38, although there are reports of $37.50 quotations outside of this territory.

Finished Material.—Some of the automobile companies are in the market for round tonnages of steel for delivery next year and mills have closed some contracts with other consumers for the first quarter. There is also some demand from the automobile industry for forging steel and spring steel for early shipment. Current business in steel bars, plates and structural material is only moderate and is mostly in small lot orders. Wire and pipe continue active. The market is fairly firm at 2c. for steel bars, plates and structural material, although this price is being shaded in some cases. However, the concession is not usually over $1 a ton. The Toledo Shipbuilding Co. has taken a lake boat requiring 3000 tons of plate which have not yet been placed. An order for oil refinery work requiring 600 tons has been taken by the Henry Vogt Machine Co., Louisville, Ky. Oil tank work requiring considerable plate tonnage is still pending. Inquiries for steel for building work has fallen off. Transportation conditions show no improvement, but with the release of cars that have been used for hauling coal to lake ports, considerable relief from the car shortage is expected shortly. Now that the American Sheet & Tin Plate Co. has reaffirmed its present prices for the first quarter, higher prices than 3.35c. for black, and 4.35c. for galvanized sheets have virtually disappeared, but most independent mills are still adhering to a minimum quotation of 2.60c. on blue annealed sheets or $2 above the Steel Corporation price. This firmness is evidently due to a heavy demand for this grade. Some independent mills are not selling sheets at present prices for delivery beyond January, believing that the leading producer will be so far behind on deliveries that they may be able to mark up their prices early in the year. Independent mills are adhering to the 5c. price for automobile body sheets and are making sales at that price for delivery into the first quarter. It seems doubtful whether they will meet the Steel Corporation's 4.70c. price on these sheets.

Jobbers quote steel bars, 2.91c.; plates and structural shapes, 3.01c.; No. 9 galvanized wire, 3.30c.; No. 9 annealed wire, 2.80c.; No. 28 black sheets, 4.15c. to 4.40c.; No. 28 galvanized sheets, 5c. to 5.40c.; No. 10 blue annealed sheets, 3.70c. to 3.76c.; hoops and bands, 3.71c.; cold-rolled rounds, 3.75c.; flats, squares and hexagons, 4.25c.

Old Material.—Valley district mills have been doing a limited amount of buying in heavy melting steel turnings and compressed steel scrap, and there is some trading in these items between dealers. Prices show practically no change although the market is inclined to weakness. Sales for Valley delivery are reported at $19.75 to $21.50 for heavy melting steel; $19.50 to $19.75 for compressed steel and $18 for short shoveling turnings. Shipments are being greatly delayed by car-shortage, but the release of cars with from 42 to 48-in. sides for handling scrap is expected to bring some relief. Shipments to two Valley district mills have been held up. The Baltimore & Ohio Railroad will receive bids Dec. 4 on approximately 18,000 tons of scrap.

We quote per gross ton, f.o.b. Cleveland, as follows:

Heavy melting steel	$18.50 to $19.00
Steel rails under 3 ft.	20.00 to 20.50
Steel rails for rolling	20.00 to 20.50
Iron rails	18.00 to 18.50
Iron car axles	25.00 to 26.00
Low phosphorus melting	20.50 to 21.00
Cast borings	15.75 to 16.00
Machine shop turnings	14.50 to 14.75
Mixed borings and short turnings	15.50 to 16.00
Compressed steel	17.25 to 17.50
Railroad wrought	18.00 to 18.50
Railroad malleable	20.00
Light bundled sheet stampings	13.75 to 14.00
Steel axle turnings	16.00 to 16.50
No. 1 cast	20.50 to 21.00
No. 1 busheling	12.50 to 13.50
Drop forge flashings over 10 in.	12.75 to 13.25
Drop forge flashings under 10 in.	12.50 to 13.50
Railroad grate bars	17.00 to 18.00
Stove plate	17.00 to 18.00
Pipes and flues	13.00 to 13.75

St. Louis

Very Little Buying of Pig Iron — Southern $4 Below Northern

ST. LOUIS, Nov. 28.—The volume of business being placed for pig iron—Northern or Southern make—is extremely small. Such buying as is being done is confined to carloads for prompt shipment. Melters continue to buy only from hand to mouth, and show hardly any interest in first quarter requirements. The recent declines in Southern iron have only seemed to strengthen the disposition of melters to wait for what they believe will be still lower prices. The market for Southern iron is $23, Birmingham. Several makers are quoting $24, but are not getting any business at that figure. The price of Northern iron is unchanged on the basis of $30, Chicago, to compete with the price of the St. Louis Coke & Chemical Co., $31 to $32, Granite City, in this market. On the present basis, Southern iron is about $4 a ton less than Northern iron, delivered St. Louis. The Federal Reserve Bank of St. Louis reports that the melt of pig iron continues on a large scale, and steel plants and foundries have business booked, which will keep them busy during the remainder of the year.

We quote delivered consumers' yards, St. Louis, [illegible] $2.16 freight from Chicago, $3.28 from Birmingham (rail and water), $5.17 from Birmingham, all rail, and 81 cents average switching charge from Granite City:

Northern foundry, sil. 1.75 to 2.25	$32 16
Northern malleable, sil. 1.75 to 2.25	32 16
Basic	32 16
Southern foundry, 1.75 to 2.25	28.17

Coke.—The demand for coke from the Granite City by-product plant continues heavy. The current production, which is still 100 per cent of capacity, is being shipped out on orders on hand. There is an especially good demand for metallurgical coke, and the domestic business is increasing.

Old Material.—The railroads are now coming out with larger offerings, but the mills are not buying, and say they will wait until after the first of the year. In the meantime the market is dull. The Wabash has a list with 500 tons No. 1 of rails and 600 tons of yard scrap. The Frisco list includes 40 cars of scrap and 10 cars of miscellaneous rails.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

	Per Gross Ton	
Iron rails	$20.00 to	$20.50
Rails for rolling	17.00 to	17.50
Steel rails, less than 3 ft.	20.00 to	20.50
Relaying rails, standard section	26.00 to	29.00
Cast iron car wheels	23.00 to	23.50
Heavy melting steel	16.00 to	16.50
Heavy shoveling steel	15.50 to	16.00
Frogs, switches and guards cut apart	16.00 to	17.00
	Per Net Ton	
Heavy axles and tire turnings	11.50 to	12.00
Steel angle bars	17.00 to	17.50
Iron car axles	26.00 to	26.50
Steel car axles	19.00 to	19.50
Wrought iron bars and transoms	21.50 to	22.00
No. 1 railroad wrought	15.50 to	16.00
No. 2 railroad wrought	15.00 to	15.50
Railroad springs	20.00 to	20.50
Steel couplers and knuckles	20.00 to	20.50
Cast iron borings	10.50 to	11.00
No. 1 busheling	13.00 to	13.50
No. 1 railroad cast	19.00 to	19.50
No. 1 machinery cast	20.00 to	20.50
Railroad malleable	18.00 to	18.50
Machine shop turnings	9.50 to	10.00

Finished Iron and Steel.—The promise of seven-day shipment obtained an order from a Kansas City concern for 100 tons of channels. This indicates that the mills are better able to make deliveries than for some time. A St. Louis railroad is in the market for a round tonnage of plates, but this is the only inquiry of consequence that has been issued by a line centering here for [illegible] It is reported that the St. Louis Southwestern will be in the market for a considerable tonnage for oil storage tanks, now that it has been decided to convert its locomotives to oil burners. Jobbers continue to show an interest in their spring fence requirements, and there has been more buying of wire nails. The Federal Reserve Bank of St. Louis reports that wire rope manufacturers, five interests reporting, showed October sales 72½ per cent larger than a year ago.

For stock out of warehouse we quote: Soft steel bars, 2.90c. per lb.; iron bars, 2.90c.; structural shapes, 3c.; tank plates, 3c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, cold rolled, one pass, 4.85c.; cold drawn rounds, shafting and screw stock, 3.90c.; structural rivets, 3.85c. per 100 lb.; boiler rivets, 3.95c.; tank rivets, ⅞ in. and smaller, 55 per cent off list; machine bolts, large, 50 per cent; smaller, 50 per cent; carriage bolts, large, 45 per cent; small, 45 per cent; lag screws, 55 per cent; hot pressed nuts, square or hexagon blank, $2.75; and tapped, $2.75 off list.

Buffalo

Further Weakness in Pig Iron—Radiator Purchase Reported

BUFFALO, Nov. 28.—Quotations of $26 on foundry pig iron, silicon 1.75 to 2.25, indicate further weakness, but sellers believe the arrival of bad weather and consequent effect on deliveries may develop a stabilized condition and that further downward trend will be stopped. On silicon 2.25 to 2.75, the current quotation is $26.50 and on silicon 2.75 to 3.25, $27.25. No transactions have occurred to establish the basic market, but $27 is regarded as the correct price. Malleable is quoted the same as No. 2 plain. No big inquiries have appeared. The largest one engaging Buffalo dealers is one of 1000 tons. Reports are current that the leading radiator interest has purchased 15,000 to 20,000 tons, but verification is lacking, although it is known that this consumer was expected to come into the market for first quarter requirements.

We quote f.o.b. per gross ton Buffalo as follows, the higher price being for early shipment:

No. 1 foundry, 2.75 to 3.25 sil.	$27.25
No. 2X foundry, 2.25 to 2.75 sil.	26.50
No. 2 plain, 1.75 to 2.25 sil.	26.00
Basic	27.00
Malleable	26.00
Lake Superior charcoal	36.28

Finished Iron and Steel.—The market is colorless and no unusual buying is reported. The approach of the period when stock taking is of unusual importance and a desire exists that stocks be kept down is responsible for a great part of the disinterest. Bars are firm at 2c. and instances of higher prices are rare. Sheets are firm at 3.35c. and 4.35c., black and galvanized respectively; one interest booking considerable tonnage following announcement by the Steel Corporation of new prices. The extra list for finishes is in effect. Much of the firm sheet demand comes from the automobile trade and though the largest consumer will have the usual shutdown for inventory purposes, promise of still greater production is made.

We quote warehouse prices, Buffalo, as follows: Structural shapes, 3.20c.; plates, 3.20c.; soft steel bars, 3.10c.; hoops, 4.10c.; bands, 3.90c.; blue annealed sheets, No. 10 gage, 4.05c.; galvanized steel sheets, No. 28 gage, 5.85c.; black sheets, No. 28, 4.85c.; cold rolled round shafting, 3.95c.

Old Material.—Existing quietness is expected to continue until after Jan. 1, inventory taking being already under way and efforts being exerted to keep down stock piles. Dealers are busy trading between themselves and most of them have sufficient old contracts to fill until after Jan. 1. In several instances dealers are paying a higher price to other dealers for certain grades of material than consumers are willing to pay. Heavy melting steel is slightly weaker with the apparent lack of interest of large users. Several small sales have been made at $19 and $19.25. Prices in several other grades have weakened.

We quote [illegible] f.o.b. Buffalo as follows:

Heavy melting steel	$19.00 to $19.50
Low phos., 0.04 and under	21.00 to 22.00
No. 1 railroad wrought	18.00 to 19.00
Car wheels	21.00 to 22.00
Machine-shop turnings	14.50 to 15.50
Cast iron borings	14.50 to 15.50
Heavy axle turnings	17.50 to 18.50
Grate bars	16.00 to 17.00
No. 1 busheling	16.50 to 17.50
Stove plate	17.00 to 18.00
Bundled sheet stampings	14.00 to 15.00
[illegible]	[illegible] to 21.00
[illegible]	[illegible] to 21.50

Philadelphia

Pig Iron Prices Show Further Weakness—Demand for All Products at Low Ebb

PHILADELPHIA, Nov. 28.—Some sellers report slightly more favorable indications during the past week, but generally the markets continue quiet. In steel, pig iron and scrap, there is only a moderate demand for immediate requirements. A somewhat more active interest in first quarter needs is in evidence, particularly in pig iron, but so far this has not resulted in very much buying. Due to more active competition from Buffalo furnaces in the New England territory, eastern Pennsylvania furnaces have again reduced their quotations and most of them are now offering foundry iron at $1 below last week's published prices.

Pig Iron.—Buffalo furnaces became decidedly more active in the New England market last week following the appearance of several inquiries for round tonnages of foundry iron for first quarter. To meet this conpetition, several of the eastern Pennsylvania furnaces reduced their prices to a basis of $27, furnace, for No. 2 plain and $28 for No. 2X, but even this concession did not take the business, as according to reports from Boston one or two Buffalo furnaces had gone to $25, Buffalo, equivalent to $26.25 at eastern Pennsylvania furnace. There has been a little better inquiry from melters in this territory, but buyers apparently have not yet made up their minds definitely that prices have reached bottom and there is a good deal of hesitancy in placing contracts for first quarter. No important transactions are reported, but sellers are confident that a substantial demand for foundry iron will develop before the first of the year. Nearly every grade of pig iron quoted in the table below shows a reduction from last week's quotations. An exception is standard low phosphorus, the price as quoted having been nominal for some time, as there has been no domestic iron available in the East. This situation will be changed, however, as the Standish furnace has gone in blast and this week will probably announce its selling price, which undoubtedly will be below $38, the price obtained on the last sales several months ago. Imported copper-free low phosphorus iron has been selling around $30, seaboard, and shipments have gone as far west as St. Louis, very little of this grade of iron having been made in the United States in the past several months. Copper bearing low phosphorus has been sold as low as $32, eastern Pennsylvania furnace, but $35 has also been obtained. Gray forge iron has been sold at $27, furnace, and more is obtainable at this price. Virginia iron is now offered at $28, furnace, for No. 2 plain, a reduction of $4 a ton from the prices announced when the first Virginia stack went in blast about two months ago. Bids close on Dec. 1 for the 20,000 tons of cast iron pipe for San Juan, Porto Rico. Last week's receipts of foreign pig iron at Philadelphia were 12,870 tons, of which 12,370 tons came from England, 500 from Scotland. Iron ore receipts were 6000 tons from French Africa.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to $1.64 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$28.14 to $28.64
East. Pa. No. 2X, 2.25 to 2.75 sil.	29.14 to 29.64
East. Pa. No. 1X	30.14 to 30.64
Virginia No. 2 plain, 1.75 to 2.25 sil.	33.17 to 34.17
Virginia No. 2X, 2.25 to 2.75 sil.	34.17 to 35.17
Basic delivered eastern Pa.	27.50 to 28.00
Gray forge	28.14 to 28.64
Malleable	30.64 to 31.64
Standard low phos. (f.o.b. furnace)	38.00 to 40.00
Copper bearing low phos. (f.o.b. furnace)	32.00 to 35.00

Ferromanganese.—A better demand for ferromanganese has been in evidence in the past week, and several sales of $100, furnace, have been made. British agents continue to quote $100, seaboard, for the imported alloy.

Finished Steel.—Shapes and bars continue fairly firm at 2c., Pittsburgh, but there continues to be weakness in the plate price. Sellers admit that sales at 1.90c. and 1.95c., Pittsburgh, have been reported to them, but few, if any, of such transactions have been definitely traced. Most of the current orders are for small lots, and these are being sold at 2c., Pittsburgh. On bar iron it is possible to shade 2c., Pittsburgh, on carload orders. Most of the independent mills have followed the lead of the American Sheet & Tin Plate Co. on sheet prices and contracts for first quarter have been made at 3.35c. for black and 4.35c. for galvanized, Pittsburgh. On blue annealed sheets some mills are asking 2.60c., Pittsburgh, though reports of 2.50c. quotations are presumed to be correct. In a few instances 4.50c., Pittsburgh, is being quoted on galvanized sheets.

Warehouse Business.—Demand for steel out of stock continues at a fairly good rate. Prices are unchanged and for local delivery are as follows:

Soft steel bars and small shapes, 3.025c.; iron bars (except bands), 3.025c.; round edge iron, 3.20c.; round edge steel, iron finish, 1½ x ½ in., 3.20c.; round edge steel planished, 4c.; tank steel plates, ¼-in. and heavier, 3.125c.; tank steel plates, ⅜-in., 3.33c.; blue annealed steel sheets, No. 10 gage, 3.85c.; black sheets, No. 28 gage, 4.60c.; galvanized sheets, No. 28 gage, 5.75c.; square twisted and deformed steel bars, 3.15c.; structural shapes, 3.125c.; diamond pattern plates, ¼-in., 4.80c.; ⅜-in., 5c.; spring steel, 4.25c.; round cold-rolled steel, 3.85c.; squares and hexagons, cold-rolled steel, 4.35c.; steel hoops, No. 13 gage and lighter, 4.25c.; steel bands, No. 12 gage to ⅜-in., inclusive, 3.825c.; rails, 3.025c.; tool steel, 8.50c.; Norway iron, 6.50c.

Old Material.—The scrap market continues inactive and prices show further weakness. Blast furnace turnings, cast borings and heavy breakable cast are lower and all prices are weak.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$16.00 to $16.50
Scrap rails	16.00 to 16.50
Steel rails for rolling	19.50 to 20.00
No. 1 low phos., heavy 0.04 and under	22.00 to 23.00
Cast iron car wheels	20.00 to 21.00
No. 1 railroad wrought	19.00 to 20.00
No. 1 yard wrought	17.00 to 17.50
No. 1 forge fire	15.00 to 15.50
Bundled sheets (for steel works)	14.50 to 15.00
No. 1 busheling	14.50 to 15.00
Turnings (short shoveling grade for blast furnace use)	14.50 to 15.00
Mixed borings and turnings (for blast furnace use)	14.50 to 15.00
Machine shop turnings (for steel works use)	14.50 to 15.00
Machine shop turnings (for rolling mill use)	14.50 to 15.00
Heavy axle turnings (or equivalent)	15.00 to 15.50
Cast borings (for steel works and rolling mills)	15.00 to 16.00
Cast borings (for chemical plants)	20.00 to 22.00
No. 1 cast	20.00 to 21.00
Heavy breakable cast (for steel plants)	19.00 to 19.50
Railroad grate bars	16.50 to 17.00
Stove plate (for steel plant use)	16.50 to 17.00
Railroad malleable	15.50 to 16.50
Wrought iron and soft steel pipes and tubes (new specifications)	14.00 to 14.50
Shafting	21.00 to 22.00
Steel axles	22.00

San Francisco

Moderate Activity in Foreign Pig Iron—Scrap at High Levels

SAN FRANCISCO, Nov. 22.—The pig iron market along the coast has been active in a small way during the past fortnight, with the southern section of the State showing the greatest buying. Several sales of fair tonnages were involved, one for 500 tons, and others for smaller amounts. It is understood that prices were attractive for the round lots, figuring something around $31, ex ship, duty paid. On best material, the prices named are in the neighborhood of $32. Besides this Belgian tonnage, there was some business done in Scotch iron, of which some 300 tons was moved at about $34, ex ship, duty paid. High prices quoted on domestic iron, and the difficulties of shipment, are restraining business in domestic, so that the actual sales consummated are practically negligible.

Cast Iron Pipe.—A moderately good activity prevails in California, mainly in the southern section. Los Angeles has just closed for 3300 tons, and is again in the market for 2800 tons for city work. Several towns are inquiring for materials, such as El Centro, which is advertising for 200 tons. There appears to be a slightly lower tendency in prices, following the easiness in pig iron. Offers lately have been at $1 concession, making the new price $53 for 6-in. and larger, delivered.

Finished Iron and Steel.—Good activity has marked practically all the products, although business can hardly be called large. Building affords considerable opportunity for the movement of materials. The construction of commercial structures throughout the State continues on a more than normal basis, and occasional large jobs are involved. Among the latest announced are the proposed new Rosslyn Hotel for Los Angeles, which will require around 1200 tons of steel, bids for which opened yesterday; an addition to the Western States Life building of San Francisco, calling for about 300 tons of structural steel; and the Athens Athletic Club, a $2,000,000 building for Oakland. It is understood the Southern Pacific Co. will occupy the lower floors of this structure. The proposed University of California memorial stadium is a project involving a large steel tonnage. It will be a combination of earth bowl and coliseum, and will be constructed on cement. The seating capacity is to be 72,000. Although business in the heavy materials has not been particularly conspicuous, the volume is reported satisfactory. The market on plates seems more stable with the gradual narrowing of the range of quotations by the various mills. At present the delivered price is from 2.40c. to about 2.60c., or even less. While as low as 2.35c. has been heard, it is not known that business has been placed on that basis. There is no notable change in sheets. The Shell Oil inquiry for 48 tanks of varying sizes is reported filled at prices ranging from $3,000 to $4,000, erected. Around 200 tons of structural shapes and plates has been awarded for the San Pedro dam. Several rail orders are around, some 400 tons having been placed for export and 300 tons for a Northern interest.

Coke.—A moderate trade in coke is reported in this market, but nothing of special significance is apparent. Smelters and foundries are the main buyers at present, with the former providing the greater part of the demand. The market rules around $17, ex ship, coast ports. The movement of spot stocks of foreign material is steady.

Old Material.—The market on scrap remains at high levels, due to the prevailing scarcity of offerings. Some little business has been done, the majority of which is said to have been transacted in the South. Heavy melting is quoted at about $26 per net ton, delivered at consumers' plants. Cast iron scrap is held at prices ranging from $13.50 to $14, per gross ton.

RAILROAD EQUIPMENT BUYING

Freight Car Purchases Total 9000 and Additional Inquiries 1250

The Chicago, Milwaukee & St. Paul has placed 3000 composite cars of 50 tons capacity with the Bettendorf Co., 2000 40-ton box cars with the Western Steel Car & Foundry Co.

Car Co. and is still negotiating for 2000 additional coal cars.

The Northern Pacific has placed 1000 box cars each with the American Car & Foundry Company and the Western Steel Car & Foundry Co. and still has an additional 1000

Western Steel Car & Foundry Co. and 500 hopper cars from the Ralston Steel Car Co

The Union Pacific is inquiring for 5000 refrigerator cars

The Rock Island lines, which recently ordered 500 box automobile, 250 refrigerator, 250 ballast and 250 flat cars

cars to the Standard Steel Car Co. The same car builder has contracts for 40 coaches from the Long Island and 50

gines of the six-wheel type

FABRICATED STEEL BUSINESS

About 25,000 Tons of Awards and Inquiries for Half as Much

Apartment house on Fifty-fourth Street, New York, 750 tons, to A. E. Norton, Inc.

Apartment house on West Seventy-first Street, New York, 650 tons, to Paterson Bridge Co.

Chelsea Storage Warehouse, Mount Vernon, N. Y., 550 tons, to Hedden Iron Construction Co.

Methodist Episcopal Hospital, Brooklyn, 400 tons, to George A. Just Co.

Joint Disease Hospital, 124th Street, New York, 1000 tons, to Hinkle Iron Works.

Pier at Norfolk, Va., 500 tons, to Virginia Bridge & Iron Co.

Transit shed at berth 232, City of Los Angeles, 485 tons, to Austin Co.

Steel frame transit shed at berth 176, Los Angeles, 488 tons, to Austin Co.

Phelps Avenue station for Springfield, Mo., Gas & Electric Co., 214 tons, to unnamed fabricator.

Grand Tower, Ill., power station, Middlewest Power Co., mentioned last week, 1685 tons, to Mississippi Valley Structural Steel Co.

Chevrolet Motor Co., buildings, Norwood Ohio, 440 tons, to Jones & Laughlin Steel Co.

Michigan Stamping Co., plant addition, Detroit, 350 tons, to Russell Wheel & Foundry Co.

Rock Island Lines, two 60-ft. deck plate girder spans, Geneseo, Ill., 103 tons, to Milwaukee Bridge Co.

Parcel Post building, Cleveland, 785 tons, to the Forest City Steel & Iron Co.

Physicians' building, Cleveland, 350 tons, to the Forest City Steel & Iron Co.

High school, Altoona, Pa., 250 tons, to Fort Pitt Bridge Works.

Masonic Temple, Muncie, Ind., 900 tons, reported awarded to Indiana Bridge Co.

Chevrolet Motor Co. Division of General Motors Co., Buffalo, 600 tons, to Kellogg Structural Steel Co., Buffalo.

Standard Oil Co., 40 oil storage tanks, Casper, Wyo., 12,000 tons, 20 each to Chicago Bridge & Iron Works and the Graver Corporation.

Michigan Steel Corporation, Detroit, mill buildings, 1500 tons, to Jones & Laughlin Steel Co.

Structural Projects Pending

Inquiries for structural steel work now being figured on include the following:

Apartment house at Fifth Avenue and Ninety-eighth Street, New York, 1000 tons.

Steel work at Centre Street for New York Transit Commission, 150 tons.

Bridge work for Chesapeake & Ohio Railroad, 150 tons.

Mechanics and Metals Bank, Fifty-seventh Street, New York, 300 tons.

Loft, West Thirtieth Street, New York, 600 tons.

Lehigh Portland Cement Co., Dwight P. Robinson, contractor, 700 tons.

Power station, Joliet, Ill., Public Service Co. of Northern Illinois, 2300 tons.

M. Rich & Brothers, department store, Atlanta, Ga., 1880 tons, plans revised to call for complete reinforced concrete frame.

American Rolling Mill Co., mill buildings, Ashland, Ky., 4500 tons.

American Can Co., Indianapolis, 150 tons.

United Brethren, office building, Dayton, Ohio, 150 tons.

The Hartford, Conn., branch of the American Society of Mechanical Engineers, at its November meeting last week, enjoyed motion pictures. The feature of the evening was a four-reel showing, entitled "From Ore to Finished National Pipe," which was accompanied by a lecture. The subject was treated very largely from the standpoint of the engineer. The manufacture of hats was explained by a film made at the plants of one of the largest Connecticut manufacturers, and a film, "The Winning Shot," presented by the Winchester Repeating Arms Co., New Haven, Conn., was presented. F. G. Hughes, vice-president New Departure Mfg. Co., Bristol, Conn., ball bearings and automobile parts, gave an interesting talk on "Some Problems of Management."

The Valley Forge Steel & Tool Co., 521 West Monroe Street, Chicago, announces that Harry J. Cogswell, formerly associated with the Ajax Forge Co., Chicago, has been appointed general sales manager.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Plates

Sheared, tank quality, base, per lb ..... 2.00c.

Structural Material

Beams, channels, etc..... 2.00c.

Iron and Steel Bars

Soft steel bars, base, per lb..... 2.00c.
Refined iron bars, base, per lb..... 2.60c.

Hot-Rolled Flats

Hoops, base, per lb..... 2.75c. to 2.90c.
Bands, base, per lb..... 2.75c. to 2.90c.
Strips, base, per lb..... 2.75c. to 2.90c.

Cold-Finished Steels

Bars and shafting, base, per lb..... 2.50c.
Strips, base, per lb..... 4.50c.

Wire Products

Nails, base, per keg..... $2.70
Bright plain wire, base, per 100 lb..... 2.45
Annealed fence wire, base, per 100 lb..... 2.45
Spring wire, base, per 100 lb..... 3.25 to 3.35
Galvanized wire, base, per 100 lb..... 2.95
Galvanized barbed, base, per 100 lb..... 3.35
Galvanized staples, base, per keg..... 3.35
Painted barbed wire, base, per 100 lb..... 3.00
Polished staples, base, per keg..... 3.00
Cement coated nails, base, per count keg..... 2.20
Woven fence, carloads (to jobbers)..... 70½ per cent off list
Woven fence, carloads (to retailers)..... 68 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads...60 and 5 per cent off list
Machine bolts, small, cut threads....50 and 10 per cent off list
Machine bolts, larger and longer....50 and 10 per cent off list
Carriage bolts, ⅜ x 6 in.:
Smaller and shorter, rolled threads,
50, 10 and 5 per cent off list
Cut threads .....50 per cent off list
Longer and larger sizes.....50 per cent off list
Lag bolts .....60 and 5 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads....50 and 10 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.:
Smaller and shorter.....45 per cent off list
Larger and longer sizes.....45 per cent off list
Hot pressed square or hex. blank nuts...$3.25 to $3.50 off list
Hot pressed nuts, tapped.....3.25 to 3.50 off list
C.p.c. and t. sq. or hex. nuts, blank..... 3.25 to 3.50 off list
C.p.c. and t. sq., or hex. nuts, tapped..... 3.25 to 3.50 off list
Semi-finished hex. nuts:
9/16 in. and smaller, U. S. S....75, 10 and 5 per cent off list
⅝ in. and larger, U. S. S.....70, 10 and 2½ per cent off list
Small sizes, S. A. E.....80 and 5 per cent off list
S. A. E., ⅝ in. and larger.....75 and 5 per cent off list
Stove bolts in packages.....80 and 5 per cent off list
Stove bolts in bulk.....80, 5 and 2½ per cent off list
Tire bolts .....50, 10 and 10 per cent off list

Cap and Set Screws

Milled square and hex. head cap screws....75 per cent off list
Milled set screws.....75 per cent off list
Upset cap screws.....75 and 10 per cent off list
Upset set screws.....80 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb.....$3.00
Large boiler rivets, base, per 100 lb.....3.10
Small rivets .....65 and 5 to 65 per cent off list

Track Equipment

Spikes, 9/16 in. and larger, base, per 100 lb..... $2.75
Spikes, ½ in. and smaller, base, per 100 lb.... 3.50
Spikes, boat and barge, base, per 100 lb..... 3.50
Track bolts, base, per 100 lb.....$3.85 to 4.50
Tie plates, per 100 lb..... 2.35
Angle bars, base, per 100 lb..... 2.75

Welded Pipe

Butt Weld

Steel Inches	Black	Galv.	*Iron* Inches	Black	Galv.
⅛	49	23½	⅛ to ¾.....	+7	+33
¼ to ⅜.....	55	29½	½	26	8
½	60	46½	¾	32	17
¾	64	52½	1 to 1½.....	34	19
1 to 3.....	66	54½			

Lap Weld

2	59	47½	2	29	15
2½ to 6.	63	51½	2½ to 6	32½	19
7 to 8.....	60	47½	7 to 12.....	30	17
9 to 12..	59	46½			

Butt Weld, extra strong, plain ends

⅛	45	28½	¼ to ⅜.....	+15	+48
¼ to ⅜.....	51	31½	½	25	12
½	57	46½	¾	32	18
¾	62	51½	1 to 1½.....	34	20
1 to 1¼.....	64	53½			
2 to 3.....	65	54½			

Lap Weld, extra strong, plain ends

2	57	46½	2	30	17
2¼ to 4.....	61	50½	2½ to 4.....	33	21
4½ to 6.....	60	49½	4½ to 6.....	32	20
7 to 8.....	56	43½	7 to 8.....	25	13
9 to 12.....	50	37½	9 to 12.....	20	8

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 and 2½ per cent.

Boiler Tubes

Lap Welded Steel		*Charcoal Iron*	
1¾ in	21½	1½ in	+ 7
2 to 2¼ in.	36	1¾ to 1⅞ in.....	3
2½ to 3 in	47	2 to 2¼ in.....	13
3¼ to 13 in.....	52	2½ to 3 in.....	18
		3¼ to 4½ in.....	20

To large buyers of steel tubes a supplementary discount of 5 per cent is allowed.

Standard Commercial Seamless Boiler Tubes

Discounts on cold-drawn tubes in carload lots, f.o.b. Pittsburgh, follow:

1 in.	55	2½ and 2¾ in.....	38
1¼ and 1½ in.....	47	3 in.	42
1¾ in.	31	3¼ to 4 in.....	47
2 and 2¼ in.....	34	4¼ in. and 5 in.....	39

Hot Drawn

3 in	44	to 4 in.....	49

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base.....85 per cent off list
Carbon 0.30 to 0.40, base.....83 per cent off list
Plus usual differentials and extras for cutting.

Seamless Locomotive and Superheater Tubes

Cents per Ft.		Cents per Ft.	
2-in. O.D. 12 gage.....	14	2¼-in. O.D. 10 gage....	19
2-in. O.D. 11 gage.....	15	3-in. O.D. 7 gage.....	34
2-in. O.D. 10 gage.....	16	1½-in. O.D. 9 gage.....	13¾
2¼-in. O.D. 12 gage....	16	5¾-in. O.D. 9 gage.....	53
2¼-in. O.D. 11 gage....	17	5½-in. O.D. 9 gage.....	55

Tin Plate

Standard cokes, per base box..... $4.75

Terne Plate

(Per package, 200-lb.)

8-lb. coating	$9.30	25-lb. coating I. C....	$14.25
8-lb. coating I. C....	9.60	30-lb. coating I. C....	15.25
15-lb. coating I. C....	11.80	35-lb. coating I. C....	16.25
20-lb. coating I. C....	13.30	40-lb. coating I. C....	17.25

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....2.50c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.35c.
Regular auto body sheets, base (22 gage), per lb., 4.70c. to 5.00c.

Galvanized

No. 28 (base), per lb.....4.35c. to 4.50c.

Tin-Mill Black Plate

No. 28 (base), per lb.....3.35c. to 3.50c.

Manufacturers have pamphlets, which can be had upon application, giving price differentials for gage and extras for length, width, shearing, etc.

Freight Rates

All rail freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic.	$0.325	Buffalo	$0.265	St. Louis	$0.43
Philadelphia, export...	0.235	Cleveland	0.215	Kansas City	0.735
Baltimore, domestic...	0.315	Cleveland, Youngstown		Kansas City (pipe)...	0.705
Baltimore, export	0.225	Comb.	0.19	St. Paul	0.595
New York, domestic...	0.34	Detroit	0.295	Omaha	0.735
New York, export....	0.255	Cincinnati	0.295	Omaha (pipe)	0.705
Boston, domestic	0.365	Indianapolis	0.31	Denver	1.275
Boston, export	0.255	Chicago	0.34	Denver (pipe)	1.215

Pacific Coast	$1.50		
Pac. Coast, ship plates	1.20		
Birmingham	0.69		
Memphis	0.385		
Jacksonville, all rail...	0.50		
Jacksonville, rail and water	0.415		
New Orleans	0.515		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 30c. to 40c.; ship plates, 30c. to 40c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 30c. to 40c.; sheets and tin plates, 50c.; rods, wire rope cable and strands, 75c.; wire fencing, netting and stretcher, 50c.; pipe, not over 8 in. in diameter, 50c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Macungie and Topton Blast Furnaces Sold

The Macungie and Topton blast furnaces, which were acquired by the Replogle Steel Co. in its purchase of the properties of the Empire Steel & Iron Co., have been sold for $25,000 each. The purchaser of the Macungie furnace at Macungie, Pa., is the East Penn Foundry Co., whose plant adjoins the furnace property. The company has not decided whether to scrap the furnace and utilize the property for a proposed extension of its plant or to operate it. The Topton furnace has been sold to Howard Knauss and local capitalists of Topton, Pa., and will be operated at some time in the near future. Mr. Knauss was blast furnace superintendent at Catasauqua, Pa., for the Empire Steel & Iron Co.

Two weeks ago, the directors of the Replogle Steel Co. decided to sell the properties because of the fact that iron can be made much more economically at its other furnaces and Leonard Peckitt, president, was empowered to conclude negotiations.

The Macungie furnace was built in 1874 and repaired in 1902. Its annual capacity is 25,000 tons. The Topton furnace was built in 1873, remodeled in 1888 and rebuilt in 1892 and again repaired in 1902. Its annual capacity is 40,000 tons.

Conference on Numbering of Steel

A conference to consider the desirability of providing a system of designating qualities or kinds of steels by code numbers, has been called by the American Engineering Standards Committee at the request of the U. S. Bureau of Standards. The conference will be held in Room 704, Department of Commerce Building, Nineteenth Street and Pennsylvania Avenue, Washington, at 10 a. m. Dec. 6.

The subject of this conference is a matter of importance to all manufacturers of steel and to all users of steel in large quantity. This conference will attempt to determine the desirability of applying a uniform numbering system to forging steels, casting steels, structural steels, including plates, tool steels or other steels not so classified.

While the American Engineering Standards Committee has invited to this conference representatives of all technical and industrial associations known to be interested in the subject, any organization which feels that it should be represented in the conference, but has received no formal invitation, is urged to communicate with the American Engineering Standards Committee, 29 West Thirty-ninth Street, New York.

The Society of Automotive Engineers has already formulated a system now in wide use, applying to the steels used in automotive practice, and there has been considerable discussion as to the advisability of applying such a system more generally.

The following are the agenda which were suggested for this conference, at an informal meeting in New York on Sept. 15, of persons interested in the topic:

[illegible]

Resumé of present American practice and of the steps leading to the conference.

[illegible]

forging steels?

Is it desirable to have a uniform numbering system for casting steels?

[illegible]

structural steels, including plates?

Is it desirable to have a uniform numbering system for tool steels?

Is it desirable to have a uniform numbering system for any other steels?

What should be the basis of classification for such a numbering system: chemical composition, physical proper-

[illegible]

Are there systems existing which can be used as a basis for any or all of the above groups?

What, if any, are the limitations of systems now in use or proposed?

Engineering Co-operation with South America

The importance of the engineering co-operation and financial support of the United States in the development of South America was emphasized at a dinner tendered to Calvin W. Rice, Fred Lavis and A. W. Billings, representatives of American engineering societies, recently returned from the International Engineering Congress at Rio de Janeiro in September. W. L. Saunders, chairman of the board of directors Ingersoll-Rand Co., presided over the affair, which was held at the Engineers Club, New York, Nov. 28 and attended by representatives of the four national engineering societies, the Western Society of Engineers, the Engineers Club of Philadelphia and the joint activities of these organizations.

Fred Lavis, one of the delegates representing the American Society of Civil Engineers, pointed out that South America is at the threshold of a great period of development and emphasized the opportunity of American engineering and finance.

Calvin W. Rice, secretary of the American Society of Mechanical Engineers, the holder of credentials from the Inter-American High Commission and ten engineering societies of America and Canada, made a trip to Buenos Aires, Montevideo, Santiago, Lima and Havana after the close of the congress at Rio de Janeiro. In speaking of his trip, Mr. Rice emphasized the mission of the engineering profession as the development of the world as a place of co-operative friendship, which he carried out in his trip by urging the adoption of international standards and by encouraging engineering organizations to devote their efforts to service for the public. The results of the congress were shown in its resolutions which established a permanent organization, set up the mechanism of the derivations of standards, and encouraged renewed consideration of a South American transcontinental railroad. Everywhere in South America, Mr. Rice found universal respect for the engineer, which is best shown by the fact that the name of doctor is applied only to doctors of engineering.

Steel Quality Discussed at Washington Meeting

W. R. Shimer, metallurgist of the Bethlehem Steel Co., gave a lecture before the Washington chapter of the American Society for Steel Treating on the evening of Nov. 24. His remarks illustrated by lantern slides, traced the manufacture of steel from the ore bed to the finished product.

In the discussion of the paper James E. Howard, engineer-physicist of the bureau of safety of the Interstate Commerce Commission, remarked that experience in the behavior of steels has shown at times a close approach to the limit of ultimate endurance of the metal. "Steel rails, in railway service, afford illustrations of this kind, demanding, if attainable, an advance in the ability of the rails to meet conditions which are imposed upon them." It is a controversial point, he added, between steel makers and railroad engineers, whether the limits of endurance of steel are really being reached or whether the grades of steel put out by the steel mills are responsible for the failures of rails to endure track conditions. "Railroad engineers, almost as a unit, attribute the failures of rails to antecedent conditions at the steel and the rail mills. Track records are exhibited to show that certain heats, certain rollings, and even the output of certain years of a given mill have given unsatisfactory results, while other rails furnished under the same specifications, by the same mill, and exposed to the same track conditions, have given good accounts of themselves.

"It would be appreciated," he said, "if Mr. Shimer would tell us to what extent the proper grading of the rail steel according to quality classification would be expected to influence the results, overcome these criticisms of the railroad engineers, and improve the situation from the railroad point of view."

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
Nov.	Lake	Electro-lytic*	New York	New York	St. Louis	New York	St. Louis
22	14.12½	13.62½	36.37½	7.25	6.90	7.45	7.10
23	14.12½	13.62½	36.05	7.25	6.90	7.35	7.00
24	14.12½	13.62½	36.07½	7.25	6.90	7.25	6.90
25	14.12½	13.62½	....	7.30	6.95	7.15	6.80
27	14.12½	13.62½	36.62½	7.30	6.95	7.35	7.00
28	14.12½	13.62½	36.37½	7.30	6.95	7.37½	7.02½

*Refinery quotation.

New York

NEW YORK, Nov. 28.

The markets are generally quiet and prices are firm. Buying of copper is only moderate. The tin market is quieter than in many weeks. Lead has advanced on good demand and zinc prices have turned upward again.

Copper.—Buying of electrolytic copper either for domestic or foreign consumption is only moderate, but deliveries on contract continue heavy. There is some inquiry for first quarter, but most of it is confined to January-February delivery. Prices continue firm at 13.62½c., refinery, or 13.87½c., delivered, with some producers asking 14c., delivered. Lake copper is unchanged in a quiet market.

Tin.—The last week in the Straits tin market has been one of the dullest and most uninteresting in some time. Both consumers and dealers have shown very little interest. Estimates of November deliveries into consumption place the total at about 5000 tons. The principal events of interest bearing upon the market have been the announcement of tin plate prices for the first half of next year and also a sudden realization of the trade that spot stocks of Straits tin are light. For the first time in several weeks spot Straits tin is now at a premium and the quotation to-day was 36.37½c., New York. London prices to-day were nearly £4 per ton less than a week ago at £174 12s. 6d. for spot standard, £175 12s. 6d. for future standard and £176 7s. 6d. for spot Straits. Arrivals thus far this month have been 4652 tons with 8550 tons reported afloat.

Lead.—The market is strong and the metal is in good demand, with sales of some large lots reported. The leading interest on Friday, Nov. 24, advanced its price 10 points to 6.90c., St. Louis, or 7.10c., New York. This move is believed to have been occasioned by placing in the market of heavy orders for December. Independents are taking business at 6.95c., St. Louis, or 7.30c., New York.

Zinc.—Prime Western zinc, after declining from 7.35c., St. Louis, to 6.80c., St. Louis, on Nov. 25 again reversed its course until to-day it is quoted at 7c. to 7.05c., St. Louis, or 7.35c. to 7.40c., New York. In the six days of last week the British market declined 60s. per ton and in the last two days recovered 47s. of this loss, due, it is believed, largely to speculative influences. Domestic demand is not heavy, although fair sales were made at the low point last week. Inquiries to-day are reported as the largest in some time.

Old Metals.—Demand from consumers continues fair and values generally show little change this week. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	13.50
Copper, heavy and wire	12.50
Copper, light and bottoms	11.25
Heavy machine composition	10.25
Brass, heavy	8.25
Brass, light	6.50
No. 1 red brass or composition turnings	9.50
No. 1 yellow rod brass turnings	7.75
Lead, heavy	6.25
Lead, tea	5.00
Zinc	5.00

Antimony.—Chinese metal in wholesale lots for early delivery is quoted at 6.50c., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, imported from foreign producers, is quoted at 21c. to 22c. per lb., New York, duty paid, in wholesale lots for early delivery.

Chicago

Nov. 28.—Lead has gone up in sympathy with an advance by the leading producer. There is little trading in this metal, however, both buyers and sellers being indisposed to negotiate. Zinc took a sharp drop last week and, while it has stiffened during the past few days, is still below the quotation of Nov. 21. Copper is not in a strong position, although it is quoted the same as a week ago. The old metals are unchanged. We quote, in carload lots, lake copper, 14.37½c; tin, 37.50c. to 38c.; lead, 7.10c.; spelter, 7.05c.; antimony, 8.50c., in less than carload lots. On old metals we quote copper wire crucible shapes and copper clips, 11.50c.; copper bottoms, 9.75c.; red brass, 9c.; yellow brass, 7c.; lead pipe, 5.25c.; zinc, 4.75c.; pewter, No. 1, 23c.; tin foil, 26c.; block tin, 30c., all buying prices for less than carload lots.

St. Louis

Nov. 28.—On lead, we quote car lots: 6.95c. to 7.05c., and slab zinc, 7c. to 7.10c. On old metals we quote: Light brass, 3.50c.; heavy red brass and light copper, 7.50c.; heavy yellow brass, 4c.; heavy copper and copper wire, 7.50c.; zinc, 2c.; lead, 3c.; pewter, 15c.; tin foil, 20c.; tea lead, 2c.; aluminum, 9c.

REFRACTORIES PRICES

Concessions Are Reported in Both Fire Clay and Silica Brick—Demand Not So Active

PITTSBURGH, Nov. 27.—The market in fire clay and silica brick gives evidence of a lighter demand in that concessions from what are regarded as the regular quotations are appearing with more frequency than was the case recently. Ohio and Kentucky fire brick of high quality lately have been as low as $41 per 1000 at works and $43, previously the minimum in those districts, now is maximum except for very small lots. Moderate duty fire clay brick are down about $1 per 1000 in almost all producing districts, and while Chicago and Birmingham report advances on small sales of silica brick, the prevailing price on Pennsylvania silica is $43 and it is reported that some makers have wanted business badly enough to go below $40 to secure it. The old price of $45 on the latter still is being named by the larger producing interests, but it is admitted that sales are difficult with so many willing to take business for less.

Steel manufacturers, notably those who include sheets among their products, have been giving shipping instructions against old orders in silica and fire clay brick rather freely in the past few weeks. Apparently, it is planned to do a good deal of furnace repairing and rebuilding during the slack times believed to be immediately ahead. The fear of transportation snarls also probably prompts shipping directions, in order that reserves may be built up before weather conditions interfere.

The market for magnesite brick is a limited one at present prices. The cost, steel works men claim, is too high and many of them still are turning to chrome brick as a satisfactory substitute at a more reasonable price.

We quote per 1000 f.o.b. works:

Fire Clay:	High Duty	Moderate Duty
Pennsylvania	$43.00 to $46.00	$38.00 to $41.00
Ohio	43.00 to 44.00	38.00 to 41.00
Kentucky	43.00 to 44.00	38.00 to 41.00
Illinois	43.00 to 45.00	40.00 to 42.00
Missouri	43.00 to 45.00	38.00 to 42.00
Ground fire clay, per net ton		7.50 to 8.50
Silica Brick:		
Pennsylvania		43.00 to 45.00
Chicago		50.00
Birmingham		48.00
Ground silica clay, per net ton		9.00 to 10.00
Magnesite Brick:		
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.)		70.00
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)		43.50
Chrome Brick:		
Standard size, per net ton		50.00

PERSONAL

Frederick Best, secretary and director of Thomas Firth & Sons, Ltd., Sheffield, Eng., has resigned to become commercial manager of Bolckow, Vaughan & Co., Ltd., Middlesbrough. Mr. Best has been traveling in the United States and Canada for the past few weeks on business for the Firth interests and sailed Nov. 28, on the Mauretania for England. He has been connected with Thomas Firth & Sons since 1895, prior to which he was 12 years with William Jessop & Sons, Ltd., Sheffield. He became secretary of the Firth Company in 1902 and was made special director in 1909. Later he was appointed director in charge of the Tinsley steel department of that company. Mr. Best is also Firth's nominee director of Firth-Derihon Stampings, Ltd., High Speed Steel Alloys, Ltd., and chairman of the Firth-Brearley Stainless Steel Syndicate. In addition to these connections with the British companies, he is vice-president of Thomas Firth & Sons, Inc., of America and a director of the American Stainless Steel Co. Through his connections with the Firth companies in England, he was connected with the Firth-Sterling Steel Co. in this country. During the war, Mr. Best was appointed to the high speed steel advisory committee of the British Government, also acting as secretary of the aircraft steelmakers' committee.

Herbert A. Stanton, assistant treasurer in charge of credits of the Norton Co., Worcester, Mass., sailed from New York, Saturday, Nov. 25, on the Majestic for a two months' business trip in Europe.

George S. Davison, president, Allen S. Davison Co., Pittsburgh, which owns and operates the Basic Products Co. and the Sharpsville Furnace Co., has been appointed representative of the Pittsburgh Chamber of Commerce on the American committee of the International Chamber of Commerce.

Benjamin Drewes, general superintendent of foundries, Kissel Motor Car Co., Hartford, Wis., has resigned to accept the position of assistant general superintendent of foundries for Fairbanks, Morse & Co. at the Eclipse works in Beloit, Wis. Mr. Drewes will be assistant to General Superintendent R. J. Barr.

William D. Martin has been appointed assistant general manager of the Kenosha, Wis., works of the American Brass Co. (division Anaconda Copper Co.) to fill the vacancy caused by the resignation of James R. Anderson. Mr. Martin was transferred from Waterbury, Conn., to Kenosha in 1910 as purchasing agent, and more recently has supervised the sales department.

L. E. Rohland, for many years connected with the Crucible Steel Co. of America, is now associated with the Poldi Steel Corporation of America, 115 Broadway, New York, as special sales representative in charge of the demonstrating department.

A. A. Heller has taken over the management of the International Oxygen Co., Newark, N. J., in place of L. W. Hench, secretary and general manager, resigned.

H. H. Shierk has resigned as member of the sales force of the Kearney & Trecker Corporation at Chicago to become sales representative for the Miehle Printing Press & Mfg. Co., that city.

George Macnoe, manager Boston office, W. B. Connor, Inc., has been re-called to New York to take charge of the contractors' sales department, handling heating and pumping equipment.

Bruce W. Ott, for many years identified with the Stoddard-Dayton and Maxwell Motor Car companies, has been appointed manager of the Fisher Ohio Body Corporation, Cleveland.

Fred Glover has been appointed president of the Timken-Detroit Axle Co., to succeed A. R. Demory, whose resignation from this office became effective Nov. 1. Mr. Glover became associated with the Timken organization in July, 1919, as vice-president and general manager, going from Washington, where he had been chief of the Motor Transport Service, and later chief of the Motors and Vehicle Division. The only other change made is that of chairman of the board of directors, to which position H. W. Alden has been appointed.

C. H. Heist, superintendent of blast furnaces at the Mayville, Wis., plant of the Steel & Tube Co. of America, has been appointed assistant manager. W. C. Ratcliffe has been appointed superintendent of blast furnaces, succeeding Mr. Heist.

J. E. Stauffer, A. M. Byers Co., Pittsburgh, was elected president of the Pittsburgh Association of Purchasing Agents at the annual meeting of that organization on Nov. 22.

E. V. Wenzell will take the position of sales manager of Giddings & Lewis Machine Co., Fond Du Lac, Wis., on Dec. 1. Mr. Wenzell was connected with the Norton Co., Worcester, for 10 years as demonstrator and salesman, and when war broke out he was made captain in the Ordnance Department, during which time he spent 19 months in France in charge of all grinding equipment. On his return, he was connected with the Modern Tool Co., Erie, Pa., as assistant sales manager for 18 months, and for the past year and a half was with the Cincinnati Grinder Co. as salesman.

Carl G. Schluederberg, assistant to the managers of the supply and merchandising departments, Westinghouse Electric & Mfg. Co., left recently for a four-months trip in the Orient to study business conditions there. Mr. Schluederberg is active in electro-chemical circles and is president of the American Electro-Chemical Society.

John H. Peckham, who for several years has been New England representative of the Norton Co., Worcester, Mass., is now associated with the sales force of Henry Prentiss & Co., 149 Broadway, New York, as a grinding machine specialist covering the entire territory of the company in New England, New York, and parts of New Jersey and Pennsylvania.

J. Leo Scanlon has been appointed Buffalo representative of the Mahr Mfg. Co., with offices at 950 Ellicott Square, Buffalo.

William T. Rayner, treasurer, Gilbert & Barker Mfg. Co., Springfield, Mass., sailed recently for a pleasure trip through South American countries,which will extend over several weeks.

H. W. Bartling has been transferred from the Cleveland to the Pittsburgh district sales office, Allis-Chalmers Mfg. Co.

R. R. Robinson has been appointed assistant manager of purchasing by the Packard Motor Car Co., Detroit.

William H. Graves, assistant chief metallurgist, Packard Motor Car Co., Detroit, has been appointed chief metallurgist to succeed C. E. Barnes, who has resigned.

Lorenzo C. Dilks has been made vice-president of Starrett Brothers, 101 Park Avenue, New York, engaged in general building construction. He will have his office at 8 South Dearborn Street, Chicago. The president of the new company is Paul Starrett, formerly president of the United States Realty & Improvement Co., and of the George A. Fuller Co. Mr. Dilks has long been identified with the steel trade. He began an engineering engagement with the Pencoyd Iron Works in 1892 and specialized for years in bridge construction work. At one time he was Eastern sales manager for the Eastern Steel Co. and later became president and general manager of Milliken Brothers, New York, manufacturer of structural steel work.

Frank T. Chapman, for many years manager of sales of the Vento cast iron indirect radiation of the American Radiator Co., has become general manager of the Hargrave Service Systems, 25 West Forty-third Street, New York, supplying what is called a scientific salesmanship service dealing with fundamentals of human nature in connection with sales.

The Wilson Welder & Metals Co., New York, has just completed a repeat order for welding machines for the Polish State Railways, making a total of 13 Wilson machines for this railroad.

OBITUARY

FREDERICK G. NIEDRINGHAUS, retired tinware manufacturer, died at his home in St. Louis on Nov. 25, from heart disease after an illness of 10 days. He was 86 years old. Mr. Neidringhaus was born in Westphalia, Germany, in 1837, and went to St. Louis when 18 years old. In 1856, he and his brother, William F. Niedringhaus, went into the tinware business, which was later incorporated as the St. Louis Stamping Co., and in 1899 as the National Enameling & Stamping Co. He retired as president in 1908. The brothers were among the first manufacturers of stamped tinware in this country. He founded Granite City, when a plant was established on a tract of farm land, part of what later became a great steel industrial center. Mr. Niedringhaus served one term in Congress. He is survived by his wife, a son, Thomas K. Niedringhaus, vice-president of the National Enameling & Stamping Co.; and five daughters.

HENRY L. KINSLEY, Wellesley, Mass., New England representative of the Warner & Swasey Co., machine tools, died Wednesday, Nov. 22, at the Natick Hospital, Natick, Mass., following an operation. Mr. Kinsley appeared on the road to recovery immediately after the operation, but on Tuesday serious complications developed. He was a native of Stoughton, Mass., and was born 68 years ago. Practically all his business life was spent in the machine tool industry. He represented the Warner & Swasey Co. with offices at Boston for more than 15 years, and probably was one of the best known machine tool men in the New England territory. Previous to his association with the company he was with the Fairbanks and the Manning, Maxwell & Moore companies.

THOMAS M. MESTON, president, Emerson Electric Mfg. Co., St. Louis, died there on Nov. 23. A verdict of suicide was rendered by the coroner, an autopsy showing the presence of cyanide of potassium. Mr. Meston was 51 years old. He was born in Scotland and went to Canada with his parents when a child. In 1886 he went to St. Louis and was employed by the Simmons Hardware Co. In 1897, he was made secretary of the Emerson company, vice-president in 1905, and president several years later. He leaves a wife and two children.

CYRUS MARK, formerly identified with the Mark Mfg. Co., Chicago, died at his home in Evanston, Ill., Nov. 25, aged 86. Until 1910 he was associated with his sons, Clayton and Anson Mark, in the Mark Mfg. Co., with plants at Evanston, and Zanesville, Ohio. The company was later merged into the Steel & Tube Co. of America, of which Clayton Mark is chairman.

JOHN JACOB BOGERT, president of the Bogert-Carlough Co., Paterson, N. J., died as the result of an accident on Friday, Nov. 17.

HEDLEY P. CARTER, vice-president and treasurer, H. C. Cook Co., manufacturer of sheet metal novelties, Ansonia, Conn., died at his home in that city on Nov. 19, aged 51.

CHARLES GARLAND, treasurer, Garland Mfg. Co., Pittsburgh, died at Linesville, Pa., on Nov. 23. He was born in Ireland, Jan. 18, 1869, coming to this country in 1883. He was secretary of the Westinghouse Machine Co. for a number of years, but since 1908 had been affiliated with the Garland Mfg. Co., in association with his brothers. He made his home at Edgewood, Pa., a suburb of Pittsburgh.

The eight-hour day is gradually being abandoned in Germany either by permission of the official inspectors or by mutual consent of employer and employee, according to the recent reports by the Prussian industrial inspectors. Last year more than 4500 business concerns were given permission to work longer hours, and in 1920 at least half that number received such permits.

GERMAN FOUNDRY IRON LOWER

Slight Pig Iron Reduction Does Not Affect Steel Prices

(*By Cablegram*)

WILMERSDORF, BERLIN, GERMANY, Nov. 27.—Foundry iron No. 1 has been reduced (from 110,173 m. per metric ton last week) to 107,765 m. [At 1 5/16c. per 100 m., the new price is equivalent to $14.37 per gross ton, compared with $18.19 last week, based on 1⅝c. per 100 m.]

Steel prices are unchanged. [Falling values of the mark, however, have dropped steel prices in international trade, though the mark quotations remain, as last week, at 161,600 m. for ingots, 219,200 m. for steel bars and 332,000 m. for thin sheets.]

Changing Values of Currency and Prices in Germany

BERLIN, GERMANY, Nov. 8.—The general price-rise brought by the further depreciation of the mark, which began in late June, continues; and last month it took unexampled dimensions, bringing up with it prices of all metal products. The *Frankfurter Zeitung's* wholesale commodities index for Nov. 1, which is based on 100 for July, 1914, showed 94,492, against 43,223 on Oct. 1, 29,116 on Sept. 1, and 4,217 at the beginning of 1922. The figures show how even in times of rapid exchange depreciation prices follow currency; and they justify the belief that were the mark stabilized, German prices would speedily reach world-market level.

The rise in steel and iron prices continues. A couple of months ago the former monthly rises were replaced by weekly rises, and now increases are sometimes made at still shorter intervals. The latest prices for pig iron, with earlier figures for comparison, are (in marks per metric ton):

	Nov. 8	Oct. 11
Hematite	95,243	38,099
Foundry iron No. 1	79,342	32,696
Foundry iron No. 3	79,272	32,626
Siegerland steel-making iron	75,320	31,497
Spiegeleisen	77,356	34,494

The shortage of pig iron is acute, and despite complaints that the buying power of the population has been killed by the extraordinary price rise, all pig iron is not only immediately bought up, but more is imported. The Essen trade journal *Bergwerks-Zeitung* reports that some iron works have slightly cut down production; but the sole reason given is the insufficiency of paper mark working capital to finance production on an adequate scale; and the traditional remedy against this deficiency is the creation of more paper mark capital by means of inflation. The steel concerns get this new artificial capital through their credit operations; and in the lull which follows every mark exchange fall, it is as easy to finance production on the new higher price level as it was on the older lower level.

The upward movement of the products of the Steel Syndicate has been equally great. Prices here are in marks per metric ton:

	Nov. 8	Oct. 11
Ingots	112,800	57,640
Blooms	124,500	63,630
Construction forms	152,100	77,780
Bars	154,000	78,700
Wire rods	165,300	84,520
Thick sheets (over 5 mill.)	173,000	88,460
Thin sheets (under 1 mill.)	228,800	116,970

The lowest hourly wage is 66 m., the highest 89½ m. per hr., or from 528 m. to 716 m. per day. Characteristic, nevertheless, is that manufacturers complain of inability to export. The new American tariff, it is asserted, will close American markets, and the United States, France and Belgium will undersell Germany in finished metal goods. This propaganda has been so successful that a project has been submitted to cut down some of the export duties.

British Iron and Steel Market

Pig Iron Is Easier—Continental Prices Are Stiffer, Due to Fuel Difficulties, and Business Is Hard to Transact

(By Cable)

LONDON, ENGLAND, Nov. 28.

Pig iron is easier on account of cheaper fuel and lessened demand for foundry grades. Shipments to the United States continue on old contracts, and sales of special analysis iron have been made covering March shipment. But new demand from America for foundry iron has become almost stagnant. Home inquiry is improving but other export buying is hampered by depreciating exchange quotations.

Hematite makers are fairly busy and their output is being increased. Prices are firm.

Continental demand for fuel has decreased considerably and the market is easier.

Foreign ore is quiet. Sellers of Bilbao Rubio ask 22½s. ($5.08), ex-ship Tees.

Home demand for finished iron and steel is expanding. The railroads are considering next year's requirements and small lots are being placed. The Government is inviting railroad managers to meet to consider large electrical and other undertakings.

Export buying generally is quiet. Prices are firm. The Continental fuel situation is causing apprehension to Continental makers and prices generally are higher. Business is exceedingly difficult, owing to variations in quotations. Plate orders are urgently needed.

Tin plate has an easier tendency, on account of the recent weakness in tin. There is a fair amount of sales below the minimum prices fixed by the works. Export business is steady, though the individual quantities are unimportant. Home buying is good.

There have been moderate sales of galvanized sheets. The works generally are comfortably placed, but are hesitating to quote beyond January, owing to the uncertainty of spelter.

Japan is still purchasing black sheets but other markets are quiet.

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $4.52 per £1, as follows:

[illegible] delivered	[illegible]		to	£1	10s.	$6.33 to	$6.78
[illegible] No. 1 foundry	3	16½				21.81	
Cleveland No. 3 foundry	4	12				20.79	
Cleveland No. 4 foundry	4	7½				20.11	
Cleveland No. 4 forge	4	4	to	4	5	18.98 to	19.21
[illegible]	4	0				18.08	
[illegible]	4	12	to	4	14	21.02 to	21.24
[illegible]	14	0				67.80	
Ferromanganese*	14	10	to	£14	15s.	65.54 to	$66.67
Rails, 60 lb. and up	7	5	to	8	0	32.77 to	36.16
[illegible]	7	0	to	7	5	31.64 to	32.77
Sheet and tin plate bars, Welsh	7	0	to	7	7½	31.64 to	33.33
Tin plates, base box	0	19½	to	0	19¾	4.41 to	4.46
						C. per Lb.	
[illegible]	8	10	to	9	0	1.52 to	1.82
Boiler plates	11	10	to	12	0	2.32 to	2.42
[illegible]	9	0	to	9	10	1.82 to	1.93
[illegible]	8	5	to	8	15	1.66 to	1.77
Beams	8	5	to	8	15	1.66 to	1.77
[illegible]	9	0	to	9	10	1.82 to	1.93
[illegible]	16	10	to	17	10	3.41 to	3.50
[illegible]						1.81	
[illegible]						2.03	
[illegible]	11	5	to	11	10*	2.28	2.32*
Cold rolled steel strip						1.48	
Cotton ties, Indian specifications	15	0				3.03	

*Export price.

Continental Prices, All F. O. B. Channel Ports, Delivery as Specified

Belgium, Jan., Feb.	£4	7½s.	to	£4	10s.	$20.11 to	$20.34
Luxemburg, Jan., [illegible]							
France, Jan., Feb.	4	7½	to	4	10	20.11 to	20.34
Billets:							
[illegible]							
[illegible]							
[illegible]							

Wire nails (keg basis):							
[illegible]	[illegible]	14½				3.28	
[illegible]	[illegible]	20½				4.63	
Wire rods, 5 mm. (0.2 in.):							
[illegible]	[illegible]	5	to	10	7½	32.77 to	46.89
Angles:						C per Lb.	
Belgium	7	7½				1.49	
Tees:							
Belgium	8	5				1.66	
Merchant bars:							
Belgium, Jan., Feb.	6	15				1.26	
Luxemb'g, Jan., Feb.	6	12½	to	6	15	1.24 to	1.36
France, Jan., Feb.	7	0	to	7	2½	1.41 to	1.44
Germany, Mar., Apr.	6	15				1.36	
Joists (beams):							
France, not quoted.							
Belgium, Jan., Feb.	6	0				1.21	
Luxemb'g, Jan., Feb.	6	2½				1.24	
Channels:							
Belgium	7	10	to	7	12½	1.51 to	1.54
¾-in. plates:							
Germany, Dec., Jan.	6	10				1.31	
Belgium, Jan.	6	10	to	6	12½	1.31 to	1.34
Luxemburg, Jan.	6	10	to	6	12½	1.31 to	1.34
France, Jan.	6	10	to	6	12½	1.31 to	1.34
No. 8 gage wire:							
Belgium	14	10⅝				2.93	

Less Pig Iron Demand from America—Continental and Export Business Poor

LONDON, ENGLAND, Nov. 16.—The advent of the general election has rather tended to moderate dealings in the iron and steel markets, but a certain amount of business has been put through. Less and less is heard of American demand for the better grades of foundry iron, but sales of special irons are still taking place on United States account, and shipments up to March have been booked. With the falling off in the American inquiries, the market here has been easier, as other export buying is quiet, Continental purchases being hampered by the erratic movements in the exchange rates. There is, however, some increase in requirements, and this has tended to keep the market at its present level. Output has been increased by one or two furnaces, but producers are still far from disposed to making any general increase in production, owing to the high cost of fuel. The current quotation for No. 3 Cleveland G. M. B. is about 92s. 6d., but makers would grant concessions for shipment beyond December.

In finished iron and steel, more orders have been coming to various steel works, more especially in connection with structural orders in the home trade, and certain works are now better situated, but in the main, order books are far from filled. Export buying, apart from Colonial Government orders, is slow, but it is anticipated that before long India will be beginning to place her requirements for next year and negotiations are already proceeding for rail contracts.

Plate makers are badly wanting orders, particularly for heavy specifications, but these should be supplied soon, as more and more orders for new boats are being placed by the Orient, Ellerman, Elder, Dempster and other lines, and here it is interesting to note that Messrs. Harland & Wolff have just completed the construction of what is claimed to be the world's largest motor liner for the West African mail and passenger services. Shipping companies are evidently feeling that prices are not likely to get much lower for some time and indeed, with costs at their present high level, it is difficult to see how steel makers can make more substantial reductions; from the financial reports of various works it would seem that in many cases the last financial year resulted in losses.

Business in the continental markets has been completely disorganized by the violent movements in the exchange rates. Merchants who were covered in francs have been enabled in some cases to sell advantageously at comparatively low prices, but most of the continental works have been disinclined to follow the fall in the exchange and sterling quotations in general have remained unchanged. It is reported, however, that works on that side are badly in want of orders for plates and beams, and for these specifications would, in several instances be prepared to take a very low figure. There has been a certain amount of speculation as to whether continental prices will go much lower, but opinion seems to rule that this can hardly be expected as the decrease in the franc means an increase in the cost of production.

Shaping Management to New Conditions

(*Continued from page* 1432)

pany were outlined. Two plants are operated, one at Groton and one at Cortland, N. Y., and about 1000 persons are employed. The paper dealt with a specific type of manufacture, the continuous producing of Corona portable typewriters, their cases and a few accessories, and for their particular type of manufacture it was said to have been found expedient to departmentalize highly and to functionalize thoroughly the entire organization. Further, individual departments have been studied and every operation standardized.

Manufacturing is divided into two sections, parts to finished-parts stock, and assembly of machines from that stock. The parts-manufacturing department is made up of machine departments and finishing departments, all inspection work performed on parts, as well as the tool room and wood shop, being also classified under parts manufacturing. The flow of parts is with few exceptions continuous and there is comparatively little back flow of parts from a higher to a lower floor.

Mr. Brown outlined the general organization, and briefly noted the functions of the various departments and executives. An interesting feature was the two groups which act as consultants to the works manager in factory matters. One is the factory advisory committee, which is made up of all heads of departments except supervisors, and meets bi-monthly, passing on all major factory problems. The other advisory committee includes the former and also the supervisors, and are open forums for the discussion of any topics of general interest. "These conferences," said Mr. Brown, "enable the management to present information on sales costs, items of expense and other matters which ordinarily are not brought to the attention of foremen, but which are of interest and tend to stimulate enthusiasm and inspire confidence." These meetings are held bi-monthly also, and are addressed periodically by officials of the company.

The major part of Mr. Brown's paper dealt with the manufacturing organization and the control of operations. As a background to the story, figures as to the number of parts made and the operations performed were given. There are 671 parts on the typewriter, 139 on the case and 110 on the folding stand, the total being 920 parts. There are 355 different parts on the typewriter, 61 on the case and 37 on the stand, a total of 453 different parts. There are 1999 manufacturing operations on the typewriter, 210 on the case and 205 on the stand, a total of 2414 operations exclusive of inspection. Adding sub-assembly operations, assembly operations and inspection, the total operations approximate 4600.

Under control of operations the standardization of mechanical and chemical methods, including and establishing of manufacturing routines was described, also the standardization of tools and machines. Production tools are for the most manufactured in the plant, but machinery is not specially made if results can be secured with a standard product. The routine in connection with the designing, making, storing and issuing of tools was outlined.

Standards Arrived at by Research

Research to secure standards of operation includes time study and experimental work. A routine instruction card is first made out for the part to be studied and standardized. Proper methods of manufacture are furnished by the methods section, after which the time study is made. The time study man determines the rate, which is passed to the head of the planning department and the works manager on a proposal sheet, for their approval. If approved, an instruction card, showing the method of operation, is issued. The operator then performs the work, according to the instruction card, using what is called an operation cost ticket, which upon completion accompanies work to the planning center, where time is recorded and inspection made. The operator's accomplishment is then posted on the record of the employees' efficiency on work completed. The routine of these records was outlined, and were said to be of value in showing relation of accomplishment to actual standards. Factory experimental work is under direction of the methods section, whose duty is to devise and maintain the best methods of manufacture and procedure that can be found. This is accomplished by research work on parts, careful reading of technical papers, visits to other plants, and in many other ways.

The planning department, the methods scheduling, routing, controlling and dispatching were treated at length. A record of parts is kept in what is known as the parts ledger which shows all parts on order, in process and in finished parts. From this a manufacturing order is issued, which is sent to a balance of stores ledger clerk from whom it goes to the control board division for use in planning on the control boards. The control board clerk checks up all tools and machines required in manufacturing for the order, and from a machine burden record proceeds to lay out his work on the control boards so that it will be finished on the date specified. All work shown on the control board is copied on what is known as planned operation lists by the dispatch clerk. A copy of the list is sent to the department supervisor and another to the planning center. Operation cost tickets are used, one copy going to the cost department and one to the dispatch clerk, from which the completed work may be posted on the control boards. A bill of material is sent by the dispatch clerk to the storekeeper, who issues material to the department indicated, at the time specified. All parts are forwarded from one operation to another on parts forwarding and identification tickets.

The assembling operations were taken up in detail. The first step is known as sub-assembling. Parts are requisitioned to jobs from the finished-parts stock room and delivered to the jobs in standardized trays to increase operator efficiency. Operations are on piece work and highly standardized tools and fixtures are used. When completed the sub-assemblies are sent to the assembly stock service division, placed in trays with other parts and issued to the jobs on which they are used. Major assembly work is progressive, there being a certain number of assemblers performing the same work on a job; starting with the numbering of the frame the work travels from one end of the room to the other, so that there is a continuous flow until assembly work is completed.

A card for recording the time spent by the assemblers on the various jobs is unique. The card bears the number and name of each job, serial number of the machine, which the card accompanies, and place for date and clock number of the operator. As it travels forward with the machine the stub is filled in by the operator for the job which he performs and is torn off and retained. At the end of the day all stubs are turned in to the department clerk and checked. This clerk makes out an output report for each job, and also time tickets for each operator. From data furnished by the cards a close control of assembly operations is said to be maintained.

Many Economies from Precise Control

"Thorough functionalizing of the factory organization and the resulting development of close control on all manufacturing activities has brought about many economies," said Mr. Brown. "The control of manufacturing operations through the study of proper routing and the elimination of all unnecessary operations has resulted in lower manufacturing costs. This has been appreciably helped by the establishment of definite and precisely understood instructions for all operations whether piece work or day work. We are not content with securing efficiency through piece work, but we have also established control of production on day work on both manufacturing operations and detail inspection operations. By maintaining accurate records we are able to compare individual efficiencies on the same or on similar operations, and gradually we are establishing dependable standards for operations not on piece work as well as for those on piece work. The direct saving in labor cost through the establishment of standards and the maintenance of records has been very high, resulting in lower costs for operations and higher returns to the operator."

Control of operations through the planning system,

and especially through the functioning of the route division, are said to have permitted great reduction in process and finished-parts inventories. The stores system employed has had the same effect on raw materials inventories and a close control of assembling operations through the daily posting of string boards in the works manager's office has reduced assembly inventories by permitting operation on smaller cushions between jobs.

As an indication of the value of the accurate production control mechanism employed, the operation between the Cortland and Groton plants was outlined. Parts made at Groton are carried each week day by motor truck to Cortland plant, 11 miles away, where all sub-assembly operations and all major assembly operations are performed. Carrying cases are also manufactured. The truck takes over the parts and brings back assembled machines in their cases. In winter the 11 miles of road is kept open by a tractor-operated snow plow, and in the two years of operation, in the face of blizzards and other unfavorable conditions, it was stated that not one hour's loss of production has been suffered through failure of parts to reach the Cortland plant, or the failure of assembled machines to reach Groton.

The relations with employees and employee activities was another part of Mr. Brown's address that was received with interest. Unusual effort has been made to gain the confidence of the members of the organization in management policies. The problem of an industry in an isolated village is difficult because the people are so largely dependent on themselves for recreation and amusement, Mr. Brown said. To help in this the Corona band was organized and gymnasium and athletic activities provided.

Sessions Devoted to Sales And Statistics

At a session devoted to statistical compilation and some of its uses as a function of scientific management, H. B. Horwitz, Joseph & Feiss Co., Cleveland, explained the organization, operation and economies realized through the centralized statistical department of his company. Floyd W. Woodcock, Day & Zimmerman, Inc., Philadelphia, discussed the value and application statistical of compilations in the operation of public utilities. Malcolm C. Rorty, American Telephone & Telegraph Co., New York, presided.

A sales session which had for its subject "Master Budgets of Sales and Production," was presided over by Charles W. Hoyt, Hoyt's Service, Inc., New York. W. W. Duncan, manager of distribution, Hood Rubber Co., Watertown, Mass., explained the methods of his company in analyzing the market and establishing coordinated schedules of sales production and finance on the basis of that analysis. E. E. Brooks, of the Dennison Mfg. Co., Framingham, Mass., explained the system used by his company, which was unique because of the wide variety of items sold. A session devoted to the supervision of personnel was intended to consider the durable things in personnel work.

Officers Elected

Richard A. Feiss, Joseph & Feiss Co., Cleveland, was re-elected president of the society, and E. W. Clark, 3d, Philadelphia, was re-elected treasurer. John H. Williams, Day & Zimmerman, and Keppele Hall, Joseph & Feiss Co., Cleveland, were elected directors in place of R. M. Hudson, of the Department of Commerce, Washington, and J. C. Heckman, Cheney Brothers, New York.

Meeting of Iron and Steel Jobbers

The executive committee of the American Iron, Steel and Heavy Hardware Association, A. H. Chamberlain, secretary, held its semi-annual meeting in New York on Thursday, Nov. 23. It was presided over by W. L. Niekamp, Beck & Corbitt Iron Co., St. Louis. A feature of the meeting was a luncheon at the Harvard Club, to which were invited a number of Eastern representatives of the jobbing trade and the New York sales managers of various steel companies. Addresses were made by Carl Snyder, of the statistical department of the Federal Reserve Bank, New York, and by C. S. Trench, of C. S. Trench & Co., New York.

MATERIALS OF ENGINEERING

Investigations Initiated by American Society for Testing Materials

The steel committee of the American Society for Testing Materials, known as Committee A-1, has the following under consideration among other things:

The sub-committee on steel castings is to undertake a revision of the society's present standard specifications for steel castings and has appointed a sub-sub-committee with the following personnel to investigate the subject and prepare a report:

Standard Steel Works Co., L. H. Fry, chairman; American Foundrymen's Association, A. H. Jameson; Bureau of Construction and Repair, U. S. N., F. B. Olcott; Eagan-Rogers Steel & Iron Co., J. I. Rogers; General Electric Co., J. M. Darke; Westinghouse Electric & Mfg. Co., T. D. Lynch.

The sub-committee on boiler steel is giving consideration to marking requirements for boiler steel; substitution of an increase in elongation requirement for firebox steel in lieu of an additional homogeneity test; and to permissible variations in dimensions and out-of-round of rivet bars.

The sub-committee on tool steel has made a provisional draft of specifications containing two features: a complete statement of purposes for which the various classes of carbon tool steels are frequently used, and permissible variations in dimensions of various sizes of tool teels.

The sub-committee on steel sheets has organized three sub-sub-committees to prepare specifications for cold-rolled strip steel, for automobile sheet steel, and for galvanized roofing sheets. Quite a bit of work has been done individually on specifications for cold-rolled strip steel, a number of separate specifications having been analyzed. In the preparation of specifications for automobile sheet steel, the sub-committee is co-operating with the Society of Automotive Engineers.

A revision of the tentative specifications for steel plates for forge welding is to be undertaken. The revision will be in the hands of a special committee under the chairmanship of F. N. Speller, metallurgical engineer, National Tube Co., Pittsburgh, and the committee plans to keep in touch with what is being done on similar lines by the American Welding Society and the boiler code committee of the American Society of Mechanical Engineers.

To Study Plate Tolerances

A special committee on plate tolerances has been established to look into the revisions of permissible variations in weight and thickness of steel plates. Past president A. A. Stevenson has been appointed chairman of the committee.

The Science of Human Effort

At the recent meeting of the British Institute of Metals Dr. R. S. Hutton called attention to the much greater attention welfare work is now receiving in Great Britain. Previous to the war only 25 firms had established any department of this character, while today about 1000 firms have such departments. Apart from this welfare work, there is no doubt that the application of psychological methods to human effort has lagged behind the scientific study of materials. Recently, the foundation of the Institute of Industrial Psychology, to supplement the work of the Industrial Fatigue Research Board, has resulted in the appointment of C. S. Myers, late professor of psychology of Cambridge University, as director.

Studies of vocational selection, fatigue, time and motion, as well as other aspects of the problem, have been undertaken. Attention is being given to the Binet-Simon test, which had already been applied somewhat extensively in educational work as well as in the United States Army. The same type of psychological test has been made in Germany since the war, and some of the largest industrial corporations there have ascribed to it their success in getting back to

something like pre-war efficiency. This applies to such well known establishments as Carl Zeiss, Siemens and Halske, Osram Lamp Works, German General Electric Company, Krupps, as well as on the railroads and other public works.

Fatigue studies have covered a vast field, including environment, hours, physical condition, rest pauses, methods of work and other factors. No simple test has been devised to measure fatigue, but enough is known to make discrimination possible between healthy fatigue and its more detrimental and permanent occurrences.

In time and motion study, the English idea is to get away from the American forms of stimulus in the way of bonus, and to find the easiest way of performing a task, based on the innate rhythm underlying all human actions when carried out with a minimum of fatigue. In improving the process of metal polishing, as an example, careful study reduced the time occupied by 26 to 35 per cent, and, in addition, when the best way of doing the work has been ascertained, people may be taught to earn the standard wage within a few days, instead of many months.

Standards for Oil Well Casing Threads to Be Considered

WASHINGTON, Nov. 28.—Standards for oil well casing threads will be discussed at a meeting in St. Louis, Dec. 6-8, to be attended by representatives of the American Petroleum Institute and a sub-committee of the National Screw Thread Commission on special threads. Among the members of the sub-committee are three employees of the Government and as such may be considered as representative of the United States. They are: Maj. J. O. Johnson, of the gage section of the War Department, chairman of the subcommittee; Commander M. A. Libbey of the Navy; and H. W. Bearce, of the Bureau of Standards, who is also chairman of the commission.

Woodward Iron Co. Disaster

BIRMINGHAM, ALA., Nov. 27.—Final reckoning of the Woodward mine disaster on Nov. 20 showed 86 dead and 65 wounded. The chances were that all the wounded would recover. Total loss in damage to the mine, Dolomite No. 3, and in compensation of the victims is estimated at $300,000. The mine damage is not great and will be shortly repaired. The victims will be cared for under the Alabama compensation act, Woodward Iron Co. being protected by insurance companies. The cause of the disaster was the setting fire to dust in the main entry caused by loosened tram cars leaving the track and striking the electric cable, which emitted sparks that ignited the dust. Official investigation by the coroner began Monday. The mine was considered a model one. Many of the 475 men in the mine when the explosion occurred escaped through other openings, the mine having several.

Meeting of Quad City Foundrymen

The third meeting of the Quad City Foundrymen's Association was held at the Chamber of Commerce, Davenport, Iowa, at 6.45 p. m. Nov. 20. The attendance was large, 80 being present. A permanent organization was formed and the members passed a constitution and by-laws as recommended by the constitution and by-laws committee.

Henry Bornstein, chief chemist Deere & Co., gave a talk on "Chemistry and Cast Iron." This was followed by a discussion which had to be curtailed in order that the meeting could close at 10 o'clock, which had been decided upon as the proper closing time.

The next meeting is to be held in Moline, Ill., at the new LeClaire Hotel, Dec. 18.

A. E. Hageboeck is president of the association, John Ploehn, vice-president, and R. G. Van Alstyne, secretary-treasurer.

REFRACTORY RESEARCH

Manufacturers Will Conduct Inquiry as to All Uses

The Refractories Manufacturers' Association, Oliver Building, Pittsburgh, has undertaken an important survey of the refractory industry, which has for its object the obtaining of a large amount of information in regard to furnace conditions which it is believed will be of much value to manufacturers and users of refractories.

This survey will probably not be completed for more than a year, and it is hoped that preliminary reports will be made at the end of the first three months, the first half year and so on, until the survey is completed. These reports will cover the information which will be gathered by using a rather elaborate questionnaire, which will be distributed to consumers of refractory brick in the thirteen industries to which the bulk of this material goes. These include blast furnaces, stoves and connections; open-hearth furnaces and metal mixers; heating, puddling and forge furnaces; cupolas; malleable furnaces; oil refineries; gas plants; glass houses; by-product coke ovens; zinc, copper and lead refineries; boilers; cement, lime and plaster kilns and kilns for burning ceramic products.

The questionnaire covers temperature and combustion conditions found in the typical furnace, abrasion, slag action, the presence or absence of uncommon furnace gases, spalling conditions, loads, insulation, character of draft, etc. This information will be sought in the industries named and the answers to the questionnaires will be sent to the Mellon Institute of Industrial Research, at Pittsburgh.

Industrial Conference at Buffalo

BUFFALO, Nov. 24.—Elimination of waste and wider development of safety standards were the two outstanding features of the sixth annual industrial conference of the State of New York held at the Lafayette Hotel, Nov. 21, 22 and 23. Various papers were read and addresses made. Practically all the speakers agreed that much of the prevalent waste in industry would be eliminated through a better co-operation between capital and labor. Standardization was urged by one speaker as the most desirable means of eliminating waste. Another speaker on the same subject urged that labor should aline itself on the side of labor saving devices rather than against them, as a solution to the problem.

Henry D. Sayer, industrial commissioner of the State, intimated that he would resign his post shortly after the new administration takes office Jan. 1.

At the opening session, Tuesday evening, W. D. Baldwin, chairman of the board of directors of the Otis Elevator Co., urged the creation of a panel of about 150 representative business men from which arbitration bodies of five or six members could be drawn to act on all industrial problems and difficulties.

Imports into Japan

WASHINGTON, Nov. 28.—The following table shows imports of iron and steel articles and machinery into Japan in September and October, as reported to the Department of Commerce by cable:

	September Yen	October Yen
Pig iron, ingots and slabs	1,970,000	2,000,000
Bar iron, rods, plates and sheets	6,740,000	6,320,000
Pipes and tubes	290,000	240,000
Machinery	9,120,000	7,160,000

Civil service examinations are announced for assistant engineer in irrigation and drainage and for topographic and subsurface draftsman. Requests should be made for form 1312, stating the title of examination desired, and applications must be filed with the United States Civil Service Commission before Dec. 26.

Plans of New Companies

The Tile Products, Inc., 314 West Forty-seventh Street, New York, has been incorporated with a capital of $150,000 to manufacture building tile and kindred products. Immediate production will be delayed for a time pending preliminary developments. Officials of the company are identified with the Beaver Floor Tile Co., New York. The incorporators are: E. L. Hendrickson, F. Seller and H. A. Treat.

The Pavo Machinery Co., Brooklyn, N. Y., has been incorporated with a capital of $30,000 to manufacture machinery and parts. It is still in the process of organization. The incorporators are O. Heyman, T. B. McGirr and J. A. Voice.

The Dunbrack Tool & Die Co., a Massachusetts corporation, capitalized at $20,000, of which W. H. Dunbrack is president, has been organized to succeed Charles H. Lucas, 108 Alder Street, Waltham, Mass., who has been engaged for the past 15 years in the manufacture of tools, dies and gages. In addition to experimental instrument work, the new company will manufacture jigs, fixtures, cutters, gages, subpresses and open dies. Plant extensions in the near future are under consideration. The officials of the new company were previously associated with the Keystone Watch Case Co.

The Reid Air Spring Co., 121 George Street, New Haven, Conn., was recently incorporated with a capital of $100,000 to manufacture air springs, shock absorbers, automobile parts, etc. Equipment is being installed in a factory at 229 Commerce Street, New Haven. It is expected that production will be started before Jan. 1. Contracts for construction and equipment have been awarded. Edward Reid is president and general manager.

Edward J. Carnes, 36 Bradshaw Street, Medford, Mass., is president and treasurer of the Edward J. Carnes Co., recently incorporated under Massachusetts laws with a capital of $50,000 to do structural steel erection work of all kinds, including buildings, bridges and industrial equipment. Mr. Carnes has had charge of the erection of many large structures in and about Boston, having been superintendent of erection, New England Structural Co., Boston, for several years. During the war he was prominently identified with Government work at Halifax and New Jersey. The new company has several contracts, including the steel for the Milk Street Realty Co., Milk Street, Boston, and is doing work in Lowell and Lawrence, Mass., and also Providence, R. I.

The Keystone Foundry Co., Lebanon, Pa., recently completed the construction of a steel building and has added some modern equipment. It will produce machine molded soft gray iron castings.

The Protect Your Home Lock Co., 309 South La Salle Street, Chicago, which was recently incorporated with a capital stock of $50,000, will have its manufacturing done by contract and is now receiving bids. The incorporators are E. M. Wolon, W. B. Ginsberg and J. C. Wolon, secretary.

The H. R. Kuhnhardt, Jr., Corporation, 17 Battery Place, New York, has been incorporated with a capital stock of $400,000 to manufacture refined metals, alloys, etc. According to its very comprehensive charter the company may manufacture many products, but it is definitely understood that it will not deal in steel products in the near future. It does considerable South American buying of general commodities. The incorporators are: W. W. Wait, E. Armstrong and L. Debrigard.

The Lanton Auto Equipment Co., New York, was recently incorporated with a capital stock of $150,000 to manufacture automotive equipment and parts. Nothing definite has been decided about its future activities, since organization plans are still in the making. H. W. Nuckols and J. A. Hanf are the incorporators. The company's immediate representative is J. M. Gibbons, 3841 Grand Central Terminal, New York.

The Grove Electric Corporation, 67 Wall Street, New York, has been incorporated with a capital of $75,000 and will engage in the construction of high-voltage transmission lines in Cleveland and contiguous territory. William H. Grove, president of the company and an engineer of wide experience, is now supervising operations in Cleveland. The other officers are: Herbert M. White of the Springs Co., 67 Wall Street, New York, secretary-treasurer; R. C. Lewis, vice-president; and J. F. Cleary, director.

The A. L. Wagner Mfg. Co., 132 King Street, New York, has been incorporated with a capital of $50,000 to manufacture metal goods and plated metal specialties. However, no manufacturing is being contemplated at the present time, the organization merely taking over the established business of Mr. Wagner, which has handled a general line of metal goods. A. L. Wagner is the chief incorporator.

The Pacific Foundry & Machine Works, Inc., Portland, Ore., was recently incorporated to manufacture iron, steel and other metal castings, taking over a business already established. John M. Joyce, 606 Concord Building, Portland, Ore., is corporate representative.

The Swan Metallic Seal & Cap Co., 208 South LaSalle Street, Chicago, was recently organized to manufacture metal products. Contracts have been let to cover the required equipment and material. James L. Monaghan is secretary.

The Western Machine Works, Inc., Tacoma, Wash., has been incorporated to manufacture machinery and parts and to conduct a general machine shop. The new company took over a co-partnership which has been established for some time. C. P. Burkey, 807 Pacific Savings Bank Building, Tacoma, Wash., is corporate representative.

The Lewis Electric Mfg. Co., Inc., 1400 Niagara Street, Buffalo, which was recently incorporated to manufacture mechanical appliances, will have its early production done by contract and sometime later will be in the market for equipment for factories of its own. Standard production will probably not begin until about Jan. 1. E. Sears Yates is secretary.

The Cambridge & Paul Instrument Co. of America, Inc., Ossining, N. Y., was recently incorporated with a capital stock of $200,000 to manufacture scientific and industrial instruments, taking over the business formerly conducted by Charles F. Hindle, that city, which has manufactured Cambridge & Paul instruments for 35 years. Manufacturing will be done at Ossining in the plant formerly owned by Mr. Hindle. Present plans provide for large plant expansion in the near future. The officers of the company are: Charles F. Hindle, president; John O. Hindle, secretary; and R. S. Whipple, C. C. Mason, F. Wakeham, H. B. Williams, directors.

The American Turn-Auto Co., 40 West Gay Street, Columbus, Ohio, has been incorporated under Ohio laws with a capital stock of $2,500,000 to manufacture mechanical equipment, the chief product being the Turn-Auto, used to facilitate handling cars in repair. The Turn-Auto company will be the operating branch of a holding company. At present manufacturing is being done under contract, but this is only temporary. If the present plans carry, a number of service stations will be established at various points. Howard M. Bennett is general manager.

The Manufacturers Machine Tool & Supply Co., Inc., 256-260 Middle Street, Bridgeport, Conn., was recently organized with a capital of $50,000 and will handle new and used machinery and mill supplies throughout the country. The officers of the company are: T. Leo Lally, president and treasurer; A. A. Johnson, vice-president; John Smith, secretary; and A. E. Wright, manager.

The Efficiency Oil Burners, Inc., 32 Broadway, New York, has been incorporated with a capital stock of $100,000 to manufacture oil burners and fuel appliances. A Canadian branch of the same company, the Efficiency Oil Burners, Ltd., is located at 850 Burlington Street East, Hamilton, Ont. Sage Bros., Inc., 780 Union Street, Brooklyn, N. Y., will cover Greater New York and do the manufacturing for distribution in the United States, while the Hamilton factory will manufacture for Canadian distribution. However, this arrangement is only temporary. The incorporators are Harvey A. Willis, James McNaught and Henry Holmes.

Operations have been started at the new branch plant of the Chicago Nipple Mfg. Co., with other factories at Chicago and Los Angeles, Cal. The Baltimore establishment has a daily capacity of 40,000 iron pipe nipples, to which will be added a large quantity of coils, bends and pipes.

Aborn Steel Co. Resumes Business

Announcement has been made of the resumption of business by the Aborn Steel Co. of Nos. 22 and 24 Clarke St., New York. Some months ago, following the sudden death of its president, the late Joseph T. Slingsby, the company was forced into bankruptcy. In those proceedings it developed that the financial embarrassment arose entirely from the fact that a large number of its debtors facing financial difficulties or in bankruptcy, were unable to meet their obligations to it.

On November 8 a decree confirming a composition offered by the Aborn Steel Co. and discharging it from bankruptcy was entered in the United States District Court for the Southern District of New York, and the company received back its assets from the trustee in bankruptcy and resumed business for its own account.

In the reorganization, the Aborn Holding Co., Inc. has been organized under the laws of the State of New York for the purpose of taking title to the real estate and other assets of the former company, but operations are to be conducted by the Aborn Steel Co. as operating agent of the Aborn Holding Co., Inc., which has assumed the responsibility of all the obligations. The operations of the reorganized company are under the management of J. W. Phillips, president, who for many years had represented the Aborn Steel Co. in the Metropolitan territory, but has more recently been with the firm of Peter A. Frasse & Co. Others of the older employees of the Aborn Steel Co. now remain associated with the new company, including E. E. Geiss, vice-president and J. Giegerich, secretary. The board of directors includes in its number A. Watson Current, vice-president of the First National Bank, Belleville, and Milton B. Ignatius New York. The other directors are J. W. Phillips, E. E. Geiss and H. R. Slingsby.

Machinery Markets and News of the Works

RAILROADS STILL BUYING

Pennsylvania Closing This Week on a Large List of Shop Equipment

Automobile Manufacturers Next in Line with Purchases—Some Other Industrial Demand

The Pennsylvania Lines East has given a number of informal orders for machine tools on the list of about 80 items issued several weeks ago. It is expected in the trade that practically all of the tools will be bought this week. The Chicago, Burlington & Quincy is also at the point of closing on its general list at Chicago, but purchases of about 30 tools for its Eola scrap yard.

Railroad purchases include a driving wheel lathe and an axle wheel lathe for the Pittsburgh & Lake Erie; a 72-in. duplex borer for the Missouri-Kansas-Texas; several tools for the Chicago & Northwestern and the Pere Marquette. The Chesapeake & Ohio is expected to place an order this week with a Cincinnati builder for six tools.

In the automotive field, there have been a number of purchasers. The Ford Motor Co. has bought three machines for its Hamilton, Ohio, plant totaling $30,000; the Studebaker Corporation, South Bend, Ind., has bought four turret lathes; the Stewart-Warner Speedometer Corporation, Chicago, recently purchased 16 presses from one manufacturer; the Continental Motors Corporation, Muskegon, Mich., has purchased two gang drills. Small-lot orders are coming from the motor truck industry. The Maximotors Corporation Muskegon, Mich., has been looking up equipment in Chicago.

The Packard Motor Car Co., Detroit, is in the market for a miscellaneous list of equipment. The Ansted Engine Co., Connersville, Ind., has recently taken a contract for automobile engines and clutches which will probably necessitate buying of several tools.

Among industrial users of tools, there is a fair degree of activity, notably in the Cleveland section The Standard Tool Co., Cleveland, has purchased 14 Pratt & Whitney automatic lathes; the Grabler Mfg Co., Cleveland, bought 16 electrically driven grinding machines; the Hoover Suction Sweeper Co., Canton Ohio, has purchased about 15 machines, and the National Screw & Tack Co., Cleveland, has bought several tools and will probably be in the market for more The Pittsburgh Steel Co., Pittsburgh, has bought several tools for its plant at Monessen, Pa. The Gopher Machine Mfg. Co., New Prague, Minn., has issued an inquiry for 14 tools. The Lehigh Portland Cement Co. Allentown, Pa., has bought several tools.

New York

NEW YORK, Nov. 28.

As the year draws near a close buying of machine tools continues to become smaller in volume. There is a fairly good demand for used tools, but sales of new tools have fallen off appreciably. Railroad buying is the only activity of importance, and even in this branch the individual orders are for one or two tools at a time. The Pittsburgh & Lake Erie has bought a driving wheel lathe and an axle lathe and the Missouri-Kansas-Texas Railway a 72-in. duplex borer. The Lehigh Portland Cement Co., Allentown, Pa., has bought several tools.

Few new inquiries are noted for electric traveling cranes and the hand power crane market is particularly dull. There are evidently a fair number of locomotive crane inquiries current, but reported purchases are not numerous. The Bartlett Haywood Co., Baltimore, Md., which recently closed for several overhead traveling cranes with the Chesapeake Iron Works for its new foundry, will purchase most of the other equipment for the new plant, including cupolas, tumbling barrels, ladles, etc., from the Whiting Corporation. The Brooklyn Edison Co., Brooklyn, N. Y., is stated to be on the point of closing for the two 150-ton overhead cranes, now under negotiation. The Pennsylvania Equipment Co., Norwood, Pa., wants a 25-ton, 45-ft. boom, 8-wheel used locomotive crane equipped for clamshell bucket.

Among recent purchases are:

Dwight P. Robinson & Co., 61 Broadway, New York, two 10-ton overhead traveling cranes from the Northern Engineering Works. This company has also purchased a 3-ton, 55-ft. 5½-ft. span electric crane for a new warehouse of the Walworth Mfg. Co., in Long Island City, from the Milwaukee Electric Crane & Mfg. Co.

Lehigh-Portland Cement Co., Allentown, Pa., a single leg gantry crane, 80-ft. span, 4-motor to handle 3-cu. yd. bucket for Birmingham, Ala., from the Whiting Corporation.

United Gas & Electric Co., 61 Broadway, New York, a 40-ton, electric traveling crane for Harrisburg, Pa., from the Milwaukee Electric Crane & Mfg. Co.

Truxillo Railroad Co., 40 Rector Street, New York, a Type No. 1, self propelling, steam pile driver from the Industrial Works.

Sanderson & Porter, 52 William Street, New York, is stated to have closed for a 6-ton electric crane to handle 3-cu. yd. bucket, with an unnamed builder.

Ohio Marble Co., Piqua, Ohio, a 4-motor, 87-ft. span bucket crane from the Northern Engineering Works.

New Orleans Railway & Electric Light Co., New Orleans a 3-motor, 25-ft. span and a 10-ton, 40-ft. span, 1-motor overhead traveling crane from the Northern Engineering Works.

J. A. P. Cressfield Contracting Co., Philadelphia, a 50 ton, 52-ft. span, 4-motor electric traveling crane from the Northern Engineering Works.

The Empire State Ice Co., 76 West Monroe Street, Chicago, is taking bids for the erection of a three-story plant at 161st Street and Grant Avenue, New York, to cost about $200,000, including machinery.

The Bureau of Supplies and Accounts, Navy Department Washington, will receive bids until Dec. 12 for 75 pressure switches, schedule 316; also for 27,500 lbs. of steel crankshafts for the South Brooklyn Navy Yard.

The New York Edison Co., 130 East Fifteenth Street New York, will make extensions and improvements in its power house at 33-43 Gold Street, to cost about $100,000.

The Board of Water Supply, Municipal Building, New York, will take bids until Dec. 5 for gate valves and hydrants for the Mount Prospect, Park Slope, Fort Hamilton and Clove conduits, Catskill aqueduct. Benjamin F. Einbigler is secretary.

The Whitaker Paper Co., 48 Great Jones Street, New York, with plant at Cincinnati, has disposed of a bond issue of $1,500,000, a portion of the proceeds to be used for extensions and improvements.

The Superior Ice Co., Inc., 50 East Forty-second Street, [illegible] Bay, Brooklyn, to cost $250,000 with equipment. Waldemar Mortensen, 209 West Seventy-sixth Street, New York, is engineer.

The Morris Tool Co., New York, has leased a portion of the building at 22 Thames Street, totaling about 4,000 sq. ft., for [illegible]

The Fort Washington Auto Club, Inc., Fort Washington, New York, will build a service and machine repair shop in connection with its new two-story building, 50 x 229 ft., on Broadway, near 187th Street. Charles B. Meyers, 31 Union Square, New York, is architect.

The Kerite Insulated Wire & Cable Co., 30 Church Street, New York, with plant at Seymour, Conn., is arranging for the sale of common stock for $1,000,000, provided by an increase in capital from $200,000 to $1,200,000, a portion of the proceeds to be used for extensions and improvements.

The Burnham Boiler Works, Inc., Irvington-on-Hudson, New York, has broken ground for a one-story foundry and machine shop on the Dillerville Road, Lancaster, Pa., to cost $200,000. Frank D. Chase, Inc., 645 North Michigan Avenue, Chicago, is architect and engineer.

Luke Loughlin & Co., 114 Jefferson Avenue, Jersey City, N. J., operating an automobile business, has plans for a new one-story factory, 50 x 100 ft., at 68 Fleet Street, for the manufacture of automobile parts and equipment, estimated to cost $20,000. John G. Helmers, 375 Summit Avenue, West Hoboken, N. J., is architect.

I. T. Williams & Sons, 367 Bay Street, Stapleton, S. I., operating a hardwood lumber plant, have acquired a portion of the former shipyard property of the S. L. Moore Corporation, a subsidiary of the Bethlehem Steel Co., Elizabeth, N. J., and will remodel the plant and remove to this location. Considerable additional machinery will be installed. Docking facilities on the waterfront, with material-handling and conveying machinery will be provided. E. R. Ballou is chief engineer in charge. Thomas R. Williams heads the company.

The Board of Education, Elizabeth, N. J., has voted in favor of an appropriation of $495,000, for the construction of a new junior high school at Westfield Avenue and Cherry Street, to include a vocational department. Plans will be prepared by Kilham, Hopkins & Greeley, 9 Park Street, Boston.

The City Commissioners, Wildwood N. J., will install new pumping equipment and auxiliary machinery at the municipal pumping plant in connection with extensions in the waterworks. William H. Boardman, 426 Walnut Street, Philadelphia, is engineer.

Fire, Nov. 22, destroyed a portion of the lumber plant of the Heidritter Lumber Co., South Front Street, Elizabeth, N. J., including saw mill, power house and equipment, with loss estimated at $100,000. It is planned to rebuild. H. E. Wolff is secretary.

Plans are in progress for a merger of the American Motors Corporation, Plainfield, N. J., and the Bessemer Motor Truck Co., Philadelphia, with plant at Grove City, Pa., both manufacturers of motor trucks. The consolidation will include expansion.

The Morgan Ordnance Reserve Depot, Morgan Station, South Amboy, N. J., under the direction of the Ordnance Salvage Board, Frankford Arsenal, Philadelphia, will dispose of a quantity of equipment at the plant Dec. 13, including 3,000,000 lb. of brass; 3,000,000 lb. of steel; 50,000 lb. of copper; factory supplies and equipment, etc.

The Fischer-Sweeny Bronze Co., 312 Adams Street, Hoboken, N. J., manufacturer of brass, bronze and aluminum castings, has leased a new one-story building at Bound Brook, N. J., totaling 16,000 sq. ft. of floor space, for the establishment of a new plant. The present works at Hoboken and at Newark, N. J., will be removed to this location, where operations will be concentrated.

The Cyclone Fence Co., 233 Broadway, New York, manufacturer of metal fencing, has awarded a general contract to Walter Kidde & Co., 140 Cedar Street, for the first unit of a new plant at 796-808 Frelinghuysen Avenue, Newark, one-story, 165 x 200 ft. Additional units will be built later. The main plant is at Waukegan, Ill. Joseph Slomer, vice-president, is in charge.

John A. Harvey, 277 Sherman Avenue, Newark, N. J., manufacturer of wire products, is in the market for used insulating machinery, for wrapping magnet wire, size of wire [illegible]

Vocational departments will be installed in the proposed three new junior high schools to be erected on Renshaw Avenue, Winans Street and on South Clinton Street, Newark. The Board of Education will have plans drawn for the first noted at an early date. Dr. Clifford J. Scott is school superintendent.

The National Box & Lumber Co., 354 South Street, Newark, N. J., will prepare a list of machinery for installation in its new two-story factory on D Street, 80 x 250 ft. Hyman Rosensohn, 188 Market Street, is architect. Frank M. Edwards, company address, is in charge.

The Artistic Metal Products Co., New Jersey Railroad Avenue and Lafayette Street, Newark, has leased space in the building at 126 South Street, for a new plant. Michael Rabb is president.

The North East Electric Co., Rochester, N. Y., is inquiring for 30 Stromberg electric No. 35 recorders, tenth-hour registration.

Marvin Briggs, Inc., 167 Sixth Street, Brooklyn, N. Y., is inquiring for a right hand horizontal engine, 150 r.p.m. and cylinder diameter of approximately 24 in.

New England

BOSTON, Nov. 27.

LITTLE transpired in the machine tool market in this section the past week to stimulate enthusiasm. Sales consisted of one or two machines in individual transactions and used tools again took the lead. In addition, the aggregate closed fell considerably short of that for the previous week in volume as well as in dollars. The Massachusetts manufacturer, who the previous week closed on more than a dozen used and new tools, purchased a new 3-in. heavy duty boring mill and a 3A used universal boring machine, which constituted the most important business from a monetary viewpoint placed by any one user. Some of New England's largest industries figured in the week's transactions, but their purchases are best described as "nibbles."

A Cincinnati maker of lathes announces an advance in prices averaging 12 per cent. The Foster line of screw machines will be 10 to 20 per cent higher, effective Dec. 1.

Notwithstanding the lull the past week, November will prove the most profitable month experienced this year by some machine tool dealers. Collectively, the trade in this territory is gaining ground, although slowly. The two most encouraging factors are the upward trend of prices and the large number of quotations out on a wide range of machines. It is believed, however, most of the prospective business will not be closed until after Jan. 1. New prospects include a 60-ton crane wanted by a bridge builder and a fairly large hand crane desired by a soap manufacturer.

Two sales at auction were held in Hartford, Conn., on Nov. 23 and 24 at the Hartford Automotive Parts Corporation and the Hartford Tool Works, Inc. Very little interest was shown except by second-hand machinery dealers, although a few purchases were made by users. At the sale at the Automotive Parts plant representatives of the Spicer Mfg. Corporation purchased a Thompson butt welder and several machine tools. This sale was of some surplus and much obsolete machinery, and most of the bidding was erratic. This was largely due to condition of some of the machines, although bids generally were low. A 1200 lb. drop hammer, brought $1,550. Two trimming presses brought $575 each. A 2½ in. guillotine shear brought $650. The Thompson butt welder, which was new, brought $340. Two Hamilton 14-in. motor-driven lathes brought $500 each. Three New Britain automatics brought prices ranging from $250 to $650, the bidder at the high price being permitted to take his choice. An assorted lot of Gridleys went at $350 for seven machines. A lot of eight Potter & Johnson machines went at $50 each, although some of them were of late serial numbers. Out of eight Pratt & Whitney, Hendey and Becker millers, one bidder had his choice of two at $50, the remainder going at $15 each. A Brown & Sharpe No. 12 Miller went at $30; a Gould & Eberhardt 14-in. shaper at $310. At the other sale the machinery offered was generally in better condition and better prices prevailed, although here also very little interest was shown by users. One bidder, aside from dealers, was J. Andersen, a former workman in the shop, who secured a number of tools. A Gray planer, 24 in. x 6 ft., with one head, brought $510. A Brown & Sharpe No. 1 universal grinder brought $410. Bids on a Cincinnati No. 2 universal grinder were so low that it was withdrawn from the sale. A Jones & Lamson 3-in. x 36-in. single spindle [illegible] brought $425; an American 3-ft radial, $640; a

Kempsmith No. 1 universal miller, $570, and a Van Norman No. 2 duplex, $775; a Steptoe 16-in. shaper brought $360. Erratic bids were also more or less prevalent, as shown by $300 bid for a Porter 16-in. x 8-ft. lathe, $450 for an American 16-in. x 8-ft., $300 for one American 14-in. x 6-ft., $500 for another. A Cisco lathe, 16-in. x 6-ft., brought $300; an American lathe, 14-in. x 6-ft., $285.

Construction of a two-story addition, contemplated by the Home Accessories Co., 44 Pearl Street, Worcester, Mass., has been put over until May 1.

Work on a one-story, 100 x 242 ft. manufacturing unit will soon be started by the Brooks-Skinner Co., Inc., Quincy, Mass., steel garages.

The United Shoe Machinery Corporation, Beverly, Mass., recently purchased the St. Louis plant of the Haynes-Langenberg Mfg. Co., and will establish a factory there. The Haynes-Langenberg Company, gas furnace burners and furnaces, will erect a three-story plant giving 50 per cent more floor space than the building just sold.

The Standard Specialty Works, Gardner, Mass., screw machine products, is building a one-story, 40 x 100 ft. manufacturing unit.

Work has begun on a 50 x 100 ft. manufacturing unit for the Savings Spring Co., Ashland, Mass., motor truck springs. E. H. Howard, Framingham, Mass., is the engineer. The company plans to add additional units.

Machine tool sales the past week included several Hendey lathes to the Hood Rubber Co., Watertown, Mass. by the Metz Co., Waltham, Mass., automobiles. The Metz Co. is in the process of liquidation, a number of its metal-working tools having been sold during the past month.

A vocational department, consisting of five shop rooms, will be included in the new $1,000,000 junior high school to be built by the Board of Education, Pawtucket, R. I.

Jenkins Brothers, 510 Main Street, Bridgeport, Conn., manufacturers of valves, etc., are planning the erection of a new manufacturing unit, on Main and Water Streets, to cost $250,000. Lockwood, Greene & Co., 101 Park Avenue, New York are the engineers.

The Ford Motor Co., Highland Park, Mich., has preliminary plans for a three-story assembling plant at Cambridge, Mass., estimated to cost $250,000. It is proposed to acquire an existing building and remodel it.

Elevating and conveying machinery, a track hopper and other equipment will be installed in the new coaling plant on Newton Street, Waltham, Mass., to be constructed by the New England Coal Co., Waltham. George P. Carver, 261 Franklin Street, Boston, is engineer.

The Utilities Power Co., Meredith, N. H., recently organized, is disposing of a bond issue of $600,000, the proceeds to be used for the construction of a hydroelectric power plant at Ayer's Island, Bristol, N. H., and a transmission system. Later other units will be built to provide for an output of 35,000 hp. Jackson & Moreland, 387 Washington Street, Boston, are engineers. Herbert B. Rust is president.

The Hood Rubber Co., Nichols Avenue, Watertown, Mass., manufacturer of automobile tires, etc., is taking bids for a four-story addition estimated to cost $60,000. F. C. Hood is general manager.

The Arey & Blount Electric Co., Worcester, Mass., has been incorporated with a capital of 100 shares of stock, no par value, to manufacture electrical products. Local property has been taken over and a plant will be established immediately. Ralph G. Arey is president, and William H. Blount, Box 161, Shrewsbury, Mass., treasurer.

G. Bertholdi, Peabody, Mass., care of G. A. Cornet, 10 Central Avenue, Lynn, Mass., architect, has plans nearing completion for a one-story machine shop on Wilson Square, to cost $25,000.

The Standard Oil Co., Fall River, Mass., will commence the erection of a distributing plant at the foot of Slade Street, including pumping plant, to cost close to $40,000.

Ovens, power equipment, elevating and conveying machinery will be installed in the one- and two-story addition, 100 x 115 ft., to be erected at the plant of the Massachusetts Baking Co., Housatonic Avenue, Bridgeport, Conn., to cost $80,000.

The Gulf Refining Co., Waterbury, Conn., will build a new oil distributing plant on South Fifth Street, to cost $25,000.

Philadelphia

PHILADELPHIA, Nov. 27.

ROBERT M. GREEN & SONS, 1413 Vine Street, Philadelphia, manufacturers of soda fountains and fixtures, have acquired the five-story factory at 1413-21 Vine Street, and a three-story plant on Pearl Street, for $200,000. A three-story factory, 1426-30 Wood Street, has also been purchased for $23,800, to be used for extensions. R. M. Green, Jr., heads the company.

The Hurley Motor Co., 219 North Broad Street, Philadelphia, has purchased the three-story building, 40 x 100 ft., at 227-29 North Broad Street, for $250,000, for new headquarters and works. J. Scott Hurley is head.

The Baldwin Locomotive Works, Inc., 500 North Broad Street, Philadelphia, will make machinery replacements and install additional equipment to cost about $200,000. Present steam-operated machinery will be replaced with electric-driven equipment. Tentative plans are under consideration for developing a portion of its property at Eddystone for the production of locomotive tenders, estimated to cost $2,000,000 with machinery.

A refrigerating plant will be installed in the one and two-story meat-packing plant, 68 x 180 ft., to be erected at Front and Vernango Streets, Philadelphia, by Duffy Brothers, 3255 North Front Street, estimated to cost $75,000. The Kuhn Engineering Co., 3058 North Eighth Street, is engineer.

The Foreign Trade Bureau of the Philadelphia Commercial Museum, Thirty-fourth Street, has received an inquiry from a company at Beirut, Syria, for mining equipment and from companies in Copenhagen and Yokohama for ice-manufacturing, refrigerating and printing machinery. Full information available upon request.

Herbert Brothers, 1540 Wood Street, Philadelphia, representatives for the Chandler automobile, have leased the five-story building, 55 x 160 ft., now in course of erection at 1409-11 North Broad Street, for a new service and repair works and local headquarters.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until Dec. 5 for 450 storage batteries for aircraft service at the Philadelphia aircraft factory, schedule 312; also for miscellaneous quantities of aluminum sheets, tubing and bars, and duralumin sheet and bars, schedule 322.

A vocational department will be installed in the new high school to be erected at Haddon Heights, N. J., for which $300,000 in bonds is being arranged.

The National Biscuit Co., Tenth Avenue and Fifteenth Street, New York, will break ground at once for an eight-story and basement plant, 150 x 258 ft., on Glenwood Avenue, Philadelphia, to cost $1,000,000, including equipment. A. G. Zimmerman, 85 Ninth Avenue, New York, is architect.

The Atlantic Refining Co., 3144 Passyunk Avenue, Philadelphia, has acquired a tract of land on the Schuylkill River, known as the Rambo farm, for extensions in its oil storage and distributing plant.

The Freeman Electric Co., 803 South State Street, Trenton, N. J., manufacturer of electrical products, has revised plans for a one-story unit at its proposed new factory at Mead and Prince Streets, including improvements in the present building. Bids will be asked early in the coming year. E. H. Freeman is president.

The Public Service Electric Co., Trenton, N. J., is arranging to discontinue regular operations at its Chauncey Street power plant, and will build an addition to its generating plant at Burlington to cost $270,000 to handle service in this district, including a new transmission line. The Trenton power house will be retained for emergency operations.

A vocational department will be installed in the proposed new high school to be erected at Norristown, Pa., for which bonds for $500,000, have just been voted. Plans are being drawn.

The Empire Tire & Rubber Co., North Clinton Avenue, Trenton, N. J., will build a one-story addition, 50 x 90 ft.

The Champion Blower & Forge Co., Harrisburg Pike and Charlotte Street, Lancaster, will commence the erection of a one-story addition, 60 x 145 ft., to cost $25,000. It will be used as an assembling department, to replace a structure recently destroyed by fire.

The Berkshire Electric Co., Lancaster, Pa., has arranged for a bond issue of $59,000, to be used in connection with additions and improvements.

The Keystone Auto Specialties Co., York, Pa., care of R. R. Markle, Spooner Building, Harrisburg, Pa., architect, has plans for a new four-story factory, 65 x 180 ft., to manufacture automobile equipment.

The Megargee Paper Mills, Modena, Pa., have acquired about 70 acres at Bristol, Pa., and will use a portion of the site for a new mill, including a power house, machine shop and other buildings, to cost more than $200,000.

The Board of Education, Broad and Crosby Streets, Chester, Pa., will take bids about Dec. 15, for a two-story industrial school building at Eighth and Fulton Streets. Sanders & Young, 39 South Seventeenth Street, Philadelphia, are architects.

Miller Brothers, Carlisle, Pa., plan to rebuild their one-story machine and automobile repair shop, destroyed by fire Nov. 21. Machine tools and other equipment were demolished.

The Jonathan Coal Mining Co., Franklin Bank Building, Philadelphia, will build a one-story addition, 51 x 85 ft., to its coal washery at Auburn, Pa., including the installation of machinery. Improvements will also be made in the present plant.

The Metropolitan Edison Co., Reading, Pa., has been granted approval to acquire the York Haven Water & Power Co., and the York Haven Electric Transmission Co., both of York Haven, Pa., and will expend $1,000,000 for extensions and improvements, to double approximately the present generating and distributing facilities.

A manual training department will be installed in the new high school to be erected at Narbeth, Pa., for which bonds for $165,000 have been approved.

The Pennsylvania Power & Light Co., Allentown, Pa., has arranged for a bond issue of $7,000,000, a portion of the proceeds to be used for extensions and improvements.

Jas. Pierpoint & Sons Co., Franklin Trust Building, Philadelphia, is in the market for a 100 or 150-kw. motor generator, 250 volts, d. c.; also for two short wall mining machines.

Pittsburgh

PITTSBURGH, Nov. 27.

BUSINESS in machinery and equipment in this district still is on a small scale and the trade derives its chief encouragement from negotiations under way rather than from orders booked. Prospective business is heavy and is increasing daily in the form of fresh inquiries, but placing of orders is exceedingly slow. The largest single machine tool order of the past week was for seven tools by the Pittsburgh Steel Co., Monessen, Pa., and represents a closing against an inquiry put out last June. Used, rebuilt or surplus Government tools lately have been appearing at prices which have spoiled more than one sale of new tools. The Pennsylvania Railroad has not yet closed against the tools and cranes it inquired for several weeks ago for its Conway shops, Freedom, Pa., and the explanation is that the appropriation for the purchase has not yet been authorized.

No further price changes are noted, but all talk is of further advances, notwithstanding that one of the principal reasons for such a movement, high materials costs, has been disappearing lately in lower fuel and iron prices.

The report about machine tools is applicable to cranes; there is much pending business, but few orders.

The H. D. Shawkey Motor Co., 5526 Penn Avenue, Pittsburgh, local representative for the Durant automobile, has acquired property at Penn and Pacific Avenues, East End, 100 x 200 ft., for a new service and repair building estimated to cost $100,000.

The United States Engineer Office, Pittsburgh, will take bids until Dec. 20 for steel lock gates for Lock No. 1, Allegheny River, as per specifications on file.

The Hyde Murphy Co., Ridgway, Pa., manufacturer of planing mill products, has plans for a four-story addition, 60 x 90 ft., estimated to cost $25,000 with machinery.

The Pennsylvania-Ohio Electric Co., New Castle, Pa., has arranged for a bond issue of $750,000, a portion of the proceeds to be used for plant construction, additions and improvements.

Fire, No. 22, destroyed a portion of the foundry and pattern shop of the Velte Foundry & Machine Co., Mars, Pa., with loss estimated at $40,000, including equipment. It is planned to rebuild.

The Young Roofing Mfg. Co., Pittsburgh, manufacturer of prepared roofing, occupying temporary quarters at 245 First Avenue, has plans for rebuilding its plant at Thirty-fourth Street and the Allegheny Valley Railroad, destroyed by fire several months ago. Additional machinery will be installed.

A manual training department will be installed in the high school to be erected at Springfield, Pa., for which bonds for $200,000 have been approved.

The New Castle Electric Co., New Castle, Pa., has arranged for a bond issue of $500,000, a portion of the proceeds to be used for extensions and improvements.

The American Refractories Co., Union Arcade, Pittsburgh, has acquired property at [illegible] Pa., and plans the development of the site for refractory manufacture.

A vocational department will be installed in the new high school to be erected at Clairton, Pa., for which bonds for $550,000, are being sold.

The Penn Public Service Co., Johnstown, Pa., is planning for an increase in capital from $3,400,000 to $5,000,000, a portion of the proceeds to be used for extensions and improvements. It will take over and merge the Armagh, Confluence, Boswell and Lumber City Electric companies and make a number of additions.

The Shriver Coal Co., Morgantown, W. Va., will enlarge its coal tipple and install additional machinery at its mine. The company has recently increased its capital to $600,000. Everhart Bier is president.

The Charleston Paper Mfg. Co., Nitro, W. Va., has plans for a local mill to cost in excess of $100,000. A plant will be remodeled and machinery installed.

The Ideal Corrugated Box Co., Jeannette Street, Parkersburg, W. Va., has plans for a two-story addition, 70 x 150 ft., to cost $30,000, including equipment.

The Nightrack Mfg. Co., Huntington, W. Va., manufacturer of metal and wood specialties, is taking bids for a two-story and basement plant, 40 x 120 ft., to cost $25,000. William F. Diehl, R. & P. Building, is architect. Thomas W. Harvey is president.

The Superior Block Coal Co., Morgantown, W. Va., recently organized, has acquired a tract of 200 acres of land in the Cass district, and will construct a steel tipple. Mining and electric power equipment will be installed. Harold S. Smith is head.

An ice and refrigerating plant will be installed in the five-story factory to be erected by the Imperial Ice Cream Co., Fairmont, W. Va., George W. Strong is president.

The Board of Education, Huntington, W. Va., is said to have a list of equipment in preparation for installation in the manual training department of a new school.

The Vulcan Coal Co., Lost Creek, W. Va., will make extensions and improvements in its plant to cost approximately $100,000, including the installation of additional electrical equipment, conveying machinery, etc. John Quinn is superintendent in charge.

Baltimore

BALTIMORE, Nov. 27.

THE Air Reduction Co., Canadian Pacific Building, New York, will erect a plant at Fayette and Eleventh Streets, Baltimore, at a cost of $150,000. Plans are being prepared by Francisco & Jacobus, architects, New York. N. E. Britton is construction engineer for the company.

The American Ice Co., Calvert Building, Baltimore, will take bids early in December for a new one-story plant, estimated to cost $100,000 including machinery. G. Leslie Weir, 41 East Forty-second Street, New York, is architect.

G. D. Graveley, Richmond, Va., is organizing a company to construct and operate a plant at Nansemond, Va., for the manufacture of tractors and other agricultural equipment.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until Dec. 12 for 20 portable electric drills, and nine electric grinders, for the Mare Island Navy Yard, schedule 295; also for one armature coil winder and one motor-driven tapping machine for the Hampton Roads, Va., Navy Yard, and two armature coil winders and two motor-driven tapping machines for San Diego, schedule 310.

The Common Council, Woodmont, Md., is arranging a bond issue for the installation of a municipal electric lighting plant.

The Lexington Refrigeration & Storage Corporation, Baltimore, is planning for extensions in its ice plant and refrigerating system, 516 West Lexington Street, to cost $300,000. J. F. Brinley is president.

The Chicago Nipple Mfg. Co., 1966 Southport Avenue, Chicago, manufacturer of iron pipe nipples, coils, bends, etc., plans the erection of a one-story addition to its branch plant at Baltimore, recently established, to be 90 x 100 ft. It is also extending operations at its Chicago works.

The Purchasing Clerk, Bureau of Engraving and Printing, Washington, will take bids until Dec. 1 for one air hammer drill.

The Purchasing Agent, Post Office Department, Washington, will receive bids until Dec. 4 for 50 pipe taps.

The Martin-Parry Corporation, York, Pa., manufacturer of commercial automobile bodies, has plans nearing completion for new works at Monument and Fallsway Streets, Baltimore, totaling about 12,000 sq. ft. of floor space, to be equipped for assembling.

The Security Cement & Lime Co., 116 West Washington Street, Hagerstown, Md., has completed plans for a one-story addition to its cement mill at Security, Md., to include the installation of additional equipment. John Porter is general manager; J. E. Ferguson & Co., 43 North Jonathan Street, Hagerstown, are engineers.

D. B. Irwin, Box 1133, Raleigh, N. C., has inquiries out for machine tools, new or used, in good condition, and other equipment for installation in a local machine shop, including drill press and drills; lathe for threading service; small forge, with blower; power shears for angles, bars, etc.

A manual training department will be installed in the new two-story high school, 100 x 200 ft., to be erected at Claymont, Del., for which bonds for $275,000 have just been sold. Coffin & Coffin, 522 Fifth Avenue, New York, are architects.

The Bureau of Yards and Docks, Navy Department, Washington, has plans in preparation for the installation of electric elevator cranes at the Puget Sound Navy Yard, Seattle, Wash., specification 4755.

The Carolina-Tennessee Power Co., Murphy, N. C., has preliminary plans under way for a new hydroelectric generating plant with capacity of 60,000 hp., estimated to cost $6,000,000, including transmission system.

The Herfurth Engine & Machinery Co., Alexandria, Va., machinery dealer, has inquiries out for a used 100-hp. engine, oil-operated, in good condition.

The McCooks Machine Works, 906 East Cary Street, Richmond, Va., is planning for the installation of additional tools, including a lathe, drill press, bench tools, etc.

The Wilson-Hock Co., City Point, Va., machinery dealer, has inquiries out for equipment for mica grinding machinery, complete outfit, about 75-mesh; also for a rotary dryer, 7 ft. in diameter, 90 ft. long, with auxiliary operating apparatus.

Colson & Co., Elyria, Ohio, manufacturers of juvenile vehicles, wheels, etc., have leased the four-story building at 116 South Eutaw Street, Baltimore, for a factory branch.

The Quartermaster, United States marine barracks, Quantico, Va., will take bids until Dec. 4 for one spring balance scale, as per specifications on file; also, will open bids (date not stated) for universal connecting rods alinement jig and motor tester.

The Shambow Shuttle Co., Greenville, S. C., has plans for a one and one-half story addition, 70 x 300 ft., to cost $75,000, including machinery. Equipment will include a mechanical conveyor system, overhead and floor track type. John Shambow is president.

Buffalo

BUFFALO, Nov. 27.

A ONE-STORY addition to its generating plant on Webster Street is planned by the Tonawanda Power Co., Sweeney Building, Tonawanda, N. Y., to cost $150,000 with machinery.

The American Kardex Co., Tonawanda, N. Y., manufacturer of office filing equipment and devices, has engaged Louis Eggert, 35 Elmwood Avenue, architect, to prepare plans for a two-story addition, 50 x 160 ft., to cost $70,000 including equipment.

The Northwestern Motors Co., Erie, Pa., is planning to rebuild its plant, destroyed by fire Nov. 18 with loss reported in excess of $175,000.

H. Sutter, 428 Erie Street, Elmira, N. Y., is arranging for the installation of equipment in a local building for the manufacture of radio equipment and parts.

A manual training department will be installed in the new high school at Mount Morris, N. Y., estimated to cost $100,000, for which C. A. Foote, 32 Murray Street, architect, has been engaged to prepare plans.

The Eastman Kodak Co., Kodak Park, Rochester, N. Y., has tentative plans in preparation for a new refrigerating machine plant. C. K. Flint, company address, is architect.

Power equipment, transmission and other mechanical equipment will be installed in the proposed flour milling plant to be constructed by the Island Warehouse Co., Ganson Street and the Ship Canal, Buffalo, estimated to cost $500,000.

The Bancroft-Jones Corporation, Buffalo, manufacturer of sectional steel buildings, contemplates the installation of a repair and parts department in a one-story building, 60 x 120 ft., to be erected at Urban and Fougeron Streets.

An ice-manufacturing plant, 65 x 80 ft., and 30 x 60 ft., with power house, 30 x 65 ft., will be erected by the Culliton Ice Cream Co., Buffalo, at Halbert and East Jewett Streets. All departments will be electrically operated. E. H. Culliton is president.

A manual training department will be installed in the two-story high school to be erected at Phelps, N. Y., estimated to cost $150,000, for which Foote & Carpenter, 154 East Avenue, Rochester, N. Y., architects, will prepare plans.

Chicago

CHICAGO, Nov. 27.

THE Chicago, Burlington & Quincy is at the point of closing on the remainder of its general machine-tool list and the inquiry for its Denver shop. It is probable that orders will be placed before Dec. 1, and if such be the case, November total sales for local dealers will compare favorably with those for October. The railroad will not place its Eola scrap yard equipment until later. Machine tool business from general sources is diminishing, although here and there a few sizable orders are developing. The general tendency of buyers, however, is to postpone purchases until after taking inventory.

The Beloit Iron Works, Beloit, Wis., has closed for a 48-in. x 48-in. x 12-ft. planer, and an 84-in. vertical boring mill. The Studebaker Corporation, South Bend, Ind., has placed orders for four sizable turret lathes. The Stewart-Warner Speedometer Corporation, Chicago, recently purchased considerable power press equipment, including 16 presses from one maker. Greater activity in tool and die shops is evidenced by inquiries for additional equipment. An interesting development is an inquiry for grinding equipment to grind terra-cotta building blocks. The Maximotors Corporation, a new company located at Muskegon, Mich., has been canvassing local machine tool houses for machine tools.

The Foster Machine Co., Elkhart, Ind., manufacturer of turret lathes and hand screw machines, has advanced prices 10 per cent effective Dec. 1.

The Gopher Machine Mfg. Co., manufacturer of power farming machinery, New Prague, Minn., has issued the following list:

One hand-feed box board matcher.
One punch, capacity 1-in. hole in ¾-in. iron, depth of throat, 6 in. or more.
One tool grinder for general toolroom work.
One twist drill grinder.
One tapping machine, capacity 18 gage.
One Warner & Swasey, Foster, Millholland or similar turret lathe, with 3-jaw chuck, capacity about 1⅝ in. x 12 in.
One 24-in. back-geared power feed drill press.
One multiple-spindle wood boring machine, table 5 to 8 ft. long, 8 to 12 spindles.
One single spindle, or combined vertical and horizontal, wood boring machine.
One wood bending machine, Defiance 9-in. single arm or similar, for bending bobsled runners.
One wood steaming retort 84 in. long or over.
One power rivet spinner, ¼-in. capacity.
One power punch, quick stroke, for light sheet metal work.
One 30-hp., one 25-hp., one 15-hp., one 10-hp., three 5-hp., 60-cycle a. c. motors.

H. Von Holst, 112 West Adams Street, Chicago, is preparing plans for a large repair shop at Homan Avenue and Division Street, for the Peoples Gas Light & Coke Co., to cost $300,000.

The Adams Pattern & Foundry Co., 6250 South Halsted Street, Chicago, has let contract for a one and two-story foundry building, 24 x 98 ft. and 37 x 125 ft., at 2732-44 West Thirty-sixth Place, to cost $25,000.

The Aurora Shade Machinery Co., Aurora, Ill., recently incorporated with $20,000 capital stock, is not a new company, but a partnership which has changed its form of organization to a corporation. The company manufactures window shade machinery and shade shop accessories. Expansion in buildings or equipment is not contemplated at this time.

The Elkay Mfg. Co., 606-08 North Sangamon Street, Chicago, recently incorporated with $15,000 capital stock, has been in business since January, 1920, but was not incorporated until Nov. 17, 1922. It manufactures sheet metal and sheet metal products. No expansion in manufacturing space or equipment is contemplated at present.

The Union Pacific System, Omaha, Neb., has authorized the construction of new shops and yard facilities at Los Angeles, Cal., to cost $1,750,000. The improvements will include an engine-house, locomotive shops, freight car shops, coach shops and a coach yard. It is proposed to start construction at once.

The Rockford Cabinet Co., Rockford, Ill., has let contract for a four-story addition, 128 x 202 ft., to cost $250,000.

The Crouse Pump Co., Wichita, Kan., has started the construction of a foundry, 60 x 70 ft., to cost $20,000.

The Knapp Brothers Mfg. Co., manufacturer of metal

ft. north of Fourteenth Street, and will erect a one-story factory, 75 x 400 ft., to cost $100,000.

The Service Caster & Truck Co., Kansas City, Mo., manufacturer of steel roller bearing casters, will move to Albion, Mich., where the Chamber of Commerce will erect a plant for its use.

The People's Gas Light & Coke Co., 122 South Michigan Avenue, Chicago, has preliminary plans under way for a two and three-story meter and repair works at Homan and Division Streets, estimated to cost $300,000, including machinery. H. Von Holst, 112 West Adams Street, is architect.

The National Copper & Steel Tank Works, Chicago, has acquired a new one-story building, 75 x 125 ft., at 455-61 North Artesian Avenue, and will occupy the structure following the installation of machinery.

The Westinghouse Electric & Mfg. Co., East Pittsburgh, has broken ground for the first unit of new branch works on West Pershing Road and Leavitt Street, Chicago. The complete plant will be seven-stories, 240 x 500 ft., estimated to cost $2,000,000 with machinery.

The Gophers Machine & Mfg. Co., New Prague, Minn., has plans under way for a one-story machine shop.

A vocational department will be installed in the three-story junior high school to be erected at Jamestown, N. D., estimated to cost $300,000. Shannon, Boyd & Boyd, Jamestown, are architects.

The Interstate & Foreign Trade Department, Chicago Association of Commerce, 10 South La Salle Street, Chicago, has received an inquiry from a company at Mazatlan, Mex., for motor wheels for bicycles (No. 1703).

The Great Northern Railway Co., St. Paul, Minn., has tentative plans under consideration for the construction of an engine house and repair shops at St. Cloud, Minn.

The Interstate Iron & Steel Co., 104 South Michigan Avenue, Chicago, is in the market for a No. 3 Medart bar straightener for immediate delivery.

Detroit

DETROIT, Nov. 27.

BARNES-GIBSON-RAYMOND, INC., was incorporated Nov. 1 under Michigan laws, with a capital of $500,000, to manufacture springs at 6400 Miller Avenue, Detroit. The company purchased the complete plant of the Zenith Foundry Co., erected two years ago, and has salvaged the equipment and is remodeling the property to suit its manufacturing needs. Contracts for equipment have been placed and it is planned to begin operations shortly after the first of the year. Officers of the company are Fuller F. Barnes, president; F. M. Raymond, vice-president; F. E. Whittlesey, secretary; A. B. Peterson, treasurer; Lyman D. Adams, assistant treasurer and general manager; W. J. Black, assistant secretary and sales manager.

The Advance Stamping Co., Detroit, has been incorporated under State laws with a capitalization of $25,000 to manufacture stamped metal goods, sheet metal products, etc. The company is represented by W. S. McDowell, 1012 First National Bank Building, where temporary offices will be maintained until the factory space in the Grand Trunk Building on Twelfth Street is ready for occupancy. Roy W. Young is president of the new company.

The Eagle Spring Bumper Co., Detroit, has been incorporated with a capital of $50,000 to manufacture automobile bumpers and kindred equipment. The company is operating at 93 Adelaide Street, Detroit, producing bumpers only at the present time. Officers of the company are Harry Caplan, president; M. Caplan, vice-president, and Barnet White, secretary and treasurer.

The United Auto Parts Co., Flint, Mich., has been incorporated with a capital of $30,000 to manufacture automobile parts and equipment. Incorporators are Joseph F. Zimmerman, William J. and Harold R. Burns, 1303 North Saginaw Street, Flint.

Plans are under way for rebuilding the plant of the Monroe Body Co., Ludington, Mich., destroyed by fire Nov. 13 with loss of $150,000. B. F. Monroe is president of the company.

The Paragon Recoil Snubber Co., Muskegon, Mich., has been incorporated with a capital of $10,000 to manufacture shock absorbers and other automobile parts. Incorporators are James W. McNabnay, Oley R. Fountain and George [illegible]

The Ackerman-Blaesser-Feezey Co., Inc., Detroit, has been incorporated with a capital of $30,000 to manufacture automobile parts and kindred equipment. Incorporators are C. E. Blaesser, C. T. Feezey and E. L. Ackerman, 1167 Longfellow Avenue, Detroit.

The Eagle Aeroplane Corporation, Detroit, has been incorporated with a capital of $25,000 to manufacture mechanical toys, aircraft devices, etc. Incorporators are George Shield and A. S. Barkley, 1587 Spruce Street, Detroit.

The Michigan Valve & Foundry Co., successor to the business of the Flower Valve & Mfg. Co., Detroit, is purchasing some new equipment to facilitate production in its foundry and machine shop.

S. W. Raymond, distributor for Ford products at Adrian, Mich., announces that the Ford company will erect a parts plant in that city shortly after the first of the year. A site has been selected on the Detroit, Toledo & Ironton Railroad and the new enterprise will employ 30 or 40 men.

The Motor Pattern & Machine Co., Ford City, Mich., has been incorporated with a capital of $10,000 to manufacture patterns and special equipment. The plant is located on Labadie Street, and has been in operation since Oct. 15. Officers of the company are L. J. Feltes, president; J. J. Marks, general manager; C. A. Brady, secretary and treasurer.

The Detroit Approved Spring Co. has been incorporated to manufacture a new type of rear spring for Ford cars. It is a subsidiary of the Huebner Mfg. Co., of which Julius J. Huebner is general manager. Offices are at 5531 Woodward Avenue.

The Service Caster & Truck Co., Kansas City, Mo., will remove to Albion, Mich., where a site has been secured near the plant of the Albion Malleable Iron Co. A factory, 50 x 200 ft., will be erected for the manufacture of roller-bearing truck castings.

The Consumers Power Co., Iron Mountain, Mich., has purchased 700 acres in Dickinson County, which include 80 acres containing the waterpower site known as Sturgeon Falls, on the Sturgeon River, and will build a power plant which will generate 1000 hp.

The Detroit Edison Co., 2000 Second Street, Detroit, will erect a two-story power house on Pisger Street, to cost $125,000.

Fire, Nov. 15, destroyed the distributing plant of the Huron Portland Cement Co., Atwater and Riopelle Streets, Detroit, with loss estimated at $250,000, including equipment and stock. It is planned to rebuild.

The Ford Motor Co., Highland Park, Mich., has tentative plans for a new assembling plant, 300 x 1500 ft., in the vicinity of St. Louis, estimated to cost $2,000,000 with machinery.

The Petoskey Portland Cement Co., Petoskey, Mich., has preliminary plans under way for additions and improvements estimated to cost $500,000, including equipment. J. C. Buckbee, First National Bank Building, Chicago, is consulting engineer.

The Detroit Lubricator Co., 5938 Trumbull Street, Detroit, has awarded a contract to the Everett Winters Co., Book Building, for a two-story power house, estimated to cost $26,000.

The Kelso Mfg. Co., Detroit, Mich., has been incorporated with a capital of $25,000 to manufacture automobile equipment and parts. Incorporators are D. G. MacMillan and P. M. Gelatt, LaCrosse, Wis., and J. P. Kelso, 1208 Kresge Building, Detroit. The last noted represents the company.

Waderlow Brothers, Inc., Detroit, Mich., has been incorporated with a capital of $30,000 to manufacture mechanical equipment. Incorporators are Frank Walters, Charles A. and Benjamin A. Waderlow, 4470 Helen Avenue, Detroit. The latter represents the company.

The Central Paper Co., Muskegon, Mich., has awarded contract to the Markle Cement Co., Muskegon, for two-story, three-story and four-story mills, 45 x 150 ft., 42 x 55 ft. and 46 x 90 ft., respectively, and a three-story machine department, 55 x 300 ft., estimated to cost $200,000.

The Rickenbacker Motor Co., Detroit, has acquired the former plant of the Detroit Steel Co., and will remodel the structure for early occupancy. It will provide a total floor area close to 500,000 sq. ft. A one-story addition will also be erected to cost $12,000.

The Commonwealth Light & Power Co., Ludington, Mich., has acquired the White River Power & Light Co., Whitehall, Mich., and will make extensions and improvements, including the hydroelectric power plant on the White River.

In connection with extensions and improvements at its car shops at Ludington, Mich., the Pere Marquette Railroad Co., Detroit, will build a new car shop, for rebuilt cars, 100 x 160 ft.

The City Clerk, Monroe, Mich., will take bids until Dec. 11 for equipment for the new pumping plant at the municipal waterworks, including steam turbine-driven electrical generator, two 150-hp. watertube boilers, pumping machinery, one hand-power traveling crane, etc. Hoad, Decker,

Shoecraft & Drury, Ann Arbor, Mich., are consulting engineers.

The Northwest Engineering Co., Green Bay, Wis., is in the market for an 84-ft. vertical boring mill of standard make and in good condition.

Milwaukee

MILWAUKEE, Nov. 27.

DEMAND for machine tools has developed a spotty character and needs show a more miscellaneous tone. The past week's sales compare well with the average of the previous weeks, giving November a volume at least equal to October, with some interests reporting a probable increase. Prospective buyers are watching price developments closely. Experience demonstrated that recent advances on machine tools did not have the effect of driving buyers into the market. Purchases remain confined to barest necessities and there is no freedom about buying. December is expected to be about as active as October and November, but high hopes are held out for an active demand after Jan. 1 and completion of inventories.

The Kieckhefer Container Co., Milwaukee, manufacturer of fiber and wooden boxes and packages, is preparing to build a new fiber box plant estimated to cost $750,000 to $800,000, including equipment, at Delair, near Camden, N. J., to supplant factories operated there for three years in leased buildings. A trust deed to secure an issue of $2,000,000 first mortgage bonds has been given the First Wisconsin Trust Co., Milwaukee. Half of the issue only will be marketed at present and already has been absorbed. John W. Kieckhefer, Milwaukee, is president and general manager.

The Welch Investment Co., 417 Brumder Building, Milwaukee, has plans by Henry C. Hengels, architect, 445 Milwaukee Street, for two additional stories on the present automotive sales and service building at 704-708 Grand Avenue, occupied by the Netter-Heiser Co., Ford dealer. One floor will be equipped as a machine and repair shop.

The All-American Metallic Casket Corporation, Cicero, Outagamie County, Wis., has been organized with a capital stock of $50,000 and is starting work on the construction of a plant at Nichols, near Appleton, Wis. The incorporators are J. A. Burrichter and Edward A. Walters, St. Paul, Minn., and F. H. Tandy, Nichols. The general contract for building and equipping the factory has been let to Mr. Walters.

The Milwaukee Gas Specialty Co., 2017 Clybourn Street, Milwaukee, is taking bids until Dec. 1 for a machine shop addition, 45 x 112 ft., one story and basement, designed by Leiser & Holst, architects, 105 Wells Street. With new equipment the improvement will cost about $40,000. Otto F. Pfeil is secretary-treasurer.

The Royal Fixture Corporation, Milwaukee, has been incorporated with a capital stock of $50,000 to manufacture electric illuminating fixtures, lamps, electrical devices, etc. A building at 85-87 Thirty-fifth Street has been taken over and is being equipped as a machine and assembling shop. The principals are David C. Loppin, 679 Forty-eighth Street and Sam Rabuchin, 844 Eleventh Street, Milwaukee.

The Motor Castings Co., 425 Fifty-sixth Avenue, Milwaukee, has increased its capital stock from $10,000 to $20,000 for enlargement of its gray iron shop.

The Hansen Canning Machine Corporation, Port Washington, Wis., has accepted plans for a brick and steel machine shop, 110 x 120 ft., for the production of special machinery for fruit and vegetable packing plants. The investment will be about $75,000.

The Village Board of Kennan, Wis., has engaged Earl D. Jackson, consulting engineer, 400 Endicott Building, St. Paul, Minn., to design a municipal hydroelectric light and power plant, with steam generating auxiliaries. Construction will start early in 1923. The estimated cost is $35,000.

Robert Wark & Co., Inc., Clinton, Wis., is a new $10,000 corporation organized by Robert Wark, F. W. Herron and William O. Thomas, to manufacture septic tanks, chemicals, storage tanks, etc. The Stone building at Clinton has been leased for a long term and is now being equipped. Forty men will comprise the initial working force. Mr. Wark formerly was associated with the Koustine Co., sanitary engineers, Buffalo, N. Y.

The William M. Boenning Mfg. Co., Manitowoc, Wis., has been incorporated with a capital stock of $25,000 as the development of a business established recently by William H. Boenning for the manufacture of automotive equipment, principally shock absorbers, signals, etc. T. F. and G. H. Mackmiller are associated in the new corporation.

The Board of Education, Appleton, Wis., has determined upon sites for the new east and west side junior high and vocational training schools, to be erected at an estimated cost of $175,000 each. Fourteen architects are preparing competitive plans. It is hoped to be ready to let contracts by Jan. 1.

The Helzen Corporation, Milwaukee, has been incorporated by Lester Schick, 396 Layton Avenue, H. Otto and Richard J. Hennessey, attorney, to manufacture mechanical appliances. The capital consists of $30,000 preferred stock and 3000 shares of no-par value common shares. It is proposed to establish a machine shop at once, but details are not yet available.

The Perfection Mfg. Co., Milwaukee, has been granted a State charter to manufacture automotive accessories, equipment, parts, specialties and devices. The capital stock is $25,000 and the incorporators are Joseph L. Schmidling, 1738 Eighth Street, E. L. Kuebner and Edward A. Sprogg. A small shop established recently will be considerably enlarged.

The Whiting-Plover Paper Co., Plover, Wis., has let contracts for a beater room addition, 30 x 108, three and four stories of brick and steel construction. Specifications for equipment are being completed by L. A. DeGuere, consulting engineer, Wisconsin Rapids, Wis. E. A. Oberweiser is general manager of the mill.

Articles of incorporation were filed Nov. 23 by the Wetmore-Gibbons Co., Milwaukee, organized with 2000 shares of no-par value common stock to manufacture and furnish mechanical engineering advice for developing inventions of mechanical appliances and devices. The incorporators are C. P. Wetmore, head of the Wetmore Mechanical Laboratories Co., A. C. Gibbons and Dean Farley. The production of precision tools is intended to be undertaken shortly.

Cleveland

CLEVELAND, Nov. 27.

THE local machine market continues fairly active. Some good sized orders were placed during the week and dealers report considerable activity in small orders ranging from single machines to lots of three or four tools. Some manufacturing plants are adding considerable equipment by buying two or three machines at a time and scattering their purchases over an extended period. During the week the Standard Tool Co. purchased 14 Pratt & Whitney automatic lathes, and the Grabler Mfg. Co., Cleveland, bought 16 electrically driven grinding machines. The Hoover Suction Sweeper Co., Canton, Ohio, purchased about 15 machines. The National Screw & Tack Co., Cleveland, which will build an extension, purchased several tools and is expected to be in the market for considerable additional equipment. The Continental Motors Corporation, Detroit, placed two gang drills with a Cleveland dealer. Some small lot machinery orders are coming from the motor truck industry.

Most dealers report that their November sales will show some gain over October. About the usual lull is expected in December, but machine tool builders are working on a number of good prospects and look for considerable activity in January. Dealers in some cases are being asked to make new quotations on machines inquired for several months ago but not yet purchased.

The Columbian Hardware Co., Cleveland, has purchased the equipment and inventory of the Cleveland Drop Forge Co., which will be removed to its present plant. The site occupied by the forge company has been purchased by the W. S. Tyler Co., which occupies adjoining property. The acquired equipment includes 35 hammers and two headers. The Columbian company will engage in a general commercial drop forging business, in addition to the manufacture of its regular line of products, which includes vises and anvils. The Cleveland Drop Forge Co. was organized a few years ago and took over the Cleveland plant of the Wyman & Gordon Co. The men who have been largely interested in the company will have a small stock holding interest in the Columbian Hardware Co. and will have one representative on the board of directors of the latter company. The Columbian Hardware Co. was organized about two months ago by its president, H. F. Seymour, who purchased the plant of the Consolidated Iron & Steel Co., of which he was vice-president.

The E. Konigslow Stamping & Tool Co. has been incorporated and will carry on the business heretofore conducted under the name of the E. Konigslow Stamping & Tool Works. The new officers are H. F. Stuhr, president; F. S. Fraser, vice-president and treasurer, and O. W. Charles, secretary.

The company will be compelled to give up its present site which will be required in the erection of the new Union passenger station and is looking for new quarters with approximately 12,000 sq. ft. of floor space.

The Hoover Suction Sweeper Co., Canton, Ohio, has increased its capital stock from $2,000,000 to $6,000,000 and a new organization will be effected under the name of the Hoover Co. The capital stock has been increased with a view of enlarging the manufacturing facilities and in engaging in the production of other electrical household appliances.

The Seneca Wire & Mfg. Co., Fostoria, Ohio, is building an extension to its plant.

The Ohio Match Co., Wadsworth, Ohio, will erect a three-story addition, 120 x 200 ft.

The Advance Foundry Co., Dayton, Ohio, is in the market for a 10 to 15-ton electric crane, 40-ft. span; also for modern equipment.

Cincinnati

CINCINNATI, Nov. 27.

AFTER a poor start, the month of November is shaping up very well for machine tool manufacturers and in the past few days some fair-sized orders were booked in this vicinity. The Pennsylvania Railroad bought a number of the tools recently inquired for, although formal orders have not been issued. The Chicago & Northwestern has purchased at least four lathes, and the Pere Marquette a similar number, both orders being placed with Cincinnati manufacturers. The National Cash Register Co., Dayton, Ohio, bought two centerless grinders, and the New Advance Machine Co., Van Wert, a drill and lathe. The Standard Sanitary Mfg. Co. purchased a multiple spindle drill, costing approximately $10,000, for its Louisville plant, and the Ford Motor Co., for its Hamilton, Ohio, plant placed orders for two more Bullard Mult-au-Matics and a Springfield grinder, the three machines approximating $30,000. The Cincinnati & Ohio will likely close a list of six tools this week, a tentative order having been placed with a local manufacturer for part of this equipment.

A local manufacturer of turret lathes reports business increasing greatly, and the past week booked a single order for six machines. So heavy has been the increase in the demand for turret lathes that this manufacturer has added 50 men to its force the past two weeks. The Connersville Blower Co., which recently booked a large order for equipment for a by-product coke plant, has purchased a large press and is about to close on a 90-in. lathe, the new equipment being necessary to produce parts required on the order. The Ansted Engine Co., Connersville, Ind., builder of automobile engines, has about closed a contract for 18,000 engines and clutches, and will need several new machines to round out shop equipment. The Packard Motor Car Co. is also in the market for miscellaneous equipment for its Detroit plant. Frog and switch companies are running full time on industrial and mining work and have been buying tools, principally planers. Textile and electrical manufacturers have also been fair buyers.

Turret lathe manufacturers have again advanced prices, the increase averaging 15 per cent. This makes an average increase of approximately 27 per cent since last spring. Other manufacturers are expected to follow.

The Otis Elevator Co. will install the new elevators in the Hotel Gibson, Cincinnati, the contract price being $80,000.

The Belfont Iron Works Co., Ironton, Ohio, producer of pig iron and manufacturer of nails and wire, has taken bids on a building to house a slag crushing machine.

The Zinc & Spar Co., Livingston, Ky., has been incorporated with a capitalization of $75,000 for the production of zinc-oxide and fluorspar. Wheeling, W. Va., capital is interested. D. G. Hearne is general manager at Salem, Ky.

The Crawford, McGregor & Canby Co., Dayton, Ohio, manufacturer of golf clubs, will add two floors to its plant

The Ohio River Sand Co., Louisville, Ky., has under construction a steel-framed, electrically operated sand hoister at its plant on First Street. The hoister will cost approximately $100,000 and will replace steam-driven machinery at present in use.

The Louisville Garage Co., Louisville, Ky., will shortly commence the erection of a garage and service station on Fifth Street, to cost $100,000. Lee L. Miller is president.

The Gulf States

BIRMINGHAM, Nov. 27.

THE Calcasieu Mfg. Co., Elizabeth, La., recently organized with a capital of $2,000,000, is perfecting plans for the erection of a first unit for a new paper mill. A by-products plant for rosin and pine oil extraction will also be built. The new mill will cost in excess of $500,000, with machinery. J. F. Carter is general superintendent.

A manual-training department will be installed in the new high school to be erected at Tulia, Tex., for which bonds for $100,000 have been sold. Plans are being drawn.

The Common Council, Centerville, Ala., is planning for the installation of a pumping plant, in connection with a new waterworks system. A bond issue will be arranged.

The Quartermaster Department, United States Army Supply Base, New Orleans, is said to be planning to rebuild the machine shop at the mechanical department, recently destroyed by fire.

The Abilene Light & Power Co., Abilene, Tex., has acquired the Roby Light Co., Roby, Tex., and the Rotan Light Co., Rotan, Tex. The properties will be merged and extensions and improvements made in the plants and systems, including the installation of new power houses at Roby and Rotan.

The Louisiana Celotex Co., New Orleans, La., operating a local mill for the manufacture of fiber board products from waste sugar cane, has plans under way for two new units to more than double the present capacity. The expansion will cost close to $1,000,000, including machinery. B. G. Dahlberg is president.

The National Carbon Co., Madison Avenue, N. W., and 117th Street, Cleveland, manufacturer of electric batteries and kindred specialties, is said to have tentative plans for the establishment of a new service and factory branch at Dallas, Tex.

The Gulf State Land & Lumber Co., Coushatta, La., is planning for the installation of electrical equipment and other machinery at its plant.

A manual-training department will be installed in the proposed high school at Albany, Ala., two stories and basement, to cost $125,000, for which bids will be called about the middle of December. William B. Ittner, Board of Education Building, St. Louis, is architect.

The American Oil Co., Tulsa, Okla., has plans nearing completion for a new refinery at Pioneer, Tex., to have an initial capacity of 2500 bbl. per day. T. J. Ryan is president.

A manual-training department and laboratory will be installed in the new one-story high school buildings on Eighth Avenue, Birmingham, to be erected by the Birmingham-Southern College Trustees, estimated to cost in excess of $175,000.

The City Commission, Terrell, Tex., is planning for the installation of additional machinery at the municipal power house, including engine, electric apparatus, etc.

The Buffalo Refining Co., Sherman, Tex., recently organized, has acquired the local plant of the Buffalo Products & Refining Co., with capacity of approximately 400 bbl. per day. Plans are under consideration for enlargement and the installation of additional machinery.

Indiana

INDIANAPOLIS, Nov. 27.

THE Baltimore & Ohio Railroad Co., Baltimore, has tentative plans under consideration for new locomotive shops at Gary, Ind., estimated to cost $425,000, including new freight houses to be located on an adjoining site.

The Union Traction Co., Anderson, Ind., is planning the erection of an addition to its local central power plant, estimated to cost $200,000, including machinery.

The Republic Creosoting Co., 1614 Merchants Bank Building, Indianapolis, will build a new pumping plant at its works at Maywood. New stills, condensers and other mechanical equipment will be installed. Batchelder & Scales, 426 Board of Trade Building, are architects.

J. J. Briggs, 3323 Park Avenue, Indianapolis, has concluded negotiations with the Common Council, Seymour, Ind., for the purchase of a local site for a new plant to manufacture stucco and concrete products. Plans will be prepared

at once and machinery ordered. Arrangements have been made to secure raw material from deposits at Bedford and Mitchell, Ind.

The City Council, Auburn, Ind., has completed plans for a one-story addition to the municipal electric power plant to cost $60,000. E. E. Weinland is manager.

The Lewis E. Myers Co., Valparaiso, Ind., manufacturer of office furniture and equipment, has acquired adjoining property, factory of Pitkin & Brooks. The new owner will remodel and improve the structure and install machinery.

The Globe-Bosse-World Furniture Co., Evansville, Ind., has commenced the erection of a one-story addition, 45 x 160 ft. A list of equipment will soon be arranged.

The Evansville Enameling Co., Fulton Street, Evansville, Ind., will take bids early in December for a one-story addition to cost $20,000. Russ & Karges, Furniture Building, are architects.

The Central South

ST. LOUIS, Nov. 27.

THE Illinois Central Railroad Co., 135 East Eleventh Place, Chicago, has plans under way for a one-story addition to the machine shop at its Jackson, Tenn., repair shops, 75 x 200 ft.

A manual training department will be installed in the four-story junior high school to be erected at Kansas City, Kan., estimated to cost $250,000. Rose & Peterson, 434 Brotherhood Block, Kansas City, are architects.

The Hannibal Railway & Electric Co., Hannibal, Mo., is arranging for a bond issue of $150,000, a portion of the proceeds to be used for extensions and improvements.

The Standard Sanitary Mfg. Co., Bessemer Building, Pittsburgh, will break ground at once for a one-story addition, 56 x 325 ft., at its plant at Sixth and Shipp Streets, Louisville, estimated to cost $75,000.

The Mengel Body Co., Louisville, recently organized under New Jersey laws with capital of $1,000,000, by officials of the Mengel Box Co., Dumesnil and Eleventh Streets, has plans in preparation for an automobile body manufacturing plant at Fourth and G Streets, comprising a 30-acre site, lately acquired. It will include a power house, machine shop and other mechanical departments, aggregating 200,000 sq. ft. of floor space, and will cost in excess of $500,000, with machinery. Joseph & Joseph, Francis Building, are architects.

The North Missouri Power Co., Brookfield, Mo., is having plans drawn for extensions and improvements in its electric power plant, to cost $150,000, including machinery.

The Colonial Supply Co., Henryetta, Okla., manufacturer of oil well supplies and equipment, plans the establishment of a one-story machine shop and branch works at Weleetka, Okla.

G. T. Braden, Tulsa, Okla., is organizing a company to build and operate an oil refinery at Perry, Okla., estimated to cost $75,000.

The St. Louis & Southwestern Railroad Co., St. Louis, has tentative plans for additions to its car and locomotive shops at Pine Bluff, Ark. The work will be carried out during the coming year in connection with an expansion and improvement program estimated at $2,000,000.

The Consumers' Light & Power Co., Ardmore, Okla., has preliminary plans under way for a new ice and cold storage plant, estimated to cost $100,000 with machinery.

The Crouse Clear Vision Gasoline Pump Works, Inc., 822 East Harry Street, Wichita, Kan., is planning for a new two-story foundry, 60 x 75 ft., for the manufacture of pump castings, estimated to cost $25,000. Emery Crouse is president.

The DeKalb County Electric Light Co., Maysville, Mo., has perfected plans for a new power house, 50 x 70 ft., estimated to cost $75,000. O. L. Wright is president.

Officials of the Andrews Steel Co. and the Newport Rolling Mills, Inc., Newport, Ky., affiliated, have organized the Globe Iron Roofing & Corrugating Co., under Delaware laws, to manufacture steel and iron roofing and kindred products. Joseph B. and W. N. Andrews head the company, which has an initial nominal capitalization of $20,000.

The Oklahoma Portland Cement Co., Ada, Okla., will build an electric power plant for service at its mills at Ada and Lawrence, Okla. Other improvements will be made. Charles Boettcher is president.

The Tennessee Electric Power Co., Chattanooga, Tenn., is arranging an expansion and improvement program for the coming year, to include the construction of a third unit at its hydroelectric power plant at Rock Island, Tenn., the erection of an auxiliary steam-operated generating plant, new transmission lines, substations, etc. The work will involve $5,000,000. B. C. Edgar is vice-president and general manager.

A manual training department will be installed in the two-story and basement high school to be erected at St. Charles, Mo., estimated to cost $245,000, for which bids on a general contract will soon be asked. William B. Ittner, Board of Education Building, St. Louis, is architect.

The Litton Veneer Co., Rockford, Ill., will build a new branch plant on Nettleton Street, St. Louis, to include a one-story power house. B. B. Bertram is manager.

The Common Council, Fulton, Mo., will commence the construction of a one-story municipal electric power plant, 45 x 73 ft., to cost $35,000. H. K. Graf, Chemical Building, St. Louis, is architect.

A manual-training department will be installed in the three-story and basement high school to be built at Sapulpa, Okla., estimated to cost $125,000. Jewell Hicks, 19½ West Main Street, Oklahoma City, Okla., is architect.

The Kenyon Brick & Tile Co., 2700 West Tenth Street, Oklahoma City., Okla., is planning for the erection of a new plant addition to increase the capacity to about 40,000 bricks daily. At a later date, other extensions will be made to more than double this output. A. W. Kenyon is president.

The Fountain City Lumber & Body Co., Chattanooga, Tenn., recently organized, has acquired the plant of the Fountain City Mill & Lumber Co. Plans are under way for enlargements, to include the installation of a department for the manufacture of automobile bodies. The mill of Brantley Brothers has also been secured and the equipment will be removed to the Fountain City plant with additional machinery to be purchased. J. R. Brantley is president and J. V. Brantley, secretary and treasurer.

Inquiries for two presses for blanking and light forming, with about 36 x 72 in. bed between housings, have been received from the Niedringhouse Metalware Corporation, Goodfellow and Natural Bridge Avenues, St. Louis.

Canada

TORONTO, Nov. 27.

MACHINE tool sales are well up to expectations and inquiries indicate a brisk demand for equipment with the coming of the new year. November business compares very favorably with that of the previous month. Automobile manufacturers are entering the market and are sending out inquiries for equipment for additions which are now under way. The Ford Motor Co. of Canada will require approximately $75,000 worth of equipment for a machine shop at Ford, Ont., and for a new assembling plant to be erected on Danforth Avenue, Toronto. The Durant Motor Co., Leaside, will require considerable equipment for an addition now under way. The General Motors Corporation, Oshawa, Ont., proposes to make improvements and extensions to its various plants there and will require considerable equipment.

Both the Canadian National Railways and the Canadian Pacific Railway are buying in a small way for replacement purposes for various car shops, and in addition to present requirements builders look for more extensive orders from this source for car shops and repair plants to be erected in western Canada. Makers of electrical equipment report good orders being booked and others in prospect.

The plant of the Stephen Brick Co., Ltd., Prince William Street, St. John, N. B., was destroyed by fire with a loss of $100,000 to building and equipment.

The Thompson Motor Supplies, Ltd., 415 Queen Street West, Toronto, proposes to erect a factory at Acton, Ont., to cost $15,000.

James Stutt & Sons, West Flamboro, Ont., are contemplating erecting a lumber mill at Dundas, Ont., and are interested in equipment.

The Goderich Elevator & Transit Co., Goderich, Ont., will build an addition to its grain elevator to cost $250,000.

The Electropax Mfg. Co., Mount Dennis, Ont., whose plant was recently destroyed by fire with a loss of $100,000, will rebuild and will require new machinery and equipment.

Bids will be called at an early date for the erection of an addition to a grain elevator at Port Arthur, Ont., to cost $300,000 for Parrish & Heimbecker, Ltd., 614 Grain Exchange, Winnipeg.

The MacDonald Mfg. Co., Ltd., 145 Spadina Avenue, Toronto, Ont., manufacturers of paper cartons, etc., has awarded the general contract to Hugh Walker, 230 Langley Avenue, Toronto, for a factory to cost $150,000. H. H. Babcock, 277 Sackville Street, is architect.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	
Refined iron bars, base price	3.04c.
Swedish bars, base price	7.50c.
Soft steel bars, base price	3.04c.
Hoops, base price	4.39c.
Bands, base price	3.84c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	3.14c.
Channels, angles and tees under 3 in. x ¼ in., base	3.04c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.10c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	3.30c.
Toe-calk, ½ x ⅝ in. and larger	4.15c.
Cold-rolled strip, soft and quarter hard	6.75c. to 7.25c.
Open-hearth spring steel	4.00c. to 6.00c.
Shafting and Screw Stock:	
Rounds	3.90c.
Squares, flats and hex	4.40c.
Standard cast steel, base price	15.00c.
Extra cast steel	18.00c.
Special cast steel	23.00c.

Tank Plates—Steel

¼ in. and heavier ..... 3.14c.

Sheets

Blue Annealed

	Per Lb.
No. 10	4.19c.
No. 12	4.24c.
No. 14	4.29c.
No. 16	4.39c.

Box Annealed—Black

	Soft Steel C. R., One Pass, Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.30c. to 4.70c.	.....
Nos. 22 and 24	4.35c. to 4.75c.	5.00c.
No. 26	4.40c. to 4.80c.	5.05c.
No. 28	4.50c. to 4.90c.	5.15c.
No. 30	4.75c. to 5.15c.	.....

No. 28 and lighter, 36 in. wide, 10c. higher.

Galvanized

	Per Lb.
No. 14	4.60c. to 5.00c.
No. 16	4.75c. to 5.15c.
Nos. 18 and 20	4.90c. to 5.30c.
Nos. 22 and 24	5.05c. to 5.45c.
No. 26	5.20c. to 5.60c.
No. 27	5.35c. to 5.75c.
No. 28	5.50c. to 5.90c.
No. 30	6.00c. to 6.40c.

No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
½ in. Butt	—50	—42	½ in. Butt	—11	+13
¾ in. Butt	—56	—44	¾ in. Butt	—17	— 1
1-3 in. Butt	—57	—44	1 in. Butt	—20	— 2
2½-6 in. Lap	—54	—41	2 in. Lap	—14	— 2
7⁄8 in. Lap	—50	—26	2½-6 in. Lap	—18	— 2
9-12 in. Lap	—46	—25	7-12 in. Lap	—10	— 6

Steel Wire

	Per Lb.
Bright basic	4.75c. to 5.00c.
Annealed soft	4.75c. to 5.00c.
Galvanized annealed	5.40c. to 5.65c.
Coppered basic	5.40c. to 5.65c.
Tinned soft Bessemer	6.40c. to 6.65c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	19½c. to 20½c.
High brass wire	20 c. to 21 c.
Brass rod	17 c. to 18 c.
Brass tube, brazed	26⅜c. to 27⅜c.
Brass tube, seamless	23 c. to 23½c.
Copper tube, seamless	25¾c. to 26 c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 22c. to 23c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14-20	
		Primes	Wasters
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb.	$5.80
		90 lb.	6.15 5.90
		100 lb.	6.25 6.00
IC	$10.00 $8.50	IC	6.40 6.15
IX	11.50 10.00	IX	7.40 7.15
IXX	13.00 11.25	IXX	8.40 8.15
IXXX	14.25 12.50	IXXX	9.40 9.15
IXXXX	16.00 14.00	IXXXX	10.40 10.15

Terne Plates

8-lb. coating, 14 x 20

100 lb.	$7.00
IC	7.25
IX	7.50
Fire door stock	9.00

Tin

Straits pig	39c.
Bar	45c. to 50c.

Copper

Lake ingot	15¼c.
Electrolytic	15 c.
Casting	14¾c.

Spelter and Sheet Zinc

Western spelter	8¾c.
Sheet zinc, No. 9 base, casks	10¼c. open 10¾c.

Lead and Solder*

American pig lead	8c. to 8¾c.
Bar lead	9c. to 10c.
Solder, ½ and ½ guaranteed	27½c.
No. 1 solder	26c.
Refined solder	23¼c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	75c.
Commercial grade, per lb.	35c.
Grade D, per lb.	25c.

Antimony

Asiatic ..... 7¾c. to 8½c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb. 25c. to 27c.

Old Metals

Business is fair and the market is steady. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy crucible	12.00
Copper, heavy wire	11.50
Copper, light and bottoms	9.50
Brass, heavy	6.50
Brass, light	5.50
Heavy machine composition	8.75
No. 1 yellow brass turnings	7.00
No. 1 red brass or composition turnings	8.00
Lead, heavy	5.75
Lead, tea	4.50
Zinc	4.50

THE IRON AGE

New York, December 7, 1922

ESTABLISHED 1855 VOL. 110, No. 23

Polish Machinery Industry Shows Revival

An American Observer Finds Signs of Progress—Some Contrasts Between Conditions To-day and in 1909—Prospects for Export Trade

BY CAPTAIN GODFREY L. CARDEN

Readers of THE IRON AGE *will recall Captain Carden's previous contributions to its columns dealing with the machine tool industry in Great Britain, Germany, France and other European countries, also his reports to the Department of Commerce in pre-war years when he went to Europe as its special agent to investigate machine tool developments. On his return to the United States from Russia, some weeks ago, Captain Carden re-visited Germany and in later articles he will give our readers the results of his observations there.*

COMING out of Russia a few weeks ago, I stopped off at Warsaw to visit again those machinery works with which I had been familiar before the war. Immediately I was impressed on arrival with the clean-up of the streets and the excellent up-keep of both public and private buildings. It was a new Warsaw, a very different city from what I had known in 1909 when the Russians were in control.

The Germans, I was told, had allotted to each house *concierge* the cleaning to the middle of the street of all roadway fronting his immediate premises. With two *concierges* working opposite there was never any question as to that particular portion of the street being kept clean. Whether it was the Germans who were responsible for first cleaning up Warsaw, I do not know, but it is certain that the Polish capital is to-day as clean



Agricultural Machinery Works at Sosnowiec, Southwest of Warsaw, Poland

as most German cities were before the war, and far cleaner than many German cities of to-day.

In 1909 I had occasion as special agent for the Department of Commerce to report on the Warsaw shops of Gerlach & Pulst; Bormann, Szwede & Co.; Rohn, Zielinski & Co. and K. Rudzki & Co. The first named was a prominent machine tool works. It was comparatively new when I visited it in 1909, but before the war came it had made rapid progress, and its prospects for the future were unusually good. The German drive into Poland forced the Russians back and as the latter retreated they swept the works clean of everything. Nothing, I am informed, was left. The plant has never been restored.

Typical Machinery Plants

Both Rohn, Zielinski & Co. and Bormann, Szwede & Co. are in full swing. They are typical of the Polish machinery industry and for that reason I paid especial attention to them. In 1909 Bormann, Szwede & Co. employed as high as 1000 men. To-day the number is 450. As in previous years, this establishment turns out steam engines and engine fittings, boilers, pumps, blowers and a general line of equipment for sugar refineries and distilleries. A standard type of steam engine is built for sugar works, and the firm undertakes to construct complete installations for refineries and distilleries. The works originated as far back as 1808, but the present firm name dates from 1875. In 1909, when I went over the shops, it was with Director Maurycy Bormann. This last visit it was with his son, a man of the same charming personality as the father. It is the son who is now the active head of the business.

Competent Mechanics Scarce

The works comprise a general machine shop, copper smithy, foundry and repair shop. Sugar machinery, copper piping and boiler construction made up the bulk of the orders which I observed in hand. Mr. Bormann spoke in optimistic terms of the prospects ahead. They had all the work they could do for the present; more, in fact, and the greatest trouble was to secure competent mechanics. There was a decided tendency among Polish workmen to go to France because of the higher wages now being paid there.

All raw material used in his shops, Mr. Bormann said, came from Polish territory. This is something which was not possible before the war. Poland, it must be borne in mind, has gained important mineral territory which during the war belonged to enemy states.

For the present the orders coming in are for the most part from Latvia, Lithuania, Esthonia, and home territory. Before the war a very considerable business was carried on in southeastern Russia in sugar machinery and it was hoped that the opportunity would present itself to open up business again in Russia.

Mr. Bormann was of opinion that the dread of socialistic ideas for Poland had passed by. The Polish workman, he declared, had got beyond that stage and was now to a great extent immune.

On all sides at the Bormann, Szwede plant there was evident a gratifying snap and vim, and the sentiment was expressed to me that in due course, unless the unexpected happens, the Polish machinery industries will come back into their own.

Rohn, Zielinski & Co. Works

At the Rohn, Zielinski & Co. plant I went about with Mr. Ligarzewski, engineer over the technical department. This plant is now employing about 300 men, practically the same number as in pre-war days. Now as in former years, these shops are turning out air and circulating pumps of the Worthington type and a line of radiators. Many of the pumps in former Russian warships came from these Warsaw shops. The American Worthington pump has always been regarded as the most serious competitor the Warsaw shops had to meet, even more so than was Gardner of England, or Schwabe of Erfurt, Germany. Prior to the war Warsaw was Russian territory and Russian duty was exacted, but according to the Warsaw viewpoint Worthington pumps from the United States had an advantage in sea freight over continental freight rates into Russia, and furthermore, owing to the comparatively light weight of the Worthington pump, the duty collected was relatively small.

Practically all raw material required by the Rohn, Zielinski shops is obtainable in Polish territory, although I believe it is still the practice to draw on outside sources for lubricators and for sleeves to cover that portion of the pistons exposed between the cylinders of high-pressure pumps.

Turning Out Machine Tools

I noted with considerable interest that the Rohn, Zielinski shops are attempting to meet some of the Polish machine tool demand by undertaking on their part to turn out engine lathes, planers and slotters. Four sizes of lathes are made, one size planer, and a Loewe type slotter.

Practically all the tools in the shop are of a pre-war age, and a lot of new equipment is demanded, but for all that this plant is going ahead and doing things, and even figuring on export just as soon, it was said, as it is possible to increase capital to a point which will permit of putting in new tools. The Slavic border states which were formerly Russian territory are regarded as a natural export field for their outputs.

When one considers that this plant passed successively from Russian to German and then back to Russian hands, and finally into Polish hands, and that both Russians and Germans undertook to carry off what they could, it is a wonder that there is anything left of the shops. However, the plant is there to-day and running, and the spirit shown is fine.

The Rohn, Zielinski works have branches in London and elsewhere, and before the war they had also a branch in Moscow.

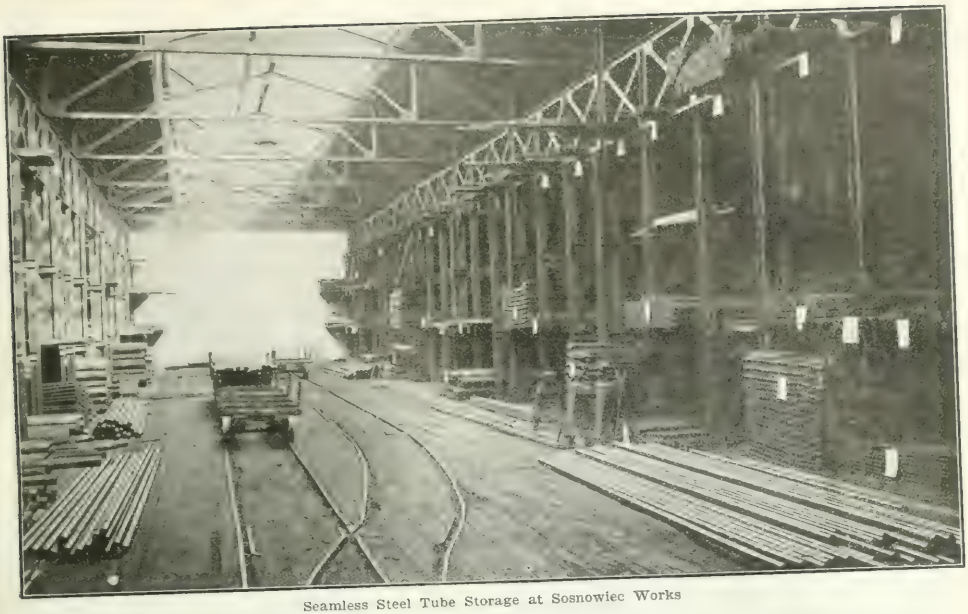
The Rudzki shops are as formerly representative of that class of works in Poland which engage in a general line of machinery. The plant comprises shops both within the city limits of Warsaw and at Nowominsk. These works undertake bridge construction, railroad frogs, complete water works for railroads and towns, and complete arrangements for gas works, heavy sluice valves and street hydrants. The railroad frog part of the business has always been an important feature of these shops.

Revival in Metal Working Lines

The consensus of opinion obtained in my talks among the machinery men was that there was a considerable revival in the manufacture of iron and steel products, which at one time had practically reached the vanishing point. At least two new plants are recorded since the cessation of the war, for machinery and locomotive building.

What has been accomplished so far has been in the face of heavy handicaps, especially so when one considers that the Germans carried away all available raw material and machinery from the industrial districts of Russian Poland. To re-establish the factories meant the securing of new equipment. I observed in this connection considerable machine tool installations secured under the reparation terms, the tools being transferred to Poland from Austrian shops.

Following the termination of the last war with the Soviet Government of Russia, the economic improvement in Poland has been a steady one. The railroad equipment replenished by rolling stock under the reparation terms from Germany has clarified the situation very much. The Polish railroad gage now corresponds to



Seamless Steel Tube Storage at Sosnowiec Works

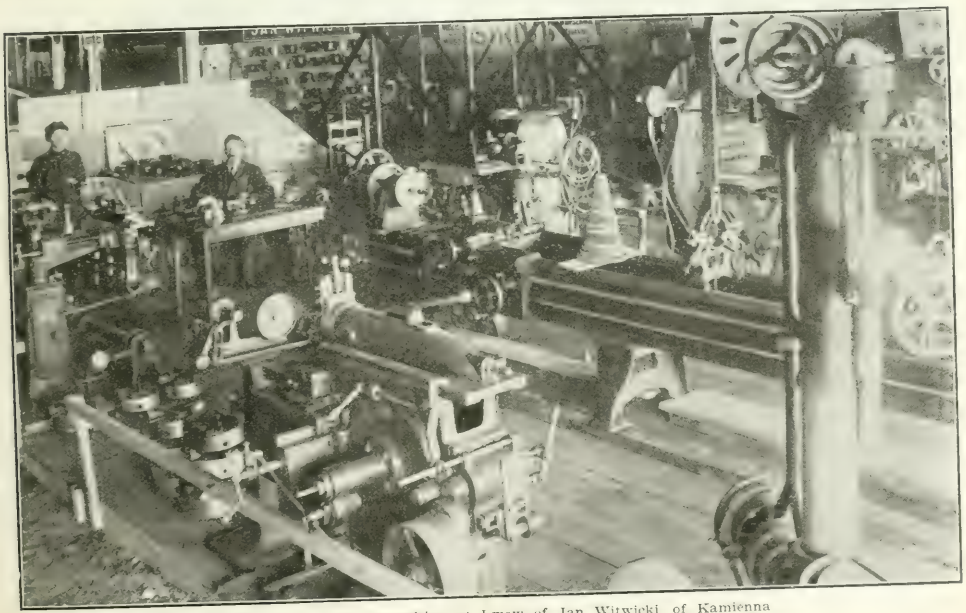
the standard European gage. This standard gage extend right up to Stolpse on the Russian frontier.

Textiles the Chief Industry

While the metal and machinery industry is important, it must not be overlooked that before the war 53 per cent of all industrial workmen were employed in the textile factories. The normal pre-war annual production in textiles, of which 60 per cent was cotton goods, totaled $200,000,000. At Lodz alone there were employed before the war more than 100,000 textile workers.

The Polish textile mills were largely owned and managed by Poles. During the war these mills suffered. Copper and brass parts were taken, also electric motors. So far as equipment is concerned these mills are now in shape to run on about a 65 per cent pre-war basis. The closing of the Russian market makes a serious situation for these mills, until some arrangement can be made whereby they again can serve Russian territory. At the present time the Polish textile mills are turning out about 40 per cent of pre-war outputs.

The spirit in Poland to-day is remarkably good. There always existed the elements for a strong national sentiment. Those elements have since crystallized and Poland to-day presents possibilities of marked character. The industrial future just now depends largely on the stability of the present Government.



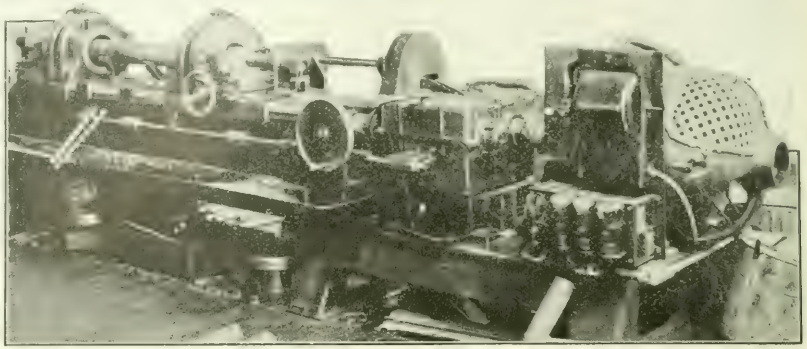
Exhibition at First Exposition at Lwow of Jan Witwicki, of Kamienna

FACING AND CENTERING MACHINE

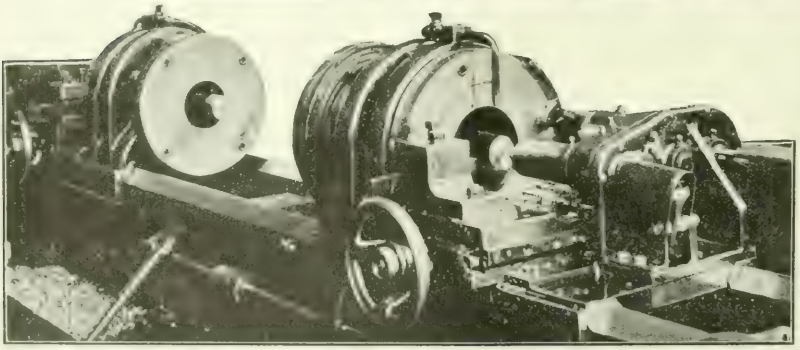
Double-End Semi-Automatic Production Unit for Railroad Axles and Drive Shafts

Automatic features are an outstanding characteristic of the double-end semi-automatic facing and centering machine shown in the accompanying illustrations. The equipment illustrated was originally developed by the Goodman Mfg. Co., maker of mining machinery, Chicago, for use in connection with a standard shop operation for which, it is said, there was not available a machine to do the work on a production basis.

The machine in different sizes can be used for not only large work, such as railroad axles, but also for properly preparing armature shafts, gear shafts and similar work, for subsequent turning operations on lathes having multiple stops. For the latter class of work a uniform distance between bottoms of center holes is very essential and the machine illustrated is intended to take care of this requirement, and also to cut off and face the shaft itself to proper length at the same setting.



Double-End Semi-Automatic Facing and Centering Machine for Preparing Railroad Axles, Gear and Other Shafts for Turning Operations on Lathes Having Multiple Stops



The Heads Can Be Separated to Permit Dropping the Work Between Them. Traverse of the heads is by power, and an automatic stop is provided. Cutting-off tools have power cross feed with automatic stop and reverse. Centering spindles operate automatically as part of cycle of cutting-off tools

The heads are arranged so that they can be separated to permit dropping the work in place between them, instead of putting it through one of them. Traverse of the heads in either direction is by power, and an automatic stop is provided for either direction. The cutting-off tools have a power cross feed with an automatic stop and automatic reverse, with stop. The centering spindles are operated automatically as a part of the cycle of the cutting-off tools. The centering tools automatically traverse into position and feed into the work as the cutting-off tools are withdrawing; the centering tools have automatic stop when the proper depth is reached, and automatic reverse and stop.

Because of the automatic features mentioned one man can operate several machines, the number depending upon the length of time consumed in the machining. Other features include quick-acting universal chucks, quick-setting gage for drill spindles, quick-acting V-rests for adjusting heavy work, and a quick-change feed mechanism which provides four changes of feed.

The advantages of the machine from a production standpoint, may be noted perhaps from an outline of the set-up and sequence of operations. In setting-up for the job the first step is to adjust positions of the heads by power traverse and hand wheel, so that the cutting-off tools are spaced apart correctly for the length of the shaft to be cut. The stop on the front of the machine is then set against the head and the latter moved ⅛-in. away from the stop. The power release clamp on the left-hand side of the head is then set. Finally the heads are separated to a distance sufficient to permit the work to be dropped between and the power releasing clamp on the right-hand side of head is set.

The sequence of operations is as follows: Place the work on the V-rests between the heads, throw power-traverse lever for the heads; when head traverse throws out, turn the handwheel the remaining distance ⅛-in. against the stop. Then tighten the universal chucks; pull the clutch handle, starting the work to revolve; and pull out the power feed knob of both heads. The cutting-off and centering tools then automatically perform their functions, return to the predetermined position and stop. The machine is then stopped by pushing the clutch handle, the chucks are opened and the power traverse lever thrown in reverse, whereupon the heads traverse apart to the automatic stops, and the operator removes the work.

Some of the principal dimensions of the machine are: swing over the ways, 19 in.; swing over the tool slide, 7 in.; and diameter of the hole in the chuck, 7 in. The maximum distance, heads apart is 5½ ft.; the maximum distance between cutting tools, heads apart, 7 ft. 8 in. and the minimum distance between cutting tools, heads together, 2 ft. 2 in. The shortest piece that can be faced and centered, using double chucks is 13¾ in. The length of the bed is 10 ft. 8¾ in. and the width of the shears, center of Vee, is 13⅝ in. The floor space occupied by the machine is approximately 3x16 ft. A variable speed, 10 hp. 250 to 1000 r.p.m. motor is used.

On a drive shaft 21⅞ in. long and 2¾ in. in diameter, the time claimed for facing and centering is 4 min. On an axle 60 in. long and 5⅜ in. in diameter the time claimed is 15 min., from floor to floor.

Efficiency of Electric Power Supply*

Improvement Depends Upon Making the Best Use of Existing Facilities and Choosing Carefully the Source of Power

BY CHARLES P. STEINMETZ†

POWER production is an industrial operation, just like the making of steel rails or of furniture, or the running of a railroad or a hotel. The high efficiency of modern industrialism is essentially due to the subdivision of industrial operation so that every industrial operation is carried on in a separate plant by a separate organization such as to secure the maximum possible economy for each particular operation, whether the making of steel rails or the running of a hotel.** However, the plant and organization most efficient for one industrial operation, such as the making of structural steel or the running of a railroad, cannot be most efficient for another and entirely different operation, such as the production of the power which is needed as raw material in the principal industrial operation. Thus best economy requires the separation of power production from the industry served by it.

This was not possible so long as there were no means of transporting or transmitting and distributing the power. It became possible by the development of electrical engineering, and thereby a new industry has been developed, the industry of electric power production, transmission and distribution, co-ordinate with the older industries, such as those of making steel rails or running a railroad. This made it possible to segregate the power production from the industry using the power as raw material, and thereby to secure maximum economy in both.

Increasingly since then industrial electric power supply from a general electrical power system has taken the place of the local industrial steam or electric power generating plant, and that not merely where a small or moderate amount of power is involved, but even with such large powers as the operation of a metropolitan rapid transit system or trunk line railway electrification.

With this the efficiency of the electric power industry has become of importance to all industries, and to the public at large.

An important factor in industrial economy is the cheapness of the raw material. The principal raw material of the electric power industry is energy; hydraulic energy, of the water powers, and fuel energy of coal, gas, oil, etc. Thus the development of the country's water power is of interest not only to the corporation exploiting the water power, but to all industries and the public at large.

The raw material of an industry is cheapest when it can be secured as the by-product of another industry, though generally it is not safe for an industry to entirely depend on a by-product as a source of raw material, due to its limitations. Energy, the raw material of the electric power industry, is a by-product of many other industries, for instance, the steel industries, in the blast furnace gases, etc.

Thus we get the general conclusions:

1.—Power production has become a separate industry.

2—It is more economical for an industry to secure power from the electric power industry than to produce its own power.

3.—Economy requires that by-product power of an industry be not wasted, even partly, but be used to its fullest extent as raw material for power.

*Abstract of a paper presented at the sixteenth annual convention, Association of Iron and Steel Electrical Engineers, Cleveland.

†Chief consulting engineer, General Electric Co., Schenectady, N. Y.

**This does not necessarily mean a separate corporation but often, and increasingly so, a number of industrial operations are controlled by the same corporation, but then best economy usually leads to separate technical and administrative organizations for each industrial operation.

Electric Energy Cannot Be Stored

It is characteristic of electric energy that it cannot be economically stored (in the quantities and under the conditions considered here). Therefore it must be used at the rate at which it is produced. Thus, if the load is not constant, the station cannot be full loaded all the time, and the more the load varies, the less is the station output compared with the output which the station could give at uniform load, and the higher therefore the cost of power. This makes the cost of electric power dependent on the load curve, that is, the variation of the load throughout the day and throughout the year, and on the load factor, that is, the ratio of the total (daily or annual) load on the station, to its capacity.

With a daily load curve as given by Fig. 1 (winter lighting load), of load factor 0.33, the station gives only 33 per cent of the output which it could give if continuously carrying its maximum load. With an annual load distribution as given by Fig. 2, the load exceeds 150,000 kw. for 8 hr. only. The additional apparatus required to take care of these additional 30,000 kw. of annual peak load makes the power during the 8 hr. of the peak cost more than $1 per kwhr., while the average cost throughout the year may be a fraction of a cent per kwhr.

With the station load curve Fig. 2, an additional amount of kwhr. larger than the total kwhr. now sold by the station could be supplied without any additional investment, if limited to the off-peak period, and the only additional cost due to this amount of off-peak energy would be that of fuel and some attendance, etc. And as the fixed cost usually is the major—and with water power almost the entire—cost of the power, the cost of off-peak power therefore should be lower still than that of continuous power, while that of peak power is much higher. Off-peak power is somewhat of the nature of a by-product, in many respects; its cost is low, but if developed beyond the limit, it ceases to be off-peak power and becomes peak power.

The size of the generating, transmitting, converting and distributing plant, and practically every other element entering into the cost of electric power, except fuel and size of prime mover, are determined by the kva. delivered by the station, while the power is measured by the kw. The cost of power per kw. thus essentially depends on the ratio of kw. to kva., that is, the power factor of the load.

Thus the lower the power factor the higher the cost, and the higher therefore should be the price of the power. For instance, if the total cost of power, exclusive of fuel, and the fixed charges due to the mechanical part of the generating plant, constituted the fraction q of the cost of power, at power factor p, Q kw. would represent $\frac{Q}{p}$ kva. apparent power, thus $(\frac{Q}{p} - Q)$ kw. additional generator and line capacity, costing as much as $q\,(\frac{Q}{p} - Q)$ additional kw. of power, and the cost of power at power factor p thus would be $Q + q(\frac{Q}{p} - Q)$ $= (1 - q + \frac{q}{p})\,Q$, that is, would be increased by the factor $1 + \frac{q}{p}(1 - p)$.

Thus, considering as standard the cost of power at

unity power factor and continuous load, the cost increases with increasing power factor, and it increases with increasing fluctuation of load, that is, with increasing ratio of maximum to average load or, as explained, with maximum demand factor, as seen above. This really is not strictly true, but it depends upon whether the maximum demand overlaps with the station peak or not.

Methods of Power Supply

There are three ways of supplying power to an industry:

First is the isolated local plant without connection with any electric power system. The advantages and disadvantages of this arrangement have been discussed in the preceding. Where considerable energy is available as a by-product of the industry, the cost of power from a local isolated plant may figure lower than power can possibly be bought from the central station. This, however, may have little meaning, as it depends on the value assumed for the by-product energy used as fuel by the local plant. If the by-product energy is not sufficient for the total power demands of the industry,

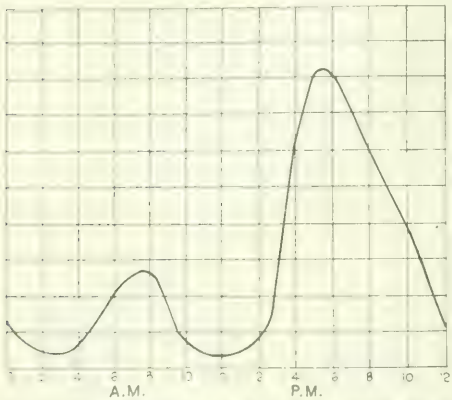


Fig. 1 Winter Building Load of a Central Power Station

additional fuel has to be used; where there is more by-product energy than required to produce the power, the surplus may be wasted, or an attempt made to find some other use for it. Or it may also be converted into electric power and some of the electric power sold. Or some industrial uses for the surplus electric power may be developed, such as electric smelting or refining. The latter probably is the most economical arrangement.

Secondly, the electric power required by the industry may all be bought from an electric power system, and no local plant operated. This is most convenient, but depends on the rates which can be secured from the electric power company. In general, the power would be bought in bulk under a rate based on maximum demand and on power factor. It would therefore be economically desirable to arrange the industrial operation so as to have as nearly uniform power consumption as possible, without large peaks of power consumption, so as to have the maximum demand exceed the average demand as little as possible, and thereby get the best rates. For power, synchronous motors would be used as far as possible, and operated over-excited so as to compensate for the lagging currents of induction motors.

Power factor corrective devices, such as synchronous condensers, may be installed in the substation. The substation with its transforming, regulating, power factor controlling devices, etc., may be owned and operated by the power company, or by the industrial corporation, or it may be owned by the one and operated by the other. The power may be metered on the primary side of the substation or on the secondary side. The general economic principle, I believe, should be that everything pertaining to power generation, transmission, transformation, control, etc., should be operated and preferably also owned by the power supply company, as being a legitimate part of the electric power industry; while everything pertaining to the application of the power to the specific industry served by the substation should be operated by the industrial corporation. The specific arrangement which can be made will, however, to some extent depend on the financial strength, on the progressiveness of the management and the farsightedness of the engineering staffs of the two companies.

If there is considerable by-product energy, some arrangement should be made to utilize fully this available energy. If the by-product energy is wasted entirely by not being used, or wasted intrinsically by being put to an inferior use, for heating only, instead of first taking out the available mechanical power, then the arrangement is uneconomical, even if financially the central station power supply should figure out an advantage.

Where a daily or annual peak is a factor in the cost of central station power generation, and off-peak power therefore of lower cost than continuous power, lower rates may be secured if the plant operation can be organized so as to disconnect the central station supply for a few hours during the day, and operate on local power only. Or a two-rate metering may be arranged, that is, a lower meter rate during the off-peak period. This would allow the use of central station power during peak load, if so required by the industry, but put a premium on avoiding it and securing the lower rate of the off-peak power.

A third way of operation would be to carry constant load on the local station, and take the fluctuations by the central station service. In this case a less favorable price for central station power would result, but the local station would work at best economy. With by-product energy, the local station may then be operated at such output as to consume the by-product energy at the rate at which it is produced, and eliminate the need of storage.

Economy in Use of Power

The most economical arrangement between local station and central station power supply to a large extent depends on local conditions of power demand and

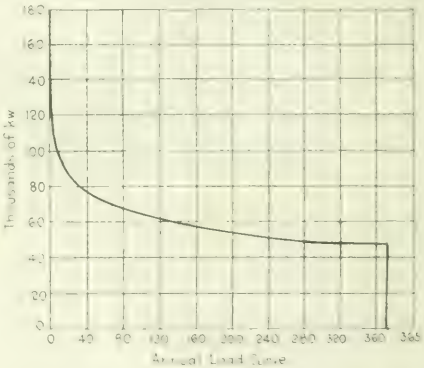


Fig. 2. Annual Load Distribution of a Central Power Station, Showing How Small Is the Total Use of the Highest Station Capacity

supply, and on the possibility of modifying the power demand to get more favorable conditions, and is deeply involved in the matter of rate making. While the economic principle of rate making is to arrange the price in proportion to the cost of power, as depending on quantity and quality (such as load factor and power factor, peak and off-peak), the actual rates may not quite represent this, and the lowest rate may not always be the most economical.

The fundamental principle of operation of an electric power system [as of any other] is to get as much output as possible out of the most economical stations

and call upon the less economical stations only after the more economical ones are fully loaded. That is, in a system comprising several steam stations, during times of light load only the most economical stations would be kept running, and with increasing load less economical stations started, so that the least efficient stations (usually the small, old stations) or machines in the station (for what applies to the different stations, equally applies to the different machines in the same stations) may be operated only a few times during the year, or in emergencies due to accidents to some of the more efficient machinery.

Where hydraulic stations and steam stations operate in the same system, the hydraulic stations would be operated at continuous full load, and the variations of the load taken by the steam stations, since the efficiency of power production of the hydraulic station decreases with decreasing load much faster than that of a steam station, as in the hydraulic station practically the total cost is fixed cost; in the steam station a part of it proportionate cost. Obviously, if there is water storage, and a season when the total water supply is less than needed to operate the hydraulic station continuously at full load, it would be most economical to shut it down during periods of light load on the system and carry full load during the peak load of the system.

A local station utilizing by-product energy would have to some extent the same characteristic as a hydraulic station: low proportionate cost of power, due to cheap energy. Compared with the huge main station of the electric power system, it probably will be less economical, and thereby also have somewhat the characteristics of secondary stations. The former would favor continuous full load operation, the latter shut down during light load on the system, and the most economical method of operation therefore would have to be worked out on the basis of the cost of power production under different circumstances.

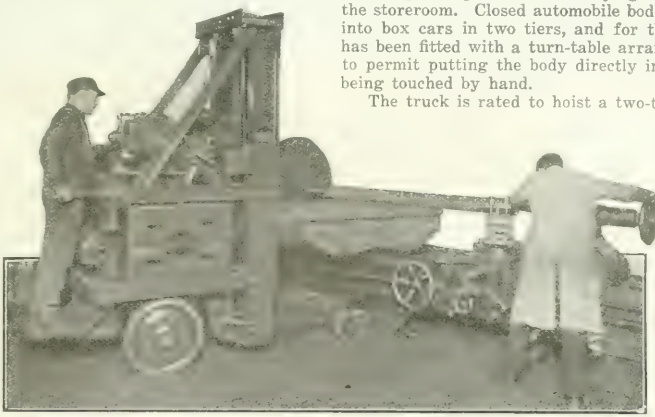
THE SPEED OF THE DOLLAR

Small Profits Many Times Over Make Large Totals in the Year

BY JOHN J. RALPH

WHAT was last year's turn-over? The turn-over of total capital? The turn-over of live capital? For six years, in metal working lines, it has hardly been necessary to ask this. This year it will be because the reward is not so easily earned, nor is it limited solely by what one's conscience allows him to take!

Each turn-over is a purchase. If your purchases have been right then you can sell and re-purchase. Each time there is a turn-over there should be a profit. The faster the turn-over, the bigger the trip profit, at the same price, because the less the proportion the dollar carries each time for permanent and long time purchase load—another name for fixed overhead.



Combined Electric Truck and Portable Elevator. Loads may be placed directly on drays or in freight cars from the ground. Other uses include placing of heavy dies in punch presses and transporting them to and from the store room

To what extent is the idea of profit "Buy low and sell high"? Does it appear that one must get his costs out of each thing sold? Why? Was it felt necessary to get no more than mere costs for the past six years?

Has each one looked to see what purchases he can make that will speed the dollar on the round trip? Is there an ingredient finer than that now used which will improve the product and speed the dollar gait, so that even if it does not bring in so much each trip it can travel oftener and at the end of the year have brought back a sizable total?

The retailer is learning that lesson, poorly and slowly, to be sure. The jobber is doing better. Their magazines are full of the story. But has the manufacturer learned it? His literature is full of scientific management—technical processes—efficiency engineering, but to the merchant has been left the slogan, "Cut your losses, take your profits, and *repeat*."

The manufacturer is, first of all, a merchant. As such it is his business to make a profit, and to make this profit on his ability as a merchant. He is a manufacturer because, as a merchant, that seemed to him the path of most successful merchandizing. Some think that because of the manufacturing he is entitled to a profit. Not at all. The profit is the result of his ability as a merchandizer.

Electric Truck and Portable Elevator

The Baker R & L Co., Cleveland, has added to its line of industrial trucks and tractors the combined electric truck and portable elevator, designated as the Hy-Lift, shown in the accompanying illustration. It is designed to carry material and also to raise it, placing the loads directly on drays or in freight cars from the ground, tiering packages and unloading into the upper tiers of bins. Other uses include the placing of heavy dies in punch presses and carrying them to and from the storeroom. Closed automobile bodies may be loaded into box cars in two tiers, and for this use the truck has been fitted with a turn-table arrangement intended to permit putting the body directly into place without being touched by hand.

The truck is rated to hoist a two-ton load from the floor to a height of 6 ft., a cable hoist being employed. The machine consists of an electrically-driven truck mounting two vertical I-beam members which act as a track for the lifting carriage. The latter runs on four steel wheels and carries the load platform which is hinged to it. The hoist is of the two-drum type, with electric motor drive through a 40 to 1 worm reduction. An automatic limit switch opens the power circuit at the limits of travel and the load is held in position by means of a solenoid brake. The controller for this mechanism is conveniently mounted adjacent to the driver's platform.

The Wisconsin Southern Railroad Co., C. D. Smith, Fond du Lac, Wis., president, has announced that construction work will be started by April 1 on 50 miles of a proposed 250-mile steam railroad line, standard gage, single track, between Madison and Sturgeon Bay, Wis., by way of Fond du Lac and Manitowoc. The cost is estimated at $2,600,000. The corporation was organized in Wisconsin in 1892 with an authorized capitalization of $5,000,000.

NEW INDUSTRIAL LEADERSHIP

Engineer-Business Type the Country's Salvation, According to Dean Kimball

A mind capable of high development along business and financial lines, while yet retaining in its background the powerful scientific methods of attacking problems which have made modern industry possible, is the great contribution that the engineer can bring to the problem of universal well-being, said Dexter S. Kimball, dean of the Colleges of Engineering, Cornell University, in his presidential address before the American Society of Mechanical Engineers, New York, Dec. 4. "The one great thing we are all seeking is *justice;* but there is no justice where there is no knowledge, and the engineer, again using this term in its widest sense, alone possesses an accurate and intimate knowledge of industry."

"No one would presume to say that the engineer alone can solve the industrial riddle," he went on to say, "but it is clear that he can make a very great contribution to the solution. The National Department of Education has for some time been advocating strongly that engineering students be taught more of the fundamentals of business and that young men preparing for the field of business and commerce be instructed in some of the outstanding features of engineering. And it may be that we shall yet develop a combination of these two fields that will produce the new type of industrial leader. But whether the new leadership comes from one field or the other, or from a combination of the two, the problem of universal well-being offers a challenge and a call to duty that the engineer may not refuse."

Early in his address Professor Kimball emphasized that wide application of the principles of mass production has been made possible by mass financing, the work of the financier. The engineer, in turn, is now developing the principles of mass management, and his contributions to the philosophy of management are already noteworthy. "I believe," he said, "most business men would be surprised to know to what a large extent the methods of the engineer have invaded their chosen field, and there can be little doubt that the near future will see the engineering type of manager a predominant figure in all industrial administration."

All first-class engineering colleges, he added, now prescribe more or less economic study and students of engineering recognize this study as a necessary part of their mental equipment.

The address was well received, Secretary Rice remarking that so far as his memory went it was the first time a presidential address received an encore as evidenced by the prolonged applause.

Cincinnati Selected for Triple Supply Convention

Advance announcement has been made of another triple convention of the National Supply & Machinery Dealers' Association, the Southern Supply & Machinery Dealers Association and the American Supply & Machinery Manufacturers Association, to be held in Cincinnati, May 17, 18 and 19, 1923, with headquarters for all three Associations at the Hotel Sinton.

Employment in Cleveland

Employment of labor in Cleveland during November increased 1.9 per cent according to the monthly report of the Cleveland Chamber of Commerce and the State-City Employment Bureau, which compiled these figures from reports of 100 companies employing 500 or more persons. On Nov. 30, these companies employed 86,384 persons as compared with 84,796 on Oct. 31, and with 61,423 during July, when the low point was reached. Employees of iron and steel plants and manufacturers of iron and steel products increased 3.2 per cent during the month and there was a gain of 4.70 per cent in employment in plants making metal products other than iron and steel. The seasonal slump in the automotive industry resulted in a decline of 4 per cent in employees in plants making automobiles and automobile parts.

COMING MEETINGS

December

American Society of Mechanical Engineers. [illegible] ing Societies Building, 29 West Thirty-ninth Street, New York. Calvin W. Rice, secretary.

National Exposition of Power and Mechanical Engineering. Dec. 7 to 13, inclusive. Grand Central Palace.

January

American Engineering Council. Jan. 11 and 12. [illegible] ington. L. W. Wallace, 24 Jackson Place, Washington, D. C.

The Charles A. Coffin Foundation Is Announced

President Gerard Swope, General Electric Co., makes the following announcement:

"On May 16, 1922, Charles A. Coffin in his 78th year retired from the active leadership of the General Electric Co. Mr. Coffin has been identified with the development of the electrical industry since 1882. He was the founder of the General Electric Co., of which he has been the inspiration and leader for 30 years.

"As an expression of appreciation of Mr. Coffin's great work, not only for the General Electric Co., but also for the entire electrical industry, and with the desire to make this appreciation as enduring and constructive as Mr. Coffin's life and work have been, the board of directors of the company created on his retirement, and now desires to announce the Charles A. Coffin Foundation."

The income from a $400,000 fund set aside for the foundation, amounting to approximately $20,000 a year, will be available for encouraging and rewarding service in the electrical field by giving prizes to its employees, recognition to lighting, power, and railway companies for improvement in service to the public, and fellowships to graduate students and funds for research work in technical schools and colleges.

The foundation will be administered by a committee appointed by the board, which committee will have power to change the conditions of the distribution of the fund and the amounts for each particular purpose.

Charles A. Follett, who has been active in steel circles for nearly 20 years, during eight of which he was identified with the Phoenix Tube Co., Brooklyn, N. Y., has joined interests with G. M. Wheeler, formerly for eight years vice-president and general manager of the Newark Tube & Metal Works, Newark, N. J., to organize the Lincoln Steel Co., with offices at 120 Liberty Street, New York. Mr. Wheeler was also at one time connected with the Phoenix Tube Co.

Henry Ford is carrying on diamond drill exploration in the Michigamme valley west of Channing, Mich. The first hole has reached a depth of 300 ft. This is a continuation of the exploration work as started by John M. Longyear many years ago and carried on later by the Chicago, Milwaukee & St. Paul railway, and the Oliver Iron Mining Co. Experts always have contended that some day a high grade body of iron ore would be discovered in the Michigamme valley.

CRANE OF UNUSUAL PROPORTIONS

American Bridge Crane in Holland Has Long Apron

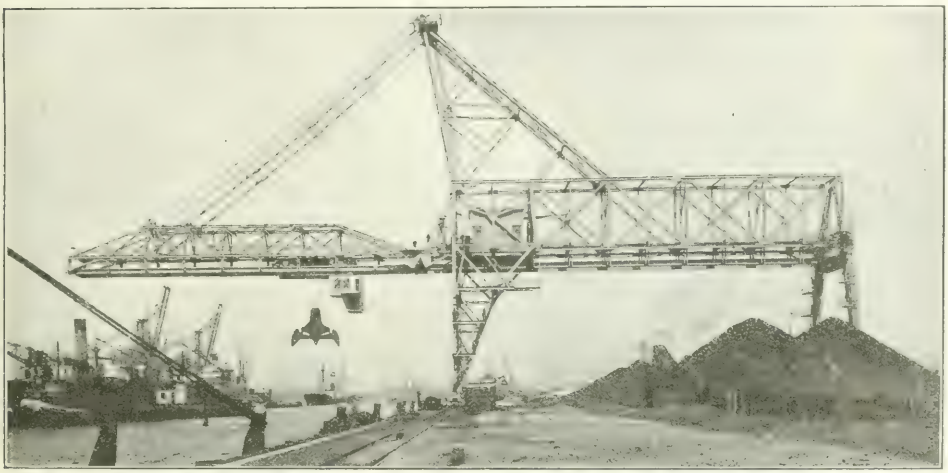
Unique in that it has an apron longer than the bridge span, a bridge crane for handling ore and coal has recently been erected by the Brown Hoisting Machinery Co., Cleveland, for the Coal Trading Association, Rotterdam, Holland. This crane is also of interest because the builder had to meet keen German competition, but was able to convince the buyer that the American crane was superior to the types offered at considerably lower prices by German manufacturers. Several cranes for similar work, all of German make, had previously been installed by the Rotterdam company, two of these appearing at the left in the picture. After the first American crane had been operated a short time, an order was placed for a duplicate installation.

The crane is designed for transferring foreign ores from steamers of 2000 to 10,000 tons capacity to barges up to 3600 tons capacity, that carry it from Rotterdam up to the blast furnaces and steel plants along the Rhine and Ruhr Rivers, and for unloading coal brought down the Rhine in the same barges on their return trip. The coal is transferred to steamships, mostly for shipment to France. A peculiar situation has developed from the war reparation terms in that Germany, after making her required shipments to France, has not enough coal to supply her domestic demands, and buys fuel from England to supply the deficiency. Consequently, coal laden barges are running both ways on the Rhine, those coming down carrying German coal for France, and some upbound carrying English coal for German industries.

In handling ore the cargo-laden steamship is tied up to the dock and, as a rule, two barges are tied alongside the ship, bringing the three vessels side by side. The reason for loading two barges at a time is that, while the crane is dumping ore into the hatch of one, the other is being shifted enough lengthwise to bring the compartment to be next loaded into line with the bucket. This permits the continuous operation of the bridge. The method of transfer explains the need of the long apron. This is hinged 14 ft. from the front bridge legs, so that it can be raised to clear the masts of the steamship when the bridge is being moved on its track. The apron rods, connected in 30-ft. sections, are folded up when the apron is raised. The apron is raised by twelve strands of ¾-in. wire rope.

The bridge span is 155 ft. 8 in. long and it is 161 ft. from the bridge rail to the end of the apron. The bridge is equipped with two interchangeable 10-ton buckets—a clam shell bucket for coal, and a bucket for handling the Swedish and Spanish lump ores. The bucket is operated by a man-riding trolley equipped with two independent drums each driven by a 175-hp. motor. The bucket is provided with a motor-driven table for rotating. The trolley is driven by a 105-hp. motor, and motors of the same capacity are used for raising the apron and for propelling the bridge. The propelling motor is located in a motor house above the pier legs, power being transmitted to the wheels through shafting and gears.

The bridge has a capacity of handling 500 to 600 tons of ore, or 600 to 700 tons of coal, per hour. Storage space is provided under the bridge, to be used in case boats are not available for trans-shipping cargoes.



With Enough Overhang to Reach Two Barges Tied up Outside a Steamship, This Crane Is Enabled to Transship Coal with Unusual Speed from Barge to Ship, or Vice Versa

Rapid Wage Advances in German Metal-Working and Building Trades

The rapid rise in the cost of living in Germany in the past summer was accompanied by greater increases in money wages than in any period of equal length. As compared with pre-war rates, wage rates as fixed by the latest collective agreements are for skilled workers between 53 and 57 times, and for unskilled workers between 62 and 76 times those of 1914, according to information received by the International Labor Office in Geneva, Switzerland. The following table gives the weekly money wages of 1914 and the latest quotation as well as the percentage of increases for some of the workers:

Metal Workers

	July, 1914	Latest Figure, 1922	Per Cent Increase
General Average:	Marks	Marks	
Skilled workers	35.57	1965	5070
Semi-skilled workers	33.49	1836	5480
Unskilled workers	25.04	1795	7170
Berlin:			
Skilled workers	42.44	1962	4620
Semi-skilled workers	39.96	1874	4690
Unskilled workers	30.62	1830	5980

Building Trades

	July, 1914	Latest Figure, 1922	Per Cent Increase
General Average:	Marks	Marks	
Skilled workers	37.56	2041	5430
Unskilled workers	29.11	1816	6240
Berlin:			
Skilled workers	43.46	2088	4800
Unskilled workers	29.15	1984	6805

Temperatures at Which

Fusion, Melting and Vap
Substances—Table of
and Users o

BY HENR

THE temperatures listed below are chiefly those relating in some way to the production and heat treatment of steel or to the fusibility of steel and of its components. The higher temperatures, that is, those of vaporization and dissociation of compound substances employed in steel metallurgy, are mostly unknown, and so far as we can see now they would have only a scientific interest for iron and steel men.

In speaking of the melting point of a substance, either element or compound, one must understand what is meant, as there are a number of temperatures near the melting point which bear some relation to it. Some of these are practically useful and some have only a scientific value. These are:

(1) The temperature at which the substance sinters, as a clay. This is useful. It is below the fusion point, No. 4.

Degree Temperature		
Cent.	Fahr.	
—10	—10	Steel [illegible] which is non-magnetic because of having been heated, is made magnetic; that is, it will be attracted by a magnet.
0	32	Iron and steel have higher tensility and lower ductility than at higher temperatures up to 100 deg. Cent.
100	212	Water boils. Least tensility of steel below red heat (Howard, French). Greatest contraction of area of boiler steel below red heat (French). When steel containing 0.95 per cent of carbon is hardened and drawn at 100 deg. Cent. it has the least degree of solubility in 1 per cent sulphuric acid (H_2SO_4) (Heyn and Bauer). When the same steel is dissolved in acid the greatest proportion of the carbon is evolved as gaseous hydrocarbons. Sheffield drill rod, having presumably about 1 per cent of carbon, when hardened and drawn at 100 deg. Cent., has least specific magnetism (Barns and Strouhal). Steel loses its sonority when struck between 100 deg. Cent. and 150 deg. (Law). The low tensility and high ductility indicate this temperature as being the best for cold-drawing operations on steel.
120	248	Seasoning steel to increase ductility.
150	302	Least ductility of Yorkshire iron rods. (7.5 per cent).
204	399	Least ductility of manufactured iron (12 per cent).
220	428	Faintest visible straw color in tempering eutectic steel having 0.9 per cent carbon.
290	554	Greatest tensility of steel and wrought iron.
292	558	Blue color given to eutectic steel in tempering.
350	662	When soft steel (0.07 per cent C) is quenched and reheated at 350 deg. Cent. it has the greatest degree of solubility in 1 per cent sulphuric acid. Nickel becomes non-magnetic.
360	680	When hypereutectic steel, containing 0.95 per cent carbon, is quenched and drawn at 400 deg. Cent. it has the greatest degree of solubility in 1 per cent sulphuric acid. The steel is by that treatment wholly converted into troostite.
420	788	Zinc melts. Useful for calibrating.
444.5	832	Boiling point of sulphur (for calibrating).
475	887	Lowest visible red of iron in pitch darkness (Howe).
480	896	Greatest strength of cast gun iron. (Howard).
580	1076	High nickel steel containing 25 per cent nickel becomes non-magnetic.
655	1211	Aluminum melts.
675	1247	Point Ar. 1 of all steels containing carbon.
680	1256	Mercury boils.
700	1292	Lowest temperature for annealing eutectic steel containing 0.9 per cent carbon.
750	1382	Point Ar. 2 in cooling steel with not more than 0.45 per cent carbon. Iron becomes non-magnetic.
774	1425	Quenching temperature of chromium steel balls having ½ in. diameter.
804	1472	Sodium chloride (common salt) melts.
802	1475	Quenching temperature of chromium steel balls of over ½ in-. diameter.
850	1562	Grain made finer in annealing steel containing 0.27 per cent carbon and 0.88 per cent manganese. Phosphorus a maximum. Specific heat (of 0.1657) of iron occurs (Harker).
890	1634	Point Ar. 3 of pure iron.
900	1652	Highest temperature for annealing softest steel containing not over 0.10 per cent carbon. Critical temperature at which softest ingot iron (Armco) is redshot when rolled.
900	1652	Lowest temperature for case-hardening (900 to 1000 deg.).
930	1706	Low limit of temperature for forging steel for cannon.
960	1760	Silver melts.
1060	1940	Quenching temperature for manganese steel.
1083	1981	Copper melts. Used as sentinel pyrometers for heating manganese steel for quenching before real pyrometers were available.
1100	2012	Lowest fusion point of cast iron.

OPPOSE RADICAL BILL

Manufacturers, Navy and Army Strongly Object to Socialistic Measure

WASHINGTON, Dec. 5.—Socialistic and revolutionary, the Hull bill providing for exclusive manufacture by the Government of military and naval supplies is not expected to be reported out by the House Committee on Naval Affairs, which is holding hearings on the measure. At the same time, it has attracted considerable attention from the business world because of the principles involved. The trend toward radical legislation, and which may be expected to be emphasized much more after March 4, next, also is an element in the interest shown in the Hull bill and is an example of what organized labor is seeking in the way of legislation.

The measure, as might be expected, is supported by the American Federation of Labor, but is vigorously opposed not only by the business interests of the country but by the War and Navy departments. The attitude of the business interests was explained to the committee by James A. Emery, counsel for the National Association of Manufacturers, who appeared before the committee last Wednesday and to-day as a representative of that association, the National Metal Trades Association, the National Founders' Association and the State Association of Manufacturers. He was accompanied by representative manufacturers in many lines, including the foundry trade. Memoranda from both Navy and War departments have been sent to the committee in opposition to the bill, and the views expressed by these departments and those expressed by Mr. Emery have undoubtedly made a strong impression on the committee.

Fundamentally Objectionable

Mr. Emery said that the bill is fundamentally objectionable because on the broadest scale, it puts the Government into the business of general manufacture in competition with its own citizens and under conditions of unfair competition. He declared that the proposal is impracticable and could operate upon the scale suggested only at great expense to the Government. He added that it "involves a continuing fraud upon the public in the form of an arbitrarily determined cost of production which eliminates actual elements of cost and leaves the determination of these to the discretion of an irresponsible official."

Mr. Emery added in part:

A Revolutionary Proposal

"The Hull bill is a revolutionary proposal, originating in the metal trades department of the American Federation of Labor. It is intended not only to prevent any lessening of the number of employees in the Navy yards and arsenals but to multiply their number. This is to be accomplished by requiring the Government to manufacture exclusively every requirement of the Army and Navy, from warships to clothing. In addition, the arsenals and navy yards, by direction of their department heads, or at the request of any other department or bureau, are directed to submit competent bids for

hysical Changes Occur

ion of Metals and Other ratures for Producers on and Steel

HIBBARD

(2) The highest temperature at which a vessel made of the substance can be used. Instance a porcelain crucible. This is useful. It is lower than No. 1.

(3) The temperature at which it softens in any degree which, as in a firebrick, limits its usefulness. This is useful. It is lower than the fusion point, No. 4.

(4) The temperature at which its edges are rounded. This is often called the fusion point and is generally the one given in the table. It has only a scientific value.

(5) The temperature at which it becomes fluid. Instance a slag. This is interesting, but taken alone is not useful. It is above No. 4.

(6) The lowest temperature at which it may be handled molten in practice, as a slag or metal in a metallurgical operation. This is useful. The temperature may be 50 or 100 deg. Cent. (90 to 180 deg. Fahr.) above No. 5 as the substance leaves the furnace.

Degree Temperature		
Cent.	Fahr.	
1115	2039	Cobalt becomes non-magnetic.
1120	2048	Magnesium boils.
1170	2138	Fusion point of the more fusible acid open-hearth steel slags.
1177	2150	Forging or rolling temperature for high speed steel.
1200	2192	Burning temperature of clay firebrick.
1204	2200	Temperature for quenching high speed steel tools. (Bethlehem.)
1210	2210	For rolling rail steel.
1250	2282	Ferrate of calcium ($CaO\ Fe_2O_3$) melts. Highest melting point of cast iron.
1251	2284	Ferrous silicide (Fe_2Si) melts.
1255	2291	Manganese melts.
1296	2365	Temperature for quenching high-speed steel tools (Arnold).
1325	2417	Fusion point of manganese steel (13 per cent manganese).
1344	2451	Complete fusion of iron containing 0.89 per cent carbon.
1350	2462	Lowest fusion point of simple steels. (1350 to 1400 deg. Cent.)
1360	2480	Sulphate of calcium melts and decomposes.
1378	2512	Fluoride of calcium melts.
1400	2552	Burning temperature for silica bricks.
1419	2586	Ferrous oxide (FeO) melts.
1420	2588	Wrought iron welds.
		Furnace temperature for magnesia bricks (1400 to 1450 deg. Cent.)
		Silicon melts.
1413	2629	Ferric silicide (FeSi) melts.
1450	2642	Manganese spinels melt (1450 to 1740 deg.)
1452	2646	Nickel melts.
1470	2678	Silicate of manganese ($MnSiO_3$) melts (1470 to 1500 deg.)
1490	2714	Cobalt melts.
1500	2732	Silicon volatilizes (Whitney).
		Silicate of iron ($FeSiO_3$) melts (1500 to 1550 deg.).
1512	2754	Silicate of calcium ($CaSiO_3$) melts.
1520	2768	Casting temperature of crucible tool steel.
1525	2777	Chromium melts.
		Lead boils.
		Highest fusion point of steel.
1530	2786	Iron melts.
1538	2800	Fe_3O_4 melts.
1548	2818	Fe_2O_3 melts.
1550	2822	Lowest operating temperature of open-hearth furnaces and Bessemer converters.
1560	2840	Fireclay bricks melt (1560 to 1725 deg.).
1565	2849	Silicate of magnesium ($MgSiO_3$) melts.
		Bauxite bricks melt (1565 to 1785 deg.).
1650	3000	Highest operating temperature of open-hearth furnaces and Bessemer converters.
1670	3020	Tridymite melts.
1700	3092	Silica bricks melt (1700 to 1750 deg.).
		Titanic acid (TiO_2) melts.
1710	3110	Cristobalite melts.
1740	3164	Koalin melts.
1750	3182	Pure silica melts.
1755	3191	Platinum melts.
1795	3263	Titanium melts.
1820	3308	Bauxite melts.
1900	3452	Manganese boils.
2050	3722	Chromite bricks melt.
		Pure alumina melts.
2059	3738	Chromic oxide (Cr_2O_3) melts.
2165	3929	Magnesia bricks melt.
2180	3956	Chromite melts.
2200	3992	Chromium boils.
		Silicon boils.
		Aluminum boils.
		Graphite made from amorphous carbon. (2200 to 2400 deg.)
2220	4028	Carborundum decomposes without melting.
2450	4442	Iron boils.
2500	4532	Zirconium oxide melts.
2550	4622	Molybdenum melts.
2572	4662	Lime (CaO) melts.
2750	4982	Vanadium carbide melts.
2800	5072	Magnesia (MgO) melts.
3176	5750	Tungsten melts.
3600	6512	Molybdenum boils.
3700	6692	Carbon is vaporized.
5200	9392	Tungsten is vaporized.

every form of Government supply in competition with private producers."

The War Department memorandum sent by Secretary Weeks points out that in peace times it is necessary to hold at arsenals a nucleus of skilled workers, capable of quick expansion, to meet emergencies, but that the arsenals are not equipped with facilities for commercial production on any extensive scale.

"It has been the policy of the Government to encourage private concerns by giving them war supply contracts in peace times so that when quantity production is needed urgently, these concerns can adjust themselves to Government demands without loss of time in tuning up," the Secretary wrote.

The Navy Department memorandum likewise makes out a strong case against the bill. For instance, it is pointed out that to take out of the hands of the Secretary of the Navy the control of all work to be done at the navy yards, which would be a result of the bill, would tie his hands in such a way that "the purpose of his executive office would be seriously impaired and his responsibilities could not be met."

In summing up its objections, the Navy says: "In general, the object of the bill appears to convert all Navy yards and plants of the Navy in peace time into general factories for everything used by the Government, regardless of whether or not such plants are particularly fitted for such manufacture. It seems to be a case of any kind of work at any time and at any cost, totally oblivious of the purposes for which such Government plants were established. Whether or not the fleet would suffer and the naval forces be crippled, is dismissed from consideration. The fact is ignored that, in time of war such Government plants would be devoted to that war material which commercial plants could not supply in sufficient quantities, and that under the provisions of this act, the peace time work of these Government plants would be devoted in a great measure to doing that very work which on the very first sign of war, would be called for from the commercial world."

Contract for Virginian Railroad Coal Handling Plant

The Virginian Railroad has placed a contract with the Alliance Machine Co., Alliance, Ohio, for what is said will be the largest coal handling plant in the world, which will be erected at Norfolk, Va. The plant including the pier and superstructure involves an expenditure of approximately $3,500,000. Of this, over $1,000,000 will represent the cost of the handling plant. The plant will include two car dumpers, each handling two cars tandem at a time, two movable loading towers and four 130-ton transfer cars. The dumpers will have a capacity for handling coal cars of 120 ton capacity. The plant will be entirely electrically operated and will require 42 motors ranging from small sizes up to 450 hp. Each dumper will be operated by two 450-hp. motors. The plant will have a maximum capacity of 5000 tons per hr. It will require approximately 3700 tons of steel including several hundred tons of castings, and in addition steel trestles will require 6000 tons of steel. The contract for trestles was recently placed with the Bethlehem Steel Co.

Casting Steel Ingots Centrifugally

Results from Using a Horizontal Bottle-Neck Mold—Comparison with Earlier Attempts—Excellence of Ingots and Their Cost

BY L. CAMMEN

NUMEROUS attempts have been made to cast ingots centrifugally, beginning with the work of Sir Henry Bessemer. Some have succeeded in producing small ingots of unusually good structure but at an excessive cost in labor. No one has been able in the past to make large ingots centrifugally at a cost which could profitably compete with the current practice in ingot casting.

Some Early Processes

The following schemes have been tried in the past. The French works of the Commentry-Fourchambault

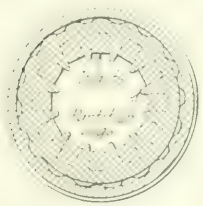


Fig. 1.—An Unsuccessful Scheme for Casting Ingots and Gears Centrifugally. The small ingots lie between the partition lugs

Co. in the late seventies of the last century tried casting Bessemer ingots for rail rolling in molds disposed somewhat like spokes in a wheel, pouring the metal through what would correspond to a hub. With short stubby ingots excellent results were achieved, but when an attempt was made to produce large ingots, the metal was unsatisfactory and the process was abandoned.

Sebenius in Sweden tried to make ingots in molds which were suspended on hooks from a cross, rotatably held on a vertical shaft. The metal was teemed into the molds while they were stationary and then the cross was set into rotation. Owing to centrifugal force, the molds flew out until they assumed a nearly horizontal position.

The metal was, of course, subjected to powerful centrifugal action, and excellent results were obtained on small ingots, the construction being obviously unsuitable to the manufacture of large ingots. After the death of Sebenius the process was discontinued.

At least two tool steel companies in this country, within the knowledge of the writer, tried to make centrifugally cast ingots by casting them in the shape of a doughnut or ring. The process was entirely unsuccessful. Before spreading out to the rim of the mold, the molten metal came in contact with the large mass of cold metal in the mold corresponding to the hollow of the doughnut, and chilled to such an extent that the ingots were full of cold shots. Furthermore, the ingots suffered from a peculiar pipe formation, taking the form of a series of cavities, from 1/16 to ¼ in. wide, located about ⅛ to ¼ in. under the skin of the ingot along the inner face (i.e., the face of the ring bordering on the inner hollow).

It is easy to explain how these cavities originated. The inner face of the ingot was in contact with the central part of the mold (the ingots were 4 in. by 4 in. by 24 in.), which was relatively cold, and contained a large amount of metal as compared with the metal in the ingot. Because of this, this inner face of the ingot chilled very rapidly, more rapidly, in fact, than the inside core of the ingot, and when this latter began to cool and contract, there was no free molten metal to feed into the contraction cavities, and pipes resulted. The action of the centrifugal force not only did not prevent the formation of this kind of pipe, but rather assisted it.

The last scheme is shown in Fig. 1. It is at least 30 years old and has been repeatedly and unsuccessfully tried both for the casting of ingots and for casting spur gears. A little analysis will show why it does not work. The metal is supplied to the mold while it is spinning, and as it hits the projections 36, it is scattered into a fine spray. Such a spray chills with surprising rapidity, and falls back in the form of shot which is usually not remelted by the metal at the bottom of the mold, but is incorporated as such into the ingots or gears making them worthless.

The Bottle-Neck Mold

It is therefore merely a question of supplying the metal to the mold in such a way that it should fill the interspaces between the lugs 36 without scattering, and this has been solved by the addition of the "bottle-neck" shown in Fig. 2. Here the spout (of the same type as used in all Cammen installations) projecting into the mold for a distance of about 4 in., is placed not in the center of the cylindrical part of the bottle-neck, but inside it, about 1 in. above its lower edge, the length of the cylindrical part of the bottle-neck being about 8 to 10 in. only.

Under the action of the centrifugal force, the metal is propelled along the longitudinal axis of the mold, and slides down into the conical part of the bottle-neck, passing thus finally into the spaces between the lugs. If the lugs have properly shaped ends, there need be no washing and splashing of metal, and the

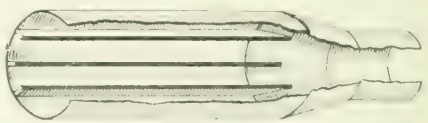


Fig. 2.—The Cammen "Bottle-Neck" Mold for Centrifugally Casting Ingots and Plates

latter flows between them with perfect smoothness. The idea of the bottle-neck addition to the mold (covered by patent applications) is of course very simple, and yet this is what makes all the difference between failure and success in this process.

The process is handled as follows: The metal teemed into the mold should be fairly cool, and poured at as slow rate as the ingot sizes and the chemistry of the steel permit. Thus, for 16-in. ingots, a 1¼-in. nozzle should be used, pouring at the rate of, say, 1½ tons per min. Each mold should contain four ingot divisions, as shown in Fig. 3. The mold is started about half a minute before the teeming, so that by the time the metal begins to come in it should have attained its proper speed. The matter of control of speed is very important, and will be discussed separately at some other time.

The spinning is continued for some time after the

end of the pouring, in fact until the metal has solidified to such an extent that the ingot can be taken out. This time may vary from 3 min. for a 4 in. by 4 in. ingot to 10 min. for a 16 in. ingot. The front head (i.e., the head at the end opposite to that at which the metal is poured) is, by the way, supplied with a large opening, 8 in. in a 16 in. ingot mold, which permits one to observe the metal during the teeming, and to regulate its flow accordingly, and also to see when the metal is ready to pull from the mold.

Experience has shown that it is not necessary to provide protection against metal being thrown from this window, as this never takes place. The lugs are so shaped that the solid ingot frees itself automatically as soon as the rotation of the machine is stopped,



Fig. 3.—Cross Section of Mold Centrifugally Casting Four 16-In. Steel Ingots. The "bottle-neck" is not shown

and a special device called a "spider" is provided to permit easy withdrawal of the ingot, which is done by a hydraulic puller or by compressed air.

In view of the high centrifugal stresses, cast iron cannot be used for the molds and steel must be employed. Experience has shown that ordinary steel is not suitable, and a comparatively cheap alloy has been found which gives excellent results. The molds are cast in halves, with the split along the lug, so as to leave no fin on the ingot. They should be cast with a chill against the inner face, to prevent blowholes under the surface which would rapidly burn into cavities and produce roughness on the face of the ingot. The inside surface is then planed smooth, and it is even believed that it will pay to finish it to mirror-like smoothness by inexpensive lapping. It is believed from various data that the life of the mold will be at least 2500 castings (the amount of castings actually made is not sufficient to give reliable data as to the life of the mold). The mold will then have at least 75 per cent of its value as scrap.

The cost of making ingots by the centrifugal casting process is as follows for 16 in. ingots. The machine costs about $10,000, and a mold about $10,000 also. In addition to the gang at the ladle, two men can handle a machine, and roughly one casting can be made every 30 min. (say 9 tons). The cost is therefore:

Mold	$1.60
Labor (2 men for 30 min.)	0.70
Power (100 hp. for 30 min.)	0.50
Varia	0.50
Total, 9 tons	$3.30
Per ton	0.367

This does not include overhead, royalties, etc., but these are not much different from similar items in the case of stationary ingot casting.

Metallurgy of Centrifugal Ingot Casting

From a metallurgical point of view, centrifugal ingot casting is radically different from ingot casting in stationary molds. In the first place, a centrifugally cast ingot is "cast on the side," the metal spreading along the dimension that in a stationary ingot corresponds to its height. Furthermore, as four ingots are being cast at the same time, each partition-mold gets only one-fourth of the metal delivered from the ladle in a given time. Say, for example, that we are casting 16-in. ingots, and that 1000 lb. of metal have been poured from the ladle in about 20 seconds. This is about as slow as metal can be conveniently teemed in commercial work. A stationary 16-in. ingot mold would be filled to a depth of about 15 in. In centrifugal casting, this metal is divided between four molds, each getting about 250 lb., and as the ingots are poured "on a side," this produces a layer only about 1 in. deep.

Therein lies the whole secret of the superiority of centrifugally cast ingots over the common variety. By the end of the teeming period of the first 20 seconds, an inch layer of steel as compared with one of 15 in.! Of course, the cooling proceeds at an immensely faster rate in the former than in the latter case, and both pipe formation is prevented and dendritism retarded. This latter feature will be better shown in another article giving sulphur prints and photomicrographs of centrifugally cast ingots.

In itself centrifugal force does not appear to have any material influence on the structure of the metal, and all talk about "fluid pressure" affecting the grain of the steel cast seems to be without foundation in fact. It is the rate of cooling of the metal that does the job, and it does not matter how this rate of cooling is obtained provided it is there. Centrifugal force is merely a cheap and convenient way to spread the metal so as to produce the desired rate of cooling, but exactly the same results would have been obtained if the same rate of cooling were produced by some other means.

There was apprehension at first that in centrifugal casting there would be excessive cracking of the surface. Experience has shown that this is not the case, and the most likely explanation of this freedom from cracking is the fact that the casting is made "on the side," and that the metal is supplied at such a slow rate that there is at no time a heavy weight of liquid metal pressing against a comparatively thin ingot wall, as is the case in ingots cast in stationary molds. In centrifugal casting, the metal is spread in a very thin sheet over a large area, and it is easy to show by a simple mathematical calculation that its pressure on the ingot walls is extremely slight, even when assisted by the action of the centrifugal force.

Another reason for freedom from external cracking may be found in the fact that the weight of the mold, as compared with that of the casting, is from two to two and a half times greater than in stationary ingot molds. Of course, the primary reason for making the mold so heavy is to give it sufficient mechanical strength to withstand centrifugal stresses, but indirectly it affects the rise of temperature in the mold and keeps it from drawing away from the casting to the same extent as it does in stationary castings.

From an operating point of view centrifugal ingot casting must rate very high. Absence of hot tops, necessity for handling the molds, stripping, etc., makes it superior even to top-pouring, and there can be no comparison when bottom pouring is considered. At the same time it should be remembered that the art is only in its infancy, and it is not recommended to attempt to cast ingots in sizes larger than 16 in.

There is another factor that must be emphasized in the strongest possible way, and that is, that centrifugal ingot casting is not a cure-all. It will help make a good ingot from good steel, a better ingot, in fact, than can be made otherwise, but it will not make a good ingot from dirty or poorly melted steel.

Surprise may be expressed that results as important as those described above could have been obtained by such simple means as the addition of the "bottle-neck" to the old and familiar mold for centrifugal casting of gears. This has been, however, the story in many of the most important inventions that have in the past revolutionized the steel industry. All of

them can be told in half a dozen words. What, after all, is the Bessemer process but blowing air through molten steel; the Thomas-Gilchrist process, but the use of a special lining in a converter, etc.? Only things that are simple and give results can survive in the steel industry, and the simplicity of the process or machine is therefore its best recommendation. In fact, quite often the simpler the mechanism, the more difficult it is to invent it.

An article at an early date will give sulphur prints of centrifugally cast ingots, photomicrographs taken at various cross-sections of the ingot, and will explain why centrifugally cast ingots are practically free from dendritic structure.

Heavy Type 60-In. Swing Lathe

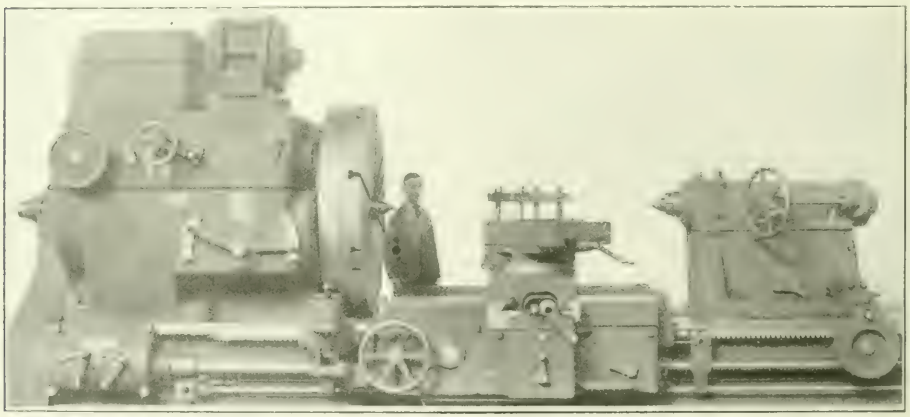
A 60-in. swing lathe of heavy type, shown in the accompanying illustration, has been built recently at its Pond works, Plainfield, N. J., by the Niles-Bement-Pond Co., 111 Broadway, New York.

The machine shown is fitted with a constant-speed motor of 40 hp. and has 24 faceplate speeds through change gears, which are operated by levers on the headstock. When an adjustable-speed direct current motor can be used, the speed range of the motor permits the omission of the geared-speed changes in the head above the joint line, without reducing the range of faceplate speeds. For either alternating or direct current motor drives a handle mounted on the carriage may be used for starting or stopping the motor, and when the lathe is driven by a d.c. motor any faceplate speed within range of the motor may be obtained by the same handle.

When moving the tailstock on the bed, the adjustment of the tail spindle is not changed. In addition to large bolts which clamp the tailstock to the bed, a tail brace pawl is provided which engages a ratchet in the bed and prevents slipping of the tailstock under heavy end thrust. The pawl may be lifted out of the ratchet by means of the handle on the front of the tailstock. The ratchet is in sections and is removable to permit cleaning out of chips which may accumulate in the bed.

The tool carriage has lateral, cross and angular power and hand feeds. It also has rapid traverse along the bed by means of a 5 hp. and drum switch with spring return to off position, mounted on the carriage. The tool slide is of the full width of the bridge and has clamping bolts and straps for securing the cutting tools. Large micrometer collars are fitted on the crossfeed screws.

The carriage apron is of one piece, inclosing the



Heavy Type 60-In. Swing Engine Lathe. The drive motor of the machine shown is of the constant speed type 40 hp. Twenty-four faceplate speeds are obtainable through change gears

A push button on the headstock may be used for "jogging" the driving motor to permit quick and easy shifting of the speed change gears.

The headstock is entirely inclosed. Bearings and gears are lubricated continuously by means of a pump which supplies filtered oil to a reservoir in the upper part of head, from which it is piped to each place requiring lubrication. Surplus oil drains into a settling tank in the base of the head and is pumped through a filter back to the reservoir. The faceplate spindle bearings, which are unusually large, are fitted with oil distributing rings and large oil wells in addition to the continuous oil supply.

Four pairs of parallel slots are provided in the faceplate for attachment of heavy steel faceplate jaws. The centers are of tool steel, hardened and ground, and are fitted with spanner nuts for easy extraction. The tail spindle is of ample diameter for stiffness when run out, and the tailstock has increased diameter near the center. The tail spindle adjustment is by gearing and a hand wheel conveniently located. Double clamping bolts for securing in position when set are provided for the tail spindle.

For use in turning slight tapers the upper portion of the tailstock has a cross adjustment by screw. It is clamped to the lower section by bolts which are independent of the bolts that clamp the tailstock to the bed.

gearing; and shafts have bearings at each end. Gears and bearings are oiled from one reservoir which is filled from the top of the carriage. The direction of any feed may be changed and started or stopped at the carriage. Operating levers are located conveniently and interlocked so that neither two feeds, nor a feed and thread cutting can be engaged simultaneously. Feeds are obtained from a spline in the leadscrew, the thread of the leadscrew being used only for the thread cutting. The feeds or threads are obtained through a quick-change gear box which gives four changes without removing the gears, other feeds or threads being obtained by change gears provided at the end of the headstock. Gears and bearings in the feed box are amply lubricated from a tank provided.

On lathes with long beds the leadscrew and controller shaft are supported at intervals by bearings which are automatically spaced by the carriage. A steady rest, having five jaws with screw adjustment and large wearing surfaces, is included.

Figures prepared by the American Bureau of Shipping as of Nov. 1, show that on that date the sea-going steel tonnage, building and contracted for, totaled 170,390 gross tons against 156,890 on Sept. 1. Ships now being built are for coastwise or Great Lakes service, hence protected from foreign competition by law.

A Review of Steel Mill Electrification*

Ability of Motors to Take Heavy Overloads Important—Efficiency, Flexibility, Durability and Low Operating Costs Noted

BY B. G. LAMME† AND W. SYKES‡

INSTEAD of many steam engines scattered through steel mills, with boiler plants here and there to supply such engines, central power plants have grown up and electric motors have replaced the engines. With such developments have come more exact knowledge of power consumption, increased economies, greater convenience, greater reliability, and higher speeds with greatly increased production—for the electric motor is particularly well adapted for higher speed work.

One of the limitations of the older methods of individual drive was that the power behind each unit was represented by the power capacity of the unit itself. With the electric drive, on the contrary, the power behind each unit is more or less equivalent to the capacity of the generating plant itself, and in emergencies this great power may be relied upon to help out. True, there may be disadvantages in this, for with the entire power plant behind the individual machine, the equipment must be made stronger or there may be disastrous breakages. But when such situations are recognized and prepared for, then the full benefits of the big power plant are recognized.

Pulling the Load

Operating men naturally are inclined to rate or rank power apparatus according to its emergency or abnormal capabilities, rather than its normal or average operation. Everybody expects apparatus to do its normal service and, therefore, this attracts little attention. Under extreme conditions, however, one type of apparatus may vastly exceed another in its capabilities and here is where electrical apparatus, as a rule, makes a very good showing, for usually its emergency capacity is far beyond its normal rating. Unlike other apparatus, its normal capacity is not fixed by its ability to "pull the load," but by its heating characteristics. With the heating limits disregarded, which is usually the case in extreme emergency, then the apparatus, having the whole generating plant behind it, can pull enormously higher loads, but not infrequently with resulting damage to itself. In other words, electrical apparatus usually does not "lie down" under extreme conditions (as the steam engine, for example, is liable to do) but continues to pull the load that is put on it, although it may put itself "out of business" through overheating.

Tendency to Overload Equipment

This has been one of the difficulties in electric railroad operation. Operating men, until they obtain proper knowledge, usually through experience, often want to load electrical equipment until it tends to "lie down" or "stall," just as with the steam locomotive. Usually the pulling capacity of the electric locomotive is far beyond its heating capacity, and here was a frequent source of trouble in the early days of operation of electric railroads. In any other kind of service, where the maximum load conditions may be more or less fixed, the danger is not so pronounced. But the above illustrates one of the characteristics of the electric drive, in that the peak capacity may be enormous compared with any other type of drive, for the electric motor is simply a transmitter or transformer of power, and not a power generator within itself.

High Electric Efficiency

The great advantages of the electric system as a whole would sufficiently outweigh any very considerable disadvantages in efficiency, if such existed. On the contrary, however, the efficiency of the electrical apparatus as a whole ranks materially higher than that of any other type of power supplying devices. Take the electric transformer, for instance, which might be called the heart of the alternating current system, for it is this which gives the system its voltage flexibility. Here the efficiency reaches 98 to 99 per cent under normal load conditions. The efficiency of the step-up transformer of the Colfax station of the Duquesne Light Co. is 99 per cent. In most power operations, outside of electric, 60 to 80 per cent efficiency is considered reasonably good, and sometimes 20 to 30 per cent is acceptable. But in electric motors and generators efficiencies such as these would be considered absurd, except in very extreme cases.

When we consider that the efficiency of electric motors and generators, even in comparatively small sizes, reaches as high as 90 per cent, and rises to 96 per cent or better in much larger units, it may be seen that electric operation presents tremendous advantages from the efficiency standpoint. Furthermore, of the 4 to 10 per cent loss in rotating electric machinery, quite an element is purely mechanical loss, due to rotation, so it may be seen that the purely electrical losses represent a very small portion of the total power transformed. In the transformer, a purely stationary device, mechanical losses are absent and it is due to this fact that the efficiency of the transformers is so very high.

It may be said, therefore, that from the efficiency standpoint the electric system, as a whole, is so far ahead of anything else in power generation, transmission and utilization, that there really is no good second.

Flexible Speed Control

From the flexibility standpoint the electric system also possesses enormous advantages. By means of proper converting devices, either of the two outstanding systems, namely, alternating or direct current, can be utilized according to the needs of the problem. Each system possesses peculiar merits of its own. The alternating current system is flexible in voltage, so to speak, but the normal a.c. motor is inflexible in speed. The direct current system, while more or less inflexible in its voltage possibilities, permits greater flexibility in variations and control of speed. Consequently, in many large mill installations, both direct and alternating currents are used.

One of the great limitations of the alternating current motor in some applications, and one of its great merits in other applications, is its inflexibility in speed. It tends to run at a constant speed, and speed variations are not practicable except through the medium of extraneous devices. It is more or less independent of voltage limitations and thus is applicable where very large powers are required and where the problem of carrying such power to the point of application is a large problem. For this reason, in heavy mill work in general, where extremely large motors are used, alternating current has been adopted almost exclusively. The same is true in other power applications of very large units, such as ship propulsion.

On the other hand, where economical speed control

*Abstract of a paper presented at the sixteenth annual convention, Association of Iron and Steel Electrical Engineers, Cleveland.

†Chief engineer Westinghouse Electric & Mfg Co., East Pittsburgh, Pa.

‡Vice-president Canadian American Alloy Corporation.

is desired over a very wide range, direct current oftentimes furnishes the most economical solution of the problem. As stated before, the one great advantage of the direct current motor over any other type is in the flexibility of its speed control. For this reason it is not infrequent, in large power installations, to find considerable units of power transformed from alternating to direct current simply to meet economical speed control problems.

A striking instance of this is found in the large electric reversing mills, many of which have been installed throughout the country in recent years. Here we have even more than economical speed control, for through the medium of the a.c. to d.c. transforming equipment, we are able to flatten out the enormously fluctuating power due to the nature of the load, so that comparatively uniform power is taken from the generating system. Here we have the means for transforming from steady power to a violently fluctuating one, or vice versa. This is one illustration of the possibilities of the electric system in regard to flexibility.

From the durability and maintenance standpoints, electric machinery in general ranks high. It is not unusual to find electric machines 20 years old or more, which apparently are in as good condition as new. Wearing parts, as a rule, are confined to the mechanical parts. In electric locomotives, for instance, there may be mild inspections daily, or at some other frequent interval, but complete overhauling may occur only at very long intervals. Compared with the corresponding steam locomotive in similar service, electric locomotives get comparatively little attention, oftentimes much less than the most economical maintenance call for. The same is true, in general, of other applications of electrical machinery. People have become so accustomed to the idea of reduced attendance and reduced repair in connection with electrical machines, that often they carry the matter too far for best results.

Early Electric Developments

Electric motors were placed in steel mills at a very early date. These machines were ordinary motors, not designed for mill service. Five hundred volts was used in some of the first installations, as this enabled the standard railroad motors to be used. Experience soon showed that this was too high a voltage, on account of danger to workmen and also due to insulation failures. Mill type motors were later developed and this design is still used with very little change.

In the development of main drives, Europeans were about 10 years ahead of the United States in applying motors. The first motors were put on mills in Europe about the middle of the '90's, and, as in this country, the first machines were direct current. At an early date, however, induction motors were used for mills where speed changes were not required, these motors usually being belt or rope connected.

The European motors have developed along somewhat different lines from those built in America. In general, tonnage has not been such an important feature in European mills as in American. The business conditions have been such that each mill had to produce a wider range of material and flexibility has been a more important factor than tonnage. We find in most European plants a great variety of mills which are not kept fully occupied, but are necessary to supply the varying demands of customers. This naturally required that the equipment should be kept as cheap as possible, which no doubt accounts for the light construction used.

In recent years, through consolidations and other arrangements, European mills are being laid out to produce a few classes of products and to bring up the tonnage of such products, the market being supplied by the correlation of a number of manufacturers. This has led gradually to a practice approaching the American.

However, the machines in use to-day in Europe are built very much lighter than would be considered advisable here and what would perhaps strike the American mill man as peculiar is the almost universal use of hand wound coils in partially closed slots. The use of form wound coils for induction machines has not been at all customary except by some of the English manufacturers.

American Practice Differs from European

While all apparatus is subject to failure in itself, it is necessary so to design our American machines that repairs can be made rapidly by the operating force; for this reason the windings are universally of such a type that they can be replaced or repaired by the ordinary mill force. This is not the case with the European designs, where really skillful winders are required to produce satisfactory results.

In the United States the earliest electrical drive of any size was in the motors driving the light rail mill at the Edgar Thompson works. These machines have been in use for 17 years with practically no delays and no cost for maintenance. Very shortly after this, American engineers were called upon to build machines for what still remains the greatest mill electrification —the Gary plant. The boldness of the engineers in laying out this plant has been more than justified and many of our members will accept Gary as a normal development.

It is perhaps not so well appreciated as it should be that this was a great engineering undertaking which involved many different problems. In the first place, a gas engine driven power house of this magnitude never before had been attempted and grave problems were involved in insuring stability of operation. The designing and building of the slow speed induction motors used for driving mills in sizes for which there was no precedent was a great and successful undertaking.

One very highly important factor in this connection was the control apparatus for handling the power involved and all American engineers interested in steel mills are indebted to the poineer work done at the Gary plant for many of the things which have become commonplace to-day. With the success of the Gary installation, and of many other installations which went in about the same time, there was little question as to the use of motors for driving mills when the speed conditions and power supply seemed favorable.

Influence of Adequate Gearing

One great impetus to the advancement of electric drive has been the development of adequate and reliable gearing. This has rendered the slow speed motor to a large extent unnecessary, thereby eliminating one of the troublesome features of electrification. These slow speed motors were expensive and nearly always special, which involved a heavy tax for development on practically all installations. With the development of gearing it was, of course, a simple matter to change the ratio so that the development charges from an electrical standpoint could be much reduced, and tended to become less and less as successive installations were made.

Development of the reversing mill was a direct outcome of the successful application of the Ilgner system to large mining hoists in Europe. During 1905 investigations were made on a steam-driven mill in Austria, to determine the power requirements. The data available at that time were very meager and a great deal of investigation was necessary to enable an estimate to be made as to the size of motors required.

About the end of 1905 an order was placed for an equipment with the Aktien Electricitaets Gesellschaft of Berlin, which was to develop a maximum of 10,350 hp. This equipment was put into operation in July, 1906, and with the exception of a few minor troubles operated satisfactorily from the beginning. Three separate motors were used for the mill and three generators, all being connected in series, the maximum voltage being about 1600. The equipment was divided into three units in this way, as this did not involve such a large departure in sizes from what had been built previously, and it was thought that the inertia of the equipment would be materially reduced by keeping down the diameters of the motor armatures. The generators had laminated fields and were completely com-

pensated. A special exciter was used which, operating on a separate winding on the generator field, opposed the main excitation. The opposing field varied directly with the armature current, as the idea was to provide a stabilizing element which would keep the load from exceeding a certain amount.

About the end of 1905 experiments were conducted on a small scale by the Illinois Steel Co. to determine the operating characteristics of the Ilgner system. That system had not been used in the United States for hoisting so that there were no data available as to its operation. In the spring of 1906 an order was placed with the Westinghouse Electric & Mfg. Co. for the supply of a reversing mill drive for the 30-in. universal plate mill at the South Works of the Illinois Steel Co. This equipment was to develop a maximum of 8000 hp. and it was put in operation about the beginning of 1907.

At the time it was designed and built there was no knowledge of what was being done in Europe, nor did the Europeans have any knowledge of what was being done in the United States. This equipment has been in continued service to date. The motor is a double unit and the novel feature is the fact that there is only one generator, which has two windings. At the time this machine was built it was thought that this construction would be cheaper than single machines, but this did not prove to be the case. Consequently the idea was not utilized in subsequent installations.

Cost Figures Favor Motor Drive

Some time ago an opportunity occurred to check up the operating figures of two plants producing largely the same class of products and having approximately the same tonnage. One was completely electrically driven and the other steam driven. When due allowance was made for the value of the gas from the blast furnaces, in each case crediting the furnaces with the value of the amount of coal which this gas replaced, and some adjustments made for slight variations in the output of the two plants, it showed that there was a definite advantage in the case of an electrically driven plant of between $3 and $4 per ton on material shipped, based on operation of the plants during 1920, when they both turned out as much material as they could. The fact that the advantage of electrification is of the order of dollars per ton is confirmed by the investigations of a reliable firm of consulting engineers in connection with plant valuation, from which they arrived at the conclusion that, under the same conditions of fuel cost, etc., the electrically driven plant had the advantage of at least $2.50 per ton compared with the steam driven plant with modern equipment.

ANNEALING OF GRAY CAST IRON

Results of a German Investigation on Three Grades of Iron

For many years there has been considerable interest in the annealing of gray cast iron for various reasons. One of them is the removal of shrinkage strains, and another is the replacement of the combined carbon found in the cementite of the pearlite areas by free carbon or graphite and iron.

There is a short paper in *Stahl und Eisen* for Sept. 28, on this subject by Dr. E. Piwowarsky, of Breslau University, giving the results of annealing tests on three grades of iron. All three irons were in the form of round bars, 0.787 to 0.866 in. dia. From these bars pieces were cut about ⅞ in. long and subjected to various heat treatments, and then analysed and tested for Brinell hardness. The heat treatments were carried out in a platinum resistance furnace in a quartz tube closed at one end, into which a slow stream of pure nitrogen was introduced to keep down the oxidation and the loss of carbon to a minimum. The small pieces were fastened to a thin nickel wire so that they could be removed quickly from the furnace at the desired temperatures.

The composition and critical points of the irons are given in Table 1.

The first work was done with Iron C, and the aim of the work was to produce as much graphite as possible. The results and the treatments are shown in Table 2.

As shown by the results the formation of temper-

Table 1.—Composition and Critical Points

Kind	Material	Composition, Per Cent						Critical Points	
		Total Car.	Gr. C.	Mn.	P.	S.	Si.	Ac_1 Deg. C.	Ar_1 Deg. C.
A.	Original iron	3.18	2.49	0.63	0.102	0.068	2.95	810–825	750–725
B	Iron A with nickel (analysis showed 0.86 per cent)	3.35	2.66	0.62	0.105	0.070	2.93	800–815	735–715
C	Iron A with about 20 per cent steel scrap	2.48	1.54	0.60	0.090	0.055	2.25	800–805	740–735

Table 2—Results with Iron C

Test No.	Treatment	Microstructure	Composition: Total Car.	Gr. C.	Gr. in Per Cent of Total	Brinell Number
1.	Original iron	Graphite and lamellar pearlite	2.48	1.54	62.0	236
2.	12 hr. at 675 deg. C. Cooled in air	Graphite and lamellar pearlite	2.47	1.58	64.0	220–225
3.	As above but cooled in furnace 10 deg. per min.	Graphite and lamellar pearlite	2.47	1.65	66.5	210–214
4.	12 hr. at 775 deg. C. Cooled in air	Graphite, lamellar and granular pearlite and some ferrite	2.46	1.84	74.5	153–157
5.	As above, but cooled in furnace 10 deg. per min.	Graphite, granular pearlite and ferrite	2.46	1.92	78.0	147–150
6.	12 hr. at 850 deg. Cooled in air	Graphite and lamellar pearlite	2.39	1.62	67.5	216–218
7.	As above, then cooled in furnace 2 deg. per min. to 750 deg., then cooled in air	Graphite and lamellar pearlite	2.40	1.66	69.0	212–214
8.	12 hr. at 850 deg. Cooled in furnace at 2 deg. per min. to 675 deg., then in air	Graphite and ferrite with some pearlite	2.42	2.24	92.5	122–124
9.	12 hr. at 850 deg. Cooled in furnace at 1 deg. per min. to 675 deg., then in air	Graphite and ferrite with some pearlite	2.40	2.26	94.0	114–118
10.	20 min. at 830 deg. Cooled in furnace at 1 deg. per min. to 775 deg., then in air	Graphite and lamellar pearlite	2.39	1.64	68.5	215–220
11.	20 min. at 830 deg. Cooled in furnace at 1 deg. per min. to 725 deg., then in air	Graphite and ferrite with traces of lamellar pearlite	2.38	2.22	93.0	120–124
12.	20 min. at 830 deg. Cooled in furnace at 1 deg. per min. to 675 deg., then in air	Graphite and ferrite with traces of lamellar pearlite	2.39	2.30	96.0	114–116

Irons A and B

No.	Treatment	Microstructure	Composition Total Car. A	Total Car. B	Gr. C A	Gr. C B	Gr. in Per Cent of Total A	Gr. in Per Cent of Total B	Brinell Number A	Brinell Number B
1.	As furnished, original	Graphite and lamellar pearlite	3.18	3.35	2.49	2.66	78.0	79.5	206–207	196–202
		Graphite, lamellar and granular pearlite and some ferrite	3.17	3.32	2.60	2.78	82.0	83.5	168–172	166–168
2	hr., 725 deg. Cooled in	Graphite, ferrite and lamellar pearlite	3.16	3.24	2.88	2.86	91.0	88.0	134–136	136–140
		Graphite, ferrite and some lamellar pearlite	3.08	3.29	2.92	3.10	95.0	94.0	120–125	124–126
	Cooled in air	Graphite, ferrite and lamellar pearlite	3.06	3.33	2.70	2.88	88.0	86.5	158–162	163–167
15	min., 850 deg. Cooled at the rate of 2 deg. per min. to 700 deg.; then in air	Graphite, ferrite and some granular pearlite	3.14	3.27	3.03	3.11	96.5	95.5	118–124	115–117
15	min. at 850 deg. Cooled in furnace at 10 deg. per min. to 675 deg., then held at 675 deg. for 1 hr. and cooled in air	Graphite, ferrite and traces of pearlite	3.12	3.22	3.01	3.13	96.5	97.5	114–118	112–116

carbon is very small below Ar_1, and while somewhat greater between Ar_1 and Ac_1 does not reach satisfactory amounts. Annealing above Ac_1 is useless, but there is practically complete precipitation of the graphite by heating slightly above Ac_1 followed by as slow cooling as possible through Ar_1.

The results with Irons A and B are shown in Table 3. The structure of the iron containing nickel was practically the same as the other, so they are shown in one column. Contrary to the other iron there is considerable graphite formation below Ar_1, and after two hours, annealing between Ar_1 and Ac_1 the greater part of the pearlite is already broken up. The most certain method, however, is to give a short heating slightly above Ac_1 followed by slow cooling through Ar_1.

G. B. W.

COKE REGION CONDITIONS

Largest Production of the Year—Effort to Relieve Tent Colony Situation

UNIONTOWN, PA., Dec. 2.—A gain of 18,720 tons of coke was made in production during the week ending Nov. 25 over the preceding week in the Connellsville region. Merchant operators again overtook the furnace interests in the gain in output during the week. An interesting phase is the increased production over a year ago but with fewer ovens in operation, a situation which counteracts reports of decreased efficiency in operation as a result of the strike situation in the region. Forty-seven per cent of the ovens of the region are now in operation.

Production during the week was 201,100 tons, the highest this year.

Mayors and burgesses of the county held a meeting in Uniontown this week at which plans were discussed toward relieving the situation resulting from the tent colonies in the region. No formal action was taken although it was reported that the mayors and burgesses would make some effort to have the operators take the striking miners back to work. It is an accepted fact the operators will not co-operate with the Mine Workers' Union. It is common knowledge that former employees who have been on strike would be taken back when needed upon the terms of new employees and under the same conditions as existed before the strike took place.

There is little possibility, however, of any agreement on the part of the operators through efforts of the executives of the municipalities. The strike situation in the region insofar as production is concerned has ceased to be an issue. Many of the operators, too, have discharged the guards at their plants.

The Brier Hill Coke Co. suspended operations at its plant on Wednesday and declared for an indefinite suspension during which time it will electrify the haulage way and mine equipment. The Brier Hill company has 600 acres of coal land.

Car situation continues to be a handicap to the operators in the region. The Fayette-Greene Coal Producers' Association, at a recent meeting, appointed a special committee to investigate the car situation on the Baltimore & Ohio Railroad and on Saturday evening issued a call for a meeting of all operators on that road to be held in Uniontown Wednesday evening, Dec. 6, to hear the report of the committee and a plan to be presented by Baltimore & Ohio Railroad officials for a change in the system of placing cars.

New Method of Testing Sand to Be Described

At a meeting of the Chicago Foundrymen's Club, at the City Club, 315 Plymouth Court, Chicago, on Saturday, Dec. 9, Eugene W. Smith, the Crane Co., Chicago, will deliver an address on a new method of testing molding and core sands and clays which he has developed within the past few months.

An exhibit of 100 samples of sand from nearly every State, tested by Mr. Smith, will be exhibited in the rooms of the club from noon Saturday until 7 o'clock, when dinner will be served. Following the dinner Mr. Smith will make demonstrations of his testing method and will test any samples of sand which may be submitted to him. By vibratory precipitation, samples of sand contained in small bottles are separated into layers of bond and silica. The ferric and aluminum oxides also may be identified by color and the fineness of the sand may be readily observed. The test has been used by its originator in practical foundry work to determine the class of castings to which different grades of sand are best suited.

Milton O. Knauss Purchaser of Blast Furnace

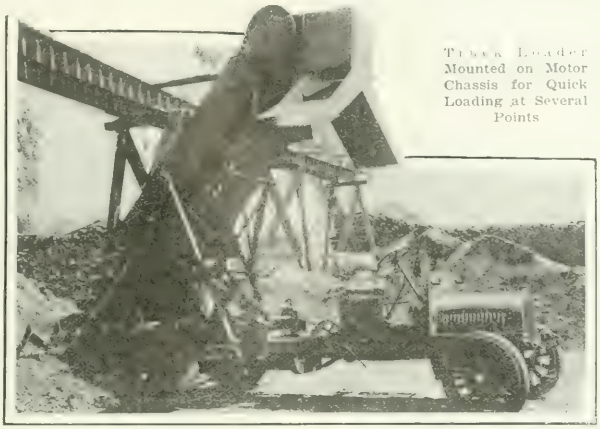
The purchasers of the Topton blast furnace from the Replogle Steel Co., reported on page 1464 of the Nov. 30 issue of THE IRON AGE, were Milton O. Knauss and associates, not Howard A. Knauss. The latter is connected with the Reading Iron Co., Reading, Pa. The confusion in names was due to the fact that Howard A. Knauss was formerly superintendent of blast furnaces at Catasauqua, Pa., for the Empire Iron & Steel Co., while Milton O. Knauss occupies that position now for its successor, the Replogle Steel Co., Milton O. Knauss and Howard A. Knauss are brothers.

Plans for the organization of chambers of commerce in the principal cities of the country as a step toward harmonizing on a nationwide scale all radio instrumentalities, the effects of which, because of the rapid development of the industry, are producing confusion and disorganization, were announced here by the National Radio Chamber of Commerce at its headquarters, 165 Broadway, New York.

Truck Loader Mounted on Truck Chassis

An application of the truck loader intended to increase the mobility of that equipment when high-speed loading is required at a number of points, is shown in the illustration. It consists of mounting the loading or elevating element of a truck loader of the bucket type on a motor truck chassis. The equipment shown is that of the George Haiss Mfg. Co., 141st Street, New York.

The standard path digger elevator is used with double chain, toothed buckets and feeding propellers, so that no shoveling is required for a path into the pile for the loader. It is pivoted on standard A-frames over the rear wheels, and may be collapsed while traveling. A two-way side discharge chute is provided at the top for loading on either side. The elevator is driven from the jack shaft or by a separate engine, the latter plan being more efficient, though more expensive, as the truck chassis can be moved while loading. The capacity is 1 to 2 cu. yd. per min. The equipment illustrated is said to have loaded 4 tons of egg coal in 3 2/3 min., a rate of 1½ cu. yd. per min.



Truck Loader Mounted on Motor Chassis for Quick Loading at Several Points

Independents Follow Corporation on Tin Plate Price

YOUNGSTOWN, Dec. 5.—While independents still show dissatisfaction with the $4.75 price on tin plate, announced for the first quarter by the leading interest, they are all falling in line with this quotation and are taking forward commitments. Lower iron and steel-making costs are offering some compensation for the failure to establish a higher quotation, as was expected. Preliminary developments indicate a heavy 1923 demand for tin plate. Can makers are coming into the market and placing business for next quarter, including releases against such tonnage. Makers indicate that they are discontinuing concessions from the $4.75 price, but it is likely that preferred customers will enjoy preferential treatment. For instance, though $4.75 has been the nominal tin plate quotation for a period of months, a number of producers have been rolling tonnages accepted at $4.60 per base box.

While the plate market is spotty, nevertheless enough small tonnages are coming through to represent a sizable aggregate. On small orders, the chief independent interest in this territory claims to be obtaining 2.10c., but the bulk of the business moving is going at 2c. or less. The above company is working off an accumulation of large-mill plate sizes and building up stocks, in preparation for the suspension of its 132-in. mill for alterations.

New Steel Castings Company in New Jersey

Eastern Steel Castings, Avenue L and Edwards Street, Newark, N. J., will take over early in 1923 the business now carried on by Bayonne Steel Casting Co., Bayonne, N. J. It has a modern and enlarged plant, equipped for making both open-hearth and electric steel castings and retains the experienced organization of the older company. William D. Sargent, president of the Bayonne company, is head of the new organization.

Valley Iron and Steel Plant Operations Well Maintained

YOUNGSTOWN, Dec. 5.—In the Mahoning and Shenango Valleys, iron and steel plant operations are holding at a very satisfactory rate. Suspension this week of the Tod blast furnace by the Brier Hill Steel Co. will be offset by the resumption of one of the two stacks at Hubbard, Ohio, operated by the Youngstown Sheet & Tube Co., giving it five active furnaces, of six. The Brier Hill company's Tod stack has been operating on merchant iron.

Sheet mill production is down somewhat from the levels maintained until recently, with 96 of 109 units scheduled. The Republic Iron & Steel Co. has its sheet department on a 50 per cent operating basis. The Falcon Steel Co., Niles, has added one sheet mill to the four units which were rolling last week, while the Sharon Steel Hoop Co. has added three sheet units to its active list.

Steel output approximates 80 per cent, with 55 of 66 open-hearth furnaces charged. The Brier Hill company this week cut the number of its active open-hearth units from 11 to eight. All three Bessemer converters in the Mahoning Valley are blowing.

The Carnegie Steel Co. is pouring from all six blast furnaces at its Ohio works and is operating 17 bar mills at its Youngstown plants. The Trumbull Steel Co. has 37 sheet, tin plate and jobbing mills active.

At its Girard works, the A. M. Byers Co., Pittsburgh, is operating one blast furnace, 75 puddle furnaces, bar mill two 12-hr. turns and plate mill one 8-hr. turn.

In the Shenango Valley, the Carnegie Steel Co. properties are operating virtually at normal. With exception of two inactive tin plate mills, the American Sheet & Tin Plate Co. plant at Farrell is 100 per cent.

Fabricating plants are still producing at a high rate, though several are slowing down for inventory.

Youngstown Companies May Be Absorbed

YOUNGSTOWN, Dec. 5.—Inclusion of one or more Valley independent iron and steel interests in an amalgamation is regarded as likely, especially in view of the recent absorption of the Midvale Steel & Ordnance Co. by the Bethlehem Steel Corporation.

A leading Youngstown independent has been casting about for some time in an endeavor to establish a pipe manufacturing connection in the Chicago district, either through purchase or construction.

Common stock of the Youngstown Sheet & Tube Co. is to be listed on the New York Stock Exchange in the near future, according to present plans, and the possibility of heavy purchases by Eastern interests has been referred to by leading steel makers.

That Valley independents appreciate the advantages of an acceptable consolidation in strengthening their own position in a competitive field, they have freely indicated.

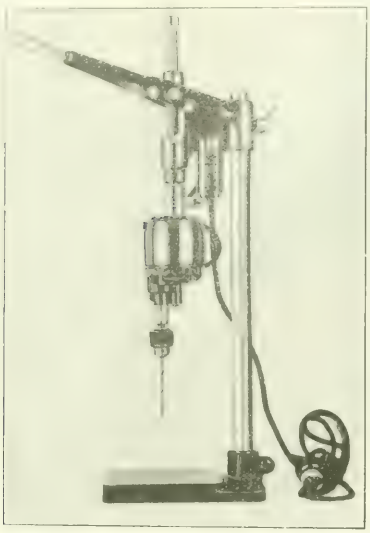
Henry C. Turner, receiver for the Empire Tube & Steel Corporation, College Point, L. I., will receive sealed bids at his office, 2 Rector Street, New York, until Jan. 5, for the purchase of the plant, equipment and property of the company.

Automatic Drill for Light Operations

A small bench type drilling machine intended for manufacturing purposes involving light drilling operations and having as a feature automatic starting and stopping of the motor, has been placed on the market by Joseph W. Jones, 29 West Thirty-fifth Street, New York.

The location of the motor may be seen from the accompanying illustration; it is started or stopped automatically as the handle is lowered or raised. Current is being used only when the machine is actually drilling and besides the saving in current, this arrangement is intended to add to the life of the unit by reducing wear and tear on the motor and other parts.

The machine is rated to drill holes up to ¼ in. in steel. Bronze bearings with suitable provision for oiling are provided throughout. The armature speed is



Bench Drill for Light Manufacturing Operations. The motor is automatically started and stopped as the handle is lowered and raised

reduced 4¼ to 1 by means of hardened steel gears and a ball end thrust accommodates the pressure at this point. The drill is equipped with a Jacobs ¼ in. chuck. The speed is 3500 r.p.m. on alternating current and 4000 r.p.m. on direct current. The size of the base is 6 x 7½ in. and the height 20 in. The weight of the machine is 18 lb. net.

Duplexing with Electric Furnaces

An interesting "new steel making process" has been put in operation at the works of Edgar Allen & Co., Ltd., Sheffield, England. Concerning the equipment and the claims, the Stobie Electric Steel Co., Dunston-on-Tyne, writes as follows:

We have installed in those works one 10-ton and one 3½-ton Stobie electric steel melting furnaces which are being worked together as a single unit under the Stobie patent duplex electric process. By this means, scrap steel is electrically melted and refined by oxidation in a continuous manner in the large primary furnace, and a third or more of the molten bath is transferred down a shoot at short intervals to the small secondary furnace for finishing. The advantages of the process are both electrical and metallurgical.

Electrically, the load factor is greatly increased by the continuous working, and the power factor is much improved by the maintenance of, mainly, molten baths. Fluctuations of current are, also, less marked and of shorter duration.

Metallurgically, the main advantage is the frequent supplies of small quantities of steel, of varying compositions if required, at the low cost of operating a plant of large output. For ingot or foundry work, this advance in practice is of considerable interest.

Additional advantages of the new process over an installation of several furnaces working independently include the less space occupied by the plant; the reduced crane service required; the much reduced repairs to furnace linings for a given output of steel and the freer choice in scrap for melting.

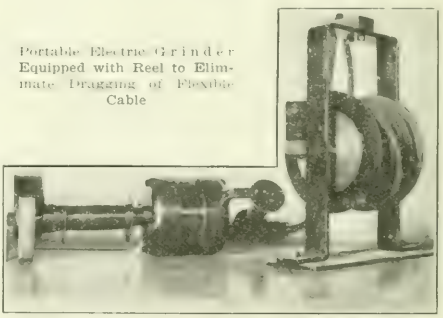
Colorado Fuel & Iron Decreased Deficit

The gross receipts of the Colorado Fuel & Iron Co. for the three months ending with September were $7,266,964, or $1,697,817 larger than those for the corresponding period in 1921. Operating expenses were $946,162 larger than those for the 1921 quarter, standing as they did at $6,376,401. Thus the net earnings were $890,563, while in the 1921 quarter they were $138,908. Other income brought the earnings for the third quarter up to $963,955, but after interest, taxes and depreciation, there was a deficit of $131,463, whereas in the three months ending Sept. 30, 1921, there was a deficit of $810,868.

The financial statement for the nine months ending with September, last, is not so encouraging. Gross receipts amounted to $22,492,865, whereas for the same period in 1921 they were $23,587,982. Operating expenses were $19,993,964, while last year they were $21,669,486, and total net income $2,706,288, as against $2,221,401, while the deficit for the first nine months of this year was $581,162, or $2,068 larger than the deficit for the same period last year.

Reel for Use with Portable Grinder

For use with its standard portable electric grinder, and to eliminate dragging of the flexible cord over the floor and catching on projecting objects, etc., the reel shown in the accompanying illustration has been developed by Forbes & Myers, Worcester, Mass. With this equipment the life of the flexible cable is considerably increased and it is intended to make the grinder



Portable Electric Grinder Equipped with Reel to Eliminate Dragging of Flexible Cable

a permanent fixture of the shop, always ready for use by merely closing the switch.

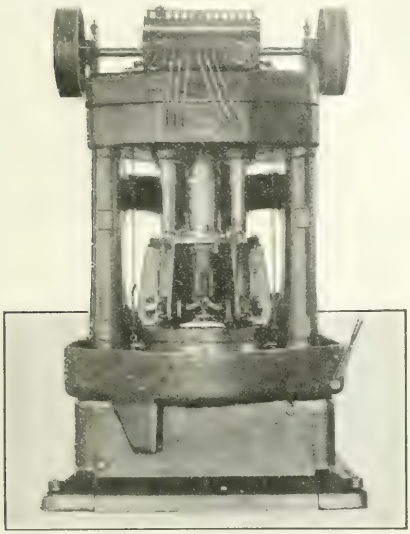
The outfit illustrated consists of a standard machine, the new reel, and 35 ft. of flexible cable. When the reel is placed centrally, either on the ceiling or on a column, the 35 ft. of cable is adequate for a room 60 ft. square. A four-wire cable is used. Three wires are for the three-phase power current, this current being said to be preferable to the single-phase from the light socket. The fourth is a ground wire which connects the frame of the grinder permanently to the frame of the reel, regardless of whether the switch is open or closed. When the frame of the reel is connected to a water pipe or other permanent ground, danger of electric shocks is minimized.

The iron ore in North Carolina has been reported on by W. S. Bayloy, in bulletin 735-F of the United States Geological Survey, Washington.

Cylinder Boring Machine

A machine designed primarily to bore air-cooled gas engine cylinders and finish the head of the cylinder at the end of the bore, is being marketed by the Manufacturers' Consulting Engineers, Syracuse, N. Y. It is also adaptable to the boring of gas-engine cylinders en bloc and it is claimed that in the case of block cylinders having removable heads, the machining time would be reduced considerably. The machine as shown in the accompanying illustration is large, the height from floor to top of pulley being 8 ft. 2 in. and the base approximately 5 ft. square.

In boring, three separate cuts are taken, and in finishing the head of a cylinder two separate cuts are



Multiple Spindle Machine for Boring Gas Engine Cylinders and Finishing the Head at One End of the Bore

taken. There are five spindles which rotate but do not move axially, so that all five cuts are taken at the same time in separate cylinders. The work is mounted in a rotating fixture having five working positions and one loading position, loading and unloading are done while cuts are being taken. The work holder and work are fed upward on to the cutting tools by a cam which is said to permit of quick return, quick approach, uniform boring, a reduction in feed for finishing the head of the cylinder and a dwell for the final finish of the head of the cylinder. The time of a cycle for boring a 3¼-in. cylinder, 9 5/32 in. long and finishing the head, is 1½ min.

The machine is rigidly constructed, and the rigid and accurate relation held between cutters and fixtures is emphasized. This is obtained through the use of the large diameter pilot which is integral with the head of the machine and pilots in the ram which is actuated by the cam and on which is mounted the rotating fixture. Coolant is used to keep cylinders at approximately constant temperature throughout the cut and so no heat distortions appear. It is pumped through the spindles and discharged adjacent to the cutting tools on to the surface to be machined. Passing through the spindle, the coolant keeps the spindle and bearings at constant temperature. It also serves to wash chips away as soon as made.

The machine is semi-automatic, the only duty of the operator being to load and unload the work while the machine is in operation, and index the fixture when the machine comes to rest automatically at the end of the quick return, and throw in the clutch after the fixture has been indexed.

Clock Dial for Control Under Manufacturing Budget

Included among twenty-five forms presented in a treatise on budgeting as a means of business control, issued by the fabricated production department of the Chamber of Commerce of the United States, is a novel clock arrangement by which the small manufacturer can tell at a glance the daily state of his business.

Clocks, or dials, are devised for each of the principal activities of the business. Each clock has two hands, a red one, pointed at the budget allowance, which remains stationary for the entire month, and a black hand, which is daily set at the amount of money spent by each department. The dials can be arranged so that they can be conveniently contained in a flat box 2 in. deep, 24 in. wide and 50 in. long, designed for hanging on the wall.

The idea was conceived and put into operation by a manufacturer of optical goods, who found that his organization could be conveniently divided into the following five groups: material, factory, administration, sales and advertising. The five executives at the head of these departments are placed into a business of their own and are told what the results of their next month's activities should be, together with the amount of money they may spend to produce these results. The sales manager is told how much in orders he is expected to get to keep the factory running; the factory superintendent, how much goods he must get out and how much accounts receivable he must create to provide the funds necessary in the following month; the purchasing agent, how much material is necessary to keep a well balanced inventory and to take care of the plans of the sales department; the advertising department and administration, how much money they may spend in carrying out these plans.

A copy of the pamphlet, "Budgeting for Business Control," may be secured by writing direct to the Fabricated Production Department, Chamber of Commerce of the United States, Mills Building, Washington.

Critical State of South Russian Metal Industry

"The facts revealed by a special commission of inquiry appointed by the Soviet Government show that the metal industry in South Russia has touched such a low ebb that only the most urgent and radical measures can save it from complete destruction." The statement is made in the Russian Supplement to Industrial and Labor Information, the weekly publication of the International Labor Office at Geneva.

The total output of the metal works in Southern Russia at the present moment amounts to only 4 per cent of the pre-war output, while orders on hand represent 15 to 25 per cent of the present possible output of the works. This shortage of orders, added to the fact that the price paid by the state is considerably lower than the cost of production, has resulted in the works being run at an enormous loss.

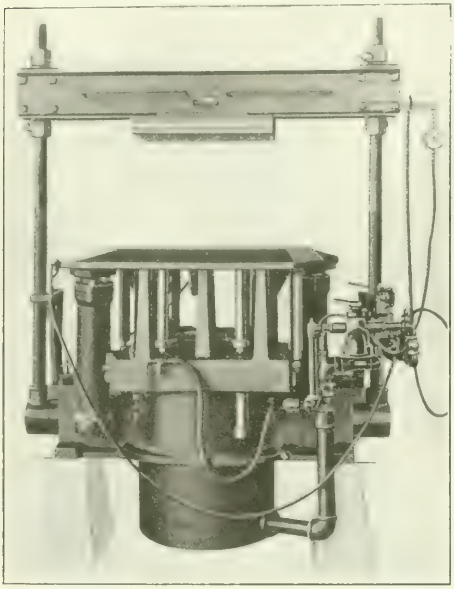
In view of this, the committee decided that the only solution to the problem was to close all the metal works in Southern Russia with the exception of three, each equipped with one blast furnace, and to concentrate the entire production program in these three works. Even to realize this scheme, the Governmment will have to spend at once about 550 million roubles a rouble being calculated at 3,400 to £1, of which nearly 400 million are classed as "arrears in workers' wages" while a monthly subsidy of 750 million roubles will also be needed.

The American Engineering Council, the executive organ of the Federated American Engineering Societies, will meet in Washington, Jan. 11 and 12. Dean Mortimer E. Cooley, president of the federation, will preside. The 12-hr. day in industry, topographic mapping, government reorganization, types of government contracts and a wide range of other engineering, political and economic topics will be discussed. The plan oor an engineering investigation into the Muscle Shoals situation will come up.

Large Split-Pattern Molding Machine

Mumford jolt-squeeze split-pattern molding machines, constructed as shown in the accompanying illustration, are being offered by the Hanna Engineering Works, 1765 Elston Avenue, Chicago. The equipment shown accommodates a 24 x 24-in. flask, has a 12-in. pattern draw and is 56 in. between strain rods. The squeeze cylinder is 21 in. in diameter.

In this design the height of the swinging yoke may be varied on the tubular strain rods by adjustment of the split strain rod nuts which lock into place. The design of the counter-tension device permits adjustment of the counter-tension spring by the operator, so that when the swinging yoke is in the rear position, a slight touch of the hand will cause it to swing to the upright.



Large Jolt-Squeeze Split-Pattern Molding Machine. When swinging yoke is in rear position, a slight touch will cause it to swing upright

The counter-tension device is inclosed in the base and is adjustable from the outside.

The ramming head is the same as in the company's smaller units. Flask pin lugs are cast integral with the ramming-head posts to which the vibrator frame is attached by fillister head screws passing through hardened steel bushings encased in the vibrator frame. The bushings have only sufficient clearance to allow vibration, giving alinement between pattern plate and the flask pins.

Pattern drawing is accomplished by means of two automatic slow-start oil pattern draft cylinders, controlled by a knee valve. A smooth slow start is given for the first ¾ in. and a rapid finish for the balance of the pattern draw, thereby leaving the operator's hands free to pick up the mold the instant the pattern is drawn. While the mold is being carried to the floor the flask frame settles to its initial position, the machine being ready for the next flask.

The pattern draft guide plungers have bearing in the cylinders their entire length and are fitted with leather hat packings held in place by glands of standard shape. This design is intended to meet the conditions of the draw feature, as the same pressure which drives the draw plungers up squeezes the packing around the plunger. When pressure is relieved from beneath the plungers, the packing releases, allowing the flask frame to return without resistance except as the flow of oil is controlled through a suitable cock provided for that purpose.

Jolting is accomplished by means of the Mumford one-piece, heat treated, no-spring jolt valve. This is inserted through the side of the cylinder and protrudes into a pocket which is longitudinal with the axis of the plunger. Both side walls of this pocket have machined strips which are parallel to each other and to the axis of the plunger and the axis of the hole which embraces the inside jolt valve. The latter is cylindrical except near the inside and where two flats have been milled on opposite sides and parallel with each other, thus forming a cubical plug which fits between the flats on the sides of the pocket in the plunger. The inside jolt valve is supported rigidly in the cylinder, and an inside guide for the jolt-squeeze feature is incorporated, the surfaces of which are practically at right angles to any twisting or swirling motion of the plungers. These surfaces are constantly lubricated by the oiling system provided for the cylinder and plunger, and are adequately protected from sand and rust.

The squeeze plunger and cylinder are unusually long, which is intended to assure long life and smooth operation. The plunger is provided with cast iron piston rings and the squeeze valve is of the air brake type.

Railroad Situation Improving

WASHINGTON, Dec. 5.—With loading of revenue freight continuing to be the heaviest in the history of American railroads for the present time of the year, according to a report of the Car Service Division of the American Railway Association of last Thursday, there is also a continued increase of the number of cars and locomotives installed and on order, and a reduction in the number of cars in need of repair. For the week which ended on Nov. 18, loading of all commodities totaled 969,094 cars. This is an increase of 178,731 cars, or about 23 per cent over the corresponding week last year, and an increase of 79,956 cars over the corresponding week in 1920. This also was an increase of 15,185 cars over the week before, when, however, car loading declined owing to the observance of Armistice Day as well as election day. The number of new railroad-owned equipment installed from Jan. 1 to Nov. 15 totaled 58,189 cars, an increase of 3415 since Nov. 1. The total number of box cars installed was 20,370, an increase of 1018 since Nov. 1, and of coal cars 28,615, an increase of 1803 since Nov. 1. The total number of cars on order Nov. 15 was 63,016, of which 30,948 were box cars, an increase of 104 since Nov. 1, and 23,437 coal cars, an increase of 866 since Nov. 1. The net increase of all classes of cars since Nov. 1 was 552, while the total increase in cars installed and on order compared with 1921 was 51,769.

Locomotives installed from Jan. 1 to Nov. 15 totaled 961, an increase of 95 since Nov. 1, while those on order Nov. 15 totaled 1288, an increase of 56 since Nov. 1 and of 867 when compared with 1921.

Freight cars in need of repair totaled 235,660 on Nov. 15, or 10.4 per cent of the cars on line, the smallest number in need of repair since Feb. 15, 1921, and a reduction of 14,300 since Nov. 1, this year, at which time there were 249,960 or 11 per cent. Since July 1 last, when the shopmen's strike began, there has been a reduction of 88,923 in the number of cars in need of repair, the total on that date having been 324,583, or 14.3 per cent of the cars on line.

The annual meeting of the Ohio State Foundrymen's Association will be held at the new Hotel Manchester, Middletown, Ohio, Dec. 7 and 8. An exceptionally interesting program has been arranged for the two days' session, including the annual banquet Thursday evening and an inspection of the plant of the American Rolling Mill Co., Friday morning. Following the sessions, the visitors will be entertained in Cincinnati.

Production in the Connellsville bituminous region for the week ended Nov. 11 was 176,880 tons, an increase of 12,560 tons over the preceding week. This brings the 1922 output to that date to 4,280,890 tons, or 1,229,610 tons greater than the production over a like period in 1921.

BOOK REVIEWS

The Welding Encyclopedia. Compiled and edited by L. B. Mackenzie and H. S. Card. Second edition. Pages 314, 6 x 9 in. Published by Welding Engineer Publishing Co., 608 South Dearborn Street, Chicago. Price, bound in flexible imitation leather, $5.

Designed as a reference book on the theory, practice and application of the four autogenous welding processes, the first 149 pages consist of a dictionary of all words, terms and trade names used in the welding industry. Then come separate chapters on oxy-acetylene welding, electric arc welding, electric resistance welding and thermit welding. Instructions are given for welding operations on the most common types of repair and production work and descriptions of the application of welding to various industries. The data and instructions cover both ferrous and non-ferrous metals.

Special attention is given to pipe, boiler and tank welding and rail joint work. The rules and regulations of the principal authorities governing boiler and other work and safeguarding welding operations are gathered into a chapter of 27 pages. The heat treatment of steel is given its due meed, with color charts for judging temperatures, etc., particularly in connection with the use of the acetylene flame. Charts and directions for preparing joints for welding and a catalog section of 74 pages (making a total volume of 388 pages) complete the work. It is profusely illustrated, both by diagram and half tone.

Hütte—Taschenbuch für Eisenhüttenleute. Compiled by Akademischer Verein Hütte, Berlin. Pages 982, 5 x 7½ in.; illustrations, 511. Published by Wilhelm Ernst & Sohn, Berlin, Germany. Price, 738 marks.

The association of German engineers that is publishing the well known mechanical handbook "Hütte," now in its twenty-third edition, issued in 1910 a supplementary volume covering the problem of the technology and operation of the iron and steel industry. The second printing of this work has been issued. The volume is handier, less bulky because thinner paper has been used; the number of pages remains the same but the content in the new edition is larger on account of the use of two kinds of type.

The subjects are dealt with in the usual way, terse statements, quotations of fact, results and conclusions without any trimmings; each chapter is from the pen of an authority on the problem presented and over fifty experts collaborated in the making of the book. The study of the book, full of references to current German periodicals, is difficult to those not well acquainted with the language and literature. This will handicap the value of the book outside of Germany.

The first 200 pages cover the scientific fundamentals with few changes; the chapter on mineralogy has been superseded by a study on iron ores and deposits, the numerous varied specifications have been omitted to advantage and the art of measuring has been added. Pyrochemistry of refractories and slags is one notable subdivision incorporating some new illustrations that reflect up-to-date research.

The second section deals with combustion and offers a completely new and practical treatment of that important industrial problem. The second subheading has been rewritten and adapted to the standard of to-day. The theoretical information is well presented and cleverly interwoven with useful tables and practical data. The chapter on industrial furnaces has also been considerably improved, although the reviewer misses the furnace theory of Groume-Grimailo for an explanation and calculation of sections and flow of gases. The slagging gas producer has been treated too generously for its importance, while the by-product producers have not been given a square deal. The addition on heat economics is most timely in these days of high fuel prices.

The third chapter is completely new, an interesting addition. The installation of steel plants is discussed from all angles, general, construction, mechanical transportation, legal and economic, including technical organization and accounting.

The machinery of steel plants furnished the material of the next chapter. The practical point of view of the operator is emphasized and backed by numerous facts, tables, results of test to help the correct solution for design of power houses and judicious choice of machinery. The predominance of the gas engine seems extraordinary to the American student but is explainable by the different economic conditions existing in Europe. Worth mentioning also is the preference of piston blowing engines over centrifugal units.

The fifth chapter deals with iron and steel production and foundries. The present status of German experience in blast furnace construction, layout and operation is concisely put forward, but American conditions have evolved different solutions and other standards that preclude comparisons. The basic Bessemer (Thomas) process is of no interest at all to Americans and the open hearth process is not treated according to its increasing importance. The reviewer feels that this section has been neglected especially if compared to the subsequent chapter.

Rolling, design of rolling mills and their operation, their heating furnaces, the art of grooving and finishing steel products are discussed in the sixth chapter with great care and thoroughness. The absence of comprehensive data on these subjects makes the information valuable to the designer and valuable to the operator, although exception has to be taken to some statements or details that do not apply to American conditions. In fact, the latest developments or tendencies of evolution have not been considered, and since 1914 considerable progress has been made. The pages dealing with butt and lapwelding pipe are exceptionally poor and not up to the standard in spite of recent publications in Germany that do justice to this important branch of the rolling mill.

The enormous amount of material gathered, digested and condensed in the 500 pages should be made available to the English speaking engineer, not by a direct translation but by an adaptation to American needs of the information given. J. F. S.

Science and Common Sense in Working with Men. By Walter Dill Scott and M. H. S. Hayes. Pages ix + 154, 5 x 7½ in. Published by the Ronald Press Co., 20 Vesey Street, New York.

This little book deals with the function of personnel administration, and in particular with that function as it exists in the average manufacturing establishment to-day. Fifty years ago, it is pointed out, the average establishment numbered considerably less than one hundred souls, and the manager of that day was perforce so close to his employees that he automatically performed the duties of a personnel administrator along with many others.

But to-day, with manufacturing establishments ten to twenty times as large, and with the changed conditions which the years have brought, the problem of properly selecting personnel is increasingly difficult, and must be delegated by a works manager to a personnel executive. So, after briefly showing the needs of this executive, and advising on his selections, the most of the book is devoted to recommendations for his guidance. On the premise that workers are individuals and not a bulk mass, various individual tests are described, both physical and mental, and methods for recording and interpreting them given.

Since Professor Scott was director of the committee on classification of personnel in the army, he and his co-author have excellent sources from which to provide considerable of the data presented. And the presentation is ably made. E. C. R.

The Gantt Chart. By Wallace Clark. Pages xii + 157, 5½ x 8½ in.; illustrations, 43. Published by the Ronald Press Co., 20 Vesey Street, New York.

Perhaps because the title of this book is rather vague, the author explains at the outset that the Gantt chart is an aid or working tool of management in that it is used to relate facts to time in a graphic manner. No other phase of management is touched on, the book

being entirely confined to an explanation of Mr. Gantt's methods of graphically portraying facts in relation to time.

After giving a simple illustration of the use of an actual chart, detailed explanations of the construction of a chart is made, including the standard notations for a chart as developed by Mr. Gantt. From that on through the remainder of the book the text is confined to actual examples of the chart. Its use during the war to measure the efficiency of industries working upon munitions, and in the shipyards to aid in following all phases of ship-building is explained in great detail, and accompanied by many illustrations of the actual charts developed.

Its possibilities in industry in connection with both planning and production and as a means of following them up are given. The book is concluded with two appendices, one by Frank W. Trabold, entitled "How a Manager Uses Gantt Charts," and the other by Walter N. Polakov, entitled "The Measurement of Human Work."

E. C. R.

Applied Motion Study. By Frank B. Gilbreth and L. M. Gilbreth, Ph. D. Pages xviii + 220, 5 x 7½ in.; several illustrations. Published by Sturgis & Walton Co., New York.

This book is really a collection of papers presented before various scientific and industrial bodies at various times, outlining the principles and practice of motion study and describing its application to various fields of industry. When several papers on such a subject are collected and published in book form intact, a certain amount of repetition is bound to occur, particularly in the description of apparatus such as is used by the Gilbreths in their motion study methods.

Of the ten papers reproduced in this book, four are largely devoted to the description of the aforementioned apparatus. In considerable detail, they describe the application of photography and the motion picture camera to the study of motions, with a view to obtaining records, a study of which permits of eliminating waste motions, and teaching novices the type of motions used by experts in any particular field. The concluding article of the series described the effect of such motion study investigations upon the workers.

Three of the remaining five papers treat on scientific management in a more general way, covering its need, its methods and its practice. One paper is devoted to the possibilities of motion study for the aid of crippled soldiers and one describes the "three position plan" of promotion as developed by the authors.

E. C. R.

What is entitled "The Testimony of a Decade" is an impressive booklet issued by the American Sheet & Tin Plate Co., Frick Building, Pittsburgh, setting forth service tests under which copper steel alloys for sheet and tin mill products were shown particularly advantageous. One unusual chart based on the sheet tests at Pittsburgh, made under the supervision of the American Society for Testing Materials, shows that a low copper content in sheets of both iron and steel could not resist exposure well, the low content being designated as under 0.05 per cent copper, while the high copper content of the Keystone copper steel was in many cases still sound after 64 months' exposure. Besides numerous tables and opinions of various authorities, the booklet includes a remarkable photograph of the sheet exposure test plant at Pittsburgh, showing the various states of preservation on April 1, 1922.

An operator's handbook of 93 pages, 6 x 9 in., covering its Mult-Au-Matic has been issued by the Bullard Machine Tool Co., Bridgeport, Conn. A chapter is devoted to the scope, novel features and general and detail construction. The sequence of functions and interrelation of actuating mechanism of the Mult-Au-Matic is taken up and also the dimensions of the 8 and 12 in. machine. Space is given to motor drive and speed and feed data, a speed and feed chart being included. A section on the installation of the machine gives detail instructions and is illustrated by several installation diagrams, a line cut showing the standard method of slinging being given. The lubrication and cutting compound system is explained and illustrated, instruction as to oils and oiling being given. A detailed view of the lubrication and cutting compound system is included. Instruction as to starting the machine is given in several pages and a section on setting up is illustrated by large line cuts. Standardized tools and attachments, also typical tooling diagrams for various classes of work are treated of and illustrations are given of typical tooling diagrams covering a variety of work. The latter, with the accompanying data, serve to indicate Mult-Au-Matic methods. A section is devoted to operation and care and another to maintenance adjustment. A large feed chart is inserted in the booklet. Simplicity of diction and diagram is a feature that makes for easy reading and the instructions cover every unit and function of the machine.

The Story of Peat

The United States contains 12,000 sq. mi. of unused peat land, an area more than ten times that of Rhode Island, capable of yielding 14 billion tons of fuel at a cost of $1.50 to $5 a ton, according to a comprehensive bulletin on the subject just issued by the United States Geological Survey. The deposits are on the surface and lie in the New England, Atlantic Coast, and Great Lake States, most of them in regions remote from coal mines. This bulletin, which required two years for its preparation, points out the location of thousands of deposits, owned by thousands of farmers and other landowners.

Fifty million tons of peat is used annually as fuel in Europe. Peat is suitable also for use as a fertilizer and in promoting the intensive growth of truck crops, both in greenhouses and in open fields. Manufacturers of commercial fertilizers are paying as much as $10 a ton for good peat. The present output is about 100,000 tons annually. In some parts of the country the yearly proceeds from the intensive cultivation of peat and muck soil for lettuce, celery, and onions amount to more than $500 an acre.

Those who own or are interested in deposits of peat or muck may obtain free copies of the bulletin by addressing the U. S. Geological Survey, Washington. It was prepared by C. C. Osbon and is published as the survey's bulletin 728, entitled "The Occurrence and Uses of Peat in the United States."

New Books Received

American Malleable Cast Iron. By H. A. Schwartz. Pages 416, 6 x 9 in.; illustrations 190. Published by Penton Publishing Co., Cleveland. Price, $7.

British and American Foundry Practice. By P. G. H. Boswell. Pages 106, 5½ x 8½ in.; illustrated. Published by Hodder & Stoughton, Ltd., Warwick Square, E. C. 4, London. Price, 4s. 6d. net.

Stores and Materials Control. By Madison Cartmell. Pages 459, 5½ x 8½ in.; illustrated. Published by Ronald Press Co., 20 Vesey Street, New York. Price, $4.50.

Railroad Freight Transportation. By L. F. Loree. Pages 771, 5 x 8 in., illustrated. Published by D. Appleton & Co., 29 West Thirty-second Street, New York. Price, $5.

Belt Conveyors and Belt Elevators. By Frederic V. Hetzel. Pages 333, 6 x 9 in.; illustrations, 291. Published by John Wiley & Sons, Inc., 432 Fourth Avenue, New York. Price, $5.

Fuel Oil in Industry. By Stephen O. Andros. Pages 203, 6 x 9 in.; illustrations, 93. Published by Petroleum Extension University, Inc., Citizens Trust Building, Fort Wayne, Ind. Price, $3.75.

Production Grinding. By Fred B. Jacobs. Pages 218, 6 x 9 in.; illustrations, 188. Published by the Penton Publishing Co., Cleveland. Price, $3.

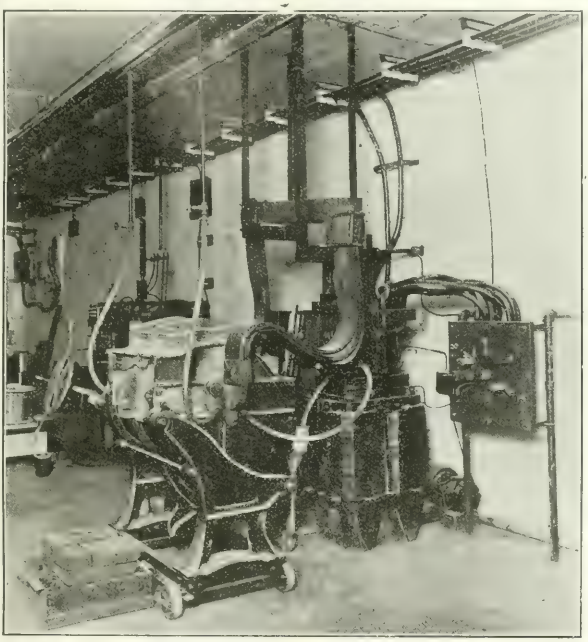
The Control of Quality in Manufacturing. By George S. Radford. Pages 404, 5½ x 8½ in.; illustrations, 89. Published by the Ronald Press Co., 20 Vesey Street, New York. Price, $5.

HIGH TEMPERATURE MELTING

Ryan Furnace, a New Type in This Field—Novel Scheme to Increase Output

A new rare alloy melting and refining plant, unique in many ways, has recently been put in operation in the center of industrial New York. The entire output of the plant is restricted to the melting of what may be termed "higher temperature metals" such as chromium, nickel-vanadium, chrome-nickel-tungsten, palladium alloys and pure tungsten, all of which necessitate temperatures in the melting zone of 3600 to 4300 deg. Fahr. The installation is that of the Bario Metals Corporation, 147 Varick Street, New York. All operations in melting and casting are done with electric furnaces and ovens. The equipment includes three Ryan high temperature melting units, one Northrup high frequency furnace and one electric core and mold baking oven.

The Ryan furnace is claimed to present a new departure in electric metal melting. The units in the Bario plant have a holding capacity of 125 lb. per heat and are rated as capable of melting and refining alloy mixtures in 30 to 40 min. from the time the cold charge is placed in the furnace. The furnace is of the graphite resistor type; that is, the heat is developed by the passage of current at particular voltages and specific quantities through a stationary graphite electrode. Furnace temperatures up to 4300 deg. Fahr. have been attained. While temperatures higher than those stated are obtainable in the arc furnace, the difference claimed is that in the Ryan furnace there is an equable diffusion of the heat over the entire bath and the temperature gradient between the melting and refining point of the metals and the heat at the electrode can be kept very close, eliminating superheating which is detrimental in alloy melting operation.



The Ryan Furnaces Are Located on Trucks So That as Soon as the Melting Is Finished in One Furnace Another One Can Be Put in Its Place in Front of the Transformer. In this way one transformer suffices for two or more furnaces

With reference to metallurgical operations, the furnace has sufficient door area and clearance to carry on any necessary slagging or charging operations. The furnace is adapted for the melting of higher temperature metals, such as those named and the manufacturer and developer of the furnace, F. J. Ryan & Co., Wesley Building, Philadelphia, do not believe that units over 500 lb. holding capacity will become practical owing to the restriction in size and length of electrodes and their placement throughout the furnace. However, in capacities from 50 lb. up to 500 lb. the arrangement and operation are regarded as presenting no new difficulties over present electric furnace practice.

The arrangement is briefly the connection of the furnace unit through the ends of the electrodes; these are in contact with water boxes attached to bus bars running back to the transformer, which is set directly in back of the furnace with tap arrangements connected with a radial type switch. This switch provides for a wide range of temperature control. The furnace is lined with standard magnesite brick both in roof and hearth, and is of the stationary or nose tilt type allowing for pouring directly from the furnace into molds.

A novel arrangement has been worked out to allow for maximum utilization of the power available. With each transformer setting there has been supplied two furnaces, each unit being set upon a truck. After the heat has been completed, the bus connections are disconnected by the loosening of two bolts and the furnace is moved from in front of the transformer and a new furnace previously charged is moved into its place. The entire operation requires about 5 min. This allows for maximum production in relation to horse power connected load.

It is quite universal practice for power companies to charge for a connected load notwithstanding the percentage of production in relation to the connected load. Therefore it is of advantage to the customer to be able to work his plant to the maximum point of that connected load.

New Installations of Electric Brass Melting Furnaces

The Detroit Electric Furnace Co., Detroit, has arranged to supply a 2000-lb., 300-kva. Detroit electric brass melting furnace for the Ford Motor Co. at Highland Park, Mich. This furnace when installed will complete a battery of eight 2000-lb. furnaces in the brass foundry of the company. These furnaces are expected to handle the entire brass melting requirements of the Ford organization. The Detroit company is also installing a battery of three furnaces in the plant of the Neptune Meter Co., Long Island City, N. Y., which manufactures water meters.

Other installations now being made by the Detroit Electric Furnace Co. are one 2000-lb. furnace in the plant of the Tottenville Copper Co., Staten Island, N. Y., and one 500-lb. furnace in the United States Arsenal, Watertown, Mass. With the exception of the furnace at the Watertown Arsenal all of the installations above mentioned are equipped with automatic electrode control, thus to eliminate the necessity of an operator in attendance at the furnace.

Examinations for associate automotive engineer, applications to close Dec. 26, and for assistant engineer of the Patent Office, Jan. 10, 11 and 12, are announced by the United States Civil Service Commission, Washington, to which application should be made.

Slight Gain in Iron and Steel Exports

October Figures 3449 Tons Above September But Below Every Preceding Month Since November, 1921— Rails and Pipe Lead

WASHINGTON, Dec. 5.—Exports of iron and steel in October, 132,924 gross tons, valued at $14,626,411, represented a gain of 3449 tons over September. The corrected total for that month being 129,475 tons, thus making it the lowest since November, 1921. Exports of machinery in October showed a slight gain over September, the respective monthly values being $19,189,666 and $19,160,208. Compilation of import figures covering the period from Sept. 21, when the Fordney-McCumber tariff act went into operation, through

Imports, January, 1920, to October, 1922, Inclusive

	Gross Tons		
	All Iron and Steel	Pig Iron	Semi-finished Material
*Average, 1912 to 1914	2,406,218	221,582	145,720
*Average, 1915 to 1918	5,295,333	[illegible]	1,468,026
Calendar year 1919	4,239,837	309,682	258,907
Fiscal year 1920	4,212,732	248,126	288,766
Calendar year 1920	4,961,851	217,958	216,873
[illegible]	[illegible]	3,710	315
February	393,328	1,307	92
March	230,635	2,320	1,023
April	162,592	1,234	678
May	142,551	2,541	749
June	119,081	1,689	1,106
Fiscal year 1921	4,168,619	129,541	82,549
July	86,523	2,744	363
August	75,827	2,424	2,447
September	95,169	3,078	1,318
October	106,582	2,830	153
November	122,290	1,299	1,869
December	134,415	2,550	250
Calendar year 1921	2,213,042	28,305	10,363
January, 1922	160,920	1,043	4,683
February	133,975	1,430	6,627
March	208,843	2,724	10,002
April	198,830	2,750	9,376
May	230,662	3,897	13,091
June	212,295	1,996	13,178
Fiscal year 1922	1,721,418	28,330	63,127
July	157,169	1,943	10,149
August	145,640	1,791	9,353
September	129,475†	5,203	6,810
October	132,924	1,553	8,364
Ten months	1,708,323	24,320	91,595

*Calendar years. †Revised.

October, has been delayed owing to the readjustments of the schedules made necessary by lack of help in the Bureau of Customs, Treasury Department, and by the new classification. The Department of Commerce has announced that the figures will not be ready until the latter part of December.

The October export figures show that Canada has regained her position as the principal foreign market for American steel products. At the same time the figures show that Japan, which for a period recently was the leading export market, has dropped back and is buying comparatively small lots. This is attributed partly to financial conditions in Japan and partly to

The following tables show some of the principal destinations of American iron and steel exports in October:

Steel Bars	Gross Tons
Quebec and Ontario	4,978
Cuba	904
Steel Rails	
Cuba	6,708
[illegible]	
Quebec and Ontario	1,489
Galvanized Wire	
[illegible]	[illegible]
Quebec and Ontario	961
Barbed Wire	
[illegible]	[illegible]

Galvanized Sheets	Gross Tons
Quebec and Ontario	2,267
Chile	[illegible]
Mexico	[illegible]
Cuba	530
[illegible]	
Quebec and Ontario	3,595
Japan	1,993
[illegible]	
Quebec and Ontario	1,737

the fact that importers in that country evidently had laid in good-sized stocks and are supplying requirements from them rather than through new purchases. The largest export movement in October consisted of 20,202 tons of steel rails. Of this total Cuba took 6708 tons and Japan 6289 tons.

Machine tools exported in October numbered 1656, with a value of $322,900, as compared with 1448 tools

Number and Values of Machine Tools Exported in September and October

	September, 1922		October, 1922	
	Number	Value	Number	Value
Lathes	67	$51,874	80	$57,161
Boring and drilling machines	93	40,628	166	34,262
Planers, shapers and slotters	13	15,758	12	38,256
Bending and power presses	21	11,085	12	7,179
Gear cutters	26	14,667	52	983
Milling machines	27	29,662	50	69,383
Sawing machines	23	5,041	10	1,800
Thread cutting and screw machines	42	22,924	16	7,464
Punching and shearing machines	18	7,171	49	14,977
Power hammers	27	20,886	9	10,386
Rolling machines	2	3,897	2	786
Wire-drawing machines	1	81	7	935
Polishing and burnishing machines	7	1,265	4	1,284
Sharpening and grinding machines	1,081	56,468	1,187	78,044
Total	1,448	$284,407	1,656	$322,900

valued at $284,407 in September. Sharpening and grinding machines to the number of 1187 valued at $78,044 and boring and drilling machines to the number

Exports of Iron and Steel—Gross Tons

	October		10 Months Ending October	
	1921	1922	1921	1922
Pig iron	2,723	1,553	23,524	24,320
Ferromanganese	10	5	614	1,059
Ferrosilicon	97	78	318	444
Scrap	3,293	4,510	30,494	59,813
Ingots, blooms, billets, sheet bar, skelp	153	8,364	8,244	91,595
Iron and steel bars	5,961	9,659	179,654	148,416
Alloy steel bars*	[illegible]	292	[illegible]	3,698
Wire rods	1,330	1,180	13,305	37,696
Plates, iron and steel	15,301	4,303	318,661	81,286
Sheets, galvanized	3,060	7,520	48,629	96,219
Sheets, black steel	20,930	6,256	122,115	204,144
Sheets, black iron	618	452	11,173	9,971
Hoops, bands, strip steel	1,673	2,969	17,466	27,928
Tin plate, terne plate, etc.	5,504	6,324	90,176	66,226
Structural shapes, plain material	10,587	11,151	276,595	107,847
Structural material, fabricated	542	3,596	9,249	38,731
Steel rails	9,976	20,202	292,138	240,674
Rail fastenings, switches, frogs, etc.	462	3,747	7,426	30,730
Boiler tubes, welded pipe and fittings	13,476	15,000	323,534	148,526
Cast iron pipe and fittings	1,953	2,629	44,846	22,117
Plain wire	2,087	8,894	60,369	100,306
Barbed wire and woven wire fencing	3,621	6,711	26,160	63,222
Wire cloth and screening*	[illegible]	128	[illegible]	1,273
Wire rope and cable*	[illegible]	512	[illegible]	3,959
Wire nails	1,805	2,131	21,016	48,967
All other nails and tacks	573	531	4,973	7,173
Horseshoes	41	72	509	893
Bolts, nuts, rivets and washers, except track	806	1,888	22,223	15,158
Car wheels and axles	[illegible]	1,258	[illegible]	13,885
Iron castings	[illegible]	706	[illegible]	8,247
Steel castings†	[illegible]	193	[illegible]	1,906
Forgings	[illegible]	114	[illegible]	1,840
Machine screws	[illegible]	16	[illegible]	161
Total	106,582	132,924	1,953,414	1,708,323

*Not reported separately prior to January, 1922.
†Previous to January, 1922, reported by value only.

of 166 valued at $34,262 represented the largest items as to numbers that were exported in October. By value the largest machinery item consisted of agricultural

MACHINERY EXPORTS
By Value

	October, 1921	October, 1922	Ten Months Ending October, 1921	October, 1922
Locomotives	$3,509,440	$355,777	$28,958,940	$7,573,556
Other Steam Engines	562,969	90,554	1,683,686	1,854,426
Boilers	146,246	220,162	4,467,079	1,067,001
Accessories and Parts		290,816		2,531,076
Automobile Engines	92,553	346,163	1,482,701	4,561,640
Other Internal Combustion Engines	156,597	374,589	5,028,373	3,562,202
Accessories and Parts for		265,290		2,291,421
All Other Parts of Engines	584,865		10,807,714	
Complete Tractors, except Agricultural	74,298	12,350	5,708,363	116,205
Electric Locomotives	236,845		1,743,722	
Other Electric Machinery and Apparatus	1,798,655	425,755	25,255,707	6,734,249
Excavating Machinery	181,568		2,205,832	
Concrete Mixers	29,589	27,485	540,391	479,746
Road Making Machinery	117,814		883,209	
Elevators and Elevator Machinery	78,450		1,850,857	
Mining and Quarrying Machinery	306,173	617,678	6,889,713	8,853,318
Oil Well Machinery		363,396		3,591,411
Pumps	534,258	503,660	11,224,482	4,944,770
Lathes	146,128	57,161	2,789,777	628,933
Boring and Drilling Machines		34,262		470,988
Planers, Shapers and Slotters		38,256		247,795
Bending and Power Presses		7,179		280,966
Gear Cutters		983		92,818
Milling Machines		69,389		312,924
Sawing Machines		1,800		38,231
Thread Cutting and Screw Machines		7,164		147,509
Punching and Shearing Machines		14,977		134,655
Power Hammers		10,886		106,485
Rolling Machines		786		159,802
Wiredrawing Machines		935		12,382
Polishing and Burnishing Machines		1,248		12,918
Sharpening and Grinding Machines	89,272	78,044	1,090,230	653,847
Other Metal Working Machinery and Parts of	445,531	370,408	14,310,171	4,603,611
Textile Machinery	1,724,940	579,217	16,584,195	12,146,945
Sewing Machines	445,228	868,502	6,209,425	5,592,616
Shoe Machinery	65,554	82,593	1,602,198	833,475
Flour-Mill and Gristmill Machinery	129,638	47,385	1,495,470	917,942
Sugar-mill Machinery	667,445	625,033	14,803,253	3,064,780
Paper and Pulp Mill Machinery	175,138		2,457,153	
Sawmill Machinery	22,208	43,120	976,156	514,812
Other Woodworking Machinery	72,589	100,663	2,362,868	1,137,414
Refrigerating and Ice Making Machinery	147,709	112,211	1,563,498	1,519,032
Air Compressors	185,287	178,304	3,616,416	1,771,543
Typewriters	956,240	882,160	10,716,432	9,405,584
Power Laundry Machinery	56,994	51,255	844,207	352,413
Typesetting Machines	254,278	423,720	3,072,236	3,188,015
Printing Presses	377,115	365,227	6,892,238	2,992,754
Agricultural Machinery and Implements	1,118,829	1,650,776	35,963,657	19,398,206
All Other Machinery and Parts	7,420,472	8,562,597	135,643,711	76,834,162
Total	$22,690,915	$19,189,661	$371,724,060	$195,934,578

machinery and implememnts, the October total amounting to $1,650,776. The value of typewriters was $882,160, of sewing machines $868,502, of mining and quarrying machinery $647,678, of sugar mill machinery $625,033, of textile machinery $579,217, and of pumps $503,660. No other item reached $500,000.

Chief countries of destinations of October and September, 1922, iron and steel exports, stated in gross tons:

	October	September
Canada	44,815	41,417
Japan	15,675	22,328
Cuba	14,161	7,656
Argentina	10,141	4,145
Mexico	8,416	6,193
Australia	5,549	2,403
Colombia	4,121	2,303
United Kingdom	3,837	4,306
Brazil	3,575	6,133
India	2,888	2,909
Peru	2,759	1,562
China	2,529	5,689
Chile	2,292	4,229
Honduras	1,611	*
Philippine Islands	1,193	2,224
Chosen (Korea)	1,134	3,403
British West Indies	1,131	*
Venezuela	971	1,304
South Africa	819	979
Uruguay	570	*

*Indicates less than 500 tons.

Of the amounts given above, 54,842 tons went to North American countries in October, against 47,610 tons in September; 24,429 tons to South America, against 19,676 tons; 22,226 tons to Asia, against 34,329 tons; 15,292 tons to West Indies, against 7656 tons; 6742 tons to Oceanica, against 4627 tons; 3837 tons to Europe, against 4306 tons; 819 tons to Africa, in October, against 979 tons in September. It will be noted that the Continent of Europe is not represented, no country there having been sent so much as 500 tons.

BRITISH FOREIGN TRADE

October Steel Exports Largest Since July, 1920—Imports Heaviest of the Year

The October official data on British foreign trade in steel and iron show that the total exports were 354,595 gross tons, or the largest since July, 1920, when they were 393,016 tons. This is an increase of 65,251 tons over September. The October exports make the average for the first 10 months 281,803 tons per month. Exports of scrap are included. To Nov. 1, this year, total exports have been 2,818,035 tons against 1,325,243 tons for the same nine months in 1921.

The October imports were 100,252 tons, or the heaviest for the year, those in January having been 100,178 tons. The average for the first 10 months of this year is now 78,248 tons per month. These data also include scrap. The following table shows comparative data:

British Steel Exports and Imports, Gross Tons

	Exports	Imports
October	354,595	100,252
Aver. per month, first quarter, 1922	267,047	82,536
Aver. per month, second quarter, 1922	274,830	67,785
Aver. per month, third quarter, 1922	274,347	74,360
Aver. per month, 1921	144,885	152,734
Aver. per month, 1920	274,881	128,685
Aver. per month, 1919	188,519	50,801
Aver. per month, 1913	420,757	195,264

The following table covers the principal exports:

Principal British Exports, Gross Tons

	Average per Month		October	
	1913	1921	1921	1922
Pig iron	78,771	8,602	7,614	119,288
Steel rails	41,676	14,698	14,864	17,146
Steel plates	11,162	10,673	7,544	6,551
Galvanized sheets	63,506	17,635	32,222	39,487
Steel bars	20,921	8,927	10,711	22,107
Tin plates	41,208	18,873	25,356	35,125
Black plates	5,679	1,178	1,382	7,154
Steel sheets	....	....	3,758	14,181
Total exports, first 10 months, 1922				2,818,035
Total exports, first 10 months, 1921				1,325,243

The most marked recovery in the October exports this year over those in October, 1921, has been in pig iron, galvanized sheets, steel bars, steel sheets and tin plates.

Pig iron imports in October were 16,404 tons compared with a monthly average in 1921 of 55,564 tons.

Iron ore imports in October were 325,183 tons which compares with a monthly average in 1921 of 157,298 tons.

Manganese ore imports in October were 62,320 tons. Last year they were 14,405 tons per month and in 1913 they were over 50,000 tons per month.

American Malleable Castings Association to Meet at Cleveland in Foundry Week

Robert E. Belt, secretary-treasurer of the American Malleable Castings Association, advises that a joint meeting of the western and eastern sections of the association will be held in Cleveland in connection with the annual convention of the American Foundrymen's Association.

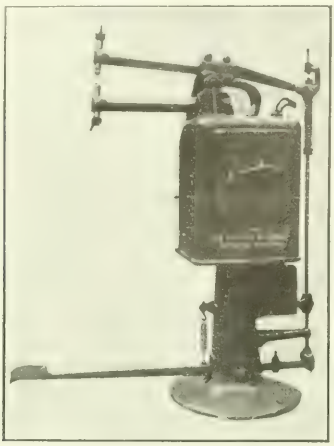
The meeting probably will be held on Wednesday, May 2, and the technical program of the American Foundrymen's Association malleable session will be arranged so as to meet the convenience of the members of both associations. It will be a notable week for the men of the malleable castings industry, who through their organization have made important contributions to technical research.

Four of the new sheet mills which are being installed by the Newton Steel Co., Youngstown, at its Newton Falls, Ohio, plant will be completed and ready for production in January, according to current developments. The additional capacity will be largely devoted to production of full finished sheets for automobile body and fender and metal furniture stock.

The Chicago Hardware Foundry Co. has reopened its Elkhart, Ind., plant which has been idle since January, 1921. The Elkhart foundry was purchased from the Concord Foundry Co. in 1919.

Machine for Welding Light and Medium Stock

An improved welding machine, designated as the type SAF, intended for use on light and medium stock has been placed on the market by the U. S. Electric Welder Co. It can weld rough oxidized as well as smooth stock. About 4 sec. per weld is required for 3/16 in. material, and the production of two 1/16 in. bright sheet steel is 4000 welds per hour. Two sizes, having kva. capacities of 12.5 and 18 and horn sizes of 2 and 2¼ in. respectively, are available. Horns of various lengths may be provided. The illustration



Improved Welder for Light and Medium Stock

shows the 12.5 kva. size, equipped with a 12 in. horn, the same machine equipped with motor being designated as the type SAM.

The machine is equipped with the company's transformer. The internal automatic reactance prevents breakdown at overload and permits the handling of heavy stock without overheating. It is also said to increase output considerably. The automatic switch is equipped with magnetic blowout, removable contacts and is entirely inclosed. A five-point pivot switch provides different voltages at the welding point, which is water cooled. Mechanical parts of a special alloy or cast steel, and because of heavy construction, extra heavy pressure on the points can be obtained when desired. All conductors carrying line voltage are inclosed. Gitz oilers are provided where required.

Coal and Coke Production

WASHINGTON, Dec. 5.—Estimated production of bituminous coal for the week ended Nov. 25, including coal coked, mine fuel, and local sales, was 11,038,000 tons, according to the Geological Survey. Preliminary returns of cars loaded the first three days of Nov. 29-Dec. 2, indicate that production continued at about the same rate, but on account of the Thanksgiving Day holiday the total output will probably drop to 9,300,000 and 9,700,000 tons.

Production of beehive coke in the week ended Nov. 25, showed a gain of 8 per cent over that in the preceding week. The total output as estimated on the basis of cars loaded was 285,000 tons the week before. The cumulative output during 1922 to date stands at 6,598,000 net tons. In the corresponding period of the four years preceding, it was: 1921, 4,936,000; 1920, 19,193,000; 1919, 17,822,000; 1918, 28,149,000. Thus it is shown that from the viewpoint of beehive coke production the year 1922 is 77 per cent behind 1918, 63 per cent behind 1919, 66 per cent behind 1920, and 33 per cent ahead of 1921.

The movement of bituminous coal from Lake Erie ports declined to 828,949 net tons in the week ended Nov. 26. In comparison with the week preceding this was a decrease of 21 per cent and was the lowest tonnage dumped since the week ended Sept. 11. Of the total dumpings 797,211 tons were cargo coal and 31,738 tons were vessel fuel.

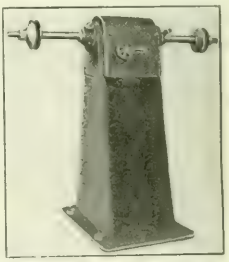
In comparison with the three years preceding, the total shipment of cargo coal is now 21 per cent behind 1921, 20 per cent behind 1920 and 18 per cent behind 1919.

Indiana Foundrymen Organizing

An organization meeting of Indiana foundrymen was held at Purdue University, Lafayette, Ind., Nov. 24 and 25, to bring the foundrymen of the State closer together, for discussion of problems affecting the industry. Arthur J. Tuscany, secretary-manager of the Ohio State Foundrymen's Association, explained the workings of his association and it is probable that an Indiana association will be patterned after it. A number of interesting papers were read and discussed. Prof. R. E. Wendt, Purdue University, discussed "Foundry Conditions in Indiana"; F. D. Chase, Chicago, described "The Lay Out and Design of a Modern Foundry"; H. P. Northrup, Indianapolis, described "The Manufacture of Pig Iron" and N. M. Waterbury, Indianapolis, "The Manufacture of Malleable Iron." David E. Ross, W. M. Klingman, Prof. J. F. Keller and E. T. Runge also addressed the meeting.

Polishing and Buffing Lathe

A ball-bearing heavy-duty polishing and buffing lathe designated as the No. 86, and constructed as shown in the accompanying illustration has been placed on the market by the Connecticut Dynamo & Motor Co., Irvington, N. J. It is designed to permit placing the countershaft or line shaft on the floor behind the lathes and still have the belt and pulleys on the lathe fully covered for the protection of the operator. The hood may be revolved to permit belting from any angle and the belt shifter follows the belt and is always in the right position.



The Hood May Be Revolved to Permit Belting from Any Angle

The spindle is 48 in. long overall, 2 in. in diameter between bearings, 1.77 in. in diameter in the bearings, and 1¼ in. in diameter between flanges. The distance between wheels is 36 in. and height to center line of spindle 38 in. The diameter of flanges is 6 in. The tight pulley is 6 in. in diameter, 4½ in. face and the loose pulley 5¾ x 4¼ in. The maximum wheel thickness is 4 in. The size of the base at the floor is 20 x 24 in. and the weight 550 lb. net.

C. H. Wills & Co., Marysville, Mich., manufacturers of the Wills-St. Claire car, have been granted a friendly receivership through the United States courts by the appointment of the Security Trust Co., Detroit, as receiver. The Michigan Malleable Iron Co., Detroit, instituted proceedings in behalf of the company. The application for a receiver came after many conferences with most of the principal creditors and Eastern bankers. Although the company is said to be solvent, this process was deemed expedient in order to re-finance and conserve the best interests of all concerned.

The Board of Water Supply, Municipal Building, New York, will take bids until Dec. 19 for the Mount Prospect conduit line, Catskill Aqueduct, consisting of about 10,530 ft., 72 in. steel pipe; 6,270 ft., 66 in. steel pipe; 360 tons of cast iron pipe and special castings, meters, valves and other appurtenances. Benjamin F. Einbigler is secretary.

CONTENTS

December 7, 1922

Polish Machinery Industry Shows Revival 1483
American Observer Finds Signs of Progress—Contrasts Between Conditions Today and in 1909—Prospects for Export Trade

Efficiency of Electric Power Supply 1487
Improvement Depends Upon Making the Best Use of Existing Facilities and Choosing Carefully the Source of Power

Temperatures at Which Physical Changes Occur 1492
Fusion, Melting and Vaporization of Metals and Other Substances—Table of Temperatures for Producers and Users of Iron and Steel

Casting Steel Ingots Centrifugally 1494
Results from Using a Horizontal Bottle-Neck Mold—Comparison with Earlier Attempts—Excellence of Ingots and Their Cost

A Review of Steel Mill Electrificati on 1497
Ability of Motors to Take Heavy Overloads Important—Efficiency, Flexibility, Durability and Low Operating Costs Noted

Slight Gain in Iron and Steel Exports 1508
October Figures 3449 Tons Above September But Below Every Preceding Month Since November, 1921—Rails and Pipe Lead

Pig Iron Production in November 1520
Daily Output 9898 Tons More Than in October—Gain of 24 Active Furnaces

Facing and Centering Machine..... 1486
The Speed of the Dollar..... 1489
Electric Truck and Portable Elevator... 1489
New Industrial Leadership..... 1490
Employment in Cleveland..... 1490
Coming Meetings 1490, 1500, 1509
Charles A. Coffin Foundation.....1490, 1518
Crane of Unusual Proportions..... 1491
Rapid Wage Advances in German Metal-working and Building Trades..... 1491
Oppose Radical Bill..... 1492
Heavy Type 60-In. Swing Lathe..... 1496
Annealing of Gray Cast Iron..... 1499
Coke Production Large..... 1500
Milton O. Knauss Buys Blast Furnace.. 1500
Truck Loader Mounted on Truck Chassis 1501
Plant Operations 1501
Youngstown Merger Rumors..... 1501
Automatic Drill for Light Operations... 1502
Duplexing with Electric Furnaces..... 1502
Reel for Use with Portable Grinder..... 1502
Cylinder Boring Machine..... 1503
Clock Dial for Control Under Manufacturing Budget 1503
Critical State of South Russian Metal Industry 1503
Large Split-Pattern Molding Machine... 1504
Railroad Situation Improving..... 1504
Book Reviews 1505
New Books Received..... 1506
High Temperature Melting..... 1507
British Foreign Trade..... 1509
Machine for Welding Light and Medium Stock 1510
Coal and Coke Production..... 1510
Indiana Foundrymen Organizing..... 1510
Polishing and Buffing Lathe.....1510
Editorials 1512
Steel Output for 1922—A Glaring Exception—Duplexing with Electric Furnaces—Revival in British Steel—Government by Public Opinion.
Correspondence 1514
Device for Cleaning Old Machinery.
Manufacture of Brass Tubes.....1515
Czechs Face Collapse.....1516
Lake Superior Iron Ore Shipments for 1922 1516
Mechanical Engineers' Meeting.....1517
To Reorganize Jones & Laughlin Steel Co.1518
Relieving Industry of Burden.....1518
New Wickwire-Spencer Factor.....1519
Ore Rate Case Lost.....1519
British Iron and Steel Market.....1536
Standardized Terminology in Industry....1536
Fabricated Steel Business.....1538
Railroad Equipment Buying.....1538
German Prices Sky-Rocket.....1539
New Trade Publications.....1541
Steel and Industrial Stocks.....1551
Industrial Finance 1502, 1551
Plans of New Companies.....1552
Trade Changes 1553

Iron and Steel Markets.....1522
Comparison of Prices.....1523
Non-Ferrous Metal Market.....1535
Prices Finished Iron and Steel, f. o. b. Pittsburgh.....1537
Personal Notes.....1540
Obituary Notes.....1540
Machinery Markets and News of the Works.....1542
New York Jobbers' Prices.....1554

ESTABLISHED 1855

THE IRON AGE

EDITORS:

A. I. FINDLEY WILLIAM W. MACON GEORGE SMART

C. S. BAUR, *General Advertising Manager*

Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

[illegible] U. S. A. George H. Griffiths, *Secretary*

[illegible] 239 West 39th Street, New York: Chicago: [illegible] Philadelphia: [illegible] Detroit: 317 West Fort St. Cincinnati: Mercantile Library Bldg. Buffalo: 881 Ellicott Square. Washington: 26 Jackson Place, N. W. San Francisco: 320 Market St. London, Eng.: 13 Hayemarket, S.W.1.

Subscription Price: United States and Possessions, Mexico, Cuba, $6.00. Canada, $8.50. Foreign, $12.00 per year. Single copy 25 cents.

[illegible] at the Post Office at New York, New York, under the Act of March 3, 1879.

Steel Output for 1922

Estimates made two months ago of the probable steel output of the country in 1922 need some revision upward in view of the high rate of production maintained in November and the indicated rate for December, winter blockades before January being rare. There is a probability, in view of an 80 per cent ingot production through half of November, and the high rate that is looked for this month, at least up to the holidays, that the year's steel ingot output will be not far short of 33,000,000 tons, or more than 63 per cent of capacity, assuming the latter to be 52,000,000 tons. With 19,224,000 tons of ingots 1921 was rated a 37 per cent year. Thus 1922 promises to be about 70 per cent better in point of tonnage.

While the Steel Corporation has been credited with about 45 per cent of the country's steel capacity, it actually produced about 55 per cent of the total in 1921, entering that year with a good order book, while the independent companies then had little business ahead and were curtailing production sharply. In 1922 the Steel Corporation's output is likely to be less than 50 per cent of the total, probably but little more than 48, estimating that it reaches 16,000,000 tons out of a probable total of 33,000,000 tons.

A Glaring Exception

To the general rule that restraint of trade is not permitted because it is unlawful there has been growing up a glaring exception, the restraints that arise from the operation of labor unions. It may help to broaden the viewpoint to recall that it was several decades before the discovery of America that English courts recognized the rule that a contract by which a man bound himself not to engage in any branch of trade or labor was unenforceable, the principle being that the man might be disabling himself and thus might become a charge upon the community. Long afterward exceptions began to be developed, these exceptions being clearly defined and covering only cases where the agreement was strictly incidental in some much broader transaction. These are the cases to which is legally applied the often loosely used "reasonable restraint of trade."

The restraint is still fully recognized and where the agreement may not be indictable it is still unenforceable. The principle is in full effect, that a man may not restrain himself from engaging in certain business or labor. Despite this well-established fact we have the glaring exception that labor unions restrict their members as to the quantity of work they may do in a day, and bring about conditions whereby there are long periods of idleness.

In the case of the coal miners, one may exclude wholly from the argument the question whether the conditions existing in the coal industry have represented a restraint of trade under our present laws, and yet find that the coal miners have passed into the condition against which the rule recognized six centuries ago was directed. The danger was to be avoided, of a man becoming a charge upon the community. Is not that precisely the position militantly taken by the coal miners? They are here, they receive employment only so many hours a year, much fewer than men are ordinarily expected to work, and they have got to be kept.

In the building trades, in coal mining, or in anything else, whenever and wherever men refuse to do a reasonable amount of work, whether by limiting the rate of performance, requiring the employment of unnecessary helpers, subdividing work to different trades, striking, or any of the other devices used, they are making themselves charges upon the community. The actual and recognized result is that the community pays undue prices for transportation, for construction work and for coal and other commodities. From basic principles, what is the defensible difference between the community supporting by taxation a man in an almshouse and supporting him in partial idleness by paying too high prices for transportation, for construction or for goods? Practically the difference is that the one class of contracts in restraint of trade to which reference is made can be prevented by making the contracts unenforceable, while the other cannot, under our present system, for the reason that the men practicing the

restraint do the enforcing themselves, not requiring aid of the law.

It may require much time and much talk for public sentiment to come to a full realization of the glaring exception and to correct the abuse. But that public sentiment eventually will reach that point is an entirely reasonable expectation.

Duplexing with Electric Furnaces

Making steel by a duplex electric process is novel and so far as known is not practiced in the United States. On another page reference is made to an English operation of this sort. There are certain advantages in using two electric furnaces, one for melting and partial refining and one for finishing, but it is a question whether the advantages are not outweighed by the expense. Unless electric power is very cheap, preliminary melting and refining can be as advantageously and more cheaply accomplished in basic open-hearth furnaces, even when scrap is a very large factor. For this reason duplexing has not been done entirely with electric furnaces in this country. A conspicuous example of domestic practice is the naval ordnance plant at Charleston, W. Va., where basic open-hearth steel is finished in the largest electric furnaces in the world. Undoubtedly in the United States coal and oil are cheaper melting mediums than electricity and carbon electrodes. One of the drawbacks to the British electric steel industry has been high-cost electricity and there is reason to expect that British experience will parallel the American, though it is possible that the Stobie plan may fit in where small quantities of several kinds of high-grade steel are wanted.

It is recalled that in 1911 Girod made steel by a similar process in southern France, so that the British patent is not entirely new. Original plans of the Ford company's new steel plant involved electric duplexing, or the finishing in small electric units of steel partially refined in very large ones. But it may turn out that even in this case preliminary work may yet be done in the open-hearth.

Revival in British Steel

Betterment in the steel industry of Great Britain is indicated by the October statistics of both production and foreign trade. The output of both pig iron and steel reached in that month the highest rate for the year at 481,500 tons and 565,200 tons. The marked change that has come over the industry is represented by an October pig-iron production over twice the monthly average in 1921, and yet only 56 per cent of the average 1913 monthly production. In steel the showing is better. October production was nearly twice the monthly average in 1921 and about 90 per cent of that for 1913.

The October steel exports, given in detail elsewhere, show a surprising recovery of foreign markets. At 354,600 tons the movement was not only the largest this year but the best since July, 1920, being 85 per cent of the great record of 1913. There was an increase of about 65,200 tons over September, but 50,000 tons of this was pig iron, most of which came to the United States. From the data at hand this means an exportation to the United States in ten months of about 159,000 tons of pig iron. Thus the recent exportation of British pig iron exceeds any previous record—even the heavy movement in 1912 and 1913—and with less than half the blast furnaces operating. Exports of steel bars and black sheets this year already exceed the pre-war rate, while the demand from other countries for galvanized sheets and tin plates has been nearly equal to what was required as a normal peace-time demand.

The British recovery in steel exports is in sharp contrast with the experience of this country. Here all the progress has been in production while the export movement is now the smallest in many years. In Great Britain increased production has been due largely to foreign demand; in the United States nearly all the steel has been taken up at home and exports have sunk into insignificance. While the readjustment of the British industry has been and is slow, conditions are approaching normal. A favorable factor is that the war increase in capacity was relatively not so large as that with which the American industry sooner or later must reckon.

Government by Public Opinion

More than a third of a century ago there was a loud public outcry against the railroads, against their watering of stock, giving of rebates, naming of rates on the principle of "all the traffic will bear," and various other things. It is not overstating the case to say that public opinion was very much against the railroads. The railroads objected strongly to the passage of the original interstate commerce act in 1887. They objected to its enforcement and by diligently pursuing the matter in the courts they succeeded in making the act have less effect than its friends thought it would have.

When the courts decided that the Interstate Commerce Commission could declare a given rate unreasonable but must not volunteer to mention a rate it would consider reasonable, the common feeling was that it was going to be very difficult to bring about real regulation of rates. Yet it is probably entirely correct to say that in all those years "public opinion" was that the condition was bad and that there ought to be regulation.

During the first decade of the present century there was much public sentiment against what was called "big business." The popular desire appeared to be that as many large corporations as possible should be eliminated by dividing them into small pieces and that those that could not be caught in that way should be very closely regulated. It was the declared purpose of the Roosevelt and Taft administrations to bring about "old-fashioned competition."

Yet with all the time that has elapsed there have been few dissolutions and there has not been established by law the regulation as to selling prices that seemed to be popularly demanded. At the same time the public feeling against large

corporations has subsided. There has been some legislation, it is true, in the Clayton and Trade Commission acts, and there have been decisions under the Sherman law which give the public a much clearer grasp of what the act means and does than it had ten years ago. One has only to recall some of the talk there was ten years and more ago, however, to be convinced that the sort of regulation then demanded has not been established and that the sentiment in favor of that kind of regulation has largely died out.

Considering the trend of public feeling on other subjects it would be idle to assert that the public conscience or the public desire has changed. The changes that have occurred are that large corporations have become more careful, and have even become punctilious, as to what they will do or will not do, while the public has learned that the large corporations were not so bad as it thought.

In very large measure we have government by public opinion in this matter. The larger the corporation or the more public its business, the more particular it is as to its conduct. The contrast between this attitude toward public opinion and the attitude of the railroads a third of a century and more ago toward public opinion is very striking.

But there is another contrast—a contrast between big business and little business. Little business has been profiteering in the past few years and the profiteering is not ended. There are altogether unreasonable profits in many of the items that help to make up the family budget. Furthermore, while the large corporations are efficient and conduct their operations economically, there is much waste in little business. We have too much handling of goods and too much retail shop keeping.

There is much public opinion against these unreasonable profits and these wastes but it does not lead to results. Those who are responsible do not feel that they need care about public opinion. Big business does. The result is that big business is governed by public opinion and little business is not. The care and circumspection of the Steel Corporation's walk and conversation, not only in the more than eight years in which its fate was in the balance, but in the years since the Supreme Court's decision in its favor, have become proverbial in the steel trade. Legislators, progressive and otherwise, may well give up the pursuit of big business for a season while they consider what can be done to bring all other business up to a like degree of compliance with the will of the public.

American makers of tin plate have had a large demand for their product in 1922, with indications of even a greater output in 1923. Importations of pig tin have been on a liberal scale to take care of the needs of the mills in the past year, running well above those of 1913 and being exceeded only in 1920. The monthly average of imports in 1913 was 3879 tons, at an average price of 44.33 cents per pound, New York. To November, this year, imports averaged 4171 tons, with an average price of between 31 and 32 cents and a current quotation of 36 cents. In 1913 the average price of tin plate was $3.55 per box, as compared with $4.75 to-day, and a contract price of $4.75, though not a maintained price, over the past year. The figures illustrate how other factors than the market price of tin plate have had much to do with making the price of pig tin, though the coating of steel sheets is the largest use to which tin imports are applied, amounting to about 40 per cent of the total.

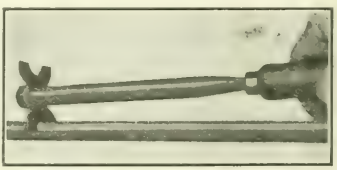
Statistics of Germany's iron and steel export trade for June and July, recently available, show that over 50 per cent of the total of 421,900 tons for the two months consisted of structural material, rails, plates, wire and pig iron in the order named. Rails were 25 per cent of the total, the Argentine taking the largest share. Structural material was widely distributed. Over 40 per cent of the total exports went to six countries, Holland leading and the Argentine and Japan standing next. The figures for these two months are fairly representative of other months of the year, not only in distribution but also as to the total movement, which has averaged close to 200,000 tons per month.

CORRESPONDENCE

Device for Cleaning Old Machinery

To the Editor: The tool shown in the illustration was devised by a warehouse man to facilitate the work of cleaning a number of used machines that had accumulated a covering crust of dirt, composed of a mixture of paste and sand. A regular flat scraper was used to clean the plane surfaces but all the finished cylindrical parts were scraped with the tool illustrated. By the judicious use of emery cloth in three grades, following the scraping operation, the machines were restored to almost the original brightness.

The tool is made up of a piece of ⅝-in. rod, a screw and a washer. The rod is drilled and tapped at one end for the screw, the other end being pointed for driving



Tool Facilitates Cleaning Machinery

into a handle. Ordinary washers are used as scrapers and sawed in two, both halves being held as shown by tightening the screw in the end of rod. By holding both halves in this way one half can be used as a roughing tool to break up the dirt surface and the other as a sort of finishing tool to remove it. The washers are sharpened by holding them flat against the side of an emery wheel for a moment. This gives sufficient edge for the purpose intended and yet not cut into the metal. Different sizes of washers are used as required, one size taking care of several diameters of work less than itself. As a guide, a washer having a 1 in. hole is satisfactory to use on round parts from that dimension down to 11/16 in.

HARRY MOORE.

Rosemount, Montreal, Canada.

MANUFACTURE OF BRASS TUBES

How Various Defects Are Discovered—Methods of Amelioration

Some defects occurring during the manufacture of 70-30 brass tubes were described by W. E. Ballard in a paper read before the Birmingham* University Metallurgical Society. The observations cover actual works practice, and they are based in the main upon experience at the works of the Muntz Metal Co., Ltd., Birmingham. Tubes of 70-30 brass are usually cast in chills and round a core of sand, the casting being annealed and pickled after being trimmed. The tube is then reduced to the required size by a series of drafts on a drawbench, each application of cold work usually being followed by annealing. Failures, therefore, might be classified under the headings of casting, annealing and drafting.

Faults Due to Molding

Failures produced in casting were considered by Mr. Ballard to be due to too little binding material being used in the sand mixture, or to the cores having been dried at too high a temperature, perhaps in the neighborhood of 150 deg. C., in which case they would always show cracks before being placed in the mold. Another cause might be rough handling after leaving the stoves, and to overcome this difficulty the cores are dressed before their final drying with a wash of powdered charcoal in a weak solution of binding material. It has been found that large holes in the tubes are usually due to badly dried cores, or to a spot of water having fallen on the core just before it was placed in the mold.

Mr. Ballard complains that very little work of a scientific nature had been done on the subject of mold dressing, and he said there was a considerable difference of opinion with regard to the oil base. It was a common thing to find as many as four oils combined in the dressing. A dressing recommended to him consisted of Russian tallow, lard or a substitute, seal oil, a little beef tallow, a pinch of resin and charcoal. Whatever oil is used as a base, it would need a certain proportion of thickening matter. If the mixture was too thick, the casting would have a peculiar wavy surface resembling a crocodile's skin. If still thicker, large black marks resembling thumb prints would be seen. If the mixture was too thin, the casting freshly taken from the mold would be a bright golden color in patches and the surfaces of these patches would be honeycombed with small holes.

The question of the influence of the oil base brought up another thorny subject, namely, mold temperature, as to which the practice of various works was widely divergent, the temperature varying from 100 deg. C. to 300 deg. C. If the mold was too hot, the surface of the casting was similar to that found when the dressing was too thin, and if the mold was too cold, the surface of the casting showed dirty patches and was slightly corrugated. The use of lard oil substitute or lard oil itself demanded a cool mold, not above 150 deg. C. Seal oil and cottonseed oil also needed cool molds, though a higher temperature might be attained if a little resin was added. Too much resin gave the casting a shiny hard bluish surface and the mold gradually became covered with a hard metallic skin. Personally he thought it better to use an oil base which gave the biggest latitude of mold temperature, and mineral oils of high flash point undoubtedly had this advantage. It had been suggested that oils of high viscosity at 150 deg. C. might be best for dressing purposes. But the ascertained viscosities of the common oils used in dressing showed that this property was not essential, otherwise castor oil with a viscosity of 390 compared with the 100 of whale oil would make a wonderful dressing. The specific gravity also seemed to be a negligible factor, but either the flash point or the temperature of spontaneous ignition in oxygen did seem to give a fair indication of suitability for dressings. Tar and bitumen were quite good for dressings for heavy castings with a good body of metal, but their partial combustion left a good deal of dirt. Therefore heavy mineral oils seemed to be as satisfactory as anything.

*England.

Defects in the Tube Wall

Internal defects in the tube wall were the most difficult to discover and to cure. At Muntz Metal Co.'s works great care was exercised to avoid faults of this nature. Every day sample castings were taken and burst by being expanded on plugs. The fractures were examined carefully. Another system used there was breaking up castings under a power hammer. He thought bursting by expansion was probably the best method, as fracture then occurred down the line of maximum defects. A tube so fractured proved to be generally porous. Holes were seen all over the fractured surface, some dirty and some with a shiny internal surface. The only possible cause of such a bad defect was too low a pouring temperature.

Mr. Ballard was confident that brass tubes could not be spoiled by overheating within reason, although he was prepared to admit the possibility of casting billets at a slightly lower temperature than 1200 deg. C. By making the casting too thin for its length, slight porosity and general dirtiness of the tube walls were shown on fracture, and he said that cutting down thickness to its limit to save drafts has been the cause of many toolmakers' troubles. A similar defect was shown in castings which were made too long, and he said that a few black holes in the middle of the casting were usually a sign of too rapid pouring and of air in the mold, which was the cause of many spills in the finished tubes.

In discussing defects of molding, Mr. Ballard classified them as falling under the headings of insufficient annealing, overheating and fire cracking. He urged that every annealing furnace should have its pyrometer and if possible a recorder too. Overheating he said was more easily detected as the annealed tube then usually showed a yellowy green bloom due to oxide of zinc. Such samples were sometimes so full of intercrystalline cavities that they broke when dropped on the floor. Their fracture sometimes showed very coarse needle-like crystals. Such tubes seldom stood up to the test of the drawbench. Local overheating sometimes caused a weak area in otherwise good tubes. It was in detecting underheating and overheating that the microscope was most generally useful in a tube works. Sections at right angles to the direction of drawing were usually the most instructive.

Defects Due to Drawing

Mr. Ballard next discussed the effect of drawing on the stability of the finished tube. He considered that there were really only two methods used in drawing a tube. The hollow sinking method was for the adoption of diameter without reducing the wall thickness. In other processes which he called "pinch" the reduction of wall thickness was accomplished by supporting the tube inside with a bar or plug.

A curious phenomenon in connection with hollow-drawn tubes or any tubes having high internal stresses was their behavior when treated with mercurious nitrate solution in various ways. The intensity of internal stresses could be roughly gaged by the time taken for cracks to develop when the stressed article was placed in such a solution. When the outside of a highly stressed tube was treated with the solution cracks developed as quickly as if the tube were immersed completely. If the inside were so treated cracks might not develop for several days. A tube that had been made by a reduction by "pinch" alone would not crack at all in such a solution; it would not firecrack or season crack however much there had been put upon it. Tubes which had been subjected to "pinch" and sink might or might not crack, according to which effect predominated.

Raymond E. Bell has opened offices in the Woolworth Building, New York, Suite 3412, to act as consulting industrial and management engineer. O. H. Blackman, until recently president of the Blackman Co., New York, will join him.

CZECHS FACE COLLAPSE

Increase of Crown Curtails Exports—Imports Increase—Stinnes Works Undersells Czech Producers

PRAGUE, CZECHO-SLOVAKIA, Nov. 17.—The collapse of the important Czecho-Slovak metal industries supplies a new comment on the theory that currency depreciation is necessarily associated with industrial stagnation. The Czech crown in London, between Dec. 31, 1921, and the middle of this month, rose from 285 to 139 to the pound; but while the steel industry of Germany with declining exchange has prospered, and the output of iron in Poland, also with a declining exchange, has enormously increased, Czecho-Slovakia's iron and steel branch has shared in the general industrial stagnation, which increased the number of unemployed in August to 557,000. Czecho-Slovakia's industries are far too extended for the home market. Since her crown began to rise, the republic as an exporting country has been badly hit by German, and in part by Austrian, under-selling; and the decline witnessed in Germany in 1920, after a temporary exchange recovery, is being repeated in Czecho-Slovakia on a smaller scale.

Of 47 blast-furnaces in old Austria-Hungary, 27 are in Czecho-Slovakia, which has less than a fourth of the population of the former empire. Pig-iron output at full capacity is about 1,500,000 tons, which is a quarter of Germany's present capacity. Since March, 1922, only 5 blast-furnaces have been in blast. The Prague Iron & Steel Corporation had all its 8 furnaces out in late July, and could resume limited production only after obtaining cheap coke from Germany. The last monthly production figures vary between 23,000 and 34,000 metric tons. For steel production there are 42 Siemens-Martin, 5 Thomas and 3 Talbot furnaces, with a total capacity of 2,000,000 tons, operating according to latest reports at 25 per cent, as against 40 per cent at the end of 1921, which was 6 per cent less than in 1920, absolute figures being 917,662 tons against 972,976 tons.

These slump conditions and the moderate fall in living costs led recently to an effort to reduce production costs. Wages were cut 30 per cent and coal and coke from the Ostrau district were reduced 28 per cent. No noticeable increase in sales of iron and steel have so far resulted. Last reports are highly unfavorable. Although Austrian production cost is much higher than German, the Austrian Alpine Montangesellschaft, now under the direction of Hugo Stinnes, has easily undersold Czech producers; overseas orders for Czech steel have ceased; and in Hungary and Jugoslavia, Stinnes has created his own iron and steel trading companies and is fighting Czecho-Slovakia determinedly.

The selling mergers in the Czecho-Slovak steel industry have been completed. In May an agreement for selling output in common was concluded by the Prague Iron company, Berg und Huetten company, Witkowitz company, Oderberg Cable & Wire Co., Hernadthal Ironworks, Rothan-Neudek Ironworks, Radek Ironworks, Eisenwerke der Stadt Rokycan, Zbiro Works, Max Hofgartner Co., Schwartz & Beck, Libschitz Ironworks, Willy Coburg Co., A. Hahen and Freistadt Steel & Iron Works. The cartel at once took steps to increase exports to Austria, and announced that if sales did not improve it would close its less profitable works. The Freistadt works were mentioned as the first due to be closed. M. Josevich, a Czech expert, declares that further closing down cannot be avoided, because in the present state of the international market Czech production at full capacity is much too large. At end of August the cartel reduced iron and steel prices. The Federation of Czech Industries declares that only a radical reduction of the coal tax and of railroad freights can save the situation. The Skoda company, the Bohemian-Moravian Machinery Co., the Kolben Electrotechnical Co., and Wichterle & Kovarik, manufacturers of farm machines, have united to form the "Czech Machine Concern," with branches in Kovno, Rovno, Lemberg and Constantinople.

Export is declining. Exports registered as "base metals and wares thereout" in the first eight months of 1922 was almost the same as in the same months of 1921, but exports of machines were only 20,365 metric tons against 29,132 tons, while imports of iron and iron wares rose from 104,020 tons to 188,458 tons, base metals and wares thereout from 13,993 to 19,977 tons, and machines from 16,216 to 17,305 tons.

Czecho-Slovakia's coal and lignite production have decreased. The latest figures published, for the first fortnight in September, show lower production than at any time since the early part of 1919, when post-war disorganization still reigned. Large stocks of unsalable coal lie about the pit mouths. Between the termination of the industrial boom in March, 1921, and the late summer of this year, 8 per cent of the coal miners have been discharged. Because of the relatively slight drop in wages and the great recovery of crown exchange, Czech cost of living in gold, which in 1921 was 94 per cent of the pre-war cost of living in gold, was lately reported at 195 per cent, while Germany's gold cost of living was only 35 per cent of that of 1914 (at present much less), and Austria's 60 per cent. Such conditions make it impossible for the Czech steel industry to hold its own in export, and only a new decline in crown exchange or a gradual reduction of the whole domestic price-level can restore the industry's competing capacity.

Lake Superior Iron Ore Shipments for 1922

CLEVELAND, Dec. 4.—Iron ore shipments by water from the Lake Superior district during the season of 1922 which closed Dec. 2, amounted to 42,613,184 gross tons. This is a gain of 90.6 per cent over 1921, when the movement was 22,300,726 tons, but shipments last year were the lightest in 17 years, or since 1908. The 1922 movement, however, does not show up well in view of the fact that it fell below the total in eight out of the previous twelve years, starting with 1910. The record year was 1916, when the movement was 64,734,198 tons. Shipments passed the 60,000,000 ton mark during the next two years, dropped back to slightly over 47,000,000 tons in 1919 and climbed up to 58,500,000 tons in 1920. It is estimated that the all-rail shipments this year will amount to approximately 1,000,000 tons.

The following table gives the season's shipments by ports in gross tons and the corresponding figures for 1921:

	Season 1922	Season 1921
Escanaba	4,592,354	1,806,656
Marquette	1,876,220	786,240
Ashland	5,813,207	2,264,705
Superior	11,234,195	4,991,278
Duluth	13,044,771	9,164,803
Two Harbors	5,952,437	3,286,338
Total	42,613,184	22,300,726
1922 increase	20,312,458	

Anouncement by the Chicago, Milwaukee & St. Paul Railway Co. that its West Milwaukee locomotive and car repair shops at Milwaukee would close down from Saturday night, Nov. 25, to Friday morning, Dec. 1, for the usual Thanksgiving holiday recess, brought an emphatic protest from the traffic department of the Milwaukee Association of Commerce.

The machinery, stock and equipment of the Thurlow Steel Works, Inc., Fourth and Booth Streets, Chester, Pa., will be offered for sale by E. Wallace Chadwich and Howard M. Lutz, receivers, on Dec. 5, including two 5-ton electric traveling cranes, lathes, grinders, drills, steam hammers and miscellaneous equipment.

Hickman, Williams & Co., Inc., announces the establishment of a scrap division in its Pittsburgh office in charge of J. F. McKillips, assisted by Jay Stephens. Messrs. McKillips and Stephens have been active in the scrap trade for a number of years

MECHANICAL ENGINEERS MEET

Sessions Include Machine Shop, Materials Handling and Educational Subjects

Sessions under the auspices of the machine-shop division, materials-handling division, management division, committee on education and training for the industries and the research committee, were among the features of the second day of the forty-third annual meeting of the American Society of Mechanical Engineers, held in New York, Dec. 4 to 7. A general session, with A. L. Rice, vice-president of the society, as chairman, was also held.

Particulars of a system of helical gearing designed by him for use on metal planers were given by Forrest E. Cardullo of the G. A. Gray Co., Cincinnati, in a paper on "A New System of Helical Involute Gearing for Use On Metal Planers." In this system the directions of rotation and the helical angles of the several gears are so chosen as to counterbalance and minimize end thrust, advantage being taken at the same time of the end thrust to counterbalance the side thrust of the cutting tools. The tooth form adopted is an involute having a 14½-deg. pressure angle, a pinion addendum of 3/2 p in. and a pinion dedendum of 1/2 p in., p being of normal diametral pitch. The advantages of this form of tooth for the work in question were enumerated at length and dimensions of a pinion, gear and rack designed according to the principles set forth are given in tabular form. Among those discussing the paper were Earle Buckingham, Pratt & Whitney Co., Hartford; Charles Meyer, Acme Machine Tool Co., Cincinnati, and F. K. Hendrickson, Reed-Prentice Co., Worcester.

Some of the more commonly used methods of testing and inspecting spur gears were briefly reviewed by M. Estabrook, Niles-Bement-Pond Co., New York. Two new devices for testing gears were described and illustrated by slides. These were the Saurer gear-testing machine, a Swiss development, and the Odontometer of the Pratt & Whitney Co., which is used for testing gears for tooth curves and spacing, and which can be used during the processes of manufacture.

"Spherical Gears" was the subject of a paper by Charles H. Logue, Syracuse, who pointed out that the basis for a study of all gears whose pitch surfaces are in rolling contact is found in the study of the bevel gear. "By acquiring this point of view," the speaker said, "not only are the elementary features of bevel-gear design brought out and applied to spur gears, but also the real connection between the two types is shown. This is essential to a complete understanding of either." Mr. Logue endeavored especially to point out the necessity for a difference in the design of the teeth heretofore not considered.

A paper on "Power Required for Cutting Metal," by Fred A. Parsons, Kempsmith Milling Machine Co., Milwaukee, was read in part by Walter Ferris, vice-president, The Oilgear Co., Milwaukee. Various points were illustrated by slides. The paper gives the results of an investigation covering more than ten years, the purpose of which has been to determine the fundamental laws governing milling, turning, planing and drilling operations on various metals and alloys. In addition to many tests made on Kempsmith milling machines, those reported by F. W. Taylor and Professors Bird and Fairfield in the society's transactions, have been analyzed and several variables studied. The author's results are given in the shape of formulas and tables by means of which the power required to machine metal in a given case may be calculated, and an example of their use worked out in detail. A description of a slide rule devised for making the calculations is given in the paper.

C. J. Oxford, National Twist Drill & Tool Co., Detroit, and R. Poliakoff, New York, were among those who discussed the paper.

Walter Ferris, The Oilgear Co., Milwaukee, presented a paper on "Applications of Hydraulic Transmission Variable-Speed Drive to Machine Tools and Manufacturing Processes." A number of applications of the "Oilgear" to machine-tool and the driving of other machinery were described and illustrated. It was pointed out that hydraulic transmission has been in the course of development as a variable-speed drive for more than 25 years and applied to gun control, etc. The "Oilgear" was said to be based on the same principles as earlier hydraulic transmissions, but has been developed, since 1909, with a view to industrial requirements first. It was stated that this method opens a field in which great improvements in machine tool design may be made.

"A New Method of Determining the Effect of Speed Upon the Strength of Gear Teeth" was the subject of a paper by Wilfred Lewis, president Tabor Mfg. Co., Philadelphia, given at the research session.

Various methods of handling ash were described and illustrated in the paper by John Hunter and Alfred Cotton of the Heine Boiler Co., St. Louis, which was the only paper at the materials handling session. The paper began with the early developments on shipboard, but dealt for the greater part with stationary practice, beginning with rudimentary and progressing to the most modern installations, of which schematic and actual examples were given.

The session devoted to education and training for the industries consisted of reports on "Extension and Correspondence Schools," by J. A. Moyer, director, University Extension, Massachusetts Department of Education; and "Industrial Education as Represented in Schools," by C. R. Richards, staff, Federal Board for Vocational Education. A third report was that of R. L. Sackett, dean of engineering, Pennsylvania State College, on "Schools for Apprentices and Shop Training." These reports were intended to disclose the present status of industrial education and training in order to secure expert attention and advice to the end that the average efficiency of the process may be raised. W. W. Nichols, chairman of the committee, presided.

The steps taken in selecting the site for the location of a mill for rolling monel metal were given in detail by W. L. Wotherspoon, New York, in a paper on "Refinery and Rolling Mill for Monel Metal, Huntington, W. Va.," read at the general session. The economic problems involved were stated and the facts leading to their solution were given. The layout of the plant, with emphasis on features of design that were of particular interest, was described and illustrated by slides.

The size of dry-vacuum pump to employ in a given case, a rapid and practically accurate method for its determination, applying to any set of conditions, was outlined by E. W. Noyes and H. V. Sturtevant of the Sullivan Machinery Co., Claremont, N. H., at the general session.

Crane No. 1 Furnace Sold for Scrap

Crane No. 1 furnace, which was acquired by the Replogle Steel Co. in its purchase of the Empire Iron & Steel Co., has been sold by order of the board of directors to the H. Sofranscy Co., dealer in iron and steel scrap, Allentown, Pa., and will probably be dismantled soon. It was built in 1839 and had been rebuilt several times.

This is the third furnace sold by the Replogle Steel Co. within two weeks, the sale of the Macungie and Topton furnaces having been reported in last week's issue of THE IRON AGE.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until Dec. 19, for material for the naval aircraft factory at Philadelphia, as follows: 11,250 pounds cold-rolled annealed nickel steel bars, schedule 330; 8600 chrome vanadium sheet steel, 96 in. long, schedule 331.

There has been an advance of $1 a dozen in prices of shovels, the new quotations being $8.41 a dozen for fourth grade black and $9.41 for polished, f.o.b. makers' plant.

WILL BE REORGANIZED

Jones & Laughlin Steel Co. Becomes an Open Corporation with Increased Capital

PITTSBURGH, Dec. 5.—The Jones & Laughlin Steel Co. shortly will be reorganized and the name changed to the Jones & Laughlin Steel Corporation, while the capitalization now standing at $30,000,000, all common stock, will be increased to $120,000,000, of which $60,000,000 will be 7 per cent cumulative preferred stock and $60,000,000 of common stock. A limited amount of the preferred stock is to be offered the public and by this move the Jones & Laughlin company, which has been a closed corporation, becomes an open one.

Application for a charter under the laws of Pennsylvania for the new corporation has been made and all details for these changes have been completed and wait only formal action of the stockholders and directors at a meeting to be held this week. The management of the company will not be affected in any way by this transaction.

Prizes to Be Awarded Under Charles A. Coffin Foundation

The foundation committee of the Charles A. Coffin Foundation, established by the General Electric Co., as announced elsewhere in this issue, proposes to distribute the income of the foundation as follows:

1. Eleven thousand dollars in prizes for the most signal contributions by employees of the General Electric Co. toward the increase of its efficiency or progress in the electrical art. Particularly, the prizes are to further encourage suggestions from workmen. With each pize, the company will give a certificate of award. Foremen's prizes are to be awarded for the best department, taking into account its appearance, efficiency of operation, and conditions which add to the better conduct of the work and the welfare of the employees. All employees of the company, except executive officers, heads of departments, works managers, superintendents, district office managers and similar executives, are eligible for such prizes. In works where employees' representation has been adopted such representatives will co-operate with the prize committee in awarding prizes in such works.

2. A gold medal, to be known as the "Charles A. Coffin medal," will be awarded annually to the public utility operating company within the United States which, during the year, has made the greatest contribution toward increasing the advantages of the use of electric light and power for the convenience and well-being of the public and the benefit of the industry. The company receiving the medal will also receive $1,000 for its employees' benefit or similar fund. A committee to be named by the National Electric Light Association and known as the Charles A. Coffin prize committee of the National Electric Light Association, which shall consist of its president, chairman of its public policy committee and a third member nominated by them, will award this medal, acting with the advice and co-operation of a committee appointed by the foundation committee. The expenses of the committee are to be paid out of the income of the foundation.

3. A gold medal, to be known as the "Charles A. Coffin Medal," will be awarded annually to the electric railroad company within the United States which, during the year, has made the greatest contribution toward increasing the advantages of electric transportation for the convenience and well-being of the public and the benefit of the industry. The company receiving the medal will also receive $1,000 for its employees' benefit or similar fund.

4. Five thousand dollars is to be awarded annually for fellowships to graduates of American colleges and technical schools, who, by the character of their work, and on the recommendation of the faculty of the institution where they studied, could with advantage continue their research work either here or abroad; or some portion or all of the fund may be used to further the research work, at any of the colleges or technical schools in the United States. The fields in which these fellowships and funds for research works are to be awarded are: electricity, physics and physical chemistry. A committee appointed by the foundation committee will award such fellowships and funds for research work, with the advice and co-operation of a committee of three, one to be appointed by each of the following: National Academy of Sciences, American Institute of Electrical Engineers and Society for the Promotion of Engineering Education.

5. In each annual report of the General Electric Co. a statement will be made of the awards under the "Charles A. Coffin Foundation," and other publicity will be given to such awards.

The board of directors of the General Electric Co. has appointed as the Charles A. Coffin Foundation Committee the following officers of the company: A. W. Burchard, J. R. Lovejoy, E. W. Rice, Jr., Gerard Swope, O. D. Young.

Relieving Industry of Burden

In a paper on this subject before the management division of the American Society of Mechanical Engineers, Dec. 5, at the annual meeting in New York, Wallace Clark, industrial engineer, New York, stressed the importance of (1) getting into active use all the equipment possible, and (2) disposing of equipment which can not be kept busy. He referred particularly to the heavy burden of idleness and waste now carried by manufacturing plants because their capacity exceeds present demands. The paper presents a general plan for lifting this burden, largely through reducing the time of manufacture.

W. N. Polakov, consulting engineer, New York, brought out, in the discussion, that nearly all waste in industry may be traced to waste in men's time. He divided the history of scientific management into three periods: 1880 to 1905, dogmatic period, in which the observer was everything and the observed scarcely considered; 1905 to 1915, analytic period, in which, under the leadership of H. L. Gantt, was begun a scientific analysis of interrelated phenomena; 1915 to date, relativist period, devoted to charting methods, in which industry, management and the manager, and their activities, have been regarded as joint phenomena.

Frank B. Gilbreth, Montclair, N. J., divided idleness into three parts: Rest, for overcoming fatigue; delay, through unavoidable causes; avoidable delay. The economics of idleness is the first step, he maintains, in the study of economics for the worker, and the study of idleness is as definite a thing as any time study or study of fatigue.

Fred J. Miller, New York, pointed out that previous attempts at attacking this problem have centered on improving the worker, not the management, whereas management carries by far the larger share of responsibility for existing waste in industry. Scheduling work to avoid this waste does not necessarily mean that the workman has to work any faster or any more steadily, but it aims to obviate the delays due to lost motion and misdirected effort.

John Younger, vice-president Standard Parts Co., Cleveland, cited the situation near the end of the war, when thousands of trucks were being built for military purposes, to the exclusion of pleasure cars. One of his plants was furnishing springs for the trucks, but shortage of steel for this purpose made a shortage in springs. Seeing this shortage of springs for trucks—the heaviest kind—small plants devoted to the manufacture of this very product sprang up all over the country. Could their managers have visualized the real situation, through the operations of a trade association, they would have seen that the shortage of springs was not due to a shortage in manufacturing facilities, and hence would not have added equipment which soon became idle.

NEW WICKWIRE-SPENCER FACTOR

J. Leonard Replogle Acquires an Interest in the Wire Company

J. Leonard Replogle, chairman of the board of the Replogle Steel Co. and president of the Vanadium Corporation of America, has been elected a director of the Wickwire-Spencer Steel Corporation, of Worcester, Mass., and Buffalo. In making the announcement, President T. H. Wickwire, Jr., stated that Mr. Replogle has acquired a substantial interest in the Wickwire-Spencer company and will take an active part in the management. This new connection with the wire business is a step in carrying out Mr. Replogle's plans for re-entering the finished steel industry. The published reports of his acquisition of a Wickwire-Spencer interest have referred to the possibility of a further move in which the Replogle Steel Co. would be concerned, but there has been no definite development.

The Wickwire-Spencer Steel Corporation was formed early in 1920 by the consolidation of the Clinton-Wright Wire Co., Worcester, and the Wickwire Steel Co., Buffalo. Previously there had been a consolidation taking in the plants of the Wright Wire Co., the Morgan Spring Co., the Clinton Wire Cloth Co. and the Spencer Wire Co. The capitalization of the Wickwire-Spencer Steel Corporation includes $7,500,000 8 per cent convertible preferred stock and $12,500,000 7 per cent mortgage bonds, together with 330,000 shares of common stock.

The Wickwire-Spencer plant at Buffalo consists of two blast furnaces with an annual capacity of 300,000 tons, a steel plant equipped with four 60-ton open-hearth furnaces and a wire mill having 600 wire drawing blocks, 80 wire nail machines, 50 tack machines, 24 barbed wire machines and 4 galvanizing pans. The steel plant has a capacity of 170,000 tons of ingots per year, converted into 120,000 tons of wire rods and 30,000 tons of small billets. In raw materials the company has an interest in the Hanna Ore Mining Co., Mesabi range, and the Buffalo Iron Mining Co., giving it 250,000 tons of iron ore a year, and from the Wickwire Mining Co.'s property 200,000 tons a year. The Wickwire Limestone Co. has a quarry at Gasport, N. Y.

The Replogle Steel Co.'s iron ore and blast furnace operations in the Wharton, N. J., district have been extended in an important way in the past three years. Two modern blast furnaces have been built at Wharton, an extensive sintering plant and well-equipped ore yards and bin system. The principal iron mines of the company are the Replogle and the Hibernia.

Early in 1922 the Replogle Steel Co. acquired the Empire Steel & Iron Co., with blast furnaces at Catasauqua, Macungie and Topton, Pa., and at Oxford, N. J.—five in all. The Topton and Macungie furnaces have been sold recently, and the policy of the Replogle Steel Co. indicates a concentration of pig iron production at the Wharton plant, where there is ample space for the addition of two more modern furnaces. The second Wharton furnace is ready for operation and will be started when conditions in the pig iron market warrant it. For the one furnace now running, a few more than 100 men are required. The second furnace could be operated with an increase of the force to a total of 125 men.

Recently the working of the Elizabeth vein at the Mt. Hope iron mine,which was acquired with the Empire Steel & Iron Co., has given the company an ore of increased iron content. This ore is now being taken out from the 900-ft. level, and much of it is running 60.80 in metallic iron. In the operation of the Wharton furnaces, as high as 100 per cent of New Jersey magnetite has been used.

ORE RATE CASE LOST

Examiner for Interstate Commerce Commission Decides Against Buffalo Interests

WASHINGTON, Dec. 5.—Passing upon the complaint of the Lackawanna Steel Co. and other producers in the Buffalo district, Examiner Bronson Jewell to-day handed down a tentative report recommending that the Interstate Commerce Commission find that rates charged for transportation of coal and coke from the Reynoldsville, Pittsburgh and Connellsville districts to Buffalo are not unjust or unreasonable or unduly prejudicial in comparison with rates charged interior iron and steel interests for the transportation of iron ore from Lake Erie ports. The examiner recommends that the complaint be dismissed.

The proceeding, one of the most important rate cases involving the iron and steel industry, is an outgrowth of attempts by the railroads to reduce rates on iron ore prior to the decision of July 1, 1922, when a general reduction of 10 per cent was made in railroad rates by the Commission. It was the attitude of the complainants that the relationship of the rates on fuel northbound and iron ore southbound was reasonably satisfactory previous to the general rate increase of 40 per cent in 1920.

On account of the difference in the amounts and the manner in which the increases were applied, the complainants contended that the relationship of the rates was destroyed to their disadvantage. It was proposed by the complainants that the rate of $2.51 to Buffalo be reduced to $2.38 and that the ore rate to interior furnaces be increased 30.8c. per ton. This sum represented the amount increased 40 per cent asked by the ex-lake ore carriers as their share of the 40 per cent increase which applied entirely to the carriers in the Upper Lake region.

The examiner said that some of the disadvantage Buffalo claimed had been removed by the reduction that went into effect July 1, in which case the Commission reached the conclusion that uniform reduction should be made and not different kinds of reductions as proposed by the Lake iron interests.

"In answer to complainants' charge that the carriers have for many years wilfully conspired systematically to rob iron and steel plants at Buffalo," said the examiner, "it is sufficient to point out that witnesses for these interests stated that the relationship of ore and fuel rates was satisfactory up to June 25, 1918. Since that time the only changes which have occurred have been caused either by order of the Director General or pursuant to decision of this Commission."

Minnesota Occupation Tax Argument in Supreme Court

WASHINGTON, Dec. 5.—Arguments will be made in the United States Supreme Court probably to-morrow or Thursday on the Minnesota Occupation Tax. This relates to a tax of six per cent assessed by the State of Minnesota on the value of iron ore at the place where it is mined less deductions for the expense of mining and certain other deductions. The tax has been upheld by the Supreme Court of Minnesota and the decision has come before the United States Supreme Court on appeal of the Oliver Mining Co. and prominent steel interests owning and mining ore in Minnesota.

The tax is being attacked first because it is alleged that it constitutes a burden on interstate commerce for the reason that all the ore, with a negligible exception, is mined pursuant to contracts previously made which provide for the mining, selling and delivery of the ore at lower lake ports. Secondly, it is claimed that irrespective of the question of interstate commerce, the tax is void under the constitutions of the United States and Minnesota, because it is unequal in its operation.

From a legal standpoint the case has assumed added interest as the result of the recent decision of the United States Supreme Court upholding the tax assessed by the State of Pennsylvania on the production of anthracite coal.

NOVEMBER IRON OUTPUT

Gain Last Month 9898 Tons Per Day as Compared with October

Twenty-six Furnaces Blown In and Only Two Blown Out or Banked

Another record in the country's pig iron output in the last two years was registered in November. It is necessary to go back to November, 1920, to find a month which exceeds the record made by the blast furnaces of the country last month. While the increase over October was not so large as the increase in October over September, it was remarkably heavy, when the shorter month is considered. Not only was the total production last month the largest since November, 1920, but the number of furnaces active on Dec. 1 was the greatest since Dec. 1, 1920. There were 26 furnaces blown in during November and only two blown out, or a net gain of 24, which compares with a net gain of 29 in October. The increase also in daily output of 9898 tons over October was nearly 12 per cent.

Production of coke and anthracite pig iron for the 30 days in November amounted to 2,849,703 gross tons, or 94,990 tons per day, as compared with 2,637,844 tons, or 85,092 tons per day in October, a 31-day month. This represents a gain of 211,859 tons over October. In November, 1920, the total output was 2,934,908 tons, or 97,830 tons per day.

The total number of furnaces in blast on Dec. 1 was 242 as compared with 218 on Nov. 1, with 144 on Sept. 1, with 172 on Aug. 1, and with only 29 on Aug. 1, 1921, the low point in that year's depression. On Dec. 1, 1920, the number of furnaces in blast was 252. The capacity of the 242 furnaces in blast on Dec. 1 is estimated at 97,135 tons per day, as compared with 87,935 tons per day for the 218 furnaces in blast on Nov. 1. This is an increase of 9200 tons per day.

The manganese-iron alloy output for November was 17,424 tons, of which 13,232 was ferromanganese and 4192 was spiegeleisen.

Daily Rate of Production

The daily rate of production of coke and anthracite pig iron by months, from November, 1921, is as follows:

Daily Rate of Pig Iron Production by Months, Gross Tons

	Steel Works	Merchant	Total
November, 1921	[illegible]	9,223	47,183
December	41,173	12,023	53,196
January, 1922	42,130	10,933	53,063
February	46,857	11,387	58,244
March	53,547	12,128	65,675
April	[illegible]	12,140	69,070
May	60,619	13,790	74,409
June	62,534	16,167	78,701
July	62,504	15,297	77,792
August	45,672	12,914	58,586
September	[illegible]	13,935	67,791
October	66,060	19,032	85,092
November	72,177	22,813	94,990

Output by Districts

The accompanying table gives the production of all coke and anthracite furnaces for November and the three months preceding:

Pig Iron Production by Districts, Gross Tons

	Nov.	Oct.	Sept. (30 days)	August (31 days)
[illegible]	164,987	148,419	115,635	80,322
[illegible]	12,071	13,134	10,736	11,601
[illegible]	[illegible]	[illegible]	55,711	46,254
[illegible]	71,861	66,232	[illegible]	35,286
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	32,374	25,410	20,679
Pittsburgh district	639,162	610,281	502,801	432,178
Shenango Valley	110,028	[illegible]	63,811	58,812
[illegible]	127,682	116,508	68,140	62,659
[illegible] and Kentucky	[illegible]	[illegible]	41,136	41,324
Wheeling district	77,761	[illegible]	[illegible]	57,572
[illegible]	321,188	302,431	218,363	130,555
[illegible]	[illegible]	[illegible]	184,914	191,880
[illegible]	31,868	[illegible]	17,909	15,305
[illegible]	[illegible]	116,073	[illegible]	312,363
Wis. and Colo.	[illegible]	[illegible]	67,656	67,265
[illegible]	[illegible]	210,991	204,802	204,389
[illegible]	[illegible]	20,365	22,241	17,543
Total	[illegible]	[illegible]	2,033,720	1,816,170

Production of Steel Companies—Gross Tons

Returns from all furnaces of the United States Steel Corporation and the various independent steel companies, as well as from merchant furnaces producing ferromanganese and spiegeleisen, show the following totals of steel making iron, month by month, together with ferromanganese and spiegeleisen. These last, while stated separately, are also included in the columns of "total production:"

Production of Steel Companies—Gross Tons

	Total Production			Spiegeleisen and Ferromanganese		
	1920	1921	1922	1920	1921	1922
Jan.	2,232,455	1,932,159	1,306,045	23,957	22,228	6,874
Feb.	2,181,679	1,625,695	1,311,170	28,038	29,013	8,540
Mar.	2,480,668	1,323,443	1,629,982	35,275	41,294	13,695
Apr.	1,968,542	1,015,621	1,707,902	27,628	24,310	19,209
May	2,128,720	1,024,678	1,879,180	33,407	9,232	20,334
June	2,209,770	883,312	1,876,033	34,751	4,536	23,090
July	2,230,567	715,664	1,931,138	36,789	5,524	26,049
Aug.	2,254,943	807,144	1,415,832	36,985	3,878	19,327
Sept.	2,247,250	815,692	1,615,696	39,546	3,289	14,916
Oct.	2,393,644	1,034,312	2,047,873	34,786	3,902	21,478
Nov.	2,150,075	1,138,789	2,165,295	26,944	3,525	17,424
Dec.	2,047,167	1,276,381	.....	28,023	3,953	.....

Capacities in Blast Dec. 1

The following table shows the number of furnaces in blast Dec. 1 in the different districts and their capacity, also the number and daily capacity in gross tons of furnaces in blast Nov. 1:

Coke and Anthracite Furnaces in Blast

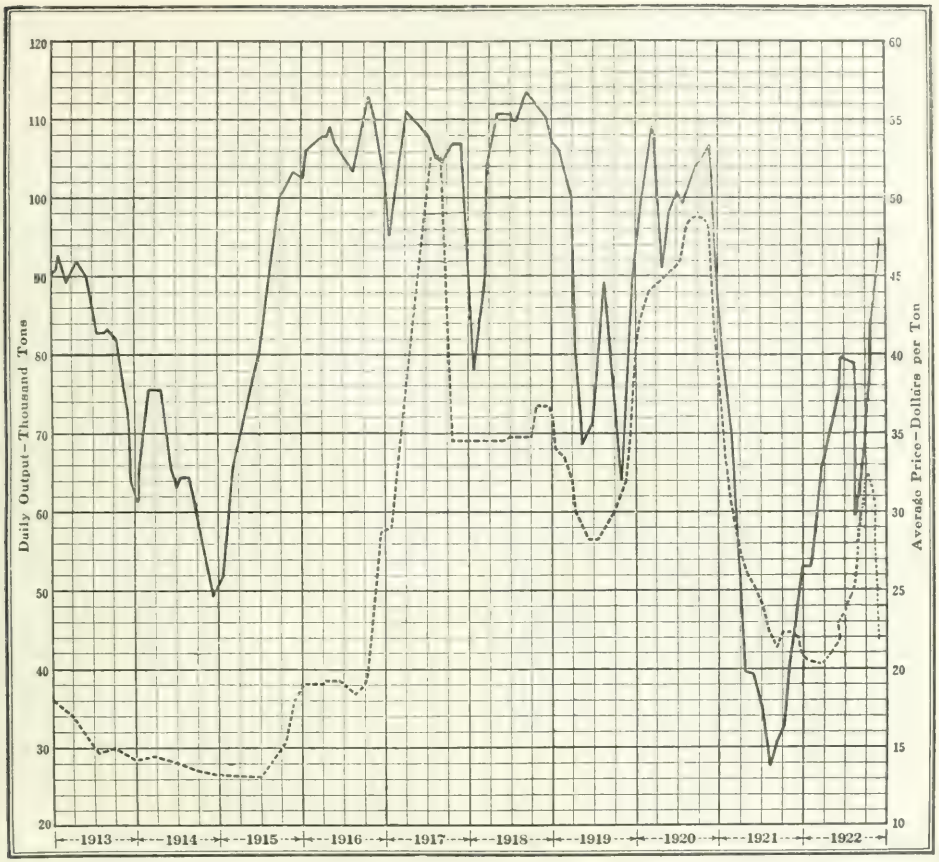
Location of Furnaces	Total Stacks	Dec. 1 — In Blast	Dec. 1 — Capacity per Day	Nov. 1 — In Blast	Nov. 1 — Capacity per Day
New York					
Buffalo	22	13	5,495	12	4,800
Other New York	4	1	70	0	.....
New Jersey	4	1	405	1	420
Pennsylvania					
Lehigh Valley	18	5	2,020	5	1,900
Spiegel	2	1	140	1	150
Schuylkill Valley	15	8	2,600	6	2,130
Lower Susquehanna	10	3	1,095	3	1,090
Lebanon Valley	6	1	145	1	130
Ferromanganese	2	1	50	0	.....
Pittsburgh District	55	45	21,300	42	19,500
Ferromanganese and Spiegel	4	2	285	2	390
Shenango Valley	19	10	3,750	9	3,500
Western Penna.	26	12	4,500	10	4,050
Maryland	2	1	1,520	1	1,530
Ferromanganese	1	1	110	1	75
Wheeling District	15	6	2,840	5	2,430
Ohio:					
Mahoning Valley	28	22	10,930	21	9,830
Central and Northern	26	22	10,300	22	9,360
Southern	16	4	1,730	4	930
Illinois and Indiana	42	30	15,400	28	14,340
Mich., Wis. and Minn.	12	10	3,150	9	3,080
Colorado and Missouri	6	1	420	1	430
The South					
Virginia	16	1	360	1	365
Kentucky	7	1	260	1	260
Alabama	40	23	6,965	21	6,500
Ferromanganese	1	0	0	1	70
Tenn., Ga. and Texas	16	7	710	7	670
Total	418	242	97,135	218	87,935

The figures for daily average production, beginning with January, 1916, are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since Jan. 1, 1916—Gross Tons

	1916	1917	1918	1919	1920	1921	1922
Jan.	102,746	101,643	77,799	106,525	97,264	77,945	53,063
Feb	106,456	94,473	82,835	105,006	102,720	69,187	58,214
Mar.	107,667	104,882	103,648	99,685	108,900	51,468	65,675
Apr.	107,592	111,165	109,607	82,607	91,327	39,768	69,070
May	108,422	110,238	111,175	68,002	96,312	39,394	74,409
June	107,053	109,002	110,793	70,495	101,451	35,494	78,701
July	104,917	106,820	110,354	78,340	98,931	27,889	77,592
Aug.	103,346	104,772	109,341	88,496	101,529	30,780	58,586
Sept.	106,745	104,465	113,942	82,932	104,310	32,850	67,791
Oct.	113,189	106,550	112,482	60,115	106,212	40,215	85,092
Nov.	110,394	106,859	111,802	79,745	97,830	47,183	94,990
Dec.	102,537	92,997	110,762	84,944	87,222	53,196	.....

Among the furnaces blown in during November were the following: One Susquehanna furnace in the Buffalo district and the Standish furnace in New York; two Warwick furnaces in the Schuylkill Valley; the Robesonia furnace in the Lebanon Valley; the Neville Island furnace of the Carnegie Steel Co., No. 2 Eliza furnace of the Jones & Laughlin Steel Co. and the Clinton furnace in the Pittsburgh district; Claire fur-



The Full Line Represents the Daily Production of Pig Iron and the Dotted Line Is the Average of the Price Per Ton of No. 2 Southern Pig Iron at Cincinnati, Local No. 2 Iron at Chicago and No. 2X Iron at Philadelphia

nace in the Shenango Valley; the Scottdale furnace and No. 1 Johnstown furnace of the Cambria Steel Co. in western Pennsylvania; the Buena Vista furnace of the Allegheny Ore & Iron Co., one Low Moor furnace and the Pulaski furnace in Virginia; Riverside No. 2 furnace of the National Tube Co. in the Wheeling district; No. 1 Ohio furnace of the Carnegie Steel Co. in the Mahoning Valley; the Globe, Hamilton and Sarah furnaces and the Marting furnace of the Marting Iron & Steel Co. in southern Ohio; two South Chicago furnaces of the Illinois Steel Co. and No. 6 Gary furnace in the Chicago district; one Bay View furnace in Wisconsin; No. 3 North Birmingham furnace of the Sloss-Sheffield Steel Co. and No. 5 Ensley furnace of the Tennessee Coal, Iron & Railroad Co. in Alabama.

Only two furnaces were blown out during November: No. 1 Joliet furnace of the Illinois Steel Co. in the Chicago district and No. 1 Woodward furnace of the Woodward Iron Co. in Alabama, the latter for relining.

Diagram of Pig Iron Production and Prices

The fluctuations in pig iron production from 1913 to the present time are shown in the accompanying chart. The figures represented by the heavy lines are those of daily average production by months of coke and anthracite iron. The dotted curve on the chart represents monthly average prices of Southern No. 2 foundry pig iron at Cincinnati, local No. 2 foundry iron at furnaces in Chicago, and No. 2X at Philadelphia. They are based on the weekly quotations of THE IRON AGE.

Production of Coke and Anthracite Pig Iron in the United States by Months, Beginning Jan. 1, 1918—Gross Tons

	1918	1919	1920	1921	1922
Jan.	2,411,768	3,302,260	3,015,181	2,416,292	1,644,951
Feb.	2,319,299	2,946,168	2,978,879	1,937,257	1,629,991
Mar.	3,213,091	3,090,243	3,375,907	1,595,522	2,035,920
Apr.	3,288,211	2,478,218	2,739,797	1,193,041	2,072,114
May	3,446,412	2,108,056	2,985,682	1,221,221	2,306,679
June	3,323,791	2,114,863	3,043,540	1,064,833	2,361,028
½ year.	18,002,572	16,033,808	18,138,986	9,428,166	12,050,683
July	3,420,988	2,428,541	3,067,043	864,555	2,405,365
Aug.	3,389,585	2,743,388	3,147,402	954,193	1,816,170
Sept.	3,418,270	2,487,965	3,129,323	985,529	2,033,720
Oct.	3,486,941	1,863,558	3,292,597	1,246,676	2,637,844
Nov.	3,354,074	2,392,350	2,934,908	1,415,481	2,849,703
11 mos.	35,072,430	27,949,610	33,710,259	14,894,911	23,793,485
Dec.	3,433,617	2,633,268	2,703,855	1,649,086	.....
Tot. yr	*38,506,047	30,582,878	36,414,114	16,543,997	.....

*These totals do not include charcoal pig iron. The 1921 production of this iron was 94,730 tons.

Iron and Steel Markets

HEAVY PIG IRON BUYING

A New Low Level—Detroit District Takes 50,000 Tons

Output 11 Per Cent Greater—Sheet Bars at $36.50 for First Quarter

The week has been marked by a burst of activity in pig iron in several districts apart from the East, notably at Detroit, prices giving way to an extent indicating that both buyers and sellers are feeling for the bottom of the market.

In the South, a round tonnage was placed at $21, but $23 now prevails, as it did before the $2 concession was made. The naming of $26 as the base price in the Detroit district found quick response and sales there aggregated 50,000 tons, chiefly to automobile, stove and furnace interests. There was also liberal buying at Buffalo at $25, but price concessions at Cleveland developed little business. A fair volume of orders was placed at Pittsburgh, the declines ranging from $2 on basic to $1 and $1.50 on foundry grades. The eastern Pennsylvania market showed little change, in contrast with the weakness elsewhere, but sales were not numerous.

Arrivals of foreign pig iron at Philadelphia for the week amounted to 20,900 tons, the largest for any week this year. In the past two months the receipts there have been 94,000 tons. Concessions are being made on import iron in the effort to keep up the movement. Eastern pig-iron makers meanwhile plan to go to the President for a 50 per cent increase in the 75-cent duty.

November pig iron output was the largest since November, 1920. At 2,849,703 tons in 30 days, it averaged 94,990 tons a day, against 2,637,844 tons in October, or 85,092 tons a day. The increase was over 11 per cent. The merchant furnaces made the surprising gain of 3800 tons a day over their October rate and are now producing 10,000 tons a day more than in August, an increase of about 75 per cent in the three months.

The net gain in active furnaces last month was 24. The total on Dec. 1 was 242, with a daily capacity of 97,135 tons against 87,935 tons a day for 218 furnaces on Nov. 1.

Pig iron production is now at a yearly rate of 35,500,000 tons. In all last year 16,688,000 tons, or less than half as much, was made. The high record was 39,434,000 tons in 1916.

In the steel market the chief new feature was the naming of $36.50 by the Carnegie Steel Co. as its sheet bar price for the first quarter of 1923. The figure is midway between the $35 for which buyers have been maneuvering and the $38 price for which some sellers have been holding. While no formal announcement has been made of a billet price it is expected to be the same as for sheet bars.

It now appears that the Steel Corporation's total purchases of semi-finished steel some weeks ago were no less than 150,000 tons, of which 100,000 tons was for the National Tube Co. and 50,000 tons for the American Sheet & Tin Plate Co.

In finished steel the first week of December continues the large-scale output of the second half of November and the minor variations in prices of plates, shapes and bars. Buyers stress the fact that deliveries by some mills have improved to such an extent that certain consumers are getting deliveries sooner than they expected.

A few plate mills appear to need orders for immediate rolling, and in one case a 3000-ton inquiry for plates for a Lake shipyard brought out one bid of 1.80c. at mill.

Automobile plants are operating at a higher rate than in any previous December. Makers are not hastening to buy steel for the first quarter, their inquiries, which point to liberal buying, being mostly tentative.

The range of 1.90c. to 2c. on heavier products continues on prompt business as in recent weeks. At Chicago in particular the obligations of the mills are heavy. Rail bookings in that district are well over 800,000 tons. The cars placed there in the past two weeks represent 100,000 tons of rolled steel.

Awards of 4200 more cars bring the total so far this year to over 145,000 freight cars. With 25,000 under negotiation (over 10,000 added in the week) the year's car buying will be close to the 170,000 of 1916 and greater than for any other year since 1912. Locomotive business is notably active. Orders were placed for 139, with new inquiries for almost as many.

Large orders for machine tools have been placed during the past week by the Chicago, Burlington & Quincy and the Pennsylvania Lines East. The Burlington orders foot up to $500,000 and those of the Pennsylvania to about half as much. The Missouri Pacific has an inquiry out for 53 machines.

The Philadelphia-Camden bridge towers account for half of the 20,000 tons of fabricated steel contracted for in the week, and building work in New York and Chicago furnished much of the 22,000 tons of fresh inquiries.

The United States Cast Iron Pipe & Foundry Co. was low bidder on 20,000 tons of cast iron water pipe for San Juan, Porto Rico. South America is inquiring for 50,000 boxes of tin plate.

Pittsburgh

Steel Corporation Announces Sheet Bar Price —Pig Iron Prices Decline

PITTSBURGH, Dec. 5.—Sharp recessions in pig iron prices, which, however, have been accompanied by a fair amount of activity, are the outstanding feature of the past week in this market. Basic grade has had a clear decline of $2 a ton since a week ago, while Valley Bessemer iron is offered at $1 a ton and foundry grades $1.50 a ton lower. On the latter grade, there has been business for first quarter of 1923 delivery as low as $25, Valley Furnace, or $2 a ton below the price of a week ago, but as yet that price has not been done on tonnages for early shipment.

Fresh weakness also has developed in the coke market, which is at least 50c. a ton lower than a week ago, and while this may be partly ascribed to pressure on the part of pig iron producers, the principal reason

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton	Dec. 5, 1922	Nov. 28, 1922	Nov. 7, 1922	Dec. 6, 1921
No. 2X, Philadelphia†	$29.14	$29.14	$31.14	$22.34
No. 2, Valley furnace	*25.50*	27.00	29.00	20.50
No. 2, Southern, Cin'ti†	27.05	27.05	29.05	22.00
No. 2, Birmingham, Ala.†	23.00	23.00	25.00	17.50
No. 2 foundry, Chicago*	*28.00*	29.00	30.00	20.00
Basic, del'd, eastern Pa.	27.50	27.50	28.14	21.00
Basic, Valley furnace	*25.00*	26.50	29.00	19.00
Valley Bessemer, del. P'gh	*31.77*	32.77	34.27	21.96
Malleable, Chicago*	*28.00*	29.00	30.00	20.00
Malleable, Valley	*27.00*	28.00	30.00	20.00
Gray forge, Pittsburgh	*26.77*	28.27	30.77	21.46
L. S. charcoal, Chicago	36.15	36.15	36.15	31.50
Ferromanganese, furnace	100.00	100.00	100.00	60.00

Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$40.00
Bess. billets, Pittsburgh	*36.50*	37.00	38.00	29.00
O.-h. billets, Pittsburgh	*36.50*	37.00	38.00	29.00
O.-h. sheet bars, P'gh	*36.50*	37.00	38.00	30.00
Forging billets, base, P'gh	45.00	45.00	45.00	32.00
O.-h. billets, Phila	43.17	43.17	45.17	34.74
Wire rods, Pittsburgh	45.00	45.00	45.00	38.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	2.00	2.00	2.00	1.50
Light rails at mill	**2.15**	2.00	2.00	1.55

Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.275	2.275	2.325	1.95
Iron bars, Chicago	*2.35*	2.50	2.50	1.65
Steel bars, Pittsburgh	2.00	2.00	2.00	1.50
Steel bars, Chicago	2.10	2.10	2.10	1.60
Steel bars, New York	2.34	2.34	2.34	1.80
Tank plates, Pittsburgh	1.95	1.95	2.00	1.50
Tank plates, Chicago	2.30	2.30	2.30	1.60
Tank plates, New York	*2.29*	2.34	2.34	1.88
Beams, Pittsburgh	2.00	2.00	2.00	1.50
Beams, Chicago	2.20	2.20	2.20	1.65
Beams, New York	2.34	2.34	2.34	1.88
Steel hoops, Pittsburgh	2.75	2.75	2.90	2.00

Sheets, Nails and Wire,	Dec. 5, 1922	Nov. 28, 1922	Nov. 7, 1922	Dec. 6, 1921
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh	3.35	3.35	3.35	3.00
Sheets, galv., No. 28, P'gh	4.35	4.35	4.50	4.00
Sheets, blue an'l'd, 9 & 10	2.50	2.50	2.60	2.25
Wire nails, Pittsburgh	2.70	2.70	2.70	2.75
Plain wire, Pittsburgh	2.45	2.45	2.45	2.50
Barbed wire, galv., P'gh	3.35	3.35	3.35	3.40
Tin plate, 100-lb. box, P'gh	$4.75	$4.75	$4.75	$4.75

Old Material, Per Gross Ton:				
Carwheels, Chicago	$24.00	$24.00	$25.00	$16.00
Carwheels, Philadelphia	20.00	20.00	21.00	17.00
Heavy steel scrap, P'gh	20.50	20.50	20.50	14.00
Heavy steel scrap, Phila	16.00	16.00	16.50	11.50
Heavy steel scrap, Ch'go	17.00	17.00	17.75	11.50
No. 1 cast, Pittsburgh	*22.00*	22.50	23.50	16.50
No. 1 cast, Philadelphia	20.00	20.00	22.00	17.50
No. 1 cast, Ch'go (net ton)	19.50	19.50	20.50	13.00
No. 1 RR. wrot, Phila	19.00	19.00	19.00	15.50
No. 1 RR. wrot, Ch'go (net)	*15.00*	15.25	16.50	10.50

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	*$6.50*	$7.00	$7.50	$2.75
Foundry coke, prompt	*7.50*	8.00	9.00	4.00

Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	14.12½	14.12½	14.12½	13.75
Electrolytic copper, refinery	**13.75**	13.62½	13.62½	13.50
Zinc, St. Louis	**7.10**	7.02½	7.10	4.87½
Zinc, New York	**7.45**	7.37½	7.45	5.37½
Lead, St. Louis	6.95	6.95	6.85	4.45
Lead, New York	7.30	7.30	7.15	4.70
Tin (Straits), New York	*36.25*	36.37½	38.00	31.75
Antimony (Asiatic), N. Y.	*6.40*	6.50	6.60	4.50

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Dec. 5, 1922, Finished Steel, 2.439c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

Nov. 28, 1922,	2.439c.
Nov. 6, 1922,	2.446c.
Dec. 6, 1921,	2.135c.
10-year pre-war average,	1.689c.

These products constitute 88 per cent of the United States output of finished steel

Composite Price, Dec. 5, 1922, Pig Iron, $25.86 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Nov. 28, 1922,	$26.77
Nov. 6, 1922,	28.86
Dec. 6, 1921,	19.47
10-year pre-war average,	15.72

is found in the fact that production lately has been running so much ahead of consumption that some of the Connellsville operators, instead of maintaining the recent effort to increase production, have begun to curtail.

The principal feature in the situation has been the announcement by the Steel Corporation of the price of $36.50 on sheet bars for first quarter of 1923 shipment. This announcement probably points the way for independent producers who lately have been quoting $37 to $38, while buyers have been trying to place tonnages at $35. If the market can be maintained at $36.50 for sheet bars, the effect probably will be to prevent serious price cutting in sheets and tin plate.

In finished lines, conditions are much as they were a week ago. Mills with light order books are giving ear to lower bids on attractive tonnages, but those having large bookings find no abatement in the demands of those who have placed the orders, and cancellations are so infrequent as to be a matter of comment. There is no special reason for making any material price changes. We note no important falling away in plant operations in this and nearby districts except for the suspension of two blast furnaces. The Shenango Furnace Co. last night blew out its No. 4 stack because of necessity for repairs, while the Tod furnace of the Brier Hill Steel Co., Youngstown, is scheduled to go out of blast this week.

Pig Iron.—This market has been clearly established on basic grades in the past week at $25 at Valley furnace by one sale to a Pittsburgh district sheet maker at that figure and another of 4000 tons to a West Virginia steel maker at a price which is not divulged, but is not believed to have been more than $25, Valley furnace. Sales have been done during the week as high as $26.50 for 750 tons of special analysis basic and we also note the sale of 1000 tons of standard basic at $26. There is an inquiry before the market amounting to 15,000 tons a month over the first quarter of the new year, from a central Ohio steel maker who recently made some big purchases. Valley Bessemer iron is quoted at $30, furnace, this price being supported by a sale of 300 tons, but it is a question how long this grade can hold at that price, since it measures a premium of $5 a ton over basic, and there is no claim that there is any such difference in the producing costs of the two kinds. Moreover, Bessemer iron has been offered and sold at $29, Johnstown, the freight rate into Pittsburgh being the same as from the Valley or $1.77 per ton. The most acute weakness has been in foundry iron, sales of which for early delivery have been made anywhere from $26.50 down to $25.50, Valley furnace, for No. 2, while we note one sale of 2000 tons for first quarter delivery at $25 flat, and there is an unconfirmed report that 5000 tons, also for first quarter delivery, has been closed at the same figure. An absence of

sales makes it impossible to give more than an approximation of the market on malleable and gray forge grades. A few carloads of low phosphorus iron have been sold at $37, Valley furnace. W. P. Snyder & Co. make the November average price of Bessemer iron from Valley furnaces $31.75 and of basic $27.60, as compared with $33.50 and $30 respectively in October.

We quote Valley furnace delivery to the Cleveland or Pittsburgh district being as follows:

Basic	$25.00 to $26.00
[illegible]	[illegible]

Ferroalloys.—Sales of ferromanganese again are rather light in this district, but the market appears firm at $100 per gross ton, Atlantic seaboard, for either domestic or British 80 per cent material, freight to Pittsburgh common rate points, being $4.79. Not much business yet has been done here in 50 per cent ferrosilicon which now is quoted at $82.50 to $85 per gross ton delivered. Consumers of this material are pretty well covered to the end of the year and are rather slow to enter negotiations for their 1923 requirements. Spicgeleisen is dull and easy; the leading commercial maker is quoting 20 per cent material at $37, furnace, and 16 to 19 per cent at $36, but it is believed that attractive orders would bring lower prices. Effective Nov. 30, Jackson, Ohio, makers of Bessemer ferrosilicon and deliveries made a further reduction in prices of $2 per ton. The new quotations on Bessemer ferrosilicon now are much more nearly in line with the prices quoted on the product of electric furnaces which is priced at $42 for 10 per cent; $43 for 11 per cent; and $44 for 12 per cent f.o.b. Niagara Falls, with freight to Pittsburgh of $3.56.

We quote 80 per cent ferromanganese at $100, furnace, or $104.79 delivered Pittsburgh district for either domestic or British, and 76 to 80 per cent German at $67 c.i.f. Atlantic seaboard. Average 20 per cent spiegeleisen, $37, furnace; 16 to 19 per cent, $36 or domestic; 20 per cent, foreign, $37 f.o.b. Atlantic seaboard, duty paid; 50 per cent ferrosilicon, domestic, $82.50 to $85, delivered. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, $44.50; 11 per cent, $47.80; 12 per cent, $51.10; 13 per cent, $55.10; 14 per cent, $60.10; silvery iron, 6 per cent, $33; 7 per cent, $34; 8 per cent, $35.50; 9 per cent, $37; 10 per cent, $42.50; 11 per cent, $43.50; 12 per cent, $44.50; 13 per cent, $47. The present freight rate from Jackson and New Straitsville into Pittsburgh district is $3.56 per gross ton.

Steel Skelp.—Mills here are quoting steel pipe skelp at 2c. for either grooved or sheared and report a fair demand at that price.

Wire Products.—Mills in this district still have all the business they can readily handle and since they are making strong effort toward cleaning up old obligations, new business, especially that calling for early delivery, is not easily placed. Labor and transportation conditions are somewhat better than they were recently, but the leading interest is said to be sold over the greater part of the first quarter of 1923, and four to six weeks is the best promise independents will make on delivery of nails where the demand is heaviest. Prices are very firm on all products with no extensions being given on unspecified contracts made at the September prices. Prices are given on page 1537.

Iron and Steel Pipe.—Although improved conditions in regard to labor and car supplies have permitted a freer movement and some reduction in mill stocks, the demand remains heavy, particularly in standard pipe, and delivery promises still are pretty extended. On butt weld sizes of standard pipe, eight weeks is as early as deliveries are promised on new orders. The National Tube Co. has blown in the larger of its two blast furnaces at its Riverside works, Benwood, W. Va., after a shutdown of 20 months, and as the first steel has been made, it is expected that some of the pipe furnaces will resume this week. In general, the pipe making capacity in this part of the country is operating close to 80 per cent. Prices are very firm and while costs have come down in the past five or six weeks, there still is very little margin as between them and selling prices. Discounts are given on page 1537.

Wire Rods.—There is still sufficient demand to absorb all current offerings and the market is firm at recent levels. On early deliveries, makers here still find it possible to obtain $47.50 base for soft rods.

We quote No. 5 common basic or Bessemer rods to domestic consumers, $45 to $47.50; chain rods, $45 to $47.50; screw stock rods, $50 to $52.50; rivet and bolt rods and other rods of that character, $45 to $47.50; high carbon rods, $52 to $57.50, depending on carbon, per gross ton, f.o.b. Pittsburgh or Youngstown.

Billets, Sheet Bars and Slabs.—The Carnegie Steel Co. to-day announced a price of $36.50 per gross ton for sheet bars for first quarter of 1923, delivered. This announcement probably definitely establishes the market on billets, sheet bars and slabs at that figure, which is about half way between what buyers have fixed as their price limit, and what independent mills had been quoting against most inquiries. The Carnegie Steel Co. did not make any definite announcement as to prices of billets and slabs, but it is safe to assume that these forms will not command any more than sheet bars, especially as the latter in the past have commanded a premium. While sales of forging billets lately have been made as high as $47.50, the more common maximum has been $45, and now that prices on soft billets have been reduced, it is probable that forging steel will be obtainable at lower prices. It is doubtful whether spot tonnages of billets, sheet bars and slabs can be sold to-day at any higher than $36.50, Pittsburgh, or Youngstown.

We quote 4 x 4-in. soft Bessemer and open-hearth billets, $36.50; 2 x 2-in. billets, $36.50; Bessemer sheet bars, $36.50; open-hearth sheet bars, $36.50; slabs, $36.50; forging billets, ordinary carbons, $43 to $45, all f.o.b. Pittsburgh or Youngstown mills.

Sheets.—Except on automobile sheets, independent manufacturers have generally adopted for first quarter business the reaffirmed prices of the leading interest. All makers are heavily booked on automobile sheets, and independent producers do not see the need of meeting the Steel Corporation price, in view of the fact that the latter has practically no surplus tonnage of full finished stock available for first quarter shipment. So far, there have been no important price concessions from the regular quotations, and announcement by the Steel Corporation of $36.50 for first quarter sheet bars is likely to stabilize the raw material at that level and prevent much shading of prices in finished products. Mill operations still are averaging above 80 per cent of capacity with the leading interest at 81 per cent. Prices are given on page 1537.

Tin Plate.—The market does not show the activity that was expected to follow the establishment of prices for the first quarter and first half of 1923. January requirements of can makers rarely are heavy, but their specifications for shipments that month are as large as they usually are. Independent makers, with the exception of one or two small ones, who cannot operate profitably at the price, have adopted the reaffirmed Steel Corporation quotation of $4.75 per base box, Pittsburgh.

Iron and Steel Bars.—Prices of soft steel bars depend largely on the order books of makers. As a general rule the price here is 2c. base, Pittsburgh, because mills here appear to have fairly good backlogs. This price probably would be shaded by mills which need orders, and it is generally accepted that mills having a public quotation of 2c. will accept the first quarter requirements of their so-called preferential customers at 1.90c. This is the usual concession made to such buyers. There is no special activity in concrete bars, prices of which are on the same base as soft bars. Iron bars are unchanged.

We quote [illegible] reinforcing bars, rolled from billets, 2c. base; rail steel reinforcing bars, 1.90c. to 2c.; refined iron bars, 2.60c. in carloads, f.o.b. mill, Pittsburgh.

Steel Rails.—Although the demand for light rails often before has been heavier than it is now, the market actually is slightly stronger than it has been as a result of the action of one maker in advancing its price from 2c. to 2.15. base. All makers in this district rolling these sections from new steel now are quoting 2.15c. base.

We quote 25 to 45-lb. sections rolled from new steel, 2.15c. base; rolled from old rails, 2c. base; standard rails, $43 per gross ton mill for Bessemer and open-hearth sections.

Structural Material.—It is the experience of most fabricating shops that the inquiry is unusually good for this time of year, and hopes run strong that spring construction will start on as large a scale as it ended this fall. Plain material is had at 2c. for structural beams, but this is well above prices named by fabricators seeking protection on tonnages for later shipment. Prices are given on page 1537.

Plates.—Competition for passing business is sharper in this line than in most others, and price cutting is more frequent. Few large inquiries are reaching this market in spite of car and tank orders which are being placed in the Middle West. Bids close next Monday on 10 barges asked for by the Government, bids to go to Rock Island, Ill. Prices are given on page 1537.

Boiler Tubes.—Makers of steel tubes are heavily committed and not showing much desire for more business except for deferred delivery. Present orders are sufficient to keep capacity well engaged for from 60 to 90 days. Makers of iron tubes are unable to promise deliveries on new orders until after the turn of the new year. Discounts are given on page 1537.

Cold-Finished Steel Bars and Shafting.—It is commented upon that for a market that is not extremely active, prices are showing remarkable firmness. Deviations from the established price of 2.50c. base Pittsburgh are practically unknown. Buyers are specifying well on contracts and we note one new order for 1100 tons. The strength of the market may be accounted for largely by the fact that the indications are that most makers will be unable to place their first quarter contract, except at higher prices than the tonnages now reaching them on old contracts. Ground shafting holds unchanged at 2.90c. base, f.o.b. mill for carloads.

Track Fastenings.—It is reported that some of the Eastern makers of small spikes lately have gone as low as $3.25 base per 100-lb. Pittsburgh, to secure orders, but locally there has been no deviation from $3.50 base. Makers here are well filled up on both standard and small spikes and are not yet anxious enough for new business to meet outside competition. On track bolts, the going price for carload lots now is $3.75, base per 100-lb. Prices are given on page 1537.

Hot Rolled Flats.—Makers in this district are holding firmly to 2.90c. base, Pittsburgh, on the general run of business, but makers of cold-rolled strips are said to be covered at 2.75c. base, and on hoops and bands, more especially the latter, 2.75c. is fairly frequent. Prices are given on page 1537.

Cold-Rolled Strips.—The regularly established price of 4.50c. base, Pittsburgh, still is finding close observance.

Bolts and Nuts.—This market is quiet and no more than steady. The approach of inventory season makes for conservatism about specifications. No announcement yet has been made about first quarter prices, but the impression is that present quotations will be continued. Discounts are given on page 1537.

Rivets.—We note no further change in prices since a week ago. Specifications are as large as they ever are at this time of the year. First quarter prices have not yet been announced. Prices and discounts are given on page 1537.

Coke and Coal.—Production of beehive oven coke has caught up with and passed consumption and the market is lower and weak. On standard furnace grades, $7 is now maximum on either spot tonnages or December contracts, and spot sales have been made as low as $6.50, and on coke, good enough for blast furnaces in periods of shortage, as low as $6 has been done. Foundry grade is held as high as $8.50 by one or two makers, but as a general rule $8 has been the recent maximum, and good foundry coke has been sold as low as $7.50. There are also ample supplies of coal for current requirements and efforts to maintain prices are unavailing. Steam coal is quotable anywhere from $2.25 to $3 per net ton at mines for mine run, coking coal from $3 to $3.75 and mine run gas from $3.50 to $4.

Old Material.—There has been no special change in prices since a week ago but the undertone of the market is weak because there is so little interest in supplies on the part of important consumers. Activity has subsided very materially in the Youngstown district in the past few weeks, and mills there not only have stopped buying, but a number of them, presumably to avoid large tonnages in their inventories, are holding up shipments. Eastern mills seem to be well fortified against their immediate requirements and local mills consequently have less competition for current offerings than was the case a short time ago. There is a disposition on the part of steel makers in this district to press this advantage fully and to wait on lower prices before buying. Foundry grades are very dull.

We quote for delivery to consumers' mills in the Pittsburgh district taking the Pittsburgh freight rate as follows:

	Per Gross Ton	
Heavy melting steel	$20.50 to	$21.00
No. 1 cast, cupola size	22.50 to	23.00
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va.; and Franklin, Pa.	21.50 to	22.00
Compressed sheet steel	22.00 to	22.50
Bundled sheet sides and ends	17.50 to	18.00
Railroad knuckles and couplers	22.00 to	22.50
Railroad coil and leaf springs	22.00 to	22.50
Low phosphorus standard bloom and billet ends	24.00 to	24.50
Low phosphorus, plates and other grades	23.00 to	24.00
Railroad malleable	21.00 to	21.50
Iron car axles	28.00 to	29.00
Locomotive axles, steel	23.00 to	24.00
Steel car axles	22.00 to	22.50
Cast iron wheels	22.00 to	22.50
Rolled steel wheels	22.00 to	22.50
Machine shop turnings	16.00 to	16.50
Heavy steel axle turnings	17.50 to	18.00
Short shoveling turnings	17.50 to	18.00
Cast iron borings	17.50 to	18.00
Heavy breakable cast	18.50 to	19.00
Stove plate	17.00 to	17.50
Sheet bar crop ends	23.50 to	24.00
No. 1 railroad wrought	20.00 to	20.50

Youngstown Sheet & Tube Co. Not in Merger Plans

YOUNGSTOWN, Dec. 5.—The Youngstown Sheet & Tube Co. is not at this time involved in any merger plans, says President James A. Campbell. He states that late building operations have stimulated demand for such steel products as wire nails, standard merchant pipe and conduit. Buying of nails is heavier than in several seasons. Mr. Campbell looks for a better winter business for the steel industry than he did several weeks ago, when he predicted that plants would maintain 60 per cent operations.

To Appeal for Higher Pig Iron Tariff

The American Pig Iron Association and the Eastern Pig Iron Association are considering an appeal to President Harding and the United States Tariff Commission to increase the duty on foreign pig iron, which is now 75c. per gross ton. Under the Fordney-McCumber tariff bill the President is authorized, upon recommendation of the Tariff Commission, to increase or decrease any duty by not more than 50 per cent. If the President were to exercise his power, the most that he could increase the pig iron tariff is 37½c. per ton, which makes the full tariff $1.12½. Under the Payne-Aldrich tariff the rate was $2.50.

Decrease in Alabama Iron Stocks

BIRMINGHAM, Dec. 5.—Alabama furnace stocks as of Dec. 1 show a decrease of 26,000 tons. The totals of Nov. 1 and Dec. 1 were: Foundry, 82,000 and 62,000 tons; machine cast, 9400 and 3900; warrants, 1300 and 700 tons; basic, 9800 and 9900 tons; totals, 102,000 and 76,000 tons. Some makers were cleaned out.

The Markle Warehouse Association, Houston, Tex., jobber in plates, shapes, bars, etc., has opened a warehouse in New Orleans.

Chicago

Pig Iron Prices Give Ground But Steel Strong with Filled Order Books

CHICAGO, Dec. 5.—Pig iron prices continue to give ground, although a large volume of inquiry has developed. Finished steel, however, is firm, with local mills shipping less than they are booking. The leading interest continues to quote 2c., Chicago, on bars and 2.10c. on plates and shapes, but is unable to promise definite delivery in view of heavy forward commitments. The Inland Steel Co., which recently opened its books for the first quarter, now has little tonnage left for that delivery. The large obligations of Chicago mills are enabling Eastern producers to take tonnage in this territory for early shipment at Pittsburgh base quotations, ranging from 1.90c. to 2c. on plates, shapes and bars.

Demand for heavy material for railroad cars and oil storage tanks is unabated. The Chicago, Milwaukee & St. Paul has increased its recent orders to 7500 cars and the Northern Pacific to 3000 cars, while the St. Louis Southwestern has closed for 1200 cars. Car purchases within the past two weeks will put close to 100,000 tons of steel on local mill books. Building construction is also holding up, but new steel business from general sources has fallen off to some extent, as it generally does during the holiday season. Consumption, however, is well maintained and the temporary pause in buying will have little effect on the mills in their present strong position.

The Illinois Steel Co. has added a blast furnace at Joliet but otherwise the production situation is unchanged. Works managers look forward to the winter with apprehension as they have been unable to build up adequate reserve stocks of fuel. Railroad congestion and car shortage, which are bound to be felt if severe weather comes, are likely to result in the curtailment of furnace and mill operations.

Pig Iron.—Local prices have receded to a common level of $28 base, furnace, for both prompt and first quarter delivery. In territory intermediate between Chicago and other producing centers, even lower prices have been named. Detroit and Toledo producers are now quoting $26 base, furnace, and are making their competition felt deep into what is regarded as Chicago territory. A Benton Harbor, Mich., melter, for instance, has placed 1500 tons of malleable for the first quarter with a Detroit furnace. Southern iron has been exceedingly weak within the past week but now shows signs of stiffening. One Southern furnace was in the market for a few days at $21 base, Birmingham, and after booking about 15,000 tons withdrew. So far as can be learned none of this iron was sold in this district. Another Southern maker sold 15,000 tons to a Birmingham cast-iron pipe manufacturer and has withdrawn all quotations. Recent sales of Southern foundry in this district were made at $22, base Birmingham, and in two instances at 50c. under that price, but so far as can be ascertained no Southern furnaces are now quoting less than $23, with two asking $25. A large volume of inquiry has developed, indicating that the actual needs of melters are greater. The American Radiator Co. is sounding the market for 50,000 tons for all of its plants, while a Chicago district melter wants 7500 tons of foundry iron for the first quarter. A Kewanee user is inquiring for 2600 tons of Northern and Southern foundry iron for the first quarter and another Illinois melter is in the market for 3000 tons of foundry for first half. There are numerous other inquiries ranging from 250 to 1000 tons. Selling is also on a broader scale. First quarter contracts recently closed cover 1500 tons of malleable, bought by a down-State melter, 1000 tons of malleable purchased by a Wisconsin user and 1000 tons of foundry for a Michigan consumer. Whether a buying movement is about to develop is still uncertain. Further delay may, in fact, have results contrary to those expected by melters. The fuel supply of furnaces is not yet large enough to fortify them against interruptions in railroad service, which generally accompany spells of severe weather. Producers are confronted with added uncertainty as to the quality of fuel. For some time they have been forced to take their share of pooled lake coal which has not been up to standard, and even the all-rail, low volatile coal which they are now receiving is to some extent off grade. The shortage of anthracite coal in the East has created an unusual demand for low volatile fuel needed in coking operations. A local buyer has purchased 500 tons of foreign low phosphorus iron containing a trace of copper for delivery to a plant on the Eastern seaboard; the price is reported to have been about $26.50, tidewater, duty absorbed. Silvery has dropped another $2.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$36.15
Northern coke, No. 1, sil. 2.25 to 2.75	28.50
Northern coke, foundry No. 2, sil. 1.75 to 2.25	28.00
Malleable, not over 2.25 sil.	28.00
Basic	28.00
High phosphorus	28.00
Southern, No. 2	$28.01 to 29.01
Low phos., Valley furnace, sil. 1 to 2 per cent copper free	37.00
Silvery, sil. 8 per cent	40.29

Ferroalloys.—Melters in this district are contracting for their 1923 requirements in 50 per cent ferrosilicon. Otherwise the ferroalloys are quiet.

We quote 80 per cent ferromanganese, $107.56, delivered; 50 per cent ferrosilicon, $80 to $85, delivered; spiegeleisen, 18 to 22 per cent, $46.05 to $47.05, delivered.

Plates.—Of 11,000 freight cars ordered last week, 9700 will be built in the Chicago district. Fully 78,000 tons of plates, shapes and bars are involved and will be furnished by local mills. Oil storage tank construction continues to be a feature of the market. Besides 22,000 tons of tankage now pending, a much larger tonnage will be called for if the programs of the Standard and Sinclair companies are carried out. In view of the heavy commitments of local mills to car builders, there is some question whether all the plate needs of oil companies can be taken care of here. The leading interest has a heavy backlog and is taking no business for specific shipment. The foremost independent, which recently opened its books for first quarter, now has comparatively little tonnage left to sell for that delivery. Eastern mills are booking prompt material in this territory at from 1.90c. to 2c., base Pittsburgh. Local tank fabricators are bidding on 1200 tons of plate work for a pipe line at Honolulu.

The mill quotation is 2.10c. to 2.30c., Chicago. Jobbers quote 2.90c. for plates out of stock.

Cast Iron Pipe.—Chicago has awarded 1550 tons to the United States Cast Iron Pipe & Foundry Co. Charles M. Porter, Chicago, is low bidder on the general contract for 400 tons for Mt. Prospect, Ill. This pipe is not likely to be bought until spring. Little further pipe buying is expected until after Jan. 1.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $55.20 to $56.20; 6-in. and above, $51.20 to $52.20; class A and gas pipe, $3 extra.

Rails and Track Supplies.—Specifications continue heavy but new business is rather light.

Standard Bessemer and open-hearth rails, $43; light rails rolled from new steel, 2.15c., f.o.b. makers' mills.

Standard railroad spikes, 2.85c. to 3c. mill; track bolts with square nuts, 3.85c. to 4c., mill; iron tie plates, 2.50c.; steel tie plates, 2.35c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.50c. base and track bolts, 4.50c. base.

Bars.—While new business in soft steel bars is not so heavy as a month or two ago, this is to be expected, as buying is never so brisk during the holidays and inventory season. Consumption, however, is being main-

tained in all directions and bookings of local mills are still in excess of shipments. Farm implement manufacturers, whose operations have not averaged over 30 per cent, expect to increase their outputs and are inquiring for considerable tonnage for first quarter. The leading mill has a heavy hangover into next year and the Inland Steel Co., which recently opened its books for first quarter, is now practically sold up for that period. Eastern mills continue to book tonnage for prompt shipment at 1.90c. to 2c., Pittsburgh. Bar iron has weakened and is now available at 2.35c., mill. New business is still slack, but the Republic Iron & Steel Co. resumed operations to-day after several weeks of idleness. Part of its optput, however, will be puddled coupling iron. Rail steel bars remain firm at 2c., mill, but demand is lighter from some sources, notably bedstead manufacturers are reinforcing bar sellers.

Mill prices are: Mild steel bars, 2c. to 2.10c. Chicago; common bar iron, 2.35c. to 2.50c., Chicago; rail steel, 2c., Chicago mill.

Jobbers quote 2.50c. for steel bars out of warehouse The warehouse quotation on cold-rolled steel bars and shafting is 3.80c. for rounds and 4.30c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 2.50c. base; hoops, 4.15c.; bands, 3.55c.

Wire Products.—The production situation shows no improvement; in fact, the output of the leading interest was below recent levels last week owing to a shutdown on Thanksgiving, Friday and Saturday for inventory. There is a seasonal let-up in the demand for barbed wire, although some orders are being received for delivery after the first of the year. Woven wire fence business is good. In general, wire and nail production is not yet equal to the needs of users. Wire rods continue in active demand, a current inquiry from a nail manufacturer calling for 1000 tons. For mill prices see finished iron and steel, f.o.b. Pittsburgh, page 1537.

We quote warehouse prices f.o.b. Chicago: No. 9 and heavier black annealed wire and No. 9 and heavier bright basic wire, $3.30 per 100 lb.; common wire nails, $3.45 per 100 lb.; cement coated nails, $2.90 per keg.

Bolts and Nuts.—Sellers have opened their books for first quarter at the September discounts, but as yet have closed few contracts. Buyers continue to pursue a waiting policy in the hope that prices will weaken.

Jobbers quote structural rivets, 3.75c.; boiler rivets, 3.85c.; machine bolts up to ⅞ x 4 in., 50 per cent off; larger sizes, 50 off; carriage bolts up to ⅞ x 6 in., 45 off; larger sizes, 45 off; hot pressed nuts, squares and hexagons, tapped, $2.75 off; blank nuts, $2.75 off; coach or lag screws, gimlet points, square heads, 55 per cent off.

Reinforcing Bars.—Bookings in concrete bars are not only unusually heavy for this season, but are practically as large as at any time this year. For one important seller, last week was the largest in 1922 in tonnage sold. Another prominent dealer closed an aggregate of 3000 tons during the week, much of which represented individual sales of less than 100 tons. The unusual activity of the building industry and the firmness of mill prices have finally made themselves felt in warehouse quotations. Sellers now have large backlogs and are not disposed to take further business at concessions. The warehouse quotation of 2.50c., which was in effect some time ago, is again generally adhered to. Recent lettings include:

Toby Rubovitz, printing building, Chicago, 250 tons to Concrete Steel Co.

Foundation, Elks Club building, Milwaukee, 200 tons to Corrugated Bar Co.

Harsh-Chapline Shoe Co., factory, Milwaukee, 260 tons to Corrugated Bar Co.

Primalt Products Co., plant, Chicago, 250 tons to Corrugated Bar Co.

American Butter Co., warehouse, Kansas City, 100 tons to Concrete Steel Co.

Aquitania Hotel, building, Chicago, 500 tons to American System of Reinforcing.

Illinois State road work, 800 tons to Kalman Steel Co.

Harrison Street viaduct, Chicago, 100 tons to Kalman Steel Co.

Shoe factory extensions for Harsh & Chapline Co. at Milwaukee, 260 tons to Corrugated Bar Co.

Creamery for Fairmont Creamery Co. at Green Bay, Wis., 200 tons to Kalman Steel Co.

Garage for Chippewa Valley Auto Co., Chippewa Falls, Wis., 190 tons to Truscon Steel Co.

Pending work includes:

Foundations for new Strauss building, Chicago, 100 tons.

Addition to the Rochester Packing Co. plant, Rochester, N. Y., 150 tons to the Corrugated Bar Co., of Buffalo.

Sheets.—Local mills are practically sold up for first quarter and in some cases were unable to allot to customers all the tonnage desired. Users will probably turn to outside sources for their remaining requirements, although Eastern mills have not yet closed many first quarter contracts. They continue to book considerable prompt business, however.

Mill quotations are 3.35c. for No. 28 black, 2.50c. for No. 10 blue annealed and 4.35c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote f.o.b. Chicago, 4c. for blue annealed, 4.85c. for black and 5.85c. for galvanized.

Structural Material.—Chicago building permits in November showed a substantial gain over October and, in fact, exceeded those of any prior month of the year except March and June. Fabricating awards and inquiries continue to hold up remarkably well. Bids will be taken Dec. 6 on the Roosevelt road viaduct of the Chicago Union Station, a project involving 3000 tons. The new Chicago *Tribune* building, the design of which has just been adopted, will require about 5000 tons. The activity of fabricating shops is indicated by their purchases of prompt material from Eastern mills to supplement what they are getting from local sources.

The mill quotation on plain material is 2.10c. to 2.20c., Chicago. Jobbers quote 2.90c. for plain material out of warehouses.

Old Material.—Large railroad accumulations continue to be offered on the market, further accentuating the weakness of prices. Declines this week, however, are not so general as a week ago, a fact which may be ascribed to fair sized purchases of open-hearth grades by two leading steel mills. Demand from other sources, however, remains unusually light. Notwithstanding the augmented supply of scrap, certain specialties are still scarce, notably couplers and knuckles, coil springs, steel wheels, iron arch bars and iron angle bars. Railroad offerings include the Louisville & Nashville, 6000 tons; the Northwestern, 4500 tons; the Belt Railway of Chicago and the Pere Marquette, 1000 tons each, and the Erie a blank list.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton

Iron rails	$22.50 to $23.00
Cast iron car wheels	24.00 to 24.50
Relaying rails, 56 and 60 lb.	26.00 to 27.00
Relaying rails, 65 lb. and heavier	32.00 to 35.00
Rolled or forged steel car wheels	22.00 to 22.50
Rails for rolling	17.50 to 18.00
Steel rails, less than 3 ft.	18.50 to 19.00
Heavy melting steel	17.00 to 17.50
Frogs, switches and guards cut apart	17.00 to 17.50
Shoveling steel	16.50 to 17.00
Drop forge flashings	12.00 to 12.50
Hydraulic compressed sheet	13.50 to 14.00
Axle turnings	15.00 to 15.50

Per Net Ton

Iron angles and splice bars	21.00 to 21.50
Steel angle bars	16.00 to 16.50
Iron arch bars and transoms	21.00 to 21.50
Iron car axles	24.00 to 24.50
Steel car axles	17.50 to 18.00
No. 1 busheling	13.75 to 14.25
No. 2 busheling	9.00 to 9.50
Cut forge	15.00 to 15.50
Pipe and flues	10.50 to 11.00
No. 1 railroad wrought	15.00 to 15.50
No. 2 railroad wrought	15.00 to 15.50
Steel knuckles and couplers	19.50 to 20.00
Coil springs	21.00 to 21.50
No. 1 machinery cast	19.50 to 20.00
No. 1 railroad cast	18.00 to 18.50
Low phos. punchings	17.00 to 17.50
Locomotive tires, smooth	15.50 to 16.00
Machine shop turnings	9.25 to 9.75
Cast borings	13.00 to 13.50
Stove plates	16.00 to 16.50
Grate bars	16.00 to 16.50
Brake shoes	16.00 to 16.50
Railroad malleable	20.00 to 20.50
Agricultural malleable	20.00 to 20.50

New York

Increased Activity in Pig Iron—Large Order for Cast Iron Pipe for Porto Rico

NEW YORK, Dec. 5.—Buying of pig iron is much more active and the volume of business transacted in the past week makes an excellent showing compared with the smaller tonnages of earlier weeks. The sales have not perhaps footed up as rapidly as in other sections of the country, and price concessions have not been so marked in eastern Pennsylvania and Virginia as in Buffalo. One agency took orders for 8500 tons, representing for the most part lots of from 100 to 500 tons. New England malleable interests in the last two weeks have purchased fully 10,000 tons. Most of the buying of foundry and malleable irons has been for first quarter, and a boiler company which sent out an inquiry for 2000 tons has purchased a part of the tonnage, taking foreign iron. Another transaction was 1200 tons, divided between Scotch and Buffalo irons. A melter of considerable importance, after sending out an inquiry for 6000 tons for first half, bought a part of the tonnage at Buffalo. A New Jersey melter bought 3000 tons for first quarter. Numerous inquiries ranging from 100 to 500 tons have appeared. On foreign iron, prices are lower. French iron, analyzing 2.25 to 2.75 per cent silicon and 1 to 1.50 per cent phosphorus, can be had at $24, Philadelphia. On Scotch, the usual quotation is now about $27.50, duty paid, with $25 to $27 being quoted on Continental grades, the lowest quotations being on unsold iron in this country which was imported some time ago.

We quote delivered in the New York district as follows: [illegible] from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$33.27
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	32.27
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	29.27
Buffalo, sil. 1.75 to 2.25	29.91
No. 2X Virginia, sil. 2.25 to 2.75	34.44
No. 2 Virginia, sil. 1.75 to 2.25	33.44

Ferroalloys.—Demand for ferromanganese and spiegeleisen is confined to small lots for early delivery at prevailing prices. There are also a few inquiries for ferromanganese totaling several hundred tons. No activity is noted in the manganese ore market. Some contracts for 1923 delivery of 50 per cent ferrosilicon have been made at $82.50, freight allowed, which is now the quotation for any delivery. The price of ferrochromium, containing 4 to 6 per cent carbon, for 1923, is 14c. per lb. of contained chromium, freight allowed, and contracts for next year's consumption are being negotiated. Quotations are as follows:

Ferromanganese, domestic, furnace, nominal	
Ferromanganese, British, 80 per cent, f.o.b. Atlantic port	$100.00
Spiegeleisen, 17 to 19 per cent, furnace	$36.00
Spiegeleisen, 20 per cent, furnace or duty paid	$37.00 to $38.00
Ferrosilicon, 50 per cent, delivered, per ton	
Ferrotungsten, per lb. of contained metal	90c. to 95c.
Ferrochromium, 4 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr., delivered	14c.
Ferrovanadium, per lb. of contained vanadium	$3.50 to $4.00
Ferrocarbontitanium, 15 to 18 per cent, in carloads, per net ton	$200.00
Ores	
Manganese ore, foreign, per unit, c.i.f.	29c. to 30c.
Tungsten ore, per unit, in 60 per cent con-	
Chrome ore, basis 48 per cent Cr_2O_3, crude, per ton, c.i.f. Atlantic seaboard	$18.00 to $28.00
Molybdenum ore, 85 per cent concentrates	

Cast Iron Pipe.—Some large buyers are beginning to place orders for spring delivery. Prices are firm and unchanged. Among recent awards are the 2500 tons of 6-in. to 36-in. pipe for the city of Boston, and the 20,000 tons of 30-in. pipe for the city of San Juan, Porto Rico, both of which went to the United States Cast Iron Pipe & Foundry Co. On the latter tender, foreign competition was encountered, a Belgian bid being third lowest. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $54.50; 4-in. and 5-in., $59; 3-in., $64.80, with $4 additional for Class A and gas pipe. Soil pipe discounts are unchanged in this market, but some slight tendency to shade is reported. Purchases are now being made for January-February delivery and later next year and orders for immediate shipment are still unusually good for this season. We quote discounts of both Southern and Northern makers, delivered New York, as follows: 2 to 6-in. standard, 33 to 35¾ per cent off list; heavy, 43 to 45¾ per cent off list.

High Speed Steel.—The market continues quiet and prices unchanged at from 75c. to 80c. per lb. for 18 per cent tungsten high speed steel, with special brands of some companies ranging up to 90c. per lb.

Warehouse Business.—Although there is no change in prices on most iron and steel items out of stock, black and galvanized sheets are slightly weaker, particularly the latter, which have declined to as low as 5.25c. per lb. on some recent sales. The current market on black is from 4.50c. to 4.75c. per lb. and galvanized sheets are not quotable on a basis higher than 5.50c. per lb. Difficulty is still reported in obtaining shipments and even the sheet sellers, although inclined to shade prices, admit that there are delays on shipments from mill. Steel pipe discounts are unchanged and business continues fair, despite the lateness of the season. With the copper market stronger, brass and copper warehouses report their products out of stock firm at prevailing quotations. We quote prices on page 1554.

Finished Iron and Steel.—Consumers and jobbers in the New York territory have begun to contract on a small scale for first quarter. It is notable that with the possible exception of tin plate, buyers are not covering ahead for their full requirements, there still being some hesitancy as to prices notwithstanding the firmness with which they have held in recent weeks. Except on plates, which are obtainable in large lots at 1.90c. to 1.95c., Pittsburgh, there is no price cutting of importance. The market on shapes and bars, so far as the mills are concerned, holds at 2c, and concessions from this price which have been reported are said to be due to offerings of material for resale, but even this factor is disappearing, as fabricators and jobbers see a good demand for steel products during the first quarter of the year. Most of the tin plate mills have opened their books for the first half to consuming buyers and for first quarter to jobbers, quotations being uniform at $4.75 per base box, Pittsburgh. A liberal volume of business has already gone on mill books and considerable more will be closed before the end of the year. Other contracting is principally in shapes, bars, cold finished steel and wire products, with some in pipe. Structural steel projects show a total of more than 16,000 tons in awards in the Eastern district during the past week, including the towers for the Delaware River Bridge at Philadelphia, totaling 9500 to 10,000 tons, while new work on which figures are being put in totals about 7000 tons. Concrete construction calls for only a moderate amount of bar tonnage, but many projects will come up early in the new year on which preliminary figures have been submitted. For a filtration plant at Indianapolis 1100 tons of concrete bars are required. The Concrete Steel Co. has been awarded 600 tons for a power plant to be erected by the Foundation Co. at Philo, Ohio; 750 tons for the Rich department store at Atlanta, Ga.; 350 tons for the St. Francis Convent at Dubuque, Iowa, and 335 tons for a warehouse in Philadelphia. One of the largest plate jobs being figured on is for steel pipe for Honolulu, H. I., which requires 800 tons of plates, and 3000 tons will be required for a water main in Brooklyn for the Board of Water Supply of New York.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, structural shapes and steel plates, 2.39c.; bar iron, 2.34c.

Coke.—The market seems to be slightly stronger, but this strength is not reflected in quotations, which remain about $8 to $8.50 for foundry and $6.50 to $7 for furnace, while by-product is still quoted at $14.84 to $14.91, delivered, Newark and Jersey City points.

Old Material.—Prices are holding fairly firm on practically all items. Heavy melting steel is still quoted at from $12.50 to $13.50 per ton, based upon purchases for Alan Wood Iron & Steel Co., at $16 delivered and to a Pottsville mill at $16.50, which at the

$3.78 freight rate, brings the buying price New York to $12.72 per ton. The Bethlehem Steel Co. and the Jones & Laughlin Steel Co. are both active, the former specifying railroad steel and the latter railroad or equivalent. Buying is also being done for Midland and Monessen. Stove plate is quotable at $12.25 to $13.25 per ton, with Mahwah, N. J., quiet and $16 per ton being paid for a Harrisburg, Pa., consumer, which figures back to a buying price New York of $12.20 per ton. On specification pipe, $14 per ton is being paid for a Lebanon mill, which is about the only active buyer at present. A small tonnage of machine shop turnings is reported to have been shipped to a Phoenixville mill at $14.50 per ton.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$12.50 to $13.00
Steel rails, short lengths, or equivalent	14.25 to 14.75
Rails for rolling	15.00 to 15.50
Relaying rails, nominal	21.00 to 22.00
Steel car axles	No market
Iron car axles	24.00 to 26.00
No. 1 railroad wrought	15.00 to 15.50
Wrought iron track	14.25 to 14.75
Forge fire	11.00 to 11.50
No. 1 yard wrought, long	13.50 to 14.00
Cast borings (clean)	12.50 to 13.00
Machine-shop turnings	11.00 to 11.50
Mixed borings and turnings	11.00 to 11.50
Iron and steel pipe (1 in. diam., not under 2 ft. long)	9.75 to 10.25
Stove plate	12.25 to 13.25
Locomotive grate bars	13.00 to 13.50
Malleable cast (railroad)	13.50 to 14.00
Cast-iron car wheels	16.50 to 17.50

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton, follow:

No. 1 machinery cast	19.00 to 20.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	17.00 to 17.50
No. 1 heavy cast, not cupola size	15.00 to 15.50
No. 2 cast (radiators, cast boilers, etc.)	13.50 to 14.00

Birmingham

On Some Sales $23 Has Been Shaded, But Market Is Now Firmer

BIRMINGHAM, ALA., Dec. 5.—Hammering of the Birmingham iron market seemed to have come to an end last week, after three makers had booked about 50,000 tons in a week, two of them went out of the market for the time being. The maker beginning the marking down process was one of those quitting the market on disposing of all surplus iron and booking the greater portion of first quarter capacity of its one-stack plant. The other maker quitting the market also booked the greater part of a one stack first quarter capacity, but, in order to get a start, one maker took several thousand tons under $23, cutting that price, in some instances, down to approximately $21. Other makers enter stout claim to having done nothing under $23. Advices from competitive sales markets confirm numbers of sales of 1000-ton lots at that base. At the close of the week the absolute bottom of the market seemed to be $23. The Tennessee company had not been heard from in the booking, neither had much been heard from the two largest foundry iron makers. The 50,000 tons was placed half in the South and half in the Middle West. Confirmation of the reported purchase of 50,000 tons of Birmingham iron by the United States Pipe & Foundry Co. at $22 to $23 is not obtainable here. The two largest interests deny having sold any tonnage to that company recently, but one pipe company has bought lots of 1000 to 3000 tons from various makers in the past month, paying the market prices, such as $23 and $24 and is credited with having taken some of the iron offered at one time at $21. A large foundry interest to-day booked lots of 1000 and 2000 tons at $23 and $23.50, and another booked 800 tons at $23.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon, 1.75 to 2.25	$23.00
Basic	23.00
Charcoal, warm blast	32.00

Cast Iron Pipe.—Presumably the 3,000-ton pressure pipe order placed for Los Angeles came to a Birmingham shop, but to which is not known yet. The pressure pipe base remains at $43 with little new business. Soil pipe is dull at $55 for standard and $45 for extra heavy. The Alabama By-Products Co. will buy 4½ miles of 12-in. gas pipe for its gas main to East Birmingham factories to be constructed at once. The National Cast Iron Pipe Co. will, this month, increase capital stock from $500,000 to $1,000,000. It will build a new foundry for the manufacture of pipe by the centrifugal or De Lavaud process.

Finishing Mills.—Steel corporations and independent steel mills maintain full turn in practically every instance. The Chickasaw Shipbuilding & Car Co. is averaging 20 to 25 new steel cars and a like number of repairs a day. The Tennessee company's rail mill continues on its 10,000-ton turn. Wire drawing mills have all they can care for. Structural steel is fairly active. Bars are very active. The Steel Voyager leaving Mobile last week carried 2400 tons of rails to Yokohama, 1560 tons of rails to Yokkaichi and a large tonnage of splice bars and angle bars, nuts and bolts to these places and Darien.

Old Material.—Scrap is beginning to show a little more life following the low stocks on yards of steel scrap users and dealers are not forced to shade the quotations.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Steel rails	$16.00 to $17.00
No. 1 steel	14.00 to 16.00
No. 1 cast	18.00 to 20.00
Car wheels	18.00 to 20.00
Tramcar wheels	17.00 to 19.00
Stove plate	16.00 to 17.00
Cast-iron borings	9.00 to 10.00
Machine shop turnings	9.00 to 10.00

Boston

First Quarter Iron Sold with Buffalo Getting Most of the Business

BOSTON, Dec. 5.—Further shrinkages in prices quoted by domestic furnaces and by holders of foreign iron induced fairly liberal purchases for 1923 first quarter delivery, during the past week. Aggregate bookings exceeded 10,000 tons, more than 80 per cent of which was Buffalo, and the rest western and eastern Pennsylvania, charcoal and foreign iron. Buffalo iron sold at $25 furnace base, and included tonnages running as high as silicon 4 to 5 per cent, the largest individual transaction being 3000 tons taken by a machinery maker. Western Pennsylvania iron, with a freight rate equivalent to the Buffalo, sold at $26 base. Eastern Pennsylvania sold in a small way at $27 furnace base. Virginia furnaces dropped their price to $28 furnace base with the regular 50c. differential, but failed to get much business, nor was much Alabama sold, even at $23 furnace base. Both Lake and Massachusetts charcoal iron sold in limited tonnages, the furnace at Richmond Furnace, Mass., having blown in for a short run. Some holders of foreign iron, especially foundries, which resold, disposed of iron at a material loss. Limited tonnages of Scotch, silicon 2.50 plus, sold at $28 f.o.b. dock, duty paid, which represented a loss of more than 50c. a ton, while other holders let go at less than $27 f.o.b. shipping point. Continental irons sold at $26 f.o.b. dock, duty paid, and more for less than $26, while German iron, with analysis guaranteed, was offered dealers at $26 f.o.b., duty paid. English irons are obtainable at $26 or less, duty paid.

We quote delivered prices on the basis of the latest reported sales, now infrequent, and as follows, having added to furnace prices $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia and $9.60 from Alabama:

Eastern Penn., sil. 2.25 to 2.75	$31.15 to $32.15
Eastern Penn., sil. 1.75 to 2.25	30.65 to 31.65
Buffalo, sil. 2.25 to 2.75	29.91 to 31.41
Buffalo, sil. 1.75 to 2.25	29.91 to 30.91
Virginia, sil. 2.25 to 2.75	34.42
Virginia, sil. 1.75 to 2.25	33.92
Alabama, sil. 2.25 to 2.75	33.10
Alabama, sil. 1.75 to 2.25	32.60

Finished Material.—The George W. Harvey Co., Boston, has awarded approximately 2000 tons of structural steel to the New England Structural Co., also of that city, for the Fourth Atlantic National Bank Building. All bids for a local municipal police station, involving 700 tons, were rejected, and the project is up for refiguring. During the past week, local mill representatives booked a good business in all but concrete bars, most of it on a 2c f.o.b. Pittsburgh base, although 1.95c was done. Practically all bars are for immediate

shipment, indicating small stocks in manufacturers' hands. A moderate tonnage of sheets and tin plate also was taken. Some of the New England street railway companies are in the market for frogs, switches, etc., and requirements will run considerably in excess of those a year back. One carrier is inquiring on an additional 500 tons of 50-lb. rails, having placed the bulk of its requirements previous to the last advance in prices. The call for forgings is limited.

Iron Imports.—During the week ending Dec. 2, 2,100 tons of Middlesbrough, England, iron was brought into this port. During the previous week, 1322 tons of Belgian and 2150 tons of Scotch, a total of 3,832 tons, arrived.

Warehouse Business.—The movement of iron and steel out of warehouses is remarkably good for this time of the year, continued open weather being a market factor in small construction work calling for finished materials. Prices on iron and steel are steady and unchanged. With the exception of stove and tap bolts, which are unchanged, local bolt and nut quotations are approximately 5 per cent higher, making machine bolts 40 per cent discount. Washers are quoted as heretofore. Steel goods of all kinds are up 15 to 20 per cent.

Jobbers quote: Soft steel bars, $3.065 per 100 lb. base; flats, $3.85; concrete bars, 3.16½c.; structural steel, $3.065 to $3.50; tire steel, $4.50 to $4.85; open-hearth spring steel, $5 to $6.50; crucible spring steel, $12; steel bands, $4.25; hoop steel, $4.75; cold rolled steel, $4 to $4.50; refined iron, $3.065; best refined iron, $4.50; Wayne iron, $6.50; Norway iron, $6.60 to $7.10; plates, 3.16½c. to $3.35; No. 10 blue annealed sheets, $4.15 per 100 lb. base; No. 28 black sheets, $5.40; No. 28 galvanized sheets, $6.40.

Coke.—Both the New England Coal & Coke Co. and the Providence Gas Co. continue to quote foundry coke on a basis of $16 delivered within the $3.10 freight zone. This price is the same as named in November. Both companies are doing better in the matter of deliveries, and foundries in this territory are specifying liberally. Connellsville foundry cokes are still available at $1 and more under the market for local fuel, but foundries show little interest due to the uncertainty of getting shipments through unless a lot of red tape is involved.

Old Material.—New business continued at a minimum the past week, and purchases against old contracts were limited. A further readjustment of prices in general has taken place, the market evidently trying to reach a level where buying will be stimulated. Heavy melting steel apparently is holding better than other materials, $14 shipping point having been paid for several car lots, which represents the top of the previous week's market. Mixed borings and turnings are not coming on the market as freely as heretofore, yet tonnages were bought for shipment to West Virginia at $11 on cars shipping point, off 50c. a ton. Chemical cast iron borings are easier, $17 and $16.50 on cars shipping point having been done early in the week, while the market to-day is $16 to $16.50. Selected cotton ties fetched $11 shipping point, but ordinary kinds were bought at $9. Limited tonnages of No. 1 machinery cast changed hands at $20 shipping point, but 90c. a 100 lb. is the common price demanded by holders. The embargo situation is easier on both scrap and pig iron, permits being freer on those lines embargoed, while some carriers have temporarily lifted embargoes.

[illegible] prices are for gross ton lots delivered consuming points:

No. 1 machinery	$20.00 to $22.00
No. 2 machinery cast	18.00 to 20.00
Stove plate	16.50 to 17.00
Railroad malleable	20.50 to 21.00
Bundled sheets	14.00 to 14.50
Car wheels	20.00 to 20.50

[illegible] f.o.b. Boston rate shipping points:

[illegible]	[illegible] to $14.00
No. 1 railroad wrought	13.00 to 13.50
[illegible]	[illegible] to 11.00
Wrought pipe (1-in. in diam., over 2 ft. long)	9.50 to 10.00
Machine shop turnings	10.00 to 10.50
Cast iron borings, rolling mill	12.00 to 12.50
[illegible]	[illegible] to [illegible]
[illegible]	[illegible] to [illegible]
Bundled forged scrap	11.00 to 11.50
Regular forged scrap and bundled sheets	[illegible] to [illegible]
Axles	20.00 to 20.50
Shafting	19.00 to 19.50
Rails for rolling	15.00 to 15.50

Cincinnati

Southern Pig Iron Sold at $21, But $23 Now Seems Minimum

CINCINNATI, Dec. 5.—The market is undoubtedly more active and inquiries especially are more numerous and for fair-sized tonnages. Prices continue weak, although in the Birmingham district furnaces are now making a more determined effort to stop the decline. One Southern furnace on Wednesday announced a price of $21, Birmingham, and after booking 12,000 tons, withdrew from the market. Most of this tonnage was placed in the Southern market, about 4,000 being for shipment into St. Louis, Chicago and Cincinnati districts. A Louisville sanitary manufacturer, which the week before bought 4000 tons, took an additional 1000 at the low price. So far as reported, no other furnaces have followed this lead, and in fact one interest which had been a seller at $23, advanced to-day to $25. Three of the larger producers are now holding to this figure, with one other interest asking $24. The Northern market is weak. With the exception of iron from the Ironton district, which is quoted at $27, $26 appears to be the market. A radiator manufacturer is reported to have placed about 20,000 tons for first quarter, the iron being divided between lake front, Valley and Buffalo furnaces, the latter business going at $25. French Iron is reported to have been offered at $21, alongside New York, which undoubtedly accounts for weakness in Eastern prices. Silvery prices have been cut $2 per ton, the 8 per cent grade now being quoted at $35.50, Jackson County furnace. Inquiries pending include one for 2000 tons from a Kokomo, Ind., stove maker, one for 1000 tons from an Indianapolis melter, and 1000 tons each from two Michigan stove manufacturers. A Southern melter is inquiring for 1000 tons of malleable, and a northern Ohio interest is asking for 500 to 1000 tons. Several other inquiries for 100 to 500 tons are current. A sale of 500 tons of Southern iron was made to-day on the basis of $23, Birmingham.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$27.05
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	27.55
Ohio silvery (nominal), 8 per cent	37.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	29.27
Basic Northern	28.27
Malleable	29.27

Warehouse Business.—Local jobbers report business continuing brisk, deliveries apparently being the most important factor in the demands of consumers. While buying is of the hand-to-mouth character, the number of orders brings the actual tonnages up to a very good aggregate, and it is expected that current buying will continue throughout the month. There is a better demand for wire products for January and February shipment, and nails are also much in demand. Prices are unchanged.

Cincinnati jobbers quote: Iron and steel bars, 2.95c. base; reinforcing bars, 3.05c. base; hoops, 4.05c. base; bands, 3.85c. base; shapes and plates, 3.05c. base; cold-rolled rounds, 3.75c. base; cold-rolled flats, squares and hexagons, 4.25c. base; No. 10 blue annealed sheets, 4c.; No. 28 black sheets, 4.70c; No. 28 galvanized sheets, 5.75c.; No. 9 annealed wire, $3.10 per 100 lb.; common wire nails, $3.20 per keg, base.

Finished Material.—There is a fair demand for bars, shapes and plates for immediate shipment, but sheets have dropped off considerably, and while some inquiries are current, these are generally for carload lots for fill-in purposes. Independent sheet mills generally are quoting 2.60c. for blue annealed, 3.35c. for black and 4.35c. for galvanized sheets, with 4.95c. to 5c. being the prevailing quotation on auto body sheets. These prices are not quoted for the entire first quarter, as the mills are inclined to book only for December and January delivery. Some first quarter contracts have been made on bars, shapes and plates at 2c., but the tonnages involved are small and 1.95c. more nearly represents the general market for early delivery on these products, with reports of 1.90c. having been done. An inquiry for 1000 tons of bars, noted last week, failed to bring out a better price for first quarter than

2c., and the inquirer has decided to wait a while before placing the order. On wire and wire products, the demand is looking better, and some orders for January shipment have been placed by jobbers. Coal mining communities are showing some activity in light rails, and reports of fair sized tonnages being placed are being made. In the structural field, no new inquiry has come out, and the lettings are light, in no case being for more than 100 tons. A number of projects under consideration, however, will likely be up for bids within the next week or two. Most of these buildings will be of concrete construction. The Mengel Body Co., Louisville, Ky., took bids Dec. 4 on a body-building plant, 500 tons of steel being required. The Masonic Temple, Muncie, Ind., has been awarded to the Indiana Bridge Co., and this company is inquiring for 900 tons of shapes for the job. A school building at Williamsburg, Clermont Co., Ohio, is up for bids, the steel involved being 200 tons.

Coke.—Coke consumers are asking operators to hold up shipment of December quotas on contracts, the idea apparently being to show a light inventory. The demand is light, with prices showing no change from last week.

Old Material.—Local dealers report little activity in scrap markets, the consumers apparently being satisfied to let matters drift until the situation as to price trend becomes more clear. Prices are undoubtedly weak, but deals are so scarce that it is almost impossible to figure what quotations are.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

	Per Gross Ton	
Bundled sheets	$13.50	to $14.00
Iron rails	16.50	to 17.50
Relaying rails, 50 lb. and up	26.00	to 26.50
Rails for rolling	17.50	to 18.00
Heavy melting steel	16.50	to 17.50
Steel rails for melting	15.50	to 16.50
Car wheels	19.50	to 20.00
Per Net Ton		
No. 1 railroad wrought	14.00	to 14.50
Cast borings	11.50	to 12.00
Steel turnings	11.00	to 11.50
Railroad cast	17.00	to 18.00
No. 1 machinery	20.50	to 21.00
Burnt scrap	11.50	to 12.00
Iron axles	20.00	to 20.50
Locomotive tires (smooth inside)	14.00	to 15.00
Pipes and flues	10.50	to 11.00

Buffalo

Pig Iron Declines $1 and Market Shows Much More Activity

BUFFALO, Dec. 5.—The pig iron market is considerably livelier with the base price touching the low figure of $25 for silicon 1.75 to 2.25. All but one of the selling agencies have done a lively business, and from the manner in which big users are manifesting interest, the general impression is that consumers feel that at $25 base the bottom has been touched. Several attractive inquiries are out involving tonnages up to 5000 tons. One furnace considers itself out of the market by reason of the continued price weakening and will not compete for first quarter business at $25 base, believing that a stronger market is not far away. Malleable weakening is on the same ratio as foundry iron. There is no likelihood of any increased furnace operation with the possible exception of the Donner Steel Co., which may start its Tonawanda furnace, should the market reach a firmer base.

We quote f.o.b. per gross ton Buffalo as follows, the higher price being for early shipment:

No. 1 foundry, 2.75 to 3.25 sil	$26.00
No. 2X foundry, 2.25 to 2.75 sil	25.50
No. 2 plain, 1.75 to 2.25 sil	25.00
Basic	26.00
Malleable	25.00
Lake Superior charcoal	36.28

Finished Iron and Steel.—Tubular products and wire material continue to represent the high levels of finished material demand. Bars, shapes and plates are moving on an even keel. Rumors of a price of 1.95c. on bars have been circulated, but specific information is lacking as to any selling material at this price. Larger sheet business developed from some quarters following the announcement of the Steel Corporation's schedule of 3.35c. and 4.35c. for black and galvanized respectively. Reinforcing bar demand is good in the light of the fact that the season is virtually closed, but the leading bar maker is well supplied with orders involving less than 100 tons. Shipments on wire and pipe production are behind schedule and delivery pressure is strong.

We quote warehouse prices, Buffalo, as follows: Structural shapes, 3.20c.; plates, 3.20c.; soft steel bars, 3.10c.; hoops, 4.10c.; bands, 3.90c.; blue annealed sheets, No. 10 gage, 4.05c.; galvanized steel sheets, No. 28 gage, 5.85c.; black sheets, No. 28, 4.85c.; cold rolled round shafting, 3.95c.

Warehouse Business.—The volume of orders now being filled in local warehouses is greater than at any other time this year, but individual orders do not call for the tonnages sought some time ago. Prices are firm, in line with the stabilized mill schedules. The usual December quietness is not apparent this year.

Old Material.—Trade between dealers is virtually the only activity of any importance in used material, although tentative inquiries have been put out by several big consumers involving important tonnages. Several mills might be interested in purchases of steel at an attractive figure, but not on the basis of current quotations. Dealers expect a livelier market after the holiday season. The largest individual user of steel is out of the market temporarily, deliveries on old contracts being sufficient for present requirements.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$19.00 to $19.50
Low phos., 0.04 and under	21.00 to 22.00
No. 1 railroad wrought	18.00 to 19.00
Car wheels	21.00 to 22.00
Machine-shop turnings	14.50 to 15.50
Cast iron borings	16.00 to 16.50
Heavy axle turnings	17.50 to 18.50
Grate bars	16.00 to 17.00
No. 1 busheling	16.50 to 17.50
Stove plate	17.00 to 18.00
Bundled sheet stampings	14.00 to 15.00
No. 1 machinery cast	20.00 to 21.00
Hydraulic compressed	17.00 to 17.50
Railroad malleable	20.50 to 21.50

St. Louis

Decided Increase in Interest in Pig Iron—Coke Market Active

ST. LOUIS, Dec. 5.—A marked increase in interest is being shown by melters in first quarter requirements of pig iron. That interest extended as far as the issuance of inquiries for more than 25,000 tons of foundry iron and about 4000 tons of malleable iron, all of Northern make. Just how much of this will develop into orders and at what price is problematical. There is no question that the melters who have been doing a big business are in need of iron or will be shortly. The market is nominally at $30, Chicago, but it is believed that this price can be shaded, but just how much will develop with the placing of orders covered by the inquiries referred to. The market for Southern iron remains at $23, Birmingham, 500 tons—300 for December shipment and 200 for January shipment—and several carlots being sold at that figure. Several concerns are still quoting $24, Birmingham, and are holding at that figure.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago, $3.28 from Birmingham (rail and water), $5.17 from Birmingham, all rail, and 81 cents average switching charge from Granite City:

Northern foundry, sil. 1.75 to 2.25	$32.16
Northern malleable, sil. 1.75 to 2.25	32.16
Basic	32.16
Southern foundry, 1.75 to 2.25	28.17

Finished Iron and Steel.—Business in all lines is rather quiet. Railroads are buying very little, the only inquiry of note being one for 100 tons of tank plates, issued by the Missouri Pacific. One line centering here bought 75 tons of locomotive tires. Fabricators report very little business in prospect. Jobbers continue to buy nails.

For stock out of warehouse we quote: Soft steel bars, 2.90c. per lb.; iron bars, 2.90c.; structural shapes, 3c.; tank plates, 3c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, cold rolled, one pass, 4.85c.; cold drawn rounds, shafting and screw stock, 3.90c.; structural rivets, 3.85c. per 100 lb.; boiler rivets, 3.95c.; tank rivets, $\frac{7}{8}$ in. and smaller, 55 per cent off list; machine bolts, large, 50 per cent; smaller, 50 per cent; carriage bolts, large, 45 per cent; small, 45 per cent; lag screws, 55 per cent; hot pressed nuts, square or hexagon blank, $2.75; and tapped, $2.75 off list.

Coke.—The market for coke is extremely active. Buyers are insisting on shipments and are stressing their need for the fuel. The outstanding feature of the week was the shipment of a solid trainload of 53 cars of coke from the St. Louis Coke & Chemical Co., Granite City, to the Metropolitan Utilities at Omaha, Neb., the shipment leaving at 2 o'clock Friday afternoon for 24-hr. delivery by the Burlington. The coke was needed to prevent a shut-down of the plant.

Old Material.—The market for old material is unchanged. Consumers are not buying anything and hardly are expected to do so until after the first of the year. In the meantime, dealers are not taking on any new purchases, although considerable material is coming in, the result of purchases made some time ago and held up on account of the railroad strikes. The only new railroad list out is from the Pennsylvania System (Southwestern Region), 4800 tons.

We quote dealers' prices f.o.b. cars, Buffalo, Pittsburgh, Cleveland, Detroit, Chicago and other Michigan district and Southern Ohio points, as follows:

	Per Gross Ton	
Rails for rolling	16.50 to	17.00
Steel rails, less than 3 ft.	20.00 to	20.50
Relaying rails, standard section	26.00 to	29.00
Heavy melting steel	16.00 to	16.50
Heavy shoveling steel	15.50 to	16.00
Frogs, switches and guards cut apart	16.50 to	17.00
	Per Net Ton	
Heavy axles and tire turnings	11.50 to	12.00
Steel angle bars	17.00 to	17.50
Iron car axles	26.00 to	26.50
Steel car axles	19.00 to	19.50
Wrought iron bars and transoms	21.50 to	22.00
No. 1 railroad wrought	15.50 to	16.00
No. 2 railroad wrought	15.00 to	15.50
Railroad springs	20.00 to	20.50
Steel couplers and knuckles	20.00 to	20.50
Cast iron borings	10.50 to	11.00
No. 1 busheling	13.00 to	13.50
No. 1 railroad cast	19.00 to	19.50
No. 1 machinery cast	20.00 to	20.50
Railroad malleable	18.00 to	18.50
Machine shop turnings	9.50 to	10.00

Cleveland

Low Prices Bring Out Large Volume of Orders at Detroit, But Cleveland Melters Fail to Respond

CLEVELAND, Dec. 5.—The ore shipping season closed Dec. 2 with the dispatch of a cargo from Escanaba, only one cargo being shipped this month. The movement by water during the season was 42,613,184 gross tons. November shipments, including the one cargo of 9626 tons shipped during December, amounted to 3,420,560 tons. The season closed with a good supply of ore in the hands of consumers, the amount at furnace yards and on lower lake docks on Dec. 1 being estimated at 43,000,000 tons. The tabulation of shipments by ports during the past season will be found in another column.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $5.95; Old range non-Bessemer, 51½ per cent iron, $5.20; Mesabi Bessemer, 55 per cent iron, $5.70; Mesabi non-Bessemer, 51½ per cent iron, $5.05.

Pig Iron.—Considerable activity in pig iron has developed in the Michigan territory. A number of round-lot sales of foundry and malleable iron were made during the week to some of the largest consumers in Detroit, and other Michigan consuming points for the first quarter delivery, and a number of inquiries are pending. One producer is working on inquiries aggregating over 25,000 tons in lots up to 3,000 tons and the heavy buying is expected to last another week. Prices considerably lower than have been prevailing recently were quoted and these apparently have stimulated the buying. As low as $26 is being quoted for shipment to Michigan points and there are reports that outside furnaces have sold foundry and malleable iron for Detroit delivery at approximately $26, Detroit. However, a Detroit producer announces that it is now holding to $27 furnace for both Detroit and outside delivery. The buying has been done by some of the largest consumers in the automotive field and by three or four of the large Detroit stove companies. Co-incident with the weakening of the Detroit market has come another reduction of $1.50 to $2 a ton in Cleveland prices. The decline in the local market appears largely due to the competition of Buffalo iron, which has been offered in Cleveland at $25 for foundry grades, equivalent to $27.65 delivered. Local furnaces seem disposed to name prices that will shut out outside iron and have marked down foundry iron to $27.50 delivered Cleveland, but for outside shipment are quoting $26.50. Based on these prices a few small lot sales are being made, but the market in this territory continues rather quiet. Another $2 price reduction has been made on Ohio silvery iron.

We note the sale of several lots of silvery iron aggregating 400 tons at the new schedule. Southern foundry iron has been quoted at $21, Birmingham, but the tonnage offered at that price appears to have been quickly sold and the price withdrawn before any sales were made in this territory. Another producer to-day reduced its price $1 a ton to $22. During the week before the reduction several first quarter contracts were booked at $23. Low phosphorus iron has sold at $36, or $1 below the recent price.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron includes a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and a $6 rate from Birmingham.

Basic, Valley furnace (nominal)	$26.50
Northern No. 2 fdy., sil. 1.75 to 2.25	27.50
Southern fdy., sil. 1.75 to 2.25	29.00
Malleable	27.50
Ohio silvery nominal, sil. 8 per cent	38.52
Standard low phos., Valley furnace	37.00

Bolts, Nuts and Rivets.—Some contracts for bolts and nuts for the first quarter delivery are being placed at present prices by automobile manufacturers, implement manufacturers and railroads, but jobbers are holding off until after inventory time. There is a fair volume of current orders. The leading local rivet manufacturer has met the competition of the Pittsburgh district makers and reduced prices $3 a ton to 3c for structural and 3.10c for boiler rivets. These prices have been quoted on some first quarter inquiries that have appeared. Small rivets are also weaker, being quoted as low as 65 and 10 per cent off list.

Reinforcing Bars.—General contracts have been placed for the Jefferson and Longfellow Schools, Cleveland, each requiring 100 tons of reinforcing bars. Hard steel reinforcing bars are not firm, although 2c. is still the common price for car lots.

Sheets.—While there has been shading of $1 to $2 a ton on black sheets, most mills seem to be holding firmly to the American Sheet & Tin Plate Co. prices, and considerable business is being booked for deliveries extending through the first quarter. Independent mills are booking large tonnages in automobile body sheets for the first quarter. On these they are adhering to 5c.

Semi-Finished Steel.—Sales in small lots are reported at $37.50, but the market appears to be represented by a range of $37 to $38, Youngstown, for sheet bars, billets and slabs. Some inquiry is coming out for sheet bars for the first quarter, but quotations have not yet been made.

Finished Material.—Deliveries by some of the mills have improved to such an extent that some consumers are getting material sooner than they expected, and will not place additional orders with mills that can make early shipments. Large buyers are well covered and new business is mostly in small lots from the smaller consumers. Automobile companies are not rushing to buy steel for the first quarter and inquiries from that source are said to be largely of a tentative nature. Automobile plants are reported to be operating at a greater capacity than at this time in any previous year. Although steel bars can be purchased at 1.95c., 2c. is by far the more common quotation, and the leading interest is understood to be adhering to the latter price. Plates are weak, evidently due to the fact that some mills are in need of orders for immediate rolling. On an attractive plate inquiry for several thousand tons an independent mill is understood to have quoted below 1.90c. On the other hand, another mill reports the sale of 1470 tons in three lots for field tanks at 2c. For

car lots 2c. is usually the minimum price, but for larger lots 1.95c. is being openly quoted. A Sharon plant has taken an order for oil refinery equipment requiring 1000 of plates for which it has sent out an inquiry. The 3000 tons for a boat for the Huron Transportation Co., taken by the Toledo Shipbuilding Co., has not yet been placed. In the structural field, the Niagara, Lockport & Ontario Power Co., Niagara Falls, has taken bids for transmission towers requiring 4000 tons of structural material. The Cleveland Board of Education has placed general contract for two school buildings each requiring small tonnages of steel and will place 10 additional school houses as soon as plans can be prepared.

Jobbers quote steel bars, 2.91c.; plates and structural shapes, 3c.; No. 9 basis galvanized wire, 3.40c.; No. 9 annealed wire, 2.80c.; No. 28 black sheets, 4.15c. to 4.40c.; No. 28 galvanized sheets, 5c. to 5.40c.; No. 10 blue annealed sheets, 3.70c. to 3.76c.; hoops and bands, 3.71c.; cold-rolled rounds, 3.75c.; flats, squares and hexagons, 4.25c.

Coke.—We note the sale of 6000 tons of Virginia foundry coke for the first quarter to a sanitary interest at $8. Connellsville foundry coke is moving in small lots at $8 to $8.50 for standard makes.

Old Material.—The scrap market is dull and inclined to weakness. Heavy melting steel has declined 25c to 50c a ton and a greater decline is noted on a few other grades. Small purchases of heavy melting steel were made during the week by Valley district mills at $21 and dealers are offering $20 to $20.50 for this grade for Youngstown delivery. Local mills are out of the market. The trade expects little activity in the market until January. Railroad lists pending or on which bids were received during the week include scrap offerings by the Pennsylvania, New York Central, Erie and Big Four.

We quote per gross ton, f.o.b. Cleveland, as follows:

Heavy melting steel	$18.25 to $18.50
Steel rails under 3 ft.	19.75 to 20.00
Steel rails for rolling	20.00 to 20.50
Iron rails	18.00 to 18.50
Iron car axles	25.00 to 26.00
Low phosphorus melting	20.00 to 20.50
Cast borings	15.75 to 16.00
Machine shop turnings	14.50 to 14.75
Mixed borings and short turnings	15.50 to 16.00
Compressed steel	16.50 to 16.75
Railroad wrought	17.00 to 17.50
Railroad malleable	20.00
Light bundled sheet stampings	13.00 to 13.50
Steel axle turnings	16.00 to 16.50
No. 1 cast	20.50 to 21.00
No. 1 busheling	12.50 to 13.50
Drop forge flashings over 10 in.	12.75 to 13.25
Drop forge flashings under 10 in.	12.50 to 13.50
Railroad grate bars	17.00 to 18.00
No. 1 plate	17.00 to 18.00
Pipes and flues	13.00 to 13.75

Detroit Scrap Market

DETROIT, Dec. 5.—Lettings on tonnages for December delivery have developed the fact that there were a smaller number of dealers bidding for this tonnage. The following prices are on a gross ton basis f.o.b. cars producer's yards, excepting stove plate, automobile and No. 1 machinery cast, which are quoted on a net ton basis:

Heavy melting steel	$14.50 to $15.50
Shoveling steel	15.00 to 16.00
No. 1 machinery cast	19.00 to 21.00
Cast borings	12.00 to 13.50
Automobile cast scrap	21.00 to 23.00
Stove plate	16.50 to 18.00
Hydraulic compressed	14.50 to 15.50
Turnings	11.50 to 12.50

An examination for an electrical engineer for the dredge construction service, War Department, carrying a $4,000 to $6,000 salary, is announced by the United States Civil Service Commission, Washington, to which application should be made asking for form 2118, stating title of the examination desired.

The timber lands of the Buckeye Furnace Co., at Wellston, Ohio, have been purchased by the George D. Baker Co., Washington Court House, Ohio. These lands formerly supplied the wood for the charcoal pits of the Buckeye furnace.

Philadelphia

More Pig Iron Inquiry for First Quarter-Steel Demand Also Improves

PHILADELPHIA, Dec. 5.—Signs that buyers now recognize that pig iron prices have about reached bottom are at hand in belated inquiries for fairly large tonnages from several important melters in the East, and the Eastern pig iron trade is cheered by the prospect of a good buying movement for first quarter. A half dozen or more inquiries on which eastern Pennsylvania furnaces have quoted total upward of 20,000 tons of iron, which is more than has been in the market at any one time since the critical period of the coal strike. An increasing demand for steel products, especially plates, which have been exceedingly dull, is also a development of early December, and is somewhat surprising in view of the fact that this is usually a very inactive month in steel buying. A small volume of contracting has been done in steel products for first quarter, principally bars, shapes, tin plate, sheets and pipe, but there is apparently a reviving interest among buyers not usually in evidence at the tag end of a year.

Ore.—Last week's receipts of ore included 7692 tons of iron ore from Sweden and 2500 tons of chrome ore from South Africa.

Ferroalloys.—An increasing demand for ferromanganese has developed within the past two weeks. The Lavino Furnace Co. is getting its Marietta furnace in readiness for operation, but has no definite plans as to when it will be blown in. Domestic alloy is quoted at $100, furnace, and the imported at $100, Atlantic seaboard, duty paid.

Pig Iron.—Not a great deal of inquiry for pig iron has developed in the immediate Philadelphia territory, but melters in New England and in the New York district have come into the market for fairly large tonnages in the past week or 10 days and some buying has been done. Recent inquiries include 3000 tons from the Richardson-Boynton Co., (placed) 2000 tons from the Burnham Boiler Corporation, 2000 tons from the Essex Foundry Co., 2500 tons from the Central Foundry Co., with older inquiries of 1000 tons from the Westinghouse Electric & Mfg. Co., 1000 tons from the Saco-Lowell Shops and several thousand tons from the H. B. Smith Co. still pending, while the Draper Corporation, which was in the market for 8000 tons, has closed for 550 tons of foundry iron. While a good deal of the business which emanates from territory reached by Buffalo furnaces may go to that district because of the lower prices on Buffalo iron, this is regarded favorably by Eastern Pennsylvania furnace operators because it will tend to lessen Buffalo competition. A report that the American Radiator Co. is about to close for 20,000 tons of Buffalo iron was regarded as a good omen for the recovery of pig iron buying throughout the East. The United States Cast Iron Pipe and Foundry Co. has been a fairly large buyer in the East. It was awarded 20,000 tons of water pipe for San Juan, P. R., and presumably is covering on the iron required for this work. Prices on foundry iron quoted by eastern Pennsylvania furnaces have gone no lower within the week, but $27, furnace, for No. 2 plain and $28 for No. 2X are more openly named on inquiries. One or two furnaces are attempting to get 50c. a ton higher, but with little success so far. Foreign iron of a grade equivalent to No. 2X is quoted at $27, Philadelphia docks, duty paid. Last week's receipts of European iron at the port of Philadelphia were 20,943 tons, of which 13,857 tons came from England, 1900 tons from France, 4436 tons from Belgium and 750 tons from Scotland. This is the largest movement in any one week this year. Another record was broken when one ship brought 8500 tons, the largest single cargo which has been received, it is stated, at any Atlantic port. Basic pig iron was sold at $26.50, furnace, in a transaction involving 1500 tons. An Eastern steel company is negotiating for 2500 tons, which probably will be bought this week. Copper free low phosphorus iron is now being offered at $35, Standish fur-

nace. Imported iron of this grade is being offered at about $30, Philadelphia, duty paid. The Emporium furnace in western Pennsylvania has gone in blast. The furnace of the Delaware River Steel Co. at Chester will probably become active about Jan. 1.

Philadelphia and include freight rates varying from 76 cents to $1.64 per gross ton:

East. Pa. No. 2X, 2.25 to 2.75 sil.	29.14 to 29.64
Virginia No. 2 plain, 1.75 to 2.25 sil.	33.17 to 34.17
Virginia No. 2X, 2.25 to 2.75 sil.	34.17 to 35.17
Basic delivered eastern Pa.	27.50 to 28.00
Gray forge	28.14 to 28.64
Malleable	30.64 to 31.64
Copper bearing low phos. (f.o.b.	to

Semi-Finished Steel.—Eastern mills quote $38 to $40, Pittsburgh, on open-hearth rerolling billets and $42.50 to $45, Pittsburgh, on forging quality. Little business is being done.

Plates.—A quickening in the demand for plates has been a development of the past week, although it has been necessary for mills to go to 1.95c., Pittsburgh, in most instances to close desirable orders. This is to-day's market on large lots, but 2c. is being obtained on small lots. There are reports also of 1.90c., Pittsburgh, but whether a price as low as this is being made by any interest other than Carnegie Steel Co. is not fully determined. Recent purchases by the Pennsylvania and Philadelphia & Reading Railroads were probably made at not more than 1.95c. A shipbuilder in the market for 700 tons has stated that it will buy at 1.85c., Pittsburgh, but there is nothing to indicate that the business has been closed at this or any other price. A few small contracts for first quarter have been made at 2c., Pittsburgh.

Structural Shapes.—The largest business in structural steel closed in this district in a long time is the order for about 10,000 tons of plates and shapes for the towers of the Delaware River Bridge, awarded to the Bethlehem Steel Bridge Corporation. It is expected that requests for bids on a part of the superstructure, requiring about 30,000 tons, will be out soon. Plain material holds at 2c., Pittsburgh, and though there are reports of concessions of $1 a ton these are not definitely established.

Bars.—A good demand for steel bars has come up within the past week, largely for early delivery, but some first quarter contracts have been made at 2c., Pittsburgh. Prices hold firm, with the possible exception of some cutting on concrete reinforcing bars, and this, it is said, has not been done by the mills. Bar iron is quoted at 2c., Pittsburgh, but concessions are occasionally offered on fairly large lots, a carload or more. Bolt, nut and rivet makers are making contracts for first quarter on the basis of the discounts given on fourth quarter contracts.

Sheets.—Blue annealed sheets are obtainable at 2.50c. to 2.60c., Pittsburgh; black sheets at 3.25c. to 3.35c. and galvanized at 4.25c. to 4.35c., Pittsburgh, but it is stated that the concessions on black and galvanized have been offered mainly by one Ohio mill which recently started operations.

Warehouse Business.—Demand for steel out of stock has dropped off slightly. Concessions in prices are reported to have been given by some jobbers. We quote for local delivery as follows:

Soft steel bars and small shapes, 3.025c.; iron bars (except bands), 3.025c.; round edge iron, 3.20c.; round edge steel planished, 4c.; tank steel plates, sheets, No. 28 gage, 5.75c.; square twisted and de- squares and hexagons, cold-rolled steel, 4.35c.; steel tool steel, 8.50c.; Norway iron, 6.50c.

Coke.—There is a good deal of a spread in coke prices. Blast furnace coke of standard quality is obtainable from $6.50 to $7, Connellsville, and foundry coke at $7.50 to $8.50, depending upon quality. Heating coke is offered at $6 to $6.50, Connellsville.

Old Material.—Prices on all grades of scrap seem to have reached a point of resistance, and for the first time in many weeks there are no declines. The explanation is that most of the scrap dealers are indifferent about selling at current levels. Machine shop turnings for steel works or rolling mills are about 50c. a ton higher.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$16.00 to $16.50
Scrap rails	16.00 to 16.50
Steel rails for rolling	19.50 to 20.00
No. 1 low phos., heavy 0.04 and under	22.00 to 23.00
Cast iron car wheels	20.00 to 21.00
No. 1 railroad wrought	19.00 to 20.00
No. 1 yard wrought	17.00 to 17.50
No. 1 forge fire	15.00 to 15.50
Bundled sheets (for steel works)	14.50 to 15.00
No. 1 busheling	14.50 to 15.00
Turnings (short shoveling grade for blast furnace use)	14.50 to 15.00
Mixed borings and turnings (for blast furnace use)	14.50 to 15.00
Machine shop turnings (for steel works use)	15.00 to 15.50
Machine shop turnings (for rolling mill use)	15.00 to 15.50
Heavy axle turnings (or equivalent)	15.00 to 15.50
Cast borings (for steel works and rolling mills)	15.00 to 16.00
Cast borings (for chemical plants)	20.00 to 22.00
No. 1 cast	20.00 to 21.00
Heavy breakable cast (for steel plants)	19.00 to 19.50
Railroad grate bars	16.50 to 17.00
Stove plate (for steel plant use)	16.50 to 17.00
Railroad malleable	15.50 to 16.50
Wrought iron and soft steel pipes and tubes (new specifications)	14.00 to 14.50
Shafting	21.00 to 22.00
Steel axles	22.00

CANADIAN MARKET

Little Interest in Pig Iron—Prices Recently Reduced—Fuel Situation Improves

TORONTO, ONT., Dec. 5.—The Canadian pig iron market shows a lack of interest. With only one month left of the present year, no orders have been closed for iron for first quarter delivery, and even inquiries for this period are absent from the market. It is true, however, that a number of melters in Ontario and Quebec are carrying heavy stocks of English and Scotch iron which was taken in at prices much lower than those quoted by Canadian blast furnace operators. It is reported that shipments of British iron into Ontario and Quebec have ceased with the closing of navigation up the St. Lawrence. There are, however, large tonnages of British iron piled in the vicinity of Montreal from which Quebec melters will be supplied during the winter months. Ontario melters are entering the market from time to time for foundry and malleable iron, but their orders are small and seldom exceed one to two car lots.

While the fuel situation throughout Ontario is much better than it was four or five months ago, there is still considerable room for improvement and at the present time furnaces, mills and foundries are meeting with some difficulty in securing supplies. The present reason for this, however, has more to do with the shortage of cars for transportation purposes than from an actual shortage of fuel at the mines. At the present time the Algoma Steel Corporation, Sault Ste. Marie, Ont., has one furnace blowing on foundry iron; the Steel Co. of Canada, Hamilton, is operating one furnace on basic and proposes to blow in a second on foundry during the next week or two. The Dominion Steel Corporation, Sydney, N. S., has two furnaces blowing, one on basic and one on foundry, and is making preparations to blow in a third in the immediate future.

During the past couple of weeks Canadian furnaces have announced a reduction of $2.50 per ton in pig iron prices and those now in effect are as follows: No. 1 (2.25 to 2.75 silicon) and malleable, $33.80; No. 2 (1.75 to 2.25 silicon), $32.80, Toronto. No. 1 and malleable, $36.15; No. 2, $35.15, Montreal. British iron prices are Summerlee and Carron, $33 to $35 per ton dock, Montreal.

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
Nov.	Lake	Electrolytic*	New York	New York	St. Louis	New York	St. Louis
29	14.12½	13.62½	35.87½	7.30	6.95	7.40	7.05
Dec.							
1	14.00	13.62½	36.12½	7.30	6.95	7.45	7.10
2	14.00	13.62½	.....	7.30	6.95	7.45	7.10
4	14.00	13.62½	36.00	7.30	6.95	7.45	7.10
5	14.12½	13.75	36.25	7.30	6.95	7.45	7.10

*Refinery quotation.

New York

NEW YORK, Dec. 5.

Owing to the Thanksgiving holiday and the approach of the end of the year when inventories are taken, the markets are naturally quiet. Prices are firm in all of them, but the buying of copper, tin and zinc have been moderate. The lead market continues the most active of all.

Copper.—The principal news feature of the week is the statement of the acquisition of the Chile Copper Co. by the Anaconda Copper Mining Co. While no official announcement has been made it is generally believed that the deal has gone through. Such a consummation would make the Anaconda company the largest factor in the copper industry, owning as it does the American Brass Co., and it would also remove from the market a large part of the low cost competitive metal refined in South America. Whether due to this probable consolidation or not, prices have stiffened until practically no electrolytic copper is available at less than 14c., delivered, or 13.75c., refinery, at which levels practically all of the moderate demand not prevalent is being satisfied. Lake copper is quoted at 14c. to 14.12½c., delivered.

Copper Averages.—The average price of Lake copper for the month of November, based on daily quotations in THE IRON AGE, was 14.10c. The average price of electrolytic copper was 13.61½c., refinery, or 13.86½c., delivered.

Tin.—The market has been dull and quiet practically the entire week, with consumers more or less indifferent and dealers not active. On Wednesday, Nov. 29, there was a slight pressure to sell and about 100 tons changed hands at around 35.75c. to 36c. On Friday 100 tons of future delivery was sold on the New York Metal Exchange at about 36c. During the week the premium on Straits tin disappeared. Spot Straits tin was quoted to-day at 36.25c., New York, with the London market about £2 per ton higher than a week ago at £176 for spot standard, £177 for future standard and £177 15s. for spot Straits. November deliveries into consumption were 4812 tons and statistics for the month show that the visible supply of tin was increased by 2384 tons. So large an increase was not expected and a declining market has been the result. Imports for the first 11 months of this year have been 53,593 tons, as compared with 20,668 tons for the same period in 1921.

Lead.—Conditions are unchanged and the market is quiet and very firm. The leading interest continues to quote 6.90c., St. Louis, or 7.10c., New York, but independents are quoting 6.95c., St. Louis, or 7.30c., New York. Consumption continues very heavy.

Zinc.—Because of moderate advances in the London market, due to speculation or other causes, the market here has experienced a partial advance during the week so that prime Western zinc is now quoted at 7.10c., St. Louis, or 7.35c., New York, for early delivery. Domestic demand is seasonably light and sales to foreign markets, after a period of inactivity, have again been made in light volume. It is probable that in the last few weeks about 12,000 to 15,000 tons has been sold.

Antimony.—Wholesale lots of Chinese metal for early delivery are quoted at 6.40c. to 6.50c., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is unchanged, as imported from foreign producers, at 21c. to 22c. per lb., duty paid, New York, in wholesale lots for early delivery.

Old Metals.—Trading is fairly active though values are not so firm. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	13.375
Copper, heavy and wire	12.50
Copper, light and bottoms	11.25
Heavy machine composition	10.25
Brass, heavy	8.25
Brass, light	6.50
No. 1 red brass or composition turnings	9.50
No. 1 yellow rod brass turnings	7.75
Lead, heavy	6.25
Lead, tea	5.00
Zinc	5.00

Chicago

Dec. 5.—All of the metals are very dull, but zinc has advanced slightly. Stocks of zinc are said to be low, but consumptive buying has been too light to develop an actual shortage. Speculative influences appear to account for the present price of the metal. We quote, in carload lots, lake copper, 14.37½c.; tin, 37.50c. to 38c.; lead, 7.10c.; spelter, 7.15c.; antimony, 8.50c., in less than carload lots. On old metals we quote copper wire crucible shapes and copper clips, 11.50c.; copper bottoms, 9.75c.; red brass, 9c.; yellow brass, 7c.; lead pipe, 5.25c.; zinc, 4.62½c.; pewter, No. 1, 23c.; tin foil, 26c.; block tin, 30c., all buying prices for less than carload lots.

St. Louis

Dec. 5.—Lead and zinc are strong. We quote lead at 6.97½c. to 7c., carlots, and zinc at 7.10c. to 7.15c. On old metals we quote: Light brass, 3.50c.; heavy red brass and light copper, 7.50c.; zinc, 2c.; lead, 3c.; pewter, 15c.; tin foil, 20c.; tea lead, 2c.; aluminum, 9c.

Ottawa, Ill. Mill to Resume on Forging Bars

The Alliance Steel Co., 20 West Jackson Boulevard, Chicago, seller of bars, sheets, plates, shapes, etc., has leased the mill of the Central Steel Co., Ottawa, Ill., a plant which has been idle for about nine years. The mill has been changed over from 8 in. to 9 in., and will be motor driven. Operations will be started late this month and production is expected to total about 1200 tons per month. The company will specialize in forging bars and alloy steel for the drop forge and automobile trade. A new continuous heating furnace has been installed, but two old sand bottom oil-fired furnaces will be retained for heating alloy steel. Later it is planned to roll bar size shapes. F. A. Jones is president and treasurer of the company.

The tenth annual meeting of the Compressed Gas Manufacturers' Association will be held at the Hotel Astor, New York, on Jan. 15. The members of the association are manufacturers of oxygen, hydrogen, acetylene, carbonic gas, ammonia, chlorine, sulphur dioxide, blaugas, carbo-hydrogen, etc. Manufacturers of supplies and equipment are associate members of the association. A. R. Brunker, Liquid Carbonic Co., Chicago, is president and John H. Hayes, 120 West Forty-second Street, New York, is secretary.

Preliminary figures indicate that the Trumbull Steel Co., Warren, Ohio, established a new monthly record in November in shipping finished steel products, and that earnings exceeded those of October. Final compilation is expected to show shipments of 32,000 tons of finished steel last month.

The Bonney-Floyd Steel Foundry Co., Columbus, Ohio, has purchased a 3-ton Moore rapid 'Lectromet furnace for its steel foundry.

British Iron and Steel Market

Pig Iron Is Easier — Continental Markets Are Erratic on Fluctuating Exchange—Germany and America Sell Rails to South Manchuria

(By Cable)

LONDON, ENGLAND, Dec. 5.

Railroad rates on fuel, pig iron, ore and steel have been reduced. The market is quiet generally, with an easier tendency. Hematite is firm on sustained demand; prompt supplies are scarce and makers are quoting from January onward.

Foreign ore is weak. Bilbao-Rubio is quoted at 21¾s. to 22¼s. ($4.94 to $5.05), ex-ship Tees.

Coke is weak on diminishing export demand and increased production.

Steel business undoubtedly is improving. More works in all parts of the country are re-opening and there is increased ship building under way. One group of steel makers has booked 40,000 tons of ship plates. Japan has bought 2000 tons of ship plates. The Indian railroads are buying wagons (cars), tires and wheels. The home railroads have formed extensive plans for electrification, etc., to relieve unemployment, the work to be commenced immediately.

Continental markets are erratic, owing to the exchange fluctuations and an acute shortage of fuel. German competition is prominent again, the South Manchurian Railroad having bought 5000 tons of rails in Germany; the railroad has also bought 5000 tons in the United States.

India is buying German merchant bars and sheets. Two-inch billets have been done at £5 12½s. ($25.54) f.o.b., January and February shipment.

Tin plate is steady and there is a fair business for both home and export for early shipment. Tin plate has been sold freely at 19½s. ($4.43) basis f.o.b. South America is inquiring for 50,000 boxes. China is buying wasters. A small line of oil plates has been done on the minimum basis price.

Galvanized sheets are firmer on account of dearer spelter. There is good inquiry and moderate business. Thin gages have been advanced 10s.

Black sheets are steady. There is good Japanese demand, but there is some difficulty in placing orders owing to the works' quoting for February, March and April delivery. Belgium is competing on the thicker gages.

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $4.54 per £1, as follows:

Durham coke, delivered	£1	8s.		to	£1	10s.	$6.36 to	$6.81
Cleveland No. 1 foundry	4	16½					21.91	
Cleveland No. 2 foundry	4	12					20.88	
Cleveland No. 3 foundry	4	7½					19.86	
Cleveland No. 4 forge	4	2½					18.73	
Cleveland basic	4	0					18.16	
East Coast mixed	4	13		to	4	13½	21.11 to	21.22
Ferrophosphorus	15	0					68.10	
Ferromanganese*	14	10		to	14	15	65.83 to	66.97
Rails, 60 lb. and up	7	5		to	8	0	32.92 to	36.32
Billets	7	0		to	7	5	31.78 to	32.92
Sheet and tin plate bars, Welsh	7	0		to	7	7½	31.78 to	33.48
Tin plates, base box	0	19½		to	0	19¾	4.43 to	4.48
							C. per Lb.	
Ship plates	8	10		to	9	0	1.72 to	1.82
Boiler plates	11	0		to	11	10	2.23 to	2.33
Tees	9	0		to	9	10	1.82 to	1.93
Channels	8	5		to	8	15	1.67 to	1.77
Beams	8	5		to	8	15	1.67 to	1.77
Round bars, ¾ to 3 in.	9	0		to	9	10	1.82 to	1.93
Galvanized sheets, 24 g.	17	5		to	17	10	3.50 to	3.55
Black sheets, 24 gage	11	15					2.38	
Black sheets, Japanese specifications	15	5					3.09	
Steel hoops	11	0		&	11	10*	2.23 &	2.33*
Cold rolled steel strip, 20 s	22	2½					4.48	
Cotton ties, Indian specifications	15	0					3.04	

*Export price.

Continental Prices, All F. O. B. Channel Ports, Delivery as Specified

No. 3 foundry pig iron:								
Belgium, Jan., Feb.	£1	10s.					$20.43	
Luxemburg, Jan., Feb.	4	10					20.43	
France, Jan., Feb.	4	10					20.43	
Billets:								
France, Jan.	5	0		to	£5	15s.	22.70 to	$26.11
Luxemburg, Jan.	5	0		to	5	15	22.70 to	26.11
Lorraine, Jan.	5	0		to	5	15	22.70 to	26.11
Wire nails (keg basis):								
Germany	0	14½					3.29	
Belgium	0	20½					4.65	
Wire rods, 5 mm. (0.2 in.):								
Belgium	7	5		to	10	7½	32.92 to	47.10
Angles:							C. per Lb.	
Belgium	7	7½					1.49	
Tees:								
Belgium	8	5					1.67	
Merchant bars:								
Belgium, Jan., Feb.	6	15					1.37	
Luxemb'g, Jan., Feb.	6	15					1.37	
France, Jan., Feb.	7	0		to	7	2½	1.42 to	1.44
Germany, Feb., Mar.	6	5		to	6	10	1.27 to	1.32
Joists (beams):								
France, not quoted.								
Belgium, Mar., Apr.	7	10		to	8	17½	1.11 to	1.19
Luxemb'g, Jan., Feb.	8	17½		to	8	2½	1.19 to	1.24
Channels:								
Belgium	7	10		to	7	12½	1.52 to	1.55
Plate plates:								
Germany, Jan.	6	5					1.27	
Belgium, Jan.	6	7½		to	6	10	1.29 to	1.32
Luxemburg, Jan.	6	5					1.27	
France, not quoted.								
No. 8 gage wire:								
Belgium	14	10s.					2.95	

STANDARDIZED TERMINOLOGY

Management Committee Seeks Definitions of Business Terms

Serious obstacles to the progress of its work were reported by the joint committee on standardization of terminology in industry, at the Dec. 5 meeting of the American Society of Mechanical Engineers in the Engineering Societies Building, New York. Lack of cooperation from the "member" societies was given as the chief hindrance, while funds are needed to prosecute the work. The classification being developed is based on the Dewey decimal system.

In the discussion on the committee's preliminary report it was brought out that, owing to the different conceptions by different men of the meanings of words, one of the first things here needed was a set of definitions. Some minds associate wages with finance, others with personnel, with ideas of management, with the work of the treasurer, or of the accountant. Some regard wages as a matter of incentive. Each of these diverse ideas leads to an attempt to classify wages according to the conception involved. Obviously, the true classification can put wages in one place only.

Frank B. Gilbreth defined the primary purpose of a classification as one "to bring automatically to one's attention information he did not know existed." He pointed to the necessity of getting together the bulk of the data and material to be classified, before any attempt at classification is made, because the purpose is "to bring related data together." As an aid in this direction, he deprecated the tendency of business publications to publish unrelated articles and data on the front and rear of the same sheet, and advocated running the advertisements on the backs of pages containing editorial matter, in order to make it easy to file the data so published.

Bethlehem and Midvale Officials Inspect Mills

E. G. Grace, president Bethlehem Steel Co., and A. C. Dinkey, president Midvale Steel & Ordnance Co., accompanied by about 30 of the Bethlehem and 15 of the Midvale executive, sales and operating officials, left Monday on a tour of inspection of the Midvale-Cambria properties, which the Bethlehem Steel Co. will shortly take over and operate. The party visited Johnstown, Pa., on Tuesday and inspected the mills, blast furnaces, coke ovens, etc., there and on Wednesday went through the mills at Coatesville, Pa.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Plates

Sheared, tank quality, base, per lb.....1.95c. to 2c.

Structural Material

Beams, channels, etc.....2.00c.

Iron and Steel Bars

Soft steel bars, base, per lb.....2.00c.
Refined iron bars, base, per lb.....2.60c.

Hot-Rolled Flats

Hoops, base, per lb.....2.75c. to 2.90c.
Bands, base, per lb.....2.75c. to 2.90c.
Strips, base, per lb.....2.75c. to 2.90c.

Cold-Finished Steels

Bars and shafting, base, per lb.....2.50c.
Strips, base, per lb.....4.50c.

Wire Products

Nails, base, per keg.....$2.70
Bright plain wire, base, per 100 lb.....2.45
Annealed fence wire, base, per 100 lb.....2.45
Spring wire, base, per 100 lb.....3.25 to 3.35
Galvanized wire, base, per 100 lb.....2.95
Galvanized barbed, base, per 100 lb.....3.35
Galvanized staples, base, per keg.....3.50
Painted barbed wire, base, per 100 lb.....3.00
Polished staples, base, per keg.....3.00
Cement coated nails, base, per count keg.....2.20
Woven fence, carloads (to jobbers).....70½ per cent off list
Woven fence, carloads (to retailers).....68 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads...60 and 5 per cent off list
Machine bolts, small, cut threads....50 and 10 per cent off list
Machine bolts, larger and longer....50 and 10 per cent off list
Carriage bolts, ⅜ x 6 in.:
Smaller and shorter, rolled threads, 50, 10 and 5 per cent off list
Cut threads.....50 per cent off list
Longer and larger sizes.....50 per cent off list
Lag bolts.....60 and 5 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads....50 and 10 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.:
Smaller and shorter.....45 per cent off list
Larger and longer sizes.....45 per cent off list
Hot pressed square or hex. blank nuts...$3.25 to $3.50 off list
Hot pressed nuts, tapped.....3.25 to 3.50 off list
C.p.c. and t. sq. or hex. nuts, blank.....3.25 to 3.50 off list
C.p.c. and t. sq., or hex. nuts, tapped.....3.25 to 3.50 off list
Semi-finished hex. nuts:
9/16 in. and smaller, U. S. S....75, 10 and 5 per cent off list
⅝ in. and larger, U. S. S.....70, 10 and 2½ per cent off list
Small sizes, S. A. E.....50 and 5 per cent off list
S. A. E., ⅝ in. and larger.....75 and 5 per cent off list
Stove bolts in packages.....80 and 5 per cent off list
Stove bolts in bulk.....80, 5 and 2½ per cent off list
Tire bolts.....50, 10 and 10 per cent off list

Cap and Set Screws

Milled square and hex. head cap screws....75 per cent off list
Milled set screws.....75 per cent off list
Upset cap screws.....75 and 10 per cent off list
Upset set screws.....80 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb.....$3.00
Large boiler rivets, base, per 100 lb.....3.10
Small rivets.....65 and 10 to 65 and 5 per cent off list

Track Equipment

Spikes, 9/16 in. and larger, base, per 100 lb.....$2.75
Spikes, ½ in. and smaller, base, per 100 lb....3.50
Spikes, boat and barge, base, per 100 lb.....3.50
Track bolts, base, per 100 lb.....$3.75 to 4.50
Tie plates, per 100 lb.....2.35
Angle bars, base, per 100 lb.....2.75

Welded Pipe

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	49	23½	¼ to ⅜	+ 7	−33
¼ to ⅜	55	29½	½	26	8
½	60	46½	¾	32	17
⅝	64	52½	1 to 1½	34	19
¾	66	54½			
1 to 3	66	54½			

Lap Weld

2	59	47½	2	39	15
2½ to 6	63	51½	2½ to 6	32½	19
7 to 8	60	47½	7 to 12	30	17
9 to 12	59	46½			

Butt Weld, extra strong, plain ends

⅛	45	28½	¼ to ⅜	+15	+48
¼ to ⅜	51	34½	½	25	13
½	57	46½	¾	32	18
¾	62	51½	1 to 1½	34	20
1 to 1½	64	53½			
2 to 3	65	54½			

Lap Weld, extra strong, plain ends

2	57	46½	2	30	17
2½ to 4	61	50½	2½ to 4	33	21
4½ to 6	60	49½	4½ to 6	32	20
7 to 8	56	43½	7 to 8	25	13
9 to 12	50	37½	9 to 12	20	8

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 and 2½ per cent.

Boiler Tubes

Lap Welded Steel		*Charcoal Iron*	
1¾ in.	21½	11 in.	+ 7
2 to 2¼ in.	36	1⅜ to 1¾ in.	3
2½ to 3 in.	47	2 to 2¼ in.	13
3¼ to 13 in.	52	2½ to 3 in.	18
		3¼ to 4½ in.	20

To large buyers of steel tubes a supplementary discount of 5 per cent is allowed.

Standard Commercial Seamless Boiler Tubes

Discounts on cold-drawn tubes in carload lots, f.o.b. Pittsburgh, follow:

1 in.	55	2½ and 2¾ in.	38
1¼ and 1½ in.	47	3 in.	42
1¾ in.	31	3¼ to 4 in.	47
2 and 2¼ in.	34	4¼ in. and 5 in.	39

Hot Rolled

3 in.	44	3¼ to 4 in.	49

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base.....85 per cent off list
Carbon 0.30 to 0.40, base.....83 per cent off list
Plus usual differentials and extras for cutting.

Seamless Locomotive and Superheater Tubes

Cents per Ft.		Cents per Ft.	
2-in. O.D. 12 gage	14	2¼-in. O.D. 10 gage	19
2-in. O.D. 11 gage	15	3-in. O.D. 7 gage	34
2-in. O.D. 10 gage	16	1½-in. O.D. 9 gage	13¾
2¼-in. O.D. 12 gage	16	5⅜-in. O.D. 9 gage	53
2¼-in. O.D. 11 gage	17	5½-in. O.D. 9 gage	55

Tin Plate

Standard cokes, per base box.....$4.75

Terne Plate

(Per package, 200-lb.)

8-lb. coating	$9.30	25-lb. coating I. C.	$14.25
8-lb. coating I. C.	9.60	30-lb. coating I. C.	15.25
15-lb. coating I. C.	11.80	35-lb. coating I. C.	16.25
20-lb. coating I. C.	13.30	40-lb. coating I. C.	17.25

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....2.50c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.35c.
Regular auto body sheets, base (22 gage), per lb., 4.70c. to 5.00c.

Galvanized

No. 28 (base), per lb.....4.35c.

Tin-Mill Black Plate

No. 28 (base), per lb.....3.35c.

Manufacturers have pamphlets, which can be had upon application, giving price differentials for gage and extras for length, width, shearing, etc.

Freight Rates

All rail freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic	$0.325	Buffalo	$0.265	St. Louis	$0.43
Philadelphia, export	0.235	Cleveland	0.215	Kansas City	0.735
Baltimore, domestic	0.315	Cleveland, Youngstown		Kansas City (pipe)	0.705
Baltimore, export	0.225	Comb.	0.19	St. Paul	0.735
New York, domestic	0.34	Detroit	0.295	Omaha	0.735
New York, export	0.255	Cincinnati	0.295	Omaha (pipe)	0.705
Boston, domestic	0.365	Indianapolis	0.31	Denver	1.25
Boston, export	0.285	Chicago	0.34	Denver (pipe)	1.215

Pacific Coast	$1.50		
Pac. Coast, ship plates	1.20		
Birmingham	0.69		
Memphis	0.385		
Jacksonville, all rail	0.50		
Jacksonville, rail and water	0.415		
New Orleans	0.515		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 30c. to 40c.; ship plates, 30c. to 40c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 30c. to 40c.; sheets and tin plates, 50c.; rods, wire rope cable and strands, 75c.; wire fencing, netting and stretcher, 50c.; pipe, not over 8 in. in diameter, 50c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

RAILROAD EQUIPMENT BUYING

Purchases of 4200 Cars and 131 Locomotives and Fresh Car Inquiries Totalling Over 10,000

The Chicago Milwaukee & [illegible] has ordered 1000 gondola cars each with the Western Steel Car & Foundry Co. and the Pullman Co. These are in addition to the 5500 cars ordered by the road last week, making a total of 7500 to be built. This company has also placed 25 Mikado type locomotives with the Baldwin Locomotive Works in addition to the 50 recently ordered from the same builder.

The Northern Pacific has placed 1000 box cars with the General American Car Co. in addition to the 2000 ordered last week.

The 1000 box cars placed by the Pere Marquette with the Western Steel Car & Foundry Co., as announced last week, have been transferred for construction to the shops of the Pressed Steel Car Co. of which the Western company is a subsidiary.

The St. Louis Southwestern has ordered 500 steel underframe box cars from the Mt. Vernon Car Mfg. Co. and 200 ballast cars and 500 automobile cars from the American Car & Foundry Co.

The Texas & Pacific is inquiring for 1000 gondola cars, 800 box cars and 200 automobile cars.

The Great Northern is considering the purchase of 1000 ore cars of 75 tons capacity.

The Steamship Fuel Corporation is in the market for 100 hopper cars.

The Southern Pacific is inquiring for 3700 box, 650 flat, 550 stock and 100 caboose cars.

The Northern Pacific has placed 20 Pacific type, 25 Mikado type and four Mallet type locomotives with the American Locomotive Co.

The Delaware, Lackawanna & Western has awarded 5 Pacific type locomotives to the American Locomotive Co.

The Canadian National Railways are inquiring for 56 locomotives, 95 passenger service cars and 50 express refrigerator cars and 50 caboose cars and 1250 stock cars.

The Illinois Central contemplates entering the market for additional freight cars after the first of the year.

Sales by the American Locomotive Co. include the following: Lehigh-Portland Cement Co., Allentown, Pa., 1 four-wheel switching type (79,000 lb.); Inspectoria Federal Das Estradas, for the E. F. Central Do Piauhy, Brazil, 1 six-wheel switching type (70,000 lb.) and one consolidation type (90,000 lb.); Richmond, Fredericksburg & Potomac Railroad Co., Richmond, Va., 1 eight-wheel switching type (230,000 lb.) and 1 six-wheel switching type (172,000 lb.); Riverside-Portland Cement Co., Riverside, Cal., 1 six-wheel switching type (128,000 lb.); Georgia Northern Railway Co., Moultrie, Ga., 1 ten-wheel locomotive (143,000 lb.; Essex Terminal Railway Co., Walkersville, Ont., 1 six-wheel switching type (145,000 lb.); Detroit Terminal Railroad Co., Detroit, Mich, 2 eight-wheel switching type (240,000 lb.); Warren Foundry & Pipe Co., Phillipsburg, N. J., 1 four-wheel switching type (99,000 lb.); Union Oil Co., Oleum, Cal., a switching engine.

Minneapolis, St. Paul & Sault Ste. Marie Railway Co. has ordered 5 Pacific type (269,000 lb.) locomotives of the American Locomotive Co.

The Central Railroad of New Jersey has ordered 10 eight-wheel switching type (240,000 lb.) locomotives of the American Locomotive Co.

The Union Pacific System has bought a 12-in. rotary snow plow of the American Locomotive Co.

The Denver and Rio Grande Western Railroad System has closed with the American Locomotive Co. for 10 mountain type (377,000 lb.), 10 Mallet type (531,000 lb.) and 5 Mallet type (230,000 lb.) locomotives.

The Maine Central has ordered 8 locomotives of the Lima Locomotive Co.

The Pennsylvania Equipment Co., Norwood, Pa., is in the market for 10 used vestibuled passenger coaches, besides two baggage cars.

The Grand Trunk has issued inquiries for 40 locomotives.

The Pere Marquette is in the market for 40 locomotives.

FABRICATED STEEL BUSINESS

Awards of About 20,000 Tons and New Inquiries for 22,000 Tons

Addition to Roslyn Hotel annex, Los Angeles, 1258 tons, to Llewellyn Iron Works.

Building for Castle & Cooke, Ltd., Honolulu, Hawaii, 200 tons, to Worden-Allen Co.

Santa Fe Lines, addition to ice plant, Bakersfield, Cal., 176 tons, to unidentified fabricator.

Plates for Maliko siphon, Wailoa ditch, Maui, Hawaii, 128 tons, placed locally.

Buildings for Richmond, Fredericksburg & Potomac Railroad, Richmond, Va., 350 tons, to McClintic-Marshall Co.

Missouri Pacific, turntables, 210 tons, to unnamed fabricator.

Department store addition for H. C. Prange Co., Sheboygan, Wis., 400 tons, to Worden-Allen Co.

Car repair shop for Lake Superior & Ishpeming Railroad at Marquette, Mich., 200 tons, to Wisconsin Bridge & Iron Co.

Fourth National Bank building, Boston, 2000 tons, to New England Structural Co., Boston.

Sacking plant and grain storage building for Board of Commissioners, New Orleans, 260 tons, to St. Louis Structural Steel Co.

Seventh District sheds for Board of Commissioners, New Orleans, 450 tons, to St. Louis Structural Steel Co.

Horses and props, Dam 32, Ohio River, 225 tons, to American Bridge Co.

Jewish Temple, Cleveland, 900 tons, to the National Iron & Wire Co.

Henry Longfellow School, Toledo, 100 tons, to the American Bridge Co.

Towers for Delaware River Bridge connecting Philadelphia and Camden, 9500 to 10,000 tons, largely plates, to Bethlehem Steel Bridge Corporation.

Texas Co., 10 tanks of 64,000 bbl. capacity each, 2200 tons of steel, to Phoenix Iron Works Co., Meadville, Pa.

Store and loft building for Revillon Frères, West Thirty-fourth Street, near Fifth Avenue, New York, 1000 tons, to Hay Foundry & Iron Co.

Apartment building at Park Avenue and Eighty-seventh Street, New York, 900 tons, to Paterson Bridge Co.

Coal bunker for East Penn Junction, [illegible] Pike Grove, Pa., 200 tons, to Bethlehem Steel Bridge Corporation.

Power house for State of New York at Vischer's Ferry, N. Y., 250 tons, to Bethlehem Steel Bridge Corporation.

Apartment building at Lexington Avenue and Sixty-ninth Street, New York, 220 tons, to Hedden Iron Construction Co.

Structural Projects Pending

Inquiries for structural steel work now being figured on include the following:

National Screw & Tack Co., crane runway and trestle, 200 tons.

Niagara Falls, Lockport & Ontario Power Co., Niagara Falls, transmission towers, 4000 tons, bids taken.

Chicago Union Station Co., Roosevelt Road viaduct, 3000 tons, bids in Dec. 6.

Chicago Tribune Building, Chicago, about 5000 tons, plans not completed.

American Radiator Co., St. Paul, Minn., 500 tons, bids taken Dec. 4.

LaSalle Street sub-station, Commonwealth Edison Co., Chicago, 300 tons.

Harsh & Chapline Co., shoe factory addition, Milwaukee, 200 tons, Hackendahl & Schmidt, low bidders.

Chicago, Burlington & Quincy, beams and deck plate girder spans, 150 tons.

Northern Pacific, girders and plates, 113 tons.

Municipal Police Station, Boston, 700 tons.

Sand Springs, Okla., cotton mill, 372 tons, Southwest Engineering Co., Tulsa, engineer.

Plant for Mengel Body Co., Louisville, Ky., 450 tons, bids in.

School at Williamsburg, Ohio, 100 tons.

Two steel dump scows, U. S. Engineers Office, Portland, Ore., about 100 tons, bids close Dec. 26.

Apartment building at Broadway and Eighty-second Street, New York, 900 tons.

Apartment building at Fifth Avenue and Ninety-fifth Street, New York, 500 tons.

Addition to West Side Y. M. C. A. building, Fifty-seventh Street, New York, 1500 to 2000 tons.

Knickerbocker warehouse at Amsterdam Avenue and Sixty-ninth Street, New York, 1000 tons.

Baltimore & Ohio, bridge work, 1400 tons.

New York Central Lines, bridge repairs, 500 tons.

New York Municipal Railway Corporation, extension to platform at Canal Street, 200 tons.

Northeast Junior High School, Baltimore, 400 tons.

Independent Fruit Auction Corporation building, New York, 200 tons.

GERMAN PRICES SKY-ROCKET

Pig Iron Advances 45 Per Cent—Steel Only 10 to 13 Per Cent

(By Radiogram)

BERLIN, GERMANY, Dec. 5.—Foundry iron No. 1 has advanced to 156,665 m. per metric ton ($19.89 per gross ton, at 1¼c. per 100 m.); steel ingots are now quoted at 177,800 m. ($22.58); steel bars, at 243,300 m. (1.38c. per lb.); thin plates or sheets, at 373,600 m. (2.12c. per lb.)

[Foundry iron No. 1 was 107,765 m. (14.37) last week. On Nov. 20 ingots were quoted at 161,600 m. ($26.68); bars, at 219,200 m. (1.62c. per lb.); thin sheets, at 332,000 m. (2.45c. per lb.) These mark prices for steel remained unchanged Nov. 27. In each case the American price equivalent was figured at the exchange rate momentarily prevailing.]

Standardization Proceeding—Russia Introduces Metric System—Otto Wolff and A. E. G. Negotiate Merger

BERLIN, GERMANY, Nov. 17.—The upward movement of German prices has not yet halted, and wages are being generally raised. One of the most important wage changes is in the coal industry, where miners wages have been increased by 55 per cent, and allowing for the heavy increases in cost of production, as well as for the doubling of the tax on building miners' dwellings, the federal coal council has just raised prices on the average by 72 per cent. Although they have now reached a value about a thousand times that of 1913, even now the German prices are only about 40 per cent of the cost of imported coal, but the significance of the increase lies in the fact that it causes all other prices to rise again heavily.

The immediate effect of the increase in coal is the rise in iron and steel. In the case of bar iron for instance this amounts to about 66 per cent since Nov. 1, and to about 170 per cent since Oct. 18. Compared with November, 1921, bar iron is now about 48 times higher. The following table shows the present guiding prices for basic material in marks per metric ton, at works:

Ingots	161,600	Hoop iron	258,700
Blooms	178,000	Wire rods	235,000
Billets	188,700	*Sheets	
Sheet bars	193,200	No. 6 and lower	247,300
Structural shapes	216,700	Nos. 6 to 11	278,800
Bar iron	219,200	Nos. 11 to 20	311,900
Universal iron	237,900	No. 20 and lighter	332,000

*United States gage.

Prices of some items are higher than those prevailing abroad, and should the mark retain its present exchange value, German iron and steel manufacturers may find it almost impossible to compete. Most works, however, have sufficient orders to tide them over the winter. Considerable orders for rolled material, machinery, and hardware have lately been booked from neighboring countries in the East. South America and Scandinavia are also buying more freely. Scrap prices have increased greatly not only because of the depreciation of the mark, but also through higher foreign prices. Working more hours at ordinary pay or with only a small extra, is strongly urged by employers, on the ground that an increase in German production would improve the position of the country. Labor, however, is averse to a compromise on this point.

Agreement with Poland Under Negotiation

Since Germany raised the embargo on exports to Poland some time ago in exchange for facilities given by Poland in the transit of Russo-German commerce, Poland has bought a considerable amount of German goods especially of a technical nature. Negotiations being conducted at Dresden touch some of the most vital questions between Poland and Germany. The Government has introduced in the Reichstag a draft for the settlement of the difference between Germany and Poland caused by the partitioning of the mines and other industrial works in Upper Silesia.

Progress in Standardization

The movement to standardize industrial products has received much attention in Germany during the past few years under the leadership of the Society of Constructional Engineers. Most of the work has been done in engineering standardization but the interdependence of standards in other lines has led to the formation of a new body, the Standard Committee of German Industry, (Normenausschuss der Deutschen Industrie) which combines different interests. The standards worked out and introduced comprise all lines of engineering, building material, sizes of papers, etc., and a great number of others are under consideration. It will be years before these standards are generally introduced in Germany, but the smaller European countries show great interest in the German standards and may adopt some of them. As Russia is introducing the metric system, German standards may also influence development there. From January, 1923, the system will be used in the foreign trade commissariat, in the postal service and in the commissariat of health. Until 1927 it is to be introduced for sole use in all the other commissariats in the commerce and industry of the whole country.

Wolff and A. E. G. Negotiate Merger

The fusion of the Sachsenwerk electrical works with the Otto Wolff company not having materialized, the Wolff interests are now establishing association with the Allegemeine Elektricitäts Gesellschaft. The association of these two great concerns, Otto Wolff with the large steel works of Phoenix, Rheinstahl, van der Zypen and its extensive trading and export organization, and the A. E. G., creates a powerful organization to influence the further development of the German engineering and electrical industries considerably.

Polish Steel Industry Active

The Polish iron industry is developing. The number of workmen increased from 5380 in 1919 to 17,800 in 1922. The table shows the development in production during the same time:

	Blast Furnaces		Open-Hearth Furnaces		Rolling Mills	
	Number in Blast	Production, Metric Tons	Number Operating	Production, Metric Tons	Number Operating	Production, Metric Tons
1919	8	15,200	3	16,180	4	14,360
1920	5	42,610	7	68,107	8	48,970
1921	7	60,443	15	118,033	10	92,054
1922, 1st half	7	39,400	11	67,160	10	57,806

Date of Freight Rate Extended

WASHINGTON, Dec. 5.—Modifying its recent order requiring cancellation of schedules proposing a proportional rate of 20c. per 100 lb. on iron and steel products from New Orleans rate points to Houston, Texas, rate points, the Interstate Commerce Commission to-day entered an order postponing the effective date to Feb. 15, 1923, instead of Dec. 11.

Erection of a 500-ton blast furnace for the Sharpsville Furnace Co., Sharpsville, Pa., has been started by the William B. Pollock Co., Youngstown. Fabrication of plate work for the stack has been in progress at the Pollock company's plant for some time. Included in the new installation are a pig casting machine and ladles. It is expected the furnace will be ready for pouring in about four months.

The spring convention of the Society of Industrial Engineers will be held in Cincinnati, April 18, 19 and 20, the major subject being "Management Problems of the Smaller Plants." All the papers to be presented will deal with plants of 500 employees and less.

PERSONAL

L. M. Waite, sales manager of Garvin Machine Co., New York, for the past year and a half, was elected general manager of the company on Dec. 1. He entered the service of the Cleveland Automatic Machine Co. as office boy and worked his way up until he became a salesman. He then joined the National Acme Co. at the time of its formation and occupied positions of various capacities in the shop and sales work, leaving the company after having been a sales manager for many years. During the next eight years he was identified with the machine tool industry in New England, both in the manufacturing and sales capacities.



L. M. WAITE

A. R. Hussey, for the past eight years associated with the Brown & Zortman Machinery Co., Pittsburgh, has severed that connection and joined the sales force of the Pittsburgh office of Manning, Maxwell & Moore, Inc. Mr. Hussey's first affiliation with the machine tool business was with the Baird Machinery Co., Pittsburgh, in 1903.

J. W. Dowling, Bessemer Building, Pittsburgh, has been appointed sales agent of the Big Savage Fire Brick Co., Frostburg, Md., succeeding Walter H. Kelley, who resigned to become refractories engineer of the Bethlehem Steel Corporation, with headquarters at Bethlehem, Pa. Mr. Dowling will continue to represent in a sales capacity the Superior Silica Brick Co., Port Matilda, Pa., and the Kentucky Fluorspar Co., Marion, Ky.

E. C. Woolgar, sales manager of the machinery department, National Acme Co., Cleveland, who has been confined in a hospital for several weeks, during a portion of the time being critically ill, has undergone a marked improvement during the last few days and is regarded as well on the road to recovery.

Charles M. Wambaugh was elected president of the Columbus-McKinnon Chain Co. at the adjourned annual meeting held recently. Julius F. Stone and Charles J. Carter were elected vice-presidents, A. F. Markel, treasurer, and J. C. Dunn, secretary.

James E. Sague, formerly vice-president in charge of manufacturing and engineering, Worthington Pump & Machinery Corporation, has been appointed chief consulting engineer of the corporation. Frank H. Jones, formerly vice-president in charge of sales, has been appointed consultant in matters pertaining to sales. William Goodman has been appointed vice-president to take Mr. Sague's place in charge of manufacturing and engineering, and E. T. Fishwick has been appointed vice-president in charge of sales.

T. B. Reid, well known in machine tool circles both in Canada and in the United States, has been appointed vice-president and sales manager for the Joliette Steel Products, Ltd., Joliette, Que., with offices in Toronto. He was formerly secretary-treasurer and manager for the A. R. Williams Machinery & Supply Co., Buffalo and Detroit, having his headquarters in Buffalo. For several years he has been connected with the Canadian General Electric Co. and the Russell Motor Co.

Wilbur S. Sample, formerly manager of the Montreal office of the George A. Fuller Co., Ltd., has recently left for Dairen, Manchuria (North China) to assume the duties of district manager of the George A. Fuller Co. of the Orient, Ltd., in Chinese territory. He will direct the construction of a general hospital for the South Manchurian Railway Co. at Dairen, together with additional construction work which is to follow both in that section and Shanghai, China.

A. E. Jones, sales engineer in the New York office of the Terry Steam Turbine Co., has accepted a position in a similar capacity with W. B. Connor, Inc., 90 West Street, New York, effective Jan. 1.

C. C. Sundmacher, for 15 years connected with Pickands, Brown & Co., Chicago, has become identified with the United Coke & Coal Co., Fisher Building, Chicago, as sales representative.

Andrew C. Scherer has been appointed by Robert W. Hunt & Co. as assistant to C. W. Gennet, Jr., in the supervision of its rail and track appliances department. Mr. Scherer was graduated from the University of Wisconsin in 1909, and immediately thereafter entered the employ of the Hunt company. Since that time he has been its chief inspector at the Monterey (Mexico) Steel Works, and following the closing of that establishment was transferred as chief inspector to the Lackawanna Steel Co. plant, in which position he remained until entering the Ordnance Department of the United States Army as lieutenant. Upon returning to civil life at the close of the war, he resumed his connection with Robert W. Hunt & Co., having charge of its physical laboratory in Chicago until the recent appointment.

B. M. Grutering, Antwerp, Belgium, representing Belgian blast furnace interests, has arrived in the United States and is at the Hotel Plaza, New York.

T. W. Siemon, vice-president in charge of the drop forge division, Union Switch & Signal Co., 1817 Braddock Avenue, Swissvale, Pa., has severed his connection with the company. Finley L. Walton has been appointed to succeed him.

OBITUARY

FRANCIS WOOD CARPENTER, president Congdon & Carpenter Co., Providence, R. I., died on Friday evening, Dec. 1, at his home in that city following a protracted illness. Mr. Carpenter was born in Seekonk, R. I., June 24, 1831, the son of Edmund and Lemira Tiffany Carpenter. After his graduation from the academy of that town, he entered the employ of Gilbert Congdon as an apprentice, and after learning the various branches of the business was taken into partnership, the firm becoming G. Congdon & Co. In 1892 the firm was incorporated under its present name, and Mr. Carpenter became president. For many years he was president of the Rhode Island Perkins' Horse Shoe Co., and president of the American National Bank.

JAMES J. MCCARTHY, who has been prominently identified with the railway supply business for many years, died Nov. 25 at his home, 4800 Kimbark Avenue, Chicago. Mr. McCarthy was one of the original organizers of the Independent Pneumatic Tool Co., and served as a director up to the time of his death. He also organized the Chicago-Cleveland Car Roofing Co., and took an active part in its business. Mr. McCarthy was past his 80th year, and died of pneumonia.

WILLIAM M. BYERS, for more than half a century actively associated with the financial and industrial life of Gananoque, Ont., died suddenly at the residence of his brother-in-law, B. W. Heaslip, with whom he resided. He was largely interested in the Ontario Steel Products Co., Ltd.; the Gananoque Spring & Axle Co., the Ontario Wheel Co., and other industrial as well as a number of financial interests.

F. B. MCNAB, 37, business manager of the General Motors Research Laboratories Corporation, Dayton, Ohio, died at his residence in that city on Nov. 13.

NEW TRADE PUBLICATIONS

By-Product Coke & Gas Plant.—Semet Solvay Co., Syracuse, N. Y. In a 44 page booklet, 8 x 11 in., have been placed a large number of illustrations and a considerable amount of data covering the by-product coke oven work of the company issuing the publication. There are diagrams showing methods of operation as well as photographs showing both details and general views of the plants. A map is given indicating the location of the principal units installed by this company.

Sturtevant Unit Heater.—B. F. Sturtevant Co., Hyde Park, Mass. Bulletin No. 296 of 16 pages, 8 x 11 in., is devoted to an individual forced blast heater unit for shop use. This is shown to be a development of a system originally introduced by the company in 1870, and part of the bulletin is taken up with the historic development of the heater. Both photographs and diagrams are used as illustrations and tables are given of different sizes and capacities of units.

Pneumatic Collecting and Conveying Systems.—B. F. Sturtevant Co., Hyde Park, Mass. Catalog No. 291 has 72 pages, 8 x 11 in., filled with illustrations and data covering the subject matter above. There are numerous tables of sizes and capacities, together with discussions of both the tables and designs of apparatus. The work is frankly fragmentary because of the innumerable details which would have to be covered to make it complete for each of the many industries served.

Deaeration of Water.—H. S. B. W.-Cochrane Corporation, formerly the Harrison Safety Boiler Works, Philadelphia. Booklet describing the apparatus designed to deliver water free of dissolved oxygen at any temperature from 140 deg. upward, as required, for hot-water heating and service systems and for feeding to economizers and boilers, all as a measure of preventing corrosion to piping, boilers and other apparatus.

Brass and Copper Price List.—American Brass Co., Waterbury, Conn. Revised sheets for insertion in American Brass Co.'s loose-leaf price book, covering brass, bronze and nickel silver sheets and strips, copper in rolls, and various wire and rod prices, etc.

Copper Shingles.—Edwards Mfg. Co., Cincinnati. Artistically illustrated brochure devoted to shingles and Spanish tile made in copper, showing various forms of copper shingles, together with views of houses and buildings on which the material has been used.

Radio Apparatus.—Ludwig Hommel & Co., 530 Fernando Street, Pittsburgh. Encyclopedia of radio apparatus, listing and illustrating virtually all items with a view to convenience in ordering. It includes a bibliography of texts on various phases of radio construction and operation.

Calendar.—Link Belt Co., 910 South Michigan Avenue, Chicago. 1923 Link Belt calendar, ready for distribution in December, 13½ x 24 in., containing 12 separate full sheets, each with an illustration of Link-Belt machinery and equipment.

Chase Condenser Tubes.—Chase Metal Works, Waterbury, Conn. In a 32-page pamphlet is described the manufacture of tubes for condensers, from the mixture of the metals to the final test of the tubes after manufacture. The story is well illustrated and covers not only the details of the manufacturing process, but discussion of the grain size and of various methods of testing and examination of the tubes after they have been made. The pamphlet carries the thesis that a sound condenser tube, irrespective of its casting or early stages of manufacture, can be made to comply with any reasonable specification by the annealing and drawing operations.

Die Heads.—Geometric Tool Co., New Haven, Conn. Booklet of 11 pages describing the company's style DS screw-cutting die heads, which are self-opening and adjustable for Brown & Sharpe, and particularly adaptable to other single spindle automatics. Features of construction are outlined and instructions for operating are given. Specifications and list of parts are included.

Tapping Devices and Appliances.—Geometric Tool Co., New Haven, Conn. Booklet 4 by 7¼-in., 29 pages, describing and illustrating the Jarvis high-speed tapping device, with instructions for operating and a list of parts. The Jarvis friction tapping device, style FD; the Jarvis quick-change chucks and collets, style P, for drilling, counterboring, tapping and chuck setting, and the Jarvis combination tapping device and quick-change chucks, style S and style R, are illustrated and described. A section on the construction and operation of the Jarvis self-opening stud setter is included.

Material Handling Equipment.—Herbert Morris, Inc., 30 Church Street, New York. Two bulletins illustrating and describing the Morris triple-gear chain block and hand-power cranes. Specifications on all sizes of this company's chain blocks from ¼-ton to 10-ton capacity are given, as well as line drawings of the construction.

Air Hoists.—Sullivan Machinery Co., Chicago, Ill. Bulletin 76-B describes the company's double-drum, portable air hoist known as "turbinair," for use in hauling ore-scrapers or "slushers." The two drums of this hoist are controlled independently by friction clutches and band brakes, corresponding in operation to those used on the single drum hoist. By this method either drum may be operated separately, or both may be thrown into gear at the same time.

Centrifugal Pumps.—Dayton-Dowd Co., Quincy, Ill. Bulletin 249, superseding 244, size 7½ x 10½, 32 pages. Covers the company's type CS single stage, double-action pump. The design and specification of the pumps are given in the first section, the illustrations including cross-sectional views, characteristic curves, a table of dimensions, and a speed capacity table with approximate efficiencies. Section two describes and illustrates the method of testing. The various types of drive, motor, turbine and belt, are described and illustrated in a third section, which is followed by a section with illustrations of various installations. A section devoted to hydraulic data includes correct and incorrect methods of installing suction lines.

Steam Turbines.—Standard Turbine Corporation, Wellsville, N. Y. Bulletin 6, size 8½ x 11 in., 8 pages. Describes type 228 standard steam turbine, which is of the velocity stage type, with two revolving rows of buckets in each stage and built in one or two stages, as the condition may require. Various details of construction such as the casing, bearings, buckets and nozzles and other details are given, the illustrations being of the pump unit and the generator unit. Sectional views showing the interior construction are included.

Gear Design.—R. D. Nuttall Co., McCandless and Harrison Avenues, Pittsburgh. Booklet No. 36, containing a series of charts on gear design, and bulletin No. 34, a new publication entitled, "Industrial Helical Gears."

Horizontal, Boring, Drilling and Milling Machines.—Niles-Bement-Pond Co., 111 Broadway, New York, circular No. 285, size 9 by 11 in., 12 pages. Describes and illustrates its duplex control borer, driller and miller. The illustrations include large detail views of various parts of the machine, a double page being given to illustration of an operator manipulating the various controls. Different drive arrangements are illustrated, and also tables and other attachments. Specifications are given for the 60 and 72 in. machines.

Duraloy.—Cutler Steel Co., Pittsburgh. Bulletin No. 221, 4 pages, devoted to the development, physical properties, composition and characteristics, strength and high temperatures, machining and welding qualities, oxidation and heat resistance, resistance to corrosion, and abrasion of Duraloy, a chromium iron alloy.

Rust Proofing.—Udelyte Process Co., Kokomo, Ind. Booklet describes the company's rustproofing process involving the use of the metal cadmium, which is deposited electrochemically.

Bearing Metals.—Cadman Mfg. Co., Pittsburgh. Engineering bulletins, No. 1 and No. 2, discuss this company's 60 years' experience in making bearing metals.

Locomotive Repairs.—Metal & Thermit Corporation, New York. Fourth edition of pamphlet No. 21 contains many revisions and additions on the application of thermit to locomotive and railroad equipment repairs.

Metropolitan Subway and Elevated Systems.—In a splendidly handled pamphlet of 28 pages, 8 x 10½ in., the General Electric Co., Schenectady, N. Y., has issued as bulletin No. 44018 a description in brief of the systems of the Boston Elevated Railroad, Brooklyn Rapid Transit, Chicago Elevated Railroads, Hudson and Manhattan Railroad, Interborough Rapid Transit and Philadelphia Rapid Transit Co. Each of these is illustrated not only by half-tones, but with an outline map of the district covered, showing the extent of the lines, both elevated and subway. Attention, of course, is concentrated upon the electric features of the equipment as furnished by the issuing company, but enough is given of the characteristics of the systems to make it decidedly readable.

Machinery Markets and News of the Works

MORE RAILROAD BUYING

Chicago, Burlington & Quincy and Pennsylvania Place Large Orders

Missouri Pacific in the Market at St. Louis for List of 53 Machines

The Chicago, Burlington & Quincy Railroad and the Pennsylvania Lines East have enlivened the machine-tool markets during the past week by the placing of large orders for shop equipment. The Burlington will probably conclude its purchases this week and the total will be close to $500,000, according to Chicago reports. The Pennsylvania Railroad had about 80 items on its list and orders for practically all of these machines have been placed either formally or informally.

Another large railroad inquiry has come out at St. Louis, the Missouri Pacific asking prices on 53 items, principally engine lathes, turret lathes, planers, shapers, drilling machines and milling machines. The inquiry of the Chicago, Milwaukee & St. Paul is still pending at Chicago. The New York Central has purchased a few machines; the Southern Pacific has ordered a 90-in. quartering machine and a few smaller tools, and other railroad business has been received, mostly in the form of orders for single tools.

Railroad equipment companies are buyers. The American Locomotive Co. is in the market for several machines and the American Car & Foundry Co. has inquired for three or four tools. The Canton Car Co., Canton, Ohio, will enlarge its facilities for repair work and will probably buy cranes and tools.

Inquiries from general industrial sources are numerous, but the percentage of orders is small. A Pittsburgh dealer has compiled figures showing that it has quoted on about 2000 inquiries in 11 months of this year, the total value being $1,500,000 to $2,000,000. Only a small part of this business has been closed, which leads to the belief that much of it will come up again in 1923.

The Ford Motor Co. is inquiring for tools for its assembling plant at Green Island, N. Y. The Chicago, Wilmington & Franklin Coal Co. has bought 8 or 10 tools for its mine at West Frankfort, Ill.

New York

NEW YORK, Dec. 5.

THE most important buying of machine tools in the East is that by the Pennsylvania Railroad for its new shops at Altoona, Pa. Orders are being placed at the purchasing office in Philadelphia. A good share of the 80 tools on its list has been formally or informally ordered. Most of the current business of importance continues to come directly or indirectly from the railroads. The American Locomotive Co., New York, has inquiries out for several machines, including four boring mills, and is expected to issue further inquiries shortly The American Car & Foundry Co., New York, is in the market for a few tools. The Southern Pacific has bought a 90-in. quartering machine and a few smaller tools for Western shops. The Sprague Electric Works of the General Electric Co., of Bloomfield, N. J., is in the market for three turret lathes. Other shops of the General Electric Co. continue to send out inquiries. Two milling machines have been purchased for the Erie works.

November business with some sellers was the best of the year. This is particularly true with dealers who handle both new and used tools. Recent advances in prices of new machines are causing buyers to look over carefully all available used machines, and in many instances the latter are bought because of considerable saving in price.

No new crane inquiries of any size have appeared the past week, but there are several for cranes of fairly large capacities which are pending. Some inquiries have appeared for estimating purposes in arranging appropriations for next year, and one or two have been withdrawn from the market. Among these are the American Car & Foundry Co., which recently has been accepting bids on a 10-ton overhead crane and the Cutler Steel Co., Pittsburgh, Pa., which has also postponed purchase of a 10-ton electric crane. Among current inquiries, about the largest is from the American [illegible] its Schenectady plant. The inquiry calls for two 150-ton double trolley, 75-ft. span cranes for handling locomotives and two 20-ton, 71-ft. span, also double trolley cranes. The recent inquiry of the Adirondack Light & Power Co., Amsterdam, N. Y., for a 30-ton electric crane will probably be closed this week. The Kansas City Bolt & Nut Co., Kansas City, Mo., is stated to be in the market for a 47-ft. span ladle crane.

Among recent purchases are:

American Locomotive Co., a 20-ton locomotive crane for use at its Brooks plant, Dunkirk, N. Y., from the Ohio Locomotive Crane Co.

Pickands, Mather & Co., Cleveland, two 40-ton, 50-ft. boom locomotive cranes for use in Minnesota, from the Industrial Works.

Gould & Taylor Cut Stone Co., Brooklyn, N. Y., a 7½-ton, 65-ft. span, 3-motor overhead traveling crane, from the Bedford Foundry & Machine Co.

Edward G. Budd Mfg. Co., Philadelphia, a 5-ton, 17-ft. span, 3-motor overhead traveling crane, from the Niles-Bement-Pond Co.

Philip T. King, 30 Church Street, New York, dealer, has purchased four 50-ton unused Industrial wrecking cranes from the Navy Department, Great Lakes, Ill.

David J. Joseph Co., Cincinnati, iron and steel scrap, three 3C and one 8C locomotive cranes for its Youngstown and Cincinnati yards, from the Browning Co.

The Arctic Hygeia Ice Mfg. Co., 300-60 East 133d Street, New York, has plans for extensions and improvements to cost $150,000, including additional equipment. Ophuls & Hill, 112 West Forty-second Street, are engineers. George Kinkel is president.

The Electric Cord Adjuster Corporation, 103 East 125th Street, New York, recently organized to manufacture electrical specialties, is making inquiries for black steel-spring wire, tubing and kindred products. A. F. Brown is manager.

The Bureau of Yards and Docks, Navy Department, Washington, will take bids until Dec. 28 for refrigerating machinery for the ice plant at the proposed veterans' hospital at Tupper Lake, N. Y., as set forth in specification 4720; also for one steel water tank, specification 4724.

The Board of Trustees, Floral Park, N. Y., will install an electrically operated pumping plant in connection with

waterworks extensions. C. E. Marshall, Hempstead, N. Y., is engineer.

Carnival Place, Inc., 2 Columbus Avenue, New York, has plans for a one-story automobile service and machine repair works, 139 x 350 ft., at Nagle and Academy Avenues, to cost $125,000. Frederick Heister, 534 West Fifty-sixth Street, is architect. James E. Butterfield is president.

The Ice Service Co., 68 Ninth Avenue, New York, operating five local ice-manufacturing plants, is disposing of a bond issue of $3,000,000, a portion of the proceeds to be used for extensions and improvements.

The Elmhurst Ice Co., Renn Place, Elmhurst, L. I., is taking bids for the erection of a two-story ice-manufacturing plant, 40 x 119 ft., on Junction Avenue, Corona, N. Y., estimated to cost $150,000, including machinery. William Vanfelde, 2188 Metropolitan Avenue, Middle Village, N. Y., is architect.

The Metropolitan Mechanical Works, Inc., 129 Boerum Place, Brooklyn, is making inquiries for a precision bench lathe.

A two-story machine shop and mechanical department extension will be made to the works of the Borough Park Garage Co., 16 West Thirty-first Street, New York, at 3091-3111 Fourteenth Avenue, Brooklyn, to cost $25,000.

The International Petroleum Co., 120 Broadway, New York, will build pumping plants, oil storage and distributing plants and other mechanical structures in connection with a new pipe line system in the South American oil fields, estimated to cost $20,000,000. It will be used by the Leonard Oil Development Co., Colombia Syndicate, Transcontinental Oil Co., and other interests of the Standard Oil Co.

The Western Electric Co., 195 Broadway, New York, with plant at Hawthorne, Ill., is arranging for a $15,000,000 bond sale, a portion of the proceeds to be used for extensions, improvements, etc.

The New York Central Railroad Co., 466 Lexington Avenue, New York, will receive bids until Dec. 13 for two inclined freight elevators for Pier D, North River, with fence wire, posts and parts for complete installation. C. S. White, Room 344, address noted, is purchasing agent.

The Hudson Wire Co., 62 Water Street, Ossining, N. Y., has awarded a contract to the McClintic-Marshall Co., 50 Church Street, New York, for a new one-story building, 50 x 150 ft., to cost $25,000.

The Radio Corporation of America, Woolworth Building, New York, has tentative plans under consideration for the construction of new wireless stations in England, France, Germany and other European countries, with power plants for long-distance transmission, steel towers, etc. Edward J. Nally is president.

The Federal Meter Co., Broklyn, recently organized, has perfected plans for the operation of a plant at 838 Fourth Avenue. John H. Atwell, formerly connected with the Thomas Meter Co., is one of the heads of the new company.

The Board of Trustees, Glens Falls, N. Y., will install an electrically operated pumping plant in connection with extensions and improvements in the sewerage system, estimated to cost $120,000. Revised plans are to be prepared. J. Meyer, City Hall, is city engineer.

A power house will be constructed in connection with the new two-story plant, 65 x 115 ft., to be erected at Mechanicsville, N. Y., by George P. Ide & Co., Troy, N. Y., manufacturers of collars, etc., estimated to cost $100,000. Edward T. Loth, 253 Broadway, Troy, is architect.

The Crane-Simplex Co., Inc., 115 Broadway, New York, recently organized, has acquired the property and equipment of the Simplex Automobile Co., New Brunswick, N. J., from the Mercer Motors, Inc., Trenton, N. J., and will resume the manufacture of the Simplex car in a plant at Long Island City, where a building will be equipped and placed in operation early in January. The New Brunswick plant was used for the manufacture of Hispano-Suiza airplane motors during the war, when production of the Simplex automobile was discontinued, and will not be utilized by the new organization at the present time. L. R. Ayers is president of the new company; John H. Bawden, Jr., for the past ten years associated with the Mercer organization, is vice-president and general manager; Harvey B. Clark and Frederick H. Brand, identified with the former Simplex company, are treasurer and assistant treasurer, respectively.

The M. W. Kellogg Co., Westside Avenue, Jersey City, N. J., manufacturer of pipe, steam specialties, etc., has completed plans for a new one-story foundry on Hackensack Avenue, to cost $49,000.

A vocational department will be installed in the two-story junior high school to be erected on the Newton Lake Boulevard, Collingswood, N. J., for which plans are being completed by P. A. Davis, 1713 Sansom Street, Philadelphia, architect.

The Commonwealth Electric Co., Summit, N. J., and affiliated interests, the Lakewood & Coast Electric Co., and the Lakewood & Coast Water & Electric Co., have been acquired by the Albert Emanuel Co., 61 Broadway, New York, manager of utility properties, for $4,000,000. The new owner will take possession at once, and plans for extensions and improvements in the plants and system. The American Waterworks & Electric Corporation, 50 Broad Street, New York, has purchased the Commonwealth Water Co., another affiliated interest, operating at New Providence, Millburn, Maplewood and vicinity, and will improve and increase the capacity of the plant.

The Irvington Cooperage Co., 63 Cordier Street, Irvington, N. J., is in the market for a 100-hp. boiler, locomotive type.

The Wiener Body Co., 252 Academy Street, Newark, manufacturer of automobile bodies, has acquired four acres on Hoffman Place, Irvington, for the erection of a new plant. Max Wiener heads the company.

The William B. Kerr Co., 144 Orange Street, Newark, manufacturing jeweler, has leased the two-story and basement factory at 263 Washington Street for a new plant and will remove to this location.

The Katchem-Shaw Iron Works, Inc., 487-95 Lyons Avenue, Irvington, has filed plans for a one-story building, 75 x 100 ft., for a structural steel and ornamental iron fabricating works. Solomon Shaw is chief engineer and one of the heads of the company.

Ovens, power equipment, conveying and other mechanical equipment will be installed in the new baking plant to be erected by Dugan Brothers, 287 Broadway, Brooklyn, at 161-75 Abington Avenue, Newark, for which plans have been filed. It will cost $135,000 with equipment.

A manual training department will be installed in the two-story high school to be erected at Hightstown, N. J., estimated to cost $200,000, for which plans are being prepared by Guilbert & Betelle, 346 Broad Street, Newark, architects.

The L. H. Trowbridge Sign Co., 86 Frelinghuysen Avenue, Newark, manufacturer of display signs, has leased a floor in the building at 48-50 Westfield Avenue, Elizabeth, N. J., for a branch plant.

The Magnus Electric Co., Inc., 451 Greenwich Street, New York, is enlarging its factory floor space by 11,000 sq. ft. to provide for increased output, the second enlargement within a year. Specifications are being prepared for bids on additional equipment and new machinery, for added facilities in its electrical plug and radio accessory departments.

New England

BOSTON, Dec. 4.

THE past week was colorless in the machine tool market, the holiday having a tendency to slow up the little business available. Sales in practically every instance involved single machines, and used equipment figured to a greater extent than new. Additional inquiries developed, all unimportant, but nevertheless swelling the aggregate prospects to sizable proportions. Common opinion among the leading local houses is that business will remain quiet until after the new year. It is intimated by some good prospects that purchases will be made then. The General Electric Co., West Lynn., Mass., is reported to have made up its 1923 machine tool budget, which involves a fairly large number, and there is a possibility of the tools being purchased through the company's Schenectady office.

The Parker Metal Goods Co., Worcester, Mass., recently incorporated under State laws by Arthur H. Parker, founder of the Parker Wire Goods Co., has acquired manufacturing space in the Peter Baker Building, 28 Cherry Street, and will produce general wire hardware, special wire goods and metal stampings. Mr. Parker is president and treasurer of the new company.

Work has been started on a 60 ft. addition to the forging department of the Stanley Rule & Level Co., Southington, Conn., plant, a subsidiary of the New Britain plant. Orders have been placed for new forging machinery.

Frederick M. Ramsdell, Worcester, Mass., founder of the Ramsdell Specialty Co., Inc., recently acquired by the Worcester Electric Supply Co., has organized the Ramsdell Tool & Mfg. Co., which produces screw machine products and machinery. Mr. Ramsdell is president and general man-

ter Associates, Inc.

The Old Colony Envelope Co., Westfield, Mass., has purchased a three-story and basement plant on North Elm Street, together with 33,000 ft. of land. Production will start as soon as equipment can be installed.

The M. S. Wright Co., Worcester, Mass., vacuum cleaners, has organized the Sweeper Vac Appliance Co., a subsidiary, [illegible] sales manager of the parent company, is president; Clifford L. Wright treasurer, and Walter L. Chandler secretary.

The Marlboro Wire Goods Co., High Street, Marlboro, Mass., is having plans prepared for a larger factory to take care of its increased business. A site has not been selected, but financing plans are complete.

William H. Blount, formerly superintendent Sleeper & Hartley, Inc., Worcester, Mass., and Ralph G. Arey, have organized the Arey & Blount Electric Co., capitalized for 100 shares of stock without par value, to manufacture electric flashers. Mr. Arey is president, and Mr. Blount treasurer.

The Reed & Prince Mfg. Co., Worcester, Mass., manufacturer of screws, bolts, nuts and kindred products, will erect immediately two additional buildings, one 60 x 380 ft., one and two stories; the other 90 x 125 ft., one story with monitor roof, to be ready for occupancy late in the spring. The company is now rushed to capacity and additional manufacturing space and larger storage facilities are necessary in spite of the fact that the works were largely increased during the war. The new business includes some foreign orders, but the bulk is from a very wide diversity of customers over the United States. The company has 1150 people on its payroll and is operating with two and three shifts.

The Parker Wire Goods Co., Worcester, Mass., which, as recently announced, will erect a factory on the site of the old Star Foundry, will build a structure 120 x 300 ft., one story, with monitor roof. The present rented space in the Osgood Bradley Building is inadequate and the new factory will permit immediate expansion as well as future growth. Arthur H. Parker, founder of the business, has resigned as president, treasurer and director and severed his connection with the company. Howard W. Nester has been elected treasurer and general manager. The office of president is still vacant.

The Champion International Co., Lawrence, Mass., manufacturer of pulp and fibre products, has commenced foundations for a new one-story machine shop, 62 x 112 ft., for parts production and machinery repairs. Herbert S. Kimball, 177 State Street, Boston, is architect.

The Edison Illuminating Co., 70 State Street, Boston, is arranging an appropriation of $11,500,000, of which $7,000,000 will be used for the construction of a 60,000-kw. capacity generating plant on site recently acquired at Weymouth, and $4,500,000 for extensions and improvements in present power plants and electric substations.

The Safety Car Heating & Lighting Co., Dixwell Avenue, New Haven, Conn., manufacturer of electric heating and lighting equipment for railroad cars, will build a one-story addition, 106 x 115 ft. A. E. Brinkerhoff, 527 Fifth Avenue, New York, is architect.

The Manufacturers' Polishing & Plating Supply Co., Bridgeport, Conn., recently organized with a capital of $100,000, has leased a portion of the former plant of the Morris Metal Goods Co., Union Avenue, and will install equipment for the manufacture of buffing wheels and tools, plating and polishing equipment, etc. The company is headed by F. T. and H. H. Bristol.

The E. Howard Clock Co., 206 Eustis Street, Boston, has filed plans for a one-story addition estimated to cost $22,000.

The Atlantic Screen & Wood Products Co., Roxbury, Mass., has leased the three-story factory at 25 Vale Street, for the manufacture of screens and other domestic wire goods, wood specialties, etc.

The Blakeslee Forging Co., Plantsville, Conn., has awarded contract to the Immick Co., State Street, Meriden, Conn., for a two-story forge shop addition, 39 x 45 ft. Greenwood & Noerr, 847 Main Street, Hartford, Conn., are architects.

The Cambridge Motor Co., 195 Massachusetts Avenue, Cambridge, Mass., has awarded a contract to the J. F. Smith Construction Co., Boston, for a two-story and basement service and machine repair works at Massachusetts Avenue [illegible] ft.

The New England Power Co., Worcester, Mass., has preliminary plans for a new central power and distributing plant for the Eastern Massachusetts districts, to cost in excess of $150,000. New transmission lines will also be built.

Philadelphia

PHILADELPHIA, Dec. 4.

ADDITIONS to be constructed at the plant of the Pennsylvania Sugar Co., 1045 North Delaware Avenue, Philadelphia, will comprise a one and two-story machine shop, power house, and barrel plant. Bids will be called early in January. George H. Earle, Jr., is head.

In connection with a program for new school buildings at Philadelphia, during 1923, for which a fund of $15,000,000 is being arranged, plans will be drawn for a new industrial high school to cost in excess of $500,000 with equipment. The Board of Education, William Rowen, president, is in charge.

A three-story automobile service and repair building, 104 x 120 ft., for company trucks and cars, estimated to cost $25,000, exclusive of equipment, will be erected at 223-27 Lombard Street, Philadelphia, by the Abbot's Alderney Dairies, Inc., 3041 Chestnut Street. Walter Smedley, Stephen Girard Building, is architect.

The Kohler Co., Kohler, Wis., manufacturer of sanitary ware, has acquired property at Thirty-second and Turner Streets, Philadelphia, totaling 15,000 sq. ft., for a three-story branch plant, for which plans will soon be prepared.

The General Electric Co., Witherspoon Building, Philadelphia, has awarded contract to H. E. Baton, 1713 Sansom Street, for a six-story addition to its local plant at Seventh and Willow Streets, to cost about $80,000.

The Robinson Electric Co., 1135 North Fortieth Street, Philadelphia, has leased property at 809 Race Street for branch works.

The Commercial Truck Co., Twenty-seventh and Brown Streets, Philadelphia, is in the market for an air hammer, type No. 3 Nazel.

The United States Hoffman Machinery Co., 101 Fourth Avenue, New York, manufacturer of clothes-pressing machines, etc., has leased a floor in the building at 1023-25 Race Street, Philadelphia, for a local branch, a portion of the premises to be equipped as a machine repair works.

H. J. O'Donnell, 6106 Vine Street, Philadelphia, operating a sheet metal works, is planning for the installation of a turning machine, sets of 30 and 36-in. rollers, tinners' tools, etc.

The Great Eastern Mills Co., 440 Seventh Avenue, Pittsburgh, manufacturer of sugar products, has leased two buildings at 939-41 North Front Street, Philadelphia, and will install pulverizing machinery and other equipment for a branch plant. George H. Earle, 3rd, represents the company locally.

Joseph Meara, 514 Stuyvesant Avenue, Trenton, N. J., operating a machine and automobile repair shop, has acquired property, 148 x 220 ft., at Hermitage Avenue and Artisan Street, for a new motor service and repair works.

The Atlantic City Electric Co., Atlantic City, N. J., will make extensions and improvements in its power house, substations and system in the vicinity of Cape May, N. J., comprising property recently acquired and to be connected with its main system.

A one-story power house, with radial brick stack, 98 ft. high, will be constructed by the Gilbert Wall Paper Co., 728 Linden Avenue, York, Pa., in connection with its proposed two-story wall paper factory at State Street and the Pennsylvania Railroad, 85 x 325 ft. Bids recently called have been rejected and plans are being revised. J. A. Dempwolf, Casset Building, is architect. Paul C. Gilbert is president.

The Livingood Mfg. Corporation, Lebanon, Pa., has been incorporated with a capital of $50,000 to manufacture metal goods, camping stoves, etc. Local property has been acquired and machinery will be installed at once. William A. Forry, Lebanon, R. F. D. 6, is treasurer.

The Biehl Wagon & Auto Works, 31 South Fifth Street, Reading, Pa., manufacturer of automobile equipment, etc., will soon call for bids for a new two-story plant, 85 x 200 ft., at West Reading. H. G. Mohn, Mohnton, Pa., is architect. J. Biehl is head.

Chapman & Fisher, Bourse Building, Philadelphia, engineers, have plans for the construction of two storage piers and one coaling pier at Cape May, N. J., the latter to be equipped with machinery for loading, unloading, etc., estimated to cost $900,000. The owner's name will be announced later. Bids are expected to be called early in February.

The Pennsylvania Equipment Co., Norwood, Pa., machinery dealer, is in the market for a condenser, about 26,000 cu. ft.; also, a six-wheel saddle tank, with separate tender switching engine.

A vocational department will be installed in the new two-story and basement junior high school to be erected at Berwick Street and Seitz Avenue, Easton, Pa., estimated to cost $350,000, for which bids will be called early in January. William H. Michler, Drake Building, is architect.

The Wilmington Door & Sash Co. will commence the rebuilding of its plant, recently destroyed by fire, to be two and three stories, 200 x 200 ft., estimated to cost $150,000, including machinery. W. C. Wagner is president.

The Daniels Motor Co., Reading, Pa., is arranging for additional manufacture at its plant, and will construct engines for its cars in entirety in the future, eliminating outside parts production and local assembling as heretofore. New machinery has been installed in a number of departments and further expansion is planned. George E. Daniels is president.

The Eastern Foundry Co., Boyertown, Pa., will build a one-story machine shop, in addition to its new one-story foundry, 175 x 185 ft., now in course of erection. The latter will be used for pipe production.

A three-story automobile service and repair building, 50 x 100 ft., to cost about $65,000, will be constructed by the Nanticoke Garage Co., Nanticoke, Pa. Plans are being completed by G. T. Price, 409 Miller Building, Scranton, Pa., architect.

The Cover Electric Co., Huntingdon, Pa., has arranged for a bond issue of $25,000, the proceeds to be used for extensions and improvements.

A manual-training department will be installed in the new two-story high school, 70 x 165 ft., to be erected at Bridgeport, Pa., for which new bids will be called in January. H. C. Richards, 608 Chestnut Street, Philadelphia, is architect.

Fire, Nov. 30, destroyed a portion of the distributing plant of the Independent Oil Co., Allentown, Pa., with loss estimated at $60,000, including equipment. It is planned to rebuild.

The Board of Education, Wayne, Pa., is said to be arranging a list of equipment for installation in the manual-training department of the new high school.

The Susquehanna County Light & Power Co., Scranton, Pa., has arranged for a bond issue of $100,000, a portion of the proceeds to be used for extensions and improvements.

The Electric Foundry & Engineering Co., Tacony, Philadelphia, has installed additional equipment and will specialize in steel castings under 200 lb. A reorganization has taken place. William M. Darlington is president and J. W. Corriston, secretary and treasurer.

The Keystone Boiler Works, Inc., Manayunk, Philadelphia, is in the market for a second-hand rotary bevel shear of capacity up to ½-in. plate or heavier.

Baltimore

BALTIMORE, Dec. 4.

PLANS have been authorized by the Curran Motor Radiator Co., Baltimore, for additions, the largest one story, 48 x 190 ft., to increase the capacity from 50 to 500 radiators per day, primarily of type for Ford and Chevrolet cars. The capital will be raised from $50,000 to $500,000 for the expansion.

The Bedford Pulp & Paper Co., Richmond, Va., with mill at Big Island, Va., has arranged for a bond issue of $800,000, a portion of the proceeds to be used for extensions and improvements. Milton E. Marcuse is president.

The Palmetto Light & Power Co., Florence, S. C., will make extensions and improvements in its plant to cost about $35,000. Additional equipment will be installed.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until Dec. 12 for one motor-driven, back-geared precision lathe, for the local navy yard, schedule 328; until Dec. 19, for a quantity of flashlights and batteries for Eastern and Western yards, schedule 344; one switchboard for the Puget Sound Navy Yard, Washington, schedule 343, and for one patternmaker's lathe, two patternmakers' benches, one saw bench, one hand planer and jointer, for Bellevue, D. C., schedule 335.

E. A. Melton, Balstic, N. C., R. F. D. 1, is in the market for a steam shovel, used, in good condition.

The American Woodworking Co., Sisson Street, Baltimore, will soon take bids for a new one-story plant, 70 x 300 ft., to cost approximately $30,000. T. G. Pratt, 325 North Charles Street, is architect. Frederick Hershfeld is president.

The Anderson Tractor Co., Anderson, S. C., recently organized with a capital of $200,000, has plans for new works to cost close to $75,000 with machinery. Motor-driven tractors in three sizes will be manufactured, with complete parts and assembling departments. W. S. Anderson is president.

The Cape Fear Gravel Pits, Inc., Lillington, N. C., has tentative plans in progress for a plant to manufacture concrete building blocks and tile, estimated to cost $200,000, including machinery. C. W. Lacy is president.

The Crane Co., 836 South Michigan Avenue, Chicago, manufacturer of valves, steam specialties, etc., has leased property on West Broad Street, Richmond, Va., for the establishment of a new branch plant.

The Chief Signal Officer, United States Army, Washington, will receive bids until Dec. 19 for electrical equipment, including armature for motor generator, storage batteries, voltmeter, switchboard tools, knife switches, binding posts, etc., as set forth in circular PR 13228-1CP; until Dec. 18 for two condensers, dynamotor, linemen's test sets, vibrators, etc., as set forth in circular PR 12858-1CP.

Fire, Nov. 22, destroyed a portion of the woodworking plant of the DeKalb Supply Co., Decatur, Ga., with loss estimated at $75,000, including machinery. It is planned to rebuild.

The Crystal Ice Co., Elizabeth City, N. C., will commence the remodeling and improving of its ice-manufacturing plant, including the installation of additional equipment, estimated to cost $100,000. Ophuls & Hill, 112 West Forty-second Street, New York, are engineers.

The Herfurth Engine & Machinery Co., Alexandria, Va., machinery dealer, has inquiries out for a number of ice machines, belt-driven, inclosed type, in good condition.

The Board of Education, Cary, N. C., has plans in preparation for a new two-story vocational school and expects to take bids in January. C. Gadsden Sayre, Anderson, S. C., is architect.

The Bureau of Yards and Docks, Navy Department, Washington, is taking bids until Dec. 20 for a refrigerating and ice-manufacturing plant at the naval base, Pearl Harbor, T. H., specification 4735.

The Tractor Cultivators, Inc., Powell Building, Newport News, Va., William Downie, president, will soon take bids for a new plant at Mansemond, Va., consisting of a main one-story structure, 100 x 100 ft., and smaller building, for the manufacture of farm tractors and kindred equipment. A. Byron Williams, Powell Building, is architect.

The Chapin-Sacks Corporation, Knoxville, Tenn., is planning for the construction of a new three-story ice manufacturing and ice cream plant at Savannah, Ga., estimated to cost in excess of $80,000, with machinery. The ice-making department will be equipped for a daily output of 150 tons. R. B. Whitney is local manager in charge.

A manual-training department will be installed in the new three-story high school to be erected at Carthage, N. C., for which bids will be called on general contract early in February. C. Gadsden Sayre, Anderson, S. C., is architect.

The Fisheries Products Co., 50 Broad Street, New York, has tentative plans for rebuilding its fertilizer plant at Money Point, Va. It will be one story, 245 x 300 ft., estimated to cost $200,000, with machinery.

The Glasgow Clay Products Co., Glasgow, Va., has inquiries out for a rotary, mechanical dryer, with capacity for handling 10 tons of shale per hour.

An electric power plant will be constructed by the Republic Cotton Mills, Inc., Great Falls, S. C., in connection with its proposed new textile plant, estimated to cost in excess of $1,000,000. The machinery for the power station will cost close to $100,000. J. E. Sirrine, Greenville, S. C., is architect and engineer. Robert S. Mebane is president.

The American Mfg. Co., Martinsville, Va., recently organized with a capital of $1,000,000, has acquired a local site for the erection of a new plant to manufacture furniture, estimated to cost $200,000, with machinery. Ground will be broken early in January. A. D. Witten is president and H. N. Dyer, secretary and treasurer.

Pittsburgh

PITTSBURGH, Dec. 4.

MACHINE tool business still runs chiefly to sales of individual tools, but there is a very fair number of such orders and the trade also finds encouragement from negotiations under way. One firm has made a compilation of the number of inquiries it has quoted on during the first 11 months of this year and finds that it runs close to 2000, with a value of between $1,500,000 and $2,000,000. Only a relatively small part of this business has been closed and of the remainder, it is thought that much of it will be placed during the coming year.

Crane activities are more prospective than actual. The Carnegie Steel Co. inquiry for three 125-ton ladle cranes for its Duquesne works still is open, although the award is likely this week. The Koppers Co. has yet to place several cranes in connection with new construction at Clairton and Weirton, and the Ohio Pump & Machinery Co.,

for which the inquiry came out a short time ago. [illegible] 10-ton cranes placed by the Michigan Steel Co., Alliance, Ohio. A good many hoist orders are coming along, one maker reporting sales of nine and another of one, the latter a 1-ton pneumatic Detroit hoist. Power equipment like cranes promises better than it is actually selling. The West Penn Power Co. is planning extension of its Springdale, Pa., plant. The Gulf Refining Co. has placed two 5000 kw. turbines for its Port Arthur, Tex., plant with the General Electric Co.

The National Metal Products Co., 1016 East Eleventh Street, Indianapolis, has acquired property, 75 x 138 ft., at Chateau and Fayette Streets, Pittsburgh, as a site for a [illegible] plant. A specialty will be made of die-castings and kindred products.

The National Forge & Tool Co., Irvine, Pa., is planning for the installation of additional equipment at its plant.

The New Castle Electric Co., New Castle, Pa., has arranged for a bond issue of $85,000, a portion of the proceeds to be used for extensions and improvements. An appropriation of $500,000 was recently arranged.

A one-story and basement service and repair building, 85 x 150 ft., for company motor trucks and cars will be constructed by the Pure Oil Co., Thirty-ninth Street and the Junction Railroad, Pittsburgh.

The Clarksburg Ice & Cold Storage Co., Clarksburg, W. Va., will commence the construction of a one-story ice-manufacturing plant, 50 x 120 ft., to cost about $50,000 with machinery.

A manual-training department will be installed in the new high school to be erected at Weirton, W. Va., estimated to cost $180,000, for which plans will soon be prepared. The County Board of Education, New Cumberland, W. Va., is in charge.

Fire, Nov. 27, destroyed a portion of the shops, power house and tipple at the mines of the Clifton Coal Co., Clifton, W. Va., with loss approximating $50,000. It is planned to rebuild.

The Baldwin-Pocahontas Coal Co., Roderfield, W. Va., is planning for the installation of new tipple and other operating equipment at its plant. J. W. Baldwin is president and general manager.

The Cutler Steel Co., Bowman Building, Pittsburgh, is perfecting plans for the early operation of its new plant at New Cumberland, W. Va., comprising the former works of the National Steel Castings Co. Improvements will be made.

The West Penn Power Co., West Penn Building, Pittsburgh, is arranging for the commencement of work on its addition at Springdale, Pa. The unit will be larger than the present station, and is estimated to cost $6,000,000. A. M. Lynn is president.

The Philadelphia & Cleveland Coal Co. Rockefeller Building, Cleveland, is planning for the construction of a new steel tipple on site recently acquired in the vicinity of its properties at Huntington, W. Va.

The Centre Foundry & Machine Co., Warwood, W. Va., has awarded a contract to the Riverside Bridge Co., Martins Ferry, Ohio, for a one-story foundry, 100 x 320 ft., at Wheeling, W. Va. F. H. Young is general manager.

The Coal River Collieries Co., Huntington, W. Va., will install new electrical equipment, including motors, substation apparatus, etc., at its properties adjoining its works, for the manufacture of automobile equipment. A. G. Wickersham, 517 McClure Avenue, Homestead, Pa., is architect.

The National Radiator Co., Central Avenue and Ohio Street, Johnstown, Pa., is completing plans for a new one-story foundry, 30 x 350 ft., at New Castle, Pa., for the manufacture of stove and radiator castings. J. E. Adams, Nemo Building, Johnstown, is engineer.

The Virginian Railway Co., Norfolk, Va., is said to be planning for the erection of new locomotive and car shops at Justice, W. Va., where a site has tentatively been selected.

The Howard Smokeless Coal Co., Clarksburg, W. Va., recently organized, has acquired the plant of the Byrers Coal Co., at Byrer Tugart Junction, Barbour County, W. Va. Plans are under way for enlargements, including the installation of new machinery. Daniel Howard heads the company.

The Owens Bottle Co., 1401 Nicholas Building, Toledo, Ohio, will soon call for bids for a one-story addition to its plant at Charleston, W. Va., 120 x 200 ft., estimated to cost approximately $150,000, with machinery. The Devore Co., Nicholas Building, Toledo, is engineer. E. D. Libbey is president.

The Kentucky & West Virginia Power Co., Logan, W. Va., is planning to rebuild its power plant recently destroyed by fire, with loss approximating $30,000.

The Auto Truck Equipment Co., 7511 Penn Avenue, Pittsburgh, is taking bids for a new one-story and basement plant, 31 x 100 ft.

Buffalo

BUFFALO, Dec. 4.

THE New Process Gear Co. of Delaware, Syracuse, N. Y., has been organized by T. W. Warner, of the T. W. Warner Corporation, Toledo, Ohio, and W. C. Durant, head of the Durant Motors, Inc., New York, with capital of 300,000 shares of stock, no par value, to operate the local plant of the New Process Gear Corporation, recently acquired. Plans are being prepared for enlargements for the manufacture of gears and transmissions for the Durant and Star cars. T. W. Warner heads the new company; C. R. Burt is manager.

A vocational department will be installed in the three-story high school, 80 x 150 ft., to be erected on Prospect Street, Attica, N. Y., estimated to cost $294,000, for which ground will be broken at once. Morris & Allen, Prudential Building, Buffalo, are architects.

The Cooper Electric Corporation, Hilton, N. Y., is planning for the construction of a new one-story power plant at Parma, N. Y., to cost $55,000.

Fire, Nov. 25, destroyed the car barn and repair shop of the New York State Railways Co., Oneida, N. Y., with loss estimated at $100,000, including equipment.

Power equipment; conveying and other mechanical equipment will be installed in the new one-story printing plant, 100 x 200 ft., to be erected by the A. S. Gilman Printing Co., 623 St. Clair Avenue, Niagara Falls, N. Y., for which a general building contract has been awarded to Wright & Kremers, Gluck Building, Niagara Falls.

Cedric L. Lloyd and W. B. Ellis, Lockport, N. Y., have organized the Master Gear Co., to operate a plant for the manufacture of gears and transmissions for automobiles.

A vocational department will be installed in the two-story and basement senior and junior high school, 150 x 150 ft., to be erected at Owego, N. Y., estimated to cost $275,000. Coffin & Coffin, 522 Fifth Avenue, New York, are architects.

The North East Electric Co., Rochester, N. Y., will purchase a used No. 66 Jarecki pipe machine and a standard Wieland 6-in. pipe threader and cutter.

Detroit

DETROIT, Dec. 4.

THE Michigan Stamping Co., Mack Avenue, Detroit, manufacturer of stamped metal products, has plans for a one-story addition, 140 x 350 ft., to be used in part as a machine shop, and the remainder for general manufacture. Albert Kahn, 1000 Marquette Building, is architect. Walter F. Tant is secretary.

Fire, Nov. 19, destroyed the machine shop, laboratory and other buildings at the plant of the Petroskey Portland Cement Co., Petroskey, Mich., with loss estimated at $50,000. It is planned to rebuild the structures in connection with extensions and improvements to be made to the mill, to cost approximately $500,000.

The Michigan Copper & Brass Co., 5851 West Jefferson Street, Detroit, has filed plans for a one-story addition, to cost $30,000.

Officials and stockholders of Sears, Roebuck & Co., Arthington and Homan Avenues, Chicago, have acquired the plants of the Eddy Paper Co., Three Rivers and White Pigeon, Mich. The Eddy Paper Co. of Illinois has been organized to operate the properties. Extensions and improvements will be made.

The Detroit Public Heating Commission, 174 East Atwater Street, Detroit, has plans nearing completion for a new main municipal electric power plant, substation and transmission system, to cost approximately $5,000,000. Smith, Hinchman & Grylls, 800 Marquette Building, are architects.

The United Produce Co., Lansing, Mich., has plans for a new four-story ice-manufacturing and cold-storage plant, 85 x 280 ft., estimated to cost about $200,000, including equipment. Warren M. Holmes, Tussing Building, is architect.

The Detroit Edison Co., 2000 Second Avenue, Detroit, has preliminary plans under way for a new generating plant at Slocums Island, Mich., to cost approximately $[illegible],000,000. A new power house is also contemplated at

Ecorse Avenue and Dearborn Street, Detroit, and foundations are in progress for a one-story electric substation on Savannah Street, to cost $50,000. Alexander Dow is president and general manager.

Chicago

CHICAGO, Dec. 4.

THE Chicago, Burlington & Quincy has placed some of the equipment against its list and will probably conclude purchases during the week. Its total expenditure for machine tools, including those purchased a few weeks ago, is expected to reach $500,000. The Chicago, Milwaukee & St. Paul has not yet taken action against its inquiry. Inquiries from industrial sources are numerous, but orders are slow in coming through. In some cases users indicate that they will delay buying until after the first of the year. One of the largest individual purchases recently made was closed by the Chicago, Wilmington & Franklin Coal Co. for its mine at West Frankfort, Ill. The following motor-driven machines were bought: A 25-in. shaper, 4-ft. radial drill, 28-in. upright drill, 12-in. x 6-ft. engine lathe, 20-in. x 14-ft. engine lathe, 36-in. x 18-ft. engine lathe, two floor grinders with 14 x 2-in. wheels and a hack saw.

In general, the sales totals of local machine tool houses for November were not equal to those of the previous month, although one dealer had the best month of the year and another booked fully as much business as in October.

The only price change reported was an advance of about 10 per cent on a number of sizes of power hack saws by the Racine Tool & Machine Co., Racine, Wis.

The Interstate Iron & Steel Co., Chicago, is inquiring for a No. 2 Diamond automatic surface grinder with a capacity of 36 x 12 x 12 in. and arranged for motor drives.

The Niagara Radiator & Boiler Co., Chicago, has ordered a 10-ton overhead electric traveling yard crane from the Erie Steel Construction Co., Erie, Pa.

Wilson & Jaspert, Inc., 578 Douglas Avenue, West Hammond, Ind., recently organized with $4,800 capital stock, will manufacture complete phonograph and radio sets, and also a combination phonograph and radio receiver in the same cabinet. The company has leased a plant containing 6000 sq. ft. of floor space on Hoffman Street, Hammond. Its machine requirements have been partially filled, but it will soon be in the market for some small machine shop equipment, including several drill presses. Officers are Arthur L. Wilson, president; William P. Heckman, vice-president, and George H. Jaspert, secretary-treasurer.

The Anderson Electric Works, Inc., 212 West Austin Avenue, Chicago, recently organized with $25,000 capital stock, will repair, buy and sell motors, generators, and electrical equipment. It has leased 6500 sq. ft. at the address given and has purchased all of its equipment. Officers are A. C. G. Anderson, president; J. C. A. Anderson, vice-president; E. H. Johnson, secretary and treasurer, and Max V. Boreing, manager and superintendent.

The Muehlhausen Spring Co., manufacturer of phonograph springs, 5841 Loomis Street, Chicago, will receive bids through an architect on a one-story factory, 100 x 142 ft., at 5811-19 South Western Avenue, to cost $40,000.

The Golden Rule Cutlery Co., 212 Sheldon Street, Chicago, has let contract for remodeling its factory at a cost of $16,000.

B. Heller & Co., manufacturing chemists, 3925 Calumet Avenue, Chicago, have taken bids on a four-story addition, 62 x 380 ft., to cost $100,000.

The Central Manufacturing District, Chicago, has commenced the construction of a three-story plant, 150 x 205 ft., on Forty-seventh Street just west of Spaulding Street, for the Superior Furniture Corporation, a new company. The building and land will represent an investment of $200,000.

The Chicago Metallic Mfg. Co., manufacturer of household metal ware, 544 West Thirty-fifth Street, Chicago, has purchased the plant at 3711-19 South Ashland Avenue, occupied by the Eveready Co., a subsidiary of the National Carbon Co. The building contains 90,000 sq. ft. of floor space. The Eveready Co., which manufactures electric novelties, will occupy the vacated plant of the Oxweld Acetylene Co., at Thirty-sixth Street and Jasper Place.

The Studebaker Corporation, South Bend, Ind., plans further expansion of its facilities. An addition to the closed-car body plant will be 172 x 518 ft. and four stories. An extension to the power house, 48 x 116 ft., two stories, is now being erected. Improved arrangements for the final inspection and testing of cars will be provided by a one-story glass-covered building, 40 x 624 ft., which will connect the shipping and storage department with the final assembly department. There will also be a new four-story car storage building, 76 x 624 ft., and a train shed, 80 x 624 ft. These buildings are part of a general expansion program which includes also two additions to the Studebaker plants at Detroit. One of these units will be a five-story building, 58 x 441 ft., to house final assembling and testing departments and the other a structure, 95 x 248 ft., for various machining operations and stores. All of the buildings will be of reinforced concrete.

The Damascus Steel Co., a new industry which is erecting a plant on a 10-acre site near the Standard Steel Car Co. works, Hammond, Ind., has completed the concrete foundations for its principal buildings.

The American Seating Co., Grand Rapids, Mich., is building a power plant and warehouse to cost $400,000.

Traum & Lien, Fairbury, Neb., will remodel the Marthis tire shop into a machine shop.

Milnes Brothers, 3453 Prairie Avenue, Chicago, operating a sheet metal works, will build a one and two-story addition, 45 x 50 ft., to cost $20,000. Lyman J. Allison, 115 South Dearborn Street, is architect.

A vocational department will be installed in the three-story-and-basement junior high school, 164 x 175 ft., to be erected at Webster City, Iowa, estimated to cost $290,000. William Gordon, 319 Hubbell Building, Des Moines is architect.

The Wabash Railroad Co., St. Louis, has preliminary plans for a new locomotive repair and machine shop at Decatur, Ill., and expects to call for bids early in 1923. George F. Hess, Decatur, is division superintendent.

The Common Council, Shelbyville, Ill., has plans nearing completion for a municipal electric light and power plant. Bonds for $100,000 have been voted. A. W. Fuller, 1979 Railway Exchange Building, St. Louis, is engineer.

The Commanding Officer, Rock Island Arsenal, Rock Island, Ill., will receive bids until Dec. 13 for 450 roller bearings, 20 ball bearings and 40 radial thrust bearings, as specified in circular OAP-35419A.

The Marquette Cement Mfg. Co., 140 South Dearborn Street, Chicago, Ill., will make extensions and improvements in its plant at West Davenport, Iowa, to cost $100,000.

A manual-training department will be installed in the two-story-and-basement high school to be erected at Carbondale, Ill., estimated to cost $110,000, for which bids are being received until Dec. 18 on general contract. Beuttler & Arnold, Grain Exchange Building, Sioux City, Iowa, are architects.

The Universal Portland Cement Co., 210 South La Salle Street, Chicago, is arranging for a one and two-story addition to its plant at Morgan Park, Duluth, Minn., to cost $235,000. The work will consist of extensions in the grinding department, burner building and power house.

A manual-training department will be installed in the new two-story-and-basement high school to be erected at Corydon, Iowa, estimated to cost $135,000. William Gordon, 319 Hubbell Building, Des Moines, is architect.

The Hurley Machine Co., West Twenty-second Street, Cicero, Ill., manufacturer of electric washing and ironing machines, is taking bids for a one-story addition, 61 x 130 ft., to cost approximately $35,000. Edward Hurley is president.

The Mt. Vernon Car Mfg. Co., Mt. Vernon, Ill., is inquiring for an engine lathe of 20-ft. bed and 36-in. swing.

The Universal Packing Co., 190 North State Street, Chicago, is in the market for used imperial X B2 Ingersoll-Rand air compressors, sizes 14 x 9 x 12; 16 x 10 x 14; 19 x 12 x 16. Laidlaw feather valve machines will also be considered.

Hill, Clarke & Co. Improvements

Hill, Clarke & Co., 649 West Washington Street, Chicago, dealers in re-manufactured machine tools, have completed improvements to the store at that address. Additional office space, 20 x 30 ft., has been provided, and a warehouse, 40 x 80 ft., has been added at the rear of the building. The warehouse is equipped with a monorail hoist system, which has also been extended into the show room. Large doors opening from the alley permit motor trucks to be driven into the building and machines to be unloaded and conveyed to any portion of the warehouse or show room by the overhead hoist. The company has a plant and warehouse at 2100 South Kilbourn Avenue, Chicago, where machine tools are re-manufactured and stored. The new warehouse at the store will materially increase the company's storage facilities.

Cleveland

RAILROAD buying featured the local machinery [illegible] lathes with a Cleveland manufacturer for its Al[illegible] two turret lathes from a Wisconsin maker. The Chicago, Burlington & Quincy has purchased three double end punching machines from a Cleveland manufacturer. Local machinery houses report a fair volume of orders mostly for single tools, but inquiry is not active as many prospective purchasers have advised the trade that they will postpone buying until January. Single tool orders are well distributed among automobile accessory manufacturers, brass plants and other industries. Some inquiry has come from the Ford Motor Co. for equipment for its new plant at Green Island, N. Y., one that reached a local machinery builder being for six screw machines. The Canton Car Co., Canton, Ohio, will enlarge its facilities for car repair work and expects to buy one or more cranes and probably some machine tools.

New inquiries include one from the Taplin Stove Co., Mansfield, Ohio, for a multiple spindle drilling machine and one from the East Iron & Machine Co., Lima, Ohio, for a riveting machine.

The plant of the Yoder Co., Cleveland, manufacturer of sheet metal work and machinery, was partially destroyed by fire a few days ago. The building containing the manufacturing departments equipped with about 40 machine tools was burned and it is expected that only from 25 to 40 per cent of these can be salvaged. The company is rebuilding this portion of its plant and expects to be operating again in a few days. It will be in the market shortly for machinery to replace the tools lost in the fire.

The E. N. Riddle Co., Toledo, Ohio, manufacturer of lighting fixtures, will enlarge its plant by the erection of buildings to be used for foundry and other purposes.

The Alliance Machined Steel Casting Co., Alliance, Ohio, will build a 75 x 600 ft. extension to its foundry, nearly doubling its present capacity.

The Archbold Ladder Co., Archbold, Ohio, will erect a two-story building, 40 x 110 ft.

The Towmotor Co., Cleveland, has received an order from Stafford & Myer, Port Louis, Island of Mauritius, for tractors and trailers amounting to approximately $30,000. It has also recently taken an order from the Lehigh Valley Railroad for Pier 8, New York, an additional order from the Van Dorn Iron Works, Cleveland, two orders from London, England, and one from the Keystone Steel & Wire Co., Peoria, Ill.

The Miller Rubber Co., Akron, Ohio, will erect two additional factory buildings, 70 x 105 ft., and 40 x 42 ft.

The Republic Structural Iron Works, 1290 East Fifty-third Street, Cleveland, is inquiring for a 1-in. capacity gate shear, 96-in. blade and 36-in. throat, or size near to this, and for a gate shear of capacity ⅜ or ½-in. plate by 120-in. blade or size near.

Milwaukee

[illegible]

CONSIDERABLE encouragement has been given the machine-tool trade by an increase in inquiries based on immediate needs and requirements to be placed early in the new year. Railroad business is slightly more prominent, local shops having booked a number of single-tool orders embraced by fairly large lots placed in Chicago and Eastern markets. In addition, a fair list is expected to come out soon for a new car repair shop which the Lake Superior & Ishpeming road will build in Marquette, Mich. Automotive industries are making inquiry for miscellaneous tool room and production equipment, most of which is expected to be placed shortly after Jan. 1. Throughout Wisconsin general industrial activity involving metal-working operations is increasing to the point where extensions of capacity will soon require additional equipment beyond replacement needs. Confidence is expressed that December sales will equal if not slightly exceed the volume reached in October and November.

M. Tullgren & Sons, architects, 425 East Water Street, Milwaukee, have been engaged by the Creamery Package Mfg. Co., Chicago, to design a new three-story brick, steel and concrete manufacturing plant, 165 x 266 ft., to be erected at West Division and North Kostner Avenue, Chicago. It manufactures dairy equipment and supplies. Contracts will be let about Jan. 1.

Contracts are being let by the Lake Superior & Ishpeming Railroad Co., Marquette, Mich., for a new car repair shop which will cost about $50,000 and require considerable tooling. The Wisconsin Bridge & Iron Co., Milwaukee, has taken the structural steel work, involving about 200 tons.

The Rice Lake, Wis., Board of Education has engaged E. J. Hancock, architect, Eau Claire, Wis., to design a combination high and vocational training school, estimated to cost $150,000, and to be built early next spring. Dr. F. A. Tate is president of the board.

The Northern Supply Co., Chippewa Falls, Wis., a new $50,000 corporation organized to manufacture telephone, telegraph and power transmission line supplies, has started work on the erection of a two-story brick factory, 40 x 120 ft., to be ready Jan. 15. Most of the equipment will be for wood-working operations on poles, cross-arms, brackets, pins, braces, etc. J. M. Bischell, formerly of Bloomer, Wis., but for several years engaged in similar business at Baltimore, Md., is president and general manager.

The Kools Mfg. Co., Appleton, Wis., incorporated several months ago with $25,000 capital stock to manufacture potato-paring machines and other labor-saving devices, has leased a part of the plant of the Appleton Motor Truck Co. and will start quantity production Jan. 1. Up to this time a limited output has been effected through contracts with local foundries and machine shops. William Kools is president; Edward Kools, vice-president, and Frank Kools, secretary-treasurer.

The Dry Milk Co., 15 Park Row, New York, has plans for a Western plant to be erected at Columbus, Wis., at a cost of $125,000. It will be of brick and concrete, 200 x 250 ft., two stories and basement, with steel sidewall and monitor sash. Bids are now being taken on the building. Equipment will be purchased through the headquarters in New York.

The Lindsay Light & Power Co., Waupaca, Wis., has been authorized to issue bonds of $45,000 for the construction and equipment of a hydroelectric generating plant, plans for which have been completed. Contracts will be let about Jan. 1.

The Consolidated Water Power & Paper Co., Wisconsin Rapids, Wis., will enlarge its paper mill and hydroelectric generating plant at Stevens Point, Wis., at an estimated cost of $350,000 early in 1923, according to announcement made by George W. Mead, secretary-treasurer and general manager. Specifications are expected to be ready by Jan. 15 or Feb. 1. L. A. DeGuere is consulting and contracting engineer.

The Filedex Corporation of America has been incorporated at Green Bay, Wis., with a nominal capital of 3000 shares of non-par valued common stock, to manufacture patented filing cabinets. It has leased the former plant of the Lawson Airplane Co. and is buying miscellaneous equipment, including some precision tools. J. E. Lederman of Chicago, formerly with the Addressograph Co., International Register Co. and factory manager Hess Ball Bearing Co., is patentee of the device and has been engaged as general works manager. E. H. Mayhew, formerly of the Woodstock Typewriter Co., is president; H. A. Minahan, vice-president; Joseph Kabat, secretary, and Charles J. Loignon, treasurer, all of Green Bay.

The Janesville Caloric Corporation, Janesville, Wis., has been incorporated with an authorized capital of $500,000 to take over the plant and business of the Caloric Co., Janesville, manufacturer of fireless cookers, but for several years producing opera chairs for the Stafford Co., Chicago. The new owners will on Jan. 1 resume the manufacture of fireless cookers and begin the production of electric cookstoves, later adding other lines of electrically operated household devices. Officers of the new company are: President, Charles Touton; vice-presidents, Walter Magill, M. A. Hudson; secretary and manufacturing superintendent, Frank Coyle; treasurer, Clarence G. Sutherland.

The Wisconsin Steel & Dock Co., Milwaukee, has been incorporated in Wisconsin with a nominal capital of 3000 common shares without par value, to engage in the construction and equipment of vessels, operate a drydock, fabricate hulls and boilers, and do a general marine contracting business. It takes over a shipbuilding plant partially developed during the war at Kewaunee, Wis., and will establish a smaller drydock and shop plant in Milwau-

kee as well. The principals are F. W. Stevens, A. E. Schunk and Louis Hoffman, all of Milwaukee.

The South Side Buick Co., Milwaukee, has been organized with $40,000 and has acquired a building at Fourteenth and Forest Home Avenues and will rebuild it and install equipment for servicing automobiles, trucks, tractors, etc. John Piszczek, 448 Mitchell Street, is general manager.

The Stratford Light & Power Co., Stratford, Marathon County, Wis., will build a hydroelectric generating plant, with steam auxiliary, and a distributing system at an estimated cost of $50,000.

Cincinnati

CINCINNATI, Dec. 4.

THE past week was unusually quiet in the machinery market, due principally to the intervening holiday and the fact that the Christmas season is drawing closer. The only important inquiry to come out was from the Missouri Pacific Railroad, which calls for 53 items. With this exception inquiries and orders were confined almost entirely to single machines. There has, however, been some railroad buying, and the Pennsylvania Railroad is reported to have placed nearly all its requirements with the exception of lathes. The Big Four bought a 54-in. driving wheel lathe. Manufacturers of special machinery and small machines report fair orders.

The Missouri Pacific Railroad, E. A. Howe, purchasing agent, Railway Exchange Building, St. Louis, has sent out the following inquiry, under file No. 3245:

One 200-ton locomotive hoist.
One 2 x 24-in. flat turret lathe.
One 3-in. heavy duty turret lathe.
One 5-in. heavy duty turret lathe.
One No. 2 center driven axle lathe.
One 16 x 10-in. tool room lathe.
One 20 x 6-in. monitor lathe.
Two 16 x 8-in. portable engine lathes.
One 54-in. car wheel lathe.
Two 16-in. x 8-ft. engine lathes.
Two 22-in. x 10-ft. engine lathes.
Two 24-in. x 10-ft. engine lathes.
One 30-in. x 17-ft. engine lathe.
One 42-in. x 12-ft. engine lathe.
One 36-in. x 12-ft. engine lathe.
One 96-in. driving wheel press.
One 6-ft. semi-universal radial drilling machine.
One 2-in. spindle, high-speed drilling machine.
One 36-in. upright high-speed drilling machine.
One 42-in. upright high-speed drilling machine.
One 30 x 30-in. x 8-ft. planing machine.
One 36 x 36-in. x 12-ft. planing machine.
One 48 x 48-in. x 18-ft. planing machine.
Two 26-in. shapers.
One 18-in. crank slotter.
One 24-in. upright high-speed turret drilling machine.
One 100-ton hydraulic bushing press.
One No. 2 universal milling machine.
One No. 5 horizontal milling machine.
One 36-in. horizontal vertical boring mill.
One 42-in. rapid production boring and turning mill.
One 54-in. rapid production boring and turning mill.
One 2½-in. double head bolt threader.
One 1½-in. double head bolt threader.
One 36-in. heavy duty Morton draw-cut shaper.
Five 2-wheel floor grinders.
One No. 1 universal grinder.
One wet tool grinder.
One 1½-in. bolt header.
Three 48-in. grind stones.

All of these machines are to be equipped for alternating current, 440-volt, three-phase, 60-cycle motors.

The Trailmobile Co., Cincinnati, has awarded contract to the Austin Co., Cleveland, for a new plant and warehouse adjacent to its present property in the Oakley district. The present plant has been sold to the Fay & Eagan Co. Work has commenced and it is expected that the Trailmobile Co. will occupy the plant on February 1. Little new equipment will be required. Murray Shipley is president.

Fire at the plant of the Post-Glover Electric Co., Ludlow, Ky., Nov. 28, caused damage estimated at $25,000. The company manufactures electrical devices and will rebuild as soon as plans can be completed. F. B. VanWinkle is president.

The Brightman Mfg. Co., Columbus, Ohio, manufacturer of cold rolled shafting and highly finished nuts, has been reorganized by a group of Chicago men who have purchased the holdings of the Brightman family. The business will be continued in its present location. J. P. Dods, formerly manager, is vice-president of the reorganized company. W. C. Waggoner, who was president of the new company, died suddenly in Columbus on Nov. 28, but his death will make no change in the company's plans.

The Irwin Augur Bit Co., Wilmington, Ohio, recently occupied its new forge plant. The company reports orders so heavy that more men are now being employed than ever before in its history.

The Fairbanks Co., Springfield, Ohio, piano plate manufacturer, will shortly call for bids for an addition to replace the part destroyed by fire on Nov. 11. M. L. Milligan is president.

The Wellston Mfg. Co., Wellston, Ohio, is contemplating the erection of an addition and is planning to double its capital stock. The company manufactures heating furnaces as well as several specialties. I. W. Warden is president.

Indiana

INDIANAPOLIS, Dec. 4.

CONSTRUCTION will begin on a one-story addition to the municipal electric power plant, Crawfordsville, Ind., to cost $200,000, including machinery. Carroll & Breming, 511 Traction Terminal Building, Indianapolis, are engineers.

The Kokomo Steel & Wire Co., Kokomo, Ind., has commenced the erection of a one-story addition, 90 x 425 ft., to be used for a galvanizing department, estimated to cost $55,000.

The Wabash Valley Electric Co., Clinton, Ind., is planning for the installation of power and line equipment in Vigo County, for connection between its generating plants at Clinton and Sullivan.

The Standard Oil Co., of Indiana, Indianapolis, has called a special meeting of stockholders on Dec. 28 to arrange for an increase in capital from $140,000,000 to $250,000,000, a portion of the proceeds to be used for extensions and improvements.

A manual-training department will be installed in the new three-story high school to be erected at Laporte, Ind., estimated to cost $300,000, for which ground will be broken at once. Miller, Fullenwider & Dowling, 6 North Michigan Avenue, Chicago, are architects.

The Kunkel Valve Co., Fort Wayne, Ind., has foundations under way for a new one-story plant, 75 x 150 ft., to cost about $35,000. The Austin Co., 208 South La Salle Street, Chicago, is engineer in charge.

The Gary Street Railway Co., Gary, Ind., is arranging an appropriation of $500,000 for the extension of its traction line, power house and electric system, additional rolling stock, shop equipment and facilities for repairs.

In connection with the acquisition of the coal railroad division of the Chicago & Eastern Railway, La Crosse, Ind., by the Chicago, Attica & Southern Railroad Co., Attica, Ind., for $250,000, plans are being developed for the use of motorized equipment on the road, and purchases will be made at an early date. Shop facilities will also be provided for the repair of electric rolling stock. The line acquired is 145 miles long.

The Central Indiana Power Co. has awarded contract for its new 40,000-kw. power station on the Wabash River, near Terre Haute, to Stone & Webster, Inc., Boston. This company, which is under the management of Kelsey Brewer & Co., of Grand Rapids, Mich., is a consolidation of utilities serving 70 cities centering in Indianapolis. The consolidation project involves additional financing to the extent of approximately $12,000,000.

The Gulf States

BIRMINGHAM, Dec. 4.

EVANS & MEADE, engineers, have been engaged by the Common Council, Florence, Ala., to prepare plans for the new municipal hydroelectric generating plant on Cypress Creek, estimated to cost $250,000, with equipment.

The Crossett Lumber Co., Crossett, La., has tentative plans for a new plant, with machine shop, power house and other buildings, estimated to cost approximately $1,000,000 with machinery. Later it is proposed to build a mill on adjoining tract for the production of wood pulp.

The Imperial Oil Co., Tampa, Fla., is planning the construction of a new plant to manufacture lubricating oils, with initial output of 500 gal. per day. A pumping plant, machine shop and other auxiliary buildings will be erected, to cost $75,000. W. F. Miller is president.

The Southern Railway Co., Washington, has tentative plans for new repair shops at Gadsden, Ala. W. H. Thrall is chief engineer. Fire, Nov. 26, destroyed a portion of the

Chalmette, near New Orleans, used for grain elevator service, with loss estimated at close to $75,000. It is planned to rebuild.

The Dothan Machine Shop, Dothan, Ala., is planning to [illegible] destroyed by fire Nov. 20. An official estimate of loss has not been announced.

The Caddo Ice, Light & Power Co., Caddo, Tex., plans for extensions and improvements in the electric power and ice-manufacturing plant, recently acquired; additional equipment will be installed. The company was organized to take over and operate the utilities. S. T. Swenson is president, and W. I. Wright manager.

Vocational departments will be installed in the two junior high schools to be erected at Tenth and Hubbard Streets, and Stockton and College Streets, Jacksonville, Fla., by the Duval County Board of Public Instruction, each two and three stories, 160 x 250 ft., estimated to cost $275,000. Greeley & Benjamin, Jacksonville, are architects.

The Hoffman-Burleigh Mfg. Co., Daytona, Fla., recently organized, will build a one-story plant, 60 x 100 ft., for the manufacture of sash, doors, etc. All machinery will be individually motor-driven. W. A. Hoffman is president and manager.

The Tropical Radio Telegraph Co. Miami, Fla., operated by the United Fruit Co., 17 Battery Place, New York, is planning the construction of a new local wireless transmitting station, with complete power plant, steel towers 437 ft. high, and other primary equipment. George S. Davis is general manager.

The Southwest Gas & Electric Co., Shreveport, La., will issue bonds for $2,500,000, a portion of the proceeds to be used for extensions and improvements.

A. F. Messick, Lakeland, Fla., is in the market for a stone-crushing plant, with auxiliary machinery, to have a daily capacity from 150 to 200 tons.

The Gulf States Steel Co., Birmingham, is perfecting plans for the electrification of its bar mill at Gadsden, to include the construction of a transmission line and the installation of motors, controllers, switchboard and other equipment at the mill. C. A. Moffett is president.

A manual-training department will be installed in the new high school to be erected at Georgetown, Tex., for which plans have been prepared by C. H. Page & Brothers, Austin, Tex.

The Marland Oil & Refining Co., Ponca City, Okla., is considering plans for a new seaboard oil terminal and distributing plant in the vicinity of Texas City, or Galveston, Tex., estimated to cost $150,000, with equipment.

The Common Council, McLean, Tex., will issue bonds for $30,000, for the installation of a municipal electric light and power plant.

The Acme Flooring Co., Hattiesburg, Miss., recently organized with a capital of $500,000, is perfecting plans for a factory to manufacture hardwood flooring. A power house will also be erected.

Material-handling equipment, including elevating and conveying machinery, will be installed by the Board of Harbor Commissioners, New Orleans, in connection with the proposed construction of new warehouses and dock improvements, estimated to cost $6,000,000.

The General American Tank Car Corporation, 111 West Monroe Street, Chicago, has arranged for a bond issue of $1,000,000, the proceeds to be used in connection with the erection of a new car works on site of 300 acres recently acquired at Good Hope, near New Orleans.

The Central South

ST. LOUIS, Dec. 4.

A TWO-STORY and basement enameling plant, 80 x 125 ft., is being built by the Odorless Refrigerator Co., West First Street, Chattanooga, Tenn., a subsidiary of the Tennessee Furniture Co. W. H. Sears, James Building, is architect. Gaston G. Raoul is president.

A manual-training department will be installed in the high school to be erected at Hugoton, Kan., for which bids on a general contract are being asked. Lorentz Schmidt & Co., Wichita, Kan., are architects.

Fire, Nov. 21, destroyed the plant of the D. M. S. Motor Repair Co., Kansas City, Mo., with loss estimated at $45,000.

Alexander & Baity, 535 West Commercial Street, Springfield, Mo., have tentative plans under way for a new electric light and power plant at Bolivar, Mo., to cost about $35,000.

The St. Louis & Southwestern Railroad Co., St. Louis, is [illegible]

ments during 1923, to include the erection of new locomotive and car shops, and extensions to existing plants, with the installation of considerable new machinery.

The Phillips & Buttorff Mfg. Co., 217 Third Street, North, Nashville, Tenn., manufacturer of stoves, tin products, etc., has completed plans for a new one-story building, 175 x 300 ft., to cost approximately $35,000. Marr & Holman, Stahlman Building, are architects.

The Knox Porcelain Co., Knoxville, Tenn., recently organized with a capital of $370,000, will commence the erection of a new plant on five acres, lately purchased. It will consist of three individual units, to be equipped for the most part for the manufacture of electrical porcelain specialties, and is estimated to cost in excess of $100,000. J. N. House is president.

A complete machine department for parts production and repair work will be installed in the new two-story and basement garage and service building, 150 x 200 ft., to be erected by the Louisville Garage Co., Louisville, on Fifth Avenue, estimated to cost $225,000, with equipment. Lee R. Miles is president. D. X. Murphy & Brothers, Louisville Trust Building, are architects.

The Paducah Ice Co., Paducah, Ky., will commence the erection of a two-story and basement ice manufacturing plant, 75 x 220 ft., at 1222 South Third Street, to cost $250,000, with machinery. The Pillsbury-Becker Engineering Co., St. Louis, is engineer.

The White Eagle Oil & Refining Co., Wichita, Kan., has arranged for an increase in capital from 320,000 to 640,000 shares of stock, no par value, a portion of the proceeds to be used for refinery extensions and improvements.

An electrically-operated pumping plant will be installed by the Common Council, La Plata, Mo., in connection with extensions and improvements in the municipal waterworks to cost $190,000. Black & Veatch, 701 Mutual Building, Kansas City, Mo., are engineers.

The Federal Can Co., Nashville, Tenn., is planning for the erection of a one-story addition to cost $20,000.

The Yahola Sand & Gravel Co., Yahola, Okla., will increase the capacity of its plant from 100 to 150 cars. Additional machinery for washing, sorting, screening, etc., will be installed. W. S. Dills is president and general manager.

The Smith Furniture Co., 5955 Easton Avenue, St. Louis, is taking bids for a new three-story plant, 128 x 145 ft., at Seventh and Washington Streets, to cost $100,000. Wedemeyer & Nelson, Wainwright Building, are architects.

The Taylor Paper Co., Memphis, Tenn., has tentative plans under way for the construction of a new branch mill estimated to cost approximately $100,000, including equipment.

The Knoxville Power & Light Co., Knoxville, Tenn., is disposing of a bond issue of $300,000, a portion of the proceeds to be used for extensions and improvements.

The Nashville Railway & Light Co., Watkins Building, Nashville, Tenn., is planning for extensions and improvements in its power plants and system, including the installation of turbo-generators, boilers and other equipment, estimated to cost $500,000. E. C. Edgar is general manager.

The Interstate Refiners, Inc., Kansas City, Mo., operating oil refineries, is perfecting plans for an increase in capital from $52,500,000 to $101,000,000, a portion of the proceeds to be used for extensions and improvments

The Litton Veneer Co. Rockford, Ill., will build a power house in connection with its new mill at Springfield, Mo., where a site has ben purchased on Nettleton Street.

The Phillips Higrade Refining Co., Okmulgee, Okla., will make extensions and improvements at its refinery, to include a new power house to double the present capacity, one-story machine shop, one-story pumping plant, tank houses and other work, estimated to cost $500,000, with equipment.

The Pacific Coast

SAN FRANCISCO, Nov. 27.

PLANS are under way by the Union Pacific Railroad Co., Chicago, for the construction of new locomotive and car shops at Los Angeles, to cost close to $1,500,000 including equipment.

The Dinuba Planing Mill, Dinuba, Cal., has acquired a site on West Tulare Street for a new one-story plant to cost $75,000, including machinery.

The Emergency Fleet Corporation, Washington, has rejected the single bid of $405,000 received for the purchase of the Liberty Shipbuilding Co. plant, Alameda, Cal., Nov. 14, and will readvertise the property. The plant cost $2,500,000 during the war.

The Nevada-California Electric Corporation, Symes Build-

ing, Denver, Col., has arranged for a bond issue of $1,500,000, a portion of the proceeds to be used for extensions and improvements. E. S. Kassler is president.

The Corcoran Union High School District, Corcoran, Cal., has completed plans for a one-story vocational training shop at the school.

The Sespe Light & Power Co., Los Angeles, has tentative plans for a new hydroelectric power plant on the Sespe Creek, Ventura County, with initial capacity of 47,000 hp., estimated to cost $5,000,000.

The Oregon Pulp & Paper Co., Salem, Ore., has awarded contract to Van Patten & Son, Salem, for a four-story addition to cost $50,000, exclusive of machinery.

The W. M. Murphy Motors Co., 1919 Calaveras Street, Fresno, Cal., will build a one-story machine and mechanical shop on Van Ness Avenue, 45 x 88 ft. and 20 x 40 ft.

The Brewer-Cranston Box Co., Spokane, Wash., is arranging to rebuild its plant, recently destroyed by fire, estimated to cost $35,000. A list of machinery will soon be prepared. O. Z. Brewer is manager.

The Coast Power Co., Tillamook, Ore., has plans nearing completion for a new power plant to cost $150,000, including equipment.

The Hawley Pulp & Paper Co., Oregon City, Ore., has plans under way for enlargements in its plant to cost approximately $1,500,000, including additional machinery. W. F. Hawley, Sr., is president.

The Yuba Development Co., 1213 Hobart Building, San Francisco, has tentative plans for a new hydroelectric generating plant on the North Yuba River, with capacity of 19,900 hp., estimated to cost $1,500,000.

The California Lock & Lift Co., San Francisco, has acquired property at 165 Thirteenth Street, Oakland, Cal., improved with a two-story building, and will occupy the structure at once.

The San Joaquin Light & Power Corporation, Fresno, Cal., has plans for extensions and improvements in its plant and system in the vicinity of McKittrick and Santa Maria to cost $500,000.

The Monolith Portland Cement Co., Monolith, Cal., will make extensions and improvements to increase the capacity to 3000 bbl. per day.

Canada

TORONTO, Dec. 4

SALES of machinery and machine tools in November were equal to those of October and in some districts dealers report a slight increase. Inquiries and orders are coming from numerous sources and there is also a large amount of business in sight from industrial concerns which have announced their intention of building and improving plants in the early spring. Municipal and Provincial governments have extensive programs for the coming year and companies making equipment for electric and waterworks plants, etc., are looking forward to considerable activity in the new year. Small tools are also in active demand and dealers report a steady improvement in sales the past month.

The Thompson Motor Supplies, Ltd., which will erect a plant at Acton, Ont., to cost $40,000, is interested in equipment. A. Harrison is connected with the company.

The Wilkie Products, Ltd., 312 Pitts Street, Tillsonburg, Ont., is preparing to erect a factory and is asking for machinery and metal working tools, etc.

The Arnprior Creamery Co., Arnprior, Ont., will erect a cold storage plant and will purchase equipment and boilers. E. McKinny is purchasing agent.

Silverwoods, Ltd., London, Ont., is interested in equipment for a cold storage plant, etc. A. E. Sherwood is manager.

The Sydenham Brick & Tile Co., Wallaceburg, Ont., is asking for drying and conveying machinery.

The Skinner Brothers Mfg. Co., Inc., St. Louis, Mo., manufacturer of Baetz patent heaters will establish a plant in Canada to take care of Canadian and foreign business. No statement regarding a site has been made.

The Aleza Lake Sawmill Co., Prince George, B.C., will build a sawmill to cost $20,000 and is interested in equipment.

Jobbin & Genois, 113 Abraham Hill, Quebec, Que., will erect a marble plant at Riviere a Pierre, Que., to cost $25,000.

Cutten & Foster, 302 Church Street, Toronto, makers of auto tops, etc., will build an addition to cost about $50,000. William F. Sparling & Co., 54 University Avenue, Toronto, are architects.

The Howard Furnace Co., 881 Yonge Street, Toronto, will call for bids for the erection of a factory to cost $24,000. H. J. Chown, 20 Wayland Avenue, Toronto, is architect.

James Carnwath, 502 Harbor Commissioner Building, Toronto, has the general contract for a factory to cost $50,000 for the Independent Concrete Pipe Co., Harbor Commissioners Building.

The Shawinigan Water & Power Co., Ltd., Shawinigan Falls, Que., has started work on water power development on the River St. Maurice at Le Gres Falls, Que., to cost $1,500,000. C. R. Lindsay is resident manager.

The Town Council, Souris, Prince Edward Island, proposes to erect an electric light and power plant to cost $18,000. C. C. Carlton is clerk.

Joseph Crane, 309 Esplanade East, North Vancouver, B. C., will construct new marine ways and erect a ship repair machine shop to cost $40,000.

STEEL AND INDUSTRIAL STOCKS

Higher Levels at Close of Week—Not Justified by Business Conditions

Coming out from under the severe pressure sustained on Monday, steel and industrial stocks finished the week with a bullish demonstration in striking contrast to the violent selling movement which dominated the previous Saturday. Extravagance of the sort which ruled the market on the upside speculation in October was recurrent in the recent drastic decline; speculation of late has been as it was then—inordinately out of proportion to the scope of the business swing. The early decline broke on Tuesday. The bullish tendency then prevailed to the eve of Thanksgiving, indicating that the decline was initiated by speculative forces making the most of the unpalatable news. Crucible, Gulf States Steel and like stocks were run up sharply on Friday by a drive against over-extended short interests. Speculative banter over a rumored merger with Replogle pushed Wickwire-Spencer up two points. International Harvester fell nine points at the close as the result of failure to pay dividends on its common. The average of 20 industrials remains at 94.10.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

	Low	High		Low	High
Allis-Chalm.	41	43¼	Lackawanna Steel.	75	77
Am. B. S. & Fdry.	68	75	Lima Loco.....	52⅛	56⅞
Am. B. S. & F. pf.	111	111	Midvale Steel.....	28	30
American Can....	67¾	72½	Nat.-Acme	115⅝	125⅝
American Can pf..	109	111	Nat. E. & Stm....	60¼	65½
Am. Car & Fdry..	175	184	Nat. E. & Stm. pf.	98	98
Am. Car & F. pf..	122¾	122¾	N. Y. Air Brake..	24½	28⅝
Am. Locomotive..	115¾	121⅝	Otis Steel.....	6	8½
Am. Locomot'e pf.	120	121	Otis Steel pf.....	40	40½
Am. Radiator.....	111¾	118	Pittsburgh Stl. pf.	92	92¼
Am. Steel Fdries..	42	44⅜	Pressed Stl. Car..	75	78¾
Baldwin Loco.....	113½	119⅞	Pressed Stl. pf...	99	100
Baldwin Loco. pf.	116¼	117	Ry. Steel Spring.	108	111
Bethlehem Steel..	59¾	62¾	Ry. Stl. Spring pf.	118	118
Beth. Stl. Cl. B..	59¾	63½	Replogle Steel.....	21	26
Beth. Stl. 8% pf..	106	110	Republic	42½	45
Brier Hill.....	14	14¾	Republic pf.....	83	85
Br. Em. S. 2d pf.	26½	26¾	Sloss	37⅝	38
Cleve. Pneu. Tool.	50¾	51½	Steel of Canada ..	77	78¼
Colorado Fuel.....	24½	26½	Superior Steel ..	28⅛	28¾
Crucible Steel ...	58½	66	Transue-Williams	32	32
Crucible Steel pf..	90	91	Un. Alloy Steel...	23	25
Deere, pf.....	72	72¼	U. S. Pipe.....	23	26
General Electric..	174	183	U. S. Pipe pf.....	59½	60
Gt. No. Ore Cert..	30¾	31	U. S. Steel	99⅞	103⅝
Gulf States Steel..	68	76¾	U. S. Steel pf.....	120½	121½
Inland Steel	40	40	Vanadium Steel ..	30⅝	33¼
Int. Har.	91	104½	Va. I. C. & Coke..	55	55
Int. Har. pf.....	117	117¾	W'house Air Br..	93	99

Industrial Finance

E. G. Kirby, Toledo, Ohio, has been appointed receiver of the Gram-Bernstein Motor Truck Co., Lima, Ohio, in proceedings brought in the Federal Court. Operations of the plant will be continued and steps are being taken to effect a reorganization.

The Keystone Steel & Wire Co., Peoria, Ill., showed a net gain to surplus of $29,539 for the fiscal year ended June, 1922, as against a deficit of $541,073 for the previous year.

The Twin Ports Steel & Machinery Co., Superior, Wis., has filed a voluntary petition in bankruptcy, admitting liabilities of $71,303 and claiming assets of $55,929. The concern for many years conducted a foundry and machine shop at 126-136 Hughitt Avenue, Superior.

An involuntary petition in bankruptcy has been filed

against the Oshkosh Tractor Co., of Oshkosh, Wis., manufacturer of tractors and gas engines. Miss Alma Barry, attorney-at-law, 425 East Water Street, Milwaukee, has been appointed receiver.

The Bangor & Aroostook Railroad Co., Bangor, Me., has asked authority from the Interstate Commerce Commission to issue $250,000 equipment trust certificates. The company proposes to purchase 200 new freight cars with funds derived from the sale of the certificates and other resources at its disposal.

Notice has been filed with the secretary of Connecticut that the Norwalk Iron Works Co., Norwalk, Conn., has dissolved and all claims have been settled.

The income account of the Vulcan Detinning Co. for the September quarter gives sales as $392,311, whereas for the corresponding period last year they were $321,445, or $70,866 smaller. Net profits for the quarter amounted to $43,672, as against $16,365 last year, an increase of $27,307.

President Llewellyn of the Interstate Iron & Steel Co. reports gross earnings for the first 10 months of $1,101,237. Gross profits after depreciation, taxes, etc., were $437,104, and net profits after bond interest and other deductions were $112,083. The year's total tonnage will approach the largest for the last five years.

The Guy Steel Casting Co., Elmwood, Conn., is to go out of business. Claims may be sent to George B. Kinghorn, 776 New Britain Avenue, Hartford, Conn.

A special stockholders' meeting of the American Screw Co. has been called for Dec. 1, for the purpose of authorizing the directors to declare a 50 per cent stock dividend. The company has $3,000,000 stock outstanding, while at the close of 1921, its surplus account stood at $2,962,373. The company is paying at the rate of 7 per cent per annum, but in January, last, an extra disbursement of 1 per cent was declared.

Letters are going out to stockholders of the Lackawanna Steel Co. urging that stock certificates be sent in for conversion into Bethlehem Steel Corporation securities. These letters point out that unless the stock certificates, properly indorsed, are surrendered to the transfer agent, Kean, Taylor & Co., New York, Bethlehem securities and cash cannot be mailed to the original Lackawanna stockholders, nor can dividends lately declared on Bethlehem securities be distributed. Approximately 75,000 shares of Lackawanna Steel Co. common stock, or 21 per cent of the 351,085 outstanding at the time of the merger, have not been surrendered for conversion.

The Biggs-Watterson Co., Cleveland, dealer in new and second-hand machinery, has made an assignment.

The Mansfield, Ohio, plant of the Browning-Somers-Adams Co. has been sold at auction to B. F. Miles, Cleveland, for $125,000.

The H. J. Walker Co., Cleveland, manufacturer of motors, has been placed under a receivership in the Federal court. The company was affiliated with the Grant Motor Co. which recently went into a receivership. Joseph C. Hostetler was named as receiver.

The Interstate Iron & Steel Co., Chicago, showed gross earnings of $1,101,237, during the first 10 months of this year. After providing the usual reserves for depreciation, taxes, etc., of $664,137, there was left a gross profit of $437,-100. After bond interest and other deductions, the net profit was $112,083.

The Michigan Trust Co., Grand Rapids, Mich., has qualified as receiver for the Muskegon Castings Co., Muskegon, Mich., under $25,000 bond. The company is considered solvent, but was embarrassed for working capital, and it is expected that business will be continued under the receivership.

The Holland Furnace Co., Holland, Mich., will increase its capital stock from $1,800,000 to $3,600,000, of which $2,000,-000 will be common stock.

Reorganization plans having failed, the property of the Union Motor Truck Co., Bay City, Mich., will be sold at bankruptcy sale Dec. 12.

Large English Cutlery Company Fails

The Sheffield Steel Products, Ltd., a leading English cutlery company, is in financial difficulties, according to advices reaching Washington. The company was an amalgamation of a number of enterprises engaged in manufacturing cutlery, surgical instruments, pliers, corkscrews and related products. At the end of 1920 it was said to be the largest manufacturer of table cutlery in the world, the authorized capital being £4,000,000. Recently the company launched a chain store venture, which is said to have been [illegible] to the financial collapse. A receiver has been appointed to [illegible] take place.

Suit for Receiver for Wagner Electric Mfg. Co.

Suit for a receiver of the Wagner Electric Mfg. Co., a Missouri corporation, has been filed in the Circuit Court at St. Louis by representatives of the estate of Richard C. Kerens, John J. Raleigh and Jane M. Leahy. An injunction to prevent reorganization under the laws of Delaware also was asked; plaintiffs who own about 1600 shares of stock of the Missouri corporation alleged that such reorganization would make their stock valueless.

A restraining order also was asked against the officers and directors holding a meeting of stockholders, Dec. 29, called to vote on a plan to reduce the capital stock of the company and of having the stockholders ratify the transfer of the assets to the Delaware corporation.

A temporary restraining order was issued by Judge Hall, returnable Dec. 8.

The company was reorganized and has been functioning since Aug. 11 as the Wagner Electric Corporation, a Delaware corporation. This reorganization is said to have been ratified at a meeting Aug. 4. W. A. Layman, president, said that 93 per cent of the stockholders of the Missouri corporation had exchanged their stock for stock in the Delaware corporation and were satisfied with the reorganization.

Plans of New Companies

The Fourchime Auto Whistle Co. Clinton, N J., which has been incorporated with a capital stock of $50,000, to manufacture automobile equipment and kindred metal products, is receiving bids on screw machine work. It is in the market for a nickel plating outfit. In connection with its activities the company will do stamping work on a jobbing basis. The incorporators are: Roland J. Hines, J. H. Knox, Jr., and L. Duckworth.

The Commercial Iron Works, Inc., Portland, Ore., was recently incorporated with a capital of $100,000 to manufacture iron and steel products, castings, etc. Properties have been acquired and buildings are equipped for operation. The company is represented by John M. Joyce, 606 Concord Building, Portland.

The Production Machinery Co., corner Main and Horton Streets, Jackson, Mich., originally organized as a sales company, was recently incorporated with authorized capital of $100,000 to manufacture iron and metal working machinery. The company has equipped a modern shop to which extensions have been added from time to time to keep in pace with the demand for vertical lathes and boring mills. Since incorporating, plans have been made to add to the equipment in order to produce on a still larger scale. D. E. Murray is secretary-treasurer.

The McLain Co., Portland, Me., has been incorporated with a capital of 1350 shares of stock, no par value, to manufacture metal-working tools and machinery. Immediate plans provide for building wood-working machines with present shop facilities, but a factory will be erected in the spring and manufacturing will be extended. At that time the company will be in the market for equipment. Frank H. McLain is president and Clark B. Dunton is treasurer, both of Portland.

The Katchen & Shaw Iron Works, Inc., Newark, N. J., will operate a general steel and iron working plant, including the manufacture of structural ironwork. William and Alexander Katchen and Saul Shaw have incorporated the company with an authorized capital of $18,000. The present address of the company is care of J. H. Steinhardt, 31 Clinton Street, Newark.

The Athey Truss Wheel Co., 17 North LaSalle Street, Chicago, which was recently incorporated to manufacture tractors and kindred steel products, is now producing in its own plant. The officers of the company are: A. D. Plamondon, president; J. H. Roberts and I. H. Athey, vice-presidents; and J. A. Roberts, secretary-treasurer. The company's works are located at 5631 West Sixty-fifth Street, Chicago.

The Associated Radio Manufacturers, Inc., which was recently organized to manufacture radio apparatus and equipment, will not begin operations in the immediate future. Ralph C. Watrous, Commodore Hotel, New York, is secretary.

A company organized to manufacture automotive equipment, the chief product of which will be a disappearing luggage carrier invented by M. J. Lantier, has been incorporated with a capital stock of $150,000. Manufacturing will be let out on contract. The men in back of this enterprise include: H. W. Nuckols, formerly president of the Packard Motor Car Co. and the Maxwell Co.; William T. Koch, proprietor of Koch chain stores, and R. H. Woodward, Jr., of Merrill, Lynch & Co. A. H. Johnson, formerly of the General Motors Co., is engineer, and John M. Gibbons, 3841 Grand Central Terminal, New York, general attorney for the New York,

New Haven & Hartford Railroad Co., is counsel for the company, which will be known as the Latler Automotive Equipment Co. Thorpe W. Wright has been appointed general manager.

The American-Ukrainian Agricultural Corporation, 321 Broadway, New York, was recently incorporated with a capital of $75,000 to manufacture agricultural equipment, tractors, etc. The company is still in the process of organization and is looking for a place to begin operation. The incorporators are: J. Glassman, S. J. Finkler and P. D. Mucha.

The Neptune Air Craft Corporation, 233 Broadway, New York, has been incorporated with a capital stock of $100,000 to manufacture airplanes and parts. The company, it is understood, has taken over certain properties which will require considerable readjustment before they can be converted to this particular line of manufacture. The incorporators are: A. Bickel, W. Hutchinson and E. M. Bancroft. Counsel for the company is Henry Amermann, Woolworth Building, New York.

The Plastuck Mfg. Co., 205 Sunset Avenue, Syracuse, N. Y., has been incorporated with a capital stock of $300,000 and will engage in the manufacture of sheet lathing and kindred products. The future of the company is still undecided pending a meeting of the incorporators which will be held in the near future. S. J. Potter and F. S. Hutchinson are the chief incorporators. Counsel for the company is Warren B. Hutchinson, 75 Maiden Lane, New York.

The Severin-Tripp Machinery Co., 25 Church Street, New York, has been organized by Fred C. Severin, formerly with the Niles-Bement-Pond Co., and B. H. Tripp, for many years with the Chicago Pneumatic Tool Co., to supply the growing demand for new and used tools and equipment suitable for railroads. Mr. Severin will have charge of the New York office and Mr. Tripp will manage the Philadelphia office at 2220-2222 Chestnut Street.

Trade Changes

Roger J. Adams & Co., Inc., Newark, N. J., is making arrangements for opening a branch office in Los Angeles, Cal., about Jan. 1. Its activities will include the sale of contractors' machinery and building material, but it will also represent several large eastern construction companies.

The Rockford Milling Machine Co., Rockford, Ill., announces the following changes in agencies: J. C. Austerberry, Detroit, will represent the company in the Michigan territory; the Co-operative Machinery Co., Cleveland, will be exclusive agent in that district, and the Western Iron Stores Co., Milwaukee, will be exclusive representative of this company and of the Rockford Tool Co. in Wisconsin territory.

The manufacture and sale of the Loy & Nawrath line of power brakes, shears and kindred products has been taken over by the Birmingham Iron Foundry, Derby, Conn. This business formerly conducted by the Loy & Nawrath Co. of Newark, N. J., will be handled by the Loy & Nawrath Division of the Birmingham Iron Foundry and all correspondence and business will be centered at the Derby office. Increased facilities are provided by the new arrangement.

The B. L. Schmidt Co., Davenport, Iowa, has changed its name to the Micro Machine Co., and has moved into its new factory building. The company will center its attention exclusively on the manufacture of the Micro wet internal grinding machine for automotive cylinder refinishing.

The Goetzke Gasket & Packing Co., New Brunswick, N. J., has moved its New York branch from 242 Lafayette Street to the Hudson Terminal Building, 50 Church Street, where the company has secured the services of King & Shepard as sales representatives in the metropolitan district.

The Power Specialty Co., builder of Foster superheaters, economizers, and oil heating and cooling equipment, announces the opening of a branch office at Dime Savings Bank Building, Detroit, in charge of L. Lanyi. Another has been opened at 2324 Fourteenth Street, Boulder, Col., in charge of R. B. Nutting, who was formerly Chicago district manager.

The Roller-Smith Co., electrical instruments and radio appliances, 233 Broadway, New York, announces the appointment of the Electric Material Co. as agent in Washington and parts of Oregon and Idaho. The Electric Material Co. recently opened an office in the Hinckley Building, Seattle. R. F. Robinson, who has had nearly 20 years' electrical experience, is in charge.

Plant and equipment of the Gibb Instrument Co., Detroit, manufacturer of electric welding equipment, have been moved to Bay City, Mich. In the new location manufacturing facilities are provided to cope with the increased business. During the past two years the company has concentrated on the development of automatic and semi-automatic arc, spot and seam welders.

The V & O Press Co., designer and manufacturer of power presses and sheet metal working machinery, Brooklyn, N. Y., has appointed L. F. Carlton as western sales manager, with offices at 549 Washington Boulevard, Chicago. Mr. Carlton was connected with the Consolidated Press Co. for 18 years and has a wide acquaintance among power press users.

Effective Dec. 1, the R. H. Madden Co., Inc., will succeed the Madden & Morrison File Co. in the management of the Madden File Works, which has been conducted in Middletown, N. Y., since 1857. Madden files and rasps will continue to be the main product of this company. The officers are: R. H. Madden, president; Z. Edward VanFleet, vice-president; Charles W. Moore, secretary and treasurer.

The Wilson Welder & Metals Co., Inc., 132 King Street, New York, announces the appointment of the Alexander Milburn Co., Baltimore, Md., as exclusive representative in Maryland, Virginia and District of Columbia. The Milburn company will maintain a complete demonstration plant.

M. F. Day, Jr., for the past 11 years with Hickman, Williams & Co., Inc., in its Philadelphia, St. Louis and Pittburgh offices, has gone into business for himself with temporary offices at 936 Mellon Street, Pittsburgh, and will do a general brokerage business in pig iron, coke and coal.

The business of the New Haven Sherardizing Co. will be moved to Akron, Ohio, where it will occupy quarters at 917 Sweitzer Avenue. A. F. Shoen is general manager.

On or about Dec. 1, W. H. J. Fitzgerald & Co., 165 High Street Boston, machine tools, will remove to 261 Franklin Street. At about the same time, the company will open a warehouse in Chelsea.

The American Brass Co., Waterbury, Conn., plans to consolidate much of the clerical work now done at its Ansonia and Torrington branches with the Waterbury office. For this purpose an addition to the main office building at Waterbury will be erected at once.

The Branford Brass Foundry .Co., Inc., Branford, Conn., recently incorporated under the laws of Connecticut, to engage in the brass foundry business, organized the past week by the election of the following officers: President, Hugh A. Cox; secretary, Frederick A. Ells, and treasurer, Robert L. Rosenthal.

BUYING DEFERRED

Prevailing Opinion at Youngstown, However, Is That Good Business Is Coming

YOUNGSTOWN, Dec. 5.—While buying in such lines as sheets, plates, strips and sheet bars has temporarily moderated, steel makers express no apprehension over this condition which is attributable in part to inventory taking. Producers believe there is a substantial overhanging demand in the market, which is being held back by price uncertainties.

Makers here profess to believe that the market will settle around current quotations, though efforts to break down prevailing minimums are noted. There is a question, for instance, as to the stability of the present 3.35c. minimum on black sheets, and indications that some makers will go lower to fill out their rolling schedules.

Considerable irregularity exists in demand for sheets, especially the common grades. Makers of highly finished sheets are booking business for next quarter delivery on the present 5c. per lb. basis, though some tonnage has moved at 4.85c., or $3 per ton less. There continues to be sustained requirement for full finished stock, and broadened manufacturing programs of automobile interests for next year are expected to stimulate the whole steel list entering into motor car manufacture.

In the pig iron market, it is declared that prospects of another coal strike next April are already beginning to be a factor in the price situation. While the market on standard basic material is nominal at $27.50, transactions are reported at least $1 per ton lower. There is much uncertainty in the minds of consumers as to whether or not the bottom has been reached in the pig iron market.

Indicating the depleted state of foundry iron stocks is the demand at this season of the year, when requirements usually fall away sharply. In the Youngstown district, 32 of 47 blast furnaces are pouring, but most of the output is consumed by the makers in their steelworks departments.

Scrap buying is light and prices show little change, with heavy melting scrap pegged at $21.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	
Refined iron bars, base price	3.04c.
Swedish bars, base price	7.50c.
Soft steel bars, base price	3.04c.
Hoops, base price	4.39c.
Bands, base price	3.84c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	3.14c.
Channels, angles and tees under 3 in. x ¼ in., base	3.04c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.10c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	3.30c.
Toe-calk, ½ x ⅜ in. and larger	4.15c.
Cold-rolled strip, soft and quarter hard	6.75c. to 7.25c.
Open-hearth spring steel	4.00c. to 6.00c.
Shafting and Screw Stock:	
Rounds	3.90c.
Squares, flats and hex	4.40c.
Standard cast steel, base price	15.00c.
Extra cast steel	18.00c.
Special cast steel	23.00c.

Tank Plates—Steel

¼ in. and heavier	3.14c.

Sheets

Blue Annealed

	Per Lb.
No. 10	4.19c.
No. 12	4.24c.
No. 14	4.29c.
No. 16	4.39c.

Box Annealed—Black

	Soft Steel C. R., One Pass, Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.30c. to 4.55c.	.....
Nos. 22 and 24	4.35c. to 4.60c.	5.00c.
No. 26	4.40c. to 4.65c.	5.05c.
No. 28	4.50c. to 4.75c.	5.15c.
No. 30	4.75c. to 5.00c.	.....

No. 28 and lighter, 36 in. wide, 10c. higher.

Galvanized

	Per Lb.
No. 14	4.60c.
No. 16	4.75c.
Nos. 18 and 20	4.90c.
Nos. 22 and 24	5.05c.
No. 26	5.20c.
No. 27	5.35c.
No. 28	5.50c.
No. 30	6.00c.

No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
½ in. Butt	—50	[illegible]	½ in. Butt	—11	+13
¾ in. Butt	—55	—44	¾ in. Butt	—17	— 1
1-3 in. Butt	—57	—44	1-1½ in. Butt	—20	— 2
2½-6 in. Lap	—54	—41	2 in. Lap	—14	+ 2
⅞ in. Lap	—50	—26	2½-6 in. Lap	—18	— 2
[illegible]	[illegible]	—25	7-12 in. Lap	—10	+ 6

Steel Wire

[illegible] Per Lb.

Bright basic	4.75c. to 5.00c.
Annealed soft	4.75c. to 5.00c.
Galvanized annealed	5.40c. to 5.65c.
Coppered basic	5.40c. to 5.65c.
Tinned soft Bessemer	6.40c. to 6.65c.

*Regular extras for lighter gage

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	19½c. to 20½c.
High brass wire	20 c. to 21 c.
Brass rod	17 c. to 18 c.
Brass tube, brazed	26⅝c. to 27⅝c.
Brass tube, seamless	23 c. to 23½c.
Copper tube, seamless	25¾c. to 26 c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 22c. to 23c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin Coke—14-20

Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20		Primes	Wasters
		80 lb.	$5.80	$5.55
		90 lb.	5.90	5.65
		100 lb.	6.00	5.75
IC	$10.00	$8.50	IC	6.15	5.90
IX	11.50	10.00	IX	7.15	6.90
IXX	13.00	11.25	IXX	8.15	7.90
IXXX	14.25	12.50	IXXX	9.15	8.90
IXXXX	16.00	14.00	IXXXX	10.15	9.90

Terne Plates

8-lb. coating, 14 x 20

100 lb.	$7.00
IC	7.25
IX	7.50
Fire door stock	9.00

Tin

Straits pig	39c.
Bar	45c. to 50c.

Copper

Lake ingot	15¼c.
Electrolytic	15 c.
Casting	14¾c.

Spelter and Sheet Zinc

Western spelter	8¾c.
Sheet zinc, No. 9 base, casks	10¼c. open 10¾c.

Lead and Solder*

American pig lead	8c. to 8¾c.
Bar lead	9c. to 10c.
Solder, ½ and ½ guaranteed	27½c.
No. 1 solder	26c.
Refined solder	23¼c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	75c.
Commercial grade, per lb.	35c.
Grade D, per lb.	25c.

Antimony

Asiatic	7¾c. to 8½c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb. 25c. to 27c.

Old Metals

The market is sluggish but business continues fair. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy crucible	12.00
Copper, heavy wire	11.50
Copper, light and bottoms	9.50
Brass, heavy	6.50
Brass, light	5.50
Heavy machine composition	8.75
No. 1 yellow brass turnings	7.00
No. 1 red brass or composition turnings	8.00
Lead, heavy	5.75
Lead, tea	4.50
Zinc	4.50

THE IRON AGE

New York, December 14, 1922

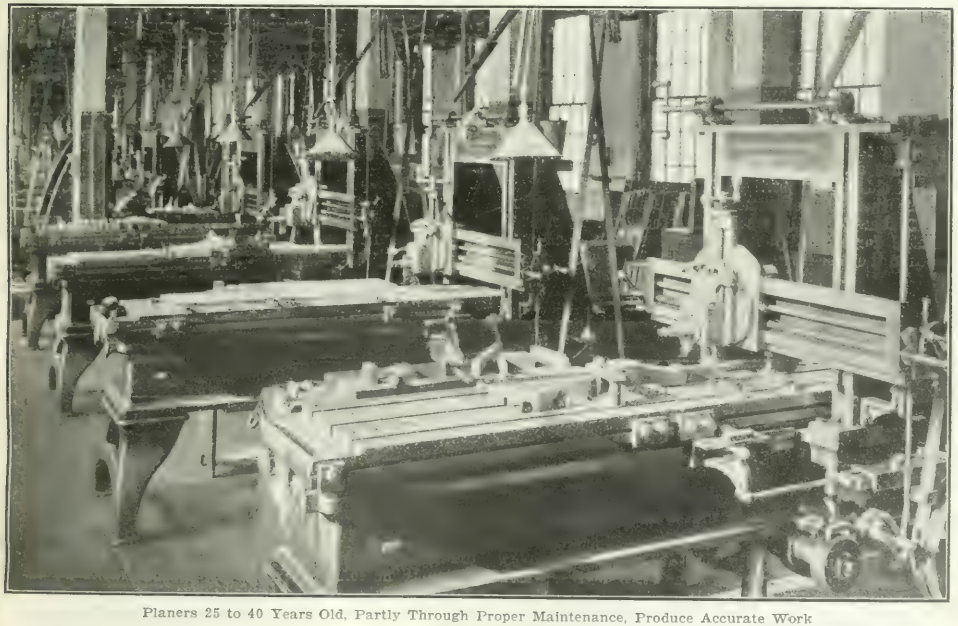
ESTABLISHED 1855 VOL. 110, No. 24

No Hand Scraping on Planed Work

Accuracy and Long Life Secured with Reduction in Labor Cost —Special Fixtures to Hold Strips for Planing—Two-Bit Tool Holder Saves 25 to 50 Per Cent

BY L. S. LOVE

THE question of planing metal parts for exact fits without the necessity of hand scraping has been given considerable prominence lately. Advocates of the method claim for parts so planed a better fit and long life in addition to a decided saving in labor costs; those demanding hand scraping after planing claim it to metal to metal contact. To overcome this difficulty on large planers, where the combined weight of the table and job are high, a mixture of cylinder oil and ordinary lubricating oil has been found effective, the heavier oil tending to stick to the surface. Also forced lubrication, through a pump delivering oil through tub-



Planers 25 to 40 Years Old, Partly Through Proper Maintenance, Produce Accurate Work

to be necessary to provide, through scraped depressions, pockets for oil for lubrication, if there is motion between the planed parts. This latter contention appears not to be borne out by fact.

The Sigourney Tool Co., Hartford, Conn., whose product is book stitching and binding machinery and sensitive drill presses, has largely to thank its planer work for its reputation and ability for accuracy. The company has found that too thick a film of oil or too much oil in the ways of a planer will detract from the accuracy obtainable. We know that in handling very large work, a thin film of oil in the planer ways will squeeze out and cause the table to jump or chatter due ing to the ways at close intervals is frequently used. These methods, however, do not apply on small or average sized work.

Battery of Old Planers Doing Unusual Work

One of the illustrations shows a battery of planers in the Sigourney shop ranging in age from 25 to 40 years. These machines have ways, vees, heads, clapper-boxes, rails and housings planed to size, and consequently to fit, without scraping; the only hand work on them has been to remove the fuzz or loose metal left by the tool. The practice generally is to replane parts of new tools purchased. These machines to-day, after

their many years of service, are still accurate and are producing planed work to limits usually expected only of grinding machines or precision tools. Of course, it must be understood that in addition to accurate machines, it is necessary to have men who will take an interest in their work and have learned to produce a 1-in. block when they are told to, and not a block 0.999 in. or 1.001 in., as is so frequently the case.

Furthermore, the design and maintenance of the plate [illegible]. For finishing, a



[illegible] Made for Attachment as This Side Frame Bearing for the Head Clamp Bar. It is planed and fits with a full bearing, thereby prolonging life as [illegible] bearing which [illegible] as [illegible]

tool with an absolutely straight face, must be set properly in the tool holder. After the cutting edge of the tool is ground, it is stoned. It is held in a vise and the hone passed back and forth over the edge, in the manner of a file. These stones are kept flat and true, by rubbing on a cast iron bench plate with emery, and when not in use are kept in jars of kerosene to keep them clear of old oil and particles of steel.

Also the feed taken now for a finish cut is much coarser than formerly, when a fine feed was considered essential for a good job. The difference in feed was shown in the case of four pairs of parallel blocks. Some of the blocks made within the last five to ten years showed the wide feed marks. The other blocks, which were about 30 years old, showed the old method with the fine feed. None of these blocks have been scraped, and yet it is possible to take any three pairs and have them parallel within 0.00025 in. Angle plates and other fixtures in use in this shop are planed without scraping to an equal degree of accuracy.

To give an idea of what can be done with accurate planing, probably the most outstanding example in this shop is a coupling used in one of its book machines. As can be seen in another illustration, the flanges composing the two halves of this coupling have four slots cut in their edges, and four in their faces. These slots are all planed, without reference to their relative positions when assembled, by being held on angle plates in the planer. The coupling is also shown assembled. As stated, in planing these flanges, no reference is considered as to the relative positions of the various slots when assembled, yet when the flanges are placed face to face, the hole through must permit free operation, without binding, on a vertical shaft; the slots on the edges must line up to take the guide bars, and the slots in the faces must line up to carry the radiating arms. These latter, being about 30 in. long, must fit absolutely, as any error would be greatly multiplied in their length. The two halves of the coupling can be put together in any one of the four possible positions, with uniform fit of the inserted bars in any of them, and all with no scraping.

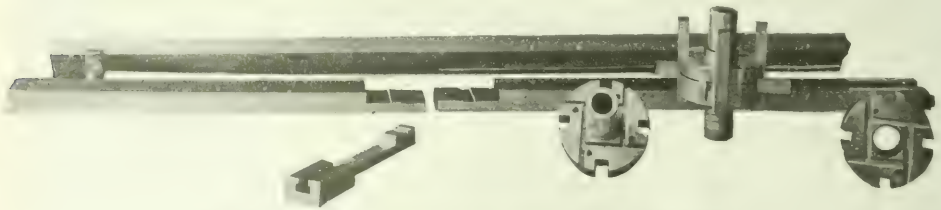
Another example of uniform accuracy is also shown. This is a small cast block with a T-slot in which is inserted a short cast bar. These parts are made up in lots of hundreds; are all planed and not scraped; yet any bar must fit accurately any block.

The fold bars shown in this same illustration are made in two parts. One half has a slot which is a cam track; the other half is plain. They are made in two pieces for ease of planing the cam track. A joint is then planed with an integral key in the plain end and the two pieces fitted together and held with fillister head screws. It can readily be seen from the illustration that this planed joint, without any scraping, scarcely shows in the finished fold bar, and the edge of the bar, composed of two pieces, is entirely straight and flat.

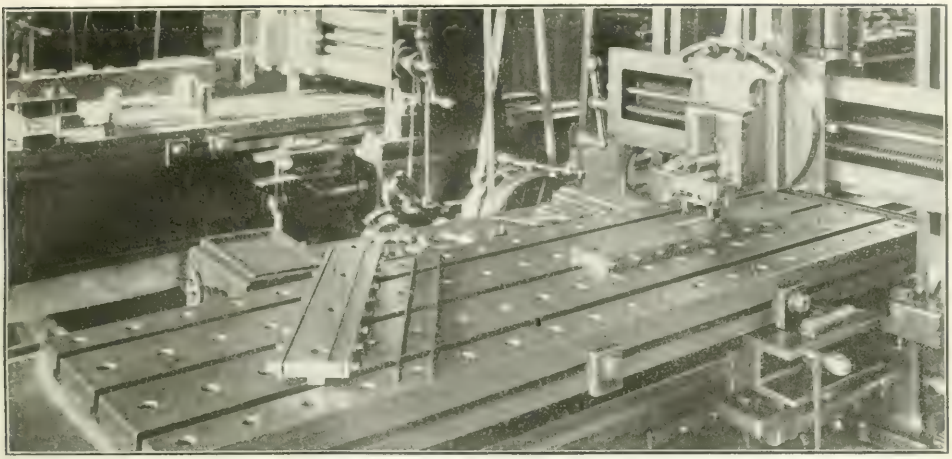
Larger work as well as small parts are planed with equal accuracy. One illustration shows the side frame of the book casing machine, a machine used to glue board covers on books. Each side frame supports in a long slot a rectangular bar about 35 in. long, which has a vertical movement and operates the head clamps; this is a part of the machine which clamps on the back of the book, after the cover is glued and put in place. The way in which this bar travels and the bar itself are planed, but not scraped, and there is no gib nor other provision to compensate for inaccuracies; yet the fit is so close there is no looseness, and the lasting qualities of such a bearing are proved by the fact that this part, receiving almost continuous motion in the operation of the machine, shows no appreciable wear after years of service.

Thin Strips Planed Within 0.00025 in. of Parallel

A most interesting development in the use of planers in the Sigourney plant is the production of thin narrow strips, which are made in a variety of sizes for use in different parts of the company's product. For example, strips 18 in. long, ¾ in. wide and 0.042 in. thick, are planed in pairs in the fixture shown, with a tool holder carrying two bits. A roughing and a finishing cut are taken on this work, the finished pieces being within 0.00025 in. of parallel. The fixture consists of a cast plate with a tongue to fit into the T-slot of the planer table. In the top center of the plate is an integral clamping strip against both sides of which the work is held by adjustable side clamps. These latter are so arranged that they are drawn in and down against a beveled edge at the bottom of the fixture plate, thus not only clamping against the side of the work, but also drawing it down against a firm seat on the fixture. Different thicknesses of strip are planed by use of packing strips of different thicknesses set under them; the thicker the work, the thinner the packing strip. While the set screws in this fixture are provided with square heads for a wrench, the work can be held sufficiently



[illegible] Planed and Not Scraped Interchangeable Without Play or Shake



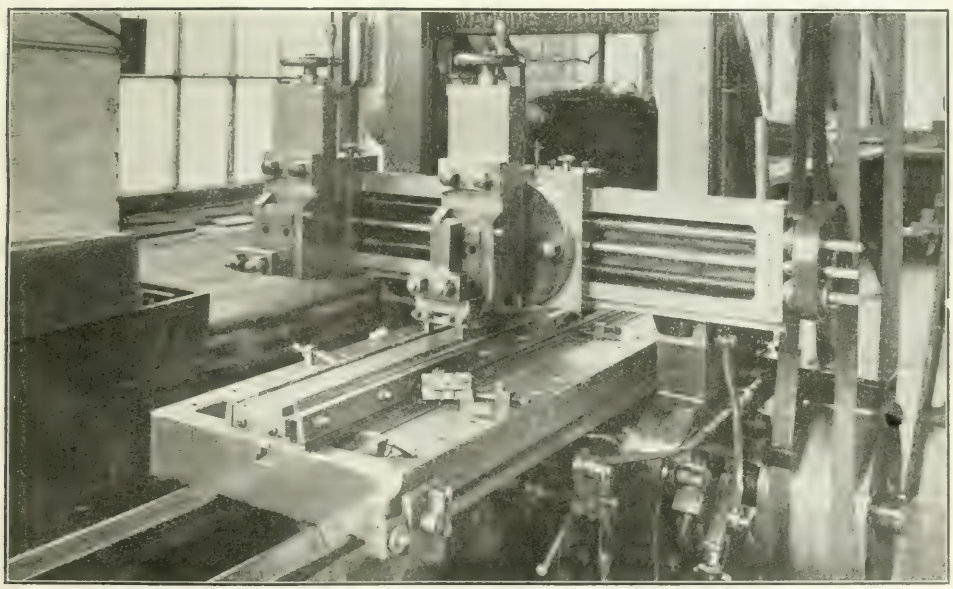
Accuracy in Planing Strips as Thin as 0.042 In. Is Found Possible Within 0.00025 In. in 18 In. When Proper Tools and Work Holding Fixtures Are Used

tight by simply drawing the screws snugly up by hand.

One reproduced photograph shows a different kind of fixture used with a double bit tool holder for planing a different form of strip; the particular work in the machine at the time the picture was taken was brass. It will be noted, that the clamps in this fixture are different from those in the preceding job, being of an L-shaped section. Along the lower edge of this clamp is a bead which fits into one of several grooves in the base of the fixture, the groove used depending upon the width of the work. Also different sizes of clamps are used varying with the work to be done. An accompanying sketch shows the section of the clamp.

Referring again to the photograph, the design of this two bit tool holder will be found of interest. The distance apart of the two bits is adjustable, the blocks holding them riding on a dovetailed seat in the holder itself. The shanks of the bits are finished exactly to size and fit in their individual holding blocks, the reason for this construction being that they may be held rigidly in position and not shift due to side pressure. In order that the rake and clearance of cutters may be properly controlled, after the shanks are finished, they are inserted in a machining fixture with slots at the desired angle, so that shaping and grinding of the cutting edges may be done parallel with the sides of the grinding fixture, and yet present the correct rake and clearance angles to the work when they are set in the tool holder. For clearer understanding this bit holding fixture is shown on the planer table almost directly under the tool holder; also two bits are shown beside it. This two-bit tool holder is provided with oil holes, so that oil may be fed through it to the cutting edges of both bits when desirable.

The use of this type of tool holder on work up to 4 in. in width saves 25 to 30 per cent over a two head planer on similar work, and is 50 per cent faster than a single head planer.



A Two-Bit Planer Tool Holder Saves 25 to 30 Per Cent as Compared with a Two-Head Planer and 50 Per Cent as Compared with a Single-Head Planer on Work Up to 4 In. Wide

OHIO FOUNDRYMEN DINE

School for Training Men at State University Proposed Association Growing

The annual meeting of the Ohio State Foundrymen's Association was held at the New Manchester Hotel, Middletown, Ohio, Dec. 7 and 8. A very good representation of the membership attended, and some interesting papers and discussions were heard. The election of officers for the coming year, and completing of plans for a membership campaign were the principal items of business, followed in the evening of Thursday by the annual banquet with an instructive address by F. D. Chase, Chicago, on "Modernizing Your Present Foundry."

Kenyon Riddle, city manager, welcomed the delegates to Middletown, and in discussing the benefits of community spirit and association, referred to the city in which they were meeting, which last year raised a fund of $1,000,000 among its citizens for civic purposes.

Mr. Riddle's address was followed by the reports of the officers. President Huber briefly reviewed the work accomplished during the past year, and outlined what he thought should be the aim of the association during the coming one.

Progress of Association

Secretary Tuscany's report showed that 35 new members had been added to the roster during the year, and indicated that next year the membership, with a little intensive individual work on the part of the members, could be more than doubled. Nearly 200 foundries scattered throughout the State are now enrolled.

During the past year, the cost work of the association had been greatly extended, and many of the members had been brought into line on the uniform trade customs of the organization. A consulting actuary had been engaged to handle compensation matters, and a special credit service secured at nominal cost. The scope of the trade report had been broadened, and a department for special services to members had been opened. The association had also made great strides in its statistical services, and had added a complete library dealing with foundry problems which is accessible to any member.

George K. Elliott, metallurgist of the Lunkenheimer Co., Cincinnati, read a paper on "The Relation of the Electric Furnace to Cast Iron." Mr. Elliott described some of his company's experiences in duplexing, and described some of the advantages of the electric furnace working in conjunction with the cupola. He did not recommend the electric furnace as a cure all for the foundrymen's troubles, stating that it was his belief that in ordinary foundry practice, nothing had yet been developed that would take the place of the cupola. But where special work, and high-grade castings were concerned, the electric furnace could be used to good advantage, as with an electric furnace it is possible to control the elements in any way desired. Following the reading of the paper, a general discussion brought out the fact that in many places, perhaps in the majority, the cost of melting with an electric furnace would be economically prohibitive, but that in certain cases the extra cost would be more than justified in the production of certain types of castings.

Pat. Dwyer, Editor of *The Foundry*, gave an interesting talk on "Sidelights of Cupola Practice," gathered from his own experiences in shops, and also gave a resume of what is being accomplished in the matter of more efficient cupola handling in some of the shops of the country.

A. J. Tuscany, secretary, discussed "Foundry Operation for a Profit," in which he gave some concrete illustrations of the methods employed by some buyers in securing low-priced castings, and warned the members to thoroughly investigate statements made to them of ridiculously low prices before taking any action to meet them.

J. H. Thompson of the Dayton Pneumatic Tool Co. had an interesting paper on "The Proper Maintenance of Pneumatic Tools," showing what an expensive proposition badly kept tools may become.

Developing Foundry Material

J. H. Hogue, French Foundry Co., Piqua, Ohio, discussed "The Labor Situation—Developing Foundry Material." Mr. Hogue described some of the foundries connected with educational institutions, and gave an outline of the courses followed, which he thought entirely inadequate when the importance of the industry is considered. He did think, however, that the people in charge were doing wonders when the equipment was considered, but that much more could be done if a foundrymen's association could be interested. He advocated the establishment of a school for training men in connection with Ohio State University for advanced students in engineering, and that a student majoring in foundry practice be given a degree of foundry engineer. Modern and up-to-date buildings and equipment should be supplied, and foundrymen of the State should supply the funds and be the directors of the school. The school could also be used for experimental purposes. The people in charge at the university were very much in favor of such a school, and were patiently waiting for the State foundrymen to give them the necessary co-operation to make the school a thoroughly practical one.

President Huber described the system of education and training given at the foundry of the American Rolling Mill Co. It was suggested that the association should take steps to have the number of apprentices in the shops increased, as at the present time there are not sufficient molders to go around even with the industry as a whole operating at a 60 per cent rate. The whole subject was deemed of such importance that a committee was appointed to go into it thoroughly and report at next meeting.

F. W. Huber, Middletown; Walter Seelbach, Cleveland; G. W. Piehl, Cincinnati, W. E. Matthews, Bucyrus, and L. H. Wise, Zanesville, were elected directors for the three-year term. The directors organized by electing Mr. Huber president; J. H. Bruce, Cleveland, vice-president; Walter Seelbach, treasurer and A. J. Tuscany, Cleveland, secretary-manager.

On Friday the delegates were taken on an inspection trip through the plant of the American Rolling Mill Co., followed by a luncheon at the Armco dining room as the guests of the company. The members later drove to Cincinnati, where the Cincinnati members entertained them during the afternoon and evening.

The selection of the meeting place for next year will be made at the next meeting of the board of directors of the association.

Foreign Trade Convention to Meet in New Orleans

The tenth national foreign trade convention of the National Foreign Trade Council, of which James A. Farrell of the Steel Corporation is president, will be held in New Orleans on April 25, 26 and 27, 1923. O. K. Davis, secretary of the council, says that "the selection of New Orleans as the convention city is peculiarly fitting in view of the development of the city as a great center of American foreign trading activity. Of special interest to foreign traders in all parts of the Mississippi Valley has been the development of shipping facilities at the port of New Orleans, and the consequent increase in steamship services. Since the third national foreign trade convention was held in New Orleans in 1916 this progress has been particularly marked, and has been accelerated by the increasing proportion of American foreign trade carried on with the West Indies, Central America, Mexico, South America and Asia, much of it passing through Gulf ports. As in former years, leading foreign traders from every part of the United States and every line of industry, as well as a considerable number of business men from foreign countries, will be in attendance at the convention."

E. J. Buffington Explains Pittsburgh Base

Custom in Steel Trade Declared a Natural Development Similar to Those in Other Industries—Change May Come in Chicago Territory

E. J. BUFFINGTON, president Illinois Steel Co., has written an explanation of what the Pittsburgh basing plan is, comparing it to similar methods as to other products, especially wheat and sugar. Mr. Buffington says:

"A clear understanding of the subject requires that it first be defined. It is necessary that we should have clearly in mind not only what it is but what it is not.

"What is commonly called 'Pittsburgh basing' or sometimes 'Pittsburgh plus' means this: Sometimes a producer of steel at a point distant from Pittsburgh sells his steel at various points for a price which is the sum of the price of such steel at Pittsburgh plus the freight to those points. Stated more concretely, for many years past the prices of some steel products in Chicago have commonly, although not always, been the sum of the prices of such products at Pittsburgh, plus the freight from Pittsburgh to Chicago.

"Such 'Pittsburgh plus' places are not the result, as is so many times assumed or implied, of the adoption of a 'plan' by any manufacturer or group of manufacturers. No one has adopted an artificial or arbitrary method of fixing prices. On the contrary, 'Pittsburgh plus' prices are the natural result of the free play of economic forces. The 'Pittsburgh plus' prices at all places are the natural market prices at those places.

"Pittsburgh Plus" Defined

"'Pittsburgh plus' or 'Pittsburgh basing' has come in the common mind to have reference to the price of steel. Exactly similar price conditions, however, apply to grain, sugar and a great many other commodities. In discussing 'Pittsburgh plus' or 'Pittsburgh basing' we are discussing merely one specific illustration of the effect of many producers on the one side attempting to sell their products and many purchasers on the other side attempting to buy those products, all under varying market conditions.

"Since the beginning of the manufacture of steel in the United States the Pittsburgh, Pennsylvania, district has been and continues at the present time to be the largest steel district in the country. If one desired to purchase steel for use in Chicago when no steel was produced in Chicago, the cost of such purchase was then the price of steel in Pittsburgh plus the freight to Chicago. In other words, the price was a 'Pittsburgh plus' price.

"When Chicago began to produce steel, but in quantities insufficient to supply the demand in Chicago, then the purchasers in Chicago were still compelled to get part of their steel in Pittsburgh. When they bought steel in Pittsburgh, the cost to them at Chicago was the Pittsburgh price plus the freight to Chicago. In other words, the price was 'Pittsburgh plus.'

Basis for Prices

"Under these conditions, if a purchaser of steel in Chicago offered to buy from a manufacturer in Chicago, when, as stated, the manufacturers in Chicago were able to produce and furnish only a part of the demand in Chicago, what would the price naturally be? Taking into consideration practical trade conditions, what would the price be? Why, if part of the purchasers of steel were obliged to go to Pittsburgh for their steel and pay the Pittsburgh price and then pay the freight from Pittsburgh to Chicago, that established the market price in Chicago. The Chicago producer could readily get a price which was the same as the cost to the purchaser who obtained his steel in Pittsburgh, that is to say, the Pittsburgh price plus the freight from Pittsburgh to Chicago.

"As stated above, the Pittsburgh district is the largest steel producing district in the country. No other district in the United States produces a sufficient amount of steel to supply the adjacent country under normal trade conditions. Therefore, all districts in the United States are generally dependent upon the Pittsburgh district for some part of the steel which they require. Naturally, then, not as the result of any artificial plan, but as a result of the free play of the laws of supply and demand, the prices in these districts come to be the prices which equal the sum of the Pittsburgh prices plus the freight.

Chicago Basis to Come?

"Of course, if the time ever comes when the Chicago district produces a surplus of steel so that the entire demands of this district are supplied by steel produced in Chicago and the surplus presses out toward Pittsburgh, or in other directions, the prices of steel at Chicago cannot be 'Pittsburgh plus' prices. Under those circumstances, Chicago will establish its own prices.

"An illustration of this may be found in the actual experience of the trade recently. A year or so ago the demand for steel fell off to such an extent that the producing capacity of the Chicago district exceeded the demands of that district. Quickly the prices in Chicago fell below the prices in Pittsburgh plus the freight.

"In substance, the prices of steel in the regard we are considering are not different from the prices of grain. There is always a market price for grain in Chicago. Vast quantities of grain come into Chicago from the fields where produced, and are then distributed from Chicago to points of consumption. The great mass of wheat is produced west of Chicago and consumed east of Chicago.

"The price paid by grain dealers at the various points west of Chicago, where wheat is produced, is day by day the Chicago price less the freight from the point of purchase to Chicago. The price of wheat east of Chicago is the Chicago price plus the freight from Chicago to the given point. In neither case does the cost of producing the wheat west of Chicago or the cost of producing the wheat east of Chicago fix the price. The market price at Chicago fixes the price in both localities.

Sugar Prices Compared

"The price of sugar furnishes another illustration of the subject. The United States does not produce sufficient sugar to supply its needs. In consequence, large quantities of sugar are bought in Cuba. The prices for sugar which rule in different parts of the United States bear a direct relation to the prices of sugar at seaboard points, such as New York, Baltimore, Galveston and elsewhere.

"It may be laid down as a general rule that the district in which the greatest quantity of the products named or other products similarly affected by market conditions are produced or marketed establishes the market prices for such products and becomes a basing point for the prices of such products in other districts.

"It appears that the Western Association of Rolled Steel Consumers is exploiting a desire and purpose to provide, preferably by Government regulation, prices of steel products which they purchase upon some basis more favorable to them than the prices which prevail under normal market conditions. So far as we know, the Western Association of Rolled Steel Consumers is not advocating a like government regulation of the prices at which its members sell respective finished products."

FAVORS SHIP SUBSIDY

Strong Arguments Made by the Chamber of Commerce of the United States

WASHINGTON, Dec. 12.—The Chamber of Commerce of the United States has taken an active interest in the ship subsidy legislation and Vice-President Elliot H. Goodwin in a letter to members of the Senate has stated that America's position as second maritime nation of the world cannot be maintained without the grant of aid to present and prospective ship owners. This endorsement of the Administration's ship subsidy bill from the chamber, it is hoped, will give the measure added strength because it is obvious that it faces a difficult fight in the Senate. At the time of sending the letter the chamber also issued an interesting pamphlet entitled "Why a Merchant Marine?" The pamphlet sets out reasons why a privately owned merchant marine is a national necessity and at the outset stresses its importance as a matter of national defense. After dealing with this subject, it is pointed out that should the present period of business depression be followed by a decline in American shipping or even by a serious postponement of its development, the shipyards in the United States will greatly suffer and probably many of them will go out of business. This, it is stated, will be a serious misfortune, since these yards are necessary to national defense as well as to the healthy development of a merchant marine.

The Economic Reasons

The report then takes up the economic reasons for the establishment of a merchant marine and states that they are various. Shipping under the national flag, it is stated, and an adequate tonnage of vessels of different types are in fact essential parts of the trade facilities, an organization with which the people of the United States will be able to extend their commerce to all sections of the world. In other words, it is stated, if we are going to succeed in foreign trade, not only our wares must compare favorably with those of our competitors but our service as well, of which shipping is an important part. It is pointed out that not so very long ago only 12 per cent of American exports consisted of manufactures. To-day that proportion is 30 per cent or more and during the war it was considerably higher. "The product of our expanded industries, taken as a whole, is so much greater than our national requirements as to create a serious situation, that will be reflected on every farm and in every shop, and in every home as well, unless markets for the surplus can be found abroad," says the report.

It is pointed out that last year American exports totaled $4,485,122,696, and American imports $2,529,025,403, and that there is not a State in the country that does not make a contribution to our export trade. It is declared that an analysis made of a cargo recently shipped to South America from a Southern port disclosed that practically every community in the United States, manufacturing and agricultural, had a part in the production of that cargo.

Importance of Foreign Trade

"But, it is asked by the uninformed, why emphasize the importance of our foreign trade?" the report says. "It is only a fraction of our total trade, and the loss of it could easily be offset by a well-directed expansion of our domestic trade. One of our half dozen greatest manufacturers has pointed out that the last fractional part of a given industrial production often represents the profit of the whole output, and that a market for the last part, outside the saturated limits of our domestic market, is essential to the success of the manufacturer's venture. Furthermore, while in some industries the percentage of product exported is not large, it is to be kept in mind that of cotton, wheat and copper from 20 per cent to 30 per cent and even 50 per cent is exported."

To show that the United States is not a self-contained nation, the report points out that it is necessary to import many products, such as nickel from Canada and New Caledonia, tin from Malay Straits and Bolivia, vanadium from Peru, rubber from Brazil and the Far East, raw silk from China and Japan, etc.

It is pointed out that it is necessary for American interests to employ American vessels and that no sane merchant would permit competitors to deliver his daily sales even if the competitors would offer to do it more cheaply. There is a psychological element in the relation of seller and buyer which every dealer in commodities realizes and which is greatly diminished if not wholly lost by the employment of a competitor as an intermediary at any point between purchase and delivery. This business principle applies to deliveries by ship and ships entering ports of the world flying the American flag advertise to the nations that these vessels are the delivery wagons, so to say, of our country's commerce.

Becomes a Drummer

"Not only that," it is pointed out, "but a laden vessel sent to a foreign country becomes a drummer there, or a trade missionary, not only for the sale of the goods carried out, but for cargoes to bring back. If there is not at hand a cargo to bring back, the shipowner seeks one, may even buy one if it can be obtained in no other way. The return cargo may be something which can be sold here in the United States at a profit representing reasonable freight rates. In this way the owner gets his freight charge and establishes a new trade. Also, American ships visiting foreign ports lead to the establishment in those ports of American branch houses fighting for a portion of the carrying trade for American ships, and for the participation of American merchants in the world's business. Foreign agents will not work full-heartedly for American interests, especially when in so doing they will be working against the interest of their own nationals."

The report, handling the subject from a point not generally brought out, states that in 1920 the United Kingdom's net national income from shipping, as estimated by a leading English journal, was £340,000,000. This is pointed out to show that, while England always has had a balance of trade against her, this balance in the exchange of commodities has been corrected by her "invisible exports," that is, the interest on her loans and investments abroad and by her freight money. It is stated that if the goods are carried in an American ship the freight money is retained here and the profit in the transaction is added to the nation's wealth.

Austrian Trade in Critical Condition

VIENNA, AUSTRIA, Nov. 24.—The decline of the German mark and the improvement in the Austrian krone have led to an acute crisis in Austrian commerce and industry. Demand has greatly receded and orders have fallen off very suddenly. Unemployment is growing and some firms financially unsound are even forced to emergency sales of goods in order to provide for the necessary working capital. The position in the coal industry is especially critical and as much as one-third of the men have been dismissed lately. Upper Silesian coal is coming into the country at a price with which neither Czechian nor Austrian firms can compete. In the iron and steel, and in the metal working industry, conditions are similarly discouraging and quite a number of factories are working on short time. The electric industry is still comparatively busy on large old contracts, but home and foreign trade in electrical appliances is slackening. In this line, as well as in machinery, tools, hardware, etc., Austrian firms find it impossible to meet German prices. It was expected that the decline in the German exchange would swamp German works with orders again, and that German competition would consequently be kept out of the home market. Just the contrary has taken place, and the position of the Austrian industry is very unsettled.

The North & Judd Mfg. Co., manufacturer of hardware, New Britain, Conn., has re-opened its plant at New Haven, Conn., formerly the Fitch factory, and a large number of molders are employed.

Coke Oven Gas in Open-Hearth Furnaces

A French Discussion of Various Methods of Using This Gas—Effect of Heating—Use of Mixed Gases

AN interesting and thoughtful article by Jean Dupuis appears in the *Revue de Metallurgie* for October, on the use of coke oven gas as fuel for open-hearth furnaces. This paper was presented at the recent congress at Liège held in June, and the writer is evidently connected with the Saint-Jacques plants of the French firm of Forges de Chatillon, Commentry et Neuves-Maisons.

The main advantage in using this gas as fuel for the open-hearth is to help in the proper use of coal. If a standard European steel plant is considered as comprising essentially blast furnaces, basic Bessemer, rolling mills, coke ovens sufficient to supply the blast furnaces, and an open-hearth large enough to absorb the Bessemer steel scrap, then the heat balance of such a plant shows that it should be possible to require raw coal only at the coke ovens. The excess of blast furnace and coke oven gas together with the coke breeze, etc., are sufficient to satisfy all the needs of the plant for power and heat. It is evident that the realization of such an ideal would give both the minimum use and proper use of coal because all of it would pass through the by-product ovens.

The gaseous fuels available in the order of fuel value, are blast furnace gas with a minimum of 106 B.t.u., gas from producers burning coke with 123 B.t.u., gas from ordinary gas producers with 146 B.t.u., and coke oven gas with 450 B.t.u. To properly portion out these fuels a consideration of both quantity and fuel value is necessary, that is to say, it is necessary to furnish to each apparatus the heat that it needs in a given time, and in such form that the necessary temperature can be reached for proper operation. The open-hearth offers the most difficult problem, and among metallurgical apparatus using exterior fuel requires the highest temperatures.

The theoretical temperatures of combustion in the open-hearth of the gaseous fuels mentioned above are given below. It is assumed that the air is preheated to 1000 deg. C., and the necessary known excess is used sufficient to give complete combustion in the laboratory of the furnace. Also that the gas is preheated to 1000 deg. C., except the coke oven gas, which for reasons given below is not preheated. Under these conditions the temperatures in round numbers are:

1850 deg. C. for blast furnace gas	(3360 deg. Fahr.)
2000 deg. C. for coke producer gas	(3630 deg. Fahr.)
2100 deg. C. for coal producer gas	(3810 deg. Fahr.)
2300 deg. C. for coke oven gas	(4170 deg. Fahr.)

The minimum temperature necessary to operate an open-hearth furnace may be said to be the temperature reached with present practice, that is to say, with ordinary producer gas. This is not strictly true because perservering efforts have been made in Germany to use coke producer gas and similar tests have been carried out in France at Montlucon. The results are concordant; the furnace can be operated but it is not practicable because the time of heats is too long. It would seem then that a temperature of combustion of at least 2100 deg. C. is necessary and, to reach this temperature, coke oven gas must be used either alone or in mixture, if producer gas is not employed.

It is believed coke oven gas was first used in the United States in 1906 and at Hubertushütte in Upper Silesia in 1907. But in 1909 at the Cockerill works in Belgium and at Mulheim-Ruhr in Germany the matter was taken up systematically. Since then many applications have been made at different plants comprising not only the use of coke oven gas alone or with tar, but also in admixture with the other three gases. All these combinations are possible, all are practicable and justified by the particular conditions of the individual plants.

Part of this question may be discussed now, namely, the very interesting application of coke oven gas alone (or with tar), and the use of mixed coke oven and blast furnace gas. Both methods allow the elimination of gas producers thus simplifying greatly the design of the open-hearth plant and bringing about a marked saving.

Two Methods of Using the Gas

These are the two methods most used. Unfortunately they are not always possible, because one can only be used in plants with blast furnaces and the other requires large amounts of available coke oven gas. It is easy to calculate that it is necessary to carbonize about three tons of coal to have enough gas to make a ton of steel, when the coke ovens are heated with their own gas. In other words with the usual European battery of 40 ovens taking 8 tons each, the excess gas is just enough for a 25-ton open-hearth furnace making heats every six or eight hours. This shows how interesting it is to consider heating coke ovens with poorer gas, which is easily possible because the temperatures required do not exceed 1200 deg. C. From the successful tests already made it would seem that heating coke ovens with blast furnace gas should become the rule in plants installed near blast furnaces. This would give more opportunity to develop the use of coke oven gas in metallurgical apparatus, particularly the open-hearth.

The first applications of coke oven gas were naturally made with existing arrangements, such as used for ordinary producer gas. It was soon found that during passage through the regenerators it suffered a marked loss in heating value. The principal changes consisted of loss of heating power and of density, increase in volume, decrease in total weight and in total heating value. Analysis showed a decrease in percentage of hydrocarbons and an increase in hydrogen, so that the results were due to dissociation of hydrocarbons at the temperature of the regenerators. After separation of benzol the coke oven gas contains about 2 per cent olefines and 25 to 35 per cent saturated hydrocarbons which supply more than half of the heating value. The olefines dissociate at 600 deg. C., the saturated hydrocarbons commence at 900 deg. C. and their dissociation is intense and rapid at 1000 deg. C. In addition to the changes mentioned above there are also deposits of carbon formed on the arches, flues and bricks of the checker chambers, which deposits naturally greatly affect the efficiency of the regenerators.

Careful laboratory tests, confirmed by work in the plants has shown the following:

1. Changes are brought about in coke oven gas by reheating which are more important as the temperature is increased, the time of heating is prolonged, and the gas is higher in hydrocarbons.
2. The percentage of heavy hydrocarbons, methane and carbon-dioxide decreases.
3. The percentage of hydrogen and carbon-monoxide increases.
4. The volume of gas increases. Not only does its density decrease but its total weight also is lessened.
5. The calorific power of the gas decreases more rapidly than the volume increases.
6. The decrease in percentage of heavy hydrocarbons is most marked between 600 and 900 deg. C., that of methane begins at 900 deg. C., and that of carbon-dioxide at 1000 deg. C. The decrease in total weight of gas is caused by the deposition of carbon, and as shown below this is the only real cause of loss of heating power.

A simple solution would seem to remove all the difficulties, namely, not to heat the rich gas. Why is pro-

ducer gas heated? For two reasons: First, to be able to reach the temperature of combustion necessary to operate the process, and second, to bring about required regeneration because the gas represents at least 40 per cent of the volume entering the furnace and if reheating is not carried on the waste gases would carry to the chimney an excessive proportion of heat units.

These two reasons lose nearly all their force when rich gas is considered. The temperature attained by combustion of the cold rich gas has been shown to be amply sufficient for furnace operation because it exceeds by 200 deg. that obtained from heated poor gas. Also the gas represents only 15 per cent of the volume entering the furnace and reheating can be applied to the air alone, and still sufficient regeneration be obtained.

Practical Applications

This method has been adopted practically with good results. Not only have the inconveniences of preliminary heating disappeared, but the construction of the furnace has been considerably simplified. Two regenerators instead of four, elimination of gas flues and uptakes, change of the end construction to a single air passage, the gas being introduced by a metal burner suitably water cooled. In regard to production the Cockerill plant at Seraing, Belgium, to which work reference is always made when coke oven gas is mentioned, published results in 1913, showing an increase of 25 per cent with a decrease of 30 per cent in consumption of pig iron, in an open-hearth changed in a simple manner.

This important increase in output came first from the difference in temperature of combustion, which is about 2300 deg. C. for coke oven gas against 2100 deg. C. for ordinary producer gas. This difference of 200 deg. seems relatively small, but it must not be forgotten that the useful effect of a fuel is measured by the heat that it can give to the surroundings which are to be heated. This is proportional (other things being equal) to the difference in temperature of combustion and the temperature of the surroundings. If 1700 deg. C. is assumed as the temperature of the open-hearth furnace then the difference is 400 deg. with ordinary producer gas and 600 deg. with the coke oven gas, which is an increase of 50 per cent.

This explains the increase in output, and also shows why there is such interest in the use of rich gas in the open-hearth. Unfortunately, as mentioned before, the quantity available is often restricted, the rich gas is required for other uses such as gas engines and the heating and lighting of towns.

Use of Mixed Gases

When a proper supply of rich gas is unobtainable the question of mixed gases must be considered, and the problem of using a mixture of coke oven and producer gas is altogether different to that of the coke oven gas alone. The main question is whether it is sufficient to mix the rich gas with the producer gas, or whether special appliances are necessary. If coke oven gas is added before the gases enter the checkers then a homogeneous mixture is assured after passage through the windings of the checkers and the flues, but there is the danger of dissociation of the rich gas to be considered.

The writer then goes into this danger of dissociation at great length from a theoretical standpoint and gives the results of careful laboratory work on various mixtures. It was found that an addition of moisture to the gas mixture in proper amount would completely prevent deposition of carbon. If the rich gas is in excess in the mixture such a method cannot be used because such a large amount of water vapor is needed that the volume of gas is enormously increased, and the temperature of combustion is lowered so much that furnace operation would be impossible.

On the other hand if the amount of coke oven gas is sufficiently low, say not over 20 per cent, then carbon deposition can be prevented by having the proper amount of moisture in the producer gas. This conclusion was thoroughly proved in practice at the Saint-Jacques works. At this plant they had decided to use coke oven gas alone in certain of their open-hearth furnaces, but while waiting for the necessary changes in construction wished to use coke oven gas in the simplest manner possible. Following the laboratory experiments mentioned above, arrangements were made to add coke oven gas to the producer gas before entering the regenerators. The producer gas contains normally about 12 per cent water vapor and the amount of coke oven gas used was about 15 per cent of the mixture. This practice has been in force now for over a year and a half, there has been noticed a marked increase in the temperature of the furnace, without any abnormal deposits formed in the checkers or the flues.

G. B. W.

Unemployment in Great Britain

The total number of registered unemployed in Great Britain on Nov. 20 was 1,379,000, an increase of 2000 over Nov. 13, and 12,200 over Nov. 5. It has been announced that the unemployment problem is to be considered the principal domestic problem before the new Parliament. During November alone, unemployment registration was increased by 50,000. The proposals for relief include an extension of the trade facilities act to £50,000,000, an expansion of the export credits scheme, and many local projects. The coal miners' wage problem is again a cause of contention.

British Business Outlook Brighter

British business sentiment was greatly improved in November, says Commercial Attaché Walter S. Tower, in a cable to the Department of Commerce. Expansion in coal production and increase in the volume of iron and steel orders have had perceptible influences on the tone of the general industrial situation while many other factors have contributed to the present confidence in the situation, not least among which is the clearer political outlook both at home and abroad. The iron and steel industries have been taking on additional equipment. These interests expect a trade boom, notwithstanding the fact that some manufacturers of pig iron have found it difficult to sell their present full production. The Welsh tin-plate trade also showed increased activities during the month. Continental competition was greatly lessened on account of exchange fluctuations. Prices of tin plate showed a steady tendency toward higher levels during the month.

During the week ended Nov. 18, British coal output was 5,376,000 tons as compared with 5,440,000 and 5,423,000 during the weeks ended Nov. 11 and Nov. 4, respectively. Dock congestion is again a serious handicap to handling exports.

Receiver Appointed for Ferromanganese Company

David Halstead has been appointed receiver of the American Manganese Mfg. Co., Edward E. Marshall, president, by the United States District Court No. 4, Philadelphia, where the home offices of the company are located. Liabilities on merchandise are said to exceed $500,000 and on notes $2,000,000. The company has two blast furnaces at Dunbar, Pa., and is one of the country's largest producers of ferromanganese.

Last month the Truscon Steel Co., Youngstown, made larger shipments than in any previous November in the company's history, states President Julius Kahn. Heavy demand for construction materials such as the company produces, is reflected by the situation.

Improved Wire-Galvanizing Equipment

Long Annealing and Spelter Pans and Unusual Capacity of Take-Up Frame Feature New Design

GALVANIZED wire quality has been given considerable attention during the past few years, and to meet the more exacting requirements various improvements have been made in the equipment used in the manufacture of this wire. This is particularly true of telegraph wire, which is given a rigid inspection as to both its physical properties and its electrical conductivity.

Wire manufacturers make two grades of galvanized wire; fence wire and telegraph and telephone wire. Fence wire, after leaving the spelter bath, runs through asbestos wipers which remove the surplus metal, thus producing a smooth surface and finish suitable for use in fence machines. After galvanizing it is given two or three one-minute immersions in a solution of copper sulphate. Telegraph and telephone wire is not wiped to remove the surplus spelter, as much as possible being left on the wire. This wire will stand seven or eight one-minute immersions in copper sulphate, although only four immersions are required.

A new telegraph wire galvanizing outfit, having a number of new features of which the outstanding one is that it has a convertible take-up frame so that it can be used for galvanizing either telegraph or fence wire, has been brought out by the Broden & Dailey Construction Co., Cleveland. One of these outfits is now being installed in the plant of a Canadian steel company, the plan of which, Fig. 1, shows a 28-ft. lead annealing pan. Common practice is to use two smaller pans, usually 16 ft. in length, but it is claimed that the use of the single and larger pan results in a better and more even operation and is more economical. Fig. 2 shows a sectional view of the lead annealing furnace. The acid cleaning equipment through which wire passes after annealing and before galvanizing follows standard lines. The galvanizing equipment includes a 28-ft. spelter pan and an end-fired furnace. The latter is said to result in a marked saving in coal as compared with the side-fired type of furnace generally used. Fig. 3 shows the spelter furnace.

In galvanizing telegraph wire it is necessary that both annealing and the coating of spelter be uniform. This is accomplished in the new outfit by the design of the take-up frame, shown in Fig. 4. The wire is pulled through the annealing and spelter baths by the drum *A* at a constant speed, which assures an even annealing and uniform coating of spelter. A variable speed motor regulates the speed for different sizes of wire.

The block *B* winds up the wire as it is delivered by the pull-out drum *A*, and as the bundle increases in diameter on the block, a friction slip *C* allows the block to slip and take up the wire only as fast as the pull-out drum delivers it to the block. An automatic distributer distributes the wire across the face of the block to assure a uniform bundle which will be compact and easy to handle. The outfit has forty drums and blocks, so that it galvanizes 40 strands of wire at a time as compared with a more common capacity of 32 to 36 strands.

As fence wire blocks are different in construction from telegraph blocks it is not necessary to have a friction drum to regulate the speed of the wire through the

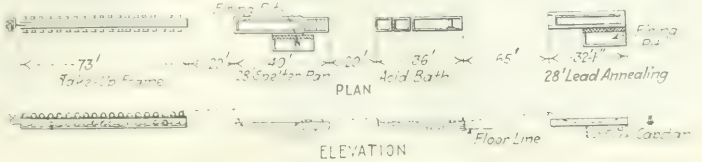


Fig. 1. Straight Line Advance of the Wire Is a Feature of the Layout of This Plant. The four main elements, and their relation to each other, are shown in the drawing

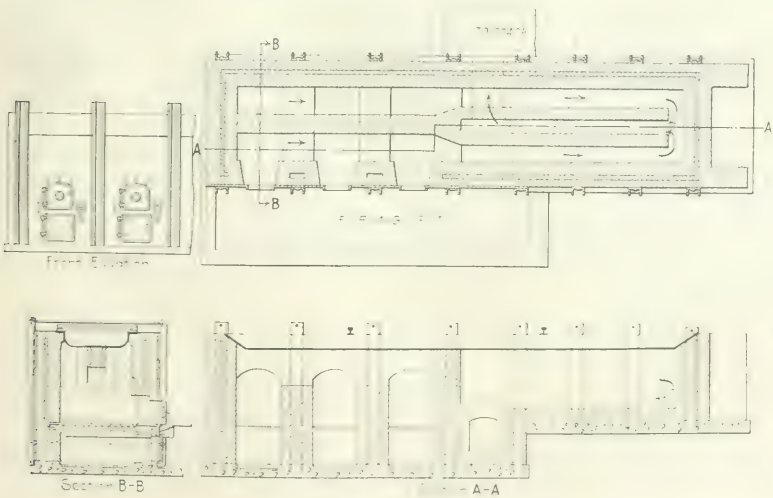


Fig. 2. Lead Annealing in a Pan 28 Ft. Long Is a New Development Which Is Expected to Prove More Economical Than with Two 16-Ft. Pans. Firing is from the side, while the hot gases travel the entire length of the pan and then double back for the half length at the outgoing (or cooler) end

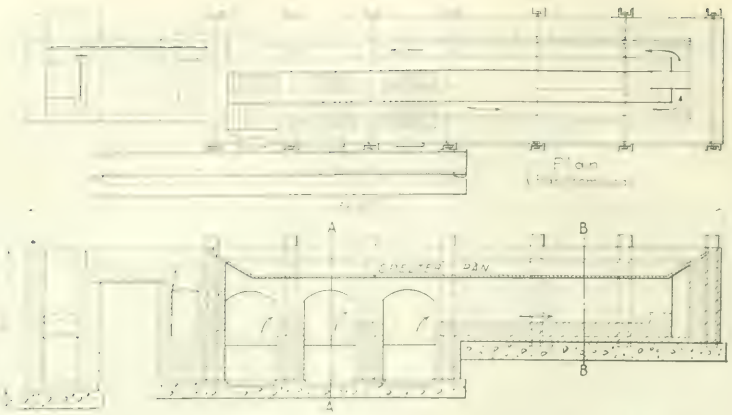
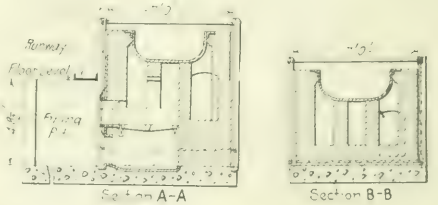


Fig. 3. As in the Lead Annealing Unit, the Spelter Pan Is 28 Ft. Long and Has Side Firing. The flue arrangement differs, however, as will be noted by comparing with the drawing on the previous page

lead and spelter baths. When fence wire is to be galvanized on the same frame the 40 telegraph wire-blocks, 20 on each side of the frame, are taken off and replaced with fence wire blocks. Then the friction drive is made a solid drive, being bolted with four bolts, and a small clutch is thrown out on the pull-out drum, allowing the drum to run as an idler. When the machine is thus converted for galvanizing fence wire the block *B* will pull the wire through the annealing and spelter baths and the pull-out drum *A* will merely act as a sheave to guide the wire onto the block *B*. It is



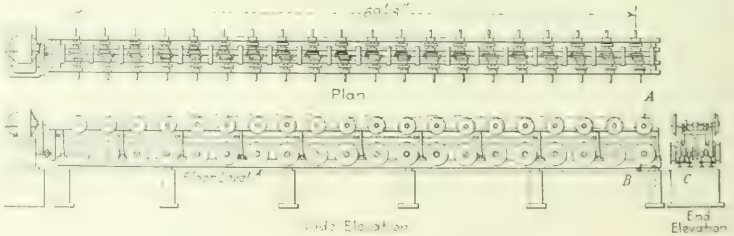


Fig. 4. With 40 Drums and Blocks the Capacity of the Machine Is Greater Than with the Usual 32 or 36 Units. The motor drives from one end, by means of a through shaft from which bevel gears operate the individual units

stated that the changing over of the equipment from one kind of wire to the other takes only three or four hours.

Taxation and National Income

In a pamphlet of 96 pages the National Industrial Conference Board, New York, reviews the subject of Federal, State and local taxation over the period of 1903 to 1921 and relates the amount of taxation to estimated national income. Attention is directed to the great extension of governmental activities in all countries during the past two decades, which has resulted in heavy increase in expenditures by the Government and hence in taxation. The per capita cost of government in the United States, $22 in 1903; became $45 in 1920-21, the increase being more than 100 per cent. Figures for other countries are shown in the table.

	1903	1913	1920-21
	$	$	$
Great Britain	40	42	61

The national income of the United States is estimated at 2½ billions of dollars in 1903, at 34½ billions in 1913; at 66 billions in 1919 and at 50 billions in 1921. The percentage of income taken by taxation is given as 5.2 in 1903, increasing to 6.4 in 1913 and to 14.32 in 1920-21. These percentages are lower for the most part than for the other countries listed, Japan showing the highest rate previous to 1917 and giving place to Great Britain in the later years. In dollars of taxation per capita, however, the United States stands second only to Great Britain at all three of the periods covered in the table, with Japan lowest of all at all times. The per capita taxation for all purposes in the United States was increased from $17.55 in 1903 to $22.95 in 1913, to $84.37 in 1920, thence falling to $79.15 in 1921. The latter compares with $124.84 in Great Britain at par of exchange, but with a considerable smaller quantity at current rates of exchange.

Industrial States, New York, Massachusetts and Michigan, in 1919 paid from 15 to 17.2 per cent of total income into the tax collectors' offices. This compares with agricultural States such as Texas, Georgia and Iowa, where the payments were from 7.6 to 8.9 per cent of total income.

The Wisconsin Foundrymen's Association held the first of a series of open meetings for all foundrymen at the Hotel Pfister on Nov. 28. H. P. Kreulen, Bethlehem Steel Co., was the principal speaker. A general discussion on the association and foundry work followed. Mr. Goldstein, of the Nash Motors Co., Kenosha, commented on some results obtained. The next regular meeting of the association will be held on Tuesday, Dec. 19, for members only.

What to Expect from Foremen Training

Results Obtained in Iron and Steel and Metalworking Plants, Particularly in Better Team Work and Closer Co-operation With Management

BY B. M. NUSSBAUM*

AN executive of a large rolling mill in Illinois stated at a public meeting that production in his plant increased 34 per cent within the year. The increase he attributed largely to the improved foremanship resulting from a training course through which the sixty-two foremen had been conducted.

The industrial engineer of a New York shipbuilding works reported a 50 per cent reduction in labor turnover in the year following a course in foremen training. The more harmonious handling of the human element in the organization reflected in these figures was due, he said, to the training.

The president of another large industry reports that his company realized at least $100,000 last year through improvements and economies suggested by members of the plant organization. And he credits foremen training with being the most important factor in bringing about this result.

Management's Three Main Objectives

These are three great objectives toward which modern industrial management in the iron and steel and machinery industries is bending thought and effort: (1) To increase production, (2) to harmonize labor relations within the organization, and (3) to save money through improved methods and equipment and through added economies. Can foremen training give a plant these results? Is the management of a mill, foundry, or machine shop which adopts a program of foremen training justified in expecting increased output, reduced labor turnover and lowered costs? These questions put foremen training on a baldly practical basis, but surely there is no other basis on which it can claim the attention of industry. Executives are perfectly justified in asking these questions, and in judging foremen training by the answers it gives to them.

Some "Musts" in Foremen Training

My reply to the above questions would be a yes with reservations. That is to say, foremen training will contribute toward these results provided certain conditions are met. The training must be adapted to the needs and limitations of the foremen. It must be presented to them in a way to win their interest and secure their study. It must be indorsed and supported in every way by the management (and the best results have been accomplished where the executives of the plant enrolled in the course and took part in the training with the foremen). And it must be accompanied by equally enlightened policies with reference to labor administration, industrial relations, production methods, and all other factors making for efficiency of operation.

This may seem a formidable program of conditions, but the fact is that most plants interested in foremen training are either already practicing or are favorably inclined toward the other enlightened policies suggested. In fact, these other policies become really effective only through enlightened foremanship. No matter how friendly and harmonious labor and management relations may be, a hard-headed orders-is-orders type of foreman can destroy it in a week of overbearing bossiness. And no matter what admirable production plans the management may lay out, and what efficient short cuts it may ordain, all of these improvements will stop short with the foremen unless they are in intelligent co-operation with the management.

Foremanship is therefore vital in all efforts to increase production, cut down labor wastes, and eliminate production losses of every kind. Even in those instances where it has nothing to do with originating the efficiency efforts, it has it in its power to nip the effort and render it powerless. The three instances cited at the beginning of this article are typical of experiences in many plants where training has been used to improve the foremanship. In other cases managers have reported improvement in team work, in labor harmony, in the alertness and resourcefulness of the foremen, in relations between foremen and the management, without being able to cite tangible records of bettered production. But the fact that a result is intangible is no reflection on its value. Good will is an intangible, and yet it is one of the most valuable assets on the balance sheet of the average American corporation. Industrial good will is no less essential to successful operation than customer good will.

Perhaps the best way to enumerate results that may be expected from foremen training will be to quote some records, cite a few experiences, and give the testimony of some executives and foremen.

Records of Foremen Study

Records of study are valuable only as an index of the extent to which the training program has got across to its foremen students. One of the stock objections to foremen training is that the foremen will not study. Many managers have said frankly to me that they were entirely "sold" on the desirability of a foremen training program, but that no training could be of much value unless it required some systematic study, and that foremen simply would not study. Well, here are the records of a few plants in the iron and steel and machinery industries with a foremen training program that does require study. The program here called for the study of text material, attendance upon lectures and conferences based on the text material, and the solving of plant problems in which the principles and methods taught in the texts were applied.

	No. of Men Who Enrolled	No. of Men Who Finished	Percentage of Men Who Finished
The Carborundum Co., Niagara Falls, N. Y.	98	75	75
Bucyrus Co., Evansville, Ind.; South Milwaukee, Wis.	111	98	88
Cambria Steel Co., Cambria, Pa.	61	56	92
Carpenter Steel Co., Reading, Pa.	69	63	91
Detroit Steel Castings Co., Detroit, Mich.	28	25	90
Deere & Mansur, Moline, Ill.	44	44	100
American Steel Foundries, Indiana Harbor, Ind.	55	52	94
Niles - Bement - Pond Co., Plainfield, N. J.	86	71	82
Taylor-Wharton Iron & Steel Co., High Bridge, N. J.	50	46	92

Many more companies might be cited, but these are enough to give some idea of the results accomplished. Any training effort which will enlist so large a percentage of the foremen in active study means a great deal in changed attitude and changed habits of the foremen. It means their minds are more receptive to new ideas, accustomed to applying principles to industrial problems, and habituated to the idea of growth and increase in knowledge. "Just to get one of our foremen out of a know-it-all attitude and to get him to look on suggested methods and changes without his old attitude of prejudicial criticism is worth a great deal to the increased efficiency of our organization," said the superintendent of a Pennsylvania forge shop.

Handling a Difficult Labor Situation

Perhaps where foremen training accomplishes its most noticeable results is in the realm of human re-

*Vice-president Business Training Corporation, New York.

lations within the department and within the plant. It is just here that the average foreman is most lacking. The driver type of foreman is less typical now than he was a generation ago, but in the ordinary department the foreman is still far from capable in handling his men, winning their loyalty, and ironing out the misunderstandings and grievances that crop up from time to time. He may not be a tyrant, but all too often he is a bungler in dealing with the delicate relations that exist between employer and employee, between management and men. For this reason no foremen training course can succeed completely unless it gives a good share of its attention to the problems of handling men. Indeed it is here, rather than in the technical processes and equipment of his department, that the average foreman most sorely needs systematic training.

I recall an experience in a New Jersey plant. A group of laborers had made a number of impossible demands upon the management and had threatened to strike unless the demands were met. This occurred two years ago, when labor was short, and a strike at that time would have been seriously embarrassing. At the same time, it would have been suicidal to grant the demands. It happened that just at this time the foremen and other department heads were in the midst of a three-months course of training in foremanship, and when the training class heard of the trouble the management was having with the threatening strike, they asked if they might not meet with the strikers' committee and see if the misunderstanding could not be ironed out. The management granted the request, a committee of the laborers met with a committee of the foremen's class, and they went into conference.

As a result of their study in the course the foremen had a more intelligent comprehension of the point of view and problems of the management, and were able to convey this to the laborers in a way that soon won their confidence. At the same time, the foremen, because of their closer contact with the laborers, were able to interpret the point of view of the men to the management in a way that the laborers themselves had been unable to do. The result was that the trouble was sifted down to a few fundamentals; these were adjusted to the satisfaction of both sides, and the strike was averted. It is not difficult to imagine how foremen thus trained in the art of managing men would be able to cut out misunderstandings and labor wastes in their own departments and key their men up to full co-operation with the plans and policies of the management.

Two Important Results

Perhaps the effect of foremen training on the individual foremen can be summarized under two heads: 1. Training awakens the foremen mentally and gives them a valuable fund of new information on industrial principles where they have been accustomed largely to rule of thumb. 2. It motivates them for bigger work, makes them see the importance of their duties as a part of the whole team work of industry, gives them renewed self-confidence and usually a larger sense of loyalty to the plant and to the management of which they now feel themselves to be a part. These changes show up in keener thinking on the job, better handling of men, more skilful planning of work, improved relations between the department heads, closer co-operation with the management.

For example, the Warner Gear Co., of Muncie, Ind., enrolled 100 of its supervisory force in a course in production methods. "Immediately after we had started the training," said A. B. Bolender, general foreman, "I noticed a more hearty co-operation among the different department foremen. They were trying to help each other out of their difficulties to a much greater extent than I have ever seen a bunch of foremen in a shop of this size. They also seem much more congenial to deal with. I can also see a great difference in the way they handle their men. They go at it in a more tactful manner, and seem more interested in the welfare of their workmen. Most of the foremen are now doing more studying of conditions in their department, and are also starting a system of planning their work, which is all the outcome of the training."

Ability to Do Team Work

From a New London, Conn., plant comes this incident: "A while ago we had to move some heavy machinery. We had put it off as long as we could, as our knowledge in that line of work was limited, and finally when we started to tackle it, we couldn't seem to get anywhere. There were twelve men on the job, and six of them were in the foremen training course. Each man had his own idea. Finally one of the foremen said, 'See here, we're studying team work in the course; let's apply a little of that principle to this job.' We sat down, discussed the problem, agreed to a plan, and went to work. When we quit that night the job was done and everything was moved to the second floor. Our first try-out of team work was a real success."

"There is no question that the morale of our key men has been bolstered up and a feeling of unity maintained throughout the entire organization," said R. F. Bradley, director of personnel, in reporting results of foremen training in the American Tube & Stamping Co. of Bridgeport, Conn.

From the Detroit Steel Casting Co. this statement was made by E. E. Mains, metallurgist, who took the course with the foremen: "The entire organization has a much clearer idea of the function of foremen, hiring and handling men and materials, keeping of records, their relation to each other and to the management, which is already manifested in their work and attitude, and will result in greater co-operation and efficiency."

From observation and experience and the testimony of those who have benefited it may be said that foremen training can accomplish these direct results in the foremen:

Better handling of labor.
More receptive attitude toward new methods and improvements.
Greater alertness and resourcefulness in originating improvements.
Closer team work between departments.
More intelligent co-operation with the management.
Closer attention to wastes.
Greater loyalty to the plant and pride in its workmanship.

These results a plant manager may confidently expect, provided the course is a practical one, dealing with fundamental principles and methods, and provided further that it is rightly conducted. Such a course, in my experience, must include text material, group discussion, lectures by men who know what as well as how, and problems calling for written work. From a real program of training real results may be counted on, which will be reflected in the cost sheet and the profit and loss statement.

Decreased Operations in Valleys

YOUNGSTOWN, Dec. 12.—Independent iron and steel plant operations in the Mahoning Valley show a further recession this week, due to a seasonal condition at this time of the year. Of 109 independent sheet mills in the Valley, 85 were scheduled at the beginning of the week, or 11 less than last week. Independent open hearth capacity is melting at 70 per cent, 39 of 51 units being charged.

Owing to a slackening in business, the Brier Hill Steel Co. has cut its operations to 60 per cent, maintaining two blast furnaces, seven open-hearth furnaces and 19 sheet mills on the active list. Its plate mills are operating irregularly.

The Youngstown Sheet & Tube Co. is averaging 85 per cent and the Republic Iron & Steel Co. 75 per cent. In the Valley, independent schedules average 75 per cent, while subsidiary properties of the Steel Corporation are maintaining a 90 per cent level.

Car building and repair interests and tank plants are maintaining a high average production rate, owing to the sustained volume of business of such nature which is developing.

WILL MAKE DURALOY

New Product to Be Manufactured by the Cutler Steel Co.—Properties Described

The Cutler Steel Co., with a plant at New Cumberland, W. Va., and general sales offices, at present located in the Hudson Terminal Building, New York, will begin commercial production soon after Jan. 1 of duraloy, an oxidation, corrosion and abrasion-resisting metal. This product, a chromium iron alloy, is the result of approximately 12 years of extensive research and experimentation. Developed primarily as a low cost alloy oxidation resistant, it was found also to possess satisfactory resistance to corrosion under certain conditions; high tensile strength at elevated temperatures and hardness and toughness offering marked resistance to wear and abrasion.

The physical properties of the material vary according to specific analysis, treatment and whether cast, forged or rolled. The range is from properties somewhat better than cast iron up to those of commercial alloy steels. Physical properties, which show a wide variation, due to the difference in composition and treatment, follow:

Specific gravity, 7.60. Weight per cu. in., 0.27 lb. Weight per cu. ft., 467.00 lb. Coefficient of expansion per deg. Fahr., 0.0000090 (average). Contraction allowance in casting, ¼ in. per ft. Brinell hardness, 170 to 600.

	Cast	Rolled or Forged
Ultimate tensile strength....	40,000-90,000	80,000-130,000
Elastic limit, lb. per sq. in...	30,000-80,000	65,000-110,000
Elongation in 2 in.....	2.0-0.0 per cent	26-8 per cent
Reduction in area.....	3.0-0.0 per cent	50-10 per cent

Careful tests have been made to determine the tensile strength at high temperatures and have disclosed the retention of a relatively large percentage of the original tensile strength. Typical results of such tests show 98,110 lb. per sq. in. at 392 deg. Fahr.; 72,000 lb. at 1112 deg.; 40,000 lb. at 1292 deg.; 25,000 lb. at 1472 deg.; 20,000 lb. at 1652 deg. and 10,000 lb. at 1832 deg.

The metal will satisfactorily resist oxidation up to 2100 deg. Fahr. Laboratory and industrial service tests conducted for extended periods at that temperature show practically no loss of weight. Above that temperature the results are uncertain, depending somewhat on service conditions, but it is claimed they are as satisfactory as can be obtained from any other metal. The following table gives results obtained from tests run at 1800 deg. Fahr., a fair average temperature for most applications, the figures in each case being the percentage of original weight lost.

Material	Hours 2	5	25	100	200	300
Duraloy	0.00	0.00	0.00	0.00	0.00	0.01
Nickel	0.01	0.14	0.50	0.80	6.80	(a)
Nickel-copper	3.81	12.10	(a)			
Cast steel	5.39	12.50	(a)			
Cast iron	5.57	(a)				
Steel	6.80	(a)				

(a) Material no longer considered because of excessive weight loss.

The metal is to be furnished commercially in practically every form, including castings, rolled or forged bars, sheet wire and tubing. Some of the uses to which the metal can be put on account of its long service life under heat, and consequent low heat hour cost are:

Heating furnace bottom plates, chain links, frames, guide channels, manifolds, saddles, sills, rollers, stack dampers; roasting furnace rabble arms, rotating sweeps, shafts, sleeves; enameling furnace T bars, burning points and racks; annealing boxes, carbonizing boxes, lead pots, oxidizing salt pots, hooks, baskets, pyrometer protection tubes; retorts for cyanide compounds, nitrogen compounds, oil cracking and low temperature distillation of oil shale, coal and special charcoals; annealing pans for non-ferrous work; molds for antimony, brass, tin, copper, type metal, zinc; burner parts and bosses; heat exchangers, tunnel and kiln linings, commercial gas plant muffles and benches, glass and vulcanizing molds, economizer and superheater tubing, soot blowers, valves for internal combustion engines, smoke jacks.

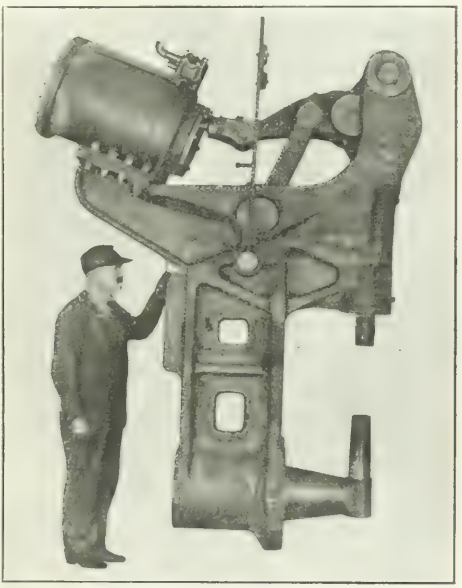
The chemical resistivity of the metal recommends it for these uses: Chemical plants; autoclaves, digesters, containers, vats and piping, cylinder linings; linings for apparatus for treatment of oil refining residues; linings for caustic pots, salt pots and fruit juice and organic acid containers; impeller blades, rings, sleeves and all rotating parts; perforated and wire screens, ship parts and fittings; periscopes, valves, mining machinery.

Applications where resistance to wear and abrasion is essential suggest these uses: Balls and races for grinding; extrusion and drawing dies; liners for launders in concentrators; liners for ore, coal and coke chutes; pan mill plates and mullers; metal tubing piercing tips, rolls.

Last-Head-in-Boiler Riveter

A large riveting machine as shown in the accompanying illustration, for use in driving up the last heads in boilers through the manhole has been built recently by the Hanna Engineering Works, 1765 Elston Avenue, Chicago.

The reach of the unit is 14 to 18 in., the gap 35 in., the cylinder diameter 18 in., and the capacity 100 tons. The die stroke is 5¾ in. The weight is 9900 lb. The machine is arranged for portable use in two positions and suspension is made with the dies vertical as shown.



Riveting Machine for Driving Up Through the Manhole the Last Heads in Boilers. It is arranged for portable use in two positions; suspension is made with dies vertical as shown. The reach is 14 to 18 in., the gap 35 in. and the capacity 100 tons

It swivels about a point close to the center of gravity, permitting the stationary die to be swung on and off the manufactured head of the rivet in a direction very nearly that of the line of die travel. The mass or weight of the riveter is not lifted or lowered in riveting.

The stake is of forged alloy steel. The distance from the center of the beam stake to end face of the die standing thereon is 30 in., which accommodates a 60-in. shell. The length of this die can be varied in conjunction with the opposite die to take care of shells as small as 42 in. in diameter. The distance from the axis of the dies to the long face of the throat is 16 in. This machine is used on high pressure containers in which the rivets are 1¼ in. and the plates 1½ in. thick.

Either a straight push hydraulic actuating mechanism or the company's pneumatic mechanism may be provided for the machine.

EXPORTS OF MACHINERY

Openings for United States Manufacturers in Latin America and Other Lands

"Germany is experiencing a shortage of raw materials and fuel, which is handicapping her industrial progress," said Alan G. Goldsmith, chief of the Western European Division, Bureau of Foreign and Domestic Commerce, before the Cleveland foreign trade convention, held Dec. 5 under the auspices of the Cleveland Chamber of Commerce. In iron and steel production it is estimated, said Mr. Goldsmith, that Germany is running between 65 and 75 per cent of capacity.

Dr. Julius Klein, chief of the Bureau of Foreign and Domestic Commerce, pointed to the fact that Latin America is the third largest market of the United States for tin plate, taking in all about 15 per cent of our export of this product. About 12 per cent of the steel sheets shipped abroad go to Latin America, while approximately 48 per cent of the total exports of bolts, nuts, rivets and washers and 30 per cent of the exports of galvanized sheets are taken by Latin American countries. In barbed and other wire, Latin America has easily been our best export customer.

Demoralization in Europe

W. H. Rastall, chief of the machinery division, Bureau of Foreign and Domestic Commerce, discussed the export machinery situation as follows:

"Conditions have demoralized business in Europe. In 1915 Europe took more than half of the total of our machinery exports. Most of our manufacturers still seem to feel that their attention should be concentrated in that direction. We in Washington feel that other markets show prospects of greater expansion, more especially the markets of Latin America, Australia and Asia. In 1915 Asia took less than 6 per cent of our total machinery exports; in 1921, 26 per cent. In 1915 Asia approximated $77,000,000; in 1921, $246,000,000. Latin America in 1915 absorbed about $12,000,000 worth of our machinery; in 1921 more than $92,000,000 worth. Australasia increased her purchases from about $3,000,000 in 1915 to more than $7,500,000 in 1921. It would appear that the alert sales manager should place his greatest energies behind those markets that are expanding. Conditions in Latin America, Australasia and Asia are more or less similar.

"The yen, the Philippine peso and the rupee are very close to their pre-war values. The Java guilder is somewhat depressed, while the Mexican dollar, the Shanghai tael and other silver currencies of the Far East are, as usual, practically the bullion value of their silver content. The Far East has recovered very largely from exchange troubles that developed during the war. Conditions in the Orient are much nearer normal than are those in Europe.

Japan Developing Rapidly

"We have recognized the rapid development in Japan. That country has been absorbing an amazing quantity of machinery. In 1911 China imported about $200,000 worth; in 1920, $14,000,000. In 1915 the Philippines absorbed less than $1,000,000 worth; in 1920, $10,000,000. In 1913 British India absorbed less than $500,000 worth; in 1920, $15,000,000. In four years Asia has absorbed over $242,0000,000 worth of American machinery, a larger quantity than would have been absorbed in 40 years at the pre-war rate.

"The American machinery salesman in Asia is a missionary of civilization of superlative potency. I warn you to watch Asia and the forces released by the mechanical missionary. From Yokohama to Bombay, Asia wants to be industrialized. These people realize that machinery will raise the standard of living for all. The foreign sales manager should give a great deal of attention to Asia.

"Another new development in the machinery trade lies in the fact that our competitors are disabled. Germany is no longer a factor of outstanding importance. Great Britain finds it difficult to sell machinery abroad.

Importance of Exports

"Export business is rapidly becoming of pressing importance. The Baldwin Locomotive works recently announced that 60 per cent of their product was exported. I know of companies that export well over 25 per cent. The latest figures available show that on the average the 4000 machinery manufacturing plants of this country export 17 per cent of their product. This business is absolutely necessary to the welfare of these shops, and to at least a million of our people.

"Good methods can multiply our machinery exports many times. The department of commerce is prepared to assist you to get this business on terms that include prompt payment and a clean contract."

GREAT RAILROAD ACTIVITY

Unprecedented Loadings of Revenue Freight—Coke Shipments Gain

WASHINGTON, Dec. 12.—Unprecedented loadings of revenue freight for this time of the year continue, total loading for the week which ended on Nov. 25, amounting to 955,495 cars, according to reports received from the rail carriers by the Car Service Division of the American Railway Association. This was an increase of 282,030 cars over the corresponding week last year and an increase of 151,794 cars compared with the corresponding week in 1920. The total for the week of Nov. 25, however, was a decrease of 13,599 cars compared with the preceding week. This decrease was almost entirely due to a seasonal falling off in ore shipments resulting from the cessation of navigation on the Great Lakes.

Coke loadings totaled 13,234 cars, a gain over the week before of 803 cars. Compared with last year, this was an increase of 6878, but a decrease of 1211 compared with two years ago. Ore loadings amounted to 15,052 cars, 17,728 below the preceding week. While this was an increase of 9334 cars above the same week last year, it was a decrease of 16,912 cars compared with the same week in 1920.

Locomotives in need of repair on Nov. 15 totaled 18,356 or 28.5 per cent of the number on line. This was a decrease of 10 locomotives compared with the number on Nov. 1.

Locomotives in need of heavy repairs totaled 15,120, an increase within 15 days of 19, while those in need of light repairs amounted to 3236, which was a decrease of 29 within the same period.

From Nov. 1 to Nov. 15, the railroads turned out of their shops 12,139 locomotives. The number of serviceable locomotives on American railroads totaled 46,101 compared with 46,096 on Nov. 1.

Employment Gains in Iron and Steel Industries

WASHINGTON, Dec. 12.—The iron and steel industry made the greatest gain in employment in November of all industries, having added 12,735 during the month. Expansion of employment throughout the nation was the greatest in November since Jan. 1 last, according to the report of the United States Employment Service, 1428 concerns on Nov. 30 having 44,653 more employees on their payrolls than those carried on Oct. 1. The improvement in iron and steel was reflected in metal and metal products other than iron and steel with an employment increase of 3294.

The approach of winter has caused a decline in building operations in many parts of the country without causing a surplus of workers in these lines. In some cities, however, building programs are unabated and increasing in volume. With the advantage of open weather, highway construction and public improvements are continuing to absorb large numbers of unskilled workmen. The common labor shortage has been relieved in a measure by the release of many farm workers but it is still apparent in many places.

Movement to Designate Steel by Numbers

Investigation Instituted Under Government Auspices by Engineering Standards Committee to Have Numbering System for Tool and Other Steels

WASHINGTON, Dec. 12.—Based upon a system of definite specifications to be worked out by a sectional committee of the American Engineering Standards Committee, a recommendation was adopted here last Wednesday at a meeting in the Department of Commerce building to make an investigation looking to the uniform numbering of forging, casting, structural, tool and other steels. Vigorous opposition was expressed by makers of tool steel to the inclusion of this class of material in the investigation, but the resolution was carried by a vote of 18 to 3 with 7 not voting.

The conference was called by the American Engineering Standards Committee at the request of the United States Bureau of Standards and was attended by approximately 30 steel producers, consumers, representatives of technical societies and Government officials, including Dr. G. K. Burgess, head of the metallurgical division of the Bureau of Standards and chairman of the metal committee of the Federal Board of Specifications, who presided over the conference.

The sectional committee to be appointed will be sponsored by the Society of Automotive Engineers and the American Society for Testing Materials, whose numbering systems were declared to have proved satisfactory. The committee will be made up of representatives of all the interested parties, including producers and consumers. The recommendation in favor of the investigation at first excluded tool steel after protest had been voiced by J. H. Parker, of the Carpenter Steel Co., Reading, Pa., and who, as a representative of the tool steel industry, read a statement from Dr. J. A. Mathews, president of the Crucible Steel Co. of America, who declared that numbering of tool steel was impracticable. His attitude was similar to that of other makers of tool steel. Subsequently, however, the resolution was broadened so as to embrace tool steel.

French System in Favor

Another interesting feature of the meeting was the reading by L. H. Fry of a report on European practice regarding the numbering of steel in which it was declared that only the French and Swiss systems could be offered as bases for use in the United States. General comment on the report indicated that the conference favored the French system providing for definite grades by complete specifications, and avoiding a code system. Several objections were raised to the Swiss code system. Other countries covered in the report have made no or comparatively little progress regarding the practice.

In adopting the resolution favoring the numbering of steels, it was the sense of the conference that the system should be based upon definite specifications rather than being based upon suggestions relating to chemical and physical properties and heat treatment. Also it was felt that the sectional committee should be given freedom of action and not be bound to a rigid plan. The point was made that the specifications be standardized before adopting a numbering system.

Some Objections to a Numbering System

In opposing any numbering system for tool steel, Mr. Parker quoted from Dr. Mathews' memorandum which declared that tool steel has many components and that the steel from one heat alone may vary in analysis, to say nothing of the differences between various heats, and that a numbering system would be impracticable. It was asserted it would be a retrograde move and that such a system would be extremely complicated.

R. M. Bird, of the Bethlehem Steel Co., who represented the American Society for Steel Treating, said that the success of the Society of Automotive Engineers was due to its system being based entirely on chemical composition. He said that the numbering system is not and cannot be a specification and added that conflict with the systems of steel makers would be the inevitable result. The Bethlehem Steel Co., he said, has its own system for numbering grades and kinds of steel, which is an extension of the S. A. E. system, but it was declared that it cannot apply to tool steel.

C. F. W. Rys, Carnegie Steel Co., said he did not think it would be possible to develop a symbol or number system or a combination of the two until sets of definite specifications had been worked out, such as those of the A. S. T. M. and the S. A. E. F. P. Gilligan, Hartford, Conn., representing the S. A. E., said that the S. A. E. first decided on the compositions needed by automotive makers and then designated numbers and that it is satisfied with the numbering system, which has not reached its limitations. He said the society is ready to co-operate for the extension of the system but that it had been disturbed through outside units distorting the numbers and he declared that if there is an extension of steel grades to fit all numbers the S. A. E. will find itself without a numbering system.

Federal Board of Specifications

Army and navy representatives went on record in favor of a numbering system for all steels and said that they have systems of their own, but that extension of the system is desirable provided it does not block progress and destroy initiative in perfecting steel grades. They said that objections raised to-day regarding numbering of tool steel are like those the Navy and War departments faced 25 years ago regarding specifications but had to overcome, the result of which, it was declared, was to build up and perfect the steel industry.

Dr. Burgess pointed out that the Federal Board of Specifications soon will work out a system calling for but one specification for one metal. The matter of inspection will be left to the purchaser, he said. The board is attached to the Bureau of the Budget and is adopting specifications for materials and supplies purchased by all Government departments and when adopted it will be mandatory for all departments to follow them in preparing their own specifications for materials. The board is made up of experts from the various bureaus, and the Bureau of Standards gives advice and conducts necessary tests in its extensive laboratories. In all cases, it is pointed out, specifications are selected after thorough consideration of the Government's needs on the one hand and the manufacturers' interests on the other. It is intended that these specifications shall provide for goods that satisfactorily fill their purpose, but will at the same time be such as can be economically manufactured. They are declared to provide for the best commercial practice and not to put the Government in the position of demanding specially made material.

Speaking on behalf of consumers, Mr. Lynch said there is considerable confusion experienced in ordering steel that is wanted in a hurry and that it is felt by the users that if producers could get together, it would be found that but little would have to be added to the S. A. E. specifications. The S. A. E. system was commended by George L. Norris, New York, also representing that society, who favored the extension of its system to steels which it does not now cover. Like others he opposed using the brand name with the numbering system and said such a practice would run counter to the by-laws of the S. A. E. and the A. S. T. M.

Part of Plan to Eliminate Industrial Wastes

The conference was held in connection with the activities of the Division of Simplified Practice of the De-

partment. It was intended that the conference should be addressed by W. A. Durgin, head of the division, but he was absent from the city, as was also Secretary Hoover, who has shown extreme interest in this division, because of its underlying purpose to eliminate waste.

Dr. Julius Klein, director of the Bureau of Foreign and Domestic Commerce, was scheduled to make the opening address at the conference and to welcome those present, but owing to his presence before a committee of Congress, was unable to appear. It would also have been the purpose of Dr. Klein to express the attitude of the department regarding such conferences as that on the numbering of steels. It is known that the department does not consider itself as an expert in such matters but recognizes as experts only those in the steel industry. It is the official attitude of the department that the men in the industry with their knowledge gained through years of study, research and practical experience, will determine whether or not the numbering of steels will serve to eliminate many of the wastes arising out of the modern tendency to provide an infinite variety of ways or means of serving a common purpose. It is felt by the department that the analysis of the utility requirements of the various fields may show that several purposes may be efficiently served by a reduced variety of steels—in which case the resultant interchangeability cannot help but react to the advantage of the producing industry and to the consumer as well.

Recognizing that some centralization of the best thought and practice of the industry is needed, the American Engineering Standards Committee was selected to work toward that end. It is the attitude of the department that if the codification of steels, and consequent specific designation by number or otherwise, means a further conservation of national resources and a reduction of the present extravagance with which the most precious resource, human energy, is conserved, such action will be highly significant. The department is working toward what has been described by the statement that the highest aim of the people can well be to make the processes of trade, industry and commerce as direct and simple as possible in order that the consumer may be supplied more readily with the necessaries and comforts of life.

Colorado River Development Project Emphasized

The trip of Secretary Hoover in the West and his accomplishment is held by the department to be of extreme importance to the iron and steel industry. Through the recent efforts of Mr. Hoover, the compact for the development of the Colorado River basin has been signed by the seven States affected. In the opinion of officials of the Department of Commerce, this means a vast region will be opened for agricultural activities, bringing with them greater demand for farm machinery of all kinds. Dr. Klein is of the opinion that the great power reserve created will mean tremendous industrial activity and increased business for steel producers and manufacturers of machinery. Pointing out that railroad facilities will be extended into these hitherto unpopulated regions, Dr. Klein has explained that the Great American desert will give way to onward march of American ingenuity, resourcefulness and enterprise.

"In every step of this huge undertaking steel will play an important part," according to Dr. Klein. "In fact, there is no greater prospective market ahead for the American steel industry than that connected with this project. This new market, added to those existing for steel, and the products made therefrom, means the industry will be taxed to its utmost capacity to meet the demand. Without question, then, it is absolutely necessary that the industry put its own house in order by eliminating all avoidable forms of waste to the greatest possible extent. The elimination of excessive variety and duplication in manufactured products commonly used is one important step; the further development and application of standards is vital."

Precision Eccentric Boring Head

The Bruce precision eccentric boring head shown in the accompanying illustration is being placed on the market by the Precision & Thread Grinder Mfg. Co., Philadelphia.

The tool is intended especially for application to drill presses and milling machines for boring jigs and fixtures and also for index boring. It is graduated in



Eccentric Boring Head for Application to Drilling and Milling Machines When Boring Jigs and Fixtures, and Also When Index Boring. The eccentricity of the tool is varied by means of the graduated screw shown

0.001 in. and provided with a gib to take up wear. Adaptors are provided, these being designed to take various sizes of drills within the capacity of the tool, which permits drilling and boring.

Four sizes are available, the No. 1 having a range of ⅝ to 1½ in. and the No. 4, 1 to 6 in. The tool is furnished with a set of six boring tools, chuck and test indicator.

A Moving Picture of the Production of Cast Iron Pipe Centrifugally

At the National Exposition of Power and Mechanical Engineering at the Grand Central Palace, New York, last week, a moving picture film was exhibited of the DeLavaud process of making cast iron pipe centrifugally as practiced by the United States Cast Iron Pipe & Foundry Co. at Birmingham, Ala. The film included details of the old method of making pipe by the sand mold process, this constituting the first part of the film. The picture, as taken by the Pathescope Co. of America, Inc., and exhibited in their rooms in the Aeolian Building presents in strong contrast the details of the old and new process carried on in the same plant. The picture shows the latest improvements in the DeLavaud process, which has been considerably modified since the first details of it were published by THE IRON AGE in 1916. The film was also shown before a meeting of foundrymen in Boston.

Labor Legislation Association Meeting

The annual meeting of the American Association for Labor Legislation is scheduled for Dec. 27, 28 and 29 at the Congress Hotel, Chicago. A session for Wednesday afternoon on "Industrial Wastes and General Welfare," is to be held at the City Club, of Chicago; a session on Thursday morning at the Congress Hotel will be devoted to the "Business Cycles and Unemployment"; a session on Thursday afternoon is to be devoted to "Factors to be Considered in Wage Determinations"; the Thursday evening session will take up "Workmen's Insurance," this held at the City Club; and on Friday morning a joint session will be held with the American Statistical Association on "Employment Statistics." Thomas L. Chadbourne, New York, is president and Dr. John B. Andrews, 131 East Twenty-third Street, New York, is secretary of the Association.

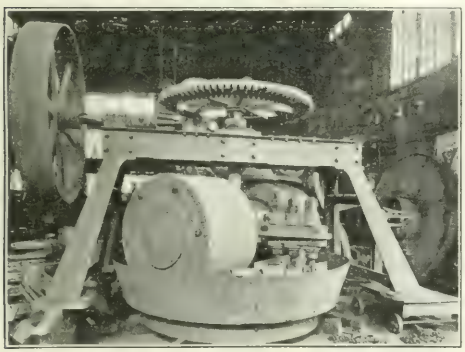
Flue Dust Briquetting by Corrosion Process

Plant of M. A. Hanna Furnace Co., at Buffalo—Claims of the Economic and Practical Value of the Product

BY A. L. STILLMAN*

THE corrosion process of briquetting applied to blast furnace flue dust has been adopted by the M. A. Hanna Furnace Co. for flue dust reclamation, and the company's first plant is now operating in Buffalo.

This plant, before the present process was installed, had an interesting history. The original installation was made by the Buffalo Slag Co. in 1919, following the lines of the well-known Schumacher catalytic process. Flue dust was mixed with a catalytic solution which gave it a certain cementing property, which was accentuated by fairly heavy pressure. Briquettes were formed in a Schumacher type of press—a toggle of



An 8-Ft. Pan Masticator Used in Preparing the Briquette Mix

mechanical type with a horizontal rotating mold table. The pressure realized in the Schumacher press was about 8000 lb. per sq. in. and the capacity was 8 tons per hr. The briquettes were brick shaped, and their dimensions were: 5¼ x 8¾ x 3 in. After formation in the press, the briquettes were carried on a conveyor belt to a storage bin where they were removed from the belt by hand and piled for 24 hr. seasoning.

The methods of flue dust preparation for recharging for the blast furnace are three:

Sintering and nodulizing only,

Briquetting only,

Briquetting followed by sintering.

It has always been thought that by the second method—briquetting only—a better product would be obtained. Until quite recently the Schumacher or catalytic method has been the best system of briquetting evolved, both from the standpoint of cost and of product. None the less, its progress in the United States has not been rapid. With the exception of the plant at the Buffalo Slag Co. but one other installation was in operation in the United States in 1920. That was also in Buffalo, at the plant of the Wickwire Steel Co. The operation was practically the same, but the briquettes were cylindrical, 7 in. in diameter and about 4 in. high.

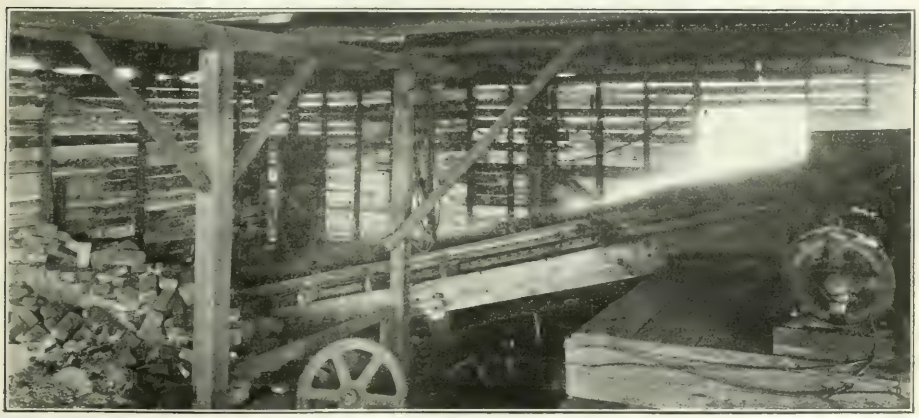
The criticism of the process in America, the reasons why it has not taken hold are as follows:

1. The briquettes are large and bulky.
2. The hand labor involved in moving briquettes and piling them up for storage is a distinct disadvantage.
3. The time required for setting; namely, 24 hrs. before the briquettes become strong enough for ordinary handling and charging into the blast furnace is also a disadvantage.

The majority of blast furnace men turned from briquettes to sinter reluctantly—reluctantly because they did not like to give up the advantages that briquetting gave them; namely, the low first cost of plant, the low cost per ton of production, the realization of coke value in the dust, the porosity and the easy reducibility. Again, briquetting was simple—required no fire box, no heating, no highly skilled labor, no technical supervision. Experiment has been continuous, therefore, to find a way to preserve the advantages of briquetting and do away with some, at least, of the disadvantages.

The first requirement is size. The briquettes must be made smaller. In making briquettes on piston presses the cost per ton varies inversely with the size. In making briquettes 7 in. in diameter on the Schu-

*General Briquetting Co., 25 Broad Street, New York.



Briquettes on Seasoning Belt on Way to Cars at Buffalo Furnaces. Priquettes of the old form are shown at the left

macher press briquetting costs were somewhat lower than sintering costs. Obviously, when this diameter was shortened, the cost mounted. It was necessary to abandon the piston type of press altogether.

The Belgian or roll type of press has been used in many places and for many years in the briquetting of coal fines. The usual Belgian press consists of two rolls operating against each other with pockets so placed as to form eggette or pillow shaped briquettes. The pulverized material mixed with its binder is fed to the machine from a feeding hopper in which fingers, mounted on rotating arms, perform the function of providing the rolls with a steady, balanced feed.

Pressures are difficult to estimate, but it is probable that such presses are usually operated so as to give the equivalent of 3000 lb. per sq. in. As the pressure is really a succession of linear pressure varying at each point on the briquette inversely with the thickness of the briquette at that point, the actual measurement is extremely difficult. The behavior of briquettes as usually made in such presses is about the same as those of piston and mold briquettes made at 3000 lb. per sq. in.

In flue dust briquetting these presses were tried and found wanting; the pressure was insufficient, the briquettes were weak—too weak, indeed, to stand the fall from the press—and nothing of merit was accomplished until the application of the Universal press to the problem solved the difficulty. The important discovery of the self-feeding roll made by Ellsworth B. A. Zwoyer and featured in this press, solved the pressure problem. Pressures equivalent to 6000 lb. per sq. in. were realized and small briquettes made at this pressure were able to stand the drop from the press. The press itself deserves a word of description.

The Universal press is the result of a comprehensive study of all types of roll or tangential presses and extended experience in operating briquette plants. It consists of a frame, rolls, drive and feed. The side girders of the frame contain recesses for the bearings for the driving shaft and for the two intermediate shafts. Steel tie bars, surmounting each of these girders, serve to take up the thrust of the rolls through the bearings. The press is rugged and simple, having the fewest moving parts consistent with performance.

The feed consists of a vertical hopper, without mechanism or rotating fingers, mounted directly above a pair of briquetting rolls. In the vertical hopper a column of material is fed, and the size and weight of the column determine the actual weight upon the briquettes. The weight of the material presses down upon the mixture actually undergoing pressure. The pressure of the material thus thrown against the rolls produces a reaction, which is exerted by the rolls themselves as pressure upon the forming briquette. The rolls are made of special cast iron, cast in one piece, and fastened directly to the shaft without a spider. The diameter of the roll is proportional to the size of the briquette made. For a 2 in. square briquette, weighing 4 oz., 20-in. diameter rolls are used. The shape of briquette turned out by this press may be described as that shape formed by two equal size pyramids with square bases coincident, with apices and corners rounded off.

The corrosion process as adopted at Buffalo is simple in principle. The term corrosion is used because an acid or corroding agent acts upon the iron monoxide in the flue dust with corrosive effect, making iron sesquioxide. The usual corrosive agent is wire-mill liquor or a solution of copperas. One part copperas crystals, 9 parts water, 45 parts fresh flue dust and 45 parts old flue dust is a typical briquetting mix. These ingredients are thoroughly mixed, masticated and pressed. A binder forming reaction occurs as follows:

$$Fe(OH)_2 + H_2O + \text{heat} = Fe(OH)_3 + H + \text{heat}$$
(binder)

As the heat moderates and the excess of water evaporates the ferrous sulphate is again formed.

It will be seen that the oxidation takes place through acid reacting upon the iron ore, and returning to its own constituency after the exhaustion and drying out of the water present. The iron sesquioxide formed in this manner is a dense, hard, waterproof binder.

In the plant operation the dust is dumped from cars and screened. Screened dust goes to feed bins from which it is withdrawn by measuring tables. The tables discharge a measured quantity of the dust to a horizontal pug mill wherein is added the proper proportion of corrosive agent. The flow of the solution is regulated by valve. The pug mill discharges the mix into the pan of the masticator.

The masticator, as will be seen, consists of a pan—stationary—about 8 ft. in diameter, over which operate two heavy rolls—48 in. in diameter and 24 to 38 in. wide—alternated by distributing plows. The capacity of the machine is determined by the speed at which it is operated and by the positions in which the plows are set. Ordinarily, it is desirable to give at least four passes of the rolls to the material passing through. The mix is fed at the side and discharged through the center. The masticator is primarily a first class mixer wherein the diffusion of a liquid through solid particles takes place. Then, too, by mastication the breaking of the dust particles by the rolls, combined with this better diffusion of the solution, results in more rapid and efficient chemical reaction or binder formation. It has generally been found that briquettes made by mastication are stronger, better and quicker setting than those not so made. Again, where mastication is used a greater proportion of old flue dust, which, containing but little FeO, is inert and has no part in the chemical reaction, can be carried.

From the masticator the mix, now thoroughly digested, is conveyed to the press, above described. From the press the briquettes drop to a belt. They are soft when made—just strong enough to stand the drop from the press to the screen chute on to the traveling belt. On the belt they obtain one hour's slow travel in the open air. The briquettes, drying rapidly in the heat of the chemical reaction, form a high permanent set in that time. As the surface exposed in proportion to volume of briquette is four times that of the Schumacher variety, the time required for hardening and seasoning is very much less. At the end of one hour they can safely be dumped into the bins.

The photographs reproduced were obtained from the Chemical Publishing Co., Easton, Pa., which is publishing a book on "Briquetting."

The Precision Instrument Co., Inc., Detroit, has acquired control of the Precision Instrument Co. of Newark, N. J., draft gages, pressure recording instruments, CO_2 and specific gravity recorders, laboratory meters, etc. The present management remains unchanged. C. P. Baldwin, president, says the company expects to enlarge the business considerably, adding several new lines. The company's New York office will be in the Engineering Building, 114 Liberty Street. The factory will later be located in New York.

To teach heating and ventilating engineering by mail the Northern Institute, 1951 East Fifty-seventh Street, Cleveland, was incorporated Nov. 1, having acquired the Cleveland Engineering Institute. The present officers are: President, George W. Roberts; vice-president and general manager, K. L. Seelbach; secretary, Henry F. Pollock, formerly vice-president of the McCaskey Register Co.; treasurer, W. L. Seelbach, Walworth Run Foundry Co. Mr. Roberts remains as director as does Earl A. Davis as chief examiner.

During the first ten and one-half months of 1922, the Bessemer Limestone & Cement Co., Youngstown, shipped 1,000,000 bbl. of cement from its plant at Bessemer, Pa., which has an annual rated capacity of 1,000,000 bbl. The company is constructing additional storage facilities to enable it to build up larger reserve stocks against spring demands.

The H. B. Smith Co., Westfield, Mass., heating appliances, has granted a wage increase of 10 per cent to something more than 500 workers, effective Dec. 4. An increase of 15 per cent was asked by the workers.

NOVEMBER STEEL OUTPUT

Ingot Production Rate About 39,500,000 Tons Per Year—Increase Over October Very Small

According to the steel ingot statistics, as collected by the American Iron and Steel Institute, the 30 companies which in 1921 made 87.50 per cent of the total, had an output in November of 2,889,297 gross tons. This compares with 2,872,415 tons in October and is an increase of 16,882 tons. The increase in October over September was 498,636 tons.

On the assumption that companies reporting are supplying the same percentage of the total as they did last year, the output for the 26 working days of November was about 3,302,000 tons or 127,000 tons per day. The October production on the same basis was about 3,282,760 tons or approximately 126,260 tons per day. The November output was at the rate of about 39,500,000 tons per year.

The statistics of the American Iron and Steel Institute since January, 1921, follow in gross tons:

Monthly Production of Steel Ingots by 30 Companies Which Produced About 87.50 Per Cent of the Steel Ingot Production in 1921

Months	Open-Hearth	Bessemer	All Other	Total
January, 1921	1,591,281	608,276	3,629	2,203,186
February	1,295,863	450,818	2,796	1,749,477
March	1,175,591	392,983	2,404	1,570,978
April	1,000,053	211,755	2,150	1,213,958
May	1,047,810	216,497	1,543	1,265,850
June	808,286	193,644	1,476	1,003,406
July	689,489	113,312	575	803,376
August	915,334	221,116	1,621	1,138,071
September	908,381	265,152	1,207	1,174,740
October	1,269,945	345,837	1,028	1,616,810
November	1,294,371	363,912	1,718	1,660,001
Total—11 months.	11,996,404	3,383,302	20,147	15,399,853
December	1,129,174	296,380	1,539	1,427,093
Total—Whole yr.	13,125,578	3,679,682	21,686	16,826,946
January, 1922	1,260,809	331,851	822	1,593,482
February	1,395,835	348,571	616	1,745,022
March	1,918,570	451,386	795	2,370,751
April	1,997,465	445,939	1,109	2,444,513
May	2,214,774	494,893	1,474	2,711,141
June	2,143,708	487,851	2,918	2,634,477
July	2,020,572	464,047	2,485	2,487,104
August	1,807,310	404,379	2,893	2,214,582
September	1,911,147	460,127	2,505	2,373,779
October	2,352,207	518,010	2,198	2,872,415
November	2,360,903	525,945	2,449	2,889,297
Total—11 months.	21,383,300	4,932,999	20,264	26,336,563

The November daily estimated output of 127,000 tons compares with 70,020 tons per day in January and with 114,700 tons per day in May.

Cost Accounting in the Manufacture of Iron and Steel Sheets

The National Association of Cost Accountants has recently issued an official publication entitled "Cost Accounting in the Manufacture of Iron and Steel Sheets," by Keith B. Woods. While the article is necessarily condensed, the author has endeavored to make the pamphlet a comprehensive outline of a system for obtaining accurate costs. Among the many points brought out as resulting from the application of this system are the following:

1. There is practically no duplication of effort, the original entry following right through to the cost sheets without re-writing. An example of this is where the service card or order is used for the overhead on the cost sheets.

2. All cards are so laid out that the exact responsibility of each superintendent or foreman is shown.

3. The card of accounts is carried in the greatest detail but shown on most cost sheets in about nine items. Each one of the nine items can be quickly analyzed down to the last requisition or labor card, etc., in its original entry.

4. Probably the greatest improvement over the ordinary sheet cost system is that the costs are mathematically correct as to different products and gages. Sheets are sold by gage or gage differentials from a base gage and finish differentials from a fixed product—one pass cold rolled and box annealed steel sheet No. 28 gage. In the system outlined great care has been taken to get the distribution of expenses on the correct basis for each kind of expense of every department, both to other departments and to the product, and there is no averaging of gages either on the cost sheets or through the inventory to confuse the real cost and give one on the cost of sales that for a given period is practically meaningless, although probably correct over a moderately long period.

Copies of this pamphlet may be procured from the office of the secretary of the association, 130 West Forty-second Street, New York. The price to non-members of the association is 75c. per copy.

Valuable Ore Statistics

The Lake Superior Iron Ore Association through its secretary, W. L. Tinker, has just issued for distribution among the members a 25-page booklet containing tabulations of various data relating to the production and shipment of Lake Superior iron ore. Shipments from each mine for each year are given from the time the mines were opened, some of these records going back to 1854. Receipts at Lake Erie ports and the amount of ore on docks at the opening and close of the season are given as far back as 1883. Production of ore from mines outside the Lake Superior district and the imports of ore from 1879 are listed. The tables are reproduced on photographic paper, being photographs reduced to one-half the size of the original typewritten tables.

Receiver's Fine Showing

Steps toward the liquidation of the Standard Parts Co., Cleveland, have been taken at a meeting held by Frank A. Scott, receiver and the creditors' committee. The company has been operating under a receivership since September, 1920, and during that time its liabilities have been reduced from $11,000,000 to less than $7,000,000, and the receiver has returned to creditors 30 per cent in liquidated dividends. At the request of the creditors' committee, the receiver will make application to the court to offer the plants for sale, either publicly or privately. At present the company is operating four plants, the Standard Welding Division, the Perfection Spring Division and the Eaton Axle Division, Cleveland, and a spring plant in Pontiac, Mich.

Use of New Carnegie Dock

The recent placing by Carnegie Steel Co., of the contract for what is to be known as the Central Dock on the Monongahela river, near West Braddock, Pa., is not, as has been generally assumed, the first step in the direction of the use of the inland water ways by the Steel Corporation for long distance shipments of steel. It is reliably stated that the Corporation in building this dock has in view the greater use of the rivers in connection with interplant movement within the Pittsburgh district, and does not contemplate at this time making shipments of steel to down river points, as already developed by the Jones & Laughlin Steel Co., and planned by some of the other independent steel companies with locations on or adjacent to the rivers. The contract for the construction of the dock has been placed with the Dravo Contracting Co., Pittsburgh.

Wages in Michigan Foundries

According to investigations of the Michigan Foundrymen's Association, the tonnage of melt increased in October over September, a betterment in activity regarded as due in part to the automobile industry.

Floor molders are now receiving between 55 and 65 cents an hour for a 9-hr. day and bench molders between 50 and 60 cents. Specific cases there are of higher wages, but the figures mentioned are believed to be a fair average. Male core workers earn around 50 cents. Wages for common labor have increased pretty generally from about 40 cents to 50 cents an hour.

The association will hold a meeting on Thursday, Jan. 18. J. Edgar Lee, Grand Haven, Mich., is president, and A. W. Blodgett, 419 Kelsy Building, Grand Rapids, is secretary.

ALUMINUM IN STEEL

An Argument Favoring Its More Liberal Use—How Not to Use It

BY W. H. KEEN*

GENERALLY speaking, the open-hearth process is much the same to-day as it was yesterday, with the same methods of handling the reactions except for slight changes due to individuality of melters. Protests from metallographists against the use of aluminum have been so loud that the average open-hearth superintendent has eliminated it from his category except for use in occasional homeopathic doses. The object of this article is to call attention to the fact that aluminum should be one of his most important reagents and should be used freely at the proper time.

Why is it that protests are so numerous against use of aluminum in the killing of steel? The recent literature seems crowded with adverse criticism, with almost never a word of commendation. The use of aluminum results in decidedly more and greater advantages than disadvantages, and in fact the writer goes so far as to say that its use is exceedingly desirable, almost necessary to produce a perfectly clean, sound steel. It is true that photomicrographs have been published showing inclusions of alumina as the cause of failures and, while these data are important, and should be given due consideration, yet the accompanying information as to manufacturing details is all too meager to use the information in a scientific analysis of the problem.

It was regular practice in an open-hearth alloy steel plant, where the writer was at one time employed, to add a small amount of aluminum in the ladle and in the molds. It was used because no bad results had ever been traced to its use and because, on occasional heats which were inclined to be a little wild, it quieted the metal and saved the ingots.

In this connection, it is advisable to call attention to the very powerful effect of very small additions of aluminum; most melters are familiar with it but it is worth repeating. Ingots of soft steel particularly (0.10 to 0.15 per cent carbon) when not completely killed will throw a worm and sometimes actually boil in the mold, even after the initial set of the surface and several minutes after pouring. A few small pieces (less than an ounce to 1000 lb.) thrown in during the pouring will prevent this entirely.

How Additions Should Be Made

However, addition of aluminum to the individual ingots is probably open to severe criticism, and it is more than likely many samples of steel found to contain inclusions of aluminum oxide represented heats poured in this manner. Pieces of aluminum thrown into metal rising in an ingot mold oxidize not only from reaction with carbonic gas and oxide impurities in the steel, but also with oxygen from the air as the small pieces float about for an instant on the surface of the metal and then become entrapped.

Aluminum should be added in the furnace before tapping and should be immersed completely in the bath. In this manner all of the desired effect of the reaction is obtained and none of the undesirable results. Aluminum is also beneficial in electric steels, but smaller additions will accomplish the end desired.

The thermit reaction is utilized to-day in the preparation of many important metals and no objection has ever been made to use of these metals in steel because of their aluminum content. In this reaction, aluminum has shown itself to be a very powerful reducing agent and, in addition, to react so consistently that conditions are always under excellent control.

Oxides are the principal non-metallic impurity in steel—all steels, particularly open-hearth and Bessemer. The ordinary reduction with silicon and manganese in the natural way, is effective, but almost never perfect and varies according to the skill of the melter and other conditions due to the mixture used, temperature of the furnace and action of the slag. If aluminum will reduce such metals as tungsten and vanadium so perfectly, why shouldn't it be applied to steel? The writer has had experience with its use in steel and can state that it will "kill" the steel most effectively.

Other Advantages

It has other advantages incidental to its use when added to the bath. The analysis can be kept in much better control. In the case of the open-hearth, the addition of 2 to 4 lb. to the ton, according to condition of the bath, will stop the boiling reaction instantly and the bath will lie perfectly quiet as long as the aluminum is in excess. The carbon remains practically constant under these conditions, and any slag which may have been taken up by the metal has abundant opportunity to rise to the surface before the heat is tapped. Guesswork on re-carburizing is eliminated, as the laboratory test of the bath is of much greater value than under the usual conditions where the reaction is allowed to continue.

Experiments were made increasing the quantity of aluminum added up to an amount found by analysis of 0.37 per cent. The object was to determine any bad effect of the aluminum on the steel. Tensile tests showed a slight improvement with every increase in the amount used, and we judged from this that the additions were not harmful. Several lots of aluminum used were found to contain small percentages of zinc. When so contaminated, the results were poor. Zinc is often found in aluminum reclaimed from scrap and should be guarded against carefully.

No substitute for aluminum has yet been found, but recently a new alloy (calcium silicide) has appeared on the market with similar claims for its performance. This alloy has merit but, in its present state of develment, has to be added to the ladle. It would be interesting to make a direct comparison with aluminum if it could in some way be introduced effectively into the bath.

Steel deoxidized by large doses of aluminum will be found very clean and dense and will work up with a minimum of chipping or grinding and mill losses. The improvement is particularly noticeable on nickel-chrome and chrome steels.

The writer realizes that the foregoing statements will probably meet with considerable adverse criticism from many sections of the country, but he considers the results important because they contradict a well-established prejudice.

*Metallurgical engineer, [illegible] Church Street, New York

More Regular Car Movement

YOUNGSTOWN, Dec. 12.—Though peak of the fall freight movement was passed about four weeks ago, carriers serving the Youngstown district still report a heavy loaded car traffic. Industrial freight traffic on certain roads is expected to establish a new record in December, from present indications. Open weather has thus far enabled railroads to handle the large volume of steel tonnage which has been offered them.

There is considerably more regularity in the car movement, and the supply of box car and mill type gondolas has shown substantial improvement this month. More than 7000 loaded cars are being moved daily on the Ohio Region of the Erie.

While ore shipping from boats has virtually ceased, the movement from lake docks to inland furnaces is still under way. Blast furnaces are operating at a comparatively high rate in the Mahoning and Shenango Valleys, requiring large ore reserves.

Both the independents and Steel Corporation subsidiaries in this district are commencing to establish substantial coal stocks, against possible interruptions to freight movement during the winter. Possibility of another coal strike next April is also a stimulant in this respect. Heavy tonnages of coal and coke are being stored by the Ohio Works of the Carnegie Steel Co.

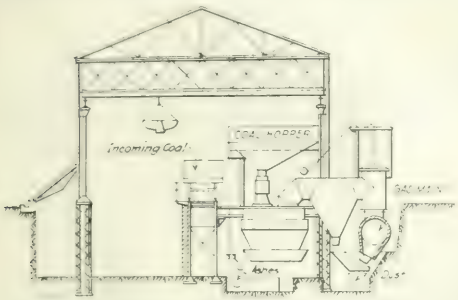
Labor conditions with the mills are satisfactory. Employment managers state that no efforts are being made by the plants to recruit workers among Southern negroes, as reported by some interests.

MORGAN PRODUCERS IN BRITAIN*

57 Gas Machines Installed in England, Scotland and Wales Since 1919

Since the Morgan gas machine was introduced into American steel plants, in 1914, some 400 have been installed there and 100 in other countries. In Great Britain the first machine was started in the spring of 1919. During 1919 and 1920 trials were carried out to ascertain what the machine could do on different British fuels. In spite of the trade depression, 57 machines, with a yearly gasifying capacity of over 500,000 tons of coal, have since then been installed here, 30 of them as repeat orders.

In some instances new plants of Morgan machines have been constructed, but more usually they have been

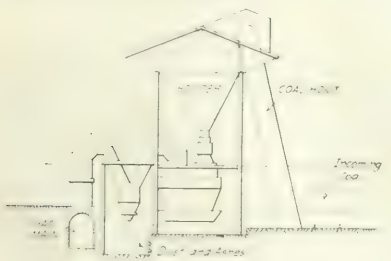


Section Through Gas-Making Plant at Stewarts & Lloyds Works, Coatbridge, England, Showing How Coal Is Handled and Gas Taken Off

put down to replace existing plant, and we understand that over 150 producers in the country, of various types, have now been replaced by these gas machines. In one steel plant 10 machines are doing the work of 54 old producers, and at the same time the output of steel has been considerably increased. These machines are particularly noted for their simple, heavy design and construction; for their labor-saving features, for high-quality gas and for large capacity. It is shown that 3000 lb. of coal per hour, and even more, can in most cases be gasified.

Savings in Fuel and Labor and Increased Output

The makers claim the following savings in labor, fuel and increased output reached during 1920-1922 at



At the Plant of the Grovesend Steel & Tin Plate Co., Gorseinon, England. Coal Is Hoisted by Conveyor Buckets and Discharged into the Overhead Hopper

steel works in England, Scotland and Wales by replacing existing gas producers with Morgan producer-gas machines:

	Savings in coal consumption. Per Cent	Savings in labor. Per Cent	Increased steel production. Per Cent
Steelworks A.....	23	52	15
Steelworks B.....	32	63	15
Steelworks C.....	27	68	20
Steelworks D.....	20	60	10

*From an article in *Iron and Coal Trades Review*, London, England.

The figures are arrived at after 9 to 18 months' actual working, not including lock-outs, strikes, protracted stoppages of plant, holidays, etc. (except in the case of steel works D, where the figures refer to a shorter period). The saving in coal is compared with the fuel consumption when the same kind of coal was previously used. In two of the works it has been possible to run the furnaces on separate Morgan gas machines, at the same time other furnaces of exactly the same design have been working on other producers. The same proportion of pig iron and scrap has been used to produce the same steel, with the same kind of fuel. Therefore, the comparison is as correct as possible.

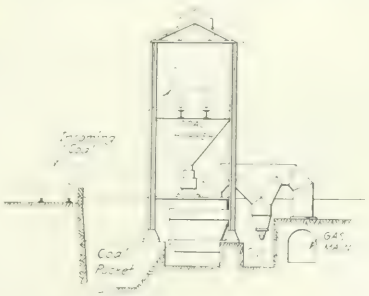
In many plants the gas producers are often neglected, although in many respects they are the most important part of the steel making plant. It is stated that on certain plants the [annual] saving in labor only is enough to cover 25 per cent of the total cost of the gas machine plant.

From the figures given in the above table the saving in fuel can evidently, in most cases, be safely stated at 225 lb. per ton of steel. In one case a saving of over 335 lb. per ton has been verified. Assuming coal at £1 per ton, the [annual] saving in fuel on a plant producing 100,000 tons of steel per year would be £10,000, which would cover 30 to 40 per cent of the total outlay for the Morgan gas plant. It is therefore evident that the yearly saving in labor and fuel alone will cover at least 60 per cent of the total outlay for a new gas plant.

The saving from increased output is perhaps even more important than the saving in labor and fuel; this of course especially refers to busy times, which must return some day. The spreading of overhead charges over a larger output, and the additional profit on that, can best be calculated by the steel maker himself. The cost for power, water and oil will be more than offset by the saving in steam.

Steel-Making Capacity

In one British plant five such machines serve, without reserve, two 60-ton and three 35-ton open-hearth



Railroad Cars Deliver Coal, at the Rotherham (England) Plant of Steel, Peech & Tozer, Ltd., Either to a Coal Pocket or Directly into the Hoppers, from an Overhead Track

furnaces, all the soaking pits, and also the sand furnaces and ladle-heaters. The average gasification per producer per hour is given as 2780 lb.

In another plant the basic open-hearth furnaces average 500 tons of steel per furnace-week from cold stock. One gas machine is employed per furnace, and has proved more than ample. The same result has been arrived at in an acid plant with furnaces of the same size. In another works four machines serve three 60-ton furnaces, and a fourth furnace will be put on to the same battery.

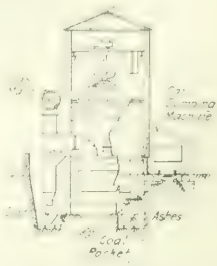
In one works coal of such clinkering nature had to be used that, on the older producers, from 3 to 6 hr. per day of poking was required to break down the clinkers formed. These coals were also very dusty. Tests showed that 58.7 per cent passed ⅛-in. mesh; 19.6 per cent passed ¼-in. mesh; 8.3 per cent passed ½-in mesh; and only 13.4 per cent was above ½-in. mesh. During three months an open-hearth furnace,

producing 450 to 500 tons of steel per week, was run by one Morgan gas machine on the above fuel, without any reserve, and not one hour was lost due to the gas. The coal consumption was considerably decreased below previous practice and the output of steel increased.

This indicates that such dusty and caking fuel can be gasified by the gas machines to advantage and without making clinkers; 3000 lb. per hour of this coal is possible per machine, but a slower rate is recommended on such a dusty fuel. It has also been proved that the machine will gasify coal which expands to such an extent that it cannot be used in an ordinary producer.

Quality of Gas

Owing to the uniform composition of the fuel bed, every particle of rising air and steam, on its way upward is brought into intimate contact with the fuel,



Each Gas Machine Here Has Its Own Ash Bunker, Which Is Dumped Periodically into Buggies Below. The coal tippler dumps carloads of coal into the coal pit, whence it is taken by grab bucket on the crane and delivered into the individual hoppers

and no holes can be formed in the fuel bed through which the air and steam can rush without coming in contact with the coal. By these means only is a high quality of gas obtainable concurrently with a high rate of gasification.

In the table are given results obtained from Morgan gas machines in British works during two consecutive months of operation under ordinary conditions, the plant and tests being worked by the regular staff. The average rate of gasification per producer per hour was 2418 lb. of coal. The gas was analyzed by continuous 24-hr. samples. The results, based on complete average of all tests, are substantially the same as those given in the table, which are based on average of Tuesdays and Fridays only, so as not to make too elaborate a table.

Twenty-four Hours Continuous Samples of Gas From Morgan Producer-Gas Machines, Taken Every Tuesday and Friday for Two Months, During Ordinary Operating Conditions.

Date, 1922	CO₂ Per Cent	CO Per Cent	H Per Cent	CH_4 Per Cent	N Per Cent	Combustible gas Per Cent
May 2	5.20	25.00	9.91	4.26	51.63	39.67
May 5	4.80	26.40	14.41	4.16	50.23	42.00
May 9	3.20	29.68	14.05	3.22	49.75	46.95
May 12	3.20	28.00	11.05	4.48	53.27	43.53
May 16	3.40	28.30	12.90	4.50	50.90	45.70
May 19	4.20	26.95	14.79	3.85	50.21	45.59
May 23	6.00	26.22	15.09	4.38	48.31	45.69
May 26	5.00	26.15	14.72	4.15	49.98	45.02
May 30	4.00	26.04	14.91	3.56	50.59	44.51
June 2	4.16	26.89	15.59	3.63	49.73	45.73
June 6	4.60	27.37	14.37	3.83	49.83	45.57
June 9	3.60	25.45	14.79	3.35	52.81	43.59
June 13	4.20	25.20	15.07	3.25	52.28	43.52
June 16	4.60	25.30	14.32	3.25	52.53	42.87
June 20	5.20	26.70	15.47	3.30	49.33	45.47
June 23	6.00	26.75	15.45	3.48	48.32	45.68
June 27	5.30	25.63	15.30	3.97	49.80	44.90
June 30	5.40	25.61	15.05	3.09	50.85	43.75
Mean	4.61	26.79	14.36	3.78	50.43	44.52

Labor

The labor required for running a gas-machine plant will depend on the size of the plant and on the mechanical facilities for bringing coal to the feeds of the machines and for handling the ashes. In one British plant, consisting of five Morgan machines gasifying 800 to 900 tons of coal per week, three men per shift do all the work around the machines, including the delivery of ashes into standard railroad cars. An additional man operates the grab bucket crane supplying the producers during the day shift only, and the coal cars are discharged by the regular staff serving all the different departments.

In a case recently investigated, before reconstruction the total staff on the gas plant, including three foremen and the unloaders, was 104 men. In this case the coal was discharged by hand onto the producer stage, and the ash was removed by a hoist. A Morgan plant, properly equipped to do the same work, would need the following labor staff: Gas and ash men (4 per shift), 12; foremen (1 per shift), 3; cranemen (1 on two shifts), 2; unloaders (2 on one shift), 2; total, 19. These 19 men are sufficient for a plant producing all the gas for a steel plant with a capacity of 200,000 tons per year. Assuming that these men were paid on an average £3 per week, the saving in labor alone, per year, would cover more than 25 per cent of the total cost of the gas-machine plant, including everything above and below ground.

Repair and Maintenance

In these machines the only part liable to wear out rapidly is the leveler which, by means of counterweights, is pressed against the surface of the fuel bed over which it slides. Only the part actually touching the coal requires periodical renewal. We understand that the cost of a new leveler bar is about £15, and that it will last from nine months to two years, depending on the nature of the coal. Even on coking coal, which is the most cutting, the leveler claims a life of at least nine months, while it can be replaced in half-an-hour, from stop to start. A new quality of steel is now being provided, which is expected to last considerably longer.

It is also probable that the feed drum may wear out in from three to four years. Its cost is about £14, and it can be replaced in two hours. Bushings may also need replacing after a time. Replacement of other parts can be due only to accidents, neglect, faults impossible to detect in manufacture, or inferior material. The makers claim, however, that the cost per machine per year, averaging all the machines in the country, should not exceed £5. On this basis it is safe to say that a maintenance cost of £25 per year per machine, including labor, should be well on the safe side. We understand that actual figures gathered from practice in the United States come considerably below this figure.

At one plant, where the Morgan gas machine has been previously employed and thoroughly studied, a high-capacity mill, costing perhaps £250,000, was built. To heat the steel for this mill one Morgan machine is installed, which means that if anything went wrong with the machine, the mill would be brought to a standstill, as there is no other means of heating the steel.

Electric Power Production

Reports of the United States Geological Survey reflect the increased industrial activity of the past few months in the larger production of electric power, the gain from June to October in electric units being 12.5 per cent. In June 3835 millions of kwhr. were produced, advancing to 4313 millions in October. All of this gain came from power derived from fuels, for the water power showed the usual seasonal decline as available water supply fell off. The coal consumption was increased between June and October from 2,486,000 tons to 3,247,000 tons, in spite of bad conditions due to the coal and railroad strikes.

Briggs & Turivas, Inc., Chicago, dealer in scrap iron and steel and salvaged material, has purchased the plant of Frederick Cowin & Co., Inc., Joliet, Ill., formerly the Joliet Rolling Mills. The plant is completely equipped, consisting of a combination 8-in. and 12-in. finishing mill, 12-in. and 16-in. finishing mills and a 22-in. muck mill. It has a capacity of 5000 tons monthly of finished material and five railroads serve the property. Whether the plant will be sold by Briggs & Turivas, Inc., as a going proposition or dismantled has not yet been decided.

JUDGE GARY HOPEFUL

Believes Country Will Enjoy Prosperity Unless Economic Laws Are Violated

Judge E. H. Gary, chairman United States Steel Corporation, has written an article for the January number of *System* on business conditions. He says in part:

"I cannot see other than good business ahead, provided natural economic progress is not interfered with. The greatest danger to the consistent and logical development of the country is in the possibility that attempts may be made to substitute unwise and sometimes vicious laws of man for the laws of Nature, thereby interrupting the even movement of supply and demand.

"To permit labor associations or farmer organizations to do, as the result of combination, things that are claimed to be beneficial to them but which are denied to others is to create classes, to favor some of them and to injure the whole body politic. It tends to array class against class, and it naturally adds to the cost of production. And be it remembered, the general purchasing public, in the end, must pay the bills. This, as a net result, is certain. This is not equal opportunity and equal obligation.

Organization of Groups

"There is no reason why any group should not organize to gain for itself a better economic position if it believes that through organization that position can be gained. But it is not in the public interest to permit any group secretly to expend large sums of money for subversive propaganda. The public is entitled to know the facts about the expenditures of money to influence public opinion.

"The surest and wisest of all regulation is public opinion, but sound opinions cannot be formed excepting on the facts. It is hardly possible to have serious industrial disturbance if all the facts are known. In the graver strikes of the last several years the facts have not been generally known.

"The progress of prosperity has been halted by these strikes which could not have lasted so long in the face of an enlightened public opinion, and there will continue to be stoppages of trade as long as full publicity for every factor in trade is not compelled by law.

Vicious Bills Pending

"There are many vicious bills pending in Congress which bear upon economic progress. They tend to unsettle industry, to induce fear. It is no answer that the fears usually prove groundless. It is not so much that large expenditures are proposed as it is the spirit generally exhibited. Selfishness, greed and vindictiveness are displayed.

"It can be said with some positiveness that if we do not have prosperity this year it will be because of agitation and laws, no matter what their altruistic guise, which are directed against the general welfare. Neither the tariff nor the debts owing us from Europe out of the war will in my opinion have any considerable effect upon business. The tariff is, as always, unsatisfactory, and no satisfactory tariff bill will be passed until the two major political parties agree upon the principles of the tariff and take it out of politics. The saving grace of the tariff bill just passed is that its provisions may be modified by the President.

The Immigration Law

"Just at this time it is generally recognized that there is a shortage of labor, although now and generally there are considerable numbers of idle men who do not ask for or desire steady work. The shortage in labor, however, has come principally as the result of the percentage immigration laws which have limited the number of workmen who would now come to this country if not prevented by the laws referred to.

"These laws ought to be changed promptly. The restrictions upon immigration should be directed to the question of quality rather than numbers of foreigners coming to this country. Measures for limiting the number of immigrants to those who are clearly shown to be healthy morally, politically and physically, ought to be clear, strict and enforceable; but the number allowed to come here should be equal to the necessities of our industries."

EFFECTS ECONOMIES

Purchase of Iron and Steel and Other Products for Short Line Railroads

WASHINGTON, Dec. 12.—Organized in June, 1921, in Washington, with James W. Cain as manager of purchases, the Consolidated Purchasing Agency of the American Short Line Railroad Association has effected appreciable economies in buying iron and steel products and other materials and developing other plans of efficiency that have converted losses into profits. Still other methods of increasing efficiency in the conduct of the short line carriers are in contemplation. With this object in view, the offices of the agency were transferred on Dec. 1 from Washington to 616-618 Railway Exchange, Chicago.

The membership of the American Short Line Railroad Association consists of slightly less than 500 carriers, which in combination represents more than 25,000 miles of main line track and an investment of more than $1,000,000,000. These roads vary from small logging lines a few miles in length up to interstate carriers of several hundred miles, made up of Classes 1 and 2 carriers.

Combining Purchases

While the Consolidated Purchasing Agency assumes no financial responsibility, being unincorporated, it acts as an instrument for combining the purchases of the many roads it represents and negotiates prices on a volume basis instead of the retail basis on which the individual small railroad formerly purchased its supplies.

No attempt has been made to cover all purchases, but rather the agency has proceeded conservatively and confined its efforts during the first year to those materials which were either standard or susceptible of standardization. For example, purchases of steel rails have been made in 500-ton lots and distributed to member lines in less than 500-ton shipments, which gave them the same advantage as the purchaser of 500 tons and more. Likewise, spikes and bolts are purchased in carload lots, and even though a small road may need only 25 kegs, it derives the benefit of the carload price.

It is hoped to establish three regional agencies during the coming year, one in the East, one in the South, and one on the Pacific Coast, to facilitate distribution of materials, which may be shipped in carload lots and reconsigned.

After an investigation covering the greater part of a year, augmented by answers to questionnaires sent all member lines throughout the United States and Canada, the Consolidated Purchasing Agency made recommendation and placed orders for more than $250,000 worth of gasoline railroad motor car equipment, representing some 20 cars, which, Mr. Cain states, are showing excellent results on the different lines. He pointed out that they are replacing steam passenger trains, which were being operated at a loss, while the operation of motor cars is now showing a substantial profit.

Finance Corporation

Through the activities of Mr. Cain, a finance corporation is now being organized under direction of the association whereby member lines and others may acquire motor car equipment under a lease purchase plan, making it possible for the equipment to pay for itself through the saving effected. Mr. Cain states that this corporation will be ready to operate by the first of the year, when formal announcement will be made.

Work is also progressing satisfactorily in the direction of arranging for standard designs of cars and loco-

motives for the purpose of effecting substantial economies. It will also be possible, Mr. Cain declares, by using standard designs to arrange financing on a basis that could not be done where a variety of different designs were contemplated. Through the consolidation of the requirements of these lines, the quantity will be sufficient to justify liberal prices and terms, Mr. Cain states.

"Just as fast as these different problems are worked out," he added, "others will be taken up, such as combining the fuel requirements in different districts; grouping the insurance, and possibly evolving policies giving more complete coverage than heretofore; conversion of coal burning equipment to oil, where the combined locomotives are sufficient to justify lower prices and enable financing of the equipment and many other innovations which make for economy."

The transfer of the office of the agency to Chicago was necessitated by the increased volume of business being handled by this department which can best be taken care of from a more central point. There also was need of being located in an industrial and railroad center to facilitate procuring materials and equipment more promptly.

Simplification of Food Containers

WASHINGTON, Dec. 12.—A preliminary meeting of representatives of associations and groups was held at the Department of Commerce last Wednesday to consider plans for the conference to be held on Jan. 16 at the department to consider the simplification of food containers.

It was decided upon recommendation by the National Wholesale Grocers' Association, represented by M. L. Toulme, New York, that simplification can be affected by a number of manufacturers using containers. It was also agreed that associations using the following seven commodities be divided into groups with the idea of simplification: Soap, and soap products and lye; extracts and spices; condensed and evaporated milk; all cereal manufactures; macaroni and noodles; salt; and baking powder.

It was decided that a larger representative of the important associations should be invited to the January meeting in order that as far as possible all those using metal, wood, glass, paper board and fiber box containers should attend, and to instill greater interest. The question of simplifying fruit and vegetable containers will be in charge of Russell W. Bennett, of the Southern Crate Manufacturers' Association, Jacksonville, Fla.

Chicago Building Activity Sustained

In November permits were issued in Chicago for 1131 buildings, involving 37,961 ft. of frontage and $20,443,000, as compared with 721 permits, 24,462 ft. of frontage and $12,389,000 for November, 1921, an increase of about 65 per cent. The November figures also show an increase of 28 permits, 3167 ft. of frontage and $5,446,850 over October of this year. If the same rate of activity is maintained through December, the permits for the entire year will involve a total cost of $210,000,000, a gain of 70 per cent over 1921.

Increased Industrial Activity

Figures of the Department of Commerce show that the increase in activity during October exceeded the estimates. Among other things the month showed the largest output for any month since 1920 in pig iron, steel ingots, coke, copper, zinc, cement, brick, maple flooring, North Carolina pine, petroleum, knit underwear and in consumption of cotton, silk and newsprint paper. Corresponding increases are shown in activity in all distributive movements, including department stores, chain stores and mail order houses as well as wholesale trade.

Production of copper is given at 103,273,000 lb., compared with 96,408,000 lb. in September and with only 24,614,000 lb. in October, 1921. Production of zinc is shown likewise at 79,880,000 lb., compared with 66,268,000 lb. in September and with 29,034,000 lb. in October, 1921. Production of petroleum is given as 47,255,000 bbl., compared with 45,291,000 bbl. in September and with 35,539,000 bbl. in October, 1921. Building construction shows a slight falling off in September, the index number being 127 against 129. Costs of building increased during the month, the index number for frame houses advancing from 193 to 196 and of brick houses from 197 to 199.

Steel Corporations' Unfilled Orders Decrease

The United States Steel Corporation on Nov. 30 last had 6,840,242 tons of unfilled business on its books, or 62,045 tons less than on Oct. 31. This decrease is the first one reported since February, when one of 100,609 tons was shown, following a decrease of 26,736 tons in January. In October the unfilled business increased 211,680 tons; in September, 741,502 tons; in August, 173,944 tons; in July, 140,630 tons; in June, 381,303 tons; in May, 157,315 tons; in April, 602,765 tons; and in March, 353,079 tons. A year ago the corporation had 4,250,542 tons of unfilled business on its books, or 2,589,700 tons less than it has to-day.

Following is the unfilled tonnage as reported by months since January, 1919:

	1922	1921	1920	1919
Jan. 31.....	4,241,678	7,573,164	9,285,441	6,684,268
Feb. 28.....	4,141,069	6,933,867	9,502,081	6,010,787
Mar. 31.....	4,494,148	6,284,765	9,892,075	5,430,572
Apr. 30.....	5,096,913	5,845,224	10,359,747	4,300,685
May 31.....	5,254,228	5,482,487	10,940,465	4,282,310
June 30.....	5,635,531	5,117,868	10,978,817	4,892,855
July 31.....	5,776,161	4,830,324	11,118,468	5,578,661
Aug. 31.....	5,950,105	4,631,926	10,805,038	6,109,103
Sept. 30.....	6,691,607	4,560,670	10,374,804	6,284,638
Oct. 31.....	6,902,287	4,286,829	9,836,852	6,472,668
Nov. 30.....	6,840,242	4,250,542	9,021,481	7,123,330
Dec. 31.....	.....	4,268,414	8,148,122	8,265,366

The largest total of unfilled orders was on April 30, 1917, when it was 12,183,083 tons. The lowest was on Dec. 31, 1910, at 2,605,747.

Research on the Corrosion of Steel Pipe

The National Tube Co., Pittsburgh, has announced the establishment of an industrial fellowship in the Mellon Institute of Industrial Research of the University of Pittsburgh, Pittsburgh. A systematic study is to be made of practical methods for the prevention of corrosion in hot water supply systems. Attention will also be given to the classification of waters of various chemical composition, with respect to their relative corrosive action upon iron and steel, particularly in the form of pipe lines, boiler economizers, tubes, etc.

The present incumbent of the Fellowship is Clifford R. Texter, who for the past several years has been carrying out research on the corrosion of iron and steel, where not exposed directly to the atmosphere. Mr. Texter welcomes correspondence with engineers and manufacturers interested in the field to which his industrial fellowship relates.

Symington Plant at Chicago Purchased

The former Symington Co. plant, until recently a depot of the United States Ordnance Department, Seventy-fourth and Ashland Avenue, Chicago, has been purchased by A. Harris and associates, composed principally of the executives of Harris Brothers Co., dealer in salvaged material. The purchase, however, has no connection with the Harris Brothers Co. A portion of the plant will be leased to Harris Brothers Co. to be used for the extension of its house and garage construction operations. The rest of the works will be leased or sold for manufacturing and storage purposes. The property extends 3400 ft. west from Ashland Avenue and covers practically 13 city blocks. It is served by the Belt Railway of Chicago and other lines, and is in the center of a well populated district. The buildings are of modern construction and cover 700,000 sq. ft. It is the intention of the buyers to improve the vacant property included in the purchase.

REFRACTORIES DULL

Lower Prices Are Named for Silica and Magnesite Brick

PITTSBURGH, Dec. 11.—Fire clay brick prices are holding fairly well in Pennsylvania and the Central West, but in Ohio and Kentucky the market is weaker, and a few days ago makers of Pennsylvania and Chicago silica brick announced a reduction of $3 per 1000. The latter development is a natural sequence of the competition provided by some of the smaller producers who have been so much in need of business that they have not been paying much attention to the established quotations.

There also has been a reduction of from $2 to $5 per ton in the price of magnesite brick. This change may be ascribed to the fact that users quite generally stocked up heavily before the enactment of the Fordney tariff law, and those companies who did not pursue this course have been substituting chrome brick quite freely for magnesite. The "official" quotation on magnesite brick is now $68, but some producers are known to have gone as low as $65 to obtain business. Makers of chrome brick are quite generally holding to $50 per net ton at works for standard sizes, and it is stated that this price now is not being shaded as it was a few weeks ago.

Business is seasonably quiet in practically all lines, although there are a few good-sized inquiries out in connection with new open-hearth furnace construction. A Cleveland steel company, which is adding to its steel works capacity, has an inquiry out for 750,000 brick. The more common impression is that the next change in fire clay brick will be downward because producers are finding considerable resistance among large consumers to paying current prices, and it is a fact that with coal prices down materially from their early fall levels, it has been possible to decrease production costs.

We quote per 1000 f.o.b. works:

	High Duty	Moderate Duty
Fire Clay		
Pennsylvania	$43.00 to $46.00	$38.00 to $41.00
Ohio	40.00 to 42.00	35.00 to 38.00
Kentucky	41.00 to 43.00	37.00 to 40.00
Illinois	43.00 to 45.00	40.00 to 42.00
Missouri	43.00 to 45.00	38.00 to 42.00
Ground fire clay, per net ton	7.50 to	8.50
Silica Brick:		
Pennsylvania		42.00
Chicago		47.00
Birmingham		48.00
Ground silica clay, per net ton	8.00 to	9.00
Magnesite Brick:		
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.)	65.00 to	68.00
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)		43.50
Chrome Brick:		
Standard size, per net ton		50.00

COAL OUTPUT

Tonnage of Bituminous Almost as Large as for Preceding Year

WASHINGTON, Dec. 12.—Reports to the Geological Survey indicate a total production of about 11,100,000 tons of bituminous coal during the week of Dec. 4 to 9. The estimated cumulative production of bituminous coal this year to Dec. 2, inclusive, stands at 365,387,000 tons, which is 11,899,000 tons or 3 per cent less than in the corresponding period of 1921; 139,979,000 tons or 28 per cent less than in 1920; 59,717,000 tons or 14 per cent less than in 1919; 174,809,000 tons or 32 per cent less than in 1918; and 145,032,000 tons or 28 per cent less than in 1917.

Shipments of bituminous coal from lower Lake Erie ports declined in the week ended Dec. 3, and the season virtually came to a close on that date. Reports furnished by the Ore and Coal Exchange show that 554,525 net tons were dumped, of which 535,505 tons were cargo coal and 19,020 tons were vessel fuel. Cumulative dumpings during the present season to Dec. 3 stood at 18,991,482 tons, a decrease of 18 per cent when compared with the average for the three years preceding. Of the 18,171,965 tons of cargo coal dumped to date, 1,149,063 tons, or 6.3 per cent, were consigned to destinations not ordinarily taking Lake coal.

The total output is estimated from the railroad shipments at 292,000 net tons, an increase of 4,000 tons over the week before.

The United States Geological Survey's estimate of beehive coke production in 1921, made in March, was substantiated by final returns from the producers. These reports show that the total output was 5,538,042 net tons, the smallest record since 1885 and 73 per cent less than in 1920. By-product coke continued to supersede the beehive oven variety, and of the 25,287,622 tons of coke produced in 1921—both beehive and by-product—but 22 per cent of the total came from beehive ovens against 40 per cent in 1920.

Orders as to Movement of Coal Are Canceled

WASHINGTON, Dec. 12.—Virtually all of the service orders which have given priority to the movement of coal since the strike were canceled last midnight by the Interstate Commerce Commission. The one remaining restriction is the requirement that all shipments must be forwarded by the most direct of routes available regardless of the normal traffic arrangements between carriers.

At the same time of the cancellation of the service orders, the commission also canceled the open top car regulation which has been a source of particular inconvenience to the iron and steel industry. The regulation governing the movement of this type of equipment is continued only in a few territories where individual railroads have been specifically required to furnish certain coal cars to designated mines for the purpose of supplying fuel to communities or buyers in particular need of coal.

Cement Rates Declared Unjust

WASHINGTON, Dec. 12.—In a proposed report regarding the complaint of the Atlas Portland Cement Co., Examiners John E. Keller and John T. Money, recommended that the commission wipe out the intrastate cement rates in Indiana and Illinois as unduly prejudicial and unduly preferential to mills in those States, the re-creation of Scale 1 territory, to be composed of Illinois and Indiana and southern Wisconsin, the establishment of a scale of rates intermediate between Scale 1 and Scale 11 as they existed before Scale 1 and Scale 11 territories were merged into Scale 11 territory, and the denial of all applications for the establishment of key rates. In addition, they recommended the strict application of the mileages, advising the commission not to grant the prayer of the carriers for privilege to apply the scales by the method they use in applying the class scale in central territory. The report also covers complaints of the Universal Portland Cement Co. and the Missouri Portland Cement Co.

COMING MEETINGS

January

American Engineering Council. Jan. 11 and 12. Annual meeting, headquarters of Federated American Engineering Societies, 24 Jackson Place, Washington. L. W. Wallace, 24 Jackson Place, Washington, N. W., secretary.

February

American Institute of Mining and Metallurgical Engineers. Feb. 19 to 21, inclusive. Annual meeting, Engineering Societies Building, New York. Dr. F. F. Sharpless, 29 West Thirty-ninth Street, New York, secretary.

INCREASE IN COPPER USE

Research Association Points to Larger 1922 Consumption—Elects Officers

At the second annual meeting of the members of the Copper and Brass Research Association, held Dec. 5 at its offices, 25 Broadway, New York, the following were elected directors to serve for the ensuing year, the first eight mentioned comprising the executive committee:

R. L. Agassiz, president Calumet & Hecla Mining Co.; Walter Douglas, president Phelps Dodge Corporation; C. F. Kelley, president Anaconda Copper Mining Co.; Stephen Birch, president Kennecott Copper Corporation; Charles Hayden, vice-president Chino, Utah, Nevada, Ray companies; F. S. Chase, president Chase Rolling Mills; Edward H. Binns, president C. G. Hussey & Co.; H. J. Rowland, sales manager Rome Brass & Copper Co.; J. W. Allen, treasurer Green Cananea Copper Co.; Henry F. Bassett, president Taunton-New Bedford Copper Co.; H. C. Bellinger, vice-president Chile Exploration Co.; F. H. Brownell, vice-president American Smelting & Refining Co.; J. Parke Channing, vice-president Miami Copper Co.; Carl F. Dietz, president Bridgeport Brass Co.; B. Goldsmith, president National Brass & Copper Co.; E. O. Goss, president Scovill Mfg. Co.; Robert H. Gross, president East Butte Copper Mining Co.; U. T. Hungerford, president U. T. Hungerford Brass & Copper Co.; C. V. Jenkins, treasurer Utah, Chino, Ray, Nevada companies; H. B. Paul, auditor Calumet & Arizona Mining Co.; R. M. Raymond, director United Verde Extension Mining Co.; A. E. Seelig, manager Michigan Copper & Brass Co.; W. Parsons Todd, manager sales Copper Range Co.

The directors elected the following officers: President, R. L. Agassiz; vice-presidents, C. F. Kelley, F. S. Chase, E. J. Rowland, Walter Douglas and U. T. Hungerford; treasurer, Stephen Birch; secretary, G. A. Sloan; and manager, William A. Willis.

In connection with the conclusion of the first full year of the association's activity as an unincorporated, voluntary organization of the brass and copper industries R. L. Agassiz, president Calumet & Hecla Mining Co., who is president of the Copper and Brass Research Association, said:

"The research and educational work of the Copper and Brass Research Association has played an important part in the rapid growth of consumption of brass and copper during the past year, for, despite uncertain business conditions, copper consumption in this country is now substantially greater than in pre-war years. Having digested an unprecedented quantity of war-time scrap metal, the industry is now again in a strong position.

"The underlying purpose of this whole effort is to develop to the maximum the domestic consumption of the metal. Export trade will always be a large factor, but it will be possible, we believe, to so augment the American use of the metals that the varying industrial pulse of Europe will be much less influential in determining the prosperity of the industry.

"In this connection, it is interesting to note that while the 1922 consumption of copper and brass in the building industry in this country was about 150,000,000 lb. (an increase of over 100,000,000 lb. as compared with 1921), yet the potential market for copper and brass in the building industry alone is placed at approximately 650,000,000 lb. annually.

"The constantly growing domestic use of brass, which is only next to the electrical industry as a consumer of copper, is another helpful factor.

"The electrical industry, where the physical properties of copper are indispensable, is in reality only in its infancy. The high cost of fuel, with uncertain and expensive transportation, is responsible for the growing use of electric power generated at central points, distribution over wide areas being possible economically because of copper's high conductivity.

"Our plan is to provide through the instrumentality of the Copper and Brass Research Association a technical and advisory service which may be freely called upon by users of our metals, a service which no copper or brass producer or manufacturer could reasonably be expected to undertake alone. Already wide use is being made of these facilities. Information has been furnished on the use of copper and brass for almost every conceivable subject, from safety pins to locomotive boiler tubes.

"An important accomplishment has been the fact that many of the more than 2000 manufacturers who produce articles made of brass or copper have taken advantage of the association's activity to individually advertise their products, thus extending the association's own educational work.

"The association has found a ready response all over the country to its campaign directed toward eliminating waste in industry and in the home by the use of noncorrodible metal, a waste the size of which was demonstrated by a survey conducted by the association, showing that rusted metal in homes alone costs home-owners more than $600,000,000 annually, about five or six times as much as the fire loss."

The following are now members of the Copper and Brass Research Association: Association Smelting & Refining Co., Anaconda Copper Mining Co., Arizona Commercial Mining Co., Braden Copper Co., Bridgeport Brass Co., Calumet & Arizona Mining Co., Calumet & Hecla Mining Co., Chile Exploration Co., Chino Copper Co., Chase Rolling Mills, Chase Metal Works, Copper Range Co., Engles Copper Co., East Butte Copper Mining Co., Greene Cananea Copper Co., U. T. Hungerford Brass & Copper Co., C. G. Hussey & Co., Inspiration Consolidated Copper Co., Kennecott Copper Corporation, Michigan Copper & Brass Co., Miami Copper Co., Mother Lode Coalition Mines Co., National Brass & Copper Co., Nevada Consolidated Copper Co., New Cornelia Copper Co., New England Brass Co., North Butte Mining Co., Old Dominion Co., Phelps Dodge Corporation, Ray Consolidated Copper Co., Rome Brass & Copper Co., Scoville Mfg. Co., Shattuck Arizona Copper Co., Taunton-New Bedford Copper Co., United Verde Extension Mining Co., Utah Copper Co., and Utah Consolidated Mining Co.

Chicago Merger Planned

The Inland Steel Co. and the Steel & Tube Co. of America, both with headquarters at Chicago, are negotiating for a consolidation of their properties, but as yet have come to no agreement. Both companies figured in the five-company merger planned last spring which included the Midvale Steel & Ordnance Co., Republic Iron & Steel Co., and the Youngstown Sheet & Tube Co. This was finally abandoned and a consolidation of the Midvale, Republic and Inland companies was then brought to the point of consummation, but it was likewise dropped. The Inland and Steel & Tube Co. works adjoin at Indiana Harbor, Ind., and form logical units of a single large plant such as will be made possible if the merger of the two corporations takes place.

Wages of Telegraphers Reduced

CHICAGO, Dec. 9.—The United States Railroad Labor Board last night rendered a decision, effective Jan. 1, 1923, which cuts off approximately $1,500,000 annually from the wages of 11,000 railroad telegraphers employed by 11 Class I railroads, including the Chicago & North-Western, the Chicago, Burlington & Quincy, the Chicago, Milwaukee & St. Paul, the Chicago, Rock Island & Pacific, the Chicago, St. Paul, Minneapolis & Omaha, the Minneapolis & St. Louis, the Great Northern, the Illinois Central, the Minneapolis, St. Paul & Sault Ste. Marie, the Northern Pacific and the Southern Pacific (Pacific system).

President John Stevenson, Jr., of the Standard Tank Car Co., Sharon, Pa., states that unfilled orders on the company's books aggregate $8,000,000, sufficient to keep the plants operating at a capacity rate until next June.

Octogenarian pays high tribute to steel makers



A. B. FARQUHAR, for over 50 years a reader of The Iron Age, tells the story of his long and useful life. Unusual experiences of war and peace.

THE First Million the Hardest is the somewhat misleading title of the intensely interesting autobiography by A. B. Farquhar, in collaboration with Samuel Crowther, recently published by Doubleday, Page & Co. Despite its title, which one is inclined to suspect was selected by Mr. Crowther rather than by Mr. Farquhar, this book is not a guide to making millions and is not a volume in which the idea of the dollar predominates, for running through it is evidence of the high ideals of a man who has loved to serve his fellowmen.

The first chapter, "The Quest of the Million-Dollar Secret," in which Mr. Farquhar tells of his visits to A. T. Stewart, William B. Astor, James Gordon Bennett and others, when he was a very young man, is as full of interest as the story which Edward Bok tells of his visits to the great literary men of New England when he was in his teens. Mr. Farquhar's account of how he was "captured" by Abraham Lincoln after having "sold" York to the Rebels, is a chapter that chains the attention and excites admiration for the young patriot whom the great President enlisted in the Union cause. In telling of the business side of the war, Mr. Farquhar relates a few of the unpleasant experiences of which he had knowledge, showing the gross frauds that were perpetrated against the Government. When Mr. Farquhar called the attention of Secretary Stanton to some flagrant offenses, he was surprised to learn that the Secretary was entirely familiar with what was going on, but felt helpless to prevent it. In comparing business methods of Civil War days and earlier times to those of recent years, Mr. Farquhar shows his cheerful optimism and the ability of an old man to see how, in some respects at least, conditions to-day are better than they were in the past. This optimism is also shown in Mr. Farquhar's narration of events connected with several periods of depression.

In conclusion Mr. Farquhar asks: "What does it all mean? What have these years taught me?" These are the principles which he lays down:

(1) *That it is, as a rule, safe to trust human beings. Comparatively few are unfair, if you are fair yourself.*

(2) *That troubles and apparent difficulties are but stepping-stones to progress—the most practical way of learning—and, as John Sherman said, "The way to resume is to resume."*

(3) *That there is nothing that will take the place of work, either to gain success or to gain happiness or to gain both—and I think it is possible to gain both if, in the striving and working for success, the dollar is not put above the man.*

(4) *That one can and must keep faith with oneself.*

(5) *That God is not mocked. You cannot break His laws without suffering.*

(6) *That one's only dangerous enemy is oneself. In the ultimate no one can hurt you but yourself.*

(7) *That friends are among the greatest assets—and the way to get friends is to be a friend.*

(8) *That one should never seek anything for which one does not give value. This avoids the disposition to speculate—which is one of the greatest dangers that beset the business man.*

"Following these rules," says Mr. Farquhar, "the world grows in interest and life is happier with gathering years."

Throughout his business career, Mr. Farquhar has been a buyer of steel, and in reply to a request from THE IRON AGE as to whether he would like to say anything of special interest to iron and steel manufacturers in connection with the publication of his autobiography, Mr. Farquhar has written as follows:

"The interest my book seems to have aroused throughout the country has surprised me. I was induced to write it at the earnest request of some of my friends, who insisted that my experiences were too valuable to be buried with me, and I am 84 years old this week, still in good health. I am just about leaving for directors' meeting of the Chamber of Commerce of the United States, to be held in Omaha, Neb. I am honorary vice-president and one of its founders.

"I have been a reader of THE IRON AGE for half a century, or I may say since its first issue. The journal never was better or more interesting than at present. I haven't time to give it the attention, however, that I used to when the active head of the business of A. B. Farquhar Co., Ltd. I am still its president.

"I have watched the steel interests grow from their beginning. Was an intimate friend of Andrew Carnegie, whom I loved; never went to New York without calling to see him, and his death left a vacancy that will be hard to fill. I regard him as in many respects the ablest business man of the century. It was certainly true of him that he made the United States the iron and steel center of the world at that early date, though it would have come sooner or later because of our natural resources.

"Well, as civilization has advanced from the time of the cave dweller, we had the stone age, the bronze age, the iron age, and now the steel age. The cheaper methods of making steel in the open hearth and Bessemer process have done more to add to the material wealth and consequent civilization of the world than anything else, at least in modern times. I have lived through about the most interesting period of the world's history, covering the invention of the telephone (I knew Graham Bell and witnessed his tests at the Centennial in '76, and was at dinner with him when Vail and others were discussing the propriety of making it of commercial value), of the motor car, airplane, etc.

"The manufacture of steel has grown to be so large and important as to raise the character of those who have engaged in it. For instance, in July, '79, when the panic of '73 was closing, I met the president of a Pittsburgh steel company in Atlantic City. We lunched together on Sunday. He turned to me and said, 'I have been buried here resting for a week or two, but don't you think that matters are mending?' I knew they were. He said, 'Would it not be a good idea to lay in a stock of steel?' I suggested I would take 1000 tons at a price named. He said I should double it, or use the thousand tons as a multiple and he would accept, although the price was low. I said all right. That is every word that passed between us, and although steel nearly doubled in price, without a word my entire order was filled, which, by the way, was doubled. After the armistice when able men connected with stabilizing prices tried to get a reduction in the price of steel, Judge Gary agreed to a base of 2.35c. Steel was being sold as high as 4c. at the time. Walter Hines, then in charge of railroads, made the great mistake of not agreeing to this, but the judge, having offered this price to the world, maintained it, although the independents still held to the higher prices. I do not believe there is a more honorable or higher class of men engaged in any business in this world than the steel makers."

BLOW TORCH STEEL FURNACES*

Formation of the Open-Hearth Combustion System and What It Means

If an open-hearth port had only one function to perform, namely, to act as a gas burner, its design would be relatively easy but, since it must act also as a passageway for waste gases, it has always been designed as a compromise to meet its two quite different functions. As a result, ports have been made too large for proper combustion on the incoming end, and too small for outlet of the products of combustion on the outgoing end.

A gas port, on the incoming end, like any other burner should be designed to induce rapid and intimate mixture of fuel and air in order to produce high flame temperature and at the same time cause the flame to travel at high velocity, and with good control. To produce this condition, while at the same time providing amply large areas for flow of waste gases leaving the hearth—these gases though greater in volume to travel at lower velocity—involves necessarily the introduction of means of alternately restricting and enlarging the areas of each port end. This is accomplished by the Open-Hearth Combustion System.

The Open-Hearth Combustion System embraces what were formerly known as McKune and Egler types of open-hearth furnaces as well as several other types of some similarity to them. The McKune and Egler furnaces were developed quite simultaneously. The McKune patents became the property of Miami Metals Co. of Chicago, and the Egler of Arthur G. McKee Co. of Cleveland. It was soon realized that both groups had furnaces of very considerable merit but at the same time that the patent situation was such as to seriously hamper exploitation of either furnace due to the more or less justifiable fear of steel plant executives of becoming involved in patent dispute by their adoption of either furnace. By the formation by the Miami and McKee groups of a trusteeship, now known as the Open-Hearth Combustion System, they have not only eliminated the one large obstacle standing in the way of general adoption of this important improvement in open-hearth operation but they have made it possible now to offer furnace designs to the steel industry which are a composite of the best features of all the ideas previously held separately by them.

Three Types of Furnaces

The Open Hearth Combustion System now has three types of furnaces known as Type A, Type B, and Venturi. Type A furnaces are those in which the combined air and fuel are caused to pass through a port of fixed area known as the mixing port. In this type, the movable dampers or other restrictions are used to deflect the incoming air to the mixture port. In Type B furnaces the combined air and fuel is forced through a restricted opening defined by movable dampers.

In each of these types of furnaces the restrictions inserted in the incoming end are of course removed from the outgoing end so as to provide amply large passages for the waste gases from the hearth.

The Venturi type requires no special equipment and no moving parts in the port ends. Its merit lies in the novel design of furnace port ends, the lines of which are made to approximate those of the Venturi tube and, like the Venturi tube, the flow area can be much reduced without appreciable reduction in the amount of flow, for the reason that the gradual change of area causes inappreciable friction loss.

The Venturi furnace having no moving parts has of course the same port construction on each end. Its lines, however, permit a very great decrease of area through which the combined gas and air enter the furnace, this decreased area being at the same time ample to carry off as much waste gas as will the larger area of the conventional furnace, due to its easy flow lines. The restricted incoming area causes increased velocity and better mixture of the air and gas than usual, this being accomplished without sacrifice of outgoing conditions. This type of furnace is a distinct improvement over conventional designs and its use makes an appeal because of the fact that this construction involves no added expense. These port ends are, however, still a compromise between the best incoming and outgoing conditions and results obtained from this type furnace have not been so satisfactory as those obtained from types A and B.

The formation of the Open-Hearth Combustion System has made it possible to design furnaces which, it is believed, will show still further improvement over the standard design than did either the Egler or McKune. These designs are only comparatively recent developments and but one furnace of the new design is in operation and a second one under construction. The performance of the new furnace gives promise of being in every way satisfactory, although it has been operating for too short a time to make any accurate judgment.

Results With Egler and McKune Furnaces

The performances of both Egler and McKune furnaces have in most installations come up to expectations. Where these furnaces have been installed and where conditions have been such as to give them a fair show, they have shown an increase in tonnage of approximately 20 per cent and a decrease in fuel of approximately 10 per cent. It is confidently felt that even these results will be improved as a result of developments now going on.

There is a point, however, which must be kept in mind in regard to installation and operation of these furnaces. Their successful operation requires more than just the installation of equipment. Due to their better methods of combustion they can handle and require more gas per hour than will a furnace of standard design. With the expectation of burning more fuel per hour it must be seen before installation is made that the effective draft conditions are such as to be able to handle an increased volume of waste gas. Furthermore, since the air supply is under fan pressure, it is necessary that the air checker chambers and the brick work in general be considerably tighter than in ordinary furnaces.

Furthermore, the action of the flame and the whole operation of the furnace is different than ordinary and consequently requires both the attention of the management and some little training of the furnace men themselves during the early days of operation to insure proper performance. There is nothing mysterious about the operation of this type furnace but there are certain methods to be learned and certain conditions to be maintained, failure to accomplish which will lead to unsatisfactory operation.

*[illegible] the Pittsburgh Foundrymen's Association by E. J. McDonald [illegible] of Open-Hearth Furnaces."

Economic Essay Prizes

Actuated by a desire to advance the study, and the more general appreciation of economics, Alvin T. Simonds, president Simonds Saw Co. of Fitchburg, Mass., and Chicago, proposes an essay contest open to pupils of high schools and normal schools in the United States and Canada. Mr. Simonds offers two prizes of $1,000 and $500 for the best essays written by students on the subject: "The Lack of Economic Intelligence and Some of the Injuries It Has Caused Individual and General Welfare in the United States Since 1860."

Mr. Simonds hopes this contest will interest in the study of economics many who might otherwise pass it by. He also expects it will aid in creating a public sentiment that will increase the practical study of the subject in secondary schools.

As a foundation on which the essays may be constructed Mr. Simonds suggests that facts and examples which bear on the subject should come from the history of the United States since 1860, with special emphasis upon the present.

Rules governing the contest have been prepared, and persons interested may obtain copies of them by addressing the Simonds Economic Prize Contest, 470 Main Street, Fitchburg, Mass.

CONTENTS

December 14, 1922

No Hand Scraping on Planed Work 1555
Accuracy and Long Life Secured with Reduction in Labor Cost—Special Fixtures to Hold Strips—Two-Bit Tool Holder Saves 25 to 50 Per Cent

E. J. Buffington Explains Pittsburgh Base 1559
Custom in Steel Trade Declared a Natural Development—Change May Come in Chicago Territory

Coke Oven Gas in Open-Hearth Furnaces 1561
French Discussion of Various Methods of Using This Gas—Effect of Heating—Use of Mixed Gases

Improved Wire-Galvanizing Equipment 1563
Long Annealing and Spelter Pans and Unusual Capacity of Take-Up Frame Feature New Design

What to Expect from Foremen Training 1565
Results Obtained in Iron and Steel and Metal-Working Plants, Particularly Better Team Work and Co-operation with Management

Movement to Designate Steel by Numbers 1569
Investigation Under Government Auspices by Engineering Standards Committee to Have Numbering System for Tool and Other Steels

Flue Dust Briquetting by Corrosion Process 1571
Plant of M. A. Hanna Furnace Co. at Buffalo—Claims of Economic and Practical Value of the Product

Ohio Foundrymen's Meeting 1558
Foreign Trade Convention in New Orleans. 1558
Ship Subsidy Favored 1560
Austrian Trade Conditions 1560
Unemployment in Great Britain 1562
British Business Outlook 1562
Taxation and National Income 1564
Duraloy to be Produced 1567
Last-Head-in-Boiler Riveter 1567
Export of Machinery 1568
Railroad Activity 1568
Employment Gains 1568
Precision Eccentric Boring Head 1570
Motion Picture of Making Cast Iron Centrifugally 1570
Labor Legislation Association Meeting 1570
November Steel Output 1573
Cost Accounting in Manufacture of Iron and Steel Sheets 1573
Ore Statistics 1573
New Carnegie Dock 1573
Wages in Michigan Foundries 1573
Aluminum in Steel 1574
Morgan Producers in Britain 1575
Electric Power Production 1576
Judge Gary's Views on Business Conditions 1577
Economies Effected in Railroad Buying 1577
Simplification of Food Containers 1578
Building Activities 1578
Steel Corporation's Unfilled Orders 1578
Research on Corrosion of Steel Pipe 1578
Refractories Market 1579
Coal Service Orders Canceled 1579
Cement Rates Declared Unjust 1579
Coming Meetings 1579
Increase in Copper Use 1580
Chicago Merger Planned 1580
Telegraphers' Wages Reduced 1580
Octogenarian Pays Tribute to Steel Makers 1581
Blow Torch Steel Furnaces 1582
Economic Essay Prizes 1582
Editorials 1584
Equalization in Pig Iron—The Change in Labor Turnover—An Important Manganese Steel—Lower Labor Cost in Britain.
Correspondence 1586
Life of Galvanized Sheets Depends on Amount of Zinc Coating.
Federated Chamber for Near East 1587
Export Market 1588
French Markets 1588
German Market Conditions 1589
Belgian Market 1590
Luxemburg Market 1590
Plant Activities 1591
Jones & Laughlin Earnings 1591
Power Equipment Exhibited 1604
British Iron and Steel Market 1606
Railroad Equipment Buying 1608
Fabricated Steel Business 1608
Human Problem in Industry Discussed 1609
Metal Lath Standards 1611
Policy of Fact Finding Commission 1611
Industrial Finance 1621

Iron and Steel Markets 1592
Comparison of Prices 1593
Prices Finished Iron and Steel, f. o. b. Pittsburgh 1607
Non-Ferrous Metal Market 1609
Personal Notes 1610
Obituary Notes 1611
Machinery Markets and News of the Works 1612
New York Jobbers' Prices 1622

ESTABLISHED 1855

THE IRON AGE

EDITORS:
WILLIAM W. MACON GEORGE SMART
C. S. BAUR, *General Advertising Manager*

Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.
Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York
... IN U. S. A. George H. Griffiths, *Secretary*
... Detroit: 317 West Fort St. Cincinnati: Mercantile Library Bldg. Buffalo: 881 Ellicott Square. Washington: 26 Jackson Place, N. W. San Francisco: 320 Market St. Leader Bldg. Chicago: Otis Building. Pittsburgh: ... Cleveland: 6 ... Philadelphia: ... W. 41st Building. Cleveland. Cincinnati: Lincoln ...
Subscription Price: United States and Possessions, Mexico, Cuba, $6.00; Canada, $8.50; Foreign, $12.00 per year. Single copy 25 cents.
... entered as second class matter ... 1879, at the Post Office at New York, New York, under the Act of March 3, 1879.

Equalization in Pig Iron

After several months in which the pig iron market has presented only one side, the past fortnight has witnessed a restoration of equalization, in whole or in part. For a long time consumers would purchase only against their pressing requirements, for they realized that prices were unnaturally high and they saw them in actual process of decline practically from week to week. Around the beginning of this month interest in first quarter deliveries began to appear, and already considerable business has been done for that period. It may not be impressive as pig iron tonnages sometimes go, but it is impressive as compared with the character of business done in immediately preceding months.

Using THE IRON AGE composite as a basis for comparisons, pig iron has declined about $7 from its high point, which fell in the second half of September. Previously the advance from the low point of early in the year had been approximately double this amount.

In other words, an equalized, or partly equalized, market is developed, with buying for forward deliveries, when the market has declined one-half as much as it previously had advanced. From the viewpoint of early in the year, when the market was at its low point, the advance that ran from March to September inclusive was not expected, nor was it even expected that the market would advance during the year by the net amount now recorded, which is fully $7 a ton. Instead, many furnacemen were asserting that their costs were too high to enable them to quote prices that would be attractive to pig iron consumers, and they continued to urge that freight rates be reduced so that they could assemble their raw materials more cheaply. Freight rate reductions were made July 1, but their influence is entirely lost in the much greater increases that have occurred in other items.

Wages in the iron and steel industry generally were advanced 20 per cent on Sept. 1, but the wage cost at the blast furnace is a relatively small item. The greatest difference is in the cost of coke, but even the advance in wages in the Connellsville region of between 40 and 50 per cent does not explain much as to coke. Applied to the market price of Connellsville furnace coke for spot shipment, which averaged about $3 in January and February, even a 50 per cent change would only make $4.50 coke. The disorganization in the market and the loss in efficiency add much to the price.

It is entirely unfair, moreover, both to coke producers and to furnacemen, to take prices ruling in the market early in the year as pivotal or basic. The coke producer was losing money and the furnaceman was losing money. The latter had written down his ore pile and was still dealing in red ink figures in monthly operations. In so changeable an industry, losses must sometimes be taken, but the taking of losses cannot be prolonged indefinitely. It is a habit that cannot become confirmed.

While the pig iron market now presents an appearance of equalization in that some buyers have been taking hold for forward delivery, it does not follow that prices are stabilized. Many buyers hope to buy at somewhat lower prices later and average their purchases down, while the sellers hope to sell at higher prices and average up. Were there to be stable conditions in coal and coke the liquidation in coke prices could not be considered complete; but on the other hand the possibility of another strike next April begins to loom and is already being considered by both buyers and sellers of pig iron. While we have made progress in various respects we have not yet entered a period of stability.

The Change in Labor Turnover

It has been estimated that for each new man employed to take the place of another in shop work the money loss is somewhere between $40 and $200. Decreased production while the newcomer is being trained, spoiled work, machinery operating below accustomed capacity, and other considerations enter into the case. Even a highly skilled workman must become used to a new task and environment before he can reach his full efficiency.

To-day labor turnover is at a low point, according to the records of firms that follow the item closely. The experience of one large plant which

manufactures textile machinery is probably typical. Perhaps the showing in this case is the more impressive because the firm did not feel the business depression very seriously, owing to the peculiarities of conditions in its own market.

The records show that in 1918, at the peak of war production, the labor turnover was 168 per cent. This means that in order to maintain a given working force the names of 268 men were on the payroll in the period of 12 months for each 100 men required in operating the works. Men came and went in relatively rapid succession. This was but natural, because the draft was working, and there was a restlessness of labor, which characterized the war period.

In 1920, with business still at highest pitch, the percentage of turnover had reduced to 143 per cent, which was still abnormally high, though the army and navy had demobilized, and men were back in industrial employment. Ultra-prosperity of labor continued to breed restlessness.

At present labor turnover in these works is only 27 per cent. The figure is the more extraordinary at this time, because the company has been increasing its working force for months past, probably doubling the number of people on its payroll in the last half year, and it is a well-accepted fact that the greater the number of men hired the greater the per cent of turnover.

The change for the better is not difficult to explain. A great many workers have felt the pinch of unemployment, and are glad of the opportunity to work at a good job without hunting about for something they think may be better. No one connected with industry who went through the years immediately preceding the great slump is likely to forget the ceaseless shopping around of workers, from shop to shop and city to city, following the will-o'-the-wisp of higher wages. When the break came these drifters were first to feel its hurt, for, taking them as a whole, they were the first to go, as working forces were decreased. Owners tried in every way to keep their tried and true men at work, at least part of the time. But toward these others they felt small sense of responsibility.

Thousands of men learned a lesson from experience, and probably it will be a long time before it is forgotten. The result should be a lower turnover. As the period of good business goes along, the per cent will increase to a certain extent, especially in the face of labor shortage. But those who have given the matter closest scrutiny agree it will end in a moderate figure compared with that of the last good times.

Reckoned in money, turnover is a formidable thing. Taking the case of the textile machinery firm, reckoning cost per man at the average figure of $125, when the firm was on a 143 per cent basis it was losing annually $17,875 for each 100 men of its established force. To-day, on a 27 per cent basis, it is losing $3,375.

Patent litigation frequently has been a serious deterrent to the introduction of a new process which has unquestioned merit. Improvements to old processes have often been delayed or rejected for the same cause. The announcement is gratifying, therefore, that the various conflicting patent interests, involving the blow-torch and similar improvements to open-hearth furnaces, have pooled their aims in one company. Actual improvements in open-hearth efficiency, particularly as regards combustion economy—more than ever a vital matter today—had been few for many years. Just when the marked benefits resulting from the Egler, McKune and Venturi types of furnaces seemed likely to be postponed by conflicting patent litigation, this co-operative movement has been perfected. Already it has been demonstrated that the output of a furnace can be increased 20 per cent and the fuel consumption decreased 10 per cent. The co-operation of the various interests is also resulting in further improvements to existing types of furnaces.

An Important Manganese Steel

Considerable study has been given of late to a steel which has been known for some time but without full advantage being taken of its excellent qualities, if indeed they have been really appreciated. It is a manganese steel containing about 1.25 per cent manganese and having a low to medium carbon range. It should be classed as one of the simplest alloy steels, possibly the simplest of all.

Two important articles on the properties and advantages of such steel have appeared recently in THE IRON AGE. In the issue of Sept. 28, under the title "Pearlitic and Sorbitic Manganese Steels," the author strongly urges the value of a higher manganese content in both steel castings and rolled material and the striking properties these have shown after proper heat treatment. In THE IRON AGE of Nov. 23 a discussion of "The Effect of Manganese on Carbon Steels" by two members of the staff of the Bureau of Standards brings out the beneficial effect of increased percentages of manganese on the structure of steel, particularly in adding to the strength of low and medium carbon steels. The authors clearly confirm some general impressions. An important fact is that in normalized steel of this composition the higher manganese content causes a pronounced decrease in grain size resulting in greater strength.

This testimony of the late Dr. Henry M. Howe before the American Society for Testing Materials in 1917 has had specific confirmation in the work done more recently:

> The retarding effect of manganese on structural changes shows itself by leading in general to finer structure, * * * * This greater fineness leads to better quality in general and to a higher elastic limit in particular, though of course with a corresponding sacrifice of ductility. The great value of manganese for this purpose has not begun to receive the attention it deserves.

A conspicuous use of steel of above 1 per cent manganese content was for cast steel anchor chain during the war. It has been employed also for couplers and in a number of cases it has given great strength and toughness to special forgings and rolled material.

For some time an extensive investigation has been carried on with large forgings. A railroad

company has under way a series of tests as to its availability for rails, and such rails have proved quite satisfactory in actual service.

Lower Labor Cost in Britain

The British Ministry of Labor has issued a report which reveals marked reductions in wages, especially in labor entering into exports. Iron and steel are particularly affected, and comparisons with wage costs in the United States afford food for reflection.

The report contains a table comparing wages in the leading industries of the country on Dec. 31, 1920, and Sept. 30, 1922, a period of 21 months beginning with labor at the peak. Each figure is the percentage increase over pre-war rates. The average decrease in wages is large—from 170 per cent above pre-war figures on Dec. 31, 1920, to 75 per cent above on Sept. 30, 1922. This represents a reduction of 35 per cent. But the metal industries have been affected much more than that.

In 1920 the iron miners of the Cleveland district were receiving 200 per cent above pre-war rates; in September last their wages had dropped to 43 per cent above pre-war schedules, a reduction of over 50 per cent. The heavy iron and steel trades, as the classification has it, had been from 50 to 350 per cent above the pre-war basis. On Sept. 30 they were 20 to 100 per cent above. Tin plate and sheet steel trades ranged from 150 to 231 per cent, they are now 34 per cent, above the high level.

In the engineering trades, fitters and turners dropped from 130 per cent above pre-war to 48 per cent, and iron molders from 125 to 44 per cent. Lesser cuts were made in the building trades, agricultural labor, railroad labor and other classes. Shipyard workers have been reduced 35 per cent.

Coal miners have suffered a deep cut. They were getting from 185 to 190 per cent over pre-war rates, now they are getting only 20 to 40 per cent. All these figures are based on a full working day.

These changes downward appeal to British economists as "an important factor contributing to the more effective competition of British trades in foreign markets," to quote a report of Barclay's Bank, Ltd. It is also deduced that the lower wage and the resulting greater volume of business have contributed much to the reduction of 500,000 in the number of unemployed since January. The increase in British iron and steel exports meanwhile has been significant.

The final adjustment of British wages has not been reached. In this respect the condition is parallel to that existing in the United States, where the farmer has ground for complaining because it takes nearly an acre of wheat to buy a day's work of a plasterer or bricklayer. The comments of the British economist are quite in line with much that has been said on the same subject on this side:

> creases (the per cent above pre-war rates) not only in differ-
> ers within those industries, while the wages again vary in
> different districts. Certain adjustments in the relative pre-
> war wages received by different workers were undoubtedly
> necessary, but it is evident that many inequalities still exist.
> end of September, 1922, are equivalent to little more than
> 20 per cent above the pre-war rates, while in others as much

The particularly arresting fact, from the standpoint of American steel manufacturers, is that while the readjustments in labor cost have resulted in a steady increase in British iron and steel exports, the high costs which persist here are accompanied by exports at the lowest rate in years.

CORRESPONDENCE

Life of Galvanized Sheets Depends on Amount of Zinc Coating

To the Editor: We have read with great interest the article in your issue of Nov. 16 entitled "Galvanizing at Fault?" Our experience leads us to believe that the stand of G. F. Halfacre and J. A. Singmaster of the New Jersey Zinc Co. is well taken, and we cannot agree with J. A. Aupperle's contention that Messrs. Halfacre and Singmaster overstate conditions.

We have been producing hot galvanized material for use under the exacting conditions existing in the marine field for about 65 years, and for many years we have been insisting that only a heavy coating of zinc would afford protection to iron or steel for long periods of time. We were accordingly much gratified to find our conclusions verified by the research department of the New Jersey Zinc Co. Frequent letters which have come to us from farmers and others along the coast, (to say nothing of conversations with people who were using galvanized sheets and galvanized fence wire) have convinced us that whatever these products were doing in the laboratory, in the field of actual service they were falling down with astonishing rapidity. Every plumber or tinsmith with whom we have talked knows that the galvanized sheets now furnished have a very short life and admits it frankly. We quote below from a couple of letters which we have received within the past two weeks that are typical of many letters bearing upon the same subject. One written at Hawks Park, Florida, Nov. 5, 1922, says:

> Do you manufacture galvanized hog fence? If not, kindly tell me where I can get a good quality of such fence.
>
> Here the salt air is much stronger than in Maine. So much so that the galvanized wire which they have here will not last over five years. When I came here in 1915 I bought some second-hand chicken fence. It's just as good now as when I bought it. The other wire I bought in New Smyrna four years ago is all rusted out and gone.
>
> The galvanized goods they sell here are no good. For instance, when I came they had just built a new freight house and covered the roof with galvanized roofing. Now it looks as though it had been used as a target for bullets and shot.

With the old-time sheets lasting from 25 to 30 years on the Isthmus of Panama and in the Philippine Islands under conditions notoriously favorable to corrosion, it looks as if there was something the matter with sheets that break in seven years like those used at Hawks Park, Florida.

The superior durability of the chicken wire in this instance is worth noting, and the reason for it is very simple. This wire is woven first and then galvanized, so that it takes on the heavy coating of zinc upon which durability depends, and we do not believe that a superior base in the case of the hog wire and galvanized sheets would offset their lack of zinc coating due to wiping down.

Another farmer writing from Wethersfield, Conn., to find where he could secure our hot galvanized nails concluded his letter as follows:

> I am so disgusted with galvanized steel fencing and such galvanized steel nails as we have used that I cannot express myself.

We have received numerous requests from farmers to galvanize their rusting fence wire. The writer is to-day replacing portions of the galvanized gutters and leaders on his home after only five years of service. The next time these gutters and leaders are replaced they will be formed from the self colored iron or steel

sheets and then galvanized by the hot process. With a heavy coat of zinc, we feel confident that they will outlast the old light-coated ones five to one, and that regardless of the quality of the base.

We might cite much more evidence from the field of actual service to support the stand of Messrs. Halfacre and Singmaster, but space and time are limited. If (as Mr. Aupperle remarks) it is a fact that galvanized gutter and leader pipes made from pure iron are giving good service under many different kinds of atmospheric conditions in this and foreign countries, there are thousands of consumers who would like to know where they can get such material.

So far as those classes of material which must be formed after galvanizing are concerned, we do not believe that anything like maximum durability can be attained. If the zinc coating is heavy enough to afford maximum protection, it will flake off when the sheet is formed, and if there isn't enough zinc to flake when the sheet is bent, you can be very sure that there is not enough zinc coating to protect the material for any length of time—and this irrespective of the base. Some bases are doubtless more durable than others, but they will all rust rapidly unless protected with zinc, or why is it necessary to galvanize them at all?

In our opinion too much stress has been laid on the importance of the base so far as it influences durability. It is doubtless an important factor in the forming operations referred to by Mr. Aupperle, but "in a well galvanized sheet the iron base is rarely brought to test under weather exposure until after many years of service. Speller found that the base of galvanized roofing taken from Panama, which had seen service for over 25 years and was still in good condition, proved to be steel, but a larger proportion is wrought iron and often of inferior quality." It is not the base but a heavy zinc coating that prevents rust.

We suggest that those who are interested in this subject secure a copy of research bulletin entitled "The Value of Heavy Galvanizing as Demonstrated by Actual Use," issued by the New Jersey Zinc Co., New York. This bulletin is by far the best thing we have ever seen on the subject. As a result of their investigations they point out that both old and modern sheets showed the presence of chlorides—that the lead and iron content of the zinc coating in both the old and new sheets was practically the same when calculated on the basis of the spelter used. But in spite of these similarities the new light-coated sheets were breaking down in the Philippines in from two to five years, whereas the old heavy coated sheets were still good after 25 to 30 years. They logically conclude that only the difference in the weight of the zinc coating will account for the difference in term of service, and we believe they are absolutely right.

These conclusions are borne out by other investigators. For instance, Van Gundy noted that galvanized plate which had seen service of 20 or 25 years in Panama was better than modern plate which had been in service less than two years, and he makes this startling statement: "Yet, even after this service, I found that it had three times as much zinc on it as the American manufacturers put on their plate, even the best in the market." See Proceedings American Society for Testing Materials, 1909, p. 441.

Another investigator sums up the results of his work on fence wire as follows:

> In every instance where a very durable fence was found the coating of zinc was relatively very thick; while, on the other hand, the fences which showed marked corrosion in from one to two years proved to have almost no zinc on the iron, the zinc color being due to a layer of alloy alone.

We repeat that the durability of galvanized material depends principally upon the thickness and even distribution of the zinc coating. The purity of the coating and the purity of the base are minor considerations which can be ignored provided a thick coating of zinc is properly applied. The question we are asked frequently is not why the base does not last, but why the zinc coating doesn't. The reason as a rule is that there never was enough zinc used.

We have great respect for scientific research, but we feel that in some cases at least it requires a judicious mixture of "horse sense." Every one who has been in touch with the process of zinc coating for the past 20 years can recall the highly technical articles which appeared in advocacy of electro-galvanizing and sherardizing some years ago. The details and terms were Greek to the average reader, but the general impression created by these articles was that the only thing for the hot galvanizers to do was to shut down their trusty old kettles and install one of the new processes.

Our Mr. E. S. Mowry pointed out the weakness of the new methods in the columns of THE IRON AGE of Jan. 25, 1906, and time has shown that Mr. Mowry and not the research workers was right. To-day it is admitted that sherardizing and electro-galvanizing have their uses, but no engineer who knows his business would recommend them for use where extreme durability is required. The new methods failed on the score of durability because they lacked sufficient zinc coating, and a thin coating of zinc applied by the hot process will fail just the same, regardless of the quality of the base or purity of the coating.

WILBUR J. ROBINSON,
Wilcox, Crittenden & Co., Inc.
Middletown, Conn., Dec. 7, 1922.

Federated Chamber for Near East

A dinner will be held Dec. 15 at the Hotel Commodore, New York, by the Federated American Chambers of Commerce of the Near East, 29 Broadway, New York. The speakers are Oscar S. Straus, former Ambassador to Turkey; Dr. S. Panaretoff, Bulgarian Minister at Washington; Thomas Whittemore, explorer, and L. I. Thomas, president of the Federated American Chambers of Commerce of the Near East.

The federation was recently organized to correlate the efforts of the American Chambers of Commerce at Constantinople, Athens and Alexandria. The president is Lucien Irving Thomas, Standard Oil Co. of New York; the vice-president is J. F. Lucey, of the Lucey Mfg. Corporation; the treasurer is Neal Dow Becker, of the Hammond Typewriter Co.; and the secretary is E. E. Pratt, formerly chief of the Bureau of Foreign and Domestic Commerce of the Department of Commerce. Among the directors is A. A. Holliday, Jones & Laughlin Steel Co., Pittsburgh, and the life members include Cleveland H. Dodge, Phelps-Dodge Co.; James A. Farrell, president United States Steel Corporation; C. H. Minor, International Western Electric Co., and A. B. Farquhar, A. B. Farquhar Co., York, Pa.

Carpenter Steel Co. Denies Merger

The Carpenter Steel Co., Reading, Pa., has announced that statements made in the newspapers and circulated throughout the country for several months reporting the merger or sale of the Carpenter Steel Co. to other interests are erroneous. No such negotiations are pending, says President F. A. Bigelow, and no change from the present ownership and management is contemplated.

Detroit Scrap Market

DETROIT, Dec. 12.—Prices on all scrap materials are approximately the same as those quoted a week ago. The majority of the melters in this district have covered for their first quarter requirements on pig iron and are anticipating a normal differential on their scrap requirements.

The following prices are on a gross ton basis, f.o.b. cars producers' yards, excepting stove plate, automobile and No. 1 machinery cast, which are quoted on a net ton basis:

Heavy melting steel	$14.50 to 15.50
Shoveling steel	15.00 to 16.00
No. 1 machinery cast	19.00 to 21.00
Cast borings	12.00 to 13.50
Automobile cast scrap	21.00 to 23.00
Stove plate	16.50 to 18.00
Hydraulic compressed	14.50 to 15.50
Turnings	11.50 to 12.50

EXPORT MARKET QUIET

Japanese Rail Inquiries Still Heavy—South Manchuria Rails May Go to Germany—Renewed Interest in Foreign Iron

NEW YORK, Dec. 12.—With the exception of purchases of rails by Japan, which include tonnages of light, medium and heavy sections, the export market is quiet. The little Japanese business now appearing in bars, sheets and similar material is evidently being placed in Great Britain or on the Continent. In tin plate, however, one Japanese export house in New York recently booked an order for 1900 base boxes of charcoal tin plate for a canning factory.

Among current rail inquiries is one for a tonnage of 23 miles of 20-lb. sections (723 gross tons). On the bids recently opened by the South Manchuria Railway Co. on 85 miles of 100-lb. rails and accessories including splice bars, bolts, nuts and spikes, the average price per ton on the rails and accessories quoted by an American seller was $44.63 per ton, c.i.f. Dairen, compared with $45.16 per ton, c.i.f., the average price per ton submitted by a British seller. On the rails alone there was a difference [illegible] between the American quotation of $43.50 and the British price of $43.54. Although early delivery was offered by both the American and British mills, it is believed that the tonnage will be awarded on a German bid, which is said to have been about $8 per ton less, as the terms of delivery specified by the buyer were 40 miles at Dairen in May and the remaining 45 miles to be delivered in July. It is believed that these terms will permit the Germans to obtain the business.

There has been some inquiry recently for structural material from Japan, but seldom for tonnages of any size, being as a rule confined to 100 or 200 tons. The present quietness in the Japanese market is attributed by some Japanese exporters to the money stringency caused by the custom of settling all accounts carried by business houses before the beginning of the new year. Consequently, a slight renewal of activity is expected after Jan. 1.

An importer of Scotch iron states that the recent dullness in sales of imported iron has been broken in the past ten days by considerable inquiry from foundries in the New England district. Most of these inquiries are for prices on fairly high grade Scotch foundry iron and range from 100 to 500 tons, although one or two being handled by this importer are for 1000 tons or more. This importer also reports an interest among these foundries in lower grades, which should be available at $20 to $21 per ton, c.i.f. Atlantic port. At present Scotch foundry iron analyzing 2.25 to 2.75 per cent sil. with phos. at 0.2 to 0.3 per cent can be brought in at $27.25 per ton, c.i.f. Atlantic port, duty paid, and on a large firm offer this price could probably be shaded.

UNCERTAIN FRENCH MARKET

Producers Shy at Extending Contracts — Coke Shortage Restricts Pig Iron Stocks—Prices Fairly Firm

PARIS, FRANCE, Nov. 24.—The recent fluctuations in the rates of exchange have brought about a state of uncertainty in the French iron and steel trade which makes sellers and purchasers shy of binding themselves beyond the end of this year. The same uncertainty is also, to some extent, restricting export transactions.

Owing to the lack of coke, French pig iron production is no longer increasing.

In October, Germany delivered to French blast furnaces 355,000 tons of reparations coke, plus about 30,000 tons to foundries. From Nov. 1 to Nov. 19, deliveries to French blast furnaces totaled 219,000 metric tons. The rate of delivery was about the same as in October. The slacking off in deliveries which occurred the first four days of November, causing the blowing out of a few blast furnaces in Lorraine, is worthy of note. The quantum of coke due to France in October was 410,000 tons (including supplies to foundrymen).

The coke resources of France are:

1—The production from ovens annexed to French collieries, which averaged 79,700 tons per month during the first nine months of 1922 (against a pre-war monthly production of 220,000 tons).

2—The production of ovens annexed to French iron works, averaging 106,000 tons per month during the first half-year of 1922.

3—Imported coke (68,000 tons in October), mostly from Belgium, and which is not all metallurgical coke.

Belgium, which is in great need of coke, will only be able to deliver a small quantity of coke this month and, as French requirements, on the basis of the present pig iron production, may be estimated at 650,000 tons, a shortage of about 100,000 tons had to be reckoned with this month. In order to alleviate this situation, the Societe des Cokes de Hauts-Fourneaux purchased 20,000 tons in Great Britain.

The restarting of a few coke oven batteries in the North of France, which had been destroyed during the war, is announced for next month, but this new supply will be readily absorbed by furnaces soon to be put into blast in the same district.

The adjusted price at the Franco-German frontier of German reparations coke has been maintained for December at 95 fr., but it will be very likely raised to 97 fr. for January delivery.

Iron Ore.—French production of iron ore in September amounted to 2,064,314 tons, with stocks at the end of that month aggregating 3,234,386 tons. France has exported the following tonnages of iron ore:

	September, Metric Tons	First Nine Months. Metric Tons
Germany	130,811	1,541,842
Belgium	594,479	1,633,865
Sarre	249,838	1,955,072
Netherlands	6,451	172,089
Other countries	237,195	1,504,675
Total	1,218,774	6,809,543

Pig Iron.—Available supplies of foundry iron are scarce, both for November and December delivery, and French producers refrain generally from binding themselves to any fixed date of delivery. The present average price of chill-cast foundry pig iron P. L. No. 3, is 240 to 250 fr. The export price, f.o.b. Antwerp (Belgian currency), is 260 to 270 fr. The production of French hematite is almost entirely absorbed by the home market and very little of it is being exported. Producers have raised their prices, which are now as follows, at furnaces:

	Fr
North	310 to 320
East	320 to 330
Center	280 to 300

Some hematite pig iron, produced in the electric furnace and analyzing less than 2 per cent silicon and more than 3 per cent carbon, is being offered at 260 fr. at works in the center of France.

Semi-Finished Steel.—A feeling of uncertainty pervades this market, and works decline to quote for delivery beyond the end of December. A few parcels were sold to Great Britain, but for prompt delivery. On the other hand, Germany is still taking substantial tonnages. Present average prices for basic steel on the home market are:

	Fr.
Ingots	310
Blooms	330 to 340
Slabs and billets	340 to 360
Sheet billets	385 to 395

About 20 fr. per ton should be added for open-hearth steel. Export prices, f.o.b. Antwerp (Belgian currency), are: Ingots, 330 fr.; blooms, 350 to 360 fr.; billets, 370 to 380 fr.; sheet billets, 400 to 420 fr.

Beams and Rails.—The demand for beams has seasonally slackened off. At its meeting of Nov. 18 the Comptoir Sidérurgique, which recently had slightly altered its selling conditions to the detriment of purchasers, decided to maintain them so modified, and to maintain also its base price of 475 fr. per ton. The large order of rails for the French railroads is still being

considered and will probably be shortly allocated to French producers exclusively. The infringement by the Société des Hauts-Fourneaux de la Chiers, which is a branch of the Belgian Société d'Ougrée-Marihaye, of the articles of association of the Comptoir Sidérurgique (controlling the home sales of beams and rails) has caused a sensation, and the dissolution of the Comptoir Sidérurgique had even been contemplated. It is reported, however, that at the meeting of the comptoir, on Nov. 18, it was decided to let matters stand as they are. Export prices, f.o.b. Antwerp (Belgian currency), are:

	Fr.
Beams	380 to 390
Heavy rails	420 to 425
Light rails	400 to 410

Plates and Sheets.—Actuated by the satisfactory situation of the French sheet market (orders taken in October aggregated 65,000 tons, about the same tonnage as in September), and, also, by the rise of the pound sterling and a recent increase in the price of Belgian sheets, the Comptoir des Tôles et Larges Plats decided, at its meeting of Nov. 17, to raise to 630 fr. the base price of flats, an increase of 20 fr. per ton. The other base prices, delivered at average destinations remain unchanged as follows:

	Fr.
Heavy sheets	660
Medium sheets	700
Light sheets	730

Export prices, f.o.b. Antwerp (Belgian currency) are: Heavy sheets, 470 to 480 fr. for basic steel and 520 to 530 fr. for open-hearth; flats, 450 to 460 fr. and 470 to 480 fr. for basic and open-hearth respectively.

Rolled Merchant Products.—The market is now inactive. Delays of delivery do not exceed 6 to 10 weeks for average specifications. The present price is 430 to 450 fr. at producers' works in Lorraine. The export price, f.o.b. Antwerp (Belgian currency), is: 425 to 430 fr.

Castings.—The situation in castings is uneven. Some works are well filled with orders and complain only of a lack of skilled labor, while others have no orders on hand. Prices, also, vary considerably according to districts and makers.

GERMAN STEEL PRICES JUMP

Pig Iron Advance Is Slight, But Steel Is Up 21 Per Cent on Average

(By Radiogram)

WILMERSDORF, BERLIN, GERMANY, Dec. 12.—Foundry iron No. 1 has been advanced from 156,665 m. per metric ton (last week) to 159,390 m. ($20.24 per gross ton, at 1¼c. per 100 m.). Steel ingots have gone up from 177,800 m. to 214,300 m. ($27.21); steel bars, from 243,300 m. to 293,200 m. (1.66c. per lb.); thin steel sheets, from 373,600 m. to 450,300 m. (2.55c. per lb.)

[Compared with two weeks ago, foundry iron has advanced 48 per cent, from 107,765 m.; steel ingots, 33 per cent, from 161,600 m.; bars, 34 per cent, from 219,200 m.; thin sheets, 36 per cent, from 332,000 m.]

German "Prosperity" Increases Despite Decline of the Mark

BERLIN, GERMANY, Nov. 25.—According to official theory, the iron and steel industry is under the injurious influence of the currency depreciation, and is threatened with ruin. In practice, there is no sign of this; the currency depreciation indeed involves a corresponding price rise; but the substance of the industry, that is, its production and its sales, remains practically unaffected. The last Prussian trade ministry monthly report declares that, despite pessimists, no crisis is in sight, or is even possible. Privy Councillor Kloeckner, head of the big Kloeckner company, states that his companies have orders until late spring.

While some minor works temporarily reduced output when the mark decline began, the sole reason, as Kloeckner shows, was shortage of working capital, not shortage of orders. The large concerns did not suffer and the small companies have now replenished their working capital by the customary credit and inflation process.

During the time when the mark declined, some German manufacturers and traders raised prices practically without any restrictions, in some cases even in excess of the actual inflation of the currency, and producers of raw material have sometimes been accused of increasing the economic difficulties of the country by their price policy. While in some industries prices are still going up because of higher wages and increased cost of raw materials, the Steel Syndicate decided at its last meeting not to raise the prices of rolled material. The recent improvement in the exchange would warrant a reduction in prices, but the combine claims that other factors of production have increased. The Pig Iron Association has however reduced some of its prices for the first time since early in 1921. The following table shows the decreased price in marks per metric ton:

	Marks per Metric Ton	
	Nov. 26	Nov. 16
Hematite	130,829	143,365
Foundry iron No. 1	107,765	110,173
Foundry iron No. 3	107,695	110,103
Foundry iron, Luxemburg quality	102,993	105,465
Steel-making iron, low in copper	130,161	142,697
Siegerland steel-making iron	102,034	102,034
Spiegeleisen, 8 to 10 per cent	110,994	110,994
Malleable pig iron	128,469	141,005
Ferrosilicon, 10 per cent	152,478	165,014

The foreign trade reports for the first nine months of 1922 again show the remarkable extent to which Germany has become an importer of cheap heavy iron and steel products for the purpose of manufacturing and exporting high-priced finished goods. In pig and bar iron, two former export specialties, Germany is now predominantly an importer:

	First Nine Months of 1922	
	Imports, Metric Tons	Exports, Metric Tons
Pig iron	192,115	110,411
Scrap	437,223	44,603
Ingots, billets, slabs, blooms, etc.	199,408	54,621
Bars, girders, bands	535,701	379,341
Sheets	56,447	173,857
Wire	7,963	100,669
Rails, ties, etc.	76,595	251,934
Bridges and parts	1,264	39,789
Farm machinery	1,028	29,057
Tools, etc.	540	31,028
Screws, rivets, horseshoes, etc.	4,718	22,612
Railroad springs, other car springs	471	5,153
Axles	153	2,405
Steel bottles, milk cans, etc.	2,478	82,300
Boilers	1,897	24,661
Machines	8,065	339,157

Before the war Germany was a great exporter of finished steel and iron goods and machines, but was also a great exporter of heavy and semi-finished steel and iron. The shortage of the latter, due to the loss of Alsace-Lorraine, has merely had the effect of making her an importer, and the result is that other iron-producing nations are doing Germany's rougher, less profitable work. By this is supplied an explanation of the fact that Germany while not having sufficient heavy materials has almost no unemployment.

The new Otto Wolff syndicate has enormously extended its already big sphere by coming to an agreement with the General Electricity Co. (A. E. G.) which under the two Rathenaus became Europe's greatest producer of electrotechnical wares. Otto Wolff and the director of the Phoenix Corporation, also a Wolff concern, have been elected members of the A. E. G.'s control board. The Wolff group came into relations with the A. E. G. in August, 1921, when both concerns and also Krupp's took up shares in the Rhenish Steel Corporation, which is now a dependent of Wolff. The A. E. G. has already wide ramifications, including the important Deutsch Werft Co. of Hamburg, the Gutehoffnung Smelting Corporation (Haniel concern), and the Linke-Hoffmann machinery concern. The Wolff combination now closely resembles Stinnes' Electro-

Metal Concern, but it is less closely fused. The A. E. G. has decided to increase its capital from 1,100,000,000 to 1,400,000,000 marks, which at present exchange is only $200,000, and a mere fraction of the value of the corporation's assets. The Rhenish Steel Works reports unsatisfactory per capita productivity of its employees, and abscribes its increasing output solely to new plant and methods; but *Die Wirtschaftskurve* published by the *Frankfurter Zeitung* in the November issue gives further details showing that the individual efficiency of workmen is rapidly increasing, and in many industries is already higher than before the war.

BELGIAN MARKET QUIET

Higher Raw Materials—Checking Forward Selling —Slight Increase in Pig Iron Output

BRUSSELS, BELGIUM, Nov. 29.—With the fluctuations in exchange rates (15.65 fr. to the dollar Nov. 29 in Brussels) the tendency of the Belgian iron and steel market is uncertain. The present shortage of coke supplies and the probability of a rise of 15 fr. per ton, effective Jan. 1, are adding to the general reluctance of Belgian mills to book orders for forward delivery. Six blast furnaces have been temporarily blown out. However, the present situation of the trade cannot be considered bad; prices have firmed up and show a rising tendency.

Pig Iron.—Available supplies are scarce and prices have been rising. A few transactions were recently concluded at 250 fr. for basic pig iron and 290 fr. for chill-cast foundry iron, No. 3 P. L. Antwerp, Luxemburg and Lorraine furnaces are quoting foundry iron at 285 to 290 fr. f.o.b.

Semi-Finished Material.—Notwithstanding a good demand from Great Britain, which is only partly met, this market is rather inactive. Present prices on basic material are.*

	Delivered in Belgium Fr.	Lorraine and Luxemburg Products, f.o.b. Antwerp Fr.
Ingots	325	320
Blooms	350	355 to 360
Billets	370	375
Sheet billets	400	400 to 410

*Supplement for open-hearth steel: 20 to 30 fr.

Rolled Products.—The demand for iron products is satisfactory, and prices are rising.

For export f.o.b. Antwerp, prices are slightly lower than the domestic market. Bolt making iron is quoted at 490 fr.; screw stock at 635 fr. and forge iron at 490 fr. for domestic delivery.

The market for rolled steel products is quiet, especially for export. Producers are, in many cases, refraining from accepting orders, which makes it comparatively easy to maintain prices by means of a few domestic orders.

Inquiry for angles and rods is particularly active, as well as for small sections.

Domestic prices are as follows:

	Fr.
Bars	470
Rails	490
Beams, large	410
Beams, small	425
Rods	560

For export, prices f.o.b. Antwerp, notably for Lorraine products, are slightly lower.

Sheets and Plates.—Sheet mills are generally well filled with orders. Medium gage sheets are particularly active.

The following prices are being quoted:

	Fr.
Heavy	490
Medium	510
Light, 1½ to 1 mm	650 to 825
Light, 0.5 mm	950 to 1000

Argentina Buys Belgian Rails

On its total requirement of 100,000 tons of rails, the government of the Argentine Republic has so far allocated 30,000 tons, to the Société de Sambre-et-Moselle. The remaining tonnage will soon be re-advertised for tenders.

The Providence iron works, at Marchienne-au-Pont, has received from Bulgaria an order for 250 tons of beams and 50 tons of concrete iron on a bid that was about 7 per cent below the German prices.

Pig Iron Production Increases in October

Production of pig iron in October showed an increase over September of 11,570 metric tons and the October ingot production was 176,420 metric tons compared with 163,890 metric tons in September. The average monthly production of pig iron in 1921 was 73,032 metric tons, compared with 207,058 metric tons monthly average in 1913 and the ingot production averaged 60,625 metric tons last year, compared with 200,398 metric tons in 1913.

October Production

	Number of Furnaces in Blast	Pig Iron, Metric Tons
September, 1922	32	163,120
October, 1922	33	174,690

LUXEMBURG MARKET FIRM

Blast Furnace Operation 63 Per Cent—Exports Active, But Decline of Mark Curtails Ore Sales

PARIS, FRANCE, Nov. 26.—Activity in iron and steel in the Grand Duchy of Luxemburg during the last few months has been quite satisfactory. Of the 47 furnaces in the country 30 are now in blast, distributed as follows between the various concerns:

	Total	Number in Blast
Aciéries Reunies de Burbach-Eich-Dudelange	15	13
Terres-Rouges	11	6
Hauts-Fourneaux et Aciéries de Differdange et St. Ingbert	13	6
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]

Several plants are working at full capacity. The Luxemburg industry is therefore in a better situation than either the French or the Belgian trade, and this may be explained by the fact that, while using its own ore, the Grand Duchy is exclusively an iron exporting country situated in close proximity to Antwerp and, especially, to Germany, the latter country being always ready to absorb important tonnages of pig iron and semi-finished material from Luxemburg.

In October Luxemburg produced a total of 165,182 metric tons of foundry, Bessemer and open-hearth furnace pig iron, compared with 151,813 metric tons in September, while the production in October of basic, open-hearth and electric furnace steel was 139,002 metric tons, compared with 134,690 metric tons in September.

Iron Ore.—In 1913 the iron mines situated in the Grand Duchy produced 7,331,000 metric tons of ore. In 1921 the production fell off to 3,031,000 tons. It materially increased this year and is averaging 350,000 to 400,000 tons per month, from which it may be inferred that the year's output will be about 4,500,000 tons.

The Luxemburg iron mines may be divided into three classes:

1. The mines belonging to iron work situated in the Grand Duchy. They were well occupied during the greater part of this year and the output of some of them is even reaching the pre-war level.

2. Those belonging to iron works situated outside the Grand Duchy. The production of these mines has been irregular and is proportionate to the activity of the owning concerns.

3. Those belonging to private individuals. These mines are meeting with some difficulties, as consumers are more exacting in their demands for quality of their ore, and the collapse of the mark is now interfering with shipments to Germany.

The following are the prices at mines (Belgian cur-

rency), quoted in October, 1922, by the iron mines which are selling ore: Calcareous ore, 29 to 30 per cent of iron, 9.50 fr. per ton; siliceous ore, 35 per cent of iron, 9 fr. per ton.

Foundry iron.—Chill-cast foundry iron, No. 3 P. L., is now about 270 fr. (Belgian currency), f.o.b. Antwerp.

Semi-Finished Material.—Present prices on basic material, f.o.b. Antwerp (Belgian currency), are: Billets, 365 to 370 fr.; sheet billets, 385 to 390 fr.

Rolled Products.—The demand for beams and merchant products is important, and hoop and strip steel as well as rods, are particularly animated. Luxemburg produces but a small tonnage of sheets and is therefore not much affected by present conditions in that material.

Present prices, f.o.b. Antwerp (Belgian currency), are:

	Fr.
Beams	410 to 420
Rolled merchant products	460
Rods	550
Hoops	600

Prospects Are Favorable

The prospects of the iron and steel trade in Luxemburg are favorable. It should, however, be observed that the margin of profit is small and was recently influenced by the rise in the price of coke and by the introduction of a tax on transactions.

Although Luxemburg producers do not feel any real anxiety about their labor supply, a certain lack of foreign labor, especially skilled workmen, is noted. There are also complaints about the insufficiency of coke supplies.

Large inquiries for rails are being handled by Luxemburg concerns, which are quite hopeful of securing a part of them.

WHEELING PLANTS BUSY

Riverside Works National Tube Co. Practically Full—Furnace Lighted

WHEELING, W. VA., Dec. 11—The most interesting development of the past week among steel plants in this district was the lighting of the second blast furnace at the Riverside works, National Tube Co., Benwood. With full pig iron production, that plant is rapidly getting back to normal activities in the other departments. Three of the five butt weld furnaces are in operation and the two remaining ones will go on late this week. There are two lap weld furnaces at this plant, but it is doubtful whether they will go into operation immediately. Steel works and skelp mills, now on day turn, will run day and night turns starting on Wednesday or Thursday. LaBelle plant of the American Sheet & Tin Plate Co. remains down, but other local units of this and other subsidiaries of the Steel Corporation are running at a high rate. Another blast furnace, making three in all, at Mingo, Ohio, works, Carnegie Steel Co., was blown in last week. Wheeling Steel Corporation plants are operating on an average of 80 per cent of capacity. This week's schedule follows:

Wheeling Steel Corporation:

Wheeling Steel & Iron Co., Benwood plant 65 per cent; Belmont plant, 100 per cent; Top Mill furnace, idle; Martins Ferry furnace in blast; Yorkville plant operating 50 per cent.

Whitaker-Glessner Co., Wheeling mills, 75 per cent; Martins Ferry mills, 85 per cent; Beech Bottom plant, 75 per cent; Portsmouth plant, 95 per cent.

LaBelle Iron Works, Steubenville plant, 75 per cent; Wheeling plant, 95 per cent.

United States Steel Corporation:

National Tube Co., Riverside plant, Benwood, practically full.

American Sheet & Tin Plate Co., Laughlin Plant, Martins Ferry, 87 per cent; LaBelle plant, Wheeling, idle; Aetna Standard, Bridgeport, Ohio, 100 per cent.

Carnegie Steel Co., Bellaire plant, idle; Mingo Junction blast furnaces, three or four in blast; bar mills, 100 per cent.

JONES & LAUGHLIN EARNINGS

Statement for First Time Makes Public Important Facts—Stock Offered

Earnings of the Jones & Laughlin Steel Co., over a period of 10 years, form an interesting feature of the public offering through Pittsburgh and New York bankers of $14,000,000 of cumulative 7 per cent preferred stock of the Jones & Laughlin Steel Corporation, as the company now is to be known, as a result of the reorganization and recapitalization of the company. The company, since its inception until the recent proposed change in capital and name, was announced as a close corporation and made no public statement of earnings. The earnings from 1913 to 1923, inclusive, those for 1923 being partly estimated, have been as follows:

Years Ended Dec. 31	Net Sales	Depreciation, Depletion and Amortization	Net Earnings after Depreciation, Depletion, Amortization, Interest and Taxes
1913.....	$43,101,196	$1,420,650	$5,340,669
1914.....	32,402,076	2,053,890	2,702,631
1915.....	44,431,035	2,054,895	7,267,022
1916.....	77,353,009	3,126,026	20,257,877
1917.....	129,810,539	6,117,696	26,622,033
1918.....	128,923,400	18,179,144	7,294,531
1919.....	103,243,608	6,545,961	17,120,287
1920.....	148,615,441	8,568,559	22,611,085
1921.....	39,930,625	3,682,774	†3,610,037
1922*....	71,500,000	3,900,000	4,900,000
Total...	$819,310,929	$55,649,595	$110,506,048
Average..	81,931,092	5,564,959	11,050,604

*December estimated. †Deficit.

The consolidated balance sheet as of Oct. 31, 1922, shows net tangible assets of $137,200,000, or $228 per share of preferred stock. Total funded debt was only $21,700,000. Current assets are $66,000,000, including $31,400,000 cash and United States Government obligations.

The statement adds: "Net earnings for the 10 years have averaged 2.6 times the dividend requirement on the $60,000,000 preferred. During this period, dividends have amounted to $38,700,000, as compared to $71,800,000 retained in the business."

According to the transfer agents, the entire $14,000,000 of preferred stock offered to the public has been subscribed. Jones & Laughlin preferred stock has been listed on the Curb Market.

Sheet Inquiry More Active—Buying Light

YOUNGSTOWN, Dec. 12.—Sheet prices are largely holding at the levels recently named by the American Sheet & Tin Plate Co., and followed by all Valley independents. Tendencies to cut under the market have received a setback since the sheet bar price announcement. While inquiry for first quarter business is somewhat more active, current buying is limited and mills are curtailing production.

In the black sheet market, competition for tonnages is especially keen, and a number of the smaller mills have been tempted to dip below the 3.35c. minimum in order to fill out their rolling schedules.

Buyers have little difficulty in placing blue annealed tonnages at 2.50c. per lb. Galvanized sheet makers generally complain that the 4.35c. quotation leaves them but little margin, due to the advanced cost of spelter, but no business is being rejected at the market minimum.

The 5c. price on full finished sheets, for No. 22 auto body stock, has been considerably strengthened since the $36.50 price on sheet bars developed. Some highly finished sheet business has undoubtedly been accepted by independents at 4.85c., or $3 per ton below the independent market.

Iron and Steel Markets

SHIPMENTS STILL HEAVY

Some Excess of Steel Making Pig Iron in December

Better Buying for Implement Works—More Cars for Finished Products

The week has brought greater activity in pig iron at Pittsburgh, with sales of 40,000 tons, a continuance of the high rate of pig iron production throughout the country and a notable reduction in the accumulation of finished steel at Pittsburgh district mills as more cars have become available.

In its decrease of 62,000 tons in November the Steel Corporation's total of unfilled orders indicates what is to be expected also in this last month of the year and in the case of all steel companies with the present remarkable output. As high as 85 per cent of capacity has been reached this week in the Pittsburgh district but there will be some falling off in ingot production in the holiday season and the piling of a corresponding amount of pig iron.

With a net gain of three furnaces in the past week, there are now in blast in the Warren, Ohio, Wheeling, W. Va., and Johnstown, Pa., triangle 99 out of 139 furnaces, or nearly twice as many as at the low point in August.

Manufacturers of wire products and pipe are making little if any gain on their obligations, as demand is still large, but in nearly all other products consumers are well taken care of by deliveries on old and in some cases quite low-priced contracts.

Under such conditions the try-out of prices on quantity buying of plates, shapes and bars is likely to be deferred for several weeks. Meanwhile most mills consider it a 2c. market in spite of the 1.95c. and 1.90c. exceptions. One of the latter was made in the case of 6000 to 8000 tons of plates for the Pennsylvania Railroad, all for delivery this month.

For the first time in two years farm implement manufacturers who buy from Chicago mills report a sufficient improvement in the outlook for farmer buying to warrant increases in their production programs. They are now placing a part of their first quarter requirements in bars and other materials.

In the automobile field some orders are being placed for spring and rim steel, but it is all for January shipment, as is some bar business just taken at Cleveland. There is inequality in prices for concrete reinforcing bars, both East and West.

Some Central Western mills still have a 3.25c. price on black sheets, or $2 below the recently announced price of the Steel Corporation.

Between 25,000 and 30,000 steel cars are now under more or less active negotiation, the buying of the week amounting to 3000 cars, with fresh inquiries for nearly 8000. Ninety locomotives have been added to the pending business. Chicago district car builders, if all pending business were closed, would have nearly a six months' supply of work.

Fully three-fourths of new fabricated steel offerings come from the Central West, and the total is about 33,000 tons. Awards approximate 20,000 tons, or up to the volume of recent weeks.

Activity in pig iron shifted the past week to districts in which there had been little buying, particularly Chicago and Pittsburgh, and sellers in nearly all parts of the country have been marking up prices, though they report little done at the new quotations. While nearly all recent contracts were for first quarter, a limited amount for second quarter delivery has been placed, but the price which will prevail for the latter period is uncertain. The latest transactions involved about 40,000 tons of various grades at Pittsburgh and nearly an equal amount at Chicago. Bessemer has declined $2.50 in the Pittsburgh market and malleable $1. In the South at least one furnace is selling at $22.50 and resale iron can still be had at $22. Apart from the large pipe foundry contracts, the tonnages of important interests reported to have covered in the late movement have not been clearly developed.

British exports of iron and steel in November amounted to 372,332 tons, of which 117,708 tons was pig iron (including ferroalloys). Of the 117,708 tons, 79,070 tons was sent to the United States.

The British Government has ordered work started this month on two new 35,000-ton battleships, calling for some 60,000 tons of iron and steel.

Germany has sold 15,000 tons of rails to the Far East at £5 5s. ($24.26) f.o.b. The delivered price is considerably below the American, which including accessories averaged $44.63 per gross ton against $45.16 the British bid. On the rails alone the United States at $43.50 was only 4c. below Great Britain.

Another slight drop in THE IRON AGE pig iron composite price brings it to $25.71 per gross ton, compared with $32.54 at the end of September.

For finished steel THE IRON AGE composite price, representing seven leading products, remains at 2.439c. per lb., compared with the 1922 high point of 2.474c., Oct. 3.

Pittsburgh

Heavy Selling of Pig Iron—Steel Moving More Freely

PITTSBURGH, Dec. 12.—Pig iron still holds the center of the stage. The drive for tonnages by merchant producers has continued and with some of the steel companies, besides those which have been selling for some little time, seeking business. The week has been one of extreme activity, and it is probable that fully 40,000 tons has been placed. The bulk of the business has been in foundry iron, although one or two fair-sized sales of steel-making grades are included. On foundry and basic grades $25, furnace, has been the prevailing price. Producers of foundry iron are fairly well committed and are inclined to seek higher prices, but there is no evidence yet that more than $25, furnace, can be obtained except on small lots. Bessemer iron has declined $2.50 per ton and sales of malleable iron have been made at $1 per ton below last week's price.

Loss of two Valley district furnaces from the active list last week has been more than counterbalanced by the blowing in of five Steel Corporation furnaces, these

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton	Dec. 12, 1922	Dec. 5, 1922	Nov. 14, 1922	Dec. 13, 1921
No. 2X Philadelphia*	$28.26	$29.11	$31.14	$24.26
No. 2 Valley furnace†	*25.00*	25.50	28.00	20.50
No. 2 Southern Cincinnati	26.05	27.05	27.05	22.00
No. 2, Birmingham, Ala.†	*22.50*	23.00	23.00	17.00
No. 2 foundry, Chicago†	28.00	28.00	30.00	Nom.
Basic, del'd, eastern Pa..	27.50	27.50	28.14	21.00
Basic, Valley furnace....	25.00	25.00	28.00	19.00
Valley Bessemer, del. P'gh.	29.27	31.77	33.77	21.96
Malleable, Chicago*	28.00	28.00	30.00	20.00
Malleable, Valley	*26.00*	27.00	29.00	20.00
Gray forge, Pittsburgh..	26.77	26.77	29.77	21.46
L. S. charcoal, Chicago...	36.15	36.15	36.15	31.50
Ferromanganese, furnace.	100.00	100.00	100.00	60.00

Rails, Billets, etc., Per Gross Ton				
O.-h. rails, heavy, at mill.	$43.00	$43.00	$43.00	$40.00
Bess. billets, Pittsburgh..	36.50	36.50	38.00	29.00
O.-h. billets, Pittsburgh..	36.50	36.50	38.00	29.00
O.-h. sheet bars, P'gh....	36.50	36.50	38.00	30.00
Forging billets, base, P'gh	45.00	45.00	45.00	32.00
O.-h. billets, Phila.....	43.17	43.17	45.17	34.74
Wire rods, Pittsburgh....	45.00	45.00	45.00	38.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb..	2.00	2.00	2.00	1.50
Light rails at mill.....	2.15	2.15	2.00	1.55

Finished Iron and Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Iron bars, Philadelphia..	2.275	2.275	2.235	1.95
Iron bars, Chicago.....	2.35	2.35	2.50	1.65
Steel bars, Pittsburgh....	2.00	2.00	2.00	1.50
Steel bars, Chicago.....	2.10	2.10	2.10	1.60
Steel bars, New York....	2.34	2.34	2.34	1.88
Tank plates, Pittsburgh..	1.95	1.95	2.00	1.50
Tank plates, Chicago....	2.30	2.30	2.30	1.60
Tank plates, New York..	2.29	2.29	2.34	1.83
Beams, Pittsburgh.....	2.00	2.00	2.00	1.50
Beams, Chicago	2.20	2.20	2.20	1.65
Beams, New York.....	2.34	2.34	2.34	1.88
Steel hoops, Pittsburgh..	2.75	2.75	2.90	2.00

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡2.25 to 2.75.

Sheets, Nails and Wire, *Per Lb. to Large Buyers:*	Dec. 12, 1922 Cents	Dec. 5, 1922 Cents	Nov. 14, 1922 Cents	Dec. 13, 1921 Cents
Sheets, black, No. 28, P'gh	3.35	3.35	3.35	2.90
Sheets, galv., No. 28, P'gh	4.35	4.35	4.50	4.00
Sheets, blue an'l'd, 9 & 10	2.50	2.50	2.60	2.25
Wire nails, Pittsburgh...	2.70	2.70	2.70	2.50
Plain wire, Pittsburgh....	2.45	2.45	2.45	2.50
Barbed wire, galv., P'gh..	3.35	3.35	3.35	3.40
Tin plate, 100-lb. box, P'gh	$4.75	$4.75	$4.75	$4.75

Old Material, Per Gross Ton:				
Carwheels, Chicago.....	$24.00	$24.00	$24.00	$16.00
Carwheels, Philadelphia..	20.00	20.00	21.00	16.50
Heavy steel scrap, P'gh	*20.00*	20.50	20.50	14.00
Heavy steel scrap, Phila..	16.00	16.00	16.50	11.50
Heavy steel scrap, Ch'go	17.00	17.00	17.50	11.00
No. 1 cast, Pittsburgh....	**22.50**	22.00	23.50	16.00
No. 1 cast, Philadelphia..	20.00	20.00	21.00	16.50
No. 1 cast, Ch'go (net ton)	19.50	19.50	20.50	12.50
No. 1 RR. wrot, Phila....	19.00	19.00	19.00	14.50
No. 1 RR. wrot, Ch'go (net)	15.00	15.00	16.00	10.50

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt ..	$6.50	$6.50	$7.00	$2.75
Foundry coke, prompt....	7.50	7.50	8.50	3.75

Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York..	14.12½	14.12½	14.12½	13.75
Electrolytic copper, refinery	13.75	13.75	13.62½	13.50
Zinc, St. Louis.....	**7.22½**	7.10	7.25	4.85
Zinc, New York.....	**7.37½**	7.45	7.60	5.20
Lead, St. Louis.....	6.95	6.95	6.90	4.40
Lead, New York.....	7.27½	7.30	7.25	4.70
Tin (Straits), New York.	**37.25**	36.25	36.87½	32.75
Antimony (Asiatic), N. Y.	*6.35*	6.40	6.60	4.50

The prices in the above table are for domestic delivery and do not necessarily apply to export business

Composite Price, Dec. 12, 1922, Finished Steel, 2.439c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel

Dec. 5, 1922,	2.439c.
Nov. 14, 1922,	2.446c.
Dec. 13, 1921,	2.135c.
10-year pre-war average,	1.689c.

Composite Price, Dec. 12, 1922, Pig Iron, $25.71 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Dec. 5, 1922,	$25.86
Nov. 14, 1922,	28.02
Dec. 13, 1921,	19.46
10-year pre-war average,	15.72

including two of the American Steel & Wire Co., which blew in No. 1 furnace of its Shoenberger works Dec. 7 and its No. 2 on Dec. 10; one Lucy and one Mingo furnace, Carnegie Steel Co., and the second furnace of National Tube Co. at its Riverside works, Benwood, W. Va. There are now 99 out of 139 furnaces in the district bounded by Wheeling, Warren, Ohio, and Johnstown, Pa., in blast, the largest number in more than two years, and virtually twice as many as were active at the low point during the last week of August last. A few of the steel companies are making only enough iron for their actual requirements, but most of them are producing a surplus which they are either piling or offering on the open market.

Steel works activities in this district are at least 85 per cent. The recent order removing the restrictions on the use of open top cars has found very quick reflection in the movement of steel from the mills. Some of the sheet and tin plate manufacturers whose product moves chiefly in box cars have not been able to materially increase shipments because of a continued shortage of that kind of equipment, but those products which can be shipped safely in open top cars have been moving with marked freedom, and accumulations, notably of pipe, which resulted from their shortages during the height of the movement of coal to the lakes, have largely disappeared. Manufacturers of wire goods and pipe are not able to make much in cutting down their obligations, because the demand in those lines still is heavy and urgent, but real activity in other products is lacking because of the proximity of inventory time and the fact that deliveries of material on old and low-priced contracts are heavy enough to meet present requirements of buyers. The possibility of a recurrence of the coal strike on April 1 is undoubtedly causing considerable stocking against such an exigency.

There has been no special change in steel prices since a week ago. The effort of most manufacturers is to maintain 2c. base, Pittsburgh, on plates, shapes and bars, but there is no question that preferred customers are getting supplies at less and a quotation of 1.90c. is being made on sizable tonnages by some mills lacking substantial backlogs. The market is firmer on galvanized and blue annealed sheets than it is on black shapes, on which prices as low as 3.15c. base, Pittsburgh, are heard. Curtailment of beehive oven coke has failed to check the downward trend of prices and while $6.50 per net ton at ovens is about as low as standard furnace grade is obtainable, it is also as high as any recent sales made. Coal prices also are weak.

Pig Iron.—While sales of the week have reached large proportions, prices have been in buyers' favor. One furnace interest in the past week has made sales aggregating more than 15,000 tons, including 5500 tons of gray forge at $25, furnace; 6500 tons of No. 2 and No. 3 foundry at the same figure; 2000 tons of No. 3 iron

at $25 and 1100 tons of No. 2X, No. 2 and No. 3 at $26 for No. 2X and $25 for the other grades. This business was done by a western Pennsylvania furnace, but a portion of tonnage was sold on a Valley furnace base. Another merchant interest with furnaces in the Valley has taken practically the same amount of business on a basis of $25 for No. 2 grade. We also note sales of malleable iron amounting to about 1400 tons for first quarter delivery at $25, Valley furnace. Of the steel-making grades, there was one sale of 1000 tons of Bessemer at $29, Johnstown, this to a buyer having a low freight rate from that point and 1000 tons to a Pittsburgh district steel maker at $27.50, Johnstown. The Valley market on this grade also is quotable at $27.50, as a Valley steel maker, as well as a merchant producer in that district, has lately quoted that figure. A Pittsburgh district sheet maker has taken 2000 tons of basic at $25, Valley furnace, and 4000 tons at a slightly lower figure in a trade arrangement with a steel company which involves a tonnage of skelp. Some malleable iron was included in sales of foundry iron from a western Pennsylvania furnace at $25, furnace. Some of the merchant furnaces are now asking $26, furnace, for No. 2 foundry, but the bottom does not yet seem to be reached on basic as brokers are quoting as low as $24.75 on iron from the Valley.

We quote Valley furnace the freight rate for delivery to the Cleveland or Pittsburgh district being $1.27 per gross ton:

Basic	$25.00
Bessemer	27.50
Gray forge	25.00
No. 2 foundry	25.00
No. 3 foundry	25.00
Malleable	26.00
Low phosphorus copper free	36.00

Ferroalloys.—A fair amount of business in ferromanganese is being figured on, but actual sales are moderate. Prices are unchanged at $104.79, delivered Pittsburgh, common rate points, for either domestic or British 80 per cent material. The market definitely is weaker on spiegeleisen, especially for first quarter of 1923 delivery. We note sales aggregating more than 1000 tons at $33 furnace, for average 20 per cent material for that delivery. On spot tonnages $36, furnace, is asked for 20 per cent and $35 for 16 to 19 per cent, but these prices are not supported by sales. The campaign of makers of 50 per cent ferrosilicon for 1923 contracts has not yet made much headway in this district, the feeling among consumers being that the increase in prices over those of last year is too great.

We quote 80 per cent ferromanganese at $100, furnace, or $104.79 delivered Pittsburgh district for either domestic or British, and 76 to 80 per cent German at $67 c.i.f. Atlantic seaboard. Average 20 per cent spiegeleisen, $37, furnace; 16 to 19 per cent, $36, furnace; domestic, $39 per gross ton, delivered. Average 50 per cent ferrosilicon, $84 per gross ton, furnace. Average 50 per cent ferrosilicon, domestic, $82.50 to $85, delivered. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, $44.50; 11 per cent, $47.80; 12 per cent, $51.10; 13 per cent, $55.10; 14 per cent, $60.10; silvery iron, 6 per cent, $32; 7 per cent, $34; 8 per cent, $36; 9 per cent, $37.50; 10 per cent, $39.50; 11 per cent, $42; 12 per cent, $44.50; 13 per cent, $47. The present freight rate from Jackson and New Straitsville into the Pittsburgh district is $2.66 per gross ton.

Steel Skelp.—The Steel Corporation still is fairly heavily committed on skelp, but independent mills have tonnages for sale and are quoting 2c. for either grooved or sheared in the pipe sizes and gages. Mills producing boiler tube skelp are getting $2 to $3 per ton above that figure.

Wire Products.—Pressure for deliveries against orders, particularly of nails, shows no material abatement and if forward buying is not heavy, it is because the mills are not actively seeking it. The leading interest still is largely out of the market in this district, but probably will be able to take on business for late first quarter delivery before long, since it is doing slightly better at its Donora, Pa., works in the matter of production and on Dec. 7 blew in a blast furnace at its Shoenberger works in Pittsburgh, after a suspension since April 11 last, which points to increased steel production at that plant. Prices are very firm on all products and where business has been lost by one company or another, it has been on account of delivery rather than the price. It is claimed that wire products are too low in price, but a belief that an advance at this time would not rest well is keeping manufacturers in line at the prices set up last September. Prices are given on page 1607.

Iron and Steel Pipe.—The supply situation in steel pipe is slightly easier than it was a few weeks ago, due to the fact that the mills have been able to materially increase their shipments as a result of an increased supply of open top cars. The National Tube Co. not only is shipping its current production, but in the past few weeks has been able to move much of the pipe which piled up when cars were so scarce, during the heavy movement of coal to the lakes. This interest, however, still is 60 to 90 days behind its orders, being particularly heavily sold up on butt weld standard pipe. Its position in this respect, however, may soon be partly corrected by the fact that it now has both of its blast furnaces on at its Riverside works, Benwood, W. Va., with three butt weld furnaces on and two others scheduled to go in late this week. Independent mills note no let-up in the demand and they also are behind their orders and unable to give early promises on standard pipe. Oil country and line pipe obligations are lighter than those in standard pipe and fairly early shipments are being promised. Wrought iron pipe specifications are fairly good for the time of year. There are no suggestions of any immediate change in prices. Discounts are given on page 1607.

Wire Rods.—Mills in a position to take on any business are able to get $47.50 per gross ton, base, but sales at that figure usually refer to early shipments and to buyers, not listed as regular customers of the selling mills. Regular customers are getting their supplies at $45, base, both on current business and for first quarter of 1923. Most mills in this district are pretty heavily committed between old orders not fully completed and the business they have taken in the past month or so.

We quote No. 5 common basic or Bessemer rods to domestic consumers, $45 to $47.50; chain rods, $45 to $47.50; screw stock rods, $50 to $52.50; rivet and bolt rods and other rods of that character, $45 to $47.50; high carbon rods, $52 to $57.50, depending on carbon, per gross ton, f.o.b. Pittsburgh or Youngstown. Carbon rods command $3 over base for 0.20 to 0.40 carbon; $5 over base for 0.41 to 0.55 carbon; $7.50 over base for 0.56 to 0.75 carbon and $10 over base for over 0.75 carbon.

Billets, Sheet Bars and Slabs.—A Pittsburgh district sheet maker recently closed for 6000 tons of sheet bars for delivery in equal amounts over the first quarter of 1923. The price is reported to have been $37.50, Pittsburgh, but full confirmation is lacking and there is some question whether as high as that was paid in view of the fact that several independent makers have adopted the Steel Corporation base of $36.50, Pittsburgh or Youngstown, as the basis of first quarter shipments to regular customers. The Steel Corporation has few outside semi-finished customers, but since they are competitors of those companies served by independent mills, the latter cannot at present, put their customers at a disadvantage with those of the Corporation by insisting on higher prices. The market is in an untested condition on billets and slabs, since there is very little business up, but the common belief is that they cannot be sold at any higher prices than sheet bars. Forging billets are quoted by the Steel Corporation at $5 a ton over soft billets; using the nominal base of $36.50 for soft billets, there is an indicated price of $41.50 for forging steel. As high as $45, however, still is being quoted on this form.

We quote 4 x 4-in. soft Bessemer and open-hearth billets, $36.50; 2 x 2-in. billets, $36.50; Bessemer sheet bars, $36.50; open-hearth sheet bars, $36.50; slabs, $36.50; forging billets, ordinary carbons, $41.50 to $45, all f.o.b. Pittsburgh or Youngstown mills.

Boiler Tubes.—Leading makers of charcoal iron boiler tubes, as of Dec. 6, advanced prices $10 per ton, through a reduction in the discounts of 5 points, the explanation being higher materials and labor costs. An Eastern maker of iron tubes and a producer in a small way of lap-welded steel tubes advanced the latter $16 a ton, effective Dec. 6, but this announcement is regarded merely as one of withdrawal from the market by this interest and other producers are not expected to follow the advance. All kinds of boiler tubes are scarce as far as immediate supplies are concerned, with lapwelded steel tubes especially hard to secure promptly. Discounts are given on page 1607.

Sheets.—The leading interest reports business as good, but among independents, with the exception of those producing full-finished and electrical sheets, the report is that buyers are inclined to pursue a conservative course in purchases. It is reported that a new mill has gone as low as 3.15c., base, for black sheets to line up a backlog, but as a general rule, there is very little shading of the Steel Corporation bases of 3.35c. for black, 4.35c. for galvanized and 2.50c. for blue annealed. On full finished sheets, independents still are holding to 5c., base, for No. 22 gage, automobile body stock and probably will not be obliged to drop from this level, for while the Corporation base is 4.70c., it cannot take on much business for delivery before the second quarter. Mills operations are well maintained. Last week, the leading interest had more than 85 per cent of its sheets mills active and this week's schedule is right up to that gait. Independent mills are running about 80 per cent of capacity. Prices are given on page 1607.

Tin Plate.—Business is of about normal proportions for this time of the year. The leading interest has specifications for the bulk of its first quarter production, but this is not true of the independent mills, whose customers are not anticipating their requirements. The question of prices has lost interest, since leading independents have gone along with the Steel Corporation at $4.75 per base box, Pittsburgh, for standard cokes. This, as is well understood, is the "official" quotation and large consumers have preferential treatment as to prices. The leading interest is operating at 73 per cent of capacity, due to a shortage of sheet bars at some of its plants. The general average of the industry is at about the same rate.

Iron and Steel Bars.—Most mills are holding steel bars and bar mill shapes at 2c. base, Pittsburgh, and a fair number of small orders has been entered at that figure. This is the top of the market, however, and regular customers are being accommodated at 1.90c. and attractive tonnages probably can be placed at the same figure. There has been no change in bar iron prices.

We quote steel bars rolled from billets at 2c.; reinforcing bars, rolled from billets, 2c. base; rail steel reinforcing bars, 1.90c. to 2c.; refined iron bars, 2.60c. in carloads, f.o.b. mill, Pittsburgh.

Structural Material.—While fabricating shops are not getting many new awards of any considerable size, they are figuring on a much greater number of inquiries than usual at this time of the year. Mill deliveries of plain material are heavier, but there is not much evidence yet of stocking by the fabricating shops. Prices are not very well defined. As with plates and bars, the mills are quoting 2c., but shading that price as much as $2 per ton on desirable business. Prices are given on page 1607.

Steel Rails.—All makers of light rails, rolling them from new steel, are quoting 2.15c., base, but new business is not especially large at that figure and with rerolled sections readily obtainable at 2c., base, there is reason to suppose that all sales of new steel rails are not at the quoted base. Railroads are specifying steadily on standard rails contracts.

We quote 25 to 45-lb. sections, rolled from new steel, 2.15c. base; rolled from old rails, 2c. base; standard rails, $43 per gross ton mill for Bessemer and open-hearth sections.

Plates.—Most of the demands coming to mills here are for small tonnages, and while 2c. base is commonly quoted, it is doubtful whether much business is being placed at above 1.95c., and 1.90c. probably could be done on an order of fair size. Prices are given on page 1607.

Cold-Rolled Strips.—Although the market on hot-rolled strips is not especially well maintained at the established base of 2.90c. base, Pittsburgh, makers of cold-rolled strips claim that it has not been necessary for them to go below 4.50c., Pittsburgh, on this product. Business is described as good.

Bolts, Nuts and Rivets.—Business is of about the usual proportions for this time of year. Quoted prices show no change, but it is reported that some makers need orders badly enough to be willing to make concessions. Discounts and prices are given on page 1607.

Cold-Finished Steel Bars and Shafting.—There is no occasion to change the price, which remains firm at 2.50c., base, Pittsburgh, for carloads, since there is a steady if not insistent demand and there is no sign right now that hot-rolled bars will be available in the near future as low as 1.75c., upon which the present price of 2.50c. for cold-finished bars is based. Ground shafting also holds firm on a base of 2.90c. for carloads at mill.

Hot-Rolled Flats.—The market still is quotable from 2.75c. to 2.90c., base, Pittsburgh. The higher figure is the regular market quotation, but evidently, there are some mills which find trouble in getting enough consumers to maintain mill schedules at that figure. Shading of the regular price seems to be more frequent in bands and strips than in hoops. Prices are given on page 1607.

Track Fastenings.—The interesting phase of the situation in these products is that the railroads tributary to this city, are advancing the delivery dates on their specifications. Prices show no change, although Eastern makers are underquoting local makers of small spikes by as much as $5 per ton. Current demands are seasonably light. Prices are given on page 1607.

Coke and Coal.—The coke market still is weak, in spite of efforts to steady it through curtailed production. Supplies of furnace grade still are more than ample for current requirements, in view of the fact that $6.50 per net ton at ovens, last week's minimum standard grade, is this week's maximum. Coal oven operators are talking $7 and higher for early 1923 contracts, but in naming such a price are evidently figuring on probable weather conditions, rather than on what furnace interests will pay. The foundry coke market is fairly steady at $7.50 to $8 per net ton at oven. There is not enough demand for coal to sustain the market. While coking coal for delivery over an extended period is not available at less than $3.25 and some are asking $3.50, the market on small tonnages for prompt delivery is $2.75 to $3. Gas coal is quoted within the same limits and steam coal ranges from $2.25 to $3.

Old Material.—We note sales of heavy melting steel to Pittsburgh district steel companies aggregating about 15,000 tons, at prices varying from $20 to $20.75 per gross ton, delivered. The business included 10,000 tons at the higher figure, but this was to a plant having a freight rate of about 50c. per ton higher than most Pittsburgh district mills, and the market on this grade is now properly quoted at $20 to $20.50, a decline of 50c. per ton from a week ago. Demands from melters generally are light and the undertone of the market is soft. Dealers do not appear anxious for tonnages around these prices, and barring an early revival of activity and strength in outside markets, it looks as though lower prices are ahead here. Cast scrap has been strengthened by an order for a small lot for quick delivery. No. 1 cupola cast scrap a week ago should have been $22 to $22.50 and compressed sheets $19.50 to $20; inadvertently, the latter was quoted last week at $22 to $22.50, which was an error.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

	Per Gross Ton
Heavy melting steel	$20.00 to $20.50
No. 1 cast, cupola size	22.50 to 23.00
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va.; and Franklin, Pa.	20.50 to 21.00
Compressed sheet steel	19.50 to 20.00
Bundled sheet sides and ends	17.50 to 18.00
Railroad knuckles and couplers	21.50 to 22.00
Railroad coil and leaf springs	21.50 to 22.00
Low phosphorus standard bloom and billet ends	24.00 to 24.50
Low phosphorus, plates and other grades	23.00 to 24.00
Railroad malleable	20.00 to 20.50
Iron car axles	28.00 to 29.00
Locomotive axles, steel	23.00 to 24.00
Steel car axles	21.50 to 22.00
Cast iron wheels	22.00 to 22.50
Rolled steel wheels	21.50 to 22.00
Machine shop turnings	15.50 to 16.00
Heavy steel axle turnings	17.00 to 17.50
Short shoveling turnings	17.00 to 17.50
Cast iron borings	17.50 to 18.00
Heavy breakable cast	18.50 to 19.00
Stove plate	16.50 to 17.00
Sheet bar crop ends	22.50 to 23.00
No. 1 railroad wrought	18.50 to 19.00

Chicago

Heavy Buying of Pig Iron—Improved Demand for Steel Bars

CHICAGO, Dec. 12.—Heavy buying of pig iron has halted the decline which had extended over several weeks. Demand for finished steel is holding its own, the bookings of a leading producer being on the same plane for some time. The most encouraging development lies in active inquiry for first quarter steel from farm implement makers. For the first time in two years, these manufacturers report a sufficient resuscitation in demand to justify operations on a broad scale. With increased requisitions from the implement industry and prospects of continued demand from car builders, railroads, concrete bar dealers, fabricators, automotive plants and makers of shafting, bolts, nuts and rivets, mills believe that bookings will tax their capacity through and beyond first quarter.

Inquiries for 45,000 railroad cars are pending, and the placing of these together with present orders will engage the plants of car builders for six months. The programs of Western railroads for the first six months of next year call for large expenditures on both rolling equipment and track maintenance. While deliveries are somewhat improved owing to better mill operations, car builders, concrete bar dealers and others still complain that they are not receiving their full needs. Users of semi-finished material, in particular, are short of stocks and in a number of cases have found it necessary to buy from Eastern mills. A shipment of 5500 tons of billets was recently moved by boat from Buffalo.

The Illinois Steel Co. has added a blast furnace at Gary, giving it 10 active stacks at that works, eight at South Chicago, two at Joliet and one merchant furnace at Milwaukee.

Pig Iron.—Buying has been very heavy during the past week. At the beginning of the buying movement considerable tonnage was booked at $27 base, local furnace, but the usual quotation soon became $28 base. The bookings of a leading merchant to-day exceeded 30,000 tons and the total tonnage taken since the first of last week will engage the capacity of furnaces in this district over the larger part of first quarter. Several sales of 10,000 tons each have been made and many more, ranging from 7500 tons down to 500 tons. Buying has not only been liberal, but it has been for both first quarter and first half. Practically every melter in the district has been or is in the market. One inquiry still pending calls for 3600 tons of malleable for Indiana delivery and 850 tons of foundry and 150 tons of silvery for Chicago shipment. Prices of Southern iron are still somewhat uncertain. Although most producers are quoting $23 base, Birmingham, a sale at $22 for Michigan delivery has just been made and one furnace is openly quoting $22.50 base. A local buyer is inquiring for 1000 tons of low phosphorus for local delivery and 500 tons for shipment to a plant on the Atlantic seaboard. Both domestic and foreign material are available at from $36 to $37 delivered. A Milwaukee producer is expected to go in on low phosphorus next Monday. Four hundred tons of silvery for Detroit shipment and several carload lots for Chicago district delivery have been sold at the new schedule. Charcoal iron is quiet with occasional reports of slight concessions. Toledo and Detroit producers of foundry and malleable have advanced prices $1 to $27, furnace.

malleable and basic irons are f.o.b. local furnace and per ton. Other prices are for iron delivered at consumers' yards or when so indicated, f.o.b. furnace other than local.

ing sil. 1.50, delivered at Chi-	
Northern coke, No. 1, sil. 2.25 to	$36.
Northern coke, foundry No. 2, sil.	35.
1 to 2 per cent copper free....	36.00 to 37.00
Silvery, sil. 8 per cent.....	40.29

Ferroalloys.—A carload sale of spiegeleisen for Chicago delivery indicates a drop of $1 in the market. A few carloads of ferromanganese have been disposed of and prices appear firm at $100 seaboard. Melters continue to contract for their 1923 requirements in 50 per cent ferrosilicon and the minimum quotation appears to be $82.50 delivered.

We quote 80 per cent ferromanganese, $107.56, delivered; 50 per cent ferrosilicon, $80 to $82.50, delivered; spiegeleisen, 18 to 22 per cent, $46.05, delivered.

Plates.—The number of railroad cars pending has increased to 45,000 during the week and additional inquiries to be put out soon will call for 6000 more. With their present bookings and the orders which will be received when this pending business is closed, railroad car builders will have sufficient work to engage their capacities for six months. New business in plates is coming to the mills at about the same rate as for several weeks and one important producer has turned down orders because it could not make the deliveries desired. Notwithstanding improved operations, mills still find it difficult to supply customers with all the material they need. They are especially pressed for steel by the car builders. Oil storage tanks involving 16,000 tons of plates are still unplaced.

The mill quotation is 2.10c. to 2.30c., Chicago. Jobbers quote 2.90c. for plates out of stock.

Cast Iron Pipe.—Akron, Ohio, takes bids on 536 tons of 6 to 12-in., Dec. 16. Municipal inquiries are decidedly few and private buying is not particularly active. Pipe shops, however, are booked full for 30 to 60 days and are not much concerned about new business for the present.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $55.20 to $56.20; 6-in. and above, $51.20 to $52.20; class A and gas pipe, $3 extra.

Rails and Track Supplies.—The production of the Gary mill has been increased from 7000 to 9000 tons a week, indicating a somewhat heavier pressure for shipments. Specifications for track supplies are liberal and new business is good. The Chesapeake & Ohio is inquiring for 5800 kegs of spikes and bolts for prompt shipment and 10,000 kegs for first quarter. The Great Northern is in the market for 5500 kegs of spikes and bolts representing a month's requirements. A number of roads did not place their track fastenings when they contracted for their rails, prefering to buy their needs from month to month. Demand for light rails is poor.

Standard Bessemer and open-hearth rails, $43; light rails rolled from new steel, 2.15c., f.o.b. makers' mills.

Standard railroad spikes, 2.85c. to 3c. mill; track bolts with square nuts, 3.85c. to 4c., mill; iron tie plates, 2.50c.; steel tie plates, 2.35c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.50c. base and track bolts, 4.50c. base.

Bars.—For the first time in two years, farm implement manufacturers report a sufficient revival in demand from the farmer to warrant a marked expansion in their production programs. They are now placing their first quarter requirements in bars as well as in other materials to supplement unused stocks still on hand. Demand for soft steel bars continues to come from a diversity of sources, but is notably strong from dealers in reinforcing bars who complain that deliveries are below their needs. Prices are unchanged. New business in bar iron is of fair proportions but not sufficient to warrant satisfactory mill operations. The minimum quotation on this product is 2.35c. mill. Buying of hard steel bars is lagging, but prices remain unchanged.

Mill prices are: Mild steel bars, 2c. to 2.10c. Chicago; common bar iron, 2.35c. to 2.50c., Chicago; rail steel, 2c., Chicago mill.

Jobbers quote 2.80c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 3.80c. for rounds and 4.30c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 2.50c. base; hoops, 4.15c.; bands, 3.55c.

Wire Products.—Pressure for deliveries has been relieved, but buying for shipment after the first of the year is in good volume. Jobbers throughout the West look for a healthy spring demand and are taking steps to protect themselves accordingly. The operations of

the leading interest are unchanged at 65 per cent, but next week it is planned to reopen the Anderson, Ind., plant which has been idle for about three months. For mill prices see finished iron and steel, f.o.b. Pittsburgh, page 1607.

We quote warehouse prices f.o.b. Chicago: No. 9 and heavier black annealed wire and No. 9 and heavier bright basic wire, $3.30 per 100 lb.; common wire nails, $3.45 per 100 lb.; cement coated nails, $2.90 per keg.

Bolts and Nuts.—The placing of first quarter contracts is slowly gaining headway and discounts appear to be holding steadily. Specifications against fourth quarter contracts are fair and bolt and nut plants are maintaining their recent working schedules.

Jobbers quote structural rivets, 3.75c.; boiler rivets, 3.85c.; machine bolts up to ⅞ x 4 in., 50 per cent off; larger sizes, 50 off; carriage bolts up to ⅞ x 6 in., 45 off; larger sizes, 45 off; hot pressed nuts, squares and hexagons, tapped, $2.75 off; blank nuts, $2.75 off; coach or lag screws, gimlet points, square heads, 55 per cent off.

Reinforcing Bars.—Sales are keeping up well, although a holiday lull is expected to be felt soon. During the week one large dealer sold a total of 1500 tons for first quarter delivery to fabricators of concrete work in various sections of the West. Individual lettings over 100 tons have not been so numerous, although one project awarded, a sewage disposal plant at Indianapolis, involves 1250 tons. Considerable prospective work continues to develop, notably road construction. General contracts will soon be awarded on 200 miles of Illinois highway work involving 2000 tons. The largest pending building project is the South Chicago assembly plant of the Ford Motor Co., which will take fully 1000 tons of bars instead of a few hundred tons as was first estimated.

Prospective business includes:

State of Illinois, 200 miles of road work, 2000 tons, bids on general contract to be taken at Springfield Dec. 21.

Ford Motor Co., assembly plant, South Chicago, 1000 tons.

Evanston, Ill., high school buildings, 515 tons, Avery Brundage, low bidder on general contract.

Addition to Calumet power station, Commonwealth Edison Co., Chicago, 300 tons still pending.

Court house, Kenosha, Wis., 200 tons, bids on general contract to be taken Dec. 27.

Mount Clemens, Mich., high school building, 150 tons, bids to be taken on general contract Dec. 20.

Baptist hospital, Louisville, Ky., figures on general contract to be in Dec. 14, tonnage not yet estimated.

Evansville, Ind., high school, 100 tons, general contract to be let Dec. 13.

United Butchers Packing Co. plant, Chicago, 425 tons.

Awards include:

Sewage disposal plant, Indianapolis, Ind., 1250 tons, to Truscon Steel Co.

Illinois road work, 700 tons, to Truscon Steel Co.

Addition to Calumet power station, Commonwealth Edison C., Chicago, 210 tons, to Truscon Steel Co.

Mengel Box Co. plant, Louisville, Ky., 150 tons, to Corrugated Bar Co.

Coney Island Bank building, Coney Island, N. Y., 100 tons, to Kalman Steel Co.

Sheets.—Both local producers are booked through first quarter and are unable to take care of the full requirements of their customers who are placing the rest of their needs with outside mills. Prices are firm.

Mill quotations are 3.35c. for No. 28 black 2.50c. for No. 10 blue annealed and 4.35c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote f.o.b. Chicago, 4c. for blue annealed, 4.85c. for black and 5.85c. for galvanized.

Semi-finished Material.—A boatload of 5500 tons of 1¾-in. billets shipped from Buffalo has been delivered to a local mill and about 3000 tons additional are to come in a later shipment. Users of semi-finished material throughout this district have found Chicago mills unable to supply their full requirements and have been forced to buy in the East. Even the Steel Corporation subsidiary came into the market last week for sheet bars and the best quotation it obtained was $40, local mill.

Structural Material.—Fabricating awards reported here during the week total 5163 tons, of which 2300 tons is represented by a single project, a new power station at Joliet. A number of large jobs are now being figured, among them three involving 4000 tons each and one of 3000. An unusual amount of new work is coming out for this season. Plain material prices are unchanged.

The mill quotation on plain material is 2.10c. to 2.20c., Chicago. Jobbers quote 2.90c. for plain material out of warehouses.

Steel Castings.—Some of the leading makers are now investigating labor and material costs as a basis for working out prices for first quarter. Whether or not any changes will be made is as yet problematical. Although there have been some weak spots in the market, notably in quotations of car castings, the present tendency appears to be toward general firmness.

Old Material.—Consumers are still showing little interest in the market and it is now thought unlikely that they will come in for much additional tonnage before the first of the year. Sentiment among dealers, however, is improved and the general feeling is that prices have reached bottom and that the next movement will be upward. During the past week, quotations have shown very little change. Railroad offerings are lighter, new lists including the Wabash, 1200 tons; the Great Northern, 1500 tons and the Soo Line and the Chicago Great Western 800 tons each.

We quote delivery in consumers' yards Chicago and vicinity, all freight and transfer charges paid, as follows:

	Per Gross Ton
Iron rails	$22.00 to $22.50
Cast iron car wheels	24.00 to 24.50
Relaying rails, 56 and 60 lb.	26.00 to 27.00
Relaying rails, 65 lb. and heavier	32.00 to 35.00
Rolled or forged steel car wheels	22.00 to 22.50
Rails for rolling	17.50 to 18.00
Steel rails, less than 3 ft.	19.00 to 19.50
Heavy melting steel	17.00 to 17.50
Frogs, switches and guards cut apart	17.00 to 17.50
Shoveling steel	16.50 to 17.00
Drop forge flashings	12.00 to 12.50
Hydraulic compressed sheet	13.50 to 14.00
Axle turnings	15.00 to 15.50
Per Net Ton	
Iron angles and splice bars	21.00 to 21.50
Steel angle bars	16.50 to 17.00
Iron arch bars and transoms	21.00 to 21.50
Iron car axles	24.00 to 24.50
Steel car axles	17.50 to 18.00
No. 1 busheling	13.75 to 14.25
No. 2 busheling	9.00 to 9.50
Cut forge	15.00 to 15.50
Pipe and flues	10.50 to 11.00
No. 1 railroad wrought	15.00 to 15.50
No. 2 railroad wrought	15.00 to 15.50
Steel knuckles and couplers	19.50 to 20.00
Coil springs	21.00 to 21.50
No. 1 machinery cast	19.50 to 20.00
No. 1 railroad cast	18.00 to 18.50
Low phos. punchings	17.00 to 17.50
Locomotive tires, smooth	15.50 to 16.00
Machine shop turnings	9.25 to 9.75
Cast borings	13.00 to 13.50
Stove plates	16.00 to 16.50
Grate bars	16.00 to 16.50
Brake shoes	16.00 to 16.50
Railroad malleable	20.00 to 20.50
Agricultural malleable	20.00 to 20.50

Standardizing Scrap

PITTSBURGH, Dec. 12.—Purchasing agents representing about 14 of the steel plants in this and nearby districts held a meeting at the William Penn Hotel here to-day, under a call from H. V. Smallwood, Wheeling Steel Corporation, Wheeling, W. Va., who presided at the meeting, to consider the subject of standardization of scrap specifications. It was stated at the conclusion of the meeting, which was behind closed doors, that except for a general discussion of the subject, nothing was done.

The Worthington Pump & Machinery Corporation, employing 5000 to 8000, has taken out group insurance to the amount of $5,000,000 for its employees. Each employee is insured for $250 the first year, for $500 for the second year, and for $100 additional for each year thereafter, with the maximum $1,000.

To purify coke oven gas for use in the open-hearth furnaces, the Koppers Co., Pittsburgh, will install a liquid purification plant of 12,000,000 cu. ft. capacity at Midland, Pa., for the Pittsburgh Crucible Steel Co. It is expected that the plant will be put into operation by the first of March and the results will naturally be watched with interest.

New York

Buying of Pig Iron Continues with Some Makers Marking Up Prices

NEW YORK, Dec. 12.—Buying of pig iron has proceeded at a satisfactory rate. The present tendency is toward higher prices, but no sales are reported at the new quotations which have been named, and it remains to be determined whether there will be an advance over prices which prevailed for the first quarter. Buying has been largely for delivery up to April 1 and most melters are pretty well covered for that period, but in the case of a prominent foundry company which placed an order for 5000 tons, delivery will extend over the second quarter and some smaller tonnages also will be for that period. The principal buyer of the past week was the Worthington Pump & Machinery Corporation, which purchased about 5000 tons of domestic iron, largely from Buffalo, for delivery at Harrison, N. J., 350 tons; Buffalo, 1600 tons; Elmwood Place, Ohio, 1000 tons; Holyoke, Mass., 980 tons, and East Cambridge, Mass., 740 tons, and one or two other points, all for shipment the first quarter of next year. Prices it paid are understood to have been on a basis of about $25, Buffalo, for the greater part of the tonnage. A stove company has purchased some 3000 to 4000 tons for delivery in the first quarter. Other buying has been in smaller lots by numerous companies. The American Car & Foundry Co. is in the market for 1500 tons of foundry malleable for December-January delivery. An inquiry for 2000 tons of basic for prompt delivery has appeared. Transactions in foreign iron include one of 500 tons and a number of smaller lots. One Buffalo seller is now quoting No. 2X, No. 2 plain and malleable at the same price, $26, and No. 2 at $26.50, but no sales are reported at these figures. Continental iron is selling at $26 to $26.50, duty paid, and Scotch, $27.50, duty paid.

We quote delivered in the New York district as follows, having added to furnace prices $2.27 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$33.27
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	32.27
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	29.27
Buffalo, sil. 1.75 to 2.25	29.91
No. 2X Virginia, sil. 2.25 to 2.75	34.44
No. 2 Virginia, sil. 1.75 to 2.25	33.44

Ferroalloys.—Demand for ferromanganese is very light and confined to small lots for early delivery, consumers requirements being fairly well covered by contract. Quotations continue unchanged and firm. Some business in spiegeleisen has been done but the volume is not large. Contracts for 50 per cent ferrosilicon for 1923 consumption are being rapidly consummated all over the country at $82.50 to $87.50, delivered. Quotations are as follows:

Ferromanganese, domestic, furnace, nominal per ton	$100.00
Ferromanganese, British, 80 per cent, f.o.b. Atlantic port	$100.00
Spiegeleisen, 17 to 19 per cent, furnace	$36.00
Spiegeleisen, 20 per cent, furnace or duty paid	$37.00 to $38.00
Ferrosilicon, 50 per cent, delivered, per gross ton, carloads	$82.50
Ferrotungsten, per lb. of contained metal, 90c. to 95c.	
Ferrochromium, 4 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr., delivered	14c.
Ferrovanadium, per lb. of contained vanadium	$3.50 to $4.00
Ferrocarbontitanium, 15 to 18 per cent, in carloads, per net ton	$200.00

Ores

Manganese ore, foreign, per unit, c.i.f. 29c. to 30c.	
Tungsten ore, per unit, in 60 per cent concentrates, nominal	$7.50 to $8.50
Chrome ore, basis 48 per cent Cr_2O_3, crude, per ton, c.i.f. Atlantic seaboard	$18.00 to $28.00
per lb. of MoS_2, New York	55c. to 60c.

Cast Iron Pipe.—Business is unusually good for the winter season and numerous inquiries and orders for spring delivery are reported by one maker in this district. The demand is particularly heavy for small sizes [illegible] to current prices, which are firm. Municipal tenders have ceased for this year, but several are expected in January. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $54.50; 4-in. and 5-in., $59; 3-in., $64.80, with $4 additional for Class A and gas pipe. In the soil pipe market business continues good, but there are continued reports of a softening in prices. It is reported that in some instances the current discounts have been increased by as much as 5 points. We quote discounts of both Southern and Northern makers, delivered New York, as follows: 2 to 6-in. standard, 33 to 35¾ per cent off list; heavy 43 to 45¾ per cent off list.

High Speed Steel.—The market is quiet and unchanged. Producers continue to quote 75c. to 80c. per lb. for 18 per cent tungsten high speed steel, with special brands of some companies ranging up to 90c. per lb.

Warehouse Business.—Business continues good in practically all lines, but orders are reported to be decreasing in size as the end of the year draws near. In black and galvanized sheets, one factor in this market reports considerable business, most of which is for next year delivery and some of the orders for spring delivery. Prices are reported firm with the exception of sheets, which are now holding fairly well at from 4.50c. to 4.75c. per lb. base, on black and about 5.50c. per lb. base on galvanized. Prices on galvanized are reported to have been shaded in transactions where the tonnage was of any size, as low as 5.25c. per lb. having been done occasionally. Discounts on wrought iron and steel pipe are firm on the present basis and business continues good. One warehouse reports considerably better business last month than in November, 1921. Brass and copper prices are unchanged and business good, with little or no decrease in business noted during this last month of the year. We quote prices on page 1622.

Finished Iron and Steel.—A surprise of December is the volume of building construction that is being contracted for and figured upon. This is usually the dullest time of the year and activity for spring work is not expected until about the last of January. While the volume of the work in the market is smaller than that of a few months ago, it totals much larger than the trade looked for. For example, the projects awarded in the Eastern district during the past week aggregate more than 7500 tons and new projects on which nearby fabricators are figuring total nearly 5000 tons. The demand for concrete bars also is keeping up, a large number of small jobs replacing the large jobs which were being figured on a few months ago. As the first quarter of the year approaches there is noticeable a stiffening in prices and the mills are not willing to make concessions from 2c., Pittsburgh, on bars and shapes. On plates prices are not quite so well defined as the large excess of plate-producing capacity creates a situation for which there seems to be no remedy in sight. Orders from manufacturing consumers and jobbers are generally of a fill-in character, and while some of the mills have opened their books for first quarter contracts, buyers have taken hold only in a small way. Some large tin plate contracts have been booked, but in other products the tendency is still to let the future take care of itself. Railroad car business keeps up at a fairly good rate. The Baltimore & Ohio has inquired for 1000 box cars, making 5000 cars which this road will probably buy soon. The Union Tank Car Co. has ordered 3000 steel tank cars.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, structural shapes and steel plates, 2.39c.; bar iron, 2.34c.

Coke.—Prices continue to be well maintained with very little change. Furnace is usually selling at $7 and foundry at $7.75 to $8.50, with by-product quoted at $14.84 to $14.91, delivered Newark and Jersey City points. The market for both grades has been strengthened somewhat by the fact that dealers are making a drive to sell coke for domestic purposes as a substitute for anthracite, owing to the difficulty in obtaining the latter.

Old Material.—Prices are weak on practically all grades, but there is an inclination to point to the fact that mills at present are withholding offers because of the approach of the end of the year and the usual inventory, after which, because of the small stocks of scrap in mill yards, a resumption of buying is expected. At present No. 1 heavy melting steel is not quotable at much better than $11.50 to $12.50 per ton, as a buying price, New York. Railroad quality or equivalent, based upon $16, delivered, paid by the Bethlehem Steel Co., and shipments to the Jones & Laughlin Steel Co. and

Pittsburgh Steel Co. at Monessen, is fairly firm at $13.50 to $14, New York. Wrought scrap is generally weak and few transactions are noted. While a fair estimate of the market on mixed borings and turnings is $11 to $11.50 per ton, one dealer in this district states that he has been offered a small tonnage at $10 per ton. Stove plate is fairly firm, considering the general inactivity in other grades of scrap. A Phoenixville mill, which has been buying stove plate at $16.50 and $16 per ton, delivered, has dropped out of the market, but shipments are still going to Harrisburg. A consumer at Perth Amboy recently bought a small tonnage at $16 per ton delivered and a Mahwah, N. J., plant is again buying. Specification pipe is quiet, with the chief buying by a Lebanon mill at $14 per ton and rigid inspection of shipments.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$11.50 to $12.50
Steel rails, short lengths, or equivalent	13.50 to 14.00
Rails for rolling	16.00 to 16.50
Relaying rails, nominal	21.00 to 22.00
Steel car axles	No market
Iron car axles	25.00 to 26.00
No. 1 railroad wrought	14.00 to 14.50
Wrought iron track	13.50 to 14.00
Forge fire	11.00 to 11.50
No. 1 yard wrought, long	13.00 to 13.50
Cast borings (clean)	12.00 to 12.50
Machine-shop turnings	11.00 to 11.50
Mixed borings and turnings	11.00 to 11.50
Iron and steel pipe (1 in. diam., not under 2 ft. long)	9.75 to 10.25
Stove plate	12.25 to 13.25
Locomotive grate bars	13.00 to 13.50
Malleable cast (railroad)	13.50 to 14.00
Cast-iron car wheels	16.50 to 17.50

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast	$19.00 to $20.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	17.00 to 17.50
No. 1 heavy cast, not cupola size	15.00 to 15.50
No. 2 cast (radiators, cast boilers, etc.)	13.50 to 14.00

Birmingham

Production Highest of Year—Pipe Company Bought Pig Iron at $22.50

BIRMINGHAM, ALA., Dec. 12.—At the close of last week the Birmingham iron market seemed to be on the base of $23, with three makers out of the market on well-filled first quarter capacity except at higher prices. The general run of small spot business in the South was from $24 to $25. Two lots of iron carrying two higher silicon differentials brought $26, or a $25 base and 50c. for each silicon differential. It now seems well established that a large pipe maker closed for 15,000 to 20,000 tons on a base of $22.50, one maker booking three-fourths of the tonnage. The tonnage included several grades and the price was averaged on the $22.50 base. This business was taken on the heels of the withdrawal of the low of $21 made by a one-furnace interest which advanced to $23, and then went out of the market. Lots of 500 and 1000 tons have been booked for St. Louis and Cincinnati territory at $23. Southern consumers drew in following the low base, but are on the serious inquiry bench. The total of around 60,000 tons booked week before last was by small makers. The larger makers have not been conspicuous in the market, although one opened up this week at $23 and placed an average of 500 to 1000 tons per day at that price. While the Sloss-Sheffield Steel & Iron Co. is back to a five-furnace production, the Woodward Iron Co. went to a four-furnace production Dec. 1, but the blown-out stack will be relined and go in again Jan. 1, it is expected. November iron production was the largest of the year, length of the month considered, and almost 100 per cent in excess of the production a year ago.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon, 1.75 to 2.25	$23.00
Basic	23.00
Charcoal, warm blast	32.00

Cast Iron Pipe.—Presumably the 20,000 tons of pipe for San Juan, Porto Rico, will be turned out in the Alabama shops of the United States Cast Iron Pipe & Foundry Co. This interest also booked 1550 tons for Chicago. The reported cut to $40 on some Southern business by one Birmingham pressure pipe maker is reported, but the base remains at $42.50 to $43. Soil pipe remains dull with makers nominally quoting $55.

Coal and Coke.—Coke brings $7.50 to $8, with some spot sales at $8.50. Coal is easy, with average of less than $3 for run of mine.

Old Material.—Scrap has been featureless, with none of the large buyers in the market, and the small consumers paying the quoted price.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Steel rails	$16.00 to $17.00
No. 1 steel	14.00 to 16.00
No. 1 cast	18.00 to 20.00
Car wheels	18.00 to 20.00
Tramcar wheels	17.00 to 19.00
Stove plate	16.00 to 17.00
Cast-iron borings	9.00 to 10.00
Machine shop turnings	9.00 to 10.00

Boston

Approximately 30,000 Tons of Pig Iron Sold During Past Fortnight

BOSTON, Dec. 12.—The domestic pig iron market in this territory appears to be firmer. Buffalo iron, heretofore $25 furnace for No. 2 plain and No. 2X, and eastern Pennsylvania, which went as low as $26 furnace base, are quoted by at least some sellers $1 higher; Alabama, which dropped to $21 for a few hours, is usually quoted $23. At the lower prices approximately 12,000 tons was sold, bringing total transactions in New England, exclusive of whatever may have been placed in Connecticut through New York houses, to more than 27,000 tons the past fortnight. With foreign iron, at least 30,000 tons was sold. Since the advance in asking prices business has flattened out to almost nothing. Foreign iron sales, as indicated, were small with the closing out of odds and ends by the less important interests. More important accounts are not forcing iron on the market. Reports of German iron sales are more or less unreliable. Of the fortnightly sales, two textile machinery makers took 10,000 tons, the rest being split up among heater, valve and general castings manufacturers. The largest pending inquiry is from the Worthington Pump & Machinery Corporation for three plants, first quarter delivery. It is for 3040 tons, divided as follows: Silicon 1.75 to 2.25, 150 tons; silicon, 2.00, 500 tons; silicon 2.25, 150 tons; silicon, 2.50, 300 tons; silicon 2.25 to 2.75, 240 tons; silicon 2.75 to 3.25, 300 tons; silicon 3.25 to 3.75, 950 tons; silicon 3.75 to 4.25, 400 tons; silicon 4.50, 50 tons.

We quote delivered prices on the basis of the latest reported sales, now infrequent, and as follows, having added to furnace prices $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia and $9.60 from Alabama:

Eastern Penn., sil. 2.25 to 2.75	$31.15 to $32.15
Eastern Penn., sil. 1.75 to 2.25	30.65 to 31.65
Buffalo, sil. 2.25 to 2.75	29.91 to 31.41
Buffalo, sil. 1.75 to 2.25	29.91 to 30.91
Virginia, sil. 2.25 to 2.75	33.42 to 34.42
Virginia, sil. 1.75 to 2.25	32.92 to 33.92
Alabama, sil. 2.25 to 2.75	33.10
Alabama, sil. 1.75 to 2.25	32.60

Iron Imports.—Imports of iron at this port for the week ending Dec. 9, amounted to 560 tons of Belgian, whereas, for the previous week they were 2100 tons of Middlesbrough, Eng. During the week of Dec. 9, 125 tons of English ferro manganese were received at this port.

Warehouse Business.—The demand for iron and steel is less active, yet sales, as compared with a year ago, are much larger. The recent advance in bolts and nuts so far has failed to curb buying. The wire nail situation is not as acute as it was a month ago, but could be better. Horseshoes are doing fairly well. Warehouse prices on iron and steel are reported as steady and unchanged.

Jobbers quote: Soft steel bars, $3.065 per 100 lb. base; flats, $3.85; concrete bars, 3.16½c.; structural steel, $3.065 to $3.50; tire steel, $4.50 to $4.85; open-hearth spring steel, $5 to $6.50; crucible spring steel, $12; steel bands, $4.25; hoop steel, $4.75; cold rolled steel, $4 to $4.50; refined iron, $3.065; best refined iron, $4.50; Wayne iron, $5.50; Norway iron, $6.60 to $7.10; plates, 3.16½c. to $3.35; No. 10 blue annealed sheets, $4.15 per 100 lb. base; No. 28 black sheets, $5.40; No. 28 galvanized sheets, $6.40.

Coke.—Coke prices remain unchanged, both the New England Coal & Coke Co. and the Providence Gas Co.

continuing to quote foundry fuel at $16 delivered within the $3.10 freight zone. The movement of coke from ovens to consumers has slowed up and one producer is all of two weeks behind on deliveries. The trouble is due not so much to a car shortage as to the inability of the transportation companies to handle freight. At no time during the strike, or since then, has the congestion in freight yards been as pronounced as it is to-day. Faulty locomotives are at the bottom of New England's transportation problem.

Old Material.—Although not brisk, business is more active than in early December and better than anticipated, notwithstanding embargoes have held up shipments west of Pittsburgh. Activity centers largely in heavy melting steel and in blast furnace borings and turnings, although chemical borings are doing better and miscellaneous material is selling. Heavy melting steel sold at $14 to $14.50 shipping point, largely for one account in the Pittsburgh district, while borings and turnings for Ohio delivery, first sold as high as $11.75 f.o.b. cars, and more recently at $11. Chemical cast iron borings, in round tonnages, brought $16 and $16.50 on cars, shipping point, with 100 tons selected material, fetching $17. Shafting at $19.50 and $20, shipping point, or $21.50 to $22.60 delivered, and horseshoes at $15 to $15.50 on cars or around $20.50 delivered New Jersey, figured in the week's transactions. Passing business suggests New England foundries are using less machinery cast. Pennsylvania Railroad officials hold out little encouragement for the lifting of embargoes. The Boston & Albany Railroad has embargoed scrap and pig iron.

The following prices are for gross ton lots delivered consumers' yards:

No. 1 machinery	$20.00 to $22.00
No. 2 machinery cast	18.00 to 20.00
Stove plate	16.50 to 17.00
Railroad malleable	20.50 to 21.00
[illegible]	14.00 to 14.50
Car wheels	20.00 to 20.50

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$14.00 to $14.50
No. 1 railroad wrought	13.00 to 13.50
No. 1 yard wrought	11.00 to 11.50
Wrought pipe (1-in. to 2-in., over 2 ft. long)	9.50 to 10.00
Machine shop turnings	10.00 to 10.50
Cast iron borings, rolling mill	12.00 to 12.50
Cast iron borings, chemical	16.00 to 16.50
Blast furnace borings and turnings	10.50 to 11.00
Bundled forged scrap	11.00 to 11.50
Regular forged scrap and bundled skeleton	9.50 to 10.00
Axles	20.00 to 20.50
Shafting	19.50 to 20.00
Rails for rolling	15.00 to 15.50

Cincinnati

Southern Pig Iron Obtainable at $22.50—Advances by Some Sellers Check Buying

CINCINNATI, Dec. 12.—The pig iron market continues active as far as inquiries are concerned, but advancing of asking prices has for the time being, at least, held up the closing of some of those outstanding. Nevertheless a fair amount of orders is being booked for first quarter delivery. An Indiana malleable shop bought 500 tons of malleable, a Michigan stove manufacturer 1000 tons of Southern, and a Cincinnati melter 500 tons of Southern foundry. These were the largest sales reported, but in addition a number running from 100 to 400 tons were made. Southern iron is now available from one furnace at $22.50, Birmingham, and resale material is said to have been sold at slightly under this figure. The general quotation, however, is $23, with one or two of the larger producers holding for $25. The Tennessee company is reported to be an active solicitor for business at $23, base. In the North, prices are very much firmer following recent heavy selling. Some southern Ohio furnaces are now asking $27.50 on prompt shipment material, and $28 on first quarter contracts, but iron can still be had at $27 for a round tonnage. Silveries and basic irons are rather quiet, and carload sales of the former grade represent present activity. Inquiries include 3600 tons of malleable for Indianapolis, 2000 tons of foundry for Michigan, 1000 tons of foundry for central Ohio, 1000 tons for Indianapolis, 500 for Cincinnati, 500 for Richmond and 500 for Louisville. In addition a large number of smaller inquiries are being worked on, the total representing a very satisfactory tonnage.

Based on freight rates of $4.66 from Birmingham and $2.23 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$26.55
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	27.05
Ohio silvery (nominal), 8 per cent	37.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	29.27
Basic Northern	28.27
Malleable	29.27

Warehouse Business.—The demand for structural shapes show no sign of letting up, and during the week some good orders were placed. Inquiries from Southern points are very good, and quick shipment material is much in demand. Reinforcing bars are also in fair demand. Wire products are moving much better than has been the case for some time. Prices are holding up strongly, but no changes have been made.

Cincinnati jobbers quote: Iron and steel bars, 2.95c. base; reinforcing bars, 3.05c. base; hoops, 4.05c. base; bands, 3.85c. base; shapes and plates, 3.05c. base; cold-rolled rounds, 3.75c. base; cold-rolled flats, squares and hexagons, 4.25c. base; No. 10 blue annealed sheets, 4c.; No. 28 black sheets, 4.70c.; No. 28 galvanized sheets, 5.75c.; No. 9 annealed wire, $3.10 per 100 lb.; common wire nails, $3.20 per keg, base.

Tool Steel.—The demand for high-speed steel is entirely satisfactory to the producers, and some fair-sized orders have been placed for December shipment. The outlook is very promising. Prices are firm, with 18 per cent tungsten high-speed steel quoted at 75c. to 90c., with special brands of some companies as high as $1.00.

Finished Material.—The demand for bars, shapes and plates, in small lots, is fair, although during the latter part of the week even this business showed a slight falling off. To date very little business has been booked for first quarter, although a number of the independent companies are making contracts on the basis of 2c. for bars, shapes and plates. Deliveries on plates are falling behind, as from practically all mills four to five weeks is the best delivery promise, whereas in November it was possible to secure two to three weeks' delivery. The sheet market is rather quiet, due just as much to the attitude of the mills as to the lethargy of buyers. Independent mills are not pushing sales of galvanized sheets, and some of them are booking only at the insistence of regular customers. High prices of spelter are given as the reason why independent mills can not produce galvanized sheets profitably at 4.35c. Pickled specialties are in good demand, and some good orders for automobile body sheets have been placed for January and February delivery. The minimum price on auto body stock is 5c. and this price probably will prevail for the first quarter at least. Wire mills report the demand picking up steadily, with shipments also improving. Prices are very firm, and on wire nails $2.75 is being done regularly by an independent mill which can make almost immediate shipment. The demand for reinforcing bars has fallen off with the lateness of the season for building purposes, although a large number of small projects are still under way, and many more, small and large, will be up for figures about Jan. 1. In the structural field, chief interest centered in the buildings for the American Rolling Mill Co. at Ashland, Ky., involving 4000 tons. Bids were taken on Dec. 5 and the contract has been awarded to the Fort Pitt Bridge Co. and McMyler Interstate Co. The Mengel Body Co., Louisville, Ky., has awarded the steel for its new plant to the Louisville Bridge & Iron Co., which is inquiring for 400 tons of shapes to cover the contract. The L. & N. Railway has taken bids on a bridge in Louisiana, involving several hundred tons, and award will likely be made this week.

Coke.—There is little activity in prompt shipment coke, but by-product ovens are contracting for next year, the price to be based on present coal prices. Some contracts have already been made on this basis, one of 7200 tons being the largest. Coke prices show little change, but, if anything, the market is lower. Sales have been light. Car shortage is reported in West Virginian and Southern producing points.

Old Material.—The scrap market is quiet, though we note a sale of a fairly heavy tonnage of steel to an

Ashland plant at around $18.50 delivered. Orders are confined to one or two carloads. Prices are soft, and most items have been reduced 50c. a ton.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

	Per Gross Ton	
Bundled sheets	$13.00 to	$13.50
Iron rails	16.00 to	17.00
Relaying rails, 50 lb. and up	25.50 to	26.00
Rails for rolling	17.00 to	17.50
Heavy melting steel	16.00 to	17.00
Steel rails for melting	15.00 to	16.00
Car wheels	19.00 to	19.50
Per Net Ton		
No. 1 railroad wrought	14.00 to	14.50
Cast borings	11.00 to	11.50
Steel turnings	10.50 to	11.00
Railroad cast	16.50 to	17.50
No. 1 machinery	20.50 to	21.00
Burnt scrap	11.00 to	11.50
Iron axles	20.00 to	20.50
Locomotive tires (smooth inside)	13.50 to	14.50
Pipes and flues	10.00 to	10.50

Buffalo

Recent Heavy Buying of Pig Iron—Some Sellers Advance Quotations

BUFFALO, Dec. 12.—Exclusive of the tonnage of pig iron purchased by the American Radiator Co. for use in its Buffalo plants, it is estimated that more than 100,000 tons of various grades of foundry iron have been sold here in the last 10 days. The greater portion of this buying is coincident with the radiator purchase. Apparently other buyers were influenced by the action of radiator interests in showing that they were ready to buy. Some of the radiator business, it is understood, went under $25. Two furnaces which have booked sufficient tonnage for first quarter delivery announce their base price is $26 and that the differential of $1 is in effect. Another producer who did not take any of the tonnages offered announces $26 as the base. No sales for delivery beyond March 1 have been made. Malleable is also quoted at $26 by some sellers. A few scattered sales at $24.50 base were made while the big buying was going on. Generally the furnaces are optimistic; they consider a seller's market is close at hand and that the continued weakening has been stopped.

We quote f.o.b. per gross ton Buffalo as follows, the higher price being for early shipment:

No. 1 foundry, 2.75 to 3.25 sil.	$26.00
No. 2X foundry, 2.25 to 2.75 sil.	25.50
No. 2 plain, 1.75 to 2.25 sil.	25.00
Basic	26.00
Malleable	25.00
Lake Superior charcoal	36.28

Finished Iron and Steel.—Bar and sheet business has taken a more lively turn and several sellers have booked considerable new business for first quarter. Reports of prices lower than 2c. on bars continue, but Buffalo sellers uniformly claim these have not been made in this district, though 1.90c. and 1.95c. may have been quoted elsewhere. Plates and structural shapes were purchased more freely in the last few days than previously, and in lots of several hundred tons and up. A number of 100 to 300-ton lots of bars were booked. Local information is to the effect that the Steel Corporation has sufficient business booked for the next five months and one local bar seller has his books filled up to the end of February. That Feb. 1 will see a sellers' market is the prediction by a majority of producers. Inquiry for wire rods is more lively. In sheet demand the price at 3.35c. for No. 28 gage black is firm and on this basis the local sheet maker has taken several thousand tons in both common sheets and specialties; this week is expected to bring sufficient demand at this price to warrant closing the books for first quarter. Structural jobs in lots of less than 100 tons have been encouraging.

We quote warehouse prices, Buffalo, as follows: Structural shapes, 3.20c.; plates, 3.20c.; soft steel bars, 3.10c.; hoops, 4.10c.; bands, 3.90c.; blue annealed sheets, No. 10 gage, 4.05c.; galvanized steel sheets, No. 28 gage, 5.85c.; black sheets, No. 28, 4.85c.; cold rolled round shafting, 3.95c.

Old Material.—Very little new business has developed and the tendency to keep down inventories is more pronounced as the first of the new year approaches. Two mills which consume large quantities of heavy melting steel have held up shipments for this reason. Inquiry is encouraging. Neither dealers nor consumers have large stocks on hand and the fact that after Jan. 1 there will be greater activity tends to the belief that lower prices on scrap are remote. Railroad malleable is scarce and inquiry is good. Cast scrap is active and borings and turnings in good demand. The market for heavy melting steel is $19 to $19.50.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$19.00 to $19.50
Low phos., 0.04 and under	21.00 to 22.00
No. 1 railroad wrought	18.00 to 19.00
Car wheels	21.00 to 22.00
Machine-shop turnings	14.50 to 15.50
Cast iron borings	16.00 to 16.50
Heavy axle turnings	17.50 to 18.50
Grate bars	16.00 to 17.00
No. 1 busheling	16.50 to 17.50
Stove plate	17.00 to 18.00
Bundled sheet stampings	14.00 to 15.00
No. 1 machinery cast	20.00 to 21.00
Hydraulic compressed	17.00 to 17.50
Railroad malleable	20.50 to 21.50

St. Louis

Heavy Sales of Northern Pig Iron—Railroads Buy Plates

ST. LOUIS, Dec. 12.—A heavy volume of sales of northern pig iron during the last week has made the market firm at $28, Chicago, with the St. Louis Coke & Chemical Co. quoting $29 to $30, f.o.b. Granite City furnace. The latter concern reports the sale of more than 20,000 tons of malleable, foundry and basic iron during the week. Some of this was requested for immediate shipment, with a liberal portion for delivery over the first quarter. Other sales reported include: 3000 tons and 6000 tons of foundry iron to two Illinois melters; 2000 tons of foundry iron to Indiana and Ohio points; 1000 tons to a Kansas melter, and 800 tons of malleable to an Illinois concern. An Indianapolis melter wants 3000 tons of malleable for January and February delivery, and there are other inquiries for about 20,000 tons of Northern iron pending. The market for Southern iron is at $23, Birmingham, with very little interest shown. One leading maker is still quoting $25.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago, $3.28 from Birmingham (rail and water), $5.17 from Birmingham, all rail, and 81 cents average switching charge from Granite City:

Northern, foundry, sil. 1.75 to 2.25	$30.16
Northern malleable, sil. 1.75 to 2.25	30.16
Basic	30.16
Southern foundry, 1.75 to 2.25	28.17

Finished Iron and Steel.—Chief interest the last week was in railroad business. The Missouri Pacific bought 300 tons of tank plates and 100 tons of fire box plates. The Mobile & Ohio bought a carload of wheels from Midvale Steel & Ordnance Co., and another line centering here purchased 100 tons of axles and 132 tons of locomotive tires. The Missouri Pacific wants 3000 kegs of track bolts. The Mobile & Ohio is in the market for 4500 pairs of angle bars, approximately 160 tons, and the Wabash wants 2000 pairs, approximately 70 tons. Jobbers are buying very little for prompt or first quarter delivery. Fabricators report that there is a slump in new business.

For stock out of warehouse we quote: Soft steel bars, 2.90c. per lb.; iron bars, 2.90c.; structural shapes, 3c.; tank plates, 3c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, cold rolled, one pass, 4.85c.; cold drawn rounds, shafting and screw stock, 3.90c.; structural rivets, 3.85c. per 100 lb.; boiler rivets, 3.95c.; tank rivets, $\frac{7}{8}$ in. and smaller, 55 per cent off list; machine bolts, large, 50 per cent; smaller, 50 per cent; carriage bolts, large, 45 per cent; small, 45 per cent; lag screws, 55 per cent; hot pressed nuts, square or hexagon blank, $2.75; and tapped, $2.75 off list.

Coke.—The market for coke for industrial purposes may be said to be weaker. There still is a fairly good demand, but with the improvement of railroad conditions, especially in the East, the movement to this market has been heavier. The local by-product makers report good business.

Old Material.—The only interest shown by consumers of old material in this market is in specialties, such as couplers and knuckles, springs and wheels, and there

is already a short interest in these grades. Other buyers are not interested, although dealers expect they will come into the market shortly after the first of the year. The Wabash has out a list of about 1250 tons, about 700 tons consisting of yard scrap. A Louisville & Nashville list closed, with all of the material going to Eastern markets.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

[illegible]	$[illegible] to $[illegible]
[illegible]	[illegible] to [illegible]
[illegible]	[illegible] to [illegible]
Relaying rails, standard section..	26.00 to 29.00
[illegible]	22.00 to 23.50
[illegible]	[illegible] to [illegible]
[illegible]	[illegible] to [illegible]
[illegible]	[illegible] to [illegible]

Per Net Ton

Heavy axles and tire turnings...	11.50 to 12.00
[illegible]	[illegible] to [illegible]
[illegible]	[illegible] to [illegible]
Steel car axles.....	19.00 to 19.50
Wrought iron bars and transoms	21.50 to 22.00
No. 1 railroad wrought.....	15.50 to 16.00
No. 2 railroad wrought.....	15.00 to 15.50
Railroad springs.....	[illegible] to [illegible]
Steel couplers and knuckles.....	20.00 to 20.50
Cast iron borings.....	[illegible] to [illegible]
No. 1 busheling.....	[illegible] to [illegible]
No. 1 railroad cast.....	19.00 to 19.50
No. 1 machinery cast.....	20.00 to 20.50
Railroad malleable	18.00 to 18.50
Machine shop turnings.....	9.50 to 10.00

Cleveland

Heavy Selling in Territory Outside the City—Price Advances by Some Companies

CLEVELAND, Dec. 12.—Ore on Lake Erie docks at the close of the season of navigation, Dec. 1, amounted to 9,899,313 gross tons as compared with 9,032,595 tons on the same date a year ago and with 10,955,868 tons on Dec. 1, 1920. Receipts at Lake Erie ports during the season were 31,713,645 tons as compared with 15,554,341 tons during 1921. Shipments from these docks for the season were 21,095,473 tons as compared with 12,195,679 tons during the previous year. Receipts at other than Lake Erie ports during the season were 10,483,888 tons as compared with 6,560,139 tons during the previous year. By ports these receipts were as follows: Detroit, 809,230 tons; Indiana Harbor, 1,124,170 tons; Gary, 2,894,447 tons; South Chicago, 5,010,308 tons; Milwaukee, 27,040 tons; Boyne City, 3,695 tons; East Jordan 17,873 tons; Saulte St. Marie, Ont., 291 456 tons; Point Edward, Ont., 305,669 tons. Receipts at lake front furnaces located at Lake Erie ports to Dec. 1 were 8,507,194 tons as compared with 2,712,433 tons last year. Shipments from Lake Erie ports for the season till Dec. 1 were 21,695,473 tons.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $5.95; Old range non-Bessemer, 51½ per cent iron, $5.20; Mesabi Bessemer, 55 per cent iron, $5.70; Mesabi non-Bessemer, 51½ per cent iron, $5.05.

Pig Iron.—Pig iron sales continued heavy in foundry and malleable grades during the week and two producers, who have been particularly active in the market having taken all of the business that they cared for at the prices they were naming, have marked up their quotations. Others to meet the prevailing competitive situation have reduced their prices. Sales by Cleveland producers during the past ten days since the buying movement started, including business taken by Lake, Detroit and Valley and Pittsburgh district furnaces, aggregated 250,000 to 300,000 tons. The greatest activity was in the Michigan territory, but considerable business has come out in the northern Ohio territory and also in the Pittsburgh district. Buying in Cleveland has been light. The market is still fairly active, although buying has quieted down somewhat. Most producers have confined their sales to the first quarter although one or two furnaces have taken some contracts for the entire first half. While probably the heaviest buying has been done by the automotive industry, a large tonnage has been booked in other fields. A sanitary interest has been a heavy buyer. The demand for malleable iron has been particularly heavy, one maker selling nearly as much of this grade as foundry iron. Foundry iron is being quoted at $25 Cleveland for shipment to competitive points and a Cleveland producer is naming $25 Valley for shipment from a western Pennsylvania furnace. However, $26 appears to be the more common local price for outside shipment, a number of sales being made at that price. One Valley furnace advanced its price from $25 to $26 during the week, but continued to take business, and made another advance to $27, virtually withdrawing from the market. A Detroit producer which advanced its price to $27 a week ago has made some sales at that price. Another producer that has been active in the Detroit territory has now advanced its price $1 a ton to a $27 minimum basis and has sold 15,000 tons at the advance. A local interest reports sales in the Pittsburgh district aggregating 10,000 tons. For Cleveland delivery, local producers are quoting malleable and foundry, $26 to $26.50, furnace, a decline of 50c. to $1 during the week. The Westinghouse Electric & Mfg. Co. has purchased 900 tons for its Cleveland plant, this business apparently going to a Valley producer. The same company bought 1100 tons for its Trafford City, Pa., plant from a Cleveland interest. The Fanner Mfg. Co., Cleveland, purchased 1000 tons of special malleable iron running low in manganese from an outside furnace. One Mansfield, Ohio, consumer purchased 1000 tons of foundry iron and another 500 tons. One Michigan foundry bought 9000 tons of malleable and foundry iron and another consumer 5000 tons of malleable. An Ohio malleable foundry purchased 4000 tons and is negotiating for 4000 tons additional. The General Electric & Mfg. Co. has sent out a number of inquiries for various grades of pig iron. Sales of Southern iron aggregating 2000 tons in small lots are reported in this territory, mostly for the first quarter. One producer, after taking some business at $22, marked up its price to $22.50, and later in the week to $23, which now appears to be a minimum quotation. A sanitary interest is inquiring for its Southern iron requirements for the first quarter, estimated at 10,000 tons. A central Ohio consumer is inquiring for round tonnage of basic iron.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron includes a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and a $6 rate from Birmingham.

Basic, Valley furnace [illegible]	$[illegible]
Northern No. 2 fdy., sil. 1.75 to 2.25	$26.50 to 27.00
Southern fdy., sil. 1.75 to 2.25	29.00
Malleable	[illegible]
Ohio silvery, nominal, sil. 8 per cent	38.52
Standard low phos., Valley furnace	36.00

Semi-Finished Steel.—The leading local producer has met the Carnegie Steel Co.'s price of $36.50 on sheet bars and is naming the same price for slabs and billets. During the week this interest sold several lots aggregating 15,000 to 20,000 tons, mostly in sheet bars, largely for December and January delivery, but in some cases for first quarter shipment. Forging billets are easier, a local inquiry for 200 tons bringing out a $42.50 quotation.

Sheets.—Some independent mills are still shading black sheets $2 a ton to 3.25c., but blue annealed and galvanized sheets are firm at the American Sheet & Tin Plate Co. schedule, and some mills are holding to 2.60c. for the former. Some mills that started to take sheet contracts only for January delivery are now closing contracts for the first quarter at the regular schedule.

Reinforcing Bars.—With the falling off of the building work, the demand has quieted down. A round lot will be required for the United Brethren Publishing Co. Building, Dayton, Ohio, and 100 tons for the Kentucky Baptist Hospital, Louisville, Ky. Prices on hard steel reinforcing bars remain unchanged at from 1.95c. to 2c.

Bolts, Nuts and Rivets.—Many consumers of bolts and nuts are placing first quarter contracts at present prices, which appear firm. Buyers, however, are not taking much chance against the market decline for manufacturers usually revise prices on existing contracts in case the market is established at lower levels. Rivet manufacturers are booking some first quarter contracts at the prevailing prices of 3c. for structural and 3.10c. for boiler rivet. Rivet specifications are light, due evidently to the approaching inventory time.

Finished Material.—The market on steel bars, plates

and structural material has become firmer, this being particularly true of plates, which have been weaker than the other two items. Some of the plate mills have increased the tonnage on their books and are not making the price concessions that appeared during the previous week or two. A sale of 2000 tons of plates to an Erie, Pa., boiler shop is reported at 1.95c., but some mills are not quoting below 2c. The Toledo Ship Building Co. has placed 3000 tons of plates with the leading interest for a lake boat for which it recently took a contract. A Sharon, Pa., shop has placed 1000 tons of plates for oil refinery work, most of the order going to a Youngstown mill. A Youngstown shop has placed 1500 tons of plates with a Youngstown mill for oil tank work. Steel bars are firm, there being little evidence now of any shading of the 2c. price. Structural material is commonly quoted at 2c. The volume of new business is holding up well. While not many consumers are placing contracts for the first quarter, many are buying steel for their requirements extending well into that quarter. Orders were placed by two or three local bar consumers during the week for approximately 2000 tons of steel bars for January shipment. In the automobile field some orders are being placed for spring and rim steel for January shipment. Building construction work has fallen off considerably, but a fair volume of work is in prospect, which is expected to come out early in the year.

Jobbers quote steel bars, 2.91c.; plates and structural shapes, 3.01c.; No. 9 galvanized wire, 3.30c.; No. 9 annealed wire, 2.80c.; No. 28 black sheets 4.25c. to 4.40c.; No. 28 galvanized sheets 5c. to 5.40c.; No. 10 blue annealed sheets, 3.70c. to 3.76c.; hoops and bands, 3.71c.; cold-rolled rounds, 3.75c.; flats, squares and hexagons, 4.25c.

Coke.—Standard Connellsville foundry coke is now being quoted as low as $7.75, but most producers are asking from $8 to $8.50. The only activity is in small lots.

Old Material.—The American Steel & Wire Co. came into the market during the week for heavy melting steel for its Cleveland works and is understood to have purchased 5000 to 6000 tons from a local dealer at $19 to $19.50 delivered, and another local mill in the market for machine shop turnings for which it is offering $15.50 and has bought some at that price. A local briquetting plant has resumed operations and is buying turnings. Valley district mills are doing some quiet buying in small lots for deliveries extending over 45 to 60 days. The market is fairly firm and prices have advanced 25c. a ton on turnings and mixed borings. Dealers are behind on shipments because of the car shortage and some of the mills are crowding for deliveries. Other have held up shipments.

We quote per gross ton, f.o.b. Cleveland, as follows:

Heavy melting steel	$18.25 to $18.50
Steel rails under 3 ft.	19.75 to 20.00
Steel rails for rolling	20.00 to 20.50
Iron rails	18.00 to 18.50
Iron car axles	25.00 to 26.00
Low phosphorus melting	20.00 to 20.50
Cast borings	15.75 to 16.00
Machine shop turnings	14.75 to 15.00
Mixed borings and short turnings	15.75 to 16.00
Compressed steel	16.50 to 16.75
Railroad wrought	17.00 to 17.50
Railroad malleable	20.00 to 20.50
Light bundled sheet stampings	13.00 to 13.50
Steel axle turnings	16.00 to 16.50
No. 1 cast	20.50 to 21.00
No. 1 busheling	12.50 to 13.50
Drop forge flashings over 10 in.	12.75 to 13.25
Drop forge flashings under 10 in.	12.50 to 13.50
Railroad grate bars	17.00 to 17.50
Stove plate	17.00 to 17.50
Pipes and flues	13.00 to 13.75

An open competitive examination for master electrician to fill a vacancy at the Navy Yard, Brooklyn, N. Y., at a salary of $12.96 per day, duties involving the executive management and direction of an electrical shop employing about 300 men, has been announced by the United States Civil Service Commission, Washington, to which application should be made for the requisite blanks.

E. D. Garfield, resident manager of Manning, Maxwell & Moore, Inc., Milwaukee, Wis., has opened an office in the Palace Theatre Building in that city.

Philadelphia

Pennsylvania Railroad Buys Several Thousand Tons of Plates at 1.90c.

PHILADELPHIA, Dec. 12.—The noteworthy developments in the local market within a week have been the definite settling of the plate price on large tonnages to 1.90c., Pittsburgh, and a gradual broadening of the demand for pig iron. In general, the steel market is quiet, as is to be expected in the last month of the year, but a fair volume of business in small tonnages is being put on mill books and the mills are encouraged to believe that larger buying will come soon after the turn of the year. This view is borne out partially, at least, by the reports which steel salesmen bring in from their customers.

Pig Iron.—Users of foundry iron in increasing numbers are covering their requirements for first quarter in whole or in part and there is a distinctly better tone in the eastern Pennsylvania pig iron market despite the fact that some furnaces have made slight concessions in an effort to close business during the past week. The withdrawal of some $25 quotations by Buffalo furnaces has made it easier for eastern Pennsylvania furnaces to compete for business in New England without going below $27, base, furnace, and this has imparted a healthier tone to the situation in this district. It would be stretching a point to say that pig iron prices are firmer, but at least it can be said that a larger number of orders is being taken at prices above $27, base. One furnace company which has a well-filled order book has announced that it will not consider business below $28, base, furnace. The largest foundry iron orders of the week were placed by the Westinghouse Electric & Mfg. Co. for its Essington plant, totaling about 2500 tons. The business was divided among three of four furnaces and the approximate delivered prices were $27.76 for No. 2 plain and $28.76 for No. 2X. There is a tendency among furnaces to equalize freight rates, thus meeting the competition of the furnace having the lowest rate to point of destination. The reduced prices quoted in the table below are in line with this tendency and do not imply a reduction in price at the furnace except in special instances. On an order for about 400 tons of No. 1X a furnace made a price of $28.50 furnace. Lower prices are in effect on foreign iron, as some sellers are attempting to unload the stocks which they have been obliged to put in storage. Consumers are not so anxious to take foreign iron now that domestic grades are easily obtainable. Last week's receipts from abroad show a sharp decline from the previous week, but several good-sized cargoes are expected next week. The total for the week ended Dec. 16 was 5000 tons, divided as follows: England, 2340; Scotland, 2006; France, 500; Belgium, 154.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to $1.64 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$27.76 to $28.14
East. Pa. No. 2X, 2.25 to 2.75 sil.	28.76 to 29.14
East. Pa. No. 1X	29.76 to 30.14
Virginia No. 2 plain, 1.75 to 2.25 sil.	33.17 to 34.17
Virginia No. 2X, 2.25 to 2.75 sil.	34.17 to 35.17
Basic delivered eastern Pa.	27.50 to 28.00
Gray forge	28.14 to 28.64
Malleable	30.64 to 31.64
Standard low phos. (f.o.b. furnace)	35.00
Copper bearing low phos. (f.o.b. furnace)	32.00 to 35.00

Ore.—Receipts of iron ore last week totaled 7839 tons, all from Sweden.

Ferroalloys.—Demand for ferromanganese has fallen off in the past week. Prices are unchanged at $100, furnace, for domestic and $100, seaboard, duty paid, for the imported. Spiegeleisen is offered at $37, furnace, or less. A shipment of 250 tons of spiegeleisen was received from England at this port last week.

Coke.—The Keystone Coal & Coke Co. has announced that it will take contracts for foundry coke

for first quarter at $8.50, ovens, and at $7.50 for first half or the entire year.

Semi-Finished Steel.—Sales of open hearth re-rolling billets have been made at $38, Pittsburgh, and forging billets at $42.50, Pittsburgh.

Plates.—The Pennsylvania Railroad has divided orders for 6000 to 8000 tons of car plates for immediate rolling among three or four mills, and the price paid is reported to be equivalent to 1.90c., Pittsburgh, though quotations were made in each instance on a mill basis. The plate market has been weak for some time, but concessions have been made with a good deal of secrecy. Now, however, mills are openly quoting 1.95c., Pittsburgh, on ordinary lots and 1.90c. is freely quoted when the tonnage is attractive. It is only on small lots that 2c., Pittsburgh, is obtainable. Quotations of 1.85c., Pittsburgh, are said to have been made and even 1.80c. has been mentioned, but there is no definite information that sales have been made at these low levels. Plate mills are operating mostly on single turn, and the aggregate tonnage booked in the past two weeks has not been sufficient to sustain the recent rate of operation; in fact, the tendency has been somewhat the other way.

Structural Material.—More is heard of slight price concessions on structural shapes, but apparently there are no quotations below 1.95c., Pittsburgh. The volume of business has shrunk slightly, which is to be expected at this time of year, and current orders are mostly for small lots for early rolling. The going price on small-lot business is 2c., Pittsburgh.

Bars.—Steel bars are firm at 2c., Pittsburgh, and most of the mills are in a comfortable position. Current business is in small volume, but business on mill books is sufficient in most instances for 60 to 90 days. There is less talk of concessions on bar iron, which is quoted at 2c., Pittsburgh.

Sheets.—While most of the small orders for blue annealed are at 2.60c., Pittsburgh, larger lots are obtainable at 2.50c. Black sheets are quoted by most mills at 3.35c. and galvanized at 4.35c., Pittsburgh, with some mills uninterested in orders for galvanized sheets, which they say represent a loss at current selling prices.

Warehouse Business.—Orders for steel out of stock have picked up in the past week. Apparently consumers are filling some of their immediate needs from warehouse stocks rather than buy in larger quantities from mills just prior to inventory. We quote warehouse prices for local delivery as follows:

[illegible] steel bars and shapes [illegible] base (except bands) [illegible] 4.50c.; round edge steel, iron finish, 1½ x ½ in., 3.20c.; round edge steel planished, 4c.; tank steel plates, [illegible] and beveled [illegible] 3.33c.; blue annealed steel sheets, No. 10 gage, 3.85c.; black sheets, No. 28 gage, 4.60c.; galvanized sheets, No. 28 gage, 5.75c.; square twisted and deformed steel bars, 3.15c.; structural shapes, 3.10c.; diamond pattern plates, ¼-in., 4.80c.; ⅜-in., 5c.; spring steel, 4.25c.; round cold-rolled steel, 3.85c.; squares and hexagons, cold-rolled steel, 4.35c.; steel hoops, No. 13 gage and lighter, 4.25c.; steel bands, No. 12 gage to ⅜-in., inclusive, 3.825c.; rails, 3c.; tool steel, 8.50c.; Norway iron, 6.50c.

Old Material.—Current price quotations on various grades of old material represent all that can be obtained by those who are in a position where they must sell, but if consumers were to come in the market for substantial tonnages, it would be difficult, and probably impossible, for them to cover at the prices which are being paid on the small lots now being sold. Dealers are not willing to sell "short" at present levels because of the fear that they would be unable to cover at a profit. The tendency of dealers with yard stocks is to hold for higher prices, which the trade believes will come in January.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$16.00 to $16.50
Scrap rails	16.00 to 16.50
Steel rails for rolling	19.50 to 20.00
No. 1 low phos., heavy 0.04 and under	22.00 to 23.00
Cast iron car wheels	20.00 to 21.00
No. 1 railroad wrought	[illegible]
No. 1 yard wrought	17.00 to 17.50
No. 1 forge fire	15.00 to 15.50
Bundled sheets (for steel works)	14.50 to 15.00
No. 1 busheling	14.50 to 15.00
Turnings (short shoveling grade for blast furnace use)	14.50 to 15.00
Mixed borings and turnings (for blast furnace use)	14.50 to 15.00
Machine shop turnings (for steel works use)	15.00 to 15.50
Machine shop turnings (for rolling mill use)	15.00 to 15.50
Heavy axle turnings (or equivalent)	15.00 to 15.50
Cast borings (for steel works and rolling mills)	15.00 to 16.00
Cast borings (for chemical plants)	20.00 to 22.00
No. 1 cast	20.00 to 21.00
Heavy breakable cast (for steel plants)	19.00 to 19.50
Railroad grate bars	16.50 to 17.00
Stove plate (for steel plant use)	16.50 to 17.00
Railroad malleable	15.50 to 16.50
Wrought iron and soft steel pipes and tubes (new specifications)	[illegible]
Shafting	21.00 to 22.00
Steel axles	22.00

POWER EQUIPMENT EXHIBITED

Boilers, Stokers, Pulverized Coal, Control Apparatus and Other Equipment Shown

The first national exposition of power and mechanical engineering, organized to indicate the progress of the last few years and having exhibits of boilers, stokers, pulverized coal and oil burning equipment, superheaters, control apparatus and a large variety of other material, was held in New York, Dec. 7 to 13. The decision to organize the show resulted from a meeting of representatives of the American Society of Mechanical Engineers, the National Association of Stationary Engineers and the National Electric Light Association. More than 125 companies exhibited. An outline of some of the exhibits follows.

[illegible] stage, were shown by the Bethlehem Shipbuilding Corporation, Ltd., Bethlehem, Pa., and various units of the Bethlehem Dahl mechanical oil burning system were on view. An 8-in. single stage pump, a two stage series pump, and a Class C turbine were exhibited by the De Laval Steam Turbine Co., Trenton, N. J. A small high-speed geared turbine was in operation. The Coppus Engineering & Equipment Co., Worcester, exhibited a 20-in. power turbine, boiler [illegible]

Models of its water tube boilers were shown by the George T. Ladd Co., Pittsburgh and a model of its patented water [illegible] Boiler Co., Cleveland. Power plant apparatus of the various companies for which it is an agent was exhibited by the Vincent-Gilson Engineering Co., New York. Among these were soot blowers, [illegible] engine stops, turbine blowers, Enco oil burners, steam purifiers and gas producers.

Coal and Ash Handling

Diagrams and models of Riley and Jones underfeed stokers, and Murphy automatic furnaces were at the booth of the Sanford Riley Stoker Co., Worcester, Mass. A heavy duty Coxe stoker was shown by the International Combustion Engineering Corporation, New York, a model of the Green stoker in operation being also on view. A Quinn fuel oil burning unit complete connected to a furnace, the Lopulco pulverized fuel burner were among other of the several exhibits. Models of the Huber hand stoker were displayed by the Flynn & Emrich Co., Baltimore, chain grate stokers by the Green Engineering Co., East Chicago, Ind., also Sealfex arches and Green cast iron hoppers, and the improved Files hand stoker, was shown by the Gibby Engineering Co., East Boston, Mass. The United Machine & Mfg. Co., Canton, Ohio, exhibited grate sections of the Harrington traveling-grate stoker, and data on its Industrial underfeed stoker and the Mosher desaturator.

An interesting exhibit was that of the R. H. Beaumont Co., Inc., Philadelphia, showing a model of a super-central coal handling installation in operation. A new style electric [illegible] in addition to other manual and electric ash removal equipment. Coal and ash handling machinery were shown by the C. W. Hunt Co., West New Brighton, N. Y. and steam jet ash conveyors by the M. H. Detrick Co., Chicago, improved Detrick flat suspended arches being also featured. The Victor Engineering Co., Philadelphia, showed ash conveying equipment of the steam jet type, and also Carrick combustion control, damper and forced draft regulator. Ash hoppers and gates were shown by Allen-Sherman-Hoff Co., Philadelphia.

Water Handling Equipment

The exhibit of the H. S. B. W. Cochrane Corporation, [illegible]

process water softener, weighing meters and flow meters all of which were shown in operation. Other equipment included a V-notch weir meter and recorder, and a motor controlled multi-port valve in operation. Feed water softeners and filters were shown by the International Filter Co., Chicago, and also chemical boxing, feeding and proportional equipment.

Foster radiant heat and standard type superheaters, and economizers were displayed by the Power Specialty Co., New York. The Davidson Pump Co., New York, exhibited a boiler feed pump and a small working model in operation.

A steam jet with surface inter condenser and after heater in one shell, and a steam jet air pump with jet condenser, were shown by the Wheeler Condenser & Engineering Co., Carteret, N. J. A model of a 5000-kw. General Electric turbine with surface condenser and several auxiliaries was a feature. A model of the company's induced and natural wooden cooling tower was also shown. Evaporators, condensers, heaters, economizers, and tube cleaners were among the exhibits of the Roto Co., Hartford. Feed water regulators, special turbine driven boiler-feed pump governors, and other specialties were exhibited by the S-C Regulator Mfg. Co., Fostoria, Ohio. Its latest type of inter and after condenser Radojet air pumps, Rotrex air pumps, condensate pumps and a dynamometer, were shown by the C. H. Wheeler Mfg. Co., Philadelphia.

The Nash Engineering Co., South Norwalk, Conn., exhibited its Hytor pumps and compressors and a Jennings condensation pump in operation. Reilly feed water heaters, instantaneous heaters, fuel oil heaters, steam and oil separators, and multi-screen filters were included in the large exhibit of the Griscom-Russell Co., New York. Water softeners of the hot press type, were exhibited by the Graver Corporation, East Chicago, Ind.

Meters and Control Devices

The Bailey Meter Co., Cleveland, exhibited its boiler meter and multi-pointer gage in connection with a miniature 2 hp. gas fired boiler, and a V-Notch weir meter, both in operation. Other displays included pulverized material feeder and meter, differential gas pressure recorders, and gas meters with pressure compensator. A CO_2 recorder in operation, indicating draft gages, indicating and recording thermometers for flue gas, and other uses, gages for steam pressure and vacuum, were displayed by the Foxboro Co., Inc., Foxboro, Mass. Hays CO_2 and draft recorders in operation, the Hays improved gas analyzer, draft gages and chain-operated water gages, were among the items shown by Paul B. Huyette Co., Philadelphia.

Recording gages, thermometers and tachometers were among the instruments shown by Schaeffer & Budenberg Mfg. Co., Brooklyn, N. Y. The Ruggles-Klingemann Mfg. Co., Salem, Mass., displayed its step compensated draft and temperature regulator, and other regulators. Steam meters, low and high pressure gas meters, water meters and flow curves were among the exhibits of the Republic Flow Meters Co., Chicago.

CO_2 recording equipment, draft indicators and recorders, combined barometer and vacuum recorders, and an absolute pressure indicator for condensor service were shown by the Uehling Instrument Co., Paterson, N. J. A feature was the Pyroporous flue gas filter for assuring clean gas for analysis. Tag-Mono recorders for the automatic flue gas analysis, was a feature of the exhibit of the C. J. Tagliabue Mfg. Co., Brooklyn, N. Y. Thermometers, hydrometers, and automatic controllers were among other instruments shown.

Indicating and recording pressure and vacuum gages, dead-weight gage testers, inspectors' testing outfits, and boiler test pumps were among the items shown by the Ashton Valve Co., Boston. A 24-in. double illuminated master pilot gage was a feature. A new cabinet type inclined draft gage single and double tube; open type inclined draft gage, and the new multi-tube vertical draft gages with movable scale and with equalizer for filling individual chambers simultaneously, were among the exhibits of L. M. Ellison, Chicago.

Fire Bricks, Baffles and Arches

A double suspension combustion and ignition arch was shown by the Liptak Fire Brick Arch Co., Minneapolis, and models illustrating the Bernitz method of wall construction, were exhibited by the Bernitz Furnace Appliance Co., Boston. Drake blocks for furnace wall construction were shown by the Drake Non-Clinkering Furnace Block Co., New York, and the American Arch Co., New York, featured its type "P" arch.

The Quigley Furnace Specialties Co., New York, demonstrated the utility of Hytempite, Carbosand and typical applications of Insulbrix. High temperature cements and Mono baffle plates were shown by the King Refractories Co., Inc., New York. Sil-O-Cel heat insulating materials, with models of boilers illustrating the method of bonding were exhibited by the Celite Products Co., New York. Furnace wall supports, intended to increase stoker efficiency, were shown by the Furnace Engineering Co., New York. "Steel Mixture," a fire cement for boiler settings, with a model boiler showing its use, was exhibited by McLeod & Henry Co., Troy, N. Y.

Valves and Fittings

Among a wide variety of valves and fittings the Edward Valve & Mfg. Co., East Chicago, Ind., displayed a new valve with forged steel body and bonnet, monel trimmings for 1100 deg., intermittent temperature.

Reducing valves, and special pressure regulating mechanisms were among the specialties exhibited by the Julian d'Este Co., Boston. A new steam regulator with removable seat and mounting, was also shown. Back pressure valves, lever balanced valves, pressure regulators, pump governors, automatic stop and check valves were displayed by the Foster Engineering Co., Newark, N. J.

In addition to a large display of brass, iron, and steel valves, Jenkins Brothers, New York, showed Mason regulator valves, a new rapid action valve, new air gun valves, new marine valve and their Selco valve. The display of the Lunkenheimer Co., Cincinnati, included steel, bronze, iron and special alloy valves, lubricators, whistles, boiler mountings and other specialties.

Yarnall-Waring Co., Philadelphia, exhibited its tandem blow-off valve, seatless blow-off valve, pipe clamp, boiler skimmer and other devices. Back pressure, balanced tank and relief valves were among those shown by Kieley & Mueller, New York, steam traps, damper regulators, and pump governors being also shown.

Pratt & Cady bronze and iron valves, Reading acid open hearth steel fittings were shown by the Reading Steel Casting Co., Bridgeport. Union bonnet valves, regrinding and a new line for high pressure and high temperature service were shown.

Valves and fittings for all pressures and duties were shown by the Crane Co., Chicago, oil separators, steam traps, pipe bends and other equipment being also shown. Hancock valves and Consolidated safety valves were exhibited by Manning, Maxwell & Moore, New York, Ashcroft gages, Metropolitan injectors and a Reeves automatic stoker control in operation being also featured.

A large exhibit was that of the Walworth Mfg. Co., Boston, which included valves, fittings, pipe tools and the Watts line of power plant specialties and stack heaters. Galvanized amalgamated lead lined iron pipe, fittings and valves were shown by the Lead Lined Iron Pipe Co., Wakefield, Mass.

Other Material Exhibited

Thrust bearings for steam turbines were exhibited by the Kingsbury Machine Works, Philadelphia. Steel sections for overhead shafting layouts, and unit air filters were shown by the Midwest Steel & Supply Co., New York. Francke flexible couplings, Keytite self-fitting keys, and Pintite couplings for line shafting made up the exhibit of Smith & Serrell, Newark, N. J. Friction clutches of the Smith type and collar oiling bearings were shown by the Hill Clutch Co., Cleveland and various sizes of friction clutches, and a model of its ball bearing marine reverse gear were exhibited by the Carlyle Johnson Machine Co., Manchester, Conn. A worm gear reducing unit with motor and base was shown in operation by the Philadelphia Gear Works, Philadelphia.

Cast iron pipe made by the De Lavaud centrifugal process, and a section of a barometric condenser, Helander patent, were among the items shown by the U. S. Cast Iron Pipe & Foundry Co., Burlington, N. J.

Oil filtration equipment, oil systems and accessories were shown by S. F. Bowser & Co., Fort Wayne, Ind. The De Laval Separator Co., New York exhibited oil purifiers for fuel and transformer oils.

Waterproof "Speed-Grits," a specialized paper for water rubbing paint materials, is being marketed by the Manning Abrasive Co., Troy, N. Y. It can be used either with oil or dry, where flexibility and toughness are required, and also where exceptional finish is wanted. Although developed primarily for the automobile trade, the new papers are said to be applicable to the finishing of metal furniture, machinery with a highly finished paint surface, typewriters and other products that require many surfacing operations on paint and varnish and where water sanding and rubbing is required. The waterproof Speed Grits are said to be an improvement over pumice on many operations, it being claimed that they cut faster and cleaner and at a lower cost.

Melvin Jameson, for the last 30 years with the Peninsular Stove Co., Detroit, has been appointed general sales manager of the company.

British Iron and Steel Market

Foundry Iron Is Easier—Britain to Lay Down Two New Battleships at Once—Germany Sells 15,000 Tons of Rails to Far East at $24.26 F.O.B.

(By Cable)

LONDON, ENGLAND, Dec. 12.

Fresh American inquiries have come in for foundry iron and hematite. The pig iron market otherwise is quiet, with foundry grades easier. Hematite is active. Some makers have secured orders covering January to March capacity. Prices are firm.

Demand for finished iron and steel is expanding, more especially from the home trade. The Government has ordered that the two new capital ships [permitted under the Conference on the Limitation of Armaments, to replace four smaller vessels to be discarded later] be laid down by the end of the year. British railroads are placing orders, but the decision has been reached to dissolve the Disposal Board at the end of March, thus releasing large tonnages of second hand material.

Bars, sheets and joists (beams) have been bought for delivery on the Pacific Coast. Exports generally are quiet, though the Chinese demand is improving.

Total pig iron [including ferroalloy] exports for November were 117,708 tons, of which 79,070 tons were consigned to the United States. The total exports of iron and steel for November were 372,332 tons.

Tin plate makers have advanced the minimum quotation of 20s. ($4.62) basis, f.o.b. Swansea tin plate bars for January to March delivery have advanced 3¾s. (87c.). Good business was being done in tin plate before the rise, which now is causing some little confusion.

Galvanized sheets are firm, on moderate demand. The works are well booked up, but there is a possibility that the output will decrease, owing to the tightness of the spelter situation.

Japan is inquiring for black sheets, of the usual specifications, for December shipment, but the works are unable to supply the sheets earlier than February to March.

There has been a fair business in Continental steel recently transacted. German works are now full up to February or March, except for plates. Belgium has sold merchant bars and joists (beams) to India and sheets and wire nails to South America. Germany has sold 15,000 tons of rails to the Far East at £5 5s. ($24.26) f.o.b. America has bought Continental light and heavy rails.

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $4.62 per £1, as follows:

Cleveland No. 1 foundry	4	15¼			22.06	
Cleveland No. 4 forge	4	2½			19.06	
Sheet and tin plate bars,						

Continental Prices, All F. O. B. Channel Ports, Delivery as Specified

No. 3 foundry pig iron:						
Belgium, Jan., Feb..	£4	10s.			$20.79	
Luxemb'g, Jan., Feb.	4	10			20.79	
France, Jan., Feb...	4	10			20.79	
Billets:						
France, Jan.	5	0	to £5	15s.	23.10 to	$26.57
Luxemburg, Jan. ...	5	0	to 5	15	23.10 to	26.57
Lorruine, Jan.	5	0	to 5	15	23.10 to	26.57
Wire rods, 5 mm. (0.2 in.):						
Belgium	7	5	to 10	7½	33.50 to	47.93
Wire nails (keg basis):						
Germany	0	14½			3.35	
Belgium	0	20½			4.74	
Angles:					C. per Lb.	
Belgium	7	7½			1.52	
Tees:						
Belgium	8	5			1.70	
Merchant bars:						
Belgium, Feb., Mar..	6	12½	to 6	15	1.37 to	1.39
Luxemb'g, Feb., Mar.	7	0	to 7	2½	1.44 to	1.47
France, Jan., Feb...	7	0	to 7	2½	1.44 to	1.47
Germany, Feb., Mar.	6	10			1.34	
Joists (beams):						
France, Jan.	6	5			1.29	
Belgium, Jan.	6	0			1.24	
Luxemburg, Jan. ...	6	5			1.29	
Channels:						
Belgium	7	10	to 7	12½	1.55 to	1.57
⅜-in. plates:						
Germany, Jan. Feb.	6	0	to 6	2½	1.24 to	1.26
Belgium, Jan.	6	10			1.34	
Luxemburg, Jan. ...	6	5			1.29	
France, not quoted						
No. 8 gage wire:						
Belgium	14	10s.			3.00	

Proposed Railroad Improvements to Assist Unemployed—Less Pig Iron Demand

LONDON, ENGLAND, Nov. 29.—The election has now come and gone and more hopeful feeling is generally entertained by the business community that the revival in trade will be helped by sane legislation. One of the first problems which are apparently being resolutely grappled with by the government is that of unemployment. The first apparent development of this has been the convening of the various railroad managers of the new leading railroad groups of the country, when proposals were put before them that, to alleviate the present distress caused through unemployment, the railroad companies embark upon a program of further construction. A good deal of this, of course, will consist of renewal work, but it is also proposed that various schemes of electrification of existing lines be carried through, as well as the construction of new small lines connecting up various points of the new group system. It is understood that the schemes will not be financially assisted by the government, but will be carried through from the ample resources of the railroad companies.

A factor which may have considerable bearing on the trade situation generally, and therefore on further alleviating the unemployment question, is the announcement that the railroad rates for certain raw materials are to be reduced from Dec. 1. These materials are coal, coke and patent fuel for blast furnace and steel work.

In the meanwhile the tendency in the Cleveland pig iron market is somewhat easier, at least so far as foundry qualities are concerned. This is, of course, partly a reflection of the diminution in the American demand, but is also attributable to the unfortunate exchange situation with the continent, which seriously hampers export business on the part of this country. It is understood that some sales of foundry iron of special analysis have been made to America for delivery up to March, however, and the general tendency in home consumption is toward improvement. The current quotation for the No. 3 G. M. B. is about 92s

In finished iron and steel, conditions appear to be slowly but steadily improving. Home consumers have taken rather more interest in the market recently, and steel makers seem to have been receiving a certain amount of shipbuilding orders. Rail makers also are experiencing more business. So far as export trade is concerned, however, conditions have been quieter. It is understood that a Japanese order for locomotives has been booked by Glasgow and other firms, while the Leeds Forge Co. has booked an order for 56 double-deck electric cars for Edinburgh, while Metropolitan-Vickers is understood to have secured a good share of the £4,000,000 of contracts placed in connection with the electrification of South African railroad.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Plates

Sheared, tank quality, base, per lb.....1.95c. to 2c.

Structural Material

Beams, channels, etc.....2.00c.

Iron and Steel Bars

Soft steel bars, base, per lb.....2.00c.
Refined iron bars, base, per lb.....2.60c.

Hot-Rolled Flats

Hoops, base, per lb.....2.75c. to 2.90c.
Bands, base, per lb.....2.75c. to 2.90c.
Strips, base, per lb.....2.75c. to 2.90c.

Cold-Finished Steels

Bars and shafting, base, per lb.....2.50c.
Strips, base, per lb.....4.50c.

Wire Products

Nails, base, per keg.....$2.70
Bright plain wire, base, per 100 lb.....2.45
Annealed fence wire, base, per 100 lb.....2.45
Spring wire, base, per 100 lb.....3.25 to 3.35
Galvanized wire, base, per 100 lb.....2.95
Galvanized barbed, base, per 100 lb.....3.35
Galvanized staples, base, per keg.....3.35
Painted barbed wire, base, per 100 lb.....3.00
Polished staples, base, per keg.....3.00
Cement coated nails, base, per count keg.....2.20
Woven fence, carloads (to jobbers).....70½ per cent off list
Woven fence, carloads (to retailers).....68 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads...60 and 5 per cent off list
Machine bolts, small, cut threads....50 and 10 per cent off list
Machine bolts, larger and longer....50 and 10 per cent off list
Carriage bolts, ⅜ x 6 in.:
Smaller and shorter, rolled threads, 50, 10 and 5 per cent off list
Cut threads.....50 per cent off list
Longer and larger sizes.....50 per cent off list
Lag bolts.....60 and 5 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads....50 and 10 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.:
Smaller and shorter.....45 per cent off list
Larger and longer sizes.....45 per cent off list
Hot pressed square or hex. blank nuts...$3.25 to $3.50 off list
Hot pressed nuts, tapped.....3.25 to 3.50 off list
C.p.c. and t. sq. or hex. nuts, blank.....3.25 to 3.50 off list
C.p.c. and t. sq. or hex. nuts, tapped.....3.25 to 3.50 off list
Semi-finished hex. nuts:
9/16 in. and smaller, U. S. S....75, 10 and 5 per cent off list
⅝ in. and larger, U. S. S....70, 10 and 2½ per cent off list
Small sizes, S. A. E.....80 and 5 per cent off list
S. A. E., ⅝ in. and larger.....75 and 5 per cent off list
Stove bolts in packages.....80 and 5 per cent off list
Stove bolts in bulk.....80, 5 and 2½ per cent off list
Tire bolts.....50, 10 and 10 per cent off list

Cap and Set Screws

Milled square and hex. head cap screws....75 per cent off list
Milled set screws.....75 per cent off list
Upset cap screws.....75 and 10 per cent off list
Upset set screws.....80 per cent off list

Rivets

Large structural and ship rivets base, per 100 lb.....$3.00
Large boiler rivets, base, per 100 lb.....3.10
Small rivets.....65 and 10 to 65 and 5 per cent off list

Track Equipment

Spikes, 9/16 in. and larger, base, per 100 lb....$2.75
Spikes, ½ in. and smaller, base, per 100 lb....3.50
Spikes, boat and barge, base, per 100 lb.....3.50
Track bolts, base, per 100 lb.....$3.75 to 4.50
Tie plates, per 100 lb.....2.35
Angle bars, base, per 100 lb.....2.75

Welded Pipe

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	49	33½	¼ to ⅜	+7	+33
¼ to ⅜	75	29½	½	26	8
½	67	46½	¾	32	17
¾	64	52½	1 to 1½	34	19
1 to 3	66	54½			

Lap Weld

2	59	47½	2	29	15
2½ to 6	63	51½	2½ to 6	32½	19
7 to 8	60	47½	7 to 12	30	17
9 to 12	59	46½			

Butt Weld, extra strong, plain ends

⅛	45	28½	¼ to ⅜	15	48
¼ to ⅜	51	34½	½	25	13
½	57	46½	¾	32	18
¾	62	51½	1 to 1½	34	20
1 to 1½	64	53½			
2 to 3	65	54½			

Lap Weld, extra strong, plain ends

2	57	46½	2	30	17
2½ to 4	61	50½	2½ to 4	33	21
4½ to 6	60	49½	4½ to 6	32	20
7 to 8	56	43½	7 to 8	25	13
9 to 12	50	37½	9 to 12	20	8

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 and 2½ per cent.

Boiler Tubes

Lap Welded Steel		*Charcoal Iron*	
1¾ in.	21½	1½ in.	+12
2 to 2¼ in.	36	1¾ to 1⅞ in.	— 2
2½ to 3 in.	47	2 to 2¼ in.	—8
3¼ to 13 in.	52	2½ to 3 in.	—13
		3¼ to 4½ in.	—15

To large buyers of steel tubes a supplementary discount of 5 per cent is allowed.

Standard Commercial Seamless Boiler Tubes

Discounts on cold-drawn tubes in carload lots f.o.b. Pittsburgh, follow:

1 in.	55	2½ and 2¾ in.	38
1¼ and 1½ in.	47	3 in.	42
1¾ in.	31	3¼ to 4 in.	47
2 and 2¼ in.	34	4¼ in. and 5 in.	39

Hot Rolled

3 in. ..... 44 | 3¼ to 4 in. 49

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base.....85 per cent off list
Carbon 0.30 to 0.40, base.....83 per cent off list
Plus usual differentials and extras for cutting.

Seamless Locomotive and Superheater Tubes

Cents per Ft.		Cents per Ft.	
2-in. O.D 12 gage	14	2¼-in. O.D. 10 gage	19
2-in. O.D. 11 gage	15	3-in. O.D. 7 gage	34
2-in. O.D. 10 gage	16	1¾-in. O.D. 9 gage	13¾
2¼-in. O.D. 12 gage	16	5⅜-in. O.D. 9 gage	53
2¼-in. O.D. 11 gage	17	5½-in. O.D. 9 gage	55

Tin Plate

Standard cokes, per base box.....$4.75

Terne Plate

(Per package, 200-lb.)

8-lb. coating	$9.30	25-lb. coating I. C.	$14.25
8-lb. coating I. C.	9.60	30-lb. coating I. C.	15.25
15-lb. coating I. C.	11.80	35-lb. coating I. C.	16.25
20-lb. coating I. C.	13.00	40-lb. coating I. C.	17.25

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....2.50c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.35c.
Regular auto body sheets, base (22 gage), per lb., 4.70c. to 5.00c.

Galvanized

No. 28 (base), per lb.....4.35c.

Tin-Mill Black Plate

No. 28 (base), per lb.....3.35c.

Manufacturers have pamphlets, which can be had upon application, giving price differentials for gage and extras for length, width, shearing, etc.

Freight Rates

All rail freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic	$0.325	Buffalo	$0.265	St. Louis	$0.43
Philadelphia, export	0.235	Cleveland	0.215	Kansas City	0.735
Baltimore, domestic	0.315	Cleveland, Youngstown Comb.	0.19	Kansas City (pipe)	0.705
Baltimore, export	0.225	Detroit	0.295	St. Paul	0.595
New York, domestic	0.34	Cincinnati	0.295	Omaha	0.735
New York, export	0.255	Indianapolis	0.31	Omaha (pipe)	0.705
Boston, domestic	0.365	Chicago	0.34	Denver	1.275
Boston, export	0.255			Denver (pipe)	1.215

Pacific Coast	$1.50
Pac. Coast, ship plates	1.20
Birmingham	0.69
Memphis	0.385
Jacksonville, all rail	0.50
Jacksonville, rail and water	0.415
New Orleans	0.515

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 30c. to 40c.; ship plates, 30c. to 40c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 30c. to 40c.; sheets and tin plates, 50c.; rods, wire rope cable and strands, 75c.; wire fencing, netting and stretcher, 50c.; pipe not over 8 in. in diameter, 50c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

FABRICATED STEEL BUSINESS

Awards of 20,000 Tons But New Inquiries, Mostly in West, for Two-Thirds More

Apartment house at Broadway and Eighty-second Street, New York, 1200 tons, to Hay Foundry & Iron Works.

Mechanics & Metals Bank, Fifty-seventh Street, near Seventh Avenue, New York, 300 tons, to Hay Foundry & Iron Works.

Loft building on West Thirty-fourth Street, New York, 400 tons, to George A. Just Co.

Marcus Brown apartment house, New York, 800 to 1000 tons, to A. E. Norton, Inc.

Turbine foundation for Public Service Corporation, Newark, N. J., 400 tons, to Hay Foundry & Iron Works.

Building for Firth Carpet Co., Auburn, N. Y., 100 tons, to Hay Foundry & Iron Works.

School building at New Rochelle, N. Y., 200 tons, to unnamed fabricator.

Building for Lehigh Portland Cement Co., at Birmingham, Ala., 1400 tons, to Bethlehem Steel Bridge Corporation.

Bridges for Chesapeake & Ohio Railroad, 400 tons, to American Bridge Co.

Bridge for New York Central Railroad, 110 tons, to American Bridge Co.

Building for Anaconda Copper Mining Co., 200 tons, to Wisconsin Bridge & Iron Works.

Addition to South Brooklyn Savings Bank, Brooklyn, 200 tons, to Hedden Iron Construction Co.

Apartment house at Lexington Avenue and Eighty-ninth Street, New York, 1250 tons, to Paterson Bridge Co.

Jewish Hospital, Brooklyn, 400 tons, to Paterson Bridge Co.

Public Service Co. of Northern Illinois, power house addition, Joliet, Ill., 2300 tons, to Mississippi Valley Structural Steel Co.

Mengel Body Co., plant addition, Louisville, Ky., 400 tons, to Louisville Bridge & Iron Co.

Southern California Telephone Co., Thornwall office building, Los Angeles, 377 tons, to American Bridge Co.

Missouri Pacific Railroad, turntables, 349 tons, to American Bridge Co.

Illinois Central Railroad, 327-ft., 6-in. through plate girder spans, Simpson, Ill., 309 tons, to American Bridge Co.

LaSalle Street substation, Commonwealth Edison Co., Chicago, 300 tons, to Midland Structural Steel Co.

Byllesby Engineering Corporation, Chicago, two self-supporting steel stacks, Reinach, Okla., 183 tons, to Minneapolis Steel & Machinery Co.

Northern States Power Co., steel stack, Minneapolis, 120 tons, to Minneapolis Steel & Machinery Co.

Northern Pacific Railroad, Central Avenue bridge, Minneapolis, 115 tons, to American Bridge Co.

National Screw & Tack Co., Cleveland, factory building, to Riverside Bridge Works.

Ashland plant, American Rolling Mill Co., 4000 tons, to Fort Pitt Bridge Co. and McMyler Interstate Co.

Louisville & Nashville Railroad, bridge work, 300 tons, bids taken.

Fair Garage, at Chicago, 150 tons, to Lakeside Bridge & Steel Co., Milwaukee.

Transmission towers for Power Construction Co., Worcester, Mass., 3200 tons, to American Bridge Co.

Structural Projects Pending

Inquiries for structural steel work now being figured on include the following:

The Greater Northern Railway, 3345 tons of fabricated bridge material for 1923 delivery.

Office building, Albany, N. Y., 125 tons.

Power house, Yale University, New Haven, Conn., 400 tons.

Hotel at Broadway and 100th Street, New York, 1000 tons.

Convention hall at Atlantic City, N. J., 300 tons.

City hospital at Providence, R. I., 500 tons.

Bridge for City of Boston, 400 tons.

Ice plant on Avenue Z, New York, 300 tons.

Apartment house on upper Broadway, New York, 1500 tons.

Highway bridge, Lexington, Mo., 4000 tons, bids taken.

Union League Club building, Chicago, 4000 tons, bids asked.

Roosevelt Road viaduct for Chicago Union Station Co., 4000 tons, bids to be opened this week.

Great Northern Railroad, girders and towers for various locations, 3000 tons, bids taken.

Missouri Pacific, a 200-ft. and a 225-ft. through riveted truss span, 700 tons, bids taken.

Ft. Wayne Corrugated Paper Co., mill at Hartford City, Ind., 150 tons.

Highway bridge, Glasgow, Mo., 1700 tons.

Highway bridge, Waverly, Mo., 2100 tons.

Highway bridge, Yankton, S. D., 3000 tons.

Bridge for City of Spokane, Wash., 2200 tons, bids opened Dec. 8.

Dipper dredge for United States Engineer office, Milwaukee, 200 tons of shapes and plates, bids under consideration.

RAILROAD EQUIPMENT BUYING

Fresh Inquiries for 8000 Cars and 90 Locomotives and Purchase of 3000 Cars

The buying by one company of 3000 cars, the appearance of inquiries for 7950 cars and the addition to motive power prospects of 90 locomotives describe the week's developments in railroad equipment buying.

The Baltimore & Ohio Railroad has issued an inquiry for 1000 box cars and will probably buy this week the 2000 hopper cars and 1000 gondolas, for which an inquiry was issued some weeks ago.

The New York Central Railroad has divided an order for 72 passenger coaches among four or five car builders.

The Union Tank Car Co. has placed orders for 3000 tank cars as follows: Standard Steel Car Co., 1000; American Car & Foundry Co., 1000; Cambria Steel Co., 500; General American Car Co., 500.

The United Gas & Improvement Co. is in the market for 150 hopper cars.

The Denver & Rio Grande Western has issued an inquiry for 350 70-ton gondolas and 500 drop bottom stock cars.

The Great Northern is inquiring for 500 75-ton ore cars.

The St. Louis, Troy & Eastern is in the market for 400 gondola cars.

The Southern Pacific has issued inquiries for 1200 gondola cars and 500 logging cars in addition to the 5000 cars reported last week.

The Canadian National Railways are in the market for 2250 box cars, 100 ballast, 100 general service, 100 refrigerator and 800 automobile cars in addition to the 1250 stock, 50 caboose and 50 express refrigerator cars reported a week ago.

The Union Pacific is expected to place 5000 refrigerator cars for the Pacific Fruit Express within a few days.

[illegible] the 2-10-2 type and 5 Mallet engines.

The Chicago & Eastern Illinois contemplates the purchase of 12 additional locomotives of the Pacific and Mikado type.

California Iron Market

SAN FRANCISCO, Dec. 6.—The pig iron market is quiet at present, so far as actual sales are concerned. There are some indications for 2000 to 3000 tons, but as yet no considerable part has materialized. These offerings, for the most part, are rather lower grade iron than usual, with a high sulphur and phosphorus analysis, and only suited to a few industries on the coast. It is understood prices range from $26 to $27, c.i.f., duty for buyers' account. On low silicon iron current prices are from $29 to $32, according to grade. Some small volume of business in spot materials has been done, but as foundry demand is rather unsteady and limited, the market does not present many features. Domestic quotations are still too high to make business to the coast inviting.

Coke.—This market has been almost uneventful, except for an occasional small sale of a car or two of spot material, and the placing of perhaps 500 tons of foreign coke for December-January shipment. The smelting trade appears to be pretty well stocked for the present. There is no particular change in prices named, the market appearing around $17, ex ship. The steamer Roman Star has just arrived with 2800 tons of English coke. No business in domestic material is reported.

Cast Iron Pipe.—A pre-holiday condition seems to be prevailing along the coast, both in municipal and private business. It is expected, however, that a good volume will be presented after the new year, as many municipalities are contemplating sizable projects. The price remains about steady at $53 for 6-in., delivered. A recession in the soil pipe market has taken place, the new price being 50 off Birmingham base, compared with 45 off, which was in force.

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
Dec.	Lake	Electrolytic*	New York	New York	St. Louis	New York	St. Louis
6	14.12½	13.75	37.00	7.30	6.95	7.55	7.20
7	14.12½	13.75	37.37½	7.30	6.95	7.65	7.30
8	14.12½	13.75	37.50	7.30	6.95	7.60	7.25
9	14.12½	13.75	.....	7.27½	6.95	7.60	7.25
11	14.12½	13.75	37.25	7.27½	6.95	7.60	7.25
12	14.12½	13.75	37.25	7.27½	6.95	7.57½	7.22½

*Refinery quotation.

New York

NEW YORK, Dec. 12.

The markets are all very quiet except copper, purchases of which both for domestic and foreign account have been fairly heavy. On most days the tin market has been dull. The lead market is unchanged and the zinc market is exceedingly quiet.

Copper.—Demand for electrolytic copper has increased within the past week and sales have been fairly heavy for early and first quarter delivery. Consumers have been picking up all the low priced metal obtainable and the market is now firmly established at 14c., delivered, or 13.75c., refinery. The volume of foreign purchases continues large. Lake copper is quoted at 14.12½c. to 14.25c., delivered.

Tin.—The Straits tin market has been largely a dull affair in the last few days. Sales were made on Dec. 7 of about 600 tons, covering November-December and December-January shipments at 37.25c. to 37.50c. Much of this was resale metal, out of town dealers and consumers being the sellers. On Wednesday, Dec. 6, about 250 tons changed hands. Other days, including today, have been dull and slow. Prices in general have advanced, due to higher London prices, with spot Straits tin quoted today at 37.25c., New York. After the statistics were published the London market advanced, but today it had declined quite sharply until prices were about £1 per ton less than those a week ago with spot standard quoted at £175 10s., future standard at £176 15s. and spot Straits at £177 5s. Arrivals thus far this month have been 4010 tons, with the quantity afloat 7428 tons.

Lead.—The lead market is quieter but fairly firm. There is no let up in consumption, nor is there much new business being transacted. There has been no change in the quotations of the leading interest, which stand at 6.90c., St. Louis, or 7.10c., New York. Independent producers are quoting 6.95c., St. Louis, and 7.25c. to 7.30c., New York, and are obtaining business at these levels.

Zinc.—So far as domestic demand is concerned there has been almost no buying this month. Consumers are covered for December and are awaiting developments as to future needs. The market has been practically under the influence of quotations in London and prices have risen or fallen accordingly, but the actual buying from abroad has not been especially heavy. Prime Western zinc for spot delivery commands the highest prices because of its scarcity but the farther away the future position, the lower the quotation. For 30-day delivery prime Western is quoted at 7.20c. to 7.25c., St. Louis, or 7.65c. to 7.60c., New York. Future positions are about five points per month below these levels.

Antimony.—Chinese metal in wholesale lots for early delivery is quoted at 6.35c. to 6.40c., duty paid, New York.

Aluminum.—Wholesale lots for early delivery of virgin metal, 98 to 99 per cent pure, are quoted by importers at 22.50c. to 23c. per lb., duty paid, New York, but the leading interest continues to refuse to make public its regular quotation.

Old Metals.—Prices are a little higher and business is fairly active. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	13.00
Copper, heavy and wire	12.50
Copper, light and bottoms	11.25
Heavy machine composition	10.25
Brass, heavy	8.25
Brass, light	6.50
No. 1 red brass or composition turnings	9.50
No. 1 yellow rod brass turnings	8.00
Lead, heavy	6.25
Lead, tea	5.00
Zinc	5.00

Chicago

DEC. 12.—Copper and lead have declined while tin and zinc have advanced. Buying of copper has been light and confined to immediate requirements. Lead is held rather firmly and another advance by the leading interest would not be surprising although consumptive buying is at a low ebb. Zinc has recovered its recent losses but the market is very dull and users are waiting for another decline. We quote, in carload lots, lake copper, 14.25c.; tin, 38.50c. to 39c.; lead, 7.10c.; spelter, 7.35c.; antimony, 8.50c., in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 11.50c.; copper bottoms, 9.75c.; red brass, 9c.; yellow brass, 7c.; lead pipe, 5.50c.; zinc, 4.62½c.; pewter, No. 1, 23c.; tin foil, 27c.; block tin, 31c., all buying prices for less than carload lots.

St. Louis

Dec. 12.—Lead and zinc are 20 points higher than last week. We quote lead, 7c., carlots, and slab zinc, 7.30 to 7.35c. On old metals we quote: Light brass, 3.50c.; heavy red brass and light copper, 7c.; heavy yellow brass, 4c.; heavy copper and copper wire, 7.50c.; zinc, 2c.; lead, 3c.; pewter, 15c.; tin foil, 20c.; tea lead, 2c., and aluminum, 9c.

Human Problem in Industry Discussed

Substitution of "the rule of reason and intelligence" for force in an effort to restore in America "the freedom of the individual, be he employer or employee," was urged by E. M. Herr, president of the Westinghouse Electric & Mfg. Co., Pittsburgh, at a joint meeting of the American Society of Mechanical Engineers and the American Economic Association, held in New York Dec. 6.

Mr. Herr advocated a change in the immigration laws, saying: "With industry dependent to such a large extent upon foreign-born workers, the recent immigration laws threaten for lack of 'common' labor, the return to and maintenance of normal production, and it is to be hoped that these laws will be made reasonably liberal and that restrictions will be based on fitness instead of as at present without regard to the immigrant's character or qualification to become an American citizen."

Mr. Herr, whose topic was "The Human Problem in Industry," said that, notwithstanding the popular view, the factory system in the United States was not dominated by the "interests" or "trusts," by far the greater number of manufacturing establishments even now being small. More than 300,000 employees are now working in this country under shop representation plans, he said, and in most cases improved relations between management and employees have resulted, Mr. Herr stated.

Enormous waste flows from labor's fears of layoff or discharge, arbitrary exactions and reductions in wages, unfair discipline and ill-health, he charged, urging as a remedy greater public confidence in the investment in industry. Real wages, he asserted, have advanced, despite the high cost of living. The worker must be made more secure in his job by the employer, said Mr. Herr, who advocated insurance against unemployment from sickness. Unemployment on account of the fluctuation in production because of changes in seasonal demand must, he said, be lessened.

PERSONAL

W. L. Allen has resigned as vice-president and general manager of Laclede Steel Co., St. Louis, and will be associated after Jan. 1 with Frank H. Johnson, Chicago, in the sale of the Laclede company's products and those of other steel companies. Prior to coming with the Laclede company, Mr. Allen was president of the Valley Steel Co., East St. Louis, Ill., which was taken over by the Laclede Steel Co. in 1918. After leaving college as a metallurgist, he spent several years in the operating departments of blast furnace, open hearth and finishing mill plants, and was one of the early sales engineers of the armor plate department of the Carnegie Steel Co. in the promotion of chrome-vanadium and alloy steels. He later acted as commercial engineer of the R. D. Nuttall Co. in the development of heat treated gearings. His official connection with the Laclede Steel Co. brought him into intimate contact with the manufacture, sale, and use of hot and cold-rolled strip steels. Mr. Allen has had an unusual combination of sales and operating experience.



W. L. ALLEN

John T. Lewis, who has been assistant general superintendent Newburgh works, American Steel & Wire Co., Cleveland, has been promoted to the position of general superintendent Shoenberger works, Pittsburgh, succeeding Charles F. Hill, who several months ago was made general superintendent Newburgh works. Mr. Lewis is succeeded at Newburgh works by B. E. Pheneger, who has been superintendent Central Furnaces, Cleveland.

Colton D. Noble, formerly sales-manager of the North & Judd Mfg. Co., New Britain, Conn., will resume his duties with the company shortly. Mr. Noble left the company in 1918 to go with the M. S. Brooks Co., manufacturer of hooks, brackets, etc., Chester, Conn.

Emil Manweiler, secretary and general manager Eastern Malleable Iron Co., Naugatuck, Conn., has been appointed Aide-de-Camp on Governor-Elect Charles A. Templeton's Staff, of Connecticut.

George Prendergast, for many years district manager in New York for the Lackawanna Steel Co., has established himself in business at 2 Rector Street, New York, as representative of Dilworth Porter, Inc., maker of tie plates and track spikes, and of the Cleveland Frog & Crossing Co.

C. G. Taylor has been appointed director of purchases of the Westinghouse Electric & Mfg. Co., and will have general supervision of the purchasing activities of all plants comprising the electrical group located at East Pittsburgh; East Springfield, Mass.; Newark, N. J.; Mansfield, Ohio; Cleveland; Trafford, Pa.; South Bend, Ind.; Homewood, (Pittsburgh) Pa., and Derry, Pa. Mr. Taylor has been with the Westinghouse company since 1887 and was appointed assistant purchasing agent in 1895, and in 1917 was made purchasing agent. C. G. Bunnell, who has been appointed purchasing agent of the East Pittsburgh works to succeed Mr. Taylor, has been with the Westinghouse company since 1905. For several years he has had charge of machinery and equipment purchases.

George F. Gustafson has been appointed to the sales force of Manning, Maxwell & Moore, Inc., at Chicago. Until recently he was identified with the Putnam Machine Co., Fitchburg, Mass.

A. N. Pershing and H. F. Bovard have been elected directors of the Keystone Coal & Coke Co., Greensburg, Pa., to fill the vacancies caused by the resignations of Richard C. Coulter and Robert K. Cassatt. Mr. Bovard is vice-president and general manager and Mr. Pershing is vice-president and treasurer of the company.

James E. Frost, general superintendent Alabama Co., Birmingham, Ala., has been appointed operating vice-president and as such will rank next to John W. Porter, who was recently appointed vice-president and general manager, in place of Harry W. Coffin, retired. Mr. Frost is a graduate of Lehigh and has held responsible positions with such companies as the Republic Iron & Steel Co., the Sloss-Sheffield Steel & Iron Co. and the Gulf States Steel Co.

Gordon Lee, chief of the automotive division of the Bureau of Foreign and Domestic Commerce, has resigned. Following his resignation which becomes effective Dec. 15 he will take up the work of directing foreign sales for the Yellow Cab Mfg. Co., Chicago, assuming those duties at the first of the year.

R. J. Rudd, for several years connected with the sales force of the American Hoist & Derrick Co., St. Paul, Minn., and recently with the T. H. Letson Co., 50 Church Street, New York, is now associated in a selling capacity with Philip T. King, 30 Church Street, New York, dealer in used locomotive cranes and other used equipment.

Alfred B. Carhart, vice-president and sales manager Crosby Steam Gage & Valve Co., Boston, and previously for ten years works manager at the Crosby factory of that company, has resigned to become president and general manager of the Precision Instrument Co., 21 Halsey Street, Newark, N. J. He is a mechanical and electrical engineer, a graduate of Princeton University, and before going to Boston was connected with several manufacturing companies in New York.

D. P. Cromwell has been appointed superintendent of the Hubbard blast furnace department of the Youngstown Sheet & Tube Co., Youngstown, Ohio, located at Hubbard, Trumbull County. He succeeds Ernest Evans, transferred to the East Youngstown plant. Mr. Cromwell was formerly located at the company's East Youngstown blast furnaces.

J. F. Kurtz, Jr., for many years associated with the Crucible Steel Co. of America, and for the past seven years assistant general sales agent, has resigned.

J. A. Adamson, formerly district engineer in the New York office of Lockwood, Greene & Co., engineers, has been appointed manager for the New York office of the John W. Ferguson Co., United Bank Building, Paterson, N. J.

E. P. Merrill has been appointed general manager of steel sales for the British Empire Steel Corporation, Ltd., with headquarters at Montreal, Canada. He will also have charge of all steel sales of the corporation's subsidiaries.

T. E. Doremus, who for the past three years has represented E. I. du Pont de Nemours & Co., as general eastern manager for the Orient, with headquarters at Shanghai, China, has returned to the United States. He is now located at Seattle, Wash., where he is manager of the explosives department of the du Pont company.

Paul L. Battey and Alfred R. Kipp have incorporated under the name Battey & Kipp, Inc. Their offices will be located at 123 West Madison Street, Chicago, and their business will consist in general engineering.

T. A. Martin, for many years identified with the George H. Smith Steel Castings Co., Milwaukee, Wis., has become associated with the Farrell-Cheek Steel Foundry Co., Sandusky, Ohio, as general superintendent.

G. S. Rutherford, who has been manager of the Detroit plant of the Solvay Process Co. during the past

year, has been appointed assistant to the president of the company at the home office, Syracuse, N. Y. The change became effective Dec. 1. W. C. Shallcroft, formerly assistant to Mr. Rutherford, has been appointed manager of the Detroit plant.

L. E. Blackburn, who has been connected with the Dupont company for many years on the engineering staff, has been appointed plant engineer for the Olds Motor Works, Lansing, Mich., to succeed Walter S. Kidd, who resigned recently announcing his intentions of engaging in a private enterprise at Wilmington, Del.

OBITUARY

WILLIAM B. DEAN, member of the firm, Nicols, Dean & Gregg, heavy hardware and automotive equipment, St. Paul, Minn., died at his home in that city on Dec. 6. Mr. Dean was born in Pittsburgh in 1838, and when he went to St. Paul at the age of 18 he entered the employ of Nicols & Berkey, successors to the first hardware dealer in the city. Four years later he succeeded Mr. Berkey as partner. His wide range of interests made him prominent in social as well as industrial circles. As a member of the executive committee of the Great Northern Railroad and a director for 22 years, Mr. Dean was a prominent factor in framing the policies of the transcontinental system. He also served in the Minnesota legislature and was a director on many state, local and industrial governing bodies.

EDWARD L. HUTCHINSON, manager of the plate department, Moltrup Steel Products Co., Beaver Falls, Pa., died at his home there on Dec. 4. He was born in Allegheny, Pa., 68 years ago and was secretary-treasurer of the Emerson-Smith Saw Works, prior to its absorption by the Moltrup Steels Products Co., and also secretary of the Ingram-Richardson Mfg. Co., Beaver Falls.

W. B. EVEREST, general traffic manager, Westinghouse Electric & Mfg. Co., died at his home in Pittsburgh on Dec. 5. He was born July 3, 1868, at Newark, N. J., and has been located at the East Pittsburgh works of the Westinghouse company since 1884. He previously had been with the United States Electric Co., Newark, N. J., which was absorbed by the Westinghouse company. He had held the position of general traffic manager since 1914.

FRED AUGUSTUS MARSH, general purchasing agent Link-Belt Co., Chicago, died at his home in that city Dec. 11, following a stroke of apoplexy. Mr. Marsh was 51 years of age and had been connected with the Link-Belt Co. for 30 years. He had long been active in the National Association of Purchasing Agents, in which he had held important official positions.

Fact Finding Commission's Policy

WASHINGTON, Dec. 12.—Because it has no authority to compel agreement, the Fact Finding Coal Commission will seek only by persuasion and suggestion to bring about an understanding between bituminous operators and miners. This was decided at a conference in Washington this week, called by Chairman John C. Hays Hammond, of the commission, as the result of the failure of the operators and miners to reach an agreement at their recent conference in Chicago. The spectacle of the country being faced with another coal strike next April has created genuine concern on the part of the commission and great disgust on the part of Government authorities generally, as is evidenced by their expressed sentiments. It has been pointed out by Mr. Hammond that the commission has nothing to do with arbitrating differences between operators and miners and consequently will make no attempt to settle controverted points other than by suggestion. He said that the representatives of each side have been called in an attempt to impress upon them that "the American people expect a wage agreement to dismiss the possibility of another coal strike next April."

The commission yesterday had before it President W. K. Fields of Pittsburgh Coal Co., Pittsburgh, and President Michael Gallagher of the M. A. Hanna Coal Co., Cleveland. President John L. Lewis, United Mine Workers of America, is expected to appear during the week.

METAL LATH STANDARDS

Reduction of Varieties and Weights Recommended by Trade Meeting at Washington

WASHINGTON, Dec. 12.—Meeting here to-day with William A. Durgin, head of the division of simplified practice, Department of Commerce, 33 manufacturers, distributers and users of metal lath adopted resolutions calling for the reduction in varieties of flat lath from approximately 80 to 9 and the reduction in weights of rib lath from 10 to 7, with the probability that the latter will be reduced further at later conferences. It also was recommended that tolerances be not greater than 0.1 lb. per sq. yd., based on lots of not less than 1000 sq. yd. Present sheet mill practice calls for a tolerance of 2½ per cent, while that recommended at the conference runs to a maximum of 4 per cent.

The recommendations, if adopted by 80 per cent of the metal lath manufacturers, will be adopted and the standards put into effect for one year beginning July, 1923. It is estimated that 33,000,000 sq. yd. of metal lath, equivalent to about 48,000 net tons, will be consumed in 1922, a large increase over previous years, both because of the growing use of metal lath and the large building program of the present year.

The following are the sizes of metal lath that it was recommended be the only recognized standards, though their adoption is not to affect steel stocks on hand.

Standards of Flat Lath, Weights per Sq. Yd.

Painted Steel	Special Metal	Galvanized Before
2.2	2.2	
2.5	2.5	2.5
3.0	3.0	
3.4	3.4	3.4

¾-In Rib Lath Standards

2.5		
3.0	3.0	
3.8	3.8	
4.8	4.8	

The conference urged that every effort be made in the metal lath industry to direct practice to a consolidation of the 2.5, 3 and 3.8 lb. sizes to a single intermediate weight. It also was recommended that there be transmitted to an auxiliary conference of lath manufacturers the sense of the conference of today that sheet lath be standardized at 4.5 lb.

In addressing the conference Secretary Hoover said that there is a big gap between the cost of production and the price at which articles reach the consumers and that overcoming such a gap is probably the most difficult problem in trade today. He declared that the only way is to keep up consumption and eliminate waste of the process of distribution, and he pointed out that simplification is of extreme importance in this direction.

He said that he did not think that wages are coming down. It was asserted by the Secretary that prices of agricultural products are not in line with prices of manufactures and said the situation is due to maladjustment following the war. The real attack, he pointed out, is fundamental elimination of waste. Replying to claims that standardization means elimination of competition, the Secretary said that the opposite is true, because it intensifies competition.

The November wage distribution by industries at Youngstown, amounting to $5,739,475, established a new monthly record for the year, exceeding the October disbursement by $109,981. During the first 11 months of 1922, the industries paid approximately $48,000,000 in wages, comparing with a total distribution last year of $50,384,741. Employment is now well sustained, reflecting the stable industrial situation, and it is expected the 1922 payroll will exceed that of the previous year.

Machinery Markets and News of the Works

D., L. & W. ISSUES LIST

Lackawanna Asks for Prices on 27 Tools — Railroad Buying Still Predominates

Outlook for 1923 Is Good, in the Opinion of Manufacturers and Dealers

THE Delaware, Lackawanna & Western Railroad has issued an inquiry at New York for 27 machine tools, most of them for its shops at Kingsland, N. J. The Chicago, Burlington & Quincy has made additional purchases at Chicago, and still has about $100,000 worth of tools to buy. No action has been taken on the large inquiry of the Chicago, Milwaukee & St. Paul. Railroad business in general is fairly active, there being a fair volume of smaller orders. It is now estimated that the total purchases of the Pennsylvania Lines East for new shops at Altoona, Pa., total several hundred thousand dollars exclusive of the cranes, which were bought a few months ago at a cost of about $225,000. Early action is expected at Cincinnati on the list of 53 machines issued by the Missouri Pacific Railroad.

At Pittsburgh two new lists have appeared, one from the Duquesne Light Co. and the other from the Western Penitentiary. It is expected that the tools inquired for some time ago by the National Tube Co. for its new plant at Gary, Ind., will be bought shortly.

In general, the machinery markets reflect the approach of the end of the year and many prospective purchasers are postponing buying until after the inventory period. It is believed in the trade that the foundation has been laid in the past few months for a very satisfactory 1923 business.

Further advances in prices are being announced by some machine-tool builders and other rises are said to be in prospect for Jan. 1.

New York

NEW YORK, Dec. 12.

THE Delaware, Lackawanna & Western Railroad [illegible] shops at Kingsland, N. J., Kingston, Pa., and Buffalo. Most of the tools are for Kingsland, where the capacity of the shops will be considerably increased. Purchases of the Pennsylvania Lines East for its new shops at Altoona, Pa., are now said to total several hundred thousand dollars, not including the orders for cranes, amounting to $225,000, which was placed a few months ago. In other respects the Eastern machine-tool market is rather dull.

The list of the Delaware, Lackawanna & Western Rail[illegible]

One 500-ton single-end car wheel press.
Two 20-in. heavy-duty vertical drilling machines.
One Whiton 6-in., 2-spindle centering machine.
One Whiton 4-in., 2-spindle centering machine.
One duplex control, motor-driven, horizontal-boring, drilling and milling machine; diameter of spindle 4 in.
One planer, 48 x 48 in. x 10 ft.
Two heavy-duty engine lathes, 30 in. x 8 ft. [illegible] centers.
One Warner & Swasey No. 2 universal hexagon turret lathe.
One 36-in. Morton draw-cut pillar shaper.
Two motor-driven, double-spindle floor grinders, wheel 18 in., 3 in. face.
Two double-spindle sensitive drilling machines, ⅛ to ¾ in.
One No. 5 Cincinnati plain milling machine.
One double-end punch and shear, 40-in. throat.
Two Chicago steel power bending brakes.
Three 20-in. engine lathes, two for Buffalo and one for Kingston.
One 32-in. shaper for Kingston.

No new crane inquiries of any size are reported, and most of the larger inquiries that have been pending for some time are still under consideration. W. C. Perry, 878 Elm Street, New Haven, Conn., is in the market for a used 20 or 25-ton, 60-ft. span, overhead traveling crane. Inquiry for locomotive cranes is heavy but few orders are so far noted. Considerable interest is exhibited by prospective purchasers in used equipment. The hand-power crane field is quiet, but an exception to this general condition is an inquiry stated to be current calling for 14 small capacity cranes, 1-motor driven. The Bureau of Supplies and Accounts opened bids to-day at the Brooklyn, N. Y., office, Thirtieth Street and Third Avenue, on the sale of three 20-ton Link-Belt locomotive cranes, two buckets and two extra booms, one Link-Belt and the other Ohio, and two locomotives all at Constable Hook, N. J.

Among recent purchases are:

Slattery Engineering & Construction Co., 10 East Forty-third Street, New York, a 10-ton crawl-tread crane, from the Brown Hoisting Machinery Co.;

O. B. S. Co., Philadelphia, a 10-ton, crawl-tread crane for use on bridge construction work in Westchester County, N. Y., from the Brown Hoisting Machinery Co.;

Oklahoma Central Power Co., Chicago, Ill., a 50-ton, overhead traveling crane from the Niles-Bement-Pond Co.;

Union Building & Construction Co., Passaic, N. J., a 7-ton locomotive crane from the Orton & Steinbrenner Co.;

American Locomotive Co., for installation at Schenectady, N. Y., two 150-ton, 75-ft. span, double trolley, overhead cranes and two 20-ton, 71-ft. span, double trolley, overhead cranes, from the Niles-Bement-Pond Co.

The General Equipment Co., 30 Church Street, New York, was high bidder on the three used Link-Belt Locomotive cranes sold by the Bureau of Supplies and Accounts on Dec. 12, which are located at Constable Hook, N. J.

The V & O Press Co., manufacturer of presses, dies and sheet metal working machinery, for many years located in Glendale, Brooklyn, N. Y., has started work on a new factory at Hudson, N. Y., to which city the business will be moved about May 1, 1923. The new building will give improved and increased facilities for the manufacture of the company's products and will also permit of broadening the scope of its operations.

The Department of Public Works, Albany, N. Y., C. L. Cadle, superintendent, will commence the erection of a new electric power plant at the Vischer Ferry dam, Saratoga County, for use in connection with the State Barge Canal, estimated to cost $300,000.

L. Schlenker, 255 Centre Street, New York, manufacturer of dies, tools, etc., has inquiries out for a 100-lb. drop hammer.

The United States Engineer Office, Army Building, New York, will receive bids until Dec. 16 for 30 crane rail brackets and 12 roof girders, as specified in circular 2659.

The Empire State Ice Co., 76 West Monroe Street, Chicago, has purchased property at the northeast corner of Grant Avenue and 161st Street, for the erection of a three-story plant to cost $200,000, with machinery.

The Mason Motor Truck Co., Flint, Mich., a subsidiary of the Durant Motors, Inc., 1819 Broadway, New York, will operate an eastern assembling plant in a portion of the factory of the Locomobile Co., Bridgeport, Conn., another interest of the Durant organization.

Fire, Dec. 7, destroyed a portion of the plant of the Fuller & Warren Co., Lower River Street, Troy, N. Y., manufacturer of stoves, castings, etc., with loss reported at $60,000.

The Department of Plant and Structures, Municipal Building, New York, is having plans prepared for a four-story service and repair works for the equipment of the Department of Parks, at Columbus Avenue and Seventy-seventh Street, estimated to cost $400,000, with machinery.

J. H. Pardee, head of the J. G. White Management Corporation, 43 Exchange Place, New York, and associates, are arranging for a reorganization of the Richmond Light & Railroad Co., Staten Island, which has been in receivership for a number of years. The new company will take over the property for $2,000,000 and will extend and improve the plant and system for light and power service. Mr. Pardee will be president.

The American Brake Shoe & Foundry Co., 30 Church Street, New York, has negotiations in progress for the sale of its plant on Avenue L, Newark, to an industrial company in kindred line of production, whose name is temporarily withheld. It is said that the selling company will discontinue operations in the Newark district.

The Brooklyn Edison Co., 360 Pearl Street, Brooklyn, has called a special meeting of stockholders, Dec. 22, to arrange for an increase in capital from $30,000,000 to $50,000,000, the majority of the proceeds to be used for extensions. A fund of $15,000,000 will be utilized for a new generating plant at Hudson Avenue and the East River, to have an ultimate capacity of 400,000 kw., and other power plant extensions. In addition it will expend an average of $500,000 a month during 1923 for new machinery for existing power houses and substations and extensions in transmission lines. M. S. Sloan is president.

Scott & Williams, Inc., 366 Broadway, New York, manufacturer of knitting machinery and parts, has arranged for an increase in capital from $1,000,000 to $2,000,000, a portion of the proceeds to be used for extensions.

The Linde Air Products Co., 30 East Forty-second Street, New York, has work under way on a new plant at North Anthony and St. Louis Streets, New Orleans.

The Richardson & Boynton Co., Dover, N. J., is disposing of a bond issue of $1,000,000, a large portion of the proceeds to be used for extensions and improvements. D. Rait Richardson is president.

Henry Maurer & Son, Maurer, Perth Amboy, N. J., manufacturers of firebrick, refractories, etc., have acquired about 10½ acres in East Brunswick Township, to be used in connection with their local works.

The United Lead Co., Maurer, Perth Amboy, N. J., has work in progress on an addition, 300 x 300 ft., and plans to commence the installation of equipment at an early date.

Fire, Dec. 6, destroyed the lumber mill of Brady Brothers, Avenue E, Bayonne, N. J., operated under the name of the Consumers' Coal & Ice Co., with loss of about $250,000, including power equipment, woodworking machinery, etc. It is planned to rebuild.

Officials of the Empire Cream Separator Co., Nelson Place, Bloomfield, N. J., have organized the Empire Milking Machine Co., with capital of $500,000, to manufacture automatic milking machines and other dairy machinery. The company is headed by D. J. Welsh, H. E. McWhinney and E. A. Haeusler.

A vocational department will be installed in the four-story and basement high school to be erected at Woodbury, N. J., estimated to cost $300,000.

Fire, Dec. 5, destroyed two shops, including forge shop, at the repair works of the Erie Railroad Co., Secaucus Road, Jersey City, N. J., with loss estimated at $20,000.

The Public Service Production Co., Public Service Terminal, Newark, a subsidiary of the Public Service Corporation, has taken title to the new four-story reinforced-concrete building at Clinton Avenue and Twenty-first Street, Irvington. The first two floors will be equipped for a general machine and repair works for motor trucks and cars of the parent organization. The top floor will be equipped as a complete service and testing laboratory. N. A. Carle is head.

The Board of County Freeholders, Woodberry, N. J., is planning for the installation of a new electric lighting plant at the County Farm, Clarksboro.

The Thatcher Furnace Co., Garwood, N. J., with branch plant on St. Frances Street, Newark, has arranged for an increase in capital from $750,000 to $1,160,000, a portion of the proceeds to be used for extensions.

Fire, Nov. 28, destroyed a portion of the plant of the Fernando C. Mesa Co., Chancellor Avenue, Irvington, N. J., manufacturer of electrical porcelain products, with loss estimated at about $75,000, including tool department and power house.

A vocational department will be installed in the new high school to be erected at Millville, N. J., estimated to cost $350,000, for which an appropriation has been received.

The American Water Works & Electric Corporation, 50 Broad Street, New York, will issue bonds for $1,500,000 in connection with its recent purchase of the Commonwealth Water Co., Summit, N. J., and vicinity, a portion of the proceeds to be used for extensions and improvements.

The Keystone State Construction Co., 17 West Forty-second Street, New York, and Providence, has purchased from the Worcester plant of the Whitcomb-Blaisdell Machine Tool Co., the following used tools: One 18-in. lathe, a power hack saw and a tool room grinder. The Grant Mfg. & Machine Co., Bridgeport, purchased from Pratt & Whitney a used 2½-in. Lucas boring mill. Both sales were arranged through Allen Ashley, clearing house for surplus machinery, 152 West Forty-second Street, New York.

Export Opportunity

Printer & Co., 711 Elphinstone Road, Bombay, India, advise THE IRON AGE that they are desirous of representing American manufacturers of metals, machinery and hardware.

New England

BOSTON, Dec. 12.

SALES of machine tools have increased, but business is far from active and is largely confined to used equipment. The most important sale of new equipment was a car wheel boring machine taken the past week by the Bangor & Aroostook Railroad. The Boston & Maine is about to close on a new 4-in. pipe machine, and the Boston & Albany on a 24-in. lathe. It is believed these sales will constitute the last business placed this year by the New England carriers. Most of them have made up their 1923 machine tool requirements, and in certain cases fair lists are represented. The question of financing machine tool purchases, however, has not been settled. Since last reports a Florence, Mass., manufacturer purchased a new 16-in. shaper; a New Hampshire interest several used upright drills and a lathe; a Connecticut manufacturer bought two milling machines and other metal-working interests have closed on odds and ends in used equipment, including a universal boring machine, which went to Ohio.

Machinery dealers have put out additional prices on miscellaneous equipment in the past week. The Laconia, N. H., authorities have issued their school machine shop requirements, which involves 15 tools, but purchase against the list will not be made until spring. Stone & Webster, Boston, are inquiring for a 75-ton, four motor, 54-ft. span crane for an Indiana plant.

The tendency of prices continues upward. A Hartford, Conn., manufacturer has made an advance of about 10 per cent on planers, and smaller percentages on other tools. Used machinery dealers report better prices on some offerings.

The Gibby Engineering Co., 96 Condor Street, East Boston, was awarded the hand stokers for the Calf Pasture Pumping Station, Dorchester, Mass. The firm's bid was $3,148.

The State of Massachusetts, Department of Mental Diseases, W. A. Merrill, 109E State House, Boston, is asking bids until Dec. 18 on boilers, stokers, fan and engine equipment.

The Gillette Safety Razor Co., South Boston, has plans under way for an eight-story addition which will be devoted exclusively to the manufacture of razor blades. No financing will be necessary in connection with the enlargement.

The navy radio station, Miami, Fla., has been acquired by the Tropical Radio Telegraph Co., a subsidiary of the United Fruit Co., Boston. The station will be enlarged and new equipment installed.

The plant formerly occupied by the Lindquest Engineering Works, Marlboro Street, Portland, Conn., has been taken over by the Portland Machine Co. of which Charles J. Grimes, East Main Street, is general manager. It will specialize in regrinding automobile cylinders and piston work. The shop will be in charge of John Foley, Freestone Avenue.

A hydro-electric power plant of 35,000 hp. capacity is to be erected on the Pemigewasset River, near Bristol, N. H., by the Utilities Power Co. Herbert B. Rust is president, and Bertram Blaisdell, treasurer, both of Meredith, N. H.

The New York, New Haven & Hartford Railroad Co., South Station, Boston, has started work on a concrete coaling plant for locomotives at its Worcester, Mass., yards, to cost about $45,000. It also has foundations under way for a new brick and steel engine house and repair shop on Dorchester Avenue, South Boston, to cost approximately $75,000.

Bird & Son, Inc., 185 Devonshire Street, Boston, manu-

[illegible] is having plans prepared for an addition to its plant at East Walpole, Mass. Monks & Johnson, 99 Chauncey Street, are architects.

Sleeper & Hartley, Inc., 335 Chandler Street, Worcester, Mass., manufacturer of wire machinery, has commenced the erection of a one-story addition.

The Bangor & Aroostock Railroad Co., Bangor, Me., has plans for a new coaling station at Squa Pan, Me., to be equipped with automatic machinery.

The Keystone Mfg. Co., 53 Wareham Street, Boston, manufacturer of metal toys, plans the installation of a punch press and other equipment.

Stockholders of the American Screw Co., 21 Stevens Street, Providence, R. I., have approved an increase in capital from $3,000,000 to $4,500,000, a portion of the proceeds to be used for extensions and improvements.

The Transloid Products Co., Danbury, Conn., recently organized to manufacture composition products, has purchased the former factory of Warner Brothers, East Liberty Street, and will take immediate possession. Charles Hetzel is president and general manager.

The Hart & Hegeman Mfg. Co., Hartford, Conn., manufacturer of wiring equipment and other electrical apparatus, is taking title to the former plant of the Hartford Auto Parts Corporation, Russ and Lawrence Streets, and will use the structure for extensions.

Fire, Dec. 6, destroyed a portion of the power house, and cutting and polishing plant of the Columbia Granite Works, Inc., Westerly, R. I., with loss estimated at $40,000, including equipment.

The Board of Education, Rockville, Conn., is having tentative plans drawn for an addition to the high school, to be used entirely for the vocational departments. Charles Phelps is chairman of the board.

The James Russell Boiler Works, Inc., 9 Dewar Street, Boston, has plans for an addition and will break ground at once.

A manual training department will be installed in the two-story junior high school, 221 x 225 ft., to be erected at Lynn, Mass., estimated to cost $400,000. George A. Cornet, Donahue Building, is architect.

Latham & Crane, Inc., Willimantic, Conn., manufacturer of planing mill products, is planning to rebuild the portion of its plant destroyed by fire Nov. 24, with loss estimated at $35,000, including equipment.

The Tileston & Hollingsworth Co., 49 Federal Street, Boston, manufacturer of paper products, will commence the erection of another addition to its plant on River Street, to cost $30,000. Work has recently been placed under way on an addition to the machine department.

The H. & B. Machine Co., Attleboro, Mass., will commence the erection of the superstructure for a one-story addition to its Machine Shop No. 1, near the Pawtucket, R. I., line, to cost about $100,000, including equipment. E. P. Sheldon & Son, 15 Westminster Street, Providence, R. I., are architects.

Lucas & Son, Bridgeport, Conn., are inquiring for four Garvin No. 3, duplex milling machines with 40-in. feed.

Philadelphia

PHILADELPHIA, Dec. 11.

THE North American Foundries Corporation, Philadelphia, is being organized by local interests to take over the plant of the Thurlow Steel Works, Inc., Fourth and Booth Streets, Chester, Pa., recently acquired at a receiver's sale by Edwin H. Gackenbach of Gackenbach & Co., Inc., Widener Building, investment securities, who is interested in the new company. The plant will be remodeled for the manufacture of pistons for automobile engines, and a line of automotive castings. It is expected to commence operations in February.

Paul Brosz, 2511 West Huntingdon Street, Philadelphia, is making inquiries for a planer, band saw; bench tools and other equipment for his proposed wood-working shop.

The American Railway Express Co., Eighth and Market Streets, Philadelphia, will commence the erection of a two-story service and repair building for company trucks, 100 x 200 ft., at Thirtieth Street and Columbia Avenue.

H. M. and C. B. Siner, Church and Tacony Streets, Philadelphia, brick manufacturers, will build a one-story power house in connection with other extensions.

The James H. Billington Co., 113 Chestnut Street, Philadelphia, manufacturer of textile equipment, mill supplies, etc., has awarded contract to F. L. Hoover & Sons, 1023 Cherry Street, for an addition to its plant on North Fifth Street, to cost about $25,000.

An appropriation of $160,000 has been approved by the City Council, Philadelphia, for the installation of a power system and concrete tunnels at the institution for feeble minded at Byberry. On another requisition, a 50-ton refrigerating plant will be purchased for the city hospital. F. T. Armstrong, room 316, City Hall, is purchasing agent.

The Great Atlantic & Pacific Tea Co., Broad and Somerset Streets, Philadelphia, has leased the building at Twenty-fourth and Bonsall Streets for the establishment of a service and repair works for company motor trucks.

The Edward G. Budd Mfg. Co., Twenty-fifth Street and Hunting Park Avenue, Philadelphia, manufacturer of steel automobile bodies, has taken title to a five-story concrete factory at the northeast corner of Twenty-fifth and Stokley Streets, heretofore held by the Simmons Co., for $425,000. It will be used for extensions.

The Merchant & Evans Co., 2035 Washington Avenue, Philadelphia, manufacturer of roofing, etc., is said to be arranging a list of sheet-metal machinery and other equipment for installation in an addition.

The Electric Power Equipment Corporation, Thirteenth and Wood Streets, Philadelphia, manufacturer of high-tension electric switches and other equipment, has acquired the former Darby Building, Eighteenth Street, for a new plant. It will be remodeled and the present works will be removed to this location. L. R. Lewis is president.

The Foreign Trade Bureau of the Philadelphia Commercial Museum, Thirty-fourth Street, has received an inquiry from a company at Havre, France, desiring to get in touch with a manufacturer of belt fasteners. Full information available upon request.

The Pennsylvania Brick & Tile Co., foot of Westmoreland Street and the Delaware River, Philadelphia, will commence the erection of a new plant, for the manufacture of cement-brick, estimated to cost $100,000 exclusive of land. In addition to manufacturing equipment, the installation will include mechanical handling and conveying machinery of different kinds, to provide for complete automatic operation. The works will have a capacity of 150 bricks per day. Louis F. Drucker is president, and Lloyd M. Chapman, engineer.

The Board of Education, Nineteenth and Chestnut Streets, Philadelphia, is planning for the erection of a three-story trade and vocational school, 150 x 170 ft., at Spring Garden and Brandywine Streets, to cost about $750,000, including equipment.

The John A. Roebling's Sons Co., Trenton, N. J., manufacturer of wire rope, cable, etc., has authorized an increase in capital from $15,000,000 to $34,500,000, a portion of the proceeds to be used for extensions. Col. Washington A. Roebling is president.

A manual training department will be installed in the new school to be erected on North Montgomery Street, Trenton, N. J., for colored students, for which plans are being completed by William Slack & Son, St. Regis Building, architects.

A manual training department will be installed in the new high school to be erected at Bordentown, Pa., for which bids on a general contract are being taken. Fowler, Seaman & Co., Broad Street Bank Building, Trenton, are architects.

The Hubley Mfg. Co., Plum Street and Elizabeth Avenue, Lancaster, Pa., manufacturer of toy metal banks, etc., has awarded a contract to John Wickersham, Breneman Building, for a four-story addition, 45 x 85 ft., in the Rossmere district. J. H. Hartman is in charge.

James Farnam, 114 West Eighteenth Street, Chester, Pa., architect, is preparing plans for a one, two and four-story industrial plant, with power house, at Baltimore, totaling 165 x 325 ft., for a company whose name is temporarily withheld. Bids will be called at an early date.

The Elk Graphite Milling Co., St. Marys, Pa., a subsidiary of the Speer Carbon Co., with local plant, will soon commence the erection of a new plant in the Rettger section, for the manufacture of graphite products.

A manual training department will be installed in the new two-story and basement high school to be erected at New Holland, Pa., estimated to cost $100,000, for which plans are being prepared by Clifford Townsley, New Holland, architect. B. G. Good is president of the Board of Education.

The Harrisburg Mfg. & Boiler Co., Nineteenth and Naudain Streets, Harrisburg, Pa., manufacturer of boilers, tanks, etc., has purchased property at Blackwood and Bolton Streets for expansion.

The Independent Oil Co., Allentown, Pa., will commence the immediate rebuilding of its distributing plant at Twelfth and Liberty Streets, partially destroyed by fire Nov. 30, with loss reported at $60,000, including equipment.

The Lebanon Machine Screw Co., Lebanon, Pa., has taken out a State charter with capital of $25,000 to manufacture machine screws and kindred mechanical products. Property has been acquired at East Lebanon and work on a one-story plant will commence at once. J. Warren Light, Fourth Avenue and Lehman Street, is treasurer.

The Kurtz Brothers Furniture Co., Avenue B and West

Union Street, Bethlehem, Pa., manufacturer of hotel and school equipment, etc., has awarded contract to the R. S. Rathbun Contracting Co., Bethlehem, for eight factory buildings, with main structure one-story, 60 x 270 ft., to replace its plant recently destroyed by fire with loss of $750,000. The new plant, with machinery, will cost approximately a like amount. John and Charles Kurtz head the company.

The Coopersburg Granite Co., Coopersburg, Pa., will commence the erection of a new plant for cutting, grinding, polishing and finishing marble. A list of equipment will soon be arranged.

G. W. Corbett, 63 High Street, Pottstown, Pa., will install equipment in a local building for a foundry to specialize in the production of steel and semi-steel castings.

The Harrisburg Stanley Spring Works, Cameron and Calder Streets, Harrisburg, manufacturer of automobile springs, will install additional equipment to increase its capacity about 50 per cent, including a new furnace. C. C. Sampson is president and general manager.

The Middlesex Electric Light, Heat & Power Co., Carlisle, Pa., has been organized under State laws to install and operate a light and power plant and system in this section. Robert C. Brenneman, Carlisle, is treasurer.

The Conewago Felt & Paper Co., York Haven, Pa., now being organized under Maryland laws with capital of $300,000, will build a local paper mill, to include departments for corrugated paper products and saturating felt. A site has been acquired on Conewago Creek, about one mile from the city, and ground will be broken early in the coming year. E. E. Brunner, president York Haven State Bank, heads the new organization. O. R. Emigh will be vice-president and general manager.

The Penn Seaboard Steel Corporation, 1417 Sansom Street, Philadelphia, is in immediate need of one 9 to 12-ton, double-acting, double-frame steam hammer, of 12 to 15-ft. clearance between legs and 150-lb. per square inch steam pressure.

The Carbondale Machine Co., Carbondale, Pa., is in the market for 200 to 300 ft. of octagon, cold-rolled steel 2⅜ in. across flats, for screw machines.

Stone & Webster, Inc., Boston, has recently opened a branch office in Philadelphia at 307 Real Estate Trust Building, with George Chamberlain as manager. The company has several million dollars' worth of work under way in that city, including the Jefferson Hospital, a new building for the Insurance Co. of North America, a district service building for the Western Union Telegraph Co. and foundations for a power house extension for the Philadelphia Electric Co.

Baltimore

BALTIMORE, Dec. 11.

JAMES E. SMITH, an official of the Chesapeake Paper Board Co., Claggett and Woodall Streets, Baltimore, has acquired at a public sale the plant and property of the Ironsides Board Corporation, Norwich, Conn., for $200,000. The new owner is planning to remodel the plant and place it in operation at an early date. It will be run as a branch mill and certain machinery exempted from the sale replaced.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until Jan. 9 for five machine tools for the naval base, Bellevue, D. C., schedule 353; until Dec. 19 for 6000 ft. No. 8 single conductor cable for the Puget Sound Navy Yard, and 6000 ft. of three-conductor cable.

The Bartlett Hayward Co., Scott and McHenry Streets, Baltimore, manufacturer of machinery and parts, has taken out a permit for its one-story foundry, 202 x 262 ft., at Monroe and Nanticoke Streets, to cost about $125,000, including equipment.

A manual training department will be installed in the new high school to be erected at Catonsville, Md., estimated to cost $250,000, for which plans are being prepared by Smith & May, 763 Calvert Building, Baltimore, architects.

The Granite Carbonating Co., Kinston, N. C., recently organized to manufacture soda fountains, including portable fountains, is perfecting arrangements for a plant, to comprise an existing building which will be remodeled. It will include a foundry, machine shop and general metal-working department. H. F. Walker is president and general manager.

The Carolina Power Co., Raleigh, N. C., has arranged a fund of $6,000,000 for power plant construction, including extensions and improvements in the plants and systems of its affiliated organizations, the Carolina Power & Light Co., and the Yadkin River Power Co. The work will include the construction of a hydroelectric generating station on the Cape Fear River, near Brickhaven, with an ultimate capacity of approximately 60,000 kw. The first unit is expected to be ready for service late in 1923.

The Carolina-Tennessee Power Co., Murphy, N. C., is perfecting plans for a hydroelectric power house on the Hiwassee River, Cherokee County, comprising two individual units with total capacity of 60,000 kw., estimated to cost $5,000,000. W. V. N. Powellson is president, in charge.

The Bedford Pulp & Paper Co., Richmond, Va., has plans for a three-story addition to its paper mill at Big Island, Va., 60 x 140 ft., estimated to cost $35,000, exclusive of machinery. The company recently issued bonds for $800,000, to be used in part for expansion. Charles K. Bryant, 1808 Hanover Avenue, Richmond, is architect.

The Pennsylvania Railroad Co., Baltimore, has awarded contract to the John P. Pettyjohn Co., Lynchburg, Va., for a new engine house, with repair extension and oilhouse at Hagerstown, Md., to cost $50,000.

The Bureau of Yards and Docks, Navy Department, Washington, D. C., will take bids until Jan. 24 for a refrigerating and ice-manufacturing plant for the naval station at Pearl Harbor, H. T., specification 4735.

The Federal Storage Battery Co., P. O. Box 111, Alexandria, Va., has leased a local building and plans the immediate installation of equipment to manufacture electric storage batteries. George W. Carroll is general manager.

Property of the McCullough Iron Works, foot of Seventh Street, Wilmington, Del., including machinery, galvanizing equipment, tools, etc., will be offered at public sale, Dec. 20.

A one-story electric power plant will be constructed by the Virginia Woolen Co., Winchester, Va., in connection with its new local mill estimated to cost $80,000. T. B. Patton is president. Lockwood, Greene & Co., Atlanta, Ga., are architects and engineers.

The Lincoln Furniture Co., Bristol, Va., recently incorporated with a capital of $500,000, has awarded contract for a new plant, comprising about 72,000 sq. ft. of floor area, with power house, machine shop and other departments, estimated to cost $100,000, with machinery. C. C. Lincoln, Sr., is president.

The General Purchasing Officer, Panama Canal, Washington, will take bids until Dec. 20 for the following equipment for the canal zone: 15,000 ft. of plow-steel hoisting rope; 2000 ft. of iron or steel rope; 1600 lb. of soft steel wire; 20,000 ft. of safety fuse; one air and oil pumping outfit; 50 cast steel separators; 150 ft. of brass tubing; 200 copper controller segments; one centrifugal pump; four sets of stocks and dies; sheet iron and steel, structural steel angles and cold rolled steel, all as set forth in circular 1503.

R. P. Johnson, Wytheville, Va., machinery dealer, is making inquiries for a crude oil stationery engine with complete equipment, 25 to 40 hp., used, in good condition.

The Rowland Lumber Co., New Bern, N. C., is planning for the immediate rebuilding of its plant, known as the Roper Mills, destroyed by fire Dec. 1 with loss of about $300,000, including power house, machinery, etc.

A manual training department will be installed in the two-story and basement high school, 50 x 220 ft., to be erected at Thomasville, N. C., estimated to cost $200,000. Harry Simons, Banner Building, Greensboro, N. C., is architect.

C. E. Johnson, 822 West Main Street, Richmond, Va., operating a machine shop, is planning for the installation of a new lathe, shaper, drill press and other tools.

A. H. Jennings, P. O. Box 441, Greenwood, S. C., has plans for the establishment of a factory to manufacture handles, spokes and other turned-wood products.

The Salisbury Ice Co., Salisbury, Md., will commence the construction of a one-story ice-manufacturing plant, 60 x 120 ft., to have a daily capacity of 100 tons.

Pittsburgh

PITTSBURGH, Dec. 11.

MACHINE tool business the past week has been light, but the trade seems to have lost none of its confidence in a good 1923 business, probably because there has been no material slowing up in inquiry, which includes two lists. One is from the Duquesne Light Co. and the other from the Western Penitentiary. The tools for the Gary plant of the National Tube Co., it is believed, will begin to be placed soon. Bids on about 30 tools for this project, independent of the 14 placed several weeks ago, have been asked. Sales of individual tools maintain a fairly good rate. No price changes have been announced here lately, but there are reports that a number of lines will be further advanced on or about Jan. 1.

Heavy equipment has shown a fair degree of activity the past week, in both sales and inquiries, and the recapitaliza-

cast large expenditures in modernizing its Pittsburgh works. In the past week that company bought a revolving 7-motor floor type charger for its Aliquippa works, from the Alliance Machine Co., and is expected to close shortly for a 15-ton crane. The Alliance Machine Co. also has been awarded a 5-ton electric traveling crane by the Koppers Co., for the Clairton by-product plant of the Carnegie Steel Co. The Ohio Pump & Machinery Co., Akron, is reported to have placed a 15-ton crane. The Wheeling Steel Corporation, Wheeling, W. Va., has ordered a 50-ton Morgan crane for its Portsmouth, Ohio, works. The Hanlon-Gregory Galvanizing Co., Pittsburgh, is a prospective buyer of a monorail system and a Pittsburgh district company is seeking prices on three 1-ton hoists, while an order is pending for nine small hoists. Definite inquiry is noted from a railroad equipment company for a 10-ton crane, while there is a railroad inquiry for a 15-ton electric pillar crane. Prices for estimating purposes have been asked by one interest on 21 cranes. The Carnegie Steel Co.'s dock to be built in West Braddock, Pa., for use in connection with river shipments of steel by that company, will mean an order for a gantry crane. The Blaw-Knox Co., which early in November asked for bids on a 10-ton, 75-ft. span crane, has withdrawn the inquiry. The Westinghouse Electric & Mfg. Co. has taken the order for the switch equipment for the turbine installation recently ordered for its Pittsburgh works by the Jones & Laughlin Steel Co. Mills for the Michigan Steel Corporation, Detroit, which has started work on the construction of a sheet mill, will be furnished by the Mesta Machine Co., Pittsburgh.

The National Forge & Tool Co., Irvine, Pa., is not in the market for additional shop equipment, as mentioned in last week's issue, except that it has inquired for one used Colburn drill.

Fire, Dec. 7, destroyed a portion of the plant of the Safety Sled Co., Jewett, near Kane, Pa., with loss reported at $150,000, including machinery and stock. It is planned to rebuild.

The Studebaker Sales Co., Baum Boulevard, Pittsburgh, has awarded a contract to Conley & De Mey, 127 North Highland Avenue, for a two-story and basement service and repair works, 90 x 112 ft., at 4724 Baum Boulevard, to cost about $65,000.

The F. J. Kress Box Co., 2930 Liberty Avenue, Pittsburgh, has awarded contract for a three-story addition, 70 x 155 ft., estimated to cost close to $50,000.

A vocational department will be installed in the new high school to be erected at Monongahela, Pa., estimated to cost $200,000, for which plans are now being prepared. The board of Education is in charge.

The Federal Enameling & Stamping Co., McKees Rocks, Pa., has completed plans for its three-story addition and will soon take bids. A list of equipment will be arranged. Frank Frimmer, 1133 Charles Street, is engineer.

The Airtight Weatherstripping Co., Union Arcade, Pittsburgh, manufacturer of metal weatherstrips, has acquired the business of the same character operated by George R. C. Johnston, Drexel Building, Philadelphia. The companies will be merged under the name of the purchasing organization, and the Philadelphia works continued as a branch. E. W. Lauschke is general manager.

The Freedom Oil Works, Inc., Freedom, Pa., has awarded contract to the R. B. McDanel Co., New Brighton, Pa., for a two-story addition, 50 x 75 ft., to its service and repair building, to cost about $45,000.

Fire, Dec. 6, caused by an explosion, destroyed the forge and car shop at the coal mines of the Englert Brothers Co., Robinson Township, near Carnegie, Pa. An official estimate of loss has not been announced. It is planned to rebuild.

The Midland Smokeless Coal Co., Ronceverte, W. Va., recently organized, is planning for the installation of pumping equipment, general mine and haulage machinery, electrical apparatus, etc., at its properties. C. H. Thompson is president.

The Steele-Wallace Corporation, Richwood, W. Va., has been incorporated with a capital of $1,750,000 to take over and merge the Fulton Mfg. Co., Richwood, and the Escanaba Mfg. Co., Escanaba, Mich., both specializing in the manufacture of woodenware products. It plans for extensions and improvements.

The United States Engineer, Huntington, W. Va., will receive bids until Dec. 16 for one electric lighting outfit for dam No. 30, Ohio River, to include a steam turbine direct-connected to a generator, with switchboard, instruments and auxiliary apparatus.

The Morgan Brothers Co., Kenova, W. Va., has acquired a site for the erection of a new hardwood mill, estimated to cost approximately $60,000, with machinery.

The United States Engineer, Huntington, W. Va., will soon commence the construction of a new electric power plant on the Ohio River.

The Midland Smokeless Coal Co., Rupert, W. Va., is planning for the installation of electric equipment, pumping machinery and other mechanical equipment at its properties. L. E. McClung is vice-president in charge.

There is an inquiry for two 48-in., heavy type, triple-geared engine lathes. Short distance between centers can be used. Address P. O. Box 249, Pittsburgh.

Detroit

DETROIT, Dec. 11.

THE Union Carbide Co., 30 East Forty-second Street, New York, will commence the erection of an addition to its plant at Sault Ste. Marie, Mich., to cost $500,000, including machinery.

The Simplex Paper Co., Palmyra, Mich., has commissioned the Austin Co., Cleveland, to prepare plans for an addition to its plant, including new power house, to cost $100,000. It is expected to commence work early in the coming spring.

The Federal Drop Forge Co., Lansing, Mich., has commenced the erection of a one-story addition, 60 x 140 ft., to be used for the machine and hammer departments. It is estimated to cost $30,000.

A vocational department will be installed in the new junior high school to be constructed at Port Huron, Mich., estimated to cost $300,000, for which bids on a general contract are being received until Dec. 18. Van Leyen, Schilling, Keough & Reynold, 3440 Cass Avenue, Detroit, are architects.

Fire, Dec. 3, destroyed a portion of the plant of the Monroe Paper Co., Monroe, Mich., with loss estimated at $50,000. It is planned to rebuild.

The Detroit Steel Products Co., East Grand Boulevard and Griffin Street, Detroit, has acquired the former plant of the Patterson Mfg. Co., Holly, Mich., which has been idle for a number of years. The new owner will remodel the works for a branch plant.

The Michigan Gas & Electric Co., Three Rivers, Mich., has preliminary plans under way for a new hydroelectric power plant on the St. Joseph River, near Mottville, Mich., to cost approximately $450,000.

The Handley Motors, Inc., Kalamazoo, Mich., has been organized to take over and operate the Handley-Knight Motors Co., with local plant for the manufacture of automobiles. The new company is capitalized with 600,000 shares of stock, no par value, and plans for extensions for the production of a six-cylinder motor instead of a four-cylinder engine as heretofore. It will also manufacture chassis. James I. Handley is president.

The Stout Metal Airplane Co., Detroit, has been incorporated with a capitalization of $300,000 to manufacture airplanes perfected by William B. Stout, president of the company. Glenn H. Hoppin and Stanley E. Knauss are associated with Mr. Stout in the new enterprise.

The Morrison Metal Stamping Co., Jackson, Mich., has been incorporated with a capital of $250,000. Clarence B. Hayes, 709 West Main Street, Jackson, is president of the new company and his associates are William D. Brundage and C. Stanley Porter of the same city.

The Guy Disk Valve Motor Corporation, Ypsilanti, Mich., has acquired the former Alco Engine Co.'s plant in Hillsdale, Mich., and will transfer its business to that place in the near future. The company manufactures a new type of automobile engine which several manufacturers have contracted for on a royalty basis.

The Athol Mfg. Co., Marysville, Mich., is planning to enlarge its plant and install additional machinery to manufacture a new line of products in addition to its established line of rubberized goods.

The Federal Drop Forge Co., Lansing, Mich., is increasing its capacity by an addition, 60 x 140 ft., in which new machinery will be installed. The company is at present producing automotive, gas engine and lawn mower forgings.

Representatives of the Ford Motor Co. are acquiring property at Ypsilanti, Mich., on which a factory will be erected. This is in connection with the waterworks site approved for sale to the Ford Co.

The Steel Products Co., Detroit, has acquired the plant of the defunct Patterson Mfg. Co., Holly, Mich., which has been vacant for several years. It is expected that between 75 and 100 men will be employed within a few months.

The Chatfield Bronze & Iron Works, Gladstone, Mich., has begun operations and took off the first heat several weeks ago. It will produce bronze and gray iron castings and will add a machine shop to its plant in the near future.

The Reliable Mfg. Co., Pontiac, Mich., has been organized

to manufacture the Mott threading machine, a new device for threading metal pipes. Wendell J. Mott, the inventor, is vice-president and general manager of the new company and associated with him are W. Hayes McKinney, Detroit, as president, and William C. Bryant, secretary and treasurer.

The Blakely Mfg. Co., Wabash and Stanley Avenues, Detroit, is in the market for salvage sheet steel in 22, 20 and 16 gage that only

Cleveland

CLEVELAND, Dec. 11

EVIDENCE of the usual December slump in the machinery market is noted, but dealers are still getting a fair volume of single tool orders. There is some activity in the Detroit automobile field and a Cleveland machinery house has closed an order for approximately $40,000 worth of machinery. Other orders from Detroit include two 2-spindle drills for the Kelsey Wheel Co., and two surface grinders for the Ford Motor Co. The National Screw & Tack Co., Cleveland, is making inquiry for considerable equipment for its extensions. These purchases will probably include a number of bolt-heading machines. The company will add to its products the manufacture of hardened and ground special bolts used in the automotive field, and equipment will be bought for the manufacture of this new line.

Local dealers are receiving a moderate volume of inquiries, but it is probable that the placing of many orders will be deferred until after the first of the year. The Columbia Chemical Co., Barberton, Ohio, has an inquiry for a 1-ton electric traveling crane.

The plant of the Forest City Machine & Forge Co., 5101 Lakeside Avenue, Cleveland, has been sold by authority of the Federal Court to V. B. Torbensen, president of the recently organized Vig-Tor Axle Co., for $225,000. The plant was completed during the war for shell work and includes two three-story buildings, one 40 x 70 ft., one 17 x 85 ft., and a main machine shop, 100 x 296 ft. The purchase also includes equipment which consists of about 200 machine tools, a portion of which are adapted for the manufacture of axles. The Vig-Tor Axle Co. will occupy the plant about Jan. 15 and expects to buy additional equipment. Offices at present are in the Bulkley Building. A. L. Krosen, formerly of Timken Detroit Axle Co., will be vice-president and general manager; W. N. Jackson, treasurer, and Carl H. Harrison, secretary.

The Marquette Metal Products Co., Cleveland, has leased from the International Steel Tie Co., 10,000 sq. ft. of floor space at 19,906 Waterloo Road, for factory purposes.

The plant of the Collinwood Foundry & Mfg. Co., 17,004 Waterloo Road, Cleveland, has been purchased at receiver's sale by Max Greenhut, president-treasurer, L. N. & N. Foundry Co. The plant will probably be operated under its old name and the business of the L. N. & N. Foundry Co. moved to this location. The foundry covers 120 x 150 ft. and it is equipped for one cupola.

The Maumee Metal Parts Co., Toledo, has purchased a building of Huebner-Toledo Brewing Co., at Hamilton Street and the New York Central Railroad, and is remodeling it for factory purposes. The company manufactures aluminum castings.

The Lima Sheet Metal Co., Lima, Ohio, will shortly make extensions at an estimated cost of $7,000.

The Fairfield Engineering Co., which has moved its plant from Lancaster to Marion, Ohio, has placed contract for a one-story brick and steel factory, 90 x 140 ft. It manufactures conveying and unloading machinery.

The Toledo Pipe Threading Machine Co., Toledo, Ohio, is planning extensions. It has increased its capital stock from $50,000 to $1,000,000 by a stock dividend and will expend its cash surplus for additions and improvements.

Buffalo

BUFFALO, Dec. 11.

FOLLOWING a reorganization of the Dunlop Tire & Rubber Corporation of America, Buffalo, a bond issue of $16,000,000 has been arranged, a portion of the proceeds to be used for extensions, particularly in other factories in different parts of the country. Operations will be resumed at the local works at once. Sir Eric Geddes, an official of the parent organization, the Dunlop Rubber Co., Ltd., has been elected chairman of the board of the subsidiary concern.

The Jamestown Store Front Co., 29 North Main Street, Jamestown, N. Y., manufacturer of metal store fronts, is planning for the installation of new equipment at its plant.

The Lautz Co., 861 Main Street, Buffalo, will install grinding, cutting, polishing and conveying equipment at its marble plant, 110 x 480 ft., on East Ferry Street, now in course of erection. A two-story office adjoining, 40 x 88 ft., will also be built.

L. L. Brown and A. J. Gust, Angola, N. Y., have plans for a new one-story ice-manufacturing and refrigerating plant, 65 x 70 ft. H. W. Schantz, 78 Main Street, Buffalo, is architect.

Kittinger Brothers, 1893 Elmwood Avenue, Buffalo, have awarded a contract to Harding & Crea, White Building, for a three-story addition, 90 x 115 ft., to their furniture manufacturing plant, estimated to cost $50,000.

The Prene Mfg. Co., Buffalo, has acquired three buildings at the plant of the Wickwire-Spencer Steel Corporation, River Road, for the establishment of a new plant to manufacture skid chains. Possession will be taken at once and equipment provided to give employment to about 200.

The Republic Light, Power & Heat Co., Dunkirk, N. Y., has been ordered by the Public Service Commission to make extensions in its plant and system, including natural gas facilities and distribution, to cost about $2,000,000.

The American Locomotive Co., 30 Church Street, New York, is planning for an addition to its Brooks Works, Dunkirk, N. Y., to cost $50,000.

The American Laundry Machinery Co., Kossuth Street Subway, Rochester, N. Y., has called a special meeting of stockholders to arrange for an increase in capital from $8,000,000 to $14,000,000, a portion of the proceeds to be used for extensions and improvements.

The Charles E. McGill Machine Co., Commercial Avenue, Binghamton, N. Y., manufacturer of textile machinery and parts, recently organized, has tentative plans for a new factory. Charles E. McGill, formerly president McGill & Holford Mfg. Co., in the same line of production, heads the new organization.

Fire, Dec. 2, destroyed a portion of the power house at the plant of the Union Explosives Co., Le Roy, N. Y. It is planned to rebuild at once.

The New Ice & Coal Co., 925 Clinton Street, Jamestown, N. Y., is arranging for the construction of a new ice-manufacturing and refrigerating plant to cost $25,000, exclusive of machinery.

The Board of Erie County Commissioners, City Hall, Buffalo, has plans for a one-story power house and refrigerating plant, 75 x 100 ft., at Alden, estimated to cost $50,000. W. A. Kidd, 524 Franklin Street, is architect.

The Vacuum Oil Co., Rochester, N. Y., affiliated with the Standard Oil Co., New York, has arranged for an increase in capital from $15,000,000 to $70,000,000, a portion of the proceeds to be used for extensions.

The Rochester Packing & Cold Storage Co., 78 Front Street, Rochester, N. Y., has completed plans for an addition and improvements to its ice and refrigerating works, estimated to cost $175,000 with machinery.

Adolph P. Goehler, Buffalo, has made application to construct and operate a machine shop, 40 x 50 ft., at 288 Genesee Street, for general machinery and parts production.

The National Brake Co., Ellicott Square, Buffalo, is planning for the erection of a branch factory at Bridgeburg, Ont., to cost $35,000.

The Empire State Ice Co., Chicago, will build an ice-manufacturing plant at Atlantic Avenue and the New York Central Railroad crossing, Rochester, N. Y. About $250,000 will be expended for machinery.

Cincinnati

CINCINNATI, Dec. 11.

BIDS on the Missouri Pacific list of 53 machines, published last week, were taken at St. Louis Dec. 8, and indications point to early action by the road. A local manufacturer has received confirmation of a railroad order for 30 machines, the informal order for which was placed a few days ago. Scattered orders for single machines made a fair total, but on the whole the market is quieter than for several weeks. Manufacturers are of the opinion that some sizable lists will appear within the next three weeks from railroads and industrial companies which have not yet expended their 1922

the machine tool trade, and next year is expected to see a return of better business.

The control of the Icy-Hot Bottle Co., Cincinnati, manu-

of Cincinnati business men, headed by Gustave Mattman, president Willard Machine Tool Co. No changes will be made in the company's plans for the present other than that Mr. Mattman will assume personal supervision of the company's affairs.

The P. Goldsmith & Sons Co., Cincinnati, manufacturer of sporting goods, has acquired property adjacent to its plant on Findley and John Streets, and will shortly commence the erection of an addition containing 55,000 sq. ft. of floor space.

The Mengel Body Co., Louisville, Ky., which will build automobile and truck bodies, has awarded contract for a plant containing approximately 200,000 sq. ft. of floor space. It will shortly issue a list of equipment and work will be rushed so that manufacturing operations may be commenced early in the spring. Arthur D. Allen is president of the company.

The Tennessee Copper & Chemical Corporation, Hamilton, N. Y., producer of fertilizers, has commenced the erection of a plant at Glendale, near Cincinnati, to cost approximately $50,000.

The M. J. Kehoe Co., London, Ohio, has been incorporated with a capitalization of $25,000 to manufacture power washing machines. It plans the establishment of a factory in London.

The Ohio State University, Columbus, Ohio, which is completing the erection of a power house, is negotiating with the War Department for the purchase of the Government power plant at Langley Field. It has not yet been declared surplus property and for that reason has not been put up for sale.

Chicago

CHICAGO, Dec. 11.

THE Chicago, Burlington & Quincy has made additional purchases against its list, but still has about $100,000 worth of special heavy railroad tools to buy which will probably be placed during the current week. The Chicago, Milwaukee & St. Paul has taken no action against its inquiry. Both inquiries and orders from miscellaneous consumers are few, and it is now believed that the market will remain quiet until the opening of the new year. Auction sales of bankrupt stocks, while not so numerous as some months ago, still constitute a factor which cannot be overlooked by the trade. On Dec. 15, the plant and equipment of the Spacke Machine & Tool Co., Indianapolis, inventoried at $1,750,000, will be disposed of. The Stewart-Warner Speedometer Corporation, Chicago, has bought a small installation of polishing lathes.

The General American Tank Car Corporation, Chicago, is inquiring for a 10-ton three-motor overhead traveling crane.

The Evens Fibre Box Co., 4734-60 South Spauling Avenue, Chicago, has let contract for a one and two-story factory, 101 x 483 ft., and 21 x 127 ft., to cost $150,000.

The Commonwealth Edison Co., 72 West Adams Street, Chicago, has let contract for a one-story power station, 38 x 50 ft., 2141 South Troy Street, to cost $16,000.

E. Valkman, 3966 Avondale Avenue, Chicago, has let contract for a one-story tin shop, 22 x 50 ft. and 26 x 30 ft., at 4520 Irving Park Boulevard, to cost $7,000.

The Diamond Crystal Salt Co., St. Clair, Mich., has commenced the construction of a machine shop, 50 x 178 ft.

The plant of the Meyer Furnace Co., Peoria, Ill., was recently destroyed by fire with an estimated loss of $100,000.

The Ryan Car Co., 13501 Baltimore Avenue, Chicago, is

Bennett, First National Bank Building, is architect.

The Phelps Electric Co., Chicago, manufacturer of electric flashing devices and other equipment, has arranged for the removal of its plant from 163 North Curtis Street to 227 West Randolph Street, for increased facilities. The new location will provide approximately 5000 sq. ft. of floor space.

The American Radiator Co., 820 South Michigan Avenue, Chicago, is calling for bids on a general contract for the construction of its proposed new plant on Minnehaha Street, St. Paul, Minn., to comprise a number of one and two-story

machinery. A. H. Stem, 601 Endicott Building, St. Paul, is architect.

The Commonwealth Edison Co., 72 West Adams Street, Chicago, is arranging for the sale of a new stock issue of $12,000,000, a large portion of the proceeds to be used for new power-plant construction, and extensions and improvements in present generating stations and lines.

The Oliver Iron Mining Co., Hibbing, Minn., has plans in progress for extensions and improvements in its plant to cost about $140,000, including the installation of additional equipment. The work will comprise a new crushing and screening plant at the Hull Rust mine, to cost about $98,000; remodeling and improving of machine shop, and the installation of additional equipment; extensions and improvements in the crushing and screening plant at the Morris mine; erection of new one-story machine shop, for parts production and repairs.

The Board of Directors, St. Olaf's College, Northfield, Minn., will commence the erection of a new one-story power plant at the institution, to cost $300,000.

A manual training department will be installed in the proposed new two-story and basement high school, to be erected at De Witt, Iowa, estimated to cost $125,000, for which John C. Wood & Co., architects, 410 Howes Building, Clinton, Iowa, will prepare plans.

The Red Wing Sewer Pipe Co., Red Wing, Minn., manufacturer of vitrified sewer pipe, has commissioned A. F. Gauger, 302 Central Bank Building, St. Paul, Minn., architect, to prepare plans for a three-story plant, 75 x 275 ft., estimated to cost $90,000, including machinery. It will replace a works recently destroyed by fire.

The Hamler Boiler & Tank Co., 6025 West Sixty-sixth Street, Chicago, is inquiring for one 16-ft. plate-bending roll, used, in good condition.

Milwaukee

MILWAUKEE, Dec. 11.

DESPITE the fact that the holiday spirit is becoming more pronounced, a moderate volume of business is passing in the machine tool trade. Inquiry is being sustained at a much higher point than usual during the first half of December. It is, however, predicated more on needs which will be placed early in the new year than on immediate requirements. Automotive industries form the chief figure, especially in the milling machine demand.

Employment bureaus report that while the general call for help has fallen off, this is due mainly to the cessation of outdoor activities, and there is a shortage of skilled men for metal-working, tannery and shoe factories.

The Huron Portland Co., 1525 Ford Building, Detroit, has awarded initial contracts, for excavation and piling, for its new dock, warehouse and distributing building in Milwaukee, on the Burnham Canal, to cost about $225,000. Construction contracts probably will not be let before Jan. 1. The project involves considerable hoisting and conveying machinery, electric motors, etc. J. W. Boardman, vice-president, Detroit, is in charge.

The Random Lake Ice Co., Locust Street, Milwaukee has engaged the George B. Bright Co., consulting engineer, Detroit, to design an artificial ice plant and storage and distributing warehouse, 100 x 125 ft. Inquiry is being made for equipment, including a large ice machine, with electric motor drive. John T. Hoff is president and general manager.

The American Garage Equipment Co., Milwaukee, authorized capital $250,000, and the American Auto Hoist Co., Milwaukee, authorized capital $50,000, have been granted corporate charters in Wisconsin to engage in manufacturing. The identity of the principals is withheld for the present by Louis Wiener, of Wolfe & Kolinski, attorneys, 425 East Water Street, Milwaukee, who appears as incorporator. A statement concerning the plans will be forthcoming shortly, according to Mr. Wiener.

The Hansen Canning Machine, Corporation, Port Washington, Wis., has placed the general contract with the National Construction Co., 490 Virginia Street, Milwaukee, for erecting a steel, brick and concrete manufacturing plant, 112 x 120 ft., at Cedarburg, Wis. The investment in building and machinery will be about $100,000.

The S. E. Tate Printing Co., 133 Second Street, Milwaukee, has engaged Rosman & Wierdsma, architects, 424 Jefferson Street, local, to prepare plans for its new printing and publishing plant, 50 x 175 ft., seven stories and basement. Contract for the substructure has been let to the Robert L. Reisinger Co., 495 Oakland Avenue. Other con-

tracts will not be placed before March 1. H. L. Arnold is president and general manager of the Tate company.

The Belle City Malleable Iron Co., Racine, Wis., which is enlarging its capacity approximately 100 per cent, has increased its capitalization from $500,000 to $1,300,000. The increase of $800,000 represents the cost of improvements. A two-story annealing building, 75 x 357 ft., is being completed and will be ready about Jan. 15. A new $25,000 office building will be ready Dec. 15. Contracts will be let about Feb. 1 for the remaining structures, including a large foundry and auxiliaries. The entire plant will be replaced by modern buildings and equipment without interruption of operations. The concern specializes in automotive and agricultural castings.

The Milwaukee Gas Specialty Co., 2017 Clybourn Street, Milwaukee, let the general contract to Henry Danischefsky, 1484 Humboldt Avenue, local, for an addition, 45 x 120 ft., two stories. Inquiry is being made for equipment for manufacturing portable gas stoves, cigar lighters and other gas appliances and specialties. Otto F. Pfeil is president and general manager. The architects are Leiser & Holst, 105 Wells Street.

The Vollrath Co., Sheboygan, Wis., manufacturer of enameled utensils and stampings, is building an addition to its annealing building at an estimated cost of $45,000.

The Board of Education, Viroqua, Wis., has selected a site and will engage an architect immediately to draw plans for the proposed new high school and vocational training institute, for which a bond issue of $150,000 has been sold. Work will begin about March 1.

James W. Andrewson, who has resigned as assistant manager American Brass Co., Kenosha, Wis., is organizing a new $100,000 corporation to establish a new brass industry in Kenosha, which will specialize in seamless tubing and rods, it is said. John Henry, mechanical superintendent, and George Rahr, general foreman, with three other factory executives, also resigned from the American company service and will be associated with Mr. Andrewson in the new enterprise. Further details will be given out later.

The All-American Metallic Casket Co., Nichols, Wis., a new $50,000 corporation, has work under way on a factory, 50 x 160 ft., two stories, containing a metal fabricating room, mill room, plating room, finishing department, etc. Equipment is now being purchased. The plant will employ about 60 at the start.

The Globe Ball Co., Milwaukee, manufacturer of steel balls, ball bearings, etc., is planning to enlarge its works at Forty-seventh Avenue and Rogers Street, West Allis. The capital stock has been increased from $75,000 to $150,000 and the corporate title changed to the Globe Bearings Co. Philip Grossman is secretary-treasurer and general manager.

The Perfection Table Slide Mfg. Co., Watertown, Wis., a new $125,000 corporation, has plans for a new plant costing about $75,000, work on which will begin April 1. In the meantime inquiry is being made for equipment for production of extension tables and other hardwood furniture specialties. William C. Schultz is president and general manager; E. W. Pfeifer, vice-president; E. H. Cook, secretary-treasurer.

The Kimberly-Clark Co., Neenah, Wis., manufacturer of pulp and paper, has let the contract to C. R. Meyer & Sons Co., Oshkosh, Wis., for a $75,000 mill addition.

The Nichols Mfg. Co. is being organized at Nichols, Wis., by J. A. Baurichter to manufacture automotive devices, antiglare shields and other specialties. For the present it will operate in leased quarters.

Indiana

INDIANAPOLIS, Dec. 11.

THE American Steel & Wire Co., Kokomo, Ind., is planning for extensions in its local works, including the installation of additional equipment, estimated to cost $400,000. The work will include an addition to the power house, with new boilers, stokers and auxiliary apparatus.

The Board of Education, Ohio and Meridian Streets, Indianapolis, has plans under way for a one-story repair shop, 175 x 220 ft., and warehouse on Martindale Avenue, estimated to cost $75,000, including equipment. William Earl Russ, Meridian Life Building, is architect.

The Langhaar Ball Bearing Co., Aurora, Ind., has commenced the erection of a new plant on site recently acquired. Adjoining property has also been secured and will be improved with a one-story extension. The present works will be removed to the new location and additional equipment installed.

The Indianapolis Light & Heat Co., Indianapolis, has made application to issue common stock for $1,962,000, a portion of the proceeds to be used for extensions and improvements.

The Fort Wayne Box Co., Fort Wayne, Ind., has tentative plans for a new factory for Sulphite Stock, to cost $100,000, including machinery.

New interests have acquired the plant and equipment of the Arvac Mfg. Co., Anderson, Ind., and plan to reorganize for the manufacture of a cotton dusting machine and similar equipment. The works will be remodeled and operations commenced at an early date. About $400,000 was given for the Arvac assets.

The Madden-Copple Co., Indianapolis, operating a general machine and repair works for motor trucks and automobiles at 209 West North Street, has leased a one-story building, 120 x 122 ft., to be erected at St. Clair Street and Capitol Avenue, for a new works. It is planned to remove the present shop to the new location and install additional equipment. Charles E. Campbell is president.

The Gulf States

BIRMINGHAM, Dec. 11.

THE Corsicana Ice Co., South Fourteenth Street, Corsicana, Tex., will install additional equipment at its electric power plant to double the present capacity.

Stockholders of the Magnolia Petroleum Co., Dallas, Tex., operating oil refineries, have approved of an increase in capital from $120,000,000 to $180,000,000, a portion of the proceeds to be used for extensions and improvements.

The City Council, Corpus Christi, Tex., has authorized the city engineer to prepare estimates of cost and data relative to the construction of a municipal electric light and power plant.

A manual training department will be installed in the three-story junior high school, 160 x 225 ft., to be erected at Jacksonville, Fla., for which bids on a general contract have been called. Freeley & Benjamin, Bisbee Building, are architects.

The Vernon Ice & Electric Co., Vernon, Tex., has been organized as a subsidiary of the Texas Central Power Co., to take over and operate the local light and power plant. Plans are under way for extensions and the installation of additional equipment.

C. L. Wagenknecht, Fort Pierce, Fla., and associates, have organized a company to build and operate a local machine works, primarily for marine service. Foundations for the initial building are under way and a list of equipment will be prepared at once, to include lathes, drills, bench tools, etc.

The Common Council, Lafayette, La., is disposing of a bond issue of $144,000, the proceeds to be used for the installation of a municipal light and power plant and extensions in the waterworks.

The Prest-O-Lite Co., Indianapolis, a subsidiary of the Union Carbide Co., 30 East Forty-second Street, New York, manufacturer of acetylene apparatus, is perfecting plans for the erection of a new plant on site at Upperline Street and the Seventeenth Street Canal, New Orleans, acquired some time ago. It is estimated to cost $200,000, with equipment.

The Yuba Oil Co., Nacogdoches, Tex., has acquired the local oil refinery and property of the Carolina Oil Co. for about $100,000. The new owner will take immediate possession and plans for enlargements and the installation of new equipment. C. C. Chappell is in charge.

The Young Lumber Co., Auburn, Ala., is planning to rebuild the portion of its mill recently destroyed by fire with loss estimated at $30,000, including machinery.

The United States Engineer, Florence, Ala., will receive bids until Dec. 30 for one 15-in. dredging pump and appurtenances for the United States dredge Pettus, as per specifications on file.

The Atlantic Ice & Coal Corporation, Atlanta, Ga., is planning for a new ice-manufacturing and cold storage plant at Montgomery, Ala., with initial capacity of 150 tons of ice per day and storage facilities totaling 100,000 cu. ft. It is estimated to cost $300,000, including machinery.

A vocational department will be installed in the new junior high school to be erected at Brownwood, Tex., estimated to cost $120,000.

The San Antonio Portland Cement Co., San Antonio, Tex., has awarded a contract to the Elder Construction Co., San Antonio, for a one-story addition to its mills at Cementville, estimated to cost $50,000 with equipment.

A one-story power house addition will be built by the Texas Cotton Mills Co., McKinney, Tex., in connection with its new textile mill to cost $600,000, with machinery. The machine shop will also be extended and other mechanical equipment installed.

The Common Council, Perryton, Tex., is arranging for a bond issue of $35,000, the proceeds to be used for the installation of a municipal electric power plant and system.

to cost $200,000, including machinery. It also maintains

B. M. Fluker, Richland, Tex., operating the local electric power plant, will commence the installation of additional equipment for increase in capacity. About $20,000 will be expended.

electric lighting plant and extensions in the waterworks.

The Southern Paper Co., Moss Point, Miss., is disposing

The Electrified Water & Machinery Co., Dallas, Tex., has leased a building, 63 x 120 ft., to be constructed on South Ervay Street, for a new plant to manufacture mechanical equipment.

The Texas Gas & Electric Co., Orange, Tex., will install a new 225-hp. engine, electrical equipment and auxiliary machinery at its local power plant. Line extensions will also be made

Buying for National Railways of Mexico

The Western Purchasing Co. has been appointed foreign purchasing agent for the National Railways of Mexico. This appointment applies to the purchasing of all materials not bought in Mexico City. In the past foreign purchases for the National Railways of Mexico were handled by the New York and Houston, Tex., offices, which now have been ordered closed, and the records of both offices are being sent to El Paso to become a part of the files of the Western Purchasing Co. It is estimated that the purchases to be handled at El Paso will average more than $200,000 United States currency per month.

Will Solomon, who is president of the Western Purchasing Co., announces that purchases, where possible, will be made directly from manufacturers through their El Paso representatives and that all bills will be discounted by the company. The arrangement became effective Dec. 1.

The Central South

ST. LOUIS, Dec. 11.

THE Springfield Ice & Refrigerating Co., Springfield, Mo., will take bids at once for an ice-manufacturing plant to cost $60,000. Ophuls & Hill, 112 West Forty-second Street, New York, are engineers. A. F. Johnson is head.

The International Aircraft Co., Kansas City, Mo., care of Clifton B. Sloan, 321 East Eleventh Street, architect, has plans under way for a one-story plant, 103 x 200 ft., at Davenport Road and Seventy-first Street, for the manufacture of airplanes and parts, estimated to cost $80,000. Robert B. Hawley is president.

The Post Glover Electric Co., Ludlow, Ky., is planning to rebuild the portion of its electric power plant recently destroyed by fire with loss of $35,000, including equipment. Frank V. Van Winkle is president.

The White Mining Co., 1518 Kentucky Avenue, Joplin, Mo., is planning for the installation of additional equipment at its plant, including air compressors, gas engine and appurtenances, transmission apparatus, etc.

The Radio Shop, Inc., Sunnyvale, Cal., manufacturer of radio equipment, has arranged for the establishment of a branch plant at St. Louis and will be affiliated with the Echo Radio Corporation, 315 International Life Building, St. Louis, recently organized. A. B. Dorman will be manager in charge at this point.

The stockholders of the Standard Oil Co. of Kansas, Wichita, have approved of an increase in capital from $2,000,000 to $8,000,000, a portion of the proceeds to be used for extensions and improvements in refineries and other properties.

The Grimm Metal Sign Corporation, 700 South Eighteenth Street, St. Louis, recently organized, has leased a building and will install equipment for the manufacture of metal signs, etc. H. A. Grimm is president, and H. Tandberg, general

The Coupe De Luxe Body Co., St. Louis, has leased 15,000

The Sand Springs Power, Light & Water Co., Sand Springs, Okla., is perfecting plans for extensions in its electric power plant to double, approximately, the present capacity of 15,000 kw. New transmission and distributing lines will also be built.

The Grace Sign & Mfg. Co., 425 South Main Street, St. Louis, is planning for the operation of a new plant at Second and President Streets. A building on the site will be equipped at once.

A manual training department will be installed in the proposed high school to be erected at Nevada, Mo., estimated to cost $110,000. C. A. Smith, 602 Finance Building, Kansas City, Mo., is architect.

The Clinton Coal Co., Jeff, Ky., will soon be in the market for mine cars and other equipment for installation at its properties. E. H. Griffith is general manager.

Electrically operated pumping machinery and other power apparatus will be installed at the municipal waterworks, Kirksville, Mo., in connection with general improvements and extensions in the plant to cost $325,000. Black & Veatch, Mutual Building, Kansas City, Mo., are engineers.

The Purchasing Agent, Post Office Department, Washington, will take bids until Dec. 22 for the installation of a conveyor system at the United States Post Office, Oklahoma City, Okla.

A manual training department will be installed in the three-story high school to be erected at Sedalia, Mo., for which a bond issue of $500,000 is being arranged.

C. R. Williamson, Trezevant, Tenn., is planning for the establishment of a plant to manufacture special farm implements. Initial operations will be devoted primarily to assembling; later, a plant for castings and parts will be installed. A company will be organized to operate the works

George Roderick, 1112 East Douglas Street, Wichita, Kan., is making inquiries for a jig saw, boring machine, combination wood-working machine and other equipment.

The Pat Mfg. Co., Randall Building, 210 West First Street, Oklahoma City, Okla., recently organized, has arranged for the establishment of a plant to manufacture dust pans and kindred metalware. Sidney C. Bray is general manager.

The Modern Auto Parts Co., 1803 Park Avenue, St. Louis, is planning for the installation of additional equipment.

A power house will be constructed at the new plant of the Brown Shoe Co., Washington Avenue and Sixteenth Street, St. Louis, at Union City, Tenn., estimated to cost $250,000. Albert B. Groves, St. Louis, is architect.

A vocational department will be installed in the proposed new high school to be erected at Kirksville, Mo., for which bonds for $190,000 are being arranged. Irvin Dunbar, care of the Board of Education, is architect.

The Pacific Coast

SAN FRANCISCO, Dec. 5.

THE Comet Oil Co., Los Angeles, recently organized with a capital of $600,000, has acquired property on East Twenty-sixth Street as a site for a new refinery, with capacity of about 2500 bbl. per day, estimated to cost $500,000. It is headed by Adolph Ramish and J. J. Gans.

The Westinghouse Electric & Mfg. Co., First National Bank Building, San Francisco, is completing plans for the initial units of its new plant at Emeryville, Cal., to cost $900,000, including equipment. The company engineering department, Union Building, Pittsburgh, Pa., is in charge.

The National Paper Products Co., Stockton, Cal., has awarded a contract to the Davis-Heller-Pearce Co., Delta Building, for an addition, to cost $125,000, with machinery.

The Concrete Pipe Co., Kelso, Wash., has preliminary plans under way for a plant near Freeport, Wash., to cost in excess of $75,000, with equipment.

The Pacific Power & Light Co., Portland, Ore., has plans in progress for a hydroelectric power plant on the Deschutes River, estimated to cost more than $3,000,000, with machinery and transmission lines.

The Puget Sound Lumber & Box Co., 1201 East Northlake Avenue, Seattle, Wash., will commence the construction of a new one-story plant, 78 x 225 ft., with wing extension 70 x 130 ft., estimated to cost $35,000.

The Visalia Implement Works, Inc., Visalia, Cal., will commence the construction of a new one-story plant to cost $80,000, with equipment. The company is headed by J. S.

The Sacramento Pipe Works, R Street near Seventh Street, Sacramento, Cal., has plans under way for a number

of buildings, with new works [illegible]. It is estimated to cost more than $80,000, with machinery.

Stockholders of the Standard Oil Co. of California, 200 Bush Street, San Francisco, have approved of an increase in capital from $[illegible] to $[illegible], a portion of the proceeds to be used for extensions and improvements in refineries.

The Blue Tank Pipe Line & Refinery Co., Long Beach, Cal., has acquired 15 acres at Wilmington, Los Angeles, as a site for a new refinery to cost close to $900,000, including machinery.

Canada

Toronto, Dec. 11

ALTHOUGH the holiday season is near, dealers continue to report an active demand for machinery and tools. Building trades are busy on the construction of new industrial plants and additions with the result that the prevailing demand for all classes of equipment is good and the outlook is promising. Recently large contracts have been closed for equipment for car shops for the Grand Trunk Railway at Battle Creek and the Canadian National Railways has also purchased considerable equipment for the Moncton and St. Malo shops. In addition, a number of smaller orders have been closed for one or two machines for shops in other parts of the Dominion. The Canadian Pacific Railway, while not issuing any large lists has been buying in a small way, chiefly for replacement. Automobile manufacturing concerns are putting their plants in shape for increased operations after the first of the year and buying for replacement purposes as well as for new plants is becoming more active. Inquiries are also making their appearance from some of the large automobile concerns which have plants under way. While there is still a strong demand prevailing for rebuilt and second hand equipment, new lines are steadily coming into more prominence.

Bids will be received until Jan. 15 by R. C. Desrochers, secretary Department of Public Works, Ottawa, for the construction and installation of pumping and other machinery for the dry dock at Esquimalt, B. C. The dry dock which is under construction for the Dominion Government will, when completed, represent an expenditure of approximately $4,500,000.

The National Meter Co., Ltd., New York, has leased property at 151 Duchess Street, Toronto, and will install machinery and equipment at once for the manufacture of meters, etc.

The Canadian Postel Lock Nut Bolt Co., Ltd., recently incorporated, is preparing to erect a plant at Collingwood, Ont.

The Ontario Shale Brick Co., Ltd., 32 Sun Life Building, Hamilton, Ont., will build a plant there.

The Acme Trading Co., Bank of Montreal Building, Montreal, contemplates the erection of a pulp mill at Three Rivers, Que., to cost $100,000.

George McIntyre, 7 Burlington Crescent, Toronto, will erect a stone cutting plant to cost $9,000 and will purchase equipment.

The Ford Motor Co. of Canada, Ltd., Ford, Ont., has awarded the general contract to Wells & Gray, Ltd., Windsor, Ont., for a machine shop to cost $1,500,000. Contracts for machinery and tools have not yet been placed. The company, however, recently placed contracts with the Westinghouse Co. of Canada for direct current motors. It is the intention of the company to do away with belt drives and has adopted direct motor drive for its entire plant, according to W. R. Campbell, vice-president.

The MacDonald Mfg. Co., 145 Spadina Avenue, Toronto, manufacturers of tinware, etc., has awarded the general contract to Brown & Cooper, 297 Carlton Street, Toronto, for an addition to cost $100,000.

The Wilkie Products, Ltd., Tillsonburg, Ont., has been incorporated with a capital stock of $112,000 by William H. Bennett, Edwin I. Torrens of Tillsonburg, Ont.; Leon E. Varnam, Windsor, and others to manufacture pistons, piston rings, machinery, etc. It is asking the city for concessions, in return for which a manufacturing plant will be erected.

John B. Smith & Sons, 53 Strachan Avenue, Toronto, Ont., is in the market for a lathe, 24 to 30 in. swing, 8 ft. long or over, second-hand, in good order.

STEEL AND INDUSTRIAL STOCKS

Market Recovers After Reaction—More Stock and Cash Dividend

Following a reactionary trend in the early days of the week, the market in steel and industrial stocks recovered its balance at midweek, and after some hesitancy on Thursday, finished with fairly active trading characterized by general firmness. Such recovery as appeared, however, was but moderate. A few favored issues, chief of which were American Locomotive and Kelsey Wheel, rose even against the general declines, the latter jumping 6½ points on Tuesday's trading. Altogether it has been a year remarkable for its flood of stock and cash dividends, and the movement is still unabated; rather it seems likely that the rush will take on greater impetus owing to the attitude of the radical bloc in Congress in favor of taxing undivided surpluses. The average of 20 industrial stocks is 97.7 against 94.1.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

	Low	High		Low	High
Allis-Chalmers...	42⅜	44⅞	Gulf S. Stl. 1 pf.	100	101
Allis-Chal. pf....	96	96	Inland Steel.....	40	42
Am. B. S. & Fdy.	73½	75	Int. Har.	86⅞	92
American Can...	69½	73⅞	Int. Har. pf.....	116	116
American Can pf.	110¾	111½	Lackawanna Stl.	75¾	78
Am. Car & Fdry.	180	185	Lima Loco.	54½	58½
Am. Car & F. pf.	123	123	Midvale Steel...	27⅞	29
Am. Locomotive.	113½	124⅜	Nat.-Acme	12⅜	13
Am. Loco. pf....	120	122¼	Nat. En. & Stm..	63⅜	66⅜
Am. Radiator...	117¾	120	N. Y. Air Brake	27½	29
Am. Steel Fdries	37¾	44⅞	Nova Scotia Steel	25¾	28
Am. Stl. Fd. pf..	105	105	Otis Steel	7¼	8½
Baldwin Loco...	116	124⅞	Otis Steel pf....	40	40
Bald. Loco. pf..	116	116	Pressed Stl. Car	77	79
Bethlehem Steel.	601/	611/	Pressed Stl. pf..	98¼	98¼
Beth. Steel Cl. B	60⅝	63⅝	Ry. Steel Spring.	112	113
Beth. Stl. 8% pf.	109	111	Ry. Stl. Spg. pf..	115⅜	115⅜
Brier Hill.....	14	14	Replogle Steel...	23	26⅜
Br. Em. Steel...	9	9	Republic	44¾	47½
Br. Em. Stl. 2 pf.	26	26¼	Republic pf.....	83½	84⅞
Cambria Steel...	401/	404/	Steel of Canada.	57½	58⅝
Chic. Pneu. Tool	79¼	82½	Superior Steel..	28½	29
Colo. Fuel.....	21⅝	26⅜	Un. Alloy Steel..	34	34½
Crucible Steel..	61	66⅝	U. S. Pipe.....	24½	25
Crucible Stl. pf..	89⅝	90	U. S. Steel.....	101	104
Deere pf.	72	73½	U. S. Steel pf...	120½	121
Gen. Electric....	178	186½	Vanadium Steel.	33	35¼
Gt. No. Ore Cert.	30	31⅜	Va. I., C. & Coke	56	56
Gulf States Steel	70¾	76⅜	Whouse Air Br..	99½	104⅜

Industrial Finances

A new issue of $4,645,000 Dominion Iron & Steel Co. consolidated mortgage 5 per cent bonds is being offered by Hayden, Stone & Co. at 85 and interest, to yield the investor 6.46 per cent. These bonds are guaranteed both as to principal and interest by the Dominion Steel Corporation, Sydney, N. S., and are due September 1, 1939. Application will be made to list the bonds on the New York Stock Exchange. The present issue is secured by a direct mortgage on the entire property, subject only to the closed issue of $5,741,000 first mortgage bonds. The net tangible assets after reserve for depreciation and depletion and including only a nominal sum against the large ore holdings equal $3,340 for each $1,000 mortgage bond outstanding. For the past 10 years and nine months the yearly average of net earnings after depreciation and deflation was 3½ times the present interest requirements of all mortgage bonds.

The Dominion Iron and Steel Co., Ltd., Sydney, N. S., has sold $4,645,000 bonds to bankers, who, in turn have resold the issue to investors. The bonds are a consolidated 5 per cent mortgage, dated June 1, 1909, and maturing Sept. 1, 1939.

Announcement is made by the Waterbury Rolling Mills, Inc., Waterbury, Conn., of an increase in the capitalization from $200,000 to $600,000. No new plant improvements are contemplated, the increase in capitalization being simply a readjustment of assets.

On Sept. 30 last the American Steel Foundries Co. had $3,401,127 cash on hand, or $2,438,972 more than on Jan. 1. Its total quick assets were $19,684,109, while its total quick liabilities were $5,660,451, leaving a net working capital of $14,023,658, contrasted with $13,125,542 on Jan. 1.

Through banking interests, the New Process Gear Co., Inc., Syracuse, N. Y., offers for investment $2,000,000 first mortgage 6½ per cent serial bonds maturing $200,000 each in one to ten years. The bonds constitute a first mortgage on the company's land, buildings, machinery and equipment.

The Richardson and Boynton Co., Dover, N. J., heating apparatus, has sold $1,000,000 15-year 6½ per cent sinking fund bonds dated Dec. 1, last, to bankers, who in turn are making a public offering. Funds derived from the sale of these bonds are to be used for expansions and improvements of plants and for other corporate purposes.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	
Refined iron bars, base price	3.04c.
Swedish bars, base price	7.50c.
Soft steel bars, base price	3.04c.
Hoops, base price	4.39c.
Bands, base price	3.84c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	3.14c.
Channels, angles and tees under 3 in. x ¼ in., base	3.04c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.10c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	3.30c.
Toe-calk, ½ x ⅜ in. and larger	4.15c.
Cold-rolled strip, soft and quarter hard	6.75c. to 7.25c.
Open-hearth spring steel	4.00c. to 6.00c.
Shafting and Screw Stock:	
Rounds	3.90c.
Squares, flats and hex	4.40c.
Standard cast steel, base price	15.00c.
Extra cast steel	18.00c.
Special cast steel	23.00c.

Tank Plates—Steel

¼ in. and heavier 3.14c.

Sheets

Blue Annealed

	Per Lb
No. 10	4.19c.
No. 12	4.24c.
No. 14	4.29c.
No. 16	4.39c.

Box Annealed—Black

	Soft Steel C. R., One Pass, Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.30c. to 4.55c.	.....
Nos. 22 and 24	4.35c. to 4.60c.	5.00c.
No. 26	4.40c. to 4.65c.	5.05c.
No. 28	4.50c. to 4.75c.	5.15c.
No. 30	4.75c. to 5.00c.	.....

No. 28 and lighter, 36 in. wide, 10c. higher.

Galvanized

	Per Lb.
No. 14	4.60c.
No. 16	4.75c.
Nos. 18 and 20	4.90c.
Nos. 22 and 24	5.05c.
No. 26	5.20c.
No. 27	5.35c.
No. 28	5.50c.
No. 30	6.00c.

No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
⅛ in. Butt...	—50	—37	⅛ in. Butt...	—11	+13
¼ in. Butt...	—55	—44	¼ in. Butt...	—17	— 1
⅜ in. Butt..	—57	—41	⅜-1½ in. Butt	—20	— 2
2½-6 in. Lap.	—54	—41	2 in. Lap....	—14	+ 2
7-8 in. Lap...	—50	—26	2½-6 in. Lap.	—18	— 2
9-12 in. Lap.	—46	—25	7-12 in. Lap..	—10	+ 6

Steel Wire

	Per Lb.
Bright basic	4.75c. to 5.00c.
Annealed soft	4.75c. to 5.00c.
Galvanized annealed	5.40c. to 5.65c.
Coppered basic	5.40c. to 5.65c.
Tinned soft Bessemer	6.40c. to 6.65c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	19½c. to 20½c.
High brass wire	20 c. to 21 c.
Brass rod	17 c. to 18 c.
Brass tube, brazed	26⅜c. to 27⅜c.
Brass tube, seamless	23 c. to 23½c.
Copper tube, seamless	25¾c. to 26 c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 22c. to 23c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14-20		
	Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	Primes	Wasters
			80 lb..	$5.80 $5.55
			90 lb..	5.90 5.65
			100 lb..	6.00 5.75
IC..	$10.00	$8.50	IC..	6.15 5.90
IX..	11.50	10.00	IX..	7.15 6.90
IXX..	13.00	11.25	IXX..	8.15 7.90
IXXX..	14.25	12.50	IXXX..	9.15 8.90
IXXXX..	16.00	14.00	IXXXX..	10.15 9.90

Terne Plates

8-lb. coating, 14 x 20

100 lb.	$7.00
IC	7.25
IX	7.50
Fire door stock	9.00

Tin

Straits pig	40c
Bar	45c. to 50c.

Copper

Lake ingot	15¼c.
Electrolytic	15 c.
Casting	14¾c.

Spelter and Sheet Zinc

Western spelter	8¾c.
Sheet zinc, No. 9 base, casks	10¼c. open 10¾c.

Lead and Solder*

American pig lead	8c. to 8¾c
Bar lead	9c. to 10c.
Solder, ½ and ½ guaranteed	27½c.
No. 1 solder	26c.
Refined solder	23¼c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	75c.
Commercial grade, per lb	35c.
Grade D, per lb	25c.

Antimony

Asiatic 7¾c. to 8½c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb 25c. to 27c.

Old Metals

The market is more active and values are firm. Dealers' buying prices are as follows:

	Cents Per Lb
Copper, heavy cut	12.00
Copper, heavy wire	11.50
Copper, light and bottoms	9.50
Brass, heavy	6.50
Brass, light	5.50
Heavy machine composition	8.75
No. 1 yellow brass turnings	7.00
No. 1 red brass or composition turnings	8.00
Lead, heavy	5.75
Lead, tea	4.50
Zinc	4.50

THE IRON AGE

New York, December 21, 1922

ESTABLISHED 1855 VOL. 110, No. 25

Germany's Great Locomotive Works

The Borsig Organization and Methods Were Once in a Class by Themselves, but Now Operations Are Full of Difficulty—German Competition Not to Be Feared

BY CAPT. GODFREY L. CARDEN*

Captain Carden returned to the United States recently after an extended stay in Russia. On the way home he stopped off in Poland and in Germany to inquire into conditions in the metal working industries. His article on Poland appeared in THE IRON AGE *of Dec 7. The present article gives the results of a visit to the famous Borsig locomotive works at Tegel, which Captain Carden described at length in the special report he made to the Department of Commerce on the machine tool industry in European countries a few years before the war. A third article dealing particularly with conditions in machine tool plants in Germany will appear in our Annual Review Number of Jan. 4, 1923.*

AT Tegel on the outskirts of Berlin is located the Borsig Locomotive Works. I visited this plant a few weeks ago both to see General Director Neuhaus and to ascertain what significant developments, if any, there had been since the war.

I had not seen the Borsig works since pre-war days, when I reported on these shops for the Department of Commerce. At that time I stated that the Borsig organization stood in the first rank in Germany in point of shop efficiency. In no other German plant had I seen, in certain instances, such advanced forms of shop method as were apparent there, and I advised that the American who wished to become early acquainted with German progress could see nothing finer in this line than is offered at the Borsig shops. I also noted the fact that the present General Director Neuhaus, who was then the shop director, had spent three years at the Allis-Chalmers works in Milwaukee.

Once a Large User of American Machine Tools

Borsig's, because of its high efficiency, has stood in a class by itself. The shops have been large users of the highest grades of American machine tools, and in pre-war days the workmen were stimulated by high prices for additional work. About 5500 men was the usual number at Borsig's just before the war.

Today the Borsig plant is working intensively, but it is a different works from that of pre-war times, and what is true of Borsig's also applies, I was told, to German industries as a whole. The old-time German discipline is gone, the snappy shop gait has disappeared. Men work now on an eight-hour basis. They are undernourished and ill-fed. The unions are adamant against a prolongation of the eight-hour period, and the workman, under the tremendous rise in prices due to the depreciation of the mark, finds himself barely able to keep beyond the stage of actual want. Meat, which the Germans had been accustomed to eat, is seldom had by the workman nowadays. To augment his pay, many a man is working on the outside at night. He hangs back very often in his day work to save his strength for the work at night. The latter pays better.

British and Belgian Competition

So far as orders go, the situation at Borsig's early in October was a satisfactory one. This plant, in common with other German locomotive works, is booked with orders for several months ahead. The foreign orders for Borsig have come in from the Balkan states and from the Soviet republic of Russia. In addition they have received their share of the German railroad orders. Apart from the foreign territory mentioned, Borsig finds that all British and Belgian locomotive shops are quoting more advantageously abroad, and this condition is attributed largely to the inability to quote fixed prices. The falling mark is blamed for this.

Borsig in common with Swedish locomotive shops has not hesitated to do business with Soviet Russia, and I saw during the past summer really excellent passenger trains in Russia with German locomotives in service. I refer especially to the trains now running between Moscow and Minsk and between Moscow and Petrograd. These trains reflect the improvement in economic conditions in Russia which have taken place gradually and steadily in the past six months. Borsig by the confidence exhibited unquestionably stands in preferred position today to take advantage of the rapidly approaching reconstruction period in Russia.

German Railroads Stripped

The loss of 5000 locomotives and 150,000 trucks by Germany under the surrender terms hit her railroads hard. Naturally, the victors took only sound equipment. About 7000 locomotives were sent to all frontiers for inspection before the Allies found 5000 acceptable ones. The lame ducks were thrown back on the Germans. The locomotive shops were called upon to make many repairs. Practically all the copper fireboxes of the German locomotives had been stripped for military purposes and iron or steel substituted. In the

*Department of Commerce.

case of engines still deemed in fair condition, copper has been renewed. Despite an immense amount of repair work undertaken by the locomotive shops, the German rolling stock is still a long way off from that high standard which it had attained before the war.

In the 10 years preceding the war, the German railroad trains ran with a block-like precision that was proverbial. Such a thing as a late German express train was practically unknown. Accidents were of the rarest happening. But it is different today, and no one recognizes it more quickly than the locomotive works directors who come into direct touch with all shortcomings. There is a lack of the old-time discipline. The experienced personnel of pre-war days to a great extent is gone. The heavy military demands of the railroads during the war, transferring great masses of men first from one frontier to another, and the maintenance of upkeep and supplies under tremendous pressure, all this used up both material and personnel.

With a return to peace, there was the necessity for providing employment for many. The railroads very soon became over-staffed, and much of the personnel was unsuitable. There has been real effort made to improve this situation, it is said, and conditions in both 1921 and 1922 show steady progress.

Lack of Skilled Men a Serious Drawback

In the locomotive shops, however, it has not been possible to create a productivity equal to pre-war days. The falling off is accounted for by the Germans as a direct outcome of the foreign political pressure, and of abolition of work beyond eight hours. Sunday work has ceased and overtime workers are to be had only by permission of the unions. In some instances the unions, where a very special claim is made, will permit of two to three hours' overtime, but in such cases the pay demanded for the workman is high.

While the great bulk of skilled mechanics who were in the German shops in 1914 disappeared in the war, the heads of locomotive works today are endeavoring to develop a new set of skilled men. But at the best those they have so far evolved might be properly termed, as they say at Borsig, "the most skilled of the unskilled." There was no opportunity to train young men in the locomotive shops in war time. Instruction was out of the question, and besides the shops were called upon to produce much equipment of a warlike character, even cannon.

Following the peace came the revolution, and now with socialistic ideas prevalent among the workmen the lot of a works superintendent or director is not an easy one. It may be that the German workman, as his brother in Poland has learned to, will ignore eventually socialistic notions, and become as it were immune. But it must be remembered that the Polish workman is a member of a nation that has come out victor, and that his general lot is improved, whereas the reverse is the case in Germany. No wonder, then, that at a works such as Borsig's, which before the war could challenge in shop efficiency any locomotive plant on the continent, they are apt to characterize the low morale of the German workmen of today in no unmeasured terms.

The Mark and Foreign Business

As to improvements in locomotive design or construction, little or nothing has been done since the war. The entire effort of the plants has been directed to making good war damages by deterioration or excessive demand, filling all orders possible and endeavoring to hold on to old clients abroad. There seems to be a pretty general feeling that the falling mark was designed to help obtain foreign business, and that any stabilizing would tend to check exports. However, those with clear vision declare that if the shock has to come when the mark is checked in its fall, it is only delaying the catastrophe to put it off.

With regard to raw material the locomotive plants, in common with other industries, have felt the shortage in coal. The sheet industry also has been hampered by raw material shortages, and this has reflected on the locomotive plans. Scrap iron so far has been plentiful, but this is bound to run out before long, when new difficulties will be met. Right now considerable scrap is reported to be coming in from Russia, and this and other items exported by the Soviets are serving as a credit abroad.

It seems to be pretty well recognized, however, that the world's market price on locomotives is being reached by German trade, and that in the immediate future business abroad will be more and more difficult to secure under existing limitations in Germany. The machine tool trade in Germany has recognized this fact already, and the increased difficulty is experienced in the German iron and steel industry in general and in the cutlery works at Solingen and Remscheid. Not only has there been a decrease in foreign business of late, but cancellations of orders are reported in many instances.

What applies to the locomotive, machine tool and other metal trades is also applicable to the boiler people. I visited shortly after the Borsig shops the Durr boiler works at Düsseldorf. This plant produced many of the water tube boilers for the German navy, and since the war it has turned its attention naturally to commercial work. The Durr works received at the outset many orders from foreign countries for refineries, power stations and the like, and today has orders ahead for several months. The ability to maintain itself on anything like a profitable position is dependent on the same elements which affect all the other metal trades.

Great Concern About the Future

Viewed in the light of competition, the German shops are today in no shape to give serious concern to establishments capable of giving accommodation. The low quotations on German goods which poured forth immediately following the armistice were a desperate effort to hold some of that foreign business which the German industries enjoyed before the war. While the falling mark undoubtedly helped this effort at the outset, the fear now is that this fall has gone beyond the power of stopping. With doubt and uncertainty occupying the mind of the German director, with the workmen underfed and undernourished, with a morale below normal, with shop hours limited, and with a growing scarcity of raw material, the outlook for the German industry is not favorable. The main thought of the German workman for the coming winter is to get enough of food and clothing to maintain life. The time has not yet come when he may think of accumulating. Compared with the Russians whom I had just left behind, the German seems to be the more troubled about the future. The Russian is at least looking forward. He believes reconstruction is at hand. The Pole knows that for Poland it is here. The German hopes it is coming, but so far he has only learned that this so-called present activity is a fictitious thing without any real assurance of lasting value.

Newton Steel Co.'s Plans

Revision of its original program of expansion at its plant in Newton Falls, Trumbull County, Ohio, is announced by the Newton Steel Co., Youngstown, eight new sheet mills being installed instead of six. The new installation will give the company a complement of 18 units. It is expected four of the new mills will commence operations early next year. Directors have declared a quarterly dividend of 2 per cent on common stock, payable Jan 1 to stock of record Dec. 20, making a total disbursement for the year of 5 per cent on the junior issue. Heretofore the company has distributed 1½ per cent quarterly on common. It has also authorized the regular preferred dividend of 1¾ per cent.

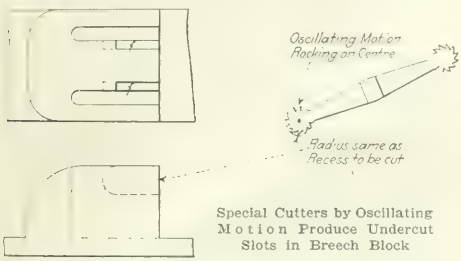
Special Machines Found Economical

Interesting Methods Developed for Handling Gun Parts—Continuous Milling Machine and Draw Cut Shaper Built by Parker Brothers Years Ago

BY L. S. LOVE

PECULIAR shapes of some of the parts composing the operating mechanism of shot guns makes it exceedingly difficult, and in some cases impossible, to machine them economically on commercial types of machine tools. To produce these parts gun makers have developed special machines to perform difficult operations. Typical of such solution of problems confronting them is the manner in which Parker Brothers, Meriden, Conn., manufacturers of shot guns, handle some of their work.

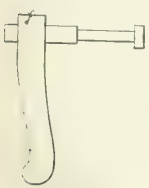
One of the operations which would impose an impossible task from the economical production standpoint on any ordinary machine tool is the milling of two parallel slots in the breech block. These slots are ⅛ in.



Special Cutters by Oscillating Motion Produce Undercut Slots in Breech Block

wide, ¾ in. long, with a ¼-in. radius at the closed end. These slots, being inaccessible to the ordinary milling machine or profiler cutter, owing to interference from other parts of the piece, are whittled out in a special machine with special form cutters.

The machine on which this work is handled has a main column, knee and table, similar in appearance to those of a hand milling machine. The shaft, which would correspond with the spindle of the milling machine, carries on its front end a cam and on the rear end a crank. The cam or eccentric actuates a forked arm, which carries two rollers riding on the cam. This arm, rocking back and forth under control of the cam,



The Top Lever Rocks on Centers to Machine the Lever Concentric with the Shaft

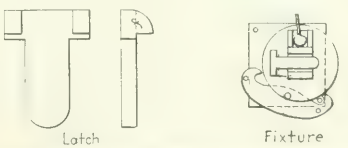
is attached to the work holding the fixture, mounted on the table of the machine, thereby producing a reciprocal motion in the fixture and work. This motion, being positively timed with that of the cutter, relieves it and prevents drag on its back stroke.

An extension bracket mounted on the side of the column carries the cutter spindle or shaft. On its rear end this shaft is joined by a crank and connecting rod to the crank on the main spindle or cam shaft. This auxiliary shaft carries the cutter holder, in which are mounted two cutters set the correct distance apart to produce the proper spacing between the slots. The cutters are of special type, are made double ended, as an economy of steel, and are of a size and form to correspond with the width and radius of the slots to be machined, thereby producing the proper contour, as the work is fed against the cutters by means of the table feed. The cutting action is produced by an oscillating motion set up by the cranks and connecting rod, rocking the cutters on centers. When fed in to the proper depth the slots are finished.

Another operation for which a special machine has been designed is the finishing of the top lever, concentric with its rocker shaft. This shaft is first turned in a small lathe, with a special former controlling the tool. Three diameters are reduced to size in one set up. The shaft is then mounted in the special machine, which is similar to a bench lathe. The live spindle, instead of revolving, has a reciprocal motion. This is produced by a rack meshed with a pinion on the rear end of the spindle. This rack operates vertically, receiving its motion from a crankshaft located below the bed of the machine. The reciprocating motion of the rack oscillates the lever against a scraping tool, which produces the desired finish and contour. The tool is fed across the work by a ratchet feed mechanism.

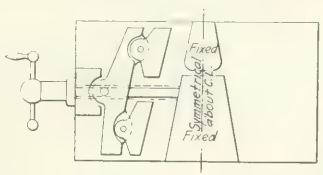
Continuous Milling Operation in Use for Years

Continuous milling appears to have been developed by Parker Brothers long before that method of manufacturing was generally recommended by milling



The Latch Forging Is Match Milled in a Fixture Which Locks in Two Positions 90 Deg. Apart

machine manufacturers. The machine used was designed and built by them a number of years ago, and incorporates several features which are used in recently designed machines on the market. This machine carries a chucking fixture on its spindle. The fixture has six stations to hold an equal number of breech blocks. The operation is the milling of the front end of the block to a curve which is not a true circle. As the fixture is revolved, the milling cutter head is moved to follow the contour, being controlled by two formers, one



Guard Bows Are Held Two at a Time in a Self-Compensating Fixture

working against the other to produce the curve desired. Tapered rollers, instead of straight, ride on the formers to compensate for grinding of the cutters. The fixture is indexed by an over-riding ratchet feed. After the first revolution of the fixture a completely milled block is removed and a fresh blank inserted as each successive station reaches the operator's position.

A cleverly designed fixture has been designed to hold a small latch forging for milling. This forging is shown in an accompanying sketch. It is necessary that

the tongue of this latch and the space between the ears be milled to match. This is accomplished in the fixture shown. The jaws of the vise to hold the work are cam closed. The work is then passed under the milling cutter, which mills the tongue up close to the ears. The fixture is then indexed 90 deg. and the cutter is passed between the ears, thus matching the second cut entirely with the first. The indexing of the fixture can readily be understood from the sketch. A double end latch holds against a pin at one corner, thus securing the fixture for the first operation. Ninety degrees away is the other end of the latch which registers on the pin for the second operation. This pin is located diagonally across from the first, so that moving the latch around 90 deg. brings the fixture and piece at right angles with its first position for the second operation.

The guard bow or trigger guard, being irregular in shape, was found difficult to grip in a manner that would hold the forgings, with their slight variations in size, sufficiently rigid for slab milling the sides. This operation is performed by holding the work in a fixture designed to hold two of the bows at once. The fixture consists of a cast base in the center of which are mounted two fixed tapered blocks as shown in sketch. On either side of these blocks are the movable jaws, controlled by a floating screw with right and left-hand threads. These movable jaws are each composed of three rocking blocks, backed against a block operated by the screw, and sliding in grooves or guides parallel with the axis of the screw. Work is laid against the fixed blocks in the middle of the base and the screw turned to tighten the jaws. As the blocks which are moved by direct action of the screw advance toward the middle of the base, the rocking blocks adjust themselves to any irregularities of the pieces to be held and the floating action of the screw compensates for variations in movement necessary on one side over that on the other side of the fixture, thus gripping both pieces securely for milling.

This company, many years ago, designed and built a draw head shaper to plane the butts of shot gun barrels. The ram of this machine is rectangular in section and carries a head similar to that employed in draw cut shapers now on the market. This shaper will plane any desired contour on the butts. The head movement is controlled by a bar which is attached to its side. The other end of the bar rides, by means of a roller, on a form block attached to the side of the machine. Adjustment of this block, acting through the bar, affects the position of the head while planing, thereby permitting different contours to be planed. The drive of this machine is similar to present day shaper drives.

GERMAN IRON RISES SLIGHTLY

Steel Prices Not Advanced, But Gain in Exchange Pushes Dollar Values Up

BERLIN, GERMANY, Dec. 19.—Foundry iron No. 1 is now 160,328 m. per metric ton ($24.43 per gross ton, on basis of 1½c. per 100 m., compared with 159,390 m. last week. Prices of steel products remain, in marks, at last week's figures: ingots, 214,300 m.; bars, 293,200 m.; thin sheets, at 450,300 m. Due to the advance in exchange value of the mark, from 1¼c. to 1½c. per 100 m., all of these "stationary" prices show increases in dollar values, ingots becoming $32.66 per gross ton; bars, 2.00c. per lb. and thin sheets, 3.06c. per lb.)

Freight Rate and Coal Advances Cause General Price Increase—Scrap Higher Than Pig Iron

BERLIN, GERMANY, Dec. 1.—The recent temporary improvement in the exchange led to hope of a probable halt in the upward movement of prices. It has, however, been short-lived and heavy increases are again taking place all-round, on account of the 150 per cent increase in railroad rates Dec. 1, and the rise in the coal price. Bituminous coal, which is taken as the basis of calculation, has been increased from 14,011 m. to 22,763 m. per ton, and pig iron, steel and other products have followed. The Association of German Iron Foundry Masters has raised prices for building and machine castings 20 per cent plus 50 m. per kg., and for commercial castings 40 per cent. Prices for rolled material have been raised 8 to 10 per cent and are now as follows, per metric ton: [Advances reported by radiogram from Berlin were printed on page 1589, Dec. 14. Another appears above.]

	Dec. 1	Nov. 16
Blooms	196,800	178,000
Billets	208,800	188,700
Structural shapes	240,800	216,700
Universal iron	263,700	237,900
Hoop iron	289,300	258,700
Nos. 11 to 20	348,700	311,900
No. 20 and lighter	373,600	332,000

Open-hearth material is about 10 per cent higher than the foregoing prices. The steel association (Stahlbund) has raised prices so rapidly of late that German prices for rolled material are on the same level and in some cases even higher than foreign quotations. Considering that foreign manufacturers must reckon with much higher production costs, the policy of the Stahlbund is the subject of considerable comment. Pig iron and steel prices, which were reduced by about 12 per cent for the last week in November, have not been established for December but it is reported on good authority that they will be increased again.

The scrap market is erratic. Customers seldom pay a part in advance, and as payment is made between the 15th and 20th of the month following delivery, the heavy capital required to carry accounts forces the trade to effect as many deliveries as possible bebore the end of the month. The first half of the month is therefore quieter than the second. Prices are about 110,000 m. per metric ton for iron scrap, about 120,000 m. for steel scrap and about 150,000 m. for machinery cast scrap per ton. These prices are higher than German pig iron quotations, and are even above foreign quotations. The reason for this anomaly is the extensive speculative buying going on, as high as 135,000 m. being paid for iron and steel scrap. Although works are not paying this price yet, speculators expect prices to advance.

At a recent branch meeting of the Association of German Engineering Firms in Düsseldorf at which manufacturers of heavy machine tools were represented, it was stated that some companies had suffered considerable losses, as the present sliding scale of prices does not allow for the exorbitant increase in costs which has taken place. It was decided to introduce a compensating price system similar to systems in use in other lines, according to which prices are being adjusted in relation to the changing economic conditions. It was suggested that an effort be made to induce customers to accept alterations in contracts, as the manufacturers were in a number of instances unable to execute the orders under the stipulated conditions.

Unemployment has increased slightly, which is attributed to the usual curtailment in some trades at this season. The expected heavy unemployment is evidently not taking place.

Civil service examinations for a mechanical engineer for the Washington Navy Yard, several aeronautical positions and for mechanical draftsmen, are announced by the United States Civil Service Commission, Washington, to which application should be made for further information.

BUSINESS CYCLE DISCUSSED

Its Characteristics Outlined and Limitations Considered by Economists

At a dinner of the American Statistical Association held at the Machinery Club, New York, Dec. 15, several speakers outlined the principal features of the so-called business cycle, but all disclaimed any pretension of using it for predictions. As a matter of fact, they emphasized their inability to predict even the duration of such a cycle between peaks or between hollows and stated that the principal benefit to be gained from its consideration would come from a study of its internal composition.

Prof. Wesley C. Mitchell, director of the National Bureau of Economic Research, defined the business cycle as being a recurrent sequence of (1) prosperity, (2) crisis, (3) depression and (4) revival, and stated that the observation of this sequence and of its effects is as international as the literature dealing with it. He pointed out that the expression "business cycle" was one which could be justified as to both terms and defined it as a series of business phenomena which returns upon itself. There is no regularity, either as to the length or the amplitude, each such cycle being a unique phase of human experience. Nevertheless, one can recognize the similarity between successive cycles and all follow exactly the rotation above mentioned.

Both Professor Mitchell and other speakers pointed out the observed fact that cycles in consumers' commodities are less violently variable than in other commodities and that, so far as consumers' products are concerned, the rate of consumption is more stable than the rate of production. These facts were known some time before it became possible to proceed with quantitative analyses.

Length of Recurring Periods

Professor Day of the Harvard Economic Committee pointed out that, until recently, because of lack of data, most business analyses had proceeded on the basis of annual figures. This, he stated, is the reason why so little progress was made in getting at basic reasons and connecting them up with results. Even quarterly data are not sufficiently frequent and so far as possible statisticians have come to demand monthly data on all important business movements. In some cases the interval is even less, for we have weekly figures in a good many lines. Analyzing such data for a composite business curve covering the period from 1877 to 1920, he found that the period between successive low points varied between 26 and 48 months up to the time when the great war dislocated all such analyses. The average he placed at about 40 months, although he found four successive periods in the early part of this century of 43, 43, 44 and 44 months. There is thus a periodicity which, while not definite, may be roughly approximated.

Extremes Less the Nearer the Consumer

In manufactured goods, particularly, the amplitude of variation is much greater below the normal line than above it. To fit the normal line, therefore, the duration of the period above is greater than that below. It is not often that the normal is exceeded by more than 20 per cent, but a loss of 50 or 60 per cent below normal is not uncommon. Thus, the recurrent periods of prosperity have longer duration than the depths of depression.

The closer the item under consideration is to the consumer, the less violent will be its fluctuations. Professor Day made a comparison between the production of news print and of footwear, both of which go into direct final consumption, with pig iron, which does not. In the former case, the variation is confined almost wholly between 90 per cent and 110 per cent of normal, while pig iron fluctuates between 30 per cent and 130 per cent, or through 100 "points" against 20. In all these cases, however, the presence of an accumulated stock may interfere with the regular flow of the curve. These stocks intervene between production and consumption, and there is normally a heavy depletion of stocks before production on a large scale is resumed after a period of idleness.

Col. Malcolm C. Rorty, of the American Telephone & Telegraph Co., showed a noteworthy chart entitled "A Half Century of American Business." This is based on monthly figures of a large series of items beginning with 1877. Other items were added to from time to time as additional data became available on the monthly basis so that, while the first eight years of the period were based on monthly pig iron figures only (figures of the number of furnaces in blast, only) the last few years were based on many items, including pig iron. The next series added after the pig iron was that of bank clearings outside New York. The two items carried through 1892, after which Bradstreet's index was added as a third item and so successive additions were made until the present index is thought to be sufficiently complete to represent very closely the trend of business conditions. This diagram, which is believed to represent the longest continuous monthly data extant, has a normal line and the curve is given in percentages above and below that normal. For the most part, the amplitude of prosperity and of depression lies between 10 per cent and 20 per cent from normal. The maximum shown above the line was 18 per cent, while one point went 25 per cent below the normal.

Milwaukee Metal-Working Shops Busier

Forty-eight shops reporting to the Milwaukee branch of the National Metal Trades Association reported an increase of 536 employees in October over September. The total number employed in October was 16,166, as against 15,630 in September. The average number of hours worked per man per week was 52.1 in October and 51.1 in September. The total number of man hours for 36 shops in October, 1922, was 2,956,266, as against only 1,712,512 for the same shops in October, 1921, a gain of 72.6 per cent. At the high point of production, however, in March, 1920, the number of man hours for these 36 shops reached 4,212,392.

Reorganization of International Steel Tube Co.

The International Steel Tube Co., Cleveland, at a special meeting of its stockholders Dec. 15, decided to affect a reorganization and unanimously adopted reorganization plans presented. The company, which has a Delaware charter, will be reorganized under the same name as an Ohio corporation. It is understood that N. E. Smythe, S. R. Smythe Co., Pittsburgh, will be president of the reorganized company. Mr. Smythe is president of the present company, having succeeded H. P. Bope, who recently formed the American Steel Corporation, which is promoting the erection of a blast furnace and steel plant at Sandusky, Ohio. The International Steel Tube Co. has its plant virtually completed with the exception of installing some equipment and expects to be in operation about May 1.

Cars in Need of Repairs

The number of freight cars in need of repairs on American railroads continues steadily to decrease, according to reports received from the carriers by the car service division of the American Railway Association. On Dec. 1, 226,288 freight cars, or 9.9 per cent of the cars on line were in need of repairs. This was a decrease of 9372 cars since Nov. 15, at which time there were 235,660 cars, or 10.4 per cent. Cars in need of heavy repairs totaled 176,006 compared with 187,596 on Nov. 15. On Dec. 1 last year, 320,292 cars, or 14 per cent of the total number on line were in need of repairs.

Gear Makers to Meet in April

The seventh annual meeting of the American Gear Manufacturers' Association will be held at the Hotel Cleveland, Cleveland, April 19, 20 and 21, 1923.

M. A. HANNA CO. ORGANIZED

Takes Over Properties of Partnership—Stock Issue of $12,000,000 Quickly Subscribed

Details of the organization of the M. A. Hanna Co., Cleveland, to succeed the partnership of M. A. Hanna & Co. have become known in connection with the announcement of banking interests of a public offering of $12,000,000 of the first preferred stock in the new company. The entire issue was subscribed the day it was advertised.

The new company, which is an Ohio corporation, will take over the assets and business of M. A. Hanna & Co. and affiliated interests in ore mines, blast furnaces, lake vessels and coal properties. There will be no change in the personnel, as the management will be in the hands of M. A. Hanna & Co. in the various affiliated organizations will be exchanged for second preferred and common stock in the new company.

The companies wholly owned by the M. A. Hanna Co. are the Wakefield Iron Co., Virginia Ore Mining Co., American-Boston Mining Co., Pittsburgh & Eastern Coal Co., the M. A. Hanna Coal & Dock Co., Paint Creek Coal Mining Co., and the Wheeling & Lake Erie Coal Mining Co. In addition the company has interests in the following companies, its ownership in all but four representing the controlling interest: Bates Iron Co., Boomer Coal & Coke Co., Calumet Transportation Co., Consumers' Ore Co., Hanna Furnace Co., Massillon Coal Mining Co., Mahoning Ore & Steel Co., New Field By-Products Coal Co., New Field Coke Co., Nokay Iron Co., Producers' Steamship Co., Richmond Iron Co., Susquehanna Collieries Co., and Waukenabo Co.

Earnings of M. A. Hanna & Co. for Five Years

	Average	1917	1918	1919	1920	1921
Net income after all charges including interest but before depreciation and depletion reserves and Federal taxes	$3,557,950	$5,273,607	$4,268,364	$2,378,184	$5,373,450	$496,143
Deduct depreciation and depletion	806,193	1,003,741	976,811	735,534	977,900	336,979
Net income before Federal taxes	2,751,757	4,269,866	3,291,553	1,642,650	4,395,550	159,164
Deduct Federal taxes at present rate of 12½ per cent.	343,969	533,733	411,444	205,331	549,444	19,895
Net income after Federal tax deduction	2,407,788	3,736,133	2,880,109	1,437,319	3,846,106	139,269
Add company's proportion of undistributed net income of partially owned companies applicable to dividends on shares owned, less Federal taxes at 12½ per cent	786,881	2,146,771	1,987,433	1,134,491	1,100,375	*2,434,669
	$3,194,669	$5,882,904	$4,867,542	$2,571,810	$4,946,481	*$2,295,400

*Loss

of the seven men who have been active partners in the firm. Matthew Andrews will be chairman of the board of directors and Howard M. Hanna, Jr., president. The other members of the partnership are Leonard C. Hanna, Jr., Franklin B. Richards, William Collins, Richard F. Grant and George M. Humphrey.

The business of the Hanna firm was established in 1867 by Daniel P. Rhodes, father-in-law of M. A. Hanna, under the name of Rhodes & Co. and was taken over in 1885 by M. A. Hanna & Co. It was greatly extended under the direction of M. A. Hanna and his brothers, Howard M. Hanna, Sr., and Leonard C. Hanna, Sr. Since the organization of the present firm, it has managed and acted as sales agents for a large number of companies, many of which it controlled by stock ownership. The new company will handle through the properties it will operate and its sales agency connections a normal yearly tonnage of 15,000,000 to 20,000,000 tons of iron ore, coal and pig iron of which approximately 1,000,000 tons will be in pig iron, the remainder being about equally divided between ore and coal.

During the past few years, various interests in the firm have reverted to estates through deaths of older members and this was a factor in deciding to form an incorporated company. The new company will in a sense be a holding company, as it will acquire various holdings now owned by the present partners and by estates, but it will also function in the operations of the various properties similarly to the present partnership organization.

Since 1885 the average return under the partnership has been more than 22 per cent per annum upon the average annual capital and surplus invested. During the ten years previous to Dec. 31, 1921, the average annual return was approximately 15 per cent. For the five years ending Dec. 31, 1921, the net income averaged $2,407,788. The new company will have net assets of $30,127,027, or $251 per share of first preferred stock.

The capital stock will consist of $12,000,000 of first preferred 7 per cent cumulative stock, $20,000,000 being authorized, $2,594,800 of convertible second preferred 8 per cent cumulative stock of $10,000,000 authorized, and 275,198 shares of common stock of no par value, of an authorized issue of 500,000 shares. From the proceeds of the first preferred stock a sufficient amount will be applied to retire $1,573,300 first preferred stock of the Standard Investment Co., which has been a holding [illegible] in the M. Hanna interests that are combined in the new organization. The remainder will be used to retire obligations and for working capital. The investment of the members of the firm

The company will control through the ownership of a substantial majority of its common stock the Hanna Furnace Co., which operates eight blast furnaces at Detroit, Dover, Ohio, Leetonia, Ohio, West Middlesex, Pa., and Buffalo. In addition to having other large ore mining interests, the company will have full ownership of the Wakefield mine, located in the Gogebic range. It will have full ownership of companies owning 17 bituminous coal mines in West Virginia, Pennsylvania, and Ohio, in addition to controlling other large coal properties. Its lake vessel interests will consist of a 22 per cent interest in the Producers' Steamship Co., and a 63 per cent interest in the Calumet Transportation Co., having eight modern lake freight boats.

The first preferred stock issue is being placed on the market by Dillon, Read & Co., New York, and the Union Trust Co., Cleveland, at $102 per share, to yield 6.85 per cent.

Earnings for Five Years

For the five years ended Dec. 31, 1921, the earnings of the interests now consolidated in the M. A. Hanna Co., together with the proportionate amount of undistributed earnings of companies partly owned applicable to dividends on the company's interests therein, are shown in the table.

Ground Broken for Michigan Steel Corporation's Sheet Mill

The Michigan Steel Corporation, which is building a modern specialty sheet mill at Ecorse, Detroit, has broken ground for the building foundations and has purchased from the Mesta Machine Co., Pittsburgh, a complete hot and cold mill train together with Mesta drive. All equipment is of special design and extra heavy steel castings, this particular equipment being developed as especially applicable for the production of high-grade sheets used in the building of automobile bodies and parts.

This does not mean that the company has purchased all of the machinery that it will require, as it is still open for bids on finishing department, annealing and pickling equipment and all inventory items. The railroad siding has been laid into the plant, and materials for building are being assembled.

The manufacture of wrought brass in the electrical furnace is to be discussed by W. R. Webster, vice-president Bridgeport Brass Co., at the meeting of the Providence Engineering Society on Tuesday evening, Jan. 16.

INDUSTRIAL MACHINERY

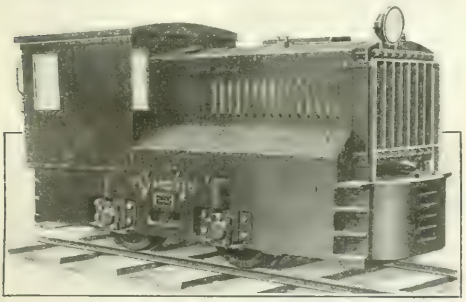
Many Problems Presented to One Division of Commerce Bureau

WASHINGTON, Dec. 19.—The problems confronted by the Industrial Machinery Division, Bureau of Foreign and Domestic Commerce, are not simple because there are more than 4000 factories in the United States producing industrial machinery, and in 1919 the products of these factories were valued at over $2,200,000,000, of which nearly $400,000,000 was exported in 1919, a ratio of about 17 per cent. Making this observation in his annual report for the fiscal year ended June 30, 1922, W. H. Rastall, chief of the division, points out that the need for such a division is shown by the rapid increase in the number of inquiries answered by it from week to week. The number for the week ended Oct. 8, 1921 (the division was organized in the fall of 1921) was 21, while for the week ended June 10 it was 400 and in the week ended May 20 it reached 629. Mr. Rastall points out that many machinery manufacturers have called personally at the division's offices, the total number of visitors up to June 24 having been 166.

One of the first problems attacked, says the report, was that involving the exporting of American steam boilers, as it is necessary to have these comply with the laws governing the construction and operation of such boilers in each country of destination. A brief statement regarding the situation in each particular country has been prepared and distributed to those interested. In co-operation with the Automotive Division, a survey of the world's highways has been made and in those instances where important construction work is in hand the attention of interested manufacturers has been directed to the situation. Correspondingly, in co-operation with the Transportation Division, a survey has been made of the railroads of the world and called to the attention of those interested in this field for machinery. Contact has been established with a number of groups of machinery manufacturers in an effort to co-operate with them in the solution of their foreign trade problems. Mr. Rastall points out that special surveys of the foreign markets for refrigerating machinery, machine tools and other kinds of equipment have been made, followed by a thorough sales analysis, and interested manufacturers have been shown where the best markets may be found and have been given information regarding the dealers best fitted to serve them in each of these markets. Mr. Rastall calls attention to a report, prepared by himself, which is about to be used regarding the machinery markets in Asia. The report is a result of an investigation by Mr. Rastall, when he was a trade commissioner. Mention is made of the fact that special and confidential circulars were issued to the number of 240 by the division, most of these being for the purpose of calling attention to opportunities for business existing in foreign fields. Attention also is called to articles in *Commerce Reports*.

New Seven-Ton Gasoline Locomotive

A new 7-ton, four-speed, gear-drive gasoline locomotive, found to have developed and maintained a drawbar pull of 5250 lb. at 2½ miles per hr. on sanded rails, has been placed on the market by the Fate-Root-Heath



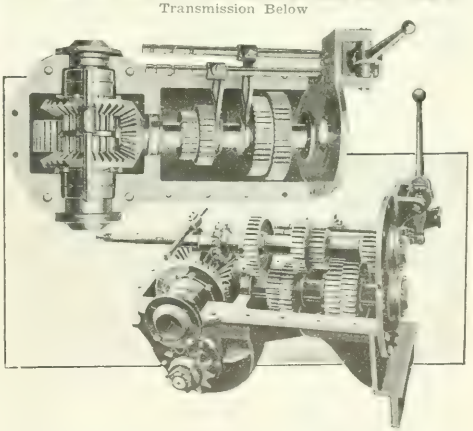
Co., Plymouth, Ohio. The speeds are 2½, 4, 8 and 12 miles per hr., either forward or reverse.

Unique design of the transmission is credited with the results attained. Gears are unusually large and massive, and a feature is the additional shaft and the final gear, which is 14½ in. in diameter, and has a 4-in. face. This gear is intended to permit of the proper speed reduction, and also the placing of the sprocket shaft, which it drives, on the same plane with the axles, no jackshaft being required. The other gears are of 2 and 2¼-in. face, and of large diameter. The sliding gears are made in pairs on the second driving shaft, giving extra long hub length and minimizing wear. Driven gears only are in mesh. Forward and reverse speeds are by means of large bevel gears with internal gear teeth, into which the pinion that drives the main gear meshes, obviating use of clutches. Gears are of alloy steel, hardened, and are mounted on large shafting and ball bearings. Bearings are located inside of the gear case, from which they receive adequate lubrication.

The final drive is by means of two short, heavy chains, one to each axle, driven directly from the transmission. The engine is a heavy-duty Buda model, four-cylinder, 5-in. bore, 6½-in. stroke, equipped with Bosch high-tension magneto and starting and lighting, a Pierce governor and Stromberg carburetor. The radiator is the Modine sectional core type, cooled by a 24-in. fan, and protected by a steel guard, as shown. The clutch is of the dry plate type, having nine driving disks faced on each side with non-burnable facings.

The axles are 3 15/16 in. in diameter and are mounted in Hyatt heavy-duty roller bearings with hardened steel sleeves to take the wear. Axle end-thrust is taken by bronze thrust plates placed in the axle boxing caps, which provide adequate lubrication. The axle springs are 12¾ in. long, the wheels readily following uneven track and giving excellent traction. The brakes are placed between the wheels, and the brake shoes engage both the tread and flange of the wheel. Brake rigging of the lever type is used, which is said to give the same pressure on all four wheels, regardless of the wear on the wheels or shoes. Sand

Full View of Locomotive Is Shown at Left and Views of Transmission Below



pipes are located close to the rails and sand boxes are close to the engine to keep sand dry. The valve does not slide on its seat, a construction which eliminates wear, and the sand, being agitated when the valve is opened, assures a positive flow.

The frame is massive, built close to the track, and the bumpers are arched so as not to derail cars in rounding sharp curves. The cab and canopy are of all-steel construction and the cab has side as well as rear entrance. Wire glass windows are provided in the cab.

New Hammer Die for Drawing Tapers

A combination hammer die for drawing tapers, available for any make or size of trip, air or steam hammer, and from the use of which, it is claimed that one man in one heat can draw any taper that can be handled under a hammer, has been placed on the market by Beaudry & Co., Inc., Boston.

One end of the die is provided with a tilting face, as shown in the illustration, supported so that it moves freely on a fixed axis. The operator by shifting the position or angle of the work, and striking a light blow automatically adjusts this tilting face to any desired angular position with relation to the top hammer die. Thus any taper desired may be given the work, and any shaped piece can be completely finished and smoothed up, point and all, without hand finish.

Scale falling between the tilting face and die holder



Combination Hammer Die for Drawing Tapers

is worked into a pit through grooves and forced out through a hole in each side of the die holder, an arrangement intended to assure that the tilting face works freely at all times. The fixed plain part of the die face can be used for general forging the same as any ordinary die.

The die holder is cast of gun iron, and the tilting face is forged from 0.60 per cent carbon hard steel. The die can be used to advantage on such work as flat, cape, diamond point and track chisels, caulking tools, railroad spikes, cant dogs, wedges and shims, slice bars, crowbars, pickaxe ends, drift pins, marlin pins, bucket teeth, rocker arms, eccentric rods, equalizing levers, valve yokes, brake levers, keys, gibs and similar work.

American Bolt Corporation Formed

The American Bolt Corporation, Dover, Del., has been incorporated with authorized capital stock of $10,500,000 for the purpose of acquiring and consolidating under one management the Standard Bolt Corporation, Columbus, Ohio; the Bayonne Nut & Bolt Co., Bayonne, N. J.; the Michigan Bolt & Nut Co., Detroit, and the Boss Nut Co., Chicago. In this connection the new corporation is offering a $1,750,000 issue of first mortgage, 15-year, 7 per cent sinking fund gold bonds at par and interest through Brooke, Stokes & Co., Philadelphia, and Hyney, Emerson & Co., Chicago.

J. Rich Steers, president Mayonne Nut & Bolt Co., is attending a conference of the principals which is being held in Detroit for the purpose of completing the financial program and to outline the course of management.

Record Output of Portland Cement

All records have been broken this year in the production and shipment of cement for building purposes. Already in 11 months the output has gone well beyond the largest 12 months' record preceding. Figures of the Geological Survey placed the November production at 11,349,000 bbl., making the total for the 11 months 105,199,000 bbl., compared with the record output of 1920, when for 12 months the total was something under 101,000,000 bbl. November is the seventh consecutive month showing an output of more than 11,000,000 bbl.

Shipments for the 11 months have totaled 111,705,000 bbl., the November figure being 10,167,000 bbl., this being the seventh month in which shipments exceeded 10,000,000 bbl. In both production and shipments November shows a distinct falling off from October, but the decline is far lower in each case than the usual seasonal decline, because of the fact that building operations are going ahead this fall in much larger volume than is customary.

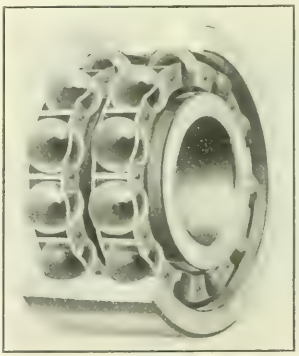
Exports for the first ten months of the year show a total of 912,109 bbl., or not quite 1 per cent of the production. Imports are negligible, being only about 150,000 bbl. About 38 per cent of the October exports went to Cuba. Nearly all of the balance went to other West India islands, South and Central America and Mexico.

Large Western Electric Co. Improvements

The Western Electric Co., Hawthorne, Ill., has commenced the construction of a copper rod mill and copper wire works, to cost $2,500,000, and a $100,000 machine shop for overhauling the locomotives and rolling stock of the Manufacturers' Junction Railway, a subsidiary organization. The rod mill will be 120 x 200 ft., and the wire-drawing plant, 120 x 345 ft. The rod mill equipment has been built and is ready for installation as soon as the foundations are complete. The mill will consist of a roughing stand for breaking down the copper billets, an intermediate stand and finishing rolls which will roll down to ¼-in. copper rod. From the rod mill the rods will be conveyed by monorail to pickling tanks and thence to the wire drawing plant where the blocks will reduce the metal to sizes ranging from 12 to 40 gage. The need for the wire works is indicated by the fact that the Hawthorne plant of the Western Electric Co. now uses 1,500,000,000 ft. of copper wire a month in its telephone cables alone.

Double Row Radial Bearings

Strom double-row radial bearings have been added to the line of the U. S. Ball Bearing Mfg. Co., 4535 Palmer Street, Chicago. They are of two types, standard and maximum, and one of the outstanding features is the retainer construction.



Double Row Maximum Type Radial Ball Bearing

Two independent riveted retainers are used as shown in the illustration; one for each row of balls. This is intended to assure the same strength in each retainer as obtained in the single-row type of bearings. They are said to be especially adaptable for installations requiring unusual bearing capacity in a limited amount of space. The bearings are designed to carry heavy radial loads, but because of the construction, they are said to be capable also of supporting thrust loads.

The number of workers in profitable employment in the industries of Illinois showed an increase during November. Analysis of reports of 1492 companies to the General Advisory Board of the Department of Labor showed an increase of two per cent in employees over the number at work in October. In every month of 1922 except July, Illinois employers have reported a larger number of workers than in the month preceding. The record of November, 1921, showed a decrease of 0.9 per cent from the total number of employed in October, 1921.

The Empire Rolling Mill Co., Cleveland, manufacturer of black and galvanized sheets has established a selling organization in charge of Harry J. James. This company's product has heretofore been sold by the Bourne-Fuller Co., Cleveland.

Foreign Pig Iron Generally Satisfactory

Analyses of Results Obtained from Employment of Various Grades of Imported Metal in American Melting Practice Indicate Uniformly Successful Application

BY W. A. BARROWS, THIRD

PRIOR to the early part of the past summer foreign pig iron remained a negligible factor in the markets of the United States for a period of nearly twenty years. Unimportant tonnages of iron from the Orient were reported on the West Coast at intervals and ballast iron was offered in New England on several occasions. Importations of pig iron were largely accidental or in such small tonnages or of such unusual analyses that the markets of this country as such were unaffected thereby to any appreciable extent.

The forerunner of the important present movement was the importation by a melter located on the Eastern seaboard of a small tonnage of high phosphorus foundry iron from the European Continent in the spring of 1921. This was largely by way of experiment, an attempt to introduce that particular metal generally in the Eastern market at that time failing through lack of information regarding the quality of the metal, and consequent indifference on the part of the buyers and also to availability of domestic product in practically all grades and at relatively low prices.

Although some provision was made prior to April 1, 1922, by pig iron consumers against advancing prices anticipated in the event of a serious coal strike, stocks and commitments considered at that time ample to tide over the emergency were found to be inadequate in view of the widespread interruption which developed to merchant blast furnace production.

Early in June substantial purchases of pig iron for importation to this country from abroad were negotiated. Interruptions to transportation further restricted domestic output and movement of iron to the consuming centers, particularly from the South. By the first of July importation of foreign pig iron into the United States on a large scale was well under way.

Conditions favored this movement. Producers in Great Britain and on the Continent were confronted with stagnant home markets and were eager to liquidate large stocks on the furnace yards. Ocean freight rates were relatively low and an abundance of cargo space was available. Reluctance on the part of melters to purchase iron with which they were unfamiliar was offset by sheer necessity of obtaining supplies to avoid shutdowns. It is probable, however, that the latter course would have been preferable had the first receipts of pig iron proved unsatisfactory.

That this was not the case is attested by the fact that an estimated total of 200,000 tons or more of foreign pig iron arrived on the Eastern seaboard of the United States during the four months preceding Nov. 1. As this tonnage originated in a number of different localities and covered a wide range of analyses, it has been a matter of considerable interest to observe the adaptation of the various grades to foundry and steel works practice in this country.

Scotch Irons Popular at First

For identification purposes the foreign irons were roughly classified at the beginning of the importation movement as Scotch, English and Continental. By reputation the Scotch irons were at least familiar to foundry melters, particularly in New England, where the experience of many of the buyers goes back to the time when Scotch irons regularly formed part of foundry cupola mixtures in many of the foundries of that district. Because of the greater familiarity with the metal and also because Scotch irons correspond closely in analysis and general characteristics to the best brands of domestic foundry iron, importers experienced less hesitancy on the part of the buyers to purchase it, and accordingly the standard brands of Scotch iron command a substantial premium in the American markets at the outset. This price differential became less marked however, as grades having the same general characteristics produced in England, Belgium and France became better known, and as the results obtainable from employment of higher phosphorus grades became generally understood. Scotch irons are, of course, produced in a great variety of analyses. The following ranges, however, may be considered typical of the bulk of the iron imported from that country:

Analyses of Scotch Pig Irons, Per Cent

Silicon, 2.00 to 2.50, 2.50 to 3.00, 3.00 to 3.50, 3.50 to 4.00	
Sulphur	Not exceeding 0.05
Phosphorus	0.60 to 1.00 or 0.20 to 0.40
Manganese	0.80 to 1.20

As cast scrap was relatively in much better supply than pig iron at the time importation of foreign iron was inaugurated, the early demand was more insistent for the higher silicon grades. Melters speedily discovered the Scotch irons to be excellent scrap carriers, however, and excepting for special cases the silicon range 2.50 to 3 per cent was found sufficiently high to admit an increase of 10 to 20 per cent or more in the amount of scrap carried in the cupola mixtures where domestic irons analyzing 2.25 to 2.75 per cent silicon were replaced. The phosphorus range of 8.60 to 1 per cent has been most popular, although large tonnages of Scotch irons analyzing 0.20 to 0.40 per cent phosphorus have been employed with excellent results in the manufacture of engine castings and other work where tensile strength and resistance to wear are essential. The lower phosphorus Scotch irons have also been utilized to very good advantage by mixing with the lower priced high phosphorus English or Continental grades to yield castings having normal phosphorus content, this practice affording substantial savings.

Cleveland District Large Contributor

By virtue of their relatively low cost and great fluidity, the high phosphorus Middlesbrough grades produced in the North of England from the Cleveland "iron-stone" were particularly suited to the requirements of cast iron pipe and sanitary manufacturers, and large tonnages of these irons have been successfully employed by these melters, not only near the Eastern seaboard, but even in the Pittsburgh and other inland iron producing districts.

In general the following represents the analysis range covering the bulk of the tonnage of this grade imported:

Silicon	2.00 to 3.00 per cent
Sulphur	Not exceeding 0.05 per cent
Phosphorus	About 1.60 per cent
Manganese	0.40 to 0.60 per cent

Manufacturers of cast iron pressure pipe experienced little difficulty in obtaining a satisfactory product using Middlesbrough irons with domestic irons or with other foreign irons. Their pronounced fluidity, due to high phosphorus content, permitting a lower average silicon mixture to be used for a given section, has reduced to a minimum trouble from shrinking, warping and sweating. Any tendency toward brittleness encountered was generally overcome by mixture with lower phosphorus grades. However, brittleness and lack of tensile strength have not been encountered in the use of these irons to the extent that metallurgists

*E. Arthur Tutein, Inc., pig iron merchants, Boston.

in this country anticipated in view of the high phosphorus content. Experiences of soil pipe manufacturers with Middlesbrough irons have not differed greatly from those of the pressure pipe makers. Due to the tendency of the Middlesbrough irons to promote fluidity and soundness their employment has greatly assisted in meeting the exacting requirements of the more intricate sanitary ware castings.

While some grades of foundry iron are produced in England to correspond to Scotch irons in analysis, the bulk of the foundry tonnage imported from that country has been relatively high in phosphorous, running variously from 1 per cent to nearly 2 per cent in extreme cases. Importations appear to have consisted of sand-cast iron in every case.

British hematite irons in both low phosphorus and Bessemer specifications have formed an important part of the tonnage imported from England during the past few months. An actual analysis of a typical shipment follows:

	Per Cent		Per Cent
Silicon	2.07	Copper	0.022
Sulphur	0.027	Chrome	Nil
Phosphorus	0.030	Nickel	0.005
Manganese	0.808	Titanium	0.050

These irons have been available in practically any silicon range ordinarily available in this country. In consequence, practically every low phosphorous requirement has been met, including those of the acid open-hearth and converter steel makers, as well as manufacturers of stay bolt and engine bolt iron, low phosphorus melting bar, etc. These irons have been found similar to the best domestic low phosphorus in analysis and general characteristics.

British hematite irons analyzing 0.07 to 0.08 per cent phosphorus have been adapted to a variety of American melting practices, malleable iron manufacturers and Bessemer steel makers being the principal users. This iron has also been largely used as a sweetener in gray iron foundries using high phosphorus Middlesbrough or Continental grades, to bring down the average phosphorus content of the mixture. The British hematite irons have probably penetrated farther into the interior of the United States than any other grade of foreign iron during the past few months, the Bessemer grade having been actually shipped into the heart of the Pittsburgh district for steel making purposes, and the low phosphorus grades having moved at least as far west as Cincinnati, Milwaukee and St. Louis.

Continental Grades Gain in Favor

Perhaps the most remarkable feature of the entire recent experience with foreign iron in this country has been the general discovery that the high phosphorus Continental foundry grades from France, Luxemburg and Belgium can be employed in practically every branch of foundry enterprise, not only without lowering the standard of quality in the product, but even with improvement in many instances.

At the outset it was considered that these irons would prove to be suitable only for manufacture of cast iron pressure pipe, soil pipe, etc. Just at the time the first shipments began to arrive in this country, however, the shortage of all grades of foundry iron was most acute; consequently high phosphorus Continental irons found their way into cupola mixture of foundries engaged in nearly every branch of gray iron foundry production. Much to the surprise of everyone concerned, the results obtained by users of these irons were decidedly satisfactory in nearly every case. Even foundries engaged in producing engineering castings found that as much as 40 per cent of these irons could be incorporated in their cupola mixtures without appreciable loss of tensile strength, etc. Many jobbing foundries reported that use of these irons improved their product in soundness, appearance and machinability. These irons have been particularly successful in meeting the requirements encountered in manufacture of small intricate hardware sections, etc. In general the silicon content of these grades has been found upon arrival to be considerably higher than represented by the sellers abroad, iron sold to analyze 2.25 to 2.75 per cent silicon actually analyzing nearly 3.50 per cent silicon as received.

The following analysis is representative of this particular grade:

Silicon	3.25 per cent
Sulphur	0.017 per cent
Phosphorus	1.60 per cent
Manganese	0.45 per cent

Particular mention should be made here of the uniformly low sulphur content of the foundry irons from the Continent. Extensive inquiry among users of high phosphorus Continental foundry iron has failed to reveal a single instance where the sulphur content of the iron was over 0.019 per cent. It would be most interesting from a metallurgical standpoint to learn whether this is due to employment of exceptionally low sulphur fuel or to lean ore mixtures with resultant large slag volumes in Continental blast furnace practice.

Perhaps the most singular feature in connection with the high phosphorus Continental foundry iron is the lack of brittleness encountered in the iron itself and in the castings in which it is used. If the beneficial effects of phosphorus in cast iron, such as promotion of soundness, and tendency toward elimination of shrinking, etc., can be retained without loss of tensile strength it would seem that production of higher phosphorus grades of foundry iron in the United States would be logical. It is possible that the experience gained from importation of these irons may have a profound effect on the metallurgy of cast iron in this country.

Continental foundry irons of normal specifications have also been imported in large tonnages. These irons may be represented by the following general analysis range:

Silicon	2.00 to 2.50 or 2.50 to 3.00 per cent
Sulphur	Not exceeding 0.03 per cent
Phosphorus	0.60 to 1.00 per cent
Manganese	0.40 to 0.80 per cent

These irons have proved to be excellent general purpose foundry irons and have been widely used without any great departure from regular practice with best grades of domestic or Scotch iron. As in the case of the high phosphorus Continental grades, these irons have been found to run uniformly low in sulphur.

In general it may be said that foreign irons have made good in the United States. Expressions of satisfaction from users of the various grades have been the rule and complaints due to poor quality of the metal extremely rare. This is especially remarkable in view of the fact that the foreign irons were introduced at a time when the available supplies of metallurgical fuels were comparatively poor in quality, due to strike conditions. Under these circumstances a large measure of credit for the successful application of foreign iron to the various melting practices should perhaps be attributed to the resourcefulness and adaptability of the melters of the United States.

British Pig Iron and Steel Output for November

LONDON, ENGLAND, Dec. 15 (*By Cable*).—The production of pig iron in Great Britain in November was 493,900 gross tons and that of steel ingots and castings 600,800 tons. These compare with 481,500 tons of pig iron and 565,200 tons of steel ingots and castings in October.

The pig iron and steel output for Great Britain by months has been as follows in gross tons:

1922	Pig Iron	Steel Ingots and Castings
January	288,000	327,500
February	300,100	418,800
March	89,800	549,400
April	394,300	404,200
May	407,900	462,300
June	369,200	400,200
July	399,100	473,100
August	141,700	520,800
September	130,200	555,900
October	481,500	565,200
November	493,900	600,800
Total	3,505,800	[illegible]

The November output of pig iron and steel is the largest for any month of the year. The 1921 pig iron production averaged 217,600 tons per month and the steel output 302,100 tons per month. In 1913 the two figures were 855,000 tons and 639,000 tons per month respectively.

Furnace Maintenance with Pulverized Fuel

Effect of Imperfect Mixing in Causing Overheating of Brick Surfaces—Abrasion of Eddying Currents—Efficient Firing and Low Maintenance

BY MILTON W. ARROWOOD*

THERE appears to be a general impression that pulverized fuel is likely to be destructive of brickwork, particularly in boiler furnaces; this notwithstanding the fact that in certain metallurgical lines, especially malleable iron melting and annealing, as well as billet heating, pulverized fuel properly applied has shown material savings in brickwork as compared with previous practice with gas, oil or hand firing.

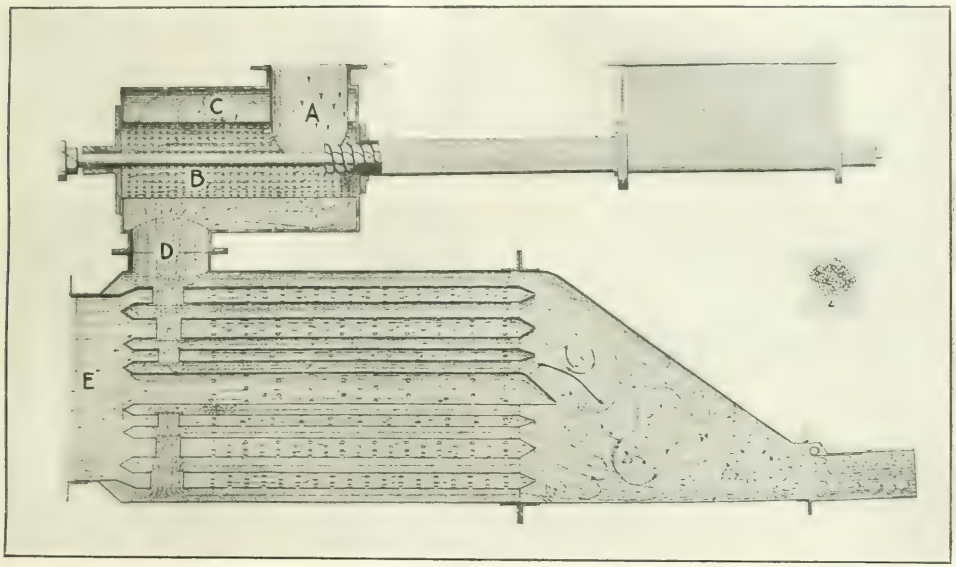


Fig. 1. Section (Diagrammatic) Through a Multi-Mix Burner for Powdered Coal, Showing the Principles of Operation

Although current publications advocate large combustion space for boilers when using powdered coal, relative to the space required by other methods of firing, it is the writer's opinion that the primary underlying cause (at least for the excessive space proportions usually discussed) is the necessity of having a large volume of gas in which to impinge the incoming coal stream and shatter it, thereby preventing its coming into contact with the brickwork or tubes.

A secondary reason for this large space would appear to be the necessity for accommodating a considerable amount of excess air. Since the commingling process is more or less uncertain and it cannot be prophesied in advance to what particular part of the furnace a certain amount of the fuel will flow, it is necessary to have ample air available throughout the space so that wherever the fuel happens to fall it may, if possible, find sufficient air for its combustion.

This process of commingling inside the furnace necessarily results in progressive combustion of the fuel as and where it finds sufficient air. Since the velocity is relatively high, some of the fuel will not readily find its full quota of air until late in the cycle of its passage through the furnace, as the time of passage may be only a fractional part of a second. It is even reasonable to suppose that some of the fuel may never find its full quota of air within the time limit available, and may thus pass out of the furnace in the act of distillation or burning, one or the other, depending upon the amount of air in contact with it. When the amount of combustible thus deposited is viewed in connection with the difficulty of getting accurate weights of pulverized fuel as fired, it is manifest that great care should be taken in interpreting test results where complete, continuous records of the various gases passing to the stack are not available, as a check against the estimated weights taken from screw calibrations of fuel as fired.

According to standard formulas the air required for an ordinary fuel of about 13,000 B.t.u. heat value is approximately 5000 times its own volume. That is to say, about 8½ lb. of air per pound of fuel is the theoretical amount, making no allowance for the large excess used in many cases. The process of complete mixing to insure perfect combustion is, then, something involving much more than a mere general commingling of various gas and air streams. Since the particles of pulverized fuel are substantially in a compact mass, and since every one of them must be moved away from every other one far enough to permit 5000 times its own volume of air immediately around it, it is doubtful if such a uniform division of material on a 5000 to 1 ratio is at all possible with any ordinary scheme of mixing.

The difficulty here involved is such as to cast a strong doubt on any tests purporting to show complete combustion of fuel in a furnace, depending on commingling and progressive combustion, unless fully substantiated by exact, continuous records of gas conditions, not only as to the CO_2 but as to all the other gases and the amount of air flowing into the furnace.

*Executive engineer Ground Coal Engineering Co., 5707 West Lake Street, Chicago.

Aside from the fuel efficiency there is always the brick maintenance question. Losses of furnace linings have been so severe in some recent pulverized fuel boiler installations that the latest installations have taken unusual precautions, such as building double walls through which air is drawn and using water pipes next to the walls and floor of the furnace (which no doubt has a secondary advantage of increasing the heating surface). In some cases there has been a frank advocacy of a certain amount of excess air with a view to "conditioning" the temperature of the furnace—a

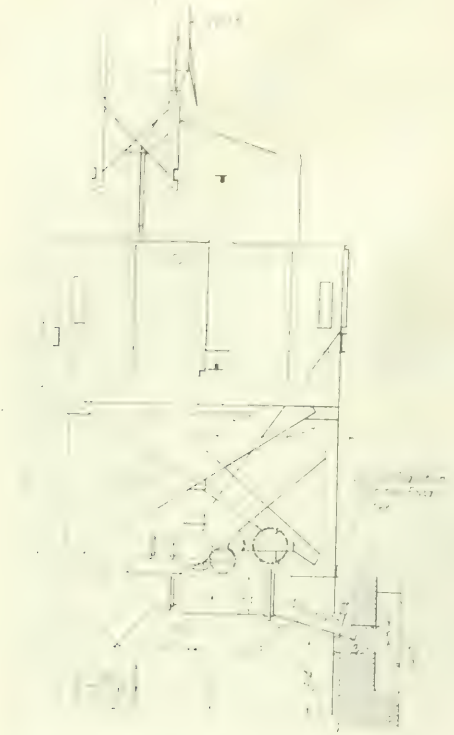


Fig. 2. Burner 22 In. in Diameter in Front of a Malleable [illegible] Showing Relation of Coal Hopper and of Blower to the Burner Nozzle

use of excess air directly to cool the brickwork and part of the gas in contact therewith.

Such use of excess air is solely choosing the lesser of two evils, since the watertube idea or the drawing of air through double walls, preheating it and afterward using this preheated air for combustion, are both more economical means of arriving at the same result—protection of the brick against destructive flame action.

It seems more rational, however, to avoid this difficulty of brick destruction by so handling the gases that their heat must apply directly to the existing heating surface of the boiler rather than to water tubes constituting, of course, an addendum to the regular surface and an additional complication in structure. This is accomplished in a method, presently to be described, by establishing control of the location and temperature of the heat liberating sources so as to govern the temperature in the gases in such a way that the section of gas in contact with the brickwork is farthest removed from the flow gradient) is the coolest gas in the furnace.

If it be assumed that a given volume of air is not in an eddying condition against a brick surface, but has [illegible] through this air adjacent to the brick will cause the combustion of a large number of small particles in immediate contact with the brickwork.

As one of these particles burns, its place is assumed by a succeeding particle, and thus in effect the temperature at a given point next to the brickwork is substantially near the theoretical combustion temperature of the given fuel. This will, in general, be about 1000 deg. Fahr. or more in excess of the average prevailing furnace temperature. Thus, if the temperature of the gases is 2500 deg., the actual temperature at the brick surface, where successive particles are being piled up and burned, may be 3500 deg. or more. This is believed to be the primary cause of brick troubles in the type of furnaces relying upon commingling of the gases within the furnace.

Where the air adjacent to the brickwork is not only flowing with the low, general velocity of the gases but is in the form of an eddying current, of relatively high local velocity, the condition is aggravated still further as the successive particles, due to the eddying effect, are brought in contact with air and burned, each substantially at or near the point of its predecessor, thus building up a temperature condition impossible for ordinary refractories to sustain.

In other words, assuming that a commingling furnace is working ideally on the principle for which it is designed, with the eddying currents forming uniformly throughout all parts of the furnace volume, so that combustion is accordingly practically uniform throughout the gas volume, a material percentage of the total combustible still is actually burned within a very few inches of the brickwork.

Effect on Furnace Linings

In a furnace not properly proportioned for such ideally uniform commingling throughout its entire volume, it is possible that unusual, strong eddying currents may form in certain parts of the volume and may have a strong, mechanical abrading effect on the brickwork. Again, certain other parts of the gas volume may act in a compact eddy, so to speak, and owing to lack of circulation overheat the brickwork. This was claimed as the primary cause of brick loss in at least one boiler installation.

It is a definite physical fact, familiar to any laboratory worker, that the uniform diffusion of one gas into another is exceedingly difficult to attain. It has seemed much more feasible to bring about a diffusion of the coal particles and the necessary chemical amount of air for perfect combustion in an apparatus especially designed to give the complete, uniform, 5000 to 1 ratio division which alone can give complete combustion, resulting in the maximum amount of heat liberated in the minimum amount of the cleanest, chemically inert gases.

By performing the mixing outside of the furnace the process is much simplified, since it consists merely in a diffusion of dust particles throughout the requisite air volume. Fig. 1 shows in diagram form the operation of a feeding device which it is believed successfully meets the conditions of dispersing the particles to get the complete, uniform diffusion.

Partly mixed material coming from the coal control enters the burner at *C*, in what is known as a quadruple burner, so called on account of having four sets of mixing shells concentrically arranged. This burner, which is 30 in. in diameter and about 10 ft. long overall, is of the size and type generally used for large rotary kilns. The design is capable of being used with any number of mixing shells and, in smaller sizes, one or two sets are usually employed. On the average malleable annealing oven, for example, two sets of shells will ordinarily be used, the outside diameter of the burner being 6 to 10 in. and the overall length 3 to 4 ft.

Fig. 2 shows this apparatus in front of a melting furnace, the burner here used being triplex, or with three sets of mixing shells, and is 22 in. in diameter. One photograph of the front end of this furnace shows the coal hopper, to the bottom of which is attached the coal control, containing the feed screw which delivers the coal to the control mixing drum at the left. Below is the burner proper with its discharge nozzle, which is 5 in. high and 40 in. wide. The blast fan is mounted immediately at the right of the short outlet connection



Burner of Fig. 2, Showing Fan Drive and Hopper. The control mixing drum appears at left center, behind the post and above the discharge nozzle of the burner

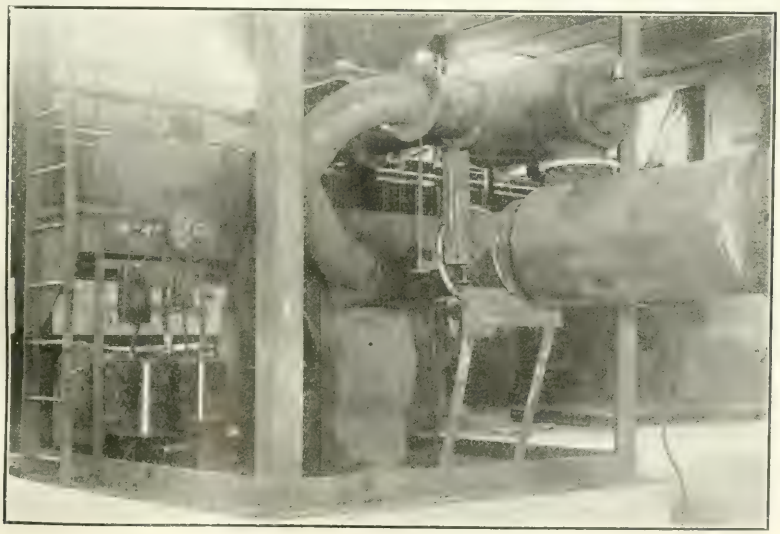
which joins it to the 14-in. valve and hence to the burner.

In operation this burner, on a boiler in the Mount Vernon plant of the Philadelphia Rapid Transit Co., although working under adverse conditions, with the wrong air pressure for the size of burner used, burned 3¼ lb. of fuel per cu. ft. of combustion space, as compared with 1.4 lb. with another method of feeding involving the necessity of getting mixing by commingling with the furnace. And while, with the commingling type of feeding, about 60 per cent of the ash in the hearth was combustible material, careful analysis showed only a small fraction of 1 per cent combustible with the multi-mix equipment.

Referring again to Fig. 1, in which an attempt is made to indicate the general tendency to formation of air currents, it will be noted that the partially mixed air and coal, on coming from the coal control and entering the burner at the point *C*, is divided by means of the successive communicating tubes, *E*. This mixture enters each of the four concentric coal-and-air strata, while at the same time additional air in an amount regulated to give a perfectly balanced mixture enters the open end of the burner through a 14-in. valve. Some of this air passes into the center pipe, while the remainder goes into the air strata, which are concentric and just inside their respective coal-and-air strata. The outer shells of all air strata and the inner pipe contain holes arranged in successive staggered rows, a total of 1516 holes being used in all the shells of the 6-in. burner. These 1516 jets of air give a tremendous mixing effect in the comparatively thin strata of partially mixed coal and air streams.

At this point it will be discovered that, aside from the space economy in having the shells arranged concentrically, there is a purpose in having the radial distance between the shells comparatively short, in order to insure a good, jet piercing effect into the resilient strata of material. The analogy here is that of cutting a thick piece of rubber with a knife. One's first instinct is to place the rubber on a hard surface. With usual fan blast, the air jet will pierce little more than 2 in., so at this distance a solid backing is provided.

This structure will cause a large number of complicated, cross-firing and eddying currents, thus affording every practical assurance of the thorough and complete mixing—diffusion—of the coal dust in the entire volume of air. The partially mixed material, on entering the various strata of the burner, is considerably expanded, owing to the fact that the volumetric capacity of the burner is calculated on the total amount of air to be used, while a small proportion of this air, usually from



Direct Current Motor Controls, Fan and Valves. The gear reduction set for the feed screw drive is at left, the housing on the platform



Firing Equipment for a Battery of Eight Annealing Ovens, for Which the Burner Opens into a Flue Below the Ovens, Through Which the Gases Are Distributed. A portion of the horizontal flue, beneath the ovens, appears at upper left

one-fourth to one-eighth, is introduced into the coal control. The exact division of air is not of first importance, provided sufficient air is admitted to the coal control to give the general breaking effect desired. Since the greatest mixing effect occurs in the burner proper, the larger proportion of air can be used there to best advantage.

In any case, therefore, the rough mixture from the coal control will find considerable expansion volume on entering the coal-and-air strata of the burner. On this account, and also on account of some loss of pressure due to friction in the upper part of the apparatus, the pressure in the coal-and-air strata will be considerably less than in the air strata. The rough mixture is then in the condition of expanding or opening up, at the same time that the 1516 spreading air jets are feeding into its rarer atmosphere. Any process of attempting to drive air jets from without into a cylindrical moving stream of air loses all sight of this expansion effect in mixture and, moreover, tends to make piercing by the jet more difficult, owing to its compressing the stream into which it endeavors to flow.

Some attempt is made to indicate the currents by arrows and flow lines in Fig. 1. The annular stream of completed mixture issuing from the coal-and-air strata into the nozzle are deflected down by its sloping roof into and across each other until, on reaching the bottom of the nozzle, they would tend to flow in a reverse direction but for the stronger driving power of the stream as a whole. Thus numerous eddying currents are formed in the nozzle and the mixture is kept in violent agitation until the moment of discharge into the furnace as a rolling, eddying mass of air currents uniformly charged with coal dust. This internal rolling and whirling effect in the material as discharged is of the greatest value in securing rapid ignition by bringing the inner portions of the mass—especially in the larger burners—in contact with the outer ignition film of mixture.

Even with comparatively large nozzles and low discharge velocities, this burner shows no tendency to back fire. Very probably this is due in some degree to the eddying currents tending to damp or break up any incipient flame current propagation in a direction toward the burner. This is considered a valuable feature, since it permits the low velocity of discharge so essential to best results, and particularly so in the large burners.

The elongated rectangular nozzle also appears to have a certain damping effect against back firing, particularly in the smaller sizes. Early in the experimental work, with burners of this design, it was discovered that the discharge velocities could be reduced to a point much lower than had previously been considered possible.

A vital point is that the heat is being liberated in the central zone at, or near, the geometrical center of the flame (the cross section of which is in general of elliptical form) and the problem of heat control in the furnace then consists merely in feeding fuel to this liberating heat center at such rate as will cause the heat to flow from it to the heating surfaces, at a rate equivalent to the absorption rate of these surfaces. The brickwork in the meantime is in contact with the lower temperature film of gas farthest removed from the heat center.

Owing to the relatively high temperature possible, due to the heat center being in the center of the gas volume, which makes it possible to use gas temperatures higher than feasible where the heat is being liberated directly in contact with the brick, there is a faster rate of imparting heat. This is because the heating surfaces, due to this higher gas temperature of relatively clean gas, are relatively clean; and the more rapid circulation of water owing to the more rapid absorption of heat by the boiler surfaces are factors which tend cumulatively to increase materially the rate of heat absorption. It has proved possible to feed fuel at the rate necessary to give any overrating on the boiler that the boiler itself is deemed capable of sustaining, regardless of brick conditions or even the consideration of an excess gas temperature, such as would be destructive on the boiler itself.

With this method of firing, the rate of heat absorption is so materially increased (and in approaching higher ratings this rate goes up apparently in a geometrical progression ratio) that for the higher ratings the actual gas temperature need be little, if any, higher than for normal ratings. The furnace thus tends always toward an equilibrium of gas temperature ranging, say, from 2500 to 2700 deg. in the center of the gas volume at liberating zone, relatively near the feeding inlet, regardless of the rate at which it may be operating.

The Electric Hoist Manufacturers' Association reports that its members have received during the first 11 months of this year, orders for 2916 electric hoists valued at $1,610,967, and have made shipments of hoists during this same period valued at $1,432,569.

CANNOT REDUCE PIG IRON RATES

Railroads Not Allowed to Cut Charges to St. Louis, Ohio River Crossings and Other Points

WASHINGTON, Dec. 19.—The Interstate Commerce Commission has refused carriers the permission to reduce rates on pig iron from Alabama and Tennessee furnace points to St. Louis, Ohio River crossings and other points in Central Freight Association territory. In a decision handed down last Thursday, the Commission, whose report was written by Commissioner Hall, held that the proposed rates were unduly prejudicial against the St. Louis and southern Ohio furnaces, unduly preferential to the Alabama and Tennessee furnaces and consequently unlawful. Commissioner Campbell dissented, but did not write a separate report. The commission pointed out that it may well be that the present rates from the Alabama and Tennessee furnaces should be reduced and that its findings are without prejudice to the filing of new schedules proposing reduced rates so related as to be free from undue prejudice and preference.

The schedules had been filed to become effective about Sept. 1, but were protested by the St. Louis Coke & Chemical Co., Granite City, Ill., and southern Ohio furnaces. At the hearing other furnace men appeared as protestants, while the St. Louis Chamber of Commerce, Louisville Board of Trade, Associated Foundries of Cincinnati, and certain of the Southern producers of pig iron supported the proposals.

It was proposed in the schedules to restore previous relationship of rates on Northern and Southern pig iron and with this end in view the suggested rate from Birmingham to St. Louis was $4.22, the Chicago-St. Louis rate becoming $2.16 when the 10 per cent reduction was made effective on July 1. No corresponding reduction in the proposed rate from Birmingham was made, so that the difference between the present rate from Chicago and the proposed rate from Birmingham to St. Louis is $2.06. The proposed rate from Birmingham to Cincinnati was $3.53 and to Louisville $4.79.

Shipments to the North

The report passing upon the movement of pig iron says:

"Ordinarily the South consumes from one-third to one-half of the pig iron it produces. About 59 per cent of the excess is shipped to central territory, the chief market for pig iron. The Southern producers, in marketing their pig iron in this territory, encounter strong competition from Northern furnaces, including those at Chicago, Ill., Granite City, and points in the southern Ohio district. In recent years competition in this market has become more intense.

"The percentage of Southern output shipped to points outside of Southern territory was 67.2 in 1912, and is estimated to have been 71.5 in 1918, 50.4 in 1919, and 53.1 in 1920. In 1921 the percentage dropped to 25.9, and for the first four months of 1922 it was only 32.3. The Southern producers ascribe this marked decrease since 1920 in large part to the cumulative effect of the increases in spread between their rates and those paid by the Northern furnaces to St. Louis and the Ohio River crossings.

"Accordingly, in 1921, they requested respondents to so reduce their rates as to give them better access to the Northern markets. As a result, and after numerous conferences, the proposed schedules were filed."

Consumption of St. Louis Product

At another point, the decision says:

"Protestants at Granite City and in the southern Ohio district oppose the proposed reductions unless corresponding reductions are made in the rates from their furnaces to the same destinations.

"The plant of the Granite City protestant commenced operations in February, 1921, and has an annual capacity of about 180,000 tons. Most of its output is disposed of in the St. Louis district, but it has also made shipments to Louisville and Cincinnati, principally prior to Sept. 1, 1921, when the rates from Granite City to the Ohio River crossings were materially increased. The St. Louis district consumes annually more than 500,000 tons of pig iron, a fact which the Birmingham interests urge as indicating that the Granite City protestant could there dispose of its entire output and therefore has little real concern in the relative level of the rates to the Ohio River crossings. This protestant is interested in future shipments to the Ohio River crossings, and has a right to expect rates free from undue prejudice."

Interstate Commerce Commission Rulings on Limestone Rates

WASHINGTON, Dec. 19.—Reduced rates on limestone from points on the Western Maryland Railroad to destinations in western Pennsylvania and northeastern Ohio, were found justified by the Interstate Commerce Commission in a decision of last Thursday, and in consequence it was ordered vacated, suspended schedules making these rates applicable. At the same time, however, the commission found not justified a rate of $1.76 per ton from quarries at Martinsburg, West Virginia, on the Baltimore & Ohio Railroad to Youngstown, Ohio, alone, and ordered the cancellation of the schedule carrying this proposed rate without prejudice to its publication provided the Baltimore & Ohio also establishes a rate of $1.51 to Beaver Valley points in Pennsylvania. This is the new rate of the Western Maryland. The Baltimore & Ohio did not propose reductions to the latter points, but did propose a cut to Youngstown on the ground of competition by ex-lake limestone. Commissioner Meyer, who prepared the decision, said that the commission was not convinced that ex-lake competition was such a controlling factor as to warrant a reduction in the Youngstown rate because of dissimilarity of conditions without a similar reduction by the Baltimore & Ohio to Beaver Valley points. The Jones & Laughlin Steel Co., Pittsburgh, protested against the Baltimore & Ohio's proposed Youngstown district rates unless a corresponding reduction was made to Beaver Valley points.

The Western Maryland reductions are to apply from the Cavetown, Md., and Thomasville, Pa., groups, while the points of origin on the Baltimore & Ohio are in the Martinsburg group. The present and proposed rates follow:

From—	To—	Old Rate, Cents	New Rate, Cents
Thomasville group	Pittsburgh	164	136
Thomasville group	Woodlawn	202	151
Thomasville group	Youngstown	239	176
Cavetown group	Pittsburgh	126	126
Cavetown group	Woodlawn	164	151
Cavetown group	Youngstown	214	176
*Martinsburg group	Pittsburgh	126	126
*Martinsburg group	Woodlawn	164	164
*Martinsburg group	Youngstown	214	176

*Ordered cancelled pending filing by Baltimore & Ohio of rate of $1.51 to Beaver Valley.

Consolidated Steel & Iron Corporation Formed

The negotiations for the merging of the Hoosier Rolling Mill Co., Terre Haute, Ind., and the Missouri Iron & Steel Co., St. Louis, have reached completion. The new company will be known as the Consolidated Steel & Iron Corporation. Under the new organization, T. J. Stuart of St. Louis is chairman of the board; J. R. Finkelstein of Terre Haute, president; E. J. Schroeder, Breese, Ill., vice-president, and F. J. Buckley, New York, treasurer. Mr. Buckley is also treasurer of Pitcher & Co., 62 Cedar Street, New York, which will handle the $3,000,000 worth of financing of the new corporation.

HELPING STEEL INDUSTRY

Encouraging Progress Made by Government Officials—Chief Becker's Report

WASHINGTON, Dec. 19.—Training Government field men as to the kind of information that American iron and steel producers desire has been one of the principal problems of the Iron and Steel Division of the Bureau of Foreign and Domestic Commerce, as pointed out by Luther Becker, chief of the division, in his annual report for the fiscal year ended June 30, 1920.

"The chief of the division drew up a comprehensive and detailed outline of questions to serve as a basis for investigation and preparation of reports for transmission to Washington whenever anything was found that the investigator believed to be of interest to the American exporter of steel," says the report. "Each question was designed to develop information of vital concern to an exporter of steel, and none was included that was impossible to answer.

"Gratifying results have already been achieved with this plan, and from sections of the world least expected. Some of the returns were published, while others served as background material for use in answers to specific trade inquiries. One foreign government published the division's outline in its official publication in the vernacular, as indicative of the methods and thoroughness of the bureau in the collection of foreign information for American exporters of steel. Many specific questionnaires were prepared and sent out during the year, in behalf of individual manufacturers, to those field officers concerned with the particular problem for investigation. In each instance the answers have come back with the information desired; and expressions of appreciation from the inquirers, testifying as to the value of the material submitted, show the results obtained. The division also outlined, for certain of our foreign-service men, lists of questions to serve as guides in the preparation of their monthly cable surveys."

Relations With Manufacturers

The report points out that organization of the Iron and Steel Division was planned for the beginning of the fiscal year, but was not completely effected until December, 1921, and calls attention to the fact that the steel industry was already highly and efficiently organized for foreign trade. The main purpose of the division was not chiefly to inaugurate foreign trade activity, but rather to maintain and enlarge it. Unlike other American industries, the report states, the steel manufacturers have not resorted to trade associations to further their foreign trade promotion and except for representation in general export clubs and associations embracing other industrial lines, there does not exist a strictly iron and steel export trade association. The division's contact with the industry was, therefore, largely a matter of direct relations with each manufacturer and exporter of iron and steel.

Commercial inquiries related chiefly to foreign trade subjects and required the major part of the attention of the personnel of the division. This activity of the division, it is asserted, has constituted the most important service rendered to the exporters of steel, "for it is by this method that information gathered in foreign markets and steel industrial centers is best disseminated and the inquirer afforded an opportunity of sharing the intimate foreign trading and manufacturing experience of the personnel of the division."

The report states that many persons engaged in the steel industry came to Washington during the year to consult the division on problems confronting them in marketing abroad their individual products, the result of this direct contact being that it was possible to answer more completely the question presented and to outline a plan or policy of operation, whenever this phase of the problem was involved.

Foreign Inquiries

The report states that an important service rendered to the industry consisted in keeping it fully advised of foreign inquiries involving steel construction work of all kinds, information being obtained through commercial attaches, trade commissioners, and consuls, throughout the world. Reference also is made to the research work of the division and the publication of information gathered. Much of this research involved translation work. The report concludes:

"Results obtained through the operations of the iron and steel division can not at this early stage be judged by any dollars-and-cents method. Whatever advantage has been gained through the efforts put forth is known to the individual exporter. Repeated inquiries and the numerous letters of commendation received from a variety of sources indicate the estimation placed by the industry on the achievements of the division thus far."

FREIGHT CAR MOVEMENT

Requisitions and Loading Show Decrease Owing to Thanksgiving

WASHINGTON, Dec. 19.—Reports received by the car service division of the American Railway Association show that requisitions for freight cars over and above the current supply totaled 133,786 cars on Nov. 30, representing a decrease of 18,781 compared with the total on Nov. 23.

The shortage in box cars amounted to 67,468 which was a reduction since Nov. 23 of 11,569, while the shortage in coal cars totaled 42,848, or a reduction of 835 within the same period. Reports also showed a reduction in the shortage in stock cars during that time of 4506, the total on Nov. 30 being 9541. There was a reduction of 1541 in the shortage in refrigerator cars which brought the total to 6075. At the same time, 5595 surplus freight cars of various classes and in good repair were reported, which was an increase within a week of 289 cars. Owing to the observance of Thanksgiving Day on Nov. 30, this was a reduction of 110,276 cars, compared with the preceding week. Compared with the corresponding week last year, however, this was an increase of 103,370 cars, but a decrease of 57,385 compared with the corresponding week in 1920. Because of the holiday, reductions compared with the week before were reported in the loading of all commodities.

Coal loading during the week amounted to 186,158 cars, a reduction of 15,874 compared with the previous week. While this was an increase of 49,574 cars compared with the same week last year, it was a decrease of 47,070 cars compared with two years ago.

Forest products loading totaled 60,010 cars, a decrease of 6036 compared with the preceding week. Compared with the same week last year, however, this was an increase of 12,369 cars, and with the same week in 1920 an increase of 7427 cars.

Coke loading totaled 13,075 cars, a reduction of 159 cars under the week before, but an increase of 6730 cars over the same week last year. Compared with the corresponding week in 1920 this was a decrease of 1929 cars.

Ore loading totaled 10,550 cars, 4502 cars less than the preceding week. While this was an increase of 5373 cars over one year ago, it was a decrease of 15,553 cars under the same week in 1920.

Use and abuse of pyrometers is to be discussed at a meeting of the American Society for Steel Treating on Jan. 12 at the rooms of the Providence Engineering Society, Providence, R. I., by G. C. McCormick, assistant metallurgist of the Crompton & Knowles Loom Works, Worcester.

The Waterbury, Conn., Chamber of Commerce announces that employees in local industries now number 12,729, as compared with 9595 eleven months ago. The percentage of gain not only applies to the largest industries, but to the smallest as well. Metal products predominate.

NEW AUTOMATIC GRINDERS

Finishing Opposite Sides of Parallel Pieces Increased Output and Quality Claimed

Automatic grinding machines for finishing the opposite sides of parallel pieces and designed for many operations formerly done on hand-operated disk grinders and straddle milling machines have been added to the line of the Badger Tool Co., Beloit, Wis.

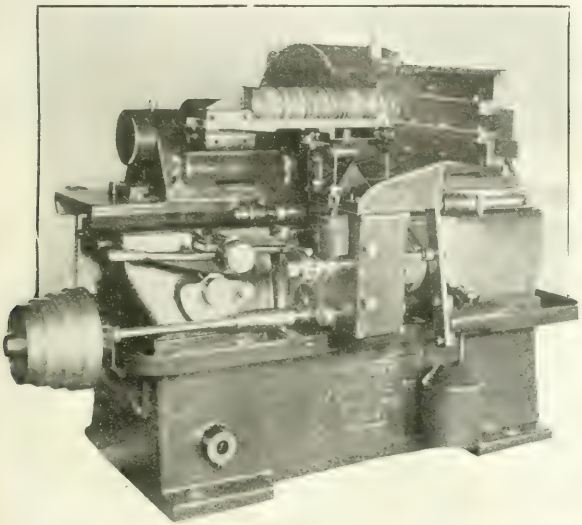
In hand-operated disk grinders the grinding-wheel heads were moved to and away from each other by means of pressure applied to the hand lever, and the work was usually placed in a holder and drawn in and out between the wheels by hand. On some work, where both hands were required to direct the work being ground, it was sometimes necessary to employ a foot lever for opening and closing the grinding wheels. With the new automatic grinder, shown in the accompanying illustrations, the various hand operations are mechanically performed, resulting, it is claimed, in greatly increased production, more satisfactory work and the minimum of grinding wheel expense.

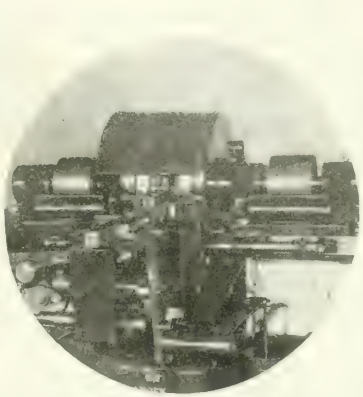
Three distinct principles employed in the Badger automatics are shown in the accompanying illustrations, one of which is of the automatic piston ring grinder employed in rough grinding the parallel sides of ring castings 2½ to 5 in. in diameter, and ⅛ in. and up in thickness. The ring castings are handled rapidly and a feature emphasized is that the machine produces a very flat rough-ground ring.

In this machine castings are placed side by side on a track set parallel with the machine-spindles and a pusher is provided at the outer end of the row of ring castings. As the cross ram travels in and out between the two grinding wheels it slices off one casting from the end of the row on each forward stroke. The travel of the cross ram is timed in proper relation to the opening and closing of the grinding wheels. Each ring casting is pushed entirely through the two parallel grinding wheels and comes out finished at the back, falling down a chute into a container. The operator merely keeps the track loaded with castings and occasionally inspects the rings for size. One operator can run two machines. The production varies according to the size of the ring and the amount of stock to be removed. Special ⅜ in. thick Diacarbo grinding disks are used and the grinding is done dry. The grinding wheels are fully inclosed except for a narrow slot in front and back, which permits of an effective dust system. A special wheel truing device is attached to the rear of machine. It is unnecessary to stop the machine or disturb setting in dressing the wheels, which operation is done in about 2 min.

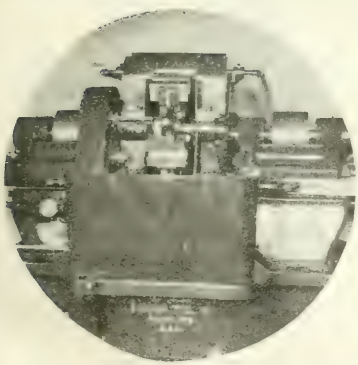
This same machine is used for grinding other pieces somewhat similar to piston ring castings, such as rough surfacing the sides of hardened steel thrust washers. In this case the grinding disks are replaced with abrasive wheels held in chucks, and a wet grinding system is supplied. The operation of the machine, however, is the same as for piston rings.

An automatic hinge grinder for grinding the opposite edges of automobile door hinges, and illustrating





New Automatic Grinding Machines for Finishing the Opposite Sides of Parallel Pieces. The piston ring grinder is at the left and the hinge grinder partially shown above





Rear View of the Automatic Spring Grinder, Showing the Arrangement of Wheel Dresser Mechanism. Is Above The springs are carried between the rotating carrier head as shown in view at the left

tee principle of handling parallel pieces of irregular shape is partially shown in a separate illustration. In this case the work is located on a reciprocating fixture bar on top of which is placed a suitable holder, the work is not passed through the wheels and out of the rear. The holder is designed so that the edges of the hinge are ground in proper relation to the central bosses in order to make both the male and female parts of the hinge interchangeable. In this case the heads are opened and closed automatically and timed in correct relation to the forward and backward stroke of the fixture bar. The length of stroke on the fixture bar may be varied. Hinges of malleable iron are ground dry on abrasive cylinder wheels, steel hinges being wet ground. The wheel dressing attachment is conveniently located at the rear of these machines and the wheels may be dressed in 3 min. without stopping the machine or disturbing the setting.

The automatic coil spring grinder illustrated is for grinding coil springs to length, producing flat seats, square with the axis of the spring. The springs are carried between the grinding wheels on a rotating carrier head which consists of four sets of jaws. One jaw of each set is fixed and the others pivoted. As the carrying head revolves, the movable jaw opens at the proper time to receive the coil spring, grips the spring while passing between the grinding wheels and releases it at the proper time, permitting the finished spring to fall down a chute. The jaws are fitted with hardened removable V-blocks so that various diameters and lengths can be accommodated by using different set of blocks. The operator simply places the spring in the jaws as each set comes to him. In some types and sizes of springs it is possible to load this carrier head with a hopper or gravity feed. Most of the coil springs are ground wet on abrasive cylinder wheels.

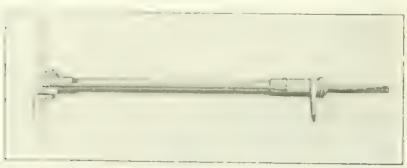
The wheel dresser mechanism may be seen in the rear view illustration of the spring grinder, the same mechanism on the piston ring grinder and the hinge grinding machines being also of this type.

One of the outstanding features of the automatic grinders is the principles employed in presenting the work to the grinding wheels. The areas to be ground must be passed over certain portions of the grinding wheels and they must travel it at a predetermined rate of speed. Provision to definitely accomplish this has been made. On some classes of work it is necessary to be able to have grinding wheels set at a slight angle, which angle is definitely determined. The machines are designed so that the wheels can be opened either in front of back or top or bottom. The belt-driven machines weigh approximately 4500 lb.

New Rivet Cutter

The Boyer rivet cutter, designed on the principle that a few intermittent heavy blows will cause less distortion of steel plate than lighter, more rapid blows, has been brought out by the Chicago Pneumatic Tool Co., 6 East Forty-fourth Street, New York. A succession of four blows is said to cut a ¾ in. rivet in from 10 to 15 sec.

In using the device, the hand-operated throttle handle is pushed forward, whereupon a full charge of high-pressure air enters the rectangular-shaped passages and drives the piston forward with great force. Reversing the handle returns the piston. Damage to



The Rivet Cutter. Each stroke of piston is controlled

the back head is prevented by a chamber which cushions the piston on its return stroke.

The component elements of the rivet cutter, which is shown in the accompanying illustration, include a solid steel dead handle, a spade-handle type hand-hold attached to the forward end, a crank type throttle handle and a taper type throttle valve adjusted permanently to its seat. The cylinder is of seamless tubing, heat treated. Alemite connections supply grease to two recesses in the throttle valve. The front head is electrically welded, the back head being removable. A bypass is provided from the back to the front head, eliminating internal return live air ports. An adjustable lock nut holds the chisel in position, a safety type chisel retainer being provided as special equipment.

The weight of the standard rivet cutter with chisel is 78½ lb. The length is 50 11/16 in. overall, and the length of the chisel 19 in.

Topton Furnace to Be Operated

The recently reported sale of the Topton blast furnace at Topton, Pa., to Milton Knauss and associates did not materialize, and the furnace has become the property of H. Sofranscy Co., Allentown, Pa., dealer in iron and steel scrap, which announces that the furnace will probably be operated in the spring. The Crane No. 1 furnace, also purchased by the H. Sofranscy Co., will be dismantled and sold for scrap.

Reed-Prentice Co. Changes

Changes have been made in the board of directors of the Reed-Prentice Co., Worcester, Mass., in connection with the consolidation of the business of the Becker Milling Machine Co. and Whitcomb-Blaisdell Machine Tool Co. in the Reed-Prentice Works, by the addition of J. Verner Critchley to the board and the recent election of Merrill G. Hastings as treasurer. The officers now are the following: President, Arthur H. Weed, Boston; vice-president, George A. Gaskill, Worcester; treasurer, Mr. Hastings; directors, Arthur H. Weed, George C. Lee, H. P. Kendall, John W. Farley and Malcolm Donald, all of Boston, and Vice-President Gaskill and Mr. Critchley, Worcester. The new executive committee consists of President Weed, Vice-President Gaskill and Mr. Critchley. Frank O. Hoaglund is the general manager and F. W. McIntire general sales manager. The removal to the Reed-Prentice plants is now completed. The company's business is steadily improving.

Employment in Detroit, after climbing steadily since the early part of September, decreased 1630 during the week ending Dec. 5, according to the figures of the Employers' Association. The 79 firms composing the association show a total of 179,695 on their payrolls as compared to 112,904 a year ago. These figures represent two-thirds of the city's working population.

Several manufacturers of picks, mattocks and railroad tools have advanced prices 10 per cent, effective Dec. 15.

COMING MEETINGS

January

American Engineering Council. Jan. 11 and 12. Annual meeting, headquarters of Federated American Engineering Societies, 24 Jackson Place, Washington. L. W. Wallace, 24 Jackson Place, Washington, N. W., secretary.

February

American Society for Steel Treating. Feb. 15 and 16. Winter sectional meeting, City Club, Chicago. W. H. Eisenman, 4600 Prospect Avenue, Cleveland, Ohio, secretary.

American Institute of Mining and Metallurgical Engineers. Feb. 19 to 23, inclusive. Annual meeting, Engineering Societies Building, New York. Dr. F. F. Sharpless, 29 West Thirty-ninth Street, New York, secretary.

CONTENTS

December 21, 1922

Germany's Great Locomotive Works 1623

Borsig Organization and Methods Were Once in Class by Themselves—Operations Now Full of Difficulty—German Competition Not to Be Feared

Special Machines Found Economical 1625

Methods Developed for Handling Gun Parts—Continuous Milling Machine and Draw Cut Shaper Built Years Ago

Foreign Pig Iron Generally Satisfactory 1631

Analyses of Results Obtained from Use of Various Grades of Imported Metal Indicate Successful Application

Furnace Maintenance with Pulverized Fuel 1633

Effect of Imperfect Mixing in Causing Overheating of Brick Surfaces—Abrasion of Eddying Currents—Efficient Firing and Low Maintenance

German Iron and Steel Market.....1626
Business Cycle Discussed 1627
Labor Notes 1627
Coming Meetings 1627, 1640
M. A. Hanna Co. Organized.....1628
New Sheet Mill at Detroit.....1628
Industrial Machinery 1629
Seven-Ton Gasoline Locomotive.....1629
New Hammer Die for Drawing Tapers...1630
American Bolt Corporation Formed.....1630
Record Output of Portland Cement.....1630
Western Electric Co. Improvements.....1630
Double Row Radial Bearings.....1630
British Iron and Steel Output.....1632
Cannot Reduce Pig Iron Rates.....1637
Interstate Commerce Commission Rulings on Limestone Rates.....1637
Government Helping Steel Industry.....1638
Freight Car Movement.....1638
New Automatic Grinders.....1639
New Rivet Cutter.....1640
Topton Furnace to Be Operated.....1640
Reed-Prentice Co. Changes.....1640

Editorials 1642
Wide Distribution of Steel Demand—Coal and Transportation — Pirating American Machinery — The Ferromanganese Equation
Pacific Coast Merger Completed.....1645
People Will Not Tolerate Coal Strike.....1645
Carnegie Steel Co. Ships via River.....1645
Brier Hill Co. to Build Strip Mill.....1645
Railroad Equipment Buying 1658
Youngstown Sheet & Tube Co. to Absorb Brier Hill Steel Co.....1658
Fabricated Steel Business.....1659
German Rail Sale to Japan.....1660
More Sheet Buying at Youngstown.....1660
Making Cast Iron Pipe Shown by Moving Pictures 1660
British Iron and Steel Market.....1662
Japanese Copper Market Dull.....1662
Weekly Reports on Exports and Imports..1663
Plans of New Companies.....1674
Steel and Industrial Stocks.....1675
Industrial Finance 1675

Iron and Steel Markets.....1646
Comparison of Prices 1647
Prices Finished Iron and Steel, f. o. b. Pittsburgh.....1661
Non-Ferrous Metal Market 1663
Personal Notes 1664
Obituary Notes 1664
Machinery Markets and News of the Works.....1665
New York Jobbers' Prices.....1676

ESTABLISHED 1855

THE IRON AGE

EDITORS:

WILLIAM W. MACON GEORGE SMART

C. S. BAUR, *General Advertising Manager.*

Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

Entered at the Post Office at New York, N. Y., U. S. A. George H. Griffiths, Secretary

Publication Corporation, 243 West 39th

Chas. S. Baur, Pres., Charles G. Phillips, Vice-Pres., Treas. E. J. Frank, Secy.

Chicago Office, Old Colony Building, Phone Harrison 1266. Pittsburgh Office, 1100 Lytle Building, Phone Atlantic 1500. Cleveland Office, Guardian Building.

Detroit, 317 West First St. Cincinnati, Mercantile Library Building, Phone Main 4205. Philadelphia, 851 Liberty Square Building, Phone Race 2666. Washington, 26 Jackson Place, N. W., Phone Lafayette 3250. Boston, 620 Market St. London, Eng., 11 Hanover St., W. 1.

Subscription Price, United States and Possessions, Mexico, Cuba, $6.00. Canada, $8.50. Foreign, $12.00 per year. Single copy, 25 cents.

Entered as second class matter June 18, 1879, at the Post Office at New York, N. Y., under the Act of March 3, 1879.

Wide Distribution of Steel Demand

Seeing that the production of steel decreased by more than one-half from 1920 to 1921 and increased by about three-fourths from 1921 to 1922, it is obvious that it would usually be very difficult to make even a guess as to the volume of demand and production for a year ahead. At the same time, the current trends and indications are of value as indexes to the probabilities, particularly for the fore part of the new year.

It is an impressive fact that nearly all the major lines of steel consumption present a very favorable outlook at the present time. The chances are good for a large demand. It does not follow that the demand will tax the productive capacity, for there is a wide latitude in the word "large" in connection with steel. The steel ingot-producing capacity is in excess of 50,000,000 tons a year, but ability to produce has not been measured by physical capacity in the past few years as it used to be, limitations by transportation, labor supply, etc., having asserted themselves. In 1916 and previous years the steel industry was able to operate at its physical capacity when it had the orders. In 1921 production of steel ingots was less than 20,000,000 tons and at the middle of the year the rate of production was barely over 10,000,000 tons. Thus there are various ingot outputs, less than 50,000,000 tons, to which the adjective "large" may properly be applied.

Orders for freight cars and locomotives have been heavy in the past year, but a large portion of the business placed is still to be filled, while there is much more business now in sight. Thus a heavy flow of steel to car and locomotive shops is assured for months to come. Rails have been bought freely for delivery in the first half of next year. In other classes of railroad demand there has been little business, but there are prospects of terminal work, such as the Pennsylvania's large project for Pittsburgh.

Demand from the farmer has turned good recently. Makers of fence are much in arrears in filling their orders. Agricultural implement works have been increasing their operating schedules and appear to have good prospects. The farmer is not so well off as he might be, but his buying power has increased greatly as a result of this year's crops.

While on account of the high costs in dwelling house and garage construction one may look at that activity askance, the actual fact is that there has been a great boom. It may not be so much of a boom in 1923, but its end is not in sight. Mills are still crowded to make deliveries of the two barometers of house-building, butt weld merchant pipe and nails.

The automobile makers are planning for heavy production in the first quarter or half of the new year, and their expectations are entitled to respect, for their operations in the past year have been at least as heavy as they predicted.

The consumption of steel in the oil fields, particularly in tubular goods, forms a larger proportion of the total steel demand than is sometimes realized. From the viewpoint of prices and stocks of oil the steel prospect in this direction is not good, but the practical fact is to be considered that the oil country demand has proved heavier in the past few months than was being predicted at the middle of the year.

The lines of consumption that present a less favorable aspect are fewer. Skeleton steel construction is not particularly active and the export trade is poor. Plainly, however, the favorable features of the steel tonnage outlook greatly outweigh the unfavorable features. One can say at least that the steel tonnage of the next six months will be large, not small.

Products made by the centrifugal casting process are growing in number and importance. Besides the introduction on an extensive commercial scale of the DeLavaud process for making cast-iron pipe, there is now being produced in two localities in the United States reinforced concrete pipe, 20 in. and 27 in. in diameter. While this latter process has been in operation in Germany, Australia and South Africa, the American procedure has several novel features, particularly for pipe to be used under high pressure. References have been made in these columns to the

centrifugal production of iron castings other than pipe in Great Britain, of brass and non-ferrous alloy products and certain steel materials. A notable contribution to the steel phase of this subject appeared in THE IRON AGE of Dec. 7. It is too early to predict that the centrifugal casting of steel ingots will attain commercial success on a large scale. That the process, if commercially successful, has many features of superiority over present methods is manifest. Its introduction would solve some of the present problems of poor quality due to ingot practice, and from that standpoint alone it deserves the careful study of steel metallurgists.

Coal and Transportation

There is not nearly so much genuine public interest in the coal problem as is requisite for a solution, for it seems clear that sound and strong public opinion must be the force impelling to the solution. There is no nostrum that the executive or legislative branches of the Government could apply without such backing.

The public at large does not rightly appraise the argument, so often presented, that the coal industry is hampered by insufficient transportation facilities. The inference is that provision of greater railroad capacity would settle the matter of coal. It will be granted by the great majority of men that too much capital is invested in coal mining and many, perhaps also a majority, will admit that not enough capital is invested in railroads. It appears that the excess investment in coal mining places a burden upon the public, which pays high prices for coal. The covert suggestion is made that by investing more capital in railroads the evil effects of too much capital invested in coal mining may be eliminated. Seeing that the remedy if successful would result in depreciating much coal mining investment, it seems improbable that the coal operators thus involved actually want to see the suggested remedy applied.

The additional railroad investment, however, would be in coal moving facilities, whereas if more capital is to be attracted to railroading it should be invested in other ways, where it is more needed. The railroads can and do transport all the coal the country needs, the only point being that they cannot carry the peak loads offered.

Rarely if ever is there any great shortage of coal transportation facilities. When "car supply" is reported as being 50 or 60 per cent short the public is badly misled if it infers that the practical shortage is anything like such an amount. Recent reports, for instance, have given car shortages as ranging from 40 to 70 per cent for many bituminous districts, when production was running at 11,000,000 tons a week, which is well above current consumption, and is probably equal to the highest consumption maintained for any considerable period in the past.

These curious percentages of car shortage arise from the system used in reporting operations. At a given mine production may be restricted by any one of five principal causes: (1) Lack of cars; (2) labor shortage; (3) labor strike; (4) mine disability; (5) no market. At a given moment only one of these causes is observable. To illustrate, if there are men enough to operate the mine at 50 per cent and the railroad could furnish cars for a 55 per cent operation, then the 50 per cent "loss" in production is ascribed wholly to "labor shortage." Give the mine a few more men, and "transportation disability" would be uncovered as the limiting influence.

All this is well understood in practice, but the public has not yet taken sufficient pains to inform itself fully, to understand, for instance, that when there is reported a 60 per cent car shortage there might be labor shortage or lack of market to prevent an operation at much above 40 per cent if the cars were furnished. Typical cases may easily be selected from the records of one factor being replaced by another as the restrictive influence.

In the week of Dec. 18, 1920, the report of bituminous operations showed 67.8 per cent production, with 14.5 per cent lost by transportation disability, 8.7 per cent by labor shortage and strikes and 3.9 per cent lost from "no market." In the week of Jan. 1, 1921, the loss was 33 per cent, with only 5 per cent by transportation, but 10.8 per cent on account of labor and 10.9 per cent on account of "no market." Four weeks later there was 52.6 per cent total loss, with only 2.4 per cent through transportation and 2.1 per cent on account of labor, but with 43.4 per cent assigned to "no market." Possibly the car supply had not increased at all, but it could no longer be an assigned cause with many mines.

Pirating American Machinery

W. H. Rastall, chief of the Industrial Machinery Division of the Bureau of Foreign and Domestic Commerce, gives excellent advice to American machinery builders as to the protection of their machines, especially machine tools, against pirating on the part of manufacturers in other parts of the world. He takes his text from reports received from observers at this year's great merchandise fair at Leipzig, particularly the machine section. These say that a surprisingly large number of tools were "copies of well known American devices that have demonstrated their merit in service in many countries." The essential point, Mr. Rastall points out, is that American machinery is being reproduced at greatly reduced cost. He writes in Commerce Reports:

> Builders all over the world copy designs, and American machinery manufacturers are warned to protect their interests in these matters. Many tricks are used in order to secure drawings, but these can be discovered and circumvented. One very common method is to issue an invitation to submit prices, the proposal to be accompanied by detailed working drawings. In such cases an experienced manufacturer will submit outline drawings, including the principal dimensions, but not showing matters in detail.
>
> Foreign manufacturers copy American machinery because it is good, and our own builders can prevent successful copying if they will bear in mind the peculiar disabilities of these foreign shops. One of the most obvious of these is in the selection of material. The American market is rich in the variety of iron, steel and other building materials available. No other manufacturing country has equal supplies of steels of varying carbon content or of the special alloys. The foreign mechanics cannot distinguish these grades by mere inspection, and usually laboratory methods are impracticable.
>
> It is suggested, therefore, that manufacturers be careful not to divulge the specifications of the materials used, the heat treatment and other processes applied, beyond the merest generalities. On the other hand, it is often good

[illegible] it to be known that operations among steels, [illegible] and their particular uses in the selection of [illegible] necessity and as practiced.

In considering this factor of competition, which is not new, though now apparently on a much larger scale than before the war, it should be remembered that the experience of American machine tool builders has been that more times than not the copy was not successful. The machines look alike but do not produce alike. This is particularly true with precision machines, such as milling machines, grinding machines and the better grades of automatics, and with most of the high production machines generally. The pirate finds himself at a disadvantage, and often is slow to discover the fact, because in making his copy he does not know the little refining details of the sort which the original designer had to find out for himself from actual experience with the first machines built from his drawings, a process which sometimes consumes much time.

There is much that the foreign builder has to learn, and Mr. Rastall's words are sound when he advises the American salesman against going into too great detail as to actual tolerances employed for the various machine parts and as to surfaces of contact and the like. Ignorance of specifications of this character stands between the foreign builder and successful duplication. Certainly, discreet salesmanship is no small factor at this time.

Abroad, the foreigner has the advantage of price. But in quality the American has the best of it, for the higher types built here far surpass, as a rule, those built in other countries, both in excellence and in quantity of product. Otherwise they never would have been established in such great numbers in foreign machine shops, where they serve as demonstrating units, a condition which very often is taken advantage of. A particularly strong selling point is that their parts are interchangeable, though the European manufacturer lays stress on the hand fitting of his own machines.

That foreign patents on machinery are important was demonstrated at the recent meeting of the National Machine Tool Builders' Association, and in many countries priority of trademarks is based upon priority of application instead of upon priority of use, a condition which permits of dangerous consequences to the American owner who defers action too long. At the present time instability of some of the governments stands out as a disconcerting fact, and some American manufacturers do not like to spread their ideas on the records of foreign patent offices where they are open to inspection. Then, again, the strictness of some of the foreign patent laws, including compulsory working of patents, has acted as a deterrent. It must be admitted, however, that where no patent protection is sought in a foreign country, the machinery builder of that country may make that fact a defense against the charge of piracy.

In several instances lately well known colleges have secured as teachers men of large experience in practical scientific activities or in actual manufacture. A leading technical school has now on its faculty three men who have had a broad experience, one in large scale scientific research, another in steel plant metallurgy and a third in general business organization and manufacture. A year or so ago another technical school called to its teaching force a steel metallurgist who had been widely known in consulting work. These moves indicate not only an improvement in the financial resources of such institutions but also a definite move for the strengthening of teaching forces.

The Ferromanganese Equation

Earlier in the year, because of the heavy importations of ferromanganese to anticipate the new tariff, it was thought that supplies for the steel industry would be abundant well into 1923. An analysis of the situation to-day does not show a condition of plenty. Figures for the first eleven months of this year indicate that the total domestic production will approximate 146,000 gross tons and that the imports will reach 90,000 tons. Thus the total available supplies for the year are about 236,000 tons.

A conservative estimate of the 1922 steel output, ingots and castings, places the total at 34,000,000 tons. Of 17 pounds of ferromanganese to the ton of steel, such an output would call for 258,300 tons of ferromanganese. The combined production and imports for the year, therefore, fall short of this theoretical consumption by about 22,000 tons. Another interesting factor in the situation is that domestic production, outside of that by steel companies themselves, has been and still is exceedingly small. Expensive coke and the high duty on the ore have been adverse factors.

It is evident that unless domestic output increases materially, importations of British ferromanganese must be on a larger scale. Thus far the principal result of the new tariff has been to advance the price of ferromanganese from $67.50 to $100 per ton, adding correspondingly to the cost of steel and not diminishing American dependence on the foreign producer. Should the country's steel output in the first half of 1923 be at approximately the present rate, demand for merchant ferromanganese would reach substantial proportions.

An increasing amount of attention has been given in recent months, both in articles and in technical society papers, to the annealing of gray cast iron. This is a comparatively new field and already results worth while have been announced, not only in the removal of internal stresses but also in changes of structure and in improved properties. One of the most interesting examples of the application of heat treatment to cast iron on a large commercial scale is the annealing of the cast iron pipe made by the centrifugal process, where each pipe is carefully treated in a special furnace, as the last stage in the process before dipping in tar. As the production of alloy iron castings increases, the need for heat treatment will grow and the results should be valuable.

PACIFIC COAST MERGER

Columbia Steel Corporation Will Consolidate Properties and Build New Plants

SAN FRANCISCO, Dec. 19.—Organization of the Columbia Steel Corporation has just been completed by the election of the following officers: Wallace M. Alexander, W. W. Armstrong, D. H. Botchford, Albert E. Boynton, E. F. Burrell, W. E. Creed, W. W. Crocker, C. G. Dall, John S. Drum, A. C. Ellis, Jr., Herbert Fleischhacker, J. D. Grant, S. F. B. Morse, L. F. Rains, Joseph Sloss. Officers of the company are: W. E. Creed, president; J. D. Grant, first vice-president; Joseph Sloss, vice-president; D. H. Botchford, vice-president; L. F. Rains, vice-president; John D. Fenstermacher, secretary; Joseph Sloss, treasurer.

The Columbia Steel Corporation was organized for the purpose of consolidating the properties, plant and business of the Columbia Steel Co. operating at Pittsburg, Cal., and Portland, Ore., with the properties of the Utah Coal & Coke Co. and certain iron ore properties in Utah. The new company will expand the plants of the Columbia Steel Co. at Pittsburg by increasing the open-hearth capacity and by adding to mills already built sheet and wire mills to meet requirements of Coast markets. In addition, the company will construct at a plant site between Provo and Springville, Utah, a blast furnace and by-product coke oven plant for making of pig iron to supply pig iron requirements of new steel works and the general market for merchant iron on the Coast. The capital of the corporation is $20,000,000, divided into $10,000,000 of preferred stock and $10,000,000 of common stock.

Chairman Hammond Says People Will Not Tolerate Coal Strike

WASHINGTON, Dec. 18.—The American people will not permit another coal strike, according to formal notice served on both operators and miners last Saturday by Chairman John Hays Hammond of the Federal Fact Finding Commission. It was indicated that the Government would make every effort to prevent a strike and was ready to take drastic action if one should develop. The statement of Mr. Hammond followed a conference with President John L. Lewis of the United Mine Workers and other union officials. It was pointed out by Mr. Hammond that the Government would be compelled to intervene and take any action necessary in order to insure production of coal if the miners and operators failed to reach an agreement before the present contract in the bituminous coal fields expires on April 1, 1923.

Carnegie Steel Co. Ships 8500 Tons of Steel via the Ohio River

PITTSBURGH, Dec. 19.—A shipment of steel by the Carnegie Steel Co. which may eventually lead to increased use of the inland waterway system by the Steel Corporation, left here yesterday afternoon. This initial and experimental down river shipment amounted to 8500 tons in ten barges under tow of the steamers William G. Clyde and the Homestead. The steel is destined for Evansville, St. Louis and New Orleans. The Clyde took out six barges of steel and one barge of fuel and the Homestead four barges of steel and two of fuel. At a point below Bellaire, Ohio, the two tows will be consolidated and the Clyde will proceed south with the consolidated consignment.

The division of the steel which will mean the dropping off of the barges at the different points of call is as follows: Evansville three barges, 850 tons each of structural shapes, plates and bars; St. Louis, three barges of 850 tons each of structural plates, shapes and bars, and New Orleans, two barges, 850 tons each, of tubular products and two barges of 850 tons each of structural shapes, plates and bars. This down river shipment of steel has been loaded in barges awaiting departure for three weeks, delay being occasioned by the low stage of the water down river.

It is by no means certain that the company will make further use of the river, but it is believed that a careful record of the trip will be kept and will serve as a guide in case the company does wish to continue.

Dividend Not Considered, Says Judge Gary

Judge Elbert H. Gary, chairman of the United States Steel Corporation, yesterday issued a formal denial concerning the many rumors that the Corporation would declare a large extra dividend either in the form of cash or in the distribution of the company's large holdings of Liberty bonds. Judge Gary said:

"It is well known that it is not the practice of the Steel Corporation to commit itself in advance of what it will or will not do in the future. Action of course depends upon conditions and circumstances at the time it is taken.

"Concerning rumors that the Corporation intends to declare a stock dividend or either an extra cash dividend I have only this to say: The subject has not been discussed or considered by the board, by finance committee or any other officials so far as I know."

Brier Hill Steel Co. Will Build Strip Mill

Definite decision to erect a strip mill has been reached by directors of the Brier Hill Steel Co., but engineering details are still undetermined. The new unit will be constructed on a site at Youngstown between the company's sheet mills and its plate mills. The company is going forward with the rehabilitation of its Thomas sheet works at Niles and the alteration of its 132-in. plate mill, to enable it to roll a wider range of gages. Plans for other extensions, for which the company has issued $10,000,000 of bonds, are still in abeyance, but final decision will likely be reached early next year.

President James H. Grose states the company's new office building, opposite its open-hearth plant, will be completed and ready for occupancy next April. Directors have authorized the usual quarterly preferred dividend of $1.75 per share, payable Jan. 1 to stockholders of record Dec. 20.

Varieties of Metal Lath Eliminated Number 133

Reduction from more than 80 varieties to 10 of expanded flat metal lath and from more than 70 to 7 in ⅜ in. expanded rib lath now being used extensively in the building industry, was recommended at the conference of metal lath manufacturers, users and distributers held at the Department of Commerce under the auspices of the division of simplified practice of the department, as reported on page 1611 of the issue of Dec. 14.

A second conference on sheet lath was held Dec. 18 at the William Penn Hotel, Pittsburgh, and the 4.5 lb. per sq. yd. standard was recommended for submission to the industry for approval.

In the conference on numbering steels held in Washington, Dec. 6, a representative of the Navy Department said that the Navy now has an accumulation of a million pounds of unidentified tool steel, all of which must be analyzed and tested before it can be used. This condition, it was said, would not exist if the quality of steel were designated by code numbers, representing definite specifications. Whether the basis for such a numbering system should be chemical composition, physical properties, or heat treatment was left to be determined by a sectional committee, which is to be approved by the American Engineering Standards Committee.

The Algoma Steel Corporation, Ltd., is to remodel the No. 3 furnace and hot blast stoves at Sault Ste. Marie, Ontario, and Freyn, Brassert & Co., Chicago, have been retained as consulting engineers for the work.

Iron and Steel Markets

AN ACTIVE DECEMBER

Year-End Operation Maintained in an Unusual Degree

Flurry in Coke Due to Domestic Demand—A 200,000-Ton Automobile Inquiry

Greater activity than had been expected of December marks the steel trade in all leading centers. The slowing down commonly looked for in the last third of the month will be less than in any year since 1917.

In the Pittsburgh district several independent steel companies that had planned to shut down on Saturday for a full week find that they must resume on Dec. 26. The Steel Corporation subsidiaries there will suspend only from Saturday noon until Tuesday morning.

Producers of steel look with increased confidence to a large operation of their plants in the first quarter of the new year and some of them are taking a firmer stand on prices of plates, structural shapes and bars.

The first contact with real winter has brought a few but only a few complaints of increased car shortage at steel plants, but it has had a pronounced effect upon the fuel situation. The East has been a heavy buyer of soft coal and coke and has taken enough of the latter to advance sharply the price of blast furnace coke.

High sulphur Connellsville coke which was hard to move at $6 a ton one week ago is now selling as high as $9 for domestic use. Thus far the advance in blast furnace coke has been 50c. to $1. With the prospect of further Eastern inroad on the Connellsville supply some merchant furnaces will find it hard to break even on recent prices for pig iron.

Chicago still leads in indications of a high rate of operation for the next few months. A large producer there has had orders and specifications this month at a greater rate than in November, a condition which has few December precedents. Railroads there are buying plates, shapes and bars for their own use and are beginning to close first and second quarter contracts for steel car wheels, axles, locomotive tires and forgings.

The automotive industry is an important factor in the market. An inquiry from one large company covers 200,000 tons of bars and other rolled material. Cleveland reports also that sales of steel bars to bolt and nut manufacturers, automotive and other industries have been fairly heavy.

With 60 locomotives and nearly 6000 cars closed, it has been another good week in railroad buying. Over 154,000 is the total of car purchases so far this year. Nearly 4000 cars and 130 locomotives have been added to the pending lists, which represent about 500,000 tons of steel.

The International & Great Northern is in the market for 14,000 tons of rails, which are expected to be placed in the South.

Fabricated steel business continues in surprising volume. Bureau of Census figures indicate not far from 1,500,000 tons for the last nine months, in spite of a gradual recession from the great activity in April, which took 91.5 per cent of shop capacity. December awards are close to the November rate.

Active buying of pig iron has kept up at Pittsburgh, 20,000 tons of foundry grades being taken. At Cleveland, where only lately buying has lagged, transactions exceeded 100,000 tons, mostly foundry iron. The recent movement in the Birmingham district has amounted to 250,000 tons. Charcoal pig iron, long quoted at $33, furnace, has been marked down $3, and basic at Pittsburgh has declined 75c. on a sale of 6000 tons, but for the most part pig iron prices are firmer and in several centers have been marked up from 50c. to $1, with limited sales at the new quotations. In the South, $23, Birmingham, now prevails.

In the recent heavy buying of pig iron one transaction has excited widespread interest. It can now be stated that the American Radiator Co. bought 73,000 tons of foundry iron from the Bethlehem Steel Co. for delivery over the first half of 1923. The iron will come from the Lackawanna furnaces at Buffalo.

An upward turn in the scrap market is given some significance as a year-end development.

The British report of an American inquiry for 30,000 tons of rails which, it is indicated, may go to a Continental mill, is received here with reserve, though on the score of price alone, in view of a recent German sale in Manchuria, the possibility is admitted.

Pittsburgh

Keen Interest of Buyers in Requirements for 1923—Pig Iron Active

PITTSBURGH, Dec. 19.—Steel buyers are keenly interested in their requirements for the early part of 1923, and there has been such an unexpectedly large volume of specifications and new orders for tonnages for shipment after Jan. 1 that it now looks as though the holiday let down in mill operations would be less general and for a briefer period than had been expected. A number of the independent producers who had planned on shutting down next Saturday for a full week now find that it will be necessary to resume on the day after Christmas and it is the plan of the Steel Corporation subsidiaries to suspend only from next Saturday noon until Tuesday morning. The trade plainly is cheerful and is expecting that the first quarter of the new year will be marked by considerable activity. These hopes are founded on the belief that the railroads and the auto-

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in *Italics*

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Dec. 19, 1922	Dec. 12, 1922	Nov. 21, 1922	Dec. 20, 1921
No. 2X, Philadelphia	$28.76	$28.76	$30.14	$21.34
No. 2, Valley furnace†	25.00	25.00	27.50	19.50
No. 2, Southern, Cin'ti†	**27.05**	26.55	27.05	21.50
No. 2, Birmingham, Ala.†	**23.00**	22.50	23.00	17.50
No. 2 foundry, Chicago*	28.00	28.00	30.00	19.50
Basic, del'd, eastern Pa.	27.50	27.50	27.50	20.25
Basic, Valley furnace	*24.25*	25.00	27.50	18.25
Valley Bess., del. Pitts.	29.27	29.27	33.27	21.96
Malleable, Chicago*	28.00	28.00	30.00	19.50
Malleable, Valley	26.00	26.00	29.00	20.00
Gray forge, Pittsburgh	*26.73*	26.73	28.73	20.96
L. S. charcoal, Chicago	*33.15*	36.15	36.15	31.50
Ferromanganese, furnace	100.00	100.00	100.00	60.00

Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$40.00
Bess. billets, Pittsburgh	36.50	36.50	38.00	29.00
O.-h. billets, Pittsburgh	36.50	36.50	38.00	29.00
O.-h. sheet bars, P'gh	36.50	36.50	38.00	30.00
Forging billets, base, P'gh	*41.50*	42.50	45.00	32.00
O.-h. billets, Phila.	43.17	43.17	43.17	33.74
Wire rods, Pittsburgh	45.00	45.00	45.00	38.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	2.00	2.00	2.00	1.50
Light rails at mill	*2.10*	2.15	2.00	1.55

Finished Iron and Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.275	2.275	2.275	1.85
Iron bars, Chicago	2.35	2.35	2.50	1.60
Steel bars, Pittsburgh	2.00	2.00	2.00	1.50
Steel bars, Chicago	2.10	2.10	2.10	1.60
Steel bars, New York	2.34	2.34	2.34	1.88
Tank plates, Pittsburgh	1.95	1.95	2.00	1.50
Tank plates, Chicago	2.30	2.30	2.30	1.60
Tank plates, New York	2.29	2.29	2.34	1.83
Beams, Pittsburgh	2.00	2.00	2.00	1.50
Beams, Chicago	2.20	2.20	2.20	1.60
Beams, New York	2.34	2.34	2.34	1.88
Steel hoops, Pittsburgh	2.75	2.75	2.75	2.00

Sheets, Nails and Wire, *Per Lb. to Large Buyers:*	Dec. 19, 1922 Cents	Dec. 12, 1922 Cents	Nov. 21, 1922 Cents	Dec. 20, 1921 Cents
Sheets, black, No. 28, P'gh	3.35	3.35	3.35	3.00
Sheets, galv., No. 28, P'gh	4.35	4.35	4.35	4.00
Sheets, blue an'l'd, 9 & 10	2.50	2.50	2.50	2.25
Wire nails, Pittsburgh	2.70	2.70	2.70	2.75
Plain wire, Pittsburgh	2.45	2.45	2.45	2.50
Barbed wire, galv., P'gh	3.35	3.35	3.35	3.40
Tin plate, 100-lb. box, P'gh	$4.75	$4.75	$4.75	$4.75

Old Material, Per Gross Ton:				
Carwheels, Chicago	$24.00	$24.00	$24.50	$15.50
Carwheels, Philadelphia	20.00	20.00	20.00	16.50
Heavy steel scrap, P'gh	20.00	20.00	20.50	14.50
Heavy steel scrap, Phila.	**16.50**	16.00	16.00	11.50
Heavy steel scrap, Ch'go	**17.50**	17.00	17.00	11.00
No. 1 cast, Pittsburgh	22.50	22.50	23.00	16.00
No. 1 cast, Philadelphia	20.00	20.00	20.00	16.50
No. 1 cast, Ch'go (net ton)	**20.00**	19.50	20.50	12.50
No. 1 RR. wrot, Phila.	19.00	19.00	19.00	14.50
No. 1 RR. wrot, Ch'go (net)	**15.25**	15.00	15.50	10.50

Coke, Connellsville,

Per Net Ton at Oven:				
Furnace coke, prompt	**$7.00**	$6.50	$7.25	$2.75
Foundry coke, prompt	**8.00**	7.50	8.00	3.75

Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York	**14.50**	14.12½	14.12½	13.87½
Electrolytic copper, refinery	**14.37½**	13.75	13.62½	13.62½
Zinc, St. Louis	*7.00*	7.22½	7.20	4.90
Zinc, New York	*7.35*	7.57½	7.55	5.25
Lead, St. Louis	*6.87½*	6.95	6.90	4.40
Lead, New York	*7.25*	7.27½	7.25	4.70
Tin (Straits), New York	**38.12½**	37.25	36.50	33.00
Antimony (Asiatic), N. Y.	*6.30*	6.35	6.50	4.50

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Dec. 19, 1922, Finished Steel, 2.439c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

Dec. 12, 1922.	2.439c.
Nov. 21, 1922.	2.446c.
Dec. 20, 1921.	2.098c.
10-year pre-war average.	1.689c.

These products constitute 88 per cent of the United States output of finished steel

Composite Price, Dec. 19, 1922, Pig Iron, $25.42 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Dec. 12, 1922.	$25.71
Nov. 21, 1922.	27.61
Dec. 20, 1921.	18.85
10-year pre-war average.	15.72

motive industry will continue as heavy buyers, and the signs of renewal of interest in the market on the part of the agricultural industry also encourages optimism. There is no real evidence that steel now leaving the mills is going to other than specific uses, and it is generally believed that stocks in second hands still are extremely moderate, thus creating another potential outlet in the form of replenishments.

Prices are showing greater steadiness as a general rule and while it is not disputed that large tonnages of the major products still can be placed as low as 1.90c., observance of the regular market base of 2c. is more uniform. The market on hot-rolled flats is nearer 2.75c. base than it is to the regular quotations of 2.90c. base and 3.25c. still is occasionally reported on black sheets. In other directions, however, notably in tubular goods and wire products, for which the demand is exceptionally brisk, the market is well described as firm.

Further good-sized sales of pig iron have so heavily committed most of the merchant producers that there is a definite movement away from the low bases at which the bulk of the business was booked. Some of the merchant furnace interests now are asking as high as $27, furnace for No. 2 foundry, and $26 is probably as low as any of them now would go to get business, although in the week under review the greater portion of the business in this grade was at $25. The same tendency is observed in basic grade, but is less pronounced due to the fact that steel company competition with merchant producers still is fairly sharp.

Wintry weather conditions have not affected railroad operations to a point where there has been any serious curtailment in shipments of either iron or steel, but they have had a very pronounced effect upon the fuel situation, largely because the East is short of hard coal and has been a heavy buyer of soft coal and of coke, to partially make good the deficiency. Medium and high sulphur coke, which was hard to move at as low as $6 per net ton at ovens as recently as a week ago, since has sold as high as $9 for domestic use in the East. There has been an advance of fully $1 per ton in soft coal prices in this flurry of demand, which naturally creates a problem for pig iron producers who do not produce their own coke. This development will have weight upon the prices of Connellsville coke for first quarter and probably will mean prices so high as to make production of iron recently sold very unprofitable.

Outside of the independent sheet mills, which are running on slightly lower scale than recently, there has been no appreciable falling away in steel plant operations, notwithstanding the proximity of the holiday.

Pig Iron.—Sales of foundry iron aggregating about 20,000 tons have been closed in this market in the week

under review on a basis of $25 furnace, for No. 2 grade, by both Valley furnaces and those located outside of that district. Although it is doubtful whether any more tonnage could be placed at that price and the minimum asking price of merchant producers is $26, with some asking $27, so little tonnage actually has been sold at these prices that we still must give recognition to $25 as a quotation. It is a question how soon the high prices can be established by sales, for while the furnaces are admittedly well booked up, that very condition means that the melters are correspondingly protected. The Westinghouse company was the principal buyer of foundry iron here this past week. The Air Brake company took altogether about 15,000 tons and the Electric company about 4000 tons. A further decline of 75c. a ton has been registered in basic iron on a Valley transaction involving 6000 tons which was sold at $24.25, Valley furnace. There is some doubt that this price could be done again, as $24.50 now is the minimum asking price of producers and some are seeking $25. The inquiry of the Central Steel Co., Massillon, Ohio, for 15,000 tons a month for the first quarter of 1923 still is reported as open. Some of the merchant producers who quoted against this business in the past few days have withdrawn quotations. There is little doing in Bessemer iron and the quotation of $27.50, Valley furnace, is supported only by sales of 200 or 300 tons. No doubt a larger tonnage would induce lower quotations.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.77 per gross ton:

Basic	$24.25 to $25.00
Bessemer	27.50
Gray forge	24.00 to 25.00
No. 2 foundry	25.00 to 26.00
No. 2 plain	24.00 to 25.00
Malleable	26.00
Low phosphorus, copper free	36.00

Ferroalloys.—It is understood that large users of 50 per cent ferrosilicon in this and nearby districts have closed for much of their 1923 requirements on a basis of $82.50 delivered. Figures of actual tonnages placed are not obtainable. It is believed that this price still holds on contracts for tonnages for all of 1923, although some makers now are asking $85. Business in ferromanganese is fairly good, but sales as a rule involve only small tonnages. The going price on both domestic and British 80 per cent material is $100 seaboard, or $104.79 delivered this district. It is reported, however, that there was a sale recently of domestic material amounting to close to 1500 tons to a steel maker outside the Pittsburgh district at $95 seaboard. It is believed that this concession was made, however, as a means of securing specifications on an old contract. The spiegeleisen market is soft and while there is no change in official quotations it is not doubted that 20 per cent domestic material can be had as low as $33 on first quarter contracts.

We quote 80 per cent ferromanganese at $100, furnace, or $104.79 delivered Pittsburgh district for either domestic or British, and 76 to 80 per cent German at $67 c.i.f. Atlantic seaboard. Average 20 per cent spiegeleisen spot $36, furnace contracts $32; 16 to 19 per cent, spot, $35; contracts, $32; 20 per cent, foreign, $37 f.o.b. Atlantic seaboard, duty paid; 50 per cent ferrosilicon, domestic, $82.50 to $85, delivered. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, $44.50; 11 per cent, $47.80; 12 per cent, $51.10; 13 per cent, $55.10; 14 per cent, $60.10; silvery iron, 6 per cent, $33; 7 per cent, $34; 8 per cent, $35.50; 9 per cent, $37.50; 10 per cent, $39.50; 11 per cent, $42; 12 per cent, $44.50; 13 per cent, $47. The present freight rate from Jackson and New Straitsville into the Pittsburgh district is $3.66 per gross ton.

Steel Skelp.—This product is not showing a great deal of activity, despite the sold-up condition of non-integrated makers of tubular goods, presumably because the mills are making better deliveries than recently on old contracts. These were entered at well below today's market price of 2c. for grooved or sheared and sales at that figure at present are rather difficult. As yet, however, there is no evidence that less is being done.

Wire Products.—While specifications for shipments during the remainder of this month, notably in nails, are lighter than they were recently, this is looked upon merely as a seasonable condition and it is observed that buyers are showing a good deal of anxiety about supplies for after Jan. 1. Most producers are doing better in the matter of both production and shipment, but it is their experience that orders and specifications are well in excess of normal production. The Bessemer department of Shoenberger works, Pittsburgh, American Steel & Wire Co., has started up, and steel production at Donora, Pa., works of this company also is expanding steadily. There seems to be some doubt that the company will have much tonnage available for first quarter delivery since it is sold ahead about 15 weeks on nails alone. There is a very brisk demand for manufactured wire. Prices are very firm on all products. They are given on page 1661.

Iron and Steel Pipe.—Increased interest in line pipe is a recent development. The Texas Co. is in the market for 85 miles of 10-in. pipe, about 10,000 tons, while one of the Standard Oil companies is seeking 5000 tons for a line to Wyoming. A Central Western mill recently took 35 miles of 6-in. line pipe. Oil country goods also are showing a little more activity and there has been no let-up in the demand for standard pipe, notwithstanding that as a result of an increased supply of cars shipments have been much heavier in the past two weeks than in any corresponding period since early in the year. It is still the practice of makers to scale down orders and to give buyers only a part of what they ask for. The best delivery promised against new orders for butt welded pipe is eight weeks, and some report sufficient orders to engage capacity on these sizes for the next two or three months. There is a fair business doing in wrought iron pipe. Prices on both classes are very firm. Discounts are given on page 1661.

Wire Rods.—We note no change in prices or in general market conditions. Most makers are pretty well obligated against probable production for the next three months, and for that reason it is rather difficult to place new tonnages except at a premium over the regular market quotation of $45 for the base size of soft rods. The American Steel & Wire Co. has not yet disclosed its position with regard to first quarter prices, or the tonnage it can take for this period on top of its present obligations.

We quote No. 5 common basic or Bessemer rods to domestic consumers, $45 to $47.50; chain rods, $45 to $47.50; screw stock rods, $50 to $52.50; rivet and bolt rods and other rods of that character, $45 to $47.50; high carbon rods, $52 to $57.50, depending on carbon, per gross ton, f.o.b. Pittsburgh or Youngstown. Carbon rods command $3 over base for 0.20 to 0.40 carbon; $5 over base for 0.41 to 0.55 carbon; $7.50 over base for 0.56 to 0.75 carbon and $10 over base for over 0.75 carbon.

Billets, Sheet Bars and Slabs.—It had developed that a recent sale of 6000 tons of sheet bars at a reported price of $37.50, Pittsburgh, actually was closed at around $37.10, Pittsburgh, and that the tonnage involved some copper-bearing steel. On sheet bars of ordinary analysis, the market is not above $36.50, Pittsburgh or Youngstown, and we note an additional sale of 6000 tons at $36, Pittsburgh. A local maker of strip steel is in the market for 2000 tons of billets and there is also an inquiry for 1000 tons from a Pittsburgh maker of railroad track equipment. The effort of makers is to obtain $36.50 for billets and slabs as well as sheet bars. The market is weaker on forging billets, which, on the basis of sales, now are quoted at $41.50 to $42.50.

We quote 4 x 4-in. soft Bessemer and open-hearth billets, $36.50; 2 x 2-in. billets, $36.50; Bessemer sheet bars, $36.50; open-hearth sheet bars, $36.50; slabs, $36.50; forging billets, ordinary carbons, $41.50 to $42.50, all f.o.b. Pittsburgh or Youngstown mills.

Sheets.—The Steel Corporation sheet-making subsidiary is still getting liberal orders and specifications for deliveries after Jan. 1, but this is not generally true of independent companies, most of which will end the year with rather light order books, since over most of the last half of the year they disposed of their production on orders rather than contracts. Customers of such mills, not fearing an early advance in prices, are inclined to defer placing orders. The American Sheet & Tin Plate Co. last week operated 88 per cent of its sheet mills, and expects to do as well this week. Independent mill operations are not above 80 per cent and they would not be that high if it were not for the fact that those making full-finished sheets are running full. Outside of black sheets, there is no important shading of

the regular market quotations and one or two independents are trying to obtain 2.60c. base for blue annealed, or $2 per ton above the regular quotation. Prices are given on page 1661.

Steel Rails.—The official quotation of all makers rolling light rails from new steel still is 2.15c. base, and some business is reported at that figure, but demands are not especially numerous or large and sales at 2.10c. base are reported. These sections rolled from old standard rails are quoted at 2c. base.

We quote 25 to 45-lb. sections, rolled from new steel, 2.10c. to 2.15c. base; rolled from old rails, 2c. base; standard rails, $43 per gross ton mill for Bessemer and open-hearth sections.

Tin Plate.—There is no evidence yet that there is any important shading of the regular market quotation of $4.75 per base box, Pittsburgh, for standard cokes other than the usual preferential treatment on prices that is accorded large consumers. The leading interest is understood to be very largely obligated against probable production over the first half of 1923, and a large independent producer reports commitments equal to about 80 per cent of its first half production. Such cases, however, are the exception rather than the rule.

Cold-Finished Steel Bars and Shafting.—Orders for first quarter of 1923 are coming along in good shape and include a few fairly large tonnages from jobbers serving the automotive industry. Reported improvement in the agricultural industry has not yet been felt here, but makers are looking forward to increased orders from this source. All makers are firm at 2.50c. base for carloads and indications point to the maintenance of this figure since makers are not likely to secure hot-rolled bars as cheaply for first quarter as those now coming to them. Ground shafting also is firm at 2.90c. base, f.o.b. mill, for carload lots.

Track Fastenings.—Leading makers in this district are well sold up and while specifications for material for shipment over the remainder of the year are light, they are coming along steadily against those to be be made during the early part of next year. Prices show no change. They are given on page 1661.

Iron and Steel Bars.—Except to large and preferential customers, the market here on soft steel bars is not below 2c. The Corporation has not yet announced willingness to enter first quarter contracts and is quoting 2c. on current inquiries. Apparently this interest is carrying over heavy tonnages into the new year and is not inclined to be bound by a fixed price on such business as it can take for that delivery. There is no change in iron bars.

We quote steel bars rolled from billets at 2c.; reinforcing bars, rolled from billets, 2c. base; rail steel reinforcing bars, 1.90c. to 2c.; refined iron bars, 2.60c. in carloads, f.o.b. mill, Pittsburgh.

Structural Material.—There is better observance of 2c. as a base than was the case recently, although on particularly desirable tonnages it is probable that concessions from this level still can be had. Fabricating shops are getting an unusually large amount of inquiry for the time of year, and while not much is being placed, this is ascribed largely to the fact that active construction work cannot very well get under way before March or April. Mill shipments on old orders are fairly free, and it is said that the bulk of them is going directly into consumption. The New York Central Railroad recently took bids on 1200 tons of steel for bridge repair work, and it is expected that an award will be made on the Fortieth Street Bridge, Pittsburgh, this week. The McClintic-Marshall Co. is low bidder on the latter job, involving 6500 tons. Plain material prices are given on page 1661.

Plates.—A large producer in this district is figuring on inquiries involving 40,000 tons, but the purpose is not disclosed. In general, the market is not showing special activity, although tonnages are being specified against regularly. About 1000 tons of steel, mostly plates, will be required for 10 barges recently asked for by the Federal Engineers, Rock Island, Ill., on which the Green Bay Dry Dock Co., Green Bay, Wis., was low bidder. The effort of the mills still is to get 2c. base, Pittsburgh, but business is still being lost at that price. Prices are given on page 1661.

Boiler Tubes.—The shortage of lap welded boiler tubes for immediately delivery still is unrelieved, and jobbers are now having much trouble in obtaining premiums for such service. The supply situation in seamless steel tubes is easier than it has been. Interest in charcoal iron tubes is moderate owing to their high cost. Discounts are given on page 1661.

Rivets.—Specifications lately have been on a very much heavier scale than was true previously and leading makers are renewing contracts for first quarter on the basis of present prices. Demand shows good diversification, increased interest on the part of the farm implement manufacturers being a feature. Prices and discounts are given on page 1661.

Coke and Coal.—Decidedly higher prices have developed since a week ago as a result of heavy and feverish demands from the East in an attempt to partly make good the shortage of anthracite coal for domestic use. Heating coke and medium and high sulphur coke, which recently was selling around $6 to $6.25 per net ton at oven, has sold as high as $8.50 to $9 in the past few days, and this naturally has strengthened the price ideas of producers on furnace and foundry fuel. Blast furnace interests which have lately tried to pick up spot tonnages have found almost none available except at prices far above what they could afford to pay on the present basis of pig iron. Such sales of furnace coke as have been made to the blast furnaces have been at $7 to $7.50, or 50c. to $1 per ton above last week's price. A large producer of foundry grade opened its books for first half at $7.50 per net ton at oven, but quickly filled up and withdrew from the market. Lately $8 to $8.50 has been the prevailing range, this also measuring an advance of 50c. to $1 per ton. Stiff advances also have been made in coal prices, particularly in prepared sizes, the result of urgent Eastern buying. Very little coal is available as a result of that demand, but as nearly as can be established the market is quotable at $3 to $3.25 for mine run steam; $3.25 to $3.75 for coking coal and $3.75 to $4.75 for gas.

Old Material.—The market can be looked upon in two ways; it is neither as weak as the mills would like to see it nor as strong as those long of the market could wish. The fact that those who went short against sales to steel mills have been able to cover them without much difficulty and usually at a profit, and that there are efforts on the part of some sellers to put on additional tonnages to original orders is not suggestive of a shortage in supplies or strength in prices. Heavy melting steel has been offered rather freely lately at $20.50 delivered to a Pittsburgh plant where the specifications are hard and rigidly observed. Compressed and bundled sheet scrap are slightly lower in sympathy with heavy melting steel, but the market is firmer on blast furnace grades with sales of short shoveling turnings noted at $18.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

	Per Gross Ton
Heavy melting steel	$20.00 to $20.50
No. 1 cast, cupola size	22.50 to 23.00
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va.; and Franklin, Pa.	20.50 to 21.00
Compressed sheet steel	19.00 to 19.50
Bundled sheet sides and ends	17.00 to 17.50
Railroad knuckles and couplers	21.50 to 22.00
Railroad coil and leaf springs	21.50 to 22.00
Low phosphorus standard bloom and billet ends	24.00 to 24.50
Low phosphorus, plates and other grades	23.00 to 23.50
Railroad malleable	20.00 to 20.50
Iron car axles	28.00 to 29.00
Locomotive axles, steel	23.00 to 24.00
Steel car axles	21.00 to 21.50
Cast iron wheels	22.00 to 22.50
Rolled steel wheels	21.50 to 22.00
Machine shop turnings	15.50 to 16.00
Heavy steel axle turnings	17.00 to 17.50
Short shoveling turnings	17.50 to 18.00
Cast iron borings	17.50 to 18.00
Heavy breakable cast	18.50 to 19.00
Stove plate	16.50 to 17.00
Sheet bar crop ends	22.00 to 22.50
No. 1 railroad wrought	18.50 to 19.00

Chicago

Railroad Buying Still Active—Better Inquiry for Sheets

CHICAGO, Dec. 19.—For a leading local mill, total bookings in orders and specifications are considerably heavier than in November, although strictly new business is not so large. The maintenance of such a volume of business at this time of the year is without precedent and is indicative of a continuing need for material. It is also notable that those industries which have been operating subnormally are coming into the market for increasing tonnages. Greater stability in the cotton and grain markets is being reflected in demand for implements and tractors the manufacturers of which are now pressing the mills for more steel.

Buying of freight cars continues and there is much equipment on inquiry. Local mill protections cover 46,000 cars, which will require nearly 500,000 tons of steel, the largest tonnage which has been pending at one time this year. The latest car order of size has been placed by the Pacific Fruit Express and calls for 5000 refrigerator cars. The railroads continue to buy bars, plates and shapes for their own use and likewise are commencing to close first and second quarter contracts for steel carwheels, axles, locomotive tires and forgings. The automotive industry remains an important factor in the market, an inquiry from one large interest covering 200,000 tons in bars and other steel requirements. Demand for tool steel is the best in two years. This commodity has always been regarded as an excellent barometer of machine shop operations, but in this instance increased buying may be due to fear that higher prices of tool steel will be caused by advances in tungsten resulting from the new duty. Better inquiry for certain special sheets furnishes further testimony to the improved situation among agricultural implement makers. One farm equipment manufacturer is inquiring for 1000 tons of spring steel.

Blast furnace operations remain unchanged, but steel production is slightly improved. The Illinois Steel Co. has increased its steel output to 83 per cent of ingot capacity. The Inland Steel Co., however, remains on a 75 per cent basis.

Ferroalloys.—Outside of few carload sales of ferromanganese at $100 seaboard, there has been little activity in either that alloy or spiegeleisen. Users of 50 per cent ferrosilicon continue to contract for their 1923 needs.

[illegible] delivered.

Pig Iron.—Buying has eased off appreciably, and while there is considerable tonnage still pending, new inquiries are less numerous. It is apparent that there are many buyers who have bought only part of their first quarter requirements and still others who have not yet placed tonnage for that delivery. Inventory taking is now consuming the attention of users and it is therefore believed that renewed buying on a broad scale will not develop until the opening of the new year. While the market has lost much of the momentum which characterized it at the crest of the buying movement a week or two ago, it is by no means inactive. Orders for 500 and 1000 tons are still fairly common. A northern Illinois implement manufacturer has just closed for 1000 tons of foundry for first quarter shipment. Foundry iron from the Soo is again finding its way into this territory, particularly to certain centers in Michigan. One tonnage, in fact, was sold in northern Illinois because the analysis desired could not be obtained from nearby furnaces. Southern iron is generally quoted at $23 base Birmingham, although quotations of as low as $22.50 are still being named. A sale of 300 tons of domestic low phosphorus has been made at $36 delivered. The Milwaukee furnace which was expected [illegible] to postpone such action for a week or two. Charcoal iron has weakened and can now be bought at $30, furnace, and there are unconfirmed reports of quotations as low as $27.50 [illegible]

500 tons of 10 to 11 per cent electrolytic silvery at the ruling prices. Local producers lost an Indianapolis order for 3600 tons of malleable to a Cleveland interest which quoted $25 furnace.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$33.15 to $36.15
Northern coke, No. 1, sil. 2.25 to 2.75	28.50
Northern coke, foundry No. 2, sil. 1.75 to 2.25	28.00
Malleable, not over 2.25 sil.	28.00
Basic	28.00
High phosphorus	28.00
Southern, No. 2	28.51 to 29.01
Low phos., Valley furnace, sil. 1 to 2 per cent copper free	36.00 to 37.00
Silvery, sil. 8 per cent	40.29

Plates.—During the week a local mill booked the steel for 1300 cars recently placed and it has protections out on 46,000 new freight cars which will require nearly 500,000 tons of plates, shapes, bars and axles. This is the largest tonnage of car steel which has been on inquiry in this market this year. Chicago producers of plates are heavily committed through first quarter and can take little additional tonnage except small lots here and there which will fit into existing rolling schedules. One mill, in fact, refused to extend a protection on 15,000 tons for oil storage tanks because it did not wish to obligate itself beyond first quarter at present prices.

The mill quotation is 2.10c. to 2.30c., Chicago. Jobbers quote 2.90c. for plates out of stock.

Cast Iron Pipe.—Prices are unchanged and show a greater tendency toward firmness. New business is light, but better buying is expected to develop after the first of the year. Hinsdale, Ill., will receive bids on 550 tons of 12-in. on Jan. 22. Lincoln, Neb., has awarded 300 tons of 6-to 24-in. to the National Cast Iron Pipe Co.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $55.20 to $56.20; 6-in. and above, $51.20 to $52.20; class A and gas pipe, $3 extra.

Rail and Track Supplies.—The Louisville, Henderson & St. Louis has placed 1000 tons of rails with the Inland Steel Co. The El Paso & Southwestern has withdrawn an inquiry for 10,000 tons, having succeeded in obtaining earlier delivery against rails on contract. The International & Great Northern, which has just been absorbed by the St. Louis-San Francisco, is in the market for 14,000 tons, which will probably be placed in the South. Specifications for track fastenings are liberal, but net business is rather light. There is little demand for light rails.

Standard Bessemer and open hearth rails, $45; light rails rolled from new steel, 2.15c., f.o.b. makers' mills.

Standard railroad spikes, 2.85c. to 3c. mill; track bolts with square nuts, 3.50c. to 3.60c. mill; iron tie plates, 2.50c.; steel tie plates, 2.35c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.40c. base and track bolts, 4.50c. base.

Bars.—While new business in soft steel bars is not so heavy as in November, it is unusually large for this time of the year. Local mills are practically sold up for first quarter and Eastern mills able to offer earlier deliveries are booking more tonnage in this district. Such orders are being taken at 2c. base Pittsburgh. The General Motors Corporation is in the market for about 200,000 tons in bars and other steel requirements, and a part of this tonnage may go to local producers, although the major portion is expected to be placed in the East. Demand for bar iron is not nearly so active as for soft steel, although bookings are somewhat heavier than a month ago. Hard steel bars are still dull, notwithstanding a moderate improvement in buying by the implement industry.

Mill prices are: Mild steel bars, 2c. to 2.10c. Chicago; common bar iron, 2.35c. to 2.50c., Chicago; rail steel, 2c., Chicago mill.

Jobbers quote 2.80c. for steel bars out of warehouse. The warehouse [illegible] on cold rolled steel bars and shafting is 3.80c. for rounds and 4.30c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 2.50c. base; hoops, 4.15c.; bands, 3.55c.

Wire Products.—New business is unusually heavy for this season, with nails particularly in demand. Most jobbers have been unable to accumulate stocks and continue to press the mills for material. Inquiries are coming from practically all parts of the West except a few sections where severe weather has set in. With the opening of its Anderson, Ind., plant this week the leading interest will increase its output, which up to date has not exceeded 65 per cent. For mill prices see finished iron and steel, f.o.b. Pittsburgh, page 1661.

We quote warehouse prices f.o.b. Chicago: No. 9 and heavier black annealed wire and No. 9 and heavier bright basse wire, $3.30 per 100 lb.; common wire nails, $3.45 per 100 lb.; cement coated nails, $2.90 per keg.

Bolts and Nuts.—Contracting for first quarter is proceeding steadily, and while slight concessions are reported here and there, prices are holding rather well.

Jobbers quote structural rivets, 3.75c.; boiler rivets, 3.85c.; machine bolts up to ⅞ x 4 in., 50 per cent off; larger sizes, 50 off; carriage bolts up to ⅞ x 6 in., 45 off, larger sizes, 15 off; hot pressed nuts, squares and hexagons, tapped, $2.75 off; blank nuts, $2.75 off; coach or lag screws, gimlet points, square heads, 55 per cent off.

Reinforcing Bars.—Lettings of concrete bars are falling off as the holidays approach, but the amount of prospective work which continues to come up augurs well for business next quarter. During the past week, one prominent dealer alone received inquiries for 1000 tons from smaller jobbers scattered throughout the West. Sizable projects continue to reach the figuring stage. A local plant for the Creamery Package Co. will require 500 tons. Recent awards include:

Tower Auto Corporation, garage, Chicago, 500 tons, to Joseph T. Ryerson & Son.

Evansville, Ind., high school building, 100 tons, to Corrugated Bar Co.

Farmers Mutual Packing Co. plant, Muscatine, Iowa, 100 tons, to Concrete Steel Co.

School building, Marshall, Mo., 100 tons, to Kalman Steel Co.

National Concrete Co., Indianapolis, Ind., 100 tons, to Concrete Steel Co.

Long, Walbridge and Sumner School buildings, St. Louis, 237 tons, to Concrete Steel Co.

Pending work includes:

Creamery Package Co. plant, Chicago, 500 tons.

Nurses' training school for Michael Reese Hospital, Chicago, 250 tons.

Richmond, Fredericksburg & Potomac Railway, engine house, Richmond, Va., 185 tons, Arnold Co., Chicago, architect.

Elks Club building, Omaha, Neb., about 400 tons.

Sheets.—Aside from completing negotiations started some weeks ago, local mills are out of the market for first quarter and are not actively soliciting business. Valley mills do not appear to be so well booked, although they are reported to be on a much more comfortable basis than a month ago. The business they are getting in this district at present consists largely of orders for early shipment rather than contracts for the quarter.

Mill quotations are 3.35c. for No. 28 black, 2.50c. for No. 10 blue annealed and 4.35c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.
Jobbers quote f.o.b. Chicago, 4c. for blue annealed, 4.85c. for black and 5.85c. for galvanized.

Steel Castings.—Leading makers have not yet announced their first quarter prices, but it is not believed that there will be any changes. A considerable tonnage of car castings is pending in the market and it is thought likely that it will be placed shortly after the first of the year, if not before.

Structural Material.—Fabricating awards have fallen off as the holidays draw near, but much new work continues to develop. Bids are being taken this week on the Union League Club building, Chicago, which will involve 4800 tons instead of 4000 tons as reported last week. It appears that new figures are to be taken on the Stevens Hotel, Chicago, a 16,000 ton project, which was reported let several months ago. The Missouri State Highway Commission receives tenders Wednesday on 2200 tons for a highway bridge at Waverly. An unusual amount of highway bridge work is coming to a head for the reason that Government aid will be restricted to road construction after Jan. 1. A large fabricator reports a total of 30,000 tons of work has come up for figures within the past week. Plain material prices are unchanged, with local mills practically sold up for first quarter.

The mill quotation on plain material is 2.10c. to 2.20c., Chicago. Jobbers quote 2.90c. for plain material out of warehouses.

Old Material.—Although there is usually little consumer buying in the closing weeks of the year, substantial purchases of open-hearth grades have been made by two important steel mills, one of which had been out of the market for a considerable period. These orders were placed at advancing prices, which resulted in sympathetic advances by allied grades and a firmer tone throughout the entire list. Sentiment among dealers has improved and speculative buying is increasing in volume. Aside from the purchases of heavy melting steel, there has been little consumptive buying except the usual run of single carload sales of cast grades. There is only one new railroad offering, a list of 4500 tons advertised by the Rock Island.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton

Iron rails	[illegible]
Cast iron car wheels	[illegible]
Relaying rails, 56 and 60 lb.	26.00 to 27.00
Relaying rails, 65 lb. and heavier	32.00 to 35.00
Rolled or forged steel car wheels	22.00 to 22.50
Rails for rolling	18.00 to 18.50
Steel rails, less than 3 ft.	19.75 to 20.25
Heavy melting steel	17.50 to 17.75
Frogs, switches and guards cut apart	[illegible]
Shoveling steel	[illegible]
Drop forge flashings	12.50 to 13.00
Hydraulic compressed sheet	14.25 to 14.75
Axle turnings	[illegible]

Per Net Ton

Iron angles and splice bars	21.00 to 21.50
Steel angle bars	17.00 to 17.50
Iron arch bars and transoms	21.00 to 21.50
Iron car axles	24.00 to 24.50
Steel car axles	17.50 to 18.00
No. 1 busheling	14.50 to 15.00
No. 2 busheling	9.00 to 9.50
Cut forge	15.25 to 15.75
Pipe and flues	11.00 to 11.50
No. 1 railroad wrought	15.25 to 15.75
No. 2 railroad wrought	15.25 to 15.75
Steel knuckles and couplers	19.50 to 20.00
Coil springs	21.00 to 21.50
No. 1 machinery cast	20.00 to 20.50
No. 1 railroad cast	18.50 to 19.00
No. 1 agricultural cast	18.50 to 19.00
Low phos. punchings	17.00 to 17.50
Locomotive tires, smooth	16.00 to 16.50
Machine shop turnings	10.00 to 10.50
Cast borings	13.00 to 13.50
Stove plates	16.00 to 16.50
Grate bars	16.50 to 17.00
Brake shoes	16.50 to 17.00
Railroad malleable	20.00 to 20.50
Agricultural malleable	20.00 to 20.50

Detroit Scrap Market

DETROIT, Dec. 18.—The scrap market has a tendency to firmness generally with melters holding their requirements to December delivery. As usual, tonnages are smaller than for previous months, with most plants going into their inventory period in another week. The recent advance in pig iron has not as yet been reflected in the scrap market. The following prices are on a gross ton basis, f.o.b. cars producers' yards, excepting stove plate, automobile and No. 1 machinery cast, which are quoted on a net ton basis:

Heavy melting steel	$14.50 to $15.50
Shoveling steel	15.00 to 16.00
No. 1 machinery cast	18.00 to 20.00
Cast borings	12.00 to 13.50
Automobile cast scrap	20.00 to 22.00
Stove plate	16.00 to 17.50
Hydraulic compressed	14.50 to 15.50
Turnings	11.50 to 12.50

An automatic gas-fired pipe annealing furnace is to be provided for at the plant of the National Cast Iron Pipe Co., Birmingham, similar to two furnaces at the works of the U. S. Cast Iron Pipe & Foundry Co., except that these are oil fired. The installation will be made by F. J. Ryan & Co., Philadelphia, which is also to install an automatic rotating bolt annealing and tempering furnace for the Graham Nut & Bolt Co., Pittsburgh.

New York

Strong Demand for Coke for Domestic Uses With Slow Delivery by Railroads

NEW YORK, Dec. 19. Owing to the cold weather which has prevailed for several days and the very heavy demand for furnace coke for domestic uses, the coke market has been the center of interest to an unusual extent and prices have advanced sharply. It is estimated that fully 40,000 tons of coke has been sold to domestic consumers within the past week or 10 days and the demand continues active, with price trend distinctly upward. How long this condition will exist depends upon the weather. The movement of coke on the railroads is now very slow and unsatisfactory and a heavy snow storm would make matters much worse. Prices of coal have advanced $1 within a week. Low volatile grades are hard to obtain and are quoted at $4.50 to $5.25 at the mines, while high volatile is selling at about $3.75. Quotations on furnace coke range from $8 to $9.50, with foundry grades at about the same figures. For domestic purposes furnace coke is being delivered at $11.91 at the piers and delivery to homes in Greater New York is about $4 additional. By-product coke is still quoted at $14.84 to $14.91, delivered Newark and Jersey City points.

Pig Iron.—Buying of pig iron has been in rather small lots the past week. One agency sold a total of 8000 tons with no tonnage running over 1000. Prices are firmer and $26, base, is apparently the lowest price on Buffalo iron, while $27, furnace, is being quoted in eastern Pennsylvania and Virginia. It is recognized that the principal buyers are covered for the first quarter, but many who have been trailing will probably find it necessary to pay higher prices. Very little is heard of foreign iron, but reports indicate that a considerable unsold tonnage is being held at seaboard cities. Continental iron is selling at about $26 to $26.50, duty paid, and Scotch $27.50, duty paid.

We quote delivered in the New York district as [illegible] basis prices $2.75 freight [illegible] Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$31.27
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	30.27
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	29.27
Buffalo, sil. 1.75 to 2.25	30.91
No. 2X Virginia, sil. 2.25 to 2.75	33.44
No. 2 Virginia, sil. 1.75 to 2.25	32.44

Ferroalloys.—Sales of ferromanganese for first quarter, with some of it for as early delivery as possible, have been made recently, involving 3000 to 4000 tons, all British alloy, at the regular quotation. There is some likelihood of an advance in the British delivered price if the pound sterling continues to go higher. There have been heavy sales of spiegeleisen for delivery for the first half of 1923 at $34, furnace, for the 19 to 21 per cent grade, and at $33, furnace, for the 16 to 19 per cent alloy. These are the quotations prevailing for large quantities, but for carload lots the range is $36 and $35, respectively. Contracts for 50 per cent ferrosilicon for 1923 consumption continue to be liberally negotiated at a range of $82.50 to $87.50, depending on the quantity and place of delivery. There has also been some contracting done in ferrochromium. Quotations are as follows:

[illegible] delivered, furnace, [illegible]

Ferromanganese, British, 80 per cent, f.o.b. Atlantic port $100.00

[illegible] $34.00 to $36.00

[illegible] per gross ton, carloads ..... $82.50 to $87.50

Ferrotungsten, per lb. of contained metal, [illegible]

to 70 per cent Cr., per lb. Cr., delivered, [illegible]

Manganese ore, foreign, per unit, c.i.f. 29c. to 30c.
Tungsten ore, per unit, in 60 per cent con- [illegible] per ton, c.i.f. Atlantic seaboard $18.00 to $28.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS. New York

Finished Iron and Steel.—Structural steel work continues as the principal factor in an otherwise quiet market. Active projects total about 17,000 tons, and in addition a number of buildings are known to be under consideration and will be definitely in the market for quotations soon. In some instances preliminary figures have been obtained on several office and loft buildings and apartment houses. It is expected also that within a week figures will be asked for on steel for the new Roosevelt Hotel (United Hotels Co.) for which excavation has already been begun on Madison Avenue, New York, and the new Equitable Building at Seventh Avenue and Thirty-second Street, New York. Both of these jobs have been figured on before but bids were rejected. The former project will require 5000 tons and the latter close to 10,000 tons. Prospects for a very active building program to be begun early in 1923 are considered excellent by local fabricators. Prices continue unchanged, but steel mill representatives report that there is less inclination to give concessions. On some structural jobs shapes have been going at 1.95c., Pittsburgh, but it is said there are now more quotations of 2c. Plates are 1.90c., Pittsburgh, for large lots and 2c., Pittsburgh, for small lots. Bars are firmer at 2c. There appears to be greater strength also in the prices of bar iron, which is now more generally quoted at 2c., Pittsburgh. Car building work has fallen off in the past week, but it is expected that fresh inquiries will be out early in the new year. There is a fairly good run of inquiries for concrete reinforcing bars, but the individual lots asked for are small. The Concrete Steel Co. has been awarded 300 tons for a building for the Utica Steam & Mohawk Valley Cotton Mills, Utica, N. Y., and 300 tons for road work at Yadkin, N. C. Several jobs taken by the Turner Construction Co. require 1000 to 1200 tons of bars. These jobs include the Lake Placid Club, Lake Placid, N. Y.; Vacuum Oil Co. building, Bayonne, N. J.; building for American Stores Co., Philadelphia; building for Edward Langer Printing Co., Jamaica, Long Island; building for New York Telephone Co., East Ninety-seventh Street, New York; building for Abbotts Alderney Dairies Co., Philadelphia.

We quote for mill shipments New York delivery, as follows: Soft steel bars and steel plates, 2.24c. to 2.34c.; structural shapes, 2.29c. to 2.38c.; bar iron, 2.34c.

Cast-Iron Pipe.—The usual dullness of the holiday season seems to have only slightly affected private purchasing in this market and makers are looking forward to a fair number of municipal tenders after the first of the year, as many municipalities in the New England district change officials Jan. 1 and the new administration will issue calls for bids on pipe for spring delivery. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $54.50; 4-in. and 5-in., $59; 3-in., $64.80, with $4 additional for Class A and gas pipe. Soil pipe continues unchanged at the established discounts, but the market is unsettled and there is a strongly developed tendency to shade on the part of many sellers. However, the following quotations rather generally cover the present market. We quote discounts of both Southern and Northern makers, delivered New York, as follows: 2 to 6-in. standard, 33 to 35¾ per cent off list; heavy, 43 to 45¾ per cent off list.

Warehouse Business.—With the approach of the holidays, the market in this district has quieted down somewhat, but business is still far better than usual at this season. Structural steel, bars and plates are still holding up well and in steel pipe the smaller butt-weld sizes are in good demand with stocks generally low. Both black and galvanized sheets are active, but business has evidently been largely stimulated by considerable shading of current prices. Galvanized sheets, which are nominally quoted at about 5.50c. per lb. base, have been cut to as low as 5.25c. per lb., even on small tonnages and black sheets, which are slightly stronger, have gone at as low as 4.35c. per lb., although 4.50c. per lb. base is still rather generally the price. The brass and copper market reports business good and prices showing an upward tendency. Copper sheets and seamless tubes and brass sheets, wire and seamless tubes are all up ¼c. per lb. We quote prices on page 1676.

High-Speed Steel.—The market is extremely quiet and prices are unchanged at 75c. to 80c. per lb. for 18 per cent tungsten high-speed steel, with special brands of some companies ranging up to 90c. per lb.

Old Material.—Prices are stronger, partly in anticipation of a heavier demand after the first of the year and partly because of what is evidently the effort of one factor in this district to bring out tonnages for shipment to Bethlehem. With $20 per ton being paid for shipment of heavy melting steel equivalent in quality to railroad, shipments to Bethlehem of railroad steel at $16 per ton have not been numerous. An increase to $16.50 per ton has been made for steel to this point and shipments are going forward to the Jones & Laughlin Steel Co. at $20 per ton, while $19.50 per ton has been paid by brokers both for this point and for a Donora mill. The Alan Wood Iron & Steel Co. is temporarily out of the market. Specification pipe is now quoted at $14.75 for shipment to a Lebanon mill, an advance over the previous quotation of 75c. per ton. Stove plate is still quotable at $12.25 to $13.25, but sellers are inclined to hold on for higher prices. Stove plate is being shipped to Harrisburg at $16 with $16.50 being paid for Pencoyd shipment. A recent transaction in steel car axles with a mill in this district justifies a quotation New York of $17 to $18 per ton. Heavy melting steel may be quoted at $12 to $13 per ton and railroad quality or equivalent is quotable at $14 to $14.50.

Buying prices per gross ton, New York, follow:

Heavy melting steel yard	$12.00 to $13.00
Steel rails, short lengths, or equivalent	14.00 to 14.50
Rails for rolling	16.00 to 16.50
Relaying rails, nominal	21.00 to 22.00
Steel car axles	17.00 to 18.00
Iron car axles	25.00 to 26.00
No. 1 railroad wrought	14.50 to 15.00
Wrought iron track	14.00 to 14.50
Forge fire	11.00 to 11.50
No. 1 yard wrought, long	13.00 to 13.50
Cast borings (clean)	12.00 to 12.50
Machine-shop turnings	12.00 to 12.50
Mixed borings and turnings	11.00 to 11.50
Iron and steel pipe (1 in. diam., not under 2 ft. long)	10.50 to 11.00
Stove plate	12.25 to 13.25
Locomotive grate bars	13.00 to 13.50
Malleable cast (railroad)	13.50 to 14.00
Cast-iron car wheels	16.50 to 17.50

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast	$19.00 to $20.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	17.00 to 17.50
No. 1 heavy cast, not cupola size	15.00 to 15.50
No. 2 cast (radiators, cast boilers, etc.)	13.50 to 14.00

Birmingham

Buying Movement of Past Few Weeks Estimated at 250,000 Tons

BIRMINGHAM, ALA., Dec. 19.—It is estimated that since the buying movement began with one furnace breaking away from the high point on a $25 base, which was quickly reduced to $23 and then as low as $21 by this interest, 250,000 tons of Birmingham iron has been booked. The larger portion has been taken recently, the leading pipe interest being credited with buying at least 75,000 tons. Last week's sales seem to have run from $22 to $23 and the week closed with no interest apparently selling under $23. Inclination to go under $23 is less strong because the larger consumers have been cared for and it is customary to sell at $1 over price which these large deals are based on following their booking. All makers did a good business last week. An especially desirable tonnage might bring out less than $23, as has been the case heretofore. The Tennessee company blew in a third stack on foundry at Bessemer last Friday and a fourth is scheduled to blow in before Jan. 1. This also, it is believed, will be on foundry, although the company has barely gotten sufficient basic for requirements under present operation of seven stacks on that production. Soil pipe makers have bought some iron, but have not begun to fill for first quarter requirements. Christmas holidays at most plants will be short.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon 1.75 to 2.25	$23.00
Basic	23.00
Charcoal, warm blast	32.00

Finishing Mills.—Finishing mills will run up to the holidays on full turn and take three days holiday, resuming Tuesday, Dec. 26. Exports from Mobile last week included 1150 tons of steel rails for Puerta Tarafa, Cuba. One thousand tons of nails went to San Francisco, Seattle and Portland. The steamer Memphis City is at Mobile for a fourth cargo of 6000 tons of Birmingham steel products for the Orient. All independent steel mills are on full turn and new business comes in steadily. The South is taking large quantities of galvanized sheets from Youngstown.

Cast Iron Pipe.—The United States Cast Iron Pipe & Foundry Co. booked 15 miles of 6, 8, 10 and 12-in. De Lavaud process pressure pipe for a natural gas main for Alexandria, La., after spirited bidding by ordinary pressure pipe and steam pipe. This is the first De Lavaud contract secured on public letting, although numerous smaller lots have been sold and it may be construed as the formal entrance of this pipe into the market. The company has four machines making this pipe at its North Birmingham plant and the National Cast Iron Pipe Co. is about to install the machines in a new factory under sublease from the leading interest. Pressure pipe base is $42 and soil pipe base is $50. The latter is listless and shops will take a two weeks' holiday. The Pacific Coast took 1000 tons of soil and pressure pipe by vessel out of Mobile last week.

Coal and Coke.—Coal production by furnace interests is breaking records. Steam coal is fairly active at $3 base. Coke ranges from $7 to $8.50.

Old Material.—The scrap market is still quiet, but shows signs of coming to life as pig iron is settling to a firm base. Yards are fairly well stocked.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Steel rails	$16.00 to $17.00
No. 1 steel	14.00 to 16.00
No. 1 cast	18.00 to 20.00
Car wheels	18.00 to 20.00
Tramcar wheels	17.00 to 19.00
Stove plate	16.00 to 17.00
Cast-iron borings	9.00 to 10.00
Machine shop turnings	9.00 to 10.00

Boston

Pig Iron Much Less Active, But Prices Appear Firmer

BOSTON, Dec. 19.—Very much less pig iron was sold in New England the past week than heretofore, inasmuch as most large melters are covered for first quarter, and smaller foundries will wait until after Jan. 1 before buying. Business put through, however, confirms last week's reported improvement in prices. One active Buffalo furnace, reported to have advanced from $25 furnace for No. 2 plain and No. 2X to $26, after closing a limited tonnage on the latter basis, has increased its price to $27 for these two grades and has booked orders at the new prices. Other active Buffalo interests, having advanced from $25 furnace No. 2 plain, No. 2X and No. 1X to $26, have closed on a moderate tonnage at the new price. The lowest price at which western Pennsylvania No. 2X sold in this territory the past week was $26, and the lowest for the same grade of eastern Pennsylvania, $27.50. Hardly enough Alabama and Virginia iron sold to constitute a market, yet the recovery in prices noted a week ago is maintained. On Buffalo irons, as will be noticed, there is still a tendency to disregard differentials between No. 2 plain and No. 2X, but on higher silicons $1 differentials are the rule. Foreign irons are quiet, the more important interests still holding offerings rather than make concessions. In at least one case, however, a limited tonnage of Scotch corresponding to our No. 2X, was taken by a large holder at $28.75 f.o.b. dock Boston, duty paid. New inquiries in the market concern small tonnages of special analysis iron.

We quote delivered prices on the basis of the latest reported sales, now infrequent, and as follows, having added to furnace prices $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia and $9.60 from Alabama:

Eastern Penn., sil. 2.25 to 2.75	$31.15 to $32.15
Eastern Penn., sil. 1.75 to 2.25	30.65 to 31.65
Buffalo, sil. 2.25 to 2.75	30.91 to 31.91
Buffalo, sil. 1.75 to 2.25	30.91 to 31.91
Virginia, sil. 2.25 to 2.75	33.42 to 34.42
Virginia, sil. 1.75 to 2.25	32.92 to 33.92
Alabama, sil. 2.25 to 2.75	33.10
Alabama, sil. 1.75 to 2.25	32.60

Iron Imports.—During the week ending Dec. 16, approximately 1627 tons of Scotch iron were received at the port of Boston, bringing the aggregate importations for the first half of December up to 2187 tons. During the week ending Dec. 9, there were 560 tons of Belgian iron landed here.

Warehouse Business.—Warehouse stocks of iron and steel are in fairly good shape and prices hold steady, not having changed for several weeks. Demand is good for this time of the year, but consumer's individual orders in most cases are small. Activity in bolts and nuts is increasing rather than decreasing. Washers also are more active with an inquiry for 3200 pounds by the Boston & Albany Railroad being the average received by large consumers the past week. The market on anvils is 1c. higher at 18c. per lb. Rasps are up 10 per cent. Wire nail mills are reported 16 weeks behind on deliveries. Screws of all kinds are in demand and difficult to obtain from makers.

[illegible] quote Soft steel bars \$3.065 per 100 lb. base; flats, \$3.85; concrete bars, 3.16½c.; structural steel, \$3.065 to \$3.50; tire steel, \$4.50 to \$4.85; open-hearth spring steel, \$5 to \$6.50; crucible spring steel, \$12; steel bands, \$4.25; hoop steel, \$4.75; cold rolled steel, \$4 to \$4.50; refined iron, \$3.065; best refined iron, \$4.50; Wayne iron, \$5.50; Norway iron, \$6.60 to \$7.10; plates, 3.16½c. to \$3.35; No. 10 blue annealed sheets, \$4.15 per 100 lb. base; No. 28 black sheets, \$5.40; No. 28 galvanized sheets, \$6.40.

Coke.—Both New England producers of foundry coke still quote on a basis of \$16 delivered within the \$3.10 freight rate zone, and both are backward in deliveries on contract shipping specifications. Connellsville cokes, for domestic use, are active in this territory. Boston interests have bought several hundred cars of 48-hr. fuel, which, in turn, has been sold to the retail trade to replace anthracite. In addition, importations for domestic purposes will resume, one cargo already having left England for Boston, with others to follow. The influx of outside cokes is expected to relieve the load on New England producers and help the foundry coke supply situation. The Providence Gas Co. has discontinued taking orders for domestic coke because of its oversold condition. One New England producer is shipping a considerable tonnage of coke to Canada on old contracts.

Old Material.—Part of 10,000 tons heavy melting steel recently purchased by the United States Steel Corporation at \$20.75 delivered Donora, was covered in New England the past week at \$14 to \$14.50 on cars. Other purchases also were made on the same basis, but the lack of material available curtailed business. The lifting of embargoes Dec. 15, 16, 17 and 18 for shipment on West Virginia resulted in some business in mixed borings and turnings at \$11 to \$11.25 on cars, shipping point, while a limited tonnage of chemical cast iron borings changed hands at \$16.60 to \$17 on cars. Single car lots of cotton ties at \$9 shipping point, against old contracts, and of shafting at \$19 shipping point, for Portland, Me., consumption, are included in the past week's business. Horseshoes are in demand at \$16.50 shipping point or about \$20.15 delivered, but difficult to obtain.

[illegible] livered consuming points:

No. 2 machinery cast	18.00 to 20.00
Stove plate	16.50 to 17.00
Railroad malleable	20.50 to 21.00
[illegible]	[illegible]
Car wheels	20.00 to 20.50
[illegible]	[illegible]
[illegible]	[illegible]
No. 1 heavy melting steel	\$14.00 to \$14.50
No. 1 railroad wrought	13.00 to 13.50
No. 1 yard wrought	11.00 to 11.50
[illegible]	[illegible]
2 ft. long)	9.50 to 10.00
Machine shop turnings	10.00 to 10.50
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
Rails for rolling	15.00 to 15.50

Cincinnati

Fair Buying of Pig Iron Followed by Dullness —Prices Firmer

CINCINNATI, OHIO, Dec. 19.—Buying of pig iron was fairly heavy during the early part of the week, but toward the close dropped off to small proportions, due probably to a further strengthening of prices, particularly in the South, where \$23 to-day appears to be the minimum. Some fair sized sales of both Northern and Southern were made. A Kentucky sanitary manufacturer is reported to have bought 9000 tons of Southern iron, 4000 each from two furnaces, and 1000 from a third. Eight thousands tons of this tonnage went at \$22.50 base and 1000 tons at \$23. A central Ohio melter bought 1000 tons of Valley iron at \$26.50 and a southern Ohio melter 1000 tons of southern Ohio foundry at \$27. An Indiana malleable shop is reported to have closed on 2000 tons, and a northern Indiana manufacturer on 3500 tons of foundry. Scattered sales ranging from carload lots to 500 tons brought the total sales up to a fair aggregate. There are a number of first quarter inquiries before the trade, but it is noticeable that when melters are closing they usually buy about one-half of the tonnage inquired for. A Michigan stove manufacturer is inquiring for 2000 tons, a central Ohio melter 1200 tons of malleable, and an eastern Ohio melter 1000 tons of foundry. These are the largest outstanding but a number ranging from 100 to 500 tons are being worked on. The Interstate Commerce Commission has denied the application of Southern railroads to put into effect the new rates on pig iron from Birmingham district to Ohio River crossings.

Based on freight rates of \$4.05 from Birmingham and \$2.27 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	\$27.05
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	27.55
Ohio silvery (nominal), 8 per cent	37.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	29.27
Basic Northern	28.27
Malleable	29.27

Finished Material.—Although buying has slowed up materially, there is still a fair number of orders being placed for early shipment, and some contracting is also going on for first quarter. We note one inquiry for 2000 tons of plates, and another for 500 tons for January shipment. Jobbers are placing some fair-sized orders for bars, shapes and plates for first quarter delivery. On sheets there is only fair activity and while reports are heard of price shading, most of the business actually being placed is at 2.50c. for blue annealed, 3.35c. for black, and 4.35c. for galvanized. On bars, shapes and plates, 2c. is considered as the going market, although on attractive tonnages 1.90c. has been done. The wire market is showing considerably more life, but mills are more concerned now with making deliveries on present contracts than adding to their order books. In the structural field, there have been few new projects of any size brought out, although one or two are scheduled for bids early in January. Reinforcing bars are also quieter, but there are a number of inquiries before the trade for 100 tons and less. The Kentucky State Highway Department is inquiring for 300 tons for first quarter delivery.

Warehouse Business.—Jobbers report a considerable let-up in orders during the past few days, largely accounted for by the holiday season and approach of the inventory period. There have been some good inquiries, however, for reinforcing bars and small shapes, and wire products are also moving better, largely for January shipment. Prices are unchanged.

Cincinnati jobbers quote: Iron and steel bars, 2.95c. base; reinforcing bars, 3.05c. base; hoops, 4.05c. base; bands, 3.85c. base; shapes and plates, 3.05c. base; cold-rolled rounds, 3.75c. base; cold-rolled flats, squares and hexagons, 4.25c. base; No. 10 blue annealed sheets, 4c.; No. 28 black sheets, 4.70c.; No. 28 galvanized sheets, 5.75c.; No. 9 annealed wire, \$3.10 per 100 lb.; common wire nails, \$3.20 per keg, base.

Tool Steel.—The number of orders placed for immediate shipment during the week brought the aggregate tonnage up to fairly heavy figures. Some manufacturing plants are increasing their operations steadily, and while little new business is being placed with machine

tool manufacturers, orders now on hand are sufficient to permit of present operations being maintained well into the new year. Tool steel prices are holding firmly, with 18 per cent high speed steel quoted at 75c. to 90c., with special brands of some companies quoted at $1 per lb.

Coke.—There was a fair amount of activity in the coke market, mostly for first quarter and first half contracts. With the exception of domestic coke, spot business is very light. Prices have strengthened considerably in some fields, and receded in others. Connellsville furnace is quoted at $7.25 and foundry at $8; New River foundry at $11 to $12; Wise County furnace $6.50 and foundry at $8; by-product foundry $11, Connellsville basis. We note one sale of 2000 tons and one of 10,000 for first half.

Old Material.—There is little activity in the local scrap market, though dealers are buying small tonnages to apply against contracts. Prices are unchanged.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

Per Gross Ton	
Bundled sheets	$13.00 to $13.50
Iron rails	16.00 to 17.00
Relaying rails, 50 lb. and up	25.50 to 26.00
Rails for rolling	17.00 to 17.50
Heavy melting steel	16.00 to 17.00
Steel rails for melting	15.00 to 16.00
Car wheels	19.00 to 19.50
Per Net Ton	
No. 1 railroad wrought	14.00 to 14.50
Cast borings	11.00 to 11.50
Steel turnings	10.50 to 11.00
Railroad cast	16.50 to 17.50
No. 1 machinery	20.50 to 21.00
Burnt scrap	11.00 to 11.50
Iron axles	20.00 to 20.50
Locomotive tires (smooth inside)	13.50 to 14.50
Pipes and flues	10.00 to 10.50

St. Louis

Demand for Pig Iron Not So Active, But Prices Are Firm

ST. LOUIS, Dec. 19.—The demand for pig iron was not so active the last week as the two previous weeks, although the market for Northern iron is firm at $28 Chicago, and $23 Birmingham for Southern iron. Melters who have not already made purchases for first quarter are determined to wait now until after the first of the year, and no one wants to take iron in now before the taking of inventory. While sales have been heavy in this district, most of the iron has gone to melters in the northern part of the district, and St. Louis and East Side melters have not begun to look to their requirements for first quarter. Their melt has been heavy, and it is expected that they will begin to buy shortly after the first of the year. The St. Louis Coke & Chemical Co. sales amounted to between 8000 and 10,000 tons of foundry and malleable, with inquiries for 4000 to 5000 tons pending.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago, $3.28 from Birmingham (rail and water), $5.17 from Birmingham, all rail, and 81 cents average switching charge from Granite City:

Northern foundry, sil. 1.75 to 2.25	$30.16
Northern malleable, sil. 1.75 to 2.25	30.16
Basic	30.16
Southern foundry, 1.75 to 2.25	28.17

Finished Iron and Steel.—The usual holiday lull prevails in the market for finished iron and steel. No railroad inquiries are being issued, and jobbers are not interested in taking on any more material, because of a desire to reduce rather than increase stocks just prior to the taking of inventories. The only new inquiry is for five or six cars of bars and two or three cars of sheets from the United Railways Co. The inquiry of the Missouri Pacific for 3000 kegs of track spikes, reported last week, is still pending. An Oklahoma tank builder bought 300 tons of tank plates.

For stock out of warehouse we quote: Soft steel bars, 2.90c. per lb.; iron bars, 2.90c.; structural shapes, 3c.; tank plates, 3c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, cold rolled, one pass, 4.85c.; cold drawn rounds, shafting and screw stock, 3.90c.; structural rivets, 3.85c. per 100 lb.; boiler rivets, 3.95c.; tank rivets, ⅞ in. and smaller, 55 per cent off list; machine bolts, large, 50 per cent; smaller, 50 per cent; carriage bolts, large, 45 per cent; small, 45 per cent; lag screws, 55 per cent; hot pressed nuts, square or hexagon blank, $2.75; and tapped, $2.75 off list.

Coke.—The demand for coke, both metallurgical and domestic, on the Granite City by-product ovens, is such that they have withdrawn from the market on all grades, rejecting last week about 75 carloads. More Eastern coke is being offered in this market.

Old Material.—The market on old material is stagnant. Consumers will not take on any more material until after the year-end inventory period, and dealers are not urging that they buy. It is expected that shortly after the first of the year there will be some buying. The lists of the Mobile & Ohio and Pennsylvania closing last week were taken care of, the former material being sold here, and the latter moved East.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Iron rails	$20.00 to $20.50
Rails for rolling	16.50 to 17.00
Steel rails, less than 3 ft.	19.50 to 20.00
Relaying rails, standard section	26.00 to 29.00
Cast iron car wheels	23.00 to 23.50
Heavy melting steel	16.00 to 16.50
Heavy shoveling steel	15.00 to 15.50
Frogs, switches and guards cut apart	15.50 to 16.00
Per Net Ton	
Heavy axles and tire turnings	11.50 to 12.00
Steel angle bars	16.50 to 17.00
Iron car axles	25.00 to 25.50
Steel car axles	19.00 to 19.50
Wrought iron bars and transoms	21.50 to 22.00
No. 1 railroad wrought	15.50 to 16.00
No. 2 railroad wrought	15.00 to 15.50
Railroad springs	20.00 to 20.50
Steel couplers and knuckles	20.00 to 20.50
Cast iron borings	10.50 to 11.00
No. 1 busheling	13.00 to 13.50
No. 1 railroad cast	19.00 to 19.50
No. 1 machinery cast	20.00 to 20.50
Railroad malleable	18.00 to 18.50
Machine shop turnings	9.50 to 10.00

Buffalo

Limited Selling of Pig Iron at Higher Prices Follows Recent Movement

BUFFALO, Dec. 18.—Quietness prevails after the heavy buying movement earlier in the month and the fact that two of the principal factors in that movement have very satisfactory backlogs enables them to turn down business offered at less than $26, one furnace even announcing a new low figure of $27 for silicon 1.75 to 2.25. An aggregate of 5000 tons was refused by one producer because the purchaser would not bid higher than $25.50. The $1 differential is nearer reality than in many weeks. A few sales of No. 2 plain foundry iron at $26 have been made and malleable at $27, but the whole trend of foundry iron selling is slow. Basic is quoted at $25 and $25.25 and small sales have been made at that figure. The Wickwire Steel Co. will blow in a furnace later in the month and will have foundry iron to market early in January.

We quote f.o.b. per gross ton Buffalo as follows, the higher price being for early shipment:

No. 1 foundry, 2.75 to 3.25 sil.	$27.00
No. 2X foundry, 2.25 to 2.75 sil.	26.50
No. 2 plain, 1.75 to 2.25 sil.	26.00
Basic	25.25
Malleable	28.00
Lake Superior charcoal	$33.28 to 36.28

Finished Iron and Steel.—Several selling agencies compare the brisk buying movement in certain steel products to the high peak of 1920. The strongest demand is for bars, but shape and plate business is strong. The demand for wire, both plain and specialties, is exceptional and the leading wire maker is even buying steel outside to meet production schedules. Demand for pipe, both butt and lap welds, is brisk and deliveries are behind. The price of 2c. on bars, shapes and plates is firm notwithstanding repeated rumors of cutting; in no instance have sellers been able to verify reported prices of 1.90c. and 1.95c. on bars. Jobbers have been active in placing business for January delivery; stocks are depleted. Sheet demand is brisk and prices firm at 3.35c. and 4.35c.

We quote warehouse prices, Buffalo, as follows: Structural shapes, 3.20c.; plates, 3.20c.; soft steel bars, 3.10c.; hoops, 4.10c.; bands, 3.90c.; blue annealed sheets, No. 10 gage, 4.05c.; galvanized steel sheets, No. 28 gage, 5.85c.; black sheets, No. 28, 4.85c.; cold rolled round shafting, 3.95c.

Old Material.—Transactions between dealers in heavy melting steel continue, but consumers are generally disinterested and will be the rest of this month. Prospective buying is good and consumers believe higher prices may come soon after the holidays. Stocks already well depleted will be further reduced before the end of the year and normal purchass to replace stocks will develop a fairly lively business. Mills continue to refuse to pay the price dealers ask for heavy melting steel.

[illegible] gross ton

[illegible]	$19.00 to $19.50
[illegible]	21.00 to 22.00
No. 1 railroad wrought	18.00 to 19.00
Car wheels	21.00 to 22.00
[illegible]	14.50 to 15.50
Cast iron borings	16.00 to 16.50
Heavy axle turnings	17.50 to 18.50
[illegible]	16.00 to 17.00
[illegible]	16.50 to 17.50
Stove plate	17.00 to 18.00
Bundled sheet stampings	14.00 to 15.00
No. 1 machinery cast	20.00 to 21.00
Hydraulic compressed	17.00 to 17.50
Railroad malleable	20.50 to 21.50

Cleveland

Sales of Pig Iron Aggregate Over 100,000 Tons, with Prices Showing Upward Tendency

CLEVELAND, Dec. 19.—The pig iron market was active during the week in the Cleveland territory, where the buying movement did not get under way as quickly as in some other sections. Cleveland producing interests sold during the week about 105,000 tons of pig iron mostly in foundry grades, about one-half of which is for shipment from furnaces located in Cleveland. Sales were largely by producers who did not participate in much of the business placed during the previous two weeks and who were slower than some other furnaces in pushing their prices upward. However, these have advanced their quotations, so that the local market is 50c. a ton higher than a week ago. Local furnaces are now quoting foundry iron at $26.50 to $27 at furnace for local delivery. For outside shipment, $26 is the ruling quotation and that now appears to be the minimum price in the Mahoning Valley. The prices quoted by Detroit furnaces and other lake furnaces are unchanged at a minimum of $27, but small lot sales are reported at $27.50 and higher. The local Cleveland price has enabled Cleveland furnaces to book business for Western shipment outside of their territories. The Link-Belt Co., Indianapolis, has placed 3600 tons of malleable iron with a Cleveland producer at $26. The same producer also took 3500 tons from an Indiana automobile company. Sales during the week were practically all for the first quarter, although they included some prompt shipment business. Very little iron has been sold for delivery for the first half. Most Cleveland foundries are now covered for the first quarter with iron purchased at $26, furnace. Local purchases include 2000 tons taken for the first quarter by the Westinghouse Electric & Mfg. Co., which lately has been buying from month to month. The General Electric Co. purchased 1800 tons of foundry iron from a lake furnace for its Erie works. Some inquiries are pending from consumers who would like to place orders at the minimum prices that prevailed recently, but the buying movement has commenced to subside. However, some of the producers have comfortably filled order books and are not seeking additional business. Buying in the Michigan territory during the week was mostly by smaller companies that followed the lead of the larger buyers who had previously covered. Two 2000-ton inquiries are pending, one from Indiana and one from Michigan.

[illegible] and low phosphorus iron, are delivered Cleveland, and for local iron includes a 50c. switching charge. Ohio ellvery and Southern iron prices are based on a $3.02 freight rate from Jackson and a $6 rate from Birmingham

[illegible]	$25.00 to [illegible]
[illegible]	[illegible] to [illegible]
Southern fdy., sil. 1.75 to 2.25	29.00
[illegible]	[illegible]
[illegible]	[illegible]
Standard low phos., Valley furnace	36.00

The Standard Sanitary Mfg. Co. has purchased 5000 tons of Southern foundry iron for its Louisville plant for the first quarter from one interest at $23, and it is understood to have placed 4000 tons with another producer. The market is firm at $23.

Iron Ore.—Consumers are showing more disposition to take ore from docks than they usually do at this season of the year and the movement has been good up to a few days ago when the cold weather temporarily checked shipments.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $5.95; Old range non-Bessemer, 51½ per cent iron, $5.20; Mesabi Bessemer, 55 per cent iron, $5.70; Mesabi non-Bessemer, 51½ per cent iron, $5.05.

Semi-Finished Steel.—The local market is inactive after a buying spurt that followed the naming of $36.50 price on sheet bars, slabs and billets.

Finished Material.—The volume of buying has fallen off somewhat, but most consumers have placed orders which with those that will be carried over by mills are expected to carry them well through the first quarter. Sales of steel bars to bolt and nut manufacturers, automotive and other industries have been fairly heavy. Some of the plate mills that recently needed orders are now comfortably filled. Railroads are sending in specifications for track accessories, asking for early shipment, so that they will have the material on the ground when work starts in the spring. Some of the independent mills have orders for all the wire and wire products that they can manufacture during the first quarter and are not taking additional business. The volume of building work is good for this season of the year. Plain structural material is not active, as fabricators are not placing stock orders, buying only for requirements. Shipments from the Pittsburgh district mills have improved materially with the removal of restrictions on the use of open top cars. The stiffening of the market noted last week is more in evidence. Steel bars now seem firmly established at 2c. in this market, although there are a few outstanding 1.95c. quotations. One mill has advanced small angles to 2.25c. Plates are also firmer. On these 2c. is now the common quotation, although 1.95c. can probably still be done on tank plates. However, on boiler plates and other specifications material, the market is firm at 2c.

Jobbers quote steel bars, 2.91c.; plates and structural shapes, 3.01c.; No. 9 galvanized wire, 3.30c.; No. 9 annealed wire, 2.80c.; No. 28 black sheets, 4.35c. to 4.40c.; No. 28 galvanized sheets, 5c. to 5.40c.; No. 10 blue annealed sheets, 3.70c. to 3.76c.; hoops and bands, 3.71c.; cold-rolled rounds, 3.75c.; flats, squares and hexagons, 4.25c.

Strip Steel.—Makers have booked a good volume of business in both hot and cold-rolled strip steel from the automotive industry, either in first quarter contracts or for early shipment next year. Hot-rolled strip is generally quoted at 2.90c., Pittsburgh, but attractive orders are bringing out a 2.75c. price. Cold-rolled strip is firm at 4.50c.

Bolts, Nuts and Rivets.—Bolt and nut makers are getting some contracts at present prices for the first quarter delivery, and there are no reports that these prices are being shaded. Rivet manufacturers are also taking a good volume of contracts for the first quarter at 3c. for structural and 3.10c. for boiler rivets. Current orders and specifications for bolts, nuts and rivets are rather light.

Sheets.—Automobile companies have bought heavily and some of the independent mills have well filled order books for the first quarter, but others are in need of orders, particularly for black sheets. Galvanized sheets lack firmness, quotations of 4.25c. or $2 a ton concession having appeared on warehouse stocks. Black sheets are firmer and now appear to be holding well at 3.35c. One producer has made a $5 a ton advance on long terne sheets to 4.90c.

Reinforcing Bars.—Bids will be taken this month for two highway jobs in Ohio and one in Kentucky requiring 1500 tons of reinforcing bars and on Jan. 3 bids will be taken for three State hospital units for Grafton, Ohio, requiring several hundred tons. The Concrete Steel Co. has taken 100 tons for New York Central Railroad work. Hard steel reinforcing bars are quoted at 1.90c. to 2c., the lower price being for large sections.

Warehouse Business.—Weakness has developed in warehouse prices on sheets, which can be bought at a $3 a ton concession from regular prices.

Coke.—One Connellsville district producer has taken renewal contracts on foundry coke for the first half at $7.50. For prompt shipment, standard Connellsville foundry coke is quoted at $8 to $8.50.

Old Material.—The market has become somewhat more active and firmer. Prices on heavy melting steel, cast borings and a few other grades have advanced 50c. a ton. The leading local consumer has released a round lot of heavy melting steel on old contract which has led to an unfounded report that this company was buying scrap, but it expects to be in the market after the first of the year. A local dealer is offering $19 for heavy melting steel to fill this old contract. Machine shop turnings and cast borings are in good demand and the supply of the latter is rather scarce. One sale of 350 tons of turnings is reported to a local consumer at $15.50 delivered.

We quote per gross ton, f.o.b. Cleveland, as follows:

Heavy melting steel	$18.50 to $19.00
Steel rails under 3 ft.	20.00 to 20.50
Steel rails for rolling	20.50 to 21.00
Iron rails	18.00 to 18.50
Iron car axles	25.00 to 26.00
Low phosphorus melting	20.50 to 21.00
Cast borings	16.00 to 16.50
Machine shop turnings	14.75 to 15.25
Mixed borings and short turnings	15.75 to 16.00
Compressed steel	16.50 to 16.75
Railroad wrought	17.00 to 17.50
Railroad malleable	20.00 to 20.50
Light bundled sheet stampings	13.00 to 13.50
Steel axle turnings	16.00 to 16.50
No. 1 cast	20.50 to 21.00
No. 1 busheling	12.50 to 13.50
Drop forge flashings over 10 in.	12.75 to 13.25
Drop forge flashings under 10 in.	12.50 to 13.50
Railroad grate bars	17.00 to 17.50
Stove plate	17.00 to 17.50
Pipes and flues	13.00 to 13.75

Philadelphia

Blast Furnaces Quoting Higher Prices on Pig Iron—Steel Still Weak

PHILADELPHIA, Dec. 19.—New factors have entered into the pig iron and steel situation within the past week, among which higher coke prices and a more acute shortage of freight cars, particularly at Johnstown, are of most importance. The shortage of coal in many of the cities of the country has caused a sudden increase in the demand for coke and ovens which ordinarily have not supplied domestic trade are now shipping a large part of their output for that purpose, with the result that prices have jumped within a few days to $8 to $8.25, Connellsville, for blast furnace coke and to about $8.50, Connellsville, for foundry grade. These prices are for spot shipments; on contracts the price on furnace coke is somewhere above $7, but the situation is changing from day to day due to the demands for domestic fuel.

Of no less moment is the car situation. At the Johnstown plant of the Midvale Steel & Ordnance Co. to-day, there was a shortage of 135 cars; that is, the railroads could not supply a sufficient number to carry away shipments which were ready. It is almost impossible to obtain gondola cars because of their constant use for coal and coke shipments. Consumers are pressing for deliveries, few having carried sufficient stock to meet an emergency.

The December volume of steel business, while showing a falling off from that of November, is very much better than is usually the case in the final month of the year, and mills will enter upon the new year with a substantial amount of business on their books in some lines. Plates are the outstanding exception.

Pig Iron.—On some of the most attractive tonnages of foundry iron sold within the past week or ten days, prices dipped as low as $26, Eastern Pennsylvania furnace, on No. 2 plain and to $27 on No. 2X, but the market has undoubtedly stiffened this week due to several influences, these being the higher prices quoted in the Buffalo market, where $26 and $27 are now the ruling quotations; the upturn in the prices of coke, and the substantial volume of business which recently has been booked by which furnaces have been placed in a somewhat more independent position. It is stated that it is now impossible to obtain quotations lower than $27, furnace, on No. 2 plain and $28, furnace, on No. 2X, while at least two furnaces name $28 as their minimum on No. 2 plain. The advance in the coke price of fully $1 a ton is expected to be followed by further advances if the very large demand for coke for domestic use continues. Colder weather and the shortage of coal has brought this demand for coke from many cities. While demand for foreign foundry iron has fallen off in the past two weeks, there is a call for other grades, principally low phosphorus, one importer having sold about 1200 tons within a week at $28, duty paid, Philadelphia. Of this 300 tons went to the Pittsburgh district. A nearby steel foundry is the market for 1000 tons of low phosphorus. To meet foreign competition, makers of copper bearing low phosphorus iron are willing to make concessions, and it is possible to buy the domestic grade at $30, furnace. Receipts of foreign iron last week were small, totaling only 1976 tons, all from England. Two or three large cargoes are due this week. Foreign foundry iron of standard grade is to be had at about $25, Philadelphia. In basic iron the only transaction of importance reported is the sale of several thousand tons to a Bridgeport, Conn., consumer at about $26, furnace. A recent order for gray forge totaled 3000 tons, being divided equally among three furnaces. The prices said to have been quoted were $27 and $28, furnace.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to $1.64 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$27.76 to $28.14
East. Pa. No. 2X, 2.25 to 2.75 sil.	28.76 to 29.14
East. Pa. No. 1X	29.76 to 30.14
Virginia No. 2 plain, 1.75 to 2.25 sil.	33.17 to 34.17
Virginia No. 2X, 2.25 to 2.75 sil.	34.17 to 35.17
Basic delivered eastern Pa.	27.50 to 28.00
Gray forge	28.14 to 28.64
Malleable	29.64 to 30.60
Standard low phos. (f.o.b. furnace)	35.00
Copper bearing low phos. (f.o.b. furnace)	30.00 to 35.00

Ferroalloys.—There is a steady demand for domestic ferromanganese, the situation having improved to such an extent that the Lavino Furnace Co. contemplates putting its Marietta furnace in blast about Jan. 1. On acccount of the higher exchange rates, there is talk of British ferromanganese being advanced. Prices now quoted are $100, seaboard, duty paid, for the imported and $100, furnace, for domestic. Spiegeleisen prices are lower and large tonnages can be bought at $33 and $34, furnace, with small lots being quoted at $35 and $36.

Semi-Finished Steel.—Few inquiries for billets are being received by the mills. Quotations range from $38 to $40, Pittsburgh, for re-rolling grade and from $42.50 to $45, Pittsburgh, for forging quality.

Plates.—Whereas a few weeks ago plates were regarded as weak at 2c., Pittsburgh, sellers now say that they are firm at 1.90c., Pittsburgh. Only large lots are obtainable at the latter price, most mills quoting 2c. on the smaller and less desirable tonnages. An Eastern railroad has bought 600 tons from an Eastern mill on its line at 2c., mill, but it is stated with a good deal of positiveness that this sale would not be duplicated. Locomotive buying continues active. The Chicago, Burlington & Quincy has ordered 65 engines from Baldwin Locomotive Works, and inquiries are out from the Union Pacific for 78, and from the Chicago & North Western for 56. The Merchant Shipbuilding Corporation, Chester, Pa., is inquiring for 4750 tons of plates.

Structural Material.—A fair volume of business in structural shapes for this time of year is reported by the mills. Prices quoted are 1.95c. and 2c., Pittsburgh, the former price being given usually on only the more attractive business.

Bars.—Though the price of bars has shown more strength than that of plates and shapes, it is now

possible to buy either merchant bars or concrete reinforcing bars at 1.90c., Pittsburgh, in large lots. A Buffalo mill is reported to have been the principal factor in making this price. Some of the other mills whose order books are fairly well filled have declined business rather than go below 2c. Bar iron is firmer at 2c., Pittsburgh.

Sheets.—The situation in sheets continues unchanged. Most of the mills are booked quite solidly for first quarter. Going prices on sheets for prompt delivery or for first quarter are 2.50c. to 2.60c. for blue annealed, 3.35c. for black and 4.35c. for galvanized, all f.o.b. Pittsburgh.

Warehouse Business.—Prices are unchanged and for local delivery are as follows:

[illegible] bars and small shapes, 3c.; iron [illegible], 3c.; round edge iron, 3.20c., round edge steel, iron finish, 1½ x ½ in., 3.20c., round edge steel planished, 4c.; tank steel plates, ¼-in. and heavier, 3.10c.; tank steel plates, ⅜-in., 3.30c.; blue annealed steel sheets, No. 10 gage, 3.35c.; black sheets, No. 28 gage, 4.60c.; galvanized sheets, No. 28 gage, 5.75c.; square twisted and deformed steel bars, 3.15c.; structural shapes, 3.10c.; diamond pattern plates, ¼-in., 4.80c.; ⅜-in., 5c.; spring steel, 4.25c.; round cold-rolled steel, 3.85c.; squares and hexagons, cold-rolled steel, 4.35c.; steel hoops, No. 13 gage and lighter, 4.25c.; steel bands, No. 12 gage to ⅜-in., inclusive, 3.825c.; rails, 3c.; tool steel, 8.50c.; Norway iron, 6.50c.

Old Material.—Indications all point to the conclusion that scrap prices are on the eve of a move upward. There have been only faint stirrings in the market within the past few days, but these have been sufficient to show the underlying strength. It has been repeatedly stated in the past few weeks that prices were as low as could reasonably be expected for the present, and that the first signs of renewed interest in buying would be met with higher quotations. One of the indications of a stronger market was the announcement this week that a steel company had raised its price for No. 1 heavy melting steel to $17, delivered, because it was not getting a sufficient supply at the lower prices which had been offered. On top of this another steel company came into the market and paid $17 and then $18, delivered, for a tonnage, but the latter price was only for quick shipments which were urgently required. Another Eastern steel company today offered $16, delivered, without takers, and it is doubtful whether less than $16.50 can be done with prospects that the price will go higher during the week if pending business is negotiated. There is greater strength also in borings and turnings. One steel mill is offering $15 to $15.50 for turnings for open-hearth furnace use, while turnings for rolling mills probably could not be bought for less than $16. Heavy axle turnings have been sold at $16.50. Cast borings are at least 50c. a ton higher and we now quote $15.50 to $16, delivered.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$16.50 to $17.00
Scrap rails	16.50 to 17.00
Steel rails for rolling	19.50 to 20.00
No. 1 low phos., heavy 0.04 and under	22.00 to 23.00
Cast iron car wheels	20.00 to 21.00
No. 1 railroad wrought	19.00 to 20.00
[illegible]	[illegible]
No. 1 forge fire	15.00 to 15.50
Bundled sheets (for steel works)	14.50 to 15.00
No. 1 busheling	14.50 to 15.00
Turnings (short shoveling grade for blast furnace use)	14.50 to 15.00
Mixed borings and turnings (for blast furnace use)	14.50 to 15.00
Machine shop turnings (for steel works use)	15.00 to 15.50
Machine shop turnings (for rolling mill use)	15.50 to 16.00
Heavy axle turnings (or equivalent)	16.50 to 17.00
[illegible] and rolling mills)	15.50 to 16.00
Cast borings (for chemical plants)	20.00 to 22.00
No. 1 cast	20.00 to 21.00
Heavy breakable cast (for steel [illegible]	[illegible]
Railroad grate bars	16.50 to 17.00
Stove plate (for steel plant use)	16.50 to 17.00
[illegible]	[illegible]
Wrought iron and soft steel pipes and tubes (new specifications)	14.50
Shafting	21.00 to 22.00
Steel axles	[illegible]

RAILROAD EQUIPMENT BUYING

Over 6000 Cars and 60 Locomotives Bought and Fresh Inquiries for 3900 Cars and 134 Locomotives

The Union Pacific is inquiring for 78 locomotives.

The Union Pacific has placed orders for 5000 refrigerator cars for the Pacific Fruit Express as follows: 1000 each to Pullman Co., General American Car Co. and Pacific Car & Foundry Co., 1500 to Standard Steel Car Co. and 500 to Mt. Vernon Car Mfg. Co.

The Pacific Fruit Express is also in the market for 300 express refrigerator cars.

The Mexican Government is inquiring for 20 postal cars.

The Chicago, Milwaukee & St. Paul has placed an order for 800 Roger ballast cars with the American Car & Foundry Co.

The Minarets Western Railway & Lumber Co., Fresno, Cal., is inquiring for 200 flat cars of 40 tons capacity.

The Chicago & Northwestern is in the market for 18 Mikado type, 12 Pacific type locomotives and 20 6-wheel switch engines and 3000 box and 200 milk cars. It also contemplates issuing inquiries for 3000 additional cars.

The Illinois Central is reported to be contemplating the purchase of several Mountain type and Pacific type locomotives.

The Missouri Pacific is inquiring for 13 coaches and 4 combination coach and baggage cars.

The New York Central Railroad has placed orders for 185 passenger cars as follows: 30 multiple-unit passenger coaches, 20 coaches and 10 baggage cars with the Standard Steel Car Co.; 40 baggage cars and 20 coaches with the American Car & Foundry Co.; 20 combination passenger and baggage cars and 10 coaches with the Pressed Steel Car Co., and 35 coaches with the Pullman Co.

The Pittsburgh Steel Co. has ordered 25 steel gondolas from the Standard Steel Car Co.

The Atlanta & West Point Railroad is inquiring for 150 hopper cars.

The Long Island Railroad has placed an order for 92 passenger cars with the American Car & Foundry Co.

The Muscle Shoals, Birmingham & Pensacola Railroad has inquired for 200 gondolas.

The Atlantic Coast Line has an inquiry out for 500 sets of 40-ton trucks for cars to be repaired in its own shops.

The Philadelphia & Reading Railroad has inquired for 45 passenger coaches and five combination coaches.

The Rutland Railroad is inquiring for 25 center constructions for coal cars.

Chicago, Burlington & Quincy has placed 50 Mikado type and 10 Santa Fe type locomotives with the Baldwin Locomotive Works.

Youngstown Sheet & Tube Co. Will Probably Absorb Brier Hill Steel Co.

YOUNGSTOWN, Dec. 19.—It is probable that the Youngstown Sheet & Tube Co. will acquire the Brier Hill Steel Co., this city, one of the largest independent sheet makers in the country. This announcement was made Tuesday afternoon by President James A. Campbell, of the Sheet & Tube company, following a directors' meeting. He explained that details are still to be worked out and recommendations made by the boards of the two companies to their stockholders. Holders of Brier Hill common stock will be paid in the common stock of the Sheet & Tube company while the latter will assume the bonded and preferred obligations of the Brier Hill company.

Directors of the Sheet & Tube company increased the common dividend of the last quarter to $1 per share. Last quarter the company distributed 75c. per share. They also authorized the regular preferred dividend of $1.75. Both dividends are payable Jan. 1 to holders of record Dec. 20.

The Italian ambassador to Washington, Prince Gelasio Gaetani, now on his way to this country, was graduated from the School of Mines of Columbia University in 1903, and is to be entertained at a dinner in Washington on Jan. 12 by the American Engineering Council of the Federated American Engineering Societies. A dinner will be given to Prince Gaetani late in February in New York by the national engineering societies.

FABRICATED STEEL BUSINESS

Amount of Seasonal Decline in Structural Steel Sales in November

WASHINGTON, Dec. 16.—A considerable seasonal decline occurred in the sales of fabricated structural steel in November, according to reports received by the Department of Commerce through the Bureau of the Census. November sales amounted to 46.8 per cent of shop capacity as against 57.3 per cent reported for October.

These percentages are based on a uniform capacity rating recently reported to the Bureau of the Census by almost all the reporting fabricators. Through these new ratings, the total monthly capacity of the 143 identical firms reporting each month from April through November has been reduced from 223,685 tons to 211,510 tons. The following table shows the tonnage booked each month by these firms and the percentage of their revised capacity:

	Tonnage Booked	Per Cent of Capacity*
April	193,520	91.5
May	173,588	82.1
June	154,770	73.2
July	143,907	68.0
August	146,621	69.3
September	137,485	65.0
October	121,150	57.3
November	99,040	46.8

*Increased percentages over previous reports for past months due to revision of capacities.

On the basis of these revised capacity reports and of known or reliably estimated capacities of other concerns, the Department of Commerce places the present capacity of the fabricated structural steel shops at 250,000 tons per month.

A considerable increase in the capacity of the structural steel fabricating shops of the United States since 1913 is shown in a special survey made by the Department of Commerce. A preliminary report, based on data received from 143 firms with a total revised capacity rating of 208,440 tons per month, shows an increase since 1913 of 45,025 tons in monthly capacity, or about 27½ per cent.

The following table shows the total monthly capacity for each year as reported by the above firms, representing about 83 per cent of the present estimated capacity of the United States, and the increase over the preceding year and over 1913:

Capacity of 143 Steel Fabricating Concerns

	Total Monthly Capacity	Increase Over Previous Year	Increase Over 1913
1913	163,415	.....	.....
1914	164,265	850	850
1915	166,500	2,235	3,085
1916	170,900	4,400	7,485
1917	175,935	5,035	12,520
1918	185,060	9,125	21,645
1919	188,800	3,740	25,385
1920	194,675	5,875	31,260
1921	197,575	2,900	34,160
1922	208,440	10,865	45,025

The increase noted in the year 1922 was largely due to the entrance of shipbuilding concerns into the fabrication of structural steel. In this connection, the Department of Commerce points out that the capacity of structural steel shops is quite elastic in that, when not busy on structural steel, a shop is often used for tank work, railroad cars, shipbuilding, etc., and, similarly structural work may be turned out in tank shops, shipbuilding plants, etc. The capacity figures given in the report refer to that portion of the fabricating capacity that is usually used for structural work; it is capable of expansion or contraction.

The capacity as reported for this survey was defined as the amount of structural steel work that actually could be turned out running single turn on the character and class of structural work that the plant ordinarily secures. Structural work was considered for this purpose as all work using structural shapes.

About 11,000 Tons in Awards but 28,000 in New Projects

Westchester Lighting Co., office building, Yonkers, N. Y., 600 tons, to A. E. Norton, Inc.

Elks' Club, Union Hill, N. J., 400 tons, to Fagan Iron Works

Apartment building on East Ninety-fifth Street, New York, J .E. Carpenter, architect, 500 tons, to Hinkle Iron Works.

Y. M. C. A. building in Jersey City, N. J., 700 tons, to Fagan Iron Works.

Pennsylvania Railroad bridges, 500 tons, to Fort Pitt Bridge Works.

Baltimore & Ohio Railroad bridges, 500 to 700 tons, to American Bridge Co.

Yale University power plant, New Haven, Conn., 200 tons, to Levering & Garrigues Co.

Logan Theater, Philadelphia, 400 tons, to Belmont Iron Works.

State of Pennsylvania storage building, 150 tons, to Belmont Iron Works.

State of North Carolina highway bridges, 1200 tons, to Pensacola Shipbuilding Co.

Baltimore, Md., high school building, 400 tons, to Bethlehem Fabricators, Inc.

Chesapeake & Ohio Railroad bridges, 400 tons, to Phoenix Bridge Co.

Hollis, Long Island, telephone exchange, 150 tons, to Hay Foundry & Iron Works.

Missouri Pacific Railroad, through riveted truss spans, near Fort Gibson, 700 tons, to Virginia Bridge & Iron Co.

Fort Dodge, Des Moines & Southern Railroad, deck plate girder spans, 238 tons, to American Bridge Co.

Crossett Lumber Co., fuel house, Crossett, Ark., 153 tons, to American Bridge Co.

Gas holder at Leominster, Mass., 300 tons; gas holder at Hanover, Mass., 300 tons; gas holder at Benwood, W. Va., 100 tons, all to Stacey Mfg. Co., Cincinnati.

Guibert Steel Co., Pittsburgh, 200 tons, to Memphis Steel Construction Co.

High transmission towers for Power Construction Co., Worcester Mass., 1100 tons additional, making total 4300 tons, to American Bridge Co.

Miramar Apartment, Cleveland, 1200 tons, to Forest City Steel & Iron Co.

Bridge work, Boonville, Mo., 350 tons, to Mt. Vernon Bridge Co.

Jamestown Worsted Mills, Jamestown, N. Y., factory building, 200 tons, to the Norton Co.

Structural Projects Pending

Inquiries for structural steel work now being figured on include the following:

Loft building at Seventh Avenue and Thirty-seventh Street, New York, 3000 tons.

Mutual Trust Co. building, Philadelphia, 200 tons.

Transit Commission, New York, subway stations in Brooklyn, 1000 tons.

Transit Commission, New York, subway construction in Brooklyn, 4000 tons.

Transit Commission, New York, extension of subways to Flushing, 7250 tons, Phoenix Bridge Co. low bidder.

Apartment building on Park Avenue, Dwight P. Robinson & Co., general contractors, 1500 tons.

John R. Thompson Hotel, Chicago, 5000 tons, plans not yet out for figures.

Central Life Insurance Building, Chicago, 700 tons.

Addition to Lumber Exchange Building, Chicago, tonnage not yet estimated.

Two steel barges for Mississippi River Commission, Vicksburg, approximately 2000 tons, bids being taken.

Superior-Payne Realty Co., Cleveland, office building, 2000 tons.

Erie County bridge, Hamburg, N. Y., 200 tons, Independent Bridge Co., low bidder.

Addison Junior high school building, Cleveland, 200 tons.

Gunther & Davis building, Cleveland, 300 tons, bids taken.

McKinney Steel Co., Cleveland, head frame for mine at Crystal Falls, Minn., 275 tons, bids taken.

Morris & Bailey Steel Co. Absorbed

PITTSBURGH, Dec. 19.—Official announcement has been made of the absorption of the Morris & Bailey Steel Co. with a plant at Wilson Station, near Clairton, Pa., manufacturer of cold-rolled strip steel, by the Oliver Iron & Steel Co., Pittsburgh. It is the purpose of the purchasing company to maintain the Morris & Bailey Co. as a separate interest and to continue it as a commercial producer of cold-rolled strip steel.

The Coatesville Plate Washer Co., Coatesville, Pa., has been organized to engage in the manufacture of plate washers from scrap. It has leased the building at Coatesville formerly occupied by the Greenwood Cotton Mills. A. Stoffal has been appointed manager.

GERMAN RAIL SALE TO JAPAN

Manchurian Order Increased and Given to Three Mills—Rails, Switches and Tin Plate Inquiries —Foreign Iron Stronger

NEW YORK, Dec. 18.—Export trade generally is quiet, with some small business continuing to appear from South American markets, chiefly Colombia, Argentina and Brazil. One exporter in New York with connections as a representative of German export interests has sold a total of about 10,000 ft. of small water pipe and some small tonnages of galvanized sheets to buyers in Colombia in the past few weeks.

The situation in China is unchanged and very little business is reported. Japan continues to inquire for rails and also exhibits interest in tin plate, structural material, hoops, wire and sheets. With the exception of the tin plate, however, inquiries for these materials are for small lots. At present there are two inquiries in the market from Japan for oil can size tin plate, one calling for 5000 base boxes and the other for 3000 boxes. There are several small tonnages of structural steel pending and one or two small inquiries for black sheets; the latter, however, are not expected to be placed here. Bids were opened Dec. 13 by the Imperial Government Railways on 400 tons of I beams and bids will be opened Dec. 20 on the tender for 30 sets of manganese steel frogs and switches.

Among current rail inquiries from Japan is one for 5 miles of 12-lb. and 5 miles of 18-lb. rails, a total tonnage of about 235 gross tons, from a private source. The Aichi Railway Co. is receiving bids on 6½ miles of 75 lb. rails (766 gross tons) and accessory splice bars, bolts, nuts and spikes. The 85 miles of 100-lb. rails and accessories, for which the South Manchuria Railway Co. has been in the market was increased to 110 miles and the entire tonnage of about 17,285 tons, plus the accessories was divided among three German mills through three different Japanese export houses; Takata & Co., which received 42½ miles; Furukawa & Co., which received 42½ miles; and Mitsui & Co., which received 25 miles. The price, which is said to have been $6 or $7 per ton lower than the lowest American bid, is reported to have been better than $35 per ton, c.i.f. Dairen and the delivery May and July as specified by the buyer. This tender is the second tonnage awarded by the South Manchuria Railway Co. to Germany this year.

Contract for digging the tunnel between Shimonoseki and Moji, Japan, may be awarded to a foreign contractor, according to the Department of Commerce. The project, which involves the construction of a railroad tunnel more than a mile long, most of the distance through solid rock, will connect two of the larger islands of Japan at a cost of several million dollars. Information on bidding is being supplied by the Japanese Department of Communications.

Both Continental and Scotch pig iron are showing a stiffening tendency according to an importer of foreign irons. This importer is now offering "Dalzell" Scotch No. 3, with an analysis of sil. 2.25 to 2.75 per cent; sul. 0.015 to 0.02; mn., 0.1, and phos., 0.3, at $27.50 per ton duty paid New York. Considerable interest is still evinced by foundries in the New York and New England districts in small tonnages of foreign iron and this importer reports a number of small inquiries on hand of 100 to 300 tons each.

Although imports of bars and other semi-finished material could undoubtedly be made profitably by purchasing in Germany, importers show no inclination to enter into this business because of the violent fluctuations of the mark in foreign exchange, which is likely to wipe out even the margin of profit that would be possible on an imported tonnage.

MORE SHEET BUYING

Price Concessions Made at Youngstown—Auto Stock Sold at 4.65c.

YOUNGSTOWN, Dec. 19.—Orders for first quarter sheets, including principally black and galvanized grades, are coming to district producers in larger volume, and it is expected will be in sufficient proportions to maintain a 75 per cent operating rate of independent capacity in the Valleys.

Independent makers of full finished sheets are no longer adhering to the 5c. quotation on No. 22 gage auto body stock, and business is being freely accepted at 4.75c. to 4.85c. Some small tonnages have moved at 4.65c. The independent market is regarded, however, as nearer 4.85c. per lb. on this grade, or $3 per ton higher than the 4.70c. quotation of the leading interest. There continues to be more activity in highly finished sheets than in other grades, though a number of interests have established a comfortable backlog on galvanized sheets.

On No. 28 gage galvanized 4.35c. is the general quotation and makers are not turning away any business offered at this price. While the $36.50 sheet bar price announcement has served to stabilize the sheet market, nevertheless some of the smaller interests are reported to be cutting under usual quotations in order to build up a reserve on their books. However, the principal makers are closely investigating all such reports and are prepared to meet competitive conditions in this market.

Because of irregularity in the common sheet market most of the independent interests in the Mahoning Valley are curtailing production schedules.

For a paper on "Steam Formulas," Prof. Robert C. H. Heck, of Rutgers College, has been awarded life membership in the American Society of Mechanical Engineers. Junior prizes of the society went to R. H. Heilman, industrial fellow at the Mellon Institute, Pittsburgh, and F. L. Kallam, graduate student at Leland Stanford Junior University.

Making Cast Iron Pipe Shown by Moving Pictures

The New England Foundrymen's Association held its December meeting on Wednesday evening, the 13th, at the Boston Athletic Association, Boston, 130 members and friends attending. E. H. Ballard, General Electric Co., president, presided. The only business transacted was the appointment of a nominating committee to make nominations for officers to be balloted for at the annual meeting next month, and the acceptance of the Edison Electric Illuminating Co., and the Pulaski Iron Co., to membership in the association. The nominating committee consists of George P. Aborn, Worthington Pump & Machinery Corporation, Blake & Knowles Works, East Cambridge; Charles B. Newcomb, Deane Works, Holyoke, same corporation; and A. B. Root, Jr., Hunt-Spiller Mfg. Co., South Boston.

The rest of the evening was given over to moving pictures, the most instructive being one on making cast iron pipe, presented by the United States Cast Iron Pipe & Foundry Co., Burlington, N. J., showing in detail the process of making centrifugal cast iron pipe as well as the sand cast method. John D. Capron, publicity manager of the company, explained the different methods during the progress of the film, and answered many questions put to him by the foundrymen. Another interesting film related to the method of gathering wood in Pacific Coast forests, and its conversion into by-products. The tests to which motors are put in this industry was interesting. The film was presented by the General Electric Co., West Lynn, Mass. Other films shown were for the purpose of entertainment.

Sales of oak leather belting for November are reported by the Leather Belting Exchange at 467,816 lb., valued at $826,164, or an average of $1.77 per lb. This shows a falling off in both quantity and value from October, when the total was 499,943 lb., valued at $861,902 or $1.72 per lb. Both figures, however, are far above the total for November, 1921, which was 262,820 lb., valued at $439,172, or $1.67 per lb. The figures represent about 60 per cent of the entire industry.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Plates

Sheared, tank quality, base, per lb.....1.95c. to 2c.

Structural Material

Beams, channels, etc.....2.00c.

Iron and Steel Bars

Soft steel bars, base, per lb.....2.00c.
Refined iron bars, base, per lb.....2.60c.

Hot-Rolled Flats

Hoops, base, per lb.....2.75c. to 2.90c.
Bands, base, per lb.....2.75c. to 2.90c.
Strips, base, per lb.....2.75c. to 2.90c.

Cold-Finished Steels

Bars and shafting, base, per lb.....2.50c.
Strips, base, per lb.....4.50c.

Wire Products

Nails, base, per keg.....$2.70
Bright plain wire, base, per 100 lb.....2.45
Annealed fence wire, base, per 100 lb.....2.95
Spring wire, base, per 100 lb.....3.25 to 3.35
Galvanized wire, base, per 100 lb.....2.95
Galvanized barbed, base, per 100 lb.....3.35
Galvanized staples, base, per keg.....3.35
Painted barbed wire, base, per 100 lb.....3.00
Polished staples, base, per keg.....3.00
Cement coated nails, base, per count keg.....2.20
Woven fence, carloads (to jobbers).....70½ per cent off list
Woven fence, carloads (to retailers).....68 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads...60 and 5 per cent off list
Machine bolts, small, cut threads....50 and 10 per cent off list
Machine bolts, larger and longer....50 and 10 per cent off list
Carriage bolts, ⅜ x 6 in.:
Smaller and shorter, rolled threads,
50, 10 and 5 per cent off list
Cut threads.....50 per cent off list
Longer and larger sizes.....50 per cent off list
Lag bolts.....60 and 5 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads....50 and 10 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.:
Smaller and shorter.....45 per cent off list
Larger and longer sizes.....45 per cent off list
Hot pressed square or hex. blank nuts...$3.25 to $3.50 off list
Hot pressed nuts, tapped.....3.25 to 3.50 off list
C.p.c. and t. sq. or hex. nuts, blank.....3.25 to 3.50 off list
C.p.c. and t. sq. or hex. nuts, tapped.....3.25 to 3.50 off list
Semi-finished hex. nuts:
9/16 in. and smaller, U. S. S....75, 10 and 5 per cent off list
⅝ in. and larger, U. S. S....70, 10 and 2½ per cent off list
Small sizes, S. A. E.....50 and 5 per cent off list
S. A. E., ⅝ in. and larger.....75 and 5 per cent off list
Stove bolts in packages.....80 and 5 per cent off list
Stove bolts in bulk.....80, 5 and 2½ per cent off list
Tire bolts.....50, 10 and 10 per cent off list

Cap and Set Screws

Milled square and hex. head cap screws....75 per cent off list
Milled set screws.....75 per cent off list
Upset cap screws.....75 and 10 per cent off list
Upset set screws.....80 per cent off list

Rivets

Large structural and ship rivets base, per 100 lb.....$3.00
Large boiler rivets, base, per 100 lb.....3.10
Small rivets.....65 and 10 to 65 and 5 per cent off list

Track Equipment

Spikes, 9/16 in. and larger, base, per 100 lb....$2.75
Spikes, ½ in. and smaller, base, per 100 lb....3.50
Spikes, boat and barge, base, per 100 lb.....3.50
Track bolts, base, per 100 lb.....$3.75 to 4.50
Tie plates, per 100 lb.....2.35
Angle bars, base, per 100 lb.....2.75

Welded Pipe

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	49	23½	¼ to ⅜	+7	+33
¼ to ⅜	55	29½	½	26	8
½	60	46½	¾	32	17
¾	64	52½	1 to 1½	34	19
1 to 3	66	54½			

Lap Weld

2	59	47½	2	29	15
2½ to 6	66	54½	2½ to 6	32½	19
7 to 8	60	47½	7 to 12	30	17
9 to 12	59	46½			

Butt Weld, extra strong, plain ends

⅛	45	23½	¼ to ⅜	+15	+48
¼ to ⅜	51	34½	½	25	13
½	57	46½	¾	32	18
¾	62	51½	1 to 1½	34	20
1 to 1½	64	53½			
2 to 3	65	54½			

Lap Weld, extra strong, plain ends

2	57	46½	2	30	17
2½ to 4	61	50½	2½ to 4	33	21
4½ to 6	60	49½	4½ to 6	32	20
7 to 8	56	43½	7 to 8	25	13
9 to 12	50	37½	9 to 12	20	8

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 and 2½ per cent.

Boiler Tubes

Lap Welded Steel		*Charcoal Iron*	
1¾ in.	21½	1½ in.	−12
2 to 2¼ in.	36	1¾ to 1⅞ in.	+2
2½ to 3 in.	47	2 to 2¼ in.	−8
3¼ to 13 in.	52	2½ to 3 in.	−13
		3¼ to 4½ in.	−15

To large buyers of steel tubes a supplementary discount of 5 per cent is allowed.

Standard Commercial Seamless Boiler Tubes

Discounts on cold-drawn tubes in carload lots f.o.b. Pittsburgh, follow:

1 in.	55	2½ and 2¾ in.	38
1¼ and 1½ in.	47	3 in.	42
1¾ in.	31	3¼ to 4 in.	47
2 and 2¼ in.	34	4¼ in. and 5 in.	39

Hot Rolled

3 in.	44	3¼ to 4 in.	49

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base.....85 per cent off list
Carbon 0.30 to 0.40, base.....83 per cent off list
Plus usual differentials and extras for cutting.

Seamless Locomotive and Superheater Tubes

Cents per Ft.		Cents per Ft.	
2-in. O.D 12 gage	14	2¼-in. O.D. 10 gage	19
2-in. O.D. 11 gage	15	3-in. O.D. 7 gage	34
2-in. O.D. 10 gage	16	1¾-in. O.D. 9 gage	13¾
2¼-in. O.D. 12 gage	16	5⅜-in. O.D. 9 gage	53
2¼-in. O.D. 11 gage	17	5½-in. O.D. 9 gage	55

Tin Plate

Standard cokes, per base box.....$4.75

Terne Plate

(Per package, 200-lb.)

8-lb. coating	$9.30	25-lb. coating I. C.	$14.35
8-lb. coating I. C.	9.60	30-lb. coating I. C.	15.25
15-lb. coating I. C.	11.80	35-lb. coating I. C.	16.25
20-lb. coating I. C.	13.00	40-lb. coating I. C.	17.25

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....2.50c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.35c.
Regular auto body sheets, base (22 gage), per lb., 4.70c. to 5.00c.

Galvanized

No. 28 (base), per lb.....4.35c.

Tin-Mill Black Plate

No. 28 (base), per lb.....3.35c.

Manufacturers have pamphlets, which can be had upon application, giving price differentials for gage and extras for length, width, shearing, etc.

Freight Rates

All rail freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic	$0.325	Buffalo	$0.265	St. Louis	$0.43
Philadelphia, export	0.235	Cleveland	0.215	Kansas City	0.735
Baltimore, domestic	0.315	Cleveland, Youngstown		Kansas City (pipe)	0.705
Baltimore, export	0.225	Comb.	0.19	St. Paul	0.60
New York, domestic	0.34	Detroit	0.29	Omaha	0.735
New York, export	0.255	Cincinnati	0.29	Omaha (pipe)	0.705
Boston, domestic	0.335	Indianapolis	0.31	Denver	1.27
Boston, export	0.255	Chicago	0.34	Denver (pipe)	1.215

Pacific Coast	$1.50		
Pac. Coast, ship plates	1.20		
Birmingham	0.69		
Memphis	0.385		
Jacksonville, all rail	0.50		
Jacksonville, rail and water	0.415		
New Orleans	0.515		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 30c. to 40c.; ship plates, 30c. to 40c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 30c. to 40c.; sheets and tin plates, 50c.; rods, wire rope cable and strands, 75c.; wire fencing, netting and stretcher, 50c.; pipe not over 8 in. in diameter, 50c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

British Iron and Steel Market

America Inquires for 30,000 Tons of Rails—Shipbuilding and Railroads More Active—Tin Plate Firmer

(By Cable)

LONDON, ENGLAND, Dec. 19.

Pig iron is quiet and easier on the decrease in the American demand and the approach of the holidays. Home consumers have made small purchases, owing to the revival in shipbuilding, but others generally are dormant. Some Scottish producers are curtailing output. Hematite is steady and active.

Foreign ore is firmer. Sellers of best Bilbao Rubio are asking up to 22½s. ($5.22) ex-ship Tees.

Improved general demand is noted for finished iron and steel. British railroads are placing more orders. India and Portugal are buying rails. Burmese railroads have bought 1200 tons of rails. Other markets are improving.

Continental markets are still complicated, owing to rapid fluctuations in exchange ratios. Prices generally are dearer. Belgium and Germany are the only real competitors [of Great Britain].

America is inquiring for 30,000 tons of rails, which are expected to go to a Continental works.

Tin plate is firm and a further increase in the minimum basis price is talked of, owing to advancing costs of raw materials and a shortage of steel scrap. There is fair export buying by the Continent, including Germany and Portugal. The Far Eastern demand is expanding, but the home trade is quieter.

Galvanized sheets are steady, with moderate sales, except to India, but an improved demand in that quarter is anticipated shortly. The works are well booked and are not anxious for orders.

Japanese specifications of black sheets are in demand for early shipment, but the works generally are unable to accept the business. Other markets are quiet.

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $4.64 per £1, as follows:

[illegible]					$6 [illegible]		
[illegible] No. 1 foundry	4	1			20 [illegible]		
[illegible] No. 3 foundry	4	1½			19 11		
[illegible] No. 4 foundry	4	[illegible]			19.42		
Cleveland No. 4 forge..	4	2½			19.14		
[illegible]	4	[illegible]			18 [illegible]		
[illegible]	14	[illegible]			1 [illegible]		
[illegible]	15	[illegible]			6 [illegible]		
[illegible]	14	[illegible]			6 [illegible]		
[illegible]	7	[illegible]			[illegible]		
Sheet and tin plate bars, Welsh	[illegible]	[illegible]	to	[illegible]	32.48	to	34.32
Tin plates, base box...	1	0	to	1 0½	4.64	to	4.67
[illegible]	[illegible]	[illegible]			[illegible]		
Boiler plates	11	0	to	11 10	2.28	to	2.38
[illegible]	[illegible]	[illegible]			[illegible]		
[illegible]	[illegible]	[illegible]			[illegible]		
[illegible]	[illegible]	[illegible]			[illegible]		
[illegible]	[illegible]	[illegible]			[illegible]		
Black sheets, 24 gage..	11	15			2.43		
[illegible]					[illegible]		
[illegible]					[illegible]		
[illegible]					[illegible]		
[illegible]					[illegible]		

Continental Prices, f.o.b. U. K. Channel Ports, Delivery as Specified

Merchant bars:							
Belgium, Feb., Mar.	£	12½	to	£ 6 15	1.37	to	1.40
Luxemburg, Feb., Mar.	7	0	to	7 2½	1.45	to	1.48
France, Jan., Feb.	7	0	to	7 2½	1.45	to	1.48
Germany, Feb., Mar.	6	10	to	6 15	1.35	to	1.40
Joists (beams):							
France, Jan.	6	5			1.29		
Belgium, Jan., Feb..	6	0	to	6 5	1.24	to	1.29
Luxemburg, Jan. ...	6	5			1.29		
Channels:							
Belgium	7	10	to	7 12½	1.55	to	1.58
¾-in. plates:							
Germany, Jan.	6	5	to	6 10	1.29	to	1.35
Belgium, Jan.	6	10			1.35		
Luxemburg, Jan. ...	6	5			1.29		
France, not quoted.							
No. 8 gage wire:							
Belgium	14	10[illegible]			3.01		

JAPANESE COPPER DULL

Exports of Brass and Copper Products Decline Because of High Costs—Active Demand for Gas Pipe

TOKIO, JAPAN, Nov. 20.—Exports of copper continue inactive and the market in China and other countries for Japanese copper is deeply depressed by the competition of foreign copper. At the same time, the copper market in Japan is continuously threatened by foreign copper, though the market is now quiet owing to the high price of copper in the American market and elsewhere. In addition, there being no prospect of the recovery of financial circles in this country, the demand for copper for the manufacture of wire and other copper goods has fallen off very much and copper stocks do not decrease at all. On the whole, the relation between supply and demand is quite unfavorable.

Although the cost of manufacturing copper products has been reduced by 20 per cent compared with some time ago as a result of the strenuous efforts of the copper manufacturers, it is still far higher than the cost of manufacturing American copper and there does not seem to be any further margin for Japanese copper manufacturers to cut down the cost. Judging from the circumstances, there is no single factor for improvement and the future is considered doubtful.

Some time ago there was an export from Japan of brass plates to India and contracts for the export of brass wire to Bombay and Calcutta were concluded. Although there are many inquiries for brass goods, the price offered does not cover the cost unless the goods are manufactured from brass scrap. At present there are 600 tons of brass scrap on the market. As brass on the London market is quoted at high prices because of the scarcity of stocks, it is impossible to import supplies, and it will probably be impossible to export more brass goods at present. The market for electrolytic copper continues to drop and the selling price stands at 43.50 yen. The recent purchase by the Osaka arsenal of 500 tons of electrolytic copper at 42.30 yen seems to have affected the market favorably.

The season for active demand for gas piping has arrived, and as a result of the scarcity of stock, the market has shown some strength lately. Quotations have risen by about 10 per cent. One inch National is quoted at 16 sen, 2 in. goods at 41 sen, 3 in. goods at 70. A further rise in quotations is expected.

Secondary metals in Japan have been weak and unsteady lately, registering desultory declines but are once more developing an active turn. Tin, lead, zinc and alloys are on the upgrade. Demand for secondary metals is light, but foreign news is encouraging. Moreover, the stocks are low, although new arrivals in small lots are reported occasionally. Accordingly, holders are in a buoyant mood and some of them have raised quotations. American zinc was quoted at 22.50 yen on Nov. 3 compared with 21.50 yen Oct. 21 and American lead at 16.30 yen compared with 16 yen Oct. 21.

Some holders name 24 yen per picul for 99 per cent zinc. Electrolytic copper is quoted at 46 yen per picul.

The H. D. Evans Steel Co., 127 to 133 Oliver Street, Boston, has purchased the property it occupies, which consists of a brick building and 2836 ft. of land, all assessed on $60,000. The company has occupied this property for nearly 25 years.

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
Dec	Lake	Electro-lytic*	New York	New York	St. Louis	New York	St. Louis
13	14.25	13.75	37.50	7.27½	6.92½	7.55	7.20
14	14.25	13.87½	37.50	7.25	6.90	7.50	7.15
15	14.37½	14.00	37.50	7.25	6.90	7.45	7.10
16	14.37½	14.12½		7.25	6.90	7.42½	7.07½
18.....	14.50	14.25	38.25	7.25	6.87½	7.40	7.05
19.....	14.50	14.37½	38.12½	7.25	6.87½	7.35	7.00

*Refinery quotation.

New York

NEW YORK, Dec. 19.

Copper is the only market which is active and buying of electrolytic is very heavy. The tin market is moderately active at higher prices. Demand for lead is fair and prices are slightly easier. There is almost no demand for zinc and prices have fallen.

Copper.—Prices for electrolytic copper have advanced practically ⅛c. each day, and buying for both domestic and foreign consumption has been very heavy. One or two producers are out of the market and most sellers are careful as to the extent to which they take new business. Evidently a pronounced buying movement is well advanced and prices are the highest for the year at a minimum of 14.37½c., refinery, or 14.62½c., delivered, with the probability that 14.75c., delivered, will be the minimum within the next day or two. A price of 15c., delivered, is predicted by conservative sellers by the end of the year or very soon thereafter. The heavy buying has been almost wholly for delivery in the first quarter. The market as a whole is very strong and the statistical position is favorable to the producers. It has become distinctly a sellers' market. Lake copper, in sympathy, is quoted at 14.50c. to 14.75c., delivered.

Tin.—The market for Straits tin was quiet and lifeless up to last Friday. On that day, however, Dec. 15, dealers became purchasers, followed by consumers, and 600 to 900 tons is estimated to have been sold. On Saturday about 300 tons more changed hands and yesterday dealers and consumers took from 250 to 300 tons. The sales embraced principally arrivals for December, January and February. To-day the market was again listless. Prices during the week have advanced quite sharply, due partly to the stronger situation in sterling exchange. Spot Straits tin was quoted to-day at 38.12½c., New York, and prices in London were about £5 per ton higher than a week ago at £180 for spot standard, £181 10s. for future standard and £181 15s. for spot Straits. An unusual incident has been the shipment of 100 tons of Chinese tin to Germany, indicating that this is the cheapest market in the world for that grade. It is also reported that 100 tons of Banca tin was shipped from here to England. Arrivals thus far this month have been 5045 tons, with 7183 tons reported afloat.

Lead.—The market continues quiet and slightly easier, with evidences of more lead available. There is no let up in consumption, but new business at the moment is light. Quotations are unchanged by the leading interest at 6.90c., St. Louis, or 7.10c., New York. Prices in the outside market are slightly easier at 6.87½c., St. Louis, or 7.25c., New York.

Zinc.—The market is exceedingly quiet and rather weak. Although spot delivery metal is rather scarce, there is very little demand for it. Consumers have not yet entered the market for next year, and there has been a falling off in foreign demand due to the exchange situation and other conditions. Statistics for November showed an increase in stocks of 1454 tons, the first since July 31, 1921. Prime Western for early delivery is quoted at 7c. to 7.05c., St. Louis, or 7.35c. to 7.40c., New York, with spot delivery about five to 10 points higher.

Antimony.—Wholesale lots of Chinese metal for early delivery are quoted at 6.30c. to 6.40c., duty paid, New York.

Aluminum.—Virgin metal, 98 to 99 per cent pure, for early delivery in wholesale lots as imported is quoted at 22c. to 23c. per lb., duty paid, New York, but the price of the leading domestic producer is not publicly quoted.

Old Metals.—The market is active and firm with a strong upward tendency. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	13.625
Copper, heavy and wire	12.50
Copper, light and bottoms	11.25
Heavy machine composition	10.50
Brass, heavy	8.25
Brass, light	6.50
No. 1 red brass or composition turnings	9.50
No. 1 yellow rod brass turnings	8.00
Lead, heavy	6.25
Lead, tea	5.00
Zinc	5.00

Chicago

Dec. 19.—Copper and tin have advanced while lead and zinc have declined. The rise in copper is due to liberal consumer buying while tin is stronger for the reason that for several days all tin offered for sale in New York for foreign account was taken at the prices quoted. Lead is exceedingly quiet while zinc declined sharply the latter part of last week and is now showing signs of recovery. A number of the old metal grades have advanced in sympathy with new material. We quote, in carload lots, lake copper, 14.75c.; tin, 39.50c. to 40c.; lead, 7c.; spelter, 7.25c.; antimony, 8.50c., in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 12c.; copper bottoms, 10c.; red brass, 9.25c.; yellow brass, 7.25c.; lead pipe, 5.50c.; zinc, 4.62½c.; pewter, No. 1, 23c.; tin foil, 27c.; block tin, 32c., all buying prices for less than carload lots.

Exports and Imports to Be Reported Weekly If Bill Passes

WASHINGTON, Dec. 19.—Export and import figures covering iron and steel and other commodities carried in large cargo lots are to be reported weekly by the Bureau of Foreign and Domestic Commerce. Announcement to this effect was made to-day by Secretary Hoover. The facilitated service is to begin, he said, as soon as the bureau is reorganized through taking over the present work of the Bureau of Customs Statistics, Treasury Department.

The bill providing for this transfer has been agreed upon in conference and is expected to be reported to Congress within a few days. It is hoped that the weekly reports on iron and steel and other imports and exports can be begun by the middle of January. The consolidation of the two bureaus also will make it possible to report other figures more expeditiously than is possible under present conditions.

The first reports on imports covering the period Sept. 22 to Oct. 30 has been greatly delayed owing to reclassification necessary on account of the new tariff law and will not be ready until the end of December or early in January. The new import tables carry about 1250 items as against 700 carried under the Underwood-Simmons Tariff Act.

Best Co. Plant Taken Over

PITTSBURGH, Dec. 19.—The Kelly & Jones Co., Pittsburgh, has taken over the property of the Best Co., Etna, Pa., comprising six and one-half acres with plant facilities for producing power house piping, pipe bends and coils, welded steel heaters and lap and Van Stone joints and for electric and acetylene welding. It is to be known as the Etna Plant of the Kelly & Jones Co., which has a plant in Greensburg, Pa., and warehouses and offices in Pittsburgh, New York, Chicago, Cincinnati and San Francisco.

PERSONAL

Charles N. Replogle has been elected president and general manager of the Brightman Mfg. Co., Columbus, Ohio, succeeding the late W. C. Waggoner.

F. R. Minton, who has had 25 years' experience in handling refractory materials, has been appointed manager of the fire brick department of the Chicago Fire Brick Co., 133 West Washington Street, Chicago.

Nils Anderson, president DeBevoise-Anderson Co., Inc., 114 Liberty Street, New York, has been elected vice-president of the Elk Run Mining Co., which is operating in Jefferson County, near Punxsutawney, Pa.

Frank W. Trabold, who has been in the forging business for several years, principally with J. H. Williams & Co., which he served in various capacities as sales and works manager, general manager and vice-president, was elected president of the Western Drop Forge Co., Marion, Ohio, at a recent meeting of the board of directors.

Charles F. Rand, chairman of the Engineering Foundation, has been elected to honorary membership in the Association of Members of American National Engineering Societies in Cuba, which honor does not come long after his receiving the Cross of the Legion of Honor from the French Government for distinguished service to France and to civilization. Mr. Rand was decorated by King Alfonso for achievements in the development of Cuban iron mines. Col. Arthur S. Dwight, member of the executive board of the American Engineering Council and president of the American Institute of Mining and Metallurgical Engineers, has been made an honorary member of the Chemical, Metallurgical and Mining Society of South Africa.

Howard Kenworthy, formerly Cleveland district sales manager of the Newton Steel Co., Youngstown, Ohio, and recently in the sales department of the Trumbull Steel Co., at Warren, Ohio, has been transferred to the Cleveland sales office of the latter company.

S. L. Ayr has severed his connection as assistant general manager of the central products division, General Motors Corporation and is now with the Bantam Ball Bearing Co. as manager of its Detroit territory, with offices at 905 Dime Bank Building, Detroit. He was formerly for 12 years with the Packard Motor Car Co. as manager of the truck division.

Gen. Lucius B. Barbour, Hartford, Conn., has been elected a director of Landers, Frary & Clark, manufacturers of cutlery, New Britain, Conn., to succeed his father, the late Gen. Lucius A. Barbour.

J. C. Hopkins, who has been superintendent of furnaces at the Shoenberger works, Pittsburgh, American Steel & Wire Co., has been appointed to a like capacity at the Central furnaces, Cleveland, succeeding B. E. Pheneger, recently promoted to the position of assistant general superintendent, Newburgh works, Cleveland, of the company. J. H. Williams, who has been assistant superintendent of Central furnaces, goes to the Shoenberger works in succession to Mr. Hopkins. These changes are all now in effect.

Ray G. White, formerly Chicago branch manager of B. M. Jones & Co., Inc., has been appointed Eastern railroad sales agent for the McInnes Steel Co., Ltd., Corry, Pa., manufacturer of hammered crucible tool steels. He has opened a temporary office at 56 Murray Street, New York.

Ernest G. Jarvis, superintendent of foundries and rolling mills, McNab & Harlin Mfg. Co., Paterson, N. J., has resigned effective Jan. 1 and expects to take a much needed rest for a few months. About Jan. 15 he will sail for a cruise of South and Central America. After his return he will resume his metallurgical activities in a consulting capacity.

Arthur L. Collins, recently associated with the Standard Steel & Bearings, Inc., has entered the tool and alloy steel department of Horace T. Potts & Co., Philadelphia, as sales metallurgist. He was graduated from Stevens "Tech" with the degree of M.E. in 1914 and he was with Atlas Ball Co. as engineer of tests and as metallurgist until 1920. In 1921 he was metallurgist for the Ace Motor Corporation. He is instructor and lecturer in metallurgy and metallography at Temple University. He has been secretary and treasurer of the Philadelphia Chapter of the American Society for Steel Treating since its inception.

Loring G. Calkins, for many years with Rogers-Brown & Co., Chicago, latterly New England manager for Crocker Bros., New York, is to open an office in Boston on Jan. 1, as New England manager for Waldo, Egbert & McClain, Inc., Marine Trust Building, Buffalo, to handle pig iron, coke, coal, ores and steel. He has had over 16 years experience in handling these commodities.

J. Muhleman, for 20 years a buyer for the International Harvester Co., and latterly director of purchases for the A. O. Smith Corporation, Milwaukee, and the Detroit Pressed Steel Co., Detroit, his last affiliation, has joined the sales organization of Briggs & Turivas, Inc., Chicago, and will devote his time to the mill and warehouse department of its new iron and steel business.

E. D. Hillman, formerly chief clerk with the Consolidated Steel Corporation, is now heating and industrial engineer for the Kings County Lighting Co., 4802 New Utrecht Avenue, Brooklyn, N. Y.

E. C. Brandt, works manager for the past two years, Krantz works, Westinghouse Electric & Mfg. Co., has been appointed works manager of the new plant now being erected by the company in Homewood, Pittsburgh. Mr. Brandt was born in Tarrs, Pa., in 1887, and has been with the Westinghouse company since 1905. Previously he was with Kelly & Jones Co., Greensburg, Pa.

OBITUARY

E. J. MISHLER, general sales manager of the Reading Iron Co., Reading, Pa., died Monday, Dec. 11. He was 53 years old and had been connected with the Reading Iron Co. for about 30 years.

THOMAS LAMBERT SMALL, manager Stone & Webster, Baton Rouge, La., who died last week at the age of 36 years, was a native of Cambridge, Mass, the son of the late Frank Milton Small of that city.

JAMES A. MATHEWS, formerly identified with the steel industry in Cleveland, died Dec. 13, aged 72 years. He was at one time connected with the old Cleveland Rolling Mill Co., and in 1894 organized the Crescent Sheet & Tin Plate Co., Cleveland, which established the plant now known as the Crescent Works of the American Sheet & Tin Plate Co. Later he took a prominent part in the formation of the American Tin Plate Co. For some time he had been a vice-president of the Guardian Savings & Trust Co., Cleveland.

HUGH DE HAVEN, president and founder of the De Haven Mfg. Co., Brooklyn, N. Y., iron, steel and wire specialties and mill supplies, died on Wednesday, Dec. 6.

DAVID TOD ARREL, 44, grandson of Ohio's war governor, David Tod, died on Dec. 13 at Mercy Hospital, Pittsburgh, following a lingering illness. Though he at no time took an active part in the management of any iron or steel properties in the Mahoning Valley, he was heavily interested financially in a number of companies at Youngstown, Ohio, where he made his home. Mr. Arrel left the bulk of his fortune, estimated at upward of half a million dollars, for charitable work at Youngstown.

WILLIAM A. PRICE, who in 1875 was one of the founders of the Gibson & Price Co., Cleveland, manufacturers of lead pipe, sheet lead and other lead products, and who has since been president and manager of that company, died Dec. 16, aged 75 years.

Machinery Markets and News of the Works

C. B. & Q. COMPLETES PURCHASES

Western Road Has Placed Orders Totaling About $500,000

Business Is Tapering Off as Year Draws to a Close —1923 Prospects Promising

AS the year draws to a close, there is a noticeable tendency on the part of buyers to postpone purchases until after the first of the year. In some markets, there is a continued good volume of inquiry, indicating perhaps that the expansion of buying of the last few months will gather greater momentum early in 1923. Prospects appear promising for production machines in particular, as the inclination of manufacturers is to study costs more closely with a view to reducing them.

At Chicago the Chicago, Burlington & Quincy Railroad has completed purchase of its large list, and the orders which have been placed in recent weeks total about $500,000. Attention is now being given by this road to a recent inquiry for machines for its Eola scrap yard. Other railroad buying continues, but mostly on a small scale. The Tennessee Central has bought a half dozen large machines from an Eastern company. The Seaboard Air Line has issued a small list. The Pullman Co. has an inquiry out for six tools.

The Guilbert Steel Co., Pittsburgh, will place an order soon for steel for a new structural steel fabricating shop and shortly after will buy a complete line of shop equipment.

About 20 metalworking and woodworking machines have been bought by the Cleveland Board of Education for a vocational school.

A general advance in prices is forecasted from Cincinnati. A number of advances will probably take effect on Jan. 1.

New York

NEW YORK, Dec. 19.

THERE has been very little activity of importance in the New York machine-tool market within the past week, but December business has been fairly satisfactory. An Eastern machine-tool company has received an order from the Tennessee Central Railroad for one driving wheel lathe, one driving wheel press, one side-head boring mill, one car wheel borer, one bushing press and one 30-in. planer. It is expected that purchases by the Delaware, Lackawanna & Western Railroad on its recent inquiry for 27 machines will be deferred until after the first of the year.

The crane market is quite active, particularly in electric overhead cranes and in inquiries for used locomotive cranes. Business in hand-power cranes and chain blocks is, however, particularly slack.

Among current inquiries for overhead traveling cranes is one from Stone & Webster, 147 Milk Street, Boston, calling for a 75-ton, 54-ft. 4-in. span, 4-motor crane with 15-ton auxiliary, for the Indiana Electric Co., Terre Haute, Ind. The 60-ton overhead crane recently asked for by the General Electric Co. for its Pittsfield works, is stated to have been temporarily postponed pending an appropriation. The Pennsylvania Railroad, Philadelphia, has postponed purchase of a 3-ton, 33-ft. span bucket handling crane for the same reason. In the locomotive crane field there is an inquiry current from the Reading Iron Co., Reading, Pa., for two 15-ton and one 25-ton locomotive crane, either new or used. Bids on the three 20-ton locomotive cranes, 50-ft., 60-ft and 70-ft. booms, included in an equipment tender recently issued by the city of Wilmington, Del., have been rejected on the claim that the prices quoted were too high. The Katchen-Shaw Iron Works, 485 Lyons Avenue, Newark, N. J., is receiving bids on a 5-ton overhead crane and several monorails and trolleys.

Among recent purchases are:

Brooklyn Edison Co., Brooklyn, N. Y., two 150-ton, 95-ft. 6½-in. span overhead cranes, one with additional 75-ton trolley, from the Morgan Engineering Co.;

General Electric Co., a 15-ton, 24-ft. span, 10-ton, 75-ft. span and 10-ton, 45-ft. span overhead traveling cranes without electrical equipment, from the Niles-Bement-Pond Co.;

General Electric Co., an 8-ton, three 5-ton and four 3-ton overhead traveling cranes without electrical equipment, for Schenectady, N. Y., from the Whiting Corporation;

Yale Medical School, New Haven, Conn., through Hollis French & Allen Hubbard, consulting engineers, 210 South Street, Boston, a 10-ton, 1-motor overhead traveling crane from the Whiting Corporation;

Cameron, Joyce & Co., Keokuk, Iowa, a 20-ton, 50-ft. boom, locomotive crane with 1½-cu. yd. bucket from the Industrial Works;

New York Steam Co., New York, a 20-ton used Brownhoist locomotive crane from the Hoisting Machinery Co.;

Alabama Shipbuilding & Drydock Co., Mobile, Ala., a 10-ton, 45-ft. span overhead traveling crane from an unknown builder;

Hetch Hetchy Dam, for Moccasin Creek Station, near San Francisco, Cal., a 135-ton power house crane from the Pawling & Harnischfeger Co.

The Katchen-Shaw Iron Works, 485 Lyons Avenue, Newark, N. J., a new company, has established temporary offices at 828 Broad Street, Newark, and is inquiring for punch and shear machinery, drill press, stationary and portable compressors, erecting equipment and other tools required for the fabrication of steel sash. The company also contemplates the purchase of a 5-ton crane and several monorail hoists and trolleys.

The American Linseed Co., 297 Fourth Avenue, New York, will install barrel-filling equipment, cooperage and other kindred machinery in its two-story addition, 60 x 110 ft., at Port Richmond, S. I., estimated to cost $35,000, for which bids on a general contract will be called at once. Francisco & Jacobus, 511 Fifth Avenue, are engineers.

Gregg & Co., 165 Broadway, New York, engineers, are preparing plans for the construction of a reduction plant for non-metallic minerals at Chattanooga, Tenn., to be owned and operated by a company now being organized. The plant will be equipped with grinding and pulverizing machinery for a capacity of about 40 tons per day, handling mica, feldspar, limestone, etc., and is estimated to cost $100,000.

The C. D. Greenbaum Co., 4189 Broadway, New York, manufacturer of plumbing supplies, etc., has plans for a new two-story and basement building at Amsterdam Avenue and 180th Street, estimated to cost $50,000. Maximilian Zipkes, 432 Fourth Avenue, is architect.

The Long Island Railroad Co., George Kefer, purchasing agent, Jamaica Office Building, Jamaica, L. I., will receive bids until Dec. 29 for 420 kegs of track bolts, 1 x 5⅜ in., and 1360 kegs of track bolts, ⅝ x 6½ in.; delivery between March 1 and 15.

The Greenpoint Metallic Bed Co., Brooklyn, has been chartered under State laws with a capital of $1,000,000, to take over and succeed the company of the same name at 226 Franklin Street, for the manufacture of brass and metal bedsteads. The present plant will be continued and extended. The incorporators of the new company are B. M. Frank and I. Gilman.

The Vertientes Sugar Co., Ronald M. Byrnes, vice-president National City Co., 55 Wall Street, New York, operating sugar mills in the Province of Camaguey, Cuba, is disposing of a bond issue of $10,000,000, a portion of the proceeds

to be used for extensions and improvements in plants. A construction program is being arranged to increase the output from 240,000 bags per year to 1,000,000 bags, gross, within the next 18 to 24 months. George H. Houston is president.

The Pan-American Petroleum & Transport Co., 120 Broadway, New York, has concluded an agreement with the Naval Department, Washington, for the development and operation of naval oil reserve properties in California, naval reserve district No. 1, and will install plants and equipment estimated to cost $5,000,000. The total expenditure is estimated at $40,000,000.

The Calumet & Hecla Mining Co., 25 Broadway, New York, is arranging for the acquisition of existing manufacturing plants, or the construction of new plants in different localities, for copper products manufacture. It is also perfecting arrangements for a consolidation with a number of its subsidiaries to carry out the projected manufacturing plans.

The Hoover Suction Sweeper Co., 47 West Thirty-fourth Street, New York, with plant at Canton, Ohio, has arranged for a change of name to the Hoover Co., at the same time increasing its capital from $2,000,000 to $6,000,000. A portion of the increase will be used for larger plant facilities, to include the manufacture of other domestic electrical equipment.

A manual training department will be installed in the three-story and basement high school to be erected at Asbury Park, N. J., 220 x 308 ft., estimated to cost $600,000, for which bids will be asked in February. E. A. Arend, 105 West Fortieth Street, New York, is architect.

The Wisconsin Cabinet & Panel Co., a subsidiary of Thomas A. Edison, Inc., West Orange, N. J., has plans for a two-story addition to its plant at New London, Wis., 72 x 100 ft., estimated to cost $60,000.

The Borough Council, Pemberton, N. J., has authorized a sale of bonds for $20,000 for a municipal electric power plant.

The Vacuum Oil Co., 61 Broadway, New York, has awarded contract to the Turner Construction Co., 242 Madison Avenue, for a new two-story, reinforced-concrete building at its refinery at Constable Hook, Bayonne, N. J., 75 x 190 ft.

Henry Maurer & Son, Maurer, Perth Amboy, N. J., manufacturer of fire brick and other refractories, has arranged for an increase in capital from $40,000 to $500,000, a portion of the proceeds to be used for extensions and improvements.

The American Type Founders Co., Communipaw Avenue, Jersey City, N. J., has commissioned Day & Zimmerman, Inc., 611 Chestnut Street, Philadelphia, engineer, to prepare plans for a new factory at Elizabeth, N. J., to be used primarily as an assembling works for Kelly presses, estimated to cost $500,000, with equipment.

Negotiations are in progress for the erection of a vocational school for Essex County at Irvington, N. J. Robert L. Saunders, Irvington, superintendent of schools, is in local charge.

The Crane Co., 84 Mechanic Street, Newark, with headquarters at Chicago, has leased property on Freemont Street, Jersey City, N. J., to be improved with a brick building, for the establishment of new branch works.

The Sundh Electric Co., Newark, has been chartered under State laws with a capital of $204,000 to take over and operate the company of the same name, with plant at 209 Parkhurst Street. The new company will specialize in a line of electrical machinery. It is headed by Louis Larsen, William Deans and W. Furney Jeffreys.

A manual training department will be installed in the new two-story and basement high school, 71 x 100 ft., to be erected at Sucasunna, N. J. Rasmussen & Wayland, 252 West Forty-sixth Street, New York, are architects.

The Research Corporation, 25 West Forty-third Street, New York, has leased two one-story buildings, totaling about 15,000 sq. ft. of floor space, now in course of construction at East Bound Brook, N. J., for a new machine shop and structural iron-working plant.

The New Jersey Power & Light Co., Dover, N. J., is planning for the installation of a plant and system at Sergents-

Philadelphia

[illegible] other equipment will be installed in the three-story printing plant, 175 x 200 ft., to be erected at Thirty-fourth and Market Streets, Philadelphia, by the Stephen Greene Co., Sixteenth and Arch Streets, estimated to cost $500,000. Clarence E. Wunder, 1415 Locust Street, is architect.

The Foreign Trade Bureau of the Commercial Museum, Thirty-fourth Street, Philadelphia, has received an inquiry from a company at Amsterdam, Netherlands, desiring to purchase electrical apparatus and appliances, gas and gasoline engines, hardware specialties, and kindred products. Full information available upon request.

Reynold H. Greenberg, Morris Building, Philadelphia, will soon take bids for a four-story automobile service and repair building, 120 x 220 ft., at 3020-32 Market Street. Philip S. Tyre, 1509 Arch Street, is architect.

Ovens, motors, conveying machinery, automatic and other equipment will be installed in the five-story confectionery factory, to be erected by Stephen F. Whitman & Son, Inc., 415 Race Street, Philadelphia, adjoining its present plant, estimated to cost $250,000. William Steele & Sons, Sixteenth and Arch Streets, are engineers.

A large electrically-operated pumping plant will be constructed in connection with the proposed new sewerage disposal plant of the City Commission, Trenton, N. J., estimated to cost $1,250,000. George A. Johnson, 150 Nassau Street, New York, is consulting engineer.

The Board of Freeholders, Trenton, N. J., has authorized the operation of plans for the installation of a new stone crusher and kindred machinery at the county work house.

The Central Railroad of New Jersey, 143 Liberty Street, New York, is planning for the erection of a locomotive and car repair works on site near the north city limits of Allentown, Pa., estimated to cost $300,000. The present car and engine shops at Ashley, Pa., and car repair plant at Mauch Chunk, Pa., will be removed to the new location, with additional equipment for increased capacity.

The Philadelphia Electric Co., Tenth and Chestnut Streets, Philadelphia, has tentative plans under consideration for further additions in its generating plant at Beach and Palmer Streets, to increase the capacity about 90,000 kw.

A vocational department will be installed in the two-story high school, 138 x 210 ft., to be erected at Eighteenth and Upland Streets, Chester, Pa. Sanders & Young, 39 South Seventeenth Street, Philadelphia, are architects,

A. B. Faulkner, 720 Fifth Avenue, Williamsport, Pa., is planning for the establishment of a factory to manufacture electric outdoor operating displays.

New interests have acquired the plant and property of the Blossburg Electric Light & Power Co., Blossburg, Pa., affiliated with the Hornell Electric Co., Hornell, N. Y. Tentative plans are under way for extensions and improvements in the system, to include the construction of a new power plant at Blossburg to cost $750,000. Gannett, Seeylle & Fleming, Harrisburg, Pa., are in charge.

In connection with a bond issue of $1,250,000, recently approved, for school construction, the Board of Education, Lancaster, Pa., is selecting a site for the erection of a new junior high school, with vocational department, estimated to cost $400,000.

The Trenton Potteries Co., North Clinton and Ott Streets, Trenton, N. J., manufacturer of sanitary ware, has plans in preparation for a four-story addition, 72 x 115 ft., estimated to cost approximately $100,000, with machinery. W. A. Klemann, First National Bank Building, is architect.

The Superior Wire Cloth Co., Turnpike, near New Freedom, Pa., recently organized with a capital of $100,000, is completing plans for a new plant to cost $50,000, for the manufacture of wire cloth and other wire products. B. C. Gugler is president.

A manual training department will be installed in the new two-story and basement high school, 75 x 120 ft., to be erected at Giberton, Pa., estimated to cost $110,000, for which bids will be asked at an early date. Peter B. Sheridan, Markle Bank Building, Hazleton, Pa., is architect.

The Down Tool Works, Fleetwood, Pa., has commenced the construction of a new plant on Locust Street, one-story, 35 x 135 ft., with extension, 24 x 38 ft., estimated to cost $17,000. W. R. Down heads the company.

The Board of Education, Mill City, Pa., will take bids at once for the erection of a one and two-story vocational school, 70 x 86 ft., to cost approximately $70,000. J. H. Dovey, Coal Exchange Building, Scranton, Pa., is architect.

The Mineral Products Co., East Newport, Pa., manufacturer of roofing products, has tentative plans under way for rebuilding the portion of its plant, recently destroyed by fire with loss of $25,000.

A two-story automobile service and repair works, 53 x 126 ft., will be erected by the Liberty Garage, Phoenixville, Pa., operated by Edwin A. Unger. Plans have been drawn by J. V. Povey, 162 Second Avenue, Royersford, Pa., architect.

A manual training department will be installed in the two-story high school, 95 x 160 ft., to be erected at Annville, Pa., estimated to cost $100,000. Edward Z. Scholl, 136 Robe-

Son Street, Reading, Pa., is architect and will take bids on a general contract at once.

The Eureka Paper Box Co., Howard Avenue, Williamsport, Pa., will install new machinery for paper container manufacture in a local building.

The Pennsylvania Equipment Co., Norwood, Pa., is making inquiries for a 25-ton locomotive crane, with clamshell bucket. Also for an 80-ton second-hand switching locomotive, and five steel-underframe, general service gondola cars.

The Woodoleum Mfg. Co., 131 Arch Street, Philadelphia, manufacturer of composition products, is completing plans for a new two-story factory at Bridesburg, Philadelphia, 30 x 75 ft., and will take bids for building and equipment early in January.

New England

BOSTON, Dec. 18.

A FURTHER curtailment in machine tool sales was noted the past week in this territory, as well as a decrease in the number of new inquiries. The bulk of the business was in used equipment, which covered a diversified although not extensive line. Of the new tools sold a 24-in. American lathe, purchased by the Boston & Albany Railroad; a pipe machine taken by the Boston & Maine; a new 3A Universal boring machine and a milling machine bought by a Massachusetts electrical appliance manufacturer; a straightening machine placed in Rhode Island, and a special design high speed power press sold to a Danvers, Mass., concern are perhaps the most important. The greatest center of activity appears to have been in the Providence, R. I., section. There a local and a Pawtucket school list, together with inquiries on various kinds of equipment by a large Providence manufacturer, the purchase of tools for a general service station by the local electric lighting company, and the installation of two Shaw cranes, purchased some time ago, in a Providence plant, have attracted a large number of machine tool salesmen.

Due to buying by New England concerns engaged in locomotive repair work, small tools are moving as well as at any time this year. The Bath Iron Works, Bath, Me., which is making repairs on 20 locomotives, has been the most active interest in the small tool market the past week, although some of the railroads have placed sizable orders.

The Norton Co., Worcester, Mass., has booked a $35,000 order from the Studebaker Co. for nine heavy grinding machines, six of the new type known as the double-head crank pin grinder, the other three 14-in. machines for grinding crankshafts. The company has shipped recently four of the double-head crank pin type to the Hudson Motor Car Co., Detroit, and five to the Nash Motors, Inc., Kenosha, Wis.

Hunt-Spiller Mfg. Corporation, 387 Dorchester Avenue, South Boston, gun iron castings, has awarded a contract for additions to cost about $40,000.

A new automobile body concern to be known as the Springfield Body Corporation, West Springfield, Mass., is in the process of formation. It is proposed to take over the Smith-Springfield Body Corporation, and to construct a branch plant in the New York district with an annual capacity of 2500 custom-built bodies.

Bids have been closed by the United Electric Railways Co., Providence, R. I., for a one and two-story car house, 170 x 460 ft.

The Goss & DeLeeuw Machine Co., New Britain, Conn., has been incorporated under State laws with a capital of $100,000 to do general machine and tool work. Stanley T. Goss, formerly with the New Britain Machine Co., John S. Black, general superintendent Corbin Screw Division, American Hardware Corporation, and Adolph L. DeLeeuw, Plainfield, N. J., are interested in the company. Definite manufacturing plans have not yet been made.

The Lacy Mfg. Co., manufacturer of dies, tools, etc., 50 Middle Street, Bridgeport, Conn., plans the construction of a new factory on Union Avenue to cost $35,000.

The Sexton Can Co., manufacturer of Everett, Mass., has awarded contract for a two-story 50 x 130 ft. addition to its plant on Cross Street.

The Standard Specialty Works, Inc., Union Street, Gardner, Mass., manufacturer of screw machine products, has commenced foundations for a new one-story plant, 40 x 100 ft., to cost $25,000. C. E. Hoglund is general manager.

The Maine Central Railroad Co., Portland, Me., is considering plans for new car shops at Rumford, Me. B. T. Wheeler, Portland, is company architect.

The Bemis Car Truck Co., Birnie Avenue, Springfield, Mass., is perfecting plans for a one-story addition, 55 x 140 ft., to cost close to $25,000.

A manual training department will be installed in the three-story junior high school, 125 x 245 ft., at Somerville, Mass., for which foundations are under way. Ritchie, Parsons & Taylor, 15 Ashburton Street, Boston, are architects.

The Concord Electric Railway Co., Concord, N. H., is considering plans for rebuilding its power plant at West Concord, destroyed by fire Dec. 4.

The Stamford Gas & Electric Co., Bank Street, Stamford, Conn., will make improvements in its power plant to cost about $40,000, including the installation of additional equipment.

The Sexton Can Co., Cross Street, Everett, Mass., has taken out a building permit to erect a two-story addition, 50 x 130 ft., to cost $25,000.

The Bead Chain Mfg. Co., Bridgeport, Conn., manufacturer of suspension chains for electric lights, etc., is planning for extensions for considerable increase in capacity. The company has recently increased its capital from $50,000 to $300,000, for expansion.

The Hartford Despatch & Trucking Co., 105 Albany Street, Hartford, Conn., has awarded contract to the Schnare Construction Co., 318 Main Street, Springfield, Mass., for a one-story machine shop and service building at East Hartford, for company motor trucks, estimated to cost $100,000, including equipment.

A manual training department will be installed in the proposed high school to be erected at Cumberland, R. I., estimated to cost $90,000. Irving C. Mitchell is superintendent of schools, in charge.

The Richards Co., Wentworth, Mass., manufacturer of tin products, has acquired a substantial interest in the National Tin Corporation, 50 Broadway, New York, and in the future will operate the latter's property, including mills, at Hill City, S. D. The local plant will also be expanded to handle increased raw material from the acquired property.

The recent increase in capital of the American Screw Co., Providence, R. I., from $3,000,000 to $4,500,000 does in no way concern any extensions or improvements, as the increase was merely a capitalization of surplus.

The B. F. Sturtevant Co., Hyde Park, Boston, is inquiring for a used gate shear similar to No. 3 Hilles & Jones Co. make, throat depth of housings 12 in., cutting capacity ⅜ in. through steel plate; also for a used No. 16 Blanchard high power vertical surface grinder, 30-in. magnetic chuck and direct motor drive to the spindle.

The Roxbury Steel Casting Co., 53 Gerard Street, Roxbury, Mass., is in the market for a Tinius Olsen testing machine of 100,000 lb. capacity.

Baltimore

BALTIMORE, Dec. 18.

THE Consolidated Gas, Electric Light & Power Co., Lexington Building, Baltimore, has preliminary plans for extensions and improvements in its electric power plants and system, including the construction of a new generating station at Dundalk, Md., other expansion to cost $1,380,000, with machinery. Within the next 15 months it is purposed to build an addition to the power house at Westport, Md., to cost $716,000, with equipment. Herbert A. Wagner is president.

The Corby Baking Co., 2301 Georgia Avenue, N. W., Washington, will build a two-story producer gas plant, 75 x 134 ft., in connection with a new bakery, to cost $75,000. P. M. Anderson, Room 920, South Building, is engineer. W. S. Corby is vice-president.

The Chief of Air Service, Munitions Building, Washington, is taking bids for one bench shears; one hand burring machine; one hand setting-down machine; one hand wiring machine, with 3 in. rolls; one hand turning machine; one hand grooving machine; one slip roll forming machine; one combination brake; one foot-power squaring shears; one tinners' bench plate, and one combination scrowl and circular snips, all as specified in circular P. R. 6248; also, for 1050 level gage assemblies, as per specifications on file.

The Lingo City Machine Shops, Wilmington, N. C., are planning to rebuild the portion of their works destroyed by fire Dec. 8, with loss reported at close to $35,000.

The Norfolk & Western Railway Co., Roanoke, Va., J. H. Clemmitt, purchasing agent, will take bids until Dec. 27 for wire fencing, covering requirements for six months; also for steel springs, couplers, and other equipment.

The Common Council, Davidson, N. C., will install an electrically-operated pumping plant in connection with extensions in the municipal waterworks to cost $60,000. Mees & Mees, Kinney Building, Charlotte, N. C., are engineers.

The Southern Power Co., Charlotte, N. C., will install a series of new electric switching plants, transformer stations, and other mechanical departments in connection with its new high-tension transmission system, 200 miles long, estimated to cost $2,000,000. Work is now under way on two new steam-operated electric generating plants.

The Post Quartermaster, United States Marine Barracks, Quantico, Va., will take bids until Dec. 27, for one variable belt feed saw mill, with wire cable carriage drive, equipped with giant dogs, parallel bars, etc., as per information on file.

The Petroleum Export Co., 638 Equitable Building, recently organized, is perfecting plans for a new refinery, with initial daily output of 1000 bbl. The machinery installation is estimated to cost $400,000. Walter B. Brooks is head.

The City Council, Hagerstown, Md., has authorized the issuance of bonds for $300,000, the proceeds to be used for the construction of a municipal electric power plant, for which plans are now in preparation. The city engineer is in charge.

J. A. Boggess, West Palm Beach, Fla., is organizing a company to construct and operate a plant at Atlanta, Ga., for the manufacture of mop wringers and other metal equipment for domestic service.

The Bureau of Yards and Docks, Navy Department, Washington, is preparing plans and will call for bids at an early date for the installation of a water-softening plant at the Naval Base, San Diego, Cal.; also for the construction of bins and other work in connection with a new coaling plant at Pearl Harbor, H. T., specifications 4768 and 4772, respectively.

Thompson & Lothrop, Penfield Building, Philadelphia, operating electric light and power, and other utilities, have acquired the plant and property of the Chestertown Electric Light Co., Chestertown, Md. The new owners will take immediate possession and will make extensions and improvements, including the installation of new machinery.

The Savannah Iron & Wire Works, Liberty and Houston Streets, Savannah, Ga., is planning to contract for a quantity of ornamental iron castings in outside foundries, and is making inquiries with regard to plants equipped to handle this class of work.

A manual training department will be installed in the new high school to be erected at Newark, Del., for which revised plans are being completed by Guilbert & Betelle, 546 Broad Street, Newark, N. J., architects. Bonds for $160,000 for the structure have been sold.

The North State Creosoting Co., North Charlotte, N. C., is in the market for an air compressor, 9 x 10 in. or 9 x 11 in.

A manual training department will be installed in the new high school to be erected at Kittrell, N. C., estimated to cost $75,000. E. M. Rollins, Henderson, N. C., is superintendent of schools in charge.

The Baltimore Steel Co., Eastern Avenue and Eden Street, Baltimore, has taken out a permit to build a one-story shop addition, 45 x 90 ft.

The DeKalb Supply Co., Decatur, Ga., manufacturer of woodenware, will rebuild the portion of its plant recently destroyed by fire with loss of $75,000, including equipment. New wood-working and other machinery will be installed to cost $20,000.

The Hackley-Morrison Co., Inc., 1708-22 Lewis Street, Richmond, Va., machinery dealer, has inquiries out for vertical boilers, and for boilers of the Scotch marine type.

An electrically-operated pumping plant will be installed at the municipal waterworks, Hagerstown, Md., in connection with proposed extensions and improvements to cost $100,000.

The Hagerstown Lime & Chemical Co., Hagerstown, Md., will take bids at once for machinery for installation at its local lime marl properties, lately acquired, including grinding, conveying and other equipment. The company was recently organized with J. S. Myers as president.

Detroit

DETROIT, Dec. 18.

THE Charles B. Bohn Foundry Co., 733 Hart Avenue, Detroit, manufacturer of brass, bronze and other metal castings, will soon complete plans for a number of additions in its plant for increase in production. Christian W Brandt, 1114 Kresge Building, is architect.

The Arctic Ice Cream Co., 3301 Grand River Avenue, Detroit, will build a one-story automobile service and repair works for company trucks and cars on Gibson Street. On an adjoining site, a one-story mechanical shop will be constructed for machinery repairs and other service.

The Reliance Engineering Co., Lansing, Mich., has acquired the local plant and property of the Eureka Cement Mixer Co., and will use the works for extensions. Improvements will be made, with changes in machinery for the production of automobile equipment and farm implements.

The Michigan Home & Training School, Lansing, Mich., will commence the erection of a two-story industrial school, 52 x 130 ft., at Lapeer, Mich., estimated to cost $55,000.

The Wilson Foundry & Machine Co., Pontiac, Mich., will commence the erection of an addition 36 x 52 ft., to be equipped as a testing works. It is also considering the construction of other extensions.

The Michigan Copper & Brass Co., 5851 West Jefferson Street, Detroit, has arranged for an increase in capital from $1,000,000 to $3,000,000 for expansion. Work has been commenced on an addition to cost approximately $30,000 and other extensions are projected.

Fire, Dec. 7, destroyed the plant of the C. J. Litscher Co., Grand Rapids, Mich., manufacturer of electrical supplies, etc., with loss estimated at $200,000, including equipment and stock.

The Reliable Mfg. Co., Pontiac, Mich., recently organized to manufacture pipe-threading machines, etc., has tentative plans for a one-story factory. Wendell J. Mott is general manager in charge.

The Federal Stamping Co., East Twentieth and Columbia Streets, Holland, Mich., is having plans drawn for a new one-story factory on River Avenue estimated to cost $100,000, including equipment.

The Morrison Metal Stamping Co., Jackson, Mich., recently organized by officials of the Hayes Wheel Co., will be operated as a subsidiary of that company. A site adjoining the Hayes works has been purchased for a new plant and plans will be prepared at once. It will cost in excess of $60,000. Clarence B. Hayes is president.

Ryniewicz Bros. & Co., Detroit, have been incorporated with a capitalization of $50,000 to operate a general machine shop. William Ryniewicz, 3564 Medbury Avenue, is president of the new company and has as his associates, John Ryniewicz and Joseph P. Kotwicki, Detroit.

Pittsburgh

PITTSBURGH, Dec. 18.

THE past week has been active in point of inquiry but not in sales. Absence of awards usually is ascribed to the time of year. Continued good inquiry, however, is adding to the prospective list. The Westinghouse Electric & Mfg. Co. now is taking bids on a cornice brake and a gang punch; also on a number of small tools for replacement. This company usually purchases by quarterly periods and the tools inquired for are listed for purchase out of the first quarter of 1923 appropriations. The list of the Duquesne Light Co., Pittsburgh, referred to in these columns a week ago, calls for six tools. A punch and shear, a radio drill, a gang drill, a drill press, a riveting machine and a hack saw are on the list.

The Guibert Steel Co., which is planning fabricating works on the west side of Pittsburgh, is expected to close soon for the steel for the building and soon thereafter for a fairly complete line of structural shop equipment. Frank I. Ellis, Farmers Bank Building, Pittsburgh, is the engineer of Pacific Coast interests who are planning to build a sheet mill, and another prospective sheet mill project is by interests headed by C. L. Pollock, who is to sever his connection as sales manager of the Apollo Steel Co., Apollo, Pa., early next year. Rehabilitation of the Ashland, Ky., works, American Rolling Mill Co., involves liberal expenditures for new equipment.

The Jones & Laughlin Steel Co. has closed for a 15-ton crane for its Aliquippa works with the Cleveland Crane & Engineering Co., which is a duplication of a crane already in operation. The Westinghouse Electric & Mfg. Co. has an inquiry out for a 5-ton crane, the award of which is expected soon. The Northern Engineering Co., Detroit, has taken the order for three 1-ton hoists for the Aluminum Co. of America, and also one for a 1-ton air hoist for the Pittsburgh Forge & Iron Co. The Universal Brick & Tile Co., Pittsburgh, is in the market for a 3-ton hoist.

The Nealy Nut & Bolt Co., Pittsburgh, has taken out a

building permit for a new plant at 2141 Merriman Way to cost $65,000.

A one-story power house will be built at the Armstrong County Community Hospital, Kittanning, Pa., in connection with a new hospital building, to cost $250,000. Crow, Lewis & Wick, 200 Fifth Avenue, New York, are architects.

The Universal Sanitary Mfg. Co., New Castle, Pa., is preparing plans for additions to double the present capacity. It has acquired the plant of the Florentine Pottery Co., Cambridge, Ohio, manufacturer of sanitary ware, for about $100,000, and a subsidiary will be organized under the name of the Cambridge Pottery Co., to operate the works. Improvements will be made. C. J. Kirk is president.

The Rochester Rubber Products Co., Rochester, Pa., is planning for the installation of additional equipment to manufacture automobile tires and other rubber products. M. M. Goettman is treasurer.

The Night Hawk Peninsular Mines, Ltd., Pittsburgh, operating in the Porcupine district, is disposing of a stock issue of $300,000, the proceeds to be used for the construction of a new mill and the installation of machinery. The present steam-power operation will be supplanted by electric power. James R. Dodworth, president and treasurer Pittsburgh-Hanover Coal Co., 323 Fourth Avenue, is chairman of the board of the Night Hawk company.

The Superior Auto Accessories Co., 1342 Forbes Street, Pittsburgh, has plans in preparation for a one-story and basement building, 100 x 145 ft., with extension, 78 x 120 ft., on site recently leased on the Baum Boulevard and Woodworth Street, to cost $55,000. The Hunting-Davis Co., Century Building, are architects.

The Metal & Thermit Corporation, 120 Broadway, New York, manufacturer of welding equipment, etc., has awarded contract to W. B. Mason, 551 Third Avenue, Pittsburgh, for a two-story shop on Fayette Street, 40 x 100 ft., to cost $30,000.

The Central Coal Mining Co., Wheeling, W. Va., has acquired almost 800 acres, adjoining its present properties, and plans for the installation of electric equipment, tools, machinery, etc.

New interests have acquired the plant and property of the Elk Run Mining Co., Florence, Pa. It will be reorganized and capitalized at $100,000. Extensions and improvements will be made, including the installation of additional equipment.

The Topliff-Ely Co., Washington, Pa., manufacturer of sleds, childrens' vehicles, etc., has awarded contract to F. M. Gardner, Washington, for a three-story plant addition, 25 x 80 ft., estimated to cost $100,000, including equipment.

A manual training department will be installed in the new two-story and basement high school, 108 x 130 ft., to be erected at Wayne, W. Va., estimated to cost $100,000, for which bids on a general contract are being received until Jan. 2. Holmboe & Pogue, Empire Bank Building, Clarksburg, W. Va., are architects.

The Morgan Brothers Co., Kenova, W. Va., will break ground at once for its new mill, 40 x 150 ft., for finished hardwood production, including flooring. From $15,000 to $20,000 will be expended for machinery, all of which will be motor-driven. Later, extensions will be made for the manufacture of doors, sash, etc. T. F. Morgan is president and manager.

The Ohio Valley Machine Co., Thompson Avenue Moundsville, W. Va., has commenced the erection of a large one-story addition.

The Hazel-Atlas Glass Co., Wheeling, W. Va., has disposed of a bond issue of $800,000, for its affiliated interest, the Kerns-Gorsuch Glass Co., with plants at Barnesville and Zanesville, Ohio. The proceeds will be used for extensions and improvements at the Zanesville works, where a new plant will be built on a 130-acre site.

The Blackwood Electric Steel Corporation, Parkersburg, W. Va., will take bids until Jan. 2 for equipment for its new foundry, including annealing furnaces, welding apparatus, general foundry equipment, grinders, air compressors and traveling crane. The plant will develop a capacity of 12 tons per day and will be one-story, 140 x 230 ft. F. S. Blackwood heads the company. Mills, Rhones, Bellman & Nordhoff, Ohio Building, Toledo, Ohio, are architects.

F. D. Barron, Charleston, W. Va., has tentative plans for rebuilding his automobile service and repair works recently destroyed by fire with loss of $100,000, including equipment.

The Aetna Foundry & Machine Co., Warren, Ohio, manufacturer of wire mill machinery, etc., is completing negotiations for the purchase of the Youngstown Foundry & Machine Co., Youngstown, Ohio. It is purposed to consolidate the plants and organizations.

Cleveland

CLEVELAND, Dec. 18.

ORDERS were placed during the week by the local Board of Education for about 20 metal and wood-working machines for the John Adams School. This was the outstanding activity. While some small lot inquiries came out, the approaching holiday lull is indicated by the tapering off in orders. With a fair volume of business in prospect the trade appears confident of considerable activity at the beginning of the year. The Vig Tor Axle Co., which purchased the plant of the Forest City Machine & Forge Co., advises that it will be both a buyer and seller of equipment. It will replace considerable of the machinery now in the plant with other tools suited for its purposes, and will take up its machinery requirements about Jan. 16.

While no definite announcements are made, it is intimated that there will be some further price advances Jan. 1.

With an improvement in conditions in industrial plants the supply of tool makers and pattern makers has become short in the Central West.

The American Steel & Wire Co. is inquiring for a 30-ton electric traveling crane for its Cleveland works.

The Ohio Injector Co., Wadsworth, Ohio, has had plans prepared for a three-story addition, 60 x 250 ft.

The Vacumeter Co., Cleveland, has been organized by E. M. Barnes, formerly president Packard Ohio Motor Co., to manufacture automobile accessories, and will probably place a plant in operation. It is now located at 426 Bulkley Building.

O. H. Sebring, who recently began the erection of a plant in Sebring, Ohio, for the manufacture of aluminum ware, has decided to make instead a line of electrical supplies. A building 70 x 140 ft. will be occupied.

The Ohio Seamless Tube Co., Shelby, Ohio, through its board of directors, has authorized the expenditure of $200,000 for the erection and equipment of a building, 100 x 280 ft. It will be equipped with cold draw benches in order to increase the cold drawing capacity of the plant. Another building will be erected for storage purposes.

The Standard Equipment Co., Lorain Avenue and West 106th Street, Cleveland, plans the erection of a new factory for the manufacture of automobile axles, which the company plans to make in addition to its present line of differentials and gears. It will provide a capacity for 250 to 300 axles per day. O. J. Ashman is vice-president and general manager.

The Advance Foundry Co., Dayton, Ohio, is inquiring for a 10 to 15-ton electric crane of 40-ft. span; also for modern equipment.

Buffalo

BUFFALO, Dec. 18.

AN addition to its works at Blasdell, N. Y., estimated to cost $60,000, is planned by the Seneca Iron & Steel Co., Erie County Bank Building, Buffalo.

Fire, Dec. 13, destroyed a portion of the car shops and barns of the International Railway Co., Ellicott Square, Buffalo, in the Cold Springs district, with loss estimated at $300,000, including buildings, equipment and rolling stock. It is planned to rebuild.

H. Sutter, 428 Erie Street, Elmira, N. Y., is planning for the installation of equipment in a local building for the manufacture of wireless equipment and parts.

The James Mfg. Co., 700 Madison Avenue, Elmira, N. Y., manufacturer of farm implements and equipment, has plans for the erection of a one-story addition.

The Kensington-Davis Corporation, 144 Kensington Avenue, Buffalo, is planning for the installation of machine shop and foundry equipment in a local building.

Fire, Dec. 11, destroyed a portion of the oil plant of the Sinclair Refining Co., South Buffalo, N. Y., with loss estimated in excess of $100,000, including equipment.

The Binghamton Light, Heat & Power Co., Binghamton, N. Y., will install new power equipment at its local plant. Work is in progress on a new automobile service and repair building for company trucks and cars.

The Automatic Tire Machine Co., 19 Bush Street, Buffalo, manufacturer of automatic machinery and parts, is having plans prepared for the erection of a new one-story plant, 57 x 210 ft., on site recently acquired on Bush Street. W. A. Schaffer is president.

for the erection of a new two-story and basement factory on [illegible] general manager.

The Binghamton Caster & Specialty Co., Binghamton, N. Y., is planning for the installation of equipment in a local building for the manufacture of casters and other hardware specialties. H. C. Miller, 11 Floral Avenue, heads the company.

A. L. Dixon, 1034 Main Street, Buffalo, is arranging for the construction of a two-story automobile service and repair shop, 100 x 200 ft., to cost close to $50,000, including equipment.

The plant and contents of the Sinclair Oil Co., Alabama Street, Buffalo, were damaged to the extent of $100,000 by [illegible]

Chicago

CHICAGO, Dec. 18.

THE Chicago, Burlington & Quincy has concluded purchases against its general machine tool list, involving a total expenditure of close to $500,000. The road is now giving its attention to the list of scrap yard machinery for its Eola reclammation plant which was published in this column Oct. 19. The placing of the Chicago, Milwaukee & St. Paul list is held up pending an appropriation. The Toledo, St. Louis & Western is in the market for a driving wheel lathe for its Frankfort, Ind., shop. The Norfolk & Western, Roanoke, Va., is inquiring for a single-spindle motor-driven centering machine. General trade has grown very dull with the approach of the holidays, and it is likely that few orders of consequence will be closed before Jan. 1. There is considerable prospective business, however, and sellers are confident that a fair rate of buying will develop next month.

The Pullman Co., Chicago, has issued an inquiry for six machines, either new or used, as follows:

One 18-in. slotter
One 48-in. open side planer with a 20-ft. bed
One 5 or 6-ft. radial drill
One 10-in. slotter
One 36-in. x 36-in. x 8-ft. bed, or longer, planer with four heads
One 36-in. swing heavy duty drill press with compound table and tapping attachments
One 20-in. shaper.

The Nash Motors Co. has purchased two large semi-automatic turret lathes, but with this exception, no further orders from the automotive industry have been reported. For the first time in years foreign competition has made itself felt in this market. A local manufacturer has purchased a German guillotine shear to cut stock 30 in. wide and 1 in. thick.

The Crane Co., Chicago, is inquiring for a 10,000-lb. steam hammer. The National Brake & Electric Co., Chicago, has placed an order for a 40-ton electric overhead traveling Shaw crane.

The Creamery Package Co., 61 West Kinzie Street, Chicago, plans the construction of general offices and a plant at the corner of Kostner Avenue and Division Street, to cost $500,000.

Frank Cuneo has purchased from the Barco Mfg. Co., the four-story plant at 212-222 West Illinois Street, Chicago, and will spend $50,000 remodeling the property, which will be leased to the Lion Specialty Co., candy manufacturer, 25 East South Water Street.

The American Steel & Wire Co., has commenced the construction of a new boiler house at Anderson, Ind. Four 500-hp. boilers will be installed at a cost of about $500,000.

Edward Sabbatini and Richard Bateson, formerly connected with the Coons Machine Shop, Hibbing, Minn., have opened a general machine shop in the Con Kepple Building on Second Avenue. It covers a space 40 x 81 ft., with a [illegible]

The Triangle Steel Products Co., Michigan City, Ind., will construct a new drop forge plant and make minor improvements to its present shop at a cost of $20,000.

The Kokomo Malleable Iron Works, Kokomo, Ind., is in- [illegible] which will more than double the capacity of the plant.

Work has been started on a new power plant at the Soldier Orphans Home, Bloomington, Ill., to cost $165,000. It will be 89 x 100 ft., and will contain four 150-hp. boilers.

The Norman Mfg. Co., recently of Peoria, Ill., has established a new plant on East State Street, Bettendorf, Iowa, and will manufacture piston rings exclusively. H. M. Jerome president, was recently connected with the Micro Machine Co. of Bettendorf.

The Kunkle Valve Co., Fort Wayne, Ind., has let contract for a one-story factory, 75 x 150 ft., to cost $25,000.

The city of Red Wing, Minn., contemplates the erection of a municipal electric light plant.

The Mount Vernon Car Mfg. Co., Mount Vernon, Ill., plans the construction of a new shop to be used exclusively for car repair work. It will be 150 x 500 ft., and will contain six repair tracks.

The Advance Window Frame Co., 1818 West Austin Avenue, Chicago, has let contracts for a one-story factory, 122 x 125 ft., at the southeast corner of West Division Street and Kildare Avenue.

Frank D. Chase, Inc., 645 North Michigan Avenue, Chicago, has prepared plans for two one-story buildings at Throop and Fifty-eighth Streets and Fifty-ninth and Ada Streets, for the Goldsmith Brothers Smelting & Refining Co., 29 East Madison Street. The cost will be $200,000.

Toby Rubovitz, 517 South Wells Street, Chicago, has let contract for a three-story printing plant, 105 x 148 ft., at the southeast corner of West Congress and Laflin Streets, to cost $250,000.

Nelson Brothers are receiving bids through Orlando Van Gunton, 26 East Huron Street, Chicago, on a three-story automobile salesroom, repair and paint shop, 50 x 125 ft., at 6310-14 Broadway, to cost $100,000.

The Yellow Cab Mfg. Co., 57 East Twenty-first Street Chicago, has let contract for a one-story factory, 199 x 368 ft., at 5801 Dickens Avenue, to cost $350,000.

The Electrical Dealers' Supply Co., 162 West Randolph Street, Chicago, will erect a three-story factory to contain 45,000 sq. ft. of floor space in Diversey Boulevard near Oakley Avenue. It will cost $150,000.

The Hopper Paper Co., Taylorville, Ill., has plans nearing completion for a two-story addition, 80 x 160 ft., estimated to cost $65,000. Billingham & Webb, Press Building, Kalamazoo, Mich., are architects and engineers.

The Denver Ice & Cold Storage Co., Denver, Colo., is planning for a new ice-manufacturing and cold storage plant to cost $100,000, including machinery. M. Charles Salet is plant manager.

The Disbrow Sash & Door Co., Seventh Avenue and South First Street, Cedar Rapids, Iowa, has plans for a two-story and basement addition to cost $50,000.

The Knapp Brothers Mfg. Co., 2419 West Fourteenth Street, Chicago, manufacturer of steel and metal specialties, has tentative plans for a new one-story factory, 75 x 100 ft., with adjoining buildings, on site recently purchased, estimated to cost $100,000, including machinery.

The International Harvester Co., 606 South Michigan Avenue, Chicago, is considering plans for a one-story branch plant at Lisbon, N. D.

The Midwest Power Co., La Moure, N. D., is planning for the construction of a new one-story electric power plant. L. L. Wilson is manager.

The Spaulding Mfg. Co., 318 West Austin Avenue, Chicago, manufacturer of conveying machinery and parts, will commence the erection of a one-story plant, 77 x 125 ft., at 1524 Elmdale Avenue, to cost $22,000.

The Ford Motor Co., Detroit, has filed application for permission to construct a hydroelectric power plant in the vicinity of St. Paul, Minn., estimated to cost $750,000.

Daniel P. Farrell, Chicago, will commence the erection of a new one-story box manufacturing plant at 4411-29 West Lake Street, 100 x 200 ft., estimated to cost $45,000, including machinery.

A manual training department will be installed in the two-story and basement high school to be erected at Reeder, N. D., for which bids will be taken on a general contract until Dec. 28. Shannon, Boyd & Boyd, Devil's Lake, N. D., are architects.

Indiana

INDIANAPOLIS, Dec. [illegible]

THE Studebaker Corporation, South Bend, Ind., has arranged for the establishment of a factory branch and service works at 832-34 North Meridian Street, Indianapolis, occupying the building formerly used by the Sterling Motor Car Co. W. J. Owens will be in charge.

Guy Dillon, Indianapolis, has arranged for the establishment of a one-story works for the manufacture of wireless equipment at 150 Virginia Avenue

The Board of Sanitary Commissioners, Indianapolis, J. A. Craven, president, will receive bids until Dec. 28 for mechanical equipment for a sewerage disposal plant, including rotary dryers, stokers, conveying machinery, electrically-operated centrifugal pumps, air-washing equipment, valves, power plant piping, etc. C. H. Hurd, 1405 Merchants' Bank Building, is engineer.

A manual training department will be installed in the new Benjamin Harrison, Jr., high school, to be erected on 144th Street, East Chicago, Ind., estimated to cost $500,000, for which an architect will soon be selected. The Board of Education is in charge.

Homer A. Woods, 19-29 West South Street, Indianapolis, will soon break ground for a new four-story plant on Ludlow Avenue, for the manufacture of electrical products. It will be 60 x 200 ft., estimated to cost $200,000 with machinery. A list of equipment will soon be arranged.

Milwaukee

MILWAUKEE, Dec. 18.

MACHINE-TOOL trade is gradually becoming quiet, as customary at the approach of the holidays and interest is slackening. Inquiry is less active as well. Analysis of the situation by manufacturers and dealers, however, reveals that there are some substantial requirements to be looked for immediately after the inventory period has passed. Production is holding up fairly well, with shops engaged in cleaning up old orders before the usual holiday recess.

The Phoenix Mfg. Co., Eau Claire, Wis., a pioneer manufacturer of logging and sawmill equipment, which for the past two years has entered the field of manufacturing metal-working tools of special design, on Jan. 1 will add another new department, namely, the production of mechanical stokers under the patents of the American Engineering Co., Philadelphia. Officers and members of the American company have acquired interest and been given places on the board of directors of the Phoenix company, these including Maxwell Alpern, president; W. F. Sauter, chairman of the board, and Charles L. Cushmore, secretary-treasurer. Joseph G. Worker continues as vice-president and general manager of the Phoenix company. Amendments have been filed to the corporate articles in Wisconsin fixing the authorized capitalization at $251,600, divided into 2516 shares of common stock. Previously the capital consisted of $650,000 common and $100,000 preferred stock.

The Chippewa Pump Co., Chippewa Falls, Wis., is planning the enlargement of its works to handle the largely increased volume of new business from municipal and public utilities. Plans, however, have not yet matured.

The Seamless Steel Products Co., Twenty-seventh and Greves Streets, Milwaukee, has increased its capital stock from $100,000 to $200,000 to finance the further development of the plant and business. E. J. Lansing is president and general manager.

The Leatham D. Smith Co., Sturgeon Bay, Wis., operating a stone crushing plant, is making alterations and improvements at a cost of $75,000 which will more than double its capacity. It has purchased a new 42-in. McCully gyrating crusher, operated by a 200-hp. motor, and having a capacity of from 700 to 1400 tons per hr. Two No. 6 Allis crushers are being equipped with electric motor drive and other equipment is being changed. An additional steam shovel will be purchased in the spring. Negotiations are pending for the purchase of a 3000-ton steel steamer, to be equipped with self-unloading conveyors. Leatham D. Smith is president and general manager.

The James Mfg. Co., Fort Atkinson, Wis., manufacturer of steel and other metal barn and stable fixtures and equipment, sheet steel farm specialties, etc., has acquired the buildings and equipment of the defunct Aluminum Hardware Mfg. Co., Elmira, N. Y. These will be remodeled and improved and occupied by the branch works of the James company at Elmira, which have been operated in leased quarters for about five years. The floor space will be increased from 60,000 ft. to 100,000 ft. by this acquisition. F. H. Williams is general manager at Elmira, and W. D. James is president and general manager James Mfg. Co. at Fort Atkinson.

The Krier Preserving Co., Belgium, Wis., has plans for a new canning plant and steam power plant estimated to cost $100,000. It is asking prices on one and two 160-hp. water tube marine boilers, with hand stokers and metal stack, a 125-hp. high pressure, horizontal steam engine, a 125-hp. air compressor, and the special equipment necessary for canning and preserving.

The United Radiator Co., 2111 Tower Avenue, Superior, Wis., has been acquired by E. W. Rohne, Minneapolis, Minn., and P. H. McConnell, who will install equipment to manufacture automobile radiators and a general line of sheet metal specialties, besides continuing repair work.

The Common Council of Sheboygan, Wis., has let contracts for a two-story building, 78 x 109 ft., to be equipped as a general machine, repair and storage-house for all city automobiles, street construction and maintenance equipment, etc. A small list of new and used tools will be purchased.

The Board of Education, Hancock, Mich., will close bids Dec. 28 for a new high and vocational training school estimated to cost $225,000. It is to be ready for equipment about Sept. 1, 1923.

The Eureka Novelty Co., Chicago, has moved its plant and equipment to Stevens Point, Wis., where a new building has been erected. It is 100 x 105 ft., two stories and basement. Present equipment will be supplemented by new tools for metal and wood-working processes. The principal product will be display cases for retail stores.

The Harvey Spring & Forging Co., Racine, Wis., has increased its capital stock from $200,000 to $300,000 and plans enlargement of its shop early in 1923. William T. Harvey is general manager.

The Malleable Iron Range Co., Beaver Dam, Wis., has increased its capitalization from $700,000 to $1,000,000 to cover improvements in the plant made during the past year, and further development work in 1923. F. W. Rogers is president and general manager.

The Riverside Steel & Structural Co., Green Bay, Wis., has been organized by H. L. Flower, formerly of the Carl Hartmann Co., Green Bay, and will engage in the business of fabricating shapes and plates, manufacture and repair of machinery, and dealing in reinforcing steel, sash and other metal building supplies and industrial equipment. A machine shop and warehouse at Tenth Street and Broadway has been purchased and will be enlarged and improved. Considerable new production equipment will be installed.

The Burdick Cabinet Co., Milton, Wis., expects to occupy its new manufacturing plant, with 40,000 sq. ft., about Feb. 1, and is now inquiring for additional equipment. Its principal product is a patented electrical bath cabinet and other therapeutic equipment and electric hospital appliances. It is increasing its capital by an issue of $100,000 preferred stock to cover the expansion.

The Simmons Co., Kenosha, Wis., manufacturer of steel and brass beds, is engaging also in the manufacture of a line of domestic furniture made of seamless and welded steel tubing and sheets.

The Gaulke Dairy Co., 658 Forest Home Avenue, Milwaukee, contemplates the erection of a two-story addition, 35 x 100 ft., and will soon be in the market for dairy equipment and refrigerating machinery. Work is to start early next spring.

The Juda, Wis., Board of Education has engaged H. C. Haeuser, architect, 445 Milwaukee Street, Milwaukee, to design a combination high school and industrial training institute costing about $100,000, for construction next spring.

According to unofficial statements, the Anaconda Copper Co. has practically completed plans for the addition of a large copper wire mill to the present plant of the American Brass Co. at Kenosha, Wis., early next year. The company some time ago acquired property adjoining its works in Kenosha, which will be cleared of the present buildings and used as the site for a modern mill.

The Western Lime & Cement Co., 68 Wisconsin Street, Milwaukee, has purchased 350 ft. on Fox River frontage at Green Bay, Wis., as the site of a new dock, reduction plant and distributing warehouse, including kilns for preparing limestone for paper mill as well as construction purposes. Definite plans for the improvement of the property have not been revealed, however. George W. Nast is general manager.

The Perfection Table Slide Co., Watertown, Wis., a new $125,000 corporation, has let contracts for a two-story factory, 60 x 180 ft., with a separate power plant, 30 x 45 ft., and an office, 28 x 30 ft., work to start about March 15. Omar L. Gaston, Watertown, is general contractor. The concern will manufacture extension tables and other furniture specialties. William C. Schultz is president and general manager.

The Federal Steel Sash Co., Waukesha, Wis., has been incorporated in Wisconsin with a capital stock of $50,000 by C. J. McIntosh, president, and other officers and members of the Federal Steel & Structural Co., Waukesha, fabricator and erector of structural shapes. The original Federal company engaged in the fabrication of steel sash about two years ago, and the department has grown to the extent of making a separate entity desirable. Plans are said to be under way

[illegible] additions to the present plant and installing much new equipment.

The Pyro Mfg. Co., Milwaukee, has been organized by S. A. Stevens, F. A. Biggs and Walter Schlecht, 300 Cherry Street, with a capital stock of $10,000, to manufacture blowtorches and similar devices and appliances. Arrangements are being made to lease manufacturing space and for the purchase of tools.

Cincinnati

CINCINNATI, Dec. 18.

IT is almost a certainty that a general advance in machine tool prices will be made shortly, and it would not be surprising if announcements of substantial increases in some selling prices were made within the week. Manufacturing costs are on the upgrade, chiefly on account of the higher wages being paid, and a corresponding increase in prices is necessery, it is stated, to permit machine tool manufacturers, with the present volume of business offering, to break even. Announcements are expected first from planer manufacturers, who have been checking costs closely and find that tools are being sold at a loss.

Orders during the week were almost entirely confined to single machines and with a minimum of these. It is expected that during the remainder of the month there will be some buying by corporations which have unexpended appropriations. Some orders of this nature have already been contracted for. This business is generally placed, according to one local manufacturer, without the formality of shopping around, as the master mechanics of plants generally pick the tools they favor with little regard to cost. The Seaboard Air Line has issued a small list, on which early action is expected. It is reported that the National Tube Co. has made further purchases on its inquiry for its new plant at Gary, but whether all the tools have been bought is not known. Some scattered railroad orders are also reported, but the market generally can be well regarded as quiet.

The Bickett Miller Co., 650 Evans Street, Cincinnati, has been incorporated with a capitalization of $25,000 to manufacture the Bickett bench miller. The company also controls the Cincinnati Valve Co., organized to manufacture the Gilbert automatic grinding valve. It is in the market for a second-hand valve milling machine. Charles E. Bickett is president.

The J. F. Kurfees Paint Co., paint manufacturer, Floyd and Market Streets, Louisville, Ky., has purchased property adjoining its plant and will erect a five-story addition, 61 x 204 feet, to cost $200,000.

The National Forge Co., Louisville, Ky., recently incorporated with a capitalization of $75,000, will erect a plant at 2020 Garland Avenue, and will remove its equipment from Anniston, Ala., where it had been operating as a partnership. Whitfield Clark is president.

The United States Foil Co., Louisville, Ky., manufacturer of tin foil, has awarded contract for a steel and brick addition to cost $75,000. Some new equipment will be installed, including several machine tools.

The Pacific Coast

SAN FRANCISCO, Dec. 12.

THE Rogers Una Drive Motor Truck Co., Sunnyvale, Cal., manufacturer of motor trucks and parts, is planning the erection of a new factory at Fresno, Cal., and the removal of its present works to this location. Negotiations are in progress with the Fresno Chamber of Commerce for a suitable site.

The Kroyer Motors Co., Stockton, Cal., manufacturer of farm tractors and parts, has leased the former plant of the Long Beach Shipbuilding Co., Long Beach, Cal., for the establishment of a new works. The buildings will be remodeled and additional machinery installed.

The Illinois Electric Co., 314 West Madison Street, Chicago, has construction under way on a four-story factory branch and distributing plant at Boyd and San Pedro Streets, Los Angeles, estimated to cost $250,000, with equipment.

The Magna Copper Co., Superior, Ariz., is arranging a program of extensions and improvements during 1923 to cost $3,500,000. The work will include a new mill with power house and the installation of considerable electrically-operated mining machinery.

The Martin Products Co., Emeryville, Cal., has leased property at Holden and Forty-fifth Streets for the manufacture of automobile products, including cartridges for greasing service, guns and other metal specialties.

The Rucksteel Sales & Mfg. Co., Berkeley, Cal., manufacturer of two-speed axles for Ford automobiles, is planning the establishment of a new assembling plant at The Hague, Holland, to provide for European business. J. T. C. Labouchere will leave the headquarters at Berkeley, and represent the company at the new foreign works.

The Sun Portland Cement Co., Huntington, Ore., recently organized with a capital of $1,000,000 will break ground at once for a local mill, with capacity of 1100 bbl. per day. The work will include a power house and machine shop and is estimated to cost $300,000. H. A. Ross is president.

The Long Beach Iron Works, Long Beach, Cal., has had plans prepared for the erection of a new plant on the Anaheim Road, to cost $75,000 including machinery.

The Gulf States

BIRMINGHAM, Dec. 18.

A STOCK issue of $1,250,000 has been disposed of by the Houston Lighting & Power Co., Houston, Tex., to be used in connection with the erection of a steam-operated electric power house on the Houston Ship Canal, estimated to cost $1,000,000. Samuel R. Bertrom, Jr., is vice-president and general manager.

The White Pine Lumber Co., Bernalillo, N. M., is planning for the erection of a new mill, estimated to cost $500,000, with machinery. A power house is contemplated.

The El Paso Ice & Refrigerating Co., Mills Street, El Paso, Tex., has tentative plans for extensions and improvements in its plant to cost $55,000. The capacity will be increased from 140 to 200 tons per day. J. C. Peyton is president and general manager.

Bonds have been approved by citizens at Perryton, Tex., for $35,000, for the installation of a municipal electric power plant. The Common Council has authorized plans.

The Bessemer Metal Products, Bessemer, Ala., recently organized, is arranging for the operation of a local plant to manufacture piston rings and other automotive products. E. J. Jenkins is president.

The Pelsang Boat Works, Inc., Miami, Fla., recently reorganized, will make improvements and extensions in its local plant, including the installation of considerable machinery. A department for motor boat work will be installed, with machine shop for engine repairs. Roy C. Wright is president, and E. S. Thibault, superintendent.

An electrically-operated pumping plant will be installed at Rotan, Tex., in connection with the construction of a new waterworks, for which bonds for $50,000 have been approved.

The Gulf State Land & Lumber Co., Coushatta, La., is planning for the installation of new equipment at its lumber mill, to be operated with individual motor drive.

The Home Furnace Co., Inc., Corsicana, Tex., recently organized, has plans under way for the establishment of a works to manufacture furnaces, steel kettles and kindred products. S. B. Robinson, Corsicana, is president.

Fire, Dec. 7, destroyed the plant of the R. H. Benner Lumber Co., Mobile, Ala., including planing mill and other departments, with loss estimated at $150,000. It is planned to rebuild.

A manual training department will be installed in the new high school to be erected at Greenville, Tex., for which plans will be prepared at an early date. The Board of Education, L. N. Byrd, president, is in charge.

The East Texas Public Service Co., Jefferson, Tex., is planning for extensions and improvements in its local power plant to cost $30,000. Additional equipment will be installed. The Jefferson Light & Ice Co., a subsidiary, will also make extensions and betterments to cost a like amount.

A manual training department will be installed in the proposed high school to be erected at Decatur, Ala., estimated to cost $125,000, for which bids on a general contract are now being asked. D. O. Whilldin, Birmingham, is architect.

A vocational department will be installed in the new high school to be erected at Brookhaven, Miss., estimated to cost $150,000, bonds in which amount have just been voted. Plans will be prepared at once.

The Central South

ST. LOUIS, Dec. 18.

THE Haynes-Langenberg Mfg. Co., 4042 Forest Park Boulevard, St. Louis, manufacturer of gas furnace equipment, burners, etc., is taking bids on a general contract for its three-story plant on the Kings Highway, 150 x 200 ft., estimated to cost $200,000, with machinery. G. E. Langenberg is president.

The Kansas City Bolt & Nut Co., Independence and Winchester Avenues, Kansas City, Mo., manufacturer of bridge bolts and other heavy equipment, has tentative plans under consideration for an addition.

The B-R Electric Co., Fifteenth and Walnut Streets, Kansas City, Mo., has commenced the erection of a new five-story and basement building at 1411 Walnut Street, for general distributing and operating service. It is expected to be ready for occupancy early in the spring.

The Cincinnati Butchers' Supply Co., 1976 Central Avenue, Cincinnati, will build a refrigerating and cold storage plant in connection with its proposed meat-packing factory two and three stories, 40 x 175 ft., at 1860 Mellwood Avenue, Louisville, estimated to cost $50,000.

Fire, Dec. 9, destroyed a portion of the plant and stock of the North American Oil Co., El Dorado, Ark., with loss estimated at close to $200,000, including equipment.

A manual training department will be installed in the proposed high school to be erected at Ashland, Ky., estimated to cost $100,000, for which plans will soon be prepared.

The United States Engineer, Custom House, Nashville, Tenn., will take bids until Dec. 26, for a quantity of bolts, steel washers, nails, etc.

The Jefferson City Light, Heat & Power Co., Jefferson City, Mo., is perfecting plans for extensions and improvements in its power house, to include the installation of new electric generators, boilers and auxiliary operating machinery.

The Louisville Garage Co., Louisville, has plans under way for the erection of a new service and repair works on Fifth Street, estimated to cost $100,000, with equipment.

The Beasley Lumber Co., Hot Springs, Ark., has tentative plans for rebuilding its millwork plant, destroyed by fire, Dec. 8, with loss estimated at $45,000, including equipment.

The Oklahoma Gas & Electric Co., Oklahoma City, Okla., has acquired more than 750 acres on Harrah Lake, near Harrah, Okla., and will use the site for a new electric generating plant. Preliminary plans are being drawn for the initial units, totaling about 30,000 kw. A fund of $10,500,000 has been arranged for 1923 construction, to include the new electric plant, and other plant and system extensions and improvements. J. F. Owens is vice-president and general manager.

H. R. Bremer, 413 North Drury Avenue, Kansas City, Mo., operating a general machine shop, is planning for the installation of a lathe, hand tools and other equipment.

The Commen Council, Rich Hill, Mo., is having plans completed for extensions and improvements in the municipal electric power plant, including the installation of additional equipment and will call for bids [illegible]

The Ward Furniture Mfg. Co., 200 North First Street, Fort Smith, Ark., has broken ground for an addition to its plant, totaling 150,000 sq. ft., to be used as a hardwood finishing mill, estimated to cost $90,000 with machinery.

The Wood & Lane Co., 915 Olive Street, St. Louis, machinery dealer, has inquiries out for hoists of different sizes; also for mining machinery and locomotives for industrial service.

The Board of Public Service, Room 208, City Hall, St. Louis, will receive bids until Jan. 2 for the construction of a two-story service building and power plant, 55 x 225 ft., at the Training School for Feeble Minded, Scott Farm, estimated to cost $150,000. The installation will include two 200 hp. oil-burning water-tube boilers, electric apparatus, ice and refrigerating equipment, etc. L. R. Bowen, City Hall, is architect and engineer.

Coffey & Sons, Black Rock, Ark., manufacturer of wagon equipment and parts, including iron and wood specialties, have tentative plans for a one-story addition, 50 x 150 ft.

H. Foerster, 3539A Giles Avenue, St. Louis, will commence the erection of a new iron and steel works at 3907 Bingham Street, to be one-story, 50 x 140 ft., and estimated to cost $20,000.

The Producers' Gasoline Co., Okmulgee, Okla., is planning for the construction of a new gasoline refinery to cost $50,000. W. E. Pine is president in charge.

The Western Union Telegraph Co., Chattanooga, Tenn., and 195 Broadway, New York, has completed plans for a one-story general mechanical repair plant at Chattanooga, 200 x 300 ft., and estimated to cost $250,000.

A manual training department will be installed in the proposed Hume-Fogg high school to be erected at Nashville, Tenn., estimated to cost $125,000. The Board of Education is in charge.

Canada

THE closing weeks of the year, which, as a rule, are quiet, have not shown the usual characteristics this season and a good volume of business is making its appearance. Orders are coming from many sections of the Dominion for all classes of equipment and in some quarters fair sized lists have come out. Automobile concerns are again coming into the market for equipment for new works as well as for replacement purposes. Wood-working equipment and pulp and paper machinery are also in good demand. Industrial activities average about 70 per cent and with [illegible] and prospects business in hand a good volume of business is looked for within the next few months.

It is reported that the Canadian National Railways has sent out inquiries to several railroad equipment manufacturers in the Dominion regarding bids for some $15,000,000 worth of equipment. While no definite announcement has been made regarding the placing of orders, builders are of the opinion that some action will be forthcoming now that Sir Henry Thornton has been installed as president.

Gilpin Brothers, Wiarton, Ont., are in the market for a high or low speed engine, 100 to 125 hp.

Notice has been sent out that the time for receiving tenders for machinery and equipment for the Esquimalt, B. C., dry dock, which will represent an expenditure of $4,000,000 when completed, will be received by R. C. Desrochers, secretary Department of Public Works, Ottawa, Ont., up to Jan. 31, instead of Jan. 15, as previously announced.

The city of Winnipeg, Man., will have plans prepared for the erection of a power plant.

The McAuliffe Davis Lumber Co., 57 Duke Street, Ottawa, Ont., will build an addition to its factory to cost about $40,000.

Joseph Limoges, Terrebonne, Que., will rebuild his sash and door factory, recently destroyed by fire, and will require equipment.

H. W. Cooper, general manager Oshawa Railway Co., Oshawa, Ont., will purchase an electric engine and two passenger cars.

The Public Utilities Commission, Cobalt, Ont., proposes to install auxiliary pumping system and will purchase equipment, either steam or gasoline driven, to cost $10,000.

The plant of the Maple Leaf Mfg. Co., 999 Christopher Columbus Street, Montreal, manufacturer of automobile trucks, etc., was destroyed by fire Dec. 9, with loss to building and equipment of $100,000. No statement has been made regarding rebuilding.

The Muskoka Wood Mfg. Co., Huntsville, Ont., is rebuilding its plant, destroyed by fire last June. It will be 75 x 250 ft., and equipped with electrically driven machinery. The power house will be 40 x 70 ft., and will develop between 700 and 800 hp. A soft wood factory will also be erected. The American Machinery Co. will supply the machinery for the hardwood flooring plant and Sheldons, Ltd., will furnish the dry kiln and shaving exhaust equipment.

The Consolidated Mining & Smelting Co. of Canada, Trail, B. C., is completing the erection of a new foundry, 65 x 96 ft., to have a capacity of eight tons of castings per day, in which will be installed two cupola furnaces. The foundry will be operated entirely for the use of the company in supplying miscellaneous castings and cast iron balls for the grading of ores.

The Dominion Iron & Steel Co., Ltd., Sydney, N. S., is spending $50,000 on a new unit to its wire mill and will increase the daily capacity from 60 to 120 tons. It is expected to have the plant in operation by the end of January.

The Western Supply & Mfg. Co., Ltd., Winnipeg, Man., has taken out a Dominion charter and after Jan. 1 will operate under the name of Dominion Bronze & Iron, Ltd. It will take over the plant and business of the old company without any change in capital stock or management. The change in name is being made merely to have a style showing its products, ornamental bronze and iron work.

Plan of New Companies

The Greer Press & Type Casting Co., Brooklyn, N. Y., [illegible] in the manufacture of printing presses and kindred products. [illegible] organization meeting which will be held soon. The incorporators are R. Greer, C. A. Davis and E. Beardsley. Counsel for the company is R. T. Sadler, 44 Court Street, Brooklyn.

The Puget Sound Automobile Mfg. Co., 810-12 Securities Building, Seattle, Wash., was recently organized to manufacture automobiles and automotive equipment. Upon completing the purchase of a site which has already been selected, construction will be started on a factory. Much of the material has been placed, but the company is still in the market for some minor accessories. The chief item of manufacture will be a medium priced pleasure car which will be called the Puget Vertex Eight. W. Augustus King, who has had over twenty years experience as a designing engineer and builder, is president of the company; Omar A. Kyger is vice-president and treasurer; and E. Stanford Keller [illegible]

The Pulaski Hardware Co., Pulaski, N. Y., was recently incorporated with a capital of $100,000 to manufacture hardware and other metal specialties. It has its own building and equipment sufficient for immediate operation. This company is represented by W. W. Armstrong, Powers Building, Rochester, N. Y.

The Corliss Wheel Co., 3 Maiden Lane, New York, which was recently organized with capital stock of $100,000, will begin operations on a new type of disk wheel for automotive use as soon as dies and other equipment are installed. It is still in the market for part of this equipment. Harry L. Sturgis, assistant superintendent Locomobile Co., is secretary.

The Penn State Steel Co., Philadelphia, has been incorporated with capital stock of $50,000, to manufacture iron and steel products. E. M. Applebaugh, of the Pennsylvania Brake Steam Co., Danville, Pa., is negotiating for a building which later will be equipped. Saul Horowitz, 3-9 Broadway, N. Y., is treasurer and counsel for the company.

The Pohlig Mfg. Co., Stewart Avenue and Harrison Place, Brooklyn, N. Y., which was recently incorporated with a capital stock of $500,000, will go through a financial readjustment before giving thought to any negotiations for manufacturing its product, which will consist of automobile fenders and other sheet metal products. S. C. Whitbeck of Whitbeck & Griffin, 170 Broadway, New York, is the chief incorporator.

The Perfect Mailing Machine Co., 257 West Seventeenth Street, New York, has been incorporated with capital stock of $1,200,000 to manufacture mailing machines and devices. Arrangements for manufacturing will be made after Jan. 1 at which time it is expected, the preliminary organization will be completed. The principals in the company are Isador Steiner, of William Steiner Sons & Co., 257-65 West Seventeenth Street; J. While, President; and D. E. Klein.

The Detroit Nut Co., Inc., Detroit, which was recently incorporated with capital stock of $125,000, to manufacture bolts, nuts, and kindred products, is merely a change in the legal status of the company. The personnel and general operation of the company remain the same. The incorporators are Ernest R. Baldwin, Samuel Baxendale, and Carlton M. Higbie. The latter, who is located at 431 Griswold Street, Detroit, represents the company.

The Goodale Co., Kalamazoo, Mich., has been re-organized and is operating under the name of the D. R. C. Foundry Co. Dwight R. Curtenius, formerly identified with the Kalamazoo Stove Co. and the Kalamazoo Malleable Iron Co., is one of the principals in the new organization.

The Stout Metal Airplane Co., Detroit, has been incorporated with a capital stock of $300,000, and will engage in the manufacture of airplanes and airplane equipment. The incorporators are Stanley E. Knauss, Glenn H. Hoppin, and William B. Stout. The latter, whose address is 109 Seward Avenue, Detroit, represents the company.

The Wendland Wheel Corporation, National Building, Cleveland, incorporated under Delaware laws with capital stock of $500,000, will engage in the manufacture of automobile wheels of special design. Plans are now under way to purchase five acres of land and to secure an option on 15 additional acres where an assembling plant of 25,000 sq. ft. capacity will be erected in the near future. During the [illegible] but eventually the company will do all of its work. Frank W. Eichenberg is secretary.

[illegible] will be friction draft gear for railroad cars and engine [illegible] contract. Further organization of this company has been deferred until the early part of next year, owing to the death of one of the incorporators, Wilson E. Symons, 108 West Forty-third Street, New York, is the chief organizer.

The United Mfg. Co., Norwalk, Conn., has been incorporated under the laws of Connecticut, to deal in iron, brass and other such materials. The capital stock is $50,000 and the company will commence business with $25,000. The incorporators are: John H. Richter; George O. Dufault, 25 St. John Street; and Frank Fox.

The Acme Electro-Plating Co., 1043 Fourth Avenue, Huntington, W. Va., was recently incorporated to manufacture plated metal products. However, no manufacturing will be done at the present time, activities being confined to a general plating business. Louis Klamer is vice-president and Maurice Rosen is general manager.

The Fire Protection Corporation of New Jersey, 978 Woodland Avenue, Plainfield, N. J., will erect and equip a pipe and machine shop at some point in New Jersey, not yet selected, for the purpose of manufacturing sprinkler equipment for automatic fire protection. Construction will be started about Jan. 1. This company was recently incorporated with a capital stock of 1000 shares, no par value. Branches will be operated in New Jersey, eastern Pennsylvania, Delaware and Maryland. All parts of the sprinkler equipment for the present are manufactured in Chicago. The incorporators are F. V. Gray, Henry L. Hall and Martin B. Stutsman.

The Long View Concrete Pipe Co., Long View, Wash., has been incorporated with a capital of $50,000 to manufacture reinforced concrete pipe. It is engaged in the construction of a plant for which it will be in need of equipment. The incorporators are J. M. Ragland and Philip Easterday. Fisk & McCarthy, Kelso, Wash., represent the company.

The Eastern Tractors Co., Inc., 94 Massachusetts Avenue, Cambridge, Mass., was recently incorporated with a capital of $100,000 to manufacture tractors and parts. The company acts as manufacturing and selling agent for the Northern Trailers Co., handling snow plows, sleds and logging equipment. In addition the company manufactures and distributes Holt caterpillar tractors, tank-type tractors and motor trucks; also road building machinery, tractor trailers, lawn mowers, etc. Orin F. Files is president and E. Y. Eldridge and Charles P. Connors are directors, all of Bangor, Me.

The United Speedometer Repair Co., 460 West Fifty-fifth Street, New York, has been incorporated with a capital of $10,000 to manufacture speedometer and other instrument parts. Its principal activities will be confined to general repair work. The incorporators are D. Nudelman, L. and E. G. Friedlander.

The H. A. Dahlgren Co., Inc., 20-22 Forest Avenue, Jamestown, N. Y., has been incorporated to manufacture automobiles and equipment, but will confine its present activities to the buying and selling of automobiles, parts and accessories. G. M. Cowan is president.

The Ledox Storage Battery Co., Inc., 314-16 Bergen Street, Brooklyn, N. Y., which was recently incorporated with capital stock of $25,000, is manufacturing two makes of storage batteries. The company makes its own plates and castings, but the remainder of the work is let out through contracts. A new branch has been opened at 76 Fourth Avenue, Brooklyn, as the main office, sales room and repair department. Further expansion is contemplated. The officers of the company are: J. Donald Moulton, president; R. B. Stackpole, vice-president; O. W. Larson, secretary and treasurer.

The Fay Mfg. & Supply Co., Inc., 238-240 West Fifty-third Street, New York, is engaged in the manufacture of automatic screw machines and screw machine products, handling anything in this line from 1/16 in. to 2 in. in diameter. It has its own shop, which is sufficiently equipped for present needs, but plans provide for doubling the output in the near future. L. S. Lieberman is treasurer.

Pittsburgh Welding Corporation has been incorporated under the laws of Pennsylvania with a capital of $15,000, to take over the business of the Pittsburgh Welding Co., a partnership, at 40 Water Street, Pittsburgh. The company is engaged in job welding and also manufactures special tanks, gear guards, insulated and water-cooled furnace doors and specialties in structural steel and plates. The company expects to purchase another portable engine generator set for electric welding. The officers are Ernest H. Pacy, president; John M. Fouse, treasurer; George M. Durschinger, secretary.

Walter Kidde & Co., Inc., Engineers and Contractors, 140 Cedar Street, New York, are organizing the DeBats Metals Co., which will begin production in the near future. B. G. Worth is Vice-President.

STEEL AND INDUSTRIAL STOCKS

Rise in United States Steel Common Paves the Way for Other Issues

Contrary to persistent fluctuations in the general list, which closed with only negligible changes, steel and industrial stocks took some abrupt advances and displayed periodic firmness. Baldwin and Crucible were a little upset in the early week, having been played as a lever to disturb the entire list. Later in the week, operations in Steel common overshadowed the whole market. Speculative reports seeking to brighten the probability of a stock dividend by the Corporation, in addition to extra cash payments now expected, but without good reason, added impetus to the advance which carried Steel to 107⅝ on exceptionally heavy dealings. In the wake of this rise, other steel issues moved up, Gulf States Steel to a new high at 79¼, and Crucible to 73¼. Republic sold up 1½. Recent advances in Steel are on the prospect of a favorable last-quarter statement and built on the belief that cash dividends will come next year. If Steel holds its now probable 80 per cent capacity throughout 1923, there need be little doubt that the belief will be justified.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

	Low	High		Low	High
Allis-Chalmers...	42½	44⅜	Int. Har.	86¼	92¼
Am. B. S. & Fdy.	73	75½	Int. Har. pf....	115	115
American Can..	72½	74½	Lackawanna Stl	76	77½
American Can pf.	112	113⅞	Lima Loco.	57½	60
Am. Car & Fdry.	184	189	Midvale Steel...	27⅝	29⅛
Am. Locomotive.	122½	124⅞	Nat.-Acme	118¼	123⅝
Am. Loco. pf....	120	122	Nat. En. & Stm.	65	65¾
Am. Radiator...	118	119	N. Y. Air Brake.	27	28
Am. Radiator pf.	105	105	Nova Scotia Steel	26	26
Am. Steel Fdries.	37½	38½	Otis Steel	90	94
Baldwin Loco...	122¼	128⅝	Otis Steel pf....	45	45½
Bald. Loco. pf...	111½	111½	Pressed Stl. Car	78⅞	83½
Bethlehem Steel.	61½	63	Ry. Steel Spring.	113¾	116½
Beth. Steel Cl. B	62¼	65	Replogle Steel...	23⅜	26⅝
Beth. Stl. 8% pf.	108¼	111⅞	Republic	45½	48½
Brier Hill ...	14	15	Republic pf.....	82¼	83
Er. Em. Steel...	39	39	Sloss	40	40
Br. Em. Stl. 2 pf.	25¾	26	Steel of Canada.	57⅜	68⅞
Cambria Steel...	41	41	Superior Steel...	29½	30½
Chic. Pneu. Tool	81¾	83¾	Transue-Williams	35	35
Colo. Fuel	24⅝	24½	Un. Alloy Steel .	34½	35
Crucible Steel .	64½	73⅜	U. S. Pipe	24½	29½
Crucible Steel pf.	90¼	92	U. S. Pipe pf....	64	67
Deere pf.	92	73½	U. S. Steel	102¾	107⅝
Gen. Electric...	120	122½	U. S. Steel pf...	120½	121¾
Gt. No. Ore Cert.	30¼	31½	Vanadium Steel.	34	36⅝
Gulf States Steel	73½	79⅜	Va. I., C. & Coke	55	55
Inland Steel....	40	42½	Whouse Air Br..	104	110⅜

Industrial Finances

The Security Trust Co. of Detroit was appointed receiver for the Republic Motor Truck Co., Alma, Mich., on Dec. 11, under a bill of complaint filed by the Bankers' Trust Co., New York, and the Guardian Savings & Trust Co., Cleveland, trustees for a mortgage securing a series of collateral notes, of which about $2,500,000 is outstanding. The appointment brings all property of the truck company into possession of the same receiver, the Security Trust Co., on Sept. 28, having been appointed receiver in general. Since that date the receiver has been operating the truck company's plant on a limited scale.

The King Motor Car Co., Detroit, has been purchased by C. A. Finnegan of Buffalo, who paid $500,000 and assumed debts amounting to $1,000,000. The voluntary bankruptcy took place in December, 1920, and the Detroit Trust Co. was named receiver. Since then the company has paid claims amounting to $1,385,000.

The Birmingham Iron Foundry, Derby, Conn., gray iron castings, has increased its capitalization from $300,000 to $1,200,000.

The Brown & Sharpe Mfg. Co., Providence, R. I., fine and machine tools, has increased its capitalization from $100,000 to $16,000,000, and a stock dividend of 15,900 per cent declared to dispose of the new stock. The shares of this corporation are closely held.

The balance sheet of the Wyman-Gordon Co., Worcester, Mass., drop forgings, as of Oct. 31, last shows total assets and liabilities of $7,995,223, contrasted with $6,247,247 on June 30, 1921. Current assets are given as $3,241,742, and current liabilities as $337,859. The company on the last date had a surplus of $2,180,141, whereas on June 30, 1921, the surplus stood at $1,792,264.

The Laconia Car Co., Laconia, N. H., in the year ending Sept. 30, last, showed an operating profit of $168,804, contrasted with $194,584 for the previous 12 months. In the past year, however, interest charges were about only half of those of the previous year, consequently the net earnings before Federal taxes were $140,187, whereas for the previous year they were $133,945. Current assets at the close of the year were $961,035, and current liabilities $549,229. Since that date, however, $150,000 of notes payable have been liquidated. The company has approximately $1,800,000 of business on its books.

Babcock & Wilcox Co., New York, boilers, has increased its capitalization from $15,000,000 to $25,000,000, of which $5,000,000 will be distributed as a 33⅓ per cent stock dividend.

One of the largest stock dividends declared by an industrial concern this year was 1400 per cent, by the Whitin Machine Works, Whitinsville, Mass., textile machinery. The company's authorized capital was increased from $600,000 to $9,000,000.

Directors of the Hart & Cooley Mfg. Co., New Britain, Conn., registers, ventilators, etc., have recommended to stockholders that the capitalization be now increased from $660,000 to $990,000, and that a 50 per cent stock dividend be declared.

Stockholders of the Wyman-Gordon Co., Worcester, Mass., drop forgings, have authorized the retirement of all outstanding 6 per cent first preferred stock, which was issued and sold in 1916, the original amount being $1,000,000. The stock will be retired early in 1923. It is understood a little more than 50 per cent of the original issue remains in investors hands. The company is to pay a 70 per cent stock dividend in the form of common and second preferred stock to holders of common shares. In connection with this dividend the capitalization has been increased by 8,500 shares of second preferred stock and 4,500 shares of common, making the aggregate of the latter 21,500 shares.

A jury in the United States District Court at Milwaukee has awarded a verdict of $32,029 damages in favor of the Jefferson Forge Products Co., Detroit, against the Falls Motors Corporation, Sheboygan, Wis. The complaint asked damages of $40,000, claiming breach of contract with respect to purchases of crankshaft forgings manufactured on special specifications.

In the consolidated balance sheet of the Canadian Car & Foundry Co., Ltd., and associated companies, as of Sept. 30, a surplus of $2,664,575 is shown, as compared with $3,251,207 for the same period in 1921. Reserves are $5,674,711, against $5,377,246 over a like period last year.

The Rickenbacher Motor Co., Detroit, has announced its first annual statement for the fiscal year ending Oct. 31, total assets are $5,016,673 and net surplus $721,637. Listed assets are: cash, $616,354; capital assets $1,963,981; inventory at cost, $438,429; prepaid expenses, $290,698; and accounts receivable, $650,088. Liabilities consists of common stock, $3,413,120; deferred liabilities, $538,000; current liabilities, $343,916; surplus, $721,637. The first mortgage bonds were reduced $100,000 in October leaving a balance of $400,000 to be provided for.

The Reo Motor Car Co., Lansing, Mich., shows a net profit of $3,140,529, after federal taxes have been deducted, for the fiscal year ending Aug. 31. This is $2,118,297 in excess of the 1921 profits, while the net surplus was $5,719,913, which is less than last year, due to the fact that during the year the company declared a 100 per cent dividend, which took $6,973,250 from the surplus.

The Security Trust Co. has been appointed receiver for the Lincoln Tool Co., 2996 Hubbard Ave., Detroit, which has been engaged in the manufacture of special tools and appliances. Assets of the company are listed at $50,000 and liabilities are half that amount. The receiver has announced that it does not intend to operate the plant. After completing the inventory and appraisal of the books, it will endeavor to find a purchaser for the property and distribute the proceeds among the creditors.

A petition has been filed in the United States District Court asking that a receiver be appointed for the Saxon Motor Car Corporation, Detroit. Following a meeting in New York on Aug. 3, an effort was made to re-finance the company by the sale of 200,000 additional shares of stock. Failing in this arrangement, the Wire Wheel Corporation New York, Detroit Insurance Co. and the Publicker Commercial Alcohol Co., Philadelphia, presented a petition for a receivership.

The Lorraine Motors Corporation, Grand Rapids, Mich., has filed a voluntary petition in bankruptcy. This concern was originally the Hackett Motor Car Co., which manufactured the Hackett car, and was later reorganized as the Lorraine Company. Liabilities were given as $82,000 and assets as $91,000.

The Ewing Bolt & Screw Co.'s plant was sold at the receiver's sale on Dec. 5 to Hal. H. Smith, Detroit attorney and a creditor of the company, for a reported price of $101,000, $100,000 of which covers a mortgage on the plant and machinery. The company has been operated by John A. Hale as receiver for the past several months. Mr. Smith has announced that efforts will be made to reorganize the company and place it on a better production basis.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	
Refined iron bars, base price	3.04c.
Swedish bars, base price	7.50c.
Soft steel bars, base price	3.04c.
Hoops, base price	4.39c.
Bands, base price	3.84c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	3.14c.
Channels, angles and tees under 3 in. x ¼ in., base	3.04c.

Merchant Steel

	Per Lb
Tire, 1½ x ½ in. and larger	3.10c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	3.30c.
Toe-calk, ½ x ⅜ in. and larger	4.15c.
Cold-rolled strip, soft and quarter hard	6.75c. to 7.25c.
Open-hearth spring steel	4.00c. to 6.00c.
Shafting and Screw Stock:	
Rounds	3.90c.
Squares, flats and hex	4.40c.
Standard cast steel, base price	15.00c.
Extra cast steel	18.00c.
Special cast steel	23.00c.

Tank Plates—Steel

¼ in. and heavier	3.14c.

Sheets

Blue Annealed

	Per Lb.
No. 10	4.19c.
No. 12	4.24c.
No. 14	4.29c.
No. 16	4.39c.

Box Annealed Black

	Soft Steel C. R., One Pass, Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.30c. to 4.55c.	.....
Nos. 22 and 24	4.35c. to 4.60c.	5.00c.
No. 26	4.40c. to 4.65c.	5.05c.
No. 28	4.50c. to 4.75c.	5.15c.
No. 30	4.75c. to 5.00c.	.....

No. 28 and lighter, 36 in. wide, 10c. higher.

Galvanized

	Per Lb.
No. 14	4.35c. to 4.60c.
No. 16	4.50c. to 4.75c.
Nos. 18 and 20	4.65c. to 4.90c.
Nos. 22 and 24	4.80c. to 5.05c.
No. 26	4.95c. to 5.20c.
No. 27	5.10c. to 5.35c.
No. 28	5.25c. to 5.50c.
No. 30	5.75c. to 6.00c.

No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
⅛ in. Butt	—50	—42	⅛ in. Butt	—11	+13
¼ in. Butt	—55	—44	¼ in. Butt	—17	— 1
1-3 in. Butt	—57	—44	1-1½ in. Butt	—20	— 5
[illegible]		—41	2 in. Lap	—14	+ 2
⅞ in. Lap	—50	—26	2½-6 in. Lap	—18	— 7
9-12 in. Lap	—46	—25	7-12 in. Lap	—10	— 6

Steel Wire

[illegible]	[illegible] to 5.00c.
[illegible]	[illegible] to 5.00c.
Galvanized annealed	5.40c. to 5.65c.
Coppered basic	5.40c. to 5.65c.
Tinned soft Bessemer	6.40c. to 6.65c.

*Discounts [illegible]

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	19¾c. to 20¾c.
High brass wire	20¼c. to 21¼c.
Brass rod	17 c. to 18 c.
Brass tube, brazen	26⅝c. to 27⅝c.
Brass tube, seamless	23 c. to 23½c.
Copper tube, seamless	26 c. to 26¼c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 22¼c. to 23¼c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14-20		
	Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	Primes	Wasters
			80 lb..	$5.80	$5.55
			90 lb..	5.90	5.65
			100 lb..	6.00	5.75
IC..	$10.00	$8.50	IC..	6.15	5.90
IX..	11.50	10.00	IX..	7.15	6.90
IXX..	13.00	11.25	IXX..	8.15	7.90
IXXX..	14.25	12.50	IXXX..	9.15	8.90
IXXXX..	16.00	14.00	IXXXX..	10.15	9.90

Terne Plates

8-lb. coating, 14 x 20

100 lb.	$7.00
IC	7.25
IX	7.50
Fire door stock	9.00

Tin

Straits pig	40c
Bar	45c. to 50c.

Copper

Lake ingot	15¼c.
Electrolytic	15 c.
Casting	14⅞c.

Spelter and Sheet Zinc

Western spelter	8¾c.
Sheet zinc, No. 9 base, casks	10¼c. open 10¾c.

Lead and Solder*

American pig lead	8c. to 8¾c
Bar lead	9c. to 10c.
Solder, ½ and ½ guaranteed	27½c.
No. 1 solder	26c.
Refined solder	23¼c.

*Prices of solder indicated by grades heated vary according to composition.

Babbitt Metal

Best grade, per lb	75c.
Commercial grade, per lb	35c.
Grade D, per lb	25c.

Antimony

Asiatic	[illegible]

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb. 25c. to 27c.

Old Metals

The market is decidedly stronger in sympathy with new metals. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy	[illegible]
Copper, heavy wire	11.75
Copper, light and bottoms	9.50
Brass, heavy	6.75
Brass, light	5.75
Heavy machine composition	8.75
No. 1 yellow brass turnings	7.00
No. 1 red brass or composition turnings	8.00
Lead, heavy	4.75
Lead, tea	4.50
[illegible]	4.50

ELEPHANT BRAND

REG. U.S. PAT. OFF.

Phosphor-Bronze

Bushings



"ELEPHANT BRAND" Phosphor Bronze "S" Bearing Metal is a true bronze, possessing the highest degree of properties required in a bearing metal. Its long record of success in every branch of industry has given it a place by itself among metals of this class. Its hardness, durability and anti-friction qualities minimize wear on journals and tendency to heating, insuring long life.

It identifies bushings which are a perfected product for more than forty years' specialization in the making of bearing metals, bushings which are tough, durable and a correct combination of copper, tin, phosphorous and lead.

Send for Complete Information

Ingots
Castings
Rods
Wire
Sheets
Ropes
Tubing

The Phosphor Bronze Smelting Co.

2200 Washington Avenue., Philadelphia, Pa.



Alloy Steel that meets your requirements better than ever before

For you it may prove to be Harrisburg. For hundreds of critical buyers it has proven to be Harrisburg. An alloy steel that merely equals in quality and uniformity what you are now using gives little reason for a change in your source of supply. An alloy steel which shows greater uniformity, closer conformity to specifications than you have heretofore known is well worth adopting as a standard of quality.

The constantly increasing use of Harrisburg Alloy Steels simply means that in Harrisburg men with visions of improved products and improved production are finding steel that meets their requirements better than ever before.

You, too, may obtain such steels in form of skelp, slabs, billets, strips, rounds, flats and shapes. Your inquiries will receive prompt attention, and the service of our engineers is at your disposal.

HARRISBURG
PIPE & PIPE BENDING COMPANY
HARRISBURG, PENNA.

HARRISBURG
ALLOY STEELS

For Your Convenience in Buying

All Advertisements Are Grouped According to Products

You can refer direct from this page to each group by referring to section numbers at top of following pages

For additional reference, see Buyers' Index and Advertisers' Index on last pages (Sections Nos. 55 and 56)

BEGINNING WITH PAGE SIX

SECTION

IRON and STEEL 1
General classified under Raised Pleasant

PIG IRON, IRON ORE, COAL, COKE, FIRE-BRICK REFRACTORIES 2

FERRO-ALLOYS 3

BRASS, COPPER, NICKEL, SILVER, BABBITT, ALUMINUM, ZINC, SPELTER and OTHER NON-FERROUS METALS 4

FORGINGS 5

CASTINGS 6

STAMPINGS, PRESSED METAL WORK 7

SCREWS, SCREW MACHINE PRODUCTS . . . 8

BOLTS, NUTS, NAILS, SPIKES, RIVETS, WASHERS 9

SPRINGS 10
Wire Shapes and Parts

WIRE 11
Wire Rope, Wire Fence, Wire Cloth, Wire Screen

PERFORATED METALS 12

PIPE, TUBING 13

GEARS 14

BEARINGS 15

BUSHINGS 16

ELECTRICAL APPARATUS 17
Motors, Generators

TRANSMISSION MACHINERY 18

BELTING, BELT FASTENERS, DRIVING CHAIN and CHAINS 19

MATERIAL HANDLING MACHINERY and APPARATUS 20
Cranes, Electric and Hand Industrial Trucks, Hoists, Industrial Railways, Factory Trucks, Power Shovels, Weigh Scales

FOUNDRY MACHINERY EQUIPMENT and SUPPLIES 21

FURNACES, OVENS, FORGES and HEAT TREATING EQUIPMENT 22

POWDERED COAL EQUIPMENT 23

INSTRUMENTS, INDICATING, RECORDING and LABORATORY 24
Pyrometers, Thermometers, Meters, Counters, Etc.

WELDING MACHINES, APPARATUS, OXY-GEN WELDING 25

GALVANIZING, METAL COATING APPARATUS, ELECTRO PLATING EQUIPMENT and SUPPLIES 26

OILS, OIL EQUIPMENT and CLEANING COMPOUNDS 27
Fuel Oils, Cutting Oils, Lubricants, Oil Filters, Oilers, Oil Systems

TANKS and STEEL PLATE WORK 28

ENGINEERS, STRUCTURAL WORK, BRIDGES, BUILDINGS 29
Rooting, Sash Operating Devices, Apparatus for Ventilating, Factory and Heating

LUMBER and FLOORING 30

SAFETY and SANITARY APPLIANCES . . . 31

FOLLOWING EDITORIAL PAGES

SECTION

MACHINE TOOLS 32
Arranged alphabetically and classified under Boring Machines, Drilling Machines, Lathes, Manufacturing, Automatic Screw Machines, Machines for Boring, Planing, Shaping, Milling, Grinding.

GRINDING WHEELS 33
Wheel Dressers, Threading Tools

SAWING MACHINES and SAWS 34

FACTORY and MILL EQUIPMENT 35
Power Transmitting and Supplies, Metal Presses, Forging Machines, Cold Saws, Bolt Machines, Screw Machines

TWIST DRILLS, REAMERS, MILLING CUTTERS, TAPS, DIES, SCREW CUTTING TOOLS 36

SPECIAL MACHINERY, GAGES, JIG, FIXTURE and TOOL WORK 37

CHUCKS, TOOL HOLDERS 38

FILES, WRENCHES, VISES, ANVILS, CLAMPS 39

PNEUMATIC and ELECTRIC TOOLS and EQUIPMENT 40

PIPE THREADING and CUTTING MACHINERY and SWAGING MACHINES 41

WIRE WORKING and FORMING MACHINERY 42

BOLT, NUT, NAIL, RIVET and SCREW MAKING MACHINERY 43

RIVETERS, PUNCHES, SHEARS 44

SHEET METAL WORKING MACHINERY . . . 45

PRESSES 46

HAMMERS 47

STEEL MILL EQUIPMENT . . . . . ROLLING MILL MACHINERY, ROLLS, ETC. . . 48

POWER PLANT EQUIPMENT, APPLIANCES and SUPPLIES 49
Boilers, Pumps, Engines, Air Compressors, Gas Producers, Steam and Pipe Specialties, Packings, Felts and Insulating Material.

CLEARING HOUSE SECTION 50
Contains a large Selection of Used Machinery, Machine and Equipment

WE WANT TO BUY SECTION
A Place Where Buyers Advertise Their Wants

CONTRACT WORK SECTION 52
Outside Work Wanted on Contract Basis: the Market Place for the Disposal of Surplus and Idle Manufacturing Capacity.

BUSINESS OPPORTUNITIES SECTION . . . 53
Opportunities to Buy or Lease Factories, Mills, etc. Boards of Trade Opportunities, Capital and Agencies Wanted, etc.

THE WEEKLY MEETING PLACE OF EMPLOYER and EMPLOYEE 54
For Help and Situation Wanted Advertisements

BUYERS' INDEX SECTION 55
Where All Materials and Products Advertised Herein Are Classified Under Their Proper Headings

ADVERTISERS' INDEX 56
About 1500 Names of Keenan Advertisers



INGOT MOULDS

Direct or cupola metals of all shapes and sizes. Embody the results of 26 years' experience in filling the requirements of the largest steel plants.

Also Sprue Plates, Runners, Fountains, Cinder Pots, Blast Furnace Bells, Hearth Jackets, Cooling Plates and Miscellaneous Bessemer.

Iron Castings

VALLEY MOULD & IRON CORPORATION

SHARPSVILLE, PA.

WORKS:

JOSEPHINE, PA. SHARPSVILLE, PA. WEST MIDDLESEX, PA.

IMMEDIATE SHIPMENT

From Stocks at

CHICAGO, ST. LOUIS and ST. PAUL

ANGLES, Structural and Small.
BEAMS, Structural.
CHANNELS, Car Truck, Ship Building, Structural and Small.
COLUMN H SECTIONS.
TEES, Structural and Small.
ZEES, Structural.
PLATES, U. M., Sheared and Checkered.
FLATS, Mild and Forging.
HALF OVALS, Mild.
HEXAGONS, Free Cutting.
ROUNDS, Mild, Forging, Free Cutting, Welding, Hammer, Drift Pin, Cold Drawn Screw Stock, Nickel, Chromium Nickel, Polished Shafting and Rivet.
SQUARES, Mild, Forging and Cold Twisted.
BANDS, Scrolled and Straight Lengths.
HOOPS, Scrolled and Coiled.
SHEETS, Blue Annealed and American Bessemer.
AUTOMOBILE SPRING STEEL, Round Edge-Concave.
FORGING BILLETS.
RAILS, Heavy and Light.
RAIL FITTINGS, Splices, Rail-Clips, Track Bolts and Track Spikes.
SHEET PILING, U. S. Steel.
VANADIUM WELDING FLUX.
BOILER TUBES.
BOLTS, Machine, and Bolt Ends.
RIVETS, Structural, Cone Head, Countersunk and Draw Bar Yoke.

ADDRESS

WAREHOUSE DEPT., ILLINOIS STEEL COMPANY, CHICAGO, ILL.
ILLINOIS STEEL WAREHOUSE CO., ST. LOUIS., MO.
ILLINOIS STEEL WAREHOUSE CO., ST. PAUL, MINN.

STOCK LISTS WILL BE MAILED REGULARLY TO THOSE INTERESTED

REPUBLIC

For A Quarter of a Century



For a quarter of a century this company has been functioning as an iron and steel institution. Before the days of the Civil War many of the smaller companies, now a part of Republic, were existent. The picture shows the Brown-Bonnell plant of the Republic Iron & Steel Co. as it appeared in 1861.

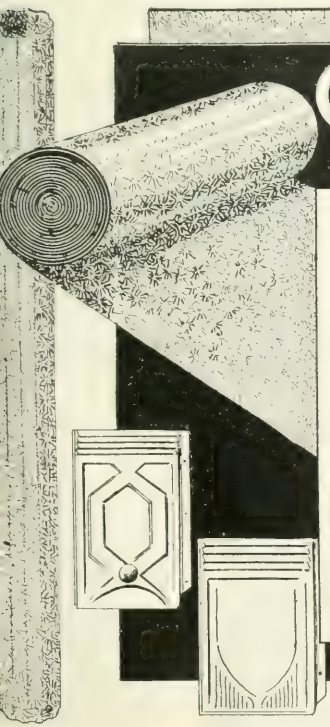
SALES OFFICES

Birmingham Detroit Philadelphia
Cleveland Cincinnati Buffalo
San Francisco New York Chicago
St. Louis Pittsburgh Boston
Dallas

REPUBLIC IRON & STEEL COMPANY

GENERAL OFFICES: REPUBLIC BLDG., YOUNGSTOWN, OHIO

OHIO METAL



Good Steel Made Better

The Raw materials that go into Ohio Metal are chosen with deepest concern for their chemical and physical properties, and, in fact, are the best obtainable. The Pig Iron is of high grade, dependable quality, and the Steel Scrap is of known analysis, consisting largely of crop ends, and material produced in our own mills.

Ohio Metal has exceptional qualities for all outside purposes and is particularly adapted to the manufacture of galvanized products. Eaves trough, spouting, roll and formed roofing, metal shingles, etc., of Ohio Metal will outlast ordinary steel.

Ohio Metal can be obtained in several forms, such as Billets, Slabs, Blue Annealed Sheets, Galvanized Sheets, and Sheared Plates.

A complete list of Ohio Metal Products sent upon request together with quotations.

Wheeling Steel Products Co.

Wheeling, West Virginia

Exclusive Sales Agents for Whitaker-Glessner Co., Wheeling Steel & Iron Co., and LaBelle Iron Works

ALAN WOOD IRON AND STEEL CO.

SAN FRANCISCO
FORT WORTH

Philadelphia, Pa.

NEW YORK
BOSTON
LOS ANGELES

ALAN WOOD IRON & STEEL CO. ESTABLISHED "A.W." 1826 PHILADELPHIA

O. H. FORGING BILLETS

SHAPES PLATES and BARS

Mill and Warehouse Service

WAREHOUSES:

Baltimore ..... Md.
Boston ..... Mass.
Cleveland ..... Ohio
Pittsburgh ..... Penna.
Waverly (Newark) ..... N. J.

Carnegie Steel Company

GENERAL OFFICES:
Carnegie Building, Pittsburgh, Pa.

District Offices: Birmingham, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Denver, Detroit, New Orleans, New York, Philadelphia, Pittsburgh, St. Louis, St. Paul.

Export Representatives: United States Steel Products Company, New York, London.

1539

Have you considered your losses from partially finished parts rejected because of pipes, seams and inferior material?

PENN
MACHINERY STEEL

(*a special 40/50 C Open Hearth*)

Will relieve you of all such costs. It is clean, easily machined and absolutely reliable. The price is attractive.

In Stock { Rounds $\frac{3}{8}$" to 6$\frac{1}{2}$"
Squares $\frac{5}{8}$" to 2$\frac{1}{2}$"

Horace T. Potts & Co.

Founded 1815

316-18-20 N. Third St.

Philadelphia, Pa.

"PEERLESS"

Cold Drawn Steel Products

Alloy Steels—Special Shapes—Screw Stocks—Rounds—Flats—Hexagons Squares—Every Analysis

The PEERLESS DRAWN STEEL COMPANY

MASSILLON, OHIO

DISTRICT SALES OFFICES

New York—C. E. Dickey, Manager.....Woolworth Bldg.
Philadelphia—S. H. Truitt, Manager.....527 Land Title Bldg.
Rochester—I. I. Guntert, Manager.....219 Post Ave.
Cleveland—J. E. Auwerter, Manager.....1320 Citizens Bldg.
Detroit—L. H. Carlisle, Manager.....1938 Penobscot Bldg.
Chicago—F. H. Johnson, Manager.....208 S. LaSalle St.
San Francisco—A. W. Dow, Manager.....Call Bldg.
Cincinnati—R. V. Mann, Manager..1019 First Nat'l Bank Bldg.
Boston, Mass.—Frank S. Spencer, Manager....1265 Boyleston St.
Birmingham, Ala.—C. H. Krauss, Manager,
Jefferson Co. Bank Bldg.
Louisville, Ky.—L. C. Jenkins, Manager.....1008 Lincoln Bldg.
St. Paul, Minn.—Pfaff & Bathke, Managers.....Pioneer Bldg.
St. Louis, Mo.—Wm. R. Blair, Mgr.....905 Carleton Bldg.
New Orleans, La.—John C. Brill, Manager,
610 United Fruit Co. Bldg.

Please address your inquiries to our nearest office.

MORRIS, WHEELER & COMPANY

For IMMEDIATE Shipment

Plates, Universal, Sheared and Floor
Sheets, Blue, Black and Galvanized
Bars, Hot and Cold Rolled
Hoops and Bands, Black or Galvanized
Boiler Tubes
Welding Rods
Shapes, Structural
Fabricated Steel

Philadelphia's Largest Steel Warehouse Since 1828

We Are Often Told

that a more aggressive selling policy would increase our business. Perhaps it would. But we have not yet seen the wisdom of placing the emphasis on spectacular selling methods. Most of our business comes because we have made good in the past, and we prefer it that way.

THE FITZSIMONS COMPANY
"A good concern to do business with"
YOUNGSTOWN, OHIO

Cold drawn steel and shafting. Rounds, squares, flats, hex., and special shapes.

Newport Rolling Mill Co.

Newport, Kentucky, U. S. A.

MANUFACTURERS OF

BLACK AND GALVANIZED STEEL

AND

"GENUINE OPEN HEARTH IRON"

PURE IRON—COPPER ALLOY
RUST RESISTING

SHEETS AND FORMED PRODUCTS

ALL GAUGES, WIDTHS AND LENGTHS

SEND US YOUR INQUIRIES

PROMPT SHIPMENTS GUARANTEED

The Trumbull Steel Company

Manufacturers of

VARIOUS STEEL PRODUCTS

Sales Offices in Principal Cities

Mills and General Offices
WARREN, OHIO

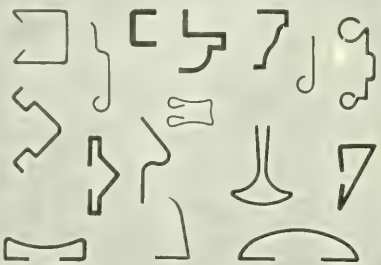
COLD DRAWN STEEL

Is Manufactured By

The National Drawn Steel Company
East Liverpool, Ohio
Pittsburgh District

Special Shapes—Our Specialty

DAHLSTROM
METAL MOULDINGS & SHAPES



Regardless of the Size or Style; if it is a drawn shape we can draw it accurately and satisfactorily for you.

Our Tool Department can make the exact Tools and our Draw Benches can draw them out the way you need them.

DAHLSTROM METALLIC DOOR COMPANY
445 Buffalo Street — Jamestown, New York
New York · Cleveland · Chicago
832 Cunard Bldg 916 Swetland Bldg. 195 Lasalle St.
St. Louis · Detroit
106 North 3rd St — 1331 Dime Savings Bank Bldg.

MOLTRUP'S
Free Cutting
SCREW
STEEL



Two Grades
One Quality

Bessemer Cold Drawn is specially rolled for cold drawing; it is free cutting, accurate to size, concentric and absolutely straight. Permits high rate of production at minimum tool and cutter cost.

Open Hearth

Used on screw work or machine parts where great strength is desired, especially adapted to parts which are to be case hardened.

Send for our catalog

Moltrup Steel Products Co.
Beaver Falls, Pa.

New York Office Woolworth Building, Central Steel & Wire Co., Chicago and Detroit; Union Iron & Steel Co., Cincinnati; H. D. Cushman Company, Cleveland.

Hot and Cold Rolled Nickel
Cold Rolled Chrome Vanadium
"Acme" Screw Stock
Hot and Cold Rolled Strip
Page-Armco Welding Rods
Brass Rods, Rounds and Squares

The Page-Pierce Co.
"STEELS OF QUALITY"
Cleveland

Open Hearth, Rounds
Squares, Flats and Angles
Sheets; Automobile, Black, Galvanized, Drawing and Stamping
Galvanized Toncan Metal

COLD ROLLED STRIP STEEL
SHAFTING
SCREW STOCK
NEEDLE WIRE

WETHERELL BROS. CO.
251 ALBANY ST., CAMBRIDGE, MASS.
STEEL

OPEN HEARTH SPECIALTIES
DIE BLOCKS
TOOL STEEL
DRILL RODS
CUTLERY STEEL

Armco Ingot Iron

(99.84% Pure)

Chemically and Physically Uniform
Suitable for electrical and magnetic uses.

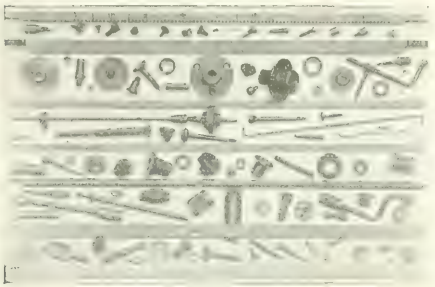
Can now be supplied promptly in

Bright Finished Cold Rolled Strips

Suitable for blanking, punching, bending, etc., as well as Cold Finished Special Shapes in bars and rods or flats.

Write nearest office

EDGAR T. WARD'S SONS CO.
BOSTON-NEWARK-PHILADELPHIA-CHICAGO



SPECIAL SHAPES

Why waste time on extra machining operations and cutting off superfluous stock when our special shapes are so close to requirements as to need hardly any finishing?

STEEL:

Bessemer Screw
Open Hearth
Chrome Vanadium
Chrome Nickel
Nickel

Rounds, Hexagons, Squares, Flats and Special Shapes

Union Drawn Steel Co.

General Offices: Beaver Falls, Pa.
Works: Beaver Falls, Pa., and Gary, Indiana
BRANCH OFFICES
BOSTON BUFFALO CLEVELAND
WAREHOUSES
New York Philadelphia Chicago
Detroit and Cincinnati

QUALITY D SERVICE

Alloy and Carbon Steel

Blooms, Billets, Slabs and Bars for all purposes

Basic and Malleable Pig Iron

Niagara Foundry Pig Iron

DONNER STEEL CO., INC.

Works and General Offices, Buffalo, N. Y.

DISTRICT OFFICES:

New York—Equitable Bldg. Philadelphia—Morris Bldg. Detroit—Penobscot Bldg. Chicago—624 South Michigan Boulevard. San Francisco—Call Bldg. Milwaukee—First National Bank.

INLAND

BASIC OPEN HEARTH

STEEL PRODUCTS

BILLETS BARS PLATES SHAPES SHEETS RAILS

MERCHANT BARS
Rounds — Squares — Flats —
Concrete Reinforcing

PLATES
Sheared and Universal

SHEETS
Black — Blue Annealed — Galvanized.

COPPER ALLOY STEEL SHEETS

STRUCTURAL SHAPES
Beams up to 24" and Std. Channels.
Angles up to 8" x 8".

STANDARD HEAVY TEE RAILS
Rolled from Reheated Blooms.

TRACK ACCESSORIES
Bolts — Spikes — Splice Bars —
Tie Plates.
Plain and Heat Treated.

Inland Steel Company
38 South Dearborn Street, Chicago
Works
Indiana Harbor, Ind. Chicago Heights, Ill.

SIMONDS

Write for Prices
Simonds Mfg. Company
Steel Mills Lockport, N.Y.

MAGNET STEEL
HIGH SPEED STEELS
CHROME BALL AND BEARING STEELS
CARBON AND ALLOY TOOL STEELS
SPECIAL STEELS

STEEL

IRON AND STEEL

F. R. PHILLIPS & SONS CO.

ESTABLISHED 1883

IMPORT — DOMESTIC — EXPORT

PENNA. BLDG. PHILADELPHIA
60 CHURCH ST. NEW YORK
CORSO ITALIA MILAN, ITALY

INGOT MOLDS

THE PENN MOLD & MFG. COMPANY

Works: DOVER, OHIO
General Offices: WHEELING, W. VA.

U-LOY

OPEN HEARTH AND ELECTRIC FURNACE ALLOY STEELS

ALSO TONCAN METAL

Let our Research Department help you solve your problems.

United Alloy Steel Corporation, Canton, Ohio

AGATHON ALLOY STEELS

also Sheet Steel and Hot Rolled Strips

AGATHON STEELS.

THE CENTRAL STEEL COMPANY
Massillon, Ohio
Cleveland Detroit Chicago Syracuse Philadelphia

BROWN-WALES CO. **SELAW** IRON & STEEL

Headquarters in New England for

IRON & STEEL and kindred Materials

Immediate Delivery from Stock
Distributor for ARMCO IRON

BROWN-WALES CO., Boston 9,
BARS—SHEETS—STRUCTURALS
261 BROADWAY, N. Y. CITY BANGOR, MAINE
55 CHURCH ST., NEW HAVEN

MANGANESE STEEL PARTS

IF YOU USE IT WHY NOT THE BEST?
PROMPT RESPONSE TO INQUIRIES FOR
HADFIELD'S "ERA" BRAND
MANGANESE STEEL

The HADFIELD-PENFIELD STEEL COMPANY
BUCYRUS, OHIO.

PARK & WILLIAMS, Inc.

STEEL · PIG IRON · ALLOYS
PW &
COAL · COKE · ORES

PHILADELPHIA
Real Estate Trust Bldg.

SWEDE PIG IRON
SWEDISH IRON ORE.

Acid Open Hearth
FORGING INGOTS
BILLETS
HOT ROLLED BARS
Carbon and Alloy Steel

The McConway & Torley Co.
ARSENAL STA. PITTSBURGH

The Taylor-Wason Corporation

60 Lansdown St., Boston

Warehouse and Yards Cambridge, Mass.

Steel Beams, Channels, Angles
Reinforcing Bars and Nails

MACHINE RACKS
SPECIAL COLD DRAWN SHAPES
Machine Keys, Woodruff Keys, Crankshafts, Connecting Rods, Elevator Guides

STANDARD GAUGE STEEL COMPANY
BEAVER FALLS, PA.
DISTRICT OFFICES
Chicago, Ill. Boston, Mass. Philadelphia, Pa. New York City Detroit, Mich.

STEEL OPEN HEARTH PRODUCTS

MANUFACTURED TO COMPLY WITH THE STANDARD SPECIFICATIONS
SHAPES MANUFACTURED

Bolt Rods, Rivet Rods, Billets for Forging, Bands, Flats, Plain Squares, Plain Rounds, Square and Round Deformed Bars for Reinforcing, Ingots for Forging, Square Twisted Bars for Reinforcing Angles—Equal and Unequal Legs

Stock Lists Will Be Furnished Upon Request

Sales Offices: Seattle, San Francisco, Los Angeles, Northwestern Bank Bldg., Portland

PACIFIC COAST STEEL CO.

Furnaces and Mills: South San Francisco, Seattle, Portland

General Offices: Rialto Building, San Francisco, Cal. Cable Address "COASTEEL." New York Office, 52 Broadway

STRUCTURAL STEEL

PLAIN AND FABRICATED

PLATES—SMALL SHAPES—STEEL AND IRON BARS

LARGE WAREHOUSE STOCKS INSURE PROMPT DELIVERY

RICHARD DECOU COMPANY

TWELFTH AND NOBLE STREETS, PHILADELPHIA

Allegheny

Steel and Iron Products

High Grade Electrical SHEETS for Transformers, Dynamos and Motors.

Special Pickled and Cold Rolled Grades for Automobile Bodies.

Metallic Furniture and all Forms of Deep Stampings.

Sheared Plates—3/16" and heavier up to 96" wide.

Lap Welded Steel Boiler Tubes—2" to 6" O.D.

Heavy Steel Castings.

Hot and Cold Pressed Stampings.

Wrot Washers.

Allegheny Steel Company
Pittsburgh, Pa.

SALES AGENTS

CHANDLER & FLOYD, Inc. 501 Fifth Avenue NEW YORK, N. Y.

STEEL SALES CORPORATION 129 S. Jefferson St. CHICAGO, ILL.

SOLICITING AGENT
J. ALLAN ARMSTRONG
1436 Dime Bank Bldg., DETROIT, MICH.

Special "High Grade"

Basic Open Hearth Steel

FORGING BILLETS

NICKEL
CHROME NICKEL
VANADIUM
CHROME VANADIUM
CHROME

SHEET BARS
SLABS
Special Steel for All Purposes

ANDREWS STEEL CO.

Newport, Ky.
U. S. A.

District Sales Office
1040 McCormick Bldg., Chicago

NORWAY IRON
SWEDISH IRON

ARTHUR C. HARVEY CO.

60-94 Everett St., Boston, Mass. (Allston Dist.)

STEEL AND IRON OF ALL KINDS CARRIED IN STOCK

Largest Warehouse Stock in the East. Prompt Shipments

GENUINE SWEDISH BAR IRON & SWEDISH WELDING WIRE

SWEDISH & DOMESTIC TOOL STEELS

FEDERAL TOOL & ALLOY STEEL CORPORATION

Chicago General Office and Warehouse: 62-76 Rutledge St., Brooklyn, New York City **New Orleans**

Large Stocks—Immediate Shipments—Interesting Prices

"Red Cut Cobalt"

HIGH SPEED STEEL

TREATED BITS

Standard sizes carried in stock ready for quick shipment.

able hardness, toughness and superiority of "RED CUT COBALT" Treated Bits.

VANADIUM-ALLOYS STEEL CO.

OFFICE & WORKS: LATROBE, PA.

TOOL STEEL

DISSTON

Crucible Steel

FOR over half a century we have made the highest grade Crucible Tool Steel experience, expertness and efficiency can produce. The reputation of Disston Saws, Tools, and Files rests to a large extent upon the quality of Disston-made Steel used in their manufacture.

We can furnish you Crucible Steel in Sheets, Bars, Special Shapes, Hammered, Hot Rolled, Cold Rolled.

HENRY DISSTON & SONS, Inc.
Philadelphia, U. S. A.
NEW YORK CINCINNATI BOSTON
120 Broadway 6th & Baymiller Sts. 218 Pearl St.
Chicago: Charles G. Stevens Company
Western Ave. Boulevard & 45th St.

DISSTON

WOLFRAM
HIGH SPEED STEEL

VULCAN CRUCIBLE STEEL COMPANY
ALIQUIPPA, PA.

WARDLOW'S

CRUCIBLE CAST STEEL for fine Pen and Pocket Cutlery, Razors, Shears, Files, etc. "Tough" Cast Steel for Turning Tools, Machine Knives, Dies, Punches, etc. DOUBLE SHEAR Steel for Butchers' Knives
Works at Sheffield and Oughtibridge, England.
Enquiries to S. & C. WARDLOW, 278 Pearl Street, New York
HENRY WOODCOCK, Agent for U. S. A.

Snead Architectural Iron Works
LOUISVILLE, KY.

Structural Steel & Ornamental Iron, Large Stock of Standard & Bethlehem Shapes. Immediate Shipments Plain or Fabricated Material.

Rock Drill Steel (Solid and Hollow)
Tool and Die Steel
Polished Drill Rods

PATRIARCHE & BELL
STEEL
351 West St. New York.

Spring Steel
Bars and Sheets
Music Wire
Cop'd Bess. Rods

HIGH GRADE COLD DRAWN STEELS
Rounds, Squares, Flats, Shapes
DRILL RODS
Pittsburgh Tool Steel Wire Company
Monessen, Pa.

FJAB

A. MILNE & CO.
741-5 Washington Street, New York
8 Oliver Street, Boston
17-19-21 North May St., Chicago

TOOL STEEL
Hollow and Solid Drill Steel
★ PRINCE ★
Chrome Steel
HOLLOW AND SOLID



For Your General Shop Tools
USE "HAWK" BRAND TOOL STEEL

A [illegible] carbon steel made from selected sound and dense "Hawk" Brand Ingots. Gives a beautiful [illegible] at low heat. Holds its cutting edge longer on high speed automatic work and [illegible] production. Have your next order specify "Hawk" Brand Tool Steel.

Steel of Every Description.

HAWKRIDGE BROTHERS COMPANY 303 Congress St., Boston, Mass.

BETHLEHEM

TOOL STEELS





Just as the modern battleship is the product of the lessons learned from the "Monitor," the "Merrimac," and all other iron and steel clad war vessels since then, so do Bethlehem Tool Steels today represent the accumulated experience gained in the manufacture of iron and steel products covering a period of over 60 years.

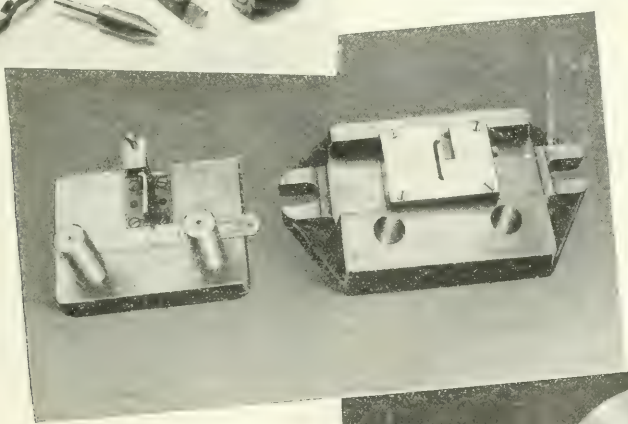
All of which proves the value of consistent, conscientious effort. Bethlehem Tool Steels are leaders today because they are backed by generations of tool steel experience.

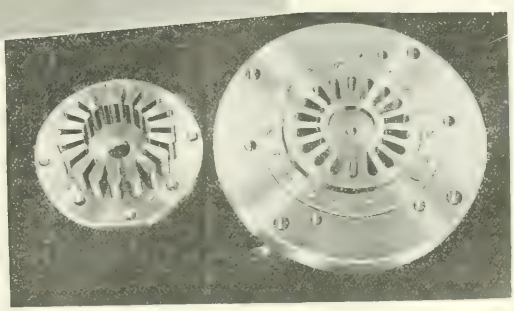
BETHLEHEM STEEL COMPANY

General Offices: **BETHLEHEM, PA.**

Sales Offices:

New York
Boston
Philadelphia
Baltimore
Washington
Atlanta
Pittsburgh
Buffalo
Cleveland
Detroit
Chicago
St. Louis
San Francisco





Bethlehem Tool Steels are made in standard grades to meet every condition of service.

STAINLESS
SHEET STEEL
From .025" Thickness Up

FIRTH STAINLESS STEEL

High Grade Sheet Steel
For all Purposes

THOS. FIRTH & SONS, INC.
H. C. HIDES, *Gen. Mgr.*
American Industrial Building
HARTFORD, CONN.
Warehouse 319 Hudson St., New York City
Works: Sheffield, England

FIRTH-STERLING

S-LESS

The
STAINLESS STEEL
which is proof against
the ordinary agencies of
Rust, Stain and Corrosion

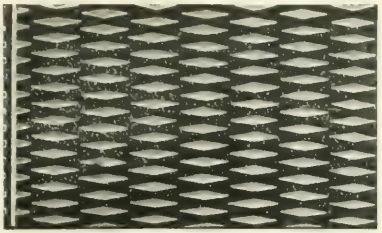
FIRTH-STERLING
STEEL COMPANY
McKeesport, Pa.
NEW YORK BOSTON HARTFORD
PHILADELPHIA CHICAGO CLEVELAND
DETROIT LOS ANGELES

THE BRIER HILL STEEL CO.
PLATES TANK, BOILER, FLANGING, FIRE BOX, ETC.
BLUE ANNEALED, BLACK, GALVANIZED SHEETS
General Offices: Youngstown, Ohio
CONSOLIDATED STEEL CORPORATION, NEW YORK CITY—SOLE EXPORT REPRESENTATIVES

JAMES G. LINDSAY & CO. INC.
ESTABLISHED 1884
PHILADELPHIA
STEEL PLATES SHAPES BARS SHEETS
SHIPMENTS FROM MILL OR STOCK

YOUNGSTOWN
"COPPEROID STEEL" SHEETS
Are superior in point of durability to any Steel or Iron Sheet manufactured. If you want the maximum resistance to corrosion in sheets, investigate them.
THE YOUNGSTOWN SHEET & TUBE COMPANY
Youngstown, Ohio

WORTH STEEL CO.
Manufacturers of
SHEARED STEEL PLATES
FLANGED AND DISHED HEADS AND IRREGULAR FLANGING
General Offices - - - Claymont, Del.



Rolled Steel *"NEVERSLIP"* Floor Plates

AMERICAN PRESSED STEEL CO.
PHILADELPHIA, PA.

AUTOMOBILE SHEETS

Deep Drawing Qualities

ENAMELING AND JAPANNING STEEL

SENECA SHEETS BLACK SHEETS

SENECA IRON & STEEL CO., Buffalo, N.Y.

All Finishes now made in Buffalo
Direct Exporters

New York Office: 1108 Woolworth Bldg.
Chicago Office: 332 So. Mich Blvd.
San Francisco Office: 16 California St.
Detroit Office: 2-108 General Motors Bldg.

TENNESSEE COAL IRON & RAILROAD COMPANY

Blue Annealed
and
Red Tank Sheets

Down to and

Including No. 12 Gauge

General Offices: Brown-Marx Bldg., Birmingham, Alabama

Branch Offices: Boston, Buffalo, Chicago, Cincinnati, Cleveland, Denver, Detroit, New York, New Orleans, Philadelphia, Pittsburgh, St. Louis, St. Paul. Pacific Coast Representatives—U. S. Steel Products Company, San Francisco, Seattle, Portland, Los Angeles.

Export Representatives—United States Steel Products Company, New York City.

APOLLO

STEEL COMPANY

Blue Annealed, One Pass Cold Rolled and Galvanized Steel Sheets. Either Open Hearth or Bessemer

GENERAL OFFICES: APOLLO, PA.

SALES OFFICES: PHILADELPHIA: 702 Lincoln Bldg. CLEVELAND: 811 Citizens Bldg. CHICAGO: 840 McCormick Bldg. SAN FRANCISCO: Call Building

STEEL SHEETS

Automobile Metal Furniture

Enameling Pickled Black

The Eastern Rolling Mill Company

Baltimore Maryland

EDDYSTONE STEEL CO.

CRUM LYNNE, PA.

BLUE ANNEALED SHEETS

ALLOY STEEL PLATES

STEEL PLATES, BULLET-PROOF ARMOR PLATES

SHEETS

BLUE ANNEALED — BLACK — AUTO BODY

PLATES

TANK - FLANGE - FIREBOX
AND LOCOMOTIVE QUALITIES

STEEL CASTINGS

1 to 150,000 POUNDS

THE OTIS STEEL COMPANY
CLEVELAND, OHIO

SHEETS TIN PLATE

Black,
Galvanized,
Blue Annealed,
Single Pickled,
Uniform
Blue
Coke Tin Plate
All Qualities

The Falcon Steel Co.
The Falcon Tin Plate Co.
Works: NILES, O., CANTON, O.
General Offices: NILES, OHIO

SHEETS

KEYSTONE COPPER STEEL

American Bessemer—Open Hearth—Keystone Copper Steel
Black Sheets, Galvanized Sheets, Special Sheets, Corrugated Sheets, Formed Roofing Products, Tin and Terne Plates, Etc.
AMERICAN SHEET AND TIN PLATE COMPANY, PITTSBURGH, PA.
Write for full information, and booklets. Watch for our double-page ads.

Standard Tin Plate Company
CANONSBURG, PA.
Tin Plates Black Plates Terne Plates
All Grades, Coatings and Finishes
Our recent increased capacity for Common Ternes and Black Plates solicits further patronage
Also TIN PLATES OF OUR USUAL GOOD QUALITY

N. & G. TAYLOR CO.
PHILADELPHIA
ESTABLISHED 1810

Manufacturers of high grade TIN PLATE of all kinds.

"Best Quality" Cokes, Charcoals and Ternes.

Specialty: The "Target-and-Arrow" brand of roofing tin, formerly known as "Taylor's Old Style."

Works: Cumberland, Md.
General Offices: 300 Chestnut Street, Philadelphia
Cable Address: Jupiter, Philadelphia

THE GRIFFIN MANUFACTURING CO.

ERIE, PENNSYLVANIA

MANUFACTURERS OF

COLD ROLLED STRIP STEEL

Many manufacturers have improved their product and saved money by substituting GRIFFIN COLD ROLLED STRIP STEEL for brass and malleable iron castings.

Our skilled engineers are at your service to help work out your stamping problems.

New York—Warehouse, Peter A. Frasse & Co., 417 Canal St.
Boston—Warehouse, H. D. Evans Steel Co., 127 Oliver St.
Cleveland—Warehouse, The Paterson-Leitch Co. 936 East 67th St.
Detroit F. Walter Guibert, 328 Ford Building
Chicago—Warehouse. The Central Steel & Wire Co. 119 N. Peoria St.



ACCURATE TO GAUGE • UNIFORM IN QUALITY • SUPERIOR FINISH

Superior Steel Corporation

Hot and Cold Rolled Strip Steel

Made in any degree of tempers to suit the most accurate requirements for difficult stamping and forming work. Our specialty—"The best and most uniform Drawing Steel manufactured."

GENERAL OFFICES—Union Arcade, Pittsburgh, Pa.

SALES OFFICES

EASTERN SALES OFFICE:
Real Estate Trust Bldg., Broad and Chestnut Sts.
Philadelphia, Pa.
NEW YORK CITY LOCAL AGENTS:
WM. H. LEONORI & CO., 30 Howard St., New York City

WESTERN SALES OFFICES:
STEEL SALES CORPORATION
Jefferson and Adams Sts., Chicago, Ill.
DETROIT SALES OFFICE:
Dime Bank Bldg., Detroit, Mich.

ROLLING MILLS: P. C. C. & ST. L. R. R., CARNEGIE, PA.

STRIP STEEL

A Dependable Source of Supply

with an Organization equipped to satisfy the requirements of the most exacting user of

Hot Rolled Strip Steel **Cold Rolled Strip Steel**

WEST LEECHBURG STEEL COMPANY

Gen. Sales Office PITTSBURGH, PA.
Works LEECHBURG, PA.

Sales Offices
NEW YORK
CHICAGO
DETROIT
TOLEDO
CLEVELAND
819 Finance Bldg.
CINCINNATI
906 Union Central Bldg.

UNIFORM QUALITY UNSURPASSED FINISH ACCURATE GAUGE

GREER STEEL COMPANY

Cold Rolled Strip Steel

FOR

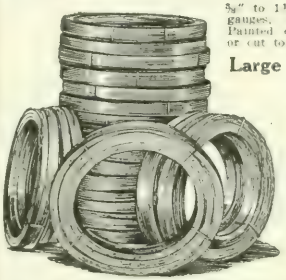
STAMPING AND DEEP DRAWING

SPECIAL AND ALLOY STEELS

GENERAL OFFICES, DOVER, OHIO

DETROIT—SALES OFFICE and WAREHOUSE: Twelfth Street Terminal Buildings
CHICAGO SALES OFFICE: 1432 Conway Building
WAREHOUSE: Standard Steel & Wire Co., 549 W. Washington Street
CINCINNATI—WAREHOUSE: Union Iron & Steel Co.
REPRESENTATIVES: E. W. Strong, Penn Building, Erie, Pa.; J. E. G. Coxwell, 40 Central Street, Boston, Mass.

COLD ROLLED STEEL HOOPS



⅝" to 1½" wide, No. 23 to 29 gauges, inclusive; Blue, Black, Painted or Galvanized, in coils, or cut to length.

Large Stock on Hand

These hoops are box band quality, dead soft, suitable for packing hoops, baling cloth, waste, etc.; bundling lumber, shingles, etc.; reinforcing baskets, boxes and hampers, and kindred purposes.

De Haven
Manufacturing Co.
50-52-54 Columbia Heights
Brooklyn, N. Y.
Tel. 5620-5621 Main
564 West Randolph Street
Chicago, Ill.

ELLIOTT-BLAIR STEEL CO.

MANUFACTURERS OF

TRADE E-B MARK

FINE COLD ROLLED STRIP STEEL

SINCE 1893

Mills—New Castle, Pa.—Mercer, Pa.
Main Office—5th Floor, Johnson Bldg., New Castle, Pa.
Detroit Agent—Sidney Norwood, 917-918 Kresge Bldg.

COLD ROLLED

Flat Steel of Every Description

STRIPS-SHEETS PLATES

UNEXCELLED FOR ACCURACY TO GAUGE
FINE FINISH AND DRAWING QUALITY

THE MORRIS & BAILEY STEEL CO.
PITTSBURGH, PA.

HIGH GRADE

STRIP STEEL

STAMPING AND DEEP DRAWING
UNIFORM IN QUALITY

Control of the Quality begins with the manufacture of the steel in our own Open Hearths and continues through all subsequent processes

LACLEDE STEEL CO.

ST. LOUIS

Steel Works & Rolling Mills, Alton, Ill.

OFFICES:
Detroit—Chicago—St. Louis—Kansas City

THE AMERICAN TUBE & STAMPING CO.

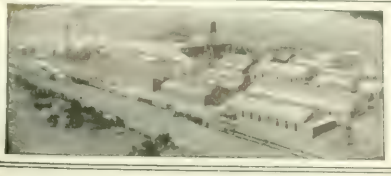
STRIP STEEL

HOT ROLLED

Works and Main Office: BRIDGEPORT, CONN.

COLD ROLLED

New York Office: 120 Broadway
Worcester, Mass.: Park Bldg.



The Athenia Steel Co.

135 William Street, New York City Works: Athenia, N. J.

Makers of High Grade Tempered and Polished Steel for Clock, Watch, Motor and Typewriter Springs, and Tempered and Untempered Steel for other purposes. Special quality—equal to finest imported—both for finish and accurate rolling.

Western Agents: La Salle Steel Co., 2305-25 S. Halsted St., Chicago, Ill.



C S E O

COLD ROLLED STRIP STEEL FOR DEEP DRAWING

The Columbia Steel Company

GENERAL SALES OFFICE AND WORKS
ELYRIA, OHIO

PIG IRON

Foundry Malleable
Basic

COKE

Foundry Furnace
Domestic

Immediate Delivery
St. Louis Coke & Chemical Co.
St. Louis Chicago

HOT AND COLD ROLLED
STRIP STEEL
Largest hoop rolling mill & longest lengths in the world
ACME STEEL GOODS CO. CHICAGO

Silvery Pig Iron (Silicon 6% to 10%)
Bessemer Ferro Silicon (Si 10-20%)
50% Ferro Silicon 90%
Southern Ferro Alloys Company
Chattanooga, Tenn.

Rosiclare Fluor Spar All Grades
ROGERS, BROWN & CO.
SALES AGENTS
CINCINNATI BUFFALO
NEW YORK ST. LOUIS
CLEVELAND BOSTON
CHICAGO PITTSBURGH
PHILADELPHIA

PIG IRON & COKE

Fluor Spar, Aluminum, Magnesite, Smithing Coal, Ferro Alloys, Manganese, Chrome & Iron Ores

CINCINNATI
PHILADELPHIA
PITTSBURG
BUFFALO
CHICAGO
BOSTON
NEW YORK
CLEVELAND
ST. LOUIS

ROGERS, BROWN & COMPANY

PIG Iron, Steel, Wire Rods, Wire, Wire Rope, Wire Cloth, Springs, Perforated Metals, Electrically Welded Fabrics, Wire Lath, Fencing, Machinery Guards, Ornamental Iron.

Wickwire Spencer Steel Corporation
Liggett Bldg., 42nd St. and Madison Ave.
New York City
Worcester Buffalo Detroit Chicago San Francisco

E. ARTHUR TUTEIN
INCORPORATED
PIG IRON, IRON ORE, COKE
Philadelphia New York Boston

W. C. RUNYON & CO.
PIG IRON, COAL and COKE
OFFICES
Borden Bldg., New York First Nat. Bank Bldg., Pittsburgh
SALES AGENTS
THE STRUTHERS FURNACE CO.
BASIC AND FOUNDRY PIG IRON

HILLSIDE FLUOR SPAR ROSICLARE

Dependable because it is mined, washed and concentrated under the rigid rules, inspection and analysis established for the "Hillside" product. And shipments are made on time from covered and drained storage bins.

HILLSIDE FLUOR SPAR MINES
38 So. Dearborn St., Chicago

PIG IRON – ALLOYS
IRON & STEEL PRODUCTS
ORES · FLUORSPAR
COAL & COKE
SERVICE THAT SATISFIES

BRANCH OFFICES:
30 Church Street.....New York
Pennsylvania Bldg.....Philadelphia, Pa.

IRON TRADE PRODUCTS COMPANY
FARMERS BANK BLDG., PITTSBURGH, PA.

PILLING & COMPANY, INC.
Pig Iron Iron Ores Alloys Coal Coke
120 Broadway, New York — Real Estate Trust Building, Philadelphia

FERRO MANGANESE
PIG IRON
FERRO SILICON
COKE
CROCKER BROTHERS
FERRO ALLOYS PIG IRON COKE
PHILADELPHIA NEW YORK CINCINNATI BOSTON
SAN FRANCISCO REPRESENTATIVES: GUNN CARLE & CO.

Hickman, Williams & Co.

INCORPORATED

Basic
Bessemer
Low Phos
Malleable
Foundry
Silvery
Charcoal



Ferro Silicon
Ferro Manganese
Spiegeleisen
Ferro Phosphorus
Sheet Bars
Ingots
Billets
Slabs
Fluor Spar
Mill Cinder
Mill Scale
Coke
Wire Rods

CHICAGO—McCormick Bldg.
ST. LOUIS—Federal Reserve Bank Bldg
CINCINNATI—First National Bank Bldg.
PHILADELPHIA—Morris Bldg.
PITTSBURGH—Oliver Bldg.
BIRMINGHAM—Brown-Marx Bldg.
NEW YORK—Equitable Bldg.

W. P. Snyder & Co.

ESTABLISHED 1888

Pittsburgh, Pa.

Iron Ore

Pig Iron

Coal—Coke

The Shenango Furnace Co.

The Stewart Furnace Company

Kirby Bldg., Cleveland, Ohio

Manufacturers of

Low Phos. and Bess. Pig Iron

Furnace at Sharon, Pa.

WITHERBEE, SHERMAN & CO.

Producers of

Iron Ore and Pig Iron

2 RECTOR ST. NEW YORK



We can Supply You with the Following Quality Products

PIG IRON COAL
COKE ALLOYS

The Matthew Addy Company

CINCINNATI NEW YORK
PHILADELPHIA ST. LOUIS CHICAGO

CLEVELAND CLIFFS

IRON ORE PIG IRON COAL COKE

THE CLEVELAND-CLIFFS IRON CO.

ESTABLISHED 1850 CLEVELAND, OHIO

Pickands Mather & Co.

Cleveland, Ohio

Iron Ore Pig Iron
Coal

Hillman Coal and Coke Co.

NATIONAL BANK BLDG. PITTSBURGH, PA

Low Phosphorus Connellsville
Blast Furnace Coke

FOR

Bessemer & Low Phosphorus Iron

Shipments 3,000,000 Tons Annually
Prompt Shipment Any Railroad Delivery

JOHN A. SAVAGE & CO.
IRON ORE & PIG IRON
DULUTH

ALL GRADES OF
LAKE SUPERIOR IRON ORES
AND NORTHERN PIG IRON

PIG IRON SALES OFFICE
821 DIXIE TERMINAL
CINCINNATI

CRESCENT QUALITY
SERVICE RELIABILITY
HIGH GRADE FIRE CLAY BRICK AND DUST
CRESCENT REFRACTORIES CO.
CURWENSVILLE, PENNSYLVANIA.

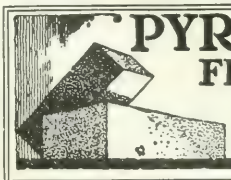
PEABODY FUEL COMPANY
CONNELLSVILLE
COKE
OPERATORS & SHIPPERS
COAL
COKING-GAS-STEAM
PITTSBURGH, PA.

We have been making FIRE BRICK since 1836—that ought to count

Many large users say we have the best. We have solved their Fire Brick troubles, let us assist in solving yours. We are specialists in refractories for use with oil as fuel.

Tell us what you have and we will tell you what you need.

QUEENS RUN REFRACTORIES CO., INC.
LOCK HAVEN, PA.



PYRO-STEEL FIRE BRICK
Made from the famous Sciotoville Clays
The Pyro Clay Products Co.
Oak Hill, Ohio

The Tod-Stambaugh Co.

SALES AGENTS, SHIPPERS AND MINERS OF— IRON ORE

1508 HANNA BUILDING CLEVELAND, OHIO

AMERICAN REFRACTORIES COMPANY

Manufacturers of Highest Grade
Silica, Magnesia, Chrome and Fire Clay Brick
ARCO and ARCOFRAX Super-Refractories
"AA" Austrian Dead Burned Magnesite

Eastern Sales Office: 120 Broadway New York, N. Y.
General Sales Office: 315 Union Arcade Pittsburgh, Pa.
Western Sales Office: 208 So. LaSalle St. Chicago, Ill.

The Chas. Taylor Sons Co.

Manufacturers of
TAYCO—The famous HIGH TEMPERATURE FIRE BRICK—a special refractory.
Fire Clay Brick for All Needs
Gen'l Offices: Cincinnati Mines: Olive Hill, Ky.

DAILY CAPACITY 150,000
A. P. Green Fire Brick
MEXICO, MISSOURI

The Stowe-Fuller Co.
FIRE BRICK
Manufacturers
Fire Clays—Silica Magnesite and Chrome Brick.
Ground Fire Clay—Silica, Magnesite and Chrome Cements.
1209 KIRBY BLDG., CLEVELAND, OHIO

United States Refractories Corporation
Mount Union, Penna.

Manufacturers of
High-Grade Silica and Fireclay Brick
Silica Cement and Fine Ground Fireclay

BRANDS: Silica—"M T U" Fire Clay—"U S R CO"
Capacity 70,000,000 Per Annum

FIREBRICK
The ASHLAND FIREBRICK CO.
ASHLAND, KENTUCKY.
ASHLAND



HYTEMPITE
(Reg. U. S. Pat. Off.)
is used for laying up Boiler and Furnace Walls and for Cupolas, Cupola Spouts, Ladles, Open Flame Melting Furnaces, Forge and Tool Furnaces, etc. Withstands high temperatures, and has great binding strength.
QUIGLEY Furnace Specialties Co., Inc.
26 Cortlandt St., New York

SIL-O-CEL INSULATION

CELITE PRODUCTS COMPANY



Best and most economical lining for converters, soaking pits, mixers, cupolas, etc.

Edge Hill Silica Rock Co.
New Brunswick, N. J.

HARBISON-WALKER REFRACTORIES CO.
Manufacturers of
High Grade Silica, Chrome,
Magnesia and Fire Clay Brick,
Dead Burned Magnesite and Furnace Chrome,
Chrome Ore,
Metalkase Magnesite Brick (Maccallum Pat.)
PITTSBURGH, PA.

"IRONTON STEEL"
HIGH GRADE
HAND MADE
FIRE BRICK
THE IRONTON FIRE BRICK CO.
IRONTON, OHIO

MAGDOLITE
The Pure Furnace Lining
Made from solid pieces of handpicked dolomite, double burned without [illegible]. Write for quotations on immediate shipments.
Standard Burned Dolomite—Lime Silica Limestone—Chemical Lime
J. E. BAKER COMPANY, York, Penn.

Pittsburgh Metallurgical Co.
Producers of
"Pittsburgh"
Bessemer Ferro Silicon—50% Ferro Silicon
Lump, Pea and Ground
Main Office : : : : Niagara Falls, N. Y.

Ferro-Uranium
Ferro-Vanadium
of the
Highest Quality
STANDARD ALLOYS COMPANY
PITTSBURGH, PA.

Electromet Brand

Ferro-Alloys and Metals

CHROMIUM

High Carbon Ferrochrome (maximum 6% carbon)
Low Carbon Ferrochrome (in grades, maximum 0.10% to maximum 2.00% carbon)
Chromium Metal
Copper-Chromium
Miscellaneous Chromium Alloys

MANGANESE

Low Carbon Ferromanganese
Manganese Metal
Manganese-Silicon
Manganese-Copper
Miscellaneous Manganese Alloys

SILICON

Ferrosilicon 50%
Ferrosilicon 75%
Ferrosilicon 80 to 85%
Ferrosilicon 90 to 95%
Refined Silicon (minimum 97% silicon)
Calcium-Silicon
Copper-Silicon
Manganese-Silicon
Magnesium-Manganese-Silicon
Miscellaneous Silicon Alloys

ZIRCONIUM

Ferrozirconium
Silicon-Zirconium
Nickel-Zirconium
Zirconium-Ferrosilicon

Our ELECTROMET BOOKLET describes our complete list of alloys and metals as well as our Service and Research Departments

Electro Metallurgical Sales Corporation
Sole Distributors
Carbide and Carbon Building
30 East 42nd St. New York



TO IMPROVE YOUR PRODUCT

PROBABLY in no other class of steel has the use of Ferro Carbon-Titanium increased more rapidly or consistently than in Plate Steel.

THE majority of manufacturers of this class of steel are regular users of from two to three pounds of Ferro Carbon-Titanium per ton of steel poured. This is particularly true of those making heavy duty quality plate.

INCREASED yield of first quality plate easily compensates for the slight cost of the Titanium —which amounts to from twenty-three to thirty-three cents per ton of steel in the ladle.

IF you are making plate steel you cannot afford to allow your competitors the advantage they have over you through the regular use of Ferro Carbon-Titanium in their steel.

The Titanium Alloy Mfg. Company

Niagara Falls, New York, U. S. A.

Pittsburgh Office	New York Office	Chicago Office
Oliver Bldg.	94 Fulton St.	Peoples Gas Bldg.

FERRO —MANUFACTURERS— FERRO

CHROME—SILICON

Carbon: .75% to maximum 8% 50% 75%—85% 90%

SILICO-MANGANESE ALL GRADES BESSEMER GRADES (10% to 20%)

UNITED STATES FERRO ALLOYS CORPORATION

WORKS: Niagara Falls, N. Y. MAIN OFFICE: 39 East 42d St., New York

KEOKUK

MACHINE CAST

SILVERY IRON

BESS'R FERRO SILICON

KEOKUK ELECTRO-METALS CO.

Sales Office 132 So. La Salle Chicago, Ill.

Furnace: Keokuk, Iowa

KEOKUK

BUY DIRECTLY FROM THE MANUFACTURER

FERRO-MANGANESE—REFRACTORIES

E. J. LAVINO AND COMPANY

PHILADELPHIA, BULLITT BUILDING OLIVER BUILDING PITTSBURGH

FERRO FERRO

SILICON — CHROME

The Baltimore Electro Alloys Company

MANUFACTURER

BALTIMORE, MARYLAND

FRANK SAMUEL S. M. TOMLINSON S. A. COCHRAN

Frank Samuel, Harrison Bldg., Philadelphia

89 Cortlandt St., New York. 53 State St., Boston, Mass.
Wabash Bldg., Pittsburgh

FERRO-MANGANESE, SPIEGELEISEN,
FERRO-SILICON AND SILICO-SPIEGEL

Sole American Agents for

THE NEWCASTLE ALLOY CO., LTD.

FERRO-SILICON AND SILICO-SPIEGEL

MANUFACTURERS OF

Ferro-Chrome (Carbon .65%, 1%, 2%, 4-6%, 6-8%)

Ferro-Tungsten Ferro-Molybdenum

ORES—Manganese, Chrome, Iron

American Swedish Iron Co.'s Special Low Phosphorus Melting Bars, etc.

Walter-Wallingford & Co.

50% Ferro Silicon
Ferro Manganese
Chrome Ore
Pig Iron

20% to 25%
Ferro Phosphorus
Spiegeleisen
Iron Ore
Coke

CINCINNATI PITTSBURGH CHICAGO

Thomas R. Heyward Co.

Ferro Manganese, Fluor Spar

Pig Iron Coal and Coke

Bowman Building Pittsburgh, Pa.

"Carlton" Brand

FERRO MANGANESE

C. W. LEAVITT & COMPANY

SOLE AGENTS

30 Church Street New York



AJAX BULL BEARING ALLOY

BETTER THAN BABBITT

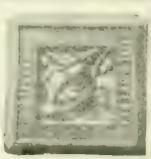
WEARS LONGER—RUNS COOLER—COSTS LESS

THE AJAX METAL COMPANY, Philadelphia

ESTABLISHED 1880

NEW YORK CHICAGO BOSTON CLEVELAND

Also Makers of Ajax Plastic Bronze—Car Brasses—Engine Castings



BRASS-BRONZE-NICKEL SILVER
IN
SHEETS, RODS and WIRE
Seamless Brass and Copper Tubing
CAP and MACHINE SCREWS
Manufactured Articles to Order
SCOVILL MANUFACTURING COMPANY
Established 1802
WATERBURY, CONNECTICUT
New York Philadelphia Chicago
San Francisco Boston Cleveland

BRASS
Tube
Wire
Rod
Sheet
CHASE METAL WORKS
Division of Chase Companies Inc
WATERBURY CONNECTICUT
PLANTS
CHASE METAL WORKS CHASE ROLLING MILLS
New York Rochester Boston Chicago Philadelphia Pittsburgh

BRASS, BRONZE, COPPER
IN
THIN GAUGES
THE BALTIMORE BRASS CO.
1205 WICOMICO ST. BALTIMORE, MD.

ROME Quality
BRASS
COPPER
BRONZE
Sheets; tubes; rods; electrical copper; rivets and bars.
ROME BRASS & COPPER COMPANY · ROME N·Y·

SHOT
U
NICKEL
S
INGOT

ANALYSIS		ANALYSIS	
Nickel	99.00 to 99.50%	Silicon	.05 to .20
Iron	.50	Sulphur	.03 (Max.)
Carbon	.10	Copper	.05

UNITED STATES NICKEL CO.
New Brunswick, New Jersey

SEYMOUR PRODUCTS
Nickel (formerly German) Silver
Wide Sheets Polished and Patent Levelled
Pure Nickel
Sheets, Wire and Rods
Rolled Pure Nickel
Nickel (formerly German) Silver
Sand Castings
Anodes
Cast Nickel Anodes
Nickel Silver, Phosphor Bronze, Cupro Nickel
Brass, Bronze, etc., Ingots, Sheets, Wire, Rods, Tubes, Blanks and Shells
THE SEYMOUR MFG. CO.
SEYMOUR, CONN.
Telephone—Seymour 115 Cable Address—SEYMOUR CO.

AMERICAN
AMERICAN NICKEL 99%Ni.
AMERICAN MALLEABLE NICKEL IS MANUFACTURED from the purest nickel obtainable —insuring an unvarying uniform product. It is produced under the "Hennig" Process and will analyze over 99% nickel.
May be rolled or pressed either hot or cold and can be forged, drawn or spun into any form and machined as readily as mild steel.
The raw material resources of this company are practically unlimited, the manufacturing facilities complete and unexcelled.
Write for new bulletins.
"Exclusive American Representatives The Mond Nickel Company, Limited"
AMERICAN NICKEL CORPORATION
Clearfield, Penna.
Sales Offices:
Oliver Building
Pittsburgh, Pa.

99% NICKEL
NICKEL

BAUSH METAL

DURALUMIN

A Few Advantages

MACHINING

Better than aluminum.

Cost greatly reduced when compared with iron or steel.

Taps and threads well.

RECIPROCATING PARTS

Weight reduced without loss of strength.

Acceleration increased.

Inertia decreased.

Polishes easily.

Resists atmospheric conditions.

No plating required.

Can be rolled, forged, drawn, heat treated and annealed.

Hot and cold worked.

A QUALITY METAL

Duralumin is an alloy produced after years of systematic endeavor to meet the demand for a metal which shall be as light as Aluminum and as strong as mild steel, yet without the many disadvantages of Aluminum in its pure state.

Duralumin is the only light metal that can replace steel in forgings. With a two-thirds saving in weight, heat treated Duralumin Forgings approximate mild steel forgings in strength.

Wherever weight is a deciding factor Duralumin is the most satisfactory metal for most articles made by hot working or forging. Naturally, Duralumin Forgings are especially desirable for reciprocating or moving parts where inertia, due to their own weight, forms a large part of the total stress.

Minimum Physical Properties of Rolled or Sheet Metal (heat treated) and of Forging Metal are:

Tensile .....55,000 lbs. per sq. inch

Elastic Limit ...30,000 lbs. per sq. inch

Elongation.....18%

BAUSH MACHINE TOOL COMPANY

Metals Division

SPRINGFIELD, MASS., U. S. A.

Manufacturers of

BAUSH
DURALUMIN

BLOOMS—SLABS—BILLETS—SHEETS—FORGINGS

BAUSH CASTING METAL INGOTS

Aluminum Alloy of High Tensile Strength

Rolling Mill and Drop Forge Works:
SPRINGFIELD, MASS.

Detroit Office:
1825 Dime Savings Bank Bldg.

Platinum in all forms for all purposes

Crucibles and Dishes. Anodes and Cathodes. Special forms made to order. All of "Baker Standard Quality." Platinum scrap purchased. *Catalog "A" sent on request.*

BAKER & CO., INC.

Murray and Austin Sts. Newark, N. J.

METAL ROME WARE

Die Pressed Forgings
Drawn Metal Work
Tubing
Utensils

ROME MANUFACTURING CO.

ROME, NEW YORK

BRASS AND COPPER

FORGINGS

True to size
Therefore less machining
Greater strength
No blow holes or sand holes
Tell us your needs

HARVEY ELECTRIC CO.

2002 Southport Ave.
CHICAGO, ILL.

TIOGA FORGINGS

Hammered or pressed, smooth forged, rough turned, finished machined and treated.

Open Hearth, Carbon or Alloy Steel.

The Tioga Steel & Iron Co.

52nd St. and Grays Ave. Philadelphia

KROPP FORGE COMPANY
IRON and STEEL

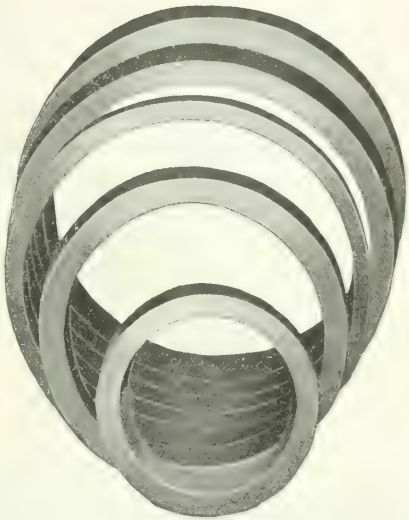
FORGINGS

HEAVY and LIGHT
ALL KINDS OF ALLOY STEEL
Carried in Stock

2524 West 21st St. Chicago

Factory:
53rd-54th W. Roosevelt Road

Welded Rings and Bands



"Forgings that Stand the Test"

GEAR RING BLANKS
CORE RING BLANKS
SPROCKET BLANKS

6″ to 60″ in diameter.

Guaranteed True to Diameter and Flatness

THE AKRON-SELLE CO.
Akron, Ohio

NATIONAL

The large number of National Forging users are scattered all over the country. Wherever forgings are used, you will find "National" well represented.

FORGINGS

Our forgings are the kind that instill confidence. That confidence is never shaken because we know that the only way to achieve success in business is to gain and *hold* the confidence of our customers.

NATIONAL FORGE & TOOL CO.
IRVINE, WARREN CO., PENN.
Bell Phone: 55 Youngsville, Pa.
Branch Offices:
Pittsburgh, Cleveland, New York, Philadelphia, Pa.

STEEL and IRON
FORGINGS
SHAFTS
GEAR BLANKS
RINGS
RODS
CAM SHAFTS
AXLES
BUSHINGS
DIE BLOCKS
CRANE HOOKS
Miscellaneous Shapes
SHIPMENT FROM STOCK
FORGED STEEL PIPE FLANGES ALL KINDS MACHINED OR AS FORGED
SHIPMENT FROM STOCK
HYDRAULIC BLIND
REDUCING WELDING
WE MAKE ALL SIZES
FORGED CHROME STEEL CRUSHER BALLS
SHIPMENTS FROM STOCK
PHILA. STEEL & IRON CO.
PHILADELPHIA, PA.
Office—1008 Comm. Trust Bldg.
Works—33rd & Gray's Ferry Road

FORGINGS
DIE BLOCKS
SHEAR KNIVES
Heppenstall Forge & Knife Co
WORKS
Pittsburgh Bridgeport
Offices in Principal Cities

QUALITY HAMMERED DROP UPSET **FORGINGS**
SCHUYLKILL FORGE COMPANY
SCHUYLKILL DROP FORGE CO.
LUZERNE AND THIRD STS. PHILADELPHIA

Don't Worry
About Those
FORGINGS
Consult Us At Once
Complicated Forgings Our Specialty
We will furnish them exact to blue print and on the date promised. We can produce it
Melling Forging Company
Lansing Michigan

FORGINGS
Railroad, Coal Mine, Automobile, Tractor, Miscellaneous
Drop and Upset
SHEAR KNIVES
Solid Hammered Crucible Tool Steel Blades
Cast Steel Blades for Slab Mill Shears
PITTSBURGH KNIFE AND FORGE CO.
OFFICE AND WORKS: PITTSBURGH, PA.

CHAMPION CMF
DROP FORGINGS
THE CHAMPION MCH. & FORGING CO.
CLEVELAND, OHIO.

FORGINGS
5 LBS. TO 5000 LBS.
WELDLESS RINGS, GEAR BLANKS, SPINDLES, ETC., SMOOTH FORGED, ROUGH MACHINED, OR FINISHED. THOROUGHLY EQUIPPED FOR HEAT TREATING OR ANNEALING.
CANN & SAUL STEEL CO., Inc., 516 Commerce St., Phila., Pa. Works: Royersford, Pa.

INDIANAPOLIS DROP FORGING CO.

MANUFACTURERS OF AIRPLANE DROP FORGINGS

AUTOMOBILE MOTOR TRUCK TRACTOR MOTORCYCLE

INDIANAPOLIS INDIANA

QUALITY DROP FORGINGS

STORMS DROP FORGING CO.

EAST SPRINGFIELD, MASS.

WDF

Quality Forgings

"If It Can Be Forged from Steel 'WDF' Can Forge It."

WESTERN DROP FORGE COMPANY

Marion, Indiana

BRANCHES:

Philadelphia Buffalo Cleveland Detroit Chicago Milwaukee St. Louis Jackson, Mich.



WILLIAMS' SUPERIOR DROP-FORGINGS

Large or small, simple or complicated, any quantity made to order.

DROP—FORGINGS often cheaper than castings —always far superior—

J. H. WILLIAMS & CO.

"The Drop-Forging People"

BROOKLYN: 57 Richards St. BUFFALO: 57 Vulcan St.

CHICAGO: 1057 W. 120th St.

FRONT AXLES

DROP FORGINGS

Backed by 40 years' Experience

ANYTHING THAT CAN BE DROP FORGED UP TO 300 LBS.

ANY ANALYSIS OF STEEL

MODERN METHODS ALL FACILITIES

CHARACTERISTICS OF DROP FORGINGS

The process of fabrication refines the grain and improves the character of the raw material. Still further improvement is possible by heat treatment.

UNION SWITCH & SIGNAL CO.

Pittsburgh District Swissvale, Pa.

CRANK SHAFTS

GEAR BLANKS

CAM SHAFTS

Drop Forgings

Often Cheaper Than CASTINGS

Always Far SUPERIOR

We can and will make any FORGING you want and deliver it when you want it.

RICHMOND FORGINGS CORPORATION

Richmond, Virginia

GENERAL DROP FORGE CO.

SPECIAL DROP FORGINGS OF ALL KINDS TO ORDER

SEND US PRINTS OR MODELS FOR PRICES

BUFFALO, N. Y.

DROP FORGINGS FROM SMALLEST TO LARGEST

TRUCK, AUTOMOBILE, CAR AND GENERAL FORGINGS

CANTON FORGE & AXLE COMPANY

2001-2037 DUEBER AVE., CANTON, OHIO

Drop Forgings

of every character for automobiles, ice machines, agricultural implements, locomotive and car forgings, in ordinary carbon steel or any alloy steel required. Let us quote on your requirements.

Transue & Williams Steel Forging Corporation

ALLIANCE, OHIO

DROP FORGINGS
TO ORDER
THE SCRANTON FORGING CO.
SCRANTON, PA.

THE CLEVELAND
HARDWARE CO.
DROP FORGINGS
CLEVELAND, OHIO.

DROP FORGINGS
The
KILBORN & BISHOP CO.
200 Chapel St., New Haven Conn.

STRIEBY & FOOTE CO.
NEWARK, N. J.
Drop Forgings
as good as can be made

COMMERCIAL DROP FORGE CO.
WARREN, PA.
Manufacturer of
ANY STEEL DROP FORGING
from ½ lb. to 50 lbs.

DROP FORGINGS
OF THE HIGHEST QUALITY
THE D. WILCOX MANUFACTURING CO.
MECHANICSBURG, PA.

DROP FORGINGS
1/2 TO 50 POUNDS
ENDICOTT FORGING & MFG. CO. Inc.
ENDICOTT, N.Y.

Atlas Steel Casting Company
General Office and Works: Buffalo, N. Y.
200 Fifth Ave., New York
Acid Open Hearth Steel Castings Exclusively

Carriage, Wagon, Automobile and Special
DROP
FORGINGS
RICHARD ECCLES CO., Auburn, N. Y.
ESTABLISHED IN 1880
Send to us for
Quotations.
Quality and Service Guaranteed

SIVYER STEEL
SIVYER STEEL CASTING CO., MILWAUKEE

Drop Forgings & Die Sinking
Light and Medium Sizes.
Send model or blue print for quotations.
BROOKS FORGE & MACHINE CO.
YORK, PENNA.
New York Office 50 Church Street

READING
STEEL CASTING CO. Inc.
READING, PA.
The Largest Manufacturers of
MISCELLANEOUS STEEL CASTINGS
Converter Castings 1 to 1,000 Lbs.
Acid Open Hearth Castings 25 to 11,000 Lbs.

1864 DROP FORGINGS 1922
AUTOMOBILE CARRIAGE SPECIAL
We specialize in forgings of nickel steel, chrome nickel, vanadium, tool, open hearth, Bessemer steel and Norway iron. Estimates furnished and deliveries made promptly. Latest Equipment for heat treatment.
The E. D. Clapp Manufacturing Co. Auburn, N. Y.
Detroit Office: General Motor Bldg.

Acid Open Hearth
STEEL CASTINGS
Shipping facilities unusual. Five railroads—all New York Steamship Lines direct.
RIVERSIDE STEEL CASTING CO.
Newark, N. J.

The Drop Forging Company
Automobile Forgings
Forgings for fine tool and machine work
of New York
Jersey City, N. J.

CASTINGS
of semi-steel or gray iron up to 60 tons.
Thirty years of foundry experience is your assurance of our accuracy.
Send us your blueprints for estimates.
PROMPT DELIVERIES
THE CITY FOUNDRY COMPANY
CLEVELAND OHIO

A copy of our list prices on steel castings will be sent you on request

AMERICAN STEEL FOUNDRIES

Address all communications to Dept. M. Room 1107 McCormick Bldg. Chicago

OHIO STEEL CASTINGS

Particular attention to small castings

Careful molding; electric steel; electric annealing; fast machining qualities; delivery requirements met.

The Ohio Steel Foundry Co.
Springfield, Ohio
Foundries also at Lima and Bucyrus, Ohio, where larger castings are made.

Chester Steel Castings Company

Office—Philadelphia Works—Chester, Pennsylvania

Acid Open Hearth Steel Castings up to 60,000 lbs.

McHaffie Steel Castings also, which are particularly desirable for crankshafts, connecting rods, gear blanks, cylinders, etc., and parts where a maximum ability to resist wear is required.

STEEL CASTINGS One Ounce to 50,000 Pounds

We have just doubled our capacity and will therefore be able to take additional contracts for those quality castings. We can assure you of

IMMEDIATE DELIVERY

Make use of our Metallurgical Department in determining the correct analysis of your steel.

Write to

NATIONAL STEEL CASTING CO., Montpelier, Ind.

Atlantic Steel Castings Company

CHESTER, PA.

Acid Open Hearth Steel Castings

1 to 10,000 lbs. each

Ships Castings Railroad Castings Fittings
Steel Castings of Every Description

HIGH GRADE

STEEL CASTINGS

Open Hearth Process

THE COMMERCIAL STEEL CASTING CO.

MARION, OHIO

Shipping Facilities on Five Railroads

Federal Steel Foundry Company

Foot of Morton St., CHESTER, PA.

Manufacturers of

Open Hearth Steel Castings

UP TO 75,000 POUNDS

Steel Castings

Acid Open Hearth

We solicit your business and guarantee satisfaction

Sharon Foundry Company, Sharon, Pa.

Service *Quality*

GEO. H. SMITH STEEL CASTING CO.

ELECTRIC STEEL CASTINGS

MILWAUKEE, WIS.

Chicago Office: 111 W. Washington St.

Moore & Moore Products

Electric Manganese Steel Castings, Manganese Steel Detachable Sprocket Chain, Malleable Iron Castings, Steel Drills, Reamers, Taps, etc., of electric high speed and carbon steels. Prices are predicated entirely on their cost.

MOORE & MOORE, INC.

Colonial Trust Bldg. Reading, Pa.

Lakeside Malleable Castings Company

Racine, Wisconsin

Chicago Office: 38 S. Dearborn St.

MAYNARD ELECTRIC STEEL CASTING COMPANY

Electric steel castings from 1 to 5000 lbs. each.

1-11 Kilbourn Road Milwaukee, Wis.

StL

CERTIFIED MALLEABLE CASTINGS

ST. LOUIS

MALLEABLE CASTING COMPANY

7701 NO. CONDUIT AVE., ST. LOUIS, MO.

MALLEABLE GRAY IRON

Electric Steel Castings

From a Pound to a Ton

Inquiries Solicited.

CRUCIBLE STEEL CASTING CO.

Lansdowne Del. Co. Pa.

MALLEABLE IRON CASTINGS

NEWARK MALLEABLE IRON WORKS

QUALITY NEWARK, N.J. SERVICE

ELECTRIC STEEL CASTINGS

Farrell-Cheek Steel Foundry Co.

Sandusky, Ohio

DECATUR

MALLEABLE IRON COMPANY

DECATUR ILLINOIS

MALLEABLE IRON CASTINGS

MONROE STEEL CASTINGS CO.

ELECTRIC FURNACE PROCESS

MONROE MSC MICHIGAN

Temple Malleable Iron & Steel Co.

Office 312 Harrison Bldg. PHILADELPHIA

High Grade Clean CASTINGS

Foundry TEMPLE, Pa.

Electric Steel

CHICAGO STEEL FOUNDRY CO. CHICAGO, ILL.

MALLEABLE IRON CASTINGS

Quality and Quantity Producers

VERMILION MALLEABLE IRON CO.

MEMBER OF CERTIFIED MALLEABLE CASTINGS

641 Railway Exchange Bldg. CHICAGO

202 N. Sixth Ave. HOOPESTON, ILLINOIS

ELECTRIC STEEL CASTINGS

From ¼ to 2000 lbs. in quantities

The Industrial Steel Casting Co.

Toledo, Ohio

MALLEABLE IRON CASTINGS

ACME STEEL & MALLEABLE IRON WORKS, INC.

BUFFALO, N. Y.

GRAY IRON CASTINGS

Quality and Deliveries Guaranteed

STOWELL "CERTIFIED" MALLEABLE CASTINGS

ELECTRIC STEEL CASTINGS THAT SATISFY

We can assure prompt delivery on Electric Steel Castings.

Our castings are known to be true to pattern, carefully cleaned and of a superior quality.

We are also manufacturers of Malleable, Gray Iron and Brass Castings.

Let us estimate on your needs. Send us your specifications today.

THE STOWELL COMPANY

Founders and Manufacturers—Makers of "Certified Malleable"

SOUTH MILWAUKEE

628 McCormick Building, Chicago, Ill.

CASTINGS

Certified Malleable Iron

Refined Electric Steel

BELLE CITY MALLEABLE IRON CO. Racine Wis.

RACINE STEEL CASTINGS CO. Racine Wis.

CHARCOAL MALLEABLE IRON CASTINGS

CADILLAC MALLEABLE IRON CO. CADILLAC, MICH.

THE KILBY MANUFACTURING COMPANY CLEVELAND, OHIO

Modern machine, pattern and tank shops, also grey iron and semi-steel foundry. High grade, medium and heavy weight grey iron and semi-steel castings—rough and machined. All classes of special machinery to buyers' specifications and designs.



C. I. Casting—Weight 44,000 lbs.

Malleable Castings

of GUARANTEED QUALITY for Railroad, Agricultural Implement and Automobile Requirements

NORTHERN MALLEABLE IRON CO.

ST. PAUL, MINN.

MEEKER FOUNDRY COMPANY

LIGHT MALLEABLE IRON CASTINGS for Saddlery and Chain Hardware, also Automobile Accessories

Established 1843

95 Clay St. Newark, N. J.

GRAY IRON CASTINGS

SMALL AND LARGE, TO ORDER

We are specialists in

Ingot Molds for Brass and Copper
Manhole Frames and Covers
Building Castings
General Machinery Castings up to 30 tons each

THE SESSIONS FOUNDRY CO.

BRISTOL, CONN.

LINK-BELT

MALLEABLE IRON CASTINGS

We specialize in the manufacture of small, accurate, "certified" malleable castings, of the same high quality as maintained for Link-Belt Chains.

LINK-BELT COMPANY

INDIANAPOLIS P. O. Box 346 INDIANA

THE RICHMOND

MALLEABLE CASTINGS CO.

RICHMOND, INDIANA

If you are looking for quality give us a trial.

GRAY IRON CASTINGS

OF ANY DESCRIPTION

We make a specialty of Machine Moulded Castings true to pattern and of uniform softness. Let us quote on your requirements.

FAIRMOUNT FOUNDRY COMPANY

15th and Indiana Avenue Philadelphia, Pa.

1854

WE MANUFACTURE CERTIFIED MALLEABLE CASTINGS SPECIFY THEM

ROCKFORD MALLEABLE IRON WORKS

ROCKFORD, ILLINOIS, U. S. A.

IF you are interested in getting the best castings at the lowest price consistent with quality, read in the January 4, 1923, issue of Iron Age an account of the organized production in the foundry of the

Lycoming Motors Corporation

Williamsport, Pa.

CASTINGS ANY SIZE UP TO 200 TONS EACH

GRAY IRON - SEMI STEEL - AIR FURNACE METAL

Do You Buy Metal, or Service?

YOUR primary requirement is SERVICE rather than so many pounds of iron. Consequently you want castings that last the longest. Customers have frequently told how our castings have outlasted others, even to the extent in some cases of giving from three to five times the service obtained from castings of the same design purchased elsewhere.

Send us your blue prints or sketches for estimate and quotation.

Buffalo Foundry & Machine Company

1545 Fillmore Avenue, Buffalo, N. Y.

New York Office: 17 Battery Place

Troy Foundry and Machine Co., Inc.

Successors to West Side Foundry Co.

Troy, New York, U. S. A.

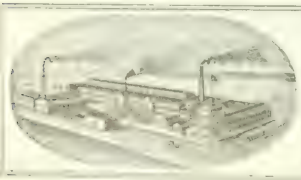
Manufacturers of



High grade, small and medium weight grey iron castings. Finished machine work done on small castings. Capacity, 30,000 Tons yearly.



Especially equipped for machine production from aluminum match plates on large contracts.



I. S. Spencer's Sons
INC.
Guilford, Conn.
Manufacturers of
Light Grey Iron,
Brass and Bronze
CASTINGS
Patented Articles
General Hardware
Screw Machine
Products
Polishing & Plating

Light Gray Iron **Castings**

Made and Finished in any manner

HUBLEY MANUFACTURING CO.
LANCASTER, PA.

LB **CASTINGS**

DIE CASTINGS—DROP FORGINGS

Lough Bros. 90 West St., New York

Grey Iron Castings

Machine Work Patterns

Made to please particular customers

Sweet & Doyle Fdy. & Machine Co.
Troy (Green Island), New York



The Atkinson Co.

ROCHESTER, N. Y.

No Castings Too Large for Our Capacity.
None Too Small for Our Best Attention.

NON-FERROUS CASTINGS

Send Us Your Inquiries and Specifications.
Give Us Your Problems and Let Us Specify.



FRAMINGHAM FOUNDRIES, INC.

FRAMINGHAM, MASS.

WE MAKE HIGH GRADE
GRAY IRON AND SEMI-STEEL CASTINGS
MAY WE ESTIMATE ON YOURS

FRANKLIN DIE-CASTINGS

With a special process for finished brass castings, range now includes brass, aluminum, bronze, tin, lead and zinc base alloys.
Estimates given from samples, drawings or blueprints.
Franklin Die Casting Corp., Syracuse, N.Y.

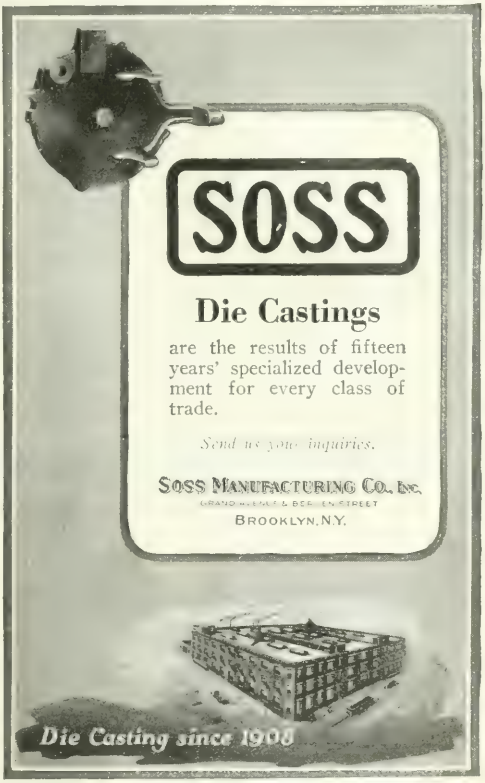
COPPER, BRONZE AND ALUMINUM CASTINGS

for Blast Furnaces, Tin and Sheet Mills, Hoop and Rod Mills, Plate Mills, Machinery Builders, Ship Builders, Railroads

5, 10 and 15% Phosphor Copper

MANGANESE BRONZE CASTINGS
Castings of Any Size. Specification Work a Specialty

Established 1887
KEYSTONE BRONZE COMPANY
General Offices: 39th Street, Pittsburgh, Pa.



BRONZE CASTINGS, FORGINGS INGOTS, RODS, SHEETS

American Manganese Bronze Co.
Holmesburg, Philadelphia, Pa.
CLEVELAND: 508 Leader-News Bldg. PITTSBURGH: 906 House Bldg.
DETROIT 7606 Woodward Ave.
New York Office: Room 806, 59 Pearl St.

Bronze Castings

Gear Bronze, phosphor bronze, Lumen bronze, manganese bronze, babbitts, solders, etc.
Let us have your address
LUMEN BEARING COMPANY
BUFFALO, NEW YORK

Castings—Brass, Bronze and Aluminum, Machine Work

The Columbus Brass Company
540 Dublin Ave. Columbus, Ohio

WELBRONCO



WELLMAN
BRASS BRONZE
ALUMINUM CASTINGS
From 1 Ounce to 1 Ton
The Wellman Bronze Company
Cleveland, Ohio

Enterprise Brass Works

MANUFACTURERS OF
PLUMBERS BRASS GOODS
BRASS, BRONZE AND ALUMINUM CASTINGS
Your Inquiry Solicited.
MUSKEGON, MICH.

Fredericksen Company

Brass, Bronze and Aluminum Castings
Die Castings a Specialty
SAGINAW MICHIGAN

DOEHLER

The World's Largest Producer of

DIE-CASTINGS

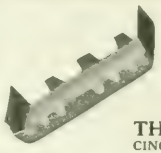
It would be folly for any producer of die-castings to claim 100 per cent perfection for his product. So long as the human element is a factor in the making of die-castings, errors will creep in. And such errors can be minimized only by creating—in the producer's organization—an "esprit du corps" under which each man feels a personal responsibility for the maintenance of a standard. The Doehler policy is to make every man in the Doehler organization feel that he is a vital factor in the success of the company—a success built on a basis of quality in die-castings and a success that can be maintained only by maintaining the standards of metal quality, accuracy and finish which have made Doehler the world's largest producer of die-castings.

DOEHLER DIE-CASTING CO.
BROOKLYN, N.Y.
TOLEDO, OHIO.



Doehler die-cast parts for electrical devices and radio apparatus

EXPERTS
In
The Manufacture and Development of
Wrought Steel Specialties
THE MOSEL MANUFACTURING COMPANY
Kensington, Conn.

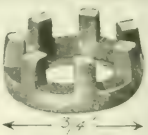


Lower Production Costs
usually follow the substitution of pressed metal parts for castings. Let us help you decide whether such substitution is practicable.
THE METAL SPECIALTY CO.
CINCINNATI OHIO

STEEL STAMPINGS
Flat and Formed Pieces of Medium Size Our Specialty
LIGHT WASHERS AND BURRS
JAPANNING, TINNING, ELECTRO PLATING
J. H. SESSIONS & SON BRISTOL, CONN. U. S. A.

STEEL BRASS ALUMINUM ZINC
STAMPINGS
PLATING ENAMELING AND ASSEMBLIES
PUT IT UP TO US - TO STAMP IT OUT FOR YOU
The NEW ENGLAND TUBE & STAMPING Co. WEST HAVEN CONNECTICUT

Precision in Pressed Parts
Can you afford not to investigate our facilities for making your pressed parts? The accuracy and finish of our products is an economy in the long run. Send us blueprints for estimates.



NEW ENGLAND PRESSED STEEL CO.
NATICK Makers of "Trouble Free" Stampings MASS.

METAL STAMPINGS
THE E. KONIGSLOW STAMPING & TOOL CO., Cleveland, Ohio
Die Makers, Light Automobile Stamping

STAMPINGS
We make the right kind of metal stampings and do drawing work, specializing in quantity production Screw Machine Products. Any metal specialties. Let us put our experience behind your product.
WILLIAMS TEST CLAMP COMPANY
CLEVELAND, OHIO

P&B
Parish & Bingham engineers are specialists in finding the right way to produce pressed metal parts. Put your problem in their hands if you want the solution to pay dividends.
Parish & Bingham Corp.
Cleveland, Ohio



SPECIAL SHEET METAL ARTICLES AND PARTS

Made to your order and design

Geuder, Paeschke & Frey Co.

1350-1600 St. Paul Avenue, Milwaukee, Wis.
Detroit Office: 712 Dime Bank Bldg.
Chicago Office: 352-358 W. Ohio St.

G.P.&F. SERVICE "KNOWING HOW SINCE '81" METAL STAMPINGS

G. P. & F. Service is the result of an ideal combination—first, a fifteen-acre plant with a complete equipment for doing both small and large quantities of work—and, second, an excellent personnel directed by executives of forty years' experience in this work.

Drawing, Stamping, Pressing, Punching, Spinning, Blanking and Forming all sheet metals, such as Aluminum, Brass, Copper, Steel, Tinplate and Zinc; Hot Galvanizing, Ternecoating, Japanning, Tinplating and Porcelain Enameling.

Send samples or blueprints for a prompt estimate. It will pay you.

BUY YOUR STEEL BLANKED TO SIZE

ELIMINATE WASTE—COST OF PRODUCTION—UPKEEP OF DIES

WE FURNISH OUTLINE BLANKS PIERCED or FORMED



Trunk Fittings Etc. | Lock Parts | Mop Stampings | Armature and Polo Piece Laminations | Ears and Clips

Sled Knees and Parts for Electric Switch Boxes

ON SUITABLE PIECES
OUR PRICES ARE LESS
THAN YOUR COSTS

We will gladly submit estimates.

Mail Samples or Drawings
for quotations to

SPECIALTY DEPARTMENT

EDW. G. BUDD MFG. CO.

Makers of all steel automobile bodies
PHILADELPHIA, PA.



HAMco Stampings

Automobile, Motorcycle and Bicycle Parts Our Specialty

During our twenty-three years in the stamping business we have specialized in making Automobile, Motorcycle and Bicycle parts.

Many manufacturers of these articles have substituted Hamco Stampings for troublesome castings because they are lighter, stronger and less expensive. They require no machining or polishing.

Let us tell you what you can save by using them.

The H. A. Matthews Mfg. Co., Seymour, Conn.

WORCESTER STAMPED METAL

· QUALITY · STAMPINGS

STAMPED METAL PARTS

For every industry

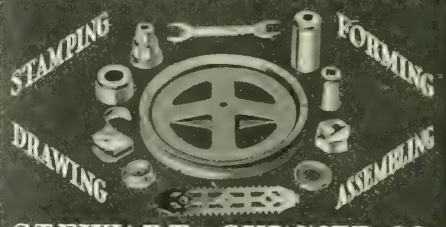
38 Years of Light and Heavy



Stamping Experience. We offer you the benefit of our knowledge and equipment.

WORCESTER STAMPED METAL CO.
WORCESTER, MASS.

METAL STAMPINGS



STEWART - SKINNER CO.
WORCESTER, MASS.



Something Unusual

This drawn brass piece was turned inside out and spun to shape—an unusual job, but one that our 35 years' experience helped us to solve quite readily.

MATTHEWS MANUFACTURING CO.
Sheet Metal Stampings
WORCESTER MASS.

SERVICE



QUALITY

WORKMANSHIP

Flat and Formed Steel

STAMPINGS

Of Every Description Up to ¼" in Thickness Are Our Specialty

We also make washers in standard—special shapes and sizes. Send us your specifications.

JOLIET WROUGHT WASHER CO.
JOLIET ILLINOIS

Your Small Metal Parts

With exceptional equipment for swaging, grinding, turning, stamping and drawing, we will give you *prompt service* in Quality Small Metal Parts.

For 50 years Torrington Products have been widely known for Quality and Service.

Send for quotations.

THE TORRINGTON COMPANY
EXCELSIOR PLANT
55 FIELD ST. TORRINGTON, CONN.



Metal Stampings and
HOT and COLD ROLLED
STRIP STEEL

Worcester Pressed Steel Company
Worcester Mass.
Branch Offices: New York, Chicago, Indianapolis, Detroit

STAMPINGS

We specialize on stampings to replace castings. Give us an opportunity to show you what we can do.

E. R. WAGNER MFG. CO.
North Milwaukee, Wis.



Specialists in Metal Goods

Metal goods made to order from Brass—Zinc — Aluminum — Steel. Stamping — Drawn Work—Assembling Parts or completed articles.

All finishes from Nickel Plate to Gold.

Send Blueprints or Samples for quotations.

THE BRIDGEPORT METAL GOODS MFG. CO.
Bridgeport, Conn.

CROSBY STAMPINGS

Send us your stamping problems; our 25 years' experience will help solve them.
Consult Our Engineers.

THE CROSBY CO., Buffalo, N. Y.
Branch Offices: New York, Detroit, Cleveland, Philadelphia, Chicago.

GLOBE Stampings



Experience (20 years), equipment (the best experience can suggest), and high standards, make GLOBE Stampings "better than the average."

The first two are the factors that enable us to give really first class stamping service at moderate prices.

May we estimate for you?

The Globe Machine & Stamping Co.
1250 West 76th St. Cleveland, Ohio

KOEHLER STAMPINGS

CUT COSTS GET OUR PRICES

See our announcement in the 1st issue of each month.

KOEHLER MFG. CO., Inc., Marlboro, Mass.

STANDARD SCREW PRODUCTS CO.

Manufacturers of

Bar Milled Cap Screws, Set Screws, Special Parts of all kinds. Cold Upset Products. Hardened and Ground Precision Work.

DETROIT, MICH.

Wood Screws



Machine Screws
Stove Bolts, Tire Bolts

American Screw Company

Providence, Rhode Island

WESTERN DEPOT:
225 West Randolph Street, Chicago, Illinois.



WOOD SCREWS

Iron, Steel, Brass, Bronze and Monel

Iron Rivets—Any Style Head

Tinners and Coopers Rivets

Pipe Couplings

Bessemer and Basic
Steel Wire
Resistance Wire

BRIDGEPORT SCREW CO.
BSCo.
BRIDGEPORT, CONN.
Trade Mark

Steel and Brass Fine Wire
Monel Wire
Steel and Brass Scratch
Brush Wire

THE BRIDGEPORT SCREW CO. Bridgeport, Conn.

Representatives:

A Master's Achievement!

A Better and Quicker Means of Attaching Name Plates and Making Fastening to Metal, Etc.

Parker Hardened Drive Screws



Save 75% of the cost of using machine screws and they are better by far than escutcheon pins.

Just drill a hole and drive the screw home with a hammer—that's all. It cuts its own thread in steel, cast iron, bakelite or other composition.

Made in all sizes. Shall we send samples?

PARKER SUPPLY CO., New York
Branches: Chicago, Philadelphia, Springfield, Minneapolis

Patent Pending



Machine Screws
Formed Wire Parts
Rivets and Pins

Special Wire and Rod Parts

What are your requirements?

OUR PRICES WILL INTEREST YOU

Send Prints or Samples

The Blake & Johnson Co.
Waterbury Since 1849 Conn.

A Penny Saved

There is little doubt left in the minds of most present day executives that it is not worth while to take chances on unknown material or workmanship, simply to get a slightly lower price.

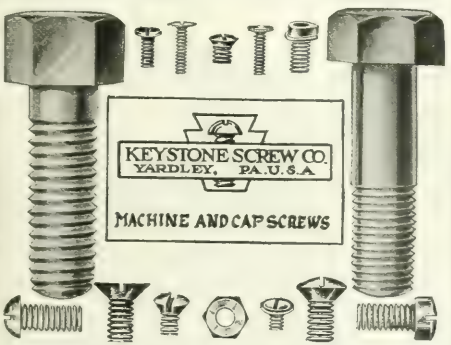
The importance of saving the pennies by careful buying is not to be underestimated. But it is quite as important to be sure that the saving is really an economy.

How much better it is to take advantage of the established reputation of the Screw Machine Products Corporation and get what is bound to be satisfactory to you and to the customer who uses your product.

Better save your customer, than a penny. Send blueprints for estimates.

◈

Screw Machine Products Corp.
1012 Eddy St., Providence, R. I.



THE F. P. SCREW COMPANY
MANUFACTURERS



Cut thread Hexagon Hd. Cap Screws

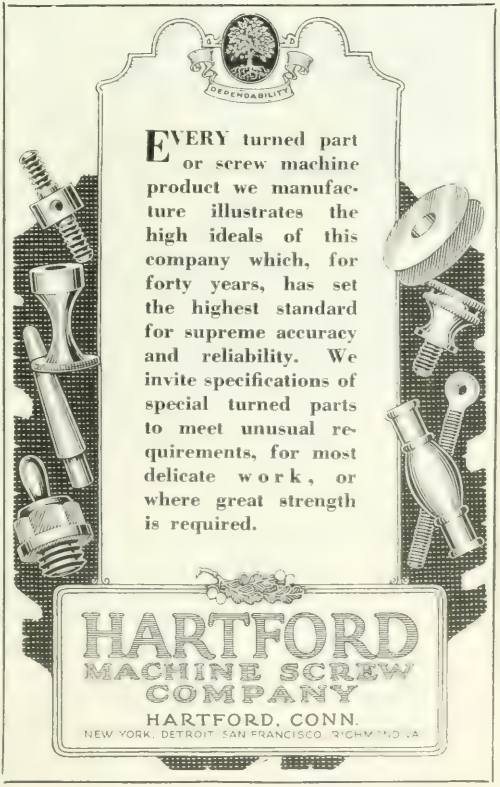
2921-23 E. 79th St., Cleveland, Ohio

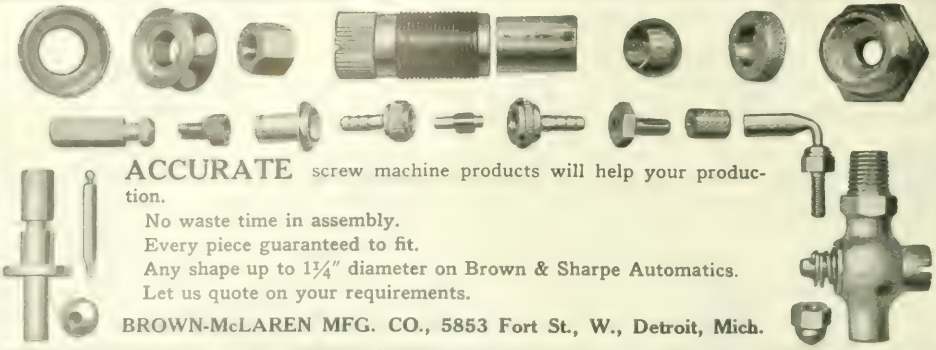
NEW YORK 100 West 56th St. CHICAGO 959 Monadnock Bldg. DETROIT 193 Hichton Ave.
MINNEAPOLIS—228 Boston Block, Thos. Bagley



MACHINE SCREWS
STANDARD, OR MADE TO YOUR DESIGN

HARVEY HUBBELL, Inc.
BRIDGEPORT, CONN.





ACCURATE screw machine products will help your production.

No waste time in assembly.
Every piece guaranteed to fit.
Any shape up to 1¼" diameter on Brown & Sharpe Automatics.
Let us quote on your requirements.

BROWN-McLAREN MFG. CO., 5853 Fort St., W., Detroit, Mich.

Mattatuck Products

Screw Machine Products—to your order!

Our product includes:
Turned or cut thread pattern machinery;
Die-cut and upset nuts and precision.

In brass, steel, nickel silver,
Any shape up to 1¼" up to 1¼" in diameter.
Send blue prints or samples.



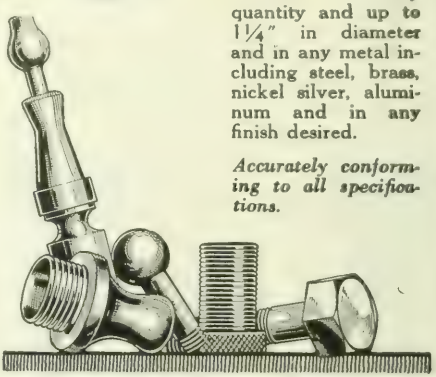
The MATTATUCK MFG. CO.
WATERBURY CONN.

"BARNES-MADE" SPECIAL SCREW MACHINE PRODUCTS

SPRINGS, WIRE & STEEL — EST — "BARNES-MADE" PRODUCTS — 1857 — SCREW MACHINE PRODUCTS

Furnished in any quantity and up to 1¼" in diameter and in any metal including steel, brass, nickel silver, aluminum and in any finish desired.

Accurately conforming to all specifications.



The Wallace Barnes Co.
Bristol, Connecticut
Western Office, Book Bldg., Detroit

Screw Machine Products



CAP and SET SCREWS

The Wm. H. Ottemiller Co., Inc.
Pattison St. and M. & P. R. R., York, Pa.



Special Automatic Screw Machine Products

Hardened and Ground Parts

Keystone Tool & Metal Parts Corp.
65 Oak St. Buffalo, N. Y.

QUALITY — SERVICE — ECONOMY

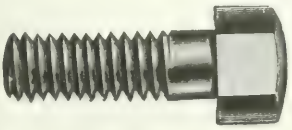
SCREW PRODUCTS

THE NEW BRITAIN MACHINE COMPANY, NEW BRITAIN, CONNECTICUT

SCREW MACHINE PRODUCTS

THE MODERN IDEA

of machine construction is that pointing directly to the plan of assembling parts manufactured under the direction of blue prints and instructions, in well equipped shops for such work by which means the final production is brought to its highest efficiency at the minimum costs.



THIS PLAN HAS MADE POSSIBLE

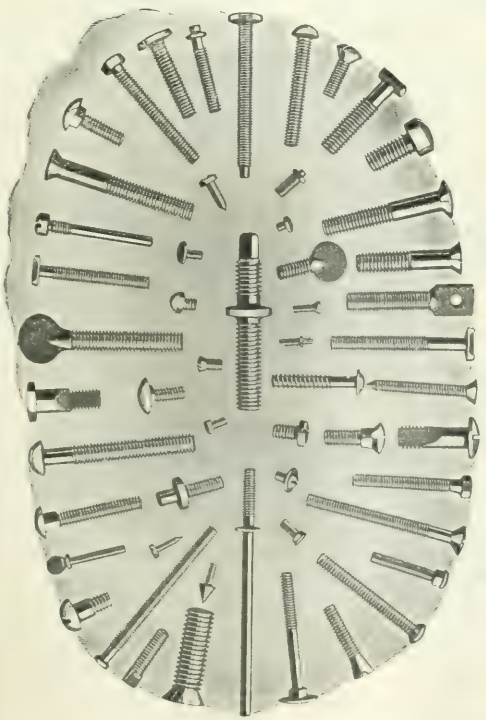
enormous productions in engines, automobiles, typewriters, cream separators, sewing machines, knitting machines and various other machines, made in liberal quantities, whereas were they obliged to depend upon their own productive resources, not only would it be necessary to have greater capital, but enlarged plants, heavy investments in machinery, and greatly enlarged man power, skilled and costly.

LET US FIGURE WITH YOU

for the production of the little duplicate parts, particularly the screw machine parts, upon which we are especially well prepared to give efficient service.

SAMUEL J. SHIMER & SONS, Inc.

Milton, Penna.



Progressive Machine Screws

The Quality Line

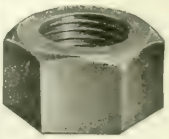
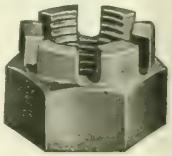
Machine screws are a small item in the manufacture of your product, *but it's a very important one.* It's essential that they be accurate, made to gauge, properly inspected, in order to insure you against loss of time in your assembling. Our modern equipped plant, with every facility for producing a *Quality product,* insures you of a service that will be a new experience if you have not already enjoyed it. In addition to our line of Standard Machine Screws we manufacture special screws of all varieties and from all standard materials. You are not asked to pay a premium for our quality or service. Write us, stating quantities, and we will send you an estimate promptly. Keep in mind that quantity insures you a satisfactory price.

The Progressive Mfg. Company

TORRINGTON, CONN.

The illustration shows special parts that we have made for other manufacturers.

"FOSTORIA"
SCREW MACHINE PRODUCTS
and Service
THE FOSTORIA SCREW CO.
FOSTORIA, OHIO, U.S.A.


Screw Machine Products
WESTERN SCREW PRODUCTS CO.
ST. LOUIS, MO.

SAE Plain Nuts
Castle Nuts

SCREW MACHINE PRODUCTS

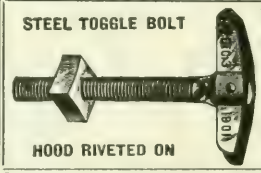
Machine Finished Forgings

Cylindrical Grinding to Precision Limits
PARK MFG. CO. Worcester, Mass.

Do You Want the BEST Expansion Bolts?

THE BROHARD COMPANY, Philadelphia, Pa.

AUTOMATIC SCREW MACHINE PRODUCTS
Send for Catalogue No. 212
THE BELL COMPANY
BELCO PRODUCTS
STRENGTH-ACC SERVICE
1555 FILLMORE AVE. BUFFALO, N.Y.
We are Growing

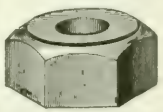
STEEL TOGGLE BOLT

HOOD RIVETED ON
Wrigley's Toggle Bolt
With Double Flanged Sides and Rigid Back
For securing Brackets and Fixtures to Hollow Tiling, Marble Slabs, Steel Ceilings or Plastered Walls where screws or nails fail to hold.
Wants for Discounts
The THOMAS WRIGLEY CO.
504 S. SHERMAN ST.,
CHICAGO, ILL.

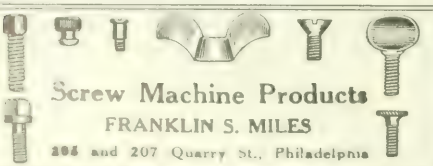
METAL PARTS and ASSEMBLIES
Screw Machine Products
Good Uniform Quality
THE NEWTON Mfg. Co.
Plainville Conn.

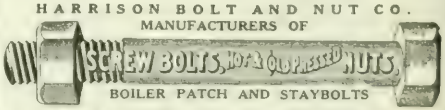
A Complete Line of
Bolts, Nuts, Rods, and Rivets
CATALOG ON APPLICATION
The Kirk-Latty Manufacturing Co.
CLEVELAND, OHIO U. S. A.

"WESTERN"


SCREW MACHINE PRODUCTS
The Western Automatic Machine Screw Co.
Elyria, Ohio

Rockford Bolt Company

ALL KINDS OF BOLTS
Nuts, Washers, Lag Screws, Rivets, Hook and Eye Bolts, Forgings, etc., either plain or galvanized. Try us to-day.
Prompt shipments everywhere
200 Ruby Street
ROCKFORD, - ILL.


Screw Machine Products
FRANKLIN S. MILES
205 and 207 Quarry St., Philadelphia

HARRISON BOLT AND NUT CO.
MANUFACTURERS OF


BOILER PATCH AND STAYBOLTS
Special and Odd Shape Bolts, Washers, Rivets
Harrison Brass and Galvanized Bolts New Jersey

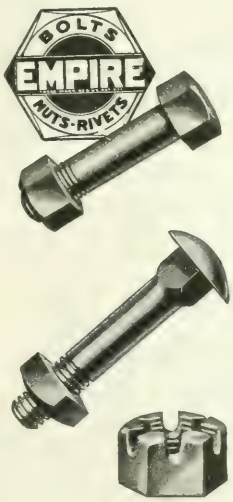
SCREW MACHINE PRODUCTS
Quality H&G Precision
THE EASTERN MACHINE SCREW CORPORATION
31-41 Barclay St. New Haven, Conn.

BOLTS—NUTS—RIVETS
ALL SIZES—COMPLETE LINE
Deliveries to Steamship or Railroad Piers in New York City District
BAYONNE BOLT & NUT CO.
BAYONNE, N. J.
(on New York Harbor)

ANALYZE YOUR PRODUCTION SCHEDULES



Breakfast at the William Penn



"I'M stopping at the William Penn," said Riggs as Bronson and himself stepped out of the sleeper in Pittsburgh. "Have breakfast with me."

"All right," answered Bronson. "It beats all how eating makes one hungry. I've been feasting for several days now."

"Why all this fancy eating?" asked Riggs as they crawled into a taxi.

"Oh, I was up to the plant and we gave the old man a party. He's been grinding away there now for exactly fifty years."

"It's always interesting to know a man who has devoted his life to a task," said Riggs, a little later as the pair sat at a table.

"Usually a man stays because he likes the job, and he usually does well what he likes to do. A fine example of that is the Russell, Burdsall & Ward organization, bolt, nut and rivet people at Port Chester—you've heard of them. There's upwards of a hundred people in that plant who have been there more than 30 years. There's one man who has been on the job for 66 years, and a goodly group that has been there over 50 years."

"Yes, I know the concern," said Bronson. "I was purchasing agent for a little plant in Indiana when I first heard of Russell, Burdsall & Ward. We used to have a deuce of a time finding a dozen good nuts until we got acquainted with R. B. & W."

"I thought all nuts were alike," said Riggs.

"All Empire nuts are," said Bronson. "That's R. B. & W.'s trademark. They developed machinery to make nuts automatically perfect. A batch of bad nuts sure can break down the production schedule in any plant that uses many."

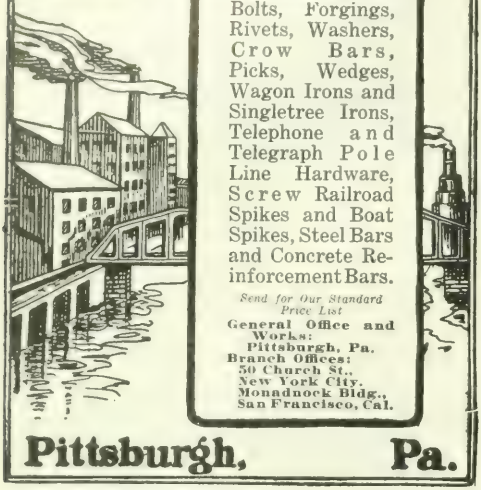
"Just how?" asked Riggs.

"Oh, it isn't the cost of the nut itself," answered Bronson. "It's the time the workman loses in trying on bad ones, but—"

"Here give me that check," said Riggs. "I invited you to breakfast. You know that nut dope rather interests me. I'm a stockholder in a little plant that may be overlooking something. I must make a memorandum on it—let's see, Russell, Burdsall & Ward, Empire nuts, Port Chester, N. Y.—there, that's done. Well, let's go."

RUSSELL, BURDSALL & WARD
BOLT & NUT COMPANY
PORT CHESTER, N.Y.
PEMBERWICK, CONN. • CHICAGO • SAN FRANCISCO • ROCK FALLS, ILL.
Makers of Bolts, Nuts and Rivets Since 1845

Oliver Iron & Steel Co.



Established 1863

Bolts, Forgings, Rivets, Washers, Crow Bars, Picks, Wedges, Wagon Irons and Singletree Irons, Telephone and Telegraph Pole Line Hardware, Screw Railroad Spikes and Boat Spikes, Steel Bars and Concrete Reinforcement Bars.

Send for Our Standard Price List

General Office and Works: Pittsburgh, Pa.
Branch Offices: 50 Church St., New York City. Monadnock Bldg., San Francisco, Cal.

Pittsburgh, Pa.

Spikes—Bolts

TRACK, BOAT, DOCK TRACK, MACHINE



Bar Iron, Rail Splice Bars, Tie Rods, Nuts, Washers

Prompt Shipment from R. R. Terminals, or Steamship Piers at New York City or Jersey City.

Established 1859



W. AMES & CO.

Factory, Warehouse and Office: Jersey City, N. J.

Bolts, Nuts and Screws

Any Style of Finish

EASTERN BOLT & NUT CO.

PROVIDENCE, R. I.

C. P. NUTS { Rough, Semi-Finished, Hexagon, Square, Jam } { Agricultural, Tinners, Coopers, Shovel, Tank, Boiler, etc. } **RIVETS**

GARLAND MANUFACTURING CO.

Successor to Garland Nut & Rivet Co.
West Pittsburgh, Lawrence Co., Pa.

The Fifteen of the Bolt and Nut Business

RHODE ISLAND TOOL CO.

Automatic Screw Machine Products by

Providence, R.I.

Fabricated Parts from Non-Ferrous Metals

Bolts, Nuts, Bushings, Springs, Ferrules, Coils, Nipples, Balls, Washers, Etc.

Made From: Brass, Bronze, Copper, Aluminum, Naval Brass, Monel Metal, Etc.

Catalogue on Request

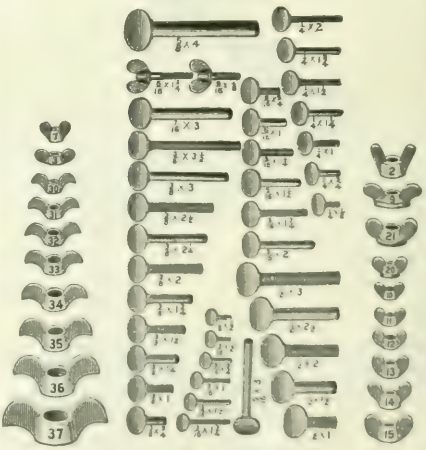
THE EVERITT CO.
261 Franklin St.
Boston 9, Mass.

A Business 67 Years Old and Improving With Age

CLARK BROTHERS BOLT CO.

ESTABLISHED 1854

Thomas Devlin Mfg. Co.
Third and Lehigh Ave.
Philadelphia, Pa., U. S. A.
MANUFACTURERS OF



Malleable and Soft Grey Iron, Steel, Aluminum. Brass and Bronze Castings to order.

Carry a large stock and variety of styles and sizes of Malleable Iron Thumb Nuts and Thumb Screws; Threaded and Blanks. Malleable Iron Fittings for Gas, Air, Steam and Water.

IMPORTANT ANNOUNCEMENT

The Ferry Cap & Set Screw Co.

have acquired the exclusive sales agency for

The Brightman Manufacturing Co.

Manufacturers of

Brightman Milled-from-Bar Nuts

We are in position to furnish the following:

U. S. Standard Semi-finished Hexagon Nuts
S.A.E. Standard Semi-finished Hexagon Nuts
S.A.E. Standard Castle Hexagon Nuts
U. S. Standard Slotted Hexagon Nuts
Check, Jam, Case Hardened and Special Nuts, etc.

Brightman Milled-from-Bar Nuts have enjoyed such a remarkable reputation for their accuracy and uniformity, it is only natural that they are to be permanently identified with Ferry Process Screws.

A union that insures maximum speed in production, due to the micrometer accuracy with which both screw and nut are threaded.

Send all specifications, blue prints and inquiries for Brightman Milled-from-Bar Nuts to

The Ferry Cap & Set Screw Co., Cleveland, O.

Manufacturers of Heat-Treated Screw Machine Products

FERRY

PROCESS SCREWS

The Palnut Compression Nut Lock



Palnut is a positive thread lock-nut. It grips the bolt all the way around. It can be spun on the bolt with the fingers. ¼ turn locks it.



The greater the vibration, the tighter it locks.

Stocked in U.S.S. and S.A.E. threads.

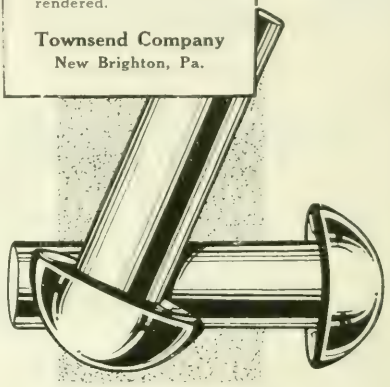
The Palnut Corporation, **Passaic, N. J.**

TOWNSEND
For Superior Quality

SUPERIORITY in the quality of product.

SUPERIORITY in the quality of service rendered.

Townsend Company
New Brighton, Pa.



Rivets, Nails, Wire, Wire Products

Interstate

Cold-Headed—Heat-Treated

RIVETS

All sizes, from 7 x ⅞ down to the smallest package goods. Full range of styles and finishes.

Send for list and test samples

Interstate Iron & Steel Co.
104 South Michigan Avenue
Chicago

VICTOR RIVETS

Steel Rivets in all styles from 1/4" upwards

Fifth Edition of our catalogue "Scientific Facts" just issued. Copy mailed upon request.

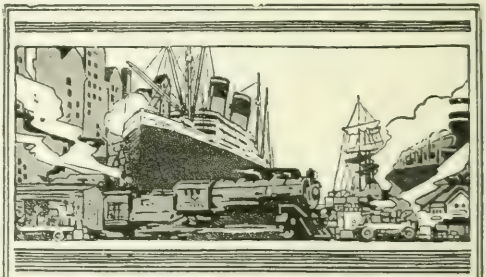
Also VICTOR { TRACK BOLTS / KNUCKLE PINS / BRAKE PINS

THE CHAMPION RIVET COMPANY



CLEVELAND, OHIO

Largest Rivet Manufacturers in The World



TOPPING BROTHERS

HEAVY & MARINE HARDWARE

SHIPBUILDERS' RAILROAD AND CONTRACTORS SUPPLIES

ESTABLISHED 1885
NEW YORK CITY

Tacks and Nails—Double-pointed Tacks and Staples—Spring Cotters—Small Washers and Riveting Burrs.

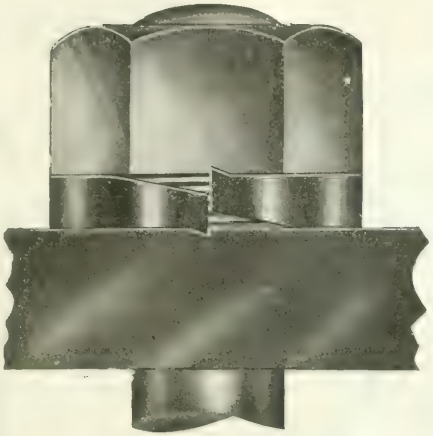
RIVETS

IRON, BRASS AND COPPER

COBB & DREW, INC.
PLYMOUTH, MASS.

CUT NAILS
WIRE NAILS

NORTON IRON WORKS
Ashland, Kentucky



WE ALSO MAKE
PLAIN LOCK WASHERS

POSITIVE
LOCK WASHERS

If You Use Bolts You NEED Them

It may be impossible to rivet a certain piece, but do you know it is possible to bolt it so that it will hold as tightly as though riveted?

Positive Lock Washers are the best insurance against loose bolts, no matter how much vibration is encountered a Positive equipped bolt will not work loose.

Try them.

THE POSITIVE LOCK WASHER CO.

Foreign Office:
Positive Lock Washer Co.
80-84 James Watt St.
Glasgow, Scotland

Miller St. and Ave. A, Newark, N. J.

Pacific Coast Office:
H. L. Van Winkle Co.
160 Beale St., San Francisco, Cal

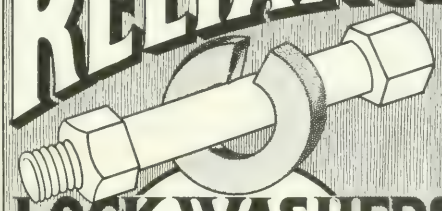
GET ACQUAINTED WITH

HOBBS LOCK WASHERS

Used on Railways and Equipment, Automobiles and Machinery of every description. The efficient remedy for loose nuts.

HOBBS MANUFACTURING CO.
Worcester, Mass.

RELIANCE



LOCK WASHERS

on every Bolt and Nut will insure the

FACTOR of SAFETY

our catalog tells why, send for it to-day

THE RELIANCE MFG. CO.
MASSILLON, O.

Branches
New York—720 Rogers Peet Bldg. St. Louis—Security Bldg.
Cleveland—961 Hippodrome Bldg. Kansas City—342 Interstate Bldg.
Detroit—3406 Woodward Ave. San Francisco—Mail Letter Bldg.
Chicago—736 Peoples Gas Bldg.

STEEL PLATE WASHERS

THE HIGHEST GRADE, OF ALL DESCRIPTIONS.

Standard sizes shipped promptly. Special sizes on short notice.

Annealed Rivet Burrs
Felloe Plates,
Etc.

Let us know your requirements

We guarantee Quality and Service

WROUGHT WASHER MFG. CO.
MILWAUKEE WISCONSIN

CUYAHOGA
Springs & Shapes



Do the small springs or wire shapes in your product function satisfactorily?

Are these parts costing you more than you think they should?

Are you inconvenienced by delayed shipments of those parts?

Use Cuyahoga products and these troubles will vanish forthwith.

We can help you in your designing, too.

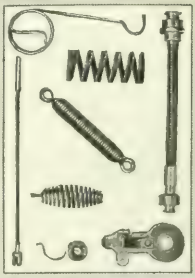
The Cuyahoga Spring Company
10252 Berea Road Cleveland, O.

No. 5 Assortment



A repair outfit containing nine most used sizes of the hardest gripping lock washers made. It's just what you need. Let us quote *our* reasonable prices.

LOCK WASHER DIVISION
NATIONAL UMBRELLA FRAME CO.
30th and Thompson Sts.
PHILADELPHIA, PA.



Quality and Service
Merit Confidence

Experience and a modern plant, thoroughly equipped, assure the best product at minimum prices.

We solicit your inquiries for
Round, Flat and Special Shaped Wire Springs of every design and analysis
Metal Stampings
Flexible Wire Shafts
Flexible Metal Tubing
Complete Metal Specialties.

THE CHAS. FISCHER SPRING CO.
240 Kent Ave., Brooklyn, N.Y.

Wire SPRINGS

We not only can do the high grade Wire Springs of any design made from Brass, Bronze, Phosphor, Monel and Oil Tempered Steel Wire but we are in a position to advise with our customers on the economical and efficient methods of these spring problems and to help you

NEWCOMB SPRING CORPORATION
234 40th. Street. Brooklyn, N.Y.



EAGLE BRAND SPRINGS

Quality, Practical Method of Manufacture, and Heat Treatment are all essential in order to produce the highest character of springs. *Send for illustrated booklet.*

MILLER & VAN WINKLE
18 Bridge Street Brooklyn, N. Y.



SPRINGS, WIRE & STEEL
EST
"BARNES-MADE" PRODUCTS
1857
SCREW MACHINE PRODUCTS

The Wallace Barnes Company

"Spring Makers for Three Generations"

Main Office and Works – Bristol, Conn.

Western Office—6400 Miller Ave., Detroit

49

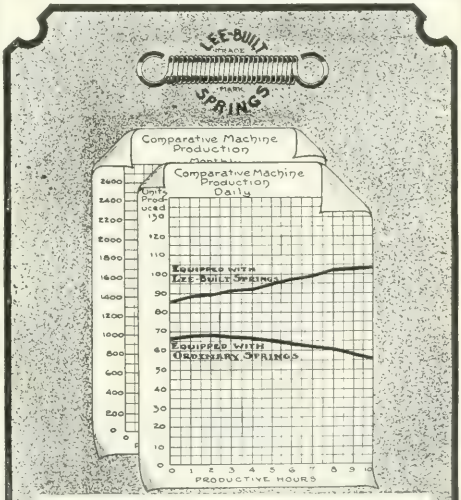
DUNBAR
FLAT SPRINGS

For Every PURPOSE and for BETTER SERVICE

THE DUNBAR BROS. CO.

BRISTOL, CONN.

Detroit Office, 2-133 General Motors Bldg.



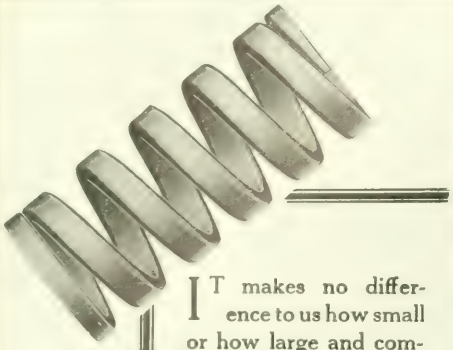
BUILT-SPRINGS
vs
COILED WIRE

Efficiency tests prove that in buying springs you can afford to buy only the best

LEE-BUILT SPRINGS

THE LEE SPRING COMPANY

349 Classon Ave., Brooklyn, N. Y.



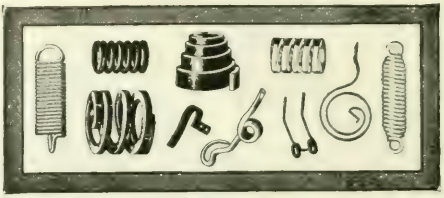
IT makes no difference to us how small or how large and complicated your spring requirements may be.

Send us your samples or blueprints and we'll send you an attractive estimate.

Raymond Manufacturing Company, Ltd.
Corry, Penna.

Chicago—
C. A. Morren, 144 W. Kinzie St.
St. Paul—
Rank & Goodell, Merchants Bank Bldg.
Kansas City, Mo.—
Moore Bros., Inc., 1316 McGee St.
St. Louis, Mo.—
E. C. Hanpeter, 513 Star Bldg.

THE WM. D. GIBSON CO.
Manufacturers of
Coiled and Flat Springs

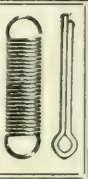


Any required shape or size. Made to sample or specifications. Crucible and Vanadium steel, brass and Phosphor Bronze. Send for our treatise on "Springs." It's as good as a textbook.

1800 Clybourn Ave. Chicago, Ill.



SPRINGS—Coiled and Flat
(Steel, Brass and Phosphor Bronze)
Spring Cotters Small Washers
Welch Patent Expansion Plugs
16 lbs. Assorted Springs..... $2.00
25 lbs. Assorted Cotters..... 3.50
Send for catalogue
HUBBARD SPRING WORKS
PONTIAC, MICHIGAN



ADVANCE

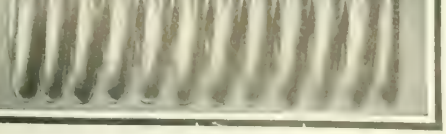


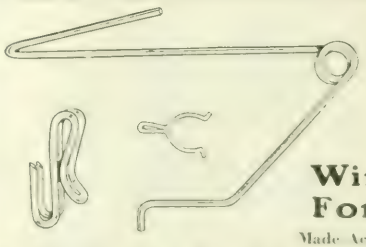
QUALITY SPRINGS
We make springs that make friends.
Reason: Quality, Delivery and Price Satisfactory
Advance Spring & Wire Company
1749 Carroll Ave. Chicago, Ill.

THE BRIDGEPORT CHAIN COMPANY
MILLER WIRE SPRING DEPT.
MANUFACTURERS OF
SPRINGS
MADE FROM
Brass—Bronze—Premier—Music
AND
Oil Tempered Steel Wire
Metal Stampings—Wire Specialties
Weldless Wire and Flat Metal Chain
CRESCENT AVE. and BUNNELL ST.
Bridgeport, Conn.

Wire Shapes?
—if it can be made we'll make it.
Campbell Wire Specialty Wks.
South Bend Indiana.

COOK SPRINGS FOR MECHANICAL PURPOSES
COIL AND FLAT OF EVERY DESCRIPTION
SPRING CO.
ANN ARBOR, MICH.

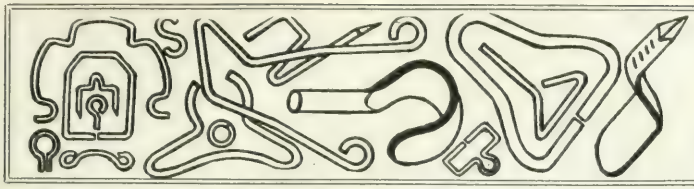




Wire Forms
Made Accurately

The great problem today is making the forms *exactly* as per requirement—no matter whether one or ten million—We do it.

C. T. Williamson Wire Novelty Co.
52-72 Badger Ave. Newark, N. J., U. S. A.



Just an assortment of wire shapes made on our automatic machines.

Send Your Problems

R. C. Jenkinson & Co.
Newark, N. J.



HINDLEY MFG. Co., Valley Falls, R. I., U. S. A.

PAGE WIRE PRODUCTS

Rods—Armco Ingot Iron and Special Analysis Steels.
Wire—Plain and Galvanized, Spring, Rope, Telephone, Telegraph, Road, Strand, Oxyacetylene and Electric Welding Wire.
Fence—Woven Wire for Farm and Railway Right of Way, Wire Link Protection for Industrial Plants, Lawns, Schools, Estates and Factory Partitions.
PAGE STEEL AND WIRE COMPANY Bridgeport, Conn.
District Sales Offices:
Chicago New York Pittsburgh San Francisco Portland, Ore.

Wire Goods Headquarters

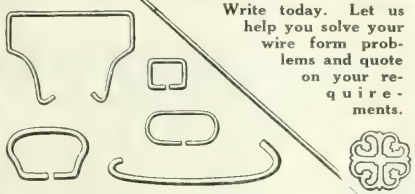


Forty Years Training

have made us expert in forming the most intricate wire shapes.

Specially designed machinery produces every shape in exact conformity with specifications.

Write today. Let us help you solve your wire form problems and quote on your requirements.



E. H. TITCHENER & Co.
BINGHAMTON N.Y.
TITCHENER-DIEHL Co.
1844 W. AUSTIN AVE. CHICAGO ILL.



EXPERT SERVICE,

the result of years of specialization on

WIRE AND RIBBON METAL PRODUCTS,

is given on all orders entrusted to us.

Send blueprints or sample for estimate.

Eastern Tool & Manufacturing Company
129 Bloomfield Ave.
Bloomfield, N. J.

MUSIC WIRE

STRENGTH UNIFORMITY DURABILITY

THE WEBB WIRE WORKS
NEW BRUNSWICK, N.J.

WIRE electrical, rope, airplane, piano, pipe-organ, flat wire (strip steel) hoops, bale ties, tacks, nails, barbed-wire, concrete re-inforcement, springs, netting, wire fences, steel posts, steel gates, trolley wire and rail bonds, auto-towing cables, horse shoes, round and odd-shape wires for manufacturing, screw-stock.

Illustrated books describing uses, FREE

American Steel & Wire Company
Chicago—New York

WASHBURN

QUALITY *and* SERVICE UNEXCELLED

Specialists in Superior Grades of

HIGH CARBON ROUND AND FLAT WIRES

PIANO WIRE, MUSIC SPRING WIRE, ALSO
WATCH, CLOCK AND MOTOR SPRINGS

WASHBURN WIRE COMPANY, INC.

118th Street and Harlem River New York, N. Y.



IRON and STEEL WIRE

Established in 1857, these Mills have been devoted to the manufacture of the highest grades of wire as well as specialties in wire drawn from Swedes Iron, Bessemer, Open Hearth and Crucible Steel.

Special Wires from Carbon Steels of Particular Analyses

GEO. W. PRENTISS & CO.
HOLYOKE, MASS.



An Efficient Wire Rope for Heavy Duty

"HERCULES" WIRE ROPE

REG. U.S. PAT. OFF.

IT CAN BE RECOGNIZED BY ITS ONE RED STRAND, WHICH IS ALSO OUR GUARANTEE THAT ITS EXCEPTIONAL QUALITY IS CONSTANTLY MAINTAINED

Made Only By

A. Leschen & Sons Rope Company, St. Louis, Mo., U. S. A.

New York Chicago Denver San Francisco

Seneca Brands Special Quality Fine Sizes

WIRE "SENECA"

Iron Steel Special Purposes All Finishes

FOR FULL AND COMPLETE INFORMATION INQUIRE

THE SENECA WIRE & MFG. CO.

FOSTORIA, OHIO, U. S. A.



PERFECTION ORANGE STRAND WIRE ROPE

THE UPSON-WALTON CO.

Factory: Newark, N. J.

CLEVELAND CHICAGO NEW YORK PITTSBURGH

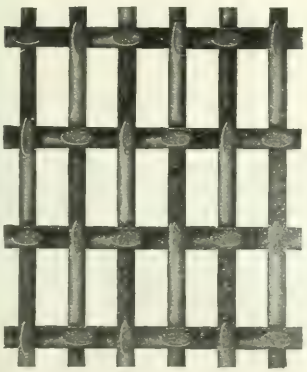
WIRE ROPE

INSULATED WIRES AND CABLES

"Made for Users Who Want the Best"

HAZARD MFG. COMPANY

New York Pittsburgh Chicago Birmingham Denver Wilkes-Barre, Pa.



Note the large amount of open space

For Rapid Screening

What limits the speed of your screening? The area of the space between wires, of course.

Rek Tang Rolled Slot Screens

are constructed so as to have larger open area for the same strength than any other screen made. And this construction, combined with the fine quality of wire used, ensures long life and a large decrease in screening cost.

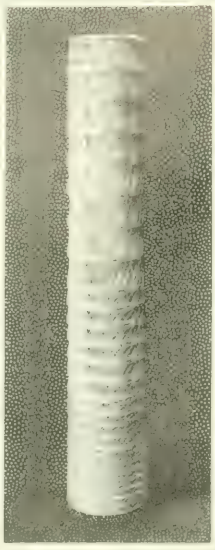
Shall we send you some interesting screening information?

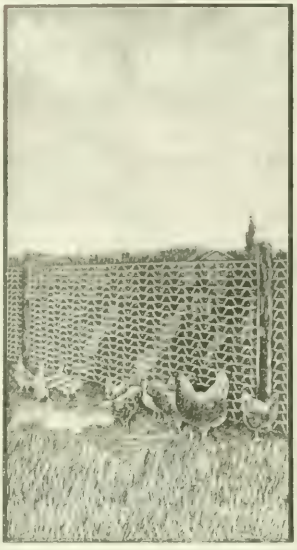
The Ludlow Saylor Wire Co.

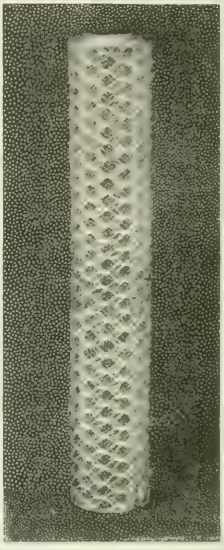
General Offices and Factory

Newstead Ave. and Wabash R. R.

St. Louis Missouri







"WICKWIRE" FENCING AND NETTINGS

(ALL GALVANIZED)

Enable you to supply your trade with a fencing or netting that is *Durable, Rustproof* and *Attractive*

W. W. POULTRY FENCE

The New Form of Mesh

WILL hang straight and tight from post to post. Requires no rail at top or bottom. Will not stretch out longer at the expense of width as is generally the case with the ordinary forms of mesh. W. W. Poultry Fence is made full width and always remains so. The horizontal wires where the strain comes are a full size heavier than the cross wires. The truss formation takes care of the contraction and expansion problem.

WICKWIRE GRADUATED POULTRY FENCE

Combines both Large and Small Fences All in One

HAS eight spaces of one and one-eighth inch mesh at the bottom, graduating through one and one-half, two and one-quarter to three and three-quarters inch mesh at the top. Acts both as a barrier against the straying away of the poultry and stock as well as a protection to them against prowling animals. Woven and galvanized on the same principle as W. W. Poultry Fence with no ends of wire to rust nor sharp bends to crack the galvanizing.

HEX NETTINGS

The Perfect Formed Mesh

In the manufacture of Hexagon Mesh Poultry Netting we have a very large capacity, and with the most modern equipment in machinery and apparatus for putting the goods up, we have succeeded in placing upon the market a Netting of the highest grade.

WICKWIRE BROTHERS, CORTLAND, NEW YORK

YELLOW STRAND
WIRE ROPE
Spreads the first cost over a long period of service. Yellow Strand Wire Rope is more economical.
Send for Catalog 3
BRODERICK & BASCOM ROPE CO.
New York ST. LOUIS Seattle

TURN BUCKLES

← B →
Also Manufacturers of Drop Hammers, Forging Hammers and Vises
MERRILL BROTHERS, Maspeth, New York, N. Y.

Anchor Post Fences
Underwriters' rustless and fireproof chain link woven wire fences. Unequalled for durability and protection.
Catalogs or Counsel
ANCHOR POST IRON WORKS
Hudson Terminal Building, 52 Church Street, New York

AUDUBON
WIRE PRODUCTS
For Industrial Uses
When in the market send for our illustrated descriptive guide to better, more efficient buying of wire cloth and wire products.
Audubon Wire Cloth Co., Inc.
Audubon, New Jersey

ALL GRADES OF WIRE CLOTH MADE OF ALL KINDS OF WIRE
WIRE CLOTH
TRADE JERSEY MARK
WIRE NETTING WIRE LATH
WIRE FENCING WIRE WORK
THE NEW JERSEY WIRE CLOTH COMPANY
MAIN OFFICE: TRENTON, NEW JERSEY
Offices and Stores: 223-227 Arch Street, Philadelphia, Pa.
93-95 Pearl St., Boston, Mass. 210 Fulton St., New York

DIAMOND
SIZING SCREENS
—for—
Coal—
Stone—Gravel
Sand—Cement
We make a specialty of perforated metal screens of all kinds for the purpose of mechanical separation and grading of materials.
Our engineering force will gladly assist in your screening problems. Send for descriptive circulars.
Territory open for live representatives.
DIAMOND MANUFACTURING CO.
WYOMING PENNA.

Perforated Metals
Electrically Welded Tanks
Sheet Metal Products

WE manufacture all kinds of screens, machinery guards, tanks, pans, etc., to your special order. Send in your plans and specifications.
Ask for catalog
Beckley Perforating Company
Garwood New Jersey

MFRS. OF PERFORATED METALS AND SCREENS
PERFORATED METALS
SCREENS OF ALL KINDS
Any Metal
Any Style
Perforation
PITTSBURGH PERFORATING CO.
632 Wabash Building Pittsburgh, Pa.

PERFORATED METALS and SCREENS OF ALL KINDS
MATERIAL IN STOCK
PROMPT SHIPMENT
Chicago Perforating Co.
2445 West 24th Place
Tel. Canal 1459 CHICAGO, ILL.

PERFORATED METAL SCREENS

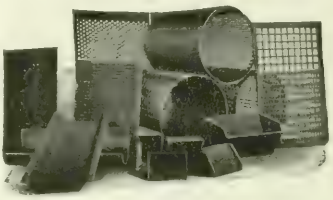
Our Products Include

- Screens
- Strainers
- Spark Arresters
- Elevator Buckets
- Conveyor Troughs
- Chutes
- Stacks
- Hoppers
- Sheet Iron Work
- Light Structural Steel
- Light and Heavy Steel Plate Construction

Either plain sheets or manufactured screens for cleaning and sizing coal and coke, for slate pickers, revolving screens, cottonseed oil mills, cement and ore, filter plate presses, locomotive strainers, etc.

Hendrick screens have been used successfully for all the above and many more purposes. Doesn't this suggest that Hendrick service will prove profitable to you?

Our catalog is a "Reference Book" of perforated metal practice. If you use it you will find this book of real value. Ask for it.



Hendrick Manufacturing Company

37 Dundaff St., N. Y. Office: 30 Church St. Carbondale, Pa.

Pittsburgh Office: 544 Union Arcade Building Hazleton, Pa., Office: 705 Markle Bank Building

ERDLE

PERFORATED METALS

Aluminum, Tin, Zinc, Brass, Copper, Steel and Other Metals and Materials

for any requirement with any kind of holes and spacing. We also manufacture and carry in stock Perforated Steel for Machinery Guards.

The experience gained by our half century in one business has taught us the value of co-operation so we freely offer you the services of our experimental department.

May we send you a Metal Sample Plate?

ERDLE

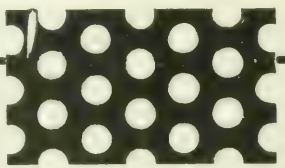
PERFORATING CO.

ROCHESTER, NEW YORK

Perforated Metals

for

ALL PURPOSES



CROSS QUALITY

Cross Screens are made right. We have been in the business long enough to know how. And when you are in a hurry we can generally make quick shipment and will tell you frankly if we can't.

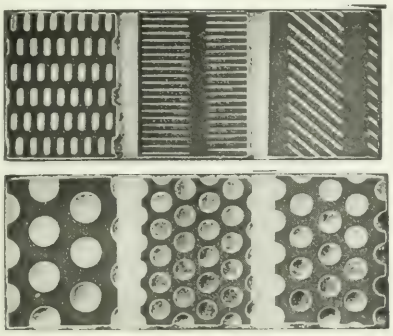
Catalog on request.

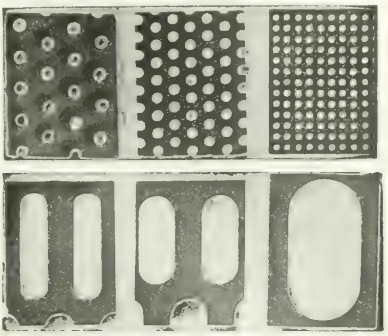
CROSS ENGINEERING CO.

Office and Works

CARBONDALE, PA.

PERFORATED METALS





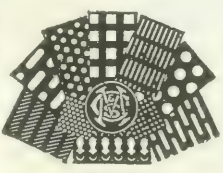
Perforated Metal is especially useful in screening of minerals because the particles enter the perforations where the smallest diameter or width of hole is found. On the top side of sheet or plate is the smallest size of opening and it enlarges slightly to the bottom side. This is not apparent in very thin sheets but is quite so in thick plates.

This slight tapering of the holes greatly aids in keeping the opening clear and preventing the filling up or "blinding" of the screen when in use.

Write us when in need of screens.

THE HARRINGTON & KING PERFORATING CO.

616 NORTH UNION AVE., CHICAGO, ILL., U. S. A.
NEW YORK OFFICE, 114 LIBERTY STREET



PERFORATED METALS

Made with any size, shape or arrangement of perforations and of any metal or material, there is a Mundt product suitable for every requirement.

We also make Conical Slot Sugar Centrifugal Screens.

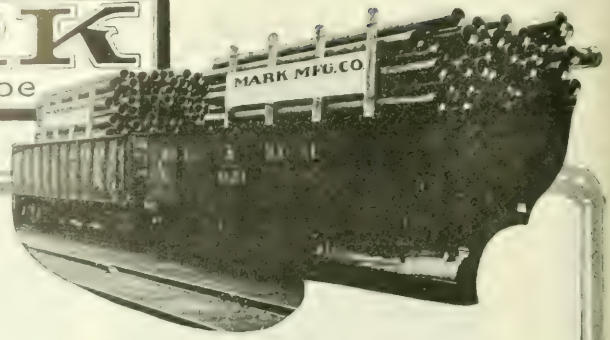
Chas. Mundt & Sons

59 Fairmount Avenue

Jersey City

New Jersey

MARK
Wrought Pipe



Mark pipe is noted for its physical and chemical uniformity.

It has combined strength and ductility.

THE STEEL AND TUBE COMPANY OF AMERICA
MARK MANUFACTURING COMPANY
GENERAL OFFICES: CHICAGO
CABLE ADDRESS: MARKTUBE, CHICAGO

DISTRICT SALES OFFICES:
NEW YORK — KANSAS CITY
PITTSBURGH — NEW ORLEANS
MINNEAPOLIS — LOS ANGELES

MILLS:
INDIANA HARBOR, IND. — ZANESVILLE, OHIO
EVANSTON, ILL.

CASING
TUBING
LINE PIPE

STANDARD BLACK AND GALVANIZED

NAVALITE AND ZINKOTE CONDUIT

Laboratorially Made Steel Products



Root Spiral Riveted Pipe

Fully 60% stronger than any other form of pipe construction.

One-fifth the weight of cast iron pipe.
One-third the weight of wrought pipe.
Suitable for Conveying Water, Air, Gas, Exhaust Steam and Wood Pulp.

Abendroth & Root Mfg. Co.
Pipe Specialists Continuously Since 1867
Sales Office: Woolworth Bldg., New York, N. Y.
Works: Newburgh, New York

Specify Reading —the pipe that endures



Reading is Genuine Wrought Iron Pipe, made only from high grade puddled pig iron. 552 sizes and kinds, ranging from ⅛" to 20" in diameter. Also producers of Charcoal Iron Boiler Tubes and Cut Nails. High grade Bar Iron for railroad and other purposes a specialty.

READING IRON COMPANY, Reading, Pa

World's largest producers of Genuine Wrought Iron Pipe

READING
GUARANTEED GENUINE
WROUGHT IRON PIPE

SPIRAL RIVETED PIPE
LAP WELDED PIPE
HIGH PRESSURE FORGE WELDED PLATE WORK
LET US KNOW YOUR REQUIREMENTS

AMERICAN SPIRAL PIPE WORKS
New York Office: 50 Church Street
Main Office and Works: Chicago, Box 185

"Central" Wrought Pipe

MANUFACTURED BY
CENTRAL TUBE COMPANY
PITTSBURGH, PA.

New York — Chicago — Philadelphia — San Francisco
Minneapolis — Kansas City — Denver
Salt Lake City — Atlanta — Fort Worth
Havana — Mexico City

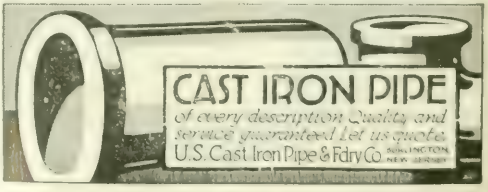
Please write to nearest office.

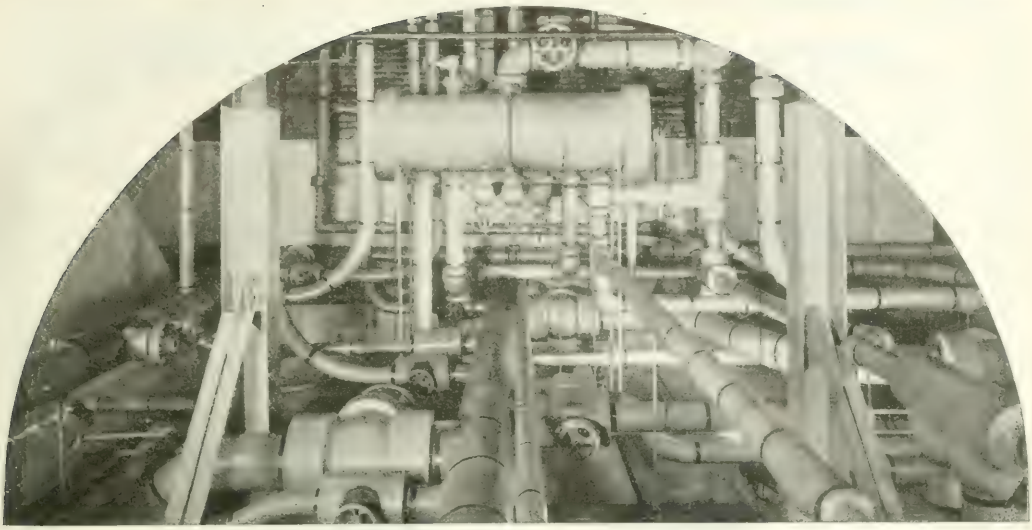
Warren Foundry & Pipe Company

Manufacturers of

CAST IRON PIPE
SPECIAL CASTINGS

Sales Office: 11 Broadway, New York — 261 Devonshire St., Boston, Mass
Works, Phillipsburg





-Where service hardships demand dependable pipe

USE "NATIONAL"

THERE is probably no type of pipe service where more is demanded of every length in the installation than in the vast network of pipes in an industrial power plant. Here giant tubes play criss-cross with tiny lines that are pygmies in comparison. Pipe leads in every direction, in every place; taking a sweeping curve here and a sharp angle there, trailing the floor here, skirting the roof, running zig-zag, or straight, or any way at all—apparently there is no rhyme nor reason.

The engineering experts who installed the piping speak of the "system," but to the average person all plans and purposes are jumbled in a marvelous maze of steel pipe.

Yet the "system" is there. We know it has to be and each little pipe is probably playing a part just as important as that of his swelled up and pretentious looking brother.

Equally important in these great installations for the development of *Power*, both the small and the large pipe must, above all, be dependable. And to be *Dependable* it must be made of *Uniform* material; it must have *High Tensile Strength* and *Sound Welds*; have *Ample Ductility* and be of *Homogeneous Physical Structure*—in short—it must be of A 1 *Quality* in every respect.

Ask for "National" Bulletin No. 1—Characteristics and Advantages of "NATIONAL" Pipe

NATIONAL TUBE COMPANY, PITTSBURGH, PA.

GENERAL SALES OFFICES: FRICK BUILDING

DISTRICT SALES OFFICES

Atlanta Boston Chicago Denver Detroit New Orleans New York Salt Lake City Philadelphia Pittsburgh St. Louis St. Paul

Pacific Coast Representatives: U. S. Steel Products Co. San Francisco Los Angeles Portland Seattle

Export Representatives: United States Steel Products Company, 30 Church Street, New York City; 36-38 New Broad Street, London, E. C.

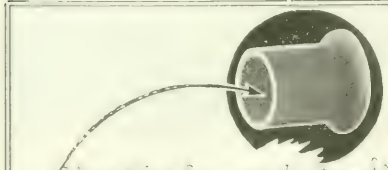
PITTSBURGH SEAMLESS TUBE CO.

ESTABLISHED 1901

BEAVER FALLS, PA.

MANUFACTURERS OF COLD DRAWN, SEAMLESS STEEL BOILER AND MECHANICAL TUBES

PROMPT DELIVERIES UP TO 5.5 INCHES OUTSIDE DIAMETER *PROMPT DELIVERIES*



Why not reduce those costs? When you can add to the quality of your product at the same time?
Do you want the details?

Send us your address.

DETROIT SEAMLESS STEEL TUBES

DETROIT

SEAMLESS STEEL TUBES CO.
DETROIT, MICHIGAN

REPRESENTATIVES
The Cleveland Tool & Supply Co. Cleveland
Lally Co., Pittsburgh
Steel Sales Corporation Chicago
Eastern Sales Office
The Canadian Pacific Rly., 342 Madison Ave., New York City



SUMMERILL TUBING COMPANY
Bridgeport, Montg. Co., Pa. (Phila. District)

Manufacturers of Seamless Tubing
in
Steel, Brass, Copper, Aluminum, Nickel Silver

SPECIALISTS IN HYPODERMIC NEEDLE TUBING AND PRECISION TUBING

STEEL TUBING
For All Mechanical Purposes
Gas Welded Seamless Butted
Electric Welded Lock-Joint Open Seam
Round, Square, Rectangular and Special Shapes

THE MOHEGAN TUBE COMPANY
306 Scott Ave. Brooklyn, N. Y.

SEAMLESS STEEL TUBING
America's Largest Warehouse Stocks
EDGAR T. WARD'S SONS CO.
BOSTON NEWARK PHILADELPHIA CHICAGO

HEADQUARTERS IN THE U. S. A.
FOR
BOILER TUBES
Seamless and Lap Weld Steel. Largest Warehouse Immediate Shipments from Pittsburgh or New York Products of All Kinds; Boilerand Tubing, Uncoiled and Light Weight Pipe.
JOHNSON-PETTER COMPANY
WAREHOUSE 342 TO 354 BUSH TERMINAL
Brooklyn, N. Y.
AND TERMINAL WAREHOUSES
Pittsburgh, Pa.

BOILER TUBES
Seamless Steel—Charcoal Iron—Lapwelded Steel
E. F. KEATING CO.
446-454 WATER ST., NEW YORK
Immediate Shipment from New York Stock



American Metal Hose Outlasts Rubber—
Steam, oil or high pressures cannot injure American Metal Hose. Their effect on rubber is only too well known. Our catalog tells the story.
THE AMERICAN METAL HOSE COMPANY
New York Waterbury, Conn. Pittsburgh
Boston Chicago

Penflex Metal Hose

For highest pressures; no leakage; built strongly. Penflex is flexible; economical. Made in many lengths and sizes; numerous uses.

Pennsylvania Flexible Metallic Tubing Co.
Philadelphia, Pa. Offices in Principal Cities.

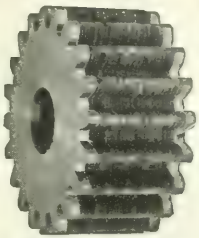
EARLE GEARS

Spur—Bevel—Spiral—Worm—Rack

THE EARLE GEAR & MACHINE CO.
4707-15 Stenton Ave., Phila., Pa.

RAWHIDE PINIONS

CUT GEARS



The Horsburgh & Scott Co.
Cleveland, Ohio

It's Just Simple Arithmetic

If an ordinary steel spur gear, costing $10, lasts ten months in your hardest service—

And a Nuttall BP treated gear will last four times as long (that's guaranteed) in the same service—

Isn't it worth four times as much, not only because of its longer life, but because it saves the labor cost of three installations?

Four ordinary gears cost $40. One BP Gear to do the same work costs about $13.50. Hadn't you better have our book on heat treated gears, and get the benefit of these big savings?

R.D. NUTTALL COMPANY
PITTSBURGH PENNSYLVANIA

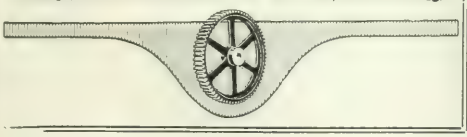
Philadelphia Office
420 Title Bldg.

Chicago Office
2133 Conway Bldg.

GEARS

SMOOTH running; correct in design, accurate and true to pitch, Caldwell gears are bound to please you. We make all types—machine-molded, cut tooth, mortise gears, worm gears, etc. Caldwell promptness is Traditional. It is at your service. Our stocks assure prompt shipment.

H. W. CALDWELL & SON CO., Link-Belt Company, Owner
Dallas, Texas, 709 Main Street
Chicago, 17th Street and Western Ave. New York, Woolworth Bldg.





HINDLEY WORM GEARS

Send Us Your Inquiries on Hindley Worm Gears

Catalogue No. 112 sent on request

HINDLEY GEAR COMPANY
Engineers
1105 FRANKFORD AVE.
PHILADELPHIA, PA.

Taylor-Wilson Gears

The capacity and excellent physical condition of our Foundry and Machine Departments enables us to do "particular work"—especially large Gear Work in which quality of material and workmanship and time are the important elements.

Give us an opportunity and we will make our service indispensable to you.

TAYLOR-WILSON MFG. CO.
Engineers—Founders—Machinists
Main Office and Works Milton Gear Works

New York Office: 30 Church St.

"Zones of Quiet"

Send Blue Prints or Sample Gears
ALBAUGH-DOVER CO. Chicago, Ill.

AD GEARS

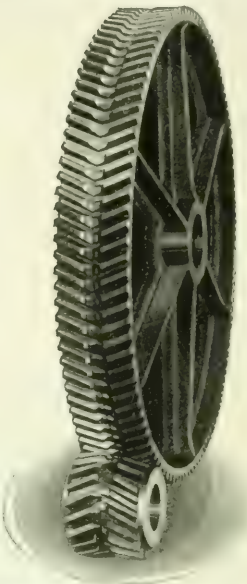


Nothing New!

Falk Gears Have ALWAYS Been Strongest at the Base.

THE FALK CORPORATION
Milwaukee, Wis.

Herringbone Reduction Units Give no Qualms to Phillie Gear



We know that here a slight inaccuracy or a poor finish may mean turbine trouble or serious loss of power in some way.

But all jobs are more or less alike with us. The odd small-size spur gear to replace a broken casting, gets the same careful attention, in its degree, as the most important reduction gearing.

We are ready always for either.

The **Phillie Gear Book** will tell you.

Spur — Bevel — Mitre — Spiral — Worm — Helical

Philadelphia GEAR Works. Phila. Pa.

Sprockets — Racks — Rawhide — Micarta — Gears

"Van Dorn" GEARING

Do you always get your gears when you need them?

It's a part of our service to schedule gears far enough in advance so they will be on hand when you need them.

Delays mean loss.

We help you overcome them.

Besides—each "Van Dorn" gear you receive will possess the fine gear characteristics you require.

We are anxious to show you the full extent of our gear service.

Will you send blue prints so we can do this for you?

THE VAN DORN & DUTTON CO.
CLEVELAND, O., U. S. A.

NEW PROCESS
RAWHIDE PINIONS

run quietly

whether new or old, with or without lubrication.

reduce vibration

preserving machine alignment and the cutting edge of the tools.

absorb shocks

thereby eliminating tooth fractures and expensive replacement of large gears.

wear like metal

úsually last as long as, and frequently longer than metal pinions on similar service.
A trial installation will quickly prove these advantages.

Try Meachem Gear Service on your next breakdown job. We make metal gears of every description and our long experience, exceptional manufacturing facilities, and large stock of patterns enable us to specialize on emergency service.

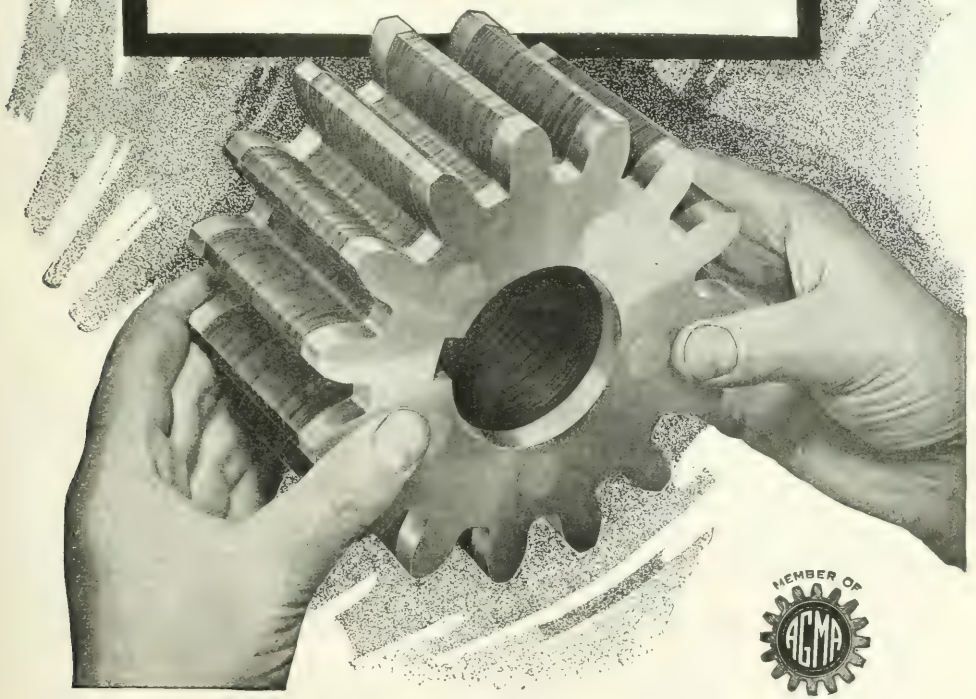
We also make gears and pinions of Formica

THE MEACHEM GEAR CORPORATION

Sole manufacturers of *new Process* RAWHIDE GEARS and PINIONS—Still made under the direction of the inventors and the men responsible for every stage in their development.

Canal Street and West Shore R. R. Syracuse, N. Y.

107



MEMBER OF AGMA

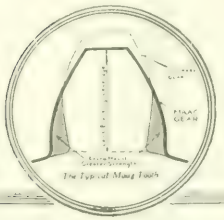
Look at the Husky Teeth of This 8-tooth Pinion!

MAAG GEARS

EVERY gear user knows that ordinary gears with 21 teeth and less become more and more undercut as the number of teeth decreases until it becomes unsafe to use them with less than 12 teeth.

In contrast to this, Maag Gears retain the characteristic "widest-at-the-base" tooth section regardless of the number of teeth. As the number of teeth diminishes and the ordinary gears undercut more and more, the comparative width of the Maag tooth shows greater and greater. And its comparative strength increases proportionately.

Pinion teeth bear the biggest burden in gear drives—stronger pinion teeth mean longer lasting gear drives.



For these reasons, Maag Gears are the logical choice for machine designers who want big reductions on short centers without loss of strength.

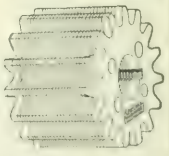


NILES-BEMENT-POND CO.

111 BROADWAY NEW YORK CITY

ALBRO-CLEM
Hindley Gearing
Will Do the Work When Common Worm Gearing Fails
ALBRO-CLEM ELEVATOR CO
Erie Ave. and D St. Philadelphia, Pa.

We Originated the Rawhide Pinion
Gears and Blanks
Spur, Bevel or Mitre
Made promptly to any specification
The Chicago Rawhide Mfg. Company
1301 Elston Avenue, Chicago, Ill.



CONNECTICUT GEARS

5 P or finer spur or worm gears 36 in. or smaller
10 P or finer helical, spiral, herringbone 8 in. or smaller
May we quote
545 Cooke St., WATERBURY, CONN.

NEW AND UP-TO-DATE PLANT—
WITH MODERN EQUIPMENT
We Specialize in Gears
Send us your inquiries. Our prices are right.
ACME GEAR COMPANY
701 Wood St., Philadelphia, Pa.

The Woodard Machine Co.
WOOSTER, OHIO
CUT GEARS
SPUR, BEVEL AND HELICAL
ROLLING MILL MACHINERY

HERRINGBONE CUT GEARS
MILL DRIVES SPEED REDUCERS
FAWCUS
SPUR WORM BEVEL GEARS
FAWCUS MACHINE CO. PITTSBURGH, PA

"AKRON ACCURATE" CUT-SPUR BEVEL and WORM GEARS
AKRON GEAR & ENGINEERING CO.
48 South Street, Akron, Ohio



BETTER WORMS

A Feature of

BROWN & SHARPE GEAR SERVICE

Our special equipment for automatically grinding worms assures accurate, uniform finish and rapid delivery.

Write for quotations on Worms, Wheels and Gears

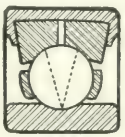
BROWN & SHARPE MFG. CO.
PROVIDENCE, R. I., U. S. A.

Schatz
"UNIVERSAL"
BALL BEARING



For combined radial and thrust loads, where precision and durability are essential. The correct three area contact design gives 300-400% greater thrust capacity.

Greater Precision
Less Friction
Longer Life



THE FEDERAL BEARINGS CO.
Incorporated
Poughkeepsie, N. Y.

R·I·V
Ball Bearings



QUALITY
(Made in Italy)

Quality Governs

The maximum number of R. I. V. ball bearings which can be produced in any given period is exactly determined in advance by the rigidly maintained high standards which they must meet and equal before they leave the factory.

Some may build more—but none can build better.

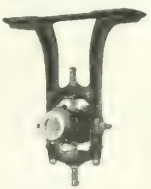
·R·I·V·CO·

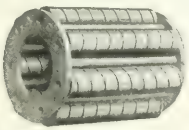
1755 Broadway, New York, N. Y.

106

HYATT ROLLER BEARINGS

For Steel Mill Equipment, Cranes, Trolleys, Hoists, Machine Tools, Trucks, Cars, Conveyors, Etc.

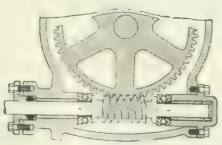


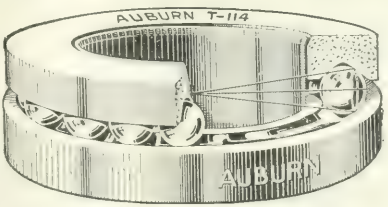


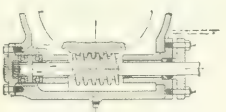
Hyatt Roller Bearing Hanger

Hyatt Roller Bearing Company, New York, N. Y.

WORM DRIVES Operate Better With AUBURN THRUSTS



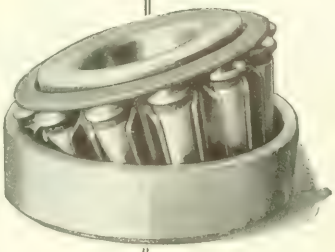




Worm Drives when equipped with AUBURN BALL BEARINGS are free from overheated bearings, lost motion, and consume less oil, besides lasting longer, due to maintained alignment. Send details of your problem and obtain the benefit of our 25 years' experience. Catalogue on request.

Steel, Brass and Bronze Balls

AUBURN BALL BEARING CO. **23 Elizabeth St., Rochester, N. Y.**



The Next Step

Loss of power due to friction calls for anti-friction bearings.

The recognition of that fact is an outstanding feature of recent industrial progress.

The next step, already taken by many manufacturers, is the adoption of an all-around bearing.

One that will carry both radial and thrust loads, with maximum life and minimum attention.

Let us tell you about it.

THE BOCK BEARING COMPANY
Toledo, Ohio

BOCK

Quality **TAPER ROLLER BEARINGS**

BEARINGS

SKF HB US ND Fafnir SRB Gurney Ball Bearings

ALL SIZES IN STOCK

IMMEDIATE DELIVERY

Hyatt Bower Bock Timken SRB Roller Bearings

STEEL BALLS

Send us your bearing inquiries or list showing your regular sizes, as we are receiving new shipments constantly on which attractive prices can be quoted. *Surplus Bearings Bought.*

THE PRUYN BEARINGS EXCHANGE
CHICAGO

"NORMA"
PRECISION BEARINGS
for Speed, Silence and Service
THE NORMA COMPANY OF AMERICA
ANABLE AVE., LONG ISLAND CITY, NEW YORK, N.Y.

ROLLER BEARINGS

for heavy duty service in steel mills and machinery

American Roller Bearing Co.
400 Melwood Avenue Pittsburgh, Pa.

FAFNIR



FAFNIR DOUBLE BALL BEARING HANGER BOXES ARE A MOST PROFITABLE INVESTMENT. THEY FIT YOUR PRESENT FRAMES.
THE FAFNIR BEARING COMPANY
NEW BRITAIN, CONN.
NEW YORK CHICAGO CLEVELAND DETROIT

ALL THAT YOU CAN ASK FOR IN A BEARING

New Departure Ball Bearings

THE NEW DEPARTURE MFG. COMPANY, BRISTOL, CONN.

"AETNA" BALL BEARINGS

RADIAL, ANGULAR-CONTACT, THRUST

Aetna Ball Bearing Manufacturing Co.
228 Institute Place Chicago, Ill.

Strom BEARINGS



All types and sizes of radial (single and double row), thrust and angular contact bearings. Write us for further information.

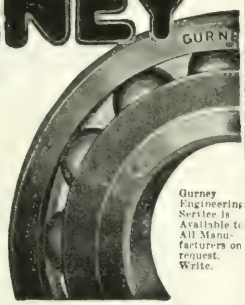
U. S. BALL BEARING MFG. CO.
4564 Palmer St. (Conrad Patent Licensee) Chicago, Ill.

GURNEY

BALL BEARINGS

Greatest
Load Capacity

GURNEY
Ball-Bearing Co.
Conrad Patent Licensee
JAMESTOWN, N. Y.



Gurney Engineering Service is Available to All Manufacturers on request. Write.

BUNTING BUSHINGS



150 Standard Sizes

"Always in Stock"

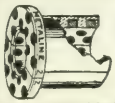
New York Chicago Cleveland San Francisco Boston
The BUNTING BRASS & BRONZE CO. Toledo, Ohio

BUSHING AND BEARINGS

Made of Superior Quality Phosphor Bronze; and, when fitted with

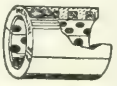
"METALINE"

(TRADE MARK)



Divided Flanged Bush METALINED

They require **no oil for Lubrication**, thus insuring **Cleanliness** and obviating the **Fire Danger**.



Divided Un-flanged Bush METALINED

THE METALINE COMPANY
Tel. Hunters Point 2315 48 3d Street, Long Island City, N. Y.

PROMET

THE HEAT-TREATED BEARING METAL

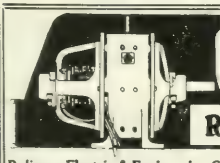
Also PROMET Heat-Treated Bronze Bearings and Bushings
THE AMERICAN CRUCIBLE PRODUCTS CO., Elyria, Ohio
Canadian Licensees: Engineering Sales and Service Company, Ltd., 177-179 Duke Street, Montreal, Quebec, Canada.

CROCKER-WHEELER MOTORS

"Niagara's Rival for Dependable Power"



CROCKER-WHEELER CO., Ampere, N. J.



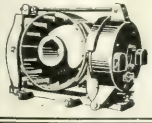
We specialize in motors ½ to 150 h.p. constant and adjustable speed D.C.; squirrel cage and slip ring A.C.

RELIANCE MOTORS

Reliance Electric & Engineering Co., 1070 Ivanhoe Road, Cleveland, Ohio

C-H Type M Brakes

Electrically Operated



Are remarkably quick acting. The short stroke magnet eliminates all intermediate bell cranks, toggles and levers. New booklet describing their simple, rugged construction on request.

The Cutler-Hammer Mfg. Co
Milwaukee and New York

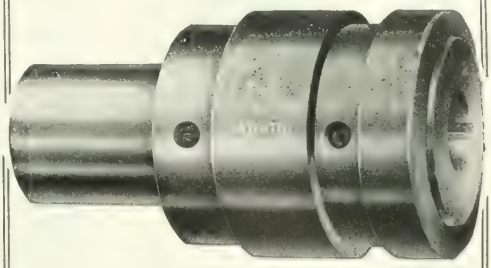
THE JOHNSON FRICTION CLUTCH

Complies with All Insurance Regulations

ITS EXTERIOR IS PERFECTLY SMOOTH WITHOUT PROTRUDING PARTS.

NO CLATTER—NO BANG.

ALL WORKING PARTS ENCLOSED AGAINST DIRT AND DUST.



SINGLE CLUTCH EXTERIOR

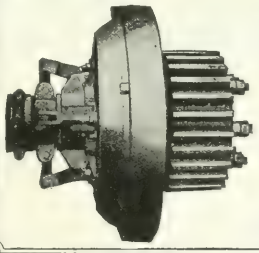
A FEW MACHINES USED ON

Butter Churns	Lathes
Bottle Fillers	Screw Machines
Bottle Cappers	Grinders
Soap Wrapping	Drill Presses
Knitting	Boring Mills
Dye Jiggers	Millers
Bottle Labelers	Tobacco Machinery
Tire Wrapping	Cigarette Machinery

WRITE FOR RED CATALOG

THE CARLYLE JOHNSON MACHINE CO. MANCHESTER CONN

Schultz Friction Clutches



have for 20 years been the standard for simplicity in construction and durability in performance.

Increase Shop Efficiency

by installing **Schultz Clutches** which will enable you to isolate bad order machines without disturbing your shop routine, thereby increasing your productive efficiency. Write for catalog.

A. L. SCHULTZ & SON, 1675 Elston Ave. Chicago, Ill.



Catalog "A" Upon Request

MOORE & WHITE FRICTION CLUTCHES

You Can Depend Upon Them

Made Only By
The Moore & White Co.
Est. 1886
2705-2735 N. 15th Street
Philadelphia, Pa.



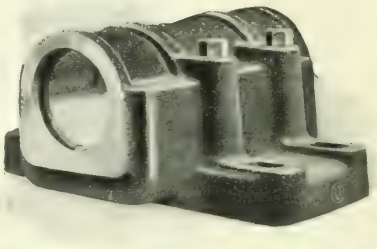
USE THEM TO CUT OUT COUNTERSHAFTS

Brown Engineering Co.

143 N. THIRD STREET, READING, PA.

PULLEYS HANGERS
The T. B. Wood's Sons Co. Line
CLUTCHES
COUPLINGS

STEP CONE PULLEYS, TAPER CONE PULLEYS, FLANGED PULLEYS or any style of pulleys for any purpose, all made of CAST IRON and correct in design.
T. B. WOOD'S SONS CO.
Chambersburg, Pa.
POWER TRANSMITTING MACHINERY

Jones
DUPLEX RING OILING
RIGID PILLOW BLOCK

OUR LINE includes various styles of Hangers, Pillow Blocks, Couplings, Collars, Etc. Ask for Catalog 20-A.
W. A. Jones Foundry & Machine Company
Main Office and Works:
4434 West Roosevelt Road, CHICAGO
Branch Sales and Engineering Offices:
NEW YORK, N. Y. 26 Murray St.
MILWAUKEE, WIS. 1st Wis. Nat'l Bank Bldg.
PITTSBURGH, PA. Union Arcade
BUFFALO, N. Y. 184 Main St.
ST. PAUL, MINN. 2482 University Ave.
Cast-iron Pulleys—Friction Clutches
Shaft Hangers—Boxes—Couplings
Cut Gears—Cast Gears—Sprocket Wheels
Rope Sheaves—Flywheels
Enclosed Worm Gear Drives
Spur Gear Speed Reducers


CRESSON-MORRIS CO.
Power Transmitting Machinery
We make a complete line of power transmitting machinery; shafting, rope-transmission, machine moulded and cut iron and steel gears for heavy service.
Cresson-Morris Company
Engineers—Founders—Machinists
Philadelphia Penna.
Branch Office, 141 Milk St., Boston, Mass.

More Power — Less Waste
Why "American" Pulleys deliver the possible maximum of power is easily explained.
Write for the details, which will be furnished gladly without obligation to you.

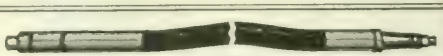
The American Pulley Company
Manufacturers of Steel Split Transmission Pulleys, Steel Split Pulleys and Pressed Steel Shapes.
PHILADELPHIA, PA.
AMERICAN STEEL SPLIT PULLEYS

FRANCKE For Direct-Connected Machinery Shafts
Smith & Serrell, 37 Central Avenue, Newark, N. J.
PINTITE For Line Shafting
SEND FOR BULLETINS

MEDART means EVERYTHING in Line Shafting Equipment
THE MEDART COMPANY
(Formerly Medart Patent Pulley Co.)
General Offices and Works: St. Louis, U. S. A.
Office and Warehouse: Cincinnati Offices: Chicago and Philadelphia

THE UNIFLEX COUPLING

"Wherever Shafts Meet"
The Uniflex is a positive drive flexible coupling. It is noiseless and will eliminate all trouble arising from misalignment of shafts.
Manufactured by Thompson Bros.
520 Buttonwood St., Philadelphia, Pa.


SUPERIOR WIRE WOUND
FLEXIBLE SHAFTING
Cores and Cases Manufactured for all Purposes
BINGHAMTON FLEXIBLE SHAFT CO.,
239-41 Water St., Binghamton, N. Y.



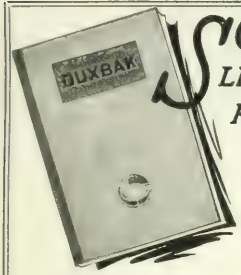
Transmission Machinery for Belt and Rope Distribution

Falls Clutch & Machinery Company

ENGINEERS—FOUNDERS—MACHINISTS

CUYAHOGA FALLS, OHIO, U.S.A.

New York 208 Fulton Street | Boston 52 Purchase Street | Cincinnati, Ohio 214 Elm Street



SCHIEREN'S LEATHER BELTING HANDBOOK

We will send you a loose-leaf binder and the successive chapters as they appear each month, upon receipt of your name and address.

DUXBAK BELTING TRADE MARK

Chas. A. Schieren Company EST. BUSINESS 1854

Tanners
Belt Manufacturers
37 Ferry St., New York

Branches and Distributors in all leading Cities



We have been manufacturing chains for 88 years. One important branch of work has been the manufacture of various kinds of special - purpose chains.

Our long experience may be of service in the solution of your problem.



CHAINS

for Every Purpose

THOMAS MORTON

245 CenterSt., New York

TEST SPECIAL RUBBER BELTING

Lowers your Belting cost by giving the best results for a reasonable expenditure

Waterproof Flexible Strong

Write for Belt Engineering Booklet

NEW YORK BELTING & PACKING CO.

NEW YORK-CHICAGO-PHILADELPHIA-PITTSBURGH-BOSTON-ST. LOUIS-SAN FRANCISCO

LINK-BELT CHAINS



For Elevating, Conveying and Power Transmitting

The Link-Belt line of chains is complete. Submit your requirements to us. We are the world's largest manufacturers of elevating, conveying and power transmitting chains and carry complete stock at convenient points to render prompt service.

This Trade Mark  Identifies Link-Belt

LINK-BELT COMPANY

Philadelphia 638 | Chicago | Indianapolis

Offices in Principal Cities

GANDY BELT

Stitched Cotton Duck

The original and the standard since 1880. Straight Roll belt for drives and conveying; Thresher belt for thresher and tractor use; Thermo-Gandy for heat and chemical uses, drives and conveying.

The name "Gandy" is not a generic term. It refers only to belting manufactured by

THE GANDY BELTING COMPANY

735 West Pratt Street, Baltimore, Maryland

New York: 36 Warren Street Chicago: 552 W. Adams Street

"LOOK FOR THE GREEN EDGE"

Stanley Solid Woven Cotton Belting

Flexible, Firm, Long Wearing, Saves Money. Stocked in Principal Cities. Write for catalog, prices, etc.

STANLEY BELTING CORPORATION

38 So. Clinton St. CHICAGO



SPROCKETS and CHAINS

In stock and to order. Send for catalog.

CULLMAN WHEEL COMPANY

1853 Altgeld St. CHICAGO, ILL.

ALLIGATOR STEEL BELT LACING

TRADE MARK REG. U.S. PAT. OFFICE

Nothing Needed but a Hammer. "Never Lets Go."



Reg. Trade Mark

Sold by leading dealers. Samples upon request.

Flexible Steel Lacing Co. 4620 Lexington St., Chicago, Ill. U.S.A. 135 Finsbury Pave., London, E.C. 2, Eng.

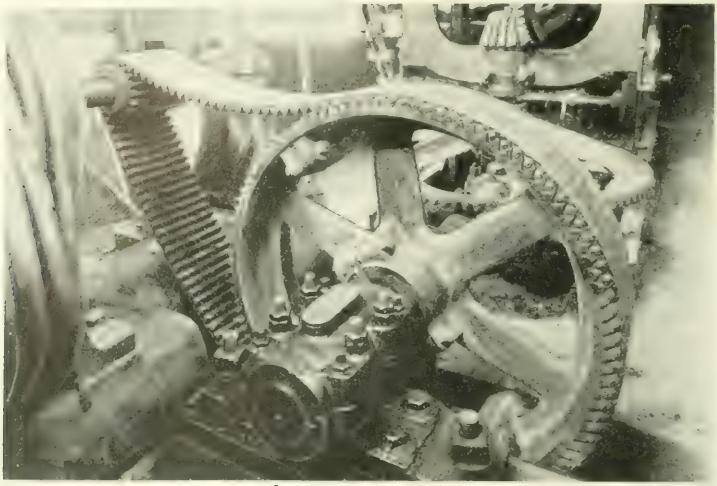
CHAIN

For all general uses

THE COLUMBUS McKINNON CHAIN CO.

COLUMBUS, OHIO

New York City: 30 Church Street. Telephone Cortlandt 8017
Chicago: 104 South Michigan Blvd.
Pittsburgh: Union National Bank Bldg.
San Francisco: 401 Wells Fargo Bldg.



Why—

is it that Morse Silent Chains maintain an efficiency of 98.6%? The reason is found in the "Rocker Joint," which maintains rolling contact between pin joints and eliminates power-wasting sliding friction.

Where—

Mr. E. J. Poole, General Superintendent of the CARPENTER STEEL CO., Reading, Pa., has this to say of the Morse Chain Drive illustrated:

"We are very well pleased with the performance of this drive, which has been in continuous service for four years. It has given no trouble whatever, nor have any repairs or adjustments been necessary. In fact the same might be said of the Morse Chain Drives on our Cold Rolling Machines.

While our selection of this type of drive was primarily on account of the close centers (3 ft. 8⅝ in.), our experience with it has demonstrated its high efficiency to our entire satisfaction.

As reference to your files will no doubt show, this drive transmits 75 horsepower from a 19-tooth sprocket on the motor, running at 690 R.P.M., to a 105-tooth sprocket on the main shaft. The speed of the latter is 125 R.P.M."

SILENT CHAIN
THE MORSE ROCKER JOINT

MORSE CHAIN CO. — *Morse Engineering Service*

LARGEST MANUFACTURERS OF SILENT CHAINS IN THE WORLD

BENEFIT BY MORSE SERVICE AS OTHERS DO

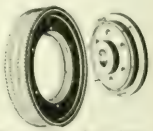
ITHACA, N. Y. — *Assistance Without Obligation*

Address Nearest Office

NEW YORK CITY
MINNEAPOLIS, MINN.
MONTREAL
PHILADELPHIA, PA.
PITTSBURGH, PA.
SAN FRANCISCO, CAL.
ST. LOUIS, MO.
TORONTO
WINNIPEG, MAN.



Spring Sprocket



Shear Pin Sprocket

"Morse" Is the Guarantee Always Behind the Efficiency, Durability and Service



"HB" and "AJAX" Grade DREDGE CHAIN

Possesses these essential qualities:

HARDNESS sufficient to withstand abrasion when used upon Dredges and Steam Shovels;

DUCTILITY that will absorb shock loads when used upon Wrecking Units; and

TENSILE STRENGTH sufficient to carry—with the highest factor of safety—heavy loads imposed when employed with Cranes, Hoists, Slings or for other severe and exacting usage where absolute DEPENDABILITY is required.

Manufactured exclusively by the

AMERICAN CHAIN COMPANY

Incorporated

BRIDGEPORT, CONN.

Boston Chicago New York Philadelphia Pittsburgh Portland, Ore. San Francisco

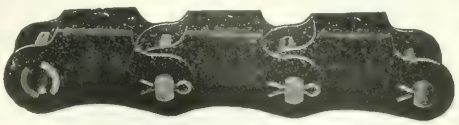


TESTED CHAINS ONLY

BRADLEE & CO.

Empire Chain Works Beach St. and East Susquehanna Ave., Philadelphia.

Sole Manufacturers of the D. B. G. Special Crane Chain. Chains for Foundry Cranes and Slings. Iron Dredging, Slope and Mining Chains. Ships Cables and Marine Railway Chains.



"The Chain of Double Life"

For standard cast tooth sprockets No. 35 to 6 in. pitch. For cut tooth sprockets 1 in. to 2 in. pitch.

UNION STEEL RIVETLESS CHAINS

The Chains with the Substantial Links and Large Case Hardened Bearings

Roller Chains, Bushing Chains, Attachment Links, Cast Tooth Sprockets, Cut Tooth Sprockets, Elevating and Conveying Machinery

Special Transmission Chains up to 1,000,000 Pounds Ultimate Strength

The Union Chain & Mfg. Co., Sandusky, Ohio

OVER 50,000 MILES

Now reported on "Whitney" High Efficiency Front End Motor Chain Drives and still in good condition.

THE WHITNEY MFG. CO. Hartford, Conn.

The Carroll Chain Company

Columbus, Ohio

"Carroll Quality" Fire Weld Chain

Variety—Service—Quality

BALDWIN

Roller Chains—Block Chains—Special Drive Chains—Malleable Detachable Chains—Sprockets, Machine Finished——Sprockets, Cast—Westlund Friction Clutch and Cut-off Coupling.

Send for Catalog and Special Bulletins.

Baldwin Chain & Mfg. Co. WORCESTER, MASS. Chicago, 122 S. Mich. Av.



It's made from a single narrow ribbon of cold-rolled, heat-treated steel. Hodell sprocket and Builders' patterns are dependable and suit all the trade.

Hodell LINK

THE CHAIN PRODUCTS CO

Main Office and Factory Cincinnati, Ohio

Sales Offices in All Important Cities



Elevators, Conveyors, Hoisting Equipment

THE GEORGE HAISS MFG. CO.

142d St. and Canal Place, New York, N. Y.

Established 1892. Representatives throughout the world



When You Buy Dredge Chain

look for the name *Woodhouse Trenton* stamped on every six-foot section. It's a guarantee of quality and a sign of the faith we have in it. Made of chemically selected pure pig iron, treble worked and rerolled.

The cut shows a section of chain as originally furnished and as worn and stretched after 16 *months' continuous work in the hardest kind of rock.* The chain is still in use. Compare this with the chains you have used.

Write for catalogue and pamphlet of testimonials.

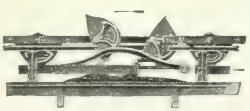
WOODHOUSE CHAIN WORKS

TRENTON, N. J.



BUILT STRONGER LASTS LONGER

G-W MATERIAL HANDLING EQUIPMENT



Pivoted bucket carriers, belt conveyors, portable belt conveyors, wagon loaders, and complete elevating and conveying equipment for power plant and other uses.

Catalog upon request. 2076-B

WORKS HUDSON, N. Y.

Gifford-Wood Co.

NEW YORK-CHICAGO BOSTON-BUFFALO

"In Two Shakes of a Lamb's Tail" You Can Settle It

[illegible] to [illegible] American Radiator Co., [illegible], N. J.

[illegible] elevator.

[illegible] two sorts [illegible]

In ten seconds you'll say "The Ridgway for mine."

The American Radiator Co. equipped [illegible] big plant at Buffalo with Ridgway Elevators.

So [illegible] the American Radiator Co. wrote it "Old Hook 'er."

"They are the best I have ever seen. This company will never use any other sort of elevator."

But you wouldn't take any one's say-so. Go to Buffalo and see for yourself what it means to

"Hook 'er to the Biler."

CRAIG RIDGWAY & SON CO., Coatesville, Pa.
Elevator Makers to Folks Who Know


Direct Acting


Double Geared


Elevator in Large Soap Factory in Jersey City

LINK-BELT
Material Handling Machinery
Elevators and Conveyors
Coal and Ashes Handling Equipment
Locomotive Cranes
Portable Loaders
Electric Hoists
Coal Storage Systems
Screens, Crushers, Feeders
Chains, Wheels, Buckets
Send for Catalogs
LINK-BELT COMPANY CHICAGO PHILADELPHIA INDIANAPOLIS
Offices in Principal Cities
68

MAGNETIC SEPARATORS
AND
"HIGH DUTY" MAGNETIC PULLEYS
MAGNETIC MFG. CO.
270-275—23rd Ave. MILWAUKEE, WIS.

WEBSTER
Elevating and Conveying Machinery
For rock, ore, coal and grain handling, and for the movement of materials in bulk or packed. Coal and ash handling systems for power plants. Literature and engineering estimates on request.
THE WEBSTER M'F'G CO.
4500 Cortland St. Chicago, Ill.
Sales Offices in Principal Cities

F-R WEIGH LARRIES
Afford Accurate Check on Coal Burned
Distribute Coal from Central Storage Bin to Any Stoker.
FREEMAN-RIFF COMPANY
Terre Haute, Indiana
Complete Conveyor Installations



ROBINS CONVEYING SYSTEMS
For Handling Bulk Materials
Write for Handbook of Conveyor Practice.
ROBINS CONVEYING BELT COMPANY
New York Chicago Pittsburgh Boston

THE SCOOP CONVEYOR
THOUSANDS IN USE
FOR STORING AND RECLAIMING, LOADING AND UNLOADING CARS, TRUCKS AND WAGONS
DOES THE WORK OF FROM 6 TO 12 MEN
AND KEEPS EQUIPMENT MOVING
WRITE FOR LITERATURE
PORTABLE MACHINERY CO., PASSAIC N.J.

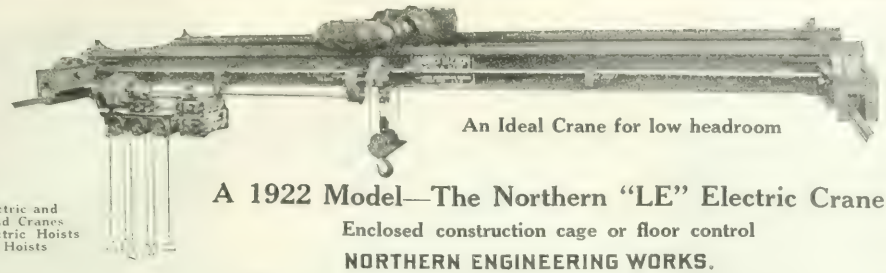
OVERWAY
CUTS CONVEYING COSTS
Catalog B-23 tells how an Overway conveying system enables one man to do the work of six. Send for a copy.
Richards-Wilcox Mfg. Co.
AURORA, ILLINOIS, U.S.A.

Godfrey Conveyors
Save Time, Labor and Money
[illegible] and handling coal, [illegible] and sanitary [illegible]. Write for descriptive catalog No. B-1.
GODFREY CONVEYOR CO.
[illegible] and General Offices
Elkhart, Indiana

HAYWARD BUCKETS
First aid to overworked labor and over burdened payrolls. Self contained, easily and fully controllable, speedy digging and rehandling machine for indoor or outdoor use. Hooked up in a jiffy to any lifting machine. Catalog 44.
The Hayward Co. [illegible] New York

The Columbus Conveyor Company
Manufacturers of
[illegible] Conveying Machinery, Portable Loaders, Equipment for Portable Car Unloaders, Buckets, Chains and Sprockets. Write for [illegible]
COLUMBUS, OHIO

For Speedy Digging and Re-handling
WILLIAMS
QUICK-ACTING CLAMSHELLS
Write for the WILLIAMS Catalog, 60 pages of facts and figures, illustrated with interesting photos of clamshell work, and blue prints of WILLIAMS Buckets.
G. H. WILLIAMS CO., Erie, Pa., U. S. A.



An Ideal Crane for low headroom

Electric and Hand Cranes
Electric Hoists
Air Hoists

A 1922 Model—The Northern "LE" Electric Crane

Enclosed construction cage or floor control

NORTHERN ENGINEERING WORKS.

212 CHENE ST. DETROIT, MICH., U. S. A.

Canadian Plant: Northern Crane Works, Ltd., Walkerville, Ont.

CHICAGO Abell-Howe Co. 1106 Michigan Ave. NEW YORK 120 Liberty St. BOSTON 201 Devonshire St. PHILADELPHIA 602 Bulletin Bldg. PITTSBURGH, PA. 3 [illegible] Ave.



The Alliance Machine Company

Engineers and Builders of

Electric Traveling Cranes, Electric Charging and Drawing Machines

Electric Bucket Handling Cranes, Electric Traveling Ladle Cranes

Electric Soaking Pit Cranes, Electric Strippers, Hydraulic Machinery, Riveters, etc.

Rolling Mill Machinery, Scale Cars, Steam Hammers
Charging Larries and Copper Converting Machinery

MAIN OFFICE AND WORKS: ALLIANCE, O.

MARIS BROTHERS INC PHILADELPHIA

CRANES

½ TON TO 25 TONS

HAND ELECTRIC



MARIS BROS., INC.

5538 Grays Avenue
PHILADELPHIA

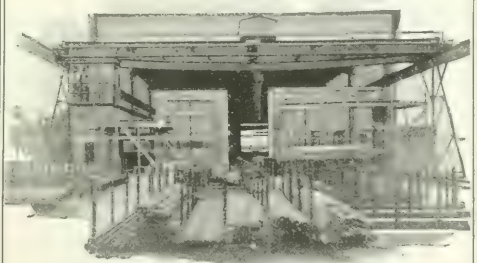
NILES CRANES

Rugged, sturdy construction of the lifting gear and electrical equipment assures the strength and reliability of Niles Cranes.

Accessible bearings are easily oiled. A thorough lubrication system reduces wear to a minimum. Cables that are prevented from twisting have long life.

Built in all standard sizes up to 250 tons capacity.

Niles Cranes include jib, gantry, wall, and electric traveling types. There's a right type and size for you, no matter what your needs.



NILES-BEMENT-POND CO.

111 BROADWAY, NEW YORK

MILWAUKEE CRANES

GIVE

MAXIMUM OF SERVICE

WITH

MINIMUM OF UPKEEP

Information furnished without obligation

Milwaukee Electric Crane & Mfg. Co., Inc.
MILWAUKEE, WIS., U. S. A.

CHESAPEAKE CRANES



"Most Rugged Crane Built"

All parts accessible and "standardized." Wearing parts extremely heavy for maximum life under adverse conditions—Ask for details.

110-ft. Span Chesapeake Crane—1 of 4 Chesapeake Cranes at plant General Electric Co., Baltimore, Md.

CHESAPEAKE IRON WORKS

BALTIMORE, MD.
New York Office, Singer Building



TRAMRAILS

HAND OR ELECTRIC

this Requires this Conserves

Valuable Floor Space,
Valuable Time,
Valuable Labor Costs,

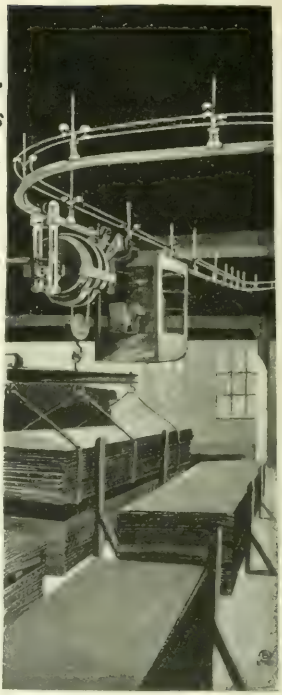
CLEVELAND ELECTRIC TRAMRAIL

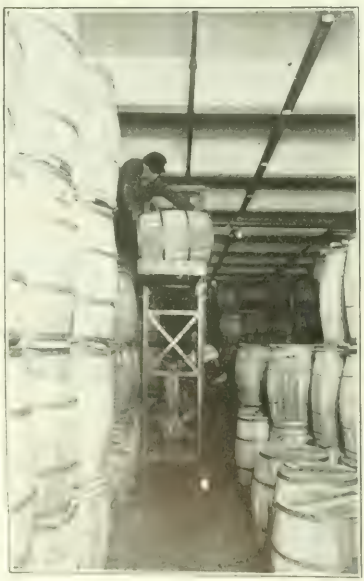
THE CLEVELAND CRANE & ENGINEERING CO.
WICKLIFFE, OHIO

CLEVELAND



CRANES





The Most Satisfactory Portable Elevator You Can Buy

Reversible flat and roller platform.

Lever for raising and lowering top section.

Quick speed lowering device.

Automatic brake.

Ability to lower on hoisting spindle as well as quick speed.

Cut gears.

Ball bearing wheels.

Rugged construction throughout.

Electric machines have regular hoist type motor, line switch, reversing controller, upper and lower limits, heavy silent chain drive.

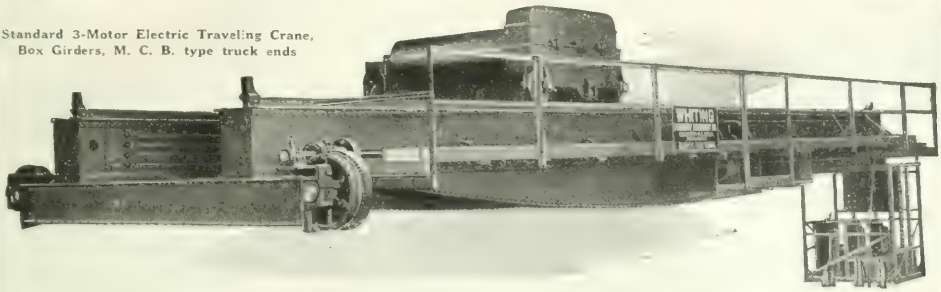
NEW JERSEY FOUNDRY & MACHINE CO.,

90 WEST STREET, NEW YORK CITY

CRANES:

Electric and Hand-Power Travelers; Bucket-Handling and Gantry, Jib, Pillar and Bracket Cranes

Standard 3-Motor Electric Traveling Crane, Box Girders, M. C. B. type truck ends



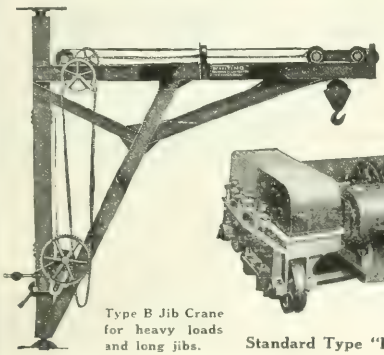
A Type for Every Service

Send for Catalog No. 158

WHITING CORPORATION, 15601 Lathrop Avenue, HARVEY, ILL. (Chicago Suburb)

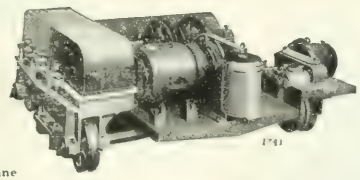
(formerly Whiting Foundry Equipment Co.)

Representatives in 25 Principal Cities



Type B Jib Crane for heavy loads and long jibs.

Let our experienced engineers help solve your handling problems.



1741

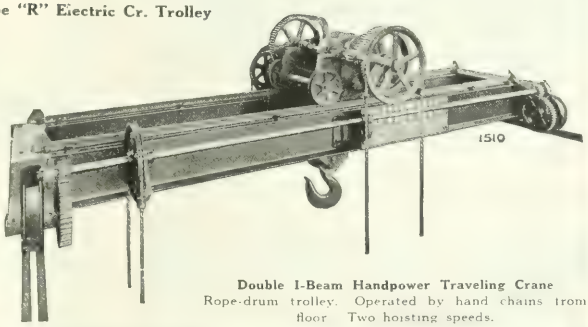
Standard Type "R" Electric Cr. Trolley



Whiting Bucket Handling Crane, Alpha Portland Cement Co., Martin's Creek, Pa.



20-Ton Whiting Gantry Crane in Freight Yard, Boston & Albany R. R., Worcester, Mass.



1510

Double I-Beam Handpower Traveling Crane
Rope-drum trolley. Operated by hand chains from floor. Two hoisting speeds.

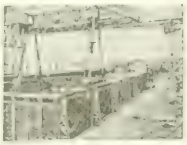
WHITING CRANES FOUNDRY EQUIPMENT RAILWAY SPECIALTIES



CHAMPION CRANES

THE CHAMPION ENGINEERING CO.
KENTON, OHIO

CHAMPION CRANES



Electric Cranes and Hoists

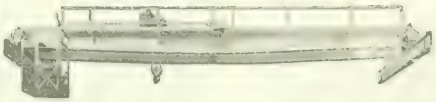
The Barber-Foster Eng'r Co.
Cleveland, O.

New York Detroit
Pittsburgh Boston
Chicago Cincinnati

Del. REctor 9080 N. B. PAYNE & CO. 25 CHURCH ST. N.Y.

MATERIAL HANDLING MACHINERY
for INDUSTRIAL AND TRANSPORTATION SERVICE
See Page 186

CRANES AND HOISTS
For EVERY Purpose



The experience gained through many years devoted to the building of lifting equipment fits us particularly to take care of your problems.

ESTABLISHED 1878

ALFRED BOX & COMPANY, Inc. PHILA. PA.

BOX CRANES

The Air Route By Conco Crane

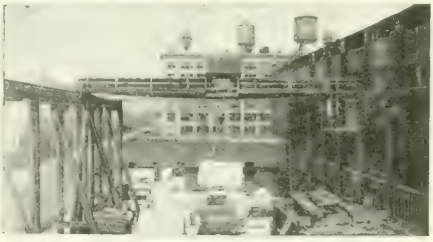


Conco hand operated cranes of many types and capacities are supplying a growing need for a means of handling materials through the air at less original and operating cost than is possible with electric equipment.

Write for bulletin that will list the one you need.

H. D. CONKEY & CO., Mendota, Illinois

Chicago office, 606 Chamber of Commerce Bldg.
Pittsburgh Representative: The Factory Products Co., Pittsburgh, Pa.
New York office 149 Broadway, New York City



Bedford Electric Traveling Cranes
ALL TYPES

BEDFORD FOUNDRY MACHINE CO.
Bedford, Indiana
30 Church Street, New York 2012 W. 13th Street, Chicago

"TOLEDO CRANES"

The name "Toledo" stands for that high degree of service which comes with acknowledged leadership.

THE TOLEDO CRANE CO.
BUCYRUS, OHIO



Northwest *Crawler* Crane

All-Purpose
Used with clamshell or dragline bucket, lifting magnet, grappling hooks, shovel attachment. Saves money in a hundred and one handling operations.

Goes Anywhere
Perfected crawler mechanism; moves about the plant; climbs grades or stock pile; never idle. Controlled and operated entirely by one man.

Northwest Engineering Co., Chicago

ELECTRIC ROEPER HAND POWER
TRAVELING CRANES
ROEPER CRANE & HOIST WORKS
READING, PA.



Crane Work Wherever a Truck Will Go

The Byers Machine Co.
330 Sycamore St., Ravenna, Ohio
Builders of Full Circle Cranes, Auto-Cranes, Buckets, Hoists, etc.

ERIE

"The Crane of Satisfaction"
5 TO 30 TONS—ANY SPAN
Write for Catalog
Erie Steel Construction Co.
Erie, Pa.

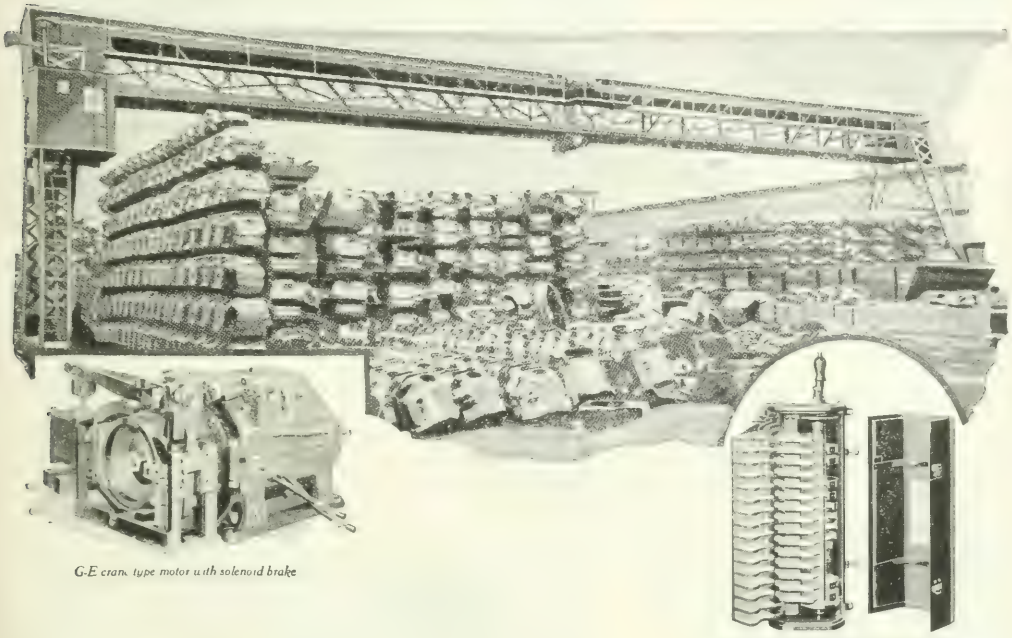
STRENGTH

ARMINGTON TEE RAIL CARRIER AND HAND CRANES

Don't worry about your material moving
Tell Us Your Requirements
THE ARMINGTON ENGINEERING CO.
Euclid, Ohio

EFFICIENCY

So much depends upon the electric crane in shop and yard that it must have electric equipment which can stand severe service



G-E crane type motor with solenoid brake

G-E drum type controller for crane motors

Cranes respond readily when G-E equipped

THE ready handling of heavy, unwieldy material is the big advantage that users of traveling cranes gain when the motors and control on that equipment are always equal to the job.

G-E crane motors and control are built for this purpose and are backed by years of experience in manufacture and operation. These motors withstand the moisture and dirt of outdoors, the troublesome grit of foundries and shops, and the grind of service wherever they operate.

G-E motors are rugged and compact, and their parts are easily accessible Series winding gives a high starting torque which enables them to handle their hook load without flinching.

The General Electric Company builds motors and control for leading manufacturers of cranes because G-E engineering service is a most valuable asset, not only to these manufacturers but to the users of this machinery.

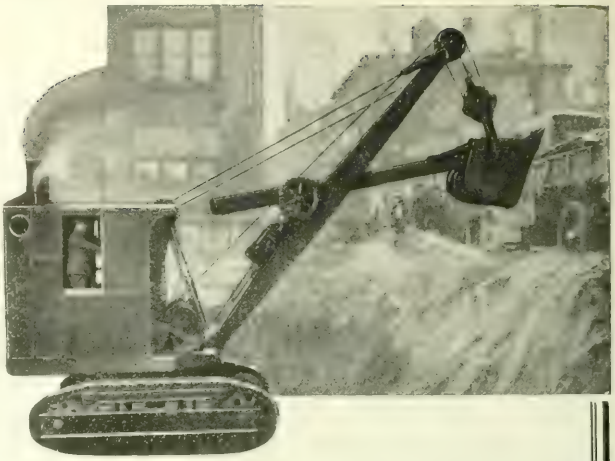
General Electric Company

General Office Schenectady, N.Y.

Sales Offices in all large cities

43B-575

DEPENDABLE
O S
LOCOMOTIVE CRANES



The O. S. 7-Ton Steam Crane Readily Becomes a Shovel

The auxiliary shovel boom makes a powerful and effective steam shovel of this O. S. Crawling Tread Steam Crane.

The boom is equipped with its own independent crowding engines.

This equipment multiplies many times the utility of an already versatile crane. The crawling tread makes it available for use anywhere.

Construction details are really features in the importance of their bearing on effective crane operation.

More complete details will interest you.

Write for them.

ORTON & STEINBRENNER CO.

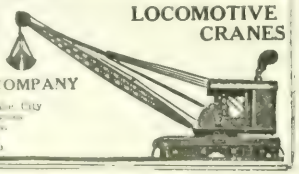
Office—Chicago, Ill. Agents in all Principal Cities Factory—Huntington, Ind.





Chicago Office, Railway Exchange Building

BROWNING
A Giant's strength with a Wizard's deftness
LOCOMOTIVE CRANES
THE BROWNING COMPANY



INDUSTRIAL

Locomotive Cranes — Transfer Cranes
Erection Cranes — Grab Buckets
Tractor Cranes — Lifting Magnets

INDUSTRIAL WORKS, Bay City, Mich.

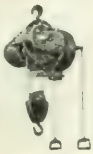
LOCOMOTIVE CRANES
CLAM SHELL BUCKETS - SHIPBUILDING CRANES
CAR DUMPERS PILE DRIVERS
THE McMYLER INTERSTATE CO.
CLEVELAND OHIO

BROWNHOIST

Locomotive Cranes
Grab Buckets
Belt Conveyors
Chain Conveyors

Electric Hoists
Overhead Tr. Cranes
Pillar & Jib Cranes
Heavy Dock Machinery

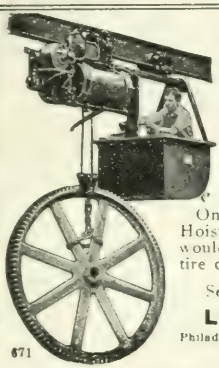
THE BROWN HOISTING MACHINERY CO.
Cleveland, Ohio



NORTHERN HOISTS

ELECTRIC and AIR HOISTS
¼ to 10 Tons, AC or DC
NORTHERN ENGINEERING WORKS
212 Chene St., Detroit, Mich.





LINK-BELT Electric Hoists

Save time, money and labor in handling materials. Require small headroom. All working parts enclosed and fully accessible.

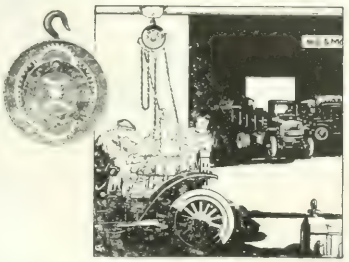
One man and a Link-Belt Hoist can handle pieces that would ordinarily require an entire crew.

Send for catalog No. 380

LINK-BELT COMPANY
Philadelphia Chicago Indianapolis
Offices in principal cities

671

FORD TRIBLOC



For Accurate Placing

THE Tribloc lowers its load gently and accurately into place. To understand why, one has only to examine the planetary gear system. Such a well balanced drive insures absolute smoothness of operation—whether in lifting or lowering. No matter how carelessly operated a Tribloc will never jump, jam, or jerk under its proper load.

Write for information on any type or capacity to 40 Tons.

2217-D

FORD CHAIN BLOCK CO.
2ND & DIAMOND STREETS PHILADELPHIA, PA.

OVER-SEAS REPRESENTATIVE
ALMACOA ALLIED MACHINERY COMPANY OF AMERICA ALMACOA
51 CHAMBERS ST. NEW YORK, U.S.A.

PARIS BRUSSELS TURIN BARCELONA RIO DE JANEIRO



Thor

Hoisting Service

The THOR PNEUMATIC MOTOR HOIST provides a convenient, dependable means of moving material.

Ample power from the two double acting cylinders is transmitted to the drums through a worm gear of such pitch as to hold the load at any point.

Sensitive control is provided by the hand chains.

Write for catalog of pneumatic equipment.

Independent Pneumatic Tool Co.
600 West Jackson Boulevard, Chicago

Branch Offices in all Principal Cities.
EASTERN OFFICE:
1403 Broadway (at 42d St.), New York, N. Y.
FACTORY: State and Clark Sts., Aurora, Ill.
LONDON OFFICE:
No. 40 Broadway, Westminster, London, S.W. 1, England



PEERLESS HOISTS

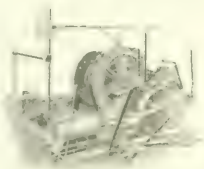
are made with the same precision and care as our finest machine tools.

The result is a hoist worthy of your earnest consideration.

Send for Hoist Bulletin and full information today.

EDWIN HARRINGTON SON & CO.
PHILADELPHIA, PA.

TRADE MARK
MUNDY
ESTABLISHED 1869

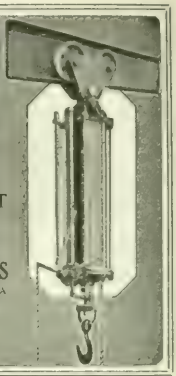


CONCRETE TOWER HOIST

WRITE FOR BULLETIN

J. S. MUNDY HOISTING ENGINE CO.
Newark, New Jersey

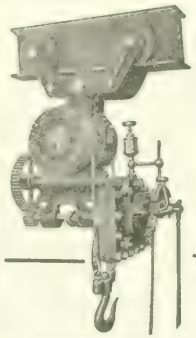
QMS
HOISTS and TROLLEYS



STRONG · DURABLE · EFFICIENT

All Styles and Sizes
Catalog on Request

HANNA ENGINEERING WORKS
126 LAFLIN AVE CHICAGO U. S. A.
MANUFACTURERS OF HOISTS AND TROLLEYS
FOR
"QUICK MOTION" MACHINE CO.
E. G. BUTCH COMPANY
QMS PRODUCTS



Simple—Powerful —Safe

Dake hoists are simple, powerful and above all, safe. They are provided with a positive limit switch. The worm gear acts as an effective brake making it impossible for a load drop. Made with chains or wire cable and in hook or trolley types in capacities up to 10 tons.

The Dake Engine Company
Grand Haven, Mich.

The Euclid Crane & Hoist Co.
Euclid, Ohio



"H'IST 'ER UP" with a "STAMP" 22 years of experience are back of

STAMP HOISTS

THE CHARLES E. STAMP CO.
616 St. Clair Ave., N. E.
Cleveland, Ohio
Western Branch: Stamp Electric Hoist Co.
1500 17th St., San Francisco, Cal.

TRADE MARK
WRIGHT
LISBON OHIO

Are you hoisting the Wright way?
It will lighten your load at the lowest cost and most economical way. *Write for data*

WRIGHT MANUFACTURING COMPANY
Lisbon Ohio, U. S. A.

PNEUMATIC GEARED HOISTS 1-15 TONS
PNEUMATIC MOTORS 2-15 H.P.
ELECTRIC HOISTS—TRAVELING AND HAND CRANES
DETROIT HOIST & MACHINE CO. DETROIT MICH.

CYCLONE HOISTS
HIGH SPEED
"with the Gyrating Yoke"
One-fourth to 40-ton sizes.
Jobbers in all cities.
Send for our Catalog.
Hoists-Cranes-Trolleys
Branches: New York Pittsburgh Chicago
The Chisholm-Moore Mfg. Co. Cleveland



OHIO LIFTING MAGNETS
are indestructible

All insulation is Asbestos. They have low heat rise. Outer ring has no thru holes and therefore will never break or wear out

The OHIO ELECTRIC & CONTROLLER CO.
CLEVELAND, OHIO

THE MOTO HOIST

A High Grade, Low Priced Hoist

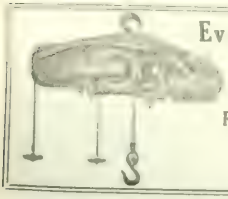
The Drake Manufacturing Co., Inc.
Friendship, New York

½ and 1 Ton
New York Office:
15 Park Row

VULCAN of WILKES-BARRE LOCOMOTIVES

Built for service and give it

VULCAN IRON WORKS Wilkes-Barre, Pa.
Est. 1849



Everedy Electric Hoists
¼ to 3 Ton Capacity
LIGHT WEIGHT
QUICK SPEED
LOW PRICED
Reading Chain & Block Corp.
Cranes—Electric Hoists
Chain Hoists
READING, PA.



PORTER LOCOMOTIVES
OVER A HALF CENTURY OF SERVICE
H·K·PORTER CO.
PITTSBURGH, PA.

ILLINOIS



For Safety, Forged and Rolled

Steel Wheels

Passenger and Freight Service

Illinois Steel Company

General Offices, 208 S. La Salle Street
CHICAGO, ILLINOIS

BRANCH OFFICES:

Birmingham: Brown-Marx Bldg.
Boston: Massachusetts Trust Bldg.
Buffalo: Marine Nat'l Bank Bldg.
Chicago: Con't and Com'l Bank Bldg.
Cincinnati: Union Trust Bldg.
Cleveland: Kirby Bldg.
Denver: First Nat'l Bank Bldg.
Detroit: Ford Bldg.
New Orleans: Maison Blanche
New York: Hudson Terminal Bldg.
Philadelphia: Widener Bldg.
Pittsburgh: Carnegie Bldg.
St. Louis: Third Nat'l Bank Bldg.
St. Paul: Pioneer Bldg.

Pacific Coast Representatives: U. S. Steel Products Co., San Francisco, Seattle, Portland, Los Angeles
Export Representatives: United States Steel Products Co., New York City



THE map above shows the location of the 49 foundries in the United States and Canada, represented by the Association of Manufacturers of Chilled Car Wheels.

Chicago, 3	Sayre,Pa.
St. Louis, 2	Berwick,Pa.
Buffalo, 4	Albany
Pittsburgh, 2	Toronto
Cleveland, 2	NewGlasgow,N.S.
Amherst, N.S.	Madison,Ill.
Montreal	Huntington,W.Va.
Mich.City,Ind.	Wilmington,Del.
Louisville	Houston,Tex.
Mt.Vernon,Ill.	Hannibal,Mo.
Ft.Wayne,Ind.	Reading,Pa.
Birmingham	Baltimore
Atlanta	Richmond,Va.
Savannah	Ft.William,Ont.
Boston	St.Thomas
Detroit	Hamilton
St.Paul	Ramapo,N.Y.
KansasCity,Kan.	Marshall,Tex.
Denver	Los Angeles
Tacoma	Council Bluffs
Rochester,N.Y.	

American Railroad Association Standards

650 lb. wheel for 60,000 Capacity Cars
700 lb. wheel for 80,000 Capacity Cars
750 lb. wheel for 100,000 Capacity Cars
850 lb. wheel for 140,000 Capacity Cars

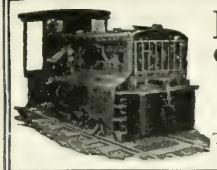
The Standard Wheel for Seventy One Years.

CHILLED IRON WHEELS

for railway and street car service. Capacity 20,000 per day. 25,000,000 in service.

ASSOCIATION OF MANUFACTURERS OF CHILLED CAR WHEELS
1847 McCormick Bldg., Chicago

CHILLED IRON WHEELS



PLYMOUTH
Gasoline Locomotives
For all Industrial Haulage
Ask for Bulletins
THE FATE-ROOT-HEATH CO.
PLYMOUTH, OHIO, U. S. A.

MINSTER INDUSTRIAL LOCOMOTIVES



THERE IS A SIZE FOR YOUR PURPOSE
The INDUSTRIAL EQUIPMENT COMPANY
OHIO STREET, MINSTER, OHIO, U. S. A.
EASTERN and EXPORT DEPT., THE HERBERT CRAPSTER CO., Inc.
No. 1 Madison Avenue, NEW YORK CITY

ATLAS CARS Storage Battery Locomotives & Tractors



THE ATLAS CAR & MFG. CO.
ENGINEERS CLEVELAND, OHIO MANUFACTURERS



Portable and Industrial Track, Frogs, Switches, Crossings, Switch Stands, Rail Braces.
Cincinnati Frog & Switch Co.
Cincinnati, Ohio



***The* TOWMOTOR**
Low Upkeep
Slow Depreciation

The two essentials to the value of an investment in material handling equipment. Besides economical operation the Towmotor does more good, hard work than you would believe possible in a tractor of this type.

Let us tell you why

"The Towmotor Makes Good"

THE TOWMOTOR COMPANY
1226 East 152nd Street. Cleveland, Ohio

Baker INDUSTRIAL TRACTORS & TRUCKS



—accomplish an average saving of 75% as compared with hand trucking
See our page in December 14th issue.

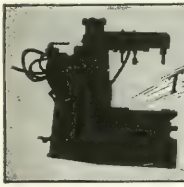


THE BAKER R&L CO. Cleveland, O.

JACKLIFT MASTER TRUCK
Capacities Up to 8000 Lbs.
The Elevating Truck that is 100% efficient. Made in 66 models, to fit every need. Catalog on request.
LEWIS-SHEPARD CO., 564 E. First St., Boston, Mass., U. S. A.



Electric Industrial TRUCKS and TRACTORS
For Interdepartment Haulage
ELWELL--PARKERS
adopted as standard by large users. Types to meet every transfer requirement. All parts interchangeable. Lift, Platform, Crane and Dump Trucks, Tractors. Request Catalog 181.
The Elwell-Parker Electric Co. Cleveland, Ohio



THE FASTEST
on the market
THE GRIMES JOLT ROLLOVER MOLDING MACHINE
GRIMES MOLDING MACHINE CO.
1218-22 Hastings St. Detroit, Mich.

Roller Bearing Trucks and Cars



All Kinds for All Purposes
CHASE FOUNDRY & MFG. CO., Columbus, Ohio



Molding Machines
for production and jobbing castings
Wm. H. Nicholls Co., Inc.,
4 College Place Brooklyn, N. Y.

SHARON
PRESSED STEEL COMPANY
INDUSTRIAL TRUCKS AND TRAILERS
PRESSED STEEL PARTS
For Railways, Motor Cars, Trucks and Tractors
Main Office SHARON, PA. and Works

FOUNDRY MOLDING MACHINES
MODERN STANDARD SPECIAL
POURING DEVICES LIGHT CRANES
ARCADE MANUFACTURING CO.
Freeport, Ill., U. S. A.

PANGBORN SAND-BLASTS

PANGBORN CORPORATION — ALL WAYS SERVICE — ALWAYS — HAGERSTOWN, MD.

P. O. Box 856

Our Sandslinger—
will ram ten cubic feet of sand per minute in moulds of any size.

Write for the details.

The Beardsley-Piper Company
Manufacturers of Foundry Machinery
312 Union Park Court Chicago, Illinois
Canadian Representatives: Hugh Park Foundry Co., Oshawa, Ontario, Canada

CAPE MAY SAND CO. — CAPE MAY CITY, N.J.

ASSURE YOURSELF OF UNIFORMLY HIGH QUALITY BY SPECIFYING CAPE MAY SAND
Unexcelled for molding, cores and sand blast.
CAPE MAY SAND CO.
512 Washington St. Cape May City, N.J.

SLY Foundry Equipment
Dust Arresters
Sand Blast
Tumbling Mills—Core Ovens—Cupolas
The W. W. Sly Mfg. Co., Cleveland, Ohio

FLINT SHOT
A Free-Running Abrasive
Easy on sand blast equipment. Nothing to clog or rust.
UNITED STATES SILICA CO.
122 South Michigan Ave. Chicago

SYSTEM HOEVEL SAND-BLAST AUTOMATIC MACHINES
SELF-CONTAINED
For all purposes, Most Efficient and Economical
HOEVEL MANUFACTURING CORPORATION
Controlled by L. O. Koven and Brother, 160 Ogden Ave., Jersey City, N. J.
Cleveland Office, 501 Ulmer Building

For Better Results USE **Portage Sands** OVER 98% SILICA
Molding Sandblasting
THE PORTAGE SILICA COMPANY
YOUNGSTOWN, OHIO

Sound Castings by **Castrite** TRADE MARK
Make your molds and cores of the right porosity by Castrite, and with proper metal your castings are bound to be good. *Shall we send complete information?*
Electric Welding Machine Co., 2002 E. Larned St. Detroit, U. S. A.

FOUNDED 1827 — INCORPORATED 1901 — J. W. PAXSON CO. MOLDING SAND PHILADELPHIA, PA.

J. W. PAXSON CO.
PHILADELPHIA, PA.
FOUNDRY
SAND
FACING SUPPLIES
EQUIPMENT
Sand Blast and Magnetic Separators

WOOD RIM SIEVES
FOR ALL PURPOSES
Foundry and Hardware Riddles, Mason's and Coal Sieves
Oat, Flour and Meal Sieves
Geo. H. Jelliff & Son
New Canaan Conn., U. S. A.

EQUIPMENT
Sand Cutters, Sand Blast, Steel Flasks
Molding Machines, Core Machines
Dust Arresters, Charging Buckets
Oven Trucks, Pattern Compound
Snap Flasks
The American Foundry Equipment Company
Marlin-Rockwell Bldg., New York
Boston Philadelphia York Pittsburgh Detroit
Cincinnati Chicago Waterloo

ROOTS Since 1859 ROOTS
Rotary Positive Blowers for air pressures of less than ten pounds; Gas Pumps for same pressures; Vacuum Pumps for 26" or less; and Rotary Pumps for heads of 200 feet or less. Let us send you Catalogs and help you with your problems.
THE P. H. & F. M. ROOTS CO.
CHICAGO CONNERSVILLE, IND. NEW YORK

SIMPSON SAND MIXERS
Save labor expense. Reduce amount of new sand and binder required. The Simpson Intensive Foundry Mixer permits of a material reduction in the quantity of the castings by a more thorough mixing of the new sand and other foundry sand ingredients in a much shorter time. Details?
National Engineering Co., 549 W. Washington St., Chicago, Ill.

Blowers *Exhausters*
The Connersville Blower Co.
Connersville, Ind.
Boosters *Meters* *Pumps*

GEORGE F. BETTINOS
SANDS AND SUPPLIES — PLUMBAGO FACINGS
GRAPHITE — Imported and Domestic—Crude or Refined For All Purposes
Molding Sands
Sand Blast Sand
Foundry Supplies and Equipment.
Philadelphia New York Boston

NORTHERN BLOWER — ACCEPTED SERVICE
Dust Collectors
Sand Blast
Foundry Equipment
Industrial Ventilation
The Northern Blower Co.
Cleveland, Ohio



Crucibles — Stoppers — Covers — Phosphorizers — Sleeves

and other articles for use in melting and refining metals.
The Best Is True Economy.

McCULLOUGH-DALZELL CRUCIBLE CO. **Pittsburgh, Pa.**



LARGE SMALL **PATTERNS** WOOD METAL

Our 20 years' experience enables us to make patterns for machine or hand molding that will give as perfect a mold on the last casting made as on the first.

MUMMERT-DIXON CO., Hanover, Pa.

Sterling

Foundry Flasks, Wheelbarrows, Carts & Trucks - Warehouse Trucks - Contractors Wheelbarrows



Packers Galvanized Equipment - Foundry Wedges Shop Boxes Skim Gates - Column Clamps

Warehouse - Chicago | Warehouse - New York | **Sterling Wheelbarrow Company** Main Office & Factory Milwaukee, Wisconsin. | Warehouse - Detroit | Warehouse - Cleveland

HENDERSON
TUMBLING BARRELS
THE RECOGNIZED STANDARD
Get Our Catalog
THE HENDERSON BROS. CO.
Waterbury Conn.

FOERST
Fuel Oil Burners



The No. 8 Fan Tail Burner here shown is made in one solid piece. It has no wearing parts, therefore leakage and other troubles are impossible.

Foerst Burners are made in sixteen different styles, internal and external mixing types.

Write for catalog.

JOHN FOERST & SONS, BAYONNE, N. J.

DISTRIBUTORS

Baumes-McDevitt Machinery Co., St. Louis, Mo.
Fuel Oil Engineering Co., Box 742, Cincinnati, Ohio
W. G. Edmonds, Clyde, N. Y.
Elliot & Selby, Philadelphia, Pa.

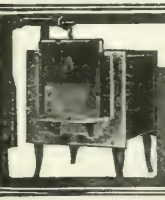
The Ideal **Automatic Tumbling Barrel**
will save at least
50% of Labor in Your Tumbling Room
SEE OUR ADVERTISEMENT IN FIRST ISSUE EACH MONTH
THE IDEAL CONCRETE MACHINERY CO.
1315 Monmouth Avenue
CINCINNATI OHIO U. S. A.

AMERICAN GRINDING PANS
are invaluable for reclaiming core sand.
The materials used in their construction assure you of a sturdy and valuable service.
Send for our interesting catalog. It will interest you.
HADFIELD-PENFIELD STEEL CO.
Successors to
American Clay Machinery
BUCYRUS, OHIO

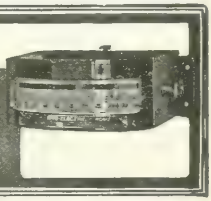
The Hawley Down Draft Furnace Co.
BUILDERS OF THE ORIGINAL DOWN-DRAFT SMOKELESS FURNACE AND THE HAWLEY-SCHWARTZ METAL FURNACE. FORMERLY OF CHICAGO.
EASTON, PA.

DIAMOND
MOULDING EQUIPMENT — FOUNDRY SUPPLIES
FLASKS STEEL JACKETS BANDS
WEDGES CLAMPS CORE BOXES
DIAMOND CLAMP & FLASK CO.
RICHMOND North 14th & F Sts. INDIANA

BOOTH
Booth Rotating furnaces for brass melting and melting of cast iron borings.
Booth Direct arc furnaces for steel and iron melting and refining of steel.
Booth Laboratory furnaces.
Furnaces in all sizes from 1 lb. to 20,000 lbs. capacity.
The Booth Electric Furnace Co.
411 North Wells Street, Chicago, Ill.



HOSKINS
ELECTRIC FURNACES - PYROMETERS



The secret of successful heat treatment lies in the exact control of the temperature. This control can be obtained by using Hoskins Electric Furnaces and Pyrometers. Write to the Hoskins Mfg. Co., Detroit, for details.

FERGUSON SHOP FURNACES
FOR HEAT TREATING AND FORGING
AUTOMATIC OR CONTINUOUS WILL REDUCE FUEL AND LABOR COSTS
FERGUSON FURNACE COMPANY
MAIN OFFICE
CHICAGO TOLEDO - OHIO NEW YORK

THE COST OF FUEL

is not as important as what you can get out of it. This [illegible] utilize [illegible] is governed by [illegible] furnace design and operation.

W. S. ROCKWELL COMPANY, 50 Church St., New York

[illegible] Engineers and Contractors [illegible] Heating Equipment

Boston Cleveland Detroit Montreal

Buffalo Rochester Golden Bros., Ltd. Dudley, Worc., Eng.

FURNACES for heat-treating, billet heating, sheet mills, brass mills, oil, coal, gas, electric.

TRADE MARK Reg. U. S. Pat. Off.

Tate Jones & Co. inc.

FURNACE ENGINEERS Pittsburgh, Penna. ESTABLISHED 1880

New York Chicago Buffalo San Francisco St. Louis

TRADE MARK Reg. U. S. Pat. Off.

THERMALLOY

THE STANDARD HEAT RESISTING ALLOY AT A REASONABLE PRICE

The ELECTRO ALLOYS CO., Elyria, Ohio.

NEW YORK 50 Church St. CLEVELAND 511 Bulkley Bldg. DETROIT 403 Real Estate Exch.

See our display ad in last week's issue.

ELECTRIC FURNACES

"GREAVES-ETCHELLS" for melting and refining Iron and Steel.
FAST MELTING ACID LINED FURNACES.
ELECTRICALLY HEATED:—Core and Mold Drying Ovens.
VITREOUS ENAMELING AND JAPANNING OVENS.
HEAT TREATING FURNACES for brass, iron and steel.

ELECTRIC FURNACE CONSTRUCTION CO.
908 Chestnut St., Phila., Pa.

ANTHONY

NEBULYTE OIL & GAS BURNERS

The ANTHONY Co., LONG ISLAND CITY, N.Y.

DETROIT

ROCKING ELECTRIC

USED BY THE FOREMOST FOUNDRIES

FURNACES

ROLLING MILLS, SMELTERS AND REFINERS

Detroit Electric Furnace Co., Detroit, Mich.

AMERICAN GAS FURNACE CO. PIONEERS IN 1878 LEADERS TODAY

Gas Blast Burners, Furnaces, Heating Machines for every industrial purpose; also Positive Pressure Blowers.

American Gas Furnace Co.
1004 Lafayette St., Elizabeth, N. J.

METALLURGICAL FURNACE EQUIPMENTS

Pulverized Coal Fuel Oil Gas

FULLER ENGINEERING COMPANY
FULLERTON, PA.

You should be using

Bellevue Furnaces

They are the most economical in service, give the largest production, and are easily controlled.

BELLEVUE INDUSTRIAL FURNACE CO.
DETROIT, MICH.

Moore-Rapid Lectromelt Furnaces

Built in Eight Standard Sizes from 1/8 to 12 Tons. Remarkable Overload Capacity.

Pittsburgh Electric Furnace Corporation
Pittsburgh, Pa., U. S. A.

Stewart Furnaces

Guarantee Uniform Heat Treating

CHICAGO FLEXIBLE SHAFT COMPANY
1146 S. CENTRAL AVENUE, CHICAGO
NEW YORK ST. LOUIS DETROIT

W. E. MOORE & CO., ENG'RS

PITTSBURGH, U. S. A.

Designs and Supervision of

ROLLING MILL, FORGE SHOP, FOUNDRY AND MINE INSTALLATIONS, POWER PLANTS AND HEAVY INDUSTRIAL POWER APPLICATIONS, ELECTRIC FURNACES FOR STEEL, IRON AND BRASS

gas EFFICIENT-INDUSTRIAL FURNACES oil

UNIFORM TEMPERATURE - MAXIMUM OUTPUT - MINIMUM FUEL COST

THE SURFACE COMBUSTION CO.

PHILADELPHIA PITTSBURGH CHICAGO BALTIMORE

FUEL OIL **FURNACES** GAS

Oil, Gas and Combination Burners
Oil Pumps and Tanks Blowers and Compressors
Complete Heat Treating Equipments

THE ECONOMY FURNACE COMPANY
Fuel Oil and Gas Engineers
CHICOPEE MASS.

AMERICAN INDUSTRIAL FURNACE CORP.

"Out of Flame—Progress"

Our trademark and our motto are both [illegible]

AMERICAN INDUSTRIAL FURNACE CORP.
10 Post Office Square, Boston, Mass.



To secure 100% Economy and 100% Efficiency use W. N. Best oil and tar burners and furnaces for Annealing, Case Hardening, Tempering, Forging, Heat Treating, etc. Send for Catalog

"There is nothing better than the BEST"

W. N. BEST FURNACE & BURNER CORPORATION
11 Broadway, New York City

HAGAN

ANNEALING FURNACE



Charging Machine
Saves Labor—Saves Fuel
Saves Boxes

The Geo. J. **HAGAN** Company

Peoples Bank Bldg. Pittsburgh, Penn'a

Save on Industrial Baking

Member Foundry Equipment Manufacturers Association.

In all industrial baking—japans, etc., cores and molds, electrical apparatus — the efficient heat insulation, proper ventilation and quick heating of Young Brothers' ovens save money every hour. They use either coke, oil, steam, gas or electric heating.

Ask for complete catalogue.

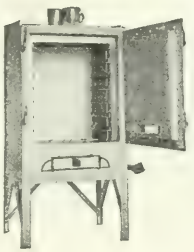
Young Brothers Company
Detroit Michigan

6504 Mack Avenue

District Sales Offices: 20 E. Jackson Boulevard, Chicago
730 Engineers Bldg., Cleveland
52 Vanderbilt Ave., New York
Edgar A. Wilcox, Los Angeles, Cal.

STEINER OVENS

Established 1889—32 years



SECTIONAL AND PORTABLE

Direct or Indirect Heated, using Gas, Electricity or Oil, Superior Construction, Economical Operation. For Japanning, Lacquering, Drying and adaptable for many other purposes.

Oven Trucks
Saw Dust Boxes
Dip-Tanks

Send for Catalog.

E. E. Steiner & Co., Inc.
2-16 Avenue C, NEWARK, N. J.

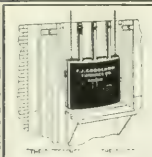
HEAT TREATING FURNACES

Oil and Combination Burners
Tanks—Pumps—Compressors—Blowers

Advance Furnace & Engineering Company
SPRINGFIELD, MASS.
Boston New York Philadelphia St. Louis Pittsburgh

OVENS—FURNACES
For All Purposes

HOLCROFT & COMPANY
6545 Epworth Blvd. **Detroit**



NO COLD ZONE
IN GOODENOW FURNACES

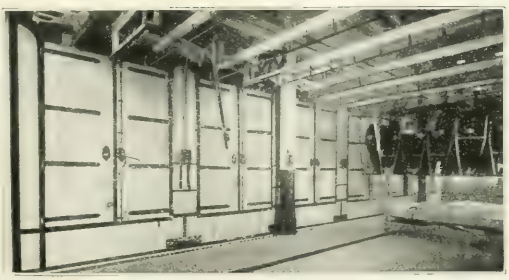
This is only possible because of our patented furnace door, which contains flues in the lining, drawing the hot gases right up to the door and giving an even temperature throughout the entire area of the hearth. This 100% hearth area means greater capacity and positive heat distribution. Practically no rejections. Let us tell you what it is doing for others.

F. J. GOODENOW FURNACE CO.
2155 W. Warren Ave., Detroit, Mich.

SEE IRON AGE CLEARING HOUSE FOR REBUILT FURNACES.

Send a trial order for the famous **MAHRVEL Blue Rivet Forge No. 18**, mounted on wide, high wheels for yard repair work. Price only $143.50.

MAHR MANUFACTURING COMPANY
Oil Burning Equipment
MINNEAPOLIS, MINN., U. S. A.



Part of an installation at Detroit plant of the Studebaker Company with a dip and bake capacity of sheet metal parts for 200 cars per day.

IN THE AUTOMOTIVE INDUSTRY

PLANT design or assembling problems are no barrier to the installation of Maehler Ovens. They are adaptable to every conceivable condition.

Maehler Ovens are performing most efficiently for some of the foremost builders, accessory manufacturers and service stations.

Copy of the Maehler Catalog will be mailed on request.

The
PAUL MAEHLER COMPANY

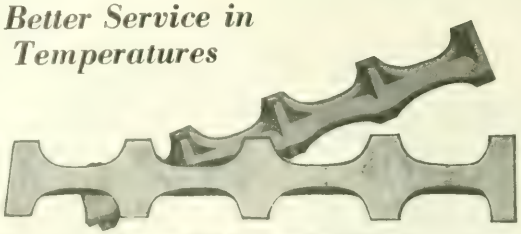
2210 W. LAKE STREET, CHICAGO

SALES REPRESENTATIVES

Ralph C. Schwarz, 921 Granite Bldg., Rochester, N. Y.
Beeman & Brouchton Co., 451 Twenty-first St., Detroit, Mich.
W. H. Kelsey & Co. 1940 E. 6th St., Cleveland, O.

CALITE CASTINGS

Give Better Service in High Temperatures



Supports Used in Enameling Furnaces

Calite supports for enamel baking are of direct and definite advantage.

Calite supports last from twenty to forty times longer than cast iron.

They do not crack, warp or distort.

They do not stick to the furnace floor, and are easy to move.

They permit of increased production through quicker working and decreased scrap loss.

They keep the furnace interior clean.

CALORIZING COMPANY OF PITTSBURGH

OLIVER BUILDING, PITTSBURGH, PA. 50 CHURCH ST., NEW YORK CITY

THE OVEN EQUIPMENT & MFG. CO.

NEW HAVEN, CONN.

"CRAWFORD SECTIONAL" OVENS Heated with Our ENCLOSED FLAME GAS BURNERS or ELECTRICITY

Ovens Carried in Stock and Built to Meet Requirements of Manufacturers. Builders of All-Steel Oven Trucks with Roller Bearings.

GEHNRICH FOR JAPANNING LACQUERING ENAMELING CORE BAKING OVENS

Send for Catalogue and Brochure

CHICAGO 222 So. La Salle St.

GEHNRICH INDIRECT HEAT OVEN CO., Inc.

LONG ISLAND CITY, N. Y.

DETROIT A. A. Treadway, Inc. 708 Penobscot Bldg.

HOLBECK PULVERIZED COAL SYSTEMS

Whether your fuel problem is in connection with forging, melting, puddling, ore roasting, annealing, heat treating or steam boiler—THE HOLBECK Pulverized Coal System offers the logical solution.

Our engineers will gladly assist you in determining all factors in connection with this system.

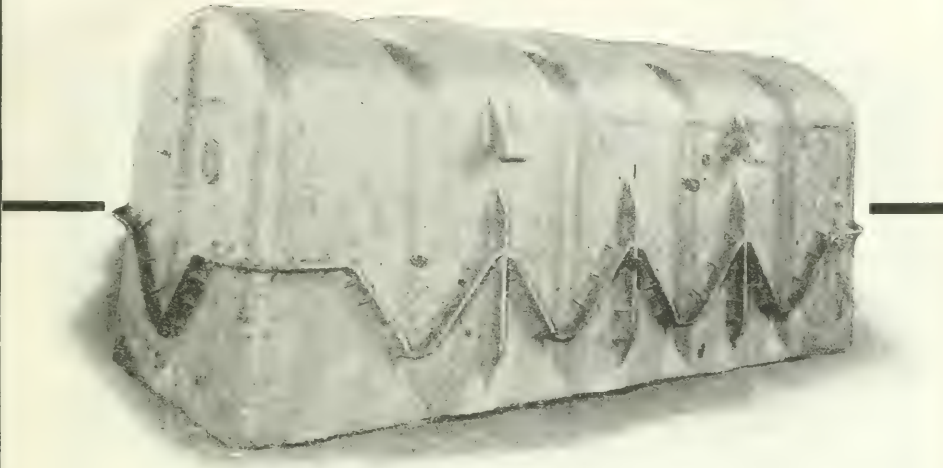
The Holbeck System can be installed in your plant. Let our engineers explain what it will do for you.

THE BONNOT COMPANY, Canton, Ohio

PHILADELPHIA OFFICE 1402 Morris Bldg.

CHICAGO OFFICE 1016 Kimball Bldg.

WHEELING
NEW TYPE
ANNEALING BOX



This New Type Annealing Box represents the last word in scientific construction, and possesses many new features which insure longer life and more efficient service.

Unexcelled facilities for the production of superior quality—

STEEL ROLLS SUPER-CHILL ROLLS
SUPER-STEEL ROLLS SAND ROLLS

The Mo-lyb-den-um Roll

Also

Steel Castings
Iron Castings
Special Machinery
Rolling Mill Machinery

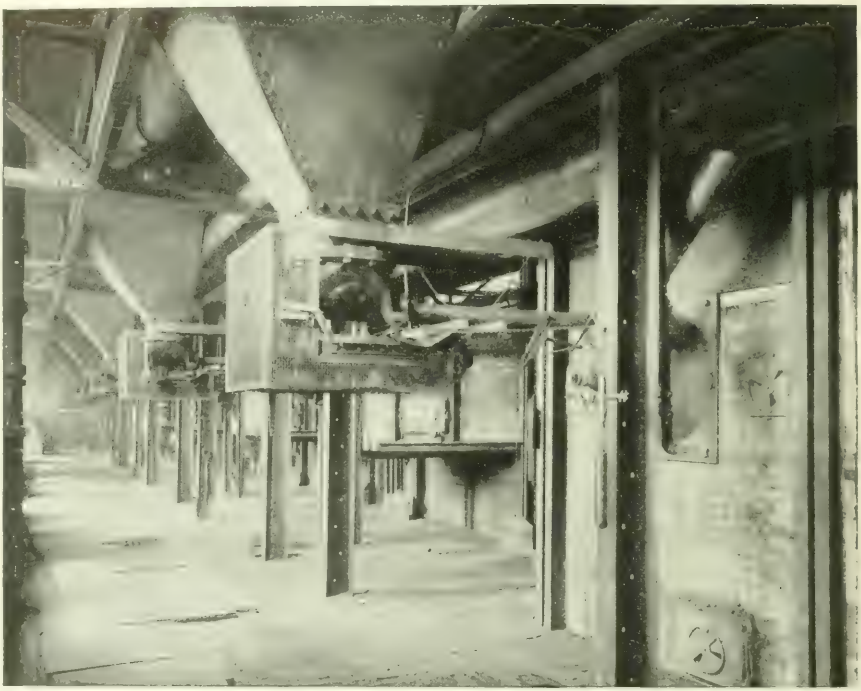
Wheeling Mold & Foundry Co.
Wheeling, West Virginia

There Used to Be One Man to Each Furnace Plus Coal Passers—

NOW

The "RAYCO" Pulverized Coal System with one man feeds all 8 Furnaces

AUTOMATIC PRACTICAL ECONOMICAL



"Rayco" equipped furnaces in a large malleable iron plant.
"Rayco" System also used under boilers at same plant.

We offer a *complete* service including furnace design—plant engineering covering fuel processes, and any related processes in operation or production—manufacture of equipment, installation and supervision of preliminary operation.

You will be particularly interested in the data sheet in our catalog showing specific and definite results achieved by plants using pulverized coal systems. Catalog gladly sent on request.

THE RAYMOND BROS. ENGINEERING CO.

1306 North Branch Street, Chicago

New York Los Angeles Paris, France Bedford, England

Grindle Powdered Coal Systems

are absolutely Safe—also Dustless

The argument that it is dangerous to have powdered coal storage tanks near a furnace is entirely false. We know of cases where powdered coal was left in the feed hopper at an idle furnace for three months without the slightest difficulty.

With the Grindle patented construction it is impossible for the flame to flash back into the burners even when the air is practically shut off; in fact, we have never been able to even burn the fuel back into the nozzle.

The Grindle System has many advantages over hand and oil firing.

Send for special Malleable Bulletin No. 5.

General catalog and prices on request.

GRINDLE FUEL EQUIPMENT CO.

(Subsidiary of Whiting Corporation)

15601 Lathrop Avenue, Harvey, Ill. (Chicago Suburb)

KLEAN HEAT

(Trade Mark Registered)

For reheating purposes in hardening steel.
Once you try it, you will always use it.
Send for Circular.

PARK CHEMICAL COMPANY

3469 Lovett Street **Detroit, Mich.**

Only an exact count is a safe count

The Productimeter

Gives an instant, accurate, easily read count. Popular with operatives—saves disputes. Popular with Agents and Overseers—checks costs against estimates. Get catalog for full money saving details



DURANT MFG. CO.

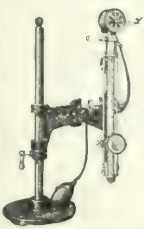
635 Buffum St., Milwaukee, Wis. (1617)

HARDNESS TESTING

Is Now Done Almost Exclusively With

The SCLEROSCOPE

(International Standard)



Direct reading, can be operated by anyone with great rapidity. Measures softest metals and hardest steels without adjustment. Send for our booklet, free.

The PYROSCOPE

as a heat indicator has solved the most difficult problems.

In heat treatment of steel, forging, founding, etc.

Unexcelled for constancy, inexpensive. Booklet free.



Selective Carburizing. Localized Hardening by SHORE Process.

Shore Instrument & Mfg. Co., Inc.

Van Wyck Ave. and Carll St., Jamaica, N. Y.

Agents in All Foreign Countries

INDICATING

RECORDING

CONTROLLING

Tycos

temperature instruments

win merit in all fields of industry. They are accurate and rugged.

Taylor Instrument Companies

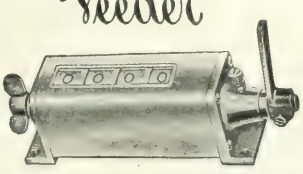
Rochester, N.Y. U.S.A.

Thereis a Tycos and Taylor temperature instrument for every purpose

Veeder

Set-Back

COUNTER



Registers one for each oscillation of the lever, indicating an operation of your machine. Sets back to zero by turning knob once round.

Put a counter on a machine and you put the operative on his mettle. You set him producing with the figures in front of him—in front of the "boss" as well. You get a measure of the *standard* for a day's production, and get the worker to measure up! Write for booklet.

The Veeder Mfg. Co. **14 Sargeant St., Hartford, Conn.**


PYROMETERS

WILSON-MAEULEN CO.
Makers of
PRECISION-INSTRUMENTS
for measuring
HEAT & HARDNESS
738 East 143 Street. New York.

The ROCKWELL Direct Reading HARDNESS TESTER


Model B
Gear Counter
Absolutely Accurate
Send for Circular
R. A. Hart Mfg. Co.
91 Wilson Court
Battle Creek, Mich.

ROOT
EYES OF PRODUCTION COSTS
COUNTERS
BRISTOL, CONN.


TRADE MARK
BRISTOL'S
REG U S PAT OFFICE
PRESSURE GAUGE

Your Pressures?

Are your pressures followed by a question mark?

You can know exactly what they are every minute if you use Bristol Recording Pressure Gauges.

And your operation is bound to be more economical when you have accurate records.

Write for Bulletin Z-1005 and ask us about our present conditions.

THE BRISTOL CO., Waterbury, Conn.

Branch Offices
Boston, New York, Pittsburgh, Detroit, Chicago, St. Louis, San Francisco, Philadelphia


DRAFT AT LAST PASS
DRAFT OVER FUEL BED
PRESSURE IN WINDBOX
Test cocks for checking accuracy at any point of scale

Patented 9/24/20

Control by Science

Careful control of boiler operation is of course essential to highest efficiency.

When such control is based on the information concerning draft and pressure which is available through the use of the PRECISION "3 in 1" Draft Gauge, it is based on accurate facts. Such scientific control is the direct way to lower costs.

Let us tell you more about it

PRECISION INSTRUMENT CO.
21 HALSEY ST., NEWARK, N. J.

Roll and Pinion Repairs

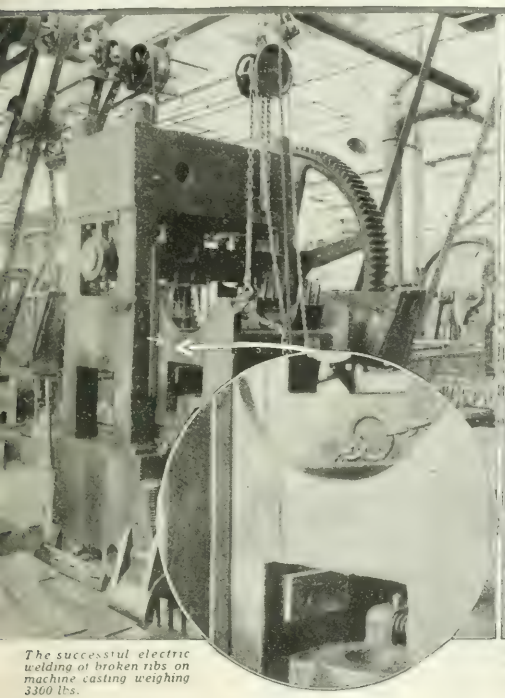
Broken teeth and pinions permanently repaired with Thermit. New teeth welded in and new necks cast on at a great saving in time and expense. *Write for Pamphlet No. 1730.*

METAL & THERMIT CORPORATION
120 Broadway, New York
Pittsburgh Chicago Boston S. San Francisco Toronto

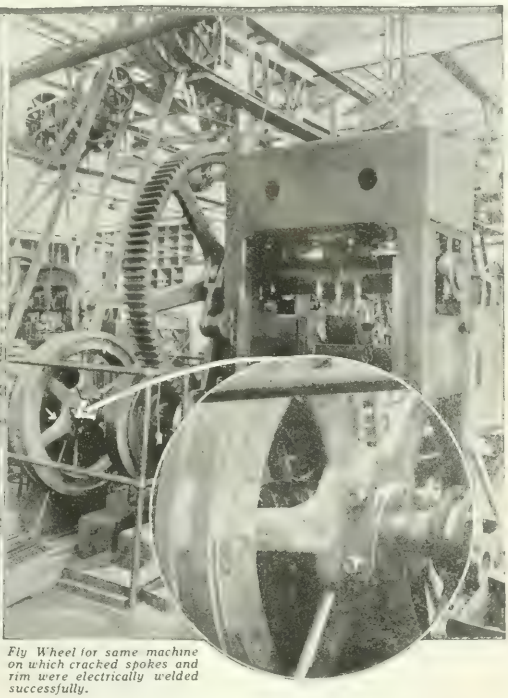
For economical, efficient and reliable welds utilize
ALLAN POLYPHASE ELECTRIC ARC WELDERS
ALLAN MANUFACTURING & WELDING COMPANY, INC.
726 Washington St. Buffalo, N. Y.

E-Z
WELDING COMPOUND
Makes stronger welds on HIGH or LOW Carbon Steel.
Also makes "Anti-Borax" Fluxes for gas welding.
ANTI-BORAX COMPOUND CO., FORT WAYNE, IND., U.S.A.

Electric welding saved this machine



The successful electric welding of broken ribs on machine casting weighing 3360 lbs.



Fly Wheel for same machine on which cracked spokes and rim were electrically welded successfully.

The following extract is from a letter to us by Enoch Ohnstrand, Chief Engineer, LIBRARY BUREAU, Ilion, N. Y.

"We figure that this repair on this machine showed a sufficient saving to pay for the installation of our electric equipment, as the machine which was broken down was a special machine made years ago for this Company, and even if it had been an up-to-date machine, we could not have purchased this part for anywhere near the price of the electric welder which we purchased from you and which we used for doing this work. I am pleased to advise you that we got splendid results from the job and in a very short time. The repairs, so far as welding was concerned, were made in about three hours actual time."

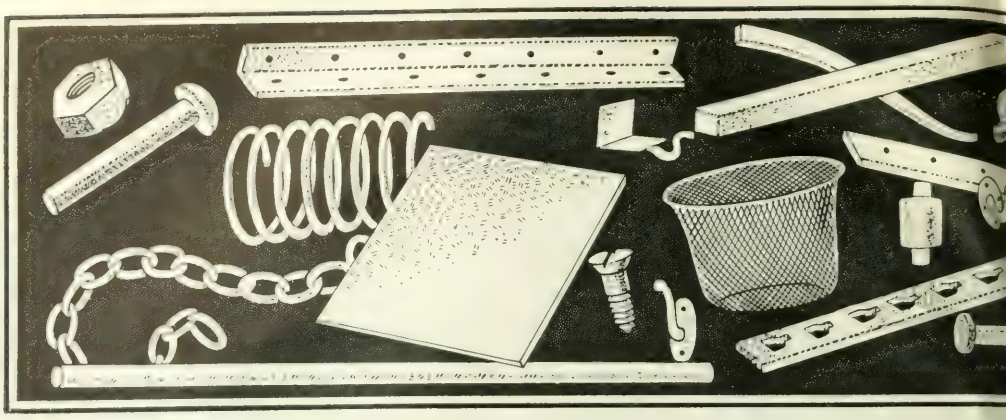
The line of G-E Electric Arc Welders includes types of stationary and portable sets for hand welding—and automatic and semi-automatic machines. G-E Specialists are at your service to select the equipment essential in electric welding processes for repairs, production or salvage in your plant.

General Electric Company

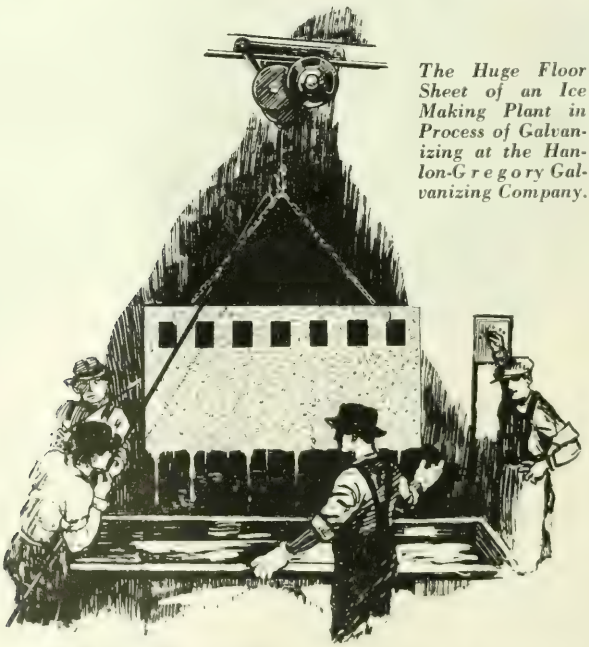
General Office Schenectady, N.Y.

Sales Offices in all large cities

43B 11



The Hot Dip Proc



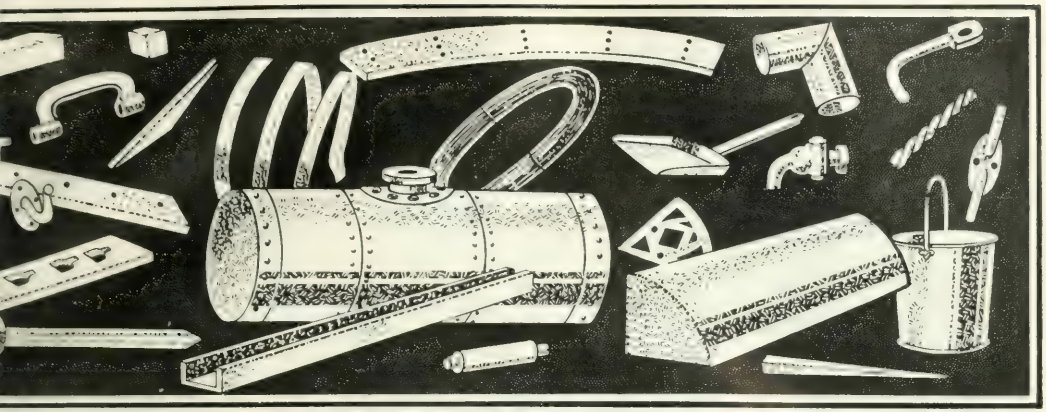
The Huge Floor Sheet of an Ice Making Plant in Process of Galvanizing at the Hanlon-Gregory Galvanizing Company.

The Human Equation enters into the process of galvanizing by the dip process to a great extent. No mechanical apparatus, efficiency devices or other ingenuities, possible in other manufacturing operations, have been able to supersede the hand dip process.

Hanlon-Gregory

Thos. M. Gregory

PITTSBURGH,



ess of Galvanizing

WHEN the Hanlon-Gregory goes into its big, new galvanizing plant this coming February it will still adhere to the good, old fashioned hand dip process which has never been equalled for job galvanizing.

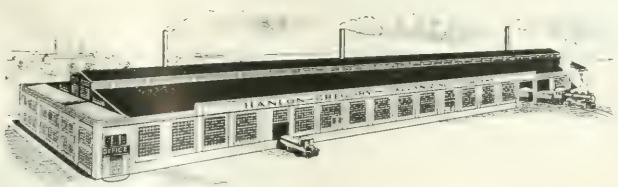
In every other particular involving the handling of hundreds of tons of material daily, the facilities will be most modern, and at the service of all will be placed the largest job galvanizing plant in the world.

Route the material you purchase through Pittsburgh to be galvanized at the Hanlon-Gregory Plant. Order the material you buy in and around Pittsburgh galvanized at the same place.

You will be assured of Service with a capital S: you will *know* that when the job reaches you, the work will be uniform and dependable.

Our capacity will be 350 tons of material daily and we will be equipped to handle quickly every conceivable fabrication in any quantity that needs galvanizing.

Let the Largest Galvanizing Plant in the World Serve You



Galvanizing Co.

Vice-Pres. & Gen'l Mgr.

PENNA., U. S. A.



AIRCO

DAVIS

AIRCO PRODUCTS

Oxygen

Acetylene

Nitrogen
Argon
and other
Atmospheric
Gas Products

AIRCO-DAVIS-BOURNONVILLE PRODUCTS

Welding and Cutting Apparatus and Supplies

Acetylene Generators

Specially Designed Machines for Automatic Welding and Cutting

NATIONAL CARBIDE

"Airco Oxygen and Acetylene Service Is Good Service"

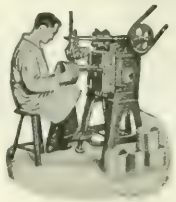
Airco District Offices
and Distributing Stations

An Airco Distributing Station is located in each of the following cities. District Offices are located in cities indicated by a star (*).

Albany N. Y.
Atlanta Ga.
Baltimore, Md.
Bethlehem, Pa.
*Burmingham Ala.
2825 North 29th Ave.
*Boston Mass.
122 Mt. Vernon St.
Dorchester
Bridgeport Conn.
Brooklyn N. Y.
Bronx N. Y.
*Buffalo N. Y.
730 Grant St.
Canton O.
*Chicago Ill.
2236 So. Lumber St.
*Cleveland O.
1210 W. 69th St.
Cincinnati O.
Coatesville Pa.
Columbus O.
Defiance O.
Des Moines Ia.
*Detroit Mich.
7991 Hartwick St.
Duluth Minn.
East Chicago Ind.
East St. Louis Ill.
*Emeryville Calif.
Park Ave. and
Halleck St.
Erie Pa.
Ft. Wayne Ind.
Gloucester N. J.
Grand Rapids Mich.
Hartford Conn.
Indianapolis Ind.
Jersey City N. J.
Johnstown Pa.
Joplin Mo.
Kansas City Mo.
Lebanon Pa.
*Los Angeles Cal.
4th and Main Sts.
Louisville Ky.
Madison Ill.
Milwaukee Wis.
*Minneapolis Minn.
327 25th St. S. E.
New Haven Conn.
*New York N. Y.
Metropolitan District:
342 Madison Ave.
Jersey City N. J.
Brooklyn N. Y.
Bronx N. Y.
Norfolk Va.
*Oklahoma City Okla.
P. O. Box 1338
Paterson N. J.
Peoria Ill.
*Philadelphia Pa.
Germantown and
Allegheny Aves.
*Pittsburgh Pa.
1116 Ridge Ave.
Portland Ore.
Pottstown, Pa.
*Richmond Va.
P. O. Box 1192
Rochester, N. Y.
San Francisco Cal.
*Seattle Wash.
3623 E. Marginal Way
Sharon Pa.
Springfield O.
*St. Louis Mo.
115 Plum St.
Tacoma Wash.
Terre Haute Ind.
Toledo, O.
Tulsa, Okla.
Warren, O.
West Quincey, Mass.
Youngstown, O.

AIR REDUCTION SALES CO.
Mfr of Airco and Airco-D-B Products.
Controls the manufacture and sale of National Carbide
Home Office:
342 Madison Ave., New York, N. Y.

SHEET METAL



Barrels, tanks, cooking utensils, enameled ware, cans, pails, containers of all kinds, cabinets, doors, etc., are being seam welded, pressure tight at the rate of

150 FEET PER HOUR

Can your process compete with this?

Write for details and samples.

Gibb Instrument Company
Manufacturers and Importers of WELDING MACHINES
Bay City, Michigan

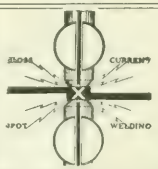
DAVIS

AIRCO

DAVIS-BOURNONVILLE COMPANY
was merged with
AIR REDUCTION SALES COMPANY
on March 17, 1922

The Oxyacetylene Welding and Cutting products formerly manufactured by Davis-Bournonville Co. are now made and sold by Air Reduction Sales Co. under the trade name of "Airco-Davis-Bournonville" or "Airco-D-B."

(See advertisement of Air Reduction Sales Co.)



The Taylor Process of ELECTRIC WELDING

is fast and cheap.

Investigate.

The Taylor Welder Co.
Warren Ohio



Milburn Combination Torch
For Cutting and Welding

A [illegible] duty oxy-acetylene torch that cuts 18 inch steel and welds any thickness by a mere change of tips

1480

A full line of welding generators, welding torches, cutting torches, etc.

Send for details, in catalog 32.

The Alexander Milburn Company
1420-1428 West Baltimore Street, Baltimore, Md.

Distributors: New York Philadelphia Bourse Building
Pittsburgh 418 Union Arcade Salt Lake 248 Market St.
Offices—14 E. Van Buren St.

THOMSON ELECTRIC WELDING CO.
THOMSON SPOT WELDER CO.
LYNN, MASS., U. S. A.

Pioneer manufacturers of butt, spot and seam welding machines. Submit your welding problems to us.

THE "ALTERNARC"
Portable Cutting and Welding Machine
"Carry It to the Work"

THE ELECTRIC ARC CUTTING & WELDING CO.
152-56 Jelliff Ave. Newark, N. J.

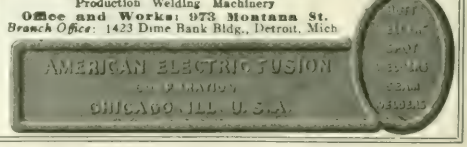
ELECTRIC WELDING MACHINES
THAT'S OUR SPECIALTY

Federal SPOT, BUTT and SEAM Welders, standard or special.

Offices in all principal cities. If not listed in your phone directory, write us direct.

The Federal Machine & Welder Co.
WARREN, OHIO

LEADERS IN ELECTRIC WELDING FIELD
Send Now for Information on Up-to-date Production Welding Machinery
Office and Works: 973 Montana St.
Branch Office: 1423 Dime Bank Bldg., Detroit, Mich





IMPERIAL WELDING & CUTTING EQUIPMENT

Save time, labor and money with the Oxy-Acetylene Process of Welding and Cutting. Imperial Equipment often pays for itself *in a single operation. Absolutely indispensable* in machine shops, foundries and iron works. Imperial Acetylene Generators make their own acetylene 2 to 4 cents cheaper per cubic foot than you can buy it. *Write for new catalog.*

Imperial Brass Mfg. Co., 1210 W. Harrison St., Chicago

"JOB GALVANIZING"

We offer good galvanizing—prompt service —reasonable prices.

MEAKER GALVANIZING COMPANY
Chicago, Ill.

PAINT WITH SOLDURA
THE PROTECTIVE COATING

For industrial uses. A durable, elastic paint with a permanent color for plant maintenance and coating of products in standard colors.

Write for information.

SOLAR COMPOUNDS CORPORATION
NEWARK NEW JERSEY

FUEL OIL
Okla. or Penna.

Gasoline, Naphtha, Kerosene, Gas Oil, Lubricating Oils.

PRODUCERS —— —— MANUFACTURERS

Marketers of Petroleum and its Products

SLOAN & ZOOK Bradford, Pa.

COLD TEST BLACK OILS
For Winter Use—Made to Specifications

THE CRAIG OIL COMPANY
TOLEDO, OHIO

Complete Oil Storage Systems for factories, mills, machine shops, etc.

Industrial Furnaces for heat treating.

WRITE FOR CATALOG.

GILBERT & BARKER MANUFACTURING CO.
Springfield, Mass.

SUN OILS

Sun Emulso
Sun Automatic Cutting Oil
Sun Pipe Threading Oil
Sun Grinding Oil

Watch for our full page "ad" every second week of each month

SUN COMPANY
PHILADELPHIA

From
UNCLEAN TO CLEAN

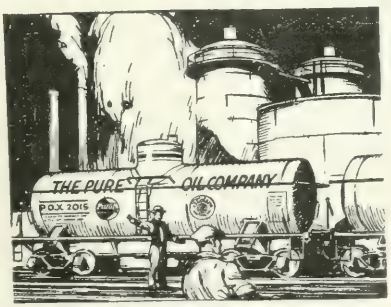
It's a simple, sure and economical matter to clean metals with ESCOLITE

Address Escolite - - - - Lockport, N. Y.

THE PURE OIL CO.

Over 2500 Pure Oil Company Tank Cars

operated in conjunction with our pipe lines, fleets of tank trucks, tankers and barges—all under the supervision and control of our complete traffic department—insure quick shipment and speedy delivery of Pure Oil Company



Fuel Oil

to any point in this country. Wire, write or telephone your requirements to any branch office or refinery listed below.

REFINERIES
Marcus Hook, Pa., Heath, O., Cushing, Okla., Warren, Pa., Minneapolis, Ardmore, Okla., Cabin Creek Junct., W. Va.

THE PURE OIL COMPANY

GENERAL OFFICES: COLUMBUS, OHIO

BRANCH OFFICES: New York, Philadelphia, Warren, Pa., Chicago, Detroit, Pittsburgh, Minneapolis, Tulsa, Okla., Ft. Worth, Texas

PRODUCERS REFINERS MARKETERS



Look Ahead for Your Fuels

Concerns that know Empire oils and deliveries and service are contracting now for their entire 1923 requirements—a privilege also yours if you care to align your power units with a dependable and economical source of fuel or Diesel oils.

Five large refineries keep our customers adequately supplied regardless of conditions in coal or transportation—and the further fact that their oils are delivered to their door in our own cars gives them assurance of clean, pure oil at minimum cost.

Users of fuel oil can tell you much of the power economy and plant simplification they have attained through doing away with the storage, firing, smoke, ash and clinker of coal fired plants.

If you care to discuss your own fuel problems, our Fuel Engineer will be glad to talk with you.

Write, wire, 'phone or visit our nearest office.

Diesel oils a specialty

PRODUCTS

Gasoline
Naphtha
Kerosene
Gas Oil
Fuel Oil
Road Oil
Absorption Oil
Neutral Oils
Red Oil
Cylinder Stocks
Paraffin Oils
Paraffin Wax

CITIES SERVICE OILS

EMPIRE

EMPIRE REFINERIES INC.

SUBSIDIARY CITIES SERVICE CO.

GENERAL SALES OFFICES-TULSA, OKLA.

NEW YORK 60 Wall St

ST. PAUL

FORT WORTH W. T. Waggoner Bldg.

NEW ORLEANS 1107 Carondelet

KANSAS CITY 705 Commerce Bldg.

PHILADELPHIA Care of Crew Levick Co.

CLEVELAND

ATLANTA 226 Hurt Bldg

"Chemically Clean" Metal in one operation is the achievement of

Wyandotte Metal Cleaner

in hundreds of metal production plants.



Order from your supply house.

The J. B. Ford Co., Wyandotte, Mich.

Sole Manufacturers



Steel Throughout for Permanence

The installation of a Caldwell Hemispherical Tank and Lattice Column Tower is the final solution of large water supply problems. The rugged construction of this combination, the excellence of the carefully selected materials and the painstaking workmanship make it the choice of exacting engineers.

The tank, conservatively designed and amply riveted, erected in our shops before shipping to ensure easy assembly at destination. The tower, a model of modern structural steel work.

Send for catalog

W. E. CALDWELL CO.
Incorporated
1940 Brook St.
Louisville, Ky.

Caldwell TANKS AND TOWERS

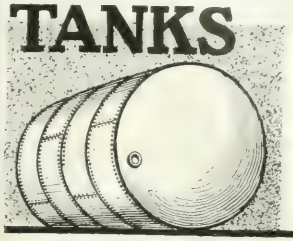
OAKITE CLEANS

Put your Cleaning Problems up to us!



OAKLEY CHEMICAL CO.
20 THAMES STREET · NEW YORK

TANKS



Steel Plate Work

Kilns
Dryers
Special Machinery

McGann Manufacturing Company, Inc.
Richland Avenue and P. R. R.
YORK, PA.

New York Works Chicago



Style "A"



Style "O"



The Hinge



Style "G"



Style "U"

GITS OIL CUPS

Give perfect satisfaction where others fail. State style and size in which you are interested, and we will send free samples and catalog.



Style "B"



Style "L"



Style "T"



Style "H"

GITS BROS. MFG. CO.
1940 So. Kilbourne Ave.
CHICAGO, ILL.

Steel Tanks and Steel Plate Construction for the Fuel Oil Storage for Industrial Plants
Oil Refining Equipment, Fuel Oil Storage
All products delivered and Erected or K.D. for Export

HAMMOND IRON WORKS
New York Office: 17 Battery Place Works: Warren, Pa.
Phone: Whitehall 0060 *Cable Address: "Hamondtank"*

JASCO SEAMLESS TANKS

SEAMLESS TANKS

SHEET STEEL STAMPINGS
DROP FORGINGS

New Booklet Now Ready

JANNEY, STEINMETZ & CO.
Morris Building Philadelphia, Pa.



Air Compressors; Gasoline and Oil Storage Systems; Heavy Metal Storage Tanks; Oil Burning Systems, Furnaces and Forges; Oil Filtration Systems; Water Softening Systems

WAYNE TANK & PUMP COMPANY,
783 Canal Street, Fort Wayne, Ind.

Wayne

PITTSBURGH DES MOINES TANKS

WORKS
PITTSBURGH
DES MOINES
CHATHAM, ONT.

PITTSBURGH DES MOINES TANKS

& Structural Steel Work

PITTSBURGH - DES MOINES STEEL COMPANY
CURRY BUILDING, PITTSBURGH, PA.

Tanks **Stacks**
Condensers
Chemical Equipment
Cement Kilns
Boilers **Water Meters**

Electric welding one of our specialties.
Let us estimate on your next plate work job.

SOTTER BROS., Inc., POTTSTOWN PENNSYLVANIA
Pottstown Boiler and Tank Works
ESTABLISHED 1869

THIS IS A "LANCASTER" TANK
IF AT ANY TIME INFORMATION IS WANTED ABOUT IT REFER TO
NO.
LANCASTER IRON WORKS, INC.
LANCASTER, PA.

Responsibility

When considering your Tank requirements, place the burden of responsibility where it belongs. By knowledge, training and experience, the Lancaster Iron Works, Inc., is the logical choice for such responsibility. The Lancaster Name Plate on your Tanks is assurance that they have met the responsibility in a way that makes the product worth all that it costs. If you do not have our three valuable booklets on Tanks, we will be glad to send them upon request.

LANCASTER IRON WORKS, INC., Lancaster, Penna.
[illegible] Avenue, New York Wesley Building, Philadelphia

LANCASTER TANKS
STEEL PLATE CONSTRUCTION

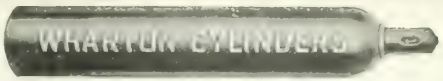
Oil Gasoline **TANKS** Water Storage

Stacks, Breeching, Gear Guards

All kinds of sheet and plate work 3/16″ to 30 gauge.

Welded, Soldered or Riveted
Black and Galvanized

Penna. Furnace & Iron Co.
Warren, Pa.



For Gases Charged at High Pressure

For oxygen, hydrogen, carbonic acid, nitrous oxide, sulphur dioxide, liquid chlorine, blaugas, etc. Prompt deliveries.

WM. WHARTON, Jr., & CO., Inc., 30 Church St., New York



STEEL TANKS
FOR ALL PURPOSES



TIPPETT & WOOD
PHILLIPSBURG, N.J.
New York Office
53 Park Place



TANKS

For Air, Gas and Liquids

Catalogues on request

Wm. B. Scaife & Sons Co.
PITTSBURGH, PA.

26 Cortlandt St., New York — 38 S. Dearborn St. Chicago

RIVETED TANKS
WELDED TANKS
COPPER-BRAZED TANKS
ALL SIZES

Riveted Steel Plate Tanks

3/16″ to 1/2″ thickness

HAMBURG BOILER WORKS
Hamburg, Berks Co., Pa.

FABRICATED
STRUCTURAL STEEL

THE INGALLS IRON WORKS CO.
EXECUTIVE OFFICES AND WORKS
BIRMINGHAM, ALA.

Air-Tight Steel Tank Co.
PITTSBURGH, PA.



Tanks—High Pressure and Storage—Regular and Special to Order—Brazed or Welded—Gasoline Storage Tanks and Pumps—Structural and Machine Work. Send us your inquiries or specifications.

C-K CO. GAS HOLDERS
Engineers—Contractors—Manufacturers
STEEL TANKS—Water—Oil—Special
PLATE WORK
BUNKERS, HOPPERS, STACKS, FLUES, CANALS, SPECIAL STRUCTURAL STEEL—Towers—Trusses—Special
We ERECT EVERYWHERE
CRUSE-KEMPER CO., Ambler, Penna.
Cable: Cruskemper Ambler Western Union Code

STEEL PLATE AND SHEET
STEEL FABRICATION

THE HELTZEL STEEL FORM & IRON CO.
NILES ROAD WARREN, OHIO

Tudor Tanks

of the best workmanship and material. We make riveted tanks in all sizes for all uses. Tudor Tubular and Water Tube Boilers.

The Tudor Boiler Mfg. Co. CINCINNATI OHIO

Blaw-Knox Products

Steel Forms for Concrete Construction, Steel Mill Buildings and Manufacturing Plants, Transmission Towers and Poles, Standardized Sectional Steel Buildings, Water Cooled Furnace Equipment, Plate Work, Pressed Steel Specialties, Forge and Hammer Welding, Clamshell Buckets.

PHONE, WIRE OR WRITE US

Blaw-Knox Company 607 Farmer's Bank Bldg. Pittsburgh, Pa.

Electric Weld

TANKS

Storage—Pressure—Pneumatic.
Steel Containers For Any Service.
Cast Shapes Transformed To Welded Plate Construction

THE JOHN WOOD MANUFACTURING CO.
CONSHOHOCKEN, PA., U. S. A.
Canadian: Toronto, Ontario, Canada.

CHESAPEAKE IRON WKS.
Baltimore, Md.
FABRICATORS OF
STRUCTURAL STEEL

THE PHOENIX IRON CO.

MANUFACTURERS OF OPEN HEARTH

Structural Steel Shapes, Beams, Channels, Angles and Ship Shapes

Works: Phoenixville, Pa. Main Office: Philadelphia, Pa.

OFFICES: 22 S. 15th St., Philadelphia 132 Nassau Street, New York Munsey Building, Washington
110 State St., Boston C. of C. Bldg., Rochester, N. Y. 26 Victoria St., London

THE PHOENIX BRIDGE CO.

Engineers, Fabricators and Erectors Bridges and Other Structures of Steel

CAPACITY 60,000 TONS Works and Engineering Office: Phoenixville, Pa.

P.I.W.
STEEL PLATE CONSTRUCTION

All Classes of Heavy and Light Industrial Steel Plate Construction

Smoke Stacks, Riveted Steel Pipe, Storage Bins, Stand Pipes, Oil Storage Tanks, Converters, Galvanizing Kettles and all classes of Steel Plate Construction for the Iron and Steel Industry.

The Petroleum Iron Works Company
Sharon, Pa.
New York St. Louis Houston Tampico Tulsa Casper
San Francisco

CHARLES PAGE PERIN
STEWART M. MARSHALL
FRANK L. ESTEP
CONSULTING ENGINEERS

Investigations, Reports, Development of Raw Materials, Ore Sintering, Coke Ovens, Blast Furnaces, Open Hearth and Electric Steel Plants, Rolling Mills, Power Plants, Cement Plants.

1107 BROADWAY - - - - - NEW YORK
Cable Address - - - - - PERINMARSH

ALEX LAUGHLIN & CO.

ENGINEERS AND CONTRACTORS

PITTSBURGH, PA.

FURNACES AND GAS PRODUCERS.
FOR IRON & STEEL WORKS.

PENNSYLVANIA ENGINEERING WORKS

BLAST FURNACES
STEEL WORKS

Special Cars of Every Description
Heavy Plate, Foundry and Machine Work

NEW CASTLE, PENNA.

SAVE MONEY! PREVENT LOSSES!

Improved Ingot Molding insures large reduction of scrap and rejections in steels of any specification.

CONSULT

GATHMANN ENGINEERING CO.
GARRETT BLDG., BALTIMORE, MD.

DAY AND ZIMMERMANN, INC.

ENGINEERS

NEW YORK PHILADELPHIA CHICAGO

ENGINEERING - CONSTRUCTION - REPORTS
MANAGEMENT - VALUATIONS

Steel Plate Construction

Steel Storage Tanks, Blast Furnaces, Gas Holders
Steel River Barges and Plate Work of all Kinds
Steel Transmission Towers

RITER-CONLEY COMPANY
General Offices, Pittsburgh, Pa.

BELMONT IRON WORKS

PHILADELPHIA NEW YORK EDDYSTONE

Engineers · Contractors · Exporters

STRUCTURAL STEEL

Complete Industrial Buildings

The H. M. Lane Company

INDUSTRIAL ENGINEERS

Detroit, Michigan Windsor, Ontario

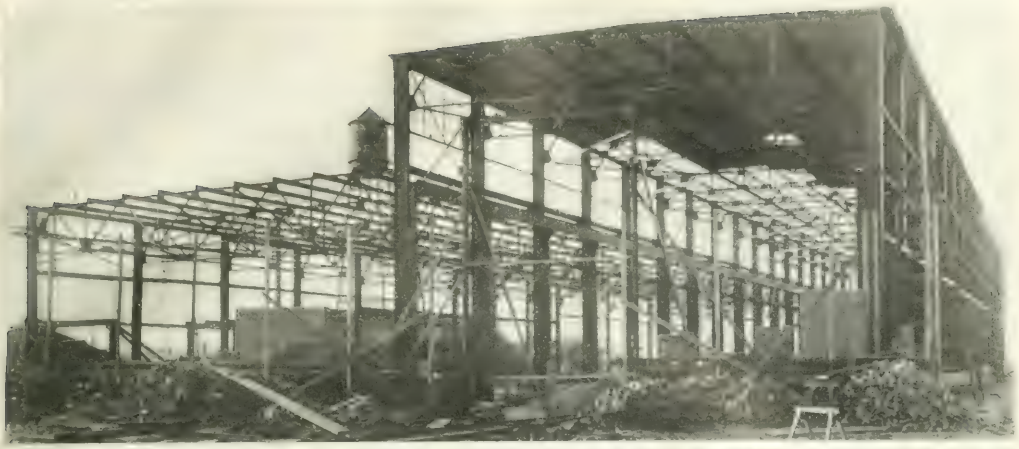
Specializing in the design and detail of Foundries, Machine Shops and Mechanical Equipment

JULIAN KENNEDY

ENGINEER

PITTSBURGH, PA., U. S. A.

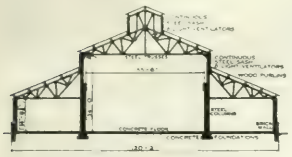
Cable Address, ENGINEER, Pittsburgh



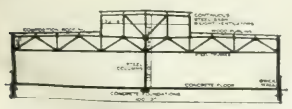
Steel framework for construction by The Austin Company for the Alabama Dry Dock and Ship Building Company, Mobile, Alabama. This structure is an Austin No. 10 Modified Standard Building



Austin No. 4 Standard Building: Width—Any multiple of 30 feet. Length—Any multiple of 20 feet.



Austin Nos. 5, 6 and 7 Standard Buildings: Width Side Aisles all 30 feet. Center Aisle approximately. No. 5, 40 feet; No. 6, 50 feet; No. 7, 60 feet. Length—Any multiple of 20 feet.



Austin No. 10 Standard Building: Normal Width — Approximately 150 feet, can be varied in multiples of 50 feet. Length—Any multiple of 20 feet.

Main Plants or Branches
Austin Builds Them Anywhere

Need a branch plant in Chicago or a new warehouse in Los Angeles? Could you use a new branch in Dallas, or better facilities in Birmingham? Would additional plant or warehouse facilities in Detroit, or in any other part of the country give you competitive advantages?

Then consult Austin Engineers. Wherever you can utilize new facilities you will find an Austin Organization in the field ready to serve you with economy and dispatch. There are now 10 Austin Branch Organizations — strategically located — ready to serve you in any part of the country.

The engineering of your project can be developed in Cleveland or in the nearest Austin Branch Office. Actual building operations can be started without delay. Austin forces are operating all winter. During construction you will receive daily reports of the progress made. Your manufacturing or distributing facilities can be quickly extended.

The following manufacturers are some of the many for whom Austin is building branch plant facilities now:

The Glidden Company
Phoenix Portland Cement Co.
The Richardson Company
United States Radiator Co.
Magnolia Petroleum Company
Welch Grape Juice Company
General Electric Company
American Borax Company
Standard Sanitary Mfg. Co.
Oswegatchie Paper Company
New Jersey State Highway Commission
Ebensburg Coal Company
Standard Wall Paper Company
Standard Steel Car Company
American Net Twine Company
American Car and Foundry Co.

Consultation involves no obligation. Phone, wire the nearest Austin office, or use the coupon below. Ask for a copy of the new building edition of The Austin Book of Buildings.

THE AUSTIN COMPANY, Cleveland

Engineers and Builders



Interior of an Austin-built Branch plant of the National Candy Company, Mt. Clemens, Michigan. An example of Austin No. 3 Standard Building used in multiple

CHICAGO..1374 Cont'l & Comc'l Bank Bldg.
CLEVELAND.....16112 Euclid Avenue
DETROIT.....1954 Penobscot Building
PITTSBURGH..493 Union Arcade Building
PHILADELPHIA....1026 Bulletin Building
NEW YORK.....217 Broadway
DALLAS.....627 Linz Building
ST. LOUIS.....1794 Arcade Building
SEATTLE.....1603 L. C. Smith Building
BIRMINGHAM..1317 Jefferson Bank Bldg.
THE AUSTIN CO. OF CALIFORNIA
LOS ANGELES..702 Pacific Electric Bldg.



AUSTIN

ENGINEERING BUILDING EQUIPMENT

THE AUSTIN COMPANY, Cleveland, Ohio

12-28-22

Gentlemen:—We are interested in the erection of a new building. Please send us a copy of the newest edition of The Austin Book of Buildings, without obligation on our part.

We are also interested in branch plant operation and would like to have additional literature pertaining to branch plants and warehouses.

Firm .....

Individual

Address .....

ARTHUR G. McKEE & CO.

ENGINEERS AND CONTRACTORS

BLAST FURNACES, HOT BLAST STOVES, STORAGE BINS, McKEE REVOLVING DISTRIBUTORS, KLING-WEIDLEIN DRY GAS CLEANERS, SINTERING PLANTS, POWER PLANTS, STEEL MILLS, OPEN HEARTH FURNACES, BLAIR VALVES AND PORTS

REPORTS — APPRAISALS — INVESTIGATIONS

2422 EUCLID AVE. CLEVELAND

Westminster Chambers 11 Victoria St. Westminster, London, Eng.

Freyn, Brassert & Company

Consulting Engineers

London
Chicago
Philadelphia

Cable Address:
Freyn, Chicago
Vilvalle, London

FRANK D. CHASE, Inc.

Engineers and Architects

Location, layout and design of industrial plants

645 N. Michigan Avenue, Chicago

FRANK I. ELLIS

Consulting Engineer

General Engineering Advice, Estimates and Appraisals. Layouts of Complete Steel Plants and Rolling Mills. Remodeling Old Plants.

Lap Weld and Seamless Tube Mills a Specialty

2125 Farmers Bank Building PITTSBURGH, PA.

STEEL For the West

Designers and Fabricators...

Minneapolis Steel and Machinery Co.

Minneapolis U. S. A.

William Swindell and Brothers

Engineers and Contractors

Electric Melting, Heat Treating and Annealing Furnaces
Open Hearth and Crucible Steel Melting Furnaces
Heating and Annealing Furnaces
Gas Producers—Furnace Reversing Valves 21" to 48"

Jenkins Arcade Building Pittsburgh, Pa.

DUFF PATENTS CO., Inc.

Office 918 Frick Bldg., Pittsburgh, Pa.

Mechanical and Hand-poked Gas Producers, Steel Stacks, Tanks, Rotary Dryers, Calciners, Steel Riveted Pipe and Steel Plate Construction.

JOHN BOYLE, JR.
PATENTS

Ouray Building, Washington, D. C.

16 years on the Examining Corps of the U. S. Patent Office

CONSULTING & CONTRACTING ENGINEERS

FOR COMPLETE STEEL PLANTS

THE S. R. SMYTHE COMPANY, Inc.

PITTSBURGH, PA. ESTABLISHED 1882

SOLE MANUFACTURERS OF THE

"SCHILD" SLIDING GAS VALVE

THE VALVE THAT SAVES GAS

The BERLIN CONSTRUCTION CO., INC.

STEEL BUILDINGS BRIDGES STRUCTURAL WORK

Office and Works BERLIN, CONN.

220 Broadway New York. Springfield, Mass.

THE CHAS. E. BEDAUX COMPANY

ENGINEERS

4500 EUCLID AVENUE CLEVELAND, OHIO

ORIGINATORS OF

THE "BEDAUX" PRINCIPLE OF HUMAN POWER MEASUREMENT

DETAILS GLADLY FURNISHED INTERESTED EXECUTIVES

Steel Buildings & Bridges

Annual Capacity 400,000 Tons

Write for Booklet

McClintic-Marshall Co.

Pittsburgh

FABRICATED STEEL BRIDGES AND BUILDINGS

The engineering skill we put into our work is the result of years of experience

SHOEMAKER-SATTERTHWAIT BRIDGE CO.

NEW YORK POTTSTOWN, PENNSYLVANIA PHILADELPHIA

KENWOOD
BRIDGE CO.
CHICAGO, ILL.

VIRGINIA BRIDGE & IRON CO.
Steel Bridges and Buildings
ROANOKE MEMPHIS BIRMINGHAM
ATLANTA NEW ORLEANS DALLAS

ROBERTSON PROCESS
ASBESTOS PROTECTED METAL
A Rust and Corrosion-Proof Building Material for Permanent Roofs, Siding and Trim
Write for Sample
H. H. ROBERTSON CO., Pittsburgh, Pa.

THE "ANTI-PLUVIUS" NON-CORROSIVE PUTTYLESS SKYLIGHT
All Metal parts guaranteed absolutely against rust or corrosion. Send for catalogue No. 20-L.
THE G. DROUVÉ CO. Bridgeport, Conn.

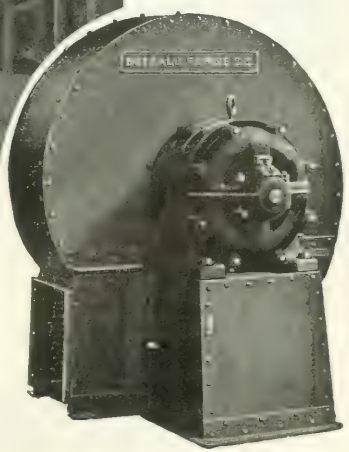
Sturtevant
PUTS AIR TO WORK
PRODUCTS

¶ Air Conditioning Apparatus—Air Washers—Acid Proof Fans
¶ Blast Gates
¶ Direct Current Motors and Generators—Dampers—Dust Blowing Sets—Dust Collectors—Dehumidifiers—Disc Fans
¶ Electric Fans—Engine Generating Sets—Electric Forge Blowers—Exhaust Heads—Electric Heat Blowers
¶ Forges—Fuel Economizers
¶ Gas Blowers and Exhausters—Gas Boosters—Gasolene Engines—Galvanized Iron Work—Gasolene Electric Generating Sets—Gear Transmissions
¶ Heaters—Heating and Ventilating Equipment—High Humidity Dry Kilns—Humidifiers
¶ Marine Heaters—Marine Forced-Draft Apparatus—Marine Gasolene Engines—Mechanical Draft—Mine Fans—Multivane Fans—Monogram Blowers and Exhausters
¶ Pneumatic Dust Collecting and Conveying Systems—Positive Pressure Blowers—Propeller Fans—Portable and Stationary Vacuum Cleaners—Pulverized Fuel Burning Equipment—Industrial Dryers
¶ Ready-to-Run Ventilating Sets
¶ Slow-Speed Reversible Planing Mill Exhausters—Steel Plate Fan—Steam Traps—Stokers—Steam Turbines—Steel Pressure Blowers—Steel Plate Planing Mill Exhausters—Steam Engines—Steel Plate Work
¶ Turbo Generating Sets—Turbovane Fans—Turbo-Undergrate Blowers
¶ Unit Heaters
¶ Ventilators (Autoforce and Cowl)

HYDE PARK BOSTON, MASS.
Sales Offices in All Principal Cities
660



20% More Efficient
than any other exhausters.



20 to 50% power savings—over other types available today—are shown by actual installations of

"Buffalo" Slow Speed Mill Exhauster

The 20% represents the difference in efficiency between this and other standard fans.
The 50% includes the former and the additional efficiency due to scientific proportion of piping by our engineering experts.

Send for book No. 410-43 containing valuable exhaust fan suggestions.

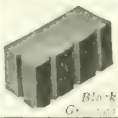
Buffalo Forge Company, 492 Broadway Buffalo, N. Y.

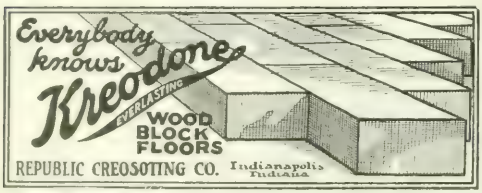


STERLING
SLOW SPEED—LOW POWER
BLOWER SYSTEMS
STERLING BLOWER COMPANY
Hartford, Conn.
Branches New York Boston Rochester Philadelphia

Skinner Bros. (Bantz Patent) Heating System
75 to 50 ... less to install than any other. Type DF supplied where steam is not available. Send for Catalog.
SKINNER BROS. MFG. CO., Inc.
1428 S. Vandeventer St. St. Louis
Boston ... Little Bldg. Kansas City ... 339 Lee Bldg.
Buffalo ... Mutual Bldg. New York ... 1714 Flatiron Bldg.
Cleveland ... Leader Bldg. Pittsburgh ... 8 Wood St.
Cincinnati ... Orlo San Francisco ... Monadnock Block
Detroit ... 1421 Marshall Bldg Spokane ... 421 First Ave
Indianapolis ... 420 Schofer Bldg. Washington, D. C., 726 Evans Bldg.

Dust Collectors
Manufactured by
THE KNICKERBOCKER CO.
Jackson, Michigan

KREOLITE BLOCK FLOORS
"Outlast the Factory"

An excellent investment for machine shops, warerooms, foundries, pickling rooms and other parts of the plant where the floors receive hard wear. Write today for our booklet "Factory Floors."
THE JENNISON-WRIGHT CO.
80 Kreolite Building Toledo, O.



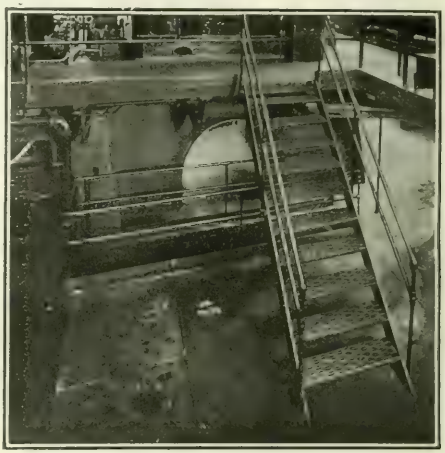

If it's for Safety we sell it
We manufacture
Adjustoglas Goggles for Chippers and Welders.
Protexall Clothing for every need.
Klennair Hoods for Dust and Fumes.
Danger Signs and Hospital Equipment.
100 page catalog ready.
The Safety Equipment Service Co.
Buell W. Nutt, President,
Successors to the Safety Dept of the Strong Kennard & Nutt Co.,
1104 Hamilton Ave N. B., Cleveland, Ohio

"I shall prepare myself, so that when opportunity comes, I shall be ready for it."
—ABRAHAM LINCOLN.

The man who conscientiously reads the business paper of his industry carefully each week is always prepared.

IRVING SUBWAY TRADE MARK (PATENTED) REG U S PAT OFF THE FIREPROOF VENTILATING FLOORING

IRVING SAFSTEP TRADE MARK (PATENTED) REG U S PAT OFF
ABSOLUTELY NON-SLIPPING ALWAYS



Built-in Accident Insurance

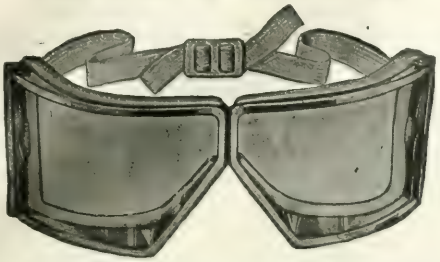
A ladder or stair with **Irving Safsteps** has step accident insurance built into it. It is next to impossible to slip on a **Safstep**—its narrow edge-on steel members grip the foot unfailingly, even with water, oil or grease upon it. And—because 80% of its area is open space a **Safstep** stairway offers almost no interference with light beneath. Each **Safstep** is a self-contained unit with its own carriers, easily and quickly installed. And its life is the life of steel. Ask for Catalog 3A7.

IRVING IRON WORKS CO.
LONG ISLAND CITY, N.Y., U.S.A.

Manufacturers of

IRVING SUBWAY TRADE MARK (PATENTED) REG U S PAT OFF
THE FIREPROOF VENTILATING FLOORING

"Everything for Safety"



PROTECT THE EYES

Your Men Will Like Our No. 711 Goggle!

The *No. 711 Goggle* is made for a long, comfortable and economical service. The lens is interchangeable—also the elastic head band. Should the lens crack it can be easily and quickly replaced; and when the head band deteriorates a new band can be put on without affecting the goggle in any way. The rubber padding around the rim of the frame that comes in contact with the face is a very high grade rubber, and is cemented to the frame with a cement that will not melt or weaken. Therefore the rubber binding will not loosen from the frame. Just the goggle for high speed emery wheel work, dry dust operations and light grinding. Also **No. 711H with heavy Safety Lenses.**

Order a dozen No. 711 Goggles on trial. You'll be sure to want more.

When You Think of Safety—think of "Hardy"

F. A. HARDY & CO. Safety Department

10 South Wabash Ave., CHICAGO

ATLANTA DALLAS DENVER SAN FRANCISCO ST. PAUL DAVENPORT

Does Your Town Want New Industries?

The Parkersburg Board of Commerce, of Parkersburg, West Virginia, used space in the Business Opportunities Section to attract new industries.

Here's what they have just written us—

"We have closed a contract for a valuable manufacturing plant which we secured through an advertisement with you sometime ago."

It may be possible for your city to do the same thing.

Drop us a line for full information.

BUSINESS OPPORTUNITIES SECTION

THE IRON AGE

239 West 39th St., New York City

Circulation Of The Iron Age Illustrated With Typical Subscribing Firms



THE DETROIT RANGE BOILER & STEEL BARREL COMPANY, Detroit, Michigan, are large manufacturers of Range Boilers, Steel Barrels, Galvanized and Black Tanks, and Steel Drums.

This company operates two plants, located at Detroit, Michigan, and Toledo, Ohio, which cover a combined area of approximately 4 acres and contain about 105,000 sq. ft. of floor space. Total number of employees, about 350.

The size of these plants and the extent of manufacturing operations can be grasped from the large consumption of Steel, Rivets, Spelter, Malleables, Coal and Coke. The tonnage of materials consumed annually is as follows: Steel, 15,000 tons; Rivets, 400 tons; Spelter, 1,000 tons; Malleables, 400 tons; Coal, 1,200 tons; Coke, 400 tons.

Products bought from THE IRON AGE Advertisers

Iron and Steel—Raw, wrought and finished, such as Shells, Bars, Rivets, Malleables, Drop Forgings, Welding Wire.

Machine Tools—Machinery and Plant Equipment, such as Presses, Power Hammers, Lathes, Welding Equipment.

Production Tools—Taps, Dies, Drills, Punches.

Power Plant Equipment—Motors.

Non-Ferrous Metals—Spelter, Lead.

Products Not Metal—Paints, Gaskets (leather and fibre), Oxygen, Carbide.

Metal Goods—Nuts, Bolts, etc.

Fuels—Coal and Coke.

—2—

The following men read The Iron Age

GEORGE A. MOORE,
General Manager.

T. M. PARKER,
Advertising Manager.

C. L. FINCH,
Superintendent.

R. W. WALSH,
Asst. Superintendent.

Insert No. 4[illegible] of the Business Paper Series of advertisements showing the various classes of manufacturing firms which subscribe to The Iron Age

Those Magic Words— "Received Many Inquiries and Orders"

GENERAL MACHINISTS

PENN SCREW AND MACHINE WORKS
BORGERSEN & CLARK, PROPRIETORS
SCREW MACHINE PRODUCTS
708-12 CHERRY STREET
PHILADELPHIA

November [illegible], 1922.

The Iron Age,
239 W. 39th St.,
New York City.

Gentlemen:

We are writing you in reference to our advertisement in The Iron Age. Since running this advertisement in your magazine, we have received many inquiries and orders from new customers.

Therefore we wish to state we are very much pleased with the results obtained.

WW:PMS

Very truly yours,
PENN SCREW & MACHINE WORKS.
Per [illegible]

The Advertisement That Produced The Business

SCREW MACHINE PRODUCTS

Small and Large Quantities
Send Us Your Inquiry

PENN SCREW & MACHINE WORKS
708-12 Cherry St., Philadelphia, Pa.

*This is No. 239 of a series of advertisements indicating concrete results obtained by advertisers in The Iron Age.

A MONEY SAVER

THE RING GAGE METHOD



THE HARTNESS METHOD



Why maintain a large force on screw thread inspection, when the HARTNESS COMPARATOR will take care of all of this work?

JONES & LAMSON MACHINE CO.

Main Office and Works: SPRINGFIELD, VERMONT, U. S. A.

London Office
9-10 Water Lane, Queen Victoria St., London, E. C.

San Francisco Office
503 Market St.

PIG IRON
IRON ORE
COAL

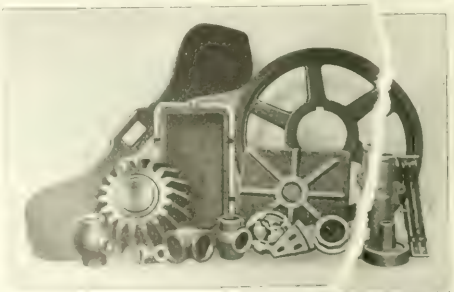
M·A HANNA & Co.

M. A. HANNA & Co.

BUFFALO CLEVELAND DETROIT
CINCINNATI PITTSBURGH TORONTO
PHILADELPHIA CHICAGO

Castings

Steel
Low and Special Carbon Nickel and Vanadium



Fittings

Steel for High Pressure and Superheated Steam From Our Own Standard Patterns or Made to Order

MALLEABLE IRON FITTINGS CO., Branford, Conn.

THE IRON AGE

New York, December 28, 1922

ESTABLISHED 1855 VOL. 110, No. 26

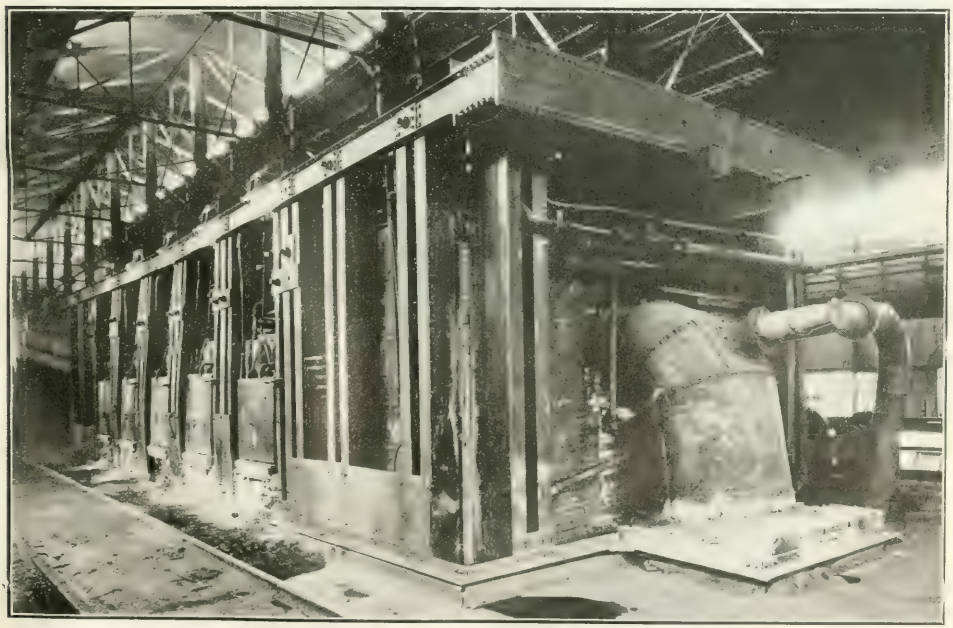
New Type of Open-Hearth Furnace

Loftus Furnace Involves New Way to Apply Blow Torch Principle—Details and Results of a Unit Now Operating Several Months

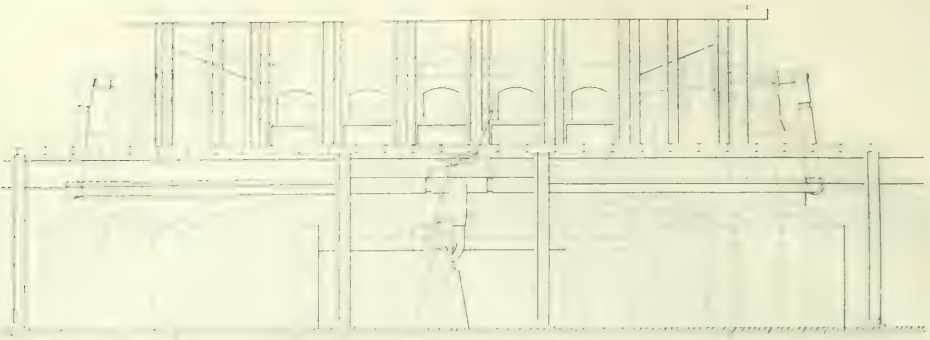
THE importance of the open-hearth process, particularly the basic, in the development of the American steel industry can be measured by its tremendous growth over the relatively short period which it has been in use. This has been due to the fact that it has permitted the use of iron of almost any phosphorus content, thus making available immense deposits of ore which could not otherwise be utilized; also to the extreme flexibility which is possible through the various methods devised for its application as a process. It has provided for the production of steel in a great variety of charges by many variations in method of manipulation, and with economy in regard to the supply of scrap and pig iron.

The open-hearth furnace in which this process has been carried out has been neglected from a broad point of view and its development has not been brought to the state of perfection which the process has reached. It has been stated by some of the most widely known operating men that the present type of furnace is not a success economically or metallurgically: Economically, it is looked upon as a heat waster and a man waster, and metallurgically its life is regarded as short and the demand for tonnage so insistent that the superintendent is frequently compelled to make certain grades of steel in a furnace which should rightfully be undergoing repairs because of defects in the furnace design. It has been further stated that the usual period of high efficiency in the present type of furnace represents not more than 60 per cent of the furnace campaign.

In a furnace of the present design the mixture of air and gas depends upon the inclination of the air port and the gas port, the extension of the end of the air port to the end of the gas port to give the air access to the gas before entering the furnace chamber. The present port areas are a compromise to suit both conditions of entry and exit so that the tendency is almost universal to make the area of the ports too large



One End of a Loftus Furnace Showing the Air Pipe and the Auxiliary Fuel Branch. Removal of the cap permits the substitution of oil, coke-oven gas or a combination of coke-oven gas and producer gas



Cross Section of a Complete Loftus Furnace Showing the Special Warm Air Blast Pipe Connection and How It Works

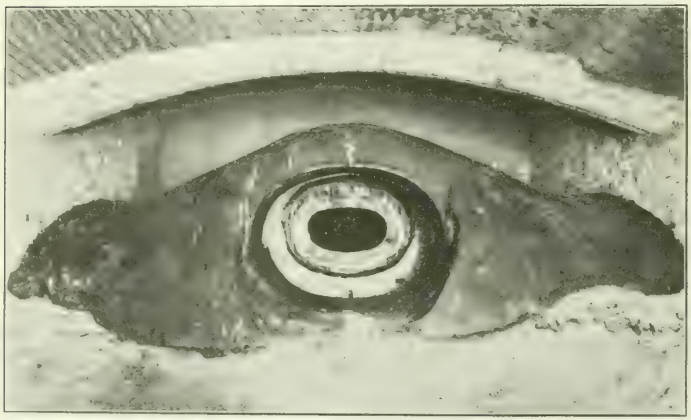
to give the proper mixture for the incoming air and gas and too small for the outgoing products. In the case of the producer gas furnace the velocity of the gas is far greater than the velocity of the air through its ports. This brings about conditions which interfere with desired combustion and the securing of high flame temperature. The delayed and improper combustion results in a flame, it is held, which starts too far from the entering port and is still burning when it passes through the outgoing ports downtakes, and at times even when entering the regenerative chambers. Such action tends to destroy the brickwork of the furnace and in this way shortens the campaign.

The furnace, the subject of the illustrations, has been designed to overcome the difficulties and also to afford the operator control over the quality, intensity and length of the flame. The drawings show a producer gas furnace wherein the producer gas is discharged from a restricted nozzle into a mixing chamber, serving to induce the necessary air for combustion. A booster supply of regenerated air is withdrawn from the regenerative chamber, passed through a special blower driven by a variable speed motor, and introduced into the center of the stream of gas in the direction of its flow through the furnace. The pressure and volume of this booster supply of regenerated air may be governed by the control of the variable speed motor, in this way giving the operator control over the flame.

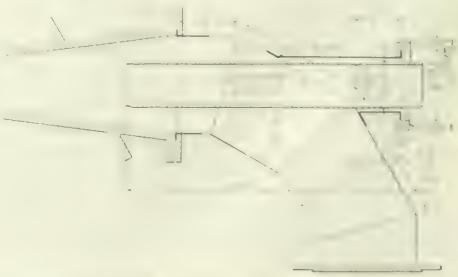
With such a furnace construction a more efficient combustion is obtained, as shown by actual operation, through the mixing of the air with the gas in the hot mixing chamber. The air and gas enter an extremely hot mixing chamber in the form of an outer envelope of air completely surrounding an annular ring of gas containing an inner core of air; all of this is calculated to produce an extremely intimate mixture. This mixture is discharged from the mixing chamber in the form of a flame having practically no stratification and with the utmost compactness and continuity of direction.

Through the agency of voluntary regulation of the pressure and volume of the booster supply of regenerated air, the operator finds himself able to control the flame. If he chooses he may melt down a charge with a short hot flame, and refine with a long mellow flame which completely covers the bath without extending through the outgoing channels.

The old type of gas uptake with its abrupt turn has been replaced by a stream line elbow or gooseneck which is supported so that it may be readily adjusted in all directions. In this way the travel of the gas may be altered to suit the desired conditions after the furnace has been put into operation. In prior constructions, if one were unfortunate enough to miscalculate the proper angle and pitch of the gas port, it was necessary to wait until



Interior of a Loftus Open-Hearth Furnace After 136 Heats. The auxiliary channel for clearing the furnace and the mixing chamber where incoming gas and air are mixed are shown

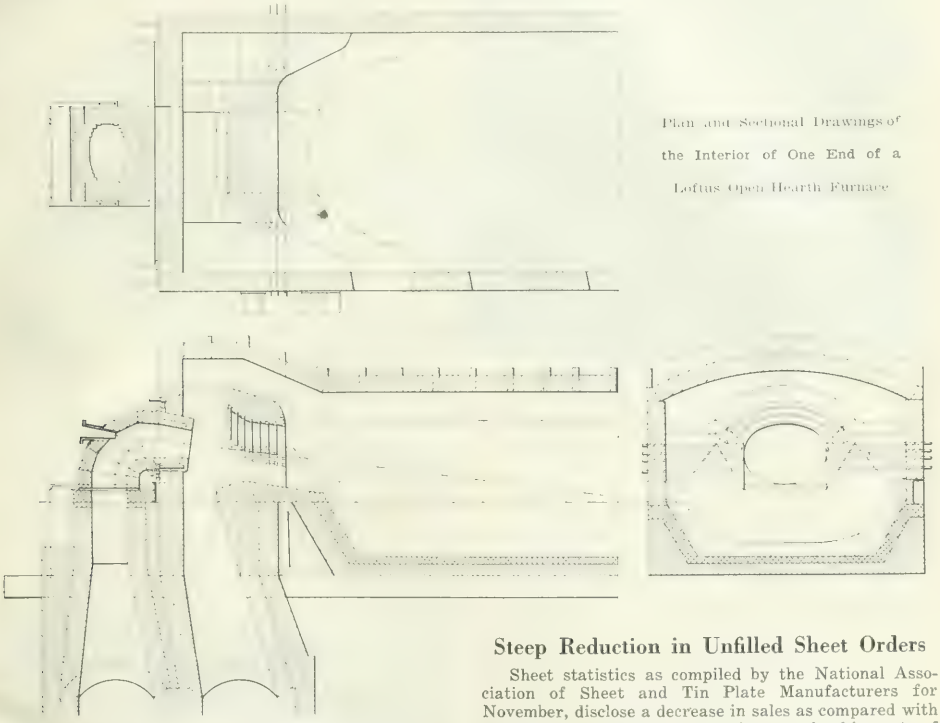


Details of the Air Pipe and the Auxiliary Fuel Branch

the furnace went down for the next major repair, although this was naturally hastened by the destructive action of the flame. The stream line effect also is counted on to decrease the erosion of that portion of the uptake corresponding to the bulkhead on the present type of furnace and to afford a construction which may be replaced in about 20 min. with a spare part, the change being made some time during the burn-out period.

At the outgoing end of the hearth the products of combustion, together with the gases which rise from the bath of steel, are cleared through the mixing chamber and the auxiliary channel over the top of the chamber. Owing to the inherent features of the design this auxiliary channel is practically inoperative on the incoming end, and by its use provides an area for the outgoing gases over three times that for the incoming

A Loftus furnace, the name adopted for the new design, has been operating on producer gas at one of the independent steel plants since June 8 this year. [Ohio works of the Sharon Steel Hoop Co., Lowellville, Ohio.] In the face of charging conditions not regarded as ideal the furnace has been able, according to the promoters, to produce an average of approximately 30 per cent more steel than the remaining furnaces in this plant on approximately 30 per cent less coal per ton of ingots. This furnace, up to the present time, has given more than 300 heats and from all indications it is believed it will run about 400 heats or more, making an increase of about 50 per cent in its usual life. The repairs have been almost negligible, as it has been possible to get approximately 100 heats from back and front walls and approximately 80 heats off the gooseneck.



Plan and Sectional Drawings of the Interior of One End of a Loftus Open Hearth Furnace

air and gas, and in this way reduces the velocity of the outgoing gases to practically one-third. The auxiliary channel on the incoming end permits a slight infiltration of air which serves to protect the side walls and roof from the intensely hot flame. The good direction of the flame, together with this feature, is counted on to give a long life on the side walls and roof.

The motor and special blower, previously referred to, after six months continuous operation, performs its functions with apparent ease, operating quietly and smoothly, and requiring no attention other than the usual inspection and oiling. As stated, the special blower withdraws air from the incoming regenerator through an intake pipe in which is located, immediately at the blower, a mixing valve to admit sufficient other air to reduce the temperature to 1000 deg. Fahr., or less, thus not to injure the blower. The flow of the regenerated blast air to either end of the furnace is controlled by four cast-iron slide gates, two of which are in the intake line and two in the discharge line, all operated by one lever located near the reversing and operating controls for the furnace. The regulator for controlling the speed of the motor is also located on the charging floor near the remaining controls, thus facilitating the operating of the furnace.

Steep Reduction in Unfilled Sheet Orders

Sheet statistics as compiled by the National Association of Sheet and Tin Plate Manufacturers for November, disclose a decrease in sales as compared with October of 36,142 tons, but an increase in shipments of 6446 tons and a decrease in the unfilled tonnage of 54,907 tons. Stocks on hand awaiting shipment were reduced 6593 tons, but unsold stocks as of Nov. 30, were 9394 tons greater than those of Oct. 31. The total number of hot mills in the United States is 658, having a capacity for November, 1922, of approximately 386,000 tons, and the percentage to which these figures are related is 69.1 per cent. Figures in net tons for November compare with those of October and September as follows:

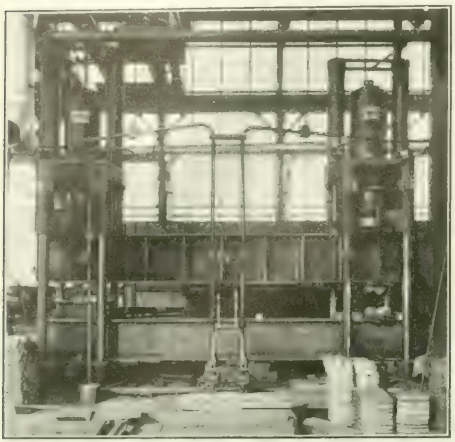
	November	October	September
Sales	172,744	208,916	188,863
Production	242,562	243,476	202,600
Shipments	230,320	223,874	190,027
Unfilled tonnage	321,487	376,394	378,574
Unshipped stocks on hand	101,688	108,291	102,198
Unsold stocks	30,084	20,690	21,241

In compliance with the request of the creditors' committee, Frank A. Scott, receiver for the Standard Parts Co., Cleveland, has made application to the Federal Court for permission to sell the four plants of that company. Provided authority of the court is granted the plants will be offered for sale at public auction about Feb. 20. However, the receiver will probably be given authority to sell the properties at private sale prior to that date.

Universal Hydraulic Press

For bending, flanging and crimping large plates the Southwark Foundry & Machine Co., Philadelphia, has devised the press shown in the accompanying illustration. The machine is made up of two 200-ton standard four column forging presses, connected with the structural steel bending beam or guides. The total pressure is 400 tons. The two presses are set approximately 14 ft. apart, giving a clear space for 14 ft. sheets. The individual units can be controlled either by one or two operating valves.

The machine is adaptable to all classes of work in



Machine for Bending, Flanging and Crimping Large Plates. The bending beam can be removed

boiler or structural shops, as the bending beam can be removed and each press used as an individual unit for small flanging, drawing or forging purposes.

Safeguarding Power Press Tools

Rules for safeguarding power press tools have been adopted by the Massachusetts Department of Labor and Industry to become effective Feb. 1, 1923. It is required that all power press tools in use shall be so constructed, or effective safety appliances provided, to prevent the hand of an operator from being in the hazard zone at the time of operation, where the speed is more than 30-45 strokes p.m. and less than 4 in. length of stroke.

Power shall be shut off and press drive wheels shall be at rest while tools are being adjusted, except where the control allows the ram to be stopped at any point of the stroke. No person shall render inoperative or fail to use any safety appliance which has been provided. Types of approved appliances are listed.

Nitrogen in Steels

WASHINGTON, Dec. 19.—Different heat treatments applied to steel will alter the amount of the nitrogen present, according to scientific paper No. 457 of the Bureau of Standards, which is available at the Government Printing Office at 5c. per copy.

It is pointed out in the paper that almost all commercial metals and alloys contain gases in greater or less amount and that these gases are believed to play an important part in determining the properties and qualities of such metals.

Since nitrogen makes up four-fifths of the volume of the air, it is explained that it is only natural that it is found in iron and steel which have been melted in contact with large volumes of air during the process of manufacture. The amount of nitrogen present in steel is not often determined by chemists although a method is available at least for determining certain forms of the element. Many steels are given heat treatments to render them specially fitted for definite service conditions, and such heat treatments are known to change the form or state of combination of certain chemical elements in the metal.

It has been shown that the nitrogen in steel may be changed in form by heat treatment. This, therefore, introduces a new factor to be considered in preparing by heat treatment steels possessing special qualities.

Level for Setting Up Precision Machines

A 15-in. precision level developed for use in setting up precision machines has been placed on the market by the Pratt & Whitney Co., Hartford.

Levels having different degrees of sensitiveness are available but for general use the makers recommend what is known as 10 second level. With this level each division (1/10 in.) that the bubble runs indicates a variation from the horizontal of 0.0005 in. in one foot. From this reading the necessary adjustment to level the work can be readily computed. A 10-second level has a vial ground to a radius of curvature of about 170 ft., and is as sensitive as practicable for setting up fine work. A 3-second level having a proportionately larger radius of curvature is more sensitive but requires several minutes for the bubble to come to rest. The inside of the vials used in these levels is ground with extreme accuracy to a uniform curvature and carefully inspected to assure that each division indicates the same angle of inclination.

One of the instruments is shown in the accompanying illustration. The frame is 15 in. long, which is said to be more convenient and reliable than a longer one. The trussed construction is intended to make the frame light, rigid and convenient to handle and also to render it comparatively insensitive to temperature changes. Insulating grips are provided to obviate touching the frame when handling, thus eliminating errors due to expansion from the heat of the hands. Like all precision instruments the level must be intelligently handled to secure the best results. The instrument must be properly applied to the level surface, the thumbs gripping the insulated portions, the finger tips touching the work first and the level gently brought into contact. The instrument may be easily checked.

In using the level the operator should not breathe on the vial nor bring his face close to the level, as the liquid is very sensitive to temperature. The best results cannot be obtained unless the work is at room temperature, as otherwise the work is constantly chang-



Level for Setting Up Precision Machines

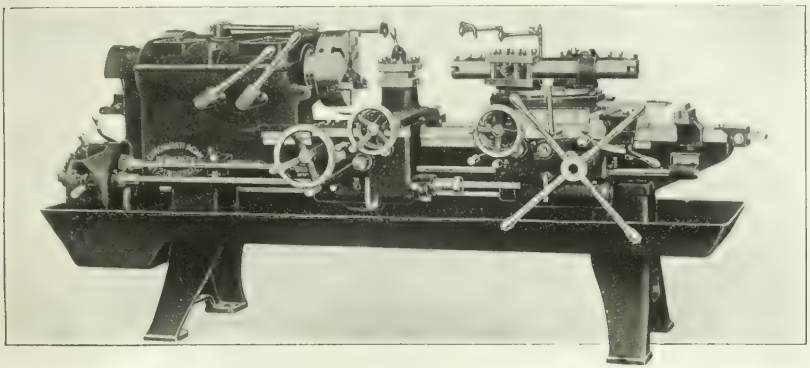
ing shape. When not in use the level should be kept in its case. For accurate work direct sunshine or drafts of air should be avoided as the level may be temporarily distorted. The vial is mounted in metal sleeves by means of plaster of paris and should it become loosened from shock, should be returned to the makers for remounting. The vial carriage may be removed from the frame by taking out the four corner screws.

Pearl A. Lewis, assistant to President Charles Willard Young, of New York, was appointed receiver of the Kelly-Springfield Motor Truck Co., $2,500,000 capital stock, Saturday afternoon, Dec. 16, upon application of the Bankers' Trust Co., New York, which is trustee for an issue of $1,500,000, 8 per cent gold bonds. Mr. Lewis gave bond in the sum of $100,000, and announced that the operation of the plant would be continued. Treasurer H. Diehl in a statement said that the action taken was necessary as a result of a recent suit filed on a disputed claim and others threatening on disputed claims. Receiver Lewis was authorized to borrow $250,000 for the conduct of the business.

Universal Flat Turret Lathe

A No. 2 universal flat turret lathe, incorporating the cross sliding turret and cross travel to the auxiliary carriage, features intended to permit the maximum number of tools to be in operation at the same time and the simplest and most inexpensive tooling arrangement, has been added to the line of the Acme Machine Tool Co., Cincinnati. Centralized control is also a feature.

The machine, a front view of which is shown herewith, is adapted to both bar and chucking work, and either is interchangeable. Chuck work up to 20¾ in. swing can be accommodated, and for bar work two sizes of automatic chuck capacity, 2½ or 3¼ in. in diameter, are available. The turret travel is 30 in. The square turret on the side carriage may be used for under-



Flat Turret Lathe with Cross Sliding Turret and Cross Travel to the Auxiliary Carriage. The capacity for clutch work is up to 20¾-in. swing, and for bar work, 2½ and 3¼ in. diameter

cutting, forming, facing and turning, and the flat turret used at the same time for boring and turning. Each having separate power feed provides independent feeds to each carriage.

The all geared head with single pulley drive provides 12 speed changes from 18 to 318 r.p.m. and is of the sliding gear type. These changes are operated through the two levers shown on the headstock, one lever controlling four changes and the other three. Sliding gears and their mates are of chrome nickel and heat treated. The stop and reverse lever located on top of the headstock controls the operation of a friction clutch on the initial drive shaft, which is the only friction in the head. Placing the friction on the drive shaft, which is subjected to the least amount of torsion, is pointed out as an ideal condition. A hand hole is provided in the top cover for easy access to friction adjustment. The company's patented gear shifting device, which permits changing from one speed to another with one continuous movement of either of the speed changing levers, is incorporated also in this design.

The side carriage spans the ways of the bed, eliminating overhang to the turret and tools. It clears the chuck and can be moved out of the way to permit the use of short tools when using the flat turret. Six independent stops for longitudinal movement are provided. The square turret is mounted on the cross slide and positioned by a hardened lock bolt, located under the cutting tool. It can be indexed to four positions, and a vertical movement of the lever on top of the turret unclamps and withdraws the bolt simultaneously. The cross sliding turret is similar to the company's previous designs.

Power rapid traverse is provided in either direction, longitudinally, for the turret, and is controlled by the lever projecting vertically at the front of the carriage. The operation of this lever also disengages automatically the feed and power to the turnstile handle, thus providing a stationary turnstile wheel while rapid traverse is in motion. Twelve longitudinal stops are provided, one independent stop for each turret position and six auxiliary stops. These are operated by an index knob at the right of the saddle. Power feed for the cross and longitudinal movement to both the side carriage and turret is provided. The gear box at the head end gives ten feeds from 10 to 250. Stops are provided for the longitudinal movement, and for the cross movement, a large micrometer dial with observation stops. The feeds can be reversed by means of convenient levers.

For motor drive a 5 hp. constant speed, 1200 r.p.m. motor is recommended, and is mounted on the rear side of the head end leg. A chasing attachment is part of the regular equipment and is located at the right end of the carriage. A taper turning attachment for the side carriage is also available, for tapers up to 3 in. per foot and 12 in. long. The swing over the carriage cross slide is 14 in. The hole through the spindle is 2⅝ to 3½ in. The floor space occupied is 3 ft. 9 in. x 10 ft. 8 in., and 3 ft. 9 in. x 16 ft. with stock supports in position. The net weight of the machine with chucking equipment is 5050 lb. and with bar equipment 5000 lb.

Standardizing Export Packing Methods and Reducing Waste

WASHINGTON, Dec. 12.—Industrial machinery and other major commodities are to be included in an investigation to be undertaken by the Department of Commerce through facilities of the Forest Products Laboratory at Madison, Wis., for the purpose of standardizing export packing methods and the elimination of waste due to breakage, pilferage, etc., which has reached abnormal proportions during the past few years. The study will be nation-wide in character and will be undertaken under the supervision of John Keely, assistant chief of the Transportation Division. Mr. Keely has had many years of practical experience in exporting and is a specialist in packing for export. The result of the studies with appropriate recommendations as to methods employed and looking to unification in export packing methods will be published by the department in a series of manuals, each covering a particular commodity. Mr. Keely will visit all the important industrial cities of the country in the course of the investigation.

The work will have the hearty co-operation of the marine insurance and steamship companies, freight forwarders, trade associations and exporters themselves, according to an announcement of the department, and will represent the best thought in export packing methods.

Commercial standards of taps and dies, as adopted by the Tap and Die Institute, are available in pamphlet form. This pamphlet, which undoubtedly can be obtained by applying to Herbert S. Blake, secretary of the institute, 116 West Thirty-second Street, New York, contains some twelve detailed tables of dimensions of taps for threading pipe, machine screws, for nuts and for tap drills and covers United States threads, American Society of Mechanical Engineers threads and the standards of the Society of Automotive Engineers. The pamphlet is a valuable contribution to the standardization movement and provides the information in convenient form.

FREIGHT CAR SHORTAGE

Decrease for First Week in December—Progress Made in Repair Work

WASHINGTON, Dec. 26.—A decrease of 21,825 was made in the freight car shortage from Dec. 1 to Dec. 8, according to the Car Service Division of the American Railway Association, the total shortage on the latter date being 111,961 cars.

Shortage in box cars totaled 56,711, a decrease of 10,757 within the same period, while the shortage in coal cars totaled 37,613, or 5235 below that on Dec. 1. An increase of 50 in the demand for coke cars over and above the available current supply was reported, which made the total shortage 394 cars for that class of equipment, while the shortage in refrigerator cars totaled 5188, or 890 less than the beginning of the month. Reports also showed a gradual increase in the number of surplus freight cars in good repair scattered throughout the country, the total on Dec. 8 being 6657, which was a gain in approximately a week of 1062 cars.

Loading of revenue freight on American railroads totaled 919,828 cars during the week which ended on Dec. 9. This was an increase of 178,487 cars above the corresponding week last year, and an increase of 81,875 cars above the corresponding week in 1920. An increase of 74,609 cars was reported over the preceding week this year, when, however, loadings were reduced owing to the observance of Thanksgiving Day.

Ore loading totaled 9879 cars, or a decrease of 671 cars compared with the week before. While this was an increase of 3895 cars above the same week last year, it was a decrease of 8552 cars compared with two years ago.

Coke loading totaled 13,051 cars, 24 less than the week before, but an increase of 6380 over the same week last year. Compared with the same week two years ago this was a decrease of 738 cars.

Compared by districts, increases over the week before in the total loading of all commodities were reported in all districts. All also showed increases compared with the corresponding week last year.

From Nov. 15 to Dec. 1 the railroads repaired and turned out of their shops 13,484 locomotives. This was within six locomotives of the greatest number repaired during any semi-monthly period in approximately the last two years. This also exceeded by 1345 the number turned out of the shops during the first half of November this year.

Locomotives in need of repair on Dec. 1 last totaled 18,009, or 27.9 per cent of the number on line. This was a decrease of 347 compared with the total number on Nov. 15, at which time there were 18,356, or 28.5 per cent.

Of the total number on Dec. 1 last, 14,450 were in need of heavy repairs, a decrease since Nov. 15 of 670 locomotives. Reports also showed 3559 locomotives in need of light repairs, which was an increase, however, of 323 within the same period. Serviceable locomotives on Dec. 1 totaled 46,525. This was an increase of 424 over the number serviceable on Nov. 15.

Exports of Railroad Material and Structural Steel

Figures of the Department of Commerce show that Japan, in October, was the largest buyer of rails weighing 50 lb. or more per yard, having taken 5981 tons of the total of 17,070 tons. Cuba, with 4912 tons, was second and Canada, with 1499 tons, was third. In rail joints, etc., first place was held by Chosen (Korea) which took 1114 tons of the total of 2487 tons. Cuba was second with 347 tons and Japan third with 254 tons. Cuba was the leader in switches, frogs and crossings, with Canada a close second, and Japan third. Cuba again took the largest amount of railroad spikes, with Mexico second, Columbia third and Japan fourth. Of car wheels and axles Mexico took the largest amount, with Cuba second, Canada third, Japan a close fourth and Honduras fifth.

Canada took the largest amount of structural forms, the heavy structural shapes sent into Canada amounting to 5418 tons out of a total of 8196 tons. Argentina was second with 1451 tons. Light structural forms sent to Canada amounted to 1419 tons out of the total of 4584 tons. Cuba was second with 888 tons and Japan third with 545 tons. In other structural forms, including plates, Canada again was the leader with 1560 tons of the total of 1966 tons. Japan was second with 148 tons and Cuba third.

November Refractories Statistics

November fire clay brick statistics as compiled by the Refractories Manufacturers' Association, Oliver Building, Pittsburgh, Frederic W. Donahoe, secretary, notes a gain in production over that of October of 652,548 9-in. equivalents, but this gain may be ascribed partly to the fact that capacity reporting for November was greater by 131,417 9-in. equivalent brick than was represented in the October figures. Shipments last month were 4,540,154 less than in the previous month and stock on hand as of Nov. 30 was 3,660,245 greater than at the end of October. Net new business gained, as did unfilled orders.

Less silica brick capacity reported for November than for the previous month, which probably explains decreases in production, shipments and new business. Unfilled orders, however, showed a gain over October. The quantities given are the totals sent in by those who reported and the capacity figure is the combined economical producing capacity of those who sent in figures. The figures in parentheses are percentages arrived at by dividing the total economical monthly producing capacity into the figures given. November figures in 9-in. equivalents, compare with those of October as follows:

Fire Clay

	November		October	
Capacity	75,056,974		74,925,557	
Stock, Oct. 31	146,737,818	(195)	*148,070,275	(197)
Production	53,988,391	(72)	53,335,843	(71)
Shipments	51,935,254	(69)	56,475,408	(75)
Stock, Nov. 30	148,790,955	(198)	†144,930,710	(193)
New orders	52,919,258	(69)	49,174,142	(66)
Cancellations	277,384	(0)	759,325	(1)
Net new business	51,741,974	(69)	48,714,818	(65)
Unfilled orders	67,842,752	(90)	67,480,023	(90)

Silica

	November		October	
Capacity	23,217,500		23,891,666	
Stock, Oct. 31	33,809,224	(145)	*32,471,079	(136)
Production	11,788,350	(51)	13,793,281	(58)
Shipment	9,649,467	(41)	11,504,105	(48)
Stock, Nov. 30	35,948,107	(155)	†34,760,255	(145)
New orders	10,113,076	(43)	10,530,033	(44)
Cancellations				
Net new business	10,113,076	(43)	10,530,033	(44)
Unfilled orders	17,871,831	(77)	17,456,201	(73)

*Sept. 30. †Oct. 31.

In an announcement of the chemical engineering course given by the Rensselaer Polytechnic Institute, Troy, N. Y., the belief is expressed that few, if any, of our engineering schools have carried this subject of chemical engineering into the engineering phase, rather than the purely chemical phase, to the same extent as in this case. The chemical engineer is defined by the pamphlet as "a professional man experienced in the design, construction and operation of plants in which materials undergo chemical or physical change." The pamphlet, which covers 32 pages, is profusely illustrated with views of the different laboratories and other departments devoted to the study of chemical engineering, while the text features the character of instruction and of the equipment provided.

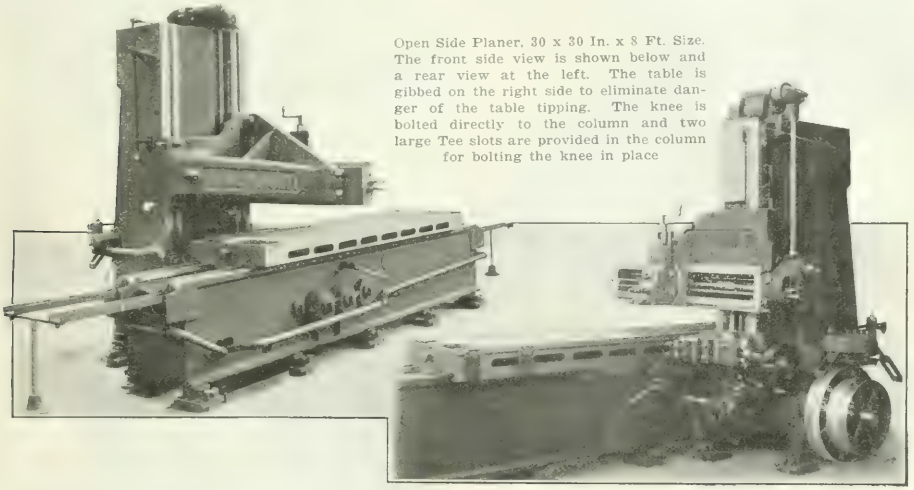
With the details of refinancing completed, the Armstrong Steel Casting Co., Huntington, Ind., will start actual operations the first week in January. Its equipment, consisting of electric furnaces and converters, affords a potential capacity of 500 tons per month. H. D. Oskin, Chicago, formerly general sales manager Trumbull Steel Co., Warren, Ohio, has been elected president; H. S. Buck, formerly vice-president and general manager Spelter Co., Fort Smith, Ark., is vice-president, and E. T. Pelton, formerly with the National Steel Castings Co., is secretary and plant manager.

New Planer Added to Cincinnati Line

The Cincinnati Planer Co., Cincinnati, has added to its line the 30 x 30 in. open side planer shown in the accompanying illustrations. Rigidity and convenience of operation are emphasized in connection with the new machine.

Among the features it may be mentioned that the table is gibbed on the right side so that regardless of how much overhang there is to the work, there is no danger of tipping the table. The table also fits between the two Vees so that however far out the work may be machined, the table cannot be twisted out of the Vees. An auxiliary table is provided where the work is very much wider than the table and carries considerable weight. The bed is closed between the Vees, made extra heavy on the right side, particularly on the housing cheek, which is carried up 4 or 5 in. higher to provide greater bearing for fastening the column. The column is unusually stiff and ribbed up on the inside to eliminate spring. In addition to being secured by a large tongue and groove, the column is bolted and doweled to the bed.

The rear view of the machine shows the construction of the knee, which is bolted directly to the column, an arrangement intended to provide greater rigidity than with the use of clamps. Two large T-slots are provided in the column for bolting the knee in place. Instead of using an ordinary bolt head or short nut, a sliding nut placed in the T-slot, which is the full depth of the knee, is intended to eliminate the possibility of locking or clamping under any condition. To obviate the tendency of the rail to tip and to aid in maintaining its alinement a gib is provided underneath the knee at the front end, seen in a rear view of the machine. This gives a narrow guide bearing on the side of the column and is adjusted to give a sliding fit; this adjustment never changes. From a front view of the machine it may be noted that the rail is gibbed at the outer edge of the housing, which gives it a narrow guide bearing in this direction and is said also to prevent the rail from tilting or sagging even when all of the clamping bolts are loose.



Open Side Planer, 30 x 30 In. x 8 Ft. Size. The front side view is shown below and a rear view at the left. The table is gibbed on the right side to eliminate danger of the table tipping. The knee is bolted directly to the column and two large Tee slots are provided in the column for bolting the knee in place

---

The Central Refractories Co., general offices of which are in the Ferris Building, Columbus, Ohio, with brick plants at New Lexington and Shawnee, Ohio, and flint clay and coal mines at Moxahala, Ohio, has taken over the Eastern Refractories Co., Orviston, Pa. Properties of this company consist of brick plants at Orviston and Snow Shoe, Pa., and fire clay deposits at Orviston. Both companies produce face brick as well as fire clay brick and the combined productive capacity is 200,000 brick daily. C. B. Young is president of the company.

Etching Reagents for Carbides in Alloy Steels

Some tests have been made to verify the results obtained previously as to the etching effect of a dilute sodium hydroxide solution aided by weak electric current. It was found that electrolytic etching with weak solutions of ammonia and with sodium hydroxide has a very similar effect upon the various constituents found so far in alloy steels, namely, both solutions darken chromium carbide and tungsten carbide, while iron carbide and iron tungstide remain unaffected even after etching for several minutes.

In the examination made in connection with the above-mentioned tests of two samples of high-speed steels melted and cooled in vacuo, an unidentified constituent of relatively great hardness was found present. It did not respond to the test for iron carbide and iron tungstide and did not assume any shape usually met with in the case of tungsten carbide. It did respond, however, to the test for chromium carbide, that is, it was darkened by either sodium hydroxide or ammonia. It appeared to be similar in behavior on etching to the very minute particles noted in the matrix of high-speed steel in the condition as received from the mill which were brought out by either ammonia or sodium hydroxide.

Since it would appear from the results of previous investigators that a large part of the chromium present in the high-speed steel is dissolved in the matrix (this would depend on the heat treatment received) while a large part of the vanadium is present in the free state as carbide, it seemed possible that the constituent referred to above might be a carbide of vanadium. To test this out an iron-carbon-vanadium alloy is now being prepared wherein it is hoped to have the vanadium and carbon present entirely as vanadium carbide, and etching tests will be carried out with the hope of finding a means of distinguishing between vanadium carbide and chromium carbide.

Safe Activities of Trade Associations

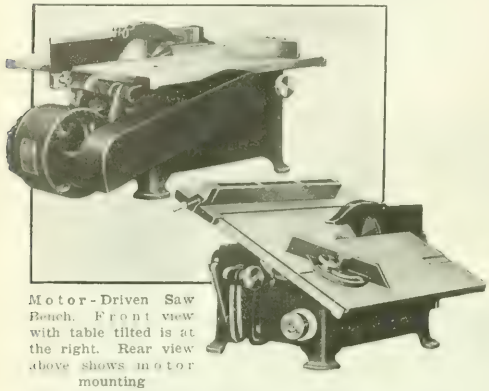
WASHINGTON, Dec. 19.—Trade associations or groups interested in cost accounting may meet solely for the purpose of the study of costs, the detection of errors and the improvements of their methods without contravention of law, in the opinion of Commissioner Nelson B. Gaskill of the Federal Trade Commission. Mr. Gaskill further believes that it is perfectly legal to make reports of such conferences available to absent members, Government agencies and other interested parties. This opinion was expressed unofficially today by Mr. Gaskill in response to an inquiry from E. W. McCullough, manager of the fabricated production department of the Chamber of Commerce of the United States.

New Motor-Driven Saw Bench

A new 7-in. motor-driven saw bench, designated as the No. 193, has been placed on the market by the Oliver Machinery Co., Grand Rapids, Mich. It operates from a lamp socket and is designed to cut 2 in. deep with a 7-in. diameter saw, and dado heads ⅝ in. wide can be used. The machine is for use on a bench or table, but a one-piece cast iron floor base is available for independent support.

The table is 21 x 24 in. and is of cast iron. It is provided with grooves on either side of the saw for cut-off gages and has a milled out slide in front for the ripping gage. The table tilts up to 45 deg. and may be instantly locked by the hand knob. A dial with graduations and a pointer serves to indicate the exact position of the table and a stop provided facilitates quick and accurate return to the horizontal position.

The saw arbor is ½ in. in diameter and runs in ball bearings, its speed being approximately 5000 r.p.m.



Motor-Driven Saw Bench. Front view with table tilted at the right. Rear view above shows motor mounting

The saw arbor yoke is hinged and is raised and lowered by the hand lever. A ½ hp., 1800 r.p.m. motor is mounted on a swinging bracket as shown in the illustration. The belt is kept in proper tension by means of a turnbuckle device which raises and lowers the bracket with the motor. A heavy type snap switch is mounted conveniently, as shown.

The cross cut gage can be used on either side of the saw and may be quickly set at any angle and clamped. Holes are provided to permit mounting an auxiliary wood face piece. The ripping gage can also be used on either side of the saw, and is tightened by means of a hand lever, which automatically lines it up with the saw at the same time. The saw guard is adjustable to allow for varying thickness of stock. The splitter guard is fastened to the table back of the saw to keep the stock from pinching the saw.

The bench type of machine is 10 in. high. When mounted on the floor column the top of the table is 32 in. from the floor.

British View of American Foundries

Oliver Stubbs, former president of the Institution of British Foundrymen, whom American foundrymen will remember as their visitor last year, said some very flattering things about American foundrymen and foundries at Manchester on Dec. 2. Big American foundries, he said, were better laid out and better equipped than British foundries. Handling facilities were superior and the methods of automatically charging the cupolas were excellent.

American foundries were handicapped because women could not handle cores over 16 lb. in weight; thus youths of 18 and 19 were doing work which would be done in British foundries by women. This, he said, prevented these youths from ever becoming skilled molders. British coremakers had not much to learn from Americans, the chief difference in practice being that whereas in Britain one man made a core, in America the work was divided, one man doing the venting, another the swabbing, etc. In heavy coremaking, British foundrymen were much in advance, he asserted. Oil sand was more used in American foundries and the sand handling methods were excellent.

Mr. Stubbs explained that American foundrymen did not give a hand-tool finish to machine molds, which was to be approved, he added, because either a molding machine is a molding machine or it is not. Great provision is made for partings and patterns are kept in good repair.

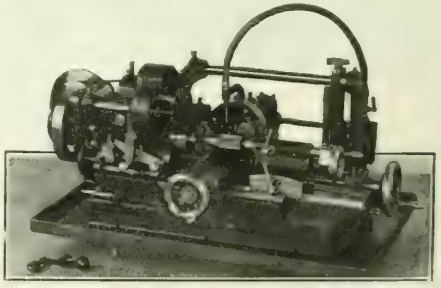
British foundries, he was sure, could beat American foundries in the production of heavy castings because their molds were better finished. Mr. Stubbs paid a big tribute to welfare work in American foundries.

Thread Miller Arranged for Relieving

A thread milling machine arranged for relieving taps, hobs and milling cutters has been placed on the market by the Waltham Machine Works, Waltham, Mass.

A front view of the machine is shown herewith. The mechanism for relieving replaces the standard taper attachment of the company's regular machine. A compound taper attachment is used and the whole attachment is arranged to travel forward and back, being actuated by a cam through levers, which are adjustable to give the amount of relief desired. As the cam makes one revolution for each flute, it can be cut to mill either concentrically or with the ordinary relief or a combination of both. In order to use the gearing necessary for operating the relieving attachment for handling the required number of flutes, a special driving mechanism is attached to the top of the workhead. There are two starting levers, one of which is used when the machine is employed for relieving and the other for ordinary threading. They are arranged so that when one is in use the other is locked.

The compound taper attachment can be used not only for plain tapers in either direction and for straight milling, but also for a combination of straight and taper milling. The change from the straight to the taper is made automatically at any predetermined point and is said to be so gradual that there is no mark upon the work to show where the change takes place. Spiral and straight fluted work may be handled with equal success and multiple as well as single threads may be relieved. By disengaging the gear connection from the work spindle to the screw and using an indexing device for the spacing of the different cuts, the machine can be used for a variety of multiple cutter work.



Thread Milling Machine Arranged for Relieving. A compound taper attachment is used and the whole attachment arranged to travel forward and back

Constant speed single-pulley drive, interchangeable cone pulleys for feeds, compensating bar for varying the lead, individual oil pump equipment and other features of the company's regular machine, can be used with the new design.

Directors of the Trumbull Steel Co., Warren, Ohio, Dec. 19 declared a dividend of 25c. per share on common stock and $1.75 on preferred, both payable Jan. 1 to holders of record Dec. 20. The common dividend is unchanged from the previous quarter.

FOR STUDYING MECHANISM

Oscilloscope Visualizes Movements Under Working Conditions—Vibrations Analyzed—Applications Cover Wide Field

A device known as the Elverson oscilloscope, which visually slows the motion of rapidly moving mechanisms, so that their functioning or the lack of it can be observed, has been placed on the market by Herbert Kennedy & Co., Ltd., London, England, and is being demonstrated by Peter Davey who is making his headquarters at the office of John H. Faunce, Inc., 8 Bridge Street, New York. A view of the instrument is shown



Elverson Oscilloscope. Applied to high-speed mechanism, it visually slows down motion to a speed the eye can follow

in the accompanying illustration. It was developed in England during the war and used by the British Government in experimental work on airplane engines.

The instrument can be used to advantage by makers and users of high speed machinery, the movements and vibrations of which are made visible to the eye, by being apparently slowed down to a comfortably visual speed, which in the case of the type A instrument illustrated, is 1 per cent of the true speed, this being considered the most generally useful ratio. Applied to a mechanism whose movement rotating or oscillating is 1000 r.p.m., the movement can be followed at 10 r.p.m. By another use of the device, the motion may be apparently arrested at any point in the cycle of operations, and the phenomena at that point examined, although the mechanism is actually still operating at full speed. It is claimed that by means of the instrument imperfections in the working of any mechanism may be seen, and their causes will be made apparent.

The apparatus is simple, self-contained and compact, and is made up of a gear box, which is coupled to and driven by, a shaft of the mechanism examined; and which acts as an interrupter, controlling the flashing of a special type of lamp, the rays of which may be thrown on to any of the moving parts of the mechanism, producing either of the effects outlined, by the operation of a simple switch mounted in the gear box. The effect seen is said to be similar to that produced by the ultra-rapid moving picture, except that the actual mechanism is being observed and not a picture of it, and that the speed is reduced by a constant and invariable ratio. Further, actual measurements, both angular and linear, may be taken under working conditions. Observations are carried out in a subdued light, but total darkness is not essential. The current necessary for operation is supplied by a small 4 volt storage battery.

Vibrations may be completely analyzed by means of a special feature of the device. By a simple adjustment, the light interruptions may be regulated to give either one, two, or four flashes per revolution of the shaft, in either what is called the "creeping" or in the "stationary" position. For example, a rapidly vibrating part employing one flash per revolution in the "creeping" position, will appear to be slowly swaying to and fro. To determine its periodicity, it is next examined at two flashes per revolution. If with two flashes per revolution, a double image of the vibrating part is produced, it is at once proved that the vibration is at shaft speed. Should it be necessary, however, to employ four flashes per revolution before a double image is produced, then it is proved that the vibration is at twice shaft speed. By applying the double image phenomena to the "stationary" position, it is found that as we alter the position in the cycle which is being examined, the two images will appear to recede and approach one another. If the motion is arrested at the point where the images are at their maximum distance apart, we then have a measurement of the amplitude of the vibration. Thus, the three essentials in the analysis of a vibration, namely, direction, periodicity and amplitude are determined.

The applications of the device cover a wide field. High speed internal combustion engines offer many problems in connection with the operation of valve gear, magnetos, shaft whip and twist, vibrations and fuel injection in Diesel engines, all of which may be easily solved. The motion of sewing and knitting machines may be minutely studied, as may the spinning and knitting operations in the production of thread. Fine mechanisms, such as tachometers and calculating machines, can be studied with ease and their smaller parts magnified if necessary.

A case where microscopic observations have been successfully taken is in connection with the double silk covering of very fine electric wire, where the exact lay of the minute silk strands and the effect of various vibrations upon them are said to have been made plainly visible.

In metal testing it is claimed that the study of a fracture under fatigue or flexure tests has produced very useful results, and that study of the behavior of springs of all types under varying load makes the solution of many problems simple. In gears and gear mountings, many problems may be investigated and a great deal learned about various forms of chain drive. Information may be obtained to aid in the balancing of high speed motors, since the vibrations due to the "out of balance" forces may be analyzed. In connection with lubrication, some of the phenomena which have been observed are said to have been very unexpected, the circulation of oil on fast moving parts in many cases, doing exactly the opposite to what was supposed. In this direction alone we have a most important application, which applies almost anywhere where high speed machinery is employed. It is to be noted that photographs may be taken of phenomena observed in the "stationary" position.

Standard Sample Metals with Certified Gas Content

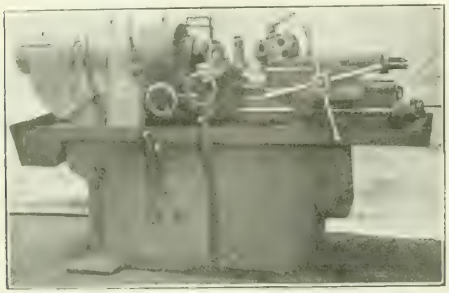
Frequent requests are now being received by the Bureau of Standards for standard samples of iron having certified gas or oxygen content. These requests have come from technical schools and university laboratories and experiment stations, from metallurgical plants and from commercial research institutions. Practically every request states that the material is required for the checking and standardization of analytical methods employed in investigating the effects of gas content upon the quality of some iron or steel product. Such requests are usually accompanied by questions for advice as to suitable methods of chemical analysis. Completion of the Bureau's work on methods of determination of hydrogen and oxygen in metals will serve greatly to stimulate and assist such researches, besides calling attention to the Bureau's facilities in this field of metallurgy.

The Westinghouse Electric & Mfg. Co. has leased a 6-story building to be erected on a lot 100 x 150 ft. at Jones Avenue and Marietta Street, Atlanta, Ga., at a cost of $360,000. The building, which is to be known as the Westinghouse Electric Building, will be used as an office, warehouse, and service station. Construction work was started Dec. 1, and will probably be completed by next May.

Self-Contained Turret Lathe

A turret lathe or screw machine with a cabinet base, as illustrated, and with the driving motor mounted on the rear cover plate inside of the cabinet, making the machine a compact, self-contained unit, has been placed on the market by the Wood Turret Machine Co., Brazil, Ind.

The removal of the rear cover plate of the cabinet takes the motor with it. A silent chain connects the motor with the main drive shaft in the center of the cabinet, the drive going through a cone friction clutch of the full floating type and a change gear box, the gears of which run in oil. Six spindle speed changes are available on the plain head machine and 12 changes on the friction back geared lathe, thus giving twice as many speeds as on the regular belt drive, with the additional advantage of a reverse for every forward speed, which is accomplished through a patented reverse gear running in oil. A 12-in. pulley on the gear shaft is belted to a 12-in. pulley on the spindle, a belt tightener being provided between. All controls are



Self-Contained Turret Lathe or Screw Machine. The motor is mounted on the rear cover plate inside of the cabinet

centralized. The knob at the upper left on cabinet base controls the belt tightener. The two left-hand levers control the speed changes, and the long lever at the right controls the starting, stopping and reverse. The removal of the front cover, which forms the entire front of the cabinet, opens to full view the motor drive unit. Air holes in both ends of the cabinet provide air circulation for the motor. It is to be noted that in this arrangement of the drive the belt pull is down in the headstock instead of up against the main bearing caps.

The machine can also be driven by belt as a single pulley drive by mounting a jack shaft on the rear cover plate in place of the motor. Revolving parts are guarded protecting the operator and also the machine itself. The motor may be either direct or alternating current, constant or variable speed.

Wheeling Steel Corporation Offers Stock to Employees

The Wheeling Steel Corporation recently offered to its employees and those of its subsidiary companies, the opportunity to subscribe to 4000 shares each of its common and preferred A stock, and in this, the second such offering, the company has followed a somewhat different plan than in its original offering two years ago and such as is usually followed in sales of stock to employees.

In the new plan employees are able to buy both classes of stock at somewhat below the prevailing market price on the installment plan of payment; no brokerage or carrying charges are assessed against the employee; no interest is charged against purchases of the common stock until such time as that issue is on a dividend basis, and even then, the interest rate cannot exceed 5 per cent. The employee is to receive accumulated dividends on the preferred A stock, now amounting to $5 per share annually, and will pay only 5 per cent interest on deferred payments. In the first offering of stock to employees, the company included a bonus to encourage subscribers to complete the purchase, but it was found that the extra payment failed to prevent cancellations when the market price declined. The bonus feature, which was an experiment, has been eliminated in the latest plan. The preferred A stock, which is offered at $107 a share, was on an 8 per cent dividend basis during the first year of the existence of the corporation, while the common stock paid $4 annually. At present no dividends are being paid on the latter class and the preferred A stock is on an annual dividend basis of $5.

The cancellation clause of the contract is liberal in that the subscriber can withdraw without consent of the company by request or by discontinuing payments for three consecutive months. Indeed, the management makes it plain in offering the stock, that while it desires as many of the employees as possibly to become stockholders, it seeks to avoid anything savoring of compulsory purchases: hence; it does not set up obstacles to cancellation. Officials of the company are not allowed to urge purchases of the stock to the extent that employees unable or not wishing to subscribe will do so in the fear of being the victim of discrimination. The whole idea is that employees who do subscribe, do so voluntarily and because they desire to be partners in the business. The stock is offered on a basis of annual salaries or wages, those receiving $500 or less being allowed to subscribe for stock to value of $60; those receiving over $500 up to $1000, can purchase $120 worth of stock and so on up to those receiving over $7000, who are permitted to subscribe for $900 worth of stock.

Dial Feeds for Punch Presses

A line of dial feeds, adaptable to any make and size of open-back inclinable punch press and available in seven sizes, has been placed on the market by the S & S Machine Works, 4522 Lexington Street, Chicago.

The feeds are used in the manufacture of electrical and radio equipment, hardware and other products. They carried the blanks, washers or shells automatically under the punch to receive second or third operations. Two or three consecutive operations may be performed with only one handling, and the operator's hands are not near the dies. Various sizes of the attach-



Dial Feeds for Application to Open Back Inclinable Punch Presses

ments are shown in the accompanying illustration. They are finished complete with crank disk bored to suit the press shaft, and are arranged to bolt on the bed of the press using the standard bolster bolts.

A special feature of these dial feeds is the mounting of a radial thrust bearing in the center of the dial plate, which is intended to provide a trouble-proof bearing and assure accuracy of the feed. The dial friction brake is adjustable by means of a hand lock-nut which provides sensitive adjustment. The brake can be set to give the minimum of friction necessary to bring the dial to rest. With this arrangement the locking dogs are not required to do duty as bumpers or stops for the dial; they act as registering and locking members only.

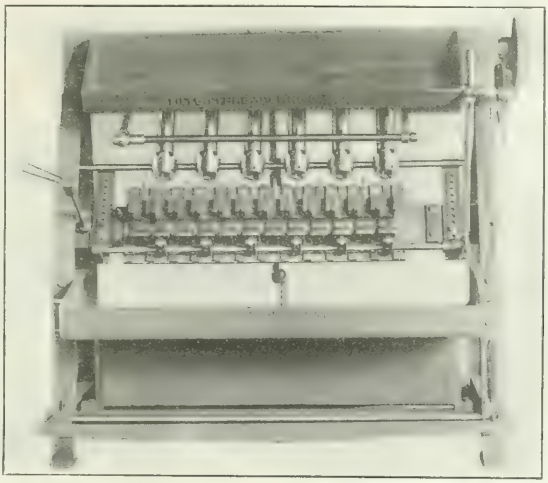
Gage Steel Committee Investigation

Representatives of the Bureau of Standards attended the meeting of the Gage Steel Committee in New York, Nov. 17. Progress reports on the work so far done by the committee were considered and a program outlined for continuing the work. The samples of steel selected by the committee for investigation have been received and preliminary work is well under way. Dimensional changes on hardening, and changes with time after hardening are being studied; also the rate of wear of different specimens which have been subjected to various heat treatments.

Production Threading and Tapping Machine

A machine here illustrated, known as tilted threader No. 3, which can be fitted up for a reversing type tapping machine or as a non-reversing threading machine, has been developed by the Holmes Engineering Co., Oshkosh, Wis. As a reversing-type tapping machine it is offered as particularly well adapted for such pieces as yokes, steering arm yokes, turning buckles, and for Society of Automotive Engineers standard pieces with a tapping capacity of ¾ in., U. S. Standard, or 1 in S. A. E. The six spindles are placed at an angle of 30 deg. from the vertical, permitting ample lubrication during operation. Self clamping jigs are used. The taps are chucked in spring-collets.

When fitted up as a non-reversing threading machine with self-opening dies, cap screws, king bolts, track bolts, spring clips and a variety of other external threading of this type may be done.



Tilted Threading Machine Which Can Be Fitted Up for a Reversing Type Tapping Machine

For both tapping and threading 12 jigs are used, six being brought up simultaneously while the six idle jigs are being loaded. Operation by a foot power lever permits the operator to use both hands while unloading and loading the idle jigs. The carriage on which the work-holding jigs are mounted can be moved to the right or left as the case may necessitate. Provision for handling long or short work is made by means of the two members at the ends of the roller shaft. These have a series of drilled holes for the purpose. In tapping, reversals are made at twice the cutting speed automatically whether cutting right or left hand and at any depth of thread.

Four changes of speeds are available by means of change pinions, and right and left threads may be cut. A rotary pump supplies lubricant to each die head through an individual pipe. Throughout the machine extra long bronze bearings are used and all thrust points are relieved by grooved ball races. As may be seen in the illustration, a workshelf that can accommodate two tote boxes is located just above the spindles. Its inclined position places the parts to be machined within easy reach of the operator.

The rated output in threading is 1200 to 2000 pieces per hour, and for tapping 1000 to 1500 pieces per hour. It is 65 in. in height and requires 41 x 66 in. floor space.

Light Aluminum-Copper Castings

The issuance of technical paper 287, "Preparation of Light Aluminum-Copper Casting Alloys," by R. J. Anderson, metallurgist, is announced by the United States Bureau of Mines. In aluminum-alloy foundry practice light aluminum-copper alloys are preferred for general use for castings, says the author; in fact, as far as can be estimated from the available figures, the domestic production of castings from an alloy containing approximately 92 per cent of aluminum and 8 per cent of copper was about 97 per cent of the castings in all kinds of alloys in 1920, which amounted to about 81,000,000 lb. Several other binary aluminum-copper alloys are employed for commercial castings; these contain from 2 to 13.5 per cent of copper, the remainder being aluminum. Alloys containing 4 to 6 per cent of copper are reported to have been used in Italy for aircraft motor castings, and the 96.4 aluminum-copper alloy is used extensively in the United States for sand-cast cooking utensils. In the United States a favorite motor-piston alloy is made with 9 to 10.5 per cent copper, the remainder being aluminum, but some plants introduce iron as well as copper to increase the hardness. Alloys containing up to 13.5 per cent copper have been used in England for special purposes. In the United States the consensus of opinion among foundrymen is that the alloy containing 92.8 aluminum is the best alloy available for general casting purposes and for some special castings. In addition more or less definite light alloys have been developed for particular uses, notably piston and carburetor alloys and alloys for so-called leak-proof parts.

Aluminum-alloy foundries in the United States employ three methods for introducing copper into aluminum in making light aluminum - copper alloys: 1. The use of copper directly; (2) the use of 33:67 copper - aluminum alloy, and (3) the use of 50:50 copper-aluminum alloy. The writer of this paper suggests that 60:40 copper-aluminum alloy might be suitable for the purpose. The usual method of preparing rich alloys is to melt the copper and part of the aluminum separately and then to pour the copper into the aluminum, keeping the temperature as low as possible by adding the remainder of the cold aluminum. A suitable method for preparing rich alloys on a large scale is described in detail in the report. Experiments of the Bureau of Mines in the preparation of rich alloys and No. 12 alloy have yielded data with regard to dross losses, relative costs, and merits of methods. The various methods used at different foundries have been compared in the light of the figures obtained from the experiments and of views expressed by representative foundrymen.

Exports of Gas Engines

Figures of the Department of Commerce show that the October exports of gas and other internal combustion engines amounted in the aggregate to 5426 units valued at $638,765. More than half of the total was represented by 3392 automobile engines valued at $346,-163, of which 1155 valued at $165,223 were sent to Canada, and 1200 engines valued at $91,334 to France.

Of gas engines proper Japan took the largest amount, with 159 units valued at $14,765 out of a total of 332 units valued at $58,249. Japan is credited also with having taken the largest amount of other stationary engines, with 776 units valued at $55,583 out of a total of 1442 units valued at $157,732. In marine engines, other than heavy oil, Japan took 34 valued at $6415 out of 189 valued at $42,336. Both Australia and England took a larger number of engines, but the valuation was smaller.

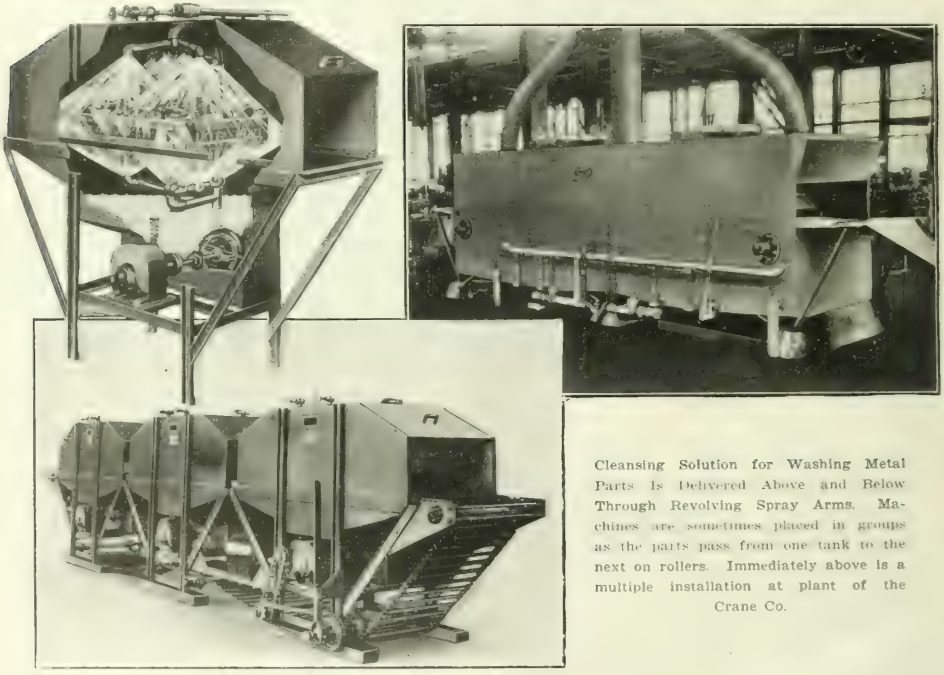
Engineers educated at Cornell University will hold a reunion at the Fifth Avenue Building restaurant in New York on the evening of Jan. 19. A dinner has been arranged by the Cornell Society of Engineers, Carroll R. Harding, Southern Pacific Railroad, New York, president.

Machine for Washing Metal Parts

For many years it has been the practice to clean screw machine products, stampings, fittings or any product in which oil or cutting compounds are used in machining processes by hand dipping or scrubbing in gasoline or cleaning solutions. Some manufacturers of such products started using the Crescent dishwashing machine for cleaning such parts, which brought about the development of machines especially adapted for this purpose. The Crescent Dishwashing Machine Co., New Rochelle, N. Y., manufacturers of a dishwasher for hotels and institutions, has incorporated the principles of that machine into parts washers of different sizes and arrangements to take care of varying requirements.

The machine consists essentially of a tank, with suitable hood to prevent splashing, to hold the cleaning solution, which may be hot water, or any cleaning compound suitable for removing the oil, dirt, chips, scale, etc., from the parts. In this tank is a centrifugal pump operated by a 1½-hp. motor. Partitions forming settling tanks are provided to prevent chips from entering the pump housing. The pump delivers the solution through a goose neck pipe carrying two spray arms, so mounted that one sprays from below the work and one from above. These arms are provided with orifices at an angle. The pressure of water driven through these arms causes them to revolve, the action being similar to that of a lawn sprinkler, except, of course, more powerful. The upper and lower arms turn in opposite directions, delivering streams of water at an angle to all parts of the articles passing between them. The parts to be cleaned are carried in heavy wire mesh baskets on rollers through the machine, entering one end and passing out at the other. Suitable conveyors leading to and from the machine can be used as desirable. The mesh of the baskets may, of course, be as fine as required to accommodate small pieces. The solution can be heated with steam, gas burners or an electric heating element.

Machines can be set in batteries for cleaning, rinsing and drying, work passing direct from one machine into the next. The battery idea has recently developed into a large multiple machine built for the Crane Co., Chicago. This machine will wash, rinse and dry when required. The wash chamber has four sets of the duplex spray arms served by a pump delivering 1200 gal. per min., driven by a 15-hp. motor. About 80 in. beyond is the rinsing compartment equipped with two sets of duplex spray units, through which a 3-hp. motor and pump delivers about 400 gal. per min.



Cleansing Solution for Washing Metal Parts Is Delivered Above and Below Through Revolving Spray Arms. Machines are sometimes placed in groups as the parts pass from one tank to the next on rollers. Immediately above is a multiple installation at plant of the Crane Co.

Use of Titaniferous Iron Ores

Many requests have reached the Bureau of Mines for information as to the possible commercial employment of titaniferous iron ores. Particularly has interest been excited by the possibility of magnetic concentration of the titaniferous iron ores in the Lake Superior region, and many loose estimates, up to billions of tons, have been made of the titaniferous magnetites available in Lake and Cook counties, Minn. It should be stated that in general the high-grade deposits are too small and the large deposits are too lean to work. In order to utilize the large deposits, magnetic concentration would be necessary, but the nature of the material in them is such as not to promise satisfactory results.

With reference to the direct smelting of titaniferous iron ores in the blast furnace, it has been shown definitely that these ores can be smelted readily for the production of pig iron, and large scale tests have been run at Port Henry, N. Y., and Onehunga and Patea, New Zealand. Moreover, at some blast furnace stacks in Norway, Sweden and England, titaniferous iron ores were smelted as such in recent years, and there is certainly no question but that such ores can be smelted successfully and commercially. However, blast furnace operators are generally prejudiced against titaniferous ores and, while this prejudice is not reasonable nor based on reliable data, nevertheless it exists. Information regarding titaniferous iron ores is given in Serial 2406, "Titanium," recently issued by the Bureau of Mines.

An address on the asbestos industry is to be made by E. R. Potter, of the Johns-Manville Co., before the Boston Society of Civil Engineers at 715 Tremont Temple, Boston, on the evening of Jan. 10.

Great Power for Good in Commonwealth

Associated Industries of Massachusetts Has Many Activities and Much Influence—Its Policies as to Strikes and Legislation

BY JOHN NELSON

THE Associated Industries of Massachusetts has come to be a great power for good in its Commonwealth. Seven years ago it was founded with a handful of members. Today it has 1550 member firms out of an eligible total of 2200 in the State. Their invested capital is, roughly, $1,500,000,000, their annual sales $2,225,000,000. The aggregate number of their stockholders is close to 200,000. They employ 550,000 men and women, who receive annually in earnings $500,000,000.

The potential strength of such a combination of industry, organized for a common purpose, is so great as to be difficult of realization. Its development and utilization have been accomplished to a high degree of coordination, as has been proved in the good that has already been done. By a combination of enthusiasms and energies, practically exerted, an esprit de corps has been created throughout the membership which is unique among industrial organizations.

Strong Presidents

A most influential factor has been, of course, the succession of presidents, all big men with big experience behind them, active in big industry, who have given of their services with the finest kind of enthusiasm. The first was the late Richard H. Rice, manager of the West Lynn Works of the General Electric Co. Next came Frederic C. Hood, treasurer of the Hood Rubber Co. of Watertown; after him Charles A. Andrews, former treasurer of the Gorton-Pew Fisheries Co., and finally Col. Charles R. Gow, owner of the Charles R. Gow Co., who is serving his second term.

The association has fulfilled the purpose of its being as set forth in a clause of its constitution:

"To improve the manufacturing conditions of the industries of Massachusetts in the public interest; to advocate fair and equitable legislation affecting the interests of its members and their employees; to inculcate just and equitable principles among its members and between its members and their employees; to acquire, possess and disseminate useful information for its members; and generally to promote the welfare of its members and their employees and the prosperity of the Commonwealth of Massachusetts and their industries."

Does Not Interfere

The Associated Industries does not interfere in strikes. In its relation to labor the organization is non-militant. Seldom does industrial trouble develop in which members are not involved, but the association holds aloof. Its function is a different one. The term non-militant cannot be applied, however, when the issue is legislation. The association has become a watchdog on measures presented to the State Legislature or to Congress. It is always ready to foster proposals which seem to the association's executives to promise good to industry. It opposes actively, and very effectively, measures which seem inimical to industry. Very often it stands opposed to organized labor. But a reputation for fair play has been won, and the members of the labor lobby at the State House live with the representatives of the association on friendly terms. No bitterness has been engendered.

The scope of effort of the association is represented in the accomplishment of two purposes. The one, which includes matters relating to legislation, is a general service to industry as a whole. The other is direct service to members through thoroughly organized departments of transportation, taxation, legal, industrial accounting, technical information, industrial relations, Americanization, insurance, finance, banking and credit, industrial investigations, a Washington service, and an excellent association organ, *Industry*, edited by George R. Conroy, head of the literary department and secretary to the executive committee. Each department has its own highly specialized experts, men of high standing each in his own field, and each department is in charge of a subcommittee of the executive committee. The staff comprises 40 people.

Have Saved Money

The services rendered are in no instance perfunctory. In many hundreds of cases they have saved money for the members. Probably, if the economies effected could be totaled, it would be found that the figure each year is greater than the total receipts from dues.

Frank F. Dresser, general counsel of the association, keeps members advised of legal matters of general interest to industry, and has charge of the presentation of evidence to legislative committees in the State. If there are shipping problems to be solved, Transportation Manager Walton O. Wright and his assistants, Francis J. Dowd and Col. Arthur N. Payne, all practical railroad men, are at the member's service, as is also Edgar J. Rich, transportation counsel, formerly general counsel of the Boston & Maine Railroad. In the last six months 800 members have taken advantage of the transportation service. Many thousands of dollars have been collected on confiscation claims, which had proved uncollectable through the regular channels. Through changes effected in freight classifications, large amounts of money have been saved to members. An impressive illustration was the saving to a large concern of $50,000 a year. Reductions in unreasonable and discriminating rates have effected economies as high as $2,500 a year.

Insurance is sometimes a source of wasteful leaks. Thomas E. Sears, insurance adviser, attends to these matters for members, who have saved from a few hundred dollars to as high as $20,000 a year through this service. For such members as cannot be accepted by the senior mutual fire insurance companies, the Associated Industries has caused to be established and developed a mutual plan known as the Improved Risk Mutuals, which is being taken advantage of by members.

F. R. Carnegie Steele is in charge of the industrial accounting and taxation department. He has answered hundreds of questions which have arisen in the perplexities of the income tax statutes. He also assists in a practical way those members who are in doubt as to their accounting methods, and this has come to be an important part of his duties.

Industrial Secretaries

Industrial Service Secretaries George F. Quimby and Edward E. Bohner are in charge of immigrant education, commonly spoken of as Americanization. Staff Engineer Edward M. Coffin and Industrial Service Secretary Herbert O. Stetson are at the service of members in any matter relating to employment relations, such as the establishment of an employment department, safety methods, sickness prevention or wage scales. In matters of finance the members are privileged to look for advice to Clifton H. Dwinnell, vice-president of the First National Bank of Boston. Louis H. Warner, formerly secretary to Secretary of War

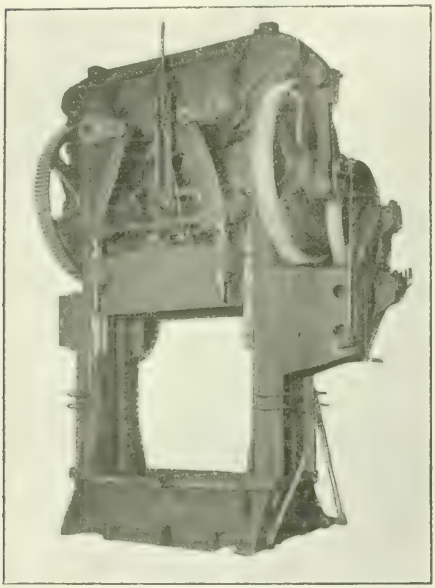
(*Continued on page* 1724)

New Double Crank Toggle Drawing Press

A double crank toggle drawing and deep stamping press incorporating new features and available in a variety of sizes has been developed by the Toledo Machine & Tool Co., Toledo, Ohio. It was designed for drawing, deep stamping and forming operations in the manufacture of automobile bodies, cowls, crown fenders and a large variety of similar work.

In developing the machines, one of which is shown in the accompanying illustration, smoothness of action, perfect timing and proper dwell of the blankholder slide were among the primary objects, economic use of floor space, necessitating a self-contained unit eliminating outside slides and outboard bearings, and provisions for maximum output, being among other features around which the design centered.

A train of double gearing, machine-cut from the solid with twin gears at each end of the crankshaft operates the inner slide or drawing plunger in the usual



Double Crank Toggle Drawing Press for Drawing, Deep Stamping and Forming Operations in Manufacture of Automobile Bodies, Engine Pans and Other Parts

manner. The outer, or blankholder slide, is operated by cranks with universal connections on each of the twin gears on the crankshaft. Each crank is connected by a steel link to a lever mounted on each side of the center of the crown, which is of heavy double-web cross section. This permits of running large steel shafts from front to back of the crown. These shafts are for mounting the levers, which connect in turn with links controlling the toggle mechanism. The latter is of substantial construction and is mounted on heavy shafts, also running from front to back.

The toggle arms and levers are of steel with inserted bronze bushings at each steel shaft bearing and when straightened out transfer the blankholder pressure direct to the frame of the press. This permits the entire use of the power of the crankshaft for the drawing operation. The press is controlled by the Toledo friction clutch, which permits stopping or starting the machines at any point of the stroke. A power slide elevator for the plunger slide is provided, and also a forced feed lubricating system to lubricate the main bearings from the floor.

The American Steel & Tube Co., Toledo, Ohio, announces that it will soon reengage in the manufacture of oxy-acetylene welded steel tubing.

Savings Effected in Utilizing Industrial Waste

The prevention of waste of industrial materials was discussed before an industrial conference held under the auspices of the industrial commissioner of New York State at Buffalo in November by M. F. Simmons, General Electric Co., Schenectady, N. Y., whose paper in part was as follows:

Every industry has more or less obsolete apparatus and materials, due to changes in design or changing market conditions, and they cannot continue to be sold through the regular channels. Such stocks can often be disposed of through offices or agencies which circularize and come in contact with jobbing houses, whose business is dealing in second-hand merchandise. Through this channel, prices are obtained greatly in excess of the value of the apparatus as scrap or if sold to local dealers not in a position to reach a wide market. In this connection we must recognize the importance of assisting our customers to dispose of second-hand apparatus when replaced by new designs. Such efforts result not only in salvaging removed materials at higher values, but also secure the goodwill and continuance of friendly patronage of the customer concerned.

Incoming materials considered in many factories as near valueless, such as boxes, cartons, excelsior, wrapping paper, and other packing materials, all admit of reclamation and application to some definite purpose. It may be of interest to mention that the Schenectady plant of the General Electric Co. repairs and makes new boxes of second-hand materials to the number of more than 60,000 a year, having a value of more than $30,000, and applies them to delivery, storage, and tote purposes within its shops. It ships nearly 500 tons of waste papers annually to the mills, and reclaims a total of more than 80,000,000 lb. of all its varied scrap products, including metals, having a market value annually exceeding $2,000,000.

Savings in Pattern Work

The pattern shop and foundry offer opportunity for setting up practices which result in saving materials. A factor of prime importance is the adoption of the green sand sweep process in the foundry. By the use of this process, or the green sand sweep process with dry sand cores, and also what are termed skeleton patterns, the making of complete patterns and core boxes may be obviated and a great amount of labor and material saved. Even where the allowances for variation are comparatively close, these methods of molding prove fully successful, since it is possible to work within necessary limits of required dimensions.

Patterns which are to be used only occasionally, or from which only a few castings are to be made, should be constructed from medium or second grade lumber. Patterns to be used but once, or where close limits of dimensions are not required, should be made of the cheaper grades of lumber.

May Have Lower Rates from the South to Middle West

BIRMINGHAM, ALA.—Birmingham iron operators incline to the belief that on reapplication of the Southern railroads for lower rates on iron into Middle Western territory, they will be successful. This is based on the Interstate Commerce Commission's suggestion that a scale be filed which would not work injustice to Ohio and St. Louis furnaces. The rates asked for and present rates were as follows: To Cincinnati, $3.53; present rate, $4.05; to Louisville, $3.24; present rate, $3.71; to St. Louis, $4.22; present rate, $5.16. The rates asked for by the railroads counted for a lower base than the iron makers had asked of the carriers by 8 per cent. As a result of the Interstate Commerce Commission's suspension of the lower rail rates, the barge and rail rates via Tennessee River and Burlington Railroad from Sheffield and Florence furnaces of the Sloss-Sheffield Steel & Iron Co. will enjoy their ascendancy. They are: To St. Louis, $3.28; to Chicago, $4.18. The barge line capacity is 10,000 to 15,000 tons a month and the company has two active stacks from which to ship.

Great Importance of the Merchant Marine

Interests of Farmers and Manufacturers Alike Demand Upbuilding of Shipping—What It Would Mean to Steel Interests

BY L. W. MOFFETT

THE destiny of American agriculture and industry points to the seas. Embraced within these two great groups are the basic elements of national life. Revolving around them are labor, transportation, finance, and the general sweep of commerce. Breaches between the two are more apparent than real. Political blocs, with their hostilities and retrograding effect on progress of civilization, sooner or later will be compelled by natural laws of economics to dissolve and recognize that the interest of one is the interest of the other. Their mutuality and interdependence will either be accepted and differences dissipated or the structure upon which healthy development of the two is built will break down and it is not to be conceived that such a tragic eventuality will ensue.

Because of the close relationship between the two that must be recognized ultimately, it is a source of genuine concern that the agricultural interests at this time, with some exceptions, are, if their so-called spokesmen in Congress are to be taken as an index, opposing the Administration's ship subsidy legislation, which has passed the House but is facing a vigorous storm of protest in the Senate. The outcome, whatever it may be, will be momentous. Should the bill go to defeat, through filibustering tactics, delay in acting on it or otherwise, it undoubtedly will mean the opportunity for enactment of a similar law building up an adequate privately owned American merchant marine will have passed and not return for a long time, perhaps when it is too late. The familiar cry of ships! ships! and more ships! may prove only a voice in the wilderness, unheard, or, if heard, impossible to heed. Should it be a cry for a means of national defense, the result surely will be something sad to contemplate. For the necessity of a merchant marine as a naval auxiliary is altogether too obvious to dwell upon, even for those whose apathy is the most marked.

Must Have Sea Power

But the cry in mind for the purposes of this article relates to commerce, to the farmer, the manufacturer, and therefore the entire economic life of the nation. America assuredly occupies a topmost position in the world of commerce, and history records no instance where a nation has long been strong in its own right unless supported by sea power. Temporarily there have been empires that have gained vast power without turning to the sea, but they have passed. So have great nations of the ages inevitably passed as their seagoing trade dwindled and disappeared.

The first American Congress apprehended these fundamentals, as is proven by the interesting fact that the initial act it passed was designed to encourage American shipping. The glories of American shipping, the leading position of the republic as a maritime nation, until the Civil War, the penetration of the famed Yankee clippers to all points of the compass, are quite well known, just as is the unhappy story that followed by which American shipping dropped to a humiliatingly small ratio, taking approximately 9 per cent only of American Commerce overseas in 1910 as compared with 90 per cent in 1830. The replacement of the sail by steam, wood by steel, development of the great West, where capital was invested, and other changes, form a twice-told tale, and need not be repeated. Nor is it necessary to say that never has America made the slightest attempt to really rejuvenate its merchant marine by legislation that it has not been blocked by interests masked in one disguise or another. That foreign propaganda coming from various sources has

Tremendous Amount Paid for Ocean Freight

The tremendous importance of ocean freight rates as "invisible exports" is shown by the report on foreign trade for the calendar year 1921, exclusive of the Great Lakes and oil tank trade. The exports totaled $3,806,955,000 and the imports $2,186,365,000. The freights on ocean shipments usually are figured at 8 per cent of the value of cargoes. Consequently this vast overseas business was worth $478,000,000 to the ships which carried it. The share of American vessels was $171,000,000, while the share of British vessels was $172,300,000; Japanese, $33,600,000; French, $20,100,000; Norwegian, $18,800,000; Dutch, $18,500,000; Italian, $14,300,000; all others, $29,300,000. This means that $307,000,000 went out of the country in ocean freights alone and at least $100,000,000 more should be added for return insurance charges on the cargoes carried in foreign vessels. Later returns make a still poorer showing for American shipping. It is estimated that during the past century some $28,000,000,000 has been paid in freight bills to foreign shipping, while less than $9,000,000,000 has been paid to American shipping. The answer is seen in figures showing the declining percentage of commerce carried in American vessels. In 1830 American vessels carried 90.5 per cent; in 1840, 83 per cent; in 1850, 72.5 per cent; in 1860, 67 per cent; in 1870, 36 per cent; in 1880, 17 per cent; in 1890, 13 per cent; in 1900, 9.4 per cent; and in 1910, 8.9 per cent, the lowest point. It increased to 14.3 per cent in 1915, to 42.8 per cent in 1920, and then declined to 35 per cent in 1921 and to 30 per cent in 1922.

Despite this showing, so-called agricultural representatives in Congress are trying to block the ship subsidy bill, while at the same time they are seeking to put through legislation to encourage farm exports. Proponents of ship subsidy maintain that it is impossible to increase export trade sufficiently for the farmer unless he is assured American ships in which to carry his products. At least one great farmers' organization, the American Farm Bureau Federation, realizes the importance of necessary transportation. James R. Howard, president of the federation, has testified before the Congress committees which held hearings on the ship subsidy bill that adequate transportation overseas at low cost was just as necessary to the farmers of the country as were good roads, reasonable railroad rates and ample port facilities.

played a powerful part in this destruction of an American merchant marine likewise is too patent to require reiteration. That it has been supported by domestic interests also is readily understood. That there has been a great deal of sincere, if misguided, opposition, is a fact well known. But singing songs of hate, as shown by world-war precedents, is a costly adventure. It is better to show by facts the absolute necessity of building up a privately owned American merchant marine regardless of every obstacle that seeks to prevent it. The day when America must submit to humiliating dependence on foreign shipping, and crippling of American commercial life, must not be allowed to return. The spectacle of American exports and imports being curtailed merely because of some more or less isolated war requiring the ships of some other nation to enter the naval auxiliary service and thereby leaving American goods high and dry through shortage of ship space has happened in the past and will be repeated in one form or another if there are not sufficient American bottoms. And likewise there will be discriminations against American goods, as in the past, whenever it is helpful to the interests of nationals whose flag carries the commerce.

People Should Be Aroused

The farmer, the steel maker, machinery manufacturer and indeed the entire gamut of American life, from beeswax to cotton, should be aroused more than ever to the necessity of seeing that the hastily built fleet of war days is placed at their service in the most convenient manner. It must serve as reasonably as ships of foreign flags, American shipyards must be thrown open and be able to compete with foreign shipyards. Whether the direct subsidy is the ideal way of bringing this about may be a question, but President Harding, a zealot and extremely well-informed man regarding the American merchant marine, has said it is the best way open. Preferential tariff duties on goods carried in American bottoms are provided in the Jones merchant marine law, but this provision never has been put into effect because it is alleged it would violate treaties. This has been a fruitful source in the past of building up the American merchant marine, but if it actually violates treaties, subsidy or some other form of help must be adopted. It is to be remembered that a treaty may very properly be abrogated after due notice to the signatory nations, although it is not known that such a step would be taken in the absence of ship subsidy legislation. It does, however, offer a possibility that might be suggested. The first act of Congress just mentioned provided preferential tariff rates to goods carried in American bottoms, but it is stated that the nation finds that it has been maneuvered into a position where there are more than 100 commercial treaties forbidding such practices, though there are discriminatory tariffs throughout the world affecting American goods and ships. Retaliatory provisions are carried in the new tariff act, but it remains to be seen what actual use will be made of them.

The Great Railroad System

The point to be kept in mind is that an American merchant marine, much better balanced than the present fleet, both Government owned and privately owned, must be established and maintained. Development of the vast wealth west of the Alleghenies began with the decline of the American merchant marine and the close of the civil war. One of the principal contributions to that development was the upbuilding of the great railroad system, largely subsidized through grants of land, Federal, State and local. The nation then was largely self-contained, and required world trade only in small measure for the disposition of surpluses and to pay with them the moneys borrowed for purposes of development. Leading maritime nations largely were creditors of American interests and they sent their ships to receive the goods in payment of money owed them. But today America is a creditor nation and also it must look across the waters for its needs, manganese from Russia, Brazil and India; rubber from India; tin from the Malay straits and Bolivia; silk from China and Japan; twines, canvas, linens and laces must be made from flax from Russia and Belgium, and numerous other products, mostly raw materials. They must be allowed to enter American ports freely if industries in this country are to be able to export semi-finished and finished products and the agricultural interests must be permitted to ship great quantities of products if agriculture is to recover from its depression. It is certain that competing foreign nations are not going to show the proper interest in these movements and the only safe recourse is an American merchant marine that is efficient and adequate. New markets must be opened for expanded industries, among them iron and steel.

The Export Trade

The steel industry has long to go before it reaches the desired point of exporting 20 per cent of its production. And it is altogether improbable that this export trade, which may easily stand between loss and profit, will be reached unless American shipping is developed as it should be. American steel must be transported in American bottoms to a much greater extent than is the case at present, if it is to enter and maintain new world markets at all commensurate with its requirements. And the same may be said of American agriculture and all other products.

In this connection it is interesting to reflect on facts showing the quantity of exports of steel from and imports of steel to America for the fiscal year ending June 30, 1922, as they relate to percentages carried in American and foreign bottoms. The American ships are divided into two groups, Shipping Board vessels and independent American vessels, privately owned and operated.

This is the picture presented:

	Imports	Exports
Shipping Board	10.2 per cent	14.2 per cent
Independent A.	15.8 per cent	30.3 per cent
Foreign	74 per cent	55.5 per cent
Total American	26 per cent	44.5 per cent

Total Imports and Exports

Shipping Board	14.1 per cent
Independent A.	29.7 per cent
Foreign	56.2 per cent
Total American	43.8 per cent

Unfavorable Showing

The showing made as to the movement of steel imports is decidedly unfavorable to American shipping, and while a much better presentation is made as to exports, this is undoubtedly due largely to the fact that the leading producer has its own fleet under the American flag. Taking overseas shipping as a whole, it is pointed out by the Shipping Board that during the fiscal year ended June 30, 1922, United States ports witnessed 37,312 arrivals and departures of vessels engaged in waterborne foreign commerce, which aggregated 80,231,000 long tons of cargo. Of this total 52 per cent moved in American vessels, including tankers and Great Lakes traffic in which American ships predominate. Excluding these, American ships moved 30 per cent only of this nation's commerce. The total vessel dead weight entering and clearing was 214,952,000 tons, 51 per cent of which was American tonnage. The actual operating performance of the American ships is more pleasing and is a good answer to foolish claims that America is not a seafaring nation. In relative efficiency, as indicated by the relation of load to deadweight tonnage, the American percentage was 37.9 and the foreign 36.4. In other words, while American vessels used 2.62 deadweight tons to transport each ton of cargo, foreign vessels used 2.74 deadweight tons per cargo ton. Exports constituted 54 per cent of the total commerce. Forty-nine per cent of the entrance and clearances and 51 per cent of the deadweight entering and clearing were American vessels, and carried 68 per cent of the total imports and 39 per cent of the total exports. Viewed from this angle, the showing is pleasing. Especially must stress be laid on the necessity of establishing American agencies in foreign ports to develop cargoes for incoming American ships. This means not only careful cultivation of foreign markets through agencies, but financial connections, building of docks, etc. Another strong point to develop is American marine insurance, which has really fared much better

than the "defeatists" have predicted, and perhaps hoped.

It is the desire of the Administration and other strong supporters of legislation to create a private American merchant marine that will carry 50 per cent of the foreign commerce of the United States, including both imports and exports. The showing made as reflected above is further illuminated when it is stated that on July 1, 1922, there were 359 Shipping Board vessels of 2,041,467 gross tons and 294 independent American vessels of 1,287,359 gross tons engaged in overseas service, making a total of 653 vessels of 3,328,826 gross tons. At the same time there were owned and controlled by the Shipping Board 1707 vessels, of 11,002,623 deadweight tons, of which 1449 were steel ships of 10,074,821 deadweight tons, 1275 being cargo vessels of 8,693,023 deadweight tons.

Many Ships Idle

From this will be seen that a large proportion of the fleet, costing the Government $50,000,000 per year, has been idle, while it is contended that by payment of a subsidy of $30,000,000 a year, together with other inducements carried in the Administration legislation, such as low rates of interest on loans from the proposed revolving fund, and certain tax exemptions, this fleet could be turned to full and efficient use when world-trade comes nearer to being restored than it has been. Unless something of this kind is done, it is pointed out, American ships, with higher operating costs, cannot successfully compete with foreign vessels, all of which are subsidized in one form or another, no matter what other term may be applied to the systems. There seems to be no chance of revising such restrictive legislation as the LaFollette seaman's act, which would reduce operating costs of American vessels.

The shipbuilding and iron and steel industries of America manifestly would be greatly benefited through contracts. It is estimated that it would require 7,500,000 gross tons or 11,250,000 deadweight tons to carry 50 per cent of American seaborne commerce. This means 1500 ships of 5000 gross tons each. They would require approximately 3,750,000 tons of steel, of which about 75 per cent would be plates, shapes and bars, principally plates, or about 2,900,000 tons. There would necessarily be large requirements for marine machinery, boilers, etc. The annual steel requirements would be, according to estimates, about 400,000 tons to maintain such a fleet, which would assuredly be a desirable business. Additional requirements would be for repairs.

"When giant American corporations, like the Bethlehem Steel Co. and the Texas Co., each of them financially stronger than any European steamship concern, and both of them shipbuilders as well as shipowners, find it necessary to close their own shipyards and have their own cargoes carried by foreign vessels, what is the answer?" asked Commissioner Edward C. Plummer of the Shipping Board. Then, answering his own question, he said:

Chartering Foreign Vessels

"When they find, as they do, that they can charter foreign vessels for less money than it takes merely to operate their own steamers under the American flag, what is the sense of setting up the claim—as opponents of American shipping do—that American ships, without Government aid, can compete with foreign ships in carrying ocean commerce of the United States?"

Mr. Plummer explained that the proposed aid to shipping is not designed only to encourage the building of ships, but really to develop American trade in foreign markets where the excess of domestic requirements must find purchasers if industries of the country are to grow. And, he emphasized, the purpose also is to make the American farmer and other exporters independent of foreign ships whose favors they otherwise must seek. Dr. Julius Klein of the Bureau of Foreign and Domestic Commerce said that the American business man is becoming more and more a student of international affairs and an insistent searcher for facts, and because of this, painted a bright picture for further development of American foreign commerce. Nearly half of the country's exports originate west of the Alleghanies, where opposition to the ship subsidy bill is said to be most pronounced, and over 47 per cent of the American exports today are composed of manufactured or semi-manufactured products. To this should be added, Dr. Klein stated, about 20 per cent for those exports made up of manufactures based on agricultural raw materials such as flour.

"These are greatly increased percentages as compared with pre-war shipments," Dr. Klein pointed out. "The transition from exportation of raw materials to manufactured and semi-manufactured exports demands intensive study of conditions abroad. We have broken away definitely from the haphazard methods which have characterized our export trade in the past. The public must be fully awakened to the necessity of a policy based upon specifically determined facts and grounded on studious preparations." The work the bureau is doing in this direction was outlined by Dr. Klein and obviously an American merchant marine to carry commerce arising from the work is a prerequisite.

Rail and Water Transportation

The commercial essence of the ship subsidy bill provides for the co-ordination of rail and water transportation in order that there may be adequate and continuous service from the gate of the farm and the door of the factory to the warehouses in foreign ports. This is intended to eliminate grain and other blockades and those tremendous losses which delays in transit, in loading and unloading, annually impose upon both producer and consumer.

Summed up, the ship subsidy legislation is designed, and it is maintained by its supporters that it will accomplish its purpose, to turn millions now being unprofitably expended caring for idle ships into profitable investment in furnishing cheap and adequate transportation of cargoes in foreign trade; building up world commerce for the farmer and manufacturer; open shipyards, create demand for ship steel, machinery, etc., protect American foreign markets from discriminations; protect American trade secrets, and to lower costs of domestic production by finding an outlet in world-trade, thus bringing down overhead costs.

The country as a whole has shown a rather amazing indifference to the bill, perhaps due to a lack of understanding its importance. This apathy should be converted into vigorous enthusiasm for the bill, and misguided hostility should be converted into friendliness by showing the farmer, and others who sincerely oppose the bill without understanding it, that it means profits to them.

With this done the opponents of the bill will be forced to retreat and a new era in American agriculture and commerce will develop.

Blast furnace design, operation and metallurgy is the subject of a joint meeting to be held in Cleveland, Jan. 30, between the American Society of Mechanical Engineers and the American Institute of Mining and Metallurgical Engineers.

COMING MEETINGS

January

American Engineering Council. Jan. 11 and 12. Annual meeting, headquarters of Federated American Engineering Societies, 24 Jackson Place, Washington. L. W. Wallace, 24 Jackson Place, Washington, N. W., secretary.

February

American Society for Steel Treating. Feb. 15 and 16. Winter sectional meeting, City Club, Chicago. W. H. Eisenman, 4600 Prospect Avenue, Cleveland, Ohio, secretary.

American Institute of Mining and Metallurgical Engineers. Feb. 19 to 21, inclusive. Annual meeting, Engineering Societies Building, New York. Dr. F. F. Sharpless, 29 West Thirty-ninth Street, New York, secretary.

METROPOLITAN STEEL PLANT

Delivery of Steel Bars by Motor Truck from Hot Bed to Job

DUE to its ability to transform scrap into finished steel products and then to land those products quickly alongside any job in Greater New York, the Pardee Steel Corporation has a 110-acre location in Perth Amboy, N. J., which may be described as strategic. With one exception, no other steel company has the same ability to send its products direct from its own shipping platform, alongside its hot beds, into the heart of New York without breaking cargo or rehandling the goods.

The Pardee plant includes open-hearth furnaces, blooming and finishing merchant mills, a cold finishing department for turning out shafting and other polished rounds and sections, and its own power plant. It is a self-contained steel plant using cold stock only, and is so arranged that expansion of facilities into larger units or added departments should be easy. There are four stationary open-hearth furnaces, two being of 50 tons and two of 35 tons nominal capacity, one of each now being operated. These furnaces are being pushed beyond their normal rating, as much as 60 tons being taken out of the 50-ton furnace.

The 16 x 18-in. ingots after stripping are heated in soaking pits of the usual type, (but fired with coal, and using waste-heat boilers to conserve heat) and then run through a 34-in. blooming mill, which produces billets from 4 x 4 in. up to larger sizes, as required. When small sizes are desired, these billets are then reheated in a non-continuous furnace and run through a 20-in. breaking-down mill. This turns them into 1½-in. or 2-in. billets, which are given a wash heat in another non-continuous furnace before being passed into the 9-in. finishing mill. The latter consists of five sets of stands, three of which are 3-high and the other two, 2-high. The main output of this mill consists of hot rolled bars for the cold finishing departments, and flats and small angles, as well as deformed bars for reinforced concrete work, ranging through all the sizes required for building construction. Patented "numbered" bars are turned out on this mill.

Another finishing mill, 12 in., also with five sets of stands, with a continuous furnace heating its steel, is used for producing both concrete bars and bars for cold drawing or cold rolling. In both cases, cooling beds, shears and handling equipment generally are worked out along adequate lines.

In the cold finishing departments, both draw benches and rolling equipment are used, together with both rotary and reciprocating straightening machines. There are three units—one, for the manufacture of turned and polished shafting; a second, for cold drawing from straight bars; the third, for making coils and other wire products. Storage facilities are ample for handling a heavy stock. The equipment is new and up-to-date and has a rated capacity, on full double turn, of 5000 tons per month.

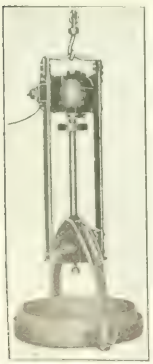
As the plant is located alongside the tracks of the Lehigh Valley Railroad and has direct connections with the Pennsylvania and the Central Railroad of New Jersey, both incoming and outgoing shipments can be handled advantageously. Mainly, however, the strategic importance of the unit lies in its being within 25 miles of the heart of New York, which makes it perfectly feasible to swing materials from the cooling bed onto a motor truck, send them over the road to any point in the city, whether it be a warehouse, a construction job or what not, and deliver the steel the same day it is loaded, and without any intermediate handling of any portion of the load. This means a large saving in both cost and time as compared with the methods necessarily employed under other conditions. The New Jersey State highway will parallel the north side of the property, placing it on the main thoroughfare between New York and Atlantic City.

An additional outlet by water will be available as soon as wharfage arrangements are made at the plant, for there is only one draw-bridge to be negotiated between the plant and Manhattan Island, this being the lowest crossing of the Raritan River, alongside which the plant is located, with some 1500 ft. of riparian rights on tide water.

Contemplated expansion of this plant will include the manufacture of alloy steels, blue annealed sheets and strip steel, for all of which it is felt that there is a nearby market.

Riddling Machine for Foundry Use

An electrically operated portable sifting machine, arranged as shown in the illustration, and built to withstand the rough treatment which riddling equipment undergoes in the screening of core and molding sands, is being manufactured by the Lowe Mfg. Co., Detroit. Simplicity of operation, few wearing parts and elimination of motor vibration are features emphasized. In ordinary foundry work, it is claimed that the machine will riddle one ton of oil core sand in 3½ min. or one ton of foundry sand in 4 min. It is said to be easily handled by two men, and the operating cost comparatively small, only 180 watts of electricity being consumed when the riddle is fully loaded and working at capacity.



The machine is suspended from a crane hook, bracket, beam or other support which will carry its weight of 125 lb. The frame is narrow at the top and there are no protruding parts. The base of the machine, the riddle band, is only 22 in. in diameter, and it may be seen that there are no legs, tripods or other obstructions underneath to impede the movements of the workers. It can be adjusted to any height convenient to the worker. The clear space thus available is emphasized as an important aid to maximum production. A General Electric 1/3 hp. motor, built especially for the machine, is used, which being totally inclosed is not affected by dust, fumes and heat. It is bolted to the side bars with machine screws secured by lock washers to eliminate vibration of the motor element, solid construction of the frame also aiding in overcoming the vibration. Ten feet of cord and a standard attaching plug are provided and a tumbler switch, mounted as shown, is within easy reach of the worker.

The flywheel into which the motor shaft is fitted runs on the same center as the motor shaft, maintaining balance. A double row of ball bearings are set in the lower face of the flywheel, ⅛ in. off center, holding the upper end of the main shaft, and a 2-in. ball supports the lower end of the main shaft 20 in. below the flywheel. The riddle yoke, located just above the supporting ball, is welded to the main shaft, and extends downward 15½ in. The ball bearing and supporting ball, holding the main shaft in position, are entirely inclosed.

When the riddle is in operation the upper end of the main shaft turns in a circular path ⅛ in. off center, the motor shaft being centered. Thus the main shaft forms a cone of revolution with its apex at the neutral point 20 in. below. The riddle yoke welded to main shaft just above the apex forms another cone of revolution with its apex inverted to that of the main shaft. A leather faced bracket, bolted to one of the side bars at the lower end, serves as a check, preventing the riddle yoke from rotating when the machine is started. The result is said to be a steady, effective motion of 1725 gyrations per min. on a 20-in. wooden rim riddle. A single locking wing-bolt is provided for clamping the riddle into position at three points, permitting of quick removal and replacement of the sieve for cleaning.

CONTENTS

December 28, 1922

New Type of Open-Hearth Furnace 1677
Loftus Furnace Involves New Way to Apply Blow Torch Principle—Details and Results of a Unit Now Operating

Great Power for Good in Commonwealth 1689
Associated Industries of Massachusetts Has Many Activities and Much Influence—Its Policies as to Strikes and Legislation

Great Importance of the Merchant Marine 1691
Interests of Farmers and Manufacturers Alike Demand Upbuilding of Shipping—What It would Mean to Steel Interests

Railroad Rates on Iron and Steel Products 1702
Revised Figures on Ore, Coal, Coke, Pig Iron and Finished Materials—Few Changes Since July

New Method of Testing Foundry Sands 1725
Vibratory Precipitation Advocated for Determining Bond, Silica and Other Properties for Molds and Cores

Unfilled Sheet Orders in November.....1679
Universal Hydraulic Press.....1680
Safeguarding Power Press Tools.....1680
Nitrogen in Steels 1680
Level for Setting up Precision Machines..1680
Universal Flat Turret Lathe.....1681
Standardizing Export Packing Methods.1681
Freight Car Shortage 1682
Exports of Railroad Material and Structural Steel 1682
Refractories Statistics 1682
New Cincinnati Planer 1683
Etching Reagents for Carbides in Alloy Steels 1683
New Motor-Driven Saw Bench 1684
British View of American Foundries....1684
Thread Miller Arranged for Relieving..1684
Oscilloscope for Studying Mechanism....1685
Standard Sample Metals with Certified Gas Content 1685
Self-Contained Turret Lathe.....1686
Dial Feeds for Punch Presses.....1686
Gage Steel Committee Investigation.....1686
Production Threading and Tapping Machine 1687
Light Aluminum-Copper Castings.....1687
Exports of Gas Engines 1687
Machine for Washing Metal Parts.....1688
Use of Titaniferous Iron Ores.....1688
New Double Crank Toggle Drawing Press.1690
Savings Effected in Utilizing Industrial Waste 1690
Lower Freight Rates Expected.....1690
Coming Meetings 1693
Metropolitan Steel Plant.....1694
Riddling Machine for Foundry Use.....1694
Editorials 1696
Matching Purchases and Sales—Incentive to Creative Effort—Imports of Pig Iron—Wanted, an Engineering Museum—Flattening the Business Curve—Stock Dividends and the Workers
Heavy Duty Engine Lathe.....1699
Elevated Intake for Blast Furnace Air..1700
Standardizing Ship Parts.....1700
Wire Wick Lubricating System.....1700
Japanese Market Weaker.....1701
Reading Iron Co. Takes Over Thomas Iron Co. 1701
Sale of Brier Hill Steel Co. Approved...1701
British Iron and Steel Market.....1718
Cost of Living Increasing.....1718
Fabricated Steel Business.....1722
Railroad Equipment Buying.....1722
Drop in German Steel Prices.....1722
Book Reviews 1723
Rogers-Brown Contest 1726
Ore Rate Sustained.....1726
Labor Notes 1727
Coal and Coke Output.....1728
Chemical Analysis of Babbitt Metal.....1728
Graphite Crucible Investigation.....1728
Electrical Developments in Steel Industry.1729
Associated Technical Societies' Meeting..1729
Quad City Foundrymen Meet.....1729
American Pumps in South Africa.....1729
Trade Changes 1730
Manganese Ore from Cuba Entitled to Free Entry 1731
New Trade Publications.....1731
French Market Report.....1739

Iron and Steel Markets 1704
Comparison of Prices 1705
Prices Finished Iron and Steel, f. o. b. Pittsburgh 1717
Non-Ferrous Metal Market 1719
Personal Notes 1720
Obituary Notes 1721
Machinery Markets and News of the Works 1732
New York Jobbers' Prices 1740

ESTABLISHED 1855

THE IRON AGE

EDITORS:

A. I. FINLEY WILLIAM W. MACON GEORGE SMART

C. S. BAUR, *General Advertising Manager*

Member of the Audit Bureau of Circulations and of
Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

[illegible] PRINTED IN U. S. A. George H. Griffiths, *Secretary*

[illegible] Publication Corporation, 243 West 39th [illegible] New York. [illegible] Charles G. Phillips, [illegible] A. I. Findley, *Treas.* F. J. Frank, *Secy.*

BRANCH OFFICES: Chicago: Otis Building. Pittsburgh: [illegible] Bldg. Philadelphia: 1420-1422 Widener Building. Cleveland: Guardian Building. Detroit: 317 West Fort St. Cincinnati: Mercantile Library Bldg. Buffalo: 881 Ellicott Square. Washington: 26 Jackson Place N. W. San Francisco: 320 Market St. London, Eng.: 11 Haymarket, S.W.1.

Subscription Price: United States and Possessions, Mexico, Cuba, $6.00; Canada, $8.50; Foreign, $12.00 per year. Single copy 25 cents.

Entered as second class matter, June 18, 1879, at the Post Office at New York, New York, under the Act of March 3, 1879.

Matching Purchases and Sales

One of the greatest difficulties manufacturers have had in the past year has arisen from the wide fluctuations in prices, whereby it has been impossible to match sales of finished product and purchases of raw material in the manner that is considered wise and expedient. Uncertainty as to the rate at which a plant could be operated has made the circumstances still more trying.

Committed as all men were in 1921 to the philosophy that production costs must be reduced indefinitely, and that profits were to be sought by economizing rather than by endeavoring to secure higher prices, the business conditions of 1922 have proved particularly trying. Costs have tended to rise rather than fall, and the manufacturer who during the first three months of the year sold his product at or near the then cost, hoping to eke out a profit by reducing cost, has had things move in precisely the opposite direction for him. The condition has commonly been described as that of "secondary inflation," a phrase that has a very bad sound when the consequences of the primary inflation leave such an impressive [illegible].

The foundryman who refused to buy pig iron last February at $19, furnace, or thereabouts, may have listened with a sympathetic ear to the claim of the furnacemen that iron could not be produced at that price without loss, but probably hoped that the furnaceman would be able to reduce his costs later and offer him iron at a lower figure. Only a few months later, the foundryman could not buy iron except at an advance of 75 per cent or more. If he sold his product without matching the sales with purchases of raw material, he was certain to lose. Another foundryman, buying the cheap iron for months ahead, escaped loss himself, but the loss was transferred to the furnaceman. Somebody had to lose.

Nor did the uncertainties come to an end when the price peak in pig iron was past. Some consumers have had to take high-priced iron in the past three months. When a few weeks ago buying of first-quarter pig iron began, the purchasers at first felt that perhaps they were paying a trifle too much, but expected to average their purchases with others later on at slightly lower prices. Then pig iron turned and higher prices must be paid, yet the danger has arisen that some furnaces will not be able to cover on coke at prices that will enable them to avoid loss on the pig iron. The foundryman cannot sell his product by fits and starts, and there has been no stable pig iron market into which he could go from time to time to cover as he made his sales.

Restriction in steel production in the summer by the coal strike forced steel mills to carry low-priced steel orders over into September and later months, when they had higher wages to pay and higher fuel costs, whereby large losses were encountered. Whatever a steel mill's earnings statement for September or October may be, the net showing is a combination of widely different results on the various orders filled, some invoice prices being much lower than others, while the cost was increased on all.

These wide fluctuations in prices are bad for all concerned. Manufacturers cannot match purchases and sales precisely, and when this is not done it is a gamble which party will gain and which will lose. It is not "straight business." The brains of industry should be devoted to efficient and economical operation of plants, not speculation in either the finished products or the raw materials involved in manufacturing. Steady demand and reasonably stable prices are requisite for the safe and proper conduct of business.

Incentive to Creative Effort

The advancement of the world has come through the exercise of creative intelligence. New methods, new processes, new appliances have been devised whereby the labor of the world is made more effective, producing more goods, better goods or new goods.

For creative effort to be exercised, and results realized, it is necessary that there be an incentive for creative intelligence to apply itself and that there be co-operation to carry out plans. It is useless, for instance, to design a new and improved blast furnace if the materials with which to build

the blast furnace are not made available or men are not willing to do the work of building the furnace.

The principle that creative effort should be encouraged is illustrated in the patent laws, which were established to insure to the inventor a reward for his work. Men who build factories, who plan industrial enterprises of all sorts, should be encouraged. It is a matter not of their having an inherent right, but one of its being in the public interest.

Captains of industry and capitalists should be encouraged. It is one of the great faults of the present times not merely that there is widespread indisposition to accord such encouragement but that there is actual hostility. Those who are indifferent or feel hostile do not recognize the principle that creative effort should be encouraged, but those who are capable of creating realize that there is indifference in some quarters and downright hostility in others.

The natural result of such a situation can readily be conceived. Men change their minds as to engaging in new enterprises, concluding that if they are to be harassed and obstructed instead of helped and encouraged, they had better let the whole thing alone. One may reasonably expect this attitude to be taken, and it is not incumbent upon men to make public announcement of their intention to assume the new position. Privately, not a little has been said along this line.

At first glance it may seem strange to assert the proposition that this industrial country needs the exercise of creative effort more than ever before, yet much can be said in defense of that proposition. It may be argued that many industries are very well developed, some of them perhaps overdeveloped. That is an argument in the affirmative, not in the negative, for since we must work it follows that we need new lines of work. In the retrospect, the industrial history of the country seems to have been chiefly a matter of expansion, of mere enlargement of facilities. At the present time we do not need to expand present facilities as we now know them, so much as we need to create new facilities, to go into new lines. It is in such work, largely pioneer in character, that creative intelligence especially needs encouragement, for the more novel the venture the greater the risk involved.

Hostility to, or jealousy of, captains of industry arises partly from widespread misapprehension of the spirit in which these men engage in their activities. The human element, the desire of accomplishment, is not sufficiently recognized. There is a desire for gain, but the gain is wanted not to take it out of industry but to put it in. Gratification of the ambition results in the placing of better tools in the hands of workmen, whereby greater product results from a day's work. Better and more encouraging conditions will arise if the mental attitude of the men who plan things is recognized. Economic progress will be impeded if public sentiment discourages the exercise of creative intelligence.

Pig iron output in 1922, with December estimated at about 3,000,000 gross tons, will approximate 26,793,400 tons. It compares with a steel output, castings included, of about 34,000,000 tons. The interesting fact is that the spread this year between the steel and the pig iron output will be the largest in many years. Blast furnace output, while about 70 per cent greater than that of 1921, is considerably below that of any year since 1911, excepting 1914, when the total was 23,332,200 tons. While coal and railroad strikes explain in part the relatively low pig iron production, the tendency to make less pig iron in proportion to steel has been characteristic of the leading countries this year. The consumption of scrap in open-hearth furnaces has been extraordinary and worldwide.

Imports of Pig Iron

In the absence of any official Government data on importations of iron and steel since the period ended Sept. 21, it is possible to obtain some measure of the heavy movement of pig iron to this country by an analysis of British statistics. Exports of pig iron and ferroalloys to the United States from Great Britain for the 11 months this year have been 318,619 gross tons. Deducting from this the estimated tonnage of ferroalloys, largely ferromanganese, the American receipts of pig iron approximate 228,600 tons. If the December shipments equal those for November, the total for the year will attain approximately 300,000 tons, a movement unequalled in the history of British pig iron exports. Based on earlier data, if the exports from Belgium and other countries continue at the volume attained, the year's imports of pig iron to the United States from all sources will total 400,000 to 450,000 tons. While a formidable figure, it is after all hardly one-sixth of an average month's production.

Wanted, An Engineering Museum

Some months ago a movement gathered some headway looking to the establishment of an engineering museum in the United States. Several members of the American Society of Mechanical Engineers, which regards itself as the "society of the industries," took an active part, and it may be put down that 1922 was responsible among other things for directing attention to an indifference of Americans toward those inventions which have made for the country's preeminence in the industrial world. Successful overtures to those in charge of the Smithsonian Institution in Washington were made, and the hope is that money and other means will be forthcoming for adding to that scientific arm of the Government a working exhibit which may at the one time afford a proper place for the records of engineering achievement and a needed opportunity for the research of the investigator and student. At least a beginning is necessary to house all that can be collected against the time when a demand develops for providing a veritable exhibition for live and immediate needs, for meanwhile the most that can be expected is a repository for models and basic records. These are usually stored in such dull arrays as to chill enthusiasm except in the persistent diggers into the past, but at present there is no central place

for gathering everything and some bits of evidence of accomplishment and progress may be lost forever, if indeed there are not gaps in the record already.

A good nucleus is now in the possession of the mechanical engineers' organization, but that society appears not to have the facilities to foster the building of a real museum and moreover the proposed governmental or quasigovernmental institution would properly have a scope beyond that encompassed by the mechanical engineer. The immediate need is for broadening sentiment for the engineering museum, for putting it under Government auspices for help both in peace and in war, for getting at least a start, (though with plans for making it of more than historical usefulness) and finally for some group like the Federated American Engineering Societies to energize the country into the necessary action.

Flattening the Business Curve

Inability to predict either the duration or the amplitude of swing of a curve depicting variations in business prosperity and depression was the keynote of several speakers at a recent dinner of the American Statistical Association in New York. It was emphasized that each business cycle, following along that curve, consists invariably of (1) prosperity, (2) crisis, (3) depression and (4) revival. But better than any attempt to predict the depth of a swing of depression or the period over which it is to last are the attempts which have been made from time to time to mitigate this condition. Thus, at the unemployment conference in Washington, last April, it was suggested that public work be undertaken freely during periods of depression, when men are out of employment and labor is cheap. This would help fill in the hollow of the curve, and to that same extent would retard piling up the peak of the curve through the doing of that work in a period of activity.

Frequently financial considerations make it virtually impossible to follow out this program. A large steel mill had under construction a new open-hearth department at a total cost of about $1,700,000. When depression hit the country in the fall of 1907, work on that plant was stopped and it was not actively resumed until 1909 when, in a period of accelerating activity, the effort was made to complete the plant and turn out steel from it at the same time. Naturally there was much confusion, much lost motion and unnecessary expense connected with this procedure. If the cash had been available to carry on the work of construction during the dull period, and thus have the equipment ready for operation when needed, the cost would have been less and the plant would have been earning dividends at the time when actually it was still being built.

Unfortunately, the banker often refuses to advance the money to permit what seems to be the rational procedure, in spite of accumulated evidence of a habit of expansion in the steel business in the United States. Records of the past 43 years show that 24 made new high output figures for steel ingots, while 16 showed a decrease from the year previous. In no case—prior to 1918—was a new high record for production delayed more than three years from the date of a fall in production, however great the crisis which produced that fall. In only one case did any year show an output below that of the highest year, which was over six years back; that was the disastrous 1921, with a tonnage below that of 1905.

It has always been held that industrial managements should make provisions for extensions of their buildings and equipment at times when business is at low ebb. Practically, this has rarely worked out. Andrew Carnegie in his day did more famine-time building than any of his contemporaries. Planning for the business future has many uncertainties. Owners who have laid by a surplus of money, that they may weather a depression with a minimum of strain and with the maximum of benefit to their workmen, have usually done about all they could. There are hopes that the study going on of the business cycle, so called, will get the careful attention of all interests concerned in industrial expansion, financial as well as managerial.

Stock Dividends and the Works

The flood of announcements of stock dividends is creating an impression upon wage earners which needs correcting. To them, recent experience has proved, a dividend is a dividend, regardless of whether it be in cash or in stock, and a dividend of hundreds per cent spells colossal earnings, which they think of as current earnings. They talk of "cutting of melons," and grow restless in the idea that they are not sharing in the cutting. In some cases more or less serious disaffection has resulted among employees of concerns declaring the dividends. They must be made to understand, if possible, that a stock dividend, under conditions as they are now being declared, is a very different matter indeed from a cash dividend.

In one case a campaign of education among the workers preceded the announcement of a stock dividend of some hundreds per cent. It was explained that the company had not increased its capital stock for years, in spite of the great growth of the plant and the volume of business done, and that the money with which business was done was represented on the books as surplus instead of capital stock as in the case of other similar large and thriving industries. The owner of one share of the old stock was no richer because he had received two additional shares, for the three combined stood for no greater share of the business than did the one share. The condition as outlined applies to most concerns which are shifting their surplus to their capital accounts. Those companies whose employees hold their stock find them useful agents in explaining the refinancing.

Theodore L. Dodd & Co., 80 East Jackson Boulevard, Chicago, with branch office in the General Motors Building, Detroit, have recently been appointed western sales representatives of the Cleveland Wrought Products Co., Cleveland.

HEAVY DUTY ENGINE LATHE

Sixteen Speed, Selective Geared Headstock Larger Head Screw and Other Features

A heavy duty, single pulley drive geared head engine lathe in 25 and 27 in. sizes, the features of which include a 16 speed, selective geared headstock with powerful multiple disk driving clutch running in oil, improved change gear mechanism, and a heavier, coarse pitch lead screw has been placed on the market by the R. K. LeBlond Machine Tool Co., Cincinnati. Massive construction is a feature emphasized.

Changes of speed are by the simple manipulation of two levers, the changes being made selectively without going through intermediate speeds to obtain the one desired. Gears are of steel and the sliding gears of nickel alloy steel, heat treated. Shafts are multiple splined and the keyways in the gears are broached from the solid metal. Shafts are short and run in bronze bearings. Gear teeth are of stub form and are rounded to permit of easy sliding engagement. The driving pulley is 20 in. in diameter and runs on an oil bush to relieve the drive shaft of the belt pull. It is clutched to the shaft by means of multiple disks. The driving clutch is operated by lever at the front of the headstock and also by a lever on the carriage, a feature which is of special importance on a long bed lathe. The lever on releasing the driving clutch applies a friction brake.

The entire headstock is flooded with oil from a submerged geared pump, oil being pumped to every bearing and flowing over the entire gear train. The spindle bearings and the multiple disk clutch are also continuously flooded with oil. The headstock is kept filled with oil to a level indicated, and an opening is provided for inspecting the oil stream. The spindle is of a 0.50 carbon hammered crucible steel forging and the bearings are of bronze, babbitt lined.

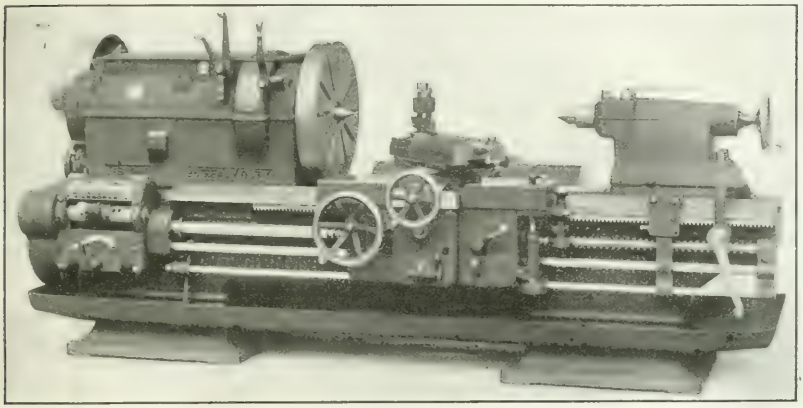
The bed is of the company's heavy duty type, the feature of which is the improved compensating "V", which among other advantages is said to eliminate the tendency of the carriage to climb. The apron is of patented construction used on lathes previously built by the company and is said to provide increased strength and rigidity with a reduction in the number of parts to about one-half the number usually employed. This is attained by making the apron casting in the form of a rectangular box, braced with cross ribs, in which all gears and shafts are supported at each end. The compound rest is of the company's heavy, straight pattern design. The carriage is unusually long, of ample width and depth, and is accurately held in position by broad flat adjustable gibs. The design of the bed and carriage is said to give an effective bearing surface of from three to four times the usual area.

The quick change gear mechanism is of the same general construction formerly used by the company but is heavier and has greater power. The number of threads and feeds is 48, the range of feeds 0.003 to 0.184 and range of threads per inch, ¾ to 46. Change gear boxes to cut a full commercial range of millimeter pitches are available.

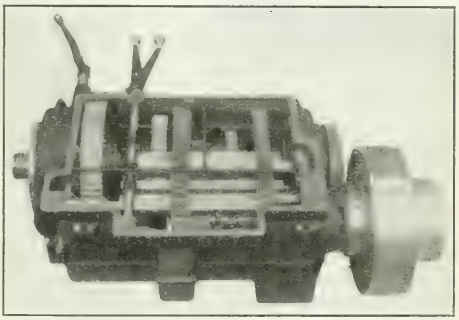
The lead screw is new and is larger than used heretofore. The thread is of special U. S. form, 1 in. pitch and 2 3/16 in. in diameter. A chasing dial is provided for catching all threads without reversing the lead screw.

Three types of motor drive are optional. The belted-motor drive has the motor mounted on a hinged motor plate attached to the base of the lathe and the drive is through an endless belt to the drive pulley. Either direct or alternating current constant-speed motors with plain starting controllers are used. Another arrangement is the constant-speed geared motor drive in which the motor is mounted on top of the headstock and the drive is through a motor pinion and intermediate gear to a gear that replaces the driving pulley. The third arrangement is the variable-speed geared motor drive, using variable-speed direct current motor with automatic or drum controllers with or without dynamic brake. The motor is mounted on the headstock and the drive is the same as the constant-speed motor drive except that the first series of gears is omitted and speed changes obtained electrically. The four mechanical changes together with approximately twenty electrical changes provide 80 spindle speeds in a correct geometric progression. A 15 hp., 1750 r.p.m. motor is recommended for the constant-speed drive, and a 15 hp., 500 to 1500 r.p.m. for the variable-speed drive.

The swing over the shears in the 25 in. lathe is 27½ in. and in the 27 in. lathes, 29½ in. The swing over the carriage is 18¼ in. and 20¾ in. respectively. The distance between centers, 12 ft. bed is 5 ft. 9 in. and 5 ft. 7 in. respectively. The range of spindle speeds is from 8 to 300 r.p.m. The front spindle journal is 5¼ in. in diameter and 7⅛ in. long.



Heavy Duty Engine Lathe. Sixteen speeds, selective geared headstock, improved change gear mechanism and coarse pitch lead screw are among the features. A view of the headstock with cover removed is shown below



Elevated Intake for Blast Furnace Air

BY DR. ALFRED GRADENWITZ

DISCUSSIONS in connection with Gayley's reports on the possibility of obtaining dry air and thus improving the efficiency of blast furnaces induced J. Bronn, a chemical engineer then in charge of the experimental department of the Rombach Iron Works, at Coblentz, Germany, to take up that interesting problem. Having noticed that the exhaust gases from gas blowing engines are overloaded with moisture, he undertook a series of tests with a view to ascertaining whether the upper strata of air possibly are cooler and, accordingly, less capable of absorbing water than those in immediate vicinity of the ground. Comparative readings on the charging gallery and in the engine room, close to the level of the iron works, respectively, showed the air in the latter actually to contain upwards of 20 per cent more water than at a height of about 30 meters (100 ft.). The question was thus raised, whether this was an exceptional case or a general meteorological phenomenon. Inasmuch, however, as records of the Potsdam meteorological station give evidence of only immaterial variations of moisture at various levels in proximity to the ground (the moisture sometimes even being greater at higher levels), the striking differences observed at Rombach must primarily be due to differences of temperature connected with special local, rather than with general meteorological conditions.



Suction Tower for Air Intake for Blast Furnace Use

When a new blower house building was erected for eight gas blower engines, Mr. Bronn decided to connect the suction ends of all these engines to a common suction tower 42 meters high (138 ft.), to supply them with air derived from that height. Though present conditions have not yet allowed the effect of this new arrangement to be gaged by accurate comparative tests, this much can be asserted, that a very considerable reduction of moisture is thus obtained, an average of 35 per cent being possibly a conservative estimate. So far from being reduced by the friction resistance of the air column drawn in from some height, the efficiency of the blower engines, on account of the lower temperature, greater density and higher concentration of the air (due to the reduction in moisture), is improved in a marked degree.

Standardizing Ship Parts

WASHINGTON, Dec. 27.—Preliminary conferences were held here on Wednesday and Thursday of last week looking to the standardization of ship parts. The conference of Wednesday, attended by about 20 shipping men, was held with Secretary Hoover, and that on Thursday with Ray M. Hudson of the Division of Simplified Practice of the Department. The shipping interests attending the conference included a central committee headed by E. A. Simmons, New York. The committee will report back to the industry and get its views before definite plans are decided upon. The conference followed one held in New York on Nov. 2. It is proposed to standardize such parts as structural steel, valves, tubes and fittings, but not such parts as hulls and engines. It was recognized at the conferences that there are three groups to be considered in developing a plan including the Great Lakes and Atlantic; the Pacific and the Gulf.

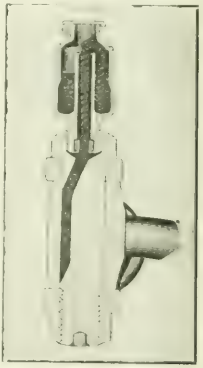
Riley Stoker Co. Acquires Chicago Concern

The Sanford Riley Stoker Co., Worcester, Mass., has acquired the business of the Ground Coal Engineering Co., of Chicago, which has been incorporated with a Massachusetts charter as the Ground Coal Engineering Corporation, the headquarters of which will be in Worcester. R. Sanford Riley is the president, Milton W. Arrowood, Chicago, vice-president, F. H. Daniels, treasurer, and David K. Beach, clerk. The company has a capital of $200,000 preferred stock and 1000 shares of common stock of no par value. It will be a subsidiary of the Sanford Riley Stoker Co.

The purchase includes the patents held by Milton W. Arrowood on processes for the use of powdered coal for power generating purposes, the coal being converted into a dust-like consistency, blown into the firebox, and burned in suspension. Mr. Arrowood, who is a graduate of Annapolis, class of 1904, and who has since specialized as a combustion engineer, will make his home in Worcester. A number of the installations of the process are now in commercial operation. Most of the equipment will be built in the Riley company's shops in Worcester.

Wire Wick Lubricating System

What is called the wire wick lubricating system and is applied as shown in the accompanying illustration, is being placed on the market by the Gits Brothers Mfg. Co., 1940 South Kilbourne Avenue, Chicago.



Wire Wick Lubricator. Oil will last from 2 to 6 weeks

The device works by capillary attraction, the oil being below the bearing and carried directly to the bearing surface by wire wicks, which are the same as those used for pipe stem cleaners. The wires are more of the nature of a brush than the felt wicks previously used, and they leave space for oil to travel between and through the fabric. The amount of lubrication is governed by the thickness of the oil and it is said that a supply of oil will last two to six weeks, depending on the size of the reservoir and the condition of the bearing. A new wick can be inserted quickly. Shackle, king and connecting link bolts, together with oil cups and oil reservoirs, can be provided in quantity by the company.

Water Shipments to Illinois Steel Co.

During the period May 1, to Nov. 27, 1922, 854 lake boats unloaded cargoes at the South Chicago and Gary works of the Illinois Steel Co. Of this number there were 705 cargoes of ore, agregating 6,105,000 tons. One hundred forty-two cargoes of limestone, amounting to 1,355,000 tons, and seven cargoes of coal, totaling 49,000 tons, were also unloaded.

No. 1 furnace, LaBelle Iron Works, Steubenville, Ohio, will be blown in Jan. 1. This addition will bring the number of active furnaces of the Wheeling Steel Corporation to four out of a total of six. At present, one furnace at Martins Ferry, one at Steubenville and one at Portsmouth, Ohio, are in blast.

JAPANESE MARKET WEAKER

Government Works Announce Price Schedule Lower Than European Heavy Tin Plate Buying

NEW YORK, Dec. 26.—In the closing days of the year, a fair number of inquiries appeared from Japanese buyers, but most of these were tenders from governmental or large private sources. One of the largest tenders, bids on which were opened Dec. 25, was for 33,000 boxes of oil can tin plate from the Nippon Oil Co. The previous purchase of this oil company this year was of a total of 34,000 boxes and was placed with the Jones & Laughlin Steel Co. The tender of the Ogura Oil Co. on 5000 boxes of oil can tin plate, bids on which were recently opened, is not yet reported placed, but it is believed the business may go to one of the leading independent makers of tin plate.

There is some inquiry for structural material and a few small orders are reported by Japanese export houses in New York. Among the government tenders upon which bids have been opened are 605 tons of I beams and 272 tons of channels for bridge work from the Imperial Government Railways. These railways also opened bids on Dec. 22 on 5000 tons of 60-lb. rails and 250 tons of splice bars for Otaru and an additional 500 tons of 60-lb. rail splice bars for Yokahama. With the recent recovery in the mark exchange and a continuance of the competitive prices quoted by American rail mills, exporters submitting bids on this tender hope that it may be placed in the United States. On the recent award of the South Manchuria Railway Co. of 100-lb. rails to Germany, the average price of a German maker on the rails and accessories, c.i.f. Dairen, was 73.16 yen ($35.85) per ton.

On structural steel, bars, plates and similar products, made by the Government steel works at Wakimatsu, Japan, American bidders will evidently find themselves at a great disadvantage for the first few months of 1923, as under a recent announcement of the Imperial Steel Works, prices on these products will be drastically cut after the first of the year, in order to eliminate European competition. The government works is reported to be carrying a stock of about 70,000 tons of material, of which it has been unable to dispose in the face of continued competition from abroad. The recently published revision of its price list offers 25,000 tons of structural material for February-March delivery with plates and angles at 97 yen ($47.53) per 1000 kg. or metric ton and I beams and channels at 99 yen ($48.51) per 1000 kg. These prices are approximately 10 yen ($4.90) per 1000 kg. less than the present Continental prices offered in Japan. Recent cable reports state that the market is weaker and that a few third-class banks have become insolvent. The market shows no evidence of immediate improvement.

European Iron to United States

There is still fairly active inquiry for imported iron and some business is reported by importers on orders of 100 or 200 tons each for a good grade of Scotch foundry iron. One importer is now offering Scotch No. 3 at $27.25 per ton, c.i.f. Atlantic port, duty paid. The recent improvement in exchange on the franc has placed iron from French furnaces on a rather high basis for profitable importation. The small surplus of German iron from one or two furnaces which one importer has been offering in this market, has not yet arrived at an American port, but the first shipment was made about Dec. 20 and the first 3000 tons is expected about the first week in January. One importer of Continental iron is offering a good grade of foundry at $25 per ton, c.i.f. Atlantic port. This importer states that in the past fortnight he has rejected firm offers totaling about 10,000 tons for foundry iron on which the buyer offered $23, $23.50 or $23.75 per ton, duty paid.

Some German steel is being imported to Pacific Coast ports, but the total is not believed to be large. On the whole it is not generally considered sufficiently profitable. One importer reports a recent order for delivery to Philadelphia of about 500 tons of plates, bars, etc., but claims that such business is the exception rather than the rule.

The Commonwealth of Australia will probably soon resume construction of the North-South transcontinental railroad to connect Adelaide, S. A., with Port Darwin, N. T. On the transfer of the Northern Territory to the Federal government in 1911, the government agreed to construct the 1100 miles of road necessary to join these two sections and form a transcontinental line. Some construction work had already been done by the states, Present plans call for construction of about 300 miles of railroad at £3,215,000, and rolling stock costing about £148,000.

SALE APPROVED

Brier Hill Directors Act Upon Sale to Youngstown Steel and Tube Co.

YOUNGSTOWN, Dec. 26.—Directors of the Brier Hill Steel Co. have officially approved the sale of the company to the Youngstown Sheet & Tube Co. Formal requests have been issued to stockholders for signatures to agreements sanctioning the sale. The principal interests in the company signed such an agreement before the directors of the Sheet & Tube company decided to make the purchase.

The letter to shareholders states that the directors recommended the sale on motion by John Tod, and that the vote was unanimous.

The purchase is to be made on the following terms: Exchange of four shares of Brier Hill common for one of Sheet & Tube common, and retirement of Brier Hill preferred at 105, or exchange, share for share, for Sheet & Tube preferred, at option of the holder.

The Sheet & Tube company still has 200,000 shares of unissued common stock in its treasury and will not be compelled to issue any new common to absorb the Brier Hill common. The value of the combined properties is conservatively estimated at $175,000,000.

With its new acquisition, the Sheet & Tube company will have an annual productive capacity of 1,350,000 tons of pig iron and 2,200,000 tons of ingots. With 43 sheet mills, it will rank as the largest independent sheet maker in the country.

Reading Iron Co. Takes Over Thomas Iron Co.

The Reading Iron Co., Reading, Pa., has formally taken over the properties of the Thomas Iron Co. Some months ago this purchase was forecast when stockholders of the Thomas Iron Co. were invited by Drexel & Co., Philadelphia bankers, to deposit their stock with the bank subject to such disposal of the controlling interest as might be decided upon. Within the past two weeks, the formal transfer of the stock to the Reading Iron Co. was agreed upon. Official announcement will probably be forthcoming shortly.

The Reading Iron Co. will now control seven blast furnaces with a total capacity of about 420,000 tons of pig iron annually. Of these furnaces, five were the property of the Thomas Iron Co. All are small except one at Hokendauqua, Pa., which was almost completely rebuilt in 1919 and has not since been operated. It will be put in blast about Jan. 1 and at first will make gray forge iron. There is a small furnace at Hokendauqua, two small furnaces at Alburtis, Pa., and one at Hellertown, Pa.

Youngstown Company Will Not Sell

YOUNGSTOWN, Dec. 26.—Stockholders of the Youngstown Foundry & Machine Co., operating two properties in this city, have decided to withdraw all proposals with reference to their sale. A special meeting was called to consider a proposal of purchase from the Aetna Foundry & Machine Co., Warren, Ohio.

Railroad Rates on Iron and Steel Products

Revised Figures on Ore, Coal, Coke, Pig Iron and Finished Materials—Few Changes Have Occurred Since July

THE IRON AGE herewith presents a table of freight rates on iron, coal, coke, pig iron and finished iron and steel products from originating or basing points to the more common centers of consumption. Sufficient time has now elapsed since the 10 per cent reduction, effective July 1, 1922, for the railroads to have worked out the new tariffs and to have made adjustments in those rates which had been inequitable. It is worthy of comment that the table of rates published in THE IRON AGE, July 6, 1922, page 20, following the announcement of the reduction, is changed in comparatively few instances, when the number of separate schedules is considered. For instance, of the 26 rates published under the caption "Finished Material" there are only four changes from the original list, and in all cases these are adjustments rather than errors of calculation.

The rate on finished material from Pittsburgh to Detroit and Cincinnati is 29c. per 100 lb. as against 29½c., as given in THE IRON AGE, July 6, while the rate to Denver on all products except pipe is $1.27 per 100 lb., against $1.27½ as first published, and the rate to St. Paul is 60c. instead of 59½c. There is only one change in the table of ore freight rates, this being to Sparrows Point, Md., which has a rate of $2 per gross ton instead of $1.99, as first calculated. On coal and coke the changes are usually a matter of a few cents a ton and the rates on Connellsville coke are largely as published just after the announcement of the July reduction. Such changes as there are in pig iron rates as a rule are fractions of a cent, the original rates being subject to variations in the interpretations of the rules covering revisions.

Pig Iron

(Per Gross Ton)

Buffalo to

Boston (all New England)	$4.92
New York	4.92
Philadelphia	4.92
Pittsburgh	3.28
[illegible]	2.27
[illegible]	1.89
[illegible]	1.39

Mahoning and Shenango Valleys to

[illegible]	1.77
Cleveland	1.77
Canton, Ohio	1.77
[illegible]	[illegible]
[illegible]	[illegible]
Follansbee, W. Va.	1.89
Wheeling, W. Va.	1.89
[illegible]	[illegible]
[illegible]	[illegible]
Scottdale, Pa.	2.27
New Castle, Pa.	0.76
Parkersburg, W. Va.	2.90
Oil City, Pa.	1.77

Virginia to

Philadelphia	5.17

Birmingham, Ala., to

[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
Indianapolis	5.29
[illegible]	[illegible]
[illegible]	[illegible]
Boston:	
Rail and water	6.91
[illegible]	[illegible]

Philadelphia:

Rail and water	6.67
Dock delivery	6.01
All rail	7.81
Pacific Coast	22.40
Omaha	8.17
St. Louis	5.17
Chattanooga	1.02

Ironton and Jaackson to

Cincinnati	2.27
Cleveland	3.03
Detroit	3.28
Chicago	4.79

From Chicago to

Rockford, Ill.	1.39
Freeport, Ill.	1.39
Rock Island, Ill.	1.77
Moline, Ill.	1.77
Davenport, Iowa	1.77
Kewanee, Ill.	1.64
[illegible] Ill.	1.77
Aurora, Ill.	0.88
[illegible] Ill.	[illegible]
Joliet, Ill.	0.63
Milwaukee, Wis.	0.76
Racine, Wis.	0.76
[illegible] Wis.	[illegible]
Waukesha, Wis.	0.76
Janesville, Wis.	1.39
Beloit, Wis.	1.39
[illegible] Wis.	1.64
Sheboygan, Wis.	1.95
Minneapolis, Minn.	3.66
St. Paul, Minn.	3.66
Michigan City, Ind.	1.39
South Bend, Ind.	1.39
[illegible]	[illegible]
Benton Harbor, Mich.	2.66

From Chicago to

Grand Rapids, Mich.	3.03
Kalamazoo, Mich.	2.65
Jackson, Mich.	3.03
Lansing, Mich.	3.15
St. Louis, Mo.	2.16
Des Moines, Iowa	4.26
Omaha, Neb.	5.47
Batavia, Ill.	0.88
Chicago Heights, Ill.	0.63
Geneva, Ill.	0.88
Carpentersville, Ill.	1.01
Danville, Ill.	1.64
Belvedere, Ill.	1.39
Sterling, Ill.	1.39
Galesburg, Ill.	1.77
Quincy, Ill.	1.77
La Porte Ind.	1.77
Terre Haute, Ind.	2.65
Indianapolis, Ind.	2.65
Mishawauka, Ind.	*2.65
Battle Creek, Mich.	3.03
Appleton, Wis.	1.95
Fond du Lac, Wis.	1.95
Green Bay, Wis.	1.95
La Crosse, Wis.	2.31
Winona, Minn.	2.31
Duluth, Minn.	3.76
Dubuque, Iowa	1.77
Cedar Rapids, Iowa	3.04
Charles City, Iowa	3.04
Waterloo, Iowa	3.04
Ottumwa, Iowa	3.645
Marshalltown, Iowa	4.01

To Chicago from

Birmingham, Ala.	6.01
Ironton, Ohio	4.79
Jackson, Ohio	4.79
Mahoning Valley	4.79
Shenango Valley	4.79
Granite City, Ill.	2.16
Sault Ste. Marie, Ont.	3.65
Wells and Marquette, Mich.	3.04
Cadillac and Antrim, Mich.	3.15
Boyne City and East Jordan, Mich.	3.275

To New York from

East. Pennsylvania	2.27
Buffalo	4.92
Virginia	5.55

To common New England points

From Eastern Pennsylvania	3.65
From Buffalo	4.92
From Alabama	9.61

From Cleveland to

Akron	1.64
Barberton	1.64
Bucyrus	2.02
Canton	1.77
Columbus	2.27
Dover	1.77
Dayton	2.52
Erie	1.77
Elyria	0.76
Lima	2.40
Mansfield	2.27
Newark	2.27
Painesville	1.77
Pena (B. & O. or N. K. P.)	1.14
Ravenna	1.64
Salem	1.77
Springfield	2.39
Valley points	1.77

From Toledo to

Bucyrus	1.77
Columbus	2.27
Mansfield	2.02
Springfield	*2.13-2.40
Dayton	2.40
Indianapolis, Ind.	2.90
Ft. Wayne, Ind.	2.27
Marion, Ind.	2.65
South Bend, Ind.	2.90
Detroit	*1.23-1.39
Jackson, Mich.	1.77
Lansing, Mich.	2.02
Saginaw, Mich.	2.52
Bay City, Mich.	2.52
Pontiac, Mich.	1.77

From Eastern Pacilities to Philadelphia:

Virginia (all furnaces)	5.17
Swedeland	0.76
Pottstown	1.14
Birdsboro	1.14
Coatesville	1.14
Reading	1.14
Bethlehem	1.26
Sparrows Point, Md.	1.64
Catasauqua	1.39
Parryville	1.39
Hokendaqua	1.39
Hellertown	1.39
Alburtis	1.39
Robesonia	1.39
Emporium	3.53
Wharton, N. J.	1.64

*Rate via D., T. & I. R.R.

New Steel Rails

(Per Gross Ton)

Pittsburgh to		*Pittsburgh to*	
New York	$5.17	Boston	$5.67
Philadelphia	4.92	Chicago	5.42
Baltimore	4.79	St. Louis	6.18

Billets, Wire Rods, Etc.

(Per Gross Ton)

Pittsburgh to		*Pittsburgh to*	
New York	$5.67	McKeesport, Pa.	$0.63
Philadelphia	5.17	Boston	6.18
Baltimore	4.92	Chicago	5.42
Cleveland	2.39	St. Louis	6.81
Beaver Falls, Pa.	1.39	Bridgeville, Pa.	1.39
Carnegie, Pa.	0.63	Ellwood City, Pa.	1.39
Leechburg, Pa.	1.26	Parkersburg, W. Va.	2.90
Ambridge, Pa.	0.76	Canonsburg, Pa.	1.39
Economy, Pa.	0.76	Newton Falls, Ohio	2.02
Washington, Pa.	1.39	Alliance, Ohio	2.02
Follansbee, W. Va.	1.64	Apollo, Pa.	1.26

Finished Material

(*Per 100 Lb., Carload Lots*)

Pittsburgh to		*Pittsburgh to*	
Philadelphia	$0.32	Kansas City	$0.735
Baltimore	0.315	St. Paul	0.60
New York	0.34	Omaha	0.735
Boston	0.365	Omaha (pipe)	0.705
Buffalo	0.265	Denver	1.27
Cleveland	0.215	Denver (pipe)	1.215
Cleveland, Youngstown combination rate	0.19	Pacific Coast, ship plates	1.20
Detroit	0.29	Birmingham	0.69
Cincinnati	0.29	Memphis	0.785
Indianapolis	0.31	Jacksonville, all rail	0.50
Chicago	0.34	Jacksonville, rail and water	0.415
St. Louis	0.43	New Orleans	0.515
Kansas City (pipe)	0.705		

Iron Ore

(*Per Gross Ton*)

(From lower lake ports)

Direct Ore

Rail of vessel to car	
Handling charge	$0.08
Line haul to	
Mahoning and Shenango Valleys	0.82
Dover, Ohio, district	0.88
Midland, Pa., district	0.99
Pittsburgh district	1.15
Jackson, Ohio, district (Toledo)	0.90
Jackson, Ohio, district (Cleveland)	1.12
Ironton and Hamilton, Ohio, districts	1.25
Johnstown, Pa., district	1.30
Lehigh Valley district	1.94
Sparrows Point, Md.	2.00

Dock Ore

In addition to line haul	
Rail of vessel to dock pile	0.20
Dock pile to car	0.13
Storage charge per ton per month	0.01

Mines to Upper Ports

The new freight rates on Lake Superior ore from the mines to the upper lake ports which became effective June 19 representing practically a 10 per cent reduction are as follows, the rates named including unloading charges:

Marquette from Eastern Marquette range	$0.69
Marquette from Western Marquette range	.78
Escanaba from Menominee and Marquette ranges	.91
Ashland from Gogebic range	.91
Duluth and Superior from Mesabi Range	.91
Two Harbors from Vermillion range	.91
Duluth and Superior from Cuyuna range	.91

Coal Freight Rates

To Eastern Points, per Gross Ton	Originating District: Pittsburgh	Connellsville, Westmoreland, Fairmont	Greensburg	Latrobe
Baltimore	$3.24	$3.09	$2.94	$2.84
Chester, Pa.	3.24	3.09	2.94	2.84
Harrisburg, (PRR & P&R)	2.73	2.58	2.43	2.33
Johnstown, Pa. (B&O)	1.39	1.39	...	...
*Johnstown, Pa. (PRR)	1.39	1.39	...	...
Lebanon, Pa. (PRR & & P&R)	3.11	2.96	2.81	2.71
New York (37th St.)	3.49	3.34	3.19	3.09
Brooklyn	3.62	3.47	3.32	3.22
Philadelphia	3.24	3.09	2.94	2.84
Sparrows Point	3.24	3.09	2.94	2.84
Steelton, Pa.	2.73	2.58	2.43	2.33
South Bethlehem, Pa.	3.36	3.21	3.06	2.96
Syracuse, N. Y.	3.36	3.21	3.06	2.96

*The rate from points on the Monongahela Railway in the Fairmont group south of the Pennsylvania state line to Johnstown is $1.76 per gross ton. Rates to Johnstown from Greensburg and Latrobe groups apply specifically from point of origin to destination. The Connellsville rate applies to shipments from points on the Southwest Branch of the Pennsylvania Railroad south of Ruffsdale, from points on the Pittsburgh, Virginia & Charleston and points on the Monongahela River railroad.

The Fairmont rate on shipments via the Baltimore & Ohio applies to shipments from points east of Suterville, Pa., from points on the Smithfield & Masontown Branch and from the Fairmont Region of West Virginiia.

To Western Points, per Net Ton	Originating District: Pittsburgh Group	Upper Connellsville	Lower Connellsville
Canton, Ohio	$1.59	$1.65	$1.84
Chicago	3.09	3.09	3.09
Cleveland	1.84	1.90	1.99
Columbus, Ohio	1.89	2.02	2.14
Detroit, Mich.	2.58	2.58	2.58
Indiana Harbor, Mich.	3.09	3.09	3.09
Toledo, Ohio	2.39	2.39	2.39
Youngstown, Ohio	1.34	1.42	1.58
Lake ports	1.66	1.72	1.81
To Canadian Basing Points:			
Port Maitland, Ont.	2.24	2.39	2.39
Buffalo	2.24	2.39	2.39

These rates apply in a general way to shipments from the territory described. There are, however, numerous extensions to the specific rates quoted and in each case before applying the rate as a basis for freight charges the shipper or consignee should determine the exact location of the mine from which the business will move; then refer to the tariff naming the rate in question.

The Pittsburgh district includes points east as far as Latrobe and south on the Southwest Branch to and including Ruffsdale; south to, but not including, Brownsville on the Pittsburgh, Virginia & Charleston railroad; eastward to Dawson on the Baltimore & Ohio railroad and eastward to Dickerson Run and southwest to and including Brownsville on the New York Central lines.

The Connellsville district includes points on the Southwest Branch of the Pennsylvania Railroad south of Ruffsdale; on the Pittsburgh, Virginia & Charleston, except Braznell and all Monongahela River railroad points; New York Central points east of Dickerson Run, including Connellsville Transfer and points on the Baltimore & Ohio, Dawson to Point Marion, Pa.

Coke

(*Per Net Ton*)

Connellsville, Pa., to		*Connellsville, Pa., to*	
Baltimore	$3.21	Pittsburgh	$1.51
Buffalo	3.28	Port Henry, N. Y.	4.54
Canton, Ohio	2.52	Port Maitland, Ont.	3.28
Chicago	4.16	Pottstown, Pa.	3.28
Cleveland	2.77	Reading, Pa.	3.28
Columbus, Ohio	2.77	Richmond, Va. (B. & O.)	4.79
Detroit	3.65	Richmond, Va. (P. R. R.)	4.79
East St. Louis	4.54	South Bethlehem, Pa.	3.53
Erie, Pa.	2.77	Swedeland, Pa.	3.53
Harrisburg	2.90	Toledo	3.28
Joliet, Ill.	4.16	Wheeling	2.27
Louisville	4.16	Valley points	2.27
Milwaukee	4.79		
New York	4.79		
Philadelphia	3.53		

In an anniversary number, dated December 8, the *Schenectady Works News* of the General Electric Co., commemorates the thirty-sixth anniversary of the establishment in Schenectady of the old Edison Machine Works, which was developed later into the General Electric Co. Many photographs of the old works and the new show the tremendous development which has taken place, but the figures are even more illuminating. The two buildings of 1886 have given place to 310 buildings today. The 70,406 sq. ft. of shop space has given place to 5,975,291 sq. ft., or more than 137 acres, while the land area, 11½ acres in 1886, is now 523 acres, or more than four-fifths of a square mile. The main avenue through the works is more than a mile long, while the number of employees is placed at 17,616, as compared with 300 in 1886. During the war years there were more than 20,000 employees.

The B. & M. Metal Rolling Mill, Wheeling, W. Va., has been incorporated with capital stock of $100,000 to engage in the manufacture of a special anti-acid metal to be known as B. & M. A 13-in. rod mill is being installed having a capacity of 25 tons per day of various sizes of rods, flats, squares and shapes, including nail plate for bronze nails. Equipment is being installed and operations will begin about March 1. The company will have a Pittsburgh branch at 804 Manufacturers Building and a New York branch at 350 Madison Avenue, E. S. Wheeler in charge.

Iron and Steel Markets

YEAR END MARKET STRONG

First Quarter Well Engaged and Price Concessions Disappearing

Finishing and Shipping Handicapped by Lack of Men—Pig Iron and Coke Higher

The year 1922 ends with much less than the usual holiday interruptions to ordering and with leading manufacturers committed against production well through the first quarter of 1923. Output is being obtained with difficulty owing to the shortage of men, especially in finishing and shipping departments, and car shortage has here and there been an added obstacle.

The steady growth in strength of steel prices is natural but is apparent mostly in the disappearance of concessions from the regular quotations. The few price advances announced represent practically a withdrawing from the market by the mills making them. Buyers show no fear that they will be forced to cover later needs at higher prices, and from the producers standpoint there are abundant indications that the effort is to stabilize the market for the time being at the present levels.

Higher prices for pig iron are based more on higher fuel than on a large demand, though this is of unusual volume for the holiday season. So fully is metallurgical coke being sent to augment the supply of domestic anthracite coal that prompt blast furnace coke is $8 to $8.50 per net ton and foundry coke $8.50 to $9, with the Eastern buying at higher prices and leaving none too much available. Much of the blast furnace coke contracts for the first quarter range between $7 and $7.50.

The pig iron advances have been 50c. to $1 in some centers. Tonnage closed and pending in the Philadelphia district amounts to 75,000 and in northern Ohio to nearly an equal amount, the latter including 45,000 to 50,000 tons of basic. Concessions have not entirely disappeared and on 25,000 tons placed by a cast-iron pipe company, the price was about $26, eastern Pennsylvania. In the South $23, Birmingham, is the prevailing price and more furnaces are in operation than at any time this year.

Hardly any product has failed to share in the December demand, and there are probably few mills which have not built up a back log in the past two weeks. In plates and cold-finished products alone are deliveries relatively easy, owing to the country's large capacity in these forms of finished steel.

In Chicago an increasing number of orders for plates, shapes and bars could not be considered because of inability to meet delivery dates, and mills outside of the district have been taking business on a Pittsburgh basis.

Building construction, with upward of 36,000 tons of fabricated steel work put under contract, shows no signs of abatement; heavy specifications for automobile forgings following a recent holding up of deliveries, indicate continued activity, and heavy buying of tractor parts points to the expected increasing consumption of the agricultural machinery trade.

Purchases of 1550 cars and 34 locomotives and inquiries for 2450 cars and 28 locomotives are less than the records of recent weeks but the railroad equipment trade looks for a repetition of the activity of the last few months.

New oil storage tank inquiries call for 16,000 tons of plates and early 1923 indications for more such work are regarded bright. Two more Lake boats have been contracted for.

Purchases by jobbers in December have been notably large, with plain structural material looming large.

One of the weak spots of the week has been developed in hot-rolled strip steel, quotations of 2.60c., Pittsburgh base, having been made on round lots to cold rolling mills.

Concessions of 5 per cent have been made on bolts and nuts but only on current orders and not on first quarter business.

Advances have been made on export orders and some improvement is noted in volume and scope of demand. The Nippon Oil Co. is in the market for the equivalent of 37,000 base boxes of tin plate.

THE IRON AGE composite price of pig iron is now $25.79 against $25.42 a week ago and $18.68 a year ago.

The composite price for finished steel remains at 2.439c. a pound. It was 2.062c. a year ago.

Pittsburgh

Price Concessions Disappearing—Operations Limited by Labor Shortage

PITTSBURGH, Dec. 26.—The year is ending with unusual activity both as regards business and plant activities. The National Works, McKeesport, Pa., will be down this week in the finishing departments, but this is the only instance in this district where the suspension for the holidays extended beyond this morning. The holidays, moreover, have brought much less than the usual interruption to ordering and with leading manufacturers committed against production well through the first quarter of the year, prices are steadily growing stronger. To date, this tendency is more apparent in the disappearance of concessions from regular quotations than in an actual advance in prices, although a large maker of wire products to-day announced withdrawal from the market for additional first quarter business except at an advance of $2 per ton over present quotations. The leading independent company here reports bookings equal to three and one-half months' production in practically all finished lines except structural shapes, and orders for that product are from 30 to 40 days' probable output. The Steel Corporation subsidiaries are almost completely sold through the first three months of the new year.

In view of these conditions, it is perhaps not to be wondered at that the holidays are attended by so little slackening in plant activity. It is unquestioned that if the labor supply were sufficient, Pittsburgh manufacturers could to-day be running full. Blast furnace and steel works operations are almost full, but the finishing mills are hampered because there are not enough men.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Dec. 26, 1922	Dec. 19, 1922	Nov. 28, 1922	Dec. 27, 1921
No. 2X, Philadelphia	$28.76	$28.76	$29.14	$21.34
No. 2, Valley furnace†	**27.00**	25.00	27.00	19.50
No. 2, Southern, Cin'ti†	27.05	27.05	27.05	21.50
No. 2, Birmingham, Ala.†	23.00	23.00	23.00	17.00
No. 2 foundry, Chicago*	28.00	28.00	29.00	19.00
Basic, del'd, eastern Pa.	26.73	27.50	27.50	20.25
Basic, Valley furnace	**25.00**	24.25	26.50	18.25
Valley Bessemer, del. P'gh	29.27	29.27	32.77	21.96
Malleable, Chicago*	28.00	28.00	29.00	19.00
Malleable, Valley	**27.00**	26.00	28.00	20.00
Gray forge, Pittsburgh	**28.27**	26.27	28.27	20.96
L. S. charcoal, Chicago	33.15	33.15	36.15	31.50
Ferromanganese, del'd	100.00	100.00	100.00	60.00

Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$40.00
Bess. billets, Pittsburgh	36.50	36.50	37.00	29.00
O.-h. billets, Pittsburgh	36.50	36.50	37.00	29.00
O.-h. sheet bars, P'gh	36.50	36.50	37.00	30.00
Forging billets, base, P'gh	**42.50**	41.50	45.00	32.00
O.-h. billets, Phila.	43.17	43.17	43.17	33.74
Wire rods, Pittsburgh	45.00	45.00	45.00	38.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	2.00	2.00	2.00	1.50
Light rails at mill	2.10	2.10	2.00	1.55

Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.275	2.275	2.275	1.85
Iron bars, Chicago	2.35	2.35	2.50	1.60
Steel bars, Pittsburgh	2.00	2.00	2.00	1.50
Steel bars, Chicago	2.10	2.10	2.10	1.60
Steel bars, New York	2.34	2.34	2.34	1.88
Tank plates, Pittsburgh	1.95	1.95	1.95	1.50
Tank plates, Chicago	2.30	2.30	2.30	1.60
Tank plates, New York	2.29	2.29	2.34	1.83
Beams, Pittsburgh	2.00	2.00	2.00	1.50
Beams, Chicago	2.20	2.20	2.20	1.60
Beams, New York	2.34	2.34	2.34	1.88
Steel hoops, Pittsburgh	2.75	2.75	2.75	2.00

Sheets, Nails and Wire,	Dec. 26, 1922	Dec. 19, 1922	Nov. 28, 1922	Dec. 27, 1921
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh	3.35	3.35	3.35	3.00
Sheets, galv., No. 28, P'gh	4.35	4.35	4.35	4.00
Sheets, blue an'l'd, 9 & 10	2.50	2.50	2.50	2.25
Wire nails, Pittsburgh	2.70	2.70	2.70	2.50
Plain wire, Pittsburgh	2.45	2.45	2.45	2.25
Barbed wire, galv., P'gh	3.35	3.35	3.35	3.15
Tin plate, 100-lb. box, P'gh	$4.75	$4.75	$4.75	$4.75

Old Material, Per Gross Ton:				
Carwheels, Chicago	**$24.50**	$24.00	$24.00	$15.50
Carwheels, Philadelphia	20.00	20.00	20.00	16.50
Heavy steel scrap, P'gh	20.00	20.00	20.50	14.50
Heavy steel scrap, Phila	**17.00**	16.50	16.00	11.50
Heavy steel scrap, Ch'go	**17.75**	17.50	17.00	11.00
No. 1 cast, Pittsburgh	22.50	22.50	22.50	16.00
No. 1 cast, Philadelphia	**21.00**	20.00	20.00	16.50
No. 1 cast, Ch'go (net ton)	**20.50**	20.00	19.50	12.50
No. 1 RR. wrot, Phila.	**20.00**	19.00	19.00	14.50
No. 1 RR. wrot, Ch'go (net)	**16.25**	15.25	15.25	10.25

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	**$8.00**	$7.00	$7.00	$2.75
Foundry coke, prompt	**8.50**	8.00	8.00	3.75
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	**14.75**	14.50	14.12½	13.87½
Electrolytic copper, refinery	**14.50**	14.37½	13.62½	13.62½
Zinc, St. Louis	*6.95*	7.00	7.02½	4.82½
Zinc, New York	*7.30*	7.35	7.37½	5.17½
Lead, St. Louis	**6.97½**	6.87½	6.95	4.37½
Lead, New York	**7.30**	7.25	7.30	4.70
Tin (Straits), N. Y.	**39.00**	38.12½	36.37½	32.75
Antimony (Asiatic), N. Y.	*6.25*	6.30	6.50	4.50

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Dec. 26, 1922, Finished Steel, 2.439c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel

Dec. 19, 1922,	2.439c.
Nov. 28, 1922,	2.439c.
Dec. 27, 1921,	2.062c.
10-year pre-war average,	1.689c.

Composite Price, Dec. 26, 1922, Pig Iron, $25.79 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Dec. 19, 1922,	$25.42
Nov. 28, 1922,	26.77
Dec. 27, 1921,	18.68
10-year pre-war average,	15.72

Higher prices are noted for most grades of pig iron, but the advance is based more upon the strength of the fuel situation than upon a large demand, because important melters are well protected by contracts against their early 1923 requirements. There has, however, been a very general withdrawal of the low prices recently quoted, since the indications are that coke is going to remain rather high during the first quarter of the year and it is now realized that recent prices were altogether too low in relation to fuel costs. High prices still prevail for both coal and coke under the influence of Eastern demands in the replacement of hard coal for domestic use, and while the car supply is better this week than it was recently, the observance of the holiday has kept a good many men away from the mines and ovens.

Higher prices for scrap in markets which compete with Pittsburgh portend higher prices here, although not enough actual business yet has developed here upon which to establish an advance.

Pig Iron.—So many consumers of pig iron covered their requirements for early part of 1923 in the recent wave of buying that business of the past week has been extremely limited by comparison with that of the two preceding ones. Enough business has been done in foundry iron, however, to establish the market on No. 2 Valley grade at $27 and that is as low as any of the producers is willing to go. Indeed, a couple of producers are now asking $28 for the base grade with the usual differential up and down for silicon content. We note sales of malleable iron at $27 Valley furnace, an advance of $1 per ton over the price of a week ago. Hardly enough business has been done in the steel making grade to establish any change in prices, but steel makers, sensing a need for any surplus production of basic grade, no longer are anxious for business and $25 is as low as any now can be had. The Central Steel Co., Massillon, Ohio, is inquiring for between 45,000 and 50,000 tons of basic for delivery over first quarter of the year. A report that the tonnage went to Cleveland furnaces is denied.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.77 per gross ton:

Basic	$25.00
Bessemer	27.50
Gray forge	$26.50 to 27.50
No. 2 foundry	27.00 to 28.00
No. 3 foundry	26.50 to 27.50
Malleable	26.00
Low phosphorus, copper free	36.00

Ferroalloys.—The past week has been one of the most active of the year, and business has been well distributed among the different alloys. We note one sale of 2000 tons of ferromanganese and others aggregating almost that much, while pending business, likely to be closed soon, amounts to 1500 tons. Sales, which

have included some British material, all have been at $100 seaboard, or $104.79 delivered, Pittsburgh, for 80 per cent. There is talk of an advance in British material to match the recent advance in sterling. There have been sales of approximately 5000 tons of spiegeleisen, including one of 3000 tons, to an Ohio alloy steel maker, for first quarter and first half delivery. Pending inquiries amount to about 1000 tons. Prices are on a tonnage basis; for 1000-ton lots, $33 furnace, for average 20 per cent material, is the going price, with $34 asked for lots of less than 500 tons and $35 the single carload price. Only a few of the important users of 50 per cent ferrosilicon have failed to enter their 1923 requirements. Business closed has been generally at $82.50 delivered, but domestic makers now being well committed at asking $85. Expected competition from foreign makers has failed to materialize. The import duty and freight charges combine to keep out Canadian material.

We quote 80 per cent ferromanganese at $100, furnace, or $104.79 delivered Pittsburgh district [illegible] British, and 76 to 80 per cent German at $67 c.i.f. Atlantic seaboard. Average 20 per cent spiegeleisen, spot, $33 to $35, furnace; contracts, $32; 16 to 19 per cent, spot, $32 to $33; contracts, $32; 20 per cent, foreign, $37 f.o.b. Atlantic seaboard, duty paid; 50 per cent ferrosilicon, domestic, $82.50 to $85, delivered. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, $44.50; 11 per cent, $47.80; 12 per cent, $51.10; 13 per cent, $55.10; 14 per cent, $60.10; silvery iron, 6 per cent, $33; 7 per cent, $34; 8 per cent, $35.50; 9 per cent, $37.50; 10 per cent, $39.50; 11 per cent, $42; 12 per cent, $44.50; 13 per cent, $47. The present freight rate from Jackson and New Straitsville into the Pittsburgh district is $3.66 per gross ton.

Steel Skelp.—On ordinary pipe skelp the market is well established at 2c. for either grooved or sheared. That price, however, finds no appeal to makers on light gage or boiler tube skelp for which some ask premiums of as much as $5 per ton over pipe skelp. The National Tube Co. is in the market for 10,000 tons of plates (skelp).

Wire Products.—Obligations of makers do not diminish and the explanation is found chiefly in a scarcity of labor. Bookings are heavy and on the present rate of production will carry the mills through the first quarter of the new year, but those manufacturers most heavily committed could clean their slates in 60 days if the labor supply was adequate. There is no scarcity of steel and the railroads are functioning normally, but cold weather has not driven many men into the mills. The leading interest is taking a little business now from regular customers. Prices are very firm and slight advances over regular quotations are obtainable on early deliveries of nails and manufacturers' wire. There is no evidence of speculative buying. A leading independent has taken all the first quarter tonnage it is likely to produce and has notified its sales offices that on any such business as it might fit in an advance of $2 per ton was to be obtained. Prices are given on page 1717.

Wire Rods.—Most makers are obligated against production during the first quarter and the market is well described as very firm. Regular customers of individual mills are covered at $45, Pittsburgh or Youngstown, for the base size of soft rods. Irregular and small lot buyers are not finding ready accommodation below $47.50.

We quote No. 5 common basic or Bessemer rods to domestic consumers, $45 to $47.50; chain rods, $45 to $47.50; screw stock rods, $50 to $52.50; rivet and bolt rods and other rods of that character, $45 to $47.50; high carbon rods, $52 to $57.50, depending on carbon, per gross ton, f.o.b. Pittsburgh or Youngstown. Carbon rods command $3 over base for 0.20 to 0.40 carbon; $5 over base for 0.41 to 0.55 carbon; $7.50 over base for 0.56 to 0.75 carbon and $10 over base for over 0.75 carbon.

Billets, Sheet Bars and Slabs.—The price of $36.50 for billets, which hitherto has been little more than an appraisal, has become fairly established through a recent sale of 10,000 tons of Bessemer billets to the National Tube Co. for delivery over the first quarter at that price, f.o.b. Pittsburgh. This brings open market purchases of steel by that interest over the past six months to 110,000 tons. It is also inquiring for 10,000 tons of open-hearth slabs and a like tonnage of plates. The Steel Corporation has made no announcement as to prices of billets or slabs for first quarter, presumably because its own requirements and those of its regular customers will absorb most, if not all, of its first quarter production. Sheet bars are firm at $36.50 and with the demand for sheets on the increase at well sustained prices, does not seem likely to be shaded. Forging billets are firmer. While the Carnegie Steel Co. price would be $41.50, based on the usual premium of $5 a ton over soft billets, this company has no tonnage to sell. Independents are quoting from $42.50 to $47.50 and most of the recent business here has been at $45.

We quote 4 x 4-in. soft Bessemer and open-hearth billets, $36.50; 2 x 2-in. billets, $36.50; Bessemer sheet bars, $36.50; open-hearth sheet bars, $36.50; slabs, $36.50; forging billets, ordinary carbons, $42.50 to $47.50, all f.o.b. Pittsburgh or Youngstown mills.

Sheets.—The past week has been featured by an appreciable increase in orders to independent mills, whose customers previously were inclined to delay buying in the thought or hope of obtaining supplies at lower prices. A Valley producer is reported to have filled up for the first quarter and to have advanced prices to former independent levels of 3.50c. base for black and 4.50c. base for galvanized. These prices cannot yet be obtained since there are still a number of independent mills which are not especially well committed against first quarter production. The leading interest has specifications for practically all of its production over the first quarter. Failure of this interest to advance its prices on automobile sheets is proving somewhat embarrassing for the independents who, although well sold over the first quarter at 5c. base for No. 22 gage automobile body stock, are finding some difficulty in obtaining more than 4.70c. base for second quarter deliveries, that being the Steel Corporation price, while for earlier deliveries it is stated that all are not adhering rigidly to the 5c. base. Prices are given on page 1717.

Steel Rails.—There is still enough competition for light rail orders to prevent full realization of 2.15c. base for those rolled from new steel. That price is being asked and obtained on much business, but 2.10c. base is still being done. Light sections rolled from old rails are quoted at 2c. base.

We quote 25 to 45-lb. sections, rolled from new steel, 2.10c. to 2.15c. base; rolled from old rails, 2c. base; standard rails, $43 per gross ton mill for Bessemer and open-hearth sections.

Tin Plate.—Specifications have lately been coming to independent manufacturers on a heavy scale and most of them in this district now are pretty well obligated against probable production over the first half of 1923. With the Steel Corporation tin plate making subsidiary sold up almost completely for the first half of the year, the supply situation is strong and this is reflected in prices, as frequent efforts on the part of consumers lately to secure concessions from the regular quotation are known to have failed. Production is hardly in keeping with the number of mills in operation and since the labor supply is not likely to be any better during the remainder of the winter than it is now, some are predicting a shortage of tin plate later in the year.

Cold-Finished Steel Bars and Shafting.—All makers are fairly heavily obligated against production during the first quarter of the year, and some are so well booked as to be indifferent about taking on any more business at the current price of 2.50c. base, Pittsburgh, for carload lots. An advance to 2.65c. base is thought to be an early 1923 possibility, as 1.90c. is about as low as makers are getting hot-rolled bars, and it is claimed that there should be a spread of not less than $15 per ton between hot-rolled and cold-finished bar prices. Ground shafting also is firm at 2.90c. base f.o.b. mill for carload.

Track Fastenings.—Current demands are moderate, but all makers here are well committed against production during the early part of 1923 and are not so anxious for additional business as to be willing to shade prices. On some tie plate specifications makers are asking as high as $50 per net ton. Large spikes are firm at $2.75 base per 100 lb., but the market on small spikes now appears to be quotable at $3.25 to $3.50 base, as lower figures are being made by American

Steel & Wire Co. and also by Eastern makers. Prices are given on page 1717.

Iron and Steel Bars.—Soft steel bars are firmer at 2c. than they have been at any time recently, and it is reported that the Carnegie Steel Co. has named this price on first quarter contracts with bolt and nut manufacturers. Mills in this district are already so heavily obligated against first quarter production that they are indifferent about further business, except at full prices. The market on iron bars also is firm at recent prices

We quote steel bars rolled from billets at 2c.; refined iron bars, rolled from billets, 2c. base; rail steel reinforcing bars 1.90c. to 2c.; refined iron bars, 2.60c. in carloads, f.o.b. mill, Pittsburgh.

Structural Material.—Although some mills will enter the new year with comparatively light order books, there is on the whole less tendency to shade 2c. than was the case recently. We regard the market as fairly firm at that figure. Prices are given on page 1717.

Plates.—Mills are better off on orders than they were a short time ago, and while it is still possible that large tonnages might be placed at less than 2c., there is greater adherence to 2c. base, Pittsburgh, than there has been. Brier Hill Steel Co., Youngstown, Ohio, has announced an advance of $5 per ton in plate prices, but the trade at large regards this announcement merely as a withdrawal by that company from the market incident to its absorption by the Youngstown Sheet & Tube Co. Prices are given on page 1717.

Tubular Goods.—General conditions are much as they have been for the past few weeks. Makers of steel pipe are operating at a comparatively high rate and ample supplies of cars permit much greater shipments than was the case a few weeks ago; yet the demand keeps up and the probable explanation is that distributors have applied so much of their consignments to old orders that they have not been able to accumulate stocks. As for some time past, the heaviest demand is in standard pipe, with butt welded sizes especially wanted. The trade expects a much heavier volume of oil country and line pipe in 1923 than it had in the past year. Scarcity of lap welded steel boiler tubes still is marked and jobbers say they would not have much to offer in tubes if it were not for the fact that they are getting fairly heavy shipments of seamless tubes. Prices are very firm all along the line. Discounts are given on page 1717.

Hot-Rolled Flats.—This market still is quotable from 2.75c. to 2.90c. base. Greatest activity is in strips, hoops and bands being rather slow. Prices are given on page 1717.

Cold-Rolled Strips.—First quarter business is heavy and the necessity of shading the regular price of 4.50c. base, Pittsburgh, is not patent.

Bolts, Nuts and Rivets.—Buyers are specifying freely against their early 1923 requirements and prices derive strength also from the firmness of the steel bar market. Prices and discounts are given on page 1717.

Coke and Coal.—The situation here still is influenced to a large extent by the continued demand from the East for coke and soft coal to replace anthracite coal for domestic purposes. A good many contracts in furnace coke recently were concluded for first quarter of 1923 at from $7 to $7.50 per net ton at oven. It has been the spot market rather than that for contracts which has been strengthened by the Eastern demand. On spot coke for blast furnace use $8 has been the recent minimum and there have been sales as high as $8.50. An Eastern maker of ferromanganese has closed for his January requirements at from $8.25 to $8.75. Most of the foundry coke contracted for delivery over the first half of the year carries prices of from $7.50 to $8 per net ton at oven, but the spot market is quotable from $8.50 to $9, and there is not much tonnage available at those prices, with Eastern buyers paying as high as $9.25. Coal production is suffering this week from the failure of men to report for work. On local business the market is quotable at $3.25 to $3.50 per net ton at mines for mine run steam coal, about $4.50 per net ton at mines for mine run coking coal, and from $4.25 to $4.50 for gas.

Old Material.—There has been a very sudden transition from softness to strength in this market, and while this development is seen more in the asking prices of sellers than in local melters' bids, it is based on the fact that higher prices are obtainable in markets both East and West of this district. Youngstown steel makers have begun to fortify themselves against their winter needs and have paid the equivalent of $20.75 Pittsburgh for heavy melting steel. Equally as good prices have been paid in the East and dealers who as recently as a week ago were offering heavy melting steel to Pittsburgh mills at $20.50 now are asking as high as $21.50, because they fear they could not cover on a sale without loss at less. It is probable that the next sale of this grade will be at $21 or more, but in the absence of sales we make no change in our quotations. Compressed sheets again are firmer, with Pittsburgh users offering $19.50 to $19.75 and not uncovering much tonnage at either price.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

	Per Gross Ton
Heavy melting steel (nominal)	$20.00 to $20.50
No. 1 cast, cupola size	22.50 to 23.00
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va.; and Franklin, Pa.	20.50 to 21.00
Compressed sheet steel	19.50 to 20.00
Bundled sheet sides and ends	17.50 to 18.00
Railroad knuckles and couplers	21.50 to 22.00
Railroad coil and leaf springs	21.50 to 22.00
Low phosphorus standard bloom and billet ends	24.00 to 24.50
Low phosphorus, plates and other grades	23.00 to 23.50
Railroad malleable	20.00 to 20.50
Iron car axles	28.00 to 29.00
Locomotive axles, steel	23.00 to 24.00
Steel car axles	21.00 to 21.50
Cast iron wheels	22.00 to 22.50
Rolled steel wheels	21.50 to 22.00
Machine shop turnings	15.50 to 16.00
Heavy steel axle turnings	17.00 to 17.50
Short shoveling turnings	17.50 to 18.00
Cast iron borings	17.50 to 18.00
Heavy breakable cast	18.50 to 19.00
Stove plate	16.50 to 17.00
Sheet bar crop ends	22.00 to 22.50
No. 1 railroad wrought	18.50 to 19.00

President Campbell Sees Possible Dangers for Business

YOUNGSTOWN, Dec. 26.—Discussing 1923 business prospects, President James A. Campbell of the Youngstown Sheet & Tube Co. states, "General indications for 1923 are such as to justify the hope that business will improve, or at least continue at its present rate, although underlying conditions are far from sound. The principal danger seems to lie in a probable further advance in costs in certain lines and resultant advance in selling prices. If this occurs, it may have the effect of checking demand, as was the case in the latter part of 1920, when the peak of high prices was reached and stagnation followed.

"Until sound basic conditions are restored in this country and abroad, there is certain to be more or less nervousness in business."

Adoption of a code of ethics, governing its membership of approximately 20,000, is announced by the American Society of Mechanical Engineers. Ultimately, it is expected, this code, prepared by a joint committee of the national engineering societies, will apply to the entire engineering profession, embracing more than 200,000 professional engineers. The code commands loyalty to country, personal honor, fairness to contractors and workers, and interest in the public welfare. Betrayal of professional confidences, undignified or misleading advertising, and questionable professional associations and practices are prohibited.

Prior to their annual meeting the week of Jan. 29, in Los Angeles, Cal., members of the Associated General Contractors of America, will make a tour of the West. Meeting in Chicago at the close of the Good Roads Show Jan. 21, the members will be carried on the special train on the Sante Fe Railroad. At Kansas City delegations from Western cities will join the party.

Chicago

Business Better Than Usual for Holiday Period—Prices Firmer

CHICAGO, Dec. 26.—Although all branches of the iron and steel market have been quieter because of the holiday, bookings have held up better than is usually the case at this time of the year. New business in plates, shapes, bars and sheets has been in good volume and local mills find it necessary to turn down an increasing number of orders because they cannot meet the deliveries asked for. The two leading producers will enter the new year with most of their first quarter tonnage committed. Outside mills are again taking care of the surplus requirements of this district at Pittsburgh base prices. A continuation of railroad car and oil storage tank buying is looked for in the early part of 1923. The Great Northern has just closed for 1500 ore cars and has issued an inquiry for 1000 box cars. Two new oil storage tank projects which have come up for bids will take nearly 16,000 tons of plates.

Steel mill operations remain unchanged with the Illinois Steel Co. on an 83 per cent basis and the Inland Steel Co. at 75 per cent. Prices are generally firm and unaltered.

Pig Iron.—Buying is heavier than is generally the case during the holiday and inventory season, although activity on a broad scale is not expected to reappear until after the opening of the new year. However, a substantial tonnage in individual lots ranging from 500 to 1000 tons has been booked and prices are steadily growing firmer. In fact, some business for spot shipment has been taken at $28.50, base Chicago furnace, or 50c. above the previous market. Blast furnace operations in this district are unchanged, but unless shipments of fuel are interrupted, it is probable that the second Mayville stack will go in soon. This would bring the number of active merchant stacks up to 10 out of the 13 in the Chicago, Milwaukee and Duluth districts, namely two Mayville, three Iroquois, two Federal, one Zenith, one Thomas and one Bayview. The remaining three, two Iroquois and one Bayview, are small furnaces and are not likely to be blown in unless demand becomes extraordinarily heavy. Southern iron is also showing greater firmness and no quotations under $23 base, Birmingham, are now reported. Among recent purchases may be mentioned 1000 tons of foundry about evenly divided between Northern and Southern bought by a northern Illinois melter, 1500 tons of Southern placed by a local sanitary manufacturer, 800 tons of Southern ordered by another Chicago user and 500 tons of Southern purchased by a downstate melter. A sale of 500 tons of Bessemer is also reported. Charcoal has been weak and one sale to an Eastern user was closed at as low as $26, furnace. Prices have since firmed and all producers are now holding to $30 base, furnace.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and [illegible] switching charges of 61c per ton. Other prices are for iron delivered at consumers' yards or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chi-	$33.1[illegible]
Northern coke, No. 1, sil. 2.25 to 2.75	$28.50 to 29.00
Northern coke, foundry No. 2, sil. 1.75 to 2.25	28.00 to 28.50
Malleable, not over 2.25 sil.	28.00 to 28.50
Basic	28.00 to 28.50
High phosphorus	28.00 to 28.50
Southern, No. 2	29.01
Low phos., Valley furnace, sil.	[illegible] to 37.99
Silvery, sil. 8 per cent	40.29

Ferroalloys.—Most users of 50 per cent ferrosilicon have covered for their 1923 needs. Otherwise the ferroalloys are quiet.

[illegible] delivered; 50 per cent ferrosilicon, $80 to $82.50, delivered; spiegeleisen, 18 to 22 per cent, $46.05, delivered.

Plates.—Local mills find it increasingly difficult to take the business offered them and in some instances are turning down orders because they cannot make the delivery asked for. Specifications from railroad carbuilders are heavy and new tank inquiries have appeared. The Mexican Petroleum Co. is in the market for storage tanks involving 7500 tons and the Union Oil Co., California, is inquiring for tanks requiring 8000 tons of plates.

The mill quotation is 2.10c. to 2.30c., Chicago. Jobbers quote 2.90c. for plates out of stock.

Rails and Track Supplies.—The International & Great Northern has placed 14,000 tons of rails with the Bethlehem Steel Co., to be shipped by water to the Texas coast. There continues to be a fair demand for track supplies, but light rails are dull.

Standard Bessemer and open-hearth rails, $43; light rails rolled from new steel, 2.15c., f.o.b. makers' mills.

Standard railroad spikes, 2.85c. to 3c. mill; track bolts with square nuts, 3.85c. to 4c., mill; iron tie plates, 2.50c.; steel tie plates, 2.35c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.50c. base and track bolts, 4.50c. base.

Bars.—With Chicago mills unable to take all the soft steel bar business offered, outside producers are booking an increasing tonnage for delivery in this district, particularly for early shipment. Demand is heavier than it has been in any pre-Christmas week for years. Buying of bar iron shows some improvement, with more liberal specifications from the railroads, but bookings still fall far short of engaging mill capacity in this district. New business in hard steel bars is heavier than was expected at this season and prices are firm at 2c., mill.

Mill prices are: Mild steel bars, 2c. to 2.10c. Chicago; common bar iron, 2.35c. to 2.50c., Chicago; rail steel, 2c., Chicago mill.

Jobbers quote 2.80c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 3.80c. for rounds and 4.30c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 2.50c. base; hoops, 4.15c.; bands, 3.55c.

Cast-Iron Pipe.—Cleveland has awarded 2000 tons, largely 48-in., to the United States Cast Iron Pipe & Foundry Co. The Hammond-Bird Iron Co. is low bidder on 536 tons for Akron, Ohio. Duluth, Minn., has taken bids on 1000 tons. The market is fairly steady at $43 base, Birmingham, for 6-in. and over, although concessions of a dollar or two a ton have been made in a few instances.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $55.20; 6-in. and above, $51.20; class A and gas pipe, $3 extra.

Wire Products.—With the Anderson, Ind., mill in operation the output of the leading interest is somewhat improved, although idleness on the holiday will cut down the production this week. New business was somewhat lighter during the past week as was to be expected at this season, but indications point to a steady demand throughout the first half of 1923. Nails are in good demand and woven fence sales are heavy. Although this is not the season for barbed wire, orders continue to be received from the South. An urgent demand for wire products is expected to develop after the first of the year. For mill prices, see Finished Iron and Steel, f.o.b. Pittsburgh, page 1717.

We quote warehouse prices f.o.b. Chicago: No. 9 and heavier black annealed wire and No. 9 and heavier bright basic wire, $3.30 per 100 lb.; common wire nails, $3.45 per 100 lb.; cement coated nails, $2.90 per keg.

Sheets.—With local mills heavily committed for first quarter, an increasing volume of business is going to Eastern producers. Prices are firm and unchanged.

Mill quotations are 3.35c. for No. 28 black, 2.50c. for No. 10 blue annealed and 4.35c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote f.o.b. Chicago, 4c. for blue annealed, 4.85c. for black and 5.85c. for galvanized.

Bolts and Nuts.—First quarter contracting is progressing slowly but steadily. A leading producer, in fact, reports having practically completed the closing of contracts. While occasional price concessions are reported, discounts appear to be holding firmly as a

whole. Specifications are heavier than was expected at this time of the year, indicating an increasing consumption of material. Farm implement makers have been contracting for their first quarter needs and are expected to specify much more heavily than for two years. A slight seasonal slackening in automobile production is to be noted, but operations at full tilt are expected after the first of the year.

Jobbers quote structural rivets, 3.75c.; boiler rivets, 3.85c.; machine bolts up to ⅞ x 4 in., 50 per cent off; larger sizes, 50 off; carriage bolts up to ⅞ x 6 in., 15 off; larger sizes, 45 off; hot pressed nuts, squares and hexagons, tapped, $2.75 off; blank nuts, $2.75 off; coach or lag screws, gimlet points, square heads, 55 per cent off.

Reinforcing Bars.—Lettings are less numerous with the arrival of the holidays, but new work continues to develop. Projects now up for figures and those still on architects' boards are expected to insure an active demand for reinforcing bars throughout the first half of 1923. Prominent sellers fear that the time is not far distant when local mill supply will prove inadequate and a considerable tonnage will have to be purchased from Eastern mills. Country dealers continue to cover their first quarter needs. One seller of this class has just contracted for 2000 tons. Considerable road work is coming to a head. In Illinois and Missouri, State lettings will soon be made and in Iowa considerable county work is at the point of being awarded. Wayne County, Iowa, will let road work involving 200 tons. A blind inquiry received from Texas calls for 1200 tons of reinforcing. The largest award of the week is 900 tons for the Hegewisch plant of the Ford Motor Co., to be supplied by the Truscon Steel Co. Lettings include:

Ford Motor Co., plant, Hegewisch, Ill., 900 tons, to Truscon Steel Co.

Richmond, Fredericksburg & Potomac Railway, engine house, Richmond, Va., 250 tons, to Corrugated Bar Co.

Junior College, Wichita Falls, Tex., 250 tons, to Truscon Steel Co.

Louisiana State University, power house and engineering shops, Baton Rouge, 100 tons, to Corrugated Bar Co.

Pending business includes:

Additional foundation work, Calumet Station, Commonwealth Edison Co., Chicago, 500 tons.

Brown Hotel, Louisville, Ky., 800 tons.

Louisiana State University, Baton Rouge, La., additional buildings, tonnage not yet estimated.

U. S. Veterans' Hospital, Knoxville, Iowa, 275 tons, general contract awarded to Warner Construction Co., Chicago.

First Avenue bridge, Sterling, Ill., 250 tons.

Jefferson school and Southeast high school, Minneapolis, Minn., 1155 tons, bids rejected.

Structural Material.—Lettings are less numerous during the holiday season, but a number of them involve more than 1000 tons each. A Seattle bridge awarded to the Bethlehem Steel Bridge Co. will take over 2000 tons, and a bridge at Glasgow, Mo., let to the Mount Vernon Bridge Co., involves 1649 tons. Prominent among new projects is the United States Insurance Exchange Building, an 18-story structure to be erected at Michigan Boulevard and Delaware Street, Chicago. Plans have not yet been completed. It is increasingly difficult to obtain plain material from local mills.

The mill quotation on plain material is 2.10c. to 2.20c., Chicago. Jobbers quote 2.90c. for plain material out of warehouses.

Coke.—The local and Milwaukee by-product plants are running practically full, notwithstanding the fact that fuel reserves are not so large as is generally the case at this season. Barring a period of severe weather, production should keep up at the present rate. Local by-product foundry coke is unchanged at $15 delivered Chicago switching district, and it is probable that this price will be continued into January. Standard grades of Connellsville foundry coke are available at $13.16, delivered.

Old Material.—Additional purchases of heavy melting by two large interests have brought the market up to about $18 per gross ton, delivered. An iron mill has also shown renewed interest in scrap and has offered as high as $16.75 per net ton, delivered, for No. 1 wrought. Dealers are completing unfilled contracts and are accumulating stocks for an expected upswing in prices. The purchases by the mills and the general betterment of sentiment in the market have tended to dry up supplies. The apparent scarcity of material, however, is probably ascribable to the fact that all holders of scrap are withholding their stocks from the market in anticipation of further advances. Most scrap grades are quotably higher than a week ago and are showing much more strength than is usually the case in the holiday season, which is ordinarily a very dull period. Railroad offerings include the Chesapeake & Ohio and the Wabash, 4000 tons each.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$22.00 to $22.50
Cast iron car wheels	24.50 to 25.00
Relaying rails, 56 and 60 lb.	26.00 to 27.00
Relaying rails, 65 lb. and heavier	32.00 to 35.00
Rolled or forged steel car wheels	23.00 to 23.50
Rails for rolling	18.50 to 19.00
Steel rails, less than 3 ft.	20.00 to 20.50
Heavy melting steel	17.75 to 18.00
Frogs, switches and guards cut apart	17.75 to 18.00
Shoveling steel	17.25 to 17.75
Drop forge flashings	12.50 to 13.00
Hydraulic compressed sheets	15.00 to 15.50
Axle turnings	15.50 to 16.00
Per Net Ton	
Iron angles and splice bars	21.00 to 21.50
Steel angle bars	17.00 to 17.50
Iron arch bars and transoms	21.00 to 21.50
Iron car axles	24.00 to 24.50
Steel car axles	18.00 to 18.50
No. 1 busheling	15.00 to 15.50
No. 2 busheling	9.50 to 10.00
Cut forge	15.50 to 16.00
Pipe and flues	11.50 to 12.00
No. 1 railroad wrought	16.25 to 16.75
No. 2 railroad wrought	15.50 to 16.00
Steel knuckles and couplers	20.50 to 21.00
Coil springs	21.50 to 22.00
No. 1 machinery cast	20.50 to 21.00
No. 1 railroad cast	19.00 to 19.50
No. 1 agricultural cast	19.00 to 19.50
Low phos. punchings	17.50 to 18.00
Locomotive tires, smooth	16.50 to 17.00
Machine shop turnings	10.00 to 10.50
Cast borings	13.50 to 14.00
Stove plate	16.50 to 17.00
Grate bars	17.00 to 17.50
Brake shoes	17.00 to 17.50
Railroad malleable	20.50 to 21.00
Agricultural malleable	20.50 to 21.00

To Reorganize Mitchell Motors Co.

Financial reorganization of the Mitchell Motors Co., Racine, Wis., is the purpose of efforts now being made by creditors representing about 80 per cent of the indebtedness, in the direction of securing extension of payments and full authority to act. A letter to all creditors signed by Herman Waldeck, vice-president Continental & Commercial National Bank, Chicago, says: "The affairs of the company are in such shape that it is imperative that the creditors act promptly and in union to properly protect interests of creditors in event of reorganization and refinancing or to take steps to protect the interests of creditors in event the stockholders are unsuccessful in providing means for properly refinancing the company. We therefore urge upon you the immediate return of the enclosed agreement with your signature attached thereto." The agreement provides for extension of payments and it invests the committee with power to arrange for refinancing, or to take such other legal action as it may deem best. Among the members of the creditors' committee is S. M. Haven, assistant treasurer and manager of the Ingalls-Shepard Division, Wyman-Gordon Co., Harvey, Ill.

The Anchor Ship Building Co., Washburn, Wis., is expected to resume the operation of its plant upon the opening of navigation in April, stockholders having tentatively approved of refinancing plans. The concern was organized in 1918 with $400,000 capital and built and equipped a new dry dock, machine shop and other buildings. In 1921 it constructed a double-end ferry boat now in use on the Hudson River, but since its completion the plant has been idle. Robert Curr organized and managed the company and is assisting a stockholders' committee headed by S. E. Swanson in reorganization and refinancing plans.

New York

Pipe for Porto Rico Goes to Belgian Agent—Price Shaded on Round Tonnage of Pig Iron

NEW YORK, Dec. 26.—Furnace coke continues to be sold to domestic consumers in large quantities, causing curtailment in supply for furnaces and higher prices. Prices of coal have again advanced and low volatile grades are quoted at $5 to $5.50 at mines, while high volatile coals are selling at $4 to $4.50. Foundry coke is ordinarily quoted at $9 to $9.50, Connellsville ovens, and furnace coke at $7.50 to $8, but furnace coke has been sold this week to domestic consumers at $9.50. By-product coke is still quoted at $14.84 to $14.91, delivered Newark and Jersey City points. British coke may be imported to relieve the present situation. At prices now prevailing in England, it can be delivered c.i.f. New York at about $10.85, whereas furnace coke sold at $9, Connellsville, is delivered at $12.91, seaboard.

Pig Iron.—The principal purchase of the past week was 25,000 tons by the Warren Foundry & Pipe Co. for first quarter delivery. While the price has been carefully guarded, indications are that $26, base furnace, was shaded on at least a part of the tonnage which came from a furnace having a low freight rate. Despite this transaction, the market for ordinary business seems to be firm at $27, eastern Pennsylvania furnace, with $26 as the lowest quotation at Buffalo. One company is quoting the following schedule, Buffalo furnace: No. 1X, $29; No. 2X,, $28; No. 2 plain, $27. The same seller last week was quoting No. 2X and No. 2 plain at $27 and No. 1 at $27.50. Foreign iron seems to be somewhat firmer with $26.50 to $27.50 usually quoted on Continental grades and $28.50 to $29 on Scotch.

We quote delivered in the New York district as follows, having added to furnace prices $2.27 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$31.27
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	30.27
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	29.27
Buffalo, sil. 1.75 to 2.25	30.91
No. 2X Virginia, sil. 2.25 to 2.75	33.44
No. 2 Virginia, sil. 1.75 to 2.25	32.44

Ferroalloys.—Buying of ferromanganese, while not so heavy as the previous week, was fairly good the last week. Sales have totaled about 1000 to 1500 tons, all British alloy, at prevailing quotations. There have also been moderately heavy sales of domestic spiegeleisen at prevailing prices, several thousand tons having been sold at the lower levels which prevail for large tonnages, or $34, furnace, for the 20 per cent alloy. Some business has also been done in spiegeleisen for importation from Great Britain. Large contracts for 50 per cent ferrosilicon for consumption in 1923 have been made by leading domestic producers at the quotations noted below, the price range depending upon the quantity and the point of consumption. The ferrochromium market has also been fairly active. Quotations are as follows:

Ferromanganese, domestic, furnace, nominal, per ton	$100.00
Ferromanganese, British, 80 per cent, f.o.b. Atlantic port	$100.00
Spiegeleisen, 17 to 19 per cent, furnace	$34.00 to $36.00
Spiegeleisen, 20 per cent, furnace or duty paid	$33.00 to $35.00
gross ton, carloads	$82.50 to $87.50
Ferrotungsten, per lb. of contained metal	90c. to 95c.
Ferrochromium, 4 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr., delivered	13c. to 14c.
Ferrovanadium, per lb. of contained vana-	
Ferrocarbontitanium, 15 to 18 per cent, in carloads, per net ton	$200.00

Ores

Manganese ore, foreign, per unit, c.i.f. 29c. to 30c
Tungsten ore, per unit, in 60 per cent con-

per ton, c.i.f. Atlantic seaboard, $18.00 to $28.00
Molybdenum ore, 85 per cent concentrates

Finished Iron and Steel.—Sales representatives of mills find many Eastern consumers indifferent to the filled order books of the mills. The attitude is that material will be available when the need is found for it. Present indications are that structural material, plates and cold rolled products are not so well sold up as other forms of finished steel, but mill specifications for the latter commonly cover the first quarter at to-day's mill operating rates and business in shapes and plates is reported improving. Conditions make prices firm though there is little likelihood of early advances, as every effort is apparently to be taken to make for stabilization and price changes will be made by the large producers only after careful consideration of the then state of demand and of order books. Activity in building lines seems unabated, unless perchance it is in concrete bars, and building operators in the East claim the end of the demand is not in sight. Firm specifications from the automobile trade show continued heavy automobile construction, and while there is a lull at the moment in railroad purchasing, a large and steady flow of such business is expected for months. Advances of prices on export account have been made and if anything there is a betterment in export inquiry. Some 3000 tons of forging billets has been sold at a $47 base.

We quote for mill shipments, New York delivery, as follows: Soft steel bars and steel plates, 2.24c. to 2.34c.; structural shapes, 2.29c. to 2.38c.; bar iron, 2.34c.

Cast-Iron Pipe.—The recent activity has evidently only been temporarily curtailed by the advent of the holidays. Prices have been advanced by one maker in this district, $1 per ton, as a result of the heavy demand and the stiffening in pig iron prices. The recent tender from San Juan, Porto Rico, on 20,000 tons of 30-in. pipe, on which the United States Cast Iron Pipe & Foundry Co. was reported to be low bidder has been awarded to Eduardo Giorgeti of San Juan, stated to be an agent of a Belgian foundry. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $55.50; 4-in. and 5-in., $60; 3-in., $64.80, with $4 additional for Class A and gas pipe. The soil pipe market is also exceedingly strong and one large maker in this district has advanced quotations, in view of the stiffening in the pig iron market. We quote discounts of both Southern and Northern makers, delivered New York, as follows: 2 to 6-in. standard, 28 to 30¾ per cent off list; heavy, 38 to 40¾ per cent off list, which is an advance of five points in prices.

High Speed Steel.—This market is quiet and unchanged. Quotations are still from 75c. to 80c. per lb. for 18 per cent tungsten high speed steel with special brands of some companies ranging up to 90c. per lb.

Warehouse Business.—Business is slow during the holidays, but prices generally are firm. In black and galvanized sheets, prices are practically unchanged with No. 28 gage galvanized quoted at as low as 5.25c. per lb. and the average quotation on black sheets about 4.50c. per lb., although sales for shipment out of the metropolitan district have been made on as high a base as 4.75c. per lb. Steel pipe is in good demand and prices unchanged. The copper market is up, another increase of ¼c. to ½c. per lb. having been made on most brass, bronze and copper products by the warehouses. We quote prices on page 1740.

Old Material.—The holidays and the usual year end inventories of mills have resulted in quiet during the past week, but prices generally are strong with an upward tendency. For shipment to Bethlehem, dealers are now paying as high as $17 per ton delivered for railroad quality of heavy melting steel. Specification pipe is also showing a slight advance, $15 per ton now being paid for shipment to a Lebanon mill. Stove plate is quiet, but prices are unchanged. No. 1 railroad wrought is quotable this week at $15 to $15.50. No. 1 heavy melting steel is strong at $12.50 to $13 per ton and a fair range for railroad quality is $14 to $15 per ton, based on buying for the Bethlehem Steel Co. at $17 and for the Jones & Laughlin Steel Co. at $20 per

ton. Eastern Pennsylvania consumers continue quiet, most of the present activity being from the West.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$12.50 to $13.00
Steel rails, short lengths, or equivalent	14.00 to 15.00
Rails for rolling	16.00 to 16.50
Relaying rails, nominal	21.00 to 22.00
Steel car axles	17.00 to 18.00
Iron car axles	25.00 to 26.00
No. 1 railroad wrought	15.00 to 15.50
Wrought iron track	14.00 to 14.50
Forge fire	11.00 to 11.50
No. 1 yard wrought, long	13.00 to 13.50
Cast borings (clean)	12.00 to 12.50
Machine-shop turnings	12.00 to 12.50
Mixed borings and turnings	11.00 to 11.50
Iron and steel pipe (1 in. diam., not under 2 ft. long)	10.50 to 11.00
Stove plate	12.25 to 13.25
Locomotive grate bars	13.00 to 13.50
Malleable cast (railroad)	13.50 to 14.00
Cast-iron car wheels	16.50 to 17.50

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast	$19.00 to $20.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	17.00 to 17.50
No. 1 heavy cast, not cupola size	15.00 to 15.50
No. 2 cast (radiators, cast boilers, etc.)	13.50 to 14.00

Boston

Sales Small the Past Week with Prices Somewhat Conflicting

BOSTON, Dec. 26.—Generally, the pig iron market the past week gave evidence of firmness. Yet a Buffalo producer, having advanced No. 2X from $25 to $26, furnace, accepted a limited tonnage at $25, buyers insisting on accepting original quotations. German and Belgian irons, although not sold, are obtainable at $26.50, duty paid, on dock here. These are the only visible weak spots. Active Buffalo furnace interests have advanced from $27 furnace for No. 2 plain, No. 2X and No. 1X, to $27, $28 and $29, respectively, after having taken business at $27. Erie iron, with a $5.92 freight, sold at $27 for No. 2X, eastern Pennsylvania at slightly better than $27 furnace base, Virginia at $23, while the most active foreign iron holder sold Scotch corresponding with our No. 2X at $29, duty paid, on dock here, and English at $27, an advance of $1 a ton, and Connecticut valve and fittings making interests bought Scotch at close to $32, delivered. Sales for the past week also include charcoal irons, lake at $30 furnace base, Massachusetts at $55 to $60, and Connecticut at $60 to $75, the latter representing he cleanup of approximately 1000 tons piled. Aggregate New England sales the past week amounted to but a few thousand tons, with textile machinery, scale and machine tool interests taking the bulk. Transportation conditions from the Buffalo district into New England are very bad, from eastern Pennsylvania fair, from Virginia fair and from Alabama good.

We quote delivered prices on the basis of the latest reported sales, now infrequent, and as follows, having added to furnace prices $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia and $9.60 from Alabama:

Eastern Penn., sil. 2.25 to 2.75	$31.15 to	$32.15
Eastern Penn., sil. 1.75 to 2.25	30.65 to	31.65
Buffalo, sil. 2.25 to 2.75	30.91 to	32.91
Buffalo, sil. 1.75 to 2.25	30.91 to	31.91
Virginia, sil. 2.25 to 2.75	33.42 to	34.42
Virginia, sil. 1.75 to 2.25	32.92 to	33.92
Alabama, sil. 2.25 to 2.75		33.10
Alabama, sil. 1.75 to 2.25		32.60

Finished Material.—Since last reports, local mill representatives have booked a sizable aggregate tonnage of common iron and steel bars, high carbon bars and special analysis stock, sheets and small structural steel for light fabricating work, for shipment during first quarter. Bars sold at 1.90c. to 2c., f.o.b. Pittsburgh, base, while the spread in structural steel prices is smaller. Fire box plates are in good demand for prompt shipment, while sales of universals are rather limited. Practically all hardware jobbing interests have covered first quarter bolt and nut requirements at prices slightly under open quotations. Nails continue in demand, although most of the large buyers are well covered. Steam and street railroads continue to show interest in special track material.

Warehouse Business.—Although some tapering off in the movement of iron and steel out of warehouse stocks was noted last week, business has more resiliency than at any period since the war. Demand runs to practically everything handled by warehouses, with sheets perhaps the most active. Warehouse stocks are not nearly so complete as a month ago, and the tendency is not to anticipate more than one or two months' requirements. The largest warehouse interests here have adopted mill quantity differentials.

Jobbers quote: Soft steel bars, $3.065 per 100 lb. base; flats, $3.85; concrete bars, 3.16½c.; structural steel, $3.065 to $3.50; tire steel, $4.50 to $4.85; open-hearth spring steel, $5 to $6.50; crucible spring steel, $12; steel bands, $4.25; hoop steel, $4.75; cold rolled steel, $4 to $4.50; refined iron, $3.065; best refined iron, $4.50; Wayne iron, $5.50; Norway iron, $6.60 to $7.10; plates, 3.16½c. to $3.35; No. 10 blue annealed sheets, $4.15 per 100 lb. base; No. 28 black sheets, $5.40; No. 28 galvanized sheets, $6.40.

Coke.—New England producers of foundry coke have fallen further behind on deliveries, largely because of the car situation. So far as is known, no foundry in this territory is in distress for fuel, but a fairly large percentage are carrying unusually small reserve stocks. The market on New England by-product coke remains at $16 delivered within the $3.10 freight zone. Sales of Connellsville 48-hr. coke for domestic purposes are increasing with coal dealers and gas companies taking everything offered. The spot market is about $9 on cars Connellsville district or $14.55 delivered New England, and for first quarter $8 to $8.50 Connellsville or $13.55 to $14.05 delivered.

Old Material.—Little new business in old material developed the past week. Activity centered in whatever dealers could pick up against old contracts, and the total tonnage involved is hardly worth mentioning. On the surface, at least, prices are firm, possibly on expectations of better business after Jan. 1. New England apparently has a sizable tonnage of desired material suitable for Pennsylvania consumption. For that reason holders are awaiting an increased demand, rather than push sales. Supplies of cast iron borings for chemical purposes and mixed borings and turnings, fairly plentiful a week back, have dried up and prices are strong, although not higher. Heavy melting steel fetches $14.50, shipping point, more often than $14.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery	$20.00 to $22.00
No. 2 machinery cast	18.00 to 20.00
Stove plate	16.50 to 17.00
Railroad malleable	20.50 to 21.00
Bundled sheets	14.00 to 14.50
Car wheels	20.00 to 20.50

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$14.00 to $14.50
No. 1 railroad wrought	13.00 to 13.50
No. 1 yard wrought	11.00 to 11.50
Wrought pipe (1-in. in diam., over 2 ft. long)	9.50 to 10.00
Machine shop turnings	10.00 to 10.50
Cast iron borings, rolling mill	12.00 to 12.50
Cast iron borings, chemical	16.50 to 17.00
Blast furnace borings and turnings	11.00 to 11.25
Bundled forged scrap	11.00 to 11.50
Regular forged scrap and bundled skeleton	9.50 to 10.00
Axles	20.00 to 20.50
Shafting	19.00 to 19.50
Rails for rolling	15.00 to 15.50

Birmingham

The $23 Quotation Adhered to Fairly Well—Twenty-four Active Stacks

BIRMINGHAM, ALA., Dec. 26.

Pig Iron.—The final estimate of sales of Alabama pig iron since Thanksgiving when buying started again is 350,000 tons, one interest booking 100,000 tons, part for second half, and all others heavily according to capacity. The holidays arrived with the $23 base seemingly firm, although regular customers buying large lots still were accorded concessions as usual. A Southern pipe maker bought 3000 tons, paying a shade under $23, but lots of 1000 tons brought $23. A Western sanitary interest took 7000 tons, paying $23 for part of it. The average small lot is bringing $24. Furnaces are feeling easy and not pushing sales. The inquiry for

second half is becoming brisk. The Tennessee company will blow in a fourth stack at Bessemer on foundry Jan. 4. The active stacks in Alabama now number 24, the greatest number in the year, and January will witness an increase. All holidays have been short ones, most mills resuming Tuesday morning.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

[illegible]	$23.00
[illegible]	23.00
Charcoal, warm blast	32.00

Finishing Mills.—Practically all steel mills resumed Tuesday on full turn after holiday since Saturday. The Gulf States Steel Co. is to go on double turn in finishing mills Jan. 1. The Tennessee company continues on double turn in mills with effort at maximum production.

Cast Iron Pipe.—Pressure pipe is fairly active at $42. The National Cast Iron Pipe Co. took 300 tons for Lincoln, Neb. This company voted $500,000 additional capital stock this week and will add a foundry to produce De Lavaud pipe. The soil pipe market has revived. Numbers of jobbers came hurriedly into the market ahead of the usual time. The base is $50, but early advances are expected.

Old Material.—The scrap market is showing signs of life again and quoted prices are firmly held even with the large consumers. Steel scrap has been moving heavily.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Steel rails	$16.00 to $17.00
No. 1 steel	14.00 to 16.00
No. 1 [illegible]	18.00 to 20.00
Car wheels	18.00 to 20.00
Tramcar wheels	17.00 to 19.00
Stove plate	16.00 to 17.00
Cast-iron borings	9.00 to 10.00
Machine shop turnings	9.00 to 10.00

Buffalo

Pig Iron Market Firm, After Recent Heavy Buying

BUFFALO, Dec. 26.—Producers and sellers of pig iron are firmly situated and able to maintain their own market owing to the unusual bookings in the last few weeks. One producer in announcing to its trade a base price of $27, silicon 1.75 to 2.25, also puts into effect the differential of $1. There is no question that some of the sellers have taken on tonnage equal to their production for the period covering contracts made. Rogers, Brown & Co. have three Susquehanna furnaces in blast and the fourth under repairs. Inquiry has eased off, but a number of 1000-ton lots are being sought. While $26 is still being done on scattered sales, the end of this quotation is near. The whole tone of the market is good.

We quote f.o.b. per gross ton Buffalo as follows, the higher price being for early shipment:

No. 1 foundry, 2.75 to 3.25 sil.	$27.00
No. 2X foundry, 2.25 to 2.75 sil.	26.50
No. 2 plain, 1.75 to 2.25 sil.	26.00
Basic	25.25
Malleable	26.00
Lake Superior charcoal	$33.28 to 36.28

Finished Iron and Steel.—No abatement of demand for various products has occurred and pressure for delivery on such products as steel and wire is strong; inventory as a factor is disregarded in the light of the necessity for getting material. THE IRON AGE has verified price concessions on bars; to meet competition 1.90c. has been done on local sales. Prior to this week, only rumors of less than 2c. have been afloat. The usual requests for holding up delivery common at this season are missing this year. Plates are perhaps the quietest steel product; car makers are not interested in new business and many are working on contracts of early in 1922. Tin plate is sold ahead—one Buffalo agency has practically booked sufficient tonnage for the first half. Labor difficulties in wire making are having serious effect on deliveries; improvement expected with the prospective return to the mills of labor normally engaged in outside work, did not develop.

[illegible] as follows: Structural shapes, 3.20c.; plates, 3.20c.; soft steel bars, 2.15c. [illegible] 4.15c. [illegible] Sheets, No. 10 [illegible] No. 28 [illegible] 4.10c. [illegible]

Coke.—Prices are erratic, with scarcely any tonnages available. Quotation of $8 for furnace coke, made on a morning late in the week, were withdrawn the same day and 10c. added—subject to immediate acceptance.

Old Material.—Dealers and mills are at the lowest ebb on stock and there is every indication of a lively season in prospect. Mills are inquiring for heavy melting steel, but dealers insist that they will have to get $20 or better. Borings are in big demand and sales are made at $16.25 to $16.75. Cast scrap and malleable are active. The only quiet item on the list is low phos. Dealers are encountering considerable difficulty in obtaining labor and the car movement is poor.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$19.00 to $19.50
Low phos., 0.04 and under	21.00 to 22.00
No. 1 railroad wrought	18.00 to 19.00
Car wheels	21.00 to 22.00
Machine-shop turnings	14.50 to 15.50
Cast iron borings	16.25 to 16.75
Heavy axle turnings	17.50 to 18.50
Grate bars	16.00 to 17.00
No. 1 busheling	16.50 to 17.50
Stove plate	17.00 to 18.00
Bundled sheet stampings	14.00 to 15.00
No. 1 machinery cast	20.00 to 21.00
Hydraulic compressed	17.00 to 17.50
Railroad malleable	20.50 to 21.50

St. Louis

Sale of 10,000 Tons of Pig Iron and Seller Opens Books for Second Quarter

ST. LOUIS, Dec. 26.—With the sale of 10,000 tons during the last week, the St. Louis Coke & Chemical Co. has now sold up its output for the first quarter of 1923. Most of this was sold on the basis of $28, Chicago, and the company has opened its books for second quarter delivery on that basis. Most of the business of that maker has been to melters outside of St. Louis. The fact is that St. Louis melters generally have failed to take care of their requirements for first quarter so far. It is expected, however, that they will begin to look to obtaining their pig iron shortly after the first of the year. A desire to hold down stocks to the lowest possible point and the hope of lower prices have been the causes for local melters holding off. Outside of the sales referred to, there has been little done due to the holiday spirit, the only inquiries pending being from 50 to 200 tons. The market for Southern iron is also quiet, with $23, Birmingham, still the prevailing price. Two makers are still quoting $25, Birmingham, in the belief that the market will come back.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago, $3.28 from Birmingham (rail and water), $5.17 from Birmingham, all rail, and 81 cents average switching charge from Granite City:

Northern foundry, sil. 1.75 to 2.25	$30.16
Northern malleable, sil. 1.75 to 2.25	30.16
Basic	30.16
Southern foundry, 1.75 to 2.25	28.17

Finished Iron and Steel.—This has been a quiet week as far as finished iron and steel are concerned. Some jobbers have yet to receive all of their purchases made in 1922. There is also a disinclination to take on any merchandise until after the first of the year on account of inventory. The most important railroad inquiry pending is that of the International & Great Northern Railway for 14,000 tons of rails, which inquiry was sent out before the road was acquired by the Frisco System. The Missouri-Kansas & Texas Railway has placed its requirements for axles for first quarter. Several large contracts for steel to be used in the construction of bridges were placed by the Missouri Highway Commission.

For stock out of warehouse we quote: Soft steel bars, 2.90c. per lb.; iron bars, 2.90c.; structural shapes, 3c.; tank plates, 3c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, cold rolled, one pass, 4.85c.; cold drawn rounds, shafting and screw stock, 3.90c.; structural rivets, 3.85c. per 100 lb.; boiler rivets, 3.95c.; tank rivets, 7/16 in. and smaller, 55 per cent off list; machine bolts, large, 50 per cent; smaller, 50 per cent; carriage bolts, large, 45 per cent; small, 45 per cent; lag screws, 55 per cent; hot pressed nuts, square or hexagon blank, $2.75; and tapped, $2.75 off list.

Coke.—The Granite City by-product producers have been out of the market for the rest of this year and are not quoting on foundry coke for January. They are taking some business on domestic coke at $11 at the ovens. Connellsville is being sold at $8 and $8.25 at the ovens, and considerable is coming through.

Old Material.—The only change in the price of old materials is in rails for rolling, which are 25c. higher than last week. While there has been no buying by consumers of any items and probably will not be until after the first of the year, dealers believe that there will be considerable bought then, with the result that there is a better feeling concerning the market and prices are firm.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

	Per Gross Ton	
Iron rails	$20.00 to	$20.50
Rails for rolling	16.75 to	17.25
Steel rails, less than 3 ft.	19.50 to	20.00
Relaying rails, standard section	26.00 to	29.00
Cast iron car wheels	23.00 to	23.50
Heavy melting steel	16.00 to	16.50
Heavy shoveling steel	15.00 to	15.50
Frogs, switches and guards cut apart	15.50 to	16.00
	Per Net Ton	
Heavy axles and tire turnings	11.50 to	12.00
Steel angle bars	16.50 to	17.00
Iron car axles	25.00 to	25.50
Steel car axles	19.00 to	19.50
Wrought iron bars and transoms	21.50 to	22.00
No. 1 railroad wrought	15.50 to	16.00
No. 2 railroad wrought	15.00 to	15.50
Railroad springs	20.00 to	20.50
Steel couplers and knuckles	20.00 to	20.50
Cast iron borings	10.50 to	11.00
No. 1 busheling	13.00 to	13.50
No. 1 railroad cast	19.00 to	19.50
No. 1 machinery cast	20.00 to	20.50
Railroad malleable	18.00 to	18.50
Machine shop turnings	9.50 to	10.00

Cleveland

One Company Sells 20,000 Tons of Pig Iron—General Price Trend Upward

CLEVELAND, Dec. 26.—The pig iron buying movement has subsided, although some sellers booked a moderate volume of business during the week and one local producer sold 20,000 tons in foundry grades for shipment from its Cleveland and western Pennsylvania furnaces. Sales by other furnaces were mostly to smaller foundries and did not involve large lots. Some sellers are comfortably filled with orders for the first quarter and are not seeking additional business. Prices have further advanced 50c. to $1 a ton and the market is firm. With the recent price declines and reaction, there is now $1.50 per ton range in the prices quoted on foundry iron by lake furnaces. This grade is quoted locally for out-of-town shipment at $26.50, but the Detroit and Toledo market is established at $28, an advance of $1 a ton during the week and one interest has advanced its Valley and Buffalo price to $28. Another lake furnace is quoting $27. A number of sales are reported at $28, including a 4000-ton lot to a Detroit melter. A Michigan consumer paid $28.50 for 750 tons of malleable iron. For Cleveland delivery, local furnaces quote foundry iron at $27 at furnace. Southern iron is firm at $23, at which several small lots are reported. Steel-making grades are quiet. A Pittsburgh consumer is inquiring for 750 tons of basic iron.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron includes a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and a $6 rate from Birmingham.

Basic, Valley furnace (nominal)	$25.00
Northern No. 2 fdy., sil. 1.75 to 2.25	27.50
Southern fdy., sil. 1.75 to 2.25	29.00
Malleable	27.50
Ohio silvery, nominal, sil. 8 per cent	38.52
Standard low phos., Valley furnace	36.00

Iron Ore.—On Dec. 1 there was 44,004,201 gross tons of Lake Superior ore on hand at furnaces and on Lake Erie docks as compared with 38,369,269 tons on Dec. 1, 1921, and with 44,181,124 tons on Nov. 1 this year. The amount at furnaces Dec. 1 was 34,104,888 tons. The ore consumption in November was 4,380,996 tons as compared with 4,012,007 tons in October. The November consumption was over 100 per cent greater than in November, 1921, when the amount consumed was 2,188,106 tons.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $5.95; Old range non-Bessemer, 51½ per cent iron, $5.20; Mesabi Bessemer, 55 per cent iron, $5.70; Mesabi non-Bessemer, 51½ per cent iron, $5.05.

Semi-Finished Steel.—The leading producer has advanced its price $2 a ton to $38.50, Youngstown, for sheet bars, billets and slabs, and reports sales aggregating 10,000 tons, about one-half of which was taken after the advance.

Finished Material.—Although the volume of business has fallen off, there is more activity than is usual during the holiday season. The market on steel bars, plates and structural material is firm at 2c. Apparently all quotations below that price have disappeared. The Otis Steel Co. has advanced its minimum price on plates $2 a ton to 2.10c. and light plates are being sold for prompt shipment at 2.25c. The leading Detroit automobile manufacturer has placed 15,000 tons of carbon steel forging bars with an Eastern mill for the first quarter delivery. Two boats placed by a Duluth interest with the Great Lakes Engineering Works will require 2000 tons of plates. The Big Four Railroad will receive bids in Cincinnati, Jan. 3, for 1370 tons of plates and 550 tons of shapes. Tank builders are figuring on new inquiries for oil tanks that will require 2000 to 3000 tons of plates. Hot-rolled strip steel has developed weak spots, quotations of 2.60c. having been made on round lots to cold-rolling mills. Hoops in lighter gages are firm. A lull has developed in the building field.

Jobbers quote steel bars, 2.91c.; plates and structural shapes, 3.01c.; No. 9 galvanized wire, 3.30c.; No. 9 annealed wire, 2.80c.; No. 28 black sheets, 4.35c. to 4.40c.; No. 28 galvanized sheets, 5c. to 5.40c.; No. 10 blue annealed sheets, 3.70c. to 3.76c.; hoops and bands, 3.71c.; cold-rolled rounds, 3.75c.; flats, squares and hexagons, 4.25c.

Coke.—With several producers out of the market, prices have advanced 50c. a ton from $8.50 to $9 for standard Connellsville foundry coke and sales of high-grade fuel are reported at the latter price.

Bolts, Nuts and Rivets.—A 5 per cent concession has been made on bolts and nuts, but it is claimed that this has been only for current orders and that regular prices are being adhered to for first quarter contracts. Makers are booking a large number of these contracts. Rivet manufacturers have closed many first quarter contracts and are getting a good volume of smaller orders. Reports indicate a shading of $2 a ton by some makers. Small rivets are rather weak. Quotations of 65, 10 and 5 per cent off list have appeared on these.

Old Material.—Prices on several grades of scrap have advanced 25c. to 50c. a ton and the market is firm, although consumers are showing an unwillingness to pay any higher prices than have prevailed recently. There was a fair volume of activity during the week, being about equally divided between the purchases by consumers and by dealers. Mills are not disposed to buy scrap for delivery beyond 30 days. Valley dealers are paying $21 for heavy melting steel scrap for early shipment.

We quote per gross ton, f.o.b. Cleveland, as follows:

Heavy melting steel	$18.50 to $19.00
Steel rails under 3 ft.	20.50 to 20.75
Steel rails for rolling	21.00 to 21.50
Iron rails	18.00 to 18.50
Iron car axles	25.00 to 26.00
Low phosphorus melting	21.00 to 21.25
Cast borings	16.75 to 17.25
Machine shop turnings	14.75 to 15.25
Mixed borings and short turnings	16.00 to 16.25
Compressed steel	16.75 to 17.00
Railroad wrought	17.00 to 17.50
Railroad malleable	20.00 to 20.50
Light bundled sheet stampings	13.00 to 13.50
Steel axle turnings	16.50 to 17.00
No. 1 cast	20.50 to 21.00
No. 1 busheling	13.50 to 14.00
Drop forge flashings over 10 in.	12.75 to 13.25
Drop forge flashings under 10 in.	12.50 to 13.50
Railroad grate bars	17.00 to 17.50
Stove plate	17.00 to 17.50
Pipes and flues	13.00 to 13.75

Sheets.—The sheet market is firm, although some of the mills are still quoting the Steel Corporation prices. On blue annealed sheets 2.60c. appears to be the

more common price. Several mills are asking 3.50c. for black and 4.50c. for galvanized sheets. The Brier Hill Steel Co. has advanced to these prices and to 2.75c. on blue annealed sheets. There is a lull in buying, as some consumers are deferring purchases until after inventories.

Philadelphia

Large Pig Iron Buying, Some of Which Develops Further Weakness in Prices

PHILADELPHIA, Dec. 26.—The past several days has brought more than the customary holiday-week activity. Large pig iron buying has been the feature of the market. A cast iron pipe company has placed upward of 20,000 tons, chiefly with two furnaces, at prices which represent a concession probably of about $1 a ton. An Eastern steel company will close this week for 15,000 to 20,000 tons of basic for February-March shipment. There nas been a large volume of buying in lots from 100 to 500 tons, and the aggregate of orders closed and pending is fully 75,000 tons.

The steel business has shown no marked change, but the weakness in prices seems to have been checked. The high coke prices are being used by both pig iron and steel interests as an argument that prices of iron and steel are bound to advance, slightly at least. The demand for coke for domestic use continues. One local office is disposing of about 2000 tons daily. Prices on coke quoted to-day ranged from $9 to $10, Connellsville, for prompt delivery.

Railroad congestion is spreading to Eastern territory, which hitherto has been only mildly affected. The New York, New Haven & Hartford has embargoed all shipments into New England, and there is a serious lack of cars at Eastern mills and furnaces.

Pig Iron.—A cast iron pipe company bought 20,000 tons or more of foundry iron during the week at prices said to be below $27, delivered. Although details of the transaction are guarded, it is reported in the trade that the iron was sold at about $26, furnace. An Eastern steel company is in the market for 15,000 to 20,000 tons of basic iron for February-March delivery and will probably buy within a day or two. Prices quoted are said to approximate $26.50 to $27, delivered. A sale of 2000 tons of basic had been practically closed today at about $26.75, delivered. There has been a large volume of buying of foundry iron in lots ranging from 100 to 500 tons, with some sales of 1000-ton lots, and the aggregate, including the basic tonnage now pending, is about 75,000 tons. This represents the largest pig iron business that has come to Eastern furnaces within a week in a long time. While concessions were made on the large tonnage of foundry iron above referred to, the market on smaller lots has held firmly to $27, furnace, for No. 2 plain; $28 for No. 2X and $29 for No. 1X. With $9 to $10, Connellsville, being quoted for furnace coke for prompt delivery, and only slightly less on contracts, the pig iron trade looks for a stronger market. The business taken in the last week has given furnaces a better order book and there now appears less willingness to make concessions. Some of the Virginia pig iron makers are holding to $28, base, but one or two have quoted $27, base, with $1 differentials for the higher percentages of silicon. One of the large inquiries before the trade is from the Reading Iron Co. for 6000 tons of gray forge, but as this company will put its large furnace at Hokendauqua, Pa., recently acquired from the Thomas Iron Co., in blast about Jan. 1 it is likely that at least a part of this tonnage will be made there. The Delaware River Steel Co. is planning to put its furnace at Chester, Pa., in blast within the next few weeks. Imports of foreign iron in the week ended Saturday, Dec. 23, totaled 5763 tons, of which 4000 tons was from Scotland and 1763 from France. Reports of the quantity of foreign iron in storage at Philadelphia have apparently been exaggerated. Probably not much more than 5000 tons has been piled on docks aside from that which is now being unloaded from ships to be shipped immediately. The demand for foreign iron has been slightly better during the past week and prices have stiffened somewhat.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to $1.64 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$27.76 to $28.14
East. Pa. No. 2X, 2.25 to 2.75 sil.	28.76 to 29.14
East. Pa. No. 1X	29.76 to 30.14
Virginia No. 2 plain, 1.75 to 2.25 sil.	32.17 to 33.17
Virginia No. 2X, 2.25 to 2.75 sil.	33.17 to 34.17
Basic delivered eastern Pa.	26.75 to 27.00
Gray forge	28.14 to 28.64
Malleable	29.64 to 30.59
Standard low phos. (f.o.b. furnace)	35.00
Copper bearing low phos. (f.o.b. furnace)	30.00 to 35.00

Iron Ore.—Receipts of iron ore at the port of Philadelphia last week included 7000 tons from Algiers and 7629 tons from Sweden.

Semi-Finished Steel.—There is little demand for billets. Prices remain unchanged, the minimum being $37.50 or $38, Pittsburgh, for rerolling quality and $42.50 for forging quality.

Plates.—No further weakness in plates is noted, and prices seem to have settled for the present to 1.90c., Pittsburgh, for large lots and 2c. for small lots, with some contracts for first quarter being made at 2c. Tuesday's mails brought a fair volume of orders to one or two mills for this time of year.

Structural Material.—One mill which has been quoting 1.95c., Pittsburgh, on structural shapes has withdrawn all such quotations outstanding and now quotes 2c. To this extent the local market appears stronger and the mills predict a 2c. minimum for first quarter.

Old Material.—Further strength has been added to the scrap market in the past week. While there has been no large buying each inquiry has brought out higher quotations from scrap dealers regardless of the tonnage involved. It is not now possible to buy heavy melting steel below $17, delivered, while on a large tonnage dealers would undoubtedly ask $18. One mill was able to get only 1000 tons at $17. No. 1 railroad wrought is slightly stronger at $20 to $21; forge fire is at least $15.50 to $16, with the tendency upward; clean turnings for blast furnace use would command $15 to $15.50, and No. 1 cast on small sales have gone up, now being quoted at $21 to $22. Dealers have firm views regarding the market and look for higher prices early in the new year when a larger volume of buying is expected.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$17.00 to $18.00
Scrap rails	17.00 to 18.00
Steel rails for rolling	19.50 to 20.00
No. 1 low phos., heavy 0.04 and under	22.00 to 23.00
Cast iron car wheels	20.00 to 21.00
No. 1 railroad wrought	20.00 to 21.00
No. 1 yard wrought	17.00 to 17.50
No. 1 forge fire	15.50 to 16.00
Bundled sheets (for steel works)	15.00 to 15.50
No. 1 busheling	15.00 to 15.50
Turnings (short shoveling grade for blast furnace use)	15.00 to 15.50
Mixed borings and turnings (for blast furnace use)	14.50 to 15.00
Machine shop turnings (for steel works use)	15.00 to 15.50
Machine shop turnings (for rolling mill use)	15.50 to 16.00
Heavy axle turnings (or equivalent)	16.50 to 17.00
Cast borings (for steel works and rolling mills)	15.50 to 16.00
Cast borings (for chemical plants)	20.00 to 22.00
No. 1 cast	21.00 to 22.00
Heavy breakable cast (for steel works)	19.00 to 19.50
Railroad grate bars	16.50 to 17.00
Stove plate (for steel plant use)	16.50 to 17.00
Railroad malleable	15.50 to 16.50
Wrought iron and soft steel pipes and tubes (new specifications)	1.00 to 1.00
Shafting	21.00 to 22.00
Steel axles	22.00

Sheets.—The advance of $3 a ton on sheets by the Brier Hill Steel Co. has had no appreciable effect upon the market as other mills continue to quote the same prices as hitherto, namely, 2.50c. to 2.60c. on blue annealed, 3.35c. on black and 4.35c. on galvanized. The prices named by Brier Hill are 2.75c., 3.50c. and 4.50c.

in the order above named. Most of the sheet companies are fairly well booked for first quarter.

Warehouse Business.—There has been no change in warehouse prices, which are quoted as follows for local delivery:

Soft steel bars and small shapes, 3c.; iron bars (except bands), 3c.; round edge iron, 3.20c.; round edge steel, iron finish, 1½ x ½ in., 3.20c.; round edge steel planished, 4c.; tank steel plates, ¼-in. and heavier, 3.10c.; tank steel plates, 3/16-in., 3.30c.; blue annealed steel sheets, No. 10 gage, 3.85c.; black sheets, No. 28 gage, 4.60c.; galvanized sheets, No. 28 gage, 5.75c.; square twisted and deformed steel bars, 3.15c.; structural shapes, 3.10c.; diamond pattern plates, ¼-in., 4.80c.; 3/16-in., 5c.; spring steel, 4.25c.; round cold-rolled steel, 3.85c.; squares and hexagons, cold-rolled steel, 4.35c.; steel hoops, No. 13 gage and lighter, 4.25c.; steel bands, No. 12 gage to 3/16-in., inclusive, 3.525c.; rails, 3c.; tool steel, 8.50c.; Norway iron, 6.50c.

Bars.—Some mills are not anxious for bar business at anything below 2c., Pittsburgh, as their schedules are fairly full for the next month or two. It is not denied that a considerable number of sales has been made during the past few weeks at 1.90c. and 1.95c., but the market is believed to be slightly stronger. Bar iron is firmer at 2c., Pittsburgh.

Cincinnati

On Southern Iron $23 Is Common Price, But $22.50 Is Reported

CINCINNATI, Dec. 26.—Customary holiday inactivity was evident in the market last week, but a number of fair-sized orders for Northern iron were booked for first quarter. Included in these was one of 2000 tons, one for 800, one for 600 and several ranging from 100 to 500 tons. The Southern market was rather quiet, due as much to the disposition of members not to book as the indisposition of the buyer to cover. We note one sale of 3000 tons to a Kentucky melter for first half at a reported price of $22.50, and several lots of 500 tons were taken at $22.50 and $23. While $23 is the more common quotation, it is said that $22.50 can still be done from one or two furnaces. Others are quoting up to $25. Twenty-seven represents the southern Ohio market, and most of the sales were made at that figure, though one furnace has now advanced its price to $27.50.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$26.55 to $27.05
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	27.05 to 27.55
Ohio silvery (nominal), 8 per cent	37.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	29.27
Basic Northern	28.27
Malleable	29.27

Warehouse Business.—Local jobbers report a rather quiet week, due entirely to the holiday season. Prices are as last quoted.

Cincinnati jobbers quote: Iron and steel bars, 2.95c. base; reinforcing bars, 3.05c. base; hoops, 4.05c. base; bands, 3.85c. base; shapes and plates, 3.05c. base; cold-rolled rounds, 3.75c. base; cold-rolled flats, squares and hexagons, 4.25c. base; No. 10 blue annealed sheets, 4c.; No. 28 black sheets, 4.70c.; No. 28 galvanized sheets, 5.75c.; No. 9 annealed wire, $3.10 per 100 lb.; common wire nails, $3.20 per keg, base.

Finished Material.—Announcement of price advances by the Brier Hill Steel Co. on plates, sheets and sheet bars was not entirely unexpected, as most of the independent companies have been considering this step for some time and have, it is said, only awaited booking sufficient tonnage to carry them over the first few weeks of the year before moving prices upward. The plate market is undoubtedly stronger, and delivery promises are being lengthened considerably each week. The same is true in a lesser degree of bars, and some independent companies report that practically all of the customary tonnage allotted to this district is under contract for first quarter. One feature of the bar market is that agricultural implement manufacturers have placed orders for more tonnage than for any quarter since 1920. There is also a fair demand for small tonnages of bars, shapes and plates for immediate shipment, though the holiday season has cut down the number of orders considerably. On these products, 2c. appears to be the minimum, and a local manufacturer is understood to have placed an order for several hundred tons at this figure. There is little demand for light rails from mining companies, and track fastenings are also quiet. The former are quoted at 2.15c. to 2.25c., and the latter at 2.75c. Small spikes are now quoted at 3.25c. There is a fair demand for wire nails at $2.75 per keg for immediate shipment, and $2.70 on first quarter contracts. Price of spring wire has been advanced to 3.35c. by some independent companies. In the structural field there have been no inquiries of size, although a number taking less than 100 tons are being figured. The Elks' Temple, Louisville, has been awarded to the Sneed Architectural Iron Co., which will fabricate and erect 1155 tons. The Dravo Contracting Co. and the Green Bay Drydock & Shipbuilding Co. have been awarded three barges each by the Mississippi River Commission, about 3000 tons of steel being required.

Coke.—There was much activity in the coke market, both for prompt shipment and first half contracts. Spot prices are very firm, and in some cases have advanced 50c. a ton over last week's levels. Contract prices rule about the same level as has been the case for several weeks. We note one sale of 10,000 tons and another of 6000 tons of foundry coke for shipment over the first half.

Old Material.—There is little activity in the scrap market, although dealers report a more active interest in future shipments. Prices are, if anything, firmer, as dealers and consumers all agree that buying must soon commence. The Big Four and C. & O. railroads have fair-sized lists out.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

Per Gross Ton	
Bundled sheets	$13.00 to $13.50
Iron rails	16.00 to 17.00
Relaying rails, 50 lb. and up	25.50 to 26.00
Rails for rolling	17.00 to 17.50
Heavy melting steel	16.00 to 17.00
Steel rails for melting	15.00 to 16.00
Car wheels	19.00 to 19.50
Per Net Ton	
No. 1 railroad wrought	14.00 to 14.50
Cast borings	11.00 to 11.50
Steel turnings	10.50 to 11.00
Railroad cast	16.50 to 17.50
No. 1 machinery	20.50 to 21.00
Burnt scrap	11.00 to 11.50
Iron axles	20.00 to 20.50
Locomotive tires (smooth inside)	13.50 to 14.50
Pipes and flues	10.00 to 10.50

San Francisco

Slight Upward Trend of Pig Iron—Old Material Advances $5 Per Ton

SAN FRANCISCO, Dec. 20.—There has been no great change in the condition of the pig iron market during the past two weeks, with the possible exception of a slight upward tendency in prices at primary foreign centers. This applies particularly to Continental iron, latest cables indicating firmness. One merchant figures that on the basis of new quotations it would be difficult to place No. 1 foundry here at less than $32.75 in 1000 lots, meaning from $34 to $35 to the trade. Recent business has been light, it being estimated that scarcely more than 500 tons has been placed. The price was around $33, c.i.f., duty for buyers' account. Inquiries for a considerable tonnage running into the new year are reported, but as yet actual business has not been noteworthy. Nothing is heard from the Chinese market, which seems to be heavily sold. Indian markets are high as compared with Continental, and domestic prices are still out of line.

Cast Iron Pipe.—The market continues to show a healthy condition, and while prices are not greatly changed, the tone is firm, with indications for a maintenance of strength into the spring season. Offerings are not being made freely by mills, and the near future seems to promise a scarcity of pipe, or, at least, deferred shipments. Together with this, an active demand is expected early in the year, both from private and

municipal sources. At present, business is limited, but there is enough offering to satisfy makers. One large interest reports that about 1000 tons is pending from private enterprises. The city of Glendale has taken bids on about 500 tons of 12 to 16-in. pipe. The award has not yet been made. Alhambra opens Jan. 2 on 250 tons of 4, 6 and 8-in. Current prices are close to $56 for 4-in. and $52 for 6-in., delivered.

Finished Iron and Steel.—Conditions on the coast remain satisfactory as far as development work is concerned. The building industry displays a steady expansion, justifying maintenance of steel mills operation. The Los Angeles section is reported especially active with the volume of orders good, although the number of consciously large offerings at the moment is not large. Oil industry contracts appear to have been filled for this year. The demand is for mixed materials in moderate sized lots, running from 50 to 200 tons. Business has been good in tubes, cold drawn shafting, rivets and the like. Plates are being maintained at about the same price as prevailed a few weeks ago, namely, from a minimum of 2.35c. to approximately 2.55c., delivered. The majority of mills are quoting not higher than 2.50c. Sheets, shapes and bars are unchanged. Prospects of particular note include the Kern County hospital to be located at Bakersfield, for which about 600 tons of steel, a considerable amount of metal lumber and light bars will be required; the U. S. Veterans' Hospital at Livermore, comprising 29 buildings; the American Legion building to be located in San Francisco, which will require around 300 tons of structural steel. The Alaskan Railway Commission is contemplating the erection of several bridges along its line from Cordova to Fairbanks, and is inquiring for bids. P. J. Walker is contractor for the new bank building, involving 2500 tons of steel, to be built in Salt Lake City.

Coke.—Outside of a few inquiries for carlot quantities, involving spot coke, the trading has been light of late. There is considerable offered at present, and there is keen competition between the various sellers. Market prices show no important fluctuations.

Old Material.—Perhaps the best single piece of business placed within the past fortnight was that involving three cars of heavy melting steel, which was sold for the account of the large interest on the basis of $16 per net ton, f.o.b. cars at point of shipment, or the equivalent of about $19, delivered. This price represents a very notable gain in the market recently, almost $5 per net ton. The reason for the strong condition is the scarcity of offerings. It is understood that around 9000 tons of scrap have been sold by one of the railroads to the purchasing company of the five rolling mills at $17.80 per gross ton, delivered. Cast iron scrap is very scarce and strong at $26 per net ton, delivered.

New Companies Organized

W. H. Russell, who two years ago purchased the business of C. H. Russell & Son, manufacturers of farm and lumber wagons, was recently incorporated under the name C. H. Russell & Son, Inc., and will conduct the business as formerly. The present organization has been built up around a business which existed for 40 years, with factories located at Clarksville, Va. The capitalization of the company is $50,000 and the machinery and supplies are adequate for present operations.

L. T. Bauer, Inc., New York, recently incorporated with capital stock of $50,000, to manufacture machinery and tools, has been disorganized according to Nathan Vidaver, 25 West Forty-third Street, New York, counsel for the company.

The Continental Roofing & Mfg. Co., Highlandtown P. O., Baltimore, Md., has purchased a plant with sufficient equipment for present operations. There is only a small amount of construction work in view at this time. The officers of the company are: Thomas M. Rainhard, president, formerly president of The Barrett Co.; W. B. Harris, formerly general sales manager of The Barrett Co., vice-president and treasurer, and Stanley Woodward, secretary.

The Plastuc Mfg. Corporation, 1265 Broadway, New York, with plant located at 205 Sunset Avenue, Syracuse, N. Y., recently incorporated with capital stock of $300,000, has taken over the entire assets of the Sheet Lathing Corporation, which includes land, factory buildings and machinery of the factory site at Syracuse. Machinery and equipment are adequate for the present. The officers of the company are: F. C. Hutchinson, president, located at the New York office; S. J. Potter, vice-president, and J. M. Bullen, secretary and treasurer.

The Grimm Metal Sign Corporation, 700-02 South Eighteenth Street, St. Louis, has been incorporated with capitalization of $50,000, to take over a business which has been established since June in making metal signs. The company is operating day and night and has more business on its order book than can be taken care of during the winter. H. A. Grimm is president and treasurer, and H. Tandberg is general manager.

Announcement has been made that the recent incorporation of the Columbia River Door Co., Kalama, Wash., has no bearing on the company's activities, which will remain as before. Its application was filed merely in compliance with legal rulings. J. F. Stone is president.

The Tire Gauge Valve Corporation, Charleston, W. Va., has been incorporated with capital stock of $200,000, to manufacture valves and specialties. Apart from working out organization plans, the company will be inactive for a few months. C. S. Monroe is secretary-treasurer.

New Books Received

Commercial Statistics for the Calendar Year 1921. By the Statistical Division, Board of Engineers for Rivers and Harbors. Pages 1326, 5¾ x 9 in. Published by Government Printing Office, Washington.

Ideas for the Radio Experimenter's Laboratory. By N. B. Sleeper. Pages 134, 5 x 8 in.; illustrations 60. Published by Norman W. Henley Publishing Co., 2 West Forty-fifth Street, New York. Price, 75 cents.

Foreign Tariff Notes, No. 42. Prepared by Division of Foreign Tariffs, Henry Chalmers, chief. Pages 204, 5¾ x 9 in. Published by Government Printing Office, Washington. Sold by Superintendent of Documents, Government Printing Office, Washington. Price, 20 cents.

Tales from the Gangway. By Pat Dwyer. "Random stories from the casting shop." Pages 450, 6 x 9 in.; illustrations 200. Published by the Penton Publishing Co., Cleveland. Price, $3.

The Westinghouse Air Brake Co., Wilmerding, Pa., has declared a regular quarterly dividend of $1.75, payable Jan. 31 to stockholders of record Dec. 30. This restores the stock to a 14 per cent annual basis, the stock having a par of $50, where it was prior to last April, when it was reduced to $1 per share quarterly. A meeting of the stockholders has been called for the purpose of voting on an increase in the capitalization of the company from $30,000,000 to $50,000,000. A stock dividend of 35 per cent will be paid upon the approval of the increase.

The National Supply Co., Delaware, has sold to bankers 75,000 shares of common stock having a par value of $50 a share, who in turn are making a public offering. The company was formed to acquire the capital stock and to continue the business of The National Supply Co. of Ohio, which in 1917 succeeded the National Supply Co. of West Virginia, incorporated in 1894. The manufacture and sale of equipment, machinery and supplies for all branches of the oil industry will constitute the company's business.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Plates

Sheared, tank quality, base, per lb.....1.95c. to 2c.

Structural Material

Beams, channels, etc.....2.00c.

Iron and Steel Bars

Soft steel bars, base, per lb.....2.00c.
Refined iron bars, base, per lb.....2.60c.

Hot-Rolled Flats

Hoops, base, per lb.....2.75c. to 2.90c.
Bands, base, per lb.....2.75c. to 2.90c.
Strips, base, per lb.....2.75c. to 2.90c.

Cold-Finished Steels

Bars and shafting, base, per lb.....2.50c.
Strips, base, per lb.....4.50c.

Wire Products

Nails, base, per keg.....$2.70
Bright plain wire, base, per 100 lb.....2.45
Annealed fence wire, base, per 100 lb.....2.45
Spring wire, base, per 100 lb.....3.25 to 3.35
Galvanized wire, base, per 100 lb.....2.95
Galvanized barbed, base, per 100 lb.....3.35
Galvanized staples, base, per keg.....3.35
Painted barbed wire, base, per 100 lb.....3.00
Polished staples, base, per keg.....3.00
Cement coated nails, base, per count keg.....2.20
Woven fence, carloads (to jobbers).....70½ per cent off list
Woven fence, carloads (to retailers).....68 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads...60 and 5 per cent off list
Machine bolts, small, cut threads....50 and 10 per cent off list
Machine bolts, larger and longer....50 and 10 per cent off list
Carriage bolts, ⅜ x 6 in.:
Smaller and shorter, rolled threads, 50, 10 and 5 per cent off list
Cut threads.....50 per cent off list
Longer and larger sizes.....50 per cent off list
Lag bolts.....60 and 5 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads....50 and 10 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.:
Smaller and shorter.....45 per cent off list
Larger and longer sizes.....45 per cent off list
Hot pressed square or hex. blank nuts...$3.25 to $3.50 off list
Hot pressed nuts, tapped.....3.25 to 3.50 off list
C.p.c. and t. sq. or hex. nuts, blank.....3.25 to 3.50 off list
C.p.c. and t. sq. or hex. nuts, tapped.....3.25 to 3.50 off list
Semi-finished hex. nuts:
9/16 in. and smaller, U. S. S....75, 10 and 5 per cent off list
⅝ in. and larger, U. S. S....70, 10 and 2½ per cent off list
Small sizes, S. A. E.....80 and 5 per cent off list
S. A. E., ⅝ in. and larger.....75 and 5 per cent off list
Stove bolts in packages.....80 and 5 per cent off list
Stove bolts in bulk.....80, 5 and 2½ per cent off list
Tire bolts.....50, 10 and 10 per cent off list

Cap and Set Screws

Milled square and hex. head cap screws....75 per cent off list
Milled set screws.....75 per cent off list
Upset cap screws.....75 and 10 per cent off list
Upset set screws.....80 per cent off list

Rivets

Large structural and ship rivets base, per 100 lb.....$3.00
Large boiler rivets, base, per 100 lb.....3.10
Small rivets.....65 and 10 to 65 and 5 per cent off list

Track Equipment

Spikes, 9/16 in. and larger, base, per 100 lb....$2.75
Spikes, ½ in. and smaller, base, per 100 lb....3.50
Spikes, boat and barge, base, per 100 lb.....3.50
Track bolts, base, per 100 lb.....$3.75 to 4.50
Tie plates, per 100 lb.....2.35 to 2.50
Angle bars, base, per 100 lb.....2.75

Welded Pipe

Butt Weld

Steel			*Iron*		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	49	23½	¼ to ⅜	+7	+33
¼ to ⅜	55	29½	½	26	8
½	60	46½	¾	32	17
¾	64	52½	1 to 1½	34	19
1 to 3	66	54½			

Lap Weld

2	59	47½	2	29	15
2½ to 6	63	51½	2½ to 6	32½	19
7 to 8	60	47½	7 to 12	30	17
9 to 12	59	46½			

Butt Weld, extra strong, plain ends

⅛	45	28½	¼ to ⅜	+15	+48
¼ to ⅜	51	34½	½	25	13
½	57	46½	¾	32	18
¾	62	51½	1 to 1½	34	20
1 to 1½	64	53½			
2 to 3	65	54½			

Lap Weld, extra strong, plain ends

2	57	46½	2	30	17
2½ to 4	61	50½	2½ to 4	33	21
4½ to 6	60	49½	4½ to 6	32	20
7 to 8	56	43½	7 to 8	25	13
9 to 12	50	37½	9 to 12	20	8

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 and 2½ per cent.

Boiler Tubes

Lap Welded Steel		*Charcoal Iron*	
1¾ in.	21½	1½ in.	+12
2 to 2¼ in.	36	1¾ to 1⅞ in.	+ 2
2½ to 3 in.	47	2 to 2½ in.	—8
3¼ to 13 in.	52	2½ to 3 in.	—13
		3¼ to 4½ in.	—15

To large buyers of steel tubes a supplementary discount of 5 per cent is allowed.

Standard Commercial Seamless Boiler Tubes

Discounts on cold-drawn tubes in carload lots f.o.b. Pittsburgh, follow:

1 in.	55	2½ and 2¾ in.	38
1¼ and 1½ in.	47	3 in.	42
1¾ in.	31	3¼ to 4 in.	47
2 and 2¼ in.	34	4¼ in. and 5 in.	39

Hot Rolled

3 in.	44	3¼ to 4 in.	49

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base.....85 per cent off list
Carbon 0.30 to 0.40, base.....83 per cent off list
Plus usual differentials and extras for cutting.

Seamless Locomotive and Superheater Tubes

Cents per Ft.		Cents per Ft.	
2-in. O.D 12 gage	14	2¼-in. O.D. 10 gage	19
2-in. O.D. 11 gage	15	3-in. O.D. 7 gage	34
2-in. O.D. 10 gage	16	1¼-in. O.D. 9 gage	13¾
2¼-in. O.D. 12 gage	16	2⅝-in. O.D. 9 gage	53
2¼-in. O.D. 11 gage	17	5½-in. O.D. 9 gage	55

Tin Plate

Standard cokes, per base box.....$4.75

Terne Plate

(Per package, 200-lb.)

8-lb. coating	$9.30	25-lb. coating I. C.	$14.25
8-lb. coating I. C.	9.60	30-lb. coating I. C.	15.25
15-lb. coating I. C.	11.80	35-lb. coating I. C.	16.25
20-lb. coating I. C.	13.00	40-lb. coating I. C.	17.25

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....2.50c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.35c.
Regular auto body sheets, base (22 gage), per lb., 4.70c. to 5.00c.

Galvanized

No. 28 (base), per lb.....4.35c.

Tin-Mill Black Plate

No. 28 (base), per lb.....3.35c.

Manufacturers have pamphlets, which can be had upon application, giving price differentials for gage and extras for length, width, shearing, etc.

Freight Rates

All rail freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic	$0.325	Buffalo	$0.265	St. Louis	$0.43
Philadelphia, export	0.235	Cleveland	0.215	Kansas City	0.735
Baltimore, domestic	0.315	Cleveland, Youngstown Comb.	0.19	Kansas City (pipe)	0.705
Baltimore, export	0.225	Detroit	0.29	St. Paul	0.60
New York, domestic	0.34	Cincinnati	0.29	Omaha	0.735
New York, export	0.255	Indianapolis	0.31	Omaha (pipe)	0.705
Boston, domestic	0.365	Chicago	0.34	Denver	1.27
Boston, export	0.255			Denver (pipe)	1.215

Pacific Coast	$1.50	Pac. Coast, ship plates	1.20
Birmingham	0.69	Memphis	0.385
Jacksonville, all rail	0.50	Jacksonville, rail and water	0.415
New Orleans	0.515		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 30c. to 40c.; ship plates, 30c. to 40c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 30c. to 40c.; sheets and tin plates, 50c.; rods, wire rope cable and strands, 75c.; wire fencing, netting and stretcher, 50c.; pipe not over 8 in. in diameter, 50c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

British Iron and Steel Market

Tin Plate Expected to Advance Further—Continental Finished Steel Quoted Much Higher, Due to Exchange Improvement

(By Cable)

LONDON, ENGLAND, Dec. 22.

Pig iron business is quieter, owing to the approach of the holidays, but the tone of the market is confident and increased activity is anticipated upon resumption of business. Some Midlands producers are preparing to re-light additional furnaces. America is inquiring for Scotch foundry iron. Hematite is firm.

Many steel plants are closing down for the holidays all next week, but there are substantial orders on hand. British railroads have made fair purchases, as have also shipbuilding and engineering works, but the general merchant business is dull.

Continental steel prices are dearer, on the appreciation of their exchange rates. In consequence, business is almost stagnant. Plates, 3/16 in., have been sold to India at £7 2½s. (1.48c. per lb.) cost and freight. Semi-finished steel is unobtainable.

Large business is being done in tin plate on the new 20s. ($4.64) basis, f.o.b., in anticipation of another price advance. So far, no alteration has been made and some works are booked up over June. Tin plate bars (sheet bars) are being talked of at higher prices.

Japanese specifications for black sheets, cold-rolled, have an agreed price now at £16 (3.31c. per lb.) f.o.b. There is good demand for early shipment, but the works are quoting no better than March or April.

Galvanized sheets are steady.

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $4.64 per £1, as follows:

Durham coke, delivered	£1 9s.		$6.73	
Cleveland No. 1 foundry	4 15		22.04	
Cleveland No. 3 foundry	4 11		21.11	
Cleveland No. 4 foundry	4 5		19.72	
Cleveland No. 4 forge	4 2½		19.14	
Cleveland basic	4 0		18.56	
East Coast mixed	4 13	to £4 13s.	$21.58	to $21.69
Ferromanganese	14 0		65.00	
Electric ferromanganese*	14 0		64.96	
Billets, 50 tons and up	7 15	to 8 0	36.96	to 37.12
Billets	7 0	to 7 5	32.48	to 32.64
Sheet and tin plate bars, Welsh	7 0	to 7 7½	32.48	to 34.22
Tin plate, base box	1 0	to 1 0½	1.64	to 1.67
			C. per Lb.	
Slab ingots	8 10	to 9 0	1.76	to 1.86
Boiler plates	11 0	to 11 10	2.28	to 2.38
Tees	9 0	to 9 10	1.86	to 1.97
Channels	8 5	to 8 15	1.71	to 1.81
Beams	8 5	to 8 15	1.71	to 1.81
Round bars, 6 to 8 in.	9 0	to 9 10	1.86	to 1.97
Galvanized sheets, 24 g.	17 5	to 17 10	3.57	to 3.63
Black sheets, 24 gage	11 15		2.43	
Black sheets, Japanese specifications	15 0		3.06	
Steel hoops	11 0	to 11 10*	2.28	to 2.38*
Cold rolled steel strip	13 0		2.69	
Cotton ties, Indian specifications	15 0		3.11	

*Export price.

Continental Prices, All F. O. B. Channel Ports. Delivery as Specified

Belgium, Jan., Feb.	£4 10s.		$20.88
Luxemb'g, Jan., Feb.	4 10		20.88
Billets: Not quoted.			
Wire rods, 5 mm. (0.2 in.):			
Wire nails (keg basis):			
Merchant bars:			
France, not quoted.			

Channels:				
Belgium	7 10	to 7 12½	1.55 to	1.58
¾-in. plates:				
Germany, Jan., Feb.	6 5	to 6 15	1.29 to	1.40
Belgium, Jan., Feb.	7 0		1.45	
Luxemb'g, Jan., Feb.	7 0		1.45	
France, not quoted.				
No. 8 gage wire:				
Belgium	14 10⅝		3.01	

COST OF LIVING HIGHER

All Items But Fuels and Metals Higher Than in October

Wholesale prices in November averaged nearly 1½ per cent higher than in October, according to the information gathered by the Bureau of Labor Statistics, and 10.7 per cent higher than in October of last year. Similarly, the average retail price of food is reported 1½ per cent higher in November than in October, but it is 5 per cent lower than it was a year ago.

Metals and metal products, as a group, declined 1½ per cent during the month, and reached a point 16.7 per cent higher than a year ago—this, in part due to recent recessions in pig iron. But THE IRON AGE composite price for pig iron, at mid-November, was 41½ per cent higher than a year ago, and the composite for finished steel was 16 per cent higher than in 1921.

Metals stand liquidated 68 per cent of the 1920 peak price excess over 1913—that is, 68 per cent of that excess has been wiped out. This liquidation, a year ago, had reached 84.5 per cent, a portion of which has since been lost by price advances in nearly all items. "All commodities" have been liquidated 62 per cent, on the basis of the November figures; a year ago, it was 71.5 per cent.

Index Numbers of Wholesale Prices, by Groups of Commodities

(1913 equals 100)

	1920 Peak	1921 Nov.	1922 Oct.	1922 Nov.	Advance in One Year, Per Cent
Farm products	247	121	138	143	18.2
Food, etc.	248	139	140	143	2.9
Cloths and clothing	346	180	188	192	6.7
Fuels and lighting	281	197	226	218	10.7
Metals and metal products	203	114	135	133	16.7
Building materials	300	163	183	185	13.5
Chemicals and drugs	213	129	124	127	—1.6
House-furnishing goods	275	178	176	179	0.6
Miscellaneous	208	119	120	122	2.5
All commodities	247	141	154	156	10.7

According to figures of the National Industrial Conference Board, the cost of living to the average workman's family advanced 0.8 per cent from Oct. 15 to Nov. 15, being 58.4 per cent above July, 1914. Food, shelter and clothing all showed increases.

Senator Reed's Immigration Bill

WASHINGTON, Dec. 26.—Senator David A. Reed of Pennsylvania has introduced a bill proposing an amendment to the immigration laws. It would base the quota of immigration on 5 per cent of the various foreign populations on the year 1890, instead of the present law fixing the quota at 3 per cent based on 1910. It is stated that the amendment would have a particular bearing in the way of increasing the labor supply from northern Europe.

In connection with the absorption of the Morris & Bailey Steel Co., Wilson, near Clairton, Pa., by the Oliver Iron & Steel Co., Pittsburgh, a new corporation known as the Oliver Iron & Steel Corporation, has been incorporated under the laws of Pennsylvania, with a capitalization of $8,000,000. Henry Oliver, president of the Oliver Iron & Steel Co., continues as president of the new company.

O. J. H. Hartsuff, general superintendent Edgar Thomson works, Carnegie Steel Co., Braddock, Pa., gave his annual Christmas tree party for the children of employees of that plant on the afternoon of Dec. 23, and distributed among 7000 of them, three gross tons of candy and 60 barrels of popcorn.

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
Dec.	Lake	Electrolytic*	New York	New York	St. Louis	New York	St. Louis
20	14.75	14.50	37.87½	7.30	6.97½	7.35	7.00
21	14.75	14.50	38.12½	7.30	6.97½	7.30	6.95
22	14.75	14.50	38.50	7.30	6.97½	7.30	6.95
23	14.75	14.50	....	7.30	6.97½	7.30	6.95
26	14.75	14.50	39.00	7.30	6.97½	7.30	6.95

*Refinery quotation.

New York

NEW YORK, Dec. 26.

The usual holiday dullness pervades most of the markets, except copper, which has been fairly active each day. Buying of tin has been only moderate and demand for lead has been fair. The zinc market is still devoid of feature or activity.

Copper.—Early last week the electrolytic copper market on heavy sales to consumers reached the highest level so far this year at 14.75c., delivered, and buying was fairly active up to the beginning of the Christmas holidays. Demand has come from foreign consumers as well as domestic, the latter covering their requirements largely for the first quarter. It is generally acknowledged that the metal cannot be bought under the present price and there are those who believe that the buying movement has not subsided and that 15c., delivered, will be reached before the end of the year. There are others, however, who feel that the market has temporarily reached its peak on this movement. Lake copper is also higher and is selling at 14.75c. to 15c., delivered.

Tin.—Owing to the Christmas holidays in London, which extend from Friday, Dec. 22, to Tuesday, Dec. 26., inclusive, the Straits tin market here has been quiet. A good business was done, however, on Dec. 21 and 22, amounting to 600 to 700 tons, mostly metal afloat. This volume of transaction is considered unusually heavy at just this time. Quotations on the London market are unobtainable today because of the holiday there, but spot Straits tin is quoted here today at 39.00c., New York, due to a probable advance in London tomorrow. Moderate sales were made. Arrivals thus far this month have been 5095 tons, with 7643 tons reported afloat.

Lead.—The principal news feature of interest was the advance in the price of the leading interest early last week to 7c., St. Louis, or 7.25c., New York. Previous to this advance there was exceedingly good buying reported at St. Louis, with 6.90c. to 6.92½c. paid. It is considered difficult now to buy lead in that market at less than 7c., but the general quotation of the independents is 6.97½c., St. Louis, or 7.30c., New York.

Zinc.—Exceeding quietness still pervades the market. Demand from consumers is especially light and sales for export have been meager. The market, however, has remained fairly steady as to prices, with prime Western for early or January delivery quoted at 6.95c., St. Louis, or 7.30c., New York. Spot metal, for which there is almost no demand, is quoted at 7c., St. Louis, or 7.35c., New York. In the absence of any activity these quotations are largely nominal.

Old Metals.—Prices have had a decided advance and business is active. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	14.25
Copper, heavy and wire	13.00
Copper, light and bottoms	11.50
Heavy machine composition	11.00
Brass, heavy	8.75
Brass, light	7.25
No. 1 red brass or composition turnings	10.50
No. 1 yellow rod brass turnings	8.25
Lead, heavy	6.25
Lead, tea	5.00
Zinc	5.00

Antimony.—Chinese metal in wholesale lots for early delivery is quoted at 6.25c. to 6.35c., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, in wholesale lots for early delivery from importers is quoted at 22c. to 23c., per lb., duty paid, New York. No public quotation is yet made by the leading producer.

Chicago

Dec. 26.—Copper and lead have advanced while zinc has declined. The strength in copper is accounted for by more liberal consumer buying, while lead is up principally because of an advance by the leading producer. Zinc declined sharply during the past week, but is now recovering as the result of export sales. The market for this metal is closely linked with foreign demand, as domestic consumption is not equal to production. Among the old metals, copper, lead and zinc grades have advanced. We quote, in carload lots, lake copper, 15c.; tin, 39.50c. to 40c.; lead, 7.15c.; spelter, 7c.; antimony, 8.50c., in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 12.25c.; copper bottoms, 10.25c.; red brass, 9.25c.; yellow brass, 7.25c.; lead pipe, 5.75c.; zinc, 4.75c.; pewter, No. 1, 23c.; tin foil, 27c.; block tin, 32c., all buying prices for less than carload lots.

St. Louis

DEC. 26.—Lead is steady at 7.05c. to 7.07½c., car lots, while slab zinc is unchanged at 7.10c. to 7.15c. On old metals we quote: Light brass, 3.50c.; heavy red brass and light copper, 7c.; heavy yellow brass, 4c.; heavy copper and copper wire, 7.50c.; zinc, 3c.; lead, 3c.; pewter, 15c.; tin foil, 20c.; tea lead, 2c.; aluminum, 9c.

Judge Gary on the Eight-Hour Day and Pittsburgh Basing

Judge Elbert H. Gary, chairman United States Steel Corporation, has returned to New York after spending a few days in Chicago. He talked to a group of newspaper reporters in Chicago on the 12-hr. day and the Pittsburgh base. He said that under other conditions he would like to see the 8-hr. day in general effect, but to establish it now would be to wreck the steel industry. "We are now short of labor," he said. "If we arbitrarily adopted the 8-hr. day we would increase our production costs immensely, as we would be forced to pay the men almost if not quite as much for 8 hr. work as they now get for 12. Even then, in the present condition of the labor market, we would be unable to get sufficient workmen. It would mean much higher prices for steel. That would be a bad thing for the steel business and for the country."

Judge Gary defended the custom of basing prices on Pittsburgh, saying that that is the cheapest point of production, as the cost of furnishing fuel at Pittsburgh is less than in the Chicago district.

Each employee of the Master Electric Co., Dayton, Ohio, received an insurance policy with premiums paid as a Christmas gift. The policies were placed with an old line insurance company and range from $500 up. Premiums will be paid by the company so long as the employees remain in the organization, and each succeeding year policies will be increased up to $2,000. Upon presenting the gifts, President E. P. Marsh announced the initiation of a nursing service to provide nurses without charge to employees who are ill. The business of the company, according to Mr. Marsh, was four times greater during the fourth quarter than it was in the corresponding period last year.

Edward Darby's Son, steel equipment, has changed its name to Edward J. Darby & Son, 520 North Third Street, Philadelphia. No change in personnel is effected through the readjustment, but the company's activities are extended.

PERSONAL

J. W. Stannard, formerly secretary-treasurer of the American Autoparts Co., Detroit, and previous to that general statistician and chairman of the statistical committee of the executive organization, E. I. Dupont de Nemours & Co., has joined the Detroit Range Boiler & Steel Barrel Co., Detroit.

Frank L. Cogill, president Coulter & McKenzie Machine Co., machinery manufacturers and iron founders, Bridgeport, Conn., has returned to this country after an extensive business trip to England and the Continent.

James H. Stratton, engineer, Wellman, Seaver, Morgan Co., Cleveland, is scheduled to address a joint meeting of the Associated Technical Societies of Cleveland in a memorial session in honor of Samuel T. Wellman, on the evening of Jan. 9.

Ralph L. Glaser has been made New England district manager of the Warner & Swasey Co., machine tools, to succeed the late H. L. Kinsley. Heretofore Mr. Glaser covered Rhode Island, Connecticut and a part of Massachusetts for the company under Mr. Kinsley's direction. Prior to that time, he served in Ohio, and later was on the Philadelphia end of the company's New York office. His appointment takes effect Jan. 1.

James A. McCory, for a number of years affiliated with the American Steel Co., Pittsburgh, as secretary and general sales manager, has taken a position with the Superior Steel Corporation, Pittsburgh.

H. A. Hutchins, formerly connected with the Thew Shovel Co., has become associated with the Northwest Engineering Co. at its main office, 1220 Steger Building, Chicago. He was with the Thew company since 1917 and at the time of his recent appointment was Chicago district manager.

James E. Strong, formerly general superintendent of the Alabama Co., has been elected vice-president in charge of operations and will be next in authority to John W. Porter, who was recently elected vice-president and general manager to succeed Harry W. Coffin, resigned. Edmund Ewing, for several years superintendent of the Bessie mines of the Sloss-Sheffield Steel & Iron Co., has resigned to become assistant to Mr. Strong.

George E. Ireland, general manager the Steel Products Engineering Co., Springfield, Ohio, has resigned. J. E. McAdams, president of the company, whose home is in Dayton, has taken active charge of the plant.

F. Rodger Imhoff, formerly sales manager and consulting engineer of the Precision & Thread Grinder Mfg. Co., 1 South Twenty-first Street, Philadelphia, recently resigned that position.

Blake C. Hooper, Minnesota Supply Co., Pioneer Building, St. Paul, Minn., has been appointed special railroad agent in the Northwest of the Chicago Pneumatic Tool Co., 600 West Jackson Boulevard, Chicago.

C. M. Stevenson, who had been district sales manager at Toledo, Ohio, for the Colonial Steel Co., Pittsburgh, until the branch was discontinued, has severed his connection, having been elected a director and appointed general manager of the Reinforced Switch & Mfg. Co., North Side, Pittsburgh, which manufactures a patented reinforced switch and fuse clip.

Edwin S. Carman, secretary and chief engineer, Osborn Mfg. Co., Cleveland, delivered an illustrated lecture entitled "The Molding Machine, an Economic Necessity," in Toledo, Ohio, Dec. 19, to a large audience composed of foundrymen, pattern makers and technical students. The talk was given under the auspices of the Toledo Foundrymen's Association in the auditorium of the Scott High School.

J. M. Hill, formerly superintendent of the Canton Sheet Steel Co., Canton, Ohio, has been appointed manager of the new sheet mills of the Weirton Steel Co., Weirton, W. Va., and will assume his new duties about Jan. 1.

L. R. Phillips has been appointed district sales manager of the Detroit Seamless Steel Tubes Co. and will establish an office in Chicago on Jan. 1. For the past 20 years Mr. Phillips has been associated with the National Tube Co., 17 of which were spent with the Chicago office, and the remaining three with the St. Louis office.

E. M. Long, who has been connected with the refining industry for the last 15 years, and who recently joined the sales force of the Calorizing Co., Pittsburgh, has been promoted to district manager of the Southwestern division, comprising southern Kansas, Oklahoma, Louisiana, Texas and Mexico. He was formerly connected with the engineering department of the Gulf Refining Co., Port Arthur, Tex.

Robert L. Wood has resigned as secretary and assistant treasurer of the Cruse-Kemper Co., Ambler, Pa., and on Jan. 1 will become associated, as vice-president and treasurer, with the John Clark Sims Co., Ltd., general advertising agent, Philadelphia. Mr. Wood is a graduate civil engineer, University of Pennsylvania; he had a short training with the Phoenix Iron Co., followed by an education in the manufacture and distribution of illuminating gas with the United Gas Improvement Co. In 1912 he joined the Cruse-Kemper Co., builder of gas holders, and fabricator of general steel plate work. His work there as an official and as purchasing agent gave him experience in buying, selling and operating.

H. W. Krueger, president Northern Corrugating Co., Green Bay, Wis., has been elected president of the Hart Mfg. Co., Louisville, Ky., in which concern he has been a stockholder and director for about six years. The Hart company during the past few months erected additions giving a daily capacity of 20 tons of castings.

Carl A. Johnson, president Gisholt Machine Co., Madison, Wis., was re-elected president of the Wisconsin Manufacturers' Association at the annual convention in Milwaukee. Judson G. Rosebush, Appleton, was re-elected vice-president; George F. Kull, Madison, secretary, and George B. Ingersoll, vice-president Fairbanks, Morse & Co., Beloit, treasurer.

The Armstrong Steel Casting Co., Huntington, Ind., has been refinanced and will resume operations on Jan. 1. New directors include W. W. Hawley, E. T. Pelton, F. E. Wickenhiser, Paul M. Taylor, D. H. Oskin, H. S. Buck and W. D. Redrup. The officers are: D. H. Oskin, president and treasurer; H. S. Buck, vice-president and general manager; E. T. Pelton, secretary and plant manager. Mr. Oskin was formerly general sales manager of the Trumbull Steel Co., Warren, Ohio, while Mr. Pelton has been with the company for some time, and was formerly identified with the National Steel Castings Co., Milwaukee. Mr. Buck was formerly vice-president and general manager of the Fort Smith, Ark., Spelter Co., and the American Zinc Products Co., Greencastle, Ind. The Armstrong plant is served by both the Erie and Wabash railroads. Its equipment includes electric steel furnaces and Bessemer converters, and its capacity is 500 tons of steel castings a month.

The Mount Royal Metal Co., Montreal, manufacturer of solders, Babbitts, type metal and other white metal alloys, is moving to its new plant, corner Mill and Oak streets. The new plant will enable it to increase its present output considerably. In connection with this business, though a separate organization, the National Bronze Co. has been incorporated and will occupy part of the new building. It is the intention to install two furnaces made by the Surface Combustion Co. The output will consist of brass and aluminum castings up to 800 lb. The manager of the Mount Royal Metal Co. is G. R. Hutchins, who is also secretary-treasurer of the National Bronze Co., of which J. R. Robb is president and H. J. Roast, vice-president and general manager.

OBITUARY

William R. Walker

WILLIAM R. WALKER died at St. Luke's Hospital, New York, Wednesday morning, Dec. 20, after an operation. He was born at LaPorte, Ind., Nov. 26, 1857, and his career was closely identified with the iron and steel industry. His first employment was with the North Chicago Rolling Mill Co., Chicago; then he was appointed chemist for the Crown Point Iron Co., Crown Point, N. Y., and later he was with Spang, Chalfant & Co., Pittsburgh, as works superintendent. He was early associated with Robert Forsyth, the well-known steel works engineer, who constructed the South Chicago Works of the North Chicago Rolling Mill Co. in the eighties. Prior to 1890 Mr. Walker was works manager of the Union Works, of the Illinois Steel Co., Chicago, and later became general manager of the South Chicago Works for the same company.

At the time of the formation of the United States Steel Corporation in 1901 Mr. Walker was appointed assistant to the president, which position he held at the time of his death. He gave special attention to metallurgical research and to improvements in operation and production.

Mr. Walker, as the organizer of the metallurgical staff and general research work of the Steel Corporation, had a unique relation to its blast furnace and steel works practice. He belonged to the second generation of the "Bessemer Boys," and this had much to do with the transition from the Bessemer to the open-hearth. Later, as the electric furnace became a factor in response to the call for quality steel, he was one of its chief sponsors. He believed that it held the solution of the problem of quantity production of quality of steel and consistently favored the installation of large electric furnace units. His advocacy of the installation of large electric furnaces in the Chicago district in war time was approved by the corporation's executives and the results in the production of shell steel fully justified his position.

To Mr. Walker the American Iron and Steel Institute has been indebted for many noteworthy programs of iron and steel papers, the meetings of the institute having become widely famed for their valuable contributions to the records of advanced American practice in the manufacture of pig iron and steel. Being at the head of the intercompany committee work of the Steel Corporation for the standardizing of practice at its various plants, he was able to get some of the most successful men in both the Steel Corporation and in independent steel companies to bring to the Institute meetings the results of their latest investigation. In a similar way he was helpful to the iron and steel committee of the American Institute of Mining and Metallurgical Engineers.

In all this work he was modest and self effacing.

In the words of President James A. Farrell, "Mr. Walker was a man of keen mental attainments and possessed an exceptional knowledge of the iron and steel industry from both scientific and practical standpoints."

Mr. Walker was a member of many of the technical associations of the county and took a leading part in their activities. He was highly esteemed by his associates in the United States Steel Corporation and in the iron and steel industry.

Don H. Bacon

DON H. BACON, formerly president of the Tennessee Coal, Iron & Railroad Co., and also president of the Minnesota Iron Co., before the United States Steel Corporation was organized, died at his home in St. Augustine, Fla., on Dec. 17, after an illness which lasted for nearly a year. Mr. Bacon, who was a native of New York State, went to Ishpeming, Mich., in the '70s as a telegraph operator for the Cleveland Mining Co. He was soon made superintendent of the Cleveland mine, and later took charge of the Minnesota Iron Co.'s properties at Tower, developed earlier by Charlemagne Tower, for whom the town was named. There Mr. Bacon became one of the leading figures in mining. In rapid succession he became general manager, then vice-president, and finally president of the Minnesota company. In 1901 he went to the South to become president of the Tennessee Coal, Iron & Railroad Co., having resigned his position with the Minnesota company. At that time the Tennessee company was new in the manufacture of finished products. It had been only two years since the ingot and rail mill at Ensley began operations. Attention was immediately directed to steel, and Mr. Bacon's efforts soon bore fruit in the quantities of open-hearth rails produced and the regularity with which the output was maintained. Many methods and devices now employed by the Tennessee company bear testimony to the careful and complete survey he made of the once struggling properties and to the vital economies he effected. The true magnitude of Mr. Bacon's efforts is best reflected in the work of the company which patterned after his beginning; and the eminence he holds in the history of the development of iron and steel in the Birmingham district can tell only a part of what he did. He remained at Birmingham with the company until it was acquired by the Steel Corporation in 1907, when he retired and moved to New York. From here he moved to St. Augustine about ten years ago.

HERBERT H. HEWITT, manager Reading Car Wheel Co., Reading, Pa., also manager of the Magnus Metal Co., Buffalo, died on Tuesday, Dec. 19, at his home, 619 Lafayette Avenue, Buffalo. Mr. Hewitt's largest interest was as president of the Hewitt Rubber Co., Buffalo.

JOHN H. BASS, founder of the Bass Foundry & Machine Co., Fort Wayne, Ind., died at his home in that city Dec. 17 at the age of 87.

HARRY F. LYNCH, some years ago engaged in iron and bolt manufacturing in Pittsburgh, and later associated with the Colorado Fuel & Iron Co., Pueblo, Col., died at the home of his son, Robert W. Lynch, in Thornburg, Pa., Dec. 16. He was born in Pittsburgh 76 years ago, and, except for the period spent in the West, had made his home in that district during his entire life. Robert W. Lynch is head of the order and shipping department, Carnegie Steel Co., Pittsburgh.

EDGAR B. PHILLIPS, general manager Phillips Wire Co., Freeman Street, Pawtucket, R. I., died Dec. 19, following an operation performed on the previous Monday. Mr. Phillips had been ill more than a month. He was born in Providence, R. I., 63 years ago. H. O. Phillips, a brother, founded the wire plant in 1892, and Mr. Phillips became associated with him at that time.

WILLIAM CAIRNS, formerly manager of the Parish & Bingham Co., Cleveland, died at St. Petersburg, Fla., Dec. 19, aged 57 years. Four years ago he became connected with the Detroit Pressed Steel Co., Detroit, and remained with that company until poor health compelled him to retire.

On the basis of 10 months already recorded, Great Britain's output of pig iron in 1922 stands fourth, as compared with other iron producing countries, and its production of steel ingots third, says Assistant Trade Commissioner H. B. A. Smith, in a report to the Department of Commerce. Again, as in 1921, the United States, France and Germany have exceeded Great Britain in output of pig iron; and the United States and Germany have outdone Great Britain in steel ingots. Average monthly production of pig iron in these countries in 1922 has been: United States, 2,092,220 tons; Germany, 510,000 tons; France, 393,660 tons; Great Britain, 387,190 tons. Monthly steel ingot averages are: United States, 2,702,100 tons; Germany, 725,000 tons; Great Britain, 467,700 tons; France, 351,000 tons. Belgium and Luxemburg fall well below Great Britain in both pig iron and steel ingots.

Riley & Foster, manufacturers' agents, whose headquarters are in Baltimore, Md., and Richmond, Va., have been appointed Southern representatives for the Dolman Mfg. Co., Inc., Springfield, Mass.

FABRICATED STEEL BUSINESS

Awards of 35,000 Tons—New Inquiries Aggregate About 11,000 Tons

Pan-American Petroleum & Transport Co., 6000 tons, to the American Bridge Co.

Apartment, Eighty-second Street, New York, 1200 tons, to the Hay Foundry & Iron Works.

Power house, Memphis, Tenn., 700 tons, to the Virginia Bridge & Iron Co.

Bridge for Boston, 500 tons, to the Phoenix Bridge Co.

West Spokane Avenue bridge, Seattle, Wash., 2118 tons, to Bethlehem Steel Bridge Co.

Missouri River bridge, Glasgow, Mo., 1649 tons, to Mt. Vernon Bridge Co.

Louisville & Nashville Railroad, bridge piers, 1599 tons, to unnamed fabricator.

Carpenter building, Milwaukee, Wis., 1300 tons, reinforced concrete construction substituted for structural steel.

Kaheka penstock pipe, Kahului Maui, Hawaii, 994 tons, to unnamed fabricator.

Fortieth Street bridge, Pittsburgh, 6500 tons, to the McClintic-Marshall Co.

Elks' temple, Louisville, Ky., 1155 tons, to Snead Architectural Iron Works Co.

Barges for Mississippi River Commission, Memphis, about 3000 tons, to Dravo Contracting Co. and Green Bay Drydock & Shipbuilding Co.

Missouri Highway Commission, bridge at Lexington, Mo., 4000 tons, to American Bridge Co.

Missouri Highway Commission, bridge at Glasgow, Mo., 1700 to 1800 tons, to Mount Vernon Bridge Co.

Corn Products Refining Co. building No. 48, Argo, Ill., 850 tons, to Bethlehem Steel Co.

Plant extensions, Owens Bottle Co., Charleston, W. Va., 1700 tons, to American Bridge Co.

Bridge material for Tennessee Eastman Corporation, 375 tons, to American Bridge Co.

Structural Projects Pending

Apartment, Eaton Avenue, New York, 1500 tons.

Loft, Seventh Avenue and Thirty-seventh Street, New York, 4500 tons, instead of 3000 as reported last week.

Manufacturing building, Hartford, Conn., 400 tons.

Public school, Flushing, N. Y., 400 tons.

Mutual Trust Co., Philadelphia, 200 tons.

Asphalt shed for the Standard Oil Co. of New Jersey, Canton, Baltimore, 200 tons.

Waverly, Mo., highway bridge, 2100 tons, Wisconsin Bridge & Iron Co., low bidder.

United States Insurance Exchange building, Chicago, an 18-story structure, tonnage not yet estimated.

Missouri Highway Commission, bridge at Miami, Mo., 2000 tons.

Facts About Pulverized Coal

Maximum conservation of coal is obtained only when pulverized, according to Frederick A. Scheffler, Fuller Engineering Co., New York, who made an address on the Westinghouse radiophone from Newark, N. J., on Dec. 21. Among other things he said:

From a moderately small beginning of a thousand tons per year of coal burned in pulverized form, the amazing figure of 15,000,000 tons per year is approximately the amount used at the present time.

Nearly half of the tonnage is consumed in the cement industry, and the remainder is fairly well divided among the other industries.

The application to boiler plants has been solved commercially only during the last six years. There is now in use and under construction 200,000 developed boiler horsepower in this country, which is a very gratifying growth in six years.

Manufacturers and public service plants equipped to handle pulverized coal need have no fear thoughts from closed mines due to strikes. They can use discarded or culm waste already mined.

Sargent & Co., New Haven, Conn., builders' hardware, proposes to increase its authorized capital stock from $325,000 to $6,500,000, of which $1,300,000 will be preferred and $5,200,000 common shares. A part of the authorized stock will be used to capitalize assets.

RAILROAD EQUIPMENT BUYING

Only 1550 Cars and 34 Locomotives Bought — New Inquiries Include 2450 Cars and 28 Locomotives

The New York, Chicago & St. Louis is inquiring for 10 switching locomotives, 10 Mikado type and 8 Pacific type locomotives.

The Snoqualmie Falls Lumber Co., Snoqualmie Falls, Wash., has ordered one Prairie type locomotive from the Baldwin Locomotive Works.

The Lehigh Valley has ordered 30 locomotive tenders from the American Locomotive Co.

The Mesaba Cliffs Iron Mining Co., Ishpeming, Mich., has ordered three 6-wheel switching locomotives from the American Locomotive Co. These locomotives are for 19 x 26 in. cylinders.

The Tennessee Central is inquiring for 1000 composite gondola cars.

The Baltimore & Ohio is asking for bids for the repair of 2000 box cars.

The Texas-Louisiana Producing & Carbon Co., Monroe, La., is inquiring for three insulated tank cars of 8000 gal. capacity.

The Denver & Rio Grande Western is inquiring for 500 stock cars of 40 tons' capacity, 100 narrow gage stock cars and 350 coal cars.

The Muscle Shoals, Birmingham & Pensacola is inquiring for 50 hopper cars and 50 gondola cars of 50 tons' capacity. This is in addition to 50 box and 50 flatcars under inquiry.

The Philadelphia & Reading has ordered 45 steel suburban passenger cars and 5 steel suburban combination passenger and baggage cars from the Bethlehem Ship Building Corporation, Harlan Plant.

Great Northern bought 1500 ore cars of 75 tons' capacity, placing equally between Pressed Steel Car Co. and the Cambria Steel Co. This railroad is also inquiring for 1000 double sheath 40-ton box cars.

The St. Louis, Troy & Eastern is in the market for 300 flat bottom gondola dump cars and 100 gondola frame dump cars.

DROP IN GERMAN STEEL PRICES

Advancing Value of the Mark Reacts on Iron and Steel Quotations

(By Radiogram)

FRIEDENAU, BERLIN, GERMANY, Dec. 26.—Foundry iron No. 1 is now quoted at 153,688 m. per metric ton ($23.42 per gross ton, at 1½c. per 100 m.), compared with 160,328 m. ($24.43) last week. Steel ingots are now held at 197,300 m. ($30.06), compared with 214,300 m. ($32.66); steel bars at 270,000 m. (1.84c. per lb.), compared with 293,200 m. (2.00c. per lb.) and thin steel sheets at 414,700 m. (2.82c. per lb.), compared with 450,300 m. (3.06c. per lb.).

United States Constitution Reprinted

The Chile-American Association, 1133 Broadway, New York, Charles M. Pepper, director, has reprinted the constitution of the United States and amendments in pamphlet form in English and Spanish, with a historical introduction in both languages, as prepared by Mr. Pepper. There has been a growing demand, the association has found, for information of this character, in view of the fact that many of the Spanish nations have modeled their own constitutions in part after that of the United States. The Chile-American Association from time to time issues, pamphlets of interest to both countries, the last preceding one having the title, "Reciprocal Resources of Chile and the United States." A number of important companies participate in the association's work, including the Bethlehem Chile Iron Mines Co., the American Smelting & Refining Co., E. I. DuPont de Nemours Export Co., Ingersoll-Rand Co., the Anaconda and other copper companies, and the International General Electric Co. The aggregate of United States investments in Chile is put at $225,000,000.

BOOK REVIEWS

American Fuels. By Raymond Foss Bacon and William Allen Hamor. Published by the McGraw-Hill Book Co., Inc., New York, 1922. Pages, 1257 in two volumes, 6 x 9 in. 383 illustrations. Price, $12 net.

To the iron and steel man one of the most interesting chapters in this whole work is that devoted to the Technology of Coke. This covers more than 140 pages in the first volume and deals with the entire subject, from the character of coal required to make coke to the use of the coke in the smelting of iron and for other purposes. Different types of coke ovens, particularly by-product ovens, are described and the disposition of the products traced.

Another chapter of particular interest to the steel man is that devoted to the Gasification of Fuels, although more attention is paid in this chapter to the recovery of by-products than to the production of gaseous fuel for heating metallurgical furnaces. This subject is taken up in detail, however, in a later chapter on Producer Gas Technology, where the common types of gas producers are described and compared. Blast furnace gas, fuel oil, powdered coal and other forms of fuels used in industrial heating are given extended treatment, while many chapters in the book are devoted to the more purely theoretical side of the subject, such as the principles of combustion, the distillation of coal, the relative values of gaseous fuels, surface combustion, heat applications, relative thermal efficiencies, etc. There are chapters on mechanical stokers, fuel conservation, the economics of American power practice, briquette fuels, and on problems in the utilization of fuels, with particular reference to petroleum.

All in all, the work is monumental and covers a large amount of valuable data. Both the chemical engineer and the mechanical engineer will find in it a complete summary of modern information concerning fuels. In the two books the aim is to provide the manufacturer and the engineer with information which will assist in a decision upon the most suitable fuel to use to get highest efficiency in plant operation. Each chapter is written by a specialist and is signed, while many of them carry exhaustive bibliographies.

In a table is given an estimate of the 1917 distribution of bituminous coal, totaling 556,850,000 net tons. Briefly, this table shows the following:

	Net Tons	Per Cent
Steel and iron industry*	90,000,000	16.2
Beehive coking	52,250,000	9.4
By-product coking	31,500,000	5.7
Other industrial power	130,150,000	23.4
Railroads	156,150,000	28.0
Domestic	57,100,000	10.2
Export, bunkering, gas making and all other	39,700,000	7.1

*Excluding coking.

Galvanizing and Tinning. By W. T. Flanders. Pages 328, 5¾ x 9 in.; illustrations 134. Published by U. P. C. Book Co., 239 West Thirty-ninth Street, New York. Price, $4.

Mr. Flanders' book has the earmarks of the practical old timer. It is full of information, small details that are usually overlooked and that reflect the writer's personal experience in the industry. Were it not obvious that the book was not prepared for the really large users of tin and zinc, it would seem badly out of balance. It is well known, of course, that the center of gravity of zinc and tin coating is in the steel industry—the galvanizing department of sheet and pipe mills and tin shops of tin plate mills—and these important branches of the galvanizing and tinning industry are given only a few pages. Drawings, illustrations and descriptions of machines and equipment of these installations could be used if the book were broadened. Also more might have been given on furnaces using gas, oil or pulverized fuel for heating zinc kettles. Coke has lost apparently its strong hold on this industry owing to its high price and owing to control of temperatures by the other fuels.

The information on electro-galvanizing incorporates an abundance of patent drawings and descriptions of special machines and devices. The Schoop process, while remarkable in its inception and interesting in its principle, is not discussed from the standpoint of its commercial value in the United States. The art of Sherardizing is covered in an exhaustive way; practically all information about its detail problems has been gleaned and summarized, including the latest development, the electrically heated Sherardizing drums. The final chapter on specifications and tests is most useful and handy. J. F. S.

Bureau of Mines: Service Monograph No. 3; Institute for Government Research. By Fred Wilbur Powell, 1922, published by D. Appleton & Co., New York and London. Pages 162 + xii. 5¾ x 8¾ in.

This is a history of the Bureau of Mines, its activities and its organization. Created in 1910 to conduct inquiries and investigations calculated to conserve health, safety, economy and efficiency in the mining, quarrying, metallurgical and miscellaneous mineral industries of the United States, the bureau is an outgrowth of some of the activities of the Geological Survey from its inception in 1879. The operations of the bureau have expanded largely during the succeeding years until today it fills a great rôle in the coordination of information and of technical researches in the particular lines to which it is devoted.

One of the large activities of the bureau lies in the publication of results of its studies and analyses of mining and other conditions. This has reached such a stage that during the past ten years the number of publications distributed by the bureau has averaged about 750,000 copies a year. These include technical papers, bulletins, miners' circulars and miscellaneous publications, in addition to the much smaller number of annual reports. The bureau maintains plants and equipment, including laboratories, scattered all over the country at points strategic for the particular interests being served, and in these plants conducts experiments called for by the exigencies of the moment. It is through its co-ordination with industry in its researches and experiments that the bureau is serving the American public.

Clay Products Cyclopedia, 1922. Published by Industrial Publications, Inc., 407 South Dearborn Street, Chicago. Pages, 200 + 52, illustrated. Price, $3.

This new volume on ceramics, which is to be published annually, consists of two main parts, 200 pages of information, definitions and statistics, and 52 catalog pages of the manufacturers of equipment. Definitions, covering 117 pages, describe 752 processes, materials and pieces of equipment, and are amply illustrated. The statistical section of 75 pages is arranged and indexed for reference.

An original index, called the departmental index of plant equipment, lists the numbers of all items used in or concerning each department. The numbers of the items refer to the definitions. In this way the reader can easily find all related topics, and determine through the definitions the one best adapted to the use he has in mind. The value of the cyclopedia lies in the fact that it combines in one book information which the clay products manufacturer has heretofore had to search for in various catalogs, reference and technical books.

Labor Legislation of 1921

A compilation of the laws of the various States and Territories during the year 1921, in so far as these laws affect the condition under which labor is performed, minimum wage, safeguards established and employment control of women and of children, etc., has been issued by the Bureau of Labor Statistics of the Department of Labor. It carries, at the end, a 52-page index covering the material printed in all such publications of the bureau since the spring of 1914. It forms, therefore, a comprehensive reference book on the subject. The preface deals in a general way with all legislation and welfare work along labor lines.

Great Power for Good in the Commonwealth

(*Continued from page* 1689)

John W. Weeks, is in charge of the association's Washington Bureau, and renders assistance to members on such matters as foreign credit ratings, securing trade information, making appointments for interviews with Government bureaus, expediting the issuance of a passport and dozens of other sorts of work, which often saves a journey to the capital. Industrial Investigator Frank V. Bistrup conducts a general information service at the Boston office.

Technical Information

The latest addition to the direct service departments is that of technical information, which is conducted under the direction of Hervey J. Skinner of the Boston firm of Skinner, Sherman & Esselen, who gives advice and opinions on such subjects as steam generation, water softening, lubrication, heating, drying of materials, specialized processes of filtration, distillation, evaporation, or on problems affecting the properties of building materials, the selection of the more important types of equipment for certain operations, the erection of machinery and the like.

Each of these departments has its force of assistants, so that there is small delay in its operations as they may affect inquiring members. And all of this service is free. Yet the cost of membership is small. The dues are based on the unit of 50 cents per $1,000 of payroll, with a minimum annual of $20 and a maximum of $500. The large membership makes these figures possible. It is significant that during the recent depression membership increased, which was not the experience of most industrial associations.

The association has an executive committee of 40 members, selected to represent the entire membership, both from the geographical and the trade standpoint. The committee determines policies, subjects for study and investigation, and scope of activities, and the president, who is the executive officer of the committee, appoints a member of that body as chairman of an advisory committee for each branch of activity.

This big executive committee differs widely from most similar bodies. To quote the words of an ex-president, there is "no small executive committee which spoon-feeds the whole committee, as in most organizations." The work is not relegated to the willing, enthusiastic few, but is borne by every member, as is demonstrated at the monthly meetings, which last from 11 to 3 and even 4 o'clock, with an attendance of two-thirds of the members, from all over Massachusetts, while other members who cannot be present send representatives.

Metal and Allied Industries

On the present committee representing the metal and allied industries are Lewis E. Bellows, Walden-Worcester, Inc., Worcester; Winslow Blanchard, Blanchard Machine Co., Cambridge; Frank P. Cox, General Electric Co., Lynn; Francis G. Echols, Greenfield Tap & Die Corporation, Greenfield; Frederick Fosdick, Fitchburg Steam Engine Co., Fitchburg; Edward F. Green, Crompton & Knowles Loom Works, Worcester; S. Harold Greene, Lockwood, Greene & Co., Boston; George N. Jeppson, Norton Co., Worcester; Theodore W. Little, Walworth Mfg. Co., Boston; Charles E. Moore, George E. Keith Co., Sagamore; Charles L. Newcomb, Worthington Pump & Machinery Corporation, Holyoke; E. Kent Swift, Whitin Machine Works, Whitinsville; and Reginald Washburn, Washburn Co., Worcester.

General Manager Orra L. Stone, who has proved himself a highly efficient organizer and executive, and his staff are charged with doing the work of the association. From Mr. Stone's office radiate the several service departments and thus there is no duplication of effort.

The legislative department is a very important one. It keeps track of all legislation. It coordinates the influence of interested members. As has been stated, it is an alert watchdog. Every petition and bill concerning manufacturers, directly or indirectly, is abstracted and a copy sent to every member of the Associated Industries, who is asked to indicate whether he favors or opposes it. The replies are card indexed, and when a committee hearing is advertised, the members interested are notified and asked to attend and present the facts from their own experience and knowledge of conditions, especially as they relate to their own plants and lines of business. In this way the association is always able to secure a large attendance to back its views on any matter affecting industry.

Effect on Legislation

The effect is not difficult to visualize. Legislators are prone to question the motives of the individual business man, especially if he be connected with a large corporation. They are suspicious. But a large group of manufacturers, representing various industries, big and little, standing with united front, is expressive of something more than selfish personal interest.

The results of the legislative system have been very much to the good of industry from the standpoint of both the employer and of the employee. The Associated Industries was responsible for the passage of the act, recently confirmed in the referendum to the voters at State election, placing financial liability on a voluntary association by making it suable in the courts, thus establishing, in respect to responsibility for their acts, the labor unions and other unincorporated associations in the same category as the individual and the corporation. The State constabulary law was passed largely through the same influence. The association's fight against the Sheppard-Towner maternity act had as an outcome the defeat of the measure so far as it concerns Massachusetts, establishing again the principle of State rights, but, that the health interests of mothers and children should not suffer, the association advocated and secured an adequate State appropriation. The State budget was subjected to sharp technical scrutiny and was kept as economical as possible, to the advantage of all taxpayers. In many matters favored by organized labor the Associated Industries has not interfered. Not the least important is the consultation with the several State departments in regard to the framing and enforcement of rules affecting industry, such as first aid rooms, protecting woodworking and other machinery, lighting codes and the like.

Two Great Measures

A phase of activity for the benefit of the community at large is the association's work on the two great issues which are generally held to be of vital importance to the people of New England, the one the Great Lakes-St. Lawrence waterway, the other the transportation act, which has in view the consolidation of the railroads of New England. Committees have worked long and conscientiously, and their reports have been received with much respect as the one real educating element that has appeared on the subject.

We have mentioned the fine esprit de corps of the Associated Industries, in which the 1550 members share. At the time of the threatened railroad strike a year ago this had an opportunity to demonstrate itself in a practical way. The moment it was known that the trainmen proposed to walk out the association offered its services to Howard Coonley, chairman of the Governor's emergency committee, and the offer was as quickly accepted. Almost overnight 12 chairmen were appointed and had accepted the trust, one for each county, and each chairman had appointed a committee, including in its personnel a member in each industrial city and town of his territory. The strike did not materialize, but had it gone into effect the Associated Industries would have had a large body of men to replace the strikers. This was what did happen when in July the shopmen went out on strike. Immediately the county chairmen were able to furnish the executives of the New England railroads with the names of some thousands of men ready to take the places of the strikers and help keep the rail system of Massachusetts and the rest of New England operating efficiently.

The case was typical of the possibilities for good which lie in the great power of the Associated Indus-

tries. No one has yet questioned the honest motive of its activities. The Governor of Massachusetts and the members of the Legislature have learned the quality of its intention and influence, and have come not only to accept them, but to seek them. And while the views of the association's representatives are often opposed to those of other interests they are accepted as honest views, fairly presented.

New Method of Testing Foundry Sands

Vibratory Precipitation Advocated for Determining Bond, Silica and Other Properties for Molds and Cores—Many Samples Shown at Chicago Foundrymen's Club

A NEW physical test for molding sands, core sands and clays, by means of which the bond and silica are separated by vibratory precipitation, the ferric and aluminum oxides are indicated by color, and the fineness of the sand may be ascertained by the eye with sufficient accuracy to determine the class of work to which it is best suited, was described and demonstrated by Eugene W. Smith, the Crane Co., Chicago, at a meeting of the Chicago Foundrymen's Club at Chicago on Dec. 9. The test is a simple one and is offered as a substitute for the old "squeeze" and "feel" method of selecting molding sand, as well as to supplement other methods, chemical or physical, which are being used with success.

Briefly, the method was described by Mr. Smith as follows:

Details of the Method

Use a 10 or 12-oz. clear glass bottle, 1¾ in. in diameter, 6 or 8 in. high, the same as is in common use for oil samples.

Rub the sand lightly to remove the lumps. Fill the bottle one-quarter full of the material to be tested.

Fill the balance with clear cold water and shake thoroughly.

Stand the bottle on any foundry vibrator plate, hold down firmly and vibrate until the heavy grains are all down. Then allow it to stand until the water becomes clear. The "bond" and "silica" will be found divided by a distinct line.

Provide a small rule, the inches divided in tenths.

When the solution is fully settled measure the total, then measure the "bond," or upper part, followed by the "silica" at the bottom.

Divide each by the first figure. The result will be the percentage of either.

The presence of "yellow" will indicate aluminum oxide and "red" the iron oxides. Sometimes both are distinctly shown in the sample, but in most cases their presence is only shown by the varying shades.

The fineness may be easily determined by general observation.

Mr. Smith exhibited 120 samples of sand which had been separated according to this method. Most of these samples were of new sands from all parts of the country. Six bottles, however, contained samples of floor sand taken on six successive days, and showing the steady reduction in the proportion of bond, the longer the sand remained in use without receiving fresh additions of new material. Mr. Smith's address was as follows:

The selection of sand for foundry use has been an annoying problem for all concerned in the past. This annoyance has been mainly due to the lack of some reliable means of determining

(1) the bond to insure its strength for making the mold and wearing qualities;
(2) for determining the silica content, for porosity sufficient to relieve the gases formed when the metal is poured; and
(3) to have both of sufficient fineness of grain to assure a proper finish to the surface of the castings when cleaned.

And to make this condition more uncertain there has never been devised any common form of communication between the foundryman, the management, the purchasing departments and the producers. Some definite form of testing molding sands, while in use from day to day, has been badly needed.

In presenting this exhibit for your consideration, together with what I believe to be an entirely new method of determining the characteristics of molding sands, I wish to impress upon your minds one thought: No part of this discussion or exhibit must be considered as antagonistic to any other method, whether chemical or physical.

I realize fully the vast amount of research already given to this subject by others, particularly along chemical lines and it is intended that this should add to, not detract from, what has already been accomplished by others.

Advantages of the New Method

I can truthfully say that by the vibratory method I have learned more about molding sands in the past six months of practical foundry use than I have from chemical analysis of sands in the past 20 years.

It affords a visible means of determining the value of new sands, as well as a reliable means of determining the changes which take place in the molding sands from day to day in the foundry. It also affords a simple means of communication between those most interested—the producer, the purchaser, and the foundryman.

It also furnishes a reliable means—which is shown here this evening—of forming an opinion of the comparative value of the various molding sands on the market, regardless of their origin.

This must not be considered as a complete exhibit of all sands of the country, as a great many to whom I applied intimated they would contribute, but probably did not recognize that this was an educational exhibit and to be presented to the Chicago Foundrymen's Club so soon. I hope later on to add many more specimens to this collection, relying on the kindness of those interested to submit specimens not included here to-night.

There is a great deal to be done yet in the research of molding sands, particularly by those who have the time and incentive—students in our universities and technical school—particularly along geological lines of study. Geology treats of the formation of rock, from nature's manipulation of the sand, also the formations of sand by the disintegration of the rock, but very little is said regarding the uses of sand and its fitness for commercial purposes.

My studies of these specimens have led me to almost revolutionary thoughts regarding theories advanced and generally accepted in the past. For instance, I would advance the question: Are alumina and iron oxides only "secondary" in forming the bonds in sands? Are they simply indicators by their presence and color of the grade of fineness?

In explanation, I would call attention to the sands from the North River district, New York, the Millville district, New Jersey, and those from Missouri. All are for the same class and grade of work: Heavy machinery and steel castings. The sands from New Lexington, Ohio, might also be included.

Other Phases

Another phase of study of the vibratory test brings out the silica deposit, showing the heat resisting qualities of the sands by determining the original class of rock from which it comes. In explanation, the Albany, North River, some of the New Jersey, also a few Ohio sands, show the presence of black volcanic rock, indicating by its very presence high heat resisting qualities. And again, those sands which show strongly the presence of mica schist—some Ohio, Tennessee and Cali-

fornia sands—show this characteristic, again indicating a high heat resistance.

By the foregoing remarks it may be seen that the vibratory method of separating the bond from the silica affords a means of study along new lines.

To the chemist, the word silica as used in connection with the vibratory test is only meant for that portion of the specimen which is precipitated by vibration; and that which is held temporarily in suspension is classed as the bond.

The simplicity of the method is its best recommendation: Six bottles provide all that is necessary for a daily foundry observation. There are in the collection about 100 specimens ranging from clear, washed river sands, showing no bonding qualities whatever and only used for sand blast, to the strongest and best known sands for steel and heavy machining, including the best known grades of fine sands in the country. Also a few specimens of sand used each day, showing the variations and demonstrating the value of the method in testing old sands.

I wish to say in conclusion that the omission of any sands from this collection is unintentional. I submit this exhibit and method for your approval and that of the foundrymen, producers and purchasers of sand. Trusting that the Chicago Foundrymen's Club has once more added a little to the educational advancement of foundry practice, I might also add that this method may be used in determining the characteristics of fire clays, bank sands, silicas and rock products, affording a reliable means of studying their characteristics.

Discussion

At the conclusion of the address, the meeting was open for discussion and the point was brought up that the relation of the time of vibration to the results achieved in the test had not yet been worked out. Mr. Smith stated that the method had just been recently developed by him and that his experiments had not yet reached the point of discovering whether the proportion of bond and silica shown in the separation would show any change if the time of vibration were shortened or prolonged. He asserted, however, that the test had been used in practical work in his foundry, and that it had proved successful as a means of determining the suitability of sands for different classes of castings.

In the course of discussion, the subject of the cutting and tempering of sand was brought up, and considerable testimony was offered to the effect that the best results could not be achieved when sand was used continuously. Fred L. Wolf, technical superintendent Ohio Brass Co., Mansfield, Ohio, who was a guest at the meeting, stated that experiments conducted at his plant indicated that it was best to permit sand to stand for 24 hr. after tempering, as it took that length of time for the colloidal condition of the material to be restored.

At the conclusion of the meeting, a resolution was passed extending the thanks of the Chicago Foundrymen's Club to Mr. Smith for his time and effort in developing the method, and an expression of appreciation for the help given by sand producers and others who made the extensive exhibit of samples possible. It was requested that this acknowledgement be extended through the various trade journals. The list of contributors to the collection of sands is as follows:

George F. Pettinos, Philadelphia; J. W. Paxon Co., Philadelphia; P. H. Collyung, Bridgeport, Conn.; Whitehead Bros., New York; Northern Refractories Co., Ridgeway, Pa., The Burton-Townsend Co., Zanesville, Ohio; The A. F. Burton Co., Springfield, Ohio; Houghland & Hardy, Evansville, Ind.; W. T. Mahony, Chattanooga, Tenn.; The Newport Sand Bank Co., Newport, Ky.; The Garden City Sand Co., Chicago; W. S. Perrigo, Beloit, Wis.; E. C. Townsend, Montreal, Canada; D. B. Davies, Mineral Supply Co., Chicago; S. T. Johnson, Obermayer Co., Chicago; Material Service Corporation, Chicago; Southern California Development Co., San Diego, Cal.; Badd Mountain Quarries Co., Winston-Salem, N. C.; Ed. E. Squier Co., St. Louis.

ROGERS-BROWN CONTEST

Prizes Offered for Suggestions as to New Uses of Cast Iron

Rogers, Brown & Co., Cincinnati, have inaugurated a prize contest to encourage the larger use of cast iron. The announcement is as follows:

"For centuries it was taken for granted that furniture should be made of wood. One day some one had a bright idea and now steel furniture is successfully replacing wood in offices, and it may not be long before its use in the home will be general. A few years ago cast iron beds were popular. Now the steel bed is replacing both wood and cast iron. These are simple illustrations of what one industry is doing to broaden its field.

"Except for the excellent work of the American Malleable Castings Association there appears to be no concerted effort to develop new uses for cast iron. Unquestionably hundreds of things are now being made of other materials which could be produced commercially in the iron foundry. The development of these new uses is not only important for the expansion of the business, but may prove to be necessary to make up for the loss due to the encroachment of others, especially the steel makers. There is a further important consideration, that of diversification. The greater number of lines a foundry is able to turn out, the smaller the chances of a shut down and, consequently, more continuous employment may be given.

"There could be no better time than the present for this search for new uses. While most plants are now running on a profitable basis, it is always considered the part of wisdom to take advantage of calm weather to prepare for the storm.

"Simply as a step in the right direction to get men in the shops as well as those in the offices and laboratories thinking we have inaugurated the prize contest.

"For suggestions of a new use for cast iron we offer the following: First prize, $250; second prize, $100; third prize, $75; fourth prize, $50; fifth prize, $25.

"By 'new use' is meant that it is not common practice now to make the article suggested of cast iron. You may show how cast iron can replace some other material except steel or suggest the manufacture of some entirely new article.

"Send along all your good ideas. Any number will be considered, but not more than one prize will be given to a person. In event that two or more persons submit the suggestion judged the best, second best, etc., each tieing contestant will be awarded his proportion of the amount of the prize tied for.

"The contest is open to every one except employees of Rogers, Brown & Co.

"The judges are John A. Penton of the Penton Publishing Co.; George Smart of the Iron Age Publishing Co., and Enrique Touceda, consulting engineer of the American Malleable Castings Association. The decision of the judges will be final.

"The contest will close on March 15, 1923.

"Address all communications to the Five Hundred Dollar Contest, Rogers, Brown & Co., 433 Vine Street, Cincinnati."

Ore Rate Sustained

WASHINGTON, Dec. 26.—Holding that rates on iron ore from Ironwood, Mich., and Baraboo, Wis., to Carondelet, Mo., within the switching limits of St. Louis were not unreasonable, the Interstate Commerce Commission in a decision made public recently ordered dismissal of the complaint of the Mississippi Valley Iron Co. vs. Chicago & Northwestern, et al. It was alleged in the complaint that rates applied between Aug. 26, 1920, and July 6, 1921, were unjust, unreasonable and unjustly discriminatory. The rates were $3 from Ironwood and $2.10 from Baraboo prior to the former date when they became $4.05 and $2.835 respectively. In July, 1921, the rates were reduced to $3.25 and $2.35 which the commission had said would be reasonable to apply to Granite City, Ill., within the switching limits of East St. Louis, Ill.

LABOR CONDITIONS

Shortage in Spring Feared at Youngstown—President Biggert Opposed 12-Hr. Day

YOUNGSTOWN, Dec. 19.—In certain industrial circles fear is being voiced that a labor shortage may develop next spring when the renewal of outside construction and road work will draw men from the mills. Accordingly, an increase in the common labor rate from 36c. to 40c. between now and spring is forecast. District employers say the labor situation at present is satisfactory and that it has not been necessary to import colored laborers from the South.

Discussing employment and working conditions, F. C. Biggert, Jr., president of the United Engineering & Foundry Co., declares there is no good argument for a 12-hr. working day. "When 12-hr. or more of each day is spent in labor, there is not enough remaining time for sleep, recreation and family association," he contends. "An average man, performing these long hours of labor, cannot keep himself in good health and devote a proper amount of time to rearing his family. There is, therefore, no question that the reduction of the day's labor below 12-hr, is in every way desirable.

"It is when we consider days of ten, nine, eight and even six hours that serious disagreement arises. Reduction of the working day can be carried to a point where it is a positive disadvantage. A reduction from 14 to 12 hours is certainly a great boon to humanity. Reducing from 12 to 10 is valuable, but not to the extent of the former reduction. To drop from 10 to eight may or may not be an advantage, depending upon the kind of work and surrounding conditions. When we talk of six hours, I think it will be commonly agreed that there is no advantage.

"As we shorten the day we come to a point where there is too much leisure, and too much leisure is worse than too much work. I have no doubt that if we were willing to live in the same way men did, say, 100 years ago, it would be possible to reduce the working day to one hour. This would be taking all the advantage of our development in reduction of hours of work, and it certainly will not appeal to any of us as being a reasonable course of action."

Mr. Biggert summarizes his argument by concluding that "it is to the interest of the workers that the working day should be as long as is consistent with health and the duties of the family."

Mill Operations Somewhat Curtailed in the Mahoning Valley

YOUNGSTOWN, Dec. 19.—Further reduction this week in the number of active sheet mills reflects the year-end decline in this branch of the steel industry. Of 109 sheet units, but 72 were scheduled at the beginning of the week.

Most Valley plants will curtail operations at the week-end, continuing over the Christmas holiday. A number will suspend Friday evening. All departments requiring continuous operation, such as blast furnaces and by-product coke ovens, will, of course, be continued without interruption.

The Brier Hill Steel Co. has reduced the number of operating sheet mills from 19 to 14; the Mahoning Valley Steel Co. did not start any of its eight sheet mills at Niles Monday, but planned partial resumption later in the week.

Of the 51 independent open-hearth furnaces in the Mahoning Valley, 41 are charged this week. Pipe mill production is well sustained, with 16 of 17 mills rolling.

The Republic Iron & Steel Co. has added a light bar mill to the active list at its Brown-Bonnell works, but its Niles sheet plant is on a 50 per cent basis. Though it has cut the number of sheet mills, the Brier Hill company has increased its active open-hearth furnaces from seven to 10.

Fabricating plants are operating from 70 to 85 per cent.

Colder weather and snow have retarded freight movement for the time being, but traffic in the Ohio Region of the Erie was much heavier during the first half of December than in the corresponding period of November. Average daily loaded car movement during the first 15 days of the month was 7307, comparing with a per diem movement in November of 6596 loaded cars. On Dec. 1 a high mark was established in the region when 7784 cars were moved.

More Metal Workers and Higher Wages

Iron and steel plants, according to figures of the Bureau of Labor Statistics, show for November a gain from October of 4343 employees in 132 establishments. This gain of 2.4 per cent was accompanied by a gain of 8 per cent in amount of payroll and a corresponding increase in the average half-monthly pay envelope from $56.43 to $59.50, or 5.4 per cent.

In the automobile industry there was a loss in 115 establishments of 1.5 per cent in number of employees, but a gain of 2.2 per cent in payroll total, and 3.7 per cent in contents of average pay envelope. In car building and repairing there was a gain of 7.9 per cent in number of employees in 84 establishments and a gain of 13.8 per cent in amount of payroll and of 5.4 per cent in average pay envelope.

Compared with a year ago there has been a gain in 214 establishments (which reported at both times) of 24.8 per cent in number of men employed, and an increase of 56.7 per cent in total payroll. This connotes a gain of 25.5 per cent in contents of the average pay envelope, which has advanced from $52.06 to $65.36.

Wages per half-month per man in automobile plants, which are exceptionally busy, are 21.8 per cent above those prevailing in steel plants. In fact, 167,853 automobile workers received over $1,000,000 more in the half month than did 185,488 steel workers.

Compared with September, average per capita earnings increased in 26 industries and decreased in 16.

Details are shown in the table.

Period	Number of Establishments	Number of Men	Half-Month Payroll	Average Pay Envelope
Iron and Steel				
Oct., 1922...	132	181,145	$10,223,020	$56.43
Nov., 1922...	132	185,488	11,036,241	59.50
Nov., 1921...	112	120,031	5,049,016	42.06
*Automobiles**				
Oct., 1922...	115	170,375	11,903,151	69.87
Nov., 1922...	115	167,853	12,163,097	72.46
Nov., 1921...	45	97,964	5,974,404	60.99
Car Building and Repairing				
Oct., 1922...	84	65,711	3,653,440	55.60
Nov., 1922...	84	70,916	4,157,970	58.63
Nov., 1921...	57	42,582	2,542,884	59.71
Metal Workers (the three groups above)				
Oct., 1922...	331	417,231	25,779,611	61.79
Nov., 1922...	331	424,257	27,357,308	64.48
Nov., 1921...	214	260,577	13,566,304	52.06

*Payroll figures are reported as "weekly"; they have been made "half-monthly" by multiplying by 2 1/6.

Jones & Laughlin Pays Large Incorporation Bonus

HARRISBURG, PA., Dec. 25.—The Jones & Laughlin Steel Corporation, Pittsburgh, incorporated here on Dec. 19, with a capitalization of $100,000, has notified the State Department of an increase in the capital to $120,000,000 and has paid a State bonus of one-third of one per cent on that amount, or $399,666.66. This completes the reorganization of the Jones & Laughlin Steel Co. into the Jones & Laughlin Steel Corporation.

Aiming by Federal organization to wipe out the confusion which exists in the country's radio industry, a series of conferences are under way in several principal radio centers, it is announced by the National Radio Chamber of Commerce, 165 Broadway, New York. The plan is stated to exclude Government monopoly, but include Federal supervision. Regional chambers are to be established from coast to coast so that proper regulation may be effected for the protection of every interest. The aid of churches, educational institutions, chambers of commerce and the press will be sought.

COAL AND COKE OUTPUT

By-Product Tonnage Continues to Increase Over Previous Months

WASHINGTON, Dec. 18.—Production of soft coal continues at a daily rate of approximately 1,900,000 tons, but the output for the week of Dec. 11 to 16 according to the Geological Survey, indicates the total production will probably be between 10,800,000 and 11,000,000 tons. The slight decline is due to the lay-off in some union districts on Tuesday, miners' election day.

The estimated cumulative production of bituminous coal this year to Dec. 9, inclusive, stands at 376,826,000 tons, which is 7,772,000 tons, or 2 per cent, less than in the corresponding period of 1921; 141,352,000 tons, or 27 per cent, less than in 1920; 53,523,000 tons, or 12 per cent, less than in 1919; 174,213,000 tons, or 32 per cent, less than in 1918; and 142,786,000 tons, or 28 per cent, less than in 1917.

Production of beehive coke to Dec. 9, stands at 7,189,000 net tons.

In the corresponding period of the four years preceding it was: 1921, 5,161,000; 1920, 19,941,000; 1919, 18,640,000; 1918, 29,235,000. Thus it is shown that from the viewpoint of beehive coke production the year 1922 is 75 per cent behind 1918, 64 per cent behind 1919, 61 per cent behind 1920, and 39 per cent ahead of 1921.

The production of by-product coke continued to increase in November and reached a total of 2,908,000 tons as compared with 2,806,000 tons in October and 2,244,000 tons in September. These figures compare with monthly averages of 1,646,000 tons in 1921. The November, 1922, production of beehive coke was given as 1,139,000 tons as compared with 878,000 tons in October, 606,000 tons in September and a monthly average of 462,000 tons in 1921.

Proposed Lorain Works of American Sheet & Tin Plate Co.

Plans of the American Sheet & Tin Plate Co. for a new plant on a site adjacent to the Lorain, Ohio, works, National Tube Co., are said to be practically completed and ready for submission, together with a request for an appropriation, to the finance committee of the Steel Corporation. This will mark the third attempt of the American Sheet & Tin Plate Co. to establish a plant at Lorain, Ohio, where it bought the land several years ago. High cost of construction prevented the authorization of the project previously, but it is said that this time it is in a fair way of being approved. It is believed that there has been some change of mind among high Steel Corporation officials as to costs and the inability of associated steel-making units of the Corporation to supply the requirements of the Sheet & Tin Plate company, makes necessary the development of other sources within the Corporation.

Little has leaked out as to the plans, but it is reported that they call for the building of one or two more blast furnaces and additions to the steel making capacity at the Lorain works of the National Tube Co., the new production to go to the American Sheet & Tin Plate Co.

New England Iron League Dinner

The New England Iron League held its Christmas dinner on Thursday evening, Dec. 21, at the Boston Athletic Association, Boston. From the standpoint of attendance and entertainment, it was one of the most successful affairs of the organization. Among those present was Harold L. Stevens, formerly New England manager Lackawanna Steel Co., and now general sales manager Central Iron & Steel Co. Following the dinner two satirical sketches were presented by members of the league, one depicting the office of a combination of steel companies, and the other the office of the New England Structural Co. The leading parts in the sketches were take by H. G. Austin, dictator of the league, Central Iron & Steel Co.; Charles H. Carter, treasurer of the league, Midvale Steel & Ordnance Co., Jack Andrews, Boston Bridge Works; and "Bob" Wallace, Bethlehem Steel Co. Following the sketches an auction sale was held, money derived from which went to the Boston Children's Hospital.

Western Roads Make Fresh Effort to Get Pacific Coast Trade

PITTSBURGH, Dec. 25.—Western railroads again are making an effort to win back through lower rates the business they have been losing in iron and steel in competition with rail and water shipments via the Panama Canal. Local agents of the railroads running west of the Mississippi to the Pacific Coast were notified late last week that effective within 30 days, tariffs to Pacific Coast points were to be reduced 25 to 40 per cent.

This fresh effort to stimulate all rail shipments of iron and steel products to the Pacific Coast is interesting, but unless Eastern connecting lines concur in the reduction, it will be ineffective in bringing about lower rates from Pittsburgh to the coast. Central Western mills will benefit by the change, which, however, is one of doubtful value in view of the fact that even with the reported concessions, it still will be possible for Pittsburgh and other Eastern mills to use the rail and water method and get material around to the Western Coast at well below the all rail charge from points as far west as Chicago. Many finished steel products today are going from Pittsburgh to the coast and around by water to Pacific Coast at a total charge of about 65c. per 100 lb. There is some doubt that Eastern roads will concur in the proposed reduction of the Western lines, since there would be no financial benefit in doing so.

Methods for Chemical Analysis of Babbitt Metal

The American Engineering Standards Committee has approved as "tentative American standard" the methods for the chemical analysis of alloys of lead, tin, antimony, and copper—otherwise known as Babbitt metal—submitted by the American Society for Testing Materials.

Two methods of anlysis are included in the document approved by the society. The first is a quick and fairly accurate method intended for practical or shop use; the second is a slower, more elaborate and more expensive, and more exact method intended for reference purposes or for the settlement of disputed questions.

The approval of the society was voted on the recommendation of a special committee, representative of all the interests concerned with the subjects, of which George C. Stone was chairman.

Graphite Crucible Investigation

The final stage of the graphite crucible investigation, in which the Bureau of Mines has been engaged for some years, has been completed. The object of this investigation was to determine the availability of domestic bond clays and domestic graphites for crucible making. During the war the obtaining of graphite and bond clays, which had been practically all imported, for making crucibles, became a most serious problem. The Bureau's investigations have shown that some American graphites and bond clays are, when properly prepared, equal or superior to foreign materials, for crucibles both in brass-making and in steel melting.

According to report received from the office of the American Consul General in London, exports from London to the United States in November included 1945 tons of pig iron as compared with 9900 in October. Other exports from London, according to this report, included 6200 tons of tin plate.

Fire, caused by the explosion of a tank, at the Zanesville, Ohio, plant of the Steel & Tube Co. of America, Dec. 22, destroyed several buildings and caused damage estimated at $400,000, fully covered by insurance.

Electrical Development in Steel Industry

Some of the engineering developments of the past year in the steel industry have been summarized by H. W. Cope, assistant director of engineering, Westinghouse Electric & Mfg. Co. The following notes are taken from his review:

An electrical equipment has been designed for the West Leechburg Steel Co. for use on a 16-in. hot strip mill. The last four stands are driven by adjustable speed d.c. motors connected directly to the stands. The last two stands take 1800 hp. each and the next two 1500 hp. each. The direct current for these motors is supplied by two 2000-kw. motor generator sets, the speed of the d.c. motors being controlled by varying the fields of the generators. The roughing and intermediate stands are driven by 1500 hp. induction motors. All the motors in this installation are controlled from a control desk overlooking the mill.

The Atlantic Steel Co. has been furnished the electrical equipment for its Morgan rod and merchant mill, which in the past has been driven by a single steam engine. The electrical equipment consists of three adjustable speed direct-current motors, two of 975 hp. and one of 1875 hp. capacity, the power for these motors being supplied from a three-phase motor generator set, the speed of the direct-current motors being controlled by a combination of shunt field and voltage control.

The new electrically driven mills of the Driver Harris Co. at Harrison, N. J., have been put in operation during the past year. This company rolls monel metal, nichrome and other non-ferrous materials. This installation consists of a 500 hp. and an 800 hp. motor, with automatic starting equipment for the motor generator set which supplies these motors. The automatic starting feature makes it unnecessary to employ an attendant to look after the motor generator set.

Cold rolled strip reels have in the past been driven either by some mechanical arrangement or by adjustable speed motors, both of which have serious faults. The problem in this particular application is to maintain a constant tension on the strip being delivered from the mill under varying conditions of mill speed and effective diameter of reel. Westinghouse engineers have developed an electric drive to meet these conditions and several are in successful operation. A generator driven from the last stand of rolls supplies power to the motor driving the reel. A voltage regulator controlled by the armature current works across the resistance in the field of the motor and maintains this current constant, thereby maintaining the torque of the motor constant, resulting in the same pull being exerted on the strip at all times with a given setting. Provision is also made for holding this tension when stopping the mill to gage the strip.

During the past year an electric drive for rod reels has been put in operation at the Minnesota Steel Co. at Duluth. This drive consists of a 100 hp. 115 to 490 r.p.m. d.c. motor, with a speed maintaining and regulating equipment. In this mill it is necessary that one of these reels follow the speed of the last stand almost exactly and since the delivery speed of the mill is at times as high as 3200 ft. per min., any slight error would soon result in a large amount of slack or would pull the rod in two. A small alternating-current generator is driven from the main mill motor and another by a 100 hp. reel motor. These two generators operate a mechanical differential which as long as their speeds are the same remains stationary.

Ohio Foundry Operations

Foundry operations in Ohio showed a slight increase in November over October according to the monthly report of the Ohio State Foundrymen's Association. Operations were 63.3 per cent of normal as compared with 61.4 per cent during October. Stocks received during November declined from approximately 46 per cent to 31.9 per cent, but the stocks on hand Dec. 1 showed no change from Nov. 1. Operations of non-ferrous foundries declined slightly, or from 74 per cent during October to 73.75 per cent in December.

H. F. Tielke Addresses Associated Technical Societies of Cleveland

H. F. Tielke, secretary Crucible Steel Castings Co., Cleveland, presented a paper on "Foundries" before the Associated Technical Societies of Cleveland, Dec. 12. Taking up the late developments in the iron and steel industry, he said that some of the results that had been obtained in heat treating alloy steels were remarkable, considering the comparatively short time that scientific work has been done along these lines. Wonderful results are being obtained in aluminum alloys, of which castings are now being produced that have a 30,000 lb. tensile strength and 6 per cent elongation. He considered this remarkable in view of the fact that an ordinary aluminum casting has a tensile strength of but 20,000 lb. per square and an elongation of 1.5 per cent. He pointed out that much progress is also being made in the production of alloy steel castings. Results that have been obtained compare well with the best heat-treated forged steels. Nickel-chrome vanadium steel castings have been made having a tensile strength of 154,700 lb. per sq. in., and elastic limit of 144,650 lb. per sq. in., 34 per cent reduction in area, 12 per cent elongation and 266 Brinell hardness. Similar results, he said, have been made daily and the field for the use of these alloys seems unlimited. Mr. Tielke declared that while more and better castings are being made with less labor than ever before, there are so many chances for improvement that he regarded the foundry industry only in its infancy.

Meeting of Quad City Foundrymen

A meeting of the Quad City Foundrymen's Association was held at the Moline Chamber of Commerce, Moline, Ill., Dec. 18. Eighty-two attended the dinner and the following committees were appointed:

Apprenticeship committee: F. W. Kirby, chairman; E. A. Gullberg, H. E. Alex, C. E. White, Carl E. Shields, Fellowship committee: E. H. Heartlein, chairman; A. C. Howard, Leon Mitchell, Dave Kennedy. Membership committee: P. T. Bancroft, East Moline, chairman; Wm. Seiffert, Moline, Roy Schofer, Rock Island, Ill., A. K. Reading, Davenport, Iowa, R. L. Eichman, Bettendorf, Iowa. President A. E. Hageboeck announced part of the program for the year.

Frank D. Chase, president Frank D. Chase, Inc., 645 North Michigan Avenue, Chicago, addressed the meeting on "A Modern Foundry," illustrating his talk with slides. He emphasized the danger of over-equipping a foundry. It has been his experience that many times the owner will have very ambitious plans, which include buildings and equipment that are entirely unnecessary. The thought he conveyed was that a foundry building was nothing other than a large machine to do a certain piece of work. This building should be both properly lighted and ventilated; and should also have ample artificial lighting equipment as it has been proved that production has been increased from 10 to 15 per cent by simply bettering the conditions under which the molder has to work.

American Pumps in South Africa

Seventy-five per cent of the centrifugal pumps used in South Africa are of American manufacture, says Consul Charles J. Pisar, in a report to the Department of Commerce. There are no extensive areas where centrifugal pumps can be used. The cost of fuel for the engines operating these pumps has always been high and this has militated against a more extensive use of such pumps.

The duty on pumps imported is 3 per cent ad valorem except for those imported from Great Britain or its colonies in which case no duty is charged. This, however, does not offer a serious handicap to American pump manufacturers, and the increasing demand for windmills and pumps, the consul believes, offers them an excellent opportunity to enlarge their business in South Africa. Most of the large pumps used in the mining industries are imported from England and Switzerland.

Trade Changes

[illegible] Co., Inc., New York, has been appointed exclusive representative in the metropolitan district for the Ajax Electric Furnace Co., Trenton, N. J.

A. S. Cameron Steam Pump Works announce the opening of a branch office at 718 Ellicott Square Building, Buffalo, equipped to render full service in compressors, pumps, condensers, oil and gas engines, pneumatic tools and drills.

The Portland Foundry Co., Portland, Conn., has purchased the entire business of the John T. Young Co., Norwich, Conn., manufacturer of several brands of heaters. The Portland company has been making castings for these furnaces for many years and has had a long experience in making heaters, furnaces and stoves. It is the intention of the company to combine the best features of different heaters into one super-heater of economical operation. It will put this heater on the market under the name of the "Portland." Extensive alterations have been going on at the Portland foundry for many months, new equipment is being installed and it is expected that the capacity will be increased over four times within the next six months.

W. H. J. Fitzgerald & Co., 165 High Street, Boston, have moved to 261 Franklin Street, that city.

Peter A. Frasse & Co., Inc., has been appointed exclusive distributor of electric carbon, alloy and tool steels manufactured by the Sizer Steel Corporation, with plants at Buffalo and Solvay (Syracuse, N. Y.), combined with the Frasse Steel Works, Inc., Hartford, Conn., cold finishing and heat treating.

The Turner & Seymour Mfg. Co., general hardware, Torrington, Conn., has been purchased by W. R. Bassick, formerly vice-president and general manager of the Bassick Co., Bridgeport, Conn.; H. L. Sutton, who for many years was general manager of the American Tube & Stamping Co., and W. L. Case, formerly treasurer of Yale & Towne Mfg. Co. The Turner & Seymour plant covers approximately four acres of floor space and is located on a 12-acre plot. A gray iron and brass foundry is also operated. Mr. Bassick is president in the new management, Mr. Sutton is vice-president and Mr. Case secretary-treasurer.

The Kemp Machinery Co., 215 North Calvert Street, Baltimore, Md., has been appointed exclusive representative by the Diamant Tool & Mfg. Co., 91 Runyon Street, Newark, N. J., handling punch and die sets in Maryland, Virginia, District of Columbia and West Virginia territory.

Control of the Putnam Foundry & Machine Co., Putnam, Conn., has passed into new hands through the purchase of a majority of the outstanding $75,000 common and $50,000 preferred stock. The purchased stock is registered in the name of a Mr. Cherry, Boston. Neither he nor the original officials of the foundry are ready to disclose the name of the new owners.

The Midland Metal Co., 1649 Warren Avenue, Chicago, large manufacturer of tin and lead foil, has absorbed the John A. Crooke Co., tin foil manufacturer, located at the same address.

Theodore Geissmann & Co., direct steel mill representatives, have moved to new offices at 624 South Michigan Avenue, Chicago.

The Eastern Fuel Co., Frick Building, Pittsburgh, has opened offices in the Heymann Building, 215 South Broad Street, Philadelphia, temporarily in charge of C. W. Stone of the Pittsburgh office. James F. Whelan has been promoted to resident manager of the New York office, 302 Broadway, and Frank W. Morton, formerly with the Underhill Coal Co. and the Tuttle Corporation, has joined the sales force at the main office.

E. Arthur Tutein, Inc., 50 Congress Street, Boston, pig iron, coke, etc., on or about Dec. 15, will remove to 200 Devonshire Street, rooms 438 to 442, inclusive, where double the present floorspace will be available for office purposes.

The E. L. Essley Machinery Co., 551-557 West Washington Boulevard, Chicago, has opened a store at 78-80 West Water Street, Milwaukee, Wis., where a full line of new machine tools, as well as high-grade used machinery, will be carried. Since the organization of the Essley company in 1908 it has had an office in Milwaukee, under the management of J. R. McDonald, vice-president, and the opening of the store will enable it to serve more completely its trade in Wisconsin territory.

The Munnsville Plow Co., Munnsville, N. Y., castings, furnaces and road machinery, has changed its name to the Sperry Foundry Corporation. The company has moved to Oneida, N. Y.

The Fuller Engineering Co., Allentown, Pa., has changed its address to Fullerton, Pa.

[illegible] facturer of grinding machines, announces that it has appointed the following exclusive sales representatives: Manning, Maxwell & Moore, Inc., in New York, New Jersey, Delaware, Maryland, and Pennsylvania east of Altoona; Brown & Zortman Machinery Co., in West Virginia, western Pennsylvania and southeastern Ohio.

The Atlas Drop Forge Co., Lansing, Mich., has declared a 10 per cent cash dividend on stock of record Dec. 5, 1922.

Andrew K. Robertson, 445 Milwaukee Street, Milwaukee, Wis., territorial representative Concrete Steel Co. in Wisconsin, has been appointed western representative N. J. Dockerty Co., Philadelphia, manufacturer of high-pressure pipe for power plant and other purposes.

Approximately 75 per cent of its forces have been transferred by the Johns-Pratt Co., Hartford, Conn., compounds, disks, etc., from the Capital Avenue plant to the Colt Patent Fire Arms Mfg. Co. plant. The molding division will remain at the Capital Avenue plant for a few months.

The Wagner Castings Co., Decatur, Ill., has changed its firm name to the Wagner Malleable Iron Co., and has increased its capital stock to $200,000. There will be no change in personnel or management.

Plans of New Companies

The Motorship Corporation Co., Sacramento, Cal., with capitalization of $10,000,000, has been granted a charter. The company proposes to carry through passengers between Atlantic and Pacific centers.

The Ochs Snow Plow Co., 297 Central Avenue, Orange, N. J., was recently incorporated with a capital stock of $125,000, to engage in the manufacture of snow plows and parts. No arrangements for manufacturing have been completed as yet, the company remaining open to any proposals to build plows or parts under contract. The product is a mechanical snow plow with ball bearing action throughout and operated by a separate motor. Patent rights have been protected here and abroad and it is the company's intention to begin manufacturing as soon as contracts can be placed. The management consists of Gustave Ochs, President; T. W. Hellmers, Vice-President and General Manager; Harry P. Milne, Secretary and Treasurer.

The Motor Craft Shops, Inc., 305 Broadway, New York, which was recently incorporated with a capital stock of $100,000 under Delaware laws, manufactures and distributes automotive devices. At present the work is being done by contract, but plans are being made for the construction and equipment for manufacturing its own product. Approximately 70 repair shops located in Greater New York will act as service stations. H. D. Felsen is the chief incorporator.

Max Hirsch, Inc., 25 West Twenty-third Street, New York, has been incorporated with a capital stock of $25,000, to manufacture metal products. No actual manufacturing will be done immediately, present activities being confined to representating manufacturers of wares made from monel metal, aluminum, brass and nickel. If present plans are unobstructed, the company expects to start its own manufacturing on a limited scale sometime later.

The Drying Machine Corporation of America, Inc., 50 Church Street, New York, has been incorporated with capital stock of $200,000, to take over the business of the Drying Machine Co., which produces mechanical drying machinery used in the manufacture of paper, pulp and kindred products. It is likely that extensions will be made in the near future but nothing definite has been decided. The incorporators are: H. P. Coe, W. W. Snow and F. S. Krag.

The Milano Gas & Fire Alarm Co., Inc., 370 East 149th Street, New York, has been incorporated with a capital stock of $100,000, to manufacture fire alarm equipment and gas devices. Operations will be developed around a similar [illegible] as additions to which extensions will be added from time to time. Silvestro Milano, 718 Bryant Avenue, New York, is the principal incorporator.

The Columbia Steel Corporation, San Francisco, Cal., recently formed by the merger of Pacific coast steel interests with a view to erecting plants, as stated in THE IRON AGE Dec. 1, has requested the citizens in the vicinity of Salt Lake City to raise $160,000 for the purpose of purchasing additional land, in which case there is a tacit promise that a 500-ton blast furnace, coke ovens, etc., will be built within a year.

Crane & Co., Inc., has been chartered under Massachusetts laws to take over the business formerly conducted under the same name at Dalton, Mass. The capitalization of the company consists of $2,000,000 divided into 20,000 shares of common stock, par value $100. The officers of the company are: President, Reuben O. Pierce, Dalton; vice-president, James F. Bacon, Boston; treasurer, Payson E. Little, Dalton.

Manganese Ore from Cuba Entitled to Free Entry

WASHINGTON, Dec. 26.—Manganese ore originating in Cuba is entitled to free entry into the United States. Formal notice has been sent to collectors of customs and others concerned by the Treasury Department, stating that articles which were on the free list of the tariff act of 1897 continue to be entitled to free entry to the United States in accordance with the Cuban reciprocity convention, when the product of the soil or industry of Cuba, regardless of the fact that the articles are dutiable in the new tariff act.

While imports of manganese ore from Cuba are comparatively small, it has been reported here that because of this reciprocity convention efforts may be made to develop deposits in Cuba in view of the fact that the Fordney-McCumber law carries a duty of 1 cent per lb. on manganese ore.

Pipe Rates Unreasonable

WASHINGTON, Dec. 27.—Recommendation has been made by Examiner Burton Fuller in a tentative report to the Interstate Commerce Commission in connection with the complaint of John A. Hunt & Co. that it finds rates on wrought iron pipe from Ranger and Jakehamon, Tex, to New Orleans, La., for export were unreasonable to the extent that they exceeded the rates contemporaneously in effect on the same commodity over the routes of movement from New Orleans to Ranger and Jakehamon. The shipments moved during July and September, 1920.

Examiner Burton Fuller has recommended reparation in the case of Paggi Brothers Oil Co., holding that a rate on drilling rigs and other oil well supplies from Harmon, La., to Saratoga, Tex., was unreasonable. The shipment was unrouted and moved over the Texas and Pacific to Longview Junction, Tex., and Gulf, Colorado & Santa Fe beyond, 317 miles. The class A rate of $1.115 was originally assessed, but refund was subsequently made to the basis of a commodity rate of 98c.

River Shipment Under Way

ST. LOUIS, Dec. 26.—The most important all-water long distance river shipment of steel products ever made by the Carnegie Steel Co. is now on its way. As stated in THE IRON AGE last week, 10 barges loaded with 8500 tons of plates, shapes and bars left Pittsburgh on Dec. 18 under tow of two steamers for Louisville, St. Louis, Evansville and New Orleans. Three barges with about 2500 tons are bound for St. Louis. Whether this will be transported via barge from Cairo or loaded onto cars and shipped by rail to this city depends upon the state of the Mississippi River.

Contracts for Freight Boats

The McDougall Terminal Warehouse Co., Duluth, Minn., through Harry Penton, consulting engineer, has placed a contract with the Great Lakes Engineering Works, Detroit, for the construction of two freight boats of the Welland Canal size for use on the Great Lakes in the summer and for the trade to the West Indies during the winter. These boats will be equipped with the Diesel electric drive. They will be built at the Ashtabula yards of the Great Lakes Engineering Works. Atlantic Coast shipyards competed with the Great Lakes shipyards for this order. The Eastern Steamship Co., Ltd., a Canadian corporation, is reported to have placed orders for 10 boats of Welland Canal size, 253 ft. long, with Canadian ship builders.

The Tri-City Manufacturers' Association will hold its thirteenth annual banquet at the LeClaire Hotel, Moline, Ill., on Jan. 15. James A. Emery, Washington, general counsel for the National Association of Manufacturers, will be the speaker of the evening. Representatives of 65 industries in Moline, East Moline, Rock Island, Davenport and Bettendorf will be present.

NEW TRADE PUBLICATIONS

Gears.—Boston Gear Works, Norfolk Downs (Quincy), Mass. Catalog No. 41, including new lists of internal gears and other standard gears, of which there are 1500 sizes in stock. Several pages are devoted to general information on ordering gears, specifications and relative thrust load ratings. Size, 128 pages; 5½ x 3 in.

Valves.—Pratt & Cady Co., subsidiary of the Reading Steel Casting Co., Inc., Bridgeport, Conn. Four circulars of eight pages, 6 x 4 in., describing and illustrating various types of bronze globe and angle valves and check valves with rotating discs. Specifications are given.

Wheels.—The Geneva Metal Wheel Co., Geneva, Ohio. Engineering booklet No. 16, giving complete description of wheels for all kinds of portable outfits that do not run on rails, excepting automobiles. With the assistance of richly illustrated pages, the booklet will answer many questions pertaining to farm implements and industrial trucks. Size, 30 pages; 9 x 5 in.

Speed Reduction Drives.—W. A. Jones Foundry & Machine Co., 4401 West Roosevelt Road, Chicago. Catalog No. 26, a new treatise on speed reduction drives; intended for consulting engineers, superintendents, chief engineers, master mechanics, and others interested in mechanical drives for factories, mills, mines or plants. In connection with descriptive matter and illustrations of typical drives, technical and practical information is given, including dimensions, weights and horsepower ratings for speed reduction sets.

Small Tools.—Consolidated Tool Works, 296 Broadway, New York, is issuing new catalog and price lists, effective Jan. 1.

How to Make a Plant Survey.—Esterline-Angus Co., Indianapolis. In a 4-page folder, "Something Concerning the Purpose, Methods and the Results Obtained by the Systematic Use of Graphic Instructions in Industrial Plants" is described. Careful study of charts obtained as operating records is recommended, as is the idea of keeping all instruments busy in order to increase the power factor, reduce the idle time and thus lower the overhead.

De La Vergne Oil Engines.—In bulletin No. 180, of 16 pages, 8½ x 11 in., the De La Vergne Machine Co., East 138th Street, New York, describes type SI pump injection oil engine as the greatest step in advance since the invention of the Diesel engine. The fuel consumption curve shows about 0.40 lb. of oil per brake hp. hr., between ¾ and full load. The engine is made in 100 and 150-hp. one-cylinder and in 200 and 300-hp. two-cylinder types. The bulletin gives dimensions and sketches of all the sizes made, as well as photographs.

De La Vergne Vertical Engine.—In a 4-page bulletin No. 181, 8½ x 11 in., the De La Vergne Machine Co., East 138th Street, New York, describes a vertical Diesel engine of the SI type, which has a guaranteed fuel consumption not exceeding 0.45 lb. per brake hp. hr., between ¾ and full load. The engine is made with 2, 3, 4, 5 or 6 cylinders, giving respectively 130, 200, 260, 300 and 400 hp. at a speed of 272 r.p.m.

Cupola Fire Brick.—J. M. Paxson Co., Philadelphia, in a 4-page folder, 6 x 9 in., Bulletin No. 42, shows standard bricks for building up annular linings for cupolas and other furnaces, as well as ladles. Sketches are given of bricks varying from circles of 30 in. inside diameter to 72 in. for cupolas and 24 in. to 60 in. inside diameter with a narrower brick. Both single linings and double linings are featured in sectional diagrams of cupolas lined up.

Portable Electric Tools.—Black & Decker, Towson Heights, Baltimore. Catalog No. 5, of 32 pages, 8½ x 11 in., generously illustrated and artistically printed on coated paper and carrying views of the electric drills and grinding machines of portable types made by the company, together with an electric screwdriver and pocket wrench, and an electric compressor. Each illustration is accompanied with information concerning the construction, size and general characteristics of the machine.

Tackle Blocks.—W. W. Patterson Co., 54 Water Street, Pittsburgh, catalog of 64 pages, 6 x 9 in., illustrating wood blocks, oil well blocks and hooks, snatch blocks and weight blocks, as built for either manila rope or wire line. It also shows many special blocks and C hooks, Patterson design hooks, wire rope slings, steam boat ratchets and contractors' tools. A number of unusual field views complete the work.

Machinery Markets and News of the Works

HOLIDAY QUIETNESS PREVAILS

Several Railroads Expected to Purchase During Week

General Electric Co. and a Mexican Oil Development Company Issues Inquiries

Seasonal quiet prevails, although in some centers a better volume of business than was expected is reported.

Indications are that some fairly good orders will be closed this week, including at least a part of the Missouri Pacific list and also the list of the Delaware, Lackawanna & Western Railroad, recently published. The Chesapeake & Ohio Railroad is also expected to close on a number of tools, and other roads are expected to spend the remainder of their appropriations for this year's requirements. The Chicago, Burlington & Quincy is reported to be purchasing against its list of scrap reclamation equipment for its Eola yards.

New inquiries include that of the General Electric Co., for 10 large boring mills and a few other tools for Schenectady. The Union Pacific is reported to be in the market for a slab miller and a few other tools. The requirement of complete equipment for a machinery repair shop in Cuba is reported to be about ready to go through and a comparatively large amount of equipment to be needed. An oil interest operating in Mexico is reported to have issued a list of miscellaneous tools and equipment.

A conspicuous sale of the week is that of a fairly large lot of milling machines reported to have been purchased by the Ford interests, presumably for the equipment of the new plant to be erected at Hegewisch, Ind. The order was said to embrace between 25 and 30 tools.

In heavy equipment there is one project which will probably go forward next year, for which prices on no less than 39 cranes have been asked. The Chicago, Burlington & Quincy is reported to be working on its 1923 machine tool budget, with a likelihood that inquiries will be issued late in January.

New York

NEW YORK, Dec. 26.

IN the closing days of the year business in machine tools is keeping up at a much better rate than was expected. Considerable business is pending, including the list of the Delaware, Lackawanna & Western Railroad, recently published, on which action is predicted for this week. The General Electric Co. has issued new inquiries for 10 large boring mills and a few other tools for Schenectady, N. Y.

The market in both electric overhead and locomotive cranes is quiet this week, few new inquiries having appeared and practically no orders of any size being reported. While a number of the large inquiries now pending will probably be carried over into January, a few orders may be placed this week. The 60-ton overhead traveling crane for the General Electric Co. at Pittsfield has been slightly revised, and it is reported that no action will be taken until after Jan. 1. The Bureau of Water Supply, Philadelphia, will open bids Dec. 29 on a 20-ton, 50-ft. boom, locomotive crane for the Shawmut Pumping Station.

Among recent purchasers are:

Chilean State Railways, 141 Broadway, New York, a 20-ton, 40-ft. boom, locomotive crane, equipped with 1-cu. yd. grab bucket, pile driver attachment and steam hammer, from the Industrial Works;

Booth & Flinn, 17 Battery Place, New York, through M. P. Armstrong, New York, a 10-ton electric locomotive crane from the Brown Hoisting Machinery Co.;

British-American Metals Co., 200 Broadway, New York, a 3-ton, 48-ft. span, 3-motor overhead traveling crane from the Northern Engineering Works;

Stauffer Chemical Co., New York, a 7½-ton, 3-motor, overhead traveling crane from the Northern Engineering [illegible]

[illegible] Motors, Ant., a 10-ton, 45-ft. span, 3-motor overhead traveling crane from the Northern Engineering Works;

General Fuel & Foundry Supply Co., Detroit, Mich., two [illegible] Motors;

The Kentucky & West Virginia Power Co., R. E. Breed, president, 30 Church Street, New York, has plans for an addition to its steam-operated electric power plant at Logan, W. Va., one-story and basement, 50 x 120 ft., estimated to cost $[illegible]

Building, Washington, D. C., is structural and electrical engineer.

An electrically operated pumping plant will be installed in the new municipal waterworks to be built by the Locust Valley Water District, Oyster Bay, N. Y., estimated to cost $300,000. S. B. Bowne, Post Office Building, Mineola, N. Y., is engineer.

The Springfield Body Corporation, Springfield, Mass., recently organized to succeed the Smith-Springfield Body Corporation, manufacturer of automobile bodies, is planning the establishment of a branch plant in the vicinity of New York, and expects to lease an existing factory.

The Saratoga Hospital, Church Street, Saratoga, N. Y., has commissioned William H. Vaughan, 400 Broadway, architect, to prepare plans for a new central power house, estimated to cost $50,000.

B. F. Stephens, 1274 Flatbush Avenue, Brooklyn, operating an automobile service and repair works, is planning for the installation of a new drill press, lathe and auxiliary equipment.

The N. & N. Motors Co., 1403 Bedford Avenue, Brooklyn, representing the Westcott automobile, has purchased the one-story building, on site 100 x 100 ft., at 774 Bedford Avenue for a new service and repair works.

The Electric Bond & Share Co., 71 Broadway, New York, operating electric utility properties in Pennsylvania, Texas, Utah and other states, is disposing of a preferred stock issue of $5,000,000, a portion of the proceeds to be used for extensions.

Officials of the Kiefer Brothers Cut Glass Co., 4 Ralph Avenue, Brooklyn, have organized the Kiefer Brothers Products Corporation, with capital of $50,000, to manufacture machinery and parts for the production of cut glass.

Fire Dec. 21 destroyed a portion of the plant of the John Hewitt Foundry Co., Sherman Avenue, East Newark, N. J., with loss estimated at $40,000.

The Morgan Millwork Co., 99 Hoboken Avenue, Jersey City, N. J., will make extensions and improvements in its one-story plant, 300 x 300 ft., estimated to cost $30,000. J. E. Laferty, 13 West Mulberry Street, Baltimore, is architect. Company headquarters are at 113 West North Avenue, Baltimore.

The H. A. Wilson Co., 97 Chestnut Street, Newark, manufacturer of metals, heating-control devices, etc., has leased space in the building at 1-7 Oliver Street for new works, and will remove to the new location. H. A. Wilson is president.

The Board of Education, Bayonne, N. J., has awarded a general contract to Egan & Montague, 15 Exchange Place, Jersey City, N. J., for a three-story vocational and high school, 200 x 300 ft., at Avenue A, Twenty-ninth to Thirtieth Streets, to cost about $1,000,000. A list of equipment will soon be prepared. Donald G. Anderson, 126 East Fifty-ninth Street, New York, is architect.

The Precision Instrument Co., Inc., 21 Halsey Street, Newark, recently organized to succeed to the business of the

company of the same name, has tentative plans for the establishment of a new plant in New York to manufacture valves, gages and other steam specialties. It is expected to remove the present works to the new location.

The Board of Education, Kenilworth, N. J., will receive bids until Jan. 22 for electrical equipment, motors, heating and ventilating apparatus, etc., for installation in the new grade school, for which plans have been prepared by Rasmussen & Wayland, 252 West Forty-sixth Street, New York.

The Ottens Ice & Cold Storage Corporation, Wildwood, N. J., care of Mark B. Reeves, Wildwood Trust Building, architect, has plans for a one and two-story refrigerating and cold storage plant, 80 x 110 ft., on West Montgomery Avenue, to cost $70,000 with machinery.

The Steel Structures Co., Inc., Grand Central Terminal, New York, is in the market for used or surplus columns, bolts, bars and beams.

Stockholders of the Singer Mfg. Co., 149 Broadway, New York, with plant at Elizabethport, N. J., have approved an increase in capital from $90,000,000 to $120,000,000, a portion of the proceeds to be used for extensions.

Philadelphia

PHILADELPHIA, Dec. 26.

THE American Ice Co., Sixth and Arch Streets, Philadelphia, has awarded a general contract to Monaghan & Losse, 3016 Chestnut Street, for a new plant at Seventeenth and Washington Streets, to cost approximately $70,000.

Bids are being asked for a three-story automobile service and machine repair shop, 102 x 105 ft., for the Abbotts Alderney Dairies Co., Inc., Thirty-first and Chestnut Streets, estimated to cost $150,000. It will be used for company motor trucks and cars. Walter Smedley, Stephen Girard Building, Philadelphia, is architect.

The Foreign Trade Bureau of the Philadelphia Commercial Museum, Thirty-fourth Street, has received an inquiry from a company at Tokio, Japan, for forging machinery and tools. Also from a concern at Havana, Cuba, which desires to get in touch with manufacturers of hardware products; and from a company at Manila, P. I., which is in the market for bolt and nut machinery, can-making machinery, and kindred equipment. Full information available upon request.

John N. Shriver & Co., 36 North Delaware Avenue, Philadelphia, food products, have acquired a five-story building at 8 North Front Street, which it will remodel for an ice and cold storage plant.

The Pennsylvania-Edison Co., Reading, Pa., is completing plans for a new electric generating plant at Holland, N. J., estimated to cost $5,000,000, including machinery and transmission system. The company is operated by W. S. Barstow & Co., Inc., 50 Pine Street, New York.

A manual training department will be installed in the proposed two-story junior high school, to be constructed at Lumber and Turner Streets, Allentown, Pa., estimated to cost in excess of $200,000. H. Courcy Richards, 608 Chestnut Street, Philadelphia, is architect.

The Wire Wheel Corporation of America, Philadelphia, has arranged for the removal of its local branch to a new building, 222-24 North Fifteenth Street, where increased floor space will be provided. A service department, machine shop, and enameling plant will be operated. W. H. Metcalf is manager.

J. Monroe Tompkins, Orthodox and Belgrade Streets, Philadelphia, manufacturer of talking machines and parts, is planning for the installation of new equipment. A new branch plant will be operated.

The Model Tire Co., Pottstown, Pa., will soon break ground for a one-story addition. George H. Starkweather heads the company.

The Coopersburg Granite Co., Coopersburg, Pa., is being organized under State laws to operate a local plant and plans have been prepared for complete cutting, grinding and polishing departments. The company is headed by A. W. and Charles D. Bradford, Coopersburg.

A. M. Hilderbrand, 91 Wood Street, Wilkes-Barre, Pa., manufacturer of millwork products, has preliminary plans for rebuilding the portion of his factory destroyed by fire recently with loss approximating $48,000, including machinery.

The City Council, Allentown, Pa., will soon commence the construction of a one-story power house to be used in connection with a municipal incinerating plant, estimated to cost $25,000.

The Bethlehem Steel Co., Bethlehem, Pa., will remodel a three-story building, 60 x 320 ft., heretofore used as a machine shop, for other branches of structural steel and miscellaneous engineering operations. The work will cost about $300,000.

The City Council, York, Pa., has tentative plans under consideration for a municipal electric light and power plant, estimated to cost $250,000. Bonds will soon be voted.

Joseph J. Brooks, Philadelphia, operating a stone works at Sixty-third Street and Mount Moriah Lane, is making inquiries for a 2-ton traveling crane.

A manual training department will be installed in the new one-story high school to be erected at Stewartstown, Pa., 60 x 188 ft., for which bids will soon be asked. H. E. Yessler, Schmidt Building, York, Pa., is architect.

The Penn Seaboard Fuel Corporation, 1714 Sansom Street, Philadelphia, is considering the installation of a steam hammer, with pressure of about 150 lb. per sq. in.

The Penn Screw & Machine Works, 712 Cherry Street, Philadelphia, has an inquiry out for a No. 6 Brown & Sharpe automatic screw machine.

Detroit

DETROIT, Dec. 26.

BIDS for a one-story addition, 33 x 75 ft., are being taken by the Osgood File Works, Inc., 225 Orleans Street, Detroit. Edward M. Osgood is president.

The Pere Marquette Railroad Co., Detroit, has tentative plans for the construction of a new one and two-story engine terminal with shops and repair facilities, at West Jefferson and Twenty-first Streets, estimated to cost $600,000, with equipment.

The Ford Motor Co., Highland Park, Mich., has plans for a new cement mill at River Rouge, Mich., one and two-stories, 150 x 300 ft., estimated to cost $500,000. Machinery to be installed includes grinding and calcining equipment, rotary coolers, pumps, conveyors, etc. The company is also taking bids for its new assembling plant on Danforth Avenue, Toronto. Albert Kahn, 1000 Marquette Building, is architect and engineer for both projects.

A manual training department will be installed in the three-story high school to be erected at Grand Ledge, Mich., estimated to cost $175,000. E. S. Batterson, Hanselman Building, Kalamazoo, Mich., is architect.

The Public Lighting Commission, 174 East Atwater Street, Detroit, is preparing plans for a new municipal electric power plant at Morrell Street and the Detroit River. Smith, Hinchman & Grylls, 800 Marquette Building, are architects and engineers.

A manual training department will be installed in the new high school to be erected at Hancock, Mich., for which foundations will soon be commenced. The Board of Education is in charge.

The Ainsworth Mfg. Co., 2240 Franklin Street, Detroit, manufacturer of automobile equipment, will build a new one-story plant to cost $25,000.

A manual training department will be installed in the two-story high school to be erected at Paw Paw, Mich., estimated to cost $175,000. E. S. Batterson, Hanselman Building, Kalamazoo, Mich., is architect.

Vocational departments will be installed in the two new high schools to be erected at Flint, Mich., estimated to cost $700,000 each, with equipment. Malcolmson, Higginbotham & Palmer, Moffat Building, Detroit, are architects.

Baltimore

BALTIMORE, Dec. 26.

THE Chief of Engineers, Room 2825 Munitions Building, Washington, will receive bids until Jan. 12 for one motor-driven centrifugal pump, as specified in Advertisement No. 100.

The Dorchester Fertilizer & Lime Co., Cambridge, Md., has plans for a one-story building at Trenton, to replace its works recently destroyed by fire, estimated to cost $35,000. W. N. Andrews is general manager.

Sterchi Brothers, Knoxville, Tenn., manufacturers of furniture, have acquired a four-story building at Asheville, N. C., for a branch plant. The structure will be remodeled and machinery installed at a cost of $150,000.

A vocational department will be installed in the new one-story high school to be erected at Jarrettsville, Md. Hamme & Witman, York, Pa., are architects.

The Georgia Railway & Power Co., Atlanta, Ga., has disposed of a preferred stock issue of $2,500,000, the proceeds to be used for its proposed Tugalo electric generating plant.

The American Furniture Co., Martinsville, Va., has

[illegible] to be installed in new plant, including lathes, saws, shapers, planers, hoisting and conveying machinery, etc. A. D. Witten is president.

The Allegheny Motor Co., Roanoke, Va., will soon take [illegible] at Sixth and Church Streets, to cost approximately $35,000. Frye & Stone, MacBain Building, are architects.

The Ocmulgee Brick & Tile Co., Hawkinsville, Ga., is planning for extensions in its plant and the installation of considerable tile-making equipment machinery. J. E. and O. R. Jelks head the company.

The Chevrolet Motor Co., 3044 West Grand Boulevard, Detroit, is said to have tentative plans for a branch plant at Charlotte, N. C., to be given over for the most part to assembling operations.

The Chesapeake & Ohio Railroad Co., First National Bank Building, Richmond, Va., is considering plans for a new engine house and repair shop at Newport News, Va.

The Hackley Morrison Co., Inc., 1708-22 Lewis Street, Richmond, Va., machinery dealer, has inquiries out for boilers, tanks, and auxiliary equipment.

The Anderson Tractor Co., Anderson, S. C., recently organized with a capital of $200,000, is perfecting plans for its new plant and will devote a portion of the works to the manufacture of spraying machinery and devices for cotton field service. W. S. Anderson is president.

The Southern Spring Bed Co., Atlanta, Ga., is planning the erection of an addition to total about 55,000 sq. ft. of additional floor area, estimated to cost $100,000 with machinery. It is arranging for a bond issue of $250,000 for expansion. Robert W. Schwab is president.

Buffalo

BUFFALO, Dec. 26.

SAMUEL H. HORN, 488 Kensington Avenue, Buffalo, is [illegible] a new building, 25 x 50 ft., to manufacture automobile bodies.

The Jamestown Metal Desk Co., Blackstone Avenue, Jamestown, N. Y., has commissioned Beck & Tinkham, 319 Washington Street, architects, to prepare plans for a one-story addition, 120 x 200 ft., to cost $50,000 with machinery.

The New Process Gear Corporation, 500 Plum Street, Syracuse, N. Y., will take bids at once for a two-story addition, 100 x 250 ft., estimated to cost $200,000 with equipment. It will be used for the production of gears and transmission systems for Durant automobiles.

A manual training department will be installed in the two-story and basement high school, 160 x 168 ft., to be erected at Lakewood, N. Y., estimated to cost $130,000. Johnson & Ford, Fenton Building, Jamestown, N. Y., are architects.

Fire, Dec. 14, destroyed a portion of the service and repair buildings of the Dodge Brothers Automobile Co. and Chevrolet Automobile Co., Main Street, North Tonawanda, N. Y., with loss estimated at $35,000, including machinery.

Fire, Dec. 18, destroyed a portion of the foundry of the Northwestern Foundries, Inc., Rochester, N. Y., including cupola department, with loss approximating $19,000.

Cincinnati

CINCINNATI, Dec. 26.

THE machinery market the past week was very quiet, and while some scattered orders were booked, no purchases of consequence were reported. Indications are that some fairly good orders will be closed this week, including at least a part of the Missouri Pacific list. The Chesapeake & Ohio Railroad is also expected to close on a number of tools which have been under negotiation for some time, and other roads are also expected to spend the remainder of their appropriations for this year's requirements. One interesting deal is the requirement of complete equipment for a machinery repair shop in Cuba. This project is about ready to go through, and a large amount of equipment will be needed. Manufacturers of special machinery are working nearly to capacity, and some orders are being booked for metal forming machinery, one company reporting orders amounting to $80,000 within the past two weeks.

Nothing further has developed in regard to prices, but definite announcements from several manufacturers are expected about Jan. 1.

Fire, Dec. 20, at the plant of the Williamson Heater Co., Cincinnati, caused $100,000 damage to two manufacturing units. The foundry escaped the flames and very little interruption to operations will be felt. The two buildings destroyed will be rebuilt as soon as possible. A. W. Williamson is president of the company.

Damage estimated at $150,000 was caused by fire at the plant of the Jarecki Chemical Co., Cincinnati, on Dec. 16. Plans are under way for rebuilding the burned structures.

The Davis Welding & Mfg. Co., Cincinnati, has purchased the plant of the Bickett Machine & Mfg. Co., Richmond Street, and plans to house all its units under the one roof. The Davis company now operates two plants in Cincinnati and the purchase of the new property enables it to greatly enlarge operations.

Edward Montanus, of the Springfield Machine Tool Co., Springfield, Ohio, announces that the company has booked an order for four 20-in. lathes for the Standard Oil Co. These lathes will be motor-driven and will be used on the oil company's tankers in dry dock along the Atlantic coast.

The Gulf States

BIRMINGHAM, Dec. 26.

PLANS are being completed by the Atlantic Coast Line Railroad Co., Atlanta, Ga., for locomotive and machine shops and roundhouse at Port Tampa, Fla., estimated to cost $150,000, including machinery.

C. K. Crossfield, West Gadsden, Ala., is organizing a company to build and operate a new ice-manufacturing plant at Gadsden, Ala., for which preliminary plans are being drawn.

The United States Engineer Office, Mobile, Ala., will take bids until Jan. 1 for one complete pump, with auxiliary apparatus, for a 20-in. pipe line dredge.

The Nortac Mfg. Co., Poplarville, Miss., is planning the erection of a new lumber plant at Orvisburg, Miss., with power house, machine shop and other departments, estimated to cost in excess of $125,000.

The Common Council, Magee, Miss., is planning for extensions in the municipal electric power plant, to include the installation of additional machinery. Bids will be called at an early date.

The Dothan Machine Co., Dothan, Ala., is planning for the installation of machine tools and other equipment at its machine shop.

The National Cast Iron Pipe Co., Tarrant City, Ala., has tentative plans under consideration for the construction of additional foundry units. The capital will be increased from $500,000 to $1,000,000 for expansion.

Electrically-operated pumping machinery will be installed at the municipal waterworks, Elgin, Tex., for which bonds for $40,000 have been voted. The City Council is in charge.

A manual training department will be installed in the high school to be erected at Selma, Ala., estimated to cost close to $100,000. The Board of Education is in charge.

An ice-manufacturing and refrigerating plant will be installed in the municipal public market to be erected at Dallas, Tex., estimated to cost $500,000. A power house will also be established. Charles L. Sanger is chairman of the Municipal Market Committee, recently appointed by the City Council.

The Sun Oil Co., Miami Beach, Fla., has acquired a local site for the construction of a new oil storage and distributing plant, estimated to cost $55,000. A service shop and machine works will also be erected.

The Atlas Oil Co., Monroe, La., will commence the construction of a new gasoline refinery to cost $100,000 with machinery.

The Louisiana State University, Baton Rouge, La., will soon break ground for a new power house, in connection with a new engineering building at the institution, estimated to cost $150,000. R. L. Himes is secretary of the building committee.

The El Paso Electric Railway Co., El Paso, Tex., is arranging an appropriation of $500,000 for the construction of an addition to its electric power plant and improvements in its system. Alba H. Warren is general manager.

The Southwestern Lumber Co., Almorgodo, N. M., is planning for enlargements in its mill to double the present capacity, estimated to cost $100,000. A list of machinery will be prepared.

A vocational department will be installed in the new junior college and high school to be erected at Wichita Falls, Tex., estimated to cost $466,000, on which work will commence early in the coming year.

The Alabama Power Co., Birmingham, Ala., has acquired the electric lighting plant at Dadeville, Ala., and plans for

extensions and improvements and the installation of additional equipment.

The Monroe-Louisiana Carbon Co., Monroe, La., has acquired a site at Ladel, near Monroe, for the construction of a new carbon manufacturing plant, to include machine shop and power house. It will cost about $250,000, with machinery.

The Greenville Mill & Elevator Co., Greenville, Tex., has plans for the erection of a new plant on site adjoining the present works. Considerable new machinery will be installed.

New England

BOSTON, Dec. 26

COMPARATIVELY little interest was shown by manufacturers in machine tools during the week before Christmas. Business placed was largely confined to used equipment, while new inquiries showed a still further shrinkage in volume. One of the most important new inquiries is from Stone & Webster, Boston, for a 10-ton one-motor crane for the Wabash Station, Indiana Electric Co., which is in addition to the 75-ton crane requirements announced in last week's issue of THE IRON AGE. A decided falling off in sales of small tool equipment is reported by the leading interests here.

With the exception of a slight advance in the Ransom line of grinding equipment, no changes in prices of machine tools are noted.

Among the sales reported the past week are a new open-side planer purchased by a Worcester maker of steel mill equipment; a Warner & Swasey turret lathe by an East Lexington, Mass., maker of unions; a triple punch and shearing machine by a Chelsea, Mass., structural steel worker; a new No. 2 Jordan press having a 3-in. stroke to a Woonsocket, R. I., manufacturer; a used 27 in. x 24 ft. Le Blond lathe to a Pacific Coast interest; a used No. 6 Bliss press, a universal milling machine and a drill press to a Gardner, Mass., manufacturer; a 20 in. upright drill, used, to a Quincy, Mass., concern; two new 16 in. lathes to a North Andover, Mass., company; a shaper to a local manufacturer; a milling machine and a tool room grinding machine to a Danvers, Mass., firm; a fairly large amount of new woodworking machinery taken by a Boston firm, and new power hacksaws by New Hampshire and Massachusetts shops.

Walter L. Delory, 18 Tremont Street, Boston, contemplates the erection of a one-story, 60 x 60 ft., machine shop on Howard Street, Brookline, Mass. No date has been set for bids to close.

Plans will be ready about the middle of January for an addition to the Brass City Machine & Tool Works, 29 Pearl Street, Waterbury, Conn., plant.

Excavating has begun for Factory No. 2, to be erected by the General Electric Co., Pittsfield, Mass., the estimated cost of which is about $150,000.

The Boston & Albany Railroad has under consideration the electrification of its line between Springfield and Troy. Preliminary work probably will start late in 1923.

The Boston & Maine Railroad plans within the next few months the erection and equipment of a repair shop at Concord, N. H. Heavy locomotive repair work will be done at the company's Billerica shops instead of at Concord. Light repair work will be done at Concord as well as general car repair work. The new plant is to cost about $250,000 and will be erected near the new $1,000,000 round house.

The Boston Elevated Railway Co. is going ahead with plans for a new consolidated car shop at Everett, Mass. Foundations for the first units should be completed before next summer and structural within a year. The company has not as yet made up a list of its machine tool requirements.

A manual training department will be installed in the high school addition to be constructed on Broadway, Pawtucket, R. I., estimated to cost $300,000. A similar department is also planned in the three-story junior high school addition on Mineral Springs Avenue, to cost approximately $150,000. W. A. Newall is superintendent of schools.

The Marlboro Wire Goods Co., High Street, Marlboro, Mass., will soon take bids for a one-story addition, 80 x 150 ft., to cost approximately $55,000. James F. Bigelow, 64 Highland Avenue, is architect. Hector Heineau is manager.

The Eastern Machine Screw Co., Truman and Barclay Streets, New Haven, Conn., has awarded contract to C. W. Murdock, Inc., New Haven, for a one-story addition.

The United Electric Railways Co., Providence, R. I., is taking bids for a new one and two-story car repair shop and car house, 175 x 535 ft., on North Broadway, East Providence, estimated to cost $315,000.

A manual training department will be installed in the new three-story and basement high school, 150 x 260 ft., to be erected on Colon Street, Beverly, Mass., estimated to cost $300,000. Adden & Parker, 177 State Street, Boston, are architects.

The American Box & Lumber Co., Edgeville, near Nashua, N. H., has tentative plans for rebuilding the portion of its plant destroyed by fire Dec. 19, with loss estimated at $250,000, including machinery.

A vocational department will be installed in the new three-story central junior high school, to be built at New Bedford, Mass., estimated to cost $300,000. The Frank Irving Cooper Corporation, 172 Tremont Street, Boston, is architect.

Pittsburgh

PITTSBURGH, Dec. 26.

SEASONAL quiet pervades the machine tool trade, although some dealers report a fair number of single orders during the week. The iron and steel industry has registered such marked improvement the past fortnight, and the industry as a whole appears to be so well assured of an active first quarter, it is the opinion that much pending business in machine tools will appear soon after the first of the year. Such a small part of the machine tool business figured on in the past six or eight months has actually been closed, that if only half of the inquiries are covered it would constitute a fairly satisfactory volume. The Pennsylvania Railroad has not yet closed against its list for its Conway shops, Freedom, Pa., and the large list for the new tube mills of the National Tube Co., Gary, is still to be figured on.

In heavy equipment, there is one project which probably will go forward next year, for which prices on no less than 39 cranes have been asked. Steel company mergers, which have been fairly numerous lately, usually are productive of plant alterations. Power equipment shares in the general promise of a good year ahead. On some types of motors one of the leading companies now is committed fully three months ahead. This was developed by a recent crane order for which a 50-hp. motor was wanted.

The Romisch Mfg. Co., Morgantown, W. Va., recently closed for a planer, a lathe, a boring mill and a hydraulic press. The Alliance Machine Co. is reported as the successful bidder for a 5-ton crane for the Westinghouse Electric & Mfg. Co., for its new plant in Homewood, Pittsburgh.

The National Metal Products Co., 1016 East Eleventh Street, Indianapolis, Ind., has organized a subsidiary, the National Metal Rod Co., to build a plant on property recently acquired at Chateau and Fayette Streets, Pittsburgh. Plans have been filed for the initial building, one story, 68 x 135 ft., estimated to cost $35,000. The parent organization maintains offices at Erie and Diamond Streets, Pittsburgh.

The National Supply Co. of Delaware, Union Building, Pittsburgh, has been organized with a capital of $25,000,000 to succeed the company of this name, with plants at Carnegie, Pa.; West Chicago, Ill.; Fort Worth, Tex., and other points, for the manufacture of oil well machinery and supplies. A stock issue of $4,200,000 will be sold, a portion of the proceeds to be used for extensions and improvements. J. H. Barr is president.

The Guyan Machine Shops, Inc., Logan, W. Va., is making inquiries for chucks for 22-in. lathes, cylinder grinder, trailers and other equipment.

The Van Vleck Motor Car Co., 420 North Craig Street, Pittsburgh, has completed plans for a three-story service and repair building, 90 x 115 ft., on Baum Boulevard, estimated to cost $120,000. E. P. Mellon, 350 Madison Avenue, New York, is architect.

The Elk Run Mining Co., Florence, Pa., recently reorganized with a capital of $100,000, has tentative plans for the installation of additional equipment at its properties.

The Pittsburgh & Lake Erie Railroad Co., Pittsburgh, Pa., C. M. Yohe, purchasing agent, will receive bids until Jan. 2 for air brake repair equipment and parts.

The Libbey-Owens Sheet Glass Mfg. Co., and the Owens Bottle Co., Nicholas Building, Toledo, Ohio, affiliated organizations, are arranging a fund of close to $3,000,000 for extensions and improvements at their plants at Charleston,

approximately, the present output, estimated to cost $2,000,000, with machinery and power equipment. The latter company will extend its local plant and install additional machinery.

The West Leechburg Steel Co., Farmers' Bank Building, Pittsburgh, will commence the erection of a one-story addition to its plant at Leechburg, 120 x 700 ft., estimated to cost in excess of $700,000, including machinery.

Moore & Eaton, Huntington, W. Va., have awarded contract to W. H. Cox, Huntington, for a two-story automobile service and repair works, 100 x 142 ft., with machine shop and battery department.

Chicago

CHICAGO, Dec. 26.

THE Chicago, Burlington & Quincy, which recently closed for about $500,000 worth of machine tools, is now purchasing against its list of scrap reclamation equipment for its Eola yards. It is also working on its 1923 machine tool budget, with the likelihood that inquiries will be issued late in January. The latest information regarding the Chicago, Milwaukee & St. Paul list is that action on it has been indefinitely postponed. The Union Pacific is reported to be in the market for a slab miller and a few other tools. General business is dull and is expected to remain so until the holidays have passed. The auction of the plant and machinery of the Spacke Machine & Tool Co., Indianapolis, brought out unusually low bids. The total of the high tenders is reported to have been hardly ten per cent of the inventory valuation of $1,700,000.

There will be few price changes on Jan. 1, the only one reported being a 10 per cent advance on [illegible] machines by the Williams Tool Corporation, Erie, Pa.

The Ford Motor Co., which recently purchased a 70-acre tract in Hegewisch, Ind., will build a plant not only for assembling operations but also for the manufacture of closed [illegible] units will be erected as soon as weather conditions permit and is expected to be in operation [illegible] year. The unit will cost about $1,500,000 and will employ 4000 men. The entire plant, as now contemplated will cost $6,000,000 and will employ 16,000.

B. R. Ringwold, 5090 South Chicago Avenue, Chicago, has let contract for a one-story door, sash and millwork factory, 50 x 130 ft., at 8084-6 South Chicago Avenue, to cost $8,000.

The Electrical Dealers Supply Co., 162 West Randolph Street, Chicago, has purchased a site, 141 x 256 ft., on the west bank of the north branch of the Chicago River north of Diversey Parkway, and will start the construction of a three-story factory in January. It will cost $150,000.

The General American Tank Car Corporation, Harris Trust Building, Chicago, will soon start the construction of a wing to its wooden car erection department, 80 x 920 ft., to [illegible]

The A. V. Moore Welding Co., Alton, Ill., has opened a welding shop at 326 East Jefferson Street, Springfield, Ill.

W. F. Macke & Co., manufacturers of automobile and pipe wrenches, Kokomo, Ind., have purchased the two-story plant of the Kokomo Specialties Co., which has been in the hands of a receiver for several months. The purchase gives the new owners 10,000 sq. ft. of additional floor space.

Philip Mitchell of the Mitchell Boat Works, Coeur d'Alene, Idaho, has purchased a new site for his plant and will commence construction about March.

The Illinois Public Service Co., 130 South Sixth Street, Springfield, Ill., will soon authorize plans for new ice-manufacturing and cold storage plants at Effingham and Charles-

The Bitumacite Coal Co., Mt Vernon, Ill., is planning the construction of new works to manufacture a special fuel, known as bitumacite, estimated to cost $100,000. In this connection another plant will be built for the manufacture

J. H. Vickers, Mt. Vernon is one of the heads of the

tentative plans for a new manual training school at Winnetka, Ill. A power house will also be built. The structures

The C. F. Massey Co., 122 South Michigan Avenue, Chicago, manufacturer of concrete products, has concluded negotiations with the Chamber of Commerce, Montgomery, Ala., for a site for the erection of a new branch plant, estimated to cost $50,000.

The Board of Education, City Hall, Minneapolis, Minn., is planning the erection of a three-story and basement vocational school, with portion to be devoted to the administrative department, estimated to cost $1,000,000.

The Common Council, Red Wing, Minn., has preliminary plans for the erection of a municipal electric light and power plant estimated to cost $350,000. William Geisheker is city engineer in charge.

The Reynolds Equipment Co., Lumber Exchange Building, Chicago, is making inquiries for a lathe, shaper, radial drill and other machine tools.

A manual training department will be installed in the two-story and basement high school to be erected at Center Point, Iowa, estimated to cost $75,000. Bartley & Pedicord, L. & J. Bank Building, Waterloo, Iowa, are architects.

The Nevada-California Electric Corporation, Symes Building, Denver, Colo., is arranging a construction program for 1923 for California and Nevada power plants and transmission systems to cost $8,000,000. The work will include the construction of seven hydroelectric generating plants with aggregate capacity of 46,500 hp.

The Central South

ST. LOUIS, Dec. 26.

THE Alpha Portland Cement Co., Easton, Pa., has acquired the plant and property of the Continental Portland Cement Co., near St. Louis, for about $1,000,000. The new owner plans for enlargements to cost $500,000 with machinery. This acquisition makes the ninth cement mill of the company, with total annual capacity of 10,000,000 bbl. Work is under way on a one-story addition to the La Salle, Ill., works, 70 x 125 ft.

The Atlantic Ice & Coal Corporation, Chattanooga, Tenn., is planning for extensions and improvements in its ice-manufacturing and cold storage plant, to cost approximately $150,000 with machinery. B. W. Baker is president.

A vocational department will be installed in the new high school to be erected at Great Bend, Kan., estimated to cost $250,000. Owen, Payson & Carswell, Interstate Building, Kansas City, Mo., are architects.

The North Missouri Power Co., Excelsior Springs, Mo., recently organized with a capital of $1,700,000, has tentative plans under consideration for the construction of a new power plant. The company is headed by S. W. Henderson and H. L. Moore.

The Common Council, Wynnewood, Okla., is having plans drawn for a municipal electric power plant and extensions in the waterworks to cost about $85,000. V. V. Long & Co., 1300 Colcord Building, Oklahoma City, Okla., are engineers.

The Marland Oil & Refining Co., Ponca City, Okla., is considering plans for extensions in its local refinery to include the installation of additional equipment.

The H. A. Scholze Fertilizer & Soap Mfg. Co., Chattanooga, Tenn., is having plans prepared for an addition to its fertilizer plant, estimated to cost $100,000. Machinery will be installed to double the present capacity. H. A. Scholze is president.

The Alpine Ice Co., Thirteenth Avenue and Rock Island Street, Wichita, Kan., will install new equipment, including a 90-ton ice-manufacturing machine, motors, transmission equipment, etc. C. M. Beachy is in charge.

The Lexington Mine & Mill Supply Co., 544 West Main Street, Lexington, Ky., will build a new one and two-story building, 50 x 210 ft., estimated to cost $50,000.

The Brooks Machine Works, 225 West Lewis Street, Wichita, Kan., will enlarge its plant and install additional machinery. J. M. Hackney is president.

The Big Four Coal Co., Whitesburg, Ky., is planning for the installation of electrical and other machinery at Candill, Ky. W. J. Raybold heads the company.

The J. P. Nanney Lumber Co., Morristown, Tenn., will install additional machinery, including planer, saws, etc., with all equipment motor-driven.

The Kansas City Bolt & Nut Co., Kansas City, Mo., is in the market for the following: One 15-ton crane of 47-ft. span, one 10-ton crane of 100-ft. span, and one 90-ton ladle crane of 47-ft. span.

The Tayloe Paper Co., Memphis, Tenn., advises it has leased a warehouse in Tulsa, Okla., for jobbing purposes, and has no intention of erecting a manufacturing unit, as was erroneously stated.

Cleveland

CLEVELAND, Dec. 26.

THE volume of business booked by machine tool dealers during the week exceeded expectations, very little falling off in sales being noted, as is usual just before the holidays. Orders were almost wholly for single machines, although one lot of six tools, including presses and other equipment, was purchased by the Metal Marker Mfg. Co., Cleveland, which was recently incorporated, and will equip a plant. The only railroad order came from the Toledo, St. Louis & Western Railroad for a Niles 90-in. driving wheel lathe for its Frankfort, Ind., shops.

Machine tool manufacturers in Cleveland are experiencing the usual holiday lull. A few orders for single machines or small lots were booked during the week, but the placing of some good prospective business has been deferred until January. A local manufacturer of gear grinding machines reports an improvement in the European demand, having recently received orders from England and France for about a half dozen machines.

The Cleveland Wrought Products Co., Cleveland, will enlarge its plant by the erection of a two-story brick building, 60 x 112 ft. It will be used as a warehouse and packing room for cap and set screws, and a portion of the present plant now used for warehouse purposes will be made available for manufacturing.

The M. J. Kehoe Co., London, Ohio, has been incorporated with a capital stock of $25,000 and will establish a plant for the manufacture of power washing machines.

The Gluntz Brass Foundry Co., Cleveland, has been organized by Daniel J. Gluntz, for 17 years superintendent of the City Brass Foundry Co., Cleveland, and others, and is establishing a plant in the building formerly occupied by the Ohio Bending & Machine Co., at Elm and Washington Streets. The company will do a general jobbing work in brass castings, and will make brass and aluminum patterns and operate a machine shop. Equipment is now being purchased.

The Buckeye Casting Co., Lima, Ohio, will add a steel foundry to its present plant, which makes gray iron castings. A building has been erected for the steel foundry department, which will be placed in operation about Feb. 1.

At the annual meeting of the directors of the Bishop & Babcock Co., Cleveland, Dec. 22, F. R. Pleasanton. was elected president. He has been general manager of the company since last June, when E. S. Griffiths retired because of poor health. Karl D. Bishop and E. H. Weatherhead were elected vice-presidents, J. H. Champ, treasurer, and C. A. Rehark, secretary.

The Pacific Coast

SAN FRANCISCO, Dec. 19.

THE Los Angeles Ice & Cold Storage Co., Los Angeles, will commence the erection of a new ice-manufacturing plant at Van Nuys, to be equipped for a capacity of 50 tons per day. A cold storage department will be installed with a capacity of 150 tons.

The Utah Power & Light Co., Salt Lake City, Utah, has made application to the State engineer, to construct and operate a hydroelectric power plant on the Green River, with capacity of 188,000 hp. Six water turbines, each of 37,600 hp. will be installed.

The Electric Screwdriver Tool Co., Inc., Oakland, Cal., recently organized, is planning for the erection of a factory to manufacture high-speed rotary tools.

The Board of Trustees, Union High School District, Corcoran, Cal., will commence the erection of a new one-story school, to be equipped exclusively for manual training.

The Southern Pacific Railroad Co., Portland, Ore., will build a new one-story wheel shop and one-story flange shop at its car and engine repair works on Brooklyn Street.

The West Coast Pulp & Paper Co., Seattle, Wash., is said to be planning the erection of a new pulp and paper mill at Olympia, Wash., to cost in excess of $750,000, with power house, machine shop and other buildings.

The Petaluma Ice & Cold Storage Co., East Petaluma, Cal., operated by the National Ice & Cold Storage Co., Postal Telegraph Building, San Francisco, is planning the erection of a two-story addition, with equipment to double the present capacity, estimated to cost $100,000.

The Simmons Co., Bay and Powell Streets, San Francisco, with headquarters at Kenosha, Wis., will commence the erection of a three-story addition to its local plant, to cost $75,000.

A vocational department will be installed in the new high school to be erected at Yuba City, Cal., for which a bond issue of $250,000 has just been sold.

C. E. Short, Orange, Cal., formerly connected with the Santiago Orange Growers' Association, and associates, will commence the erection of a new ice-manufacturing and cold storage plant on property recently acquired. It will cost $60,000.

A vocational department will be installed in the new high school to be erected at Fresno, Cal., estimated to cost $300,000, for which bids on a general contract have recently been asked. Coates & Traver, 626 Rowell Building, Fresno, are architects.

Milwaukee

MILWAUKEE, Dec. 26.

CONSPICUOUS in the relatively good volume of business placed with Milwaukee machine-tool builders in December is a fairly large lot of milling machines reported to have been purchased by the Ford interests, presumably for the equipment of a new $6,000,000 plant to be erected at Hegewisch, Ind. This order is said to embrace between 25 and 30 tools, principally standard types. Local dealers are experiencing the best December business in two years or longer, new as well as used equipment being in good demand. As a rule, purchases consist of one or two machines for replacement or to provide a small increase in capacity. Inquiry continues unusually active in view of the holiday season and the proximity of the inventory period. Confidence is expressed that after Jan. 10 or 15 a demand will come to the surface that will make trade closer to the pre-war normal than it has been.

The Mattson Foundry Co., Chippewa Falls, Wis., has been organized as a partnership between A. M. Mattson and A. J. Torgeson, who have leased the foundry and machine shop of the Northlite Mfg. Co., owned by S. M. Yates & Son, who have discontinued the manufacture of pumps. Mr. Mattson has been general superintendent of the plant for four years, and previously was connected with the Chippewa Pump Co. and the Phoenix Mfg. Co. of Eau Claire, Wis. The new concern will do a general jobbing foundry and machine shop business, repair trade, and also do brass and aluminum casting besides gray iron work.

The capital stock of the Harvey Spring & Forging Co., Racine, Wis., now is $700,000, an increase of $400,000. It was erroneously reported in THE IRON AGE of Dec. 21 that the capitalization had been increased from $200,000 to $300,000.

The Ricketson Mineral Paint Works, 97 Wisconsin Street, Milwaukee, has engaged the Birkholz Engineering Co., 290 Third Street, local, to design and equip a three-story addition, 63 x 68 ft., at Wilcox Street and the Chicago & Northwestern tracks. Construction bids close Dec. 27. The improvement will cost about $90,000 complete. Frederick C. Bogk is president.

The Beloit Iron Works, Beloit, Wis., will remodel and enlarge its machine shop at a cost of about $50,000, including new equipment, and has let the construction contract to John Schneiberg, 945 Bluff Street, local. F. L. Penney is president and general manager.

The West Allis, Wis., Board of Vocational Education has engaged Lindl-Lesser & Schutte, Inc., architects, 82 Wisconsin Street, Milwaukee, to prepare plans and supervise the construction and equipment of a $150,000 addition to the present continuation school. Bids probably will not be taken before Feb. 1.

The Capitol Garage Co., Madison, Wis., expects to take bids about Jan. 10 or 15 for the erection of a two-story garage, sales and service building, 66 x 160 ft., the machine and service department to occupy a space of 66 x 95 ft. on the ground floor. It will cost about $50,000 complete. F. L. Kronenberg, local architect, is in charge.

The Faust Lumber Co., Antigo, Wis., is preparing to erect a new sawmill and planing mill costing about $60,000, to replace the plant damaged by fire recently. New and used equipment will be purchased. L. P. Tradewell is secretary and manager.

The Western Brass Mfg. Co., Milwaukee, is a new corporation with $10,000 capital stock organized by E. C. Rosenberg, Paul Gauer and E. R. Buer, attorneys, 114 Grand Avenue. It is a reorganization under corporate form of the Western Brass & Aluminum Foundry Co., 241-243 Reed

J. H. Dierman.

The Board of Education, Rhinelander, Wis., is conducting an architects' competition to secure plans for a $100,000 addition to the high school which will be equipped as a junior high and vocational training institute. August Carlson is chairman of the building committee.

Breuer-Stone, Inc., Watertown, Wis., has been organized in Wisconsin with a capital stock of $25,000 to engage in the manufacture of machinery and mechanical devices and the development of inventions and designs. The principals are W. C. Stone, Peter Breuer and J. C. Stone. It expects to establish a shop early in the new year but is not ready to announce definite plans.

The Hayes-Fountain-Hayes Co., Janesville, Wis., street and highway paving contractors, is building a brick and steel structure, 60 x 120 ft., 23 ft. high, for the care and maintenance of its machinery, equipment and vehicles. A small machine shop will be equipped.

The Chevrolet Motors Co., division of the General Motors Corporation, expects to start initial production Jan. 1 in the plant at Janesville, Wis., erected for the purposes of the Samson Tractor Co., and now enlarged at a cost of $125,000. A new plant costing $300,000 for the Fisher Body Division, now under construction at Janesville to serve the new Chevrolet unit, will be ready for installation of equipment about Jan. 1 and start production on Jan. 15 or 20.

The Lindsay Light & Power Co., Manawa, Wis., was organized for the development of electrical energy, having purchased several water powers on the Little Wolf River, which gives it ample pressure for any demand which may be asked. The company has recently purchased water power from the Little Wolf River Lumber Co., Manawa, Wis. Its hydroelectric generating plant was finished several months ago.

Canada

TORONTO, Dec. 26.

DEMAND for machinery and tools for the past three months has been very satisfactory, and dealers state that sales have been maintained up to the closing week of the year. The Canadian National Railways have furnished the greater part of the business in individual buying, and in addition to contracts awarded the past two months have issued a list for additional equipment, including wood-working machinery, wheel lathes, electric welding outfits, lathes, bolt-turning machine and considerable miscellaneous equipment. In addition to the shop equipment some large contracts for rolling stock and nails will be placed. General manufacturing concerns are also entering the market and dealers state they have a very good volume in prospect which will most likely mature early in the new year.

According to a statement issued by Sir Adam Beck, chairman Ontario Hydro Electric Power Commission, University Avenue, Toronto, engineers will begin plans immediately for the development of additional 40,000 hp. project on the Niagara River.

Thompson Brothers, Ltd., Liverpool, N. S., whose machine shop with equipment was recently destroyed by fire are now operating again. A foundry, garage and pattern shop, 157 x 51 feet have been erected as well as a blacksmith shop [illegible] x 30 feet.

The mill owned by the Asbestos Mines, Ltd., East Broughton, Que., was destroyed by fire with a loss of $200,000. It is the intention of the company to rebuild immediately. New equipment will be required.

Brantford, Ont., will erect pumping station to cost $18,000.

The West Window Regulator Co., Milverton, Ont., will erect a factory and purchase equipment. E. H. Groop is manager.

The Automatic Sprinkler Co. of Canada, Ltd., 36 Victoria Square, Montreal, will erect a factory for the manufacture of sprinklers, fire prevention equipment, etc.

The Maple Leaf Mfg. Co., 999 Christophe Colomb Street, Montreal, will rebuild its motor plant, recently destroyed by fire with a loss of $100,000. New equipment will be purchased.

The Port Dover Planing Mills, Port Dover, Ont., will rebuild a mill recently damaged by fire and will install new equipment.

The Quebec, Montreal & Southern Railway, St. James Street, Montreal, will rebuild a factory at Sorel, Que., destroyed by fire some time ago. E. L. Gibson, Sorel, is engineer.

The Stratford Frames & Novelties, Ltd., Stratford, Ont., is having plans prepared by R. Gatehouse, care of Crown Investment Co., 49 Richmond Street West, Toronto, for the erection of a factory to cost $30,000.

The Howard Furnace Co., 881 Yonge Street, Toronto, has started work on the erection of a factory to cost $24,000.

The Nashwaak Pulp & Paper Co., Ltd., Fairville, N. B., is making arrangements to install additional turbines and other equipment in a power plant to cost $100,000.

Additional contracts have been awarded in connection with the erection of a machine shop at Ford, Ont., for the Ford Motor Co. of Canada, to cost $1,500,000. Construction work has started.

The New Brunswick Electric Power Commission, Prince William Street, St. John, N. B., contemplates power development at Nepisiquit Falls, N. B., to cost $500,000. C. O. Foss is chief engineer.

Industrial Finance

The Pittsburgh Rolls Corporation has declared a special dividend of 2 per cent on common stock, payable Dec. 30 to stockholders of record Dec. 23; also the regular quarterly dividend of 1¾ per cent on the preferred stock, payable Jan. 1 to stockholders of record Dec. 23. This is the first dividend on the common stock since January, 1919, when 1 per cent in Liberty bonds was paid.

The Southern Motor Mfg. Association, Ltd., Houston, Tex., has instituted voluntary receivership proceedings in order to allow the company to continue operations unharassed by creditors until a merger can be effected with another large automobile company. There is no question of insolvency involved, the tangible assets of the company measuring well in excess of the liabilities. It will continue in the interim to turn out Ranger cars and tractors under the directorship of E. F. Dupree. Jacques E. Blevins, president, said that negotiations for the merger are progressing favorably.

Sales of the factories of the American & British Mfg. Co. at Bridgeport, Conn., and at Providence, R. I., has been ordered by Judge John C. Knox of the United States district court for the district of southern New York. Bids will be received by the receiver George C. Van Tuyl, Jr., and opened at the office of Flaherty, Turner & Stevens, 2 Rector Street, New York City, on Dec. 22.

The Penn Central Light & Power Co. Altoona, Pa., has arranged for a bond issue of $244,000, a portion of the proceeds to be used for extensions and improvements.

The Pequonock Foundry, Inc., Bridgeport, Conn., gray iron castings, has increased its capitalization from $10,000 to $50,000.

B. P. Corey, Petrolia, Ont., will erect a refinery to cost $50,000. Under the proposed plan several buildings and a number of storage tanks will be constructed.

The Dominion Insulator Co., Niagara Falls, Ont., is completing the erection of a plant and will begin the installation of the necessary equipment.

The Victoria Lumber & Mfg. Co., Victoria, B. C., is contemplating building an addition to bring the capacity up to 1,000,000 ft. per day.

The Riverside Iron Works, Ltd., Calgary, Alta., has purchased a site in the southeast section of the city, where a new foundry, 80 x 120 ft., is being erected of steel and brick. It is also the intention to build a new plant on this site at some future date.

The J. & B. Co. and the Berkshire Magneto Co., Pittsfield, Mass., ignition and electrical motor apparatus, have merged under the firm name of the Berkshire Products Co. The Berkshire West Street plant will be closed and the equipment moved to the J. & B. Co. plant, Eagle Street. George H. Southard, Jr., is president, treasurer and general manager. Raymond D. Tufts is assistant general manager, and H. R. Williams, vice-president and director of sales.

The Northern Engineering Works, Detroit, Mich., builder of electric and hand power traveling cranes, hoists and machinery, has appointed Harry Rood of its Detroit office as New York representative, with offices at 30 Church Street, R. A. Byrns and Harrison Daugherty, 120 Liberty Street, formerly the representatives of this company in the New York district, are now representing the Towmotor Co., Cleveland, exclusively.

FRENCH PRICES STIFFEN

Producers Averse to Booking for Forward Delivery —Six More Furnaces in Blast —50,000 Tons of Rails Placed

PARIS, FRANCE, Dec. 7.—Owing to the uncertainty of coke supplies, French metallurgists, whose order books are generally full until the end of this year, are averse to taking orders for forward delivery and, as purchasers are anxious to cover their future requirements, the consequence is that prices show a stiffening tendency. The volume of domestic orders is small but export sales are satisfactory.

On Nov. 1, out of a total of 221 blast furnaces in France, 109 were in commission, compared with 103 on Oct. 1, as follows:

	Furnaces in Blast	Total Blast Furnaces
Meurthe-et-Moselle	40	81
Lorraine	46	68
Northern area	5	20
Central area	6	13
Southwestern area	5	20
Southeastern area	1	8
Western area	6	8

In November, the French blast furnaces received from Germany 357,400 tons of coke, instead of 410,000 tons due. The last named tonnage is that fixed for October by the Commission of Reparations, as no decision has so far been taken for the following months.

There have been many complaints of late about the excessive exports of scrap, most of which is going to Germany. In September, France exported 74,000 tons of scrap, while exports during the first nine months of 1922 were 737,895 tons. Prices of this material have almost doubled since April, 1921, when scrap export was released from restriction, and the French Government is now considering re-enacting restrictive measures as these exports are dangerously affecting the supplies of French metallurgists.

Iron Ore.—The production of French mines is improving except, however, in the Pyrenean area. France has exported, during the first nine months of 1922, 6,809,543 tons of iron ore, of which 1,541,842 tons went to Germany, 1,955,072 tons to the Saar district and 1,635,865 tons to Belgium. Shipments to Belgium, (594,479 tons in September), have been increasing lately.

Present prices, f.o.b. mines, are as follows:

	Fr.
Minette, Briey	15
Minette, Thionville	12
Siliceous iron ore, Longwy and Nancy	12
Carbonated iron ore, Normandy	30 to 35
Carbonated or hematite iron ore, Pyrenean area	30

Pig Iron.—Practically no sales of foundry iron are being made for December delivery, and few metallurgists are accepting orders for 1923. For January or February delivery, the price of chill cast foundry pig iron No. 3 P. L. has risen to 250 to 255 fr., at furnaces. The export price f.o.b. Antwerp has risen to 280 to 290 fr. (Belgian currency).

The demand for hematite is quiet. At the present exchange rate of the pound sterling, British hematite can only be imported into France in cases where quality is the only consideration. Prices are variable; but the following may be quoted at furnaces:

	Fr.
East	300 to 320
North	325 to 345
Center	310 to 330

Semi-Finished Steel.—This market is still strong for export, but domestic business is light. Prices now quoted (for basic steel) are:

	Fr.
Ingots	310 to 320
Blooms	330 to 340
Slabs and billets	350 to 360
Sheet billets	385 to 395

These are domestic prices. Export prices f.o.b. Antwerp are about the same, but in Belgian currency.

Beams and Rails.—The various French railroads about ten days ago allocated to the Comptoir Sidérurgique their rail orders totaling more than 50,000 tons, at the base price of 500 fr. per metric ton, corresponding to a coke price of 95 fr. at the Franco-German frontier. This base price is equivalent to 480 to 490 fr. at mills. Base prices (at mills) of the Comptoir Sidérurgique are: Beams, 475 fr.; heavy rails, 500 fr.; sleepers, 450 fr. Export prices f.o.b. Antwerp (Belgian currency) are: Beams, 390 to 400 fr.; heavy rails, 420 to 425 fr.; light rails (shorn) 400 to 410 fr.

Some time ago difficulties cropped up between the Hauts-Fourneaux de la Chiers (a branch of the Belgian Société d'Ougrée-Marihaye) and the Comptoir Sidérurgique. The result of these difficulties may be the dissolution of the Comptoir Sidérurgique Jan. 1. Negotiations are still going on between representatives of the Comptoir and the Hauts-Fourneaux de la Chiers, but with little result so far. The Comptoir Sidérurgique is the last producers' union in the French iron trade.

Plates and Sheets.—The Comptoir des Tôles has raised the extras for various thicknesses of medium and light sheets. For medium sheets, between 2 and 5 mm., the extras over the base price have doubled. For light sheets, the new extras over the base price range from 62.50 fr. for 1 mm. sheets to 250 fr. for 0.5 mm. sheets. Base prices are:

	Fr.
Universal flats	630
Heavy sheets	650
Medium sheets	730
Light sheets	930

The recent rise has not so far caused any reduction in the demand. Heavy sheets alone are a weak point in the market. Delivery offered on light sheets is three to four months; medium sheets, 10 weeks; heavy sheets, four to eight weeks.

Export prices on open-hearth sheets, f.o.b. Antwerp, (Belgian currency) are: 5 mm. and heavier, 520 to 530 fr.; flats, 470 to 480 fr.

Rolled Merchant Products.—Rolled merchant products have stiffened to 460 fr. at mills in Lorraine. The export price, f.o.b. Antwerp, in Belgian currency is 445 to 450 fr.

French State Railways: 1200 tons of brake shoes at 460 to 480 fr. (as against 330 to 340 fr. six months ago); French Northern Railways: 2000 tons of brake shoes at 460 to 480 fr. also; French State Railways: a certain tonnage of sleeper chairs at 500 fr.; for French colonies: 184 tons of fish bolts at 934 fr., 60 delivered at Havre or Dunkirk; 537 tons of coach screws at 874 fr., 50 delivered at Dunkirk. All above prices are per metric ton.

Mirra Piston Pin Co. Organized

The Mirra Piston Pin Co. has been organized at Worcester, Mass., to manufacture piston pins and similar products, and will occupy space in the factory of the Liberty Screw Co. of that city. Incorporation papers have been filed in Massachusetts, the capital consisting of 1000 shares of common stock of no par value. Frank A. Drury, Worcester, is president, Warren F. Fraser, Westboro, Mass., vice-president, Lewis M. Crittsinger, Worcester, treasurer, the three constituting the board of directors. Percival P. Drury, Worcester, is the clerk.

The Liberty Screw Co., of which Mr. Crittsinger is general manager, has been manufacturing piston pins, the finishing operations of which were performed at the Warren F. Fraser Co.'s shops in Westboro. The demand for the product has become such that it was deemed advisable to form a separate corporation for more efficient management and to concentrate manufacturing. Mr. Crittsinger, in addition to his duties as manager of the Liberty Screw Co., will manage the business, and Percival P. Drury will be the assistant manager.

Two ore deposits of considerable extent have been discovered in the vicinity of the Bjursfors field in Norsjo, Sweden, one containing zinc ore and iron pyrites, according to advices received by the Department of Commerce. Drillings in the second have revealed an unusually rich copper ore of considerable thickness and length and fairly uniform in quality. The Swedish Geological Survey is at present engaged in investigating this section, since it has easy access to the main railroad lines and also because, according to geological calculations, important deposits should be hidden there.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	
Refined iron bars, base price	3.04c.
Swedish bars, base price	7.50c.
Soft steel bars, base price	3.04c.
Hoops, base price	4.39c.
Bands, base price	3.84c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	3.14c.
Channels, angles and tees under 3 in. x ¼ in., base	3.04c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.10c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	3.30c.
Toe-calk, ½ x ⅜ in. and larger	4.15c.
Cold-rolled strip, soft and quarter hard	6.75c. to 7.25c.
Open-hearth spring steel	4.00c. to 6.00c.
Shafting and Screw Stock:	
Rounds	3.90c.
Squares, flats and hex	4.40c.
Standard cast steel, base price	15.00c.
Extra cast steel	18.00c.
Special cast steel	23.00c.

Tank Plates—Steel

¼ in. and heavier	3.14c.

Sheets

Blue Annealed

	Per Lb.
No. 10	4.19c.
No. 12	4.24c.
No. 14	4.29c.
No. 16	4.39c.

Box Annealed—Black

	Soft Steel C. R., One Pass, Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.30c. to 4.55c.	.....
Nos. 22 and 24	4.35c. to 4.60c.	5.00c.
No. 26	4.40c. to 4.65c.	5.05c.
No. 28	4.50c. to 4.75c.	5.15c.
No. 30	4.75c. to 5.00c.	.....

No. 28 and lighter, 36 in. wide, 10c. higher.

Galvanized

	Per Lb.
No. 14	4.35c. to 4.60c.
No. 16	4.50c. to 4.75c.
Nos. 18 and 20	4.65c. to 4.90c.
Nos. 22 and 24	4.80c. to 5.05c.
No. 26	4.95c. to 5.20c.
No. 27	5.10c. to 5.35c.
No. 28	5.25c. to 5.50c.
No. 30	5.75c. to 6.00c.

No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel			*Wrought Iron*		
	Black	Galv.		Black	Galv.
½ in. Butt	—50	—35	½ in. Butt	—11	+13
¾ in. Butt	—55	—42	¾ in. Butt	—17	— 1
1-3 in. Butt	—57	—44	1-1½ in. Butt	—20	— 2
2½-6 in. Lap	—54	—41	2 in. Lap	—14	+ 2
7-8 in. Lap	—50	—26	2½-6 in. Lap	—18	— 2
9-12 in. Lap	—46	—25	7-12 in. Lap	—10	+ 6

Steel Wire

	Per Lb.
Bright [illegible]	[illegible] to 5.00c.
Annealed soft	4.75c. to 5.00c.
Galvanized annealed	5.40c. to 5.65c.
Coppered basic	5.40c. to 5.65c.
Tinned soft Bessemer	6.40c. to 6.65c.

*Regular extras for [illegible]

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	20 c. to 21 c.
High brass wire	20½c. to 21½c.
Brass rod	17¼c. to 18¼c.
Brass tube, brazed	27 c. to 28 c.
Brass tube, seamless	23½c. to 24 c.
Copper tube, seamless	26½c. to 26¾c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 22½c. to 23½c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14-20	
		Primes	Wasters
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb.	$5.80	$5.55
		90 lb.	5.90	5.65
		100 lb.	6.00	5.75
IC	$10.00	$8.50	IC	6.15	5.90
IX	11.50	10.00	IX	7.15	6.90
IXX	13.00	11.25	IXX	8.15	7.90
IXXX	14.25	12.50	IXXX	9.15	8.90
IXXXX	16.00	14.00	IXXXX	10.15	9.90

Terne Plates

8-lb. coating, 14 x 20

100 lb.	$7.00
IC	7.25
IX	7.50
Fire door stock	9.00

Tin

Straits pig	40c
Bar	45c. to 50c.

Copper

Lake ingot	15¼c.
Electrolytic	15 c.
Casting	14⅞c.

Spelter and Sheet Zinc

Western spelter	8¾c.
Sheet zinc, No. 9 base, casks	10¼c. open 10¾c.

Lead and Solder*

American pig lead	8c. to 8¾c
Bar lead	9c. to 10c.
Solder, ½ and ½ guaranteed	27½c.
No. 1 solder	26c.
Refined solder	23¼c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	75c.
Commercial grade, per lb	35c.
Grade D, per lb	25c.

Antimony

Asiatic	7½c. to 8¼c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb. 25c. to 27c.

Old Metals

The market is quite active and values are advancing. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy crucible	12.25
Copper, heavy wire	12.00
Copper, light and bottoms	10.00
Brass, heavy	7.25
Brass, light	6.00
Heavy machine composition	9.25
No. 1 yellow brass turnings	7.50
No. 1 red brass or composition turnings	8.50
Lead, heavy	5.75
Lead, tea	4.50
Zinc	4.50



BEMENT HAMMERS

For the Modern Forge Shop

Bement Hammers are made in a wide range of sizes so that always the best economy on forging jobs can be obtained.

Single frame Hammers range in size from 250 lbs. to 4,000 lbs.; double frame Hammers are built from 1500 lbs. up to 24,000 lbs.

As pioneers in hammer building, we have incorporated all the features that make Bement forging hammers what they are—speedy, responsive, safe, indispensable and so reliable that they are on the job, all the time, every hour of the working day.

Bulletins on request.

NILES-BEMENT-POND COMPANY

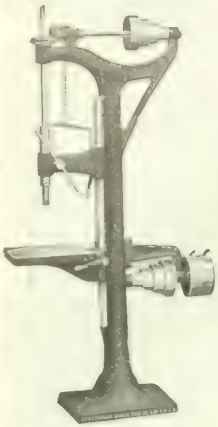
General Offices: 111 Broadway, New York City

Sales Offices in Boston, Birmingham, Philadelphia, Rochester, Cleveland, Cincinnati, Detroit, Chicago, Pittsburgh, St. Louis, St. Paul, San Francisco, Los Angeles.

404

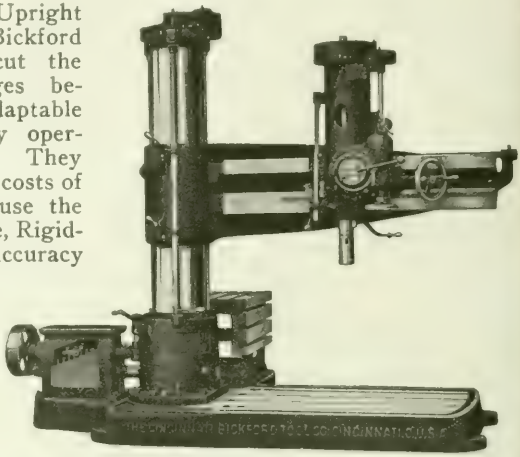
Lowered Operating Costs

Cannot be got by wage cutting or a continuous lowering of the quality of raw materials, but must come from increased efficiency of operatives and machinery.



The Cincinnati Upright and Cincinnati Bickford Radial Drills cut the overhead charges because they are adaptable—perform every operation efficiently. They cut the time and costs of production because the essentials, Range, Rigidity, Speed and Accuracy are prominent in their design.

Let us tell you what they can do for you.



CINCINNATI

The Cincinnati Bickford Tool Company

Oakley, Cincinnati, Ohio, U. S. A.

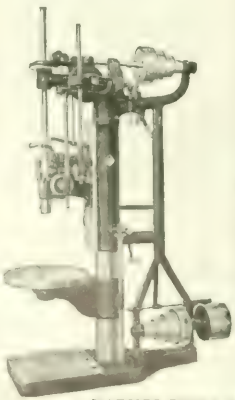
CINCINNATI BICKFORD

COMPLETE LINE OF 8 INCH TO 50 INCH SWING

With or Without Tapping Attachment

Upright DRILLS
Horizontal DRILLS
Gang DRILLS

Convenience of Operation
Accuracy
Strength



BARNES DRILLS

Made by
W. F. & John BARNES CO.
69 Ruby Street
Rockford, Ill.
U. S. A.



Self-Oiled and All-Geared Drills

are found in large plants where production is the vital need.

Your plant needs a drill that is productive and economical no matter how large or small it is.

Investigate.

BARNES DRILL CO.
Incorporated 1907
815-831 Chestnut Street
ROCKFORD, ILL., U. S. A.

DRILLING MACHINERY

FULL BALL BEARING
HIGH-SPEED AND HEAVY-DUTY
ONE TO SIX SPINDLES
HIGH-SPEED AND HEAVY-DUTY TAPPERS

Leland-Gifford Co. Worcester, Mass.

ROYERSFORD TWENTY-INCH BACK GEARED

This 20-inch back geared, vertical drill has a capacity of 1¼ inches.
Rigid, accurate, this drill is not only a big producer, but a machine for fine work.
Write for circular.

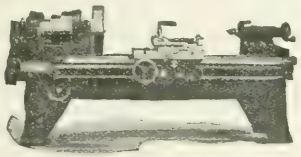


Royersford Foundry & Machine Co.,
(Incorporated)
Royersford, Pa. U. S. A.

The Mueller Machine Tool Co.
Cincinnati, Ohio
ESTABLISHED 1902
Radial Drills and Lathes
Write for particulars

TURRET MACHINERY
All Types and Sizes
DRESES MACH. TOOL CO.
Cincinnati, Ohio

"A High Grade Lathe at a Low Price"



The great number of Walcott Lathes in actual, satisfactory service, is every day influencing prospective lathe buyers. If you're looking for a lathe of high quality the Walcott is worth investigating. Write.

WALCOTT LATHE COMPANY
Jackson, Michigan, U. S. A.

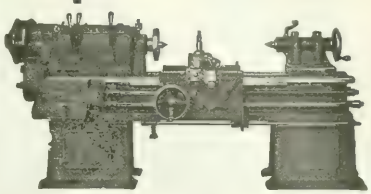
STAMINA

The Reed-Prentice Geared Head Lathe is built for endurance and especially in the design of the head stock. Its gears are always in mesh —not a sliding gear in the mechanism. Loads are quickly picked up with quiet, cushioning effect — no jar—no vibration by its internal expanding friction clutches.

Speeds can be changed without slowing down the machine or removing the tool from the work.

Let us tell you more about this "speed up production" and time and labor saving lathe.

Write us for details.

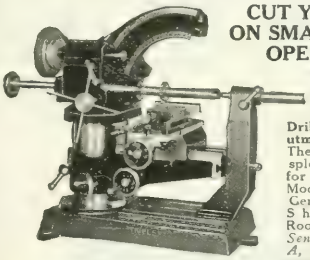


Reed-Prentice Co.
Becker Milling Machines—Lathes—Radial Drills — Production Lathes
Whitcomb Second Belt Drive Planers—Milling Cutters — Special Machinery
DETROIT **WORCESTER, MASS.** NEW YORK
677 CAMBRIDGE ST.

Ames Bench Lathes



Ames Bench Lathes are tool room favorites because of their dependable accuracy, responsive controls and wide adaptability. The grinding attachment makes them ideal for grinding and lapping fine gauges.
Specify Ames precision tools for light work and light manufacturing.
Catalog on request.
B. C. Ames Company **Waltham, Mass.**



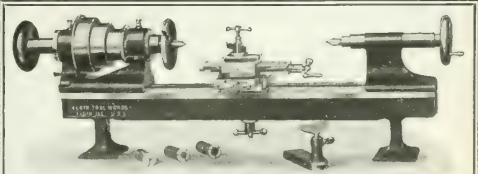
CUT YOUR COST ON SMALL MILLING OPERATIONS

The most universal machine for small work. Either Milling, Turning or Drilling is done with utmost precision. The TRIPLEX is a splendid equipment for Experimental and Model Shops. Also for General Machine Shops and Tool Rooms.
Send for our Circular A, describing the advantages and economy of using the TRIPLEX.

TRIPLEX MACHINE TOOL CORP.
18 East 41st Street, New York
All Triplex products are manufactured by
B. C. AMES CO., Waltham, Mass.

Steinle Turret Machine Co.
THE FULL SWING SIDE CARRIAGE
TURRET LATHE
STEINLE TURRET MACHINE CO.
MADISON WISCONSIN U. S. A.

International Machine Tool Co.
THE LIBBY TURRET LATHE
See our page advertisement in
the first issue of each month
INTERNATIONAL MACHINE TOOL CO.
INDIANAPOLIS INDIANA



The Elgin Precision Bench Lathe

The Elgin Bench Lathe together with its attachments is almost as efficient as a complete machine shop. You can do grinding, milling, screw cutting, planing and filing with this accurate tool.

Write for details.

ELGIN TOOL WORKS
Elgin, Ill.

Have You Considered

—a machine-tool as a long-time investment?

Although immediate production needs enter every purchase of a machine-tool, the actual dollars and cents value of it can only be determined over a period of years in which the machine is active.

The *permanent* producing qualities of an automatic screw machine or turret lathe should be and are the determining factors by which careful buyers judge production economy.

It is on this basis that ACME AUTOMATICS are built and sold—immediate satisfaction and long-time accurate production.

Actual figures on specific work tell why.

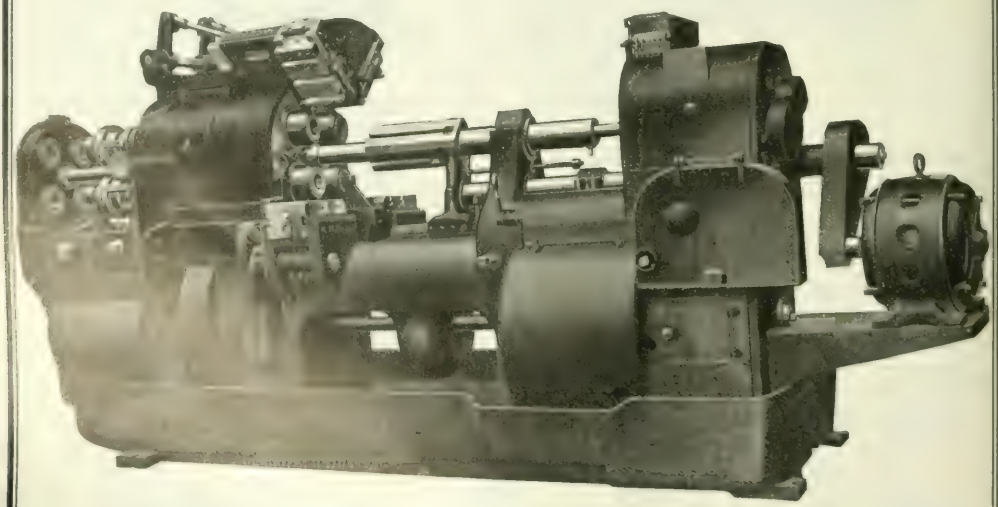
May we submit them to you?

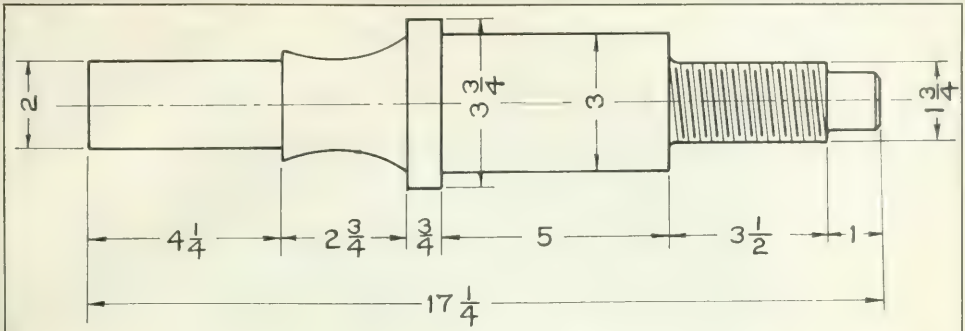
Multiple Capacities up to 4".

THE NATIONAL ACME CO.

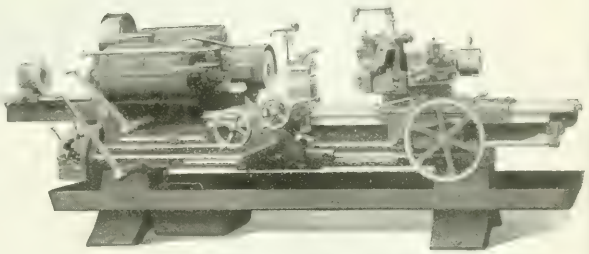
CLEVELAND, O.

New York **Boston** **Chicago** **Detroit** **Buffalo**





Four Times Former Production



A Warner & Swasey 3-A Turret Lathe increased production of these equalizer pins 300%. About a month ago this turret lathe was installed in a railroad shop. A new operator finished a lot of ten of these pins to try out the new machine. He did the ten in just one-fourth the time used previous to installing the W. & S. 3-A.

Here's why—

W. & S. Turret Lathes are easy to operate. With 10 tool positions a great many parts are finished complete in one chucking.

The 3-A carriages operate simultaneously on many parts, and with separate feed shafts, they operate independently.

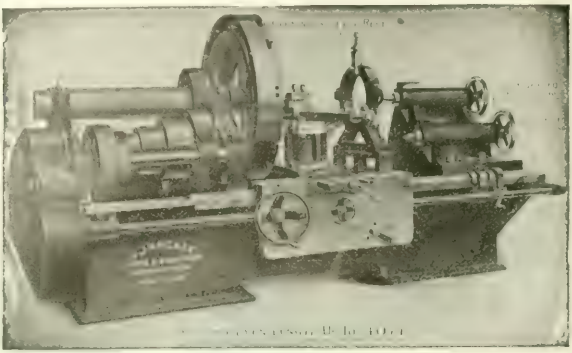
Send us blue prints or samples of parts you are making now. Ten chances to one we can show you an easier way to do them.

The Warner & Swasey Company

Cleveland, U. S. A.

NEW YORK: Singer Building
CHICAGO: 618-622 Washington Boulevard
MILWAUKEE: 209 Sycamore Building
BOSTON: Oliver Building
BUFFALO: Iroquois Building
DETROIT: 5928 Second Boulevard
DAYTON: 518 Mutual Home Building

Two Complete Lathes in One—
Greater Utility at Less Cost



Keeping one lathe at work all the time costs less than keeping two lathes at work half the time.

That is how the **McCabe "2 in 1" Double Spindle Lathe** will save money for you.

It is built to do the work of a big powerful 48-in. Triple-geared Lathe and a convenient, all around 26-in. Double Back-geared Lathe, which means greater utility at less cost.

Write for particulars

J. J. McCABE LATHE & MACHINERY CORP'N

Room 1805-10, Singer Building 149 BROADWAY, NEW YORK

CINCINNATI ACME

Turret Machinery



Full Range of All Types and Sizes

THE ACME MACHINE TOOL CO.
Cincinnati, Ohio

"Lehmann Lathes"

Three Step Cone, Double Back Geared, Geared Head, Single Pulley and Direct Motor Drive
Four Sizes, 16/18¾, 18/20¾, 22/24⅛ and 24/27¼" Swing
A high quality tool built for Accuracy and Production at the right price. Send for complete catalog.

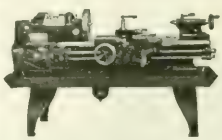
LEHMANN MACHINE CO.
3566 Chouteau Ave. ST. LOUIS, U. S. A.

GISHOLT PRODUCTS

Turret Lathes
Automatic Turret Lathes
Vertical Boring Mills
Horizontal Boring Mills
Universal Tool Grinders
Tool Post Tool Holders
Reamers (Solid-Adjustable)
Boring Bars
Periodograph (Time Recorder)
Contract Tool Work

Separate catalogs are issued for each product. Send for the one in which you are interested.

GISHOLT MACHINE CO. MADISON, WIS.



MONARCH LATHES, ALL SIZES AND STYLES, FROM 9 INCH TO 30 INCH SWING.

The Monarch Machine Tool Co.
108 Oak St Sidney, Ohio



SOUTH BEND LATHES

Size of Lathe		Standard Change Gear	Quick Change Gear
13"	Lathe	$ 175.00	$ 216.00
14"	Lathe	215.00	273.00
16"	Lathe	301.00	354.00
16"	Lathe	376.00	431.00
18"	Lathe	415.00	513.00
	Lathe	616.00	721.00
	Lathe	931.00	1016.00
	Lathe	1251.00	1353.00

SOUTH BEND LATHE WORKS
South Bend, Ind

Sidney Service Lathes

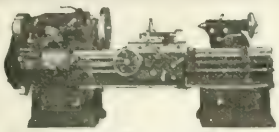
— THE KIND YOU NEED —

See Our Last Week's Display Ad.
CATALOG?

THE SIDNEY MACHINE TOOL CO.
SIDNEY, OHIO

THE AMERICAN TOOL WORKS CO.

LATHES, PLANERS, SHAPERS, RADIALS. CINCINNATI, U.S.A.

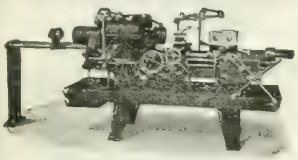


HEAVY DUTY LATHES

that will produce to the closest precision limits and stand up to severe service conditions.
Get the catalog and see why.

The Greaves-Klusman Tool Co., Cincinnati, Ohio

CLEVELAND
THE CLEVELAND PLANER Co.
3148 SUPERIOR AVE. CLEVELAND O.
OPEN-SIDE



THE FOSTER SCREW MACHINES

with their tools and attachments will increase your production.

Foster Machine Co.
Elkhart, Ind.

NEWARK GEAR CUTTING MACHINE CO.
Henry E. Eberhardt, President

MANUFACTURERS OF
GEAR CUTTING MACHINES
GEAR HOBBING MACHINES

73 PROSPECT ST., NEWARK, N. J.

J. N. LAPOINTE CO.
—of—
New London, Conn.

MAKERS OF
BROACHING MACHINES and BROACHES

"OHIO" SHAPERS
THE OHIO MACHINE TOOL CO.
SINCE 1887
KENTON, OHIO

BROACHING MACHINES

We manufacture the fastest power operated machines, fitted with automatic stops and quick return. Prices $120.00 F.O.B. Ann Arbor. Also broaching tools of quality.

American Broach & Machine Company
Factory and Office: Ann Arbor, Mich.
Detroit Office: 2496 East Grand Blvd.

STOCKBRIDGE SHAPERS

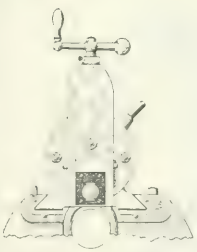
All sizes have Patented Two-piece Crank Motion. Save time—money.
STOCKBRIDGE MACHINE CO., Worcester, Mass.
Agents: Niles-Bement-Pond Co.

BAKER
Vertical Boring and Drilling Machines
Cylinder Borers
Keyseaters

BAKER BROTHERS TOLEDO OHIO, U. S. A.

Boring, Drilling, Milling, Precision?
Specify The **LUCAS** "Precision"
Horizontal Boring, Drilling and Milling Machine

LUCAS MACHINE TOOL CO.
CLEVELAND OHIO, U. S. A.
Lucas Patent Power Forcing Press



YOU SEE THEM EVERYWHERE

G & E EBERHARDTS

SHAPERS

Consider the advantages of a Single Pulley Drive Selective Speed Gear Box and Clutch Control on a Shaper. They are all found on the G & E.

Shall we send full information?

GOULD & EBERHARDT
HIGH DUTY SHAPERS
AUTOMATIC GEAR & SPECIAL MACHINERY
NEWARK, N.J. U.S.A.

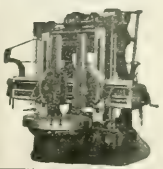
UNIVERSAL PRECISION LEVEL
"Where Accuracy Counts, We Win."



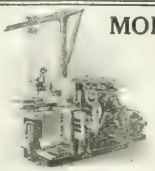
Universal Boring Machine Company, Hudson, Mass., U. S. A.

SHAPERS
simply designed but accurate and efficient

12-in. to 32-in. Stroke (Inclusive)
THE SMITH & MILLS COMPANY
Cincinnati, Ohio, U. S. A.



PLANERS AND BORING MILLS
ALL SIZES
The Cincinnati Planer Co.
Cincinnati, Ohio



MORTON HEAVY DUTY DRAW-CUT SHAPER

Morton designed and built, assuring a long life of profitable service at a minimum upkeep cost. 36" and 48" stroke. Ask for Bulletin No. 3F.

Morton Manufacturing Company
Muskegon Heights, Mich.

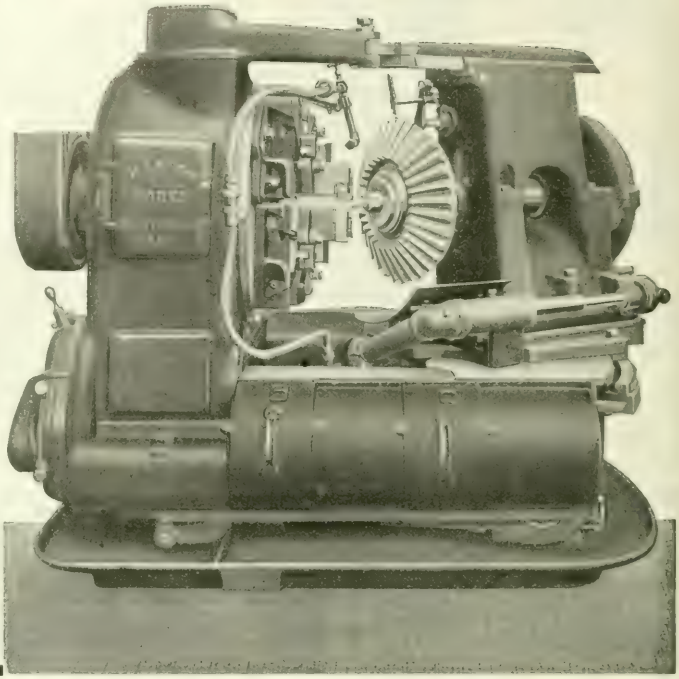
Gleason 25" Bevel Gear Generator

Automatic and Easy to Adjust

This machine has made it possible to produce large bevel gears up to 1½ D. P. in steel or iron so rapidly that designers of machinery are no longer handicapped, in the selection of generated gears, by the question of cost.

The gears produced have a uniformly high finish and run smoothly.

GLEASON WORKS
ROCHESTER, N. Y.



KEMPSMITH
MILLING MACHINES *for*
PERMANENT
PRODUCTION
PROFIT

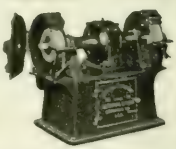
(Geared)
MAXIMILLERS

Also Cone Type, Production Type, Etc.
SEND FOR CATALOG

Kempsmith Mfg. Co., Milwaukee, U. S. A.

LONG SERVICE UNDER HEAVY PRODUCTION

The Marschke Economy Grinder is found in up-to-date shops for the above reasons.
Our catalog tells you what it will do in *your* shop.



MARSCHKE MFG. CO.
INDIANAPOLIS, IND.



BLANCHARD
HIGH POWER VERTICAL
SURFACE GRINDERS

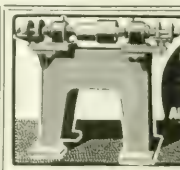
save money for their owners by increasing both production and accuracy. Investigate the BLANCHARD for your flat surface work, either hardened or soft.

The Blanchard Machine Company
Cambridge A, Mass.

Milwaukee Milling Machines
Horizontal and Vertical

Milwaukee Milling Machines are versatile, accurate and productive. Adapted for all classes of milling operations.

KEARNEY & TRECKER
CORPORATION
MILWAUKEE WIS., U. S. A.



HILL-CURTIS BALL BEARING
GRINDING MACHINES
GIVE
ECONOMICAL SERVICE
ALL TYPES AND SIZES IN BALL AND PLAIN BEARING
HILL-CURTIS CO.
KALAMAZOO, MICH.



The SPEED OF GRINDING WHEELS

SHOULD BE CONTROLLED for efficiency as well as for safety. The RANSOM patent SPEED CONTROLLER on RANSOM GRINDING MACHINES is the only device known which maintains the proper speed of the wheel until it is practically worn out.

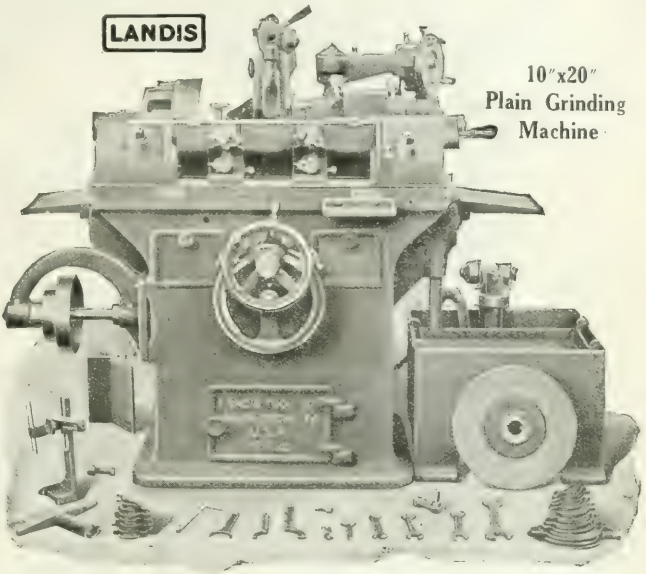
Adaptable to all RANSOM D.C. Machines.

Simple and inexpensive. Investigate.

RANSOM MANUFACTURING CO.
OSHKOSH, WISCONSIN

A Top Notcher on Small Work

If profits are to be realized on small duplicate parts, quantity production is imperative. The day of *parts at any price* has passed and economical production is the watchword.



10″x20″ Plain Grinding Machine

The LANDIS was designed to produce a greater number of parts to a finer limit of tolerance and it holds its own over long service periods.

They are quickly set up; close in adjustment and easily operated. These factors give you a speed ordinarily enjoyed only by means of automatics.

Get our catalogue and note all its details.

LANDIS TOOL CO., Waynesboro, Pa.

NEW YORK: 51 CHAMBERS STREET

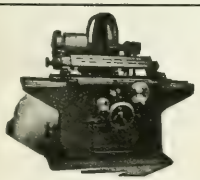
PARKER **GRINDING** SPINDLES

GUARANTEED

To Solve Any INTERNAL Grinding Problem

SPINDLES FOR ALL GRINDERS

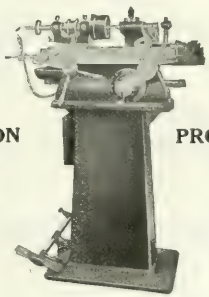
Ex-Cell-O Tool & Mfg. Co. 1214 Beaubien St. Detroit, Mich.



KNIFE GRINDER

A MACHINE that is designed for grinding light knives, such as planer, paper, cottonseed oil and any light straight machine knife. Write for further information.

The Springfield Mfg. Co
321 Mountain Grove Ave.
Bridgeport, Ct.
Send for Blue Catalog



PRECISION
Small Hole Grinder

PRODUCTION
Small Hole Grinder

Rivett Lathe and Grinder Company
Brighton District of Boston, Mass.

HEALD GRINDING MACHINES MAGNETIC CHUCKS

Internal Cylinder and Surface Grinders, Rotary and Rectangular Magnetic Chucks. Literature on Request.

THE HEALD MACHINE COMPANY
26 New Bond St., Worcester, Mass.

New York, 839 Singer Bldg.
Philadelphia, 1302 Stephen Girard Bldg.
Detroit, 400 Marquette Bldg.
Cincinnati, 311 Provident Bank Bldg.
Cleveland, 710 Engineers Bldg.
Chicago, 26 So. Jefferson St.



BRIDGEPORT SAFETY
Sectional Wheel Surface and Knife Grinders
STRONG AND POWERFUL
Used in the best Knife Makers and Sheet Mills. Revolving Knife Bar or Angle Bar as needed—built in lengths up to 216″
Catalog
The Bridgeport Safety Emery Wheel Co., Inc.
84 Knowlton St.
Bridgeport Conn.

THOMPSON

UNIVERSAL GRINDING MACHINES

SEND FOR BULLETIN No. U-13

THE THOMPSON GRINDER CO.

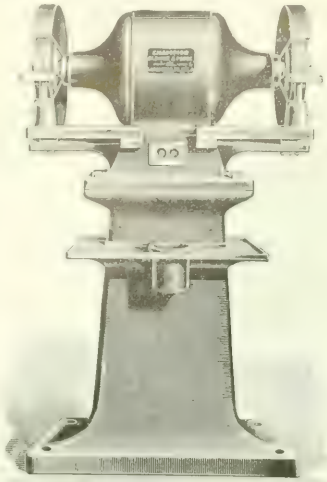
SPRINGFIELD - - - OHIO

DUMORE HIGH SPEED GRINDERS

Accurate, adaptable, convenient. Endorsed by the world's foremost mechanical experts. Thousands now in use. Made in 6 styles and sizes. Write.

WISCONSIN ELECTRIC COMPANY
2749 Sixteenth St., Racine, Wisconsin

THE CHAMPION HEAVY DUTY
Electric-Driven Floor Grinder



Champion Heavy Duty Electric Driven Grinders are designed for the heaviest kind of grinding within the range of their capacity, as well as for buffing and polishing. Motors are large and powerful. Has adjustable tool rests and wheel guards.
Emery wheels not supplied with this machine.
No. 610 Champion Heavy Duty Electric Driven Floor Grinder, capacity 8 x ¾-inch wheels, with ⅝-inch hole. Weight 300 lbs.
No. 611 Champion Heavy Duty Electric Driven Floor Grinder, capacity 10 x 1-inch wheels, with 1-inch hole. Weight 450 lbs.
No. 612 Champion Heavy Duty Electric Driven Floor Grinder, capacity 12 x 1¼-inch wheels, with 1¼-inch hole. Weight 650 lbs.
No. 613 Champion Heavy Duty Electric Driven Floor Grinder. Capacity 14 x 2-inch wheels, with 1½-inch hole. Weight 750 lbs.
Write for Catalog.
CHAMPION BLOWER & FORGE CO., Lancaster, Pa.

Get Details On This Taylor & Fenn



This 20" Water Tool Grinder is so built that water can't escape from pan to floor. Hood arrangement catches all water and keeps it from spindle and bearings. No joints to get out of order. Made with ground spindle and self-oiling spindle bearings. Water supply to wheel easily regulated. Pan conveniently removed for cleaning. Furnished for belt drive or with bracket base for attaching motor. Send for Folder.

Taylor & Fenn Company
Manufacturers of Drilling Machines. Spring Foot Presses
HARTFORD - - CONNECTICUT

WHEELS THAT GRIND

This means high-class service and lower grinding cost.

PITTSBURGH GRINDING WHEEL CO.
ROCHESTER, PA.

Grinding Wheel Dressers

DIAMONDS
DIAMO-CARBO
MAGAZINE
HUNTINGTON (3 Sizes)
SHERMAN
DESMOND HEX

Get our Catalogue.

DESMOND-STEPHAN MFG. CO., Urbana, Ohio
The Canadian Desmond-Stephan Mfg. Co., Ltd. Hamilton, Ont.

Emery Wheel Dressers

Two Sizes Nos. 1-2

CUTTERS

We make the regular Huntington (Pattern) for all sizes. Roughing for No. 1 and 2. Paragon for No. 1 only.
GEO. H. CALDER, Lancaster, Pa., U. S. A.

STERLING WHEELS
Are Good Wheels
Sterling Grinding Wheel Co.
TIFFIN, OHIO, U. S. A.



DICKINSON "Diamond"

Tools for truing Large, Coarse and Hard Emery, Corundum, Carborundum, Alundum, Crystolon or other abrasive wheels will give the greatest amount of service with a minimum of wear on the diamond. Diamonds can be set in any style of holder desired. We have had a great many years' experience in the manufacture of Diamond tools and are thoroughly familiar with what is required of them.
THOS. L. DICKINSON, 34 Gold St., N. Y.
Established 1796. Successor to John Dickinson

QUALITY
"True to the Name"

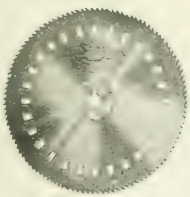
[illegible] steel by specialists of many years' experience. Specify "QUALITY" [illegible] your Hack Saw Problem.
NAPIER SAW WORKS, INC.
(The Hack Saw Specialists) Office and Factory: Middletown, N. Y.



SIMONDS
METAL CUTTING SAWS

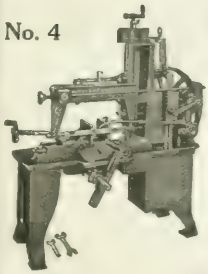
Greater production and less repairs are assured when Simonds Metal Cutting Saws are used. They hold their cutting-edge longer and cut faster.

Write for catalog and prices



SIMONDS
Manufacturing Co.
"The Saw Makers"
Fitchburg, Mass.
Chicago, Ill.

No. 4



Marvel High Speed Hack Saw

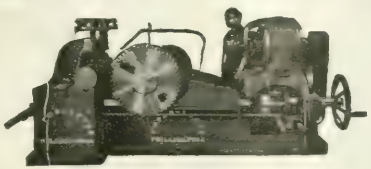
REAL CUTTING SPEED

Cut the cost of cutting. This Marvel machine will cut through 5 in. round cold rolled steel in 8 minutes, 6 in. 10 minutes.

Put This Saw to Work in Your Shop

Write to us.

Armstrong-Blum Mfg. Co. 349 N. Francisco Ave., Chicago, Ill.



190 Sizes and Types of Cold Saw Cutting Off Machines for Sawing All Kinds of Metal

THE ESPEN-LUCAS MACHINE WORKS
Front and Girard Ave., PHILADELPHIA, PENNA.



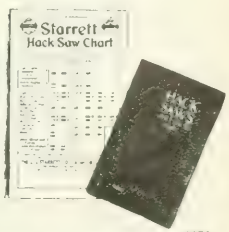
"Economical Seconds"

Be sure every hack saw blade is used only on the type of work it cuts best. It takes only a few seconds to change the blade and it's time well spent. Incorrect use means a fast dulling blade, slow cutting and an increased chance of breakage.

Starrett Hack Saws, used according to the Starrett Hack Saw Chart, will show you a new economy in cutting costs.

Write for Catalog No. 22AA and the Supplement describing the new Starrett Tools

THE L. S. STARRETT CO.
The World's Greatest Toolmakers
Manufacturers of Hack Saws Unexcelled
ATHOL, MASS.



These Starrett Hack Saw Charts and a copy of "Hack Saws and their Use" (a valuable reference book) will be mailed free on request.

4653

Starrett Hacksaws

HACK SAWS STARRETT TOOLS



LOOK!

only $150.00 for an all iron SAW BENCH with countershaft complete. It will pay you to investigate. Send for circular giving full particulars.

R. E. KIDDER CO.
33 Hermon Street
WORCESTER, MASS.

over 2000 in use
HIGLEY METAL SAWS
Vandyck Churchill Company
New York New Haven Philadelphia



***Running* Hot or Boiling Water Instantly at Low Cost**

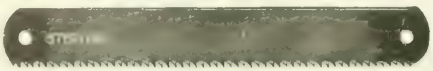
Easily attached to any water faucet and with this Instantaneous Electric Water Heater you get clean sterilized hot or boiling running water right out of the faucet, all day if you desire. Cold Water out of the same faucet by just a turn of the handle. Can be operated on either direct or alternating current.

Convenient in the shop for washing the grease or dirt off your hands or instantaneous sterilized water for first aid rooms.

Thousands in daily use—Write today for descriptive matter and prices

Bridgeport Machine & Tool Mfg. Co., Inc.
Bridgeport, Conn.

"Sterling" Superior Hack Saw Blades



DIAMOND SAW AND STAMPING WORKS
BUFFALO, N. Y.

ORDINARY PRECAUTION
demands that you check up on your night watchman.
NEWMAN WATCHMAN'S CLOCKS
for 50 years have been made to do just this.
NEWMAN CLOCK COMPANY, INC.
436 Broadway New York 424 Howard St. San Francisco 563 W. Washington Blvd. Chicago

KINNEAR ROLLING DOORS

Afford protection against fire, theft, and the elements. The perfect steel rolling door and shutter for all industrial buildings. Illustrated catalog on request. Write for details.

The Kinnear Mfg. Company
817-867 Field Ave. Columbus, Ohio



STEEL STAMPS
Hand-cut on rugged steel shanks of extra quality tool steel. The best that money can buy.
PANNIER BROS. STAMP CO.
207-209 Sandusky St. MASTER MARKERS PANNIER Pittsburgh, Penna.



STEEL SHELVING

Lupton INVESTMENT VALUE PHILADELPHIA



FACTORY EQUIPMENT
From Warehouse Stock
David Lupton's Sons Co., Phila.

YALE HAND CUT RAND STEEL LETTERS & FIGURES

Making your goods correctly spells success. We make the exact kind for that work. Let us prove to you why our stamps are of the superior kind.



The Hoggson & Pettis Mfg. Co.
New Haven, Conn., U. S. A.

Strand FLEXIBLE SHAFTS



W. Jackson Blvd., Chicago

Steel Stamps
HAND CUT
STEEL LETTERS and FIGURES
STENCILS-BURNING BRANDS
TOOL CHECKS
SEALS.
SEND FOR CATALOG





THE SCHWERDTLE STAMP CO.
ESTABLISHED 1879
39-45 CANNON ST. BRIDGEPORT, CONN.

FLEXIBLE SHAFTING
PORTABLE GRINDERS AND DRILLS
MOTOR, FRICTION, BELT AND ROPE DRIVEN
Illustrated Bulletins Upon Request
STOW MANUFACTURING CO., Inc., Binghamton, N. Y., U. S. A.
Oldest Portable Tool Manufacturers in America

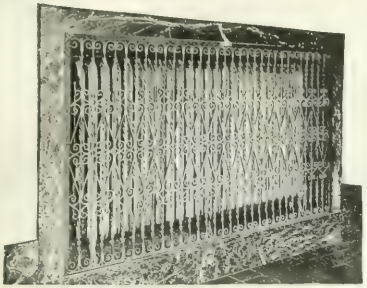
SALCO MASTER BRAND

USE
Mechanically Correct
STEEL
Letters and Figures
STAMPS—KNURLS



SCHODER & LOMBARD CO.
202-204 Centre St. New York City

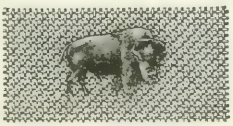
Quality, Service and Satisfaction



"Buffalo" Wire Products are GUARANTEED by more than 50 years of experience in manufacturing wire cloth and ornamental iron work of the highest grade. In foundry, plating works, machine shop — wherever hard usage or exposure are important factors —"Buffalo" Wire Products give long and excellent service.

"Buffalo" Radiator Guards and Grilles

For use in Factories, Schools, Public Halls, Churches —wherever a protected radiator is desired. Manufactured in any size or shape and to fit any type of radiator. Some are designed simply for permanence and utility, while others possess an artistic merit seldom found among products of this class. All are long-wearing and of the same good "Buffalo" quality.



Trade Mark Reg. U. S. Pat. Off.

Wire Cloth of All Kinds for All Purposes

Partial List of "BUFFALO" Products

WIRE WINDOW GUARDS WIRE ROOF SIGNS
MACHINE and BELT GUARDS
PARTITIONS and ENCLOSURES
SWITCHBOARD ENCLOSURES
WIRE LATHING RIDDLES and SIEVES
ANNEALING, DIPPING & CONVEYING BASKETS

Ornamental Iron and Wire Work

PANELS, GRILLES and GUARDS
FLOOR and COUNTER RAILINGS
WICKETS BANK TELLER CAGES
TREE GUARDS WIRE LAWN FENCING
VINE TRAINERS PORTABLE FENCING
FOLDING GATES FIRE FENDERS
SPARK GUARDS FIREPLACE SCREENS
ELEVATOR FRONTS and ENCLOSURES
ELEVATOR CABS
WIRE PANELS FOR AUTOMOBILE BODIES

WRITE for Complete Catalog No. 8-K

BUFFALO WIRE WORKS COMPANY, Inc. (Formerly Scheeler's Sons)
456 TERRACE BUFFALO, N. Y.
BRANCH OFFICE and WAREHOUSE: 9-11 South Seventh Street, PHILADELPHIA, PA.

Buffalo WIRE Works Company, Inc.

TIME CHECKS

Jas. H. Matthews & Co.
1964 Forbes Field, Pittsburgh, Pa.

MATTHEWS

UNIVERSAL

BOX STRAPPING

CARY MANUFACTURING COMPANY
Manhattan Bridge Plaza, Brooklyn, N. Y.

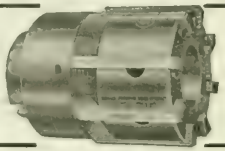




We Supply the World with Expansion Boring Tools and Reamers.

Davis
Expansion Reamers

GROUP II



Shell Type
No. 550

A high class production reamer, designed for shops where a dependable moderate-priced tool is desired.

100% Reamer Efficiency

Davis Expansion Reamers are made in three distinct groups, several types and in a wide range of sizes to meet the requirements of all shops large or small.

Accurate adjustment to size is made to size in a few seconds, without circular grinding. Forward movement of blades on taper with blades always cutting in advance of reamer body is an original feature. Blades are firmly held with hardened taper pins, accurately fitted in reamer body, and these pins do not interfere with free movement of blades in adjusting.

Send for full particulars and Circular 1530.

Davis Boring Tool Company
Incorporated

3700 to 3728 Forest Park Blvd., St. Louis, Mo.
Largest Exclusive Manufacturers of Expansion Boring Tools and Expansion Reamers.

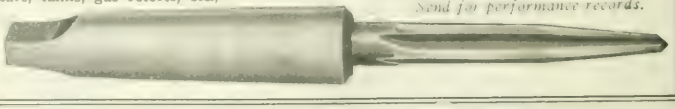
X-CEL TOOLS carry an iron-bound guarantee. Send your trial order; it incurs no obligation until the tools prove their worth.

Drills—Reamers—Taps—Cutters
ALVORD REAMER & TOOL COMPANY
MILLERSBURG PENNSYLVANIA

Wayne Tank Reamer

This new tank reamer has found instant favor among manufacturers of steel cars, tanks, gas retorts, etc., and in other work involving 2-ply or thin gauge steel. It is shorter than standard—and is practically unbreakable under ordinary usage.

Send for performance records.



WAYNE TOOL MFG. CO.
Waynesboro, Pa. U. S. A.

In Hundreds of Plants MORSE DRILLS



are speeding up production and cutting costs. Because, being carefully made of High Grade Steel,

They Are Absolutely Dependable

Morse Twist Drill & Mch. Co.
New Bedford, Mass., U. S. A.

THE BUCKEYE TWIST DRILL CO.

ALLIANCE Chicago Office: 26 South Jefferson Street OHIO, U. S. A.

Twist Drills, Reamers and Special Tools



COWLES CUTTERS

Milling Cutters for Every Requirement

Quality (C) First

Cowles Tool Company, Cleveland, O., U. S. A.

Cutter Manufacturers

BARBER-COLMAN COMPANY

BRANCH OFFICES
BOSTON, MASS CHICAGO, ILL.
CINCINNATI, O. CLEVELAND, O.
DETROIT, MICH MILWAUKEE, WIS
NEW YORK, N.Y ROCHESTER, N.Y

MAIN OFFICE & PLANT
ROCKFORD·ILL·U·S·A·

AMERICAN MACHY CORP. MINNEAPOLIS, MINN
F.O. STALLMAN SUP CO. SAN FRANCISCO, CAL
EUROPEAN REPRESENTATIVES
BARBER & COLMAN, LTD.
BROOKLANDS NEAR MANCHESTER ENGLAND

Manufacturers of MILLING CUTTERS, HOBS *and* HOBBING MACHINES

VICTOR

Floating Reamer Holders
Collapsible Taps
Adjustable Hand-Sizing Taps
Nut Facing Machines

VICTOR TOOL CO., Inc.

Waynesboro, Pa.

GOOD

DIES & STAMPINGS

DETROIT STAMPING CO 3445-61 W. FORT ST. DETROIT MICHIGAN

TAPS and DIES

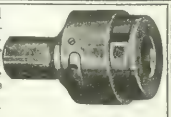
SCREW PLATES

AMERICAN TAP & DIE COMPANY

GREENFIELD, MASS.

Standardize With This Die Head

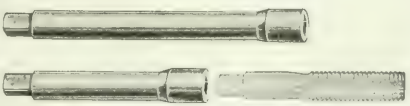
wherever high quality and maximum production are paramount, manufacturers are standardizing on H & G Die Heads, because threads may be cut faster. Chasers last longer, threads are cut perfectly and the die head always functions properly. It is correctly designed and properly made. Write for free shop test.



H&G

Trade Mark

H & G WORKS
The Eastern Machine Screw Corporation
21-41 Barclay St. New Haven, Conn.



Allen Tap Extensions

Make Any Tap a Pulley Tap

ALLEN Tap Extensions do the work of a pulley tap, with an all-round adaptability that no long-shank tap can possess. They cost less than pulley taps, and save the expense of replacements due to breakage of the special long shanks. Set consists of two pieces: 4 inches and 6 inches long, respectively, (10 inches in combination). Experience proves these lengths to be the most practical and suitable for all-round use. The sockets are formed by the Allen process of cold-drawing, which increases the density of the steel around the socket-hole, and adds to its strength 30%. The squares and socket-openings conform to the standard used generally by leading tap manufacturers, and where some makes have shanks with squares slightly larger than this standard, they may be ground to fit. List of sizes, with prices, will be sent on request; with complete catalogue of Allen products:—Safety Set Screws, Socket Head Cap Screws, Pipe Plugs, Socket Wrenches, etc.

THE ALLEN MFG. CO. 149 SHELDON ST. HARTFORD, CONN.

SMALL TOOLS AND GAGES

Taps, Dies, Punches, Milling Cutters, Reamers, Drills, Reversible End Plug and Thread Gages. Gages of all kinds.

PRATT & WHITNEY CO. WORKS HARTFORD, CONN.
OFFICE—111 BROADWAY, NEW YORK

LOVEJOY TOOL CO., INC.

SPRINGFIELD, VERMONT, U.S.A.

POSITIVE METAL CUTTING TOOLS LOCKED

INSERTED CUTTER TYPE

TURNING, BORING AND MILLING.

GTD

TAPS · DIES
DRILLS : REAMERS
SCREW PLATES · GAGES · PIPE TOOLS : MACHINE TOOLS
MILLING CUTTERS

GREENFIELD TAP AND DIE CORPORATION

GREENFIELD MASS.

BUTTERFIELD & CO. DIVISION

UNION TWIST DRILL CO.

Derby Line Vt. U.S.A.

MANUFACTURERS

TAPS, DIES, REAMERS
SCREW PLATES

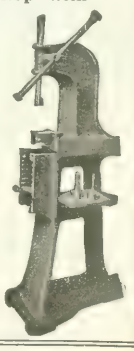
Speed Up Your Machine Shop with



NICHOLSON

Arbor Presses and Expanding Mandrels

A press that removes an arbor immediately and can also be used for punching, bending or broaching—and a set of nine self-adjusting mandrels, some one of which will instantly fit any hole from ½" to 7"—both have great value in eliminating delays.



W. H. Nicholson & Co.
115 Oregon St.
WILKES-BARRE PA.

BRUBAKER

Special Tempered Relieved Staybolt Taps



Brubaker Taps, Dies and Reamers are as perfect as skill and enthusiasm can make them.

A BIG HELP IN YOUR CAMPAIGN FOR ECONOMY—BRUBAKER TAPS

"*Twenty per cent more holes per tap.*" This is a big step toward tapping economy. Time saved is also economy, it is a well known fact that Brubaker Taps do not bog or bind, this means a steady run without stopping to renew the tap.

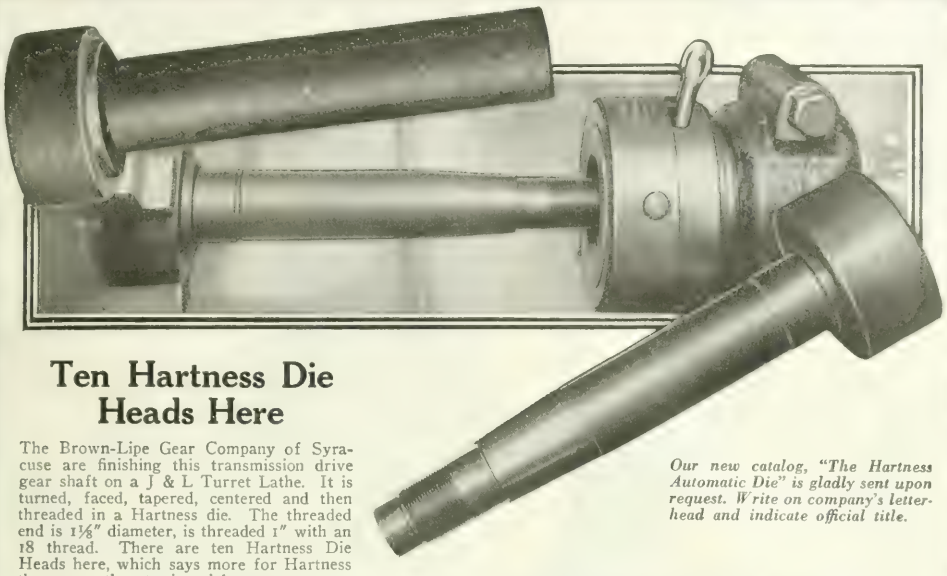
Try Brubaker's once and notice the difference between mediocre results and *real* results.

INVESTIGATE

W. L. BRUBAKER & BROS. CO.

50 Church Street New York

Factory: Millersburg, Pa.



Ten Hartness Die Heads Here

The Brown-Lipe Gear Company of Syracuse are finishing this transmission drive gear shaft on a J & L Turret Lathe. It is turned, faced, tapered, centered and then threaded in a Hartness die. The threaded end is 1⅛" diameter, is threaded 1" with an 18 thread. There are ten Hartness Die Heads here, which says more for Hartness than any other testimonial.

Our new catalog, "The Hartness Automatic Die" is gladly sent upon request. Write on company's letterhead and indicate official title.

JONES & LAMSON MACHINE COMPANY

Die Division

Springfield, Vermont U. S. A.

AMERICAN AGENTS FOR DIES AND CHASERS

Boyer-Campbell Co., Detroit. Carey Machy & Supply Co., Baltimore. E. L. Essley Machy. Co., Chicago, Milwaukee and Moline. The E. A. Kinsey Co., Cincinnati, Indianapolis and Columbus. Machinists Supply Co., Pittsburgh. Robinson, Cary & Sands Co., St. Paul and Duluth. Coghlin-Kirby Machinery & Supply Co., Toledo, Ohio. A. V. Wiggins & Co., Syracuse. FOREIGN AGENTS: For France, Spain and Belgium, F. Auberty & Co., 182 Rue Lafayette, Paris. For Holland, Spliethoff, Beenkes & Co., Rotterdam. For Sweden, A. Bol Oscar Lindlom, Post Box 420 Stockholm. For Australia, McPherson Pty., Melbourne. Japan, Manchuria, Korea, Formosa, Mitsui Bussan Kaisha, Ltd., Tokio, Japan.



Set the Pointer at Zero

With a sample or gage of just the right size between the jaws, set the pointer at zero.

The amount of variation from that standard can be read instantly in half thousandths by simply pushing the piece to be tested between the jaws.

The new metallic dial always stays flat and makes reading easy.

See Your Fit—Don't Feel For It

Write for Booklet.

The F. W. Horstmann Co.
196 Coit St., Irvington, N. J.

The Rawco Vernier Slide Caliper

Less than ¼ the price of other Vernier...



measures to one thousandth [illegible] inch externally and [illegible] depth gauge. Send for circular.

Dealer agents wanted in all cities

THE NEW METAL TOOL STEEL CO.
185 Thames St. New London, Conn.

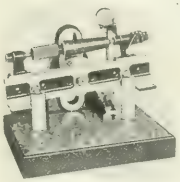


THE SKINNER CHUCK COMPANY

NEW BRITAIN, CONN. U. S. A.

Established 1887

LATHE-DRILL—PLANER CHUCKS



How Do You Check Tapers and Angles?

BETCO TOOLS

Sine Bar Fixture

is accurate and convenient, and saves the difference between its cost and that of expensive gauges. Use it to check taper reamers, taper plug gauges, wedges, end mills, etc.

The Blodgett Engineering & Tool Co.
14th & Dalzelle, on Roosevelt Sq., Detroit, Mich.

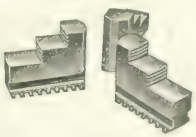
UNION

UNIVERSAL GEARED SCROLL CHUCKS ARE ACCURATE AND SUBSTANTIAL

We furnish this chuck regularly with iron or steel bodies in three or four jaw styles



Two Sets of Jaws



UNION MANUFACTURING CO.
New York Office, 26 Cortlandt St. NEW BRITAIN, CONN.
Makers of a Complete Line of Chucks.

Kent-Owens
SPECIAL MACHINERY

When some of the largest manufacturing corporations in the United States make a habit of entrusting the construction of their specialized machinery to Kent-Owens, year after year, they must be getting something more than the results of an instance of cleverness or good fortune.

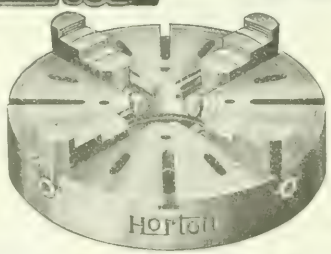
You can learn just what they get, if you will investigate.

Consult Kent-Owens engineers.

KENT-OWENS MACHINE CO.
Dept. 34
Toledo **Ohio**

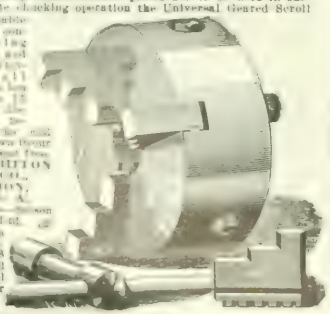
Horton

INDEPENDENT
REVERSIBLE JAWS
STEEL BODY



Steel Castings of great strength, broad jaws, large screws
The E. Horton & Son Co., Windsor Locks, Conn.

WHITON Geared Scroll "SOLID BODY" CHUCKS



THE JOHN WHITON MACHINE CO., NEW LONDON, CONN., U. S. A.
European Address: ... Ltd., ... St., London, E. C.
WHITON CHUCKS kept in stock and sold by principal dealers all over Europe.



Smooth, accurate finishing cuts, or roughing cuts on threads, are taken in the most efficient manner by this patented Spring Threading Tool. It's a great time saver.
Write for Our Latest Catalogue. It's Free.
ARMSTRONG BROS. TOOL CO.
"The Tool Holder People"
309 N. Francisco Ave. Chicago, U. S. A.

AMERICAN SWISS FILES

More Filing Per Dollar

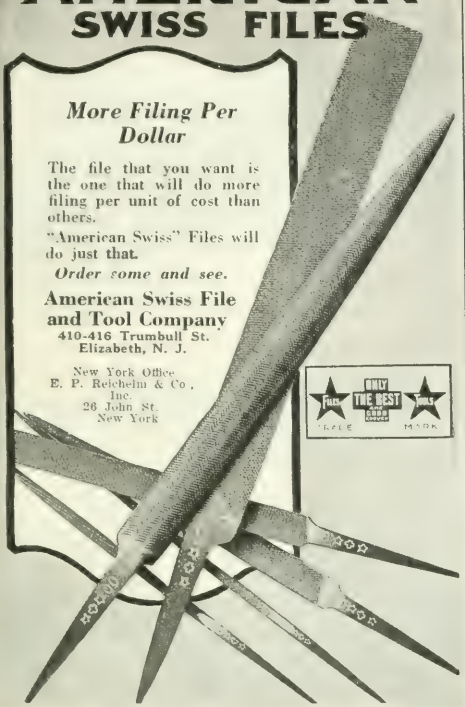
The file that you want is the one that will do more filing per unit of cost than others.

"American Swiss" Files will do just that.

Order some and see.

American Swiss File and Tool Company
410-416 Trumbull St.
Elizabeth, N. J.

New York Office
E. P. Reichelm & Co., Inc.
26 John St.
New York



CLEVELAND

Chipping and Calking Hammers

THE SPEED KING



They are Speedy

They are Dust Proof

They Work Without a "Kick"

They Speed Up Output and Lower Cost of Cleaning

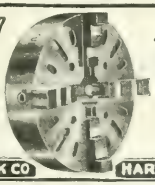
Write for Bulletin No. 51

OFFICES IN ALL THE LARGE CITIES

THE CLEVELAND PNEUMATIC TOOL CO.
CLEVELAND, O., U. S. A.

"CUSHMAN" CHUCKS 1862

Building *for* the Future
On the Experience of the Past



The "Incomparable"
That New Steel Chuck
Style 214

THE CUSHMAN CHUCK CO HARTFORD, CONN., U.S.A.

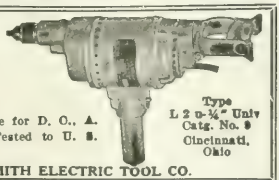
EASY NEW EASY **BOLT CLIPPERS** O. K. ALLEN-RANDALL



4 STYLES 7 SIZES

H. K. PORTER Everett, Mass., U. S. A.

Portable Electric
DRILLS and GRINDERS

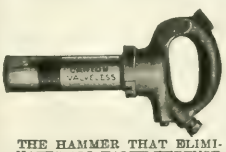


Type L 2 D-¼" Univ Catg. No. 9

Complete line of sizes suitable for D. C., A. C. and universal current. Tested to U. S. navy requirements.

Cincinnati, Ohio

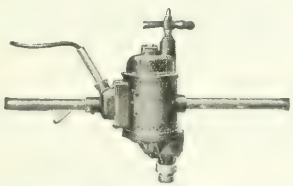
THE NEIL & SMITH ELECTRIC TOOL CO.



CANTON PNEUMATIC TOOLS
Shipped on Approval

The Canton Pneumatic Tool Co.
Factory—Canton, Ohio
640 Guardian Bldg., Cleveland
207 Frick Bldg., Pittsburgh
106 So. Jefferson St., Chicago
609 Wesley Roberts Bldg., Los Angeles
1009 North Broadway, St. Louis, Mo.
27 Warren St., New York City

THE HAMMER THAT ELIMINATES ALL VALVE EXPENSE



DON'T waste time carrying cumbersome machinery to stationary drills. Take the drill to the job! Little Giant Electric Drills are *easily portable.*

Once on the job, they speed-up drilling, reaming, wood-boring, screw-setting, nut-and-bolt tightening—wherever there's a current outlet.

Your requirements are ideally met with a variety of sizes, built in A. C., D. C., and Universal Current types. Ask for bulletins.

Chicago Pneumatic Tool Company
Chicago Pneumatic Building, 6 East 44th St., New York
*Sales and *Service Branches all over the World*

*BIRMINGHAM	DETROIT	LOS ANGELES	*PHILADELPHIA	*SEATTLE
*BOSTON	EL PASO	MILWAUKEE	PITTSBURGH	ST. LOUIS
*CHICAGO	*KEY	MINNEAPOLIS	RICHMOND	
CINCINNATI	FRANKLIN	NEW ORLEANS	SALT LAKE CITY	
*CLEVELAND	HOUSTON	NEW YORK	*SAN FRANCISCO	

BOYER PNEUMATIC HAMMERS—THEIR GIANT PNEUMATIC AND ELECTRIC TOOLS
CHICAGO PNEUMATIC RECIPROCATING AIR COMPRESSORS—AIR LIFTS
GIANT DIESEL AND GAS ENGINES—ROCK DRILLS—AIR MOTORS

LITTLE *Electric* GIANT *Tools*

"NEW PROCESS" PUNCHES

do *double* the work of any other punch. They save you the time and inconvenience of broken punches.

Shipped on approval.



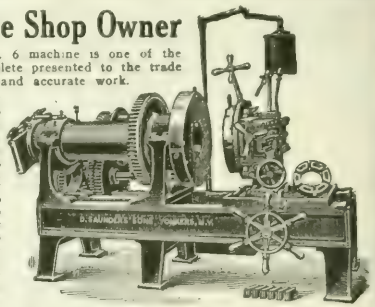
GEO. F. MARCHANT COMPANY

1422 So. Rockwell Street
Chicago

To the Shop Owner

Our No. 6 machine is one of the most complete presented to the trade for rapid and accurate work.

Capacity is 2½ to 8" Pipe alternately cut and threaded, die-head being pushed to one side to allow pipe to pass thru cutting-head. Obviates injury to chasers.



Send for Catalog A

D. Saunders' Sons

25 Atherton St. Yonkers, N. Y.



HUNTER VANADIUM STEEL RIVET SETS

for long service. They pay in the end. Give them a chance to show their worth. Standard types and sizes.

We also manufacture and carry in Stock a full line of Pneumatic Hammer Rivet Sets and Chisel Blanks.

Write for prices.

Hunter Saw & Machine Co.
Pittsburgh, Pa.

FORBES

Pipe Cutting and Threading Machines

See detailed advertisement in first issue of month

CURTIS & CURTIS CO.

327 Garden St., Bridgeport, Conn.

PIPE THREADING AND CUTTING MACHINERY

HAND OR POWER

The Merrell Manufacturing Co.
83 Curtis Street Toledo, O.

CINCINNATI SLAG GUN digs Slag and Concrete in scores of the country's largest Sheet Mills daily. CINCINNATI RIVET CUTTING GUN is cutting rivets cold and backing them out for over 100 of the biggest railroads.

Send for catalog of installations.

RIVET CUTTING GUN CO.
116 E. Third Street Cincinnati, Ohio

Pipe Cutting & Threading Machines
Bolt Threading Machines

"Better Threads at Lower Cost"

WILLIAMS TOOL CORPORATION
ERIE, PENNA.
Canadian Plant, Brantford, Ont.

Pipe Threading, Tapping and Cutting Machinery

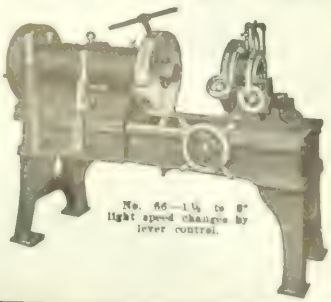
THE PIPE MACHINERY CO.
930 E. 70th St. Cleveland, Ohio

The Etna Machine Company

Builders of Machinery including Pipe Cutting-off Machines, Power Presses, Swaging Machines, Brazed Tubing Machinery. Also Grey Iron Castings.

TOLEDO OHIO

JARECKI PIPE THREADING MACHINES



No. 66—1¼ to 6" light speed changes by lever control.

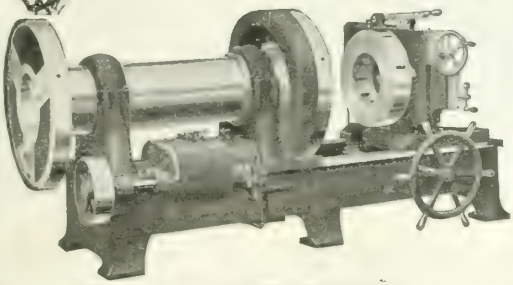
Not the Cheapest, but the Most Efficient and Durable

You should adopt them as standard equipment. Hundreds of concerns have and found them entirely satisfactory. Why not you?

Information Cheerfully Furnished Upon Request

Jarecki Manufacturing Company
Erie, Penna., U. S. A.

B. & K. Pipe Machines



Are improved right up to present-day shop requirements. Their features enable the operator to save hard labor and time at every turn. Unlike hand work the threads they cut are sure to be accurate. One hundred and forty B. & K. Pipe Machines are in use in one city. Made to cut pipe from ¼-in. diam. to 18-in. diam.

SEND FOR NEW CIRCULAR

Bignall & Keeler Machine Works
EDWARDSVILLE, ILL.

THE VAUGHN MACHINERY CO.

ROD MILLS
DRAW BENCHES
WIRE DRAWING AND
HANDLING EQUIPMENT
for Steel, Copper and Alloys

CUYAHOGA FALLS, OHIO

Wire Drawing Machines
Wire Insulating Machines
Wire Stranding Machines
Wire Cabling Machines

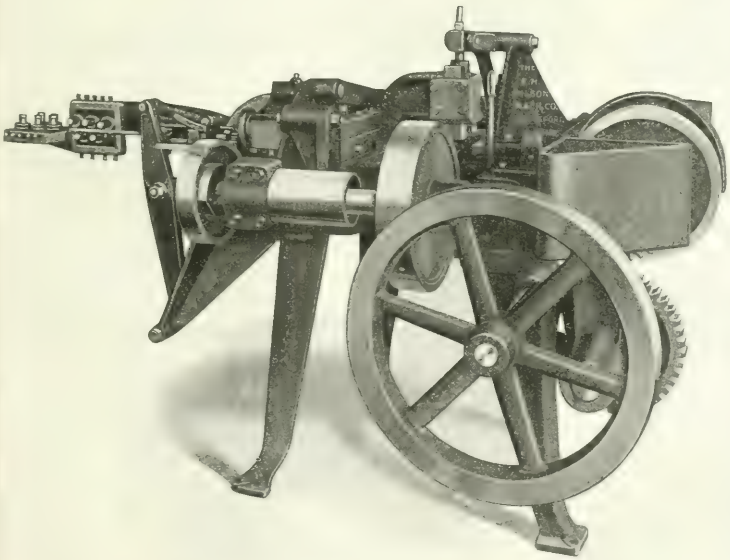
Complete Equipment for the Manufacturing of
INSULATED CABLE and WIRE ROPE

Designers and Builders of
SPECIAL MACHINERY

New England Wire Machinery Co.
NEW HAVEN, CONN.

Sole Selling Agents for
"OSLUND" Continuous Steel Wire Drawing Machines

The Nilson Four-Slide Wire Forming Machine



The Nilson Automatic Four-Slide Wire Forming Machine is just what manufacturers have wanted for a long time.

It's accurate and economical. That's due to the four equal-length slides.

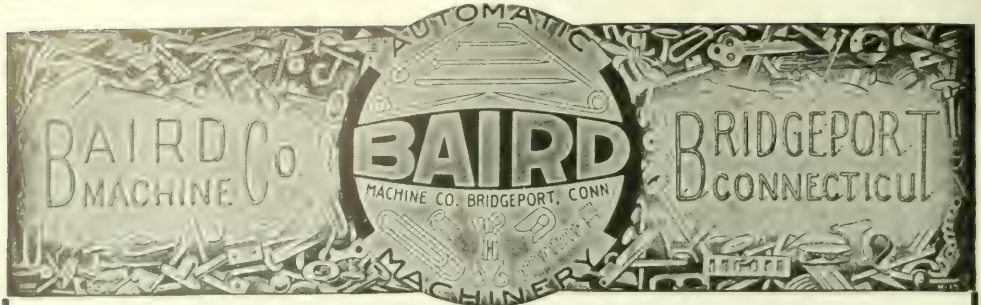
The wire feed is applied in a straight line from crank disc, an exclusive Nilson feature that does away with the old cramping and binding.

The special lubricating system is automatic and continuous, no danger of overheating.

Standard roll straightener and rotary straightener are interchangeable, and the roll straightener is adaptable for both flat and round stock.

If you are interested in wire forming machinery write for full details. It will pay you well to examine the exclusive features of the Nilson.

The A. H. Nilson Machine Company, Bridgeport, Conn.



Wire and Metal Forming Machines—Automatically feed, form, bend, cut, punch and otherwise operate upon round, half round, square or other shape wire and flat metal to produce articles requiring one or several operations.

Special Machines—Making all manner of products required in large quantity, as hooks and eyes, snap fasteners, paper clips, jacks and safety chain, clock and watch parts, electrical parts, novelties, jewelry, etc. Machines handle metal, wood, paper, composition material and combinations of such.

Wire Pointing Machines—Include all pin making machinery, toilet, safety, badge, hat, etc. Pin sticking machines to put pins in paper and various specials, as hair pins, cotter pins and novelties.

Spring Making—Machines that feed the wire and automatically drop out complete springs of the desired kind, wound springs, coiled, helical, and many special designed springs for particular purposes.

Hinge machinery and machines for producing different products of hardware.

Wire straightening and cutting, forming, stamping and ferruling machines.

PRESSES—All types, foot, bench, single and double action, open back, single and double action pillar pattern, cam, toggle and double gate or tandem. Baird presses are machined for attachments and can be quickly made over into full automatic, self-feeding machines that perform several operations upon the material passing once through the press. They take care of the future.

Eyelet Machines—or multiple press for eyelets, snap and glove fasteners, phone cord tips, curtain rings, collar buttons, pencil tips, umbrella shells, paper fasteners, bottle stoppers, cartridge work, thimbles, grommets, lamp sockets, electrical parts, button parts, caps, hollow rings, shells, oil burner parts, etc.

Tumbling Barrels—All kinds for all purposes. Oblique, horizontal, exhaust and non-exhaust, steam drying, japanning, coating, painting, mixing, heating, cooling, cleaning, grinding, rust proofing, lacquering. Standard machines adapted for all purposes with various types of barrel, as wood, cast iron, sheet iron, cast brass, sheet brass, copper, etc.

Burnishing Machines—Ball burnishing outfits for every purpose.

Spring and Wire Coiling, Forming and Winding Machines
Wire Straightening and Bundling Machines
Wire Reels

See display space in first issue of each month.

SLEEPER & HARTLEY, INC.
WORCESTER MASS.

COOK'S WOOD-SCREW MACHINES
for making IRON AND BRASS WOOD-SCREWS
We furnish complete plant installation for Starting Wood-Screw Factories
SECURE OUR HANDBOOK 5-H
THE ASA S. COOK CO.
HARTFORD, CONN., U. S. A.

BOLT and NUT MACHINERY

Send for our new Catalog.

Special Machinery Built from Prints or Specifications

General Machine Work

William H. Haskell Manufacturing Co.
Established 1856 Pawtucket, R. I.

One of our large line of
Bolt and Cold Punched Nut Machinery



¾ inch
Bolt Forging Machine

...duction of bolts and nuts.
...have advantages and improve-
...ularly successful on this work.
Write today for full details of these advantages.

Pawtucket Mfg. Co.
327 Barton St.
Pawtucket, R. I.

BOLT THREADERS, NUT TAPPERS, HEADING MACHINES, ETC.

Write to us for anything you want in the Bolt and Nut Machinery Line.



The Acme Machinery Company
Cleveland
Ohio
U. S. A.

Cor. St. Clair and Hamilton Sts.

EUROPEAN AGENTS:
Burton, Griffiths & Co., London, England. Glasener & Perreaud, Paris, France. Ing. Ercole Vaghi, Milan, Italy. Henry W. Peabody & Co., Melbourne, Australia.

Helping the Belgians Rebuild Trade and Prosperity

Landis Threading Machines

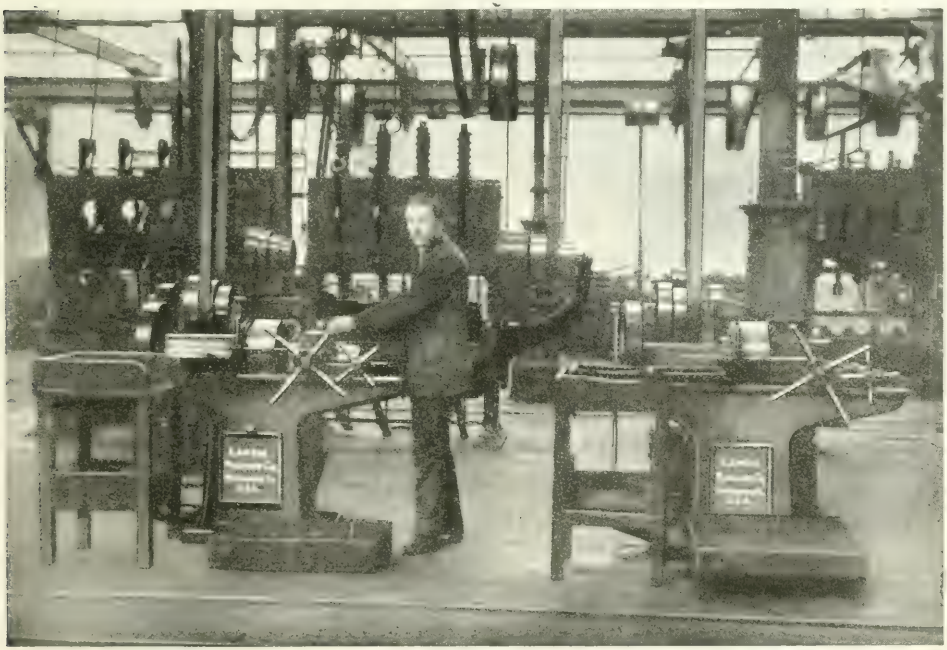
The accompanying photograph was taken in the plant of the Louviere, Bolt Company, Louviere, Belgium, and shows two Landis 1½" Single Head Threading Machines used by this concern in the making of bolts. These machines are only part of a big Landis installation in this plant.

The Landis Threading Machine is a high production tool, designed especially for speedy, accurate threading where quantities of work are sufficient to keep it busy all or most of the time. Under these conditions the Landis is a most profitable tool. May we tell you more about it?

Landis Machine Company, Inc., Waynesboro, Pa.

LANDIS

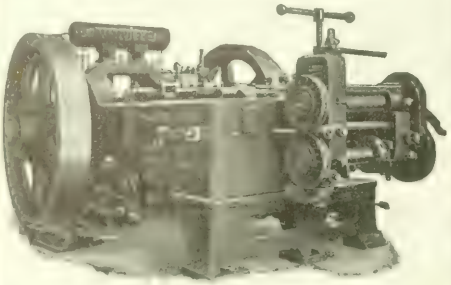
DOMESTIC AGENTS: Marshall & Huschart Machinery Co., Chicago, Ill.; Marshall & Huschart Machinery Co. of Indiana, Indianapolis, Ind.; Colcord-Wright Machinery & Supply Co., St. Louis, Mo.; R. B. Whitacre & Co., St. Paul, Minn.; Hamilton Machinery Co., Chattanooga, Tenn.; Seeger Machine Tool Co., Atlanta, Ga.; Young & Vann Supply Co., Birmingham, Ala.; Woodward, Wight & Co., New Orleans, La.; Jos. T. Ryerson & Son, Houston, Texas; Hendrie & Bolthoff Mfg. & Supply Co., Denver Colo.; Salt Lake Hardware Co., Salt Lake City, Utah; Eccles & Smith Co., San Francisco, Calif.; Los Angeles, Calif; Portland, Ore.; Hallidie Machy. Co., Seattle, Wash.; Hallidie Co., Spokane, Wash. CANADIAN AGENTS: Canadian Fairbanks-Morse Co.; Toronto and Montreal. FOREIGN AGENTS: Burton Griffiths Co., London, England; Alfred Herbert, Ltd., Calcutta, India; and Yokohama, Japan; Allied Machinery Co., Barcelona, Spain; Turin, Italy; Zurich, Switzerland, and Tientsin, China; R. S. Stokvis & Zonen, Rotterdam, Holland; Lindeteves-Stokvis, Dutch East Indies; D. Drury & Co., Johannesburg, South Africa; Benson Brothers, Sydney, Australia.



MANVILLE

DIRECT-ACTING DOUBLE STROKE
OPEN-DIE COLD HEADERS
WITH FRICTION FEED

The Header You Will Ultimately Install



Manville No. 5 B—D.S.O.D.—Header

This Powerful High Duty Machine is the latest Manville Cold Heading Machine for Upsetting Bolt, Rivet, Screw Blanks and other special headings by the Cold Process.

It has a maximum capacity of ¾" diameter by 7" long, 45 blanks per minute.

Write for Bulletin 14B.

E. J. MANVILLE MACHINE CO.
WATERBURY, CONN., U. S. A.

Builders of Cold Headers, Thread Rollers, Screw Slotters, Bolt Head Trimmers, Power Presses, Wood Screw Machines, Nut Blanking Machines, Wire Formers, and special automatic machinery.

WATERBURY FARREL FOUNDRY AND MACHINE COMPANY

Rivet, Bolt and Nut Machines, Power and Hydraulic Presses, Multiple Plunger "Eyelet" Machines. Machines for cold rolling and drawing sheets, rods and wire.

Home Office and Works: 465 Bank St., Waterbury, Conn.
Western Office: 1016 Williamson Bldg., Cleveland, Ohio.

FOREIGN AGENTS:

Geo. H. Alexander, Birmingham, England. For Rivet, Bolt, Nut, Wire Drawing and Collapsible Tube Machines.

Fenwick Frères, Paris, France. For Rivet, Bolt and Nut Machines.

D. Weil, Paris, France. For Wire Drawing Machines.

ALLEN RIVETERS

Can be depended upon to produce the maximum number of good Rivets with the least consumption of power.

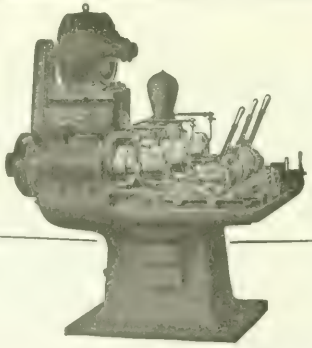
Send for Latest Catalog.

JOHN F. ALLEN CO., 372 GERARD AVE., NEW YORK

BELOIT

Punches, Shears
and Bending Rolls

HENDLEY & WHITTEMORE CO. BELOIT, WIS.



NATIONAL BOLT CUTTERS

"Always Cut Accurate Threads"

Do not require skilled labor.

Dies can be changed or adjusted in a minute's time.

Die Head has a positive lock, hence insures uniform diameter and accurate thread, regardless of stock variations.

The National interchangeable Case Die insures 40% to 50% less upkeep cost.

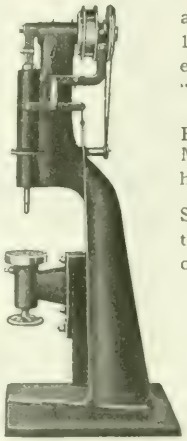
Illustration of machine will attest the [illegible]

Don't buy a Bolt Cutter without thorough investigation of the National.

Built in 22 different sizes and styles.

THE NATIONAL MACHINERY COMPANY
TIFFIN - OHIO

RIVETING



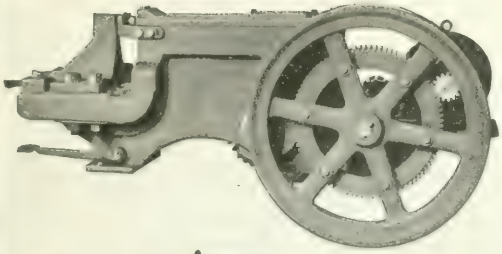
at the rate of 10,000 to 12,000 rivets per day is easy work for SHUSTER "ELASTIC ROTARY" (Trade Mark) BLOW RIVETING MACHINES. And every head is perfectly finished.

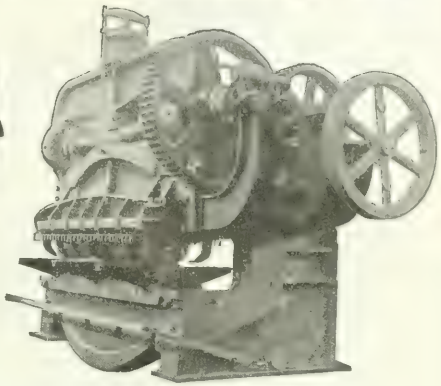
Send samples and let us tell you what can be done on your work.

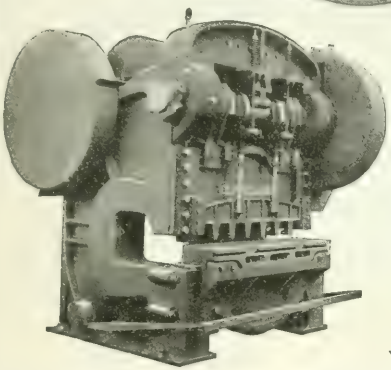
Catalogue J.

THE F. B. SHUSTER CO.
NEW HAVEN, CONN.
Formerly John Adt & Son Established 1866

Machine Tools **SOLID STEEL** Small Tools







YOU!

PUNCHING MACHINES
Vertical Open Gap
Horizontal
Multiple

SHEARS
Angle
Bar
Gate

PLATE PLANERS
ROTARY PLANERS
BENDING ROLLS
STRAIGHTENING ROLLS
WALL RADIAL DRILLS
SPACING TABLES

SMALL TOOLS
Punches
Dies
Rivet Sets
Chisel Blanks
Markers
Coupling Nuts
Etc.

You are probably interested in Metal Working Tools—that is, Metal Working Tools that will repay you one hundred cents on the dollar in service rendered. In other words, just **good substantial** Metal Working Tools that can take a lot of "punishment" without running up a lot of repair bills.

Now, take a look at the Cleveland Machines illustrated on this page and without even knowing anything about the quality of the materials used or the skillful workmanship employed we venture to state that you will just naturally feel a sense of ruggedness that assures you of their ability to do your work and do it with ease.

We appreciate the kind of work these machines are called upon to do. Punching, shearing, bending, straightening or planing plates or structural members is no mean job and calls for Machine Tools having more than good outward appearance to recommend them, it calls for Machines having the "innards" to stand up to it day in and day out, and when you specify a Machine to do that, you are specifying a CLEVELAND.

Our District Manager in your territory can refer you to a lot of concerns who will back up our statements and some day you, too, will permit us to refer to you for a recommendation.

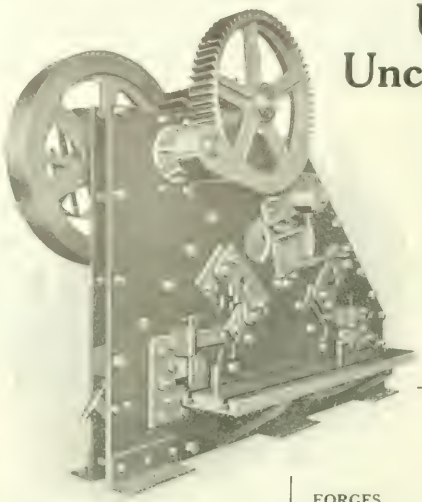
NEW YORK
C. W. Hancock
50 Church St.

CHICAGO
R. E. Graves, 332
S. Michigan Ave

THE CLEVELAND PUNCH & SHEAR WORKS CO.
Main Office & Works · CLEVELAND, OHIO
PITTSBURGH - CHICAGO - PHILADELPHIA - NEW YORK

PHILADELPHIA
R. S. Howell 321
Bulletin Bldg

PITTSBURGH
P. J. Hopkins, 511
Farmers Bank
Bldg



Unbreakable Frames Unconditionally Guaranteed

The illustration clearly illustrates the distinctive "Armor Plate" construction of the Buffalo line of punches and shears. The double end angle and bar shear shown cuts angles, tees, rounds, squares and flats without changing knives and angles or squares on any mitre up to and including 45°.

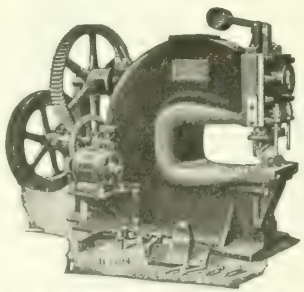
Two gangs can operate at the same time without interfering.

Write for our Catalog No. 43 giving full details

"Buffalo"

FORGES
BLOWERS
DRILLS
EXHAUST FANS
DISK FANS
PUNCHES SHEARS
VENTILATING APPARATUS

Buffalo Forge Company
492 Broadway
Buffalo, New York



"IRONTON"

Punches, Shears and Rolls
30" Machine Motor Drive

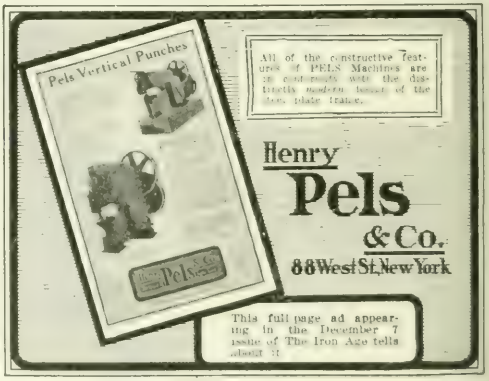
Vertical Plate Punches or Shears, Bending and Straightening Rolls, Gate or Squaring Shears, Multiple and Horizontal Punches

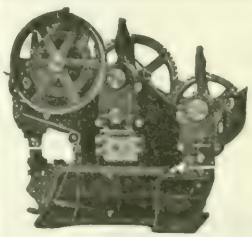
for use in

Boiler, Structural, Locomotive and Steel Car Shops, Farm Implement and Safe Manufacturers. Plunger controlled by adjustable automatic stop.

Send for catalog No. 19

The Ironton Punch & Shear Co.
Ironton, Ohio, U. S. A.



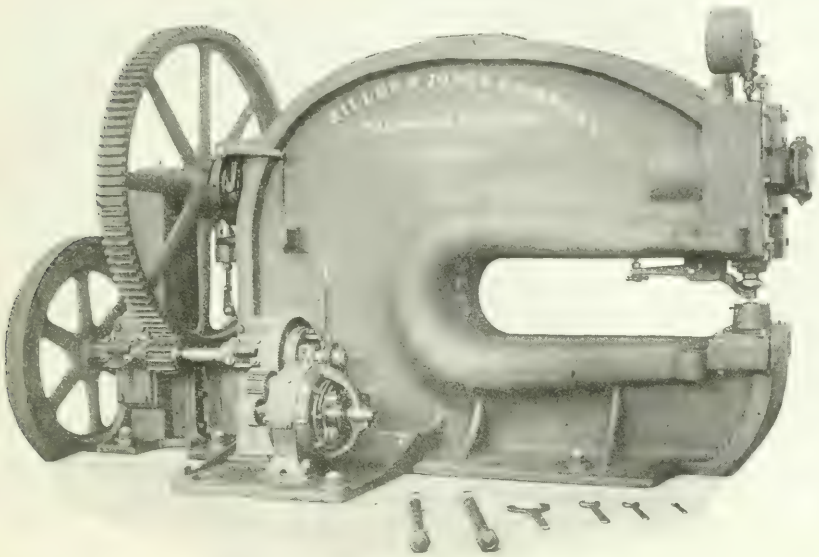


TRIPLE COMBINATION
PUNCHES & SHEARS
Solid Steel Frames
7 Sizes
Standard and New Types
Immediate Delivery from New York Stock

Satisfied Customers Everywhere

Amplex
8 West 32d St., New York
Telephone: Longacre 4824
Successors to Wiener Machinery Co.

Reserve Power without Waste



In this self-contained, single Punch and Shear will be found abundant power when power is required, with provision for keeping that power in reserve *without waste* when the machine happens to be idle.

The motor drive through cut gearing and friction clutch afford control that is at once economical and positive.

There are no wheels turning and no wear and tear on bearings except when actually necessary.

The motor drive and clutch feature is representative of the excellence of design that has characterized Hilles & Jones products for 68 years.

HILLES & JONES PLANT

of

CONSOLIDATED MACHINE TOOL CORPORATION OF AMERICA

BETTS MACHINE PLANT
Rochester, N. Y.

MODERN TOOL PLANT
Erie, Pa.

NEWTON MACHINE TOOL PLANT
Philadelphia, Pa.

HILLES & JONES PLANT
Wilmington, Del.

COLBURN MACHINE TOOL PLANT
Cleveland, Ohio

General Office: 17 East Forty-second Street, New York

DISTRICT SALES OFFICES

NEW YORK DETROIT PHILADELPHIA PITTSBURGH CLEVELAND CHICAGO ST. LOUIS

THE LONG AND ALLSTATTER CO.
POWER PUNCHING & SHEARING MACHINERY
AMERICAN PUNCH & SHEAR WORKS — THE QUALITY LINE
HAMILTON, OHIO, U.S.A.

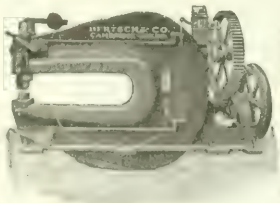
BARTLETT BENCH SHEARS
Cut 12 Gauge Metal Easily
Removable Blades. Fully Guaranteed.
Price $24.00
Bartlett Mfg. Co.,
Detroit, Mich.



Shear Blades
The Cleveland Knife & Forge Company
CLEVELAND, OHIO

WILLIAMS, WHITE & CO.
MOLINE, ILLINOIS, U. S. A.
Forging Rolls
Drop Hammers
Yeakley Hammers
Multiple Tapping Machines
THE BULLDOZERS
Presses
Plate Shears
Multiple Punches
Punches & Shears, Etc

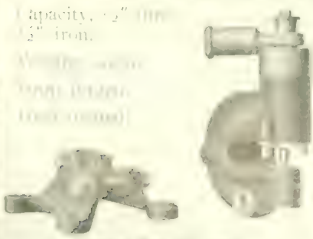
PUNCH



This cut shows one of ... Punches, with a full ... and ... selected ... controlled ... operated by ... of ... button.
... weight.

BERTSCH & COMPANY
Cambridge City, Ind., U. S. A.

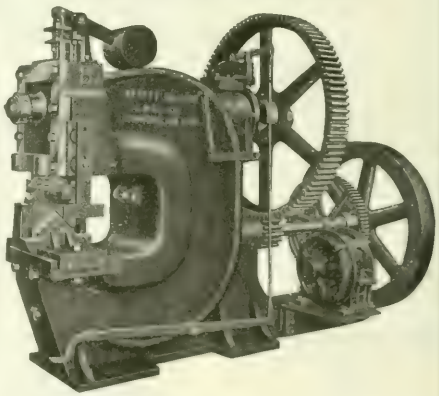
Ball Bearing Punch No. 20



Capacity, ½" ... ½" iron.
... holes in ...
NO EQUAL
Write Us.

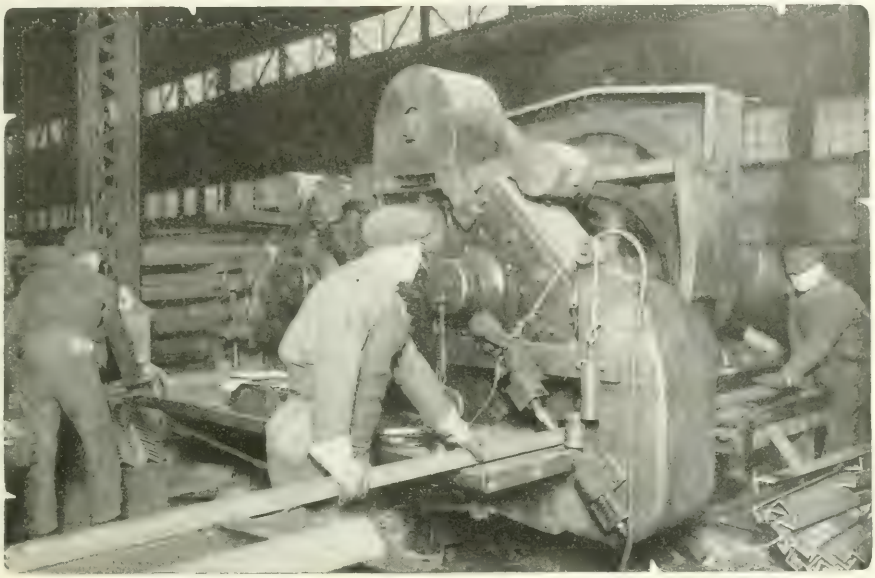
WHITNEY METAL TOOL COMPANY
100 Forbes St., Rockford, Ill.

Built for Service



Constant and lasting service is insured by the installation of

BEATTY
PUNCHES AND SHEARS
They are correctly designed and constructed
Let us quote on your specifications.
BEATTY MACHINE & MFG. COMPANY
HAMMOND, INDIANA



From Every Angle

From every angle there is decided economy for the structural shop in the use of Ryerson-Kling Double Angle Shears—in power saving, in speed, in versatility. The two ends operate independently each with its own eccentric shaft, clutch and automatic stop—just like two separate machines, yet having only one motor and occupying very little more space than would be required for a single machine.

These machines will cut angles either square or on a bevel up to 45 degrees. When the latter is being done the turntable base is a big advantage, particularly when long material is handled.

Write for details.

JOSEPH T. RYERSON & SON

Established 1842 Incorporated 1888

Plants: CHICAGO ST. LOUIS DETROIT BUFFALO NEW YORK
Offices: MINNEAPOLIS MILWAUKEE DENVER TULSA HOUSTON SAN FRANCISCO

RYERSON MACHINERY

Cut Your Shearing Costs with a



MARSHALLTOWN THROATLESS SHEAR

THE MARSHALLTOWN LINE

Throatless and Bevel Shears
Splitting Shears
Plate Millers
Pressure Gauges of all kinds

A shear that will cut sheets of any size into any shape and yet is compact and rigid, will effect a real saving in your plant.

Such a shear is possible because it is of the patented "throatless" design, and that means that it has no limitations.

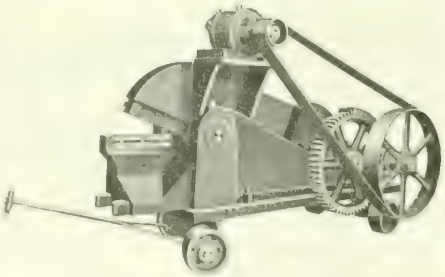
It is made in sizes to meet your requirements and at various prices, hand and power operated.

Write for catalog giving full information.

MARSHALLTOWN MANUFACTURING CO.

MARSHALLTOWN, IOWA

Canton Alligator Shear



Another Saving—

The saving in material handling costs that can be effected by taking the shear where it is needed will run into large figures in many plants.

Add to this the fact that it is an unusually well made shear with such long life and low repair expense that it would be an economy anyway.

Isn't it the sort of equipment you want?

Industrial, Shop and Automobile Turntables.

Our catalog would interest you.

Canton Foundry & Machine Co.

New York Office, 203 East Fifteenth Street

Canton Ohio

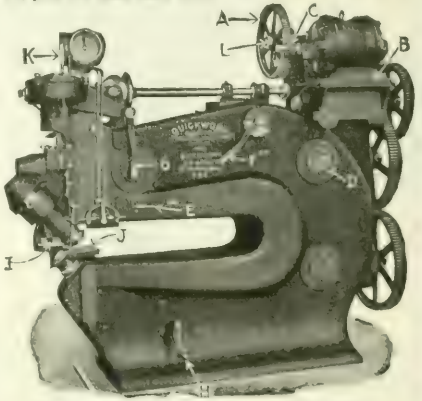
QUICKWORK

Registered in U.S.A. and Foreign Countries

ROTARY SHEARS

Made in 7 Sizes

Cut all gauges of sheet and plate metal up to 1 inch thick in straight or irregular shapes and openings, without cutting in from side of sheet. Leaves square, true edge that requires no finishing. Used in building ships, boilers, tanks, cars and general plate and sheet metal work.



Patented June 3rd, 1913—August 26th, 1919

SAVE 50% TO 90%

Eliminate Oxyacetylene Cutting and Plate Planing

Write for Catalogue No. 60

THE QUICKWORK COMPANY

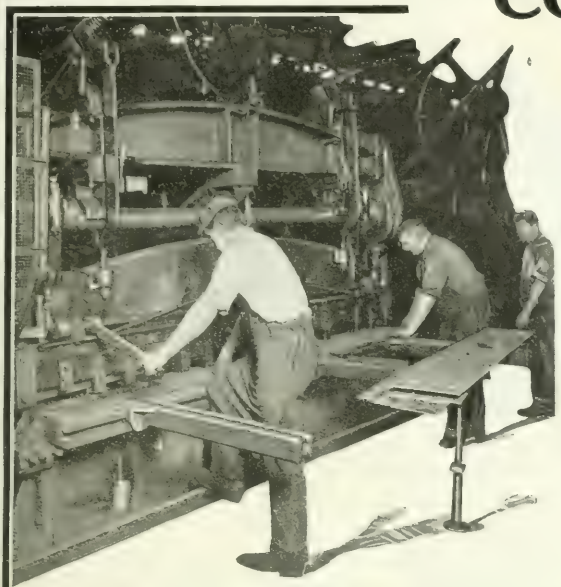
ST. MARYS OHIO, U. S. A.

Cable Address: "QUICKWORK," All Codes Used.

New York Exhibit: Grand Central Palace.

Foreign Agents: British Isles, Oliver Machinery Company, Manchester, England.

COVINGTON



Down from the fine blue hills of Virginia comes a line of punches and shears that are being bought wherever good tools are used.

This big gate shear is shearing stringers and risers from ¼" iron, for iron stairs. It has been in operation here in the Sexauer & Leinke Iron Works for over ten years and has not had a repair.

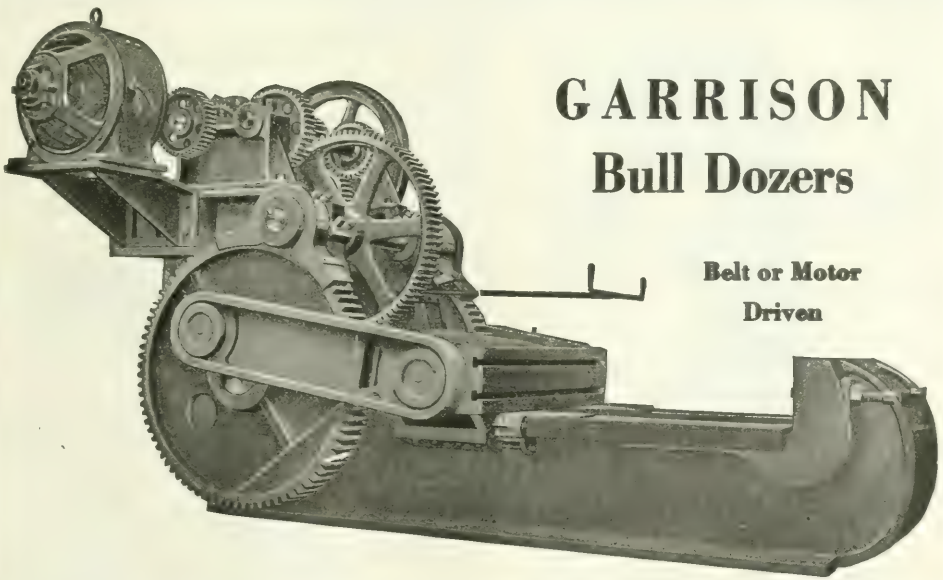
Quality tools always — the sort you're proud of years later, are the only kind made at Covington.

There's a style and size
to suit your needs.
What are they?

Vertical Punches — Gate Shears, Alligators, Bending Rolls, Plate Planers, Wall Radials, Mining Equipment, etc.

The Covington Machine Company, Inc.
FOUNDERS AND MACHINISTS
Covington, Virginia, U. S. A.

Established 1886
Incorporated 1920



GARRISON
Bull Dozers

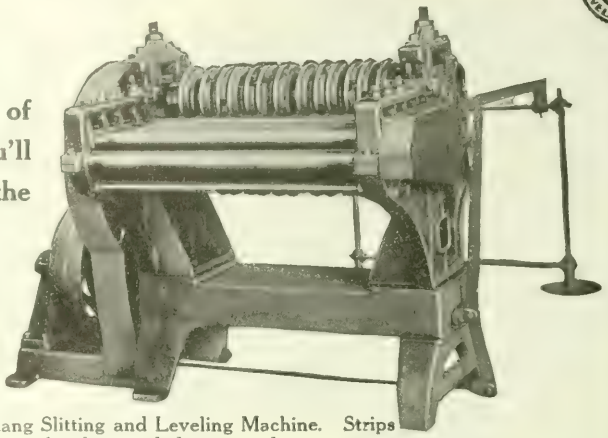
Belt or Motor Driven

ROLLING MILL EQUIPMENT OF EVERY DESCRIPTION FOR STEEL MILLS

Copper, Brass, Aluminum, Lead and Zinc Mills. "Garrison Finish" Chill and Sand Rolls

A. GARRISON FOUNDRY COMPANY (The Pittsburgh Foundry, ESTABLISHED 1860)
ROLLING MILL MACHINERY—PRESSES—SHEARS S. Tenth Street :: Pittsburgh

The Back View of a Machine You'll Want to See the Front of!



It's the Yoder Gang Slitting and Leveling Machine. Strips slit on it have smooth edges and do not curl.

Our adjustable cutters are a special feature. It is made in all sizes to meet every requirement.

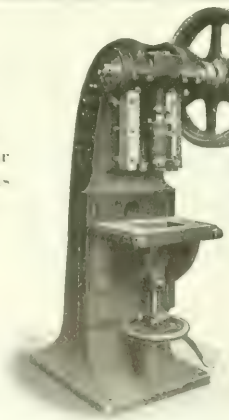
Just what are yours?

THE YODER COMPANY, CLEVELAND, O.

"Machine builders to workers in sheet metal"

Cut Your Costs

Increase Your Production



Sheet Metal Working Machinery

Niagara Machine & Tool Works

Buffalo, N. Y. U. S. A.

NIAGARA

CORRUGATING MACHINES
POWER SHEARS
OTHER SHEET METAL MACHINERY

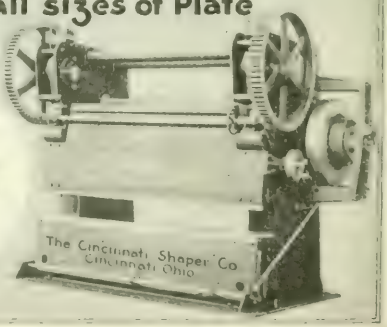
See our advertisement in first issue each month

The Streine Tool & Manufacturing Co.

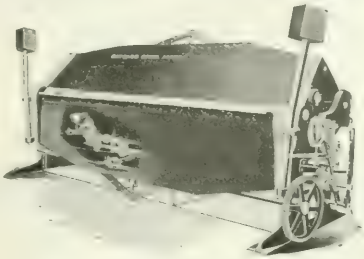
New Bremen, Ohio, U. S. A.

AUTOMATIC
LOCKSEAMING
MACHINES AND THEIR PRODUCT
STOLP COMPANY, INC., GENEVA, N.Y.

All-Steel Brakes for all sizes of Plate



Chicago Steel Bending Brakes



16 Ft. Power Brake, Capacity ⅛" Plate

Bend and Form Your Sheets and Plates on These Labor Saving Machines

USED BY

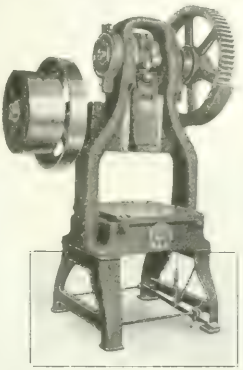
U. S. Army and Navy — Shipbuilders
Railroads — Tank and Boiler Shops
Auto Manufacturers — Aeroplane Manufacturers
Sheet Metal Shops — Structural Shops

Made from 3 to 26 feet long to bend from light sheets to ¾ inch steel plate, hand and power

Write for Catalog No. 19

DREIS & KRUMP MFG. CO.
McKinley Park Station CHICAGO
San Francisco Office: 508 Mission Street

THE WORLD'S STANDARD



"ADRIANCE"

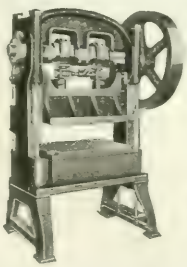
Arch Power Presses

These Presses have an extra long stroke. They are built in four sizes in geared and flywheel type and are particularly adapted for a large variety of sheet metal work such as cutting and stamping coal hod and tub bottoms, petroleum can sides, fire shovels, metal shingles, etc. Equipped with the well-known "Adriance" Clutch and the "Adriance" Brake, these presses are designed to give a maximum output with ease and economy of operation.

ADRIANCE MACHINE WORKS, INC.

Builders of Power Press Dies and Metal Working Machinery
Established 1888
Incorporated 1913
82 RICHARDS ST. BROOKLYN, N. Y.

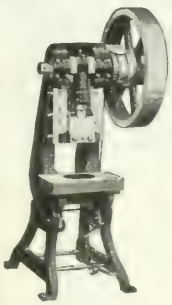
SHEET METAL WORKING MACHINERY AND DIES



"Leffler" Double Crank Presses

for heavy cutting and forming and working large dies or gangs of dies.

Charles Leffler & Co.
61 Clymer Street, Brooklyn, N. Y.



Here's the Press

for manufacturing. Great power backed by sturdy construction enables

HIGH DUTY ROCKFORD PUNCH PRESSES

to stand the grind of hard, continuous usage. Made in Straight Side and Inclinable types and various sizes.
Write to-day for details

Rockford Iron Works, Rockford, Ill.

HENDERSON PRESSES

For Sheet Metal Work

New Drop Press—Hammer Face 30" x 60"
Immediate Shipment!

Henderson Machine Co.
5032 Germantown Ave. Philadelphia, Pa.



Quicker and Better Work

is guaranteed in straightening, bending and force fitting jobs in the use of our FLEXIBLE POWER PRESS AND STRAIGHTENING MACHINE. Because of its different mechanical construction it invariably shows a saving of at least 50% over other machines. Continued pressure from a few pounds up to 20 tons controlled by foot pedal leaving hands free to handle work. Upkeep interestingly low. Get our new Bulletin.

GENERAL MFG. CO.
257 Meldrum Ave. Detroit, Mich.

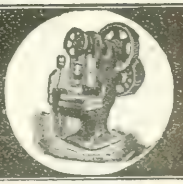


FERRACUTE PRESSES

HUNDREDS OF SIZES AND STYLES

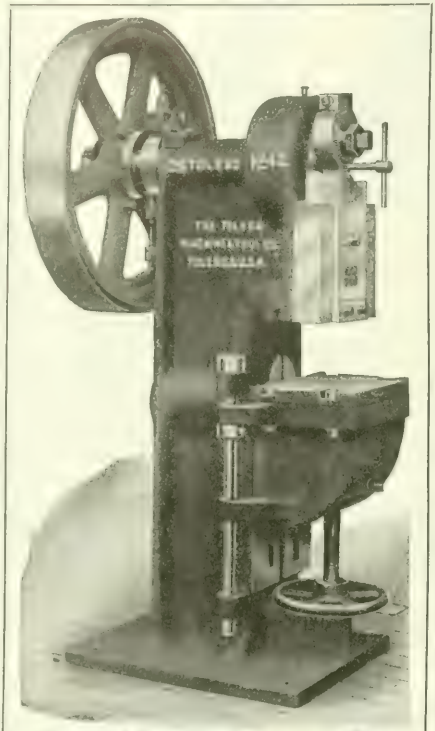
FOR CUTTING AND FORMING SHEET METAL

FERRACUTE MACHINE CO. BRIDGETON, NEW JERSEY



THE "TOLEDO"

ADJUSTABLE BED PRESSES



The "Toledo" Adjustable Bed Press, No. 43

The "Toledo" Blanking, Forming, Horning and Wiring Presses, Series No. 40, have perhaps a much greater flexibility in design than any other type of Press which has hitherto been placed on the market. This flexibility adapts these Presses for practically any kind of press operation, except double-action drawing. Changes can be quickly made by the operator to suit these Presses for a wide variety of work in the manufacture of agricultural implements, automobiles, bicycles, carriages, cash registers, hardware, stamped and pieced tinware, sheet steel stoves and ranges, steel barrels, tanks, steel boxes, percolator-strainers, burner shells, perforated drums, wheels, ash cans, go-carts, steel wagons and a large variety of other articles too numerous to mention here. The design of the frame is particularly adapted for the operation of dies and fixtures where a large space is required between the slide and the bed, and is such that it readily lends itself to special attachments for the application of dies for beading, forming, horning, wiring, riveting, perforating, etc.

"PRESSES FOR EVERY PURPOSE"

Excellent facilities for all kinds of high grade machinery castings. Forging and gear cutting a specialty.

Founders and Machinists and Engineering Specialists on equipment for sheet metal products.

Estimates furnished Correspondence solicited

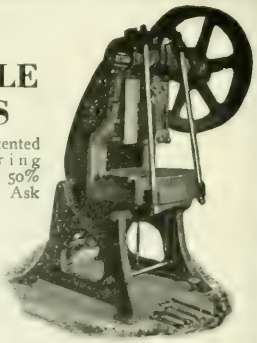
THE TOLEDO MACHINE & TOOL CO.

TOLEDO, OHIO
U. S. A.

Chicago Office
549 West Washington Street

V & O INCLINABLE PRESSES

with the V & O patented Long Slide—insuring greater rigidity and a 50% saving on your dies. Ask for Bulletin No. 1-B.



The V & O Press Co.

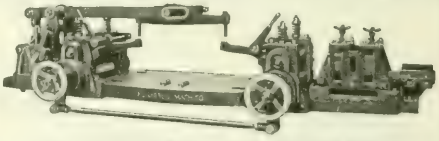
Main Office and Factory, Glendale, Brooklyn, N. Y. Branch Sales Office, 549 Washington Boulevard, Chicago, Illinois.



Typical L. & N. Mitre Press

We manufacture Power Brakes or Forming presses and squaring shears in capacities from 16 gauge to 3/8 in., from 4 ft. to 12 ft. in length. We also manufacture Mitre Presses, Special sheet metal machines, Forming and Mitre dies, and Shear Blades.

Loy & Nawrath Division
Birmingham Iron Foundry
Derby, Conn.



No. 5 Double Roll Feed with Stock Straightener and Scrap Cutter

Rolls 5½ Diam. x 8½ Long Weight 3,000 lbs.

Production—Safety—Economy

Roll Feeds Built in Ten Sizes—Will Fit Any Make of Press
We Build a Complete Line of Automatic Feeds for Punch Presses

F. J. LITTELL MACHINE CO.
4125 RAVENSWOOD AVE. CHICAGO
Formerly Acme Machine Works

Presses and Shears

Sheet Metal Working Machinery

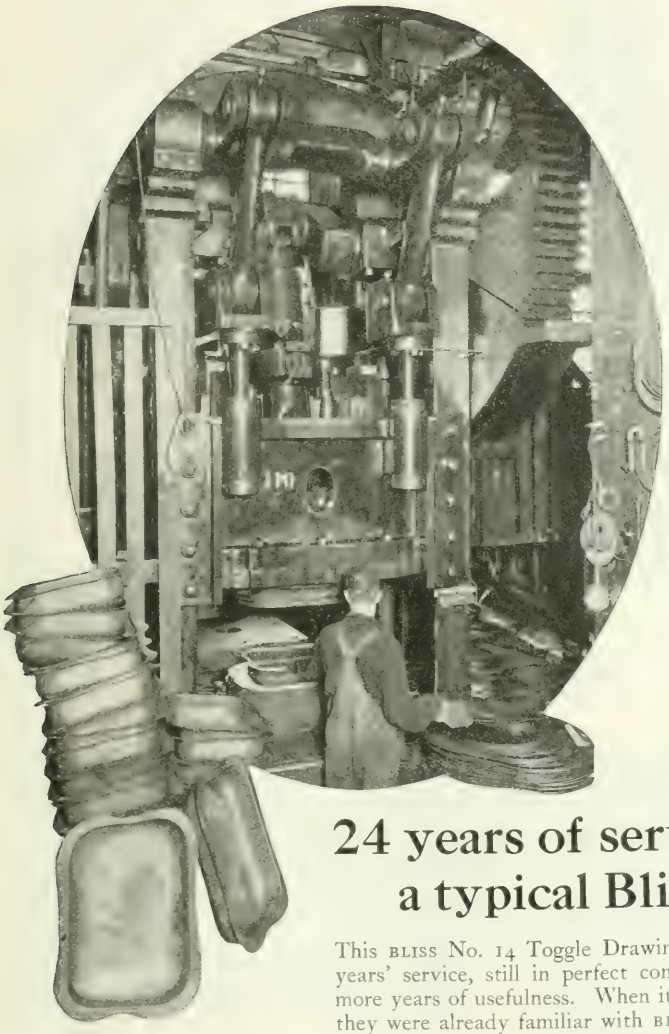
The D. H. Stoll Co., Inc.

Military Road and Austin Street,
Buffalo, N. Y.

Presses, Dies, Sub-Presses

Send for Catalogue

ZEH & HAHNEMANN CO.
Vanderpool St. and Ave. A Newark, N. J.



BLISS

24 years of service— a typical Bliss Press record

This BLISS No. 14 Toggle Drawing Press is a veteran of 24 years' service, still in perfect condition and good for many more years of usefulness. When its owners bought it in 1898, they were already familiar with BLISS quality and service, for they had been buying BLISS equipment since 1871. To-day there are 66 BLISS Presses of various types at work in this plant —eloquent testimony of the *lasting* satisfaction obtained with BLISS equipment.

Records such as this—and we can point to hundreds of others—form your safest guide in buying sheet metal working machinery. It will pay you to investigate the possibilities of BLISS equipment in *your* plant.

—Bliss for Machinery—

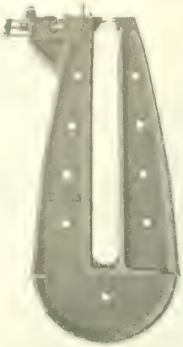
E. W. BLISS CO. MAIN OFFICE AND WORKS **BROOKLYN, N. Y., U. S. A.**

SALES OFFICES: DETROIT, Dime Bank Bldg. CLEVELAND, Cleveland Discount Bldg. CHICAGO, Peoples Gas Bldg. PITTSBURGH, Oliver Bldg. ST. LOUIS, Boatmen's Bank Bldg. BUFFALO, Marine Bank Bldg. CINCINNATI, Union Trust Bldg. NEW HAVEN, Second Nat'l Bank Bldg.

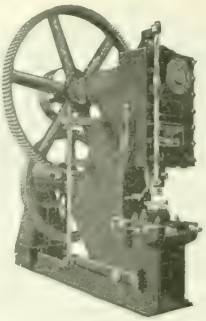
American Factories: BROOKLYN, N.Y. HASTINGS, MICH. CLEVELAND, OHIO. SALEM, OHIO.

FOREIGN SALES OFFICES AND FACTORIES:

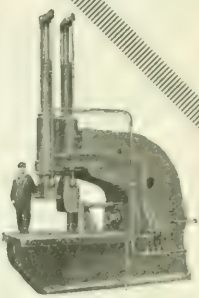
ENGLAND, Pocock St., Blackfriars Rd., S. E., London ITALY, 345 Via Nizza, Turin FRANCE, 54 Blvd. Victor-Hugo, St. Ouen, Paris



Hydraulic Riveters



Washer Press



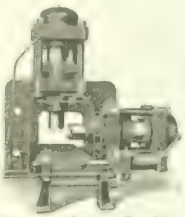
Hydraulic Sectional Flanging Press



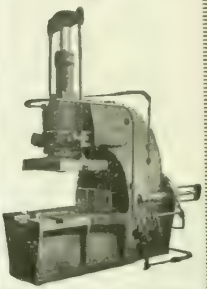
Angle Shears

HYDRAULIC & POWER TOOLS

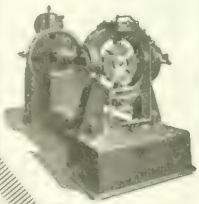
SPECIAL MACHINERY



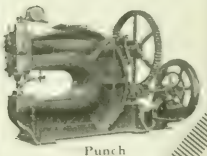
Hydraulic Spring Banding Press



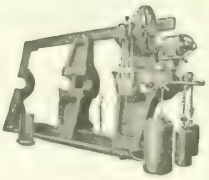
Standard Joggling Press



Flue Welder



Punch



Wheel Press



Hydraulic Spring Stripping Press

Power Tools

Flue Cutting Machines

Hydraulic Tools

Presses
Sectional Flanging
Forming Presses
Bushing Presses

Since 1836

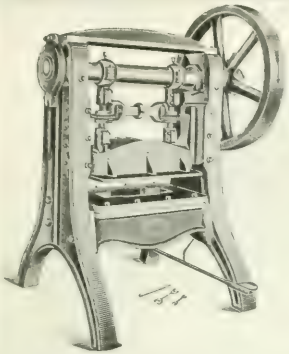
When you buy a SOUTHWARK PRODUCT you purchase also years of designing and manufacturing experience.

SOUTHWARK FOUNDRY AND MACHINE CO.
PHILADELPHIA, PA.

Fisher Bldg., Chicago Swetland Bldg., Cleveland

Hydraulic Tools

Car Wheel Presses
Forcing Presses
Plate Bending Presses
Pipe Bending Presses
Angle Bending Presses
Straightening Presses
Upsetting Presses
Staybolt Riveters
Portable Riveters
Joggling Presses
Extrusion Presses
Spring Banding Presses
Spring Stripping Presses
Testing Presses
Accumulators, Valves
Pumps, Fittings, etc.



EXCELSIOR TOOL & MACHINE CO.

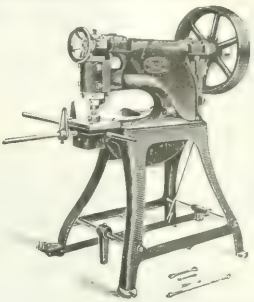
Ridge and Jefferson Avenue
EAST ST. LOUIS ILLINOIS

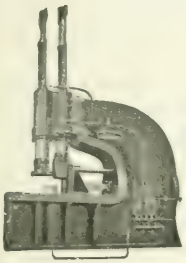
Manufacturers of

PRESSES SHEARS
BRAKES GRINDERS
ANGLE IRON BENDERS
and POLISHING MACHINES

Write and get our prices

Machine No. 37 and No. 20

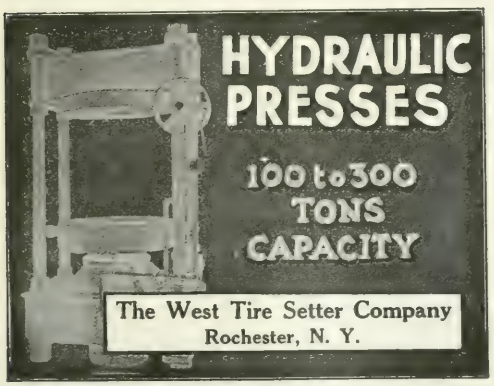




HYDRAULIC MACHINERY

of every description. Hydraulic Operating — Stop and Check Valves. For Automatic Gas Producers see our advertisement in last week's issue.

R. D. WOOD & CO. PHILADELPHIA PA.



HYDRAULIC PRESSES

100 to 300 TONS CAPACITY

The West Tire Setter Company
Rochester, N. Y.

EFFICIENCY

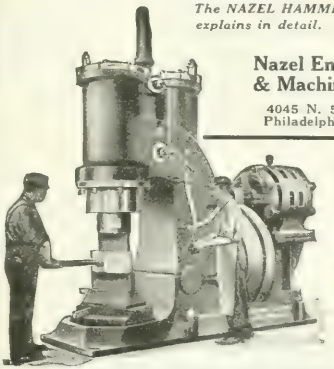
If it's a NAZEL AIR HAMMER

the air is being used at the temperature which it attains in compression, therefore there are no heat losses—result: High Efficiency.

In the case of a hammer worked from an independent air supply, there is a very considerable loss due to the cooling of air before use. The best results therefore can only be obtained in a hammer by using the air while still hot from compression. A condition attained only in a Nazel.

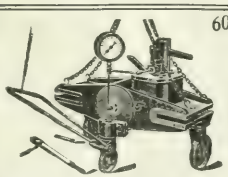
The NAZEL HAMMER BOOK explains in detail. It's free.

Nazel Engineering & Machine Works
4045 N. 5th Street
Philadelphia, Penna.



Built in three types. Six sizes Belt or Motor Driven, with capacities up to 9" square for all kinds of machine, railroad and general forgings.

NAZEL HAMMERS require no storage tanks, independent compressors or piping.



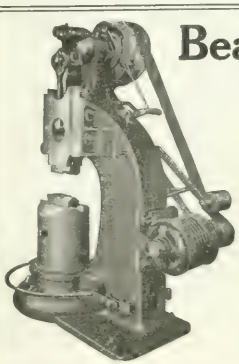
60-Ton and 100-Ton Portable
HYDRAULIC PRESSES
NEW DESIGN
for pressing on and off Cranks, Crank Pins, Sheaves, Pinions, Car Wheels, etc., by hand. Two sizes. Send for circular.
VULCAN IRON WORKS
327 N. Irving Avenue, Chicago



HYDRAULIC MACHINERY

Tell us what you need in the way of Hydraulic Equipment. We will submit drawings, estimate and catalogues. Presses, pumps, accumulators, valves or fittings.

THE HYDRAULIC PRESS MFG. CO.
15 Lincoln Ave. Mount Gilead, Ohio
New York Buffalo Cleveland San Francisco



Beaudry Hammers

FOR

General Forging

Save Fuel, Time and Labor. Cut Forging Costs in Two.

Belt or Motor Drives

Beaudry & Co., Inc.
45 Bromfield St.
BOSTON 9, MASS.

ERIE

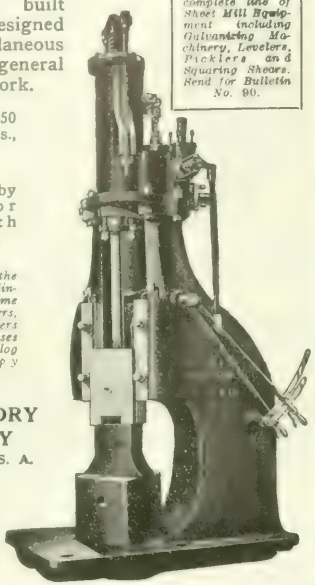
Single Frame Forging Hammers

Heavy, well built machines designed for miscellaneous forging and general blacksmith work.

Built in sizes 250 lbs. to 3500 lbs., both inclusive.

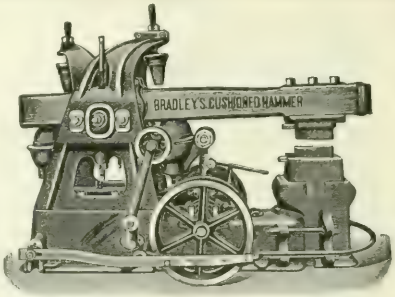
Operated by either air or steam — with equal efficiency.

We also build a complete line of Sheet Mill Equipment including Galvanizing Machinery, Levelers, Picklers and Squaring Shears. Send for Bulletin No. 90.



Full details of the "ERIE" line of Single and Double Frame Forging Hammers, Steam Drop Hammers and Trimming Presses contained in catalog "E." Your copy mailed on request.

ERIE FOUNDRY COMPANY
ERIE, PA., U. S. A.



Reduce Your Forging Costs

BRADLEY
Cushioned Helve Hammers

equipped with dies greatly increases production and reduces costs.

Their speed of operation and ease of control permit the operator to produce quality forgings.

Bradley Hammers are made in 32 sizes and 4 styles and are equipped with heads ranging from 15 to 500 pounds.

There is a Bradley Hammer to meet your needs.

Write for full particulars today.

C. C. BRADLEY & SON
Syracuse, N. Y.

CHAMBERSBURG
STEAM HAMMERS
"All sizes for every class of work"
HYDRAULIC MACHINERY
Chambersburg Engineering Co.
CHAMBERSBURG, PA.

Wire Mill and Cold Rolling Equipment

25 Yrs. Experience Back of Us
Broden & Dailey Construction Company
1836 Euclid Ave., Cleveland, Ohio

Morgan Construction Company

Rolling Mills — Producer Gas Machines
Wire Mills — Reversing Valves
(See first issue each month for *Special Announcement*)
WORCESTER, MASS., U. S. A.

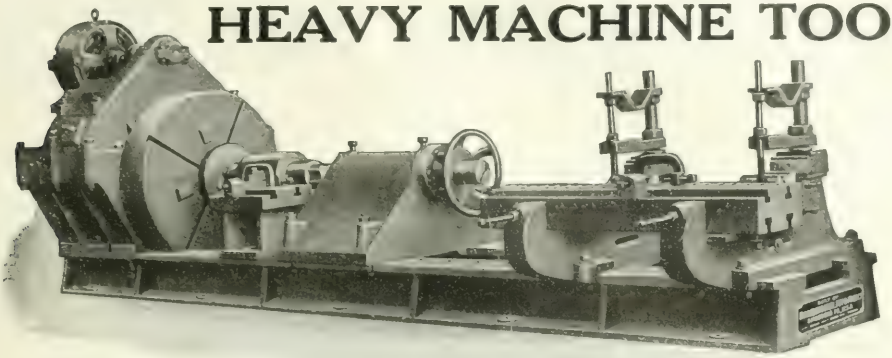
FLAT WIRE MILLS – SHEARS – STRAIGHTENERS
FLATTENERS – COILERS – SLITTERS – SAWS
SCOURING MACHINES – SPECIAL MACHINERY
ROLLING MILL MACHINERY – TUBE MILL MACHINERY
The TORRINGTON MFG. CO.
TORRINGTON, CONN., U. S. A.

UNITED ENGINEERING & FOUNDRY CO.
PITTSBURGH, PA.

BUILDERS OF COMPLETE MACHINERY EQUIPMENT FOR IRON, STEEL AND TUBE WORKS

"LARGEST ROLL MAKERS IN THE WORLD, MAKERS OF THE LARGEST ROLLS"

HEAVY MACHINE TOOLS



BIRDSBORO

A Birdsboro Roll Lathe speaks for itself. Long recognized as a leader in its class, recent improvements lift it yet higher in the opinion of discriminating users.

Hydraulic Machinery
Rolling Mill Machinery
Rolling Mill and Blast Furnace Castings
Crushing and Concentrating Machinery
Jackson Belt-Lacing Machines
Special Machinery

Cast steel gears with cut teeth running in oil, multiple speeds with a variable speed motor drive, direct connected through flexible coupling. Proper design for topping shaped rolls. Oil tight and accident proof enclosed headstock.

Other points will interest you—ask about them

BIRDSBORO STEEL FOUNDRY & MACHINE CO.

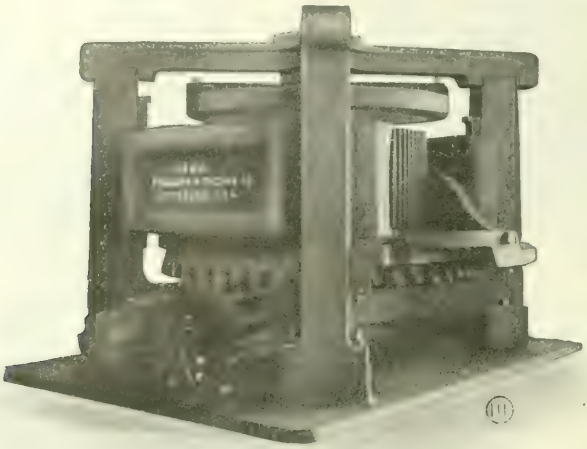
BIRDSBORO, PA.

New York Office: 90 West St., New York. Room 1710. Telephone Rector 6664-5-6.



LEWIS FOUNDRY AND MACHINE CO

FARMERS BANK BUILDING
PITTSBURGH, U. S. A.



ROTARY SQUEEZER FOR PUDDLE BALLS

ROLLING MILL and SPECIAL MACHINERY

We specialize in building special machinery of all kinds

STEEL CASTINGS under 2000 lbs. each
GRAY IRON CASTINGS under 20,000 lbs. each

Connellsville Foundry Machine & Steel Casting Co.
Connellsville, Pa.

WICKES BROS.

320 Water St., Saginaw, Mich.

Any second-hand machinery or equipment for sale? If so, see advertising rates on first page of Section 50.

ROLL LATHES

The Hyde Park kind are manufactured from correctly made castings, of heavy and rigid construction and built to last many years.

ROLLS Sand and Chilled

Handled by an experienced mill man. Tell us when you expect to place your next order.

ROLL LATHES IRON CASTINGS
TIN PLATE MACHINERY

Hyde Park Foundry & Machine Co
HYDE PARK West Penn Div. P R R PA

ROLLS CASTINGS MACHINERY

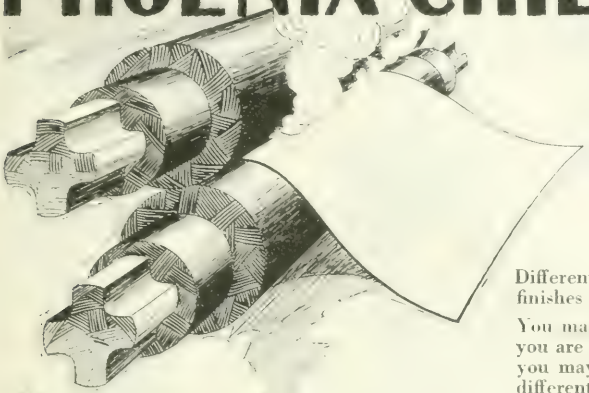
CHILLED AND SAND ROLLS

Makers of Rolls for Over 60 Years

Iron and Semi-Steel Castings, in green sand, dry sand and loam. Machine Moulded Castings a Specialty. Rolling Mill, Rubber Mill and General Heavy Machinery, Heavy Transmission Machinery.

BIRMINGHAM IRON FOUNDRY
DERBY, CONN.

PHOENIX·CHILL·ROLLS



·Rolls·
Steel · · ·
Sand *and*
Chilled Iron
·
New Process
Water Chill
·
Phoenix Metal

Different chill qualities are necessary for varied finishes of sheet and tin mills.

You may be making automobile sheet, perhaps you are rolling ordinary black sheet, then again you may be producing tin plate. All of these different products should have particular character and structure of chill for the desired finish.

We can furnish you just the roll for the purpose; special hard chill, regular chill, or our patented water chill.



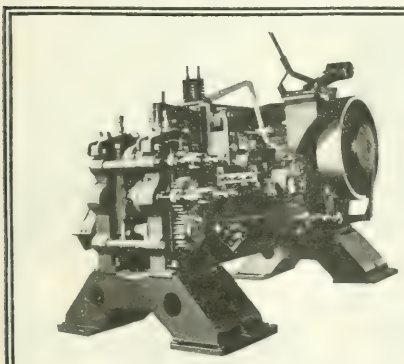
BETTER ROLLS CUT THE COST

PHOENIX ROLL WORKS

Pittsburgh Rolls Corporation

Pittsburgh, Pa.

Foreign Licensees: Schneider & Cie, Paris, France; Societe d' Ougree, Mirihiye, Fonderies A. Ketin, Liege, Belgium.





One Plant Devoted Exclusively to

ROLLS

Rolling Mill Machinery
Straightening Machines, Shears,
and Roll Lathes, Special Machinery
Engineers—Founders—Machinists

THE YOUNGSTOWN FOUNDRY & MACHINE CO.
Youngstown Ohio.

CARBON AND ALLOY STEEL ROLLS | AIR FURNACE IRON AND STEEL CASTINGS | SAND AND CHILLED IRON ROLLS

PHILADELPHIA ROLL & MACHINE CO.

52ND ST. & GRAYS AVE., PHILADELPHIA, PA.

ROLLING MILL MACHINERY

SUBSIDIARY OF TAYLOR-WHARTON IRON & STEEL CO.

THE UNDER-FEED STOKER CO. OF AMERICA

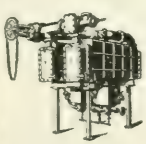
Makers of the Jones Stoker for Industrial Furnaces

General Offices: Worcester, Mass.

Boston	Cleveland	Minneapolis	Pittsburgh
Buffalo	Dallas	New Orleans	Salt Lake City
Charlotte	Detroit	New York	Seattle
Chicago	Denver	Omaha	St. Louis
Cincinnati	Kansas City	Philadelphia	

The Under-Feed Stoker Co. of Canada, Ltd., 146 King St. W., Toronto

Write for Book on Industrial Furnaces



EVAPORATORS

We build self-cleaning film type evaporators for high and low pressure operation especially adapted to producing distilled water for boiler make-up feed. Single or multiple effect.

WHEELER
Condenser & Engineering Co.
Carteret, New Jersey

180

H.S.B.W. — COCHRANE CORPORATION

Incorporated 1920 *Successors to* *Established* 1863

Harrison Safety Boiler Works, North Philadelphia, Pa.

Manufacturers of the Celebrated Cochrane Lines, Including Open Feed Water Heaters, Steam-Stack and Cut-Out Valve Heaters and Receivers, Metering Heaters, Independent V-Notch Meters, Flow Meters, Precision Meters, Weighing Meters, Cochrane Hot and Cold Process Water Softeners, Steam and Oil Separators, Multiport Drainers or Traps and Multiport Back Pressure Atmospheric Relief, Flow and Check Valves.

The Babcock & Wilcox Co.

85 LIBERTY STREET, NEW YORK
ESTABLISHED 1868

THE BABCOCK & WILCOX COMPANY — STEAM

Water Tube Boilers
Steam Superheaters
Chain Grate Stokers

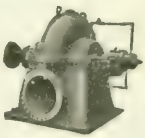
BRANCHES

BOSTON, 49 Federal Street
PHILADELPHIA, North American Building
PITTSBURGH, Farmers Deposit Bank Building
CLEVELAND, Guardian Building
CHICAGO, Marquette Building
DETROIT, Ford Building
CINCINNATI, Traction Building
ATLANTA, Candler Building
TUCSON, ARIZ., 21 South Stone Avenue
NEW ORLEANS, 521-5 Baronne Street
HOUSTON, TEXAS, Southern Pacific Building
DALLAS, TEXAS, 2001 Magnolia Building
DENVER, 435 Seventeenth Street
SALT LAKE CITY, 705-6 Kearns Building
SAN FRANCISCO, Sheldon Building
LOS ANGELES, 404-406 Central Building
SEATTLE, L. C. Smith Building
HAVANA, CUBA, Calle de Aguiar 104
SAN JUAN, PORTO RICO, Royal Bank Building
HONOLULU, H. T., Castle & Cooke Building

ERIE CITY IRON WORKS

Erie, Pa., U. S. A.

HORIZONTAL AND VERTICAL WATER TUBE BOILERS
STATIONARY RETURN TUBULAR BOILERS
ECONOMICAL RETURN TUBULAR BOILERS
STEEL PLATE CONSTRUCTION



ALBERGER CENTRIFUGAL PUMPS

Have you Catalog?

Alberger Pump & Condenser Co.
140 Cedar St., New York City
Boston Philadelphia St. Louis Chicago

PENNSYLVANIA—

PUMPS and COMPRESSORS

Pennsylvania Pump & Compressor Co.
Easton, Penna.

PIATT IRON WORKS — DAYTON, OHIO.

Smith-Vaile PIATT Pumps



Steam and Power Pumping Machinery

LONGITUDINAL AND CROSS-DRUM TYPES WASTE HEAT BOILERS

ALL CONFORM TO ASME CODE

HELIOS

HEINE LARGE UNIT BOILERS

Heine Boiler Company
SAINT LOUIS, U.S.A.

BOILER MANUFACTURERS FOR 40 YEARS

De Laval

Steam Turbine Co., Trenton, N. J.

Builders of TURBINE MACHINERY, including Steam Turbines of all capacities for high or low-pressure steam and for direct connection, or for belt or rope drive. Complete Turbo-Generator Sets. Centrifugal Pumps for all Heads and Capacities. Centrifugal Blowers and Air Compressors. Double helical Speed Reducing Gears.

Write for special bulletins on apparatus in which you are interested.

DE LAVAL STEAM TURBINE CO. TRENTON, N.J.



Deming

Distributors and agencies in principal cities to give you immediate personal service.
Catalogs free on request.
The Deming Co., Salem, O.

WATER AND POWER PUMPS FOR ALL USES



Steel Cased Setting Increases Efficiency

REDUCE BOILER ROOM COSTS!

USE THE COUPON

The Wickes Boiler Co., Saginaw, Mich.

Gentlemen: Without obligation on my part, I would like to read your educational Bulletins as checked:

Bulletin 2. The Steam Boiler Analyst.
Bulletin 3. Reducing Costs in the Boiler Room.
Bulletin [illegible] Measurable and Prevention of Air Infiltration Losses.
Bulletin 5. Saving Coal in Steam Power Plants.
Bulletin [illegible] The Economics of Waste Heat Boiler Installations.

Name .....
Business Address .....
Home Address .....
Date .....

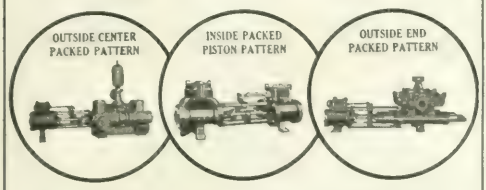
RoTURBo CENTRIFUGAL PUMPS

Manistee Iron Works Co., Manistee, Michigan

The Buffalo Class S Double Suction Single Stage Centrifugal Pumps are highly efficient and absolutely reliable. They are furnished for capacities from 15 to 75,000 G.P.M. Write Dept. No. 43.

Buffalo Steam Pump Co.
492 Broadway Buffalo, N. Y.

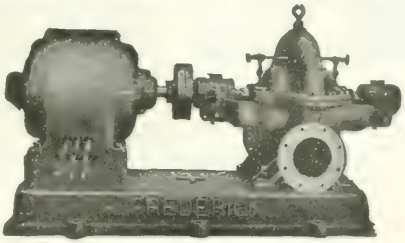
DURABLE DUPLEX STEAM PUMPS



NEW YORK SALES OFFICE, 141 BROADWAY
Send for Catalog No. 107

DEAN BROS. STEAM PUMP WORKS. INDIANAPOLIS.

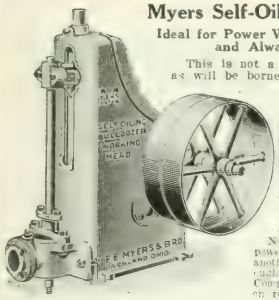
CENTRIFUGAL PUMPS



Consult us regarding your requirements
THE FREDERICK IRON & STEEL CO.
FREDERICK, MD.

Myers Self-Oiling Power Pumps

Ideal for Power Water Service Anywhere and Always Satisfactory



This is not a mere statement or theory as will be borne out by the thousands in service.

Their construction, a Myers patented idea, solves many pumping problems and does away with farmer pump troubles. Covered working parts, a positive oiling system, enlarged valves, new method of power application and other features produce a standard of service different from others.

No prospective purchaser of a power pump should decide on another pump until he has thoroughly investigated the MYERS. Comparisons invited. Literature on request.

THE F. E. MYERS & BRO. CO., Ashland, O.

TRANSIT PUMPS

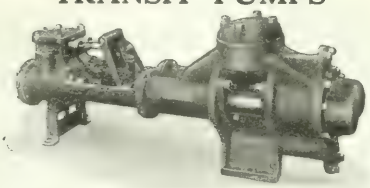


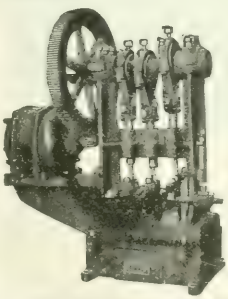
Fig. 1100

For Pressures up to 200 pounds

Where the fluid to be handled contains more or less grit, we recommend an outside packed plunger pump. The pumping is performed by the displacement of the plungers—no rings nor pistons for the grit to cut—and the packing is easily renewed.

NATIONAL TRANSIT PUMP & MACHINE CO.
Oil City, Pa.

District Offices: New York, Philadelphia, Pittsburgh, Cleveland, Kansas City, Houston and Denver



ELMES

HIGH-PRESSURE

HYDRAULIC PUMPS

Motor or Belt Driven All Sizes

A complete line of Hydraulic Machinery, Valves, Gauges and Fittings.

Catalog on Request.

CHARLES F. ELMES ENGINEERING WORKS
1003-1011 Fulton St. Chicago, Ill.
Since 1851 Inc. 1895

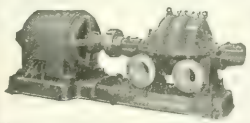
MORRIS Since 1864

CENTRIFUGAL PUMPS

Since 1864 we have been building Centrifugal Pumps, Hydraulic Dredges and Steam Engines. You can depend upon the Morris reputation.

MORRIS MACHINE WORKS
BALDWINSVILLE, N. Y.
Agents in Principal Cities

Lea-Courtenay Pumps



CENTRIFUGAL pumping machinery for every kind of pumping service

Lea - Courtenay Co.
17 Maine Street, Newark, N.J.

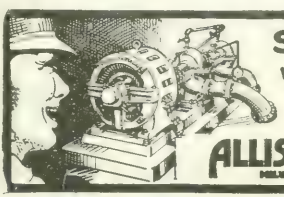
PUMPS

BOYTS, PORTER & COMPANY
CONNELLSVILLE, PA.

Boiler Feed Pumps

Electric and Steam Mine Pumps

SEND FOR CATALOG



SATISFIED

WITH CENTRIFUGAL PUMPING UNITS *from*

ALLIS-CHALMERS
MILWAUKEE, WIS. U.S.A.

D'OLIER CENTRIFUGAL PUMPS

HIGH GRADE
HIGH EFFICIENCY

D'OLIER CENTRIFUGAL PUMP & MACHINE CO.

165 Broadway New York City

NORDBERG MACHINERY

NORDBERG

Uniflow Engines · Corliss Engines · Diesel Engines
Steam and Electric Hoists
Condensers · Compressors · Special Machinery

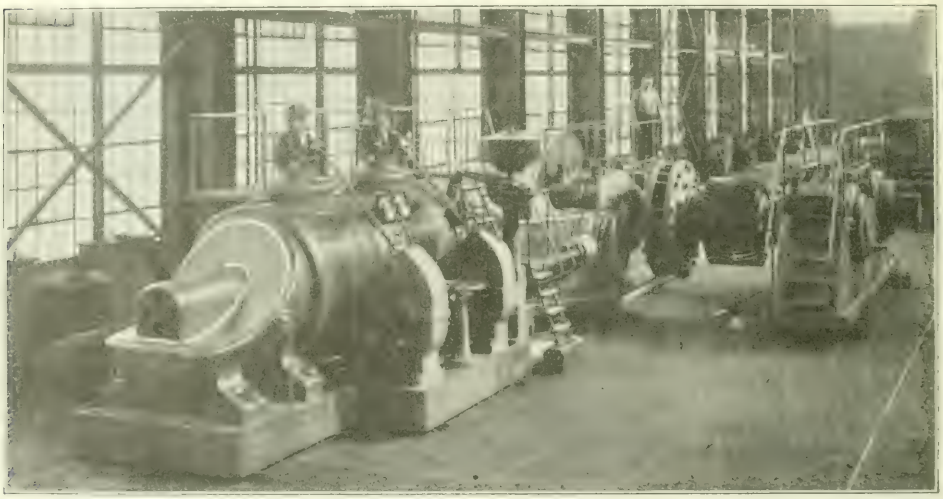
NORDBERG MANUFACTURING CO.
MILWAUKEE ... WISCONSIN

MESTA UNA-FLOW ENGINES

Stumpf Patents

High Thermal and Mechanical Efficiency
Extreme Simplicity

Mill Engines, Power Engines, Blowing Engines



ECONOMICAL IN STEAM CONSUMPTION, OIL REQUIREMENTS AND FLOOR SPACE NEEDED—PRACTICALLY NOISELESS IN OPERATION

We Build Una-Flow Engines from 500 H. P. Up to 12,000 H.P. Based on 150-lb. Steam Pressure

Send for Bulletin U.

MESTA MACHINE COMPANY

PITTSBURGH, PA.

CHICAGO:
PEOPLES GAS BLDG.

PITTSBURGH:
OLIVER BLDG.

WASHINGTON, D. C.:
MUNSEY BLDG.

FOSTER SUPERHEATERS

A necessity for turbine protection engine cylinder economy, and utilization of superheat for all its benefits.

POWER SPECIALTY COMPANY 111 Broadway, New York

Boston, Philadelphia, Pittsburgh, Chicago, Kansas City, Dallas, San Francisco, London, Eng.



ONLY Steam Engines Good Engines ONLY



Troy Engine & Mach. Co.
Troy, Pennsylvania

KERR

Steam Turbines and Gears
KERR TURBINE CO., Wellsville, N. Y.

DIESEL OIL ENGINES

40 to 1200 H.P. Horizontal and Vertical types—designed to use any kind of crude or fuel oil. Send for bulletin.

THE DE LA VERGNE MACHINE CO.
2106 E. 138TH ST., NEW YORK CITY

CURTIS
AIR COMPRESSORS—HOISTS—TROLLEYS—CRANES
ST. LOUIS

Curtis Pneumatic Machinery Co. 1570 Kienlen Av. St. Louis, Mo.

"The UNA-FLOW STEAM ENGINE"

A complete treatise setting forth the principles and advantages of the most efficient reciprocating steam engine yet developed by its inventor Prof. J. Stumpf. Price $5 Net. Published by the

STUMPF UNA-FLOW ENGINE CO., Inc.
206 E. Genesee St., Syracuse, N. Y.

AIR AND GAS COMPRESSORS VACUUM PUMPS

All Sizes All Types for All Pressures.

No finer compressor made than a Bury Universal Variable Volume three-cylinder, two-stage Air Compressor. Why not investigate?

Plate Valves "Durable ... the Pa... mum ... Solve ... with ... Service."

Bury Compressor Company
1706 Cascade St., Erie, Pa.

LET YOUR AIR COMPRESSOR GROW WITH YOUR SHOP—

ANGLE COMPOUND design gives you the air capacity you actually need in convenient units. As the call for air power grows, you can keep pace with it by adding fresh units, each a complete, efficient, two stage compressor.

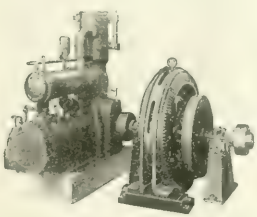
The "Half-twin" and "Twin Angle Compound" direct motor driven units (figs. 1 and 2) are examples of this efficient, step by step growth.

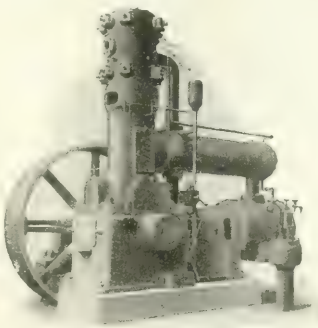
Do not buy a "temporary" compressor, which is uneconomical because it is either too large for present needs, or too small for your eventual requirements.

There's an Angle Compound size or grouping that is "right" for any air demand from 400 cu. ft. up.

ASK FOR BULLETIN 1177-B

(1) Half-Twin Angle Compound with direct drive motor. Note outboard coupling.





(2) Twin Angle Compound Compressor, two complete units, each may be run independently.



SULLIVAN MACHINERY COMPANY
80 EAST ADAMS ST., CHICAGO

Spencer Turbo-Compressors

For supplying a steady non-pulsating non-surging flow of air to your oil and gas burning furnaces, foundry cupolas, etc. The Spencer Turbo-Compressor has no equal.

Write for complete technical details.

The Spencer Turbine Co.
HARTFORD, CONN.

Chapman Producers in your gas house save time and money. Please see our monthly announcement.

The CHAPMAN ENGINEERING CO.
C&G COOPER CO.
Division of The
MT. VERNON, OHIO.

NORWALK
AIR & GAS COMPRESSORS
REFRIGERATING MACHINERY

Write for our new Refrigeration Bulletin
Just off the press

Bulletins on Norwalk Compressors for air or any of the commercial gases will also be sent on request

THE NORWALK IRON WORKS CO.
Pioneer Builders of Compressors
SO. NORWALK, CONN., U.S.A.

Producer Gas Systems

Using Bituminous and Anthracite Coals.
Raw and Scrubbed Gas for Displacing Oil, City Gas, Coal and Coke in Furnaces of all Descriptions.
WE GUARANTEE RESULTS

Flinn & Dreffein Co., 431 S. Dearborn St. CHICAGO

VALVES-FITTINGS
APPLIANCES—
OF EVERY DESCRIPTION.
TRADE MARK ATWOOD
PITTSBURGH VALVE FOUNDRY & CONSTRUCTION CO.
PITTSBURGH, PA.
ENGINEERS—FOUNDERS—PIPE-FITTERS & MACHINISTS.

If it's Compressed Air

Consult

INGERSOLL-RAND CO.
11 BROADWAY, NEW YORK

AIR COMPRESSORS

All Sizes For Every Requirement

Pioneer manufacturer of the Silent Plate Valve Self-oiling Air Compressors.

AMERICAN AIR COMPRESSOR WORKS
CATALOGUE GRATIS 558-562 Hamilton Ave., Brooklyn, N. Y.
South West Agts.: Rowley & Skinner Mchy. Co., St. Louis.

GALUSHA GAS PRODUCERS

For All Industrial Purposes

Let us know your problems and we will give you the benefit of our experience.

GAS PRODUCER AND ENGINEERING CORP.
145 Broad St., New York City
Gas Producers and Fan Extractors

For Every Heating Service

SMITH
GAS PRODUCERS

Smith Gas Engineering Co., Dayton, Ohio
Factories: Dayton, Ohio, and Lexington, Ohio
Sole Canadian Representatives
The Canadian Allis-Chalmers Co., Ltd., Toronto





HYDRAULIC VALVES

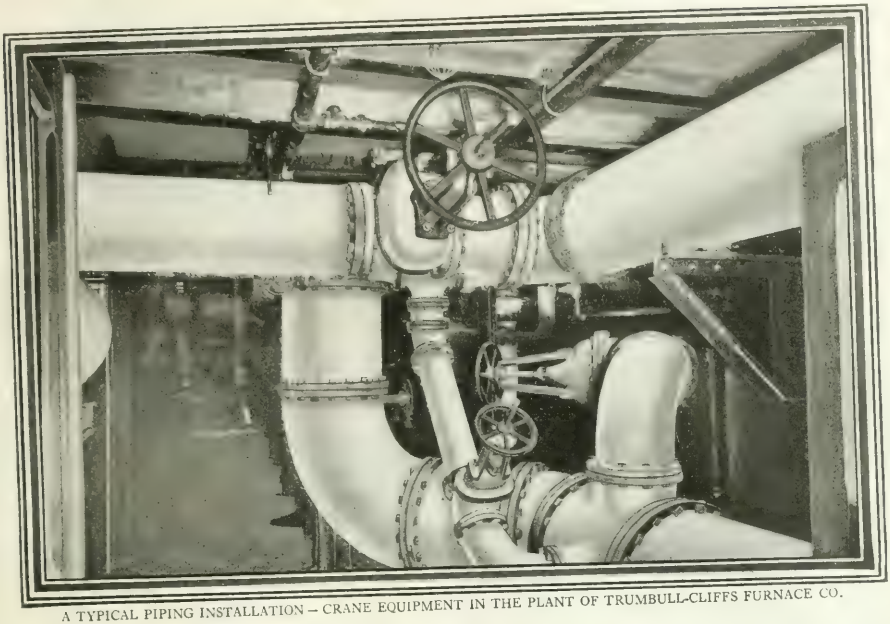
FOR

All High Pressure Purposes

These valves are made with as simple a construction as is possible with high pressure. The possibility of leakage is practically eliminated. The materials are those that long experience has proved best for the purpose. Our line covers the many requirements of hydraulic pressure installations.

Write for Bulletins

THE WATSON-STILLMAN CO.
W-S HYDRAULIC
NEW YORK, 190 Fulton Street
CHICAGO, McCormick Building
PHILADELPHIA, Widener Bldg.
441



A TYPICAL PIPING INSTALLATION – CRANE EQUIPMENT IN THE PLANT OF TRUMBULL-CLIFFS FURNACE CO.

BUILDING FOR PERMANENCE

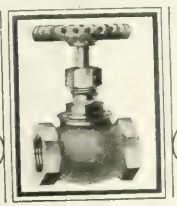
Lower upkeep expense for piping systems depends on uniform quality in all equipment used. For a pipe line is an assembly of many units and the efficiency and stability of the whole demands unfailing service from each unit—valve, fitting, piping or specialty. The high quality of all Crane valves, fittings, pipe bends and specialties, guarded by rigid inspections and the most severe factory tests, insures dependable service from a pipe line constructed of Crane units. Convenient Crane branch houses maintain complete stocks of standard pipe-line equipment at strategic shipping points.

CRANE

GENERAL OFFICES: CRANE BUILDING, 836 S. MICHIGAN AVE., CHICAGO

Branches and Sales Offices in One Hundred and Thirty-five Cities
National Exhibit Rooms: Chicago, New York, Atlantic City
Works: Chicago and Bridgeport

CRANE, LIMITED, MONTREAL. CRANE-BENNETT, LTD., LONDON
CRANE EXPORT CORPORATION: NEW YORK, SAN FRANCISCO
CIE CRANE, PARIS



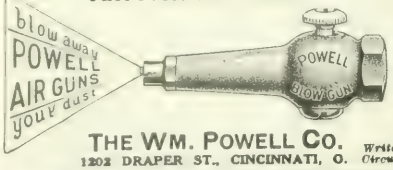
Crane 75 Low Pressure Globe Valve

DO YOU USE AIR?

THE POWELL BLOW GUN AIR VALVE

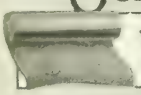
Cleans machines, tools, benches. Can be adapted for innumerable special purposes.

"Just Press the Button"

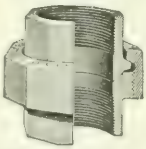


THE WM. POWELL CO. *Write for Circular*
1202 DRAPER ST., CINCINNATI, O.

Jenkins Packing



JENKO is a high-grade flexible vulcanized sheet rubber packing, suitable for severe service on steam, and hot or cold water lines.
JENKINS BROS.
New York Boston Philadelphia Chicago
TRADE JENKINS MARK

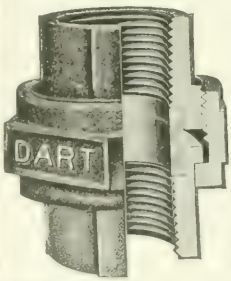


JEFFERSON UNION AND FLANGE

Adapted for Oil, Steam, Water, Gas and Air. No Packing. Guaranteed.

Jefferson Union Co., Lexington, Mass.

DART for Durability



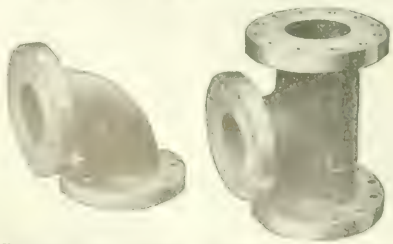
Dart Unions give years of satisfactory service. They cannot leak, rust or corrode and can be used over and over again when changes in pipe line are made.

Free samples on request.

The Fairbanks Co., Sales Agents. Canadian Factory: Dart Union Limited, Toronto.

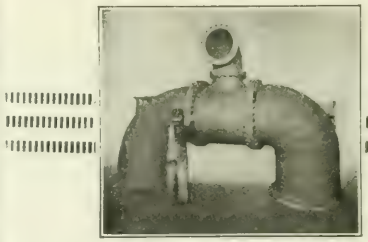
E. M. Dart Mfg. Co.
Providence, R. I.

CAST STEEL FITTINGS



Power Plant Piping, Fittings, Valves, Etc. Ready to erect

FO. B. LIMBERT & CO. Chicago



Power Plant Piping

— FOR —

Electric Light, Street Railway, Blast Furnace, Steel Works and Industrial Plants of every description.

Specialists in Welded Wrought Steel Headers, Flanged Iron and Steel Fittings, Pipe Bends and Fabricated Piping for Power Plants.

"When You Think of Piping Think of Pittsburgh Piping"

Pittsburgh Piping & Equipment Co.

MANUFACTURERS & CONTRACTORS
PITTSBURGH, PA.

New York 220 Broadway | Chicago Peoples Gas Bldg. | San Francisco Monadnock Bldg.
Cleveland Amer. Trust Bldg. | Indianapolis Traction Term'l Bldg. | Birmingham Amer. Trust Bldg.

PITTSBURGH COILS

Electric Welded, continuous. Eliminate pipe fittings. Stronger, safer, last longer.
Let us quote you.

PITTSBURGH PIPE COIL & BENDING CO.
P. O. Box 975 Pittsburgh, Pa.

NAUGATUCK SEAMLESS



COPPER BALL FLOATS

NAUGATUCK MFG. CO. NAUGATUCK, CONN.

VULCANIZED FIBRE

BE SURE AND SPECIFY

"Wilmington Fibre"

Sheets, Rods, Tubes, Washers, Gaskets and Special Shapes

Branch Offices "Everywhere"

Wilmington Fibre Specialty Co., Wilmington Delaware

FELTS

for every conceivable purpose —

Washers, Gaskets, Wicks, Pads, Strips, for lubricating, dustproofing, insulating, etc.

THE BOOTH FELT CO., INC.
477-478 19th St. BROOKLYN, N. Y.
731 Sherman St. CHICAGO, ILL.

Extra Copies of

THE IRON AGE

ANNUAL REVIEW NUMBER

JANUARY 4, 1923

will be available if ordered immediately

THIS *forward-looking* issue will give a complete summary of the past year's trends and tendencies in prices, in industry individually and collectively, in technology, economics and commerce, interpreting them as far as possible in terms of *1923*.

Folding charts in color on heavy coated paper will be found in each issue, showing price fluctuations over a full quarter of a century.

The advertising pages will be in every sense a directory or catalogue of the products and services offered by leading manufacturers in this country, with a very complete index of machinery, tools, metal products, equipment and supplies used by the metal trades and those who operate metal-working departments.

One copy of the Annual, of course, will be sent to every subscriber, but additional copies should be ordered in advance. The demand every year has been greater than the supply.

Price $1.00 Per Copy

Address all requests to the Circulation Department, The Iron Age, 239 West 39th Street, New York, N. Y.

THE CLEARING HOUSE

For the Quick Sale of USED MACHINERY

Machine Tools, Electrical and Power Plant Equipment—Steam Engines, Boilers, Air Compressors, Material Handling Equipment of all kinds.

RATES PER INSERTION

	1 Time	2 Times	3 Times	4 Times	52 Times
1 inch	$5 75	$5 25	$5 25	$4 75	$4 00
2 inches	10 50	9 50	9 50	8 75	7 75
3 inches	15 75	14 25	13 13	13 13	11 63
4 inches	19 00	17 50	17 50	16 50	15 00
8 inches	35 00	33 00	33 00	32 00	29 00

Rates for other spaces furnished on request.

"The RELIABILITY of McCabe's Used Machinery is Known the World Over"

LARGE LATHE

PRACTICALLY NEW

NILES-BEMENT-POND

MODERN HEAVY TYPE

FORGE LATHE

92" swing, 50-ft. bed, 38-ft. between centers, motor traverse carriage and motor shelf for geared motor drive on head, inc. motor and all electrical equipment.

Length Front Bearing 26".

Spindle Dia. 18".

Weight 150,000 lbs.

Special Low Price Now to Take It from Present Location.

McCABE "2-in-1" DOUBLE SPINDLE LATHES

32-54" Swing, 36' bed, taper attachment, arr. for motor drive.
26-44 -12' bed old style

LATHES

54"x21'—Pond.
50"x14'—American Geared Head.
42"x22'—Putnam, motor drive.
42"x16'—Putnam, motor drive.
38"x16'—Niles-Bement-Pond—motor drive.
38"x14'—Alliance, motor drive.
36"x16'—Springfield, motor drive.
36"x16'—Niles-Bement-Pond, motor drive.
36"x14'—Bridgeford, motor drive.
30"x12'—Lodge & Shipley.
32"x16'—Johnson, motor drive.
30"x16'—Niles-Bement-Pond, motor drive.
30"x15'—Johnson, motor drive.
30"x14'—McCabe.
30"x14'—Niles-Bement-Pond, motor drive.
30"x12'—Johnson, motor drive.
30"x12'—Niles-Bement-Pond, motor drive.
28"x12'—Schumacher-Boye.
26"x16'—Bradford, motor drive.
26"x14'—Bradford, motor drive.
26"x14'—Bridgeford, motor drive.
26"x14'—Niles-Bement-Pond.
26"x10'—Johnson.
26"x10'—Bridgeford.
26"x10'—Niles-Bement-Pond
25"x22'—Bullard.
25"x12'—Bullard.
24"x14'—Bullard.
24"x12'—Bradford.
24"x10'—Advance Rumely.
21"x 8'—McCabe.
20"x10'—Duff.
20"x 8'—Boye & Emmes.
20x12-ft. Cincinnati.
18x10-ft. McCabe.
18"x 8'—Bradford.
16"x 8'—Bradford.
16"x 6'—McCabe.

McCABE "All-in-1" LATHES

24"40" swing, 14' and 18' beds, used for demonstrating purposes only, condition guaranteed.

TURRET LATHES

28" Pond—rigid type.
24" Gisholt, motor drive.
21" Gisholt, gap.
21" Gisholt, 3½" hole.
8x36" Jones & Lamson, geared head.
2x24" Jones & Lamson, geared head.
3" Jones & Lamson, double spindle.

SHAPERS

28" Smith & Mills, single pulley drive.
25" Smith & Mills, back geared.
24" Queen City, back geared.
24" Gould & Eberhard
16" SMITH & MILLS, PLAIN.

PLANERS

84"x60"x30"—POND—4 hds., motor drive.
48"x72"x24"—GRAY—4 hds., arranged for M. D
48"x48"x15'—Pond, 2 heads.
48"x48"x15'—Sellers, 3 heads.
42"x36"x16'—D. & H. Open side, 2 heads
42"x36"x12'—Gray, 2 heads.
42"x34"x12"—Gray—2 heads.
36"x34"x24"—Gray—4 heads.
30"x30"x6'—Cincinnati, 1 head.
30"x30"x6'—Gray, 1 head.
24x24x10-ft. Gray—2 hds.

HORIZONTAL BORING MILLS

4—5" Bar—Niles
4—4" Bar—Bement-Miles.
3"—Bar—Betts.
2½"—Bar—Bement-Miles

GEAR CUTTERS

22" Gleason Bevel Gear.
36" G. & E. Spur and Bevel.
36" Fellows Gear Shaper.

WHEEL PRESSES

100-ton Watson Stillman Hydraulic.
250-ton 48" Caldwell

RADIAL DRILLS

7'—Baush, Plain.
4½' Niles, Half Universal.
4'—Bickford, Plain.
4'—Fosdick, Plain.
4'—Carlton 96" swing, speed box.
3'—Carlton, Sensitive.
3'—Morris, Plain.
3' Fosdick, Plain.
2½" Carlton, 60" swing, speed box.

SLOTTERS

24" Stroke, Niles-Bement-Pond, motor drive.
18" Putnam, motor drive.
14" Sellers, belt drive.

BENDING ROLL

10' McCabe, arranged for belt or motor drive.

BORING MILLS

10-16' Betts, 2 heads.
54" Niles, Ver. sg. heads.
48" Gisholt, 2 heads.
42" Bullard, 2 heads.
30" Bullard, Vertical turret head.

MILLING MACHINES

60x12"—Newton, Horizontal.
33x16"—Gisholt—Thread, motor drive.
30x13"—Smalley—Thread, motor drive.
No. 22—Brainerd, Plain.
No. 7—Becker-Brainerd, mfrs. type.
No. 6—Becker—Vertical.
No. 5—Brown & Sharpe Vertical.
No. 5—Hendey-Lincoln.
No. 4—Cincinnati Universal.
No. 3—Cincinnati Plain.
No. 3—Pratt & Whitney, Vertical.
No. 2—Brown & Sharpe Plain.
No. 2—Brown & Sharpe Plain.
No. 2—Owen—Universal.
No. 2—Cincinnati Vertical.
No. 1B—Milwaukee Universal.

HAMMERS

1,000 lb. Toledo, friction board drop.
1,100 lb. Bement, single frame.
1,500 lb. Chambersburg, steam drop.
2,000 lb. Niles-Bement-Pond, steam drop.
2,000 lb. Chambersburg, double frame forging.
2,500 lb. Chambersburg, steam drop.
2,700 lb. Niles-Bement-Pond, double frame forging.
3,000 lb. Chambersburg, steam drop.
3,000 lb. Niles-Bement-Pond, steam drop.
4,000 lb. Chambersburg, steam drop.
6,000 lb. N. B. P.—double frame steam.
24,000 lb. N. B. P.—double frame steam.
60,000 lb. Chambersburg, double frame.

CRANES

3-ton Shepard, Mono Rail.
5-ton Alliance, 3 motor, 61' span.
5-ton Alliance, 3 motor 48' span.
5-ton Whiting, 3 motor, 44' span.
5-ton Shaw, 3 motor, 48' span.
10-ton Northern, 4 motor, 71' span.
10-ton Shaw, 3 motor, 48' span.
25-ton P. & H., 4 motor, 71' span.
10-ton Dodge, Loco. Crane and Bucket, 4 wheel, 38' boom
Curtis-Jib 1000 lb. Air Hoist.
Curtis-Jib 4500 lb Air Hoist.
Curtis-Jib Elec Hoist.

PUNCHES AND SHEARS

Horiz. Punch, 60" gap, H & J., weight 68,000 lbs., arr. for motor drive, no motor.
Single End "McCabe" 50" Gap, weight 38,000 lbs.
Double End 36" Gap, Long & Alstatter.
Lennox Rotary Bevel Shear, ¾" plate capacity.

TESTING MACHINES

100,000 lb. Tinius Olsen. Tensile Strength.
100,000 lb. Riehle Bros., Tensile Strength.

OUR NEW FOUR-PAGE COMPLETE STOCK LIST—NOW READY

J. J. McCABE LATHE AND MACHINERY CORPORATION

SINGER BUILDING Phones: Cortland 1657-1658 NEW YORK

MACHINERY & SUPPLIES

Low Prices for Quick Sale!

ENGINES

1—28" x 48" Hamilton Right Hand Corliss.
1—20" x 42" Ohio Right Hand Corliss.
1—18" x 42" Allis Right Hand Corliss.
1—12" x 24" Buckeye Left Hand.
1—12" x 24" Douglas Plain Slide Valve.
1—10" x 12" Chandler Taylor Plain Slide Valve.
1—9" x 10" Armington & Simms Automatic.

BOILERS

2—66" x 20' Horizontal Tubular; 115 lbs. pressure.
1—72" x 16' Horizontal Tubular; 115 lbs. pressure.
1—50 H.P. Internally Fired; 90 lbs. pressure.
1—30 H.P. Vertical; 110 lbs. pressure.
1—20 H.P. Vertical; 100 lbs. pressure.

SMOKESTACKS

Just now our stock of Smoke Stacks is complete in all sizes from 8" diameter to 84" diameter. The following are ready for quick shipment:

250 Ft. Brand New 72"; 3/16" on bottom, 1/4" on top.
160 Ft. Brand New 66"; 3/16" on bottom, 1/4" on top.
50 Ft. Second Hand 42"; 3/16" material.
64 Ft.36"; 1/4" on bottom, 3/16" on top; 95% new.
800 Ft. 30" Brand New; 8 gauge
150 Ft. 72" Self Supporting; 5/16" bottom up to 3/16" on top; 95% new
2—70 Ft. Self-Supporting Stacks, 30" diameter.
1,000 Ft. 20" Second Hand Spiral Riveted, 10 gauge.
2,000 Ft. 18" Brand New; No. 8 gauge.
300 Ft. Brand New 10" Spiral Stack, 14 gauge.
120 Ft. Brand New 8" Spiral Riveted, 14 gauge.
10,000 Ft. Brand New 18" Ventilating Pipe, 18 gauge.
10,000 Ft. Brand New 30" Ventilating Pipe, 18 gauge.
150—20" Cowls, 16 gauge, 6' high.
150—18" Cowls, 20 gauge, 4' high.

PUMPS

1—16" x 8½" x 12" Duplex Steam.
1—14" x 10½" x 10" Duplex Steam.
1—12" x 7" x 10" Duplex Steam.
1—10" x 6" x 10" Duplex Steam.
3—6" x 4" x 6" Duplex Steam
4—5½" x 3½" x 5" Duplex Steam
2—4½" x 3½" x 4" Duplex Steam.
1—8" x 8" Deane Triplex Single Acting Power Pump.
1—Kingsford Horizontal Centrifugal Water Pump 24" suction, 24" discharge.
1—Platt Iron Works Horizontal Centrifugal Water Pump, 14" suction 12" discharge.
1—Fulton Horizontal Centrifugal Water Pump, 12" suction, 10" discharge.
2—Buffalo motor driven Centrifugal Pumps, 4" suction, 3" discharge, direct connected to 5 H.P. Westinghouse Motor, 220 volts, 3 phase, 60 cycle.

HYDRAULIC PUMPS

2—Hydraulic Machine Company Vertical Triplex Pumps, plungers 2¾" x 10", capacity about 35 gallons per minute, at 50 R.P.M., horsepower required 40, with base arranged for motor drive, but without motor. 1500 lbs. pressure.
2—McGowan Steam Driven Compound Duplex Outside End Packed Pressure Pumps, to operate on 100 lbs. of steam and produce 1500 lbs. water pressure at the discharge, 90 ft. piston speed. 147 gallons per minute, dia. of high pressure cylinder 15", low pressure cylinder 28", stroke 16", water on 4", steam inlet 4", exhaust 6", suction 5". Weight about 25,000 lbs. each. Condition; 90% new.

COMPRESSORS

1—Sullivan Straight Line Air Compressor, 24" steam cylinder, 26" low pressure air cylinder, 16½" high pressure air cylinder, 30" stroke, capacity 1850 cu. ft. per minute.
1—Chicago Pneumatic Single Stage Steam Driven Compressor, two cylinders, size 22" x 16", capacity 1700 cu. ft.
1—Laidlow Dunn & Gordon Belt Driven Air Compressor, size 25" x 15" x 18", capacity 750 cu. ft.
1—Ingersoll - Sergeant High Pressure Steam Driven Air Compressor, two stage, low pressure cylinder 18" x 12" high pressure cylinder 12" x 12", capacity 600 cu. ft.

250 to 1000 H.P. Water Tube Boilers Immediate Delivery!

New, high grade water tube boilers, 250 to 1000 H.P. ready for immediate delivery from points in the East, North and Central West.

Steel encased or for brick setting. Immediate delivery can be made from Chicago or our Eastern Headquarters in New Jersey, opposite New York City or Slidell, Louisiana, near New Orleans.

Our low, quick sale price offers a saving of from 25% to 50%.

Your old equipment will be taken in on a liberal exchange arrangement.

Our thoroughly posted engineers are waiting to give you expert service and complete details.

Quick action will enable us to guarantee quick installation.

LOCOMOTIVE

1—18-ton, 4-wheel drive Standard Gauge Locomotive; saddle tank, cylinders 19 in. diameter, 16 in. stroke, working steam pressure 110 lbs., link and pin couplers. Manufactured by Rhode Island Locomotive Works.

STEAM SHOVELS

6—95-ton Bucyrus Railroad Type, 5 yd. dipper; 90% new.

BARGAINS IN STEEL PRODUCTS!

The following items indicate to you the tremendous tonnages we have in structural shapes, plates, flats and rounds of all kinds. Write or wire for quotations and you will be surprised at the prices we are making.

PLATES:
500 tons, ¼" to ¾" inclusive. Sizes from 4' to 10' up.

BARS:
Rounds from ⅞" to 3" inclusive. Plain and galvanized. Flats from ⅝" x 2½" up to ⅞" x 5". Plain and galvanized.

SHIP CHANNELS:
7" and larger. Maximum lengths 35 to 45 ft.

ANGLES:
3½ x 3½ x ½" up to 6 x 6".

I-BEAMS AND CHANNELS:
3" to 15" inclusive. Both new and used.

VENTILATOR PIPE AND COWLS:
16 to 18" gauge. From 18 to 66" in diameter.

SPECIAL:
7,000 Diamond Checkered Floor Plates. Brand new. Size 2' x 4' x 3/16". Price $2.00 per plate. Immediate shipment.

WIRE:
200 tons of No. 6 to 9 gauge Galvanized Wire

10—70-ton Bucyrus Railroad Type, 2½ to 3 yd. dipper; 90% new.

MOTORS AND GENERATORS

7—Westinghouse 250 H.P. Motors, Type CCL, 440 volt, 60 cycle, 3 phase motors, speed 514 R.P.M., with base and starters. Can be furnished with pulley or flange couplings.
1—60 K.W. Triumph Generator, 125 volt, D.C., belted.
1—300 K.W. G. E. Rotary Converter, 25 cycle.
1—250 K.W. Gen. Elec., 2300-440 volt, 3 phase, 60 cycle, direct connected to McEwen compound engine.
1—240 K.W. Gen. Elec., 2300-440 volt, 3 phase, 60 cycle, direct connected to cross compound engine.
1—50 K.W. Ft. Wayne, 115-125 volt, direct current, direct connected to Ball Auto Engine.
1—35 K.W. Burke Elec., 125 volt, direct current, direct connected to Ames Auto Engine.
1—50 H.P. Allis-Chalmers Induction Motor, continuous duty, 440 volts, 3 phase, 60 cycle, speed 865, 40 degrees. Complete with Cutler-Hammer starting controller, oil circuit breaker, base and 14" x 9" belt pulley.
1—50 H.P. Allis-Chalmers Induction Motor, 440 volts, 3 phase, 60 cycle, speed 1160, 40 degrees, with potential starter, base and 12" x 8" belt pulley.
1—40 H.P. Allis-Chalmers Induction Motor, 440 volts, 3 phase, 60 cycle, speed 865, 40 degrees, with potential starter, base and 14" x 9" belt pulley.

TANKS

20—30,000 Gal. Vertical Tanks, 20' dia., 12' high, mostly 5/16" material.
15—20,000 Gal. Horizontal Tanks, 10' 6" dia., 31' 2" long, ¼" plate.
10—15,000 Gal. Horizontal Tanks, 10' 6" dia., 23' 6" long, ¼" plate.
5—12,000 Gal. Horizontal Tanks, 10' 6" dia., 18' 6" long, ¼" plate.
20—10,000 Gal. Horizontal Tanks, 10' 6" dia., 15' 6" long, ¼" plate.

We have material conveniently located in warehouses throughout the East, North and South in addition to our tremendous stocks here at Chicago.

20—11,000 Gal. Hor. Tanks, 8' dia., 30' long, ⅜" plate.
15—5,500 Gal. Hor. Tanks, 6' dia., 24" long, ⅜" plate.
50—1,000 Gal. Underground Gasoline Storage Tanks, 64" dia., 6' long, ¼" plate.
10—2,000 Gal. Underground Gasoline Storage Tanks, 64" dia., 11' 10" long, ¼" plate.
50—Complete Underground Gasoline Storage Outfits, consisting of new galvanized tank 160 gal. capacity bearing Underwriters' label, 31" dia., 48" long, 14 gauge material, with hand pump, also pipe and fittings complete.
1—56" x 25' Tank, 100 lbs. pressure.
1—52" x 13½' Tank, 100 lbs. pressure.
1—54" x 7½' Tank, 100 lbs. pressure.
1—42" x 12½' Tank, 100 lbs. pressure.
3—36" x 6' Tanks, 125 lbs. pressure.
2—30" x 5' Tanks, 125 lbs. pressure.
10—22" x 48" to 54" Tanks, 150 lbs. pressure.
25—20" x 8½' to 9½' Tanks, 150 lbs. pressure.
25—16" x 42" Tanks, 150 lbs. pressure.
1—24" x 11½' Tank, 200 lbs. pressure.
12—315 Gal. Hot Water Tanks, flat heads, 36" x 6', fitted with pipe coil and overflow valve 5/16" material, 75 lbs. water pressure.

ENGINE LATHES, TRIPLE GEARED SCREW CUTTING

96 x 40 Fifield, 30' centers.
68 x 40 Pond, 30' centers.
60 x 40 Fifield, 30' centers, with 2 carriages on bed (2).
36 x 32 American Tool Works, 25' centers with two carriages on bed, compound rests have power angular feed, quick change; nearly new
36 x 32 LeBlond 25' centers with two carriages on bed, compound rests, taper attachment, quick change; nearly new.

PUNCH PRESSES

Ferracute D.G.G. No. 55 Straight Sided Single Action Double Back Geared Punch Press Friction, Clutch Drive.
Distance between Uprights 25".
Weight 16,000 lbs.
Ferracute D.G.G. No. 56—same.
Distance between Uprights 32".
Weight about 22,000 lbs.
Ferracute No. E57 Toggle or Embossing, D.G.G.
Distance between Uprights 36".
Stroke 2½". Ram Pressure 1500 tons.
Weight about 140,000 lbs.

MILLING MACHINES

No. 4 Hendey (250).
No. 7H Becker (250).
6—Ingersoll (New), 24 x 24 x 12 Heavy Duty Horizontal Slab Milling Machines.
No. 6 Whitney Hand (10).

PUNCHES AND SHEARS For Structural Shapes

SLF - 1005 - 1010 — Beatty No. 1 Horizontal Punches, 15" throat. Capacity 1" thru 1", arranged for motor drive, 2 machines. Weight, each, about 10,000 lbs.
SL-431 Fischer Single End Geared Punch and Shear, 20 throat. Capacity 1" hole in 1" plate. Plain jaw with tight and loose pulleys, 22" dia., 5¼" face.
SL-433—No. 2 Hilles & Jones Single End Geared Punch and Shear, 15" throat. Capacity 1" hole in 1" plate, equipped with shearing blades 17" long. Tight and loose pulleys, 24" dia., 7" face.

HOISTING ENGINES

4—7½" x 10" Double Cylinder, Single Geared Drum Hoisting Engine, with reversing throttle valves.
1—6½" x 8" Clyde Double Cylinder, Double Friction Drum Steam Hoisting Engine, with two winch heads, drums 14" diam., 20" between flanges, complete with fittings. (No boiler.) Brass is made for boiler.

ELECTRIC TRAVELING CRANES

2—Brand New 10-ton overhead Electric Traveling Cranes, 31' 9" span; 3 motor type, 440 volt, A.C., 60 cycle, 3 phase.
Brand New 2 ton overhead Electric Traveling Crane, 35' span; 3 motor type, 220 D.C.

CRUSHERS

1—Buchanan's 10 x 16 Rock and Ore Breaker. Capacity 10 tons per hour; weight 40,000 lbs.

ASK FOR THE INDUSTRIAL BULLETIN NO. 1A- 205—FREE AND SENT POSTPAID!

HARRIS BROTHERS CO. CHICAGO

Re MANUFACTURED
-(ORIGINATED BY US)-
MACHINE TOOLS

(Reg. U. S. Pat. Off.)

Green List No. 53 Is Available. It actually contains over 2500 New and Remanufactured machines at second hand prices. Write

2500 SURPLUS COVERNMENT MACHINE TOOLS AT BARGAIN PRICES

MILLERS

GEAR CUTTERS AND HOBBERS

THREAD MILLERS

CUTOFF AND SCREW MACHINES

1—No. 1 Warner & Swasey.
1—No. 1 Wood.
1—No. 2 W. & S. Hor. Hex
1—No. 3 Bardons & Oliver.
2—No. 4½ Bardons & Oliver.
1—No. 5 Acme, Gd. Hd.
1—No. 6 Brown & Sharpe.
1—No. 6 Wood.
3—2" x 26" Pratt & Whitney.
2—2½" x 26" P. & W. Gd. Hd.
1—2½" x 36" Jones & Lamson.
1—3½" x 36" Cincinnati, Acme.
1—3½" H. Jones & Lamson.
10—6-A Model 2 Potter & Johnston.
1—No. 3 Warner & Swasey.
1—No. 2A Warner & Swasey.
2—No. 1A Warner & Swasey.
1—24" Gisholt.
1—24" Gisholt, Motor Drive.
19—24" Gisholt.
15—24" Gisholt, Motor Drive.
26—24" Davis.
1—24" Storrs.
5—18" Libby.
1—16" Libby.

LATHES

3—10" x 4' Wells Speed.
18—Porter-Cable.
1—Fitchburg
1—Fitchburg
1—Bogart Crankshaft
1—Streit Pulley.
1—13" x 5' Davis.
1—14" x 6' Axelson.
1—14" x 6' Monarch.
1—14" x 6' Lux & Scott
2—14" x 6' Walcott.
3—14" x 6' Tuisworth
1—14" x 6' LeBlond.
2—14" x 6' Worcester.
10—14" x 6' Rockford.
3—14" x 6' Carroll Jamieson.
1—14" x 6' Pratt & Whitney.
1—14" x 6' Blanchard.
1—14" x 6' Ledge & Shurley
2—14" x 6' Reed.
4—16" x 6' Reed.
1—16" x 6' Walcott.
1—16" x 6' Fillsmith.
1—16" x 6' Fitchburg.
1—16" x 8' LeBlond.
1—16" x 8' Carroll Jamieson.
1—16" x 8' Walcott.
1—16" x 8' South Bend.
1—10"-18" x 12' American.
16—18" x 8' Ledge & Shurley Gd. Hds.
8—17" x 6' LeBlond.
1—18" x 8' Oliver.
2—18" x 8' Walcott.
12—18" x 8' Pratt & Whitney.
4—18" x 8' Monarch.
1—18" x 8' Rockford.
1—18" x 8' Lebanon.
16—18" x 8' LaPointe.
12—20" x 8' LaPointe.
76—20" x 8' American.
2—20" x 8' American, Gd. Hd.
2—20" x 8' Ledge & Shurley.
8—20" x 10' Ledge & Shurley Pat. Hd.
1—20" x 12' Walcott.
3—20" x 12' American.
3—20" x 16' American.
6—21" x 10' LeBlond.
19—22" x 8' Davenport.
1—22" x 8' Ledge & Shurley Pat. Hd.
1—24" x 10' Ledge & Shurley Pat. Hd.
1—24" x 8' Underwood.
2—24" x 10' American.
1—24" x 10' Pratt & Whitney.
1—24" x 10' Hendey Gd. Hd.
1—24" x 10' Pacemaker.
1—24" 20" x 24' Ledge & Shurley.
8—25" x 10' Seneca.
1—25" x 10' Ledgard.
1—25" x 12' LeBlond.
1—25" x 10' Walcott.
15—26" x 10' Whitcomb Blaisdell.
1—26" x 10' Cincinnati.
1—26" x 10' Warner & Swasey.
13—26" x 11' Wickes.
1—26" x 12' Wickes.
1—26" x 12' Wickes.
27—26" x 10' Niles Bement Pond.
1—26" x 12' Pond.
1—26" x 12' Pond.
5—26" LeBlond Crankshaft
10—26" x 12' Bridgeford.
3—26" x 14' Bridgeford.
6—26" x 16' Bridgeford.
8—26" x 20' Bridgeford.
2—30" x 11' American, Gd. Hd.
4—30" x 11' American.
2—30" x 11' H. S. & G.
1—30" x 20' American, Gd. Hd.
18—32" x 12' Fitchburg
1—32" x 16' Wickes.
1—36" x 12' Wickes.
3—36" x 11' Johnson, Gd. Hd.
1—36" x 16' Johnson, Gd. Hd
1—36" x 20' Putnam.
12—36" x 30' Pittsburgh, Gd. Hd.
1—36" x 36' LeBlond, Gd. Hd.
4—36" x 37' N.-B.-P., Gd. Hd.
2—36" x 42' LeBlond, Gd. Hd.
5—40" x 12' Filfield
2—45" x 24' Pond, Gd

AUTOMATIC SCREW MACHINES

1—No. 00 Brown & Sharpe
1—No. 2 Brown & Sharpe, Semi
2—No. 2 Brown & Sharpe
1—No. 75 National Acme.
2—2¾" Cleveland
1—2"x9" New Britain.

GRINDERS

10—Heald Drill.
1—Wilmarth & Morman, Hand
1—Detroit Centerless
1—No. 2 Gardner Disc.
1—No. 16 Besley Disc.
2—No. 6 Gardner Disc.
1—Modern Internal
1—10-A Bryant, Int.
1—No. 18 Bryant, Internal
2—No. 20 Bryant, Internal
2—No. 70 Heald, Internal
1—No. 200 Heald Rung
1—No. 2 Bath Surface
1—14" P. & W. Vert. Surf.
2—22" P. & W. Vert
1—Blanchard Vertical
1—No. 1 Morse
1—No. 11 Ott.
1—No. 2 Ohio Univ.
1—No. 2 Planer Univ.
2—6"x32" Norton
1—No. 1 Ball Univ.
1—6"x20" Fitchburg.
1—10"x36" Thompson Univ.
12—10"x36" Norton.
1—10"x36" Norton
3—10"x72" Norton
1—No. 2 Brown & Sharpe Univ.
1—No. 2 Ball Univ.
2—Modern Tilts
5—12"x36" Landis.
2—Heald Tilts
1—12"x96" Landis.
1—12"x120" Landis.
1—14"x36" Norton
1—14"x48" Ohio City
12—14"x36" Norton
2—14"x72" Norton
1—16"x72" Norton.
1—20"x96" Landis.
1—20"x168" Landis.

PRESSES

1—No. 4 Rockford, Gd.
1—No. 15 Niagara Horn.
1—30-ton Lucas Forcing.
1—No. 61 V. & O. Str. Side.
1—No. 69 Shell, Gd.
1—No. 50 Toledo, Gd.
1—No. 57 Toledo.
1—No. 70 G. & E. 56 Perfecto, Gd.
1—No. 58 Toledo
1—No. 58 Toledo, Geared
3—No. 87 Bliss, Gd.
1—No. 76¾ Bliss, Gd.
1—No. 60 Toledo, Gd.

MISCELLANEOUS

1—1500 lb. Erie Steam Hammer
1—3½" Landis Single Head Bolt Cutter.
2—No. 3 LaPointe Broach.
1—No. 1 LaPointe Broach.
3—No. 4 LaPointe Broach.
1—Brown & Sharpe Polishing and Finishing Machine.
1—No. 0 Mills & Merrill Key-seater.
1—No. 0 Centerline Die Filing Machine.
70—Newton, Betts, Pratt & Whitney and Garvin Profilers.
1—4" Whiton Centering Machine.
1—Whiton Centering Machine (7").
1—15" Newton Slotter.
18—Pilton Slotters.
3—Swind Bench Slotters.
1—Richert & Schaefer Tapper, ⅝".
1—Oliver Filing Machine.
1—3" Hurlbut & Rogers Cut-Off.
1—Oliver Jig Saw, Woodworking.
1—18"x6' Woodworking Lathe.
1—No. 4 B Dreis & Krump Hand Brake.
1—Gear Straightening Press
1—6"x6' Peerless Hack Saw

DRILLS

15—14" Myers.
4—22" W. F. & J. Barnes.
2—22½" W. F. & J. Barnes.
5—25" W. F. & J. Barnes.
2—25" Silver.
1—25" Barnes.
1—26" Barnes.
1—30" Barnes.
1—34" Barnes.
1—42" Cincinnati.
1—No. 25 Foote-Burt
2—No. 1 Baker.
1—No. 210 Baker
1—No. 315 Baker.
1—No. 415 Baker
1—25" 2-spdl. Rockford.
1—3 spdl Sigourney
2—3-spdl. Taylor & Fenn.
2—4 spdl Leland Gifford
4—4-spdl Allen
15—6 Spdl Allen
1—No. 6-B Henry & Wright.
2—No. 11 Natco.
1—No. 11 Pratt & Whitney.
3—No. 20 Natco.
1—No. 20 Natco
1—No. 41 Natco.
3—No. 1 Barnes Horiz. 2 Hds.
1—Garvin Two Way Boring Mach.

RADIALS

2—2" American.
1—4' Cincinnati.
1—2" American.
1—2" Wesson.
1—3½" Wesson.
1—4' Western.
1—5' Wesson.
1—6' Western.

VERTICAL BORING MACHINES

7—24" Bullard, Vertical.
15—24" Bullard, New Era.
1—30" Gisholt.
1—34"-44" Colburn.
1—42" Colburn.
1—60" Bullard
1—72" Cincinnati.

HORIZONTAL BORING MACHINES

3—Foote-Burt.
1—4" Newark.
2—No. 1 Dodge & Hawley
1—Beaman & Smith.
1—Small Pedro Lucas.
1—No. 2B Bar Barrett
1—Rochester Floor Borer.
1—No. 3 Beaman & Smith

SHAPERS

1—15" Potter & Johnston.
1—16" Queen City.
1—18" Seneca.
1—16" Ohio.
1—26" Stroke.
1—26" N.-B.-P.

PLANERS

1—24"x24"x24" Cincinnati Crank.
1—24"x24"x12" Whitcomb.
1—30"x30"x10" Woodward & Powell.
1—30"x30"x10" Cincinnati.
1—36"x36"x10" Bickett.
2—36"x36"x12" Cincinnati, 4 Hds.
2—36"x13"x14' N.-B.-P., Frog & Switch.
3—36"x36"x18' Cincinnati, 2 Hds.
1—42"x42"x9' N.-B.-P.
1—48"x48"x12' Cincinnati.
1—48"x48"x12' Bement.
1—48"x60"x[illegible] Cincinnati.
1—96"x72"x[illegible] Niles.

Our Guarantee: your money back if you return a machine within thirty days, freight prepaid. No Excuses Necessary.

HILL, CLARKE & CO. OF CHICAGO

649 Washington Blvd.

"The Used Machinery House Known Everywhere. McCabe & Sheeran Mach'y Corpn"

A Special Selling of a Whole Plant

that will interest you, for THE PRICES ARE LOW—

TO CLOSE EVERYTHING OUT AT ONCE

The Entire Equipment of The Epping-Carpenter Pump Co. at Pittsburgh, Pa., now being dismantled—

This is no List of ordinary Tools—

These machines might be seen in operation in the best shops in the country, but seldom in second-hand Lists.

Many splendid and superb pieces of Machinery, of the Best High-grade Standard makes.

But make up your mind to inquire right away for more detailed information, if considering extra equipment.

The prices will tempt your buying now, even though you might reckon you wouldn't have use for them until later on.

Inspection can be made of everything still set up—right where they left off working, on the finest classes of work.

You need only to look them over to recognize their values at the "upset" prices we have on them, to close everything out immediately.

McCabe & Sheeran Machinery Corpn.,

Special Representative

right on the ground at the works of The Epping-Carpenter Pump Co., Pittsburgh.

A little more data on what you might expect to find

LATHES

62-in. Swing, 22-ft. Bed, "Putnam Machine Co.'s" Triple-geared.
42-in. Swing, 17-ft. Bed, "Putnam Machine Co.'s" Triple-geared.
34-in. Swing, 12-ft. Bed, "Putnam Machine Co.'s" Triple-geared.
30-in. Swing, 38-ft Bed, "Lodge & Shipley"—Geared Head.
30-in. Swing, 19-ft. Bed, "Johnson."
30-in. Swing, 18-ft. Bed, "Putnam."
26-in. Swing, 14-ft. Bed, "Schumacher & Boye."
25-in. Swing, 10-ft. Bed, "Bradford."
24-in. Swing, 12-ft. Bed, "Schumacher & Boye."
24-in. Swing, 10-ft. Bed, "Putnam."
21-in. Swing, 8-ft. Bed, "Bradford."
3—20-in. Swing, 8 ft. Bed, "Hamilton"—Arranged for Motor Drive.
12—20-in. Swing, 8-ft. Bed, "American"—Arranged for Motor Drive.
1—18-in. Swing, 10-ft. Bed, "Putnam."
1—17-in. Swing, 8-ft. Bed, "LeBlond"—Arranged for Motor Drive.
3—16-in. Swing, 8-ft Bed, "Hamilton"—Arranged for Motor Drive.
1—16-in. Swing, 6-ft. Bed, "Hamilton"—Motor Drive.
1—14-in. Swing, 8-ft. Bed, "Reed."

SCREW MACHINES AND TURRET LATHES

3—2¼" Four Spindle "Gridley" Automatics.
3—No 4 "Warner & Swasey."
4—No. 6 "Warner & Swasey."
1—Fox Monitor Lathe, "Springfield."
1—24-in. "Gisholt" Turret Lathe.
1—30-in. "Gisholt" Turret Lathe.
2—No 6A "Potter & Johnson" Automatics.
1—No. 7A "Potter & Johnson" Automatic, Motor Drive.
1—Style "H" Bullard Turret Lathe.

RADIAL DRILLS

2—7-ft. Arm "Prentice Bros."—Speed Box.
4—7-ft. Arm "Prentice Bros."—Speed Box.
1—5-ft. Arm "Prentice Bros."
1—4½-ft. Arm "Niles."
2—4-ft. Arm "Bickford," Arranged Motor.
2—4-ft. Arm "Fosdick."

UPRIGHT DRILLS

1—40-in. Swing, Goose Neck Drill, "Bement-Miles."
2—36-in. Swing, "Putnam."
2—25-in. Swing, "Barnes."
1—21-in. Swing, "Snyder."
1—20-in. Swing, "Snyder."
1—4-Spindle "Avey."
2—3-Spindle "Hoefer."

PLANERS

1—27-in. x 8 ft. "Woodward & Powell."
1—24-in. x 6 ft "G. A. Gray Co."
1—36-in x 12-ft. "Detrick & Harvey," Open Side

SLAB MILLING MACHINES

42-in. x 12-ft. "Beaman & Smith," with four (4) Heads (Two on rail and one on each side), arranged for and including motor drive, with motors, Extra Heavy.

HORIZONTAL BORING MACHINES

5-in. Bar "Beaman & Smith," Extra Heavy —Floor Type.
3⅞-in. Bar "Betts"—Knee Type
Two 4-Spindle Horizontal Boring Machines, "Beaman & Smith," with heads and motors, complete.

MILLING MACHINES

1—No. 4 "Cincinnati" Plain.
2—No. 3 "Cincinnati" Plain.
1—"Newton"—Duplex.

GRINDERS

1—No. 3 "Diamond" Water Tool.
1—No. 6 "Norton" Floor Grinder.
1—36-in. "Springfield" Grinder.
1—16-in. Water Tool—"Springfield."
3—12-in. x 36-in "Landis" Plain.
1—Double End Grinder, with two 16" Wheels.
1—"Garvin" Cutter Grinder.
1—"Sellers" Twist Drill Grinder.
1—No. 3 "Brown & Sharpe" No 1 Cutter and Reamer Grinder
1—Two Wheel Emery Grinder, 12 x 1".

BOLT CUTTERS

2—⅜ to 1½-in. "Putnam."
1—⅝ to 2-in. "Putnam."
1—7/16 to 1¾-in "Putnam."
1—1½-in. "Merriman."
1—1½-in. "Landis."

MISCELLANEOUS

Shaper—10-in. Stroke, "Gould & Eberhardt."
No. 2 "American" Gas Furnace and Blower.
No. 3 "Robertson" Hack Saw.
Cutting Off Machine, 2-in.
Slotter—12-in. Stroke
Hand Rolls, 63-in.
Horizontal Drill, "Pawling & Harnischfeger," Motor Driven.
No. 8 "Sturtevant" Blower.
Two 2-Ton Electric Hoists.
One 1-Ton "Triplex" Chain Hoist.

POWER EQUIPMENT

Air Compressor—24 x 15 x 18—Motor Drive.
Gas Engine—"Turner & Fricke," 100 H.P.

"GENERAL ELECTRIC" MOTORS

With Compensators—Alternating Current, 3 Phase, 60 Cycle, 220 Volts

Six 5 H.P.
Fourteen 7½ H.P.
Eight 15 H.P.
Two 25 H.P.
Four 50 H.P.

Complete Specifications and prices will be furnished on application to

McCABE & SHEERAN MACHINERY CORPORATION

It is important to remember our New Address

Offices: 482 HUDSON TERMINAL BLDG. **Phones: Cortlandt 2464-6586** **50 CHURCH ST. NEW YORK**

NEW and USED MACHINE TOOLS of the "BETTER KIND"

Priced Net to You at a Worth-while Saving

BORING MILLS—Vertical

2—Bement 24" New Era Type.
1—Bogues & Memphal 30".
1—Keller 30" Turret.
1—Bement 42".
1—N.-B.-P. 44"; S.P.D.
1—Putnam 44"; S.P.D.

BORING MILLS—Horizontal

1—Rockford No. 2
1—Cleveland No. 1
1—Barnard Mann 2½" bar.
1—Lucas No. 25 floor type; 3½" bar.

DRILLS—Upright and Radial

10—Lagonda No. 1 H.S.
11—Avey 6 spdle. H.S.
35—Avey 8-spdle. H.S.
6—NEW Champion 20" B.G., P.F.
1—NEW Minster DH 24" cap.
8—Peace-Burt No. 17 Rad.
4—NEW Snyder 36", sliding head.
2—NEW Turner No. 3 ver. turret Drills.
4—Hasemann H.S. Radial.
2—Reed-Prentice 4' plain; motor drive.
1—Prentice 4' plain; motor drive
1—No. 0-P 5' semi-univ.; motor drive.
1—Bausch 6 plain
3—Reed-Prentice 6' plain; gear box; motor drive.
2—Henry & Wright 4-spdle. B.B.

DRILLS—Multiple Spindle Rect. Head

3—Baush No. 1—16-spdle.
2—New Baush No. 3—24 spdle
1—New Baush No. 1—56-spdle.
2—Natco No. 14—16 spdle.
2—Natco No. 30—16 spdle.
1—Lux 6-spdle.
1—Baush No. 1—12-spdle.
1—P. & W. No. 12—12-spdle

GEAR CUTTERS

2—Bilton No. 1.
1—Bilton No. 2.
2—Barber-Colman No. 2
1—NEW 8" Herodes.
2—Brown & Sharpe 3 x 26.
1—Cincinnati No. 4.
1—S. & S. 36", spur and spiral.
3—Fellows No. 6
1—Fellows No. 6½
2—6" Gleason bevel.
1—Gleason 12" double-tool generator.
5—Gleason 18" double-tool generators.
1—NEW Gleason bevel gear tester
2—NEW Lees-Bradner tooth rounding machines.

PLANERS AND SHAPERS

1—24 x 24 x 8' Wheeler, 1 head
1—26 x 26 x 10' Niles, 1 head
1—26 x 26 x 8' Pond, 2 heads.
1—36 x 36 x 12' Pond, 2 heads. NEW
1—36 x 36 x 12' Woodward & Powell, 4 heads.
1—36 x 36 x 12' Cincinnati, 2 heads.
1—48 x 48 x 12' Putnam, 2 heads, motor drive.
1—48 x 48 x 20' Putnam, 4 heads.
1—Steptoe 15" shaper.
1—NEW Steptoe 24" B.G.
1—Steptoe 20", B.G.
1—Kelley 20", B.G.
1—Cincinnati 24", B.G.
1—Smith & Mills 26", B.G.

TURRET AND SCREW MACHINES

1—W. & S. No. 2A Turret.
1—W. & S. No. 3A Turret.
1—P. & J. No. 6A Turret.
6—Foster No. 1B Turret
4—Greenlee 2¼" x 26" Turret.
1—J. & L. 3" x 36" Turret.
1—J. & L. 2-spdle. Turret.
1—Gisholt 21" Turret.
1—Gisholt 24" Turret.
1—NEW Gisholt 28"; motor drive Turret.
2—NEW wire feed plain head Screw.
1—R. & S. No. 6; wire feed.
4—Foster No. 0 screw.
5—Foster No. 4 screw.
2—Warner & Swasey No. 4 screw.
6—Warner & Swasey No. 1.
2—W. & S. Universal Fox 16", F. B. G.

AUTOMATICS

3—Cleveland Mod. B ⅝-⅞".
6—Cleveland Mod. A ⅞".
1—Cleveland Mod. A ⅞"-1¼".
1—Natl. Acme No. 52
8—Gridley 2¼"
1—NEW Gridley No. 3 semi-auto. piston and piston ring machine.
10—Brown & Sharpe No. 00 auto.
3—Brown & Sharpe No. 0 auto.
3—Brown & Sharpe No. 00G auto.
1—Brown & Sharpe No. 2 auto.
1—Gridley ⅝" cap. 4-spdle. auto.
1—Gridley 1⅛" cap. 4-spdle. auto.
1—Natl. Acme No. 52, motor drive.
2—Natl. Acme No. 52, motor drive.
1—Natl. Acme No. 56, motor drive.
2—Natl. Acme No. 515, motor drive.
1—Radical 4-spdle.

MILLERS—Plain, Mfg. and Ver.

1—Kempsmith No. 1 plain.
1—Cincinnati No. 2 plain.
1—Kempsmith & Tracker No. 3b Plain, S.P.D.
1—Brown & Sharpe No. 3B Plain, S.P.D.
1—Ohio No. 28 plain, cone drive.
1—LeBlond No. 1 plain, cone drive.
1—Cincinnati No. 5 rectangular arm.
1—Garvin Duplex No. 3.
1—Brown & Sharpe No. 2 Ver., S.P.D.
1—Cincinnati No. 2 ver., high power.
1—Becker No. 4B Ver.
1—Cincinnati No. 3 Ver., high power.
1—Becker No. 5B Ver.
1—Becker No. 6 Ver., 62" table.
1—Boggs Type B
3—LeBlond No. 3-H Plain, heavy duty.
1—Pratt & Whitney 4" spline
3—Brown & Sharpe No. 12 mfg. type.
15—NEW Pratt & Whitney No. 10.
10—Pratt & Whitney No. 12 semi-auto.

SLOTTERS

1—NEW Newton 15", motor driven.
1—NEW Dill 15-18", belt driven.

LATHES

1—NEW Potter bench.
1—Rivett No. 504 bench.
1—NEW South Bend 13 x 6.
1—LeBlond 14 x 6 Q.C.G.
1—LeBlond 16 x 6 Q.C.G.
1—Hendey 16 x 6 yoke head.; taper att., draw-in bar, collets.
2—Rahn-Larmon 16 x 8, Q.C.G.
2—Oliver 16 x 7, Q.C.G.
1—LeBlond 16 x 8, Q.C.G.; taper att.
2—LeBlond 17 x 6, Q.C.G.
1—LeBlond 17 x 8, Q.C.G.
2—Mulliner 18 x 8, Q.C.G.
2—NEW Cincinnati 18 x 8, Q.C.G.
1—NEW Monarch 18 x 10, Q.C.G.
1—Prentice 20 x 10, geared head.
1—Greaves-Klusman 20 x 10, Q.C.G.
2—NEW 21 x 14 South Bend Gap.
2—NEW 24 x 16 South Bend Gap.
2—LeBlond 21 x 12, geared head.
2—LeBlond 21 x 12, automobile lathes.
1—Advance 24 x 8, Q.C.G.
1—NEW Rverson-Milwaukee 24 x 10, Q.C.G.
2—Reed-Prentice 24 x 14, geared head.
2—Bore & Emmes 24 x 14, Q.C.G.
1—LeBlond 26 x 12 Univ., crankshaft.
1—Walcott 26 x 14' 6" Q.C.G.
1—Walcott 26 x 16' 6" Q.C.G.
1—Reed-Prentice 27 x 16', geared head.
1—American 30 x 20, geared head.
1—Putnam 30 x 22, plain turning.
2—LeBlond 30 x 32, geared head.
1—Putnam 36 x 14, geared hetd.
4—Bridgeford 42 x 32, geared head.
2—3½ x 84 LoSwing, 2 carriages.
2—NEW Star 9x4 Style E.
2—NEW Star 9x5 Style E.
8—NEW Star 11x4 Style E
25—NEW Star 11x5 Style E.
8—NEW Star 11x6 Style E.
6—NEW Star 12x6 Style E.
10—NEW Star 13x6 Style E.
1—NEW Star 13x8 Style E.
4—NEW Star 13x10 Style E.

MILLERS—Universal

2—Kempsmith No. 2.
1—Kempsmith No. 3 plain.
1—Cincinnati No. 2 S.P.D.
1—Owen-Everson No. 2
1—Milwaukee No. 3b Univ., with dividing head, vertical head, rotary table.

PRESSES

1—Ferracute EG 56; 800 ton toggle.
1—Toledo No. 857 Rack and Pinion Reducing.
4—Toledo No. 42 H.P. horning.
1—NEW Wiliard No. 6A
4—Biles No. 64 double action.
45—Waterbury-Farrel Drawing No. 2½, No. 3½, No. 5½ and No. 6.
25—Waterbury-Farrel Double Connection 2" and 4" strokes.
1—NEW Standard No. 58, style S.
5—NEW Standard No. 78, style S.
2—NEW Standard No. 108, style S

MISCELLANEOUS

10—NEW No. 12 Pratt & Whitney profilers.
4—Leland & Gifford No. 2 profilers.
1—Quickwork No. 4B Rotary Shear.
1—Rock River, 48 throat, 1" cap., Punch.
1—Long & Allstatter No. 3 Punch.
2—P. & W. 4½ x 12" Thread Millers.
2—Davis No. 1 keyseaters.
1—Garvin 6" Cam Miller.
1—Acme 2" single head bolt cutter.
1—Dries-Krump 36" Brake.
2—NEW Cleveland Relieving Machines.
10—Rickert-Shaffer ⅝" bor. tappers.
2—Norton Crank Balancing Machines.
1—Yoder power beader.
1—Bennett & O'Connell No. 20 polishing lathe.
4—Hanson & Van Kinkel No. 11 polishing lathes.
3—LaPointe No. 1 Broaches (New London).
1—LaPointe No. 2 Broach (New London).
1—LaPointe No. 2 double spindle Broach.
5—NEW Miner & Peck 50 lb. Hammers.
1—Miner & Peck 175 lb. Hammer.
1—Erie 1100 lb. Hammer.
3—Racine 12 x 12 Hack Saws.
3—NEW Higley No. 17 Cold Saws.
4—NEW Higley No. 12 Cold Saws
2—NEW Nutter & Barnes No. 6 Cold Saws.
4—Cochrane & Bly No. 2 Cold Saws.
2—NEW No. 2 Davis Keyseaters.

GRINDERS

6—Springfield-Brandes ver., 12 x 12 x 48.
2—Brown & Sharpe type No. 2.
1—LeBlond No. 1 tool and cutter.
16—Cincinnati No. 2, 12 x 36.
3—Norton 3 x 18.
1—Norton 6 x 32
2—Norton 10 x 36
5—Norton 14 x 50
10—Bryant No. 20, chucking.
2—Heald No. 60.
6—Heald No. 70.
4—Heald No. 75.
10—NEW Yankee twist drill, assorted sizes.
6—Sellers No. 1 univ. tool and cutter.
1—NEW Van Norman No. 3½ Automaster.
1—Van Norman No. 34.
1—NEW Diamond No. 2 auto surface.
2—10 x 72 Norton, plain.
2—10 x 20 Landis, plain.
2—6 x 20 Fitchburg, plain
1—No. 16 Blanchard, belt drive.

Our latest catalog illustrates a hundred of these machines. DO YOU WANT A COPY?

MOREY and COMPANY, Inc.,

410 BROOME ST.
NEW YORK

TELEPHONE: Canal 5360

LIST YOUR
USED MACHINES
WITH US

Exceptional facilities and an enviable record for getting results.

IF YOU WANT ANYTHING
CONSULT US

We can supply you either from our own stock or from equipment listed with us.

W. H. J. FITZGERALD & CO.
261 Franklin St. BOSTON, MASS.

Real Bargains

1—[illegible] Vertical Grinder 16" x 96", complete with [illegible] half hangers [illegible] ft. $1,150.00

1—42" x 42" x 16' Niles belt drive Planer, two heads $1,500.00

1—Motor driven Newton Slab Miller, 10' table, [illegible] passage $2,500.00

1—14" x 30" Lodge & Shipley selective geared head, quick change engine lathe, arranged for motor drive $2,800.00

Many others. Your inquiries solicited.

THE RANDLE
MACHINERY COMPANY
Cincinnati Ohio

---

25 POTTER & JOHNSTON
Automatic Chucking Machines
No. 6-A Geared Head

$350.00 EACH

MACHINERY DEALERS, INC.
NEW HAVEN, CONN.

MACHINE TOOLS

AT PRICES THAT WILL ASTONISH THE MOST ECONOMICAL BUYER

ABSOLUTE SATISFACTION GUARANTEED

LATHES

1—13″ x 5′ 6″ Carroll-Jamieson.
1 ea. 14″ x 6′-8″ and 10′ Carroll-Jamieson, Q.C.G.
1 ea. 15″ x 6′ and 8′ Sidney, Q.C.G.-D.B.G.
1—18″ x 10′ Boye & Emmes, Q.C.G., D.B.G., T.A.
2 ea. 17″ x 8′ and 10′ Sidney, Q.C.G., D.B.G.
8 ea. 19″ x 8′-10′ and 12′ Sidney Q.C.G.-D.B.G.
1 ea. 25″ x 12′-14′ and 16′ Sidney, Q.C.G., D.B.G.
1 ea. 36″ x 16′ and 18′ Sidney, Q.C.G., D.B.G.
1—18″ x 14′ Reed-Pl. change—Taper Att.
1—16″ x 6′ Economy, Q.C.G., D.B.G.
1—18″ x 8′ Boye & Emmes, Q.C.G., D.B.G., Taper Att.
2—18″ x 8′ Walcott, Q.C.G., D.B.G.
1—18″ x 8′ Walcott, Pl. Chg. Taper Att.
5—18″ x 8′ Whitcomb-Blaisdell, Q.C.G., D.B.G.
1—34″ x 24″ Putnam Triple Geared, Motor driven, Taper Att., C.R., P.O.F., Q.C.G., D.B.G., 2″ Hollow Spindle, 32″, 4 Jaw Indpt. Chuck fitted.
1—36″ x 24′ Putnam, same as above.
1—64″ x 38′ Putnam Motor Driven, Triple geared, Q.C.G., Taper Att., 2½″ Hollow Spindle, C.R., P.C.F., complete and equipped with 20 H.P., D.C., 220 V. Motor (Will change motor to suit purchase.)
1—18″ x 10′ Sidney, Geared Head, Motor Drive, Q.C.G., D.B.G.
1—14″ x 8′ Sidney, Q.C.G., D.B.G.
1—28″ x 17′ Chard Heavy Duty, geared head, Q.C.G.

PLANERS

24″ x 24″ x 6′ Whitcomb, (1) head, belt drive.
24″ x 24″ x 6′ American, (1) head, belt drive.
24″ x 24″ x 6′ Pease, (1) head, belt drive.
24″ x 24″ x 8′ Bendey, (1) head, belt drive.
30″ x 30″ x 6′ Pease, (1) head, belt drive.
30″ x 30″ x 8′ New Haven, (1) head, belt drive.
30″ x 30″ x 10′ Dustin, (1) head, belt drive.
30″ x 30″ x 10′ Cleveland, Open Side, (2) head, motor drive.
36″ x 36″ x 10′ Cincinnati, (3) head, motor drive.
36″ x 36″ x 14′ Ohio Heavy Duty, (4) heads, belt drive.
44″ x 44″ x 12′ Cleveland, Open Side, (3) head, motor drive.
48″ x 48″ x 16′ Pond, (3) head, belt drive.

SHAPERS

1—14″ Davis.
1—16″ Whip.
3—16″ Steptoe, Belt Drive.
3—16″ Steptoe, Motor Drive.
1—20″ Smith & Mill.
3—24″ Steptoe, Belt Drive.

MILLERS—

1—No. 0 Steptoe, Plain, power feeds.
1—No. 11 Garvin, plain.
1—No. 3½ Fox, plain.
1—No. 1 Bickford, Plain.
2—No. 16 Whitney, Plain.
1—No. 1 Dow, plain, power feeds.
2—No. 2 Cleveland Universal, High Power, Single Pulley.
1—No. 2 LeBlond, plain, power feeds.
2—No. 1 Cleveland Universal Hi-Power, single pulley.
1—No. 2 Owen Universal, Power Feed.
1—No. 3 Cincinnati, Universal Power feeds.
1—No. 4 Brown & Sharpe, plain, power feeds.
1—No. 4 Cincinnati, plain, High Power.
2—No. 2 B. & Sharpe Vertical, power feeds.
1—No. 22 Garvin Vertical, power feeds.
1—No. 6 Becker Vertical, power feeds, late type.
1—No. 2 Garvin, plain power feeds.

GRINDERS

1—No. 1 LeBlond Universal Tool and Cutter.
1—No. 2½ Walker Surface Grinder with magnetic chuck
2—Greenfield Tool and Cutter.
1—No. 1 Fraser Universal.
1—No. 3 B. & Sharpe Cutter and Reamer.
1—10″ x 36″ Norton, plain.
1—10″ x 40″ Norton, plain.
1—10″ x 50″ Norton, plain, with cam shaft att.
1—14″ x 96″ Norton, plain.
1—12″ x 66″ No. 4 Landis, Universal.
1—12″ x 36″ No. 2 Brown & Sharpe, Universal.
Wet Tools and Double End Grinders, all types.
1—No. 60 Heald, all attachments, Serial No. 2113.
1—No. 70 Heald, Internal.

DRILLS—Upright and Radial

4—10″ Buffalo Sensitive, Bench.
6—15″ Buffalo Sensitive, floor.
6—14″ Excelsior Sensitive, floor.
10—14″ U. S. Sensitive, floor.
15—20″ Champion, B.G., P.F.
1—21″ Aurora, B.G., P.F., Tapping Att.
1—21″ Superior, B.G., P.F.
1—24″ Prentice, Sliding Head, B.G., P.F.
1—28″ Rockford, Sliding Head, B.G., P.F.
1—32″ Superior Sliding Head, B.G., P.F.
1—36″ Superior, Sliding Head, B.G., P.F.
1—Single Spindle Foote-Burke, Heavy Duty.
1—Single Spindle Baker, Heavy Duty.
1—4 Spindle Kokomo, Sensitive.
1—Single Spindle Kokomo, Sensitive.
1—6 Spindle Allen Sensitive,
1—5 ft. Bausch, Universal, motor driven.
1—7 ft. Fosdick, plain, belt drive.

BORING MILLS

2—42″ Bausch, Vertical, 2 heads, motor drive.
2—No. 1 Cleveland, Horizontal 2½″ bar single pulley.
1—Universal 3″ bar.
1—42″ Pond Car Wheel, Motor Driven.

GEAR CUTTERS

1—No. 3 36″ Brown & Sharpe, Spur.
5—No. 6 Fellows Gear Shapers.

TURRET and SCREW MACHINES

1—1″ Smurr & Kamen, wire feed.
1—No. 3 Bardon & Oliver, wire feed.
1—No. 4½ Bardon & Oliver, wire feed.
1—2¼″ x 24″ Jones & Lamson, Bar and Chucking.
1—21″ Gisholt.
1—3¼″ x 40″ Greenlee.
1—2¼″ x 7″ Gridley (4) spindle.
1—No. 52 National Acme.
1—No. 6 Warner & Swasey.
1—No. 6A Potter & Johnston, Automatic.
1—22″ x 8′6″ Bullard, all power feeds, taper att.
1—24″ Gisholt, 4¼″ spindle.

MISCELLANEOUS

2—No. 6 Fellows Gear Shapers.
1—10″ to 12″ Dill Slotter, belt driven.
1—4″ Whiton Centering Machine.
1—800 lb Niles-Bement Steam Hammer.
1 each 25 lb., 50 lb., 100 lb. Little Giant Belt Hammers.
1 each, 2″, 4″ and 6″ Oster Pipe Machines.
1—2″ Jarecki Pipe Machine.
1—No. 2 Catlin Keyseater.
1—No. 4 Catlin Keyseater.
1—No. 12 Pratt & Whitney Profiler, 2 Spindles.
1—10 ft. 3/16″ Ohl Power Squaring Shear.
Peerless Hack Saws, all sizes, new and used.

ESTABLISHED 1876 FRANK TOOMEY Inc. ESTABLISHED 1876
127-131 N THIRD ST PHILADELPHIA PA

SECOND-HAND MACHINE TOOLS

DRILLS

[illegible]
32" Superior, sl. hd., B.G., P.F.
[illegible]
5' Dreses plain radial, tapping.

LATHES

[illegible]
24" x 8' Mueller C.R. P.C.F. Q.C.
[illegible]
30" x 12' Cleveland C.R. P.C.F. Q.C.G.
[illegible]
36" x 14' Hamilton, C.R., P.C.F., triple geared.
38" x 16' Pond, geared head, C.R., P.C.F., [illegible] M.D.

BORING MACHINES

[illegible] 3" bar.
[illegible] 4" bar.
[illegible] vertical

[illegible] heads vertical
[illegible] heads vertical

SCREW MACHINES AND TURRET LATHES

[illegible] Model A, screw machine.
[illegible] Model A, screw machine.
[illegible] Model B, screw machine.
1" cap. Cinti.-Acme wire feed screw machine.
1¼" cap. Cinti.-Acme wire feed screw machine.
1½" cap. Cinti.-Acme wire feed screw machine.
2" cap. Cinti.-Acme wire feed screw machine.
16 and 18" Cole Acme quick Pox turret lathe.
24" x 24" Jones & Lamson, bar or chucking turret lathe.
24" x 36" Jones & Lamson, bar or chucking turret lathe.
No. 1-B Foster geared head turret lathe.

MILLERS

No. 2, 3 and 4 Cincinnati, plain.
No. 5 Cincinnati, plain, H. P.
No. 2B Brown & Sharpe, plain
No. 2, 3 and 5 Kempsmith, plain
No. 3, and 4 Cincinnati, vertical.
No. 2A, 4-2, 4B and 5 Becker, vertical.
No. B2 Becker continuous type, vertical
No. 1½, 2 and 3S Cincinnati, universal.
No. 1½ Brown & Sharpe, universal
30" x 10' Newton, face slab type.
14" x 12" Pratt & Whitney thread milling machines.

GRINDERS

[illegible] x 18" Norton, plain
6" x 32" Norton, plain.
10" x 36" Norton, plain.
16" x 30" Landis, plain.
12" x 120" Landis plain.

[illegible] plain, [illegible] grinder
12" x 40" B. & S. universal [illegible]
12" x 36" Cincinnati, universal.
2-12" x 24" Diamond, surface
Taylor high speed water tool grinder.
No. 1 Cincinnati cutter and reamer grinder.
No. 60 Heald cylinder grinder.
No. 11 Rivett Ball Race, with power oscillating att.
Saxon face grinder.
10" Garvens rotary with [illegible] work
No. 2 Brown & Sharpe surface grinder.
18" and 20" disc grinders.

SHAPERS AND PLANERS

14" Gould & Eberhardt crank shaper, B.G.
20" Davis crank shaper, [illegible] geared.
24" Stockbridge crank shaper, [illegible] geared.
15" and 24" Hendey friction shapers.
24" x 24" x 6' Flather planer, 4 hd.
36" x 36" x 12' Pond planer, 2 hds.
48" x 48" x 15' Sellers planer, 2 hds.
60" x 40" x 12' Pond planer, 2 hds.
66" x 60" x 30' Bement planer, 3 hds.
96" x 60" x 12' Detrick & [illegible] openside convertible planer, 4 hds., M.D.

MISCELLANEOUS

No. 3 Lapointe broaching machine
No. 72 Ferracute press.
No. 13 P. & W. profilers.
36" Gould & Eberhardt gear cutter.
36" B. & S. Gear Cutter.
18 H Gould & Eberhardt hobbing gear cutter
⅝" x ⅜" single end punch and shear
6" Gleason bevel gear generator.
American and Stewart furnaces
Newton, Burr and Racine Saws
Bliss & Adriance power presses
30 Ton Lunas forging presses

This is but a partial list of our stock.

HENRY PRENTISS & COMPANY

149 BROADWAY, NEW YORK, N. Y.

BOSTON BUFFALO HARTFORD SYRACUSE ROCHESTER

PRICES REDUCED AGAIN

BORING MILLS

12" Niles, two swivel heads
84 Bickford two swivel heads
72 Niles, two swivel heads
64 Poole, two swivel heads
Bullard two swivel heads.
42" Bullard, plain and turret head, thread cut attch
42" Rogers, turret head, universal chuck jaws
Bement, cylinder, 8" bar.
Barrett No. 2, cylinder, 5" bar.
Niles, knee type, 4" bar.
Betts, knee type, 5" bar.
Bement, knee type, 3⅞" bar.
Newark, knee type, 3" bar.
Bement, knee type, 3" bar.
Bement, knee type, 2⅞" bar.
Lucas Drilling and Tapping Machine, 2 7/16" bar
Greenwood, floor plate 8' x 8' 2 3/4" bar

PLANERS

[illegible] Hewes & Phillips 4 heads and auxiliary head.
14 Ft. Hilles & Jones Plate Planer.
[illegible]

LATHES

21 Ft. Pit Lathe, triple geared.
62" Pulley Lathe, triple geared.
62" x 22' Putnam, triple geared, 13' centers
60" x 30' Fifield, triple geared, 22' centers.
50" x 14' New Haven, 51" centers
42" x 22' Putnam, triple geared, semi quick change, 14' 2" centers
36" x 20' Putnam, triple geared, semi quick change, 12' 6" centers
28"-48" x 12' Harrington, Gap Lathe, 13' centers extended
24" x 14' Prentice, geared head, quick change, taper attachment.
24-48" x 16' McCabe, Double Spindle Lathe.
20" x 8' Whitcomb Blaisdell, geared head, quick change, 47" centers.

SLOTTERS—SHEARS—PRESSES

68" Niles-Bement-Pond Slotter
18" Betts Slotter.
16" Bement Slotter.
12" Putnam Slotter.
10" Betts Slotter.
133" Stoll Squaring Shear, 16 gauge.
36" Adriance Squaring Shear, 16 gauge
Pels Shear for I beams.
Quickwork Rotary Shear, 48" throat, ½" capacity.
Hilles & Jones Double Angle Shear, 6" x 6" x [illegible]
"B" Long & Allstatter Shear, 2½" round capacity
No. 7 Beatty Punch, 15" throat, 1¼" x 1" capacity
Toledo Punch and Riveter, 60" horn.
Acme Hot Nut Punch, 1" capacity.
Acme Heading Forging Upsetting Machine 1" [illegible]
666 Toledo Knuckle Joint Press, 2" stroke, 1000-ton pressure
D. A. 5 Ferracute Press, 4" stroke

Office:
50 Church St.
New York

NEW YORK MACHINERY EXCHANGE

Warehouse:
222 Culver Ave
Jersey City, N. Y.

NEW MACHINE TOOLS

SET UP BUT NEVER USED

Bargain Prices

3—TOLEDO PRESSES, COMPLETE, Nos. 33-P, 34-P
1—60" x 29' NILES-BEMENT-POND GEARED HEAD LATHE, ARRANGED MOTOR DRIVE
1—48" x 56' NILES-BEMENT-POND GEARED HEAD LATHE, ARRANGED MOTOR DRIVE
1—42" x 28' PUTNAM GEARED HEAD, SINGLE PULLEY LATHE
5—36" x 34' BRIDGEFORD GEARED HEAD HEAVY DUTY LATHES, SINGLE PULLEY OR MOTOR
2—48" NILES-BEMENT-POND CAR WHEEL LATHES, MOTOR DRIVE
2—36" x 28' NILES-BEMENT-POND GEARED HEAD HEAVY LATHES, WITH TWO CARRIAGES
3—36" x 16' PUTNAM GEARED HEAD HEAVY DUTY LATHES, MOTOR DRIVEN
1—30" x 25' AMERICAN GEARED HEAD HEAVY DUTY LATHE, MOTOR DRIVE WITH MOTOR
1—30" x 16' LEBLONDE HEAVY DUTY LATHE, BELT DRIVE
1—30" x 12' AMERICAN GEARED HEAD HEAVY DUTY LATHE, SINGLE PULLEY OR MOTOR
14—27" x 18' LEBLONDE GEARED HEAD HIGH DUTY LATHES, MOTOR DRIVE WITH MOTOR
6—27" x 24' LEBLONDE CONE HEAD HIGH DUTY ENGINE LATHES
2—24" x 14' PRENTICE GEARED HEAD HIGH SPEED LATHES, SINGLE PULLEY DRIVE
2—24" x 10' AMERICAN GEARED HEAD HIGH DUTY LATHES, MOTOR OR SINGLE PULLEY
5—18" x 8' AMERICAN HEAVY ENGINE LATHES, DOUBLE BACK GEARED CONE DRIVE
1—No. 2 ROCKFORD HORIZONTAL MILLING, DRILLING AND BORING MILL
1—No. 1 CLEVELAND HORIZONTAL BORING, MILLING AND DRILLING MACHINE
3—No. 3-A WARNER-SWASEY UNIVERSAL HOLLOW HEXAGON TURRET, SINGLE PULLEY
3—No. 2 WARNER-SWASEY UNIV. HOLLOW HEX. TURRET LATHES
1—24" x 24" x 12' INGERSOLL SLAB MILLER, TWO VERT. SWIVEL HEADS WITH MOTOR
2—No. 3-H LEBLONDE HEAVY DUTY PLAIN MILLERS COMPLETE
1—No. 1 CLEVELAND PLAIN MILLING MACHINE, VISE AND ARBOR
1—No. 2 CLEVELAND PLAIN MILLING MACHINE, VISE AND ARBOR
1—No. 2 CINCINNATI HEAVY POWERED GEARED HEAD UNIVERSAL MILLER
1—No. 3 STANDARD UNIV. GEARED HEAD CINCINNATI MILLING MACHINE
1—60" x 60" x 20' WOODWARD-POWELL PLANER, FOUR HEADS, REV. MOTOR DRIVE
1—36" x 36" x 20' WOODWARD-POWELL PLANER, 4 HEADS, ARRANGED MOTOR
1—42" x 42" x 12' SIMMONS OPENSIDE PLANER, TWO HEADS, BELT DRIVE
1—No. 1 MODERN UNIVERSAL GRINDER, BELT DRIVE, COMPLETE FULL UNIV. EQUIPMENT
1—5' AMERICAN PLAIN RADIAL, SINGLE PULLEY DRIVE THRU GEAR BOX
1—10" PRATT-WHITNEY VERTICAL SHAPER WITH ROTARY, BELT DRIVE
1—6" PRATT-WHITNEY VERTICAL SHAPER WITH ROTARY, BELT DRIVE
3—15" NEWTON HEAVY DUTY CRANK SLOTTERS, ARRANGED MOTOR DRIVE, DC MOTOR
1—22" CINCINNATI TRAVERSE SHAPER, 10' BED, BELT DRIVE WITH COUNTERSHAFT
1—36" MORTON DRAW-CUT SHAPER, HEAVY DUTY, ARRANGED MOTOR DRIVE WITH MOTOR
1—No. 0-No. 2 BROWN & SHARPE AUTOMATIC SCREW MACHINE COMPLETE
1—20" BARNES ALL GEARED DRILL WITH TAPPING
1—84" x 46' NILES-BEMENT-POND GEARED HEAD HEAVY DUTY LATHE, TWO CARRIAGES
1—72" x 50' NILES-BEMENT-POND, TWO CARRIAGES, ARRANGED MOTOR DRIVE

Write for Complete List—1000 New and Rebuilt Machines in Stock
All Machines Offered at Prices from 40 Per Cent to 60 Per Cent Off List

SIMMONS MACHINE COMPANY, Inc.

Warehouses and Offices

182 LAFAYETTE ST.
New York, N. Y.

ALBANY, N. Y.

88 EXCHANGE ST.
Buffalo, N. Y.

LOOK AT THESE

Every One an UNUSUAL Machine to Find and All at Real BARGAIN Prices

BORING MILLS

No. 0 (32) Giddings & Lewis horizontal.
Lucas Horizontal.
32" King Vertical.

DRILLS

28" Reed-Prentice, sliding head.
28" Barnes, sliding head.
4 Spindle Henry & Wright, 1⅛" drills.
12 Spindle Fox drill.

FURNACE

Stewart Combination furnace.

GRINDERS, CYLINDRICAL

No. 1 Brown & Sharpe universal.
No. 1 & 2 Morse universal and plain.
No. 103 Rivett internal.

GRINDERS, CUTTER AND TOOL

No. 2 Oakley.
No. 1 LeBlond.

GRINDERS, DISC

No. 4 Gardner disc.
No. 14 Gardner combination disc.
No. 8 Gardner disc.

DIE SINKERS

No. 2 Pratt & Whitney.
No. 3 Pratt & Whitney.

HAMMERS

40 lb. Bradley cushioned helve. Merril board hammer.

KEYSEATERS

No. 2 Davis keyseater.

GEAR CUTTER

No. 6 Fellows gear shaper.

LATHES

Ames bench precision.
Pratt & Whitney precision
3½ Stark precision.
26" x 10' Bridgeford heavy duty.
22" x 10' Reed.
16" x 8' Pratt & Whitney tool room.
16" x 5' Whitcomb tool room.
20" x 8' Cisco.
10" Pratt & Whitney tool room.
16" x 6' Cleveland, NEW, but cheap.

MILLERS

No. 2 Van Norman Duplex.
No. 2 Rockford heavy duty, universal
No. 1 Garvin universal.
Type A Briggs.
No. 12 Garvin plain.
No. 6 Whitney hand

PLANERS

60" x 60" x 14' Niles-Bement-Pond Planer, 4 heads, motor driven.
24" x 24" x 6' Gray, 2 heads.

SCREW MACHINES

No. 00 Brown & Sharpe automatic.
No. 2 Davenport.
⅝" Pratt & Whitney hand.
2" x 24" Jones & Lamson.
⅞" Cleveland model A automatic.
⅝" Cleveland model A automatic.
No. 1 & 2 Garvin hand.
No. 10 Foster geared head.
No. 5A & 6A Potter & Johnston automatics.
No. 3 & 4 Foster hand.

TAPPERS

⅝" National Acme nut tapper.
¾" Rickert-Schaffer horizontal.
No. 1 Garvin vertical.

WIRE STRAIGHTENER

⅜" Shuster wire straightener.

SHAPERS

24" Cincinnati.
24" Gould & Eberhardt.
20" American.
20" Stockbridge.
20" Gould & Eberhardt.
15" Hendey friction.

In addition to the above items we also have a complete line of GOOD used machinery on which we can quote you attractive prices. May we have your inquiries?

MACHINERY DEALERS INCORPORATED

FORMERLY STANDARD MACHINERY CO.

453 CHAPEL STREET NEW HAVEN, CONN.

United States Government Surplus War Material, from Five Plants, 400 Machine Tools, 1000 Tons of New High Speed and Carbon Tool Steel, Cold Rolled Steel, and Other Materials

Biggest bargains that have ever been offered in practically new machine tools. None of the machines have been used more than two months and they are like new. Prices quoted below are 25% of today's values. Photos and full description of machines mailed on application.

MILLING MACHINES

[illegible] with [illegible] table [illegible] Weight [illegible] lbs.

PROFILING MACHINES

[illegible] profiling machines with [illegible] Weight 1000 lbs.

[illegible] profiling machines with [illegible] Weight 3000 lbs.

[illegible] profiling and cam cutting [illegible] Price $14,000 each. Weight 14,000 lbs.

LATHES

[illegible] 20" swing, 10 foot 2" hollow [illegible] chucks and countershafts, all of the latest type. Price $350.00 each. Weight 6000 lbs.

[illegible] and facing lathes 28" swing, 12' bed, with countershafts. Price $650.00 each. Weight 16,000 lbs.

[illegible] 24" swing, 12' bed, with large cone countershafts. Price $1250.00 each. Weight 15,000 lbs.

CRANKSHAFT LATHES

[illegible] 12" two gears only LeBlond crankshaft lathes almost [illegible] and countershafts. Price $600.00 each. Weight 6000 lbs.

TOOL STEEL

New Black Diamond Tool Steel, Warranted

[illegible] round 10 cents per pound

[illegible] round 10 cents per pound

HALCOMB SPECIAL TOOL STEEL, ANNEALED

10,000 lbs. 4½" round.
[illegible] lbs. 4" round, 14 cents per pound
4,000 lbs. 6½" round.

HALCOMB EXTRA WARRANTED, NO. 5 TEMPER TOOL STEEL

5,000 lbs. 1" x 8", 1" x 9" and 1" x 10" flat, 10 cents per pound.
[illegible] flats [illegible] per pound
[illegible] SANDERSON 1000 STEEL [illegible] flats and squares, 10 cents per pound.
[illegible] COLONIAL TOOL STEEL [illegible] flats, 10 cents per pound
[illegible] COLONIAL TOOL STEEL [illegible] rounds from ¾" to 3½" dia., 10 cents per pound.
[illegible] RESERVE 1000 STEEL [illegible] rounds, flats and squares, 10 cents per pound.

HIGH SPEED TOOL STEEL

[illegible] RUX AA [illegible] 5½" round, 40 cents per pound
[illegible] GONDOLA [illegible] ½" to 1½" round 10 cents per pound
[illegible] CYCLOPS [illegible] 1¼" to 1⅞" round 10 cents per pound

NEW CHROME NICKEL STEEL BARS

72,828 lbs. 1⅞" round, 18-20 feet long; Analysis—Carbon .24-.45, Mang. .30-.60, Phos. .04, Sulphur .04, Nickel 3.25-3.75, Chromium 1.25-1.75
25,760 lbs. 2" round, 18-20 feet long; Analysis—Carbon .35-.45, Mang. .30-.80, Phos. .04, Sulphur .04, Nickel 1.00-1.50, Chromium .45-.75
37,990 lbs. 2¼" round, 16 feet long; Analysis—Carbon .10-.20, Mang. .30-.60, Phos. .04, Sulphur .045, Nickel 1.50-2.00, Chromium .90-1.25
65,717 lbs. 2½" round, 18-20 feet long; Analysis—Carbon .25-.35, Mang. .50-.80, Phos. .04, Sulphur .045, Nickel 1.00-1.50, Chromium .45-.75.
20,760 lbs. 2⅝" round, 14-16 feet long; Analysis—Carbon .10-.20, Mang. .30-.60, Phos. .04, Sulphur .045, Nickel 1.50-2.00, Chromium .90-1.25
1,670 lbs. 4½" round, 18-20 feet long; Analysis—Carbon .35-.45, Mang. .30-.60, Phos. .04, Sulphur .04, Nickel 3.25-3.75, Chromium 1.25-1.75
114,377 lbs. 1" round, 16 feet long, Analysis—Carbon 29-31, Mang. .64-.68, Phos. .016-.017, Sulphur .016-.018, Silicon .17-.18, Nickel 1.30-1.36, Chromium .50-.52.
194,126 lbs. 4½" round, 12 feet long; Analysis—Carbon .30-.33, Mang. .38-.41, Phos .016-.019, Sulphur .019-.025, Nickel 1.28-1.36, Chromium .47.
70,000 NEW AEROPLANE TIE RODS, round and flat, of all sizes and lengths.

NEW SCREW STOCK

400,000 lbs. cold rolled steel, 2⅞" round, in mill lengths, $35.00 per net ton.

STEEL SPLIT PULLEYS

1600 Brand New "Dodge" steel split pulleys. All sizes from 12" to 48" diameter, 4" to 42" face, with bushings. Best pulleys made. Will sell in carloads at 70% off the list price, in less than carloads at 60% off the list price. This means that you can buy three of these pulleys for what you have to pay for one from the stores.

GENERATING UNIT, ALMOST NEW

1—150 K.W. Western Electric Generator, 250 volts, 600 amperes, 600 R.P.M., direct connected to 250 H.P. General Electric Induction Motor, 3 phase, 60 cycle, 440 volts, 600 R.P.M., complete with switchboard starters and instruments. Price $2500.00 complete, or separately $1250.00 for the motor and $1250.00 for the generator.

PIPE

1,000,000 feet of new and slightly used pipe from ¾" to 16" diameter, in full lengths.
10,000 feet of slightly used 3½" diameter Reading wrought iron pipe, in full lengths, with threads and couplings, 25 cents per foot.
100,000 feet of new black mandrel wrought iron, conduit with threads and couplings, from ½" to 4", in mill lengths.

BOILER TUBES

6 miles of slightly used 3½" boiler tubes, 15 to 16 feet long, straight ends, 15 cents per foot.
2000 4" boiler tubes, 16 to 18 feet long, 20 cents per foot.

NEW LEATHER AND RUBBER BELTING

20,000 feet, all widths and lengths.

JACOB ULLMAN 48-82 Oneida Street Buffalo, N. Y.

WE
HAVE
A FINE ASSORTMENT
OF

Used Lathes

RANGING IN SWING
FROM 12" to 30"

Write for Our Blue List

Hill, Clarke & Co., Inc.

The Machinery Merchants

156 Oliver Street
BOSTON 9, MASS.

BRAND NEW

Engine Lathes

CLEVELAND

16' x 6' Cabinet Legs with Regular Factory Equipment. Send for Photo.

$375.00 Each

Machinery Dealers, Inc.
NEW HAVEN, CONN.

G A R V I N

Machine Tools have been built for fifty-seven years. Naturally some of them are on the second-hand market.

Send us the Serial Number of any such machine you may be interested in, and we will tell you its age, and at the same time quote you on its up-to-the-minute successor.

No charge for this service.

The Garvin Machine Company
Spring & Varick Sts., New York

LOOK HERE

Large and Small Lathes.
Turret Type Miller used one [illegible]
Steam Hammers—never set up.
Five Ton Traveling Jib Crane—
[illegible] Planers
[illegible] and details gladly given.

The National Supply Co.
Toledo, Ohio

GUARANTEED NEW
AT USED MACHINE PRICES

LATHES

5—14" x 6' Whitcomb
2—14" x 6' Whitcomb M.D.
5—16" x 8' and 6' Whitcomb
4—18" x 6'-8' Whitcomb G.H.
3—18" x 8'-10' Whitcomb G.H.
5—20" x 8'-10'-12' Whitcomb
1—26" x 14' Whitcomb H.D.
Lugs and other attachments can be supplied to all.

MILLERS (Vertical)

2—2-H Becker
7—3-H Becker
4—AB-2 Becker
1—Model "B" Becker & 1 Model SB
8—Model "C" Beckers
3—Model C-1 Beckers
2—Model C-2 Beckers
3—Model AC-S Beckers
Write or wire for DESCRIPTIVE list. Special list.

McCoy Brandt Machinery Co.
210-14 Penn Ave., Pittsburgh, Pa.

Blanchard Grinder

One 24" Vertical Blanchard Surface Grinder, Direct Drive, with 20 HP. G. E. motor, 440 volts, 3 phase, 580 RPM., and G. E. motor, 2 HP., 440 volts, 60 cycle, 3 phase. GOOD CONDITION. [illegible] subject to prior sale.

Sweet & Doyle Foundry & Machine Company
Troy (Green Island), New York

STOP LOOK AND WRITE

for quotations from

LARGEST STOCK OF MECHANICAL EQUIPMENT BETWEEN CHICAGO AND NEW YORK CITY

MILLING MACHINES

No. 3 S Cincinnati Universal (2)
No. 3 Cincinnati Plain, High Power (2)
No. 3 Hendey-Norton Universal
No. 2 Cincinnati Universal, High Power
No. 3 Cincinnati Plain
No. 2 B Brown & Sharpe Plain
No. 0 Brown & Sharpe Plain
No. 12 Garvin Plain
No. 2 Cincinnati Vertical
No. 3-H LeBlond Hor. Heavy Duty, Plain

SHAPERS

16" Gould & Eberhardt Single Geared Crank
16" Smith & Mills Back Geared Crank
20" Gould & Eberhardt Back Geared Crank
20" Stockbridge Back Geared Crank
24" Gould & Eberhardt Back Geared Crank
24" American Back Geared Crank, motor drive

FORGING MACHINERY

Lewis Dbl. End Bar and Splitting Shear, 30" throat splitting, 26" throat bar end.
Doelger-Kirsten No. 4 Alligator Shear, cap. 4¾" sq.
Lewis Alligator Shear, cap. 2¾" sq.
Carlin Alligator Shear, cap. 2½" sq.
1500 lb. Bement-Miles Steam Drop Hammer.
2000 lb. Bement Miles Steam Forging Hammer.
2500 lb. Bement Miles Steam Forging Hammer.
2500 lb. Chambersburg Steam Forging Hammer.
No. 7½ Bliss S S. Dbl. Grd. Toe Rod Press
1" Acme Steel Rod Upsetting Machine

STRUCTURAL EQUIPMENT

Beadle Sgl. End Punch and Shear, 50" throat
Rock River Dbl. End Punch and Shear, 24" throat
Niagara 96", 72", 36" Power Sq. Shears
Pexto and Stoll 53" Power Sq. Shears
Cleveland Straightening Rolls, 84" between housings, rolls 10" dia. had

LATHES

Johnson 50" x 49' 6" triple geared
Pond 48" x 27' triple geared
Niles 48" x 28'
Wickes 36" x 29', d.b.g., q.c.g. (2)
Hendey 24" x 26' 6", geared head, d.b.g.
Walcott 26" x 10' 6", d.b.g., q.c.g.
Sidney 18" x 8', d.b.g., q.c.g.
Hendey 18" x 8', d.b.g., q.c.g.
Cleveland 16" x 6', d.b.g., q.c.g.
Carroll-Jamieson 13" x 6'

TURRET LATHES

Jones & Lamson 2¼" x 24" Flat Turret
Jones & Lamson 3" x 36" Flat Turret
Gisholt 24" x 6' Turret

PLANERS

Betts 72" x 56" x 12', 2 hds.
Pond 48" x 48" x 22', 4 hds.
Bickett 36" x 36" x 12', 2 hds.
Chandler 24" x 24" x [illegible], 1 hd.

DRILL PRESSES

Bausch 9' Radial, Pond 8' and 6½'
Prentice 7' and 5' Radial
Dreses 3' 6", Fosdick 3' Radials
Prentice 26" High Speed Drill
Baker 20" Heavy Duty Drill
Upright Drills 20" to 40"

BORING MILLS

Betts 10/16', 84" Vertical
Niles 10', 90", 51", 36" Vertical
Pond 84", 72" Vertical
Colburn 62", Bullard 51", 42", 30"

Morgan Plate Shear, 96" between housings, cap. 1" thick. Knives 94" long. 24" throat.

26" United Engr. Roll Lathe, 18' bed.
24" United Engr. Roll Lathe, 20' bed.

RUSSELL MACHINE COMPANY, Pittsburgh, Pa.

$500,000
LIQUIDATION SALE

NEW JERSEY TUBE WORKS, HARRISON, N. J.

ALL MACHINERY—SMALL EQUIPMENT—AND METALS Must Be Turned Into Cash at Once.

ROLLING MILL—One motor driven unit consisting of four 2 high mills, 18" diameter rolls. One engine driven unit, consisting of three 2 high mills, 18" diameter rolls. One small 2 high finishing mill, belt driven. Six or eight belt driven straightening rolls.

EXTRUDING DEPARTMENT—This department contains a hydraulic extruding machine complete with Dean pump, motor driven, a complete outfit, which was one of the most successful in operation.

TUBE MILL—Fourteen draw benches, from twelve to twenty feet in length and of different pulling capacities. One brand new twin draw bench about twenty-four feet long and 40,000 pounds pull. Medart rod straightener, eight roll Kane & Roach straightener, alligator shear, pointing machines, swaging machines, metal scalpers, bending machines.

PRESS ROOM—Three No. 74½ Bliss Geared presses, two No. 12 Adriance double acting presses, Zeh & Habneman geared straight sided press, six No. 20 Bliss Presses, one No. 21 and one No. 20 "B" Bliss press, one No. 78½ Bliss triple geared press, Foster, Warner & Swazey and Garvin screw machines.

MACHINE SHOP—Twenty lathes, from 12" x 5' to 24" x 12', Brown & Sharpe surface grinder, three shapers, universal milling machine, drill presses, cylindrical grinder, planer.

MISCELLANEOUS—Mill trucks, mill supplies and complete contents of pickling, polishing and plating departments, including tanks, buffing spindles, automatic polishers, etc., furnaces and all other equipment likely to be found in a plant of this kind.

One million pounds of brass, one-half million pounds copper, spelter, lead and other metals.

Have your representative visit this plant at once, it will pay you as this is no ordinary sale.

Material and equipment can be bought in separate lots.

HERALD MANUFACTURING & TRADING CORPORATION

KINGSLAND AVENUE AND HAMILTON STREET
HARRISON, NEW JERSEY

Timely Bargains in Machine Tools and Equipment — 90% New

5—Prentice 27"x16' Engine Lathes, 10' centers, geared head, single pulley drive for 6" belt, quick change gears, compound and steady rest, face plate drive, good as new.

5—Becker No. 2 plain vertical Milling Machines, cone drive; good as new.

1—Landis 20"x96" Universal Table Grinder, 1 extra new spindle, motor drive; good as new. 25 hp., 60 cycle, 3 phase, 440 volt AC motor included; practically new.

3—Modern 12"x36" Plain Grinders, overhead drive, self contained; excellent condition.

1—Diamond Wet Tool Grinder, with Apron and cam motion ball bearing—ring wheel 30"x2½", cone drive; excellent condition.

1—Pratt & Whitney No. 12 Profiler, double spindle, belt drive, with tools; good as new.

12—Worthington Pumps, 4"x4", 3 stage; arranged for motor drive having base plate and motor pinion; good as new.

2—Gould Rotary Pumps, 4" dia. intake—3" dia. outlet, 270 gal. per minute capacity, motor drive, with 5 hp., 440 volt AC motor; NEW.

1—No. 8 B. F. Sturtevant Blower, belt drive for 5" belt, outlet 13"; good as new.

1—D. E. Whiton Centering Machine, 2 spindle, single pulley drive, 2" belt, will center up to 6" bar; excellent condition.

1—Morgan No. 9 Nailing Machine, belt drive; good as new machine.

3—American Heat Treating Furnaces 39"x35"x17"; outside measurements 65"x46"x46"; counter balanced doors; good condition.

The Prices Intensify the Purchasing Power of the Dollar. List your needs and send them to us for quotations.

Erie Mfg. & Supply Co.

Erie, Pa.

Some Excellent Values

AIR COMPRESSORS

1 [illegible] Ingersoll, two stage, 20" H.P. and 14" H.P. [illegible] 27" L.P. and 16½" H.P. [illegible] 24" stroke, with intercooler.
1 [illegible] Ingersoll, two stage, tandem compound, 17" H.P. and 29" L.P. [illegible] 27" L.P. [illegible] H.P. [illegible] 24" stroke, A.C. connected.
1 [illegible] H. [illegible] Pneumatic, tandem type, 20" H.P. and 31" L.P. Straight, 16½" H.P. and 28" L.P. air cylinders, 24" stroke, belt [illegible].

AIR RECEIVERS

1 [illegible] x 10' Receiver, 115 lb. pressure.
1 48" x 8' Manhattan Ship, 100 lb. Pressure.
2 48" x 12' Air Receivers.
1 60" x 15' Air Receiver.

WOODWORKING MACHINERY

1 McKinnon 32" saw; arbor, universal head; B.D.
1 [illegible] No. 3 [illegible] saw; B.D.
1 Lane & Lane No. 117 Lightning dbl. cyl. surfacer; B.D.
1 J. A. Fay & Co. 48" [illegible] band saw; B.D.

LATHES

1 16" x 8' quick change Sidney; B.D.
1 20" x 12' Prentiss; B.D.
1 26" x 12' Muller; B.D.
2 21" x 10' 5" Hamilton, B.D.
1 24" x 9' New Haven; B.D.
1 24" x 16' Pond; B.D.
1 36" x 14' Pond, 3 H.P.; 220 V.D.C. Motor.
1 36" x 16' Pond, 5 H.P., 220 V.D.C. Motor.
1 30" x 23' 11" Pond; B.D.
1 42" x 20" Davis; 9 H.P., 220 V.D.C. Motor.
1 24" Foster turret; B.D.
1 24" Gisholt turret; B.D.

MILLING MACHINES

1 No. 6 No. 1 Ingersoll plain, B.D.
1 24" x 24" x 12" Ingersoll planer type, M.D.

PLANERS

1 48" x 48" x 16' Pond; 4 heads, M.D.
1 66" x 66" x 20' Sellers, 4 heads, B.D.

HEAVY DUTY PUNCHES

1 25" Tht. I.&A. dbl. ¾" x ¾"; B.D.
2 30" Tht. Jumbo; ⅞" x 7/16"; B.D.
1 36" Tht. lever type dbl. ⅞" x ⅝", B.D.
1 50" 36" Small Bros. dbl. 1" x 1", M.D.
1 32" Tht. Small Bros. dbl. 1" x 1", M.D.
2 56" Tht. Amn. Ship; 1" x 1"; B.D.

SHEARS

1 12" Pet. H&I bar shear, cap. 1" bars; B.D.

If not on our mailing list send for your copy, as the above is partial list only of material and equipment we have available.

The American Shipbuilding Company

Department "B"

Foot W. 54th St. Cleveland, Ohio

Niles-Bement-Pond Co.

111 BROADWAY, NEW YORK

Second Hand Equipment

Lathes

[illegible] x 18' Taper Porter Cable
14" x 16' x 8' Whitcomb, Q.C.
17" x 6' and 8' LeBlond Geared Heads
20" x 10' LeBlond, Q.C.
26" x 10' Pond, 220 Volt D.C. Motor
28" x 12' Pond
28" x 18' Niles, Taper
32" x 17' Pond, T.G.
36" x 12' Pond, T.G., 220 Volts D.C. Motor
36" x 17' Pond, Taper, 220 Volts D.C. Motor
36" x 20' Pond, 220 Volts, D.C. Motor
36" x 28' Bement, T.G.
42" x 17' Pond, T.G., 220 Volts, D.C. Motor
42" x 20' Niles, T.G.
48" x 24' Pond, Geared Head, 220 Volts, D.C. Motor
48" x 30' Niles, T.G.
50" x 17' Miles (Old Style)
54" x 28' American, T.G., 220 Volts, D.C. Motor
63" x 40' Bement, T.G.

Turret Lathes

1", 2", 2½" and 3" P. & W.
1½" Southworth, Plain Head Screw Machine
2" x 24" W. & S. Hollow Hex
2" x 24" J. & L. Cone Head 0000
No. 6 A. P. & J., 220 Volts D.C. Motor
21 and 28" Pond Rigid Turrets
22" Conradson-American Turret

Planers and Shapers

24" x 24" x 6', 8' and 10' Whitcomb B
30" x 30" x 6' and 10' Pond 2 Heads
36" x 36" x 10' to 16' Niles
36" x 36" x 24' Bement
42" x 42" x 14' Bement
42" x 42" x 26' Pond, Reversing Motor
48" x 48" x 16' Pond, Reversing Motor
48" x 48" x 20' Bement, Belt
54" x 36" x 10' Bement, Belt
54" x 54" x 12' to 22' Pond, Reversing Motors
60" x 60" x 14' to 24" Niles, Belt
72" x 72" x 12' Bement, Belt
72" x 60" x 14' Bement, Belt
72" x 60" x 14' Bement, Reversing Motor
72" x 72" x 20' Ridgway, Forge Reversing Motor
76" x 76" x 26' Pond, Reversing Motor
10' x 10' x 36' Betts, 220 Volt, D.C. Motor

Radial Drills

4' Bickford Speed Box Radial
5' Niles Full Universal Speed Box
5' Ridgway, 220 Volt D.C. Motor
6' Pond, 220 Volt, D.C. Motor
6' Niles, Full Universal Speed Box

Grinders

Mummert Dixon Port Radial Grinder, 220 Volt, D.C. Motor
18" Gorton Disc Grinder
8" x 20' Fraser Universal
No. 3 B. & S. Universal
12" x 36' Cincinnati, Plain
No. 11 B. & S. Internal
P. & W. Old Style Vertical
P. & W. Thread Miller Cutter Grinder

Boring Machines

26"-44" Niles Side Head Mill
31" Niles Mill, with Turret Head
60" Bement B. T. Mill
72" Ridgway, 220 Volt D.C. Motor
10' Niles, 220 Volt, D.C. Motor
10'-16' Niles, 220 Volt, D.C. Motor
2½" and 3" Lucas, Horizontal
4½, 5 and 6½" Niles Floor Borers
2½" to 4¾" Horizontal Boring and Drilling Machines

Miscellaneous

Air Compressors—324" and 835" Steam Drive
Blow Furns.—No. 10 Sturtevant and No. 70 Buffalo
Cranes—3 Ton, 14' Span Niles 2 Motor 220 Volt D.C.
Cranes—20 Ton, 48' Span Sellers 220 Volt D.C.
Engines—125, 150 and 200 H.P. Plain Corliss
Generator Set—100 KW., 22 Volt, D.C. direct connected to engine
Hammer—80 lb. Bradley, Cushion Helve
Hammer—800 lb. Bement, Board Drop
Heater—600 H.P. Cochrane Feed Water
Hot Blast Apparatus—72" Pan, Steam Engine Drive
Pumps—200 to 500 Gal. Steam Drive
Saw—6' x 6' Rogers, 220 Volt D.C.
Saw—No. 16 Hooker, 8" capacity
Saw—72" Nutter-Barnes
Saw—7" capacity Paton Lucas
Shaper—6" Bement
Shaper—18" Putnam, 220 Volt D.C. Motor

[illegible] M.D.

No. 5 Becker Vertical Miller.

Presses 2C-2P-3P Ferracute.
72" Betts Vertical Boring Mill.
[illegible]

JONES MACHINE TOOL COMPANY

CINCINNATI OHIO

PLANERS

[illegible]

MILLING MACHINES

[illegible]

No. 3H LeBlond plain milling machine with vertical attachment, friction double back

No. 3 Kempsmith plain milling machine, with [illegible]

FACTORY & MILL SUPPLY COMPANY

[illegible] Street Boston, Mass.

1125 cu. ft. Ingersoll-Rand belted air compressor
1500 cu. ft. Sullivan steam-driven air compressor
36" openside traveling head shaper
60" back geared radial drill
96" x 96" x 6' [illegible]
42" x 42" x 12' New Haven planer
[illegible] Manning steam hammer
96" x 18' [illegible]
24" x 12' [illegible]
33" x 20' Draper lathe, triple geared
54" x 16' Putnam heavy lathe
No. 3 Kempsmith universal miller
No. 2½ B. [illegible]
No. 3 Becker plain miller
No. 5 Cincinnati miller
Owen duplex miller
No. 2 [illegible]

Wm. C. Johnson & Sons Machinery Co.

1001-3-5 N. 6th St. St. Louis, Mo.

We Offer Good Tools Only, at Lowest Prices

Milling Machines:

1—No. 2 VAN NORMAN Duplex Miller, with d.c. and s.s. heads, etc., 30% new.
1—No. 2 ROCKFORD Univ. S.P.D., 95% new.
1—No. 2½ ROCKFORD Univ. heavy, NEW.
1—No. 3 CINCINNATI Univ. heavy duty.
1—No. 3 KEMPSMITH plain, vert. hd., latest.
2—BRIGGS type "B" 42" Production.
1—P. & W. 32" in. heavy AUTO., all NEW.
3—No. 2-H BECKER Verticals, all NEW.
1—No. 1 BROWN & SHARPE Vertical, NEW.
15—Lincoln type, and others, all sizes.

Shapers—Planers—Slotters:

6—QUEEN CITY 16-20-24 in. B.G., all brand NEW. Full guaranteed. Get circulars.
3—16-18-24 in. GOULD & EBERHARDT, B.G.
2—16 and 20 in. MILWAUKEE, B.G., like new.
2—SLOTTERS, 6 in. Newton, complete, NEW.
3—SLOTTERS, 12 in. Betts, with rotaries.
1—PLANER, 24" x 6' Powell, latest.
10—SELLEW 16" Univ., table, all NEW.

Lathes—Screw Machines, Etc.

2—HENDEY, 14" x 6' tapered, like new.
3—PUTNAM 26" x 25' q.c.f., like new.
1—30" x 11' AMERICAN Q.C. Geared.
12—26" x 9' BRIDGEFORD, q.c.g., like new.
2—16" x 10' WHIT.-BLAISDELL, q.c. gear.
40—Other good lathes, all sizes and makes.
10—DAVIS, 12"-14" Q.C. Gear Lathes, NEW.
2—RIVETT No. 505 Precision and Collets.
1—No. 2½ V. & O. Incln., 99% new.
3—Horning, No. 39 Bliss.
1—CHUCKING GRINDER, No. 20 Bryant.
2—No. 2 Universal Grinders, latest, like new.
3—CYL. GRINDERS, 3 x 18" Norton, latest.
1—No. 2 A.W. & S. Univ. Hollow Hex., latest.
2—No. 10 FOSTER 3 1/16" cap., G.F.H.
3—2¼" GRIDLEY S.S. Auto., latest.
5—No. 2 FOSTER HAND SCREW MACHINES.
1—CIN.-ACME 34" x 36" Flat Turret Lathe.
1—BOLT CUTTER, 1½" Acme, double head.
1—No. 6 W. & S. G.F.H. Turret, latest, new.
1—BROACHER, No. 1 J. N. LaPointe.
15—HIGH SPEED DRILLS, 1, 5 and 6 spindles, H. & W. and ALLEN. All 95% new.
200 OTHER MACHINE TOOLS, new and almost new, including all sizes and makes.

Complete details—lowest prices—on request.
Only part of stock listed above.

NOTE—We are always buying—entire plants or single tools, raw material, etc., any quantity, for cash only. Let us hear from you!

A. LAMBERG & CO.

241-251 Centre Street, New York City

We have the largest stock of

NEW and USED MACHINE TOOLS WOODWORKING MACHINERY, etc. in the State of Michigan

Let us have your inquiries. Our prices will satisfy you. Ask for our latest Stock List.

Riverside Machinery Depot

251 St. Aubin Ave.

Detroit Mich.

Stokvis

Brand New Tools

Machines purchased by us direct from makers and held in high grade New York warehouses. Every Tool absolutely brand new and in first class condition. Prices below the market. Over 300 tools sold to date.

R·S·Stokvis & Sons Inc.
17 Battery Place
New York

Grinding Machines

From List of Surplus Equipment

3—6"x32" Norton Plain Cylindrical.
1—10"x36" Norton Cam.
1—10"x50" Norton Plain Cylindrical.
2—14"x36" Norton Crank Shaft.
1—Norton Tool and Cutter.
2—6"x30" Morse Plain Cylindrical.
4—No. 70 Heald Internal.
1—No. 65 Heald Cylinder.
1—Detroit Centerless.
2—Blanchard Motor Head.
1—Higley Saw Grinder.
1—Pratt & Whitney Gun Barrel Drill Grinder.
1—Cisholt Universal Tool Grinder.

Condition Excellent
Priced to Sell

The New Britain Machine Co.
New Britain, Conn.

BATH Cleveland

BORING MILLS—VERTICAL

2—Lucas Horizontal, table 42" x [illegible], excellent condition.
1—36" Bullard, cone drive, belt feed.
1—56" Colburth, cone drive, gear feed.
1—42" Bullard V.T.L.

DRILLS

2—21" Aurora with tapping spindle, geared feed, A-1.
3—24" Auroras, Superior and Cincinnati-Bickford sliding head, excellent condition.
2—28" Aurora sliding head, late model; excellent.
2—32" Cincinnati-Bickford sliding head; excellent.
1—No. 310 Baker high speed; excellent.
1—Baush 16 spindle multiple, 14" x 20" maximum layout, 11 spindles mounted.
1—4-spindle Foote-Burt rail drill for about 1" drills.
1—5' Fosdick plain radial gear feed, tapping attachment.

GRINDERS

1—No. 11 Brown & Sharpe plain, 6" x 30"; good.
1—10" x 36" Landis plain; good.
1—No. 3 Brown & Sharpe 12" x 40" universal; good.
1—14" x 50" Norton plain, excellent.
1—No. 3 Cincinnati 12" x 18" universal.

MILLERS

No. 2-A Brown & Sharpe universal, gear drive and feed.
No. 3 Brown & Sharpe plain, cone drive, gear feed; good.
No. 3-B heavy Brown & Sharpe plain, single pulley; excellent.
No. 12 B. & S. Lincoln; good.
No. 7-H Becker, Lincoln; fair.
Type A Briggs, Lincoln; excellent.
No. 2 Brown & Sharpe vertical; fair.
No. 1½ B Milwaukee universal single pulley drive, power feeds, in all directions, dividing head, vertical attachment; very good.
20" x 7½" x 18" Osterlein plain; old, fair.
24" x 7½" x 18" Osterlein plain; 10" dividing head; good.
Kempsmith, Lincoln type millers (2).
Rockford, power feed miller, table 30" x 7½".

LATHES

3—28" Bridgeport plain turning lathes, geared head and feed; good as new.
3—Bridgeford crank pin turning lathes, all geared; like new.
All sizes from 14 to 24" in stock.

SCREW MACHINES AND AUTOMATICS

1—No. 3 B. & O. brass turret lathe, with chasing attachment and universal slide.
1—2" x 24" Warner & Swasey turret lathe, bar or chuck work.
No. 53 National Acme automatic screw machines.
No. 4 B. & O. Turret lathe, power feed to slide.
21" Gisholt turret lathe complete; excellent.
1—24" Gisholt turret lathe complete; very good.

MISCELLANEOUS

No. 1 Baker keyseater; very good.
No. 5 Ajax steel body bulldozer; hi-speed.
20,000 Waterbury-Farrel 20" draw benches and extension for tube delivery.
16" Betts crank slotter; good.
Centering machine. Write us what you want.

Machines from Stock Offered on the 30-Day Trial Basis

Cyril J. Bath & Co.
Machinery Merchants
1601 St. Clair Ave. N. E.
Cleveland, Ohio

Rebuilt GISHOLT TURRET LATHES

Two 21"-3½" Spindle Bore
Three 24"-6¼" Spindle Bore

Entirely rebuilt in our own shop with same jigs and fixtures used when first built.

We guarantee them to be as accurate as new machines.

Gisholt Machine Co.
Room 1725, 30 Church St.
New York City
1888 Page Ave., Cleveland, Ohio
1201 E. Washington Ave.
Madison, Wisconsin

We have for sale the following machine tools at prices that you cannot afford to be without.

2—No. 3 Modern Universal Cylindrical Grinders Complete.

10' bed, D. B. G. Q. C. Gears complete.

bed, complete with 15 hp. Motor.

1—P. & W. Single Head Profiling Machine.

The above goods are in perfect running order and guaranteed by the

ACCURATE TOOL WORKS
Erie, Pa.

DETROIT STOCK

GEAR CUTTING MACHINES

No. 0, 12" to 8 Sharpes for spirals and bevels.
No. 1, 2" Brown & Sharpe for spirals.
No. 1, 2" Brown & Sharpe for spirals.
2 Fellows Gear Shaping Machine

MILLING MACHINES

No. 2 Garvin Vertical. Single pulley type.
No. 2-B Kearney & Trecker Plain. Latte design. Vertical attachment.
Style A Briggs Manufacturing type. 22" power table feed.
No. 20 Van Norman Duplex with subhead.

TURRET LATHES

No. 3 Foster, 1½" capacity, back gear, screw feed to turret, bar equipment.
No. 5 Warner & Swasey 3¾" cap power feed to turret and cross slide.
24" Standard Single pulley drive. 4" spindle bore.
3 & 5C Jones & Lamson Bar and chuck equipment, motor drive, late type.

DRILLING MACHINES

24" Cincinnati Bickford Plain Radial. Cone type.
Western heavy type, Plain Radial. Triple gear.

AUTOMATICS

2 2" Four spindle Gridleys
1 Style "A" Cleveland.
1 Style "A" Cleveland
1 Style "A" Cleveland
1 Style "B" Cleveland, with magazine attachment.
1 National Automatic Stud Threader

PLANER

1 36" x 36" x 12' Woodward & Powell. 2 rail heads.

TELL US WHAT YOU WANT
WHAT HAVE YOU FOR SALE?

E. B. Stickley Machinery Co.
693-701 E. Congress St., Detroit, Mich.

PLANERS

62"x56"x26' Gray, 2 heads on rail and two uprights.
42"x42"x10' Gray, 1 head.
36"x36"x16' Ohio, 1 rail head, 1 side head.
36"x36"x14' Rockford, 2 rail heads, 2 side heads.
30"x30"x12' Woodward-Powell, 2 heads
36"x36"x 8' Betts, 2 heads.
30"x30"x 8' Cincinnati, 1 head.
32"x32"x 8' Pond, 1 head.

MILLERS

No. 4 Becker-Br. Pl. D. B. G. Hd.
No. 4½ Becker-Br. Pl.
No. 5 B & S Sing. B. G.
No. 2 Cleve. Pl. Vert. Att.
No. 1 Kemp. Univ.
No. 2 Milw. Univ.
No. 3 Brown & S. Univ.
No. 4-B Becker Vert.
No. 5-B Becker Vert.
No. 6-B Becker Vert.
40" Hilles & J. Vert.
No. 2-M Potter & J. Auto. Horiz.
No. 33 Becker-Br. Planer Type.
24"x24"x8'6" Ing. Slab.
42"x40"x8' Ing. Slab.

The E. L. ESSLEY · MACHINERY · Co
551 Washington Blvd., Chicago, Ill.

GOOD MACHINE TOOLS

Gridley 4 spindle automatic, 2¾" cap.
Rockford No. 2 Plain Millers.
Brown & Sharpe No. 13 Universal Miller
Brown & Sharpe No. 3 A Plain Millers.
Brown & Sharpe Cutter and Reamer Grinders.
Brown & Sharpe No. 2 and 2 Universal Grinders
No. 2 N. Sutter
Kempsmith No. 3 Plain Millers.
Pratt & Whitney No. 2 Plain Millers (power feed).
Gisholt Horizontal Boring Mill, 4" bar.
Natco 10 spindle Multiple Drill.
Pratt & Whitney No. 12 24 spindle Multiple Drill.
24 x 24 x 8 ft. Planers.
24 x 24 x 6 ft. Planers.
Cincinnati 32 x 32 x 10 ft. Planer.
Niles-Bement-Pond 36" Radial Drill.
American 36" Radial Drill.
Lathes, Hammers, all makes and sizes
Vertical Boring Mill 64"

JOHN NUTTALL,
1748 N. 5th St., Philadelphia, Pa.

Back to Lower Prices

Boring Mill, Bullard, 32" Turret Head
Boring Mill, 12", two heads
Compressors, 9" x 8" and 12" x 10" Ingersoll-Rand
Drills, 1, 2, 3, 4 and 6 spindle, Sensitive
Drills, 24", 26", 28" and 32" Sliding Head
Gear Cutter, Whiton 36" (2)
Gear Miller, No. 1 Bolton, automatic
Hammer, 40 lb. Bradley Helve
Grinder, No. 1 Internal, Capitol 2" x 2"
Grinder, No. 1, 3 and 7S W. & M. Surface
Grinders, 6" x 30" and 10" x 24" Norton, Plain
Grinder, 12" x 42" Landis, Plain
Grinder, 12" x 36" Cincinnati Universal
Grinder, Gisholt for cylinders en bloc
Oil Groover, Garvin practically new
Air Separator, Springfield
Milling Machines, B. & S. Plain No. 1½ and No. 2 Heavy
Milling Machine, No. 32 Kempsmith, Lincoln type
Pipe Machines, 2", 4", 6" and 12"
Punch and Shear, 1½" x 1½", 10" throat
Pyrometer, Brown, 2000°, two-way
Presses, No. 3-A, 4-A, 5-A and 6-A Willard
Press, No. 18 Bliss with sub press
Press, No. 6 Rockford Straight Side
Radial, 3' Morris, plain gear box
Shear, 5' for 10 gauge, Robinson
Shear, 52", 18 gauge, Niagara
Shear No. 20 Ohio Work 14 gauge 20" throat
Turret, No. 2 Warner & Swasey, Hex Hex 2 ¼"

New Drills, 20" standard makes, $111.50

Motors, ½ to 50 H.P., 3 phase, G. E., new

Just changed daily, therefore advise specifically what you want and we will endeavor to fill your exact requirements.

THE OSBORNE & SEXTON MACHINERY COMPANY
COLUMBUS OHIO

Stop!

Why look further?
We offer some

Real Bargains

Write today

Partial List

1—16 x 6 Marvel Lodge & Shipley Lathe
1—16 x 6 Shaving Lodge & Shipley Lathe
1—18 x 10 Std. Head Mfg. L. & S. Lathe
1—22 x 10 (20" swing) L. & S. Pat. H. Chucking Lathe
3—22 x 10 Pat. Hd. L. & S. Chucking Lathes
2—24 x 8 Std. 10 H.G. L. & S. Turret Lathes
4—25 x 48 Std. Hd. L. & S. Boring Lathes
2—24 x 36 Marvel L. & S. Lathes
1—Reversing Planer control for D.C. Motor, complete without motor
1—Buffalo Forge Co. Fan and Heater Unit
1—Garvin Mach. Co. No. 1 Plain 4 Step Milling Machine
1—Model B Cleveland Automatic Screw Machine
1—Cincinnati No. 4 Plain Milling Machine, 3-Step Cone, 10 H.P. motor and motor feeds
1—Cincinnati No. 4 Plain Milling Machine, 4-Step Cone, Single Back Gear Drive, with all power feeds
1—21" Cincinnati Bickford Drill Press
1—10 H.P. 750 R.P.M. 220 Volt Allis Chalmers Motor D.C.
1—3 H.P., 1150 R.P.M., 220 Volt D.C. Reliance Motor

Send for complete detailed descriptions

The Lodge & Shipley Machine Tool Co.
Cincinnati Ohio

---

3 high pressure die casting machines in first class condition suitable for aluminum, zinc, tin or lead base metals. Will sell reasonable.

Perfection Auto Parts Co.
Cleveland, Ohio

Wire Nail & Rivet Machines
New and Second Hand. Wire Forming and Roll Thread Screw Machines. Headquarters for Heading Machines, all kinds.
Bought and sold.

JESSE ATHERTON
24 Calender St. Providence, R. I.

Special Offering
at Bargain Prices
Condition Guaranteed

5000 lbs. Chambersburg double leg steam hammer

10′ x 16′ Bement-Miles Vertical Boring Mill, 2 swivel heads, cone drive

Two 524 H.P. Babcock & Wilcox Boilers, steel headers, single setting, double butt strapped, double riveted drums, ½″ plate; 180 pounds complete

No. 8 Hilles & Jones 30 foot Bending Rolls, motor drive

Two 20 K.W. General Electric, 110-125 volts, complete with all accessories

One 10 K.W. Emberg, 110 volts, complete with all accessories

One 10 K.W. Westinghouse, 110 volts, complete with all accessories

New 125 H.P. Nash upright self-oiling enclosed crank case, 3 cylinders, complete, never used

Nineteen new 32″ x 14′ Pittsburgh Lathes, triple geared face plate drive, cone drive

Send for our latest Stock List.

C. W. Prichard Co., Inc.
Rooms 380-381
50 Church Street, New York City
Warehouse, Jersey City, N. J.
Telephone: Cortlandt 6044-7752

One No. 0 Gidding & Lewis Horizontal Boring, Drilling and Milling Machine. New—set up but never used.

Federal Equipment & Supply Co.
110 W. 40th St.
New York

In Stock for Immediate Delivery

BORING MILLS
60″ Bullard, 2 Plain Heads

DRILLING MACHINES
26″ Barnes B. G. Drill
3′ American Sensitive Radial Drill
6′ Gang Radial Drill
6′ Prentice Radial Drill
16″ Kern 2 Spindle
Taylor & Fenn 2 Spindle
Leland-Gifford, 6 Spindle

GRINDERS
8″ x 40″ Morse Grinder
14″ x 50″ Norton Grinder
No. 4 Gardner Disc Grinder
Wisconsin Tool & Cutter Grinder
No. 6 Besly Double Spindle Grinder

LATHES
16″ x 6′ Reed, compound rest
16″ x 8′ Hamilton, compound rest
24″ x 12′ Bradford, compound rest
20″ x 8′ Porter, compound rest
32″ x 18′ Bradford, compound rest
Porter-Cable Mfg. Lathe
9″ x 24″ Sundstrand Mfg. Lathe

MILLING MACHINES
No. 5 Hendy-Lincoln Type Miller
Taylor & Fenn Vertical Miller
No. 3 Becker Vertical Miller
No. 13 Brown & Sharpe Miller
No. 32 Kempsmith Miller

SCREW MACHINES
No. 0 Foster, Plain Head, Automatic Chuck and Wire Feed
No. 2 Foster, Plain Head, Automatic Chuck and Wire Feed
No. 1 Pratt & Whitney, Automatic Chuck and Wire Feed
No. 1 Bardons & Oliver, Plain Head, Automatic Chuck and Wire Feed

TURRET LATHES
24″ Gisholt
2″ x 24″ Jones & Lamson
14″ Warner & Swasey

Stocker-Rumely-Wachs Co.
117 N. Jefferson St.
Chicago, Illinois

OPENING SALE

2—Pratt & Whitney No. 12 Production Miller, A-1, each	$125.00
1—Garvin No. 2-H Horiz. Tapping Machine, A-1	40.00
1—Dispatch Mfg. Co. Electric Hardening Furnace, 110 Volts, practically new	200.00
1—Ferracute No. C-5, 2″ stroke Power Punch Press, like new	650.00
1—Modern No. 8 Plain Grinder, complete,	400.00
1—Modern No. 2 Universal Grinder, complete	650.00
1—Cochrane & Bly No. 2 Filing Machine, like new	125.00
4—Cowan 5,000 lb. capacity, Elevating Trucks, each	150.00
2—Lewis-Shepard 2,800 lb. capacity, Elevating Trucks, each	70.00
1—Lewis-Shepard, 8,000 lb. capacity, Elevating Truck	275.00
1—Wagner 3 H.P., Single Phase Motor, complete and like new	100.00
1—Garvin No. 15 Plain Milling Machine, complete, A-1	375.00

MANUFACTURERS MACHINE TOOL & SUPPLY CO., Inc.
256-260 Middle St. Bridgeport, Conn.

BUYERS WANTED
186 Machine Tools
To Be Sold in January at About One-Half Competitive Prices

To Bring Buyers to Our Warehouse We Offer

2 Turret Lathes
1 Boring Mill
1 Milling Machine
1 Key Seater
3 Presses
at $75 Each

New Catalog Now Ready

Write for It

Partial List

BORING MILLS
60″ Bickford, standard, 2 heads, low price.
8–24″ Bullard Vertical Turrets.

DRILLS
8′ Niles Plain Radial.
1′ Gang, gear box drive.
6 spindle Baush, 1″ capacity.
24″ Barnes all geared.
3 spindle Barnes gang.

LATHES
32″ x 22′ New Haven, belt drive.
36″ x 21′ Double end lathe, T.G.
32″ x 14′ Fitchburg 3 S.C., D.B.G.
28″ x 14′ Fitchburg 3 S.C., D.B.G.
30″ x 12′ Johnson, T.G., low price.
28″ x 12′ Putnam Q.C., D.B.G.
20″ x 12′ Hamilton raising block to 30.
20″ x 8′ Lodge & Shipley geared head.
18″ x 8′ Morris Q.C., D.B.G.

MILLING MACHINES
No. 50 Becker Verticals, new.
No. 3 LeBlond, plain, high duty.
Garvin 2A Universal.
Newton Vertical Slab.
Pratt & Whitney No. 2 Hand.
No. 2 Kempsmith Universal.
50″ x 8′ Ingersoll Slab.
No. 25 Becker Plain.
No. 2 Hendey Norton Plain.
No. 1½ Hendey Norton Universal.
No. 12 Brown & Sharpe Bradley Vertical, 22-14-18.

PLANERS
48″ x 48″ x 14′ Powell, 4 heads, reversible motor drive, complete with electrical equipment.
48″ x 48″ x 16′ Bement-Miles, 4 heads, belt driven.
36″ x 36″ x 12′ Niles-Bement-Pond, 2 heads.
36″ x 36″ x 18′ Pease, 2 heads.
30″ x 30″ x 10′ Flather, 2 heads, belt driven.

Graves Machinery Exchange
Liquidating the Estate of Walter Graves
Johnston Ave. & Monitor St.
Jersey City, N. J.

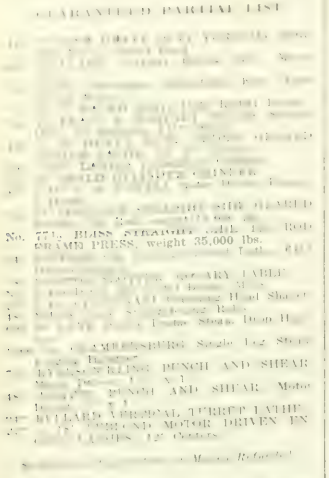
Used Tools at Bargain Prices

1—3″ Acme Class "A" single head bolt cutter.
1—81″ Pond vert. boring and turning mill, two swivel heads.
1—No. 2 Lapointe broaching machine.
1—No. 65-D Moline hole hog drill, eight ⅞″ spindles.
3—12″ Besly disc grinders.
1—30″ x 6′ Diamond face grinder, motor driven.
1—No. 2 Baker 18″ kewseater.
1—17″ x 6′ Prentice lathe, l.c.g.
1—18″ x 18″ x 36″ Pease planer, one head.
1—42″ x 42″ x 12′ Gray planer, two heads.
1—60″ x 60″ x 16′ Pond planer, two heads, belt drive.
1—No. 10 Racine power back saw, 8″ x 8″ cap.
1—No. 2 Foster hand screw machine, 1″ cap.
1—New 18″ x 10″ Millholland screw machine.
1—14″ Lees Bradner gear hobber.
1—No. 3—36″ Brown & Sharpe gear cutter.
1—No. S-B Potter & Johnston automatic.
1—No. 8-69 Yoder rotary shear, 60″ throat, cap. No. 16 gauge.

FEDERAL MACHINERY SALES CO.
12 No. Jefferson St., Chicago
212 Sycamore St., Milwaukee

MACHINE TOOL BARGAINS

GUARANTEED PARTIAL LIST



No. 77½ BLISS STRAIGHT SIDE [illegible] Bolt GRAND PRESS, weight 35,000 lbs.

[illegible] ARY LABEL

[illegible] PUNCH AND SHEAR

[illegible] PUNCH AND SHEAR, Motor

[illegible] BULLARD VERTICAL TURRET LATHE [illegible] MOTOR DRIVEN [illegible]

Send for our DECEMBER list of the largest stock in the United States of slightly used and thoroughly overhauled MACHINE TOOLS, POWER PRESSES, POWER, ELECTRICAL and CONTRACTORS' Equipment.

F. H. NILES & CO., Inc.
WICKES MACHINERY CO.
West Side and Claremont Avenues
Main Office and Warehouse
Jersey City, N. J.
ESTABLISHED 1900

[illegible] & Shell Reamer
1½" Acme Double Bolt Cutter.
3½" Acme Single Bolt Cutter.
4" Acme Single Bolt Cutter.
4" Saunders Pipe Machine.
8" Eaton, Cole & Burnham Pipe Mch.
12 x 32" Landis Plain Grinder.
2½" bar Binsse Hor. Boring Mch.
No. 2 Garvin Auto. Tapper.
B. & S. Automatics, ⅝" cap. (2)
Hand Screw Mchs., Turret Lathes ⅝" to 1⅝" cap
No. 0 Rockford Plain Miller.
No. 25 Becker Miller.
[illegible]
No. 24 Foote-Burt 24" Heavy Duty Drills.
26", 28" Barnes, 36" Aurora Sl. Hd. Drills
24" 2 spdl. Barnes All Grd. Gang Drill.
21" and 24" Gisholt Turret Lathes.
[illegible]
20" x 8' Fay & Scott Univ. Turret Lathe.
[illegible]

A. D. White Machinery Co.
108 North Jefferson St., Chicago, Ill.

[illegible] Spindle Gridley automatic Price $1750.00.
[illegible] $650.00. A-1 condition
[illegible] A-1 cond. tion, $600.00.
Five Hartford [illegible]" screw machines, fitted

IDEAL MACHINERY CO.
[illegible]

Gisholt Turret Lathes

In very good condition—14 in all—Take your choice. We need the room. Special low price.

WAYNE MACHINERY CO.
FT. WAYNE, IND.

G A R V I N

Machine Tools have been built for fifty-seven years. Naturally some of them are on the second-hand market.

Send us the Serial Number of any such machine you may be interested in, and we will tell you its age, and at the same time quote you on its up-to-the-minute successor.

No charge for this service.

The Garvin Machine Company
Spring & Varick Sts., New York

8—3 x 36 J & L's direct motor drive
1—2½" Landis bolt cutter
2—3 spindle Moline drill hogs
1—24" Hoeffer drill press
1—21" Libby turret lathe
1—18" Libby turret lathe
2—24" x 8" multiple spindle G&E gear cutters
1—48" x 12" multiple spindle G&E gear cutters

Wire *Phone* *Write*

Frost Gear & Forge Co.
Jackson **Mich.**

AURORA DRILLS

5—28" Aurora Heavy Duty Drills, Sliding head, back gears, geared feed and automatic stops.
These drills are being offered at exceptionally low prices for quick sale.

PHILADELPHIA MACHINERY EXCHANGE
117 N. 3rd ST., PHILADELPHIA, PA.

DIRECTIONS

for Purchasing Second Hand Equipment

1. Turn to the Clearing House Section (Section No. 50) and look over the items listed. Advertisements are grouped according to products—machine tools first, then other metal-working machinery, power plant equipment, electrical equipment, cranes and hoists, pipe, rails, scrap, etc.

2. If what you want is not listed, insert an announcement in the "We Want To Buy" Section, which immediately follows the Clearing House.

⅜", ½", ⅞" and 2" Clevelands, Models A and B, automatic screw machines.
No. 4 B & S wire feed machine.
No. 2 Bardons & Oliver wire feed hand screw machines.
25" and 28" Snyder drills.
25" Cincinnati-Bickford with tapping attachment.
24" G & E spur and bevel gear shaper.
No. 2A B & S universal mill, complete and in A-1 condition.
One No. 3B Hendey plain miller.
Four plain Bilton millers, practically new.
24" Milwaukee shaper, as good as new.
No. 1 and No. 2 Langelier single spindle, ball bearing. Perfect condition.
No. 58, No. 61, No. 62, No. 20B dial, No. 37½, and equal to No. 21 Bliss presses, new and used.

Also have a lot of woodworking machinery, motors, other shop equipment, and would be pleased to have your requirements or a request for a complete list.

IDEAL MACHINERY CO.,
Plainville, Conn.

GRINDERS

2—No. 2 Oakley Univ. C. & T., 10 x 20".
2—10 x 36" Thompson Full Univ.
1—Used No. 2 Woods Cutter.
1—Grand Rapids Drill, 2½" cap.
1—No. 2 Manhattan Surface, 36 x 7½".
1—No. 1 Wilmarth & Morman Surface.
1—Gisholt Univ. Tool.
2—No. 75 Heald Internal Grinders.
1—Used 10 x 24" Landis Plain. Excellent condition.

DRILLS

25—Upright, Bench and Floor, from 10 to 30".
1—Barnes 6-Spindle 14" Drill.
10—Gang 2, 3 and 4-Spindle Sensitive
3—Multi-Spindle Bausch, 12 to 24 spindles; No. 1, 2 and 3 M.T. in spindle.
4—Radials, Plain and Univ., 2' to 5'.

MISCELLANEOUS

3—16 x 8' Sidney Lathes, Q.C., C.R., H.S.
6—Willard Inc. Presses, No. 2 to 6.
1—Doty Punch and Shear, ¾ x ¾" cap.
10—Smith Turret and Screw Machines, 1 1/16" cap.
2—Hendey Shapers, 15 and 20".
2—Whipp Shapers, 16 and 20".
1—52" Bertsch Multiple Punch
1—50" Sellers Carwheel Borer.
1—37" Niles Boring Mill, 2 heads.
1—20 x 20 x 5' Hendey Planer.
1—24 x 24 x 5' Gray Planer.
1—No. 20 Lea Simplex Metal Saw.
We have over 1000 machines in stock.
Send us your inquiries.

Our Guarantee: Money Back if Not Satisfied.

WAYNE MACHINERY CO.
FT. WAYNE, IND.

One Olsen Tensile Testing Machine, 50,000 lbs. capacity, in good condition Bargain.

Address BOX T-474
Care *The Iron Age*, New York

---

1 Gisholt Boring Mill with 40" Turret—2 American Machine Company's 14 x 6 Fox Lathes with tools—4 No. 1 Toledo Hand Milling Machines—2 Wisconsin Hand Milling Machines and several Max Ams Metal Working Machines.

Petroleum Heat & Power Company
Box No. 601 Stamford, Connecticut
Telephone 3410

NEW RADIAL DRILLS
Single pulley gear box drive

1—36" with tapping att. $1250
1—45" with tapping att 1400
1—20" heavy sensitive drill. 125
1—Used 12" x 5' G. Head Lathe. . . . 150
1—Used 6" P & W Hand Scr. Mach. 100

Backer Mach. Tool Supply Co.
30 Church St., New York

STRUCTURAL STEEL BENDERS
HORIZONTAL TYPE
Capacity up to 20-inch Beams

MITCHELL-TAPPEN CO.
15 John Street, New York
Tel.: Cortlandt 2440

G A R V I N

Machine Tools have been built for fifty-seven years. Naturally some of them are on the second-hand market.

Send us the Serial Number of any such machine you may be interested in, and we will tell you its age, and at the same time quote you on its up-to-the-minute successor.

No charge for this service.

The Garvin Machine Company
Spring & Varick Sts., New York

F. H. Crawford

Power Presses
Machine Tools
Foundry Equipment
Hausfeld Furnaces
Paragon Sprayers

To all of you whose requirements we have been privileged to supply during the year just ended, and to such other friends as we cannot otherwise greet—

A Happy and Successful New Year

F. H. Crawford
299 Broadway, New York
Telephone Worth 3216

MILL MACHINERY

NEW, SPECIAL AND USED

ROLLS DRAWBENCHES
OVERHAULERS, COILERS, ETC.

Several 15,000-lb. Drawbenches
Just Completed—For Sale Cheap

Waterville Machine Works
WATERBURY, CONN.

GRAND RAPIDS SPECIALS

1— No. 2 J. N. Lapointe Broaching Machine
1— 31" by 26' Adrian Flat Turret Lathe.
1—4" P. & W. Spline Miller.
1— No. 164 Consolidated Double Crank Press
1— No. 34 Consolidated Arch Press
1— No. 3 Stiles Punch Press.
1— No. 10 Economy Scrap Baling Compress
1— 10 11. Bertsch Power Squaring Shear. 11 gauge.

Ask for complete list.

McMULLEN MACHINERY COMPANY
Grand Rapids, Mich.

No. 3¾-A
BLISS TOGGLE PRESS

Will draw and lift out 9½". Largest blank 25". Diameter of drawing punch 16".

D. C. OVIATT & COMPANY
1106 St. Clair Ave. Cleveland, Ohio

PRESSES

1—Bliss No. 10-B double crank, double geared 5" stroke, F & B x R & L, 33" x 74", weight 102,000 lbs.

1—Toledo No. 60¼ Twin Drive, Triple Back Gear, 26" stroke. F & B x R & L, 50" x 50", weight 230,000 lbs.

Both above machines can be seen in operation. Condition equal to new.

Further particulars on request.

In addition to above, we have a large list of presses, all types, to offer; send us your inquiry.

Riverside Machinery Depot
251 St. Aubin Ave. Detroit, Mich.

Power Presses

All Makes and Types

Priced at Rock Bottom

75½ Bliss, Trimming, with Side Shear. Area of Bed, 23"x23", Stroke 6". Geared for Motor Drive

76½ Bliss Trimming, with Side Shear. Area of Bed, 26"x26", Stroke 8". Back Geared, Arranged for Motor Drive

2½ Bliss, Double Crank Overhanging. Area of Bed, 32"x23", Stroke 4". Flywheel

204A Toledo, Double Crank Overhanging. Area of Bed, 41"x15", Stroke 3". Flywheel

159D Jones Double Crank Straight Side. Area of Bed, 43"x32", Stroke 3". Geared with Friction Clutch

55 Adriance Double Crank S.S. Inclined. Area of Bed, 30"x22", Stroke 2". Flywheel

Large Quantity of Bench, Punch and Inclinable Presses in Stock

Joseph Hyman & Sons
Tioga, Almond and Livingston Sts.
Philadelphia, Pa.
Write for our Yellow Price List

Crank Presses
Bliss 200-1200 Ton.

Testing Machine
Riehle—100,000 Pounds.

Motor Generator Set
G. E. 300 K.W.—440 V., 3 phase.

20' x 10' Lathes
Lodge & Shipley

ADDRESS BOX A-598
care *The Iron Age*, Park Bldg., Pittsburgh, Pa.

BRAND NEW BLISS PRESSES

NO. 61....Approx. Weight, 2450 lbs.
Strokes in Two Sizes, 4¼" and 5½"
Flywheel Weight, 400 lbs.
Distance Center to Back, 4½"
From Bed to Bottom of Slide Stroke Down ADJ., Up 9¼"
Dovetail in Slide
Width Between Uprights, 7½"
Area of Bed 10" Front to Back by 20" Right to Left
PRICE, $200.00 Each
At Additional Cost Will Change Stroke or Gear

Joseph Hyman & Sons
Tioga, Almond & Livingston Sts.
Philadelphia, Pa.

All Kinds and Types of Presses in Stock, New and Rebuilt
Ask for Our Latest Price List

LARGE PRESSES

Toledo 94-H Geared Double Crank Press, stroke 4½".

Toledo No. 59 Straight Side Single Geared, between uprights 30".

Both Presses Near New.

Lynd-Farquhar Company
419-425 Atlantic Ave., Boston 9, Mass

BUY NOW and Save Money

Delivery from stock.

New Machines at Low Prices

1—No. 11 Double Angle Shear, one shaft, capacity 6 x 6 x 1" angles.
1—No. 11 Double Angle Shear, two shafts, capacity 5 x 5 x 1" angles.
4—No. 7 Single Punches and Shears, 24" Throat, capacity 1" through 1".
1—No. 1 Single Punch, 24" Throat, capacity two holes 1 1/16" through 5/8".
2—No. 1 Single Punches and Shears, 24" Throat, capacity 1¼" through 1".
1—100 lb. Board Drop Hammer
2—600 lb. Board Drop Hammers
1—300 lb. Board Drop Hammer
1—150 lb. Board Drop Hammer.
1—80 lb. Helve Hammer.
1—No. 3 Lower or Alligator Shear, capacity [illegible]
1—No. 2 Lower or Alligator Shear, capacity [illegible]
12—No. 24 Open Back Inclinable Presses.
1—Steel Straightening Roll, capacity 48" x ¾" plate.
1—No. 8 Multiple Punch, 110" Housings, 12" throat, capacity 385 tons pressure

The Long & Allstatter Co.
HAMILTON, OHIO

BOILER SHOP TOOLS

8 ft. Wickes Rolls, drop end housings.
12 ft. Hilles & Jones Flanging Clamp.
46" Hilles & Jones Punch & Shear.
36" Cleveland Punch & Shear.
24" Reade Punch and Shear.
5" Cleveland Horizontal Punch.
18" Cockburn & Barrow Punch.
8" Cockburn & Barrow Punch.

Bertolette Machine Tool Co.
357 West Side Ave., Jersey City, N. J.

CLOSING OUT SALE

Punches, Shears, Bending Rolls, Etc.

1—**WICKES 20 FT. PLATE BENDING ROLLS** steam driven, can be arranged for motor drive, upper roll 20" dia., lower rolls 13½" dia., cap. to bend 20 ft plates 1⅛" thick, down to 10 ft. 1¼" thick; weight about 50 tons.
1—**NILES 20 FT. PLATE PLANER** belt driven, cap. ⅝" plate.
2—**SOUTHWARK HEAVY DUTY COMBINATION VERTICAL PUNCHES OR SHEARS** direct motor driven, 48" throat, cap. 1⅛" thru 1", weight 46,000 lbs. ea.
2—**GEO. WHITING NO. S HEAVY DUTY VERTICAL PUNCHES OR SHEARS** direct motor driven, 48" throat, cap. 1" thru 1", weight 20,000 lbs. ea.
1—**CLEVELAND MODEL EF COMBINATION VERTICAL PUNCH OR SHEAR** direct motor driven, 36" shear end, 48" punch end, cap. 1¼" thru 1", weight 40,000 lbs.
1—**LONG & ALLSTATTER COMBINATION ANGLE SHEAR** direct motor driven, size of blades 8"x12", cap. 6x6x⅝" angles.
1—**ROBINSON 8 FT. HAND OPERATED PLATE BENDING BRAKE** cap. No. 12 gauge.
1—**BEMENT 1500 LB. SINGLE FRAME STEAM HAMMER**, 90% new.
1—**BRADLEY 3000 LB. UPRIGHT HELVE HAMMER**, 90% new.
1—**JARECKI 8" PIPE MACHINE COMPLETE** fitted with Landis Head and Chasers.
1—**VICTOR LOEW 6" PIPE MACHINE** portable type, complete.
1—**CLEVELAND 30"x30"x8' OPEN SIDE PLANER** one head on cross rail, one side head.
1—**GLEASON 30"x20' SCREW CUTTING LATHE** with 28" chuck. Price $400.00.

SPECIAL

1—**GREENFIELD NO. 732 (LITTLE GIANT) BOLT CUTTERS**, complete, cap. ¾ to 1". Price $200.00 each.

All the above machinery is in excellent working condition, guaranteed, and are located at the TEXAS STEAMSHIP CO. PLANT, BATH, MAINE. Prices reasonable, photographs and further particulars sent on request.

JOSEPH BEAL & CO.
465-471 Atlantic Ave. Boston 9, Mass.

PUNCHES SHEARS
PLATE PLANERS
ROLLS, ETC.
HYDRAULIC TOOLS
PUMPS ACCUMULATORS
VALVES, ETC.

At Prices 20% to 70% Under Present Cost of Production

Now is the opportune time to purchase. We have just gained possession of a large number of tools of our manufacture heretofore tied up in litigation. Most of them have never been used. We solicit your inquiry for any tool you may need. If we have it in stock we will save you money.

SOUTHWARK FOUNDRY & MACHINE CO.
Philadelphia, Pa.
CHICAGO, FISHER BLDG.
CLEVELAND, SWETLAND BLDG.

WILL SACRIFICE

No. 36 W. W. & Co. Punch and Shear, 38" Throat
[illegible] Three 12" Architectural Jaw
500 lb. Beaudry Hammer, Belt Drive
[illegible] Bolt Machine, Motor Drive
36" x 12" Lodge & Davis Planer, 1 Head
44" x 12" Bond Planer, 3 Heads
6" & 4" Heavy Boring Mill, 4" Bar
42" Paragon Blue Print Machine
Other Bargains in Boring Mills
Slab Millers and Machine Tools

A. M. STOEHR MACHINERY CO.
844 N. Wells Street Chicago

Complete Rolling Mill For Sale

Ready for immediate operation

Equipment
- 8"-12" Combination Finishing Mill
- 12" Finishing Mill
- 16" Finishing Mill
- 22" Muck Mill

Rolling Capacity
- Rounds ⅜" to 3½"
- Squares ⅜" to 3¼"
- Flats ½x3 16 to 8"x½"

Approx. Annual Cap. 60,000 tons Merchant Iron or Steel

LOCATION:
Joliet, Illinois (Chicago Suburb)

Prospectus cheerfully furnished.

BRIGGS & TURIVAS
1316 Westminster Bldg.,
Chicago, Illinois

SHEAR

George A. Ohl 10 ft. power Squaring shear for cutting 12 gauge or lighter. 90% new.

Freidus Machinery Company
174 CENTRE STREET, NEW YORK CITY

Any second-hand machinery or equipment for sale?

If so, see advertising rates on first page of Section 50.

NEW EQUIPMENT BARGAINS

Kerr Turbine Engines

2500 H.P., 3600 RPM.
2650 H.P., 3600 RPM.
3000 H.P., 3600 RPM.

Turbine Steam Pumps

20 H.P. Non-condensing, 3600 RPM.
5 H.P. Direct Connected, 2500 RPM.

Boilers

25 H.P. Vertical.
80 H.P. Locomotive, A.S.M.E.
80 H.P. Return Tubular, A.S.M.E.
125 H.P. Return Tubular, A.S.M.E.

Pumps

10 x 12 x 12 Worthington Horizontal Duplex.
7 x 8 x 10 Deane Vertical Duplex.
10 x 6 x 18 National Transit Vertical Simplex.
No. 7 Single Cylinder Double Action Force.

Miscellaneous

100-Ton Hydraulic Bending and Straightening Press.
Angle Beveling Machine.
Channel and Angle Flanging Machine.
Lysholm Tables.
Buckeye Oil Rivet Forges.
Buffalo Blacksmith Forges.
Roebling Patent Slings.
Hisey Grinders—3 H.P. Motors—3 Phase—60 Cycle—440 Volts—Second-hand.

Pottstown Steel Co.
Douglassville, Pa.

CORLISS ENGINE

Hamilton Corliss Engine No. 2333, installed 1905, in excellent condition, is for sale. Cylinder 18" x 42". Will develop 210 H.P. at 25% cut off.

Owner installing electrical equipment.

A genuine bargain. Will be sold on receipt of first responsible offer.

SMITH & SONS CORPORATION
2969 Main St. Buffalo, N. Y.

One Gas Power Generating Outfit consisting of R. D. Wood Gas Producer, Westinghouse vertical Producer Gas Engine and 150 K. W. 125-250 V. Westinghouse D. C. Generator. Detail specification and price on application. Immediate delivery.

Thomas Devlin Mfg. Co.
Third and Lehigh Ave., Philadelphia, Pa.

ENGINES BOILERS
BARGAINS

Corliss 34x60—32x48—28x48 26x48 24x48—20x42 18x36 16x36 14x36, also other sizes. Boilers 500 - 600 - 500 - 200 - 250 HP. W.T., 72x18 72x20 66x18 60x16, 54x16 HRT Pumps Air Comp—Locs. Cranes, etc.

H. R. WILSON MACHY. CO.
415 Pine St. St. Louis, Mo.

Sell Your second-hand machinery through the Clearing House Section of The Iron Age.

FOR SALE
Cheap for Quick Removal

WETHERILL STEAM AIR COMPRESSOR 2000 cubic feet free air per minute. First-class condition.
Baldwin 50 ton locomotive overhauled
For particulars.

H. SOFRANSCY COMPANY
Allentown, Pa.

---

1 1000 cu. ft. capacity, Class M Ingersoll-Rand Steam Driven, 2 Stage Straight Line Air Compressor.
1—350 cu. ft. Class H Ingersoll-Rand Duplex, Steam Driven, 2 Stage Air Compressor.

Reading Engineering Works
116-120 Washington St., Reading, Pa.

AIR COMPRESSORS

One Ingersoll-Rand Air Compressor, 10x18—170' capacity, 100 RPM.—Steam 175 lb.—Steam Cylinder 10"—Air Cylinder 10"—Stroke Cylinder 18".

B. W. & Leo Harris Co.
Minneapolis Minn.

AIR COMPRESSORS

All types and sizes to meet all requirements. Steam, Belt and Electric Driven. **Twenty Years' Experience** in building air compressors. All machines thoroughly overhauled by experienced Compressor Engineers. Lowest prices. Condition Guaranteed.

Write us before you buy.

ADDRESS BOX A-530
care *The Iron Age*, Park Bldg., Pittsburgh, Pa.

AIR COMPRESSOR

One 1200 cu. ft. Laidlaw-Dunn Gordon steam driven air compressor. Cross compound two stage. One hundred and forty-five lbs. steam pressure, one hundred lbs. air pressure. This machine is in excellent condition, is stored at our shop in St. Louis, Mo., and open to inspection at any time.

HEINE BOILER COMPANY
5319 Marcus Ave. St. Louis, Mo.

One Ingersoll-Rand Belt-Driven Imperial Type 10, Two stage air compressor. Cylinders 24 x 16 x 16. 1100 cu. ft. free air per minute at 150 r.p.m. Pulley 8'0" x 2'5". Inlet unloader goes with machine. Can include in sale steel air pressure tank 48" x 12'0" ⅜" shell.

WEST BOYLSTON MFG. CO.,
Easthampton, Mass.

BOILERS

9 New 250 H.P. Colven Water Tube Boilers, 200 lbs. W.P., full and complete, offered for immediate disposal. This is an opportunity never again to be duplicated. To quick buyers, attractive prices. Write for particulars and copy of specification at once.

J. J. WHEELER ENGINEERING CO.
425 Greenpoint Ave., Brooklyn, N. Y.
Phone—Greenpoint 1803

Babcock & Wilcox Steel Header Boilers
(In Stock)

2—524 H.P. each
2—338 H.P. each
1—360 H.P.
11—267 H.P.
1—240 H.P.
1—120 H.P.
180-200 lbs. Prompt delivery.

H. P. BREARLEY
90 West St. New York

1—125 H.P. Atlas Fire Tube Boiler, with two steel stacks, and two sets of Valley Iron Shaker Grates, for the sum of $1500.00, F. O. B. Derry, Pa.

These boilers are now operating and are Hartford Inspected.

Westinghouse High Voltage Insulator Co.
Derry, Pa

Hoisting Engines and Derricks

Steam Shovels, Cars, Rails, Tanks, Road Rollers, Air Compressors, Locomotives, Boilers and Engines. Everything for sale or rent.
Pipe and Structural Steel (cut to sketch).

Henry A. Hitner's Sons Co.
Bridesburg on Delaware—Philadelphia

---

823 H.P. BOILERS

from

OLD HICKORY PLANT

38—823 H.P., Type M-30 Stirling Water Tube Boilers. B. & W. make. Complete with Westinghouse Stokers, forced draft fans, Vulcan Soot cleaners and all accessories.

New method of dismantling and cutting tubes makes re-erection easy and practical. Complete information, specifications, etc., on request.

NASHVILLE
INDUSTRIAL CORPORATION
Plant Sites and Equipment
Jacksonville, Tenn.

BOILERS

2—350 H.P. Heine Water Tube Boilers, 189 lbs. pressure allowed. Immediate shipment—$2200.00 each, complete, f.o.b. New York. Send for inspection report and full details.

"Linder for Machinery"

LINDER MACHINERY & STEEL CO.
50 CHURCH ST. N. Y. C.

48" x 30' Vulcanizer

Used cylinder or steam boy constructed of 5/16" plate, riveted and built to stand 200 lb. pressure. Heavy steel door at one end, easily opened and fastened; 18" industrial track inside and two industrial cars for same. Price upon request.

E. B. LEAF COMPANY
918 Real Estate Trust Bldg.
Philadelphia, Pa.

PRE-WAR PRICES

Our twenty-first business anniversary. Let us assume your worries. We purchase and sell a complete line of steam and electric equipment, valves, meters, etc.

WASHINGTON COMPANY
39 Cortlandt St., City

One electric driven 3 plunger geared

HYDRAULIC PUMP

with automatic control. Same can be seen at any time on the premises. Would exchange for steam driven Hydraulic Pump.

STERLING TIRE CORPORATION
Rutherford, N. J.

Engine Generator Unit

150-KW, 2300-V, 3-P, 60-C

Exciter and Switchboard.

Pfannmueller Engineering Co.
503 First National Bank Bldg., Chicago

---

60 CYCLE MOTORS

2—200 H.P., 450 R.P.M., 3 Ph., 440 V., G. E. Rew.
2—75 H.P., 900 R.P.M., 3 Ph., 220 or 440 Volts.
15—50 H.P., All Speeds, 3 Ph., 220 or 440 Volts.
3—40 H.P., All Speeds, 3 Ph., 220 or 440 Volts.
16—30 H.P., All Speeds, 3 Ph., 220 or 440 Volts.
13—25 H.P., All Speeds, 3 Ph., 220 or 440 Volts.
Many smaller sizes 25 and 60 cy. A.C. and D.C.

V. M. NUSSBAUM & CO., Fort Wayne, Ind.

Slightly used Electric Motors, latest types, guaranteed for all practical purposes, like new, refinished and tested the Gregory way—are you interested? Send for our Monthly Bargain Sheet showing complete list.

3-Phase, 25-Cycle Motors

	H.P.		Speed
1	4	[illegible]	1415
1	5	[illegible]	690
1	3	G. E., type KT	1500
1	7½	G. E., type KT	1500
1	[illegible]	[illegible]	1500
1	7½	G. E., type KT	750
1	7½	Fairbanks-Morse, type B	750
1	[illegible]	[illegible]	750
1	10	Westinghouse, CS	1400
7	10	G. E., type KT	750
1	[illegible]	[illegible]	750
5	15	G. E., type KT	750
4	15	G. E., slip-ring	725
2	15	Allis-Chalmers	720
1	20	G. E., type KT	750
1	20	Allis-Chalmers, type AN	750
4	20	Wagner	750
1	20	Westinghouse, CS	730
1	20	Westinghouse, type CW, slip-ring	730
1	25	G. E., type KT	750
1	30	Fairbanks-Morse	525
1	40	Westinghouse, slip-ring	730
5	50	Westinghouse, CS	735
1	50	Westinghouse, slip-ring, variable speed	720
1	60	Allis-Chalmers	720
1	65	Allis-Chalmers	1440
1	75	Allis-Chalmers	750
1	75	G. E., type I, form M, slip-ring, variable speed	750
1	150	G. E., form M, slip-ring (3-bearing)	480
1	150	Burke	375
1	200	G. E., form M, slip-ring (3-bearing)	480
1	200	Burke	500
2	300	Allis-Chalmers, slip-ring	485

GREGORY ELECTRIC CO.
16th and Lincoln Sts., Chicago, Ill.

Generating Sets

Direct Current
Direct Connected

200 K.W. 250 Volt Westinghouse, with 20" x 20" Porter-Allen Engine
125 K.W. 125-250 Volt Gen. Elec. Turbo Generator, 3 wire
100 K.W. 27 Volt General Electric with 16" x 14" McIntosh & Seymour Engine
100 K.W. 120 V. 3 Bearing Generator, with 14" x 14" Ames Engine
100 K.W. [illegible] Volt Sprague, with Harrisburg Automatic Engine
75 K.W. 140 Volt Belted Generator with 18" x 16" Ames Engine
75 K.W. [illegible] Volt Crocker-Wheeler Generator, with [illegible] Engine
50 K.W. [illegible] Volt Crocker-Wheeler with 13" x [illegible] Ames Engine
40 K.W. [illegible] Volt Crocker-Wheeler with 13" x [illegible] Ames Engine
[illegible] K.W. [illegible] Volt Crocker-Wheeler Generator with [illegible] Corliss Engine
[illegible] K.W. [illegible] Volt Crocker-Wheeler with 10" x [illegible] Ames Engine
[illegible] K.W. [illegible] Volt Crocker-Wheeler with 10" x [illegible] Ames Engine
25 K.W. [illegible] Volt Crocker-Wheeler with [illegible] Engine
10 K.W. [illegible] Volt Crocker-Wheeler with [illegible] Engine
Several [illegible] Volt Crocker-Wheeler Generators with [illegible] Engines
[illegible] Volt Crocker-Wheeler Motor Generator Set, 10 H.P. Motor, 7½ K.W. Generator

WICKES MACHINERY CO.
Jersey City, N. J.
Established 1900

"HONESTLY REBUILT"
ELECTRICAL MACHINERY
FOR SALE

Motors, Generators, Power Plants, Rotary Converters, Motor Generator Sets, Frequency Changers, Hoists, Locomotives and Miscellaneous Motor Driven Machinery.

SACRIFICE PRICES
FOR IMMEDIATE CLEARANCE

WE SOLICIT

ELECTRICAL REPAIR WORK

Special Attention to Large and Difficult Repairs and Emergency Service. Shops and Warehouse on Private Siding and Equipped with Cranes and Complete Facilities to Rebuild Electrical Machinery.

SATISFACTION GUARANTEED

Miller-Owen Electric Co., Inc.
PITTSBURGH, PENNA.

SPECIALS

250 KW. Ridgway 250 volt direct current generator, dir. con. Ridgway 22 x 24 engine. Latest type. Practically new. Complete $3000.

240 KVA. Gen. Elec. 3 phase 60 cycle, 220 or 440 volt Alternator, dir. con. Harrisburg 4 valve 21 x 20 engine. Perfect condition. Guaranteed. Complete. $3500.

50 HP. Gen. Elec. Slip Ring Motor, 850 RPM. Practically new. Complete with controller. $500.

Send for complete "Stock List"

Power Machinery Exchange
[illegible]

GENERATOR

200-kw., Allis-Chalmers, 250-v. D. C. to 18 x 36 Heavy Duty Corliss Engine, 125 r.p.m.

G. E.—Curtis Turbo Sets

[illegible] kw., 250 v., 2400 r.p.m., 125-lb. press.
[illegible] kw., 250 v., 2400 r.p.m., 150-lb. press.
[illegible] kw., [illegible] v., 3600 r.p.m., 175-lb. press.
[illegible] kw., [illegible] v., 5000 r.p.m., 200-lb. press.

MARVIN BRIGGS, INC.
167 Sixth Street, Brooklyn, N. Y.

A number of good 220 volt D.C. Motors ranging from 2 H.P. to 50 H.P. Send for list and prices.

The Maytag Company
Newton, Iowa

NEW 220 VOLT
Adjustable Speed Motors

Qu.	HP.	Make	Type	Speed	Price Each
1	125/250	G. E.	MPC	[illegible]	$1490.00
1	100	G. E. [illegible] Shunter	DMC	[illegible]	1000.00
1	100	Westgh. compd. 3 bearing	[illegible]	[illegible]	1000.00
2	60	Westgh.	SK	[illegible]	600.00
10	40	G. E.	LC	[illegible]	425.00
11	35	G.E.	LC	650/1350	425.00
1	27½	Electro Dynamic		450/1350	500.00
1	25	Sprague	LC	[illegible]	325.00
3	20	Elec. Mfrs.	IRC	[illegible]	375.00
5	20	Westgh.	SK	375/1000	425.00
1	20	G.E.	RP	450/1350	400.00
1	20	G.E.	RLC	600/1200	425.00
22	20	G.E.	RP	400/1200	425.00
1	15	Westgh.	SA	300/1200	350.00
6	15	Westgh.	SK	500/1500	325.00
5	15	Westgh.	SK	400/1500	350.00
1	15	Western El.	RLC	500/1000	[illegible]
18	15	G.E.	RP	550/1650	375.00
1	15	Allis Chal.	N	400/1600	360.00
1	15	Diehl	SA	500/1000	350.00
1	15	Reliance		550/1650	350.00
4	10	Allis Chal.	N	500/1500	275.00
17	10	Westgh.	SK	500/1500	300.00
1	10	West. El.	LA	1000/1500	300.00
1	10	G.E.	RP	400/1600	300.00
1	10	Electro Dynamic		300/1200	250.00
1	9½	Reliance		[illegible]	200.00
3	9	G.E.	RP	[illegible]	300.00
1	9	G.E. new	RP	400/1200	290.00
1	9	Crocker Wheeler	1	[illegible]	250.00
3	8½	Westgh. new	SK	[illegible]	275.00
1	8½	Westgh.	8	[illegible]	200.00
4	7½	Sprague (G.E.) new	LC	[illegible]	250.00
8	7½	G.E.	RP	[illegible]	225.00
4	5	G.E new	FFD	450/1350	200.00
1	5	Northwestern new	[illegible]	[illegible]	150.00

GEORGE SACHSENMAIER CO.
926-32 North Third St., Philadelphia
SEND FOR NEW LIST

2—30 H.P. Type 11432K Allis-Chalmers—440 Volt, 2 Phase, 60 Cycles

1—40 H.P. Type 11769K Allis-Chalmers—440 Volt, 2 Phase, 60 Cycles

2—35 H.P. Direct Current Northern—220 Volt Shunt Wound

1—10 H.P. Direct Current Northern—220 Volt Shunt Wound

6—40 H.P. L.C. Block Test Dynamometer—Sprague 240 Volt, 800/2500 R.P.M.

6—Dynamometer Controlling Panels with Voltmeter and Ammeter Overload Release

5—50 H.P. T.L.C. Laboratory Test Dynamometer Sprague 250 Volt, 600-2500 R.P.M. Ball Bearing Pedestals, Spring Balance Scale, Electric Tachometer

3—Panels including calibrated wattmeter, overload and under voltage release, absorption resistance

1—100 H.P. Ball Engine

1—150 K.W. Northern Generator, 150 R.P.M., 250 Volt

MERCER MOTORS COMPANY
Trenton, New Jersey

CONDENSER

1—2000 sq. ft. Worthington Surface Condenser with bronze tube heads.

1—Worthington 6 x 12 x 12 [illegible] steam driven vacuum pump.

1—8" Worthington Volute Centrifugal Circulating Pump.

1—Pipe exhaust valve.

Archer & Baldwin, Inc.
114-118 Liberty St., N. Y. C.
Telephone 4337-8 Rector

SLIP RING MOTOR

[illegible] Complete [illegible] Price low.

MILES MACHINERY CO.,
Saginaw, Mich.

COMPARE THESE MOTOR PRICES

These are only a few of the bargains we offer, picked at random from our large stock

NEW MOTORS

H.P.	Make	Ph.	Cy.	Type	Volts	R.P.M.	Price
350	Crock-Whlr.	3	60	sl. ring	2200	1170	1875.00
60	Gen. Elec.	3	60	KT	220	1160	486.00
3— 50	Gen. Elec.	3	60	sl. ring	440	1200	775.00
6— 50	Gen. Elec.	3	60	sl. ring	220	1200	625.00
50	Gen. Elec.	3	60	squ. ca.	550	600	575.00
40	Gen. Elec.	3	60	sl. ring	220	1200	550.00
30	Gen. Elec.	3	60	sl. ring	440	720	650.00
30	Westinghouse	3	60	slip ring	220	1160	560.00
2 25	Gen. Elec.	3	60	sl. ring	220	1200	475.00
4 25	Gen. Elec.	3	60	KT	220	1200	275.00
20	Gen. Elec.	3	60	sl. ring	220	1200	435.00
5 20	Gen. Elec.	3	60	KT	220	1200	237.00
20	Westinghouse	3	60	slip ring	220	1160	455.00
15	Gen. Elec.	3	60	sl. ring	220	1200	380.00
4— 15	Gen. Elec.	3	60	KT	220	1800	187.00
10	Gen. Elec.	3	60	sl. ring	440	1200	340.00
2— 10	Westinghouse	3	60	squ. cage	220	1725	187.20
5— 10	Westinghouse, D.C.			SK	220	725	249.00
5— 10	Bell	3	60	compensat	220	1800	165.00
8— 10	Gen. Elec.	2	60	K2	220	1200	187.00
6— 7½	Bell	3	60	compensat	220	1800	145.00
13— 5	Robbin & My.	3	60	compensat	220	1700	79.00
3	Wagner	1	60	BA	110/220	1725	89.19
2	Wagner	1	60	BA	110 220	1725	81.19
6 1	KW Westghse.	D.C.		CD	40	1725	59.50
55— ¼	Crock-Whlr.	D.C.			110	1725	17.75

USED MOTORS

200	Gen. Elec.	3	60	slip ring	2200	600	1175.00
200	Westinghouse	2	60	slip ring	220	580	1100.00
133	Gen. Elec.	2	60	synchron	2200	900	500.00
155	KVA Stanley	2	60	alternator	2400	900	550.00
2 100	Gen. Elec.	3	60	slip ring	440	514	900.00
75	Gen. Elec.	3	60		220	710	685.00
25	Gen. Elec.	3	60	Form L	220	900	225.00
75	Gen. Elec.	3	60	slip ring	220	900	600.00
75	Gen. Elec.	3	60	slip ring	2200	900	825.00
75	Burke	2	60	squ. cage	220	360	600.00
2— 75	Westinghouse	3	60	squ. cage	440	580	550.00
2— 50	Fbks. Mse.	3	60	squ. cage	220	900	325.00
2— 50	Burke	3	60	slip ring	220	1200	475.00
50	Westinghouse	3	60	squ. cage	440	580	500.00
8— 50	Gen. Elec.	2	60	squ. cage	220	865	365.00
50	Gen. Elec.	3	60	Wo. rotor	220	514	500.00
50	Gen. Elec.	3	25	squ. cage	220	715	400.00
40	Westinghouse	2	60	squ. cage	220	1120	300.00
40	Allis-Chal.	7	25	squ. cage	220	720	375.00
40	Wagner	3	60	sl. ring	220	1160	450.00
9— 37	Gen. Elec.	3	60	sl. ring	220	750	450.00
3— 35	Lincoln	3	60	squ. cage	440	1200	245.00
35	Wagner	3	60	squ. cage	220	1720	265.00
35	Gen. Elec.	3	60	squ. cage	440	600	350.00
30	Gen. Elec.	3	60	squ. cage	220	1800	250.00
2— 30	Westinghouse	3	25	squ. cage	220	710	300.00
30	Gen. Elec.	3	25	sl. ring	220	590	500.00
2— 30	Ideal	3	60	squ. cage	440	1150	300.00
30	Gen. Elec.	3	60	slip ring	440	900	385.00
2— 25	Wagner	3	60	slip ring	440	1150	375.00
25	Fbks. Mse.	3	60	squ. cage	220	900	235.00
25	Westinghouse	3	60	squ. cage	220	1140	225.00
25	Gen. Elec.	3	60	squ. cage	220	865	285.00
20	Cr. Whlr.	3	60	squ. cage	220	1150	225.00
20	Ideal	3	60	squ. cage	220	1150	220.00
20	Gen. Elec.	3	60	squ. cage	220	900	235.00
20	Cr. Whlr.	3	60	squ. cage	220	685	285.00
3— 20	Westinghouse	3	25	squ. cage	220	720	265.00
20	Cr. Whlr.	2	60	squ. cage	220	860	245.00
16	West. Elec.	3	60	sl. ring	440	875	300.00
2— 15	Westinghouse	3	25	squ. cage	220	700	200.00
15	Gen. Elec.	3	60	sq. cage	220	1200	210.00
15	Westinghouse	2	60	sq. cage	220	850	190.00
15	Westinghouse	3	60	sl. ring	550	1120	265.00
12½	Lincoln	2	60	sq. cage	220	600	225.00
12	Gen. Elec.	3	60	sl. ring	220	720	275.00

DIRECT CURRENT

90	Diehl ..... shunt wo.	240	460	575.00
90	Gen. Elec. ..... com. wo.	220	625	675.00
90	Westinghouse ..... comp. wo.	220	675	550.00
75	Diehl ..... shunt wo.	220	340	575.00
75	Westinghouse ..... comp. wo.	550	1100	575.00
60	Elwell-Parker ..... ped. bear.	220	650	435.00
60	Gen. Elec. ..... shunt wo.	220	425/850	675.00
50	Westinghouse ..... shunt wo.	550	900	425.00
50	C. & C. ..... MP.	220	375	475.00
50	Gen. Elec. ..... shunt wo.	220	850	450.00
4 — 47	Westinghouse ..... comp. wo.	500	600	375.00
43	Sturtevant ..... shunt wo.	220	850	375.00
35	West. Elec. ..... shunt wo.	220	800	350.00
30	Gen. Elec. ..... shunt wo.	550	1250	350.00
30	Allis-Chal. ..... shunt wo.	220	575	365.00
2— 30	Gen. Elec.	220	750/1600	385.00
25	Sturtevant ..... shunt wo.	220	950	290.00
25	Westinghouse ..... shunt wo.	220	600	275.00
25	Gen. Elec. ..... DLC	220	670	225.00
2— 15	Gen. Elec. ..... CR	220	400/800	200.00
2— 15	Electro Dynamic	220	175/1050	265.00
15	Gen. Elec. ..... CR	220	925/1850	185.00
2— 15	Gen. Elec. ..... DLC	220	550	200.00
3— 10	Electro Dynamic	220	550	160.00
4— 7½	Westinghouse ..... SK	220	740/1050	160.00

Some have not been used more than 60 days. All carry our usual ONE YEAR GUARANTEE. 1000 other bargains.

LARGEST STOCK OF ITS KIND IN AMERICA.

NATHAN KLEIN & CO.

MOTORS HOWARD & CENTRE STS., N.Y. DYNAMOS

HOISTS DERRICKS

ELECTRIC HOIST AND DERRICK $1800

PRICES F. O. B. CARS, PRIMOS, PA.

Change of Price and Place

On and after January 1st, 1923, the price of Hoist and Derrick will be $1800.00, on account of expense in removal of this equipment from Hog Island to Primos, Pa.

You Save at Least $2000

These Hoists and Derricks are standard late models, manufactured by The American Hoist & Derrick Co., St. Paul, Minn. They are almost new, and every one is GUARANTEED to be in first-class running order.

The Hoists have two drums and swingers, and are complete with starting and Control Equipment. Either side or bank control, and rated 6000 pounds single line on each hoisting drum. Slewing rope 36 ft. per minute, and hoisting rope speed 160 ft. per minute.

The MOTORS are Otis 37 H.P. A.C., 60 cycle, 3 phase, 440 volt, intermittent duty, slip-ring induction type and, if desired, may be changed to suit the individual current requirements of purchasers at cost.

These Hoists and Derricks may be inspected at any time. This Equipment is being sold in sets and in units of a Hoist or Derrick if desired. Immediate shipment can be made anywhere, but QUICK ACTION IS IMPERATIVE.

Wire, Phone or Write for Detailed Information, Folder, etc.

THE ELECTRIC HOIST & DERRICK CO.

PRIMOS, PENNSYLVANIA

Primos, Pa., is 8 miles west of Philadelphia on P., B. & W. R. R.

DIMENSIONS OF DERRICKS

Mast—16 in. square, 40 ft. high.

Boom—Made of (2) 14 in. sq. timber 48 ft. long spliced to lengths of 80 ft. with (2) ⅞ in. and (2) 1⅛ in. truss rods.

Stiff Legs—14 in. sq., 55 or 60 ft. long or 16 in. sq., 50 ft. long, will furnish either length desired, capacity 5 to 10 tons. Bull wheel 16 ft. dia. Principal sheaves 16 in. dia. and 14 in. single blocks.

The Cable which was formerly used will be given with each purchase of a Hoist and Derrick.

TRAVELING CRANES
OVERHEAD TYPE

		Make
[illegible]	28'	CLEVELAND
25	78'4"	NILES
[illegible]	To Suit	NORTHERN
[illegible]	71'	P. & H.
[illegible]	55'	SHEPARD
10	47'	WHITING
[illegible]	48'	SHAW
[illegible]	61'6"	SHEPARD
[illegible]	71'	NORTHERN

All of the Above Ready for Shipment

Also List of Hoists

N. B. PAYNE & CO.

25 Church Street, New York City
Telephones—Rector 9080—9455-6
See Page 82

CRANES

[illegible] 3 Motor, 3 Phase, 60 Cycle, 220 Volt, [illegible] Span.
[illegible] Motor, 3 Phase, 60 Cycle, 220 Volt, [illegible] Span.
[illegible] 4 Motor 220 Volt D.C., 31' Span.

FURNACES

[illegible] Nos. 10 to No. 90 Crucible.
[illegible] Type 500 lbs. and 1000 lbs.
[illegible] Fired, 9 ft. inside dia. Schwartz Oil [illegible]

BLOWERS

Roots Blowers, No. ½, No. 1, No. 2, No. 3, No [illegible] No. 5, No. 6, No. 7.
Connersville No. 40, No. 50, No. 60.
General Electric Centrifugal, direct connected to [illegible] Motor, 60 Cycle, 220 Volt, [illegible] Capacity 15000 [illegible] Will [illegible] per hour.

AIR COMPRESSORS

[illegible] x 8 Gardner, new, and one 10 x 10 Gardner.
[illegible] x 8.
Molding Machines, Sprue Cutters, Grinders, Air [illegible] Sand Blasts, Foundry Equipment.

Scully-Jones & Company
2012 W. 13th St., Chicago, Ill.

ELECTRIC CRANES

[illegible] Electric Hoist
5 Ton Auxiliary Hoist
71'-7" Span
[illegible]
220 Volts D.C.
New—Has never been installed.
1—35 Ton Main Hoist
5 Ton Auxiliary Hoist
71'-7" Span
[illegible]
220 Volts D.C.
Second hand.

For further details.

ADDRESS BOX I-454
[illegible]

CRANES

Locomotive and Overhead Traveling Types

Industrial Equipment Co.
149 Broadway, New York

SAND MIXER

1—Blystone Mixer without screen, 5 ft. capacity. Further particulars upon request.

The Advance Foundry Company
Dayton, Ohio

TANKS
Immediate Shipment

20" dia. x 4' 1½" long	65 Gallons
27" dia. x 4' 1½" long	120 Gallons
42" dia. x 4' 1½" long	280 Gallons
52" dia. x 5' 1¾" long	550 Gallons
58" dia. x 6' 0" long	800 Gallons
65" dia. x 5' 11¾" long	1000 Gallons
64" dia. x 9' 1½" long	1500 Gallons
58" dia. x 7' 6½" long	1000 Gallons
68" dia. x 10' 8¼" long	2000 Gallons
68" dia. x 15' 11⅝" long	3000 Gallons
78" dia. x 16' 3⅛" long	4000 Gallons
84" dia. x 17' 7½" long	5000 Gallons
76" dia. x 40' 0" long	9500 Gallons
84" dia. x 32' 8" long	9400 Gallons
120" dia. x 14' 5" long	8500 Gallons
120" dia. x 16' 11" long	10,000 Gallons
120" dia. x 20' 3" long	12,000 Gallons
120" dia. x 25' 3" long	15,000 Gallons
120" dia. x 31' 1" long	18,600 Gallons
120" dia. x 33' 7" long	20,000 Gallons
120" dia. x 39' 5" long	23,500 Gallons
120" dia. x 41' 11" long	25,000 Gallons
96" dia. x 16' 3" long	6,000 Gallons
96" dia. x 24' 3" long	9,000 Gallons
96" dia. x 27' 0" long	10,000 Gallons
96" dia. x 32' 3" long	12,000 Gallons
96" dia. x 40' 3" long	15,000 Gallons

Sharpsville Boiler Works Co.
Sharpsville, Pa.

Tanks from Stock

Desirable sizes such as

1	new	8350	gals.	capacity
2	"	10000	"	"
5	"	15000	"	"
1	"	26125	"	"

Also various used tanks.

TANKS from 500 to 26,000 gals. in process of manufacture for early delivery.

Shippers' Car Line, Inc.
165 Broadway, New York

---

1 Complete Acid Steel Casting Plant, consisting of two two-ton side blow converters.

1 Large Root Blower, direct connected to 85 horse power DC 220 volt motor.

2 Five horse power Tilting Motors, with necessary controllers and all necessary wiring and piping for complete plant.

We will sell one or both of these converters.

The plant has been in operation up to the last few days and is merely disposing of same on account of changing process of manufacture. In good working condition. Invite inspection.

Dibert, Bancroft & Ross Co., Ltd.
New Orleans, La.

BARGAINS
IN FOUNDRY EQUIPMENT

THE FOLLOWING FOUNDRY TOOLS AND SUPPLIES ARE ON SALE AT

VERY LOW PRICES

MOULDING MACHINES

10—10" Mumford Plain Squeezers
1—12" Mumford Plain Squeezers
1 - 8" Jolt - 30" x 42" Table
1—10" Osborn Combination Jolt and Squeezer
1—10" Tabor Plain Squeezer

The above machines are operated by compressed air.

1—hand operated Buch Squeezer, Rollover and Pattern Draw.

AIR COMPRESSOR

1—Ingersoll-Rand, type ER-1, 12" x 10" Single Stage Air Compressor, capacity 275 cu. ft. of free air per minute against 100 lb. pressure.

Equipment includes type C-1 Westinghouse, 75 H.P., intermittant Slip ring type motor with starter, controller, etc., a 36" x 8' Air receiver tested to 110 lbs., short belt drive attachment, unloader, etc.

SAND BLAST OUTFIT

1—"Pangborn" revolving Sand Blast Barrel, with dust arresting mechanism. The Barrel is arranged for belt drive, equipped with a 7½ H.P. motor for operation of the dust arrestor.

GALVANIZING PLANT

1—"Meaker" Electro Galvanizing Plant, consists of 1500 Ampere Motor Generator Set, all necessary bus bars, zinc anodes, cathodes, etc. two galvanizing tanks and approximately 1100 gallons of Meaker Galvanizing Solution.

MISCELLANEOUS FOUNDRY MATERIAL

Approximately four carloads of fine moulding sand, a small quantity of core compound, sea-coal, parting, chaplets, etc.

SOUTHWARK FOUNDRY & MACHINE CO.
5th AND WASHINGTON AVE.
PHILADELPHIA, PA.

---

1 Sturtevant No. 8 fan, 24" wide x 48" rotor dia
1 American Blower Co. fan 28" wide, rotor 7 ft. dia.
1 Hand punch No. 5, V P 18
1 Pond Machine Tool Co. hand punch
1 Sturtevant fan, size 80, Serial No. 1459, from Lincoln Power Plant

Subject to prior sale.

Chicago, Burlington & Quincy Railroad Co.
Burlington Bldg., 547 W. Jackson Blvd.
Chicago, Ill.

SPOT WELDERS

2—20 K.W. Toledo (Thomson) 27" throat, capacity to 3 gauge.

Also have others.

MILES MACHINERY CO.,
Saginaw, Mich.

BLOWERS, Rotary and Centrifugal, Roots - Connersville, General Electric. EXHAUSTERS, COMPRESSORS, VACUUM PUMPS, Cupolas, Moulding Machines, Tumbling Mills, Chain Hoists, Cranes, and all kinds of FOUNDRY EQUIPMENT. Send specifications covering your needs for Machine Tools, Equipment of all kinds. Largest machinery center.

THE CLIFTON-PRATT CO.
Cincinnati, Ohio

The Man in Chicago

Wanted a lathe. He bought it from

The Man in New Britain

who had one to sell. How did these two men get together?

Thru the Clearing House

SURPLUS STEEL, Etc.

HOT ROLLED STRIP STEEL

8 tons 1/4"x1 3/8"x75" Pickled and Oiled
400 tons .165x12 1/4"x96" E.D.D. Pickled and Oiled

COLD ROLLED STRIP STEEL

39 tons 1/4"x1 3/8"x75" Dead Soft Oiled
19 tons .031x1" (in coils) Dead Soft Oiled
10 tons .109x1 7/8"x123" Dead Soft Oiled (with 1 edge bevelled)

ANGLE IRON

28 tons 3/16"x3/4"x1/2" Hot Rolled (Approx. 18' to 20')

ALUMINUM (On hand continuously)

Large quantity .065 Dead Soft New Aluminum Clippings; pieces various shapes, widths, and lengths, but all pieces sufficiently large to make strips, minimum 2" wide up to 10" and 12", and from 12" to 30" in length.

Apply PURCHASING AGENT

EDWARD G. BUDD MANUFACTURING COMPANY

PHILADELPHIA, PENNA.

---

85 ft. Turn Table, complete with 20 H.P. motor. Capacity of handling 250 ton locomotive. Inquire

Hurwitz Bros. Iron & Metal Co., Inc.
Syracuse, N. Y.

Yellow Pine Crating

Car lots 4 inch Yellow Pine Crating. Rough or dressed. Thicknesses 3/8, 1/2 and 5/8 inches. Random lengths or cut to required lengths.

Carter Bloxonend Flooring Co.
Kansas City, Mo.

Approximately ten tons 3/16" diam. Bessemer Wire in Coils and 15 tons cut and straightened in lengths 79" long at $2.00 cwt. net f.o.b. Jamestown, N. Y.

DAHLSTROM METALLIC DOOR CO.
Jamestown, N. Y.

DOUBLE DECK BUNKS

3000 Double Deck Bunks, steel frames, woven wire springs, 30" wide. Suitable for construction camps, tent colonies, mine bunk houses, railroad camps, work cars etc., Also mattresses to fit offered at Bargain Prices

Nashville Industrial Corporation
Jacksonville, Tennessee

Bargain to quick buyer. One new combination barrel and box elevator. 29 ft. centers, never been used. Complete with double line riveted pintle chain, cut gearing, babbitted bearings and 5 H.P. motor. Manufactured by the Link Belt Co., of Philadelphia, Pa. Immediate delivery. Wire or write.

DIAMOND MANUFACTURING COMPANY
Wyoming, Pa.

INCINERATOR

In Excellent Condition— for Immediate Sale

1 Nye Odorless Crematory. No. 10, single unit. Complete with furnace, building and 50 ft. steel smoke stack. Capacity 12 tons of garbage, general refuse, dead animals and night soil during twenty-four hours operation.

Prints and Specifications furnished on request.

NASHVILLE INDUSTRIAL CORPORATION
Jacksonville, Tenn.

Steel Forging Billets

74 Tons 6" Sq. O. H. S. L. 10/12' Carbon .35 to .50, Phos. and Sulph. .04 and under. Chipped.

15 tons bands 2 1/2" x No. 11, 10 tons bands 2 1/2" x No. 11, 8 tons bands 2"x No. 11, S/L. 6/12' Soft Steel.

10 Tons 1 1/8" Round Reinforcing Bars 40/50.

3 Tons 5/8" Square Deformed Reinforcing Bars 35/40'.

8 Tons Soft Blk. Shts. No. 14, widths 24" to 2[illegible]", lengths 72" to 120" all new assorted $2.75 new cwt.

From stock at sacrifice prices

Surplus lots of bars, hoop, bright C. R. STEEL strips and bars and tool steel, to be sold at sacrifice.

J. A. RUBINO, Newark, N. J.
Phone Market 6398

GALVANIZED SHEETS
BLUE ANNEALED SHEETS
TIN PLATE

Ernest L. Brown
85 Purchase St. Boston, Mass.

FOR SALE

The following items of Alloy Coated Steel and Ingot Iron Sheets, all first grade primes, stretcher leveled and resquared:

20,000 lbs. 16 Ga. 36" x 96" Alloy Coated Steel Sheets
8,600 lbs. 16 Ga. 30" x 96" Alloy Coated Steel Sheets
8,200 lbs. 16 Ga. 36" x 108" Alloy Coated Steel Sheets
4,500 lbs. 16 Ga. 36" x 120" Alloy Coated Steel Sheets
3,000 lbs. 20 Ga. 30" x 84" Alloy Coated Steel Sheets
2,700 lbs. 20 Ga. 30" x 96 1/2" Alloy Coated Steel Sheets
60,000 lbs. 18 Ga. 35" x 93" Alloy Coated Ingot Iron Sheets

DAHLSTROM METALLIC DOOR CO.
Jamestown, N. Y.

New Structural Steel

200 tons (4700 pieces) 5" 9 3/4 lb. I Beams 9' 0". To complete shipments from this point $22.00 net ton f. o. b. New Cumberland, Pa.

Henry A. Hitner's Sons Co.
4501 Richmond St., Philadelphia, Pa.

I-BEAMS

400 tons of 6 in., 12 1/4 lb. Steel Beams, 15 ft. 9 in. long.
200 tons of 10 in., 25 lb., 14 to 16 ft. Beams.

WIRE ROPE

4000 ft. 1 3/8 in., 6 x 19 C. S. Hauling Wire Cable. Also some 1 in. and 1 1/4 in. Galvanized Cable.
10000 ft. of New 3/8, 1/2, 5/8, 7/8 and 1 1/8 in.

THE PERRY, BUXTON, DOANE COMPANY
214 West First Street
South Boston 27 Mass.

Due to certain changes we now have for disposal the following Auto Body [illegible]

Approx. 1,200 Sheets—35,000 lbs., 20 [illegible]

Approx. 280 Sheets—8,000 lbs., 20 gauge 37½" x 73"—Seconds.

All of the above is new stock in A-1 condition, purchased from a high grade mill and made up to the following specifications:

Automobile Steel Sheets, Special Fender Grade, Stretcher Leveled and Re-squared. Deep drawing quality, capable of taking 180 degrees bend on itself with the grain without showing fracture. Oiled and free from rust.

DAHLSTROM METALLIC DOOR CO.
Jamestown, N. Y.

We have to offer the following material subject to prior sale at extremely attractive prices:

Boiler Tubes

[illegible] 2" Cleaned Iron [illegible] x .120" National Lap

550 Pc. 2½" [illegible] x .120" National Lap

Rivets

[illegible] Power head button rivets [illegible] round head rivets.

[illegible] Button head structural rivets.

5400 lbs. ⅝" Button head structural rivets.

Wire Mesh

521 Rolls ½" x No. 11 x 18" Square black.

[illegible] Square black.

30 Rolls 1½" x No. 11 x 32" Square black.

We solicit your inquiries for pipe and tubing

Eagle Pipe Supply Co., Inc.
233 Broadway New York City

No. 14 H.R. Hoop Iron

50 [illegible] Kam Ltd. will switch [illegible] used in manufacturing [illegible] No. 18 No. 6 and S32 R. H. [illegible] the very reasonable.

WOODBINE MACHINE WORKS
Woodbine, N. J.

Schreer & Poster, Inc.
JOBBERS AND DEALERS IN
IRON and PIPE
BOILER TUBES, PIPE COUPLINGS, FITTINGS, THREADED PIPES AND BOILER PLATES
211-17 Kent Ave. Brooklyn, N. Y.

We can furnish from stock all sizes of
Untested Black Steel Pipe
for Structural and Industrial Purposes.
[illegible] Specifications
C. DAVIS & COMPANY
[illegible] Jones Lauhlin
Pittsburgh, Pa.

Second Hand Wrought Iron and Steel **PIPE** Overhauled Rethreaded Coupled

All Sizes In Stock

Greenpoint Iron & Pipe Co., Inc.
[illegible] Greenpoint Avenue
Brooklyn, N. Y.

We furnish all sizes of Untested Black Steel Pipe for Structural work. Will cut to any length.

McDOWELL & CO.
Galveston & Western Avenues, N. S.
PITTSBURGH, PA.

Pipe for Sale

Large Stock, All Sizes
Threaded and Coupled
Mill Lengths

Albert & Davidson Pipe Corp.
256-264 Oakland St.
Brooklyn, N. Y.

O. D. Wrought Pipe

Plain Ends

1000 ft. 24" pipe ⅜" wall
450 ft. 24" pipe ⅜" wall
3500 ft. 18" pipe 5/16" wall
1200 ft. 16" pipe ⅜" wall
500 ft. 15" pipe 5/16" wall
15,000 ft. New 6" National Pipe Co. full weight pipe with couplings and protectors
5000 ft. 8" and 10" I.D. pipe, plain end
All the above is new pipe ready for immediate delivery

For information and prices, apply to

Marine Metal & Supply Co.
167 South Street New York City

NEW PIPE SECONDS

Black and Galvanized
½ to 4 Inches
In Any Quantity

I. LANSKI & SON
3340 S. Lawndale Ave.
CHICAGO

WROUGHT IRON and STEEL PIPE

[illegible] and Second Hand. With new threads and couplings. All sizes from [illegible] Also cut to sketch.

DAVIDSON PIPE & IRON CORP.
[illegible] Kent Ave. Brooklyn, N. Y.

PIPE

[illegible] New and Second Hand.

Immediate Delivery.

L. & D. Metal & Supply Co., Inc.
1096 Flushing Avenue Brooklyn, N. Y.

IRON and STEEL SCRAP

HENRY POTTS & COMPANY
650 Real Estate Trust Bldg.
Philadelphia, Pa.
Yard—Coatesville, Pa.

THE PERRY BUXTON DOANE CO.
IRON AND STEEL SCRAP

OFFICES
Boston, Philadelphia
New York, Hartford
Milan, Italy

YARDS
So. Boston, Providence, Coatesville, Pawtucket, Worcester, Portland.

THE OLDEST HOUSE IN THE UNITED STATES IN THE OLD METAL BUSINESS
ESTABLISHED 1847

The Morton B. Smith Co.
Old Metals
241-243 Front Street New York

Lining Up Orders

THE Contract Work Section of the Iron Age was created for that purpose and it has stood the test of time only because it has brought results for the firms using space.

You may have an individual problem. If so let us help you solve it.

CONTRACT WORK SECTION
THE IRON AGE
[illegible]
239 W. 39th ST., NEW YORK CITY

LURIA BROS. & CO., Inc.

Iron and Steel Scrap

OFFICES

Reading, Pa., Colonial Trust Bldg.
Lebanon, Pa., Luria Bldg.
New York, N. Y., Woolworth Bldg.
Pittsburgh, Pa., Oliver Bldg.
Boston, Mass., Board of Trade Bldg.

YARDS

Reading, Pa. Lebanon, Pa.
Donaghmore, Pa. Pittsburgh, Pa.
Coatesville, Pa.

FOR SALE

ALL STEEL GONDOLA CARS

110,000 Pounds Capacity
Twin Hopper Bottom or Flat
Steel Floors
Air Brakes

Standard Safety Appliances Completely rebuilt and meeting all I. C. C. requirements.

For further information and photos of cars write or wire,

THE YOUNGSTOWN EQUIPMENT COMPANY

NILES, OHIO

FLAT CARS—BOX CARS

300 flat cars, standard gauge, 36 to 40 ft., capacity 40,000, 50,000, 60,000 and 80,000 lbs.

35 gondola cars, 60,000 and 80,000 lbs. capacity, 25'7" to 36' long, one and four board high, flat and hopper bottom.

15 box cars, standard gauge, 36 ft., 50,000 lbs. capacity.

All equipped with air and hand brakes.

Henry A. Hitner's Sons Co.

4501 Richmond St., Philadelphia, Pa.

FOR SALE

4—100,000 cap. flat bottom gondolas.
1—140,000 cap. all steel flat car.
4—side dump cinder cars, 60,000 lbs. cap. steel underframe, 4 ft. 8½ in. gage.

Walter A. Zelnicker Supply Co.
ST. LOUIS
Rails, Steel Piling, Steam Shovels, Machinery

Rails - Track Equipment

W. C. BRIDDELL CO., Inc.

BALTIMORE

Iron-Steel Scrap

Immediate Shipment from Stock

Tie Plates—Rail Braces Rail Clips—All New

For All Rail Sections

TRACK SPECIALTIES COMPANY
29 Broadway, New York City

We've Got 'Em

No. 1 Relaying Rails and Angle Bars for immediate shipment.
30 lb.—40 lb.—50 lb.—56 lb.—60 lb.
68 lb.—70 lb.—80 lb.—90 lb.
Also new 80 lb. Rails and Accessories.
Write or wire us for quotations stating tonnage and destination.

Hyman Michaels Company

Peoples Gas Bldg., Chicago
New York Pittsburgh St. Louis

RELAYING RAILS

1,000 tons 52 lb. section
1,000 tons 56 lb. section
1,500 tons 60 lb. section
2,000 tons 67 lb. section
1,000 tons 75 lb. section
10,000 tons 85 lb. section
5,000 tons 100 lb. section

Continental Iron & Steel Co.

2 Rector St. 110 South Dearborn St.
New York, N. Y. Chicago, Ill.

RICHARDSON for RAILS

Constant stocks of New and Relaying Rails, Spikes and Bolts. Frogs and Switches. Tell us your requirements.

Richardson & Co., Inc.

2101 Oliver Building
PITTSBURGH, PA.

New and Second-hand Rail, Frogs, Switches, Crossings, Spikes, Bolts, Tie Plates, Rail Braces and Angle Bars, 12 lb. to 100 lb.

In Stock for Spot Shipment

CENTRAL IRON & METAL COMPANY
Successors to
Chicago Rail & Equipment Company
2350 So. Rockwell St. Chicago, Ill.

RELAYING RAILS

FOR [illegible] EQUIPMENT

75 Tons 30 lbs., Virginia
400 Tons 40 lbs., Virginia
700 Tons 40 lbs., North Carolina
400 Tons 50 lbs., Baltimore

Miscellaneous Track Material
Iron and Steel Scrap

JOHN T. HILL & COMPANY, Inc.
Continental Bldg. Baltimore, Md.

RAILS

Complete stock, all section Relaying Rails. Get in touch with us by 'phone or wire for your requirements.

LOUIS COHEN & SON
Wilkes-Barre, Pa.

New **RAILS** Relaying
All Weights
Frogs, Switches and Accessories
Light Railway Equipment
Wm. T. Canton & Co.
30 Church Street, New York

$31.50 Per Ton

New Rails

150 tons 90 lb. ASCE
458 tons 100 lb. ARA B
60 tons 100 lb. ARA A
772 tons 100 lb. P. & R. R.R.
32 tons 100 lb. N.Y. N.H. & H.
50 tons 101 lb. D. L. & W. R.R.
274 tons 105 lb. D. L. & W. R.R.
146 tons 107 lb. N. Y. N. H. & H.

F. O. B. Lebanon, Pa

THE MORRISON & RISMAN CO.

1478 Bailey Ave., Buffalo
798 Drexel Bldg., Philadelphia

3000 tons 60 lb. RELAYING RAIL

A. S. C. E. Sections and Angles at Girard, Pa.

Buffalo Housewrecking & Salvage Co.

Buffalo, N. Y.

RAILS

STEAM SHOVELS CARS
LOCOMOTIVES CRANES
RAILWAY & INDUSTRIAL EQUIPMENT

E. C. SHERWOOD
Hudson Terminal Building
NEW YORK

RELAYING RAILS

13 miles 40 lb. section North Carolina
3 miles 45 lb. section, North Carolina
4 miles 56 lb. section, South Carolina
4 miles 56 lb. section, Virginia delivery
All in first class condition. Ready for immediate shipment.

H. M. Foster Company
Continental Bldg., BALTIMORE, MD

New **RAILS** Relaying
12 to 100 lbs.
Frogs, Switches and Accessories

L. A. Green Rail & Machinery Co.
First Nat'l Bank Bldg., Pittsburgh, Pa.

RELAYING
30 lb. and 60 lb. Rails

Also 20 lb., 30 lb., 40 lb., 56 lb., 70 lb., 85 lb. and other weights; and New Rails, any weight. Low prices on new Frog and Switch Material. Second-hand Locomotives.

ROBINSON & ORR,
419 Wood Street Pittsburgh, Pa.

RAILWAY SUPPLIES

New and Relay Rail, Track Spikes, Track Bolts, Frogs, Switches, Galvanized V-Crimped, Corrugated and Composition Roofings, Heavy Hardware, etc.

PIDGEON-THOMAS IRON CO.
94-96 N. Second St., Memphis, Tenn.

We Want To Buy

Cold Headers, Trimmers, Nut Machines and Tappers; complete equipment for making small bolts and rivets, including Rotary Annealing Furnace, also one 1½" Upsetter and one Hot Pressed Nut Machine.

ADDRESS BOX T-424
care *The Iron Age*, New York.

1—1½" Upsetting and Forging Machine;
1—3" Upsetting and Forging Machine;
1—5" Upsetting and Forging Machine.

Address Box T-425
care The Iron Age, New York.

No. 6 Browne & Sharpe Auto. Screw Machine; must be in good condition. Quote price and where can be seen.

Penn Screw & Machine Works
712 Cherry St., Philadelphia, Pa.

Second hand Punch and Shear, architectural jaw type, 36" depth of throat, capacity to punch 1" diameter hole through 1" thick mild steel, shearing capacity 6 x 6 x ½ angle and ⅞" thick plates, fitted with all attachments for punching and shearing angles, bars, and plates, motor drive preferred. Give price, weight, shipping point, manufacturer's name and number, and describe fully the condition of machine.

Address BOX T-477

Second hand

PUNCH PRESS

Prefer inclinable type, 20 to 25 tons. Describe, name, age, condition and price.

Address Box T-472

Wanted Quickly

---

10 to 15 Ton Electric Crane 40' Span. Modern equipment wanted. State full particulars.

The Advance Foundry Company
Dayton, Ohio

CRANES

1—15 Ton 47' Span
1—10 Ton 100' Span
1—90 Ton 47' Span Ladle Crane

State maker, type of motors, size of motors, age and present location.

THE KANSAS CITY BOLT AND NUT COMPANY
Kansas City, Missouri

CRANE

10 ton, 3 motor A.C. with span of 50' or less; only A-1 Equipment desired. Give full details and price.

ADDRESS BOX T-332
care *The Iron Age*, New York.

USED OR SURPLUS

Beams—Channels—Angles—Plates—Columns—Bolts—Rivets and Bars (reinforcing or merchant)
IN ANY QUANTITY!

Steel Structures Company, Inc.
Grand Central Terminal

HIGH SPEED STEEL SCRAP

Advise quantity and brands

Address Box T-455
Care *The Iron Age*, New York.

To Sell Industrial Properties Make Use of the Business Opportunities Section

Just recently a Troy, New York, company, that desired to dispose of its plant, inserted a one-inch announcement in this section. The advertisement appeared sixteen times, and the total cost was $70.08.

Fifteen replies were received. The advertiser wrote:

"We appreciate the service rendered and shall be glad, should we require advertising of this nature at any time in the future, to remember your paper."

Opportunities abound in this section. It would be well for you to glance over the items every week—section No. 53.

BUSINESS OPPORTUNITIES SECTION
THE IRON AGE
The World's Greatest Industrial Paper
Established 1855
239 WEST 39th STREET, NEW YORK CITY
Charter Member A B C and A B P

CONTRACT WORK

SPECIAL MACHINERY
MACHINE WORK
PRESS WORK-FOUNDRY WORK
AUTOMATIC SCREW MACHINE WORK

Rates—One Inch Space $4.00 Per Insertion on Yearly Basis.
Rates for Shorter Runs or Other Spaces Furnished on Request.

JIGS, FIXTURES, TOOLS, etc.

ALL ADVERTISEMENTS ARE GROUPED GEOGRAPHICALLY

THE RIGHT TOOLS FOR THE RIGHT PURPOSE insure *lowest cost* and *uniform production.* We specialize in tool design and construction, also in the manufacture of METAL SPECIALTIES, STAMPINGS, SCREW MACHINE PRODUCTS, ETC. What is your problem?

National Blank Book Co.
110 Riverside Holyoke, Mass.

Write Us for Quotations
DIES, JIGS & FIXTURES
Stampings, Special Machinery
If you will get our prices we will get your orders.
20 Years' Experience.
TAYLOR-SHANTZ CO.
482 St. Paul St. Rochester, N. Y.

EXPERTS
On tools, dies, jigs, fixtures, gauges, experimental work—all kinds.
Special sheet metal articles and parts made to order, and designed if desired. Complete facilities; 20 years' experience—all at your service. Careful attention to detail. Prompt delivery assured. Send blue print or sample for estimate. We can save you money.
Let us show you what we can do.
LIBERTY TOOL & DIE CO.
215-217 North Water St.,
Rochester, N. Y.

Your Tools, Jigs and Fixtures can be made to your satisfaction. Prompt deliveries, accurate work. Send Blue Prints for Estimate.

ACCURATE TOOL WORKS
ERIE, PA.

Jigs, Fixtures, Gauges
(Designers and Builders)
Special tools, machines and experimental work. In business 35 years. Honest service promptly given.
The J. C. Ulmer Co.
1791 E. 38th St. Cleveland, Ohio
Makers of fine surveying instruments

It takes extensive experience, and skill of a special sort to manufacture JIGS, FIXTURES, GAUGES, and SPECIAL TOOLS and MACHINERY, in order that they will work properly when completed. Such skill and experience are at your service here.

CHAS. J. MOODY
159 Grove Ave. Elgin, Ill.

Let Us Be Your Factory
We can do your job complete

TOOLS, DIES, STAMPINGS, TURNING, BRASS AND ALUMINUM CASTINGS, GRINDING, POLISHING, PLATING, ENAMELING AND ASSEMBLING.

A complete outfit at your service on any of the various operations.

Send us your drawings, blue prints or samples for quotations.

Douglas & Lomason Co.
5836 Lincoln Ave.
DETROIT, MICH.

STAMPINGS

ALL ADVERTISEMENTS ARE GROUPED GEOGRAPHICALLY

STAMPINGS
Sheet Drawing—Wire Forming
Complicated Assembling
Welding, Galvanizing, Tinning, Plating, Enameling
Send your specifications for estimates.
GEM STAMPED STEEL CO.
CHELSEA STATION, BOSTON

STAMPINGS
"Gray" Quality
Drawing and Forming in Light Sheet Metals
PETER GRAY & SONS, INC.
286 Third Street Cambridge, Mass.

Stamping and Drawing
Capacity 8" diameter by 4" deep. Specialists in stampings for Radio Equipment—and Auto Supplies.
LARSON TOOL & STAMPING CO.
Attleboro, Mass.

SHEET METAL
STAMPINGS
Punches, Dies and Tools
General Machine Work
Get our estimates on this class of work.
MECHANICS TOOL & STAMPING CO.
7 Summer St. Worcester, Mass.

NEED STAMPINGS?
We are desirous of manufacturing Patented Specialties and other goods for some one selling his own products. Dies, Tools, Soft Metal Castings, etc.
Low Overhead. Write for Estimate.
BRIDGEPORT SILVERWARE MFG. CORP.
65 Holland Ave. Bridgeport, Conn.

Stampings
small articles from sheet metal a specialty
Wire Specialties
Eyelets, Grommets and Rivets
Our large and up-to-date factory at your service. Inquiries are solicited.
Traut & Hine Mfg. Co.
New Britain, Conn.

INTRICATE PRESS WORK
BLANKING, FORMING
METAL SPECIALTIES
Put It Up to Us
THE ANSONIA NOVELTY CO.
ANSONIA, CONN.

DRAWN STEEL
SHELL WORK
We are experts in this line of metal drawing. Put your problem up to us.
THOMASTON METAL WORKS
THOMASTON, CONN.

METAL STAMPINGS
LIGHT MANUFACTURING
FROM METAL AND WIRE
DIES
The Robinson Tool Works, Inc.
Waterbury, Conn., U. S. A.

Small Stampings of Copper, Brass, German Silver and Steel
Our facilities are adequate to handle your work. What do you need now?
THE SEYMOUR METAL GOODS CO.
SEYMOUR, CONN.

STAMPINGS
Wire Formings and
All Kinds of Plating
WATERBURY BUCKLE CO.
WATERBURY CONNECTICUT
Established April 7, 1853

WE CAN MAKE IT!
Let us make your stampings, sheet metal-working dies, jigs, fixtures, tools, etc.
Our work is right—our price is right.
General Machine & Manufacturing Company
544 Iranistan Avenue, Bridgeport, Conn.

CONTRACT WORK

SPECIAL MACHINERY
MACHINE WORK
PRESS WORK-FOUNDRY WORK
AUTOMATIC SCREW MACHINE WORK

Rates—One Inch Space $4.00 Per Insertion on Yearly Basis.
Rates for Shorter Runs or Other Spaces Furnished on Request.

HIGH GRADE
STAMPING, SPOT WELDING, SWAGING, MILLING, DRILLING, TAPPING.
At Attractive Prices
THE GOYER COMPANY
Willimantic, Conn.

Reputable manufacturer with modern plant on switch track in small town near Chicago wants to make articles of metal or wood.

Address Box T-471
Care The Iron Age, New York

LIGHT METAL
STAMPINGS
BLANKING and FORMING
Decorating on metals for toy and can manufacturers
Established 40 Years
NEW YORK METAL CEILING CO.
535-541 West 24th Street
New York City

STAMPINGS
QUALITY QUANTITY
Specialties from Sheet Metal. Novelties, Gauges and Toys on Contract, ready for the Trade.
TOOLS—DIES
Screw Machine Products.
ALLEN P. STILLMAN, Inc.
807-9 Lexington Ave., Brooklyn, N. Y.

Stampings
Facilities above the average.
Write us for quotations.
Great Lakes Pressed Steel Corp.
1410 Niagara St. Buffalo, N. Y.

FROM THE WORD "GO"
[illegible] and wide ex[illegible] from the word "go" on
METAL STAMPING and TOOL and DIE WORK
Johnson Tool & Mfg. Co., Inc.
80 *Minutes from N. Y.* Chappaqua, N. Y.

STAMPINGS
Large and small up to ten inches deep. We have a complete equipment of single and double action presses. Send us your samples or prints, if we cannot serve you we will tell you who can.
Deep Drawn Metal Corporation
61-67 Navy Street Brooklyn, New York

Stampings and Blankings
We specialize in this type of work. Get our quotations today.
Fourchime Mfg. Co., Inc.
Clinton, N. J.

STAMPINGS—DIES
Let us manufacture your
SHEET METAL SPECIALTIES
Send us your samples or drawings for prices
ACME STAMPING & MFG. CO.
Corliss & Rudd Sts., Pittsburgh, Pa.

STAMPING AND DRAWING
We can submit attractive prices on steel blanked to size in BY-PRODUCT COLD-ROLLED STOCK .0375 to .050.
STAMPING AND DRAWING to any specification in all metals.
SEND US A SAMPLE OF YOUR BLANK
Complete facilities for Manufacturing, Assembling, Finishing and Electro-plating.
Henson-Blair Manufacturing Co.
157 W. Lehigh Avenue,
Philadelphia, Pa.

SHEET metal work of every description from No. 30 gauge to ¼" thick, boxes, tanks, pipes, vegetable lockers, ship work, special forming and stamping. Prompt deliveries. Large capacity.
J. S. THORN CO.
10th & Allegheny Ave., Philadelphia

Metal Stampings
Experimental and Model Work. Special Machinery, Punching and Forming Dies. Novelties and Patented Articles manufactured by contract. Get in touch with us.
The E. Konigslow Stamping & Tool Company
Cleveland, Ohio

Exceptional Facilities
for manufacturing Sheet Metal Specialties from No. 10 Gauge and lighter. Blanking, forming, drawing, stampings, Acetylene and Electro Welding and enameling.
F. O. SCHOEDINGER
COLUMBUS OHIO

STAMPINGS
up to ⅛ inch
We make the dies
SCREW MACHINE PRODUCTS
Up to One Inch
If desired, we will market the product.
OHIO METAL STAMPING & MFG. CO.
816 E. Market St. Akron, Ohio

High Grade Stampings and Drawings
in all metals
SPECIAL DIE WORKS
The Superior Metal Products Company
ELYRIA, OHIO

Fabricated Sheet Metal and Angle-Iron Construction
If it is sheet-metal or angle-iron we can make it. Our shop is equipped with modern machinery and every facility. Send samples or blueprints for our low contract prices in any quantity.
Prompt deliveries anywhere in the U. S.
KIRK & BLUM MFG. CO.
2851 Spring Grove Ave., Cincinnati, O.

CENTRAL LOCATION—
Several Railroads make this an ideal plant for
Contract Punch Press Work
BURGESS-NORTON MFG. CO.
GENEVA, ILL.

Heavy—Light
Stampings
Dependable Service
Dail Steel Products Co.
Main and Hosmer St., Lansing, Mich.

Stamping Specialists
If you are in need of metal Stampings of quality, ask for "Harwich Service." Consumers of large quantities of castings and forgings have been surprised at savings effected through use of Stampings.
Send your Samples, Blueprints, Sketches or Specifications to our Department "D," which will be pleased to serve you.
HARWICH STAMPING COMPANY
P. O. Box 9, No. End Sta., Detroit, Mich.

ON PACIFIC COAST STAMPINGS
Deep drawing, blanking, forming, spinning, punching, polishing and enameling of steel, copper, brass and aluminum.
DIE WORK SPOT WELDING
Send blue print or sample for estimate.
MARTIN PRODUCTS COMPANY
625 Market St. San Francisco, Cal.

SCREW MACHINE PRODUCTS
ALL ADVERTISEMENTS ARE GROUPED GEOGRAPHICALLY

SPECIALISTS IN
SCREW MACHINE PRODUCTS
WALTHAM SCREW CO.
WALTHAM, MASS.

CONTRACT WORK

SPECIAL MACHINERY
MACHINE WORK
PRESS WORK—FOUNDRY WORK
AUTOMATIC SCREW MACHINE WORK

Rates—One Inch Space $4.00 Per Insertion on Yearly Basis.
Rates for Shorter Runs or Other Spaces Furnished on Request.

Screw Machine Products
Diameters up to 1¼". Large battery of automatics available.
Ask for quotations.
BROWN BAG FILLING MACHINE CO.
10 Main St., Fitchburg, Mass.

ACCURATE SCREW MACHINE PRODUCTS
Through the handling of countless different designs, we have acquired the skill necessary to make screw machine products that *fit.*
What do you need?
Capacity ⅛ to 2¼ in.
Commonwealth Screw Company
25 Bartlett St. Worcester, Mass.

Right facilities for manufacturing
PISTON PINS
IN QUANTITIES
Low Overhead and Reliable Deliveries
Starting at Once
JOHN W. LEAHY Danbury, Ct.

Screw Machine Products
Light Machine Work
EDWARD HANSON,
BRISTOL CONN.

Screw Machine Products
up to 1¼" diameter. Light metal stampings. Brass faucets.
Clark, Cadle, Harmon Corp.
1139 University Ave., Rochester, N. Y.

Wm. Steinen & Co.
SCREW MACHINE PRODUCTS
SPRINGS—WIRE GOODS
297 Washington Street
Newark, N. J.

SCREW MACHINE PRODUCTS
Small and Large Quantities
Send Us Your Inquiry
PENN SCREW & MACHINE WORKS
708-12 Cherry St., Philadelphia, Pa.

SPECIAL
SCREW MACHINE PRODUCTS
ALSO DIES, SMALL TOOLS AND METAL NOVELTIES
EXPERIMENTAL WORK
YOUR INQUIRIES SOLICITED
THE HANNEY STAMPING WORKS
3104 Woodbridge St. E., Detroit, Mich.

MACHINE WORK

ALL ADVERTISEMENTS ARE GROUPED GEOGRAPHICALLY

MACHINE WORK
and
SPECIAL MACHINERY
Experimental and contract work from patterns to finished machine. Exceptional advantages enable us to render the best of service at a fair reasonable price. Get our quotation first.
FAY & SCOTT Dexter, Maine

Manufacturing Proposal

Proper machinery, skilled labor and an abundance of raw material place us in a position to manufacture mechanical, electrical and radio apparatus and to do every kind of precision work. Because of these facilities we believe we can underbid most concerns operating in the same line.

Send us your specifications

Pittsfield Machine & Tool Co.
Hawthorne Ave. Pittsfield, Mass.

The Man with an Idea

Crystalized into some kind of a useful machine, is the man to whom the world in general should take off its hat.

We have met a host of such men in our 46 years' experience in building special machines. They are fine fellows, chock-full of enthusiasm, and somehow or other we have been able to catch their spirit, and together, we have turned out some mighty fine machines.

Of course the knowledge gained from our long experience has been an important factor in helping our clients over the many seemingly impossible and unforeseen mechanical difficulties that are bound to crop up in building special machinery, and the genuine appreciation of these good fellows when we have surmounted an obstacle, or suggested an improvement, or discovered a way to save production costs, has been an inspiration.

If it is a special machine proposition then, don't hesitate to come to us, a close up of its personnel and a once over of our photograph gallery of past accomplishments will, we are quite sure, give you confidence in our ability to do your job *right.*

Adequate equipment for doing machine work and making jigs, fixtures, tools, etc.

C. H. COWDREY MACHINE WORKS

1820 Summer St. **Fitchburg, Mass.**

CONTRACT WORK

SPECIAL MACHINERY
MACHINE WORK
PRESS WORK-FOUNDRY WORK
AUTOMATIC SCREW MACHINE WORK

Rates—One Inch Space $4.00 Per Insertion on Yearly Basis.
Rates for Shorter Runs or Other Spaces Furnished on Request.

EXPERT
MACHINE DESIGNING

PATTERNS—CASTINGS
MACHINING

Special and Automatic Machinery Originated and Perfected by Us for

Wire and Chain Forming
Automatic Threading
Automatic Milling and Profiling
Frog and Switch Grinders
Openside Planers
Nut Milling and Castellating
Tube Cutting-Off
Automobile Manufacturing Equipment
Candy Cream Mixing Orange Washing

WRITE US

THE AUTOMATIC MACHINE COMPANY
Bridgeport Connecticut

SPECIAL MACHINERY MACHINE PARTS and TOOLS

We maintain a competent engineering department and are prepared to undertake the development, design and manufacture of special and semi-automatic production machinery.

Send for our "MACHINE EQUIPMENT" Circular.

THE HARTFORD SPECIAL MACHINERY CO.
287 Homestead Avenue
HARTFORD, CONN.

Our equipment is ready to make your
Machine Parts
Grey Iron Castings
Special Machinery
Gears
Turner Machine Company
Danbury, Connecticut

MACHINE WORK
SPECIAL MACHINERY
EXPERIMENTAL WORK
Peterson Machine Company, Inc.
34 East 29th Street Brooklyn, N. Y.
Tel. Flatbush 8412

SPECIAL MACHINERY WORK

Equipped to handle planer work 40" x 20'
Boring capacity 72" turning 40" x 20' and 54" x 12'

Gray Iron Casting
and
Wood Patterns
casting up to 4 tons

Sheet Metal Work
Tanks, stacks, penstocks, smoke breeching, etc.

Structural Steel
Plain and fabricated Large stock

The Utica Steam Engine and Boiler Works
UTICA, N. Y.

No Job Is Too Large Or Too Small For Our Attention

Complete Assemblies
Machine Work
Tool Room Work
Sheet Metal Work
Wood Work
Blacksmith Work
Drop Forgings
Heat Treating

Buffalo Pitts Company
BUFFALO, N. Y.

CAM CUTTING

All varieties of cams, from 36 in. diameter down to the smallest. Special prices on large quantities. Cam cutting machines in stock.
HEADQUARTERS FOR CAM CUTTING
THE GARVIN MACHINE CO.
Spring and Varick Streets
New York City

GEAR SPECIALISTS MACHINE WORK

Also case-hardening. Here is a shop with low overhead and modern equipment, which means low costs. *Send your specifications or sample to*
SIER-BATH COMPANY
143 W. 54th St. New York City

Special Machinery
Tools, Dies, Metal Stampings
General Machine Work
Cortland Machine & Tool Works
Cortland, N. Y.

Light and Heavy
MACHINE WORK
SPECIAL MACHINERY

Big Tools make our equipment complete. Special experience on intricate machinery. Send your blueprints here and let us quote you.
F. A. WEISBECKER & SONS
22 Frost St. Brooklyn, N. Y.

Let Our Factory
Be Your Factory

for manufacturing your SPECIALS, particularly in the line of SPECIAL MACHINES and PARTS, STEAM, GAS or HOT-WATER DEVICES, VALVES, CARBURETORS, or any product in manufacturing in which brass, iron or steel, cast or rolled, is required. Estimates given from samples or blueprints, preferably both.

Established 1894
Spindler & Deringer
Colgate and Mercer Sts., Jersey City, N. J.

HEAVY MACHINE WORK

SPECIAL MACHINERY
CONTRACT WORK

Established 1863

STEELE & CONDICT, Inc.
Manufacturing Engineers
JERSEY CITY, N. J.

GEARS
and Gear-Cutting of Every Description
FORGINGS
Steam Hammer and Hand Forgings
NILSON-MILLER CORP.
HOBOKEN, N. J. Tel. 36 Hoboken

M-C GEARS

Let us cut your Spur and Spiral Gears of the smaller sizes.
Meisselbach-Catucci Mfg. Co., Inc.
51 Stanton Street
Near Frelinghuysen Ave. Newark, N. J.

LIGHT MANUFACTURING
GENERAL MACHINE WORK

Semi-production work. Special machines developed and built. Engineering department and skilled toolmakers specializing in dies for metal stampings. Our best recommendation—we are always busy.

DIES
TOOLS
BEAVER MACHINE & TOOL CO., Inc.
625 North 3rd Street Newark, N. J.

CONTRACT WORK

SPECIAL MACHINERY
MACHINE WORK
PRESS WORK-FOUNDRY WORK
AUTOMATIC SCREW MACHINE WORK

Rates—One Inch Space $4.00 Per Insertion on Yearly Basis.
Rates for Shorter Runs or Other Spaces Furnished on Request.

MACHINE WORK

General Machine Work, Special Machinery Turret Lathe Work, Machined Parts, Patterns, Castings and Forgings. Send Blue Prints for Estimates or ask to have representative call.

PORTER MACHINE COMPANY, Inc.
113-115 Plymouth Street
Jersey City, N. J.

10 minutes from lower New York
Telephone number Montgomery 809

SPECIAL MACHINERY
BUILT TO ORDER

We have splendid facilities for producing special machinery of all kinds, and are prepared to guarantee satisfaction, both as regards workmanship and price. We have foundry facilities and an up-to-date machine shop. Send us blueprints and give us an opportunity to quote you price. We can save you money.

LAMBERT & TODD MACHINE CO.
Camden, N. J.

LOW PRICES

We have a reputation for low priced and high grade

MACHINE WORK AND
SPECIAL MACHINERY OR PARTS

Send blue prints
for estimating

DIETZ MACHINE WORKS
126-8 FONTAIN ST. PHILADELPHIA

MACHINE WORK

We offer prompt service on medium and light work requiring more than ordinary care. We have a modern shop and skilled mechanics under the personal supervision of W. S. Giele, mechanical engineer. We can also handle your castings.

Lebanon Gear & Machine Works
Lebanon, Pa.

GRINDING SPECIALISTS

External—Internal—Surface

Hardened and Ground Parts

Made Complete

A. B. LANDIS & SONS

Chestnut Hill Philadelphia

COOPERATION

Your machinery building problems will be solved with our cooperation—we offer the widest facilities and an efficient organization.

Get in touch with us.

The Allen Iron & Steel Co.
Third, Venango and Sedgley Ave., Phila., Pa.

Contract Work
Accuracy Guaranteed
Parts and Special
MACHINERY

YORK ELECTRIC & MACHINE CO
30-34 North Penn St. York, Pa.

Special Machinery

BUILT TO YOUR ORDER

GEAR CUTTING

Immediate Delivery—Low Prices
Let us quote you.

The Earle Gear & Machine Co.
Philadelphia, Pa.

SPECIAL MACHINERY

DEVELOPED AND MANUFACTURED

MACHINE PARTS

Screw Machine Products

Our broad experience and small overhead enable us to give you very efficient service at a low cost.

POWELL MFG. CO.
Hanover and Wells Sts., Baltimore

MACHINERY BUILT

with Extreme Accuracy to Your Blueprints

We specialize in machinery of light or medium weight grades. Large facilities enable prompt service. Accuracy where required to the thousandth of an inch. Let us quote on your blueprints.

The Bucher-Smith Company
Engineering Dept.
East Liverpool, Ohio

We'll build your
SPECIAL MACHINERY

And Do Experimental Work of a high order

Right prices, guaranteed work and prompt service will win.

THE J. C. ULMER CO.
1791 E. 38th St., Cleveland, Ohio

Makers of fine surveying instruments.

Turn Your Machine Work Over To Us

Our equipment and men make it possible to offer you a real service on any of your machine work. We can also handle gray iron castings and many firms make use of our brass foundry, pattern and smith shops.

Send us your specifications or blueprints. We will do the rest.

KLOTZ MACHINE COMPANY
Sandusky, Ohio

Complete Machines or Parts Manufactured

Jigs—Fixtures—Tools—Patterns

Designed and Built

REYNOLDS ENGINEERING CO.
101 3d Ave. Moline, Ill.

Machine Work Wanted

FOR

Large Planers
10 ft. Swing Boring Mill
Milling Machines
Multiple Spindle Drills
Radial Drills
Engine Lathes
Gisholt and Warner & Swasey Turret Lathes
Universal Grinders

Prompt, Satisfactory Service Assured

VOGT BROTHERS MFG. CO., INC.
MAIN and 14th ST.
LOUISVILLE, KY.

SPECIAL MACHINERY and MACHINING OF PARTS

A modern factory equipped with new machine tools, Heat Treating Department, Tool Room and Pattern Shop, Foundry and Forging Service. Complete facilities from engineering to shipping. An experienced organization, manufacturers of high grade turret lathes, is ready to assume your manufacturing problems, from machining parts to designing and building complete machines.

Quality work by modern methods.

Millholland Machine Company
1106 West Twenty-third St.
Indianapolis, Indiana

GEARS

We cut all kinds of

Spur, Bevel and Spiral Gears

Prompt Attention Given Your Inquiry

Michigan Gear and Engineering Co.
Vernor Bldg. Detroit, Mich.

CASTINGS

ALL ADVERTISEMENTS ARE GROUPED GEOGRAPHICALLY

GRAY IRON CASTINGS

Can give prompt service and the right price

MACHINE WORK

F. R. PATCH MFG. CO.
Rutland, Vt.

J. B. Ripley Brass Foundry

Windsor, Vermont

We make the finest castings in New England in **Brass, Aluminum, Composition, Phosphor Bronze, Manganese Bronze, Nickel Bronze, and Aluminum Bronze.** Prompt service. Try us.

CONTRACT WORK

SPECIAL MACHINERY
MACHINE WORK
PRESS WORK-FOUNDRY WORK
AUTOMATIC SCREW MACHINE WORK

Rates—One Inch Space $4.00 Per Insertion on Yearly Basis.
Rates for Shorter Runs or Other Spaces Furnished on Request.

Gray Iron Castings

We can handle them from pattern-design to machine-finish

J. & W. JOLLY, Inc.
HOLYOKE, MASS.

FRANKLIN MACHINE CO.
Engineers—Founders—Machinists
Providence, R. I.

Gray Iron Castings
Harris-Corliss Engines
Ball Winding Machines
Shoe Lace Tipping Machines
Wool and Yarn Baling Presses
Special Machinery of all kinds
Eastern Representative for
Cleveland Worm Gears
And Worm Gear Reduction Units

Electric Steel Castings
1 oz. to 2 ton
Special Heat-Resisting Steel
for Annealing Pots and Boxes
Careful molding, thorough annealing and proper cleaning means satisfaction and low manufacturing cost.
Rhode Island Crucible Steel Co.
Providence, R. I.

DO YOU USE Grey Iron Brass or Bronze Castings?

We make them to your satisfaction.
ASK FOR QUOTATIONS.
The Turner & Seymour Mfg. Co.
Torrington Connecticut

Machinery Castings
Grey Iron
We make a specialty of fine machinery castings, including cylinder and similar castings for gasoline motors.
THE PEQUONNOCK FOUNDRY
Bridgeport, Conn.

GRAY IRON CASTINGS

Up to 8000 Lbs.

Special Machinery

Our Prices Will Interest
You, Write for Estimate

RYTHER & PRINGLE Co.
Carthage, N. Y.

We have the foundry for:

GRAY IRON
SEMI STEEL
CHILLED CASTINGS
ALUMINUM
ACID BRONZE
BRASS

Send for our estimate on Special Machinery or Job Work.

Our machines handle:
Boring mill—up to 10 ft. diam.
Planer—up to 6 ft.
Lathe—up to 40 in.

Carthage Machine Co.
Carthage, N. Y.

MANGANESE BRONZE CASTINGS
BETTER THAN STEEL
STRONG AS DROP FORGINGS

COLUMBIAN BRONZE CORP.
FREEPORT, NEW YORK

Castings and Machine Work
Gray Iron, Brass and Aluminum Castings, also heavy and light machine work, with a good equipment for both. Reasonable prices and prompt deliveries. First-class workmanship. Write us.
McKim Foundry & Machine Co.
Lockport, N. Y.

GRAY IRON CASTINGS

With Patterns for Quantity Orders
Rigged Work a Specialty
Richey, Browne & Donald, Inc.
2101 Flushing Ave. Maspeth (L. I.), N. Y.

Superior Gray Iron Castings
1 lb. to 5 tons.
Inquiries Solicited
Satisfaction Guaranteed
Oneonta Iron Works, Inc.
Oneonta, N. Y.

GRAY IRON
BRASS, BRONZE AND ALUMINUM
CASTINGS
WELL EQUIPPED MACHINE SHOP
BOLIVAR FOUNDRY CO.
BOLIVAR, N. Y.

YOU EXPECT

the firm you favor with your order for

GREY IRON CASTINGS

to do more than supply you with high grade material. You expect *service.* Realizing this, we have made

Federal Production Service

worthy of the name. It starts before we get the order and continues indefinitely. Besides grey iron castings up to 500 lb. it covers

FORGINGS,

Aluminum and Brass Castings, Machine Work, Electro-plating, Electrical Devices (including Radio Apparatus), Patterns, Dies and

HOT GALVANIZING

Send us your inquiries.

FEDERAL SIGNAL CO.
ALBANY, N. Y.

FOUNDERS — ENGINEERS
MACHINISTS
We have been making castings and doing general machine work for over 40 years. We also make special machinery. Our facilities and experience qualifies us to handle your work with complete satisfaction.
COOPER BROTHERS
Cortland, New York

CONTRACT WORK

SPECIAL MACHINERY
MACHINE WORK
PRESS WORK—FOUNDRY WORK
AUTOMATIC SCREW MACHINE WORK

Rates—One Inch Space $4.00 Per Insertion on Yearly Basis.
Rates for Shorter Runs or Other Spaces Furnished on Request.

Brass — Bronze — Aluminum Castings

Are Everlasting Also in Service and Satisfaction

Hayes Brass Foundry, Inc.
132 Richmond Ave., SYRACUSE, N. Y.

Gray Iron Castings
Pattern Work Machine Work

We make gray iron castings up to 40,000 pounds each
Modern Shop and Equipment

Baker Manufacturing Corporation
Saratoga Springs, N. Y.

Gray Iron Castings

Our up-to-date foundry in connection with our extensive machine shops puts us in position to do a great variety of high grade work. Our prices are reasonable and orders will be filled promptly.

A. L. SWETT IRON WORKS
Medina, N. Y.

Soft Gray Iron Castings

CHARCOAL MIXTURE, FREE MACHINING
BRASS AND BRONZE
MACHINE OR HAND MOULDED
SAND BLASTED OR TUMBLED
PRICES RIGHT + SERVICE RIGHT
SATISFACTION GUARANTEED

GLENS FALLS MACHINE WORKS
GLENS FALLS, N. Y.

ESTIMATES FROM BLUE PRINTS ON

Gray Iron Castings

FROM 1 LB. TO 20,000 LBS. EA.

Rough or Machined

The Straight Line Engine Co., Inc.
SYRACUSE, N. Y.

Buffalo Bronze Die Cast Corporation

100 Arthur St., Buffalo, N. Y.

SPECIALISTS IN
Aluminum Bronze Die Castings,
Chilled Tin Bronze Castings,
Brass and Aluminum Castings

Brass-Bronze Aluminum-White Metal

CASTINGS

to your specifications, patterns to finished machine plates, polished and assembled under one roof and the supervision of the best engineering and practical minds.

Jenkins Manufacturing Co.
BLOOMFIELD, N. J.

CASTINGS

GRAY IRON
BRASS
BRONZE
ALUMINUM

PATTERN WORK

RARITAN FOUNDRY CO.
RARITAN, N. J.

Gray Iron Castings
Machine Work
Steel Stacks
Plate and Sheet Work

Osborn Machine Co.
Du Bois, Pa.

GRAY IRON CASTINGS

UP TO 1½ TONS
PROMPT SERVICE

Send blueprints for reasonable prices.

Penn Foundry & Manufacturing Co.
Reading, Pa.

Gray Iron Castings
Machine and Hand Moulded

1 lb. to 3000 lbs.
Pattern and Machine Work
Send drawings for prices

The Samuel J. Creswell Iron Works
23d and Cherry Sts. Philadelphia, Pa.

Certified Malleable
Grey Iron—Brass—Aluminum

CASTINGS

Pattern and Machine Shops

LANCASTER FOUNDRY CO.
Lancaster, Pa.

Light and Medium Weight

Grey Iron Castings

Moulding Machines for duplicate work

DAUGHERTY FOUNDRY CO.
3d & Cedar Streets, Allentown, Pa

Gray Iron Castings
of All Descriptions

Let us estimate on your requirements.
Prompt deliveries.

Berks Foundry & Manufacturing Co.

Foundries	Office
Hamburg, Pa.	Berks, Pa.
Watsontown, Pa.	

Gray Iron Castings
Patterns
Special Machinery

BARNHART-DAVIS CO.
WARREN, PA.

Our Specialties—Gray Iron Castings

Superior quality, machine or hand moulded, sand blasted, pickled or tumbled. On good tonnage we will make special moulding equipment that will warrant you the best price and most efficient service. Patterns made of wood, brass, aluminum or iron.

Grinding wheel machinery, hack saw machines, Huntington emery wheel dressers and cutters, drill press vises, wire rod cutters.

NORTH WALES MACHINE CO., Inc., North Wales, Pa.

Small Gray Iron Castings

Weighing from a fraction of an ounce to fifty pounds. Foundry equipped for both machine and hand moulding, plain gray iron castings, tumbled or sandblasted.

Orders solicited.

GRAY IRON FOUNDRY CO.
Reading, Pa.

Wm. Adams Foundry Co., Inc.
960-970 North Ninth St., Philadelphia

Iron Castings of all kinds up to 8000 lbs. each.

A few of our specialties are:
Builders Cast Iron Work—Drainage Castings,
Flanges and Fittings
Special Castings to Order
Machine and Pattern Work

Small Soft Gray Iron Castings

In production quantities, for machining. General Class; Electrical Instruments, Textile Machinery, Automobile Parts, Toys, etc.

KLINE HARDWARE CO.
Allentown, Pa.

Brass, Bronze, Aluminum and Iron Castings.

Wood and Metal Patterns.

J. J. GRONER & CO.,
1636 Washington St.
EASTON, PA.

GRAY IRON—SEMI-STEEL
CHILLED — CHARCOAL — IRON

CASTINGS

and

MACHINE WORK

MERWIN McKAIG, *Cumberland, Md.*

GRAY IRON CASTINGS

1 lb. to 5 tons

Pattern and Machine Shop Work.
Let us quote you on your casting and machine shop requirements.

Piedmont Foundry & Machine Co., Inc.
Piedmont, West Va.

CONTRACT WORK

SPECIAL MACHINERY
MACHINE WORK
PRESS WORK-FOUNDRY WORK
AUTOMATIC SCREW MACHINE WORK

Rates—One Inch Space $4.00 Per Insertion on Yearly Basis.
Rates for Shorter Runs or Other Spaces Furnished on Request.

Engineers Machinists Founders

CASTINGS
CHEMICAL
SEMI STEEL
ACID RESISTING
HEAT RESISTING
GREY IRON
CONVERTER STEEL

Heavy Machinery
Blast Furnace Equipment
Steel Plant Equipment

We solicit your inquiries.

PULASKI
Foundry & Manufacturing Corporation
Works: Pulaski, Virginia
Sales Offices:
2422 Euclid Ave., Cleveland, O.

THE ADAMSON MACHINE CO.

Engineers, Machinists
Iron and Steel Founders

Rolling Mill Machinery, Blast Furnace Castings and Machine Work, Reduction Gear Drives, Shafting, Bearings, etc. Your inquiries are solicited.

THE ADAMSON MACHINE CO.
Akron, Ohio

BRASS, BRONZE AND ALUMINUM CASTINGS
Analysis Guaranteed.
TIFFIN BRASS & BRONZE CO.
Tiffin, Ohio

GRAY IRON CASTINGS
From 1 lb. to 15,000 lbs.
MACHINE WORK
The St. Mary's Foundry Co.
Minster, Ohio

Die Castings
ALUMINUM—ZINC—TIN AND LEAD ALLOYS
Let us solve your casting problems. Quotations from samples or blue prints.
The Globe Tool & Engineering Co.
Dayton, Ohio

Malleable Gray Iron CASTINGS
Specialists on small parts for Quantity Production
Send us your blue prints or samples for prices.
The Cushman Co., Inc.
Champaign, Ill.

Gray Iron Castings
Castings up to 6000 Lbs.
Machine Work
Large vertical and horizontal boring mills, planers, engine lathes, turret lathes, radial drills and milling machines. Blacksmith and steel plate work.
The Frost Manufacturing Co.
Established 1851—Galesburg, Ill.

CASTINGS
Grey Iron or Semi Steel
5 lbs. to 2500 lbs.
Pattern and Machine Shop Work
Send Prints for Prices
EGYPTIAN IRON WORKS
Murphysboro, Ill.

GRAY IRON CASTINGS PLUS SERVICE
[illegible] Iron. High quality. Batch or [illegible] molding a specialty. Up to 500 lbs.
[illegible] blue prints or samples for prices.
SHAW, WELSH & CO.
Galesburg Illinois

Grey Iron Castings
Light and Medium. Welding Rods, Grey Iron Heat Treated. Specializing in Automobile Work.
Gale Manufacturing Co.
Albion, Mich.

Gray Iron Castings
in quantities
10 lbs. to 7½ tons. Quick deliveries.
Vogt Brothers Mfg. Co., Inc.
Louisville, Ky.

CASTINGS
Gray Iron — Semi-Steel
We specialize in finest quality semi-steel castings and have excellent facilities for machine work. *Give us a trial.*
FORT MADISON FOUNDRY
Fort Madison, Iowa

PATTERNS
ALL ADVERTISEMENTS ARE GROUPED GEOGRAPHICALLY

PATTERNS
May we have your inquiries?
American Pattern Works Co.
YORK, PA.

PATTERNS
A shop with every facility for rapid and efficient service.
Models and Experimental Work
Your inquiries solicited
RICHARD J. LIPPEY
24 So. Sitgreaves St. Easton, Pa.

Any second-hand machinery or equipment for sale?

If so, see advertising rates advertising rates on first page of Section 50.

CONTRACT WORK

SPECIAL MACHINERY
MACHINE WORK
PRESS WORK-FOUNDRY WORK
AUTOMATIC SCREW MACHINE WORK

Rates—One Inch Space $4.00 Per Insertion on Yearly Basis.
Rates for Shorter Runs or Other Spaces Furnished on Request.

FORGINGS

ALL ADVERTISEMENTS ARE GROUPED GEOGRAPHICALLY

Let Us Make It

This company has capacity available for quantities of work of following nature: Light drop forging, drilling, punching, threading, tapping, etc. Sheet steel parts of light gauge. Wood working, Enameling. Bending and forming of rounds and flats. We are desirous of building strong and permanent connections. Give us the opportunity and we will do the rest. Look us up—Ask us who we work for!

American Forging & Socket Co.
PONTIAC, MICH.

MISCELLANEOUS

ALL ADVERTISEMENTS ARE GROUPED GEOGRAPHICALLY

Patented Specialties

We would like to manufacture specialties, either to market ourselves or on contract.
Send your proposition.
THE WESTWYRE COMPANY
Westfield, Mass.

PLATE and SHEET METAL WORK

of any description. Attention given to special construction in copper and brass. Send us sample or blueprint.
BECKLEY PERFORATING CO.
North Avenue Garwood, N. J.

Hot Tinning
Hot Galvanizing

Tinned Gray Iron a Specialty

Gray Iron Castings and Drop Forgings

Let one plant complete your order. We operate our own Forge, Foundry, Hot Galvanizing, Hot Tinning and Machine Departments, specializing on Light and Medium Castings or Forgings. Save time and money by getting our estimates.

Address Special Contract Dept.

Wilcox, Crittenden & Co., Inc.
Middletown, Conn., U. S. A.

Recently

Advertisers were looking for

Hammers,	Boilers,
Shears,	Cranes,
Air	Pulleys,
Compressors,	Bars,
Motors,	etc., etc.

Did you have any of these to sell?

Turn to the We Want to Buy Section (Page 190) in this issue and see if you can supply any of the firms advertising there with what they need.

It would pay you to keep an eye on this section regularly.

Heat-Treating and Carbonizing

Cut Gears, Splined Shafts and General Machine Work.
THE MACHINE PRODUCTS CO.
17900 St. Clair Ave. Cleveland, Ohio

WIRE MESH WORK

Guards, Grilles, Railings, Factory Partitions and Special Work in Iron, Brass and Bronze.

WM. INGLIS WIRE & IRON WORKS
Detroit, Mich.

Steel Tanks, Stacks, Etc.

We fabricate materials for steel tanks and stacks of all kinds and sizes or any special work requiring sheet steel 3/16" or lighter down to No. 16 gauge. First-class workmanship.

JOS. F. WANGLER BOILER & SHEET IRON WORKS CO.
St. Louis, Mo.

Quality HAMMERED STEEL FORGINGS

Axles, Billets, Cranks, Crusher Shafts, Discs, Grinding Balls, Liner Plates, Shafting, Shoes and Dies for Stamp Mills, and Forgings for Ore Mines.

MIDWEST FORGE & STEEL CO.
East St. Louis Illinois

BUSINESS OPPORTUNITIES

Factory Sites and Factory Buildings for Sale or Rent
Business Opportunities
Advertising Rates

RATES PRICE PER INSERTION

	1 Time	2 Times	3 Times	4 Times
1 inch	$6 75	$5 25	$5 25	$4 75
2 inches	10 50	9 50	9 50	8 75
3 inches	15 75	14 25	13 13	13 13
4 inches	20 00	17 50	17 50	16 50
8 inches	35 00	33 00	33 00	32 00

Rates for other spaces furnished on request.

Machine Shop and Foundry Available

If you are considering establishing a manufacturing plant for the production of medium or heavy machinery, communicate with us first. Responsible parties can make most advantageous arrangements in connection with an existing modern plant; favorably situated with respect to materials, labor and shipping

Address Box R-982
Care The Iron Age, New York

For Sale

Going Business—Fully equipped Manufacturing Plant making an established line of plows, harrows, cultivators, etc. Located in Southwestern Ohio. Two railroad sidings, 85,000 sq. ft. floor space. 3½ acres land. Brick buildings.

The Long & Allstatter Co.,
HAMILTON, OHIO

Exceptional Opportunity

FOR SALE Malleable and Gray Iron Foundry equipped for agricultural, automobile and similar light work. Capacity 150 moulders. Chicago district. Location excellent as to labor, railway facilities and established line of customers. Prefer to lease for a term of years.

ADDRESS BOX S-841
care The Iron Age, New York.

For Sale or Rent

200 ft. river front, having several buildings [illegible] steel moulding, sand mixer, [illegible] other purposes. Foundry has 20 ton Shaw crane. Two Cupolas capable of melting sixty tons of castings per day, steam engine, fifty hp. boiler and blower. Apply

THE WATTS, CAMPBELL COMPANY
208 Ogden Street, Newark, N. J.

BALTIMORE Factory Sites

WILLIAM MARTIEN & CO.
1413 Lexington Bldg.
Baltimore, Md.

Forge Plant

For sale or lease. Hydraulic Forging plant in Pittsburgh District. Will consider selling, merging or leasing.

ADDRESS BOX S-575
care The Iron Age, 1900 Fulton Building, Pittsburgh, Pa.

MANUFACTURERS ATTENTION!

Modern manufacturing buildings available in Long Island City, New York, Brooklyn and New Jersey, suitable for any manufacturing purpose.

These properties can be had on very attractive terms and full particulars will be sent to you upon request.
Write us your requirements.

WILLIAM B. MERRALL
Industrial Real Estate
342 Madison Ave., New York City
Vanderbilt 4699

A Well-Located Factory

Three-story brick, 50 x 100, wired for light and power, equipped with a modern low-pressure steam boiler, yard, located in Milford, Conn., on the Boston & N. Y. Post Road between Bridgeport and New Haven.

For further particulars write to

D. F. WEBBER, Milford, Conn.

To Lease in Brooklyn, N. Y.

Steel Warehouse and Dock
Excellent Shipping Facilities

Address Box T-400
care THE IRON AGE, New York.

SCRAP IRON YARD

An opportunity for a prompt buyer to secure at a bargain a business established forty-five years. This Scrap Iron Yard, equipped with machinery, is located at Saginaw, Mich., and is put on the market to settle an estate. Will sell or lease. For a complete description, price list, etc., address

I. W. CLINKOFSTINE
826 Hanna Building, Cleveland, Ohio

Manufacturing Business Wanted

We [illegible] to purchase a going manufacturing [illegible] large or small if capable of expansion, with [illegible] buildings, new manufacturing engines, pumps, machine tools, motor trucks, automobile specialties, or similar products to which can be added the manufacture of our own machinery.

Address Box T-404
[illegible] New York

FOR SALE

FOUNDRY, FORMERLY USED FOR STOVE MANUFACTURING

fully equipped for light and medium work, including [illegible] Core Squeezers. Situated eastern Massachusetts. Particularly adapted for jobbing work. For particulars

ADDRESS BOX T-241
care [illegible] New York

A Jersey City Foundry

for sale or lease. Equipped and in excellent [illegible] Ideal situation because of proximity to New York and Brooklyn.

Address Box S-290
care The Iron Age, New York.

AGENCY WANTED

For Pittsburgh and surrounding territory, as Sales Representative for some well known manufacturer having a product with sufficient sale to enable me to devote my entire time to same. Have best of credentials and well known throughout district.

ADDRESS BOX T-364
Care *The Iron Age*, New York

AGENCIES WANTED

in the Cleveland district for sheets, cold drawn screw stock and hot rolled bars.

Cleveland Steel Supply Company
760 Hippodrome Annex
Cleveland, Ohio

Agencies Wanted

Would take the agency on strictly commission basis for good Sheet and Cold Rolled Strip Mill, also Nail and Wire and Steel Bar Mill for eastern Pennsylvania, New Jersey, New York and New England. Have connections in all important foreign countries for export sale. Nothing but high class manufacturers considered.

ROBERT GRANT,
2004 Woolworth Bldg., New York City

REPRESENTATIVES WANTED

We want live representatives to represent us in all large cities for the sale of cutting tools including pipe and bolt threading dies for pipe and bolt threading machinery. This class of goods is in great demand by all branches of the trade from the small steam heating contractor to and including oil refinery and steel mill. Liberal commissions paid.

ADDRESS BOX T-268
care *The Iron Age*, New York

Sales Representative

[illegible] of 35 possessing personality, [illegible] and [illegible] determination and honesty, is open to represent [illegible] office in San Francisco and cover California, Oregon, Washington; can adapt himself to any line.

ADDRESS BOX T-438
care [illegible] New York

[illegible] reputation and of over twenty years' [illegible] in the [illegible] desires [illegible]

Address Box T-473
care [illegible] New York

ALABAMA

Industry's Opportunity

ALABAMA RANKS FIRST

ROGER W. BABSON SAYS:

"In my opinion, the South Atlantic States offer the best opportunity to that of any country in the world for the energetic, ambitious man, and among the Southeastern States I place Alabama at the head of the list.

"In a recent statistical survey of the forty-eight states, Alabama ranked first as being the best location, all conditions considered, for the establishment of industrial enterprises."

Alabama laws are fair and invite manufacturing enterprises. The climate is agreeable the year around. An ample supply of competent labor is available at fair rates. The people want to work; they are industrious and appreciate the opportunity afforded by manufacturing plants. Merchants and tradesmen will aid and co-operate with manufacturing enterprises.

A large hydro-electric system, with more than ample steam reserves, provides dependable primary power in capacities for the largest industries. This power is available throughout the industrial section of Alabama.

COME TO THIS STATE AND PROSPER IN THE DEVELOPMENT OF ITS RESOURCES.

Alabama Power Co.

Birmingham Alabama

An Unusual Opportunity

Party controlling new steel project near New York desires to connect with men commanding $300,000 or more, which additional capital is required to complete proposition. Investment can be secured by first mortgage bonds. Parties already interested include important consumers of product. Sale of production assured.

Address Box T-431

care The Iron Age
New York

To Those Who Make Finished Castings

We require about 18 tons of finished castings a month—some up to 1500 lbs.

If you have a grey iron foundry and a complete machine shop—and can execute orders promptly at reasonable prices.

(f.o.b. N. Y. City)

Address BOX T-482
Care The Iron Age, New York

MANUFACTURER WANTS PRODUCT

An old established manufacturer with foundry, machine shop and wood working department wants additional products of merit to manufacture. Would consider (1) outright purchase of product or patent; (2) manufacture and sale on royalty; (3) manufacturing for established sales organization; (4) manufacturing on contract.

ADDRESS BOX T-348
care *The Iron Age*, New York.

[illegible] Mechanical Officer well connected [illegible] Eastern line to [illegible] inventor of brake [illegible] (Pat. Nov. 14, 1922) with safety feature for use on locomotive [illegible] which is easily [illegible] to anything at present used. Will sell outright, or consider proposition from responsible party for its manufacture and sale.

ADDRESS BOX T-370
care *The Iron Age*, New York.

MANUFACTURERS' AGENT

Iron, Steel and Contractor's Equipment. Established offices in Philadelphia. Would like to take on additional line to follow up inquiries or leads and do some missionary work.

Address BOX T-476
Care *The Iron Age*, New York.

TREASURY DEPARTMENT, Supervising Architect's Office, Washington, D. C., December 16, 1922.—SEALED PROPOSALS will be received at this office until 3 p.m., January 15, 1923, and then opened for [illegible] at Niagara Falls, N. Y., comprising [illegible] in the United States Post Office and Court House at the building, or at this office, in the discretion of the Supervising Architect. Jas. A. Wetmore, Acting Supervising Architect.

TREASURY DEPARTMENT, Supervising Architect's Office, Washington, D. C., Dec. 16, 1922.—SEALED PROPOSALS will be received at this office until 3 p.m., Jan. 10, 1923, and then opened for an extension to the building and driveways, United States Post Office and Court House, at Ithaca, New York, in accordance with the specifications and drawings mentioned therein, copies of which may be had at this or at the office of the Custodian, in the discretion of the Supervising Architect. Jas. A. Wetmore, Acting Supervising Architect.

"They Give Us A Line

on new equipment, processes, etc.," writes a big automobile company in regard to the advertising pages of The Iron Age.

You will find both the editorial and advertising pages an up-to-date text-book of what is new in the metal-working industries.

They keep you in touch with new equipment, new manufacturing methods, market conditions, reliable sources of supply, current wage rates, etc.

THE WEEKLY MEETING PLACE OF EMPLOYER AND EMPLOYEE

HELP WANTED

Experienced Inspector familiar with heavy work. Also Foreman.

to take charge of heavy tools

Apply

The TOLEDO MACHINE & TOOL CO.

Dorr St. and N. Y. C. Railroad, Toledo, Ohio

ENERGETIC SALESMAN for NEW ENGLAND to represent large manufacturer of twist drills. Only strictly high-grade man with best of references considered. Address Box T-[illegible], care *The Iron Age*, New York.

WIRE MILL FOREMAN, thorough, practical man who can clean and anneal and handle men and production to best advantage. Address Box T-[illegible], care *The Iron Age*, New York.

SALESMEN—WANTED, EXPERIENCED SALESMEN or sales engineers who are acquainted with, or control men experienced with a complete line of industrial Furnaces, Blowers and Burners. We want only high calibre men, and for such men we have a proposition to surpass, we believe, their expectations. Address Standard Fuel Engineering Co., 667 Post Ave., South, Detroit, Mich.

SUPERINTENDENT to take FULL CHARGE OF MANUFACTURING PLANT, making cabinet and builders' hardware. Must have a man experienced along this line. In writing, state experience, giving references and state salary expected. Address Box T-415, care *The Iron Age*, New York.

MACHINE TOOL SALESMAN. Preferably man having had experience in handling and operating power presses and shears, also dies. State age, experience and salary expected. Preference given to resident of Cleveland or Detroit. Address Box T-442, care *The Iron Age*, New York.

GALVANIZING PLANT FOREMAN, thoroughly experienced in galvanizing ware, competent to handle help, and in economical production. Position in California. State qualifications fully, salary expected, past experience references, and when available. Address Box T-440, care *The Iron Age*, New York.

ESTABLISHED MANUFACTURER of DIE CASTINGS desires sales representation in New England, upper New York, Pennsylvania, Ohio and Michigan territories. Preference will be given to those having knowledge of the line. Address Box T-467, care *The Iron Age*, New York.

MACHINE TOOL SALESMAN — Must know lathes and grinders. Of executive ability take charge of Machinery Department. Give reference, age, experience in Garage Equipment. Address Auto Equipment Company, Denver, Colorado.

SALESMAN of character and some experience wanted to sell Sheet Metals in Buffalo and vicinity for a long established and well known distributor. Address with references Box T-453, care *The Iron Age*, New York.

WANTED—All around PRACTICAL MAN familiar with all details relating to the manufacture of aluminum die casting and the laying out of dies. Address giving full experience, references and compensation expected. Address Box T-466, care *The Iron Age*, New York.

HELP WANTED

ADVERTISING MAN on MACHINE TOOLS; state age, schooling, experience and salary expected. Address Box T-479, care *The Iron Age*, New York.

MASTER MECHANIC, capable of taking entire charge of all equipment, including Hot Rolling, Cold Drawing, Electrical, etc., in Steel plant located in Central West. State age, experience, salary expected, and when available. All replies will be treated confidentially. Address Box T-480, care *The Iron Age*, New York.

ALLOY STEEL Chemist familiar with furnace control methods. State age, experience, whether now employed, and salary expected. Plant located near Buffalo. Address Box T-484, care *The Iron Age*, New York.

MAN who has EXPERIENCE and KNOWLEDGE of TYPESETTINGS especially from sales standpoint. Excellent opportunity. Write in detail. Address Box T-483, care *The Iron Age*, New York.

SALES CORRESPONDENT, with experience on machine tools; state age, experience and salary expected. Address Box T-478, care *The Iron Age*, New York.

Wanted, by a plant manufacturing high speed and high carbon tool steel exclusively, WORKS MANAGER or GENERAL SUPERINTENDENT who has had experience. Address Box T-470, care *The Iron Age*, New York.

SALES ENGINEERING MANAGER for pump department of large corporation. Salary $5,000 to $6,000. Also Chicago Sales Engineering Representative for crusher company, selling to cement industries. Salary open. H. H. Harrison & Co., Confidential Employment Service, Chicago.

SITUATIONS WANTED

SUPERINTENDENT—Technical education, with twenty years' practical mechanical experience on pressed steel, builders' hardware, machine and tool work and factory production. Now employed as factory superintendent and assistant manager, but seeks similar position with growing progressive concern. Address Box T-362, care *The Iron Age*, New York.

MANAGER, WORKS MANAGER or GENERAL SUPERINTENDENT, technical education, M. E. and E. E. High grade man, thorough and practical in modern methods, and manufacturing departments; 30 years' experience in broad and diversified class of work, heavy, medium, light and interchangeable. Experiences covering factory management and systems for office, sales, purchasing and intensive manufacturing, production and cost; capable and resourceful. A-1 references. Address Box T-86, care *The Iron Age*, New York.

OPERATING EXECUTIVE with 20 years' experience in the manufacture of Iron and Steel, specializing in the making and its treatments of all grades of alloy steel and its constructive applications to the automobile trade, also metallurgical end of same. Address Box T-404, care *The Iron Age*, New York.

PRODUCTION MANAGER or SUPERINTENDENT. Technical and practical mechanical engineer. Capable organizer in modern methods of control and promotion of production planning, preparation, scheduling and inspection. Chiefly press steel products and allied line. Reference. Address Box T-385, care *The Iron Age*, New York.

SITUATIONS WANTED

PURCHASING AGENT or OFFICE MANAGER. Man with a wide experience with a large corporation, both purchasing and traffic. Fully acquainted with market conditions. Age 30, married. With present employer 16 years. Best of references. Address Box T-341, care *The Iron Age*, New York.

WANTED, a POSITION as a CHEMIST or METALLURGIST. Have had 14 years' experience in malleable and gray iron foundries, also experienced in steel heat treatment, pyrometer upkeep, physical testing and inspection. Good analyst. Address Box T-397, care *The Iron Age*, New York.

GENERAL MANAGER LARGE STEEL FABRICATING AND WAREHOUSING PLANT. HAS HANDLED FOR YEARS ALL DETAILS OF THE BUSINESS, ENGINEERING, SALES, SHOPS, ERECTING FURNACES, ETC. RELEASED THROUGH OUTSIDE PURCHASE. ADDRESS BOX T-429, CARE *THE IRON AGE*, NEW YORK.

WORKS EXECUTIVE, 20 years' experience starting as a molder in the foundry, working through the machine shop, then becoming superintendent. Have handled male and female help for a number of years. Available immediately. Address Box T-402, care *The Iron Age*, New York.

BUSINESS EXECUTIVE—Now employed as General Manager and officially connected as Secretary-Treasurer, is available for new connection after first of the year. Qualified by a broad experience in handling entire executive and administrative responsibility of manufacturing propositions. Thoroughly prepared to completely assume and creditably discharge a large responsibility. Thirty days' notice required to make change. Address Box T-410, care *The Iron Age*, New York.

SALESMANAGER—Can fill the position as SALESMANAGER, for any kind of an industry. Have 30 years' experience as SALESMAN and SALES MANAGER. Have long standing friendship with coal operators and STEEL and IRON COMPANIES. Address Box T-408, care *The Iron Age*, New York.

SALES ENGINEER, not a "drummer," but one who has thorough understanding of shop practice and shop equipment, desires more responsible opportunity as sales representative. Address Box T-391, care *The Iron Age*, New York.

MECHANICAL SUPERVISION in mechanical force on construction and repairs, including transmission machinery, carpentry, piping and mechanical equipment in general. Long experience and good past record; desires a steady position. Chas. Godshall, 228 Smith St., Brooklyn, N. Y.

AS CHICAGO SALES REPRESENTATIVE or branch manager. Age 37. Have had several years' selling experience and thoroughly conversant with office routine. At present employed. Address Box 6022-A, care *The Iron Age*, Otis Bldg., Chicago.

WIRE MILL—Wanted position as foreman. Am a man of twenty-five years' practical experience. Know the supervision of every department from annealing to fine wire drawing. Know how to handle men to get results. Best references as to character and ability. Address Box T-435, care *The Iron Age*, New York.

Help Wanted Rates

Set solid, minimum 50 words.....$3.00
Each additional word 6c

All capitals, minimum 50 words.....$4.50
Each additional word 9c

All capitals, leaded, minimum 50 words...$6.00
Each additional word 12c

Situations Wanted Rates

Set solid, minimum 25 words.....$ .75
Each additional word 3c

All capitals, minimum 25 words.....$1.50
Each additional word 6c

All capitals, leaded, minimum 25 words....$2.25
Each additional word 9c

Display Advertising Rates Given on Request

COUNT SEVEN WORDS FOR KEYED ADDRESS

Do not send original letters of recommendation in replying to advertisements—duplicates will answer the purpose. Letters forwarded without charge.

THE WEEKLY MEETING PLACE OF EMPLOYER AND EMPLOYEE

SITUATIONS WANTED

GENERAL MANAGER

of proven record seeks new connection.

PRODUCTION experience includes successful management steel, grey iron and brass foundries; heavy forgings; structural steel; plate metal; full range, both heavy and light machine shops; quantity production interchangeable parts.

SALES management includes nation-wide distribution of product.

Have always maintained rapid and accurate office systems, without inflating overhead.

TECHNICAL TRAINING; age 38; wide business experience; forceful, resourceful; initiative.

Address Box T-377

care *The Iron Age*, New York

EXECUTIVE ASSISTANT, open for position after January 1st in production or cost department, not afraid of work. Firm in or near Philadelphia. Address Box 103, care *The Iron Age*, 1420 Widener Bldg., Philadelphia, Pa.

METALLURGICAL EXECUTIVE. I have had [illegible] and rolled products. Sales experience in grading orders and adjusting claims. Address Box [illegible] New York.

ELECTRIC FURNACE, FOREMAN MELTER, now employed, desires new connection January 1923. Experienced on Basic or Acid process. Familiar with large and small castings, ingots and alloy steels. Can assure you of maximum production and clean work. Address Box T-405, care *The Iron Age*, New York.

CAPABLE ORGANIZER and SYSTEMATIC EXECUTIVE, now employed as assistant treasurer with well known Western Pennsylvania manufacturing concern, desires new connection. Broad knowledge of business management, treasury and cost accounting sub- [illegible] a pleasure. Results guaranteed. Age 34, married. Location immaterial. Address Box T-417, care *The Iron Age*, New York.

ROLLING MILL EXECUTIVE

WORKS MANAGER or SUPERINTENDENT A practical man, thoroughly experienced in all departments of the rolling mill business. Willing to start in any capacity where there is assurance of a permanent and responsible future. [illegible] York.

MECHANICAL ENGINEER, age 45, twenty-three years' experience in designing, building [illegible] worker, wishes to connect with progressive [illegible] *Age*, New York

---

GENERAL SUPERINTENDENT or MANAGER of manufacturing plants is open for engagement. Expert in foundry, machine, wood and steel plate work. Salary $3000. Address Box T-407, care *The Iron Age*, New York.

HIGH GRADE MAN, with exceptionally wide experience and knowledge of the chemical, metallurgical and mechanical lines, desires new connection. Have traveled extensively throughout the East and Middle West in a sales capacity. Former manufacturing and big business routine experience. Intimate knowledge of new and secondary metals, both ferrous and non-ferrous. Address Box 6020-A, care *The Iron Age*, Otis Bldg., Chicago, Ill.

ESTIMATOR and DRAFTSMAN, Sheet Metal, experienced, desires permanent posit on. Technical graduate. Age, thirty. Address Box T-382, care *The Iron Age*, New York.

Young man with college education and experience in steel making and in the production as well as sales of Strip Steel, now employed as SALES MANAGER of prominent Rolling Mills, desires new connection where effectual work is appreciated. Address Box T-449, care *The Iron Age*, New York.

FOUNDRY MANAGER—Young and energetic, with successful record, desires connection with a progressive firm engaged in the manufacture of light or heavy grey iron castings. Address Box T-445, care *The Iron Age*, New York.

ELECTRIC FURNACE MELTER acid practice, six years' experience on steel castings. Able to take complete charge of melting, pouring and handling of ladles. A-1 reference. At present employed. Age 33. Address Box T 444, care *The Iron Age*, New York.

PURCHASING AGENT—Young man, present employed by large manufacturing company, a keen buyer and hard worker, thoroughly experienced in purchasing and stores control, desires position with progressive manufacturing company. Excellent references. Address Box T-443, care *The Iron Age*, New York.

ASSISTANT PURCHASING AGENT or BUYER. Young man, experienced, desires position with concern where hard work and ability secure advancement. At present employed by manufacturing company. Address Box T [illegible] care *The Iron Age*, New York.

STEEL—FOUNDRYMAN desires position electric open hearth or converter. Superintendent or foreman. 18 years' experience. Address Box T-436, care *The Iron Age*, New York.

METALLURGIST, 1916 graduate. Six years' experience as chief chemist and chief metallurgist. Thorough knowledge of ferrous and non-ferrous analysis, metallurgy and metallography, also production methods having had charge at heat treating and melting departments. During past year chief metallurgist for [illegible] non-ferrous research and physical and chemical testing. Salary $2400 to start. Available at once. Address Box T-433, care *The Iron Age*, New York.

MALLEABLE FOUNDRY MANAGER OR SUPERINTENDENT, BY A HIGH GRADE MAN. 30 YEARS' PRACTICAL EXPERIENCE COVERING ALL DETAILS. OPEN FOR CHANGE JANUARY 1. ADDRESS BOX T-[illegible] YORK.

ATTENTION
BOLTS AND NUTS

Manufacturing executive with a thorough knowledge of the Bolt, Nut and Rivet business will be available January 1st. Experience includes Manufacturing, Managing and Sales. Capable of taking over entire charge of plant. A letter to Box T-355, care *The Iron Age*, New York, will bring full history.

ROLLING MILL SUPERINTENDENT, twenty years' experience, desires change. Can supply working organization for plant. Good references furnished. Address Box T-432, care *The Iron Age*, New York.

COST ACCOUNTANT and OFFICE MANAGER experienced, reliable and can get results. References. Address Box T-236, care *The Iron Age*, New York.

MANUFACTURING EXECUTIVE—Works Manager or General Superintendent. At present in charge of plant manufacturing heavy machinery of national reputation. Technical education and successful practical experience. Present plant consists of machine, pattern, heavy forge shops, and foundry. Chicago district preferred. Address Box 6019-A, care *The Iron Age*, Otis Bldg., Chicago, Ill.

PRODUCTION ENGINEER, age 38, 15 years' experience of close limit repetition work, machine gun and rifle production in bulk quantities, jig and tool equipment [illegible] and production; also quantity [illegible] of automobiles including bodies. Reference from largest Armament Company in Great Britain. Address Box 32, Framingham Center, Mass.

PRACTICAL GALVANIZER, tinner and retinner. Experienced on sheet metal goods, castings, etc. Familiar with tinning milk can stock. Can put in plants and operate same. Address Box T-459, care *The Iron Age*, New York.

MANAGER, administrative official, or sales. Experienced in manufacture and selling medium and heavy machinery. Would be interested in work other than above if would utilize experience. Prefer Middle West location. Age 42, family. Address Box T-460, care *The Iron Age*, New York.

BLAST FURNACE SUPERINTENDENT or ASSISTANT, with 15 years' practical experience, including work in all lines from laboratory to superintendent. Best of references. Services available immediately. Address Box T-[illegible] care [illegible] New York.

IRON and STEEL METALLURGICAL, chemical and inspection ENGINEER with technical education and twelve years of practical experience along same lines in steel mills, forge shops, railroads, automobile plants and government bureaus, desires permanent position with progressive company in eastern United States. Address Box T-465, care *The Iron Age*, New York.

SALES MANAGER, age 34, fifteen years' experience domestic and export sales of steel products. Desires representation of high class manufacturer. Location Philadelphia or New [illegible] Box T-[illegible] care *The Iron Age*, Widener Building, Philadelphia, Pa.

Help Wanted Rates

[illegible]

Situations Wanted Rates

Set solid, [illegible] words . . . . . $ .75
Each additional word .05

[illegible] 25 words $1.50
Each additional word 6c

All capitals, leaded, minimum 25 words $2.25
Each additional word 9c

Display Advertising Rates

Given on Request

COUNT SEVEN WORDS FOR KEYED ADDRESS

Do not send original letters of recommendation in replying to advertisements—duplicates will answer the purpose. Letters forwarded without charge.

BUYERS INDEX

The firms listed here are also represented with an advertisement in this issue. See the advertisements for further information.

SEE ADVERTISEMENTS FOR COMPLETE INFORMATION. ALPHABETICAL INDEX—PAGES 222-224.

ABRASIVE WHEELS—See Grinding Wheels

ACCUMULATORS
Birdsboro Steel Fdy. & Mch. Co., Birdsboro, Pa.
Blaw Knox Co., Pittsburgh, Pa.
Elmes, Chas. P., Eng. Wks., Chicago, Ill.
Garrison & Edry. Co., Pittsburgh, Pa.
Mesta Mach. Co., Pittsburgh, Pa.
Southwark Fdry. & Mach. Co., Phila., Pa.
United Engrg. & Fdry. Co., Pittsburgh, Pa.
Watson-Stillman Co., 190 Fulton St., N. Y. C.
Wood, R. D., & Co., Philadelphia, Pa.

ACETYLENE—In Tanks
Air Reduction Sales Co., 342 Madison Ave., N. Y. C.
Prest-O-Lite Co., Inc., 30 E. 42d St., N. Y. C.

AGITATORS
Blaw Knox Co., Pittsburgh, Pa.

AIR TANKS AND CYLINDERS
Air Tight Steel Tank Co., Pittsburgh, Pa.
Seaife, Wm. B., & Sons Co., Pitts., Pa.

ALLOYS—Manganese—Copper
Electro Metallurgical Sales Corporation, 30 East 42nd Street, New York City.

ALLOYS—Titanium
Titanium Alloy Mfg. Co., Niagara Falls, N. Y.

ANGLES, BEAMS, CHANNELS AND TEES
Bethlehem Steel Company, So. Bethlehem, Pa.
Brown-Wales Co., Boston, Mass.
Carnegie Steel Co., Pittsburgh, Pa.
De Coi, Richard, Company, Philadelphia, Pa.
Illinois Steel Co., Chicago, Ill.
Illinois Steel Co., Warehouse Dept., Chicago.
Inland Steel Co., Chicago, Ill.
Interstate Iron & Steel Co., Chicago, Ill.
Lindsay, Jas. G. & Co., Inc., Philadelphia, Pa.
Morris, Wheeler & Company, Philadelphia, Pa.
Phoenix Iron Co., Philadelphia, Pa.
Pottstown Steel Co., Douglasville, Pa.
Republic Iron & Steel Co., Youngstown, O.
Ryerson, Jos. T. & Son, Chicago, Ill.
Shippers' Car Line, Inc., 165 B'way, N. Y.
Taylor-Wason Corp., Boston, Mass.

ANTI FRICTION METALS—See Babbitt Metal

ANVILS
Potts, Horace T., & Co., Philadelphia, Pa.

ARBORS
Whitman & Barnes Mfg. Co., Akron, Ohio.

ARMORING SURFACE—For Concrete
Irving Iron Works Co., Long Island City, N. Y.

ARRESTERS—Spark
Harrington & King Perforating Co., Chicago.
Pittsburgh Perforating Co., Pittsburgh, Pa.

AXLES—Car and Locomotive
Illinois Steel Co., Chicago, Ill.

BABBITT METAL
Ajax Metal Co., Philadelphia, Pa.
American Crucible Products Co., Elyria, O.
Keystone Bronze Co., Pittsburgh, Pa.

BALL FLOATS
Naugatuck Mfg. Co., Naugatuck, Conn.

BALLS—Forged Chrome Steel for Pulverizing
Philadelphia Steel & Iron Co., Phila., Pa.

BALLS—Grinding
Tioga Steel & Iron Co., Phila., Pa.

BALLS—Steel, Brass or Bronze
Auburn Ball Bearing Co., Rochester, N. Y.
Bethlehem Steel Company, So. Bethlehem, Pa.
New Departure Mfg. Co., Bristol, Conn.
Prompt Bearings Exchange, Chicago, Ill.
R. I. V. Company, Inc., 1755 Bway., N. Y. C.

BANDS—Steel
Akron Selle Co., Akron, O.
Interstate Iron & Steel Co., Chicago, Ill.

BAR POINTING MACHINES
National Acme Co., Cleveland, O.

BARGES—Steel
Riter-Conley Co., Pittsburgh, Pa.

BARRELS—Sand-Blast
Hoovel Mfg. Corp., Jersey City, N. J.

BARS—Alloy
Bethlehem Steel Company, So. Bethlehem, Pa.
Central Steel Company, Massillon, Ohio.
United Alloy Steel Corp., Canton, O.

BARS—Concrete, Reinforcing
American Steel & Wire Co., Chicago, Ill.
Bethlehem Steel Co., South Bethlehem, Pa.
Interstate Iron & Steel Co., Chicago, Ill.
Laclede Steel Co., St. Louis, Mo.
Morris, Wheeler & Co., Philadelphia, Pa.

BARS—Galvanized
Morris, Wheeler & Co., Philadelphia, Pa.

BARS—Iron and Steel
Ames, W. & Co., Jersey City, N. J.
Bethlehem Steel Co., South Bethlehem, Pa.
Betz Porter Co., Inc., Cleveland, O.
Cann & Saul Steel Co., Inc., Philadelphia, Pa.
Carnegie Steel Co., Pittsburgh.
De Coi, Richard, Company, Philadelphia, Pa.
Detroit Steel Co., Inc., Detroit, Mich.
Harvey, Arthur C., Co., Allston 34, Boston.
Illinois Steel Co., Chicago, Ill.
Illinois Steel Co., Warehouse Dept., Chicago.
International Fuel & Iron Corp., Pittsburgh, Pa.
Interstate Iron & Steel Co., Chicago, Ill.
Lindsay, Jas. G., & Co., Inc., Philadelphia, Pa.
Morris, Wheeler & Company, Philadelphia, Pa.
Pacific Coast Steel Co., San Francisco, Cal.
Philadelphia Steel & Iron Co., Phila., Pa.
Pottstown Steel Co., Douglasville, Pa.
Ryerson, Jos. T. & Son, Chicago, Ill.
Taylor-Wason Corp., Boston, Mass.

BEADING AND CRIMPING MACHINES
Quickwork Co., St. Marys, O.

BEAMS—See Angles, Beams, Channels and Tees

BEARINGS—Babbitt
Bunting Brass & Bronze Co., Toledo, O.
Doehler Die-Casting Company, Brooklyn, N. Y.

BEARINGS—Ball
Aetna Ball Bearing Mfg. Co., Chicago, Ill.
American Roller Bearing Co., Pittsburgh, Pa.
Annular Ball Bearing Co., Rochester, N. Y.
Fafnir Bearing Company, New Britain, Ct.
Federal Bearings Co., Inc., Poughkeepsie, N. Y.
Gurney Ball Bearing Co., Jamestown, N. Y.
New Departure Mfg. Co., Bristol, Conn.
Norma Company of America, Anable Ave., Long Island City, N. Y.
Prompt Bearings Exchange, Chicago, Ill.
R. I. V. Company, Inc., 1755 Bway., N. Y. C.
Torrington Co., Torrington, Conn.
U. S. Ball Bearing Mfg. Co., Chicago, Ill.

BEARINGS—Brass and Bronze
American Crucible Products Co., Elyria, O.
Bunting Brass & Bronze Company, Toledo, O.
Cincinnati Brass Company, Cincinnati, O.
Lumen Bearing Co., Buffalo, N. Y.
Wellman Bronze Co., Cleveland, Ohio.

BEARINGS—Oilless
Metaline Company, Long Island City, N. Y.

BEARINGS—Roller
American Roller Bearing Co., Pittsburgh, Pa.
Bock Bearing Company, The, Toledo, O.
Federal Bearings Co., Inc., Poughkeepsie, N. Y.
Hyatt Roller Bearing Co., 100 W. 41st St., New York City.
Norma Company of America, Anable Ave., Long Island City, N. Y.
Prompt Bearings Exchange, Chicago, Ill.
R. I. V. Company, Inc., 1755 Bway., N. Y. C.
U. S. Ball Bearing Mfg. Co., Chicago, Ill.

BEARINGS—Shaft Hanger
Fafnir Bearing Company, New Britain, Ct.

BEARINGS—Thrust
Aetna Ball Bearing Mfg. Co., Chicago, Ill.
Bock Bearing Co., Toledo, O.
Mesta Mach. Co., Pittsburgh, Pa.

BELT DRESSING
Gandy Belting Co., Baltimore, Md.
Schieren, Chas. A., Co., 37 Ferry St., N. Y.

BELT FASTENERS
Bristol Co., Waterbury, Ct.
Flexible Steel Lacing Co., Chicago, Ill.

BELTING—Chain
Link-Belt Co., Chicago, Ill.
Morse Chain Co., Ithaca, N. Y.

BELTING—Fabric
Gandy Belting Co., Baltimore, Md.
Stowell Belting Co., Chicago, Ill.

BELTING—Leather
Chicago Rawhide Mfg. Co., Chicago, Ill.
Schieren, Chas. A., Co., 37 Ferry St., N. Y.
Ullman, Jacob, Buffalo, N. Y.

BELTING—Leather Link
Schieren, Chas. A., Co., 37 Ferry St., N. Y.

BELTING—Rubber
New York Belting & Packing Co., 91-93 Chambers St., N. Y.
Robins Conveying Belt Co., Passaic, N. J.

BENCH LEGS—Steel
Lupton's, David, Sons Co., Phila., Pa.

BENCHES—Draw—See Wire Drawing Machinery

BENCHES—Saw
Kidder, R. E., Co., Worcester, Mass.

BENDING MACHINES—Hand and Power
Cleveland Punching & Shear Works Co., Cleveland, O.
Covington Machine Co., Inc., Covington, Va.
Dreis & Krump Mfg. Co., Chicago, Ill.
Quickwork Co., St. Marys, O.
Ryerson, Jos. T. & Son, Chicago, Ill.

BENDING AND STRAIGHTENING MACHINES—Rail
Ryerson, Joseph T. & Son, Chicago, Ill.
Southwark Fdry. & Mach. Co., Phila., Pa.

BILLETS—Duralumin
Baush Machine Tool Co., Springfield, Mass.

BILLETS—Electric Steel
Illinois Steel Co., Chicago, Ill.

BILLETS—Forging
Republic Iron & Steel Co., Youngstown, O.
Central Steel Company, Massillon, Ohio.
Interstate Iron & Steel Co., Chicago, Ill.
Pacific Coast Steel Co., San Francisco, Cal.
Ryerson, Jos. T. & Son, Chicago, Ill.
Steel & Tube Co. of America, Chicago, Ill.

BILLETS—Nickel Steel
Bethlehem Steel Company, So. Bethlehem, Pa.
Central Steel Company, Massillon, Ohio.
Illinois Steel Co., Chicago, Ill.

BILLETS—Steel
Andrews Steel Co., Newport, Ky.
Bethlehem Steel Company, So. Bethlehem, Pa.
Buel Tool Steel Co., Youngstown, O.
Donner Steel Co., Inc., Buffalo, N. Y.
Edgewater Steel Co., Canal Dover, O.
Illinois Steel Co., Chicago, Ill.
International Fuel & Iron Corp., Pittsburgh, Pa.
Steel & Tube Co. of America, Chicago, Ill.
Tenn. Coal, Iron & R. R. Co., Birmingham, Ala.
United Alloy Steel Corp., Canton, O.
Wheeling Steel Products Co., Wheeling, W. Va.
Wood, Arch. Iron & Steel Co., Chicago, Ill.

BITS—Tool
Bethlehem Steel Co., So. Bethlehem, Pa.

BITS—Track
Whitman & Barnes Mfg. Co., Akron, Ohio.

BLANKS—Chisel
Chicago Pneumatic Tool Co., 6 E. 44th St., New York City.

BLANKS—Gear and Pinion
Akron-Selle Co., Akron, O.
American Manganese Bronze Co., Phila., Pa.
Carnegie Steel Co., Pittsburgh.
Chicago Rawhide Mfg. Co., Chicago, Ill.
National Forge & Tool Co., Irvine, Pa.

BLOCKS—Chain
Ford Chain Block Co., Philadelphia, Pa.
Topping Bros., 159 Varick St., N. Y. C.
Wright Mfg. Co., Easton, O.

BLOWERS—Centrifugal
Sturtevant Blower Co., Hartford, Conn.

BLOWERS—Pressure
Buffalo Forge Co., Buffalo, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
Chicago Blower Co., Chicago, Ill.
Connersville Blower Co., Connersville, Ind.
Roots, P. H. & F. M., Co., Connersville, Ind.

BLUE PRINT MACHINES
Wilkie Brothers, Saginaw, Mich.

BOILER HEADS—Flanged and Dished
Bartlett & Snow Co., Cleveland, O.
Chicago Bridge & Iron Works, Chicago, Ill.

BOILER SHELLS—Riveted or Welded
Seaife, Wm. B., & Sons, Co., Pittsburgh, Pa.
Smith, Jas. Mfg. Co., Pittsburgh, Pa.

BOILER TRIMMINGS
Crane Co., Chicago, Ill.

SEE ADVERTISEMENTS FOR COMPLETE INFORMATION. ALPHABETICAL INDEX—PAGES 222-224.

BOILERS—Return Tubular

BOILERS—Waste Heat

BOILERS—Water Tube

BOLT AND NUT MACHINERY
Haskell, Wm. H., Mfg. Co., Pawtucket, R. I.

BOLT AND RIVET CLIPPERS
Potter, H. K., Everett, Mass.

BOLTS—Expansion

BOLTS—Special

BOLTS—Spring Shackle

BOLTS—Toggle

BOLTS AND NUTS—Brass and Bronze
Pawtucket Mfg. Co., Pawtucket, R. I.

BOLTS AND NUTS—Iron and Steel
Bayonne Bolt & Nut Company, Bayonne, N. J.
Bell Co., Buffalo, N. Y.
Eastern Bolt & Nut Co., Providence, R. I.
Harrison Bolt & Nut Co., Harrison, N. J.
Haskell, Wm. H., Mfg. Co., Pawtucket, R. I.
Oliver Iron & Steel Co., Pittsburgh, Pa.
Pawtucket Mfg. Co., Pawtucket, R. I.

BORING BARS—Expansion

BORING, DRILLING AND MILLING MACHINES—Horizontal
Landis Tool Co., Waynesboro, Pa.
Prentiss, Henry, & Co., Inc., 149 B'way, N.Y.C.

BORING MACHINES—Car Wheel

BORING MACHINES—Cylinder
Baker Bros., Toledo, O.

BORING MACHINES—Vertical

BORING TOOLS—Expansion

BOX STRAPPING AND FASTENERS
De Haven Mfg. Co., Brooklyn, N. Y.
Stanley Wks., New Britain, Conn.

BOXES—Annealing
Blaw Knox Co., Pittsburgh, Pa.
Electro Alloys Co., Elyria, O.

BOXES—Carbonizing

BOXES—Case Hardening
Quigley Furnace Specialties Co., Inc., 26 Cortlandt St., New York City.

BOXES—Journal
Gurney Ball Bearing Co., Jamestown, N. Y.

BOXES—Steel

BRAKES—Electric
Electric Controller & Mfg. Co., Cleveland, O.

BRAKES—Metal Forming
Cincinnati Shaper Co., Cincinnati, O.
Low & Nawtath Bevelon Birmingham Iron Foundry, Derby, Ct

BRICK—Chrome
Lavino, E. J., & Co., Philadelphia, Pa.

BRICK—Fire
American Refractories Co., Pittsburgh, Pa.
Ashland Fire Brick Co., The, Ashland, Ky.
Harbison-Walker Refractories Co., Pitts., Pa.
Ironton Fire Brick Company, Ironton, O.
Quigley Furnace Specialties Co., Inc., 26 Cortlandt St., New York City.
Stone Fdry. Co., Cleveland, O.
Taylor, Charles, Sons Company, Cincinnati, O.
U. S. Refractories Corp., Mt Union, Pa.

BRICK—Fire Clay
Taylor, Charles, Sons Company, Cincinnati, O.

BRICK—Magnesite
Lavino, E. J., & Co., Philadelphia, Pa.

BRICK—Silica
Lavino, E. J., & Co., Philadelphia, Pa.

BRIDGE BUILDERS
Ingalls Iron Works Co., The, Birmingham, Ala.
Pittsburgh Des Moines Steel Co., Pitts., Pa.
Virginia Bridge & Iron Co., Roanoke, Va.

BROACHES
Lapointe J. N., Co., New London, Ct.

BROACHING MACHINES
Lapointe J. N., Co., New London, Ct.
New York Metal Broach Co., 50 Church St., N.Y.C.

BRONZE—Manganese

BROOMS—Steel

BUCKETS—Clam Shell
Blaw-Knox Co., Pittsburgh, Pa.
Hayward Co., 50 Church Street, N. Y. C.
McMyler Interstate Co., The, Cleveland, O.
Orton & Steinbrenner Co., Chicago, Ill.
Williams, G. H., Co., Erie, Pa.

BUCKETS—Conveyor
Godfrey Conveyor Co., Elkhart, Ind.

BUCKETS—Electric Motor
Hayward Co., 50 Church Street, N. Y. C.

BUCKETS—Elevator
Columbus Conveyor Company, Columbus, Ohio.
Hendrick Mfg. Co., Carbondale, Pa.

BUCKETS—Grab
Hayward Co., 50 Church Street, N. Y. C.
Orton & Steinbrenner Co., Chicago, Ill.
Williams, G. H., Co., Erie, Pa.

BUCKETS—Orange Peel
Orton & Steinbrenner Co., Chicago, Ill.

BUCKLES—Bale Tie
Joliet Wrought Washer Co., Joliet, Ill.

BUILDINGS—Factory

BUILDINGS—Galvanized Sectional
Blaw Knox Co., Pittsburgh, Pa.

BULLDOZERS
Garrison A., Foundry Co., Pittsburgh, Pa.

BURNERS—Combination Oil and Gas
Advance Furnace & Engineering Co., Springfield, Mass.
Anthony Co., The, Long Island City, N. Y.
Foerst, John, & Sons, Bayonne, N. J.
Surface Combustion Co., 366-368 Gerard Ave., Bronx, N. Y.
Tate-Jones & Co. Inc., Pittsburgh, Pa.
Wayne Tank & Pump Co., Ft. Wayne, Ind.

BURNERS—Enclosed Flame Gas
Oven Equipment & Mfg. Co., New Haven, Ct.

BURNERS—Oil
Anthony Co., The, Long Island City, N. Y.
Economy Furnace Co., The, Chicopee, Mass.
Foerst, John, & Sons, Bayonne, N. J.
Wayne Tank & Pump Co., Ft. Wayne, Ind.

BURNERS—Powdered Coal
Grindle Fuel Equipment Co., Harvey, Ill.

BURRS—Steel
Wrought Washer Mfg. Co., Milwaukee, Wis.

BUSHINGS—Brass and Bronze
American Crucible Products Co., Elyria, O.
Everitt Co., Boston 9, Mass.

BUSHINGS—Phosphor Bronze
Phosphor Bronze Smelting Co., Phila., Pa.

CABINETS—Tool
Whitman & Barnes Mfg. Co., Akron, Ohio.

CABLE—Auto Towing
American Steel & Wire Co., Chicago, Ill.

CABLE—Electric
General Electric Co., Schenectady, N. Y.

CABLEWAYS AND TRAMWAYS—See Tramways

CALIPERS—Indicating
Horstmann, F. W., Co., Irvington, N. J.

CALIPERS—Micrometer
New Metal Tool Steel Co., New London, Ct.

CALORIMETERS—Coal or Gas Recording
Peerless Instrument Company, Newark, N. J.
Parr Instrument Co., Moline, Ill.
Scott, Geo. Alexander, Co., Dayton, O.

CAR ROOFS—Pressed Steel
Sharon Pressed Steel Co., Sharon, Pa.

CARBIDE
Air Reduction Sales Co., 342 Madison Ave., N. Y. C.

CARBONIZING—See Heat Treating

CARRIERS—Cut Bar
Blaw Knox Co., Pittsburgh, Pa.

CARRIERS—Sheet Bar
Blaw Knox Co., Pittsburgh, Pa.

CARRIERS—Sheet Pack
Blaw-Knox Co., Pittsburgh, Pa.

CARS—Charging
Birdsboro Steel Fdy. & Mch. Co., Birdsboro, Pa.

CARS—Dump
Atlas Car & Mfg. Co., Cleveland, O.

CARS—Industrial and Mining
Atlas Car & Mfg. Co., Cleveland, O.
Chase Foundry & Mfg. Co., Columbus, O.
McKee, Arthur G., & Co., Cleveland, O.

CARS—Railroad (Second-hand)
Snippets' Car Line Inc., 165 B'way, N. Y. C.

CASE HARDENING—See Heat Treating

CASTINGS—Acid or Heat Resisting
Buffalo Fdry. & Mch. Co., 1545 Fillmore Ave., Buffalo, N. Y.
Calorizing Co. of Pittsburgh, Pittsburgh, Pa.
Electro Alloys Co., Elyria, O.
Hoskins Mfg. Co., Detroit, Mich.

CASTINGS—Aluminum Bronze
Buffalo Bronze Die Cast Corp., Buffalo, N. Y.

CASTINGS—Brass, Bronze or Aluminum
American Crucible Products Co., Elyria, O.
Atkinson Co., Rochester N. Y.
Buffalo Bronze Die Cast Corp., Buffalo, N. Y.
Bunting Brass & Bronze Co., Toledo, O.
Columbus Brass Company, Columbus, O.
Cross Engineering Co., Carbondale, Pa.
Doehler Die-Casting Company, Brooklyn, N. Y.
Grosser, J. J., & Co., Easton, Pa.
Jenkens Mfg. Co., Bloomfield, N. J.

SEE ADVERTISEMENTS FOR COMPLETE INFORMATION. ALPHABETICAL INDEX—PAGES 222-224.

Lough Bros., 90 West St., New York City.
Lowe Brothers Co., Dayton, O.
Mesta Machine Co., Pittsburgh, Pa.
Phosphor Bronze Smelting Co., Phila., Pa.
Reading Iron Company, Reading, Pa.
Ripley J. B. Brass Foundry, Waitsfield, Vt.
Sass Mfg. Co., Inc., Brooklyn, N. Y.
Spencer's Sons, I. S., Inc., Guilford, Ct.
Spruance & Bonnard, Jersey City, N. J.
Tube Bronze & Brass Co., Tiffin, O.
Wellsboro Foundry Co., Cincinnati, O.

CASTINGS—Die

Baush Machine Tool Co., Springfield, Mass.
Buffalo Bronze Die Cast Corp., Buffalo, N. Y.
Diecasting Machine Corporation, Brooklyn, N. Y.
Precision Die Casting Co., Syracuse, N. Y.
Standard Die Casting Co., Detroit, Mich.
Globe Tool & Engineering Co., Dayton, O.
Lough Bros., 90 West St., New York City.
Soss Mfg. Co., Inc., Brooklyn, N. Y.

CASTINGS—Electric Steel

Acme Steel & Malleable Iron Works, Inc., Buffalo, N. Y.
American Steel Foundries, Chicago, Ill.
Belle City Malleable Iron Co., Racine, Wis.
Bethlehem Steel Co., So. Bethlehem, Pa.
Chicago Steel Foundry Co., Chicago, Ill.
Farrell Cheek Steel Foundry Co., Sandusky, O.
Industrial Steel Casting Co., Toledo, O.
Maynard Electric Steel Casting Co., Milwaukee, Wis.
Monroe Steel Castings Co., Monroe, Mich.
Ohio Steel Fdry. Co., Springfield, O.
Sivyer Steel Casting Co., Milwaukee, Wis.
Smith, Geo. H., Steel Casting Co., Milwaukee.

CASTINGS—Gray Iron

Adams, Wm., Foundry Co., Inc., Phila., Pa.
Baker Mfg. Corp., Saratoga Springs, N. Y.
Barnhart-Davis Co., Warren, Pa.
Berks Foundry & Mfg. Co., Berks, Pa.
Bethlehem Steel Company, So. Bethlehem, Pa.
Birdsboro Steel Fdy. & Mch. Co., Birdsboro, Pa.
Belmar Foundry, Inc., Belmar, N. Y.
Buffalo Foundry & Machine Co., 1545 Fillmore Ave., Buffalo, N. Y.
Carthage Machine Company, Carthage, N. Y.
Chisholm-Moore Mfg. Co., Cleveland, O.
City Foundry Co., Cleveland, O.
Connellsville Foundry Mach. & Steel Casting Co., Pittsburgh, Pa.
Cooper Brothers, Cortland, N. Y.
Covington Machine Co., Inc., Covington, Va.
Crosse & Blackwell Co., Philadelphia, Pa.
Creswell, Samuel J., Iron Works, Phila., Pa.
Daugherty Foundry Co., Jeannette, Pa.
Egyptian Iron Works, Murphysboro, Ill.
Excelsior Tool & Mch. Co., East St. Louis, Ill.
Fairmont Foundry Co., Philadelphia, Pa.
Federal Signal Co., Albany, N. Y.
Fort Madison Foundry, Fort Madison, Iowa.
Framingham Foundries, Inc., Framingham, Mass.
Franklin Machine Company, Providence, R. I.
Frederick Iron & Steel Co., Frederick, Md.
Frost Mfg. Co., The, Galesburg, Ill.
Gear Mfg. Co., Easton, Mass.
Gilbert & Barker Mfg. Co., Springfield, Mass.
Green Parts Manufacturing Co., Inc., Long Island City, N. Y.
Gray Iron Foundry Company, Reading, Pa.
Hubley Mfg. Co., Lancaster, Pa.
Hyde Park Fdry. & Mach. Co., Hyde Park, Pa.
Jolly, J. & W., Inc., Holyoke, Mass.
Jones, W. A., Fdry. & Mch. Co., 4434 West Roosevelt Road, Chicago, Ill.
Kirby Mfg. Co., Cleveland, Ohio.
Kline Hardware Co., Allentown, Pa.
Klotz Machine Co., Sandusky, O.
Lebanon Gear & Machine Works, Lebanon, Pa.
Lough Bros., 90 West St., N. Y. C.
Lycoming Motor Corp., Williamsport, Pa.
McKim Fdry. & Mach. Co., Lockport, N. Y.
Mesta Mach. Co., Pittsburgh, Pa.
Newark Malleable Iron Works, Louis Sacks, Inc., Newark, N. J.
North Wales Mach. Co., Inc., North Wales, Pa.
Oneonta Iron Works, Inc., Oneonta, N. Y.
Osborn Mch. Co., The, Boils, Pa.
Patch, F. R., Manufacturing Co., Rutland, Vt.
Penn Fdry. & Mfg. Co., Box 182, Reading, Pa.
Pennsylvania Engrg. Wks., New Castle, Pa.
Pequonnock Fdry., Bridgeport, Ct.
Piedmont Fdry. & Mach. Co., Inc., Piedmont, West Va.
Pulaski Foundry & Mfg. Corp., Cleveland, O.
Richey, Browne & Donald, Inc., Maspeth, L. I.
St. Louis Malleable Casting Co., St. Louis.
St. Marys Foundry Co., Minster, O.
Sessions Foundry Company, Bristol, Ct.
Shaw, Welsh & Company, Galesburg, Ill.
Spencer's, I. S., Sons, Inc., Guilford, Ct.
Stowell Co., South Milwaukee, Wis.
Straight Line Engine Co., Inc., Syracuse, N.Y.
Sweet & Doyle Foundry & Machine Co., Troy (Greene Island), N. Y.
Swett, A. L., Iron Works, Medina, N. Y.
Taylor-Wilson Mfg. Co., McKees Rocks, Pa.
Troy Foundry & Machine Co., Troy, N. Y.
Turner Machine Co., Danbury, Ct.
Turner & Seymour Mfg. Co., Torrington, Ct.
Union Mfg. Co., New Britain, Ct.
United Engrg. & Fdry. Co., Pittsburgh, Pa.
U. S. Cast Iron Pipe & Fdry. Co., Burlington, N. J.
Utica Steam Engine & Boiler Works, The, Utica, N. Y.
Vogt Bros. Mfg. Co., Inc., Louisville, Ky.
Warren Fdry. & Pipe Co., 11 B'way, N. Y. C.
Wheeling Mold & Fdry. Co., Wheeling, W. Va.
Wilcox, Crittenden & Co., Inc., Middletown, Ct.

CASTINGS—Malleable

Acme Steel & Malleable Iron Works, Inc., Buffalo, N. Y.
Belle City Malleable Iron Co., Racine, Wis.
Cadillac Malleable Iron Co., Cadillac, Mich.
Chisholm-Moore Mfg. Co., Cleveland, O.
Cushman Company, Inc., Champaign, Ill.
Decatur Malleable Iron Co., Decatur, Ill.
Devlin, Thomas, Mfg. Co., Philadelphia, Pa.
Lakeside Malleable Castings Co., Racine, Wis.
Lancaster Malleable Castings Co., Lancaster, Pa.
Link-Belt Co., Chicago, Ill.
Lough Bros., 90 West St., New York City.
Malleable Iron Fittings Co., Branford, Ct.
Mosser Pattern Company, Newark, N. J.
Moore & Moore, Inc., Reading, Pa.
Newark Malleable Iron Works, Louis Sacks, Inc., Newark, N. J.
Northern Malleable Iron Co., St. Paul, Minn.
Reading Malleable Castings Co., Reading, Pa.
Rockford Malleable Iron Works, Rockford, Ill.
St. Louis Malleable Casting Co., St. Louis.
Stowell Co., South Milwaukee, Wis.
Temple Malleable Iron & Steel Co., Phila., Pa.
Vermillion Malleable Iron Co., Hoopeston, Ill.

CASTINGS—Manganese Steel

Bethlehem Steel Company, So. Bethlehem, Pa.
Moore & Moore, Inc., Reading, Pa.
Smith, Geo. H., Steel Casting Co., Milwaukee.
Steere & Cantrell, Inc., Jersey City, N. J.

CASTINGS—Open Hearth Steel

Commercial Steel Casting Company, Marion, O.

CASTINGS—Semi-Steel

Buffalo Foundry & Machine Co., 1545 Fillmore Ave., Buffalo, N. Y.
Framingham Fdries., Inc., Framingham, Mass.
Malleable Iron Fittings Co., Branford, Ct.
Troy Fdry. & Machine Co., Troy, N. Y.

CASTINGS—Steel

Adamson Mach. Co., Akron, O.
American Steel Foundries, Chicago, Ill.
Atlantic Steel Castings Co., Chester, Pa.
Atlas Steel Casting Co., Buffalo, N. Y.
Bethlehem Steel Co., So. Bethlehem, Pa.
Birdsboro Steel Fdy. & Mch. Co., Birdsboro, Pa.
Chester Steel Castings Co., Philadelphia, Pa.
Chicago Steel Foundry Co., Chicago, Ill.
Commercial Steel Casting Company, Marion, O.
Connellsville Foundry Mach. & Steel Casting Co., Pittsburgh, Pa.
Crucible Steel Casting Co., Lansdowne, Pa.
Falk Corp., The, Milwaukee, Wis.
Farrell Cheek Steel Fdry. Co., Sandusky, O.
Federal Steel Fdry. Co., Chester, Pa.
Industrial Steel Casting Co., Toledo, O.
Lough Bros., 90 West St., New York City.
Malleable Iron Fittings Co., Branford, Ct.
Maynard Electric Steel Castings Co., Milwaukee, Wis.
Mesta Mach. Co., Pittsburgh, Pa.
National Steel Casting Co., Montpelier, Ind.
Ohio Steel Fdry. Co., Springfield, O.
Otis Steel Co., Cleveland, O.
Philadelphia Roll & Mach. Co., Phila., Pa.
Pulaski Foundry & Mfg. Corp., Cleveland, O.
Reading Steel Casting Co., Inc., Reading, Pa.
Rhode Island Crucible Steel Co., Providence, R. I.
Riverside Steel Castings Co., Newark, N. J.
Shaw Foundry Co., Sharon, Pa.
Sivyer Steel Casting Co., Milwaukee, Wis.
Smith, Geo. H., Steel Casting Co., Milwaukee, Wis.
Temple Malleable Iron & Steel Co., Phila., Pa.
United Engrg. & Fdry. Co., Pittsburgh, Pa.
Wheeling Mold & Fdry. Co., Wheeling, W. Va.

CASTINGS—Zinc, Tin or Lead

Soss Mfg. Co., Inc., Brooklyn, N. Y.

CEMENT—Fire Resisting

Quigley Furnace Specialties Co., Inc., 26 Cortlandt St., New York City.

CENTERING MACHINES

Whiton, D. E., Mach. Co., New London, Ct.

CENTERS—Index

Simmons Mach. Co., Inc., Albany, N. Y.

CHAIN MACHINERY

Baird Machine Co., Bridgeport, Ct.
Vaughn Machinery Co., Cuyahoga Falls, Ohio

CHAINS—Cable

Morton, Thomas, 245 Centre St., N. Y. C.

CHAINS—Coil

American Chain Co., Inc., Bridgeport, Ct.
Bradlee & Co., Philadelphia, Pa.
Bridgeport Chain Co., Bridgeport, Ct.
Columbus McKinnon Chain Co., Columbus, O.
Woodhouse Chain Works, Trenton, N. J.

CHAINS—Conveyor

American Chain Co., Inc., Bridgeport, Ct.
Brown Hoisting Machry. Co., Cleveland, O.
Link-Belt Co., Chicago, Ill.
Webster Mfg. Co., Chicago, Ill.
Woodhouse Chain Works, Trenton, N. J.

CHAINS—Crane and Hoist

American Chain Co., Inc., Bridgeport, Ct.
Bradlee & Co., Philadelphia, Pa.
Columbus McKinnon Chain Co., Columbus, O.
Woodhouse Chain Works, Trenton, N. J.

CHAINS—Dredge

American Chain Co., Inc., Bridgeport, Ct.
Carroll Chain Company, The, Columbus, O.
Columbus McKinnon Chain Co., Columbus, O.

CHAINS—Furnace

Bridgeport Chain Co., Bridgeport, Ct.

CHAINS—Jack

Mattatuck Mfg. Co., Waterbury, Ct.

CHAINS—Power Transmission

Baldwin Chain & Mfg. Co., Worcester, Mass.
Bridgeport Chain Co., Bridgeport, Ct.
Link-Belt Co., Chicago, Ill.
Morse Chain Co., Ithaca, N. Y.
Morton, Thomas, 245 Centre St., N. Y. C.
Union Chain & Mfg. Co., Sandusky, O.

CHAINS—Rocker-Joint

Morse Chain Co., Ithaca, N. Y.

CHAINS—Sash

Bridgeport Chain Co., Bridgeport, Ct.
Chain Products Co., Cleve., Ohio.
Morton, Thos., 245 Centre St., N. Y. C.
Parker Supply Co., Inc., 785 E. 135th St., New York City.

CHAINS—Sling

Carroll Chain Company, The, Columbus, Ohio
Columbus McKinnon Chain Co., Columbus, O.
Reading Chain & Block Co., Reading, Pa.

CHAINS—Sprocket Wheel

Cotton Weeder Co., Chicago, Ill.
Link-Belt Co., Chicago, Ill.
Stowell Co., South Milwaukee, Wis.
Union Chain & Mfg. Co., Sandusky, O.
Whitney Mfg. Co., Hartford, Ct.

CHANNELS—See Angles, Beams, Channels and Tees

CHAPLETS

Erdle Perforating Co., Rochester, N. Y.

CHASERS

Jones & Lamson Mach. Co., Springfield, Vt.

CHECKS—Metal

Matthews, J. H., & Co., Pittsburgh, Pa.
Rome Mfg. Company, Rome, N. Y.
Schwerdtle Stamp Co., Bridgeport, Ct.

CHROMIUM METAL

Electro Metallurgical Sales Corporation, 30 East 42nd Street, New York City.

CHUCKS—Drill and Lathe

Cushman Chuck Company, Hartford, Ct.
Hoggson & Pettis Mfg. Co., New Haven, Ct.
Horton, E., & Son Co., Windsor Locks, Ct.
Morse Twist Drill & Machine Co., New Bedford, Mass.
Skinner Chuck Co., New Britain, Ct.
Union Mfg. Co., New Britain, Ct.
Victor Tool Company, Inc., Waynesboro, Pa.
Whiton Mach. Co., D. E., New London, Ct.

CHUCKS—Magnetic

Heald Mch. Co., Worcester, Mass.

CHUCKS—Metal

Hoggson & Pettis Mfg. Co., New Haven, Ct.

CLAMPS—Flanging

Niles-Bement-Pond Co., 111 B'way, N. Y. C.
Ryerson, Joseph T., & Son, Chicago, Ill.

CLAMPS—Steel

Williams, J. H., & Co., 57 Richards St., Brooklyn, N. Y.

CLEANER—Metal

Electric Smelting & Aluminum Co., Lockport, N. Y.
Ford, J. B., Co., Wyandotte, Mich.
Oakley Chemical Co., 22 Thames St., N. Y. C.

CLEANING MATERIALS

Electric Smelting & Aluminum Co., Lockport, N. Y.
Ford, J. B., Co., Wyandotte, Mich.
Oakley Chemical Co., 22 Thames St., N. Y. C.

CLOCKS—Watchman's

Newman Clock Co., Inc., 428 B'way, N. Y. C.

CLUTCHES—Friction

Brown Engineering Co., Reading, Pa.
Caldwell, W. E., Co., 260 Brandeis St., Louisville, Ky.
Falls Clutch & Mchry. Co., Cuyahoga Falls, O.
Johnson Carlyle Machine Co., Manchester, Ct.
Jones, W. A., Fdry. & Mch. Co., 4434 West Roosevelt Road, Chicago, Ill.
Morse & White Co., Philadelphia, Pa.
Schultz, A. L., & Son, Chicago, Ill.
Wood's, T. B., Sons Co., Chambersburg, Pa.

CLUTCHES—Magnetic

Cutler-Hammer Mfg. Co., Milwaukee, Wis.

COAL

Addy, Matthew, Company, The, Cincinnati, O.
Bethlehem Steel Co., So. Bethlehem, Pa.
Cleveland-Cliffs Iron Company, Cleveland, O.
Hanna, M. A., & Co., Cleveland, O.
Heyward, Thomas R., Co., Pittsburgh, Pa.
Hockenbery & Williams & Co., Pittsburgh, Pa.
International Fuel & Iron Corp., Pittsburgh, Pa.
Peabody Fuel Co., Pittsburgh, Pa.
Pickands, Mather & Co., Cleveland, Ohio.
Pilling & Co., Inc., Philadelphia, Pa.
St. Louis Coke & Chemical Co., St. Louis, Mo.
Snyder, W. P., & Co., Pittsburgh, Pa.

COAL, ORE AND ASH HANDLING MACHINERY

Allinace Machine Co., Alliance, O.
Blaw-Knox Co., Pittsburgh, Pa.
Brown Hoisting Machry. Co., Cleveland, O.
Freeman-Riff Co., Terre Haute, Ind.
Gifford-Wood Co., Hudson, N. Y.
Godfrey Conveyor Co., Elkhart, Ind.
Haiss, Geo., *Mfg. Co., Inc., 142d St. & Canal Place, New York City.
Hana Engineering Works, Chicago, Ill.
Hayward Co., 50 Church St., New York City.
Link-Belt Co., Chicago, Ill.

SEE ADVERTISEMENTS FOR COMPLETE INFORMATION. ALPHABETICAL INDEX—PAGES 222-224.

COAL POWDERING EQUIPMENT

COATING AND WATER-PROOFING
Newark, N. J

COCKS—Air and Gas
Chicago, Ill.

COILING MACHINES — Flexible Shaft, Metallic Tube and Casing
Inc., Worcester, Mass

COILS—Pipe, Iron, Copper or Brass
Pipe & Pipe Coiling Co., Harrisburg, Pa.
Pittsburgh Pipe Coil & Bending Co., Pittsburgh, Pa.

COKE—Metallurgical
Addy, Matthew Company, The, Cincinnati, O.
Empire Coke Co., Pittsburgh, Pa.
Cleveland Coke Iron Company, Cleveland, O.
Connellsville Coke Co., E. 14th St., N. Y. C.
Empire Coke Co., Cincinnati, O.
Lorain Coke & Iron Co., Pittsburgh, Pa.
Pittsburgh Coke Co., Pittsburgh, Pa.
Interstate Pipe & Iron Corp., Pittsburgh, Pa.
Iron Trade Products Co., Pittsburgh, Pa.
Empire Coke Co., Pittsburgh, Pa.
Pilling & Co., Inc., Philadelphia, Pa.
Semet-Solvay Co., Syracuse, N. Y.
St. Louis Coke & Iron Co., St. Louis, Mo.
Semet-Solvay Co., Philadelphia, Pa.
Semet-Solvay Co., Cleveland, O.
Stockham Pipe & Fittings Co., Birmingham, Ala.
Tabor, T. Arthur, Inc., Boston, Mass.
Wallingford-Walter & Co., Cincinnati, O.

COKE-OVEN MACHINERY
Mfg. Co., Akron, O.
Koppers Co. & Mfg. Co., Cleveland, O.

COKE OVENS—By-Products
Smythe, S. R., Co., Pittsburgh, Pa.

COLD DRAWING MACHINES—Bar & Wire
Vaughn Machy. Co., Cuyahoga Falls, O.

COLLARS—Spacing for Milling Cutters
Detroit, Mich.

COLLETS—Spring or Split
Brown & Sharpe Mfg. Co., Providence, R. I.
Hartford Machine Screw Co., Hartford, Conn.
Pratt & Whitney Co., Worcester, Mass.

COMPOUNDS—Case Hardening and Tempering
Ajax Electric Furnace Co., Ft. Wayne, Ind.
Detroit Electric Furnace Co., Detroit, Mich.

COMPOUNDS—Welding
Ajax Flux & Chemical Co., Ft. Wayne, Ind.

COMPRESSORS—Air
Ajax Electric Mfg. Co., Milwaukee, Wis.
American Air Compressor Works, 558 Hamilton Ave., Brooklyn, N. Y.
Ingersoll-Rand Co., 11 Broadway, N. Y. C.
Chicago Pneumatic Tool Co., 6 E. 44th St., New York City.
Ingersoll-Rand Co., 11 Broadway, N. Y. C.
Power Specialty Pump & Mach. Co., 185 Broadway, New York City.
General Electric Co., Schenectady, N. Y.
Ingersoll Rand Company, 11 Broadway, N. Y. C.
Mesta Mach. Co., Pittsburgh, Pa.
Nordberg Mfg. Co., Milwaukee, Wis.
Norwalk Iron Works Co., South Norwalk, Ct.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Spencer Turbine Co., Hartford, Ct.
Sullivan Machy. Co., Chicago, Ill.

COMPRESSORS—Gas
Chicago Pneumatic Tool Co., 6 E. 44th St., New York City
Norwalk Iron Works Co., South Norwalk, Ct.

CONCRETE CONSTRUCTION
Cleveland Co

CONCRETE MACHINERY
Ohio
Knickerbocker Co., Jackson, Mich.

CONDENSERS
Ind.
Ingersoll Rand Company, 11 Broadway, N. Y. C.
N. J.

CONDUITS—Flexible Metallic
Metallic Tubing Co.

CONNECTING RODS
Bethlehem Steel Co.,
Standard Steel Works Co.,
Pa

CONTAINERS—Heat Treating
Pittsburgh, Pa.

CONTRACTORS—General
Austin Co., Cleveland, O.

CONTRACTORS' SUPPLIES—Second-hand
Alling & Cory Co., Inc., 233 B'way, N. Y. C.
Lugo Pipe Supply Co., Inc., 233 B'way, N. Y. C.

CONTROLLERS—Crane
Cutler-Hammer Mfg. Co., Milwaukee, Wis.

CONTROLLERS—Electric
Electric Controller & Mfg. Co., Cleveland, O.
General Electric Co., Schenectady, N. Y.

CONTROLLERS—Electric Motor
Cutler-Hammer Mfg. Co., Milwaukee, Wis.

CONTROLLERS—Temperature
Taylor Instrument Companies, Rochester, N. Y.

CONVEYING AND ELEVATING MACHINERY
Brown Hoisting Machry. Co., Cleveland, O.
Caldwell, H. W., & Son Co., Chicago, Ill.
Cincinnati Conveying Systems, Cincinnati, Ohio.
Cliff-Wood Co., Hudson, N. Y.
Goodman Conveyor Co., Elkhart, Ind.
Jeffrey Mfg. Co., Chicago, Ill.
Lyon, N. E. & Co., 25 Church St., N. Y. C.
Portable Machinery Company, Passaic, N. J.
Robins Conveying Belt Co., Passaic, N. J.
Webster Mfg. Co., Chicago, Ill.

CONVEYING SYSTEMS—Overhead
N. J. Fdry. & Mch. Co., 90 West St., N. Y. C.
Richards-Wilcox Mfg. Co., Aurora, Ill.

CONVEYORS—Portable
Freeman-Riff Co., Terre Haute, Ind.
Hauss, Geo. Mfg. Co., Inc., 142d St. & Canal Place, New York City.
Payne, N. B. & Co. 25 Church St., N. Y. C.
Portable Machinery Company, Passaic, N. J.

COPING MACHINES
Cleveland Punch & Shear Works Co., Cleve., O.
Pels Henry & Co., 90 West St., N. Y. C.
Ryerson, Joseph T. & Son, Chicago, Ill.

CORE BREAKERS—Pneumatic
Sullivan Machy. Co., Chicago, Ill.

CORNICE BRAKES
Dreis & Krump Mfg. Co., Chicago, Ill.

CORRUGATING MACHINERY
Stolz, E. & Mfg. Co., New Bremen, Ohio.

CORUNDUM WHEELS — See Grinding Wheels

COTTERS AND KEYS—Spring
Hilliard Mfg. Co., Valley Falls, R. I.
Hubbard Spring Works, Pontiac, Mich.

COUNTERBORES
Whitman & Barnes Mfg. Co., Akron, Ohio.

COUNTERSINKS
Whitman & Barnes Mfg. Co., Akron, O.

COUNTING MACHINES
Detroit Mfg. Co., Milwaukee, Wis.
Hunt, R. Mfg. Co., Battle Creek, Mich.
Root Co., Bristol, Ct.
Veeder Mfg. Co., Hartford, Ct.

COUPLINGS—Air Hose
Cleveland Pneumatic Tool Co., Cleveland, O.

COUPLINGS—Cut-off, Friction
Johnson, Carlyle, Machine Co., Manchester, Ct.
Morse & White Co., Philadelphia, Pa.

COUPLINGS—Flexible Shaft
Brown Engineering Co., Reading, Pa.
Jones, W. A., Fdry. & Mch. Co., 4434 West Roosevelt Road, Chicago, Ill.
Nuttall, R. D., Co., Pittsburgh, Pa.
Rouse, P. H. & F. M., Co., Connersville, Ind
Smith & Serrell, Newark, N. J.
Thompson Brothers, Philadelphia, Pa.

COUPLINGS—Friction Clutch
Caldwell, W. E., Co., 260 Brandeis St., Louisville, Ky.
Lovejoy Clutch & Motor Co., Cuyahoga Falls, O.
Lovejoy Carlyle Machine Co., Manchester, Ct.
Jones, W. A., Fdry. & Mch. Co., 4434 West Roosevelt Road, Chicago, Ill.

COUPLINGS—Oil Well Pipe
Jancey, Steinmetz & Co., Philadelphia, Pa.

COUPLINGS—Shaft
Lovejoy Clutch & Motor Co., Cuyahoga Falls, O.
Jones, W. A., Fdry. & Mch. Co., 4434 West Roosevelt Road, Chicago, Ill.
Jones, W. H. & Co., Wilkes Barre, Pa.
Smith & Serrell, Newark, N. J.

CRANES—Crawling Tractor
Industrial Works, Bay City, Mich.
Northwest Engineering Co., Chicago, Ill.

CRANES—Electric Traveling
Alliance Machine Co., Alliance, Ohio.
American Shear Knife Co., Cleveland, Ohio
Armington Engineering Co., Euclid, O.
Bedford Fdry. & Machine Co., Bedford, Ind.
Box, Alfred, & Co., Inc., Philadelphia, Pa.
Champion Engrg. Co., Kenton, O.
Chesapeake Iron Works, Baltimore, Md.
Cleveland Crane & Engrg. Co., Wickliffe, Ohio.
Curtis Pneumatic Machry. Co., St. Louis, Mo.
Erie Steel Construction Co., Erie, Pa.

CRANES—Hand Power
Alliance Machine Co., Alliance, O.
Armington Engineering Co., Euclid, O.
Bedford Fdry. & Machine Co., Bedford, Ind.
Box, Alfred, & Co., Inc., Philadelphia, Pa.
Brown Hoisting Machry. Co., Cleveland, O.
Champion Engrg. Co., Kenton, O.
Chesapeake Iron Works, Baltimore, Md.
Cleveland Crane & Engrg. Co., Wickliffe, Ohio.
Conkey, H. D., & Company, Mendota, Ill.
Curtis Pneumatic Machry. Co., St. Louis, Mo.
Erie Steel Construction Co., Erie, Pa.
Euclid Crane & Hoist Co., Euclid, O.
Maris Brothers, Inc., Philadelphia, Pa.
N. J. Fdry. & Mch. Co., 90 West St., N. Y. C.
Niles-Bement-Pond Co., 111 Broadway, N.Y.C.
Northern Engineering Works, Detroit, Mich.
Reading Chain & Block Co., Reading, Pa.
Richards-Wilcox Mfg. Co., Aurora, Ill.
Stamp, Chas., E., Co., Cleveland, O.
Toledo Crane Co., Bucyrus, Ohio.
Whiting Corporation, Harvey, Ill.

CRANES—Jib
Champion Engrg. Co., Kenton, O.
N. J. Fdry. & Mch. Co., 90 West St., N. Y. C.
Northern Engineering Works, Detroit, Mich.
Richards-Wilcox Mfg. Co., Aurora, Ill.
Whiting Corporation, Harvey, Ill.

CRANES—Locomotive
Brown Hoisting Machry. Co., Cleveland, O.
Browning Co., Cleveland, O.
Byers Machine Co., The, Ravenna, O.
Industrial Works, Bay City, Mich.
Link-Belt Co., Chicago, Ill.
McMyler Interstate Co., The, Cleveland, O.
Ohio Locomotive Crane Co., Bucyrus, O.
Orton & Steinbrenner Co., Chicago, Ill.

CRANES—Portable
Beatty Machine & Mfg. Co., Hammond, Ind.
Canton Fdry. & Mach. Co., Canton, O.

CRANES—Steam, Wire Cleaning
Vaughn Machry. Co., Cuyahoga Falls, O.

CRANES—Wall
Champion Engrg. Co., Kenton, Ohio.
N. J. Fdry. Mach. Co., 90 West St., N. Y. C.

CRANK SHAFTS
Bethlehem Steel Company, Sc. Bethlehem, Pa.
Landis Tool Co., Waynesboro, Pa.
Standard Gauge Steel Co., Beaver Falls, Pa.
Union Switch & Signal Co., Swissvale, Pa.

CROSS ARMS—Creosoted
Jennison-Wright Co., Toledo, O.

CRUCIBLES—Metallurgical
McCullough-Dalzell Crucible Co., Pittsburgh, Pa.

CRUCIBLES—Platinum
Baker & Co., Inc., Newark, N. J.

CUPOLAS—Foundry
Northern Engineering Works, Detroit, Mich.
Paxson, J. W., Co., Philadelphia, Pa.
Whiting Corporation, Harvey, Ill.

CUTTERS—Bolt
Landis Mach. Co., Waynesboro, Pa.
National Machry. Co., Tiffin, O.

CUTTERS—Gear
Whitton, D. E., Mach. Co., New London, Ct.

CUTTERS—Key Seating
Whitney Mfg. Co., Hartford, Ct.

CUTTERS—Milling
Alvord Reamer & Tool Co., Millersburg, Pa.
Brown & Sharpe Mfg. Co., Providence, R. I.
Cowles Tool Co., Cleveland, O.
Lovejoy Tool Co., Inc., Springfield, Vt.
Morse Twist Drill & Machine Co., New Bedford, Mass.
National Pipe Bevel & Tool Co., Detroit, Mich.
Pratt & Whitney Co., 111 Broadway, N. Y. C.
Reed Prentice Co., Worcester, Mass.
Wayne Tool Mfg. Co., Waynesboro, Pa.

CUTTING AND WELDING APPARATUS—Oxy-Acetylene—See Welding and Cutting Apparatus and Supplies

CUTTING COMPOUNDS
Cudahy Chemical Co., 22 Thames St., N. Y. C.

CUTTING-OFF MACHINES—Cold Saw
Automatic Machine Co., Bridgeport, Ct.
Pierce Tool Machine Works, Conshohocken, Pa.
Newton Mach. Tool Plant of Consolidated Mach. Tool Corp. of Amer., 17 E. 42d St., N. Y. C.
Vandyck-Churchill Co., 52 Vesey St., N. Y. C.

SEE ADVERTISEMENTS FOR COMPLETE INFORMATION. ALPHABETICAL INDEX—PAGES 222-224.

CUTTING-OFF MACHINES—Pipe
Bignall & Keeler Mach. Works, Edwardsville, Ill.
Etna Machine Co., Toledo, O.

CYLINDERS—Compressed Air, Gas, Etc.
Janney, Steinmetz & Co., Philadelphia, Pa.
National Tube Co., Pittsburgh, Pa.
Whitlock, Wm. J. & Co., Inc., 30 Church Street, New York City.

DERRICKS
Bedford Fdry. & Mach. Co., Bedford, Ind.
Byers Machine Co., The, Ravenna, O.
Electric Hoist & Derrick Co., Bay Ridge, Long Island, Pa.
Mundy, J. S., Holsting Engine Co., Newark, N. J.

DIAMOND TOOLS
Desmond-Stephan Mfg. Co., Urbana, O.
Dickinson, Thos. L., 34 Gold St., N. Y. C.

DIAMONDS—Carbon and Bortz (Importers)
Desmond Stephan Mfg. Co., Urbana, O.

DIE BLOCKS
Bethlehem Steel Co., So. Bethlehem, Pa.
Heppenstall Forge & Knife Co., Pitts. Pa.
Ward's, Edgar T., Sons Co., Boston, Mass.
Wetherell Bros. Co., Cambridge 39, Mass.

DIE SINKING MACHINES
Pratt & Whitney Co., 111 Broadway, N. Y. C.
Walcott Lathe Co., Jackson, Mich.

DIES—Bolt Threading
Curtis & Curtis Co., Bridgeport, Ct.
Pratt & Whitney Co., 111 Broadway, N. Y. C.

DIES—Drop Forging
Bethlehem Steel Company, So. Bethlehem, Pa.

DIES—Embossing and Stamping
Heggson & Pettis Mfg. Co., New Haven, Ct.
Schwerdtle Stamp Co., Bridgeport, Ct.

DIES—Gripping and Heading
Marchant, Geo. F., Co., Chicago, Ill.

DIES—Pipe Threading
Bignall & Keeler Mch. Wks., Edwardsville, Ill.
Curtis & Curtis Co., Bridgeport, Ct.
Pratt & Whitney Co., 111 Broadway, N. Y. C.

DIES—Screw and Thread Cutting
Eastern Machine Screw Corp., New Haven, Ct.
Jones & Lamson Machine Co., Springfield, Vt.
Landis Machine Co., Waynesboro, Pa.
National Acme Co., Cleveland, O.
Pratt & Whitney Co., 111 Broadway, N. Y. C.

DIES—Self-Opening Adjustable
Eastern Machine Screw Corp., New Haven, Ct.
Jones & Lamson Machine Co., Springfield, Vt.

DIES—Sheet Metal Working
Adriance Machine Works, Inc., Brooklyn, N. Y.
Beaver Mch. & Tool Co., Newark, N. J.
Bliss, E. W., Co., Brooklyn, N. Y.
Blodgett Engineering & Tool Co., Detroit, Mich.
Cleveland Punch & Shear Wks. Co., Cleve., O.
Ferracute Machine Co., Bridgeton, N. J.
New England Pressed Steel Co., Natick, Mass.
Toledo Mach. & Tool Co., Toledo, O.
V. & O. Press Co., Glendale, L. I., N. Y.
Worcester Stamped Metal Co., Worcester, Mass.
Zeh & Hahnemann Co., Newark, N. J.

DIES—Steel Letters and Stamps
Heggson & Pettis Mfg. Co., New Haven, Ct.
Matthews, J. H., & Co., Pittsburgh, Pa.

DOLOMITE
Baker, J. E., Company, York, Pa.

DOORS AND SHUTTERS—Steel or Wood Rolling
Kinnear Mfg. Co., Columbus, O.
Richards-Wilcox Mfg. Co., Aurora, Ill.

DRAWN WORK—Metal—See Stampings or Drawings—Metal

DRIFTS—Drill
Whitman & Barnes Mfg. Co., Akron, Ohio.

DRILLING MACHINES—Bench
Barnes, W. F. & John Co., Rockford, Ill.
Leland-Gifford Co., Worcester, Mass.

DRILLING MACHINES—Bench, Sensitive
Ames, B. C., Company, The, Waltham, Mass.

DRILLING MACHINES—Horizontal
Baker Bros., Toledo, O.

DRILLING MACHINES—Multiple Spindle
Baker Bros., Toledo, O.
Barnes Drill Co., Rockford, Ill.
Baush Machine Tool Co., Springfield, Mass.
Colburn Mch. Tool Plant of Consolidated Mch. Tool Corp. of Amer., 17 E. 42d St., N. Y. C.
National Acme Co., Cleveland, O.
Newton Mach. Tool Plant of Consolidated Mach. Tool Corp. of Amer., 17 E. 42d St., N. Y. C.

DRILLING MACHINES — Multiple Spindle, Adjustable
Barnes, W. F. & John Co., Rockford, Ill.
Pratt & Whitney Co., 111 Broadway, N. Y. C.

DRILLING MACHINES — Multiple Spindle, Vertical
Niles-Bement-Pond Co., 111 B'way, N. Y. C.

DRILLING MACHINES—Portable
Cleveland Punch & Shear Wks. Co., Cleve., O.

DRILLING MACHINES—Portable Electric
Chicago Pneumatic Tool Co., 6 E. 44th St., New York City.
Independent Pneumatic Tool Co., Chicago, Ill.
Nels & Steele Lockstitch Tool Co., Cincinnati, O.

DRILLING MACHINES—Portable Pneumatic
Chicago Pneumatic Tool Co., 6 E. 44th St., New York City.
Cleveland Pneumatic Tool Co., Cleveland, O.
Independent Pneumatic Tool Co., Chicago, Ill.

DRILLING MACHINES—Radial
American Tool Works Co., Cincinnati, O.
Cincinnati Bickford Tool Co., Cincinnati, O.
Cleveland Punch & Shear Wks. Co., Cleve., O.
Dreses Machine Tool Co., Cincinnati, O.
Harrington, E., Son & Co., Inc., Phila., Pa.
Morris Machine Tool Co., Cincinnati, O.
Niles-Bement-Pond Co., 111 B'way, N. Y. C.
Ryerson, Joseph T., & Son, Chicago, Ill.
Taylor & Fenn Co., Hartford, Ct.

DRILLING MACHINES—Rock
Chicago Pneumatic Tool Co., 6 E. 44th St., New York City.
General Electric Co., Schenectady, N. Y.
Sullivan Machinery Co., Chicago, Ill.

DRILLING MACHINES—Second Hand
Harris Bros. Co., Chicago, Ill.
New York Mchy. Exch., 50 Church St., N. Y. C.

DRILLING MACHINES—Sensitive
Leland-Gifford Co., Worcester, Mass.
Royersford Foundry & Mach. Co., Inc., Royersford, Pa.
Taylor & Fenn Co., Hartford, Ct.
Triplex Machine Tool Corp., 18 E. 41st St., New York City.

DRILLING MACHINES—Vertical
Baker Bros., Toledo, O.
Barnes Drill Co., Rockford, Ill.
Buffalo Forge Co., Buffalo, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
Cincinnati Bickford Tool Co., Cincinnati, O.
Harrington, E., Son & Co., Inc., Phila., Pa.
McCabe, J. J., Lathe & Mchry. Corp., 149 Broadway, New York City.
McCabe & Sheeran Machinery Corp., Room 482, 50 Church St., New York City.
Niles-Bement-Pond Co., 111 B'way, N. Y. C.
Prentiss, Henry, & Co., Inc., 149 B'way, N.Y.C.
Ryerson, Joseph T., & Son, Chicago, Ill.

DRILLS—Center
Whitman & Barnes Mfg. Co., Akron, Ohio.

DRILLS—Ratchet
Armstrong Bros. Tool Co., Chicago, Ill.
Pratt & Whitney Co., 111 B'way, N. Y. C.
Whitman & Barnes Mfg. Co., Akron, Ohio.

DROP FORGINGS—See Forgings

DROP HAMMERS—See Hammers, Drop

DROP PRESSES—See Presses, Drop

DRYERS FOR ALL MATERIAL
Bonnot Company, The, Canton, O.
Duff Patents Co., Inc., Pittsburgh, Pa.
McGann Mfg. Company, Inc., York, Pa.

DRYERS—Vacuum
Buffalo Foundry & Machine Co., 1545 Fillmore Ave., Buffalo, N. Y.

DURALUMIN
Baush Machine Tool Co., Springfield, Mass.

DUST COLLECTORS
Knickerbocker Co., Jackson, Mich.
Northern Blower Co., Cleveland, O.
Sly, W. W., Mfg. Company, Cleveland, O.
Sterling Blower Co., Hartford, Ct.

ELECTRIC WELDING—See Welding, Electric

ELECTRICAL EQUIPMENT
General Electric Co., Schenectady, N. Y.

ELECTRICAL MACHINERY—Second Hand
Gregory Electric Co., Chicago, Ill.
Niles-Bement-Pond Co., Inc., Woolworth Bldg., New York City.
Power Mchry. Exch., Inc., Jersey City, N. J.
Sachsenmaier, Geo., Co., Philadelphia, Pa.

ELECTRICAL WIRES
American Steel & Wire Co., Chicago, Ill.

ELEVATOR GUIDES
Fitzsimons Co., Youngstown, O.
Standard Gauge Steel Co., Beaver Falls, Pa.

ELEVATORS—Steam Hydraulic
Ridgway, Craig & Son Co., Contesville, Pa.

EMERY WHEELS—See Grinding Wheels

ENAMEL BURNING SUPPORTS
Calorizing Co. of Pittsburgh, Pittsburgh, Pa.
Electro Alloys Co., Elyria, O.

ENAMELING
American Forging & Socket Co., Pontiac, Mich.
Geuder, Paeschke & Frey Co., (Contract Mfg. Division), Milwaukee, Wis.

END MILLS
Cowles Tool Co., Cleveland, O.

ENGINEERS—Consulting
Bedaux, Chas. E., Co., Cleveland, O.
Chase, Frank D., Inc., Chicago, Ill.
Day & Zimmermann Inc., Philadelphia, Pa.
Ewes, Frank J., Pittsburgh, Pa.
Freyn, Brassert & Co., Chicago, Ill.
Gathmann Engineering Co., Baltimore, Md.
Lange, G. M., Company, Inc., Detroit, Mich.
McKee, Arthur G., & Co., Cleveland, O.
Moore, W. E., & Co., Pittsburgh, Pa.
Perin, C. P.—S. M. Marshall, 1107 B'way, N.Y.

ENGINEERS—Foundry
Chase, Frank D., Inc., Chicago, Ill.
Lane, H. M., Company, Detroit, Mich.

ENGINEERS—Heat Treating
American Industrial Furnace Corp., Boston, Mass.
Wayne Tank & Pump Co., Ft. Wayne, Ind.

ENGINEERS—Metallurgical
Gathmann Engineering Co., Baltimore, Md.

ENGINEERS AND CONTRACTORS
Austin Co., Cleveland, O.
Bedaux, Chas. E., Co., Cleveland, O.
Bonnot Company, The, Canton, O.
Booth Electric Furnace Co., Chicago, Ill.
Chase, Frank D., Inc., Chicago, Ill.
Day & Zimmermann, Inc., Philadelphia, Pa.
Fuller Engineering Co., Fullerton, Pa.
Kennedy, Julian, Pittsburgh, Pa.
Laughlin, Alex., & Co., Pittsburgh, Pa.
McKee, Arthur G., & Co., Cleveland, O.
Moore, W. E., & Co., Pittsburgh, Pa.
Pennsylvania Engg. Works, New Castle, Pa.
Raymond Bros. Engrg. Co., Chicago, Ill.
Smythe, S. R., Co., Pittsburgh, Pa.
Swindell, W., & Bros., Pittsburgh, Pa.

ENGINES—Blowing
Mesta Machine Co., Pittsburgh, Pa.

ENGINES—Corliss
Mesta Machine Co., Pittsburgh, Pa.
Nordberg Mfg. Co., Milwaukee, Wis.

ENGINES—Gas and Gasoline
Chicago Pneumatic Tool Co., 6 E. 44th Street, New York City.
Lycoming Motors Corp., Williamsport, Pa.
Mesta Mach. Co., Pittsburgh, Pa.
National Transit Pump & Mach. Co., Oil City, Pa.

ENGINES—Oil
Chicago Pneumatic Tool Co., 6 E. 44th Street, New York City.
De La Vergne Machine Co., 2106 East 138th St., New York City.
National Transit Pump & Mach. Co., Oil City, Pa.
Nordberg Mfg. Co., Milwaukee, Wis.

ENGINES—Poppet—Uniflow
Nordberg Mfg. Co., Milwaukee, Wis.

ENGINES—Second Hand
Archer & Baldwin, Inc., 114 Liberty St., N.Y.C.
Bath, Cyril J., & Co., Cleveland, Ohio.
Harris Bros. Co., Chicago, Ill.
Pfaehmueller Eng. Co., Chicago, Ill.
Schultz, A. L., & Son, Chicago, Ill.
Washington Co., 39 Cortlandt St., N. Y. C.
Wickes Machry. Co., Jersey City, N. J.

ENGINES—Steam
Dake Engine Company, Grand Haven, Mich.
Erie City Iron Works, Erie, Pa.
Stumpf Una-Flow Engine Company, Inc., Syracuse, N. Y.
Troy Engine & Mach. Co., Troy, Pa.

ENGINES—Steam (Una Flow Type)
Mesta Machine Co., Pittsburgh, Pa.
Stumpf Una-Flow Engine Company, Inc., Syracuse, N. Y.

EXHAUST HEADS
Sterling Blower Co., Hartford, Ct.

EXHAUSTERS—Gas
Connersville Blower Co., Connersville, Ind.
Roots, P. H. & F. M., Co., Connersville, Ind.
Spencer Turbine Co., Hartford, Ct.

EXPORTERS
Phillips, F. R., & Sons Co., Philadelphia, Pa.

EYE PROTECTION GLASSES
Safety Equipment Service Co., Cleveland, O.

EYELET MACHINES
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

FACING HEADS
Mummert-Dixon Co., Hanover, Pa.

FACTORY CONSTRUCTION
Austin Co., Cleveland, O.

FACTORY AND PLANT SITES
Alabama Power Co., Birmingham, Ala.
Martien, Wm., & Co., Baltimore, Md.

FANS—Exhaust
Buffalo Forge Co., Buffalo, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
General Electric Co., Schenectady, N. Y.
Skinner Bros. Mfg. Co., Inc., St. Louis, Mo.
Sturtevant, B. F., Co., Hyde Park, Mass.

FASTENERS—Corrugated
Cary Mfg. Co., Brooklyn, N. Y.

SEE ADVERTISEMENTS FOR COMPLETE INFORMATION. ALPHABETICAL INDEX—PAGES 222-224.

AND PURIFIERS

P—Cast

Wool Mechanical
Brooklyn N. Y.

FENCES—Chain Link Wire
St. N. Y. C.

FENCES—Woven Wire
Wire Co., Chicago, Ill.

FENCING—Woven
Page Steel & Wire Co., Bridgeport, Ct.

FERRO ALLOYS—Chromium
Co., Baltimore, Md.
Ohio
30
New York City
Pittsburgh, Pa.
O.
Samuel, Frank, Philadelphia, Pa.
U. S. Ferro Alloys Corp., 39 E. 42d St., N.Y.C.

FERRO ALLOYS—Manganese
N. Bethlehem Pa
E. 40th St., N. Y. C.
Electro Metallurgical Sales Corporation, 30 East 42d Street, New York City
Pittsburgh, Pa.
International Fuel & Iron Corp., Pittsburgh, Pa.
Iron Trade Products Co., Pittsburgh, Pa.
Lenzlt, C. W., & Co., 30 Church St., N. Y. C.
Cincinnati, O.
Samuel, Frank, Philadelphia, Pa.

FERRO ALLOYS—Molybdenum
Lavino, E. J., & Co., Philadelphia, Pa.

FERRO ALLOYS—Silico Manganese
Pittsburgh, Pa.
Chattanooga, Tenn.
U. S. Ferro Alloys Corp., 39 E. 42d St., N.Y.C.

FERRO ALLOYS—Silicon
Baltimore Electro Alloys Co., Baltimore, Md.
Crocker Brothers, 21 E. 40th St., N. Y. C.
Electro Metallurgical Sales Corporation, 30 East 42d Street, New York City
Pittsburgh, Pa.
International Fuel & Iron Corp., Pittsburgh, Pa.
Electro Metals Co., Chicago, Ill
Philadelphia, Pa.
Pittsburgh Metallurgical Co., Niagara Falls, N. Y.
Cincinnati, O.
Samuel, Frank, Philadelphia, Pa.
Chattanooga Tenn
U. S. Ferro Alloys Corp., 39 E. 42d St., N.Y.C.

FERRO ALLOYS—Spiegeleisen
Crocker Brothers, 21 E. 40th St., N. Y. C.
Rogers, Brown & Co., Cincinnati, O.

FERRO ALLOYS—Titanium
N. Y. C.
Titanium Alloy Mfg. Co., Niagara Falls, N. Y.

FERRO ALLOYS—Tungsten
Lavino, E. J., & Co., Philadelphia, Pa.

FERRO ALLOYS—Uranium
Standard Alloys Co., Pittsburgh, Pa.

FERRO ALLOYS—Vanadium
Lavino, E. J., & Co., Philadelphia, Pa.
Standard Alloys Co., Pittsburgh, Pa.

FERRULES
Cleveland Punch & Shear Wks. Co., Cleve., O.
Mass.
Mfg. Co., Keene, N. Y.

FIBRE AND FIBRE PRODUCTS—Hard
Wil-
bur

FILES AND RASPS
Disston, Henry, & Sons, Inc., Philadelphia, Pa.
Mass.

FILES—Precision
116
Trumbull St., Elizabeth, N. J.

FILTER CLOTH—Metal
Mc.

FILTERING AND CIRCULATING SYSTEMS—Oil
1921

FILTERS—Oil
1921

FILTERS—Pressure or Gravity
Scaife, Wm. B., & Sons Co., Pittsburgh, Pa.

FIRE CLAY
Crescent Refractories Co., Conemaugh, Pa.
International Fuel & Iron Corp., Pittsburgh, Pa.
Ironton Fire Brick Co., Ironton, O.
Lock
U. S. Refractories Corp., Mt. Union, Pa.

FITTINGS—Hydraulic
Hydraulic Press Mfg. Co., Mount Gilead, O.
Southwark Fdry. & Mch. Co., Phila., Pa.
Watson-Stillman Co., 190 Fulton St., N. Y. C.

FITTINGS—Steam and Gas Pipe
Phila., Pa.

FLANGED AND DISHED HEADS
Wash Steel Company, Claymont, Delaware.

FLANGES
Phila., Pa.
Cann & Saul Steel Co., Inc., Philadelphia, Pa.
Mass.
Philadelphia Steel & Iron Co., Phila., Pa.

FLASKS—Foundry
Diamond Clamp & Flask Co., Richmond, Ind.
Wis.

FLOATS—Seamless Copper
Naugatuck Mfg. Co., Naugatuck, Ct.

FLOORING—Creosoted Wood
Johnson Wright Co., Toledo, O.
Republic Creosoting Co., Indianapolis, Ind.

FLOORING—Metallic, Ventilating
Iron Works Co., Long Island City, N. Y

FLUORSPAR
Hillside Fluor Spar Mines, Chicago, Ill.
Lavino, E. J., & Co., Philadelphia, Pa.
Rogers, Brown & Co., Cincinnati, O.

FORGES—Rivet
Buffalo Forge Co., Buffalo, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
Mahr Mfg. Co., Minneapolis, Minn.
Wayne Tank & Pump Co., Ft. Wayne, Ind.

FORGING MACHINES
Long & Allstatter Co., Hamilton, O.
National Machinery Co., Tiffin, O.
Stokvis, R. S., & Sons, Inc., 17 Battery Place, N. Y. C.

FORGINGS—Alloy Steel
Bethlehem Steel Co., So. Bethlehem, Pa.
Cann & Saul Steel Co., Inc., Philadelphia, Pa.
Endicott Eng. & Mfg. Co., Inc., Endicott, N. Y.
Mesta Machine Co., Pittsburgh, Pa.
Schuylkill Forge Co., Philadelphia, Pa.

FORGINGS—Brass, Bronze or Copper
Harvey Electric Co., Chicago, Ill.
Rome Mfg. Company, Rome, N. Y.

FORGINGS—Drop, Iron or Steel
Akron, Steel Co., Akron, O.
American Forging & Socket Co., Pontiac, Mich.
Baldt Anchor & Chain Co., Chester, Pa.
Bethlehem Steel Co., So. Bethlehem, Pa.
Brooke Engine Wks., Mch. Co., The, York, Pa.
Cann & Saul Steel Co., Inc., Philadelphia, Pa.
Canton Forge & Axle Co., Canton, O.
Champion Machine & Forging Co., Cleve., O.
Clapp, E. D., Mfg. Co., Auburn, N. Y.
Cleveland Hardware Co., The, Cleveland, O.
Commercial Drop Forge Co., Warren, Pa.
Drop Forging Co. of New York, J. C., N. J
Eccles, Richard, Co., Auburn, N. Y.
Endicott Frg. & Mfg. Co., Inc., Endicott, N. Y.
Gedney Engine Co., Buffalo, N. Y.
Heppenstall Forge & Knife Co., Pittsburgh, Pa.
Indianapolis Drop Forging Co., Indianapolis
Janney, Steinmetz & Co., Philadelphia, Pa.
Kilborn & Bishop Co., New Haven, Ct.
Kropp Forge Company, Chicago, Ill.
Lacledе Steel Co., St. Louis, Mo.
McConway & Torley Co., Pittsburgh, Pa.
Melling Forging Co., Lansing, Mich.
Mesta Mach. Co., Pittsburgh, Pa.
Midwest Forge & Steel Co., East St. Louis, Ill.
National Forge & Tool Co., Irvine, Pa.
Oliver Iron & Steel Co., Pittsburgh, Pa.
Philadelphia Steel & Iron Co., Phila., Pa.
Pittsburgh Knife & Forge Co., Pittsburgh, Pa.
Rhode Island Tool Co., Providence, R. I.
Richmond Forge Corp. (Acca), Richmond, Va
Schuylkill Forge Co., Philadelphia, Pa.
Scranton Forging Co., Scranton, Pa.
Storms Drop Forging Co., East Springfield, Mass.
Newark, N. J.
Tioga Steel & Iron Co., Philadelphia, Pa.
Edgar & Williams Steel Forging Corp., Akron
Signal Co., Swissvale, Pa
Marion, Ind
Wilcox, Crittenden & Co., Inc., Middletown, Ct.
Williams Mfg. Co., Mechanicsburg, Pa.
Williams, J. H., & Co., 57 Richards Street, Brooklyn, N. Y

FORGINGS—Duralumin
Baush Machine Tool Co., Springfield, Mass.

FORGINGS—Hollow
Page & Pipe Bending Co., Harrisburg, Pa.
Janney, Steinmetz & Co., Philadelphia, Pa.

FORGINGS—Hydraulic Press, Iron or Steel
Bethlehem Steel Co., So. Bethlehem, Pa.
Ohio.
Janney, Steinmetz & Co., Philadelphia, Pa.
Machine Co., Pittsburgh, Pa.
Tioga Steel & Iron Co., Philadelphia, Pa.

FORMS—Steel For Concrete Construction
Blaw-Knox Co., Pittsburgh, Pa.

FOUNDRY EQUIPMENT AND SUPPLIES
American Foundry Equipment Co., Marlin-Rockwell Bldg., New York City.
Beardsley-Piper Co., Chicago, Ill.
44th St., New York City.
Clifton-Pratt Co., Cincinnati, O.
Ind
Electric Welding Machine Co., Detroit, Mich.
Grimes Molding Mch. Co., Detroit, Mich.
Ill.
Northern Blower Co., Cleveland, O.
Mich.
Paxson, J. W., Co., Philadelphia, Pa.
Pettinos, George E., Philadelphia, Pa.
Ct.
Sly W. W. Mfg. Company, Cleveland, O.
Whiting Corporation, Harvey, Ill.

FRAMES—Automobile and Truck
Sharon Pressed Steel Co., Sharon, Pa.

FRAMES—Rudder and Stern
Mesta Machine Co., Pittsburgh, Pa.

FROGS—Railway
Bethlehem Steel Co., So. Bethlehem, Pa.
Cincinnati Frog & Switch Co., Oakley, Cincinnati, O

FURNACE APPLIANCES—Water Cooled
Blaw-Knox Co., Pittsburgh, Pa.

FURNACE SYSTEMS—Open Hearth
Blaw-Knox Co., Pittsburgh, Pa.

FURNACES—Billet or Ingot Heating
Ferguson Furnace Co., Toledo, O.
Swindell W. & Bros., Pittsburgh Pa.
Tate-Jones & Co., Inc., Pittsburgh, Pa.

FURNACES—Blast
Freyn, Brassert & Co., Chicago, Ill.
McKee, Arthur G., & Co., Cleveland, O.
Pennsylvania Engrg. Works, New Castle, Pa
Riter-Conley Company, Pittsburgh, Pa.
Smythe, S. R., Co., Pittsburgh, Pa.

FURNACES—Crucible
American Gas Furnace Co., Elizabeth, N. J.
Swindell W. & Bros., Pittsburgh, Pa.
Wayne Tank & Pump Co., Ft. Wayne, Ind.

FURNACES—Electric Steel Melting
Booth Electric Furnace Co., Chicago, Ill.
Detroit Electric Furnace Co., Detroit, Mich.
Electric Furnace Construction Co., Pittsburgh, Pa
General Electric Co., Schenectady, N. Y.
Pittsburgh Electric Furnace Corp., Pittsburgh, Pa
Swindell, W., & Bros., Pittsburgh, Pa.

FURNACES—Forging
American Gas Furnace Co., Elizabeth, N. J.
Anthony Co., The, Long Island City, N. Y
Chicago Flexible Shaft Co., Chicago, Ill.
Ferguson Furnace Co., Toledo, O.
Fuller Engineering Co., Fullerton, Pa.
Goodenow, F. J., Furnace Co., Detroit, Mich.
Rockwell, W. S., Co., 50 Church St., N. Y. C.
Swindell W. & Bros., Pittsburgh, Pa.
Tate-Jones & Co., Inc., Pittsburgh, Pa.
Wayne Tank & Pump Co., Ft. Wayne, Ind.

FURNACES—Heat Treating, Automatic
Ferguson Furnace Co., Toledo, Ohio.
Rockwell, W. S., Co., 50 Church St., N. Y. C.

FURNACES—Heat Treating, Cyanide or Lead
American Gas Furnace Co., Elizabeth, N. J.
Bellevue Industrial Furnace Co., Detroit Mich.
Chicago Flexible Shaft Co., Chicago, Ill.
Ferguson Furnace Co., Toledo, O.
Wayne Tank & Pump Co., Ft. Wayne, Ind.

FURNACES—Heat Treating, Electric
American Car & Fdry. Co., 165 B'way, N. Y. C.
Electric Furnace Construction Co., Pittsburgh, Pa
General Electric Co., Schenectady, N. Y.
Hagan, Geo. J., Co., Pittsburgh, Pa.
Holcroft & Company, Detroit, Mich.
Hoskins Mfg. Co., Detroit, Mich.
Rockwell, W. S., Co., 50 Church St., N. Y. C.
Swindell, W., & Bros., Pittsburgh, Pa.

FURNACES—Heat Treating, Oil, Gas or Coal Fired
Advance Furnace & Engrg. Co., Springfield Mass.
American Gas Furnace Co., Elizabeth N. J.
American Indus. Furnace Corp., Boston, Mass.
Anthony Company, The, Long Island City, N. Y
Bauch Mach. Tool Co., Springfield, Mass.
Bellevue Industrial Furnace Co., Detroit, Mich
Best W. N. Furnace & Burner Corp., 11 B'way, New York City.
Chicago Flexible Shaft Co., Chicago, Ill.
Economy Furnace Co., The, Chicopee, Mass
Ferguson Furnace Co., Toledo, O.
Fuller Engineering Co., Fullerton, Pa.
Goodenow, F. J., Furnace Co., Detroit, Mich.
Mahr Mfg. Co., Minneapolis, Minn.
Rockwell, W. S., Co., 50 Church St., N. Y. C.
Smythe, S. R., Co., Pittsburgh, Pa.
Surface Combustion Co., 366-368 Gerard Ave., Bronx, N. Y.
Swindell W. & Bros., Pittsburgh, Pa.
Tate-Jones & Co., Inc., Pittsburgh, Pa
Wayne Tank & Pump Co., Ft. Wayne, Ind

FURNACES—High-Speed Steel
American Gas Furnace Co., Elizabeth, N. J.
Chicago Flexible Shaft Co., Chicago, Ill.
Ferguson Furnace Co., Toledo, O.
Swindell, W., & Bros., Pittsburgh, Pa.

SEE ADVERTISEMENTS FOR COMPLETE INFORMATION. ALPHABETICAL INDEX—PAGES 222-224.

FURNACES—Industrial Heating
Skinner Bros. Mfg. Co., Inc., St. Louis, Mo.

FURNACES—Non-Ferrous Melting
American Gas Furnace Co., Elizabeth, N. J.
Detroit Electric Furnace Co., Detroit, Mich.
Electric Furnace Construction Co., Philia., Pa.
Ingwer-Brown Draft Furnace Co., Easton, Pa.
Pittsburgh Electric Furnace Corp., Pitts., Pa.

FURNACES—Open Hearth
Howcraft & Company, Detroit, Mich.
McKee, Arthur G. & Co., Cleveland, O.
Swindell, W. & Bros., Pittsburgh, Pa.

FURNACES—Powdered Coal Burning
Raymond Bros. Engrg. Co., Chicago, Ill.

FURNACES—Rivet Heating
General Electric Co., Schenectady, N. Y.

FURNACES—Wire, Annealing & Galvanizing
General Electric Co., Schenectady, N. Y.
Vaughn Mchry. Co., Cuyahoga Falls, Ohio.

GALVANIZING
Federal Signal Co., Albany, N. Y.
Gilbert & Barker Mfg. Co., Springfield, Mass.
Hanlon-Gregory Galvanizing Co., Pittsburgh, Pa.
Meaker Galvanizing Co., Chicago, Ill.

GALVANIZING PLANTS
Erie Foundry Company, Erie, Pa.
Meaker Galvanizing Co., Chicago, Ill.
United Engrg. & Fdry. Co., Pittsburgh, Pa.

GALVANIZING & TINNING EQUIPMENT —Wire
Vaughn Mchry. Co., Cuyahoga Falls, Ohio.

GAS CLEANING PLANTS
Flinn & Dreffein Co., Chicago, Ill.
McKee, Arthur G. & Co., Cleveland, O.
Smith Gas Engineering Co., Dayton, O.

GAS HOLDERS
Cruse-Kemper Co., Ambler, Pa.

GAS PRODUCERS
Blaw-Knox Co., Pittsburgh, Pa.
Chapman Engrg. Co., Division of the C. & G. Cooper Co., Mt. Vernon, O.
Dorr Patents Co., Inc., Pittsburgh, Pa.
Flinn & Dreffein Co., Chicago, Ill.
Gas Producer & Engrg. Corp. of N. J., 115 Broad St., New York City.
Hagan, Geo. J., Co., Pittsburgh, Pa.
Laughlin, Alex., & Co., Pittsburgh, Pa.
Morgan Construction Co., Worcester, Mass.
Smythe, S. R., Co., Pittsburgh, Pa.
Swindell, W., & Bros., Pittsburgh, Pa.
U. S. Cast Iron Pipe & Fdry. Co., Burlington, N. J.
Wood, R. D., & Co., Philadelphia, Pa.

GASKET MAKING MACHINES
V. & O. Press Co., Ginedale, Long Island, N.Y.

GASKETS—Felt
Booth Felt Co., Inc., Brooklyn, N. Y.

GASOLINE
Empire Refineries, Inc., Tulsa, Okla.
Swan & Zook, Bradford, Pa.

GATES—Blast
Rockwell, W. S., Co., 50 Church St., N. Y. C.
Roots, P. H. & F. M., Co., Connersville, Ind.

GATES—Fence
American Steel & Wire Co., Chicago, Ill.
Anchor Post Iron Wks., 52 Church St., N. Y. C.

GAUGES—Dial
Ames, B. C., Company, The, Waltham, Mass.
Horstmann, F. W., Co., Irvington, N. J.

GAUGES—Pressure and Vacuum
Marshalltown Mfg. Co., Marshalltown, Iowa.
Precision Instrument Co., Newark, N. J.
Taylor Instrument Companies, Rochester, N. Y.
Watson-Stillman Co., 190 Fulton St., N. Y. C.

GAUGES—Snap, Thread, Cylindrical, Etc.
Pratt & Whitney Co., 111 Broadway, N. Y. C.
Starrett, L. S., Co., Athol, Mass.

GAUGES—Thread Lead
Jones & Lamson Machine Co., Springfield, Vt.

GEAR CUTTING
Acme Gear Co., Philadelphia, Pa.
Akron Gear & Engineering Co., Akron, O.
Albaugh-Dover Co., Chicago, Ill.
Albro-Clem Elevator Co., Philadelphia, Pa.
Beatty Machine & Mfg. Co., Hammond, Ind.
Caldwell, H. W., & Son Co., Chicago, Ill.
Connecticut Gears, Inc., Waterbury, Conn.
Cresson-Morris Co., Philadelphia, Pa.
Earle Gear & Machine Co., Philadelphia, Pa.
Gleason Works, Rochester, N. Y.
Hindley Gear Co., Philadelphia, Pa.
Horsburgh & Scott Co., Cleveland, O.
Jones, W. A., Fdry. & Mch. Co., 4434 West Roosevelt Road, Chicago, Ill.
Lehigh Gear & Machine Works, Lebanon, Pa.
Link-Belt Co., Chicago, Ill.
Moessebach-Cutucci Mfg. Co., Inc., Newark, N. J.
Michigan Gear & Engrg. Co., Detroit, Mich.
Morse Construction Co., Worcester, Mass.
Nic. Bement-Pond Co., 111 Broadway, N. Y. C.
Nilson-Miller Corp., Hoboken, N. J.
Pittsburgh Gear Works, Philadelphia, Pa.
Pittsburgh Rivet Co., Pittsburgh, Pa.
Sier-Bath Company, 143 W. 54th St., N. Y. C.
Standard Safety Equipment Co., Hoboken, N. J.
Van Dorn & Dutton Co., Cleveland, O.

GEAR CUTTING MACHINES
Gleason Works, Rochester, New York.
Gould & Eberhardt, Newark, N. J.
Morey & Co., Inc., 410 Broome St., N. Y. C.
Newark Gear Cutting Mch. Co., Newark, N. J.
New York Machry. Ex., 50 Church St., N.Y.C.

GEAR HOBBING MACHINES
Barber-Colman Co., Rockford, Ill.
Gould & Eberhardt, Newark, N. J.
Morey & Co., Inc., 410 Broome St., N. Y. C.
Newark Gear Cutting Mch. Co., Newark, N. J.
New York Machry. Ex., 50 Church St., N.Y.C.

GEAR PLANING MACHINES
Gleason Works, Rochester, N. Y.

GEARS—Bevel
Acme Gear Co., Philadelphia, Pa.
Earle Gear & Machine Co., Philadelphia, Pa.
Fawcus Machine Co., Pittsburgh, Pa.
Horsburgh & Scott Co., Cleveland, O.
Jones, W. A., Fdry. & Mch. Co., 4434 West Roosevelt Road, Chicago, Ill.
Mesta Mach. Co., Pittsburgh, Pa.
Philadelphia Gear Works, Philadelphia, Pa.
Van Dorn & Dutton Co., Cleveland, O.

GEARS—Double Helical Cut
De Laval Steam Turbine Co., Trenton, N. J.
Fawcus Machine Co., Pittsburgh, Pa.
Kerr Turbine Company, Wellsville, N. Y.
Mesta Mach. Co., Pittsburgh, Pa.

GEARS—Enclosed Herringbone Transmission
Fawcus Machine Co., Pittsburgh, Pa.

GEARS—Heat Treated
Nuttall, R. D., Co., Pittsburgh, Pa.

GEARS—Herringbone
Earle Gear & Machine Co., Philadelphia, Pa.
Falk Corp., The, Milwaukee, Wis.
Fawcus Machine Co., Pittsburgh, Pa.
Gleason Works, Rochester, N. Y.
Mesta Mach. Co., Pittsburgh, Pa.
Niles-Bement-Pond Co., 111 B'way, N. Y. C.
Philadelphia Gear Works, Philadelphia, Pa.
United Engrg. & Fdry. Co., Pittsburgh, Pa.
Woodard Mach. Co., Wooster, O.

GEARS—Machine Cut
Earle Gear & Mach. Co., Philadelphia, Pa.
Jones, W. A., Fdry. & Mch. Co., 4434 West Roosevelt Road, Chicago, Ill.
Nuttall, R. D., Co., Pittsburgh, Pa.

GEARS—Machine Molded
Jones, W. A., Fdry. & Mch. Co., 4434 West Roosevelt Road, Chicago, Ill.
Mesta Mach. Co., Pittsburgh, Pa.
United Engrg. & Fdry. Co., Pittsburgh, Pa.

GEARS—Non-Metallic
Akron Gear & Engineering Co., Akron, O.
Philadelphia Gear Works, Philadelphia, Pa.
Van Dorn & Dutton Co., Cleveland, O.

GEARS—Rawhide
Albaugh-Dover Co., Chicago, Ill.
Chicago Rawhide Mfg. Co., Chicago, Ill.
Horsburgh & Scott Co., Cleveland, O.
Jones, W. A., Fdry. & Mch. Co., 4434 West Roosevelt Road, Chicago, Ill.
Meachem Gear Corp., Syracuse, N. Y.
Philadelphia Gear Wks., Philadelphia, Pa.
Van Dorn & Dutton Co., Cleveland, O.

GEARS—Speed Reducing
Hindley Gear Co., Philadelphia, Pa.
Jones, W. A., Fdry. & Mch. Co., 4434 West Roosevelt Road, Chicago, Ill.

GEARS—Spur
Connecticut Gears, Inc., Waterbury, Conn.
Earle Gear & Mach. Co., Philadelphia, Pa.
Fawcus Machine Co., Pittsburgh, Pa.
Jones, W. A., Fdry. & Mch. Co., 4434 West Roosevelt Road, Chicago, Ill.
Mesta Mach. Co., Pittsburgh, Pa.
Niles-Bement-Pond Co., 111 B'way, N. Y. C.

GEARS—Worm
Akron Gear & Engineering Co., Akron, O.
Albaugh-Dover Co., Chicago, Ill.
Albro-Clem Elevator Co., Philadelphia, Pa.
Baush Machine Tool Co., Springfield, Mass.
Hindley Gear Co., Philadelphia, Pa.
Horsburgh & Scott Co., Cleveland, Ohio.
Jones, W. A., Fdry. & Mch. Co., 4434 West Roosevelt Road, Chicago, Ill.
Philadelphia Gear Works, Philadelphia, Pa.

GENERATORS—Acetylene
Air Reduction Sales Co., 342 Madison Ave., New York City.
Davis-Bournonville Co., 342 Madison Ave., New York City.
Imperial Brass Mfg. Co., Chicago, Ill.
Milburn, Alexander, Co., Baltimore, Md.

GENERATORS—Electric
Archer & Baldwin, Inc., 114 Liberty St., New York City.
Crocker-Wheeler Co., Ampere, N. J.
Klein, Nathan & Co., Centre & Howard Sts., New York City.
Reliance Electric & Engrg. Co., Cleve., O.

GENERATORS—Electric, Second Hand
Gregory Electric Co., Chicago, Ill.
Harris Brothers Co., Chicago, Ill.
Klein, Nathan & Co., Centre & Howard Sts., New York City.
McCoy-Brandt Machinery Co., Pittsburgh, Pa.
Miller-Owen Electric Co., Inc., Pittsburgh, Pa.
Power Mchry. Exch., Inc., Jersey City, N. J.
Wilson, H. R., Machry. Co., St. Louis, Mo.

GENERATORS—Turbine Driven
Kerr Turbine Company, Wellsville, N. Y.

GLUE HEATERS
Dart, E. M., Mfg. Co., Providence, R. I.

GOGGLES FOR WORKMEN
Hardy, F. A., & Co., Chicago, Ill.
Safety Equipment Service Co., Cleveland, O.

GRAPHITE
Pettinos, George, F., Philadelphia, Pa.

GRATING—Flooring
Irving Iron Wks. Co., Long Island City, N. Y.
Mitchell-Tappen Co., 15-17 John St., N. Y. C.

GREASES
Sun Company, Philadelphia, Pa.

GRINDERS' SPECTACLES
Safety Equipment Service Co., Cleveland, O.

GRINDING AND POLISHING MACHINES
Bridgeport Safety Emery Wheel Co., Inc., Bridgeport, Ct.
Calder, Geo. H., Lancaster, Pa.
Hill-Curtis Co., Kalamazoo, Mich.
Landis Tool Co., Waynesboro, Pa.
Marschke Mfg. Co., Indianapolis, Ind.
Ransom Mfg. Co., Oshkosh, Wis.
Springfield Mfg. Co., Bridgeport, Ct.
Sterling Grinding Wheel Co., Tiffin, O.
Strand, N. A., & Company, Chicago, Ill.

GRINDING MACHINES—Camshaft
Landis Tool Co., Waynesboro, Pa.

GRINDING MACHINES—Cutter and Reamer
Thompson Grinder Co., Springfield, O.
Wilmarth & Morman Co., Grand Rapids, Mich

GRINDING MACHINES—Cylindrical
Brown & Sharpe Mfg. Co., Providence, R. I.
Heald Machine Co., Worcester, Mass.
Landis Tool Co., Waynesboro, Pa.
Modern Tool Plant of Consolidated Mach. Tool Corp. of America., 17 E. 42d St., N. Y. C.
Prentiss, Henry, & Co., 149 Broadway, N. Y.
Wilmarth & Morman Co., Grand Rapids, Mich.

GRINDING MACHINES—Die
Bignall & Keeler Mch. Wks., Edwardsville, Ill.
Wilmarth & Morman Co., Grand Rapids, Mich.

GRINDING MACHINES—Drill
Landis Tool Co., Waynesboro, Pa.
Wilmarth & Morman Co., Grand Rapids, Mich.

GRINDING MACHINES—Flexible Shaft
Strand, N. A., & Company, Chicago, Ill.

GRINDING MACHINES—Internal
Greenfield Tap & Die Corp., Greenfield, Mass.
Heald Machine Co., Worcester, Mass.
Modern Tool Plant of Consolidated Mach. Tool Corp. of America., 17 E. 42d St., N. Y. C.
Prentiss, Henry, & Co., Inc., 149 B'way, N.Y.C.
Rivett Lathe & Grinder Co., Boston, Mass.
Wilmarth & Morman Co., Grand Rapids, Mich.

GRINDING MACHINES—Machine Knives
Bridgeport Safety Emery Wheel Co., Inc., Bridgeport, Ct.

GRINDING MACHINES—Portable Electric
Nott & Smith Electric Tool Co., Cincinnati, O.
Wisconsin Electric Co., Racine, Wis.

GRINDING MACHINES—Portable Pneumatic
Independent Pneumatic Tool Co., Chicago, Ill.

GRINDING MACHINES—Portable, Radial Swing
Mummert-Dixon Co., Hanover, Pa.

GRINDING MACHINES—Second Hand
Harris Bros. Co., Chicago, Ill.
Hill, Clarke & Co., Inc., Boston, Mass.
New York Machry. Ex., 50 Church St., N.Y.C.

GRINDING MACHINES—Surface
Blanchard Mach. Co., Cambridge, Mass.
Bridgeport Safety Emery Wheel Co., Inc. Bridgeport, Ct.
Heald Machine Co., Worcester, Mass.
Wilmarth & Morman Co., Grand Rapids, Mich.

SEE ADVERTISEMENTS FOR COMPLETE INFORMATION. ALPHABETICAL INDEX—PAGES 222-224.

GRINDING MACHINES—Swing Frame
[illegible] Wheel Co., Inc.,
[illegible] Wheel Co., Rochester, Pa

GRINDING MACHINES—Tool
[illegible] Pa
[illegible] Mich

GRINDING MACHINES—Universal
[illegible] Mass.
[illegible] N. Y.
[illegible] Mich

GRINDING MACHINES—Vertical Surface
[illegible] Mass.
[illegible] N. Y. C.
[illegible] Mich.

GRINDING WHEEL DRESSERS AND CUTTERS
Calder, Geo. H., Lancaster, Pa.
Dickinson, Thos. L., 34 Gold St., N. Y. C.

GRINDING WHEEL STANDS—Bench and Floor
Cleveland Punch & Shear Wks. Co., Cleve., O.

GRINDING WHEELS
New York Belting & Packing Co., 91-93 Chambers Street New York City
[illegible] Wheel Co., Rochester, Pa.
[illegible] Pa.
Standard Grinding Wheel Co., Tiffin, O

GUARDS—Lamp
[illegible] Chicago, Ill.
Hubbell, Harvey, Inc., Bridgeport, Conn.

GUARDS—Machinery
[illegible] Co., Inc., Buffalo, N. Y.
Diamond Mfg. Co., Wyoming, Pa.

HACK SAW BLADES—See Saws—Hack Saw Blades

HACK SAW MACHINES
[illegible] Mfg. Co., Chicago, Ill.
Diamond Machine Works, Rochester, N. Y.
Hanna Engineering Works, Chicago, Ill.

HAMMERS—Air
[illegible] & Mch. Wks., Philadelphia, Pa.

HAMMERS—Belt and Motor Driven
[illegible] & Co., Inc., Boston, Mass.
[illegible] & Sons, Syracuse, N. Y.
[illegible] Co., Worcester, Mass.
Long & [illegible] Co., Hamilton, O.
Nazel Engng. & Mch. Wks., Phila., Pa.
Ryerson, Joseph T. & Son, Chicago, Ill.
[illegible] Machine Tool Co., Rochester, N. Y.
Ward Leonard Electric Co., Mount Vernon, N. Y.
Weed Tool Co., Rochester, N. Y.

HAMMERS—Drop
[illegible] Co., Chambersburg, Pa.
Erie Foundry Company, Erie, Pa.
[illegible] Co., Inc., Long Island City, N. Y.
[illegible] Co., 111 B'way, N. Y. C.
Williamson, Wilson & Co., Moline, Ill.

HAMMERS—Pneumatic
[illegible] Tool Co., The Canton, O.
[illegible] Tool Co., C. E. 44th St., New York City
[illegible] Co., Greenville, O.
Independent Pneumatic Tool Co., Chicago, Ill.
Ingersoll-Rand Co., 11 Broadway, N. Y. C.

HAMMERS—Pneumatic Forging
[illegible] Mch. Works, Philadelphia, Pa.
[illegible] Co., Chicago, Ill.

HAMMERS—Power
[illegible] Inc., Boston, Mass.
[illegible] Philadelphia, Pa.

HAMMERS—Sheet Metal
Quickwork Co., St. Marys, O.

HAMMERS—Steam
[illegible] Pa
[illegible] Co., Erie, Pa.
[illegible] N. Y. C.

HANDLES—File and Solder Iron
[illegible] 14th St., [illegible]

HANGERS—Ball Bearing
[illegible] N. Y.
[illegible]

HANGERS—Factory Door
Mayer, F. H. & Bro. Co., Ashland, O.

HANGERS—Shaft
Pedrick Clutch & Mchry. Co., Cincinnati, O.
Tyson Roller Bearing Co., 100 West 10th St., New York City

Hyman, Joseph, & Sons, Philadelphia, Pa.
Jones, W. A., Fdry. & Mch. Co., 4434 West Roosevelt Road, Chicago, Ill.
Wood, T. B., Sons Co., Chambersburg, Pa.

HARDNESS TESTING MACHINES
[illegible] Mfg. Co., Inc., Jamaica, L. I., N. Y.
Wilson-Maeulen Co., 738 E. 143d St., N. Y. C.

HARDWARE—Wagon
Cleveland Hardware Co., Cleveland, Ohio.

HEAT TREATING
Mechanic Products Co., Cleveland, O.
Park Chemical Co., Detroit, Mich.

HEATING AND VENTILATING APPARATUS
[illegible] Co., Buffalo, N. Y.
Northern Blower Co., Cleveland, O.
Skinner Bros. Mfg. Co., Inc., St. Louis, Mo.
Sturtevant, B. F., Co., Hyde Park, Mass.

HINGES—Wrought Brass Butt
Root Co., Bristol, Ct.

HOBS—Formed and Ground
Barber-Colman Co., Rockford, Ill.

HOISTS—Air
Chicago Pneumatic Tool Co., 6 E. 44th St., New York City
Curtis Pneumatic Machy. Co., St. Louis, Mo.
Duke Engineering Company, Grand Haven, Mich.
[illegible] Hoist & Mach. Co., Detroit, Mich.
Hanna Eng. Works, Chicago, Ill.
Northern Engineering Works, Detroit, Mich.
Whiting Corporation, Harvey, Ill.

HOISTS—Chain
Armington Engineering Co., Euclid, O.
[illegible] & Co., Inc., Philadelphia, Pa.
Chisholm-Moore Mfg. Co., Cleveland, O.
Ford Chain Block Co., Philadelphia, Pa.
Harrington, E., Son & Co., Inc., Phila., Pa.
N. J. Fdry. & Mch. Co., 90 West St., N. Y. C.
Reading Chain & Block Co., Reading, Pa.
Wright Mfg. Co., Lisbon, O.

HOISTS—Electric
Barber Foster Eng. Co., Cleveland, O.
[illegible] & Co., Inc., Philadelphia, Pa.
Detroit Hoist & Mach. Co., Detroit, Mich.
Drake Mfg. Company, Inc., Friendship, N. Y.
Liberty Hoist & Derrick Co., Hog Island, Pa.
Euclid Crane & Hoist Co., Euclid, O.
Link-Belt Co., Chicago, Ill.
Milwaukee Electric Crane & Mfg. Co., Inc., Milwaukee, Wis.
Mundy, J. S., Hoisting Engine Co., Newark, N. J.
N. J. Fdry. & Mch. Co., 90 West St., N. Y. C.
Northern Engineering Works, Detroit, Mich.
Reading Chain & Block Co., Reading, Pa.
Roeger Crane & Hoist Works, Reading, Pa.
Stamp, Chas. E., Co., Cleveland, O.

HOISTS—Electric Traveling
Drake Mfg. Company, Inc., Friendship, N. Y.
Euclid Crane & Hoist Co., Euclid, Ohio
Maris Brothers, Inc., Philadelphia, Pa.
Niles-Bement-Pond Co., 111 B'way, N. Y. C.
Northern Engineering Works, Detroit, Mich.

HOISTS—Hydraulic
Watson-Stillman Co., 190 Fulton St., N. Y. C.

HOISTS—Mono-rail
Niles-Bement-Pond Co., 111 B'way, N. Y. C.
Northern Engineering Works, Detroit, Mich.

HOISTS—Second Hand
Electric Hoist & Derrick Co., Hog Island, Pa.
Harris Bros. Co., Chicago, Ill.
Payne, N. B., & Co., 25 Church St., N. Y. C.

HOISTS—Steam
Mundy, J. S., Hoisting Engine Co., Newark, N. J.

HOLDERS—Nipple
Curtis & Curtis Co., Bridgeport, Ct.

HOOKS—Hoist
Williams, J. H., & Co., 57 Richards Street, Brooklyn, N. Y.

HOOP FORMING AND COILING MACHINES
Yoder Co., Cleveland, O.

HOOPS—Wire
American Steel & Wire Co., Chicago, Ill.

HOOPS AND BANDS
Acme Steel Goods Co., Chicago, Ill.
[illegible] Mfg. Co., Brooklyn, N. Y.
De Haven Mfg. Co., Brooklyn, N. Y.
Morris, Wheeler & Co., Philadelphia, Pa.
Ryerson, Jos. T. & Son, Chicago, Ill.

HORSE SHOES AND CALKS
American Steel & Wire Co., Chicago, Ill.

HOSE—Air, Oil, Steam and Water
[illegible] Metal Hose Co., Waterbury, Ct.
Chicago Pneumatic Tool Co., 6 E. 44th St., New York City.

New York Belting & Packing Co., 91-93 Chambers Street New York City
Pennsylvania Flexible Metallic Tubing Co., Philadelphia, Pa.

HOSE—Flexible Metallic
American Metal Hose Co., Waterbury, Ct.
Pennsylvania Flexible Metallic Tubing Co., Philadelphia, Pa.

HOSE—Rubber
New York Belting & Packing Co., 91-93 Chambers Street, New York City.

HYDRANTS
Wood, R. D., & Co., Philadelphia, Pa.

HYDRAULIC MACHINERY
Bethlehem Steel Co., So. Bethlehem, Pa.
Birdsboro Steel Fdy. & Mch. Co., Birdsboro, Pa.
Chambersburg Eng. Co., Chambersburg, Pa.
Hydraulic Press Mfg. Co., Mount Gilead, O.
Mesta Mach. Co., Pittsburgh, Pa.
Niles-Bement-Pond Co., 111 B'way, N. Y. C.
Southwark Fdry. & Mch. Co., Phila., Pa.
United Engrg. & Foundry Co., Pitts., Pa.
Watson-Stillman Co., 190 Fulton St., N. Y. C.
Wood, R. D., & Co., Philadelphia, Pa.

HYDRAULIC RAMS
Power Specialty Co., 111 B'way, N. Y. C.

HYDRAULIC TOOLS
Watson-Stillman Co., 190 Fulton St., N. Y. C.

HYPODERMIC NEEDLE
Summerill Tubing Co., Bridgeport, Montgomery County, Pa.

ICE MACHINERY
De La Vergne Machine Co., 2106 East 138th St., New York City.

INFUSORIAL EARTH
Celite Products Co., Chicago, Ill.

INGOT MOLDS
Bethlehem Steel Co., So. Bethlehem, Pa.
Penn Mold & Mfg. Co., Wheeling, W. Va.
Valley Mould & Iron Corp., Sharpsville, Pa.

INGOTS—Aluminum
Erdle Perforating Co., Rochester, N. Y.
Leavitt, C. W., & Co., 30 Church St., N. Y. C.
Rogers, Brown & Co., New York City.

INGOTS—Aluminum Casting Alloy
Baush Machine Tool Co., Springfield, Mass.

INGOTS—Forging
Birdsboro Steel Fdy. & Mch. Co., Birdsboro, Pa.
Mesta Mach. Co., Pittsburgh, Pa.

INGOTS—Steel
Belle City Malleable Iron Co., Racine, Wis.
McConway & Torley Company, Pittsburgh, Pa.

INSTRUMENTS—Hardness and Temperature Measuring
Shore Instrument & Mfg. Co., Inc., Jamaica, L. I., N. Y.

INSTRUMENTS—Recording
Bristol Co., Waterbury, Ct.
Wilson-Maeulen Co., 738 East 143d St., N. Y. C.

INSULATION—Boiler, Furnace, etc.
Celite Products Co., Chicago, Ill.
Quigley Furnace Specialties Co., Inc., 26 Cortlandt St., New York City

INTENSIFIERS—Steam and Hydraulic
United Engrg. & Fdry. Co., Pittsburgh, Pa.

IRON—Bar
Interstate Iron & Steel Co., Chicago, Ill

IRON—Chain
Bethlehem Steel Company, So. Bethlehem, Pa.

IRON—Staybolt
Ryerson, Jos. T., & Son, Chicago, Ill.

IRON AND STEEL—Swedish
Federal Tool & Alloy Steel Corp., 66 Rutledge St., Brooklyn, N. Y.
Harvey, [illegible] Co., Albany, 31 Boston
Milo, A. & Co., 745 Washington St., N. Y.
Potts, Horace T. & Co., Philadelphia, Pa.

IRONWORK—Ornamental
Sneed Architectural Iron Wks., Louisville, Ky

JACKS—Hydraulic
Watson-Stillman Co., 190 Fulton St., N. Y. C.

JIGS, FIXTURES, TOOLS, ETC.
Accurate Tool Works, Erie, Pa.
Beaver Mach. & Tool Co., Inc., Newark, N. J.
Bridgett Engineering & Tool Co., Detroit, Mich.
Crowley, C. H., Mach. Wks., Petersburg, Mass.
Kent-Owens Machine Co., The, Toledo, O.
Kwiker Mfg. Corp., Inc., Morrison, Mass.
Liberty Tool & Die Co., Rochester, N. Y.

SEE ADVERTISEMENTS FOR COMPLETE INFORMATION. ALPHABETICAL INDEX—PAGES 222-224.

Scoss Machine Products Corp., Providence, R. I.
Stewart-Skinner Company, Worcester, Mass.
Taylor-Shantz Co., Rochester, N. Y.
Ulmer, J. C., Company, Cleveland, O.

JOINTS—Universal
Baush Machine Tool Co., Springfield, Mass.

KETTLES—Galvanizing
Blaw-Knox Co., Pittsburgh, Pa.

KETTLES—Steam Jacketed
Lancaster Iron Works, Inc., Lancaster, Pa.

KEY SEATING MACHINES
Baker Bros., Toledo, O.
Morton Mfg. Co., Muskegon, Mich.
Pawtucket Mfg. Co., Pawtucket, R. I., N. Y.

KEYS—Machine
Moltrup Steel Products Co., Beaver Falls, Pa.
Morton Mfg. Co., Muskegon, Mich.
Smith & Serrell, Newark, N. J.
Standard Gauge Steel Co., Beaver Falls, Pa.

KEYS—Riveted
Hindley Mfg. Co., Valley Falls, R. I.

KNIVES—Machine
Cleveland Knife & Forge Co., Cleveland, O.

LACING—Belt, Rawhide
Chicago Rawhide Mfg. Co., Chicago, Ill.
Schieren, Chas. A., Co., 37 Ferry St., N. Y. C.

LACING—Belt Steel
Flexible Steel Lacing Co., Chicago, Ill.

LADLES
Northern Engineering Works, Detroit, Mich.
Riter-Conley Co., Pittsburgh, Pa.
Whiting Corporation, Harvey, Ill.

LATHE ACCESSORIES AND ATTACHMENTS
Lovejoy Tool Co., Inc., Springfield, Vt.
Steinle Turret Machine Co., Madison, Wis.

LATHE DOGS
Williams, J. H., & Co., 57 Richards St., Brooklyn, N. Y.

LATHE SPINDLES—Solid and Hollow Bored
National Forge & Tool Co., Irvine, Pa.

LATHES—Automatic
Jones & Lamson Machine Co., Springfield, Vt.
National Acme Co., Cleveland, O.

LATHES—Bench
Ames, E. C., Company, The, Waltham, Mass.
Elgin Tool Works, Elgin, Ill.
Pratt & Whitney Co., 111 Broadway, N. Y. C.
Rivett Lathe & Grinder Co., Boston, Mass.
South Bend Lathe Works, South Bend, Ind.
Triplex Machine Tool Corp., 18 E. 41st St., New York City.

LATHES—Brass
Foster Machine Co., Elkhart, Ind.
Warner & Swasey Co., Cleveland, O.

LATHES—Buffing and Polishing
Hill-Curtis Co., Kalamazoo, Mich.

LATHES—Chucking
Cleveland Crane & Engrg. Co., Wickliffe, Ohio.
International Machine Tool Co., Inc., Ind.
Jones & Lamson Mach. Co., Springfield, Vt.
Warner & Swasey Co., Cleveland, O.

LATHES—Engine
American Tool Works Co., Cincinnati, O.
Betts Mach. Plant of Consolidated Mach. Tool Corp. of America, 17 E. 42d St., N. Y. C.
Greaves-Klusman Tool Co., Cincinnati, Ohio.
Harrington, E., Son & Co., Inc., Phila., Pa.
Hill Clarke & Co., of Chicago, Chicago, Ill.
Lehmann Machine Co., St. Louis, Mo.
Lodge & Shipley Mach. Tool Co., Cincinnati, O.
McCabe, J. H., Lathe & Mchry. Corp., 149 Broadway, New York City.
McCabe & Sheeran Machinery Corp., Room 482, 50 Church St., New York City.
Monarch Machine Tool Co., Sidney, O.
Moeller Machine Tool Co., Cincinnati, O.
Niles-Bement-Pond Co., 111 B'way., N. Y. C.
Ostuna & Sexton Mchry. Co., Columbus, O.
Pratt & Whitney Co., 111 Broadway, N. Y. C.
Reed-Prentice Co., Worcester, Mass.
Reeves, Jos. T., & Son, Chicago, Ill.
Sidney Machine Tool Company, Sidney, O.
South Bend Lathe Works, South Bend, Ind.
Toomey, Frank, Inc., Philadelphia, Pa.
Wolcott Lathe Co., Jackson, Mich.
Wickes Brothers, Saginaw, Mich.

LATHES—Extension Gap
Barnes Drill Co., Rockford, Ill.

LATHES—Foot Power
Barnes, W. F. & John Co., Rockford, Ill.

LATHES—Roll
United Engrg. & Fdry. Co., Pittsburgh, Pa.
Youngstown Fdry. & Mch. Co., Youngstown, O.

LATHES—Screw-Cutting
Automatic Machine Co., Bridgeport, Ct.
Rivett Lathe & Grinder Co., Boston, Mass.

LATHES—Second-Hand
Erie Mfg. & Supply Co., Erie, Pa.
Graves Machinery Ex., 50 Church St., N. Y. C.
Harris Bros. Co., Chicago, Ill.
Hill, Clarke & Co., Inc., Boston, Mass.
Lamberg, A., & Co., 241 Centre St., N. Y. C.
McCabe & Sheeran Mchry. Corp., Room 482, 50 Church St., New York City.
New York Machry Ex., 50 Church St., N. Y. C.
Russell Mch. Co., Pittsburgh, Pa.
Simmons Mach. Co., Inc., Albany, N. Y.
Stokvis, R. S., & Sons, Inc., 17 Battery Pl., New York City.

LATHES—Turret
Acme Machine Tool Company, Cincinnati, O.
Dreses Machine Tool Co., Cincinnati, O.
Foster Machine Co., Elkhart, Ind.
Gisholt Machine Co., Madison, Wis.
International Machine Tool Co., Ind., Ind.
Jones & Lamson Mach. Co., Springfield, Vt.
Steinle Turret Mach. Co., Madison, Wis.
Warner & Swasey Co., Cleveland, O.

LATHES—Wood
Barnes, W. F., & John Co., Rockford, Ill.

LEATHER—Cup
Schieren, Chas. A., Co., 37 Ferry St., N. Y. C.

LEATHER—Hydraulic
Schieren, Chas. A., Co., 37 Ferry St., N. Y. C.

LEVELING MACHINERY
United Engrg. & Fdry. Co., Pittsburgh, Pa.

LEVELS—Precision Machine Aligning
Universal Boring Mch. Co., Hudson, Mass.

LIGHTING SYSTEMS—Acetylene
Prest-O-Lite Co., Inc., 30 E. 42d St., N. Y. C.

LIGHTS—Carbide, Portable
Milburn, Alexander, Co., Baltimore, Md.

LIME—Chemical
Baker, J. E., Company, York, Pa.

LIMESTONE DRYERS AND PULVERIZERS
Bonnot Co., The, Canton, O.

LIMESTONE—Low Silica
Baker, J. E., Company, York, Pa.

LINING—Convertor
Edge Hill Silica Rock Co., New Brunswick, N. J.

LINING—Cupola
Crescent Refractories Co., Curwensville, Pa.
Edge Hill Silica Rock Co., New Brunswick, N. J.

LOADERS—Wagon, Coal, Crushed Stone
Gifford-Wood Co., Hudson, N. Y.
Haiss, Geo., Mfg. Co., Inc., 142d St. & Canal Pl., New York City.

LOCOMOTIVES—Electric
Atlas Car Mfg. Co., Cleveland, O.

LOCOMOTIVES—Gasoline
Fate-Root-Heath Co., Plymouth, O.
Industrial Equip. Co., Minster, Ohio.
Vulcan Iron Works, Wilkes-Barre, Pa.

LOCOMOTIVES—Industrial
Fate-Root-Heath Co., Plymouth, O.
Porter, H. K., Co., Pittsburgh, Pa.

LOCOMOTIVES—Steam
Porter, H. K., Co., Pittsburgh, Pa.
Vulcan Iron Works, Wilkes-Barre, Pa.

LOCOMOTIVES—Storage Battery
Atlas Car & Mfg. Co., Cleveland, O.
Baker R. & L. Co., Cleveland, O.

LUBRICANTS
Sun Company, Philadelphia, Pa.

LUBRICATORS—Oil Cups
Gits Bros. Mfg. Co., Chicago, Ill.

LUMBER—Creosoted
Jennison-Wright Co., Toledo, O.

MACHINE WORK
Adamson Mach. Co., Akron, O.
Baker Mfg. Corp., Saratoga Springs, N. Y.
Baldt Anchor & Chain Company, Chester, Pa.
Beatty Machine & Mfg. Co., Hammond, Ind.
Beaver Mach. & Tool Co., Inc., Newark, N. J.
Bucher Smith Co., The, East Liverpool, O.
Buffalo Pitts Co., Buffalo, N. Y.
Cowdrey, C. H., Mach. Wks., Fitchburg, Mass.
Dietz Machine Works, Philadelphia, Pa.
Fay & Scott, Dexter, Me.
Federal Signal Co., Albany, N. Y.
Frederick Iron & Steel Co., Frederick, Md.
Frost Mfg. Co., The, Galesburg, Ill.
Garvin Mach. Co., 255 Spring St., N. Y. C.
Hanna Engineering Works, Chicago, Ill.
Hartford Special Machinery Co., Hartford, Ct.
Industrial Equip. Co., Minster, Ohio.
Johnson, Carlyle, Machine Co., Manchester, Ct.
Jolly, J. & W., Inc., Holyoke, Mass.
Jones, W. A., Foundry & Mch. Co., 1434 West Roosevelt Road, Chicago, Ill.
Kent-Owens Machine Co., The, Toledo, O.
Kurtz Machine Co., Strasburg, Va.
Lombard & Eagle Mach. Co., Camden, N. J.
Landis, A. B., & Sons, Philadelphia, Pa.
Lebanon Gear & Machine Wks., Lebanon, Pa.
McKaig, Merwin, Cumberland, Md.
McKeen Duty & Machine Co., Lockport, N. Y.
Matthews, H. A., Mfg. Co., Seymour, Ct.
Millholland Mach. Co., Indianapolis, Ind.
Osborn Mch. Co., Du Bois, Pa.
Patch, F. R., Mfg. Co., Rutland, Vt.
Peterson Machine Co., Inc., 34 E. 29th St., Brooklyn, N. Y.
Pittsfield Mch. & Tool Co., Pittsfield, Mass.
Porter Machine Co., Inc., Jersey City, N. J.
Prosser Foundry & Mfg. Co., Cleveland, O.
Reynolds Engineering Co., Moline, Ill.
Ryther & Pringle Co., Carthage, N. Y.
Spet Bath Company, 143 W. 54th St., N. Y. C.
Sweet & Doyle Foundry & Machine Co., Troy (Greene Island), N. Y.
Thompson Machine Co., Philadelphia, Pa.
Tiea Foundry & Machine Co., Troy, N. Y.
Vogt Brothers Mfg. Co., Inc., Louisville, Ky.

MACHINERY DEALERS
Backer Machine Tool Supply Co., 30 Church St., New York City.
Bath, Cyril J., & Co., Cleveland, Ohio.
Beal, Jos., & Co., Boston, Mass.
Crawford, F. H., 299 Broadway, N. Y. C.
Erie Mfg. & Supply Co., Erie, Pa.
Essex, L. L., Machinery Co., Chicago, Ill.
Federal Mchry. Sales Co., Chicago, Ill.
Fitzgerald, W. H. J., & Co., Boston, Mass.
Graves Mchy. Exch., 50 Church St., N. Y. C.
Harris Bros. Co., Chicago, Ill.
Hill Clarke & Co. of Chicago, Chicago, Ill.
Hittner's Henry A., Sons Co., Phila., Pa.
Jones Machine Tool Co., Cincinnati, O.
Lamberg, A., & Co., 241 Centre St., N. Y.
Lindel Machine & Steel Co., 50 Church St., New York City.
McCabe & Sheeran Mchry. Corp., Room 482, 50 Church St., New York City.
McMillen Machinery Co., Grand Rapids, Mich.
Machinery Dealers, Inc., New Haven, Ct.
Manufacturers Machine Tool & Supply Co., Inc., Bridgeport, Ct.
Mitchell-Tappen Co., 15-17 John St., N. Y. C.
Morey & Co., Inc., 410 Broome St., N. Y. C.
New York Mchy. Exch., 50 Church St., N. Y. C.
Niles, F. H., & Co., Inc., Woolworth Bldg., New York City.
Nussbaum, V. M., & Co., Fort Wayne, Ind.
Nuttall, John, Philadelphia, Pa.
Prentiss, Henry, & Co., Inc., 149 B'way, N. Y. C.
Reeves, Jos. T., & Son, Chicago, Ill.
Simmons Mach. Co., Inc., Albany, N. Y.
Stocker-Rumely-Wachs Co., Chicago, Ill.
Stoehr, A. M., Machry. Co., Chicago, Ill.
Stokvis, R. S., & Sons, Inc., 17 Battery Pl., New York City.
Toomey, Frank, Inc., Philadelphia, Pa.
Wayne Machinery Co., Fort Wayne, Ind.
White, A. D., Machinery Co., Chicago, Ill.

MACHINISTS' TOOLS AND SUPPLIES— See Tools

MAGNESITE—Dead Burnt
American Refractories Co., Pittsburgh, Pa.
Harbison-Walker Refractories Co., Pitts., Pa.
Lavino, E. J., & Co., Philadelphia, Pa.
Rogers, Brown & Co., Cincinnati, O.

MAGNETS—Lifting
Cutler-Hammer Mfg. Co., Milwaukee, Wis.
Electric Controller & Mfg. Co., Cleveland, O.
Ohio Electric & Controller Co., Cleveland, O.

MANDRELS—Expanding
Nicholson, W. H., & Co., Wilkes-Barre, Pa.

MANDRELS—Solid
Nicholson, W. H., & Co., Wilkes-Barre, Pa.
Whitman & Barnes Mfg. Co., Akron, Ohio.

MANGANESE METAL
Electro Metallurgical Sales Corporation, 30 East 42nd Street, New York City.

MANUFACTURING SITES
Alabama Power Co., Birmingham, Ala.
Merrall, Wm. B., 342 Madison Ave., N. Y. C.

MARKING DEVICES—Steel Stampings
Matthews, J. H. & Co., Pittsburgh, Pa.
Pannier Bros. Stamp Co., Pittsburgh, Pa.

MATS—Door, Flexible Steel
Cary Mfg. Co., Brooklyn, N. Y.

METAL DECORATING
N. Y. Metal Ceiling Co., 537 W. 24th St., New York City.

METAL SPECIALTIES
Beckley Perforating Co., Garwood, N. J.
Bridgeport Chain Co., Bridgeport, Ct.
Bridgeport Metal Goods Mfg. Co., Bdgprt., Ct.
Budd, Edw. G., Mfg. Co., Philadelphia, Pa.
Cuyahoga Spring Co., Cleveland, O.
Everitt Co., Boston 9, Mass.
Fischer, Chas., Spring Co., Brooklyn, N. Y.
Gem Stamped Steel Co., Boston, Mass.
Geuder, Paeschke & Frey Co. (Contract Mfg. Division), Milwaukee, Wis.
Matthews Mfg. Co., Worcester, Mass.
National Blank Book Co., Holyoke, Mass.
New England Tube & Stpg. Co., Inc., West Haven, Ct.
Newton Mfg. Co., Plainville, Conn.
Parish & Bingham Corp., Cleveland, O.
Pittsfield Mch. & Tool Co., Pittsfield, Mass.

SEE ADVERTISEMENTS FOR COMPLETE INFORMATION. ALPHABETICAL INDEX—PAGES 222-224.

N. Y.

Thos. J. S., Co., Philadelphia, Pa.
Worcester.

METAL SPINNING

METAL STRAIGHTENERS
New Haven, Ct.

METAL—Bearing
O.

METERS—Gravity
Newark, N. J.

MILLING MACHINE ACCESSORIES AND ATTACHMENTS
N. Y. C.
Kearney & Trecker Corp., Milwaukee Wis.

MILLING MACHINES—Automatic
N. Y. C.

MILLING MACHINES—Bench
18 E. 41st St., N. Y. City.

MILLING MACHINES—Horizontal
Brown & Sharpe Mfg. Co., Providence, R. I.
N. Y. C.
Kearney & Trecker Corp., Milwaukee, Wis.
149
N. Y. City
Corp. 149
New York City
McCabe & Sheeran Machinery Corp., Room 482, 50 Church St., New York City.
Newton Mach. Tool Works, Inc., Philadelphia, Pa.
Pratt & Whitney Co., 111 Broadway, N. Y. C.
Universal Boring Machine Co., Hudson, Mass.

MILLING MACHINES—Manufacturing
Kearney & Trecker Corp., Milwaukee, Wis.
149
New York City
McCabe & Sheeran Machinery Corp., Room 482, 50 Church St., New York City.
Pratt & Whitney Co., 111 Broadway, N. Y. C.

MILLING MACHINES—Plain
Garvin Mach. Co., 246 Spring St., N. Y. C.
Kearney & Trecker Corp., Milwaukee, Wis.
149
New York City
McCabe & Sheeran Machinery Corp., Room 482, 50 Church St., New York City.
Rockford Milling Machine Co., Rockford, Ill.

MILLING MACHINES—Second Hand
Lodge & Shipley Co., Cincinnati, O.
Co., Chicago, Ill.
Hill, Clarke & Co., Inc., Boston, Mass.
Lamberg, A., & Co., 241 Centre St., N. Y. C.
McCabe & Sheeran Machy. Corp., Room 482, 50 Church St., New York City.
Pratt & Whitney Co., 111 Broadway, N. Y. C.
Reed-Prentice Co., Pittsburgh, Pa.
Simonds Mach. Co., Inc., Athens, N. Y.

MILLING MACHINES—Universal
Garvin Mach. Co., 246 Spring St., N. Y. C.
Kearney & Trecker Corp., Milwaukee, Wis.
Kempsmith Mfg. Co., Milwaukee, Wis.
Rockford Milling Machine Co., Rockford, Ill.

MILLING MACHINES—Vertical
Automatic Machine Co., Bridgeport, Ct.
N. Y. C.
Kearney & Trecker Corp., Milwaukee, Wis.
Kempsmith Mfg. Co., Milwaukee, Wis.
Reed-Prentice Co., Worcester, Mass.
18 E. 41st St., New York City.
Mich.

MILLS—Wire Flattening
Torrington Mfg. Co., Torrington, Ct.

MIXING MACHINES—Sand
Chicago, Ill.

MIXING MACHINES—Sand and Ore
Cleveland, O.

MOLDING MACHINES—Combination
Machine Co., Cleveland, O.

MOLDING MACHINES—Core
Machine Co., Cleveland, O.

MOLDING MACHINES—Jarring (Air)
Arcade Mfg. Co., Freeport, Ill.
Detroit, Mich.
Ill.
Nicholls, N. Y.

MOLDING MACHINES—(Hand and Power Operated)
Machine Co., Cleveland, O.
Machine Co., Cleveland, O.
Machine Co., Cleveland, O.

SEE ADVERTISEMENTS FOR COMPLETE INFORMATION. ALPHABETICAL INDEX—PAGES 222-224.

Snyder, W. P., & Co., Pittsburgh, Pa.
Southern Tool Access Co., Chattanooga, Tenn.
Stowell Furnace Company, The, Cincinnati, O.
Tobin Coal, Iron & R.R. Co., Birmingham, Ala.
Tod-Rockwell Mfg. Co., Boston, Mass.
Wade, W. Garland & Co., Cincinnati, O.
Wrought Steel Corp., Leggett Bldg., New York City.
Wilhelmy, Nicholas & Co., 2 Rector St., N.Y.C.

PILE DRIVERS
Vulcan Iron Works, Chicago, Ill.

PILE SHOES
Janney, Steinmetz & Co., Philadelphia, Pa.

PINIONS—Mill, Cut and Machine Molded
United Engrg. & Fdry. Co., Pittsburgh, Pa.

PINIONS—Rawhide
Morrison Gear Corp., Syracuse, N. Y.

PINS—Drilled
Townsend Co., New Brighton, Pa.

PINS—PISTON
Foster Screw Co., Fostoria, Ohio

PIPE—Butt-Welded Steel
Central Tube Co., Pittsburgh, Pa.
National Pipe Co., Pittsburgh, Pa.
Youngstown Sheet & Tube Co., Youngstown, O.

PIPE—Cast Iron, B. & S. and Flanged
U. S. Cast Iron Pipe & Fdry. Co., Burlington, N. J.
Warren Fdry. & Pipe Co., 11 B'way, N. Y. C.
Weeks, R. D., & Co., Philadelphia, Pa.

PIPE—Genuine Wrought Iron
Keating, E. F., Co., 452 Water St., N. Y. C.
Lorraine Tube Company, Reading, Pa.
Youngstown Sheet & Tube Co., Youngstown, O.

PIPE—Lap-Welded Steel
American Spiral Pipe Works, Chicago, Ill.
Keating, E. F., Co., 452 Water St., N. Y. C.
National Tube Co., Pittsburgh, Pa.
Republic Iron & Steel Co., Youngstown, O.
Wheeling Steel Products Co., Wheeling, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

PIPE—New and Second-Hand
Albert & Davidson Pipe Corp., Brooklyn, N. Y.
Davidson Pipe & Iron Corp., Brooklyn, N. Y.
Davis, C. & Co., Pittsburgh, Pa.
Lazarus Supply Co., Inc., 233 B'way, N. Y. C.
Greenpoint Iron & Pipe Co., Inc., Brooklyn, N. Y.
Lee & Metal & Supply Co., Inc., Brooklyn, N. Y.
McDowell & Co., Pittsburgh, Pa.
Marine Metal & Supply Co., 167 South St., New York City.
Schroer & Foster, Inc., 211-217 Kent Ave., Brooklyn, N. Y.
Ullman, Jacob, Buffalo, N. Y.

PIPE—Riveted Steel
Abendroth & Root Mfg. Co., Newburgh, N. Y.
American Spiral Pipe Works, Chicago, Ill.
Petroleum Iron Works Co., Sharon, Pa.

PIPE—Wrought Iron
Crane Co., Chicago, Ill.
Keating, E. F., Co., 452 Water St., N. Y. C.
National Tube Co., Pittsburgh, Pa.
Steel & Tube Co. of America, Chicago, Ill.

PIPE BENDS
Lindsay, Geo. B., & Co., Chicago, Ill.
Pittsburgh Pipe Coil & Bending Co., Pittsburgh, Pa.

PIPE CUTTING AND THREADING MACHINES
Bignall & Keeler Mch. Wks., Edwardsville, Ill.
Curtis & Curtis Co., Bridgeport, Ct.
Jarecki Mfg. Co., Erie, Pa.
Landis Mach. Co., Waynesboro, Pa.
Merrell Mfg. Co., Toledo, O.
New York Mchy. Exch., 50 Church St., N. Y. C.
Pipe Machry. Co., The, Cleveland, O.
Saunders', D., Sons, Inc., Yonkers, N. Y.
Taylor-Wilson Mfg. Co., McKees Rocks, Pa.
Williams Tool Corporation, Erie, Pa.

PIPE FITTINGS
Crane Co., Chicago, Ill.
Jarecki Mfg. Co., Erie, Pa.
Lindsay Crosslight Company, Chicago, Ill.
Malleable Iron Fittings Co., Branford, Ct.
Pittsburgh Piping & Equip. Co., Pittsburgh, Pa.
Pittsburgh Valve, Fdry. & Construction Co., Pittsburgh, Pa.

PIPING CONTRACTORS
Pittsburgh Piping & Equip. Co., Pittsburgh, Pa.

PISTON AND PISTON RING MACHINES
National Acme Co., Cleveland, O.

PLANING MACHINES—Metal
American Tool Works, Cincinnati, O.
Betts Mach. Plant of Consolidated Mach. Tool Corp. of America, 17 E. 42d St., N. Y. C.
Cincinnati Planer Co., The, Cincinnati, O.
Cleveland Planer Co., The, Cleveland, O.
Cleveland Punch & Shear Wks. Co., Cleve., O.
Morton Mfg. Co., Muskegon, Mich.
Niles-Bement-Pond Co., 111 B'way, N. Y. C.
Ohio Machine Tool Co., Kenton, Ohio.
Patch, F. R., Mfg. Co., Rutland, Vt.
Reed-Prentice Co., Worcester, Mass.
Ryerson, Joseph T., & Son, Chicago, Ill.

PLANING MACHINES—Open Side
Automatic Machine Co., Bridgeport, Ct.
Cincinnati Planer Co., Cincinnati, Ohio.
Cleveland Planer Co., Cleveland, O.
Patch, F. R., Mfg. Co., Rutland, Vt.

PLANING MACHINES—Second Hand
Hill, Clarke & Co., Inc., Boston, Mass.
New York Mchy. Exch., 50 Church St., N.Y.C.

PLATERS' CLEANING COMPOUND
Electric Smelting & Aluminum Co., Lockport, N. Y.
Oakley Chemical Co., 22 Thames St., N. Y. C.

PLATES—Alloy Steel
Eddystone Steel Co., Crum Lynne, Pa.

PLATES—Bullet Proof
Eddystone Steel Co., Crum Lynne, Pa.

PLATES—Cellar Door and Floor
American Pressed Steel Co., Philadelphia, Pa.
Morris, Wheeler & Co., Philadelphia, Pa.
Wood, Alan, Iron & Steel Co., Phila., Pa.

PLATES—Felloe
Wrought Washer Mfg. Co., Milwaukee, Wis.

PLATES—Iron and Steel
Allegheny Steel Co., Brackenridge, Pa.
American Pressed Steel Co., Philadelphia, Pa.
Bethlehem Steel Co., The, Bethlehem, Pa.
Carnegie Steel Co., Pittsburgh, Pa.
Lackawanna Steel Co., Buffalo, N. Y.
Eddystone Steel Co., Crum Lynne, Pa.
Harvey, Arthur C., Co., Allston 34, Boston, Mass.
Illinois Steel Co., Chicago, Ill.
Illinois Steel Co., Warehouse Dept., Chicago, Ill.
Inland Steel Co., Chicago, Ill.
Moltrup Steel Prod. Co., Beaver Falls, Pa.
Morris, Wheeler & Co., Philadelphia, Pa.
Otis Steel Co., Cleveland, O.
Republic Iron & Steel Co., Youngstown, O.
Ryerson, Jos. T., & Son, Chicago, Ill.
Shippers' Car Line, Inc., 165 B'way., N. Y. C.
Steel & Tube Co. of America, Chicago, Ill.
Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
United Alloy Steel Corp., Canton, O.
Wheeling Steel Products Co., Wheeling, W. Va.
Wood, Alan, Iron & Steel Co., Phila., Pa.
Worth Steel Company, Claymont, Delaware.
Youngstown Sheet & Tube Co., Youngstown, O.

PLATING
Meaker Galvanizing Co., Chicago, Ill.

PLUGS—Core Hole
Hilliard Spring Works, Pontiac, Mich.

PLUMBING FIXTURES—Brass
Enterprise Brass Works, Muskegon Heights, Mich.

PLUMBING FIXTURES—Factory
Crane Co., Chicago, Ill.

PNEUMATIC TOOLS
Canton Pneumatic Tool Co., The, Canton, O.
Chicago Pneumatic Tool Co., 6 E. 44th St., N.Y.
Cleveland Pneumatic Tool Co., Cleveland, O.
Ingersoll-Rand Co., 11 B'way, N. Y. C.
Rivet Cutting Gun Co., Cincinnati, Ohio.

POSTS—Steel Fence
American Steel & Wire Co., Chicago, Ill.

POTS—Grease
Blaw-Knox Co., Pittsburgh, Pa.

POTS—Lead, Cyanide or Carbonizing
Calorizing Co. of Pittsburgh, Pittsburgh, Pa.
Electro Alloys Co., Elyria, O.
Monroe Steel Castings Co., Monroe, Mich.

POTS—Terne
Blaw-Knox Co., Pittsburgh, Pa.

POWDERED COAL EQUIPMENT — See Pulverized Coal Equipment

POWER TRANSMITTING MACHINERY
American Pulley Co., Philadelphia, Pa.
Caldwell, W. E., & Co., Chicago, Ill.
Cresson-Morris Co., Philadelphia, Pa.
Falk Corp., The, Milwaukee, Wis.
Fibre Clutch & Machinery Co., Cuyahoga Falls, O.
Jones, W. A., Fdry. & Mch. Co., 4434 West Roosevelt Road, Chicago, Ill.
Link-Belt Co., Chicago, Ill.
Schultz, A. L., & Son, Chicago, Ill.
Webster Mfg. Co., Chicago, Ill.
Woods', T. B., Sons Co., Chambersburg, Pa.

POWER—Hydro-Electric
Alabama Power Co., Birmingham, Ala.

PRESS ATTACHMENTS
Littell, F. J., Machine Co., Chicago, Ill.

PRESSED STEEL PARTS
Sharon Pressed Steel Co., Sharon, Pa.

PRESSES—Arbor
Nicholson, W. H., & Co., Wilkes-Barre, Pa.

PRESSES—Drop
Bliss, E. W., Co., Brooklyn, N. Y.

PRESSES—Foot
Shuster, F. B., Co., New Haven, Ct.
Taylor & Fenn Co., Hartford, Ct.

PRESSES—Forging
Mesta Machine Co., Pittsburgh, Pa.
Lundin Machine Co., Long Island City.
Medart Manufacturing Co., Phila., Pa.
Watson-Stillman Co., 190 Fulton St., N. Y. C.

PRESSES—Hydraulic
Birdsboro Steel Fdy. & Mch. Co., Birdsboro, Pa.
Elmes, Chas. F., Engrg. Wks., Chicago, Ill.
Hydraulic Press Mfg. Co., Mount Gilead, O.
Mesta Machine Co., Pittsburgh, Pa.
Niles-Bement-Pond Co., 111 B'way, N. Y. C.
Southwark Fdry. & Mach. Co., Phila., Pa.
Watson-Stillman Co., 190 Fulton St., N. Y. C.
West Tire Setter Co., Rochester, N. Y.

PRESSES—Hydraulic, Portable
Vulcan Iron Works, Chicago, Ill.

PRESSES—Power
Adriance Machine Works, Inc., Brooklyn, N. Y.
Baird Machine Co., Bridgeport, Ct.
Beaty Machine & Mfg. Co., Hammond, Ind.
Bliss, E. W., Co., Brooklyn, N. Y.
Cincinnati Shaper Co., Cincinnati, O.
Etna Machine Co., Toledo, O.
Ferracute Machine Co., Bridgeton, N. J.
General Mfg. Co., Detroit, Mich.
Henderson Machine Co., Philadelphia, Pa.
Hyman, Joseph, & Sons, Philadelphia, Pa.
Leffler, Chas., & Co., Brooklyn, N. Y.
Manville, E. J., Mach. Co., Waterbury, Ct.
Niagara Machine & Tool Works, Buffalo, N. Y.
Rockford Iron Works, Rockford, Ill.
Stedl D. P. Co., Buffalo, N. Y.
Stearns Foss & Mfg. Co., New Bremen, O.
Toledo Mach. & Tool Co., Toledo, O.
V & O Press Company, Glendale, Long Island, N. Y.
Wedgeway Farrel Fdry. & Machine Co., Waterbury, Ct.
Zeh & Hahnemann Co., Newark, N. J.

PRESSES—Power Forcing
General Mfg. Co., Detroit, Mich.
Lucas Mach. Tool Co., Cleveland, O.

PRESSES—Scrap Bundling
Watson-Stillman Co., 190 Fulton St., N. Y. C.

PRESSES—Scrap Bundling, Wire
Vaughn Mchry. Co., Cuyahoga Falls, Ohio.

PRESSES—Steam Hydraulic
Mesta Mach. Co., Pittsburgh, Pa.

PRESSES—Straightening
General Mfg. Co., Detroit, Mich.
United Engrg. & Fdry. Co., Pittsburgh, Pa.

PRESSES—Wheel
Birdsboro Steel Fdy. & Mch. Co., Birdsboro, Pa.
Southwark Foundry & Machine Co., Phila., Pa.

PROFILING MACHINES
Automatic Machine Co., Bridgeport, Ct.

PULLEYS—Friction Clutch
Caldwell, W. E., Co., 260 Brandeis St., Louisville, Ky.
Jones, W. A., Fdry. & Mch. Co., 4434 West Roosevelt Road, Chicago, Ill.

PULLEYS—Iron or Wood, Solid and Split
Caldwell, W. E., Co., 260 Brandeis Street, Louisville, Ky.
Falls Clutch & Mchry. Co., Cuyahoga Falls, O.
Jones, W. A., Fdry. & Mach. Co., 4434 West Roosevelt Road, Chicago, Ill.
Medart Company, The, St. Louis, Mo.
Woods', T. B., Sons Co., Chambersburg, Pa.

PULLEYS—Magnetic
Magnetic Mfg. Company, Milwaukee, Wis.

PULLEYS—Steel, Rim Solid and Split
American Pulley Co., Philadelphia, Pa.
Hyman, Joseph, & Sons, Philadelphia, Pa.

PULVERIZED COAL EQUIPMENT
Bonnot Co., Canton, O.
Fuller Engineering Co., Fullerton, Pa.
Grindle Fuel Equip. Co., Harvey, Ill.
Hogan Coal Co., Pittsburgh, Pa.
Quigley Furnace Specialties Co., Inc., 26 Cortlandt St., New York City.
Raymond Bros. Engrg. Co., Chicago, Ill.

PULVERIZERS—Coal
Bonnot Co., The, Canton, O.
Raymond Bros. Engrg. Co., Chicago, Ill.

PUMPS—Boiler Feed
Dean Bros. Steam Pump Wks., Indianapolis, Ind.
Kerr Turbine Co., Wellsville, N. Y.
Lea-Courtenay Co., Newark, N. J.
Manistee Iron Works Co., Manistee, Mich.
Morris Machine Works, Baldwinsville, N. Y.

PUMPS—Centrifugal
Alberger Pump & Condenser Co., 140 Cedar Street, New York City.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Buffalo Steam Pump Co., Buffalo, N. Y.
De Laval Steam Turbine Co., Trenton, N. J.
D'Olier Centrifugal Pump & Machine Co., 165 Broadway, New York City.
Earle Gear & Mach. Co., Philadelphia, Pa.
Frederick Iron & Steel Co., Frederick, Md.
Ingersoll-Rand Co., 11 Broadway, N. Y. C.
Kerr Turbine Co., Wellsville, N. Y.
Lea-Courtenay Co., Newark, N. J.
Manistee Iron Works Co., Manistee, Mich.
Morris Machine Works, Baldwinsville, N. Y.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Platt Iron Works, Dayton, Ohio.
Wheeler Condenser & Engrg. Co., Carteret, N. J.

SEE ADVERTISEMENTS FOR COMPLETE INFORMATION. ALPHABETICAL INDEX—PAGES 222-224.

PUMPS—Hydraulic

PUMPS—Pneumatic Air Lift

PUMPS—Rotary

PUMPS—Self-Measuring

PUMPS—Steam

PUMPS—Vacuum

PUNCHES AND DIES
Cleveland Punch & Shear Wks. Co., Cleve., O.

PUNCHING AND SHEARING MACHINES
Bertsch & Co., Cambridge City, Ind.
Cleveland Punch & Shear Wks. Co., Cleve., O.
Covington Machine Co., Inc., Covington, Va.
Excelsior Tool & Mch. Co., East St. Louis, Ill.
Hilles & Whitten Co., Bond Wks.
Tool Corp. of America, 17 E. 42nd St., N.Y.C.
Niagara Machine & Tool Works, Buffalo, N. Y.
Royersford Fdry. & Mch., Co., Inc., Royersford, Pa.
Whitney Metal Tool Co., Rockford, Ill.

PYROMETERS
Bristol Co., Waterbury, Ct.

RACKS—Machine
Standard Gauge Steel Co., Beaver Falls, Pa.

RAIL BONDS
American Steel & Wire Co., Chicago, Ill.

RAIL SPLICE BARS
Ames, W., & Co., Jersey City, N. J.

RAILS
Bethlehem Steel Co., Bethlehem, Pa.
Briddell, W. C., Co., Inc., Baltimore, Md.
Canton, Wm. T., & Co., 30 Church St., N.Y.C.
Continental Iron & Steel Co., 2 Rector St., N.Y.
Green, L. A., Rail & Meby. Co., Pittsburgh, Pa.
Hill, John T., & Co., Inc., Baltimore, Md.
Illinois Steel Co., Chicago, Ill.
Morrison & Risman, Buffalo, N. Y.
Richardson & Co., Inc., Pittsburgh, Pa.
Sherer, E. C., 50 Church St., N. Y. C.
Walter A. Supply Co., St. L., Mo.

RAILWAY EQUIPMENT AND SUPPLIES
Hyman-Michaels Co., Chicago, Ill.
Track Specialties Co., 29 Broadway, N. Y. C.

REAL ESTATE—Industrial
Merrall, Wm. B., 342 Madison Ave., N. Y. C.

REAMER HOLDERS
Victor Tool Company, Inc., Waynesboro, Pa.

REAMERS—Adjustable and

REAMERS—Solid
Whitman & Barnes Mfg. Co., Akron, Ohio.

REAMERS—Taper
Whitman & Barnes Mfg. Co., Akron, Ohio.

RECORDERS—Gravity
Precision Instrument Company, Newark, N. J.

REFLECTORS—Lamp
Hubbell, Harvey, Inc., Bridgeport, Ct.

REFRIGERATING MACHINERY
Norwalk Iron Works Co., South Norwalk, Ct.

REGULATORS—Pressure
Crane Co., Chicago, Ill.

RHEOSTATS
Electric Controller & Mfg. Co., Cleveland, O.

RIDDLES—Foundry
Jelliff, George H., & Son, New Canaan, Ct.
Ludlow Saylor Wire Co., The, St. Louis, Mo.

RINGS—Hardened Tool Steel
Auburn Ball Bearing Co., Rochester, N. Y.

RINGS—Iron and Steel
Cann & Saul Steel Co., Inc., Philadelphia, Pa.

RIVET CUTTING GUNS
Rivet Cutting Gun Co., Cincinnati, O.

RIVET HEATERS—Electric
American Car & Fdry Co., 165 B'way, N. Y. C.

RIVET MAKING MACHINERY
Atherton, Jesse, Providence, R. I.
Manville E. J. Mach. Co., Waterbury, Ct.
National Machy Co., Tiffin, O.

RIVET SETS AND STANDS
Cleveland Punch & Shear Wks. Co., Cleve., O.
Hunter Saw & Machine Co., Pittsburgh, Pa.

RIVETING MACHINES
Southwark Foundry & Machine Co., Phila., Pa.

RIVETS
Champion Rivet Company, The, Cleveland, O.
Cluett & Drew, Inc., Plymouth Mass.
Hubbell, Harvey, Inc., Bridgeport, Ct.
Interstate Iron & Steel Co., Chicago, Ill.
Oliver Iron & Steel Co., Pittsburgh, Pa.
Progressive Mfg. Co., Torrington, Ct.
Topping Bros., 159 Varick St., N. Y. C.

ROD COILING MACHINES

ROD MILL MACHINERY

RODS—Brass and Copper
Baltimore Brass Co., Baltimore, Md.
Rome Brass & Copper Co., Rome, N. Y.
Wheeler Condenser & Engrg. Co., Carteret, N. J.

RODS—Drill
Pittsburgh Tool Steel Wire Co., Monaca, Pa.

RODS—Nickel
Seymour Mfg. Co., Seymour, Ct.

RODS—Nickel Silver
Seymour Mfg. Co., Seymour, Ct.

RODS—Phosphor Bronze
Seymour Mfg. Co., Seymour, Ct.

RODS—Piston

RODS—Welding
Roebling's, John A., Sons Co., Trenton, N. J.

RODS—Wire
Roebling's, John A., Sons Co., Trenton, N. J.

ROLLING MACHINERY—Cold Rolling
Broden & Dailey Construction Co., Cleve., O.

ROLLING MACHINES—Sheet Metal
Quickwork Co., St. Marys, O.

ROLLING MILL MACHINERY
Blake & Johnson Co., Waterbury, Ct.
Garrison, A., Foundry Co., Pittsburgh, Pa.
Lewis Fdry. & Machine Co., Pittsburgh, Pa.
Mesta Mach. Co., Pittsburgh, Pa.
Morgan Construction Co., Worcester, Mass.
Wheeling Mold & Fdry. Co., Wheeling, W. Va.
Youngstown Fdry & Mch. Co., Youngstown, O.

ROLLS—Alloy Steel
Mesta Mach. Co., Pittsburgh, Pa.
Pittsburgh Rolls Corp., Pittsburgh, Pa.
United Engrg. & Fdry. Co., Pittsburgh, Pa.

ROLLS—Bending and Straightening
Bertsch & Co., Cambridge City, Ind.
Bethlehem Steel Company, So. Bethlehem, Pa.
Cleveland Punch & Shear Wks. Co., Cleve., O.
Hilles & Jones Plant of Consolidated Mch. Tool Corp. of America, 17 E. 42nd St., N.Y.C.
Medart Patent Pulley Co., Inc., 4601 Carroll Ave., Chicago, Ill.
Medart & Sherman Mchry. Corp., Room 482, 50 Church St., New York City.
Marshalltown Mfg. Co., Marshalltown, Ia.
Niagara Machine & Tool Works, Buffalo, N. Y.
Southwark Foundry & Machine Co., Phila., Pa.
Wickes Brothers, Saginaw, Mich.

ROLLS—Sand Chilled and Steel
Birdsboro Steel Fdy. & Mch. Co., Birdsboro, Pa.
Hyde Park Fdry. & Mch. Co., Hyde Park, Pa.
Lewis Fdry. & Machine Co., Pittsburgh, Pa.
Mesta Mach. Co., Pittsburgh, Pa.
Pittsburgh Rolls Corp., Pittsburgh, Pa.
United Engrg. & Fdry. Co., Pittsburgh, Pa.
Wheeling Mold & Fdry. Co., Wheeling, W. Va.
Youngstown Fdry & Mch. Co., Youngstown, O.

ROLLS—Special Hardened
Bethlehem Steel Company, So. Bethlehem, Pa.

ROOFING AND SIDING—Corrugated and Plain
American Sheet & Tin Plate Co., Pitts., Pa.
Brier Hill Steel Co., Youngstown, O.
Brown-Wales Co., Boston, Mass.
Robertson, H. H., Co., Pittsburgh, Pa.
Ryerson, Jos. T., & Son, Chicago, Ill.

ROOFING AND SIDING—Iron and Steel
Newport Rolling Mill Co., Newport, Ky.
Wheeling Steel Products Co., Wheeling, W. Va.

ROOFING AND SIDING—Rust Resisting
Robertson, H. H., Co., Pittsburgh, Pa.

ROOFING—Concrete

ROPE AND CORDAGE
Broderick & Bascom Rope Co., St. Louis, Mo.
Leschen A. & Sons Rope Co., St. Louis, Mo.

RUNWAYS—Crane
Blaw-Knox Co., Pittsburgh, Pa.

RUST PREVENTATIVES

SAFETY DEVICES AND SUPPLIES
Hardy, F. A., & Co., Chicago, Ill.

SAND—Molding

SAND—Sand Blast
Cape May Sand Co., Cape May, N. J.

SAND—Silica

SAND—Steel Molding

SEE ADVERTISEMENTS FOR COMPLETE INFORMATION. ALPHABETICAL INDEX—PAGES 222-224.

SAND BLAST EQUIPMENT & MACHINES
Hoover Mfg. Corp., Jersey City, N. J.
Northern Blower Co., Cleveland, O.
Pangborn Corporation, Hagerstown, Md.
Pierson, J. W. Co., Philadelphia, Pa.
Sly, W. W. Mfg. Co., Cleveland, O.

SAND BLAST SHOT AND GRIT
Pangborn Corporation, Hagerstown, Md.

SAND CUTTING AND SCREENING MACHINES
Beardsley-Piper Co., Chicago, Ill.
Whiting Corporation, Harvey, Ill.

SAND MILLS
National Engineering Co., Chicago, Ill.

SAND RAMMERS
Beardsley-Piper Co., Chicago, Ill.
Chicago Pneumatic Tool Co., 6 E. 44th St., New York City

SAND SIFTING MACHINES
Hanna Eng. Works, Chicago, Ill.

SASH OPERATING DEVICES
Deane, G., Co., Bridgeport, Ct.

SASH—Steel
Lupton's, David, Sons Co., Phila., Pa.

SAWING MACHINES—Band for Wood and Metal
Diamond Saw & Stpg. Wks., Buffalo, N. Y.

SAWING MACHINES—Metal
Espen Lucas Mach. Works, Philadelphia, Pa.

SAWING MACHINES—Rail
Vandyck Churchill Co., 52 Vesey St., N. Y. C.

SAWS—Bands for Metal
Armstrong Blum Mfg. Co., Chicago, Ill.
Disston, Henry, & Sons, Inc., Philadelphia, Pa.
Simonds Manufacturing Co., Fitchburg, Mass.

SAWS—Circular Metal
Disston, Henry, & Sons, Inc., Philadelphia, Pa.
F. P. Screw Co., Cleveland, Ohio.
Hunter Saw & Machine Co., Pittsburgh, Pa.
Simonds Manufacturing Co., Fitchburg, Mass.

SAWS—Cold Metal
Disston, Henry, & Sons, Inc., Philadelphia, Pa.
Espen Lucas Mach. Works, Philadelphia, Pa.
United Engrg. & Foy. Co., Pittsburgh, Pa.

SAWS—Friction
Ryerson, Joseph T., & Son, Chicago, Ill.

SAWS—Hack Saw Blades
Disston, Henry, & Sons, Inc., Philadelphia, Pa.
Napier Saw Works Inc., Middletown, N. Y.
Simonds Manufacturing Co., Fitchburg, Mass.
Starrett, L. S., Co., Athol, Mass.

SAWS—Hot Metal
Disston, Henry, & Sons, Inc., Philadelphia, Pa.
Hunter Saw & Machine Co., Pittsburgh, Pa.
United Engrg. & Foy. Co., Pittsburgh, Pa.

SAWS—Inserted Tooth, Cold
Disston, Henry, & Sons, Inc., Philadelphia, Pa.
Hunter Saw & Machine Co., Pittsburgh, Pa.

SAWS—Metal Slitting
Cowles Tool Co., Cleveland, Ohio.
Disston, Henry, & Sons, Inc., Philadelphia, Pa.

SAWS—Screw Slotting
Disston, Henry, & Sons, Inc., Philadelphia, Pa.

SCRAP—Iron and Steel
Briddell, W. C., Co., Inc., Baltimore, Md.
Hiltner's Henry A., Sons Co., Phila., Pa.
Hurwitz Brothers Iron & Metal Co., Inc., Syracuse, N. Y.
International Fuel & Iron Corp., Pittsburgh, Pa.
Lanski, I., & Son, Chicago, Ill.
Lout, E. B. Co., Philadelphia, Pa.
Lurin Bros. & Co., Inc., Woolworth Bldg., New York City
Perry, Boston, Doane Co., Boston, Mass.
Potts, Henry & Co., Philadelphia, Pa.
Smith, Morton B., Co., 243 Front St., N. Y. C.
Sofransky, H., Co., Allentown, Pa.

SCREENS—Perforated Metal
Beckley Perforating Co., Garwood, N. J.
Chicago Perforating Co., Chicago, Ill.
Cross Engineering Co., Carbondale, Pa.
Diamond Mfg. Co., Wyoming, Pa.
Eadie Perforating Co., Rochester, N. Y.
Harrington & King Perforating Co., Chicago.
Hendrick Mfg. Co., Carbondale, Pa.
Mundt, Chas., & Sons, Jersey City, N. J.
Pittsburgh Perforating Co., Pittsburgh, Pa.

SCREENS—Woven Wire
Audubon Wire Cloth Co., Inc., Audubon, N. J.
Ludlow-Saylor Wire Co., The, St. Louis, Mo.

SCREW MACHINE PRODUCTS
Barnes, Wallace Co., Bristol, Ct.
Bell Companies, The, Buffalo, N. Y.
Blake & Johnson Co., Waterbury, Ct.
Bridgeport Machine & Tool Mfg. Co., Inc., Bridgeport, Ct.
Bridgeport Metal Goods Mfg. Co., Bridgeport, Ct.
Brown Bag Filling Machine Co., The, Fitchburg, Mass.
Brown-McLaren Mfg. Co., Detroit, Mich.
Clark, Cable, Harmon Corp., Rochester, N. Y.
Commonwealth Screw Co., Worcester, Mass.
Eastern Boat & Nov. Co., Providence, R. I.
Eastern Machine Screw Co., New Haven, Ct.
Ferry Cap & Set Screw Co., Cleveland, O.
Hoskins Screw Co., Fostoria, O.
Hunter Stamping Works, Detroit, Mich.
Hutson Edward, 66 Hartranft St., Bristol, Ct.
Ideal Tool Manufacturing Co., Hamden, Conn.
Jenkins Mfg. Co., Bloomfield, N. J.
Keystone Tool & Metal Parts Corp., Buffalo, N. Y.
Leahy, John W., Danbury, Ct.
Lind Tool Co., Chicago, Ill.
McClatchie Mfg. Co., Waterbury, Ct.
Miles, F. S., Co., Philadelphia, Pa.
National Acme Co., Cleveland, O.
New Britain Machine Co., New Britain, Ct.
Newton Mfg. Co., Thomaville, Ct.
Ohio Metal Stpg. & Mfg. Co., Akron, O.
Ottenhiller, Wm. H., Co., Inc., York, Pa.
Park Mfg. Company, Worcester, Mass.
Penn Screw & Machine Works, Phila., Pa.
Progressive Mfg. Co., Torrington, Ct.
Rhode Island Tool Co., Providence, R. I.
Scovill Mfg. Co., Waterbury, Conn.
Screw Machine Products Co., Providence, R. I.
Shimer, Samuel J., & Sons, Inc., Milton, Pa.
Steinen, Wm., & Co., Newark, N. J.
Stockbridge Mch. Co., Worcester, Mass.
Torrington Co., Torrington, Ct.
Waltham Screw Co., Waltham, Mass.
Western Automatic Mach. Screw Co., Elyria, O.
Western Screw Prod. Co., St. Louis, Mo.
William Test Clamp Company, Cleveland, O.

SCREW MACHINERY—Automatic
Brown & Sharpe Mfg. Co., Providence, R. I.
New Britain Mach. Co., New Britain, Ct.

SCREW MACHINERY—Automatic Wood
Cook, Asa S., Co., Hartford, Ct.

SCREW MACHINERY—Hand
Garvin Machine Co., 255 Spring St., N. Y. C.
Jones & Lamson Mch. Co., Springfield, Vt.
Warner & Swasey Co., Cleveland, O.

SCREW MACHINERY—Multiple Spindle
Acme Machine Tool Company, Cincinnati, O.
National Acme Co., Cleveland, O.

SCREW MACHINERY—Second-Hand
Harris Bros. Co., Chicago, Ill.
Hill, Clarke & Co., Inc., Boston, Mass.
Lamberg, A., & Co., 241 Centre St., N. Y. C.
Stokvis, R. S. & Sons, Inc., 17 Battery Pl., New York City.

SCREW PLATES
American Tap & Die Co., Greenfield, Mass.
Greenfield Tap & Die Corp., Greenfield, Mass.
Pratt & Whitney Co., 111 Broadway, N. Y. C.

SCREWS—Cap
Clark Bros. Bolt Co., Milldale, Ct.
F. P. Screw Co., Cleveland, O.
Ferry Cap & Set Screw Co., Cleveland, O.
Hartford Machine Screw Co., Hartford, Conn.
Keystone Screw Co., Yardley, Pa.
Keystone Tool & Metal Parts Corp., Buffalo, N. Y.
National Acme Co., Cleveland, O.
Ottenhiller, Wm. H., Co., Inc., York, Pa.
Scovill Mfg. Co., Waterbury, Ct.
Shimer, Samuel J., & Sons, Inc., Milton, Pa.
Standard Screw Prod. Co., Detroit, Mich.
Western Automatic Mch. Screw Co., Elyria, O.
Western Screw Prod. Co., St. Louis, Mo.

SCREWS—Coach and Lag
Kirk Latty Mfg. Co., Cleveland, O.
Pawtucket Mfg. Co., Pawtucket, R. I.

SCREWS—Cold Headed
F. P. Screw Co., Cleveland, O.

SCREWS—Hardened Sheet Metal and Self Tapping
Parker Supply Co., Inc., 785 E. 135th St., New York City.

SCREWS—Machine
American Screw Co., Providence, R. I.
Brown-McLaren Mfg. Co., Detroit, Mich.
Hubbard, Harvey, Inc., Bridgeport, Ct.
Keystone Screw Co., Yardley, Pa.
Miles, F. S., Co., Philadelphia, Pa.
Progressive Mfg. Co., Torrington, Ct.
Scovill Mfg. Co., Waterbury, Conn.

SCREWS—Safety Set
Allen Mfg. Co., The, Hartford, Ct.
Bristol Co., Waterbury, Ct.
Hartford Mach. Screw Co., Hartford, Ct.
Progressive Mfg. Co., Torrington, Ct.

SCREWS—Set
Bristol Co., Waterbury, Ct.
Ferry Cap & Set Screw Co., Cleveland, O.
Hartford Mach. Screw Co., Hartford, Ct.
National Acme Co., Cleveland, O.
Shimer, Samuel J., & Sons, Inc., Milton, Pa.

SCREWS—Thumb Malleable
Devlin, Thomas, Mfg. Co., Phila., Pa.

SCREWS—Wood
American Screw Co., Providence, R. I.
Bridgeport Screw Co., Bridgeport, Ct.
Topping Bros., 159 Varick St., N. Y. C.

SEAMING MACHINES
Quickwork Co., St. Marys, O.

SECOND-HAND MACHINERY—See Clearing House Section
American Ship Building Co., Cleveland, Ohio.
Bath, Cyril J., & Co., Cleveland, Ohio.
Beal, Jos., & Co., Boston, Mass.
Bourgeois, H. H., 200 West St., New York City.
Briggs, Marvin, Inc., Brooklyn, N. Y.
Crawford, L. H., 290 Broadway, N. Y. C.
Efco Mfg. & Supply Co., Erie, Pa.
Lamson & Sessions Co., Chicago, Ill.
Lamson & Mac Supply Co., Boston, Mass.
Federal Mchry. Sales Co., Chicago, Ill.
Hooton Equip. & Supply Co., 110 West 40th Street, New York City.
Howard & Bullough Am. Co., Boston, Mass.
Freidus Machry. Co., 174 Centre St., N. Y. C.
Goodman Machinery Co., 50 Church St., N. Y. C.
Graves Machry. Exch., 50 Church St., N. Y.
Harris, B. W., & Leo Co., Minneapolis, Minn.
Hill, Clarke & Co., Inc., Boston, Mass.
Hill, Clarke & Co. of Chicago, Chicago, Ill.
Hiltner's, Henry A., Sons Co., Phila., Pa.
Ideal Machry. Co., Plainville, Ct.
Johnson Wm. C. & Sons Machry. Co., St. Louis, Mo.
Klein, Nathan & Co., Centre & Howard Sts., New York City.
Lamberg, A., & Co., 241 Centre St., N. Y. C.
Lodge & Shipley Mch. Tool Co., Cincinnati, O.
Lynd-Farquhar Co., Boston, Mass.
McCabe, J. J., Lathe & Machry. Corp., 149 Broadway, New York City.
McCabe & Sheeran Machinery Corp., Room 482, 50 Church St., New York City.
McCoy-Brandt Machinery Co., Pittsburgh, Pa.
Machinery Dealers Inc., New Haven, Ct.
Manufacturers Machine Tool & Supply Co., Inc., Bridgeport, Ct.
Mines Machry. Co., Saginaw, Mich.
Mundt & Co., Inc., 110 Bleecker St., N. Y. C.
Nashville Industrial Corp., Old Hickory, Tenn.
N. Y. Machry. Exch., 50 Church St., N. Y. C.
Niles-Bement-Pond Co., 111 B'way, N. Y. C.
Niles, F. H., & Co., Inc., Woolworth Bldg., New York City.
Nilson, A. H., Mach. Co., Bridgeport, Ct.
Nuttall, John, Philadelphia, Pa.
Osborne & Sexton Machry. Co., Columbus, O.
Ould, D. C., & Company, Cleveland, O.
Philadelphia Mchry. Exchange, Phila., Pa.
Prentiss, Henry, & Co., Inc., 149 Broadway, New York City.
Prichard, C. W., Co., Inc., 50 Church St., New York City.
Reading Engineering Wks., Reading, Pa.
Riverside Machinery Depot, Detroit, Mich.
Russell Machine Co., Pittsburgh, Pa.
Ryerson, Joseph T., & Son, Chicago, Ill.
Scully-Jones & Co., Chicago, Ill.
Sherwood, E. C., 50 Church St., N. Y. C.
Simmons Mach. Co., Inc., Albany, N. Y.
Stuckley, E. B., Mchry. Co., Detroit, Mich.
Stucker Remedy Wacks Co., Chicago, Ill.
Toomey, Frank, Inc., Philadelphia, Pa.
Ullian, Jacob, Buffalo, N. Y.
Waterville Machine Works, Waterlurn, Ct.
Wayne Machry. Co., Ft. Wayne, Ind.
White, A. D., Machry. Co., Chicago, Ill.
Wickes Machinery Co., Jersey City, N. J.
Zelnicker, Walter A., Supply Co., St. Louis, Mo.

SEPARATORS—Magnetic
Magnetic Mfg. Company, Milwaukee, Wis.

SEPARATORS—Oil from Chips
Ideal Concrete Machry. Co., Cincinnati, O.

SEPARATORS—Ore
Magnetic Mfg. Co., Milwaukee, Wis

SHAFTING—Cam, Worm, Turbine and Crusher
National Forge & Tool Co., Irvine, Pa.

SHAFTING—Cold Drawn
Bethlehem Steel Company, So. Bethlehem, Pa.
Moltrup Steel Prod. Co., Beaver Falls, Pa.
Morris, Wheeler & Co., Philadelphia, Pa.
National Drawn Steel Co., East Liverpool, O.
Peerless Drawn Steel Co., Massillon, O.
Ryerson, Jos. T. & Son, Chicago, Ill.
Union Drawn Steel Co., Beaver Falls, Pa.
Ward's, Edgar T., Sons Co., Boston, Mass.

SHAFTING—Flexible
Binghamton Flexible Shaft Co., Binghamton, N. Y.
Chicago Flexible Shaft Co., Chicago, Ill.
Stow Manufacturing Co., Binghamton, N. Y.
Strand, N. A., & Company, Chicago, Ill.

SHAFTING—Steel
Musta Mach. Co., Pittsburgh, Pa.
Ullian, Jacob, Buffalo, N. Y.

SHAFTING—Tubular Material For
National Tube Co., Pittsburgh, Pa.

SHAFTING—Turned and Polished
Fitzsimons Co., Youngstown, O.

SHAPES—Brass and Copper
Baltimore Brass Co., Baltimore, Md.
Rome Brass & Copper Co., Rome, N. Y.

SHAPES—Cold Drawn
Bethlehem Metallic Door Co., Jamestown, N. Y.
Peerless Drawn Steel Co., Massillon, O.
Ward's, Edgar T., Sons Co., Boston, Mass.

SHAPES—Pressed Steel
Prest-O-Lite Co., Inc., 30 E. 42nd St., N. Y. C.

SHAPES—Steel
Phoenix Iron Co., Philadelphia, Pa.
Ryerson, Jos. T. & Son, Chicago, Ill.
Shippers' Car Line, Inc., 165 B'way., N. Y. C.

SHAPING MACHINES—Horizontal
American Tool Works Co., Cincinnati, O.
Cincinnati Shaper Co., Cincinnati, O.
Cleveland Punch & Shear Works Co., Cleveland, O.
Gould & Eberhardt, Newark, N. J.
Niles-Bement-Pond Co., 111 B'way., N. Y. C.
Ohio Machine Tool Co., Kenton, O.

SEE ADVERTISEMENTS FOR COMPLETE INFORMATION. ALPHABETICAL INDEX—PAGES 222-224.

SHAPING MACHINES—Vertical

SHEAR BLADES

SHEARING MACHINES—Alligator

Pels, Henry, & Co., 90 West St., N. Y. C.
Stolz, D. H., Co., Buffalo, N. Y.

SHEARING MACHINES—Angle, Hand and Power

Chambersburg Engrg. Co., Chambersburg, Pa.
New York City.

SHEARING MACHINES—Bar

Chambersburg Engrg. Co., Chambersburg, Pa.

SHEARING MACHINES—Beam and Channel

Chambersburg Engrg. Co., Chambersburg, Pa.

SHEARING MACHINES—Bench

SHEARING MACHINES—Billet

United Engrg. & Fdry. Co., Pittsburgh, Pa.

SHEARING MACHINES—Doubling and Squaring

SHEARING MACHINES—Metal Slitting

Yoder Co., Cleveland, O.

SHEARING MACHINES—Metal Slitting, Gang

Yoder Co., Cleveland, O.

SHEARING MACHINES—Plate

Beatty Mach. & Mfg. Co., Hammond, Ind.
Covington Machine Co., Inc., Covington, Va
Garrison, A., Fdry. Co., Pittsburgh, Pa.
Pels, Henry, & Co., 90 West St., N. Y. C.
Ryerson, Jos. T., & Son, Chicago, Ill.
Yoder Co., Cleveland, O.

SHEARING MACHINES—Plate Slitting

SHEARING MACHINES—Rotary

SHEET METAL MACHINERY

Adriance Machine Works, Inc., Brooklyn, N. Y.
Bliss, E. W., Co., Brooklyn, N. Y.
Excelsior Tool & Mch. Co., East St. Louis, Ill.
Lodtz Chas., & Co., Brooklyn, N. Y.
Southwark Fdry. & Mach. Co., Phila., Pa.
V. & O. Press Co., Glendale, L. I., N. Y.

SHEETS—Aluminum

SHEETS—Black

Eastern Rolling Mill Co., Baltimore, Md.
Lindsay, Jas. G., & Co., Inc., Philadelphia, Pa.
Otis Steel Co., Cleveland, O.
Ryerson, Jos. T., & Son, Chicago, Ill.
Trumbull Steel Company, The, Warren, O.
Wheeling Steel Products Co., Wheeling, W.Va.
Youngstown Sheet & Tube Co., Youngstown, Ohio.

SHEETS—Blue Annealed

Falcon Steel Co., Niles, Ohio.
Inland Steel Co., Chicago, Ill.
Morris, Wheeler & Co., Philadelphia, Pa.
Newport Rolling Mill Co., Newport, Ky.
Trumbull Steel Company, The, Warren, O.
Wheeling Steel Products Co., Wheeling, W.Va.

SHEETS—Brass and Copper

Chase Metal Works, Waterbury, Ct.
Rome Brass & Copper Co., Rome, N. Y.
Scovill Mfg. Co., Waterbury, Ct.

SHEETS—Duralumin

Baush Machine Tool Co., Springfield, Mass.

SHEETS—Electrical

American Sheet & Tin Plate Co., Pitts., Pa.
Trumbull Steel Company, The, Warren, O.
Wheeling Steel Prod. Co., Wheeling, W. Va.

SHEETS—Enameling Stock

SHEETS—For Drawing and Stamping

Central Steel Company, Massillon, Ohio.
Eastern Rolling Mill Co., Baltimore, Md.
Falcon Steel Co., Niles, Ohio.
Firth-Sterling Steel Co., McKeesport, Pa.
Lindsay, Jas. G., & Co., Inc., Philadelphia, Pa.
Otis Steel Co., Cleveland, O.
Mansfield Sheet & Tin Plate Co., Mansfield, O.
Seneca Iron & Steel Co., Buffalo, N. Y.
Ward's, Edgar T., Sons Co., Boston, Mass.

SHEETS—Galvanized, Flat and Corrugated

American Sheet & Tin Plate Co., Pitts., Pa.
Brown, Ernest L., Boston, Mass.
Brown-Wailes Co., Boston, Mass.
Falcon Steel Co., Niles, Ohio.
Inland Steel Co., Chicago, Ill.
Newport Rolling Mill Co., Newport, Ky.
Trumbull Steel Co., Warren, Ohio.
Wheeling Steel Products Co., Wheeling, W.Va.
Youngstown Sheet & Tube Co., Youngstown, Ohio.

SHEETS—Nickel Silver

SHEETS—Phosphor Bronze

Phosphor Bronze Smelting Co., Phila., Pa.
Seymour Mfg. Co., Seymour, Ct.

SHELVING—Steel

Lupton's, David, Sons Co., Phila., Pa.
United Alloy Steel Corp., Canton, O.

SHERARDIZING

Bridgeport Chain Co., Bridgeport, Conn.
Globe Machine & Stamping Co., Cleveland, O.

SHIP BUILDERS' MATERIAL

Topping Bros., 159 Varick St., N. Y. C.

SHOT FOR SAND BLAST—See Sand Blast Shot and Grit

SHUTTERS—Steel and Wood Bi-Folding

Kinnear Mfg. Co., Columbus, O.

SIEVES

Jelliff, George H., & Son, New Canaan, Ct.

SKIM GATES

Sterling Wheelbarrow Co., Milwaukee, Wis.

SKYLIGHTS

Robertson, H. H., Co., Pittsburgh, Pa

SLEEVES—Drill and Reamer

SLINGS—Wire Rope

Roebling's, John A., Sons Co., Trenton, N. J.

SLOTTING MACHINES

Garvin Mach Co., 255 Spring St., N. Y. C.
Niles Bement-Pond Co., 111 B'way, N. Y. C.

SNIPS

Bartlett Mfg. Co., Detroit, Mich.

SOCKETS—Drill

SOCKETS—Wire Rope

SOLDERING AND BRAZING OUTFITS

Prest-O-Lite Co., Inc., 30 E. 42d St., N. Y. C.

SPECIAL MACHINERY

Allen Iron & Steel Co., Philadelphia, Pa.
Birdsboro Steel Fdy. & Mch. Co., Birdsboro, Pa.
Blodgett Engineering & Tool Co., Detroit, Mich.
Bucher-Smith Co., The, East Liverpool, O.
Carthage Machine Company, Carthage, N. Y.
Federal Signal Co., Albany, N. Y.
Hanna Engrg. Works, Chicago, Ill.
Hartford Special Machinery Co., Hartford, Ct.
Lodtz Chas., & Co., Brooklyn, N. Y.
Littell, F. J., Machine Co., Chicago, Ill.
McGann Mfg. Company, Inc., York, Pa.
Millholland Mach. Co., Indianapolis, Ind.
Moody, Chas. J., Elgin, Ill.
Powell Mfg. Company, Baltimore, Md.
Scotchman Foundry & Machine Co., Phila., Pa.
Torrington Mfg. Co., Torrington, Ct.
Ulmer, J. C., Company, Cleveland, O.
Wagenhorst, F. A. & Sons, 22-26 Front St., Brooklyn, N. Y.
Wheeling Mold & Fdry. Co., Wheeling, W. Va.
Yoder Co., Cleveland, O.
York Electric & Mach. Co., York, Pa.

SPEED REDUCERS

Jones, W. A., Fdry & Mch. Co., 4434 West Roosevelt Road, Chicago, Ill.

SPIEGELEISEN

Bethlehem Steel Company, So. Bethlehem, Pa.
Rogers, Brown & Co., Cincinnati, O.

SPIKES

American Steel & Wire Co., Chicago, Ill.
Atlas W. & Co. Jersey City, N. J.
Bethlehem Steel Company, So. Bethlehem, Pa.
Illinois Steel Co., Chicago, Ill.
Topping Bros., 159 Varick St., N. Y. C.

SPINDLES—Grinding

SPRING MAKING MACHINERY

Baird Machine Co., Bridgeport, Ct.
Sleeper & Hartley, Inc., Worcester, Mass.

SPRINGS—Wire

Advance Spring & Wire Co., Chicago, Ill.
American Steel & Wire Co., Chicago, Ill.
Barnes, Wallace, Co., Bristol, Ct.
Bridgeport Chain Co., Bridgeport, Ct.
Cook Spring Co., Ann Arbor, Mich.
Cuyahoga Spring Co., Cleveland, O.
Dunbar Bros. Co., Bristol, Ct.
Fischer, Chas., Spring Co., Brooklyn, N. Y.
Gibson, Wm. D., Co., Chicago, Ill.
Lee Spring Co., Brooklyn, N. Y.
Muttatuck Mfg. Co., Waterbury, Ct.
Newcomb Spring Corp., Brooklyn, N. Y.
Page Steel & Wire Co., Bridgeport, Ct.
Washburn Wire Co., 118th St. & Harlem River, N. Y. C.
Wickwire Spencer Steel Corp., Liggett Bldg., New York City.

SPROCKETS

Baldwin Chain & Mfg. Co., Worcester, Mass.
Cullman Wheel Co., Chicago, Ill.
Link-Belt Co., Chicago, Ill.
Union Chain & Mfg. Co., Sandusky, O.

SPRUE CUTTERS

Hanna Eng. Works, Chicago, Ill.
Shuster, F. B., Co., New Haven, Conn.

STACKS—Steel

Hendrick Manufacturing Co., Carbondale, Pa.
Pennsylvania Furnace & Iron Co., Warren, Pa.
Pittsburgh-Des Moines Steel Co., Pitts., Pa.

STAMPINGS OR DRAWINGS—Metal

American Lube & Stamping Co., Bridgeport, Ct.
Ansonia Novelty Company, Ansonia, Conn.
Beaver Mch. & Tool Co., Inc., Newark, N. J.
Blodgett Engineering & Tool Co., Detroit, Mich.
Bridgeport Mch. & Tool Mfg. Co., Inc., Bridgeport, Ct.
Bridgeport Metal Goods Mfg. Co., Bridgeport, Ct.
Bridgeport Silverware Mfg. Corp., Bridgeport, Ct.
Budd, Edw. G., Mfg. Co., Philadelphia, Pa.
Burgess-Norton Mfg. Co., Geneva, Ill.
Crosby Co., Buffalo, N. Y.
Dail Steel Products Co., Lansing, Mich.
Detroit Stamping Co., Detroit, Mich.
Fourchine Mfg. Co., Inc., Clinton, N. J.
Gem Stamped Steel Co., Boston, Mass.
General Machine & Mfg. Co., The, Bridgeport, Conn.
Gibson, Wm. D., Co., Chicago, Ill.
Globe Machine & Stamping Co., Cleveland, O.

SEE ADVERTISEMENTS FOR COMPLETE INFORMATION. ALPHABETICAL INDEX—PAGES 222-224.

Geyer Co., The, Williamantic, Ct.
Gray, Peter, & Sons, Inc., Cambridge, Mass.
Great Lakes Pressed Steel Corp., Buffalo, N.Y.
Hayward Stamping Co., Detroit, Mich.
Henwood Bauer Mfg. Co., Philadelphia, Pa.
Hubbard Spring Works, Pontiac, Mich.
Industrial Equip. Co., Munster, Ohio.
Johnson, B. C., & Co., Newark, N. J.
Johnston Tool & Mfg. Co., Inc., Chappaqua, N. Y.
Kirk & Blum Mfg. Co., Cincinnati, O.
Koehler Mfg. Co., Inc., Morrissey Mass.
Konigslow, E., Stamping & Tool Co., The, Cleveland, O.
Larson Tool & Stpg. Co., Attleboro, Mass.
Machine Products Co., San Francisco, Cal.
Mattatuck Mfg. Co., Waterbury, Ct.
Matthews, H. A., Mfg. Co., Seymour, Ct.
Matthews Mfg. Co., Worcester, Mass.
Mechanics Tool & Stpg. Co., Worcester, Mass.
Mohr Specialty Co., Cincinnati, O.
Mossy Mfg. Co., Kensington, Ct.
National Blank Book Co., Holyoke, Mass.
National Umbrella Frame Co., Philadelphia, Pa.
New England Pressed Steel Co., Natick, Mass.
New England Tube & Stpg. Co., Inc., West Haven, Ct.
N. Y. Metal Ceiling Co., 507 W. 24th St., New York City.
Ohio Metal Stpg. & Mfg. Co., Akron, O.
Parish & Bingham Corp., Cleveland, O.
Robinson Loop Works, Inc., Waterbury, Conn.
Rockford Iron Works, Rockford, Ill.
Rome Mfg. Company, Rome, N. Y.
Root Co., Bristol, Ct.
Sewall Mfg. Co., Waterbury, Conn.
Sessions, J. H., & Son, Bristol, Ct.
Seymour Metal Goods Co., Seymour, Ct.
Soss Mfg. Co., Inc., Brooklyn, N. Y.
Stanley Works, New Britain, Ct.
Stewart-Skinner Company, Worcester, Mass.
Stillman, Oliver P., Inc., Brooklyn, N. Y.
Superior Metal Products Co., Elyria, O.
Thomaston Metal Works, Thomaston, Ct.
Torrington Co., Torrington, Ct.
Transue & Williams Steel Forging Corp., Alliance, O.
Trant & Hine Mfg. Co., New Britain, Ct.
Wagner, E. R., Mfg. Co., N. Milwaukee, Wis.
Waterbury Buckle Co., Waterbury, Conn.
William Test Clamp Company, Cleveland, O.
Worcester Pressed Steel Co., Worcester, Mass.
Worcester Stamped Metal Co., Worcester, Mass.

STAMPS—Steel Alphabets and Figures

Matthews, J. H., & Co., Pittsburgh, Pa.
Pannier Bros. Stamp Co., Pittsburgh, Pa.
Schoder & Lombard Co., 202-204 Centre St., New York City.
Schwerdtle Stamp Co., Bridgeport, Ct.

STANDPIPES

Blaw-Knox Co., Pittsburgh, Pa.
Lancaster Iron Works, Inc., Lancaster, Pa.

STANDS—Drill

Whitman & Barnes Mfg. Co., Akron, Ohio.

STAPLE MACHINES

Sleeper & Hartley, Inc., Worcester, Mass

STAPLES

American Steel & Wire Co., Chicago, Ill.
Cobb & Drew, Inc., Plymouth, Mass.
Titchener, E. H., & Co., Binghamton, N. Y.

STEEL—Alloy

Central Steel Company, Massillon, Ohio.
Disston, Henry, & Sons, Inc., Philadelphia, Pa.
Eddystone Steel Co., Crum Lynne, Pa.
Firth-Sterling Steel Co., McKeesport, Pa.
Interstate Iron & Steel Co., Chicago, Ill.
National Drawn Steel Co., East Liverpool, O.
Peerless Drawn Steel Co., Massillon, O.
Ryerson, Jos. T., & Son, Chicago, Ill.
United Alloy Steel Corp., Canton, O.
Vanadium-Alloy Steel Company, Latrobe, Pa.
Ward's, Edgar T., Sons Co., Boston, Mass.

STEEL—Bright Finished

Union Drawn Steel Co., Beaver Falls, Pa.

STEEL—Carbon

Bethlehem Steel Company, So. Bethlehem, Pa.
Carnegie Steel Co., Pittsburgh, Pa.
Firth-Sterling Steel Co., McKeesport, Pa.
Interstate Iron & Steel Co., Chicago, Ill.
Vanadium-Alloy Steel Company, Latrobe, Pa.

STEEL—Chrome

Andrews Steel Co., Newport, Ky.
Central Steel Company, Massillon, Ohio.
Vulcan Crucible Steel Co., Aliquippa, Pa.

STEEL—Chrome Nickel

Central Steel Company, Massillon, Ohio.
Interstate Iron & Steel Co., Chicago, Ill.

STEEL—Chrome Vanadium

Central Steel Company, Massillon, Ohio.
Disston, Henry, & Sons, Inc., Philadelphia, Pa.
Interstate Iron & Steel Co., Chicago, Ill.
Vulcan Crucible Steel Co., Aliquippa, Pa.

STEEL—Cold Drawn

American Steel & Wire Co., Chicago, Ill.
Fitzsimons Co., Youngstown, O.
Interstate Iron & Steel Co., Chicago, Ill.
Moltrup Steel Products Co., Beaver Falls, Pa.
National Drawn Steel Co., East Liverpool, O.
Peerless Drawn Steel Co., Massillon, O.
Pittsburgh Tool Steel Wire Co., Monaca, Pa.
Standard Gauge Steel Co., Beaver Falls, Pa.
Union Drawn Steel Co., Beaver Falls, Pa.
Union Spring & Mfg. Co., Pittsburgh, Pa.
Ward's, Edgar T., Sons Co., Boston, Mass.
Wetherell Bros. Co., Cambridge, 39, Mass.

STEEL—Cold Rolled Strips

Acme Steel Goods Co., Chicago, Ill.
American Steel & Wire Co., Chicago, Ill.
American Tube & Stpg. Co., Bridgeport, Ct.
Athenia Steel Co., 135 William St., N. Y. C.
Carnegie Steel Co., Pittsburgh, Pa.
Disston, Henry, & Sons, Inc., Philadelphia, Pa.
Elliott-Blair Steel Co., New Castle, Pa.
Great Steel Company, Dover, O.
Griffin Mfg. Co., Erie, Pa.
Morris & Bailey Steel Co., Pittsburgh, Pa.
National Umbrella Frame Co., Philadelphia, Pa.
Standard Underg. Cable Co., Baltimore, Md.
Superior Steel Corp., Union Arcade, Pittsburgh, Pa.
Trumbull Steel Company, The, Warren, O.
Ward's, Edgar T., Sons Co., Boston, Mass.
Washburn Wire Co., 118th St. & Harlem River, N. Y. C.
West Leechburg Steel Co., Pittsburgh, Pa.
Wetherell Bros. Co., Cambridge, 39, Mass.
Wickwire Spencer Steel Corp., Liggett Bldg., New York City.
Worcester Pressed Steel Co., Worcester, Mass.

STEEL—Crucible

Bethlehem Steel Company, So. Bethlehem, Pa.
Disston, Henry, & Sons, Inc., Philadelphia, Pa.
Firth-Sterling Steel Co., McKeesport, Pa.
Vanadium-Alloy Steel Company, Latrobe, Pa.
Vulcan Crucible Steel Co., Aliquippa, Pa.
Ward's, Edgar T., Sons Co., Boston, Mass.

STEEL—Cutlery

Disston, Henry, & Sons, Inc., Philadelphia, Pa.
Firth-Sterling Steel Co., McKeesport, Pa.
Firth, Thomas & Sons, Inc., 312 Hudson St., New York City.
Wardlow, S. & C., 278 Pearl St., N. Y. C.
Wetherell Bros. Co., Cambridge, 39, Mass.

STEEL—Die

Central Steel Company, Massillon, Ohio.
Disston, Henry, & Sons, Inc., Philadelphia, Pa.
Firth Sterling Steel Co., McKeesport, Pa.

STEEL—Electric

Bethlehem Steel Company, So. Bethlehem, Pa.
Disston, Henry, & Sons, Inc., Philadelphia, Pa.
Firth-Sterling Steel Co., McKeesport, Pa.
Illinois Steel Co., Chicago, Ill.
United Alloy Steel Corp., Canton, O.

STEEL—High Speed

Bethlehem Steel Company, So. Bethlehem, Pa.
Disston, Henry, & Sons, Inc., Philadelphia, Pa.
Firth-Sterling Steel Co., McKeesport, Pa.
Hawkridge Bros. Co., Boston, Mass.
Ryerson, Jos. T., & Son, Chicago, Ill.
Simonds Mfg. Co., Lockport, N. Y.
Vanadium-Alloy Steel Company, Latrobe, Pa.
Vulcan Crucible Steel Co., Aliquippa, Pa.

STEEL—Hot Rolled Strips

Acme Steel Goods Co., Chicago, Ill.
American Tube & Stpg. Co., Bridgeport, Ct.
Barnes, Wallace, Co., Bristol, Ct.
Central Steel Company, Massillon, Ohio.
Griffin Mfg. Co., Erie, Pa.
Harrisburg Pipe & Pipe Bending Co., Harrisburg, Pa.
Hawkridge Bros. Co., Boston, Mass.
Laclede Steel Co., St. Louis, Mo.
Stanley Works, New Britain, Ct.
Steel & Tube Co. of America, Chicago, Ill.
Superior Steel Corp., Union Arcade, Pittsburgh, Pa.
Trumbull Steel Company, The, Warren, O.
West Leechburg Steel Co., Pittsburgh, Pa.

STEEL—Magnet

Simonds Mfg. Co., Lockport, N. Y.

STEEL—Nickel

Betz-Pierce Co., The, Cleveland, O.
Central Steel Company, Massillon, Ohio.
Interstate Iron & Steel Co., Chicago, Ill.

STEEL—Open Hearth

Andrews Steel Co., Newport, Ky.
International Fuel & Iron Corp., Pittsburgh, Pa.
Interstate Iron & Steel Co., Chicago, Ill.
Pacific Coast Steel Co., San Francisco, Cal.
Peerless Drawn Steel Co., Massillon, O.
Steel & Tube Co. of America, Chicago, Ill.
United Alloy Steel Corp., Canton, O.
Vulcan Crucible Steel Co., Aliquippa, Pa.

STEEL—Open Hearth, Low and High Carbon

Interstate Iron & Steel Co., Chicago, Ill.
Vulcan Crucible Steel Co., Aliquippa, Pa.

STEEL—Screw

American Steel & Wire Co., Chicago, Ill.
Betz-Pierce Co., The, Cleveland, O.
Peerless Drawn Steel Co., Massillon, O.
Union Drawn Steel Co., Beaver Falls, Pa.

STEEL—Special Analysis

Central Steel Company, Massillon, Ohio.
Interstate Iron & Steel Co., Chicago, Ill.
Simonds Mfg. Co., Lockport, N. Y.
West Leechburg Steel Co., Pittsburgh, Pa.

STEEL—Spring

Athenia Steel Co., 135 William St., N. Y.
Bethlehem Steel Company, So. Bethlehem, Pa.
Central Steel Company, Massillon, Ohio.
Disston, Henry, & Sons, Inc., Philadelphia, Pa.
Interstate Iron & Steel Co., Chicago, Ill.
Patrignelle & Bell, 351 West St., N. Y. C.
Ward's, Edgar T., Sons, Co., Boston, Mass.

STEEL—Stainless

Bethlehem Steel Company, So. Bethlehem, Pa.
Firth-Sterling Steel Co., McKeesport, Pa.
Firth, Thomas & Sons, Inc., 312 Hudson St., New York City.

STEEL—Tool

Bethlehem Steel Co., South Bethlehem, Pa.
Disston, Henry, & Sons, Inc., Philadelphia, Pa.
Federal Tool & Alloy Steel Corp., 66 Rutledge St., Brooklyn, N. Y.
Firth-Sterling Steel Co., McKeesport, Pa.
Hawkridge Bros. Co., Boston, Mass.
Milne, A. & J., 64 Washington St., N. Y.
New Metal Tool Steel Co., New London, Ct.
Patrignelle & Bell, 351 West St., N. Y. C.
Penn Tool Steel Co., Philadelphia, Pa.
Simonds Mfg. Co., Lockport, N. Y.
Vulcan Crucible Steel Co., Aliquippa, Pa.
Ward's, Edgar T., Sons Co., Boston, Mass.
Wardlow, S. & C., 278 Pearl St., N. Y. C.
Wetherell Bros. Co., Cambridge, 39, Mass.

STEEL—Uranium

Standard Alloys Co., Pittsburgh, Pa.

STEEL—Welding

Federal Tool & Alloy Steel Corp., 66 Rutledge St., Brooklyn, N. Y.
Vulcan Crucible Steel Co., Aliquippa, Pa.

STEEL BUILDINGS

Austin Co., Cleveland, O.
Brossard Engineering, Philadelphia, Pa.
Berlin Construction Co., Inc., Berlin, Ct.
Blaw-Knox Co., Pittsburgh, Pa.
De Can, Richard, Company, Philadelphia, Pa.
Erie Steel Construction Co., Erie, Pa.
Hedwood Bridge Co., Chicago, Ill.
McClintic-Marshall Co., Pittsburgh, Pa.
Shoemaker-Satterthwait Bridge Co., Pottstown, Pa.

STEEL PLANTS AND ROLLING MILLS

Freyn, Brassert & Co., Chicago, Ill.
McKee, Arthur G., & Co., Cleveland, O.

STEEL PLATE CONSTRUCTION

Blaw-Knox Co., Pittsburgh, Pa.
Buffalo Pitts Co., Buffalo, N. Y.
Cruse-Kemper Co., Ambler, Pa.
Hammond Iron Works, Warren, Pa.
Heltzel Steel Form & Iron Co., Warren, O.
Hendrick Mfg. Co., Carbondale, Pa.
Pennsylvania Furnace & Iron Co., Warren, Pa.
Petroleum Iron Works Co., Sharon, Pa.
Pittsburgh-Des Moines Steel Co., Pitts., Pa.
Riter-Conley Company, Pittsburgh, Pa.
Sharpsville Boiler Wks. Co., Sharpsville, Pa.
Sotter Bros., Inc., Pottstown, Pa.
Tippett & Wood, Phillipsburg, N. J.
Wangler, Joseph F., Boiler & Sheet Iron Works Co., St. Louis, Mo.

STEEL TYPE

Schoder & Lombard Co., 202-204 Centre St., New York City.

STEPS—Safety

Irving Iron Wks. Co., Long Island City, N. Y.

STILLS—Gasoline High Pressure

Blaw-Knox Co., Pittsburgh, Pa.

STOCKS AND DIES

Jarecki Mfg. Co., Erie, Pa.
Jones & Lamson Mach. Co., Springfield, Vt.
Saunders', D., Sons, Yonkers, N. Y.

STOKERS

Babcock & Wilcox Co., 85 Liberty St., N. Y. C.
Under-Feed Stoker Co. of America, Worcester, Mass.

STOPPERS—Open-Hearth Furnace

McCullough-Dalzell Crucible Co., Pitts., Pa.

STOVE TRIMMINGS

Matthews Mfg. Co., Worcester, Mass.

STOVES—Hot Blast

Smythe, S. R., Co., Pittsburgh, Pa.

STRAIGHTENING AND CUTTING MACHINES

Shuster, F. B., Co., New Haven, Conn.

STRAIGHTENING MACHINES

Medart Company, The, St. Louis, Mo.
Shuster, F. B., Co., New Haven, Conn
Whitney Metal Tool Co., Rockford, Ill.

STRUCTURAL IRON AND STEEL WORK

Austin Co., Cleveland, O.
Belmont Iron Works, Philadelphia, Pa.
Berlin Construction Co., Inc., Berlin, Ct.
Bethlehem Steel Company, So. Bethlehem, Pa.
Blaw-Knox Co., Pittsburgh, Pa.
Chesapeake Iron Works, Baltimore, Md.
Erie Steel Construction Co., Erie, Pa.
Ingalls Iron Works Co., The, Birmingham, Ala.
McClintic-Marshall Company, Pittsburgh, Pa.
Minneapolis Steel & Machy. Co., Minneapolis, Minn.
Morris, Wheeler & Co., Philadelphia, Pa.
Phoenix Iron Co., Philadelphia, Pa.
Pittsburgh-Des Moines Steel Co., Pitts., Pa.
Snead Architectural Iron Wks., Louisville, Ky.
Virginia Bridge & Iron Co., Roanoke, Va.
Western Drop Forge Co., Marion, Ind.

SULPHATE OF IRON

American Steel & Wire Co., Chicago, Ill.

SUPERHEATERS

Babcock & Wilcox Co., 85 Liberty St., N. Y. C.
Power Specialty Co., 111 B'way, N. Y. C.

SWAGING MACHINES

Etna Machine Co., Toledo, O.
Torrington Co., Torrington, Ct.

SWITCHBOARDS

Electric Controller & Mfg. Co., Cleveland, O.

SEE ADVERTISEMENTS FOR COMPLETE INFORMATION. ALPHABETICAL INDEX—PAGES 222-224.

SWITCHES—Electric

TACKS

TANKS—Compressed Air, Gas, Oil and Water

TANKS—Elevated Water

TANKS—Gasoline and Oil

TANKS—Iron and Steel

TANKS—Second-Hand

TANKS—Seamless Steel

TANKS—Welded

TANKS—Wood

TAPES—Steel

TAPPING MACHINES
Whitney Metal Tool Co., Rockford, Ill.

TAPS AND DIES
Alvord Reamer & Tool Co., Millersburg, Pa.

TAR EXTRACTORS

TEES—See Angles, Beams, Channels and

TELEGRAPH AND TELEPHONE LINE MATERIAL

TELEPHONE—Interior
Screw Machine Products Corp., Providence, R. I.

TERNE PLATES
American Sheet & Tin Plate Co., Pitts., Pa.
Standard Tin Plate Co., Canonsburg, Pa.

THERMOMETERS—Recording

THREAD CUTTING MACHINES

THREAD ROLLING MACHINES

THREADING MACHINES—Bolt and Stud
National Acme Co., Cleveland, O.

TIE PLATES

TIES—Bale
American Steel & Wire Co., Chicago, Ill.

TIES—Creosoted
Jennison-Wright Co., Toledo, O.

Time Recording Machines

TIN PLATE
American Sheet & Tin Plate Co., Pitts., Pa.
Brown, Ernest L., Boston, Mass.
Lindsay, Jas. G. & Co., Inc., Philadelphia, Pa.
Standard Tin Plate Co., Canonsburg, Pa.
Wheeling Steel Products Co., Wheeling, W. Va.

TINNERS' TOOLS AND MACHINES
Niagara Machine & Tool Works, Buffalo, N. Y.

TINWARE MACHINERY

TIRE SETTING MACHINES—Hydraulic
West Tire Setter Co., Rochester, N. Y.

TOOL HOLDERS
Armstrong Bros. Tool Co., Chicago, Ill.
Wardwell, J. H. & Co., 57 Richards St., New York City

TOOL STANDS
Lupton's, David, Sons Co., Philadelphia, Pa.

TOOLS, JIGS, FIXTURES, ETC.—See Jigs, Fixtures, Tools, Etc.

TOOLS—Carpenters
Starrett, L. S., & Co., Athol, Mass.

TOOLS—Lathe
Armstrong Bros. Tool Co., Chicago, Ill.
Lovejoy Tool Co., Inc., Springfield, Vt.

TOOLS—Machinists
Starrett, L. S., Co., Athol, Mass.
Topping Bros., 159 Varick St., N. Y. C.

TOOLS—Screw Machine
Foster Machine Co., Elkhart, Ind.

TOOLS—Steam and Gas Fitters
Saunders', D., Sons, Yonkers, N. Y.

TORCHES—Welding and Cutting
Air Reduction Sales Co., 342 Madison Ave., N.Y.
Milburn, Alexander, Co., Baltimore, Md.

TOWERS—Steel
Cardwell, W. E., Co., 1940 Brook St., Louisville, Ky.
Pittsburgh Des Moines Steel Co., Pitts., Pa.

TOWERS—Transmission
Pittsburgh, Pa.

TOWERS—Water—See Tanks—Elevated Water

TRACK—Industrial
Bethlehem Steel Co., So. Bethlehem, Pa.
Cincinnati Frog & Switch Co., Cincinnati, O.

TRACTORS—Industrial
Townotor Co., Cleveland, O.

TRACTORS—Storage Battery
Baker R. & L. Co., Cleveland, O.
Electric Storage Battery Co., Philadelphia, Pa.
Industrial Truck Co., Cleveland, O.
Minneapolis Steel & Mch. Co., Minneapolis, Minn.

TRAILERS—Industrial
Sharon Pressed Steel Co., Sharon, Pa.

TRAMRAILS—Overhead Systems
Cleveland Hoisting Machry. Co., Cleveland, O.
Whiting Corp., Harvey, Ill.

TRAMWAYS—Wire Rope
American Steel & Wire Co., Chicago, Ill.
Roebling's, John A., Sons Co., Trenton, N. J.
Roebling's, John A., Sons Co., St. Louis, Mo.
Locher, A., & Sons Rope Co., St. Louis, Mo.

TRAPS—Steam
Nicholson, W. H., & Co., Wilkes-Barre, Pa.

TROLLEYS

TRUCKS—Electric Storage Battery
Baker R. & L. Co., Cleveland, O.
Elwell-Parker Electric Co., Cleveland, O.

TRUCKS—Elevating

TRUCKS—Industrial
Sharon Pressed Steel Co., Sharon, Pa.

TRUCKS—Wire Mill
Vaughn Machine Co., Cuyahoga Falls, O.

TUBE MILL MACHINERY
Calorizing Co. of Pittsburgh, Pittsburgh, Pa.
Woodard Mach. Co., Wooster, O.

TUBES—Boiler
Allegheny Steel Co., Brackenridge, Pa.
Kenting, E. F., Co., 452 Water St., N. Y. C.
Morris, Wheeler & Co., Philadelphia, Pa.
National Tube Co., Pittsburgh, Pa.
Ryerson, Jos. T., & Son, Chicago, Ill.
Ulman, Jacob, Buffalo, N. Y.

TUBES—Boiler, Charcoal Iron
Kenting, E. F., Co., 452 Water St., N. Y. C.

TUBES—Duralumin
Baush Machine Tool Co., Springfield, Mass.

TUBES—Nickel Silver
Mohegan Tube Co., Brooklyn, N. Y.

TUBES—Pyrometer Protection
Electro Alloys Co., Elyria, O.

TUBING—Flexible Metallic
American Metal Hose Co., Waterbury, Ct.
Pennsylvania Flexible Metallic Tubing Co., Philadelphia, Pa.

TUBING—Lock Seamed
Stolp Company, Inc., Geneva, N. Y.

TUBING—Open-Seam
Mohegan Tube Co., Brooklyn, N. Y.

TUBING—Seamless Aluminum
Montgomery County, Pa.

TUBING—Seamless Brass and Copper
Chase Metal Works, Waterbury, Ct.
Rome Brass & Copper Co., Rome, N. Y.
Rome Mfg. Company, Rome, N. Y.
Scovill Mfg. Co., Waterbury, Conn.
Montgomery County, Pa.
Wheeler Condenser & Engrg. Co., Carteret, N. J.

TUBING—Seamless Steel
Detroit Seamless Steel Tubes Co., Detroit.
Janney, Steinmetz & Co., Philadelphia, Pa.
National Tube Co., Pittsburgh, Pa.
Page Steel & Wire Co., Bridgeport, Ct.
Pittsburgh, Pa.
Summerill Tubing Co., Bridgeport, Montgomery County, Pa.
Weeks, Edgar T., Sons Co., Boston, Mass.

TUBING, Square and Rectangular
National Tube Co., Pittsburgh, Pa.
Co., Pa.

TUBING—Welded Steel
Johnson, Peter C., Bush Terminal, Brooklyn, N. Y.
National Tube Co., Pittsburgh, Pa.
Page Steel & Wire Co., Bridgeport, Ct.

TUBING MACHINERY—Brazed

TUBING MACHINES—Lock Seaming
Stolp Company, Inc., Geneva, N. Y.

TUMBLING BARRELS
Henderson Bros. Co., The, Waterbury, Ct.
Ideal Concrete Machry. Co., Cincinnati, O.
Paxson, J. W. Co., Philadelphia, Pa.

TURBINES
De Laval Steam Turbine Co., Trenton, N. J.
Kerr Turbine Company, Wellsville, N. Y.

TURBO-GENERATORS
Kerr Turbine Company, Wellsville, N. Y.

TURNBUCKLES
Mapleville, R. I.

TURNTABLES

TUYERES—Coolers, Etc., Blast Furnace
Keystone Bronze Co., Pittsburgh, Pa.

TWIST DRILLS
Alvord Reamer & Tool Co., Millersburg, Pa.
Ford, Mass.
Whitman & Barnes, Akron, O.

SEE ADVERTISEMENTS FOR COMPLETE INFORMATION. ALPHABETICAL INDEX—PAGES 222-224.

UNIONS
Crane Co., Chicago, Ill.
Dart U. M. Mfg. Co., Providence, R. I.
Jefferson Union Co., Lexington, Mass.
Steel & Tube Co. of America, Chicago, Ill.

UPSETTING AND FORGING MACHRY.
Acme Machinery Co., Cleveland, O.
National Machinery Co., Tiffin, O.

VALVES—Air
Powell, William, Company, Cincinnati, O

VALVES—Back Pressure and Automatic Relief
Crane Co., Chicago, Ill.

VALVES—Blow Off
Crane Co., Chicago, Ill.

VALVES—Gas and Air Reversing
Morgan Construction Co., Worcester, Mass.
Snyder, S. B., Co., Pittsburgh, Pa.
Swibucd, W., & Bros., Pittsburgh, Pa

VALVES—Gas, Water and Steam
Jenkins Bros., 80 White St., New York City.
Limbert, George B., & Co., Chicago, Ill.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Pittsburgh Valve, Fdry. & Construction Co., Pittsburgh, Pa.
Powell, William, Co., Cincinnati, O.
Wood, R. D., & Co., Philadelphia, Pa.

VALVES—Gate
Crane Co., Chicago, Ill.

VALVES—Globe, Angle and Check
Crane Co., Chicago, Ill.

VALVES—Hydraulic
Birdsboro Steel Fdy. & Mch. Co., Birdsboro, Pa.
Crane Co., Chicago, Ill.
Hydraulic Press Mfg. Co., Mount Gilead, O.
Powell, William, Company, Cincinnati, O.
Southwark Fdry. & Mch. Co., Philadelphia, Pa.
Watson-Stillman Co., 190 Fulton St., N. Y.
Wood, R. D., & Company, Philadelphia, Pa.

VALVES—Pop, Safety and Relief
Crane Co., Chicago, Ill.

VALVES—(Pressure Seated) Pneumatic
Cleveland Pneumatic Tool Co., Cleveland, O.

VALVES—Radiator
Crane Co., Chicago, Ill.

VALVES—Water Cooled
Blaw Knox Co., Pittsburgh, Pa.

VENTILATORS
Robertson, H. H., Co., Pittsburgh, Pa.

VIBRATORS
Hanna Eng. Works, Chicago, Ill.

VISES
Skinner Chuck Co., New Britain, Ct.
Williams, J. H., & Co., 57 Richards St., Brooklyn N. Y.

WASHERS—Ball Bearing Race
Auburn Ball Bearing Co., Rochester, N. Y.

WASHERS—Brass and Bronze
Everitt Co., Boston 9, Mass.

WASHERS—Brass and Copper
Hobbs Mfg. Co., Worcester, Mass.

WASHERS—Iron and Steel
Ames, W., & Co., Jersey City, N. J.
Bethlehem Steel Company, S. Bethlehem, Pa.
Cushman Company, Inc., Champaign, Ill.
Hobbs Mfg. Co., Worcester, Mass.
Joliet Wash. Washer Co., Joliet, Ill.
Positive Lock Washer Co., Newark, N. J.
Sessions, J. H., & Son, Bristol, Ct.
Topping Bros., 159 Varick St., N. Y. C.
Wright Wrought Mfg. Co. Milwaukee, Wis.

WASHERS—Leather
Chicago Belting Mfg. Co., Chicago, Ill.
Schieren, Chas. A., Co., 37 Ferry St., N. Y. C.

WASHERS—Lock
Hobbs Mfg. Co., Worcester, Mass.
National Umbrella Frame Co., Philadelphia, Pa.
Palmit Corp., Passaic, N. J.
Positive Lock Washer Co., Newark, N. J.
Reliance Manufacturing Co., Massillon, O.

WASHERS—Spring Steel
Dunbar Bros. Co., Bristol Ct.
Hobbs Mfg. Co., Worcester, Mass.
Positive Lock Washer Co., Newark, N. J.
Reliance Manufacturing Co., Massillon, O.

WASHERS—Tempered
Dunbar Bros. Co., Bristol, Ct.
Positive Lock Washer Co., Newark, N. J.

WASHERS—Thrust, Hardened and Ground
Grob Mch. & Stamping Co., Cleveland, O.

WASHERS—Wrought
Wright Wrought Mfg. Co. Milwaukee, Wis.

WASHING MACHINES—For Metal Parts
Hill Clutch Machy. Co. Cincinnati, O

WATER HEATERS—Electric
Bridgeport Mach. & Tool Mfg. Co., Inc. Bridgeport, Ct.

WATER SOFTENING AND PURIFYING
Scaife, Wm. B., & Sons Co., Pittsburgh, Pa.

WEDGES—Foundry
Sterling Wheelbarrow Co., Milwaukee, Wis.

WELDING—Electric
Allan Mfg. & Welding Co., Inc., Buffalo, N. Y.
American Electric Fusion Corp., Chicago, Ill.
Blaw-Knox Co., Pittsburgh, Pa.
Electric Arc Cutting & Welding Co., Newark, N. J.
Federal Mch. & Welder Co., Warren, O.
Gibb Instrument Co., Bay City, Mich.
Page Steel & Wire Co., Bridgeport, Ct.
Roebling's, John A., Sons Co., Trenton, N. J.
Taylor-Wilson Company, Warren, O.

WELDING—Forge and Hammer
Blaw-Knox Co., Pittsburgh, Pa.

WELDING—Oxy-Acetylene
Blaw-Knox Co., Pittsburgh, Pa.
Page Steel & Wire Co., Bridgeport, Ct.
Roebling's, John A., Sons Co., Trenton, N. J.

WELDING—Thermit
Metal & Thermit Corp., 120 Broadway, N.Y.C.

WELDING AND CUTTING APPARATUS AND SUPPLIES
Air Reduction Sales Co., 342 Madison Ave., N. Y. C.
Davis-Bournonville Co., 342 Madison Ave., New York City.
Electric Arc Cutting & Welding Co., Newark, N. J.
Federal Mach. & Welder Co., Warren, O.
Imperial Brass Mfg. Co., Chicago, Ill.
Milton Alexander, Co., Baltimore, Md.
Prest-O-Lite Co., Inc., 30 E. 42d St., N. Y. C.

WELDING MACHINES—Electric
Allan Mfg. & Welding Co., Inc., Buffalo, N. Y.
American Electric Fusion Corp., Chicago Ill.
Electric Welding Machine Co., Detroit, Mich.
Federal Mch. & Welder Co., Warren, O.
Gibb Instrument Co., Bay City, Mich.
Thomson Electric Welding Co., Lynn, Mass.
Thomson Spot Welder Co., Lynn Mass.

WELDING MACHINES—Seam
American Electric Fusion Corp., Chicago, Ill.
Gibb Instrument Co., Bay City, Mich.

WELDING MACHINES—Spot
American Electric Fusion Corp., Chicago, Ill.

WHEELBARROWS—Foundry
Sterling Wheelbarrow Co., Milwaukee, Wis.

WHEELS—Car, Chilled Iron
Association of Mfrs. of Chilled Car Wheels, Chicago, Ill.

WHEELS—Rolled Steel
Carnegie Steel Co., Pittsburgh, Pa.

WINDOWS—Steel
Dahlstrom Metallic Door Co. Jamestown, N. Y.
Lupton's, David, Sons Co., Philadelphia, Pa.

WIRE—Barb
American Steel & Wire Co., Chicago, Ill.

WIRE—Brass and Copper
Chase Metal Works, Waterbury, Ct.
Scovill Mfg. Co., Waterbury, Conn

WIRE—Broom
American Steel & Wire Co., Chicago, Ill.
Seneca Wire & Mfg. Co., Fostoria, O.

WIRE—Flat, Round and Square
American Steel Co., Pittsburgh, Pa.
American Steel & Wire Co., Chicago, Ill.
Belgrano Co., Brooklyn, N. Y.
Interstate Iron & Steel Co., Chicago, Ill.
Miller & Van Winkle, Inc., Brooklyn N. Y.
Prentiss, Geo. W., & Co., Holyoke, Mass.
Roebling's, John A., Sons Co., Trenton, N. J.
Seneca Wire & Mfg. Co., Fostoria, O.
Townsend Co., New Brighton, Pa.
Washburn Wire Co., 118th St. & Harlem River, New York City.
Webb Wire Works, New Brunswick, N. J.
Wickwire Bros., Cortland, N. Y.

WIRE—Mattress
American Steel & Wire Co., Chicago, Ill.
Seneca Wire & Mfg. Co., Fostoria, O.

WIRE—Netting
American Steel & Wire Co., Chicago, Ill.
Ludlow-Saylor Wire Co., St. Louis, Mo.
Seneca Wire & Mfg. Co., Fostoria, O.
Wickwire Brothers, Cortland, N. Y.

WIRE—Nickel
Seymour Mfg. Co., Seymour, Ct.

WIRE—Nickel Silver
Seymour Mfg. Co., Seymour, Ct.

WIRE—Phosphor Bronze
Phosphor Bronze Smelting Co., Phila., Pa.
Seymour Mfg. Co., Seymour, Ct.

WIRE—Piano and Music
American Steel & Wire Co., Chicago, Ill.
Wendt's, Edgar T., Sons Co., Boston, Mass.
Washburn Wire Co., 118th St. & Harlem River, New York City.
Webb Wire Works, New Brunswick, N. J.

WIRE—Plain, Galvanized and Coppered
Page Steel & Wire Co., Bridgeport, Ct.

WIRE—Rubber Covered
American Steel & Wire Co., Chicago, Ill.
Hazard Mfg. Co., Wilkes-Barre, Pa.

WIRE—Spoke and Crimping
American Steel & Wire Co., Chicago, Ill.
Prentiss, Geo. W., & Co., Holyoke, Mass.

WIRE—Spring Steel
American Steel & Wire Co., Chicago, Ill.

WIRE—Telephone and Telegraph
American Steel & Wire Co., Chicago, Ill.

WIRE—Welding
Morgan Welding & Co., Philadelphia, Pa.
Page Steel & Wire Co., Bridgeport, Ct.
Roebling's, John A., Sons Co., Trenton, N. J.

WIRE CLOTH
Audubon Wire Cloth Co., Inc., Audubon, N. J.
Buffalo Wire Works Co., Inc., Buffalo, N. Y.
Ludlow-Saylor Wire Co., The, St. Louis, Mo.
N. J. Wire Cloth Co., Trenton, N. J.
Wickwire Bros., Cortland, N. Y.

WIRE FORMING
American Steel & Wire Co., Chicago, Ill.
Bridgeport Chain Co., Bridgeport, Ct.
Campbell Wire Specialty Works, South Bend, Ind.
Cuyahoga Spring Co., Cleveland, O.
Eastern Tool & Mfg. Co., Bloomfield, N. J.
Hindley Mfg. Co., Valley Falls, R. I.
Jenkinson, R. C., & Co., Newark, N. J.
Titchener, E. H., & Co., Binghamton, N. Y.
Torrington Co., Torrington, Ct.
Townsend Co., New Brighton, Pa.
Trant & Hine Mfg. Co., New Britain, Ct.
Wickwire Bros., Cortland, N. Y.
Williamson, C. T., Wire Novelty Co., Newark, N. J

WIRE COILING MACHINERY
Baird Machine Co., Bridgeport, Ct.
Sleeper & Hartley, Inc., Worcester, Mass.

WIRE DRAWING MACHINERY
Morgan Construction Co., Worcester, Mass.
New England Wire Machinery Co., New Haven, Ct.
Vaughn Machry. Co., Cuyahoga Falls, O
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Ct

WIRE FORMING MACHINERY
Baird Machine Co., Bridgeport, Ct.
Manierre, E. J., Mach. Co., Waterbury, Ct.
Nilson, A. H., Mach. Co., Bridgeport, Ct
Sleeper & Hartley, Inc., Worcester, Mass.

WIRE MILL MACHINERY AND EQUIPMENT
Broden & Dailey Construction Co., Cleve., O.
Morgan Construction Co., Worcester, Mass.
New England Wire Machinery Co., New Haven, Conn
Shuster, F. B., Co., New Haven, Ct.
Vaughn Machry. Co., Cuyahoga Falls, O.

WIRE NAIL MACHINERY
National Machinery Co., Tiffin, O.
Ryerson, Jos. T., & Son, Chicago, Ill.
Sleeper & Hartley, Inc., Worcester, Mass.

WIRE ROPE
American Steel & Wire Co., Chicago, Ill.
Broderick & Bascom Rope Co., St. Louis, Mo.
Hazard Mfg. Co., Wilkes-Barre, Pa.
Leschen, A., & Sons Rope Co., St. Louis, Mo.
Page Steel & Wire Co., Bridgeport, Ct.
Roebling's, John A., Sons Co., Trenton, N. J.
Upson-Walton Co., Cleveland, O.

WIRE ROPE FITTINGS
American Steel & Wire Co., Chicago, Ill.
Upson-Walton Co., Cleveland, O.

WIRE STRAIGHTENING AND CUTTING MACHINERY—Automatic
Nilson, A. H., Machine Co., Bridgeport, Ct.
Shuster, F. B., Co., New Haven, Ct.
Sleeper & Hartley, Inc., Worcester, Mass.

WIRE STRANDING & CLOSING MACHINES
New England Wire Machinery Co., New Haven, Conn

WIRE WORK
Eagle Wire Works Co., Inc., Buffalo, N. Y.
Indiana Wire Wire & Iron Works, Indianapolis, Ind.

WIRING MACHINES
Geiger-Tool Co., St. Marys, O.

WOOD BLOCK FLOORING—See Flooring—Creosoted Wood

WOOD WORKING MACHINERY
Machinery Dealers, Inc., New Haven, Ct.
Oldenbusch & Smith Machy. Co., Cincinnati, O.
Sidney Mach. Tool Company, Sidney, O.

WRENCHES
Armstrong Bros. Tool Co., Chicago, Ill.
Cleveland Punch & Shear Works Co., Cleve., O.
Drop Forging Co., of N. Y., Long Island City, N. Y.
Indianapolis Drop Forging Co., Indianapolis, Ind.
Williams, J. H., & Co., 57 Richards St., Brooklyn, N. Y.

ZINC
Eagle Refining Co., Rochester, N. Y.

ADVERTISERS INDEX

A

Barnes, Wallace, Co. 46, 55
Barnes, W. F. & John, Co. 118
Bath, Cyril J., & Co. 177
Bayonne Bolt & Nut Co. 48
Beardsley Piper Co., The 90
Beatty Mach. & Mfg. Co. 144
Beaver Mach. & Tool Co., Inc. 194
Bethlehem Steel Co. 18
Blanchard Mach. Co. 124
Bliss, E. W., Co. 151
Blodgett Engrg. & Tool Co. 133
Bock Bearing Co. 72
Bolivar Fdry. Co. 196
Bonnot Co., The 94
Booth Electric Furnace Co., The. 91
Booth Felt Co., Inc. 164
Boye & Emmes, Co. 82
Boyle, John, Jr. 110
Boyts, Porter & Co. 122
Braddee & Co. 77
Bradley, C. & Son 14
Brearley, H. P. 182
Briddell, W. C. Co., Inc. 180
Bridgeport Chain Co. 56
Bridgeport Mach. & Tool Mfg. Co. 128
Bridgeport Metal Goods Mfg. Co. 43
Bridgeport Safety Emery Wheel Co., Inc. 123
Bridgeport Screw Co. 44
Bridgeport Silverware Mfg. Corp. 191
Brier Hill Steel Co., Inc. 16
Briggs, Marvin, Inc. 184
Briggs & Turivas 182
Brostol Co. 98
Brosius & Dailey Construction Co. 154
Brosius & Bascom Repair Co. 61
Brubaker Co. 48
Brooks Forge & Machine Co. 34
Brosius, Edgar E. 79
Brown Bros. Tubing Mach. Co. 176
Brown Engineering Co. 58
Brown, Ernest J. 187
Brown, Hoadley Mchry. Co. 35
Brown-McLaren Mfg. Co. 46
Brown & Sharpe Mfg. Co. 51
Brown-Wales Co. 122
Browning Co., The 84
Brubaker, W. L., & Bros. Co. 132
Bucher-Schiltz, A. 128
Bucher Twist Drill Co. 6
Budd, Edw. G., Mfg. Co. 41, 187
Buffalo Bronze Die Cast Corp. 197
Buffalo Forge Co. 111, 142
Buffalo Fdry. & Mach. Co. 38
Buffalo Hoist Works & Storage Co. 186
Buffalo Pitts Co. 194
Buffalo Steel Products 188
Buffalo Wire Works Co. Inc. 198
Bunting Brass & Bronze Co., The. 73
Business Nation Mfg. Co. 196
Buss Compressor Co. 144
Business Opportunities Section 200-202
Butterfield & Co., Inc., Union Twist Drill Co., The 151
Byers, M. J., Co., Inc. 8

B

Babcock & Wilcox Co., The ....
Backer Mach. Tool Supply Co. ....
Baker Mfg. Corp. ....
Baldwin Locomotive Works, The ....
Barnes Drill Co. ....
Barnes, Wallace, Co. 46, 55
Barnes, W. F. & John, Co. 118

C

Calder, Geo. H. ....
Caldwell, W. E., Co. ....
Campbell Wire Specialty Works. ....
Canton Pneumatic Tool Co., The. ....
Canton, Wm. T., & Co. ....
Central Iron & Metal Co. ....
Central Steel Co. ....
Central Tube Co. ....
Chain Products Co. 77
Chambersburg Engineering Co. 154
Champion Blower & Forge Co. 128
Champion Forge Co. 28
Champion Mach. & Forging Co. 32
Champion Rivet Co. 52
Chapman Engrg. Co., Inc. ....
Chase & Co., Gardner P. ....
Chase Fdry. & Mfg. Co. 89
Chase, Frank D., Inc. 110
Chase Metal Works 22
Chicago Iron Works 79, 167
Chicago Pneumatic Tool Co. 55
Chicago Flexible Shaft Co. 52
Chicago Perforating Co. 61
Chicago Pneumatic Tool Co. 1
Chicago Rawhide Mfg. Co. 70
Chicago Steel Edge Co. 56
Chisholm-Moore Mfg. Co. 86
Cincinnati Bickford Tool Co. 118
Cincinnati Forge & Switch Co. 80
Cincinnati Planer Co. 125
Cincinnati Shaper Co. 148
City Foundry Co. 34
Clapp, E. D., Mfg. Co. 34
Clark Bros. Bolt Co. 50
Clark-Cadillac Harrison Corp. 193
Cleaning House Section 166, 185
Cleveland Cliffs Iron Co. 2
Cleveland Crane & Engrg. Co. 80
Cleveland Hardware Co. 74
Cleveland Punch & Engrg. Co. 114
Cleveland Planer Co. 127
Cleveland Pneumatic Tool Co. 135
Cleveland Punch & Shear Works Co. 141
Cleveland Steel Supply Co. 200
Clifton-Pratt Co. 186
Cobb & Drew, Inc. 52
Cohen, Louis, & Son 189
Colburn Mach. Tool Plant of Consolidated Mach. Tool Corp. of America 143
Columbia Steel Co. 21
Columbian Bronze Corp. 196
Columbus Brass Co. 200
Columbus Conveyor Co. 78
Columbus McKinnon Chain Co. 7
Commercial Drop Forge Co. 84
Commercial Steel Casting Co. 55
Commonwealth Screw Co. 193
Conroy, H. D. & Co. 82
Connecticut Gears, Inc. 70
Connellsville Foundry Machine & Steel Casting Co. 156
Consolidated Machine Tool Corp. of America 143
Continental Iron & Steel Co. 189
Contract Work Section 191-199
Cook, Asa S., Co. 138
Cook Spring Co. 56
Cooper Bros. 196
Cortland Mach. & Tool Wks. 194
Covington Mach., Inc. 187
Cowdrey, C. H., Machine Wks. 193
Cowles Tool Co. 131
Craig Oil Co. 103
Crane Co. 163
Crawford, F. H. 181
Crescent Refractories Co. 25
Cresson-Morris Co. 74
Creswell, Samuel J., Iron Works. 197
Crocker Bros. 22
Crocker Wheeler Co. ....
Crosby Co., The 42
Cross Engineering Co. 62
Crucible Steel Casting Co. 36
Cruse Knitter Co. 197
Culman Wheel Co. 7
Curtis & Curtis Co. 139
Curtis Pneumatic Machy. Co. 161
Cushman Chuck Co. 135
Cushman Co., Inc., The 198
Cutler-Hammer Mfg. Co. 73
Cuyahoga Spring Co. 54

D

Dahlstrom Metallic Door Co., 10, 187, 188
Dall Steel Products Co. 192
Dake Engine Co. 86
Dart, E. M., Mfg. Co. 104
Daugherty Fdry. Co. 197
Davidson Pipe & Iron Corp. 188
Davis Boring Tool Co. 130
Davis Bournonite Co. 162
Davis, C., & Co. 188
Davis & Zimmerman, Inc. 198
Dean Bros. Steam Pump Works. 159
Decatur Malleable Iron Co. 36
Delco Remy Co. 1
Deep Drawn Metal Corp. 192
Delmag Mfg. Co. ....
De Laval Steam Turbine Co. 158
Detroit Vapor Mach. Co. 169
Detroit Co., The 138
Detroit Stoker Mfg. Co. 129
Detroit Twist Drill Co. 8
Detroit Wire & Mfg. Co. 80
Detroit Screw & Steel Tube Co. 69
Detroit Stamping Co. ....
Dexter Iron Mfg. Co. 18
Diamond Chain & Mfg. Co. 82
Diamond Mfg. Co. 128
Diamond Saw & Stone Co. ....
Dietz, Bernard H., & Bros. Co. 151
Dill Mfg. Co., The 129
Dings Mach. Works 78
Disston, Henry, & Sons, Inc. 14
Doehler Die Casting Co. 40
Dodge Coupling & Mfg. Co. 159
Donner Steel Co., Inc. 11
Dorgan & Lockwood Co. 191
Dreses Mfg. Co., Inc. 86
Drills & Reamer Mfg. Co. 149
Dreses Mach. Tool Co. 119
Drop Forging Co. of New Haven 4
Drouvé, G., Co. 111
Duff Patents Co., Inc. 110
Dunbar Bros. Co. 55
Durant Mfg. Co. 97

E

Eagle Pipe Supply Co., Inc. 188
Earle Gear & Mach. Co. 67, 195
Eastern Bolt & Nut Co. 50
Eastern Machine Screw Corp. ..48, 131
Eastern Rolling Mill Co. 17
Eastern Tool & Mfg. Co. 57
Eaton, Richard, Co. 34
Economy Furnace Co., The 92
Eddystone Steel Co. 17
Edge Hill Silica Rock Co. 26
Egyptian Iron Works 198
Electric Arc Cutting & Welding Co. 102
Electric Controller & Mfg. Co. 227
Electric Furnace Construction Co.. 92
Electric Hoist & Derrick Co. 185
Electric Smelting & Aluminum Co. 163
Electric Welding Machine Co. 90
Electro Alloys Co. 92
Electro Metallurgical Sales Corp.. 26
Elgin Tool Wks. 119
Elliott-Blair Steel Co. 20
Ellis, Frank I. 110
Elmes, Chas. F., Engrg. Works. 159
Elwell-Parker Elec. Co. 89
Empire Refineries, Inc. 104
Endicott Forging & Mfg. Co., Inc. 4
Enterprise Brass Works 39
Erdle Perforating Co. 62
Erie City Iron Works 158
Erie Foundry Co. 154
Erie Mfg. & Supply Co. 176
Erie Steel Construction Co. 82
Espen-Lucas Mach. Works 127
Essley, E. L., Machry. Co. 178
Etna Machine Co. 136
Euclid Crane & Hoist Co., The.. 86
Everitt Co., The 50
Ex-Cell-O Tool & Mfg. Co. 125
Excelsior Tool & Mach. Co. 153

F

F. P. Screw Co. 45
Factory & Mill Supply Co. 176
Fafnir Bearing Co. 72
Fairmont Foundry Co. 37
Falcon Steel Co. 18
Falk Corp. 67
Fells Clutch & Machry. Co. 75
Farrell-Cheek Steel Fdry. Co. 36
Fate Root Heath Co. 89
Fawcus Machine Co. 70
Fay & Scott 162
Federal Bearings Co., Inc., The.. 71
Federal Equip. & Supply Co. 179
Federal Mach. & Welder Co. 102
Federal Machy. Sales Co. 179
Federal Signal Co. 196
Federal Steel Foundry Co. 35
Federal Tool & Alloy Steel Corp.. 13
Ferguson Furnace Co. 91
Ferracute Machine Co. 149
Ferry Cap & Set Screw Co. 51
Firth-Sterling Steel Co. 16
Firth, Thos., & Sons, Inc. 16
Fischer, Charles, Spring Co. 54
Fitchburg Wall Paper Co. 170
Fitzsimons Co., The 9
Flexible Steel Lacing Co. 75
Flinn & Dreffein 162
Foote-Jones & Sons 97
Ford Chain Block Co. 85
Ford, J. B., Co., The 165
Fort Madison Fdry. 198
Foster, H. M., Co. 189
Foster Machine Co. 123
Foulds Screw Co., The 18
Fownes Mfg. Co., Inc. 192
Franklin Bronze Products, Inc. 39
Franklin Die-Casting Corp. 39
Franklin Mach. Co. 196
Frederick Iron & Steel Co., The.. 159
Fredericksen Co. 39
Freeman-Riff Co. 78
Freidus Mchry. Co. 182
French Blanchet & Co. 140
French Mfg. Co., The ....
Fuel Ill. 198
Fuller Heater Co. 92

G

Gandy Belting Co. ....
Garrison, A., Fdry. Co. 145
General Drop Forge Co. 33
General Electric Co. 83, 99
General Mach. & Mfg. Co. 191
Geuder, Paeschke & Frey Co. 41
Gibb Instrument Co. 102
Gibson, Wm. D., Co. 56
Gifford Wood Co. 77
Gilbert & Barker Mfg. Co. 103
Gits Bros., Mfg. Co. 105
Glens Falls Mach. Works. 197
Globe Mach. & Stamping Co. 43
Godfrey Conveyor Co. 78
Goodenow, F. J., Furnace Co. 93
Graves Machry. Exchange ... .179
Gray Iron Fdry. Co. 197
Gray, Peter, & Sons, Inc. 191
Great Lakes Pressed Steel Corp. ...192
Greaves-Klusman Tool Co. 122
Green, A. P., Fire Brick Corp. ... 25
Green, L. A., Rail & Machry. Co. ..189
Greenfield Tap & Die Corp. 131
Greenpoint Iron & Pipe Co., Inc. ..188
Grier Steel Co. 20
Gregory Electric Co. 184
Griffin Mfg. Co. 19
Grimes Molding Mach. Co. 89
Grindle Fuel Equip. Co. 97
Gronar, J. J., & Co. 197
Gurney Ball Bearing Co. 73

H

H. S. B. W.—Cochrane Corp. 157
Hadfield-Penfield Steel Co., The. 12, 91
Hagan, George J., Co. 93
Haiss, Geo., Mfg. Co., Inc. 77
Hamburg Boiler Works 107
Hammond Iron Works 105
Hanna Engrg. Works 86
Hanna, M. A., & Co. 116
Hanney Stamping Works 193
Harbison-Walker Refractories Co. 26
Hardy, F. A., & Co. 113
Harrington, E., Son & Co., Inc. .. 85
Harrington & King Perforating Co. 63
Harris Bros. Co. 167
Harris, B. W., & Leo, Co. 183
Harrisburg Pipe & Pipe Bending Co. 4
Harrison Bolt & Nut Co. 48
Hart, R. A., Mfg. Co. 98
Hartford Machine Screw Co. 45
Hartford Special Machry. Co. ...194
Harvey, Arthur C., Co. 13
Harvey Electric Co. 31
Harwich Stpg. Co. 192
Haskell, Wm. H., Mfg. Co. 138
Hawkridge Bros., Co. 14
Hawley Down Draft Furnace Co.. 91
Hayes Brass Fdry., Inc. 197
Hayward Co. 78
Heald Mach. Co. 125
Heine Boiler Co. 158, 183
Help and Situations Wanted. ..203-204
Heltzel Steel Form & Iron Co. ...107
Henderson Bros. Co. 91
Henderson Mach. Co. 149
Hendley & Whittemore Co. 140
Henry & Wright Mfg. Co. 62
Henson-Blair Mfg. Co. 192
Heppenstall Forge & Knife Co.... 32
Herald Mfg. & Trading Corp. 175
Heyward, Thos. R., Co. 28
Hickman, Williams & Co. 23
Hill, Clarke & Co., Inc. 174
Hill, Clarke & Co., of Chicago....168
Hill-Curtis Co. 124
Hill, John T. & Co., Inc. 189
Hilles & Jones Plant of Consolidated Mach. Tool Corp. of America 143
Hillman Coal & Coke Co. 24
Hillside Fluor Spar Mines 23
Hindley Gear Co. 62
Hindley Mfg. Co. 57
Hinkley, Henry A. Sons Co. 185, 187, 188
Hobbs Mfg. Co. .....
Hoist & Derrick Mfg. Co. .....
Hoist Mfg. Corp. .....
Holcroft & Loomis Mfg. Co. .....
Holden & Co. .....
Horsburgh & Scott Co. .....
Houghton, T. W., Co. .....
Howard, E. & Sons Co. .....
Hoskins Mfg. Co. .....
Hubbard Spring Works .....
Hubbell, Harvey, Inc. .....
Hubley Mfg. Co. .....
Hunter Saw & Mach. Co. 136
Hurwitz Bros., Iron & Metal Co. Inc. 187
Hyatt Roller Bearing Co. 711
Hyde Park Fdry. & Mach. Co. 189
Hydraulic Press Mfg. Co. 173
Hyman, Joseph & Sons .....
Hyman-Michaels Co. 189

I

Ideal Concrete Machinery Co. ... 91
Ideal Machinery Co. 180, 181
Illinois Steel Co. 87
Illinois Steel Co., Warehouse Dept. 6
Imperial Brass Mfg. Co. 102
Independent Pneumatic Tool Co... 85
Indianapolis Drop Forging Co ... 33
Industrial Equip. Co., N. Y. C...186
Industrial Equip. Co., Minster, Ohio 89
Industrial Steel Casting Co 36
Industrial Works 84
Ingalls Iron Works Co. 107
Ingersoll-Rand Co. 162
Inglis, W., Wire & Iron Works 199
Inland Steel Co. 11
International Fuel & Iron Corp. ..225
International Mach. Tool Co. 119
Interstate Iron & Steel Co. 52
Iron Trade Products Co. 22
Ironton Fire Brick Co. 26
Ironton Punch & Shear Co. 142
Irving Iron Works 112

J

Janney, Steinmetz & Co. 197
Jarecki Mfg. Co. 136
Jefferson Union Co. 193
Jelliff, Geo. H., & Son 200
Jenkins Bros. 164
Jenkins Mfg. Co. 197
Jenkinson, R. C., & Co. 57
Jennison-Wright Co. 112
Johnson, Carlyle, Machine Co. 73
Johnson-Peter Co. 66
Johnson, Wm. C., & Sons Machy. Co. 179
Johnston, Tool & Mfg. Co., Inc... 192
Jones Wrought Washer Co. 42
Jolly, J. & W., Jr. 196
Jones & Lamson Mach. Co. ...116, 117
Jones Mach. Tool Co. 74
Jones, W. A., Fdry. & Mch. Co.. ....

K

Kearney & Trecker Corp. 124
Keasbey, E. F., Co. 60
Keasbey & Mattison Co. 124
Kellogg, Julian 108
Kelly Duplex Machine Co. 134
Kelly Foundry & Machine Co. 111
Kelwood Bridge Co. 110
Keokuk Electro-Metals Co. 28
Kerr Turbine Co. 161
Keystone Blower Co. 39
Keystone Screw Co. 45
Keystone Tool & Metal Parts Corp. 46
Kidder, R. E., Co. 128
Kilborn & Bishop Co. 74
Kilby Mfg. Co. .....
Kilnear Mfg. Co. 128
Kirk & Blum Mfg. Co. 192
Kirk Lathe Mfg. Co. 48
Klein, Nathan, & Co. 185
Kline Hardware Co. .....
Kling Machine Co. 195
Knickerbocker Co. 112
Koehler Mfg. Co., Inc. 43
Konigslow, E., Stpg. & Tool Co. The 40, 192
Kropp Forge Co. 31

L

L. & D. Metal & Supply Co., Inc. 188
Laclede Steel Co. 20
Lakeside Malleable Castings Co... 36
Lamberg, A., & Co. 177
Lambert & Todd Mach. Co. 195
Lancaster Fdry. Co. 197
Lancaster Iron Works, Inc. 196
Landis A. B. & Son .....
Landis Machine Co. .....
Lane & Co. .....
Lane, H. M., Co., The ...
Lanski, L. & Son .....
Larkin, J. N. Co. .....
Larson Tool & Stpg. Co. .....
Laughlin, Alex., & Co. .....
Lawrence, J. J., & Co. 28
Lea Manufacturing Co. 159
Leaman Bros. Co. 183
Leaf, E. B., Co. 193
Leavitt, Jesse W. .....
Leavitt, C. W., & Co. 28
Lebanon Gear & Mach. Works....195
Lee Spring Co. 55
Leffel, James, & Co. 149
Leffel Chas. & Co. 122
Lehmann Machine Co. .....
Leland-Gifford Co. 118
Leschen, A. & Sons Rope Co. 59
Lewes Foundry & Mach. Co. 156
Lewis-Shepard Co. 89
Liberty Tool & Die Co. 194
Limbert, Geo. B., & Co. 164
Linder Mchry. & Steel Co. 183
Lindsay, James G., & Co., Inc. .. 16
Link Belt Co. 57, 78, 84, 85
Lippy, Richard J. 198
Little, F. J., Machine Co. 59
Lodge & Shipley Mach. Tool Co. ..178
Lonz & Allstatter Co. 144, 182, 200
Lough Bros. 78
Lough Bros. 134
Lovejoy Tool Co., Inc. .....
Low & Nawash, Div. Burroughs Adding Machine Co. 150
Low Iron Foundry .....
Lucas Mach. Tool Co. 123
Ludlow-Saylor Wire Co. 39
Lunken Bearing Co. .....
Luptons, David, Sons Co. 128
Lurie Bros. & Co., Inc. 185
Lycoming Motors Corp. 57
Lynd Equipment Co. 182

M

McCabe, J. J., Lathe & Machinery Corp. 122, 166
McCabe & Sheeran Machry. Corp. ..169
McClintic-Marshall Co. 110
McConway & Torley Co. 12
McCord-Brandt Machry. Co. 174
McCullough Dalzell Crucible Co. .. 91
McDowell & Co. 188
McGann Mfg. Co., Inc. 105
McKane Metwek 197
McKee, Arthur G., & Co. 110
McKim Fdry. & Mach. Co. 196
McMullen Machry. Co. 181
McMyler Interstate Co. 84
Machine Products Co. 199
Machinery Dealers, Inc. 170, 173
Maehler, Paul, Co., The 93
Magnetic Mfg. Co. 78
Maid Mfg. Co. .....
Malleable Iron Fittings Co. 116
Manistee Iron Works Co. 158
Manufacturers Machine Tool & Supply Co., Inc. 170
Manville, E. J. Machine Co. 140
Marchant, Geo. F., Co. 190
Marine Metal & Supply Co. 188
Marion Power Shovel Co. 70
Marion Steam Shovel Co. 124
Marshalltown Mfg. Co. 146
Martin, Wm. & Co. 200
Martin Prod. Co. 192
Mattatuck Mfg. Co., The 46
Matthews, W. A. Mfg. Co. 42
Matthews, Jas. H., & Co. 130
Matthews Mfg. Co. 42
Maynard Elec. Steel Casting Co... 56
Mead Co. 184
Meadows Gear Corp. 69
Meaker Galvanizing Co. 103
Mechanics Tool & Stpg. Co. 191
Medart Co., The 74
Meeker Fdry. Co. 37
Meisselbach-Catucci Mfg. Co., Inc. 194
Melting Engineering Co. 32
Mercer Motors Co. 184
Merrall, Wm. B. 200
Merrell Mfg. Co. 139
Merrell Tubes 61
Mesta Machine Co. 160
Metal Specialty Co. 40
Metal & Thermit Corp. 98
Metaline Co. 72
Michigan Gear & Engrg. Co. 195
Midwest Forge & Steel Co. 199
Milburn, Alexander, Co. 102
Miles, F. S., Co. 48
Miles Machinery Co. 184, 186
Miller-Owen Electric Co., Inc. ..184
Miller & Van Winkle, Inc. 54
Millholland Mach. Co. 195
Milne, A., & Co. 14
Minneapolis Steel & Machry. Co...110
Mitchell Machine Co. 187
Modern Tool Co. .....
Mach. Tool Corp. of America ..143
Monarch Machine Tool Co. 56
Monarch Pneumatic Tool Co. 10
Monarch Truck Co., The 54
Monarch Valve Co. .....
Monitor Controller Co. 191
Monnot, J. J. 1, 36
Moore, W. L. & Co. .....
Moore & White Co. .....
Morey & Co., Inc. ..... .170
Morgan Crucible Co. 154
Morgan Machine Co. 159
Morris Machine Works .....
Morris, Wheeler & Co. 9
Morrison & Bunnell Co. 20
Morrison & Russell Co. 180
Morse Twist Drill & Machine Co. 140
Morton Mfg. Co. 123
Morton, Thos. 75
Mosel Mfg. Co. 40
Mosher Mach. Tool Co. 117
Mummert-Dixon Co. 91
Mundt, Chas. & Sons 65
Mundy, J. S., Hoisting Engine Co. 86
Myers, F. E., & Bro. Co. 159

N

Napier Saw Works, Inc. 126
Nashville Industrial Corp. ..183, 187
National Acme Co. 120
National Blank Book Co. 191
National Drawn Steel Co. 10
National Engineering Co. 90
National Forge & Tool Co. 32
National Machry. Co. 140
National Steel Casting Co. 35
National Supply Co. 174
National Transit Pump & Mach. Co. 159
National Tube Co. 65
National Twist Drill & Tool Co...130
National Umbrella Frame Co. ... 54
Naugatuck Mfg. Co. 164
Nazel Engrg. & Mach. Works 153
Neil & Smith Elec. Tool Co. 135
Newark Gear Cutting Mach. Co...123
Newark Malleable Iron Works, Louis Sacks, Inc. 36
New Britain Mach. Co. 46, 177
Newcomb Spring Corp. 54
New Departure Mfg. Co. 72
New England Pressed Steel Co. .. 40
New England Tube & Stpg. Co. .. 40
New England Wire Machry. Co...137
N. J. Fdry. & Mach. Co. 80
N. J. Wire Cloth Co. 61
Newman Clock Co., Inc. 128
New Metal Tool Steel Co. 133
Newport Rolling Mill Co. 9
Newton Mach. Tool Plant of Consolidated Mach. Tool Corp. of America 143
Newton Mfg. Co., The 48
N. Y. Belting & Packing Co. 75
N. Y. Machry. Exchange 172
N. Y. Metal Ceiling Co. 192
Niagara Mach. & Tool Works.....148
Nicholls, Wm. H., Co., Inc. 89
Nicholson, W. H., & Co. 131
Niles-Bement-Pond Co. 70, 79, 117, 176
Niles, F. H., & Co., Inc. 180
Nilson, A. H., Mach. Co. 137
Nilson-Miller Corp. 194
Nordberg Mfg. Co. 159
Norton Co. of America 72
North Wales Machine Co., Inc....197
Northern Blower Co. 90
Northern Engrg. Works 79, 85
Northern Malleable Iron Co. 37
Northwest Engrg. Co. 82
Norton Iron Works 52
Norwalk Iron Works Co. 162
Nussbaum, V. M., & Co. 183
Nuttall, John 178
Nuttall, R. D., Co. 67

O

Oakley Chemical Co. 105
Ohio Elec. & Controller Co. 86
Ohio Locomotive Crane Co. 84
Ohio Mach. Tool Co. 123
Ohio Metal Stpg. & Mfg. Co. 192
Ohio Steel Fdry. Co. 35
Oliver Iron & Steel Co. 50
Oneonta Iron Works, Inc. 196
Orton & Steinbrenner Co. 84
Osborn Mach. Co. 197
Osborne & Sexton Machry. Co. 178
Otis Steel Co. 18
Ottemiller, Wm. H., Co., Inc. 46
Oven Equipment & Mfg. Co. 94
Oviatt, D. C., & Co. 181

P

Pacific Electric & Engrg Co.... 73
Pacific Mfg. Co. 55
Republic Creosoting Co. 112
Republic Iron & Steel Co. 7
Richardson Engineering Co. 195
Richmond Locomotive Works Co.. 136
Richards-Wilcox Mfg. Co. 78
Richardson & Co., Inc. 189
Richey, Browne & Donald, Inc...196
Richmond Malleable Castings Co.. 37
Ridgway, Craig, & Son Co. 78
Riehle, J. B., Brass Fdry. 195
Riter-Conley Co. 108
Riverside Mchry. Depot.....177, 181
Riverside Steel Casting Co. 34
Rivet Cutting Gun Co. 136
Rivett Lathe & Grinder Co. 125
Robertson, H. H., Co. 111
Robins Conveying Belt Co. 78
Robinson & Orr 189
Robinson Tool Wks., Inc. 191
Rockford Bolt Co. 48
Rockford Iron Works 149
Rockford Malleable Iron Works.. 37
Rockwell, W. S., Co. 92
Roebling's, J. A., Sons Co. 58
Roeper Crane & Hoist Works.. 82
Rogers, Brown & Co. 21, 22
Rome Brass & Copper Co. 29
Rome Mfg. Co. 31
Root Co., The 98
Roots, P. H. & F. M., Co. 90
Royersford Fdry. & Mach. Co., Inc. 118
Rubino, J. A. 187
Runyon, W. C., & Co. 22
Russell, Burdsall & Ward Bolt & Nut Co. 49
Russell Machine Co. 175
Ryerson, Joseph T., & Son 2, 145
Ryther & Pringle Co. 196

S

Sachsenmaier, Geo. Co. 184
Safety Equip. Service Co. 112
St. Louis Coke & Chemical Co... 21
St. Louis Malleable Casting Co... 36
St. Marys Foundry Co. 198
Samuel, Frank 28
Saunders, D. Sons 136
Savage, John A., & Co. 25
Scaife, Wm. B. & Sons Co. 107
Schieren, Chas. A., Co. 75
Schoder & Lombard Co. 128
Schoedinger, F. O. 192
Schreer & Poster, Inc. 188
Schultz, A. L., & Son. 73
Schuylkill Forge Co. 32
Schwerdtle Stamp Co. 128
Scovill Mfg. Co. 29
Scranton Forging Co. 34
Screw Mach. Products Corp. 45
Scully, Jones & Co. 186
Seneca Iron & Steel Co. 17
Seneca Wire & Mfg. Co. 50
Sessions Foundry Co. 37
Sessions, J. H., & Son. 40
Seymour Mfg. Co., The 29
Seymour Metal Goods Co. 101
Sharon Foundry Co. 35
Sharon Pressed Steel Co. 89
Sharpsville Boiler Wks. Co. 186
Shaw Welch & Co. 198
Sherwood, E. C. 199
Shimer, Samuel J., & Sons, Inc.. 47
Shipper's Car Line, Inc. 186
Shoemaker - Satterthwait Bridge Co. 110
Shore Instrument & Mfg. Co., Inc. 97
Shuster, F. B., Co. 140
Sidney Mach. Tool Co. 122
Sier-Bath Co. 194
Simmons Mach. Co., Inc. 173
Simonds Mfg. Co., Fitchburg, Mass. 127
Simonds Mfg. Co., Lockport, N. Y. 12
Skinner Steel Casting Co. 34
Skinner Bros. Mfg. Co., Inc. 112
Slocomer Chuck Co. 132
Sleeper & Hartley, Inc. 138
Smith & Wesson 10
Smith, W. A., Mfg. Co. 90
Smith, Geo. H., Steel Casting Co. 36
Smith Gas Engineering Co. 162
Smith & Mills Co. 123
Smith, Morton B., Co. 188
Smith & Serrell 8
Smith Tool Co., Inc. 110
Snead Architectural Iron Works.. 14
Snyder, W. P. & Co. 23
Southern Ry. Co. 183
Southwark Foundry & Machine Co. 39
Sotter Bros., Inc. 106
Southern Road Lathe Works 122
Southern Tractor Allowance Co. 21
Southwark Fdry. & Mch. Co. 152, 182, 186
Spencer's, I. S., Sons Co. 38
Spencer Turbine Co. 162
Spencer Heater Co. 194
Spring Mfg. Co. 127
Stamp, Charles E., Co. 86
Standard Alloys Co. 26
Standard Gauge Steel Co. 12
Standard Screw Products Co. 43
Standard Tin Plate Co., The 18
Stanley Belting Corp. 75
Stanley Works 24
Starrett, L. S., Co. 127
Steel & Tube Co. of America.... 64
Steele & Condict, Inc. 194
Stearns William & Co. 196
Steiner, Emil E. & Co. Inc. 76
Steinle Turret Mach. Co. 119
Sterling Blower Co. 115
Sterling Grinding Wheel Co. 126
Sterling Wheelbarrow Co. 91
Stewart Furnace Co., The 2
Stewart-Skinner Co. 42
Stickley, E. B., Machy. Co. 178
Stillman, Allen P., Inc. 192
Stockbridge Machine Co. 123
Stocker-Rumely-Wacha Co. 179
Stoeder, A. M., Mchry. Co. 182
Stokvis, R. S., & Sons, Inc. 177
Stoll, D. H., Co. 150
Stolp Co., Inc. 148
Storms Drop Forging Co. 33
Stow Manufacturing Co. 128
Stowe-Fuller Co., The 25
Stowell Co., The 37
Straight Line Engine Co., Inc. ...197
Strand, N. A., & Co. 128
Streine Tool & Mfg. Co. 148
Striebig & Foote Co. 34
Stumpf Una-Flow Engine Co., Inc. 161
Sturtevant, B. F., Co. 111
Sullivan Machinery Co. 161
Summerill Tubing Co. 66
Sun Co. 103
Superior Metal Products Co. 192
Superior Steel Corp. 19
Surface Combustion Co. 92
Sweet & Doyle Fdry. & Mach. Co. 28, 174
Sweet, A. L., Iron Works.....197
Swindell, Wm. & Bros. 110

T

Tate-Jones & Co., Inc. 92
Taylor, Chas., Sons Co. 25
Taylor & Fenn Co. 126
Taylor Instrument Companies.... 97
Taylor, N. & G., Co. 18
Taylor-Shantz Co. 191
Taylor-Wason Corp. 12
Taylor Welder Co., The 102
Taylor-Wilson Mfg. Co. 67
Temple Malleable Iron & Steel Co. 36
Tennessee Coal, Iron & R. R. Co.. 17
Thomaston Metal Wks. 191
Thompson Bros. 74
Thompson Grinder Co. 125
Thomson Electric Welding Co.... 102
Thomson Spot Welder Co. 102
Thorn, J. S., Co. 192
Tiffin Brass & Bronze Co. 198
Tioga Steel & Iron Co. 31
Tippett & Wood 107
Titanium Alloy Mfg. Co. 27
Titchener, E. H., & Co. 57
Tod Stambaugh Co. 25
Toledo Crane Co. 82
Toledo Machine & Tool Co. 150
Toomey, Frank, Inc. 171
Topping Bros. 52
Torrington Co. 42
Torrington Mfg. Co. 134
Towmotor Co. 89
Townsend Co. 52
Track Specialties Co. 189
Transue & Williams Steel Forging Co. 33
Trimt & Hine Mfg. Co. 191
Triplex Machine Tool Corp. 119
Troy Engine & Mch. Co. 161
Troy Fdry. & Mach. Co., Inc. 58
Trumbull Steel Co. 9
Tudor Boiler Mfg. Co. 107
Turner Mach. Co. 194
Turner & Seymour Mfg. Co. 196
Tutein & Arthur, Inc. 22

U

Ullman Jacob 174
Ulmer, J. C., Co. 191, 195
Under-Feed Stoker Co. of America 157
Union Chain & Mfg. Co. 77
Union Drawn Steel Co. 11
Union Mfg. Co. 133
Union Switch & Signal Co. 33
United Alloy Steel Corp. 12
United Engineering & Fdry. Co. 154
U. S. Ball Bearing Mfg. Co. 72
U. S. Cast Iron Pipe & Fdry. Co. 64
U. S. Ferro Alloys Corp. 28
U. S. Nickel Co. 29
U. S. Refractories Corp. 25
U. S. Silica Co. 90
Universal Boring Mach. Co. 123
Upson-Walton Co., The 59
Utica Steam Engine & Boiler Works, The 194

V

V & O Press Co. 150
Valley Mould & Iron Corp. 6
Vanadium Alloy Steel Co. 14
Van Dorn & Dutton Co. 68
Vandyck Churchill Co. 128
Vaughn Machinery Co., The.....137
Verder Mfg. Co. 97
Vermilion Malleable Iron Co. 36
Victor Tool Co., Inc. 131
Virginia Bridge & Iron Co. 111
Vogt Bros. Mfg. Co., Inc. 135, 198
Vulcan Crucible Steel Co. 14
Vulcan Iron Works, Chicago, Ill.. 153
Vulcan Iron Works, Wilkes-Barre, Pa 86

W

Wagner, E. R. Mfg. Co. 42
Walcott Lathe Co. 119
Walter-Wallingford & Co. 28
Waltham Screw Co. 192
Wangler, Jos. F., Boiler & Sheet Iron Works Co. 199
Wanted Section 190
Wardlow, S. & C. 14
Ward's, Edgar T., Sons Co....11, 66
Warner & Swasey Co. 121
Warren Fdry & Pipe Co. 64
Washburn Wire Co., N. Y. C. 58
Washington Co. 183
Waterbury Buckle Co. 191
Waterbury Farrel Fdry. & Mach. Co. 140
Waterville Mach. Works.....181
Watson-Stillman Co. 162
Wayne Machinery Co. 181
Wayne Tank & Pump Co. 105
Wayne Tool Mfg. Co. 180
Webb Wire Works 57
Webster Mfg. Co. 78
Weisbecker, F. A., & Sons.....194
Wellman Bronze Co. 39
West Leechburg Steel Co. 19
West Tire Setter Co. 153
Western Automatic Mach. Screw Co. 48
Western Drop Forge Co. 33
Western Screw Prod. Co. 48
Westwyre Co. 199
Wetherell Bros. Co. 10
Wharton, Wm., Jr., & Co., Inc..107
Wheeler Condenser & Engrg. Co..157
Wheeling Mold & Fdry. Co. 95
Wheeling Steel Prod. Co. 7
White, A. D., Machinery Co. 180
Whiting Corp. 81
Whitman & Barnes Mfg. Co. 130
Whitney Mfg. Co., The 77
Whitney Metal Tool Co. 144
Whiton, D. E., Mach. Co. 134
Wickes Boiler Co. 158
Wickes Bros. 150
Wicket Machinery Co. 184
Wickwire Bros. 60
Wickwire Spencer Steel Corp. 22
Wilcox, Crittenden & Co., Inc. ...199
Wilcox, D., Mfg. Co. 34
Williams, G. H., Co. 78
Williams, J. H., & Co. 33
Williams Test Clamp Co. 40
Williams Tool Corp. 136
Williams, White & Co. 144
Williamson, C. T., Wire Novelty Co. 56
Willmarth & Mormann Co. 124
Wilmington Fibre Specialty Co. ..164
Wilson, Harold R., Mchry. Co. ..183
Wilson-Maeulen Co. 98
Wisconsin Electric Co. 125
Witherbee, Sherman & Co. 23
Wood, Alan, Iron & Steel Co. 8
Wood, John, Mfg. Co. 107
Wood, R. D., & Co. 153
Woodard Machine Co. 70
Woodhouse Chain Works 77
Woods, T. B. Sons Co. 74
Worcester Pressed Steel Co. 42
Worcester Stamped Metal Co. 42
Worth Steel Co. 148
Wright Mfg. Co. 86
Wrigley, Thomas, Co. 48
Wrought Washer Mfg. Co. 54

Y

Yoder Co. 148
York Elec. & Mach. Co. 195
Young Bros. Co. 93
Youngstown Equip. Co. 189
Youngstown Fdry. & Mach. Co...157
Youngstown Sheet & Tube Co. 16

Z

Zeh & Hahnemann 150
Zelnicker, Walter A., Supply Co..189



The sister products, coal and coke, are at the very heart of modern industry. We have lately had, thru the coal strike, an intimation of what their loss would mean to our present day civilization. Factories, mills, schools, churches, theatres—all would have to close their doors if coal were taken away. Panic would reign.

It is vital, therefore that the consumer can be certain of an unlimited supply of either coal or coke, when he wants it, where and how. This is the service International renders. From our own mines and those whose output we control, from the coke ovens of the country, we buy, to ship by the most direct route to our customers.

Hundreds of concerns throughout the country turn their fuel problem over to us and it ceases to be a problem. Quietly, efficiently, our organization supplies their needs. No mistakes, no excuses—the coal and coke reaches their plants in whatever quantity they desire, and always on time.

May we not also serve you?

FUEL I IRON
TRADE MARK

International Fuel & Iron Corporation
Philadelphia Pittsburgh Cincinnati

International



The one gas for both cutting and welding

Acetylene is the *one gas* perfectly adapted and in general use for the cutting and welding of metals.

Today it stands as the *only practical welding* gas and *by far the best for cutting*, despite continuous efforts to substitute other fuel gases.

Its use does away with the necessity of two stocks of gas and two types of apparatus—one for cutting and one for welding—thus enabling operators to do quicker and better work, and simplifying problems of management.

In Prest-O-Lite Dissolved Acetylene you have this finest of fuel gas at your command in a portable form—safe, convenient, economical and dependable.

Ask our nearest District Sales Office for information as to our latest sales and service plans.

THE PREST-O-LITE COMPANY, INC.

General Offices: Carbide and Carbon Bldg., 30 E. 42nd St., New York City

Balfour Building, San Francisco

In Canada: Prest-O-Lite Co. of Canada, Toronto

District Sales Offices

Atlanta	Chicago	Detroit	Milwaukee	Pittsburg
Baltimore	Cleveland	Kansas City	New York	San Francisco
Boston	Dallas	Los Angeles	Philadelphia	Seattle
Buffalo				St. Louis

Each Prest-O-Lite user looks to his nearest District Sales Office not merely for arrangements to adequately cover acetylene needs, but for helpful cooperation and advice on any matter involved in the use of acetylene.

Prest-O-Lite

DISSOLVED ACETYLENE

Physical &
Applied Sci.
Serials

T
1
I7
v.110

Iron age

Physical &
Applied Sci.
Serials

PLEASE DO NOT REMOVE
CARDS OR SLIPS FROM THIS POCKET

UNIVERSITY OF TORONTO LIBRARY

ENGIN STORAGE